

The background features a stylized, winding path that curves from the top left towards the right. The path is composed of several layers: a dark green outer edge, a gold middle section, and a blue inner edge. The path leads towards a white, teardrop-shaped area on the right side of the page.

Waukeee Trails

master plan

April 2022



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1

Introduction

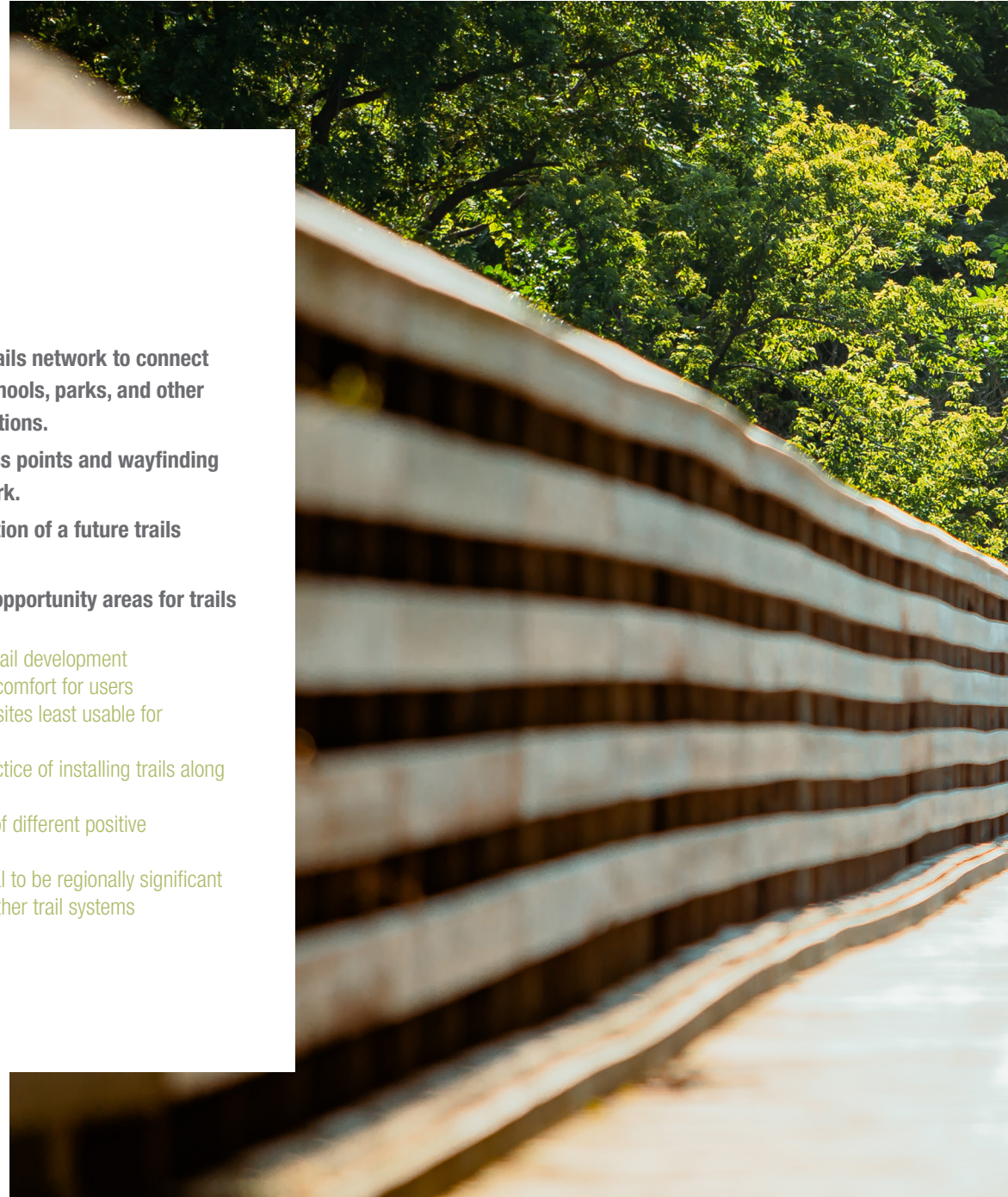
Purpose

Waukee continues to grow rapidly, becoming one of many premier cities in the Des Moines metropolitan area for all types of households. With growth comes the continual need to enhance and expand community amenities. The City of Waukee and other partners know this and plan accordingly for many great features in the community today.

Trails are one vital asset for quality of life, tourism, and attraction. A Trails Master Plan for Waukee continues planning accordingly for future needs amidst rapid growth to identify the feasibility of future trail routes.

The Plan will:

- **Identify a future trails network to connect neighborhoods, schools, parks, and other significant destinations.**
- **Recommend access points and wayfinding through the network.**
- **Guide implementation of a future trails network.**
- **Show the highest opportunity areas for trails that:**
 - » Are feasible for trail development
 - » Offer safety and comfort for users
 - » Place priority on sites least usable for development
 - » Continue the practice of installing trails along major streets
 - » Create a variety of different positive experiences
 - » Have the potential to be regionally significant and connect to other trail systems





Benefits of Trails & Greenways

The City of Waukee and many of its residents know the value that a good trail network provides – both economically and physically. In addition, many cities in the Des Moines metro, including Waukee, place a high value on investment in trails, which is a primary reason for this Plan. For Waukee, providing connected trails and greenways network will produce several benefits:

- **Improves bicycle and pedestrian access to key existing and future community destinations.**
- **Removes barriers that discourage people from biking or walking for transportation and recreation.**
- **Promotes economic development by creating neighborhoods and centers valued by a new generation of homeowners and investors.**
- **Increases community health by enhancing quality of life and options for healthy activities.**
- **Creates social connections through activities, trail interactions, and gathering places along the trails.**

Leveraging Past Planning Success

The process to create a Trails Master Plan in late 2021 and early 2022 did not occur exclusive of other planning efforts. Many other recent plans in Waukee set the stage for future trail development and preservation of greenways. These include:

WAUKEE COMPREHENSIVE PLAN

Imagine Waukee 2040 adopted in 2019 sets the frameworks for future trails and greenways in Waukee. This Trails Master Plan provides more detail and design recommendations on implementing the system over time.

SUGAR CREEK WATERSHED PLAN

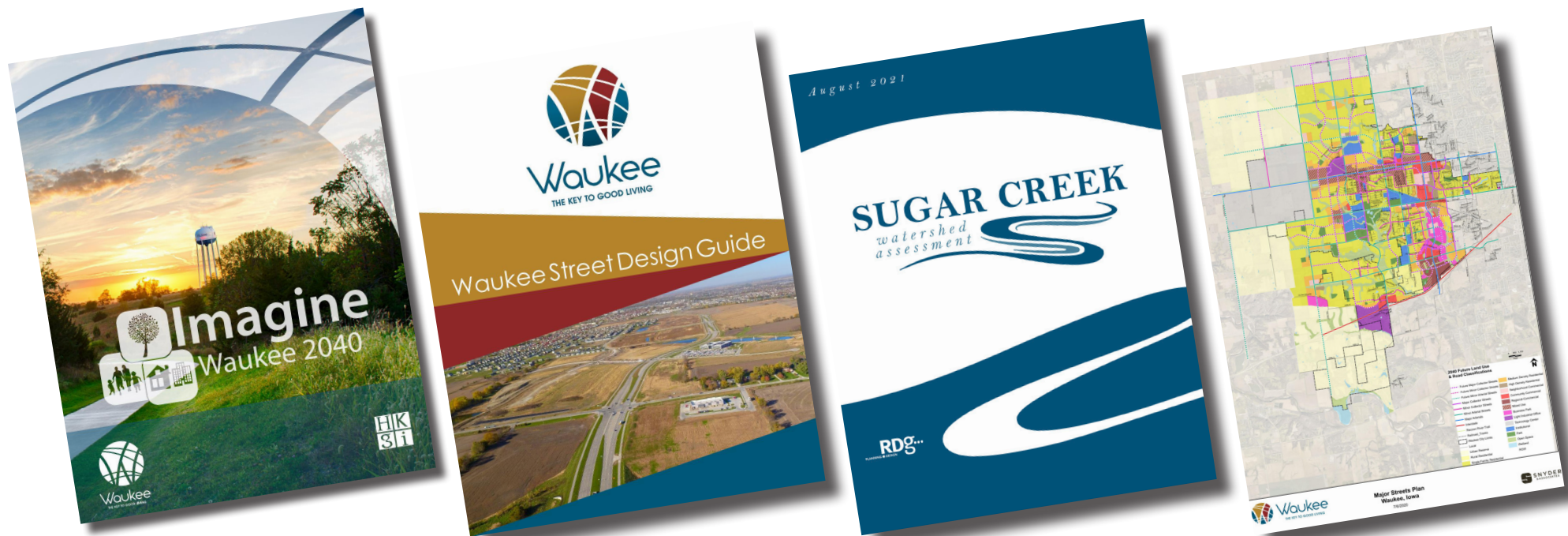
The Sugar Creek Plan provides valuable detail into preserving this critical environmental resource for Waukee. For the Trail Master Plan, the Sugar Creek Plan helps formulate recommendations for trail placement within current and future greenways.

WAUKEE STREET DESIGN GUIDE

Waukee requires trail width sidepaths on most arterial and many collector streets. The Street Design Guide illustrates the design of street sidepath routes shown in the Trails Master Plan.

WAUKEE MAJOR STREETS PLAN

The Major Street Plan informs routes for future sidepaths, which the Trails Master Plan builds upon.



Waukee Preferred Land Use Map

GUIDING PRINCIPLES

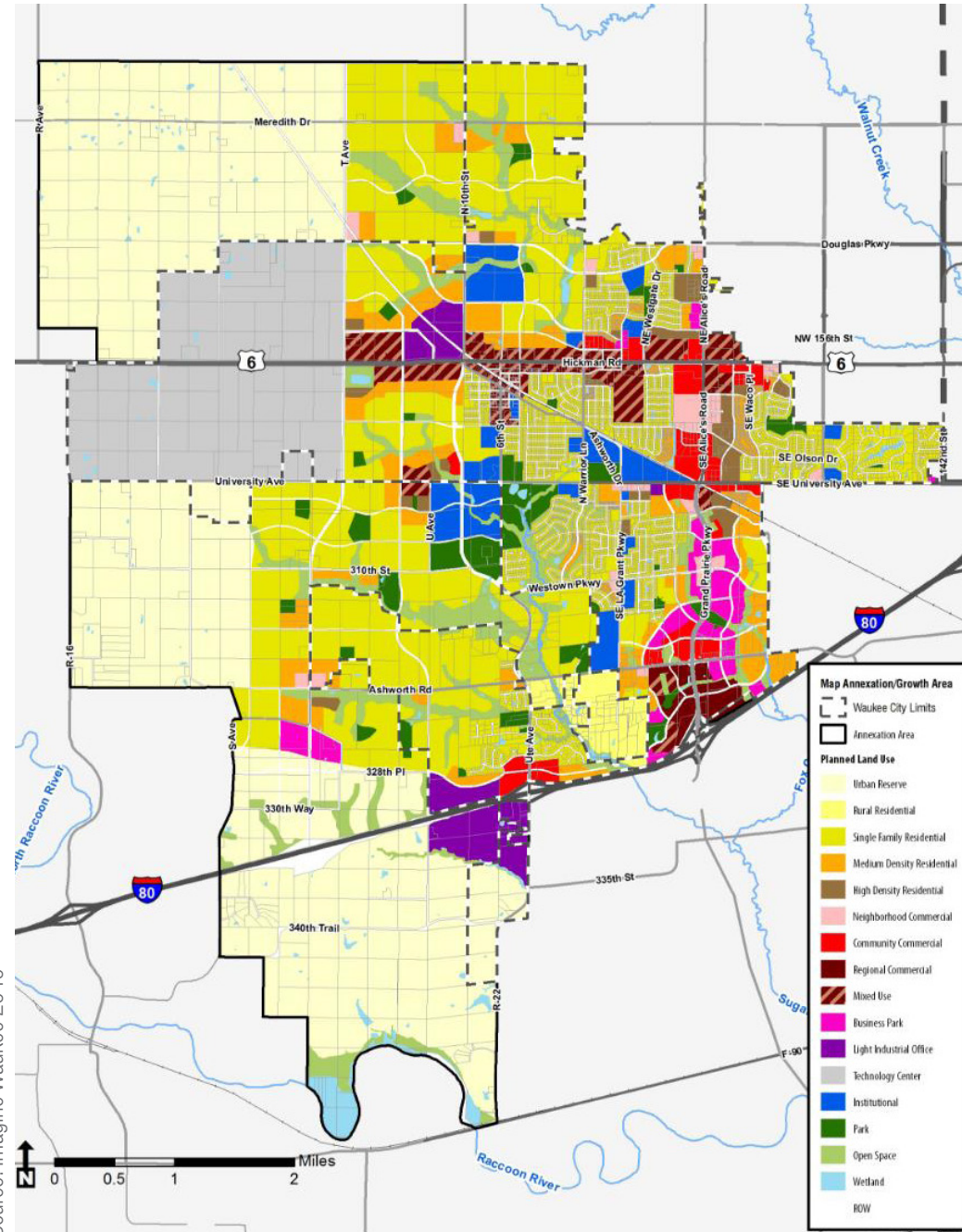
Imagine Waukee 2040 provides the principles for the Trails Master Plan. These relevant Guiding Principles are:

- A Focus on Quality Design and Distinct Places
- A Comprehensive and Multi-Modal Transportation System
- Stewardship of the Natural Environment
- Trails, Parks, and Recreational Opportunities
- Quality of Life in Neighborhoods and Gathering Places

PARK, TRAIL, AND OPEN SPACE GOALS FROM IMAGINE WAUKEE 2040

- Ensure every member of the Waukee community has equitable, walkable access to a park
- Preserve and protect the environment to improve the local ecology and improve the community's connections to nature
- Develop a park system that establishes Waukee as a regional destination for outdoor recreation
- Connect neighborhoods to local destinations and the regional trail network
- Support walking and bicycling for recreation and transportation by providing a trail and sidewalk system that is safe, convenient, and comprehensive
- Provide recreational programming that serves all segments of the Waukee community

Source: Imagine Waukee 2040



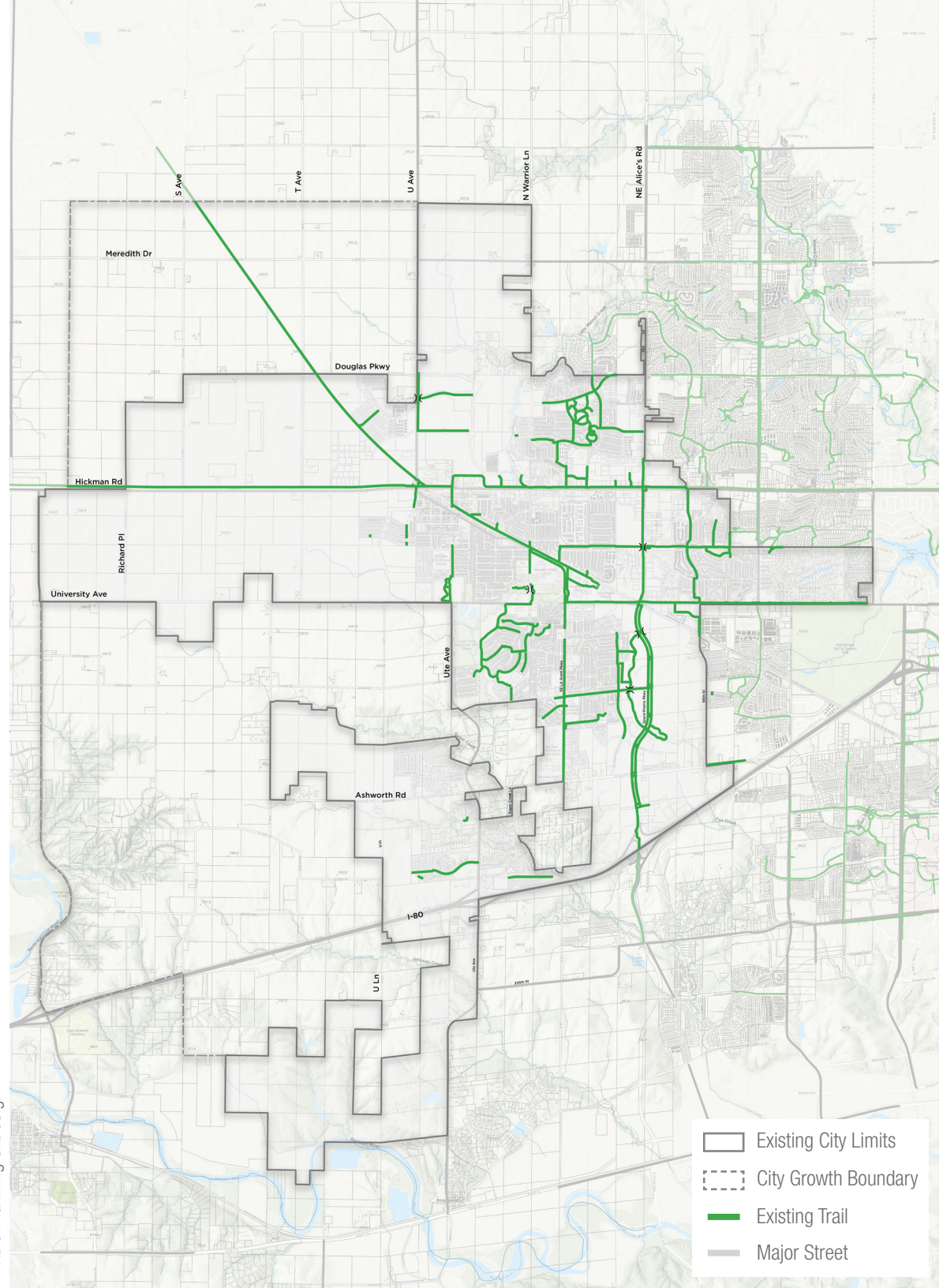
Plan Area Context

For the Trails Master Plan, the term “trails” refers to two types of facilities.

