MADISON IN MOTION
Transportation Plan

2017

CONTENTS

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I am pleased to present Madison in Motion, the City's sustainable transportation master plan. This plan goes beyond roads, busses and bikes; it recognizes the link between Madison's future land use and economic goal and recommends steps for the transportation system required to achieve it. It builds on the successes we have witnessed in recent years, such as record ridership on Metro busses and achieving Platinum status as for biking, and continues progress toward making Madison a more walkable, bikeable and transit-oriented city.

As we grow, the transportation system must provide mobility options for more residents, employees and visitors, but must do so in a way that supports our vision for Madison: a thriving downtown, vibrant main streets and strong neighborhoods, supported by a robust economy providing opportunities for all residents.

Madison in Motion contains a series of recommendations for transit, bike, pedestrian and street infrastructure to improve the safety, efficiency, comfort and experience of mobility in Madison. These include major efforts such as Bus Rapid Transit and enhanced on-street bike ways,

to those less noticeable such as preventative street maintenance and traffic calming efforts. The plan aims to leverage technology wherever possible, from real-time transit information to improved traffic signal timing resulting from connected vehicles of the future. Building equity into transportation decisions was a recurring theme in the plan, including focusing new affordable housing in areas with high level of transit service and pursuing improved transit options for existing low-income areas.

On behalf of our residents and visitors, I want to thank those who participated in the Madison in Motion process, including the residents who provided comments and feedback, various City committees that reviewed and oversaw plan development, and staff who worked diligently to bring this plan to fruition. Your efforts will help keep

Paul R. Soglin
Mayor
City of Madison

Madison is a city of choice. Our citizens love the people, character and history of the community. Madison in Motion is an action plan to assure transportation investment and policies protect and build upon these qualities.

What is Madison in Motion?

Madison in Motion, the City of Madison's Sustainable Transportation Master Plan, provides a framework for future transportation decisions in the City, ensuring a future with improved walkability, bikability, transit availability.

This framework builds on previously adopted transportation and land use plans to improve agency coordination, connectivity, and transportation choices, while providing guidance to strengthen neighborhoods with appropriate future development. The Plan evaluate the current transportation system and identifies what the City and its partners must do in order to achieve the goal of becoming a more multi-modal City.

A CITY IN FLUX

Like all cities, Madison is ever changing. Growth over the next 40 years is expected to bring 100,000 new residents and 70,000 jobs to the city. In addition, Dane County is expected to have more jobs than workers, leading to an increase in commuter trips from surrounding counties. As a result, the transportation system will need to meet the increased demands that accompany growth.

In recent years, transit ridership has significantly increased, with only minimal increases in service, suggesting that transit investments may provide one opportunity at increasing the transportation systems capacity. In addition, more and more people are biking for commuting and recreation trips, improving connectivity within the City. As demographics change, so do transportation preferences and needs. Current global trends presented in this document paint a bright future for a multi-modal Madison.

Madison is a city well prepared for the future. The existing transportation system is relatively robust, and exhibits high proportions of people walking, biking, and taking transit when compared to other similar sized cities. In addition, demand for bus service is high, which leaves little doubt that sustainable transportation modes are viable in Madison.

With the guidance of this Plan, Madison has the opportunity to make a reality from its vision for the future. A vision characterized with responsible development patterns, highly connected neighborhoods, excellent transportation choices for citizens, and a quality of life and sense of place that continue to attract residents and businesses over time.

GROWING PAINS

Despite a strong sense of vision, as Madison grows, the transportation challenges that accompany will become more complex, requiring the city's approach to evolve as well. A livable, sustainable city is built over the course of decades, not months. In addition to transportation, land use policies play a significant role in shaping cities, and must be aligned with the vision for the future. Major challenges influencing Madison's transportation future include:

» Madison's growth is regional in nature, requiring regional action beyond local plans.
» Transportation funding will continue to be a challenge that local and regional leaders must manage to best improve the transportation system.
» The current system, though well-used, is in need of a significant overhaul that includes regional expansion in order to serve Madison's future.
» Gaps in the current system that create barriers to connectivity for alternative modes of transportation.
» Madison's downtown area, a major destination in the region, is physically constrained by the isthmus, limiting opportunities for expanding transportation capacity.

These challenges require a holistic approach to improving the transportation system. The Madison in Motion plan provides a package of recommendations to ensure these challenges are met, while improving transportation options in the city.

DEVELOPING A PLAN

The Madison in Motion Plan was developed over a three year period, with technical steps interwoven with public involvement. From its beginning, the process prioritized the involvement of the greater Madison community to ensure the recommendations developed by the plan reflected the vision and desires of the City. Public outreach was organized in a way that allowed the public to provide input at ever key junction of the process, including idea development, scenario development, project selection, and recommendations. Some of the analytical processes that were intertwined with public outreach included:

» An extensive review of existing conditions, including a review of significant assets in the City, to understand the current state of the system.
» A Land Use Vision developed by understanding past adopted policies and plans, and incorporating land use patterns desired for the future of Madison.
» A discussion on project funding prioritization, providing participants an opportunity to balance project goals under the realities of funding limitations.

As a result of extensive analytical processes balanced by public input, the Madison in Motion process developed two land use scenarios, to show the regional impacts of different development trends on proposed transportation projects. The trend scenario reflected an uninterrupted continuation of current outward growth patterns, while the infill scenario assumes the adoption of polices to invite infill development, fostering increased connectivity amongst distinct activity centers.

Analysis of the two scenarios show that the recommendations in this transportation plan perform XX% better in regards to vehicle miles traveled (VMT) reduction in the infill scenario, resulting in an increased balance in transportation mode splits, and reduced congestion when compared to the trend scenario.
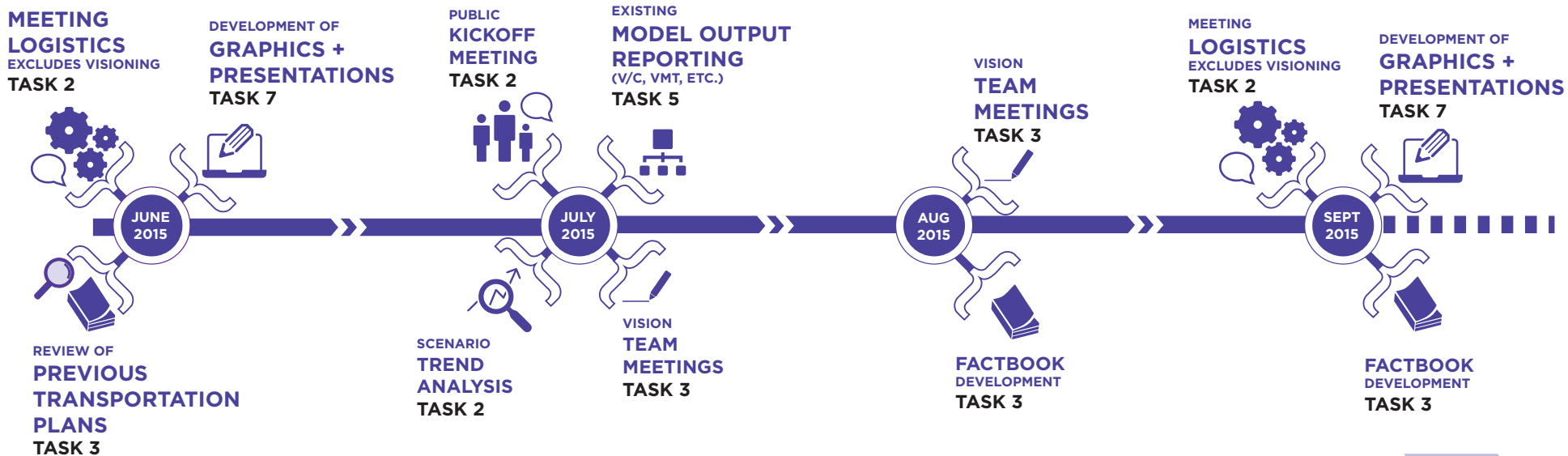
PLANS FOR IMPROVING MADISON

Based on data analysis, public input, and a review of best practices in the United States, several recommendations are made for improving the transportation system. Individual projects and policies recommended by the plan are guided by the following high level recommendations:

» In most circumstances expansion is no longer the preferred transportation enhancement option, as the roadway system is at or near capacity. Madison will need to be proactive on congestion management measures due to geographic constraints limiting roadway expansion options.

» To accommodate recent ridership increases and future population and job growth, the City must improve transit capacity and service – beginning by implementing BRT, and co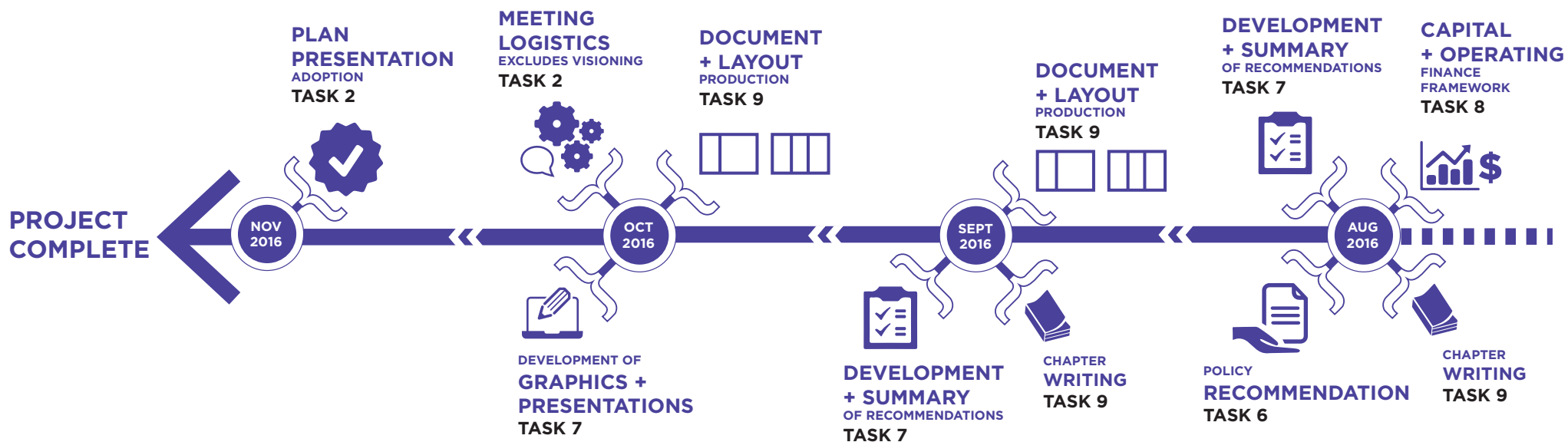ntinuing with further study of potential service improvements. In addition, regional coordination and effective funding strategies must be developed.
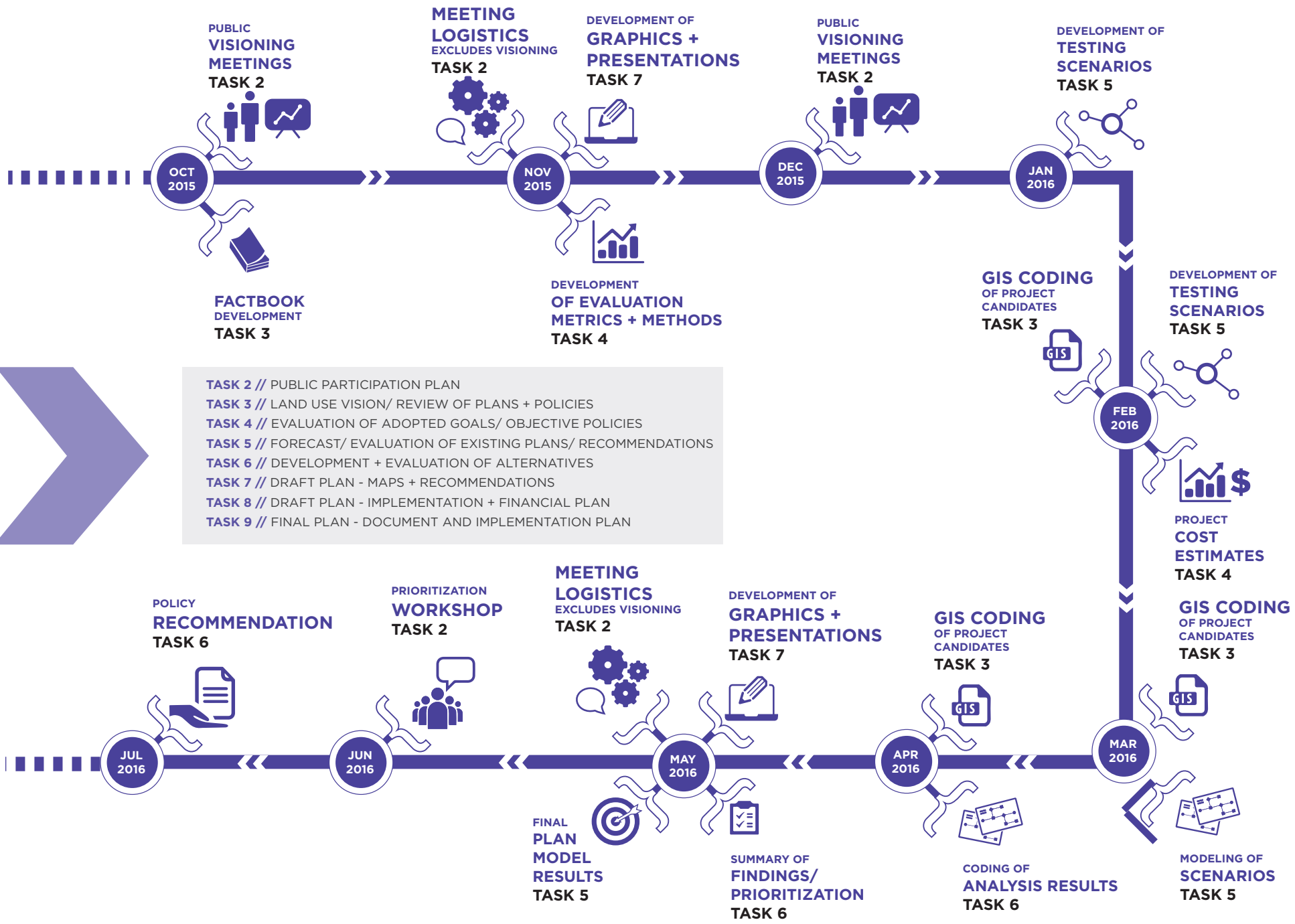
» Target growth patterns, including transit oriented development, will minimize congestion by increasing populations in areas with access to good transit.

» Bike and pedestrian networks are already popular alternatives, but require strategic interventions to provide network connectivity and further develop walking and biking as viable modes. While Madison was recently named a Platinum bicycling community, key improvements could make biking a real alternative for a larger proportion of residents.

The tools provided in the recommendations of the plan provide opportunities to address major transportation challenges on the horizon. As the Madison in Motion Plan moves to approval, solidifying it as a roadmap to the future transportation system, the plan will provide citizens, local and regional leaders, and city staff with the tools to make critical decisions about future development.

PROJECT SCHEDULE ›

JUNE 2015

MEETING LOGISTICS EXCLUDES VISIONING
TASK 2

DEVELOPMENT OF GRAPHICS + PRESENTATIONS
TASK 7

REVIEW OF PREVIOUS TRANSPORTATION PLANS
TASK 3

JULY 2015

PUBLIC KICKOFF MEETING
TASK 2

EXISTING MODEL OUTPUT REPORTING (V/C, VMT, ETC.)
TASK 5

SCENARIO TREND ANALYSIS
TASK 2

VISION TEAM MEETINGS
TASK 3

AUG 2015

VISION TEAM MEETINGS
TASK 3

FACTBOOK DEVELOPMENT
TASK 3

SEPT 2015

MEETING LOGISTICS EXCLUDES VISIONING
TASK 2

DEVELOPMENT OF GRAPHICS + PRESENTATIONS
TASK 7

FACTBOOK DEVELOPMENT
TASK 3

AUG 2016

DEVELOPMENT + SUMMARY OF RECOMMENDATIONS
TASK 7

CAPITAL + OPERATING FINANCE FRAMEWORK
TASK 8

POLICY RECOMMENDATION
TASK 6

CHAPTER WRITING
TASK 9

SEPT 2016

DOCUMENT + LAYOUT PRODUCTION
TASK 9

DEVELOPMENT + SUMMARY OF RECOMMENDATIONS
TASK 7

CHAPTER WRITING
TASK 9

OCT 2016

MEETING LOGISTICS EXCLUDES VISIONING
TASK 2

DOCUMENT + LAYOUT PRODUCTION
TASK 9

DEVELOPMENT OF GRAPHICS + PRESENTATIONS
TASK 7

NOV 2016

PLAN PRESENTATION ADOPTION
TASK 2

PROJECT COMPLETE

PUBLIC
VISIONING
MEETINGS
TASK 2

MEETING
LOGISTICS
EXCLUDES VISIONING
TASK 2

DEVELOPMENT OF
GRAPHICS +
PRESENTATIONS
TASK 7

PUBLIC
VISIONING
MEETINGS
TASK 2

DEVELOPMENT OF
TESTING
SCENARIOS
TASK 5

OCT 2015

NOV 2015

DEC 2015

JAN 2016

FACTBOOK
DEVELOPMENT
TASK 3

DEVELOPMENT
OF EVALUATION
METRICS + METHODS
TASK 4

DEVELOPMENT OF
TESTING
SCENARIOS
TASK 5

TASK 2 // PUBLIC PARTICIPATION PLAN
TASK 3 // LAND USE VISION/ REVIEW OF PLANS + POLICIES
TASK 4 // EVALUATION OF ADOPTED GOALS/ OBJECTIVE POLICIES
TASK 5 // FORECAST/ EVALUATION OF EXISTING PLANS/ RECOMMENDATIONS
TASK 6 // DEVELOPMENT + EVALUATION OF ALTERNATIVES
TASK 7 // DRAFT PLAN - MAPS + RECOMMENDATIONS
TASK 8 // DRAFT PLAN - IMPLEMENTATION + FINANCIAL PLAN
TASK 9 // FINAL PLAN - DOCUMENT AND IMPLEMENTATION PLAN

GIS CODING
OF PROJECT
CANDIDATES
TASK 3

FEB 2016

PROJECT
COST
ESTIMATES
TASK 4

POLICY
RECOMMENDATION
TASK 6

PRIORITIZATION
WORKSHOP
TASK 2

MEETING
LOGISTICS
EXCLUDES VISIONING
TASK 2

DEVELOPMENT OF
GRAPHICS +
PRESENTATIONS
TASK 7

GIS CODING
OF PROJECT
CANDIDATES
TASK 3

GIS CODING
OF PROJECT
CANDIDATES
TASK 3

JUL 2016

JUN 2016

MAY 2016

APR 2016

MAR 2016

FINAL
PLAN
MODEL
RESULTS
TASK 5

SUMMARY OF
FINDINGS/
PRIORITIZATION
TASK 6

CODING OF
ANALYSIS RESULTS
TASK 6

MODELING OF
SCENARIOS
TASK 5

Transportation has a huge impact on every aspect of our lives – more than we may realize. It is much more than how we get around.

What is Madison in Motion?

Transportation has a significant impact on every aspect of our lives - more than we may realize. More than just how we get around, it is interlaced with sustainability, physical health, economic opportunity, and the inherent character of our city. Madison's transportation system has advantages over many other American cities of its size, but several major challenges and steps remain to improve the system and improve upon its positive track record. At a time when Madison's transportation preferences, and available technologies are in flux, Madison must seize the opportunity to plan appropriately for the future.

Madison in Motion, the City of Madison's Sustainable Madison Transportation Master Plan, is a plan of action for transportation decisions in Madison. Its implementation will make Madison a more walkable, bikeable and transit-oriented city. Madison in Motion is a city wide policy and capital improvement project plan that will prepare Madison's transportation system to support sustainable growth and evolution. Over the next 25-30 years, this plan will address all travel modes in Madison. The plan ties into current visioning and land use planning efforts that are defining the form that Madison wants to take in the future, and emphasizes opportunities to use transportation projects and maintenance strategies of the system to serve a broader range of travel options, connect key destinations in the city, and contribute to Madison's quality of life. Madison in Motion will improve coordination, connectivity and transportation choice, while establishing a framework to strengthen neighborhoods with context-appropriate future development. .

Critical to the success of the Madison in Motion planning project was a process that included collaboration with public officials and the greater Madison community.

Madison in Motion

PUBLIC INPUT

Critical to the success of the Madison in Motion planning project was a process that included collaboration with public officials and the greater Madison community to ensure the outcomes met the needs and desires of the community. Input was received by the public to craft overarching project goals, develop and refine project ideas, and determine how projects should be prioritized. Public workshops were intertwined with the overall project schedule as seen on pages 6-7 to ensure the open process provided the public with a space and necessary tools to make opinions heard at critical junctions in the process. These workshops were publicized via social media and other media placements to reach a wide array of people.

Public Kick-off

At the beginning of the process, kick-off meetings were hosted at various locations in Madison to gather feedback from a diverse sample of residents. These meetings were organized to share and discuss the goals of the

transportation plan and how they relate to overarching community goals in the City of Madison. Several individuals participated in these meetings, contributing to the development of the project goals, visible on page 14.

Stakeholder Interviews

The City and planning team identified key community leaders, property owners, agency partners, and other individuals and organizations that could provide unique perspectives regarding the challenges facing Madison. Those contacted during this outreach effort included active community groups. Individuals identified as stakeholders provided insight on pressing issues faced by the community over a series of interviews and focus group meetings.

Public Visioning Meetings

Two visioning meetings were organized to engage the public in understanding the existing state of Madison and provide feedback on future scenarios developed by the planning team. The first meeting showcased City

assets, existing trends, previously adopted plans, and land use and transportation factors. In addition, community members discussed how plan goals should be prioritized based on possible project and policy recommendations while grounded in the limitations of public investment. By presenting a "snapshot," of Madison as it is today and examining potential project and policy recommendations, over 40 participants were able to better understand the challenges facing the community as it continues to grow.

The second meeting was organized to synthesize several technical processes, including the Asset Analysis, Land Use Vision, identified opportunities and project ideas, and developed Form and Transportation Scenarios. A presentation was used to walk participants through the various analysis processes at the start of the meeting, after which, over 40 participants were asked to critique and supplement the presented scenarios. Input provided by the community was invaluable for the refinement of the scenarios developed in this process.

Mobile Workshops

During the public input process, a set of mobile workshops provided an opportunity to engage with the City geography in a hands-on experience. Two bicycle workshops were hosted, yielding 20 participants. The workshops led participants on existing bikeway facilities and stimulated discussion of challenges encountered at some locations and the impacts of recent bikeway treatments at others.

The city also hosted a pedestrian-oriented workshop. Participants were guided to stops to showcase ADA, maintenance, signal, and street crossing issues. Participants also shared comments on how streets without sidewalks should be prioritized.

Candidate Project Workshop

The planning team held a public working session with community members to develop project and policy ideas for consideration as part of the plan. Potential projects and policies were presented with supporting data to facilitate discussion amongst community members. Candidate projects and policies, consistent with the goals of the project, were developed for further analysis.

Multi-day Community Workshop

At the centerpiece of the development of the Madison in Motion Plan, a community workshop brought together citizens, stakeholders, designers, and field experts. The multidisciplinary design workshop provided an opportunity to collaborate and develop solutions for the future of Madison.

The multi-day workshop began with a workshop kick-off on the first day to set goals and parameters for the sessions. This was followed by several days of a design open house for community members to participate in before concluding with a closing presentation to summarize the weeks work. Individuals that participated in the workshop contributed to the development of solutions for transportation issues including, but not limited to, identified growth areas, multi-modal choices, complete streets, improved transit, and improved network connectivity for all modes.

Final Plan Presentation Meeting

The Final Plan was presented to a crowd of over 100 residents of Madison. The presentation provided an overview of the Plan development process, highlighting the significant public outreach and data analysis that together helped form the documents recommendations. In addition, attendees received a high level review of recommended strategies to create an effective multi-modal transportation network for the future of Madison.

Oversight Committee Meetings

The Transportation Master Plan Oversight Committee was organized to ensure the project met the needs and expectations of the City of Madison. The Madison in Motion Team attended several Oversight Committee Meetings in order to provide insight regarding project process and to gather additional feedback to guide the project. The following provides an overview of key topics discussed, which assisted in the development of the plan:

» Review of public events as they occurred to further digest and understand feedback
» Discussion of existing land use and transportation goals
» Refinement of mission statement
» Desired project branding
» Development of land use scenarios with guidance from land use asset analysis, project vision statement and goals.

Working closely with the Oversight Committee helped the Madison in Motion team further unpack issues that were surfaced during public input events.

Plan Approval Process

The Plan was adopted by the Common Council on February 28, 2017. The Plan was received positively by the Council, due in part to the significant public outreach component of the development process.

Prior to adoption of the plan, it was reviewed by the following committees, which provided feedback to ensure the document was reflective of the Madison community.

» Board of Public Works - Jan. 4, 4:30, Room 108 CCB
» Transit and Parking Commission - Jan. 11, 5:00, Room 302 Madison Central Library
» Economic Development Committee - Jan. 18, 5:00, Room GR 27 CCB
» Sustainable Madison Committee - Jan. 23, 4:30, Room 351 CCB
» Pedestrian-Bicycle-Motor Vehicle Commission - Jan. 24, 5:00, Room 201 CCB
» Long Range Transportation Planning Committee – Jan. 26, 5:00, Room 108 CCB
» Plan Commission - Feb. 6, 5:00, Room 201 CCB
» Board of Estimates – Feb. 13, 4:30, Room 354 CCB
» Madison in Motion Oversight Committee (lead) – Feb. 16, 5:00, Room GR 27 CCB
» Common Council (final adoption) – Feb. 28, Room 201 CCB

PROJECT GOALS

Throughout the development of the Madison Sustainable Transportation Plan, a set of 8 goals guided decision-making.

1
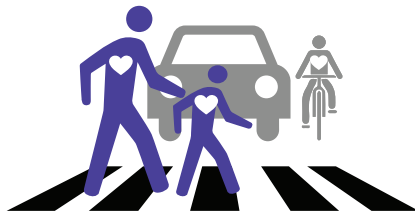### EXPAND MOBILITY CHOICES
Expand transportation infrastructure **to support a greater range of options** for all user types.

