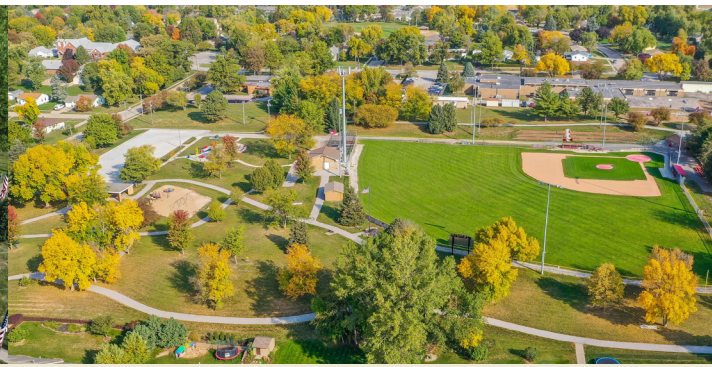
WESTERN SARPY
TRANSPORTATION
ENHANCEMENT PLAN

Gretna, Springfield, Papillion, Sarpy County





WE-STEP Final Plan Recommendations

December 2024

TABLE OF CONTENTS

LIST OF ACRONYMS

CD: Conservation district

I-80: Interstate 80

LOS: Level of service

MAPA: Metropolitan Area Planning Agency

NCHRP: National Cooperative Highway Research Program

NDOT: Nebraska Department of Transportation

ROW: Right-of-way

STAC: Steering and Technical Advisory Committee

SUDAS: Statewide Urban Design and Specifications

TDM: Travel Demand Model

TWLTL: Two-way left-turn lane

WE-STEP: Western Sarpy County Transportation Enhancement Plan

PROJECT BACKGROUND

Western Sarpy County has seen significant growth over past decades and is expected to continue growing for the next several decades due to improved access to Interstate 80 (I-80), strong regional employment, good quality of life, planned sewer extensions, and other amenities that make Sarpy County attractive for development. There is a need to develop a plan for a connected, multimodal transportation network that provides safe, efficient transportation and supports planned residential, commercial, and industrial development. A unified set of policies, guidelines, and standards used by the County and each city is recommended to ensure that roadway design, right-of-way (ROW) allocation, utility coordination, and the like are consistent and cohesive across jurisdictions.

The five agencies working together to enhance transportation in western Sarpy County include the City of Gretna, the City of Papillion, the City of Springfield, Sarpy County, and the Metropolitan Area Planning Agency (MAPA). The study area, shown in **Figure 1**, is located between Schram Road on the north, South 60th Street on the east, and the Platte River on the south and west.

The Western Sarpy County Transportation Enhancement Plan (WE-STEP) is a forward-looking plan that identifies the arterial and major collector roadway network extensions and enhancements to complement the existing transportation network and support future development. It also accounts for transportation options for all users by accommodating multimodal options and outlining standards, policies, and guidelines to provide a unifying framework. With the growth and progress anticipated in the coming years, it is paramount that the transportation network supports upcoming development to ensure a thriving future for the community – one with a network of streets, public transit, and alternative modes of transportation that connect the communities of western Sarpy County.

The Western Sarpy County Transportation Enhancement Plan (WE-STEP) is a strategic transportation plan for western Sarpy County, developed in collaboration with the City of Gretna, the City of Papillion, the City of Springfield, Sarpy County, and the Metropolitan Area Planning Agency (MAPA).

WE-STEP provides a framework to help the rapidly changing communities develop for future generations. The plan identifies a proposed future regional transportation network and flexible guidelines that can fit with whatever develops around it.

INVENTORY AND ANALYSIS OF EXISTING CONDITIONS

Review of Existing Plans, Policies, and Projects

The WE-STEP study was initiated with the understanding that each jurisdiction has a distinct set of guiding plans and policies that influence the development of the local and regional transportation network. These references include the following:

- **Gretna –** PlanGretna; adopted 2009, updated 2021
- **Springfield –** Springfield Comprehensive Plan; adopted 2015
- **Papillion –** The Papillion Plan; updated 2022
- **Sarpy County –** Sarpy County Comprehensive Plan; revised November 2020
- **MAPA –** 2050 Long Range Transportation Plan; 2020

Shared Goals

Transportation goals summarized in the Gretna, Springfield, Papillion, Sarpy County, and MAPA comprehensive plans provide common themes, including an **interconnected network**, **diverse transportation options**, and **responsive services**. These transportation goals reflect shared efforts to support community mobility and the overall quality of life. **Appendix A** includes the Existing Plans and Policies summary, which provides a more in-depth discussion about the data sources, plans, and policies/standards used as a framework for WE-STEP.

Other Relevant Studies

Numerous other studies provided a framework for WE-STEP by providing information about land use, demographic, and transportation data. Studies referenced include the following:

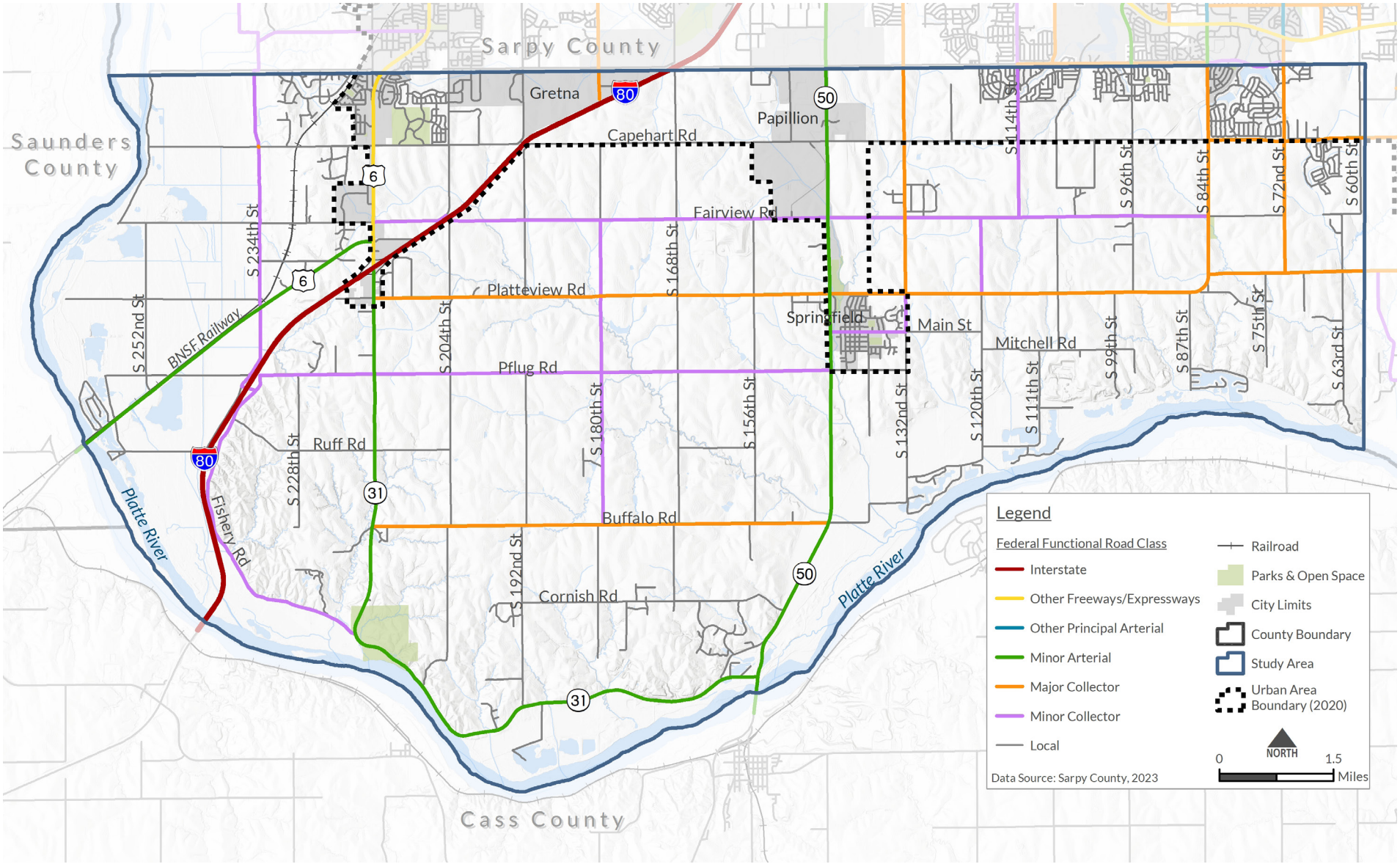
- Metro Area Travel Improvement Study
- Sarpy County I-80 PEL
- Platteview Road Corridor Study
- Platteview Road Design
- The Crossings Corridor Master Plan (Gretna)
- Sarpy County Transit Feasibility Study
- 180th/192nd Corridor Feasibility Study
- Sarpy County Trail Plan
- Lake 80
- South Sarpy County Sewer Plan
- MetroNEXT

In addition to transportation, implementing a wastewater network in southern Sarpy County will be a catalyst for development.

Functional Classification System

The Federal Highway Administration (FHWA) groups roadways into classes according to the character of service they are intended to provide. Federal Functional Classifications (**Figure 1**) provide state, regional, and local planning context for the transportation network and focus primarily on the purpose of the roadway rather than the design requirements.

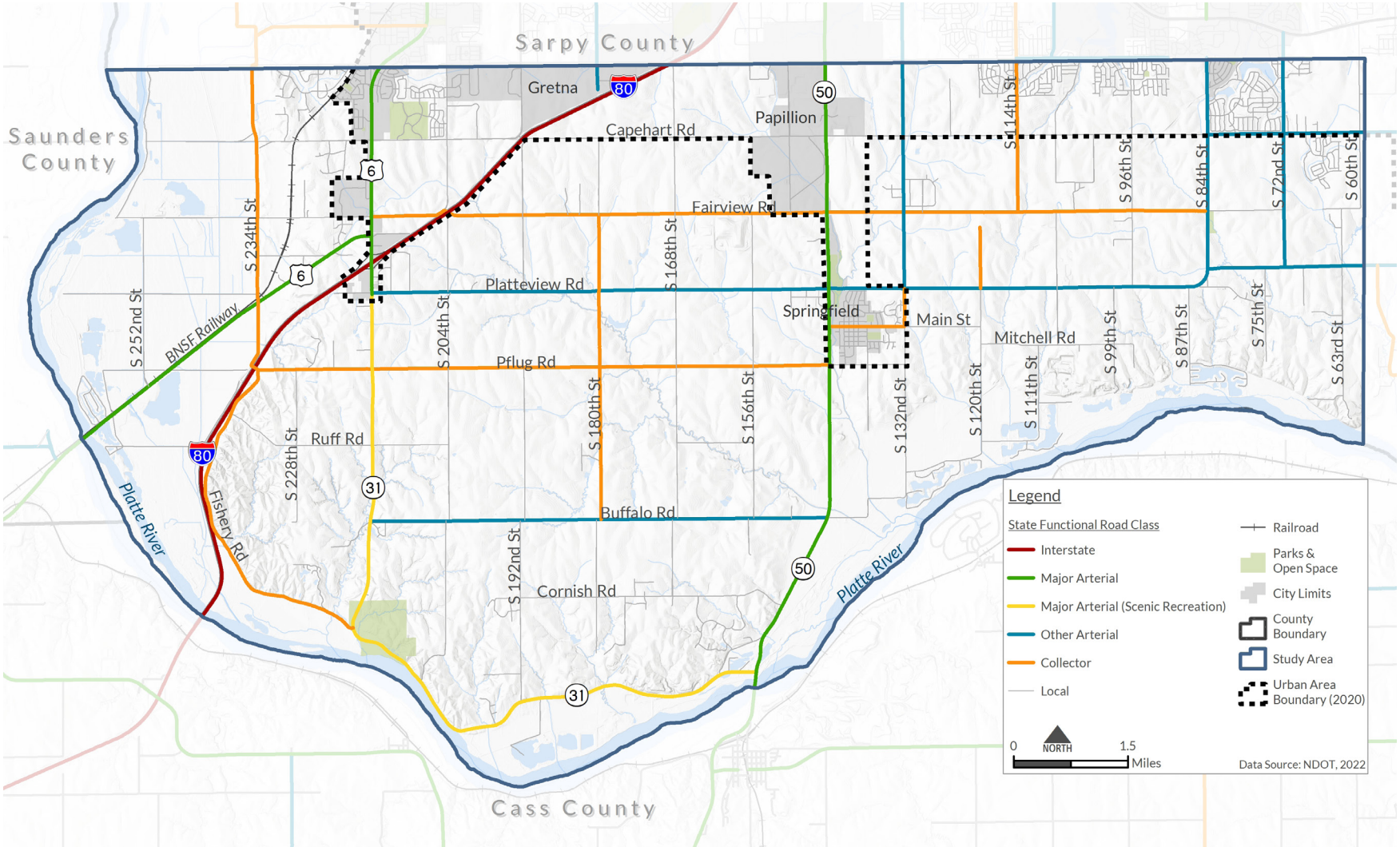
Figure 1: Existing Federal Functional Road Classifications



The State Functional Classification System provides jurisdictions with the minimum design criteria that must be achieved for a federal-aid-supported project. The State Classification System (**Figure 2**) ensures that the transportation facility is designed appropriately for the context and purpose it is intended to serve for the regional network. It is important to note that a State Classification for minimum design standards can apply to multiple Federal Functional Classifications.

Local classification systems may supplement State Classifications within local jurisdictions, but they do not replace Federal or State classifications and rely only on local regulations to oversee subdivision regulation and design requirements applied to development. This review indicated the need for a unique set of street and roadway typologies for the WE-STEP study area.