- **Off-street shared use path** – Typically, a minimum 10 foot wide paved route, separated from street right-of-way. Shared use paths typically meander through neighborhoods, greenways, and other routes off the primary vehicular street system.
- **Off-street side path** – Typically a two-way path located adjacent to roadways and separated from traffic by landscaping and curbs. To maximize safety, the separation of the sidepath from a roadway should increase as road speeds increase.

AREA AND DESTINATIONS

With the pace of land development in Waukee, the context for trail and greenway planning extends beyond current city limits. Therefore, this plan matches the planning area outlined in the Comprehensive Plan.



- Existing City Limits
- City Growth Boundary
- Existing Trail
- Major Street

Land Use

Where people live, work, and recreate is the largest driver of trail needs. Significant determinants include higher-density housing, schools, parks, recreation facilities, major employers, civic and cultural uses, and commercial concentrations. Streets that serve these areas should typically have access to a trail.

IMPORTANT PLANNING NOTES:

- **People can use a trail to reach nearly all schools and parks in Waukee.**
- **Several new subdivisions are under review or approved that will provide neighborhood trail connections.**
- **There are spots where a trail does not quite reach a community destination, but sidewalks are available. Typically these small gaps follow low volume local streets.**

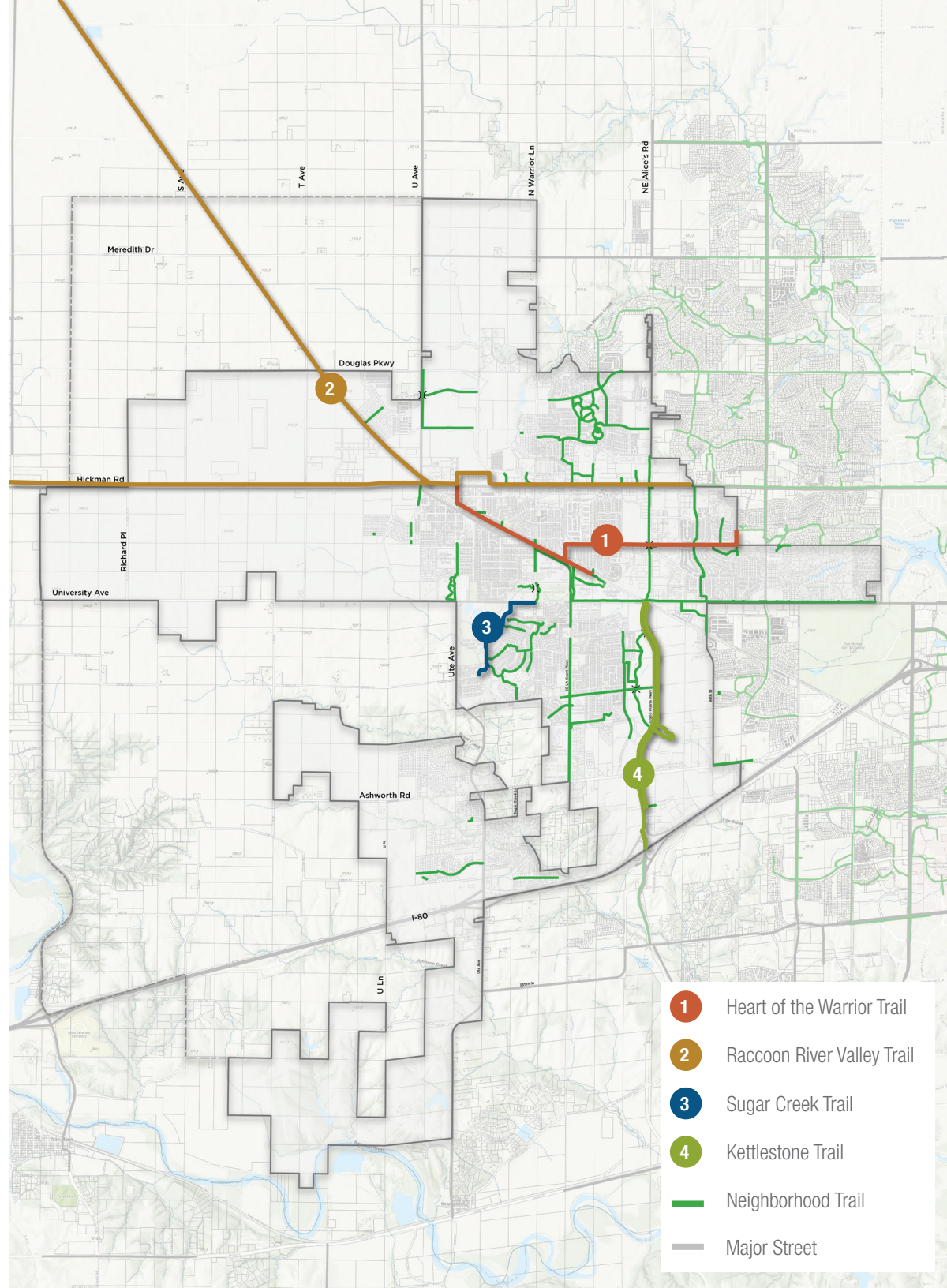


Existing Mobility System

Waukee is evolving through an arterial section grid system, with internal local and collector street networks. This development pattern makes trail development easier on these arterials when they are reconstructed and expanded with development. However, the internal conditions of each section are unique, and trail systems must adapt to those conditions.

IMPORTANT PLANNING NOTES

- Nearly all developed arterial streets have a sidepath, creating an expectation for continued routes in the future.
- The Raccoon River Valley Trail is a significant regional resource for Waukee. The Trailhead is the primary access point in Waukee. Other local access points are limited.
- Trails generally connect destinations, but the wayfinding within the system is limited.
- Very few existing trail routes conclude at a dead-end. Instead, most trails end at a destination or are ready for extensions.
- There are no designated on-street bicycle facilities in Waukee. While the entire city is well-served by sidewalks, sidewalks cannot accommodate cyclists and pedestrians at the same time.
- The City has a history of creating grade-separated crossings at major streets (typically underpasses). As a result, grade-separation is likely now an expectation of Waukee residents.
- Interstate 80 is a significant barrier to regional trail connectivity north and south.



Feature Trails in Waukee Today



Heart of the Warrior Trail



Raccoon River Valley Trail



Sugar Creek Trail



Kettlestone Trail

Greenways

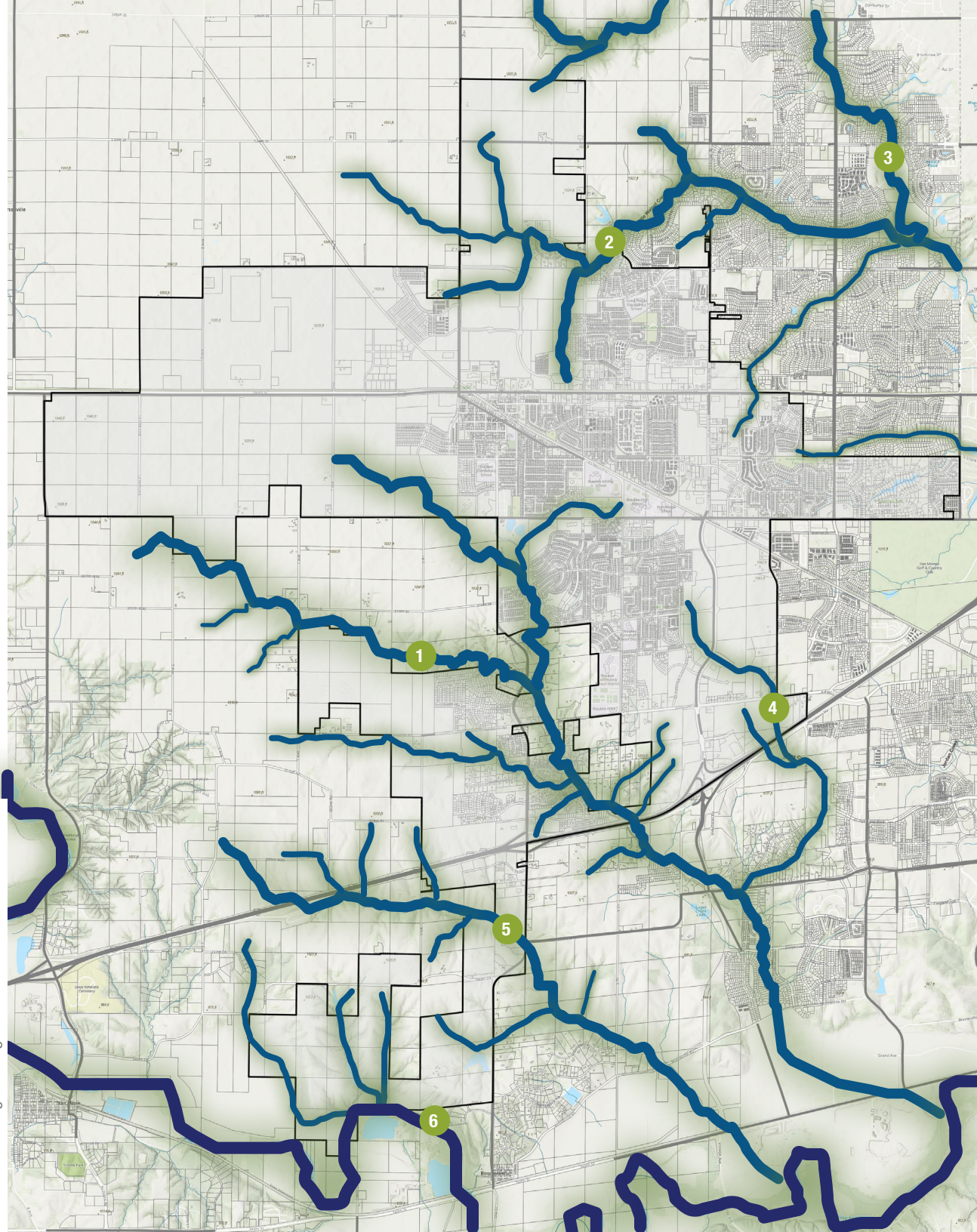
Like many cities in the Des Moines metro, several greenways cross through Waukee. These greenways provide excellent opportunities for trails, as evidenced by Des Moines, Clive, and West Des Moines, among other cities. Additionally, many drainage areas less suitable for development flow into greenways, offering further neighborhood connectivity. **A priority in the Trails Plans is providing a trail through greenways when possible.**

For trail planning, several components of existing greenways are essential to understand. Ultimately, these criteria determine where trails can occur in greenways.

- **Areas that experience flooding and should be protected**
- **Areas that include sensitive habitats**
- **Areas with unstable stream banks that experience erosion**

GREENWAYS AROUND WAUKEE:

- 1 Sugar Creek
- 2 Little Walnut Creek
- 3 Walnut Creek
- 4 Fox Creek
- 5 Johnson Creek
- 6 Raccoon River



Trail Opportunities

The Trails Master Plan for Waukee builds around opportunities. Opportunities are areas with the greatest benefit to residents with the ability to leverage existing or future assets for trail growth.

FUTURE LAND USE

Imagine Waukee 2040 guides future land uses in Waukee. It provides a great starting blueprint for future trail development and greenway preservation. Future commercial areas, schools, and parks are all important to access by trails.

Note, Imagine Waukee 2040 does not provide detailed land use plans for the entire planning context. However, the land-use development principles should also be applied to these undefined areas and are used as the basis for proposing trail networks in undesignated future land-use areas.

FUTURE STREET CONNECTIONS

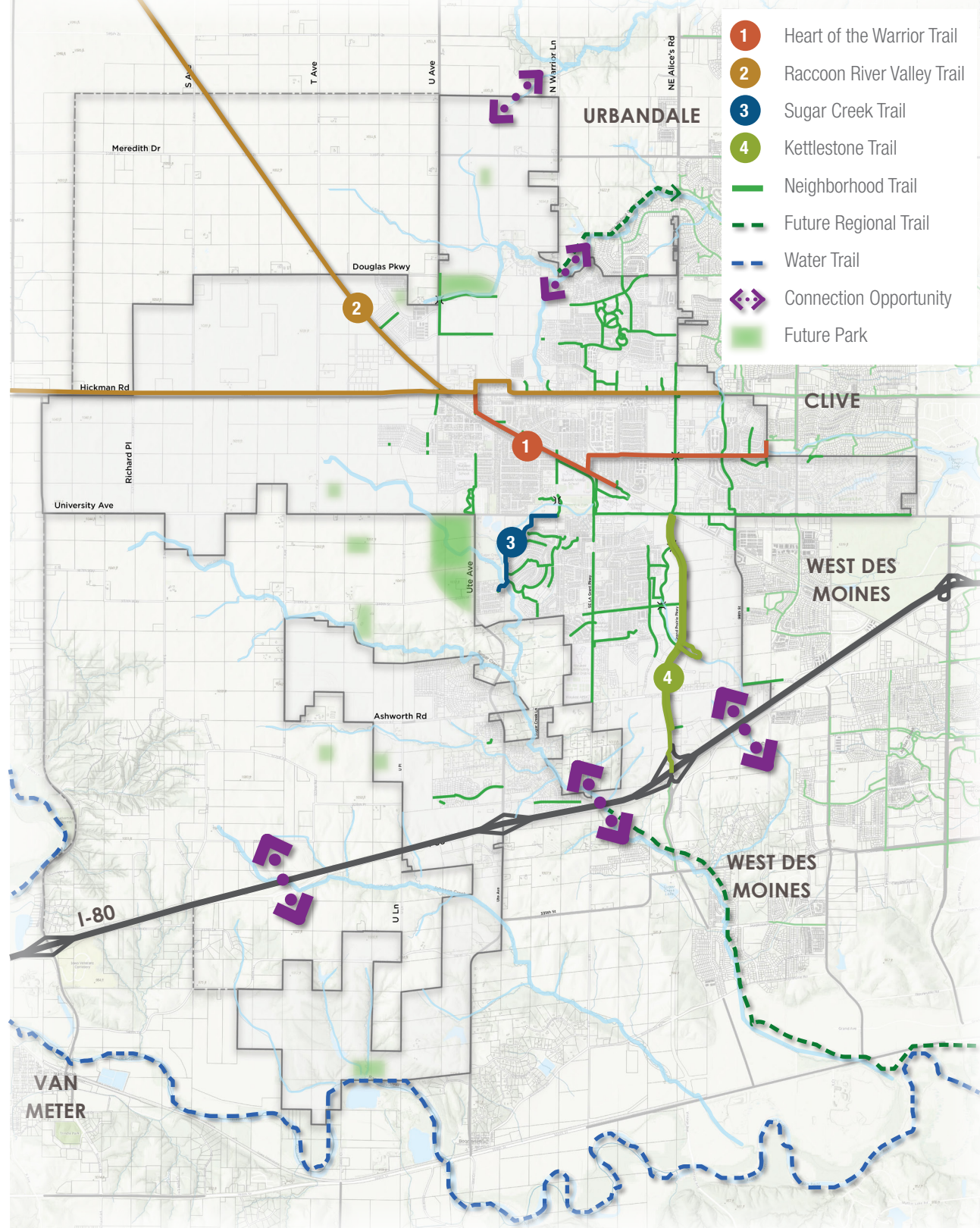
Many future arterial and collector streets are recommended as the city grows and will include sidepaths in the right-of-way.