2
IMPROVE SAFETY AND HEALTH
Future transportation system investments must contribute to **healthy living and good quality** of life for all residents.
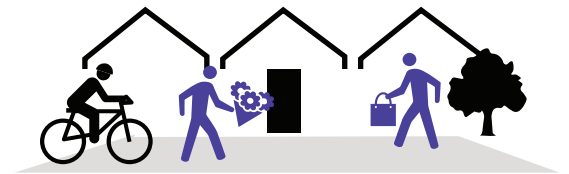
3
CREATE TRANSPORTATION EQUITY FOR ALL RESIDENTS
The future transportation system **must address the needs of all users**.

4
ENHANCE NEIGHBORHOODS
Future transportation system investments should contribute to the **creation of strong, vibrant neighborhoods**.

5
PROMOTE BENEFICIAL GROWTH
Future transportation system investments should **promote environmentally and fiscally sustainable development** that provides benefits to the entire City.

6
PROMOTE ENVIRONMENTAL SUSTAINABILITY
Transportation projects and policies will not generate adverse impacts on air and water quality. Instead, **projects will seek to improve both**.

7
MAINTAIN FISCAL RESPONSIBILITY
The transportation system should **be affordable for current and future generations**.

8
FOSTER ECONOMIC DEVELOPMENT
Transportation projects should **promote economic opportunity and community prosperity**.

TECHNICAL PROCESS

Land Use Vision

The benefits of various transportation projects are largely influenced by the relationship between transportation infrastructure and land use patterns. As such, a significant component of the Madison in Motion Plan revolved around understanding this relationship. The following were key steps taken during the planning process to ensure land use trends were evaluated comprehensively:

» **Asset Analysis** – Identified the most significant assets in the region, including natural, economic, and cultural assets. This provided a foundation for developing a vision for future land use.

» **Land Use Vision** – The Land Use Vision was the culmination of an extensive review of existing plans and policies. The vision ensured that the land use assumptions developed during the Madison in Motion process were guided by the intent of adopted plans and policies.

» **Key Opportunities** – Tying together existing plans and ideas for development in Madison, this piece of the process identified potential building opportunities that will define the future of the City.

The Land Use Vision process provided the base for developing two alternative Land Use Scenarios, which envisioned how Madison could grow between now and 2050. Both scenarios assumed that the population of Madison would grow in population by 100,000 and that the population growth would be accompanied by an additional 80,000 jobs. However, each scenario reflected different growth patterns, further explained on page 18.

Figure 1   **Land Use Scenarios**

Land Use Scenarios

Two Land Use Scenarios were developed through the Madison in Motion process in order to guide policy and project recommendations, and assist in measuring the effectiveness of recommendations. Figure 2 on page 18 shows the different impact that each scenario has on the identified growth areas.
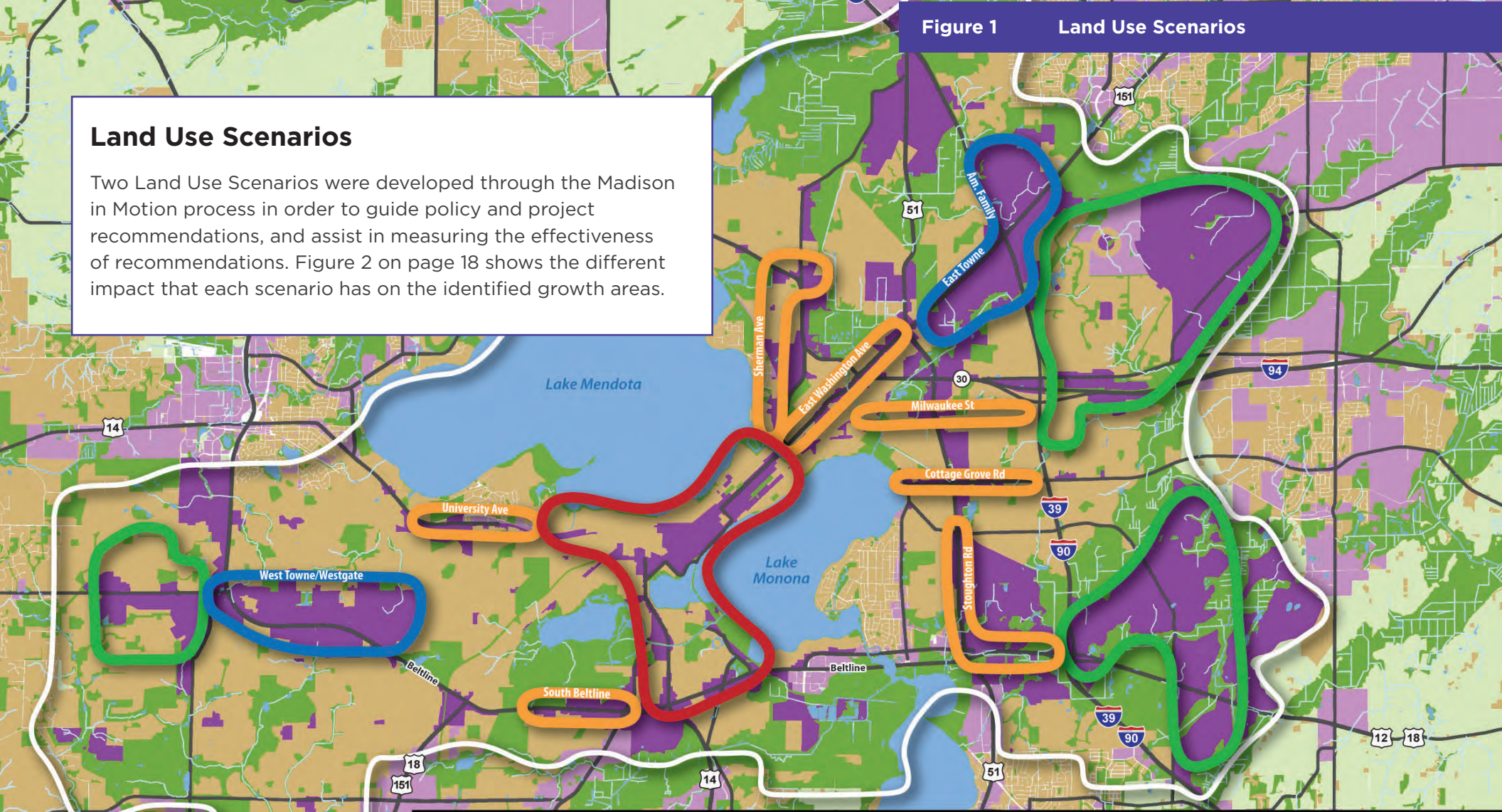
Development Typologies

- 🔴 Central City
- 🟠 Urban Corridors
- 🔵 Regional Retail and Employment Areas
- 🟢 East/West New Growth Areas

Generalized Future Land Use Categories from City of Madison & Dane County Plans

- 🟩 Parks and Environmental Corridors
- 🟨 Agricultural
- 🟫 Areas of Stability (Low or Medium Density Residential, Institutional, Communication/Utilities)
- 🟪 City of Madison's Areas of Potential Change (Mixed Use, Neighborhood Planning Areas, Industrial, Commercial, High Density Residential, Quarries)
- 🟪 Other Municipalities' Areas of Potential Change (Mixed Use, Neighborhood Planning Areas, Industrial, Commercial, High Density Residential, Quarries)

◯ Generalized Boundary of the City of Madison Planning Area

Note: Historic and Conservation Districts area areas of stability

VANDEWALLE & ASSOCIATES INC.

Scenario A – Trend Scenario

The Trend Scenario assumes that current development patterns continue uninterrupted. Characterized by a continuation of sprawling land use patterns, 70% of the growth occurs on the periphery of the City Center, while only 30% of growth is a result of infill development. This scenario would be likely to put increased stress on the roadway system, as sprawling land use patterns encourage driving.

Scenario B – Infill Scenario

The Infill Scenario is based on the assumption that policies to encourage infill development are adopted. Characterized by increased density in key growth areas, 70% of the population growth would be a result of infill development, while only 30% of growth would take place in the peripheral areas. This scenario would reduce total VMT and emissions per capita in the region when paired with improved connectivity for alternative transportation networks (transit, bicycle, pedestrian), creating a healthier and less congested Madison.

Figure 2   **Growth Areas**
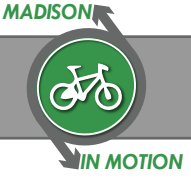
MADISON
IN MOTION

**Sustainable Madison
Transportation Master Plan**

General Scenario Assumptions

100,000 overall increase in population
80,000 overall increase in employees

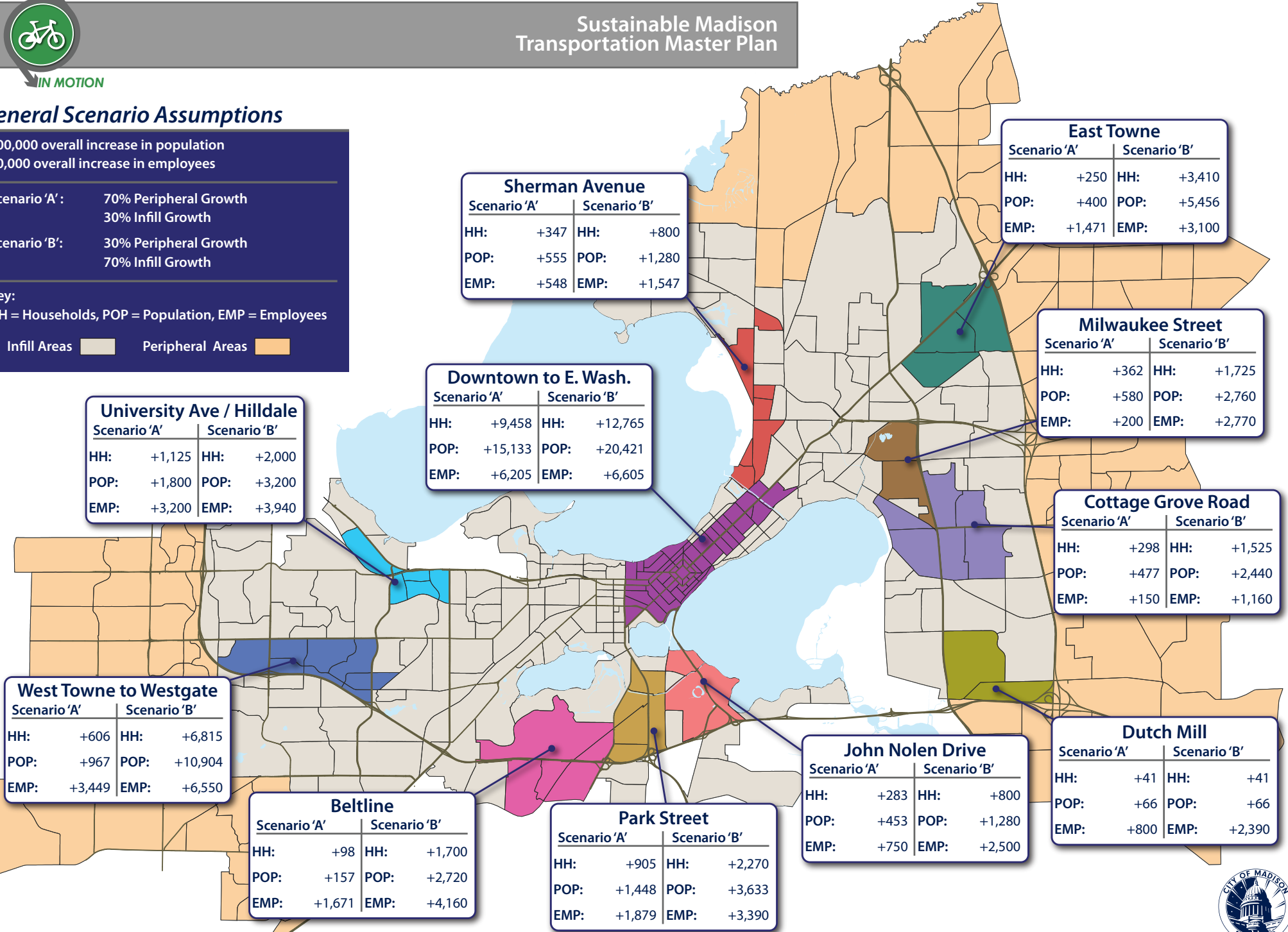Scenario 'A':   70% Peripheral Growth
                  30% Infill Growth

Scenario 'B':   30% Peripheral Growth
                  70% Infill Growth

Key:
HH = Households, POP = Population, EMP = Employees

Infill Areas ▢   Peripheral Areas ▢

East Towne

	Scenario 'A'	Scenario 'B'
HH:	+250	+3,410
POP:	+400	+5,456
EMP:	+1,471	+3,100

Sherman Avenue

	Scenario 'A'	Scenario 'B'
HH:	+347	+800
POP:	+555	+1,280
EMP:	+548	+1,547

Milwaukee Street

	Scenario 'A'	Scenario 'B'
HH:	+362	+1,725
POP:	+580	+2,760
EMP:	+200	+2,770

Downtown to E. Wash.

	Scenario 'A'	Scenario 'B'
HH:	+9,458	+12,765
POP:	+15,133	+20,421
EMP:	+6,205	+6,605

University Ave / Hilldale

	Scenario 'A'	Scenario 'B'
HH:	+1,125	+2,000
POP:	+1,800	+3,200
EMP:	+3,200	+3,940

Cottage Grove Road

	Scenario 'A'	Scenario 'B'
HH:	+298	+1,525
POP:	+477	+2,440
EMP:	+150	+1,160

West Towne to Westgate

	Scenario 'A'	Scenario 'B'
HH:	+606	+6,815
POP:	+967	+10,904
EMP:	+3,449	+6,550

Dutch Mill

	Scenario 'A'	Scenario 'B'
HH:	+41	+41
POP:	+66	+66
EMP:	+800	+2,390

John Nolen Drive

	Scenario 'A'	Scenario 'B'
HH:	+283	+800
POP:	+453	+1,280
EMP:	+750	+2,500

Beltline

	Scenario 'A'	Scenario 'B'
HH:	+98	+1,700
POP:	+157	+2,720
EMP:	+1,671	+4,160

Park Street

	Scenario 'A'	Scenario 'B'
HH:	+905	+2,270
POP:	+1,448	+3,633
EMP:	+1,879	+3,390

CITY OF MADISON

SCENARIO A

Beltline Highway (Eastbound) · Existing Development · Arboretum · Bus Stop · Mixed Office & Retail · Beltline Highway (Westbound) · Frontage Road · Surface & Structured Parking

Traditional Commercial · Medium Density Residential & Commercial · Downtown Skyline · Greenway · Existing Rail · Surface Parking · Bike-Ped Connector · John Nolen Drive (Outbound) · John Nolen Median

SCENARIO B

Beltline Highway (Eastbound) · Existing Development · Station · Protected Connections · Arboretum · Mixed Office & Service · Potential Residential · Views · East Bound · West Bound · Bus Rapid Transit (BRT) · Beltline Highway (Westbound) · Frontage Road · Structured Parking

Traditional Commercial · Lake & Park View High Density Residential · Downtown Skyline · Views · Views · Views · Greenway · Existing Rail · Structured Parking · High Capacity Transit · Multi-Modal Corridor & Transit Oriented Node Pedestrian, Bike, Shuttle, High Capacity Transit · John Nolen Drive (Outbound) · John Nolen Median

MILWAUKEE ST. CORRIDOR

ODANA CORRIDOR

Medium Density Residential

Mixed Office & Retail

Pathway Connection to Transit

Surface Parking

Bus Stop

Bus Stop

Retail, Service & Office with Auto Oriented Parking

Surface Parking

West Towne Mall

Ground Level Retail Upper Story Office & Limited Residential

Medium to High Density Residential

Employment Center

Protected Connection Between Center & Transit Hub

Dedicated Lane
• Bus
• Circulator
• Bike

Underground & Structured Parking

High Capacity Transit

Bike Park & Drop Off

Mixed Uses
• Retail
• Service/Office
• Residential

Integrating West Towne with High-Density Residential and/or Office

Mixed Uses
• Retail
• Service/Office
• Residential

West Towne Retail Center

Bus Rapid Transit

Local Feeder Bus

Population Change 2000-2010

Legend

People per acre

■ -1 to -0.5	■ 0 to 0.5
■ -0.5 to 0	■ 0.5 to 1
	■ 1 - 5

☐ City Boundary
■ Water

Figure 3   **Population Change from 2000-2010**

0   1   2   3   4
Miles
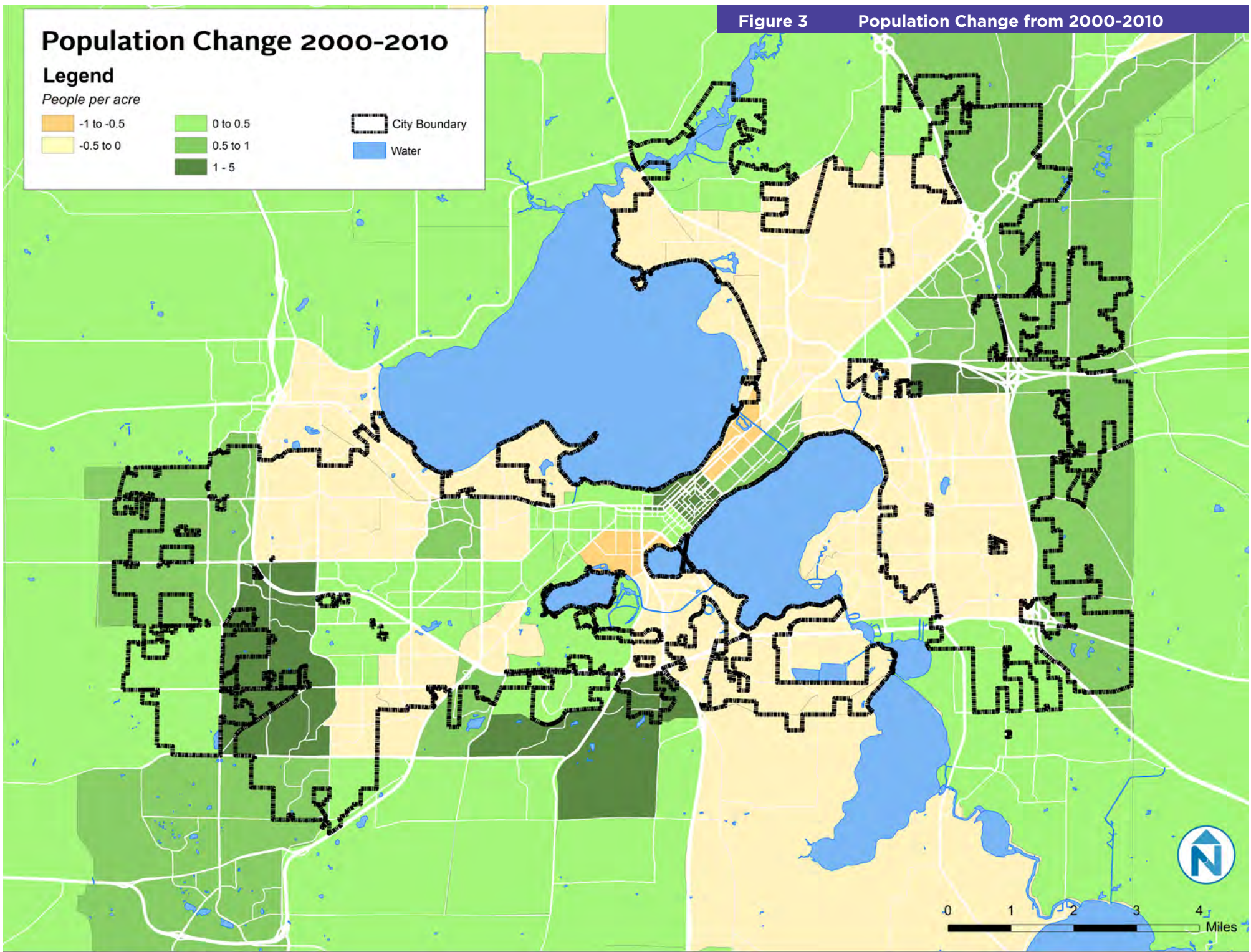
Over the past 20 years, Madison has grown by more than 50,000 residents.

4 ❯

Madison is Growing

Over the past 20 years, Madison has grown by more than 50,000 residents, more than double the next highest growth municipality in the state. During this time, it exceeded the statewide growth rate by 50%[1] continued to grow at a slow and steady pace, and is expected to grow by another 30% by 2035. In addition, the Madison region as a whole is expected to account for approximately 30% of statewide growth, pushing the region's population to 1 million by 2035.

Most of that population growth has been outside of Madison's core, with the greatest growth being observed in the periphery beyond the US 12-Interstate 90 expressway loop, as a result of expanding urbanization. Meanwhile, most of the areas within the loop have experienced stagnation or small population loss. However, this trend is not universal. Downtown Madison has witnessed increased population density since 2000, as the area welcomes infill development that adds to the liveliness and walkability of the area. The growth of downtown Madison reflects the City's vision for the development of compact, walkable communities.

[1]   WI DOA Population Estimates. Vintage 2015

This vision can become reality as a result of the projects and policy framework developed by the Madison in Motion process.

DEVELOPMENT TRENDS AND TRANSPORTATION IN MADISON

Population and employment density are two key factors that drive the potential load on the transportation system. Typically, areas of high density can support public transportation, reducing the stress on a roadway system by vehicular traffic. However, where density is high, and transit is not available or is insufficient, roadway systems can be quickly overwhelmed. Madison's downtown core faces a unique challenge of being located on an Isthmus, limiting the ability to increase road capacity in or out of downtown, the region's center of economic activity. As such, it is important to plan to provide alternative modes of transportation in the region.

Figure 4 shows the current population density in Madison, with the densest areas having the density to support bus service every 5 minutes, while the least dense areas can only support bus service every 30-60 minutes. As seen in Figure 4, employment areas identified in dark blue could also support bus service every 5 minutes, while areas in light blue, could only support bus service every 30-60 minutes. As the maps show, areas of high density (both population and employment), are sparsely distributed across Madison. In order for a high frequency transit network to thrive, the system must be able to connect multiple activity centers across the City landscape.

The shifting demand for denser housing developments in downtown Madison supports the City's vision for compact and walkable communities, which would be able to support high quality transit. The Madison in Motion Plan provides the necessary tools to guide Madison's development of compact communities and encourages a well-balanced transportation system.

HOW MADISON GETS AROUND

Madison has a diverse transportation system for a city of its size, including about 200 miles of bicycle infrastructure, leading to a high degree of transit use, walking, and bicycling. In addition, the City serves as a major transportation hub for state-coordinated intercity bus services that connect to major cities and towns throughout the Upper Midwest. However, despite the variety in the Madison transportation system, much of its infrastructure is not consistent with the vision for compact and walkable communities.

Within and adjacent to the Isthmus the limited geography contains a balance of many land uses, including residential and office buildings, government institutions, and established single family neighborhoods. Here, the development of a compact and walkable center occurs somewhat organically as limited real estate is utilized efficiently. Outside the Isthmus, larger lot sizes, lower

density, and transportation infrastructure reflect an auto-oriented environment that makes alternative modes of transportation less inviting.

As a result of the built environment, the majority (62.1%) of trips in Madison are made via automobile. Despite the majority of trips being completed in an automobile, a significant portion of trips in Madison are made by transit, and active transportation modes when compared to other similar sized cities. This trend is aided by parking limitations in the downtown isthmus, and at the University of Wisconsin Campus, the two primary employment centers in the region.

TRANSPORTATION: A SYSTEM OF NETWORKS

As previously noted, Madison's transportation system is diverse, providing access to a variety of modes. However, in the future, Madison's transportation system will need a greater balance of mode share to reduce the stress on the constrained roadway system. In order to provide more mobility options, the transportation system will be developed in a way that provides connected networks for a variety of transportation modes. Below is a review of the transportation network as it exists today.

Highway Network

Three interstate highway routes, Interstates 39, 90, and 94, connect Madison directly to Milwaukee, Chicago, Rockford and Minneapolis. As a result of the limitations of the geography of Madison, these highways do not bypass the center of the City, but instead form a partial loop, known as the Beltline, around the City in conjunction with US Highways 12, 14, 51, and 151. The looped highway system includes feeder routes, such as Highway 30, which connect the Beltline to downtown via Washington Avenue.

