City of North Saint Paul
and
Ramsey-Washington
Metro Watershed District
with
assistance from Barr Engineering Company




living streets plan

Credits

This document was developed by Barr Engineering Co. for Ramsey-Washington Metro Watershed District in partnership with the City of North St. Paul.

A special thank you goes to the Citizens Task Force who participated in this project.

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Living Streets

We're calling the new version of streets for North St. Paul "Living Streets" because the name connotes a street where people are active and nature is accommodated. You may hear other terms like Complete Streets or Green Streets. All these terms mean just about the same thing.

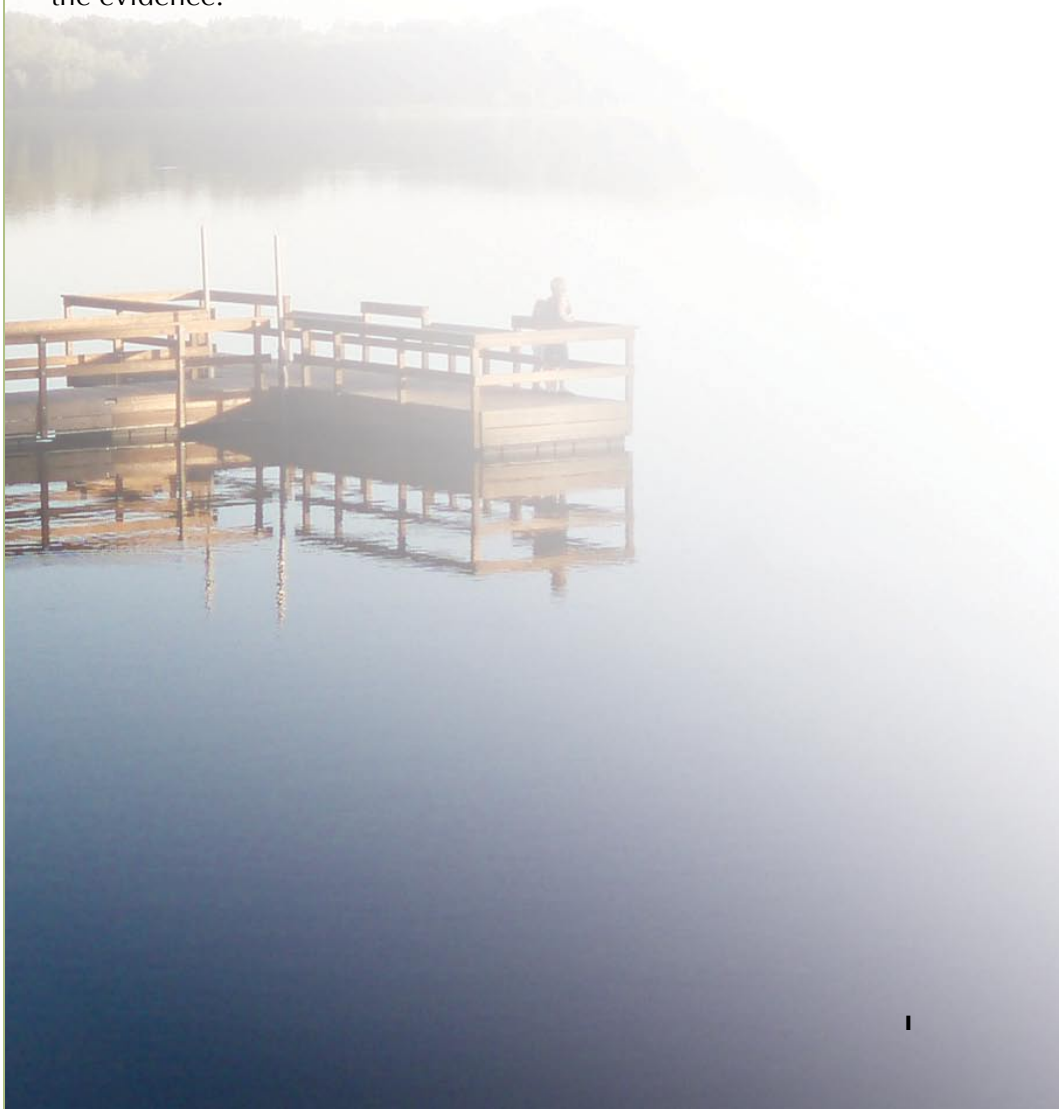
1.0 Background

This section provides an explanation as to the reasons behind the "Living Streets" project. It details the water-quality problems facing North St. Paul and how these problems can be alleviated with the implementation of stormwater best-management practices that are an integral component of living streets, as defined in this document. It also discusses the deteriorating state of North St. Paul's drinking water pipe system and the imminent need to rip up streets to replace water mains. Lastly, this section defines Living Streets and how they solve multiple problems facing North St. Paul.