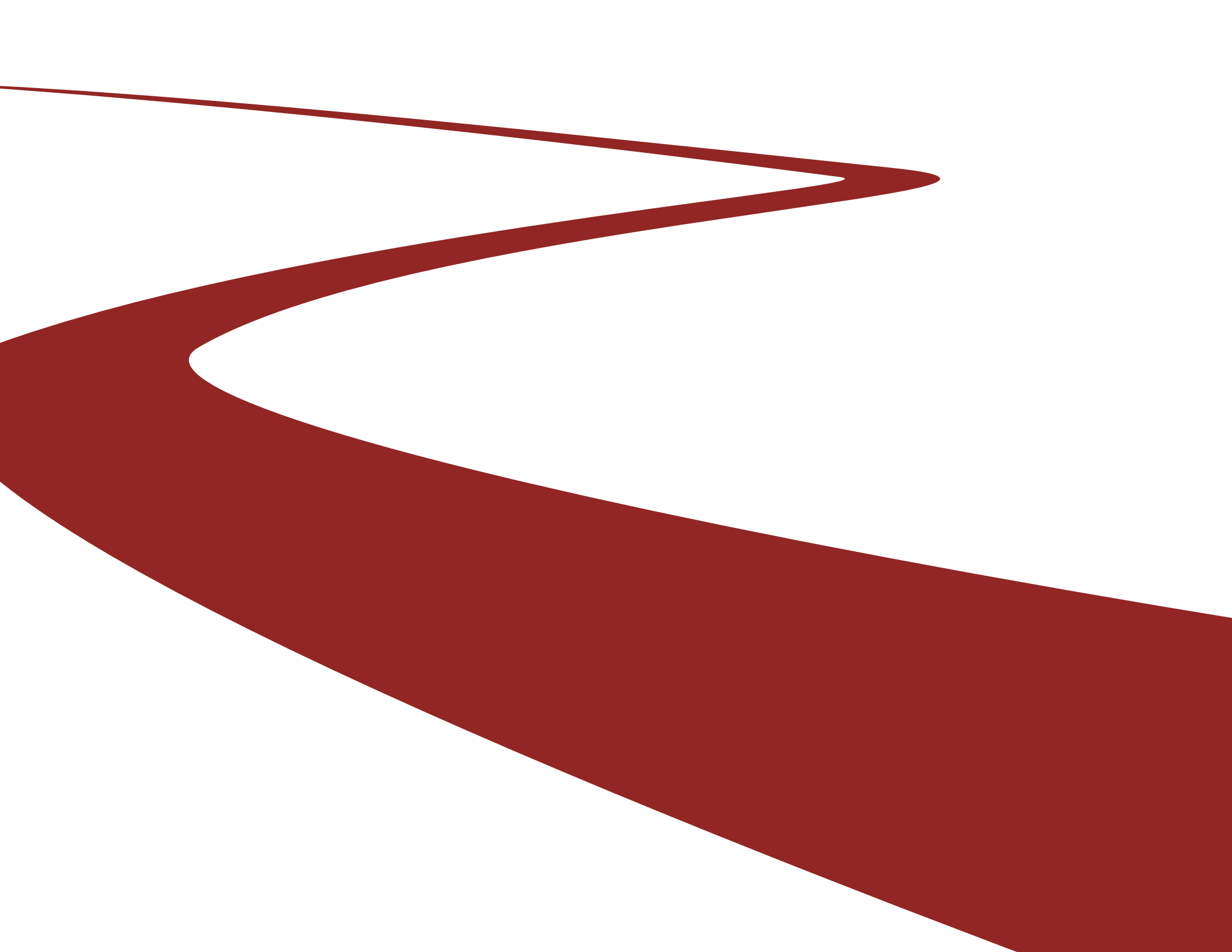
GREENWAYS AND FUTURE DRAINAGEWAYS

In addition to greenways, other drainage routes on a smaller scale provide good opportunities for neighborhood and regional connector trails. Some of these drainage areas are not currently distinct. Drainage paths would need to be preserved and managed as land develops and more impervious surfaces increase water flows to these natural drainage areas.

PROPERTY OWNERSHIP

There are several key areas owned by the City that can be used for trail connections. Current policy for development is for developers to dedicate certain amounts of land for parks, open space, and trails.





2

Trail Network Concept

Overview

The trail network concept builds on existing planning policy and likely growth directions. The concept does not identify all possible trail spurs and trail types. Instead, the concept focuses on major priority routes to reserve for hard surfaced trails as development proposals come forward or where connections are critical in existing built-up areas in Waukee.

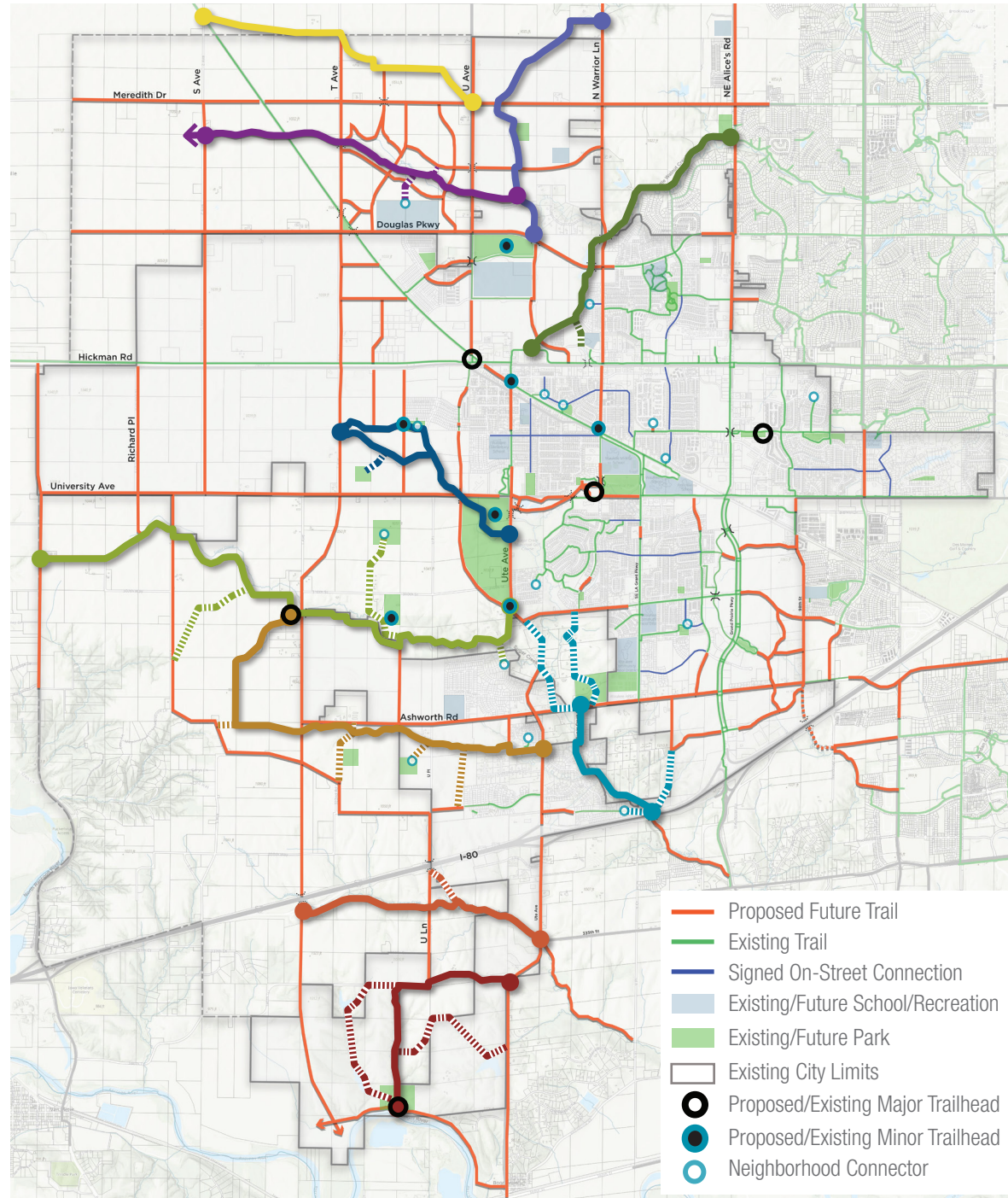
The priority routes represent lines of travel that achieve the highest level of connectivity, access to destinations, and feasibility within greenways and stream buffers. The routes reflect an analysis based on several guiding factors:

- **Integrity** - The ability of a system to link starting points continuously to destinations.
- **Directness** - The capacity to provide direct routes with minimum misdirection or unnecessary distance.
- **Safety** - The ability to minimize hazards and improve safety for users to reach destinations and the arterial and collector sidepath system.
- **Comfort** - Providing options to

reach destinations by off-street trails and areas buffered from major streets.



- **Experience** - The quality of offering users a pleasant and positive experience through Waukee's natural features.
- **Feasibility** - The ability of routes to support trail development with limited effects on environments and increases in long-term trail maintenance.

The network concept identifies alternative routes should acquisition of property or easements prove impossible in areas that are already developed.



– Note the network concept shows several opportunities for on-street bike routes to connect components of the trail system. These routes are meant to guide experienced cyclists to trail connections via shared roadways.

NETWORK CONCEPT DETAIL: PRIORITY NON-SIDEPATH ROUTES IN THE NETWORK

Map Key	Name	Endpoints	Opportunities	Challenges
	North Meredith Neighborhood Trail	U Ave to RRVT north of Meredith Dr	<ul style="list-style-type: none"> » Exact location can be determined with development » Connection to RRVT » No topographic barriers 	<ul style="list-style-type: none"> » Connection to RRVT is outside the planning area
	North Waukee Greenway	City Limits to Douglas Parkway	<ul style="list-style-type: none"> » Follow drainage way » Opportunity to connect with future regional trails to the north 	
	Little Walnut Creek Trail	NE Alice's Road to N Warrior Ln to Raccoon River Valley Trail (RRVT)	<ul style="list-style-type: none"> » Several properties under public ownership » Trail extension in place on the east end » Creek crossing can occur at N Warrior Ln 	<ul style="list-style-type: none"> » Portions under Clive jurisdiction » Topography on the northern portions » Some drainage area crossings for local entry points
	Little Walnut Creek Greenway	Sahu Acres Subdivision to S Ave and west	<ul style="list-style-type: none"> » Off-street trail along a greenway » Undeveloped and portions planned already » Connection to RRVT » Exact location can be determined with development 	<ul style="list-style-type: none"> » Need to work with County on RRVT connection » Several arterial crossing improvements needed
	Civic Campus Trail	Ute Ave/University Ave to T Ave	<ul style="list-style-type: none"> » Various portions planned » Spur route options in other drainageways 	<ul style="list-style-type: none"> » Contingent on sidepath development on T Ave
	Sugar Creek Trail North	Ute Ave to R Ave	<ul style="list-style-type: none"> » Limited number of property owners » Some established paths appear present » Limited additional creek crossings needed 	<ul style="list-style-type: none"> » Areas for critical connections on the east under private ownership » Timber clearing needed in several places
	Sugar Creek Loop	Ute Ave to T Ave	<ul style="list-style-type: none"> » Connections planned to future subdivisions » Limited number of property owners 	<ul style="list-style-type: none"> » Critical connection points under private ownership » Timber clearing needed in several places » A few bridge crossings needed based on topography
	Sugar Creek Trail South	I-80 to Ashworth Rd - spur options north	<ul style="list-style-type: none"> » Some common property ownership to form partnerships » Possibility for regional trail to West Des Moines if crossing I-80 » Fills a north/south trail gap in the area 	<ul style="list-style-type: none"> » Many property owners. Two connection options shown north of Ashworth Rd. » Most properties already developed » Up to four creek crossings needed based on topography
	Johnson Creek Trail	Ute Ave at 335th St to I-80 weigh station, potential crossing	<ul style="list-style-type: none"> » Possible regional connection to West Des Moines 	<ul style="list-style-type: none"> » Lower priority » No current connections across I-80 in the area
	Waukee South Trail	Ute Ave west along 340th Trl and south to the Raccoon River	<ul style="list-style-type: none"> » Possible regional connection to West Des Moines and Van Meter » Regional recreational opportunities along the Raccoon River 	<ul style="list-style-type: none"> » Lower priority » No current connections across I-80 in the area

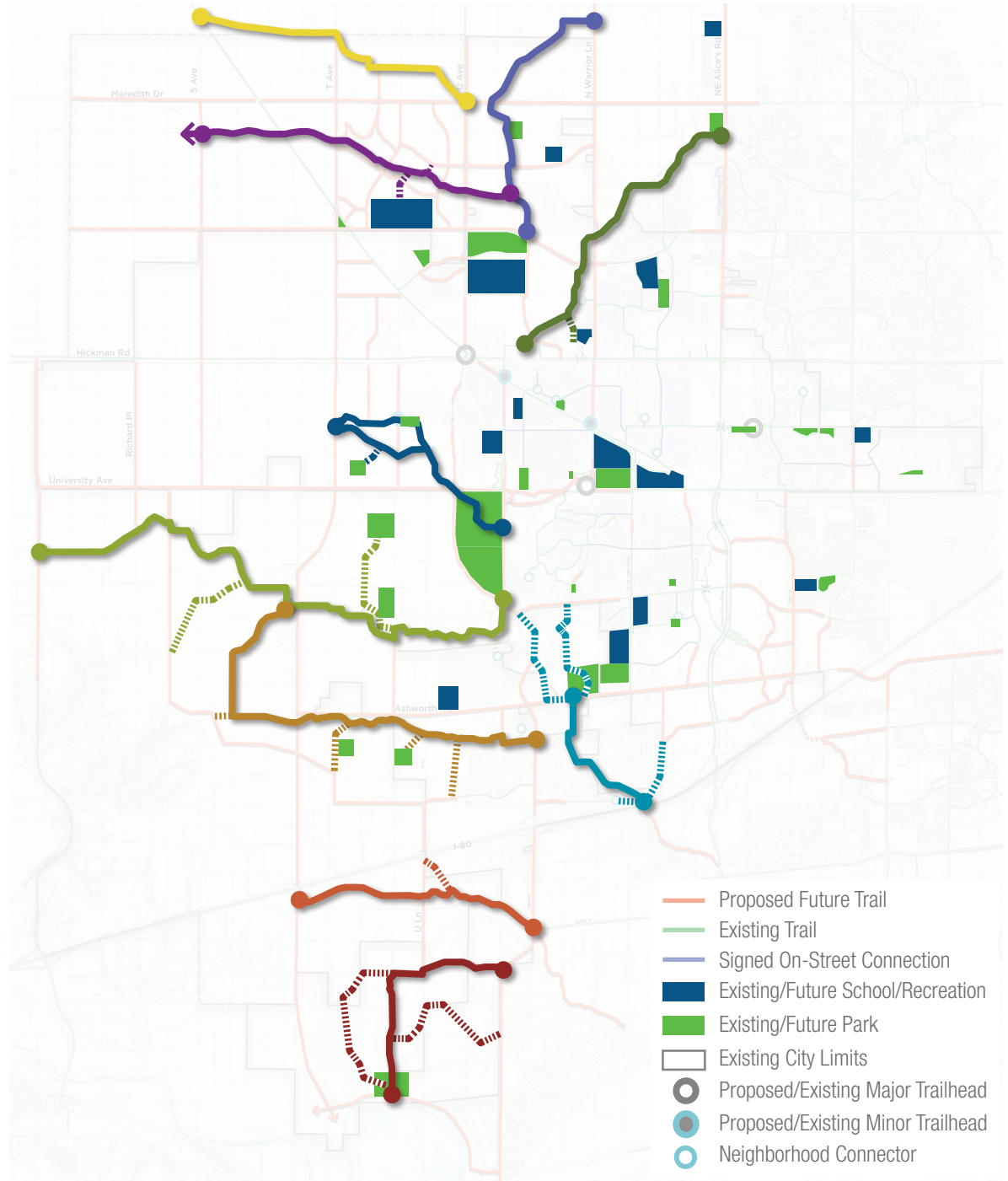
– These routes are mapped in detail and on file with the City to show which side of the greenway/stream a trail should go, bridge crossing locations, and an approximate buffer distances.