Population Density
Residents Per Acre

0 - 2.5 2.5 - 8 8 - 16 16 - 31 31 - 47 47 - 92 92 +

Figure 4   Population Density

0   1   2   3   4
Miles
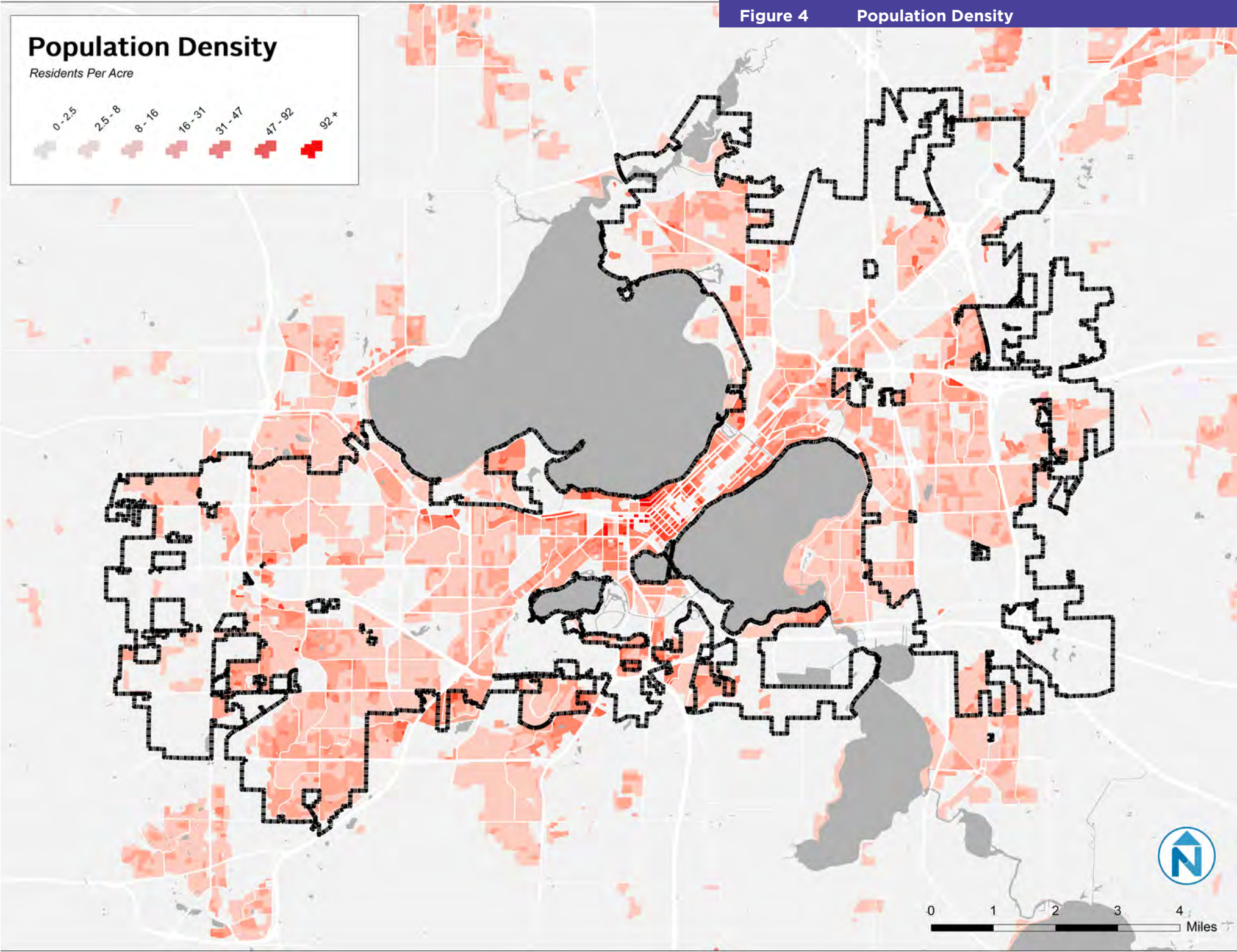
The Beltline is a critical connection for over 100,000 motorists daily, serving regional traffic from suburbs northwest of the City center, and from the surrounding southwest and southeast regions. As seen in Figure 5, much of the Beltline operates in highly congested conditions, which are expected to see increased demand in the future. The Beltline is congested both from high travel volumes and many on- and off-ramp movements (a large portion of users stay on the Beltline for only a few interchanges).

Major Arterials

Major arterial corridors serve as key thoroughfares to connect residents of Madison with their destinations. Some corridors, such as Washington Avenue and Regent Street provide direct routes to and through downtown and the University of Wisconsin Campus. Others further from downtown, such as Segoe Road and Midvale Boulevard, provide regional connectivity service, and assist with the systems overall capacity, but eventually link to the limited number of streets that serve downtown, leading to congested conditions as seen in Figure 5.

Due to the geographic conditions in and around downtown, the limited set of connecting thoroughfares are charged with the task of bringing traffic to and from downtown from the rest of the region. As a result, the design of many of these corridors reflect a prioritization towards safely accommodating high traffic volumes. However, with limited space for expansion, and demand expected to increase, these corridors will be re-imagined to serve a variety of modes effectively.

Local Streets

Due to natural and man-made features, the local street grid is constrained and changes orientation in multiple directions, adjusting to accommodate major streets away from the city center. As a result of the lack of cohesiveness in the street network, arterial and collector streets are relied on heavily,

as they are the only thoroughfares that cross over bodies of water, rail corridors, and other features. Both automobiles and non-automobile modes of transportation rely on these limited corridors, resulting in conflicts between automobile, pedestrian, transit, and bicyclist demands for access. As demand for access to downtown and the University Campus has increased along with the City's footprint, Madison faces the challenge of meeting these demands with limited ability to expand streets.
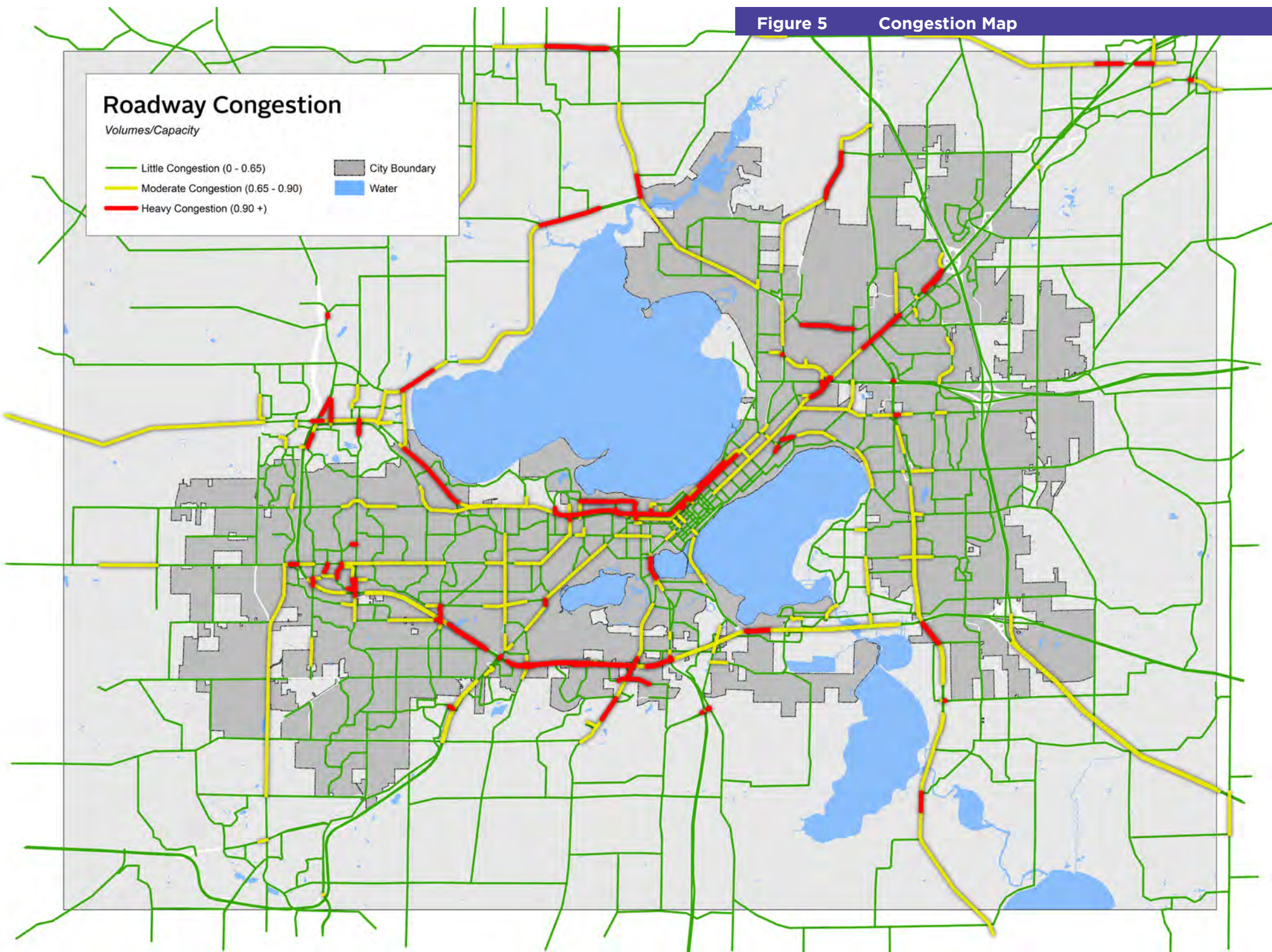
Parking

Few other factors have such a dramatic influence on the downtown built environment as the quantity and type of parking available. The way parking is managed also have a major impact on automobile trips generated, and localized congestion patterns. Parking management even influences mode choices – people are more likely to choose other modes when they have to pay for parking. The diverse mode split in Madison can be partly attributed to parking controls in the downtown and UW-Madison area.

Madison's downtown and most commercial and mixed use districts city wide do not have minimum parking requirements—a forward-looking policy, especially when compared to other cities of similar size. The lack of minimum parking requirements helps support a vibrant downtown, affordable housing, and traffic congestion management. In addition, this lack of excess parking prevents parking garages and lots from breaking up a downtown area and lessening liveliness on downtown blocks. Such parking provisions have a significant, though often overlooked, relationship with congestion – an important consideration for downtown Madison's geographic constraints.

Madison's public parking supply is managed by the Parking Utility. The agency manages 3,675 spaces in six structures (all downtown), 475 spaces in seven lots (mostly downtown), and 1,402 on-street metered spaces (mostly downtown) accounting

Figure 5   Congestion Map

Roadway Congestion

Volumes/Capacity

— Little Congestion (0 - 0.65)

— Moderate Congestion (0.65 - 0.90)

— Heavy Congestion (0.90 +)

City Boundary

Water

for about 53% of total parking spaces downtown. An additional 4,731 parking spaces are also available for public use in private garages. Off street parking in public structures range from 57to 81% peak occupancy levels, while on-street parking occupancy is likely also used at high levels.
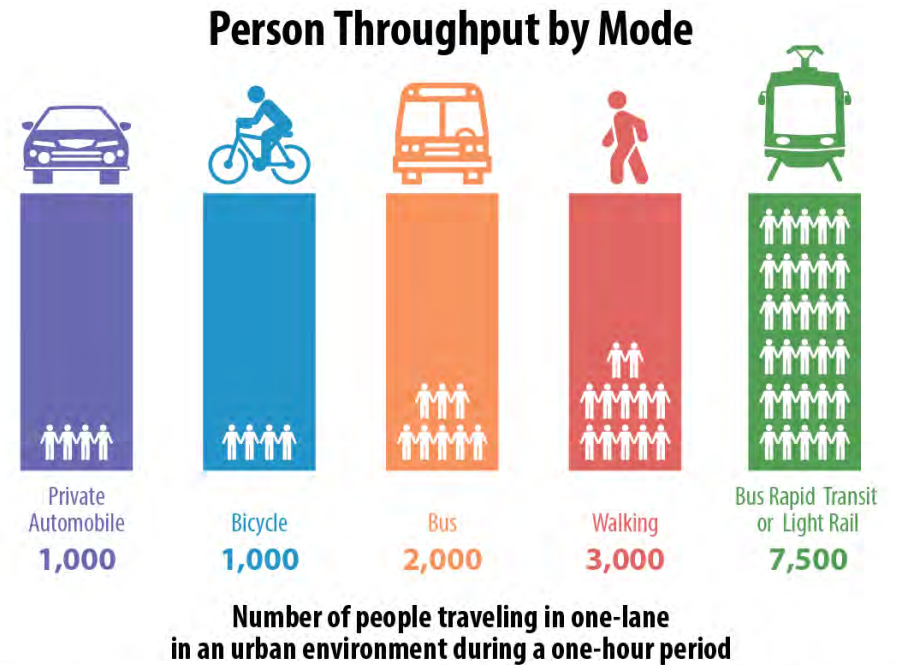
Much of the parking supply in downtown Madison remains unchanged since the 1970's, with City-owned structures averaging an age of 43 years. Many of these structures will require retrofits, or will need to be replaced in the next 20 years. However, parking facilities are often a hefty and lasting expense. The decisions about making these large capital investments represents a potential turning point at which Madison could consider the broader implications of such an investment.

Transit Access

Transit service has the most potential for removing vehicles off of congested roads, due to its high passenger carrying capacity. Metro Transit in Madison provides scheduled bus service along 62 routes, as well as paratransit service, which extends into surrounding communities. Metro Transit carries a significant portion of the population, serving approximately 10%of residents in 1990, a relatively high rate of transit usage when compared to similar sized cities.

Since 2002, transit ridership in Madison has been on the rise, as seen in Figure 6. This provides a strong reason to bring increased transit frequency to other parts of the city in the future. Figure 7 shows the areas that could support high capacity transit today, including downtown Madison and the university area, two of the City's main economic centers.

Figure 6   **Transit Ridership**

Person Throughput by Mode

Private Automobile	Bicycle	Bus	Walking	Bus Rapid Transit or Light Rail
1,000	1,000	2,000	3,000	7,500

**Number of people traveling in one-lane in an urban environment during a one-hour period**

Note: The numbers represent a daily average throughput per hour. They are calculated as daily demand divided by the number of operating hours for each facility. Data source is city and transit agency data on real facilities from U.S. and Latin American cities.

METRO Annual Fixed Bus Ridership
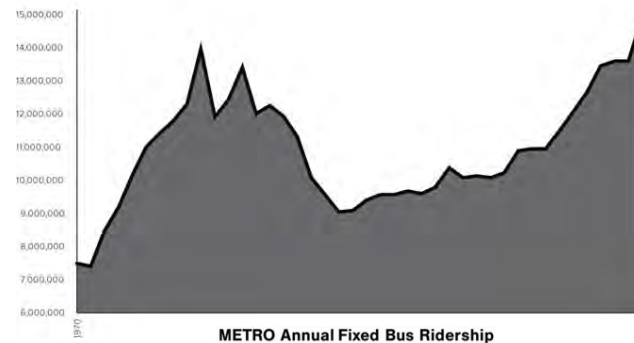
Transit ridership has increased steadily in Madison since 2002. Metro reached nearly 15 million rides in 2011, the highest ridership level the agency has seen since its inception in 1970.

Figure 7   Transit Ridership
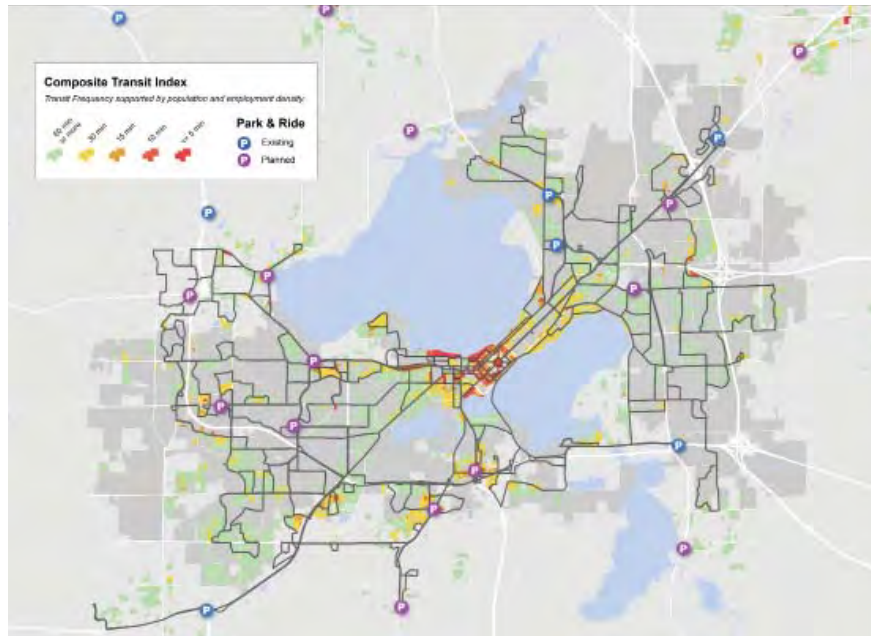
Bicycle Network

In the fall of 2015, the League of American Bicyclists upgraded Madison to a Platinum Bicycle Friendly Community from its previous Gold standing (since 2006), the result of creating over 150 miles of bicycle facilities, including dedicated facilities on more than half of arterials. This impressive bicycle network has resulted in bicycling representing 6% of the travel mode split in the City.

Despite the 46 miles of dedicated bicycle paths, 112 miles of bicycle lanes, and 116 miles of signed bicycle routes, the following gaps in the system exist:

» Gaps in areas with no bicycle service, typically on major streets with constrained right of way, such as Regent.
» Areas of low Bicycle Level of Service, where despite the

presence of bicycle lanes, traffic volumes and speeds presents bicyclists with stressful situations.
» Gaps caused by limited crossings, such as barriers created by the Beltline.
» Peak hour travel lanes force bicyclists to share limited space with vehicular traffic, putting bicyclists and motorists in uncomfortable situations.
» Gaps in the path system resulting from unfinished paths.
» Gaps in the bicycle network present opportunities for improvement that were considered during the Madison in Motion Process.
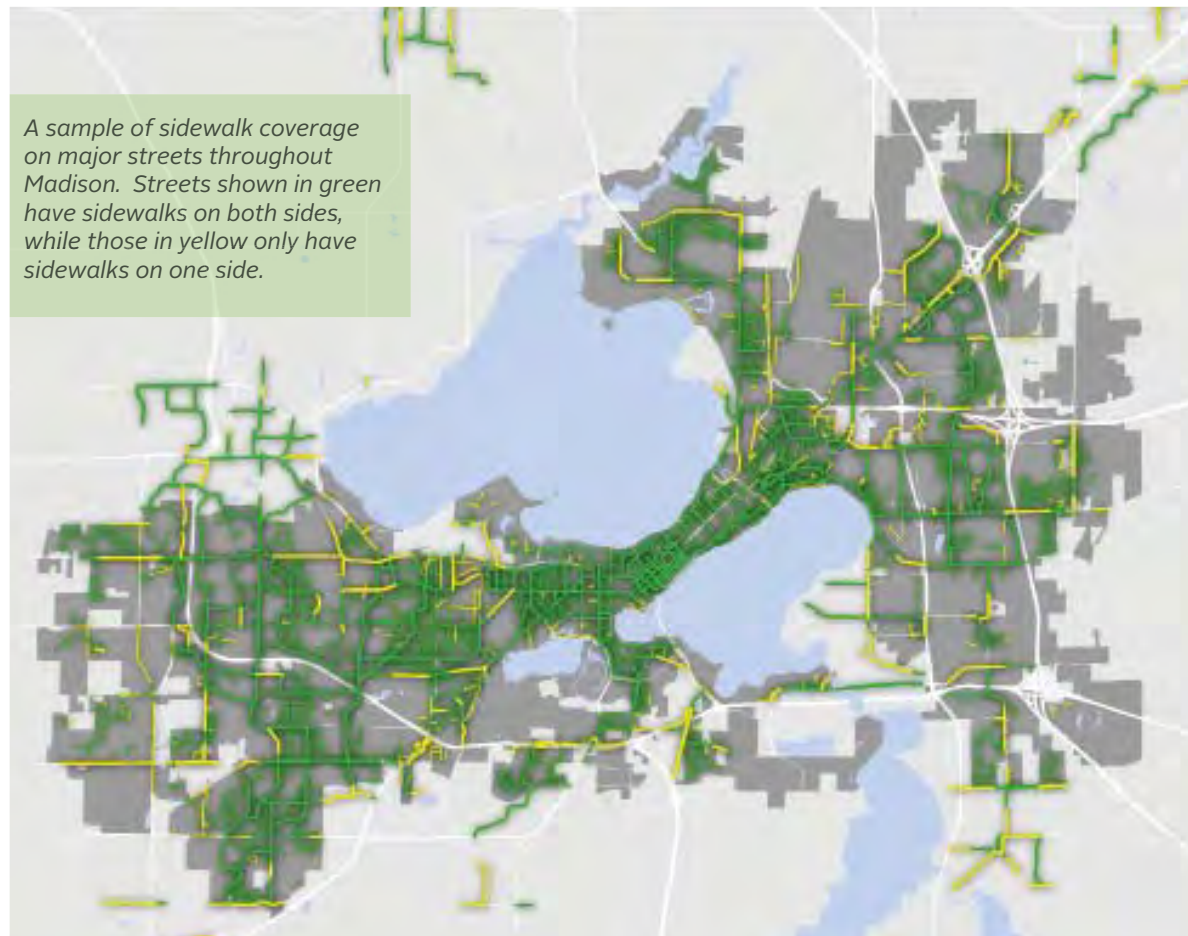
Pedestrian Network

Madison has a relatively well connected pedestrian network comprised of sidewalks and shared use paths. This pedestrian network helps connect people to residences, schools, retail areas, and other local attractions, without forcing pedestrians to walk in the street or on unpaved surfaces. As seen in Figure 8, sidewalks are on both sides of many streets, though there are significant portions of roadways without sidewalks at all. Lack of sidewalk connectivity in some areas provides one of several barriers to walking. Other barriers include:

» Uninviting streets that lack sidewalks
» Difficult street crossings due to a lack of safe gaps in traffic, or traffic turning into the pedestrian right of way
» Physical barriers such as highways and at grade rail crossings

These barriers to walking help guide attention for improving the pedestrian network in the future.

Figure 8   Sidewalk coverage throughout Madison

A sample of sidewalk coverage on major streets throughout Madison. Streets shown in green have sidewalks on both sides, while those in yellow only have sidewalks on one side.

SIDEWALK STATUS	MILES	% OF TOTAL
Both Sides	532	64%
One Side	94	11%
None	202	25%

Transportation Demand Management

Transportation Demand Management (TDM) refers to policies and strategies implemented in order to shift travel patters to better manage congestion. The Madison Area Metropolitan Planning Organization implements several TDM measures including:

» Coordination with Metro Transit to promote transit via discounted fare passes
» Ridesharing, including partnerships with employers to develop in-house rideshare programs.
» Commute alternative programs
» Partnering with employers to develop in house rideshare programs
» A database of 1,500 commuters used Rideshare, a web-based ride-matching service to match interested participants in a carpool

The University of Wisconsin's Group Unlimited Bus Program, which provides students and employees with a transit pass for a nominal fee, is seen as one of the most successful TDM measures in the region, and is partially credited as a primary generator of increased transit ridership. The City of Madison has also launched a unique TDM initiative by partnering with four banks to extend mortgage qualification levels for those purchasing a home along a Metro route.

National Trends

There are several noteworthy demographic, societal, and technology trends emerging that have big implications for transportation systems.

» **People Driving Less Overall**
- Since 2008, national VMT has trended downwards. This trend suggests that people are looking for alternatives to driving in congested conditions, and are more open to alternative modes than before. However, in 2015, low gas prices led to an uptick in VMT.

» **Younger generations are driving less, which may lead to continued downturn**
- Younger age cohorts are showing a strong preference for alternative modes of transportation, suggesting that in the future, vehicle ownership and driving may not be as valued as they are now and in the past.

» **Waiting longer to get license**
- For young people today, a driver's license is no longer as important as during past generations.

» **Renewed desire to live in urban areas**
- Millenials like having the world at their fingertips. With the resurgence of cities as centers of economic energy and vitality, a majority are opting to live in urban areas over the suburbs or rural communities. 62% indicate they prefer to live in the type of mixed-use communities found in urban centers, where they can be close to shops, restaurants and offices. They are currently living in these urban areas at a higher rate than any other generation, and 40% say they would like to live in an urban area in the future. As a result, for the first time since the 1920s

growth in U.S. cities outpaces growth outside of them. -

» **Impacts of ride sourcing**
- Ride sourcing via digital apps such as Uber and Lyft introduce a new dynamic to the transportation system. It provides a quick and relatively affordable alternative for short trip, boosting alternatives to car ownership.

» **Demand for transit is up**
- Nationwide, transit ridership has increased consistently since 2010. Though this may be tied to the Great Recession, trends suggest that younger generations are actively relying on alternatives to driving.

» **Demand Management is helping manage Transportation Systems with Limited Capacity**
- Demand Management measures like roadway pricing, parking pricing, and employee based transit benefits, are emerging as essential tools for transportation planning. For example, the University of Wisconsin TDM measures provide a template for successfully encouraging the use of alternative modes of transportation, with less than 60% of faculty/staff driving to work.

» **Expected Increases in Delivery Freight**
- Shoppers are making fewer trips to stores, instead, opting to shop from their keyboard. The digital footprint will continue to grow, and more goods will come to people, rather than them going to the goods. This means an increase in deliveries is to be expected.
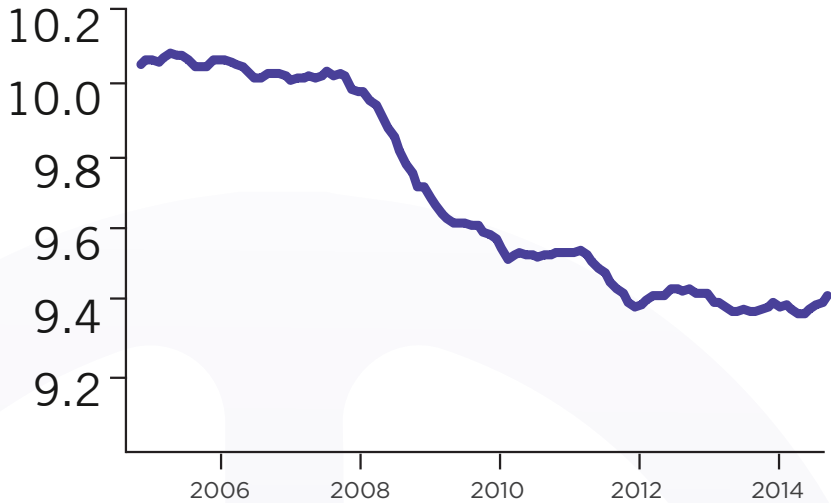
» **More Single Households**
- Younger generations are also waiting longer than before to get married and have children. This means that housing preferences and travel patterns observed in family households are not emerging as strongly as before.