Lakes with high water quality provide a valuable recreational resource to a community.

Surface Water Quality—A Critical Element of Minnesota's Way of Life

Our lakes, rivers, streams and wetlands are an essential element of what it means to live in Minnesota. They define our landscape, offer recreational opportunities, and provide habitat for wildlife. In recent years, more attention has been paid to the declining water quality of our lakes, streams, and wetlands. Many of us have become aware of the subtle and not-so-subtle changes in water quality through our personal experiences. For others, the growing list of polluted waters (known as the Impaired Waters List), documented by the Minnesota Pollution Control agency, is the evidence.



The MPCA's Impaired Waters List

The MPCA's Impaired Waters List is created by sampling water in Minnesota's lakes. Lakes are placed on the list when they exceed established pollutant level maximums. Legislation has put local units of government in charge of cleaning up impaired waters. The RWMWD and cities in the district (including North St. Paul) are the local units of government responsible for cleaning up Kohlman Lake.

In North St. Paul, most of the polluted stormwater from city streets is discharged into Kohlman Creek and then into Kohlman Lake, a shallow water body located in Maplewood. Kohlman Lake is the first lake in the Phalen Chain of Lakes (Kohlman, Gervais, Keller and Phalen). Water from these lakes eventually flows into the Mississippi River. Kohlman Lake is listed on the Minnesota Pollution Control Agency's Impaired Waters List due to excessive nutrients (see side bar). The Kohlman Lake watershed covers approximately 7,500 acres comprised of portions of North St. Paul, Maplewood, Gem Lake, White Bear Lake, Vadnais Heights, Little Canada and Oakdale. A majority of North St. Paul (89%) drains to Kohlman Lake. The remainder drains to Silver Lake. See map on the next page.

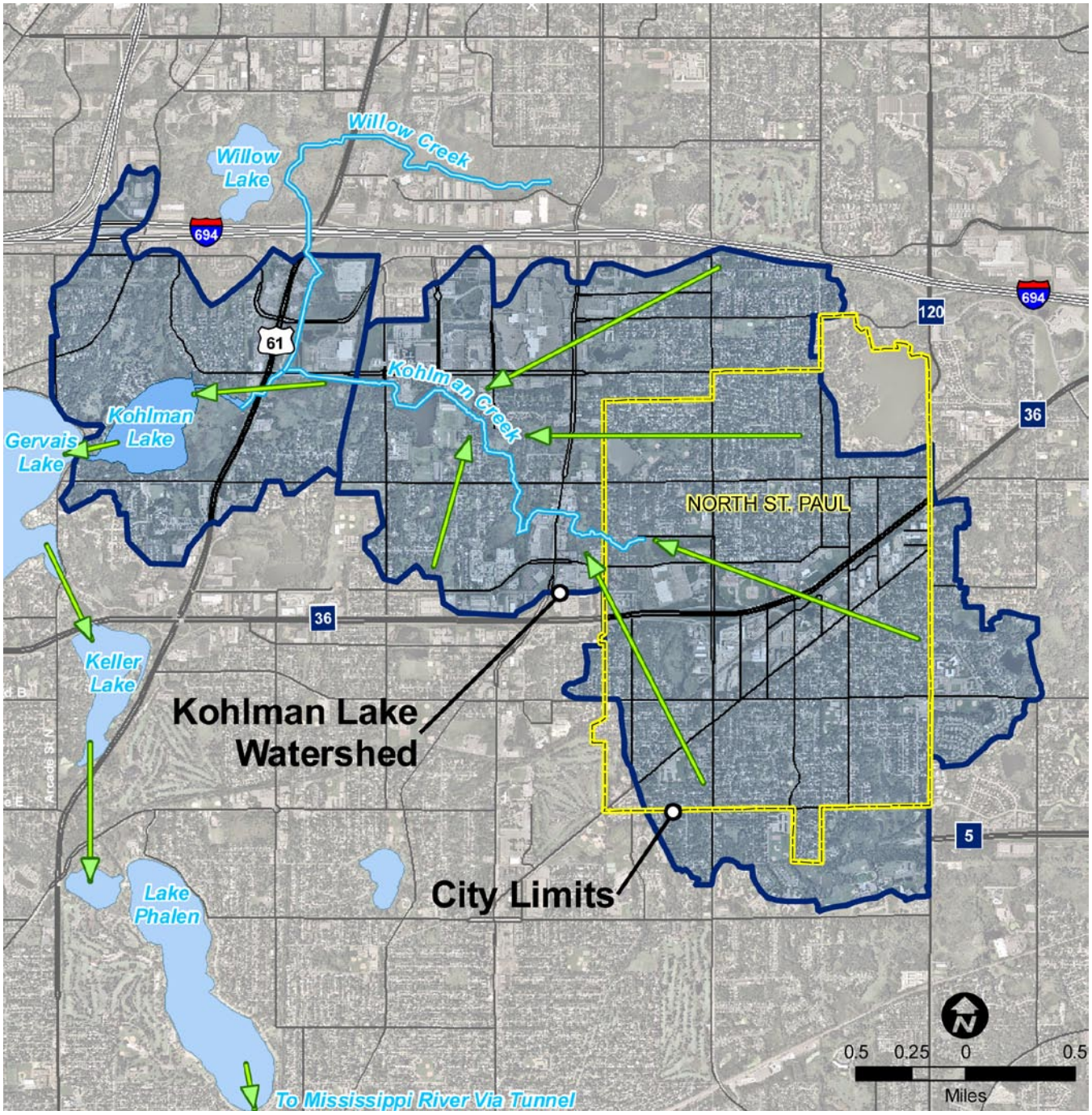
How is water quality degraded?