NETWORK CONCEPT DETAIL - SERVING DESTINATIONS

Each off-street trail is meant to reach existing and future destinations in Waukee. The priority destinations include schools, parks, recreation facilities, community activity centers, and other regional trails.

PRIORITY NON-SIDEPATH ROUTES IN THE NETWORK

Key	Name	Destinations Served
	North Meredith Neighborhood Trail	» Meredith Dr side path » Raccoon River Valley Trail
	North Waukee Greenway	» Triumph Park » Future parks » Meredith Dr and Douglas Pkwy sidepath
	Little Walnut Creek Trail	» Fox Creek Park and Grant Ragan Elementary via Douglas Pkwy. » YMCA » Raccoon River Valley Trail » NE Alice's Rd, N Warrior Ln, and Douglas Pkwy side path
	Little Walnut Creek Greenway	» Future middle school » North Waukee Greenway Trail » Raccoon River Valley Trail
	Civic Campus Trail	» Civic Campus » Future Parks » Sugar Creek Trail North » Warrior Park
	Sugar Creek Trail North	» Future parks » Civic Campus » Civic Campus Trail
	Sugar Creek Loop	» Sugar Creek Elementary School » Future parks south of Ashworth Rd » Sugar Creek Trail North
	Sugar Creek Trail South	» Timberline School and Complex » Timberline Campground » Ashworth Rd side path » West Des Moines
	Johnson Creek Trail	» West Des Moines » I-80 crossings
	Waukee South Trail	» Raccoon River » West Des Moines



NETWORK CONCEPT DETAIL - ACCESS POINTS

The trail network needs to be accessible from many locations. If good access points are not available, residents will be deterred from using the trail because of the distance to get on the trail. There are generally three types of access points in the network concept. Because of their different functions, each of the three access types has different location criteria and menus of features.

MAJOR TRAILHEADS

Purpose. Provide essential access to the trail system and include information and amenities for trail user comfort. Trailheads that serve local and regional populations that arrive by car, bike, or transit may have various features.

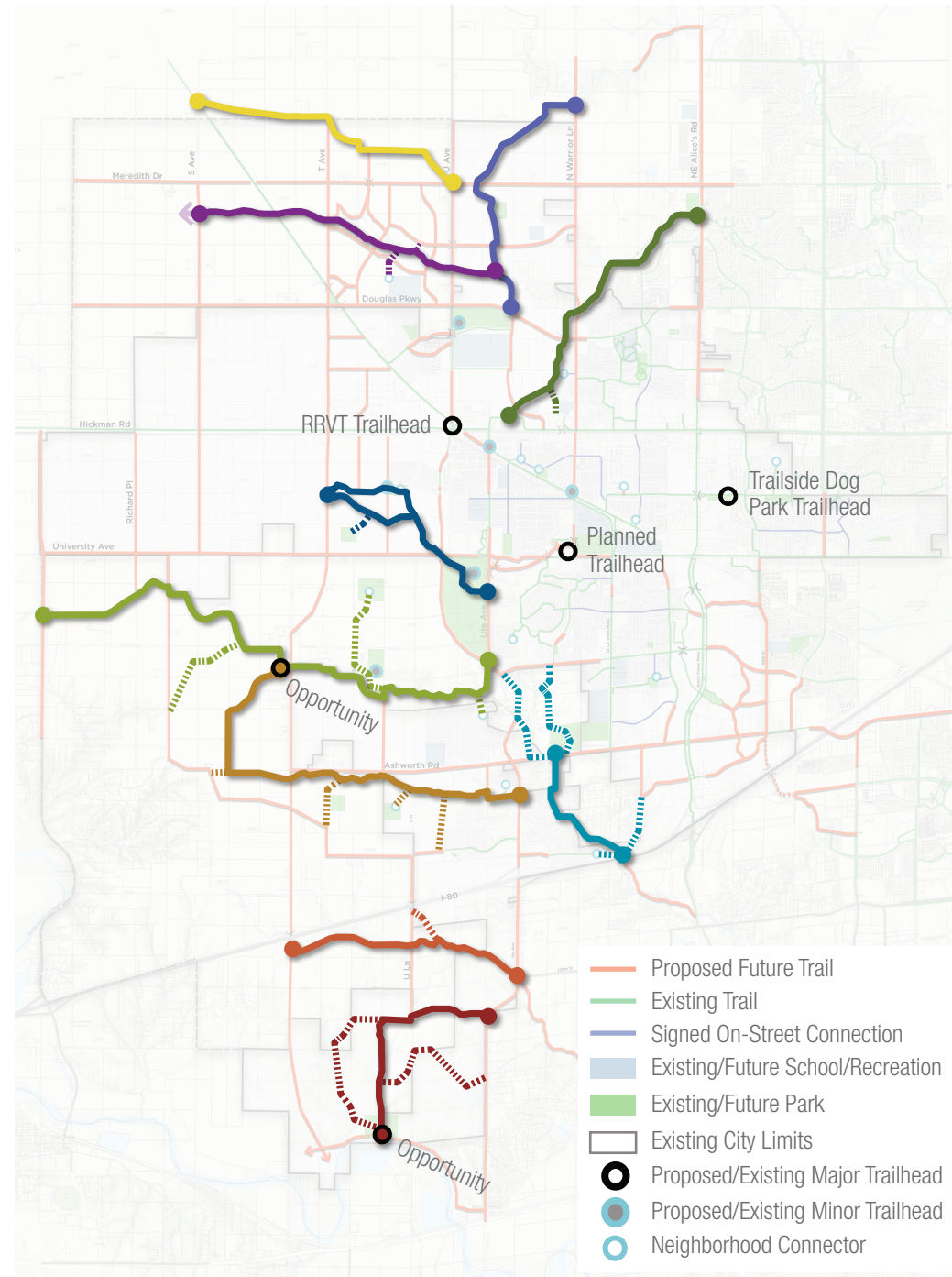
Criteria. For Waukee, major trailheads will function as interchanges, where people arrive by car and become pedestrians or bicyclists. They will also tend to use these entry points for recreational purposes. Criteria for sites include

- » Direct adjacency to a major trail. A location that requires 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.
- » 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, is desirable.
- » Presence of existing features or facilities that serve multiple uses, such as substantial parking areas.

Features. 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.
- » 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.
- » Interpretive information if applicable.
- » Fix-it station, installations that have secured tire pumps and tools for light repairs.

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



MINOR TRAILHEADS

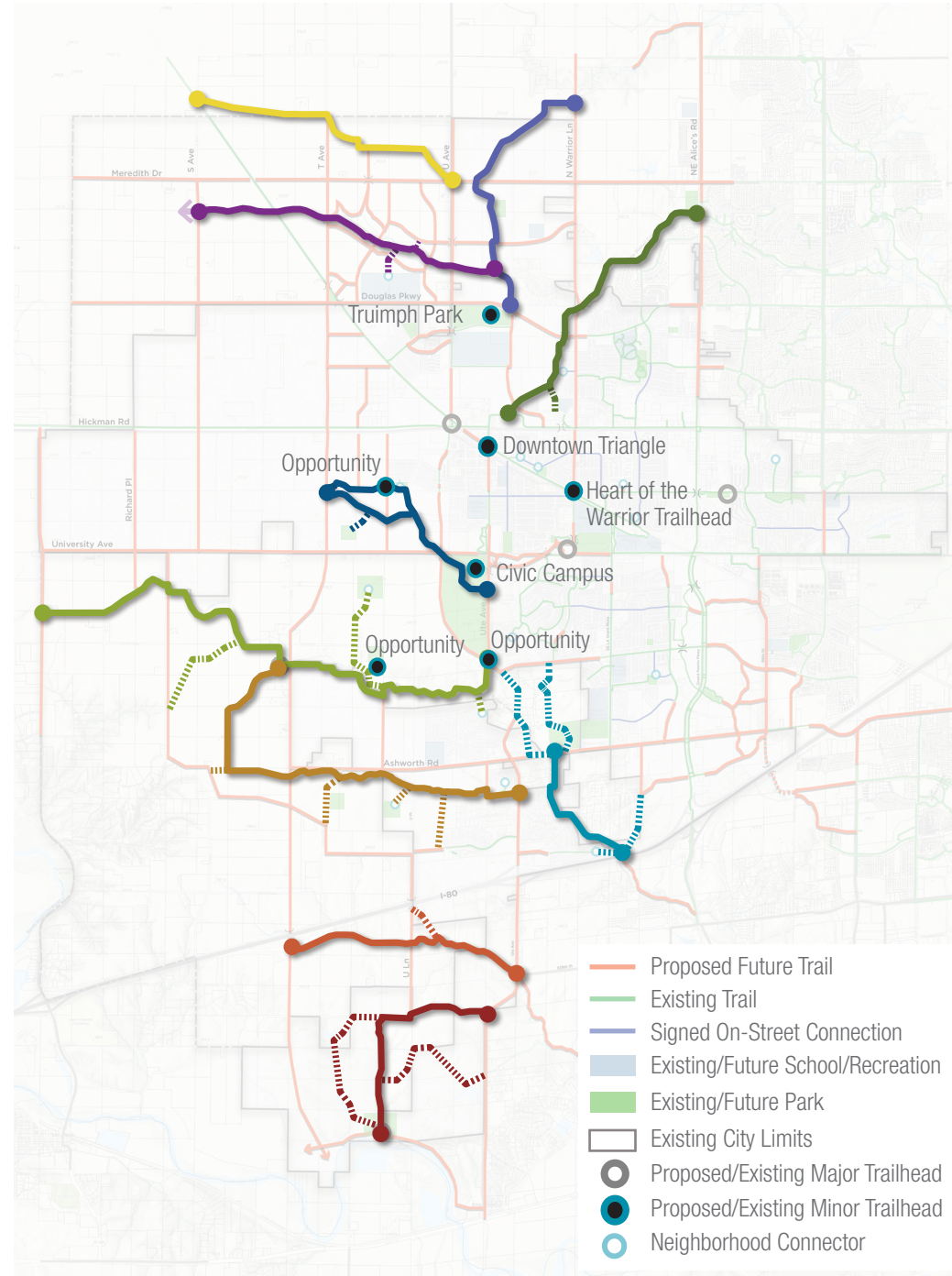
Purpose. Provide strategic points of access to the trail system. They typically serve local users. Users are more likely to walk or bike to minor trailheads. In addition to marking entrances to the system, minor trailheads can provide users with information and some amenities but have a much more limited facility program than major trailheads.

Criteria. Minor trailhead sites include:

- » As with major trailheads, direct adjacency to a major trail. Avoid a location that will require some level of on-street cycling or walking.
- » 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 exit from the trail.
- » Nearby commercial convenience services are desirable.

Facilities. A minor trailhead may include:

- » A small parking area if available in an adjacent use.
- » Bicycle parking for a few 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.



NEIGHBORHOOD CONNECTORS

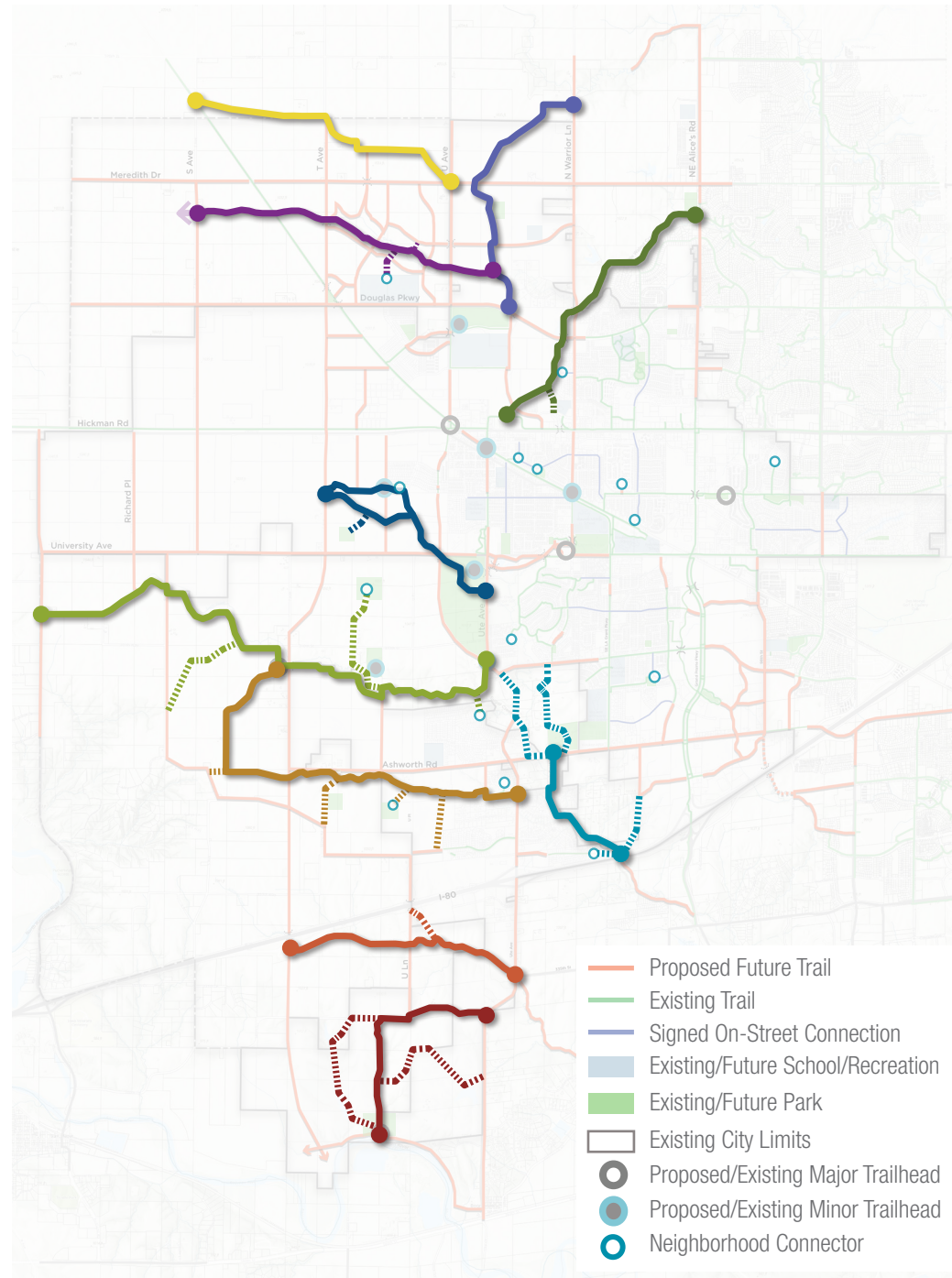
Purpose. Are “fingers” in the system that spur from the major trail routes to grant access to and from neighborhoods, parks, sidewalk systems, or other destinations. Neighborhood connectors are typically shorter than a block in length where users can see the connection point. Additional support facilities are usually not needed other than potential wayfinding signage at critical junctures where the neighborhood connector connects to the major trail.

Criteria. A neighborhood connector:

- » Provides a short distance to a major trail via a direct and visible distance.
- » Access to the major trail can be made by a ten-foot hard-surfaced path.
- » In neighborhoods, connects to a sidewalk system and on-street bike route where appropriate to reach a nearby destination or make a connection.

Features. Neighborhood connectors:

- » May include wayfinding at the trail junction to identify the trail and nearby destination.
- » Are under public ownership to allow unrestricted entry and exit.
- » Have a trail location marker if a broader emergency marking system is in place citywide.