LOCAL + GLOBAL TRENDS

PEOPLE ARE DRIVING LESS OVERALL
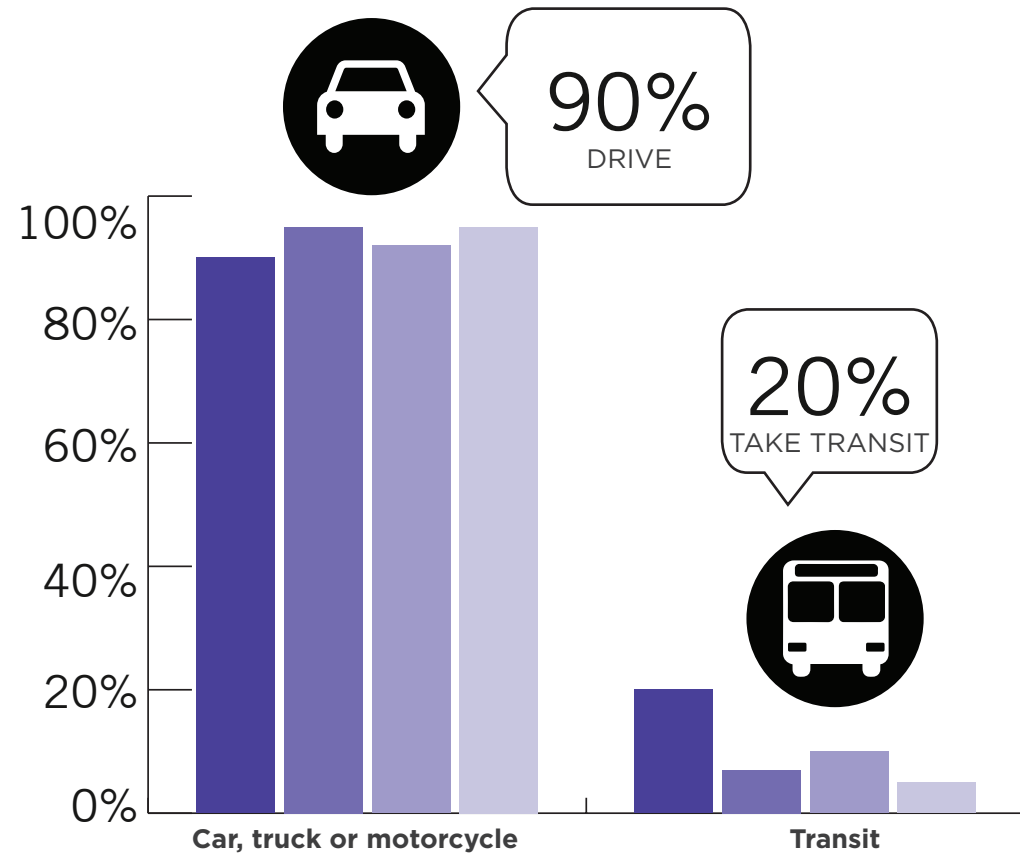
National VMT decrease over time:

YOUNG PEOPLE are waiting longer TO GET THEIR DRIVER'S LICENSE

Even the proportion of teenagers with a license fell, by 28 percent, between 1998 and 2008.

28%

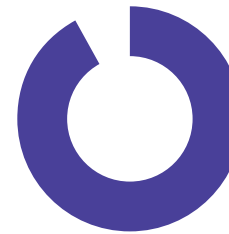## KEY AGE COHORTS are driving less by opting for ALTERNATIVES TO DRIVING

90%
DRIVE

20%
TAKE TRANSIT

Car, truck or motorcycle

Transit

Millenials are purchasing FEWER CARS

79%
People between 20-24 years old had a driver's license in **2011**
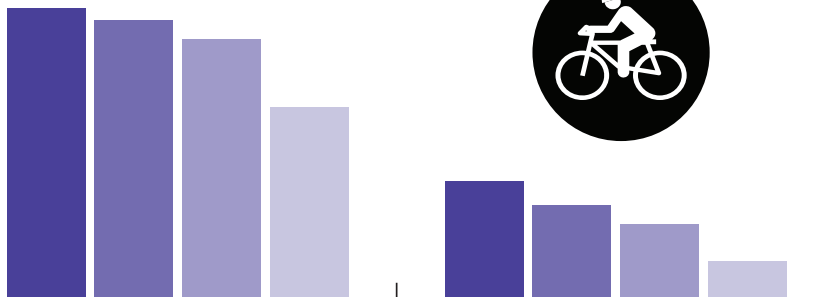
92%
People between 20-24 years old had a driver's license in **1983**

Legend:
- Millenials (Gen Y)
- Gen X
- Baby boomers
- War babies/ Silent generation
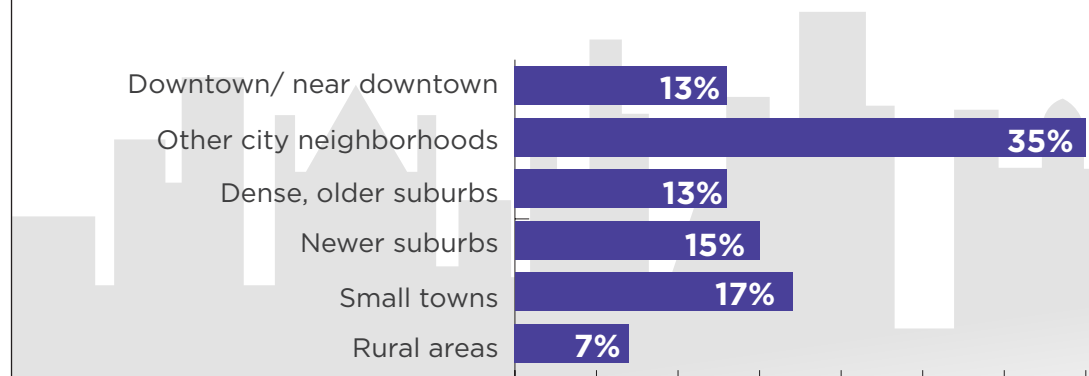
48% WALK

19% BIKE

Walk (> Several Blocks)
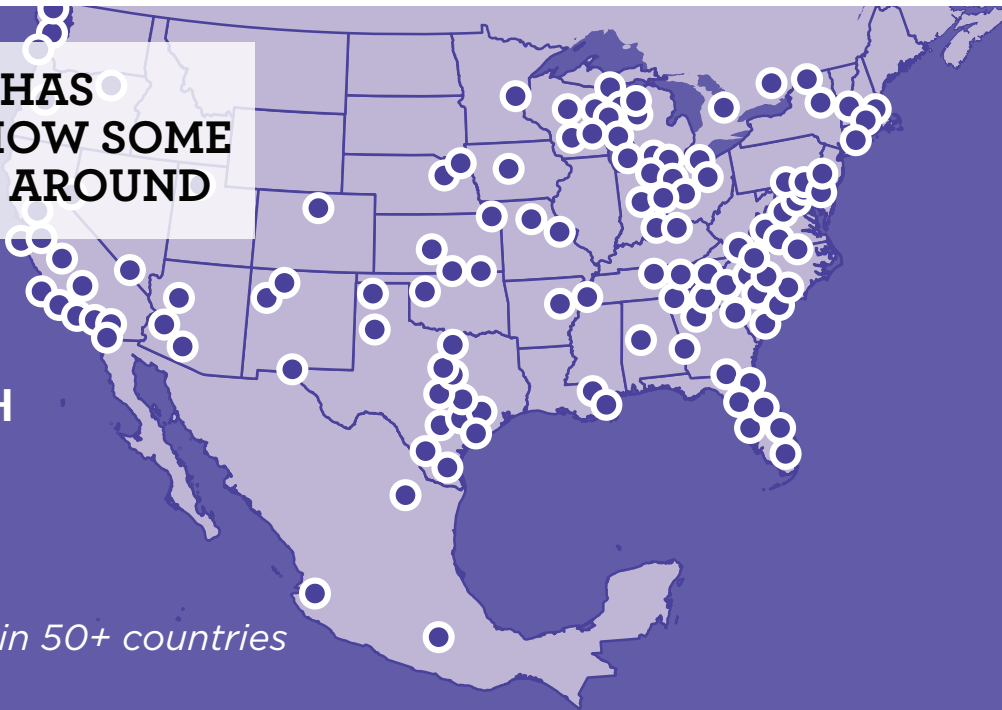
Bike

Renewed desire to LIVE IN URBAN AREAS

Millenials like having the world at their fingertips. With the resurgence of cities as centers of economic energy and vitality, a majority are opting to live in urban areas over the suburbs or rural communities. **Sixty-two percent** indicate they prefer to live in the type of mixed-use communities found in urban centers, where they can be close to shops, restaurants and offices. They are currently living in these urban areas at a higher rate than any other generation, and **40 percent** say they would like to live in an urban area in the future. As a result, for the first time since the 1920s growth in U.S. cities outpaces growth outside of them.

WHERE MILLENIALS SAID THEY LIVED, BASED ON THE ULI'S SURVEY:

Downtown/ near downtown	13%
Other city neighborhoods	35%
Dense, older suburbs	13%
Newer suburbs	15%
Small towns	17%
Rural areas	7%

MORE LOCAL + GLOBAL TRENDS

RIDESOUCE HAS CHANGED HOW SOME PEOPLE GET AROUND

PERCENTAGE GROWTH 2013 - 2014
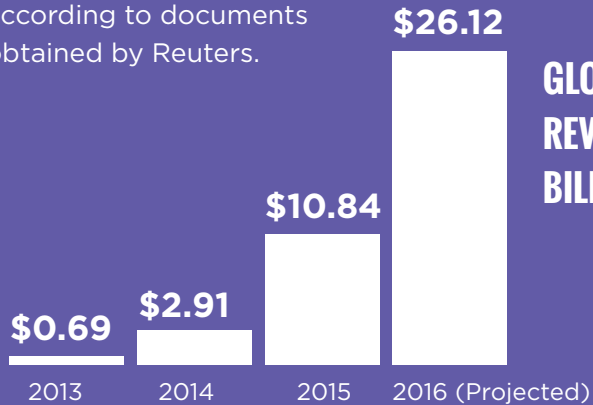
↑ **360%**

Also operational in 50+ countries

THE UNIVERSITY leads the way on TRANSPORTATION DEMAND MANAGEMENT

TRAVEL MODE TO CAMPUS (Percent)

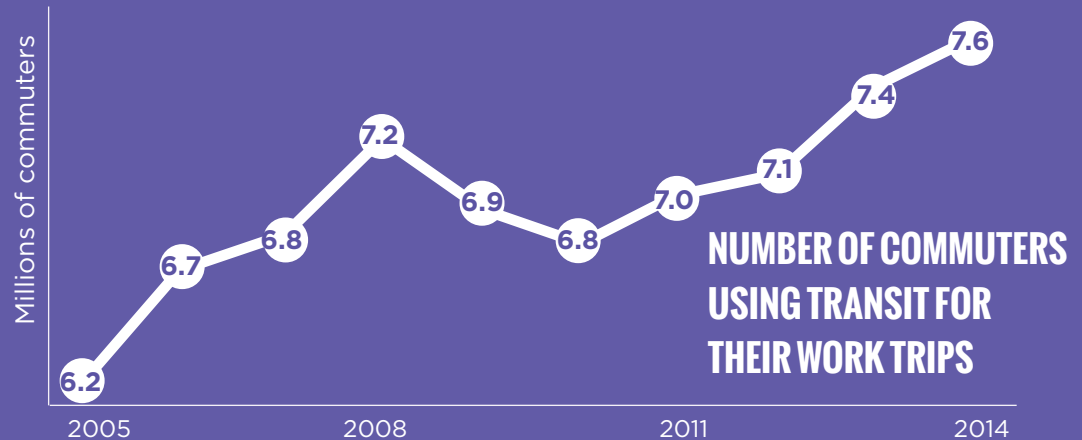|		WALK	BIKE	MOPED	MOTORCYCLE
STUDENTS	GW	49%	22%	2%	0%
	BW	32%	3%	2%	0%
FACULTY/ STAFF	GW	4%	17%	1%	1%
	BW	2%	4%	0%	0%
HOSPITAL	GW	2%	5%	0%	2%
	BW	2%	1%	0%	0%

Speedy Growth

Uber's global bookings are projected to increase 141% from 2015 to 2016, according to documents obtained by Reuters.

GLOBAL BOOKINGS REVENUE IN BILLIONS

- $0.69 — 2013
- $2.91 — 2014
- $10.84 — 2015
- $26.12 — 2016 (Projected)

DEMAND FOR PUBLIC TRANSIT IS INCREASING

Millions of commuters

- 6.2 — 2005
- 6.7
- 6.8
- 7.2 — 2008
- 6.9
- 6.8
- 7.0
- 7.1 — 2011
- 7.4
- 7.6 — 2014

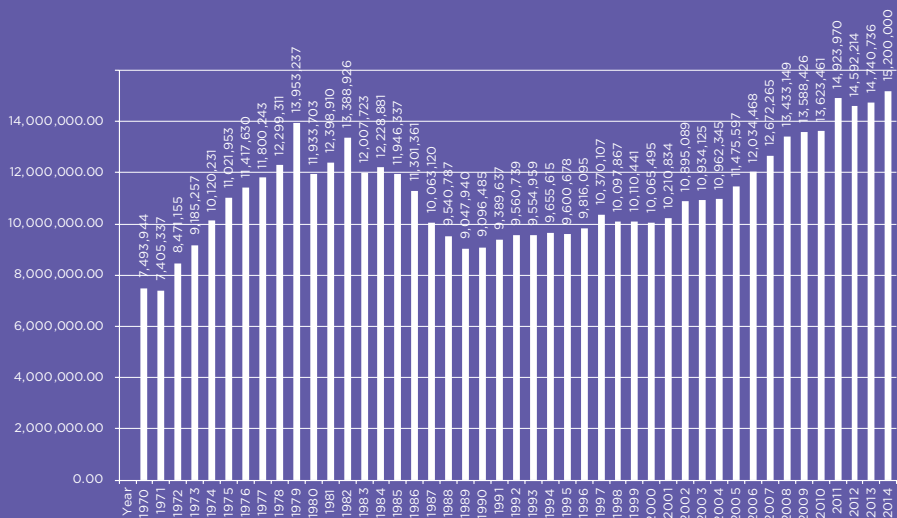**NUMBER OF COMMUTERS USING TRANSIT FOR THEIR WORK TRIPS**

GW = Good Weather // BW = Bad Weather

DRIVE ALONE	PRIVATE BUS	DROP-OFF	CARPOOL	VANPOOL	METRO BUS	CAMPUS BUS	OTHER BUS	OTHER	TOTAL
5%	0%	1%	1%	0%	14%	4%	0%	0%	100%
7%	0%	1%	1%	0%	32%	20%	0%	0%	100%
52%	0%	3%	3%	2%	14%	0%	0%	2%	100%
56%	0%	5%	4%	2%	23%	2%	0%	2%	100%
70%	1%	2%	4%	0%	11%	0%	1%	3%	100%
74%	1%	4%	4%	0%	11%	0%	1%	3%	100%

DELIVERY ECONOMY IS INCREASING

NUMBER OF DIGITAL SHOPPERS IN US FROM 2010 - 2018 (in millions)

2010	2011	2012	2013	2014	2015	2016	2017
172.3	178.3	183.8	191.1	196.6	201.7	206.2	210.8

215.1 (2017)

Transit ridership/demand is up nationwide; and in Madison.

ANNUAL FIXED ROUTE RIDERSHIP 1970-2014

Year	Ridership
1970	7,493,944
1971	7,405,337
1972	8,47,155
1973	9,185,257
1974	10,120,231
1975	11,021,953
1976	11,417,630
1977	11,800,243
1978	12,299,311
1979	13,953,237
1980	11,933,703
1981	12,398,910
1982	13,388,926
1983	12,007,723
1984	12,228,881
1985	11,946,337
1986	11,301,361
1987	10,063,120
1988	9,540,787
1989	9,047,940
1990	9,096,485
1991	9,389,637
1992	9,560,739
1993	9,554,959
1994	9,655,615
1995	9,600,678
1996	9,816,095
1997	10,370,107
1998	10,097,867
1999	10,110,441
2000	10,210,834
2001	10,895,089
2002	10,934,125
2003	10,962,345
2004	11,475,597
2005	12,034,468
2006	12,672,265
2007	13,433,149
2008	13,588,426
2009	13,623,461
2010	14,923,970
2011	14,592,214
2012	14,740,736
2013	15,200,000

MORE SINGLE HOUSEHOLDS,

GROWTH IN LIVING ALONE

NUMBER OF ONE PERSON HOUSEHOLDS (1,000s)

PERCENT OF HOUSEHOLDS WITH ONE PERSON

1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015
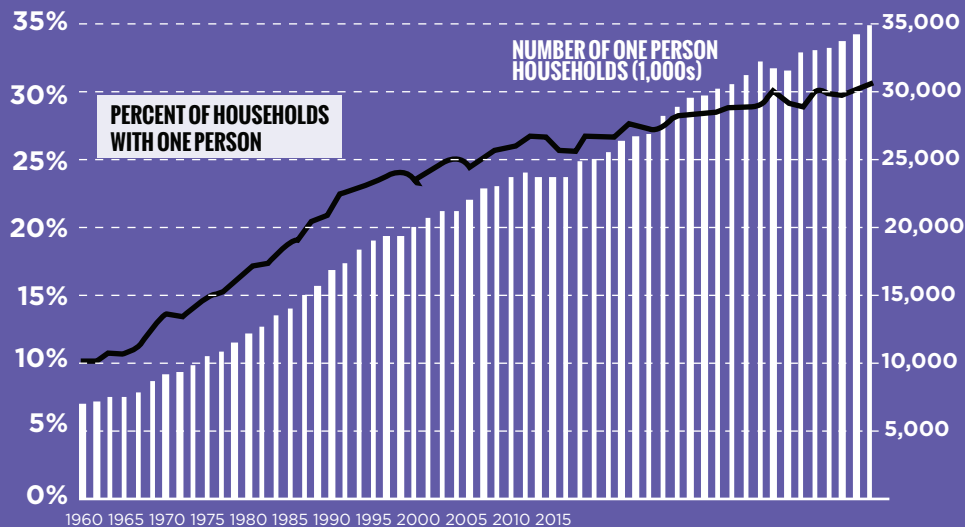
Madison's transportation system provides a high level of mobility relative to American cities of similar size.

5 〉

Key Challenges

As Madison looks to maintain and grow businesses, enhance economic competitiveness, attract future residents and workers, and improve the health and quality of life of residents, there are several key areas for improvement. **These challenges represent the major areas of opportunity** – the issues to prioritize moving forward.

KEY TRANSPORTATION CHALLENGES

» Coordinated Land Use and Multimodal Transportation System
» The Transportation System and Economic Development
» Fragility and Peak Efficiency of the Roadway Network
» Need for improved Transit
» Challenges Facing Transit
» Gaps and Barriers in bicycle network
» Gaps and Barriers in pedestrian network
» Perceptions and Reality of a limited parking supply
» Challenges of at-grade rail crossing
» Coordination of various stakeholders in planning and development efforts

Coordinated Land Use and Multimodal Transportation System

Madison's population has seen its reliance on the car decrease over the past few years, with increases occurring in people utilizing transit, biking and walking to work. While true for the City as a whole, this statistic does not illustrate the complete picture. When looking at usage rates at a finer grain, a repetitive pattern emerges: those who reside in more central areas (close to major employment areas) drive less, while those on the periphery drive more. Distances between work and home are often the most important predictor for mode choice for work trips. Outside the Beltline highway, for example, bike and transit use fall off quickly. While many of these areas have access to bus service, that service is generally less frequent and often requires one or more transfers before reaching a final destination. For most commuters, biking has a natural distance limit - defined by travel time and physical comfort. Compounding these challenges is the fact that land use pressures have been pushing lower-income households to more auto-dependent neighborhoods, where non-automobile transportation choices are less time- and cost-effective.

One of the keys to recognizing Madison's transportation goals is to support continued opportunities for redevelopment in areas already well-served by transit and bicycle infrastructure, and where commuting via these transportation modes is a reasonable and attractive option. Locating new housing and employment in areas well-served by non-auto modes is likely the most effective way to continue trends of increasing transit and bike use in Madison.

Key transit corridors, transit-oriented development nodes and Activity Centers identified in previous plans and studies are some of the areas most appropriate for and likely to see investment and intensification of development. Encouraging affordable housing as part of the overall housing mix in these areas ensures lower-income residents have access to high-quality transit and bike infrastructure, reducing reliance on more costly transportation modes.

The Transportation System and Economic Development

In many urban areas, the story of successful cities has often been tied to effective transportation systems. The City of Milwaukee was the largest and most prosperous city on Lake Michigan as a result of its port, and over time the growth of the railroad industry helped Chicago to become a Midwest economic powerhouse. For Madison's continued economic success, the transportation system must support the movement of goods and services in and out of the City, and support the needs of residents and businesses to access those goods and services.

To businesses in Madison or those considering the City as a future location, the ability to move people and freight is essential - whether it's Bagels Forever receiving raw materials, ShopBop packaging online orders, the UW Research Park getting employees to the workplace, or Webcrafters printing, binding and shipping books.

Fragility and Peak Efficiency of the Roadway Network

Major streets form a radial network in Madison, with spokes emanating from the Capitol and the central business district. The lakes and other natural barriers have created an isthmus in Madison, removing the possibility of roadway network spokes and a true grid street pattern that serves other U.S. cities. In addition, the City never implemented a freeway system (planned in the 1950's) to serve its central core. While this decision has tremendously benefited the quality life for neighborhood residents and businesses in the central City, it has resulted in highly concentrated travel demand utilizing a limited number of high-use corridors.

Unlike a grid-based network, there are few alternative routes in the event of high levels of congestions or instances of decreased capacity, such as a traffic incident. Recently, this was on full display with the 2013-14 reconstruction of Johnson Street. While both outbound travel lanes were never fully closed, its average 20,000 cars per day resulted in drivers experiencing significant delays. Many sought alternate routes, as many eastbound drivers rerouted via East Washington and, Williamson and to some extent lower capacity Mifflin and Main Streets. Before this construction project, these alternative arterials hovered near their capacity at peak hours. During construction, the reduced capacity of the isthmus arterials resulted in major backups on all eastbound corridors, the inner and outer loop, and with eastbound p.m. backups beginning near the UW campus.

In most travel corridors serving the central area of the City, roadway capacity has already been expanded as much as it reasonably can, without demolishing homes, businesses and other public facilities. This additional capacity has been provided by adding travel lanes to a select number of streets over the years, providing spot improvements to intersections, limiting driveway

and cross-street access, improving traffic signal timing and coordination, as well as other innovative traffic management techniques. Continued growth in jobs and housing is projected in the City, and much of it is targeted to develop in the narrow core of Madison. This will create numerous mobility challenges, as the current roadway network will become further stressed, may not be able to efficiently meet the travel demands of residents, commuters and businesses, and will have limited options to improve traffic capacity.

The greatest concentrations of travel demand in the Madison region are in a limited land area where there is virtually no space available for building new transportation infrastructure. In these areas, roadway improvements will likely be limited to intersection modifications to improve safety while capitalizing on what limited efficiency improvements may exist. Connecting transportation thoroughfares through the City are relatively limited, as there are a limited number of streets that pass through Madison's downtown core and the isthmus limits opportunities for new corridors. These congested streets have no practical room for expansion to meet current and upcoming demand. That being said some level of delay is inevitable. But this reinforces the fact that for Madison to continue thriving, other modes of transportation must be the focus of improvements to support current and future residents, employees and visitors. Without significant improvements in transit and bike infrastructure, the roadway system will be expected to bear the burden of new future travelers, greatly impacting those who can't use other modes - such as freight and other commercial traffic. If traffic becomes too burdensome, Madison may not be as attractive to businesses in a globally competitive marketplace.

SOURCE: flickr.com/psexypsychic

Need for Improved Transit

Transit has been an important part of the Madison landscape for decades, and recently Madison Metro has been a victim of its own success. Ridership increased 40% over the past 10 years on the award-winning system and it seems new ridership records are set each year. As more and more riders use the system, Metro only was able to increase service by 0.8% annually. As a result, the system is now operating at or near capacity, with many peak hour buses overcrowded and occasionally unable to pick up transit users waiting at stops. Experiencing crowded buses (due to rapid ridership growth) is a great challenge to have, but it does require a response.

Results from Metro's March 2015 ridership survey were recently released, and highlighted some equity issues facing the system. One of the first findings discussed is riders from low-income households are more likely to use cash fares than passes, which offer lower per-ride costs. This may be due to fewer pass sales outlets in neighborhoods with lower income levels. Another is the disparity in time in transit and number of transfers made between white riders and those of color. African-American riders were found to transfer at rates three times higher than white riders, with trips averaging nearly 32 minutes, 40% longer than white riders. Madison's most diverse neighborhoods are also some of its more auto-dependent. Lower overall densities and disjointed street patterns make many of these areas challenging to service with typical fixed route service.

The reach of effective transit can also be improved. Few park-and-ride facilities exist within the service area, and those that do drive for a portion of their trip often don't have direct service to employment centers. In other transit systems surveyed as part of Madison in Motion, park-and-ride facilities were most heavily used when located on a quick and direct transit route into core employment areas.

As the City has grown, bus routes have been extended, but often much lower ridership than core service areas. Major barriers, disconnected street systems and lower overall densities in these are all present challenges to effectively serving these areas. The routes have responded to the situation with various solutions, but the accessibility of employment centers in a time reasonably competitive with driving is a challenge. Those with the ability to drive generally do.

Challenges Facing Transit

While many City of Madison residents and employers recognize the value of Metro Transit and the need for expansion, the actual process of improving service has no clear path. Overcrowding is an ongoing problem during peak travel periods. However, nearly every bus is utilized during those times, which limits the ability to add additional service capacity. At the simplest level, more buses are needed to improve service. While the cost of new buses is not insignificant, Metro currently has no place to store or maintain them. Metro's facility on East Washington houses its fleet of 215 large 40-foot buses and 17 paratransit vehicles, which is about 50 more buses than it was designed to accommodate. Aside from costs associated with new buses and more drivers, the required facility is estimated to cost approximately $40 million. To help fund the costs, the City of Madison recently applied for but did not receive a federal TIGER grant. At this time, the City must look to improve its TIGER application and apply for additional grants, as funding sources are very limited.

Funding issues are further complicated by the fact that Metro is an entity of and funded by the City of Madison. Municipal budgets are perennially tight, and levy limits compound the issue by generally preventing revenue increases that could be used for expanding transit.

While some funding comes from other sources, including payments from the cities Middleton, Fitchburg and the UW, there is no regional funding mechanism in place. This finance and governance model is highly unusual for a city the size of Madison, and is unlike the vast majority of transit systems across the country. Establishing a regional funding mechanism is critical to overcoming issues preventing increases in transit travel time, service and usage. This is especially relevant given that much of the stress on Madison's roadways is coming from outside commuters, for whom transit is not an attractive travel option. Over the past 10 years, the number of employees who work in Madison and live within 10 miles of their workplace has gone down by more than 6,000, a change from 58% to 52% of workers. This means that Metro is providing nearly 40% more rides in an area where the pool of workers who could use transit is decreasing. In order for roadway capacity to be preserved for those whom transit is not an option, transit service must be improved to a level that is appealing for those who live within its service area.