Streets are major source of water pollutants. As rainwater washes down the streets, it collects everything in its path—grease, oil, and phosphorus from grass clippings, leaves and fertilizer. The water enters storm drains and then, for the most part, ends up in Kohlman Lake.

Rainwater from the streets enters storm drains where it (and the pollutants the water carries) end up in Kohlman Lake.

Phosphorus entering the lake from stormwater runoff causes two water-quality problems: excessive algae and decreased transparency (clarity). Transparency determines how far sunlight can penetrate a body of water, which in turn affects the depth to which plants can grow, having a direct impact on fish habitat. When a lake is filled with sediment and excessive nutrients, its ecological value decreases.

Late-summer algal blooms are an unfortunate reality on a number of area lakes.



Most of North St. Paul drains to Kohlman Lake. Stormwater drains into the storm sewer system, which empties into Kohlman Creek and down to the lake. Water flows from lake to lake, making its way to Lake Phalen and the Mississippi River. The best place to clean the water running to our lakes is at its source: every street, driveway and parking lot.

The Ramsey-Washington Metro Watershed District (RWMWD), the City of North St. Paul and other area cities are charged with the task of reducing pollution flowing into area lakes and improving their water quality. The RWMWD has taken the lead in this effort by completing several studies of Kohlman Lake and its watershed in order to develop strategies for improving the lake's water quality. As a partner in this effort, the City of North St. Paul is helping the District implement these strategies.

Streetside treatment of stormwater will reduce pollution

The problem of runoff pollution is solved most easily by soaking stormwater into the ground. One effective method is to create rainwater gardens that collect stormwater. In North St. Paul, rainwater gardens will run alongside streets. Stormwater from streets and driveways will drain into the rainwater gardens where it will be filtered as it soaks into the ground. Great numbers of these small gardens placed along North St. Paul's streets will significantly remove pollutants and enhance the aesthetic image of the city.

Rainwater gardens are filled with plants that thrive in both wet and dry conditions, providing summer-long beauty.

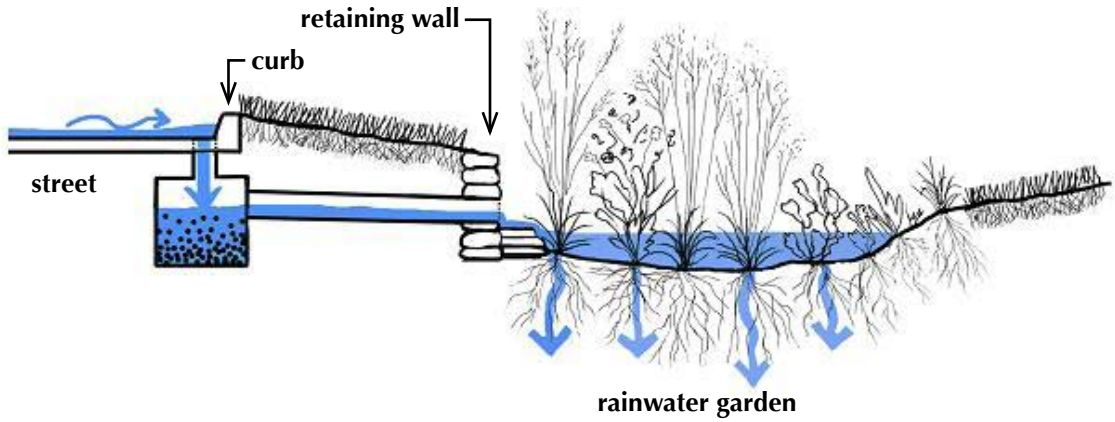
One proven strategy for reducing urban runoff pollution from entering area lakes is soaking stormwater runoff into the ground where it is naturally filtered. This is a great alternative to sending it into pipes that drain untreated into lakes. There are many ways to do this, but one of the most effective and attractive methods is with rainwater gardens, which infiltrate the water into the ground close to where the water is shed (from hard surfaces). Rainwater gardens are constructed along streets as attractive community features that also water street trees and create a great neighborhood "feel."