Figure 2: Existing State Functional Road Classification



Existing Conditions Analysis

A review of the existing conditions was completed to summarize 2023 baseline conditions of the region's current multimodal transportation system. Data was assembled from the Nebraska Department of Transportation (NDOT), City of Papillion, City of Gretna, City of Springfield, and Sarpy County. **Appendix A** contains additional information about the existing conditions analysis, which included a basic assessment of the following topics:

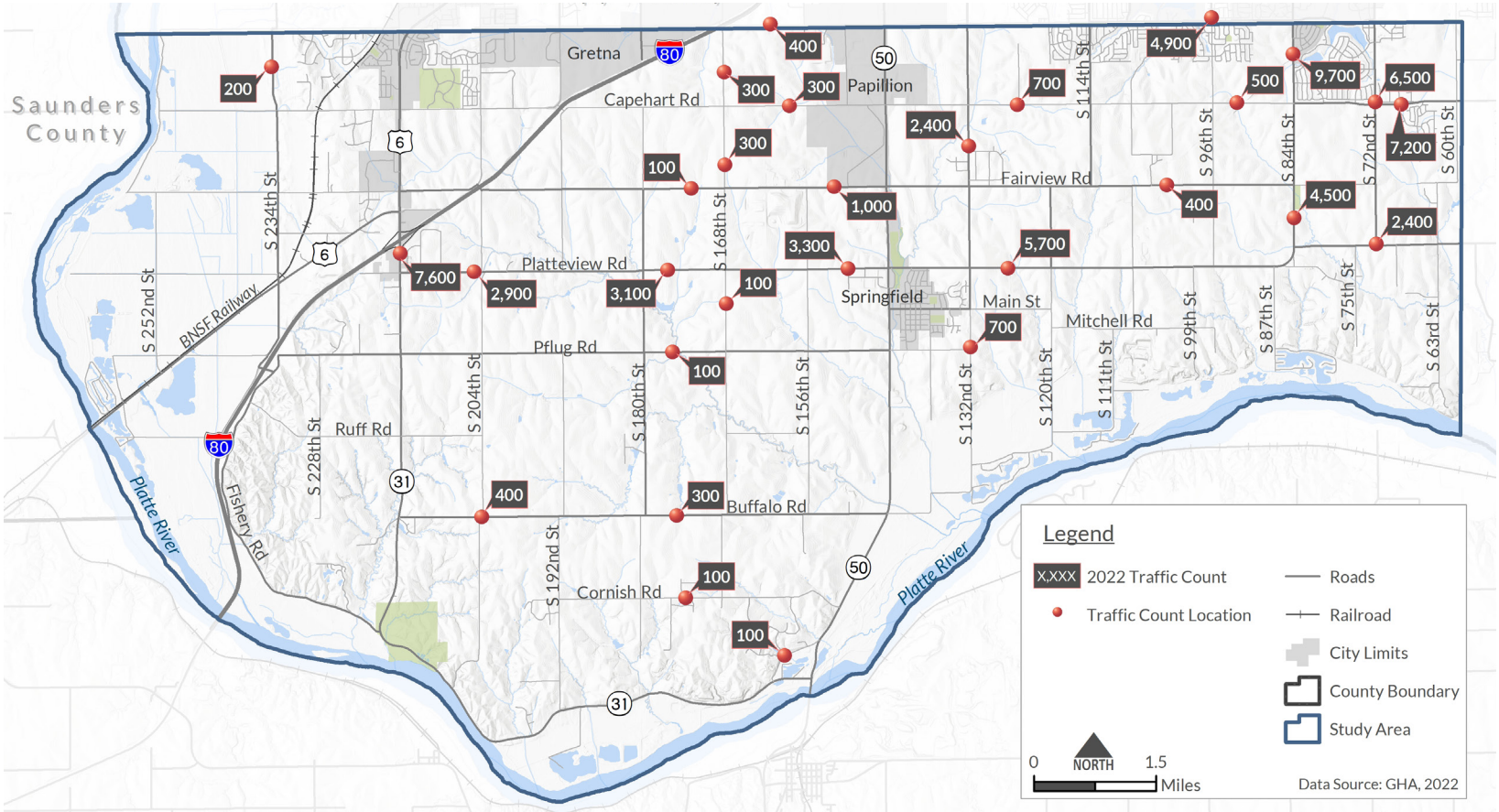
- Planning level traffic operations
- Crash history assessment
- Network connectivity and gap assessment by mode
- Environmental constraints
- Man-made constraints
- Asset conditions for pavement and bridges

Planning Level Traffic Operations

Traffic flow largely reflects the number of vehicles that move through the area, the design and speed of the corridor, and the intensity of development in the area, which are expected to increase substantially from current conditions. MAPA provided traffic count data collected in 2022, which helps to show how much traffic is using the cross-county road network in relation to traffic flows. The daily traffic volumes presented in **Figure 3** illustrate the traffic on the local road network in Sarpy County.

While it is recognized that currently the study area is largely rural in nature and anticipated to change as communities urbanize into the study area, it is important to know the baseline from which the transportation system is starting.

Figure 3: Study Area Daily Traffic Counts



Crash History Assessment

A high-level review of available crash records was completed for roadways in the study area. NDOT provided records of crashes occurring between 2016 and 2020 to MAPA. The crash record counts confirm that the heaviest traveled roadways also have the most crashes. State highways and interstates represent the largest number of overall crash records. Fairview Road, Platteview Road, and 204th Street represent the County roadways with the largest number of crash records.

The 20 intersections with the largest number of crashes were also identified for the study area. More than three-quarters of these locations occurred either on the state highway network or Platteview Road. There was a total of 15 fatalities recorded between 2016 and 2020. Six of the fatalities occurred at intersections along the interstate, state highways, or Platteview Road.

More details about the crash analysis are provided in **Appendix A**.

Network Connectivity and Gap Assessment by Mode

Several plans from the different jurisdictions in western Sarpy County addressed recreational trails in the area. After a review of the plans, five trails emerged as major connectors in the region. These consisted of the MoPac Trail, 144th Street Trail, Keystone Trail, Bellevue Loop Trail, and West Papio Trail. Together, these trails play a major role in enhancing mobility and connectivity across the region.

The Cities of Springfield, Gretna, and Papillion each have an existing trail network. However, outside each City's limits, gaps exist in the regional trail network. In many instances, bicycles or pedestrians must use the roadway shoulder to navigate a gap between jurisdictions, a practice that is often uncomfortable for most users.

Asset Conditions for Pavement and Bridges

NDOT provided data that documents the existing condition of the interstate and non-interstate state highway system. No segments of the existing network are rated Poor, and most segments are listed in Good or Excellent condition.

Sarpy County bridges are inspected routinely. Half of the 10 bridge structures are listed as fracture critical. The bridges all cross streams that drain to the Platte River. As bridges are replaced to support new roadway cross sections, design should provide for the grade-separated crossing of a new trail corridor as well.

More details about pavement and bridge conditions are provided in **Appendix A**.

Environmental Evaluation

As part of the study, an environmental screening of the study area was prepared. Water resources and conservation areas along the study area's western and southern boundary support land uses that limit development pressure. Water resources, parks, and farmland areas of statewide importance are environmental resources that most influence the current land use context in the study area.

This study can inform methods for mitigating future environmental issues, including noise, floodplains, and wetlands. More details about the environmental baseline are provided in **Appendix A**.

Noise

Noise abatements may need to be evaluated for individual projects in the study area, depending on the nature of the project, adjacent land uses near the project locations, and forecasted traffic speeds. For federal- and state-funded projects, noise evaluations will follow the NDOT Noise Analysis and Abatement Policy. Based on noise modeling projections, noise abatement measures will be evaluated for feasibility and reasonableness.

Floodplains

Areas of the floodplain are present in several locations throughout the study area (along the Platte River in the south and west section of the study area and along the Springfield and Buffalo Creeks in the central portion of the study area). The study area exists outside the Papillion Creek Partnership, which has adopted floodplain development standards enforced by each jurisdiction. The same floodplain management principles are applicable to areas of Sarpy County outside the Papillion Creek Watershed, unless exempt from the local floodplain policy adopted by the Papillion Creek Partnership.

Wetlands

Based on the National Wetlands Inventory and National Hydrography Dataset, potential wetlands and channels are present in the study area. The project area's southern border includes approximately 35 miles of Platte River shoreline, including numerous tributaries such as the Buffalo Creek, Springfield Creek, and Turtle Creek. In addition, the proposed project area encompasses the Elkhorn River confluence with the Platte River in the northwest corner. Many other wetlands and water resources are likely to be present throughout the study area and would need to be determined with a field review of specific project locations.

FUTURE GROWTH AND CONNECTIONS

Land Use and Development Trends

Future land use maps from Sarpy County and the Cities of Gretna, Springfield, and Papillion are shown in **Figure 4–Figure 7**. The City of Gretna is currently in the process of updating their comprehensive plan, so the current future land use map shown references an older version. These maps lay the foundation for not only understanding the nature and patterns associated with future travel but also opportunities for future multimodal connections.

