Technical Advisory Committee

Monday, May 21, 2018

Regular Session

Item H3

Approval Recommendation of Draft Bicycle and Pedestrian Master Plan

Staff Contact: Chad Nabity, Regional Planning Director

TAC Agenda Report **Agenda Item No. H3**
May 21, 2018

ISSUE

VOTE: Draft Bicycle and Pedestrian Master Plan

BACKGROUND

In April 2016, GIAMPO adopted the region's Long Range Transportation Plan (LRTP). It indicated that a pedestrian and bicycle study should be conducted for the Grand Island area, which would identify a walking and biking network.

GIAMPO in coordination with the City of Grand Island initiated the Bicycle and Pedestrian Master Plan in June 2017. RDG Planning and Design was retained by the City to lead the study efforts.

In May 2018, RDG Planning and Design completed a Draft Bicycle and Pedestrian Master Plan. This document provides the following information:

- Existing conditions evaluations related to walking and biking
- Estimation of the existing and potential future pedestrian and bicycling demand and the results of the pedestrian and bicycle survey
- Concepts and locations for support facilities such as trailheads and open space nodes
- Active Transportation Network (on-street network, off-street trails, and shared use paths)
- Crossing Barriers and Toolbox of Solutions
- Pedestrian Applications
- Phasing and Implementation Program
- Supporting Programs and Policies

The Draft Bicycle and Pedestrian Master Plan is enclosed in the May 21 Technical Advisory Committee meeting packet.

POLICY CONSIDERATIONS/DISCUSSION

The GIAMPO Public Participation Plan specifies there will be a 15-day public comment period before adoption of a GIAMPO report/document by the Policy Board.

BUDGET CONSIDERATIONS

None.

COMMITTEE ACTION

The Bicycle and Pedestrian Advisory Committee (BPAC) met six times during the Bicycle and Pedestrian Master Plan project. At the April 16, 2018 BPAC meeting, RDG Planning and Design made a presentation that provided an overview of the Preliminary Draft Bicycle and Pedestrian Master Plan. The BPAC expressed overall support of the draft plan.

RECOMMENDATION

Approve the Draft Bicycle and Pedestrian Master Plan and release this document for public review and comment.

STAFF CONTACTS

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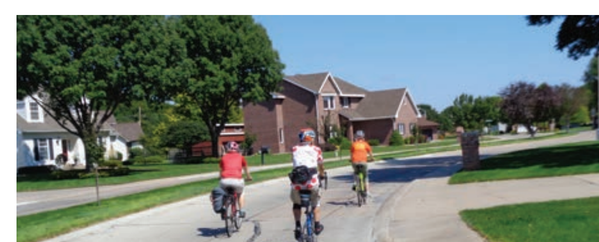
DRAFT
5-9-2018

THE GRAND ISLAND METROPOLITAN AREA

BICYCLE AND PEDESTRIAN MASTER PLAN

Prepared by RDG Planning & Design,
Alta Planning + Design, and Olsson Associates



RDG PLANNING ● DESIGN   alta PLANNING + DESIGN   OLSSON ASSOCIATES

ACKNOWLEDGEMENTS

GRAND ISLAND AREA METROPOLITAN PLANNING ORGANIZATION

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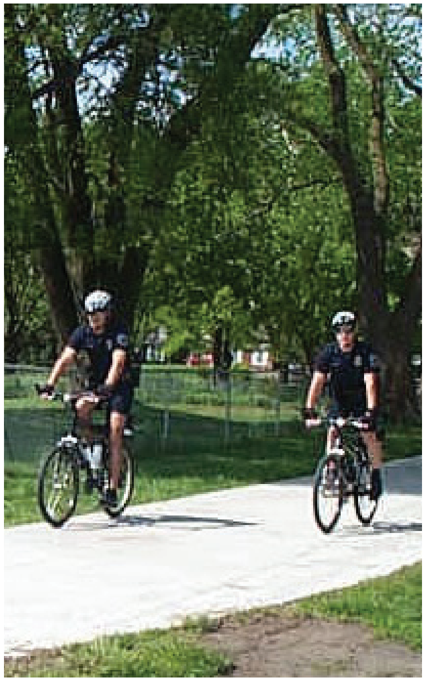


INTRODUCTION

We spend a large amount of our lives in motion – commuting to work or school, traveling to the destinations that mark our lives in cities, and generally going about our lives. How we move can affect many things, including our own health and that of our communities.

As humans, we have been blessed with the ability to travel effectively under our own power. Many of us can walk or run for great periods of time and cover substantial distances, all the while thinking and taking delight in the things and people around us. We can travel even farther and faster by bicycle, a remarkable vehicle that we can easily lift, travels at half the speed of a contemporary car in city traffic, does not use fossil fuels, produces no emissions, makes almost no noise, can be parked outside the door of our destinations or even inside our homes or offices, and makes us healthier. The introduction of new technologies, like the e-bike with small electric motors that provide pedal assists, can bring bicycling as an efficient form of transportation, within the capability of even more number of people. Our ability and efficiency to transport ourselves is indeed a gift.

It is also a gift that makes economic sense. Infrastructure for people on foot or bike costs much less per mile than for motor vehicles. People traveling on-foot or by bike put very little stress on sidewalks, streets, and trails. And human-powered transportation is inherently enjoyable, encouraging us to see each other as people and the gardens, houses, streets, yards, schools, and centers of our cities as a delight.

So now let's consider Grand Island, Nebraska's fourth largest city with a population of about 52,000 people and the state's newest designated metropolitan area. The city has very little topography and a generally well connected street grid. Travel distances to most community destinations are relatively short and many key features have reasonably good trail access. Its major trails, including the Beltline, St. Joe, Shoemaker, and Riverway are very popular with recreational users. These factors create a very friendly environment for active transportation – travel by foot and bike. The average cyclist can cover three miles in only 15 to 20 minutes.

Grand Island as a community understands these possibilities and has acted on this understanding by:

- Developing and maintaining the foundation of a strong trail system, such as the trail wayfinding signs developed cooperatively by the Central District Health Department, Central Community College, and the City of Grand Island.
- Establishing the Walk & Bike Grand Island program and creating a Bicycle and Pedestrian Advisory Committee.
- Publishing and updating a trails map that identifies both on- and off-street routes that serve major community features.
- Integrating physical wayfinding signage independantly and in collaboration with local health organizations to promote active lifestyles.
- Including bicycle and pedestrian facilities in the planning of new community parks and open spaces, including Eagle Scout and Veterans Legacy Parks.

Walking and biking are very much parts of life in Grand Island, evidenced by routine observations, such as the large number of elementary school students who walk or bike to school along the city's trails. The Grand Island area's characteristics provide the opportunity to integrate enjoyable, healthy, active transportation into the everyday lives of its citizens. This *Pedestrian and Bicycle Master Plan* is dedicated to encouraging its citizens to make healthy, low-impact, and intrinsically pleasant transportation a greater part of their routine lives. While we know that most trips will continue to be made by car, the region's transportation system should offer choices, including the option to feel safe and comfortable using the healthy, sustainable, and socially satisfying means of mobility that the bicycle and walking offer.

WHY ACTIVE TRANSPORTATION?

Goals of this Plan

This plan is designed to help the Grand Island metropolitan area achieve the following goals:

Goal One: Increase the number of people who use walking and biking for transportation as well as recreation. Grand Island's existing multi-use trails are well utilized and have a significant transportation function, such as providing access to important destinations like College Park. However, the overwhelming majority of users are recreational cyclists and pedestrians. A measurement of the success of this plan will be significantly increasing the percentage of trips for a variety of purposes. Chapter Two includes estimates of current and future utilization of a bikeway system.

Goal Two: Improve bicycle and pedestrian access to key community destinations. An active transportation network should get people comfortably and safely to where they want to go. Therefore, Grand Island's system should be destination-based, providing clear and direct connections to key community features.

Goal Three: Removing or improving barriers that discourage people from walking or biking for transportation. Grand Island's basically flat topography brings walking or biking within the physical capabilities of most of the city's population. But other important barriers can be much more discouraging. These include two railroad main lines, major regional highways like US 281 and US 30, and busy urban streets. Grand Island's street pattern, where an ordinal and railroad-oriented street grid interact, also creates unusual offset intersections and offsets that people find difficult to cross safely. Creating more comfortable barrier crossings is an important objective of this plan.

Goal Four: Improve access to the city's trail system by providing connecting links from neighborhoods to trails. Grand Island's trails are the main lines of its bikeway system, and will continue to serve many of its bicycle and pedestrian trips. Good connections to these trails, and implementing cost-effective extensions that improve service to major destinations and employment centers can create major benefits and help direct new development.

Goal Five: Use walking and bicycling as part of an effort to make the Grand Island area healthier for the community, and for the individual. Trips made by bicycle promote health at two levels:

- Community health. Reducing emissions also helps ensure that Grand Island will maintain its status as a healthy environment for its citizens. On a social level, bicycling builds community by enhancing the quality of civic life, helping us interact with each other as people. Places that lead in bicycle transportation also tend to attract people because of their community quality.
- Individual health. This is a very important objective which promotes community health through better individual health. Incorporating physical activity into the normal routine of daily life for everyone from kids to seniors makes all of us healthier, reduces overweight and obesity rates, improves wellness, and lowers overall health care costs.

Goal Six: Increase safety on the road for motorists, bicyclists, and pedestrians. Improved safety is a critical goal for any transportation improvement, and is fundamental to efforts to increase the number of people who walk and bike in the region. Physical safety improvements must also be supported by education, enforcement, and encouragement programs, and its effectiveness measured by evaluation.

Goal Seven: Capitalize on the development benefits of a destination-based bicycle transportation system. Better active transportation facilities can have a significant and desirable effect on urban design and development patterns. Walkable and bikeable neighborhoods and projects are highly valued by a new generation of homeowners and investors. The developers of Grand Island's proposed new hospital and mixed use project are including trails as an important part of their development plan, and new city neighborhoods are enhanced by the Shoemaker Trail and connectivity that it provides.

MEASURES OF SUCCESS:

Guiding Criteria for an Effective Transportation Network

The design of bicycle and pedestrian transportation systems should be guided by criteria that can be used to evaluate individual components and the effectiveness of the entire network. We elaborate on these criteria in Chapter Three, which are based on the work of the Netherlands' Centre for Research and Contract Standardization in Civil and Traffic Engineering (C.R.O.W.), one of the world's leading authorities in the design of bicycle-friendly infrastructure. These same criteria also apply to pedestrian networks. Drawing on C.R.O.W.'s work in its excellent design manual, *Sign Up for the Bike,* the Grand Island bicycle and pedestrian network should be guided by six basic guiding principles:

- Integrity (or, in C.R.O.W.'s term, Coherence): The network should, at all points in its evolution, form a coherent system that links starting points with destinations. The network should be understandable to its users and fulfill a responsibility to convey them continuously on their paths.
- Directness: The active network should offer cyclists as direct a route as possible, with minimum detours or misdirections.
- Safety: The bikeway network should maximize the safety of using the bicycle for transportation, minimize or improve hazardous conditions and barriers, and in the process improve safety for pedestrians and motorists.
- Comfort: Most bicyclists should view the network as being within their capabilities and not imposing unusual mental or physical stress. As the system grows, more types of users will find that it meets their needs comfortably.

- Experience: The active network should offer its users a pleasant and positive experience that capitalizes on the region's built and natural environments.
- Feasibility: The active network should provide a high ratio of benefits to costs and should be viewed as a wise investment of resources. It is capable of being developed in phases and growing over time.

An overriding principle of an active transportation network is avoidance of hazards or have unnecessary negative impacts on the overall transportation network.

PLAN METHODOLOGY AND STAKEHOLDER INVOLVEMENT

It was extremely important to structure a planning process that maximized both public involvement and our understanding of the physical structure and community character of the Grand Island area. The Grand Island Area Metropolitan Planning Organization's (GIAMPO) Bicycle and Pedestrian Advisory Committee , representing city and GIAMPO staff, bicycle and walking community members, health interests, the private sector, and other community interests met throughout the planning process, with an initial meeting in August, 2017.

Major public involvement events included:

- Field reconnaissance and stakeholder groups. These visits included initial field work on bicycle and interest/stakeholder group discussions, helping us become familiar with issues and the overall structure of Grand Island neighborhoods and street system. During this process, we rode most of the city's candidate streets and compiled an extensive photographic inventory
- Bicycle and Pedestrian Survey. This survey, explored the characteristics of Grand Island residents interested in bicycling and measured their level of comfort with different types of facilities. The survey, available in English and Spanish, attracted 352 responses and produced information to help frame the direction of this plan.
- Area Workshops. These local sector were a major part of the planning process. The city was divided into three sections: north, south, and west. Each workshop included extensive field work on bicycle during the days, and public meetings in the evening to discuss results and concepts.
- Community Workshop. The community workshop was held at the Grand Island Public Library in September, 2017 to solicit input from stakeholders on the emerging bicycle network and facility concepts. Participants learned about the project, contributed their ideas, and were invited to review the proposed network and infrastructure types on the project website.
- Bicycle and Pedestrian Advisory Commitee (BPAC) and GIAMPO Technical Advisory Committee (TAC). The BPAC was a client group that met at regular intervals during the course of plan development. Key milestone presentations were made to the TAC, which also assisted with

setting priorities through a ballot process that rated the importance and priority of various network segments. We also held periodic meetings with city staff, including Planning, Public Works, and Parks Departments.

ORGANIZATION OF THE PLAN

The GIAMPO Bicycle and Pedestrian Master Plan presents its analysis and recommendations in the following chapters:

1. **Chapter One: Active Transportation Environment.** Chapter One examines existing conditions in the city pertinent to walking and bicycling, including determinants of a future bikeway system such as destinations, existing facilities, and opportunities. It includes an atlas of key determinants of the area's active transportation network.
2. **Chapter Two: The Market for Active Transportation.** Chapter Two estimates current pedestrian and bicycle demand and the potential future market. It also reviews the Grand Island Area Bicycle and Pedestrian Survey, which provides extensive information about people interested in urban bicycling and walking in Grand Island and their needs, concerns, and preferences.
3. **Chapter Three: The Active Transportation Network: Principles and Structure.** Chapter Three uses the analysis of Chapters One and Two to establish over-all principles that guide the proposed Grand Island area network. It also elaborates on the measurement criteria previously presented to help guide the system's components. Finally, it presents a complete conceptual system of pedestrian and bicycle facilities.
4. **Chapter Four: Support Facilities.** Chapter Four investigates needs and establishes concepts and locations for support facilities, including trailheads, open space nodes, linkages to new park facilities, and wayfinding.
5. **Chapter Five. Crossing Barriers.** Chapter Five locates and classifies various types of physical barriers to active transportation in the city and identifies different types of solutions that can be adapted to these contexts.
6. **Chapter Six: On Foot in Grand Island.** Chapter Six analyzes pedestrian considerations in Grand Island and proposes a strategic program for improving the pedestrian environment, focusing specifically on the areas around high-density destinations such as schools.
7. **Chapter Seven: Route Details and Sequencing.** Chapter Six includes a detailed, route-by-route facility program, showing proposed conceptual design solutions for each segment of the system. It discusses criteria for determining the sequence of development and presents a phased implementation program, along with probable costs for different infrastructure types. Finally, it proposes an initial pilot network, based on serving all parts of the city and early feasibility.
8. **Chapter Eight: Support Programs.** The League of American Bicyclists describes six "E's" as components of a bicycle-friendly community (BFC) program and judges BFC applications accordingly. These program categories are Engineering, Education, Encouragement, Enforcement, Evaluation and Equity. Chapters One through Eight largely address the Engineering component; Chapter Seven recommends initiatives that support these infrastructure investments to achieve bicycle transportation's full potential as part of Grand Island's access environment.

CHAPTER 1

ACTIVE TRANSPORTATION ENVIRONMENT

THIS CHAPTER OUTLINES THE EXISTING CONDITIONS IN GRAND ISLAND PERTINENT TO WALKING AND BICYCLING. These conditions include determinants of a future bikeway system such as destinations, existing facilities, and opportunities as well as a broader understanding as to how the region has developed and grown from land use and motor vehicle transportation aspects.

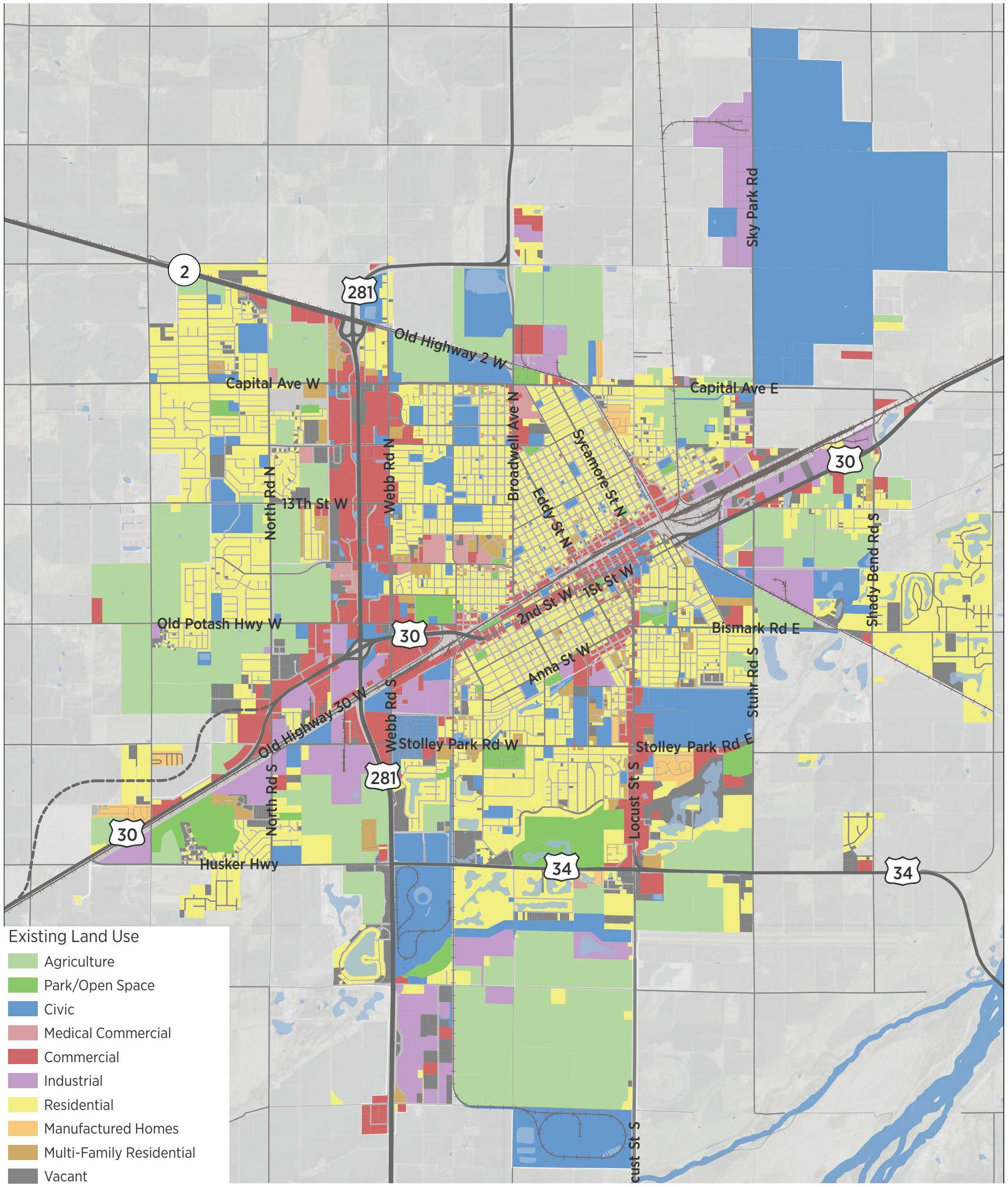
Existing Conditions
This section considers factors that can help determine the structure and character of the Grand Island area's active transportation network. Areas of analysis break into two general areas:

Demand – Factors that suggest a need for facilities and can be analyzed together to suggest the structure of the network. These factors include both points of origin such as population density and destinations such as parks, schools and places of employment. Area of analysis include

- Current land use
- Future land use
- Population density
- Employment density
- Parks and trails
- Schools and sidewalks

Facilities – These factors analyze aspects of existing infrastructure and their suitability for a future active transportation network. Areas of analysis include

- Functional street classification
- Trails and bike routes
- Average daily traffic
- Crash incidence and traffic control
- Low traffic streets with continuity
- Transit potential
- Barriers

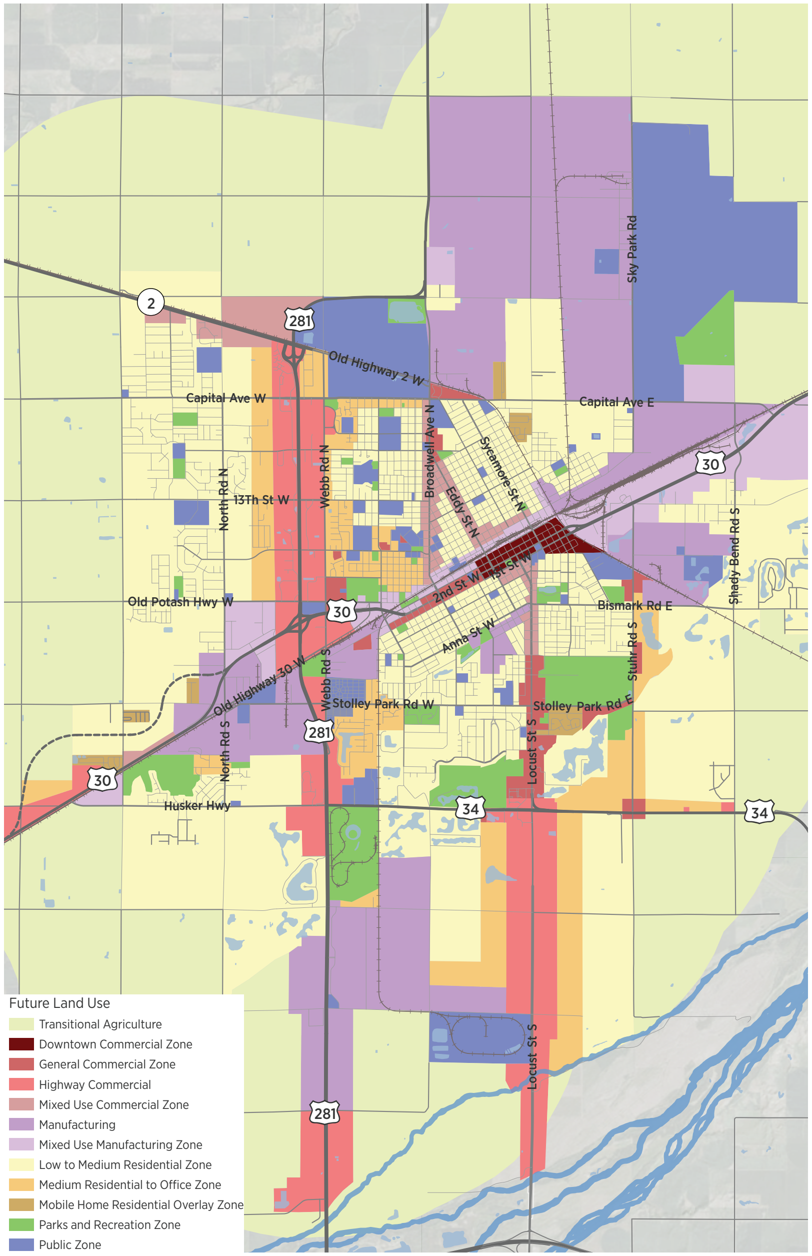


Source: Regional Planning Commission, 2017

Existing Land Use

Land use patterns help determine the structure of an active transportation network. Major determinants include concentrations of higher density housing, major employers, medical complexes, civic and cultural uses, and commercial concentrations. The streets that serve some of these key areas may not be fully compatible with bicycle transportation, but all should accommodate pedestrians and provide secondary accessways for bicyclists. Key land use factors include:

- Downtown Grand island, including the core district between Eddy and Sycamore, extended east and west along the US 30 corridor. Fourth Street north of the UP has developed as a significant traditional commercial district with a strong specialization in ethnic Hispanic enterprises.
- The dominant US 281/Webb Road commercial corridor, with Diers Avenue and Allen Drive providing parallel local circulation. South Locust, the Five Points cluster are also important commercial centers.
- The Faidley corridor north to 10th Street between Broadwell and Webb, including St. Francis Medical Center, adjacent medical office buildings, and the Grand Island Housing Authority's complex of residential developments. A second major medical and mixed use center is planned for the southwest quadrant of the US 281 and Husker Highway intersection.
- Key civic concentrations, including the VA, Fonner Park, Stuhr Museum, the Central Community College campus, public and parochial schools, and parks, ranging from Pier and Stolley Parks to smaller neighborhood open spaces.
- Major industrial employment centers generally along the UP and BNSF corridors, including JBS with 3,200 employees. Employees of food processing plants like JBS often use bicycles for travel to work for economic reasons.

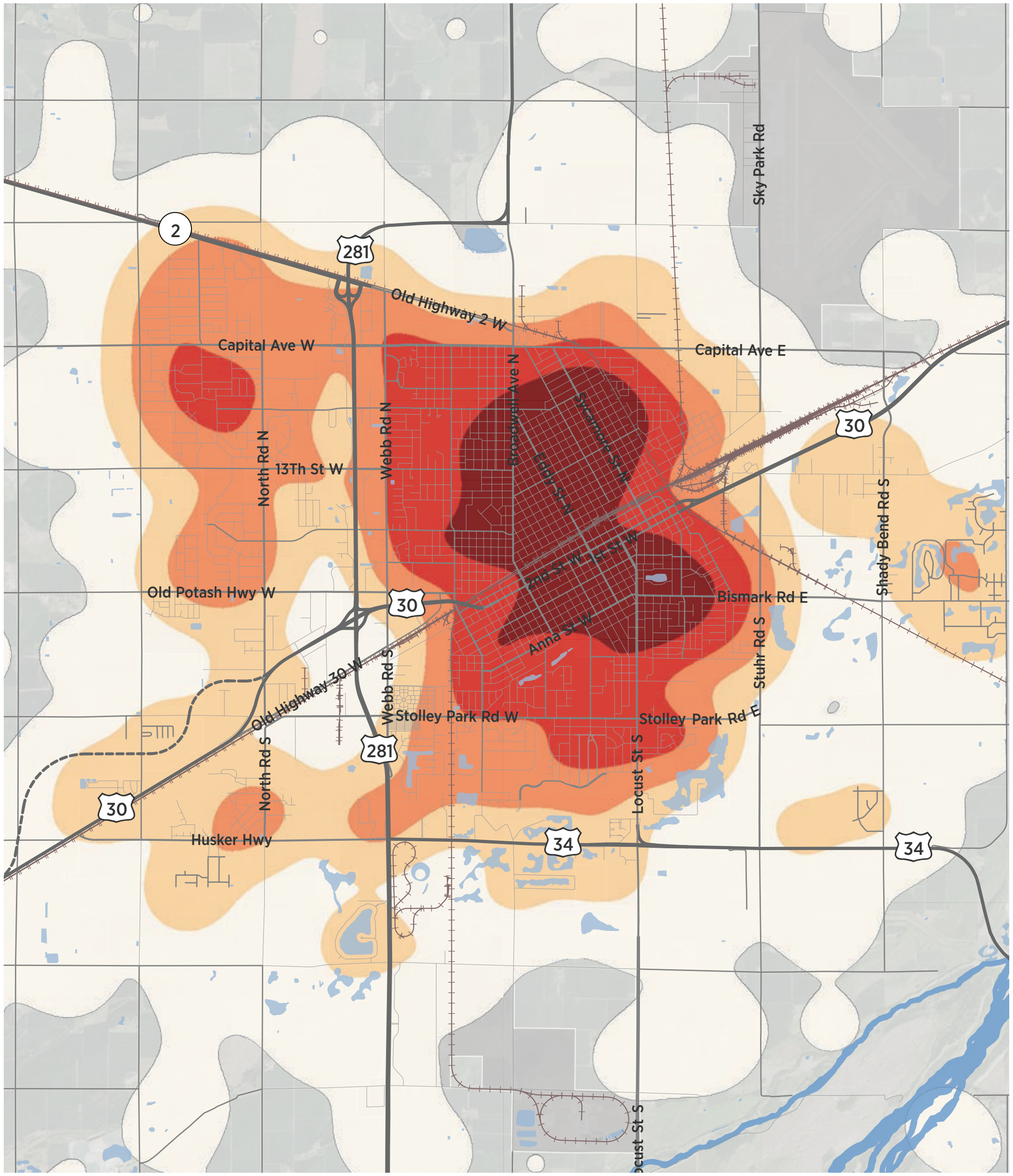


Source: Grand Island Comprehensive Plan

Future Land Use

An active transportation network should ultimately be master planned to serve projected growth directions, illustrated by the Future Land Use map on this page. Key directions include:

- Contiguous residential growth west to Engleman Road and south of Husker Highway.
- Extension of linear commercial development along South Locust toward I-80 and south along US 281 to and south of Husker Highway.
- Substantial industrial growth west of the airport to Broadwell and along the US 281 corridor.



Source: U.S. Census Bureau

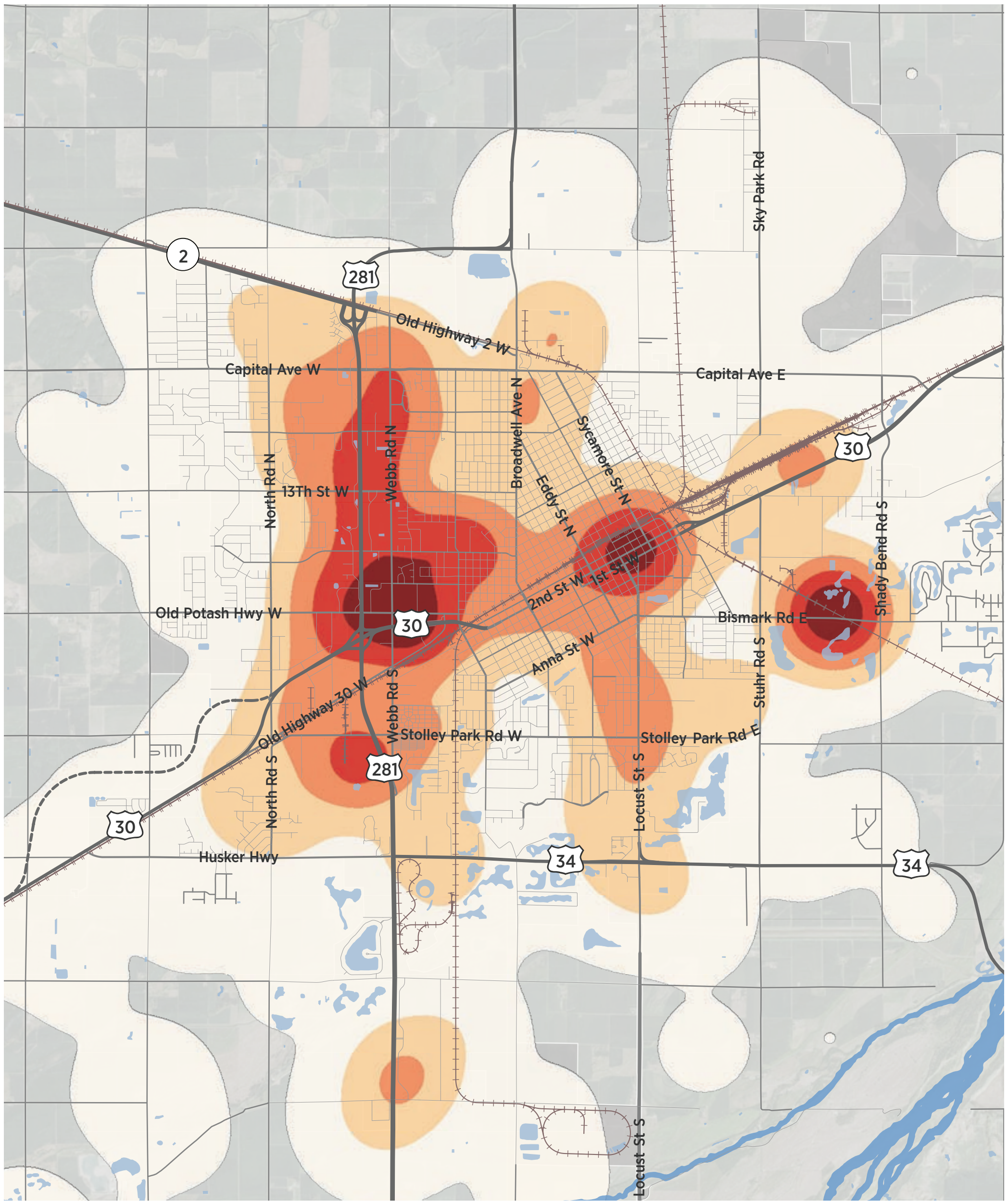
Population Density

Population density is correlated to active transportation demand. As density increases, more destinations are located closer to more people, bringing biking and walking within the capability of a larger population. The map uses block group data to show population per square mile. The city displays a smooth concentric gradation, with the highest density found between Oak and Custer from about 20th Street to Fonner Park. A second density ring extends east of Webb and north of Stolley Park, with an island of higher density in the George Park area of northwest Grand Island.

Population Density

Value

Low	0-138/sq mi
Low - Moderate	139-537/sq mi
Moderate	538-1,203/sq mi
Moderate - High	1,204-2,134/sq mi
High	2,135-3,333/sq mi



Source: U.S. Census Bureau

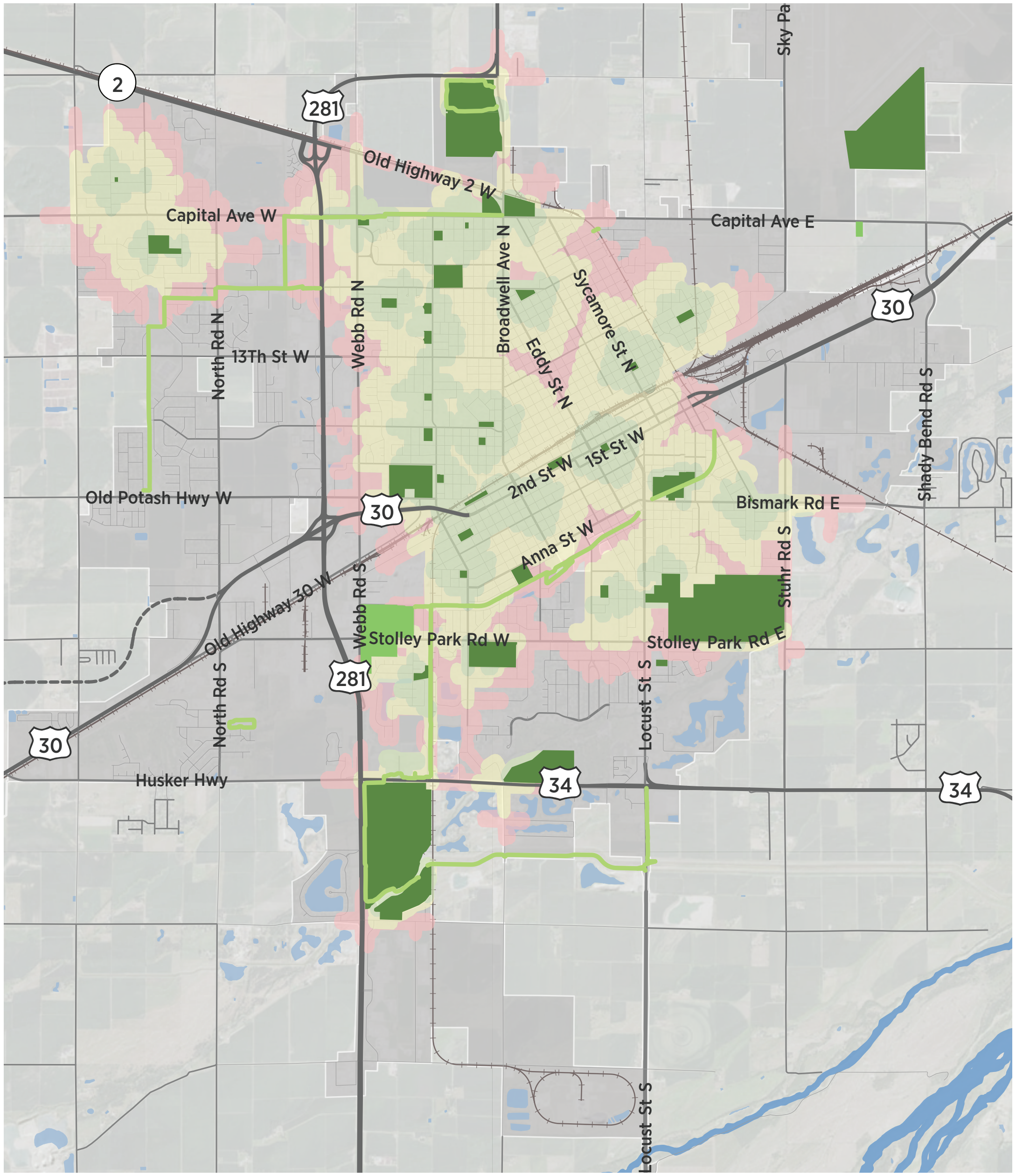
Employment Density

Employment density is also correlated to active transportation demand, identifying concentrated job centers. The map on this page uses census data to illustrate jobs per square mile in the city. The city's three most concentrated employment areas are the eastside industrial area with JBS, the city's largest single employer and some other industries; the downtown core; and the US 281/Webb Road corridor, combining major industrial and retail employment. This underscores the value of providing a strong bicycle and pedestrian connection to the eastside industrial area.

Employment Density

Value

Low	0-312/sq mi
Low - Moderate	313-1,234/sq mi
Moderate	1,234-2,770/sq mi
Moderate - High	2,771-4,922/sq mi
High	4,923-7,688/sq mi



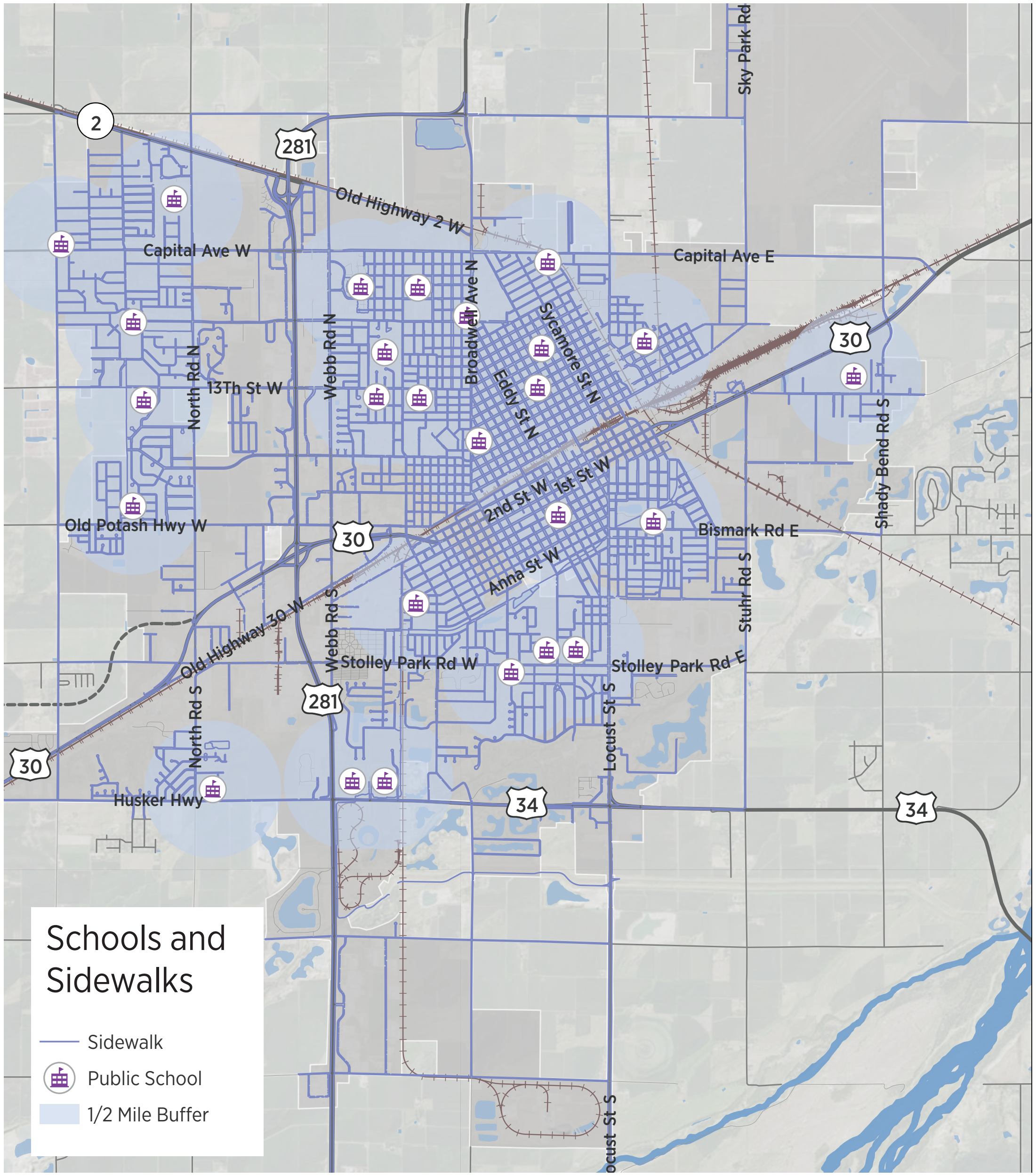
Source: RDG Planning & Design; GIAMPO

Parks and Trails

Parks and trails are among the most important destinations for an active transportation network. Indeed, trails are uniquely both destinations and means of reaching destinations such as parks and recreation assets. The map at left illustrates the distribution of parks and walk time to neighborhood parks. Ideally, all parks should be served by the active transportation network and bicycle connections are especially important to major parks throughout the city and to neighborhood parks from areas outside of easy walking distance. Of major community parks, Pier, Hall County, and Ashley Parks and the Stuhr Museum grounds are directly served by trails. Stolley Park and George Park have close trail access and Stolley is bordered by the multi-modal Stolley Park Road. Eagle Scout Park has a popular internal trail but is separated from the rest of the trail network. Other parks are typically served by sidewalks and local streets, but not by trails or major bike routes. It is also important to note that many of Grand Island's school campuses have significant neighborhood recreational facilities.

Open Space
- Cemetery
- Park
- Trails

Walk Time from Park
- 5
- 10
- 15



Source: City of Grand Island; GIAMPO; RDG Planning & Design

Schools and Sidewalks

Schools are also primary destinations for the Grand Island area's active transportation network, with elementary and junior high students being especially important constituencies. High school students, many of whom drive to school, also present a possible growth market if bicycling is viewed as a contemporary trend. The map at left overlays the city's sidewalk system and school locations, and indicates that:

- Most of school sites have good sidewalk access, although road barriers interrupt this in some attendance areas.
- Sidewalk access decreases in peripheral or lower density areas, such as Seedling Mile on the extreme east side of the study area
- A number of schools enjoy good trail access. These include schools west of US 281 along the Shoemaker Trail/Independence Avenue corridor; and Gates and Dodge Elementary Schools along the John Brownell (Beltline) Trail. These facilities are used by students, but face obstacles at busy street crossings.
- A current gap is emerging with service to new school facilities developing along the Adams Street corridor north of Stolley Park Road.
- Grand Island's students are willing to walk and bike to school when facilities are available.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15
WHEN
FLASHING
FINES
DOUBLED
DRUG
FREE
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Knickrehm School
NOSCHOOL
FRIDAY SEPT1
NO SCHOOL
MONDAY SEPT4
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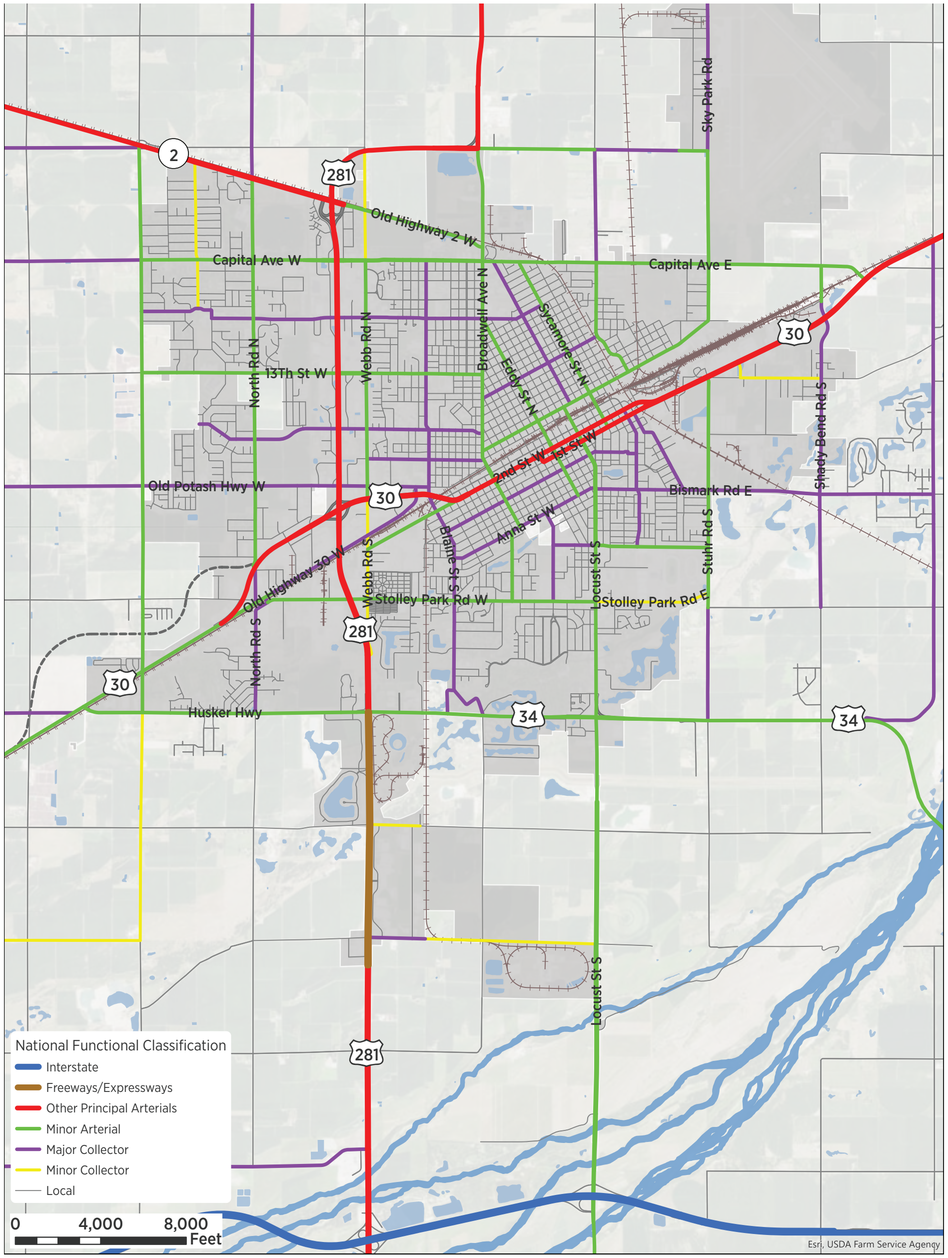


Source: GIAMPO

Functional Classifications and Existing Facilities

Grand Island's major street network is the framework of the region's transportation system and provides primary access to many of the city's key destinations. However, many of the city's major streets – expressways, principal arterials, minor arterials, and even major collectors have traffic volumes that many prospective bicyclists and even pedestrians find uncomfortable or them and their families. These same major streets also present potential barriers, as described more specifically in the Barrier Map – intersections that are difficult to cross, may not have traffic controls on secondary streets, or otherwise deter people from crossing them on foot or bike.

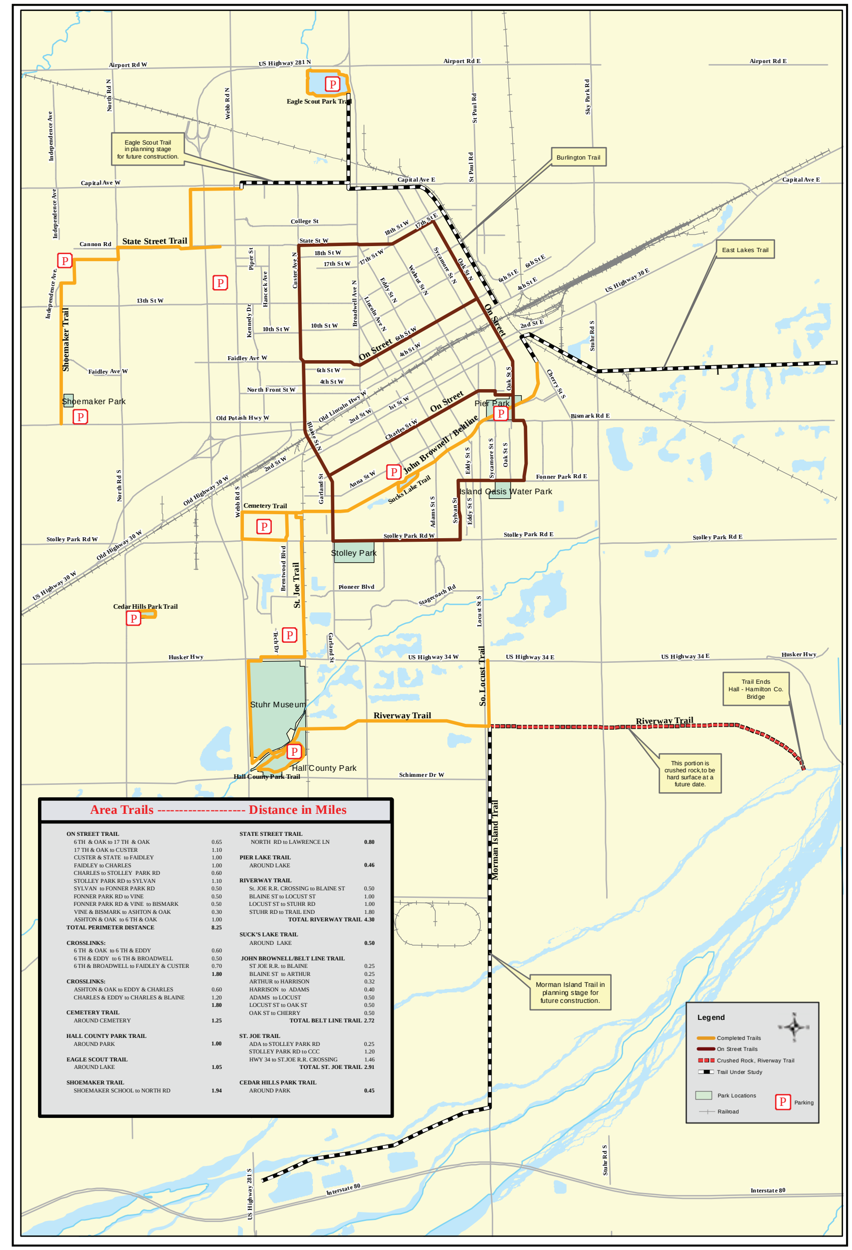
From a trail perspective, Grand Island has assembled the foundation of an excellent trail network, made up of two systems:

The Beltline/Cemetery/St. Joe/Riverway/South Locust Trails link the central and southern parts of the city and serve Pier Park, Suck's Lake, College Park, Stuhr Museum, Hall County Park, the proposed new medical center and mixed use project at Husker Highway and US 281, and the Walmart SuperCenter on South Locust on its continuous 12-mile path from Cherry and Sutherland to South Locust and US 34. The Riverway Trail continues east from South Locust to the Hall-Hamilton County Bridge. Extensions to this system are planned to connect to Mormon Island State Recreation Area via South Locust and the Platte River; and the East Lakes Trail along the BNSF and Swift Road.

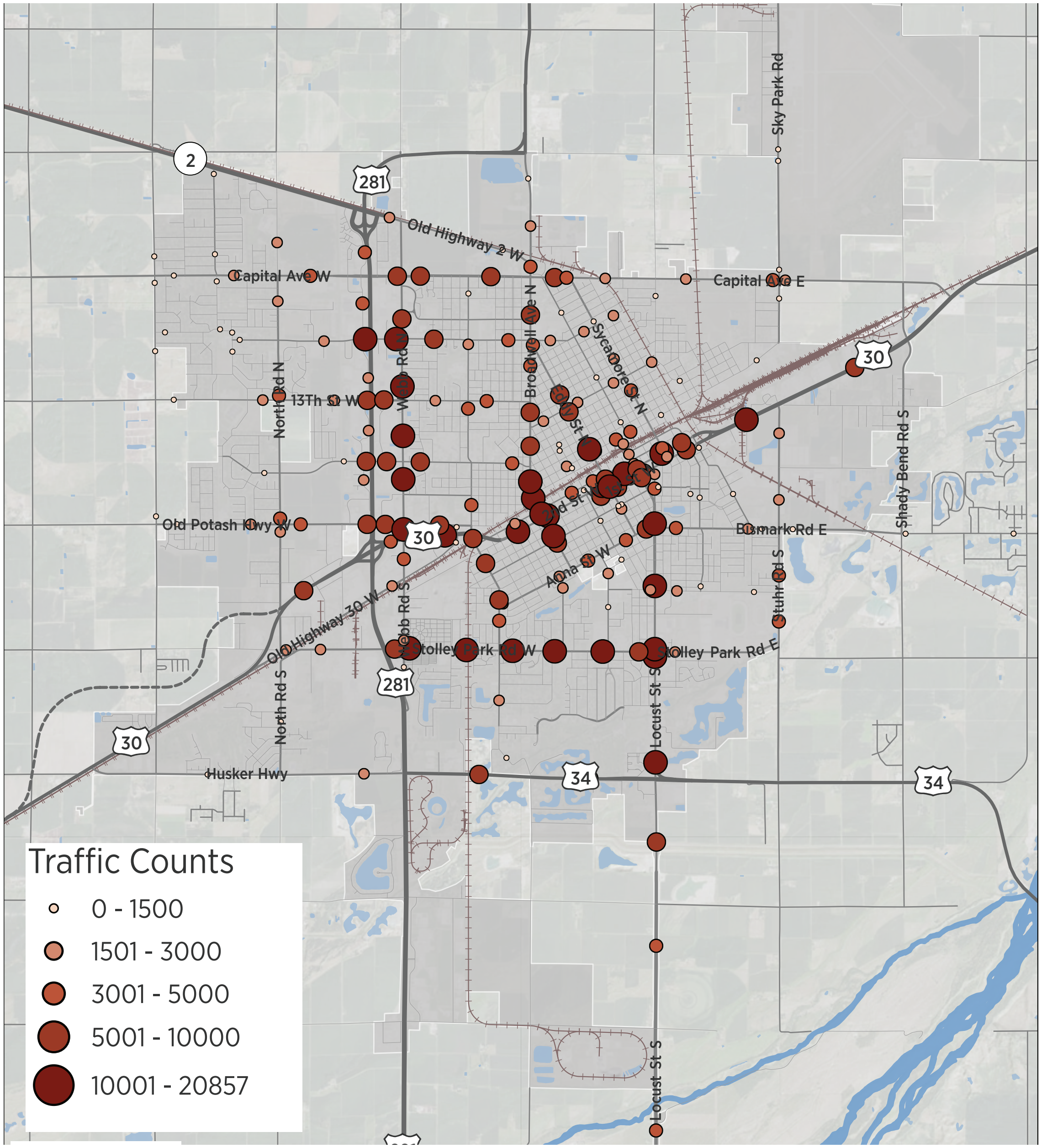
The Westside system made up of the Capital Avenue, Capitol-State Connector, State, and Shoemaker Trails, linking Ahley and Shoemaker Parks, Shoemaker and Engleman Elementary Schools, and Westridge Middle School between Capital and Broadwell and Old Potash Road. Future extensions to this system will connect north along Broadwell to Eagle Scout Park and southeast along Capital and the BNSF elevated mainline to East 4th Street.