With the city's aging drinking water and sanitary sewer pipes, and some streets in need of replacement over the next 20 years, the city has an opportunity to re-invent the function of its streets. As streets undergo reconstruction, we have an opportunity to incorporate stormwater treatment features as well as other features that improve transportation mobility, safety and quality of life. We refer to a vision of street reinvention as "Living Streets." The rest of this report discusses this concept and approach for re-inventing the streets of North St. Paul.

The city has a unique opportunity to re-invent its streets.

An opening in a curb allows water to flow from the street into a rainwater garden for a triple benefit: stormwater is prevented from reaching storm drains; it is filtered as it soaks into the ground; and it provides water to the plants and trees in the garden. The result is a highly functional and attractive neighborhood amenity.

How do rainwater gardens work?



As it rains, water flows down the street and enters the rainwater garden through a pipe or curb cut. The water then soaks into the ground, usually within 24 hours. The plants' roots absorb nutrients from the water and help filter out pollutants. The water eventually enters the groundwater table, rather than entering a lake through the stormwater system. During flood events, the rainwater gardens provide extra storage for stormwater and greatly reduce the amount of water that reaches storm drains, and therefore the lake.

Rainwater gardens become beautiful neighborhood amenities (the curb cut is located out of the picture frame to the left).

What is a Living Street?

"Living Streets" is a term used to describe efficient use of the public rights-of-way. It is about enhancing the functionality of these public corridors. It starts by preserving the important function of accommodating traffic, parking, and underground utilities, but additionally improves accommodations for pedestrians, bicycles and nature in the form of street trees and rainwater gardens.

Living Streets provide safe passage for pedestrians. Many citizens of North St. Paul don't have cars or would enjoy better opportunities to get outside and walk.