Wayfinding

A critical component of a trail system is telling users where they are within the system. Imagine Waukee 2040 calls for “a city-wide wayfinding and signage plan for trails to bring people into Waukee and to help them navigate around the community.” Thus, a trail wayfinding system will need to be implemented with the build-out of the network. A wayfinding system should answer the following questions:

- **Where am I and where am I going?**
- **How do I get there from here?**

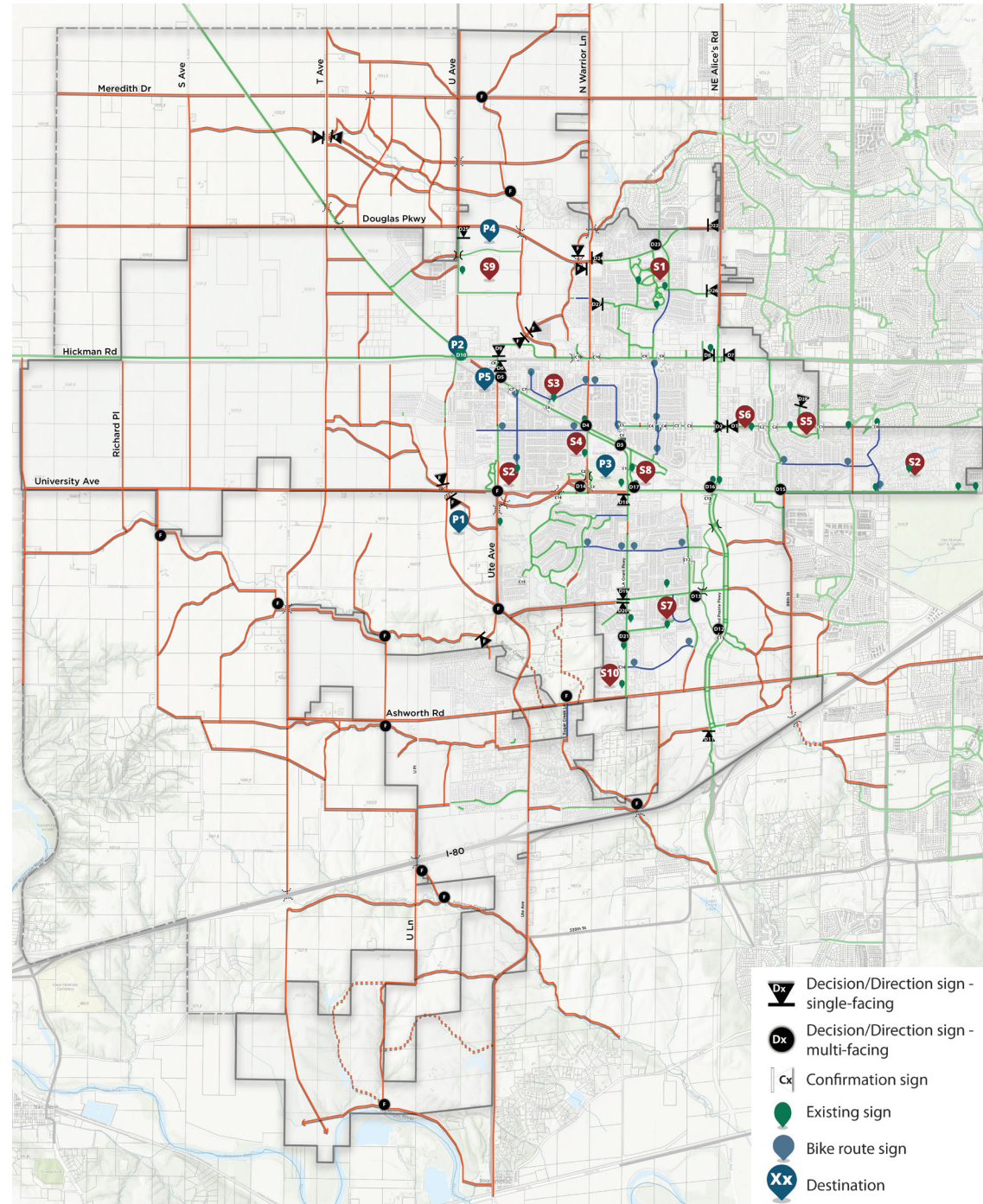
Today, there are no wayfinding markers on the trail system because the system is not at the connective capacity to make the investment warranted. However, investments in trail wayfinding will be an important component for future trail success. Note, wayfinding on the Raccoon River Valley Trail is controlled and funded separately from the City of Waukee.

Wayfinding signs are a relatively simple way to increase the awareness of the trail system, help people feel more comfortable using the trail system and show the City’s commitment to active transportation options. People will quickly become discouraged from walking or riding their bikes to destinations if they get lost, or the trip takes longer than expected. There are several key goals to the effective placement and layout of a wayfinding system:

- **Interception - To inform pedestrians, bicyclists, and even motorists of the presence of a trail system.**
- **Redirection - To inform travelers of a route decision, such as a turn at an intersection, or a choice between alternative routes. The wayfinding signs should be placed in advance of decision points and should**
- **include distances to intermediate and distant destinations.**
- **Reassurance - To inform users that they are on the correct trail, placed soon after intersections and long stretches between signs.**
- **Welcoming - To inform the traveler of arrival at a destination.**

The preliminary trail wayfinding concept that focuses mainly on directions/decision point signs, considering proposed future trail routes and destinations. The exact placement will depend on the final trail placement and other functional elements in the area, such as lighting, utility boxes, and regulating signage.

– *A full notation of possible sign contents is available separately*



DESTINATIONS

A wayfinding system cannot, and should not, try to identify every possible destination. Instead, the system should identify a limited number of key destinations that both residents and visitors frequent most. These types of destinations in Waukee include:

- **Primary Destinations** – Destinations or districts that have regional importance. These destinations warrant directional signage to appear on signage further away from the destination. Examples include:
 - » Civic Campus
 - » Raccoon River Valley Trail Trailhead
 - » Centennial Park
 - » Triumph Park
 - » Downtown
- **Secondary Destination** – Destinations of lesser regional importance and more local importance. Destinations appear on signage at closer distances to a secondary destination than primary destinations. Examples include:
 - » Fox Creek Park
 - » Warrior Park
 - » Windfield Park
 - » Waukee Public Library
 - » Ridge Point Park
 - » Trailside Dog Park
 - » Westtown Meadows Park
 - » Waukee High School
 - » Northwest High School
 - » Timberline Soccer Complex

TYPICAL SIGNS SEEN ALONG THE TRAIL SYSTEM TODAY



FAMILY OF SIGN TYPES

Sign types for implementation based on the guidance from the NACTO Urban Bikeway Design Guide include:

- **Confirmation Signs - Indicate that users are on a designated route or have reached a destination.** These signs can include destinations for efficiency in sign usage and placement at a needed point along a route.
- **Turn Signs - Indicate where a trail turns at a fork in the trail or from one street to another.** These can be used with pavement markings and should include a destination(s) and/or the trail name. Distances to destinations can also be included.
- **Decision/Directional Signs - Mark the junction of two or more trails or sidepaths.** Decision signs should be one of the first implemented, as they can prevent unnecessary confusion. These signs are placed at junctions where the user needs to make a decision on their way to a destination, particularly if they are not assisted by a mobile device.

Other signs that might be seen along the trail system include:

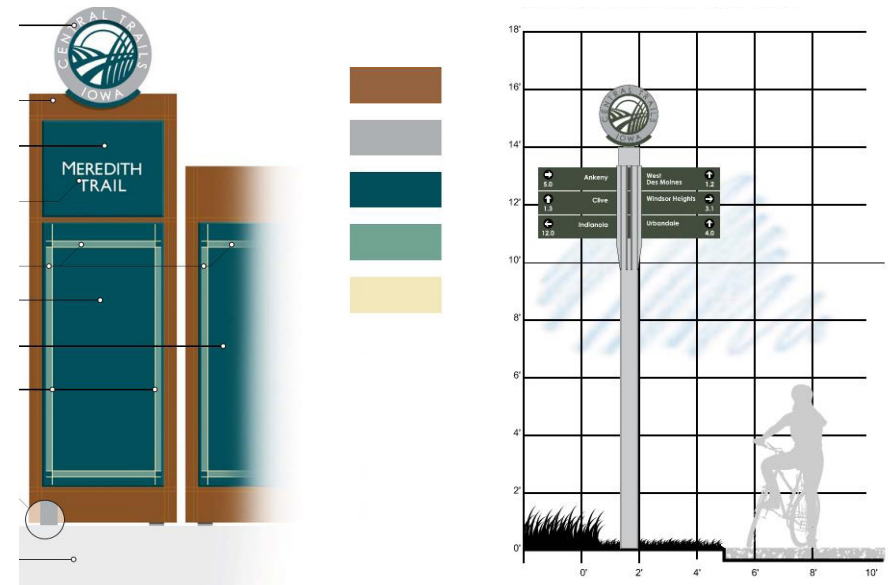
- **Informational Signs - Contain necessary instruction on the use or answer inquiries on the history of a place.** Information signs can also be used in regular intervals to display emergency contact information and trail location markers. These signs are not considered in this plan.
- **Regulatory Signs - Some of the most important signs—telling the regulations or requirements of the area.** These signs are not considered in this plan but will be important for the City to consider for content and location, such as emergency contact information or trail rules.

SIGN CONTENT

Simplicity is key to a successful trail wayfinding system. Messages on signage should be clear and as short as possible. Too many destinations on a sign confuse users. Additionally, too many signs can be just as bad as too few.

The content of each sign will depend on the desired primary and secondary destinations. The examples from the previous page are a starting point and are reflected in the wayfinding map. The trail signage can build on the work completed for a street wayfinding system.

This Trails Plan does not recommend signage branding, but consistency with the Central Iowa Trails brand can be beneficial when attracting regional cyclists when intra-city connections are completed. Additionally, the exact design of other base sign templates should follow MUTCD standards for readability, mounting height, and placement (Section 9B.01).



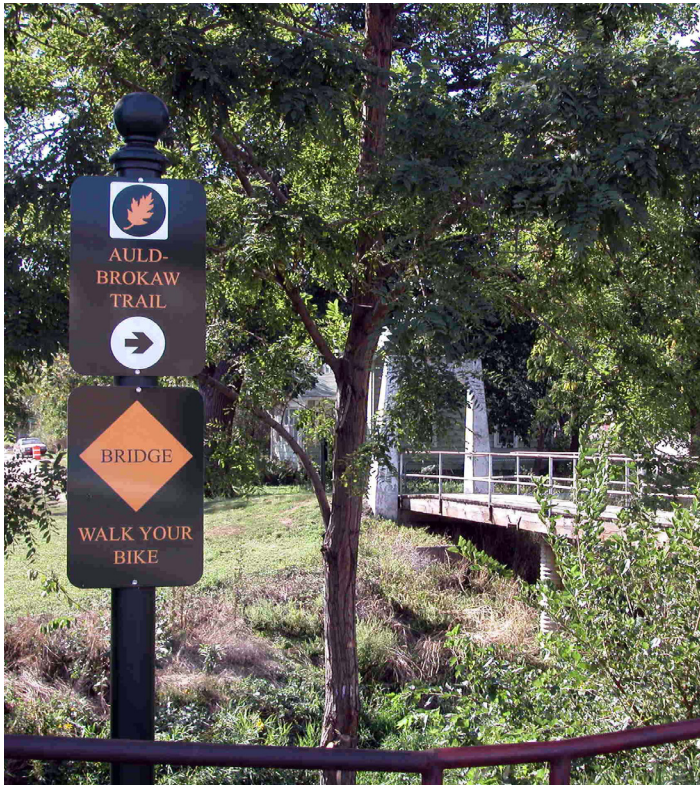
» The Central Iowa Trails Communication Master Plan may be a starting point to consider for regional trail signage design. Source: Iowa Natural Heritage Foundation and Des Moines Area Metropolitan Planning Organization (2006).

Turn Signs

» Turn signs point the way

LOCATION EXAMPLE

Turn signs are not explicitly identified on this wayfinding plan. However, they have a role to play when trails become more complex and more frequent destinations are along a route. Turn signs can direct people to the safe route to reach a destination when a that destination is in sight, such as across a major street and on safe routes to school. It can also be appropriate to place them off the regular trail system and at point to direct people to a trailhead or neighborhood trail connection point.



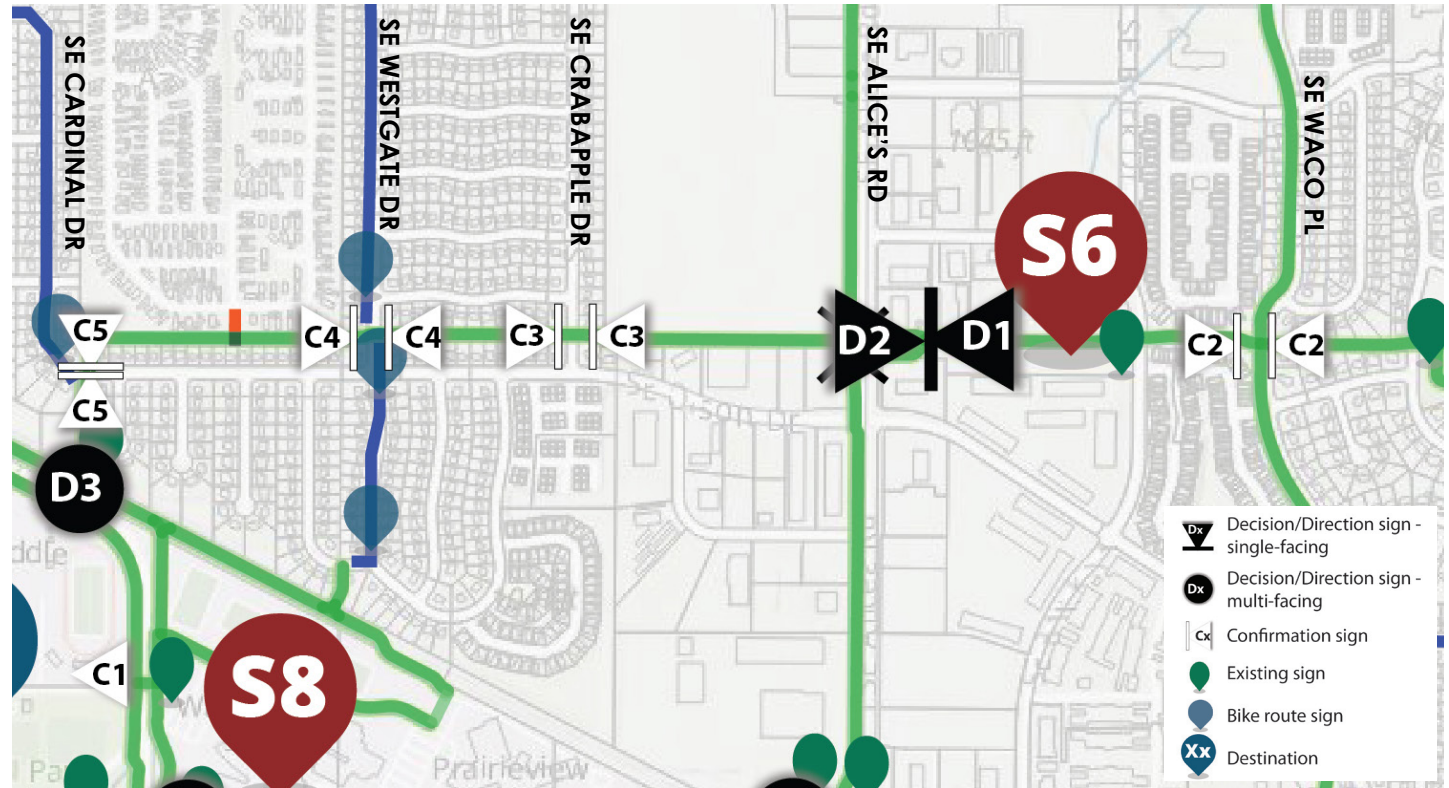
– Many times turn signs can act like direction/decision signs and confirmation signs. They direct travelers even if there is not a fork in the path. They confirm that a turn is still on the right path.

Confirmation Signs

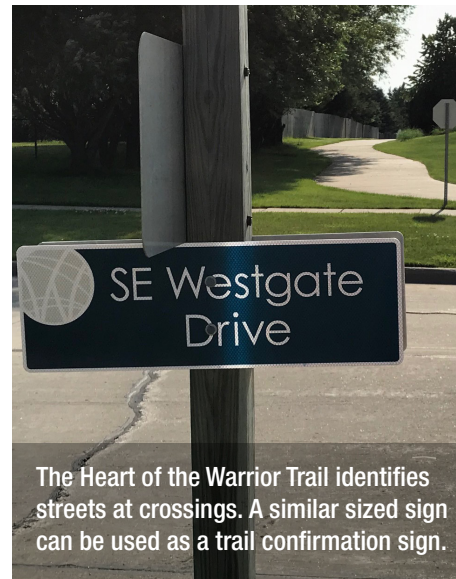
LOCATION EXAMPLE

» Confirmation signs announce or reaffirm the location or route

Where the Heart of the Warrior Trail meets a grade-separated crossing or turns into new neighborhood contexts. For example, shown below, trail uses that enter the trail from SE Westgate Dr or SE Crabapple Dr become aware of the trail name and those continuing on the trail know they did not make a wrong turn after passing a sidepath intersection from the east on SE Alice's Rd and a bike route sign on SE Westgate Dr.