While these two trails systems provide both utility and recreation, they are not connected to each other, and linkages to each other and much of central Grand Island depend upon on-street routes. East-west designated "on-street trails" include 17th/State Street, 6th Street, Charles Street, and Stolley Park/Sylvan/Fonner Park, all between Custer/Blaine and Oak/Vine. State is a major collector with average daily traffic (ADT) in the 3,000 to 5,000 vehicles per day (vpd) range, suitable for experienced riders, That volume rises above 10,000 vpd as the street approaches Webb Road. Stolley Park Road is minor arterial with ADT above 10,000 vpd. This is made somewhat more comfortable by the presence of wide shoulders on this two lane facility. Stolley Park will be converted to a three-lane section with "multi-use shoulders" usable by bicyclists in a project scheduled for 2018.

Designated north-south routes include Oak Street/Vine Street from 17th to Fonner Park Road and Custer/Blaine between State and Stolley Park. Oak Street is a low-volume local street with good continuity. The Custer/Blaine route is very important in terms of destinations, but its relatively high ADT, in the 3,000 to 5,000 vpd range along Custer and 5,000 to 10,000 vpd on Blaine are uncomfortable for many cyclists. In addition to serving major destinations, however, this corridor is significant because it includes a grade separated crossing of US 30, a major east-west barrier.



Source: City of Grand Island



Source: Nebraska Department of Transportation and City of Grand Island, 2015-16 traffic counts

Average Daily Traffic

The previous discussion of street classifications and existing facilities discussed traffic volume related to on-street routes designated in the city's Trails Map and bike route system. The map at left illustrates average daily traffic (ADT) throughout the street system and helps to identify opportunities for on-street linkages. Different ranges of traffic also are associated with different types on infrastructure treatments for bicycle and pedestrian facilities: higher levels require a greater degree of separation from motor vehicles for many cyclists and present crossing barriers to pedestrians:

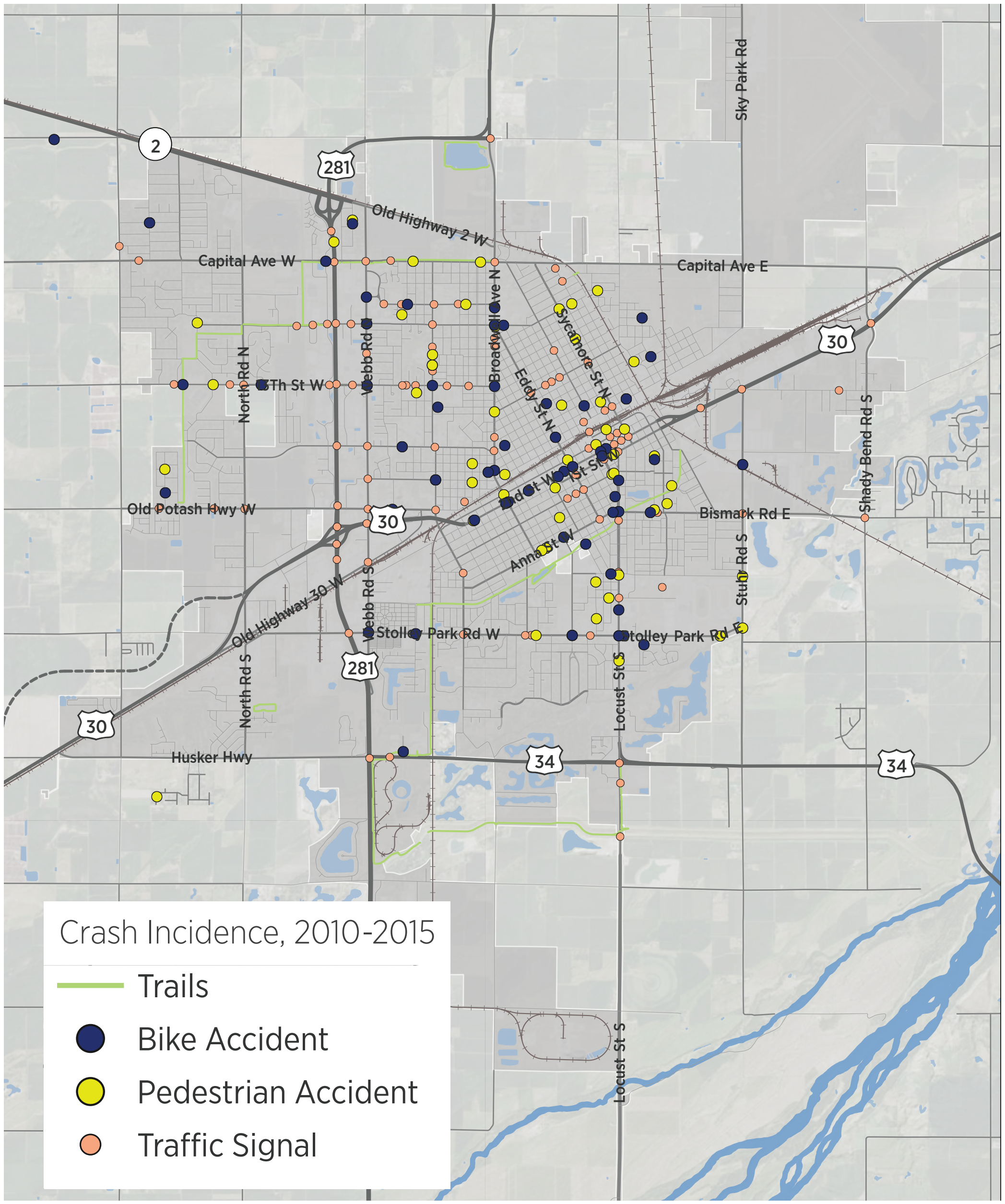
0 to 1,500 vpd: Generally comfortable for most cyclists without extensive infrastructure, relatively comfortable and crossable environment for most pedestrians.

1,500-3,000 vpd: May be uncomfortable for inexperienced cyclists. Shared lane markings and conventional bike lanes as volumes approach 3,000 vpd may be required for greater comfort levels. Pedestrian crosswalks may be required at intersections.

3,000-5,000 vpd: Typical threshold for conventional bike lanes. Require well-defined crosswalks, caution signs, and possible traffic controls at key crossings.

5,000-10,000 vpd: Requires substantial experience and comfort with shared traffic from cyclists. Conventional bike lanes are typically recommended, with protected bike lanes at higher levels. Separation of sidewalks from curbs and well-designed crosswalks with traffic controls and refuge medians at key crossings are highly desirable.

Over 10,000 vpd: Protected bike lanes, enhanced side-paths or use of alternative routes for cyclists. Sidewalk separation from curb and well-designed crosswalks with traffic controls and refuge medians at key crossings are highly desirable.

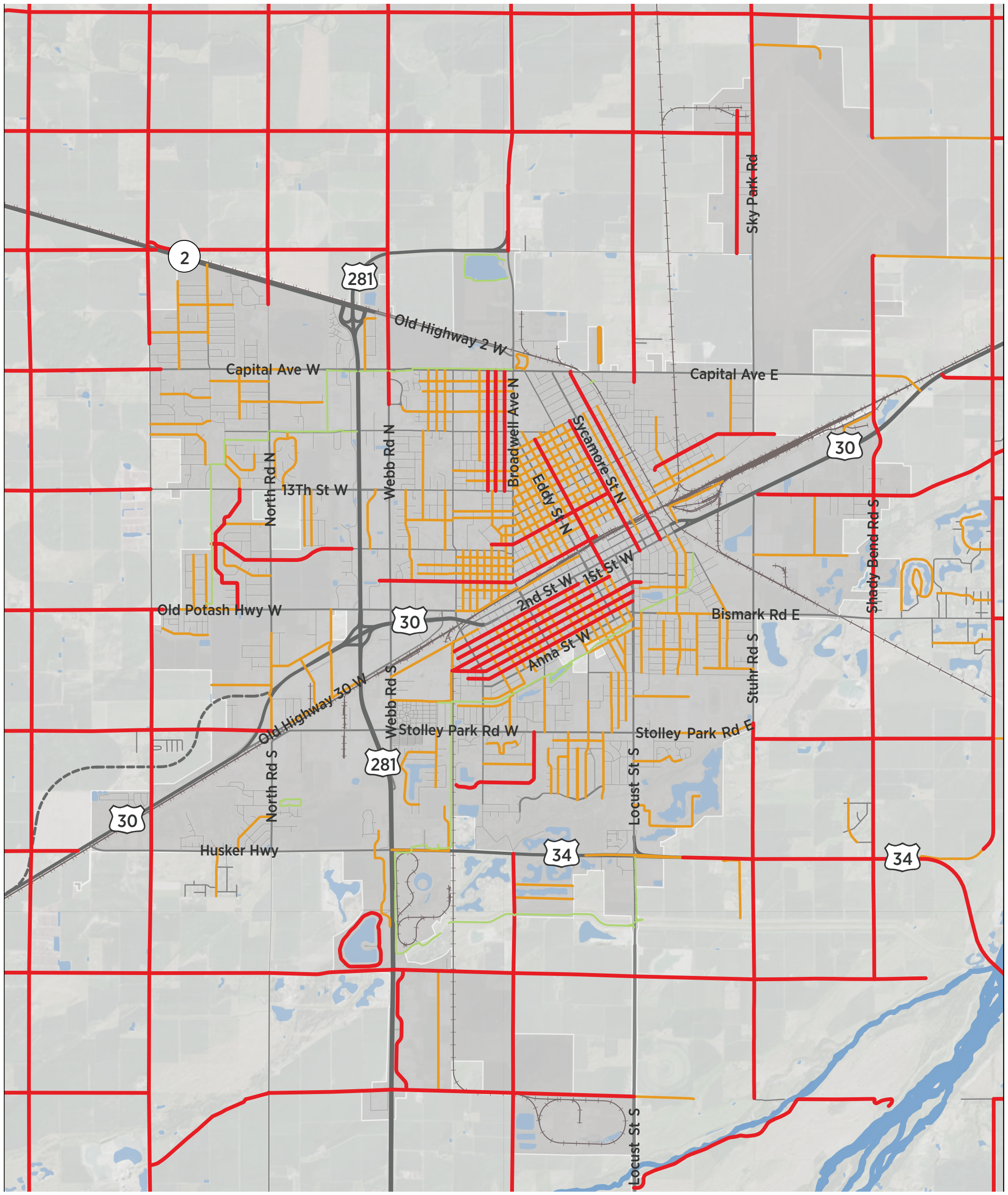


Source: Nebraska Department of Roads, 2010-2015

Crash Incidence

Incidence of pedestrian and bicycle crashes pinpoint specific problems that system planning must strive to address. The map on this page locates crash history between 2010 and 2015, overlaid on the location of traffic signals. Analysis of the map indicates that:

- Most crashes recored in these data occur at intersections without signals.
- Bicycle crashes appear to cluster along certain corridors including: 2nd Street (US 30), clustering in the vicinity of the public library; Broadwell Avenue, with difficult intersections created by the shifting grid; and Locust Street, especially between Downtown and Bismark Road.
- Pedestrian crashes are more distributed around the city, but tend to cluster around Downtown and along the 2nd Street corridor – because these areas have the greatest number of pedestrians.
- Bicycle crashes occurred at some difficult trail crossings (Capital Avenue west of US 281, the Shoemaker Trail at 13th Street, the Beltline Trail at Locust, St. Joe Trail at US 34), but not at others during this period (St. Joe Trail at Stolley Park, Beltline Trail at Blaine).



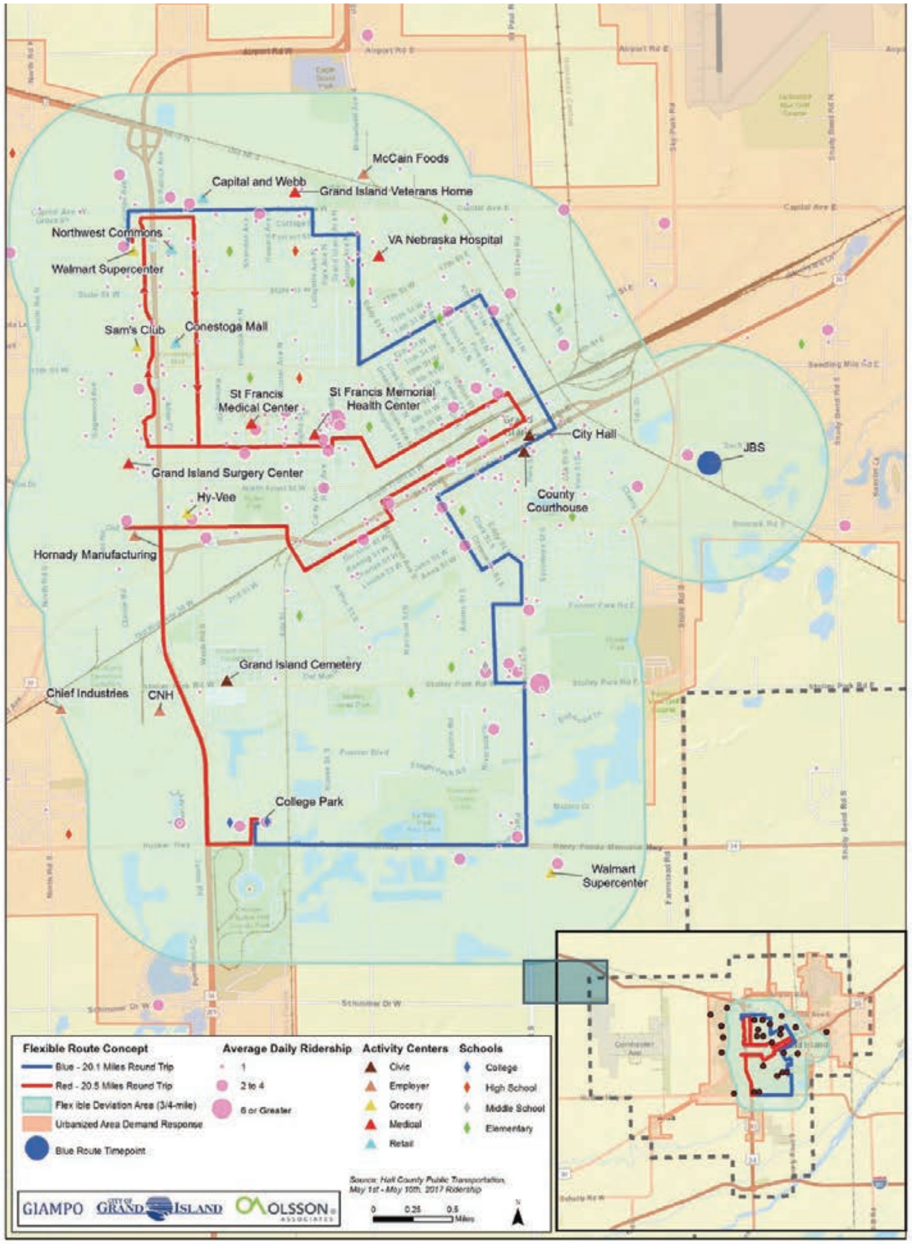
Source: Nebraska Department of Transportation; RDG Planning & Design

Opportunity Streets: Low Traffic Streets with Continuity

One way of achieving separation of bicyclists and, to some degree, pedestrians from high traffic volumes is identifying streets with low traffic that have continuity – continuous lengths of at least 1/2 mile and more significantly one mile. These “opportunity streets” are components of a secondary street system – corridors that can serve important destinations efficiently but are not “major streets” from a classification point of view. These frequently can be incorporated into a neighborhood greenway” or “bicycle boulevard” network, using wayfinding and low-capital traffic calming devices and signage to assemble an effective network.

In Grand Island, these corridors tend to be most prevalent in an east-west direction south of the UP and in a north-south direction north of the UP. In some cases, shorter segments that are offset by short distances can be assembled to create longer crosstown routes.

Another opportunity presented by Grand Island’s network is width. Many of the city’s local and collector streets are 36 feet wide – a healthy width for low traffic streets. Streets of this width can accommodate bike lanes with one-sided parking or other shared road methods. Sometimes, bike- or pedestrian-friendly improvements can also slow traffic to desirable speeds in residential neighborhoods.

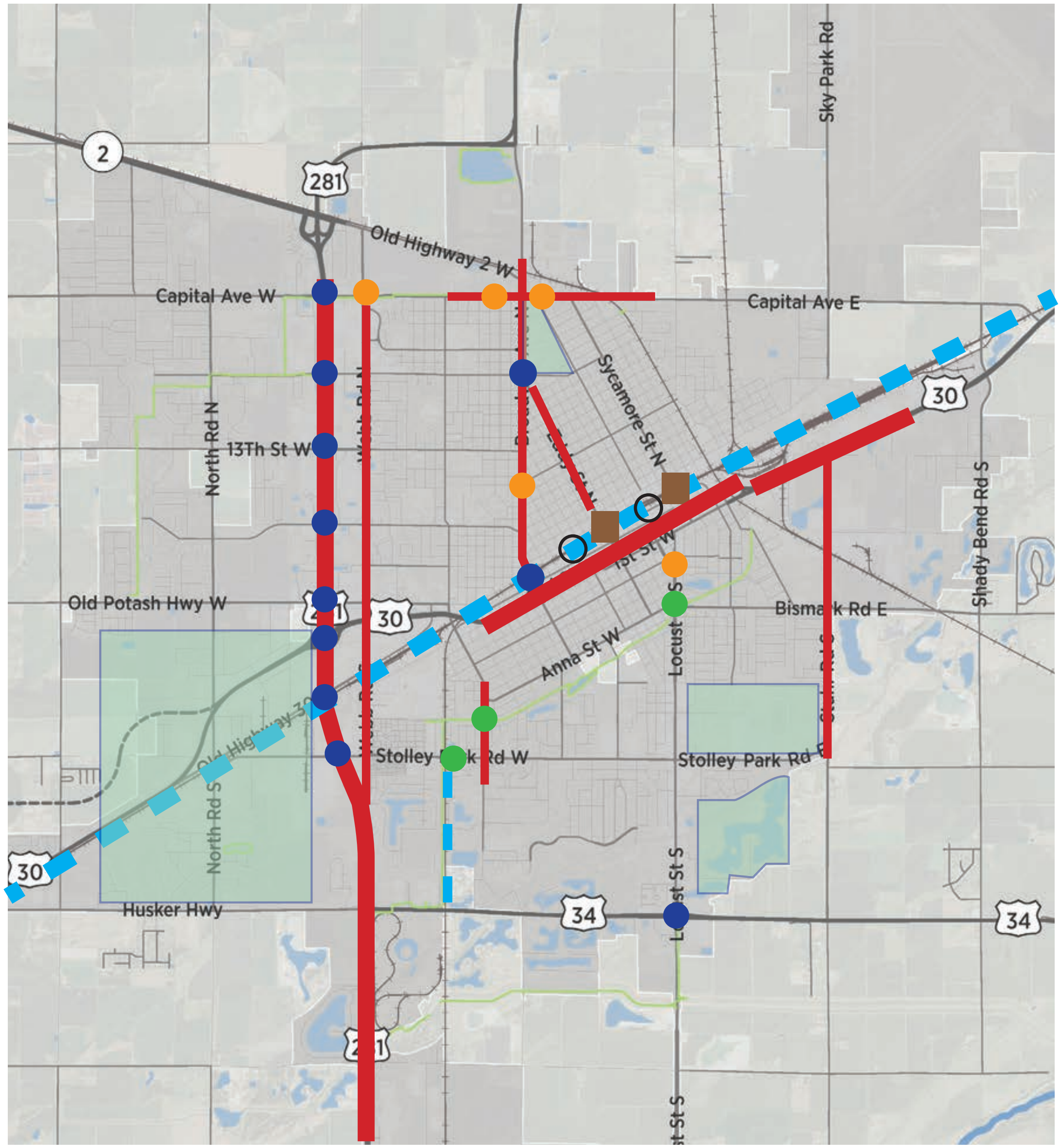


Source: GIAMPO, City of Grand Island, Olsson Associates

Opportunity Streets: Transit

Coordination of possible transit service and other active transportation improvements offers another potential system opportunity. The Grand Island Area MPO approved the Grand Island Transit Needs Assessment and Feasibility Study in December, 2017. This study proposed both a Fiscally Constrained Plan and an Illustrative Plan. The Fiscally Constrained Plan proposes continuation with modifications of the existing Demand Response Service; new vanpool service and a rideshare program; and several policy and planning initiatives, including improved branding and marketing, increased transit contract oversight, and planning a tri-city bus service that includes Hastings and Kearney. This reflects transit operations for the next five years. The Illustrative Plan proposes a Flexible Route Service concept that could be implemented if and when funding becomes available. The concept establishes two routes that can divert within a certain area by passenger request, then returning to the point of diversion to continue its route. Planning for implementation could begin in Year 4 of the transit program process pending the availability of funding.

The map at left displays the Possible Flexible Route Concept contained in the Illustrative Plan. While implementation of this program is relatively long-term, it represents a clustering of current service requests, potential destinations, and high demand corridors that assist with identification of active transportation routes.



Source: RDG Planning & Design

Barriers

The presence of physical barriers poses a major challenge to bicycle and pedestrian transportation in the Grand Island area. While topography is not an issue for pedestrian and bicycle travel in the city, barriers in the built environment – railroads, major highways, and arterial streets – pose significant obstacles. The most important issues include:

US 281. This 4-lane divided highway on the west side of the city is viewed as a major divider that discourages east-west active transportation. This dividing character of the highway is exacerbated by its great right-of-way width, with both the road and adjacent drainageways. State and Capital both include multi-use sidepaths that must cross US 281, a significant physical and psychological barrier.

- **Major Highway Barrier**
- **Other Street Crossing Barrier**
- **Difficult Arterial Crossing**
- **Difficult Trail Intersection**
- **Other Difficult Street Crossings**
- **Railroad Mainline Barrier**
- **Other Railroad Barrier**
- **RR Underpasses without bike/ ped accommodations**
- **Possible grade crossing closings**
- **Areas blocking street continuity**

Union Pacific Mainline. The triple-track UP carries over 100 trains daily, and presents a barrier that is both perceptual and physical. Two grade separated underpasses (Sycamore and Eddy) are inaccessible to bicycles and have undesirable accommodations for pedestrians. The grade crossing at Broadwell Avenue has been a chronic traffic bottleneck and may be replaced by a future grade separation at the potential cost of the one or two most accessible grade crossings of the mainline, at Lincoln and/or Walnut. Whole far less busy than the mainline, the UP south branch to the power plant separates some south side neighborhoods from the St. Joe Trail. On the other hand, the elevated east side BNSF mainline is relatively permeable, with four easily accessible crossings between 4th Street and Capital Avenue.

Other arterial streets, including trail crossings. While more easily negotiated than US 281, busy arterial streets present significant challenges. Of special note are Broadwell Avenue, where the joint between the section line and rotated street grids create difficult intersections that break east-west street continuity; and trail crossings that include the John Brownell Trail at Blaine and Locust, and the St. Joe Trail at Stolley Park Road.

Breaks in street continuity. Development and land use patterns or major projects create areas that interrupt the street grid. Examples are Fonner Park and the VA campus; lack of development east of Locust between Stolley Park Road and US 34; and southwest Grand Island.

CHAPTER 2

MARKETS FOR ACTIVE TRANSPORTATION

THIS CHAPTER INVESTIGATES THE MARKET FOR BICYCLING IN THE GRAND ISLAND REGION – THE NUMBER OF POTENTIAL CYCLISTS AND PEDESTRIANS AND THE PREFERENCES OF THAT POTENTIAL MARKET.

It draws heavily on new and recent census information, national trends, and the 352 citizens who responded to the Grand Island Area Bicycle and Pedestrian Survey.

Before building a major shopping center or apartment project, a developer usually commissions a market analysis, designed to determine whether enough people will shop or live there to support the effort and to define the features that will appeal to customers. Similarly, an active transportation master plan should also evaluate the size and character of the potential market. This helps assess the impact of a bicycle and pedestrian transportation program on factors such as motor vehicle traffic and emissions. It also helps us understand what the existing and potential bicycling community wants of the program, in turn increasing the chances that active modes can reach their potential for the Grand Island area.

This market study uses two major instruments:

- Estimates of existing and future pedestrian and bicycling demand: Using a demand model developed by Alta Planning & Design that is clear, straightforward, and easy to track for future measurement.
- The results of the Grand Island Area Pedestrian and Bicycle Survey: This survey was completed by 352 people, a very satisfactory participation rate for a community of this size, and provides valuable information about the region's potential active transportation community.

EXISTING PEDESTRIAN AND BICYCLE DEMAND

Tables 2.2a and 2.2b use the Alta model to estimate existing and potential pedestrian and bicycle demand. Primary sources of information include the 2012-2016 average computations of the American Community Survey (ACS), developed by the Bureau of the Census, and 2010 Census data. The model makes certain assumptions about transportation choices of populations such as K-12 and college students. The sources of these assumptions are included in the table.

Based on this model, Grand Island has an estimated 11,350 daily pedestrian trips and about 3,900 daily bicycle trips for all purposes (including recreational activity) in 2016. Bicycling has a 0.7 percent commuter mode share. This is about the same as Omaha's current bicycle mode share. Table 2.1 compares the Grand Island's bicycle mode share with that of a diverse nationwide sample of cities.

2030 Midpoint and 2040 Potential Demand

Tables 2.2a and 2.2b provide both projections of trips made by pedestrians and bicyclists at 50 percent and 100 percent completion of the proposed basic system, based on a 20 year implementation schedule between now and 2040. At the 2030 midpoint, enough infrastructure should be in place to have a significant impact on transportation choices. Realistically, this level corresponds to completion of Phase 1 of the Basic System illustrated in Chapter 7. This midpoint model paints a picture of what Grand Island's transportation could be 12 years from now with gradual implementation of an improved pedestrian and bicycle system. Given current fiscal constraints and allocation of existing funds, this assumes a relatively slow start in program implementation, accelerating as new funds become available. The Basic System midpoint assumes that:

- The city will grow at an average annual rate of 1.22 percent during the next 20 years, the city's average annual growth rate since 1960.
- Walk-to-work commuters increase from about 1.12% to 2.25% of all workers.
- Transit's share of the modal mix increases from 0% to a 4%, assuming implementation of the Illustrative Plan's proposed Flexible Route concept in the 2017 Olsson transit study. It is important to note that any projection of transit use is highly speculative, as most existing service has been highly targeted to seniors.
- Bicycle commuting, encouraged by new infrastructure, could increase to about 2% by 2030.
- 15 percent of K-8 students could walk to school, about 40% over the current level. This is still far lower than the 60 percent of students who walked to school 30 years ago.

Applying these changes increases daily pedestrian trips from about 11,350 in 2016 to about 23,250 in 2030, doubling over the twelve year period. Bicycle trips could increase from about 3,900 to about 8,250 daily trips. These changes could have an overall impact on the overall picture in Grand Island. This model assumes that by 2030, about 8% of commuting trips will eventually be made by "active transportation" modes – transit, foot, and bicycle.

The 2040 projections suggest that active modes (including transit) may claim up to a 15 percent mode share by 2040 and that 2% of Grand Island's residents will cycle to work. The number of students walking to school will increase to 20 percent, still far below levels experienced twenty years ago. These assumptions result in an increase of weekday pedestrian trips from 11,350 today to about 35,200; and an increase in weekday bicycle trips from about 3,900 to about 14,750.

These projections do not include technological changes that make bicycling more attractive to more people. For example, the introduction of e-bikes to the area, which use a small electric motor to assist pedal-driven bicycles, may broaden the appeal of bicycling for transportation and will certainly increase the number of people with the physical capability to ride by requiring less physical exertion. On-street infrastructure is particularly well-suited to accommodating these increasingly popular vehicles.

Table 2.1: Comparative Cities' Mode Share

City	Total Number of Workers	Walk %	Bike %
Grand Island	25,985	1.12	0.70
Omaha	204,463	2.84	0.98
Kearney	17,260	3.93	2.05
Cedar Rapids	65,912	2.95	1.76
Bellevue, WA	62,816	4.62	0.52
Bethesda, MD	31,273	6.18	2.00
Burlington, VT	22,102	20.31	4.98
Cedar Falls, IA	20,434	11.80	0.71
Des Moines, IA	100,648	2.75	0.43
Duluth, MN	41,863	5.15	0.82
Edina, MN	22,799	1.95	0.96
Evanston, IL	35,618	11.64	3.01
Fargo, ND	62,074	4.44	1.08
Fitchburg, WI	13,166	1.63	0.90
Gresham, OR	46,692	2.31	0.46
Hopkins, MN	9,595	2.53	0.67
Lee's Summit, MO	46,219	0.52	0.02
Lincoln, NE	138,108	3.13	1.54
Montclair, NJ*	18,486	4.02	0.34
Shorewood, WI	7,575	9.19	3.60
Sioux Falls, SD	84,504	2.19	0.52
Wauwatosa, WI	24,799	2.31	0.59
Wheat Ridge, CO	14,724	2.00	0.92

Source: 2012-16 ACS 5 Year Estimates
**Source: 2009 ACS 5 Year Estimates*

Table 2.2a: Existing and Projected PEDESTRIAN Transportation Trips, 2018-2040

Pedestrian Trips in Grand Island	2016 Base	2016 Share (%)	2020	2020 Mode Share (%)	2030	2030 Mode Share (%)	2040	2040 Mode Share (%)	Assumptions/Sources
Population	50,895		53,424		60,312		68,087		2016: ACS; +1.22% historic annual growth rate since 1960
Total Commuting to Work	25,985	51.05%	27,276	51.05%	30,793	51.05%	34,763	51.05%	51.05% of Grand Island population in employed workforce, ACS 2016
Walking to Work (%)	1.12%		1.5%		2.25%		3.00%		
Walking to Work (#)	291		409		693		1,043		
Work at Home	594		624		704		795		2.29% of Grand Island workers work at home, ACS 2016
Work at Home Pedestrian Trips	149	25% make one ped trip	156	25% make one ped trip	176	25% make one ped trip	199	25% make one ped trip	
Take Transit to Work (#)	178	0.69% take transit	546	2% take transit	1,232	4% take transit	2,086	6% take transit	
Walk to Transit	89	50% walk to transit	273	50% walk to transit	616	50% walk to transit	1,043	50% walk to transit	
School Population (K-8)	7,787	15.3%	8,174	15.3%	9,228	15.3%	10,417	15.3%	K-8 students = 15.3% of GI population, ACS 2016
School (K-8) Pedestrian Trips	857	11% walk to school	899	11% walk to school	1,384	15% walk to school	2,083	20% walk to school	Safe Routes to School National Partnership, 2009. 13% of children walk OR bike to school
School Population (9-12)	2,138		2,244	4.2%	2,534	4.2%	2,860	4.2%	9-12 students = 4.2% of GI population, ACS 2016
School (9-12) Pedestrian Trips	118	5.5% walk to school	135	6.0% walk to school	203	8% walk to school	286	10% walk to school	
College	1,730		1,816		2,050		2,314		College Students=3.4% of GI population, ACS 2016
College Pedestrian Trips	19	1.12%	27	1.5%	46	2.25%	69	3.0%	Same ratio as walk to work
Total Pedestrian Commuters	1,522		1,899		3,118		4,723		
Total Pedestrian Commuter Trips (Commuters x2)	3,044		3,798		6,235		9,447		2 trips for each commuter
Other Trips Ratio (commuter to non-commuter trips)	2.73		2.73		2.73		2.73		U.S. DOT, Federal Highway Administration, 2001 National Household Travel Survey, via Alta Planning & Design
Other Pedestrian Trips	8,310		10,368		17,022		25,790		Commuter Trips x Other Trips Ratio
Total Daily Pedestrian Trips	11,354		14,165		23,258		35,236		Commuter Trips + Other Trips

Table 2.2b: Existing And Projected BICYCLE Transportation Trips, 2010-2040

Pedestrian Trips in Grand Island	2016 Base	2016 Share (%)	2020	2020 Mode Share (%)	2030	2030 Mode Share (%)	2040	2040 Mode Share (%)	Assumptions/Sources
Population	50,895		53,424		60,312		68,087		2016: ACS; +1.22% historic annual growth rate since 1960
Total Commuting to Work	25,985	51.05%	27,276	51.05%	30,793	51.05%	34,763	51.05%	51.05% of Grand Island population in employed workforce, ACS 2016
Bike to Work (%)	0.7%		0.8%		1.2%		2.0%		
Bike to Work (#)	182		218		370		695		
Work at Home	594		624		704		795		2.29% of Grand Island workers work at home, ACS 2016
Work at Home Bike Trips	149	5% make one bike trip	31	5% make one bike trip	35	5% make one bike trip	199	5% make one bike trip	
Take Transit to Work (#)	178	0.69% take transit	546	2% take transit	1,232	4% take transit	2,086	6% take transit	
Bike to Transit	0	0% bike to transit	27	5% bike to transit	62	5% bike to transit	104	5% bike to transit	
School Population (K-8)	7,787	15.3%	8,174	15.3%	9,228	15.3%	10,417	15.3%	K-8 students = 15.3% of GI population, ACS 2016
School (K-8) Bike Trips	156	2% bike to school	327	4% bike to school	554	6% bike to school	833	8% bike to school	Safe Routes to School National Partnership, 2009. 13% of children walk OR bike to school
School Population (9-12)	2,138	4.2%	2,244	4.2%	2,534	4.2%	2,860	4.2%	9-12 students = 4.2% of GI population, ACS 2016
School (9-12) Bike Trips	21	1% bike to school	34	1.5% bike to school	63	2.5% bike to school	100	3.5% bike to school	
College	1,730		1,816		2,051		2,315		College Students=3.4% of GI population, ACS 2016
College Bike Trips	12	1.12%	15	1.5%	25	2.25%	46	3.0%	Same ratio as bike to work
Total Bike Commuters	520		652		1,108		1,978		
Total Bike Commuter Trips (Commuters x2)	1,039		1,304		2,216		3,956		2 trips for each commuter
Other Trips Ratio (commuter to non-commuter trips)	2.73		2.73		2.73		2.73		U.S. DOT, Federal Highway Administration, 2001 National Household Travel Survey, via Alta Planning & Design
Other Bike Trips	2,837		3,559		6,049		10,800		Commuter Trips x Other Trips Ratio
Total Daily Bike Trips	3,876		4,863		8,265		14,756		Commuter Trips + Other Trips

GRAND ISLAND BIKE/PED SURVEY

The estimates discussed above help quantify the size of a potential active transportation market and also help to assess some of the basic economic and health benefits achieved by reaching this market. With realistic mode projections, the Grand Island area could reach 49,992 daytime active transportation trips by 2040. The Bicycle and Pedestrian Survey helps define the preferences and opinions of these prospective cyclists and pedestrians, and provides important guidance for designing the network.

Who are Grand Island's Active Transportation Users?

While the survey is not a scientific sample, the number and diversity of responses suggested that it represents citizens with interest in active transportation. The first questions explored the characteristics of these responses, and found that:

Figure 2.3: Place of Residence of Participants

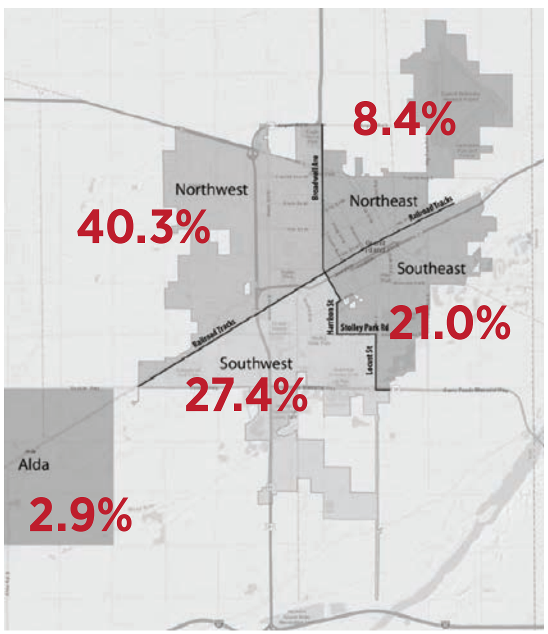
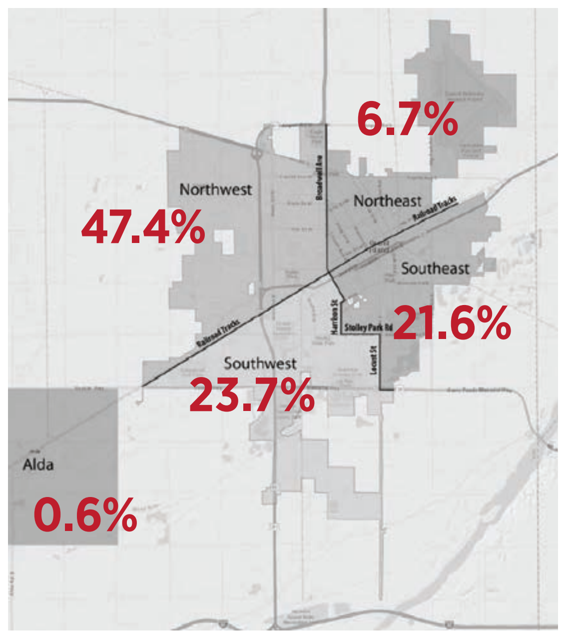


Figure 2.4: Common Destination of Participants



- **Survey respondents represent all parts of the region.** This suggests that residents in all parts of the region are interested in active transportation and that a complete system will find an audience across all of the Grand Island area. An almost even number live north and south of the railroad corridor, with the plurality of responses coming from the northwest sector. Figure 2.3 illustrates the distribution of responses.

- **Destinations are distributed almost in almost exactly the same percentages as residences.** This suggests both destinations in all parts of the region, supporting the concept of a citywide network; and the likelihood of relatively short trips, also supporting an active transportation framework. (Figure 2.4)

CYCLISTS' RESPONSES

- **Responses were relatively evenly split between regular and infrequent riders.** Only about 40% of respondents reported being "regular" riders, riding at least once or twice a week or more; 17% more reported riding occasionally, and about 42% were at best infrequent cyclists. The fact that this type of sample were motivated to complete an extensive survey on pedestrian and bicycle transportation suggests an interesting opportunity for growth and relatively high interest outside a traditional bicycling community. (Figure 2.5)

- **Exercise and recreation-related purposes are by far the most frequent reasons mentioned for bicycling.** Regular exercise is by far the most popular reason for bicycling, followed by other recreational purposes (trips to parks or recreation facilities and family outings). "Utilitarian" bicycling is still relatively uncommon in Grand Island, although about 15% of respondents (51 of 348) report commuting as a purpose for their riding. (Figure 2.6)

- **The largest group of respondents are cyclists most interested in improved infrastructure.** The largest single group, about 39 percent, were interested in cycling and comfortable on low-traffic streets, but showed concerns for safety and see a real need for new facilities to expand ridership and improve safety. The next largest single group, 22%, view themselves primarily as trail users and would like to see additional trails, augmented by interested non-riders. Just over 17% fall into the "committed urban cyclist" category – people comfortable with mixed traffic but support better infrastructure to expand participation. Very small groups were at the edge of the interest spectrum – only about 1.3% responded to being comfortable in every situation and seeing no reason for infrastructure development, and 8.5% reported that they were likely to ride under any circumstances. (Figure 2.7)

PEDESTRIAN RESPONSES

- **A majority of survey respondents walk regularly for a variety of purposes.** Roughly 57% of participants reported walking at least once or twice a week. Only about 20% report themselves as "infrequent" or non-walkers. (Figure 2.8)

- **Exercise and recreation-related purposes are by far the most frequent reasons mentioned for walking.** Purposes of pedestrian trips are very similar to those of bicycling trips. About 85% of respondents report walking for exercise, and the next largest purpose categories (trips to parks or recreation facilities, family outings, and social visits) also involve recreational or leisure purposes. A much smaller group walks for utilitarian purposes such as commuting, shopping, and community destinations. Not unexpectedly, these groups are smaller than those of people who bike for similar purposes. (Figure 2.9)

Figure 2.5: Frequency of Bicycling

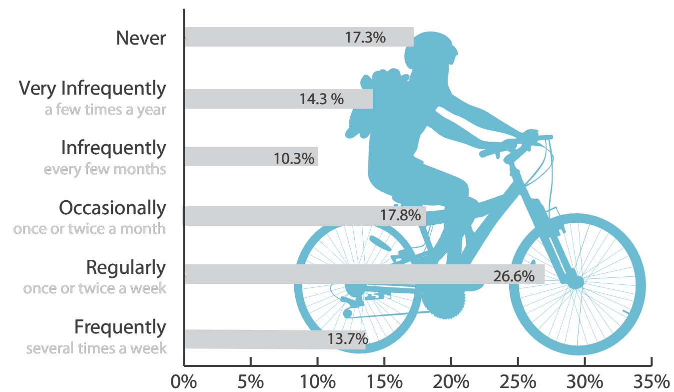


Figure 2.6: Purposes of Cycling Trips

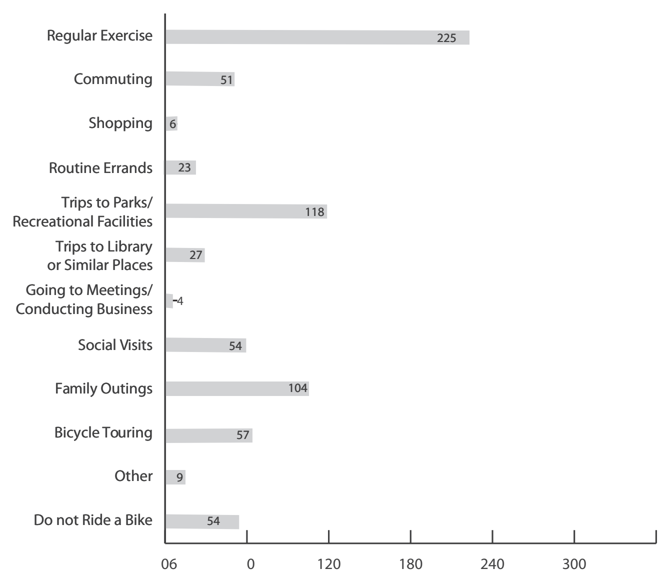


Figure 2.7: Self-Characterization of Participants

COMMITTED AND FEARLESS: I am a committed bicyclist who rides in mixed traffic on every street. I don't believe that any significant further action on bicycle facilities is necessary. **1.3%**

COMMITTED URBAN CYCLIST: I am a committed bicyclist who rides in mixed traffic on most streets, but believes that new facilities like bike lanes, bike routes, and trails are needed to improve Grand Island's biking environment for me and encourage other people to ride more often. **17.4%**

INTERESTED AND CONCERNED: I am interested in bicycling and use low-traffic streets, but am concerned about the safety of riding in mixed automobile traffic. More trails and bike lanes and routes would increase the amount of trips that I make by bicycle. **38.6%**

RECREATIONAL TRAIL USER: I am a recreational or occasional bicyclist and ride primarily on trails. I would like to see more trails, but am unlikely to ride on city streets even with bike lanes **22.4%**

INTERESTED NON-RIDER: I do not ride a bicycle now, but might be interested if Grand Island developed facilities that met my needs better or made me feel safer. **11.7%**

NON-RIDER UNLIKELY TO RIDE: I do not ride a bicycle, and am unlikely ever to do so. **8.5%**

Figure 2.8: Frequency of Walking

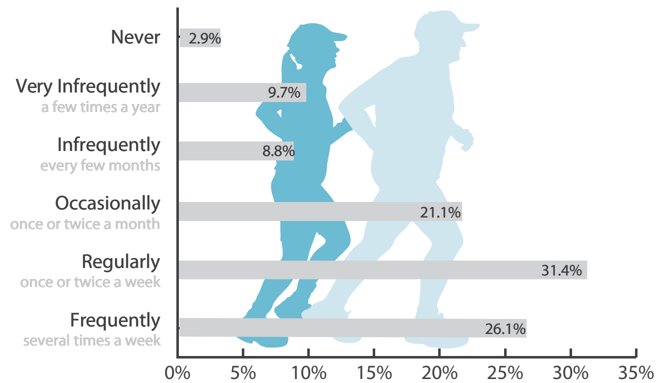
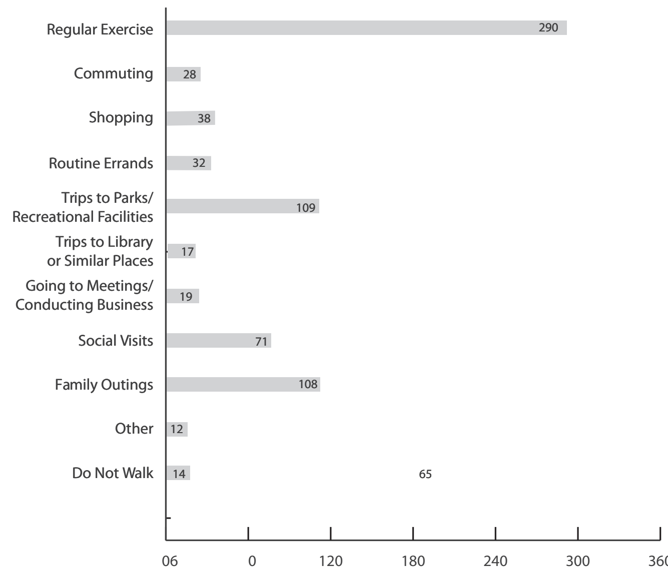


Figure 2.9: Purposes of Walking Trips



DESTINATIONS

An active transportation network should get people where they want to go. The survey listed a number of different community destinations or destination types, and asked respondents to rank them based on the importance of good bicycle and pedestrian access to them. Figure 2.10 describes the results, indicating the number of participants who considered good access important or very important. These in turn suggest the places that the network should serve.

Top priority destinations include the city's trails, schools, parks, neighborhood parks, schools, and the library. Retail and commuter destinations group at much lower importance levels, again reinforcing the preponderance of bicycling for fitness and recreational uses in the Grand Island area.

GRAND ISLAND STREETS

Much of the survey was designed to assess the comfort of current and prospective bicyclists with different types of bicycle environments. The survey asked participants to respond to a gallery of photographs of Grand Island streets and infrastructure installations from other parts of the country. Through their responses, participants assessed:

- Whether the setting is comfortable for most or all cyclists.
- Whether the setting is comfortable for the respondent, but not necessarily for less capable cyclists.

The displays in Figure 2.11 group images of various Grand Island streets on the basis of their combined favorability ratings. Groupings are based on the percent of respondents who considered the facility comfortable for both other users and themselves. and show the following results:

- The most comfortable (over 85 percent favorable) settings include either completely separated paths, both along roads and on exclusive right-of-way, or quiet neighborhood streets such as Oak Street and Stagecoach Drive. This indicates a reasonable level of user comfort with quiet streets. given the fact that relatively few of the respondents characterize themselves as fully comfortable in mixed traffic.

- The next highest-rated groups (50-85 percent favorable) include some relatively busy streets, including Custer Avenue, 13th Street, and Fonner Park Road. This indicates at least some comfort level with key candidate streets for a network that could be strengthened by some infrastructure improvement.

- Most people are uncomfortable with major arterial streets, two-lane corridors with significant traffic, and several major pedestrian crossings, including trail crossings of major streets.

Another level of interpretation is the difference between settings rated as "comfortable for me" rather than "comfortable for most people" by a substantially larger number of people. These suggest situations that experienced riders find satisfactory for themselves, but not suitable for less capable cyclists. One determining factor was the perceived or indicated amount of traffic for a particular situation. More experienced bicyclists were more comfortable dealing with-higher traffic volumes than less experienced riders.

INFRASTRUCTURE APPROACHES

Figure 2.12 displays a series of bicycle and pedestrian infrastructure approaches in use around the country. These are grouped by the percentage of respondents rating each image as "comfortable for most or all users" – a higher standard of comfort than used to evaluate Grand Island streets in Figure 2.11. This different, stricter measure is directed toward the goal of expanding the role of active modes in the overall transportation framework, rather than simply providing existing bicyclists and pedestrians with better or more comfortable facilities (a valid goal in itself, to be sure).

Figure 2.10: Importance of Bicycle and Pedestrian Access to Community Destinations

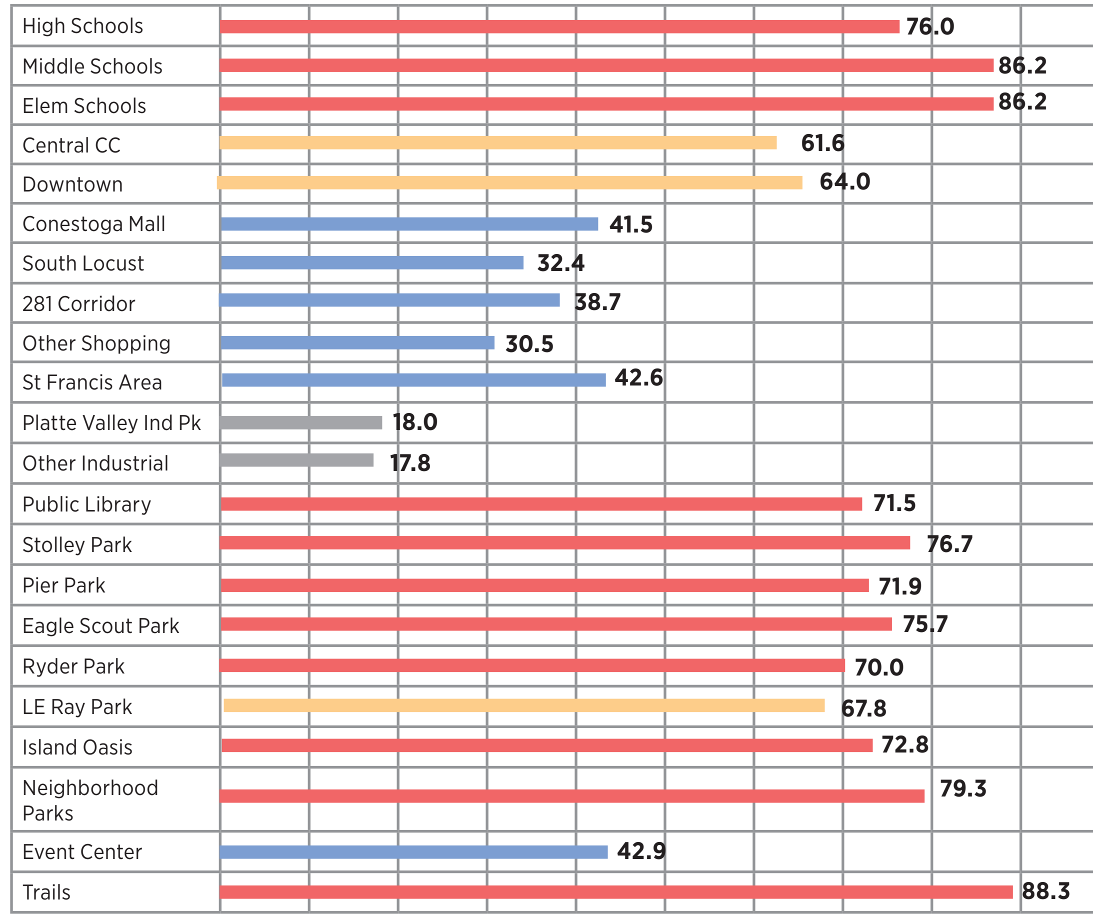


Table displays % of respondents reporting destinations as "important" or "very important" for pedestrian and bicycle access.

Figure 2.11: User Comfort of Various Grand Island Contexts

Percent of participants reporting the facility is comfortable for most users and for themselves

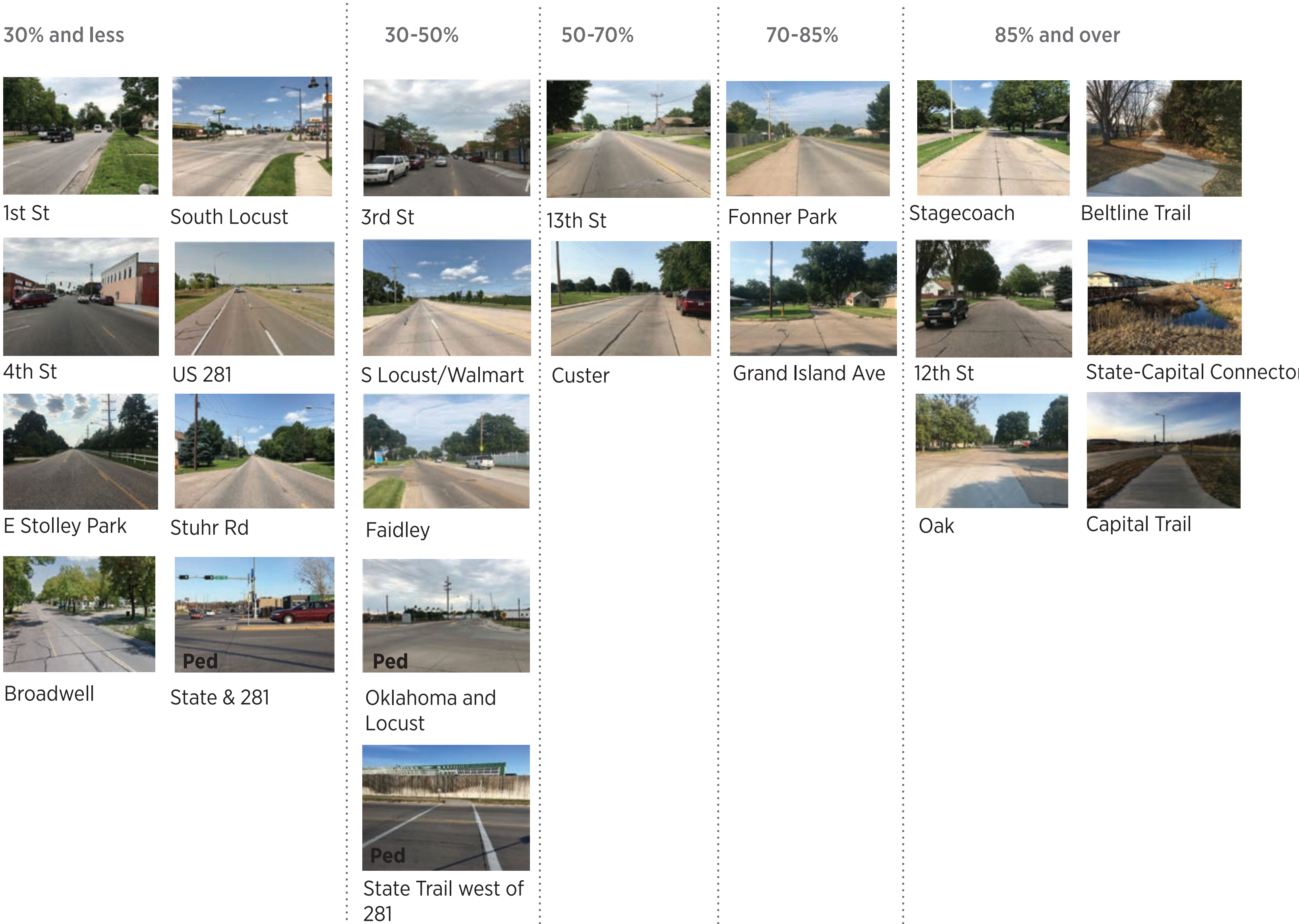
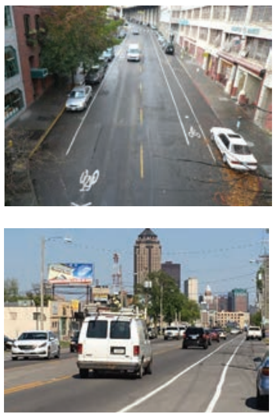


Figure 2.12: User Comfort of Various Infrastructure Solutions

Percent of participants reporting the facility is comfortable for most users

30% and less



30-50%

50-70%

70-85%

85% and over

The results of FIgures 2.11 and 2.12 suggest that:

- The highest level of comfort is associated with physically separated facilities – trails on exclusive right-of-way or on-street facilities that have a physical buffer or barrier between the bicycle/pedestrian environment and motor vehicle travel lanes.
- Views of enhancements to local and neighborhood streets are divided, with about half of respondents viewing them as comfortable for most users – a lower percentage than physically separated facilities. However, many of these respondents viewed these facilities as "comfortable" for themselves.
- Higher visibility facilities (physical separation, vertical bollards, green paint) appear to make some difference in people's perception of comfort for most users.
- Painted conventional bike lanes or shared lane markings on busy streets are not seen as comfortable for most users.