Creating Bicycle Connectivity

Gaps in the bicycle network can create challenges for cyclists in navigating and arriving safely at their destination. Gaps take various forms, from areas without or with poorly-defined bike facilities, to challenging intersections and or corridors that aren't comfortable to most riders. One gap, for example, is the bicycle lane on East Washington Avenue, ending at Blair Street. Westbound cyclist may unknowingly be faced with a hill climb and crossing a major right turn movement (the outer loop) without a bike lane. University Ave west of University Bay Drive is another of the more challenging system gaps. The path paralleling University Avenue terminates here, forcing cyclists onto a very high-volume street, which has a bike lane but can be very uncomfortable to many potential cyclists. Other routes are available, but lack of system knowledge or wayfinding signage may prevent cyclists from using routes better suited to their comfort level.

System gaps can and do cause potential cyclist to choose other modes. Lack of, or perceived lack of safety, comfort or wayfinding ability can have a significant impact on cyclist, especially those with less cycling experience. A comparison of bicycle parking usage at two similar commercial businesses helps to illustrate this point - the Willy Street Co-op on the well-used Jenifer Street bike route, and the Whole Foods on University Avenue. These similar businesses have comparable surrounding neighborhoods but drastically different bike usage, partly due to ease of bicycle access to these businesses.

Certain gaps in the bicycle route system may be unavoidable. Bike facilities are one of many competing uses of space within the roadway right-of-way, and improved bike facilities that require more space may not be pragmatic. Surrounding development,

pedestrian space, street trees, parking and auto lanes all have space needs.
Other major gaps result from many of the limited access highways in and around the City. The Interstate highways, Beltline, US Hwy 30 and 151 all have limited opportunities for cyclist to cross them. Where crossings exist, highway ramps or major intersections present less-than optimal crossings for cyclist.

Madison must continue to address gaps in the bicycle network to improve usability of the system and appeal to a greater range of potential cyclist. Innovative facilities, such as buffered bike lanes, cycle tracks and protected intersections should be evaluated as bike facility opportunities as roadway corridor reconstruction projects are developed. Interim steps, such as restriping roads to accommodate on-street bike lanes can be accomplished at a relatively low cost, and are routinely done in the City. With many major highway roadway projects now being studied in the urban area, including Interstate 39/90/94, the Beltline and USH 51/Stoughton Road, improved bike and pedestrian crossings must be included in the design. These improvements could either be enhanced at-grade street crossings or dedicated bike and pedestrian facilities (such as bridges or underpasses).

Lastly, Madison should strive for system equity, primarily by ensuring all residents have access to a bike network that reaches the entire City geographically. In addition, efforts should be made to ensure that a bike network is accessible to all households, especially areas where lower-income residents are located. Such residents often experience additional challenges in obtaining bicycles, and can frequently experience higher rates of bike thefts.

Gaps and barriers in pedestrian network

Gaps in the pedestrian network generally take a few different forms. First, some neighborhood streets were built decades ago without sidewalks. On most low-volume residential streets, the lack of sidewalks by itself is not likely to discourage walking but does raise other issues. Issues of safety become a greater concern, especially with children and in inclement weather, and lack of sidewalks presents significant obstacles to those with disabilities. On higher volume streets, the safety issue created by lack of pedestrian facilities is often sufficient to deter walking. Adding sidewalks to neighborhoods has its own unique set of challenges. Property owners often object to sidewalks for reasons including costs, snow clearing responsibility, changes in neighborhood character and "loss" of public property they had considered theirs. Space requirements for street, curb, terrace, trees and the sidewalk can also present challenges.

Even when a neighborhood has sidewalks, barriers can be present for certain users. Sidewalks without curb ramps are of little use to those in wheelchairs. In the winter, curb ramps can go unshoveled, similarly making them impassable.

Major streets can present challenges to pedestrians attempting to cross. Higher volumes and greater distance between intersections and traffic signals reduces gaps in traffic and the associated time for crossing. Such is the case on Mineral Point Rd between Speedway and Segoe Road. Along this segment, lights provide crossing points at high volume intersections but traffic volumes limit crossing at most minor intersections, which do not have signalization. Bus stops that are not located at controlled intersections can also create pedestrian crossing challenges, since transit users will need to cross the street at that location on at least one direction of the trip.

Other barriers, often in the form of highways, rail corridors or superblocks prevent pedestrian crossing and can require significant detours to reach final destinations. Major highways have public street crossings, but they can be limited to one mile spacing in the urban area. Railroads and other natural barriers (including developed land without through connections) can also create connectivity challenges.

Where highway crossings exist, they often involve crossing multiple on and off ramps and are generally unpleasant to use. Grade-separated bicycle and pedestrian crossings can provide more comfortable crossings for pedestrians, but must be located in areas with high demand for pedestrian facilities.
The last barrier to walkability is the land use pattern itself. In certain areas of the City, especially outside the Beltline and Hwy 51, residents have significantly fewer destinations to walk to for non-recreational trips. The lower density and street patterns greatly reduce reasonable walking distances in these areas.

The first step in breaking down pedestrian barrier challenges will be to locate areas where pedestrian demand is present, or is likely occur in the future. This can require a mix of origins and destinations and a supporting street network that attracts pedestrians to the crossing. The crossings are expensive and are usually undertaken as part of a larger highway project.

Perceptions and reality of a limited parking supply

Downtown Madison is home to many land uses that together generate a significant parking demand, for many hours of the day. And while it may appear there is "not enough parking" downtown directly adjacent to a particular restaurant, a block or two away there are often ample parking spots available. Perceptions of a limited parking supply relate to a driver's expectation of how close they are able to park to their destination, and at what cost. The time it takes to locate an available spot also contributes to the perceived problem.

The solution to the problem is not always to create more parking. At a cost of $30,000 or more per parking stall to build structured parking, a system that optimizes parking resources already in place could be a better option. San Francisco has recently implemented a pilot program that utilizes parking demand data to establish variable pricings. Hourly rates vary block to block, and differ at each structured facility, and throughout the day to correspond with peak and off-peak demand cycles. Users can select the area that meets their desired balance of proximity and price. The system has increase the perceived availability of parking by better distributing demand. In doing so, it has also resulted in a significant reduction in traffic by greatly reducing travel associated with finding an available park spot. Technology, time and cost are the biggest barriers to implementing a similar system for City-operated on and off-street parking facilities.

Another challenge is the fact that much of the downtown structured parking is contained within private buildings with other uses, such as offices. Generally underutilized outside of business hours, these parking resources are frequently perceived as private or simply closed to the general public. Public management of private parking resources could be one solution to helping people find parking in Madison's core. The City of Milwaukee has

implemented an innovative system for public and private off-street facilities. Each parking facility reports its availability in real-time, with information displayed on wayfinding signs throughout the downtown. This is especially useful to visitors or those not familiar with the downtown.

Challenges of at-grade rail crossings

Several active freight railroad corridors currently traverse Madison, creating a series of unique safety and mobility issues. Safety of bicyclists and pedestrians at crossings is a concern, but one that can be addressed with infrastructure improvements. Simple details, like the angle of crossing and maintenance can reduce crash risk associated with bikes when crossing railroad tracks. Perhaps the larger safety issue related to rail crossings is potential to prevent police, fire and ambulatory services from responding quickly to an emergency situation. Especially on the isthmus, a single train can block multiple principle arterial as is the case with East Washington and Johnson Street. Signal malfunctions have also cause major traffic back-ups during peak hour, which is a major concern. Intelligent Transportation System (ITS) approaches may have the potential to improve such situations with emergency responders, if real-time rail traffic and crossing facility activity could be incorporated into navigation systems, thus detouring emergency vehicles before they arrive at a blocked crossing.

Coordination of stakeholders in transportation, planning and development efforts

In total, there are 66 jurisdictions conducting planning and development in Dane County the Madison urban area. There are many entities at the table in planning for the region's transportation future. Madison is projected to grow to over 280,000 residents by 2040, and increase of nearly 45,000. The surrounding communities of Middleton, Verona, Fitchburg, McFarland and Sun Prairie are projected to add 35,000 residents to the metro area population. Accommodating this population growth in both infill and greenfield development areas (in addition to accommodating anticipated employment growth) will require regional cooperation, and identification of solutions beyond what the City of Madison can accomplish on its own.

American urban mobility is changing quickly.

Lots of new options are appearing, many of them blurring the line between private goods and public transportation. All of these mobility options – not to mention those that will surely appear in the future – have different applications in people's lives, and their role will continue to grow and evolve as consumers try them on for size and compare them to traditional transportation options.

Here is quick snapshot of some current shared mobility options, as well as more standard offerings.

BIKE SHARING

DOCK-BASED*

A dock-based bike share system that allows users to check out a bike from a dock using a credit card or membership card. Bicycles can be returned to other docks within the system. This type of system currently exists in Madison and is operated by B-Cycle.

DOCKLESS*

Relying on GPS locators and smart phone technology, this system allows users to reserve a bicycle near them. Bicycles can be picked up and returned at any ordinary bicycle rack within a designated service area, which significantly expands access points, and simplifies the return process.

PEER-TO-PEER*

Bringing the sharing economy to bike share, this system connects bicycle owners to potential renters via an online interface. Using a special lock, owners can list their bicycle as available for reservation. Bicycles can be picked up and returned at ordinary bicycle racks within pre-determined service area.

CAR SHARING

ROUND-TRIP (Traditional)

Round-trip car sharing services are a type of car rental that is designed to be convenient for people who rent cars for short periods of time. These services are membership-based and typically charge by the hour. Reservations are made online and cars are unlocked with a specialized membership card. Cars are scattered throughout a service area, and must be returned to the same pick-up location.

ONE-WAY

One-way car sharing operates similarly to traditional car-sharing but cars can be "returned" by parking them anywhere in the service area – no return trip necessary. This makes the user experience more flexible.

PEER-TO-PEER

This system connects car owners with potential renters via an online interface. Owners list their available vehicles online, and typically install hardware to the vehicle to allow immediate access to renters. Reservations for vehicles are made online and vehicles are returned to the pick-up location, or at least nearby, when trips are completed.

CLOSED NETWORK

This system is a private car share service for a specific development. These work similarly to traditional car sharing services, the car is managed by a property owner, and available only to tenants.
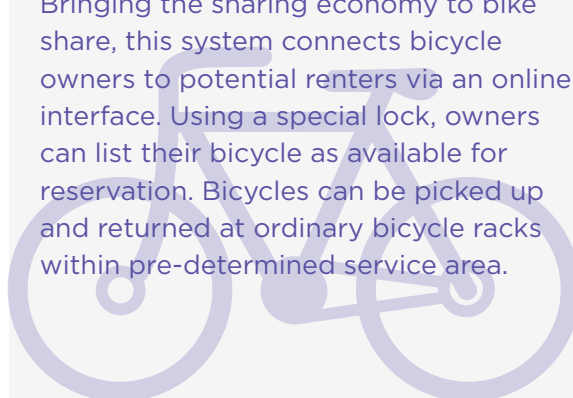
RIDESOURCING

TAXICAB/ LIMO

These services provide for-hire vehicles, which are staffed by professional drivers licensed to transport passengers. In Madison, licensed cab companies operate 24 hours a day, and serve all areas of the City.

TRANSPORTATION NETWORK COMPANY (TNC)

Such companies use an online/ mobile platform to connect passengers to drivers. Drivers use their own personal vehicles, and do not require a special license to transport passengers. Typically more affordable than taxicabs, TNC services make it easier for people to leave their vehicles at home. The speed and smooth user interface of these services have attracted many new types of users.
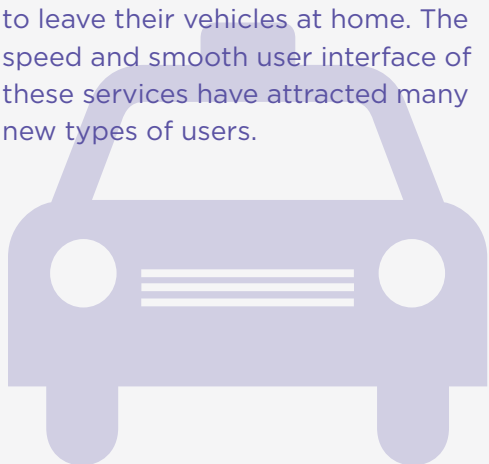
RIDESHARING

CARPOOLING

Carpooling is simply an arrangement between multiple people to make a trip in a single vehicle. A classic example of carpooling is coworkers who live near each other organizing to share a vehicle to work.

VANPOOLING

Vanpooling services are typically fee-based operations operated by a third party. The van travels on an agreed upon schedule to and from pick up/drop-off locations, and is operated by one of the commuters.

VANPOOLING SUBSCRIPTION SERVICE

These services require users to pay for each trip, provided door-to-door commuting service to people outside of traditional transit service areas and/or hours. Trips must be booked in advance, and subsidies may be utilized for lower-income users. This service fulfills travel needs not met by transit networks.

DYNAMIC RIDESHARING

This system connects passengers and drivers on an online system, pairing individuals making a similar trip. Passengers agree upon and pay a share of the trips cost. This is an expansion from traditional carpools, as it provides drivers/ passengers with an expanded pool of potential travel partners.
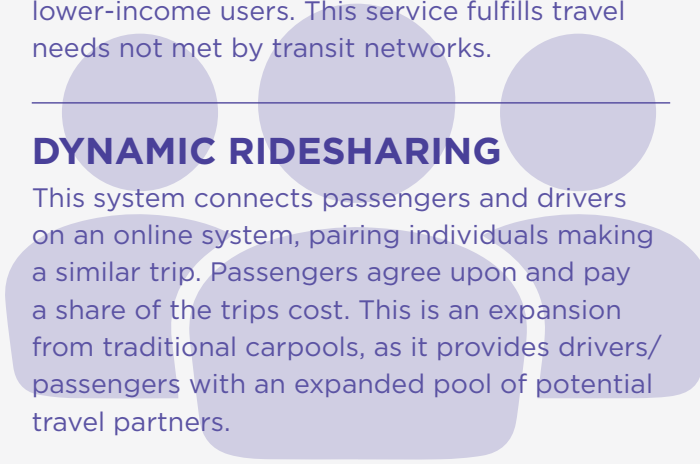
TRANSIT

PUBLIC TRANSIT

Public transit provides traditional fixed-route services, typically along high-volume corridors for the use of the general public for a minor fee. Encompassing buses, rapid transit, light rail, trolleybuses, passenger trains, ferries, and more, transit is the high-volume workhorse of transportation modes. Some public transit systems provide paratransit services for the elderly and handicapped in accordance with ADA requirements.

SHUTTLE

Shuttles are privately owned services that operate on a fixed route to pick up and drop off employees of a specific company or visitors to a major destination. These services can be planned to consider major transit locations along the route to accentuate the transit system.

MICROTRANSIT

This online service picks up passengers by using dynamically generated routes based on demand and customer locations. These services charge a fee per ride, typically more expensive than public transit, but less expensive than taxicabs or transportation network company services.
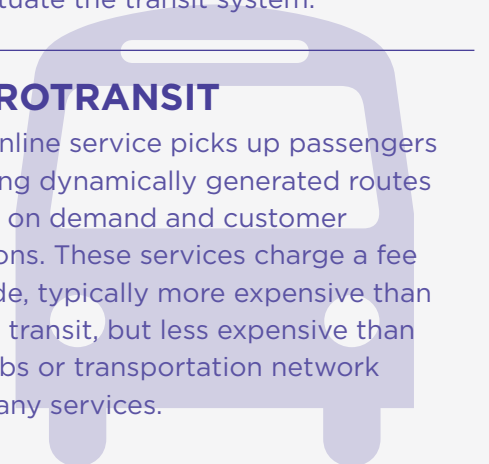
AUTONOMOUS VEHICLES

In recent years, the anticipation and questions around autonomous vehicles have intensified. As technology in transportation continues to rapidly evolve, major benefits such as improved safety, increased mobility, and maximized efficiency are on the horizon. However, autonomous vehicles will bring several challenges for jurisdictions as technology is slowly integrated with existing infrastructure, and human drivers.

Though it is expected that safety will be improved as a result of automation limiting crashes, it will take decades for roadways to become fully automated, potentially resulting in friction between autonomous and human drivers in the near future. In addition, there are concerns of negative impacts autonomous vehicles may have on VMT and emission levels as a result of empty cars traveling to cheaper parking areas away from the owners' destination, which could also add to local congestion. As technology has the potential to increase the capacity of existing roadways and intersections through more efficient signal timing and tighter vehicle spacing, reducing congestion concerns, it may encourage individuals to utilize their own vehicles as opposed to transit services. Planning ahead and implementing policies to curtail VMT in the presence of autonomous vehicles can prevent such concerns from materializing. Potential system features that could be set up to prevent increases in VMT include the following:
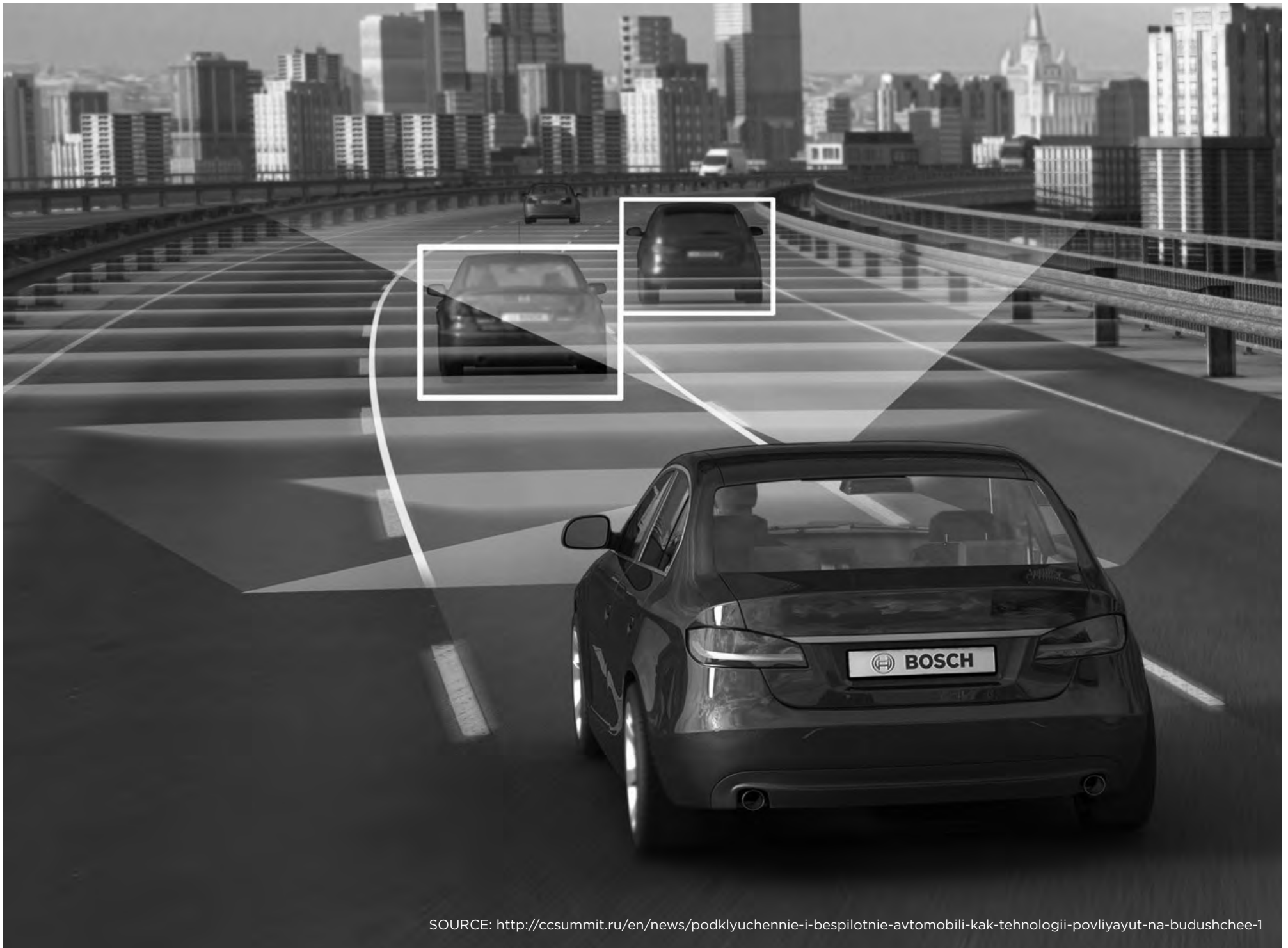
» Pay per mile
» Facilitating and encouraging the sharing economy
» Establish autonomous vehicles as support for transit and active modes, not a replacement
» Ensure high quality transit is available, especially along major corridors, as quality will be more important than ever to encourage ridership

In addition, though automation will bring many benefits assuming negative impacts are curtailed, it will not bring benefits related to improved public health, economic development, and quality of life, as seen with active transportation. Modal balance of the transportation system will be as important in the future, as it is today for residents.

Parking is another key component of the transportation system that is likely to be impacted as autonomous vehicles emerge. A system of shared autonomous vehicles could reduce, or perhaps even eliminate, the need for parking. This presents tremendous opportunity, because of the significant amount of land underutilized by being dedicated to parking, which negatively impacts walkability and the overall vibrancy of an area. If predictions of lowered parking demands materialize, cities and developers could rapidly eliminate or reduce future parking projects, opening the door to projects that bring along the benefits of density, availability of affordable housing, and walkability. With technology expected to evolve to complete autonomous capability in 2022, and 100% autonomous penetration by 2045, cities like Madison may consider creating dramatically less parking for the future, especially when considering the long development process and life span of parking structures[2].

As these technologies begin to emerge Madison should not only update infrastructure technologies to maximize capacity and safety of the network, but also look ahead to address potential challenges of managing new technologies as they may impact VMT levels and other travel patterns.

2   Morgan Stanley. (2013). "Autonomous Cars: Self-Driving the New Auto Industry Paradigm." Retrieved from: http://orfe.princeton.edu/~alaink/SmartDrivingCars/PDFs/Nov2013MORGAN-STANLEY-BLUE-PAPER-AUTONO-MOUS-CARS%EF%BC%9A-SELF-DRIVING-THE-NEW-AUTO-INDUSTRY-PARA-DIGM.pdf

As Madison continues to grow, the types of transportation challenges the city faces will evolve. Medium sized cities have unique challenges relating to increasing complexity and how and when to grow they transportation system.

6

TAKING INSPIRATION FROM ELSEWHERE

Madison can learn a great deal from cities of similar size or larger, facing similar pressures and opportunities – especially cities that track with Madison's vision for the future. This section explores applicable case studies from other cities, with a focus on cities with similarities to Madison's vision of the future. Many of the examples come from cities sharing similar attributes such as having a strong economy – including a strong tech sector, high quality of life, vibrant urban energy, progressive values, and a commitment to environmental protection. All the case studies with strong transit networks took a regional approach to transportation and economic development programs.

Several themes emerge:
» The importance of strong transit investment, especially rapid buses, BRT, and streetcars.
» The opportunity to capture the economic value of transit investments.
» The importance of pro-actively increasing quality of life and active commute options.
» The importance of learning to manage traffic and reduce demand.
» The importance of regional coordination.

Madison has a fairly robust transportation system for a city of its size. As Madison continues to grow, the types of transportation challenges the city faces will evolve. Medium sized cities have unique challenges relating to increasing complexity and how and when to grow they transportation system.

Many other urban areas across the U.S. are facing similar trends and pressures. In some ways, Madison's transportation landscape relates more closely to those of larger urban areas – it has a relatively diverse mode split and constrained downtown core, and a need for density, demand management, and a serious transit system.

Madison can look to larger cities as peers – many of the cities that share similar mode split, land use and transportation goals are significantly larger. The trial and error of growing transportation systems in these cities provide many useful lessons. Some adapted well, systematically shaping land use policies and transportation networks toward a livable future, finding leadership to make the big moves like major expansion of transit systems. On the other hand, some cities waited too long to make key decisions about growth and transportation investment – and playing catch-up is now proving to be much more difficult.

LEARNING FROM OTHERS

There are some growing pains inherent in a medium-sized city growing larger:

» Complexity and potential for disruption grow with size.
» Commutes become longer, and the need for efficient public transportation increases.
» Traffic congestion becomes a problem and the effective solutions become more nuanced, often involving demand-side strategies (Transportation Demand Management). Some of these measures, such as parking or road facility pricing, may be challenging for citizens to understand and accept. For example, parking pricing and investment in transit and biking become increasingly effective, but can also seem counterintuitive to a citizenry that has seen supply-side measures like expanding parking and roadway capacity work in the past.
» People tend to walk and bike less when there is more traffic present, so there can be increased difficulty for people walking and biking unless the physical design of facilities keeps pace.
» Increased traffic often results in increases in collisions and fatalities.
» Air and noise pollution from the transportation system can grow and become an impediment to quality of life.
» Freight distribution strategies become more important.
» Cities with aging infrastructure start to see higher maintenance costs, and the incentive for deferred maintenance starts to build.
» Regional coordination becomes more critical to developing effective solutions.

Medium-sized cities have built-in advantages (e.g., affordability) and limitations (e.g., smaller resource base and less management capacity than larger cities), and also specific pressures (e.g., the need to attract and retain citizens based on economic diversity and quality of life measures).

Madison can learn a great deal from cities of similar size or larger, facing similar pressures and opportunities – especially cities that track with Madison's vision for the future. In a case study review of cities with similar economic and quality of life goals, several themes emerge:

» The importance of strong transit investment, especially rapid buses, BRT, and streetcars, requiring strong regional coordination.
» The opportunity to capture the economic value of transit investments.
» The importance of pro-actively increasing quality of life and active commute options.

The importance of learning to manage traffic and reduce demand.

CASE STUDIES

Hiawatha Bridge on the Midtown Greenway
SOURCE: Tony Webster on Flickr

MINNEAPOLIS, MN

Minneapolis, Minnesota is nationally-recognized for its high quality alternative transportation network. It was recently named the most bike friendly city in America[3] , earning the title with its 129 miles of on-street bikeways, 97 miles of off-street bikeways, and a much-used bike sharing program. The high quality of the bicycle infrastructure even makes it possible for residents to commute by bike in the winter.

The strong focus on biking and walking is supported by a robust network of BRT and light rail corridors. The light rail service connects the Twin Cities, but Minneapolis is currently working to expand light rail service to surrounding suburbs. This effort is aided by the state's Fiscal Disparities Act, a unique regional tax base sharing mechanism that has made it easier for metro regions used to build and fund regional services[4]. The collaborative tax-sharing method has made it possible to build high-quality BRT, light rail, and commuter rail systems that connect Minneapolis with its suburbs.

