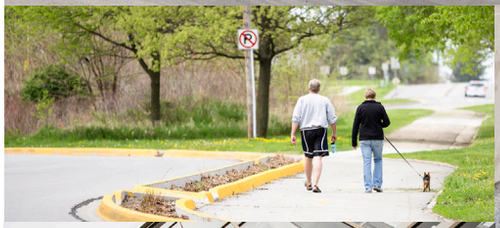

ames mobility 2040

Ames Area MPO 2015-2040 Long Range Transportation Plan

Final Report

Approved September 22, 2015
Effective Date October 12, 2015

HDR

MINUTES OF THE AMES AREA METROPOLITAN PLANNING ORGANIZATION TRANSPORTATION POLICY (AAMPO) COMMITTEE MEETING

AMES, IOWA **SEPTEMBER 22, 2015**

The Ames Area Metropolitan Planning Organization (AAMPO) Transportation Policy Committee meeting was called to order by Ames Mayor Ann Campbell at 6:00 p.m. on the 22nd day of September, 2015, in the City Council Chambers in City Hall, 515 Clark Avenue, pursuant to law. The following additional voting members were present: Gloria Betcher, City of Ames; Wayne Clinton, Story County; Amber Corrieri, City of Ames; Tim Gartin, City of Ames; Matthew Goodman, City of Ames; Chris Nelson, City of Ames; Peter Orazem, City of Ames. Jonathan Popp, City of Gilbert; Chet Hollingshead, Boone County; and Hamad Abbas, Transit representative, were absent.

HEARING ON FY 2016-19 TRANSPORTATION IMPROVEMENT PROGRAM (TIP): Ames Public Works Director John Joiner explained the two amendments that are needed to be made to the FY 2016-19 TIP. The two amendments included:

1. Add Project #14980: Construction of a portion of the Skunk River Trail from Bloomington Road to Ada Hayden Park.

   According to Mr. Joiner, the project was listed in the FY 2015 TIP; however, due to project delays, the bid letting date has moved to March 2016; and therefore, needs to be included in the FY 2016 TIP.

2. Modify Project #32738: Pavement rehabilitation project on 13th Street in Ames.

   Mr. Joiner advised that a new project description had been provided, i.e., from Furman Aquatic Center east 0.29 miles to the Union Pacific Railroad. This is being done so that staff may evaluate the potential of extending sidewalk along the north side of 13th Street to the Furman Aquatic Center.

Moved by Clinton, seconded by Betcher, to approve the Amendments to FY 2016-19 TIP to include Project #14980 and modify Project #32738.
Vote on Motion: 8-0. Motion declared carried unanimously.

IOWA CLEAN AIR ATTAINMENT PROGRAM GRANT FOR AMES TRAFFIC NETWORK MASER PLAN: City Traffic Engineer Damion Pregitzer advised that the City is seeking to apply for State of Iowa Clean Air Attainment Program (ICAAP) funds to conduct a systems engineering evaluation of the communication network. This will include a needs assessment for multiple City departments, such as, but not limited to, Public Works, Police Fire, and Information Technologies. As part of an engineering systems evaluation, standards and specifications for bidding and for cost estimation are created. This will provide a master plan for the City to modernize its technologies for Intelligent Transportation Systems (ITS), Large Special Event, and Emergency Event management. The project is expected to cost $100,000 and requires a local match of 20% ($20,000). The local match will be budgeted in FY 2016/17 from Road Use Tax funds under the Traffic Engineering Studies program. It is anticipated that the project will not begin until the ICAAP funds are received (after July 1, 2016).

According to Mr. Pregitzer, one of the Grant requirements is for the AAMPO to declare by resolution that the sponsor's proposed project or program conforms to the AAMPO's regional transportation planning process. For Metropolitan Planning Organizations (MPOs), the project or program must be identified in the fiscally constrained transportation plan. This study is part of the MPOs efforts to install traffic adaptive signal systems for traffic congestion management. Traffic adaptive signal systems are included in the 2040 Long-Range Transportation Plan as short-term, high-priority projects under the Roadway portion of the Plan. The work accomplished under this Grant could lead to future ICAAP funding that will free up local funds to be reprioritized for other local and regional project.

Moved by Corrieri, seconded by Nelson, to adopt RESOLUTION NO. 15-570 certifying that the project shown in the Iowa Clean Air Attainment Program Grant Application conforms to the MPO's regional transportation planning process.
Roll Call Vote: 8-0. Resolution declared adopted unanimously, signed by the Mayor, and hereby made a portion of these Minutes.

AMES MOBILITY 2040 LONG-RANGE TRANSPORTATION PLAN: Jason Harvey from HDR presented a summary of the AAMPO 2015-2040 Long-Range Transportation Plan (LRTP) [also referred to as Ames Mobility 2040]. He began with the Study Overview, which included Phase 1: Vision/Data collection; Phase 2: Multimodal System Performance; Phase 3: Alternative Assessment; and Phase 4: Development of the Plan. The public engagement approach was then explained, which included public workshops and meetings, the Website, a community survey, Grass Roots event, Social Media and online forums, and a newsletter.

The vision and goals of the Plan were reviewed by Mr. Harvey. He also explained the fiscal constraints that needed to be adhered to and how those impacted the Plan.

According to Mr. Harvey, seven public comments were received. He highlighted those and also reviewed the changes that had been made to the Plan since the draft was first presented in August.

Supervisor Clinton asked if there had been any discussion about having officers from the Ames Police Department on bicycle patrol. He feels that would be another presence for the safety of bicyclists and pedestrians using the paths. Mr. Pregitzer answered that enforcement is definitely part of the network.

Council Member Goodman asked if there were any time lines for some of the lower-cost issues that could be included in the City's CIP or budgeting process to get those accomplished sooner. Mr. Pregitzer stated that the high-priority lower-cost projects would be discussed during the City's budgeting process. Those would be the projects where the federal aid funding had already been expended.

Trevin Ward, 2610 Northridge #201, Ames, representing the Ames Bicycle Coalition (ABC), noted that a lot of the ABC's feedback had already been incorporated into the Plan. The Coalition believes that this Plan includes continued development of Ames bicycle infrastructure. Mr. Ward advised that he was also the incoming President of the Campustown Action Association (CAA). He reported that the CAA appreciated the attention given to Campustown, as getting better multi-modal transportation has been a primary focus for the members.

Elizabeth Wentzel, 1125 Marston Avenue, Ames, identified herself as a member of the ABC. She raised the issue of Safe Routes to Schools and stated that she feels there is a lack of bike paths/trails. Ms. Wentzel advised that the Safe Routes to School program is federally funded, but it had lost some of its funding over the years. She believes that this has fallen off the radar in Ames.

Council Member Goodman shared that he would be initiating a discussion of some of the isolated bicycle opportunities during the Budget Guidelines session to be held at the November 24 City Council meeting.

Moved by Goodman, seconded by Betcher, to adopt the AAMPO 2015-2040 Long-Range Transportation Plan.
Vote on Motion: 8-0. Motion declared carried unanimously.

ADJOURNMENT: Moved by Clinton, seconded by Goodman, to adjourn the AAMPO Policy Committee meeting at 6:31 p.m.
Vote on Motion: 8-0. Motion declared carried unanimously.

Diane R. Voss, City Clerk

Ann H. Campbell, Mayor

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Chapter 1. Introduction

Ames Area Metropolitan Planning Organization Role and Structure

The Ames Area Metropolitan Planning Organization (MPO) carries out transportation planning efforts mandated by the United States Department of Transportation (USDOT). The Federal Surface Transportation Assistance Act of 1973 required the formation of MPOs for urban areas with a population greater than 50,000. MPOs were created to ensure expenditures for transportation projects and programs were based on a comprehensive, cooperative, and continuing planning process. Federal funding for transportation projects and programs is channeled through this planning process.

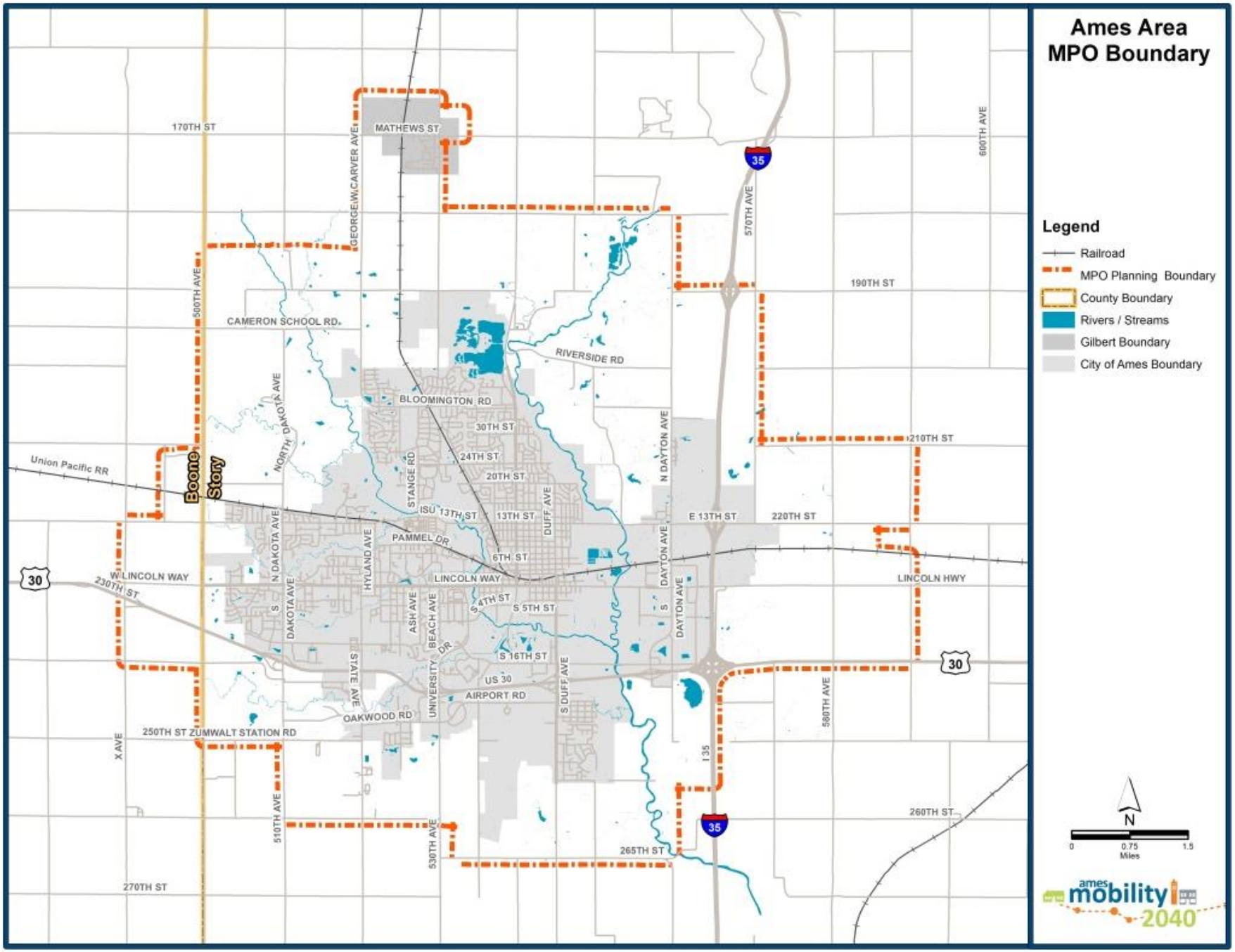
The Ames Area MPO was officially designated as the MPO of the city of Ames, Iowa, urbanized area in March 2003. As a result of the 2010 Census, Ames and the city of Gilbert, Iowa, were combined as one urbanized area, and the Metropolitan Planning Area was expanded to encompass the enlarged urban area. The Ames Area MPO approved its current planning area on November 13, 2012.

The geographic boundary for the Ames Area MPO is shown in Figure 1. Member agencies of the Ames Area MPO include the city of Ames, city of Gilbert, Boone County, Story County, Iowa State University, Ames Transit Agency (CyRide), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and the Iowa Department of Transportation (Iowa DOT).

Purpose of Long Range Transportation Plan

Transportation plans are intended to set a community on a path to address its future transportation needs by first identifying its goals and vision. These goals can be achieved through multimodal approaches that address current and future community land use, economic development, environment (natural, human, and cultural), traffic demand, public safety, health, and social needs. Transportation decisions need to be made in an environmentally sensitive way, using a comprehensive planning process that includes a dialogue with the public and considers land use, development trends, safety, and security.

Figure 1. Ames Area MPO Boundary



As demonstrated in this document, the Ames Area MPO has undertaken a comprehensive analysis and evaluation of the potential impact of transportation plans and programs while addressing the goals of the community served by these plans and programs. The *2015-2040 Ames Area MPO Long Range Transportation Plan* (LRTP) update was branded as Ames Mobility 2040 for many of the public engagement efforts. In this document, the *2015-2040 Ames Area MPO Long Range Transportation Plan* is called the Ames Mobility 2040 for simplicity and consistency.

Federal regulations require a 20-year planning horizon for the LRTP to assist communities in the transportation decision-making process. LRTPs must be updated every 5 years and should include broad-based public involvement with specific elements that are required for states and metropolitan areas. The final product in the LRTP process is a fiscally constrained set of transportation policies, projects, and programs to undertake over the next 20 years.

The process for the development of the LRTP includes:

- ***Step 1***: Establish community vision, plan goals and objectives
- ***Step 2***: Analyze existing multimodal transportation system conditions, including mobility, accessibility, and safety performance
- ***Step 3***: Perform future needs analysis
- ***Step 4***: Identify current and future system gaps / issue areas
- ***Step 5***: Create and evaluate a potential list of future projects and set priorities
- ***Step 6***: Develop funding plan
- ***Step 7***: Establish a prioritized, fiscally constrained plan
- ***Step 8***: Implement and monitor the plan

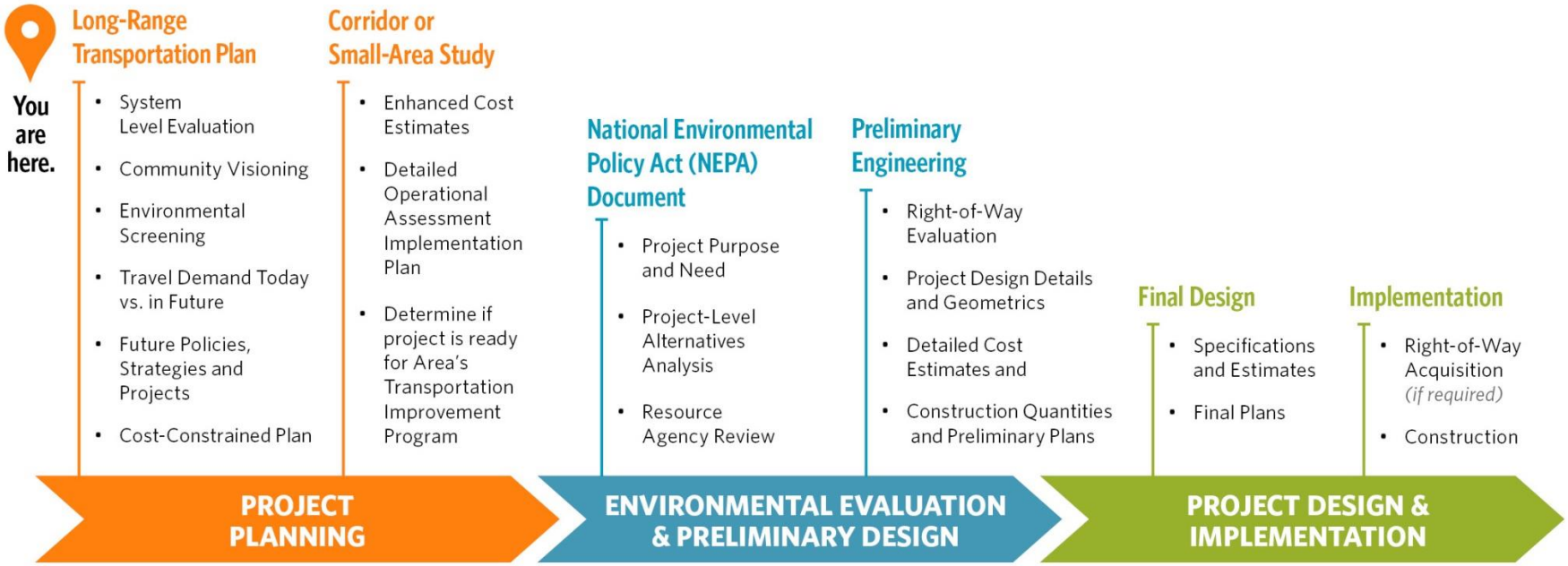
Measuring transportation system performance is a significant component of transportation planning under the *Moving Ahead for Progress in the 21st Century Act* (MAP-21). Ames Mobility 2040 has incorporated performance measurement consistent with the available guidance from MAP-21. The requirements for performance measurement have been and are continuing to be established during the development of this transportation plan. Where possible, this plan has used the performance measurement perspectives that both reflect federal guidance provided and the community's transportation vision, and is providing a solid baseline for continued performance monitoring and assessment in the metropolitan area. The Ames Mobility 2040 is an important tool used to facilitate the metropolitan planning process, as shown in **FIGURE 2.**

Figure 2. Role of the Long Range Transportation Plan

Source: Model Long-Range Transportation Plans: A Guide for Incorporating Performance-Based Planning, FHWA

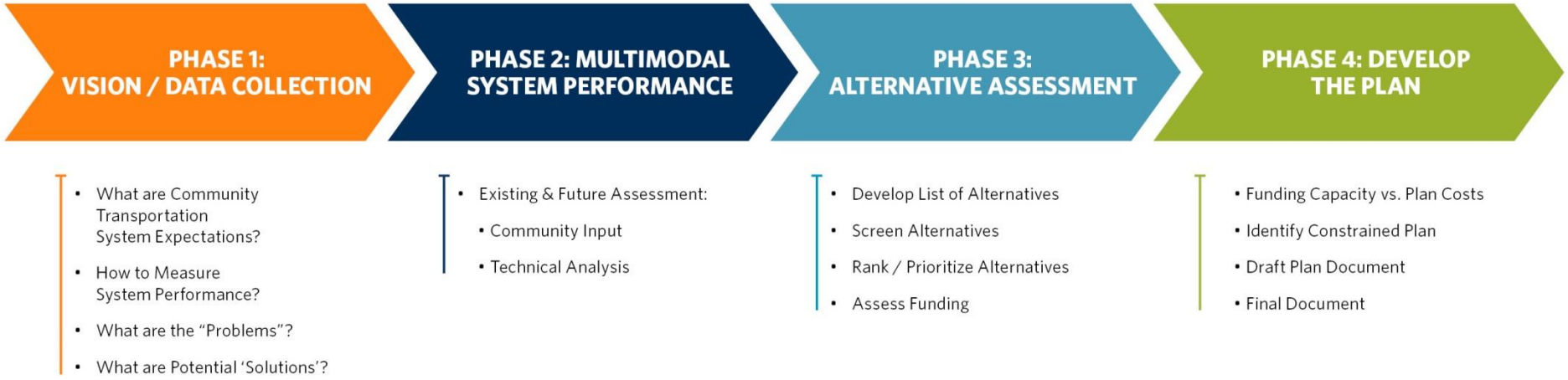
FIGURE 2 notes the last step in the process is monitoring system performance. Performance-based planning is the application of performance management techniques to transportation planning. Part of an effective performance-based planning approach is monitoring, an ongoing activity that this and future LRTP updates will use to evaluate how well the planning activities, programs, and projects implemented by the Ames Area MPO are meeting the metropolitan area, state, and federal goals. More discussion of MAP-21 implementation is provided in CHAPTER 11. The Ames Mobility 2040 plan is the first step in identifying and implementing strategies, policies, and projects for implementation within the region. Projects that are included in the LRTP should fit with the community's transportation vision and should be reasonably implementable and fundable, but more details and analysis need to be completed in later stages of project development. The project development process is illustrated in FIGURE 3.

Figure 3. Project Development Process



Four major phases of this LRTP are shown in FIGURE 4. These phases show the progression in the development of the transportation plan projects identified as part of Ames Mobility 2040.

Figure 4. Phases of Ames Mobility 2040



Chapter 2. Transportation Vision, Goals, and Objectives

One of the first steps for Ames Mobility 2040 was to develop community-based vision themes that guides the transportation planning and decision making process. Feedback gathered at the September 2014 stakeholder and public workshops and via the project website, the MindMixer town hall forum, and the Community Survey was used to craft a Transportation Vision and associated goals and objectives.

The overall vision development process went through these steps:

- Collect input from the community on their vision and values for the transportation system.
- Reconcile that community vision with Federal guidance on transportation policy.
- Combine those perspectives into Goals and Performance Objectives that would guide development of the transportation plan.

Public and Stakeholder Input

Fall 2014 Workshops Vision Input

On September 30, 2014, the Ames Area MPO met with stakeholders in Ames to gather input on issues, opportunities, and vision themes for the regional transportation system. Three workshops were held:

- The ***Plan Management Team (PMT)***, with engineering and planning staff from various jurisdictions and agencies in the Ames Area MPO.
- The study ***Focus Group***, with stakeholder representation from various civic groups, modal interests (including bicycle, pedestrian, transit, and freight), Iowa State University, schools, businesses, and first responders in the community.
- ***Public Meeting***, held at the Scheman Building.

The purpose of these workshops was twofold:

1. Gather input on the transportation issues and opportunities in the Ames area.

2. Gather input on the transportation vision for the Ames area.

After small group brainstorming sessions, those in attendance at the workshops individually prioritized which vision themes were most important. The vision themes were generated by those in attendance. Vision themes that received prioritization votes are shown in FIGURE 5.

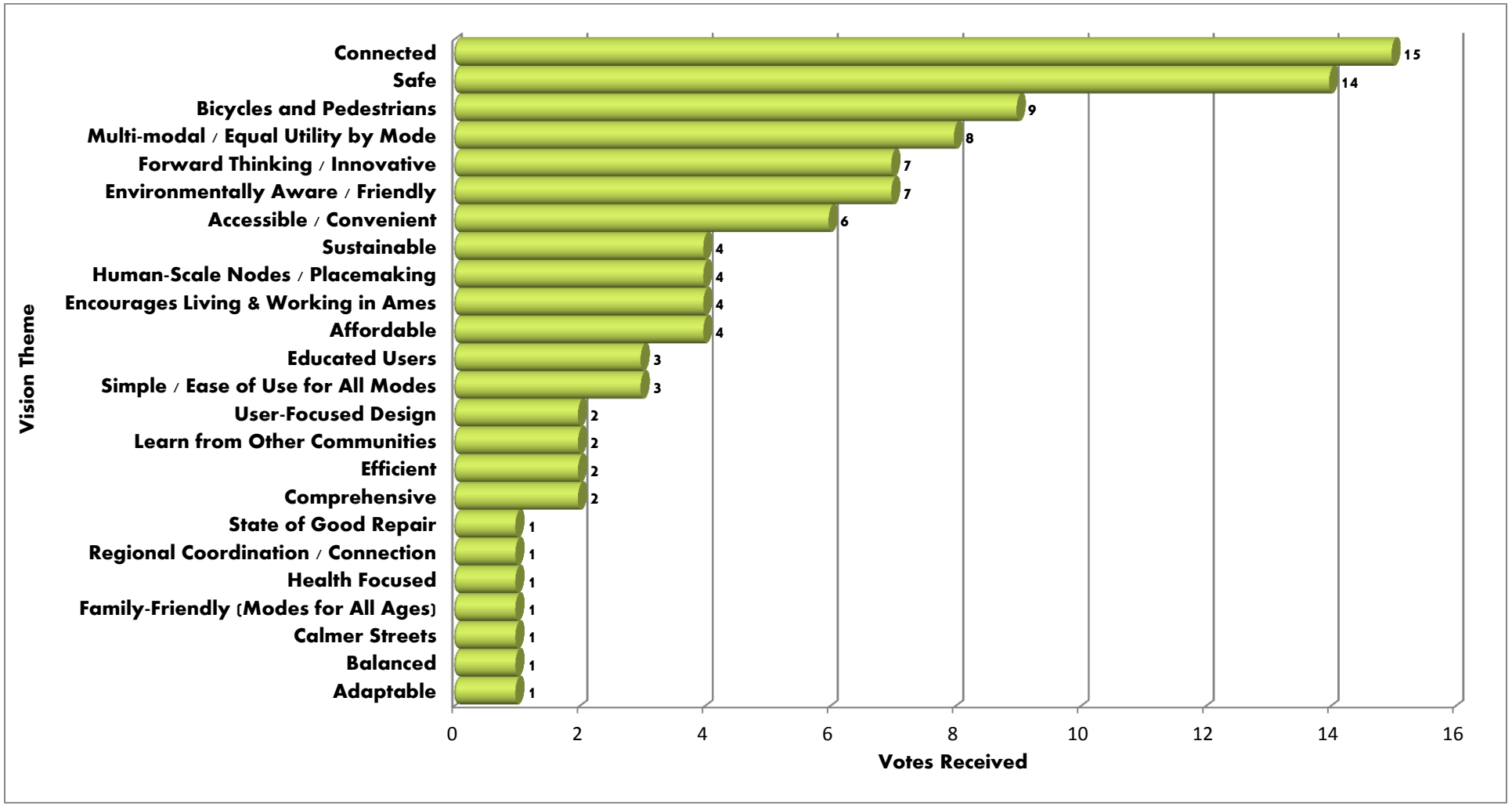
Website Vision Input

The public website for the Ames Mobility 2040 study (AmesMobility2040.com) offered multiple ways for the public to provide input on the plan. Approximately 30 comments were received via the study website through December 7, 2014, and were summarized by Vision Theme categories. Some comments covered multiple categories and have up to 3 associated themes.

The themes covered by these comments include:

- Bicycling improvement (11 comments)
- Safety improvement (9 comments)
- Pedestrian improvement (5 comments)
- Mobility improvement (4 comments)
- Connectivity improvement (3 comments)
- Transit improvement (3 comments)
- System user education (1 comment)
- Multimodal system improvement (1 comment)
- Preserve and enhance neighborhood character (1 comment)

Figure 5. Ames Mobility Vision Themes Receiving Votes and Number of Votes Received (Fall 2014 Workshops)

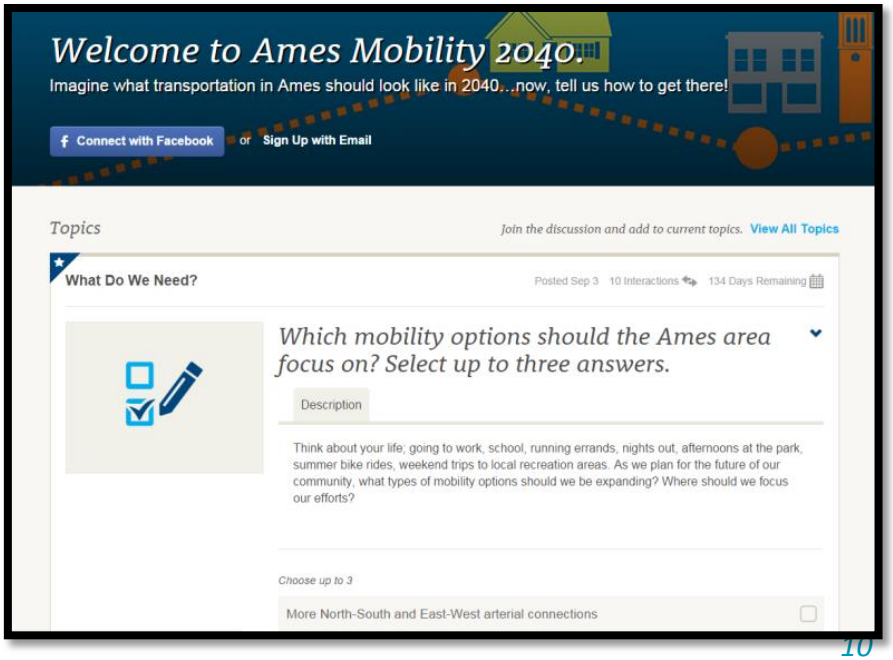


Town Hall Forum and MindMixer Vision Input

The virtual town hall forum for the Ames Mobility 2040 study is a MindMixer website dedicated to a collaborative discussion of community transportation issues. This website forum had several vision-related poll questions that were posted to the site over the course of a month. The poll questions were developed based on the top vision themes identified by attendees at the fall public workshops. There was an open-ended question that asked virtual participants for input on vision.

Poll questions were provided for seven topics that received the most votes in the Fall public workshops. The topics included in the voting process each contained a detailed description of how the list of vision theme topics was developed, and summarized the other lower-vote themes. The seven vision theme poll topics included:

- ***'Bicycles & Pedestrians'*** is one of the top themes we heard for the Plan Vision. Tell us what you think and rate it!
- ***'Connected'*** is one of the top themes we heard for the Plan Vision. Tell us what you think and rate it!
- ***'Forward Thinking/Innovative'*** is one of the top themes we heard for the Plan Vision. Tell us what you think and rate it!
- ***'Safe'*** is one of the top themes we heard for the Plan Vision. Tell us what you think and rate it!
- ***'Accessible/Convenient'*** is one of the top themes we heard for the Plan Vision. Tell us what you think and rate it!
- ***'Environmentally Aware'*** is one of the top themes we heard for the Plan Vision. Tell us what you think and rate it!
- ***'Multimodal'*** is one of the top themes we heard for the Plan Vision. Tell us what you think and rate it!



A full summary of the results of the poll questions is provided in **APPENDIX A**, which summarizes all feedback received through the website, email, and MindMixer town hall forum site. All 7 topics were generally viewed favorably by those that responded. The topics are generally consistent with input received at the Fall 2014 workshops and in the comments received via the website and email.

One of the central features of the MindMixer website was the ability for public users to start their own topics, offer their own ideas, and collaborate

on other user's ideas in a discussion topic format. Users started several additional topics not related to the vision theme poll questions or the "what three words describe your vision…" question. Study team members reviewed these additional topics and identified what general vision theme areas those discussion topics related to. The themes covered by those additional MindMixer topics include:

- Bicycling (discussed in 53 comments)
- Connectivity (discussed in 35 comments)
- Safety (discussed in 32 comments)
- Pedestrians (discussed in 30 comments)
- Infrastructure improvement (discussed in 26 comments)
- Transit (discussed in 20 comments)
- Innovation (discussed in 17 comments)
- Traffic signals (discussed in 13 comments)
- System user education (discussed in 6 comments)
- Community health (discussed in 4 comments)
- System efficiency (discussed in 2 comments)
- Multimodal (discussed in 2 comments)
- Collaboration (discussed in 1 comment)
- Coordination (discussed in 1 comment)
- Environment (discussed in 1 comment)
- Simple (discussed in 1 comment)

Vision Themes

Based on the input received through these various public input mechanisms, a range of vision themes were identified. The vision themes provide a foundation to guide the transportation planning process by reflecting community transportation desires. Five transportation vision themes were identified:

- ***Vision Theme 1 – Active Transportation System that is Connected Across all Modes of Travel:*** The Ames area should move toward an integrated transportation system that provides improved connectivity for all modes, and is active by encouraging walking and bicycling. Key concepts for this theme include providing a multimodal system that integrates all modes in some corridors; and in other corridors providing separate, dedicated, and mode-specific facilities. The system needs to be connected, so that access barriers for each mode are identified, and provide projects, programs, and strategies that address those barriers.
- ***Vision Theme 2 – Safe***: Safety is a critical transportation system consideration. Transportation system projects, programs, and strategies implemented in the Ames area should provide safety and security benefits to users of all modes.
- ***Vision Theme 3 – Environmentally Aware***: Transportation investments and actions are linked to the natural and built environment. The environmental implications, impacts, and benefits of transportation actions in the Ames area should be considered in the decision-making process.
- ***Vision Theme 4 – Forward Thinking and Innovative***: The Ames area should look to emerging and innovative methods for achieving its vision for the transportation system, leveraging best practices and successes from other cities around the country.
- ***Vision Theme 5 – Efficient Personal Mobility***: The Ames area transportation system should provide easy and convenient access, leveraging and enhancing existing transportation assets when possible, to provide efficient travel and multiple options for personal mobility.

FEDERAL TRANSPORTATION VISION GUIDANCE

For the Ames Mobility 2040 study to provide a federally compliant LRTP, federal transportation planning guidance was considered while the community-tailored transportation vision for the Ames area was developed. The MAP-21 legislation was passed by the U.S. Congress in June 2012. MAP-21 is the foundation of current national transportation funding and policy direction.

MAP-21 National Performance Goals

Final rulemaking associated with MAP-21 performance measurement is incomplete at the time of the Ames Mobility 2040 update publishing. Performance measurement will be an ongoing activity for the MPO, and the MPO will need to continually monitor regional progress toward achieving its performance targets. In this regard, the role of the LRTP is to promote and recommend projects, policies, and programs that help the region achieve its performance targets. Thus, the project performance scoring should be measured in terms consistent with the guidance provided in MAP-21.

MAP-21 established national performance goals for the federal-aid transportation program in seven areas[1]:

- ***Safety***: To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- ***Infrastructure condition***: To maintain the highway infrastructure asset system in a state of good repair.
- ***Congestion reduction***: To achieve a significant reduction in congestion on the National Highway System.
- ***System reliability***: To improve the efficiency of the surface transportation system.
- ***Freight movement and economic vitality***: To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- ***Environmental sustainability***: To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- ***Reduced project delivery delays***: To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

[1] *[§1203; 23 United States Code (USC) 150(b)]*

MAP-21 Planning Factors

The federally defined scope of the metropolitan transportation planning process, as defined in 23 USC 450.306, is that "*the metropolitan transportation planning process shall be continuous, cooperative, and comprehensive, and provide for consideration and implementation of projects, strategies, and services that will address the following factors:*

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase accessibility and mobility of people and freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation; and
8. Emphasize the preservation of the existing transportation system".[2]

[2] *§ 450.306*

GOALS

Goals provide broad statements of intent, providing direction for Ames Mobility 2040. In developing goals for the Ames Mobility 2040 study, the Federal guidance on transportation vision was compared to the community-generated input on transportation vision. In general, there was congruence between the two. The Federal guidance provided the framework for the broad goal areas that the study should address, while the community vision provided direction on how to tailor each broad goal area into a community specific vision, defining a successful outcome for each goal area. The goals for the study are provided below.

Goal 1 - Provide a *connected* transportation system that offers *efficient* and *reliable* mobility options for all modes of travel.

Goal 2 - Provide a *safe* transportation system.

Goal 3 - Consider and mitigate the impacts of the transportation system on the natural and built *environment*

Goal 4 - Provide an *accessible* transportation system fits within the *context* of its surroundings and preserves community character.

Goal 5 - Provide a transportation system that supports the regional *economy* and efficiently moves goods.

Goal 6 - *Maintain* transportation infrastructure in a state-of-good-repair.

PROJECT AND REGIONAL PERFORMANCE MEASUREMENT

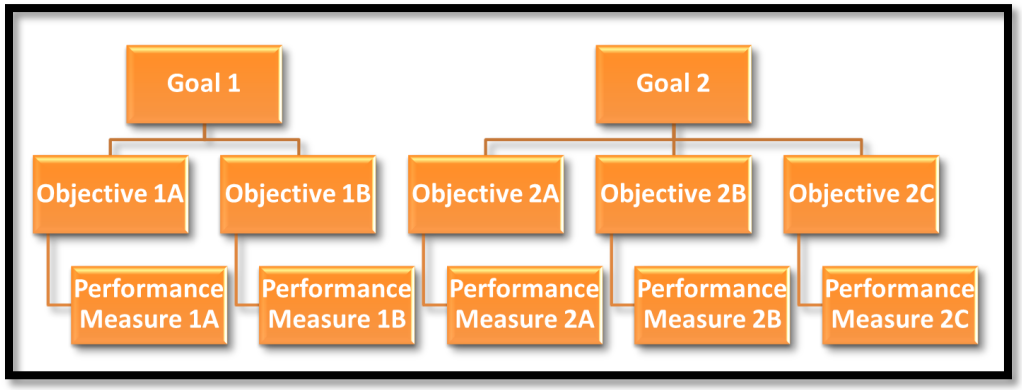
The project-level and regional performance measures have been developed consistently with the vision themes established for the Ames Mobility 2040, and reflect the MAP-21 authorization. Performance measures are used at two levels of analysis:

- ***Project-Level Performance Scoring***: Project-level performance criteria were provided to assess how individual projects fit with the Ames area's performance goals. These criteria were applied as a part of the alternatives analysis to prioritize projects.
- ***Regional-Level System Performance Assessment***: Regional performance measures were developed to assess the outcome of various scenarios or packages of projects. Similar to the project-level criteria, these regional-level measures were used as benchmarks to assess how a scenario (group or package of individual projects) does in terms of meeting the regional transportation vision.

PROJECT-LEVEL PERFORMANCE CRITERIA HIERARCHY

The project-level performance criteria are part of a hierarchy, with six goals for the LRTP, and each of those goals has multiple performance objectives. In turn, each measurable performance objective has a performance measure associated with it. That relationship is illustrated as an example in FIGURE 6.

Figure 6. Hierarchical Relationship between Goals – Objectives – Performance Measures



CyRide Service Philosophy and Service Improvement Guidelines

Additional consideration was given to CyRide's service philosophy and service improvement guidelines when evaluating transit alternatives. At the November 15, 2014, special Transit Board meeting, board members discussed a service level philosophy that could guide current and future discussions and, when considering service improvements, guidelines that would provide a framework for decisions.

- Service Level Philosophy: Within financial constraints, provide a ride for every customer desiring to use transit when and where CyRide operates.
- Service Improvement Guidelines (provided in order of priority):
  - *Guideline #1 - Capacity Change*: Service changes that address capacity challenges within the existing system. For example, extra buses added due to overcrowding on a route consistently exceeding 150 % of seated capacity (60 riders); published schedule is unchanged.
  - *Guideline #2 - Improved Existing Service*: Service improvements that address improved convenience and capacity within the existing system. For example, better service frequency or longer service hours on a route; published schedule is changed.
  - *Guideline #3 - New Service*: Service improvements that address expansion of service into new areas and days of service. For example, adding a new route (for example, State Street route) or implementing service on an existing route on a day it is not currently offered; published schedule is changed.

Project Performance Scoring Approach and Matrix

Table 1 illustrates the performance scoring matrix and relates each of those project-level performance criteria to the appropriate performance objective and LRTP goal. The table summarizes 25 different performance objectives, of which 22 can be used to measure alternative performance. The three performance objectives that do not have a scoring approach associated with them are still priorities for the community and/or anticipated national priorities, but do not have a feasible scoring mechanism (as outlined in the table) that will be considered during LRTP development. Additionally, some alternatives did not have a logical "good" (+1) score, they either provided a benefit for that performance objective, or did not.

Because some of the measures are mode-specific, the performance measure scores should not be used to compare alternatives of different modes. This system was used to measure how well an alternative fit with the LRTP goals and objectives compared to other alternatives of the same mode. The performance scoring outcomes were not the final answer to project selection. Some projects scored well, but were not reasonable to implement due to cost, right-of-way impacts, inconsistency with wider regional initiatives, or stakeholder concerns.

TABLE 2 provides a list of performance issues that were considered fatal flaws, and removed an alternative from further consideration.

Table 1. Project Performance Objectives and Scoring Approach

LRTP Project Performance Objective	Performance Method	Candidate Project Scoring Approach				Scoring Discussion
		2	1	0	-2	
		Very Good	Good	Neutral	Poor	
Goal 1: Provide a connected transportation system that offers efficient and reliable mobility options for all modes of travel.						
1A. Create and enhance multimodal access and connections between bicycle, pedestrian, transit, and private vehicle travel.	Multimodal Connectivity Ranking	Enhances access and connections between at least two modes. Or, a project that improves mobility for two or more modes.	Enhances access and connections for bicycle, pedestrian, or transit travel.	No significant impact on multimodal access or connectivity.	Creates barrier to multimodal connections.	Intermodal projects and those that have multiple modes score highest here. Projects improving bicycle, pedestrian, or transit mobility are assumed "good", as automobile travel already accounts for over 90% of regional travel. Complete streets projects score “Very Good”.
1B. Reduce the incidence of roadway congestion.	Vehicular Level of Service	Improves vehicular level of service to "D" or better for a location that would be "E" or worse otherwise, or improves LOS on NHS route.	Improves vehicular level of service.	No significant impact on traffic operations.	Degrades vehicular level of service a letter grade or worse.	LOS for existing or 2040 conditions - intersections and segments where appropriate. Assumes that target is LOS D or better. Minor drops of less than 1 LOS letter grade are not negatively scored. Alternate measure: +2 scoring for LOS improvements on NHS routes (per MAP-21), and +1 for non-NHS routes.
1C. Enhance the efficiency of the existing transportation system through system management and demand management approaches.	Transportation Management Assessment	Improves existing facility or transit route mobility. OR a project that adjusts travel demand to better fit on existing system.	-	No significant impact on system or demand management.	Degrades the service levels of an existing facility or route, or increases peak demand on the system.	Assess Transportation System Management and Demand Management - potentially new transit services that degrade demand on an existing route, or alternatives that somehow increase peak hour demands. No “good” score.
1D. Improve system connectivity through improved multimodal network connections and reduced network gaps.	System Connectivity Assessment	New multimodal network connection where a gap of 1/2 mile or more existed before. (1/2 mile from adjacent, parallel facilities)	Provides a new connection between two existing modal facilities, or an extension of an existing facility.	No change facility connectivity.	Reduces facility connectivity.	Scored for all modes separately. Determine distance of new facility to nearest existing facility as measured to parallel facilities. Must connect to existing facilities. Roadways considered should be arterial or higher for a +2.
1E. Plan for and address transportation system impacts and sufficiency when considering new developments.	No way to measure and compare in LRTP on an alternative basis.					

Table 1. Project Performance Objectives and Scoring Approach (continued)

LRTP Project Performance Objective	Performance Method	Candidate Project Scoring Approach				Scoring Discussion
		2	1	0	-2	
		Very Good	Good	Neutral	Poor	
Goal 2: Provide a safe transportation system.						
2A. Reduce the rate and number of serious injury and fatal crashes.	Safety Assessment	Results in likely safety benefits or reduced crash severity in one of the top vehicular or bicycle/pedestrian safety issue areas.	Improves vehicular or bicycle / pedestrian safety non-safety issue area; or improves safety through traffic diversion from a safety issue corridor.	No effect on vehicular or bicycle / pedestrian safety.	Increases safety concerns at an identified vehicular or bicycle/pedestrian safety issue area.	Issue areas defined in LRTP as highest-crash frequency intersections, or public-identified safety concern locations. May be assessed through crash modification factors. Addresses HSIP proposed rulemaking and 2013 Iowa Strategic Highway Safety Plan.
2B. Consider the safety of all travel modes when considering changes to the transportation system.	Multimodal Safety Assessment	Provides anticipated safety benefits to two or more modes of travel.	Provides anticipated safety benefits to one mode with no anticipated negative safety impacts on other modes.	No anticipated change in safety for any modes.	Anticipated negative impact on any mode.	Addresses the input regarding multimodal safety when considering projects. Projects where literature / studies suggest the improvement would enhance two or more modes' safety highest ranked here.
2C. Enhance transportation security by collaborating with the appropriate agencies and emergency responders.	Qualitative Security Assessment	Provides improved communications, emergency response coordination, secures critical asset or otherwise improves transportation security.	-	No anticipated change to security.	Negative impact on communications, emergency response coordination, critical assets, or overall transportation security.	Addresses security - many alternatives will be security neutral. No "Good", either improves security or doesn't.
Goal 3: Consider and mitigate the impacts of the transportation system on the natural and built environment.						
3A. Minimize the transportation system's impacts on the natural and built environment.	Environmental Screening	Reduces the natural / built environmental impacts of current and future transportation system.	-	Neutral effect on transportation system impacts on natural / built environment.	Overall increase transportation system impacts to natural / built environment.	Look at several factors: right-of-way impacts (acres), potential acquisitions (number), noise potential (yes/no), threatened and endangered species habitat (yes/no), wetlands and floodway impacts (acres). No "good" score.
3B. Identify transportation system projects and programs that can improve regional air quality.	VMT / VHT Estimation	Provides significant reduction to regional VMT and VHT.	Provides significant reduction to either VMT or VHT; no significant growth in either measure.	No significant change in regional VMT or VHT.	Project would increase both VMT and VHT.	Use model / analysis to estimate when possible. MOVES air quality model evaluates VMT at various travel speeds, with higher emissions rates coming at low urban speeds / idling. Thus, VMT and VHT declines infer improved air quality. Define "significant" in relative terms by comparing alternatives' impacts.

Table 1. Project Performance Objectives and Scoring Approach (continued)

LRTP Project Performance Objective	Performance Method	Candidate Project Scoring Approach				Scoring Discussion
		2	1	0	-2	
		Very Good	Good	Neutral	Poor	
Goal 3: Consider and mitigate the impacts of the transportation system on the natural and built environment (continued).						
3C. Coordinate with environmental agencies during project planning.	No way to measure and compare in LRTP on an alternative basis. Coordination is part of overall LRTP, and becomes more focused during project planning and development.					
Goal 4: Provide an accessible transportation system that fits within the context of its surroundings and preserves community character.						
4A. Plan and design transportation facilities that fit within their physical and social setting.	CSS Assessment	Alternative is generally more consistent with neighborhood context than current transportation facilities.	-	No real impact on neighborhood context.	Alternative is generally inconsistent with neighborhood context.	Qualitative assessment. Consider how the project fits aesthetically, how it enhances / conflicts with neighborhood's modal orientation, affects on-street parking where it's needed, or residents' perception of the project (if applicable). No "Good" score.
4B. Plan for transit, bicycle, and pedestrian access in new urban developments.	Bicycle / Pedestrian / Transit Screening	Provides bicycle, pedestrian, or transit access in neighborhoods / subareas that previously had none.	Expands bicycle, pedestrian, or transit access in neighborhoods / subareas that previously had access to that mode.	No change in bicycle, pedestrian, or transit access to neighborhood / subarea.	Reduces bicycle, pedestrian, or transit access to neighborhood / subarea.	Define neighborhoods as existing subdivisions, or those subareas with homogenous land uses that are bounded by arterial streets (including commercial nodes / industrial areas). Develop new streets with complete street concepts. Consider how appropriate the mode is for that corridor.
4C. Provide balanced transportation access to both environmental justice and non-environmental justice communities.	Environmental Justice Assessment		Directly improves mobility for EJ populations.	Limited direct effect on EJ population mobility.	Project degrades mobility for EJ populations.	Use the defined EJ areas. No "Very Good" score.
4D. Promote active transportation projects and programs.	Active Transportation Screening	Likely enhances walking, biking and recreational opportunities compared to current conditions.	-	Limited effect on walking, biking and recreational opportunities.	Likely reduces walking, biking and recreational opportunities compared to current conditions.	Bicycle / pedestrian projects where demand likely exists and programs that encourage biking and walking and include complete streets will score +2. No “good” score.
4E. Provide transit service to areas with high density or mix of land uses.	Transit Density Screening	Other subareas of similar land use mix and density have above-average ridership.		No comparative transit density.	Other subareas of similar land use mix and density have lower than-average ridership.	Qualitative assessment, considering development density and mix of land uses to gauge if appropriate for transit service. No “good” score.

Table 1. Project Performance Objectives and Scoring Approach (continued)

LRTP Project Performance Objective	Performance Method	Candidate Project Scoring Approach				Scoring Discussion
		2	1	0	-2	
		Very Good	Good	Neutral	Poor	
Goal 5: Provide a transportation system that supports the regional economy and efficiently moves goods.						
5A. Promote the efficient and safe movement of freight and goods.	Freight Route Assessment	Improves capacity, safety, or travel reliability on freight corridors through Ames area.	-	No effect on capacity, safety, or travel reliability on freight corridors through Ames area.	Decreases capacity, safety, or travel reliability on freight corridors through Ames area.	Evaluate alternatives according to whether or not they could potentially enhance mobility or safety in defined freight corridors. Work with MPO to define freight corridors. No "good" score.
5B. Identify projects and programs that maintain the current high levels of freight mobility on Interstate 35 through the Ames area.	I-35 Freight Assessment	Improves capacity, safety, or travel reliability on I-35 through Ames area.	-	No effect on capacity, safety, or travel reliability on I-35 through Ames area.	Decreases capacity, safety, or travel reliability on I-35 through Ames area.	Specific to I-35 only to address MAP-21 Freight National Performance Goals / Draft Rules - anticipated to only relate to Interstate Highway System. No "good" score.
5C. Identify multimodal transportation projects and programs that enhance the area's economy.	Employment / Retail Connectivity Assessment	New multimodal connection directly to employment or retail areas.	Provides improved, but indirect multimodal access / mobility to employment or retail area.	Neutral effect on connectivity to employment or retail areas.	Reduces multimodal connectivity to employment or retail areas.	Review TAZ data for employment areas and determine if project expands access or enhances mobility to those areas. New direct access gets +2, enhanced access gets +1.
5D. Identify multimodal transportation projects and programs that enhance access to K-12 schools.	K-12 School Connectivity Assessment	New multimodal connection directly to school.	Provides improved, but indirect multimodal access / mobility to school.	No effect on connectivity to school.	Reduces multimodal connectivity to school.	Performance objective added to reflect input regarding concerns on K-12 school access. New direct access gets +2, enhanced access gets +1.
5E. Reduce project delivery delays	No way to measure for LRTP alternatives. LRTP will discuss processes that can help streamline project development.					
5F. Provide a financially-sustainable transportation system.	Travel Benefits per Dollar Spent	Highest ranking tier of benefits / dollar spent.	Next tier of benefits / dollar spent.	Limited benefits / dollar spent OR cannot measure.	Negative VMT / VHT benefits.	Compare VMT and VHT reductions to projects cost. Rank projects against one another. Cannot measure smaller projects that aren't modeled. Transit projects to consider operational efficiency and cost savings.

Table 1. Project Performance Objectives and Scoring Approach (continued)

LRTP Project Performance Objective	Performance Method	Candidate Project Scoring Approach				Scoring Discussion
		2	1	0	-2	
		Very Good	Good	Neutral	Poor	
Goal 6: Maintain transportation infrastructure in a state-of-good-repair.						
6A. Allocate resources to maintain pavement conditions at sufficient levels.	PCI	Improves pavement in a corridor with pavement considered deficient.		No impact to pavement condition.		Use PCI data from existing conditions report. Addresses NHPP proposed rulemaking. No "good" score.
6B. Allocate resources to maintain bridge conditions at sufficient levels.	NBI Ratings	Improves a bridge considered deficient.		No impact to bridge condition.		Use National Bridge Inventory (NBI) functional and structural ratings. Addresses NHPP proposed rulemaking. No "good" score.
6C. Allocate resources to maintain transit fleet in state of good repair	Average Fleet Age	Improves average fleet age.		No impact to average fleet age.		Evaluate alternatives that affect the average fleet age. No "good" score.

Table 2. Fatal Flaws for Selected Performance Measures

LRTP Project Performance Objective	Potential Alternative Fatal Flaw
1A. Create and enhance multimodal access and connections between bicycle, pedestrian, transit, and private vehicle travel.	Alternative that removes bicycles or pedestrians from a corridor.
1B. Reduce the incidence of roadway congestion.	Alternatives that degrade traffic operations to LOS E / F on the NHS system, including forecasts of 2040 traffic operations.
2A. Reduce the rate and number of serious injury and fatal crashes per strategies outlined in the 2013 Iowa Strategic Highway Safety Plan.	Alternative increases likelihood of fatal or severe injury crashes for any mode, measured through crash modification factors.
3A. Minimize the transportation system's impacts on the natural and built environment.	Alternative has potential for significant impact on floodplain. Future development considered.
5A. Promote the efficient and safe movement of freight and goods.	If a designated freight corridor, alternative reduces the mobility of heavy commercial vehicles.

REGIONAL PERFORMANCE MEASURES

Regional performance measures are used to compare existing conditions and 2040 "do nothing" Existing Plus Committed (E+C) conditions with the Ames Mobility 2040 scenario. This E+C scenario assumes that no additional improvements are made to the transportation system beyond those currently considered "committed" (as described in Chapter 6), but that regional housing and employment growth continues at anticipated rates through 2040. The regional performance measures tie back to the six LRTP performance goals, outlined as goal areas in TABLE 3. In addition to a summary of regional performance measures for consideration for the Ames Mobility 2040 plan, performance targets are shown that reflect challenging, yet achievable performance targets for the Ames area to achieve.

The performance targets are shown as a way of assessing the level of consistency between Ames Mobility 2040 Plan outcomes with the regional transportation vision and goals. The performance measures do not reflect AAMPO policy, and there are not positive or negative consequences to the AAMPO or its member jurisdictions whether they are achieved or not achieved. The regional performance measures are desired outcomes that reflect the community vision, and the metrics reflected in TABLE 3 attempt to measure how the Ames Mobility 2040 plan compares to that vision as a first step toward performance measurement. It is assumed that the Ames area's regional performance measures and targets will be ultimately be modified when formal performance measurement rulemaking is finalized.

Additional LRTP Regional Performance Strategies for Consideration

There are additional LRTP regional performance strategies that will relate to overall plan performance but do not directly apply to individual projects. These strategies were used as guiding principles when assembling the final list of LRTP projects and programs:

- Placing a priority on ***safety projects*** for LRTP implementation. While no MPO policies were set for safety project, certain thresholds were considered, such as establishing a target percentage of LRTP budget to expend on safety projects; for instance, spending at least 5 % of the budget on safety projects. An emphasis was placed on selecting projects to enhance system safety.
- Implement projects that move Ames closer to ***achieving bicycle-friendly community status*** from the League of American Bicyclists. There are various criteria used to determine bicycle-friendly status for each of the 5E Perspectives: Engineering, Education, Encouragement, Enforcement, and Evaluation/Planning (http://bikeleague.org/sites/default/files/Attributes_of_BFC.pdf.)

Table 3. Regional System Performance Measures

Goal Area	Performance Measure	Performance Measure Target for Ames Mobility 2040	Existing Conditions Baseline[3]	2040 Conditions E+C Baseline	Performance Measure Discussion
1. Connected, Efficient, and Reliable	System Reliability / Reliability Index 80 (RI_{80})	Address reliability issues at the two (2) NHS segments with poorest reliability.	Arterial System: RI_{80} = 1.20 Freeway System: RI_{80} = 1.03	N/A	Compare 80th percentile travel times to median travel times by time of day.
	Miles of On-Street Bicycle Facilities	Increase the segment-mileage of on-street bicycle facilities by 100% compared to current levels.	3.9 Miles On-Street Lanes / Paved Shoulders 57 miles Shared-Use Paths / Sidepaths	11.1 Miles On-Street Lanes / Paved Shoulders 66 Miles of Shared-Use Paths / Sidepaths	Ames Bicycle Coalition has suggested balanced target that includes off-street and on-street. MPO to adjust as needed in future planning efforts.
2. Safety	Serious Injury / Fatal Crashes	Address safety issues at five (5) locations with highest crash rates or most serious injury / fatal crashes.	< 2.6 fatal crashes/year < 20 major injury crashes/ year	N/A	
3. Environment	VMT per Household	2040 VMT per household grows by 10% or less compared to 2010 levels.	41.6 daily VMT per household	49.7 daily VMT per household	Transportation plan likely to have limited impact on VMT.
	VHT per Household	2040 VHT per household grows 20% or less compared to 2010 levels.	1.00 daily VHT per household	1.28 daily VHT per household	
	Transit Mode Share	2040 transit mode share is higher than 2010 transit mode share.	12.5% of all modeled (auto and transit) trips.	12.0% of all modeled (auto and transit) trips.	

[3] *Existing Year Data Sources: System Reliability – 2015 Data; On-Street Bike Facilities – 2015 data; Crashes – 2009 to 2013 data; VMT, VHT and Transit Mode Share – 2010 Travel Model estimates and Iowa DOT Geographic Information Management System (GIMS) data.*

Table 3. Regional System Performance Measures (Continued)

Goal Area	Performance Measure	Performance Measure Target for Ames Mobility 2040	Existing Conditions Baseline[4]	2040 E+C Conditions Baseline	Performance Measure Discussion
4. Accessibility	Household and Employment Proximity to Transit	Maintain housing and jobs proximity (¼ mile walk distance) within 5% of 2010 levels.	Households: 74% Access; Employment: 77% Access	Households: 63% Access; Employment: 65% Access	Estimate of percentage of MPO area households and Employment within ¼ mile walk-access buffer.
	EJ Proximity to Transit	Maintain levels of transit proximity (within ¼ of a route) to EJ households within 5% of non-EJ households.	82% of EJ households	82% of EJ households	Measured for Traffic Analysis Zones with EJ Populations within ¼ mile walk-access buffer.
	Household and Employment Proximity to Bicycle Facilities	Increase the percentage of employment and households within ¼ mile of bicycle facilities by 25% by 2040.	Households: 75% Access; Employment: 67% Access	Households: 73% Access; Employment: 67% Access	Estimate of percentage of MPO area households and Employment within ¼ mile buffer. 2040 includes committed bike projects.
	EJ Proximity to Bicycle and Pedestrian Facilities	Provide higher levels of bicycle facility proximity (within ¼ mile of a facility) to EJ households than non-EJ households.	88% of EJ households	88% of EJ households	Measured for Traffic Analysis Zones with EJ Populations within ¼ mile walk-access buffer.
5. Economy and Goods Movement	LOS / Congested Miles of Primary Freight Corridors	2040 Congested Miles of NHS system same/lower than 2010 levels.	0.5 Miles	2.0 miles	Existing congestion on Duff adjacent to S 5th Street. In 2040 No-Build, I-35 south of US 30 congested and Duff Ave at S 16th Congestion
6. Asset Management	Pavement Condition Index (PCI)	Reconstruct federal-aid roadways rated poor.	105 lane miles of state and Arterial/Collector Roads rated "poor"	N/A	State of good repair funding identified in LRTP.
	Bridge Condition (NBI)	Reconstruct structurally deficient bridges.	3 Structurally Deficient Bridges	N/A	State of good repair funding identified in LRTP.
	Transit State of Good Repair	Maintain avg. fleet age at 15 years old or newer.	10.9 years avg. vehicle age	35.9 years avg. vehicle age	Recent funding reductions impacting CyRide's fleet age.

[4] *Existing Year Data Sources: Accessibility Measures – 2010 Travel Model estimates; Congested Miles – 2011 Traffic Conditions; Pavement and Bridge Conditions: 2013 data; Transit Fleet data – 2015 CyRide data.*

Chapter 3. Public Engagement Process

Ames Mobility 2040 was developed with the context of a multi-faceted, active, and on-going public engagement effort. The goal of the engagement campaign was to build awareness of the Ames Mobility 2040 within the community as a whole, and to provide multiple avenues to broadcast information to the community, while providing a range of convenient ways for the public to provide input on plan development. Community engagement efforts focused on traditional methods and innovative technological methods of engaging the public and other key stakeholders at decision milestones throughout the plan development process.

OBJECTIVES

Objectives of the community involvement effort included:

- Determination of a targeted stakeholder base to adequately tailor communications process and outreach approach.
- Education and engagement of the public to obtain feedback on this update to Ames Mobility 2040 as well as existing and anticipated transportation demands.
- Administration of a survey in the local area to determine how the public feels about access, safety, drive time, construction impacts, innovation, etc.
- Use of focus groups, workshops, and public meetings as a collaborative forum to discuss issues, alternatives, and the final analysis in a transparent and open manner.

AUDIENCES

The audience in engagement efforts included groups of people motivated by varying self-interests and persuaded by influential intervening publics and resources. The wide cross-section of target audiences included:

Local, State, and Federal Representatives (elected officials, city engineers, planning staff)

- Cities of Ames and Gilbert
- Boone County, Story County

- Ames Transit Agency (CyRide)
- Emergency Responders
- Police
- Iowa DOT
- FTA, FHWA

Area Residents, Businesses and Iowa State University

- Commuters
- Ames Chamber of Commerce
- Residents of cities of Ames and Gilbert, Boone County, Story County
- Neighborhood groups and chairs
- Hospital
- Local developers
- Iowa State University students, employees, and Community and Recreational Planning Department staff

Focus Group

The Ames Mobility 2040 Focus Group included representation from various civic groups, modal interests (including bicycle, pedestrian, transit, and freight), Iowa State University, schools, businesses, and first responders in the community. The Ames Mobility 2040 Focus Group was made up of approximately 25 individuals, specifically brought together to provide reactions to a specific topic, policy, project or issue, and was formed to help encourage key decision makers and stakeholders of the Ames community in the transportation planning process. The Ames Mobility 2040 Focus Group met three times throughout the process and provided input and guidance on Ames Mobility 2040.

COMMUNICATIONS TOOLS

A variety of communication methods and tools were used throughout the Ames Mobility 2040 process to notify and engage the public.

Website

The project website, www.AmesMobility2040.com, was one of the primary means of providing information to the community and receiving feedback. Some of the key elements of the website included:

- Home: latest updates on plan development, and key links for the public to get information and provide input.
- About: Ames Mobility 2040 project schedule
- Get Involved: comment mapping tool that allowed users to navigate to a location in the Ames area, draw on the map and leave a comment specific to that location.
- Newsroom: relevant newspaper articles, local newscasts, public notices, and publicized information about the project.
- Resources: latest presentations, maps, and documents from the plan. Also included list of frequently asked questions.
- Contact Us: ability to send the project team an email, link to social media outlets, fill out a comment form, sign up for the project mailing list, and obtain a mailing address for the project team.

The comments received via the website during the course of the projects, along with more summaries of public engagement effort, are included in **APPENDIX A**.

Grassroots Outreach

During the initial planning stages of Ames Mobility 2040, grassroots outreach was used to generate community interest and gather community input on transportation issues and opportunities for improvement within the Ames area. The following events were used as opportunities to reach out to the local community leaders and general public for input outside of the formal public meeting setting:

- ***Dinkey Day***, September 26, 2014. Event offered live entertainment, food vendors, family activities, Dinkey fun run, and historical displays emphasizing the tie between Ames and Iowa State University. The event built study awareness and drove the community to website for collecting system issues and transportation vision.
- ***Photo Treasure Hunt***. A community-wide Ames Mobility Photo Treasure Hunt was an opportunity for the community to join the conversation about transportation planning by showing through pictures what transportation and mobility alternatives the plan should consider. The hunt took place April 6–24, 2015, and individuals or teams of all ages were encouraged to participate. The treasure hunt was a fun and unique way to get participants of all ages to work together, enjoy social time, practice teamwork and problem solving skills, and learn skill-based knowledge. The Photo Treasure Hunt was hosted on the MindMixer website. The event built study awareness leading into the alternatives analysis phase of the study.

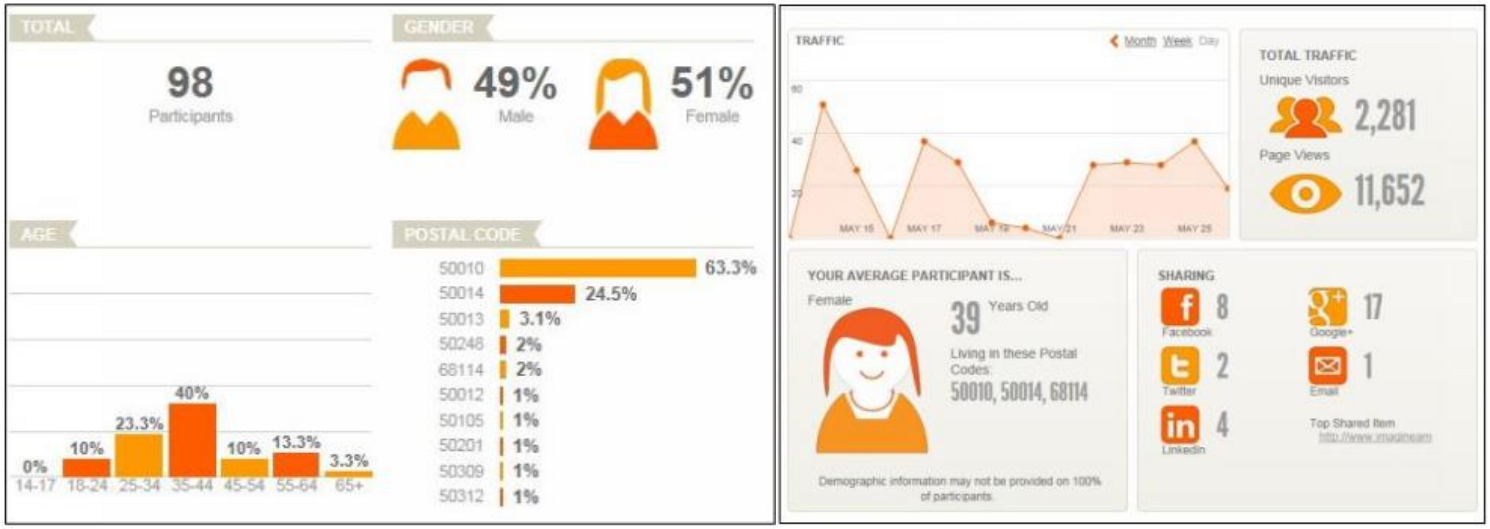
Social Media and Online Public Forums

To promote engagement and community input, two social media platforms, Facebook® and Twitter®, were used to drive visitors to the Ames Mobility 2040 website, collect input, and promote public involvement opportunities (such as workshops, public meetings, MindMixer website, and the final online meeting). Social media sites have the potential to greatly enhance project communication, especially in regard to information dissemination and two-way communication, and to help build a groundswell of champions for Ames Mobility 2040. Social media sites allow for easy sharing of information, networking across various social and professional groups, and the ability for individuals and stakeholders to promote and share Ames Mobility 2040 messaging and information on their own. The potential opportunities for the public and stakeholders to distribute Ames Mobility 2040 key messaging, project information, and public events are significant.

Virtual Town Hall- Imagine Ames on MindMixer

The Imagine Ames Virtual Town Hall MindMixer website had 135 participants. 98 of the participants were "active participants", meaning they created a MindMixer account, and contributed on the website through an idea submission, comment, or voting on a topic. A total of 1,194 interactions and 207 comments were received through this forum. Additional website traffic and participation statistics are shown in FIGURE 7.