Figure 2.13: Effectiveness of Various BICYCLE Actions

Very Effective or Effective Over 70%	Very Effective or Effective 50% - 70%	Very Effective or Effective Less than 50%
Buffered bike lanes	More bike parking	Bicyclists May Use Full Lane signage
More trails	Bike lanes	Shared lane markings
Widened sidewalks/ sidepaths on major streets	Designated on-street bike routes to key destinations	Motorist education
Bike safety programs for kids	Strong advocacy organization	Better law enforcement
Better pedestrian and intersection control of major streets	More special and community events	Improved bicycle safety education
More safe routes to schools projects	Challenges and promotions for bicycle commuters	Bike share program
	More information about clubs, events, programs	Showers at workplaces
	Bike/ped-friendly project design	
	Wayfinding signage	
	Better pavement markings at intersections	
	Better sidewalk ramps	
	Countdown crossing signals	

IMPORTANCE OF VARIOUS ACTIONS

Responses to a list of possible actions to improve Grand Island's bicycle and pedestrian environment indicated a strong priority for infrastructure programs. Figure 2.13 tabulates the responses to this list. Initiatives that ranked highest included protected bike lanes, more trails, and sidepaths. Highly rated pedestrian initiatives focused on improved pedestrian and intersection controls at major streets and safe routes to schools projects. Bike education programs directed to children were also considered highly effective.

A variety of other actions were viewed as effective by a majority of respondents, notably including wayfinding, bike lanes (presumably on streets with comfortable traffic volumes), events and promotional programs, and a designated on-street network. From a pedestrian perspective, better pavement markings at intersections and sidewalk ramps were viewed as effective programs.

Less effective actions included shared road signage, shared lane markings, bike share programs, and bicycle safety education for motorists and riders.


NO
MOTOR

CHAPTER 3

THE ACTIVE NETWORK PRINCIPLES AND FRAMEWORK

THIS CHAPTER PRESENTS THE PERFORMANCE PRINCIPLES AND FRAMEWORK OF GRAND ISLAND'S PROPOSED ACTIVE TRANSPORTATION NETWORK. These principles, derived from the analysis of existing conditions and opportunities, the community engagement process, and market preferences generate the overall system concept. The chapter describes the framework of the system and its individual components.

An effective network of bicycle and pedestrian facilities is based largely on the characteristics of both the individual community and the nature and preferences of its users. But its design and operation should also be guided by specific principles and performance measurements. Some of the world's best work in identifying design principles was done by the Netherlands Centre for Research and Contract Standardization in Civil and Traffic Engineering. This plan adapts the Netherlands concepts to the contexts of medium-sized American cities like Grand Island, identifying six guiding principles for an effective active transportation network:

- Integrity. The ability of a system to link starting points continuously to destinations, and to be easily and clearly understood by users.
- Directness. The capacity to provide direct routes with minimum misdirection or unnecessary distance.
- Safety. The ability to minimize hazards and improve safety for users of all transportation modes.
- Comfort. Consistency with the capacities of users and avoidance of mental or physical stress.
- Experience. The quality of offering users a pleasant and positive experience.
- Feasibility. The ability to maximize benefits and minimize costs, including financial cost, inconvenience, and potential political opposition.

These six principles express the general attributes of a good system, but must have specific criteria and even measurements that both guide the system's design and evaluate how well it works.

Figures 3.1 through 3.6 present criteria for each of the six guiding principles, and design guides and methods to manage performance. Each table includes:

- The **performance factors** relevant to each guiding principle. For example, the INTEGRITY principle addresses the ability of users to understand the system and use it to get to their destinations. Examples of performance factors that help satisfy this principle include clear wayfinding and directional information and continuity, ensuring that users do not confront dead-ends as they move along the route.
- The **measurements** that can be used to evaluate the success of the system and its ultimate design. For example, we can measure the effectiveness of a wayfinding system by its ability to guide users intuitively without either creating too many signs.
- The **performance criteria** that establish the design objectives and guidelines for each of these factors. For example, a wayfinding system should avoid ambiguities that confuse users and follow graphic standards that are immediately and clearly understood.

These attributes help guide network design and evaluation, but they are clearly aspirational – no network in a real place can meet all of these criteria all of the time.

ATTRIBUTES OF THE NETWORK

Based on this development of the six guiding principles presented in the tables, the Grand Island area network design follows the following major attributes:

Tailored to User Groups. Planning a bicycle network for Grand Island and the surrounding area requires us to understand the specific market groups for the system. These groups include:

- Recreational users, including people traveling to parks and recreational features, especially the trail system, from their homes. It is important to understand that travel to recreational destinations are in fact transportation trips that substitute for trips by car.

Integrity issues.

When paths diverge, directional information that tells users where each alternative leads is very important to the user's peace of mind.

Where streets are designed to discourage through traffic, users need assurance that a street that looks like a continuous route connects to other parts of the network.

Figure 3.1: Development of the INTEGRITY Guiding Principle

Performance Factor	Measures	Performance Standard
Comprehensiveness	Number of connected destinations on system	Major destination types identified in the survey results and presented in the destinations analysis should all be accessible by the network. 100 percent of top destination types, 80 percent of all destinations should be served. New destinations as developed should be developed along the network or served by extensions.
Continuity	Number of discontinuities along individual routes	Users headed on a route to a destination should not be dropped at a terminus without route or directional information.* Even at incremental levels, route endings should make functional sense.* Transitions between facility types should be clear to users and well-defined. Transitions from one type of infrastructure. to another along the same route should avoid leading cyclists of different capabilities into uncomfortable settings.* Infrastructure should be recognizable and its features (pavement markings, design conventions) consistent throughout the system.
Wayfinding/directional information	Completeness and clarity of signage Economy and efficiency of graphics Complaints from users	Signs should keep users informed and oriented at all points. Sign system should avoid ambiguities that cause users to feel lost or require them to carry unnecessary support materials. Signs should be clear, simple, consistent, and readable, and should be consistent with the Manual on Uniform Traffic Control Devices. (MUTCD)
Route choice	Number of alternative routes of approximately equal distance	Ultimate system should provide most users with a minimum of two alternatives of approximately equal distance.* Maximum distance between alternative routes should be about 1/2 mile.*
Consistency	Percentage of typical reported trips accommodated by the ultimate network.	Typically, a minimum of 50-70 percent of most trips to identified destinations should be accommodated by the bikeways network.*

* Standard applies primarily to bicycle network

Directness issues.

Right: Broadwell Avenue marks the seam between the ordinal grid oriented to true compass directions and the rotated grid oriented to the Union Pacific. At this location, approaching the Five Points intersection, a break in sidewalk continuity and signage requires pedestrians heading for major commercial destinations on the east side of the street to cross Broadwell twice. The back of curb sidewalks along an arterial street can also be uncomfortable for many pedestrian users.

Figure 3.2: Development of the DIRECTNESS Guiding Principle

Performance Factor	Measures	Performance Standard
Access	Coverage Access to all parts of the city	The network should provide convenient access to all parts of the city. As a standard, all urban residential areas should be within one-half mile from one of the system's routes, and should be connected to those routes by a relatively direct local street connection.*
Bicycling speed	Design and average speed of system	The network should permit relatively consistent operation at a steady speed without excessive delays.* System should be able to deliver an average point to point speed between 12 and 15 mph for users, although a portion of routes should permit operation in a 15 to 20 mph range.* (CROW adapted to American measurement)
Diversions and misdirections	Maximum range of detours or diversions from a straight line between destinations. "Detour ratio:" Ratio of actual versus direct distance between two points.	Routes should connect points with a minimum amount of misdirections. Users should perceive that the route is always taking them in the desired direction, without making them reverse themselves or go out of their way to an unreasonable degree. Maximum diversion of a straight line connecting two key points on a route should not exceed 0.25 miles on either side of the line.* (NACTO)
Delays	Amount of time spent not moving	Routes should minimize unnecessary or frustrating delays, including excessive numbers of stop signs, and delays at uncontrolled intersections waiting for gaps in cross traffic.* Routes should maximize use of existing signalized crossings.
Intersections	Bicycle direction through intersections	Bicyclists and pedestrians should have a clear and safe path through intersections. Two-stage crossings are sometimes necessary but should avoid conflicts between bicycles and pedestrians.

* Standard applies primarily to bicycle network

Safety issues.

Left: The Capital Trail displays characteristics of a well-designed sidepath – separation from the street, adequate width and good visibility, and infrequent driveway and street interruptions.

Figure 3.3: Development of the SAFETY Guiding Principle

Performance Factor	Measures	Performance Standard
Reduced number of crash incidents	Number of incidents Reactions/perceptions of users	The network should reduce the rate of crashes over ten year periods. Data collection should be sufficient to trace baseline data and measure the impact of improvements.
Appropriate routing: mixing versus separation of traffic	Average daily traffic (ADT) criteria for mixed traffic Traffic speed criteria for mixed traffic	System design should avoid encounters between bicyclists and incompatible motor traffic streams (high volumes and/or high speeds). Separation and protection of vulnerable users should increase as incompatibilities increase.*
Infrastructure, visibility, signage	Pairing of context and infrastructure solutions Mutual visibility and awareness of bicycle and motor vehicles	Infrastructure should be designed for utility by at least 80 percent of the potential market. The Grand Island Bicycle and Pedestrian Survey indicates that a relatively large number of people are relatively uncomfortable with many streets and prefer higher levels of separation. Infrastructure applications should be matched with appropriate contexts. Warning signage directed to motorists should be sufficient to alert them to the presence of cyclists along the travel route. Surfaces and markings should be clearly visible to all users. Obstructions, such as landscaping, road geometry, and vertical elements, should not block routine visibility of pedestrians, cyclists and motorists. Trail and pathway geometries should avoid sharp turns and alignments that hide cyclists operating in opposing directions or create crash hazards for pedestrians. Where these conditions are unavoidable, devices such as mirrors and advisory signs should be used to reduce hazards.
Door hazards and parking conflicts	Number of incidents Parking configurations Location of bicycle tracking guides	Component design should track bicycles outside of the door hazard zone.* Back-out hazards of head-in parking should be avoided or mitigated when diagonal parking is used along streets.*
Intersection conflicts	Location and types of pavement markings Number of intersections or crossings per mile	Intersections should provide a clearly defined and visible track through them for cyclists and pedestrians. Sidepaths should generally be used on continuous segments with a minimum number of interruptions.
Complaints	Number of complaints per facility type	Complaints should be recorded by type of infrastructure and location of facility, to set priorities for remedial action.

* Standard applies primarily to bicycle network

Comfort issues.

The high rankings given to trails and protected bicycle facilities indicate that Grand Island area residents are most comfortable with separated trails, quiet streets, and protected bike lanes.

Figure 3.4: Development of the COMFORT Guiding Principle

Performance Factor	Measures	Performance Standard
Road surface	Quality and type of road surface Materials Incidence of longitudinal cracking and expansion joints	The network's components should provide a reasonably smooth surface with a minimum of potholes and areas of paving deterioration.* Roads should be free of hazardous conditions such as settlement and longitudinal cracks and pavement separation.* All routes in the urban system should be hard-surfaced, unless specifically designated for limited use.* Sidewalks in the network should be repaired or designed to minimize tripping hazards or obstructions such as equipment or poles.
Hills	Number and length of hills and inclines Maximum grades on segments for both long and short distances	Grades are generally not an issue in the Grand Island area network. However, if possible, grades on approaches to overpasses and underpasses should not exceed 7 percent over a length not exceeding 400 feet in length; or 5 percent over the course of a mile.* (AASHTO) Off-road climbing facilities should be provided where slow-moving bike traffic can obstruct motor vehicles and increase motorist conflict.*
Traffic stress	Average daily traffic (ADT) Average traffic speed Volume of truck traffic	Generally, the network should choose paths of lower resistance/incompatibility wherever possible and when the DIRECTNESS guideline can be reasonably met.* The network should avoid mixed traffic situations over 5,000 vehicles per day (vpd) without separated facilities, or should use alternative routes where possible.* (NACTO with modifications)
Stops that interrupt rhythm and continuity	Number of stop signs/segment	Network routes should avoid or redirect frequent stop sign controls. The number of stops between endpoints should not exceed three (1 per quarter mile average) per mile segment.

* Standard applies primarily to bicycle network

Experience issues.

Grand Island's distinctive trail and street settings (the Cemetery Trail and Grand Island Avenue pictured here)and attractive neighborhoods create positive experiences for pedestrian and bicyclists.

Figure 3.5: Development of the EXPERIENCE Guiding Principle

Performance Factor	Measures	Performance Standard
Surrounding land use	Neighborhood setting Adjacent residential or open space use, including institutional campuses Adjacent street-oriented commercial	Surrounding land use should provide the network user with an attractive adjacent urban environment. It is desirable for at least 75 percent of the length of the route should pass through residential, open space, or street-oriented (main street) commercial environments. However, this guide is advisory and should not be taken to limit necessary connectivity or service to major employment centers.* Routes should provide access to commercial and personal support services, such as food places, convenience stores, and restrooms.
Landscape	Location and extent of parks or maintained open space	Network should maximize exposure or use right-of-ways along or through public parks and open spaces. Environmental contexts to be maximized include parks, waterways and lakes, and landscaped settings.
Social safety	Residential development patterns Observability: Presence of windows or visible uses along the route Population density or number of users	The network should provide routes with a high degree of observability – street oriented uses, residential frontages, buildings that provide vantage points that provide security to system users. Areas that seem insecure, including industrial precincts, areas with few street-oriented businesses, or areas with little use or visible maintenance should generally be avoided, except where necessary to make connections or serve major destinations like industrial employment centers.
Furnishings and design	On-trail landscaping, supporting furnishings	Network routes should include landscaping, street furnishings, lighting, rest stops, graphics, and other elements that promote the overall experience. These features are particularly important along trails.

* Standard applies primarily to bicycle network

Feasibility issues.

Taking advantage of opportunities can provide major connectivity advances at relatively low cost.

Far right: Use of a pre-existing culvert in Sioux Falls, South Dakota to extend an important trail link under a major arterial street.

Right: This creek crossing provides an excellent and relatively inexpensive way to cross the US 281 barrier south of Husker Highway.

Figure 3.6: Development of the FEASIBILITY Guiding Principle

Performance Factor	Measures	Performance Standard
Cost effectiveness	Route cost Maximum use of low-cost components Population/destination density	The network should generate maximum benefit at minimum cost. Where possible, selected routes should favor segments that can be adapted to bicycle use with economical features rather than requiring major capital investments. Initial routes should be located in areas with a high probability of use intensity: substantial population density and/or incidence of destinations. Initial investments should integrate existing assets, extending their reach into other neighborhoods and increasing access to them. Major off-street investments should concentrate on closing gaps in an on-street system.*
Phasing and incremental integrity	Self-contained value Ability to evolve	The network should provide value and integrity at all stages of completion. A first stage should increase access and use in ways that make future phases logical. The network should be incremental, capable of building on an initial foundation in gradual phases. Phases should be affordable, fitting within a modest annual allocation by the city, and complemented by major capital investments incorporating other sources.
Neighborhood relationships and friction	Parking patterns Development and circulation patterns	The network should avoid conflict situations, where a route is likely to encounter intense local opposition. Initial design should avoid impact on potentially controversial areas, such as parking, without neighborhood agreement. Involuntary acquisition of right-of-way should be avoided wherever possible. Detailed planning processes to implement specific routes should include local area or stakeholder participation.

* Standard applies primarily to bicycle network

- Students walking or biking to school.
- Residents who are actively interested in walking or biking for transportation, but are discouraged by barriers, including major streets, highways, and railroad crossings.
- Workers at major industries like JBS, an employer of over 3,000, who may find bicycle transportation or walking to be an attractive and affordable transportation option.

Destination-Based. The Grand Island area network should direct people of all ages to desitnations, whether they are parks, trails, schools, business districts, or the library. Destinations identified by the community as important help generate the structure of the network. The proposed network is more than a map of streets and trails. It is in fact part of a transportation system that takes people to specific places.

Function Model. Several reasonable models for network planning exist, with choices dependent on the nature of the city. In planning the Grand Island system, we identify a grid of routes designed to help users "read" the system with a minimum of supporting materials, To do this, have adapted a "transit model," that identifies major destination-based routes that connect points and destinations, almost as if they were bus lines.

Incremental Integrity. As shown in Figure 3.6 (Feasibility), incremental integrity – the ability of the network to provide a system of value at each step of completion – is an important attribute. The first step in completion should be valuable and increase bicycle access even if nothing else is done. Each subsequent phase of completion follows the same principle of leaving something of clear value and integrity, even if no further phases were developed.

Evolution. As part of the concept of incremental integrity, the system is designed to evolve and improve over time. For example, a relatively low-cost project or design element can establish a pattern of use that supports something better in the future. To use a cliché, the perfect should not be the enemy of the good.

Conflict Avoidance. Few important actions are completely without controversy, but successful development of a bicycle transportation system in Grand Island can and should avoid unnecessary controversy. On most streets, shared streets and signage can provide satisfactory facilities that focus on the positive and minimize divisive conflicts. Projects should demonstrate the multiple benefits of street adaptations. For example, bikeway design can slow motorists and keep unwanted through traffic out of neighborhoods, benefiting both cyclists and neighbors.

Use of Existing Facilities. Great existing features like Pier Park, Stolley Park, College Park and Central Community College, the Stuhr Museum, and others are integral to the active transportation system. Utility easements and drainage corridors like Moore Creek also offer great opportunities.

Fill Gaps. In some cases, the most important parts of a network involve small projects that make connections rather than long distance components. Often, these short links knit longer street or trail segments together into longer routes or provide access to important destinations. These gaps may include a short trail segment that connects two continuous streets together, or an intersection improvement that bridges a barrier. The development of the overall network is strategic, using manageable initiatives to create a comprehensive system.

Routes of Least Resistance. The Bicycle and Pedestrian Survey showed that much of the city's potential urban cycling market prefers quiet streets or corridors with some separation from motor traffic. It is not necessary to try to force bicycle access on major streets when more comfortable, lower cost options exist. For example, bicycle boulevards – lower volume streets that parallel major arterials – satisfy the comfort principle successfully. However, some important destinations, including major employers and shopping facilities are served by major arterials. Here, complete street guidelines should include bicycle and pedestrian accommodations in new major street projects. Signage systems can also be instrumental in guiding users efficiently to their destinations using comfortable routes made up of different street segments.

Barriers. In many cases, reducing the dividing impact of barriers such as major highways and streets, can be the mosty effective way of improving connectivity. Most people involved in this process view US 281 as an especially difficult barrier, even where crossed by multiuse paths. In other cases, existing trails cross busy streets, leading to concerns of parents about their children using the trail to get to school.

Regional Connectivity. Grand Island's potential network extends into the surrounding region. This plan's study area also includes Alda. The Riverway Trail may eventually extend east to the Platte River and long-range plans stretch out to Mormon Island State Recreation Area. Other potential considerations include the eventual routing of the US Bicycle Route System through Nebraska, probably following the Lincoln Highway corridor.

ACTIVE TRANSPORTATION NETWORK

Figures 3.7, 3.7a, 3.8, and 3.8a present the proposed active transportation network for Grand Island, based on the principles described previously in this chapter and possibilities for infrastructure development. Figures 3.7 and 3.7a focus on the on-street network, while 3.8 and 3.8a consider the off-street trail and shared use path components. This map shows the ultimate build-out by component type, and includes route designations that are used to describe infrastructure details. The components of the system include:

- On-Street Network. These corridors make up the primary on-street route grid. They form the bike and pedestrian arterials that link the parts of the Grand Island area. together. They also complement the trail system and in many ways connect neighborhoods and destinations to the growing regional pathway system. These routes use a variety of facility types, including quiet streets, multi-use shoulders, protected bike lanes, and in some cases sidepaths and short trail connections. Details of these routes are presented in Chapter Seven.

  Quiet Streets are sometimes referred to as "bicycle boulevards" or "neighborhood greenways" but function as a significant and cost-efficient part of an on-street network. They are typically local or collector streets with relatively low volumes that have good continuity and in many cases parallel higher order streets. They are far more comfortable for most cyclists and pedestrians than the busy corridors they parallel. Relatively minor adaptations, such as pavement markings, special graphics, and wayfinding can make these streets even more comfortable for a broad range of users. Bicycle boulevards are also fundamental to the community pedestrian network, and should ultimately have continuous, barrier-free sidewalk access along at least one side of the street.

- Multi-Use Trails. Grand Island's growing trail system, builds from two connected systems that ultimately can complete two major circumferential loops: the John Brownell Beltline, St. Joe/Stuhr/Riverway Trails in the south half of the city; and the Capital, Westside Connector, State, and Shoe maker Trails around the north and west sides of Grand Island. The most recent addition to the system is the Capital Avenue Trail, a high quality sidepath that now extends from Ashley Park to the west side of the city using the State-Capital Connector and Shoemaker Trails.

  Anticipated near-term connections include an extension of the Beltline to job centers on the east; eastward continuation of the Capital Trail, and a sidepath along North Broadwell to popular but isolated Eagle Scout Park and the Sports Complex. Other priority links include extension of the State-Capital Connector, which will provide access to the US 281 corridor; the first stage of the west circumferential loop with a link from the Stuhr Trail through the new hospital campus and to Cedar Hiils Park and south along Moore Creek; and a north extension of the South Locust Trail to connect with eastside on-street routes. Clear identification and wayfinding information will also integrate these trails into the overall network. These new paths are identified in the Network Map as Priority Trails.

  Later phase trails complete the outer legs of the two major circumferential loops and extend the system into other growth areas. Phasing concepts are discussed in more detail in Chapter Seven.

Above: Stagecoach Drive, part of a southside on-street link between the St Joe and South Locust Trails

Above: Underpass connection from Stuhr Trail west to new hospital site, a part of a priority trail extension to Cedar Hills Park.

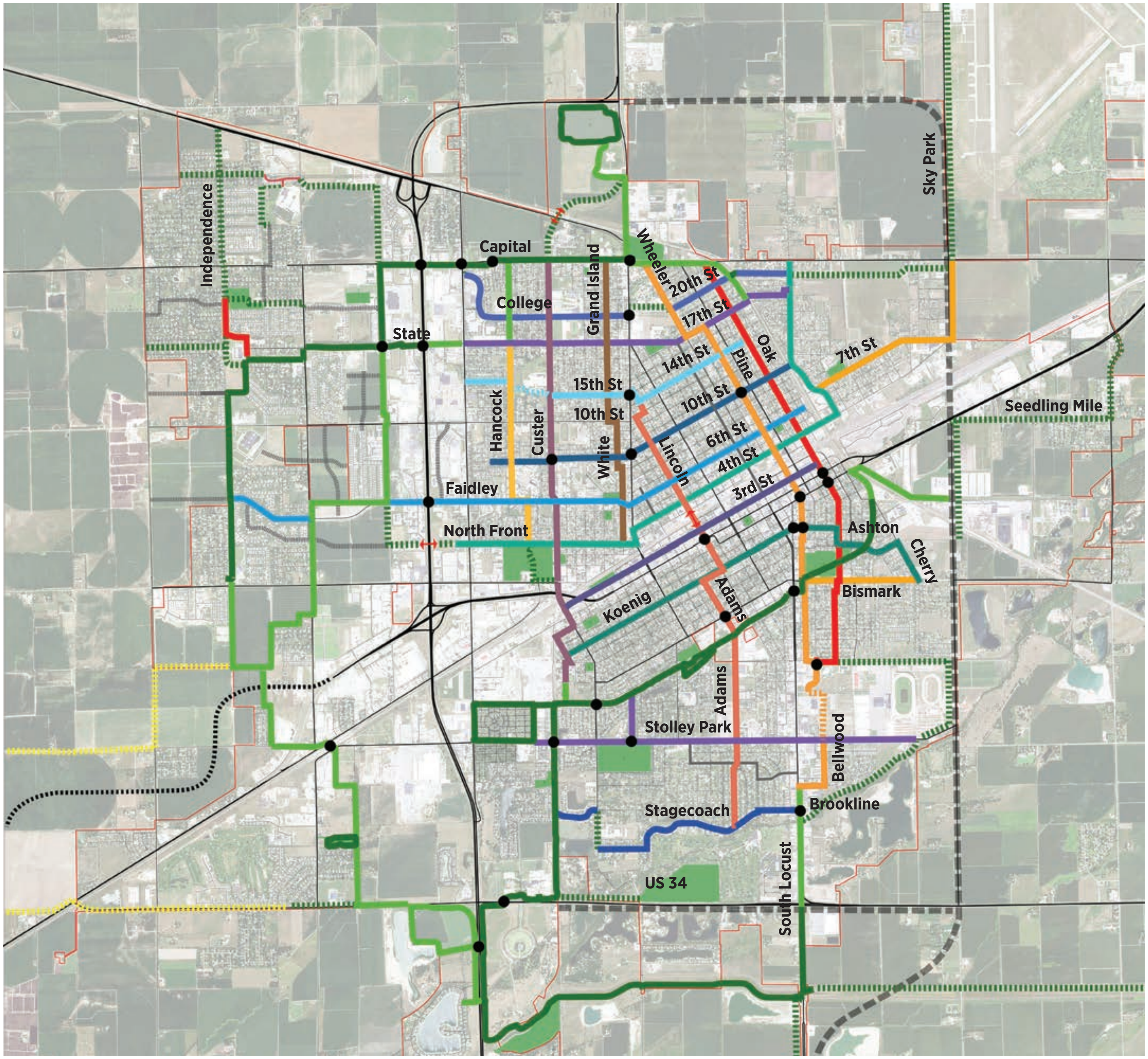


Figure 3.7: Ultimate Grand Island Area Active Transportation Network

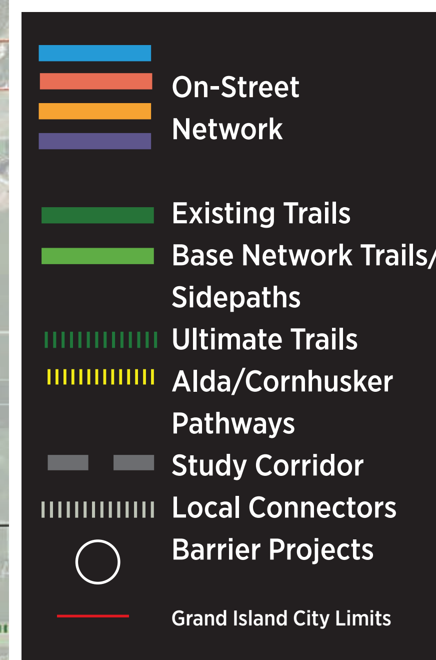
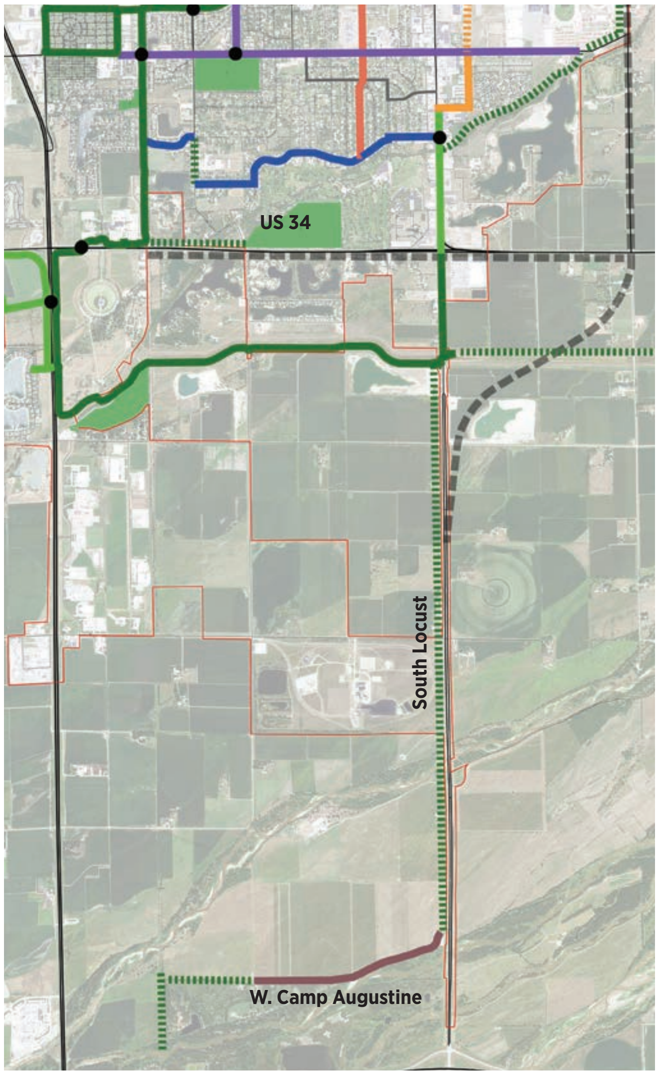


Figure 3.7a: Ultimate Grand Island Area Active Transportation Network: South Extension

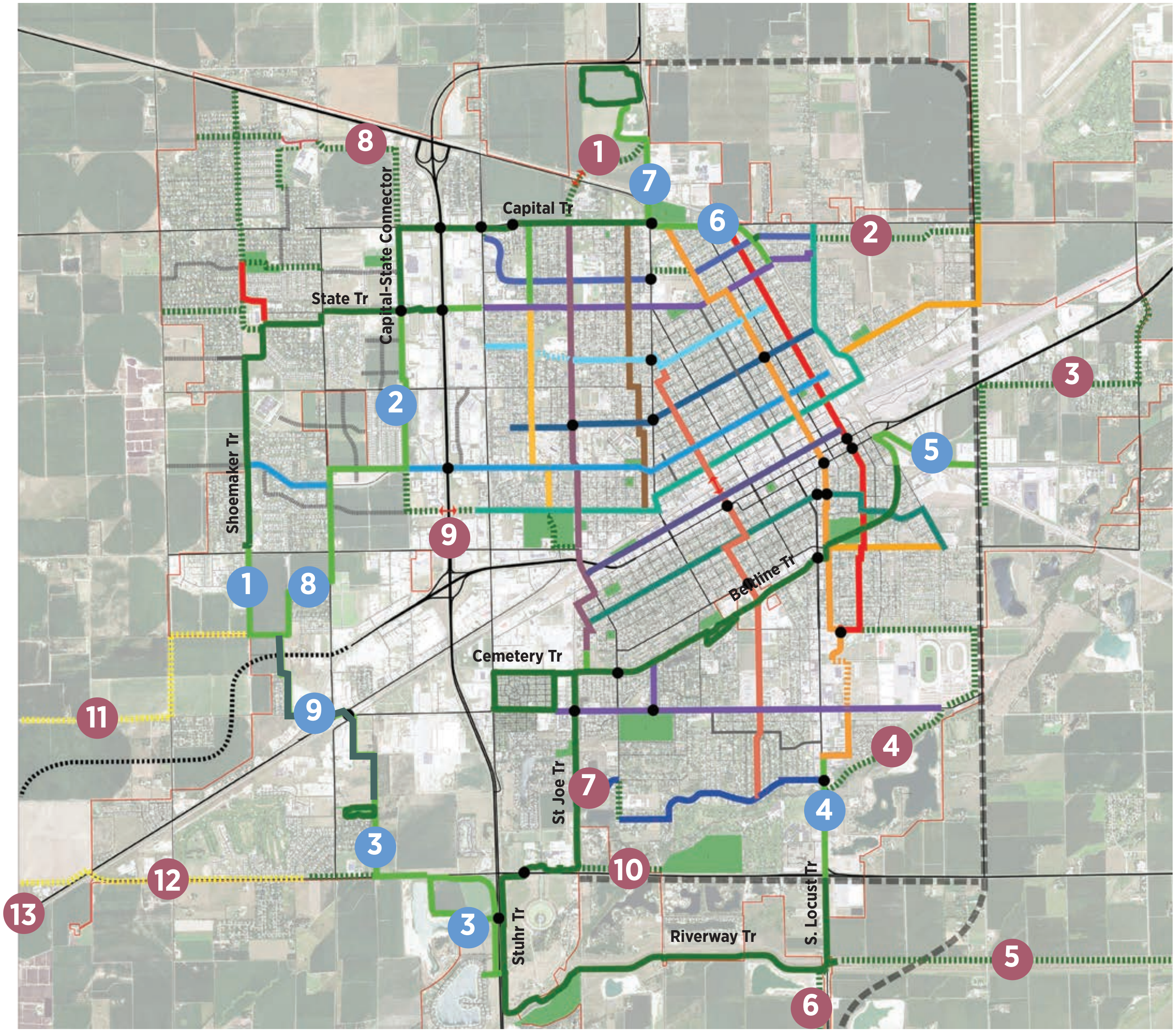


Left: Blaine Street underpass of US 30. This is a critical point in a north-south route that connects the Custer corridor with the St. Joe/Stuhr/Riverway trail system. Right: Right-of-way for a future extension of the Westside Connector that now links the Capital and State Trails parallel to US 281

On-Street Network
Existing Trails
Base Network Trails/ Sidepaths
Ultimate Trails
Alda/Cornhusker Pathways
Study Corridor
Local Connectors
Barrier Projects
Grand Island City Limits

- Alda/Cornhusker Trails. These are long-term routes that connect Grand Island to Alda and the nearby Cornhusker plant, available to the city as a potential recreation area on the site of the former ammunition testing and storage facility. These paths follow easements and in some cases county roads.
- Study Corridors. These corridors include a corridor study for a northeast bypass for US 281 and for eventual widening of US 34 on the south edge of town. Multi-modal facilities, specifically a path parallel to the roadway, are not included as part of the basic network but should be incorporated into the corridor study and the possible functional design.
- Neighborhood Connectors. These are short, primarily on-street routes, usually on low-volume local streets, that connect through routes and neighborhoods. Most require minimal infrastructure investment.

Figure 3.8: Ultimate Grand Island Area Active Transportation Network – Trails



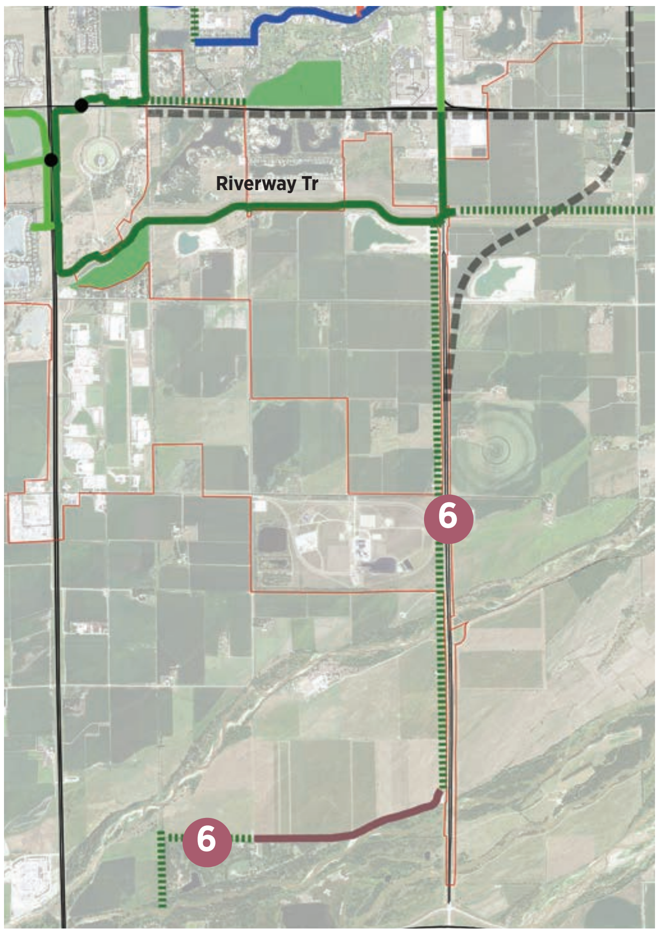
Priority Trails

1. Shoemaker Extension
2. Westside Connector
3. Cedar Hills Trail
4. South Locust Trail
5. Beltline Extension
6. Capital Trail East
7. Eagle Scout Link
8. Moore Creek Trail
9. Southwest Trail

Later Phase Trails

1. Veterans Legacy/Overpass
2. Sky Park Trail
3. Seedling Mile Trail
4. Wood River Trail
5. Riverway Trail Extension
6. Mormon Island (S. Locust)
7. Stagecoach Connector Trail
8. Northwest Trail
9. North Front Path/Overpass
10. L.E. Ray Park Connector
11. Alda/Cornhusker Trail
12. Alda/Husker Highway Trail
13. Alda Paths

Figure 3.8a:
Ultimate Grand Island Area Active Transportation Network: South Extension – Trails



Above: John Brownell Beltline Trail at Pier Park. Left: Route for future south extension of Capial-State Connector Trail

Table 3.9: Trail Network Components

MAP KEY	NAME /DESCRIPTION	LENGTH (mi)	MAJOR DESTINATIONS SERVED	SYSTEM ROLE AND ISSUES
1	**Shoemaker Trail extension, Old Potash to Moore Creek.** Route continues existing trail alignment south to Moore Creek at the half section line between Old Potash and Stolley Park Road,	.50	Shoemaker ES	First stage of link from westside to trail network on south edge of the city, a major priority of westside neighborhood residents. Completion of westside connection (Southwest Trail) may be accelerated, depending on construction of relocated US 30.
2	**Westside Connector extension, State to Faidley.** Later connection to potential bike/ped overpass over US 281 on North Front alignment	1.00	US 281 commercial and industrial corridor	Potentially vital north-south trail spine to major commercial services and future westside residential development. Includes spurs trails to major commercial centers where possible.
3	**Cedar Hills Trail,** Stuhr Trail to Cedar Hills Park	1.80	Stuhr Museum, new hospital and mixed use campus, Cedar Hills Park	South leg of westide connection of Beltline/St Joe/ Stuhr trail system to Shoemaker Trail. Includes existing underpass of US 281.
4	**South Locust Trail,** Brookline to US 34	0.75	South Locust corridor, Walmart	Links most of network to South Locust, with Beltline, Riverway, St. Joe Trails and Pine Street route to create interconnected loops. Continues Pine Street bikeway route to form continuous east side connection to Capital Ave. Requires improved crossing to trail south of US 34.
5	**Belt Line Trail extension** to JBS plant and Stuhr Road, following city-owned ROW to US 30, and continuing along perimeter of Hall County correctional center property	0.90	JBS and major eastside industrial areas	Connects central city neighborhoods to area's largest single employment concentration, Important potential commuter route for workforce needing transportation choices
6	**Capital Trail East**, Capital Ave to 20th Street underpass	0.68	Ashley Park, Knickrehm ES	Follows Capital Ave and Plum Street. Connects to 17th and 20th Street underpasses of BNSF elevated main line, links east side of tracks to trail network

Table 3.9: Trail Network Components

MAP KEY	NAME /DESCRIPTION	LENGTH (mi)	MAJOR DESTINATIONS SERVED	SYSTEM ROLE AND ISSUES
7	**Eagle Scout Trail,** existing trail to Capital	0.75	Sports complex, Veterans Legacy site, Eagle Scout Park	Sidepath along Broadwell and pathway connection between sports complex and Eagle Scout, links major recreation area to trail network
8	**Moore Creek Trail,** Faidley to Shoemaker Trail extension	1.50	Existing and future southwest residential areas	Connects Faidlley corridor and developing southwest areas via North Rd sidepath and Moore Creek drainageway. Major link of westside trail network
9	**Southwest Trail,** Moore Creek/ Shoemaker Trail connection to Cedar Hills Park. Route uses Stolley Park east to UP mainline crossing, continues south between Chief plant and cemetery and Memorial Park Road alignment to Husker Highway	1.65	Shoemaker ES, southwest development neighborhoods, Cedar Hills Park	Completes southwest trail connection from current Shoemaker Trail endpoint to Stuhr Trail and the rest of the mainline trail system. Completes a grand trail loop. May be accelerated with US 30 development, and uses a culvert as an underpass under the new road alignment.
1	**Veterans Legacy Trail / Overpass,** Capital Ave Trail to Sports Complex	0.80	Veterans Legacy site, Sports Complex, Eagle Scout Park	Connects to Custer bikeway and includes future overpass over UP. Incorporated as part of master plan for redevelopment of Veterans Home site
2	**Sky Park Trail,** St Paul to Sky Park Rd continuing alignment of East 20th Street	2.05	Airport and future industrial area	Connects east development areas to network. Extension to possible path along US 281 northeast bypass, to be determined by study corridor plan
3	**Seedling Mile Trail,** Stuhr Road to US 30 at Shady Bend	2.07	JSB, eastside industrial park, Seedling Mile ES, historic Lincoln Highway	Connects a relatively isolated eastside neighborhood to city network and industrial employment, improves sidewalk access in neighborhood. Provides good access route to county road system

Table 3.9: Trail Network Components

MAP KEY	NAME /DESCRIPTION	LENGTH (mi)	MAJOR DESTINATIONS SERVED	SYSTEM ROLE AND ISSUES
4	**Wood River Trail,** South Locust to Fonner Park and Stuhr	1.20	Fonner Park, South Locust corridor	Extends Stagecoach on-street route to Fonner Park and Oak St quiet street route, provides a loop with Stolley Park Rd and completes southeast network. Links with S. Locust Trail ann Riverway to Hall County Park
5	**Riverway Trail Extension,** South Locust to Platte River and US 34	3.00	South Locust corridor, confluence of channels that created the "Grand Island" of the Platte	Regional extension of the trail network to shouldered highway and paved county roads to the east. Possible trailhead at US 34
6	**Mormon Island (S. Locust) Trail**, sidepath along South Locust to Mormon Island State Recreation Area, Camp Augustine Road, and segment along abandoned railbed with new crossing to state recreation area	4.90	Riverway Trail, Mormon Island State Recreation Area, I-80 travel services	Regional trail connection south to Platte River corridor and visitor services. Provides new uses for Mormon Island, including trailhead for Grand Island system.
7	**Stagecoach Connection Trail,** Stagecoach and Blaine to St. Joe Trail	.07	Access to main trail system for south tier neighborhoods.	Uses sidepath along Blaine between Stagecoach and Pioneer Blvd and a short trail segment with branch rail crossing to St Joe Trail, completing a south crosstown bikeway with the Wood River Trail proposal.
8	**Northwest Trail,** Capital and Connector Trail to George Park. Route uses north extension of Westside (State-Capital Connector), path around periphery of high school campus, Northview Dr, and local streets.	1.65 off-road	Northwest High School, Engelman ES, George Park, northwest neighborhoods	Connects northwest neighborhoods to overall city trail system, US 281 corridor, and major northside destinations east of the highway

Table 3.9: Trail Network Components

MAP KEY	NAME /DESCRIPTION	LENGTH (mi)	MAJOR DESTINATIONS SERVED	SYSTEM ROLE AND ISSUES
9	**North Front Overpass.** Grade separated bike/ped crossing over US 281	0.42	Westside Connector Trail, Ryder Park, North Front/4th Street route and business district	Strategic opportunity for grade separated overpass over US 281 at a location capable of accommodating ramps. Provides excellent network linkages.
10	**L.E. Ray Park Connector.** College Park/St. Joe Trail to park. Sidepath along Highway 34	0.55	St. Joe Trail, College Park, L.E. Ray Park	Connects park with considerable potential to citywide network. Future study of US 34 widening should include bike/ped configurations.
11	**Alda/Cornhusker Trail.** Shoemaker extension to Cornhusker Plant site and Alma, via Stolley Park Road and easements	5.75	Cornhusker Plant site, Alma	Links Alma to city trails system, provides access for off-road cyclists to Cornhusker Plan
12	**Alda/Husker Highway Trail.** Stuhr Museum to Alda Village Hall via Husker Highway, S. 60th Rd or joint use with rail siding, Schimmer Dr and Mulberry Street	5.63	Stuhr Museum, Alda	Links Alda to Grand Island and trail network
13	**Alda Path**, Sidewalk to close gaps in continuity of sidewalks along Myrtle, Pine, and Vine Streets	1.0	Alda Town Hall, Post Office, Highway 30 businesses	Local access

Table 3.10: On-Street Network Components: North-South

MAP LINE	NAME	ENDPOINTS AND ROUTE	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	INFRASTRUCTURE APPROACH
	Oak	Capital Ave (N) to Fonner Park (S)	Knickrehm ES, Lions Park, YMCA, Pier Park, Dodge ES, Beltline TrailFonner Park, Island Oasis	Major north-south route with low traffic and attractive neighborhoods. Grade crossing over UP, good continuity with few turns or diversions. Interchange with Pine Route to continue south. Major barrier is crossing of 1st and 2nd Street (US 30) one-way pair	Shared route/bicycle boulevard. Upgraded arterial crossings.
	Wheeler/ Pine	Ashley Park/ Capital Ave (N) to Husker Highway/ Walmart (S) Route: Wheeler/17th/ Pine/new connections	Ashley Park, VA Hospital, GI Christian HS, Trinity Lutheran School, Five Points (indirect),Downtown, Hall Co. complex, Pier Park, Beltline Trail, Fonner park, Island Oasis, S. Locust Corridor, Walmart and S. Locust Trail	Major destination rich, north-south route. Grade crossing over UP, one significant jog but otherwise good continuity from north to south. Connecting existing street segments south of Fonner Park with trail links completes a route to Husker Highway, Walmart, and Riverway Trail, completing a grand peripheral loop. Major barrier is 1st Street (EB US 30) crossing	Shared route/bicycle boulevard. Short path segments south of Fonner Park to complete north-south route.
	Grand Island/ White	Capital Ave (N) to North Front (S) Route: Grand Island Ave/9th/ White Ave	Veterans Home/Legacy Park site, Capital Trail, GI Catholic HS, Five Points, Housing Authority district, Jefferson ES, Broadwell Park	Quiet street route, including divided boulevard, that generally parallels Broadwell Street, providing an active trans alternative. Major barriers are Capital and Faidley crossings.	Shared route/bicycle boulevard. Upgraded arterial crossings. Possible path with park development in Grand Island Ave median
	Custer/ Blaine	Capital Ave and Trail (N) to Beltline Trail Route: Custer/ Blaine/1st/ Ingalls/Louise/ Curtis/Gates Pathway	Veterans site, Grand Island HS, Walnut MS, Housing Authority complex, St Francis Hospital/Ryder Park/ Gates ES/Beltline and St Joe Trails	Major north-south link serving largest secondary school campuses; grade separation at US 30 crossing unites north and south sides. Grade crossing with UP. Major barriers are crossings at Capital, relatively high traffic counts on corridor. Currently a route on GI trail map	Protected bike lanes and sidepath along Custer to Ryder Park. Bike lanes or path along Custer segment because of traffic volume; protected bike lanes on US 30 undercrossing; shared route to Gates School; upgrade of narrow path to connect to Beltline Trail

Table 3.10: On-Street Network Components: North-South

MAP LINE	NAME	ENDPOINTS AND ROUTE	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	INFRASTRUCTURE APPROACH
	Hancock	Capital Ave (N) to North Front (S) Route: Walkway/ utility corridor/ Hancock/ St Francis campus/Faidley/ Sherman/Ryder Park paths	Capital Trail, West Lawn ES, Walnut MS, Newell ES, St Francis Hospital, Ryder Park	Quiet street alternative parallel to Webb Road and Custer Street corridors.	Path/utility easement ffrom Capital to State, bicycle boulevards, Ryder Park paths to join Custer/Blaine route at Old Potash
	Independence	George Park (N) to Shoemaker Trail Route: Independence/ Mansfield	George Park, Engleman ES, Westridge MS, Shoemaker ES, Shoemaker Trail	Westside neighborhood route connecting trail to George Park and future paths serving the park from the east. Future extension north possible with reconstruction of Independence Ave	Sidepath link along Independence from Mansfield to George Park. Possible southward trail connection to link to proposed Moore's Creek Trail.
	Lincoln/ Adams	Greenwich/15th (N) to Adams/ Stagecoach (S) Route: Greenwich/ Cotton/Lincoln/ Koenig/Adams	Jefferson ES, Public Library, Wasmer ES, Vocational campus, Beltline Trail, Barr MS, New ES	Central north-south route that serves major bike/ped destinations, including library. Major school concentrations and significant traffic along Adams south of Beltline Trail. Current surface crossing of UP mainline, but may be threatened as part of proposed Broadwell grade separation. Grade separation for ped/bike travel will be necessary between Broadwell and downtown crossings. Major barriers include 2nd Street (US 30) crossing and traffic loads south of Beltline Trail.	Shared route/bicycle boulevard north of Beltline Trail. Sidepath along Adams from Beltline to Stolley Park Rd. Pedestrian modification needed across 2nd St at library. Future Broadwell grade separation could require abandonment of other grade crossings, leaving virtually no ped/bike access between Downtown and Broadwell. A ped/bike accessible overpass should be included in Broadwell development plans.

Table 3.11: On-Street Network Components: East-West

MAP LINE	NAME	ENDPOINTS AND ROUTE	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	INFRASTRUCTURE APPROACH
	4th/St Paul	Capital (NE) to Webb and North Front (SW) Route: St Paul/ White/ 4th St/ North Front	Lincoln ES, Downtown, 4th St corridor, Ryder Park	L-shaped route from northeast to southwest part of city. St Paul segment parallels east side elevated BNSF. Continuation serves 4th Street international district. A future Broadwell Ave overpass at UP enables a direct path connection between 4th and North Front.	Multi-use shoulders on St Paul and wider parts of 4th and North Front; shared lanes elsewhere. Possible path connection between 4th and North Front should be integrated into a Broadwell grade separation.
	20/College	St Paul (E) to Webb and Capital (W) Route: 20th/ VA Hospital/ College/Rue de College	East side, Nickerehm ES, VA Hospital, Five Points area, Grand Island HS, West Lawn MS, Webb Rd commercial	Crosstown route for north side of city, uses 20th Street underpass under BNSF mainline. Requires path to link 20th and College segments along south edge of VA Hospital campus. Designed to provide an active option to high school students. Major barrier is Broadwell crossing.	Shared route/bicycle boulevard. Path through VA campus between Wheeler and Broadwell. Use of bike lanes on busier segments of College around high school
	17th/State	18-St Paul (E) to Mansfield at Engleman School (via State St Trail) Route: 18th/ Plum/17th/State/ State St Trail	Five Points, GI Christian School, Grand Island HS fields, Conestoga Mall, Highway 281 retail, Engleman ES	Long crosstown route when on-street segments are combined with State Trail on west side. Uses 17th Street grade separation at BNSF. Barriers include moderate ADT on State, gap in trail coverage and crossing at 281 intersection, navigation through Five Points area.	Shared route/bicycle boulevard east of Broadwell; possible bike lanes to Webb; trail connection between Webb and State St Trailhead west of 281.
	14th/15th	Oak (E) to Hancock (W) Route: 14th/ Greenwich/15th/ 16th	Trinity Lutheran School, Westridge MS, Conestoga Mall	Crosstown route through central north side. Major barrier is Broadwell crossing. Continuity to Hancock includes path on south edge of Westridge MS campus	Shared route/bicycle boulevard. Path thorough Westridge campus from Custer to Hancock. Central east-west route through the north side

Table 3.11: On-Street Network Components: East-West

MAP LINE	NAME	ENDPOINTS AND ROUTE	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	INFRASTRUCTURE APPROACH
	10th St	St Paul (E) to Hancock (W) Route: 10th St	Howard ES, Housing Authority complex, St Francis, Central Catholic campus, Newell ES	Major east-west route providing a comfortable norgth access to medical center and housing authority facilities than parallel Faidley route. Relatively high ADT on eastern end of corridor, moderating to west. Major but solvable barrier is Broadwell crossing. Route would be even more effective with connection to Webb, but such a corridor is not available.	Multiuse shoulder preferable east of Broadwell; shared route/ bicycle boulevard west. Short path segment on hospital site anticipated in Hancock route would provide a direct connection to center of medical campus.
	Faidley/6th	Oak (E) to Shoemaker Trail (W) Route: 6th/ Faidley	Jefferson ES, Housing Authority complex, St Francis,	Crosstown route with excellent continuity, including the arguably easiest of Highway 281 surface crossings. Most direct service to key traffic generators, including medical offices and facilities and multifamily concentrations. ADT on Faidley west of Broadwell will be uncomfortable for less experienced cyclists.	Shared route/bicycle boulevard on 6th.Sidepath west of Broadwell. Trail alignment along drainageway between Ridgewood and North Road, returning to Faidley on-street through residential area
	3rd Street	Oak (E) to Blaine (W) Route: 3rd Street	Downtown, YMCA, Pioneer Park, Public Library, Memorial Park	Direct crosstown route, includes CBD main street district. Use grade separated crossing under Highway 30 viaduct	Multiuse shoulder wherever feasible. Shared lane in other areas

Table 3.11: On-Street Network Components: East-West

MAP LINE	NAME	ENDPOINTS AND ROUTE	MAJOR DESTINATIONS SERVED	HIGHLIGHTS	INFRASTRUCTURE APPROACH
	Koenig	Cherry and Bismark (E) to Ingalls/Gates School (W) Route: Cherry/ Ashton/Koenig/ Oak	Schuff Park, Beltline Trail, Pier Park, Wasmer ES, Buechler Park, Gates ES, Augustine Park	Central crosstown route with excellent neighborhood character. Major barriers are Locust/Walnut crossing and Blaine Street.	Shared route/ bicycle boulevard, with intersection enhancements at arterial crossings.
	Stolley Park	Fonner Park (E) to St. Joe Trail (W) Route: Stolley Park Rd/ Cemetery Trail	Fonner Park, Barr MS, Stolley Park ES, Stolley Park, Grand Island Cemetery, Cemetery Trail, St. Joe Trail,	Direct crosstown route serving one of city's signature parks and education district. Stolley Park Road is being reconfigured in 2018 with three travel lanes and multi-use shoulders, open to bicycle traffic	Multiuse shoulders accommodating bikes to St. Joe Trail
	Stagecoach	South Locust (E) to St Joe Trail (W) Route: Stagecoach Dr/ Blaine/Pioneer Blvd	South Locust corridor, St Joe Trail	Attractive connector route with possibility of link to St. Joe Trail. South Locust ped/ bike crossing and connections present issues for connectivity. Continuity to St Joe Trail requires crossing of UP branch	Shared route/ bicycle boulevard on Stagecoach, sidepath on Blaine, shared route on Pioneer with short path and new railroad crossing to complete link to St Joe Trail.

INFRASTRUCTURE TYPES

Table 3.12 summarizes the infrastructure types applicable to local street contexts and Figure 3.13 applies them to the to the proposed metro area network. These specific facility types are divided into off-street and on-street categories as follows:

Off-Street

- Multi-use Trails
- Sidepaths

On-Street

- Shared Lanes
- Bicycle Boulevards (or quiet streets)
- Multiuse Shoulders
- Advisory Bike Lanes
- Protected Bike Lanes

Multi-Use Trails

The Grand Island area bike and pedestrian network will continue to make extensive use of multi-use trails on separated rights-of-way. These trails display the highest level of user comfort in the survey. They are key recreational resources and, with strategic extensions, can expand their local and regional transportation functions. In urban settings, trails are paved, although more rural settings such as the linkages to Alda and the Riverway Trail east of Locust may utilize granular stone. Trails should comply with American Association of Street and Highway Transportation Officials (AASHTO) standards and Uniform Federal Accessibility Standards and the Americans with Disabilities Act Accessibility Guidelines.