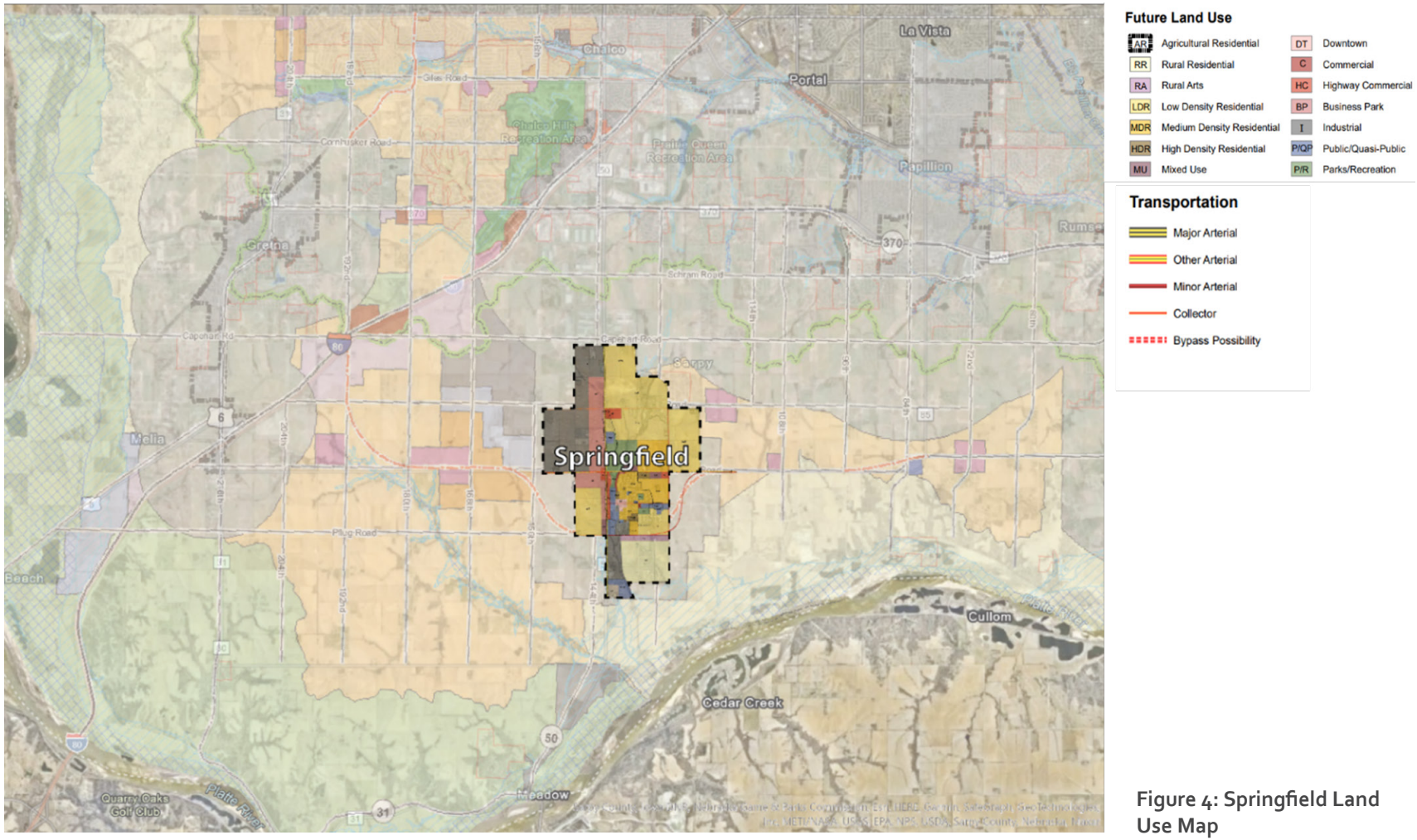


Figure 4: Springfield Land Use Map

Figure 5: Papillion Land Use Map

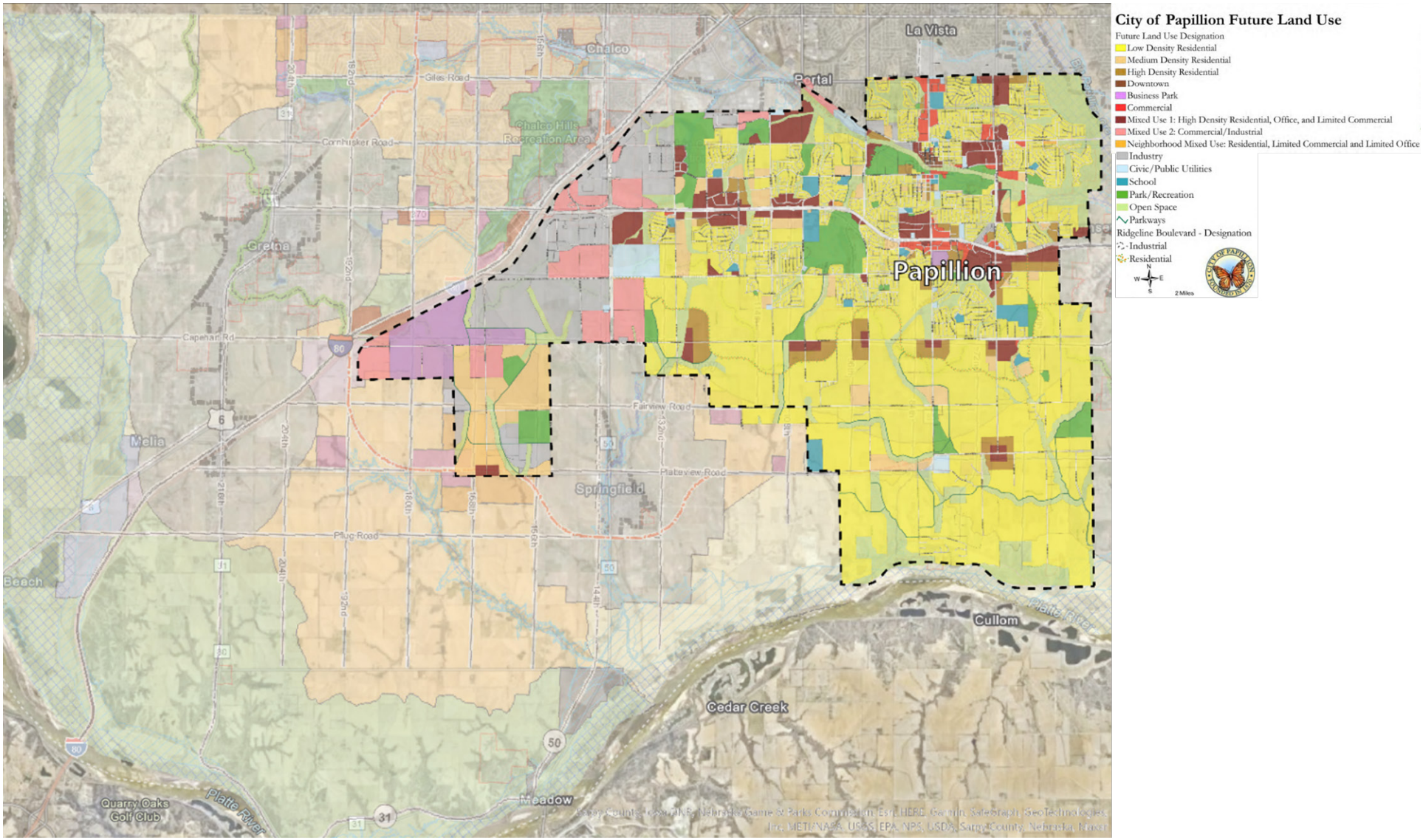
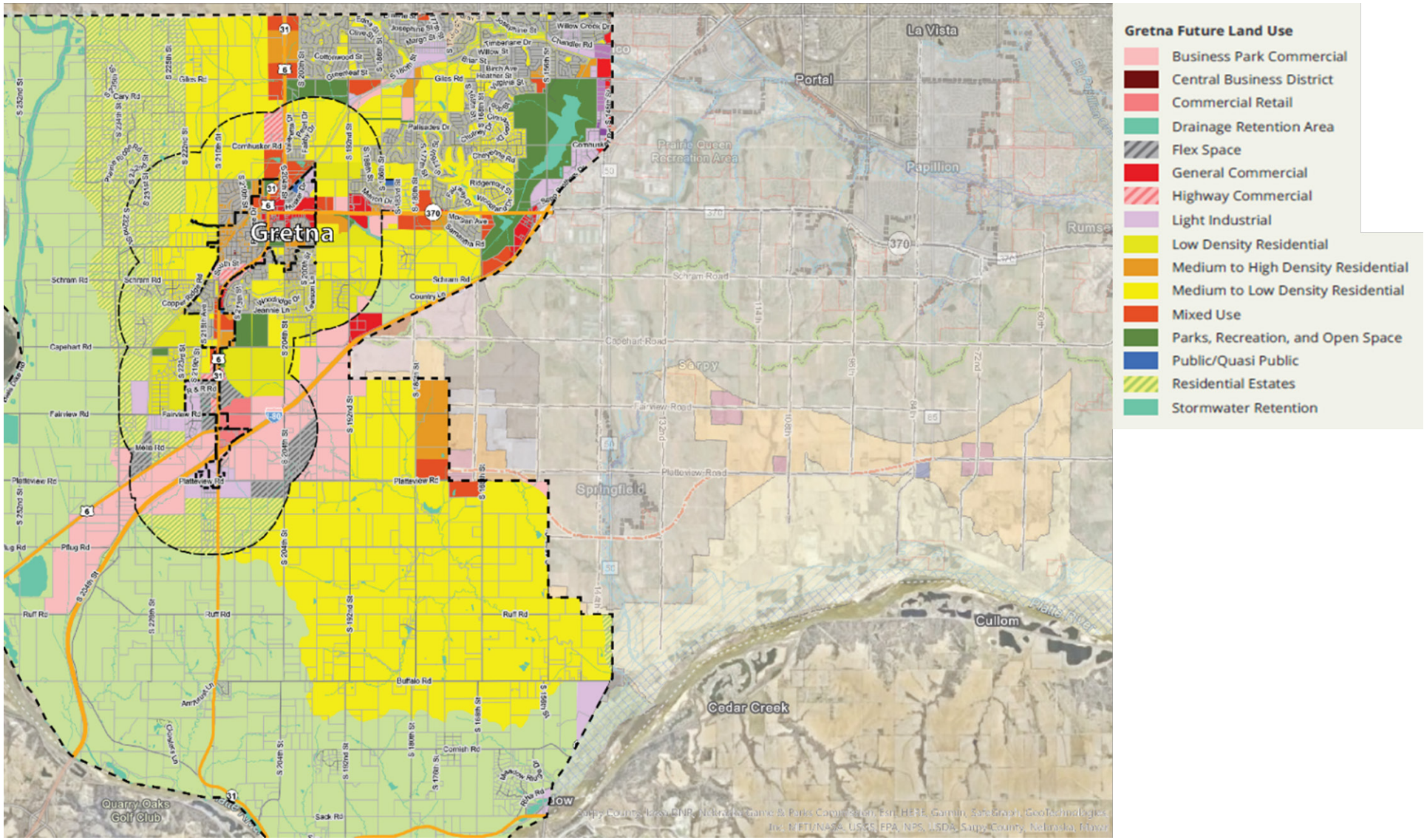
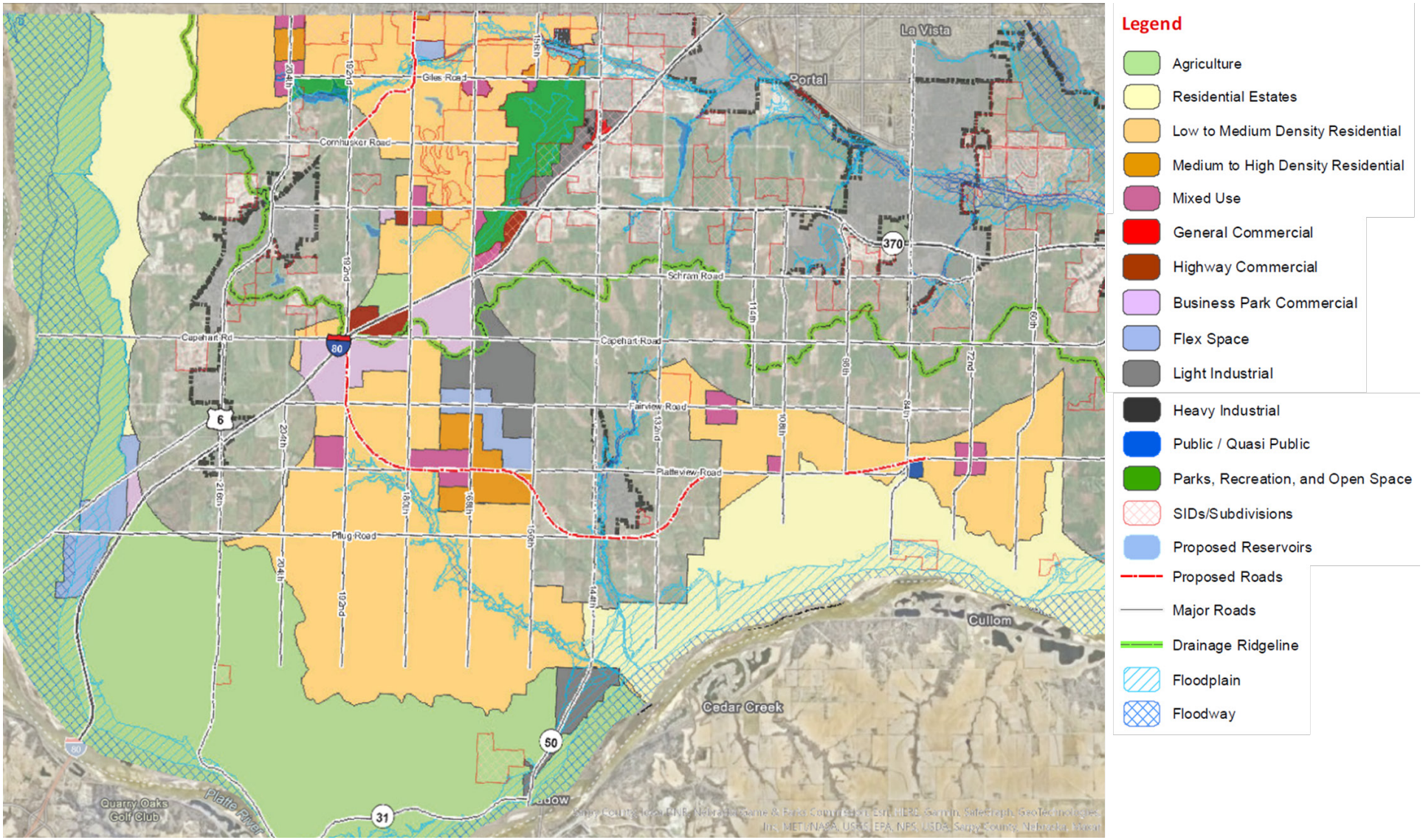


Figure 6: Gretna Land Use Map



*Gretna Future Land Use map currently being updated.

Figure 7: Sarpy County Land Use Map



The study team coordinated with MAPA and local jurisdictions to identify three land use contexts that were used for evaluating alternatives:

- Suburban scale developments
- Mixed-use urban scale developments
- Rural development patterns

Much of the anticipated future rural development is located in the area labeled as the conservation zone (shown as agriculture land adjacent to the Platte River.)

Future Scenarios and the Travel Demand Model

The agencies in the region use the regional Travel Demand Model (TDM) to plan for future transportation needs, which provides the capability to evaluate land use and transportation scenarios. Future land use projections are included in the TDM to forecast future travel and traffic patterns.

Projected traffic volumes are based on anticipated development patterns and can estimate the needed capacity of the future street system. Streets with traffic volumes forecasted to exceed available capacity are locations to be considered for safety and capacity improvements, including an alternatives evaluation and design for corridor ROW protection, roadway cross section, access management, intersection design, and accommodation for active transportation. For individual developments, local jurisdictions will require traffic impact studies to be completed with subdivision applications. This process helps determine whether the adjacent arterial and collector street network can support the proposed development demand. Development proposals are typically only reviewed by the jurisdiction responsible for approving the application.

The TDM was reviewed to develop the WE-STEP plan to provide a flexible network and set of guidelines to accommodate the travel needs for anticipated future development. Additional follow-up work will be completed to review potential network scenarios leveraging an updated version of the MAPA TDM later in 2024.

A significant driver of traffic growth is that recent planning and investments have allowed for the extension of sewer services into the study area, which will allow urban scale development in the future. The future sewer growth area is shown in **Figure 8**.

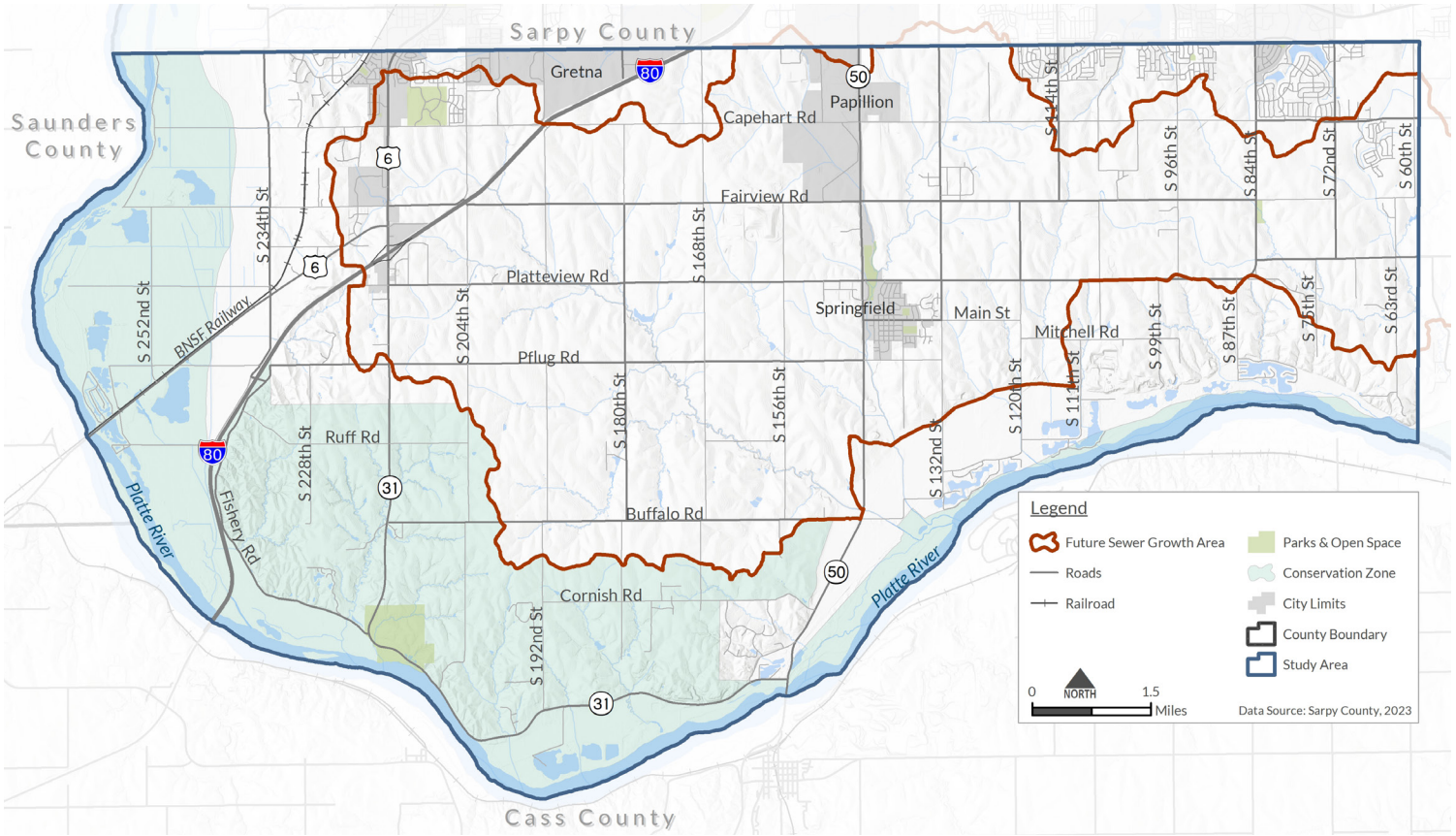


Figure 8: WE-STEP Future Sewer Growth Area

Multimodal Transportation Needs Assessment

A goal for western Sarpy County's street corridors is to make them more supportive of the broader needs of active transportation and transit users. Some corridors, including I-80, Platteview Road, State Highway 6, and State Highway 50, currently present barriers to connectivity for anticipated community growth. A limited number of crossing locations are anticipated that can present safe, comfortable active transportation corridors, which are needed to reinforce essential community and regional continuity.