Figure 7. MindMixer Site Traffic and Participation Statistics

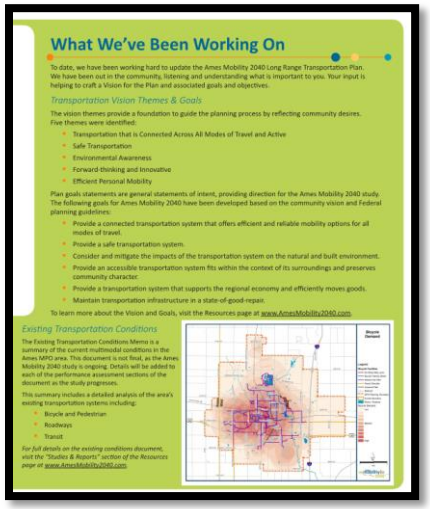


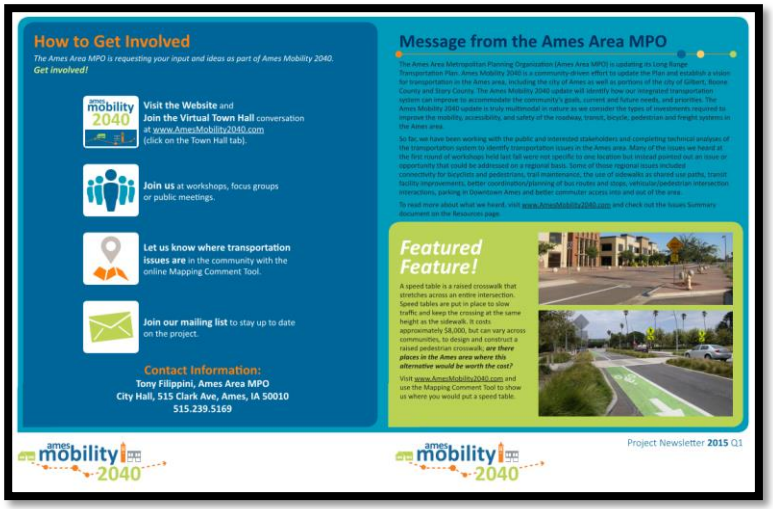
Electronic Outreach and Notifications

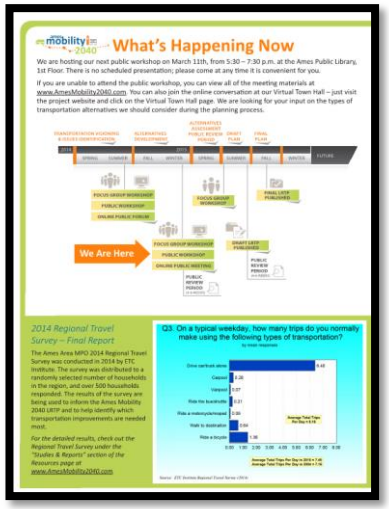
To reduce paper and mailing expenses, email was used as the main source of direct stakeholder communication. Emails were sent to stakeholders at major project milestones to update them on project status.

Newsletter

Several target audiences received a project newsletter in March 2015, which included an update of the project status and the next steps in the Ames Mobility 2040 process. The newsletter was sent electronically to persons in the project database, and hard copies of the newsletter were made available locally.







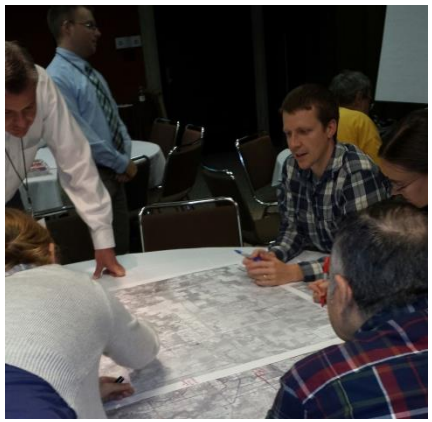
Media Outreach

Media outreach efforts will be focused on the online and in-person open house meetings and key project milestones. Ames Area MPO submitted press releases to pre-determined media outlets 2 weeks before each round of public meetings. Media outreach included radio, newspaper, and magazine advertisements.

Public Participation Meetings

Ames Area MPO offered two public workshops and an online meeting to gather input and educate the public on the purpose and need for Ames Mobility 2040. The purpose of each meeting is listed below:

- ***Public Workshop 1: Fall 2014*** –The project team solicited ideas from the public and input on transportation vision and goals, system issues and opportunities. Preliminary system performance evaluations were presented.
- ***Public Workshop 2: Winter 2014/2015*** –The project team provided an overview of the alternatives evaluated by the project team and received input on the alternatives that should be considered for inclusion in the draft Ames Mobility 2040 plan.
- ***Online Meeting: Spring 2015*** –A virtual project team presentation and meeting materials related to garnering public feedback on the alternatives analysis were provided for a month, at a specially-featured location at the project website. A custom comment form was prepared for public feedback on alternatives.



An advertisement was published 15 days in advance of each round of public meetings. Stakeholders and members of the public on the mailing list were also contacted to announce the comment period for the review of the draft document.

Notification

All public involvement activities implemented for the study were documented, including a record of contacts, outreach, media, and comments received throughout the planning efforts. The results of this documentation were reviewed throughout the process and at different decision-making milestones to confirm that public involvement activities are meeting the public involvement goals of the Ames Area MPO.

The goal was that accurate documentation enabled the Ames Area MPO to learn from successes and failures, allowing the Ames Area MPO staff to evaluate what was done, what was not done, and what might have been done better. It is hoped to apply the most successful strategies for similar future projects.

CONTACT TRACKING DATABASE

A web-based contact and comment management system was used to manage project contacts, outreach, comments, responses, earned media, and event participation. The data collected was used to track levels of engagement for all stakeholders, summarize public sentiment, create distribution lists, and identify geographic areas of concern.

All comments received via email, web comment form, mapping tool, mail, and in-person were logged into a database including the name of the commenter (if given), the date received, and contact information provided.

Upon submission of a web comment, commenters received a pop-up confirmation of receipt. All other commenters who provide an email address received a general response email acknowledging receipt of their comments.

COMMUNITY SURVEY

An MPO-wide household survey was conducted in Fall 2014 by a research group specializing in transportation studies, ETC Institute. The research team worked with the Ames Area MPO staff to design a survey instrument that gathers input from residents about the transportation needs and priorities for the Ames area.

There were 582 surveys taken to verify that the results can be analyzed for subgroups of the populations (for example, students, seniors, families with children, and persons with disabilities). The research team administered the survey through a combination of mail and phone interviews.

Survey Methodology

The survey was mailed to a random sample of 3,000 residents and administered to 582 through either the mail or a follow-up phone interview during September and October 2014. The overall results for the 582 surveys that were administered have a precision of at least +/- 4 % at the 95 % level of confidence.

Survey Major Findings

Of those surveyed, 64 % ***rated the transportation system*** in Ames as excellent or good.

Residents of the Ames community are most satisfied with the following portions of the current transportation system:

- Ease of traveling from Ames to other Iowa cities (84 % satisfied).
- Ease of traveling from home to parks and recreation facilities (74 % satisfied).
- Ease of traveling from home to work (70 % satisfied).

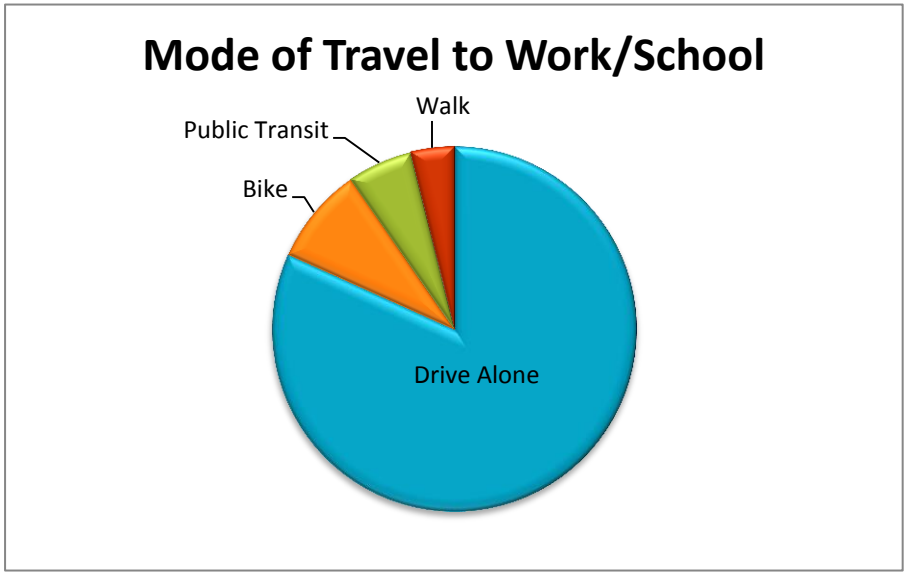
Residents of the Ames community are most dissatisfied with the following:

- Flow of traffic on area streets during peak times (45 % dissatisfied).
- Speeding traffic on neighborhood streets (40 % dissatisfied).
- Ease of north/south travel in the Ames area (38 % dissatisfied).

For the survey question regarding perception of current transportation issues, the condition of roadways was the most notable trend among the topics that were measured in both 2010 and 2014. In 2010, the percentage satisfied was 18 %, and in 2014 it was 48 % satisfied.

Residents ***travel to work or school*** by the following modes:

- 85 % drive alone.
- 9 % bike.
- 6 % public transit.
- 4 % walk.



Parking availability satisfaction by areas of town:

- 74 % were satisfied with parking availability in residential areas.
- 52 % were satisfied with parking in downtown Ames.
- 15 % satisfied with parking in Campustown.
- 13 % were satisfied with parking on campus.

The ***availability of public transit*** was rated excellent or good by 86 % of the respondents.

- 77 % were satisfied with the availability of information about public transit.
- 69 % were satisfied with the destinations served by public transit.
- 69 % were satisfied with the hours and days transit service is provided.

Fifty- three % (53 %) of respondents have ***ridden a bike*** in the last year. Of these,

- 63 % ride their bike for recreational use only.
- 7 % for commuting only.
- 30 % for both recreational use and commuting.
- 56 % felt unsafe on major streets in the area where they live.
- 49 % had ridden on an on-street bike lane during the last year. 69 % of them felt safe.

Ninety percent (90 %) of those surveyed had ***walked along and across the streets*** in the Ames area during the past year. Of those, 86 % felt safe.

Those surveyed indicated the most ***support for system enhancements*** of adding more turn lanes (92 % support), and widening existing roads (72 % support).

Of several possible ***issues related to transportation improvements***, those most important to those surveyed were protecting environmental resources (80 %), delivering solutions that preserve the environment (79 %) and addressing community health and quality of life (78 %).

Those surveyed were asked their ***preference of funding sources*** for transportation improvements. Their greatest support was for:

- an increase in gas tax (61 %).
- applying a road impact fee for new developments (59 %).
- an increased vehicle registration fee (41 %).

Priorities for Intersection Improvements: Fifty-one percent (51 %) of those surveyed felt that the intersection of Grand Avenue and 13th Street was the most important to improve over the next five years and 44 % felt that Lincoln Way and Duff Avenue was the most important.

A full copy of the Community Survey is available in **APPENDIX B** of this report.

TRANSIT ON-BOARD SURVEY

In March 2014, ETC Institute conducted an On-Board Transit Survey for CyRide. Administration of the survey by ETC Institute occurred prior to spring break at Iowa State University and other area schools (weekdays between March 1 and March 17, 2014). The primary objective for conducting the On-Board Transit Survey was to gather accurate travel data from transit riders to use in planning transit services, and to update the regional travel demand model. The survey covered 11 local bus routes operated by CyRide transit agency. The goal was to obtain usable surveys from at least 3,220 transit riders, which represented approximately 8 % of the entire system ridership. The actual number of completed, usable surveys was 3,251.

The survey was administered as a face-to-face interview on local routes using iPads which interfaced with Google Maps to allow real-time geocoding of address information. While most respondents completed the survey during their trip, call center callbacks were available for riders who did not have time to complete the survey during their trip or preferred the survey administered in their primary non-English language.

Transit Survey Findings:

Age of Transit Users

- 73 % of the riders were 18-24 years of age. 17 % of the riders were age 25-34 years, 8 % were age 35 or older, and 2 % were under age 17.

Employment Status of Transit Users

- 67 % of the transit users were employed (14 % full-time and 53 % part-time).

Estimated Percentage of Students Using Public Transportation

- 90 % of the transit riders were either college/university students or students through the 12th grade.

Estimated Distribution of Vehicle Availability

- 26 % did not have a vehicle in the household.

How Transit Riders Got to Their Destination

- Based on the expanded survey results, 91 % of the riders indicated they would walk; 8 % will get in a parked vehicle and drive alone.

How Transit Riders Got to the Bus

- Based on the expanded survey results, 84 % of riders indicated that they got to their bus by walking; 15 % drove alone and parked, and 1 % used some other mode.

Estimated Frequency of Transit Use

- One hundred percent (100 %) of the transit users indicated that they ride some form of public transit in the Ames region at least one day per week and 56 % use it 4 or more days per week.

SUMMARY OF OUTREACH TOOLS

A summary of all of the major outreach tools used in the plan, the major milestones each accomplished, and the dates which they were used are shown below in TABLE 4.

Table 4. Outreach Tool Summary

Tool	Key Milestones / Engagement Addressed	Dates
Website	Vision, Issues Development, Alternatives Development, Project Prioritization, Draft Plan Comments, Plan Awareness	June 2014 - September 2015
Virtual Town Hall	Vision, Issues Development, Alternatives Development, Plan Awareness	September 2014 - June 2015
Grass Roots Outreach	Vision, Issues Development, Plan Awareness	September 2014, April 2015
Social Media	Plan Awareness at all Phases	June 2014 - September 2015
Electronic Notifications	Vision, Issues Development, Alternatives Development, Project Prioritization, Draft Plan Comments	June 2014 - September 2015
Media Outreach	Plan Awareness at all Phases	June 2014 - September 2015
Public Meetings	Vision, Issues Development, Alternatives Development, Project Prioritization, Draft Plan Comments	September 2014, March 2015, June 2015, July 2015, September 2015
Community Survey	Vision, Issues Development, Plan Awareness	September-October 2014
Transit On-Board Survey	Vision, Issues Development	March 2014

Chapter 4. Current and Future Land Use and Development

The transportation system and land use / land development patterns are strongly linked together. Land development patterns, specifically the location, density and type of development, affect transportation demand. Conversely, transportation accessibility, as demonstrated by facility location, continuity, capacity and types / modes of transportation services available, affects land development decisions in the marketplace. Thus, it is critical to understand existing land use patterns and growth trends to understand transportation demand trends.

Demographic trends will influence current transportation issues and how the region grows in coming years. Changes in the region's population, combined with shifts in the kinds of employment opportunities available to the workforce, make the need even greater for a transportation system that provides effective options for everyone. As trends extend into the future and the population continues to grow, the Ames area will be faced with increased pressure on its regional transportation system. Locations of new development are locations that people and goods will travel to / from. By understanding these trends, we can better understand how the demands on the transportation system will change into the future. Adequately planning for future transportation demand will entail providing mobility, accessibility, and protecting the natural and social environment. These goals are important for sustaining long term economic vitality of the region and enhancing overall quality of life.

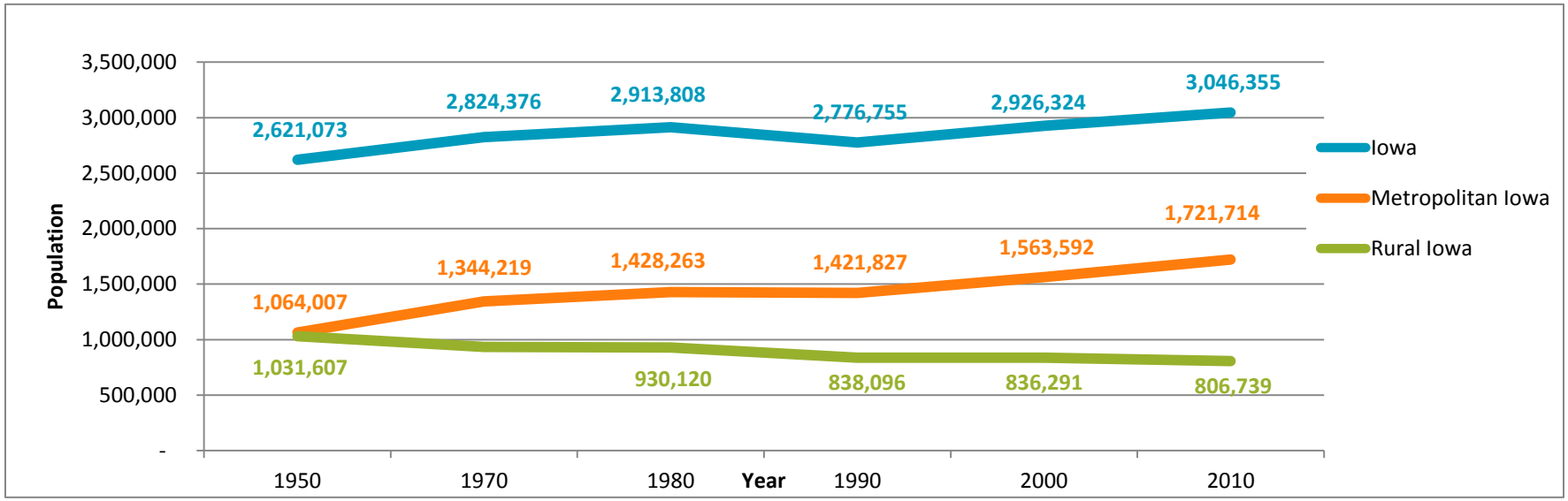
Historical Growth Trends

Statewide, Iowa's population was just over 3 million in 2010. This 2010 population represents a 4 % increase from the 2000 population, and a 16 % increase from the 1950 population. Although population statewide has generally grown over the past century, this growth has mostly occurred in metropolitan Iowa, while rural Iowa has experienced declines. The population growth in Iowa during the last decade

(2000 to 2010) has grown the fastest in Des Moines (18 %), Iowa City (16 %) and Ames (12 %)[5].

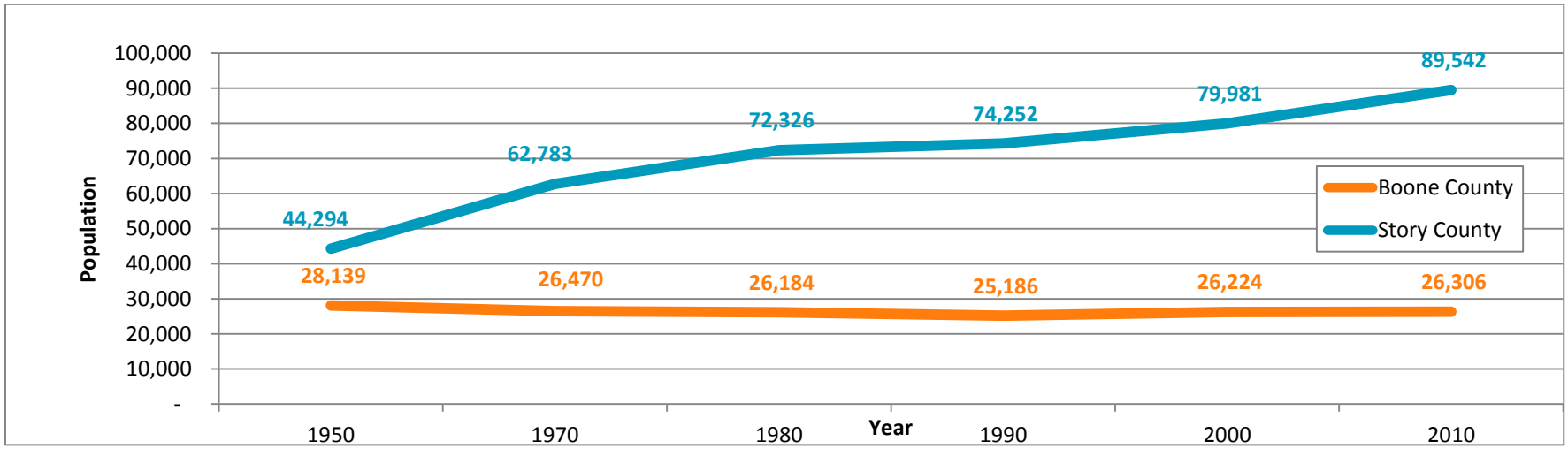
Historical population data for Iowa statewide, a combination of all metropolitan areas in the state, and a combination of all the rural areas in the state is shown in FIGURE 8. "Metropolitan Iowa" is defined as urban areas of more than 50,000 population, and "Rural Iowa" is defined as areas under 10,000 population. The population for Boone County and Story County is shown in FIGURE 9.

Figure 8. Statewide Historical and Population Growth



[5] *Source: Iowa Population over 100 Years, Iowa State University Extension, February 2011.*

Figure 9. Story and Boone County Historical Population Growth



Source: 1910-2010 Decennial Census, U.S. Census Bureau

The most current employment data for Ames indicates continued job growth. Ames' job growth at 2.5 %/year has outpaced Des Moines' growth of 2 %/year and the Iowa statewide average of 1.3 %/year.[6] Employment growth data from January 2014 to January 2015, by metropolitan area, shows that Ames has outpaced several other areas within the state, as indicated in TABLE 5.

According to American Community Survey estimates from 2013, the breakdown of the MPO area population includes:

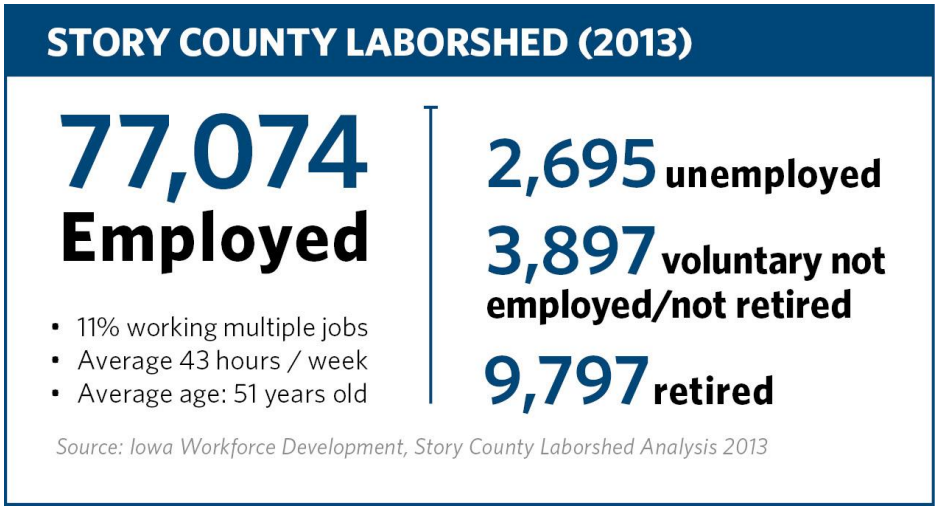
- City of Ames Population: 60,168
- City of Gilbert Population: 1,282

[6] Source: Iowa Workforce Development

Table 5. Iowa Metropolitan Area Employment Growth, 2014-2015

Area	Change in Employment, 2014 to 2015
Ames	4.9%
Cedar Rapids	-0.4%
Davenport, Rock Island, Moline	0.6%
Des Moines	2.1%
Dubuque	-3.0%
Iowa City	1.4%
Omaha-Council Bluffs	1.7%
Sioux City	1.5%
Waterloo/Cedar Falls	0.3%
IOWA	1.6%

Source: United States Department of Labor, Bureau of Labor Statistics



AMES URBANIZED AREA POPULATION PROFILE

The American Community Survey (ACS) demographic and housing estimates were compiled for the year 2010. The ACS data reported an Ames urbanized area population of 62,047. As shown in FIGURE 10, Ames is dominated by young adults in the 15-34 age range comprising approximately 58 % of the community. Household incomes vary widely across the community, as shown in FIGURE 11, and approximately 42 % of the community has an income under $35,000. TABLE 6 depicts a profile of the Ames area by race, where 82 % is White, and 9 % is Asian.

Figure 10. Ames Urbanized Area Population by Age Cohort

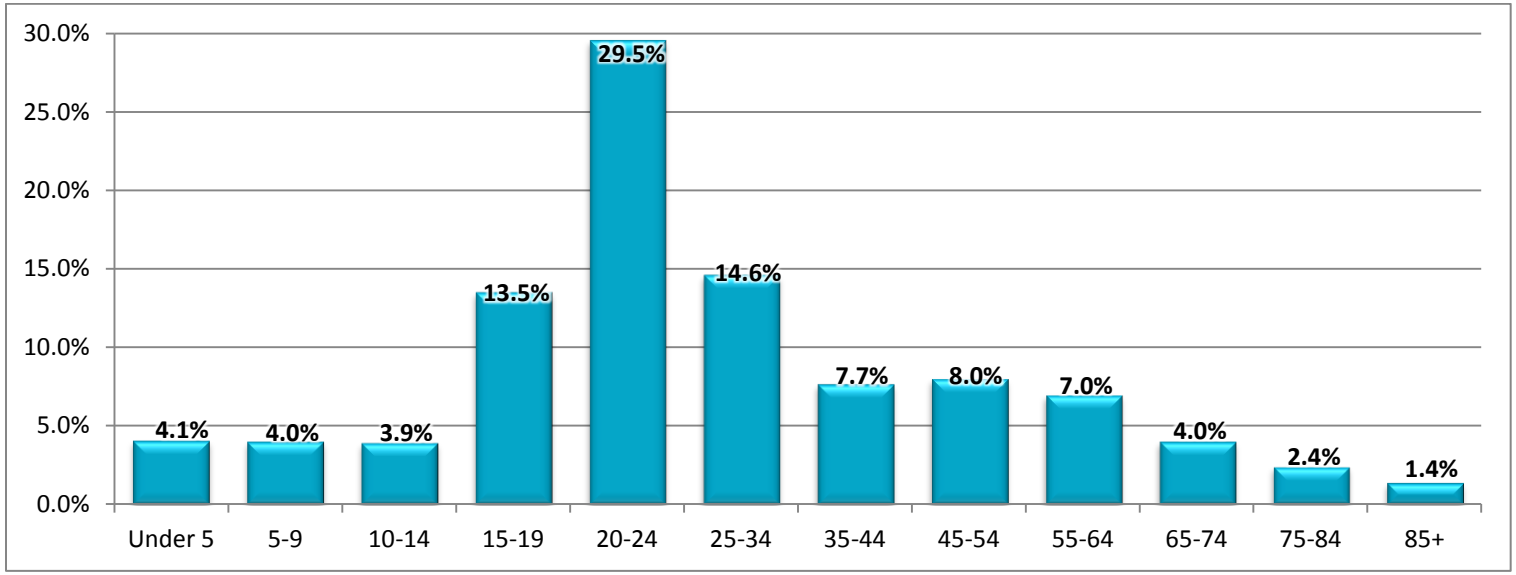


Figure 11. Ames Urbanized Area Population by Household Income

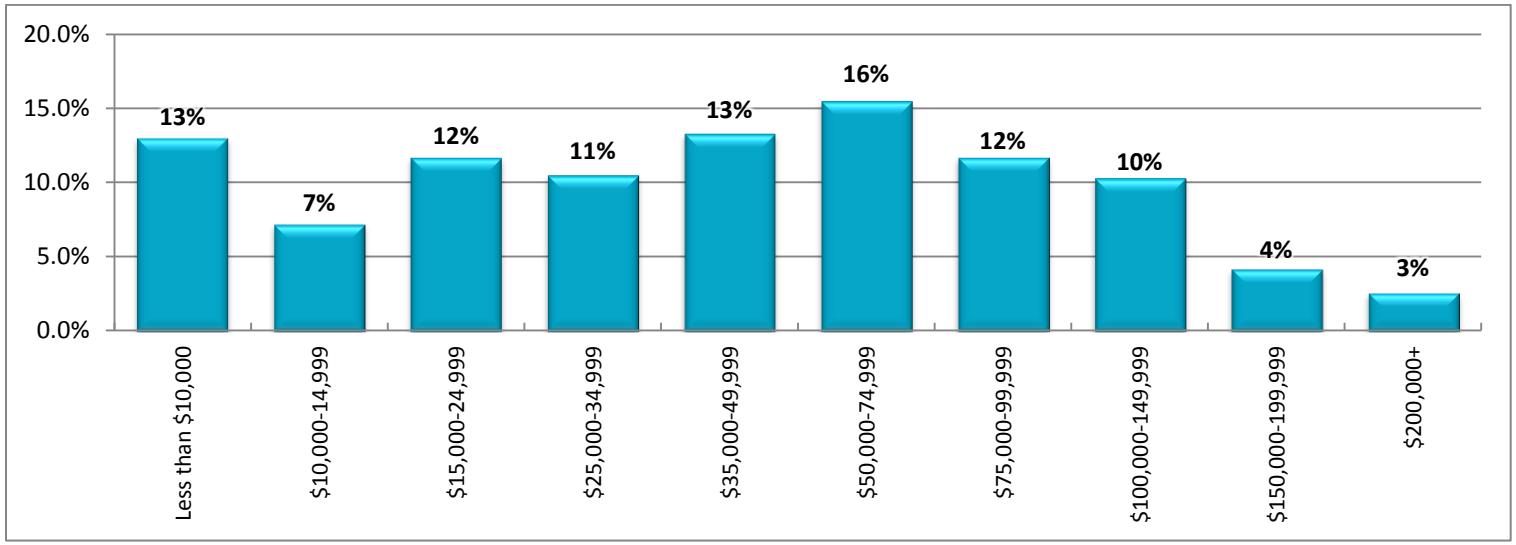


Table 6. Ames Urbanized Area Population by Race

Race	Percentage	People
White	82.21%	51,006
Asian	8.95%	5,553
Hispanic	3.61%	2,240
African American	3.18%	1,972
Two or more races	1.95%	1,212
American Indian/Alaskan Native	0.09%	53
Other	0.02%	11

Source: ACS demographic and housing estimate, Ames urbanized area, 2010

ACS data from year 2010 was also used to profile means and commute time to work, as shown in TABLE 7 and TABLE 8, respectively. As shown, 68 % of the population drives alone to work, and 56 % of the commute trips are under 15 minutes. The most frequent number of vehicles owned per household is 2, as FIGURE 12 indicates.

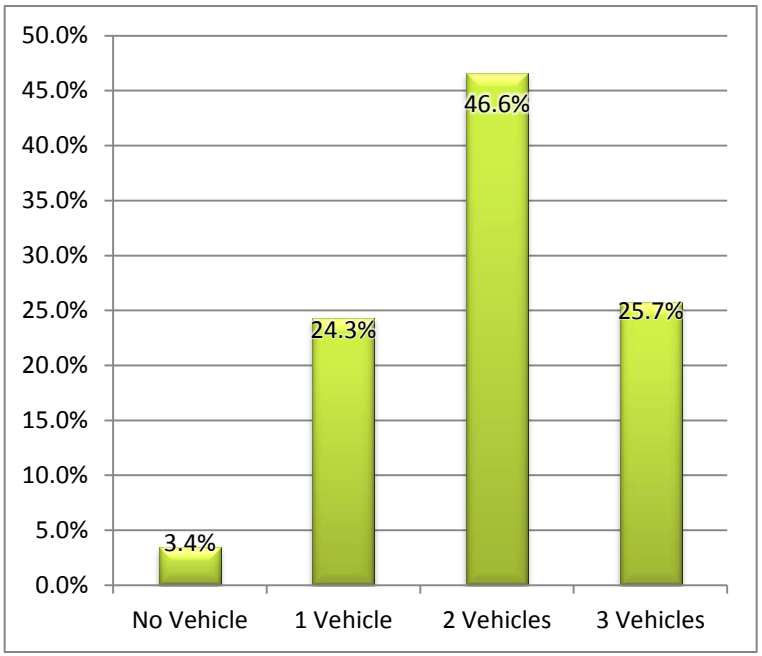
Table 7. Ames Urbanized Area Means of Transportation to Work

Means of Transportation for Workers 16 and Over	
Drive Alone	68%
Carpool	8%
Public Transportation	8%
Other	16%

Table 8. Ames Urbanized Area Commute Time to Work

Commute times to work	Percentage
Under 10	25.2%
10-14	30.6%
15-19	18.2%
20-24	9.7%
25-29	1.9%
30-34	4.2%
35-44	2.5%
45-59	5.7%
more than 60	2.0%

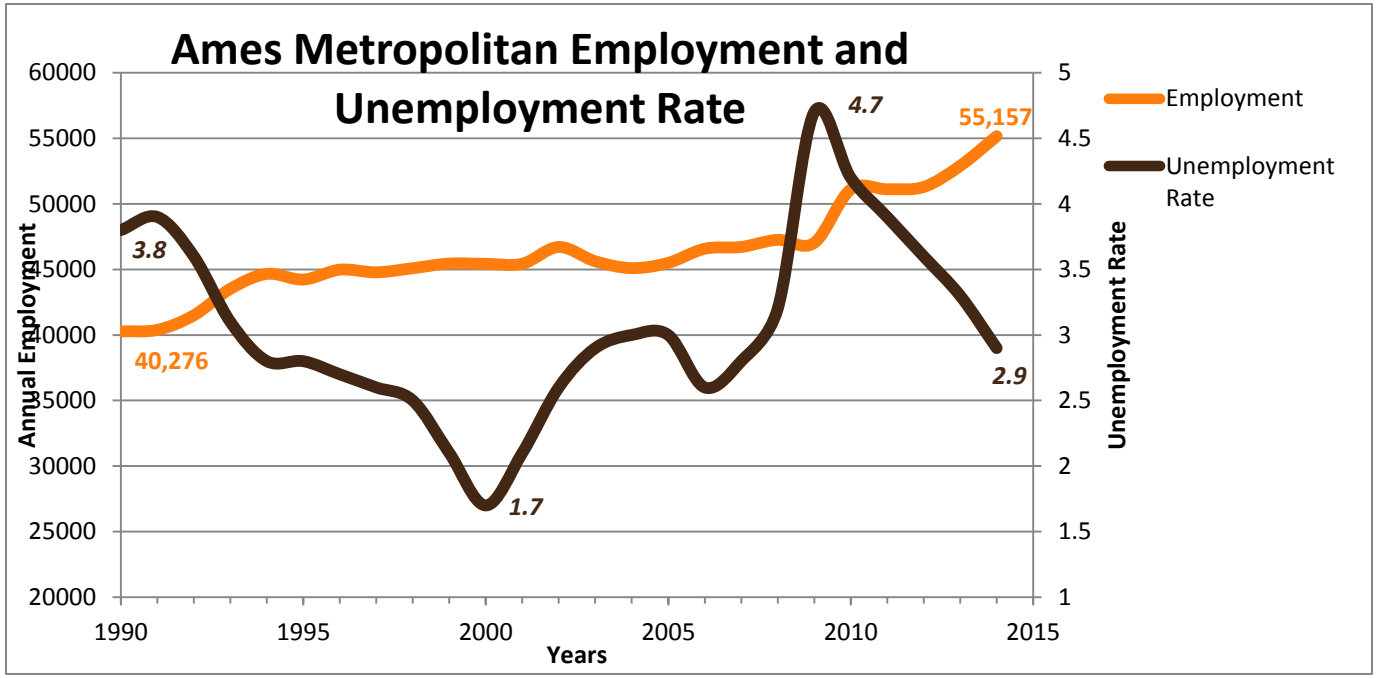
Figure 12. Ames Urbanized Area Car Ownership



AMES URBANIZED AREA EMPLOYMENT PROFILE

Current employment data for the Ames Metropolitan Statistical Area (MSA) has steadily increased in total employment from 1990 through year 2015, as illustrated in FIGURE 13. The unemployment rate in the area has fluctuated from its current 2015 rate of 2.9 %, when in year 2000 it was 1.7 %, and in year 2009 it was 4.7 %.

Figure 13. Ames Metropolitan Statistical Area Employment and Unemployment Rate, 1990- 2015

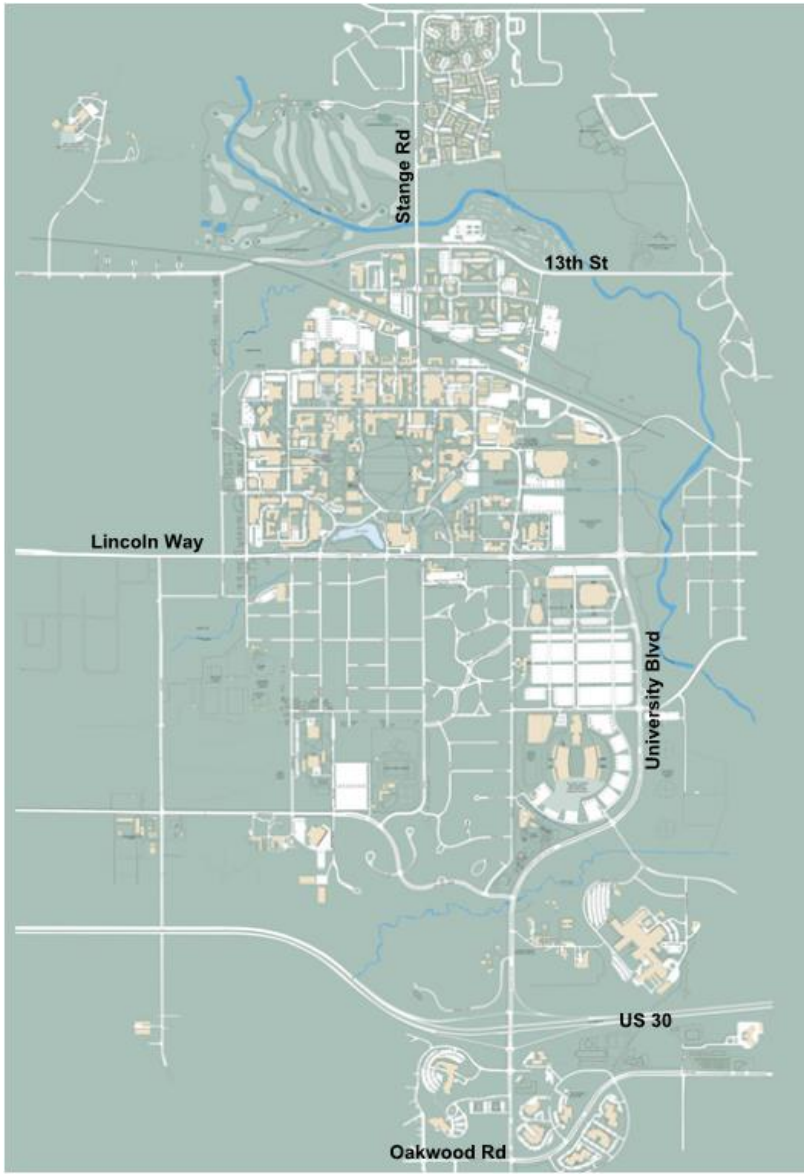


Source: Source: United States Department of Labor, Bureau of Labor Statistics

IOWA STATE UNIVERSITY

The Ames MPO area includes one major university, Iowa State University. Iowa State University is member of the Association of American Universities and a Division I NCAA University and member of the Big Twelve Conference. A majority of the Iowa State University campus is south of 13th Street and west of University Boulevard. Portions of the University go as far south as Oakwood Rd off University Boulevard. Further south of Oakwood Rd, a new Iowa State University Research Park is currently under construction on the east side of University Boulevard. The Park will be developing more than 100 acres, adding mixed-use facilities, community areas, green spaces, trailways, and more.

According to the Iowa State University Facilities Planning and Management Department, Iowa State University enrollment for Fall 2014 totaled 34,732 students (including post docs), an increase of 4.5 % from the previous year. Of this total, 28,893 students were undergraduates and 5,542 were graduate students. The student housing demographic consisted of 35.3 % living on campus, 45.4 % living off campus (and inside Ames), 16.7 % living outside of Ames, and 2.6 % in the Greek system. The University employed 16,268 people, of which 9,195 were full-time employees.



FUTURE LAND USE

Estimating the intensity and location of future land use and how the make-up of the community changes over time is used to provide a reasonable guide to the orderly growth and development in the future. The future land use estimates for Ames Mobility 2040 are not an indication of zoning regulations.

The Ames Area MPO developed a metropolitan area "control total" target for future household and employment levels. These targets are based on historical data and the Land Use Policy Plan. The population control total of 85,102 was determined for year 2040, which is a 35 % increase beyond the population in year 2010. This population was converted into households such that 32,254 households are estimated for the Ames area in the year 2040. The total employment in 2040 is estimated to be 54,729. Change in 2010 to 2040 population, households, employment, and Iowa State University Enrollment is shown in TABLE 9.[7]

Table 9. Future Land Use Control Totals

Year	Population	Households	Employment	Iowa State University Enrollment
2010	63,040	24,415	39,503	27,254
2040	85,102	32,254	54,729	38,000
Percent Change	35%	32%	39%	39%

Source: Ames Area MPO

Next, this change in future population was allocated to various travel analysis zones (TAZs or "zones") according to the likely location of future development. This allocation was based on the Land Use Policy Plan, and local staffs' understanding of current growth trends. Household and employment growth is illustrated by TAZ in FIGURE 14 and FIGURE 15, respectively.

[7] *Population, Household, Employment and Enrollment projections were developed by the MPO based on a variety of sources, including the Iowa Data Center, City of Ames Land Use Policy Plan and Woods and Poole Economics.*

Figure 14. Household Growth by TAZ: 2010 to 2040

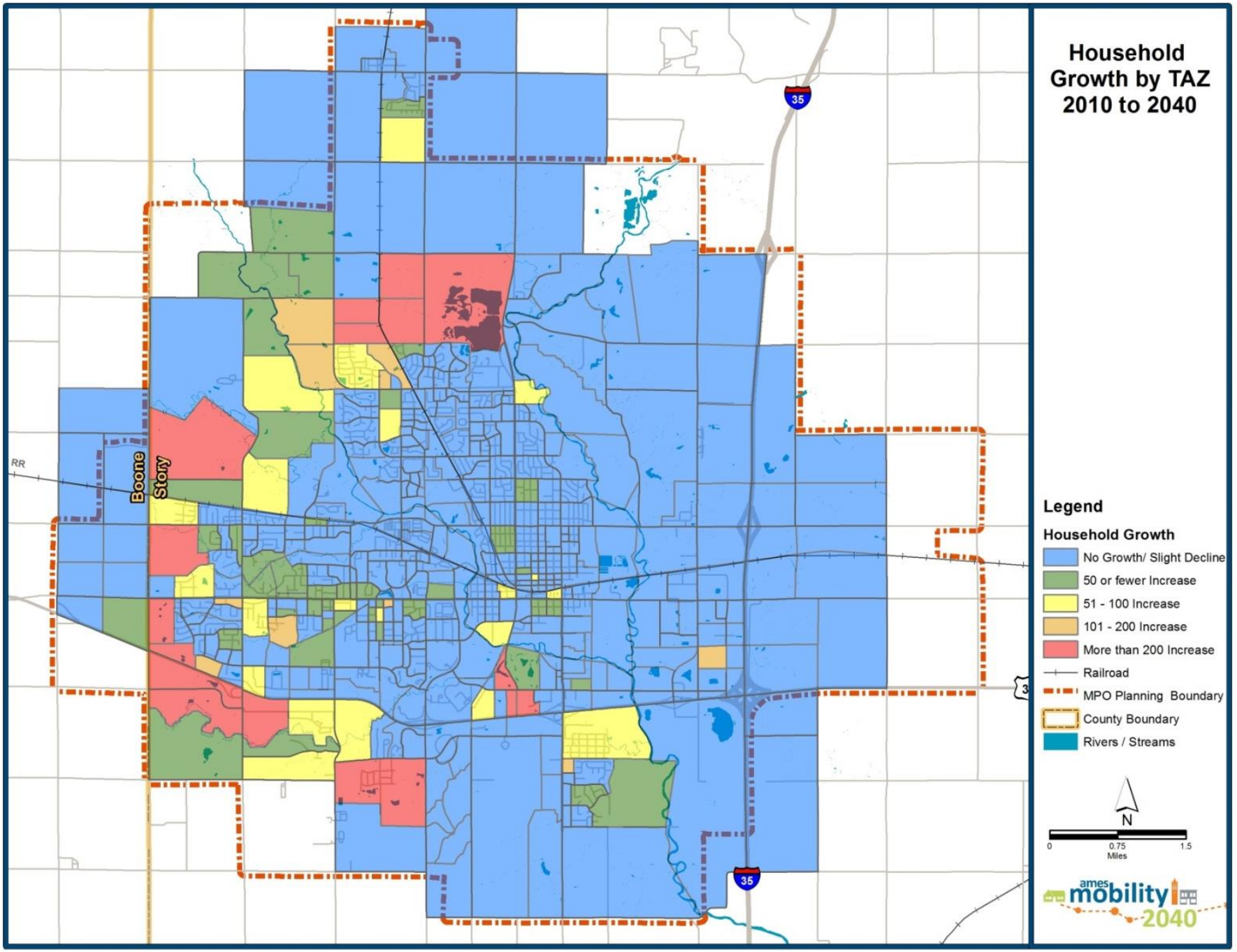
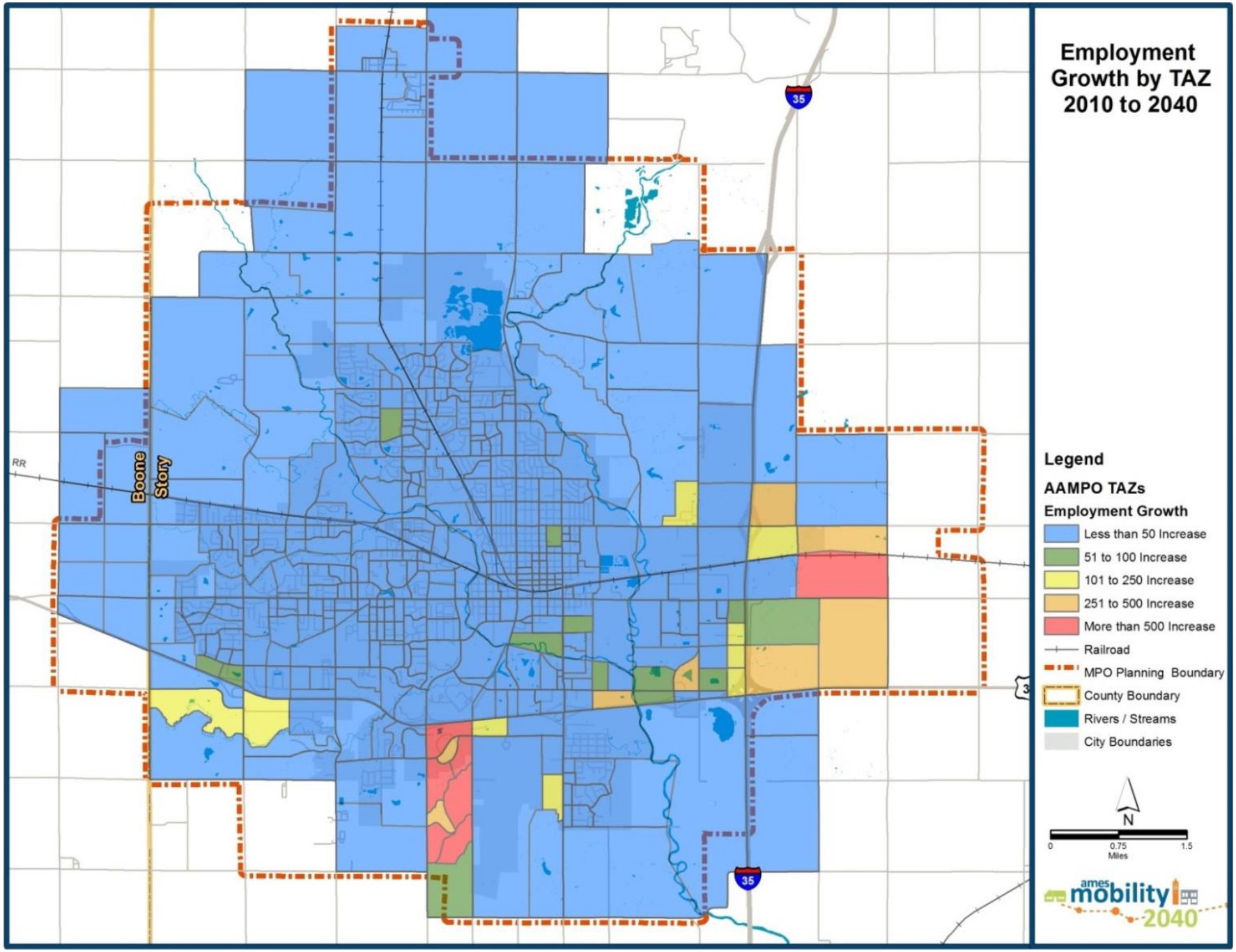


Figure 15. Employment Growth by TAZ: 2010 to 2040



Chapter 5. Existing System Performance

Bicycle and Pedestrian System Conditions

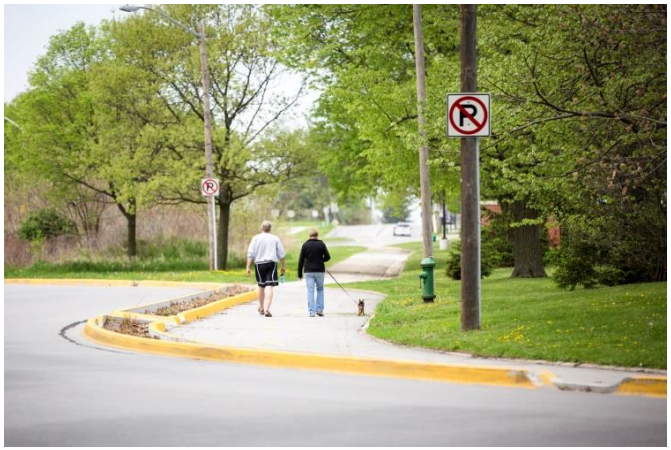
During the initial phases of Ames Mobility 2040, an early theme communicated by a wide cross-section of the community was the desire for a more complete, safe, and connected bicycle and pedestrian system. Experience from other communities suggests that a comprehensive network of bicycle and pedestrian facilities can provide many positive community benefits including improved quality of life, spur economic growth, create active and socially engaged neighborhoods and urban centers, improved safety, reduced automobile traffic congestion, and improved public and environmental health. Many communities consider bicycling and walking indicators of a community's livability, and many of the urban amenities that make bicycling safe and effective are also markers of an attractive, livable urban space, positively impacting a community's ability to attract businesses, workers, and investment. Ames is a university community with a young population that relies on bicycling and walking for a majority of its travel needs. Thus, these modes represent a necessary element of the local community and economy.

Several factors create walkable and bicycle friendly places:

- ***Land Uses***: The mix, scale, and pattern of land use impacts how accessible it is from a bicycling and walking perspective. By having a mix of complementary land uses within walking and biking distance of another, shorter trips that can be made by bicycling or walking are feasible. Implementing a traditional pattern of connected streets that better distributes traffic across the network and provides more route choices.

- ***Street Design***: Streets designed to accommodate all users encourage walking and biking include security, convenience, efficiency, comfort, and welcome. People will walk or bicycle if:
    - It is convenient

  - They feel safe doing so
  - Origins and destinations are linked through a well-connected network.
- A "***Complete Street***" is one that balances the needs of all users. In a 2008 Institute of Transportation Engineers Journal article, LaPlante and McCann define a Complete Street as "a road that is designed to be safe for drivers, bicyclists, transit vehicles and users, and pedestrians of all ages and abilities. The Complete Streets concept focuses not just on individual roads but on changing the decision-making and design process so that all users are routinely considered during the planning, designing, building and operating of all roadways. It is about policy and institutional change."
- ***Comprehensive Walking and Biking Program***: Implementing a comprehensive program that includes all of "the 5 E's ": Engineering, Education, Encouragement, Enforcement, and Evaluation. While this plan will focus on the identification and prioritization of improvement projects that consist of or include bicycle and/or pedestrian facilities, it is important to recognize that a successful program requires all 5 E's.



There are a growing number of bicycle and pedestrian facilities in the Ames area, which include sidewalks, on-road bicycle facilities (paved shoulders and various bicycle lane treatments), and off-road shared use paths. The majority of existing bicycle facilities in Ames are shared use paths that are located immediately adjacent to and parallel to roadways, which are also known as "sidepaths". Many arterial and collector roadways within the area have sidepaths, and there has been a concerted effort to expand the existing system of pathways in recent years, including sidepaths and other shared use paths in exclusive rights of-way. While there are many pathways in the area, there are very few on road bicycle facilities. Dedicated bicycle lanes include:

- Hyland Avenue and Morrill Road on the Iowa State University campus
- Ash Avenue north of Mortensen Avenue (the first separated bicycle lanes in the City)
- 6th Street from Brookridge Avenue to Grand Avenue
- Lincoln Way from Dayton Avenue to the eastern City limits
- South Dakota from U.S. 30 to 250th Street.

There are some roadways, such as Northwestern Avenue, Ross Road, Clark Avenue, and 20th Street, which have existing signage that recognizes them as a "***Bicycle Friendly Street***"; these streets do not provide dedicated bicycle facilities, but are in shared roadway environments.

FIGURE 16 shows the existing bicycle facilities within the Ames area, including paved shoulders in the rural areas. Designated "Bicycle Friendly Streets" that do not include any specific bicycle infrastructure are not included in Figure 15.

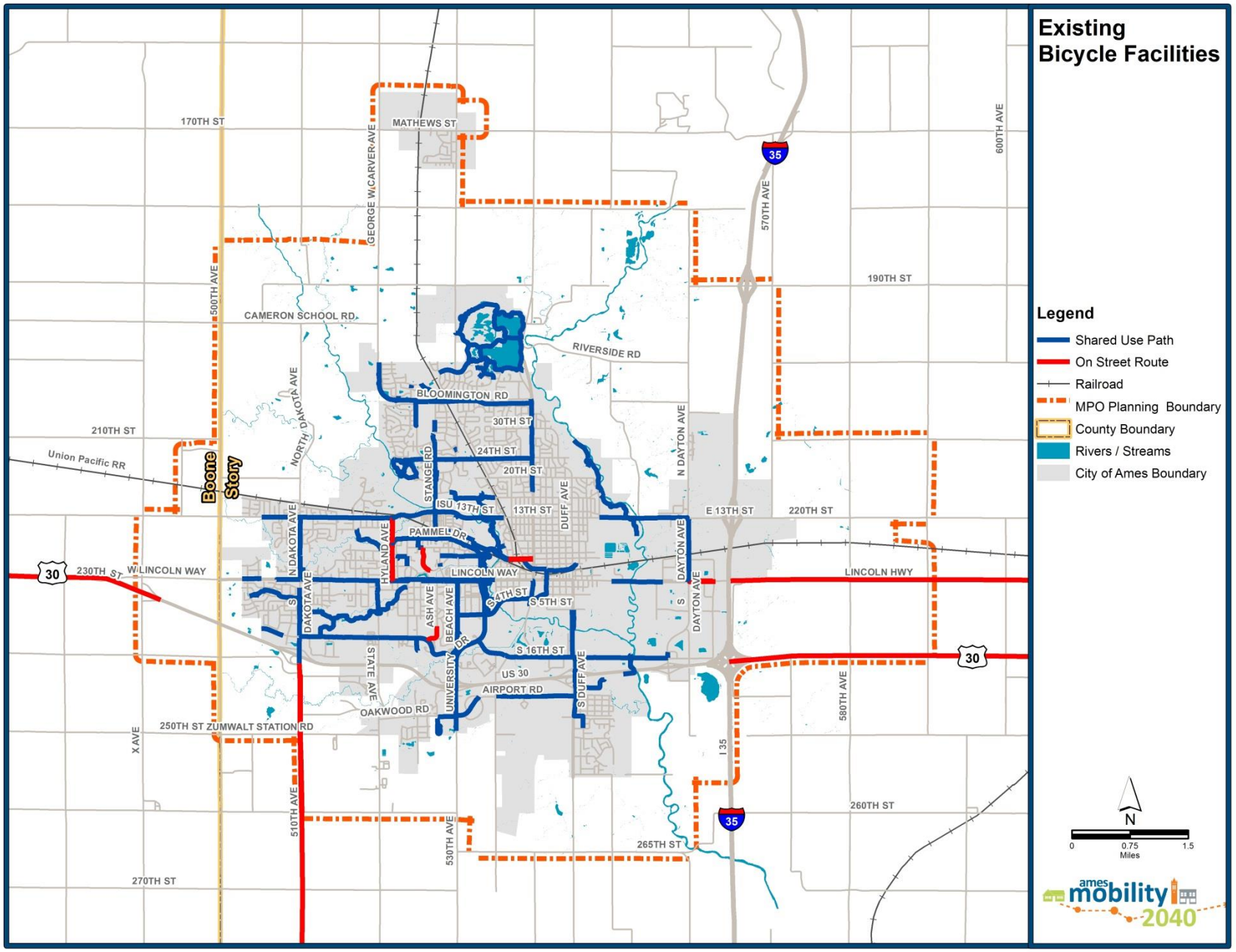
City ordinance restricts bicycles from the sidewalks along the following streets due to high pedestrian activity:

- Main Street from Duff Avenue to Clark Avenue
- Lincoln Way on the south side thereof from Stanton Avenue to Hayward Avenue
- Hayward Avenue on the east side thereof from Lincoln Way to Hunt Street
- Welch Avenue from Lincoln Way to Knapp Street

In addition, bicycles are prohibited on Grand Avenue between Lincoln Way and 30th Street due to Iowa DOT policy.

The Ames Area MPO has a draft Complete Streets Policy under consideration to its Policy Committee, which promotes "Complete Streets" principles for all transportation infrastructure projects carried out within the planning boundary of the Ames Area MPO.

Figure 16. Existing Bicycle Facilities



Existing Bicycle and Pedestrian Service Analysis

Research Background

How bicyclists' and pedestrians' sense of the level of safety and comfort within a roadway tends to be based on several factors including:

- Traffic speed.
- Traffic volumes.
- Roadway geometrics, including lane widths, presence of on-street parking, and surface condition.
- Perceived personal safety and security.
- Aesthetics, including lighting and amenities.
- Crossing treatments at intersections.

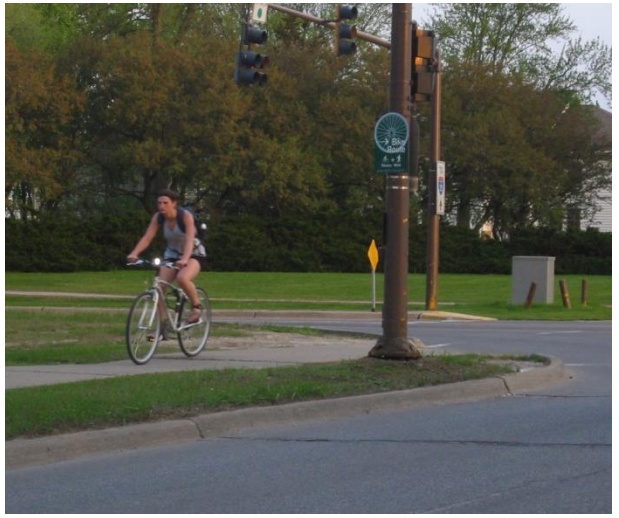
Two models have been developed, one for bicyclists and one for pedestrians, based on research that measures the perceptions of personal safety and comfort with respect to motor vehicle traffic. The Bicycle Level of Service and Pedestrian Level of Service models (version 2.0) ***do not measure travel flow or capacity***, but are based on human responses to measurable roadway and traffic characteristics. Each model was developed from a study that placed participants in actual urban roadway and traffic conditions to obtain feedback regarding the perception of hazard or level of comfort on a variety of different roadway segments. Participants graded roadway segments on a scale from A (least hazardous) to F (most hazardous) based on each participant's own assessment of facilities based on their own experience with how safe or comfortable they felt as they bicycled or walked on each segment of the street. The models are not set up to evaluate off-street (sidepath) conditions, or intersection conditions. The research result was the calibration of statistically-reliable mathematical models that quantify bicyclists' and pedestrians' perceptions of the quality of service on shared use roadway environments.

On-Street Suitability / Bicycle Level of Service

The Bicycle Level of Service model reflects the effect on bicycling suitability or "compatibility" of factors that relate to the perception of personal safety and comfort with respect to the roadway environment. These bicycling "compatibility factors" include:

- Roadway width
- Bike lane widths and striping combinations
- Traffic volume
- Pavement surface conditions
- Motor vehicle speed and type
- On-street parking

There are some additional factors that can affect bicycle suitability that are not part of the established mathematically-derived Bicycle Level of Service model. These additional, non-modeled suitability factors for a particular corridor might include lighting, landscaping/aesthetics, and number of driveway/conflict points. These additional elements may be further reviewed in the Mobility Ames 2040 plan based on issues identified with project stakeholders and the public, and therefore still considered in the overall plan development process.



Statistically, the most important variables involved the separation of the bicyclist from motorized traffic, such as the presence of a designated, striped bicycle lane. It is important to note that the Bicycle Level of Service model only represents bicycling suitability of the on-road environment and does not incorporate conditions on separated facilities such as shared use paths/sidepaths or cycle tracks. Further, the model has not been developed to distinguish between shared lane environments without any markings versus those with shared lane markings (sometimes called "***sharrows***").

Pedestrian Level of Service

The factors contained in the Pedestrian Level of Service model include:

- Lateral separation between pedestrians and motor vehicle traffic (i.e., width of sidewalk, width of buffer, etc.)
- Motor vehicle traffic volume
- Motor vehicle speed

Additional, non-modeled factors that affect pedestrian suitability for a particular corridor might include lighting, landscaping/aesthetics, and number of driveway/conflict points While not incorporated into the established mathematically-derived Pedestrian Level of Service model, these additional elements may be further reviewed based on issues identified with project stakeholders and the public, and therefore still considered in the overall Ames Mobility 2040 plan development process.

Similar to the Bicycle Level of Service model, the most important variable was found to be the lateral separation between pedestrians and motor vehicle traffic. A pedestrian's sense of safety or comfort is strongly influenced by the presence of a sidewalk. Furthermore, the value of the sidewalk varies according to its location and buffering (separation) from the motor vehicle traffic. In general, as the buffering increases, the pedestrian's comfort level increases.

Additionally, a pedestrian's comfort level increases further with the presence of a barrier within the buffer, such as on-street parking, a line of trees, or a roadside boulevard. Unlike the Bicycle Level of Service model, the Pedestrian Level of Service model can account for shared-use sidepaths, since they are located adjacent to the roadway and essentially function as wide sidewalks.

Both level of service models being used represent a predecessor to the methodologies currently included in the 2010 Highway Capacity Manual (HCM) for link-based evaluation, and therefore do not produce identical results. The Bicycle and Pedestrian Level of Service models, while slightly different from the Highway Capacity Manual, do provide a solid basis on which to evaluate the supply of current bicycle and pedestrian facilities, and suggest needs for new or improved facilities.

Suitability Analysis Ames Area Bicycle and Pedestrian Conditions

A suitability analysis of the street system for bicycle and pedestrian transportation was completed within the MPO planning boundary where applicable GIS data was available, primarily within the Ames. A total of approximately 65 roadway miles were evaluated using the Bicycle and Pedestrian Level of Service models. The Bicycle and Pedestrian Level of Service grades for the arterial and collector roadways within the study area are shown on **FIGURE 17** and **FIGURE 18**, respectively.

An additional note to the Level of Service analysis is that the pavement condition data was based on the City's pavement condition index (PCI), which is based on a scoring scale from 0 to 100. The Bicycle Level of Service methodology uses the FHWA's present serviceability rating (PSR) scale from 1 to 5 to assess the surface quality of pavements. PCI scores were correlated to an approximate PSR score based on establishing thresholds for the upper values of ranges that generally correspond to pavement description conditions of very good, good, fair, poor, and very poor. It should be noted that very poor pavement condition (PSR values less than 1.5) have a very negative impact on Bicycle Level of Service score – the few roadway segments with very poor pavement condition had Bicycle Level of Service grades of E or F even if conditions otherwise were generally favorable for cycling.