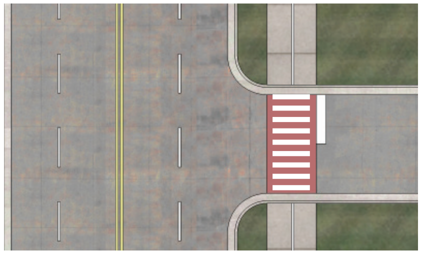
Based on AASHTO's Guide for the Development of Bicycle Facilities (2012), the appropriate paved width for multi-use trail is dependent on the context, volume, and mix of users. The minimum paved width for a two-directional trail is 10 feet. Trails that experience a high use and/or a wider variety user groups may warrant greater width from 10 to 14 feet.

Eight-foot widths are acceptable in circumstances such as areas with very limited right-of-way. A two-foot minimum graded shoulder (3-5 feet is more desirable) with a maximum 6:1 cross-slop should be provided as a recovery zone adjacent to trails. Grade crossings of arterial streets can present significant challenges for trails. Techniques for addressing these potential barriers are addressed in Chapter Five.

Grand Island's multi-use trails include the Beltline and St. Joe Trails (both rail to trail conversions), State-Capital Connector and Riverway Trails (along utility easements and/or drainage corridors), the Stuhr Trail, on the edge of a civic facility, and the Eagle Scout Trail in a public park. Future proposed multi-use trails include the Westside Connector extension, Moore Creek, and Beltline extension.

Sidepaths

Sidepaths (sometimes referred to as widened sidewalks) are typically two-way paths located adjacent to roadways and are separated from the stream of traffic by curbs. The sidepath accommodates pedestrians well and responds to potential cyclists who are uncomfortable riding in mixed



Sidepath sections. Sidepath width and construction standards are similar to those for multi-use trails. Top: Intersection crossing with high visibility crosswalks. Typically a 6-foot separation from the curb will provide reasonable visibility for pedestrians and bicyclists.

Above: Two-way sidepath along an arterial, a typical accommodation on contemporary streets.

traffic. In new projects, the added cost of these facilities is relatively small, since sidewalks are already required in most urban street projects. Sidepath widths are similar to those of multi-use trails.

The actual riding or walking surface should be separated from the back of the curb by landscaping or a contrasting pavement material. Research indicates that, to maximize safety, separation of the sidepath from a roadway should increase as road speeds increase

Challenges to sidepath safety include driveway and street intersections, including visibility, motorist awareness, ambiguities about who has the right of way, and cars that block the path. As a result, experienced cyclists usually prefer on-road facilities to roadside facilities. Yet, sidepaths, despite their shortcomings, are used frequently and remain popular with many users.

Conventional multi-use sidepaths should ideally be used in corridors with few driveway or street interruptions, and should not exclude use of on-road facilities when bike lanes and shoulders are feasible. They work best along arterial streets that have long stretches of relatively uninterrupted frontage. Sidepath crossings should be clearly defined by high visibility crosswalks and advisory signage to make motorists aware of the presence of the path.

Examples of sidepaths in the current Grand Island system include the Capital Avenue Trail. The proposed future system includes sidepaths along Faidley Avenue west of Broadwell and a link along North Broadwell to Eagle Scout Park.

Marked and Signed Shared Routes

Shared, low-volume streets make up a large part of the proposed Grand Island active network. On these streets, bicycles and motor vehicles operate within the same area. These streets should also have continuous sidewalks in good repair with barrier-free access on at least one side. These streets will typically have average

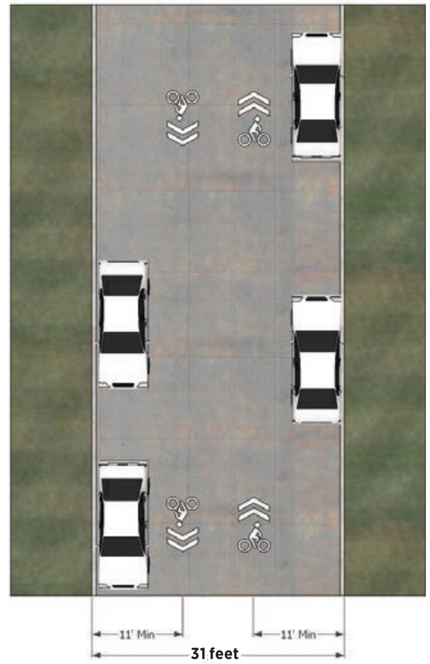
Top: Capital Avenue Trail. Above: Clayton Road sidepath in St. Louis County, Missouri. Note the highly visible crosswalk using high visibility markings and use of the trail crossing stack sign on intersecting streets.

daily traffic below 3,000 vehicles per day (preferably below 1,500 vehicles per day) and require relatively small infrastructure investment. Methods of identifying these routes include shared lane markings (sometimes called “sharrows),” often placed in the center of a travel lane between motor vehicle tire tracks to reduce wear and direct bicyclists away from the door zone of parked cars; wayfinding and/or bike route identification signs, identified as sign D11-1 by the Manual on Uniform Traffic Control Devices (MUTCD), the nationwide standard for roadway signage and markings); and motorist advisories such as the Bicycles May Use Full Lane sign, MUTCD sign R4-11).

In Grand Island, these local streets have a curb-to-curb width of 31 to 32 feet and usually (but not always) permit parking on both sides of the street. Because curbside parking on residential streets is not fully utilized, these streets at low volumes generally provide comfortable bicycling environments for most users.

Bicycle Boulevards (Quiet Streets)

Bicycle boulevards,sometimes called “quiet streets” or “neighborhood greenways” are something of a misnomer, because they are shared by pedestrians, bicyclists, and motor vehicles. They are low-volume, low-speed streets, modified to create greater comfort for both pedestrians and bicyclists, using treatments such as special signage, pavement markings (like shared lane markings), traffic calming devices such as bump-outs, and intersection modifications. Crossings of bicycle boulevards and major streets require special attention. Bicycle boulevards should have reasonable stop priority to provide continuity for bicyclists but not so much to become through routes for motor vehicles. The ideal bicycle boulevard provides both direct routing and good continuity; has traffic speeds at or below 25 mph, and average daily traffic below 3,000 vehicle per day. In Grand Island, bicycle boulevards are typically but not always on two-lane streets with width of or under 34 feet.



Marked routes. Left: Typical shared lane marking for a Grand Island street; Above: Shared lane marking installed.

Composite of possible bicycle boulevard treatments. (Alta Planning and Design illustration)

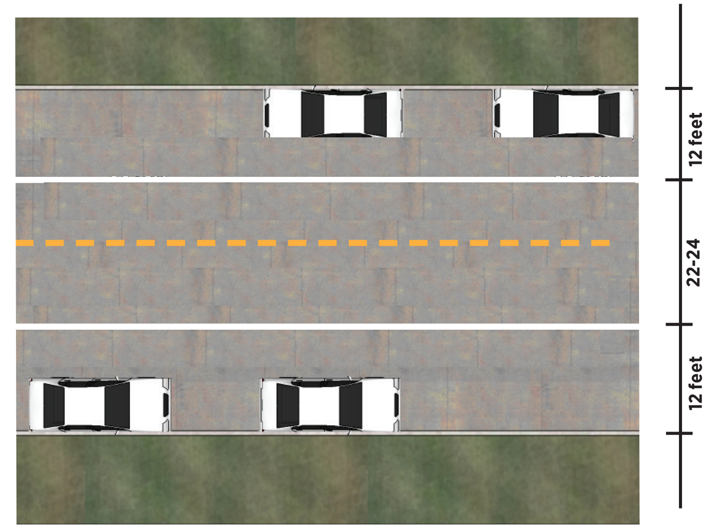
Bicycle boulevards in Topeka, KS. Topeka, which like Grand Island has an excellent secondary street system that lends itself to the bicycle boulevard concept. Topeka's facilities use shared lane markings and special street signs to mark the routes.The overall network has significantly increased bicycle travel in the city.

The Grand Island street grid is particularly adaptable to the bicycle boulevard concept. The Grand Island street network has an excellent grid of streets, many of which are largely residential in character, that could be favorable to the bicycle boulevard concept. It is important to note that in Grand Island, bicycle boulevard adaptation should not affect normal local street operation, including parking.

Parking and Multi-use Shoulders

A number of strategic streets in Grand Island have moderate daily traffic with a width of 37 feet and over. In most cases, these streets usually permit parking on at least one side. Some are also wide enough to accommodate conventional bike lanes providing exclusive space for bicycle travel adjacent to motor vehicle travel lanes. However, the exclusive bike lane concept has generally not received strong support in Grand Island.

In order to provide comfortable and safe accommodations for all users of these streets, the active network provides for two different types of shoulders: striped parking shoulders and multi-use shoulders.



Top: Typical section of a corridor with multi-use shoulders and 2-sided parking. Above: St Paul Avenue, a potential candidate street for multi-use shoulders or striped parking shoulders.

Striped parking shoulders apply to relatively wide, two- or three lanes streets with parking on both sides of the street and inadequate width for bicycle travel outside of shared travel lanes. On low-volume local streets with on-street parking, striped parking shoulders appear to manage traffic speeds through residential areas, help bicyclists properly

Ralph Rogers Ave in Sioux Falls, South Dakota. An example of a multi-use shoulder that accommodates but is not restricted to bicycle travel

track away from car doors, and keep parked cars from encroaching into travel lanes. Typical minimum width for local streets with parking shoulders on both sides and two travel lanes is 40 feet with 12-foot travel lanes. It is important to note the potential safety hazards of cyclists potentially weaving in and out of a parking lane and, as in other on-street settings, the need for cyclists to stay away from the "door zone" of adjacent parked cars. These hazards are reduced by using the Bicycle May Use Full Lane sign (MUTCD R4-11) and providing shared lane markings.

Multi-use shoulders provide a striped territory outside of travel lanes large enough to accommodate bicycle travel. Minimum width of a multi-use shoulder that prohibits parking is five feet; minimum width of a shoulder that also accommodates parking is 12 feet. Thus, typical width of a two-lane roadway with multi-use shoulders and no parking is 34 feet; with one-sided parking 42 feet; and with two-sided parking 48 feet. The reconstruction project for Stolley Park Road, to be implemented in 2018, will develop a three-lane facility with 5-foot paved shoulders, identified as multi-use

Advisory Bike Lanes

shoulders. This will provide comfortable territory for experienced adult riders on an arterial street and will not permit parking. However, the shoulders do provide a place for breakdowns and contingencies.

Advisory Bike Lanes

Advisory bike lanes are a type of shared roadway that clarify operating positions for bicyclists and motorists to minimize conflicts and increase comfort. Similar in appearance to bike

Two-way protected bike lanes in Lincoln, Nebraska (with curb) and Seattle, Washington (painted buffer with flexible bollards)

lanes, advisory bike lanes are distinct in that they are temporarily shared with motor vehicles during turning, approaching, and passing. This experimental treatment is most appropriate where traffic volumes are low to moderate (500 to 3,000 vehicles per day) and where there is insufficient room for bike lanes or multi-use shoulders. These may have wider applications in the Grand Island system, but for the purposes of this plan, are proposed in limited situations, including the continuation of Sycamore Street through Island Oasis on the Pine Street bikeway. They may also be used on paved rural roads with light traffic.

Protected Bike Lanes

Protected bike lanes are on-street facilities that provide a separation or buffer space between bicycle lanes and travel lanes. The Grand Island survey summarized in Chapter Two found that existing and prospective bicyclists significantly preferred the separated facilities over conventional bike lanes. Protected bike lanes may be provide either one-way directional movement or two-way movement. Two-way protected lanes are most effective along street segments with few driveway interruptions. Desirable minimum width for two-way facilities is ten feet, although 8 feet is acceptable in very limited conditions. (NACTO, *Urban Bikeway Design Guide*, 2014) On-street bike lane buffers and barriers are covered in the MUTCD as preferential lane markings (section 3D.01) and channelizing devices, including flexible delineators (section 3H.01). Curbs may be used as a channeling device, see the section on islands (section 3I.01). However, the use of raised buffers is not anticipated in the Grand Island plan.

In Nebraska protected bike lanes have been used in two projects – the two-way N Street Bikeway in Lincoln (NE), developed to very high design standards; and the Leavenworth/St. Mary's Bikeway in Omaha (NE), one-way lanes on a one-way pair defined by white lines. Adequate street width is necessary to provide proper buffering. The Grand Island concept proposes a two-way protected bike lane along a segment of Custer Street with no required on-street parking and few interruptions; and along connection between Custer Street and Blaine Street under Highway 30. Both applications are illustrated more fully in Chapter Seven. These facilities both involve a reallocation of existing street width rather than new, separated construction, and as such are part of an existing street maintenance program. However, their use as bicycle travel lanes is likely to require additional street maintenance in staff and budget to keep them in good repair and free of debris.

Table 3.12: Summary of Infrastructure Types in Grand Island Network

FACILITY TYPE	DESCRIPTION	EXAMPLES IN NETWORK
Multi-use trails	Separated trails on exclusive right-of-way. Some segments may be sidepaths adjacent to roadways.	Extensions of Westside Connector Trail, Moore Creek Trail, Beltline Trail east extension
Sidepath	Paths separated from but generally parallel to roadways and on public right-of-way	Capital Trail extension, segments of Custer Street bikeway, Adams
Shared and Marked Roadways	Low-volume, low-speed streets identified by signage, wayfinding, shared use lane pavement markings, but no major infrastructure changes. Often used to connect network to specific destinations.	Arthur Street between Beltline Trail and Stolley Park; Ingalls/Curtis Street from Blaine St to Beltline Trail
Bicycle boulevards	Low-volume, two-lane mixed traffic streets or groups of streets with direct continuity. May use special identification and wayfinding signage, traffic calming devices, controlled major intersections, continuous sidewalks. In Grand Island, typically but not always on 2-lane streets with width below 34 feet.	Pine Street, Oak Street, 14th/15th Street, Koenig Street, Lincoln Street. Major part of Grand Island network.
Striped parking shoulder	Area within a two- or three-lane street channel explicitly defined (usually by a white painted line) from travel lanes for parking. Bicycles are intended to operate in travel lanes. Used in conjunction with Bicycle May Use Full Lane sign and, optionally, shared lane markings.	College Street, North Front Street
Multi-use shoulders	Area within a two- or three-lane street channel explicitly defined (usually by a white painted line) from travel lanes, with adequate space to accommodate bicycle travel. May be used for parking with adequate width. Minimum shoulder width with parking is 12 feet (14 feet desirable), 5 feet without parking.	Stolley Park Road, parts of Custer Avenue and 3rd Street.
Advisory bike lanes	Shared roadway that clarify operating positions for bicyclists within shared travel lanes, typically used on segments that need definition of territory for bikes but are not wide enough for conventional bike lanes or multi-use shoulders.	Low-volume park roads, Sycamore Street through Island Oasis, very low-volume county roads
Protected bike lanes	Roadways with specific one- or two-way lanes for exclusive use by bicycles, separated by a buffer from moving travel lanes. Separation is accomplished by painted buffers often with vertical definition or a raised curb.	US 30 underpass connecting Blaine and Custer, segments of Custer Street

Figure 3.13: Infrastructure Types Applied to Network: North

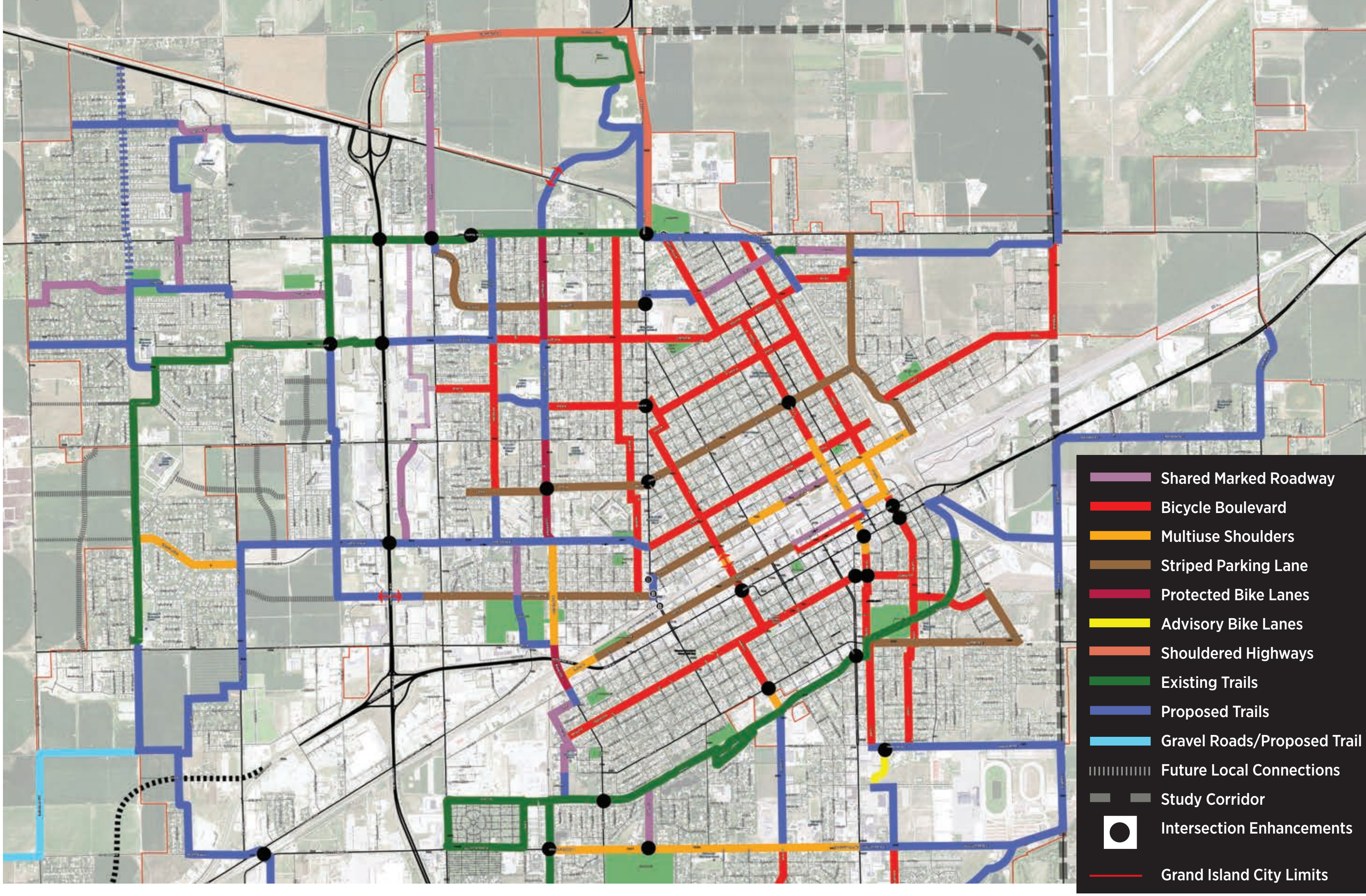
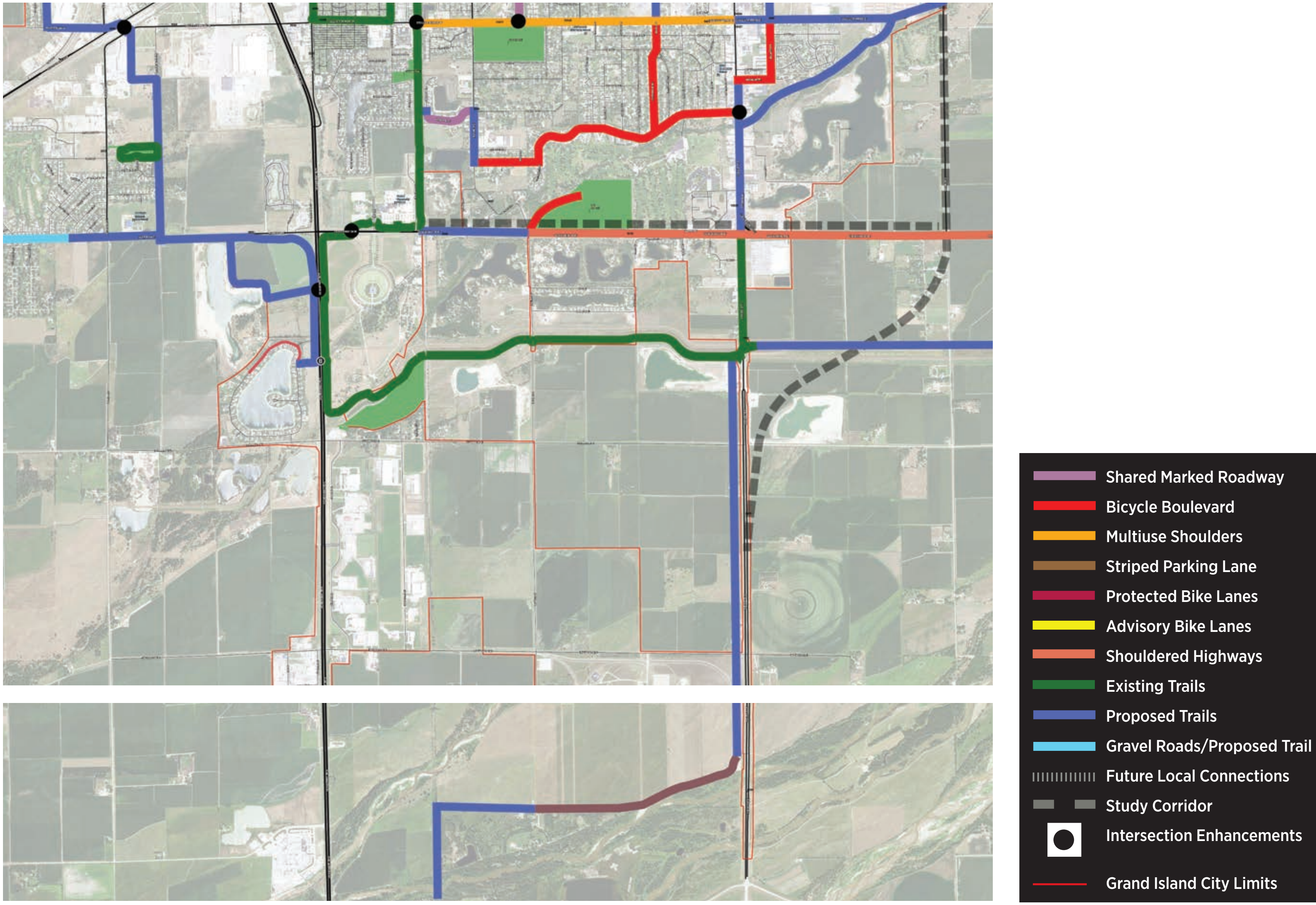


Figure 3.13: Infrastructure Types Applied to Network: South



CHAPTER 4

SUPPORT FACILITIES

THIS CHAPTER PRESENTS OPTIONS AND LOCATIONS FOR SUPPORT FACILITIES including trailheads, nodes and points of special interest that can enhance the experience of using metropolitan area trails and active transportation facilities.

Trailhead on Prairie Spirit Trail in Kansas includes information kiosk, restrooms, benches, and parking

SUPPORT FACILITIES

The planning of bicycle and pedestrian networks begins with definition of routes, which in the proposed Grand Island system will consist of a combination of multi-use paths on right-of-ways both separated from and adjacent to streets, a variety of on-street bicycle routes that share the space between curb lines with motor vehicles; and sidewalks for pedestrian use. Much of the network passes through the city, and private or public establishments provide support features for users, typically food, drink, bathrooms, and support or shelter in emergencies. However, parts of the proposed Grand Island network pass through areas that are relatively remote or lack public places or businesses that routinely serve support functions.

Well-placed support facilities can fill these needs and increase the comfort level of people using the trail and active transportation network.

But support along the route is not the only key function that support facilities provide. The destination rated as "very important" or "important" by the greatest number of respondents to this plan's preference survey, with 88%, was the trail system itself, followed by schools, parks, and the public library. In many cases, people drive to trails for recreational walking, running, or biking. Transportation to a recreational destination is still a transportation trip, and an objective of a network is to reduce the number of these trips made by car. Yet, many people will continue to drive to trails and parks, and these transition points require a level of support as well.

Finally, support facilities enhance the experience of using an active transportation network. They can help orient users and provide milestones and events along a trail.

This chapter identifies criteria, locations, and features of support facilities related to the current state of the network plan.

Types of Trailheads and Open Space Nodes

Based on both function and facilities, the Grand Island network may have three levels of support facilities. We can refer to these as major trailheads, minor trailheads, and nodes.

Major trailheads provide essential access to the shared use path system and include information and amenities for trail user comfort. Trailheads that serve local and regional populations that arrive by car, bike, or transit (if flex route service is implemented in Grand Island) may have a variety of features.

Minor trailheads provide strategic points of access to the shared use path system. They typically serve local users.

While major trailheads are likely to be accessed by car and are transfer points from car to bike or pedestrian travel, users are more likely to walk or bike to minor trailheads. In addition to marking entrances to the system, minor trailheads should provide users with information and some amenities, but have a much more limited facility program than major trailheads.

Nodes are generally focused to people already using a trail, and may point out points of interest or limited amenities to be used along the way. They also might provide useful features that can address contingencies or improve the experience.

Location Criteria and Features

Because of their different functions, each of the three support facility types has different location criteria and menus of features.

Major Trailheads

In the Grand Island area, major trailheads will function largely as interchanges, where people arrive by car and become pedestrians or bicyclists. They will also tend to use these entry points for recreational purposes. Criteria for sites include:

- Direct adjacency to a major trail. A location that will require some level of on-street cycling or walking will not be a successful major trailhead.
- Good access and visibility from a principal street, road, and bicycle and pedestrian routes. With urban trails, clear access routes are more important than with rural trails.
- Possible location at or near the ends of major trails. This tends to place major trailheads on the periphery of the city.
- From a practical point of view, sites that provide adequate space to accommodate the facility program without requiring land acquisition. Examples are parks, school sites, and other public lands.
- Reasonable access to major community facilities, including retailers and food service.
- Presence of existing features or facilities that serve multiple uses, such as substantial parking areas.

Facilities for a major trailhead may include:

- Motor vehicle parking, including accessible parking spaces.
- Bicycle parking, such as a sufficient number of inverted U's or hitching post designs. Guidelines for bike parking will be provided later in the plan.
- Wayfinding kiosks and signage, with orientation and interpretive information.
- Drinking water fountains.
- Screened portable toilets if facilities are not provided elsewhere on site.
- Shelters, benches, tables, trash receptacles, and similar site furniture.
- Emergency telephone.
- Scenic viewpoints or overlooks if relevant to the site.
- Interpretive information if applicable
- Fix-it station, installations that have secured tire pumps and tools for light repairs. One such facility is installed along the Stuhr Trail.

Many of these features are included in parks, and a trailhead location and trail extension that can use existing facility clusters is very desirable.

Trailhead possibilities. *From top: Illustration of a major trailhead with parking, screened or structured restrooms or portable toilets, shelter, and parking; portable toilet and shelter on Iowa's High Trestle Trail; minor trailhead with bench, receptacle, and information kiosk.*

Minor Trailheads

Minor trailheads will be primary points of entrance by local users. Thus, location criteria and the facilites menu will adjust accordingly. Criteria for minor trailhead sites include:

- As with major trailheads, direct adjacency to a major trail. A location that will require some level of on-street cycling or walking should be avoided.
- Location in a park (including a neighborhood park), school site, or other public space. Other potential locations include the intersection of a trail and a principal on-street route.
- Availability of at least a few parking spaces (desirable but not mandatory).
- Reasonable spacing to permit access and exiting from the trail. Given the city's size and configuration, a reasonable spacing of minor trailheads would be about two miles apart.
- Nearby commercial convenience services are desirable.

Facilities for a minor trailhead may include:

- A small parking area if available in an adjacent use.
- Bicycle parking for a small number of bicycles, such as two inverted U's, hitching posts, or other space efficient designs.
- Wayfinding signage, with orientation and interpretive information.
- Bench and trash receptacle.
- Interpretive information if applicable
- Fix-it station, installations that have secured tire pumps and tools for light repairs.

Nodes

Nodes are points along the trail, generally placed for the comfort and convenience of trail users, or to emphasize a special destination or feature. As a result, they need not be placed at street intersections or other access points. However, spacing along trails becomes a much more important factor than it is for trailheads. Possible locations for nodes include:

- Sites of special interest, such as historic sites, locally important destinations, or scenic or environmentally important features.
- Changes in trail direction or places where special guidance to the user is required.
- Junctions between trails or between trails and a major on-street route.
- Shade trees, green spaces, or other locations that can add quality to the trail experience.

Nodes should be placed to ensure a typical distance of one mile between support services or guidance. Trailheads and publicly available convenience services can fill the same function as a node and may have an effect on their location. Facilities for a node may include:

- Bicycle parking.
- Wayfinding and interpretive signage or kiosks.
- Bench and trash receptacle.
- Fix-it stations at two to three mile intervals.

Proposed Locations

Tables 4.1, 4.2, and 4.3 on the following page presents potential trailhead and node locations, based on the current development of the Grand Island regional network. These locations are divided into locations on existing trails that could be implemented if funds are available; and facilities that require future trail development. Figure 4.4 illustrates possible locations for various types of nodes.

Table 4.1: Possible Major Trailhead Locations

LOCATION	TRAIL	CURRENT SITE RESOURCES AND NEEDS	OTHER COMMENTS
EXISTING POTENTIAL			
Eagle Scout Park/Sports Complex, North Broadwell Ave	Eagle Scout Trail	Parking, restrooms, shelter	Already receives substantial use by pedestrians. For full utilization, requires connection to Capital Trail via proposed Broadwell sidepath. Future development would add wayfinding and interpretive information.
Shoemaker Elementary School, Sweetwood Drive	Shoemaker Trail	Parking, playground area, shelter	Future development would add short path connection to main trail, benches, receptacles, wayfinding graphics, landscape.
Hall County Park, Schimmer Drive between US 281 and North Rd	Riverway Trail	Parking, full camping facilities including restrooms, picnic shelters, playground	Already serves major trail loop. Future development may include dedicated parking area for trail users if necessary, wayfinding and information graphics.
Pier Park	Beltline Trail	Parking, full urban park facilities	Major in-city park at the eastern end of the city's most popular trail. Requires additional wayfinding and park information graphics.
FUTURE DEVELOPMENT			
Veterans Legacy Park	Eagle Scout and Capital Trails	New development	Legacy Park concepts incorporate Eagle Scout Park and include a trail bridge over BNSF mainline. A new full-service trailhead may be incorporated into the eventual plan, replacing or complementing the existing Eagle Scout facility. Such a trailhead may be development along the Capital Avenue trail frontage to serve in-city needs.
Wood River/Fonner Park; approximate location near Stolley Park Rd and Stuhr Rd	Proposed Wood River Trail	New development	Potential east peripheral trailhead with good regional access from Highway 34. Integrated into Fonner Park and potentially part of a loop around the periphery of the facility. Takes advantage of abundant existing parking.
Capital Avenue and Sky Park Rd	Proposed Capital Trail extension	New development	Provides a northeast point of entry to the future trail network.
Mormon Island State Recreation Area	Proposed Mormon Island Trail	Full SRA services include restrooms, parking, camping and associated facilities, and wide array of commercial visitor services	Requires extension of trail along South Locust from Riverway Trail and east-west connection to the existing SRA. Routing of east-west connection requires careful environmental study.
Riverway East, Nebraska Highway 2	Proposed Riverway Trail	New development	Endpoint if current mountain bike quality surface is upgraded to pavement. Provides excellent access to Highway 2 and Interstate 80 if corridor can be acquired.

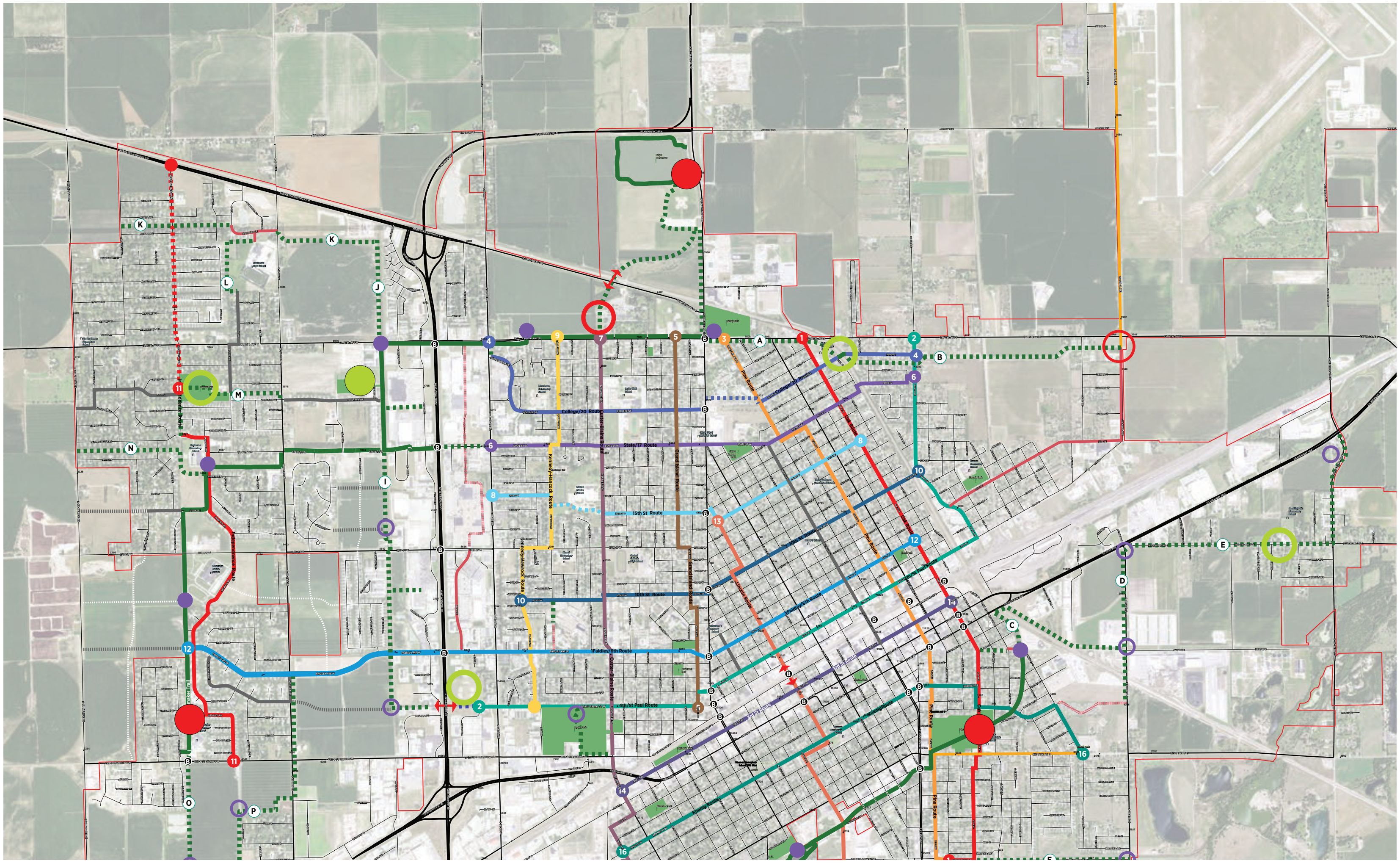
Table 4.2: Possible Minor Trailhead Locations

LOCATION	TRAIL	CURRENT SITE RESOURCES AND NEEDS	OTHER COMMENTS
EXISTING POTENTIAL			
Gates School, Curtis and Anna Street	Beltline, Cemetery, and St. Joe Trails	Parking, playground, with substantial open area on south of site	Strategic site at intersection of several trails and a major part of the on-street system. Requires upgrade of a narrow paved path leading to Beltline Trail to full trail standards. Additional facilities include shelter, benches and receptacles, bike parking, wayfinding and information graphics.
College Park, south edge of parking lots bordering trail and fronting along Husker Highway	St. Joe Trail	Parking, full Central Community College facilities	Requires shelter, limited bike parking, seating, receptacles. Strategic location near Husker Highway trail crossing.
South Locust, adjacent to Walmart parking or south driveway	South Locust Trail	Parking in adjacent commercial lot. Requires other facilities	Important point along a future South Locust connection north of US 34 and south to Mormon Island. Could be incorporated into pad site plans and would benefit from future commercial development.
Sterling Estates, Norseman Avenue	Shoemaker and St Joe Trail	New neighborhood park under development includes full array of features with connection to trail	Excellent opportunity for northwest gateway to trail system. Will require additional wayfinding and park information graphics.
FUTURE DEVELOPMENT			
Cedar Hills Park, Avon and Hampton Ave	Proposed Shoemaker extension and Moore's Creek Trail	Parking, shelter and existing trail loop	With extension of trails, will provide southwest access to the rest of the system.
George Park, Independence and Norseman A	Proposed George Park connector	Parking, shelter, full city park features, including 8-foot path between Macron and Independence Ave	Paving of alley east of Macron and developing path to Sterling Estates Park will connect major northwest park to the trail network. Wayfinding and information graphics should be incorporated into trailhead.
20th Street Tunnel/Knickrehm School; edge of school site at 20th and Plum	Proposed Capital Trail extension along drainageway	School parking available. New development	Valuable entry point for east side users to the extended Capital Trail via the edge of the school site. Requires extension of Capital Vaenue Trail, eventually to Ashley Park.
Seedling Mile School, Seedling Mile Rd and Main	Proposed Seedling Mile Trail	School parking lot and play areas. Opportunity for shelter and other support facilities between west parking lot and playground	Local entrance to trail system to the Shady Bend neighborhood. Opportunity for Lincoln Highway interpretation.
North Front fields, east of US 281	Proposed ped/bike bridge over US 281	New development	Strategic location with enough room for ramps for a full grade separated crossing and moderate ramps. Minor trailhead would be appropriate at eastern landing or proposed bridge.

Table 4.3: Possible Node Locations

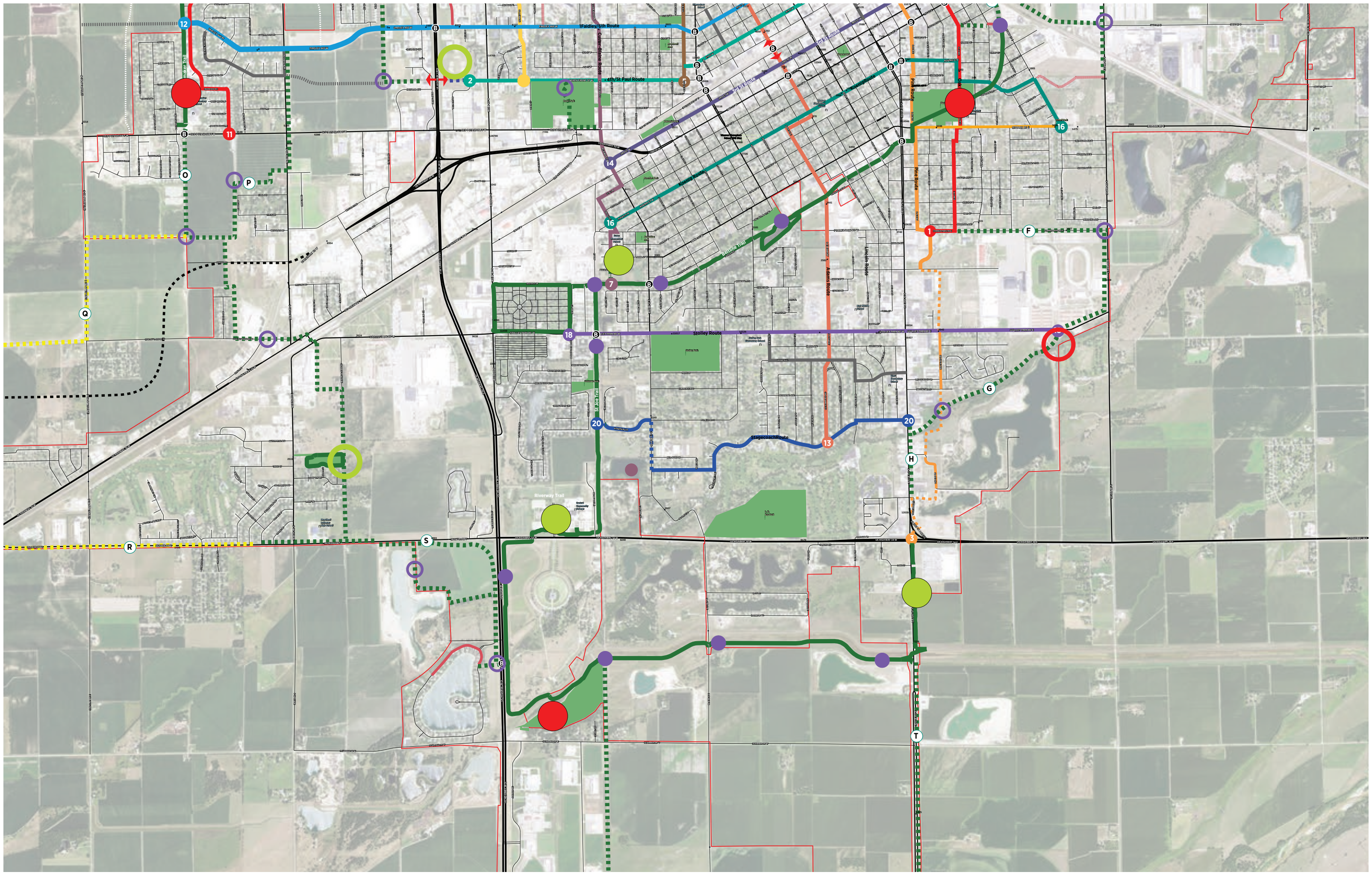
LOCATION	TRAIL	COMMENTS
EXISTING POTENTIAL		
Sutherland and Cherry	Beltline Trail	Existing east terminus of trail. With proposed Beltline extension, will be a significant node, first on east side of railroad
Suck's Lake Park	Beltline Trail	Major scenic feature on trail with adjacent parking. Functions as a minor trailhead
Blaine Cross	Beltline Trail	Node will enhance visibility at important arterial crossing
St Joe/Beltline Crossing	Beltline, St Joe, Cemetery Trails	Major junction in trail netwok, requiring wayfinding information and placemaking effort
Stolley Park Crossing	St Joe Trail	Intersection of trail and on-street bikeway. Connection to major city park on the bikeway network but off trail
Stuhr Museum site along US 281	St Joe/Stuhr Trail	Existing Fix-It installation, upgraded to node
Blaine Crossing	Riverway Trail	Node at major street crossing marks connection to lake neighborhoods south of US 34
Locust Crossing	Riverway Trail	West of trail crossing under South Locust
Ashley Park	Capital Trail	Major park with parking facilities at east end of current Capital Trail. Functions as a minor trailhead but requires a crossing of Broadwell to the west and Capital to continue east
Capital Ave Crossing	Capital Trail	Marks existing trail crossing of major arterial, increases visibility of trail users
Westside Connector	Westside (State-Capital) Connector, Capital Trail	Major wayfinding point and west end of Capital corridor
State Street	Westside Connector, State St Trail	Major trail junction, ultimately a four point trail intersection with southward connector extension
Engleman School, Mansfield Drive south of Cannon Rd	State St and Shoemaker Trails	Major westside trail intersection and school site, with change of direction and intersection with on-street route
Westridge Middle School, south edge of school site	Shoemaker Trail	Major community site, possible intersection with future local collector street west of middle school campus
FUTURE POTENTIAL		
Westside Connector north of 13th	Connector Trail extended	
Westside Connector on North Front alignment	Connector Trail extended, North Front overpass	Marks access to proposed ped/bike overpass to North Front and Ryder Park
Shoemaker Trail extended at half-section south of Old Potash	Shoemaker Trail extension	Change in direction, juction with potential Cornhusker Plant Trail
Shoemaker/Stolley Park Sidepath near North Rd	Shoemaker Trail extension	Interval node ahead of North Rd intersection

Figure 4.4: Possible Support Facility Sites: North



	Major Trailheads	Minor Trailheads	Nodes
With existing network			
With full network			

Figure 4.5: Possible Support Facility Sites: South



	Major Trailheads	Minor Trailheads	Nodes
With existing network	● (red)	● (green)	● (purple)
With full network	○ (red)	○ (green)	○ (purple)

POINTS OF INTEREST

The proposed network plan was designed to serve major destinations and points of interest in the community through trails, on-street principal routes, and shorter connectors. Thus, the active transportation network serves schools at all levels, most parks, the library, many substantial commercial areas, major employment destinations, and even cemeteries with the help of Grand Island's Cemetery Trail.

The network also is designed to extend to new growth areas and currently planned park and open space projects. Thus, future projects serve areas identified for new development in the future land use plans and identifies proposed collector streets through these areas, which should be designed to accommodate all modes comfortably. Major park initiatives identified by the city's park department include:

- Veterans Legacy Park, now in the planning stage.
- Sterling Estates Park, in the final stages of development.
- A new neighborhood park south of 13th Street and west of US 281
- Eventual recreational reuse of parts of the Cornhusker Plan, west of the city.

These facilities are also incorporated into the network.

However, one area of concern not fully considered are historically and/or architecturally significant points of interest. The National Register of Historic Places provides an excellent inventory of these resources, some of which are distinctive. The network, or at least its wayfinding system to be developed later in this planning process and part of the supporting facilities program described in this paper, should direct users to these features, all of which help tell the story of the Grand Island region. Table 4.5 lists the study area's National Register listings, if and how they are served by the network, and what steps should be taken to provide better access.

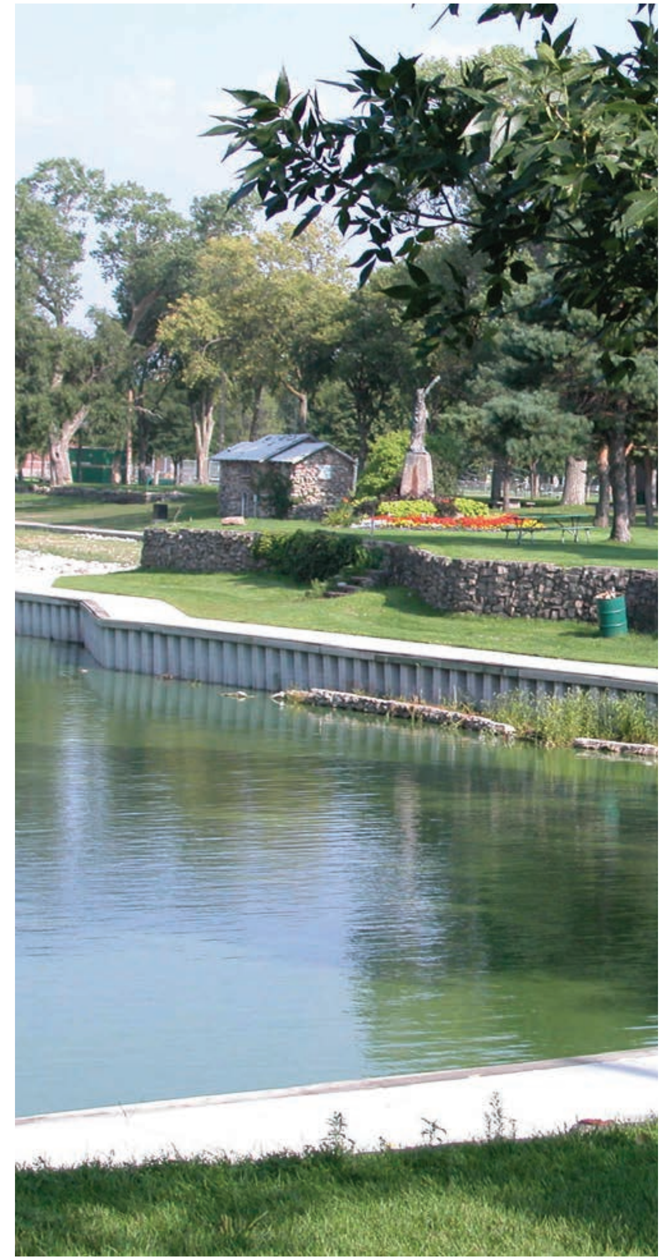


Table 4.5: National Register Properties in Grand Island Metropolitan Area

PROPERTY	ADDRESS	RELATIONSHIP TO NETWORK	POSSIBLE STEPS TO CONNECT
Trinity Evangelical Lutheran Church	512 E 12th	One block north of Beltline extension; one block east of Oak Street route	Wayfinding signage from both approaches via Plum Street from trail and East 3rd Street from Oak
Liederkranz	401 W 1st	3 blocks north of Koenig on Cedar, 2 blocks south of 3rd Street on Walnut	Wayfinding signage using Walnut connector route
Cathedral of the Nativity	204 W Cedar	1/2 block north of Koenig on Cedar	Wayfinding signage
Carnegie Library	321 W 2nd St	1 block south of 3rd on Walnut; on Walnut Con-nector	Wayfinding signage; on network
Hall County Courthouse	1st and Locust	On Pine St bikeway route	Directly on network
Burlington Depot	603 Plum	At end of 6th Street Route	Extension of route from Oak to Plum
Nine Bridges Bridge		Near Mormon Island Trail	On extended network
Shady Bend Gas Station	US 30 and Shady Bend Road	On extended Seedling Mile path	On extended network
Seedling Mile of Lincoln Highway	Seedling Mile west of Stuhr Road	Near Seedling Mile Path	Wayfinding signage on route crossing US 30 at signalized Stuhr Road intersection
Hotel Yancey	123 N. Locust	2 blocks south of 3rd	Wayfinding signage via Locust
Grand Island Post Office	203 W 2nd	1 block south of 3rd	Wayfinding signage via Locust
Hamilton-Donald House	820 W 2nd	1 block south of 3rd	Wayfinding signage via Clark
Bartenbach House	720 W Division	1 block north of Koenig	Wayfinding signage via Cleyburn and Division
Roeser-Gartner House	721 W Koenig	On Koenig route	On network
Glade-Donald House	1004 W Division	1 block north of Koenig	Wayfinding signage via Greenwich
Hargis House	1109 W 2nd	On Lincoln route	On network, requires treatment of Lincoln Ave intersection
Walnut School (GI High School)	500 N Elm	On 6th Street route	On network
Lee Huff Apartments	213 S. Walnut	On Koenig route	On network
Heinrich Giese House	2226 S. Blaine	1,000 feet north of Pioneer Blvd route and Stol-ley Park route	Wayfinding signage or sidewalk use


RAILROAD
CROSSING
2
TRACKS

CHAPTER 5

CROSSING BARRIERS

THIS CHAPTER ADDRESSES VARIOUS PHYSICAL BARRIERS TO ACTIVE TRANSPORTATION IN THE REGION. It presents a toolkit of solutions that can be adapted to the specific contexts found in the Grand Island metropolitan area with a specific focus on intersections.

Barrier crossing is an extremely important issue in the development of Grand Island's trail system and overall active transportation network. Key barriers, in general order of relative importance, include:

- **US 281.** This four-lane divided highway is viewed by most participants as the most important barrier in the study area by virtue of its traffic volume and expanse (about 90 feet between edge of pavement and about 220 feet between edges of drainage ditches). The distance of crossing is a formidable barrier to non-motorized users.
- **Union Pacific Mainline.** The UP, America's highest volume freight railroad mainline, is about 130 feet wide at various grade crossings. Existing grade separations at Sycamore and Eddy are inhospitable to active users.
- **Arterial and major collector street crossings.** Highway 30 (1st/2nd Streets), US 34, Webb Road, and Capital Avenue are significant crossing barriers. Broadwell Avenue is a high volume arterial that presents special challenges as the seam between the city's two grids – the traditional orthogonal surveyor's grid and the rotated railroad grid. Existing trails face significant crossing problems at Capital, State, Stolley Park, Blaine, and US 34 at College Park.
- **Other railroads.** The BNSF mainline, on the northern and eastern edges of the city, is elevated along the eastern edge and is relatively permeable, with a number of grade separated crossings and a pedestrian tunnel at 20th Street. Lightly used branches, such as the remaining portion of the UP's line to Hastings, are less hazards than barriers that interrupt street continuity and access to parallel trails.

These general barriers, combined with field inspection and analysis of several factors, including average daily traffic, width of corridors, observation of signal cycles, and other factors, led to a preliminary list of barrier points that should be addressed as part of the development of details in the next phase of this planning process. In a November, 2017 workshop, members of the GIAMPO's Technical Advisory Committee (TAC) and the Bicycle and Pedestrian Advisory Committee (BPAC) were asked to rate the relative importance of crossing these barriers to the integrity of the overall network on a 1 (most important) to 5 (least important) scale. These barrier sites, in relative order of importance score and relative priority rank (priority rank follows), are:

1. Capital Ave and US 281 (1.71) (1)
2. 2nd and Lincoln (1.86) (4)
3. State and US 281 (1.93) (6)

4. St. Joe Trail and Stolley Park Road (1.93) (2)
5. Capital Ave and Broadwell (2.00) (11)
6. Future US 281 overpass at North Front (2.21) (8)
7. Beltline Trail and Blaine (2.29) (5)
8. Oak and Highway 30 (2.43) (9)
9. 4th/Broadwell (2.64) (7)
10. Koenig crossing Locust and Walnut (2.71) (3)
11. Beltline Trail and Locust (2.93) (10)

Additional significant barriers to future development emerged during the planning process, but were not listed in the priority evaluation.

Figure 5.1 lists individual barriers and the specific issues they present. Figure 5.2 identifies the location of these barriers and places them into overall categories. Figure 5.3 describes a toolbox of intersection and barrier improvements, including the types of intersection problems that they can address. Subsequent illustrations show more detailed consideration of various potential solutions. Application of these to specific locations in the Grand Island area will be determined by further engineering evaluation, including a traffic study where relevant, and detailed plans that will be reviewed and approved by a Professional Traffic Operations Engineer.