The feedback from community members and stakeholders in the study area was that planning for a connected multimodal network was important, including the following:

- A complete network of shared-use paths and neighborhood connections for pedestrians and bicyclists to provide active transportation connections among homes, workplaces, services, and schools
- A system that can accommodate and support future public transit services in the study area
- Plan for safe crossings for pedestrians and bicyclists
- Recreational trail connections in the study area

STAKEHOLDER AND PUBLIC ENGAGEMENT

Community and public engagement helped form WE-STEP by focusing on engaging with planning and engineering staffs from partner agencies, stakeholders that were frequent users of the system, and the broader public to understand what elements were most important to include in the plan. These engagement activities included the following:

- Steering and Technical Advisory Committee (STAC) meetings: A meeting was held with the STAC once a month beginning in June 2023, for a total of 14 meetings, to set plan direction. The STAC includes representatives from the City of Gretna, City of Papillion, City of Springfield, and Sarpy County.
- Online public meeting: An online public meeting was available from March 25 through April 15, 2024, at westernsarpytep.com or via the City of Gretna's project page for WE STEP. The meeting's purpose was to provide information about WE-STEP and gather public feedback on the safety and design, bicycle and pedestrian connections, future development, and where the transportation network needs to support an anticipated increase in traffic.
- Small group stakeholder meetings: The project team held several small group stakeholder meetings in April and May 2024, including four in-person meetings and one virtual meeting, for identified stakeholders who operate in Sarpy County. The purpose of these meetings was to present information about the study's status and solicit input on the future of transportation in western Sarpy County.

See **Appendix B** for the stakeholder and public engagement summary.

ALTERNATIVE ANALYSIS AND DEVELOPMENT

Performance Objectives

A set of performance objectives was developed to help evaluate how well ideas and designs generated for the WE-STEP system fit with stakeholder and agency study area goals. These performance objectives guided the decision-making process that led to plan recommendations. The performance objectives are documented and described in **Table 1**.

Table 1. WE-STEP Performance Objectives

PERFORMANCE OBJECTIVES	DESCRIPTION AND CONSIDERATIONS
Future development projections and land use	Areas of future urban scale development should provide corridors with sufficient multimodal access and capacity. Typology designations are flexible to respond to adjacent land use context.
Travel demand	Multimodal travel demand is a direct result of land use patterns; more development leads to more trips. Corridors were designated to meet reasonably anticipated travel throughout the WE-STEP study area.
Connectivity	A well-connected network has a dense set of street connections with many through connections. High connectivity leads to decreased travel distances and increased route choice for more direct travel.
Roadway design	Roadway design considerations overlap with many other performance objectives, including safety, connectivity, and cost. In many cases, design is less an objective rather than a tool for implementation.
Safety	Safety is becoming the primary consideration in transportation planning and was a primary consideration in WE-STEP. Features and standards are included in the study that increase travel safety for all system users.
Transit access	There is currently no transit service in the study area due to its predominantly rural nature. However, as the study area urbanizes, the network needs to plan for transit access. Many stakeholders recognize that transit access may be important in the future.
Bicycle and pedestrian access	As the study area urbanizes, the opportunities for bikeable and walkable trips will increase significantly. Decisions made in this study considered how to create safe bicycle and pedestrian connections.
Environmental considerations	An environmental screening was conducted, and the future network recognizes environmental constraints, including conservation areas where limited future development is anticipated.
Freight and emergency response access	Recommendations for network connections and standards recognize that larger freight and emergency response vehicles will be traversing the future network, and standards will need to accommodate these uses.
Cost	The scalable network recommendations in WE-STEP recognize that as corridors transition from rural to urban corridors, there are opportunities to reduce long-term lifecycle costs.

RECOMMENDATIONS

Network Typologies

A range of street typologies were identified for the WE-STEP study area that could serve the varied transportation modes. STAC established the following principles for WE-STEP:

- The typologies should be distinct from federal and state functional classes.
- The typologies should accommodate all modes of travel.
- The typologies should be flexible to its surrounding land use.
- The typologies should be flexible to accommodate an interim and an ultimate cross section.

Arterial Typologies

Beyond the 2050 travel patterns identified in the MAPA model, the typologies identified two different categories of main growth arterials:

- **Arterial 1 –** Highest level of mobility arterial with no on-street parking and the ability to expand to six lanes of traffic in addition to bicycle and pedestrian infrastructure.
- **Arterial 2 –** Typical arterial corridor with a high level of mobility, no on-street parking, and the ability to expand to four lanes of traffic in addition to bicycle and pedestrian infrastructure. Every arterial on the 1-mile grid will at least be an Arterial 2 in the WE-STEP growth area as defined by the potential sewered area, shown in **Figure 8**.

A third typology, Arterial 3, was added to address conservation area corridors. If development occurs in these areas, it is anticipated to be limited, so the need for widening should be limited. These corridors could potentially have shared-use paths for recreational biking and walking opportunities.

The first step in developing typical sections was to identify standard ROW widths. The initial focus was on the arterial network, which would provide a system to link across the study area, connecting housing to jobs, entertainment, schools, and other land uses. To accommodate these mobility and functional needs, the general characteristics of each were as follows:

1. **ROWs**
   - Arterial 1: 150-foot-wide ROW
   - Arterial 2: 110-foot-wide ROW
   - Arterial 3: 100-foot-wide ROW
2. **Access control**
   - Full access at a recommended minimum spacing of 1/4 mile (Arterial 1 and 2)
   - Partial access at a recommended minimum spacing of 1/8 mile (Arterial 2)
3. **Bicycle and pedestrian infrastructure**
   - All Arterial 1 and Arterial 2 routes will have an adjacent shared-use path, with a recommended width of 12 feet.
   - Pedestrian crossings will occur at all controlled intersections and key non-controlled intersections with pedestrian crossing treatments/ enhancements.

In some corridors, particularly in the northern parts of the study area, large portions are already being platted due to development in process. In these corridors (Arterial 2.2), ROW is set at 100 feet wide due to past policy in the WE-STEP jurisdictions.

WE-STEP TYPOLOGIES

- **Arterial 1:** Highest mobility corridors with 150-foot dedicated ROW.
- **Arterial 2:** High mobility corridors that accommodate all modal users, developed on the 1-mile grid.
- **Arterial 3:** Conservation area arterials, anticipated to remain rural roads for the foreseeable future. If development occurs along these corridors, a 100-foot ROW is recommended to accommodate a potential turn lane and potential recreational trails in the long term.
- **Collector:** Corridors that connect neighborhoods and connect to arterials. Located 1/2 mile from arterials and ideally continuous corridors for 2 or more miles.

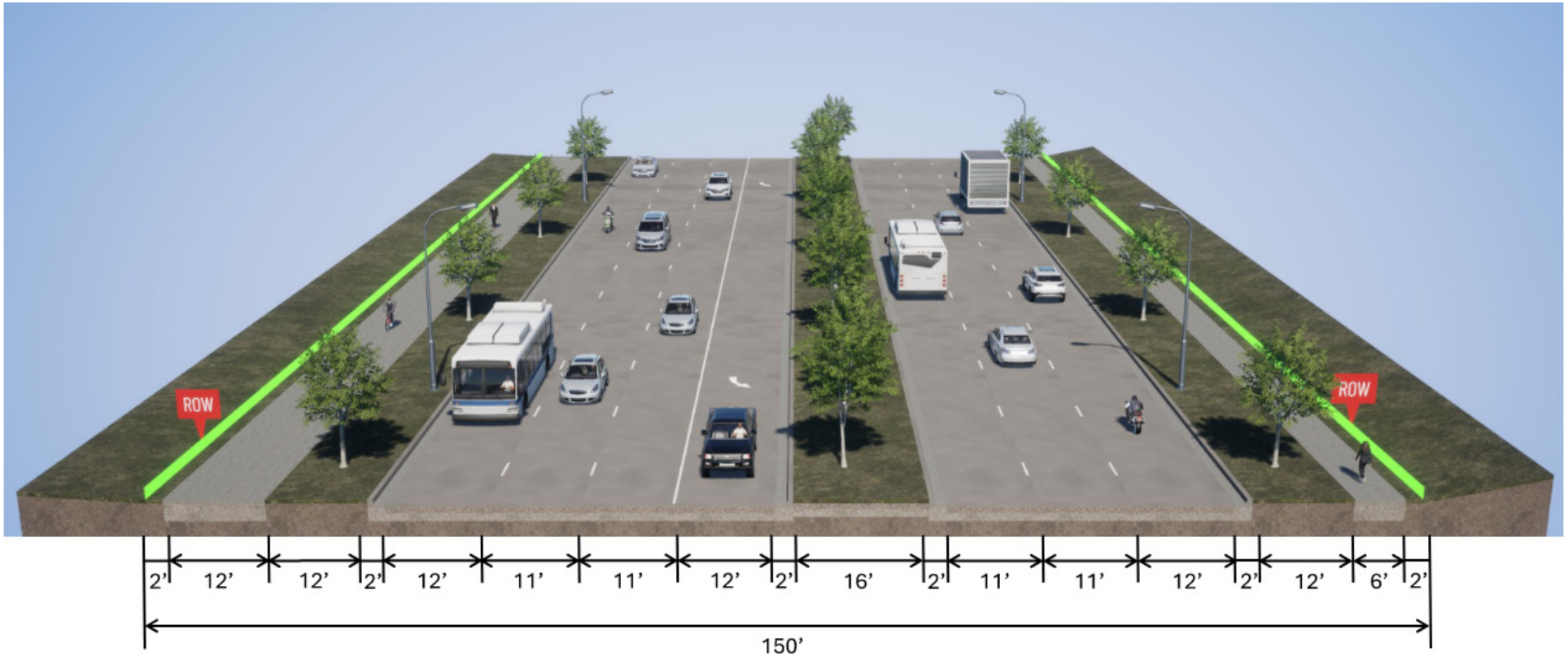
In some corridors, particularly in the northern parts of the study area, large portions are already being platted due to development in process. In these corridors (Arterial 2.2), ROW is set at 100 feet wide due to past policy in the WE-STEP jurisdictions.

Arterial 1

Arterial 1 is intended to be a continuous route that moves traffic between communities in the study area and supports long distance travel. The ultimate design for Arterial 1.1 would be a maximum of six lanes and a recommended ROW width of 150 ft. Turn lanes, a 12-foot shared use sidepath, and landscaped buffers were also included. **Figure 9** shows a standard typical section for Arterial 1.1.

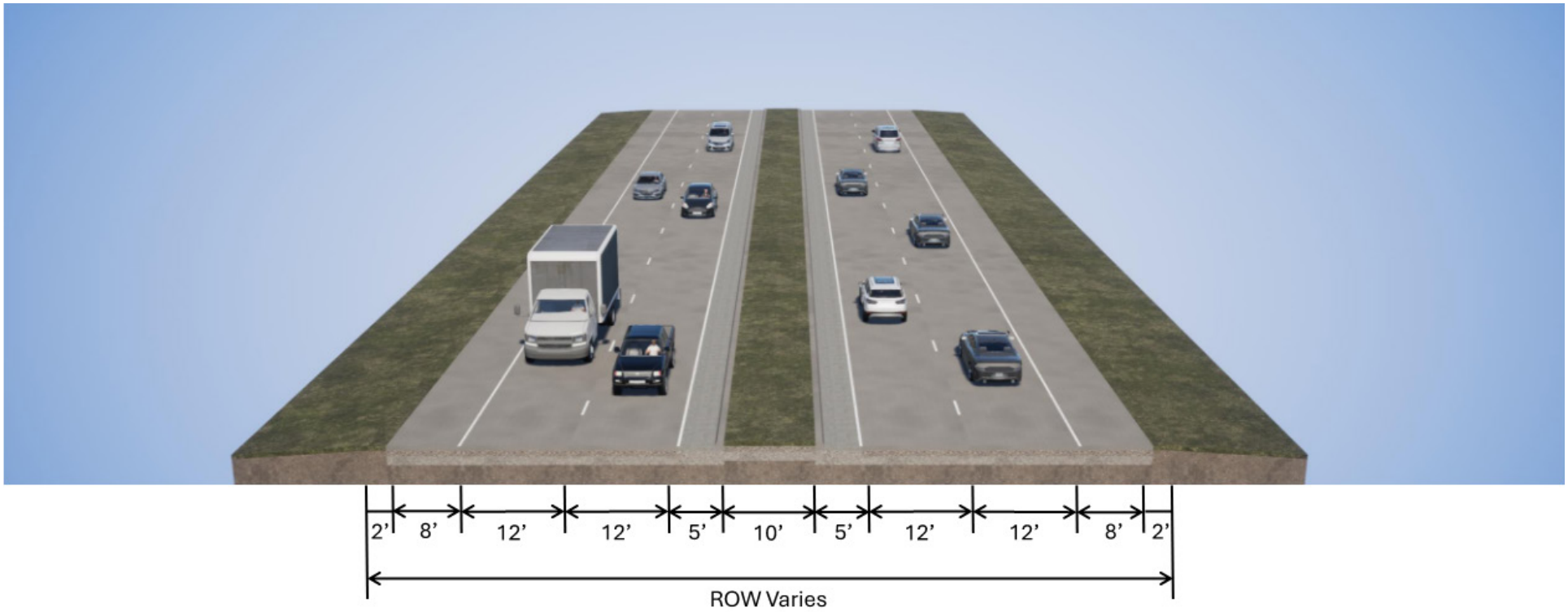
This section illustrates what would be potential "ultimate" typical cross-sections. In most locations 4-lane and 6-lane divided cross-sections would not be constructed first; current rural roads would likely have an interim 3-lane improvement for safety and traffic benefits in many locations.

Figure 9: Arterial 1.1 Ultimate Typical Section



Planning is currently underway for a Southern Sarpy Expressway that would follow the Platteview Road and Pflug Road corridors between US-75 and N-36. The typical section includes a hybrid design with an urban median and outside shoulders and ditches. There is currently no standard ROW width due to the rural nature of the section, the expected terrain of the area, and the varying needs of limited-access, high mobility corridors. Instead, ROW is expected to extend out to the ditches for maintenance. This typical section is in a preliminary design stage and may be updated based on developments with the Southern Sarpy Expressway project. **Figure 10** shows the Southern Sarpy Expressway typical section.

Figure 10: Southern Sarpy Ultimate Typical Section



Arterial 2

An Arterial 2 connects major areas of activity within and between communities and would include four lanes in the ultimate design and a recommended ROW width of 110 feet. Two subcategories of the Arterial 2.1 typical section were developed: one for suburban development patterns and one for urban scale development patterns.

Arterial 2.1a is intended for suburban areas and includes a 12-foot shared-use path, sidewalk, and landscaped buffers. **Figure 11** shows the standard typical section for Arterial type 2.1a. An Arterial 2.1b shows how this flexible right-of-way can accommodate urban areas and includes on-street parking, on-street buffered bike lanes, and sidewalks. **Figure 12** shows the Arterial 2.1b standard typical section.