Minneapolis' multimodal transportation efforts also benefit from application of transportation demand management tools. Over the last 11 years, the Minneapolis-St. Paul area has opened high occupancy toll (HOT) lanes using electronic transponder technology referred to as MnPass, in which buses and high-occupancy vehicles can travel for free during peak hours, along with single-occupancy vehicle drivers who are willing to pay a dynamically-priced fee.

HIGHLIGHTS
» Regional collaboration boosted transit planning efforts.
» Sustained investment in biking infrastructure has resulted in a world-class system, improving the quality of life of the city and serving as a point of attraction.

Hiawatha Light Rail Line
SOURCE: Miguel on Flickr

3 Source: http://www.ci.minneapolis.mn.us/bicycles/
4 Source: http://www.regionalplans.org/featured-regional-planning-programs-and-issues/tax-base-sharing/

Portland's Tikkum Crossing Transit Bridge
SOURCE: Sam Churchill on Flickr

Portland Bike Box
SOURCE: NN

PORTLAND, OR

Portland has a first-rate multimodal transportation system, especially considering its size. The quality system has been in the works for decades, and the city has been steadily building toward a vision of multimodal transportation.

The city also has successfully guided land use policy much more effective than most American cities. These coordinated efforts have made Portland a notably livable city, with one of the most diverse mode splits among cities, especially for its size. The consistent focus on multimodal transportation has yielded a comprehensive transportation system that includes a fixed-route bus system, a multi-line light rail, a streetcar, a commuter rail system, an aerial tram, and a strong network of innovative bike infrastructure.

The robust network of bicycle infrastructure earned Portland the Platinum Level Bicycle Friendly Community Award from the League of American Bicyclists[5]. Portland's bicycle system development was supported and complemented by strong community interest in bicycling. For example, the first bike share program in the United States, The Portland Yellow Bike Project, started as a community-run program without any public-sector involvement or support.[6]

HIGHLIGHTS

» Portland was ahead of the curve in making long-term investments in sustainable transportation infrastructure over the last several decades.

» The bicycle system is exceptional not just in the quantity and comfort of infrastructure – but notably the willingness to overcome key physical (and political) barriers and make the challenging connections in the system.

» Portland's and Oregon's, responsible land use policies have supported sustainable transportation, with a focus on active transportation, ensuring a high quality of life for residents.

Portland Transit Mall
SOURCE: Melanie Curry

5   Source: http://bikeportland.org/2015/11/06/league-of-american-bicyclists-says-portland-state-is-platinum-167614
6   Source: http://c2.com/ybp/story.html

Pronto Bike Share Station
SOURCE: Sam Churchill on Flickr

SEATTLE, WA

Seattle is growing by over 2% per year in recent years with its sizable tech industry growing at an explosive rate. Seattle is surrounded by water, so increasing roadways or building new highway systems is not practical. Investment in sustainable transportation is becoming increasingly important.

Seattle has turned to investments in BRT, light rail, bicycle and pedestrian infrastructure, and car-sharing programs to mitigate traffic congestion and reduce demand on the region's aging infrastructure. In 2015, voters approved Move Seattle, a $930 million transportation levy to improve transportation conditions in the city. While this program is only in the beginning stages of implementation, it demonstrates that Seattle voters and policy makers recognize that the only way for the city to continue to grow is through strong investment in sustainable transportation.

Transportation planning for Seattle is split among several regional and city-level agencies, including Sound Transit, King County Metro, and Seattle Department of Transportation. Sound Transit and King County Metro provide regional services such as BRT, fixed-route bus service, and light rail. However, Seattle relies on transit to a much greater extent than surrounding cities, so

the City of Seattle has purchased additional service from King County Metro to fully meet intra-city demand.[7]

Multimodal transportation planning has not been a painless process in Seattle; limited right-of-way and different infrastructure needs for transportation modes has made it difficult to provide safe high-quality infrastructure for all modes on arterial roadways. In recognition of these constraints, Seattle is moving towards providing parallel networks of infrastructure for bicyclists on lower-speed greenways. This should help reduce conflicts between bicyclists, streetcars, and automobiles.

HIGHLIGHTS
» Like Madison, geographic constraints make connections more challenging.
» In 2015 voters approved a major funding source for transportation improvements.
» Seattle is experiencing major congestion issues that other cities would be wise to get ahead of faster than Seattle was able to.
» Despite initial success, the question of who pays and how to capture the value of these investments to help pay for them remains as the city plans extensions and new lines.
» The city has had relative success with TOD – though each area is unique and they've learned there is no set formula. Transit can greatly enhance housing markets, but does not create them

LINK Light Rail
SOURCE: Oran Viriyincy on Flickr

MetroRail Commuter Train
SOURCE: www.city-data.com

AUSTIN, TX

Austin currently has almost 900,000 residents and is one of the fastest growing cities in the country, with growth sometimes hitting nearly 3% per year in recent years. Amid all that growth, Austin is struggling to create a first-class multimodal transportation system. Austin's current transportation system features commuter rail, fixed-route bus service, and limited BRT service. However, most residents remain car dependent and the city experience major congestion during commuting hours. The transit, biking, and pedestrian options needed to ameliorate these trends are not yet substantial enough to reduce the percent of people commuting by car. In 2014, voters rejected a light rail plan due to concerns about funding and fiscal responsibility. A recent roll-out of BRT service has struggled to maintain a ridership base because bottlenecks on arterial roadways make it difficult for buses to run on time.

The mismatch between land use policy and the available resources of the transportation system clearly demonstrate that there must be a clear and strong relationship between transportation planning and land use planning for a city to avoid these transportation headaches while growing. Development in Austin tends to "leapfrog" at the edges of the city and the policies and codes governing development along transit corridors makes densification difficult.

HIGHLIGHTS
» Other fast-growing cities would be wise to get ahead of their transportation needs, which will grow exponentially. The trade-offs needed can be more challenging over time, so early planning is advised.
» Transportation planning can be fruitless without the land use patterns to support more sustainable modes of transportation.

Capital Metro Bus
SOURCE: I-Ride Capital Metro

Pronto Bike Share Station
SOURCE: Sam Churchill on Flickr
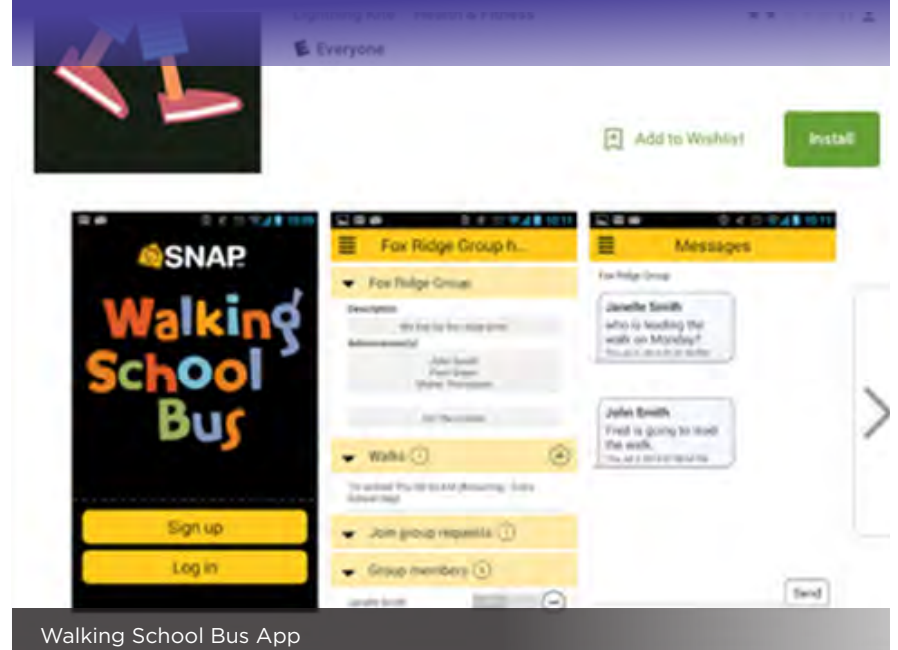
SALT LAKE CITY, UT

While Salt Lake City itself has a population of only 191,000, it has the transportation system of a much larger city because of the infrastructure investments that were made to prepare for the Winter Olympics in 2002. The city leveraged the event to make major investments in its transit system. Salt Lake City has a light rail system that with three service corridors that connect Salt Lake City to its suburbs, and several BRT corridors that encourage commuters to leave their cars at home.

Although the Utah Transportation Authority (UTA) was named the Outstanding Transportation System of 2014[8], the system has a difficult time maintaining high enough ridership levels to remain fiscally sound.[9] Much of this difficulty has to do with the fact that the transportation system was planned to meet short-term demand generated by the Olympics rather than integrated more incrementally with Salt Lake City's size and growth. Salt Lake City and UTA are working to integrate the rail lines into the urban fabric and are focusing on building connections between rail corridors, but improvements will take time.

Salt Lake City has successfully used technology and informational apps to provide residents with valuable information. For example, the UDOT Walking School Bus App lets parents register their children for walking groups. Parents receive notifications on their phones when the walking group leaves school and arrives at the neighborhood. While using the app this school year, parents and children walked about 88,000 miles, reducing 91,000 car trips, burning 8.8 million calories and reducing 37 million grams — roughly 41 tons — of carbon dioxide emissions. Parents say that they are more willing to let their children walk to school because the app lets them know that their children are safe.

HIGHLIGHTS
» Creating a successful transit system goes beyond the system planning – requiring integration with the city, and proactive land use policies.

Walking School Bus App

8   Source: http://www.railwayage.com/index.php/passenger/salt-lake-city-success.html
9   Source: http://www.sltrib.com/home/2726852-155/as-uta-aims-to-increase-ridership

CASE STUDIES: CITY CHARACTERISTICS OVERVIEW

	MADISON, WI	MINNEAPOLIS, MN	SEATTLE, WA	PORTLAND, OR	SALT LAKE CITY, UT	AUSTIN, TX
POPULATION						
City population (2014)	245,691	394,424	637,850	602,568	189,267	864,218
Population change (2010-2014)	5.4%	6.4%	9.8%	6.1%	2.4%	12.5%
Density, 2010 (Persons per sq. mi.)	3,037	7,088	7,1251	4,375	1,678	2,653
Urbanized area (UZA) population	413,049	2,714,959	3,172,957	1,907,887	1,053,638	1,464,998
TRANSPORTATION						
City mode split (to work)						
Drove alone	63%	61.6%	51%	58%	67.2%	73%
Carpool	8.4%	8%	8.4%	9.5%	12.3%	10.3%
Transit	8.9%	13.5%	19.6%	11.8%	6.6%	4.2%
Walk	9.6%	6.8%	9.3%	5.7%	5.5%	2.6%
Bike	5.5%	3.9%	3.7%	6.3%	2.8%	1.4%
Other	0.7%	1.0%	1.3%	1.2%	1.6%	1.7%
Work from home	3.8%	5.2%	6.7%	7.6%	3.9%	6.7%
City transit ridership (2014)	15,492,317	84,535,513	183,763,473	105,783,337	46,279,409	34,178,526
UZA Transit ridership (2014)	15,492,317	97,602,886	207,789,573	112,523,023	46,279,409	34,178,526

Madison is well-situated to achieve its goals for a high quality transportation system and a vibrant city. It has a good track record on mode share and, importantly, a strong vision for the type of city it wants to be. There are many possible directions a transportation system could take – to know how to direct it, the city must direct all decisions around its larger vision for a city.

Madison would be wise to aim its goals and policies toward the future of the growing city, rather than its past (i.e., "it's always been done this way" mentality).

To meet future needs, and deliver on a vision of a vibrant city with a robust transportation system, the city will have to:

» Retain and strengthen a clear, aggressive vision for growth and recognize the importance of land-use policies.
» Systematically grow the resources needed to meet planning requirements.
» Build a robust, effective transit system.
» Apply technology and demand-side strategies.
» Increase regional coordination and solutions.

Madison in Motion recommends specific projects and policies that together will begin to create the future articulated by Madison's citizens.

7

The plan's recommendations are organized within adopted Madison in Motion thematic goals, and are further subcategorized into the following:

» **Policy and Best Practice Recommendations;**

» **Action Items (next 1-5 years); and,**

» **Action Items (6-10 years and beyond).**

Note: Specific transportation projects (recommended to be implemented as part of the near-term and long-term capital budgets and plans) are discussed in Chapter 7 of the background document. Examples of such projects include street reconstruction projects, traffic calming improvements, pedestrian crossing improvements, public transit facility projects, transit service modifications, etc.

Improving the Public Transit System in Madison and throughout the Region

Policy and Best Practice Recommendations

i. Continue to utilize cost effective technologies that make using transit easier. Improving vehicular location technologies can provide more precise information to transit riders monitoring their bus via mobile apps.

ii. Coordinate with Metro Transit to implement payment or pass systems that are readily available and have the potential to interact with other transportation payment systems, such as smart cards that can be used to access parking garages, parking meters, B-cycle (or other bike-sharing services) and/or potential future car sharing services.

iii. Metro Transit should continue to seek to maintain the provision of ADA paratransit service above the current ADA minimum standards, which will help to adequately meet the needs of its customers (contingent upon continued robust regional funding.

iv. Incorporate transit priority elements like bus lanes, transit signal priority, and in-lane bus stops in street design, consistent with appropriate professional design standards.

v. Explore a wide range of transit pass options and expand locations where they can be purchased. Evaluate the potential for pass options beyond a 10-ride or monthly pass (including the use of contactless smart cards). To the extent possible, expand pass programs, and study creating a pass program for residential buildings. Install vending kiosks at transfer points and at other high-use facilities to provide a more convenient point of sale.

Action Items (next 1-5 years)

vi. The City of Madison, Dane County, the Wisconsin Department of Transportation, Madison Area Transportation Planning Board (MPO), the University of Wisconsin, and other local units of government and agencies (including those communities that currently contract for Metro Transit services, such as Fitchburg, Middleton, Verona, Shorewood Hills and the Town of Madison) should work cooperatively to take all necessary steps toward Bus Rapid Transit (BRT) project development and service

implementation, in accordance with all applicable local, state and federal regulations.

vii. As a component of detailed BRT planning and project development, Metro Transit should undertake a route restructure planning process, to evaluate a variety of ways to provide different transit services, such as improving overall system performance, improving travel times, and/or reducing transfers. Potential improvements could include layered local and express service, feeder routes to support BRT, and park and ride facility expansion.

viii. Require, as appropriate, that a variety of Bus Rapid Transit infrastructure or other system accommodations be dedicated by developments located along designated BRT corridors or adjacent to BRT station areas, in conjunction with applicable regulations and/or zoning required for development approval.

ix. Secure funding for additional Metro storage and maintenance capacity (i.e., new maintenance facility), in order to accommodate additional transit vehicles needed to meet existing service demands and potential service expansion. Evaluate

the potential to include such a facility as a component of a start-up Bus Rapid Transit project and federal funding application.

x. Metro Transit should continue to develop and implement its five-year transit service plan - the Transit Development Plan (TDP) - in close collaboration with the Madison Area Transportation Planning Board (MPO), as a means of implementing the City's public transit objectives and policies.

xi. Through the Transit Development Plan process, identify ways to improve existing transit service performance, including simplifying routes, optimizing stop spacing and staggering timing of buses (to reduce overcrowding).

xii. Through the Transit Development Plan process, Metro should continue to coordinate with other providers of specialized transportation service throughout the region, in order to provide the best service for passengers while eliminating duplicative service. Continue mobility training programs and incentives and investigate other innovative ways to encourage the migration of passengers from paratransit to fixed-route service.

Continue to work with paratransit riders, employers, staff, and service agencies to efficiently schedule trips and combine rides when practical.

xiii. Evaluate potential for point-deviation transit systems, similar to the YWCA van system or Transportation Network Companies (TNCs), especially to serve lower-income neighborhoods and employment nodes not well-served by current Metro service (where traditional fixed route transit service provides lengthy travel times or requires transfers). Evaluate a range of on-demand transit services for certain areas and last mile connections, including the use of a variety of vehicle sizes and route structures (see matrix: Ridesharing and Innovative Transit Methods, page 70).

xiv. Develop a parking/park-and-ride management and financial plan as a means to help improve the viability and effectiveness of public transit services in the City. Study the potential for new park and ride facilities supported by direct service to major employment centers, specifically investigating the donated/leased space model used by several transit agencies. Investigate opportunities to partner

with other agencies (Dane County, WisDOT, and/or other Dane County communities) to implement and/or operate park-and-ride facilities.

xv.   Expand the use of vanpools throughout the region, to provide high quality intercity and inter-regional public transportation options for employees living in areas not currently served by public transit.

xvi.   Working with community leaders, businesses, Dane County and other local units of government, create a process that evaluates opportunities to institute a new regional transportation or transit governance entity - as a mechanism to finance and manage public transit services in the Madison metropolitan area and Dane County. Create a strategy to advocate for State legislation allowing such an entity.

xvii.   Study possible transit funding sources for feasibility and effectiveness including: user fees such as fuel taxes or vehicle miles traveled charges; vehicle registration fees; public financing mechanisms such as sales taxes or bond measures; private sector financing programs such as developer

fees or assessment districts; city infrastructure fees, or public-private partnerships.

xviii.   Develop a long-range intercity bus service plan to ensure the continued provision of intercity bus services to and from the City of Madison, ensure the proper location of transit stations and bus staging areas, and address the impacts of intercity bus services and their facilities on residential neighborhoods.

xix.   Work with the City of Madison Planning Division, Traffic Engineering Division, Metro Transit, and the University of Wisconsin-Madison, and others to locate a site for a new intercity bus terminal. The new bus terminal should be in a location that is easily serviceable by transit without adding new routes. Evaluate opportunities to integrate Metro Transit connections and mixed-use development into the terminal facility.

Sharing Category	Sharing Subcategory	What is it?	Example (local examples in **bold**)	Works well for . . .	Doesn't work well for . . .	Pros	Cons
Bike Sharing	Dock-Based*	Short-term bike rental. Check out a bike from a dock with your credit card or membership card, return it at a dock.	**B-Cycle**	Short errands; short trips between stations; commutes from one station to another; walkable/ bikable areas with high population/ employment density.	Longer rides; longer trips to a stationless area; areas with low population/ employment density; areas that lack walking/ biking amenities.	Dependable; affordable for customers; convenient (if fairly close to a station).	Stations are expensive to install; employees have to manually "re-balance" bikes to maintain availability of both bikes and docking spaces; no helmets available with bikes.
	Dockless*~	Stationless short-term bike rental. Bikes have GPS locators - use an app to locate and reserve a bike. Enter a PIN to unlock a bike. Bikes can be "returned" and locked at ordinary bike racks throughout a given service area.	**Sobi**	Short errands; short commutes within the service area; walkable/ bikable areas with high population/ employment density.	Longer rides; one-way trips outside of service area; areas with low population/ employment density; areas that lack walking/ biking amenities.	No need to "re-balance" bikes between stations; no need for expensive docking stations; affordable.	Less dependable than dock-based because bikes can be anywhere within service area; bikes take up "regular" bike rack spaces; no helmets available with bikes.
	Peer-to-Peer*~	A system to connect bike owners with people who want to rent a bike via an on-line platform. Owners get a special lock, list a bike as available for rental, and renters reserve and check out a bike via the on-line service. Bikes can be "returned" and locked at ordinary bike racks throughout a given service area.	**Spokefly**	Short errands; short commutes within the service area; walkable/ bikable areas with high population/ employment density.	Longer rides; one-way trips outside of service area; areas with low population/ employment density; areas that lack walking/ biking amenities.	Does not depend on government/ non-profit for startup and operation.	Generally more expensive than dock-based and dockless options; less dependable than dock-based because bikes do not have to be returned to a specific location; bikes take up "regular" bike rack spaces; maintenance is responsibility of bike owners; no helmets available with bikes.
Car Sharing	Round-Trip (traditional)*~	Decentralized, membership-based hourly car rental. Cars are scattered around a given service area. Use an on-line platform to reserve a car. Unlock a car with a membership card and drive. The car must be returned to the checkout location.	**Zipcar**	Occasional "second car" use without having to own two cars; mid- to high-density population/ employment areas; walkable areas; short- to medium-length round trips (errands); occasional use of larger vehicles for hauling items.	Longer trips (hourly fee can become more expensive than a daily rental car); one-way trips; commuting/ trips with significant downtime in the middle; low population density areas; pedestrian-unfriendly areas.	Dependable; convenient for errands if a car is close by; can save money if used instead of buying a second car.	Lack of flexibility since cars have to be returned to a specific space; not useful for commuting and therefore has little impact on traffic during highest volume times.
	One-Way*~	Decentralized, membership-based hourly car rental. Use an on-line platform or call to locate a car - no reservations needed. Use membership card to access a car. Cars can be "returned" anywhere in a designated service area.	**car2go**	One-way trips within service area; occasional "second car" use without having to own two cars; mid- to high-density population/ employment areas; walkable areas.	Longer trips (hourly fee can become more expensive than a daily rental car); low population density areas; pedestrian-unfriendly areas.	More flexible than Round-Trip services; convenient for errands if a car is close by; can save money if used instead of buying a second car.	Would require change to state law to operate in WI (cars would need to be allowed to park for free in public metered stalls)[1]; generally more expensive than round-trip services; car locations can become unbalanced; convenience dependent on privately-determined service area.
	Peer-to-Peer*~	A system to connect car owners with people who want to rent a car. Owners sign up to have their cars listed on the service and have hardware installed to allow a renter to access the car. Renters rent a car via PC or app and return the car to the pickup location.	**Getaround**	Occasional "second car" use without having to own two cars; walkable areas; short, medium, and long (generally up to 200 mi/day) trips.	One-way trips; commuting/ trips with significant downtime in the middle.	Hourly and daily rates can be cheaper than traditional round-trip car-sharing or traditional car rental; can be more convenient than traditional car rental.	Availability is more based on peoples' willingness to list their cars than the potential for profit due to serving a large customer base in a densely populated area; car maintenance is the responsibility of the owner - less standardized than traditional car sharing or car rental.
Car Sharing	Closed-Network	Private car share for a specific development. Works similar to traditional round-trip car sharing, but the car is managed by a property owner and only available to tenants of a specific development.	**4119 Portage Rd. Project**	Reducing car ownership for large residential developments - occasional "second car" use; providing flexibility for employees who use transit to run errands during the day (if provided in an office building).	Longer trips; one-way trips; commuting/ trips with significant downtime in the middle.	Can be sold as an amenity to tenants; can work well even in pedestrian-unfriendly areas because vehicle is common to a specific site and tenants don't have to walk to an offsite vehicle; less dependent on area density or the market than traditional round-trip car sharing.	Lack of access to a wider network with a variety of vehicles; subject to individualized terms and conditions that may be less favorable than traditional round-trip car sharing.
	Taxicab/Limo	The "traditional" ridesourcing method: for-hire vehicles staffed with professional drivers licensed to transport passengers. In Madison, licensed cab companies must operate 24 hours a day and serve all areas of the City.	**Union Cab**	Pre-booked one-way trips to areas with poor/no transit service; trips to/from areas with paid parking (especially airport).	Impromptu/unscheduled trips since rides can't be hailed in the City (app-based TNCs are sometimes have the ability to respond more quickly).	Set prices mean riders know what they will pay regardless of time of day; dependable if booked in advance.	Expensive; more difficult to use on short notice in comparison to TNCs; less sophisticated technology limits utility for some segments of the population.

Ridesourcing	Transportation Network Company (TNC) *~	A company that uses an online platform to connect passengers with drivers using their personal vehicles.	Uber	Short to mid-range one-way trips.	Longer commuting trips; everyday commuting.	Flexible; easy to use with a smartphone.	Expensive; lack of a transparent pricing structure (can have "surge" pricing that makes it more expensive than a traditional taxicab); availability depends on private driver willingness to participate at certain times; less vetting of drivers than taxicab companies.
Ridesharing	Carpooling	Private arrangement between people to make a regular journey in a single vehicle.	MPO Rideshare	Commuting for groups of 2+ people who live and work in relatively close proximity to each other; commutes not covered by regular transit service.	Connecting people with existing transit; nonstandard working hours; low-density/ decentralized employment areas; non-employment trips.	Convenient; cost-effective; "guaranteed ride home" generally offered for free in case of emergency if signed up through a rideshare organization.	Dependent upon availability and timeliness of driver; dependent upon others with a car in fairly close proximity that share the same employment hours close to your destination.
	Vanpooling	A fee-based service (biweekly fees in the case of the State of WI Vanpool) where commuters share a van provided by a third party. The van runs with an agreed upon schedule and pickup/drop-off location(s) , and is driven by one of the commuters.	State of WI Vanpool	Commuting for groups of 8-15 people who live and work in relatively close proximity to each other; mid- to long-range commutes not covered by regular transit service.	Shorter commutes; connecting people with existing transit; nonstandard working hours; low-density/ decentralized employment areas.	Convenient; cost-effective; "guaranteed ride home" generally offered for free in case of emergency.	Must meet minimum ridership number to start a vanpool; generally depends on a centralized work location for riders.
Ridesharing	Vanpooling Subscription Service	A pay-per-ride service that provides door-to-door commuting to people outside of traditional transit service areas or hours. Rides must be booked in advance, and can be subsidized for lower-income people.	YWCA JobRide	Commuters who live or work outside of traditional transit service areas; commuters with nonstandard work hours.	Non-commuting trips.	Convenient; dependable (can book rides in advance); affordable for lower-income commuters.	Expensive to run - must be heavily subsidized; capacity constraints.
	Dynamic Ridesharing~	An on-line service to connect people making similar trips, where passengers pay a share of the trip cost. Essentially a technology-enhanced method of carpooling, with the potential for different passengers every day based on demand.	Tripda	Commuting for groups of 2+ people who live and work in relatively close proximity to each other; commutes not covered by regular transit service.	Connecting people with existing transit; nonstandard working hours; low-density/ decentralized employment areas; non-employment trips.	Can serve as a way to match drivers with space in their vehicles with other commuters, saving money for commuters and earning money for drivers.	Dependent upon availability and timeliness of driver; dependent upon others with a car in fairly close proximity that share the same employment hours close to your destination; less dependable than "traditional" carpooling.
Transit	Public Transit	Fixed-route, (generally) high-volume shared passenger transport for use by the general public for a fee.	Metro Transit	Mid- to high-density population/ employment areas; walkable areas; commuting.	Low density population/ employment areas; isolated employment/ residential areas; commuters with nonstandard hours.	Dependable; affordable.	"Feeder" routes/ low ridership routes are expensive to run and inefficient; fixed-route system lacks flexibility.
	Shuttle	Private transit service that generally operates on a fixed route to deliver employees to a specific company.	Google Bus (San Francisco-based service to deliver Google employees to its campus)	Employment campuses with parking constraints or employees who do not want to own a car.	Non-employment based trips; low-density residential areas; pedestrian-unfriendly areas.	Dependable; affordable; flexible timing and routes; convenient for employees; can reduce car trips to employers not served by public transit.	Generally implemented in response to a lack of adequate public transit; can "steal" public transit commuter rides if implemented parallel to transit.
	Microtransit*~	On-line based service that picks up passengers by using dynamically generated routes based on demand and customer location. Generally has a per-ride fee that is more expensive than public transit but less expensive than taxicabs or TNCs.	Bridj	Commuting to and from areas not served by public transit; short and midrange commutes.	Low density population/ employment areas (depends on a certain minimum ridership); pedestrian-unfriendly areas; long commutes.	Less expensive than taxicabs or TNCs; flexible timing and routes; can reduce car trips to employers not served by public transit; can serve as "first-mile" feeder transit to major public transit routes; can eliminate second car ownership for families that use a second car purely for commuting.	For-profit microtransit has the potential to compete with the highest-volume public transit routes, thus reducing use of the highest volume transit lines; for-profit services must follow money, which can conflict with social equity/ economic development goals of serving lower-income areas; can actually increase traffic if vans are driving back and forth to pick up fares.