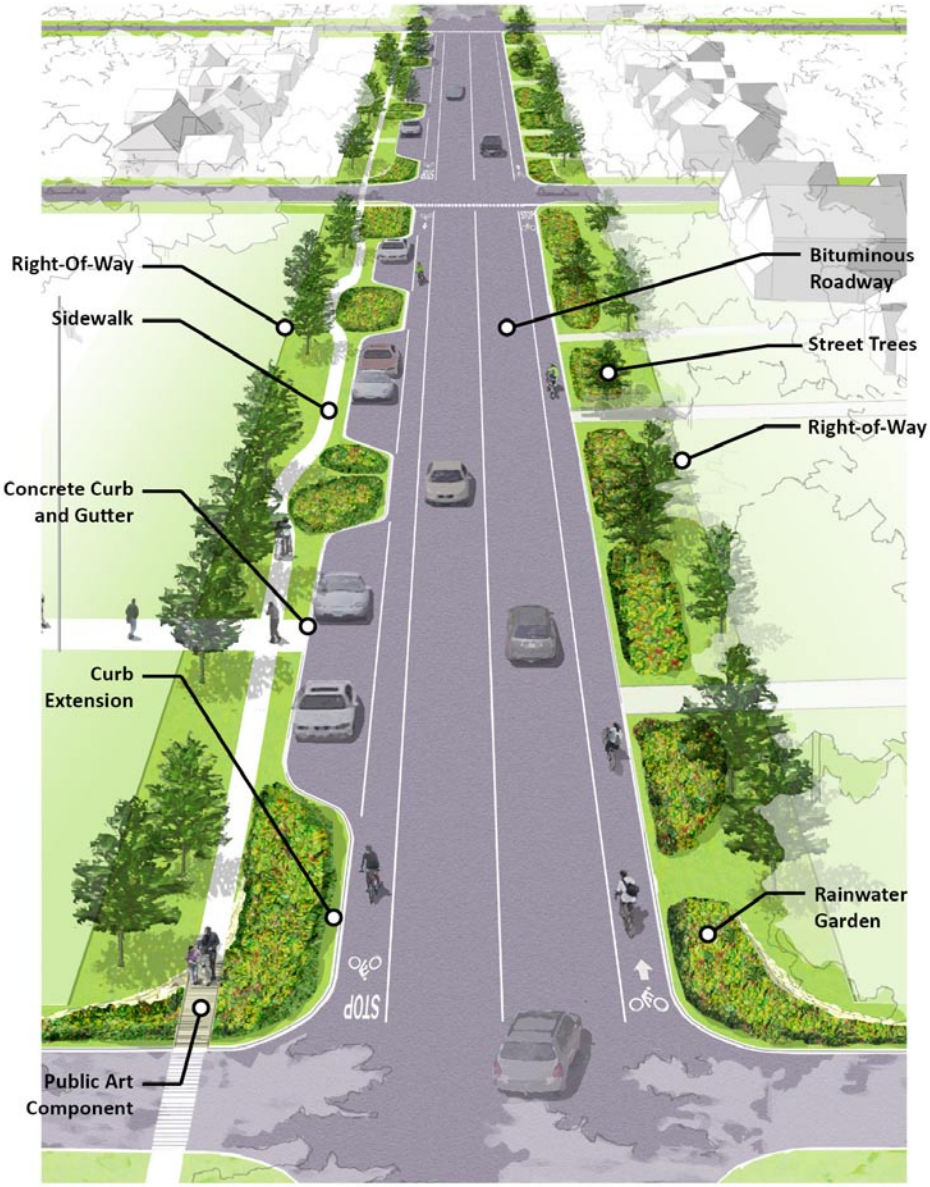
Understanding Living Streets

The streets of North St. Paul play an integral role in the life of our citizens. They are intended for everyone—young or old, motorist or bicyclist, walker or wheelchair user, bus rider or shopkeeper. We can improve on the current design to better accommodate walkers, bikes and public transportation. Our streets and public right-of-way could also better accommodate the cleansing power of nature for stormwater, and the protection and beauty that trees provide. Streets in the past were designed and built in an era where the focus was only on moving cars quickly and efficiently. Today we have the opportunity to design multi-purpose streets.

Living Streets is a term that addresses these livability and environmental needs of our community and describes a design approach for rebuilding streets. Communities across the country are embracing this design approach and asking their planners and engineers to build road networks that are safer for pedestrians, slow traffic, provide neighborhood cohesiveness, provide aesthetic value, and improve the quality of our lakes and streams by reducing stormwater pollution.

Source: The Headwaters at Tryon Creek, Portland, OR

Living Streets are designed to balance convenience for motorists with bike and pedestrian safety, water-quality protection, and the beauty of street trees.



The primary elements of a Living Street.

What does a Living Street look like?

Each Living Street is unique. Ingredients that may be found on a complete green street include:

- sidewalks
- bike lanes (or wide paved shoulders)
- parking where needed
- comfortable and accessible transit stops
- marked crossing opportunities
- pedestrian signals
- curb extensions
- rainwater gardens
- trees
- vegetation

They are designed to balance safety and convenience for everyone using the street along with water quality protection.

Source: The Headwaters at Tryon Creek, Portland, OR

This Living Street features curb extensions, a bike lane, sidewalks, and trees.

North St. Paul will have to replace deteriorating water mains. This is the perfect opportunity to redesign streets to accommodate people's needs and create a healthier, cleaner environment.