Figure 11: Arterial 2.1a Ultimate Typical Section

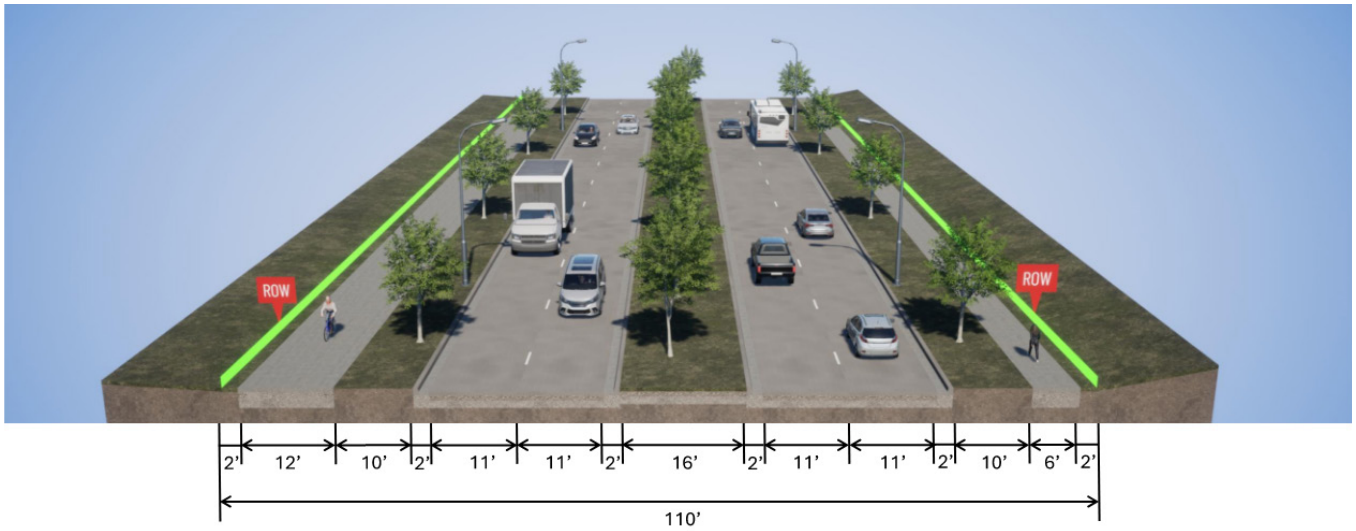
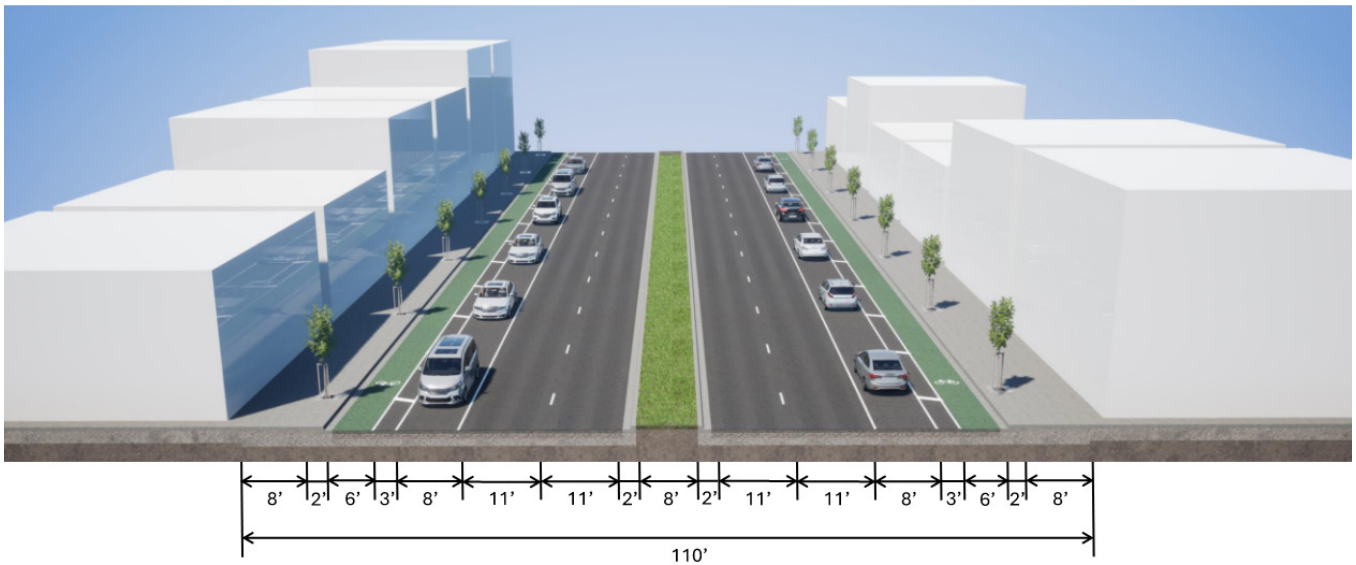


Figure 12. Arterial 2.1b Ultimate Typical Section



Some corridors in the study area are currently in development or were recently developed and are only platted to accommodate 100-foot-wide ROW. These corridors have been identified as a subcategory called Arterial 2.2. An Arterial 2.2 would accommodate four lanes of traffic and a 12-foot sidepath separated by a raised, stamped median. **Figure 13** shows a standard typical section for Arterial 2.2.

Arterial 3

A third arterial type was also identified for corridors located in the conservation zone. These corridors would reserve 100 feet of ROW for redevelopment, but it is anticipated that there will be a limited need for widening. An Arterial 3 is expected to include one travel lane in each direction and a two-way left-turn lane. These corridors could potentially have sidepaths for recreational biking and walking opportunities. **Figure 14** shows the standard typical section for Arterial 3.

Figure 13: Arterial 2.2 Ultimate Typical Section

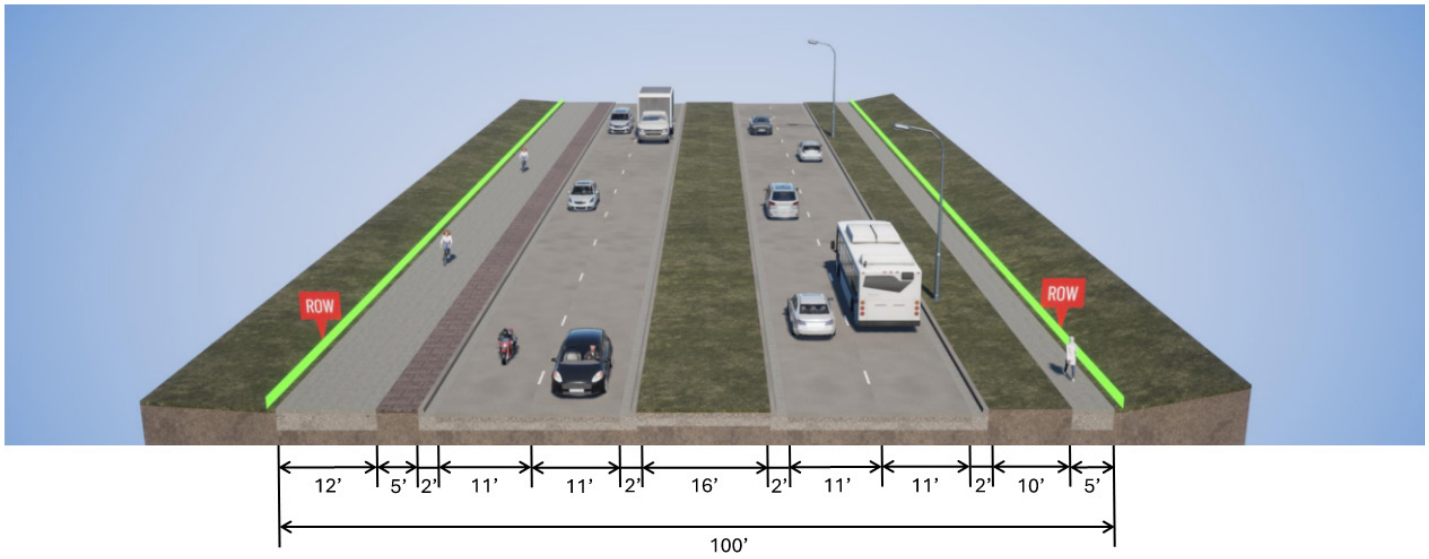
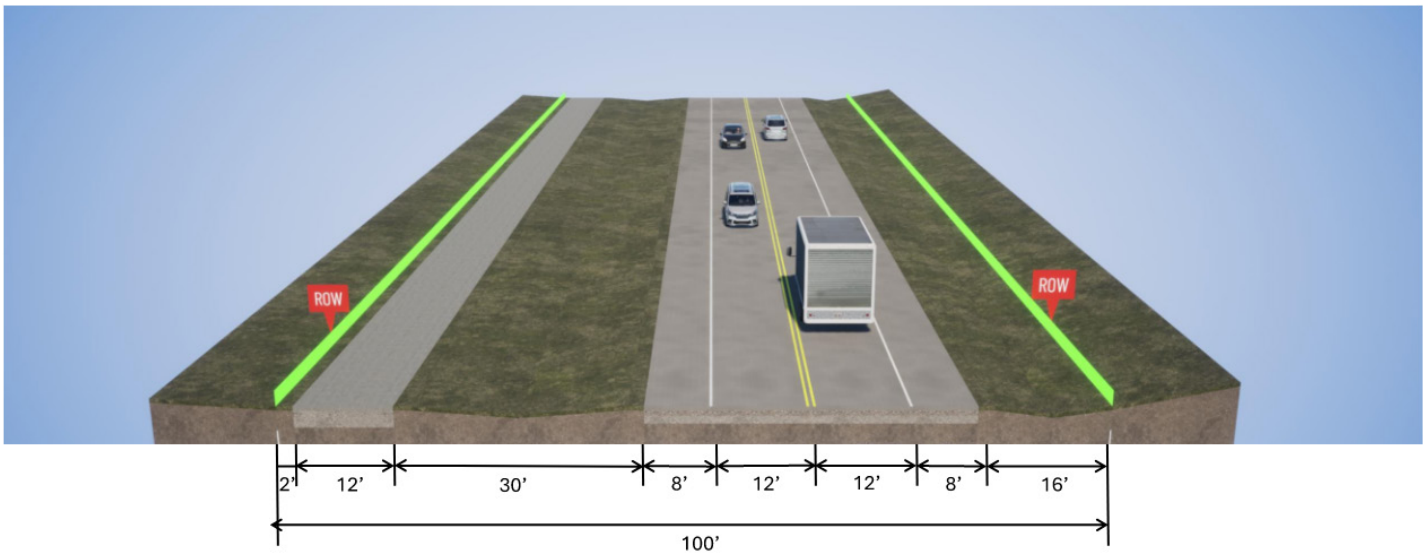


Figure 14: Arterial 3 Ultimate Typical Section



Network Map

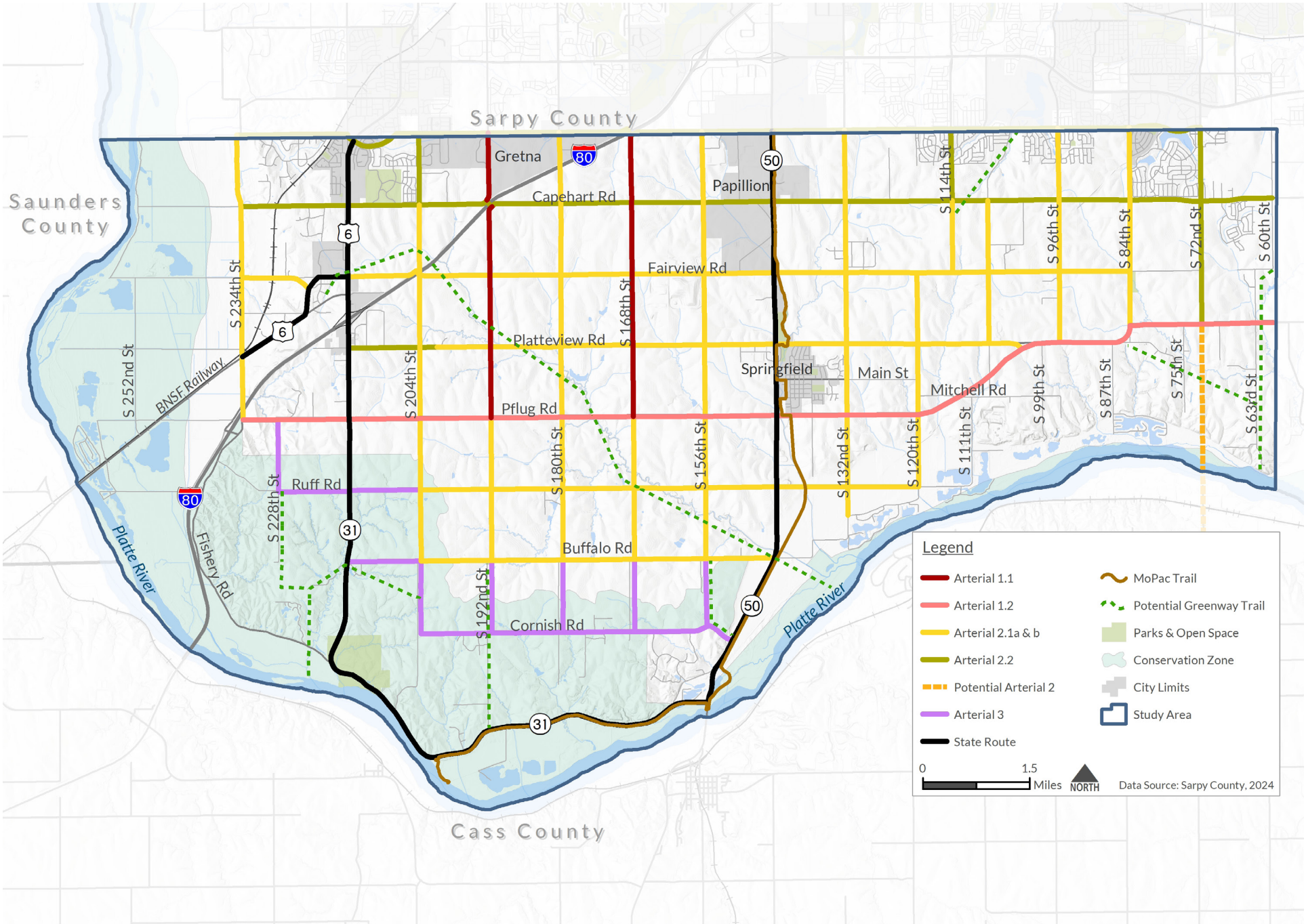
A future network map (**Figure 15**) was developed to identify which of the arterial types is recommended for the major corridors in the study area. Every arterial on the 1-mile grid will be an Arterial 1 or 2 in the WE-STEP growth area defined by the potential sewered area. To identify the jurisdictional boundaries, each city is highlighted. The boundaries for the planned future sewered area are also shaded on the map.