Figure 17. Bicycle Level of Service/ On-Street Suitability Assessment

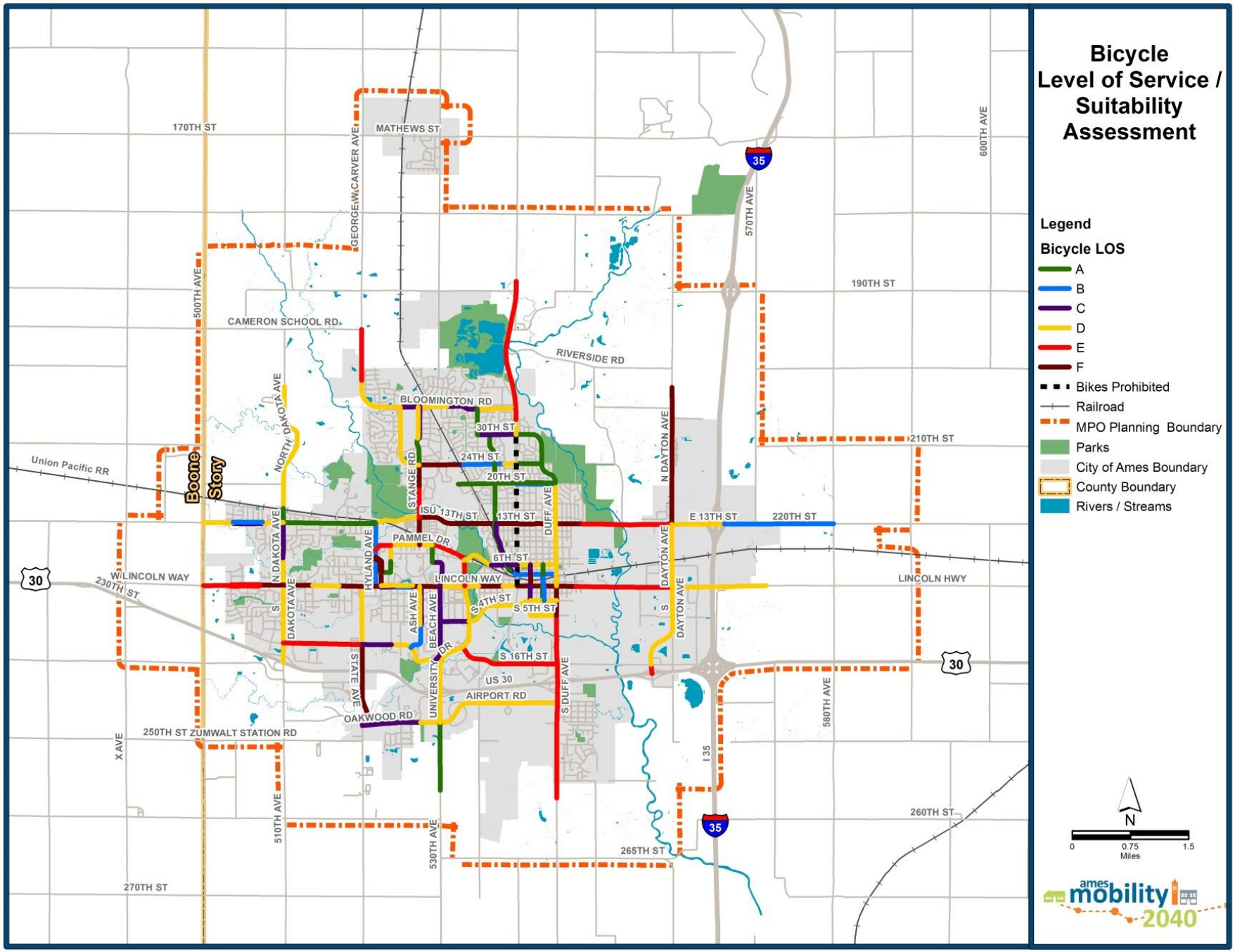


Figure 18. Pedestrian Level of Service/ On-Street Suitability Assessment

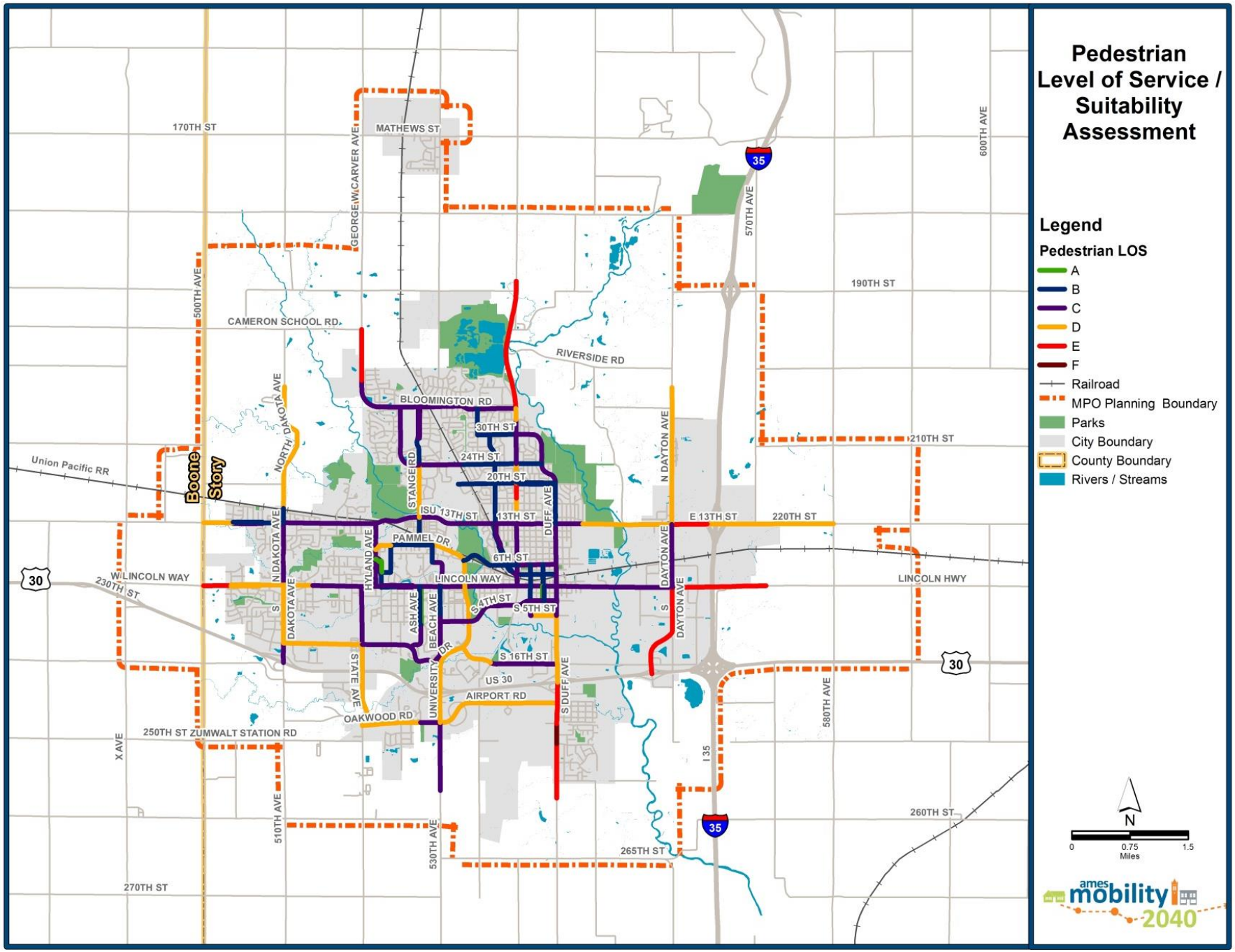


TABLE 10 provides a summary of the total miles and percentage for each level of service. Only about 20 % of roadways exemplify outstanding environments for walking or bicycling at Level of Service "B" or better, although 63 % of all roadway miles evaluated rate a Pedestrian Level of Service "C" or better. The percentage of roadways with very poor bicycling environments at Level of Service "E" or "F" is 30 %, although the percentage of very poor conditions for pedestrians is much lower at only 11 %.

Table 10. Bicycle and Pedestrian Level of Service Summary

Bicycle Level of Service			Pedestrian Level of Service		
BLOS	**Distance (MI)**	**Percentage**	**PLOS**	**Distance (MI)**	**Percentage**
A	7.0	10.9%	**A**	0.5	0.8%
B	5.7	8.8%	**B**	12.9	20.0%
C	6.6	10.2%	**C**	27.1	42.0%
D	25.4	39.4%	**D**	16.7	25.9%
E	12.5	19.4%	**E**	7.3	11.3%
F	7.3	11.3%	**F**	0	0.0%

The level of service analysis represents a "supply side" analysis. The results are significant as they can be used to conduct a benefits comparison among proposed roadway cross-sections, identify roadway re-striping or reconfiguration candidates for bicycle or pedestrian improvements, and to prioritize and program roadways for improvements. This is especially true when the Level of Service results are combined with an analysis of demand, because the roadways with the poorest level of service and the highest user demand can be given a high priority for making improvements.

Bicycle/Pedestrian Demand Analysis

Relative levels of bicycle and pedestrian demand within different parts of the Ames area is estimated based on a point scoring criteria applied to a GIS analysis of proximity to various key destinations. The proximity to key destinations reflects graduated scoring criteria which gives more points for closer proximity, accounting for the fact that people are willing to walk or ride a bicycle different distances to each destination, and also that the anticipated volume of bicycle or pedestrian activity to specific destination types will differ. It should be noted that the demand analysis does not consider existing "on the ground" conditions or facilities.

The result of the GIS demand analysis is one "heat map" each for bicycle demand and pedestrian demand that stratifies the demand levels by the color gradations on each map. Areas with darker colors are projected to have higher levels of demand. It should be noted that this demand evaluation only considers transportation trips being made to destinations, and does not consider recreational trips such as recreational bike rides or jogs/walks that do not include a stop at an intermediate destination. It is recognized that there are a substantial number of cycling club routes and other recreational corridors that traverse the City and reflect many of the City's most popular bicycle routes – these routes were considered during the evaluation of appropriate facility improvements and project prioritization.

The bicycle and pedestrian demand is generally highest in the areas encompassing and immediately surrounding the Iowa State University campus and downtown Ames; this is because these areas have a mix of complementary land uses in close proximity to each other where short trips can easily be made by bicycling or walking. The further away from Iowa State University and downtown Ames, the less demand generally exists for bicycling and walking trips because these areas consist largely of a single land use, and trips to there are typically longer and therefore less likely to be made by bicycling or walking. For this reason, roadways closer to Iowa State University and downtown Ames with poor Bicycle and/or Pedestrian Level of Service grades (below the recommended standard of "C") should generally be considered higher priorities for improvement than roadways with poor levels of service further out or on the periphery of the study area. FIGURE 19 and FIGURE 20 illustrate the pedestrian and bicycle demand, respectively.

Figure 19. Pedestrian Demand Analysis

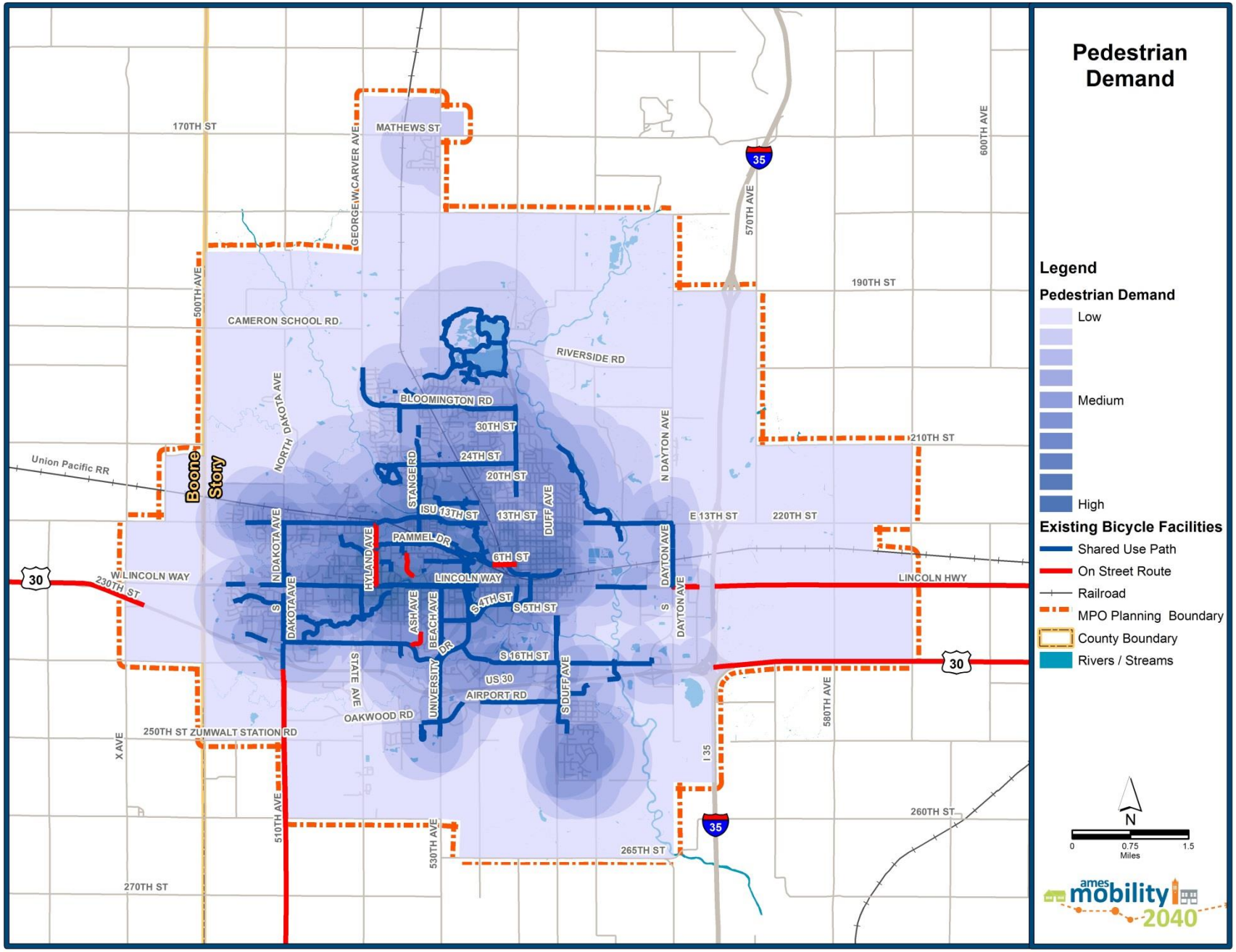
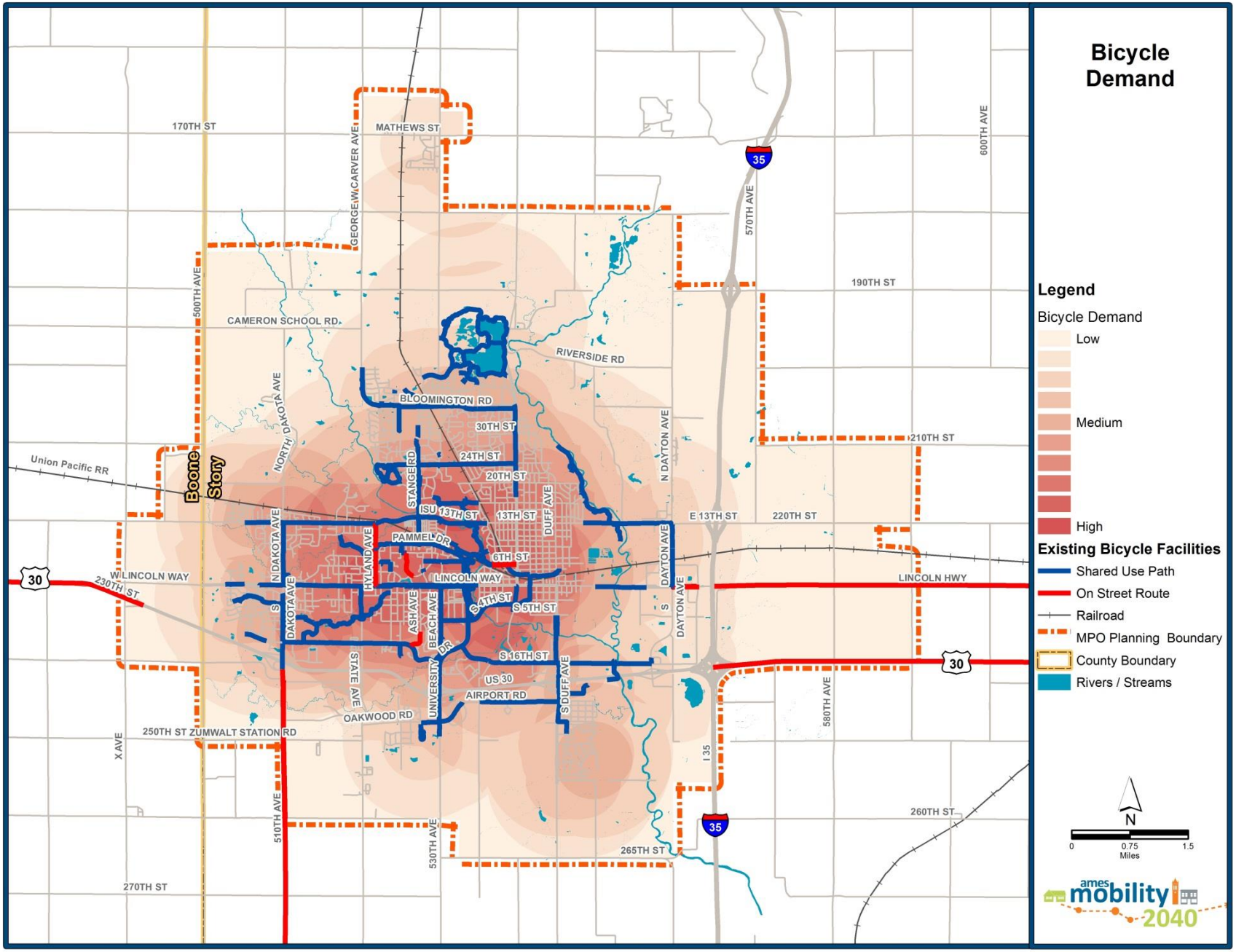
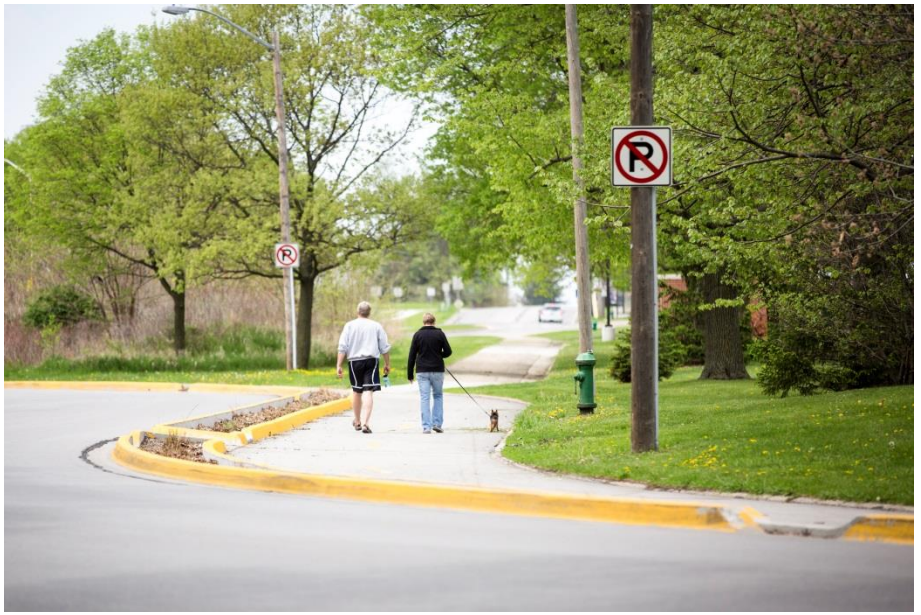


Figure 20. Bicycle Demand Analysis



Walk Score

Additionally, the Iowa State University Extension Community Economic Development recently studied the Walk Score of the Ames area. Walk Score is a website providing a numerical ranking between 0 and 100, for any address based on the accessibility of surroundings by walk. The Ames composite Walk Score maps were created using a 500-ft grid across the area, with over 2700 sample points. The results of this analysis show Ames covers a range of Walk Scores, ranging from “Walkers Paradise” (90-100), to “”Car-Dependent” (0-49). The Walk Score maps are included in the report **APPENDIX C**.



When reviewing the existing and future conditions associated with the other modes of travel, particularly transit, it is important to recognize that all modes of travel at some point involves the traveler being a pedestrian. This is emphasized by the fact that the 2014 on-board transit survey found that more than 90 % of transit system users in Ames walk to get between the bus and their ultimate trip start and trip end. Thus, walk conditions in Ames are a truly multi-modal issue, since they affect not only walk trips, but accessiblity for the vast majority of transit users.

Bicycle Illumination and Intersection Radar Detection

The suitability of roadway corridors for use by bicyclists can be made more attractive through use of amenities such as suitable roadway lighting and detection for bicyclists in the roadway. Intersections in the Ames area with bicycle radar detection are shown in **FIGURE 21**. Additionally, data from street light inventory from Ames Electric and Iowa State University with a 100-ft lighting illumination radius is shown in **FIGURE 22**. The street light inventory illustrates that although much of the area is lit along the current transportation system, there are a few bicycle/pedestrian facilities that do not border suitable lighting.

Figure 21. Intersections with bicycle radar detection

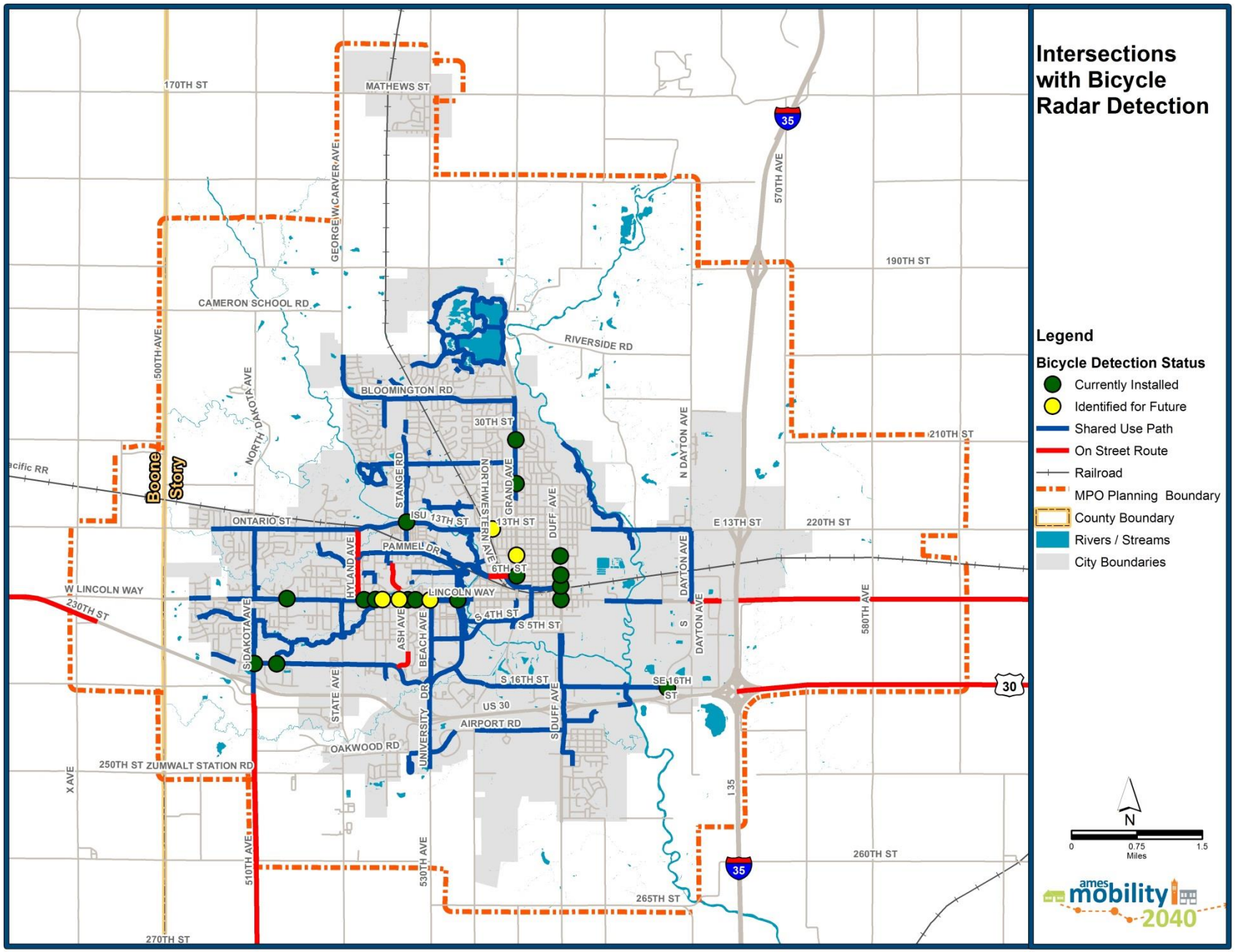
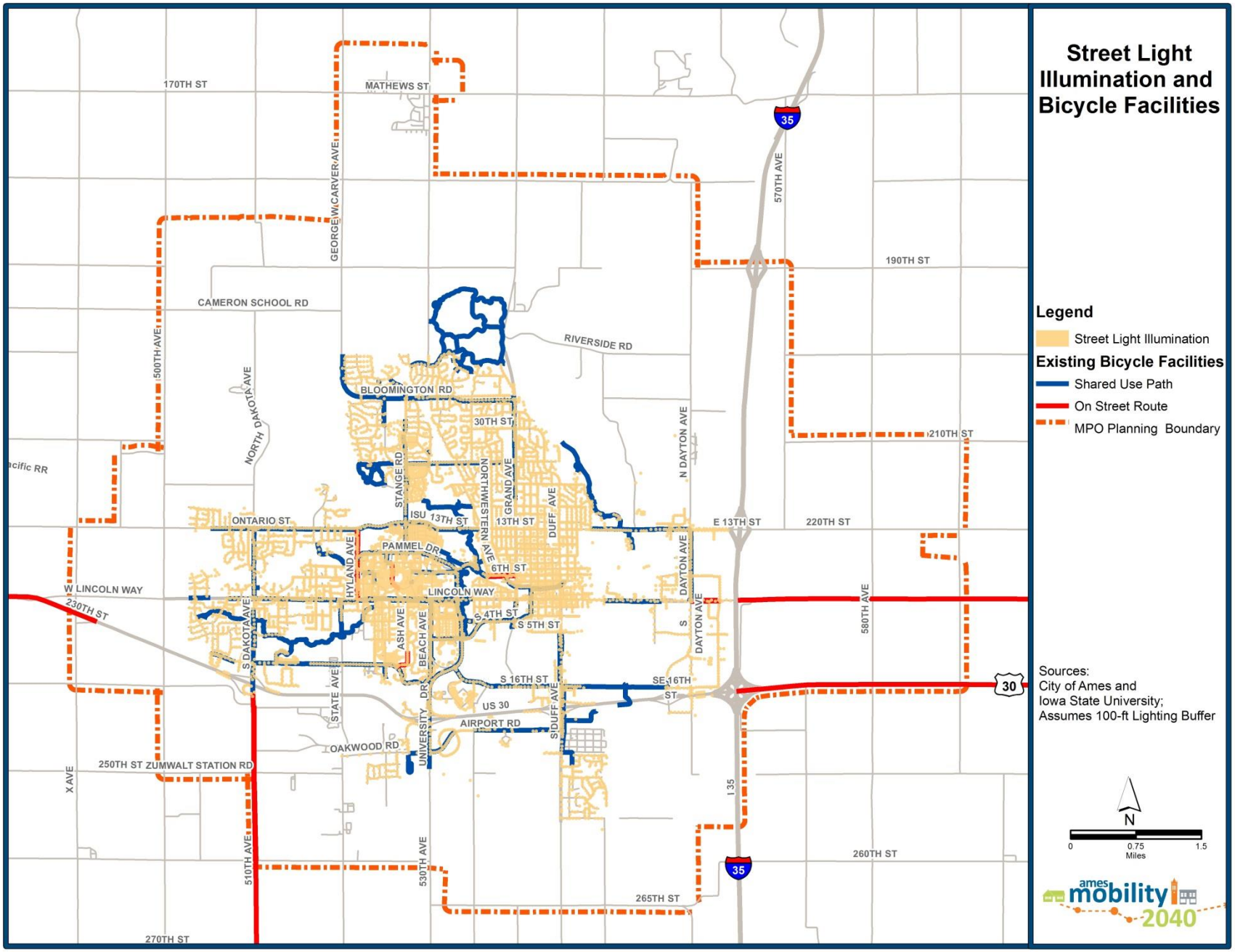
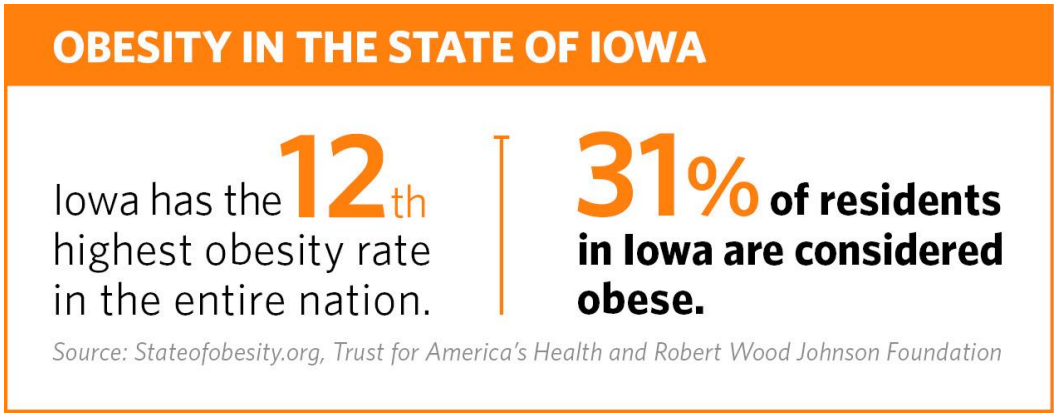


Figure 22. Roadway lighting



Active Transportation/Health Impacts

There is a strong correlation between communities with good bicycle and pedestrian environments and having more active residents. "***Active transportation***" is mobility powered by human energy, primarily walking and bicycling. Often called "non-motorized transportation," the term active transportation expresses the key connection between healthy, active living and transportation choices.



Two-thirds of American adults, and nearly one-third of children, are now considered overweight or obese[8]. Investments in active transportation networks help combat the obesity epidemic by making it easier to build routine physical activity into our daily lives.

According to the ***Institute of Medicine***, overweight children have an increased risk of:

- Type 2 Diabetes
- Low self esteem
- Decreased physical functioning
- Obesity in adulthood
- Many other negative emotional & physical effects

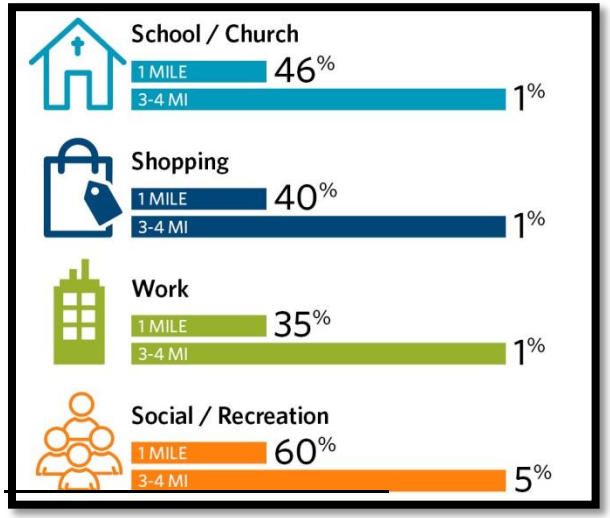
[8] Partnership for Active Transportation, 2015

Mobility and Accessibility

Transportation systems have well-documented connections to public health, with a specific tie between how people choose to travel and a community's land use decisions and patterns. An article in the American Journal of Preventative Medicine[9] concluded that the built environment and travel patterns are important predictors of obesity across gender and ethnicity. The study found that each additional hour spent in a car per day was associated with a 6 % increase in the likelihood of obesity, and conversely, each additional kilometer walked per day was associated with a 4.8 % reduction in the likelihood of obesity. This study concluded that strategies used to increase land-use mix and distance walked while reducing time in a car can be as effective as health interventions.

According to Smart Growth America, 73 % of Americans feel they have "no choice but to drive as much" as they do. Data compiled based on the FHWA, 2009 National Household Travel Survey indicates that people are willing to walk to places they need to go when the places are located closely. This data is shown in FIGURE 23, indicating that destinations within 1 mile are much more likely to be traveled by walking than those destinations 3-4 miles away.

Figure 23. Walk Trip Willingness by Destination and Distance Away

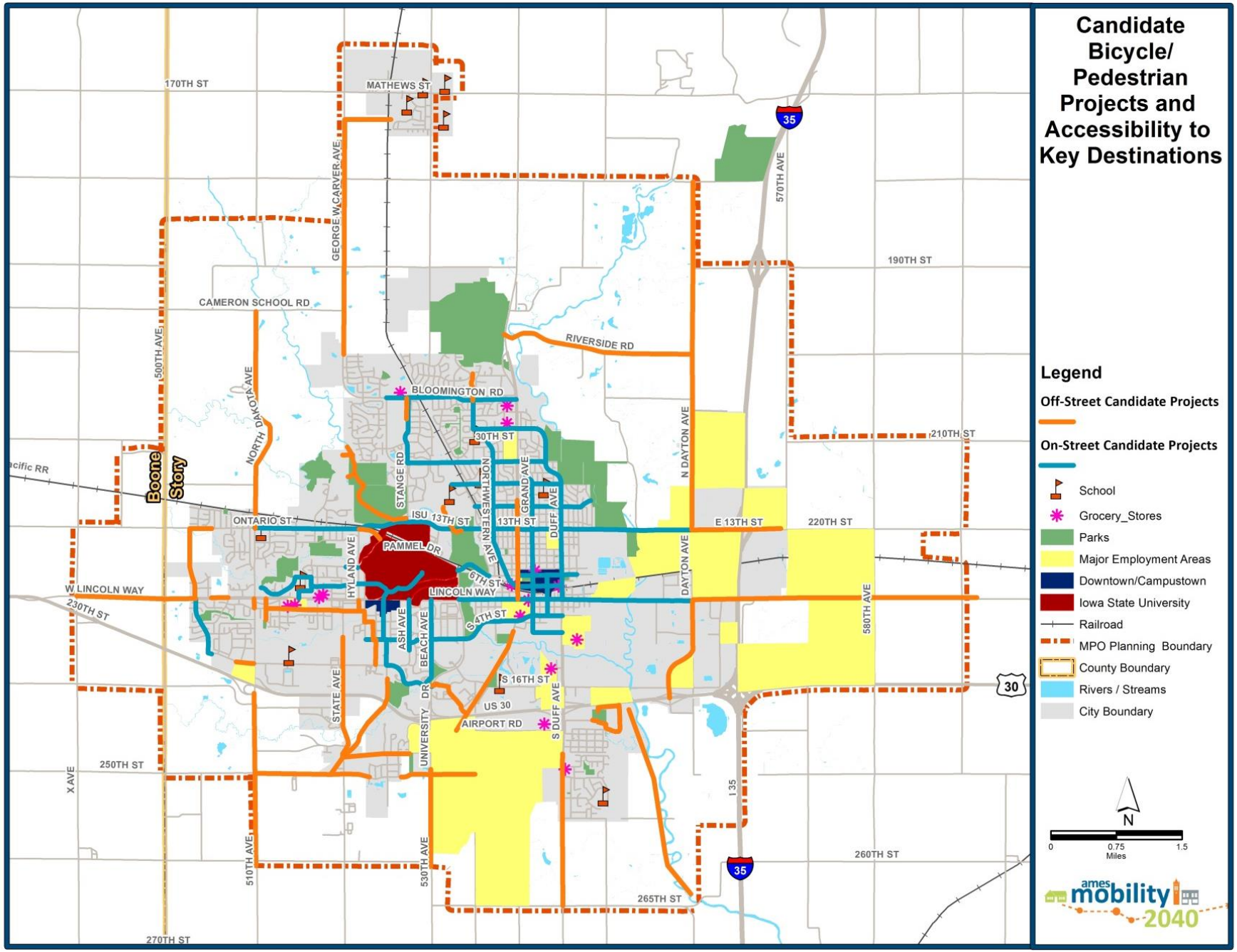


Given the establishment of the key connection between public health and land use/transportation, locations of key destinations in the Ames are (schools, Iowa State University, downtown, Campustown, grocery stores, major employment areas[10], and parks) are shown in FIGURE 24. These key destinations are shown overlaid with the bicycle pedestrian candidate projects.

[9] *Lawrence D. Frank, Martin A. Andersen, Thomas L. Schmid. (2004). Obesity relationships with community design, physical activity, and time spent in cars. American Journal of Preventative Medicine, August 2004.*

[10] *Based on 2040 TAZ's with total employment > 300*

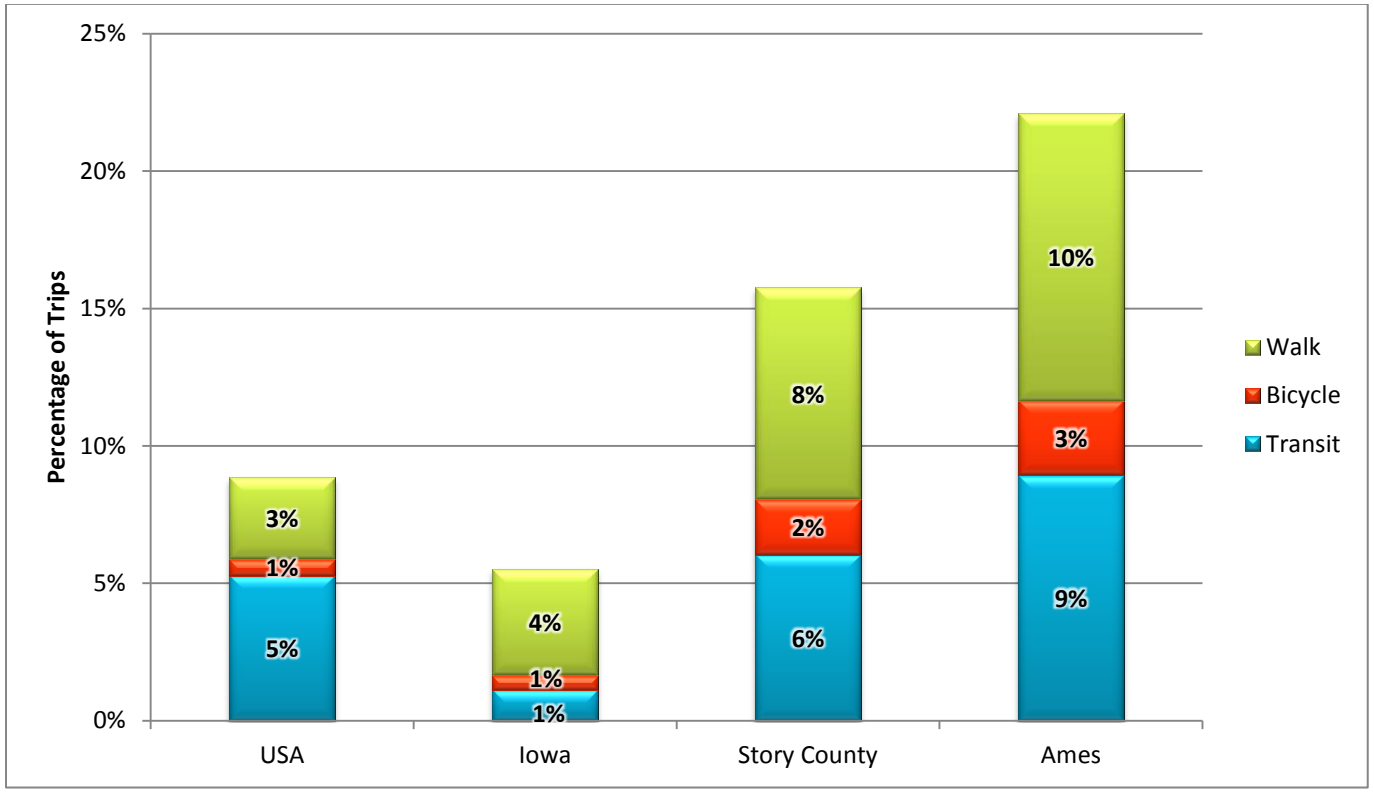
Figure 24. Bicycle/Pedestrian Potential Alternatives and Accessibility to Key Destinations



Means of Active Transportation to Work

Data summarizing means of transportation to work for workers 16 years and over is produced by the Iowa Data Center for 5-year periods. The most recent five-year period (2009-2013) percentage of trips using walk, bicycle or transit is shown in FIGURE 25. This data shows the overall portion of work trips in Ames by means of walking, cycling, or riding transit ("active transportation") is 22 %, a portion significantly over the comparable portion of trips for the United States as a whole, the state of Iowa, or Story County.

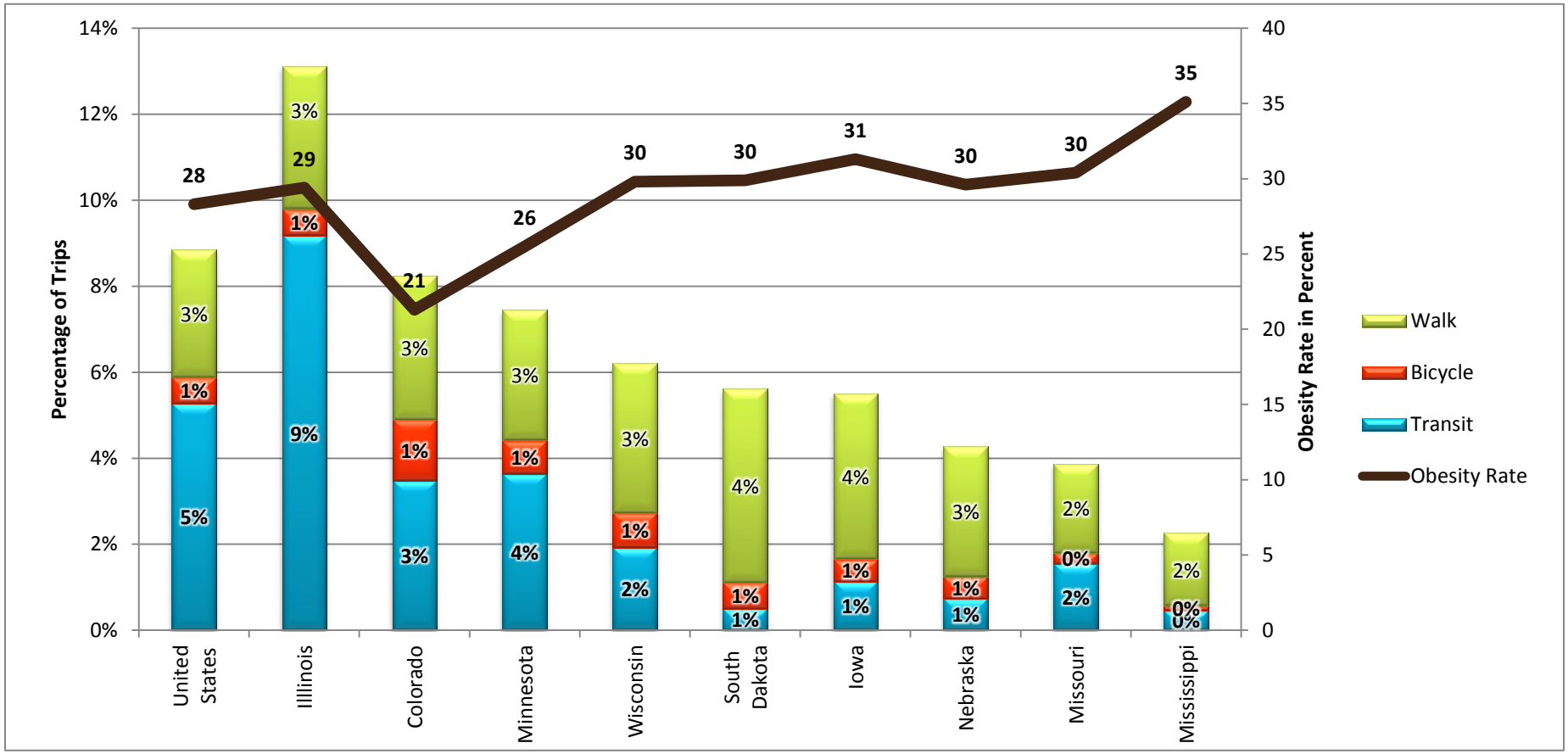
Figure 25. Means of Active Transportation to Work



Source: Iowa Data Center, 2009-2013

Additionally, obesity data as it correlates with active transportation is displayed by comparing various states to the state of Iowa as shown in FIGURE 26. The national obesity rate is 28 %, with approximately 9 % of trips made via active transportation means (transit, bicycle or walk). Iowa, along with its 6 surrounding states (Illinois, Minnesota, Wisconsin, South Dakota, Nebraska, and Missouri) is also shown in this figure. The state of Colorado, with the lowest obesity rate in the nation (21 %), and the state of Mississippi, with the highest obesity rate in the nation (35 %) is also shown in FIGURE 26.

Figure 26. Active Transportation Means to Work vs. Obesity Rate, by State



Source: Iowa Data Center, 2009-2013

Safe Routes to School

In 1969, 42 % of children walked or biked to school. In 2001, only 16 % walked to school[11]. Today, parents driving their children to school represent 20-25 % of morning traffic[12] (NHTSA, 2003). ***Safe Routes to Schools*** was created by the US Department of Transportation to promote walking and biking to school. Although a standalone Safe Routes to School funding program no longer exists under MAP-21, Safe Routes to School projects can be funded through the Transportation Alternatives Program (TAP). The Safe Routes to School program supports improving sidewalks, bike paths and safe street crossings; reducing speeds in schools zones and neighborhoods; addressing distracted driving; and educating people about pedestrian and bike safety.

Healthiest Ames

Healthiest Ames received a grant from Matching Assets to Community Health (MATCH) from the Wellmark Foundation, to which the city of Ames contributed a matching fund. The Wellmark Foundation "seeks to improve the health of Iowans, South Dakotans, and their communities", in hopes of expanding community health initiatives. The project in Ames is called "Engaging Ames in Complete Streets", with the goal of influencing policy to enhance walkability and bikeability in Ames.

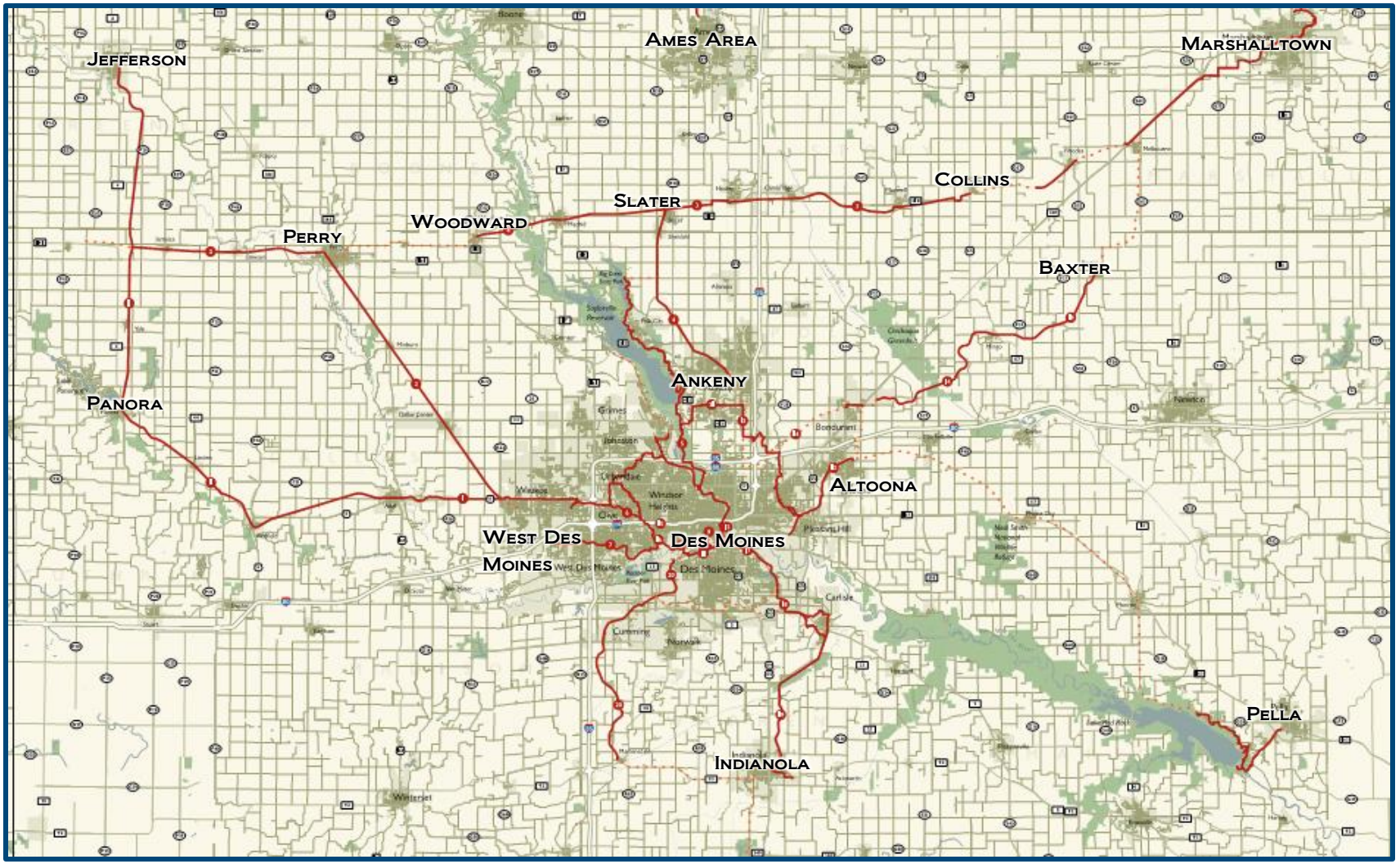
The Community Design Lab (CDL) has collected data from the Bikeability Committee of Healthiest Ames, and is actively engaged with Ames Bicycle Coalition (ABC). In the Fall of 2014, the CDL compiled maps summarizing recommendations for the Ames community at-large, and for the Iowa State University campus. These maps are included in **APPENDIX C**.

Major Trails of Central Iowa

The Central Iowa Trails network is a system of bicycle and walking paths that interconnect cities, towns, counties, parks and recreations areas, and urban and rural environments in the Central Iowa region, primarily south of Ames. It is a constantly growing and expanding network that provides an opportunity to explore Central Iowa. A current system map for the Central Iowa Trails is shown in **FIGURE 27**. As shown in this figure, the Ames bicycle system includes a section of regional trail north of Ames city limits. The Ames community has future opportunities to further establish connections to this network of trails in Central Iowa.

[11] Centers for Disease Control, 2005
[12] National Highway Traffic Safety Administration, 2003

Figure 27. Central Iowa Trails Map



Source: Central Iowa Trails InfoHub

ROADWAY SYSTEM CONDITIONS

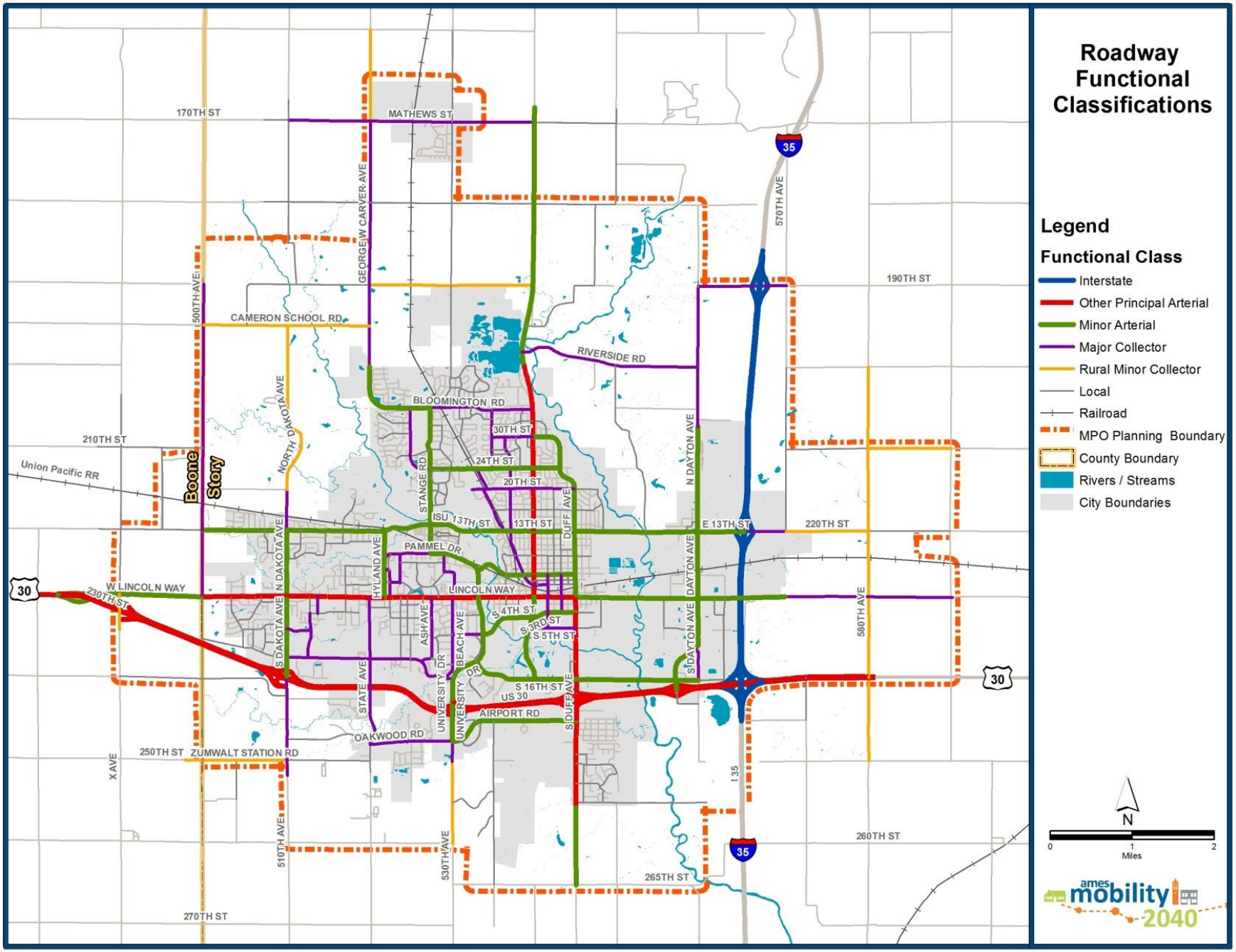
The roadway system conditions include an overview of traffic safety, traffic operations, commute patterns, and pavement and bridge condition.

Roadway Classifications

All roads, streets and highways in Iowa are classified according to a federal functional classification system. Functional classification is the grouping of highways, roads and streets by the character of service they provide. Functional classification defines the part that any particular route should play in serving the flow of trips through a roadway network. FHWA approves the functional classification system to coincide with the U.S. Census analysis. Functional classifications are used for general transportation planning efforts, and are also references for construction standards and transportation program eligibility. The existing federal functional classifications are shown in **FIGURE 28**. Functional classifications for the Ames Area MPO roadways include:

- ***Interstate***. (e.g., Interstate 35) A divided, limited access facility with no direct land access and no at-grade crossings or intersections. Interstates are intended to provide the highest degree of mobility serving higher traffic volumes and longer length trips.
- ***Other Principal Arterial***. (e.g., U.S. Highway 30) Permit traffic flow through the urban area and between major destinations. Principal arterials carry a high proportion of the total urban travel, since movement and not necessarily access is the primary function.
- ***Minor Arterial***. (e.g., 13th Street) Collect and distribute traffic from principal arterials and interstates to streets of lower classification, and, in some cases, allow traffic to directly access destinations. Access to land use activities is generally permitted, but is oftentimes consolidated, shared, or limited to larger-scale users.
- ***Major Collector***. (e.g., Beach Avenue) Provide for land access and traffic circulation within and between residential neighborhoods and commercial and industrial areas, as well as distribute traffic movements from these areas to the arterial streets. Collectors do not typically accommodate long through trips and are not continuous for long distances.
- ***Local***. (e.g., Maple Avenue) Offer the lowest level of mobility and the highest level of local property access. Local streets typically make up the largest percentage of street mileage and provide direct access to adjacent land uses. Local streets provide access to private property or low-volume public facilities.

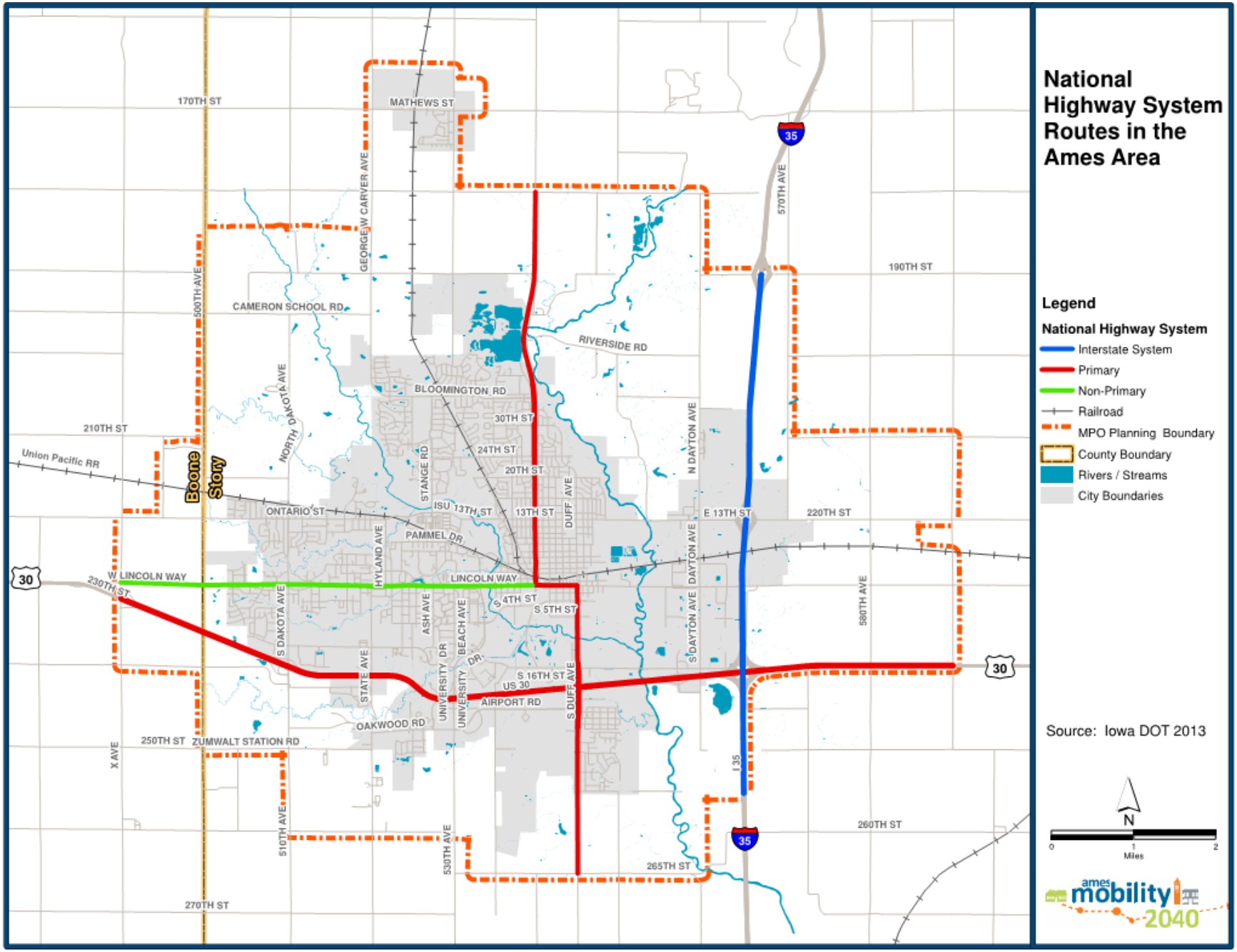
Figure 28. Existing Roadway Federal Functional Classifications



National Highway System

The National Highway System (NHS) includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The NHS was developed by the Department of Transportation in cooperation with the states, local officials, and MPOs. Corridors on the NHS within the Ames Area MPO are shown in **FIGURE 29**.

Figure 29. National Highway System Routes in the Ames Area



Traffic Safety

Ames Area Metropolitan Planning Organization Crash Analysis

Iowa DOT maintains a database of crashes called SAVER (*Safety, Analysis, Visualization and Exploration Resource*). The SAVER database was screened to identify the most frequent crash intersections within the Ames area. The most recent 5-year period of available crash data includes years 2009 – 2013.

Crashes in the Ames Area MPO area were assessed to determine the top 25 highest crash frequency locations during the 5-year period. ***Crash frequency*** refers to the total number of crashes at an intersection. While crash frequency is important because it tells us where the most crashes occur, it does not account for exposure (how much traffic happens at a given location) and may overlook low-volume sites and overemphasize high-volume sites. These intersections are identified as shown in **FIGURE 30**.

The crash frequency ranking is shown in **TABLE 11**, which also categorizes the crashes by crash severity:

- ***Fatal Injury***: Killed or resulted in death within 30 days of the crash
- ***Major Injury***: Incapacitating injury
- ***Minor Injury***: Evident injury, but not incapacitating; complaint of injury; or injured, severity unknown
- ***Property Damage Only (PDO)***: no injuries
- ***Possible/Unknown***

The number of injuries (persons) identified at each of the intersections over the course of the 5-year period are also provided in **TABLE 11**. Note that PDO crashes are shown only in the "crashes" section of the table, not the "injury" section as no injuries were recorded with these property damage only crashes.

The locations of fatal or major injury crashes from 2009 to 2013 are illustrated in **FIGURE 31**. In Ames area MPO study area during the 5-year period, there were 13 fatalities and 100 major injuries, and a total of 5,206 crashes, as shown in **TABLE 12**.

Figure 30. Highest Frequency Crash Intersections for Analysis

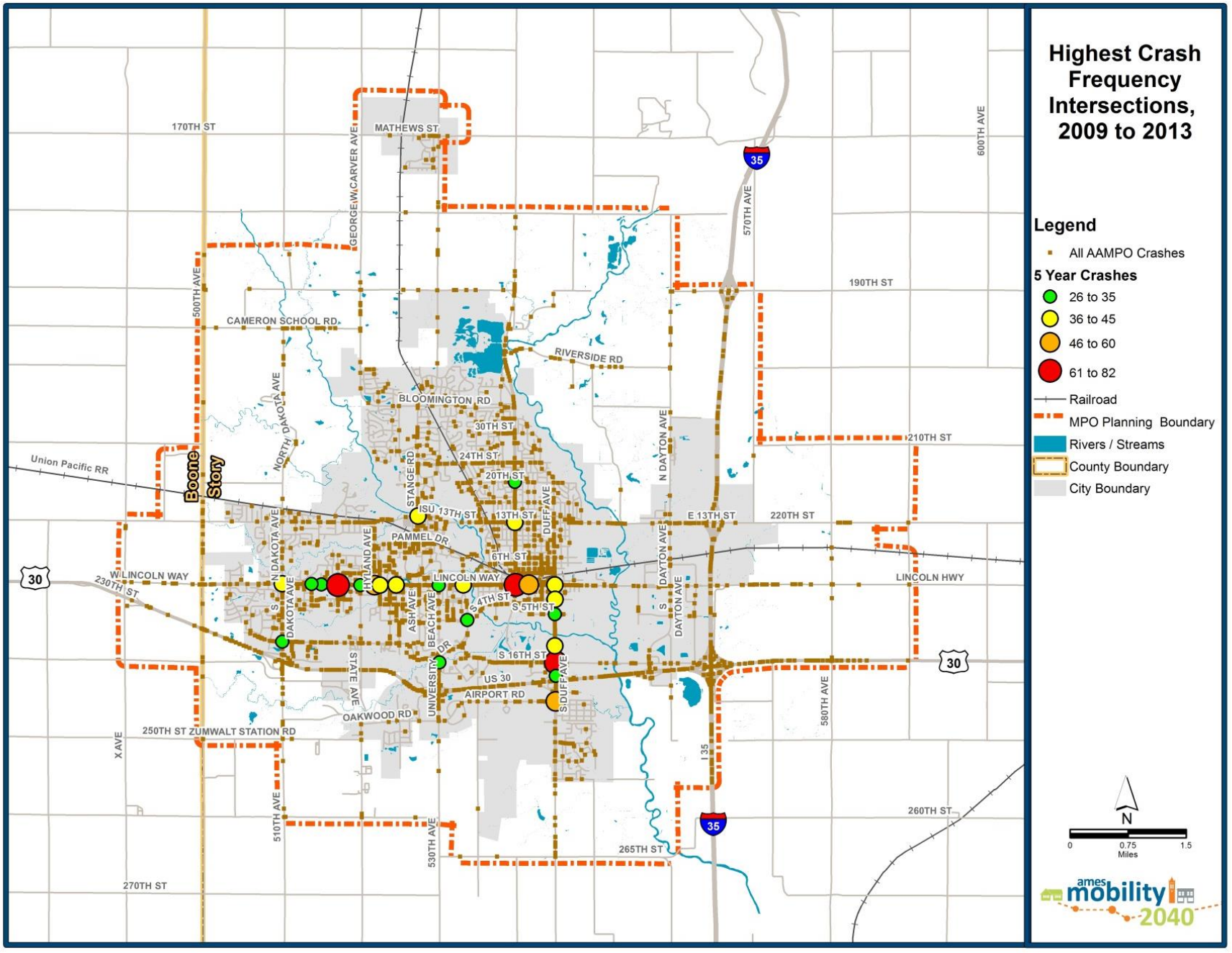


Table 11. Intersection Crash Frequency

Ranking by Frequency	Intersection	Total Crashes (5 Year)	Number of Crashes by Severity					Number of Injuries by Severity			
			Fatal	Major	Minor	Possible	PDO	Fatal	Major	Minor	Possible
1	Lincoln Way/Grand Ave	82	0	1	5	11	65	0	1	5	12
2	S 16th St/S Duff Ave	68	0	0	5	9	54	0	0	6	12
3	Lincoln Way/Walnut Ave	59	0	2	7	13	37	0	2	8	17
4	Lincoln Way/Hyland Ave	53	0	0	4	9	40	0	0	4	9
5	Airport Rd/S Duff Ave	49	0	1	4	13	31	0	1	7	22
6	Lincoln Way/S Duff Ave	44	1	0	3	7	33	1	2	3	9
7	SE 3rd St/S Duff Ave	41	0	1	3	6	31	0	1	3	7
8	13th St/Stange Rd	41	0	0	5	7	29	0	0	5	11
9	Lincoln Way/N Dakota Ave	40	0	3	3	4	30	0	3	7	8
10	13th St/Grand Ave	40	0	0	3	4	33	0	0	4	6
11	Lincoln Way/University Blvd	39	0	3	3	5	28	0	3	3	8
12	Lincoln Way/Sheldon Ave	38	0	1	4	6	27	0	1	4	9
13	Chestnut St/S Duff Ave	37	0	1	4	7	25	0	1	6	12
14	Lincoln Way/Welch Rd	36	0	5	4	5	22	0	5	4	6
15	20th St/Grand Ave	34	0	1	5	1	27	0	1	5	1
16	Lincoln Way/Marshall Ave	33	0	1	5	6	21	0	1	5	11
17	SE 5th St/S Duff Ave	33	0	0	3	7	23	0	0	4	15
18	Lincoln Way/Beach Ave	33	0	1	5	6	21	0	1	6	9
19	Lincoln Way/State Ave	33	0	0	1	4	28	0	0	1	5
20	Hwy 30 WB ramp terminal/S Duff Ave	33	0	1	5	8	19	0	1	8	8
21	Mortensen Rd/S Dakota Ave	30	0	1	2	6	21	0	1	2	7
22	Lincoln Way/Dotson Dr	29	0	0	1	4	24	0	0	1	5
23	S 4th St/University Blvd	29	0	0	4	4	21	0	0	4	5
24	Mortensen Rd/University Ave	29	0	0	3	4	22	0	0	6	6
25	Hwy 30 EB off-ramp terminal/S Duff Ave	26	0	0	3	2	21	0	0	3	2

Note- crashes based on 150-ft radius around intersection, SAVER database _saver_20130401.apr

Figure 31. Fatal and Major Injury Crashes

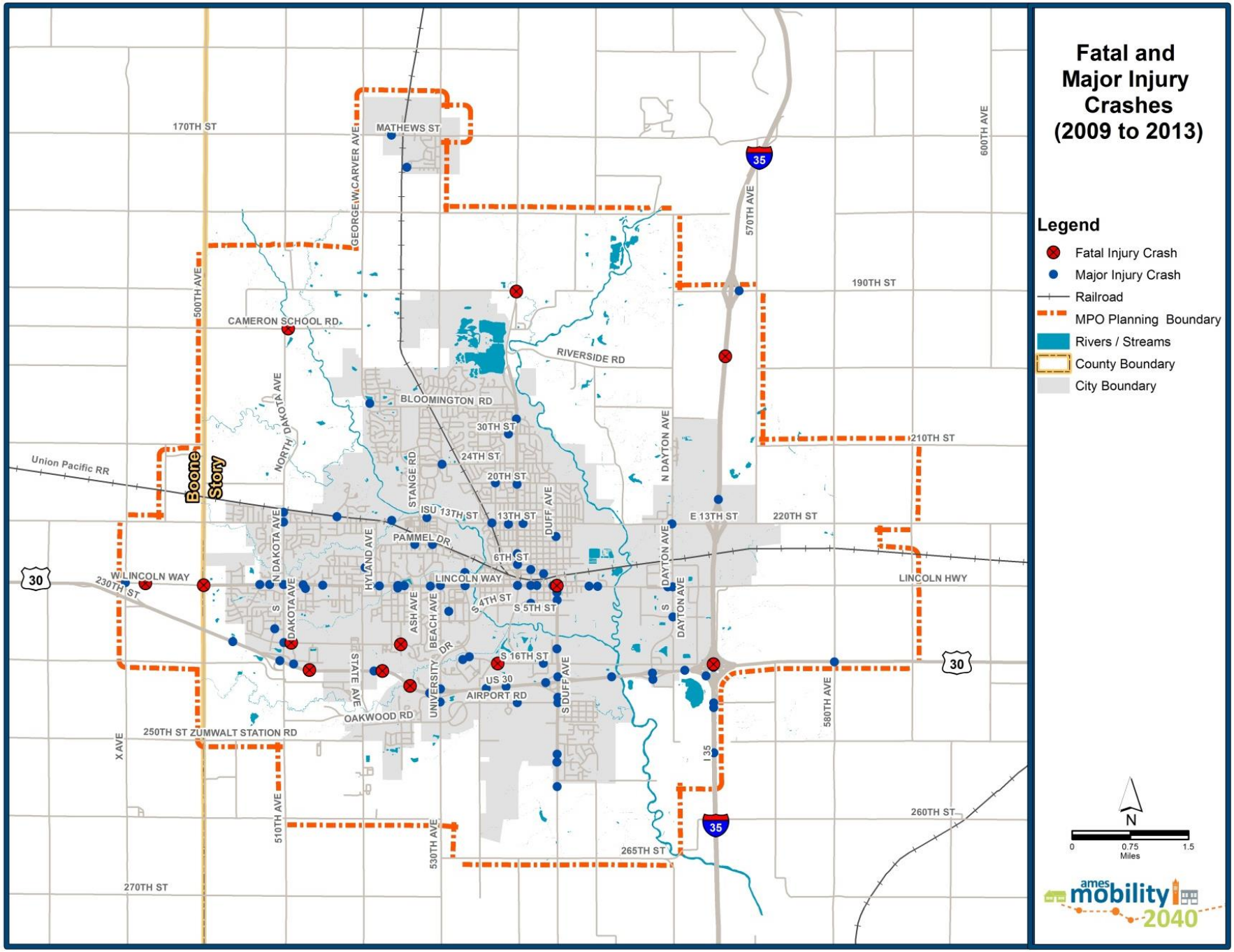


Table 12. Ames MPO Vehicular Crashes by Year and Severity

Year	Fatal	Major	Minor	Possible/ Unknown	PDO	Total
2009	4	12	84	149	873	1,122
2010	1	22	96	135	833	1,087
2011	4	26	94	143	716	983
2012	1	22	91	129	740	983
2013	3	18	101	103	806	1,031
Total (5-yr)	13	100	466	659	3,968	5,206

Source: Iowa DOT, SAVER database, 2009-2013

Crash Rates at Top Intersections

The intersections identified in TABLE 11 were further evaluated using a crash rate. ***Crash rate*** is a calculation of the number of crashes per million entering vehicles. The crash rate normalizes the crash frequency based on exposure. Crash rates were calculated for the 5-year period from 2009-2013, using average daily traffic counts for the Geographic Information Management System (GIMS) 2011 database, supplied by Iowa DOT. The study intersections are identified with the crash rate ranking as shown in TABLE 13.

