POLICIES AND BEST PRACTICES

Mobilizing Tomorrow is a plan to guide the future development of the transportation system. This chapter outlines policy recommendations and best practices to move the region towards achieving the goals and performance targets outlined in this plan.

Policy Toolkit

MPO member governments have a prime opportunity to mold the transportation network into a more robust system that offers more choices. This Chapter identifies a number of policies that the region and communities can adopt to improve the transportation system. While the MPO recognizes these policies may work differently in different communities, MPO members are encouraged to consider them and adopt them in full or part, which may streamline and thus decrease the cost of development, expand transportation choices, and mitigate environmental issues.

This chapter includes the policies related to the following topics:

- Multimodal Access
- Environmental Resiliency
- Electric Vehicles
- Parking Management
- Smart City Solutions
Multimodal Access

Looking to the year 2050, Greater Des Moines will experience significant demographic changes. The “graying” of the region will have implications for the transportation system, land use, and the placement of homes, businesses, and stores. Perhaps an even larger impact, though, could come from Generations X, Y, and Z — generally those under the age of 45 and who comprise nearly two-thirds of the region’s population. These generations have demonstrated different lifestyle choices and preferences than older generations. With these anticipated demographic shifts, creating a region where walking, biking, and using public transportation are as viable as driving will be imperative.

The region’s roadway network observes very low levels of congestion today, and forecasts indicate it will maintain a low level of congestion into the future. Even without roadway capacity additions, projections for the year 2050 do not show any significant deterioration in commute times or increased congestion around Greater Des Moines. Given this abundance of roadway capacity, Greater Des Moines can still grow while shifting funding priorities to those modes that increase transportation choice.

The region can place new emphasis on walking, biking, and public transportation such that they become more viable options. Pedestrians who can walk to different land uses, such as retail establishments, parks, and community facilities, in under 10 minutes are more likely to visit those places. Placing daily goods and services, as well as recreational destinations, within walking distance of residences increases the incentives for residents to avoid using their cars, thereby reducing traffic and wear-and-tear on the roads.

Another strategy would be to further the use of bicycle infrastructure for commuting. Complete streets have been implemented around the globe and result in multimodal access to the places we live, work, learn, and play. They typically include shared lanes, bike lanes, or cycle tracks. Complete streets should be implemented throughout Greater Des Moines, as they are accessible and friendly to users of all modes, including drivers, bicyclists, and public transportation riders.

Furthering the use of public transportation has and will continue to be a challenge for Greater Des Moines, due in large part to the lack of congestion and the short commute times, which provide little incentive to switch from private vehicles. Though bus service frequency has improved, it is often still quicker to travel by personal vehicle. Considering that future congestion is projected to be minimal, our region can at least redirect resources from private vehicle infrastructure to public transportation infrastructure in order to provide a positive incentive to switch modes.

Not only are walking, biking, and using public transportation key to increase the mobility of residents, they are central to furthering health and well-being. Every walk or bike ride is a chance for exercise and social interaction, which create a healthy and welcoming community. Additionally, walking and biking require little space for each person engaged in those activities; the more people who walk and bike, the more space can be dedicated to other uses chosen by each community. People who use wheelchairs also benefit from increased pedestrian facilities when designed to Americans with Disabilities Act (ADA) standards.

Every trip starts and ends as a pedestrian trip. As a result, improvements to the pedestrian experience benefit everyone. Additionally, no forms of travel are healthier than walking and bicycling. Providing all residents with the option of walking and biking is at the heart of supporting the region’s health and well-being. To do so requires safe, comfortable environments with all users in mind. The following six fundamental pedestrian conditions should be provided, especially in mixed-use districts, around schools, and at connections to transit. It should be noted that these conditions benefit cyclists and users of other transportation modes as well.

- **Safety**: Pedestrians are well protected from road hazards such as vehicles.
- **Security**: Pedestrians are not susceptible to real or perceived robberies or other crimes.
• **Directness**: Pedestrian paths minimize distances traveled. People will always find the most direct route anyway, regardless of where a path leads.

• **Ease of Entry**: Walking is not onerous, so steep inclines and staircases are avoided.

• **Comfort**: Paths provide high quality space appropriate to the location and destinations.

• **Aesthetics**: Environments are pleasing to the eye and inspire a person to walk to the next corner.

Creating a region where walking, biking, and taking public transportation are as viable as driving will be an incremental process to create a greater mix of transportation choices, including a robust transit network, an active carpool culture, multiple Transportation Demand Management programs, and land use and design that support walkability. Multiple steps are necessary to achieve this shift, as summarized in the following steps.

**Multimodal Policies**

**Invest in a complete transportation system**

While the road network provides efficient commutes and creates conveniences for motorists, this oversupply of capacity hinders the further development of other transportation modes. Greater Des Moines must invest in a complete transportation system — beyond one geared towards automobiles only — if it is to become a more sustainable region. The region should:

• Invest in the rehabilitation of existing infrastructure in order to maintain regional traffic operations and to make the most of significant investments made over the past decades.

• Reprioritize transportation funding to maintain the current transportation infrastructure but also increase the availability of funding that can be used to improve the transit, pedestrian, and bicycle networks. Applying transportation funds across the whole system will allow travelers the option of using multiple modes. This gives drivers additional options for getting around and gives non-drivers a feasible way to move through the region. The goal of reprioritizing transportation funding is to ensure that travel times in the region remain at or near current levels and population growth doesn’t lead to increased traffic.