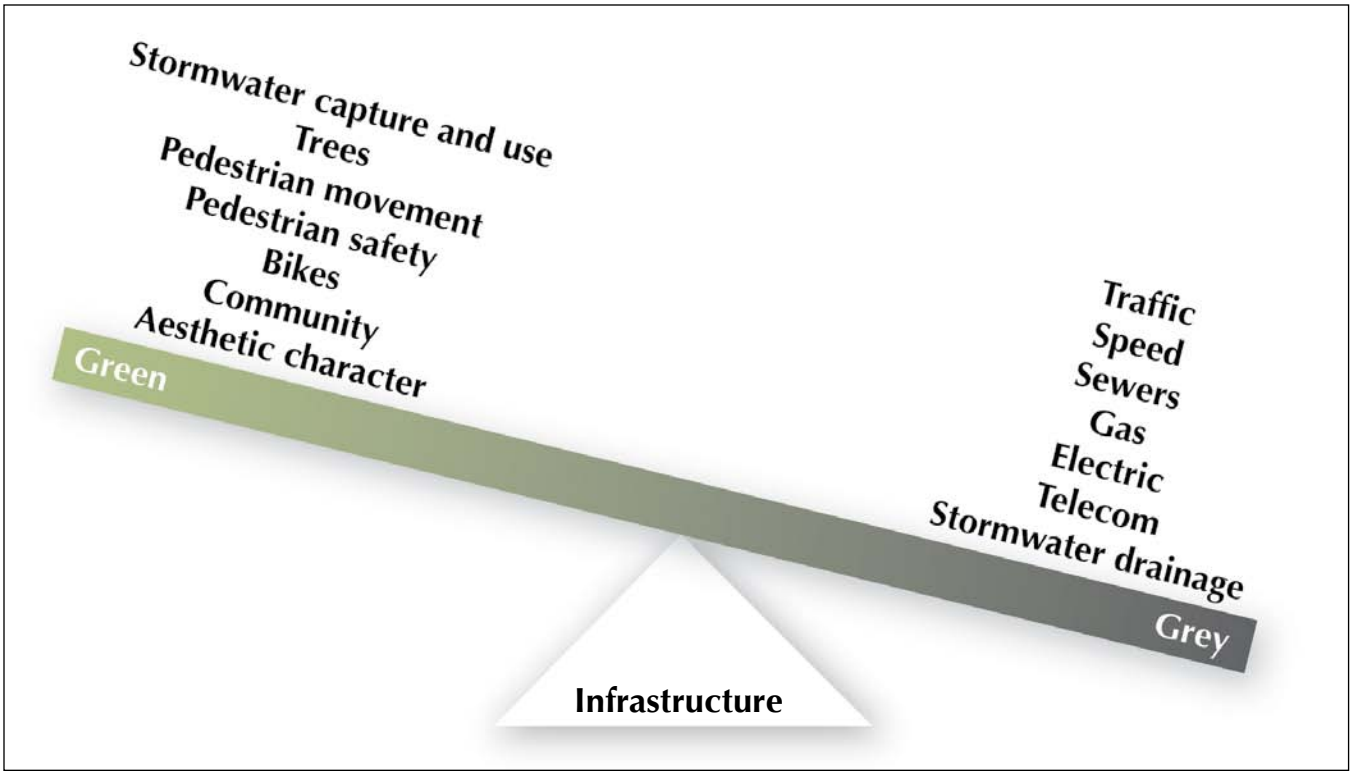
Why Plan for Living Streets Today?

North St. Paul's drinking water pipes are beginning to deteriorate. Some are up to 75 years old; many are likely to fail soon. The sanitary sewer system is also aging, although not so significantly. Replacing water mains most often requires that streets be demolished for access. This disruption of streets creates an opportunity to reinvent North St. Paul's streets to better fit the needs of today's and future residents.

Similar to a home remodeling project, the design of these street projects will consider the needs of the city's future residents and businesses to ensure the city remains an attractive and competitive place to live and do business compared to other options that exist in the north metro area.

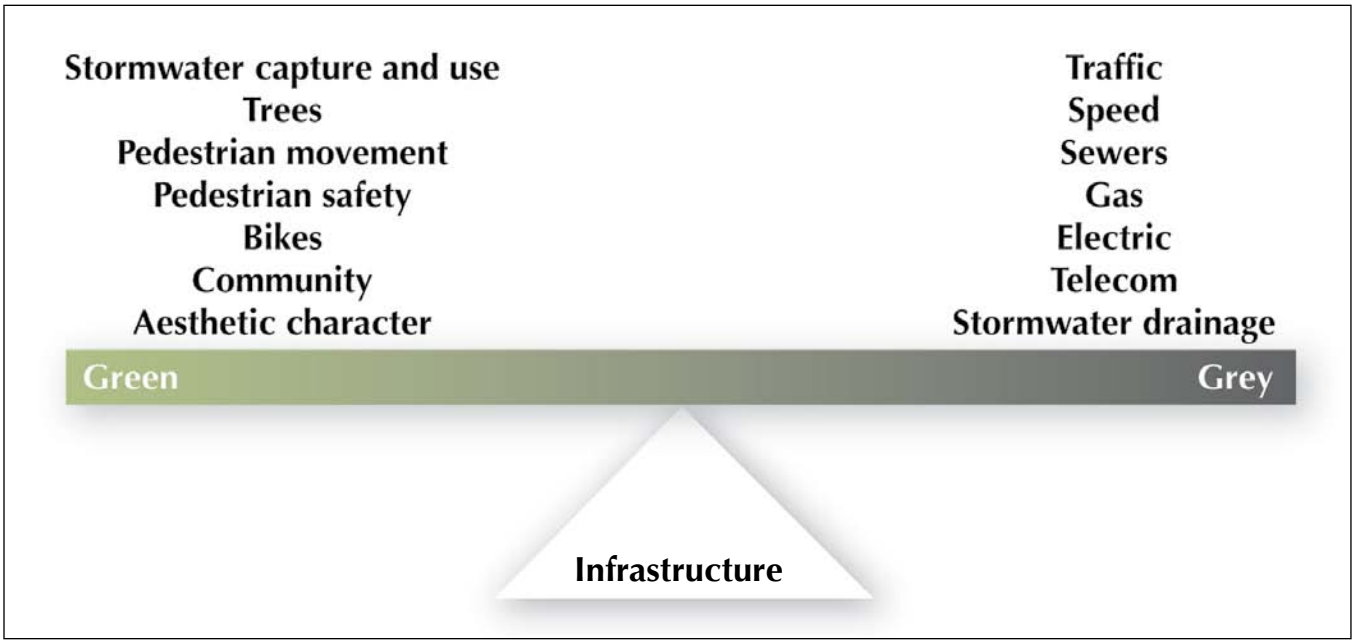
By integrating the transportation, environmental and quality of life needs into a Living Streets framework now, the design work for individual street reconstruction projects will be implemented more efficiently and at lower cost.