Figure 5.1: Barrier Points in the Grand Island Metropolitan Area

BARRIER POINT	ISSUE
Capital Avenue and US 281	Sidepath continuity across major arterial highway that acts as a barrier to pedestrians and bicyclists
2nd Avenue and Lincoln	Pedestrian crossing of highway at Public Library and intersecting street with grade crossing of UP, with a history of pedestrian crashes
State Street and US 281	Sidepath continuity across major barrier highway
St Joe Trail and Stolley Park Road	Trail crossing of major arterial, to be modified for 3-lane section with multi-use shoulders
Capital Avenue and Broadwell	Arterial intersection with sidepaths on three legs
US 281 Overpass	All ped/bike crossings of US 281 are at grade
Beltline Trail and Blaine Street	Trail crossing of major 2-lane arterial, heavy school traffic
Oak Street and Highway 30	Marked but unsignalized pedestrian crossing of US 30, a one-way highway pair with relatively high-speed traffic
4th Street and Broadwell Avenue	Offset intersection with arterial, breaks continuity to the west
Koenig at Walnut and Locust Street	Crossing of two diverging major streets in confusing setting; Walnut presents more difficult crossing problem
Beltline Trail and Locust Street	Confusing crossing and difficulty in reading trail track
St Joe Crossing of Husker Highway	Major trail crossing of highway
UP Crossings at Oak, Pine, Walnut, and Lincoln Streets UP Crossing for Shoemaker Trail extension between Old 30 and North Road	Railroad mainline grade crossings

Figure 5.2: Barrier Locations and Categories

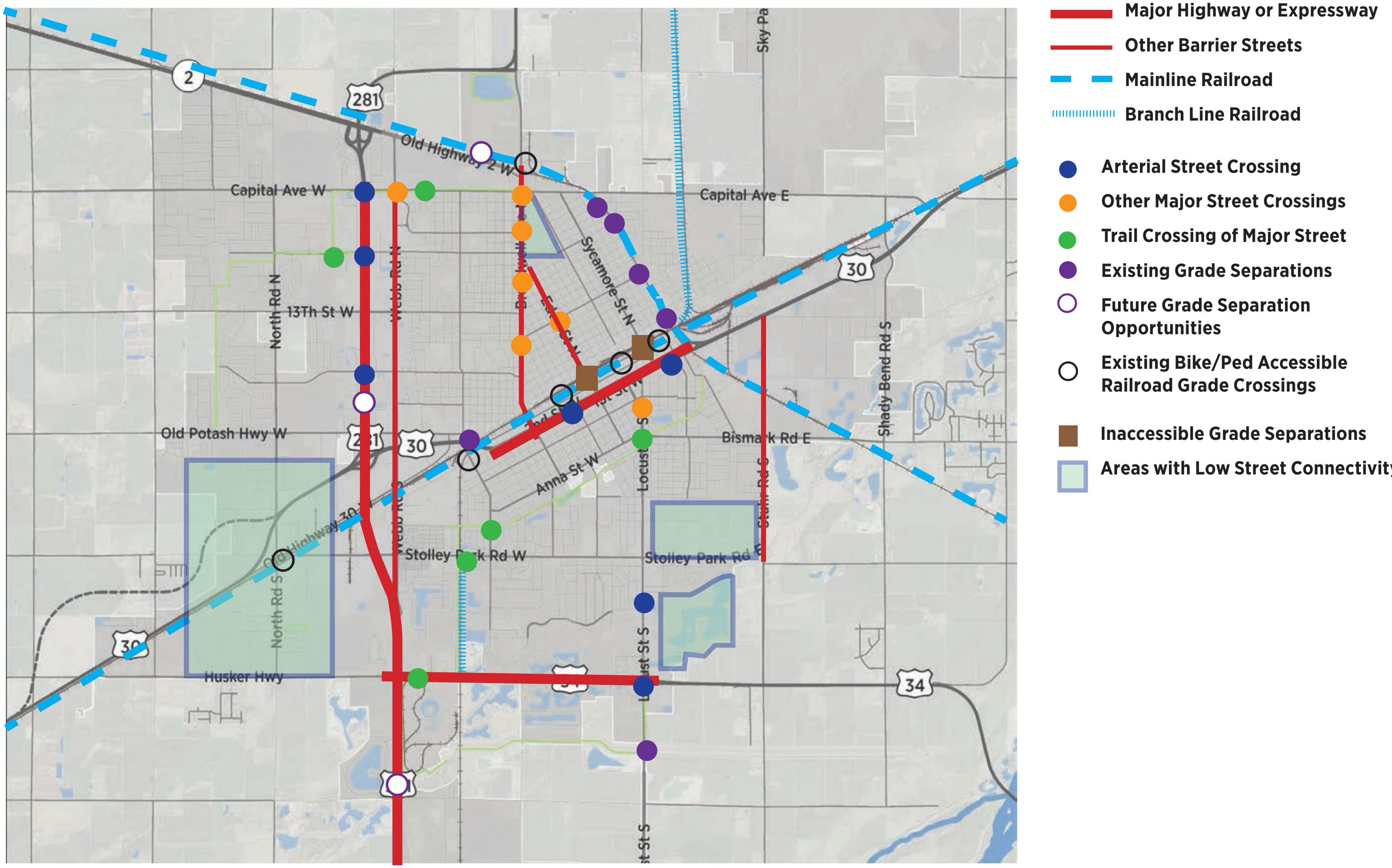


Figure 5.3: Intersection Safety Enhancement Techniques

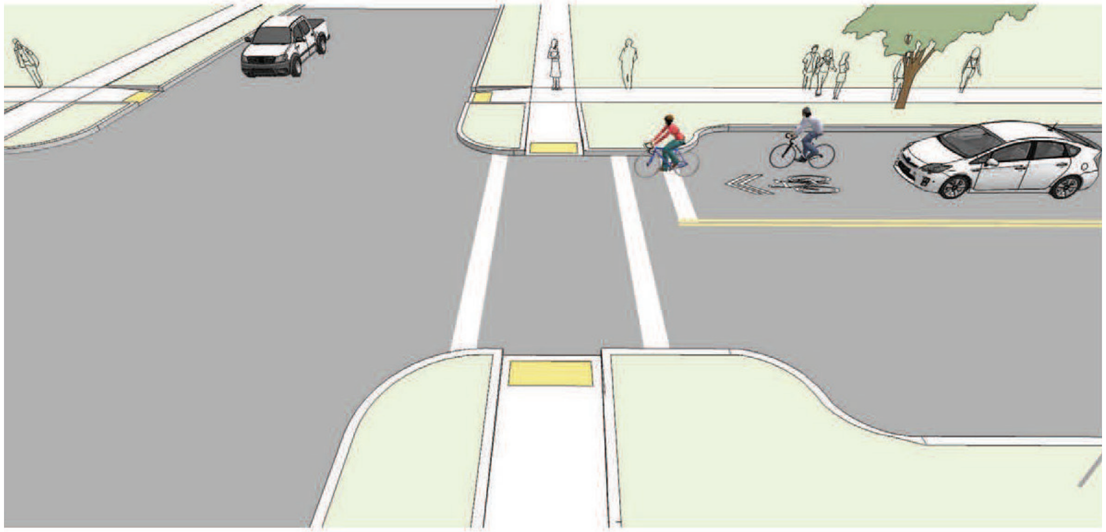
TECHNIQUE	DESCRIPTION	POTENTIAL APPLICATION
Grade separation	Overpass or underpass that separates bike/ped traffic from crossing arterials	Crossings of major arterials
Pedestrian refuge median	Island in middle of a two-way street, allowing pedestrians and bicyclists to address crossing traffic in one direction at a time from a protected place.	Trail crossings of arterials and major collectors where turning movements are not necessary
High visibility crosswalks	Well-defined crosswalks, using durable reflective materials and typically using Continental or Zebra/Ladder crosswalk markings	Arterial street crossings with significant pedestrian and bicycle traffic
Beacons: HAWKS (High Intensity Activated Crosswalk Beacon) and flashing beacons.	Pedestrian actuated signals. HAWK signals often used at midblock and for trail crossings and include flashing yellow and solid red stop sequence. Flashing beacons typically located at intersections and use flashing lights but no red signal. In January, 2018, one such beacon, Rectangular Rapid Flashing Beacons (RRFB's) were temporarily removed from MUTCD approval because of patent issue, but have received interim conditional approval as of March, 2018.	Trail crossings, other unsignalized crossings of major streets
Protected Intersection	New intersection design providing a protected, high visibility corner location for bicyclists and pedestrians.	Crossings of major arterials or the intersection of primary barriers

PEDESTRIAN CROSSING CONTEXTUAL GUIDANCE
At unsignalized locations

FACILITY TYPE	Local Streets 15-25 mph		Collector Streets 25-30 mph			Arterial Streets 30-45 mph							
	2 lane	3 lane	2 lane	2 lane with median refuge	3 lane	2 lane	2 lane with median refuge	3 lane	4 lane	4 lane with median refuge	5 lane	6 lane	6 lane with median refuge
1 Crosswalk Only (high visibility)	✓	✓	EJ	EJ	X	EJ	EJ	X	X	X	X	X	X
2 Crosswalk with warning signage and yield lines	EJ	✓	✓	✓	✓	EJ	EJ	EJ	X	X	X	X	X
3 Active Warning Beacon (RRFB)	X	EJ	✓	✓	✓	✓	✓	✓	X	✓	X	X	X
4 Hybrid Beacon	X	X	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓	✓	✓
5 Full Traffic Signal	X	X	EJ	EJ	EJ	EJ	EJ	EJ	✓	✓	✓	✓	✓
6 Grade separation	X	X	EJ	EJ	EJ	X	EJ	EJ	✓	✓	✓	✓	✓

Legend
Most Desirable
Engineering Judgement (EJ)
Not Recommended (X)

Figure 5.4: Intersection Concepts: Neckdowns



Neckdowns

Context:

- "Bicycle boulevards" – relatively low volume streets with good continuity

Technique:

- Curb extensions that reduce the curb to curb width at an intersection to 22- to 24-feet

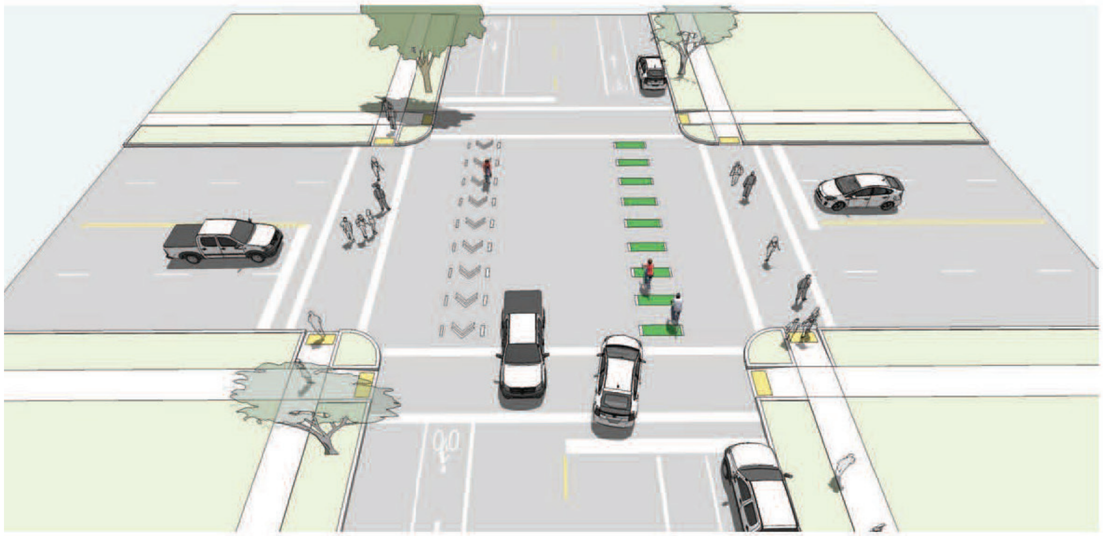
Benefits:

- Reduces average traffic speed
- Reduces distance of pedestrian crossing
- Provides some protection for parked cars
- May provide opportunities for neighborhood plantings and beautification

Problems/Issues:

- Intended result of slowing traffic speeds could cause motorists to divert to other streets with good continuity
- Potential difficulty with truck turns
- Stewardship of planted areas

Figure 5.5: Intersection Concepts: Pavement Markings



Intersection Pavement Markings

Context:

- Crossings of major intersecting streets by on-street active network routes

Technique:

- High visibility crosswalks with pavement markings using various methods to define a bicycle track across an intersection
- May be used in combination with rapid rectangular flashing beacons or hybrid signals

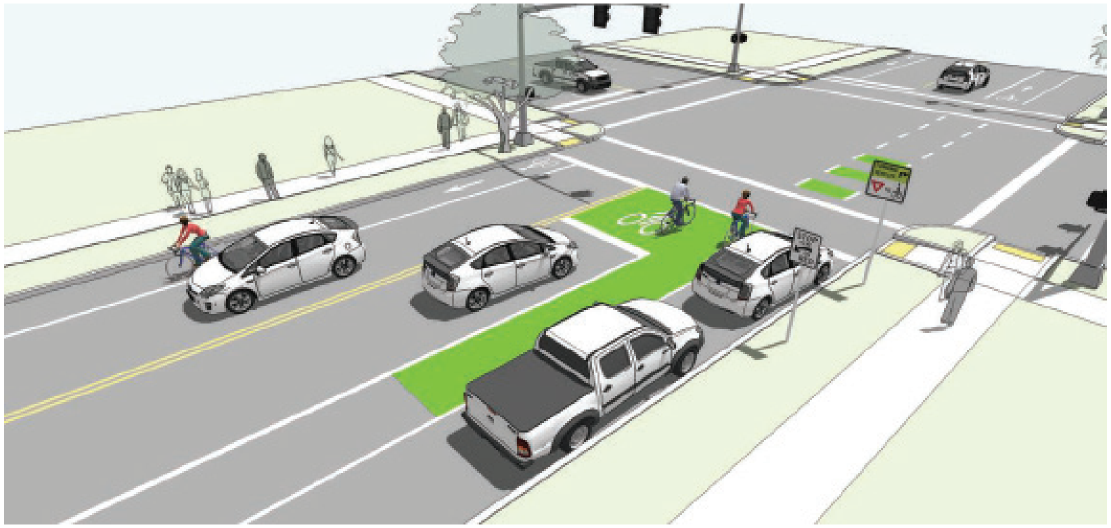
Benefits:

- Increases visibility of pedestrians and bicyclists
- Notifies motorists on intersecting major streets of presence of a significant number of active users

Problems/Issues:

- Requirement for ongoing maintenance
- Possible initial motorist confusion about unfamiliar markings

Figure 5.6: Intersection Concepts: Bike Boxes



Bike Box

Context:

- Locations (often signalized intersections) where bike routes intersect or other locations that involve a significant number of left-turning movements for bicyclists otherwise traveling in a bike facility or "as far to the right as practicable"

Technique:

- Painted area behind the stop bar defined for use by bicyclists

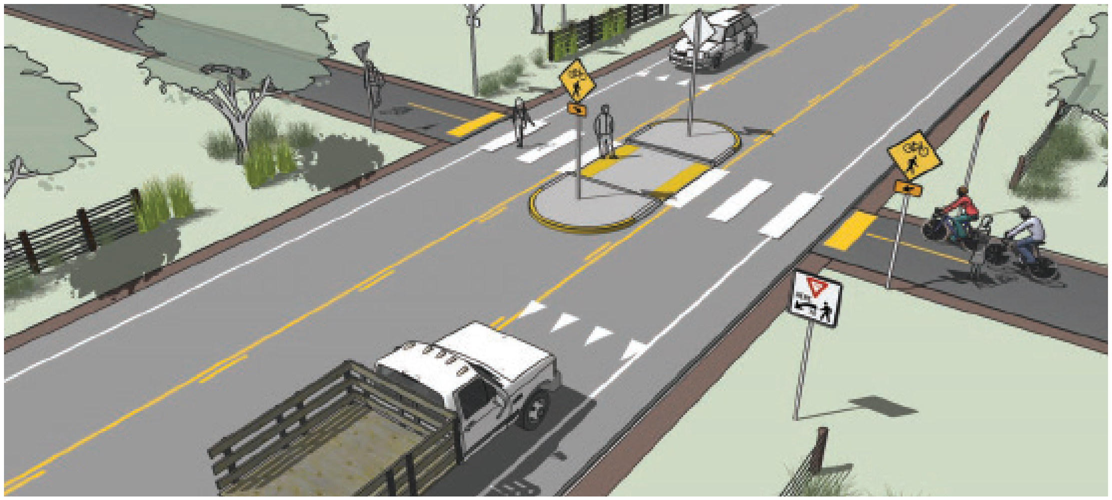
Benefits:

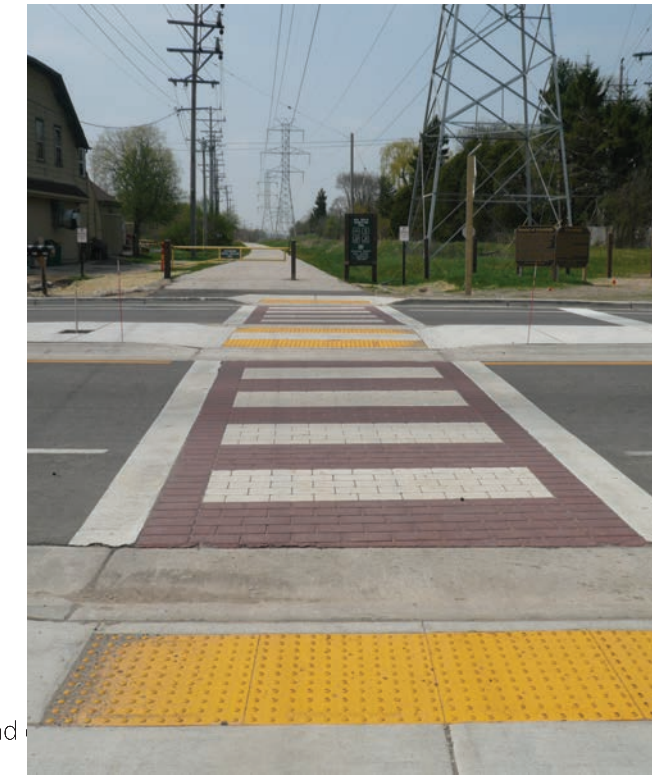
- Reduces incidence of bicyclists turning left across traffic from the right-hand side of a road
- Reduces incidence of crashes at intersections

Problems/Issues:

- Motorist compliance and education
- May restrict motorist visibility of approaching traffic on intersecting street, requiring expansion of vision clearance zone

Figure 5.7: Intersection Concepts: Pedestrian Refuge Median





Pedestrian Refuge Median

Context:

- Trail crossings of major streets
- Bike/ped crossings of major streets where left-turns are not required

Technique:

- Refuge median in a two-way turn lane. Alternative is removal of parking from crossing area and lanes slightly to provide space for the median
- High visibility crosswalks and pavement markings
- Used in conjunction with yellow caution signs.
- May include flashing beacons or HAWK protection

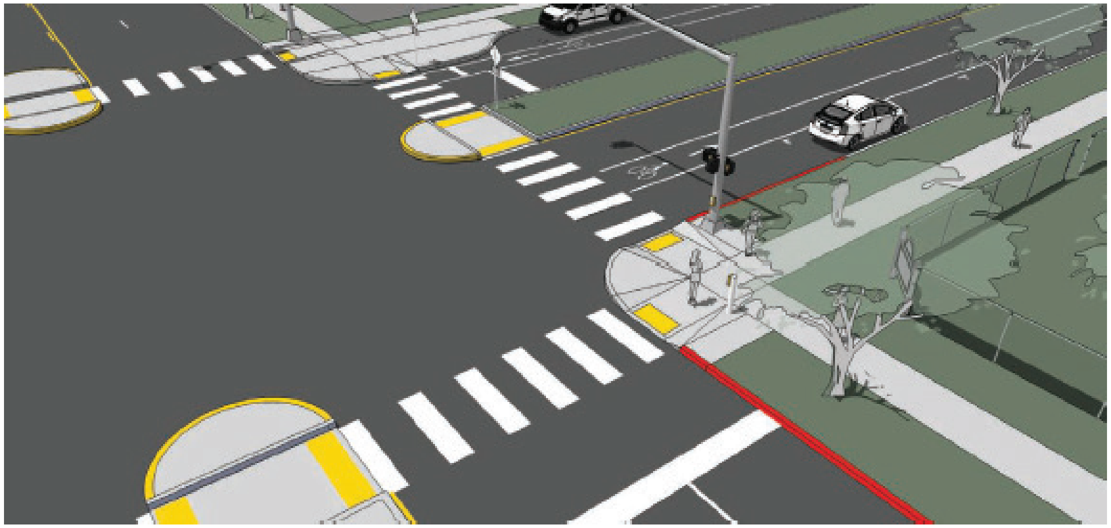
Benefits:

- Increases visibility of pedestrians and bicyclists
- Notifies motorists on intersecting major streets of presence of a significant number of active users

Problems/Issues:

- Slows traffic flow, which is an effect but not a problem from a pedestrian safety point of view
- Possible rear-end crashes caused by inattentive motorists in common with other traffic controls
- Installation cost
- Should not be used when obstructing a necessary left turn

Figure 5.8: Intersection Concepts: Reduced Curb Radius



Reduced curb radius. *The two tier mountable curb provides the benefits of a small curb radius but still provides the larger radius necessary for safe passage of trucks and other large vehicles.*

Reduced Curb Radius

Context:

- Urban street intersections along bicycle and pedestrian routes

Technique:

- Reduce curb radius at intersections. Most appropriate at locations with few vehicles that require long radius turns such as local street intersections or intersections of local and collector streets

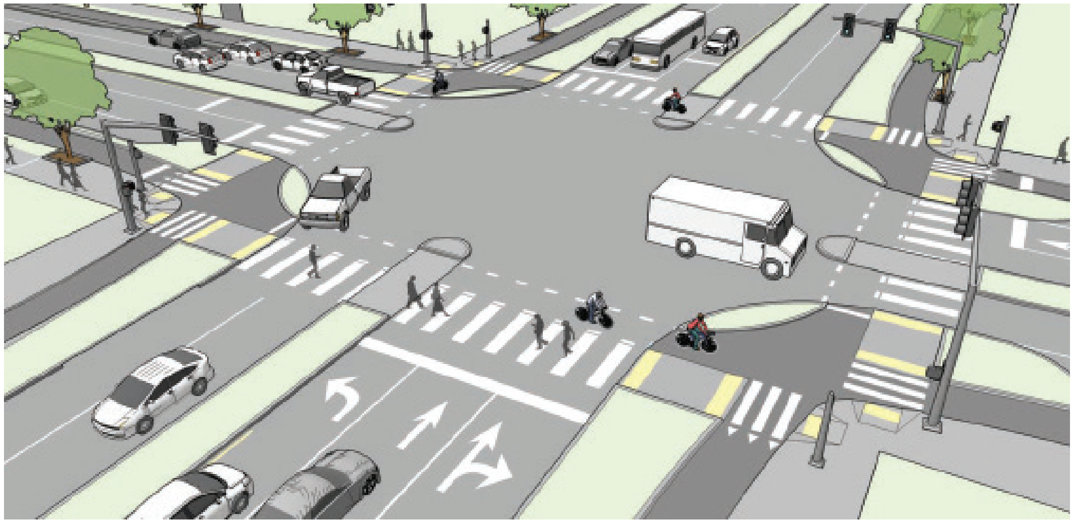
Benefits:

- Requires drivers of right turning vehicles to slow as they make turns, increasing safety for users of sidepaths
- Reduces incidence of “right-hook” crashes

Problems/Issues:

- Large vehicles may not be able to make turns without encroaching on curbs
- Potential for pedestrian crashes or conflicts if pedestrians are too close to corner
- Requires truck turn evaluation when used at major street locations

Figure 5.9: Protected Intersections



Protected Intersections

Context:

- Intersections of streets with sidepaths or trails with major arterials and wide highways

Technique:

- New intersection design in frequent use in Europe and beginning to be implemented in US, providing a visible, protected space for pedestrians and bicycles to cross wide and busy intersections. Protected space is separated from turning traffic by an island
- Requires a two-stage crossing for bicyclists turning left to an intersecting trail or major street

Benefits:

- Increases visibility of pedestrians and bicyclists
- Reduces the perceptual width of large intersections
- Provides high visibility for vulnerable users, placing them in a setting where they are both protected and in a preferred position entering an intersection

Problems/Issues:

- Expensive installation cost
- Relatively infrequent use in current American practice
- May require the removal of a right turn lane, leading to longer vehicle queues
- May be difficult for fire trucks and other large vehicles to navigate around without adequate radii
- Requires a learning curve for all users

Top: Protected intersection in Salt Lake City. Above: Conecpt for an arterial crossing with bike lanes and paths in Wauwatosa, WI

Figure 5.10: Mainline Railroad Crossings

Photo: Orange County Register

Photo: Orange County Register

Photo: California Public Utilities Commission

Mainline Railroad Crossings

Context:

- Major pedestrian and bicycle grade crossings of railroad mainlines

Technique:

- Special pedestrian crossing gates with escape gate for people with disabilities who may be trapped behind the gate
- Improved warning signage and signalization
- Clear pedestrian/bicycle track defined across railroad
- Quiet zone treatment with medians
- Railings or fencing to channel pedestrian access

Benefits

- Reduced opportunity for encroaching on tracks when trains are apprpoaching
- Reduced probability of pedestrian/bicyclist and train crashes
- Improved sense of safety crossing tracks

Problems/Issues:

- High installation cost requires railroad participation

CHAPTER 6

ON-FOOT IN THE GRAND ISLAND AREA

THIS CHAPTER ADDRESSES PEDESTRIAN ISSUES IN THE GRAND ISLAND AREA. Often, pedestrians and bicyclists have similar interests and many projects and policies are beneficial to both groups. But pedestrians have specialized needs as well.

Almost all of us walk outside for a purpose during the course of most days, and recreational walking almost always rises to the top of the list of recreational activities. Grand Island, like most cities, has a large capital investment in its pedestrian infrastructure: mainly sidewalks but also trails in Grand Island. But all too often, pedestrian facilities don't always receive the attention they deserve. But incorporating walking paths (sidewalks, paths, and multi-use trails) into new development and areas of existing development are essential to maintaining a safe, convenient active environment.

While the earlier chapters of this plan may appear to focus on bicycle transportation, most of its concepts and criteria also apply to pedestrians. For example:

- The performance criteria that open Chapter Three – integrity, directness, safety, comfort, experience, and feasibility– apply equally to people on bikes and on foot.
- The active network, incorporating street routes and trails, provides a framework that applies to both active modes.
- Pedestrians and bicyclists will both use the support facilities discussed in Chapter Four.
- Barriers for bicyclists also present barriers for pedestrians and the solutions and practices presented in Chapter Five bridge these obstacles for both groups.

Recent research and surveys indicate that households of all ages increasingly value "walkability" and the form of the development that walkability encourages. In a truly walkable community, neighborhood commercial services, schools, and other activity centers are relatively accessible to housing. Walkable communities encourage pleasant, unplanned social interaction and expand transportation options.

Decisions regarding vehicular travel also affect a community's walkability. A good transportation network uses special design techniques to ensure that street traffic is consistent with pedestrian safety, which is important when linking

neighborhoods to commercial and civic destinations around the community.

This chapter provides analysis and recommendations that reflect good current practice but are adapted to conditions in the Grand Island area. It places a special emphasis on the traditionally most important pedestrian trip – the walk to school. The goals of this part of the plan are to:

- Ensure that most areas and key activity centers are comfortably accessible by a network of pedestrian facilities.
- Create good linkages between residential neighborhoods and walking distance destinations.
- Reduce barriers that discourage walking and create obstacles to people with or without disabilities.

The specific issue areas discussed here include:

- Sidewalk zones and widths
- Sidewalk infill and improvements
- Pedestrian access to commercial areas
- ADA compliance
- Sidewalk Coverage Near Schools

SIDEWALK ZONES AND WIDTHS

Sidewalks are the most fundamental element of the pedestrian network, providing an area for pedestrians separated from vehicle traffic. Providing adequate and accessible facilities can lead to increased numbers of people walking, improved safety, comfort, and places for people to socialize (See Figure 6.1 for sidewalk zone examples). Current standards for Grand Island sidewalks are found at http://www.grand-island.com/your-government/public-works/infrastructure-specifications-and-standard-plans.

Typical Application and Features

- Sidewalks should be provided on both sides of urban commercial streets, and should provide continuity on at least one side of the street (preferably both sides) in residential areas of urban density, generally above 2 units per acre.

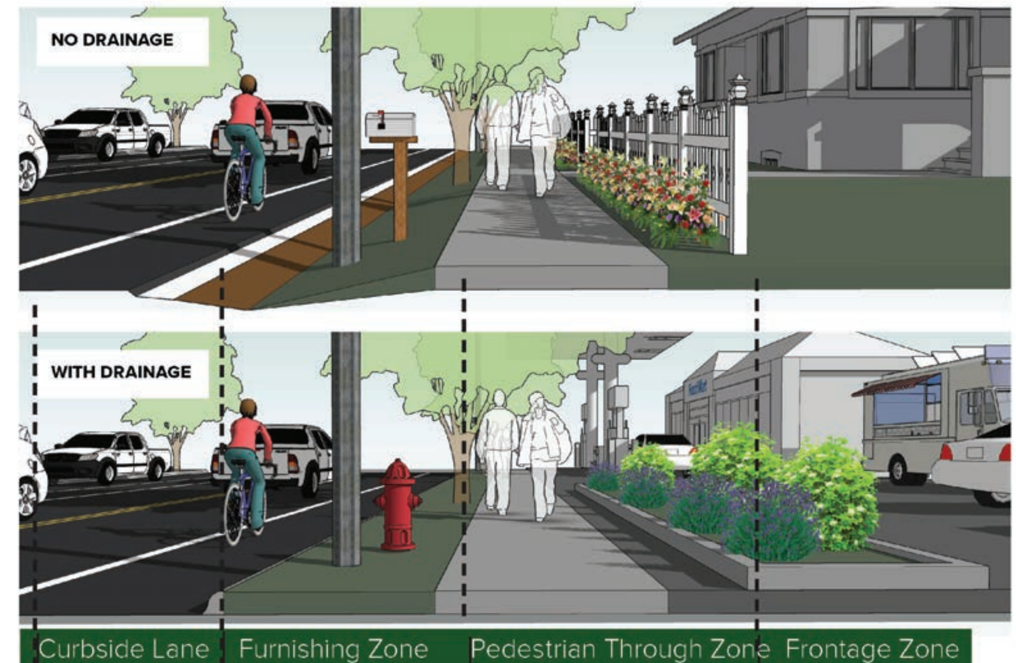
- When retrofitting gaps in the sidewalk network, locations near schools, parks, public buildings, and other areas with high concentrations of pedestrians should be the highest priority. If Grand Island implements the flexible route service from the Illustrative Plan of the Regional Transit Study, the sidewalk system should also serve timepoints.

- It is important to provide adequate width along a sidewalk corridor. An unencumbered pedestrian through zone width of five feet enables two pedestrians (including wheelchair users) to walk side-by-side, or to pass each other comfortably. It is particularly important to avoid obstructions in this zone such as poles, utility boxes, and other obstacles.

- In high demand areas such as Downtown Grand Island and areas immediately adjacent to schools or sports facilities, sidewalks should be wide enough to accommodate the high volumes and different walking speeds of pedestrians.

- The sidewalk setback zone (sometimes referred to as a "furnishing" zone or tree lawn) provides opportunities for street trees and also provides a place for storing plowed snow that maintains pedestrian access.

Figure 6.1: Sidewalk Zone Examples



Curbside Lane	Furnishing Zone	Pedestrian Through Zone	Frontage Zone
The curbside lane can act as a flexible space to buffer the sidewalk from moving traffic and may be used as a multi-use shoulder for parking and bikes, depending on width. Curb extensions may occupy this space where appropriate.	The furnishing (or sidewalk setback) zone buffers pedestrians from the adjacent roadway, and is also the area where elements such as street trees, signal poles, signs, and other street furniture are properly located. It also provides a place to store plowed snow.	The pedestrian through zone is the area intended for pedestrian travel. This zone should be entirely free of permanent and temporary objects or obstructions. Wide through zones are needed in downtown or in areas of high pedestrian flow.	The frontage zone allows pedestrians a more comfortable "shy" distance from building fronts. In commercial areas, it provides opportunities for window shopping, outdoor dining, sign placement, planters, or chairs.

SIDEWALK INFILL AND IMPROVEMENT

This section focuses on opportunities to upgrade short segments of missing sidewalk or existing sidewalks that were constructed in Grand Island with sub-standard widths.

The majority of streets in Grand Island have sidewalks on both sides. However, some residential, commercial, and industrial areas have missing segments along an otherwise continuous corridor. Some of these areas have sidewalk on only one side of the street, making access to both sides difficult. Figure 6.2 illustrates a method of addressing these gaps.

In Grand Island, as elsewhere in Nebraska, special assessments on adjacent property are the most common mechanisms for funding sidewalk infill programs. This frequently leads to opposition from property owners who don't perceive sidewalks as a benefit to them. Communities have been able to find other ways of funding sidewalk improvements, including state and federal grant programs such as Safe Routes to Schools or Safety grants, Food and Beverage Tax funding for standalone projects, gas tax funds for eligible sidewalks constructed with street projects, private sector funding of trails and sidewalks within their developments, and general funding through the Capital Improvement Program (CIP) when appropriate.

Funding for projects should be guided by adoption of a Major Pedestrian System, analogous to the Major Street System. This plan establishes the framework for such a system that includes:

- Sidewalks and trails that comprise the Active Network presented in Chapter Three.
- A web of sidewalks within a quarter mile of elementary school sites.
- Areas that have an especially high density of pedestrian use because of their character or concentration of land uses. Examples include Downtown Grand Island or the concentration of visitor services along Allen Drive.

Opportunities to Widen Sidewalks

Typical Application and Features

Although some sidewalks in Grand Island have planted buffers and wide sidewalks, other existing sidewalks are too narrow for comfortable pedestrian travel and are attached to the curb. When located along high speed and high traffic volume roadways, these conditions may deter people from walking for routine trips. They are also sometimes too narrow to meet Americans with Disabilities Act (ADA) standards and may create safety hazards for people who inadvertently walk off the sidewalk. These sidewalks are also of-

Figure 6.2: Gap Filling Opportunity

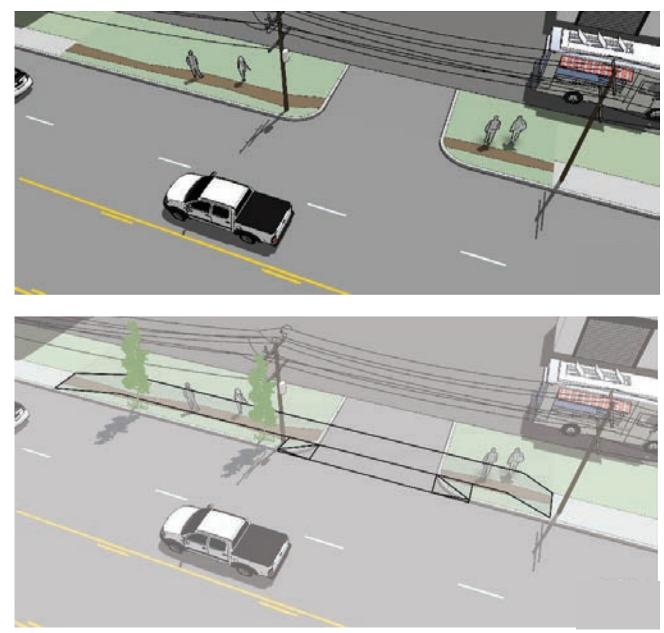


Figure 6.3: Narrow Back of Curb Sidewalk

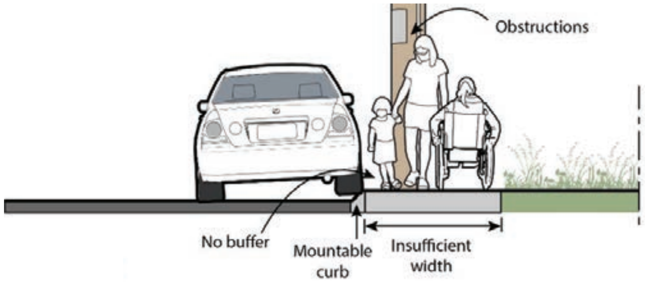
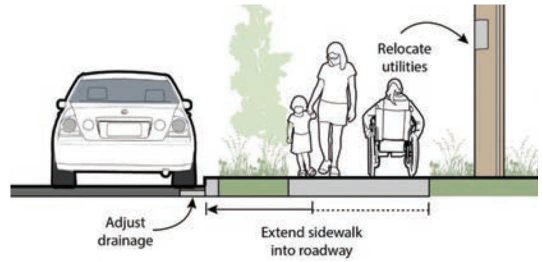
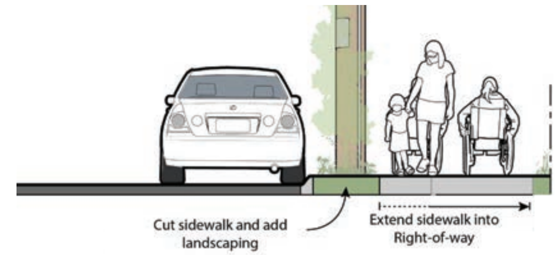


Figure 6.4: Outward Widening



Widening the sidewalk outward creates additional space for a buffer between the roadway and the sidewalk, making a more comfortable facility for people walking. Relocating utilities and other sidewalk obstructions outside of the sidewalk area increases the capacity and usefulness of the sidewalk.

Figure 6.5: Inward Widening



Widening the sidewalk inward into the right-of-way creates more space for a sidewalk. The existing sidewalk can be cut to create space for landscaping and utility poles.

ten used by parked cars, completely blocking pedestrian access. The techniques illustrated in Figures 6.4 and 6.5 are potential solutions for narrow sidewalks.

PEDESTRIAN ACCESS TO COMMERCIAL DESTINATIONS

Connections to Mall Entrances and Internal Circulation

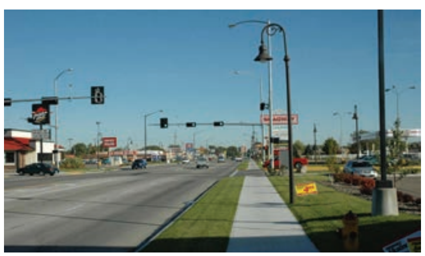
Sidewalk coverage on the west side of Grand Island is often inconsistent. Although some areas have sidewalks adjacent to commercial developments, such as shopping malls, pathways from adjacent streets and commercial development entrances are often disconnected or completely absent

Pedestrian connections are needed from existing sidewalks to mall entrances. Pedestrian access should create safe, shared use paths or sidewalks that extend from sidewalks on public streets to commercial area entrances. Examples of accessible routes from other communities often use landscaping or artistic features across parking lots.

In commercial areas that already have pedestrian connections from adjacent sidewalks across parking lots to the entrance, pedestrian crossings should be appropriately marked. This practice alerts motorists to the presence of pedestrians. These criteria should be integrated into site plan review for new major commercial development.

Major Street Crossings

Major streets in these commercial areas, such as 13th Street, US 281, Webb Road, Faidley Avenue, and State Street



From top: Safe and attractive paths from public sidewalk to front door also help to define areas within parking lots (Engelwood, CO and Des Moines, IA); sidewalk development along South Locust dramatically improved the street's business environment

Conestoga Mall includes sidewalk to the main entrance. Marked crossings need improvement as do pedestrian connections to other entrances (Credit: Google Maps).

frequently feature wide pedestrian crossing distances without marked crosswalks. A variety of potential solutions were discussed previously in Chapter Five.

A range of other tools can improve pedestrian crossings at signalized locations. Specific treatments may include adjusting signal phase walk-time, pedestrian countdown signals, and prohibition of right turns on red for motor vehicles. Busier intersections on wider streets may include pedestrian refuge islands, where slower pedestrians can safely stop and wait for another signal.

Applications to improve pedestrian crossings at major street crossings will be determined by further engineering evaluation, including a traffic study where relevant, and detailed plans that will be reviewed and approved by a Professional Traffic Operations Engineer.

Wide corner radii create long pedestrian crossing distances. Intersections lack marked crosswalks or other crossing features such as pedestrian refuge islands (Credit: Google Maps).

ADA COMPLIANCE

The Americans with Disabilities Act (ADA), enacted on July 26, 1990, provides comprehensive civil rights protections to persons with disabilities in the areas of employment, state and local government services, access to public accommodations, transportation, and telecommunications.

Title II of the ADA prohibits state and local governments from discriminating against persons with disabilities by requiring them to make all programs, services, and activities accessible to persons with disabilities. Title II requires that a public entity must evaluate its services, programs, policies, and practices to determine whether they are in compliance with the nondiscrimination requirements of the ADA.

The City is responsible for providing ADA-compliant curb ramps. The City also maintains an inventory of curb ramps that are not ADA compliant. The City has a curb ramp transition program with a goal to provide ADA compliant curb ramps at every street intersection in the city. Property owners are responsible for maintaining sidewalks adjacent to their property. The City does not investigate sidewalk compliance unless the City receives a complaint. Data do not currently exist regarding mileage of sidewalks that are non-ADA compliant. In 2016, Grand Island voters rejected a proposal to increase sales tax by a half-cent, part of which would have created a dedicated ADA funding source. The City of Grand Island should continue scheduling ADA improvements in conjunction with all street resurfacing or reconstruction projects as well as corridor-based "spot" improvements. Pursuing other opportunities to create dedicated funding streams would stabilize the City's ability to upgrade priority areas that are not ADA compliant.

The City should develop a more complete understanding of sidewalk compliance issues. A focused study should show the total mileage of non-compliant sidewalk as well as non-compliant sidewalk in priority areas, such as streets that make up the active network.

ACCESS TO SCHOOLS

Walking to elementary and middle school has long been a traditional part of growing up in America. Yet, it has gone into decline over the last 50 years. In 1969, 48% of all children between ages 5 and 14 walked or biked to school. In 2009, that number had dropped to 13%. A variety of trends led to this decline, including greater use of school transportation in urban districts, decentralization of the population, and perception of traffic-related hazards. About a third of parents in a 2005 survey by the Centers for Disease Control cited concern over traffic as the principal obstacle to their children walking or cycling to school. This, of course, creates a repetitive cycle: when parents are convinced that it is unsafe for their kids to walk to school, they drive them which in turn makes the problem worse. Some communities programs like Walking School Buses, in which volunteer parents lead a "busload" of kids walking to school together, have been effective in many places.

Other reasons exist for the decline in the number of students walking or riding to school. In Grand island (and other cities), many students are not required to attend their neighborhood school, and many choose to commute across town. This creates problems with projecting school traffic, although longer distance school commutes are feasible by bicycle. Nevertheless, many students do walk and bike to school in the city, especially where trails directly serve school sites. Examples are Gates School and the three westside schools directly along the Shoemaker Trail.

It is probably impossible to restore the walking and biking to school levels of the past, but some efforts can help. The city of Grand Island has been working with the school district to address transportation issues and provide safe routes to schools. Progress has been made despite staff constraints, and these efforts should continue.

From an infrastructure point of view, parents must feel comfortable in letting their children walk or ride, and a portion (although not all) of that comfort is derived from the presence of safe routes. As a general standard, areas within 1/4 mile of a school site should have a web of continuous sidewalk to serve the school. This should provide continuity on at least one side of the street to minimize the number of times children must cross. Figures 6.6 through 6.20 analyze sidewalk coverage within 1/4 mile of each elementary and middle school in the Grand Island public school system and suggest potential options for increasing local area coverage. The national Safe Routes to Schools Guide (www.guide.saferoutesinfo.org) identifies an elementary school walking boundary of 1/2 to 1-mile, but notes that states and localities may establish different standards. For purposes of evaluating a realistic walking boundary for a continuous system of sidewalk in Grand Island, this study reduces that "walk zone" by 50%. Further engineering study may be required to refine these potential options.