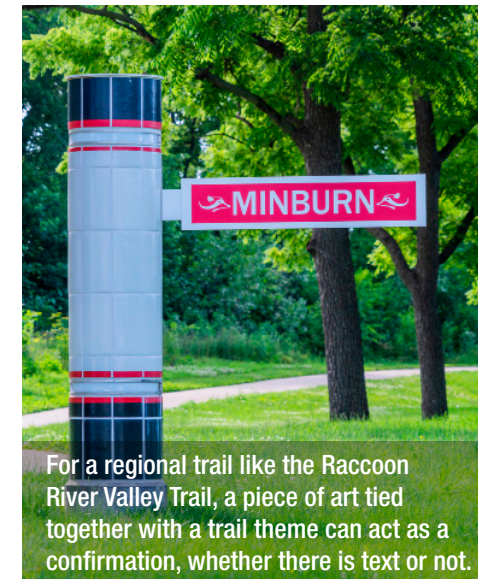
– A confirmation sign should not be complex and takes little investment



The Heart of the Warrior Trail identifies streets at crossings. A similar sized sign can be used as a trail confirmation sign.



Confirmation signs can also be combined with directional signs for efficiency.



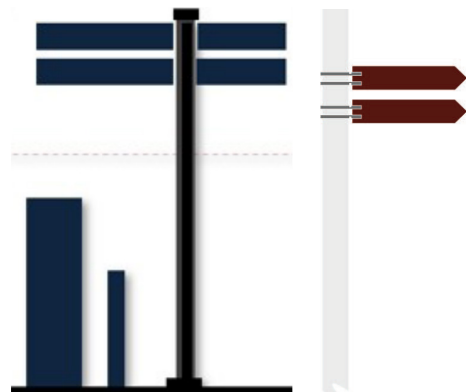
For a regional trail like the Raccoon River Valley Trail, a piece of art tied together with a trail theme can act as a confirmation, whether there is text or not.

Direction/ Decision Signs

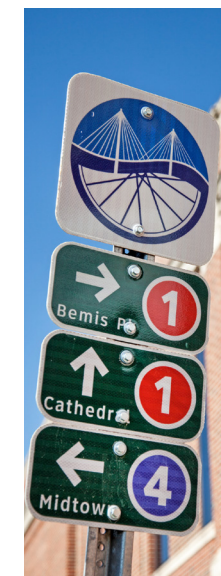
» Decision/Directional signs direct to destinations

LOCATION EXAMPLE

A properly placed decision or directional sign restored confidence in the trail user and provides knowledge on other destinations nearby. Intersections of trails are critical decision points to have signage. Below is an example where the Heart of the Warrior Trail passes under SE Alice's Rd. Strategically placed directional signs will tell users when to ascend to the SE Alice's Rd side path or continue along the Trail. Confirmation signs complement directional signs to tell users whether they've made the right decision.



– Direction/Decision signs at locations with users approaching from different directions could use multi-faced pole signs to list several destinations, if the sign does not conflict with traffic signage.





3

Implementation
Guidance

Overview

These guidelines intend to offer a degree of common expectations throughout the trail network. They do not anticipate every situation that will arise during the detailed development process and should not prevent others from developing and implementing other effective solutions. The guidance focuses on:

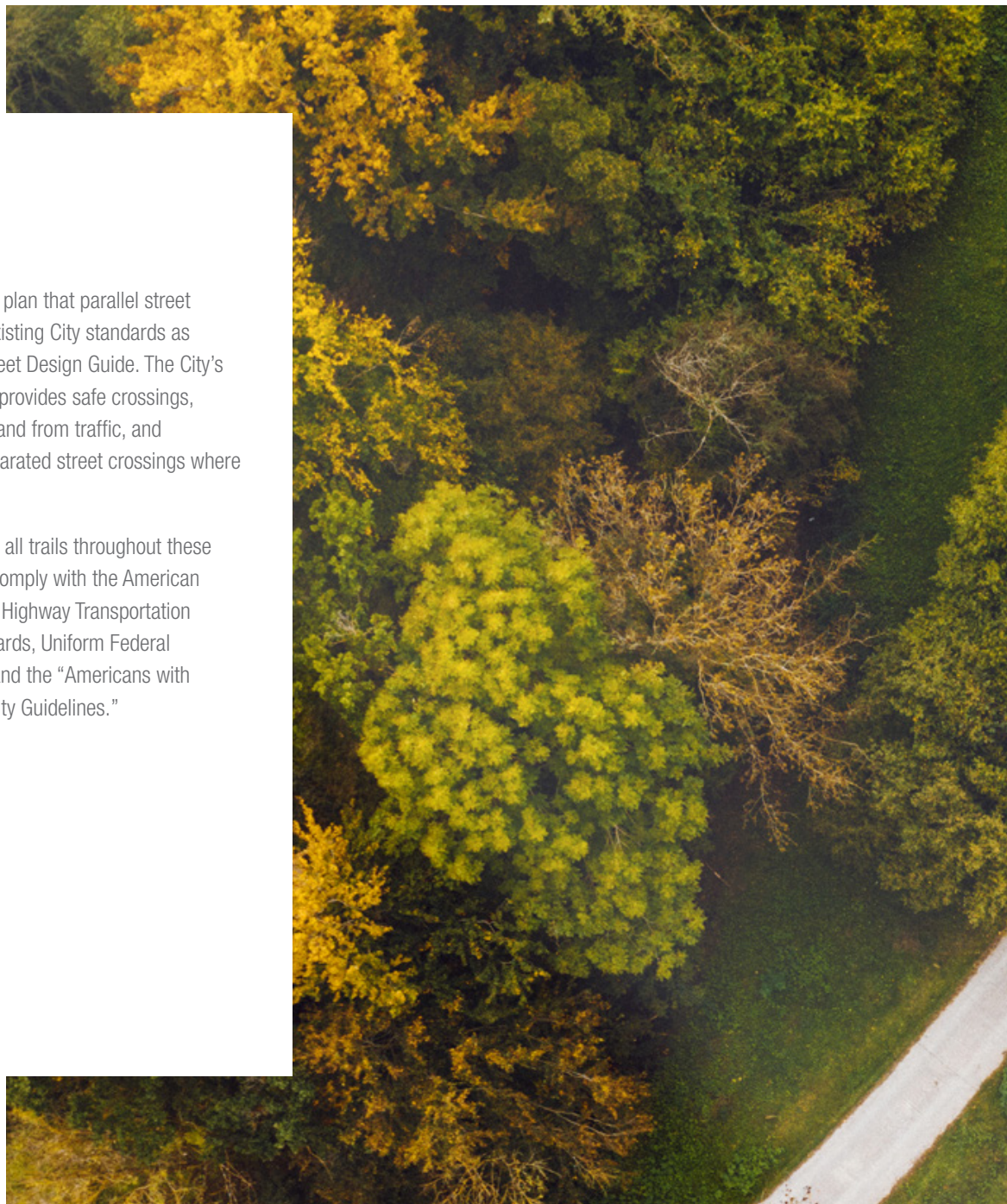
- **Easement requirements**
- **Environmental sensitivities**
- **Policy recommendations**

Much of the guidance in this chapter relates to best practices for trail development through greenways, drainageways, and natural open spaces.

Off-street trails proposed through future neighborhoods that otherwise do not transverse environmental features have relatively standard applications. Design can follow generally accepted standards like the Iowa Statewide Urban Design and Specification (SUDAS) or American Association of State Highway and Transportation Officials (AASHTO).

The trails depicted in this plan that parallel street corridors should follow existing City standards as shown in the Waukee Street Design Guide. The City's existing sidepath system provides safe crossings, adequate width for trails and from traffic, and investments in grade-separated street crossings where possible.

As a general standard for all trails throughout these guidelines, trails should comply with the American Association of Street and Highway Transportation Officials (AASHTO) Standards, Uniform Federal Accessibility Standards, and the "Americans with Disabilities Act Accessibility Guidelines."





Easement Requirements

Trail easements provide access for trails through new or existing development. Appropriate sizing of easements should allow for proper drainage, soil and tree protection, maintenance, user comfort, and privacy of adjacent property owners.

The use of easements apply to off-street trails/ shared use paths whether through a greenway, private property, or new subdivisions. The width of easements can vary depending on the context.

TRAIL EASEMENTS THROUGH GREENWAYS OR DRAINAGEWAYS

The Sugar Creek Watershed Assessment (2021) recommends acquiring open spaces along streams and drainageways when possible and provides template easement sizing for times when these areas cannot be acquired.

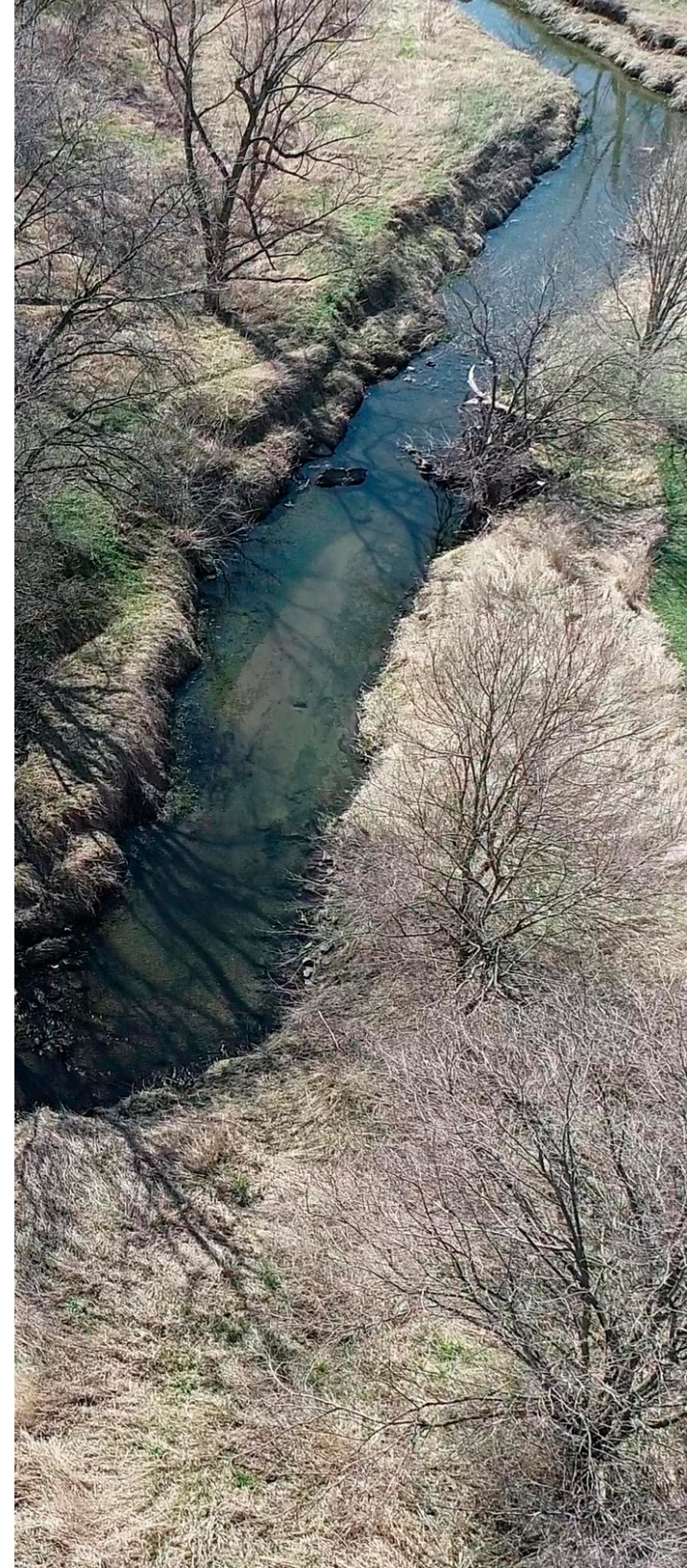
As shown in this Trails Plan, greenway and drainageways are key areas for trail connectivity. For proper spacing, trail specific easements or dedicated rights-of-way in these contexts should be:

- **25 feet (minimum) to accommodate trail and shoulder width, which includes space for buffering from structures, natural plantings, and trail features like lighting, benches, and trash receptacles.**

TRAIL EASEMENTS THROUGH OTHER OPEN SPACES AND NEIGHBORHOOD CONTEXTS

Trail easements through existing private property or future subdivisions require less width in most instances. The City currently requires a minimum of 16 feet for trails outside of street right-of-way. The following trail easement widths are recommended for different contexts:

- **16 feet**
 - » Where topography is not an issue and the easement provides short connectors to local streets or sidewalks. For example, at the end of cul-de-sacs to reach a trail or park.
- **Greater than 16 feet**
 - » Where topography may require more flexibility in exact trail location within the easement area.
 - » For trails intended to have other features other than paved paths. For example, benches, trash receptacles, art, or plantings.
 - » Where a trail is more than a relatively short connector and buffer space is desired from homes or private fences.
 - » When a trail is anticipated to get heavier use and regular maintenance and access by equipment will be needed over time.

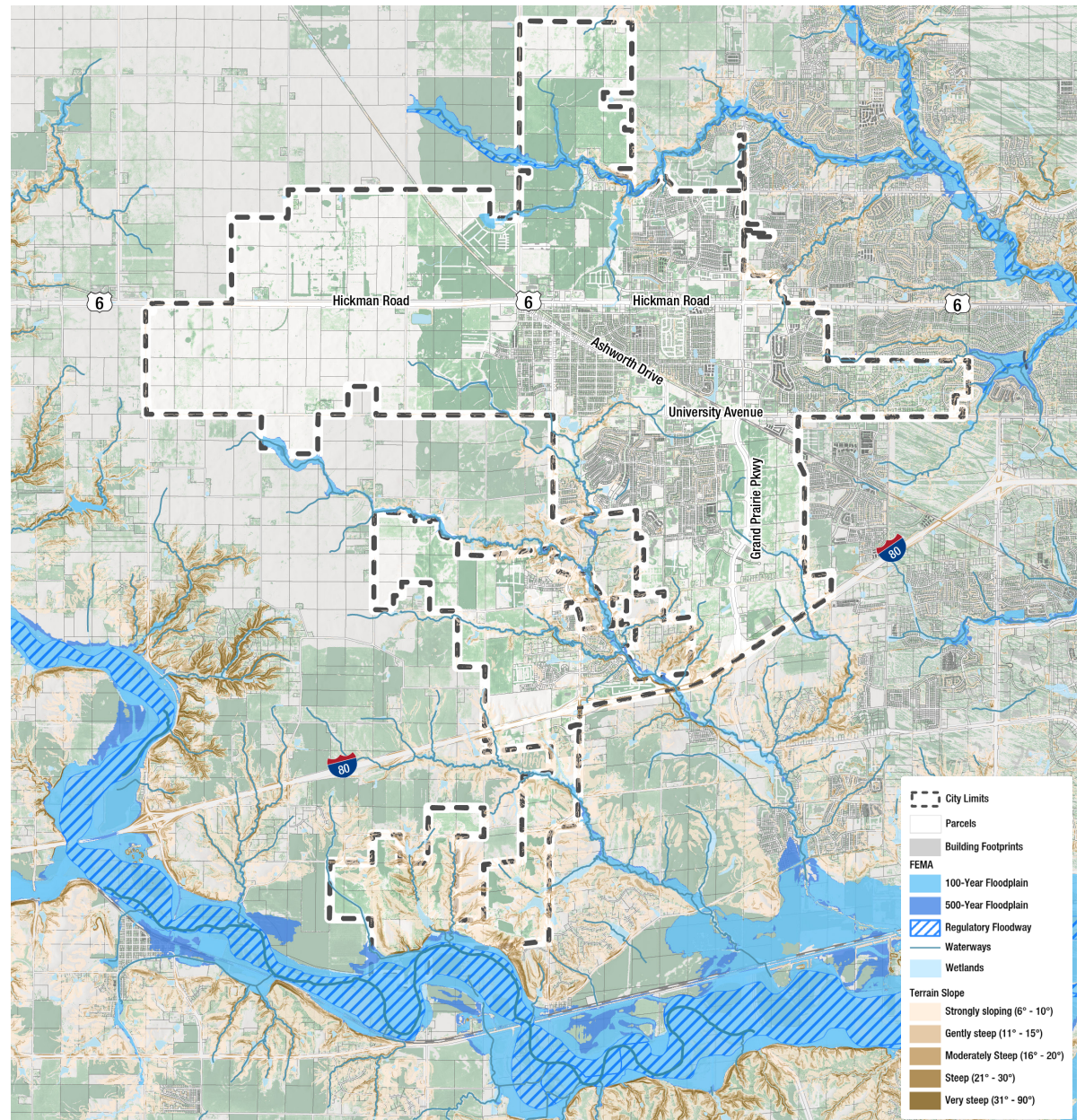


Environmental Sensitivities

THE GREENWAYS

The greenway and streams across Waukee are influenced by factors that occur in other communities and vice versa. Therefore, it is beneficial for Waukee and cities in the metro to follow similar environmental protection standards. Before major trail development, it will be important to have ordinances in place like those for stormwater management that are recommended in the Sugar Creek Watershed Assessment (2021) and Imagine Waukee 2040 (2019). For reference, these include:

- **Sugar Creek Watershed Assessment**
 - » The City has already adopted a stormwater ordinance aligning with others in the metro.
 - » Stormwater management areas could be constructed within the greenbelts along the primary path of flow (similar to the model used in the Kettlestone development).
 - » Another approach is to construct stormwater management practices next to the greenbelts, just outside of the floodplain.
 - » An ordinance that requires new developments to include more detailed studies to define required buffer widths.
- **Imagine Waukee 2040**
 - » PTROS P 2.1: Implement stormwater “best practices” into the design and operation of existing and future parks.
 - » PTROS P 2.2: Leverage the creation of a greenway system in Waukee to help protect plant and animal habitats.
 - » PTROS P 2.10: Incorporate parks as part of the City’s greenway system. Provide passive recreation space along greenway corridors for hiking, bird watching, plant walks, resting, and fishing.
 - » PTROS A 4.1: Develop a loop trail system that connects the regional trails to local destinations and provides a series of varied experiences for local riders.