Additionally, several trails are shown on the map, including the existing MoPac Trail located along 144th Street and the potential Greenway Trail and other key arterial paths. Some trails are still in development and may change on further review and design. However, the goal of the trail network is to provide improved continuity and access for pedestrians and bicycles throughout the study area.

The network was established based on the latest information available in the study area, including the following:

- Travel demand model runs through the year 2050. The input data used an older version of the MAPA model, which indicated lower growth in the WE-STEP area than the latest land use growth assumption. Therefore, the traffic forecasts did not assume as much land use and traffic growth as the in-progress model updates (anticipated for late 2024) will assume.
- Current planning for new I-80 interchange access in Sarpy County anticipates that 168th Street and 192nd Street are the corridors with the potential for future I-80 interchanges. Both corridors also have significant connections to the northern parts of Sarpy County and Douglas County, indicating that these two corridors are the highest-mobility corridors (Arterial 1) in the WE-STEP area.
- Current planning for a high-mobility, limited-access east-west corridor in the study area has focused on the Platteview Road – Pflug Road corridor. This corridor was identified as the Southern Sarpy Expressway.
- Northern portions of the network were developing quickly during this study, particularly Schram Road and Capehart Road corridors, so these ROW-constrained corridors were designated Arterial 2.2 to reflect the limited 100-foot ROW widths available.
- A conservation district overlay is designated for much of the southwest portion of the WE-STEP area, which limits development potential. Therefore, this part of the network was given an Arterial 3 designation.

Figure 15: WE-STEP Network Map



Collector Route Policy

The collector road system will link developments and local streets with the arterial network and provide access and traffic circulation in residential, commercial, and industrial areas. The collector system is integral to the overall street system because it provides connections for short-distance trips and opportunities to incorporate bicycle and pedestrian connections. STAC recognized the following benefits of a system of continuous collector and local streets within the WE-STEP area arterial grid system:

- Provides a resilient system where an incident or closure on one segment allows for multiple alternative paths with less negative impacts due to rerouted traffic
- Less out-of-direction travel due to multiple route choices for each trip, particularly for shorter trips in a neighborhood or subarea, eliminating the need to use an arterial to travel less than a few miles
- Improved connectivity for pedestrians and bicyclists
  - These trips tend to be shorter, and the distance and directness of connections have a significant impact on the practicality and probability that someone can and will walk or bike for a shorter trip.
- Potentially delayed or eliminated need for arterial improvements and widenings due to traffic dispersing to collector and local streets for some trips

The collector typology was identified so that it would do the following:

- Ideally have no direct driveway access
- Include a ROW width of 60 feet minimum
- Include a minimum typical pavement width of 26 feet that could accommodate one travel lane in each direction and on-street parking or bike lanes
- Include sidewalks on both sides of the street, each at least 5 feet wide
- Recommend speed control and safety features

Some speed control strategies include the following:

- Roundabout/traffic circle
- Median island
- Median barrier/forced turn island
- Raised intersection
- Chicane
- Realigned intersection
- Choker
- Speed cushion
- Corner extension/bulb-out
- Speed hump
- Lateral shift

Three example typical sections were developed to show design options for collector routes. **Figure 16** includes a narrow pavement width of 26 feet that accommodates one travel lane in each direction. The section also allows on-street parking on one side of the street. **Figure 17** includes 40 feet of pavement that can accommodate one travel lane in each direction and on-street parking on both sides. A bump-out is also included for this section as a speed control strategy to minimize the potential for speeding and provide shorter crossing distances for pedestrians. **Figure 18** is an example of a boulevard section that includes one travel lane in each direction separated by a raised, landscaped median. On-street bike lanes are also included. This section does have a wider width to accommodate the various elements. Collectors are designed for relatively low speeds and provide access to residential areas. It is recommended that on-street facilities and speed control strategies be provided to reduce the possibility that speeding may occur and improve the safety of the corridor.

Figure 16: Collector Road Option 1 Typical Section

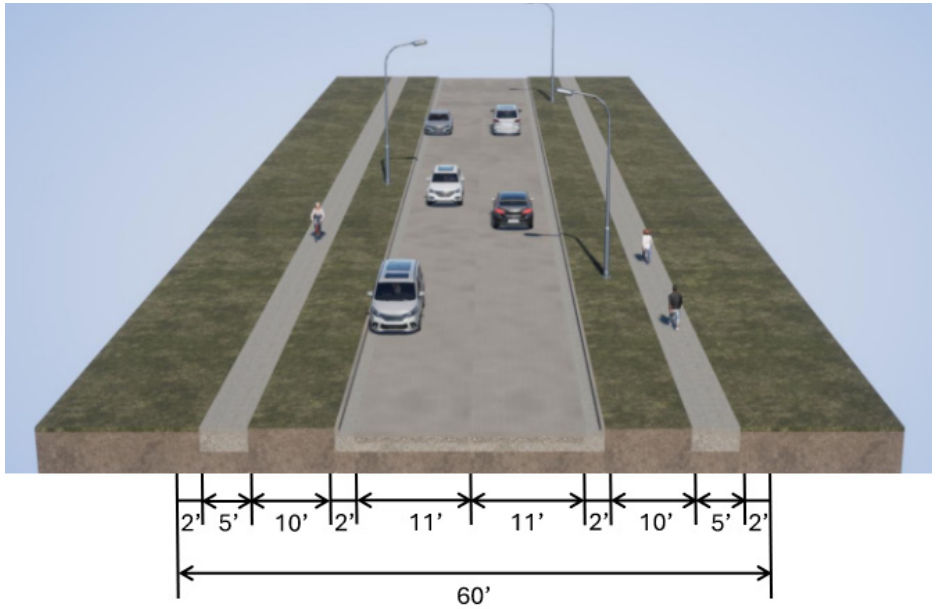


Figure 17: Collector Road Option 2 Typical Section

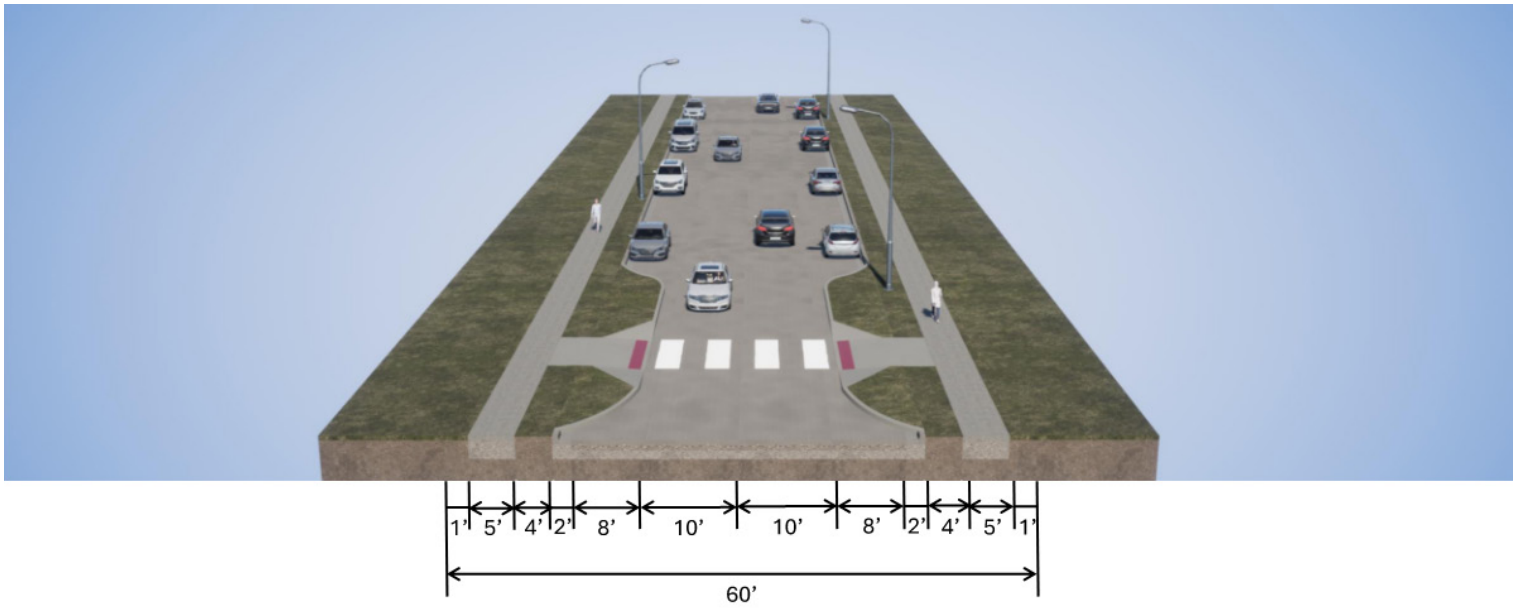
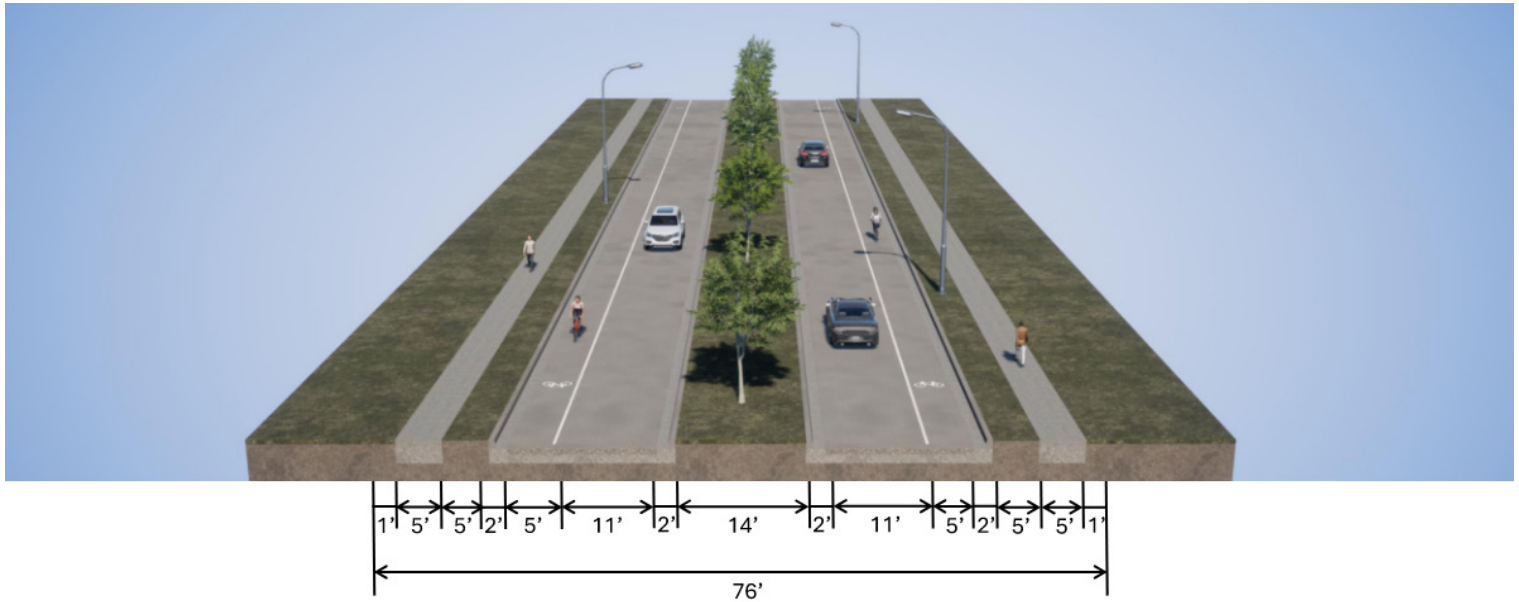


Figure 18: Collector Road Option 3 Typical Section

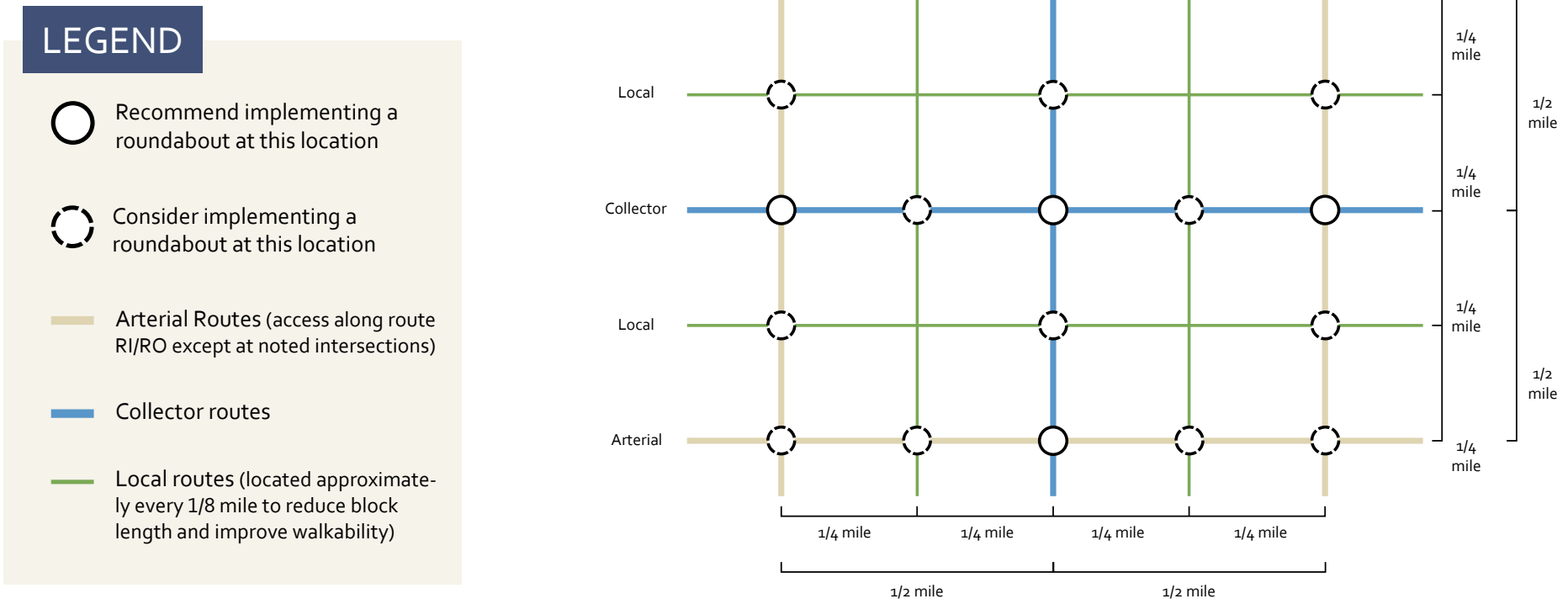


A full listing of potential cross sections and options for an interim three-lane cross section is shown in **Appendix E**. To reflect the benefits of continuous collector routes and connected grid systems, a collector and through route policy was developed, which states that every section of the network in a 1 mile grid, considering no human or development barriers exist, should include three continuous collector and local streets approximately every 1/4 mile:

- The 1/2 mile street located in the middle of the section should be a designated collector street when possible and should be continuous for more than one mile.
- The three through streets from each section should form an intersection and align with the three through streets on all adjacent sections. This network design overlaps with the access control elements of the WE-STEP arterials that bound each section, so that a full-access intersection will occur at the 1/4-mile spacing interval with the three through-route streets.
- Roundabouts are an intersection type that could potentially be implemented as a part of this policy.
- In most cases, these through routes should be designed to discourage speeding through speed control strategies, horizontal curvature, and minimizing long stretches between local intersections within a development.
- If human or development barrier exists, including ones that would require the construction of a bridge or box culvert, exceptions can be made to the layout of the collector network.