Figure 6.6: Engleman Elementary School

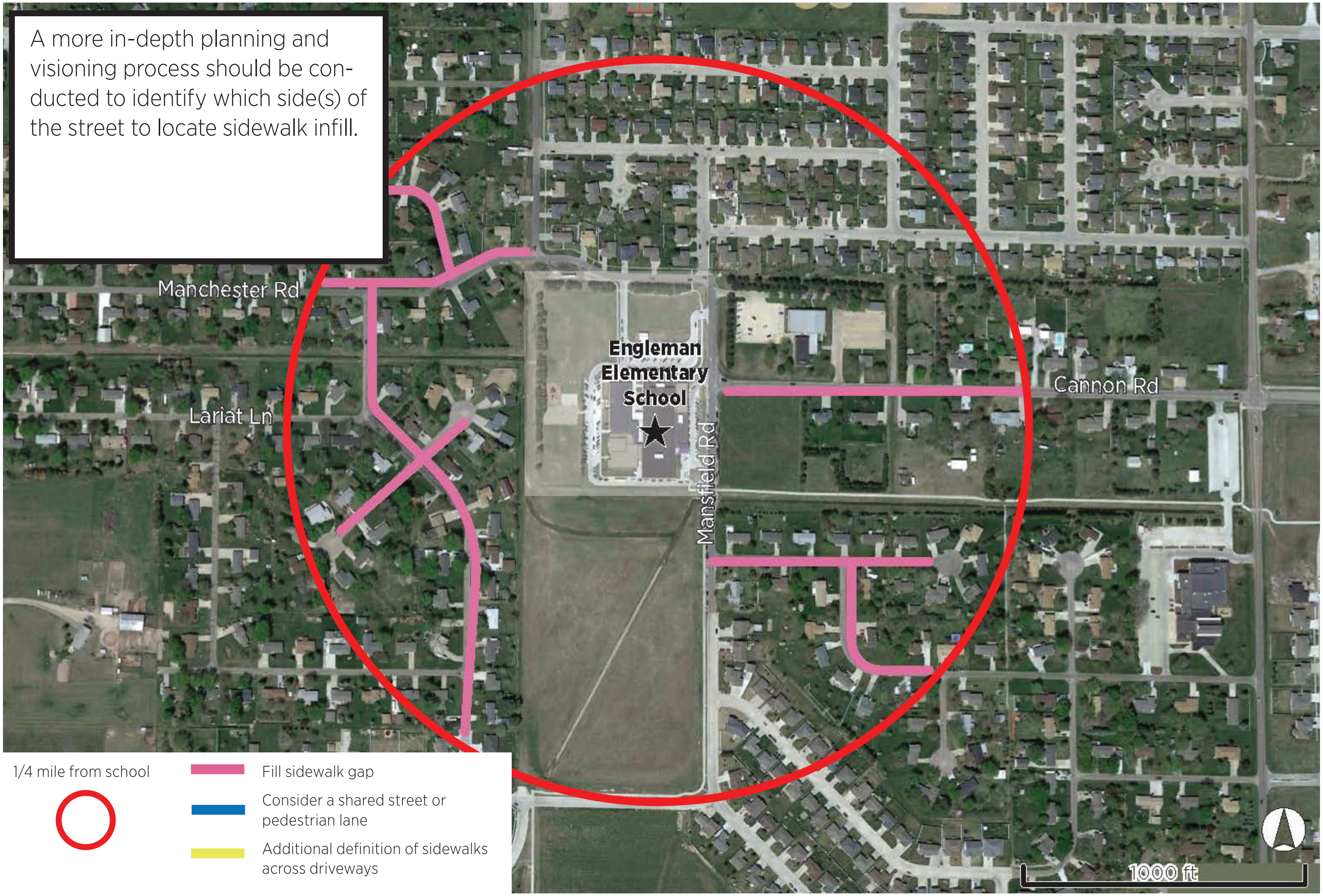


Figure 6.7: Shoemaker Elementary School

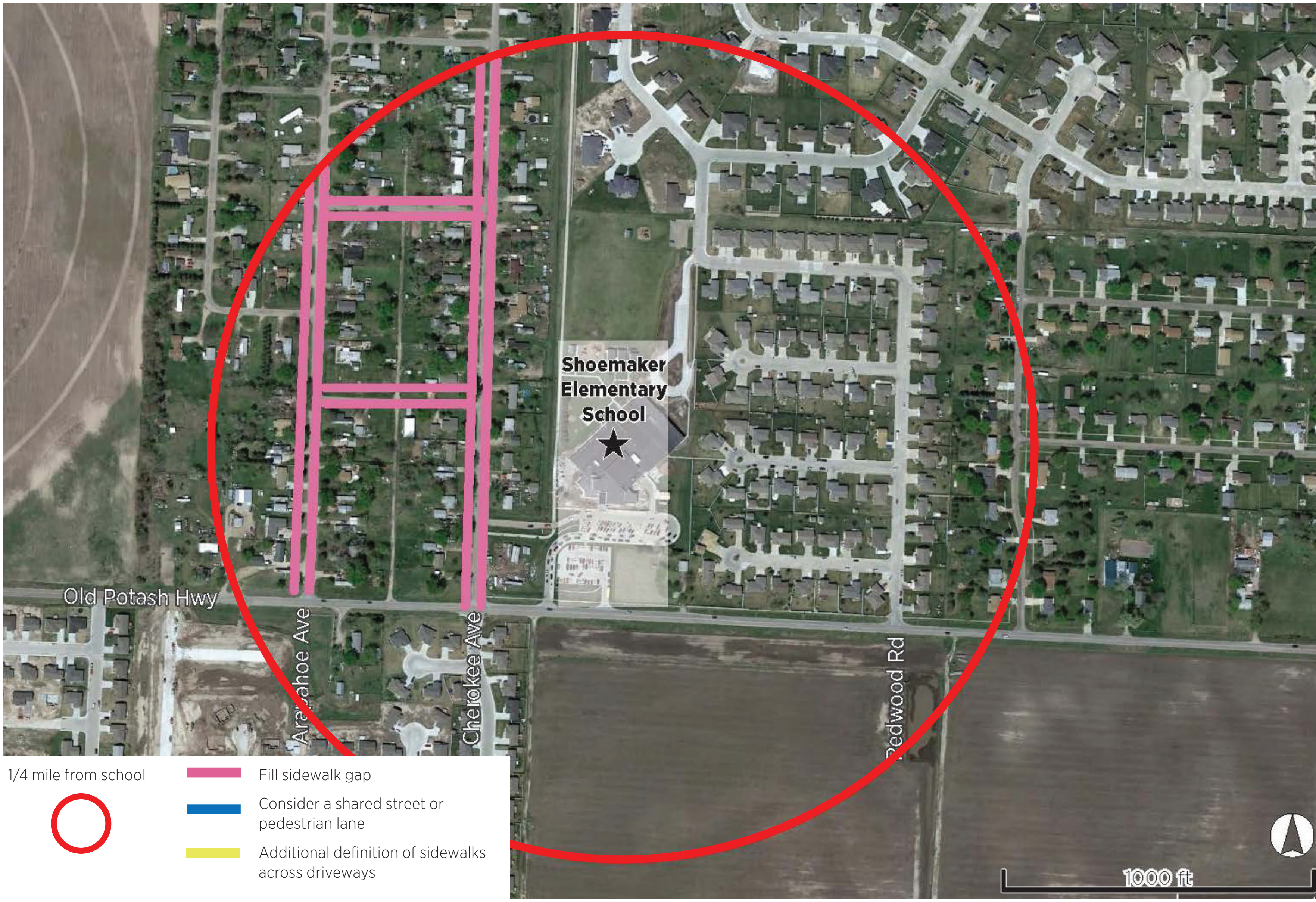


Figure 6.8: Gates Elementary School

Figure 6.9: Stolley Park Elementary School

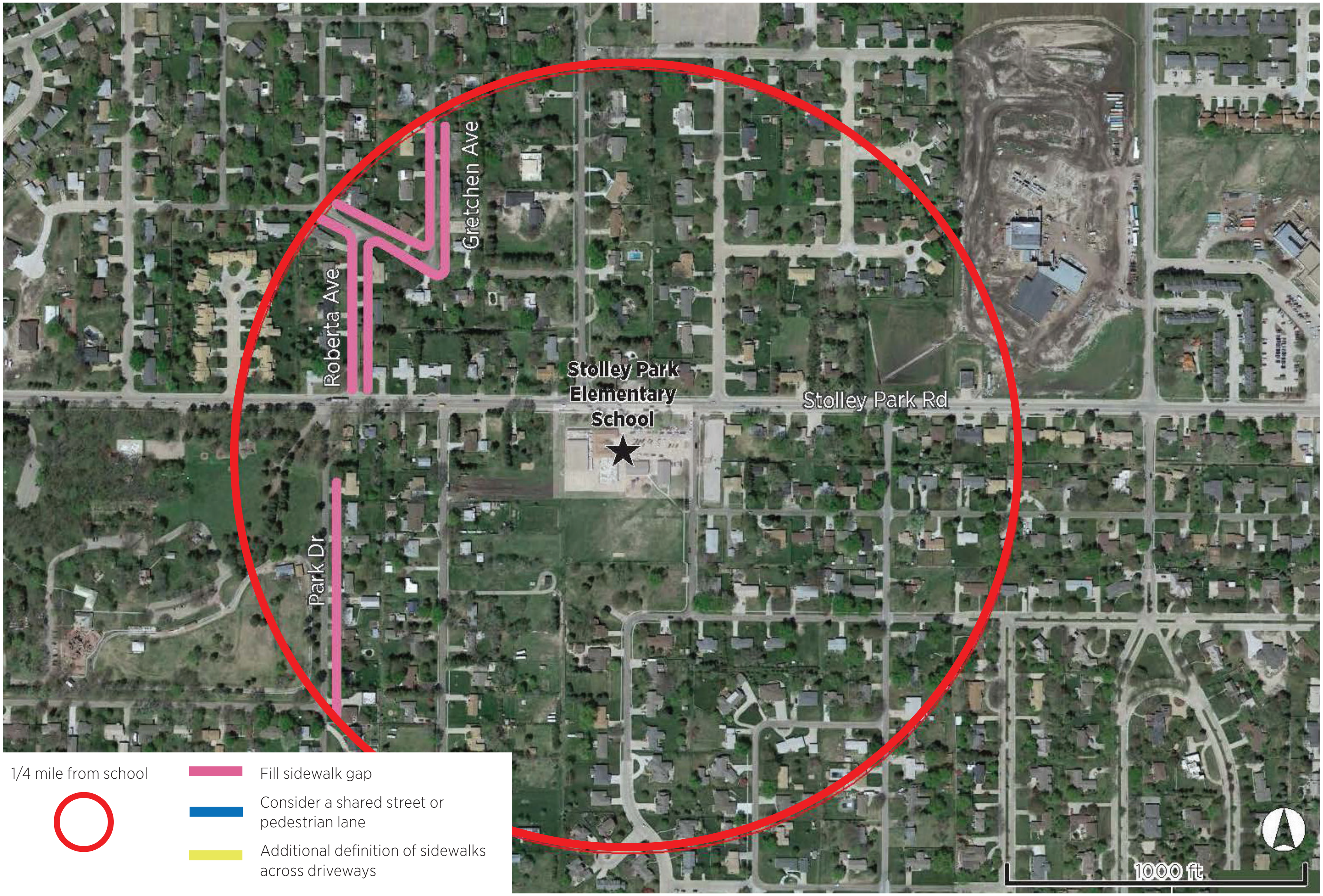


Figure 6.10: Howard Elementary School

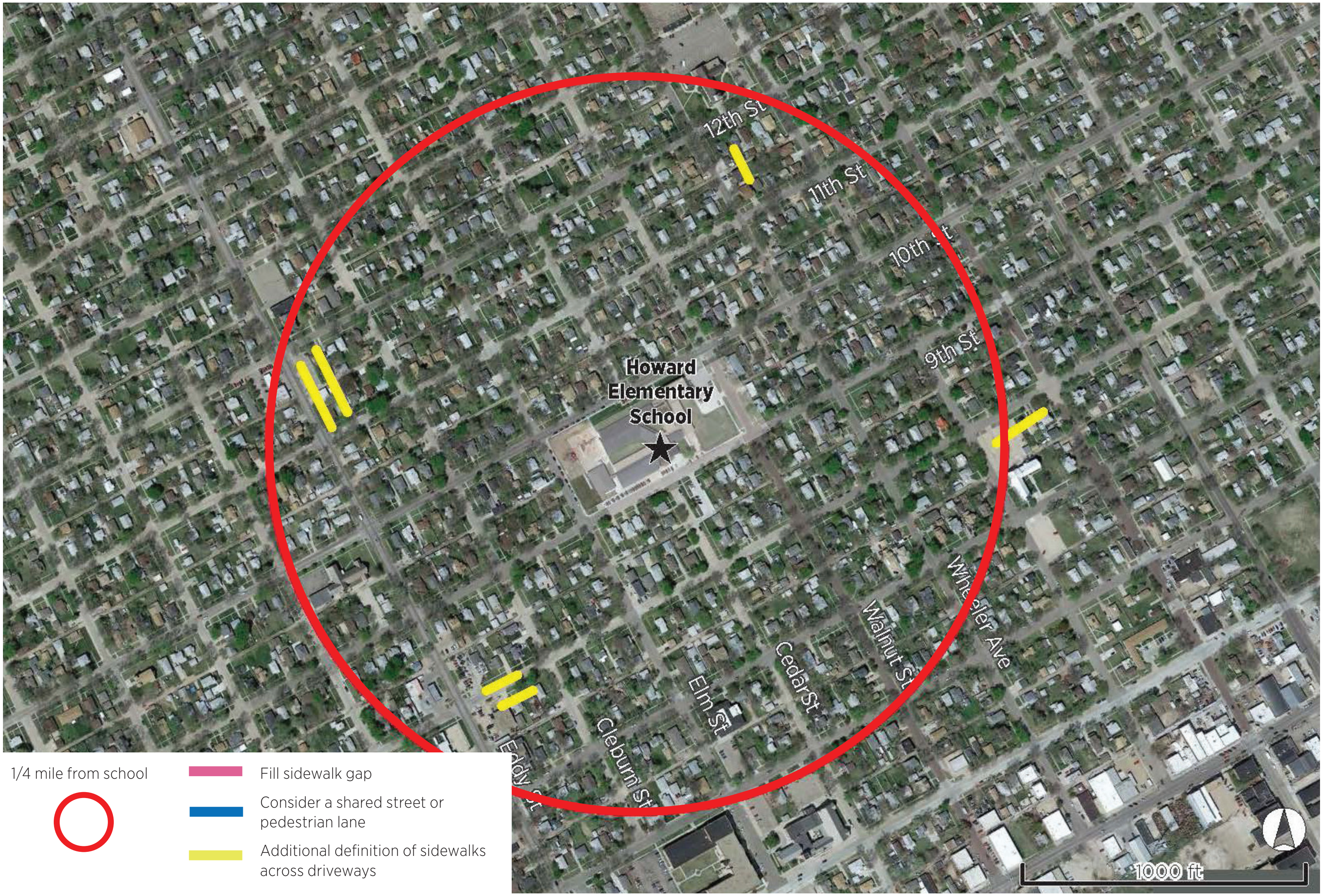


Figure 6.11: Starr Elementary School and Barr Middle School

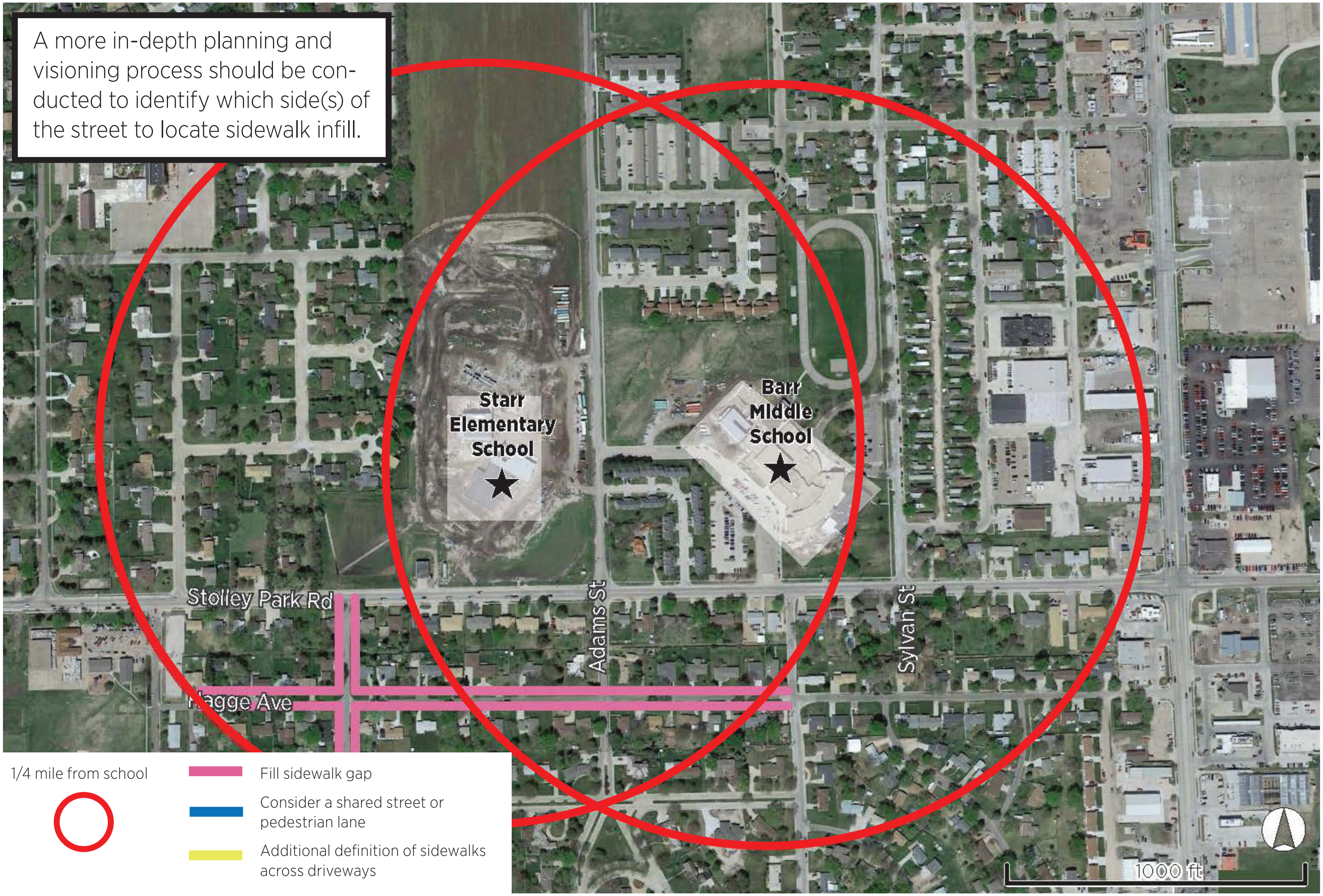


Figure 6.12: Lincoln Elementary School

Figure 6.13: Jefferson Elementary School

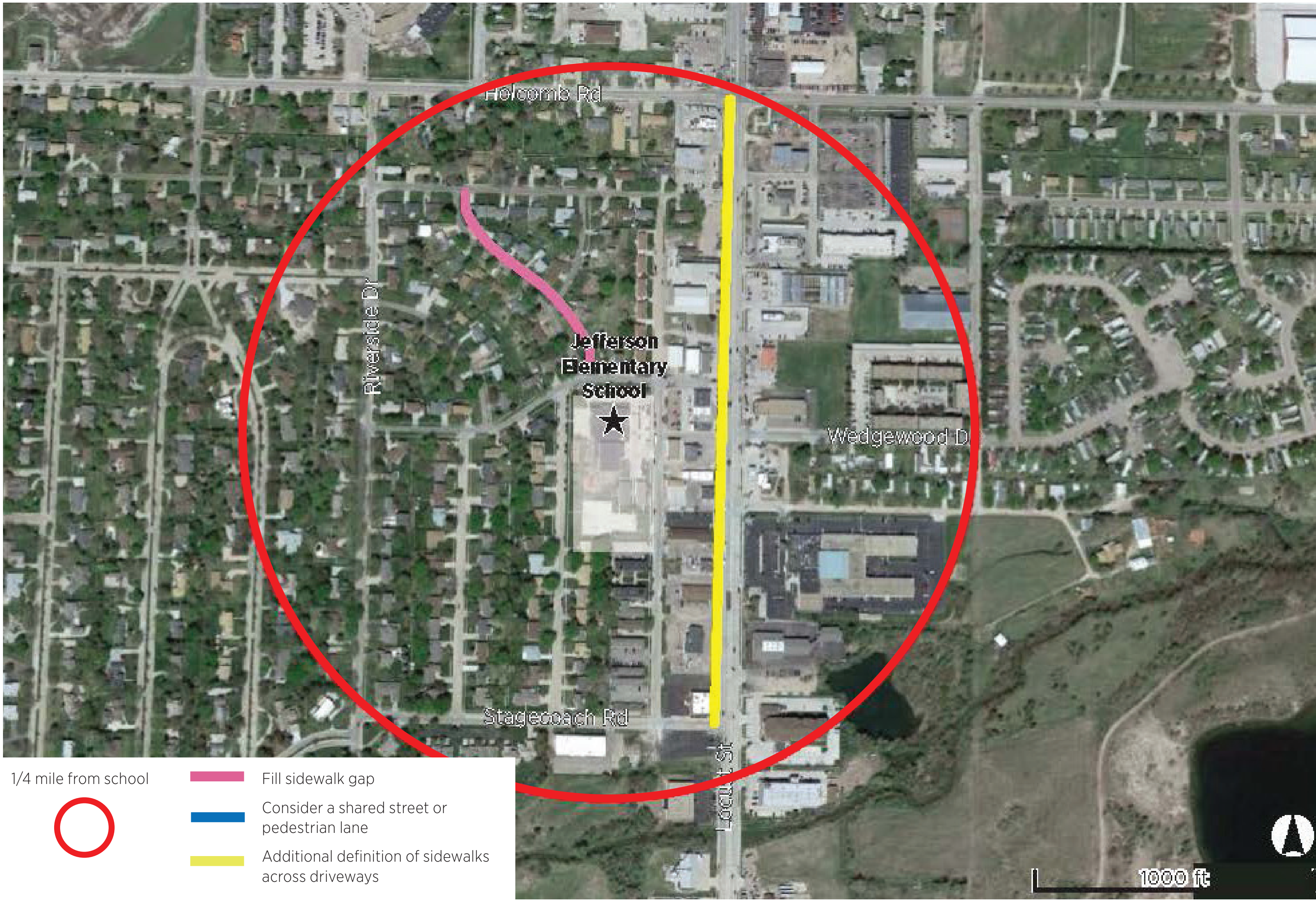


Figure 6.14: Wasmer Elementary School

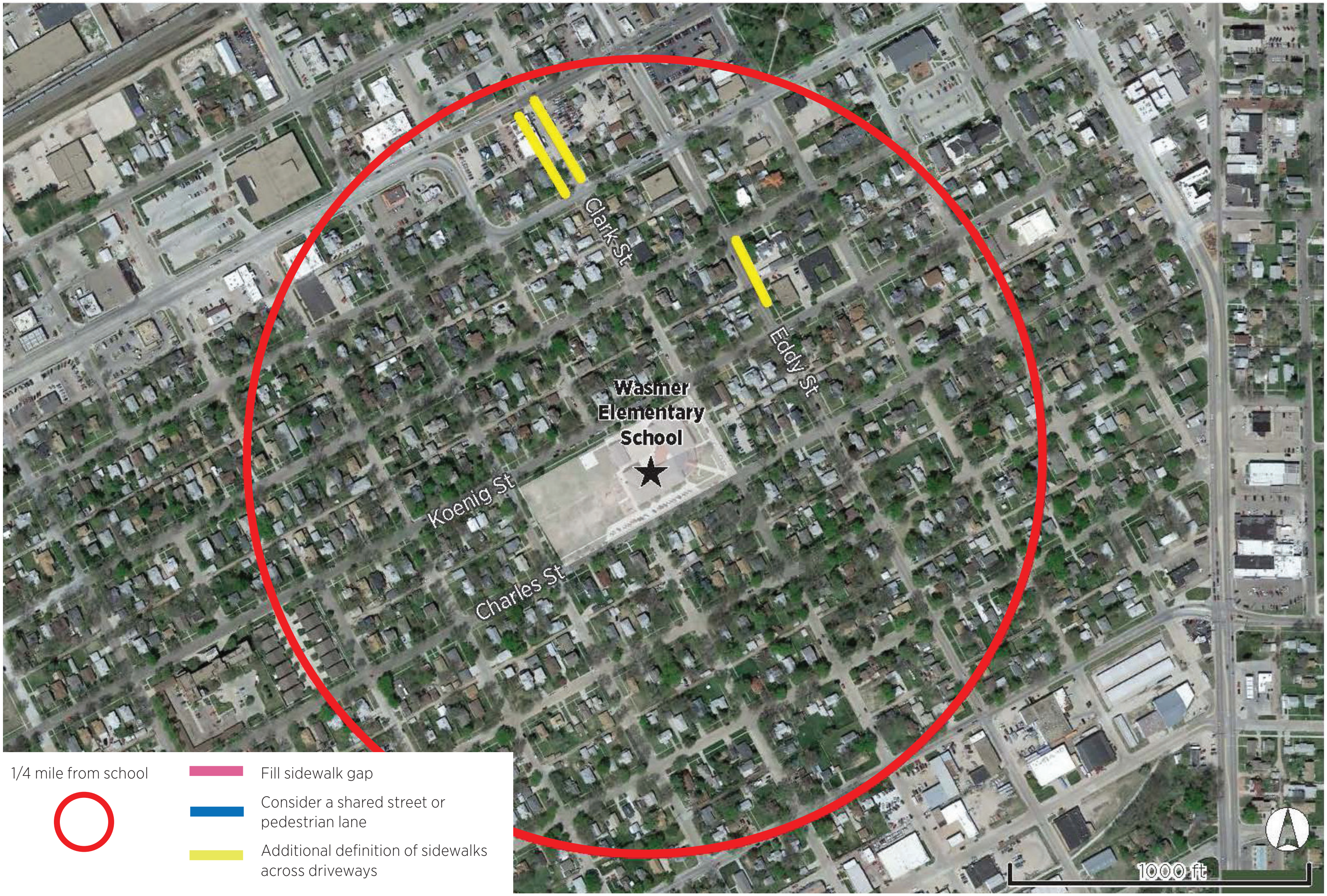


Figure 6.15: Dodge Elementary School

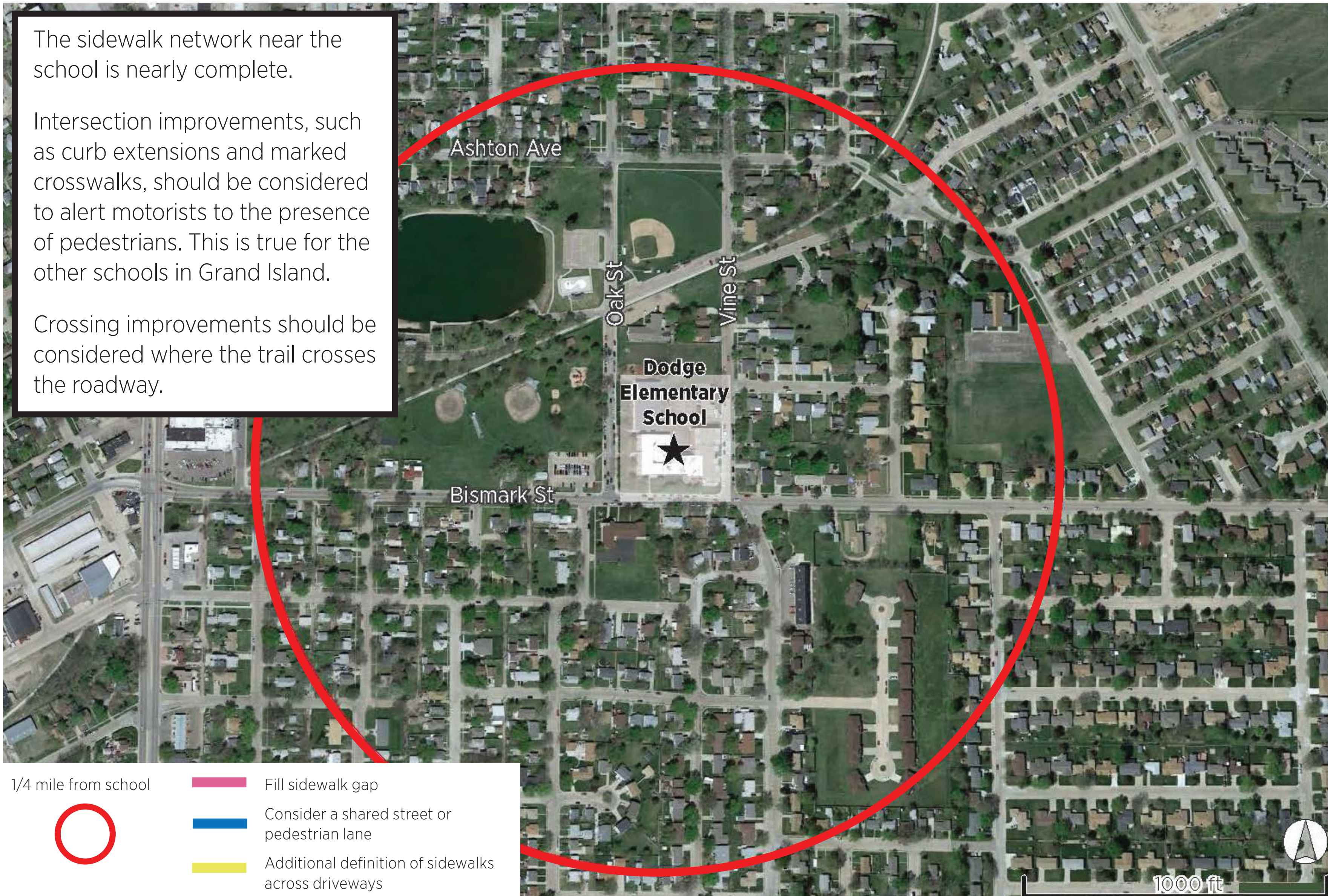


Figure 6.16: Newell Elementary School and Walnut Middle School

This area features good sidewalk connectivity within 0.25 mi of Walnut Middle School and Newell Elementary School. However, some sidewalks are narrow and attached to the back of curbs. This approach is acceptable in certain contexts, but a four foot lawn buffer should be considered.

Intersection improvements, such as curb extensions and marked crosswalks, should be considered to alert motorists to the presence of pedestrians. This is true for the other schools in Grand Island.

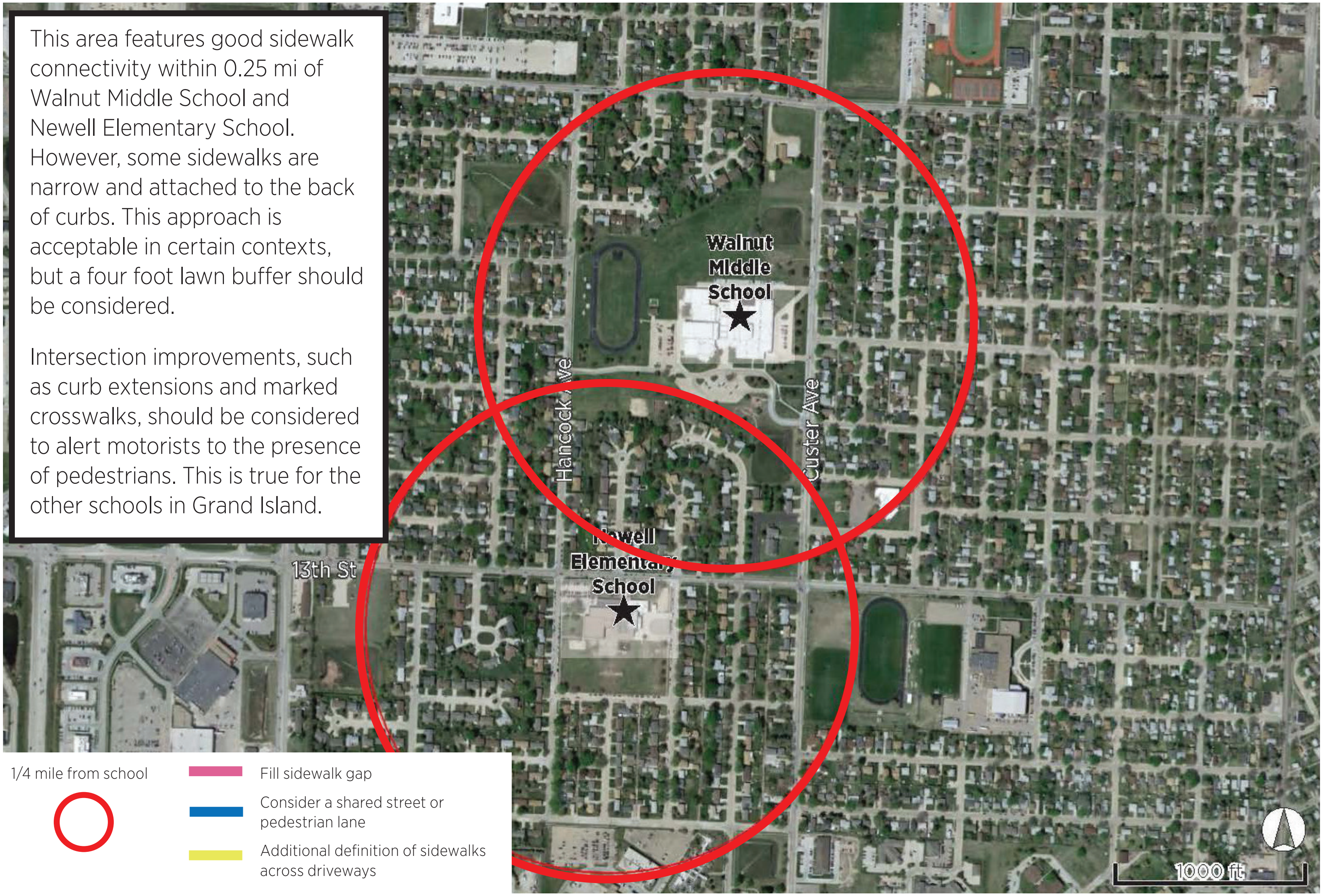


Figure 6.17: West Lawn Elementary School

Figure 6.18: Knickrehem Elementary School

Figure 6.19: Seedling Mile Elementary School

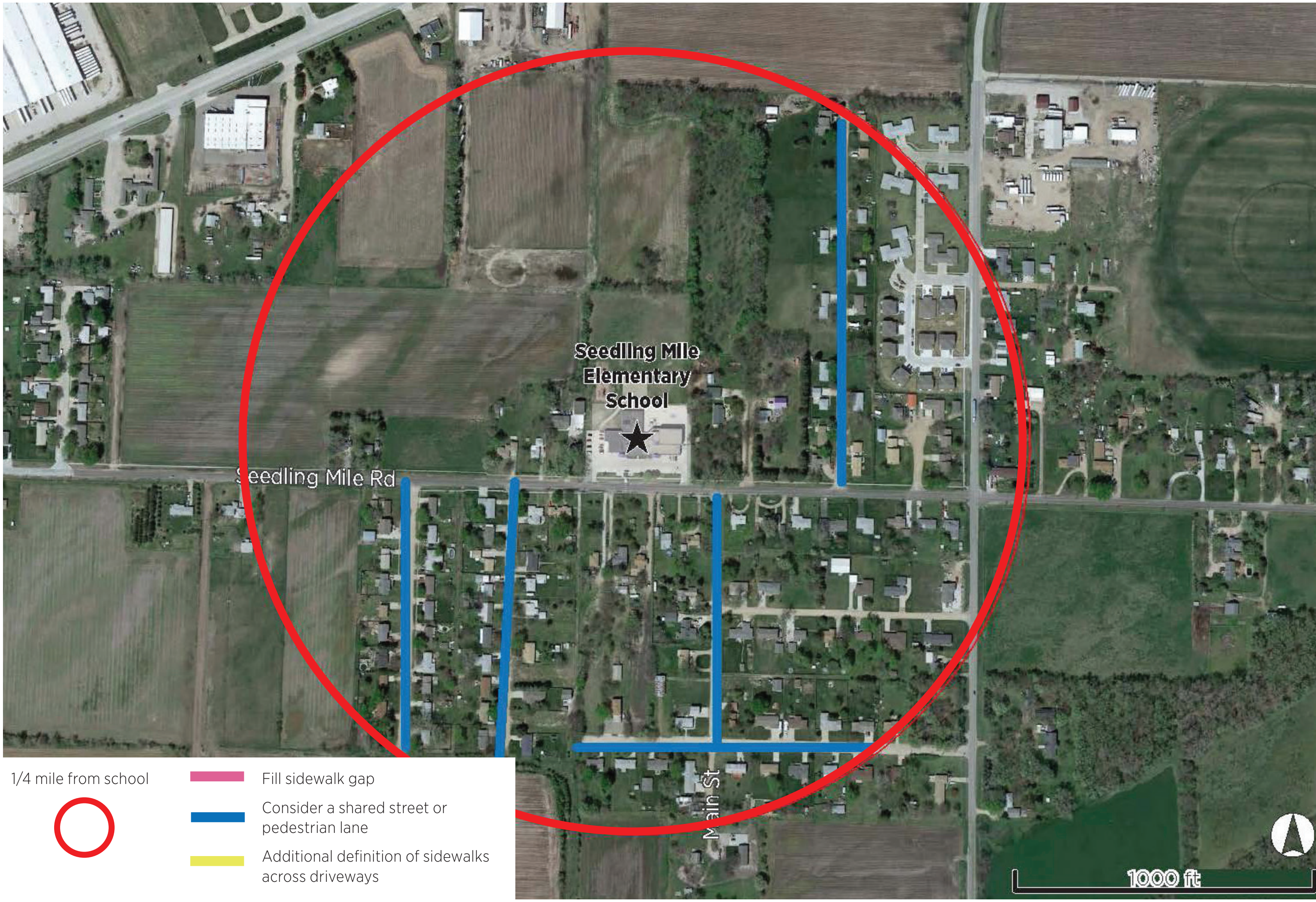
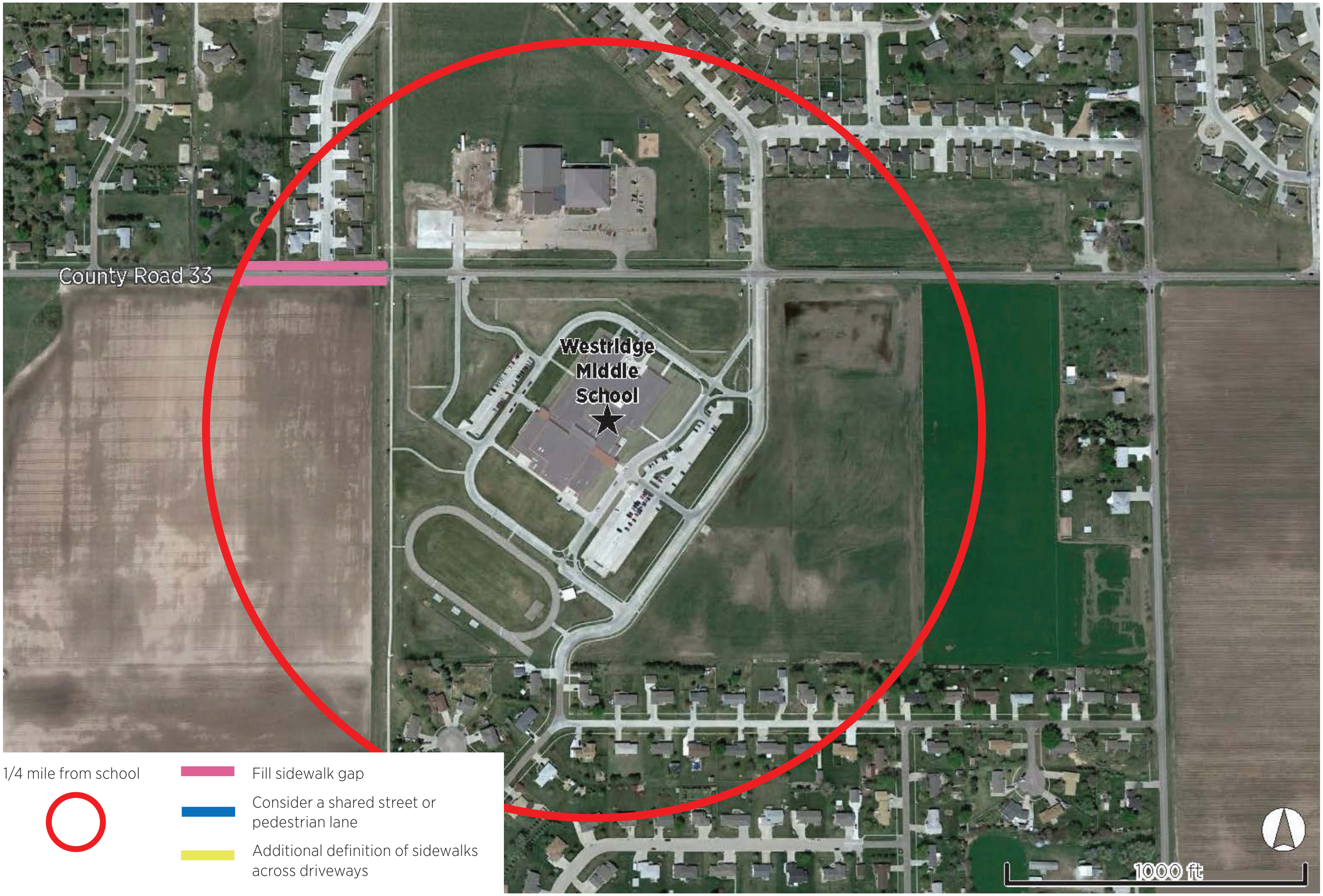


Figure 6.20: West Ridge Middle School



PRIORITY CRITERIA

Completing a long-term pedestrian development program is only accomplished through an incremental process that requires setting priorities and evaluating new conditions along the way.

Evaluative criteria apply questions such as the following to specific sidewalk projects when they are considered.

- Does the sidewalk connect important resources, such as schools to neighborhoods?
- Does the sidewalk provide continuity and integrity to the surrounding vicinity and overall system?
- Does the sidewalk create a safer path for pedestrians?
- Does the sidewalk generate community support or consensus?
- What is the sidewalk's potential to transform the image of the area?
- Does the sidewalk respond to a specific need for improved trail facilities?
- Does the sidewalk incorporate and leverage outside funding sources, such as state grants or charitable contributions?
- Is the engineering and cost feasible to construct?
- Does the sidewalk yield economic development opportunities?

The key to successful implementation will be to establish priorities based on the specific benefits of the project.

Considering priorities for Grand Island's system begins with identifying individual destinations and the quarter-mile area surrounding the destination. These target areas help establish a system of priorities that connect residents to amenities in the community.

- Schools. Access, circulation, and safety to schools is a critical to ensuring mobility choices. Increased access reduces traffic congestion.
- Shopping Centers. Providing convenience to major shopping centers.
- Community Destinations. These include the Public Library, hospitals and medical facility concentrations, and recreation and community centers.
- Employment Centers. Providing convenience between homes and places of employment will encourage people to travel to work by alternative means.
- Neighborhoods. Connecting residents to businesses and work places, providing convenient trips by sidewalk.
- Parks and Trails. Completing this plan will connect users to the city's parks and open spaces.


SPEED
LIMIT
40

CHAPTER 7

ROUTE DETAILS AND SEQUENCING

THIS CHAPTER CONSIDERS EACH OF THE POTENTIAL ROUTES IN THE PROPOSED GRAND ISLAND AREA NETWORK IN DETAIL AND ALSO PRESENTS A DEVELOPMENT PLAN FOR THE TRAIL SYSTEM. It provides guidance on the proposed concept for each significant segment of each route. Finally, it presents methods for staging the system over time.

ROUTE DETAILS AND SEQUENCING

This chapter divides the network grid into north-south and east-west components. Each route displays a strip map illustrating each street or pathway segment, key destinations along the way, and intersecting routes. These maps are divided into keyed segments, corresponding to key dividing points, milestones, or changes in infrastructure treatment. The number key for each segment corresponds to a row in the accompanying table.

The tables display:

- The endpoints and length of each segment.
- The nature of the existing facility. Information also includes number of lanes and approximate width of the street channel, aerial photography, and field measurements.
- Sidewalk coverage. Streets included in the active network should provide sidewalk continuity on at least one side.
- Recommended infrastructure. This presents the recommended infrastructure treatment and other ideas for adapting a segment for safer and more comfortable bicycle and pedestrian use. On-street treatments like marked routes and bicycle boulevards typically use pavement markings and signage. In some cases, path or trail segments fill gaps in continuity. All recommendations are preliminary and may change with detailed design. Projects should be reviewed and approved by the City Engineer when funding becomes available and may require additional engineering evaluation, including traffic studies where relevant.
- Planning level opinions of probable costs. While these are not based on detailed design, they give an idea of relative costs for planning purposes. Cost factors used for these estimates are shown in Table 7.1. These costs do not include right-of-way, contingencies, design and engineering fees, major drainage structures, or extraordinary grading expenses.

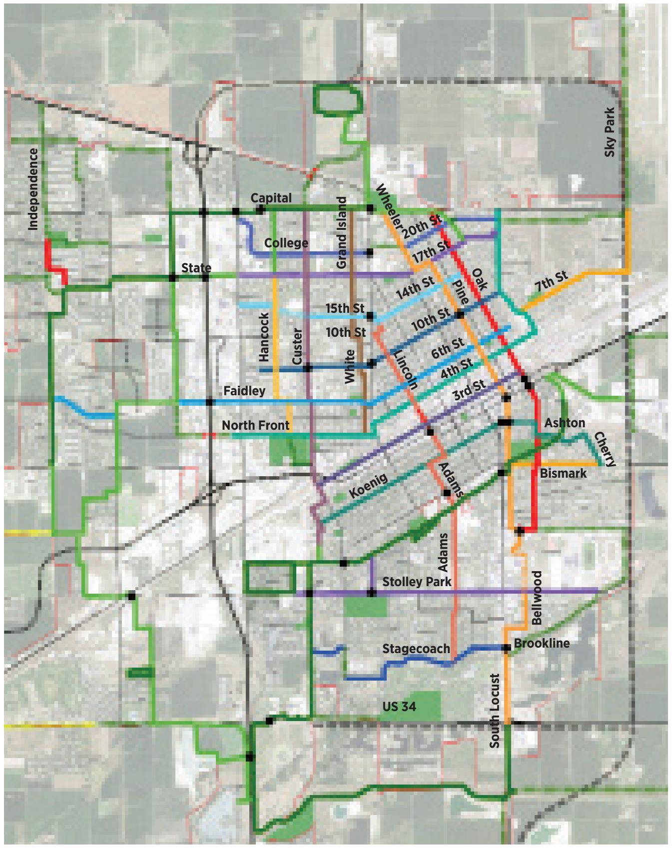
These recommendations should be refined further as individual projects are implemented. However, they provide a starting point for the more detailed design process, and provide guidance in determining priorities and costs of various improvements.

The chapter continues with a phasing and capital implementation program that includes:

- Criteria for determining priorities.
- An initial network that serves all parts of the city with strategic routes and path segments. This program includes statements of probable cost, based on current (2018) construction costs. The basic network is divided into two phases to be developed as resources are available. The first phase of the basic network would be developed over a ten year period, with the second phase completed during an additional ten years.
- An ultimate network, which may be realized within an additional ten years, again given availability of resources. These schedules may be accelerated and subsequent opportunities, such as imminent development, may move some projects forward.

Table 7.1: Probable cost factors by facility type

INFRASTRUCTURE TYPE	COST/MILE	TYPICAL FEATURES
Marked and signed route	$17,000	Signage, shared lane markings
Bicycle boulevard	$60,000	Signage, shared lane markings, routine intersection enhancements such as crosswalks, stop control modifications, occasional traffic calming features
Multi-use shoulders	$60,000	Signage, single white line dividing shoulder from travel lane
Bicycle boulevard with multi-use shoulders.	$80,000	Bicycle boulevards that also include multi-use shoulders or advisory bike lanes, appropriate on wider streets
Conventional bike lanes	$102,000	Lanes defined by white lines in both directions on a street
Protected bike lanes	$64,000 one-way $115,200 two way	Painted bike lanes with cross-hatched buffer area between bike lane and travel lane.
Sidepath	$316,800	10 foot paved roadside shared use path without major earthwork or modifications
Trails (or shared use paths)	Type 1: $396,000 Type 2: $448,800 Type 3: $554,400	10-foot paved path on right-of-way separate from roadways. Range reflects various levels of construction complexity. Higher cost reflects more complicated construction, such as additional grading and sitework.
Trails (gravel)	$200,000	Gravel on separated right-of-way or parallel to a roadway
Intersections or Barriers (Generic cost points)		
Type A: Major Intersection Construction	$350,000	Major projects such as protected intersections. If used in the Grand Island system, these would typically address bicycle/pedestrian facilities on one side of the street only to accommodate a sidepath or single-sided shared use path
Type B: Arterial Crossing	$200,000	Major intersections but requiring less capital work than protected intersections. May include improved signalization, improved crosswalks, bumpouts, minor construction
Type C: Median with HAWK	$150,000	Crossing refuge median with hybrid beacon
Type D: Median with flashing beacon	$75,000	Crossing refuge median with flashing warning beacons in place of positive red stop signal
Type E: Enhanced	$50,000	High visibility crosswalks, minor construction but normally without signalization



NOTE: Cost factors are planning level estimates based on regional experience, do not include right-of-way, contingencies, design and engineering fees, major drainage structures, or extraordinary grading expenses.

NORTH-SOUTH

OAK BICYCLE BOULEVARD

North

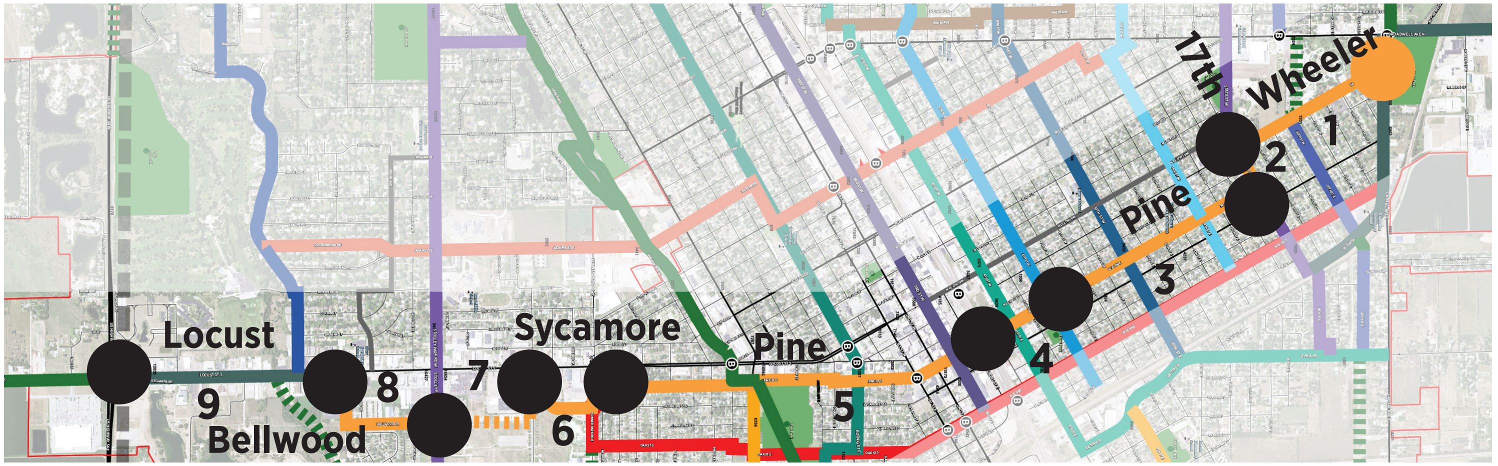
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE / WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Oak, Capital to 4th	1.25	2-lane local street/36 feet	Both sides with some 1/2 block gaps	Bicycle boulevard, with possible striped parking shoulders	$75,000
2	Oak, 4th to 3rd	0.20	2-lane local street/48 feet	Both sides. No walkway definition across UPRR	Multi-use shoulders	$12,000
3	Oak, 3rd to Koenig	0.43	2-lane local, 36 feet	Both sides	Bicycle boulevard, enhanced bike/ped intersection at 1st and 2nd	$25,800
4	Oak, Koenig to Fonner Park Rd	0,87	2-lane local, 36 feet	Both sides	Bicycle boulevard, with possible striped parking shoulders. Mark intersection jogs at Bismark and Oklahoma	$52,200
5	Fonner Park, Oak to Sycamore	0.12	2-lane minor arterial, 45 feet	Both sides	Sidepath segment	$30,000
Total		**2.87**				**$195,000**

NORTH-SOUTH

PINE BICYCLE BOULEVARD

North



CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE / WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Wheeler, Capital to 17th	0.55	2-lane major collector/30 feet	Both sides	Bicycle boulevard. Short sidepath connection on south side of Capital to Broadwell intersection	$33,000
2	17th, Wheeler to Pine	0.13	2-lane major collector/30 feet	Both sides	Bicycle boulevard	$7,800
3	Pine, 17th to 4th	0.90	2-lane local/36 feet; 50 feet south of 8th	Both sides with frequent interruptions	Bicycle boulevard. Multi-use shoulders south of 8th Street	$72,000
4	Pine, 4th to 1st	0.35	2-lane local/50 feet	Both sides.	Multi-use shoulders. Defined pedestrian path with paint across UPRR	$28,000
5	Pine, 1st to Fonner Park	1.10	2-lane local/30-36 feet	Both sides	Bicycle boulevard; enhanced pedestrian crossing at 1st; .07 mile sidepath on Fonner Park between Pine and Sycamore	$66,000
6	Sycamore, Fonner Park to Hedde	0.25	2-lane local/24 feet	No sidewalks	Advisory bike lanes through Island Oasis	$15,000
7	Park site, Hedde to Stolley Park	0.38	Fonner Park campus	NA	Multi-use path	$150,480
8	Bellwood/Brookline, Stolley Park to Locust	0.46	Bellwood: 2-lane local/36 feet Brookline: 2-lane, unpaved	No sidewalks	Shared road; Brookline block should be considered for hard-surfacing.	$7,820
9	Locust, Brookline to Hwy 34	0.75	5-lane arterial	Both sides	Upgrade east side sidewalk to sidepath; modification of US 34 intersection for path crossing	$237,600
Total		**4.87**				**$617,700**

NORTH-SOUTH

LINCOLN/ADAMS BIKEWAY

North

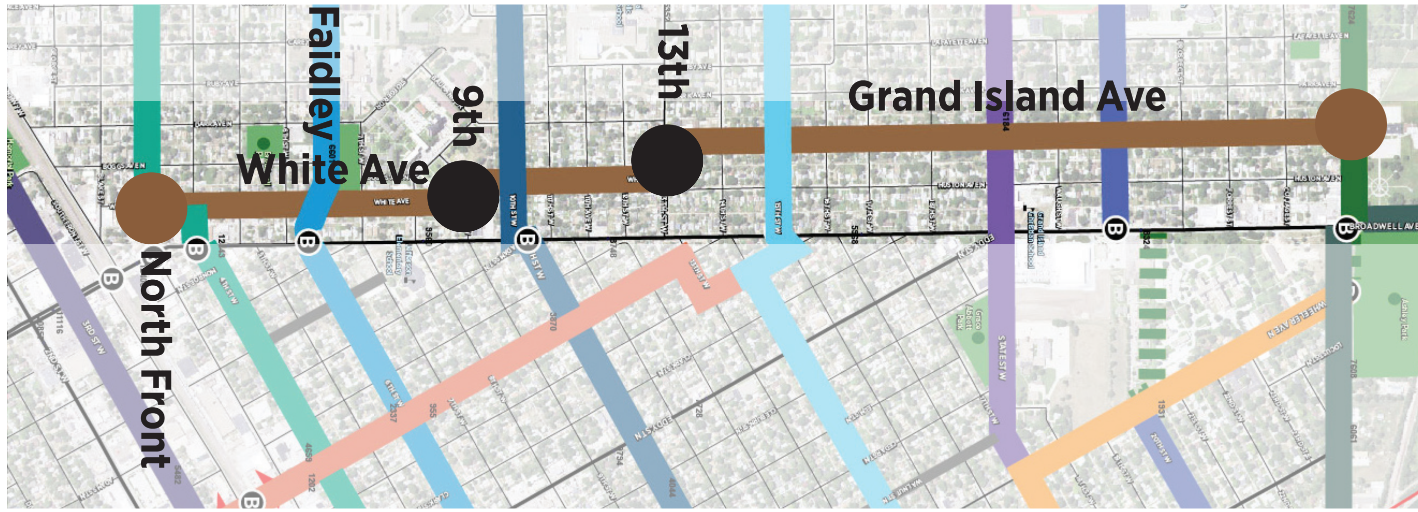
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Greenwich/ Lincoln, 15th to 4th	0.88	2-lane local/36 feet	Both sides	Bicycle boulevard, route uses 13th to connect Lincoln and Greenwich	$52,800
2	Lincoln, 4th to Koenig	0.50	2-lane local/36 feet	Both sides with interruptions between 4th and UP	Bicycle boulevard, defined path across railroad with painted multi-use shoulder; connection along Koenig to Adams	$40,000
3	Adams, Koenig to Brownell Trail	0.41	2-lane collector, 36 feet	Both sides with some gaps north of Anna; one side south of Anna	Bicycle boulevard. Multi-use shoulders without parking between Anna and Beltline Trail	$32,800
4	Adams, Beltline to Stolley Park	0.66	2-lane collector, 24 feet	No parking	Sidepath	$209,088
5	Cottonwood, Stolley Park to Stagecoach	0.50	2-lane local/28 feet widening to divided residential boulevard/50 feet with median	Both sides	Bicycle boulevard	$30,000
Total		**2.95**				**$364,688**

NORTH-SOUTH

GRAND ISLAND/ WHITE BICYCLE BOULEVARD

North



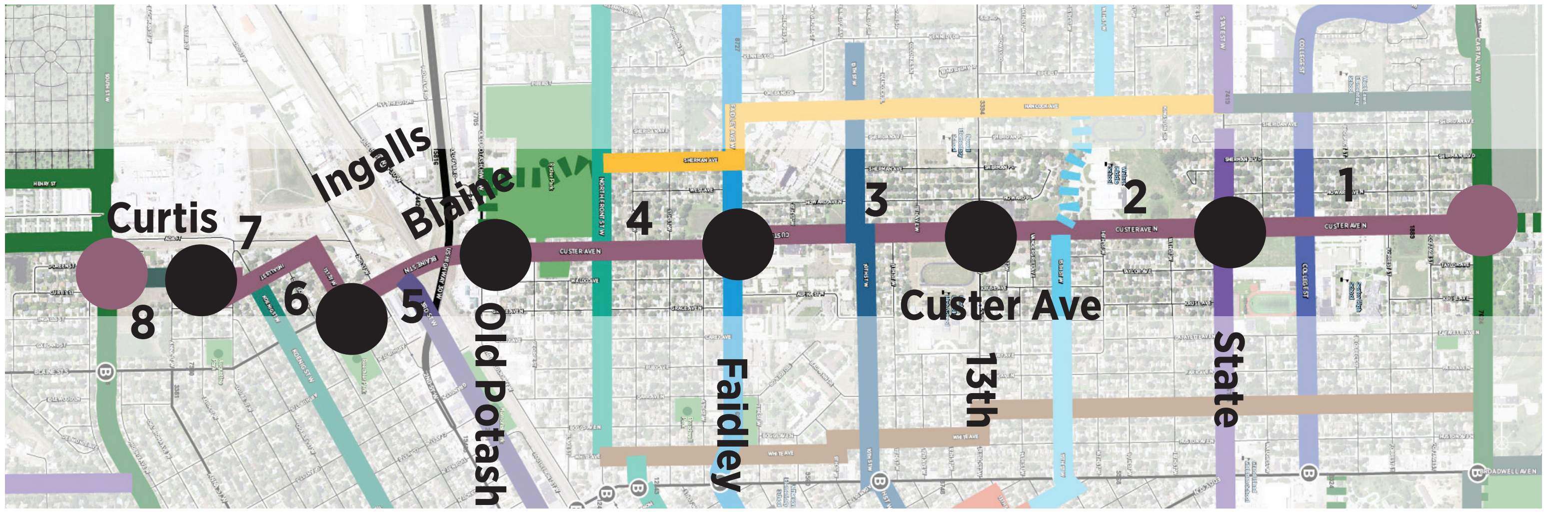
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Grand Island, Capital to 13th	0.55	Divided local residential boulevard/70 feet with 30 foot median	Both sides	Bicycle boulevard, connects to White Ave via 13th	$33,000
2	White, 13th to 9th	0.30	2-lane local/35 feet	No sidewalks	Bicycle boulevard, sidewalk completion on one side of street; enhanced crosswalk at 10th	$18,000
3	White, 9th to North Front	0.54	2-lane local/36 feet	Intermittent on both sides.	Bicycle boulevard, sidewalk completion on one side of street; enhanced crosswalk at Faidley	$32,400
Total		**1.39**				**$83,400**

NORTH-SOUTH

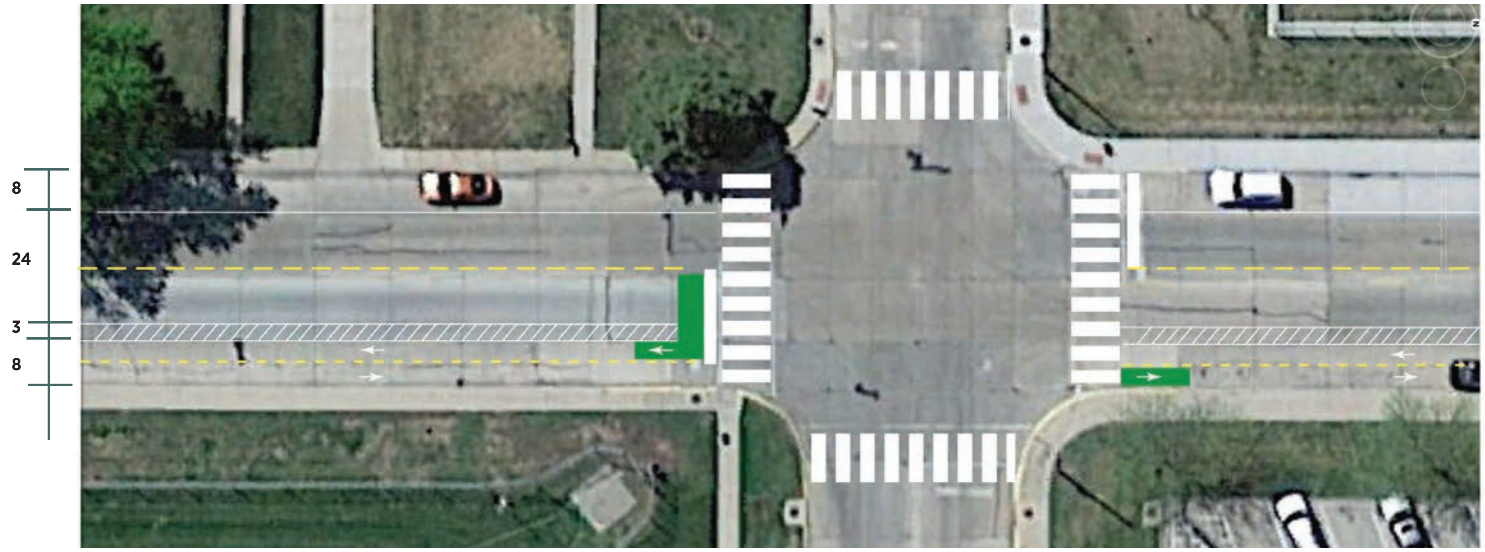
CUSTER BIKEWAY

North



CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Custer, Capital to State	0.50	2-lane major collector, 42-44 feet	Both sides	Two-way protected bike lane on east side, with parking on west side. Two stage crossing at State	$57,600
2	Custer, State to 13th	0.77	2-lane major collector/44 feet	Both sides	Sidepath on west side. Two stage crossing to east side at 13th	$243,936
3	Custer, 13th to Faidley	0.50	2-lane major collector/45 feet	Both sides	Two-way protected bike lane on east side, with parking on west side. Two stage crossing at State	$57,600
4	Custer, Faidley to Old Potash	0.50	2-lane major collector/45 feet	One side north of George, no sidewalks south	Multi-use shoulders. Multi-use trail alternative on east edge of Ryder Park. Sidewalk completion on one side.	$30,000
5	Blaine, Old Potash to 1st Street	0.30	2-lane arterial, 45 feet to 2nd St, narrowing to 36 feet south of 2nd	One side (east)	Two-way protected bike lane west side from Old Potash to 2nd, transitioning to sidepath on west side between 2nd and 1st	$34,560
6	1st/Ingalls/Louis, Blaine to Curtis	0.34	2 lane local streets, 36-40 feet	Both sides	Shared marked routes	$5,780
7	Curtis, Louise to Anna	0.13	2 lane local, 36 feet	One-side (east) continuity	Shared marked route adjacent to Gates Elementary	$2,210
8	Walkway, Anna to John Brownell Trail	0.13	Walkway parallel to Curtis	NA	Upgrade to multi-use trail standard	$51,480
Total		**3.17**				**$483,166**



Custer and College

Possible protected bike lane at Custer and College. The buffered lane is on the east side of the street, and is used on blocks where on-street parking should be unnecessary because of adjacent parking lots, open fields, or houses oriented to intersecting residential streets rather than Custer.

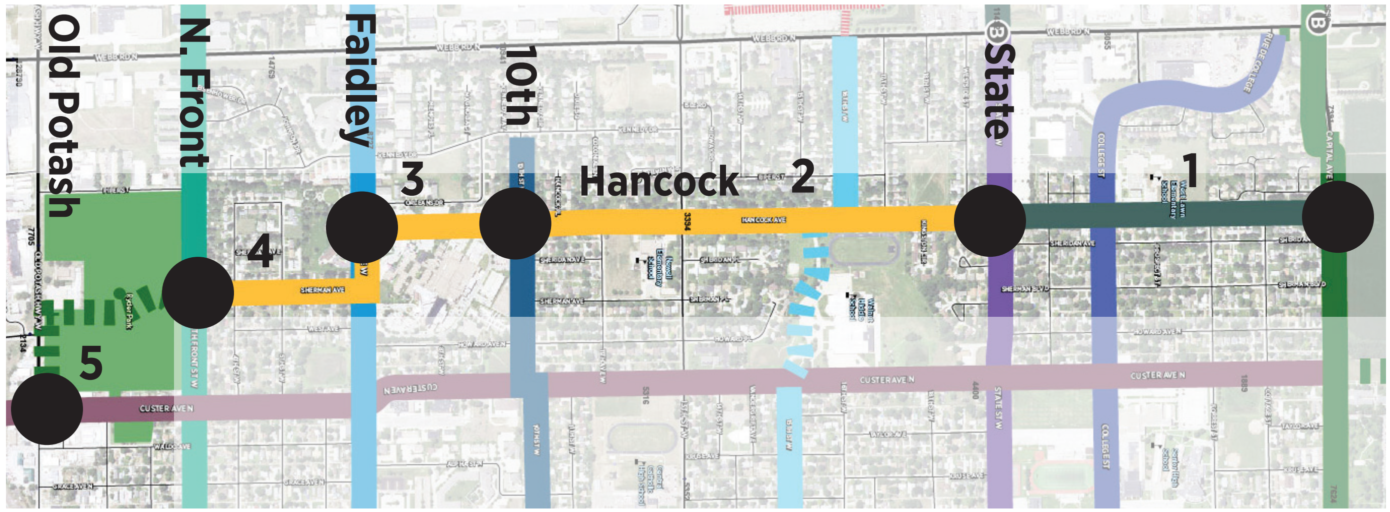
Custer and State

Houses oriented to Custer south of State may require on-street parking at their front door. Here, the bikeway shifts to a two-way off-street sidepath at the high school. The illustration shows how the crossing is made in two stages to the high school sidepath. This is reversed at 13th Street.