**Leverage the investment in public transportation and in the bicycle and pedestrian networks by co-locating land uses and making these modes user friendly**

Transportation and land use directly affect one another; the placement of a roadway has implications for the adjacent land uses and vice versa. The same is true for other modes, including public transportation, biking, and walking. As we move toward 2050, we have the opportunity to take advantage of this relationship.

Matching transit service with where people live and work is the best way to maximize access and to operate a system most efficiently. It is also important that the transit stops are accessible by bicycle and by foot. In both the short- and long-term, the geography of future development across the region should align with the region’s transit routes, and it should be linked to the bicycle and pedestrian networks. To accomplish these aims, Greater Des Moines should:

• Promote employment and residential infrastructure along transit corridors to ensure a critical mass of riders.

• Increase transit service as density increases.
• Reduce municipal parking requirements as transit service schedules increase.

• Promote regional equity through increased access to public transportation and multimodal options in neighborhoods where automobile ownership is at reduced levels.

Riding transit should be easy for everyone to use. Schedules and maps should be available at all stops, online, via phone, and in hard copy at prominent locations like libraries. Employers, residential brokers, and building managers/superintendents should provide schedules and maps to new employees and new residents. Material should be available in all of the major languages spoken in the region. Anyone who moves to Greater Des Moines should be able to understand the system.

Greater Des Moines has already made significant investments in its bicycle and pedestrian networks. The region should build upon this base in order to enhance its multimodal transportation options. Linking these networks with public transit will also ensure that these facilities serve as viable commuting options in addition to being recreation outlets. Greater Des Moines should:

• Ensure the presence of sidewalks on both sides of existing and future roadways.

• Identify, complete gaps, and make connections within the regional bicycle and pedestrian networks.

• Explore bicycle and pedestrian network management options and promotion that support year-round use.

• Offer a share-the-road educational series as part of a larger marketing campaign.

Enhance the region’s freight network to support goods movement and economic development

The freight and goods movement network within Greater Des Moines should be safe, reliable, and efficient. Freight is critical to the success of the economy of Greater Des Moines and of the State of Iowa. Greater Des Moines sits at a crossroads of North American freight traffic through the intersection of Interstates 80 and 35. Providing the freight industry with a safe, reliable, and efficient freight network can keep Greater Des Moines on a path of economic viability. To achieve these aims, Greater Des Moines should:

• Promote air, rail, and truck freight options, and explore the development of an inland port where goods can transfer among modes.

• Work with the freight industry to reduce regional impediments to freight and goods movement.

• Maximize the efficiency of goods movement in Greater Des Moines.

• Identify opportunities to expand the goods movement system.

Prepare for changes in the transportation system

Mobilizing Tomorrow looks 30 years into the future. Much can change in that time. We are potentially at the cusp of major transportation shifts — in terms of what the system looks like and how it is powered. The Greater Des Moines region must be able to adapt to these changes by tracking shifts in technology and related trends and by forming teams to address future infrastructure needs.

Educate residents and workers on the importance of a multimodal system

• Provide training for engineers and planners.

• Adopt nationally-accepted standards on bicycle and pedestrian facilities.

• Encourage the development of municipal-level bicycle and pedestrian plans.
• Work with DART to ensure that transit stops are more accessible to pedestrians.

• Implement a public education and marketing campaign to increase understanding and awareness related to a multimodal transportation system and to increase the knowledge of the relationship between the built environment and health and well-being.

Create a more walkable region

• Connect, install, and repair sidewalks.

• Plant and maintain trees and landscaping.

• Build wide sidewalks in areas of high pedestrian activity.

• Improve street crossings near schools and commercial areas.

• Enforce right-of-way priority and motorist travel speeds in high pedestrian volume areas.

• Review pedestrian planning procedures, particularly concerning construction of sidewalks in new residential and commercial developments.

• Provide land use opportunities that allow people to be within walking distance of commercial and retail activity destinations.

• Improve pedestrian accessibility at and to transit facilities.

• Improve intersection traffic signalization and crossing times for all users, including persons with disabilities, children, and the elderly.

Expand the network of on-road bicycle friendly facilities in Greater Des Moines

• Locate directional and informational signage along trails, as lane markings, and adjacent to roads.

• Reconfigure roads to allow all bicyclists to ride comfortably and safely, including the addition of shared lanes, bike lanes, or cycle tracks.

• Install more short- and long-term bicycle parking facilities.

• Provide clearly defined, safe, comfortable, and accessible bicycle commuter routes.

• Provide bicycle commuter amenities such as parking, showers, dressing rooms, and other end-of-trip facilities.

• Establish short- and long-term bicycle parking facilities near bus stops.

• Encourage the presence of paved shoulders on rural roadways.

Encourage compact, mixed-use development policies that create a more human-scale environment

• Promote the use of shorter block lengths in new developments, resulting in a fine-grained street network that features more intersections.

• Minimize the use of cul-de-sacs in order to maximize connectivity.

• Foster higher density development.
• Implement traffic calming methods to create bicycle and pedestrian friendly corridors.
• Install street furniture to create a more inviting pedestrian environment.

Nodes + Corridors Initiative

The region should develop a system of vibrant, walkable employment and residential nodes dispersed throughout Greater Des Moines and connected to one another by multimodal corridors. Developing nodes can increase employment opportunities, housing options, and overall community health and services near key neighborhoods while leaving neighborhood character intact. Over the last few decades, development in the region has been predominantly auto-oriented.