Table 13. Intersection Crash Rate

Crash Rate Ranking	Intersection	Crash Rate (Crashes/MEV*)
1	Lincoln Way/Walnut Ave	1.65
2	Lincoln Way/Grand Ave	1.65
3	Lincoln Way/Hyland Ave	1.28
4	Airport Rd/S Duff Ave	1.18
5	Lincoln Way/Dotson Dr	1.17
6	S 16th St/S Duff Ave	1.16
7	Lincoln Way/Sheldon Ave	1.04
8	Lincoln Way/N Dakota Ave	1.02
9	20th St/Grand Ave	1.02
10	13th St/Stange Rd	0.97
11	Lincoln Way/State Ave	0.92
12	Lincoln Way/Marshall Ave	0.90
13	Lincoln Way/Beach Ave	0.86
14	Lincoln Way/S Duff Ave	0.84
15	SE 3rd St/S Duff Ave	0.82
16	13th St/Grand Ave	0.81
17	Lincoln Way/University Blvd	0.80
18	Mortensen Rd/University Ave	0.76
19	Mortensen Rd/S Dakota Ave	0.76
20	Lincoln Way/Welch Rd	0.74
21	Chestnut St/S Duff Ave	0.70
22	Highway 30 WB ramp terminal/S Duff Ave	0.68
23	S 4th St/University Blvd	0.65
24	Highway 30 EB off-ramp terminal/S Duff Ave	0.60
25	SE 5th St/S Duff Ave	0.56

** Million Entering Vehicles*

Iowa Comprehensive Highway Safety Plan

FHWA's Highway Safety Improvement Plan (HSIP) requires that individual state transportation departments develop a plan that establishes statewide goals, objectives, and key emphasis areas in consultation with federal, state, local and private sector safety stakeholders (23 U.S.C. § 148). The 2013 Iowa Strategic Highway Safety Plan (SHSP) identifies the state's safety needs and guides investment decisions aimed at reducing highway fatalities and serious injuries on all public roads. The 2013 SHSP outlines a goal to achieve a 15 % reduction in fatalities and major injuries on Iowa highways by the year 2020. The SHSP outlines key strategies used to accomplish this goal, including:

Education Safety Area

- Multi-media education campaign
    - Develop a strategic communication plan integrating the Toward Zero Deaths initiative
    - Deliver safety messages to multimedia networks (television, radio, newspaper, social media)
- Enhance driver education
    - Involve parents in driver education courses
    - Require more behind-the-wheel instruction time
    - Require a diversity of driving conditions (all weather, daytime/nighttime, all road surfaces)

Enforcement Safety Area

- High Visibility Enforcement
    - Support additional officer hours on roadways
    - Increase special enforcement campaigns
- Deploy state-of-the-art technology
    - Use dynamic message signs to convey safety messages
    - Equip law enforcement with state-of-the-art technology for compliance
    - Promote technologies to gather commercial vehicle information
- Expand impaired enforcement programs
    - Expand law enforcement training to effectively identify impaired drivers
    - Launch a drowsy driving program within Iowa DOT's Office of Motor Vehicle Enforcement

Engineering Safety Area

- Prevent lane departure crashes
    - Centerline rumble strips
    - Shoulder/edgeline rumble strips
    - Curve delineation
    - Shoulder treatments
    - Cable barrier rail
- Improve intersections
    - Urban areas: Innovative intersection designs
    - Urban areas: Traffic signal modifications
    - Rural areas: Intersection lighting
    - Rural areas: Stop controls

Policy Safety Area

- Enhance multiagency collaborative efforts
    - Create a multiagency group to carry out safety strategies across the Five E's (Education, Emergency medical services, Enforcement, Engineering, Everyone)
    - Engage professionals across disciplines and systems to participate and create a unified message
- Strengthen legislative policies
    - Enact primary seat belt legislation for all positions
    - Modify careless driving law to include distracted driving as a primary offense
    - Enhance graduated driver's licensing
    - Tighten impaired driving tolerances and increase penalties for impaired driving violations

Research and Data Safety Area

- Safety data improvement
    - Expand statewide electronic crash reporting through TraCS
    - Develop a Web portal to increase safety data availability

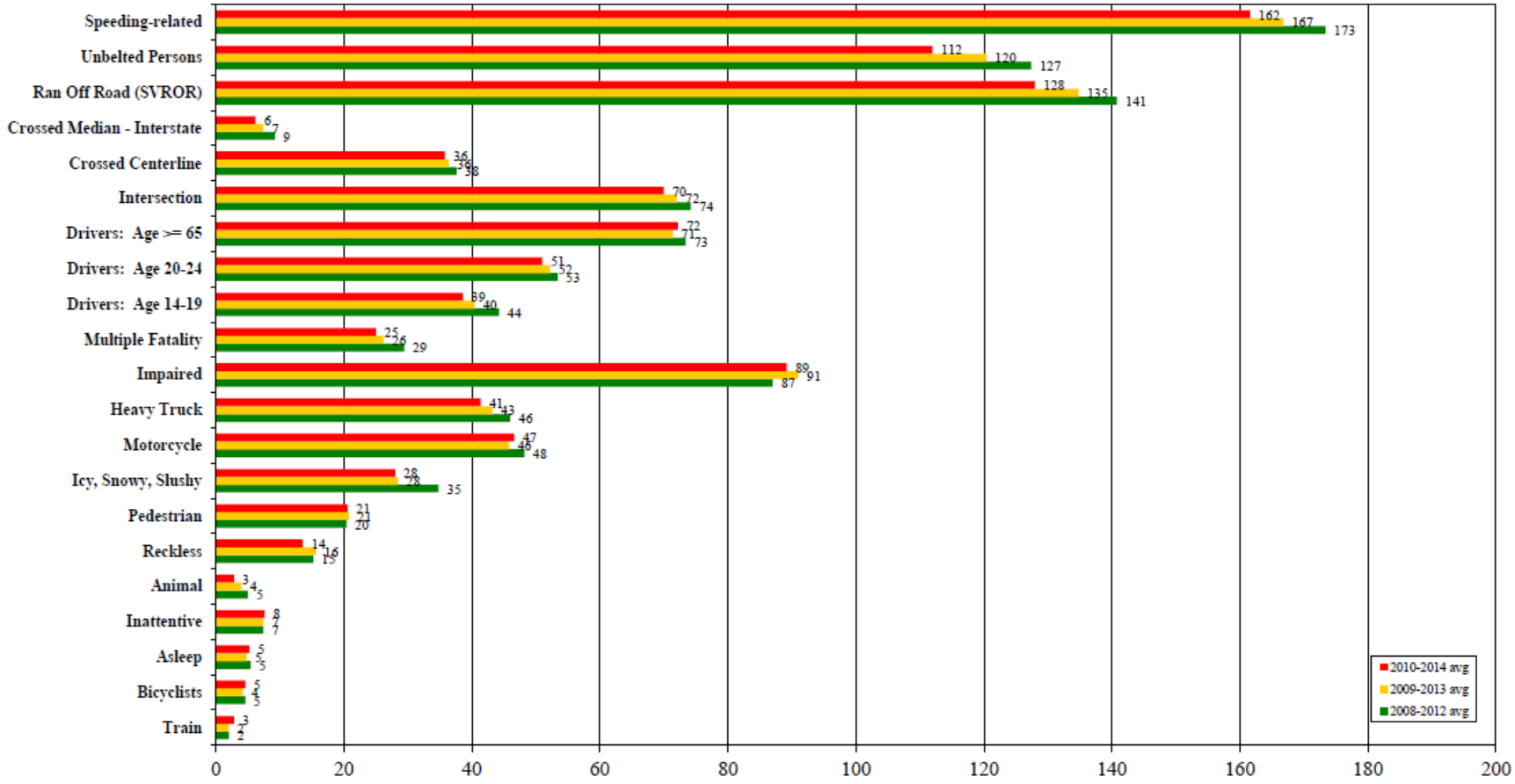
- Support creation of a web-based analytical tool

The goals identified in the Iowa Comprehensive Highway Safety Plan are consistent with Ames Mobility 2040 goals and objectives, as described in CHAPTER 2. Objective 2A- Reduce the rate and number of serious injury and fatal crashes- most directly overlaps with the Engineering Safety Area strategies outlined above.

Iowa Statewide Fatal Crash Emphasis Areas

Iowa DOT tracked fatal crashes within the state based on data from 5-year periods starting in 2008, 2009, and 2010. This compilation of fatal crash data shows the highest emphases areas are speeding-related, ran-off-road, and unbelted persons, as depicted in FIGURE 32.

Figure 32. Iowa Fatal Crashes Associated with Key Emphases



Source: Iowa DOT, Office of Traffic and Safety, April 2015

Iowa DOT Top 200 Safety Improvement Candidate Locations

A listing of the top 200 intersection sites in the state of Iowa with the highest number of crashes is maintained by the Iowa DOT Office of Traffic and Safety. This list is called the top 200 intersection safety improvement candidate locations (SICL). The most current list is based on year 2008-2012 crash data. The SICL intersections are ranked by composite ranking, based on three sub-lists: frequency rank

(total crashes), rate rank (crashes/volume), and severity rank ("value loss" at the site). Intersections on the current SICL within the Ames Area MPO are shown in TABLE 14.

Table 14. Ames Area MPO Intersections on the Top 200 Safety Improvement Candidate Locations List

Statewide Composite Ranking	Intersection	Statewide Frequency Rank	Statewide Rate Rank	Statewide Severity Rank
12	Lincoln Way and University Boulevard	129	9,528	16
34	U.S. 30 and Co Rd R70/580th Avenue	1,326	14,750	20
36	U.S. 69/Lincoln Way and U.S. 69/ Grand Avenue	11	4,852	127
37	Lincoln Way and Dakota Avenue	154	6,962	53
96	U.S. 69/S Duff Avenue and U.S. 69/ Lincoln Way	219	12,363	120

Source: http://www.iowadot.gov/crashanalysis/SICL/SICL00037_ID511579__Ames__StoryCo_2008-2012.pdf

Bicycle and Pedestrian Crashes

Bicycle-related crashes are shown in FIGURE 33 and pedestrian-related crashes are shown in FIGURE 34. These crashes are shown for a 10-year period, based on crash data from years 2004 to 2013.

Figure 33. 10-year Bicycle-Related Crashes

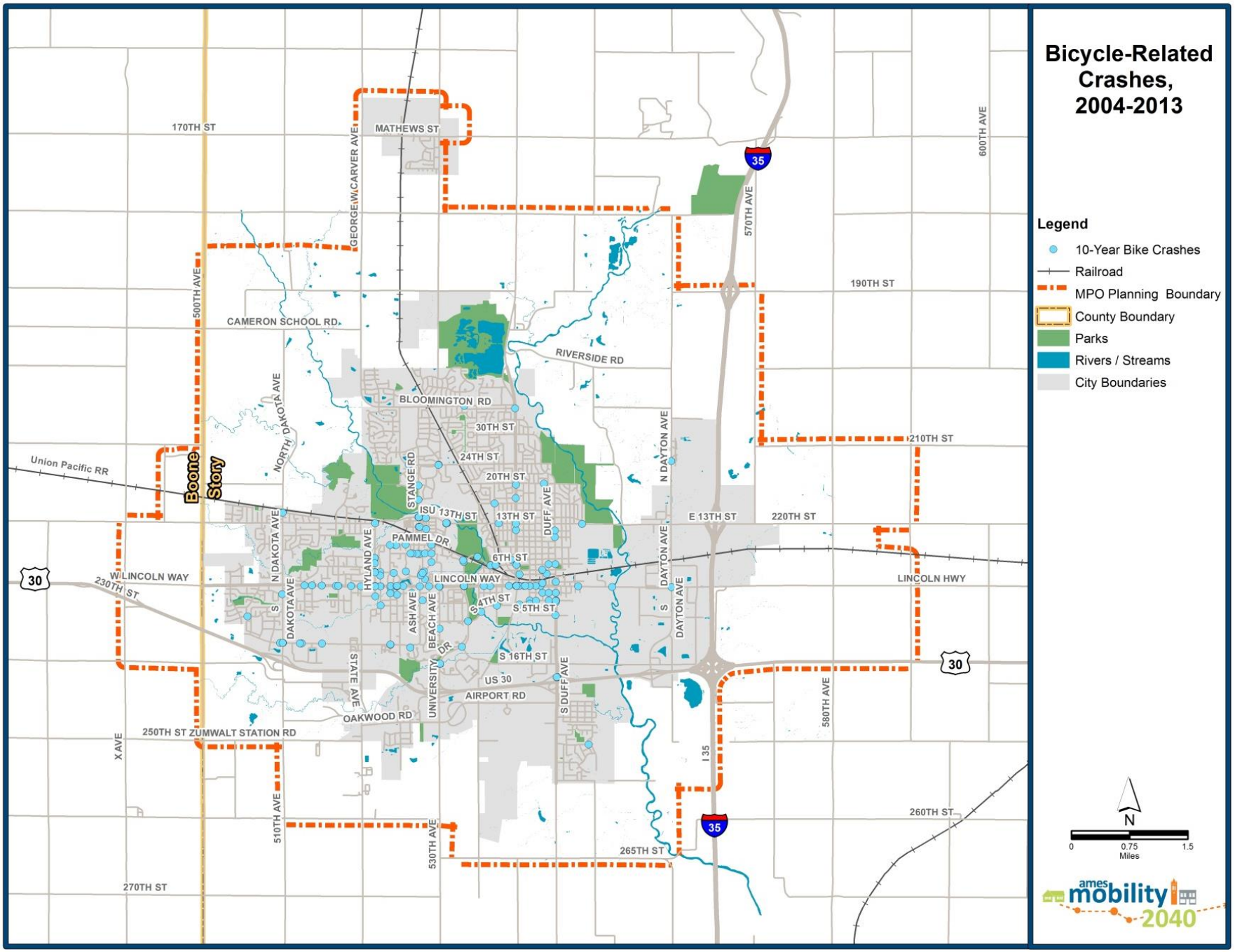
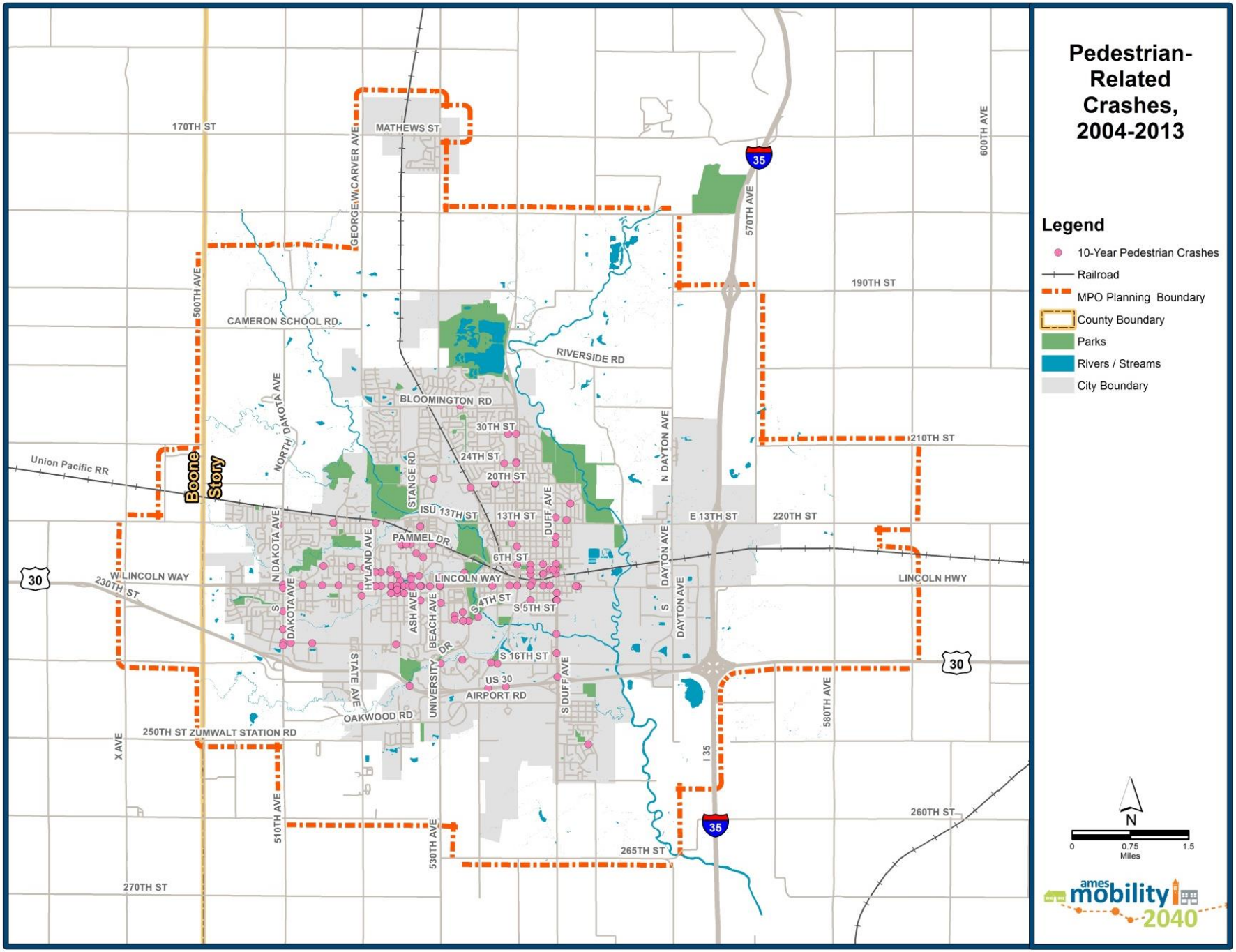


Figure 34. 10-year Pedestrian-Related Crashes



Bicycle-related crashes for the most recent 5-year period (2009 to 2013), by severity level, are shown in TABLE 15. As TABLE 15 indicates, the 113 bicycle-related crashes were primarily minor injury or possible/unknown injury crashes. TABLE 16 summarizes pedestrian-related crashes from 2009-2013, which includes 4 fatal crashes, 22 major injury, 37 minor injury, and 21 possible/unknown, for a total of 84 pedestrian-related crashes.

Table 15. Ames MPO Bicycle-Related Crashes by Year and Severity

Year	Fatal	Major	Minor	Possible/ Unknown	PDO	Total
2009	0	2	9	6	0	17
2010	0	1	12	6	0	19
2011	0	2	14	12	0	28
2012	0	3	15	11	0	29
2013	0	1	12	6	1	20
Total (5-yr)	0	9	62	41	1	113

Source: Iowa DOT, SAVER database, 2009-2013

Table 16. Ames MPO Pedestrian-Related Crashes by Year and Severity

Year	Fatal	Major	Minor	Possible/ Unknown	PDO	Total
2009	1	3	7	2	0	13
2010	1	6	5	5	0	17
2011	1	4	3	4	0	12
2012	0	3	8	4	0	15
2013	1	6	14	6	0	27
Total (5-yr)	4	22	37	21	0	84

Source: Iowa DOT, SAVER database, 2009-2013

Current Safety Strategies

Within the MPO area, there is an effort to implement strategies to improve transportation safety. For instance, the Ames Police Department meets with schools before the start of each school year to assess traffic flow and potential safety issues at each school. Added enforcement efforts are implemented as needed, and ongoing coordination with City staff occurs when issues or concerns arise. There are Safe Routes to Schools maps published for each school as well. Additional safety strategies are discussed in the "Security" section in this Chapter.

How the Safety Analysis Was Applied

Potential project alternatives were developed for those locations that had the highest crash frequency. Additionally, higher-crash locations were given higher priority (through application the safety performance measure) for improvement in the alternatives analysis portion of the study (as described in Chapter 7). Several alternatives are developed in the study that attempt to improve bicycle and pedestrian safety, in addition to mobility, considering the high level of bicycling and walking in the Ames area. Additional strategies for increasing bicycle and pedestrian awareness are discussed as well.

Security

Security of the transportation system is a primary theme at the national, state, and local levels. Security is essential for every mode of transportation. Natural disasters, such as floods, blizzards, or tornadoes, and manmade accidental or intentional incidents, such as industrial plant emergencies or acts of terrorism, can cause serious disruption and danger to the transportation system. The transportation system is also what provides an exit during an emergency when people need to evacuate or be routed around an area. Transportation considerations are important throughout all levels of emergency management and planning. These include preventing incidents when possible, preparing for potential events, quickly and efficiently responding to events when they happen, and recovering from incidents and applying lessons from them to future planning.

National Level

The ***US Department of Transportation*** (DOT) manages programs that affect the protection and resiliency of critical transportation infrastructure, and collaborates with the ***Department of Homeland Security*** on matters related to transportation security and infrastructure protection. Under the National Response Framework (NRF), the DOT is the lead agency for coordinating federal

transportation activities during emergencies and for response and recovery operations. The DOT has responsibility for a number of modal emergency preparedness programs that provide the Department of Defense and civilian agencies with assured access to commercial transportation during times of national emergency.

The ***National Infrastructure Protection Plan*** (NIPP) 2013: *Partnering for Critical Infrastructure Security and Resilience* outlines how government and private sector participants in the critical infrastructure community work together to manage risks and achieve security and resilience outcomes. The NIPP provides a call to action to leverage partnerships, innovate for risk management, and focus on outcomes.

The ***National Incident Management System (NIMS)*** is the essential foundation to ***the National Preparedness System (NPS)*** and provides the template for the management of incidents and operations in support of all five National Planning Frameworks. The purpose of the NIMS is to provide a common approach for managing incidents. *Presidential Policy Directive (PPD) 8: National Preparedness* was released in March 2011 with the goal of strengthening the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the Nation. PPD-8 defines five preparedness mission areas—Prevention, Protection, Mitigation, Response, and Recovery— and mandates the development of a series of policy and planning documents to explain and guide the Nation's approach for ensuring and enhancing national preparedness. The ***National Planning Frameworks***, which are part of the National Preparedness System, set the strategy and doctrine for building, sustaining, and delivering the core capabilities identified in the National Preparedness Goal of "*a secure and resilient Nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk*." The National Planning Frameworks describe the coordinating structures and alignment of key roles and responsibilities for the whole community and are integrated to ensure interoperability across all mission areas.

State Level

At the state level, the Iowa DOT Office of Traffic Operations ensures the mobility and safe operation of the transportation system through collaboration with transportation stakeholders through:

- Management of the day-to-day traffic operations on the highway system through the statewide Traffic Operations Center (TOC)
- Management of the emergency transportation operations (ETO) response efforts on behalf of the DOT

- Management and maintenance of the 511 Travel Information System
- Deployment and maintenance of intelligent transportation systems (ITS) on the highway system
- Development and maintenance of a coordinated, comprehensive statewide traffic incident management (TIM) response plan

Additionally, Iowa DOT has identified interstate corridors for winter closures. I-35 would be closed from I-35 Exit 111- US 30 (Ames) to Exit 194- US 18 West (Clear Lake), as determined by the DOT Highway Maintenance Supervisor and the Iowa State Patrol Officer that hazardous conditions warrant the closure of the corridor. The interstate corridor can be closed both northbound and southbound utilizing the mainline gates. The DOT Operations Support Center would activate the appropriate Dynamic Message Signs (DMSs) along the corridor.

Local Level

Several ***Multidisciplinary safety teams*** (MDSTs) are established across the state of Iowa, including a wide range of local and state safety participants from various backgrounds. The Ames Area Multidisciplinary Safety Team (MDST) meets monthly, and includes members from the city of Ames Public Works, Ames Fire, Ames Police, Story County Emergency Management, Iowa State University Department of Public Safety, Story County Sheriff, Iowa State Patrol, Story County E911 dispatch center, various Iowa DOT staff, FHWA, and Iowa State University InTrans.

The Ames MDST team meets on a regular basis to coordinate safety projects and programs, which includes road construction projects, special event management, weather events (diversion routes, flood, tornado, blizzard planning), and special safety law enforcement initiatives. The group also discusses ongoing safety programs on a federal, state, county, and local level. Each month the group provides feedback from various disciplines on current projects, and provides ideas for future efforts. The group utilizes statewide data sets for crashes and historical weather data to plan for safe operation of transportation in our area.

The city of Ames ***Emergency Operations Center*** (EOC) provides support and coordination to on-scene responders during a major incident in the community, in the event where assistance in the recovery from unplanned disruptions is required. The EOC provides a centralized location where government officials and other advisors can gather to properly manage an incident or disaster and maintain services to the unaffected community.

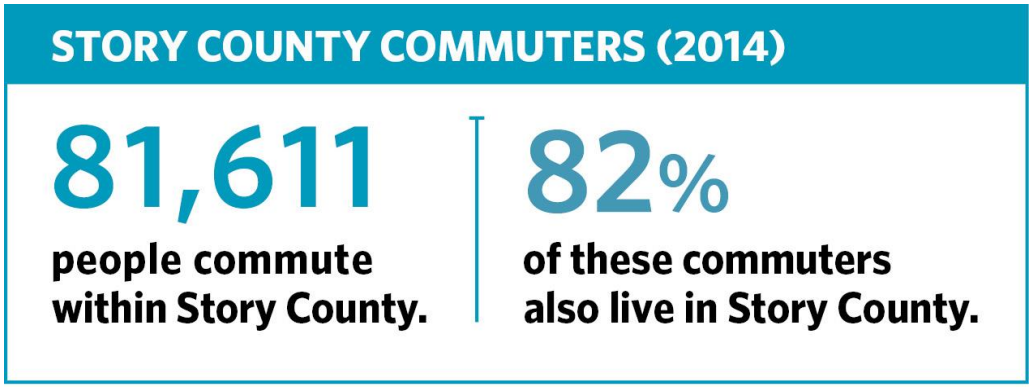
The primary Ames Emergency Operations Center is located at the following:

1. Police Department Squad Room of City Hall, 515 Clark Avenue. The center has a backup generator and fuel source. Sustenance can be provided by an external agency if and when necessary.
2. A secondary EOC has been identified in the event the primary EOC is unusable. This secondary EOC is located at Fire Station 1, 1300 Burnett.
3. A third EOC has also been identified in the event the primary and secondary EOC's are unusable. This third EOC is located at Fire Station 3, 2400South Duff Avenue.
4. In the unlikely event that all three EOCs are unusable, Fire Station 2 located at 132 Welch Avenue has been identified.

Iowa State University does have an EOC which located at Room 166, Armory Building.

County-Level Commuting Assessment

County-level commuting data was made available by AirSage, based on travel patterns from April 2014. AirSage travel data is gathered anonymously by mobile device signaling data collected from cell towers. The data does not include Bluetooth, GPS or data collected from navigational tools. The commuting data, extrapolated to full county-level population[13], shows the total number of people who have a home location in one county and commute to a work location in another county (or the same). AirSage data were used instead of traditional sources such as the American Community Survey, to avoid the reporting confusion associated with students' home place (in many cases inaccurately reflected at their parent's or guardian's homes not where they live during the school year).



[13] *The AirSage data is a sample that typically covers between ¼ and ½ of all travelers in a given study area.*

For this assessment, the following terminology is used:

- "***Commute***" includes people who predominantly spend their day at a certain location. For example, this will include college students or retired people who regularly go to the same volunteer location, in addition to traditional "work" places.
- "***Home***" location is inferred from where the mobile device spends most of its nights over the month.
- "***Work***" location is inferred from where the mobile device spends most of its weekdays over the month.

A breakdown of the Top 10 counties with workers commuting to and from Story County is shown in TABLE 17. Additionally, a graphic representation of these Top 10 counties with workers commuting to and from Story County is shown in FIGURE 35 and FIGURE 36.

Table 17. Commuting Patterns to and from Story County (April 2014)

Commuters Coming From Story County Home		Commuters Going to Story County Work	
Work County	Work Commuters	Home County	Work Commuters
Story	67,271	Story	67,271
Polk	3,758	Polk	4,322
Boone	1,635	Boone	2,277
Marshall	803	Marshall	1,389
Hamilton	641	Hamilton	931
Dallas	307	Hardin	658
Webster	190	Jasper	421
Jasper	167	Dallas	340
Black Hawk	161	Tama	337
Hardin	140	Greene	260

Source: AirSage, April 2014

Figure 35. Commuter Trips from Story County

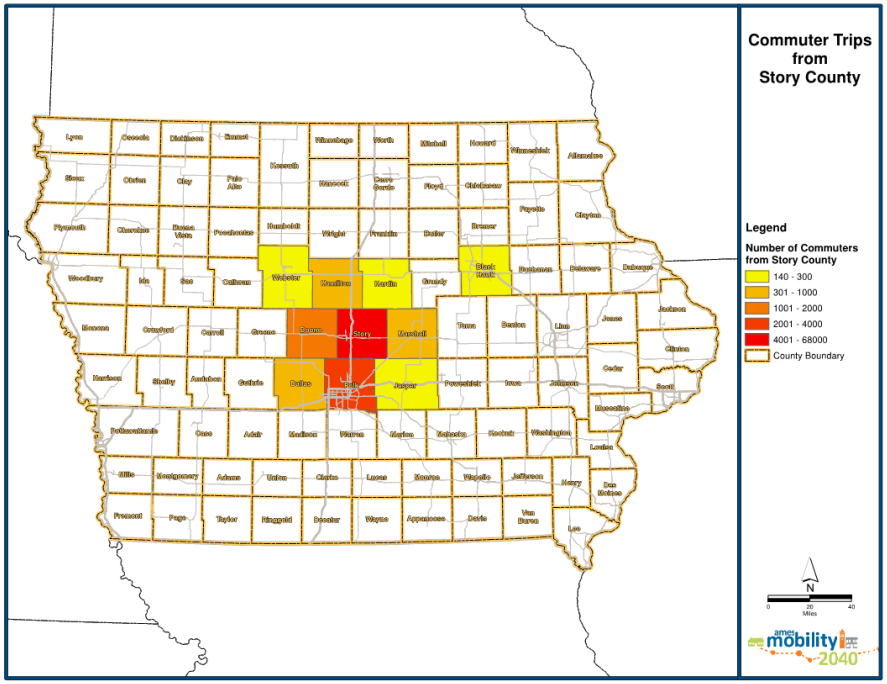
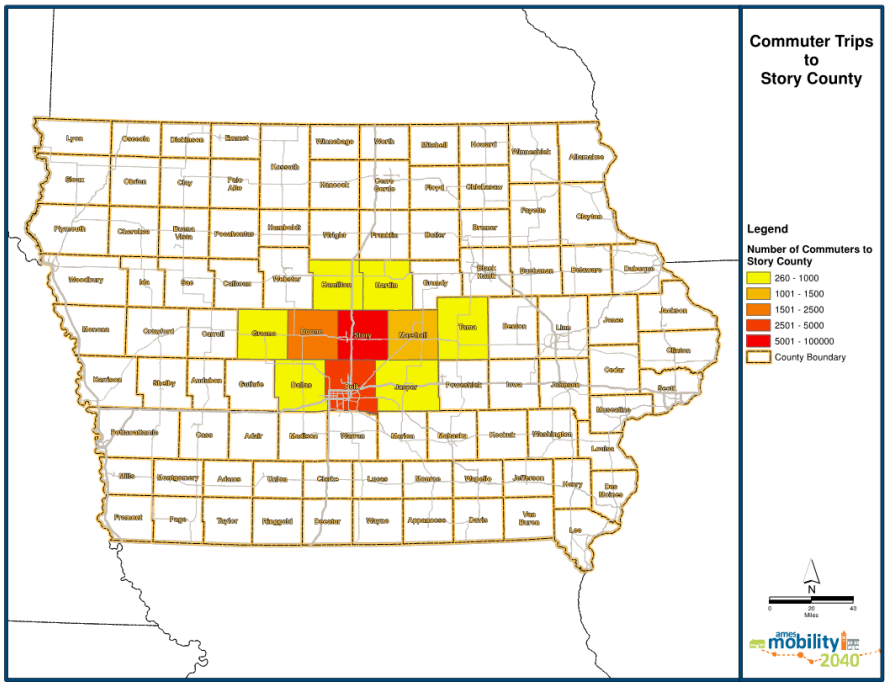


Figure 36. Commuter Trips to Story County



Source: AirSage, April 2014

2011 Existing Conditions Traffic Analysis

The primary metric used to assess existing traffic conditions is the level of service (LOS) during the PM peak hour. Key intersections within the study area were selected by the Ames Area MPO for analysis. Existing turning movement volumes were estimated based on available Iowa DOT traffic counts (collected during 2011) and some counts available from the previous LRTP (collected in 2009) adjusted to represent estimated 2011 turning movement conditions. Some additional counts were provided by Ames Area MPO staff from 2014, as well as existing reference cycle lengths, for use in the intersection analysis.

A popular method for calculating intersection delay is the Highway Capacity Manual method, which requires specific signal timings to derive intersection delay. However, signal timings can be tailored to an intersection's geometry and volumes which can vary results significantly. Modifying signal timings can be useful for intersections that are over capacity but do not always provide results that can be directly compared to other study intersections or different geometric/volume conditions of the intersection. Given the high-level, long-range nature of this plan, an analysis method that omits signal timings is desired.

The traffic analysis was conducted using an Intersection Capacity Utilization (ICU) methodology at key intersections. The ICU method was selected to complete the intersection analyses due to its simplistic nature and results that are not dependent on specific signal timings. Key intersections within the study area were evaluated using ICU Level of Service. The Level of Service is a qualitative measure describing operational conditions. It can range from "A" representing free-flow conditions to "F" representing gridlock. The ICU method relates traffic demand and available capacity for key intersection movements, regardless of present signal timing. The primary calculation in the ICU method is a reference time for each movement. The reference time is the amount of time required to serve a given movement at 100 % capacity (saturation). Signal timings are not an input in determining intersection ICU Level of Service. The parameters used to analyze each intersection with the ICU method are equivalent, and results at multiple intersections or for various geometric/volume conditions of an intersection can be directly compared.

TABLE 18 outlines the thresholds for each ICU Level of Service category.

TABLE 19 summarizes the results from the existing conditions PM Peak hour ICU analysis.

Table 18. Intersection Capacity Utilization Level of Service Thresholds

Level of Service (LOS)						
	A	**B**	**C**	**D**	**E**	**F**
Intersection Capacity Utilization	≤ 55%	> 55-64%	> 64-73%	> 73-82%	> 82-91%	> 91%
Level of Congestion	No congestion	Very little congestion	No major congestion	Normally has no congestion	On the verge of congested conditions	Likely experiences congestion periods over 15 minutes per day
	All traffic serviced on first cycle	*Almost all traffic served on first cycle*	*Most traffic served on first cycle*	*Majority of traffic served on first cycle*	*Many vehicles not served on first cycle*	*Long queues are common*
	Intersection can accommodate up to 40% more traffic on all movements	*Intersection can accommodate up to 30% more traffic on all movements*	*Intersection can accommodate up to 20% more traffic on all movements*	*Intersection can accommodate up to 10% more traffic on all movements*	*Intersection has less than 10% reserve capacity*	*Intersection is over capacity*

Table 19. Existing Conditions Intersection Capacity Utilization Analysis Results

Intersection	Peak Hour LOS		
	A/B/C	D/E	F
Bloomington Rd / Grand Ave.	•		
24th St / Stange Rd	•		
24th St / Grand	•		
13th St / Stange Rd			•
13th St / Grand Ave.		•	
13th St / Hyland Ave.	•		
13th St / Duff Ave.	•		
13th St / Dayton Rd	•		
S 5th St / Duff Ave.			•
S 4th St / Grand Ave.	•		
Airport Rd / Duff Ave.	•		
Airport Rd / University Blvd	•		
20th St / Grand Ave.		•	
Lincoln Way / Dakota Ave.	•		
Lincoln Way / Hyland Ave.		•	

Intersection	Peak Hour LOS		
	A/B/C	D/E	F
Lincoln Way / Welch Ave.	•		
Lincoln Way / University Blvd	•		
Lincoln Way / Grand Ave	•		
Lincoln Way / Clark / Walnut Ave.		•	
Lincoln Way / Duff Ave.		•	
Lincoln Way / Dayton Ave.	•		
S 3rd St / Duff Ave.		•	
Mortensen Rd / S Dakota Ave.	•		
Mortensen Rd / State Ave.	•		
Mortensen Rd / University Blvd	•		
Ontario St / N Dakota Ave.	•		
S 16th St / University Blvd	•		
S 16th St / Duff Ave.		•	
S 16th St / Dayton Ave.	•		
Stange Rd / Pammel Dr	•		

As shown in the table, all of the intersections currently perform at Level of Service C or better during PM peak hour conditions, with the exception of the following intersections:

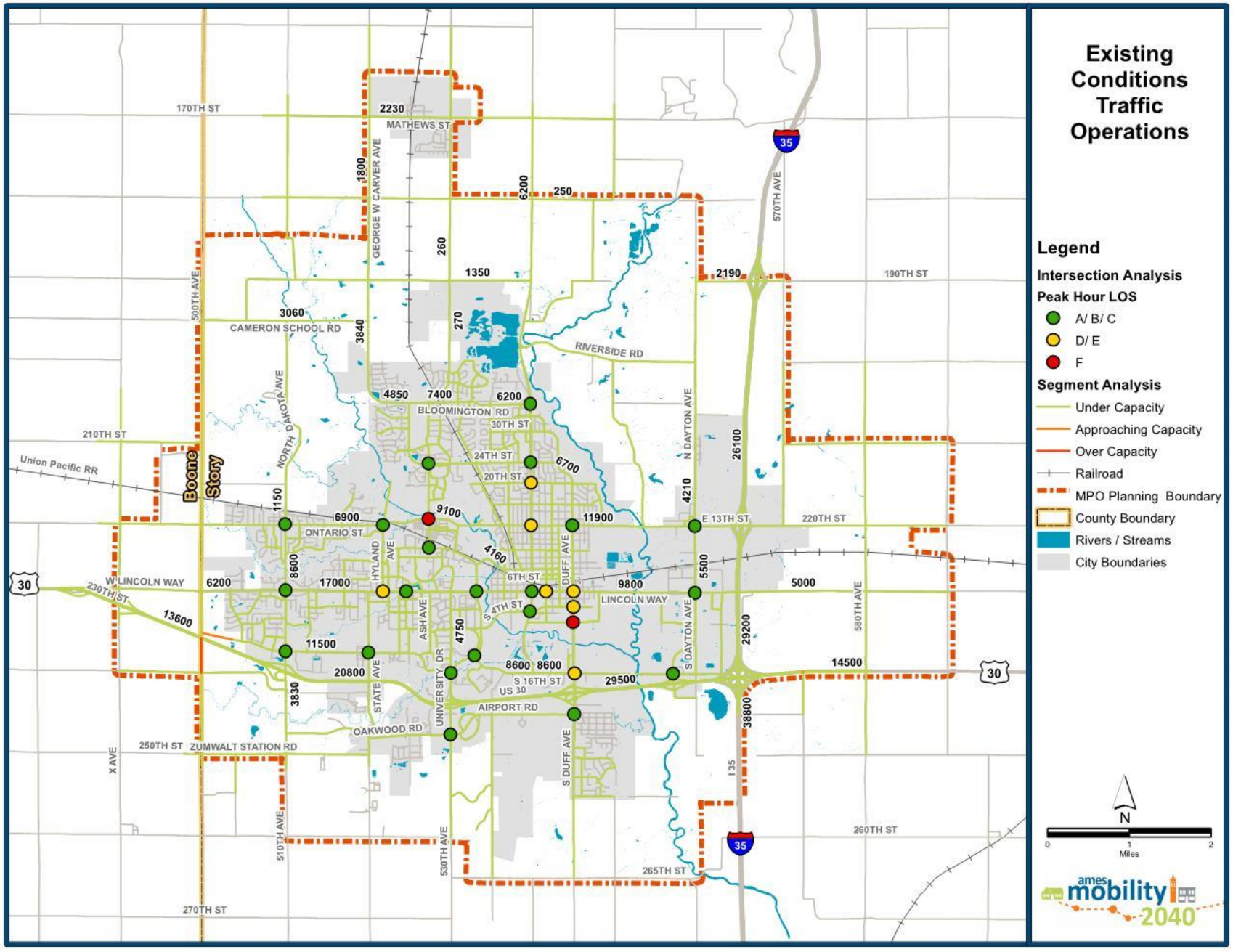
- 13th St/Stange Rd
- 13th St/Grand Ave.
- S 5th St/ Duff Ave.
- 20th St/Grand Ave.
- Lincoln Way/Hyland Ave.
- Lincoln Way/Clark/Walnut Ave.
- Lincoln Way/Duff Ave.
- S 3rd St/Duff Ave.
- S 16th St/Duff Ave.

In addition to peak hour level of service measured at the study area intersections, a planning level of service was also calculated by roadway segment. The Roadway segment Level of Service is based on an average weekday (24-hour) volume and capacity. Roadway Level of Service is defined by thresholds using a volume to capacity ratio (V/C). For the Ames Area MPO, capacity is established at Level of Service C (a V/C ratio of 1.0). Volumes are based on existing 2011 count data supplied by Iowa DOT. Capacities are based on criteria defined by Iowa DOT, classified according to roadway functional class, area type, and number of lanes. The roadway Level of Service analysis for the Ames Area MPO shows all roadways perform during the average weekday at acceptable levels of service (C or better). The thresholds used to identify the levels of congestion include:

- Volume/Capacity under 0.8 = ***Under Capacity***
- Volume/Capacity between 0.8- 1.0 = ***Approaching Capacity***
- Volume/Capacity over 1.0 = ***Over Capacity***

The existing conditions roadway Level of Service, Intersection Capacity Utilization Level of Service, and Average Daily Traffic Volume for the 2011 existing conditions analysis are shown in **FIGURE 37**.

Figure 37. 2011 Existing Conditions Average Daily Traffic Volumes, Intersection LOS and Roadway Segment LOS



Travel Reliability

Travel reliability, or the planning buffer index, captures the variability of travel time across a corridor. The more reliable a corridor, the less travel time varies from day to day. AASHTO's Standing Committee on Performance Measures (SCOPM) recommends using the Reliability Index (RI_{80}). SCOPM defines RI_{80} as the ratio of the 80th percentile travel time to a threshold time. Median travel times calculated using INRIX data were used as the threshold travel time. The RI_{80} captures the variability a commuter might encounter during a single work week excluding non-routine events, producing a ratio of the worst travel time during a work week (80th percentile) to the typical daily travel time (median). It is intended to reflect the extra time a traveler should budget to account for recurring travel variability. For instance, An RI_{80} of 1.3 would result from a typical 10 minute commute that may take 13 minutes approximately once a week. In this case, the RI_{80} indicates that the commuter should budget an extra 30 % travel time to ensure an on-time arrival.

Travel reliability was measured for all routes in the Ames area with available INRIX travel time data. Data for weekdays on non-holiday weeks in the year 2014 were used for this assessment. Data were collected and assessed in 5 minute bins for the AM and PM peak periods. RI_{80} was calculated for each 5 minute bin and the maximum for each corridor was reported.

FIGURE 38 and FIGURE 39 display the Reliability Index (RI_{80}) for the AM and PM peaks, respectively. As shown, the majority of corridors in the Ames area are relatively reliable, with reliability index values of 1.3 or lower. This means that overall, the Ames area has predictable travel times during peak hour conditions.

Figure 38. Travel Reliability Index, AM Peak

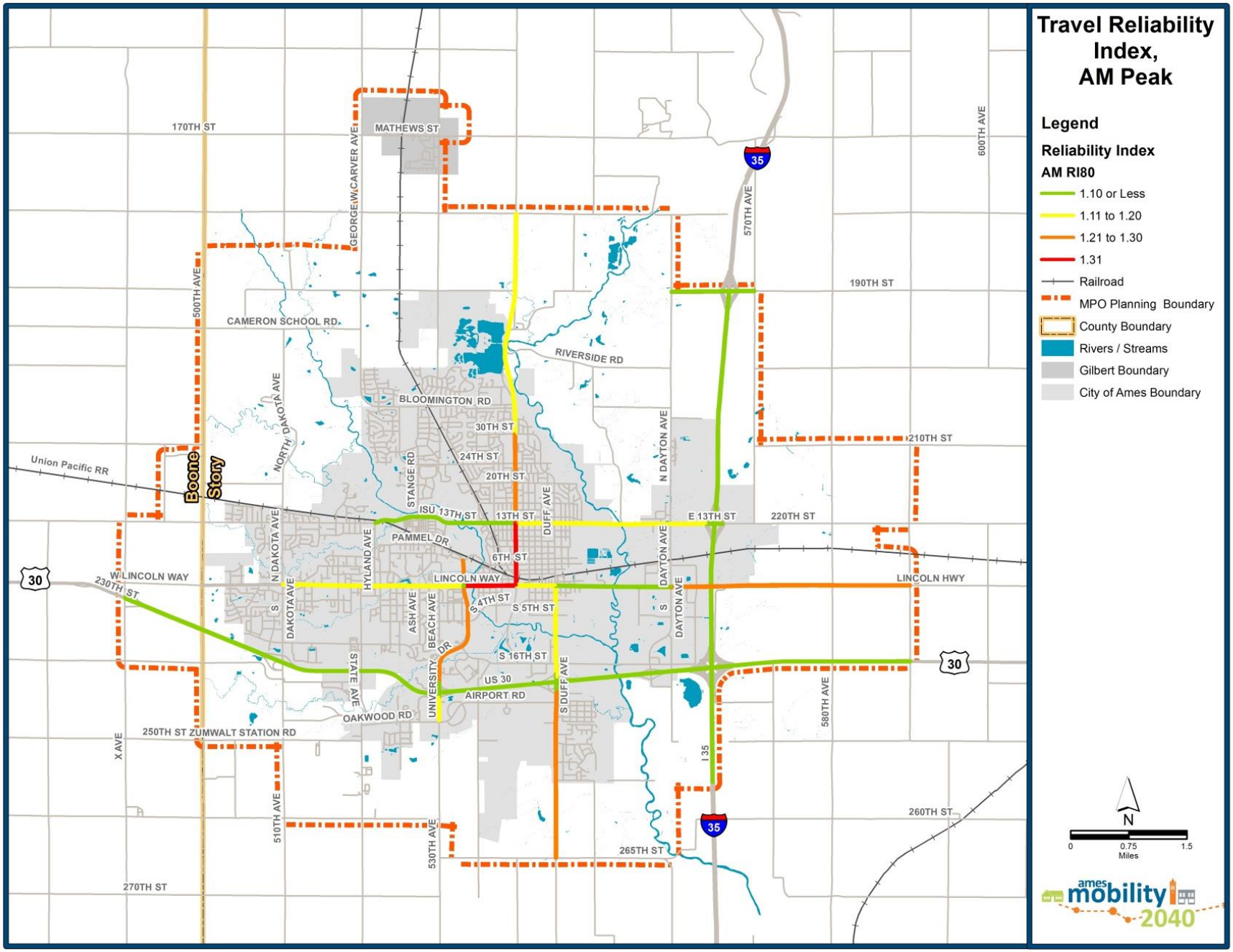
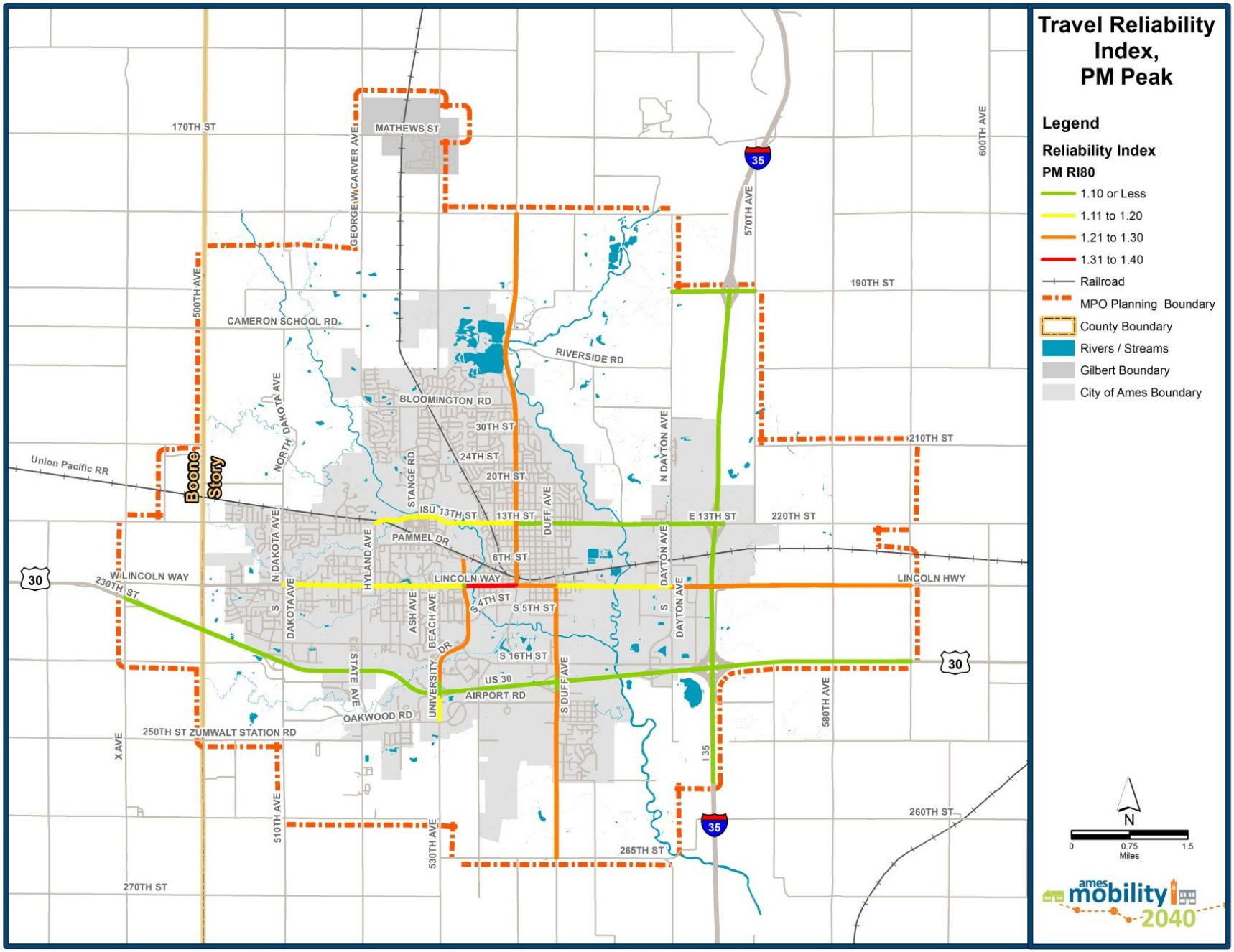


Figure 39. Travel Reliability Index, PM Peak



Bridge and Pavement Conditions

Map-21 defines ***asset management*** as a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at a minimum practicable cost. Asset management provides a basis for optimizing the preservation, improvement, and timely replacement of assets, such as roadway pavement and bridges, though cost-effective management, programming and resource allocation decisions.

Bridge Structure Conditions

FHWA maintains a database, the National Bridge Inventory (NBI), with information on all public highway bridges in the United States that are greater than 20 feet in length. Using National Bridge Inspection Standards, bridge inspectors visually assess and record up to 116 standards for the NBI. Within the database are condition ratings of the primary components of a bridge – the deck, superstructure, and substructure – that provide an overall characterization of the general condition of a bridge. The condition ratings, along with structural assessments of the clearances, approach roadway alignment, deck geometry, and load carrying capacity are used to determine the sufficiency of a bridge.

An insufficient bridge is categorized in one of two ways:

- ***"Structurally Deficient"*** A bridge is considered structurally deficient if the deck, superstructure, substructure, or culvert is rated at or below "poor" condition (0 to 4 on the NBI Rating Scale). A bridge can also classified as structurally deficient if load-carrying capacity is significantly below current design standards, or the adequacy of the waterway opening provided is determined to be extremely insufficient to the point of causing intolerable roadway traffic interruptions. Iowa DOT states that because a bridge is classified under the federal definition as "structurally deficient" does not imply that it is unsafe. A structurally deficient bridge, when left open to traffic, typically requires significant maintenance and repair to remain in service and eventual rehabilitation or replacement to address deficiencies. To remain in service, structurally deficient bridges are often

posted with weight limits to restrict the gross weight of vehicles using the bridges to less than the maximum weight typically allowed by statute.[14]

- ***"Functionally Obsolete"*** A bridge is considered functionally obsolete if the geometry of the roadway no longer meets current minimum design standards for width or vertical clearance classifications. A Functionally obsolete or structurally deficient classification does not mean that a bridge is unsafe. If a bridge meets the criteria to be classified as both structurally deficient and functionally obsolete, it is identified only as structurally deficient, because structural deficiencies are considered more critical.

TABLE 20 shows the number of structurally deficient and functionally obsolete bridges for the Ames MPO area according to the 2013 NBI. Of the 58 classified bridges within the MPO boundary, 11 have an insufficient rating. Approximately 5 % of the bridges are structurally deficient and 14 percent are functionally obsolete.

Table 20. Structurally Deficient and Functionally Obsolete Bridges in the Ames MPO Area

Status	Number of Bridges	Percent of Total
Structurally Deficient	3	5%
Functionally Obsolete	8	14%
Not Deficient	47	81%

Source: National Bridge Inventory, 2013

TABLE 21 and FIGURE 40 identify the locations of structurally deficient and functionally obsolete bridges within the Ames MPO area. TABLE 21 also identifies the main components that are causing each bridge to be classified as deficient.

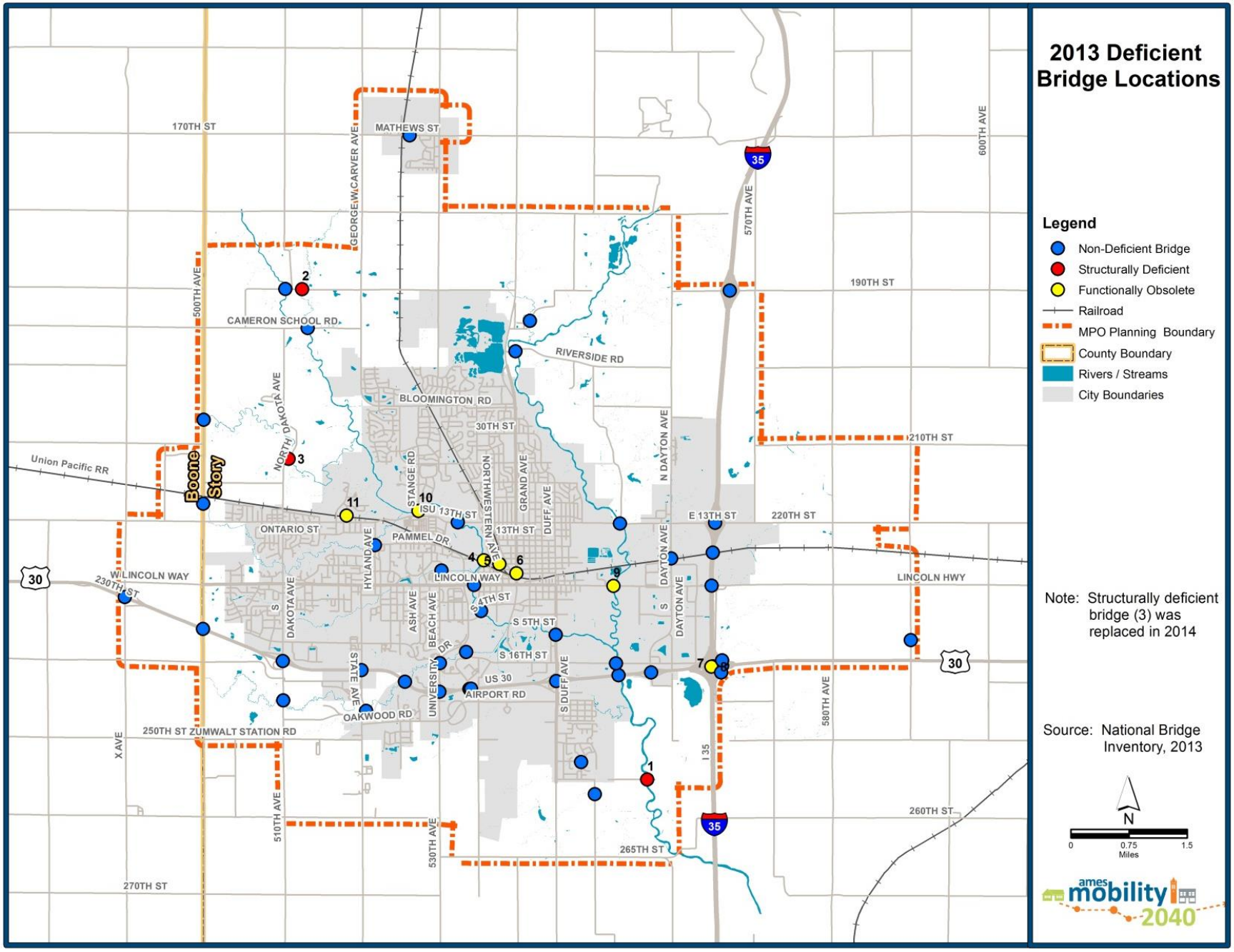
[14] http://www.iowadot.gov/subcommittee/bridgetermspz.aspx#s

Table 21. Bridge Deficiency Components

ID	Deficiency Classification	Location	Deficiency Components
1	Structurally Deficient	Ken Maril Rd @ Skunk River	Insufficient deck, superstructure, substructure, and structural conditions
2	Structurally Deficient	W 190th b/w 510th Ave & Pine Grove Ln	Insufficient superstructure
3	Structurally Deficient	N Dakota Ave @ Onion Creek	Insufficient superstructure and structural conditions
4	Functionally Obsolete	6th St @ Squaw Creek	Insufficient deck geometry
5	Functionally Obsolete	6th St @ UPRR	Insufficient deck geometry and underclearances
6	Functionally Obsolete	Main St @ Grand Ave	Insufficient underclearances
7	Functionally Obsolete	NB I-35 @ US 30	Insufficient deck geometry
8	Functionally Obsolete	SB I-35 @ US 30	Insufficient deck geometry
9	Functionally Obsolete	E Lincoln Way @ Skunk River	Insufficient deck geometry
10	Functionally Obsolete	Stange Rd @ Squaw Creek	Insufficient deck geometry
11	Functionally Obsolete	Minnesota Ave @ UPRR	Insufficient deck geometry

Source: National Bridge Inventory, 2013

Figure 40. 2013 Deficient Bridge Locations



Pavement Conditions

Roadway pavement condition in the Ames Area MPO area was evaluated using a Pavement Condition Index (PCI). The PCI is a rating representing the condition of pavements, from 0 (worst) to 100 (best). The PCI is used as a network-level performance measure and as a tool to identify pavement improvement needs. In accordance with the American Society for Testing and Materials (ASTM), TABLE 22 shows the PCI thresholds used to evaluate Ames Area MPO area roads. Typically, pavements with PCIs greater than 70 generally require only routine maintenance; pavement with PCIs between 56 and 70 require resurfacing, and pavements with PCIs less than 55 require pavement reconstruction.

Table 22. PCI Rating Scale with Description and Improvement Needs (Adapted from ASTM D6433)

PCI Range	Rating Scale	Description	Improvement Needs
71 to 100	**GOOD**	Pavement has no, minor, or scattered low-severity distresses*	Routine Maintenance like crack sealing, joint resealing, or patching
56 to 70	**FAIR**	Pavement has a combination of generally low- and medium-severity distresses	Resurfacing
0 to 55	**POOR**	Pavement has medium to high-severity distresses that cause considerable maintenance, operation problems/restrictions, and/or unsafe travel	Pavement Reconstruction

**Distresses include cracking, patch deterioration and potholes, surface deformation, surface defects, or joint deficiencies.*

The Ames pavement management system was used to collect the most recent PCI values for local, collector, and arterial roads within the Ames Area MPO area. Fox Engineering Associates, Inc. provided the most recent PCI values for Gilbert and Iowa DOT's Pavement Management Information System (PMIS) was used to collect the most recent PCI values for state-owned roads. Only roadways included in these three databases were included for analysis. FIGURE 41 shows the roadways that were included in the analysis and indicates which of those roadways are in good, fair, and poor condition.

Figure 41. Pavement Condition

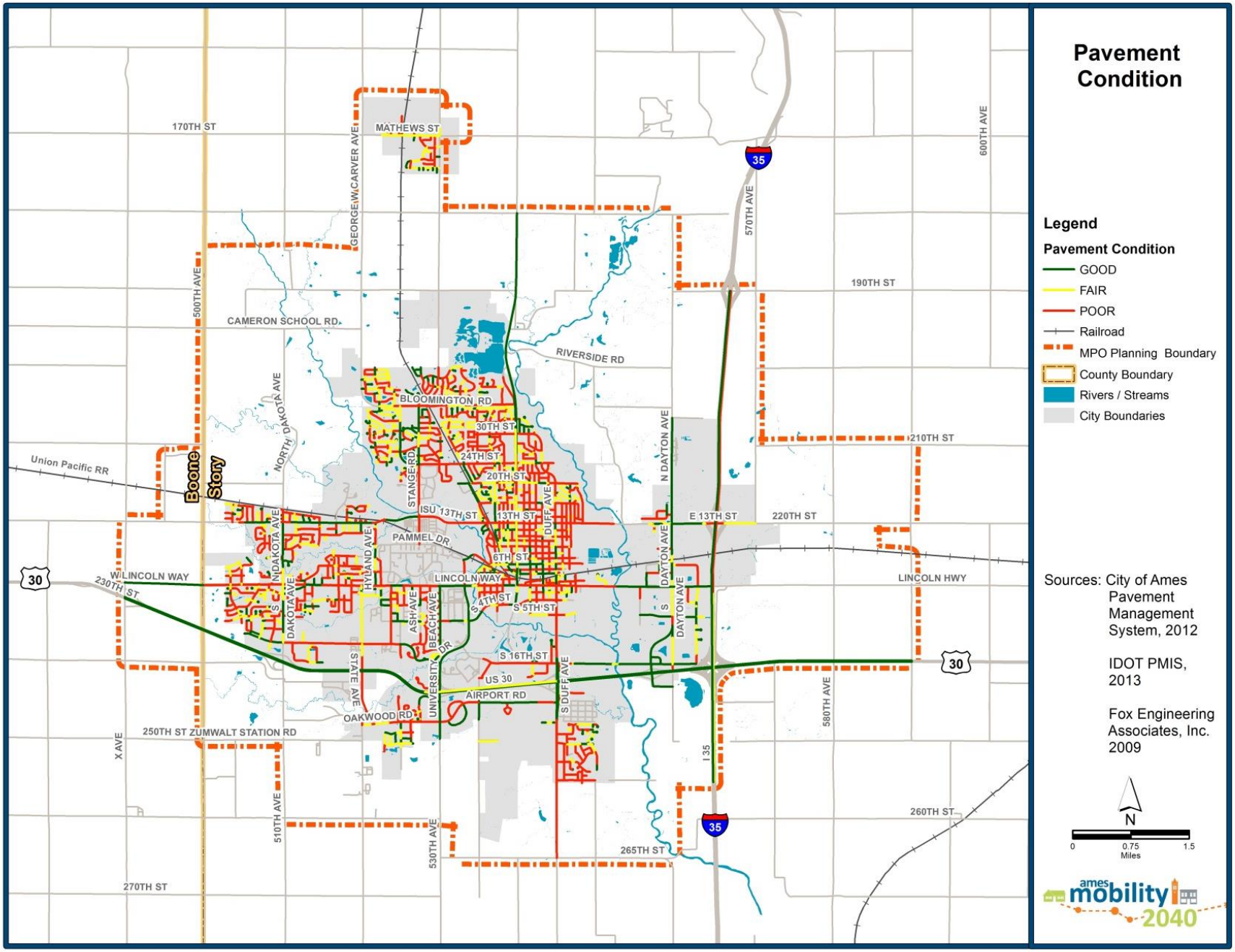


TABLE 23 shows the length, in lane-miles, of roadways in poor, fair, and good condition in the Ames Area MPO area. Local roads have the most roadway lane-miles in poor condition, with approximately 167 lane-miles rated poor. State roads have the least roadway lane-miles in poor condition with approximately 20 lane-miles rated poor. When considering all roadway types together, the combined majority of the roads are in poor condition (271 out of 546 lane-miles). It should be noted that poorer pavement conditions are generally considered more tolerable on lower volume, lower speed local streets.