Trail Design

Every off-street trail design will be different because each area has different topography, tree cover, water patterns, and other factors. However, there are best practices to use for development of all trails that navigate through greenways. The following pages illustrate design guidance for three trail contexts:

PRIMARY GREENWAY TRAILS

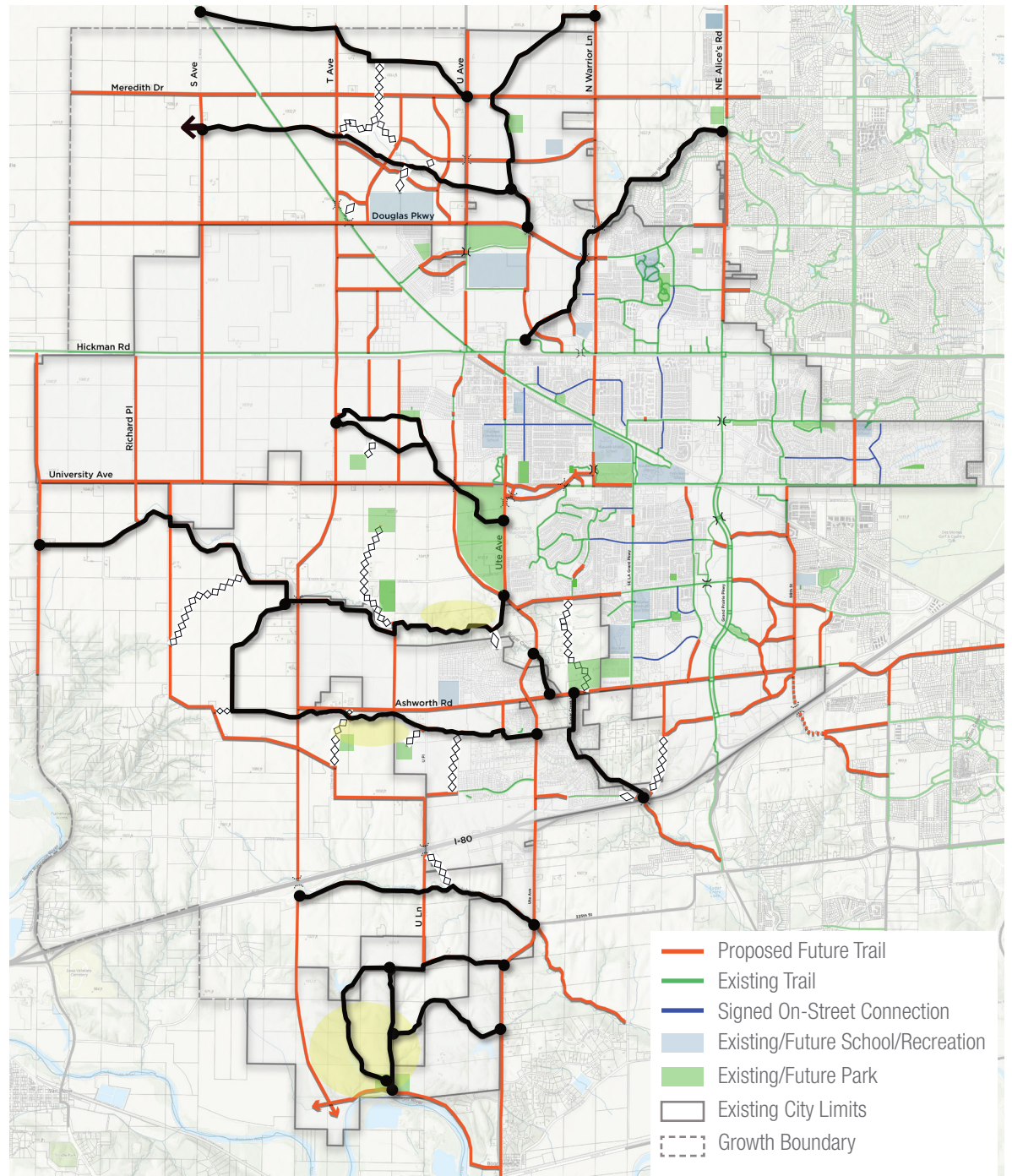
This trail section will be the primary through trail off the street network, with priority to be adjacent to drainage networks along the greenbelt, accommodating walkers, runners, cyclists, rollerbladers, and more. The overall width of the section helps facilitate safe interactions between diverse groups of users. The trail will meander through the greenway corridor, providing a variety of experiences both near and far from the edges of waterways or other natural features. It will also offer horizontal and vertical clearances to give a safe visual corridor for system users. The primary trail will be technically sound and a beautiful and scenic route.

SECONDARY TRAILS

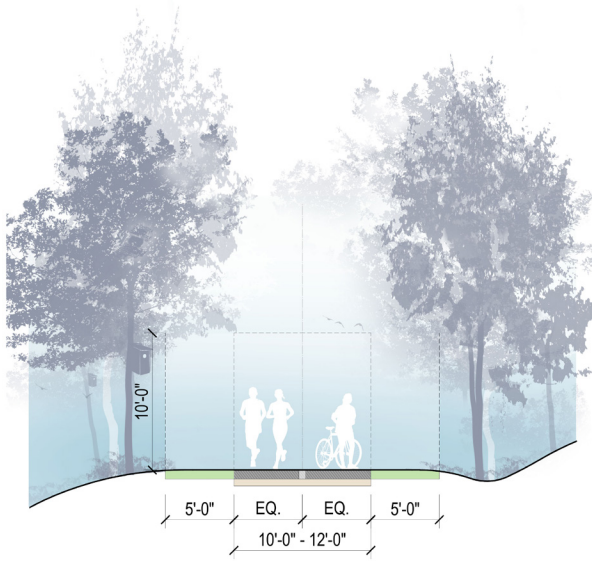
The secondary trail guidelines are designed to connect to neighborhoods, community spaces, and businesses. It will serve to stitch the primary trail into the community and help facilitate connectivity to the natural greenway system. Like the primary trail, this secondary trail system will be ADA compliant and have designated clear zones to maintain strong visual corridors for trail users.

TERTIARY TRAIL ZONES

The tertiary trail system occurs in key zones that can provide a more “off the beaten path” experience. These paths are not identified in the Trail Plan but can accompany park spaces or areas with wider greenways. This trail section will feel much more natural and be either a mown path or crushed limestone. The tertiary system is designed for areas that support a more passive audience: people who desire exploration in a quieter setting. Many of these areas may be home to flora and fauna and provide ample opportunity for self-guided education. These are not accessible routes and would have a smaller clear zone than the other trail profiles.



Trail Types



PRIMARY – TRAIL

Intent

- Scenic trail system paved for walkers, joggers, cyclists, etc.
- Center stripe to maintain direction separation

Surfacing

- 10' -12' wide trail, concrete or asphalt with associated base course or prepared sub-grade

Shoulder

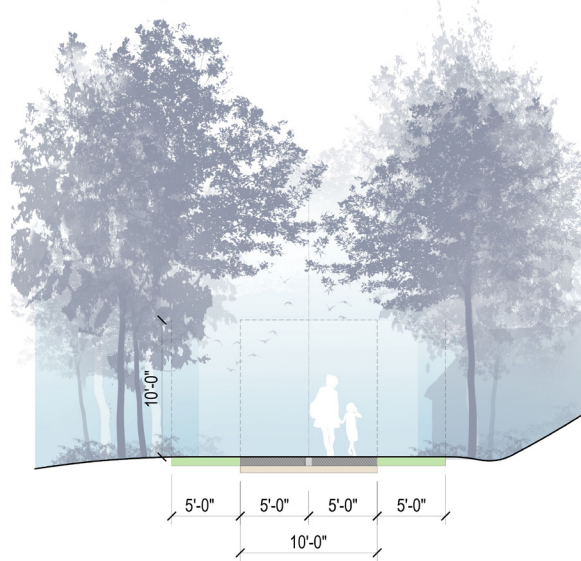
- ≥5' wide mowed area

Horizontal Clearance

- 5' wide clear zone on each side of trail
- 60' from stream (6' for every 1' of vertical bank)

Vertical Clearance

- 10' free of signage, tree branches, or other obstructions



SECONDARY – CONNECTORS

Intent

- Connection to different land use types and neighborhoods
- Center stripe to maintain direction separation

Surfacing

- ≥10' wide trail, concrete or asphalt with associated base course or prepared sub-grade

Shoulder

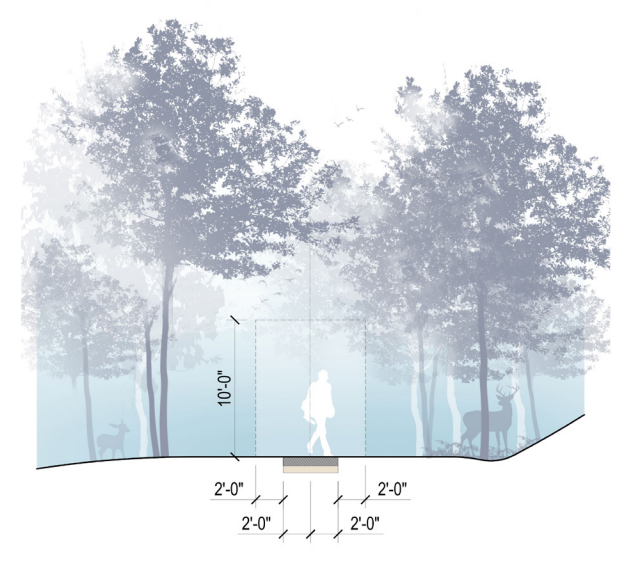
- ≥5' wide mowed area

Horizontal Clearance

- 5' wide clear zone on each side of trail
- 60' from stream (6' for every 1' of vertical bank)

Vertical Clearance

- 10' free of signage, tree branches, or other obstructions



TERTIARY – SOFT TRAILS

Intent

- Informal trail system for nature education, hiking, and observation. Areas to be determined with primary and secondary greenway trail development
- To connect natural areas and other program amenities

Surfacing

- 4' wide trail, mowed path, dirt, or crushed limestone/gravel with prepared sub-grade

Shoulder

- No shoulder necessary for soft trail system

Horizontal Clearance

- 2' wide clear zone on each side of trail

Vertical Clearance

- 10' free of signage, tree branches, or other obstructions

Trails Along Streams

Trail development practices must aim to minimize soil loss and impacts on natural areas to support a healthy stormwater and stream system within the greenbelt. The City also wants to provide a trail layout that requires minimal maintenance after flood events. The guidance here balances these two purposes to support a sustainable trail system that provides access to diverse habitats for an enhanced user experience.

STREAM ADJACENT GUIDELINE – EXISTING

In areas with an existing stream profile and adjacent trail system, the trail must be located at a distance equal to a 1:6 slope ratio from the top of the slope toward the trail. These areas also require an additional 15'-0" buffer zone before any hard-trail alignments. This will provide adequate distance to reduce erosion concerns and allow natural stream movements to occur over time.

STREAM ADJACENT GUIDELINE – RESTORED

In areas with a restored stream profile and adjacent trail system, the trail must be located at a distance equal to a 1:4 slope ratio from the edge of the restoration zone to the trail. These areas must also add a 15'-0" buffer zone before any hard-trail alignment. This profile will provide adequate distance to reduce erosion concerns and allow natural stream movements to occur over time. Each restoration zone will be distinct and dependent on several factors. Thus, there is no need to measure from the stream edge in this scenario.

STREAM ADJACENT GUIDELINE - FLOOD RISK EVALUATION

Areas next to several stream corridors in Waukee fall within floodplains or are prone to flood at different frequencies. It is possible these flood areas will also expand in the future. The City needs to evaluate its tolerance for placing trails along or close to routes that flood more often than others and the added maintenance costs. For example, policies on placing trails in 5-year versus 10-year flood event areas. Added maintenance after a flood event include debris clean-up, sweeping, and checking for pavement cracks or heaving.

For smaller watersheds, the flood frequency may only render a trail underwater for a few hours versus days. The shorter duration of flooding in these area create more maintenance needs over long-term closure concerns.



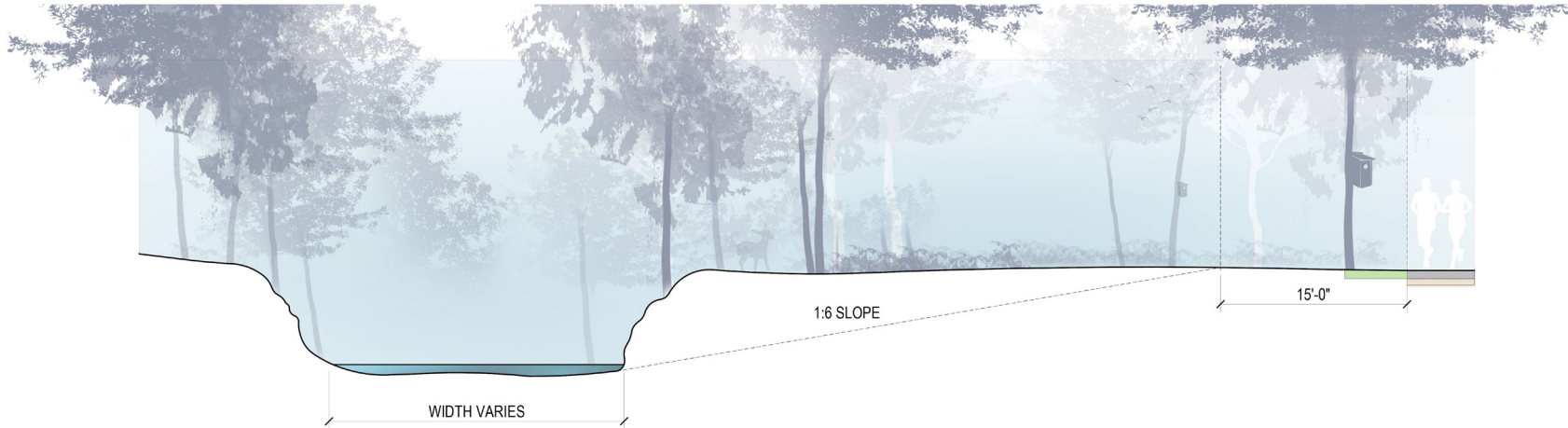
TRAIL SETBACKS ALONG STREAMS

Intent

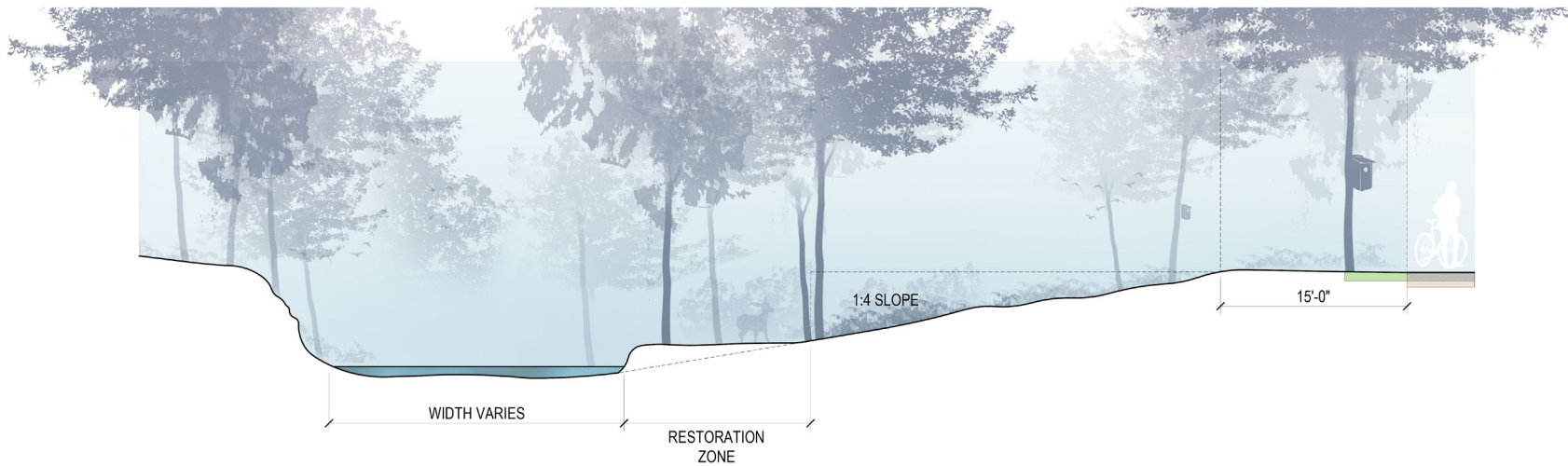
- Develop key setbacks for trails adjacent to a stream
- Provide additional 15' setback from key slope metrics
- 1:4 slope from existing top of slope on restored sections of stream
- 1:6' slope from existing top of slope on existing sections of stream

There may be instances where the setback may have to be further because of established or recommended stream buffers that are meant to limit increases in flood risk. The Sugar Creek Watershed Assessment (2021) provides stream buffer requirements which can also generally apply to other stream corridors through Waukee.