Anticipated changes in the demographics of the region also show that future residents will demand a greater range of living options resulting from both different lifestyle preferences and the escalating costs of private automobile travel. How the region grows to accommodate these additional people will be a major factor in the future success of the region’s economic, environmental, and social characteristics.

Focusing redevelopment in certain areas and connecting those areas furthers all aspects of sustainability:

• Targeting specific nodes throughout the region allows developers and local governments to use existing infrastructure, thereby reducing the need for costly infrastructure expansion and minimizing the costs to taxpayers that growth often creates;
• Developing mixed-use, mid-rise (two to five story) buildings at targeted nodes and corridors substantially increases the tax base of local communities;
• Building mixed-use, mid-rise developments helps support the maintenance of aging infrastructure through increased revenue;
• Creating a mixed-use, walkable environment at nodes and along corridors helps reduce vehicle miles traveled (VMT), improves air quality, and supports lifestyles that are more active.
• Use of these nodes and corridors allows existing residential neighborhoods to remain relatively unchanged while increasing the diversity of housing options across the region;
• Focusing these nodes and corridors on employment, commercial uses, and residential activity makes it easier for DART and others to provide multimodal transportation options.; and,
• Increasing fuel/transportation costs will make these nodes and corridors increasingly attractive over the coming decades and will help promote the region’s competitive edge.

Implementing the following actions can help achieve this strategy:

• Work with communities to identify areas that are potential candidates for development/redevelopment as walkable nodes and corridors.
• Target street improvements at identified nodes/corridors to create a more pedestrian-oriented environment. These improvements can include narrowing travel lanes, reducing speed limits, installing planted medians, adding on-street parking, widening sidewalks, and planting street trees along medians and sidewalk.
• Develop model form-based code and transit-oriented development overlays for the proposed nodes and corridors to make sure communities achieve vibrant, mixed-use, walkable environments.
Additional design recommendations for implementing the nodes + corridors initiative can be found in Chapter 5.

**Complete Streets Policy**

The MPO and its member communities should develop and adopt Complete Streets policies, complemented by roadway design standards. Complete Streets are roadways designed to safely and comfortably accommodate all users, of all ages and abilities, including but not limited to motorists, cyclists, pedestrians, transit users, school bus riders, delivery and service personnel, freight haulers, and emergency responders.

Building complete streets provides many benefits to residents, business owners, developers, and the community as a whole. First and foremost, embracing the complete streets concept will help create balanced transportation systems by providing accessible, safe, and efficient connections between destinations. It will bolster economic growth and stability while increasing property values. It will enhance job growth, improve safety, improve public health and fitness, reduce harmful emissions, and reduce the overall demand on our roadways by allowing people to replace motor vehicle trips with active transportation options. Secondly, integrating sidewalks, bike facilities, transit amenities, and safe crossings into the initial design of a project spares the expense and complications of retrofits implemented at a later date. Thirdly, proactively planning for a multimodal transportation system can promote its integration with land use policies to encourage sustainable development.

A proposed Complete Street Policy, as well as recommended street design criteria, can be found in Appendix A.

**Environmental Resiliency**

**Floodplain Management**

Greater Des Moines has seen significant damage from floods. The adoption of a floodplain management policy can help the region prepare for more extreme weather events that cause flooding and increase water flow along creeks and rivers. Floodplains provide beneficial natural functions essential for water resources, wildlife habitat, and human interaction. Some of these functions include temporarily storing flood waters; filtering sediments and nutrients to improve water quality; recharging the groundwater supply; supporting natural vegetation that reduces soil erosion; and, providing fish and wildlife habitat. A floodplain management policy should consider and protect these functions.

No Adverse Impact (NAI) Floodplain Management is an approach that ensures the actions of any community or property owner, public or private, do not adversely impact the property and rights of others while protecting natural and beneficial functions of floodplains. An adverse impact can be measured by an increase in flood stages, flood velocity, flows, the potential for erosion and sedimentation, degradation of water quality, or increased cost of public services. NAI promotes responsible floodplain development through community-based decision making. Principles of NAI include:

- Prevent the worsening of flooding and increase flood peaks / stages
- Avoid diverting flood waters onto other properties
- Prevent reducing the size of natural channel and overbank conveyance areas
- Prevent altered water velocities
- Prevent increased erosion and sedimentation
- Prevent filling in floodplain storage areas
- Reduce the community’s liability
Implementing NAI principles when planning roads can result in cost savings over time due to reduced infrastructure damage. The MPO encourages local community to integrate NAI principles in the development of the community’s transportation system and comprehensive plan in order to manage development that identifies acceptable levels of impact, specifies appropriate measures to mitigate adverse impacts, and establishes a plan for implementation.

**Green Infrastructure Introduction**

Local governments from across the county face serious challenges in managing urban stormwater. Aging infrastructure, changes in precipitation patterns, watershed development, and impervious surfaces such as roadways and parking lots cause urban flooding that pollutes water ways. Climate change will exacerbate these flood risks in many places, like the Des Moines Metro due to more intense storms that could overwhelm existing infrastructure systems. If we fail to adapt these systems, severe repetitive flooding will increasingly affect community health, safety, and welfare as the consequences of flooding often impose a disproportionate toll on the most vulnerable and disadvantaged populations and communities.