Table 23. Lanes-Miles of Roadways in Poor, Fair, & Good Condition in the Ames Area MPO

Roadway Type	Length (Lane-miles)			
	Pavement Condition			Total
	Poor	Fair	Good	
State	20	13	67	100
Arterial & Collector	85	29	63	177
Local	167	59	43	269
All Types	**271**	**102**	**173**	**546**

TABLE 24 shows the percentage of roadways in poor, fair, and good condition in the Ames Area MPO area. Approximately half of all roads in the Ames Area MPO area are in poor condition (50 %) and approximately one-third of all roads are in good condition (32 %).

Table 24. Percentage of Roadways in Poor, Fair, & Good Condition in the Ames Area MPO

Roadway Type	Pavement Condition		
	Poor	Fair	Good
State	20%	13%	67%
Arterial & Collector	48%	16%	36%
Local	62%	22%	16%
All Types	**50%**	**19%**	**32%**

TABLE 25 shows the length, in lane-miles, of National Highway System (NHS) roadways in poor, fair, and good condition in the Ames Area MPO area. TABLE 26 shows the percentage of NHS roadways in poor, fair, and good condition. A majority of the NHS roadways are in good condition (62 %) and about 26 % are in poor condition.

Table 25. Lanes-Miles of NHS Roadways in Poor, Fair, & Good Condition in the Ames Area MPO Area

National Highway System Route	Length (Lane-miles)			
	Pavement Condition			Total
	Poor	Fair	Good	
Interstate System	8	5	13	25
Primary	12	8	52	73
Non-Primary	10	0	6	17
All Types	**30**	**13**	**71**	**115**

Table 26. Percentage of NHS Roadways in Poor, Fair, & Good Condition in the Ames Area MPO Area

National Highway System Route	Pavement Condition		
	Poor	Fair	Good
Interstate System	31%	19%	50%
Primary	17%	11%	72%
Non-Primary	62%	1%	37%
All Types	**26%**	**12%**	**62%**

TRANSIT SYSTEM CONDITIONS

Transit Services

Existing transit service in Ames is provided by CyRide. A product of collaboration between the city of Ames, Iowa State University, and the Government of the Student Body (GSB) at Iowa State University, CyRide operates local bus, safe ride home, and paratransit services throughout the City. A brief description of each of these service types is provided below.

Local Bus

Local bus routes make up a majority of the CyRide's transit services. Currently, CyRide operates 13 fixed bus routes that primarily provide service to the Iowa State University campus, downtown Ames, or both. The operating characteristic (i.e. days of operation, service hours, frequency, etc.) vary by route and are summarized in TABLE 27. Additionally, some routes operate year round, while others only operate when Iowa State University is in session, and in the case of one route (#8 Aqua), only during the summer months. A map of current CyRide service is shown in FIGURE 42.

Safe Ride Home Service

In addition to local bus service, CyRide operates a safe ride home service to meet the diverse needs of the community. The Moonlight Express provides a fare-free, safe ride to users on Friday and Saturday nights when regular transit service has ended. The service consists of four shuttle routes (A, B, C, and D) that serve different areas of the city. A fifth shuttle provides more of a door-to-door service and is intended for those users outside the service area of the fixed shuttle routes. To arrange for a ride, users call the service number after 10:15 pm on the night of desired service and the dispatcher will inform them whether a shuttle is nearby or if a separate vehicle must be sent to their door. This service does not operate over the summer months.

Paratransit

Dial-a-Ride service within Ames is available to disabled individuals as mandated by the Americans with Disabilities Act (ADA), which requires complementary paratransit service within ¾ of a mile of fixed route bus services. Dial-a-Ride provides door-to-door service for qualified participants and requires the user to schedule a trip by 4:30 pm on the day before travel. Additionally, the general public may utilize Dial-a-Ride services (as space permits), but must pay a substantially greater fare.

Regional Public Transit Service

Transit service to destinations beyond the Ames city limits (but within Story County) is provided through the Heart of Iowa Regional Transit Agency (HIRTA). HIRTA provides door to door transit services in the central Iowa counties of Boone, Dallas, Jasper, Madison, Marion, Story and Warren. All rides are open to the general public.

Figure 42. CyRide System Map

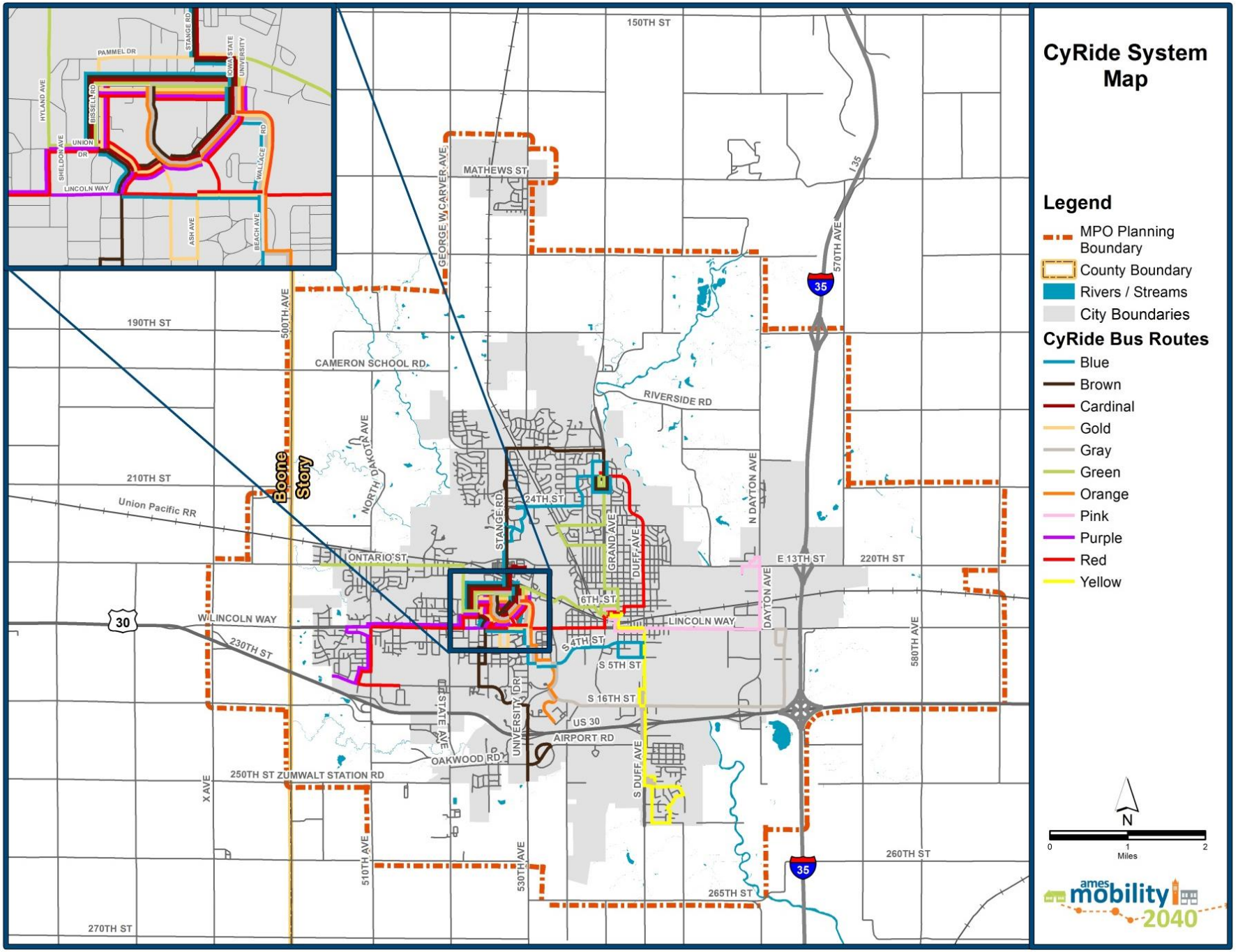


Table 27. Transit Service Hours and Frequency

ROUTE/NAME	WEEKDAY				SATURDAY			SUNDAY		
	Hours	Peak	Off-Peak	Night	Hours	Day	Night	Hours	Day	Night
Local										
#1 Red	6:30 am - 12:30 am	20	20-30	40	7:30 am - 10:30 pm	20	40	8:30 am - 12:00 am	40	40
- #1A	7:30 am - 7:00 pm	10-20	15	No Service	No Service			No Service		
- #1B	No Service				5:30 pm - 10:30 pm	No Service	40	No Service		
#2 Green	6:30 am - 11:30 pm	20	20-30	40	8:00 am - 10:30 pm	40	40	8:30 am - 12:00 am	40	40
#3 Blue	6:30 am - 12:30 am	10-20	20	40	7:30 am - 10:30 pm	20	40	8:30 am - 12:00 am	20-40	40
#4 Gray	7:30 am - 11:30 am 2:00 pm - 5:30 pm	60	No Service		No Service			No Service		
- #4A	11:00 am - 2:30 pm	No Service	60	No Service	No Service			No Service		
- #4B [2]	7:00 am - 10:00 pm	60	60	60	No Service			No Service		
#5 Yellow	6:45 am - 11:00 am 3:15 pm - 7:00 pm	30-40	No Service		9:00 am - 7:00 pm	40	40	No Service		
#6 Brown	6:30 am - 6:45 pm	20	15-30	No Service	No Service			No Service		
- #6A	5:30 pm -10:00 pm	No Service		20	11:00 am - 8:15 pm	20	20	11:00 am - 8:15 pm	20	20
- #6B	6:30 pm - 9:00 pm	No Service		40	8:30 am - 6:30 pm	40	No Service	No Service		
#7 Purple	7:00 am - 9:00 am 3:00 pm - 5:30 pm	40-60	No Service		No Service			No Service		
#8 Aqua [1]	12:30 pm - 8:30 pm	30	30	30	12:30 pm - 8:30 pm	30	30	12:30 pm - 8:30 pm	30	30
#10 Pink	7:30 am - 10:00 am 3:00 pm - 5:30 pm	45-60	No Service		No Service			No Service		
#21 Cardinal [2]	7:00 am - 10:30 pm	8	8	20	No Service			No Service		
#22 Gold [2]	7:00 am - 6:00 pm	20	20	No Service	No Service			No Service		
#23 Orange	6:30 am - 10:30 pm	5	10	20	No Service			No Service		
#24 Silver [2]	No Service				No Service			6:00 pm - 10:00 pm	No Service	20 - upon request

Table 27. (Continued) Transit Service Hours and Frequency

ROUTE/NAME	WEEKDAY				SATURDAY			SUNDAY		
	Hours	Peak	Off-Peak	Night	Hours	Day	Night	Hours	Day	Night
Safe Ride Home										
Moonlight Express 2										
- A Shuttle	10:30 pm - 3:00 am	No Service		18	10:30 pm - 3:00 am	No Service	18	No Service		
- B Shuttle	10:30 pm - 3:00 am	No Service		36	10:30 pm - 3:00 am	No Service	36	No Service		
- C Shuttle	10:30 pm - 3:00 am	No Service		40	10:30 pm - 3:00 am	No Service	40	No Service		
- D Shuttle	10:30 pm - 3:00 am	No Service		36	10:30 pm - 3:00 am	No Service	36	No Service		

***Source**: CyRide. Reflects Iowa State University school year schedule (Table provides data on actual service levels, which are more frequent than the published CyRide schedule)*

[1] *Summer Service only: May to August*

[2] *No Summer Service or during University breaks. Only operates on Friday and Saturday nights.*

Intermodal Transit Facility

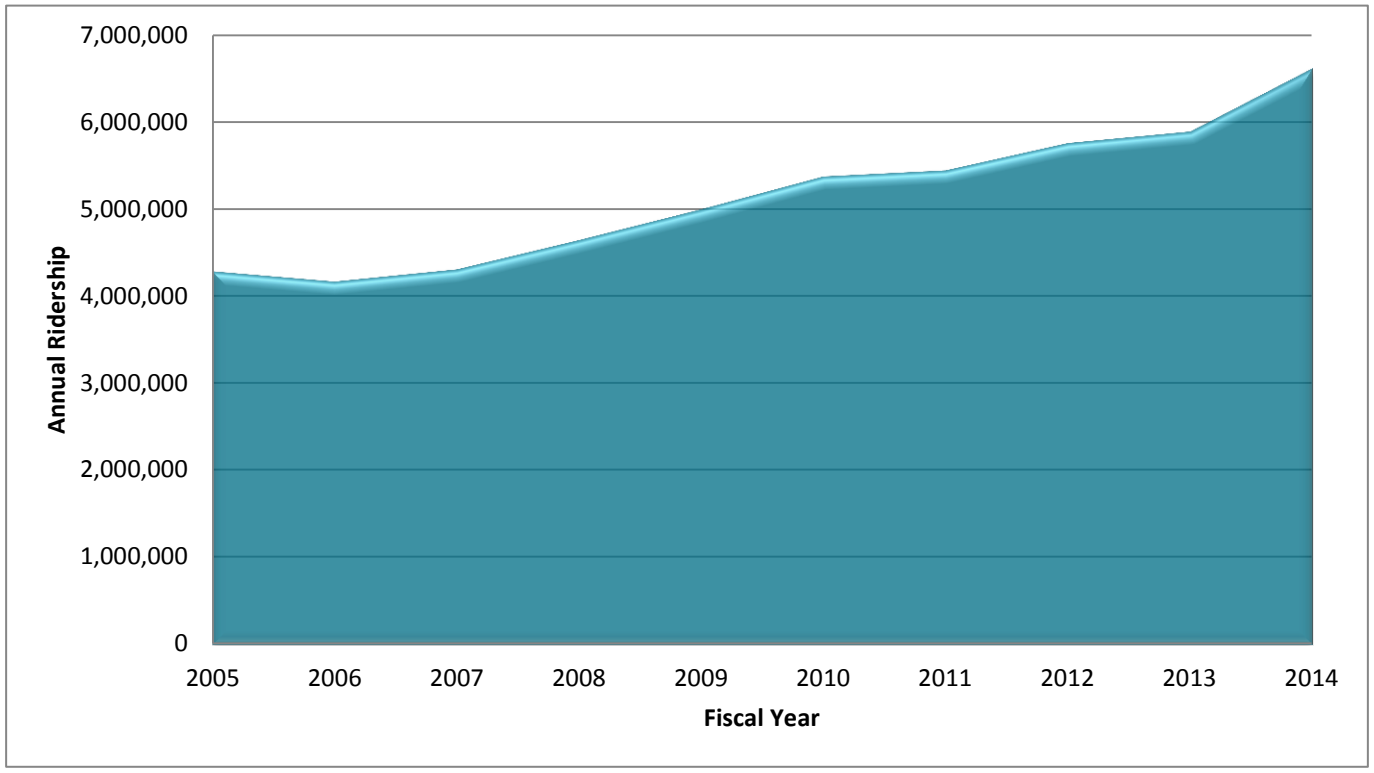
The Ames Intermodal Transportation Facility, located at the intersection of Hayward Avenue and Chamberlain Street, is a transportation hub that combines transit access, public and private transportation providers, bicycle facilities, and parking all in one facility. Although no CyRide routes currently serve the facility directly, a transit route is one block away. Additionally, intercity bus service is provided by both Jefferson Lines and Burlington Trailways. The Ames Intermodal Transportation Facility, developed in cooperation with Iowa State University and city partners, was awarded an $8.463 million Transportation Investment Generating Economic Recovery (TIGER) grant in 2009 and officially opened in 2012. As the TIGER grant amounted to roughly 20 % of the total requested funds, the facility had to be redesigned to fit within the constrained budget. Thus, some elements of the original vision for the intermodal transportation facility were left out. In an effort to bring that vision to fruition, CyRide has continued to apply for grant funding under subsequent TIGER programs.

Transit System and Route Performance

System Level Performance

Demand for transit services in Ames has continued to grow as evidenced by a review of CyRide ridership data. Total system ridership in FY 2014 (July 2013 through June 2014) reached 6,619,182, a 12 % increase from the previous year and a 54 % increase from 2005. This annual growth in ridership is depicted in FIGURE 43.

Figure 43. Annual CyRide Ridership



***Source**: CyRide Ridership Data, 2014*

TABLE 28 provides a summary of the CyRide system operating statistics. As shown, CyRide provided 119,509 hours of transit service, carried 6,619,182 passengers, and cost $8,866,644 to operate in 2014. Using this operating data, values were then established for a number of metrics commonly used to evaluate transit system performance including passengers per revenue mile, operating cost per revenue mile, and farebox recovery ratio. A summary of these values for both bus and paratransit services is provided in TABLE 29.

Table 28. Operating Data for Bus and Paratransit Services - 2014

Mode	Ridership	Revenue Hours	Revenue Miles	Farebox Revenue	Total Cost
Bus	6,608,467	116,049	1,200,036	$4,210,853	$8,690,973
Dial-a-Ride	10,715	3,460	34,737	$3,623	$175,671
TOTAL	6,619,182	119,509	1,234,773	$4,214,476	$8,866,644

***Source**: CyRide, 2014 Operations Report*

Table 29. Performance Metrics for Bus and Paratransit Services - 2014

Mode	Passengers per Revenue Hour	Passengers per Revenue Mile	Operating Cost per Revenue Hour	Operating Cost per Revenue Mile	Operating Cost per Passenger	Farebox Recovery Ratio	Average Fare per Passenger	Average Subsidy per Passenger
Bus	56.95	5.51	$74.89	$7.24	$1.32	48.45%*	$0.64	$0.68
Dial-a-Ride	3.10	0.31	$50.77	$5.06	$16.39	2.06%	$0.34	$16.06

***Source**: CyRide, 2014 Operations Report*

** Iowa State University student fee included in farebox revenue per NTD definition*

Further review of transit performance data suggests that Ames often outperforms transit services in larger urbanized areas. Under the MAP-21, the FTA apportions funds to Small Transit Intensive Cities (STIC) based on their performance on a number of criteria. Small Transit Intensive Cities are defined as small urbanized areas with populations between 50,000 and 200,000 whose performance measures exceed the average of larger urbanized areas (population between 200,000 and 999,999). As summarized in TABLE 30, Ames exceeded the average for larger Urbanized Areas (UZAs) on all but one measure (passenger miles per vehicle revenue hour), which resulted in the apportionment of $960,081 in STIC funding for FY 2014[15].

Table 30. Comparison of Ames Transit Performance Data to Larger UZAs

	Passenger Miles per Vehicle Revenue Mile	Passenger Miles per Vehicle Revenue Hour	Vehicle Revenue Miles per Capita	Vehicle Revenue Hour per Capita	Passenger Miles per Capita	Passenger Trips per Capita
Ames, Iowa	8.2	85.8	19.7	1.9	161.4	95.3
Average for UZAs with Populations 200,000 – 999,999	6.3	104.6	10.6	0.7	82.4	13.2

***Source**: Federal Transit Administration, 2014*

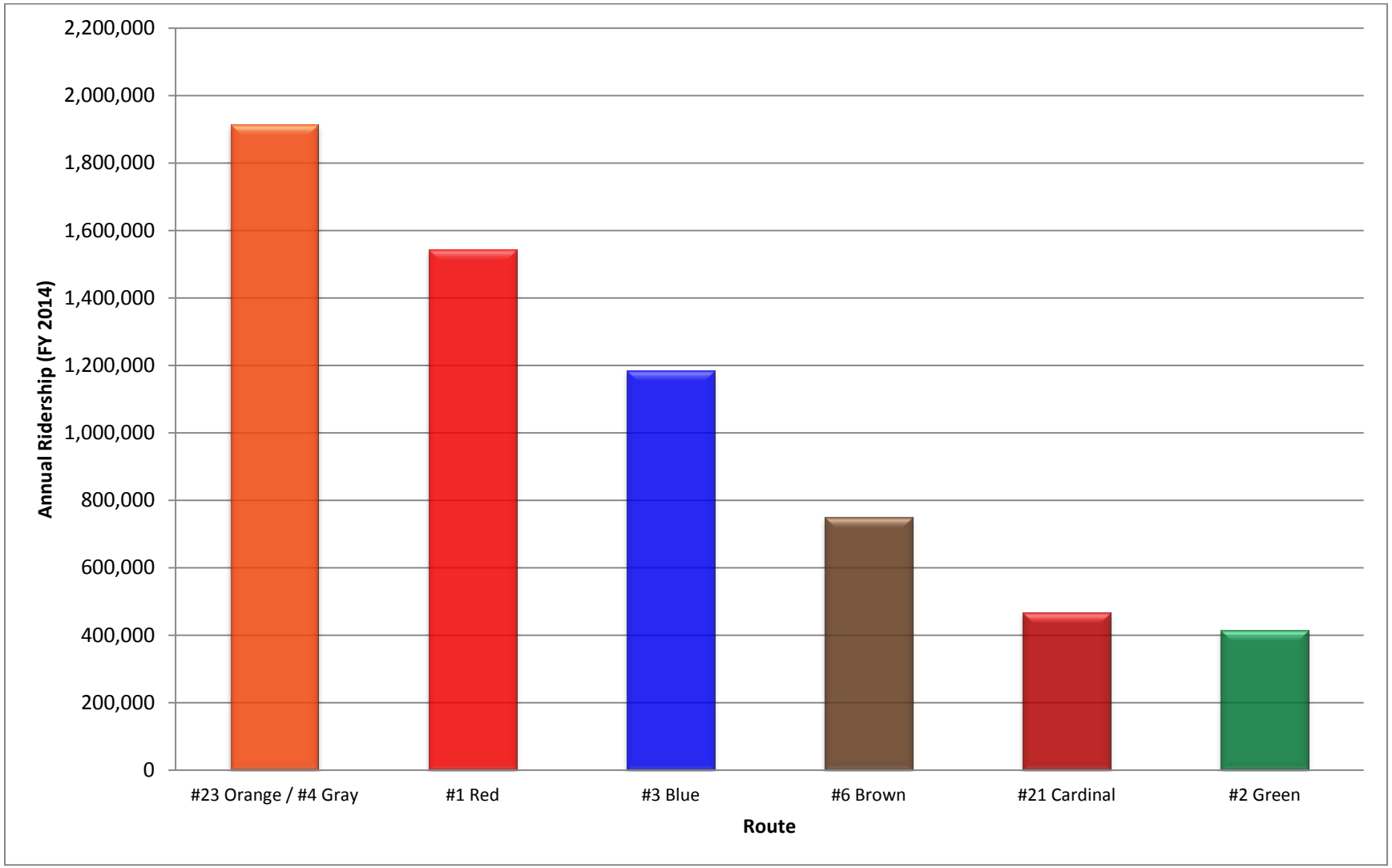
Route Level Performance

An analysis of CyRide route level data revealed a wide range in annual ridership amongst routes. Half of the routes boast ridership levels in excess of 400,000 per year. Ridership is shown in three separate figures, showing different ridership tiers in FIGURE 44, FIGURE 45, and FIGURE 46.

With over 1.9 million passengers in FY 2014, Route #23 Orange (also including #4 Gray) had the highest ridership, accounting for nearly a third (29 %) of total system ridership. Route #1 Red and Route #3 Blue featured the second and third highest annual ridership respectively. Together the top three routes accounted for 71 % of total system ridership.

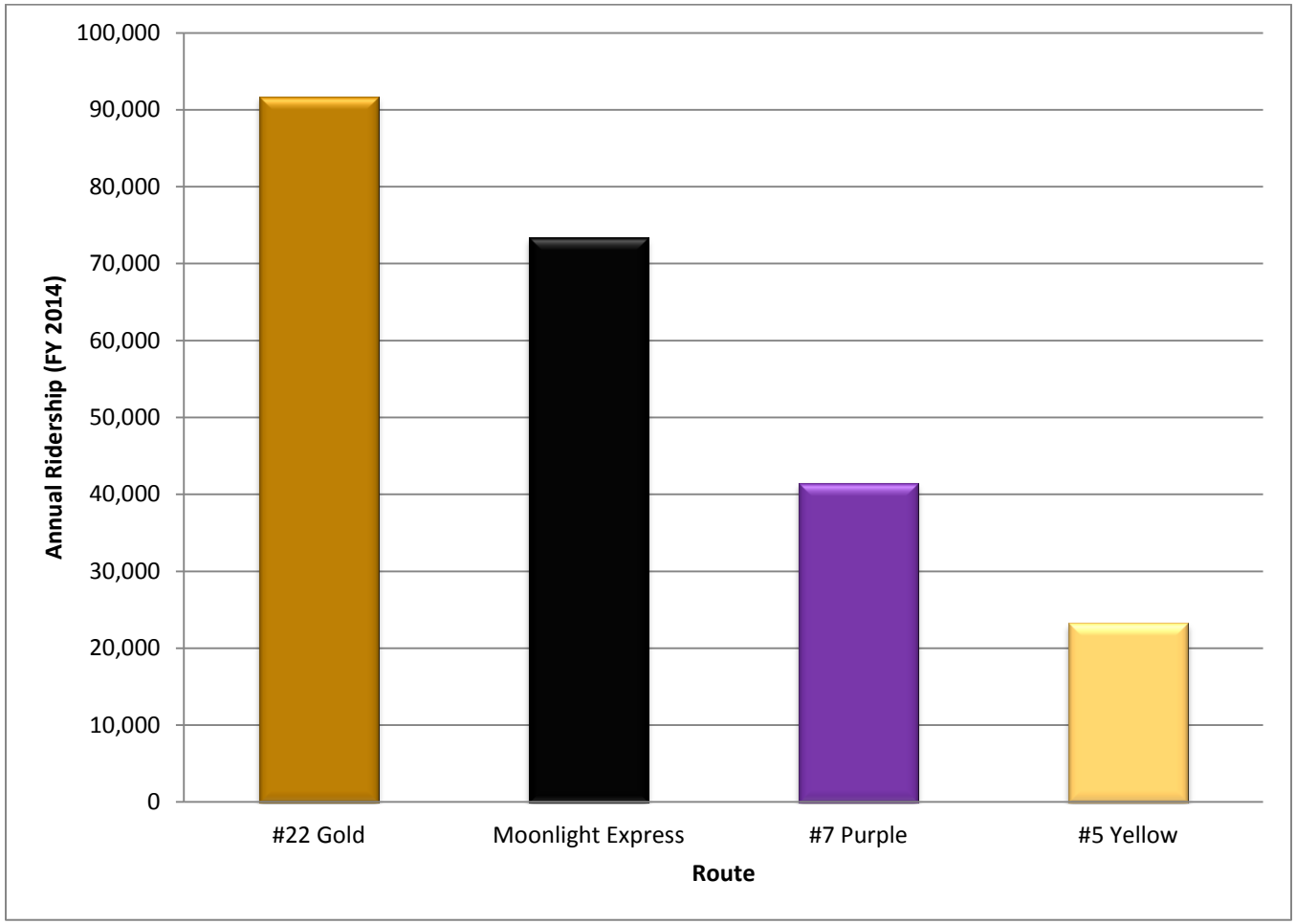
[15] *STIC funding was allocated at $192,016 per factor met or exceeded for FY 2014. Ames met or exceeded on 5 of the 6 factors.*

Figure 44. CyRide Routes: Ridership Tier 1



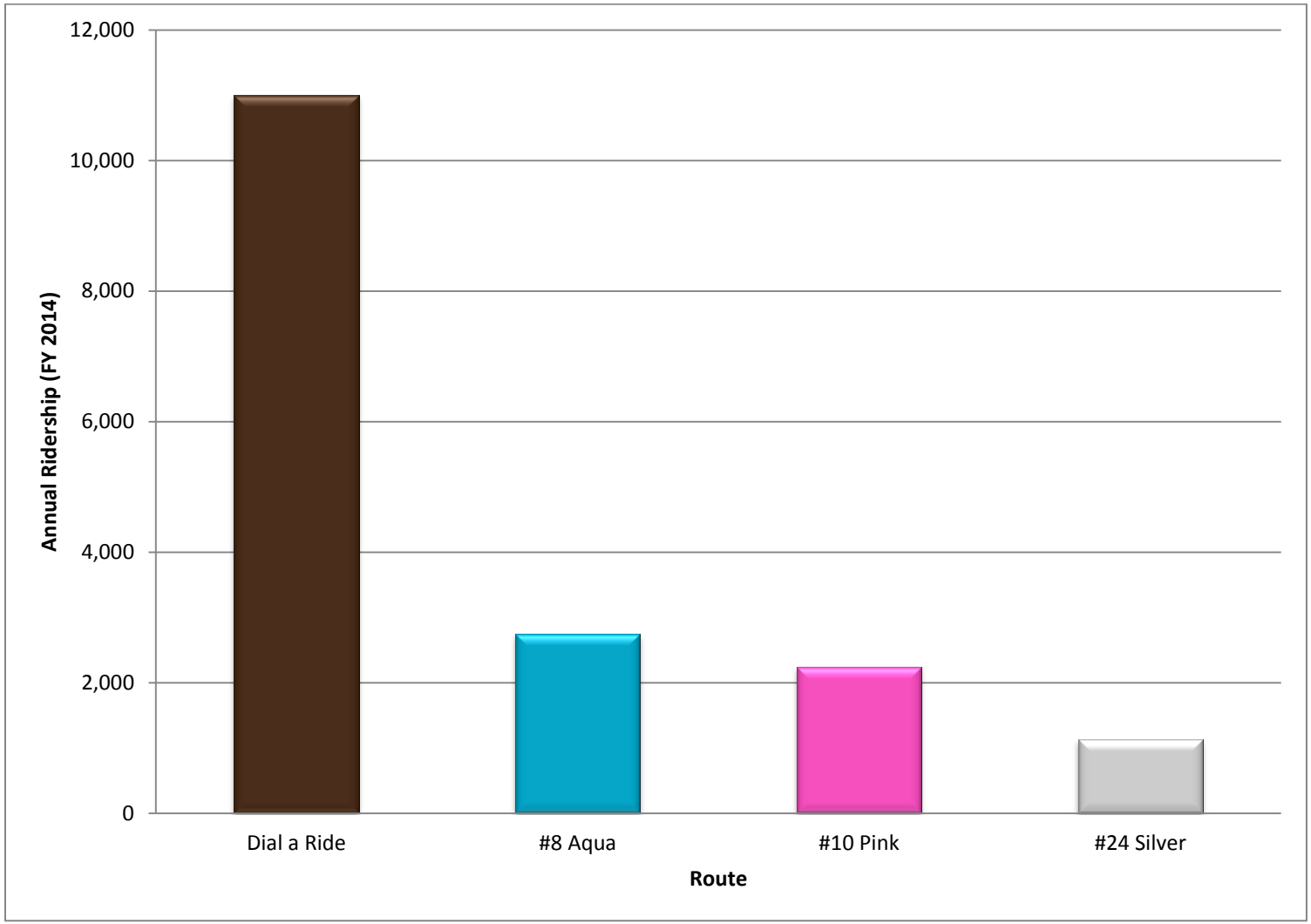
***Source**: CyRide Ridership Data, 2014*

Figure 45. CyRide Routes: Ridership Tier 2



***Source**: CyRide Ridership Data, 2014*

Figure 46. CyRide Routes: Ridership Tier 3



***Source**: CyRide Ridership Data, 2014*

While annual ridership figures provide insight into the total volume of passengers carried by each route, they do not factor in operating characteristics (service span, frequencies, days of service, etc.) and thus reveal little about service efficiency.

Transit Quality Level of Service

Transit quality level of service (LOS) refers to transit performance from the passenger's perception. Transit service can be measured for fixed-route transit as outlined in the Transportation Research Board (TRB) *Transit Capacity and Quality of Service Manual*. Transit LOS is based on service frequency and average headway.

- ***Service frequency*** reflects how many times an hour a user has access to transit, assuming that transit service is provided within acceptable walking distance and at the times the user wishes to travel.
- ***Average headway*** is the service measure used in the service frequency analysis. Average headway is the inverse of the average frequency (vehicles per hour).

Transit LOS was measured for each segment of the CyRide current service area for peak and off-peak conditions, based on fixed-route service frequency. LOS classifications are defined as noted in TABLE 31.

Table 31. Fixed-Route Service Frequency Level of Service

LOS	Average Headway (min)	Comments
A	<10	Passengers do not need schedules, bus bunching more likely, which can result in longer-than-planned waits for a bus
B	10-14	Passengers consult schedules. Maximum desirable wait time for the next service if a bus is missed.
C	15-20	Passengers will check scheduled arrival times to minimize their waiting time.
D	21-30	Passengers must adapt their travel to the transit schedule, often resulting in less than- optimal arrival or departure times for them.
E	31-59	Provides a minimal service level to meet basic travel needs. Passengers must adapt their travel to the transit schedule, usually resulting in less than- optimal arrival and/or departure times for them.
F	> Or = 60	Undesirable for urban transit service due to typical long waits for return trips.

Source: Transit Capacity and Quality of Service Manual- 2nd Edition.

The coverage area in this analysis is based on a quarter-mile (0.25-mi) distance from current CyRide stops. At locations where transit stops overlap, the frequencies were added together for an overall average headway.

Transit Quality Level of Service Results

The Transit Quality LOS for peak transit conditions are shown in FIGURE 47. As shown, many corridors in Central Ames near campus have higher service frequencies during peak periods. Off-peak Transit Quality LOS is shown in FIGURE 48.

Figure 47. Transit Quality Level of Service – Peak

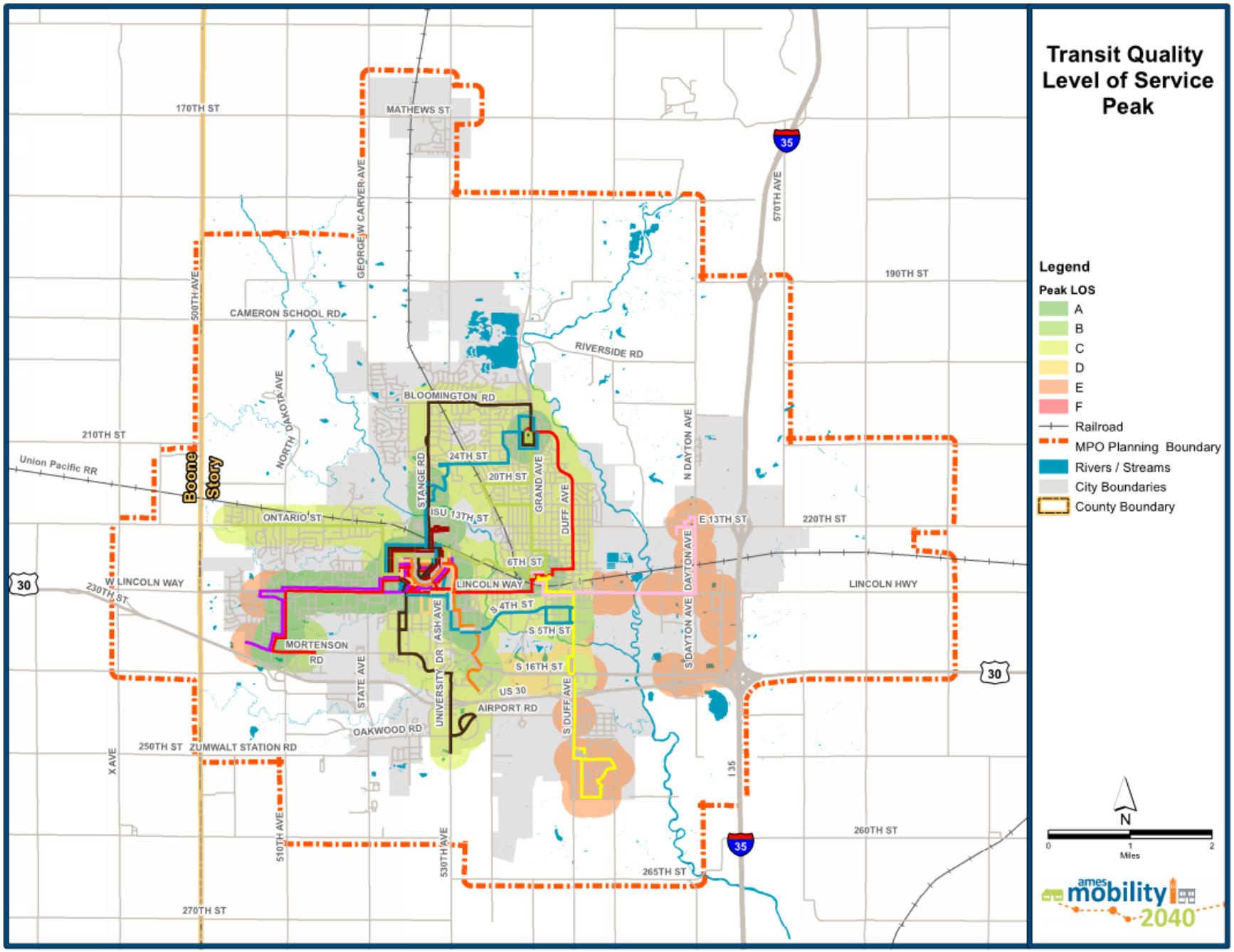
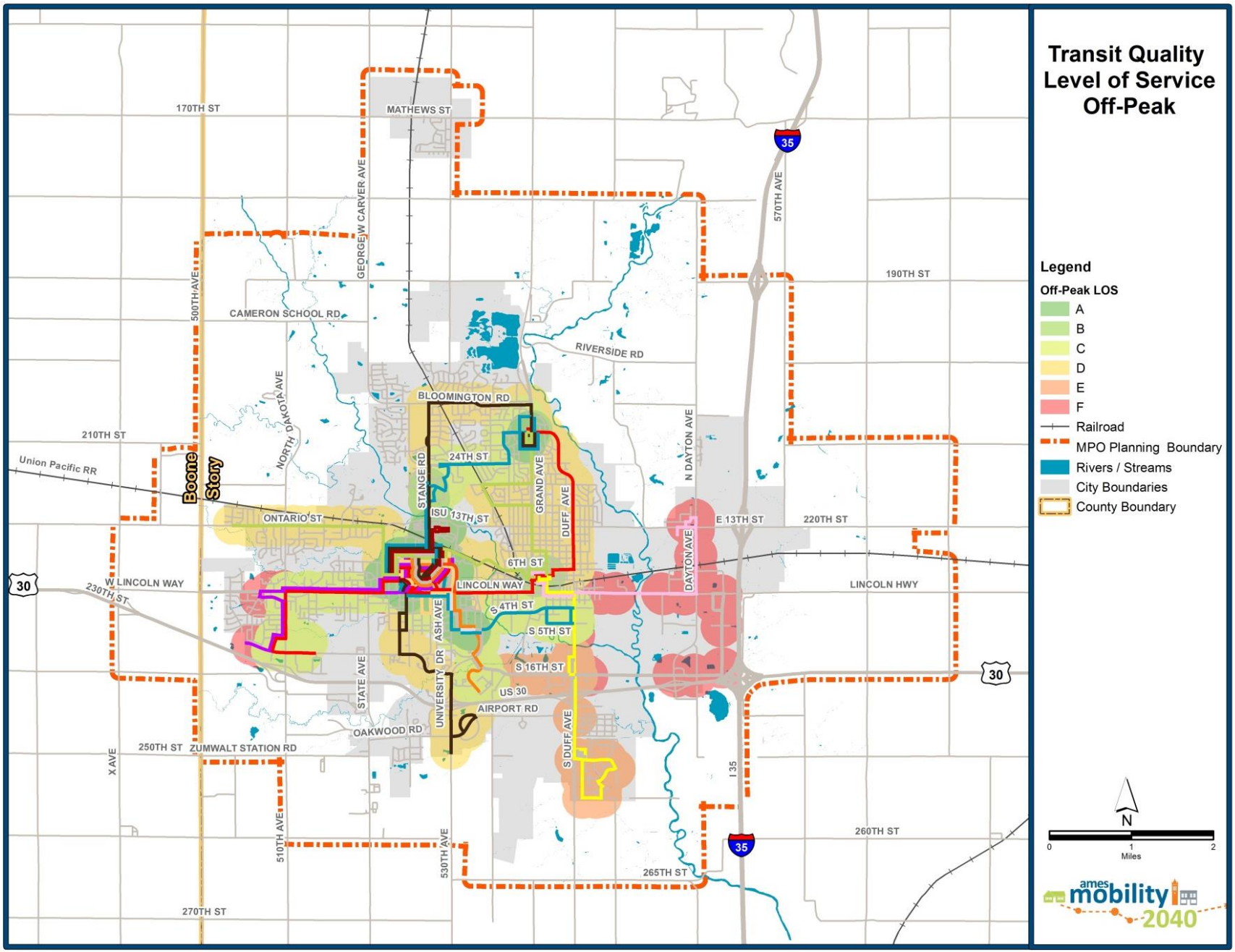


Figure 48. Transit Quality Level of Service - Off-peak

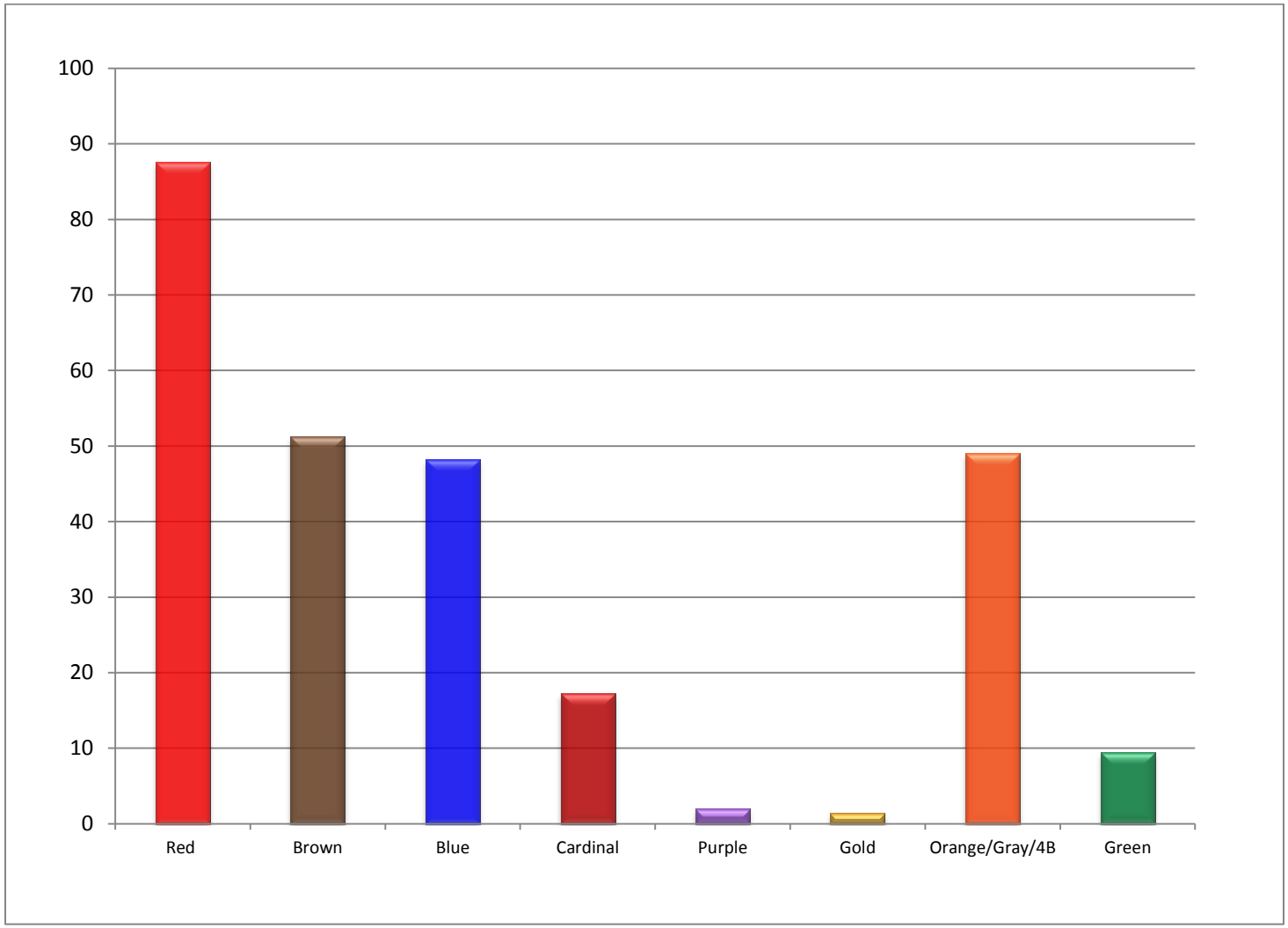


Extra Buses along Over-Capacity Routes

Understanding the frequency of service is not the only way to think about transit service quality. Several CyRide routes experience conditions where peak ridership demand at a stop or along the route exceeds the capacity of a single bus. CyRide monitors passenger service loads on a daily basis such that the number of buses serving various CyRide routes can be adjusted as needed. CyRide provides extra buses to serve routes in high demand with the goal of providing a ride to every passenger wanting a ride. At times, passengers may experience up to four full buses passing them by until they have the opportunity to board a bus with available capacity. When this happens, passengers may be frustrated and find themselves waiting several minutes past the "scheduled" time to board a bus with capacity. Although the passenger may ultimately get a ride, they may not arrive on time at their final destination. Thus, some routes might have LOS “A” conditions in terms of service frequency, but passengers might not be able to get onto the first bus that passes their stop due to over capacity conditions.

The average number of extra CyRide bus trips per route on a typical weekday is shown in **FIGURE 49**, based on data from Fall 2014. These added bus trips occur all day long, not just during the morning, afternoon and evening. The data show that the Red route typically requires 87 extra bus trips per day to serve the demand, followed by Brown route with an extra 51 bus trips, Orange/Gray/4B with an extra 49 bus trips, and Blue with an extra 48 bus trips. These extra bus trips are not printed on the published bus schedule and are therefore not in operation when Iowa State University is not in full session.

Figure 49. Daily Number of Extra CyRide Bus Trips Required by Route



Source: CyRide

Peer City Review

In effort to establish how transit services in Ames perform relative to similar communities throughout the country, data for several peer cities was collected for comparison. These cities include: State College, Pennsylvania; Champaign, Illinois; Ft. Collins, Colorado; Iowa City, Iowa; Blacksburg, Virginia; and Chapel Hill, North Carolina. A brief description of each city is first provided in the section below followed by a detailed comparison of operating data and select performance metrics.

Overview of Peer Cities

State College, Pennsylvania

State College is a borough in Pennsylvania with a 2012[16] population of 42,008 according to the Census Bureau's American Community Survey. State College is home to Pennsylvania State University's (PSU) main campus, which boasts an annual student enrollment of over 45,000. Transit service is provided by the Centre Area Transportation Authority (CATA), which divides its service types into three categories: CATABUS, CATACOMMUTE, and CATARIDE. CATABUS represents CATA's fixed route bus services and is further divided into two subcategories: Community Service and Campus Service. Community Service is comprised of 23 bus routes that serve a variety of activity centers throughout State College, while Campus Service consists of four fare-free circulator/shuttle services that operate on and in the immediate vicinity of the PSU campus. CATACOMMUTE represents a host of services—including RideShare, Vanpool, and a Guaranteed Ride Home program—designed to cater to the needs of long distance commuters. Finally, CATARIDE provides paratransit services to elderly and disabled citizens.

Champaign, Illinois

The city of Champaign, Illinois, has population of 81,083[2] and is home to the University of Illinois at Urbana-Champaign (UIUC), which featured a student enrollment of nearly 45,000 in 2012. Transit service in the area is provided by the Champaign-Urbana Mass Transit District (MTD), which operates nearly 30 local bus routes throughout the City and surrounding areas. Paratransit service is also available to eligible users as determined by the ADA. The MTD is regularly recognized for its excellent performance, having twice received the American Public Transit Association's (APTA) Outstanding Achievement Award, and proudly proclaims its' 98 % customer satisfaction rate.

[2] *U.S. Census Bureau; American Community Survey 5-Year Estimates, 2008-2012*

Ft. Collins, Colorado

The city of Fort Collins, Colorado, has a population of 144,329[2] and is the site of Colorado State University's (CSU) main campus, where student enrollment was approximately 30,700 in 2013. Transit service in in the area is provided by Transfort, which currently operates 20 regular bus routes, one bus rapid transit (BRT) route, a late night service on Friday and Saturdays, and one regional route to destinations in Loveland, Berthoud, and Longmont. In addition to fixed route services, Transfort also provides Dial-a-Ride paratransit services to certified participants within ¾ mile of fixed route service as per ADA requirements.

Iowa City, Iowa

Iowa City, Iowa has a population of 68,364[2] and is home to the University of Iowa's (UI) 1,900 acre main campus, which featured a student enrollment of 31,065 in 2013. Several different agencies provide transit service in the area including the city of Iowa City, Cambus, and the city of Coralville. Cambus is operated by UI's Department of Parking and Transportation and provides fare free service on UI's campus and surrounding areas and is open to the general public.

Blacksburg, Virginia

The Town of Blacksburg, Virginia has a population of 42,539[2] and is home to Virginia Tech's main campus, where student enrollment was approximately 31,205 in 2013. Transit service in the area is provided by Blacksburg Transit (BT), which operates 11 routes throughout the Town, neighboring Christiansburg, and unincorporated portions of Montgomery County. ADA-compliant paratransit services are provided through the town's BT ACCESS service.

Chapel Hill, North Carolina

The Town of Chapel Hill, North Carolina has a population of 57,088[2] and is the site of the University of North Carolina at Chapel Hill (UNC) main campus, where student enrollment totaled 29,127 in 2013. Transit service in the area is provided by Chapel Hill Transit (CHT), which operates over 20 weekday routes throughout Chapel Hill and the neighboring Town of Carrboro. As per ADA requirements, CHT provides its' EZ Rider paratransit services to qualified users located within ¾ mile of fixed route service.

Peer City Comparison

Operating data for bus services was gathered from NTD for each of the cities described above and compared to that of Ames. The data for Ames show both 2012 and 2014 system characteristics. CyRide's 2012 data are shown to reflect a consistent baseline for all per

systems, as that is the latest year that NTD data are available for the other systems. CyRide's 2014 data are shown to document the most current service levels for the CyRide system. A summary of this comparison is provided in TABLE 32.

Table 32. Comparison of Peer City Operating Data for Bus Services

	Ames (2012)	Ames (2014)	State College (2012)	Champaign (2012)	Ft. Collins (2012)	Iowa City – Cambus (2012)	Iowa City – Iowa City Transit (2012)	Blacksburg (2012)	Chapel Hill (2012)
UZA Population	60,438	60,438	87,454	145,361	264,465	106,621	106,621	88,542	347,602
Service Area Population	56,900	56,900	112,000	141,471	143,986	71,372	68,947	63,661	80,218
Operating Data									
Ridership	5,748,940	6,608,467	7,000,890	10,981,718	2,269,222	4,357,675	1,965,419	3,485,590	6,881,691
Revenue Hours	111,035	116,049	125,207	253,821	78,554	72,795	56,522	80,975	158,323
Total Operating Cost	$7,707,960	$8,690,973	$11,286,012	$27,513,170	$7,191,939	$2,976,483	$5,262,967	$4,960,470	$14,916,599
Farebox Revenue	$3,693,392	$4,214,476	$5,772,014	$6,314,443	$1,109,861	$0	$1,083,892	$2,884,329	$7,395,166

Sources: *National Transit Database, 2012; CyRide, 2014 Operations Report*

Using this operating data, values were then established for a number of metrics commonly used to evaluate transit system performance. The results of this analysis are provided in TABLE 33. As depicted in the tables below, transit performance in Ames ranks near the top of the cities reviewed for several performance metrics. As shown in the tables, in addition to comparing favorably with peer cities in 2012, Ames has experienced ridership gains and continued efficient service between 2012 and 2014.

Table 33. Comparison of Peer City Performance Metrics for Bus Services

	Ames (2012)	Ames (2014)	State College (2012)	Champaign (2012)	Ft. Collins (2012)	Iowa City – Cambus (2012)	Iowa City – Iowa City Transit (2012)	Blacksburg (2012)	Chapel Hill (2012)
Passengers per Revenue Hour	51.8	56.9	55.9	43.3	28.9	59.9	34.8	43.0	43.5
Operating Cost per Revenue Hour	$69.42	$74.89	$90.14	$108.40	$91.55	$40.89	$93.11	$61.26	$94.22
Operating Cost per Passenger	$1.34	$1.32	$1.61	$2.51	$3.17	$0.68	$2.68	$1.42	$2.17
Farebox Recovery Ratio	48%	48%	51%	23%	15%	0%	21%	58%	50%
Average Subsidy per Passenger	$0.70	$0.68	$0.79	$1.93	$2.68	$0.68	$2.13	$0.60	$1.09

Sources: *National Transit Database, 2012; CyRide, 2014 Operations Report*

The same operating and performance metric data was gathered for a comparison of peer city paratransit services and summarized in TABLE 34 and TABLE 35, respectively. Again, Ames compared favorably to peer city services.

Table 34. Comparison of Peer City Operating Data for Paratransit Services

	Ames (2012)	Ames (2014)	State College (2012)	Champaign (2012)	Ft. Collins (2012)	Iowa City – Cambus (2012)	Blacksburg (2012)	Chapel Hill (2012)
UZA Population	60,438	60,438	87,454	145,361	264,465	106,621	88,542	347,602
Service Area Population	56,900	56,900	112,000	141,471	143,986	71,372	63,661	80,218
Operating Data								
Ridership	10,925	10,715	8,020	136,782	37,747	10,233	31,279	62,375
Revenue Hours	2,673	3,460	3,804	41,464	19,429	9,660	14,602	24,252
Total Operating Cost	$169,384	$175,671	$206,026	$1,583,106	$1,114,404	$365,516	$890,459	$2,571,611
Farebox Revenue	$8,945	$3,623	$23,770	$260,073	$129,169	$0	$17,796	$0

Sources: *National Transit Database, 2012; CyRide, 2014 Operations Report*

Table 35. Comparison of Peer City Performance Metrics for Paratransit Services

	Ames (2012)	Ames (2014)	State College (2012)	Champaign (2012)	Ft. Collins (2012)	Iowa City – Cambus (2012)	Blacksburg (2012)	Chapel Hill (2012)
Passengers per Revenue Hour	4.1	3.1	2.1	3.3	1.9	1.1	2.1	2.6
Operating Cost per Revenue Hour	$63.67	$50.77	$54.16	$38.18	$57.36	$37.84	$60.98	$106.04
Operating Cost per Passenger	$15.50	$16.39	$25.69	$11.57	$29.52	$35.72	$28.47	$41.23
Farebox Recovery Ratio	5%	2%	12%	16%	12%	0%	2%	0%
Average Fare per Passenger	$0.82	$0.34	$2.96	$1.90	$3.42	$0.00	$0.57	$0.00
Average Subsidy per Passenger	$14.69	$16.06	$22.73	$9.67	$26.10	$35.72	$27.90	$41.23

***Sources**: National Transit Database, 2012; CyRide, 2014 Operations Report*

Iowa Park and Ride System Plan

The *Iowa Park and Ride System Plan* will be used by Iowa DOT to plan, evaluate, and develop a formal statewide system of park and ride facilities. Iowa DOT has recently finalized the plan to identify ideal locations for park and ride facilities to serve ridesharing commuters in the state. The study focused on available data on workflows between counties to identify candidate park and ride pairs. Based on the data available in the system plan, 3 of the top 25 county-to-county flows in the state involved the Ames area:

- Boone County residents commuting to Story County
- Story County residents commuting to Polk County
- Polk County residents commuting to Story County

The results of that study indicated that the junction of US 30/Dayton Ave in Ames would be a candidate location for a park and ride facility. The study indicated that this was the 8th highest priority for a park and ride lot in the state.

Previous Transit Studies

A review of recent studies was conducted to identify important findings related to the provision of transit service in Ames. Two important studies conducted in the last year that contain pertinent information on transit and include the *Ames Area MPO 2015-2019 Final Passenger Transportation Plan* and the *2014 CyRide On-Board Transit Survey*. A brief summary of each of these studies is provided below.

Ames Area MPO 2015-2019 Final Passenger Transportation Plan (2014)

The purpose of the *Ames Area MPO 2015-2019 Final Passenger Transportation Plan* was to document the existing transportation services offered in Ames, evaluate the projected needs of the community, and identify the appropriate steps required to ensure these needs are effectively met. After first providing a detailed profile of transportation services in Ames and reviewing the status of the projects identified in the previous *Passenger Transportation Plan*, a series of priorities and strategies for the next five years are presented. One of the first priorities identified was the need to secure Section 5310 funds (Enhanced Mobility of Seniors & Individuals with Disabilities) from the Federal Transit Administration to continue to meet the demand for Dial-a-Ride service throughout Ames. As stipulations related to the dispersal of these funds require transit agencies to contract out these services, CyRide plans to continue subcontracting with the Heart of Iowa Regional Transit Agency (HIRTA) to provide Dial-a-Ride service throughout the CyRide service area.

A second priority identified was a series of bus stop improvements and additional amenities intended to improve accessibility and potentially attract new users to CyRide services. Locations and specific improvements were previously prioritized in a bus stop plan and will be implemented as funding permits. Types of improvements include new shelters, lighting, and digital signage with real-time schedule information.

The remaining priorities were organized into general categories of need, with possible strategies identified for each. These included fleet needs for both fixed route and Dial-a-Ride, maintenance and operation needs, and additional service needs. While the specific strategies and projects are too numerous to mention in full, they were indicative of the consistent growth in transit demand in Ames over the last several years. Examples of these strategies include:

- Increased frequencies and longer service spans on several existing transit routes.
- Extended certain routes to serve additional destinations.

- Acquired new and/or used vehicles to expand service and provide greater frequencies.
- Modernized CyRide storage facility to maximize efficiency.

Overall, the *Passenger Transportation Plan* provides a comprehensive set of priorities and strategies aimed at satisfying projected levels of transit demand in Ames over the next several years. As funding is always a concern with the provision of transit services, the *Passenger Transportation Plan* concluded with a review of potential local, state, and federal funding sources.

2014 CyRide On-Board Transit Survey

The 2014 CyRide On-Board Transit Survey was developed with the intent of gathering accurate travel data from transit users for the purpose of updating the region's travel demand model. This survey is also discussed in CHAPTER 2. The survey was administered onboard eleven CyRide bus routes over the course of several weeks in the March 2014. The survey collected information on riders' origin and destination points, primary modes of access, locations of transit access and egress, and general demographic and household information. These efforts resulted in the collection of 3,251 surveys which provided valuable information on the travel characteristics of transit users. Some of the findings include:

- A majority of transit users (73 %) are between the ages of 18 and 24.
- A majority of transit users (90 %) are students at either college/university or K-12 schools
- 26 % of transit users come from zero auto households, while 74 % reported they have at least one vehicle
- A majority of trips completed by passengers (71 %) are home based school, followed by home based work (12 %).
- A majority of transit users walk to access the bus (84 %) and to access their final destination (91 %).
- All respondents (100 %) ride transit at least one day per week, with 56 % indicating they use transit four or more days per week.

OTHER MODAL FACILITIES AND CONSIDERATIONS

Reliable transportation systems depend on efficient connections between all modes of travel. Other modal planning activities and ongoing improvements that address freight and other needs will help to maintain the region's economy and competitiveness. This chapter describes travel considerations for moving freight and personal inter-regional travel via truck, rail, air, and bus.

Trucks

Industrial and manufacturing facilities in the Ames area depend on trucking for movement of goods. The businesses along the Dayton Avenue corridor are a major truck generating location in the Ames area. The major routes for hauling goods in and out of the Ames area are:

- U.S. 69
- U.S. 30
- Interstate 35
- S. Duff Ave
- Dayton Avenue
- S. 16th Street (east of S. Duff Ave)
- Lincoln Way (east of S. Duff Ave)

Periodic designation and update of truck routes and implementation of additional limited-access roadway facilities is key for corridors utilized by truck traffic, to encourage truck trips to avoid traveling into an urbanized area unless the urbanized area is the origin or destination.

FIGURE 50 illustrates truck volumes representing single unit and combination trucks, and notes the percentage of the daily traffic that is comprised of trucks. Existing zoning areas classified as "General Industrial" or "Planned Industrial" are also shown on this map.

An illustration of primary freight corridors in the Ames area was defined based on the NHS routes, and roadways with significant existing truck volume percentages. The primary freight corridors are shown in FIGURE 51.

Figure 50. Truck Volume and Percentage of Average Daily Traffic Volume

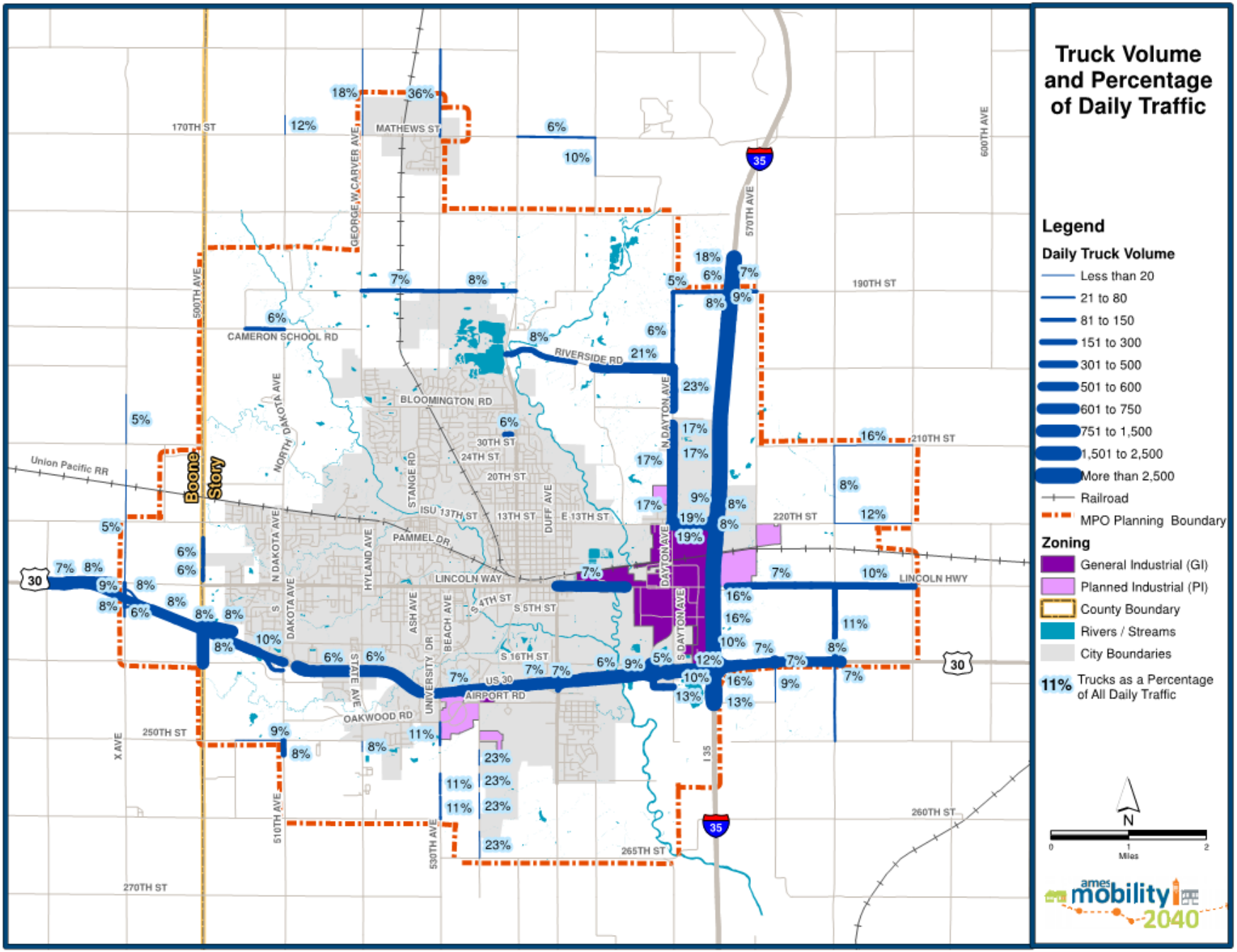
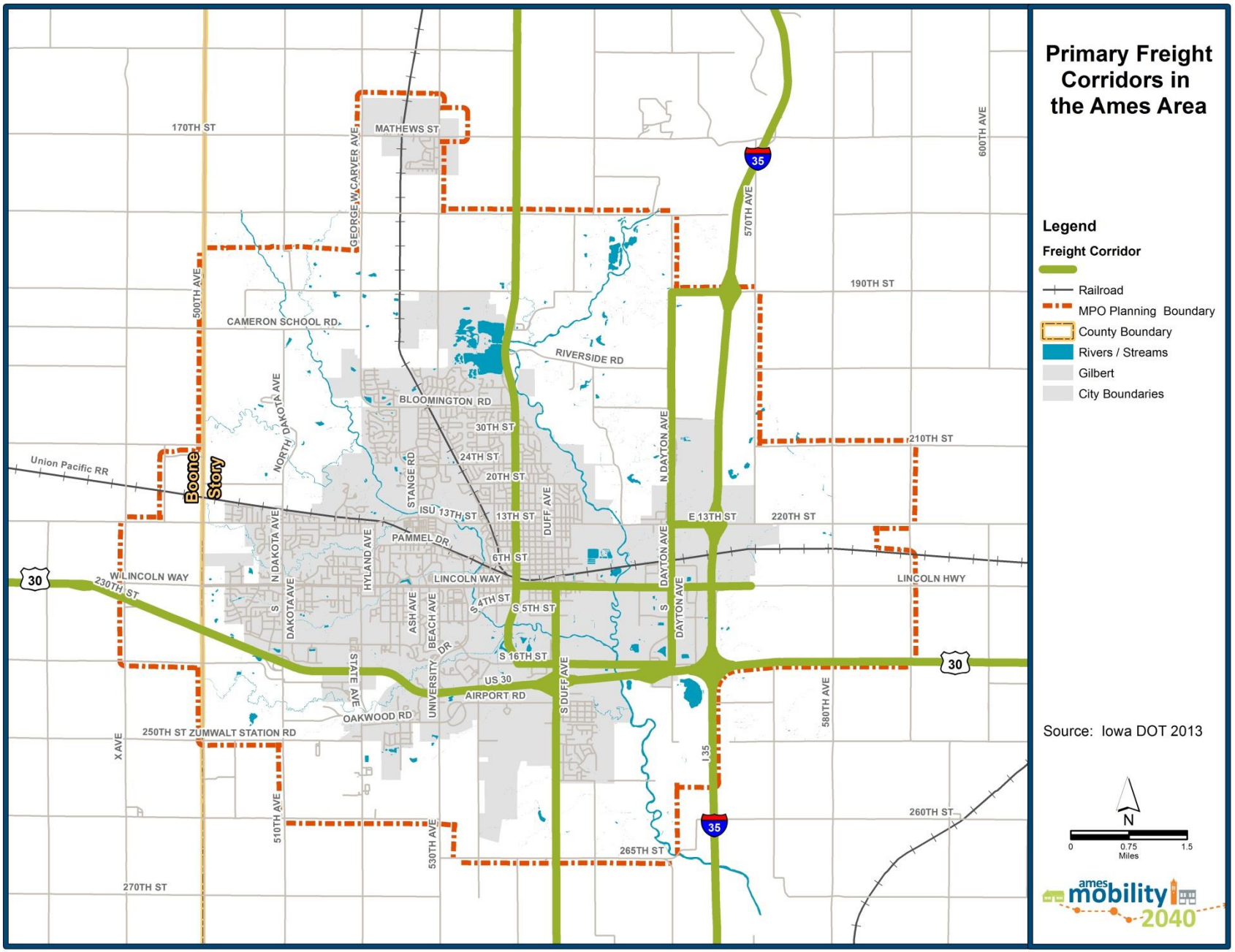


Figure 51. Primary Freight Corridors



Rail

Union Pacific Railroad (UPRR) is the rail service carrier in Ames. The east-west mainline tracks carry over 66 trains per day. This railroad has daily switching service. There are no piggyback ramps (incline loading and unloading trailers from a flat car) available locally. There are also no intermodal rail facilities within the MPO boundary.