* Generally requires a credit card.
~ Generally requires a smartphone or computer.
1: AB 322 and SB 235 to allow this were introduced in the 2015-2016 session, but did not receive a vote. City staff will continue to monitor legislation that would allow this type of service.   Updated 12/10/15

Building and Maintaining Comfortable and Safe Bicycle Infrastructure

Potential cyclist may be reluctant to bike on-street in traditional bike lanes, especially on streets with higher traffic volume or speed.

Policy and best practice recommendations

i. Ensure Madison in Motion consistency with the recommendations contained in the Bicycle Transportation Plan for the Madison Metropolitan Area and Dane County (2015), and implement the recommendations contained in that Plan.

ii. Continue to expand bicycle networks throughout the metropolitan area, with priority given to eliminating system gaps and developing additional facilities in areas where anticipated use is high.

iii. Identify opportunities to improve existing facilities, such as removing bike boulevard stop signs, widening undersized bike lanes on higher volume and speed streets, widening bike paths and giving priority to bicycles at appropriate path/street crossing locations (including raised path crossings) and advanced marking for mid-block crossings.

iv. Continue to incorporate innovative bike facilities, such as cycle tracks, buffered bike lanes and innovative intersections, where appropriate and opportunities arise.

v.

vi. Continue to construct off-street paths, with priority placed on those that eliminate existing gaps in the network.

vii. Remove major barriers to bicycling, whether by adding infrastructure at key spots or improving crossings of large roadways and other transportation infrastructure.

viii. Continue to improve intersections by adding safety improvements, bike-specific signals, diagonal crossings (where appropriate), and bicycle-sensitive actuation for traffic signals.

ix. Improve bicycle storage (including on-demand lockers and additional capacity), transit integration, and last-mile connections, for seamless integration with the larger transportation system. For example, examine ways to improve bicycle access on transit vehicles, bicycle storage facilities at major transit hubs, and innovative transportation linkages between major transit hubs and destinations (such as bike sharing, circulator transit services, etc.).

x. Identify and apply guidelines for innovative treatments, so Madison's bike infrastructure can benefit from

piloting different treatments and evolve based on what is appropriate for local conditions. Examples include emerging facility treatments being refined in other communities and design resources (e.g., protected bike lanes and intersections, new types of signalization, etc.).

xi. Continue to explore how emerging technologies can help improve bicycle safety and increase bicycle mode split. Examples include more reliable bicycle detection, vehicle-to-infrastructure/vehicle-to-vehicle (V2I/V2V) technologies and the use of electric-assisted bikes. Promote the use of new technologies related to bicycles, address relevant regulatory issues and support emerging technology training for City staff.

xii. Improve winter bicycle maintenance policies, reviewing winter biking routes, facilities plowing, and parking on streets with bike routes and bike lanes. Study winter maintenance practices to ensure the most appropriate facility is developed in new areas, balancing cost, usage characteristics, and winter/summer use patterns. Consider making winter bike facility maintenance a line item in responsible departmental

budgets to ensure adequate capital and operational funding is provided to clear facilities, and is sufficient to deliver the desired standard of maintenance.

xiii. Ensure that public and private bike storage facilities are cleared in winter. Improve the reporting process (report a problem) for maintenance of bicycle facilities.

xiv. Evaluate the creation of bicycle centers at key locations throughout the City (bicycle centers may include secure bicycle parking, lock-up facilities, bike maintenance areas, and shower facilities).

xv. Provide parallel bicycle paths within the highway right-of-way along limited access highways.

xvi. Coordinate with regional partners to ensure further development and refinement of a system of shared use paths, bicycle lanes on arterial and collector streets, and neighborhood street-level connectivity.

xvii. Improve the bike parking component of the zoning ordinance, to ensure adequate bike parking in the isthmus. Require the property owner to manage snow clearing and general maintenance.

xviii. The City's bicycle boulevard program has been in place and continues to evolve. Explore the potential to add additional treatments along current bicycle boulevards, and the creation of new boulevards as appropriate (with an increased level of treatments to encourage bicycle traffic).

xix. Improve cycling integration with transit. Investigate improved bike parking facilities at transfer points and major transit stops. Explore new options for increased bike capacity on current and future buses.

Action Items (next 1-5 years)

xx. Expand the bicycle route network, including a primary and secondary network, new off-street multi-use paths, and new on-street facilities including buffered bike lanes and cycle tracks. Create a system that balances needs of people prioritizing comfort and safety and those prioritizing efficiency and speed (see Bicycle Route Network Map, page 75).

xxi. Implement bike route wayfinding for cyclists by adopting the Bicycle Wayfinding Design Guidelines for Dane County (2016), and

provide appropriate funding for its implementation. The City should continue to work with the Madison Area Transportation Planning Board (MPO) and Dane County to implement a bicycle wayfinding system that is consistent on bikeways throughout the county, with special priority given to bikeways that have been identified as primary routes. Improve and/or simplify bicycle signage.

xxii. Continue the policy of providing bicycle accommodations on all collector and arterial streets whenever possible, and encourage adequate funding to be provided in appropriate City agency budgets in order to properly install and maintain these facilities. When these streets are scheduled for reconstruction or resurfacing, bicycle facilities need to be considered at that time (see Street Typology concepts, page 84-85); Develop specific roadway cross-sections for rural roads in developing areas of the City that may/will be converted to an urban section, in order to ensure that developers construct the proper cross-section relative to the desired urban context.

xxiii. Conduct a bicycle system route evaluation and create a map that identifies the current low-stress bicycle network (i.e., multiuse paths, protected bike lanes, low-traffic local streets, etc.), in order to help identify gaps in the continuity of the low-stress network and/or other problem areas.

xxiv. Conduct a bicycle facility capacity evaluation and plan for the isthmus, in order to determine the appropriate bicycle facility design based on usage.

xxv. Study the potential for new park and bike facilities, preferably located along major paths and within three miles of primary employment centers. Like park and rides, investigate donated/leased parking space model. Ensure adequate bicycle parking at various locations along the bike paths.

xxvi. Add new bicycle and pedestrian crossings as part of major roadway projects: investigate new bicycle and pedestrian crossings recommended for Interstate 39/90, for the Beltline (including several with new streets), for Stoughton Road (including several with streets), and for USH 151. Continue to work closely with Dane County, Wisconsin Department of Transportation, and the Federal Highway Administration to ensure improvements to existing crossings of highways, as well as the creation of new crossings (see Roadway Barrier Map, page 76).

xxvii. Assist B-Cycle with their expansion plans. Integrate B-Cycle facilities into planning and implementation of existing and planned Activity Centers throughout the City. Consider the use of tax increment financing to pay for the capital costs of B-Cycle stations in tax increment districts where system expansion is merited.

xxviii. Conduct a bikeway facility audit for the City, to help identify implementation priorities for the bicycle route network. A bicycle system audit can improve safety, comfort and ease of system navigation for cyclists. The audit can also identify locations that may be improved with such facility treatments as improving striping and painting, improved wayfinding and signage, modified roadway intersections, enhanced signalization and protected bike facilities.

Map 11
Existing and Proposed Bikeways

MADISON IN MOTION

Legend

Existing Bikeways
Off-Street Path
On-Street Route/Facility/Accommodation

Proposed Bikeways
Off-Street Path
Proposed On-Street Route on Existing Road
Proposed On-Street Route on Planned Road

Map 13
Freeway Crossings

Legend

	On Street	Bike-Ped Facility
Existing Crossing - Adequate	■ (green)	▲ (green)
Existing Crossing - Needs Improvement	■ (yellow)	▲ (yellow)
Future Crossing	■ (blue)	▲ (blue)

Building and Maintaining Comfortable and Safe Pedestrian Infrastructure

Sidewalks used by people of all ages and physical abilities, and used on some part of every trip.

Policy and Best Practice Recommendations

i.   Continue the City's sidewalk installation policy in new development areas and existing neighborhoods. Install sidewalks on both sides of all streets in all new subdivisions. Install retrofit sidewalks on both sides of all existing streets, as they are reconstructed. In limited instances, exceptions to this policy may be recommended by the Board of Public Works and approved by the Common Council. Such exceptions to the installation of sidewalks include unique topography or if the installations will result in the loss of a significant number of trees in the terrace.

- **Recommendation for New Developments:** The City should continue to enforce its ordinance requiring developers to install sidewalks along both sides of the street in all new developments at their own expense.
- **Recommendation for Site Redevelopment:** When sites are redeveloped along existing roadways without sidewalks, require the developer to install sidewalks on the site if they do not currently exist.
- **Tier 1 Streets and Sidewalks:** Tier 1 streets are those classified as arterials and collectors, streets upon which local bus service is provided, streets where there exists a high level of pedestrian activity for school access and streets that provide connections to neighborhood commercial/ community services. As such, Tier 1 streets should be given the highest priority for the addition of sidewalks in existing neighborhoods.

ii.   Maintain sidewalks, walkways, transit boarding pads, and connections to and within transit shelters for year-round use, including appropriate snow removal. Continue to enforce sidewalk snow removal and maintenance ordinances.

iii.   Continue to improve intersections and crossings, both controlled and uncontrolled, using innovative treatments such as:

- Pavement markings and treatments such as striping, painted crosswalks (possibly using red color), and decorative paving so the change in material, color, and texture signifies pedestrian priority;
- Raised crosswalks to signify pedestrian priority;
- Innovative lane channelization, pedestrian refuge areas, and

visually enhanced mid-block crossings;

- Curb extensions to effectively shorten walking distance and put the pedestrian in a more visible position to begin crossing the street;
- Signal improvements to assist with pedestrian crossings, including: pedestrian countdown signals, flashing pedestrian crossings at uncontrolled or mid-block crossings, and pedestrian-activated crossings;
- Signage at high pedestrian crossing locations to remind vehicles to yield to pedestrians at unsignalized intersections.

iv. Improve roadway landscaping, including:

- Providing adequate trees and terracing to reduce the visual and noise impact of motor vehicles on people traveling on foot adjacent to a roadway, enhance pedestrian comfort, and enhance perceived pedestrian safety;
- Improved storm water management treatments to improve water quality, help reduce peak volume, and provide a more comfortable and aesthetically pleasing pedestrian experience.

v. When streets are reconstructed ensure design supports a pleasant pedestrian experience. Providing wide, planted terraces on residential streets (8'-12' is ideal) creates an attractive buffer from the roadway while creating an optimum root environment for street trees.

vi. Where terraces are paved on the city's main streets, consider structured soil techniques, such as silva cells, to improve the health and canopy of trees and their associated ecological benefits in urban environments.

vii. On all City streets where sidewalks are installed (or retrofitted) and where terraces are paved, consider the use of permeable pavement to provide enhanced stormwater management.

viii. Continue studying how the urban canopy within the public right of way can be improved to increase stormwater management efforts, air quality and neighborhood character.

Action Items (next 1-5 years)

ix. Maintain, update and implement a Pedestrian System Plan to identify and prioritize sidewalk needs (e.g. pedestrian ramps, crosswalk enhancements, streetscape enhancements, sidewalk expansions, etc.).

x. Continue to implement a program for funding pedestrian improvements in existing neighborhoods.

xi. Work closely with the University of Wisconsin to identify priorities and implement pedestrian enhancements in and around the UW campus area.

xii. Create a planning process to identify and map existing barriers to pedestrian mobility (such as highways without adequate crossing facilities), identify where key linkages are missing, and prioritize locations where new crossings are most needed.

xiii. Create a planning process to inventory pedestrian facilities in the downtown area. Identify the optimum width of paved sidewalk and terraces, appropriate to the surrounding urban context. Inventory and analyze pedestrian facility capacity needs in the downtown and identify the specific minimum width for paved sidewalk and terraces, for both sides of all streets and blocks in the downtown.

xiv. vPrioritize Tier 1 Streets for sidewalk additions without street reconstruction. Compare pavement condition data to identify high-need streets that are unlikely to be reconstructed soon. These

pedestrian corridors may be appropriate for sidewalk installation prior to street reconstruction (insert Tier 1 Sidewalk Facility Map, page 80).

xv. Identify potential funding to ensure that new and retrofit sidewalks are built. Help to reduce the financial burden of building sidewalks on property owners in already-developed neighborhoods, by reducing the cost share percentage applied to property owners.

xvi. Pilot "shared streets" in locations with narrow roadways, high commercial activity, high pedestrian volume, and low vehicle volumes, to try out the appropriate paving treatment, programming, design features, regulations, and locations; assess the outcome (for possible expansion of a shared streets program) and explore alternative mechanisms to finance the program.

xvii. Investigate how emerging technologies, such as pedestrian-vehicle conflict warning systems for turning vehicles, can help improve pedestrian safety. Promote the use of new technologies related to pedestrians and support training in new technologies for City staff.

xviii. Evaluate modifications to parking garage exit design standards, for public and private garages, to increase pedestrian safety.

Map 12
Tier I Sidewalk Priorities

Legend

— Existing Sidewalk on One Side of Street

— No Existing Sidewalk

Note: City of Madison policy is that all streets should have sidewalks on both sides of the street. Sidewalks not included in Tier I should still be installed whenever the opportunity presents itself.
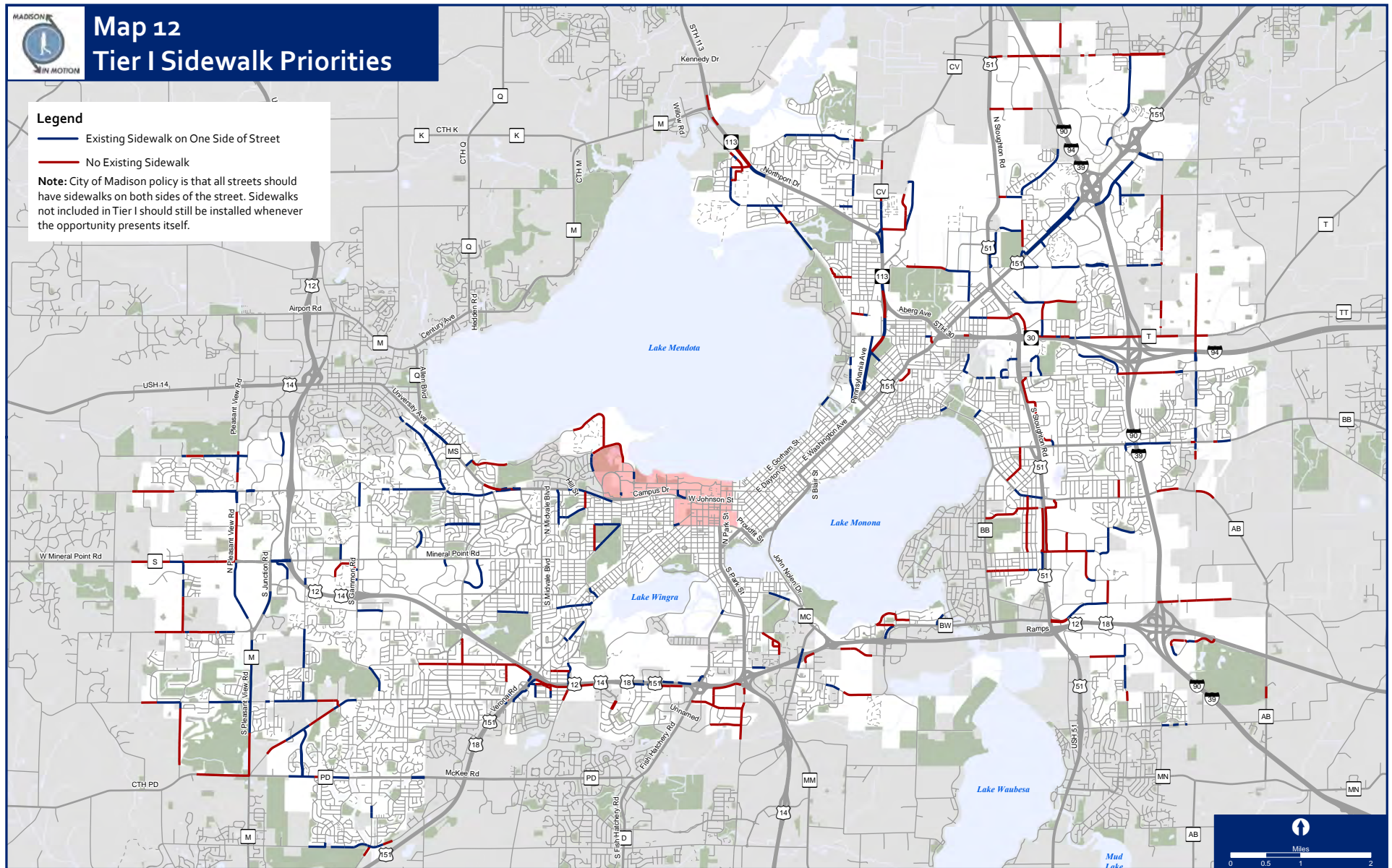
Building and Maintaining Streets and Roadways for All Users

Complete Streets are streets that work for everyone in the community, regardless of how they get around.

Policy and Best Practice Recommendations

i. Incorporate Complete Streets design components when constructing new and reconstructing existing streets and roadways (see Street Typologies, pages 84-85):

- Add pedestrian refuges, medians, and curb extensions, where needed, to improve the safety and attractiveness of walking.
- Narrow lanes to calm traffic and create space for additional uses of the right-of-way, reduce the pedestrian crossing distance between curbs, and reduce pedestrian exposure to traffic.
- Consider "road diets," with two-way left turn lanes (TWLTLs), where appropriate, pedestrian islands and bicycle facilities, to improve roadway safety and

COMPLETE STREETS NOTE:

City of Madison Resolution ID 16250 reaffirms the City's commitment to Complete Streets, and further directs staff of various agencies to follow, to the extent possible, Complete Streets concepts for all new developments, redevelopments, new street construction and street reconstruction projects. Complete Streets is a roadway facility design approach that is intended to ensure that streets are designed to enable safe access for all users, pedestrians, bicyclists, motorists and transit riders, of all ages and abilities, to be able to move safely along and across the street. Madison has a long history of following complete streets concepts without naming these as such.

While it is desired to fully accommodate all modes of transportation within the roadway cross-section, there are numerous competing uses for the street right-of-way. Specific facility treatments for each mode as components of reconstructed roadways (particularly in built-up urbanized areas of the City, like Monroe Street and Williamson Street) will need to be determined as part of roadway corridor plans, where competing interests for right-of-way (parking, sidewalk width, terraces and related amenities, bike mobility, vehicular traffic, building placement, etc.) are debated in the context of robust stakeholder involvement, careful consideration of all City objectives (including community equity implications), and a full evaluation of the impacts upon residences and businesses in surrounding neighborhoods.

better accommodate bicyclists and pedestrians.

- Consider converting one-way streets to two-way operation, where such action would not compromise other City objectives or result in detrimental impacts upon residences and businesses in surrounding neighborhoods.
- Evaluate and implement (where appropriate) traffic calming tools like traffic circles, speed tables, and speed boards as part of the City's Neighborhood Traffic Management Program (NTMP).
- Incorporate appropriate bicycle facilities for traffic speed, volume, roadway function and urban context (including shared streets, bike lanes, buffered bike lanes and cycle tracks).

ii. Adopt a "Fix-It First" policy for City of Madison streets and roadways, ensuring that pavement quality is maintained at an appropriately high level. A "Fix-It First" policy prioritizes the maintenance of roadway facilities over expansion, although some capacity expansion is warranted to accommodate orderly development (primarily on the periphery of the City). Such maintenance activities include chip seal/crack sealing, resurfacing and reconstruction. Continue to monitor street condition and utilize cost effective maintenance procedures.

iii. Reconstruct streets when they reach the end of their useful life and incorporate utility repairs or upgrades during reconstruction. Integrate Complete Streets elements into ongoing roadway construction and improvement projects. Continue to monitor street conditions and utilize cost effective maintenance procedures. Continue to implement cost-effective maintenance practices that extend the life of roadways.

iv. Install street trees along street terraces, within medians and within channelization islands, in order to help improve the aesthetics of the streetscape and potentially encourage slower traffic speeds

(by narrowing the driver's visual perspective). Ensure that such facilities allow for safe visibility and that proper maintenance resources are provided for these facilities.

v. Construct new arterial and collector streets (in and adjoining new neighborhoods) as growing areas of the City are developed, and utilize official mapping throughout the City as a tool to ensure the proper design and development of such future roadways. Facilitate rural-to-urban roadway cross-section conversions in newly-developing areas and retrofits in older areas of the City where rural cross-sections are still present.

vi. Private residential streets should generally not be allowed, due to their negative impact on the connectivity of the City's street network and their creation of isolated neighborhood pods that lack integration with the rest of the community. Explore creation of an ordinance to establish specific, narrowly-tailored criteria for the construction of private residential streets (similar to the City's general prohibition of cul-de-sacs unless specific conditions are present).

vii. To the extent possible, enhance the roadway system capacity by using Transportation Systems Management (TSM) and other innovative techniques, such as improving intersection design, driveway/access modification, lane channelization, signal timing and other strategies.

viii. On arterial streets in the City, maintain the traffic-carrying capacity of the roadway to the extent possible, especially in areas where capacity reduction would result in detrimental impacts upon residences and businesses in surrounding neighborhoods.

ix. As opportunities for reconstruction of existing streets arise, identify existing roadways with excess capacity (i.e., those with unutilized on-street parking lanes). To the extent possible, for construction of new streets and reconstruction of existing streets, narrow the street and reallocate space to more productive uses than under-utilized asphalt, such as widening the terrace, installing or expanding boulevards, or expanding bike or pedestrian facilities.

Action Items (next 1-5 years)

x. Implement the City of Madison's street/roadway, bicycle and pedestrian facility projects contained in the Madison Area Transportation Planning Board (MPO) Transportation Improvement Program (TIP).

xi. Utilize the City of Madison Traffic Engineering Division Neighborhood Traffic Management Program (NTMP) to evaluate potential traffic calming projects throughout the City. Consider traffic calming tools like traffic circles, speed humps, and speed boards.

Local Street

Collector - Chicane Parking
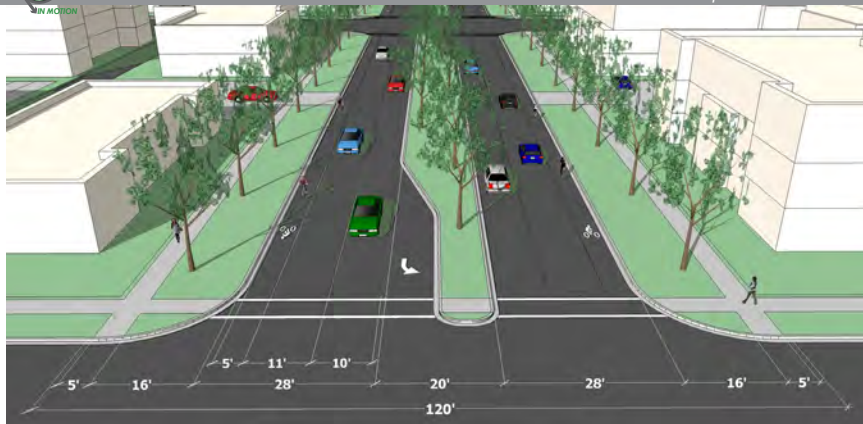
Arterial

Collector - Buffered Bike Lane
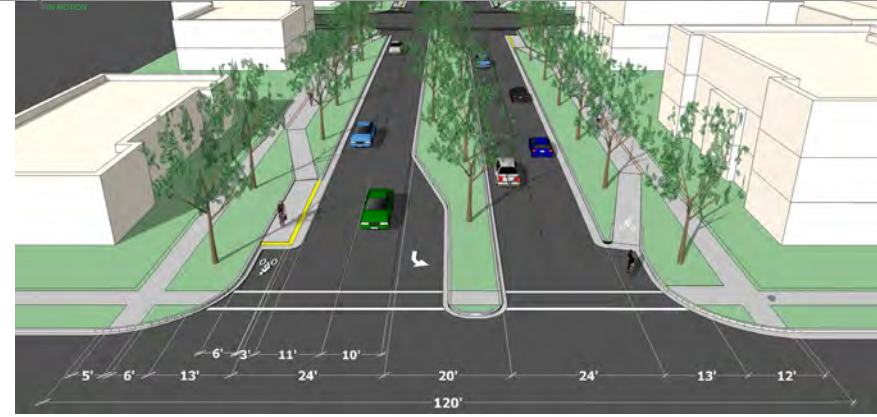
Arterial - Raised Bike Lanes

Arterial - Cycle Track
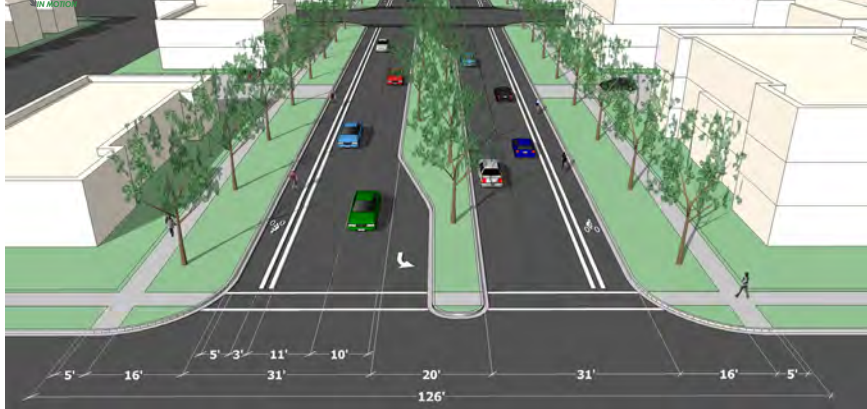
Arterial - Buffered Bike Lanes

Arterial - Raised Bike Lanes with Parking

Creating and Managing On-Street and Off-Street Parking

P

As a growing, medium-sized city, parking pressures and the perception of too-few spaces grow as quality of life concerns for cities.