Green infrastructure is an approach to water management that protects, restores, or mimics natural water cycles by retaining and treating water where it falls. Green infrastructure, unlike gray infrastructure, which is designed for the single-purpose of moving water through a sewer system, is designed to treat rainwater at the source through enhanced infiltration. It is a dynamic, multi-benefit, effective, efficient, and economical tool that has the ability to enhance community safety and quality of life at multiple scales of land area and rainfall amounts.

**Green Infrastructure Best Practices for Transportation Systems**

The following is a summary of the best stormwater management practices that can be scaled to any transportation system or built environment. Any community could mix and match a patchwork matrix of these across their public land. Doing so would lead to better management of stormwater.

**Bioswales & Biocells**

Bioswales are a type of stormwater retention that use an open-channel shape and vegetation to slow runoff and filter pollutants, reducing strain on stormwater infrastructure and improving water quality. Often integrated into streetscapes or used to convey stormwater away from critical infrastructure, bioswales can also reduce the need for gray stormwater systems to be installed by capturing and storing some of the stormwater. Bioswales can also reduce temperatures, increase habitat for urban wildlife, and improve air quality. As an added benefit, they are often aesthetically pleasing and can potentially increase property values.

**Constructed Wetlands**

A constructed wetland is an artificial wetland built to treat stormwater from primarily agricultural drainage systems but is also developed for urban runoff scenarios. According to the Natural Resource Conservation Service, “the constructed wetland system is designed to reduce nutrient and sediment loading and provide other water quality benefits while providing wildlife habitat.” This type of installation would be best for larger scale project as the ecological function typically can handle large amounts of water to filter through and eventually leave the system.

**Permeable Pavers**

Permeable pavements have spaces for air and water to pass through; the spaces allow water to infiltrate into the ground, reducing runoff. Asphalt and concrete can both be made porous by omitting the smaller aggregates that are usual components. More specialized forms of porous pavements include interlocking concrete pavers, in which water drains through the gaps between precast blocks, and grass or gravel pavers, in which fill materials are laid on top of a plastic grid. Permeable pavements also have cooling properties due to evaporation and reduced heat storage. Permeable pavements are appropriate for sidewalks, parking lots, alleys, and streets. Some concerns about
whether permeable pavements are appropriate for cold climates or high-traffic areas are being monitored and evaluated in cities like Chicago and Washington, D.C., with positive results to date.

**Tree Boxes & Trenches**

The value of trees in communities is immeasurable. Trees provide shade on a hot summer’s day. They clean the air and provide habitat and food for wildlife and they play an important role in managing urban stormwater. Trees are mini-reservoirs for rain and reduce urban stormwater runoff at the source by:

- Intercepting rain on leaf canopies and evapotranspiring moisture back into the air
- Increasing infiltration and uptake of rainwater through the tree’s root system
- Uptake of nutrients such as nitrogen and phosphorus
- Reducing soil erosion by slowing rainfall before it strikes the soil

Tree boxes are containment systems like small bioretention cells that include trees as vegetation. They include an engineered soil mix, underdrain, over flow and are usually tied to the storm sewer system or connected in a stormwater treatment to other stormwater BMPs. There are specific tree species that thrive in these systems.

Tree trenches are typically elongated surface systems in sidewalk areas that consist of engineered soils placed within a plastic network of support that can be placed beneath permeable pavers. The tree roots have a large subsurface area to expand rather than be confined in a very small containment system.

**Rain Gardens**

Rain gardens are small gardens that are designed to survive extremes in precipitation and help retain or reduce stormwater runoff through infiltration or storage. The gardens are often small and placed strategically in areas where stormwater currently overwhelms drainage capacity. They can be incorporated as part of general landscape design or as part of a larger streetscape. In addition to managing stormwater and reducing nutrient pollution, rain gardens can also reduce temperatures, provide wildlife habitat, and improve aesthetics. Rain gardens can be installed in many different areas and do not need to take up much space, including street curb cuts like this example from Anoka County, Minnesota.

**Green Streets, Alleys, and Parking lots**

Green streets, alleys, and parking lots can combine all of the above strategies into a coherent package. By combining the strategies, green streets can provide multiple benefits, including runoff and pollutant reduction, air quality improvement, and urban heat island mitigation. Local governments primarily install green streets in the public right-of-way, but green alleys and parking lots can be installed on both public and private land. For all three, a critical element can be to minimize pavement in the first place.

**Green Infrastructure Policies**

**Stormwater Management Plans**

A stormwater management plan is a comprehensive long-term plan that integrates stormwater management within a community’s broader plans for economic development, infrastructure investment and environmental compliance. Through this approach, communities can prioritize actions related to stormwater management as part of capital improvement plans, integrated plans, master plans or other planning efforts. Early and effective stormwater planning and management by communities as they develop will provide significant long-term cost savings while
supporting resilience, economic growth and quality of life.

The U.S. Environmental Protection Agency (US EPA) has a guide for any city seeking to create a Stormwater Management Plan.

**Stormwater Management Ordinances**

As development of land occurs, the importance of managing stormwater is increasingly apparent. Stormwater discharges can be responsible for water quality degradation, flooding, and stream channel erosion. Approaches to the management of these problems have been piecemeal at the state and local level, ranging from trying to prevent development to extrapolating stormwater management authority based on existing subdivision, zoning, flood control, and/or erosion control ordinances. These approaches have been largely inadequate for two reasons. First, ordinances for other purposes are not easily adapted. Second, enforcement has been difficult because the courts have been reluctant to rule in favor of ambiguous regulatory authority and against well-established private property rights. This strongly suggests the need for local stormwater ordinances.