Farm, food, chemicals and ethanol products account for 90 % by weight of the rail shipments originating in Iowa. Coal, farm products, chemicals, and food products make up 88 % by weight of the rail shipments terminating in Iowa. The study area railroad routes are shown in FIGURE 52. As shown in this figure, one rail corridor runs in a north-south direction and two mainline tracks in an east-west direction.

The at-grade rail crossings with the UPRR mainline in the MPO boundary are shown in TABLE 36.

Figure 52. Railroad Routes and At-Grade Crossings

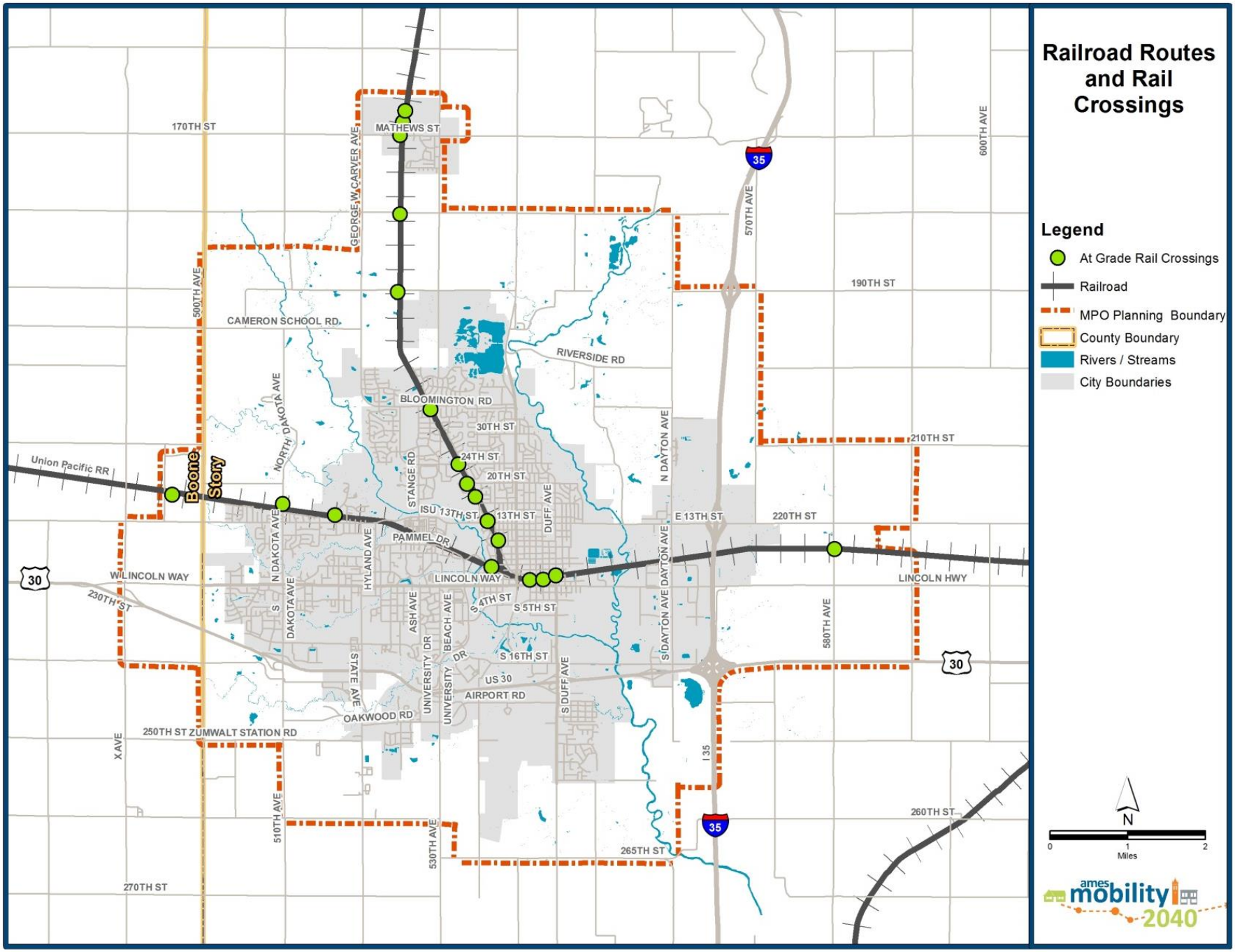


Table 36. Rail Crossing Characteristics

Crossing	Number of Tracks	Trains Per Day	Crossing Characteristics						Train Speed	AADT	AADT Year
			Gates	Flashers	Warning Signs	Pavement Markings	Bells	Raised Median	(MPH)		
East-West Railroad											
Xl Ave (Gravel) W of 500th Ave	2	58	2	Yes	Yes	No	2	No	<70	50	2011
N Dakota Ave	2	66	2	Yes	Yes	Yes	2	Yes	<70	1150	2011
Scholl Rd	2	66	2	Yes	Yes	No	2	Yes	<70	120	2011
N Hazel Ave/Brookridge Ave	2	66	2	Yes	Yes	No	1	Yes	<60	1190	2011
Clark Ave	2	66	2	Yes	Yes	Yes	1	Yes	<40	5300	2011
Kellogg Ave	2	66	2	Yes	Yes	Yes	1	Yes	<40	4050	2011
Duff Ave	2	66	4	Yes	Yes	Yes	4	No	<40	13700	2011
580th Ave	3	66	2	Yes	Yes	No	1	No	<70	920	2011
North-South Railroad											
9th St	1	4	2	No	Yes	No	2	No	<40	1220	1999
13th St	1	4	2	Yes	Yes	Yes	2	No	<40	8800	2011
16th St	1	4	2	No	Yes	No	2	No	<40	1280	1999
20th St	1	4	2	No	Yes	Yes	2	No	<40	4220	2011
24th St	1	4	2	No	Yes	Yes	2	No	<40	9300	2011
Bloomington Rd	1	4	2	No	Yes	Yes	2	No	<49	7400	2011
190th St	1	4	2	No	Yes	Yes	2	No	<49	1350	2011
180th St (Gravel)	1	4	0	No	Yes	No	0	No	<49	30	2011
170th St/Mathews Dr	1	4	0	No	Yes	Yes	1	No	<49	2310	2011
1st St	1	4	0	No	Yes	Yes	1	No	<49	N/A	N/A
2nd St	1	4	0	No	Yes	No	1	No	<49	N/A	N/A

Air Service

The Ames Municipal Airport is located within Ames corporate boundaries. This site is located south of U.S. Highway 30 and west of U.S. Highway 69. Access to the terminal area is provided via Airport Road. In 2007, the city of Ames contracted with a fixed base operator to operate the airport. The city of Ames owns and operates the airport. The airport is included in the National Plan of Integrated Airport Systems (NPIAS) as a general aviation airport. The Iowa Aviation Plan identifies the Ames Municipal Airport as an Enhanced Service Airport. The Ames Municipal Airport serves the general aviation needs of Story County and provides an important means of accessing the area. The airport hours of operation are 7:30 AM – 6:00 PM everyday.

Airport operation statistics include:

- 92 aircraft based on field
- 92 aircraft operations per day on average
- Single engine airplanes: 66
- Multi-engine airplanes: 8
- Jet airplanes: 2
- Gliders: 13
- Ultralights: 3

The Ames Municipal Airport includes the following services:

- Aviation fuel sale
- Charters
- Parking and Hangars (for transient aircraft)
- Aircraft maintenance
- Passenger terminal and lounge
- Car rentals
- Flight school/flight training
- Crew Cars
- Hangar Rental
- Pilot lounge/snooze room
- Aircraft rentals
- Public telephone
- Restrooms

No commercial air service is provided by the Ames Municipal Airport. The nearest commercial service is provided via the Des Moines International Airport (DSM), approximately 40 miles south of the Ames Area. Commercial service at DSM is provided by seven (7) airlines, with non-stop service to 18 different airports across the United States.[17]

[17] *Non-Stop Destinations Map, Des Moines International Airport.*

Intercity Bus

Intercity bus transportation provides access between Ames and other cities, providing shorter inter-city trips that are not efficiently served by the air transportation system, and provides users a cost-effective mode of travel. There are two companies that offer intercity bus service through Ames to surrounding cities and states. Intercity bus services are stationed in the Ames Intermodal Facility located at Hayward Avenue and Chamberlain Streets, allowing intercity bus travelers to connect with Ames Area bus routes.

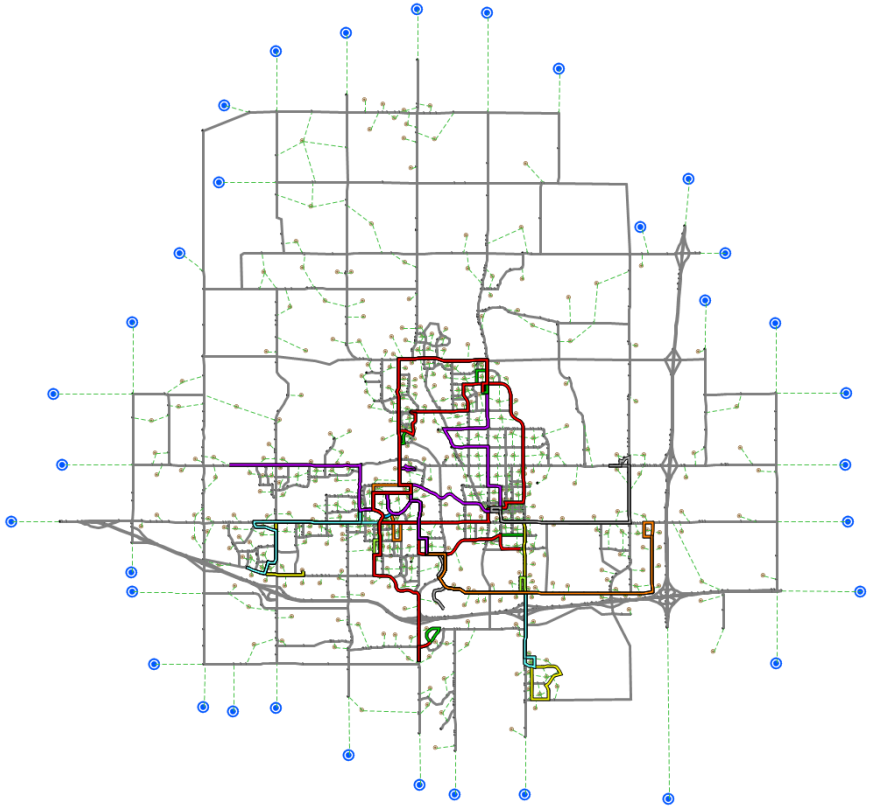
The intercity bus lines serving Ames include:

- ***Jefferson Lines:*** Jefferson Lines offers daily bus service north and south of Ames on I-35 between Kansas City, MO and Minneapolis, MN. The Jefferson line arrives and departs two times a day. The Jefferson connections to Kansas City and Minneapolis allow for transfers to the wider Greyhound bus network.
- ***Burlington Trailways:*** Burlington Trailways offers daily bus service east and west of Ames on I-80 between Omaha, NE and Chicago, IL. The Burlington line arrives and departs once a day. The Burlington connection to Chicago allows for transfers to the wider Greyhound bus network.
- ***Executive Express:*** Executive Express offers airport shuttle service to and from the Des Moines airport. Executive Express picks up at designated locations in Ames at the Holiday Inn Express on 13th Street, and the Ames Intermodal Facility on Hayward Avenue, or can pick up at a custom location for an additional charge. Professional charter services are also available by private car or van.
- ***Amtrak:*** Amtrak ran a pilot Thruway bus service from Osceola to Des Moines and Ames in the winter of 2013/2014. In its 6-day operation, the pilot project was a successful demonstration of the concept. Amtrak is currently evaluating options for creating a permanent service.

Chapter 6. Future System Performance

Travel Demand Model

In coordination with Ames Mobility 2040, the Ames Area MPO travel demand model was updated to reflect conditions representative of a base year 2010. The travel model is a computer simulation that evaluates the interaction of development patterns and the transportation system. The model is the primary tool used for assessing future conditions on the Ames area transportation system. The model estimates travel demand by evaluating the location and amount population and employment by geographic location, and understanding the capacity, travel speed and connectivity offered by the roadway and transit system. Travel demand forecasting predicts the number, purpose, origin and destination, and route of "trips" on a transportation network as a function of land use patterns. A ***trip*** is defined as travel between two points for one purpose, for instance, between home and work, or home and school, or work and shopping.

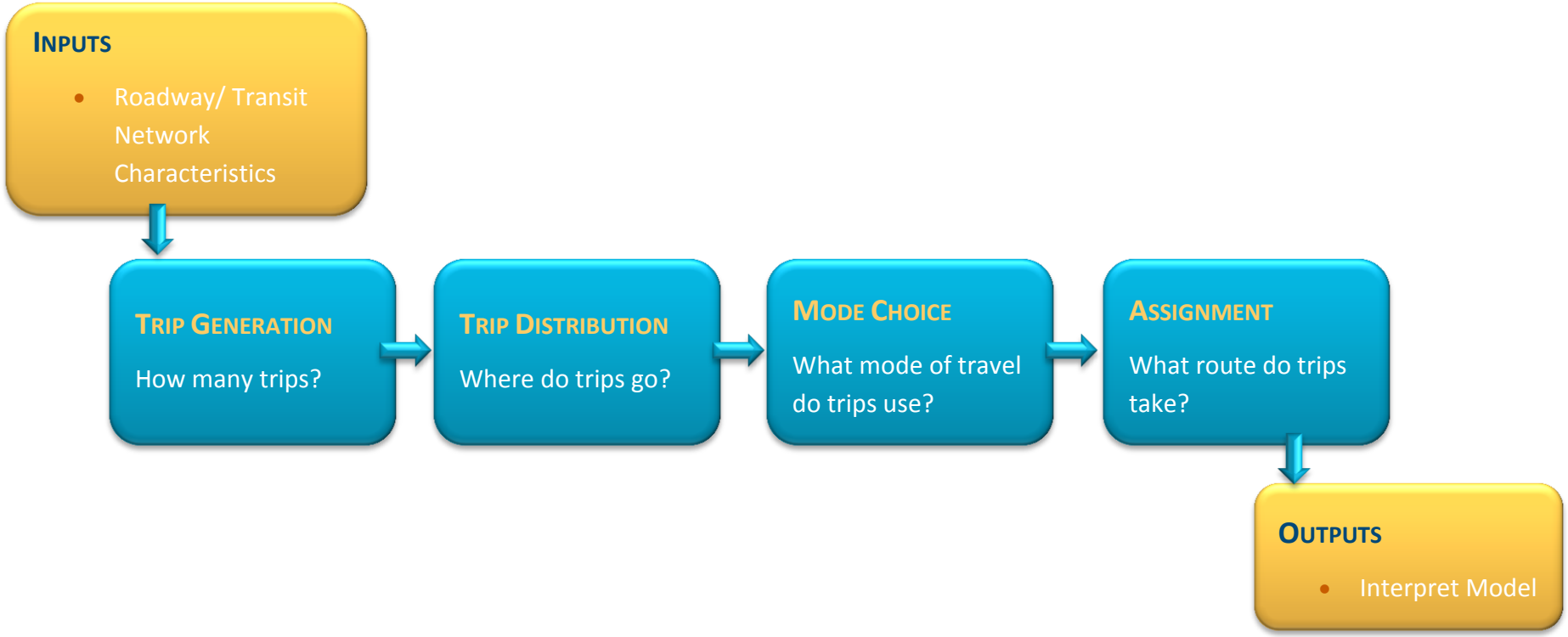


The 2010 Ames model network is a geographical depiction of the Ames Area MPO roadway and transit system, including transit network details and access levels and roadway system speeds and lane configurations. The software platform used for the Ames Area MPO travel model is TransCAD.

Model Structure

The Ames model uses the widely-applied "four-step" sequential modeling process that is the most common model type in urban areas today. The four steps include trip generation, trip distribution, mode choice, and trip assignment. Most small urban area models only deal with the auto mode. However, urban areas with higher populations or areas with high transit use such as Ames, transit models (via the "Mode Choice" step are also common. The Ames travel modeling process includes the elements summarized in FIGURE 53.

Figure 53. Ames Travel Model Structure

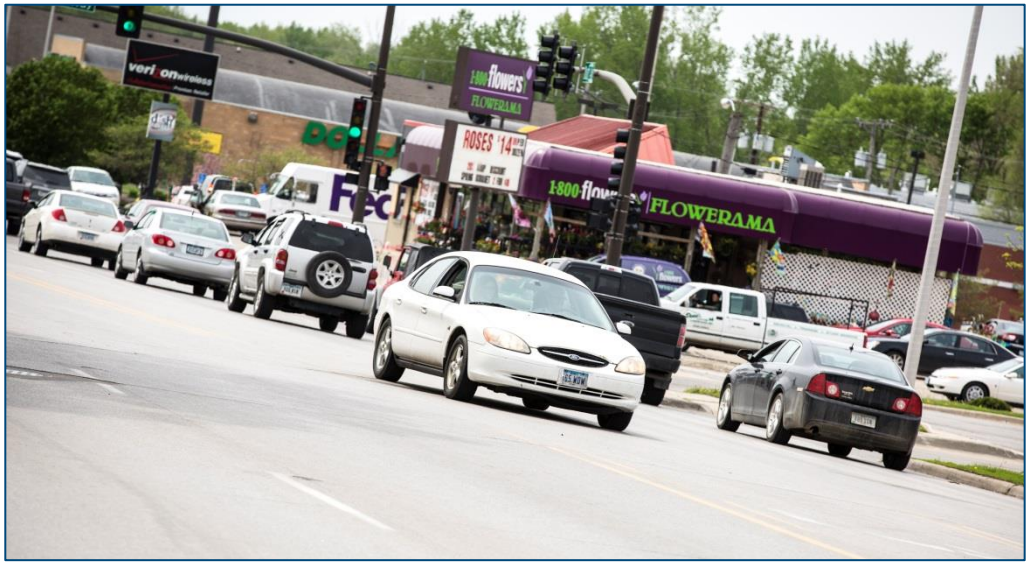


2040 Existing Plus Committed Future Baseline

The 2040 conditions used as the baseline for the future needs analysis in Ames Mobility 2040 reflect an "existing-plus-committed" (E+C) network scenario. The 2040 E+C scenario assumes no improvements to the current roadway network beyond those projects included in the Ames Area MPO's four-year Transportation Improvement Program (TIP). The 2040 E+C scenario traffic forecasts assumed that in addition to the current roadway network, two major roadway projects would be complete by 2040:

- Grand Avenue extended to South 16th Street (in current TIP for construction in 2017-2018).
- Construction of Cherry Avenue between Lincoln Way and South 5th Street (in Ames' current Capital Improvement Program).
- A roundabout constructed at Airport Road and University Boulevard.

A detailed technical documentation of the Ames travel model is included in **APPENDIX D**.

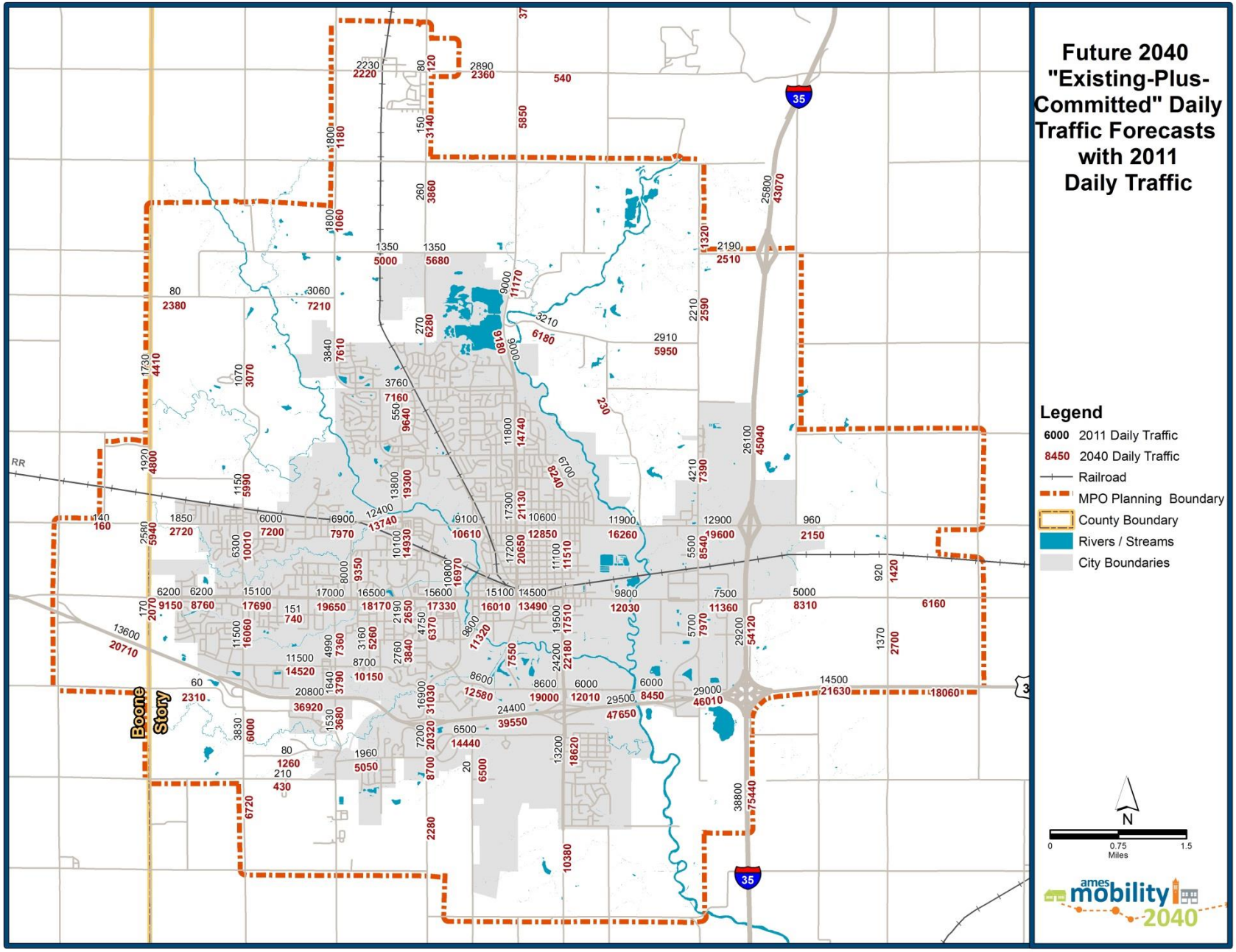


Future Traffic Volumes and Operations

Traffic volume forecasts were developed by comparing output from the 2010 base travel model and 2040 E+C network scenario travel model. The socioeconomic data included in the 2040 travel model were provided by the city of Ames and Iowa DOT staff. This 2040 land use data reflects anticipated areas of growth into the future. The growth in number of households by travel analysis zone (TAZ) between 2010 and 2040 was shown in Figure 14 of Chapter 4. Similarly, the growth in total employment by TAZ was shown in Figure 15.

The 2040 daily traffic forecasts were based on a post-processing application of the raw travel model output. Post processing assumes that there is some level of deviation in the base year travel model (2011) between model-estimated traffic (raw volume output) and observed traffic (counts). Post processing assumes that this deviation represents the adjustment, or correction, that needs to be applied to the future year model (2040) output. This approach has its basis in NCHRP 255, "Highway Traffic Data for Urbanized Area Project Planning and Design". Iowa DOT staff incorporated this post-processing approach into the travel model output. The 2040 daily traffic forecasts are shown in comparison with 2011 daily traffic volumes in Figure 54.

Figure 54. 2040 Daily Traffic Forecasts



FUTURE REGIONAL TRAFFIC ASSESSMENT

Future year 2040 traffic analysis was completed by applying a planning-level assessment of peak hour traffic operations at 30 key Ames intersections, as identified by MPO Staff. The peak hour traffic analysis was conducted using ICU methodology, reporting the ICU LOS similar to the approach documented in Chapter 5, page 94. TABLE 37 provides a summary of the various ICU LOS levels, their corresponding ICU percentage, and a description of associated congestion.[18]

Table 37. Intersection Capacity Utilization Level of Service Thresholds

Level of Service (LOS)						
	A	**B**	**C**	**D**	**E**	**F**
Intersection Capacity Utilization	≤ 55%	> 55-64%	> 64-73%	> 73-82%	> 82-91%	> 91%
Level of Congestion	No congestion	Very little congestion	No major congestion	Normally has no congestion	On the verge of congested conditions	Likely experiences congestion periods over 15 minutes per day
	All traffic serviced on first cycle	*Almost all traffic served on first cycle*	*Most traffic served on first cycle*	*Majority of traffic served on first cycle*	*Many vehicles not served on first cycle*	*Long queues are common*
	Intersection can accommodate up to 40% more traffic on all movements	*Intersection can accommodate up to 30% more traffic on all movements*	*Intersection can accommodate up to 20% more traffic on all movements*	*Intersection can accommodate up to 10% more traffic on all movements*	*Intersection has less than 10% reserve capacity*	*Intersection is over capacity*

[18] *ICU analysis assumptions:*
Saturated flow rate (Ideal Flow input) assumed to be 1,750 vehicles per hour per lane (vphpl).
Lost time is assumed to be 4 seconds for all movements at all intersections.

As described in the Existing Conditions discussion, an intersection with an ICU LOS of E or better can have a signal timing plan that provides LOS E or better with the HCM methodology. With an ICU of F, the intersection will be over capacity for at least 15 minutes during the peak period.

An assessment of regional vehicle miles traveled and vehicle hours traveled provides an important look into how overall travel patterns might change by 2040 for the existing-plus-committed (E+C) condition. Three regional travel perspectives include:

- The ***change in trips generated*** between current conditions and year 2040 conditions indicates how many trips will be made across the Ames area. Trip generation grows at a rate relatively consistent with the household growth documented in CHAPTER 4, at 43 %.
- The ***change in vehicle miles traveled (VMT)*** between current conditions and 2040 indicates the total length of Ames area travel. VMT is simply a calculation of the number of study area trips multiplied by each trip's length in distance. VMT between 2010 and 2040 is projected to grow by 58 %.
- The ***change in vehicle hours traveled (VHT)*** between current conditions and 2040 indicates the total time spent traveling across the Ames area. Like VMT, VHT is simply a calculation of the number of study area trips multiplied by each trip's time. VHT between 2010 and 2040 is projected to grow by 70 %.

From reviewing these pieces of information, it is apparent that:

- Vehicle miles traveled increases at a higher rate than trips generated. This indicates that the average distance traveled for each trip is forecasted to increase in the future. This is a function of where development is anticipated to occur. Development growth on the fringes of current development creates a spatially larger urban area with greater travel distances.
- Vehicle hours traveled increases at a higher rate than vehicle miles traveled, indicating that overall system speeds decrease in the E+C scenario, where there is no investment in the transportation system beyond currently-committed projects.

2040 Traffic Operations Results

The traffic volumes analyzed for the 2040 traffic operations represent forecasts of 2040 PM peak hour turning movements at the 30 key intersections. The 2040 PM peak hour traffic forecasts were developed by adjusting current peak hour traffic counts (years 2011-2014), based on the growth rates for each intersection leg of 2040 daily traffic volumes compared to the 2011 daily traffic counts. The

existing and 2040 traffic operations results are reflected in TABLE 38. The 2040 traffic operations results are illustrated in FIGURE 55, which was used for identifying Ames Mobility 2040 needs based on traffic operations.

Table 38. Future Conditions Intersection Capacity Utilization Analysis Results

Intersection	Existing Peak Hour LOS[d]			Future 2040 Peak Hour LOS[d]		
	A/B/C	D/E	F	A/B/C	D/E	F
Bloomington Rd / Grand Ave.	●			●		
24th St / Stange Rd	●			●		
24th St / Grand	●			●		
13th St / Stange Rd			●			●
13th St / Grand Ave.		●				●
13th St / Hyland Ave.	●			●		
13th St / Duff Ave.	●			●		
13th St / Dayton Rd	●				●[a]	
S 5th St / Duff Ave.		●			●[a]	
S 4th St / Grand Ave.	●			●		
Airport Rd / Duff Ave.	●			●		
Airport Rd / University Blvd	●				●[b]	
20th St / Grand Ave.		●			●[a]	
Lincoln Way / Dakota Ave.	●				●[a]	
Lincoln Way / Hyland Ave.		●			●[a]	
Lincoln Way / Welch Ave.	●			●		
Lincoln Way / University Blvd	●				●[a]	
Lincoln Way / Grand Ave	●				●[a]	
Lincoln Way / Clark / Walnut Ave.		●			●[a]	
Lincoln Way / Duff Ave.		●			●[a]	
Lincoln Way / Dayton Ave.	●			●		
S 3rd St / Duff Ave.		●			●[a]	
Mortensen Rd / S Dakota Ave.	●				●	
Mortensen Rd / State Ave.	●					●[c]
Mortensen Rd / University Blvd	●				●[a]	
Ontario St / N Dakota Ave.	●				●[c]	
S 16th St / University Blvd	●				●[a]	
S 16th St / Duff Ave.		●				●
S 16th St / Dayton Ave.	●			●		
Stange Rd / Pammel Dr	●				●[a]	

Notes:

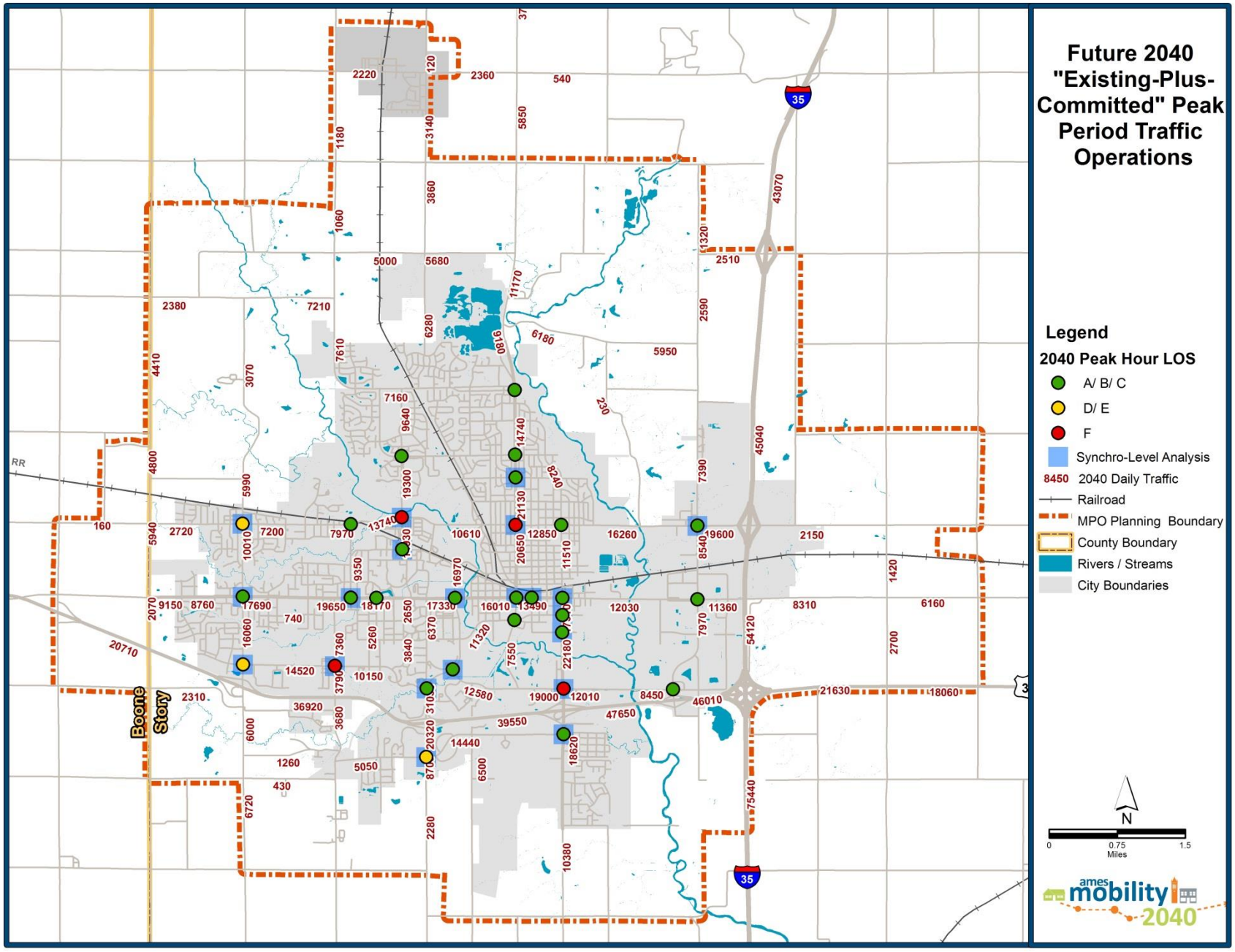
a – LOS B or C for 2040 when analyzed with optimal signal timings in Synchro software.

b – LOS D for 2040 when analyzed as a roundabout in SIDRA software.

c – when analyzed as a 4-way stop in HCM.

d – For those intersections that were identified as LOS D or worse with the ICU, a HCM approach was implemented with the Synchro software.

Figure 55. 2040 Peak Period Traffic Operations, Existing-Plus-Committed Scenario



Future Transit and Bicycle/Pedestrian Demand Assessment

By 2040, the new growth areas for transit service and bicycle/pedestrian facility demand will be those areas that see new population and employment growth. Household growth areas for the future was shown in Figure 14, with much of the growth forecast for areas north, west, and south of the current Ames city limits, and south of current Gilbert city limits. Employment growth areas were shown in Figure 15, where dense employment growth is anticipated east of I-35 (primarily industrial), and in the Research Park area, south of Highway 30. The expected additions to population and jobs in these areas provide expansion opportunities to the bicycle, pedestrian, and transit systems.

Using the travel demand model, it is possible to evaluate the change in forecasted transit system usage between today (2010) and in the 2040 existing-plus-committed scenario.

- In the base year (2010) is estimated that 12.5% of all trips are via transit.
- In the 2040 E+C scenario it is estimated that 12.0% of all trips are via transit.

This represents a small decline in overall transit mode share if no improvements are made to the transit system, and employment and housing growth occurs on the fringes of the Ames area (as forecasted in the 2040 land development scenario).

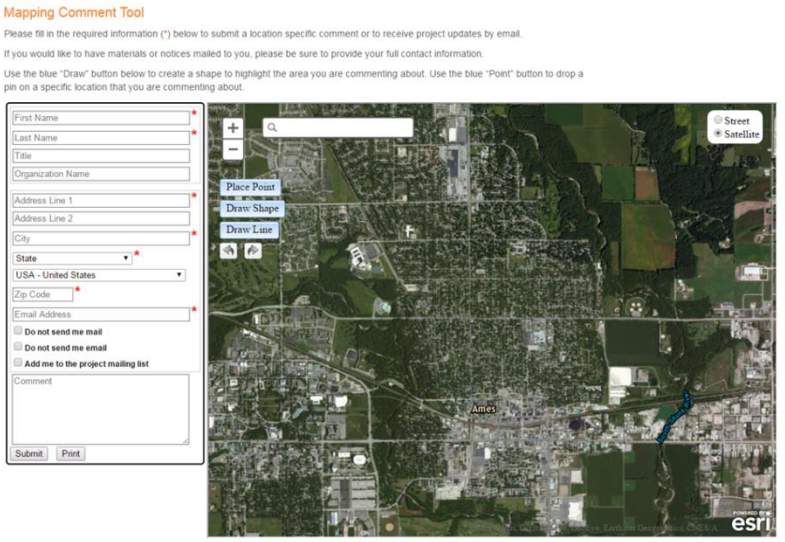
Chapter 7. Alternatives Development and Evaluation

This chapter outlines the processed used to develop projects for potential inclusion in Ames Mobility 2040. Ideas for new transportation projects were gathered from the Ames community and stakeholders in the form of public workshops, stakeholder meetings, and online feedback.

Issues Input Summary

The Long-Range Transportation Plan is a process that is formed based on the issues and opportunities received as input from the Ames community. The community engagement input opportunities included several elements: both traditional/ live (face-to-face workshops), and virtual (via internet). The variety of tools were utilized for identifying issues in the Ames area allowed many residents and stakeholders in the community to contribute to the process.

In September 2014, workshops were held with the Project Management Team (PMT), Focus Group, and Public to gather input on issues, opportunities, and vision themes for the regional transportation system. The meetings included a geographic issues (challenges) and opportunities (solutions) mapping exercise, where participants provided location-based and regional transportation system issues, by mode. The project website and Virtual Town Hall website (MindMixer) was also used to allow viewers to submit comments, either via the "online comment form", or through a mapping comment tool. The mapping comment tool allows website visitors to specify the location of specific issue. A full summary of the multimodal issues input is provided in Appendix E.



ALTERNATIVES DEVELOPMENT INPUT SUMMARY

The Alternatives Development workshop, held in March 2015, included a summary of the transportation issues gathered during Phase 1 of Ames Mobility 2040, along with the preliminary technical analysis of the roadway, bicycle/pedestrian, and transit systems.

Multiple large-scale display boards were shown around the meeting rooms as reference from the Issues/Visioning (Phase 1) stage of the planning process. These display boards included:

- ***Vision and Goals***
- ***Community Transportation Survey Results***
- ***Environmental Assessment***
- ***Roadway System*** (Issues Collected in Phase 1, Previous LRTP projects, Traffic Analysis, Safety Analysis)
- ***Bicycle/Pedestrian*** System (Issues Collected in Phase 1, Previous LRTP projects, Historical Bike/Pedestrian Plans in Ames)
- ***Transit System*** (Issues Collected in Phase 1, Previous LRTP projects, Future Transit Considerations)

Workshop participants were asked to consider system strategies, as shown in TABLE 39, when providing input on alternatives.

Table 39. System Strategy Toolbox

SYSTEM EXPANSION

- Widened Roadway, New Bikeway Connections, Expanded Transit Service
- New Roadways, New Routes, New Trails, New Services

SYSTEM MANAGEMENT

- Added Turn Lanes
- New Uses within Existing Roadway *(Bike lanes, Ped Treatments, Center Turn lanes)*
- New Intersection / Access Point Treatments
- Technology

DEMAND MANAGEMENT

- Shift Commute Times
- Increased Ridesharing
- Corridor / Lane Management
- Pricing / Parking Policy
- Policies to Shift Travel to Other Modes

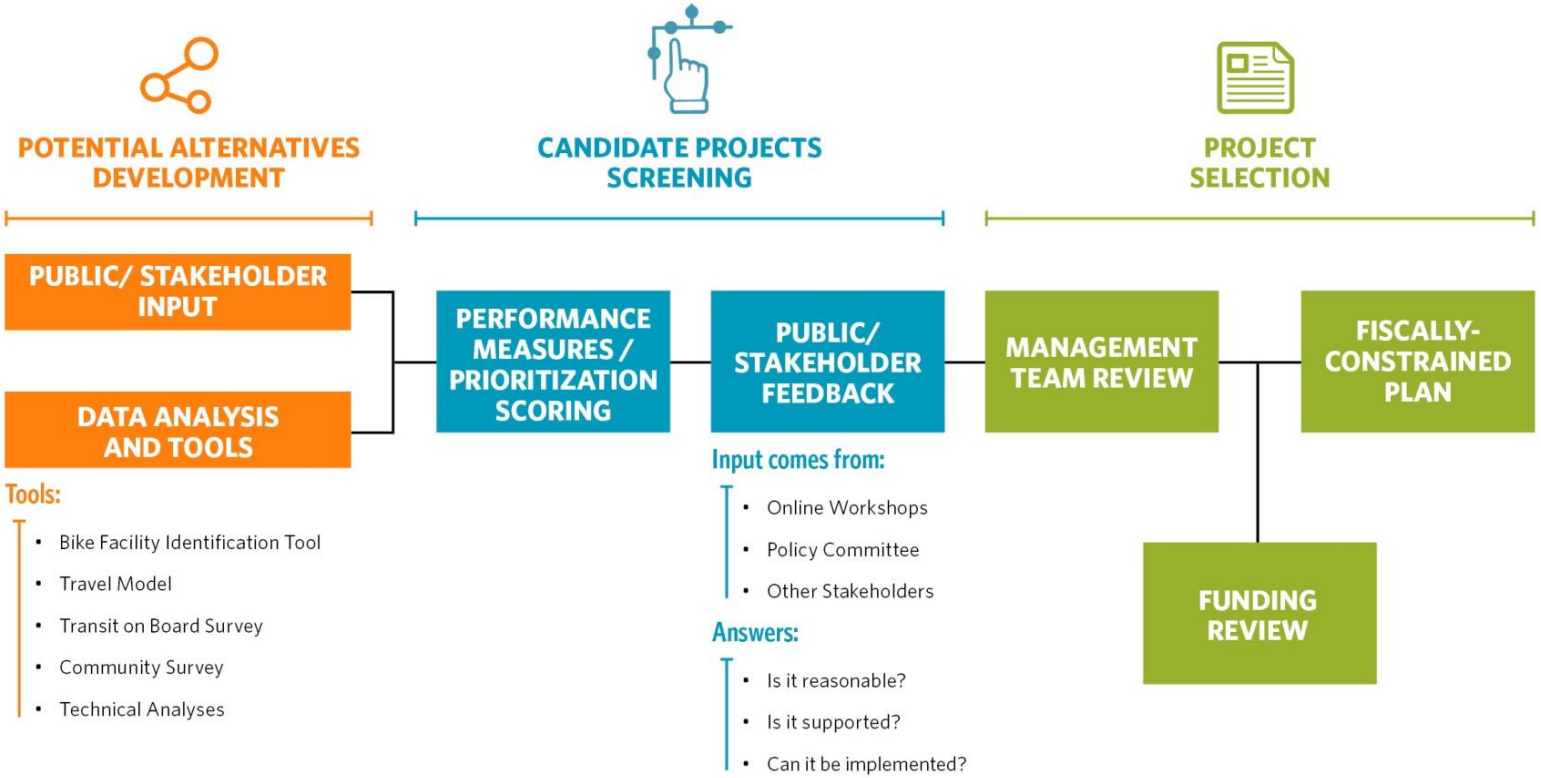
Workshop participants were asked to visit various modal "Idea Stations" to draw or write down their input on future transportation in the Ames area. The geographic responses received from each "Idea Station" at these workshops were summarized into modal alternatives maps for each mode. These maps and tables are provided in APPENDIX E.

POTENTIAL ALTERNATIVES

Following the Alternatives Development phase (Phase 2) of the process, a list of ***Potential Alternatives*** was developed for each mode. Potential alternatives were based on feedback from the public/stakeholder group workshops, as well as the technical analyses and

carryover projects from the previous 2035 LRTP. As shown below in FIGURE 56, the Potential Alternatives were later fine-tuned or eliminated based on consistency with transportation system goals, or fatal flaws, as described in CHAPTER 2.

Figure 56. Alternatives Process Detail

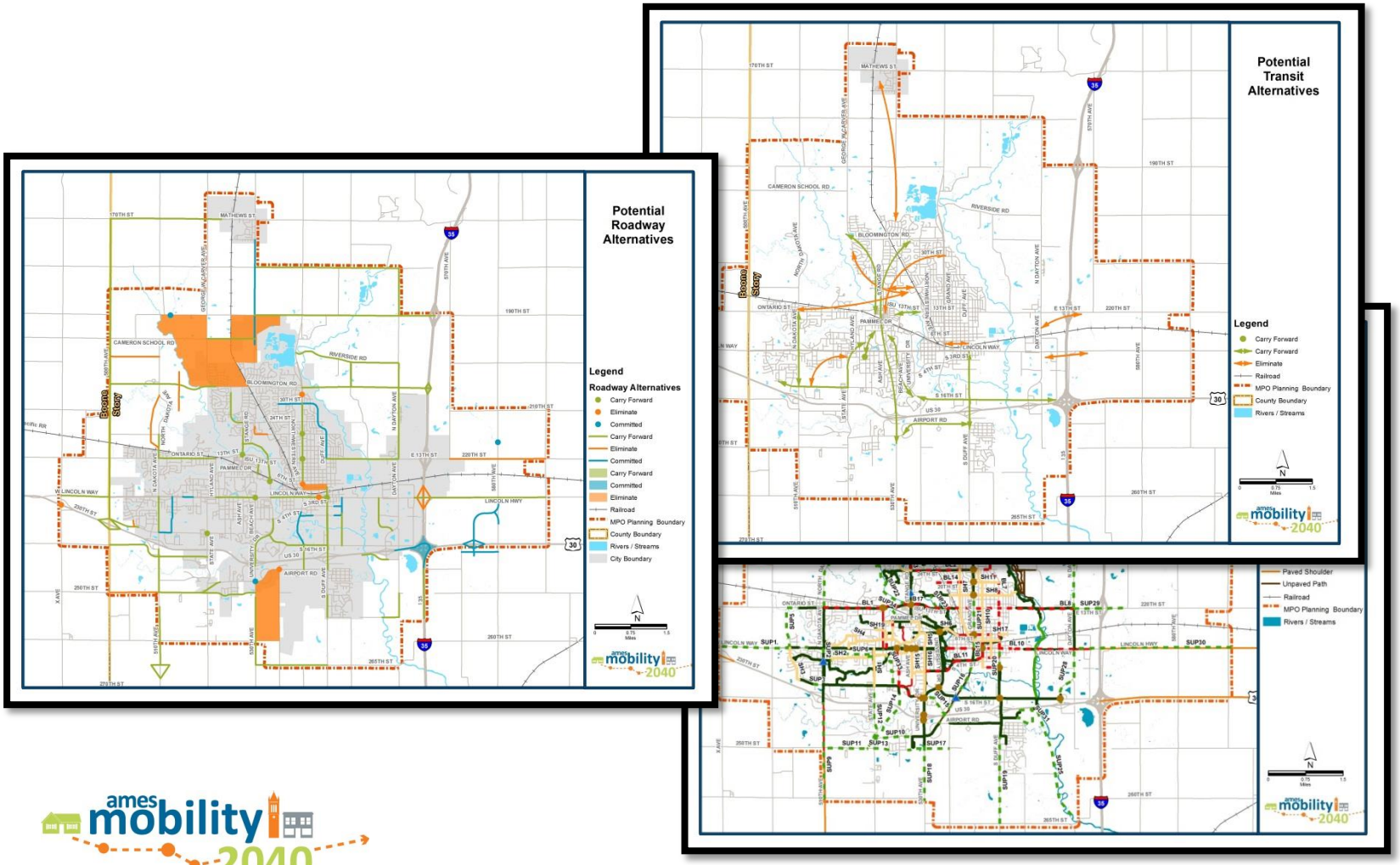


Potential alternatives for each mode were reviewed with the Management Team in May 2015. At that time, the potential alternatives were classified as either:

- **Eliminated**: drop from further consideration, project does not move on as a candidate project.
- **Committed**: currently programmed in the most recent Transportation Improvement Program (TIP).
- **Carry Forward**: moves forward in the process as a candidate project.

Performance measure scoring approach, based on the Vision and Performance Objectives documented in Chapter 2, was developed by the Plan Management Team and placed on the project website for public review, and presented to the MPO Policy Committee in April 2015. That scoring approach helped prioritize candidate projects for potential inclusion in the plan, but was not the final answer on whether or not a project was placed in the Ames Mobility 2040 plan. A public review and stakeholder process also helped further prioritize projects, and then compared against anticipated future funding levels (presented in **CHAPTER 8**).

A detailed summary of the Potential Alternatives for Roadway, Bicycle/Pedestrian and Transit, both in graphical and tabular form, are provided in **APPENDIX E**. The remainder of this section focuses on the types of projects considered during the Alternatives process.



CANDIDATE PROJECTS

A range of candidate projects were developed and promoted for further consideration based on feedback from the Potential Alternatives phase, along with technical analyses (traffic operations, traffic safety, system connectivity, etc). A description of each mode and the types of improvements considered is provided in this chapter.

Bicycle- Pedestrian System

The bicycle and pedestrian system projects focused on providing a complete and connected network, and on addressing the safety and connectivity issues identified by the public.

Bicycle/ Pedestrian Concept Types

Off-Street Path/ Trails provide a separated path for non-motorized users away from motor vehicle traffic on a linear corridor. Off-street paths can be in an independent right-of-way (e.g., along greenways, waterways, railways, and utility easements) or adjacent to a roadway (e.g., side path). Physical separation from motor vehicle traffic is attractive to many users, but intersections of trails with roadways and driveways present conflict points. Off-street paths provide opportunities for both recreational and utilitarian trips.

On-Street Buffered Lanes are conventional bike lanes paired with a designated buffer space (typically 2-5 feet in width). The buffer can be provided between the bike lane and the adjacent motor vehicle travel lane and/or to an adjacent parking lane. The buffering also may be placed to the outside of the roadway in the absence of parking; in this condition, the combined bike lane and buffer can be used to accommodate a right turn lane at intersections, which is shared by through cyclists.

On-Street Sharrows are markings used in lanes shared by bicyclists and motor vehicles when a travel lane is too narrow to provide a standard-width bike lane. Sharrows may be used on roadways with on-street parking, or where there are gaps in a bicycle lane, or on a designated bike route. May be used on a roadway with a hill where there is only enough width to provide a bicycle lane in one direction (provide an uphill bicycle lane and sharrows in the downhill direction). Typically only used on roadways with posted speeds of 35 mph or less. May be enhanced with an underlying green stripe or green boxes underneath each marking

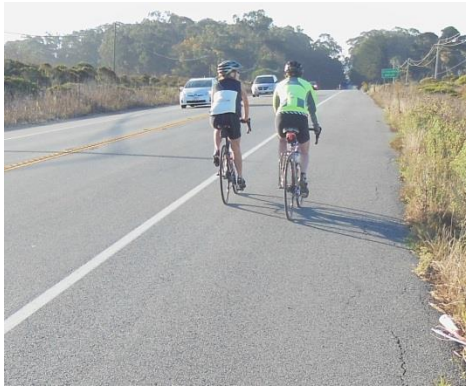
Bike Boulevards are low volume and low speed streets that have been optimized for bicycle travel. Bike boulevard treatments may include a combination of traffic calming, signage, pavement markings, and intersection crossing treatments. These applications are typically considered on residential roadways in grid-based street networks, with a desired volume of 1,500 or less motor vehicles per day[19].

[19] *National Association of City Transportation Officials, Urban Bikeway Design Guide*.

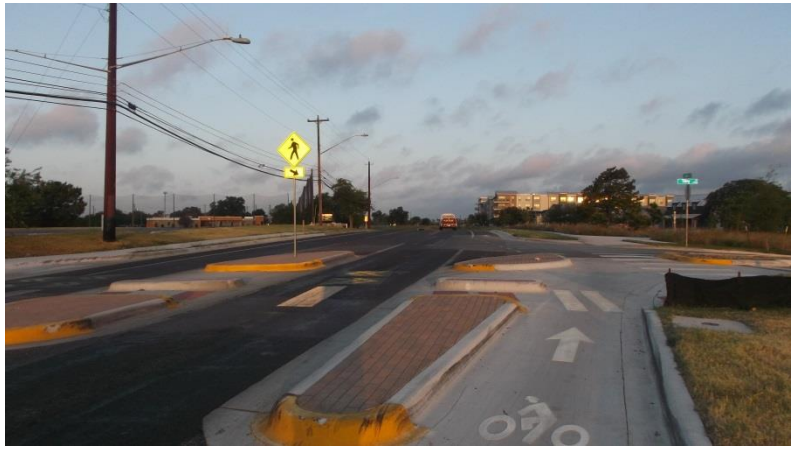
Enhanced Intersection Crossings may include several different treatment options including improved crosswalk markings and advanced stop bars, curb extensions/bump outs, medians/pedestrian refuge islands, leading pedestrian interval additions to traffic signal timing, bike boxes, raised intersections, and protected bike intersections (also known as Dutch-Style intersections).

Enhanced Mid-block Pedestrian Crossings are treatments that serve pedestrian and bike crossings at locations away from an intersection in the street network. Mid-block crossings should be located where significant pedestrian demand exists away from traditional intersection crossing locations (such as bus stops, adjacent to shopping centers, large campuses and museums, etc.). Mid-block crossing treatments can include higher-visibility pavement markings, pedestrian refuges / safety islands in the median, parking restrictions adjacent to the cross-walk, raised pedestrian crossings, and actuated pedestrian signals such as HAWK-Hybrid Pedestrian Signal and Rectangular Rapid Flashing Beacons.

Paved Shoulders are part of the roadway adjacent to the travel lanes. A wide paved shoulder refers to additional pavement width of at least four (4) feet that has been added to an existing roadway in order to more safely accommodate bicycles.



Protected Intersection based on a Dutch template that minimizes potential conflicts between people biking, driving, and walking. This style of protection allows cyclists to make a left turn in two stages without crossing against oncoming car traffic.



Cycle Tracks are an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A cycle track is physically separated from motor traffic and distinct from the sidewalk. Cycle tracks have different forms but all share common elements—they provide space that is intended to be exclusively or primarily used for bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks. In situations where on-street parking is allowed cycle tracks are located to the curb-side of the parking (in contrast to bike lanes).

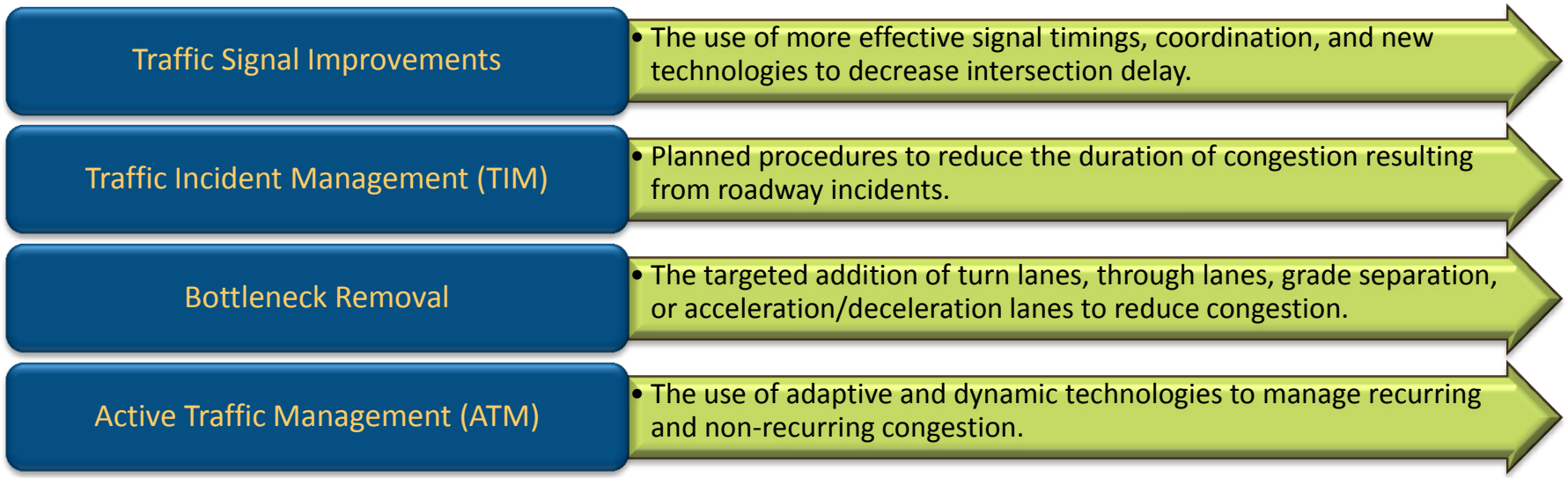
Signed Routes are typically used on minor roads with low motor vehicle volumes where bicyclists can share the road without special provisions other than signage. Signed routes are not technically a facility type, but a designation. Signage offers an indication to motorists to expect bicycles.

Roadway System

Roadway system projects focused on addressing safety issues and emerging areas of traffic congestion, while providing a sufficient amount of the budget for future preservation, or state-of-good repair projects. The rest of this section describes the various types of roadway projects considered.

Transportation Systems Management (TSM) Strategies

TSM is a set of strategies that focus on improving mobility through improving the capacity and efficiency of the existing transportation system. TSM strategies tend to be lower-cost and often focused on one area or corridor. Examples of TSM strategies are:



Transportation Demand Management (TDM) Strategies

TDM is a set of strategies that aim to manage how and when people travel in order to use the transportation system more efficiently. Examples of TSM strategies are:

Pedestrian Facilities	•Can include sidewalks and trail connections between neighborhoods, activity centers, and existing sidewalks facilities. Can also be policies / design guidelines that promote pedestrian-friendly site layout.
Bicycle Facilities	•Expanded trail and bike route systems, provision of shower and locker facilities, bicycle parking, and public bike systems.
Employee Transportation Coordinator (ETC)	•A person who provides education and administers employee transportation benefits for a single employer or an association of employers.
Rideshare Matching	•A service that identifies people living and working in geographically nearby locations for whom ridesharing might be an efficient arrangement.
Vanpool Subsidies	•Vans, whether employee-sponsored, owner-operated, or third-party operated, that transport people living within the same area to common work area.
Telecommute Programs	•Allowing employees to work from home or a "satellite" or other off-site location part-time or full-time.
Alternative Work Schedules	•Companies that offer employees more flexibility in work schedule to encourage commuting in off-peak times. Examples include flextime, compressed work week (CWW), and staggered shifts.
Incentives	•Money or benefits (prizes, recognition, etc.) that encourage employees to start or continue alternative commuting behaviors, including enhanced transit pass, cash for not driving/using a parking spot.
Commuter Tax Benefit	•Federal tax code includes several financial incentives from employers and employees to promote alternative modes of transportation through parking and transit benefits.
Guaranteed Ride Home	•Provides a back-up ride to employees who use alternative modes of commuting if any emergency should arise during the workday, or if they have to work late.
Managed Parking	•Managing parking through pricing, policy or incentives can limit parking demand and encourage the use of alternative modes of transportation.

Transit System

One benefit of the LRTP is that is multimodal in nature. This approach allows the Ames area to assess how each mode interacts with another and what pieces might be missing. In terms of transit planning, the role of the Ames Mobility 2040 is to identify the types of service enhancements that would complement mobility and access in the Ames, but not necessarily identifying specific fiscally constrained projects to include. Thus, the LRTP does not obligate specific transit projects for implementation, but does identify potential, prioritized service enhancements for regional implementation in the coming years.

The projects and alternatives that could be considered were somewhat constrained due to rules and regulations that CyRide operates under. Specifically:

- CyRide can only operate within Ames city limits.
- CyRide cannot provide service tailored to special events, such as University sporting events.
- CyRide vehicles are not allowed on local roads.

The types of candidate projects considered for inclusion in the Ames Mobility 2040 included:

- Enhancements to existing services that would have a major impact on service delivery to the community.
- New bus route services, such as establishing a new bus route corridor, or adding service days on an existing route.
- New transit technologies, including Bus Rapid Transit (BRT), an advanced bus service with higher frequencies and fewer stops, improved amenities over regular bus service and potentially “branding”, that operates in an exclusive lane or receives signal priority.

ALTERNATIVES ASSESSMENT

Projects carried forward from the Potential Alternatives phase, termed "Candidate Projects", and were further assessed utilizing the performance measures outlined in TABLE 1 of CHAPTER 2. Individual candidate projects were scored based on their compatibility with the goals and objectives of Ames Mobility 2040. A summary of the scoring for each mode, along with the individual scorecards, are shown in APPENDIX E.

Chapter 8. Future Transportation Funding

A critical element in the Ames Mobility 2040 is providing a reasonable financial plan that demonstrates how the projects and programs included in this plan can be implemented. These requirements are provided in 23 CFR 450.322(f) (10). The financial plan reflects reasonably expected planning-level estimates of construction costs and revenue sources through 2040, with revenue sources broken down by jurisdiction and funding source. The LRTP fiscal plan approach is based on methodology included in the *Financial Planning and Constraint Planning Tools for Transportation*" guidance offered by FHWA. The LRTP team expanded on the FHWA methodology by capturing a longer period of historical transportation system funding in developing funding forecasts.

MPO Funds / Federal and State Program Overview

There are two primary (formula-based) federal program funding sources that the MPO uses for transportation projects in the region:

- ***Surface Transportation Program (STP):*** provides funding for projects on any federal-aid highway, bridge, pedestrian and bicycle facilities, and transit capital projects.
- ***Transportation Alternatives Program (TAP)***[20]: provides funding for projects including on-street and off-street pedestrian and bicycle facilities, improved access to transit, and safe routes to school projects.
    - Some TAP program funds the MPO receives are via their formula allocation, while other funds have been awarded to the region competitively.
    - "TAP Flex" funds are formula-allocated MPO funds that are flexible and can be used for bicycle and pedestrian projects under TAP, or flexed into the STP program for highway projects. MAP-21 allows up to 50% of TAP apportionments to be transferred in this way.

[20] *TAP was authorized as a part of the MAP-21 transportation authorization, and replaces the Transportation Enhancements (TE) program that was discontinued under MAP-21.*

Other funding programs that the MPO has used in the past include:

- ***National Highway Systems (NHS) Program***: funding for projects on NHS roads , which includes I-35, US 30, US 69, and parts of Lincoln Way. NHS funding was consolidated under the National Highway Performance Program (NHPP) as a part of MAP-21.
- ***Emergency Relief (ER) Program***: funding for repair or reconstruction of federal-aid facilities which have suffered serious damage as a result of natural disasters.
- ***Primary Roads Program***: funding that is 100 % state funding from the Road Use Tax Fund (RUTF) dedicated to state primary roads. This funding has been used on US 30 and I-35 over the past 10 years.
- ***Iowa's Clean Air Attainment Program (ICAAP)***: The Iowa DOT has a discretionary program based on the Federal Congestion Mitigation and Air Quality (CMAQ) program to fund transportation projects and programs that result in reductions in emission and improve air quality. CyRide transit projects have received ICAAP grants in the past.
- ***Federal Demonstration Projects***: a funding program that was "earmarked" through designation of the US Congress. This funding source, and all transportation earmarks, was eliminated under MAP-21.
- ***American Recovery and Reinvestment Act (ARRA)***: an authorization passed by Congress in February 2009 as a comprehensive stimulus package in response to the financial crisis of 2007-2008 and recession that followed. During the period of 2009 to 2011, the Congressional Budget Office estimated that nearly $32 billion had been spent on transportation projects nationwide as a result of ARRA.[21] There were three 2010 pavement rehabilitation projects in the region as a part of ARRA.

Reviewing several years' of past TIPs provides an effective means of establishing funding trends by general funding source. Past funding levels for project, capital and operations / maintenance is indicative of potential future funding level trends. The remainder of this section provides an overview of past modal spending levels (and indirectly long-term funding levels) by reviewing 11-12 years of TIPs and agency spending information. The Highway Safety Improvement Program (HSIP) is an additional discretionary funding source for safety projects that the study area has not been received in the past, but the area is eligible to receive.

[21] *Actual ARRA Spending Over the 2009-2011 Period Quite Close to CBO's Original Estimate, Congressional Budget Office, January 5, 2012, https://www.cbo.gov/publication/42682.*

Transit Funding Sources

CyRide receives federal transit funding through several programs, including:

- ***Urbanized Area Formula Grants - Section 5307 and Section 5340***: funds for urbanized areas with a population over 50,000 while providing transit capital, operating assistance, and transportation planning.
- ***Enhanced Mobility of Seniors and Individuals with Disabilities – Section 5310***: funds for assisting private nonprofit groups that provides transportation for the elderly and persons with disabilities.
- ***Bus and Bus Facilities - Section 5339***: funds for replacing, rehabilitating, and purchasing buses and transit equipment and to construct bus-related facilities.

In the Past, CyRide has received funding from the **Capital Program Formula 5309**, which provides funds for upgrading of bus system capital, including fleet, equipment, and buildings. Due to changes in MAP-21, this funding source will no longer be available to CyRide after the current fiscal year.

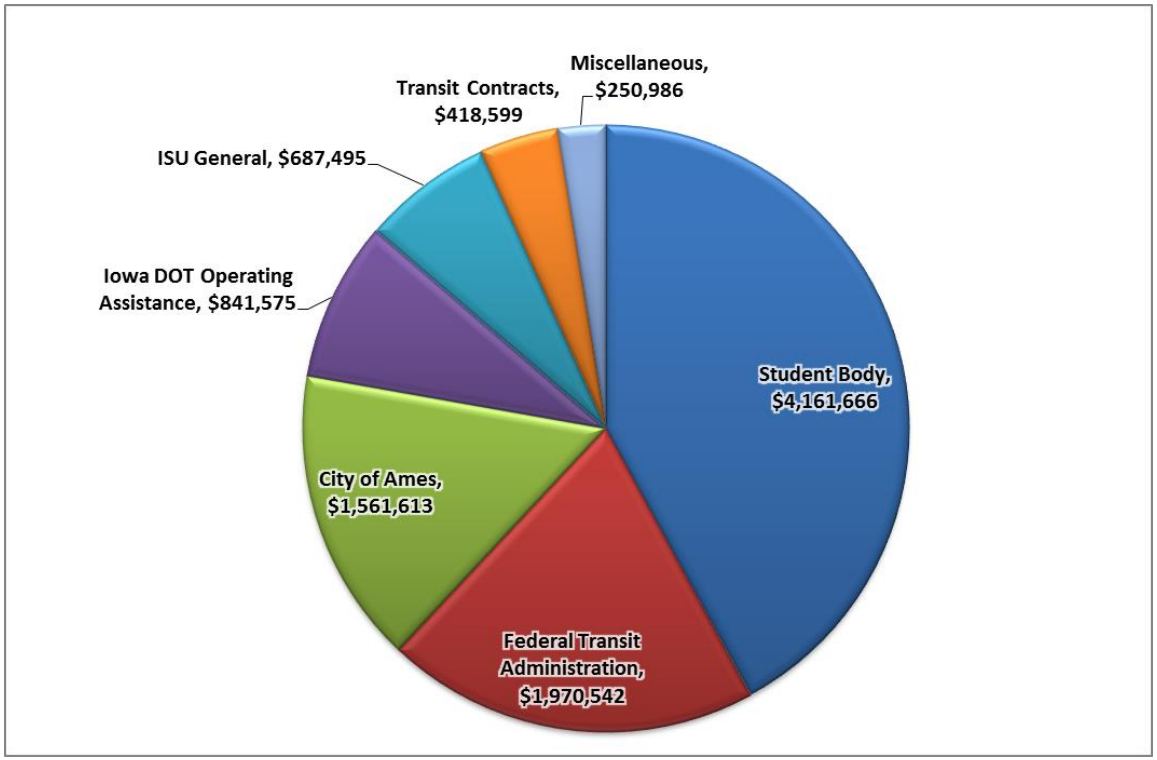
CyRide receives the majority of its local funding from the city of Ames, Iowa State University, and the Iowa State University Student Government (formerly the Government Student Body, or GSB). Additional sources include parking and miscellaneous revenues. FIGURE 57 shows a breakdown of revenue sources for the current 2015-2016 Fiscal Year.