Policy and Best Practice Recommendations

i. As city parking structures near the end of their useful life, evaluate parking capacity needs and the feasibility of incorporating public parking into larger, mixed-use development projects.

ii. Manage downtown and central area on-street and off-street parking occupancy, time limits and rate structures to ensure they are facilitating desired usage patterns and sufficient vacancies. Balance the needs of businesses with those of residents.

iii. Consider the development of a formal park and ride system, as a component of a high-capacity or express regional transit network (with express or limited stop transit service to employment centers) through partnerships with commercial property owners with under-utilized parking capacity during core employment commuting hours. A formal park-and-ride system is intended to increase transit use and reduce commuter parking in surrounding neighborhoods.

iv. Evaluate the efficacy of a "Park Once" program to help reduce automobile traffic and parking in the downtown and other areas of the City. Evaluate the use of dedicated shuttles from parking facilities on the edge of downtown and peripheral parking locations, such as the Alliant Energy Center and other locations, to help manage automobile traffic accessing the downtown. Evaluate the use of circulator transit services in the rapidly densifying downtown area and other locations in the City, to help manage automobile traffic.

v. Discourage new long-term commuter parking for single-occupant automobiles in the downtown.

vi. Ensure new parking facilities are designed to minimize or eliminate negative impacts of parking infrastructure on the surrounding area, such as traffic circulation or aesthetic impacts. Build parking facilities that reach high aesthetic standards.

vii. Promote provision of shared-parking facilities to avoid oversupply of parking.

viii. Continue to proactively study current and future parking demands and supplies, using innovative techniques such as Park+ software, to help understand parking impacts of future development on existing land uses and ensure that parking

policy, supply, demand, and impacts are all adequately weighed when considering projects that have an impact on parking.

ix.   Evaluate a variety of public ownership or management options for structured parking associated with new commercial developments to encourage shared use of parking and maximize the benefit of any City investments in parking (such as is being considered in the Capital East district).

x.   In central areas where parking demand generated from future development is anticipated to be high, such as in the Capital East District, explore the potential for new public parking facilities as a way to facilitate use of off-street parking at all times.

Action Items (next 1-5 years)

xi.   Continue to review and update parking pricing and management strategies. Evaluate dynamic pricing models for parking, to determine if different pricing methods could improve parking availability in high demand areas (such as near the UW Campus, State Street and the Capitol Square area) and increase parking revenue. Continue to coordinate

parking management policies with other transportation strategies, such as transit and travel demand management.

xii.   Permit Tax Increment Financing to be used, on a case-by-case basis, to finance public and private parking facilities, to support new development and to encourage shared parking arrangements.

Ensuring Land Use and Transportation System Coordination
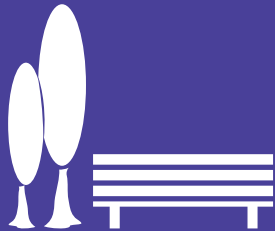
Land use and transportation plans must be coordinated and work together to achieve the City's goals.

Policy and Best Practice Recommendations

i. Encourage the development of high-density, mixed-use Activity Centers, primarily along major existing and future planned transit corridors. Activity Centers should typically include an appropriately dense mix of housing types (including affordable units and larger units for families with children), high levels of transit service, transit supportive commercial uses (such as grocery stores, child care and neighborhood-serving retail), and community facilities (such as libraries, neighborhood centers and/or senior centers).

ii. Update and implement the City of Madison Comprehensive Plan Transportation Goals, Objectives and Policies though the implementation of a variety of state, regional and local planning, project development and implementation processes.

iii. Evaluate expanding land banking funds for areas surrounding key transit nodes, transit corridors and existing/future Activity Centers.

iv. Target infill development to areas and corridors that have, or will have, high levels of transit service.

v. Focus new housing for transit dependent populations, including affordable and senior housing, along corridors with high levels of existing and planned transit service.

vi. Closely coordinate anticipated land use, density and neighborhood/urban character with appropriate street design. Provide appropriate level of on-street parking to meet demand without unnecessarily widening pavement.

Action Items (next 6-10 years and beyond)

vii. Identify the locations of future Activity Centers, both in the City and in peripheral locations throughout the region (see Activity Center Map, page 17). Collaborate with neighboring municipalities being served by Metro to maximize transit oriented development outside the City.

viii. Prepare individual Activity Center Plans, working proactively with neighborhood groups and other area stakeholders (with priority placed on those locations most likely to experience near-term redevelopment).

ix. Identify spatially mismatched areas of very high transit service and existing lower-density development to determine if higher density redevelopment along these transit corridors or around transfer points would be appropriate (examples include Whitney Way, Mineral Point Road and Sherman Avenue). Consider "up-zoning" specific nodes to encourage higher-density development in these areas, where appropriate.

Managing Transportation System Demand

Madison has both short- and long-term potential to see significant mode shift with more Transportation Demand Management measures.

Policy and Best Practice Recommendations

i. Institute employer-based Transportation Demand Management (TDM) measures as part of a comprehensive City-wide TDM program, in order to enhance the desirability of non single-occupancy vehicle (SOV)-based transportation modes – including public transit, ridesharing, bicycle and pedestrian transportation.

ii. Support ridesharing to relieve traffic congestion, reduce parking demand, reduce energy use and improve air quality. Give priority to facilities and services which encourage ridesharing for work and school trips.

iii. Incentivize employers to provide employees with Metro commute passes, especially in high frequency transit areas, retail and service sector jobs, and projects receiving city assistance.

iv. Pursue policies that result in commercial developments separating the cost of parking from leases, and thereby assign the full cost of providing and maintaining parking to those who use it.

v. Continue to make periodic pricing adjustments to City-managed parking facilities to make sure prices are in line with the market.

Action Items (next 1-5 years)

vi. iDevelop a prototype Transportation Management Association (TMA) in the City of Madison, at an appropriate area of the City (such as downtown Madison, the Capitol East District or UW Research Park), as a mechanism to organize individual employers and administer TDM initiatives.

vii. Develop and pilot TDM programs with the largest Madison-area employers.

viii. Evaluate potential further reductions in the zoning ordinance's minimum and maximum parking requirements based on proximity to high-frequency transit service.

ix. Evaluate employer-based TDM measures in order to increase the use of alternatives to the single-occupancy vehicle and to reduce the need for parking. Research TDM requirements in zoning ordinances across the US and recommend approaches to the ZTAST Staff Team for incorporation in our zoning code.

Improving Connectivity, Bridging Gaps and Enhancing Choice

One clear and distinct message from the Madison in Motion process is Madison should continue to be a community of choice – both in terms of mobility and lifestyle.

Policy and Best Practice Recommendations

i. Implement enhanced public transit service to Dane County Regional Airport, serving both passengers and employees.

ii. Expand availability of subsidized or market-priced 10 ride cards and transit passes to low income riders by installing transit pass vending kiosks at transfer points, public buildings and undeserved areas.

iii. Identify potential bicycle/pedestrian connections to break up existing superblocks (defined as city blocks that are larger than traditional city blocks, with limited crossing and access points). An example of this type of connectivity improvement would be a potential connection of East Campus Mall to Brittingham Park.

iv. Continue planning for improved connectivity across major transportation barriers between key destinations (such as the downtown business district and Law Park).

v. Evaluate sites for potential improved connectivity when redevelopment of larger parcels occurs. Examples include the Royster Corners development on Cottage Grove Road or the potential redevelopment of the Voit Farm parcel along Milwaukee Street.

vi. Utilizing data from Metro Transit's recent equity report, ensure transportation improvements equitably benefit low-income households, on both a system and neighborhood level.

vii. Improve connections across barriers such as the Beltline, Interstate 39/90 and other multilane, higher-speed roadways, in order to better connect surrounding neighborhoods and encourage non-auto modes. Utilize new bridges, new underpasses (public street or bicycle/pedestrian crossings) or improvements to existing street crossings to improve connectivity (see Roadway Barrier Map, page 76).

viii. Encourage better integration of transit and bike usage by improving bicycle storage facilities at transfer points and major stops. Consider installing bicycle parking stalls adjacent to bus stop sign poles, where possible.

Action Items (next 1-5 years)

ix.   Create a planning process to evaluate a variety of "First-Mile/Last Mile" transportation facilities and services, as a way to boost transit system use by enhancing convenience and service.

x.   As an element of the Transit Development Plan process, investigate the feasibility of integrating payment systems for buses, B-cycle (or other bike-sharing services), potential future car sharing services, and city-owned parking garages, and/or other potential transportation modes.

xi.   Promote car sharing by integrating facilities and services into city facilities and private development.

Improving Access to Affordable Housing, Employment and other Opportunities

Housing and transportation costs are two of the largest budget items in most households.

Policy and Best Practice Recommendations

i. Integrate affordable housing planning with transit planning, transit-oriented development planning, and Activity Center planning. Identify ways to enhance the accessibility of affordable housing by public transit services, especially for people with disabilities and other vulnerable populations (e.g. children, seniors, low-income communities).

ii. Explore ways to improve communication regarding vacancy, development, and housing trends to stakeholders (policy makers, developers, neighborhoods).

Action Items (next 1-5 years)

iii. Implement the recommendations contained in the City of Madison Biennial Housing Report, consistent with the directives of the Madison Common Council.

iv. Coordinate with the City's Community Development Division and Affordable Housing Initiative to target affordable and senior housing development in areas with high levels of existing and future planned public transit service, such as near transfer points or on major transit corridors, and in close proximity to community services and other neighborhood amenities.

v. Target major employers (especially in retail and service sectors), for participation in Metro's employee pass program, describing how it could benefit employees and business operations.

vi. Expand the availability of the low-income transit pass program to all eligible persons, coordinating closely with existing human service providers.

vii. Create development district initiatives (consistent with the City's Economic Development Strategy and Housing Strategy recommendations) to encourage affordable rental housing in areas well served by transit and in proximity to desired amenities

- Utilize financial tools to encourage development (e.g., TIF, affordable housing fund, land banking fund, etc.)
- Utilize neighborhood planning and urban design districts to achieve affordable housing objectives

Enhancing Racial Equity and Social Justice

For lower income households, a "transportation choice" becomes a "transportation essential."

Policy and Best Practice Recommendations

i.   Ensure transportation improvements equitably benefit low-income households, on both a system and neighborhood level. Utilize the Racial Equity/Social Justice (RESJ) evaluation tool on Madison and Motion, as well as individual recommendations and projects contained within the Plan as recommended projects and studies are carried out.

ii. Focus new housing for transit dependent populations, including affordable and senior housing, along corridors with high levels of existing and planned transit service.

iii. Integrate affordable housing planning with transit planning, transit-oriented development planning, and Activity Center planning. Identify ways to enhance the accessibility of affordable housing by public transit services, especially for people with disabilities and other vulnerable populations (e.g. children, seniors, low-income communities).

iv. Target affordable housing development in areas with high levels of existing and future planned public transit service, such as near transfer points or on major transit corridors.

Action Items (next 1-5 years)

v.   Expand the availability of the low-income transit pass program to all eligible persons, coordinating closely with existing human service providers.

vi. Make it easier to purchase 10 ride cards and transit passes for those who would use them most by installing transit pass vending kiosks at transfer points, at high-use stations, and in areas convenient to low income riders.

Transportation Enhancing Public Health and Safety

The type of transportation system we choose to build doesn't just affect our commute time, it also has direct, multi-faceted impacts on the health of citizens.

Policy and Best Practice Recommendations

i. Incorporate Health Impact Assessments (HIAs) into transportation and neighborhood planning processes, to help identify linkages between the built environment and public health.

ii. Work with WisDOT to implement the recommendations contained in the Wisconsin Strategic Highway Safety Plan (2014-2016), particularly those pertaining to improving driver alertness and reducing driver distractions.

iii. Evaluate ways to encourage more use of active transportation modes, such as walking, bicycling and public transit. Identify and address barriers to the use of these modes (see Transportation Demand Management section, page 89)

Transportation Enhancing Economic Development

Madison has many advantages working to its

Policy and Best Practice Recommendations

i.   Coordinate transportation investments with desired redevelopment and economic development outcomes. Investments in transportation should create value by fostering development and redevelopment that generates a high return (in terms of property taxes per acre), in relation to the investment of public funds in infrastructure and services.

Action Items (next 1-5 years)

ii.   Implement the recommendations contained in Connect Madison (the City's Economic Development Strategy), consistent with the directives of the Madison Common Council.

iii.   Organize and convene the business community to create a private sector driven coalition to research and advocate for investment in a modern urban transportation system and to help to make the economic case for investing in a modern and efficient transportation system.

iv.   Develop and administer a transportation needs survey for the Madison business community. Work with partners – chambers of commerce, business associations, and other communities served by Metro – to identify specific transportation needs, with a focus on a regional transit system connecting people to jobs.

v.   Create a City of Madison interdisciplinary staff team to focus on integrating emerging transportation-oriented technologies and services with regional economic development goals. Consider creating private sector partnerships in the evaluation of new transportation technologies.

vi.   Explore opportunities to establish "Innovation Districts", "Development Districts", "Activity Centers" or similarly-termed planned development areas, in conjunction with the objectives and policies of Connect Madison (the City's Economic Development Strategy) and Madison in Motion.

vii.   Explore opportunities to partner with Dane County, the State, and the regional business community on potential long-range airport improvements, including improving public transit access to the airport and working to make the airport a catalyst for commercial development activity.

Using Emerging Technologies to Enhance the Transportation System

Transportation technology is changing how people get around and the tools available to manage the transportation system.

Policy and Best Practice Recommendations

i.   Evaluate the use of enhanced, smart traffic signals that can adjust settings in response to traffic and optimize system operation for all street users. For example, such signals can extend green lights for buses and other vehicles, respond to vehicle- and bike-embedded sensors, mitigate congestion in real-time, and enhance pedestrian crossings.

ii.   Evaluate transit ITS improvements (such as GPS monitoring and real-time bus location information), to improve the transit user experience.

iii.   Continue to integrate technology and information/ITS aspects into the parking system to better direct people to available parking, reduce circling, improve customer satisfaction, and proactively monitor and manage the parking system. Integrate ITS technology related to traveler information and management of transportation systems.

iv.   Adopt a framework for how to respond to and facilitate consumer transportation technologies that improve vehicle safety.

v.   Establish priority corridors for transportation system management improvements, such as automated traffic systems, in transit planning or for congested corridors.

vi.   Monitor changing demographics and preferences around transportation and location choices to better anticipate upcoming changes in demand.

vii.   Monitor how technological advances change preferences for shopping and other consumer activities over time, and how those changes affect various aspects of transportation infrastructure and the built environment – such as delivery/drop off needs and impacts on traffic, parking, bicycle and pedestrian mobility, etc.

viii.   Continue to use improved sensors, connectivity, and data management tools to enhance transportation, transit, and parking system performance.

ix.   Continue to monitor the development of ITS initiatives and trials, such as Infrastructure to Vehicle technology, for its potential for real-time management and safety improvements.

Action Items (next 1-5 years, 6-10 years and beyond)

x.   Implement the recommendations of the Regional Intelligent Transportation Systems (ITS) Plan

for the Madison Metropolitan Area (January 2016). Recommendations of the ITS Plan will be incorporated into the Madison in Motion. However, with the rapid evolution of new transportation technologies, especially with the recent advances in autonomous vehicles, connected vehicles and electric vehicles, it is in the City's best interest to indentify and implement pilot projects on these new technologies when possible, to better position the City to make use of next-generation transportation systems and to promote mobility, public health and safety, economic growth, equity, and a clean environment.

xi.   Implement wifi on all Metro buses.

xii.   Establish a framework for incorporating and managing real time information regarding transportation options, such as transit, parking, taxi, rideshare, and traffic data.

xiii.   Develop policies and ordinances to obtain data and information from newly developing sources, such as Transportation Network Companies (TNCs), to aid in City evaluation of transit services, traffic flow, and peak demand times.

xiv.   Create a City of Madison interdisciplinary staff team to focus on integrating emerging transportation technologies and services with regional economic development goals. Consider creating private sector partnerships in the evaluation of new transportation technologies.

xv.   Work with the MPO and state of Wisconsin to enhance vanpool/carpool technologies to better match riders with rides.

xvi.   Review the impact of technology changes, such as autonomous vehicles, on municipal revenue sources - parking fees, garage revenue, tow fees, etc.

xvii.   Evaluate necessary changes to City parking infrastructure to better serve electric vehicles.

xviii.   Evaluate the impact autonomous vehicles and Transportation Network Companies will have on provision of parking as the technology continues to progress. For example:

- Should parking garages be designed to allow for conversion to other uses in case autonomous vehicles and TNCs reduce parking demand?
- Do on-street parking areas need to be redesigned to allow for additional pick-up/drop-off areas for TNCs and autonomous vehicles?

xix.   Develop and adopt a framework to analyze technology-based transportation innovations as new technology continues to develop. The framework should encourage innovation, respect consumer choice, maximize public benefit, and support other policies and best practices established in this plan. For example, framework criteria could include whether or not the technology:

- Enhances accessibility, especially for people with disabilities and other vulnerable populations (e.g. children, seniors, low-income communities);
- Improves public safety and personal security;
- Enhances transit system seamlessness and improves customer experiences;
- Allows for the City to enhance transportation/transit benefits and manage/mitigate negative impacts;
- Has a positive impact on active transportation and creating/maintaining a healthy community;
- Creates additional auto trips and congestion; and,
- Improves peoples' quality of life.

Work with Regional Partners to Create a Seamless Regional Transportation System

Transit will be a vital component to the transportation system and allow Madison's growth and economic vitality to continue.

Action Items (next 1-5 years)

i. Create a process that evaluates opportunities to institute a new regional transportation or transit governance entity, as a mechanism to finance and manage public transit services in the Madison metropolitan area and Dane County.

ii. Study possible transit funding sources for feasibility and effectiveness including: user fees such as fuel taxes or vehicle miles traveled charges; public financing mechanisms such as sales taxes or bond measures; private sector financing programs such as developer fees or assessment districts; city infrastructure fees, or public-private partnerships.

Action Items (next 6-10 years)

iii. Working with Dane County communities, explore ways to evaluate current State of Wisconsin laws and regulations pertaining to the use of development impact fees. Identify ways to expand the variety of capital and operating expenditures that are impact-fee eligible, in order to more effectively address the unique transportation impacts created by development projects in different urban contexts.

Relationships to non-City Plans and Related Planning Activities
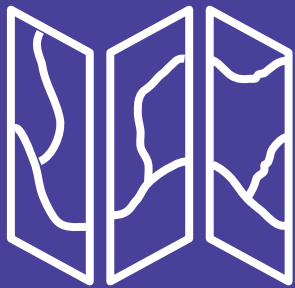
Trips don't stop at municipal borders.

Policy and Best Practice Recommendations

i. Ensure that City of Madison elected officials, policy makers and agency staff are active participants on policy and technical advisory committees of multi-agency transportation planning and project development processes that affect the City.

Action Items (next 1-5 years)

ii. Update and implement the City of Madison Comprehensive Plan Transportation Goals, Objectives and Policies though the implementation of a variety of state, regional and local planning, project development and implementation processes.

iii. Implement the transportation system recommendations contained in the Madison Area Transportation Planning Board (MPO) long-range regional land use and transportation plan.

iv. The City of Madison should remain a strong partner in the planning, design and implementation of all WisDOT arterial roadway facilities in the region, including the Beltline, Interstate 39/90, USH 51 Stoughton Road highway corridors and other state highways.

Measuring and Monitoring Transportation System Performance
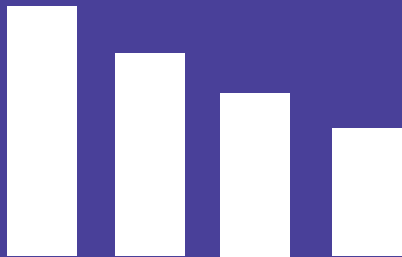
Action Items (next 1-5 years, 6-10 years and beyond)

i. The City of Madison should work with local and regional partners (including the Madison Area Transportation Planning Board, Wisconsin Department of Transportation and other area jurisdictions) to develop and maintain a transportation system performance measurement and monitoring program, to monitor transportation mode share changes over time. The performance measurement program should establish a base year 2016 dataset, utilizing the National Household Transportation Survey (NHTS) and providing necessary resources to increase the sample size (to ensure statistical validity) and to also allow for geographic targeting of data collection within certain locations of the City (to ensure that economically disadvantaged or other potentially underserved populations are reached). The City should also enhance its current data collection program to collect transportation system user volumes at specific locations throughout the City, including motor vehicle counts, transit user counts, as well as bicycle and pedestrian counts, and monitor changes over time. In addition, the City should continue to develop and refine new performance measures over time (as well as consider evolving measures), as new data sources and data collection techniques become available and reliable. Special emphasis should be given to performance measures that are specifically tailored to individual transportation modes, demographic groups and geographic locations in the City.

ii. The City of Madison should coordinate with and assist the Madison Area Transportation Planning Board, as appropriate, as it develops and monitors the transportation system performance measures at the regional level.

HOW WILL MADISON IN MOTION RECOMMENDATIONS BE IMPLEMENTED?

Recommendations contained in the Madison in Motion Plan encompass a wide range of recommendation categories.

» Policy & Mission Statements
» System Visions (Maps of Routes and Networks)
» Facility Design Best Practices/Innovative Service Delivery
» Reference to Standing Planning Processes
» Follow-Up Planning and Refinement
» Implementation Actions/Specific Projects

These recommendations are implemented in a variety of ways – through ongoing detailed planning and development processes, established transportation management programs and other transportation implementation mechanisms. As such, many of the Plan's recommendations will require the initiation of more detailed planning and/or project development processes – either stand-alone planning processes or as part of these established programs.

Policies and best practices recommendations contained in Madison in Motion will help guide the implementation of specific transportation projects, and the maps and route networks are intended to help inform where specific facilities and services should be targeted. Madison in Motion's Mission Statement and other Plan objectives and policies can be found on page 14.

Established Planning and Project Development Processes

In terms of the established planning process, many are administered by the City of Madison. However, some planning and project development processes that affect the City are managed by other local, regional or state agencies and entities.

Some examples of how various transportation facilities and services in the City of Madison are implemented, and their respective planning and project development processes include:

» Design and development of local streets in new neighborhoods as part of the City's Neighborhood Development Planning (NDP) processes.

» Implementation of transit system improvements – including a route addition or modification, installation of a new bus shelter or construction of a new park-and-ride facility – through Metro Transit's 5-year plan, the Transit Development Plan (TDP).

» Evaluation, prioritization and implementation of traffic calming measures through the City of Madison Traffic Engineering Division's Neighborhood Traffic Management Program (NTMP).

» The planning and project development of new high-capacity transit service in Madison and other Dane County communities, including new express bus service, Bus Rapid Transit service, and improvements to the local bus system.

The City of Madison recognizes the importance of these established processes as a mechanism for implementing the City's vision.

It is critically important that the City's transportation system goals, objectives and policies are integrated into these ongoing planning and project development processes. It is also important that all affected parties and interests, stakeholders, neighborhood representatives, elected officials and other City policy makers are highly involved in these planning and implementation processes. The City of Madison consistently strives to ensure full public and stakeholder participation in its planning/development processes and transportation implementation programs, and the City urges other regional and state entities to ensure appropriate Madison involvement.

1-5 YEAR PRIORITY RECOMMENDATIONS

Specific 1-5 year priority budget recommendations are outlined in detail in the Matrix in Appendix A.

Moving Forward From the Plan

The Madison in Motion Plan provides a blue print to guide the development of a sustainable transportation system for the region for the next 30 years.

However, without significant and continued collaboration with stakeholders, the plan will not succeed in its goals. The City of Madison must take an active approach to adopt policy and prioritize transportation projects recommended in this plan. Listed below are steps that can be taken to help make the Madison in Motion Plan a reality.

PLAN IMPLEMENTATION WORKING GROUP

The City could develop an Implementation Working Group. Because transportation decisions have impacts far beyond the transportation system, the group should be inter-departmental in nature. Potential group members could include:

» Department of Planning

» Department of Public Works

» Department of Parks and Recreation

» Department of Public Health

» Madison Metro Transit

» Key community groups

» Chamber of Commerce

» Developers

Expanded representation in the working group reflects the plans' focus on bringing together issues of transportation, land use, health, and economic development.

PROJECT SELECTION AND IMPLEMENTATION

While the Madison in Motion plan provides a list of recommended projects and policies, the City must identify and prioritize needs to determine which projects should be constructed and/ or implemented first. Project selection should prioritize those projects most likely to be effective in making progress in the key metrics developed in this planning process.

FUNDING IDENTIFICATION

While federal and state funding sources exist for many infrastructure projects, Madison will need to identify funds allocated for transportation projects. The implementation of the Madison in Motion Plan will represent a shift in traditional funding trajectory from a heavy focus on roadway capacity/expansion projects, to a multimodal approach.

INCREASED COLLABORATION WITH MADISON METRO TRANSIT

Much of the beneficial impacts of the Madison in Motion Plan are a result of developing denser community nodes characterized by increased walkability and activity. In order to create an effective network of community nodes, it is necessary for growth to happen in areas that are well connected to transit. As such, the City of Madison and Metro Transit must continue to collaborate in order to best serve the community. Items to be considered include, but are not limited to, the development of premium BRT service, improving the passenger experience using real-time data to provide information, and strengthening connections to other modes by developing vibrant and effective Transit Oriented Developments along key routes.