The goal is to create a balance between the important functions of traffic conveyance and utilities with the important functions of nature.



Traditionally there has been an imbalance between differing uses of public streets.

When utilities, cars, people and nature are all taken into account, streets take on greater community value.



This plan is an effort to balance the important role of streets to move traffic and accommodate utilities with the equally important need for alternative forms of transportation and a cleaner environment.

Benefits of Living Streets

Most of us think of America as the land of choices. Yet, in just about any community built in the last 50 years, there is pretty much one choice for transportation: the car. North St. Paul isn't any different than most American cities in this regard. Living Streets provide many transportation choices to the diverse range of city residents and it balances those choices to provide community, environmental and economic benefits as well.

Walkable streets raise home values

Studies show that homes in more walkable neighborhoods have higher values than similar homes in less-walkable areas. The report, "Walking the Walk: How Walkability Raises Housing Values in U.S. Cities" by Joseph Cortright, analyzed data from 94,000 real estate transactions in 15 major markets and found that in 13 of 15 markets, higher levels of walkability were directly linked to higher home values.

Surveys indicate that shoppers spend more time and money in commercial districts with tree-lined streets.

Living Streets have economic benefits because they:

Make Fiscal Sense. Smaller streets, less pavement and fewer underground storm sewer pipes cost less to build. These are savings that residents will notice on special assessments associated with their street reconstruction project.

Lower Long Term Maintenance Costs. Smaller streets also cost less to plow and repair benefiting the city's annual budget and taxpayers.

Increase Property Values. Walkable communities with tree lined streets and slowed traffic increases neighborhood desirability and property value, an asset residents will realize at the time of sale.

Spark Economic Revitalization. By making local businesses more accessible to bicyclists and walkers, residents are more likely to shop locally and encouraging local business investment and job growth. Research shows that shoppers are attracted to businesses with tree lined streets.

Good bike and pedestrian access to downtown could help business.

Living Streets build community because they:

Help Children. Streets that provide room for safe walking and biking help children get physical activity and gain independence. More children walk to school where there are sidewalks, and children who have safe walking and bicycling routes have a more positive view of their neighborhood.

Improve Public Health. By offering easy opportunities for walking and bicycling, living streets encourage a healthy life-style for people of all ages, especially the elderly, and are an important strategy to combat obesity.

Increase Safety. Traffic-calming elements like curb extensions, bump-outs and narrowed streets improve safety by reducing traffic speeds. Streets are safer for walkers, bicyclists, children, the elderly, as well as for drivers.

Enhance Neighborhood Beauty and Strengthen a Sense of Community. By making room for the planting of trees and rainwater gardens, our neighborhoods become more beautiful and attract young families that make communities thrive.

Living Streets improve environmental quality because they:

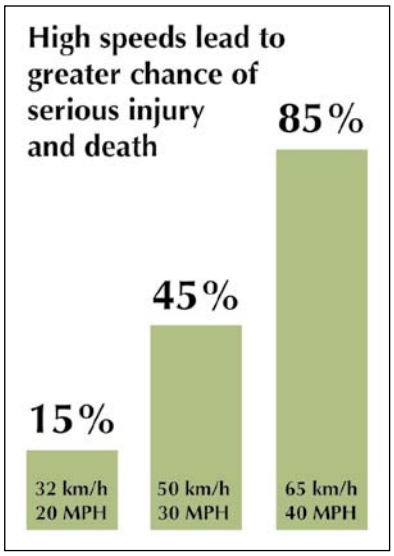
Improve Water Quality of Lakes and Streams. Rainwater gardens along roads intercept and filter stormwater runoff. Much of it soaks into the ground to water street trees while over flow water during big storms is filtered by plants before making its way to the storm sewer pipe that takes it to Kohlman Lake and ultimately further downstream to the Mississippi River.

Improve Air Quality. By providing space for walking and biking, complete green streets reduce the emissions of $C0_2$ and other pollutants harmful to the planet and human health. Trees also filter the air, trapping dust.