Stream Adjacent Trail: Existing



Stream Adjacent Trail: Restored Streambank



GREENWAY TRAIL PREPARATION

The Sugar Creek Watershed Assessment (2021) includes guidance on general maintenance of greenway habitats and construction methods for appropriate stormwater management. When preparing for trail construction, there are additional considerations to ensure longevity of the trail infrastructure and minimize maintenance needs: For example, pruning roots underneath the planned trail location up to a full growth season before to limit future pavement cracking and heaving from root overgrowth.

TRAIL MAINTENANCE

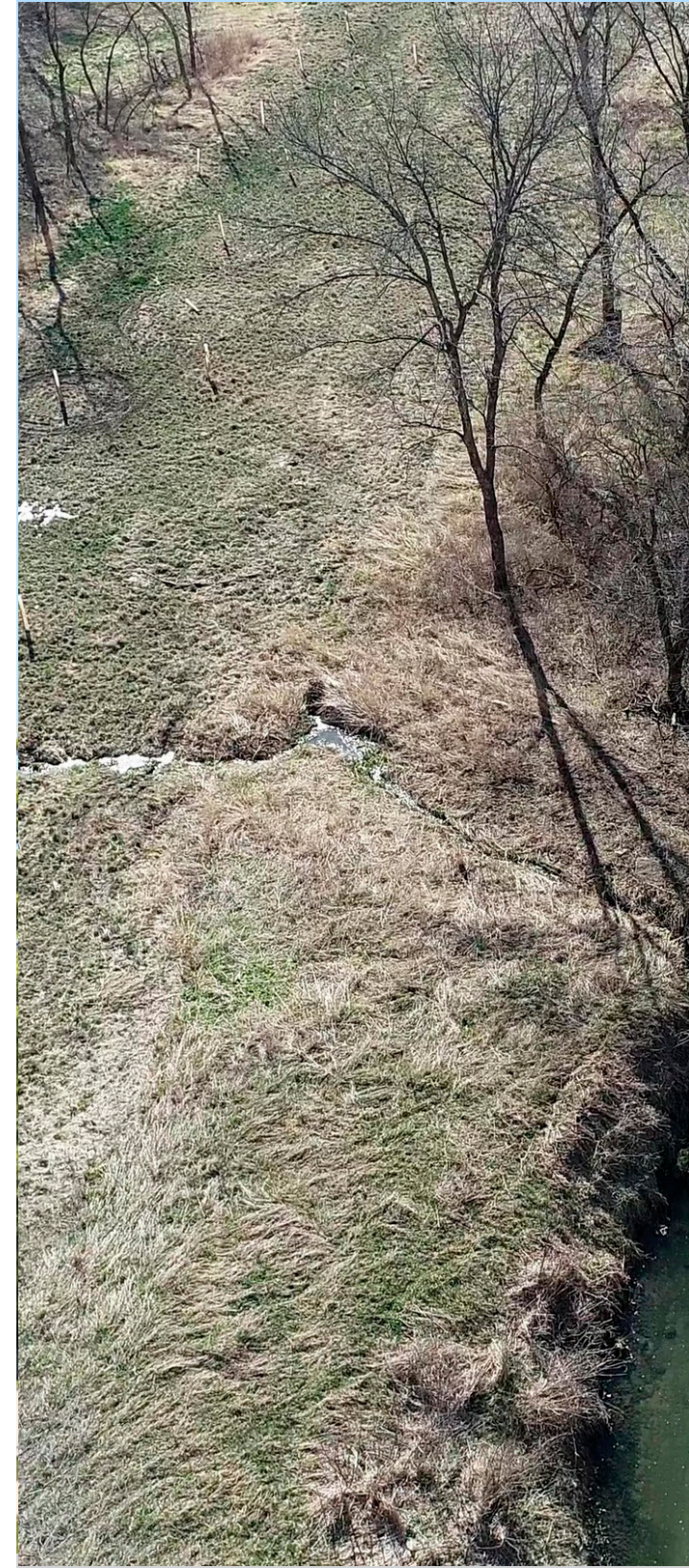
Today, the City of Waukee maintains its shared use paths and sidepaths and portions of the Raccoon River Valley Trail, including snow removal. For trails within heavily vegetated or flood prone areas, additional maintenance operations should occur:

- **All trails should be free of obstructions and brushed out of the clearance zones.**
 - » Vegetation and other elements of the urban forests (e.g.: down trees, rocks, debris piles) should be removed from all trail areas if they encroach into the trail travelway
 - » All material removed should be safely scattered off trail, down slope, and away from trail structures
 - » If a trail is located on a relatively steep slope, vegetation on the uphill side of a trail should be brushed back an additional foot
 - » Vegetation on the downhill slope can remain flush to the trail tread

- **Each trail route should be inspected annually and after any significant rain event that may have caused water to flow over trails.**
 - » If hazards cannot be removed as identified above, a warning notice should be posted at the trailhead or other trail entrances
- **Standard Weekly to Bi-Weekly Maintenance**
 - » Empty trash
 - » Mowing side strips on each side of trail
 - » Check for downed trees and debris

There are several types of weather events that will require varying levels of maintenance investments beyond weekly maintenance. These include:

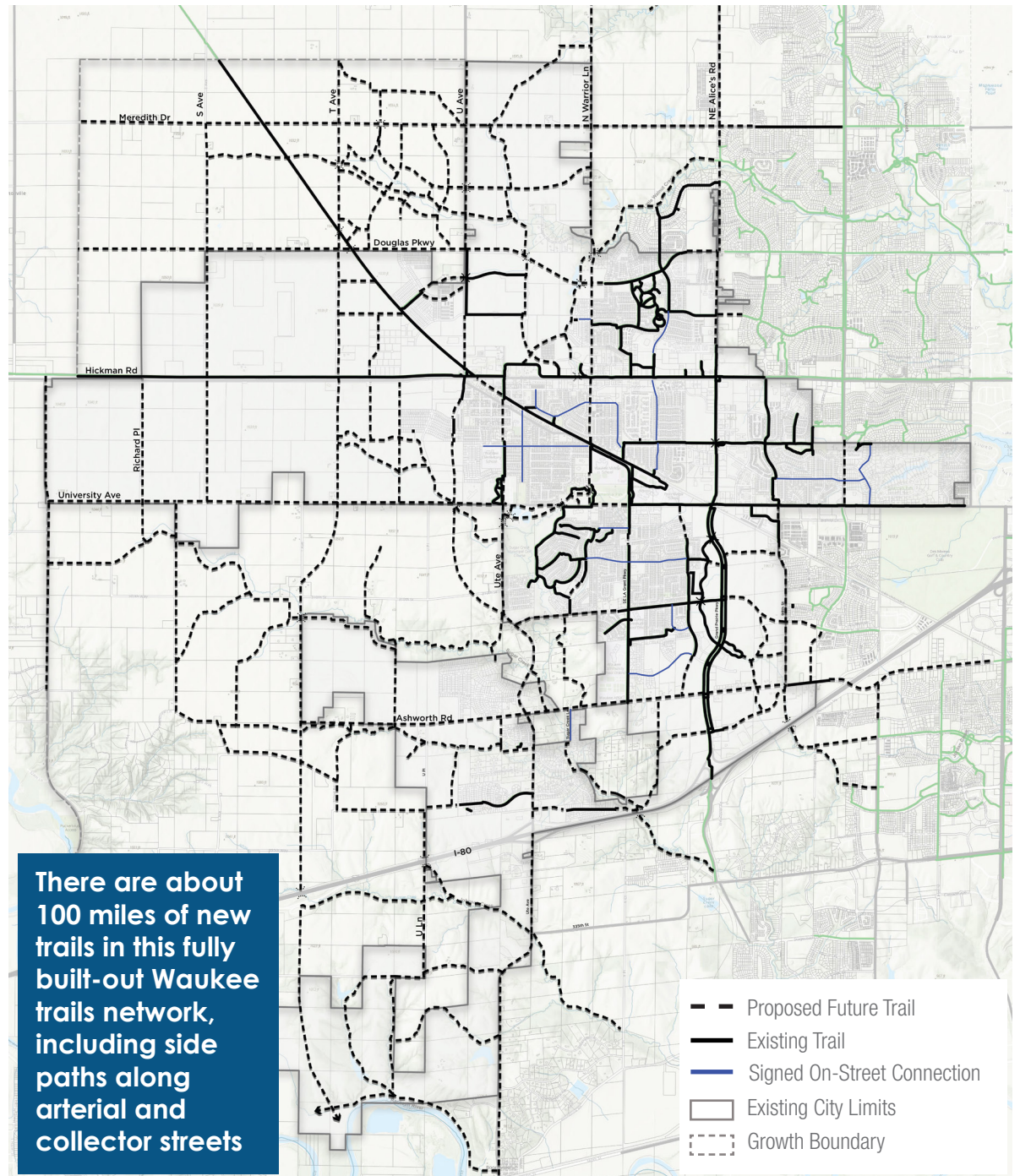
- **Pre Flood Events (if known flooding will occur)**
 - » Remove trash receptacles
 - » Turn off electric if lighted
- **Post Flood Events**
 - » Place trash receptacles back on site
 - » Debris cleanup after water recedes
 - » Remove driftwood and downed trees
 - » Sweep or blade scrape silt build-up



MATERIAL CONSIDERATIONS

Waukeee has standards today for hard surfaced trails. For trails within greenways, there are pros and cons for different types of trail materials. In all instances, trail materials for the identified in the Trails Plan should be compliant with the Americans with Disabilities Act (ADA).

- **Concrete.** Concrete often provides a more durable, longer-lived surface. This is the preferred trail material for most instances:
 - » Easy to form
 - » Lowest maintenance
 - » Best cold weather surface for durability and snow removal
 - » More resistant to freeze-thaw cycles
- **Asphalt.** Asphalt is a good surface when new, but does deteriorate faster than concrete over time. Features:
 - » Hard surface, smooth with low resistance
 - » Requires periodic resurfacing
 - » Freeze-thaw vulnerability
- **Limestone.** Limestone trails are not recommended for the routes shown in this trail plan. Limestone could be used as a temporary material if there will be a delay in final construction. Additionally, there may be spur trail loops off of main trails that could be limestone or other natural material. Limestone is not recommended for the primary trail routes because:
 - » Increased maintenance - repair and replacement of material is more frequent, especially after major rain or flood events
 - » Limited usership - natural aggregate surfaces like limestone are not comfortable to all cyclists and can be less safe for limited mobility user, such as those in wheelchairs
 - » Limited seasonal use - a hard surfaces do not experience washout in the spring months and are easier to clear snow from in the winter months
 - » While natural surfaces may be more comfortable for runners, it is the policy of the City to maintain six foot mowed strips on the sides of hard surfaced trails



Policy Recommendations

DECISION-MAKING FRAMEWORK

Critical investment or policy decisions on implementing the Trails Plan should always follow the overarching principles and goals. There may be times when the Plan does not provide an exact recommendation for a segment, location, design element, or opportunity not known at the time of this Plan. The following basic questions should be answered to guide the future trail network:

- Will the route satisfy the recreation and transportation needs of various user groups?
- Does the trail segment accommodate different levels of user abilities with appropriate features and facilities?
- Does the trail segment have the ability to provide continuity currently or in the future through incremental development?
- Will each implementation phase create a trail network rather than a single point-to-point route?
- Does the trail respond to demand by users?
- Can the trail be constructed without influencing floodplains or negatively affecting greenways?
- Where can we create and maintain relationships with property owners next to trails or areas of desired trails?



Policy Contexts

FLEXIBLE IMPLEMENTATION WITH GRADUAL DEVELOPMENT

The development of a complete, connected trail network will never be complete. The system will inevitably grow over time as the market for development grows in certain areas. The following practices should guide the gradual execution of trail development:

- **Use opportunities as they arise.** Transportation projects, as they are scheduled and funded, provide excellent opportunities for completing trail segments, as Waukeee already does today.
- **Set trail priorities based both on safety and comfort.** Clearly, safety priorities are paramount. For example, trails connecting to schools are critical local connections that may have higher priority than certain regional connections.
- **Execute transportation projects consistent with their ultimate role in the system.** The Trails Plan serves as a planning tool for reserving the appropriate easement and right-of-way width for trails needed to create a continuous network.
- **Maintain path continuity.** Trail segments that are disconnected and have limited utility should be avoided unless they represent a major opportunity that must be used to provide long-term connectivity.
- **Infill trail segments incrementally.** Because opportunities emerge at different times, completed parts of trail corridors may have gaps between them. As the trails evolve, filling these gaps will rise in priority and should be completed on a regular schedule.
- **Consider low-cost interim surfaces when necessary.** This is not ideal for sidepaths along arterial and collector streets but can be used on neighborhood or greenway trails. Land for some off-street segments will be dedicated.

TRAILS THROUGH EXISTING PRIVATE DEVELOPMENT

The goal of the Trails Plan is not to acquire mass amounts of private land for trails. However, there are critical connections in the network concept that could efficiently be met by crossing existing privately owned property. Some small connections can be made by updating existing utility easements for trail access.

Regular communication with property owners and maintaining a positive relationship is critical for future trail opportunities, and general public service. The outcomes of past communications and sentiments of trail routes change over time. Broader acceptance of trails typically evolves as people increasingly view the trail as a natural and beneficial part of the landscape and see the benefits to them with minimal effects.

Aside from each party agreeing to accept market price for the City to acquire trail routes, ways to encourage property owners to allow public trail access include:

- **Tax benefits such as a tax deduction for a charitable donation, under certain conditions, or a federal estate tax exemption.**
- **Expressing the likely improved land value with access to a trail.**
- **Showing overall community and neighborhood buy-in to a trail, and how the City will ensure privacy for the adjacent owners.**

TRAIL RESERVATION WITH DEVELOPMENT

The City has zoning and subdivision standards to reserve trail easements or dedication within new development proposals. The City should consider acquisition and maintenance of greenways as development reached them. Trail easements can be more appropriate for drainageways and stormwater management areas if these areas are kept in private ownership.

Ideally, the City should also provide a mechanism to complete the trail route before home or commercial construction, requiring construction funding techniques at the beginning of the process. If not, intermediate low-maintenance solutions can include mowed grass or single-track paths with stakes to define public use. These low-cost surfaces define the trail and establish a pattern of use. Selection of the appropriate interim surface depends on such factors as time of service until ultimate completion, slopes, drainage characteristics, soil conditions, and development design.