City / County Funding Sources

City and County funding sources for transportation improvements include:

- General obligation bonds.
- 1 % City Sales Tax in both Ames and Gilbert. Story County and Boone County have no sales tax. In Ames, most of the sale tax revenues are directed towards non-transportation programs and projects.
- Road use tax revenue from the state of Iowa. For 2015 this increased significantly for all communities, as the state just passed a 10 cent increase in the gasoline tax.
- Miscellaneous sources such as assessments.

Figure 57. Breakdown of Fiscal Year 2015 CyRide Non-Farebox Revenue



Source: Actual 2015 revenue values from CyRide

CURRENT AND HISTORICAL TRANSPORTATION FUNDING LEVELS

MPO Roadway and Bicycle / Pedestrian Historical Fiscally Constrained Spending Levels

The projects in the 2004-2015 TIP documents were classified by funding source as shown in TABLE 40. The costs shown in TABLE 40 have been normalized to 2015 dollars, assuming a 4.5 % annual construction cost increase[22]. Normalizing historical TIP costs to a baseline year of 2015 accounts for the change in transportation construction costs over time, and puts historical spending into current year dollars.

Table 40. MPO TIP Funding by Program Source, 2004-2015 (in 2015 dollars[23])[24]

Program Source	2004-2015 Funding Levels by Source			
	Federal Funding	Local Funding	State Funding	Total Funding
STP	$12,406,740	$9,794,220	$0	$22,200,960
TAP / TE[25]	$1,954,670	$2,788,110	$0	$4,742,780
NHS	$25,715,200	$0	$6,428,800	$32,144,000
ER	$172,280	$43,660	$0	$215,940
Primary Roads	$0	$0	$1,956,000	$1,956,000
Demonstration / Earmarks	$601,800	$149,860	$0	$751,660
ARRA	$842,800	$210,700	$0	$1,053,500
Total	$41,693,490	$12,986,550	$8,384,800	$63,064,840

Source: Transportation Improvement Programs, 2004-2015, Ames Area MPO.

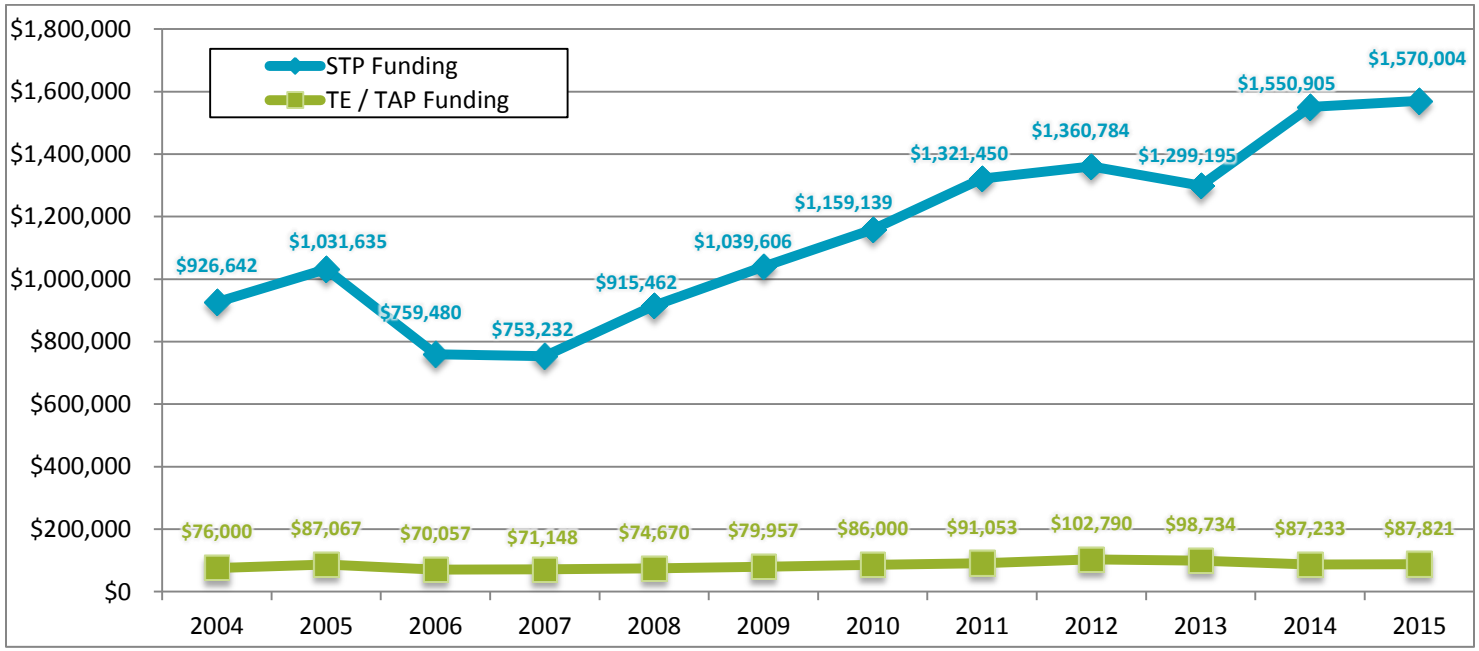
[22] *Costs have historically varied significantly, but 4.5% annual construction cost increase is the planning estimate provided by Iowa DOT staff.*
[23] *Assuming a 4.5% annual increase in construction costs.*
[24] *Note that the project cost totals represent estimates based on programmed (TIP) costs in the year of construction. Projects that show up in multiple TIPs were only counted for the final year they were in the TIP, and not double counted.*
[25] *TAP target funds (formula funds allocated to the MPO) for the period 2004-2015 were $1,144,015. Thus, $810,655 worth of TAP discretionary funds awards are estimated to the Ames area for the period 2004-2015.*

Federal-aid eligible spending on roadway and bicycle/pedestrian projects for the 2004 to 2015 period totaled $63,064,840, for average annual spending level of $5,343,195. For the purposes of forecasting, TABLE 40 provides the following key information:

- A basis for forecasting the NHS system (NHPP) and Primary Roads discretionary programs' future funds, based on past annual averages.
    - NHS average annual funding (in 2015$): ***$2,678,667***
    - Primary Roads average annual funding (in 2015$): ***$163,000***
- A basis for estimating a reasonable level of local match on future STP and TAP projects. Note that future federal projections of STP and TAP are not based on this data, but are based on the target levels actually allocated to the MPO (documented later in this section).

It should be noted that the programs described above as "discretionary" are not guaranteed, are allocated at the discretion of Iowa DOT, and these forecasts represent best projections available based on historical averages. The historical funding levels for STP and TAP (formerly TE) programs are shown in FIGURE 58.

Figure 58. MPO Formula Funding by Formula Program, 2004-2015[26]



Source: Iowa DOT

As shown in **FIGURE 58**:

- STP program funds have increased from ***$926,642*** in 2004 to ***$1,570,004*** in 2015.
- TAP program funds have increased from ***$76,000*** in 2004 to ***$87,821*** in 2015.

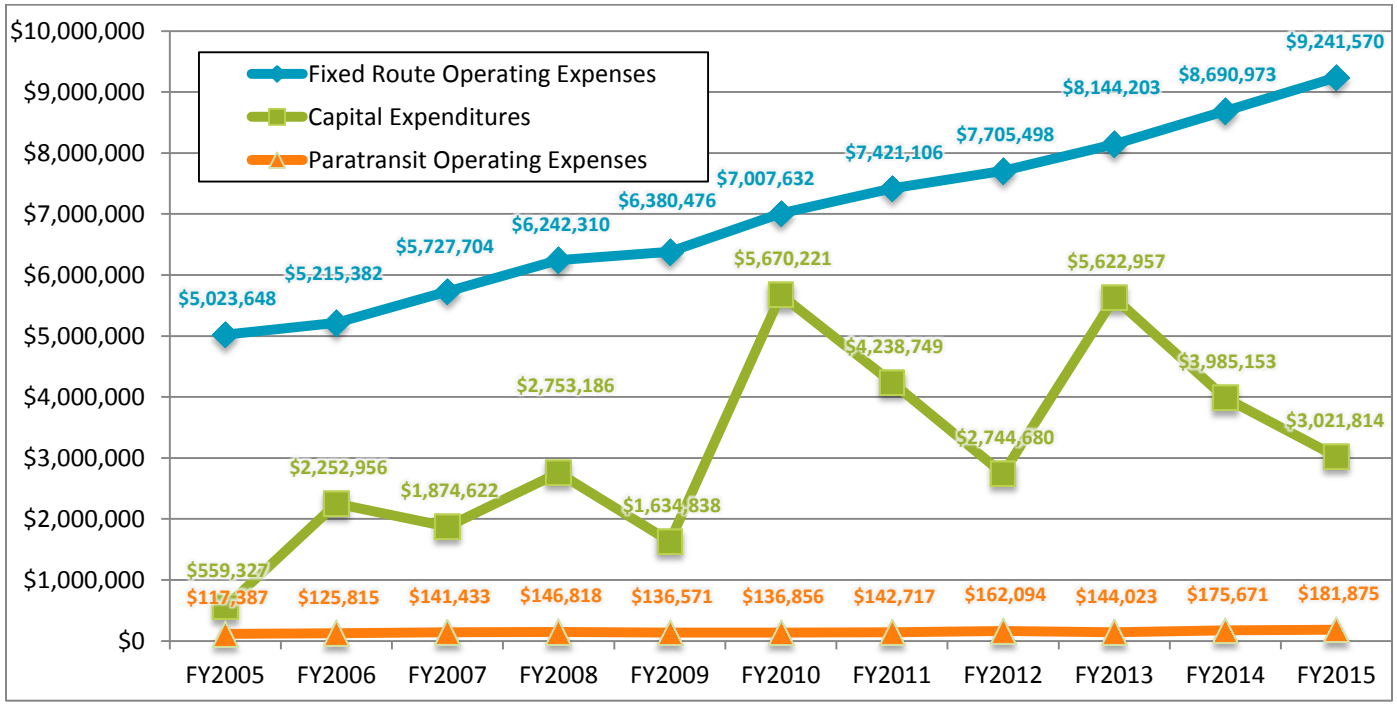
Transit Spending Levels

Transit funding levels for operations were taken from past MPO TIPs. Capital expenditures were taken from actual data provided by CyRide staff. CyRide has experienced extensive growth on the transit system since 2005, with the numbers of riders growing by 54 %

[26] *Not including TAP Flex funds, which were $66,642 in 2014 and $67,230 in 2015.*

since 2005. The need to serve this increased demand is reflected in increased costs to operate this system. Historical CyRide funding levels are shown in FIGURE 59.

Figure 59. CyRide Funding by Type, 2005-2015



Source: CyRide

As shown in FIGURE 59:

- Fixed Route Bus Operations spending has increased from ***$5,023,648*** in 2005 to ***$9,241,570*** in 2015.
- Paratransit operations spending for purchased services have increased from ***$117,387*** in 2007 to ***$181,875*** in 2015.
- Over the 2005 to 2015 period, capital expenditures have averaged ***$3,758,000*** in 2015 dollars.

Local Revenues and Expenditures

The Ames Area MPO FY 2015 programming targets are ***$1,570,004*** for STP, ***$87,821*** for TAP, and ***$67,230*** for TAP Flex. The project costs shown in the LRTP are in year of expenditure dollars. To show the availability of local funding to operate and maintain the system, and to provide the match for federal aid projects, the short-term, the short-term forecasts of operations and maintenance (O&M) costs on the Federal-Aid system are compared to short-term forecasts of non-Federal revenue for each of the jurisdictions in the MPO area. TABLE 41 shows the short-term forecasted O&M costs on the Federal-Aid system.

Table 41. Forecasted Operations and Maintenance (O&M) Expenditures on the Federal-Aid System by Jurisdiction and Type

Jurisdiction	Cost Type	Forecasted Expenditures by Year					
		2014	2015	2016	2017	2018	2019
City of Ames	Total Operations	$497,831	$517,744	$538,454	$559,992	$582,392	$605,688
	Total Maintenance	$1,083,587	$1,126,930	$1,172,008	$1,218,888	$1,267,644	$1,318,349
City of Gilbert	Total Operations	$2,121	$2,206	$2,294	$2,386	$2,481	$2,581
	Total Maintenance	$23,042	$23,964	$24,922	$25,919	$26,956	$28,034
Boone County[27]	Total Operations	$632,663	$657,969	$684,288	$711,659	$740,126	$769,731
	Total Maintenance	$995,629	$1,035,454	$1,076,872	$1,119,947	$1,164,745	$1,211,334
Story County[27]	Total Operations	$779,160	$810,326	$842,739	$876,449	$911,507	$947,967
	Total Maintenance	$1,379,297	$1,434,468	$1,491,847	$1,551,521	$1,613,582	$1,678,125
Total		$5,393,330	$5,609,061	$5,833,424	$6,066,761	$6,309,433	$6,561,809

Sources: Ames Area MPO, Final 2016-2019 TIP, July 14, 2015 and Central Iowa Regional Transportation Planning Alliance (CIRPTA), Federal Fiscal Year 2016-2019 TIP, July 2015.

TABLE 42 shows the short-term forecasted Non-Federal Aid Revenue.

[27] *Boone and Story County costs and revenues shown here include the entire County jurisdiction, not just the portion within the MPO study boundary.*

Table 42. Forecasted Non-Federal Aid Revenue by Jurisdiction and Source

Jurisdiction	Cost Type	Revenue by Year					
		2014	2015	2016	2017	2018	2019
City of Ames	RUTF Receipts	$5,887,876	$6,123,391	$6,368,327	$6,623,060	$6,887,982	$7,163,501
	Other Road Monies Receipts	$4,598,234	$4,782,163	$4,973,450	$5,172,388	$5,379,283	$5,594,455
	Receipts Service Debt	$5,743,422	$5,973,159	$6,212,085	$6,460,569	$6,718,991	$6,987,751
City of Gilbert	RUTF Receipts	$108,042	$112,364	$116,858	$121,533	$126,394	$131,450
	Other Road Monies Receipts	$15,204	$15,812	$16,445	$17,102	$17,787	$18,498
	Receipts Service Debt	$0	$0	$0	$0	$0	$0
Boone County[27]	Street Fund Receipts	$1,001,860	$1,041,934	$1,083,612	$1,126,956	$1,172,034	$1,218,916
	Farm-to-Market Receipts	$892,000	$927,680	$964,787	$1,003,379	$1,043,514	$1,085,254
	Secondary Road Fund Receipts	$5,559,289	$5,781,661	$6,012,927	$6,253,444	$6,503,582	$6,763,725
Story County[27]	Street Fund Receipts	$1,983,451	$2,062,789	$2,145,301	$2,231,113	$2,320,357	$2,413,171
	Farm-to-Market Receipts	$997,616	$1,037,521	$1,079,021	$1,122,182	$1,167,070	$1,213,752
	Secondary Road Fund Receipts	$6,091,435	$6,335,092	$6,588,496	$6,852,036	$7,126,117	$7,411,162
Total		$32,878,429	$34,193,566	$35,561,309	$36,983,762	$38,463,111	$40,001,635

Sources: Ames Area MPO, Final 2016-2019 TIP, July 14, 2015 and Central Iowa Regional Transportation Planning Alliance (CIRPTA), Federal Fiscal Year 2016-2019 TIP, July 2015.

The transit program does not have targets, and thus is not included in this section.

To demonstrate that local funding levels in excess of required operations and maintenance costs are anticipated for future transportation projects, forecasts of operations and maintenance costs and expected revenues through 2040 were completed. Costs and revenues were compared for the following funding periods:

- TIP Years (*4 years, 2016-2019*)
- Short-Term (*6 years, from 2020-2025*)
- Mid-Term (*7 years, from 2026-2032*)
- Long-Term (*8 years, from 2033-2040*)

As shown in TABLE 43, combined local non-Federal Aid Revenues exceed forecasted operations and maintenance requirements through 2040.[28] This demonstrates that local jurisdictions have sufficient funds for completing local transportation projects and providing the required local match for Federal-aid projects. While a large balance is shown for each time period, not all of this "excess revenue" will go towards roadway expansion projects on the Federal-aid system. A large portion of this funding is expected to go towards maintenance and preservation projects on the system, and some of the funding will go towards projects on the non-Federal-aid system.

Table 43. Forecasted Non-Federal Aid Revenue and O&M Costs for Local Jurisdictions

	TIP Years (2015-2019)	Short-Term (2020-2025)	Mid-Term (2026-2032)	Long-Term (2033-2040)
Forecasted Non-Federal Aid Revenue	$218,081,812	$254,737,197	$329,102,737	$418,195,663
Forecasted Maintenance Costs	$23,093,064	$29,417,923	$42,993,796	$60,572,541
Forecasted Operations Costs	$12,680,754	$16,153,841	$23,608,565	$33,261,328
Revenue in Excess of O&M Costs	$182,307,994	$209,165,434	$262,500,375	$324,361,794

Sources: Ames Area MPO, Final 2016-2019 TIP, July 14, 2015 and Central Iowa Regional Transportation Planning Alliance (CIRPTA), Federal Fiscal Year 2016-2019 TIP, July 2015.

Many transportation projects in the Ames area are completely locally-funded. These projects do not involve any federal-aid, and are not reflected in MPO Historical Funding levels (2004-2015 TIP projects). While these projects are not part of the MPO's funding, it is important to understand how much local governments spend on preservation and expansion of the Ames area transportation system, particularly on the federal-aid system.

[28] *Assumes annual linear cost growth of 4.5% year, 1.5% annual revenue increase for Ames, 2% annual revenue increase for other jurisdictions.*

City of Ames

The city of Ames represents the majority of locally-sourced transportation funding in the study area. For the purposes of establishing what amount of local roadway and bike and pedestrian funding was available, spending trends during the 2005 to 2015 period were analyzed. Based on that review of past funding, it is estimated that:

- Annual local-only funding for roadway expansion projects on the Federal-Aid system is estimated at ***$1,478,000*** annually. [29]
- Annual local-only funding for bicycle and pedestrian expansion projects is estimated at ***$386,850*** annually.

Story County

Past Story County spending on roadway and bicycle and pedestrian projects within the MPO area was evaluated. Based on that review, it is estimated that:

- Annual county spending in the MPO area is estimated at ***$454,000*** annually, or ***$104,400*** annually in roadway expansion funding.
- Annual county spending in the MPO area for bicycle and pedestrian expansion projects is estimated at ***$80,000*** annually.

City of Gilbert and Boone County

There is limited historical spending for these two jurisdictions in the MPO area:

- The city of Gilbert has spent the majority of recent transportation funding on operations and maintenance (O&M) only.
- Boone County has a very limited amount of roadway in the study area, and there is no historical spending data available on it. Future Gilbert and Boone County spending levels are assumed to be limited for the purposes of this plan.

Preservation and Expansion Spending Comparison

In order to project future system preservation needs, the levels of spending on system preservation (rehabilitation, reconstruction, resurfacing, operations and maintenance) in current and past TIPs was evaluated to understand the area's roadway and bicycle /

[29] *Review of past spending indicates the City of Ames spends 68% of non-operations and maintenance roadway on roadway preservation projects and 32% is spend on roadway expansion projects. City of Ames staff indicated that of locally-funded roadway projects: 60 % of funding went to the federal-aid roadway system, 40 % of funding went to non-federal-aid roads.*

pedestrian funding requirements. This step included a breakdown of historic and current 2015-2018 TIP individual project and program costs for:

- ***Preservation projects***: These projects are those that support existing infrastructure in the form of rehabilitation or resurfacing.
- ***Expansion projects***: These projects include expanding the multimodal system to address current or emerging operational or safety needs through new corridors, new programs, widening of existing corridors, new turn lanes, widened bridges, improved intersection treatments, traffic signal improvements, etc.

Past and current TIPs and CIPs have allocated the following levels of funding by source and mode:

- ***MPO Roadway Funding***: 59 % Expansion, 41 % Preservation
- ***City/County Roadway Funding***: 32 % Expansion, 68 % Preservation
- ***MPO Bicycle and Pedestrian Funding***: 100 % Expansion
- ***City/County Bicycle and Pedestrian Funding***: 73 % Expansion, 27 % Preservation

A more detailed discussion of the assumptions and calculations for the funding assessment are provided in **APPENDIX F**.

EXPANSION FUNDING AND YEAR-OF-EXPENDITURE "COST BAND" PERIODS

The Ames Mobility 2040 identifies when projects will be implemented, in a manner consistent with the anticipated long-term transportation budget. "Cost bands", or funding periods, are used to group projects into a generalized timeframe for implementation.

The levels of funding for expansion projects on the federal-aid system, which are the projects that Ames Mobility 2040 is tasked with identifying, are provided in **TABLE 44**. The expansion project funding levels shown in **TABLE 44** are also grouped into the "cost bands", which will be inflated to year-of-expenditure dollars, at the linear rate of 4.5 % per year to the midterm of each cost band. Ames Mobility 2040 uses the following cost bands/funding periods:

- TIP Years (4 years from 2016-2019)**:** costs taken from the TIP itself. Those funds identified as an unobligated carryover balance from the last year (2019) of the TIP are applied into the budget for 2020 to 2040 planning horizon. The carryover totals identified in the TIP are:
  - ***$4,871,125*** balance for carryover STP funding.
  - ***$201,015*** balance for carryover TAP funding.

- Short-Term (6 years from 2020-2025): costs grown to the midpoint of 2022/2023 dollars, which is 33.75 % higher than 2015 cost.
- Mid-Term (7 years from 2026-2032): costs grown to the midpoint of 2029 dollars, which is 63 % higher than 2015 cost.
- Long-Term (8 years from 2033-2040): costs grown to midpoint of 2036/2037 dollars, which is 96.75 % higher than 2015 cost.

Table 44. Federal, State and Local Funding Projections by Funding Period for Expansion Projects

Cost Band / Funding Period	State and Federal Funding Sources						Local Funding Sources[30]		
	Formula-Based Programs			Discretionary Programs					
	STP	TAP	TAP Flex	HSIP	NHS	Primary Road Program	Ames Roadway	Ames Bike and Pedestrian	Story County Roadway
TIP Period (2016-2019)	Funds Already Programmed								
Carryover Balance after 2016 – 2019 TIP Period[31]	$4,871,125	$201,015	$0	$0	$0	$0	$0	$0	$0
Short-Term (2020-2025)	$6,727,000	$547,000	$417,000	$1,404,000	$9,008,000	$549,000	$9,865,737	$2,582,190	$720,498
Mid-Term (2026-2032)	$9,578,000	$696,000	$527,000	$1,824,000	$16,057,000	$976,000	$12,518,770	$3,276,577	$935,603
Long-Term (2033-2040)	$12,467,000	$868,000	$660,000	$2,328,000	$18,080,000	$1,100,000	$15,637,378	$4,092,820	$1,194,565
Total Funds Available, 2020-2040	$33,643,125	$2,312,015	$1,604,000	$5,556,000	$43,145,000	$2,625,000	$38,021,884	$9,951,588	$2,850,666

[30] *Boone County had no available historical transportation expansion spending within the MPO boundary, and Story County had no available historical bicycle and pedestrian project spending within the MPO area. Thus, these funding levels are assumed to be limited through the 2040 planning horizon.*

[31] *These are the formula funds that are allocated to the MPO, but are not programmed to be spent during the 2016-2019 TIP period.*

Chapter 9. Fiscally Constrained Plan

Project Selection Process

MAP-21 requires that LRTPs be financially feasible and demonstrate fiscal constraint over the long-range planning horizon. Implementation of transportation improvements is contingent on available funding. A plan is considered fiscally constrained when the project costs do not excel projected revenues.

This section provides a summary of the fiscally constrained Ames Mobility 2040 project list. Not all of the projects that are priorities for the Ames area make the final, fiscally constrained project list due to the requirements of fiscal constraint. Projects selected for inclusion in Ames Mobility 2040 are based on the following considerations:

- Degree to which candidate projects were complementary with other projects in creating a comprehensive set of transportation system improvements.
- Feedback received from the public and stakeholders.
- Level of performance benefits consistent with MAP-21 direction and Ames Mobility 2040 performance measure scoring.
- Consideration of which candidate projects were implementable from a public support and project development perspective.

2015-2040 Fiscally Constrained Plan

The fiscally constrained plan is presented by implementation phase in this section.

Transportation Improvement Program (TIP) Projects

Transportation Improvement Program (TIP) projects are included in the current 2016-2019 MPO TIP. The TIP expansion and preservation projects for roadway and bicycle and pedestrian projects are shown in Table 45. These projects are considered committed projects, and are included in the fiscally constrained plan.

Table 45. 2016-2019 TIP Roadway and Bicycle / Pedestrian Preservation and Expansion Projects [32]

Project Location	Project Type	Fiscal Years	Federal Aid Funding Source	Federal Aid Anticipated	Project Total Cost
13th St: ISU/Ames jurisdiction limit east 0.184 Miles to Union Pacific Railroad	Pavement Rehab	2016	STP	$1,060,000	$1,460,000
Grand Avenue, S 16th to Squaw Creek Drive / S 5th Street	New Roadway and Bridge over Squaw Creek	2016-2019	STP	$2,000,000	$17,730,000
S 3rd St / S 4th St: From Squaw Creek to South Duff Avenue	Pavement Rehab	2017	STP	$1,292,000	$1,867,000
Lincoln Way: S Duff Ave to and including South Skunk River Bridge	Pavement Rehab	2018	STP	$1,060,000	$1,580,000
I-35 / US 30 Interchange	New Northbound to Westbound Ramp and Associated Improvements	2016-2019	NHPP	$14,393,000	$16,404,000
I-35: From Lincoln Way to 0.75 miles north of County Road E29 (NB)	Pavement Rehab	2018	NHPP	$3,413,000	$3,792,000
S Duff Avenue: From Squaw Creek to S 5th Street	New Sidepath	2016	TAP	$70,000	$100,000
Skunk River Trail: From East Lincoln Way to S. River Valley Park	New Off-Street Trail	2016	TAP	$360,000	$721,000
Gilbert to Ames Trail	New Off-Street Trail	2016	TAP	$62,000	$983,000
Skunk River Trail: From SE 16th Street to East Lincoln Way	New Off-Street Trail and Structures	2017-2018	TAP	$400,000	$1,356,000
Skunk River Trail: River Valley Park to Bloomington Road	New Off-Street Trail	2019	TAP	$140,000	$586,000

Source: Ames Area MPO 2016-2019 TIP, CIRTPA 2016-2019 TIP

[32] *In addition to these projects from the Ames Area MPO TIP, several significant locally-funded projects are included in the City of Ames Capital Improvement Program: 1) Squaw Creek Trail: Skunk River to Grand Ave Extension, 2) Bike Detection at: 9th St/Grand Ave; Welch Ave/Lincoln Way; 13th St/Northwestern Ave; Lynn Avenue/Lincoln Way), 3) Sharrows: Clark Avenue (6th St to 24th St), 4) Sharrows: Hoover Ave (30th Street to Bloomington Road); Northwestern Ave (6th St to 30th St), 5) Sharrows: Duff Ave (6th St to Lincoln Way), 6) Cherry Ave Roadway Extension: Lincoln Way to S 5th St*

The remainder of this section discusses those projects that are part of the fiscally constrained plan for 2020 to 2040. There are several projects shown in the mid-term (2026-2032), long-term (2033-2040) and illustrative list (not fiscally constrained) that are high priorities for the community, but due to the requirements of fiscal-constraint analysis either could not be phased earlier in the planning horizon, or could not fit within the limited list of projects that are considered fundable through reasonably assured funding sources. It is assumed that many of the projects shown beyond the short-term might be implemented sooner, or might move from the illustrative list to the fiscally constrained list if additional funding sources are identified.

Short-Term Projects

Short-Term projects (2020 to 2025) are shown in TABLE 46 for roadway, TABLE 47 for bicycle/pedestrian, and TABLE 48 for transit projects. These projects are considered most critical to current mobility and safety needs in the region. The short-term period extends beyond the end of the current TIP, through year 2025. The total system costs by mode in the short-term are:

- ***$23,150,000*** in year-of-expenditure costs for roadway improvement projects.
- ***$3,420,000*** in year-of-expenditure costs for bicycle/pedestrian improvement projects.
- ***$2,970,000*** in year-of-expenditure costs for transit improvement projects for bus replacements and bus stop improvements.

Mid-Term Projects

Projects in the ***Mid-Term*** are shown in TABLE 49 for roadway, TABLE 50 for bicycle/pedestrian projects, and TABLE 51 for transit projects. These plan elements are higher-priority projects that address some of the many mobility, safety, and freight needs that remain during the 8-year period of 2026-2032.

The total system costs by mode in the mid-term are:

- ***$62,091,000*** in year-of-expenditure costs for roadway improvement projects.
- ***$4,290,000*** in year-of-expenditure costs for bicycle/pedestrian improvement projects.
- ***$4,235,000*** in year-of-expenditure costs for transit improvement projects for bus replacements and bus stop improvements.

Long-Term Projects

Long-Term projects are shown in TABLE 52 for roadway, TABLE 53 for bicycle/pedestrian, and TABLE 54 for transit projects. Long-term projects address some of the many remaining mobility, safety, and freight needs. The long-term projects cover an 8-year period of 2033-2040.

The total system costs by mode in the long-term are:

- ***$49,969,000*** in year-of-expenditure costs for roadway improvement projects.
- ***$6,340,000*** in year-of-expenditure costs for bicycle/pedestrian improvement projects.
- ***$5,925,000*** in year-of-expenditure costs for transit improvement projects for bus replacements and bus stop improvements.

Table 46. Short-Term Roadway Projects

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Project Purpose / Need	Forecasted Funding Source
10	State Ave. /Mortensen Rd. Intersection Improvements	$740,000 to $1,550,000	ISU	Options are turn lane and signal or a roundabout. Project 10 assumes the midpoint cost.	$1,500,000	Congestion	ISU / City of Ames / STP
14	University Blvd./ 6th Street Intersection Improvements for Bicycles and Pedestrians	$1,200,000	ISU	Assume innovative approach - potentially a bike and pedestrian protected intersection (also known as "Dutch Style" junction).	$1,580,000	Bicycle / Pedestrian Safety and Mobility	ISU / City of Ames / STP
20	Widen S. 16th Street to 3 lanes from University Blvd. to Grand Ave. Extension. Reconstruct adjacent side path.	$3,630,000	ISU	ISU- Institutional Road. Reconstruct / improve shared-use path connection along roadway. High transit use corridor.	$4,770,000	Safety / Congestion	ISU / City of Ames / STP
44.A	Provide Restricted Access Control and Safety Improvements along S Duff between S 16th and Lincoln Way (potential medians). Improve pedestrian crossing visibility and safety at 5th / Duff and 16th / Duff.	$800,000	City of Ames / Iowa DOT (NHS)	Safety and operational improvements; good candidate for safety funding. Improved pedestrian crossing at S 5th.	$1,050,000	Safety	HSIP / NHPP
65	Adaptive Traffic Signal Technology: Lincoln Way- Hyland Ave to Beach Ave.	$280,000	City of Ames	Signal timings respond to changes in traffic patterns; improves safety and traffic operations. High transit corridor. Not in a DOT Primary Corridor.	$370,000	Safety / Congestion	City of Ames
66	Adaptive Traffic Signal Technology: S. Duff Ave- S. 3rd St to Airport Rd.	$210,000	City of Ames / Iowa DOT (NHS)	Signal timings respond to changes in traffic patterns; improves safety and traffic operations in highly variable corridor.	$280,000	Safety / Congestion	HSIP / NHPP
67	Adaptive Traffic Signal Technology: University Blvd: S. 4th St to Highway 30	$140,000	City of Ames	Signal timings respond to changes in traffic patterns; Improved safety and special event operations. Not on a State route.	$180,000	Safety / Event Congestion	City of Ames
68	Adaptive Traffic Signal Technology: Lincoln Way- University Dr. to Grand Ave.	$140,000	City of Ames	Signal timings respond to changes in traffic patterns; highly variable traffic pattern in this corridor. Not in a DOT Primary Corridor.	$180,000	Safety / Congestion	City of Ames

Table 46. Short-Term Roadway Projects (continued)

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Project Purpose / Need	Forecasted Funding Source
69	Adaptive Traffic Signal Technology: Lincoln Way- Grand Ave. to Duff Ave.	$140,000	City of Ames / Iowa DOT (NHS)	Signal timings respond to changes in traffic patterns; improves safety and traffic operations in highly variable corridor.	$180,000	Safety / Congestion	HSIP / NHPP
70	Adaptive Traffic Signal Technology: Grand Ave- 6th St. to 30th St.	$245,000	City of Ames / Iowa DOT (NHS)	Signal timings respond to changes in traffic patterns; high transit corridor.	$320,000	Safety / Congestion	HSIP / NHPP
78	New US 30 Interchange and connections near 575th Avenue		Iowa DOT (NHS)	Shown in later years of Current STIP. Not considered committed. Year of Expenditure costs from STIP.	$12,740,000	Safety / Connectivity	NHPP

Table 47. Short-Term Bicycle and Pedestrian Projects

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Forecasted Funding Source
ON 15	Clark / Walnut Bicycle Treatment, South 3rd to 6th Street	$90,000	City of Ames	Sharrows through downtown - no room for bike lanes. South of Main requires conversion to 3-lane from 4-lane. Clark Avenue reconstruction slated for 2016 between Lincoln Way and Main.	$120,000	City of Ames / TAP
ON 21	On-Street connection north of Lincoln Way between North Dakota and Iowa State Campus	$124,300	ISU / City of Ames	Sharrows are potential treatment on this corridor.	$160,000	ISU / City of Ames / TAP
ON 22	On-Street connection across Campus between Beach/Lincoln Way and Pammel/Stange	$85,600	ISU	University facility - not in MPO jurisdiction. However, part of a key regional connection. No defined corridor - work with University to identify route.	$110,000	ISU / City of Ames / TAP
ON 23	6th St Bicycle Treatment between campus and downtown bike lanes	$20,800	City of Ames	Key connection between campus and downtown.	$30,000	City of Ames / TAP
ON 24	N 16th St Bicycle Treatment, connects trail south of High School to Skunk River trail by Meadowlane Ave. Continues along Meadowlane to connect to East 13th St trail.	$157,300	City of Ames	Includes improved cycling / pedestrian enhancements at Grand / 16th (CR24). Potential sharrow or bike boulevard corridor.	$210,000	City of Ames / TAP

Table 47. Short-Term Bicycle and Pedestrian Projects (continued)

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Forecasted Funding Source
ON 25	S Walnut Bike Boulevard, S 5th to S 3rd	$10,000	City of Ames	Narrow pavement width (28') makes the current cross-section very tight for bike lanes even without on-street parking.	$10,000	City of Ames / TAP
ON 28	Main St Sharrows or Back-in-Angle Parking, Grand Ave to Duff	$26,300	City of Ames	Public-suggested back-in-angle parking to supplement sharrows for this corridor. Similar costs for signing / striping.	$30,000	City of Ames / TAP
ON 30	Ash Ave Sharrows, current bike lane end to Lincoln Way	$28,900	City of Ames	Target for short-term while ON 16 implementation plan is developed.	$40,000	City of Ames / TAP
ON 32	6th St Sharrows east of Duff	$8,700	City of Ames	Connection from east neighborhoods into downtown.	$10,000	City of Ames / TAP
ON 33	Cessna St Bike Boulevard	$13,100	City of Ames	East-west connection between north-south routes south of Campus.	$20,000	City of Ames / TAP
ON 34	Oakland St between Trail and Hyland Ave	$6,800	City of Ames	Key connection between existing shared-use paths and ISU campus access.	$10,000	City of Ames / TAP
OFF 5	Trail connection between Beedle Mortensen and Campustown south of Lincoln Way Intermodal Facility	$440,000	City of Ames	Important bike connection. Project OFF 5 is similar to combination of OFF 3 and ON 19.	$580,000	City of Ames / TAP
OFF 19	Grand Ave Side Path between Lincoln Way and 6th Street	$497,400	City of Ames	Segmented at 6th Street for implementation reasons.	$650,000	City of Ames / TAP
CR 1	Intersection of University / Mortensen - Improve visibility / safety at Mortensen	$145,000	City of Ames	Look at Leading Pedestrian Interval signal treatment for bike / pedestrian safety at intersection.	$190,000	City of Ames / TAP
CR 2	Intersection of University / S 16th St - Consider median crossing or pedestrian refuge	$50,000	City of Ames		$70,000	City of Ames / TAP
CR 3	Intersection of Duff / S 16th St - Improve crossing visibility, median refuge	$150,000	City of Ames / Iowa DOT (NHS)	Part of roadway project 44A.	Funding included in Roadway Project 44	City of Ames / HSIP
CR 4	Intersection of Duff / S 5th - Improve crossing visibility of Duff and 5th	$100,000	City of Ames / Iowa DOT (NHS)	Part of roadway project 44A.	Funding included in Roadway Project 44	City of Ames / HSIP
CR 5	Intersection of Grand / 6th St - Improve crossing visibility of Grand	$100,000	City of Ames		$130,000	City of Ames / TAP

Table 47. Short-Term Bicycle and Pedestrian Projects (continued)

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Forecasted Funding Source
CR 7	Intersection of Grand / 30th St - Crossing Visibility / Signal improvements	$100,000	City of Ames / Iowa DOT (NHS)		$130,000	City of Ames / TAP
CR 9	Intersection of US 30 / University South Ramp - Crossing Visibility / Signal improvements	$100,000	City of Ames / Iowa DOT (NHS)		$130,000	City of Ames / TAP
CR 10	Intersection of US 30 / University North Ramp - Crossing Visibility / Signal improvements	$100,000	City of Ames / Iowa DOT (NHS)		$130,000	City of Ames / TAP
CR 13	Intersection of 13th St/ Clark Ave- Improve crossing visibility	$145,000	City of Ames	Added per public comments	$190,000	City of Ames / TAP
CR 15	S 16th midblock trail crossing near Vet Med - High visibility treatment for trail cross - over	$50,000	City of Ames		$70,000	City of Ames / TAP
CR 16	South Dakota midblock trail crossing north of Clemons - Improve crossing visibility	$50,000	City of Ames		$70,000	City of Ames / TAP
CR 17	Stange at Bruner Dr Midblock - Improve crossing visibility / consider crossing signal	$50,000	ISU		$70,000	ISU / City of Ames / TAP
CR 18	Stange at Somerset - Midblock crossing improvements for visibility / consider crossing signal	$50,000	City of Ames		$70,000	City of Ames / TAP
CR 24	Intersection of Grand / (N) 16th St - Cycling Enhancements to support 16th Street Bike Route	$145,000	City of Ames / Iowa DOT (NHS)	Consider impacts to Grand traffic flow, CyRide bus operations and coordination during project implementation.	$190,000	City of Ames / TAP

Table 48. Short-Term Transit Projects

Project ID and Description		Sponsoring Jurisdiction	Implementation Notes	Year of Expenditure Cost Estimate
6	Buses (Expansion/ Replacement)	CyRide	Target funding from FTA 5339 or ICAAP funds. FTA 5310 potentially for Dial-a-Ride vehicles. Estimate assumes an average of 1-bus per year.	$2,730,000 over 6 years
7	Bus stop improvements	CyRide	Target funding from FTA 5310 funds. Assume same spending for stop improvements each year.	$240,000 over 6 years

Table 49. Mid-Term Roadway Projects

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Project Purpose / Need	Forecasted Funding Source
2	500th Avenue Pave and Reconstruct from W. Lincoln Way to Mortensen Road	$1,560,000	Story County / City of Ames	Developer-driven and some developer funding assumed. New sidewalks or shared-use path adjacent to roadway.	$2,510,000	Connectivity	Developer / City of Ames / Story County
6	Widen S. Dakota Ave. to 5 Lanes from Lincoln Way to Mortensen Road	$4,170,000	City of Ames	Needs not anticipated until mid-term.	$6,700,000	Safety / Congestion	City of Ames / STP
12	Stange Road / 13th Street intersection improvements	$950,000 to $2,640,000	ISU / City of Ames	Recent signal upgrade at this intersection. Turn lane additions would require bridge widening. Roundabout is another option. Cost shown is midpoint of two options.	$2,880,000	Safety / Congestion	ISU / City of Ames / STP
16.B	Intersection improvements at Grand Avenue / 13th Street	$2,930,000	City of Ames / Iowa DOT (NHS)	Addresses traffic operations issue. Depending on treatment, project has potential for some right-of-way impacts to adjacent properties. Cost estimate based on turn lane additions.	$4,710,000	Safety / Congestion	City of Ames / HSIP / NHPP
19.A	Convert Lincoln Way to a 3-lane between Gilcrest Ave. and Duff Ave. Improve pedestrian crossing visibility and signal improvements at Lincoln Way and Clark	$75,980	City of Ames / Iowa DOT (NHS)	Implement following Grand Avenue extension. Project overlaps with ON 10. Bike detection at traffic signals included. Safety and bicycle benefits.	Funding Shown in Bike / Ped Mode	Bicycle / Pedestrian Mobility	TAP / NHPP

Table 49. Mid-Term Roadway Projects (continued)

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Project Purpose / Need	Forecasted Funding Source
28.B	Ontario Street: Hyland Avenue to N. Dakota Avenue - On-Street Reconfiguration for Bike Lanes	$189,000	City of Ames	Overlaps with ON 1 if bike lanes are implemented, which would likely require removal of one side of on-street parking. Public involvement process during implementation is key.	Funding Shown in Bike / Ped Mode	Bicycle / Pedestrian Mobility	City of Ames / TAP
29	Lincoln Way/ Duff Avenue Intersection Improvements- Restripe for dedicated east-west left-turn lanes	$100,000	City of Ames / Iowa DOT (NHS)	No widening assumed. Need to coordinate with project 19.A. Traffic signal operations improvement with dedicated turn lanes.	$160,000	Safety / Congestion	NHPP / HSIP
51	Widen Stange Rd to 5 lanes from 24th St to 13th St	$4,827,800	ISU / City of Ames	Addresses future traffic operations issue. Majority ISU jurisdiction. High transit use corridor.	$7,760,000	Safety / Congestion	ISU / City of Ames / STP
52.A	Add Turn Lanes at Key Intersections along Dayton between 13th and Riverside Rd	$1,800,000	City of Ames	Addresses future traffic operations issue. As adjacent property is developed, turn lanes required. Likely partially developer-funded.	$2,890,000	Safety / Congestion	City of Ames / Developer
54	Widen I-35 to 6 Lanes from 13th Street to South MPO Boundary	$20,250,000	Iowa DOT (NHS)	Traffic in I-35 corridor expected to grow south of Ames. DOT-driven project. Much of the demand related to travel demand growth outside MPO boundary.	$32,550,000	Congestion	NHPP
56	Add Turn Lanes to George Washington Carver between Stange and Bloomington	$1,200,000	City of Ames	Separate turn lanes for benefit of regional through traffic. Future traffic operations / safety benefit.	$1,930,000	Safety / Congestion	City of Ames / STP

Table 50. Mid-Term Bicycle and Pedestrian Projects

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Forecasted Funding Source
ON 1	Ontario On-Street Bike Treatment, North Dakota to Stange	$189,000	City of Ames	Bike lanes or Sharrows. Bike Lanes likely require removal of one-side of on-street parking. Public involvement process during implementation is key. Same project as Roadway Project 28B.	$300,000	City of Ames / TAP
ON 8	Lincoln Way Bike Lanes, University Dr to Grand Ave	$113,970	City of Ames / Iowa DOT (NHS)	Modify roadway to 1 through lane each way plus center left-turn lane to accommodate bike lanes. Vehicle capacity likely OK through 2040; somewhat higher speeds east of River. Consider buffer between bikes and traffic. **Detailed study required before implementation. Project should happen after Grand Ave. extension to S 16th.**	$180,000	City of Ames / TAP
ON 9	Lincoln Way Bike Lanes, Grand Ave to Duff Ave	$75,980	City of Ames / Iowa DOT (NHS)		$120,000	City of Ames / TAP / NHPP
ON 10	Lincoln Way Bike Lanes, Duff Ave to Dayton	$189,950	City of Ames / Iowa DOT (NHS)		$310,000	City of Ames / TAP
ON 11	S 3rd St-S 4th St Widen for Bike Lanes, Grand to Duff	$555,000	City of Ames	Bike lanes or sharrows. Consider widening road to add bike lanes to maintain existing travel lanes for special events. Identify opportunities to address bus stop / bike lane conflicts. Eliminated potential on-street connection between Beach and Grand due to existing trail. Cost reflects widening to incorporate. Pavement reconstruction slated for 2016-17.	$890,000	City of Ames / TAP
ON 29	Kellogg Sharrows, S 3rd to 6th St	$68,300	City of Ames	Connection between committed 6th St project downtown and ON 11.	$110,000	City of Ames / TAP
ON 31	Beach Ave Sharrows, Mortensen to Lincoln Way	$50,500	City of Ames	Similar corridor as ON 30. Consider Orange Route / Bike interactions during implementation.	$80,000	City of Ames / TAP
ON 20	Sharrows Along Wilder, Mortensen to Lincoln Way	$34,700	City of Ames	Sharrows are likely treatment on this corridor.	$60,000	City of Ames / TAP
OFF 20	Grand Ave Side Path between 6th and 17th Street	$375,000	City of Ames	Segment from 6th to 17th may need easements.	$600,000	City of Ames / TAP
OFF 23	On-Street Bike connection north of Hoover Ave from Bloomington to Ada Hayden	$10,000	City of Ames	Early alternative was sidepath; modified to on-street sharrow application.	$20,000	City of Ames / TAP

Table 50. Mid-Term Bicycle and Pedestrian Projects (continued)

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Forecasted Funding Source
OFF 30	Skunk River - South Duff Trail Connection along Billy Sunday Rd.	$110,000	City of Ames	Extend existing trail along Billy Sunday.	$180,000	City of Ames / TAP
OFF 31	Hyland-Hayward South Campus Trail Connection	$407,500	ISU / City of Ames	Connects Campus and 16th Street / Mortensen trail.	$660,000	ISU / City of Ames / TAP
OFF 1	West Lincoln Way Sidepath to MPO Boundary	Funding From Roadway Project	Boone County / City of Ames / Iowa DOT (NHS)	Side path construction would be part of roadway project 32B.	Funding From Roadway Project	
OFF 41	Sidepath along S 500th Ave Project between Lincoln Way and Mortenson Extension	Funding From Roadway Project	City of Ames / Story County	Side path construction would be part of roadway project 2.	Funding From Roadway Project	
CR 6	Intersection of Lincoln Way / Clark - Improve crossing visibility	$100,000	City of Ames / Iowa DOT (NHS)	Implement at same time as roadway project 19A - roadway conversion project.	$160,000	City of Ames / NHPP / TAP
CR 8	Intersection of Stange / 13th St - Improvements for trail crossing visibility	$145,000	City of Ames	Implement with Roadway Widening	$230,000	City of Ames / TAP
CR 12	Intersection of Hyland / Ontario - Improvements for crossing visibility and safety	$145,000	City of Ames	Implement at same time as Ontario On-Street Bike Treatment (ON 1)	$230,000	City of Ames / TAP
CR 21	Intersection of Grand / Bloomington Rd - Crossing Visibility / Signal improvements	$100,000	City of Ames / Iowa DOT (NHS)		$160,000	City of Ames / TAP

Table 51. Mid-Term Transit Projects

Project ID and Description		Sponsoring Jurisdiction	Implementation Notes	Year of Expenditure Cost Estimate
6	Buses (Expansion/ Replacement)	CyRide	Target funding from FTA 5339 or ICAAP funds. FTA 5310 potentially for Dial-a-Ride vehicles. Estimate assumes an average of 1-bus per year.	$3,893,000 over 7 years
7	Bus stop improvements	CyRide	Target funding from FTA 5310 funds. Assume same spending for stop improvements each year.	$342,000 over 7 years

Table 52. Long-Term Roadway Projects

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Project Purpose / Need	Forecasted Funding Source
11	Widen N. Dakota to 3 lanes with railroad grade separation - Ontario Street to 215th Street	$5,430,000	Story County / City of Ames	Railroad grade separation improves connectivity, provides improved pedestrian access.	$10,680,000	Connectivity	City of Ames / County / STP
15	Grand Ave./ 20th Street Intersection Improvements	$1,540,000	City of Ames / Iowa DOT (NHS)	Addresses future corridor traffic growth. Improves safety and operations.	$3,030,000	Safety / Congestion	City of Ames / NHPP / HSIP
21	Extend Grand Ave as a 3-lane street from S. 16th to Airport Rd.	$12,560,000	City of Ames	Continued extension of Grand Avenue. Project would include extended shared use path with roadway.	$24,710,000	Connectivity / Congestion	City of Ames / STP
22	Widen S. Duff Ave. to 3 lanes-Jewel Dr. to Ken Maril Rd.	$2,200,000	City of Ames / Iowa DOT (NHS) / Developer	Identified during public input; traffic operations and safety needs longer-term and developer driven. Includes shared-use path extension.	$4,330,000	Safety / Congestion	City of Ames / HSIP / Developer
50.A	Widen S 16th to 5-Lanes between Grand and Duff	$3,670,000	City of Ames	Addresses future traffic operations issue that arises after Grand Avenue extension. Improves long-term traffic operations and safety.	$7,220,000	Safety / Congestion	City of Ames / STP

Table 53. Long-Term Bicycle and Pedestrian Projects

Project ID and Description		Planning-Level Cost Estimate (2015 Dollars)	Potential Sponsoring Jurisdiction(s)	Implementation Comments	Year of Expenditure Cost Estimate	Forecasted Funding Source
ON 14	20th St Bike Lanes, Ames High to Grand	$100,000	City of Ames	Likely requires removal of one side of on-street parking. Public involvement process during implementation is key.	$200,000	City of Ames / TAP
ON 16	Welch On-Street Bike Treatment, Mortensen to Union Drive	$62,300	City of Ames	Implementation by Towers could occur with roadway reconstruction - current cross-section is quite narrow. Pending Campustown pilot project (2017-18) will complete two blocks south of Lincoln Way.	$120,000	City of Ames / TAP
ON 26	20th Street Sharrows, Grand to Duff	$25,100	City of Ames	Connect between ON 14 and committed bike facility on North Duff.	$50,000	City of Ames / TAP
OFF 9	Zumwalt Station to Oakwood Trail	$490,900	Story County / City of Ames	Provides connection between bike lanes along S Dakota and Research Park area, along with OFF 11 and OFF 15.	$970,000	City of Ames / TAP
OFF 13	Vet med - University Trail Connection to Airport Rd	$631,000	City of Ames	Sensitive research area - cannot put trail through parts of Vet Med. Coordinate alignment with ISU.	$1,240,000	City of Ames / ISU / TAP
OFF 16	Research Park / University Blvd Trail connection to Heart of Iowa trail (beyond MPO Boundary)	$542,000	Story County / City of Ames	Based on Research Park Phasing. Desire is to tie OFF 16 into Heart of Iowa trail beyond MPO boundary, consistent with Story County plan. Alignment uncertain; might use abandoned rail line.	$1,070,000	Story County / City of Ames / TAP
OFF 17	S Duff Side Path or Improved Shoulders for Bikes between Ken Maril and Airport Rd	Funding From Roadway Project	Story County / City of Ames	Sidepath limits and construction consistent with roadway project 22.	Funding From Roadway Project	
OFF 21	Recreational Trail Adjacent to Veenker Golf Course and Reactor Woods	$572,000	ISU	Crosses future bridge at Blankenburg Drive / Veenker	$1,130,000	ISU / City of Ames / TAP
OFF 27	South Dayton Side Path between S 16th St and Lincoln Way	$545,800	City of Ames	Connects existing trail segments.	$1,070,000	City of Ames / TAP
OFF 40	Sidepath with Grand Avenue Roadway Extension between S 16th Street and Airport Road	Funding From Roadway Project	City of Ames	Sidepath limits and construction consistent with roadway project 21.	Funding From Roadway Project	

Table 53. Long-Term Bicycle and Pedestrian Projects (continued)

CR 14	Intersection of 20th / Grand - Crossing / Signal Improvements	$145,000	City of Ames / Iowa DOT (NHS)	Added to complement ON 14; implemented as part of that roadway conversion bike lane project.	$290,000	City of Ames / TAP
CR 19	Intersection of Dayton / S 16th - Improve visibility for crossing	$100,000	City of Ames		$200,000	City of Ames / TAP

Table 54. Long-Term Transit Projects

Project ID and Description		Sponsoring Jurisdiction	Implementation Notes	Year of Expenditure Cost Estimate
6	Buses (Expansion/ Replacement)	CyRide	Target funding from FTA 5339 or ICAAP funds. FTA 5310 potentially for Dial-a-Ride vehicles. Estimate assumes an average of 1-bus per year.	$5,446,000 over 8 years
7	Bus stop improvements	CyRide	Target funding from FTA 5310 funds. Assume same spending for stop improvements each year.	$479,000 over 8 years

The project cost totals shown above include all funding sources, including local funds, and discretionary DOT state / Federal funding. For the purposes of the Ames Mobility 2040 plan, it is important to demonstrate that there is sufficient MPO formula funding sources to cover the project costs shown in each period. TABLE 55 shows the project costs and forecasted MPO formula revenues for STP and TAP (including TAP Flex) funds by period.

Table 55. Forecasted Project Costs and Revenue for MPO Formula Funds by Funding Period

Funding Period	MPO Formula Funding Sources			
	STP		TAP + TAP Flex	
	Revenue	Project Costs	Revenue	Project Costs
Short-Term (2020-2025)	$10,331,125	$3,925,000	$999,015	$955,800
Carry over to next period	*$6,406,125*		*$43,215*	
Mid-Term (2026-2032)	$17,251,125	$9,635,000	$1,432,215	$1,175,400
Carry over to next period	*$7,616,125*		*$256,815*	
Long-Term (2033-2040)	$20,083,125	$19,970,000	$1,784,815	$1,775,400
Planning Horizon Surplus	**+ $113,125**		**+ $9,415**	

Note: Revenue levels include carry-over from previous period.

Illustrative Projects

Those projects without an identified funding source, but are still community priorities for implementation during the Ames Mobility 2040 planning horizon, are called ***Illustrative Projects***. Illustrative projects do not fit the fiscal constraint based on identified funding sources, but may move up to one of the fiscally constrained implementation periods at a later date as a funding source is identified. Those illustrative projects included in the plan include:

Roadway Illustrative Projects

- ***3.*** Extend Mortensen Road from 500th Ave. to Miller Ave.
- ***4.*** Extend Cottonwood from State Ave. to University Blvd.
- ***13.*** Haber Rd. Realignment and Widening- Pammel Dr. to 13th Street
- ***18.*** Construct a Duff Ave. Underpass at Union Pacific Railroad
- ***23.*** Reconstruct and Extend Freel Dr. 2-lane to Dayton Ave.
- ***25.B.*** Bloomington Rd. Extension- 2 lane Grand Ave. to new I-35 interchange. Improve Stagecoach Rd from Riverside to Bloomington Rd
- ***26.B.*** Extend Cherry Ave. between S 5th St and S 16th Street through Creek Floodway
- ***32.B.*** Widen Lincoln Way to 3-lanes plus bike lane - Highway 30 to 500th Ave
- ***34.*** 180th Street- Grant Ave to Dayton, Dayton from 180th to 190th, and 190th from Dayton to I-35: Pave as 2-lane road and paved shoulders or trail and turn lanes at key intersections
- ***58.*** Add turn lanes at key locations on Riverside between Grand and Dayton
- ***59.*** Add Turn Lanes to S Dakota south of US 30 to Zumwalt Station Rd
- ***71.*** Lincoln Way/ Beach Ave. Traffic Signal Improvement/ Transit Priority
- ***75.*** Add Turn Lanes to E Lincoln Way between Bell Avenue and MPO Boundary
- ***76.*** Pave 265th Street and 530th Avenue for Connectivity
- ***77.*** Create Southwest Collector by Paving Existing Gravel Roads south of US 30 between County Line and State Ave

Bicycle and Pedestrian Illustrative Projects

- ***ON- 2.*** 24th St On-Street Bike Treatment, Stange to Duff
- ***ON- 4.*** Hoover On-Street Bike Treatment, 30th St to 24th St
- ***ON- 5.*** Bloomington On-Street Bike Treatment, George Washington Carver to Grand
- ***ON- 6.*** East 13th Street Bike Treatment, Ridgewood Ave to Meadowlane Ave
- ***ON- 7.*** East 13th Street On-Street Bike Treatment, Meadowlane Ave to Dayton Ave
- ***ON- 17***. 13th Street, Stange to Ridgewood Ave
- ***ON- 35.*** Campustown On-Street Bicycle Treatments
- ***CR 11.*** Intersection of Lincoln Way / Welch- Improvements for crossing visibility and safety
- ***CR 20.*** Intersection of Lincoln Way / Lynn - - Improvements for crossing visibility and safety
- ***CR 22.*** Intersection of Lincoln Way / Ash- Improvements for crossing visibility and safety
- ***CR 23.*** Intersection of Lincoln Way / Knoll - Improvements for crossing visibility and safety
- ***CR 25.*** Intersection of Grand / 24th St- Improvements for crossing visibility and safety
- ***CR 26.*** Beach / Mortensen crossing to provide safer crossing than University / Mortensen.
- ***CR 27.*** Lincoln Way / Stanton - Improvements for crossing visibility and safety
- ***OFF 2.*** West Mortensen Side Path, fill in gap west of South Dakota
- ***OFF 4.*** Wilder-Ontario Side Path Connection
- ***OFF 6.*** North Dakota Side Path
- ***OFF 7.*** George Washington Carver Side path or bike lanes on shoulder to Gilbert
- ***OFF 11.*** Zumwalt to Cottonwood Trail Connection
- ***OFF 12.*** Worrell Creek Trail with US 30 Crossing (Identify Grade Separation)
- ***OFF 14.*** Pave existing gravel trail between South 4th St to SUP 15
- ***OFF 15.*** Cottonwood On-Street Facility, Cedar Lane to University
- ***OFF 24.*** South Skunk River Trail extension to MPO Boundary
- ***OFF 25.*** Riverside Rd Trail (Paved Shoulder is Alternative)
- ***OFF 26.*** Dayton Trail or Improved Shoulders north of 13th Street
- ***OFF 28.*** E 13th St Trail or Paved Shoulders for Bikes Extension past I-35

- ***OFF 33.*** Squaw Creek Trail from Grand Avenue Extension to 4th Street
- ***OFF 34***. Bloomington Road and Squaw Creek Trail connection to north MPO Boundary
- ***OFF 35.*** Onion Creek Trail connection to west MPO Boundary
- ***OFF 36.*** Cameron School Road sidepath to west MPO Boundary
- ***OFF 37.*** US 69 South Trail to MPO Boundary
- ***OFF 38.*** South Dakota / R38 Northbound Bike Connection between 240th Street and Mortensen
- ***OFF 39.*** Skunk River Trail connection between soft-surfaced trails near Peterson Park to Ada Hayden Park. Continued connections north of MPO Boundary
- ***OFF 42.*** Sidepath along Mortensen Avenue Extension west to S 500th Avenue (Developer Funded Roadway Project 3)

Transit Illustrative Projects

- ***2.*** Mortensen / State Street Corridor Service Improvements
- ***3.*** Orange Route Corridor Service Improvements
- ***4.*** Automatic Passenger Counters
- ***5.*** Brown Route North / South Corridor Service Improvements
- ***8.*** S. Duff Corridor Service Improvements
- ***9.*** Airport Road Corridor Service Improvements
- ***10.*** CyRide Facility Expansion
- ***11.*** Farebox system
- ***12.*** Intermodal Circulator
- ***13.*** North / South Dakota Corridor Service Improvements
- ***18.*** New transit service between North Ridge / Somerset/ Valley View via Stange Rd / Bloomington Rd / GW Carver Ave
- ***22.*** Intermodal facility Improvements
- ***23.*** Automatic Vehicle Location Technology
- ***29.*** South 16th Corridor Service Improvements - East of Duff Avenue
- ***24.*** Regional commuter study (North Ames, Nevada, Gilbert, Boone, etc.)
- ***27.*** Des Moines to Ames Transit Corridor Improvements
- ***28.*** Bus Thruway- Ames to Amtrak in Osceola

Beyond ongoing bus-replacement and station replacement projects, transit project costs are not included in these tables, since Ames Mobility 2040 does not obligate specific transit projects for implementation. The majority of transit projects are included on the illustrative project list. The fiscally constrained and illustrative plan projects are shown in the following figures:

- ***Roadway Projects*** - FIGURE 60
- ***Bicycle and Pedestrian Projects*** :
    - FIGURE 61 shows on-street projects, which could include bike lanes, cycletracks, bike boulevards, wide shoulders, wide curb lanes, shared streets (or "sharrows"), and signed routes.
    - FIGURE 62 shows off-street bicycle and pedestrian projects, which could include facilities are separated from vehicular traffic, such as shared use paths adjacent to a roadway or trails along drainageways or abandoned rail lines.
- ***Transit Projects*** – FIGURE 63