The components of stormwater management ordinances fall into four major categories: legal authority and context, technical basis, administrative apparatus, and enforcement provisions. The ordinances also generally address both stormwater quality and quantity. However, there are differences in the way a stormwater management ordinance should be written to emphasize water quality. USEPA and Iowa Stormwater Education Partnership have a set of guidelines and model ordinances available to create an effective stormwater management ordinance for either focus.

**Cost-Share Programs**

Green infrastructure projects are not only for public lands. Homeowners and businesses can help to reduce stormwater runoff and improve water quality through the use of best management practices on their own property. Since green infrastructure is scalable and dynamic, implementing best practices can be specialized, placed, and sized to accommodate the needs of any property or any neighborhood to address specific issues.

A local cost-share program can help reduce the cost burden of installing green infrastructure on private lands. Just like the practices they promote, a cost-share program can be scaled to the community’s stormwater needs and funds allotted for such a program. Many Des Moines area communities have cost-share programs in place for stormwater best practices. They range from aiding in the purchase of rain barrels up to $75 to providing funds for projects up to $4,000, and they also range in practices that are covered. Some communities target neighborhoods with extensive stormwater infrastructure expansion needs and are provided specialty cost-share programs where the specific practices are promoted and the community takes on the whole cost of installation.

In addition to the list of best practices, rainwater harvesting and soil quality restoration are a affordable and great gateway practice to introduce property owners to the amount of water their property takes on during a rain event and the capacity of water storage turf can hold. If property owners are willing to take a step forward to more intense practices towards native landscaping, rain gardens, and permaculture. In any case, a community can aid property owners to manage water on their lands through this simple and efficient program.

**Watershed Management Authorities and Plans**

In 2010, Iowa lawmakers passed legislation authorizing the creation of Watershed Management Authorities. A Watershed Management Authority (WMA) is a mechanism for cities, counties, soil and water conservation districts (SWCDs) and stakeholders to cooperatively engage in watershed planning and management.

In Iowa a watershed management authority is formed by a Chapter 28E Agreement by two or more eligible political subdivisions within a specific eight-digit hydrologic unit code watershed. A board of directors governs the WMA, which may undertake the following activities:
• Assess and reduce flood risk;
• Assess and improve water quality;
• Monitor federal flood risk planning and activities;
• Educate residents of the watershed regarding flood risks and water quality; and
• Allocate moneys made available to the Authority for purposes of water quality and flood mitigation.

A WMA does not have taxing authority and may not acquire property through eminent domain.

Currently there are 26 watershed management authorities in the state of Iowa, six of which are located in the Des Moines Area MPO planning area. Of the 26 statewide, nearly a dozen have approved active watershed management plans. Three of these approved and active plan are within the Des Moines Area MPO planning area.

A Watershed Management Plan is an important tool for any group looking to improve their local lake, river or stream. Put simply, a Watershed Management Plan identifies water quality problems in a watershed, proposes solutions, and creates a strategy for putting those solutions in action. Watershed Management Plans take a long-term, comprehensive approach, which has proven to be successful in a number of watersheds.

**Climate Action & Resilience Plans**

A Climate Action & Resilience Plan provides evidenced-based measures to reduce greenhouse gas emissions and preventative measures to address the negative outcomes of climate change. This type of plan demonstrates how a community or region will adapt and improve its resilience to climate hazards that impact today, as well as risks that may increase in the coming years.

Developing a Climate Action & Resilience Plan allows a community to develop strategies that will not only help minimize its carbon footprint but can help save money and improve the quality of life of residents. Co-benefits associated with climate action planning include decreased traffic and congestion, improved air quality, better access to parks and green spaces, and cost savings through energy efficiency projects.

Green infrastructure is a critical piece to any climate action plan developed in Iowa due to the pattern of intensifying precipitation events and droughts due to climate change. Dubuque Iowa has the most prominent and effective climate action and resilience plan in the state of Iowa. The many strengths of this plan and lessons learned from the process should be taken into consideration by any city or region that plans to create and adopt their own.
Electric Vehicles

Electric Vehicle Readiness

The future of transportation is in a fundamental shift to cleaner, more efficient fuels. Energy consumption affects air quality and impacts global climate as a result of emissions. The Tomorrow Plan recommended a strategy of promoting the use of renewable energy and reduced energy consumption. One of the more efficient and sustainable fuels is that of electric drive systems. Des Moines area cities and counties can play a critical role in promoting strategies to decrease transportation related greenhouse gas emissions through the deployment of both public and private charging infrastructure. Given this, the MPO has identified three main recommendations for municipal governments to support the next steps in early adoption of electric vehicles for private use in the metro area:

• Take the lead in the installation of publicly sited electric vehicle supply equipment
• Incentivize local installation of electric vehicle supply equipment at the workplace and multi-unit residential facilities
• Integrate electric vehicle infrastructure into comprehensive plans

Parking Management

Parking Management

The provision and management of parking play an enormous role in the look and feel of streets, traveler mode choice, and congestion levels. Parking spaces are a valuable commodity; like any commodity, they are subject to the laws of supply and demand. Typically, however, parking has been supplied without much thought to actual demand — or demand for any form of parking other than free parking — resulting in swathes of real estate being reduced to asphalt that sits largely empty for much of the day.