NORTH-SOUTH

HANCOCK BIKEWAY

North

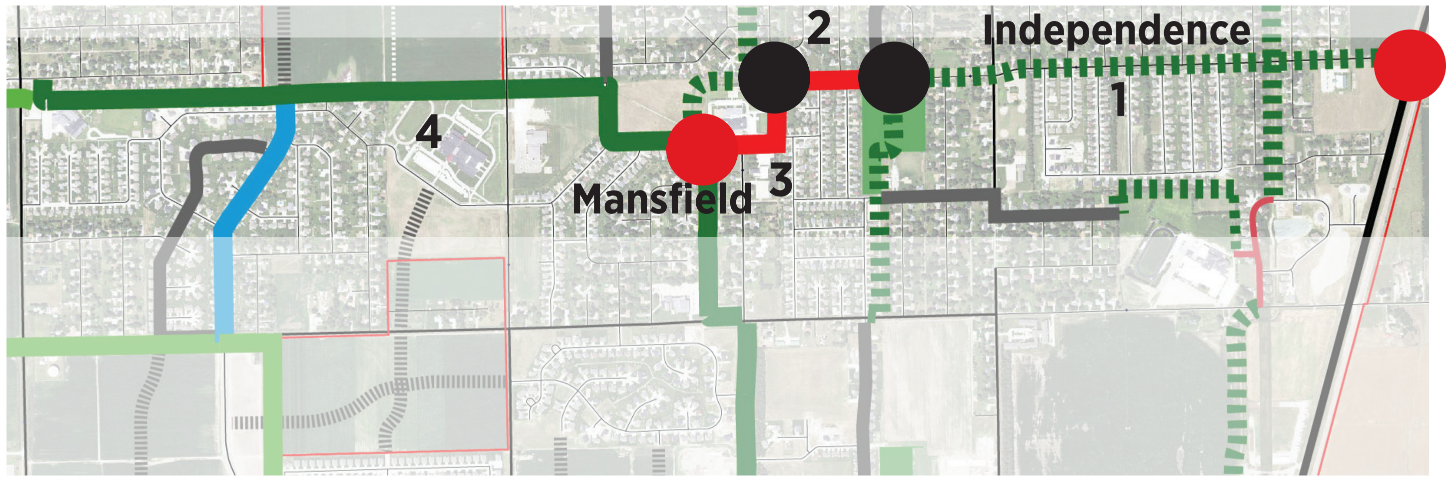


CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Easement, Capital to State	0.50	Walkway and utility easement	Two segments north and south of West Lawn Elementary School	Multi-use trail, partially on edge of elementary school. Enhanced crosswalk at State	$224,400
2	Hancock, State to 10th	0.75	2-lane collector/36 feet	Both sides	Bicycle boulevard	$45,000
3	St Francis campus and ring drive, 10th to Faidley	0.25	NA	No sidewalks	Multi-use trail on line of Hancock Ave, providing pedestrian accommodation to offices along ring drive. Uses proposed Faidley sidepath to Sherman	$99,000
4	Sherman, Faidley to N. Front/Ryder Park	0.27	2-lane local/36 feet	Both sides	Shared marked route	$4,590
5	Ryder Park paths and Old Potash to Custer	0.40	Park path	Existing paths	Upgrade path to multi-use trail, continue as sidepath along Old Potash to Custer. Connects with Custer Ave bikeway	$158,400
Total		**2.17**				**$531,390**

NORTH-SOUTH

INDEPENDENCE BIKEWAY



North

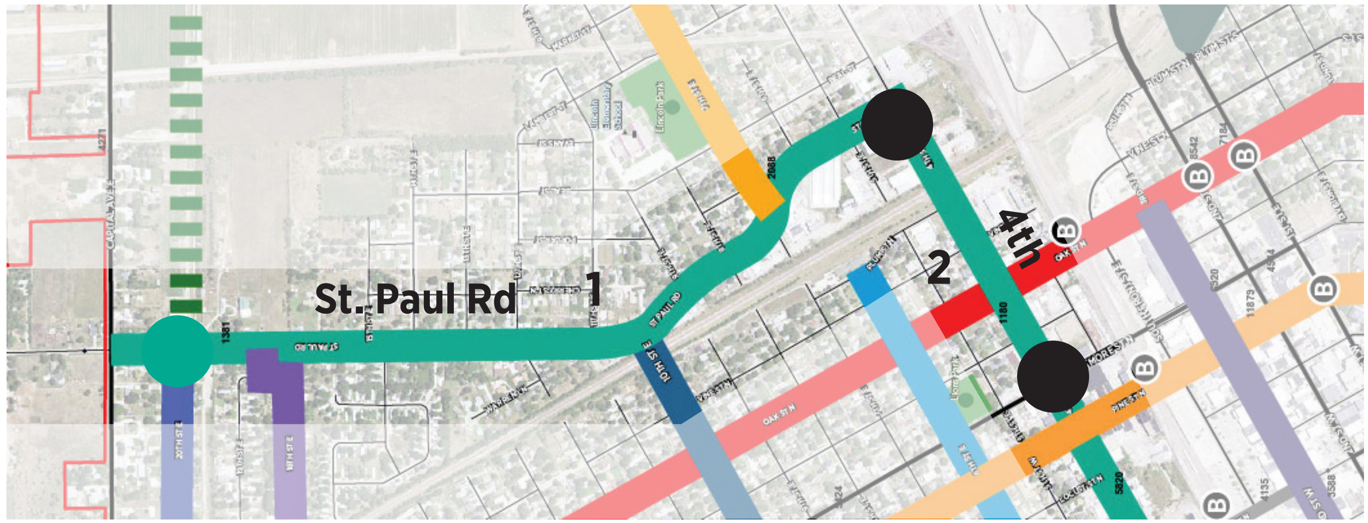
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Independence, Highway 2 to George Park	1.20	2-lane rural section collector/25 feet	No sidewalks, except east side south of Norseman	Sidepath with eventual reconstruction of Independence Ave. May be incorporated into future street project	$380,160
2	Independence, George Park to Mansfield	0.23	2-lane collector/36 feet	One-side (east) sidewalk	Sidepath on west side, with pedestrian crossing of Independence at park	$72,864
3	Engelman School campus	0.25	NA	One side around campus periphery	Multi-use trail connection to Shoemaker Trail with three options: sidepath parallel to Manchester and Mansfield; straight alignment along edge of school property to existing trail at Shanna St; continuation of Independence alignment south and east to current trail turn south of Engelman building.	$99,000
4	Shoemaker Trail	0.84	Existing trail	NA	Existing trail	0
Total		**2.52**				**$552,024**

NORTH-SOUTH/EAST-WEST

ST. PAUL/4TH BIKEWAY

North



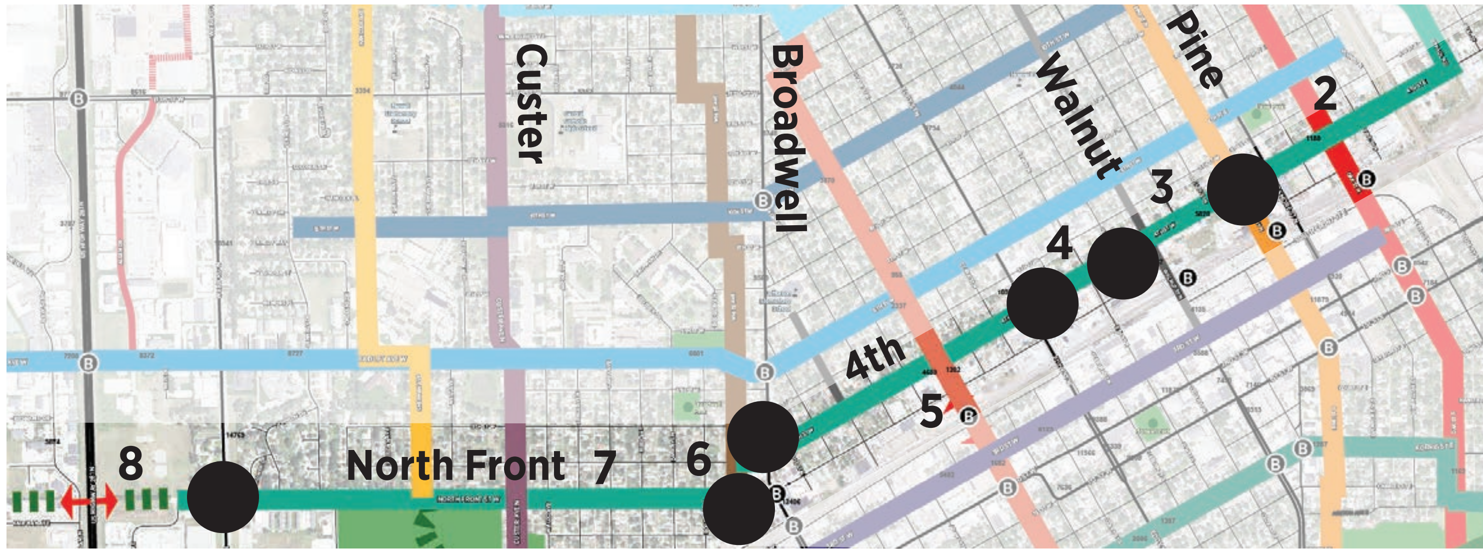
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	St. Paul, Capital to 4th	1.0	2-lane minor arterial, 44 feet	Both sides from 11th to 5th, poor coverage elsewhere	Striped parking shoulder; continuous one-side walkway between 4th and 5th and 11th and 20th. Connects with 4th Street route	$60,000
2	4th, St. Paul to Pine	0.77	2-lane minor arterial/50 feet	Both sides with some interruptions on industrial use sites	Multi-use shoulders	$46,200
3	4th, Pine to Cedar	0.25	2-lane minor arterial/50-53 feet	Both sides, some at downtown scale	Marked shared route, with painted parking lane on south side (EB). Diagonal parking retained on north side	$4,250
4	4th, Cedar to Eddy	0.20	2-lane minor arterial/50 feet	Both sides, one block interruption on south side	Multi-use shoulders	$12,000
5	4th, Eddy to Broadwell	0.55	2-lane minor arterial, 38 feet	Both sides with some interruptions	Striped parking shoulders	$33,000
6	4th-Broadwell to North Front-Broadwell	0.09	3-lane minor arterial, 40 feet	One side (west)	Enhanced crossing at 4th Street, sidepath along Broadwell to North Front. Ultimate solution will be grade separation of Broadwell over UPRR. Design should accommodate bike/ped connection under the structure to link 4th and North Front.	$28,512

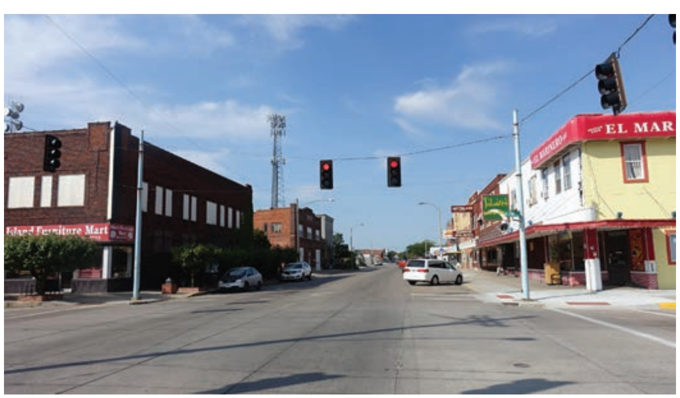
EAST-WEST

ST. PAUL/4TH BIKEWAY

North

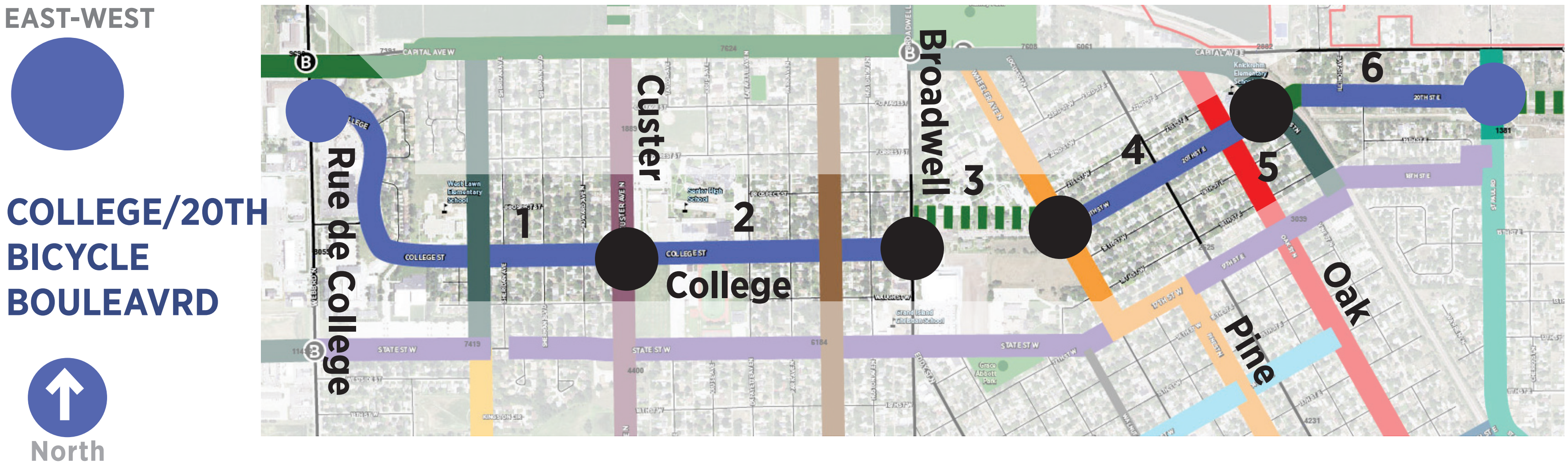


SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
7	North Front, Broadwell to Webb	1.0	2-lane major collector, 41 feet	Both sides	Striped parking shoulders	$60,000
8	North Front alignment west of Webb	0.20	NA	NA	Future trail to proposed ped/bike overpass over Highway 281.	$79,200
Total		**4.06**				**$323,162**



EAST-WEST

COLLEGE/20TH BICYCLE BOULEAVRD



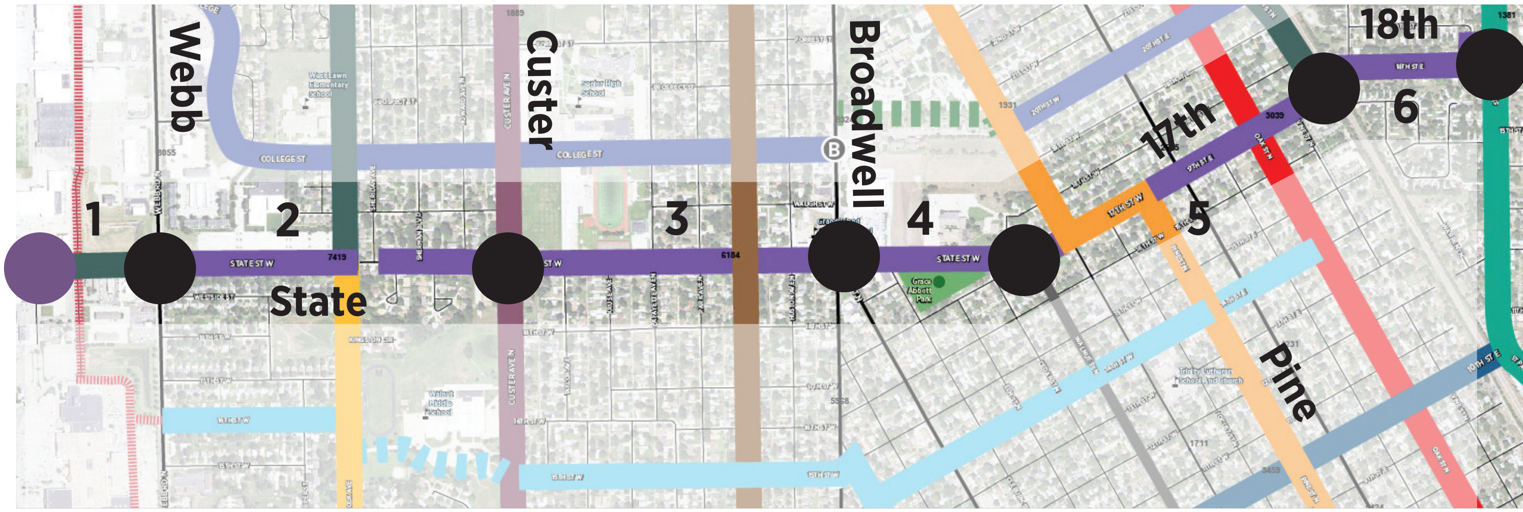
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Rue de College/College Ave, Webb to Custer	0.75	2-lane collector/36-38 feet	Both sides	Striped parking shoulders, with connection to Capital Sidepath	$45,000
2	College, Custer to Broadwell	0.50	2-lane local/41 feet from Custer to Lafayette, 36 feet Lafayette to Broadwell	Both sides	Striped parking shoulders, with enhanced pedestrian crossing at Broadwell	$30,000
3	VA campus, Broadwell to Wheeler	0.25	NA	NA	Multi-use path adjacent to VA south parking lots	$112,200
4	20th, Wheeler to BNSF	0.43	2-lane local/32 feet	Both sides	Shared, marked route. Connects to path and tunnel under BNSF main line	$25,800
5	Walkway and ped tunnel under BNSF	0.14	NA	Existing path	Widen path to 6 foot minimum, maintain existing tunnel width	$55,440
6	20th, BNSF to St Paul	0.27	2-lane local/32 feet	Both sides	Shared, marked route	$16,200
Total		**2.34**				**$284,640**

EAST-WEST

STATE/17TH BIKEWAY

North



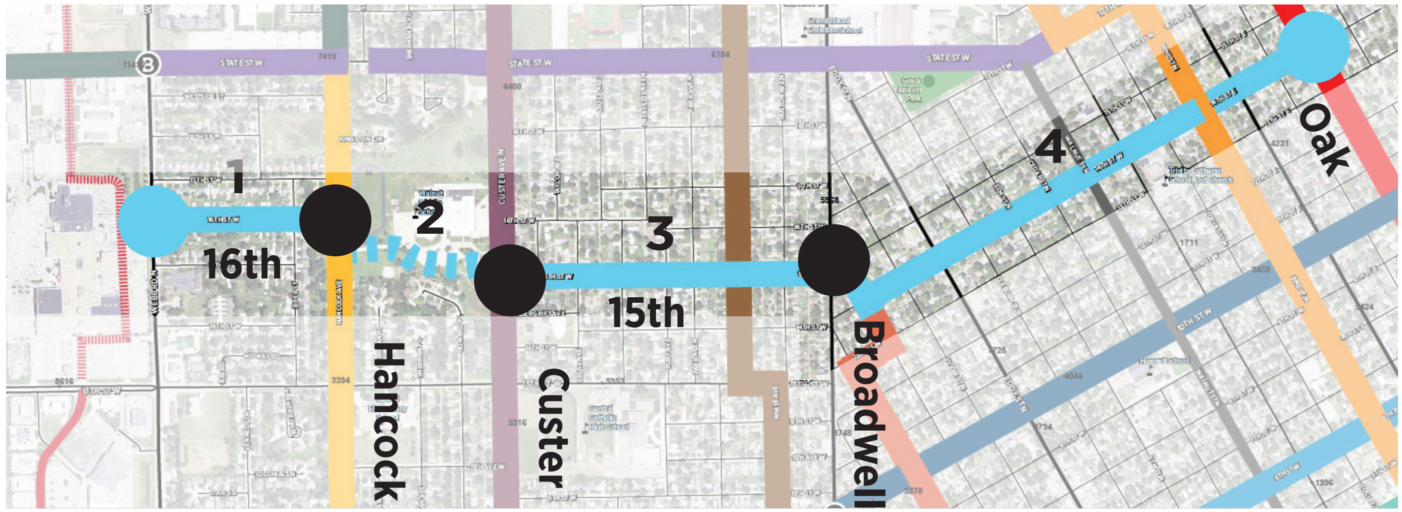
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	State, Hwy 281 to Webb	0.25	5-lane major collector/62 feet	Both sides	Extend existing half-block sidepath east of 281 to Webb, Connects to State Trail on west side of highway. Enhanced multi-modal crossing at State and 281	$79,200
2	State, Webb to Custer	0.54	2-lane major collector/40-42 feet	Both sides	Bicycle boulevard with striped parking shoulders	$32,400
3	State, Custer to Broadwell	0.50	2-lane major collector/34-36 feet	Both sides	Bicycle boulevard. Enhanced pedestrian crossing at Five Points intersection	$30,000
4	State, Broadwell to 17th	0.43	2-lane collector/50-62 feet. Wide portion has north side diagonal parking	Both sides	Bicycle boulevard with striped parking shoulders	$25,800
5	17th, State intersection to Plum	0.50	2-lane major collector to Sycamore, local to Plum/36 feet	Both sides	Bicycle boulevard. Connection via Plum to 18th Street underpass at BNSF main line	$40,000
6	18th, Plum to St Paul	0.27	2-lane local/36 feet	Both sides	Bicycle boulevard	$4,590
Total		**2.49**				**$211,990**

EAST-WEST

15TH STREET BICYCLE BOULEVARD

North



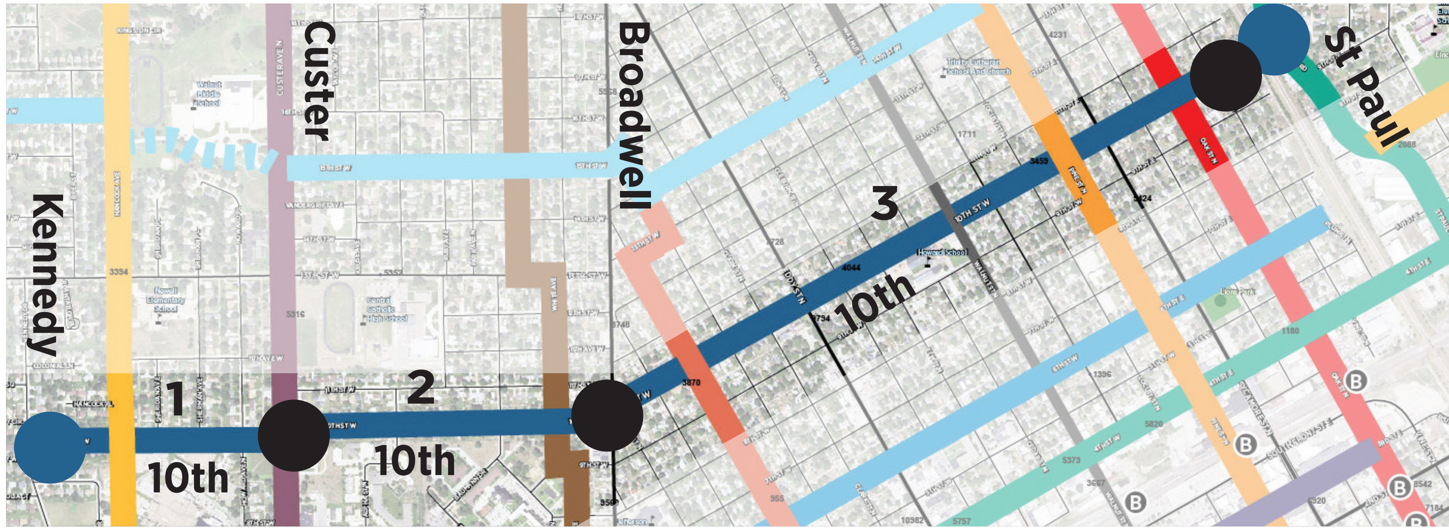
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	16th, Webb to Hancock	0.28	2-lane local/34 feet	Both sides	Bicycle boulevard. Connects to main Conestoga Mall entrance	$16,800
2	Walnut Middle School campus, Hancock to Custer	0.31	NA	NA	Multi-use path on periphery of site, south of main parking lot	$122,760
3	15th, Custer to Broadwell	0.50	2-lane local, 36 feet	Both sides	Bicycle boulevard. Enhanced ped crossing at Broadwell with short sidepath to negotiate offset intersection	$61,680
4	15th, Broadwell to Oak	0.80	2-lane local/34 feet	Both sides	Bicycle boulevard. Use Oak and Pine to connect to 17th St. Enhanced crosswalk at Eddy	$48,000
Total		**2.00**				**$249,240**

EAST-WEST

10TH STREET BIKEWAY

North



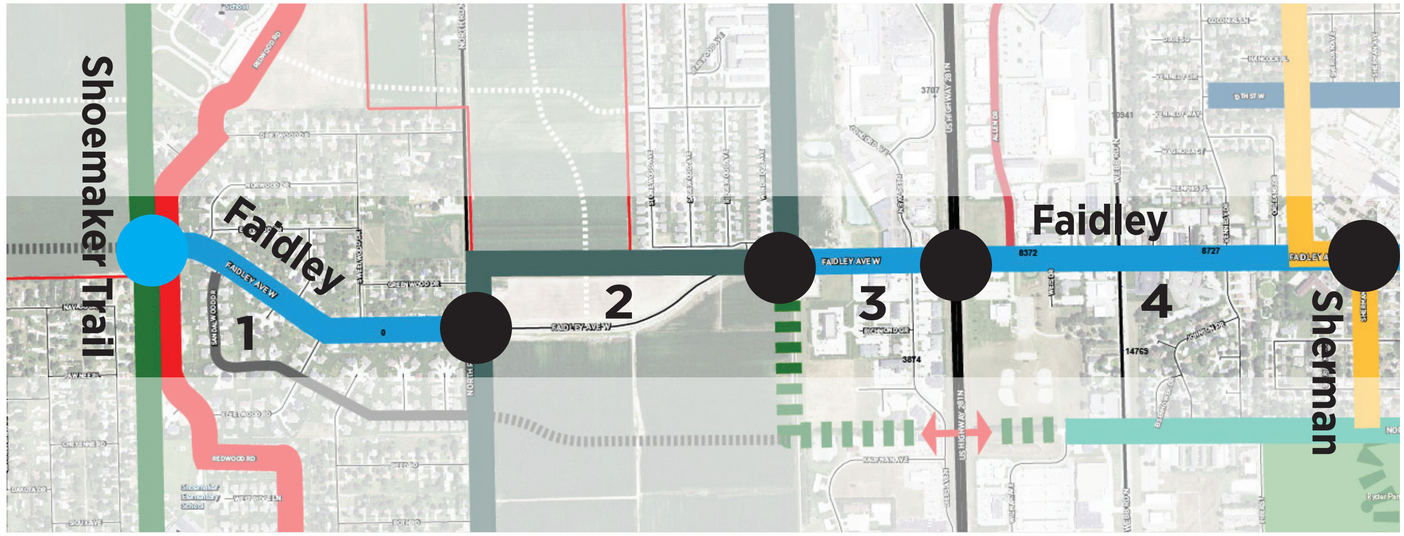
CONCEPTUAL TREATMENTS

SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
10th, Kennedy to Custer	0.40	2-lane local/36 feet	Both sides	Striped parking shoulders. Jog at Custer will use protected bike lane to connect two legs of 10th St	$32,000
10th, Custer to Broadwell	0.50	2-lane local/36 feet	Both sides	Striped parking shoulders. Enhanced crossing at Broadwell with curbs cut into Adams Street cul-de-sac from Broadwell crossing and into 10th Street eastbound	$90,000
15th, Broadwell to St. Paul	1.20	2-lane major collector/ 36 feet	Both sides	Striped parking shoulders. Street passes under BNSF viaduct. Traffic calming treatment in vicinity of Howard Elementary School	$72,000
Total	**2.10**				**$194,000**

EAST-WEST

FAIDLEY/6TH BIKEWAY (WEST)

North



CONCEPTUAL TREATMENTS

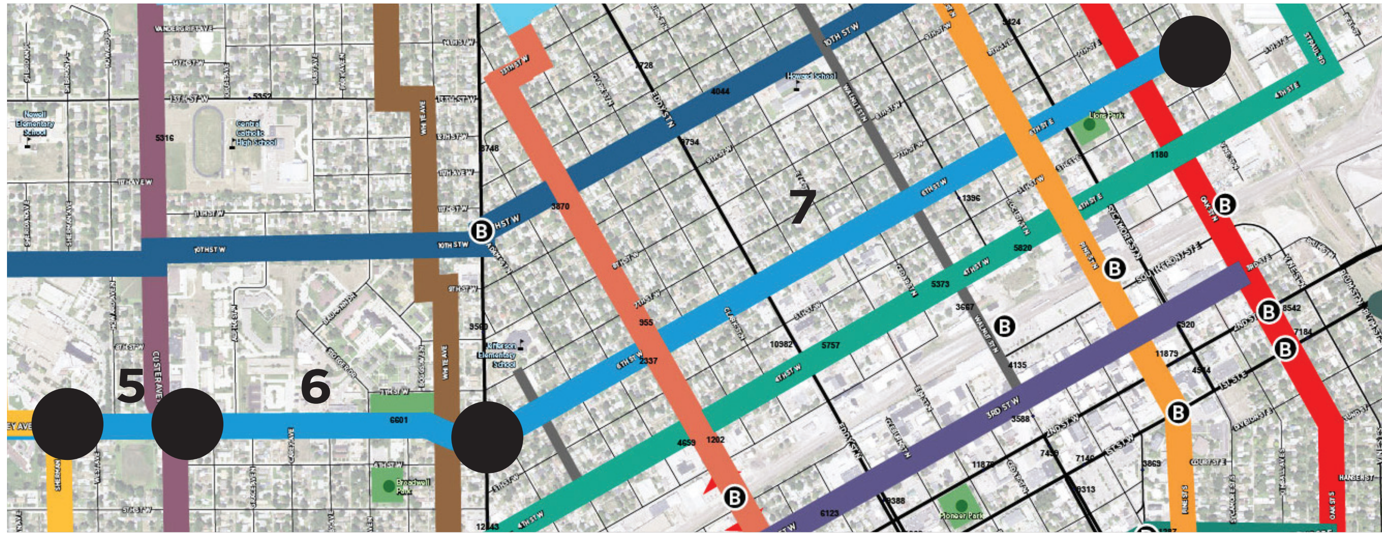
SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Faidley, Shoemaker Trail to North Rd	0.54	2-lane major collector/40 feet	Both sides	Multi-use shoulders. Enhanced crossing at North Rd	$32,400
2	Drainage corridor parallel to Faidley, North to Ridgewood	0.50	NA	NA	Multi-use trail on east and south side of drainage	$224,400
3	Faidley, Ridgewood to Highway 281	0.50	3-lane major collector, 40 feet, widening to 5-lane at 281 intersection	Both sides	Sidepath on north side with enhanced crossing at Highway 281. Connection with proposed Westside Collector Trail	$158,400
4	Faidley, Highway 281 to Sherman	0.37	3-lane major collector, 40-42 feet	Both sides	Sidepath on north side with enhanced crossing of Webb Road	$117,216

Faidley sidepath concept. In this segment, new sidepath is located adjacent to the existing back of curb sidewalk, using the existing facility as a buffer from the travel lanes. High visibility crosswalks are used to mark street and major driveway interruptions.

EAST-WEST

FAIDLEY/6TH BIKEWAY (WEST)

North



SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
5	Faidley,Sherman to Custer	0.17	3-lane major collector/ 40 feet	Both sides	Sidepath on north side. Improve crossing visibility at St. Francis entrance drive and Custer	$53,856
6	Faidley, Custer to Broadwell	0.66	3-lane major collector,/40 feet	Both sides. Some discontinuity at corners on south side	Sidepath on north side. Move path away from drop-off areas	$209,088
7	6th, Broadwell to Plum	1.25	2-lane local/36 feet	Both sides; discontinuities and poor sections east of Walnut	Bicycle boulevard with gap closing and replacement of dirt or deteriorating sections. Terminus at historic Burlington depot.	$75,000
Total		**3.99**				**$870,360**

EAST-WEST

3RD STREET BIKEWAY

North

CONCEPTUAL TREATMENTS

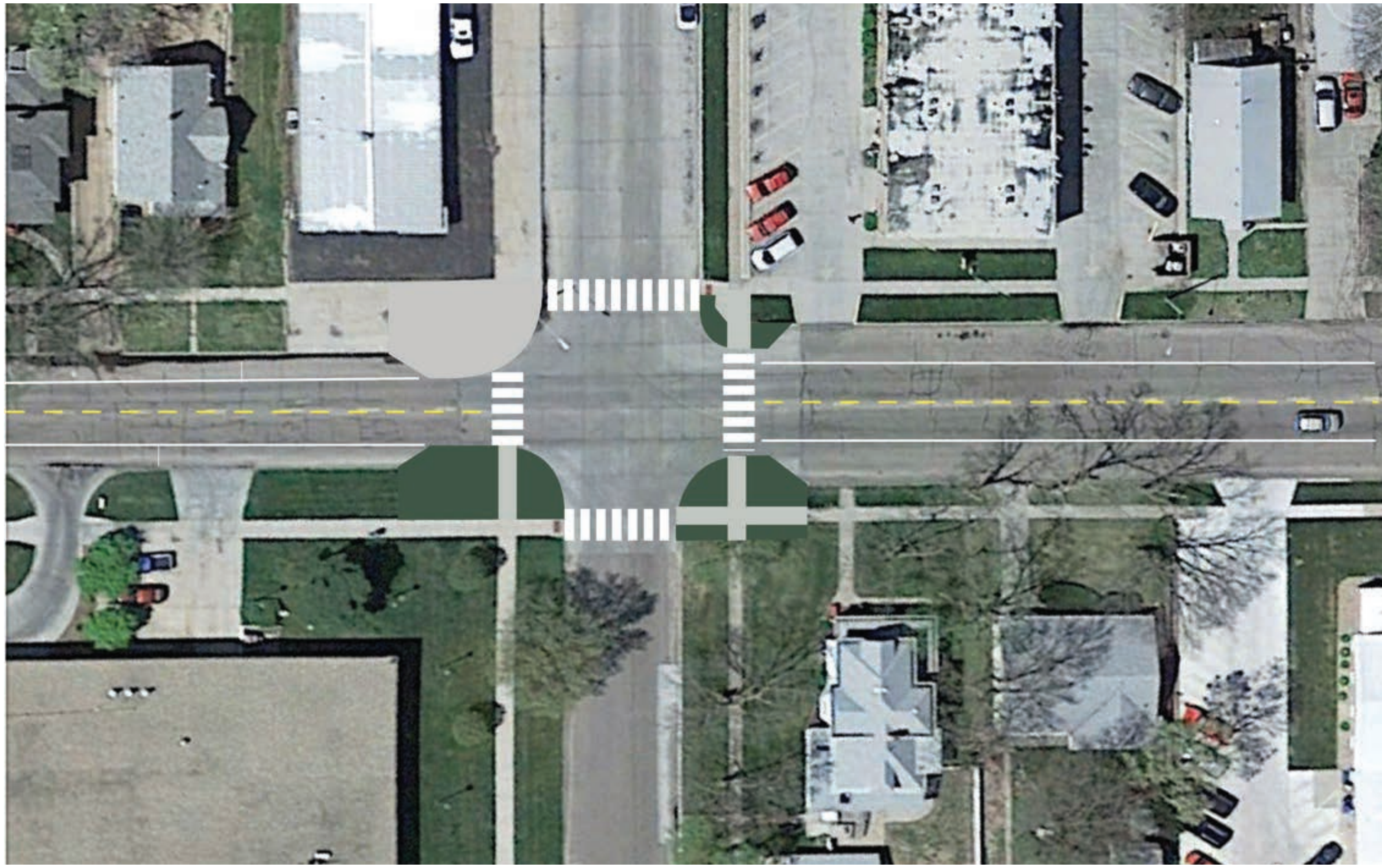
SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	3rd, Blaine to Broadwell	0.60	2-lane local/36 feet, 50 feet between Garfield and Blaine	Both sides with substantial breaks on both sides	Multi-use shoulders between Blaine and Garfield; striped parking shoulders Garfield to Blaine	$36,000
2	3rd, Broadwell to Lincoln	0.40	2-lane local/36 feet	Both sides with some gaps	Striped parking shoulders	$24,000
3	3rd, Lincoln to Elm	0.30	2-lane urban collector/ 50 feet	Both sides	Multi-use shoulders	$18,000
4	3rd, Elm to Sycamore	0.40	2-lane urban local/ 50 feet with diagonal parking on south side	Both sides	No bike-related improvements on 3rd. Transition on shared route on Elm to south alley paralleling 3rd. Provide markings to define alley as a bikeway, taking advantage of existing raised and enhanced midblock ped crossings at alleys. Incorporate yellow diamond bike/ped signage on cross streets, add midblock crossing treatment at Cedar and Walnut. Transition back to 3rd Street on Sycamore. Possible conversion of west side on-street parking lane adjacent to public parking lot to short, two way protected bike lane.	$100,000

EAST-WEST

3RD STREET BIKEWAY

North

Multi-purpose shoulder concept plan. Width of 3rd Street changes at Lincoln Street as illustrated at right. East of Lincoln, shoulder is wide enough to accommodate both bikes and parked cars. Typical street width between white lines should be limited to 24 feet maximum.

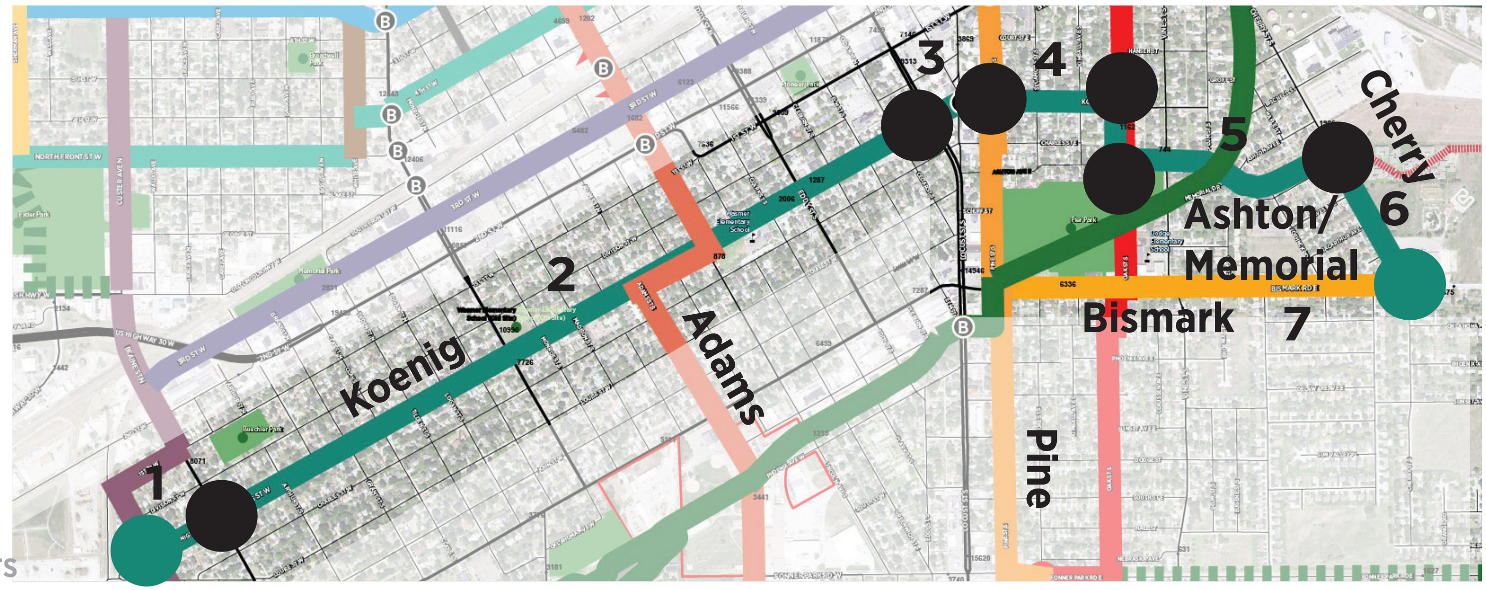


SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
5	3rd, Sycamore to Oak	0.13	2-lane urban local/50 feet, diagonal parking on south side immediately east of Sycamore	Both sides	Multi-use shoulders. Possible path extension to Plum and proposed Beltline Trail extension. However this requires crossing of 1st and 2nd dealing with relatively high speed traffic.	$7,800
	Total	**1.83**				**$185,800**

EAST-WEST

KOENIG BICYCLE BOULEVARD

North



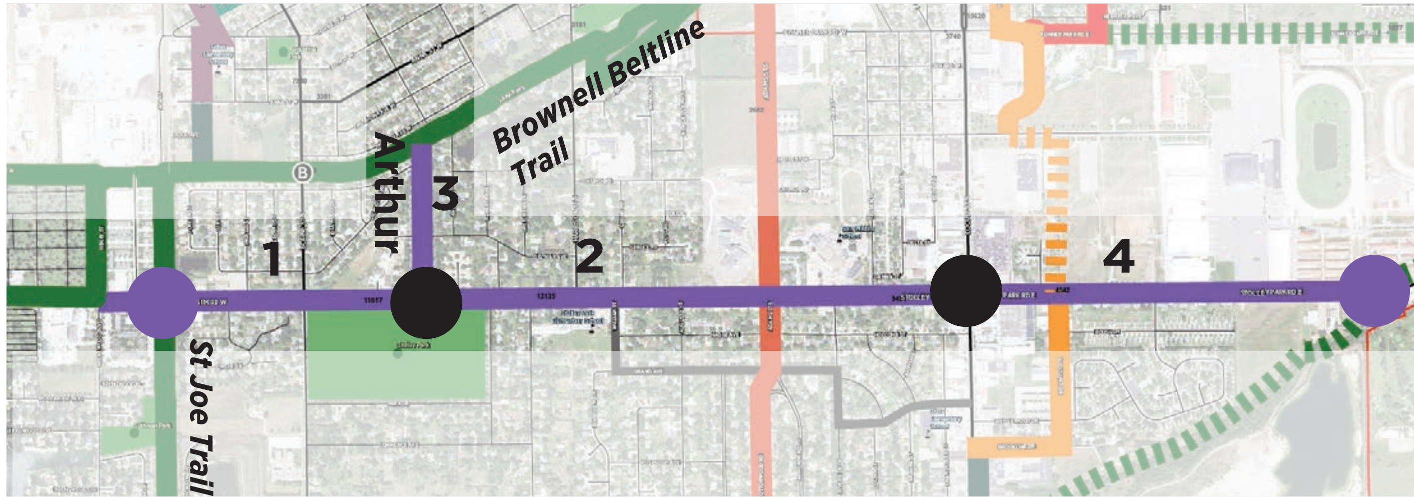
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	Koenig, Ingalls to Blaine	0.13	2-lane local/36 feet	Both sides	Bicycle boulevard	$7,800
2	Koenig, Blaine to Walnut	1.43	2-lane major collector/36 feet	Both sides with some gaps	Bicycle boulevard	$85,800
3	Koenig, Walnut to Locust	0.07	2-lane major collector/36 feet	Both sides	Enhanced crossings of both Walnut and Locust. Crossing of multi-lane Walnut presents greatest difficulty because of width and traffic volume. Traffic control should be studied	$70,000
4	Koenig, Locust to Oak	0.28	2-lane major collector/30-32 feet	Both sides	Bicycle boulevard. Route turns south along Oak Bicycle Boulevard to Ashton	$22,400
5	Ashton/Memorial Drive, Oak to Cherry	0.40	2-lane local/34 feet on Ashton, transitioning to divided residential boulevard, 51 to 125 feet with wide median	Both sides	Bicycle boulevard	$32,000
6	Cherry, Ashton to Bismark	0.26	2-lane major collector/36 feet	One side (west),	Striped parking shoulders	$15,600
7	Bismark Connection, Cherry to Pine	0.73	2-lane major collector/44 feet	Both sides	Striped parking shoulders	$58,400
Total		**3.30**				**$292,000**

EAST-WEST

STOLLEY PARK BIKEWAY

North



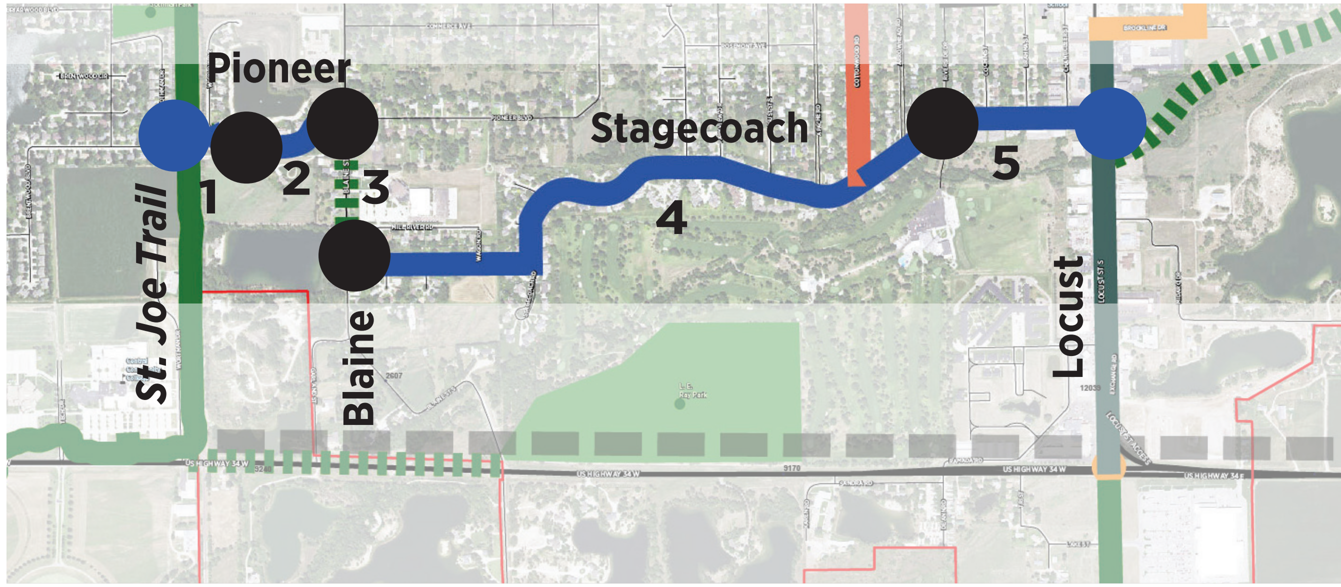
CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE /WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	St Joe Trail crossing	NA	In 2018, 3-lane minor arterial/50 feet	Trail crossing	Enhanced crossing. Consideration should be given to pedestrian refuge median, high visibility crosswalk, advance warning, and possible HAWK	Included in barriers
2	Stolley Park Rd, Trail to Locust	1.50	In 2018, 3-lane minor arterial/45 feet with multi-use shoulders	Both sides	Multi-use shoulders provide adequate bike accommodations. Enhanced crossing at Arthur Street into Stolley Park	Included in 2018 project
3	Arthur, Beltline Trail to Stolley Park	0.33	2-lane local/39 feet	Both sides but lacking on Del Mar to Stolley Park block	Shared and marked roadway with completion of sidewalk on southern block. Enhanced pedestrian crossing to link trail to park	$5,610
4	Stolley Park, Locust to Wood River	1.0	3-lane minor collector, narrowing east of Kingswood/36-24 feet	Sidewalks only on first block east of Locust	Sidepath on Fonner Park side, addressing lack of sidewalks	$316,800
Total		**2.83**				**$322,410**

EAST-WEST

STAGECOACH BICYCLE BOULEVARD

North



CONCEPTUAL TREATMENTS

SEGMENT KEY	SEGMENT	LENGTH (MILES)	STREET TYPE / WIDTH	SIDEWALK CONDITION	INFRASTRUCTURE	PROBABLE COST
1	St. Joe Trail to Pioneer Blvd	0.07	NA	NA	Trail connection to local street from regional trail, requiring a crossing of a low-use railroad branch line	$31,416
2	Pioneer Blvd, Wicklow Drive to Blaine	0.23	2-lane local/30 feet	One side	Shared and marked roadway	$3,910
3	Blaine, Pioneer to Stagecoach	0.25	2-lane major collector/24 feet rural section	Sidewalk only on Evangelical Free Church frontage	Sidepath; enhanced crossing at Blain and Pioneer intersection	$79,200
4	Stagecoach Rd, Blaine to Riverside	1.15	Local with varying sections: 2-lane/36 feet to divided 2-lane/50 feet	Both sides	Bicycle boulevard	$69,000
5	Stagecoach Rd, Riverside to Locust	0.25	2-lane local/36 feet	Both sides	Bicycle boulevard; Enhanced crossing at Locust	$15,000
Total		**1.95**				**$198,526**

PRIORITIES AND IMPLEMENTATION

The proposed Grand Island area bikeways network will be implemented in phases, and will almost certainly evolve over time. However, this plan establishes both an initial phase that guides activity during the next ten years, and a concept for how the network emerges more comprehensively from that foundation. The sequencing of phases and specific trails and routes proposed here follows these criteria and principles:

- **Response to demands.** In every phase, high priority routes should address existing demand patterns, and serve destinations that are valuable to users and appropriate endpoints for bicycle transportation. The survey results summarized in Chapter 2 provide valuable information on the importance of various destinations.
- **Route integrity.** High priority routes and projects should provide continuity between valid endpoints such as destinations and trails. When developed incrementally, routes should not leave users at loose ends.
- **Extensions of existing facilities.** Projects that make use of and extend the reach of key existing facilities that need attention,.
- **Gaps.** Small projects that fill gaps in current facilities or tie relatively remote neighborhoods to the overall system can be especially useful at early stages n the system's development. However, two very large projects are proposed in the high priority system in response to community preferences: the Faidley and Custer corridors.
- **Opportunities.** The implementation sequence should take advantage of street projects, resurfacing and street rehabilitation projects, and other infrastructure projects
- **Safety enhancement.** High priority projects should increase safety and reduce user discomfort for people of all ages.
- **Demographic equity.** Projects should provide bicycle and pedestrian access to underserved populations and connect people and households without access to a motor vehicle to destinations important to their lives and livelihood.

Table 7.2: Probable Costs for Proposed Trails

NAME : PRIORITY	LENGTH (mi)	TRAIL TYPE (See Table 7.1)	OPINION OF PROBABLE COST
Shoemaker Trail extension	.50	1	$198,000
Westside Connector extension	1.00	2	$448,800
Cedar Hills Trail	1.80	3	$997,920
South Locust Trail	0.75	Sidepath	Included in Route
Belt Line Trail Extension	0.90	3	$498,960
Capital Trail East	0.68	Sidepath/Type 2 trail	$215,424
Eagle Scout Trail	0.75	1	$297,000
Moore Creek Trail	1.50	2	$673,200
Southwest Trail	1.65	3	$914,760
Priority Trails Total	**9.53**		**$4,244,064**

NAME: FUTURE	LENGTH (mi)	TRAIL TYPE (See Table 7.1)	OPINION OF PROBABLE COST
Veterans Legacy Trail/Overpass	0.8	1	$1,859,040 (includes RR overpass)
Sky Park Trail	2.05	2	$689,040
Seedling Mile Trail	2.07	3	$655,776
Wood River Trail	1.2	Sidepath	$665,280
Riverway Trail Extension	3	3	$1,346,400
Mormon Island/(S. Locust) Trail	4.9	Sidepath/Type 2 trail	$2,699,120 (includes channel bridge)
Stagecoach Connection Trail	0.07	1	Included in route
Northwest Trail	1.65	2	$740,520
L.E. Ray Park Connector	0.55	Sidepath	$174,240
Alda/Cornhusker Trail	5.75	Gravel	$1,150,000
Alda/ Husker Highway Trail	5.63	Gravel	$1,126,000
Future Trails Total	**27.67**		**$11,105,416**
GRAND TOTAL	**37.20**		**$15,349,480**

Table 7.3: Probable Budgets for Barrier Removal Projects

NAME	ASSOCIATED ROUTE	BARRIER TYPE (See Table 7.1)	OPINION OF PROBABLE COST
Capital-281	Capital Trail	A	$350,000
State-281	State St Trail	A	$350,000
Faidley-281	Faidley	B	$200,000
North Rd/RR	Moore Creek Trail	E	$50,000
Westside Trail-State	State St Trail	D	$75,000
Stuhr-Cedar Hills 281 Underpass	Stuhr/Cedar Hills Tr		Included in route cost
St Joe Tr/Stolley Park	St Joe Trail	C	$150,000
Beltline/Blaine	Beltline Trail	D	$75,000
Stuhr Tr/Husker	Stuhr Trail	C	$150,000
Capital/Webb	Capital Trail	C	$150,000
Capital Tr east of Webb	Capital Trail	C	$150,000
Capital/Broadwell	Capital Trail/Pine	D	$100,000
20-Broadwell	20th/College	D	$100,000
15-Broadwell	15th Bike Blvd	D	$100,000
10-Broadwell	10th Bike Blvd	D	$100,000
Koenig-Locust/Walnut	Koenig Bike Blvd	D	$200,000
Lincoln-2nd	Lincoln/Adams	C	$200,000
Beltline/Locust	Beltline Trail	E	$50,000
1st Pine	Pine Bike Blvd	C	$150,000
North Front 281 Overpass	Network	bridge	$1,500,000
Lincoln RR Overpass	Lincoln/Adams	bridge	$1,500,000
Stagecoach/Locust	Stagecoach/Locust	D	$75,000
Highway 34/Locust	S. Locust/Pine	B	$200,000

- **Service to key destinations.** These include parks, schools, the library, and similar destinations.
- **Relative ease of development.** It is important that the a useful system be established relatively quickly and at comparatively low cost. Routes that require major capital cost or lead to neighborhood controversy should be deferred to later phases, when precedents are established and the network becomes part of Grand Island's urban landscape. Developability helps determine priorities. The initial system should serve major destinations and provide good connectivity while minimizing large scale projects.

Clearly economics and available resources are extremely important and facilities that meet user demands and preferences are frequently relatively expensive because they require a greater degree of separation from motor vehicles. Table 7.1 identifies typical costs per mile for the different types of on-street facilities anticipated for the Grand Island network. The subsequent detailed route tables apply these cost factors to the individual on-street components of the active network. Tables 7.2 and 7.3 display opinions of probable cost the other two key components of the network: trails and barrier removal projects. Table 7.3 should not be taken to prescribe a specific solution but rather is designed to establish an optimal budget for project types that could substantially reduce the impact of these barrier conditions.

SEQUENCING

The Sequencing illustrates these guiding criteria to identify a basic network that would provide a high level of service to the community even if no further progress is made. The sequence design divided into a basic network, which must stand alone even if no further progress is made; and an ultimate network that provides comprehensive coverage of the city and rural parts of the metropolitan area. The basic system is further divided into two implementation phases, which may be viewed as five to seven-year capital programs. This overall Basic Network implemented over 20 years translates into a proposed investment of about $10.3 million, or slightly over $500,000 annually in 2018 dollars over a 20 year period. Clearly implementation depends on availability of funding and some large projects or overall efforts could receive federal and state funds that could advance certain projects. This implementation sequence represents a suggested scenario that may change over time.