Figure 60. Planned Roadway Projects

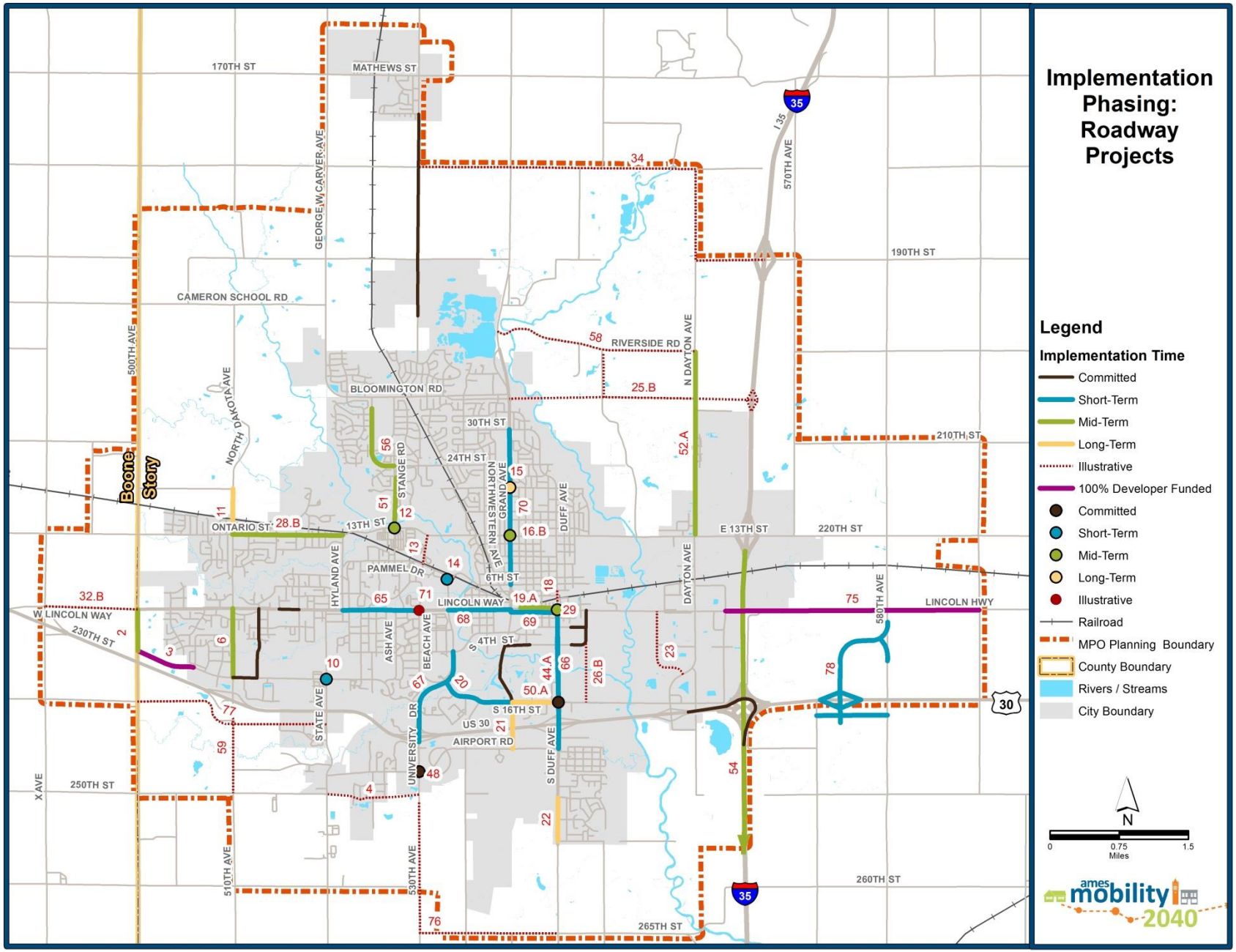


Figure 61. Planned On-Street Bicycle Route Projects

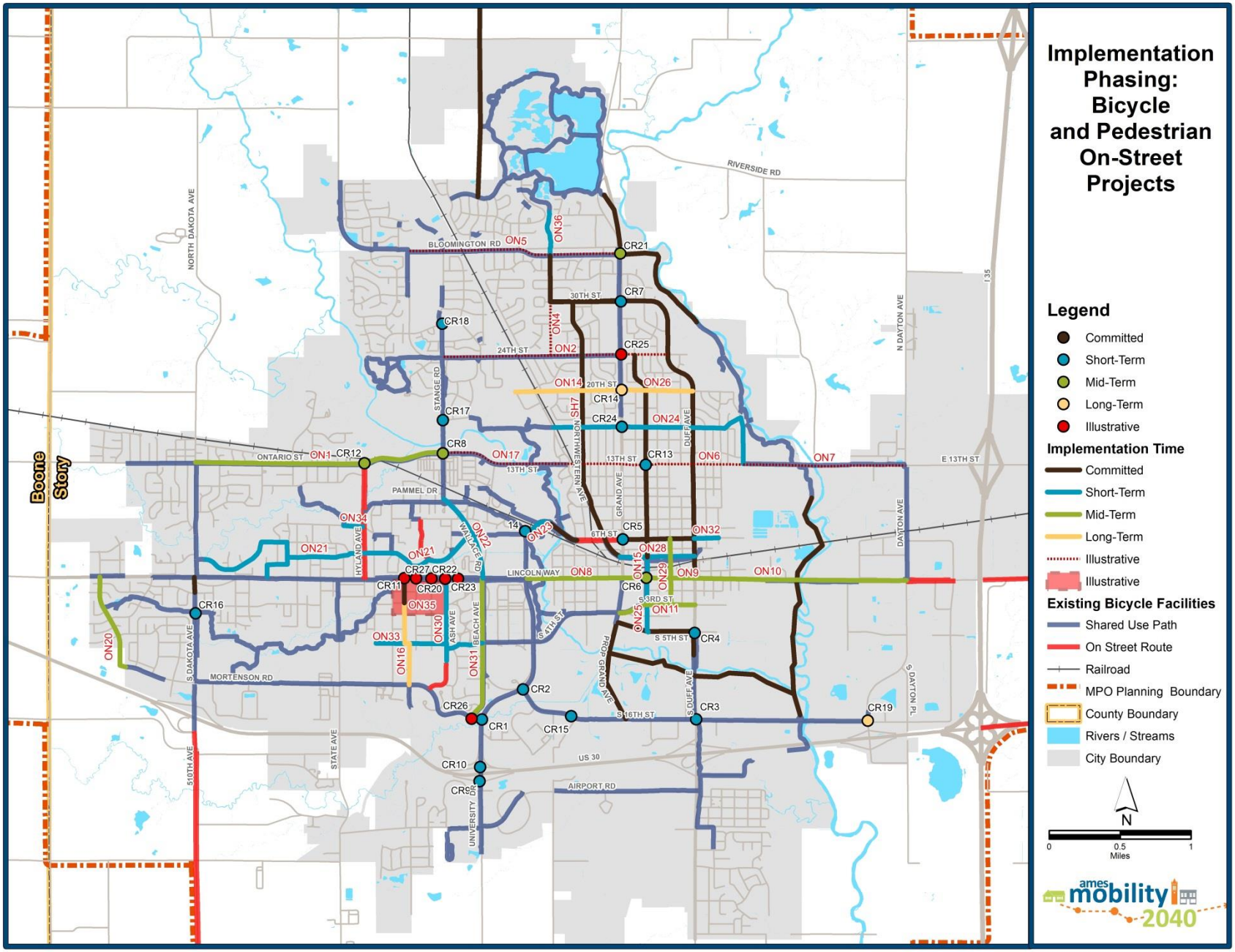


Figure 62. Planned Off-Street Bicycle and Pedestrian Projects

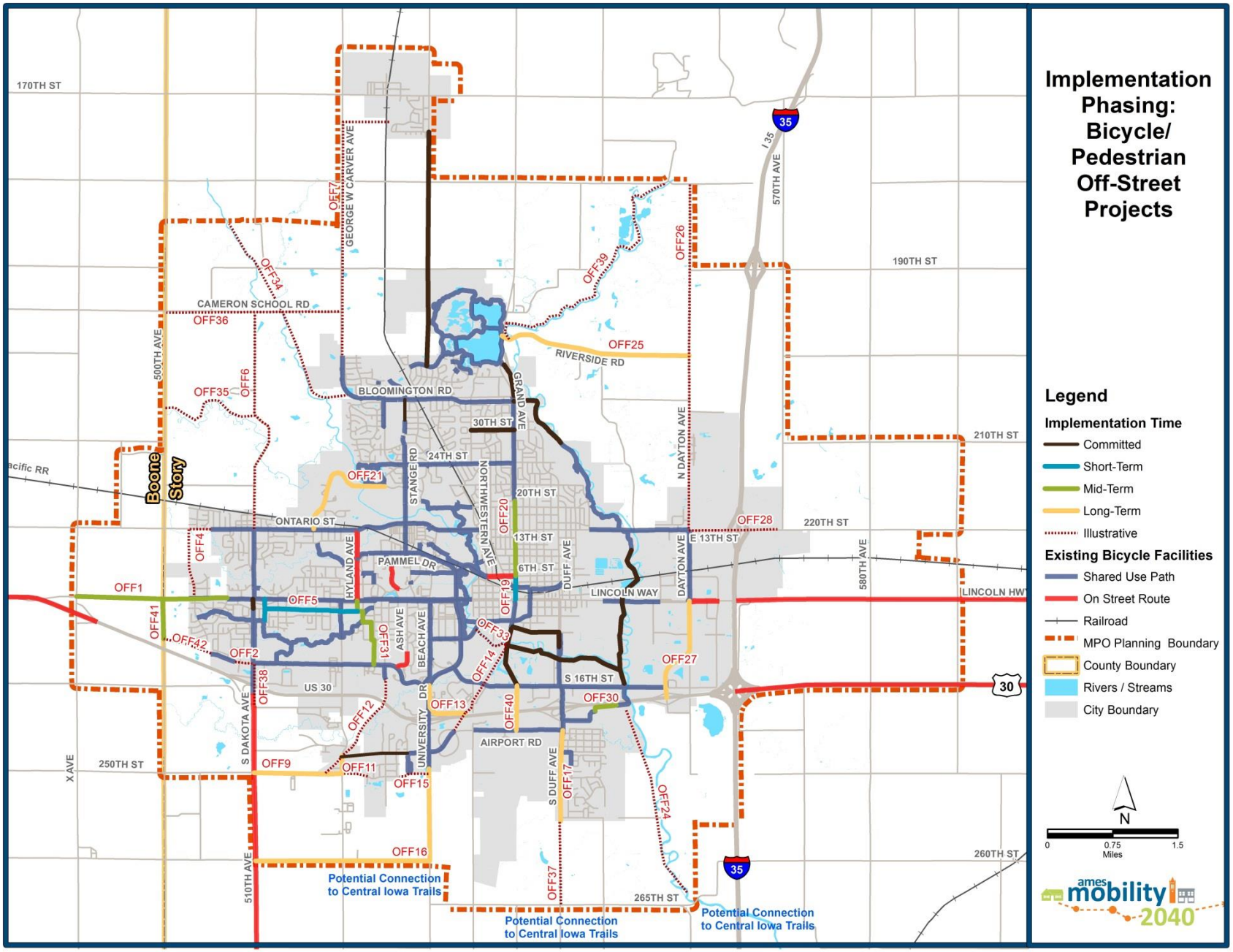
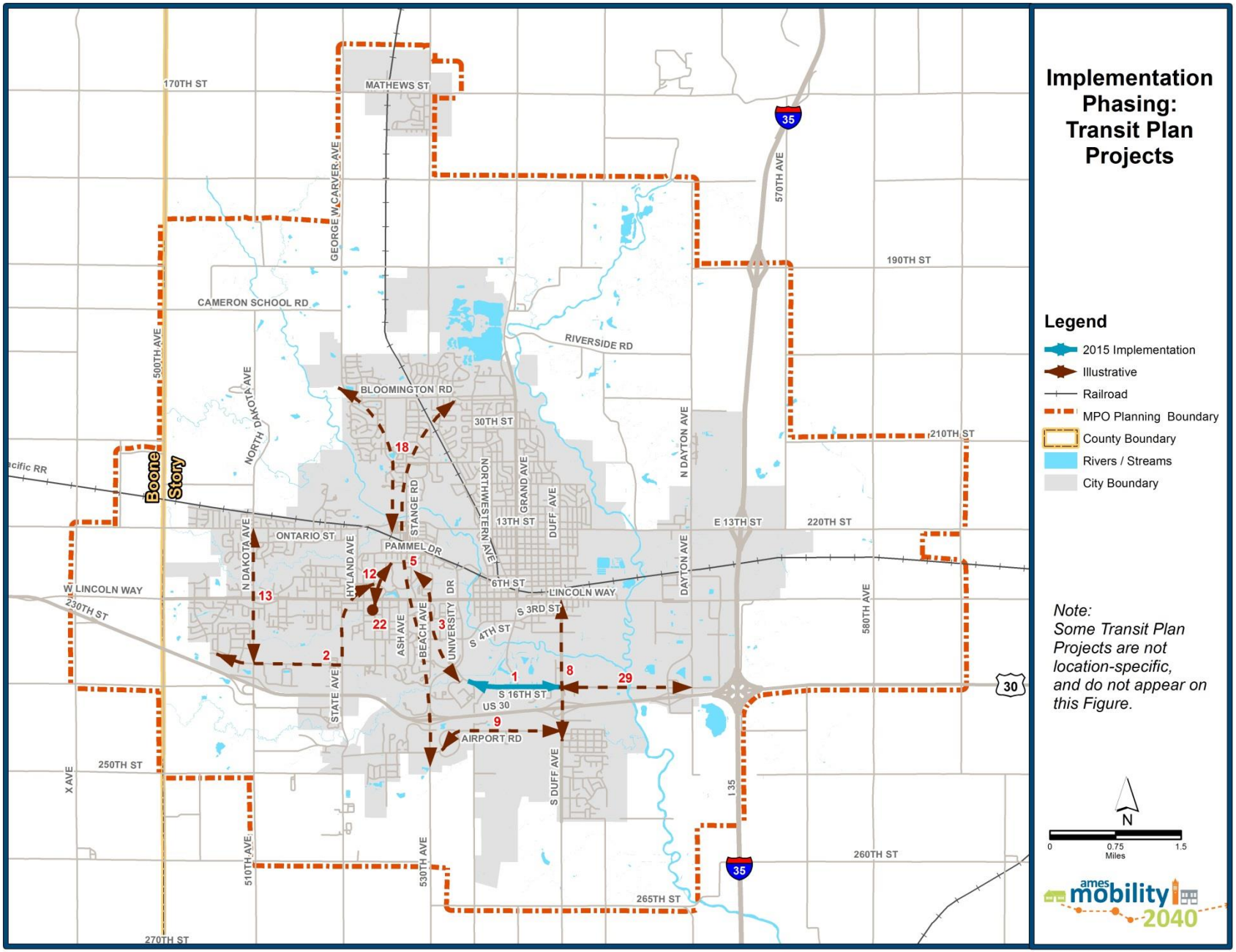


Figure 63. Planned Transit Projects



As shown in the project implementation lists and associated funding levels in the previous tables, the majority of project funding for most projects will come from non-Federal aid sources. The Ames Mobility 2040 plan includes an analysis of anticipated funding levels and required project contributions from a range of local jurisdictions and state discretionary programs. TABLE 56 shows the anticipated state discretionary program and local revenues to support the fiscally constrained project list; TABLE 57 shows the anticipated state discretionary and local project contributions required for the fiscally constrained project list.

Table 56. Forecasted State Discretionary Program and Local Revenues by Period

Cost Band / Funding Period	State Discretionary Program Revenues	Local Funding Sources	
		Ames	Story County
Short-Term (2020-2025)	$10,717,000	$12,447,927	$1,272,498
Mid-Term (2026-2032)	$19,101,000	$15,795,347	$1,652,403
Long-Term (2033-2040)	$21,508,000	$19,730,198	$2,109,765
Total Funds Available, 2020-2040	$51,326,000	$47,973,472	$5,034,666

Note: State discretionary programs include HSIP, NHPP, and Primary Roads Program

Table 57. Forecasted Project Cost Contributions from State Discretionary Program and Local Jurisdictions by Period

Cost Band / Funding Period	State Discretionary Program Contributions	Local Project Contributions		Assumed Developer Project Contributions
		Ames	Story County	
Short-Term (2020-2025)	$14,570,000	$7,119,200	$0	$0
Mid-Term (2026-2032)	$35,850,000	$16,508,600	$837,000	$2,282,000
Long-Term (2033-2040)	$3,463,000	$26,157,600	$3,500,000	$1,443,000
Total Costs, 2020-2040	$53,883,000	$49,785,400	$4,337,000	$3,725,000

Note: State discretionary programs include HSIP, NHPP, and Primary Roads Program

Note in TABLE 56 and TABLE 57:

- City of Ames revenues for roadway and bicycle / pedestrian projects are within 4 % of required contributions. ***From a Federal-aid project perspective, there is sufficient local funding to provide the required levels of local matching funds to leverage Federal-aid funding***. The minor short-fall would apply to local-only funded projects, and given the significant amount of assumptions that went into identifying future budgets and project costs, the local-only funded projects are essentially within anticipated future revenues.

- The majority of the state discretionary program needs are for two major projects on the NHS system:
    - ***Roadway Project 54*** (6-lane widening of I-35 between 13th Street and the south MPO boundary), and
    - ***Roadway Project 78*** (New US 30 interchange at 575th Avenue).

  Both of these projects have been reviewed by Iowa DOT staff, and deemed appropriate statewide priorities for planning purposes (although there is no guarantee of state discretionary funding for either of these projects). Since these projects would be funded with statewide discretionary funds, and not MPO formula funds, for the purposes of fiscal constraint it should be assumed that these two projects are reasonably fundable through the planning horizon.

- There are some levels of ***private developer funding*** assumed for a few projects, accounting for $3,725,000 in contributions during the planning horizon. This funding was only assumed for those projects where an evaluation indicated that a significant portion of the project need would arise from demand related to adjacent development. These assumptions were reviewed by jurisdiction staff and were deemed reasonable given past private contributions and future needs.

Forecasted Travel on the Fiscally Constrained Transportation Network

The roadway element of the plan addresses many key mobility and safety issues identified through the Ames Mobility 2040 process. Future 2040 daily vehicular traffic forecasts on the fiscally constrained roadway network are shown in FIGURE 64. The resulting performance of the fiscally constrained multimodal network plan is reflected in TABLE 58. This table reflects the quantifiable performance measure targets used for Ames Mobility 2040, as introduced in CHAPTER 2. Key items to note in TABLE 58:

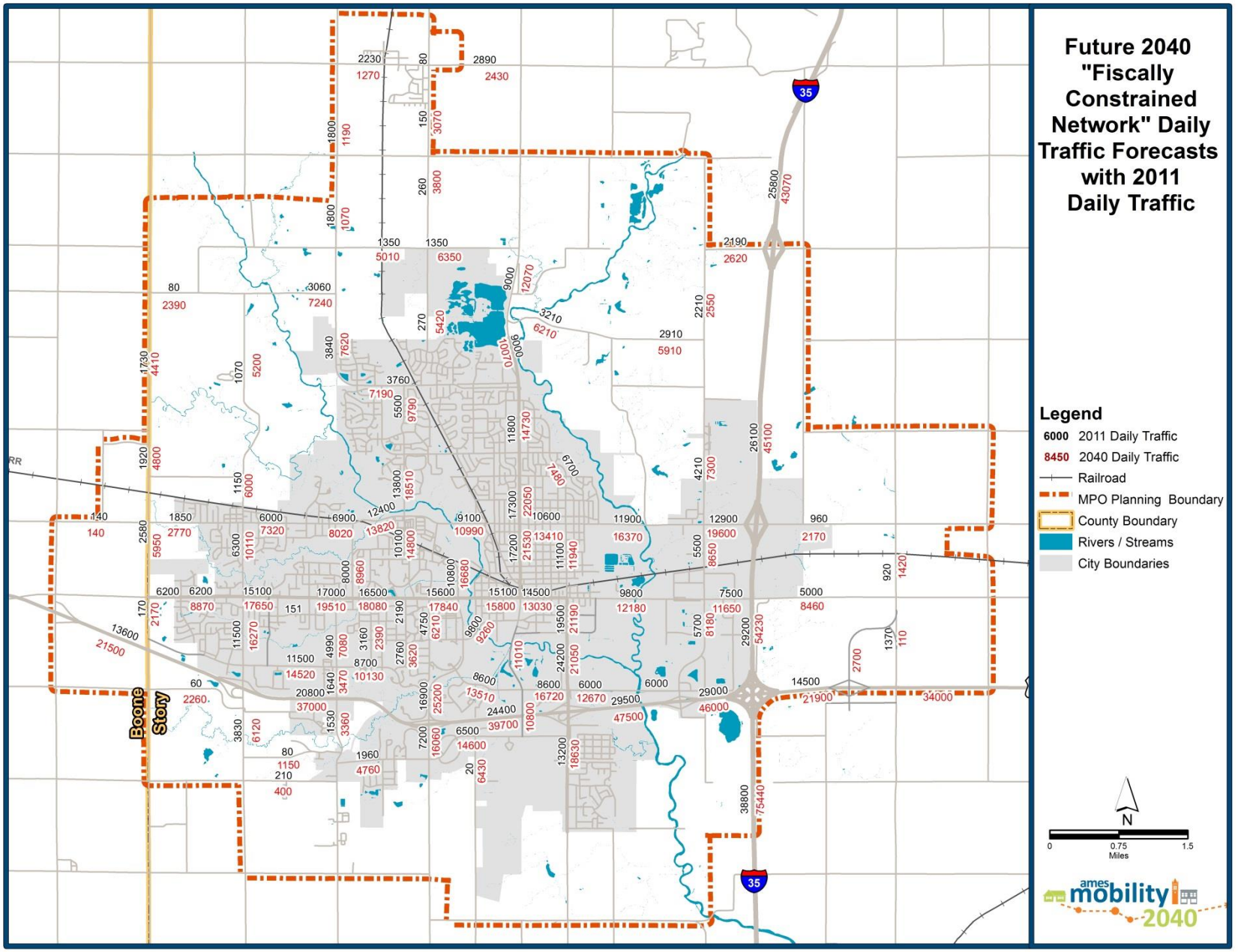
- The forecasted levels of recurring weekday congestion for 2040 are isolated to a few corridors. While the fiscally constrained plan projects address the majority of those conditions (as reflected by the improvement in the "LOS / Congested Miles of Primary Freight Corridors" measure), due to the lack of region-wide congestion, the regional measures of VMT per household and VHT per household only show little change in the LRTP / Fiscally Constrained Network scenario.
- Bicycle system expansion projects are expected to provide significantly expanded access to jobs and households across the Ames area.
- Due to funding constraints, no new transit extensions are included in the fiscally constrained plan. Thus, transit accessibility levels do not change from the 2040 E+C baseline in the 2040 LRTP / Fiscally Constrained Network Scenario.

Table 58. Forecast Regional Performance Measures on the Fiscally Constrained Transportation Network

Performance Measure	Performance Measure Target for Ames Mobility 2040	Existing Conditions Baseline[33]	2040 E+C Conditions Baseline	2040 LRTP / Fiscally Constrained Network Conditions
System Reliability / Reliability Index 80 (RI_{80})	Address reliability issues at the two (2) NHS segments with poorest reliability.	Arterial System: RI_{80} = 1.20 Freeway System: RI_{80} = 1.03	N/A	Adaptive signal and turn lane plan projects intended to address reliability issues on NHS (Lincoln Way and Duff Ave.) Corridors
Miles of On-Street Bicycle Facilities	Increase the segment-mileage of on-street bicycle facilities by 100% compared to current levels.	3.9 Miles On-Street Facilities 57 miles Off-Street Facilities	11.1 Miles On-Street Facilities 66 Miles Off-Street Facilities	28.4 Miles On-Street Facilities 82.5 Miles Off-Street Facilities
VMT per Household	2040 VMT per household grows by 10% or less compared to 2010 levels.	41.6 daily VMT per household	49.7 daily VMT per household	49.7 daily VMT per household
VHT per Household	2040 VHT per household grows 20% or less compared to 2010 levels.	1.00 daily VHT per household	1.28 daily VHT per household	1.28 daily VHT per household
Transit Mode Share	2040 transit mode share is higher than 2010 transit mode share.	12.5% of all modeled (auto and transit) trips.	12.0% of all modeled (auto and transit) trips.	12.0% of all modeled (auto and transit) trips.
Household and Employment Proximity to Transit	Maintain housing and employment proximity (¼ mile walk distance) within 5% of 2010 levels.	Households: 74% Access; Employment: 77% Access	Households: 63% Access; Employment: 65% Access	Households: 63% Access; Employment: 65% Access
EJ Proximity to Transit	Maintain levels of transit proximity to EJ households within 5% of non-EJ households.	82% of EJ households	82% of EJ households	82% of EJ households
Household and Employment Proximity to Bicycle Facilities	Increase the percentage of jobs and households within ¼ mile of bicycle facilities by 25% by 2040.	Households: 75% Access; Employment: 67% Access	Households: 73% Access; Employment: 67% Access	Households: 82% Access; Employment: 79% Access
EJ Proximity to Bicycle and Pedestrian Facilities	Provide higher levels of bicycle facility proximity to EJ households than non-EJ households.	88% of EJ households	88% of EJ households	95% of EJ households
LOS / Congested Miles of Primary Freight Corridors	2040 Congested Miles of NHS system same/lower than 2010 levels.	0.5 Miles	2.0 miles	0.5 Mile

[33] *Existing Year Data Sources: System Reliability – 2015 Data; On-Street Bike Facilities – 2015 data; Crashes – 2009 to 2013 data; VMT, VHT and Transit Mode Share – 2010 and 2040 Travel Model estimates and Iowa DOT Geographic Information Management System (GIMS) data.*

Figure 64. 2040 Peak Period Traffic Operations, LRTP / Fiscally Constrained Scenario Network



As noted in CHAPTER 2, the intent of applying regional performance measures for the Ames Mobility 2040 was to get test out some potential planning-level performance measures. The performance measures do not reflect MPO or member jurisdiction policy, or are there any specific benefits or impacts of achieving or not achieving a given performance measure. As noted previously, final rulemaking for performance measures has not yet been established at the Federal level. Those measures shown in TABLE 58 will likely be refined, as the Ames Area MPO works with the Iowa DOT in the coming months and years to finalize the performance measures and targets that the MPO will maintain on an ongoing basis.

COMPLETE STREETS

Citizens throughout the Ames metropolitan area are making increased use of active modes of transportation to meet everyday mobility needs. These active modes include bicycling and walking. "Complete Streets" principles ensure that the safety and convenience of all users of a transportation system, including pedestrians, bicyclists, public transit users, children, older individuals, motorists, freight vehicles, and individuals with disabilities, are accommodated in all phases of project planning and development.

Source: www.iyield4peds.org

WHY COMPLETE STREETS?

47% of older Americans say it is unsafe to cross a major street near their home.

Source: Planning Complete Streets for the Aging of America, AARP

Complete Streets offer high performance infrastructure that provide for multimodal transportation, the potential to reduce traffic congestion, the ability to reinforce compact communities, and to utilize sustainability applications. A Complete Streets Policy was

presented to the Ames Area MPO Transportation Policy Committee in July 2015. A complete streets policy is a first step for the MPO and member jurisdictions moving towards a network of complete streets. While implementation of complete streets is typically the domain of local jurisdictions, MPOs can provide a policy that guides regional implementation. The Ames Area MPO policy is shown below.

Ames Area Metropolitan Planning Organization: Complete Streets Policy

Purposes. This Complete Streets Policy promotes "Complete Streets" principles for all transportation infrastructure projects carried out within the planning boundary of the Ames Area Metropolitan Planning Organization (MPO), whether by the City of Ames, the City of Gilbert, Story County, Boone County, Iowa State University, or CyRide. This policy is meant to guide the decisions of Ames Area MPO and its member agencies and in no way supersedes any policies of member agencies in the Ames Area MPO.

Complete Streets Principles. The principles of this Complete Streets Policy are to design, build, maintain, and reconstruct public streets in order to provide for the safety and convenience of all users of a corridor. This includes pedestrians, cyclists, users of mass transit, people with disabilities, motorists, freight providers, emergency responders, and adjacent land users; regardless of age, ability, income, or ethnicity.

Ames Area MPO. The Ames Area MPO Planning Boundary is determined by the US Census Bureau in conjunction with the Decennial Census and is defined as an area of 50,000 or more population that is considered currently urban in character. The Ames Area MPO currently includes the transportation jurisdictions of the City of Ames, the City of Gilbert, Story County, Boone County, Iowa State University, and the CyRide Transit Agency.

Values. The values to incorporate within the Ames Area MPO Complete Streets Policy include not only safety, mobility, and fiscal responsibility, but also community values and qualities. These include environmental, scenic, aesthetic, historic and natural resources, and social equity values. This approach demands careful multi-modal evaluation for all transportation corridors integrated with best management strategies for land use and transportation. The public should be consulted, when appropriate, as a factor in the transportation infrastructure decision-making process.

Adaptability. This Complete Streets Policy provides flexibility to accommodate different types of streets and users, and to promote Complete Streets design solutions that fit within the context(s) of the community.

Applicability. Appropriate Complete Streets principles should be considered as part of all routine transportation

infrastructure projects, including:

- Project identification
- Scoping procedures and design approvals, including design manuals and performance measures
- Construction
- Maintenance
- Reconstruction

Complete Streets principles should:

- Apply to both existing and future streets,
- Apply to all transportation infrastructure projects, regardless of funding source(s), and
- Not apply to streets ultimately to be privately owned and maintained, where specified users are prohibited by law, or the cost of providing accommodation are excessively disproportionate to the need or probable use.

Exceptions to the application of this Complete Streets Policy include instances where member agencies identify issues of safety, excessive cost or absence of need. Any agency's concerns regarding project exceptions or alternatives to meeting complete streets principles may be reviewed by the Ames Area MPO Technical Committee, should that agency desire comment and the consideration of alternatives.

Existing Policies and Regulations. To support this Complete Streets Policy, member agencies may choose to review local design principles, existing policies and regulations. Agencies may request consultation with Ames Area MPO where appropriate. Such policies and regulations may include:

- Comprehensive plans
- University master plans
- Transportation plans
- Subdivision codes
- Manuals of practice
- Grant-writing practices
- Impact assessments
- Level of Service assessments
- Departmental policies and procedures
- Any other applicable procedures and standards

Latest Standards. In furthering Complete Streets principles, transportation projects should make use of the latest and best design standards, policies, and guidelines. Performance measures should also be utilized to measure the effectiveness of Complete Streets practices that align with related transportation planning efforts, particularly the Ames Area MPO Long Range Transportation Plan.

COMPLETE STREET PRINCIPLES

"to design, build, maintain, and reconstruct public streets in order to provide for the safety and convenience of all users of a corridor. This includes pedestrians, cyclists, users of mass transit, people with disabilities, motorists, freight providers, emergency responders, and adjacent land users; regardless of age, ability, income, or ethnicity."

Source: AAMPO, Complete Streets Policy, July 2015

Regional Policy Options and Strategies

The Ames Mobility 2040 is a regional document that sets priorities and identifies future projects and programs for implementation. The LRTP has focused mainly on specific infrastructure projects for implementation, but to augment those projects there are a specific set of regional-based policy options, strategies, and corridors have been identified as priorities for long-term implementation. Those long-term policies and strategies include:

- ***Travel Demand Management Strategies (TDM):*** As travel increases through the planning horizon, and congestion levels across the Ames area increase, a comprehensive, multi-jurisdictional Travel Demand Management program at some point in the mid-term or long-term is recommended. A regional study could provide specific recommendations for programs targeting the reduction of single-occupant vehicle travel during peak travel periods. The specific, multifaceted approach will vary depending on how the Ames area continues to evolve over that time, but options such as:
    - Carpool or vanpool coordination program.
    - Employer association for travel management, including coordination across major employers of potential commute time shifts and rideshare matching.
    - Expanded park and ride lots should be considered over the long-term.
    - Pricing / Parking Policy.
- Continue the application and enhancement of ***signal system technologies*** across the Ames area. This could include expanding current applications of pedestrian detection and bike detection at intersections, and adoption of adaptive signal technologies in key corridors.
- ***Complete Streets Policies***: As noted, the Ames area MPO Policy Committed was recently provided a regional complete streets policy to consider for adoption. It is recommended that the MPO continue coordination with local jurisdictions, advocate regional integration of complete streets concepts into street projects, and consider design guidelines and street typologies for policy implementation.
- ***Connections to the Regional and State Trail System***: Specific projects were included in the Ames Mobility 2040 to connect to the Central Iowa trails network. As the regional and state trail system continues to evolve, the MPO should continue identifying opportunities to interface the Ames area bicycle and pedestrian system with that wider trail system across Central Iowa.

- ***Transit Connections outside of the Ames area***: Projects were included in the transit section for further study, but a major theme throughout Ames Mobility 2040 plan development was providing connections to cities outside of the region. This type of service is beyond the scope of what CyRide can provide, but further inter-regional coordination in Central Iowa is recommended to consider potential transit connections for the future.
- ***Lincoln Way Corridor Study / Enhancement Plan***: The Lincoln Way corridor represents an opportunity to provide a vibrant, multimodal corridor between some of the primary activity centers in the Ames area, including the Iowa State University campus, Campustown, Iowa DOT, retail destinations, and Downtown Ames. It is recommended that a detailed corridor plan be developed to identify redevelopment opportunities and infrastructure requirements along this signature corridor for the Ames area.

- ***Regional Wayfinding System***: Stakeholders have identified the desire for an improved wayfinding signage system to direct travelers to civic and tourist destinations in the Ames area. While the Transportation Plan is too broad in scope to provide a detailed Wayfinding Plan, it does provide an opportunity to lay out the various elements to the Wayfinding Plan approach could including: a wayfinding vision, define the destinations that the wayfinding system needs to support, provide a hierarchy of destinations, develop a signage typology, provide a sign branding approach, and develop a wayfinding implementation policy, and finally a detailed wayfinding system implementation plan.

ALTERNATIVE FUNDING OPTIONS

As noted earlier in this chapter, many of the candidate projects had to be included on the "illustrative" project list, since they are not anticipated to be fundable through 2040 via traditional funding means. Just because a project shows up as an illustrative project does not mean it is not a priority for the Ames area. Due to the fiscal constraints on public budgets, including the federal government, some of these illustrative projects might require innovative transportation financing, an approach that has been pursued by communities and states across the country.

FHWA considers innovative finance as "a broadly defined term that encompasses a combination of specially designed techniques that supplement traditional highway financing methods. While many of these techniques may not be new to other sectors, their application to transportation is innovative."[34] According to FHWA, the primary objectives of innovative finance are to:

- Maximize the ability of states and other project sponsors to leverage federal capital for needed investment in the nation's transportation system;
- More effectively utilize existing funds;
- Move projects into construction more quickly than under traditional financing mechanisms; and
- Make possible major transportation investments that might not otherwise receive financing.

There are a number of non-traditional and innovative financing techniques available to support funding for roadway interchanges and bridge improvements in Iowa. They include:

- Tax Increment Financing (TIF)
- Self-Supporting Municipal Improvement District (SSMID)
- Revitalize Iowa's Sound Economy (RISE) Fund
- Local Option Sales Tax (LOST)
- Farm-to-Market (FM) Road Fund, and
- Traffic Safety Improvement Program (TSIP)
- Electric Utility Fund

[34] *FHWA, http://www.fhwa.dot.gov/ipd/finance/resources/general/innovative_finance_primer_2004.aspx#chapter1*

- Road Use Tax Fund (RUTF)

For bicycle path projects, alternative funding options include:

- Tax Increment Financing (TIF)
- Local Option Sales Tax (LOST)
- Federal Transportation Alternatives Program (TAP)
- Rebuild Iowa's Infrastructure Fund (RIIF)
- State Recreational Trails Program
- Vision Iowa Community Attraction and Tourism (CAT) Grant, and
- Iowa Resource Enhancement and Protection (REAP) Program

A detailed discussion of the approaches outline above, and how they have been implemented elsewhere is provided in **APPENDIX F**.

Chapter 10. Environmental Considerations

Environmental Analysis

The transportation alternatives, particularly the candidate roadway projects, in Ames Mobility 2040 were evaluated as a part of the alternatives assessment, for how well they fit within the natural and built environment. State and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation were also consulted via letter during LRTP development during alternatives analysis and draft plan phases of the study.

Environmental Screening / Considerations

Environmental resources that could potentially be affected by transportation projects included in the Ames Mobility 2040 are discussed in this section. The LRTP process included the screening of environmental characteristics for each alternative. The Ames Mobility 2040 is a regional-scale assessment, and projects included in the LRTP will require additional project development prior to implementation. As those project details are developed, more detailed environmental review will be conducted in the future phases of study.

Figure 65 and Figure 66 show some of the environmentally sensitive natural and human-built areas in the study area.

Figure 65. Natural Environmental Constraints

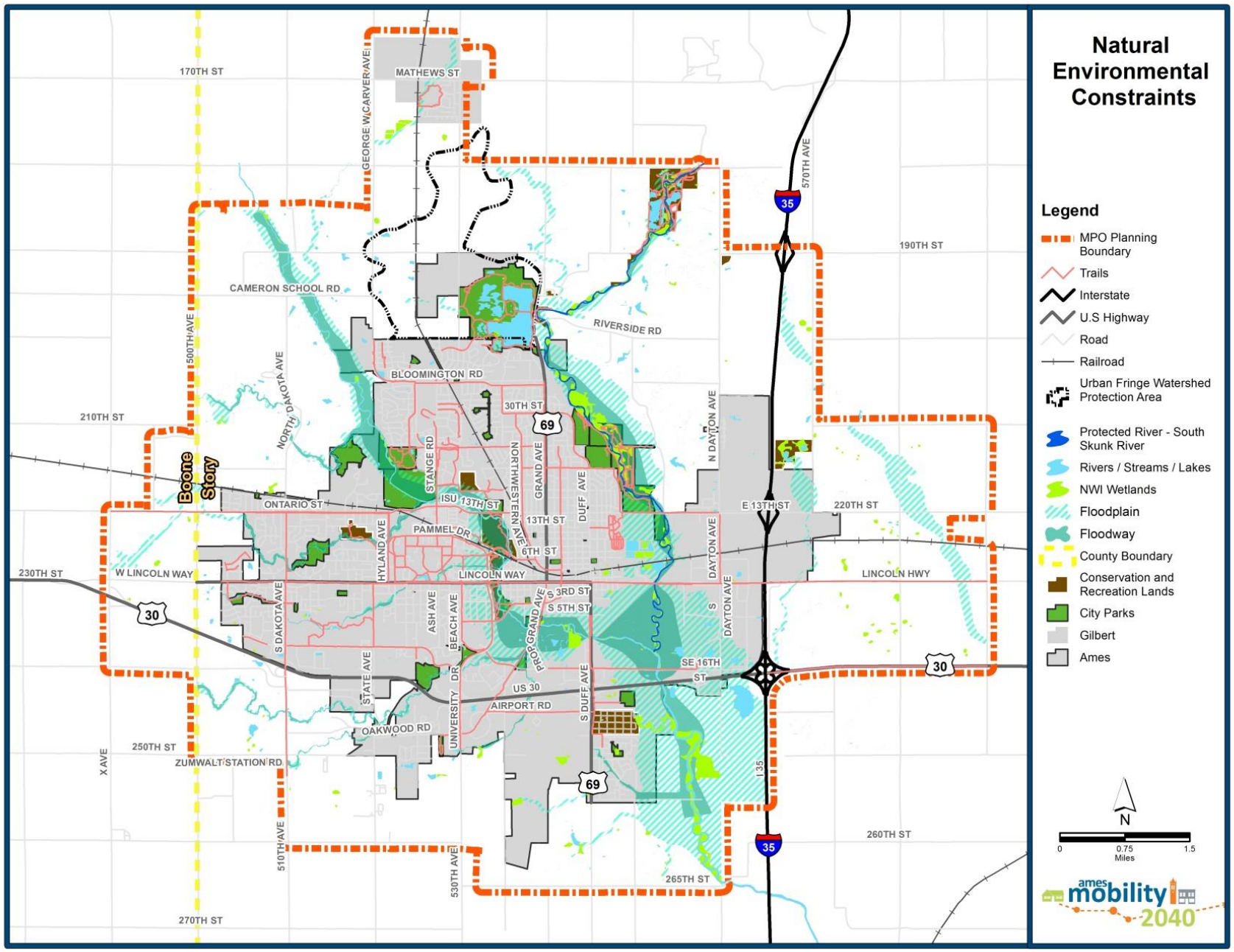
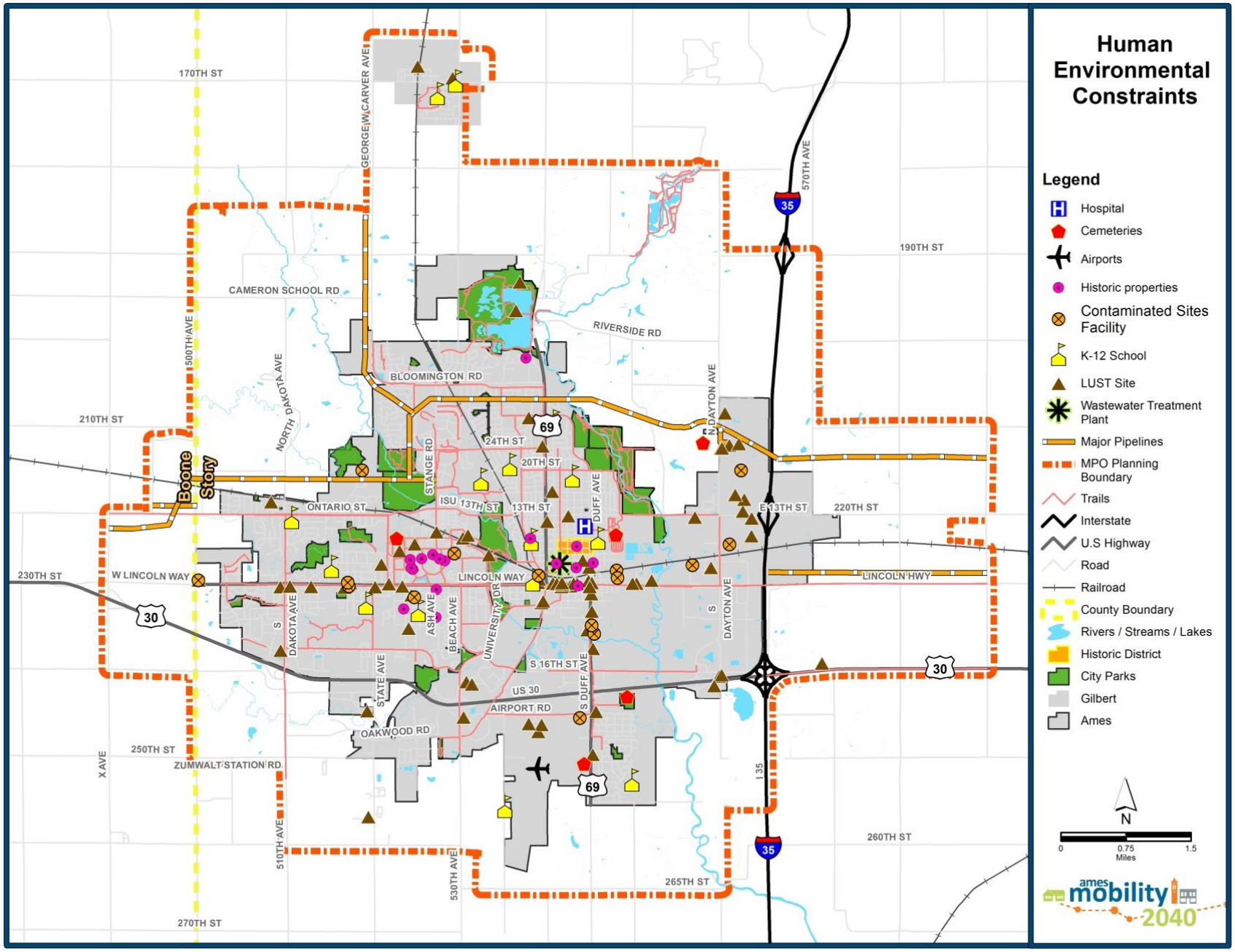


Figure 66. Human Environmental Constraints



Archaeological and Historical Resources

The consideration of impacts on cultural resources is subject to several federal laws, regulations and guidelines. Principal among these are NEPA and Section 106 of the National Historic Preservation Act. Section 106 requires federal agencies (and agencies receiving federal assistance for projects) to take into account the effects of their undertakings on historic properties (any prehistoric or historic district, site, building, structure, or object listed on or eligible for listing on the National Register of Historic Places). Through the consultation process among agency officials and other parties, the effects of the undertaking on historic properties are considered, beginning with the earliest stages of project planning. The goal is to identify historic properties within the ***area of potential effect*** (APE) as early as possible in project development, evaluate the historic significance of the properties, assess the expected project impacts, and seek ways to avoid, minimize, or mitigate any adverse effects.

Archaeological and historical data from the "I-Sites" public access website, maintained by the Iowa Office of the State Archaeologist were reviewed to determine the number of historic sites within close proximity of roadway alternatives. Several roadway alternatives are within areas with several archaeological sites nearby. As roadway alternatives continue to evolve throughout the project development process, an APE for the project would be proposed by sponsoring agencies (Iowa DOT and local governments). Coordination with the Iowa State Historic Preservation Office (SHPO) would confirm the APE. Records of known historic sites would be searched to determine the presence of historic resources within the APE. The potential for unknown archaeological sites would be determined through site specific cultural resource surveys. Through consultation with Iowa SHPO, the potential for projects to affect historic resources would be determined – No Historic Properties Affected, No Adverse Effect on Historic Properties, or an Adverse Effect on Historic Properties (when a historic resource cannot be avoided). In the event of an adverse effect on historic properties, FHWA must contact the Advisory Council to advise it of the situation, and offer an opportunity for participation in the consultation with SHPO and others to plan measures to minimize harm and, ultimately, to mitigate the adverse effects. The agency sponsoring the project will consult with SHPO and other interested parties to formulate a mitigation plan which will become the basis for a Memorandum of Agreement (MOA) drawn up and executed between FHWA, SHPO, and the DOT or local agency. Execution of the MOA completes consultation under Section 106 unless there are changes or additions to the project.

Section 4(f) and Section 6(f) Resources

The Department of Transportation Act (DOT Act) of 1966 included a provision – Section 4(f) – which is intended to protect any publicly-owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state or local significance or any land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site). U.S. Department of Transportation agencies, including FHWA, cannot approve any program or project which requires the use these lands unless there is no feasible and prudent alternative to the use of such land, and the program or project includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use, or FHWA determines that the use of the property, including any measures to minimize harm (such as avoidance, minimization, mitigation, or enhancement measures) would have a ***de minimis impact*** (a determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or refuge for protection under Section 4(f); or a Section 106 finding of no adverse effect or no historic properties affected on a historic property). There are three types of Section 4(f) impacts: direct use (such as the conversion of public park land into a transportation use), temporary occupancy (the temporary use of Section 4(f) land for construction operations), and constructive use (the proximity impacts (such as noise) of a proposed project adjacent to, or nearby, a Section 4(f) property result in substantial impairment to the property's activities, features, or attributes that qualify the property for protection under Section 4(f). Several roadway alternatives are located near parks and other Section 4(f)-protected properties. These alternatives would be further evaluated in the project planning phase.

Section 6(f), which was created as a part of the Land and Water Conservation Act, protects state- and locally-sponsored projects that were funded as part of the Land and Water Conservation Fund (LWCF). These lands cannot be converted to non-park/recreation use without the approval of the National Park Service. Conversion of these lands is allowed if it is determined that there are no practicable alternatives to the conversion and that there will be provision of replacement property. Mitigation for Section 6(f) lands impacted by a project must include replacement with land of at least the same fair market value, and reasonably equivalent usefulness and location relative to the impacted land.

The potential for roadway alternatives to impact Section 4(f) and Section 6(f) lands was evaluated by determining the proximity of alternatives to public parks, recreation areas, and refuges using GIS data from the city of Ames and Iowa DNR. Potential Section 4(f) impacts to historic resources utilized data from the "I-Sites" website previously discussed. A few alternatives may be located near Section 6(f)-protected lands; further evaluation will be needed in the project planning phase.

Regulated Material Sites

Regulated materials are hazardous substances that are regulated by federal, state, or local entities based on their potential to result in environmental contamination and potentially affect public health. The purpose of an initial regulated materials review is to identify properties that are, or may be, contaminated with regulated materials along the alternatives within the corridor study area so that the presence of these properties may be factored into subsequent alternative selection and design considerations. It is preferable to avoid highly contaminated sites in order to minimize potential additional costs, liability, or schedule delays due to site remediation.

Roadway alternatives were evaluated using GIS data from Iowa DNR to determine the proximity of any national priority sites, non-national priority sites, contaminated sites, and leaking underground storage tanks as defined by Iowa DNR and U.S. EPA. Several roadway alternatives are located near regulated material sites. More detailed assessments of projects moving forward in the planning process would be needed in future environmental reviews.

Wetlands and Waters of the U.S.

For purposes of the Clean Water Act (CWA) and its implementing regulations, the term ‘‘waters of the United States’’ means: all waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; all interstate waters, including interstate wetlands; the territorial seas; all impoundments of waters otherwise identified as waters of the United States on the CWA; and all tributaries, as defined in the CWA. Waters of the U.S. are subject to the CWA and are under the jurisdiction of the United States Corps of Engineers (USACE). A permit from USACE is necessary for all projects that would discharge dredged or fill material into waters of the United States, including wetlands.

For Ames Mobility 2040, the National Wetlands Inventory (NWI) and aerial photography were reviewed within the Ames Area MPO study area to determine potential project impacts to wetlands and other

waters of the U.S. Several roadway alternatives would potentially affect wetlands and other waters of the U.S. Wetland delineations are recommended in the initial stages of the roadway improvement project to determine the boundaries of wetlands and other waters of the U.S. within the project area and to coordinate with USACE to determine if USACE has jurisdiction over these areas.

Floodplains

Development in floodplains is regulated by the Federal Emergency Management Agency (FEMA) and the Iowa Department of Natural resources (DNR). Iowa DNR floodplain regulations affect only those highway projects in the floodplains of streams draining over 100 square miles in rural areas and two square miles in urban areas. Projects on streams with drainage areas below these thresholds are regulated by cities and counties. A floodplain permit from Iowa DNR or city or county is required for most projects within a floodplain. A hydraulic review must be completed for projects within floodplains to determine the effect of the project on the water surface elevation of the 100-year flood. FEMA regulations prohibit encroachments in regulated floodways unless it is accompanied by a no-rise analysis that demonstrates the project will cause no increase in the 100-year flood level.

Roadway alternatives for Ames Mobility 2040 were reviewed to determine the extent that they would occur within the 100-year floodplain using the latest Flood Insurance Rate Maps showing the extent of the 100-year floodplain in Story County. Several alternatives are located in floodplains and will need to be further evaluated.

Threatened and Endangered Species

Threatened and endangered species listed under the federal Endangered Species Act (ESA) would need to be considered for each project. The state of Iowa also maintains a list of state-listed threatened and endangered species, and species of special concern. Consultation with U.S. Fish and Wildlife Service (USFWS) and Iowa DNR would be required to determine which listed species have the potential to occur within each project area and the potential for the project to affect each species present.

Roadway alternatives were reviewed for their potential to affect protected species by assessing the potential habitat affected by each alternative. Projects moving forward in the planning process would need further review for their potential to affect species by completing habitat surveys and potential consultation with the U.S. Fish and Wildlife Service and Iowa DNR.

Environmental Justice Assessment

Executive Order 12898 requires federal agencies to achieve environmental justice by identifying and addressing disproportionately high and adverse human health or environmental effects, including the interrelated social and economic effects of their programs, policies, and activities on minority populations and low-income populations in the United States. U.S. Department of Transportation (USDOT) Order 5610.2(A) and FHWA Order 6640.23A define an adverse effect as the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to: bodily impairment, infirmity, illness or death; air, noise, and water pollution and soil contamination; destruction or disruption of human-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of FHWA programs, policies, or activities. In accordance with FHWA Order 6640.23A, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, minority and low-income populations were identified in the area affected by the LRTP. Projects identified as part of the Ames Mobility 2040 were analyzed to determine if they would potentially disproportionately highly and adversely affect minority and low-income populations in Ames Area MPO. The City will engage all populations, including minority and low-income populations, in the Long Range Transportation Plan public involvement process to get public comments during the planning process. The MPO's Public Participation Plan is the basis for the public engagement efforts for the Long Range Transportation Plan update, providing the direction with the intent of involving all populations within the community.

NEPA documentation for the LRTP projects would analyze these populations at a more detailed level, address potential disproportionate impacts to these populations, document efforts to inform minority and low-income populations of proposed road improvement activities and engage them in the public involvement process, and document efforts to minimize and avoid environmental impacts to the environmental justice populations.

Environmental Justice Methodology

Minority Populations

FHWA defines a minority population as any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity. FHWA defines a minority as:

- Black: a person having origins in any of the black racial groups of Africa
- Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race
- Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent
- American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition
- Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

Data from the 2010 U.S. Census of Population was used to determine the number and percentage of minority populations in Ames Area MPO. Data was analyzed to the smallest geographic unit available. For minority data, the smallest unit is the census block; data used for analysis was from the decennial censuses.[35] Per FHWA guidance, a readily identifiable group of minority persons was identified as any Census block with a "substantial" minority populations: where the percentage of minority population was at least one standard deviation (34 %) higher than the mean of a typical normal data distribution curve as compared to the percentage of the minority population within the Ames Area MPO boundary. The minority population of the Ames Area MPO area is 15.0 % of the total population; the threshold value used to determine a "substantial" minority population is 20.1 % (15 % multiplied by 1.34).

[35] *Census blocks are statistical areas bounded by visible features, such as streets, roads, streams, and railroad tracks, and by non-visible boundaries, such as selected property lines and city, township, school district, and county limits. Generally, census blocks are small in area; for example, a block in a city bounded on all sides by streets. Census blocks in suburban and rural areas may be large, irregular, and bounded by a variety of features, such as roads, streams, and transmission lines. While there are no defined populations within blocks, they typically contain from 0 to 100 people.*

In accordance with FHWA guidance[36], clusters of minority populations were also identified; these are Census blocks where there the minority population is not substantially greater than the Ames Area MPO average, but due to the large population in these blocks, the minority population is great enough to be potentially disproportionately and highly adversely affected by the proposed actions of the LRTP. These blocks had minority populations of 50 or greater in a small geographic area.

Low-Income Populations

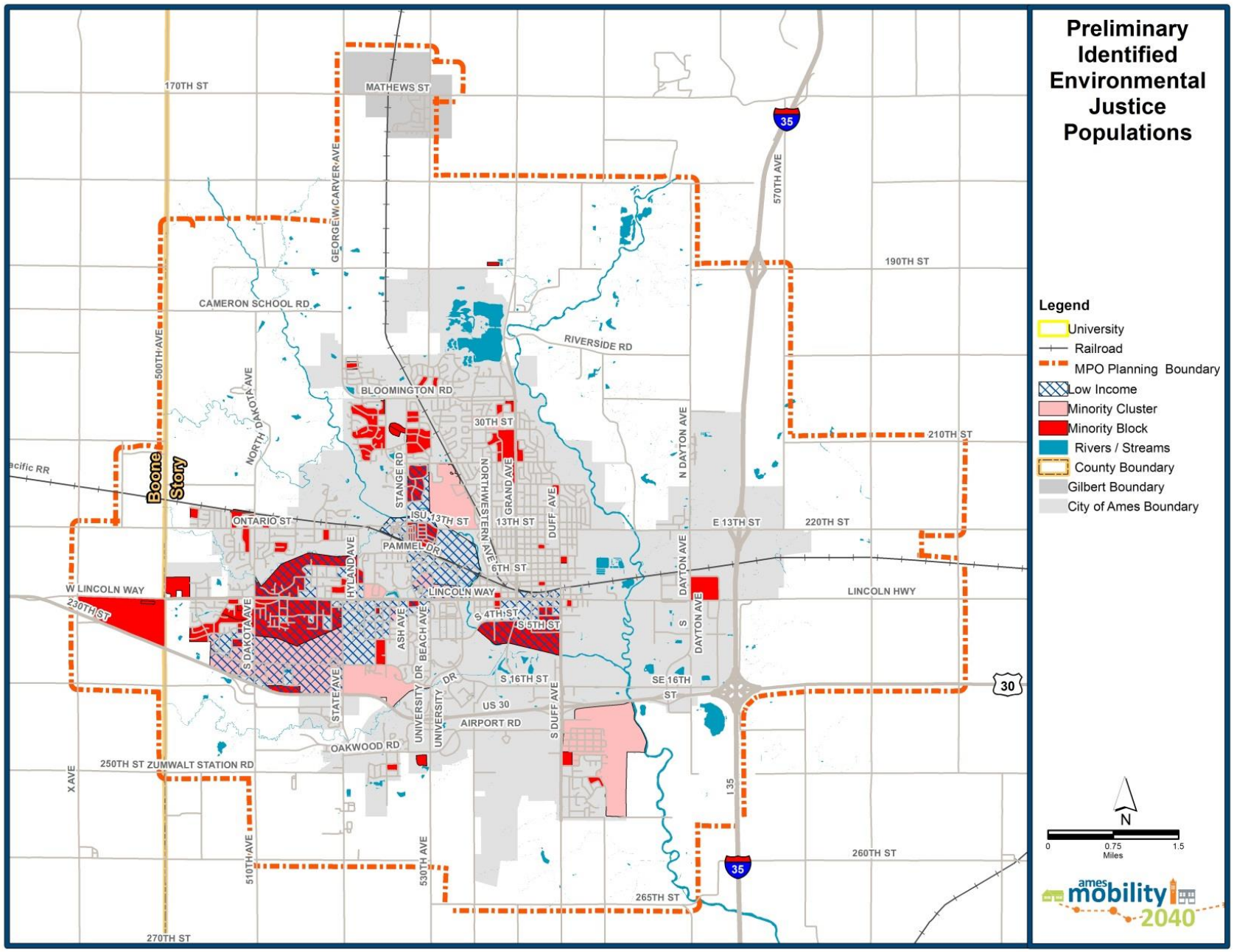
FHWA defines a low-income population as any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity. FHWA defines low-income as a person whose median household income is at or below the Department of Health and Human Services (DHSS) poverty guidelines. The best approximation for the number of people below the DHHS poverty guidelines in a particular area is the number of persons below the Census Bureau poverty thresholds in that area. In this analysis, 2009-2013 American Community Survey ([ACS] a Census Bureau product that is updated annually) was used to determine low-income data for the Ames Area MPO area. The smallest geographical unit available for ACS data is the census block group.[37] The ACS income data used are the 5-year average from 2009 to 2013. Similar to the minority population, a readily identifiable group of low-income population was identified as any Census block with a "substantial" low-income population: where the percentage of low-income population was at least one standard deviation (34 %) higher than the mean of a typical normal data distribution curve as compared to the Ames Area MPO area percentage of the low-income population. The low-income population of the Ames Area MPO area is 25.8 % of the total population; the threshold value used to determine a "substantial" low-income population is 34.6 %.

FIGURE 67 shows the Environmental Justice populations identified with the thresholds and criteria used for this analysis. It should be noted that the location of University students has a significant effect on the results for the Ames area. The student population tends to be younger, and those living away from home have limited income and can heavily influence the low-income population results for the Ames area.

[36] *Clusters are discussed in the December 16, 2011 FHWA memo "Guidance on Environmental Justice and NEPA. The analysis of environmental justice is to include any readily identifiable group or cluster of minority or low-income population.*

[37] *Block Groups (BGs) are statistical divisions of census tracts, and are generally defined to contain between 600 and 3,000 people. A block group consists of clusters of blocks within the same census tract that have the same first digit of their four-digit census block number.*

Figure 67. Identified Environmental Justice Populations



AGENCY AND STAKEHOLDER COORDINATION

The Ames Area MPO maintains a contact list of environmental, resource, and regulatory agencies to consult with, as appropriate, for it major planning activities. These agencies were consulted with during development of Ames Mobility 2040. Agencies were sent a letter from the Ames Area MPO on May 22, 2015, which included a link to the project website where several maps, datasets and analyses were made available for review. Agencies were also notified via letter in late August when the draft LRTP document was available for review in August and September 2015. Agencies were requested provide feedback for completeness and accuracy on topics relevant to the respective agency.

Agencies that were sent this letter include:

- Iowa Department for the Blind
- Iowa Dept. of Ag. and Land Stewardship
- Iowa Department of Cultural Affairs
- Iowa Economic Development Authority
- Iowa Department of Education
- Iowa Department of Human Rights
- Iowa Department of Human Services, Story Co.
- Iowa Department of Public Safety
- Iowa Department on Aging
- Iowa Homeland Security and Emergency Management
- Iowa Utilities Board
- Iowa Workforce Development
- FHWA, Iowa Division
- FTA, Region 7
- U.S. Army Corp of Engineers
- U.S. Environmental Protection Agency, Region 7
- U.S. Department of Agriculture, NRCS
- Story County Conservation
- Iowa Department of Natural Resources
- U.S. Fish and Wildlife Service
- Office of the State Archaeologist
- State Historic Preservation Officer

A response to this letter was received by the ***U.S. Army Corps of Engineers (USACE), Rock Island District***, sent on June 8, 2015. The letter stated elements of project development that would require USACE review further into the project development process. These elements include a wetland delineation/waters of the U.S. determination and corresponding Section 404 authorization, impacts to historic properties, U.S. Fish and Wildlife Service, and floodway impacts.

PLANNING AND ENVIRONMENTAL LINKAGES

Collaborative transportation planning offers opportunities to streamline decision-making and minimize conflicts and surprises during later stages of project development. Planning and Environmental Linkages (PEL) provides a coordinated approach between transportation planning and the environmental review process. The PEL approach minimizes the duplication of effort, promotes long-term environmental stewardship, and reduced cost and delay from planning through project delivery. PEL is most effective when coordinated early, as it lays the foundation for broad consensus on goals and priorities when developing solutions for issues surrounding the transportation system. The way in which transportation planning and environmental (NEPA) processes are linked depends on the specific circumstances for each project. The linkage of planning and NEPA is not specifically required by statute or regulation, through it is encouraged through FHWA guidance.

Where appropriate, the Ames Mobility 2040 has considered the environmental context of the projects, programs and strategies included in the plan, and coordinated with the appropriate resource agencies.

Chapter 11. Conformance with MAP-21

MAP-21 Performance Measurement Requirements

The MAP-21 has increased the emphasis placed on performance measurement at all levels of transportation planning. Specifically, federal code requires that "*the metropolitan transportation planning process shall provide for the establishment and use of a performance-based approach to transportation decision making to support the national goals…*." 23 USC §134(h)(2). The final rulemaking on how performance measurement and performance targets will be incorporated into the planning process are still being established. Where possible the Ames Mobility 2040 plan has incorporated the available direction on performance measurement, including:

- Goals, objectives and performance measures that reflect the National Performance Goals and Planning Factors provided in MAP-21.
- A reference point for initiating performance measurement at the MPO, by providing existing and future conditions assessments that evaluate mobility and safety through the guidance provided in MAP-21.
- A project prioritization and selection process that measured projects against the region vision and performance measures.

By the next LRTP update, FHWA will have finalized the rulemaking and Iowa DOT and the Ames Area MPO will work together to develop a set of performance measures and targets for metropolitan transportation planning. The performance measures provided in the existing conditions assessments, future conditions assessments, and alternatives process represent a reasonable starting point for performance-based planning in the Ames area. When final performance measures and targets have been set in the near future, the performance measures can be adjusted accordingly.

LRTP Consistency with MAP-21 Planning Goals

As discussed in Chapter 2, the MAP-21 guidance provided seven emphasis areas for LRTPs.

- ***Safety:*** To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- ***Infrastructure condition:*** To maintain the highway infrastructure asset system in a state of good repair.
- ***Congestion reduction***: To achieve a significant reduction in congestion on the National Highway System.
- ***System reliability:*** To improve the efficiency of the surface transportation system.
- ***Freight movement and economic vitality:*** To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- ***Environmental sustainability:*** To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- ***Reduced project delivery delays:*** To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

Figure 68 shows the activities and elements provided in Ames Mobility 2040 that fit with each of the national planning goals.

Figure 68. MAP-21 Planning Goals Addressed by Ames Mobility 2040

Safety

- Established Goal and 2 Objectives (2A and 2B) related to enhancing multimodal safety and benefitting safety in top safety issue areas in the community (Chapter 2)
- Analyzed current crash data, including crash frequency, severity, rates
- Identified recent bicycle and pedestrian crash locations. (Chapter 5)
- Recognized intersections in the Ames area that overlap with the State of Iowa's top intersection safety improvement candidate locations (Chapter 5)
- Applied safety performance measures when scoring candidate projects (Chapter 7)
- Identified projects eligible for Highway Safety Improvement Program (HSIP) (Chpater 9)
- Identified projects to improve regional safety (Chapter 9)

Infrastructure condition

- Established Goal and 3 Objectives (6A, 6B, 6C) related to State-of-Good-Repair (Chapter 2)
- Summarized current bridge structure and pavement conditions (Chapter 5)
- Identified sufficient levels of funding for maintaining infrastructure condition in financial plan. (Chapter 8)

Congestion reduction

- Established Goal and 3 Objectives (1A, 1B, 4E) to enhance access and reduce the incidence of congestion
- Assessed current roadway congestion levels at key intersections and roadway segments in the Ames area (Chapter 5)
- Assessed future roadway congestion levels (Chapter 6)
- Compiled transit system performance metrics (Chapter 6)
- Analyzed bicycle and pedestrian demand and suitability index (Chapter 6)
- Applied multimodal connectivity ranking, vehicular level of service, and transit density screening performance measures when scoring candidate (Chapter 7)
- Identified projects to address current and future congestion issues (Chapter 9)

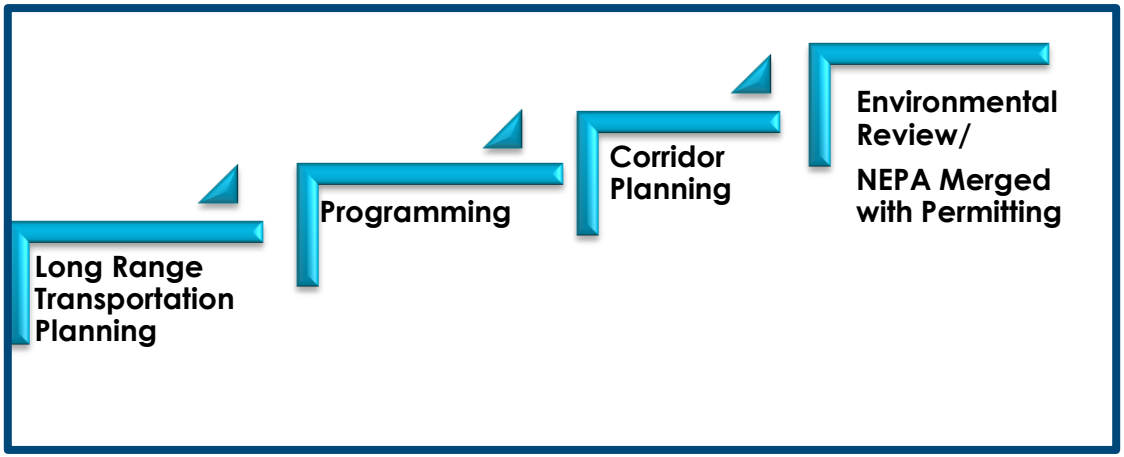
System reliability	•Established Goal and Objectives (1C, 1D,) related to improved multimodal travel reliability and system connectivity (Chapter 2) •Applied INRIX travel time data to assess curent travel time conditions (Chapter 5) •Applied system connectivity assessment and transportation management assessment when scoring candidate projects (Chapter 7) •Identified projects to improve system reliability and transit reliability through transit signal priority (Chapter 9)
Freight movement and economic vitality	•Established Goal and 4 Objectives (5A, 5B, 5C, 5F) related to enhancing freight movement and local economy (Chapter 2) •Applied fright route assessment and I-35 freight assessment performance measures when scoring candidate projects (Chapter 7) •Applied employment/retail connectivity assessment when scoring candidate projects (Chapter 7) •Identified projects to improve freight movement and serve future growth areas in the region (Chapter 9)
Environmental sustainability	•Established Goal and Objectives (3A, 3B, 4C) related to mitigating impacts on natural and built environment, and improving mobility for environmental justice areas (Chapter 2) •Identified natural and human environmental constraints and assessed environmental justice areas (Chapter 10) •Applied environmental screening, VMT/VHT estimation, and Environmental Justice Assessment when scoring candidate projects (Chapter 7)
Reduced project delivery delays	•Established Goal and Objectives (3C, 5E) related to coordination with environmental agencies during project planning and efficient project development (Chapter 2) •Applied environmental screening performance measures when scoring candidate projects to consider the streamline of future project development (Chapter 7) •Included discussion of Planning and Environmental linkages (Chapter 10)

FUTURE PROJECT DEVELOPMENT AND AGENCY COORDINATION

As discussed in CHAPTER 1, placing a project in the Fiscally Constrained Long Range Transportation Plan is only the first step in project development. ***Reduced project delivery delay*** is a national planning goal, and a key opportunity to improve ongoing agency coordination during project development. As the Ames Area MPO looks for opportunities to improve project delivery, the PlanWorks tool provided by FHWA is a relevant web resource that supports collaborative decision-making in transportation planning and project development. PlanWorks is built around key decision points in long-range planning, programming, corridor planning, and environmental review. This system suggests when and how to engage cross-disciplinary partners and stakeholder groups.

Decision Guide is the hub of PlanWorks, meant to advance the state of the practice in transportation decision making. Using actual examples and input from practitioners to identify the barriers, success factors, and structure of successful collaborative decision making in practice, the Decision Guide helps practitioners implement collaborative processes on a broad scale. The PlanWorks Decision Guide provides milestones along the transportation planning process, and identifies stakeholder/agency roles and coordination opportunities for various stages of project development.

This offers an effective reference framework for future transportation planning efforts. The Ames Area MPO may use this process for consideration in how it may benefit corridor and subarea planning studies in the area, beyond Ames Mobility 2040. The Decision Guide covers four major elements:



1. Long Range Transportation Planning: includes Vision and Goals, Evaluation Criteria Methods and Measures, Assessment of Transportation Deficiencies, Adopt Preferred Plan Scenario, Adopt LRTP by MPO.

2. Programming: includes Approve Revenue Sources, Methodology for Identifying Project Costs and Criteria for Allocation Revenue, Reach Consensus on Draft TIP, Approve TIP by MPO, Governor, Incorporate into Draft STIP, Approve STIP with respect to Fiscal Constraint.

3. Corridor Planning: includes approval of Problem Statements and Opportunities, Goals for Corridor, Adopt Preferred Solution Set, Adopt Priorities for Implementation.

4. Environmental Review/NEPA Merged with Permitting: Approve Notice of Intent, Purpose and Need/Reach Consensus on Project Purpose, Approve Full Range of Alternatives, Approve Draft EIS with Conceptual Mitigation, Approve Resource Agency Public Notice, Approve Preferred Alternative/LEDPA, Approval of Final EIS and Record of Decision.

Appendix

A. *Public Engagement Efforts*

B. *Community Survey/ Transit On-Board Survey*

C. *Healthiest Ames and Community Design Lab Documentation*

D. *Ames Travel Demand Model Documentation*

E. *System and Project Feedback*

- Multimodal Issues Input Summary
- Multimodal Alternatives Development Input Summary
- Potential Alternatives for Roadway, Bicycle/Pedestrian and Transit Maps and Tables
- Candidate Project Scorecards
- Bicycle/Pedestrian Project Alternative Phase vs. Final LRTP Project ID Numbers

F. *Funding Assessment and Techniques*

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