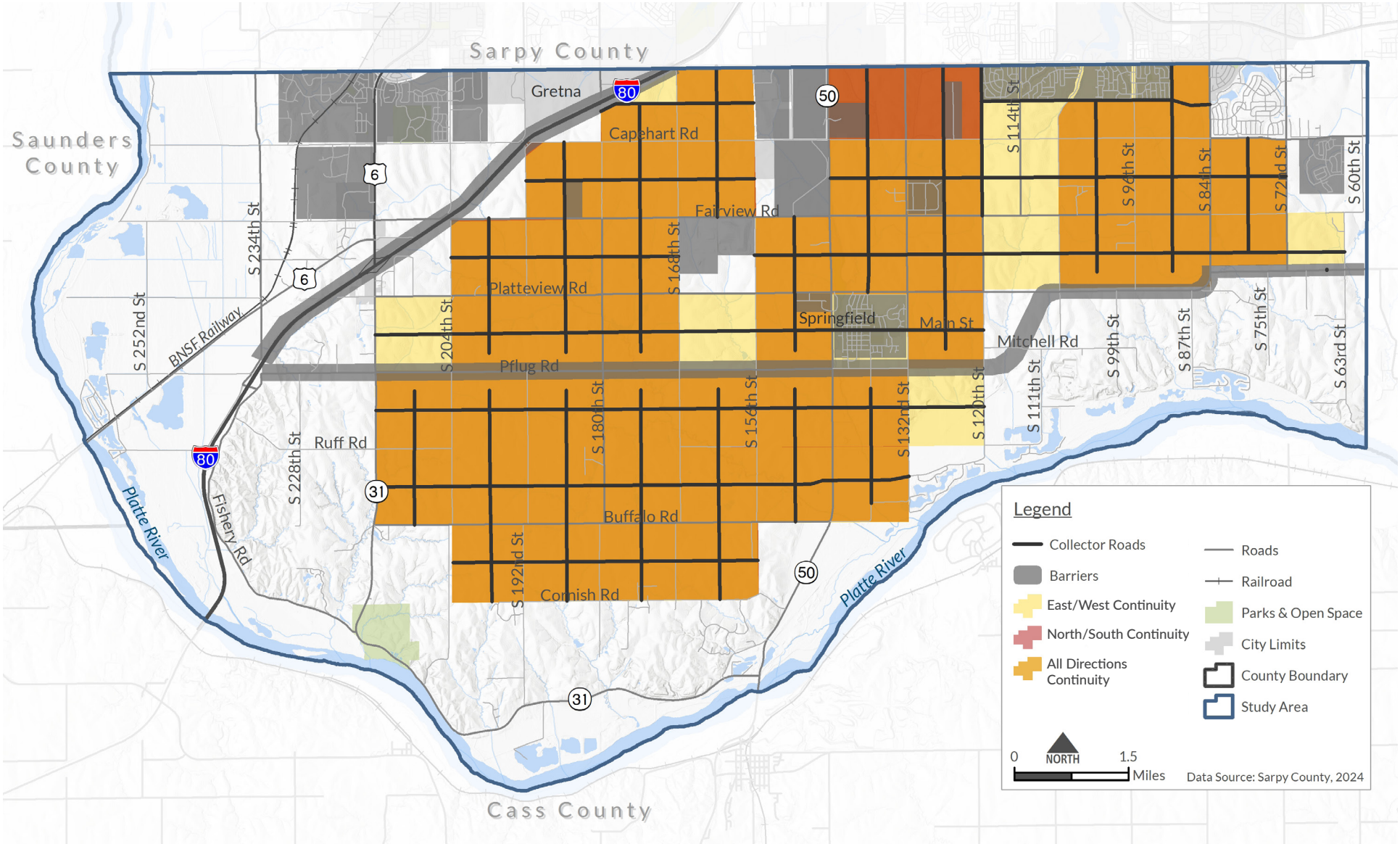
The illustration of this policy and associated locations recommended for roundabout intersection control is shown in **Figure 19**.

Figure 19: Recommended Collector and Through-Route Policy



As noted, ideally the ½ mile collector designation would be implemented in locations where at least two miles of a continuous collector could be constructed on approximately the ½ mile spacing between arterials. There are several existing and planned barriers to continuous corridors on the ½ mile like large developments and the planned Platteview-Pflug corridor. **Figure 20** shows some of these barriers and illustrates the ½ mile collector continuity potential for different portions of the study area.

Figure 20. Collector Through-Route Barriers and Continuity Potential



GREENWAY TRAILS

The planning area includes the existing MoPac Trail from the Platte River to Springfield and the 144th Street Trail extending north to Schram Road from Springfield. The study recommends shared use sidepaths to be included on the proposed arterial network. Additional Greenway Trails are also envisioned to develop over time. Two types of corridors identified by the plan are suitable for new Greenway Trails.

Buffalo Creek Greenway Trail

The City of Gretna adopted an area plan that includes a new Greenway Trail along Buffalo Creek and encourages Trail Oriented Development between US Hwy 6/34 and 204th Street. The associated vision of the Buffalo Creek Greenway Trail through Gretna is to also create community continuity as development expands south across I-80. The area plan recommends including a shared use sidepath along the I-80 interchange bridge when reconstructed and/or providing a grade separated crossing along Buffalo Creek where it passes under I-80 through coordination with NDOT. Buffalo Creek flows about 8 miles southeast from I-80 to the Platte River, flowing under US HWY 50 and the MoPac Trail along the way. The Buffalo Creek corridor will be protected from development encroachment by floodplain regulations within a conservation area. When existing bridges are replaced with new arterial streets they should include grade separated trail crossings at intersections with Buffalo Creek. Conservation areas and buffers are suitable for a trail alignment that can be coordinated between the participating jurisdiction, MAPA, and the Papo-Missouri River NRD.

Zwiebel Creek Greenway Trail

Interlocal planning between Papillion, Bellevue, and Sarpy County was completed east of 72nd Street separately from this study. East to 84th Street, a Greenway Trail can connect from Platteview Road to 60th Street along Zwiebel Creek consistent with recommendation from that plan. The planning and design for the Platteview Road improvements is considering sidepath facilities and grade separated crossings where needed to facilitate bicycles and pedestrians across the corridor at Zwiebel Creek.

Conservation Development Trails

Sarpy County Zoning regulations protect a significant portion of the County adjacent to the Platte River consistent with the Conservation Provisions of the Comprehensive Plan. These areas preserve and protect environmentally sensitive areas with conservation techniques by which new developments permanently designate a portion of subdivisions as independent conservation areas. Subdivision reviews within the zoning area will consider multiple evaluation criteria including pedestrian circulation systems. Through coordinated planning, these conservation corridors may be adjusted, but can ultimately provide access between properties, activities, or special features within the neighborhood open space system. Examples of special features to provide access to include the Lied Platte River Pedestrian Bridge, Schramm State Park, Gretna Fish Hatchery Historical Marker, and other cultural destinations such as the Cloisters on the Platte. All roadside footpaths should connect with off-road trails. Conservation Developments for Greenway Trail alignments should be coordinated further between Ruff Road and Fishery Road, from 228th Street to 204th Street and 192nd Street from Cornish Road to the MoPac Trail.

POLICY GUIDANCE/STANDARDS CHECKLIST

The study team developed a standards checklist to review the guidance for the recommended process of implementing the WE-STEP plan. An extensive standards checklist can be found in **Appendix C**. This section summarizes the major policy elements.

Travel Demand Model Guidance

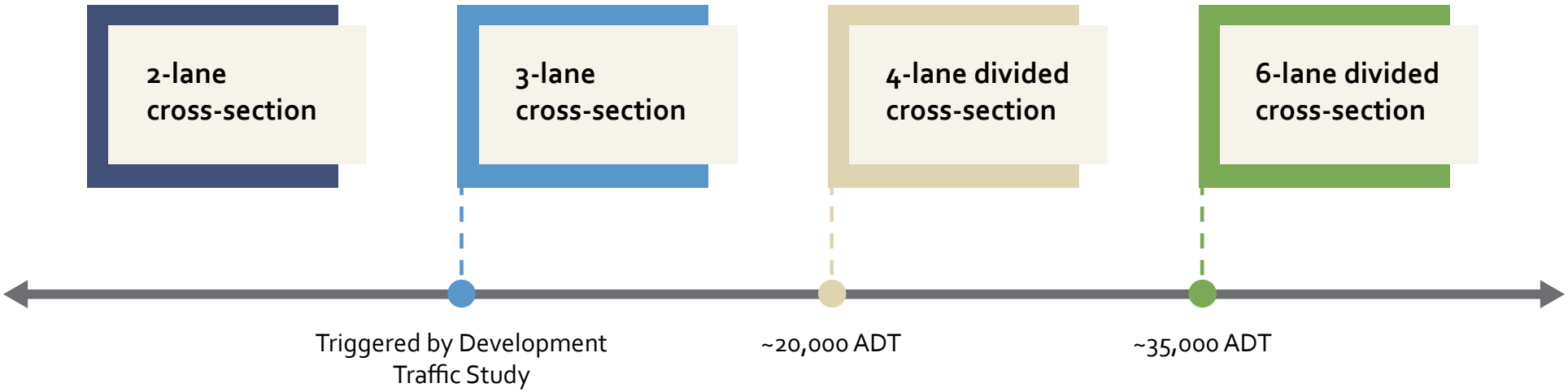
A traffic study should decide the ultimate recommendations on corridor configuration and lanes. However, the TDM provides some guidance about direction for corridor configuration. It is recommended that if the TDM output for the future year is less than approximately 20,000 daily trips, a traffic study should be completed that considers traffic analysis for an ultimate three-lane section.

If the TDM output is between approximately 20,000 and 35,000 daily trips, a traffic study that considers traffic analysis for an ultimate four-lane divided section should be completed. Lastly, if the TDM output projects more than approximately 35,000 daily trips, the traffic study should consider traffic analysis for an ultimate six-lane section. **In some cases traffic studies may identify design recommendations that diverge from these TDM-based lane guidelines**. **Figure 21** illustrates these general street improvement thresholds. While all street projects should include a corridor study to determine ultimate cross-section needs, it should be noted that typically as new adjacent urban developments come online adjacent to rural roads, a traffic study is conducted to determine what urban cross-section (3-lane, 4-lane divided, 6-lane divided) might be required.

Many Factors Influence Street Cross-Section Recommendations

WE-STEP has provided some average daily traffic thresholds triggering consideration of potential street cross-section expansion projects. In most cases, these traffic levels would equate to LOS F peak hour levels of service. In all cases, a traffic study that considers multiple factors (not just traffic level of service) should occur. In addition to consideration of level of service, user safety (including pedestrians and bicyclists) and neighborhood context are critical considerations when determining if a street widening project is warranted.

Figure 21: Generalized Street Cross-Section Traffic Thresholds



Street Design Guidance

The general guidance for the WE-STEP typologies is provided in **Table 2**. Many guidance standards have a range of values to reflect the flexibility required for a range of future corridor contexts. For instance, speeds on many corridors can vary between 30 and 45 miles per hour, reflecting the fact that some corridors will have more urban scale, street-oriented development contexts with high pedestrian activity, while others may be more suburban context with limited street orientation.

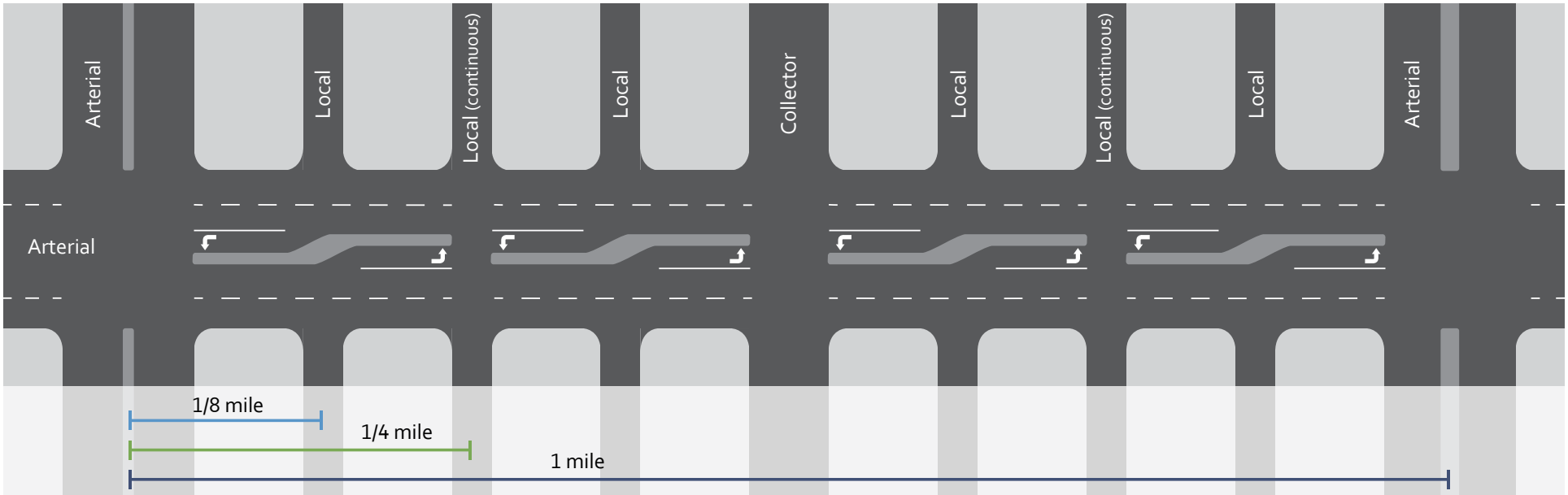
Table 2: WE-STEP Design Guidelines by Typology

ROADWAY GENERAL CRITERIA	ARTERIAL 1.1	ARTERIAL 2.1A	ARTERIAL 2.1B	ARTERIAL 2.2	ARTERIAL 3
Posted Speed (mph)	40–45	30–45	25–30	30–45	45–55
Ultimate Number of Lanes	6	4	4	4	3
Lane Width (in feet)	12	11–12	11	11–12	12
ROW (in feet)	150	110	110	100	100
Vertical Alignment	Ultimate Vertical Profile Study or AASHTO Standards				
Shoulder/Curb and Gutter	2-foot curb and gutter	2-foot curb and gutter	2-foot curb and gutter	2-foot curb and gutter	8-foot shoulder
Sidewalk with Landscaped Buffer (in feet)	5-6	5-6	5-6	5-6	–
On-Street Parking Allowed	No	No	Yes	No	No
On-Street Parking Width (in feet)	–	–	8	–	–
Shared-Use Path Required	1 side	1 side	No	1 side	1 side
Shared-Use Path (in feet)	12	12	–	12	12

Access Management Guidance

Access management along arterial corridors can improve safety by limiting turning traffic to key locations and can improve the traffic flow of an arterial corridor. **In tandem with the recommended Collector and Through-Route Policy, access management should support improved safety on arterials while providing multiple continuous routes on the collector and local through-street grid for shorter trips.** The recommended access policy for arterial streets is illustrated in **Figure 22**. Note that 1/8-mile spacing access may provide 3/4-access intersections (provide left turns off the arterial but not onto); 1/4 mile spacing intersections may be roundabouts or signalized intersections.