The concept of parking management starts from the understanding that the conventional approach has resulted in too much asphalt and distorted transportation markets, which make it almost impossible to run efficient transit systems or to simply walk or ride a bike safely across much of the country. This approach must be shifted to strategies that acknowledge the true costs of accommodating driving at the expense of alternate modes.

On-street parking and municipal parking lots and garages typically represent just a small portion of the overall supply of parking in any community. These spaces, however, tend to have an outsized impact on travel behavior and traffic impacts. These spaces are usually found downtown, or in other significant commercial centers, and tend to include the most popular parking options in these areas. This is particularly true of on-street spaces, which, more often than not, include the space that is closest to the front door of any given driver’s destination. The following overarching principles should guide parking policy and implementation.

• Manage supply as a comprehensive system. On-street, off-street, public, and private resources should be managed collectively. Standardizing pricing and payment mechanisms makes the system easier to understand for the user.
• Share parking. Most parking is sized to cater to a single use or business, resulting in oversized lots. The customer wants to be assured of a parking space; whether that space is in front of the destination or 50 feet to one side in front of a different retailer makes no difference. In mixed-use areas, different land uses have different peak periods; thus, shared parking accommodates peaks for both uses.
• Use parking as a tool to manage congestion. Each parking space encourages at least one trip on the region’s roads; thus, managing parking is a powerful way of controlling congestion.

• Incorporate good design. Zoning codes can include design standards for parking facilities to reduce parking garage blank walls and large parking lots in front of buildings, and to increase pedestrian access. Environmental innovations such as porous pavements can also be incorporated.

Parking management is not a one-size-fits-all technique. Strategies for suburban areas do not work in downtowns and vice versa. Rather than applying suburban parking requirements on mixed-use places, let the strengths and weaknesses of a location determine its parking supply. For instance, people are attracted to downtown mixed-use areas precisely because the streets are walkable and blocks compact; building parking lots in these places ruin their character.

Smart City Solutions

Introduction

As cities and metropolitan regions grow, their transportation systems become more complex and challenging. Conventional transportation planning has resulted in disparate modes of travel and sprawling urban environments that have not been conducive to meeting the lifestyles and expectations of twenty-first century citizens. Smart Cities seek to integrate information-communication technologies (ICT) with the built environment to deliver enhancements to current urban systems and services, such as increased public safety, greater efficiency, more engaged community participation, and better-informed public decision making. As a more focused component of the Smart Cities movement, Intelligent Transportation Systems (ITS) incorporate ICT into transportation infrastructure and vehicles to improve the safety, accessibility, mobility, and sustainability of urban areas.

Smart Cities and ITS require a robust ICT infrastructure to operate effectively. Interconnected sensing and communication devices installed in city infrastructure such as roadways, streetlights, and traffic signals serve to connect and relay information with connected vehicles, personal devices, and traffic operations management centers. According to the American Planning Association (APA)’s “Smart Cities and Sustainability Initiative,” the transmission of data for Smart Cities operations would require not only a wireless network because of its flexibility and convenience but also a fiber network for its capacity, security, and reliability. To prepare for developing additional ITS and Smart Cities capabilities, cities in the Des Moines metro region can begin to document existing ICT infrastructure for ITS and prepare an ITS Master Plan. The City of Des Moines approved its first ITS Master Plan for future traffic management and communication systems infrastructure in November 2018, and several surrounding communities are collaborating on an ITS Master Plan to determine the potential for shared traffic management services.


Nationally, the Federal Highway Administration’s Every Day Counts (EDC) program identifies vetted transportation technologies and innovations that can be immediately adopted in local communities and the metro region. Strategies from the EDC program for developing ITS and Smart Cities include:

- Adaptive Signal Control Technology
- Automated Traffic Signal Performance Measures
- Data Driven Safety Analysis
- Data Driven Traffic Incident Management
- Integrated Mobile Observations and Pathfinder Implementation Plan for Road Weather Management
- Queue Management Systems and Variable Speed Limit Systems for Smarter Work Zones
- Unmanned Aerial Systems
- Crowdsourcing for Operations

As a regional entity, the MPO has noted it can explore the Regional Models of Cooperation strategies.

Source: U.S. Department of Transportation

In 2015, the US. Department of Transportation inaugurated the Smart City Challenge and elicited the responses of 78 applicant cities with similar transportation challenges. These cities envisioned new means of:

- providing first-mile and last-mile service for transit users to connect underserved communities to economic opportunities
- assisting freight transportation into and within urban environments
- coordinating data collection and analysis across transportation systems
- reducing parking and payment inefficiencies
- limiting climate change impacts and carbon emissions and optimizing traffic flow on congested roadways

The Smart City Challenge and subsequent publication, “Smart City Challenge: Lessons for Building Cities of the Future,” provide a starting point to survey the spectrum of Smart Cities efforts and to review how ICT are utilized to address transportation challenges. The MPO with the City of Des Moines has a Smart City Challenge entry submission that other communities in the metro may reference.