BASIC SYSTEM: THE STARTING POINT

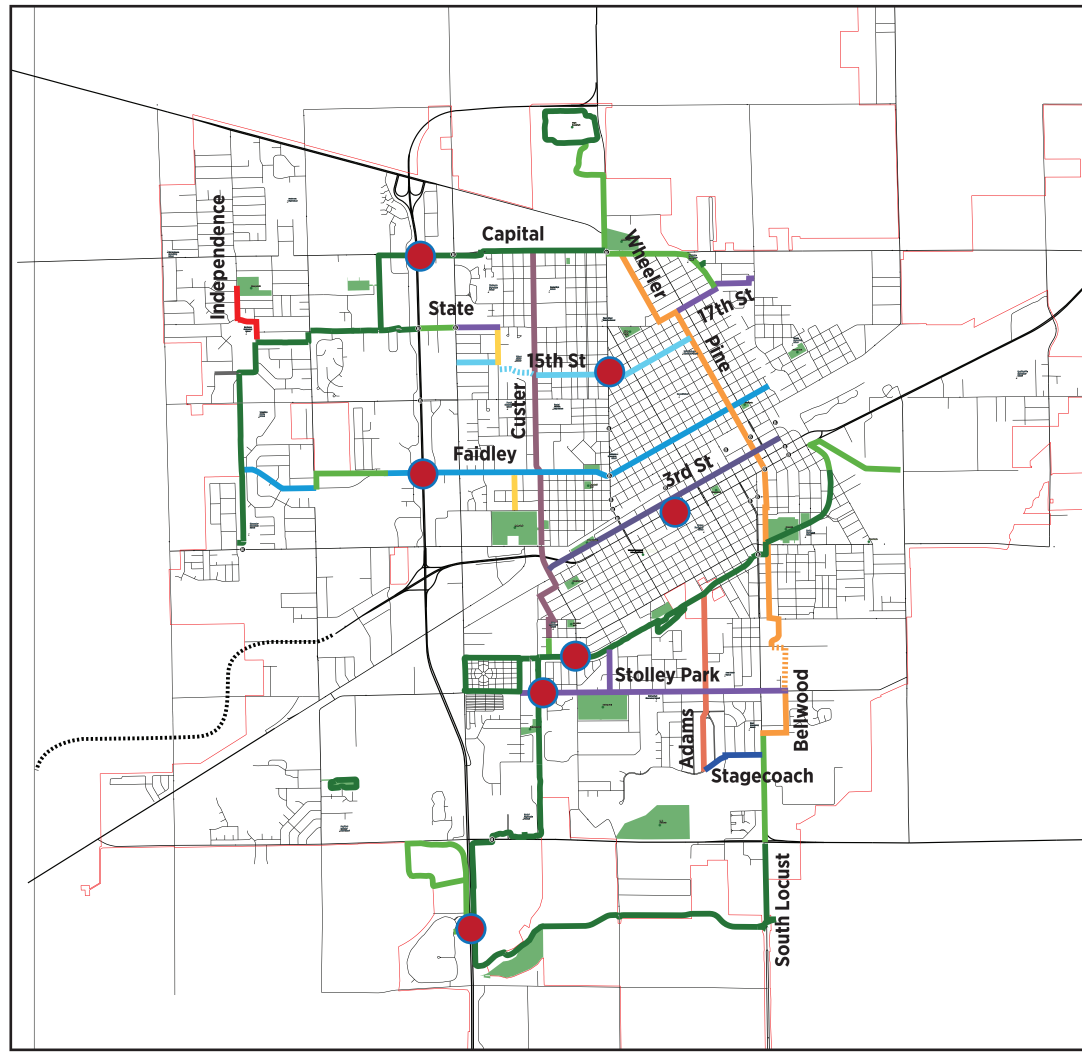
While the City and the user community will help to determine the order of projects within each phase, the system must start to emerge with some specific routes and route segments. This pilot system establishes the foundation of the ultimate network, and should provide maximum impact, link all parts of the city, and serve proven destinations and traffic patterns.

Phase One

Phase One, encompassing development envisioned for the next ten years, includes the following key elements:

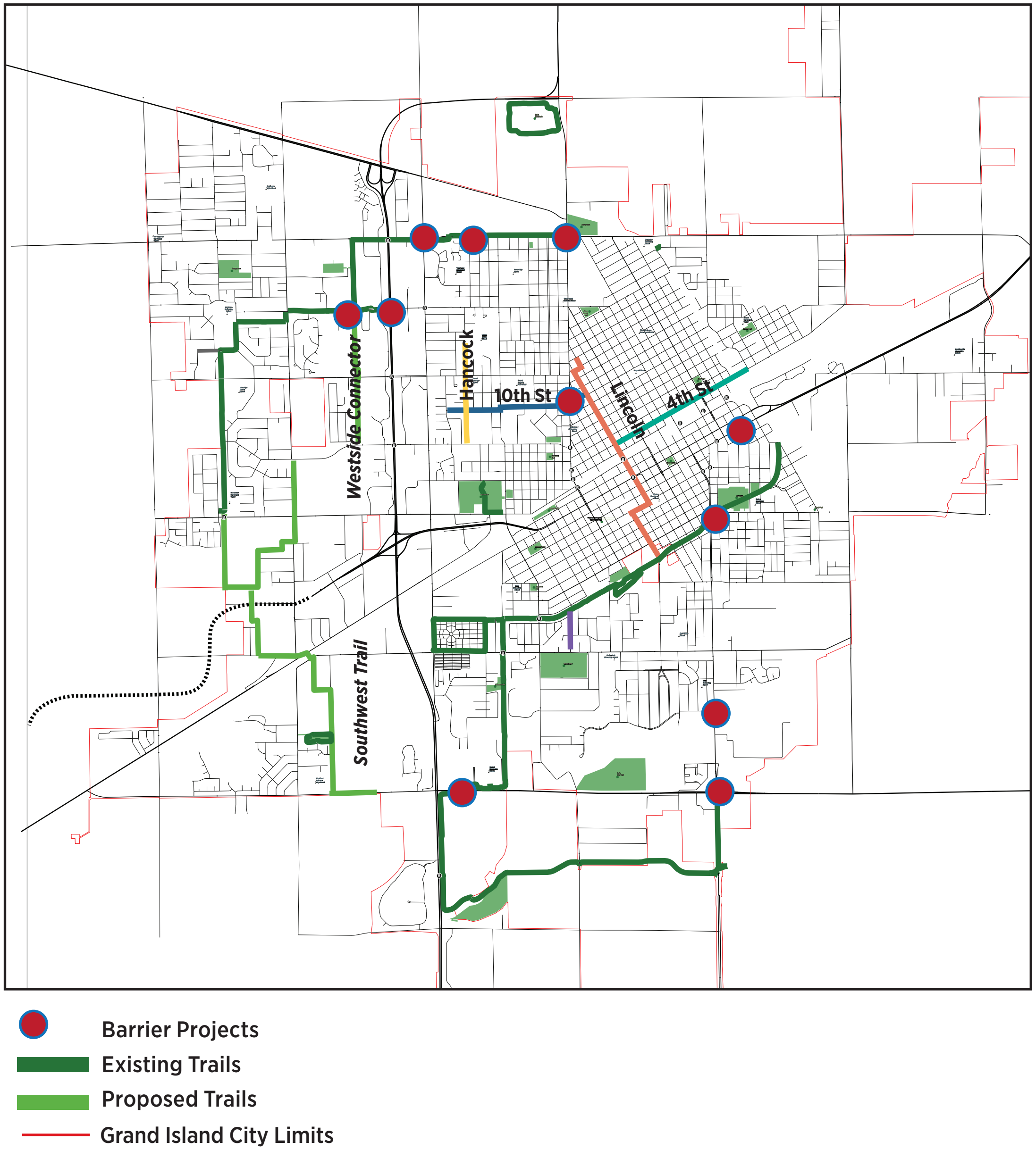
- Completion of three major street-related corridors: Faidley, Custer, and the Pine/South Locust corridors. Faidley and Custer both involve separated facilities, including sidepaths and protected bike lanes. The importance of these corridors suggests accelerating their development.
- A new midtown east-west route, using 15th Street connecting to the State Street route at both east and

Figure 7.4: Basic Network: Phase 1 Diagram



Barrier Projects
Existing Trails
Proposed Trails
Grand Island City Limits

Figure 7.5: Basic Network: Phase 2 Diagram



west ends. This fills the void between the Capital Trail and Faidley/6th Street Bikeways.

- A new sidepath along Adams, connecting the Beltline Trail to new schools along Adams Street.
- A shared use path connection between the State Street Trail and George Park.

Phase 1 of the Basic System also extends several important trails designed to fill gaps or create strategic new connections, including

- A connection between the Capital Trail and Eagle Scout Park.
- An extension of the Capital Trail to the east side of the BNSF tracks using 20th and 18th Street underpasses.
- Extension of the Beltline Trail to the JBS plant at Stuhr Road.
- Connection of the new hospital/mixed use development's trail loop to the Stuhr Trail under US 281, using an existing bridge over a drainage swale.

Phase 1 of the Basic System envisions addressing seven key barrier points:

- The Capital/US 281 intersection.
- The Faidley/US 281 intersection.
- 15th and Broadwell intersection.
- Lincoln Street crossing of 2nd Street at the Library.
- Beltline Trail crossing of Blaine Street.
- St Joe Trail crossing of Stolley Park Road.
- US 281 undercrossing from the Stuhr Trail to the new hospital site.

Phase Two

Phase 2 expands the on-street transportation improvements of Phase 1, but focuses more heavily on longer distance trails. Its major on-steet components include:

- Completion of the Lincoln/Adams bicycle boulevard, completing a north-south quiet street corridor through the residential center of the city.

- Enhancing 4th Street through the growing north downtown international district and connecting to the east side of town.
- Implementing the 10th Street bicycle boulevard, complementing the busier Faidley corridor and providing an enhanced connection across Broadwell.

Phase 2 features significant trail projects, including completing the major loop around the southwestern part of the city. This project will develop in conjunction with or after the relocation of US 30. Major trail components include:

- Extension of the Westside Connector from State to Faidley, linking up with that primary east-west bikeway.
- The Shoemaker and Moore Creek Trails, connecting the current end of the Shoemaker Trail with Cedar Hills Park, the new hospital, and the Stuhr Trail and rest of the central trail system.

Significant barrier improvement projects primarily address intersections and upgrades to existing trail crossings. These include the:

- State and US 281 intersection.
- Existing State/Capital Connector crossing west of the highway.
- Existing Stuhr Trail crossing of US 34 at College Park.
- Existing Capital Trail crossing east of Webb Road.
- Capital and Broadwell intersection
- 10th and Broadwell
- Minor enhancements of the Beltline Trail crossing of Locust Street.
- 1st and Pine, the unsignalized intersection of the Pine Street crossings.
- South Locust crossings at Stagecoach and US 34.

Figure 7.6: Completed Basic Network

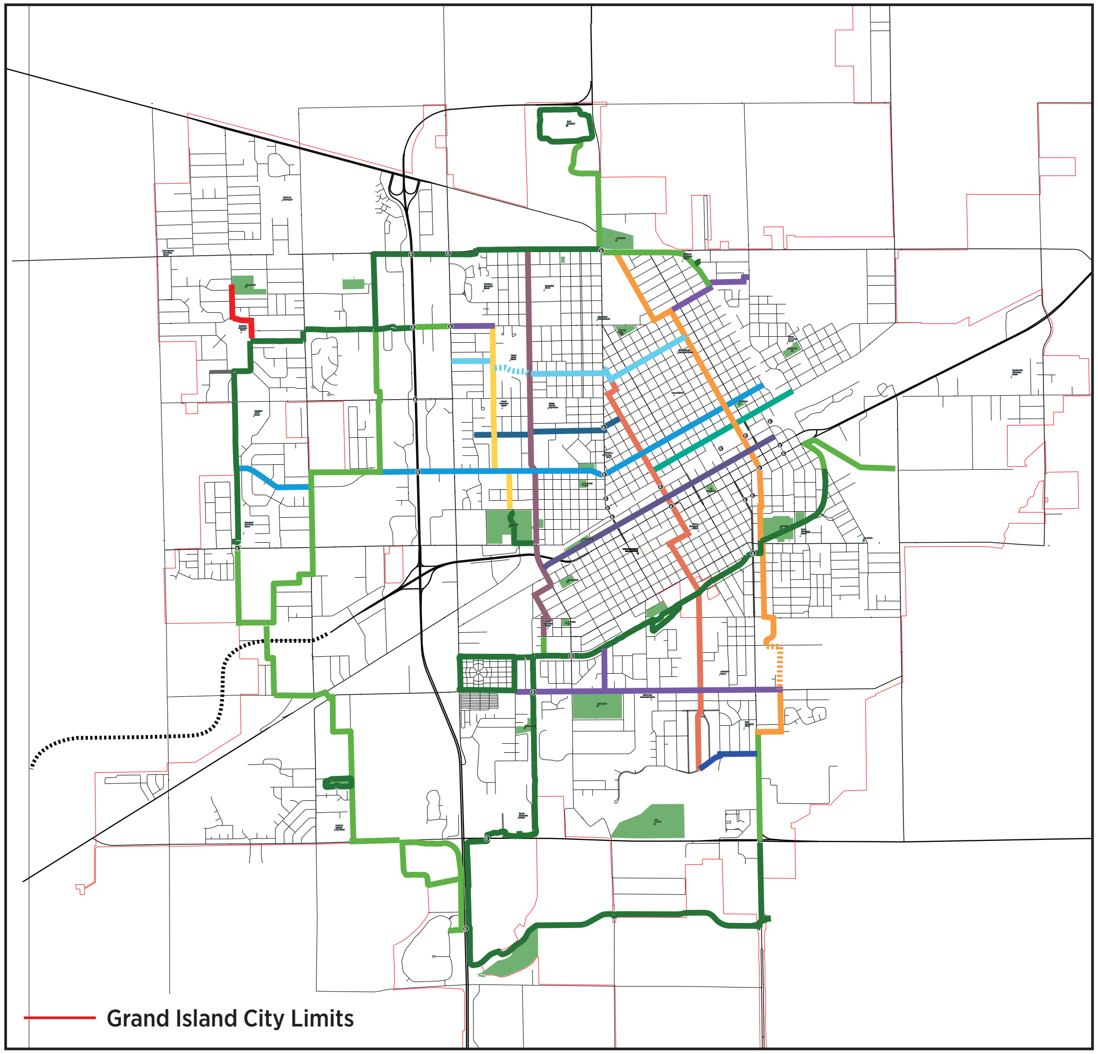
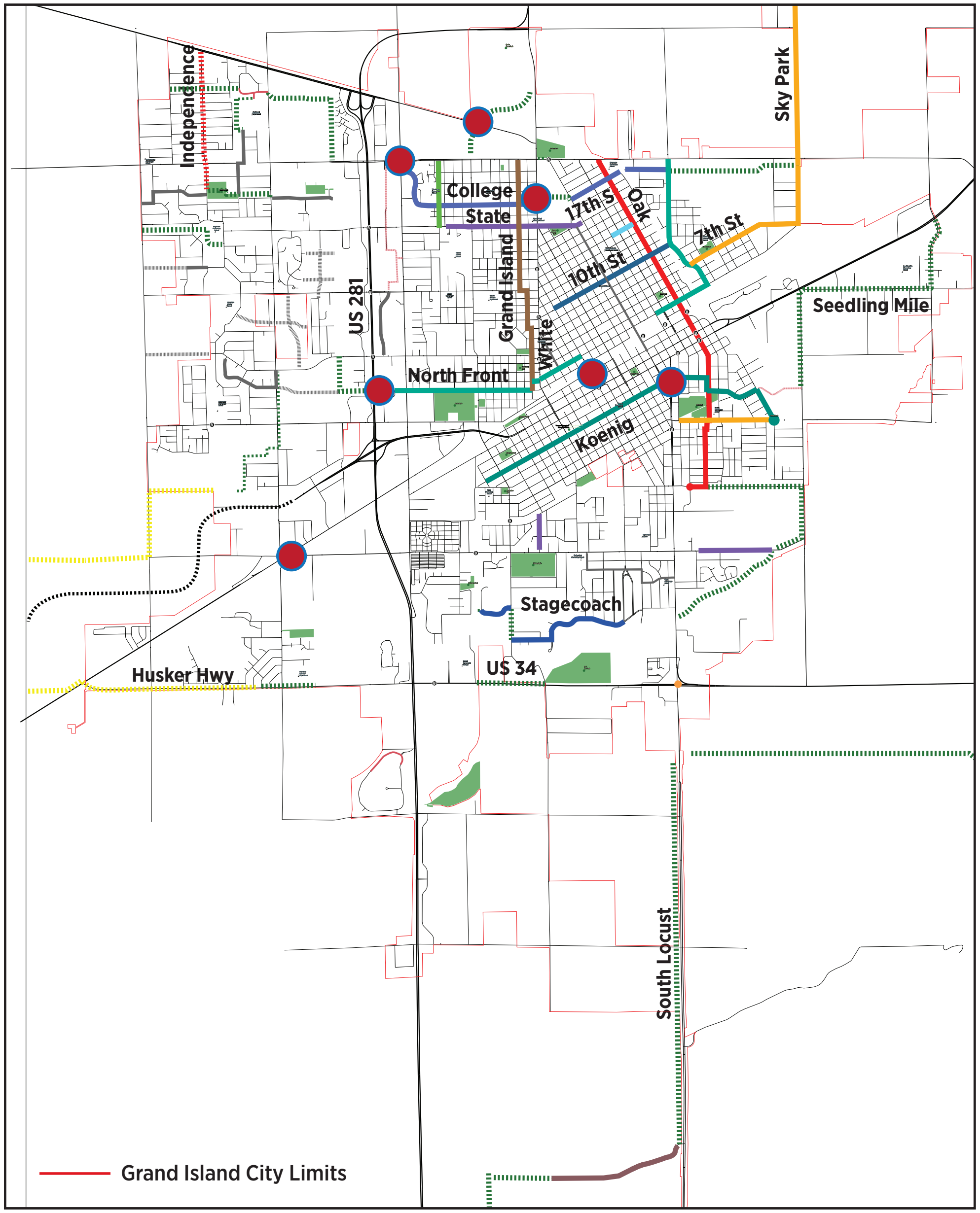


Figure 7.7: Ultimate Network Completion (Phase Three): Project



Ultimate Network Completion (Phase Three)

An ultimate network phase completes the on-street grid with significant east-west routes and expands the trail system into peripheral areas outside the city, including connections to Alda, Mormon Island, and Shady Bend.

Major on-street additions include:

- North-south routes the include the Oak Street bicycle boulevard, paralleling the earlier Pine Street route and Grand Island/White Avenue parallel to Broadwell.
- Completing east-west bike boulevard corridors along 20th/College, 17th/State, 10th, Koenig, and Stagecoach with a southern connection to the St. Joe Trail.
- Extending the 4th Street route to North Front, with the connection occurring under a proposed Broadwell grade separation over the Union Pacific
- Eventual improvement of north Independence Avenue including a sidepath in a major road construction project.
- Extensions of 7th Street and Sky Park Road to the airport and developing industrial areas. A study of a potential US 281 northeast bypass may clarify active transportation opportunities in this sector.
- Collector street connections with pedestrian and bicycle accommodations in developing subdivisions.

Long distance regional trails in the periphery of the metropolitan area are an important part of this ultimate phase. As a result, several projects are high cost and may be spread out over a longer time. These projects include trails to:

- Mormon Island State Recreation Area
- Alda and the Cornhusker Plant
- Veterans Legacy development, including a potential trail overpass over the BNSF.
- Trails in the northwest part of the city, incuding access to Northwest High School and the Independence corridor
- Paving of the Riverway Trail to N-2.
- Shady Bend area via Seedling Mile Road.

Barrier crossings are an important part of the ultimate phase, Several of these propose crossings are fairly routine, relating to bicycle boulevard crossings of Broadwell and Locust. However, three major projects involve substantial advance planning and financing. These aspirational projects include:

- A grade separated pedestrian/bike crossing over US 281 on the alignment of North Front. This increases connectivity between the east and west sides of the city.
- A grade separated pedestrian/bike crossing of the UPRR at or around Lincoln Street. This may occur in conjunction with a grade separation project of the Broadwell crossing. Such a project may require elimination of existing grade crossing(s). A pedestrian crossing is essential between Eddy and Broadwell, and the Lincoln site is particularly important for its access to the Public Library and the Adams Street educational corridor.
- A possible trail overpass developed as part of the Veterans Legacy project.

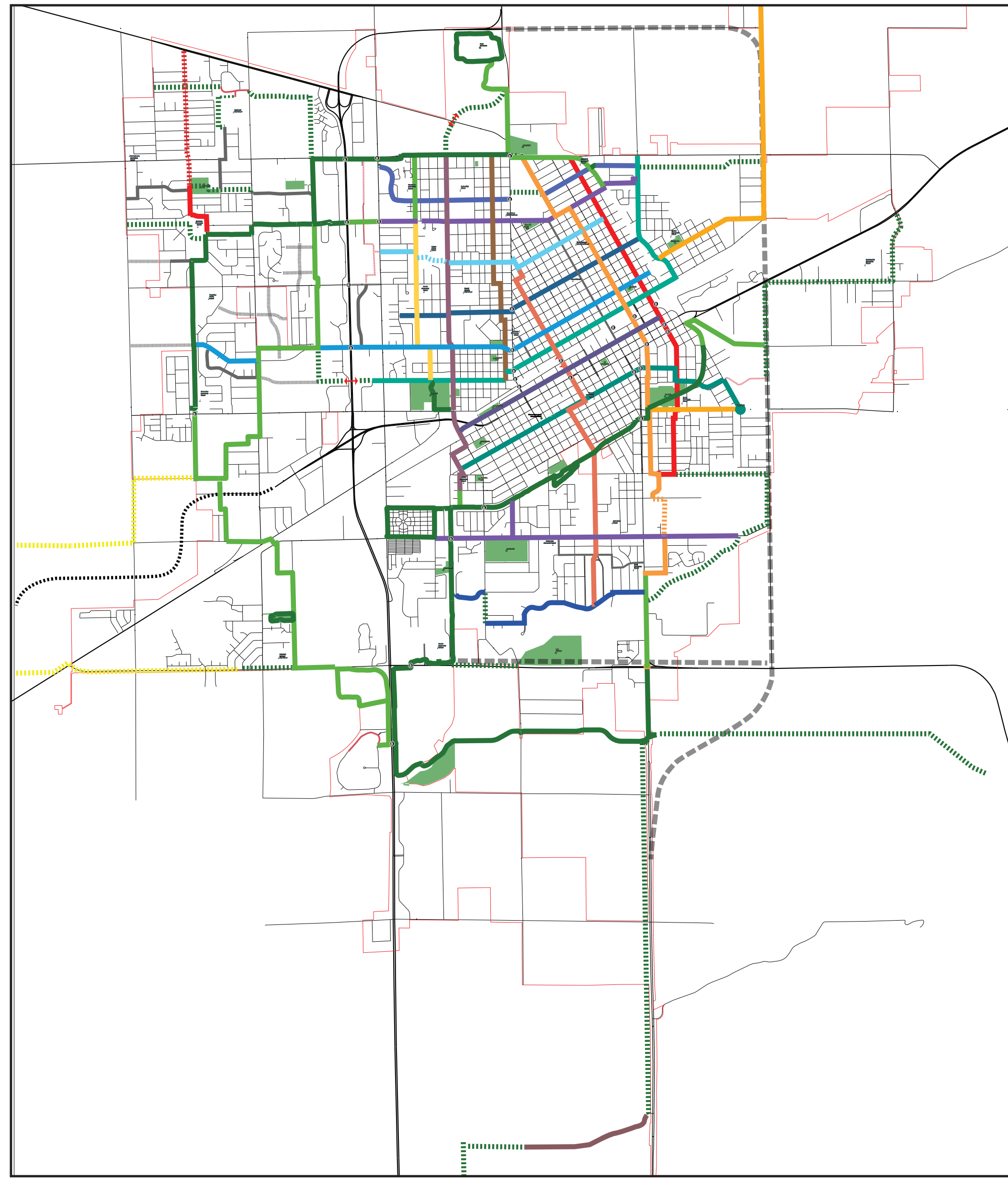
OPINION OF PROBABLE COST

Tables 7.9 through 7.12 on the following pages summarize probable planning level costs for the metropolitan area's proposed active network. It is clear that the area is unlikely to implement the entire system, even over a long period. For example, trails in the ultimate phase of the program (beyond 10 to 15 years) account for about 40% of the total projected cost. However, these calculations and concepts provide decision-makers with information that can help select specific future projects that most appropriately meet community needs.

FUNDING

Given the multi-year nature of this active transportation program, identifying and sustaining funding sources is critical. Many projects involving on-street routes could be incorporated into normal maintenance activities - thus the marginal cost of activities such as painting and maintaining multi-use shoulders may be significantly lower than the

Figure 7.8: Complete Ultimate Network



cost factors incorporated here. Bicycle boulevards and routes could be implemented through relatively inexpensive wayfinding or street signs as well. But some projects involve substantial capital cost. Highest among these are those projects that users like best – those that offer separation from motor vehicles.

Many cities set aside a certain annual allocation for alternative transportation projects and the Grand Island metropolitan area should also consider this approach. The basic network's cost of about $10 million would require about $750,000 annually over a fifteen year implementation period. But many financing programs exist that can fund specific projects and greatly accelerate realization of this network. Many of these programs involve Federal transportation and recreational funding assistance which may be uncertain in the future. The following discussion identifies sources available as of adoption.

FEDERAL TRANSPORTATION ACT PROGRAMS

FAST Act

The FAST (Fixing America's Surface Transportation) Act became law in 2015 and remains at present the primary source of transportation assistance.

FAST programs include:

- The Surface Transportation Pro-

Table 7.9: Opinion of Probable Cost: On-Street Network by Phase

ROUTES	OPINION OF PROBABLE COST			
ON-STREET NETWORK	Total	Basic Phase 1	Basic Phase 2	Ultimate
Oak Bicycle Boulevard	$195,000			$195,000
Pine Bicycle Boulevard	$617,700	$617,700		
Lincoln/Adams Bikeway	$364,688	$239,088	$125,600	
Grand Island/White Bicycle Boulevard	$83,400			$83,400
Custer Bikeway	$483,166	$483,166		
Hancock Bikeway	$531,390	$30,000	$276,990	$224,400
Independence Bikeway	$552,024	$171,864		$380,160
St Paul/4th Bikeway	$323,162		$62,450	$260,712
College/20th Bicycle Boulevard	$284,640			$284,640
State/17th Bikeway	$211,990	$156,190		$55,800
15th Street Bicycle Boulevard	$249,240	$249,240		
10th Street Bikeway	$194,000		$122,000	$72,000
Faidley/6th Street Bikeway	$870,360	$870,360		
3rd Street Bikeway	$185,800	$185,800		
Koenig Bicycle Boulevard	$292,000			$292,000
Stolley Park Road Bikeway	$322,410	$5,610		$316,800
Stagecoach Bicycle Bouleavrd	$198,526	$15,000		$183,526
TOTAL	**$5,959,496**	**$3,024,018**	**$587,040**	**$2,348,438**

Table 7.10: Opinion of Probable Cost: Trails Network by Phase

ROUTES	OPINION OF PROBABLE COST			
PRIORITY TRAILS	Total	Basic Phase 1	Basic Phase 2	Ultimate
Shoemaker Extension	$198,000		$198,000	
Westside Connector	$448,800		$448,800	
Cedar Hills	$997,920	$498,960	$498,960	
South Locust	Included in Pine Route	Included in Pine Route		
Beltline Extension	$498,960	$498,960		
Capital Trail	$215,424	$215,424		
Eagle Scout	$297,000	$297,000		
Moore Creek	$673,200		$673,200	
Southwest	$914,760		$914,760	
FUTURE TRAILS	Total	Basic Phase 1	Basic Phase 2	Ultimate
Veterans Legacy Trail/Overpass	$1,859,040			$1,859,040
Sky Park Trail	$689,040			$689,040
Seedling Mile Trail	$655,776			$655,776
Wood River Trail	$665,280			$665,280
Riverway Trail Extension	$1,346,400			$1,346,400
Mormon Island/(S. Locust) Trail	$2,699,120			$2,699,120
Stagecoach Connection Trail	In Stagecoach Route			
Northwest Trail	$740,520			$740,520
L.E. Ray Park Connector	$174,240			$174,240
Alda/Cornhusker Trail	$1,150,000			$1,150,000
Alda/ Husker Highway Trail	$1,126,000			$1,126,000
TOTAL	**$15,349,480**	**$1,510,344**	**$2,733,720**	**$11,105,416**

gram (STP). This is the primary source of funding urban road construction projects but can also be used for bicycle and pedestrian infrastructure. STP funds are frequently used for facilities like sidepaths that are developed in combination with street projects.

- Surface Transportation Block Grant for transportation alternatives. This program incorporated the pre-existing Transportation Enhancement, Safe Routes to Schools, and National Scenic Byways Program. In Nebraska, TAP funding, administered by the Nebraska Department of Transportation, have been the primary source of local trails funding in many cities, and Grand Island has used this program in the past.
- Highway Safety Improvement Program (HSIP). This program funds projects consistent with the state's Strategic Highway Safety Plan. Within the context of this plan, it is most useful for helping to fund specific safety infrastructure improvement projects.

TIGER Discretionary Grants

TIGER (Transportation Investment Generating Economic Recovery) originated as part of the American Recovery and Reinvestment Act and has focused on funding for innovative livability, sustainability, and safety projects. Nebraska has not made extensive use of this program receiving only one grant for Omaha's Bus Rapid Transit line. An innovative project such as the Custer Bikeway could be a competitive TIGER project.

National Recreational Trails

Administered by Nebraska Game and Parks, this venerable program was originally established in 1991 and provides funding assistance for recreational projects, such as park trails. This contrasts with TAP funds that must be used for projects with a significant transportation component.

LOCAL FUNDING SOURCES

Given uncertainties over Federal funds, local funding emerges as the most reliable option for multi-year programs. Grand Island's Capital Improvement Program can provide a local match for federal funds. The Food and Beverage Tax is used to help finance trail projects for the Parks Department. The current national administration has proposed a match program that would provide a limited percent of federal funding (possibly 20% of project cost) as seed money for local or private funds. An annual allocation could be financed through a local option sales tax, as permitted by LB 840, or general obligation bonds.

PRIVATE FINANCING AND PHILANTHROPY

Table 7.11: Opinion of Probable Cost: Barrier Projects Network by Phase

BARRIERS	OPINION OF PROBABLE COST			
PROJECT	Total	Basic Phase 1	Basic Phase 2	Ultimate
Capital-281	$350,000	$350,000		
State-281	$350,000		$350,000	
Faidley-281	$200,000	$200,000		
North Rd/RR	$50,000			$50,000
Westside Trail-State	$75,000		$75,000	
Stuhr-Cedar Hills 281 Underpass	Included in trail			
St Joe Tr/Stolley Park	$150,000	$150,000		
Beltline/Blaine	$75,000	$75,000		
Stuhr Tr/Husker	$150,000		$150,000	
Capital/Webb	$150,000			$150,000
Capital Tr east of Webb	$150,000		$150,000	
Capital/Broadwell	$100,000		$100,000	
20-Broadwell	$100,000			$100,000
15-Broadwell	$100,000	$100,000		
10-Broadwell	$100,000		$100,000	
Koenig-Locust/Walnut	$200,000			$200,000
Lincoln-2nd	$200,000	$200,000		
Beltline/Locust	$50,000		$50,000	
1st Pine	$150,000		$150,000	
North Front 281 Overpass	$1,500,000			$1,500000
Lincoln RR Overpass	$1,500,000			$1,500,000
Stagecoach/Locust	$75,000		$75,000	
Highway 34/Locust	$200,000		$200,000	
Total	**$5,975,000**	**$1,075,000**	**$1,400,000**	**$3,500,000**

Table 7.12: Opinion of Probable Cost: Recap by Phase

ROUTES	OPINION OF PROBABLE COST			
	Total	Basic Phase 1	Basic Phase 2	Ultimate
ON-STREET NETWORK	$ 5,959,496	$ 3,024,018	$ 587,040	$ 2,348,438
TRAIL NETWORK	$ 15,349,480	$ 1,510,344	$ 2,733,720	$ 11,105,416
BARRIERS	$ 5,975,000	$ 1,050,000	$ 1,400,000	$ 3,500,000
TOTAL	**$27,283,976**	**$5,609,362**	**$4,720,760**	**$16,953,854**

Private organizations and philanthropic giving can be a significant source of financing assistance. In some cases, communities have raised money for popular trail segments through foundations, avoiding the delays and processes that typically come attached to private grants. An example of this on a large scale is Omaha's South Omaha Trail. Health-related enterprises such as insurance organizations and hospitals have funded active transportation initiatives and are also involved in the organizational phases of the Grand Island program. Major industries such as JBS may see the direct benefit to them in a project like the Beltline Trail extension. Other significant trail and active projects have been funded by community contributors through fund-raising drives and even naming rights.

Foundations can also be a significant source of local support. The Nebraska Trails Foundation (NTF) provides funding for trail projects in both urban and rural settings. The Grand Island Community Foundation both administers funds and channels resources into specific fields of interest, including health, and may be helpful in setting up a specific fund around active transportation implementation. State and national foundations with substantial local interest (such as the Peter Kiewit Foundation and Union Pacific Foundation) also have funded related improvements in the past.

DEVELOPMENT FINANCING

Active transportation may also be integrated into new development and redevelopment projects. The implementation phase maps and overall network plan identify future collector street corridors in potential growth areas. Integrating infrastructure to support active transportation, such as adequate width for bike lanes or multi-use shoulders, traffic calming features, proposed trail routes, and pedestrian paths and connectivity is extremely helpful and should be part of the financing package for the project. The new hospital and mixed use project proposed at US 281 and 34 is incorporating part of the trail network into its project design. In redevelopment areas, tax increment financing can also be used to finance active transportation facilities that in turn increase project quality.

SIDEWALK FINANCING

Funding for sidewalk improvements or gap filling projects can be very challenging. The typical method of financing, sidewalks uses City Assessment Districts, where sidewalk costs are repaid through special assessments on properties within the district. Various other mechanisms may be considered for maintaining sidewalk continuity on the pedestrian system. These include:

APPROACHES TO SIDEWALK FINANCE

SOME APPROACHES TO SIDEWALK FINANCE

Ann Arbor, MI. *In November of 2011, voters approved a 1/8-percent increase to the Street Reconstruction Millage for the purpose of repairing sidewalks in the public right-of-way. Prior to the passage of this millage, property owners were required to repair or replace deficient sidewalks that adjoined their property. Beginning in 2012, the City assumed responsibility for the repair of the sidewalk system, which will be performed through this project over the course of the next five years.*

Missoula, MT *spreads a large percentage of the cost of installing sidewalks to the whole community by using an insurance model. There will be a premium, deductible, co-pay, out of pocket maximum, and city payment cap. The program establishes a deductible of $300. The city co-pays 70 percent while the property owner pays 30 percent. The maximum out-of-pocket for the homeowner is $2,000 and the city caps out at $15,000. The owner would pay any amount over the city's cap. The premium is the increment in general taxes necessary to finance the program.*

Manchester NH *provides a 50-50 match to property owners for sidewalk and/or curb construction. If the construction of a sidewalk necessitates the construction of a retaining wall, the homeowner is responsible for the cost and construction of said wall before construction on the sidewalk will commence. The retaining wall is to be constructed such that no part of said wall is within the city's right of way.*

- Two common funding approaches to generating revenue for financing sidewalk improvements include (1) special bond issues, (2) dedications of a portion of local sales taxes.

- Intersection ramps. The City of Grand Island has an annual program of installing intersection ramps for access by people with disabilities, funded through the Public Works Department's Capital Improvement Program.
- Street Improvement. As major infrastructure projects are completed in city right-of-way or curb-replacement projects are completed, intersections should be brought to current ADA standards. For streets with higher traffic volumes, new standards should provide for sidewalks separated from the curb by a tree lawn or parkway strip. This provides a safer environment, a more attractive street, and a place to plow snow that does not block pedestrian access.
- New Subdivisions. Construction of sidewalks should occur in all new subdivisions on both sides of the street as part of the city's subdivision regulations. Grand Island's subdivision regulations do require use of pedestrian ways to provide access through long blocks. Pedestrian paths that provide the same level of service as traditional sidewalks should be permitted as a substitute. Pedestrian facilities should be integrated into the development financing structure of the project.

MAINTENANCE COSTS

Like any transportation improvement, active transportation projects need to be maintained through their life cycle and will have an impact on operating budgets. Paint must remain visible to continue to function as planned and capital improvements like paths and trails require repairs to continue to serve their users. Maintenance costs may also vary from year to year, depending on factor such as weather and level of use. Table 7.13 presents approximate costs for maintenance of different types of facilities, based on current experience. They can be used as a guide for allocation of resources and do not include staff time.

Table 7.13: Opinion of Probable Cost: Recap by Phase

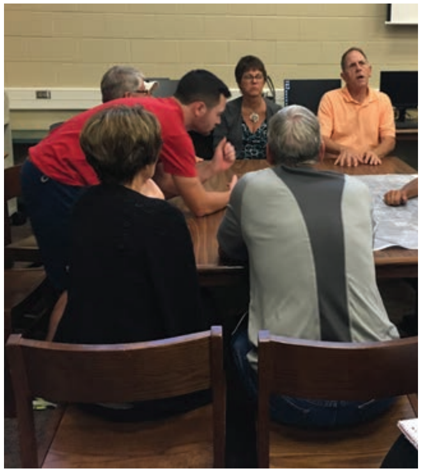
FACILITY TYPE	ANNUALIZED COST/MILE	TYPICAL MAINTENANCE TASKS
Shared use trail	$10,000	Sweeping, trash removal, mowing, weed abatement, snow removal, crack seal, sign repair
Sidepath	$2,500	Sweeping, trash removal, mowing, weed abatement, snow removal, crack seal, sign repair
Bike lanes, multi-use shoulders and advisory bike lanes	$2,500	Repainting, debris removal/sweeping, snow removal, signage replacement
Bicycle boulevard and shared routes	$1,500	Sign and shared lane marking stencil replacement

Source: Alta Planning + Design

CHAPTER 8

SUPPORTING PROGRAMS AND POLICIES

WHILE PREVIOUS CHAPTERS HAVE FOCUSED ON THE DESIGN AND CHARACTER OF A BIKEWAYS NETWORK, INFRASTRUCTURE ALONE DOES NOT CREATE AN EXCELLENT PEDESTRIAN AND BICYCLE TRANSPORTATION PROGRAM. To guide communities, the League of American Bicyclists (LAB), through its Bicycle Friendly Communities (BFC) program, establishes five components of design that are used to determine whether a city should be awarded BFC status – the 6 E's of Engineering, Education, Encouragement, Enforcement, Evaluation and Equity.



Walking and bicycling network recommendations advance a vision for expanding active transportation in Grand Island. But supportive education and encouragement programs will help more Grand Island citizens feel comfortable walking and bicycling. These programs are designed to support people of all ages and abilities so that walking and bicycling are normal, safe, and comfortable ways to travel throughout the region. Recommended policy items build on and diversify current policies related to expanding walking and bicycling. Recommended education/encouragement programs and policies listed in the table below, and described in greater detail in this chapter, reflect the needs and values of the community residents who assisted this planning effort. The table shows which of the "Six E's" of bicycle and pedestrian planning are relevant for each recommendation.

The City should coordinate education/encouragement programming implementation with local partners in the Grand Island area. The School District and parent organizations, local bike shops, wellness groups, and others are crucial for helping develop successful programs.

Implementation of partnerships and support programs are of course dependent on community support, available funding and City Council action (as required).

PROGRAM AND POLICY DESCRIPTIONS

Annual Implementation Agenda

In partnership with the GIAMPO's existing bicycle and pedestrian advisory committee, other citizen groups, GIAMPO and NDOT representatives, and other partners, Grand Island should develop an annual implementation agenda and budget that identifies specific projects, programs, and targets for executing the Bicycle and Pedestrian Master Plan. The annual agenda and budget should be based upon available staff capacity, funding resources, and similar considerations.

Adoption of Best Practice Design Guides

Design guidelines are critical to the development of a safe, consistent bicycle network. In order to support local agencies in developing bicycle facilities based on sound planning and engineering principles and best practices from around the country, the National Association of City Transportation Officials (NACTO) created the Urban Bikeway Design Guide. From Omaha and Seattle to Washington, D.C., over fifty cities have adopted the guide to inform city staff and consultants during project design and development.

PROGRAM/POLICY	EDUCATION	ENCOURAGEMENT	ENFORCEMENT	ENGINEERING	EVALUATION AND PLANNING	EQUITY
Annual Implementation Agenda	X	X	X	X	X	X
Adopt Best Practice Bicycle and Pedestrian Design Guide				X		
Zoning Code and Subdivision Regulations Updates				X		
Citywide Wayfinding Program	X	X		X		X
Youth Bicycle Safety Classes	X	X				X
Public Education and Awareness Campaigns	X	X	X			X
Bike Light Campaign	X	X	X			X
Project Outreach	X	X	X	X		X
Crash Monitoring and Evaluation				X	X	
Bicycle Master Plan Updates	X	X	X	X	X	X
League Cycling Instructor Training	X					

The guide expands upon basic facility guidance and standards included in the AASHTO *Guide for the Development of Bicycle Facilities*, 4th Edition (2012) and the Federal Highway Administration's (FHWA) *Manual for Uniform Traffic Control Devices* (MUTCD). In 2013, the FHWA signed a memorandum expressing support for the Urban Bikeway Design Guide as a valuable resource to "help communities plan and design safe and convenient facilities" for bicyclists and actively encourages agencies to use the guide to go beyond minimum requirements and design facilities that "foster increased use by bicyclists... of all ages and abilities."

The FHWA has developed a number of new resources in recent years to support bikeway planning and development as well. In 2016, the agency released the *Small Town and Rural Multimodal Networks Guide* to support transportation practitioners by applying national design guidelines to the unique settings found in small towns and rural communities. The guide encourages innovation within the bounds of MUTCD and AASHTO compliance by providing unique engineering solutions and design treatments that address small town and rural needs.

Based on their prominence across the country, Grand Island should adopt by resolution the NACTO Bikeway Design Guide and the FHWA Small Town and Rural Multimodal Networks guide as a supplemental resource to implement the network recommendations included in this plan.

Resources

NACTO Urban Bike Design Guide: http://nacto.org/publication/urban-bikeway-design-guide/

Sample Endorsement Letters:

Omaha, NE: https://nacto.org/wp-content/uploads/2015/06/Omaha_Urban-Bikeway-Design-Guide-endorsement-letter_08.04.11.pdf

Minneapolis, MN: http://nacto.org/wp-content/uploads/2015/06/Minneapolis_Urban-Bikeway-Design-Guide-endorsement-letter_08.24.11.pdf

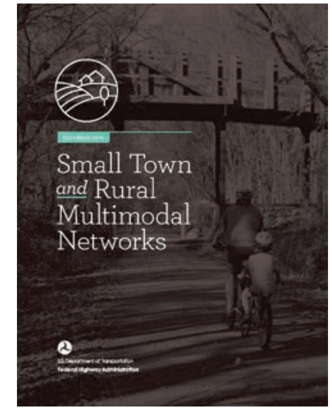
Zoning Code and Land Subdivision Regulations Updates

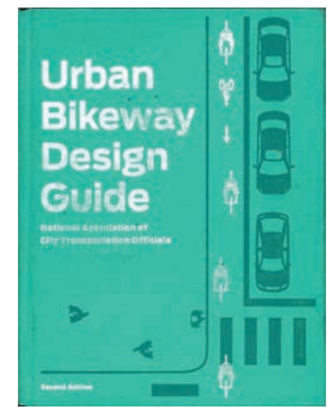
Land use patterns have significant impact on how people travel in Grand Island and the surrounding region. Bicycling and walking are disproportionately affected by land use patterns when compared to other travel modes, as travel distances, street connectivity, and other environmental factors can restrict or deter altogether bicycling and walking activity.

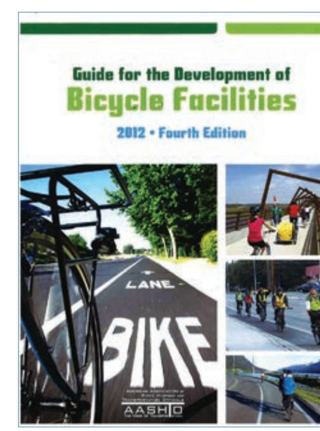
Zoning ordinances, subdivision regulations, building codes, and other policies create the framework for physical development. They focus on environmental design considerations, including aesthetics and safety, street connectivity, development scale and density, building setbacks, and mixture (or separation) of land uses. As a result, these regulations can change the way individuals relate to the people and places around them by affecting travel distances, streetscape character, presence of sidewalks and bicycling facilities, and even trees and landscaping.

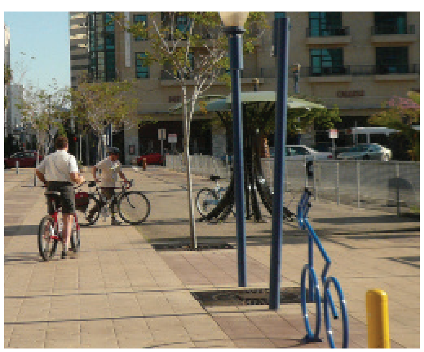
An expanding body of scientific research points to the direct link between land use policies like zoning ordinances and subdivision regulations, and active transportation. Zoning regulations can impact the percentage of population making trips on foot or by bicycle instead of car. Zoning regulations and supportive land use policies and infrastructure improvements can increase bicycling trips and the percentage of the population riding bicycles. As the walking and bicycling network grows in Grand Island, it will be important to integrate and codify this value to ensure it is reflected in future developments. Zoning and subdivision regulations should provide:

- Medium-to-high densities wherever appropriate
- Fine-grained mix of land uses
- Short-to medium-length blocks
- Street-oriented buildings
- Parking requirements that reflect actual demand, typically reducing the space committed to auto parking and require bicycle parking









Bike parking as art. Top to bottom: inverted U's at the University of Nebraska at Omaha, enhanced with the school's mascot; Edsel bike parking lot; bicycle-shaped parking sculptures.

- Require street design to be connected to create street network that supports walking, bicycling and transit
- Move toward implementation of the Grand Island Transit Study recommendation.
- Provide for safe street crossing at locations where pedestrians need to cross, such as bus stops, schools, parks, and other major destinations
- Incorporate bicycle facilities into street and building design to provide for access and parking that is convenient and accessible.
- Integrate active transportation within the Grand Island City Code would provide clarification for the rights and responsibilities of people who travel in the city by walking, bicycling and driving. The following changes are recommended to the City Code:
- Rewrite and reinstate City Code Chapter 6. Bicycles. Rewriting and reinstating Chapter 6. Bicycles to conform to national best practice would provide guidance about these roadway users' roles and responsibilities within Grand Island. This chapter should also address standards for including bicycle accommodation as standard elements in new development or during reconstruction projects. Furthermore, codifying bicycle parking requirements and other facilities would support Grand Island as the local culture of bicycling develops.
- Increase minimum sidewalk widths. (City Code, Chapter 32) Sidewalks in Grand Island are classified as 'conventional' sidewalks or 'curb' sidewalks. Minimum width for both types of sidewalk are four feet wide. Grand Island should consider increasing minimum widths from four feet to six feet on collector roadways. This increase would more comfortably accommodate all sidewalk users and would allow them to more easily pass others on the sidewalk. Arterial streets are more comfortable for pedestrians when they feature wider sidewalks than streets with lower traffic volumes. Increasing minimum widths to eight or ten feet would increase comfort along busy streets. Grass buffers should be encouraged or required wherever possible to increase space between people using the sidewalk and passing motor traffic. This increases user comfort along the sidewalk.

Resources

Zoning Regulations for Land Use Policy, Roadmaps to Health, Robert Wood Johnson Foundation: http://www.countyhealthrankings.org/policies/zoning-regulations-land-use-policy

Bicycle Parking Zoning Modifications, City of Cambridge, MA http://www.cambridgema.gov/CDD/Projects/Planning/bicycleparkingzoning

Youth Bicycle Safety Classes

Instilling a love for bicycling in children and young adults can support long-term gains in cultural acceptance of and support for bicycling activity. While many children learn bicycling at a young age, it is not a part of physical education curriculums in most schools in Grand Island and across the country, partially due to the lack of access to resources. Some school districts across the country, however, have begun to incorporate basic bicycling safety and skills into physical education curriculums with great success. Schools often partner with local police departments, non-profits, and certified bicycling instructors to provide bicycles for students and encourage safe riding practices. A partnership between the City and Grand Island Public Schools should explore opportunities to teach basic bicycling skills to young students. National resources are available to avoid the School District starting from scratch to develop bicycle safety related lessons.

Resources

SHAPE America (Society of Health and Physical Educators) Bicycle Safety Curriculum: http://www.shapeamerica.org/publications/resources/teachingtools/qualitype/bicycle_curriculum.cfm

League of American Bicyclists Bicycling Skills 123 Youth and Safe Routes to Schools courses: http://www.bikeleague.org/content/find-take-class

Safe Routes to School National Partnership Traffic Safety Training resources: http://www.saferoutespartnership.org/state/bestpractices/curriculum

Nebraska Department of Transportation Safe Routes to School resources: http://dot.nebraska.gov/business-center/lpa/projects/programs/tap/

Public Education and Awareness Campaigns

A broad public outreach and education campaign can help normalize bicycling as an accepted and welcomed way for people to travel in Grand Island through compelling graphics and messages targeted to motorists, pedestrians and bicyclists. Campaign materials can use customized messages to provide safety information for each of these types of roadway users. Common topics for media campaigns include safety and awareness; sharing the road and travel etiquette; light and helmet use; and humanization of bicyclists as fathers, mothers, sons, and daughters. These campaigns utilize a variety of media to share their messages, from buses and bus stop shelters to websites, online ads, and social media outlets.

Grand Island should develop a public education and awareness campaign to further establish bicycling as a valued mode of travel for all community residents. Partnerships with community leaders are crucial to spreading the word about such campaigns.

Resources

We're All Drivers, Bike Cleveland (Cleveland, OH): http://www.bikecleveland.org/our-work/bike-safety-awareness/

Drive with Care, Bike PGH (Pittsburgh, OH): http://www.bikepgh.org/care/

Every Lane Is a Bike Lane, Los Angeles County Metropolitan Transportation Authority (Los Angeles, CA): http://thesource.metro.net/2013/04/11/every-lane-is-a-bike-lane/

Every Day Is a Bike Day, Los Angeles County Metropolitan Transportation Authority (Los Angeles, CA): http://thesource.metro.net/2014/04/30/l-a-metro-launches-new-bike-ad-campaign-in-time-for-bike-week-l-a-may-12-18/

A Metre Matters and It's a Two-Way Street, Cycle Safe Communities, Amy Gillett Foundation (Australia): http://cyclesafe.gofundraise.com.au/cms/home

Bike Light Campaign

Bicycling at night without proper front and rear bike lights increases crash risk, yet many people bicycling in Grand Island lack the proper lighting to stay safe and visible at night. In order to increase bicycling safety and overcome cost barriers that prohibit many individuals from purchasing bike lights, Grand Island should coordinate with local law enforcement and community partners to create a bike light giveaway campaign. Similar programs across the country combine catchy names like "Get Lit" or "Light Up" to garner public and media attention. The City should consider scheduling the program to coincide with back to school events for elementary, high school, or college students or the end of daylight savings. The campaign's giveaway focus would eliminate the cost of purchasing new lights for people who may not otherwise purchase them.

Resources

How to Do a Successful Bike Light Giveaway, League of American Bicyclists: http://www.bikeleague.org/content/how-do-successful-bike-light-giveaway

Get Lit, Community Cycling Center (Portland, OR): http://www.communitycyclingcenter.org/get-lit/

Pop-Up Bike Light Giveaway, BikePGH (Pittsburgh, PA): http://www.bikepgh.org/2013/09/30/pop-up-bike-light-giveaway/

Encouragement through events large and small. From top: a community street festival celebrating bicycling and healthy living (South Omaha, NE); a group event for the opening of a new bike lane project in Bellevue, NE; the world's largest group ride, Bike New York's Five Boroughs Bike Ride, with 32,000 participants.

Biking Rules. Excerpts from a street code to promote responsible urban cycling, developed by New York City's Transportation Alternatives advocacy organization.

Project Outreach

Public meetings held during this planning effort helped vet network recommendations with members of the community. It is crucial that as recommended short- and long-term projects are developed and installed, the City continue and increase outreach efforts to discuss the projects with residents along project corridors. Outreach should be conducted early and often. Outreach materials should discuss how to interact with new street designs and should discuss how to safely drive near people bicycling and walking. Although there is no substitute for door-to-door outreach and continued conversations with residents, online videos, temporary signs, updates through social media, neighborhood meetings, and other outlets, would build awareness and support for new and improved elements of the transportation system. Examples of project outreach via community meetings and online presence are listed in the following 'Resources' section.

Resources

Seattle DOT Bicycle Program Projects (Seattle, WA): http://www.seattle.gov/transportation/bikeprojects.htm

Cincinnati Bicycle Transportation Plan Current Projects (Cincinnati, OH): http://www.cincinnati-oh.gov/bikes/bike-projects/

Denver City and County Current Projects (Denver, CO): https://www.denvergov.org/content/denvergov/en/bicycling-in-denver/infrastructure.html

Citywide Wayfinding System

While signs and sign clutter should always be minimized, a carefully designed identification and directional graphics system can greatly increase users' comfort and ease of navigating the street system. The graphic system may have individual features, but should generally follow the guidelines of the Manual of Uniform Traffic Control Devices (MUTCD). Types of signs in the system include:

- The D11-1c Bike Route Guide Sign, identifying a street or trail as a bike route and describing the route's end point or a landmark destination along the way. These are sometimes used in conjunction with arrows (M6-1 through M6-7) that indicate changes in direction of the route. These are located periodically along the route to both reassure cyclists and advise motorists.
- A version of the D1 family of destination signs (D1-1c, D1-2c, or D1-3c), identifying the direction and distance to specific destinations. Sometimes these signs include a time to destination, based on a standard speed, typically 9 miles per hour). These are typically located at intersections of routes or at a short directional connection to a nearby destination.
- On bicycle boulevards, a special street sign can be used to help provide additional notification to motorists and wayfinding information to bicyclists.
- Motorist advisory signs. The R4-11 Bicycles May Use Full Lane is usually the preferred sign on shared routes.

The graphic system should be modular to provide maximum flexibility and efficiency in fabrication. Signs should also use reflective material for night visibility. The Clearview font is recommended as a standard for text.

Installation of a wayfinding system is an inexpensive way to implement a major part of the bike network ahead of major capital expenditures, especially on streets like shared and marked routes or bicycle boulevards that do not require extensive infrastructure to be operational.

Crash Monitoring and Evaluation

Crash reports from collisions involving bicyclists can be an invaluable resource for learning about the behavior or motorists, bicyclists, and pedestrians, as well as roadway conditions and characteristics that may lead to collisions. Regular monitoring and evaluation of crash locations can help to identify high-risk areas and develop solutions to minimize crash risk. Using a five-year sample of crash data can help identify trends with regard to crash time, contributing factors, crash type, location, and other key details. The City should routinely conduct a detailed analysis of reported bicycle crashes, including a review of individual crash report narratives, every two years. In addition, an online tool on the City's website can allow those biking to report concerns about specific areas of the city where they feel unsafe. This approach can help identify a problem before a crash occurs.

Resources

Denver Bicycle Crash Analysis: Understanding and Reducing Bicycle & Motor Vehicle Crashes (Denver, CO):

https://www.denvergov.org/content/dam/denvergov/Portals/705/documents/denver-bicycle-motor-vehicle-crash-analysis_2016.pdf

University of North Carolina Highway Safety Research Center Pedestrian and Bicycle Crash Analysis Tool (PBCAT): http://www.pedbikeinfo.org/pbcat_us/

Cambridge Bicycle Crash Fact Sheet (Cambridge, MA): https://www.cambridgema.gov/-/media/Files/CDD/Transportation/Bike/Bicycle-Safety-Facts_FINAL_20140609.pdf

Master Plan Updates

Like all plans, this plan will lose its efficacy and relevance as the bike network grows, physical development occurs, travel patterns change, and community needs and values evolve. Grand Island should plan to revisit the plan every five years for a comprehensive update, at which point implementation progress can be measured, new goals and targets can be established, and bike network and support systems can be evaluated and updated to reflect current conditions and opportunities.

Sign concepts for Grand Island. Top: Bicycle boulevard street sign in Topeka, KS. Above: Bismarck, ND trail gateway sign. Right: D11-1c (above) and D1-3c (below) basic wayfinding signs

League Cycling Instructor Training

The League of American Bicyclists (LAB) oversees an educational program called League Cycling Instructor (LCI) training that teaches participants how to train others to become more confident when bicycling in traffic. Participants who successfully complete the training are then certified to teach the League's "Safe Cycling" courses to adults and children. Other cities, such as Wichita, KS, offer LCI training to interested City staff and community members. No Grand Island residents are currently certified through LAB, but 21 residents are registered throughout Nebraska (including one of the writers of this plan). The City should offer at least one certification class per year to increase the number of City staff and residents who can teach others about safe bicycling. LAB offers resources and coordination to help courses to communities.

Resources

Bicycle Friendly America, League of American Bicyclists: Nebraska: http://bikeleague.org/bfa/search/map/Nebraska?bfaq=Nebraska

LAB, Smart Cycling: http://bikeleague.org/ridesmart

LAB, Become an Instructor: https://www.bikeleague.org/content/become-instructor