Figure 22. Recommended Arterial Access Management Policy



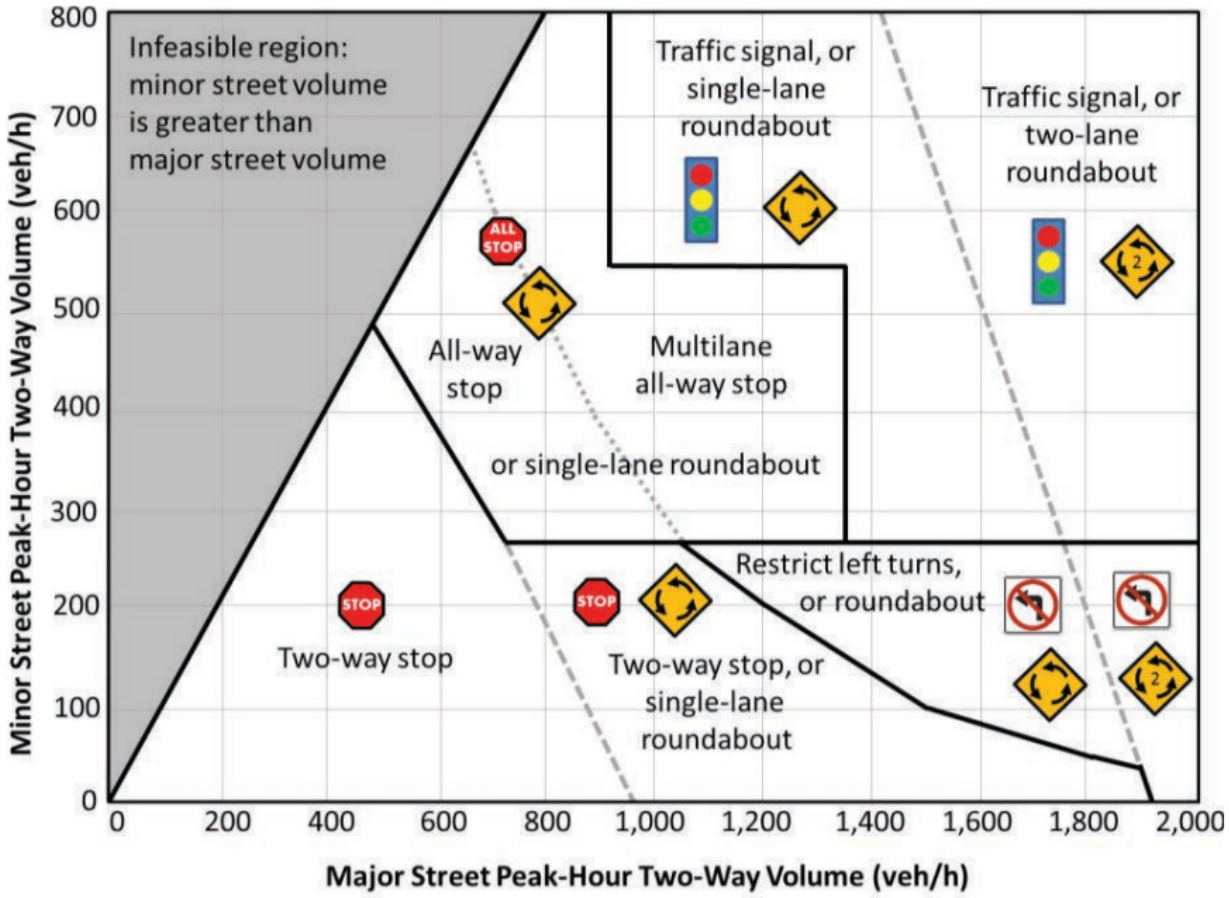
Roundabouts

Roundabouts are considered as a safe, efficient option for intersection design. When considering roundabouts, the following is recommended:

- Calculating a roundabout's level of service (LOS) for each intersection will help determine whether a roundabout is recommended.
- If the roundabout horizon year (opening year plus 20 years) LOS is less than F, it is recommended to consider implementing a roundabout.
- If roundabouts exist elsewhere along the study corridor, roundabouts are also recommended.
- For intersections where the horizon year roundabout LOS is equal to F, it is recommended that a signal warrant analysis be performed to determine the LOS for the signalized intersection.
- If a roundabout is recommended in the study area, design should follow guidelines from the National Cooperative Highway Research Program (NCHRP) 1043 (updated version of NCHRP 672).
- If available, it is recommended to use the ultimate vertical profile for roundabout design and access points tie-in locations.

Figure 23 shows the range of traffic volume scenarios where roundabouts might be a safe, efficient option for intersection control.

Figure 23. Intersection Control Type by Peak Hour Volume
(Source: "Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual", NCHRP 825 Report



Interim Build Conditions

The recommendations outlined in the typologies and typical sections reflect what can be called an "ultimate build" version of each cross-section. The ultimate build street typologies in this plan reflect a significant level of investment in what is often a mature urban corridor. In many instances, an interim improvement might make the most sense at the time it is required. In these interim cases the current 2-lane rural corridors will likely have safety and operational needs arise at a time where the full 4-lane or 6-lane divided ultimate cross-section:

1. Is more investment than is required to meet projected traffic volumes
2. Exceeds agency budgets at the time of construction

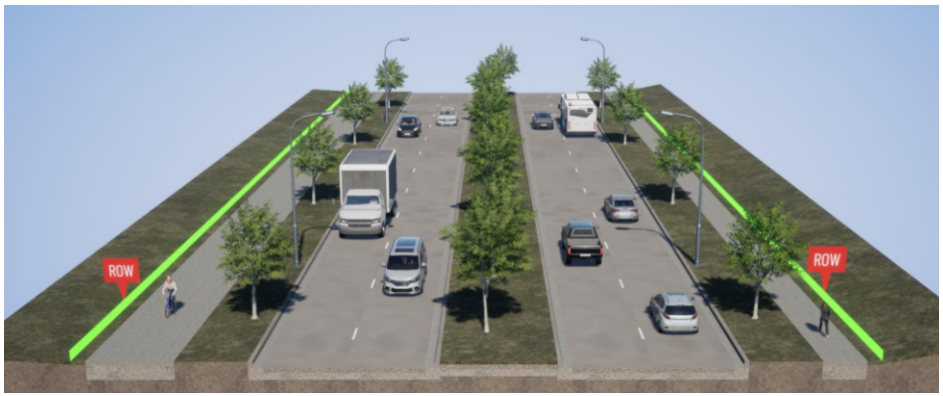
In these cases an interim 3-lane build is likely called for.

WE-STEP interim 3-lane corridor improvements should be planned and engineered in such a way to minimize life cycle costs by implementing an interim improvement that can largely be reused when the ultimate improvement is eventually constructed. This interim approach recommends:

- Creating the 3-lane street offset on the ultimate centerline so that the curb and gutter, utilities, sidepaths and sidewalks, and two (Arterial 2) or all three (Arterial 1) of the travel lanes constructed during the interim are in-place and do not need to be constructed for the ultimate 4-lane or 6-lane cross-section.
- These 3-lane interim streets should be offset on a consistent side of the ultimate cross-section throughout a corridor. The default side for a new corridor where right-of-way or design considerations do not dictate otherwise should be the north side of an east-west corridor or the east side of a north-south corridor.
- The interim street superelevation should reflect ultimate superelevation requirements.
- The interim driveway and side-street tie ins should reflect the ultimate profile of the corridor. The benefit of an offset interim section is only realized if a portion of the 3-lane street is used in the ultimate build.

An illustration of the interim and corresponding Arterial 2.1 ultimate cross-section are illustrated in **Figure 24**.

Figure 24. Interim and Ultimate Build Illustration



Interim Build, Arterial 2.1

Ultimate Build, Arterial 2.1

Additional Guidance and Recommendations

Systemic Safety Considerations

Access and Medians

Crashes skew heavily to intersections, midblock crossings, and access points (such as driveways). The access guidance provided by WE-STEP that allows full-access intersections at the 1/4 mile can limit turning conflicts that lead to crashes. Installing raised medians on the arterials can also provide a safer facility for all users. Raised medians provide refuge for pedestrians and bicycles at midblock crossings.

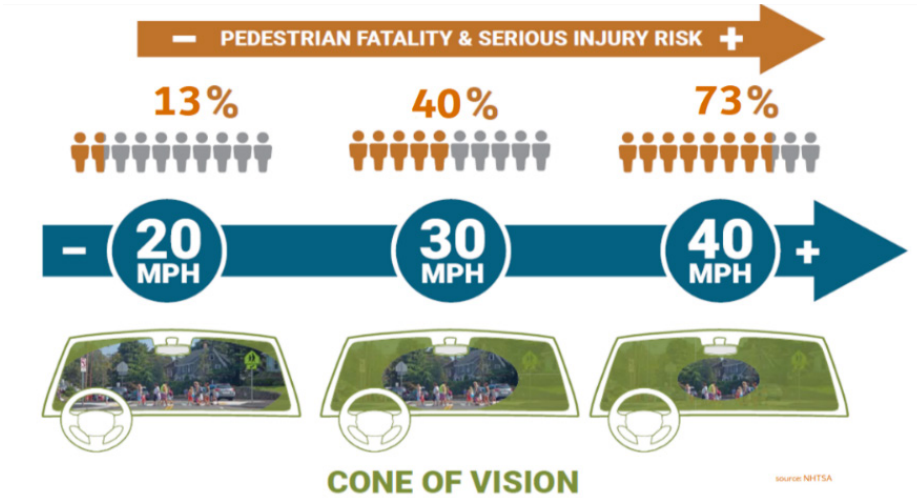
Intersection Design

Another safety concern is overbuilding intersections for expected growth. Intersections should be sized for opening day needs despite the risk to long-term operations. It is also recommended that enough ROW be acquired at the intersections to accommodate any future buildout. Note that roundabouts are a recommended intersection control type due to their safety benefits and efficiency at keeping people moving. Roundabouts also have lower ongoing costs for management and maintenance, and they decrease almost 80 percent of fatal and serious injury crashes in areas where they have been introduced as a safety countermeasure.

Corridor Speeds

Sidewalks and shared-use paths are highly recommended to provide separation between vehicles and pedestrians and cyclists. As shown in **Figure 25**, the faster a vehicle is traveling, the greater the risk for a pedestrian fatality or serious injury. Controlling speeds by introducing horizontal design features and traffic calming elements can improve pedestrian and bicyclist safety. Sidewalks provide safe routes for pedestrians that are separated from vehicles. However, cyclists' speeds can be unsafe for pedestrians, and sidewalks do not provide enough space for the two users to interact safely and comfortably. Shared-use paths provide a better facility for both pedestrians and bicyclists due to the increased width that allows for safe passing.

Figure 25. Speed and Pedestrian Risk (Source: NHTSA)



Active Transportation Guidance

Providing a safe, connected network for pedestrians, bicyclists, and potential future transit users is a key element of this study. To support these project objectives, the study has outlined the following:

- Provide sufficient ROW for separation between vehicle lanes and sidewalks and sidepaths
- Provide sufficient ROW for the potential transit-supportive features, such as bus shelters, and lane width flexibility for transit vehicles
- Identify a preferred guidance of including a 12-foot-wide sidepath along each corridor
- Recommend the inclusion of sidewalks that are a minimum of 5 feet wide
- Provide a set of bicycle and pedestrian guidelines for treatments and crossings

Continuity across jurisdictions and through corridors is critical. Sidepaths should be planned to align with the same side of the corridor as those on adjacent corridors to limit unnecessary pedestrian and bicyclist crossing of arterials. A more detailed discussion of the bicycle and pedestrian treatments and crossings is provided in **Appendix D**.

Construction Standards

It is important to establish the standard specifications and plates to conform with expectations for the construction of projects and materials for the project. If standards are not specifically outlined in supporting WE-STEP documents or by the agency with jurisdiction over the project, it is assumed that City of Omaha standard plates will be used as a baseline. In areas where local roadways intersect state facilities, NDOT standards will apply. In some specialized cases, it may be necessary to use the Iowa Statewide Urban Design and Specifications to supplement these standards.

Future Effort to Establish Vertical Profiles

An engineering study to establish the ultimate future vertical profiles on all arterial roads would be a valuable follow-on study. A common issue identified in the study area is that often when developments come online, the vertical profile on the adjacent roads are not yet defined and still reflect their original elevations. In some cases when developments have been graded and built next to a rural road before it has been improved to urban standards, the adjacent development might not fit well with the ultimate (future) road profile leading to the need for retaining walls or extreme grades for development access roads. These situations can lead to higher project costs and safety and design issues. By doing a study that establishes an overall set of recommended vertical profiles for the WE STEP area roads, these situations can be mitigated. Establishing a vertical profile would also allow utilities to bury power lines underground with confidence and limit overall utility re-work in the corridor.

SUMMARY

WE-STEP has been a partnership of the jurisdictions in western Sarpy County to establish a set of guidelines for how the future transportation system should develop. It leveraged past planning efforts and the latest information about current and future trends to develop a set of street typologies that would meet the range of demands and modal needs of future WE-STEP system users. The future WE STEP network was developed by assigning typologies to the area corridors. Finally, the guidelines, standards, and elements associated with the network were defined based on input from technical staff and system stakeholders.