The large data needs of Smart Cities and ITS require a systematic, open and transparent, and regionally collaborative and cooperative approach. The Smart Cities Council presents the process on how Smart Cities utilize data through the 3 C’s and 3 P’s:

- Collecting data through sensors in infrastructure and objects or through shared data
- Communicating data through networks for working with real-time data
- Crunching data
- Presenting information for decision makers and the public
- Perfecting systems through automated adjustments and optimizations
- Predicting phenomena through analyzing historical data to make decisions and to take actions in real-time

Facing the implementation of the 3 C’s and 3 P’s are data challenges identified by the Royal Institution of Chartered Surveyors in their report, “Smart Cities: Big Data and the Built Environment: What’s Required?” These challenges that Smart Cities may face are interoperability and common standards, opening access to data, and security and privacy. In addition, other considerations should be given to addressing the energy needs behind Smart Cities and ITS technologies and ensuring that equity is maintained, especially with existing environment justice (EJ) areas. In meeting the challenges of interoperability, common standards, and open access to data, it makes little sense for cities in the Des Moines metro to work on these topics separately and create redundancies and inefficiencies in the process. As an existing regional facilitator, the MPO plans to coordinate Smart Cities and ITS projects and activities of its members. As such, the MPO recognizes the need for a systematic, open and transparent, and regionally collaborative and cooperative approach to Smart Cities and ITS.

Smart Cities have primarily developed independently, but the MPO seeks to move beyond the convention of isolated Smart Cities. The MPO envisions the development of a Smart Region where the technologies and innovations of Smart Cities and ITS not only serve the transportation system of one community but improve the entire region’s associated systems, such as the regional environment, housing, land use, public health, and economic development. Other areas across the United States have already begun expanding their focus from Smart Cities to Smart Regions. For instance, the North Florida Transportation Planning Organization outlined its vision to become the nation’s first Smart Region in its 2017 “Smart Region Master Plan.”
It is recommended that members of the MPO pursuing Smart Cities and ITS align their projects and activities with the MPO's existing goals within The Tomorrow Plan and the Mobilizing Tomorrow plan. Some Des Moines metropolitan area cities have already started through the goals and action items identified in their comprehensive and transportation plans. Additionally, projects and activities developing Smart Cities and ITS should assume a regional approach and incorporate the appropriate communities. Community engagement and positive public reception and feedback are instrumental for sustaining the vitality of Smart Cities and ITS projects, as well as, igniting excitement and enthusiasm for continued activities.

There are a variety of Smart Cities opportunities for communities and the region to consider. The following provides a brief but not exhaustive list of examples:

**Expanding Mobility Sharing Options**

Existing carshare options, such as Zipcar, and rideshare options, such as DART’s RideShare program or transportation network companies (TNC) such as Uber’s UberPool, could be expanded to reduce personal automobile usage, emissions, and parking needs. Aside from automobiles, other micro-mobility options, including bicycle-sharing with B-Cycle and scooter-sharing, can be expanded to provide active transportation options. The interconnection between the different transportation modes can be more seamless through developing a universal smart transportation payment system that allows for transfers between different transportation modes. The continued electrification and automation of vehicles present future vehicle sharing prospects.

**Electric Fleets and Electric Charging Infrastructure**

Existing vehicular fleets of MPO members are primarily operating from fossil-fuel sources. Alternative fuel vehicles, such as electric and hybrid fleets, are a more sustainable alternative. To assist this transition, communities can support electric charging infrastructure to encourage the increased usage of electric vehicles. Additionally, the experiences gained from installing electric charging infrastructure can spur other Smart Cities and ITS device installation projects, such as LED streetlights with sensing capacity or smart parking monitors.

**Connected and Autonomous Vehicles**

The deployment of connected and autonomous vehicles is still in its infancy. While these technologies are still in development, MPO members have a chance to become innovators through pioneering experimentation. Current connected and autonomous vehicles should first be piloted within a confined area, such as on automated circulation routes containing healthcare, shopping, education, or first-mile/last-mile connections to airports and bus stations. Various agencies in Iowa are currently studying connected and autonomous vehicles, though their full utilization would require supporting connected infrastructure for communications.

**Smart Parking**

Though primarily the larger cities in the metro area are faced with parking challenges, increased population growth in the region and technological developments prompt other communities to re-examine parking as they continue toward more dense developments. Devices and sensors installed in infrastructure can indicate whether a parking space is available and broadcast the information to connected vehicles. These technologies help to reduce congestion from roaming vehicles searching for parking, provide connected and autonomous vehicles the ability to locate and self-park, and ease parking demands on land-use. For example, the Des Moines International Airport installed a parking guidance system which uses ultrasound to detect available parking spaces and then updates signage to notify drivers of available parking spots. Additionally, the Iowa DOT is currently studying smart parking for freight through the Truck Parking Information Management System (TPIMS).

**Connected Infrastructure and Improved Data-backed Trip Decisions**

Along with smart parking, other connected infrastructure can collect and relay real-time data to support and enhance trip decisions. The current movement of vehicles can be better facilitated with smart traffic signals that are connected...
and provide performance data and responsive roadway management. Bicycle and pedestrian needs can be improved through understanding their flows with bicycle and pedestrian counters and the identification of safety improvements through crowdsourcing tools. Priority at signals can be given to freight, emergency vehicles, and public transit to improve their efficiency as well as to provide better detection and safer and longer crossing times for pedestrians, those with disabilities, or bicyclists. The City of West Des Moines has experience with adaptive traffic signal systems as well as preparing advanced traffic signal detector units for bicyclists. Other examples in the metro include:

- Des Moines’ bicycle detection projects on Martin Luther King Jr. Way and Ingersoll Avenue
- Clive, Urbandale, and Windsor Heights installation of adaptive traffic signal control along Hickman Road
- Pleasant Hill upgrading to adaptive signal controls along IA 163 and Waukee upgrading to adaptive signal control with performance measures

Operations of connected infrastructure are powered on electricity and a communication network connection through wireless or fiber. MPO members can first coordinate on adopting common infrastructure and data standards before embarking on trial connected infrastructure projects. An example of such a project is the National Operations Center of Excellence’s 2019 SPaT (Signal Phase and Timing) Challenge to deploy communications infrastructure and broadcasts in one corridor or network of approximately 20 signalized intersections by January 2020 to support vehicle to vehicle (V2V) and vehicle to infrastructure (V2I) traffic operations.

Regionally Integrated Smart Transportation

As a potential component of a Smart Region, a regional transportation operations and communications coordination center (traffic management center) for the Des Moines metro has been suggested. In 2016, the Iowa DOT opened a statewide traffic management center in Ankeny which can lend support for a local center more focused on the specific transportation conditions within the Des Moines metro. A nearby example is the Transportation Management Center (TMC) of the Ozarks in Springfield, Missouri that has been operating with the Missouri Department of Transportation (MoDOT) for management of the signal system and Advanced Traffic Management System (ATMS) devices. A regional TMC would also support the Iowa DOT’s current Integrated Corridor Management (ICM) study to integrate individually managed roadways into a coherent transportation network. Regionally integrated smart transportation management would not only improve travel efficiency but safety as well. In collaboration with the Institute for Transportation (InTrans) at Iowa State University (ISU), the Iowa DOT is developing smart work zones which communicate with the TMC in Ankeny to detect queues at work zones and to display the appropriate messages on message boards. These improvements in communications give road closure information to the general public, first responders, and public transportation to better inform their routes or detour selections.

Source: U.S. Department of Transportation
To embark on the regional Smart Cities initiative, the MPO is proposing the following action items for its member communities and for the region as we continue towards the goals of The Tomorrow Plan and the Mobilizing Tomorrow plan:

Coordinate with the MPO’s Smart Cities Roundtable Transportation Subcommittee to identify and prioritize regional transportation challenges and corresponding Smart Cities and ITS solutions for MPO funding and staffing. These are not limited to:

- Optimize and coordinate adaptative traffic signals at both a local and metro scale
  (Mobilizing Tomorrow: Manage and Optimize Transportation Infrastructure and Services)

- Replace streetlights with LED lighting and the capacity for Smart Cities and ITS devices
  (The Tomorrow Plan: Improve the region’s environmental health and access to the outdoors)
  (The Tomorrow Plan: Further the health and well-being of all residents in the region)
  (Mobilizing Tomorrow: Improve the region’s environmental health)
  (Mobilizing Tomorrow: Further the health, safety, and well-being of all residents in the region)

- Install more permanent bicycle and pedestrian counters on the regional street and trail networks for more continuous data
  (The Tomorrow Plan: Improve the region’s environmental health and access to the outdoors)
  (The Tomorrow Plan: Further the health and well-being of all residents in the region)
  (Mobilizing Tomorrow: Enhance multimodal transportation options)

- Enhance alternative fuel vehicle alternatives, such as expanding electric vehicle charging infrastructure and increasing fleet and consumer electric vehicle options
  (The Tomorrow Plan: Further the health and well-being of all residents in the region)
  (The Tomorrow Plan: Improve the region’s environmental health and access to the outdoors)
  (The Tomorrow Plan: Further the health and well-being of all residents in the region)

- Address the integration of Smart Cities and ITS initiatives as a region
  (Mobilizing Tomorrow: Manage and Optimize Transportation Infrastructure and Services)
  (The Tomorrow Plan: Increase regional cooperation and efficiency at all levels)

- Develop a procurement process to experiment with Smart Cities and ITS technologies in regional pilots
  (Mobilizing Tomorrow: Manage and Optimize Transportation Infrastructure and Services)
  (The Tomorrow Plan: Increase regional cooperation and efficiency at all levels)

- Establish regional agreements and standards on data sharing, data privacy, and digital security
  (Mobilizing Tomorrow: Manage and Optimize Transportation Infrastructure and Services)
  (The Tomorrow Plan: Increase regional cooperation and efficiency at all levels)
• Define measures and goals for resolving regional transportation challenges with Smart Cities and ITS solutions
  (Mobilizing Tomorrow: Manage and Optimize Transportation Infrastructure and Services)
  (The Tomorrow Plan: Increase regional cooperation and efficiency at all levels)

• Conduct a regional inventory of ITS architecture and prepare a regional ITS plan
  (Mobilizing Tomorrow: Manage and Optimize Transportation Infrastructure and Services)

• Continue to support existing ITS initiatives such as the Iowa DOT’s Integrated Corridor Management (ICM), DART, other municipalities, etc.
  (The Tomorrow Plan: Increase regional cooperation and efficiency at all levels)

• Promote a culture of innovation

• Identify sustainable partnerships with businesses, technology enterprises, non-profits, academic institutions, and start-ups
  (The Tomorrow Plan: Increase regional cooperation and efficiency at all levels)
  (The Tomorrow Plan: Create a resilient regional economy)