Reduce the Urban Heat Island Affect. Less asphalt and more street trees reduce heat build-up in pavement and in the ambient air during hot summer days making outdoor activities more comfortable and reducing air conditioning costs in our homes and businesses.

Reduce Raw Material and Energy Used in Street Construction. Smaller streets require less asphalt, gravel beneath the street and other natural resources, and requires less energy used for their construction than larger conventional streets. This reduces the pollution and greenhouse gases emitted during the manufacturing and transporting of these materials.

Safety for children is a primary concern. Living Streets will provide safe walking and bicycling routes.



Source: *Killing Speed and Saving Lives*, UK Department of Transportation

Pedestrians' chances of death if hit by a motor vehicle at different speeds.

What are the benefits of street trees?

Living Streets promote the planting of street trees. Trees provide many benefits to the environment and community. The past few decades of tree research has focused on documenting and quantifying the benefits of trees. Early on, researchers were quantifying the amount of greenhouse gases trees remove from the atmosphere (about ½ ton of carbon dioxide per tree per year) and pollutants (about 4.3 pounds of pollutants per tree per year). Since then, researchers have begun to document an ever growing list of benefits that may not be so obvious.

Environmental Benefits

In addition to the direct removal of greenhouse gases and pollutants, mentioned above, trees:

- Reduce temperatures by shading streets, sidewalks and other hardscapes, resulting in reduced use of electricity.
- Increase the amount of water that reaches the groundwater table by helping water soak into the ground.
- Intercept rain with leaves and branches, reducing the amount of water that reaches the storm system.
- Add organic matter to the soil which further improves the water-holding capacity of the soil.
- Improve the resiliency of soil to respond to rain events. One mature tree can capture over 5,000 gallons of water in a year.
- In whole, trees can reduce stormwater by about 2% for each 5% increase in the community's tree canopy.
- Reduce soil erosion with dense root systems. Less soil, contaminated or clean, reaches the stormwater system, creeks and rivers.

Community Benefits

Trees help promote pride in the community and a sense of place, as well as providing a long list of other direct and indirect benefits.

- Street trees are an important factor in reducing road maintenance costs, by shading the pavement from the sun.
- Tree-filled neighborhoods show lower levels of domestic violence.
- Street trees can calm traffic and lower traffic speed by reducing the perceived width of street.
- Trees help reduce noise levels.
- Trees are known to shorten hospital stays and reduce workplace stress.
- Trees can be used to screen unsightly views.
- Healthy trees in neighborhoods enhance property values, increasing sale prices by 1% for each large front-yard tree and 10% for a specimen tree.
- Trees are also good for business. Surveys of shoppers in commercial districts with tree-lined streets reported that they shop there more frequently, shop longer, are willing to pay for parking, and spend on average 12% more on goods.

Policy Basis for Living Streets

Inspiration from Other Cities and Agencies

Communities across the country are realizing the "green" potential of their streets. Making our transportation system more sustainable involves many policies and practices that minimize environmental impact and create streets that are safe and comfortable for everyone regardless of age, ability, or mode of transportation.

In Minnesota, a number of communities and transportation organizations have already begun the process of reinventing the street.

The **City of Rochester**, for example, has implemented a comprehensive and detailed complete streets policy in 2009 after a multi-year review of policy options and implementation approaches by their city council and city staff.

City of Rochester, MN
Complete Streets Policy

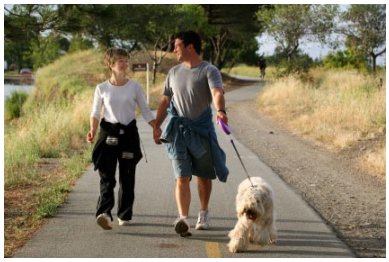
The policy focuses on enhancing the safety, access, convenience and comfort of all users of all ages and abilities, including pedestrians (including Americans with Disabilities Act compliant accessibility), bicyclists, transit users, motorists and freight drivers, through the design, operation and maintenance of a connected and balanced transportation network. The policy recognizes that all streets are different and that the needs of various users will need to be balanced in a flexible manner.

The policy requires that bicycle, pedestrian, and transit facilities shall be included in street construction, re-construction, re-paving, and re-habilitation projects. A feasibility report prepared for each street project shall include documentation of compliance with this policy. The policy allows flexibility in implementing the policy under certain conditions:

- The City Engineer determines there is insufficient space to safely accommodate new facilities.
- The City Engineer determines there are relatively high safety risks.
- The City Council exempts a project due to the excessive and disproportionate cost of establishing a bikeway, walkway or transit enhancement as part of a project.

The policy includes a wide range of transportation facilities and amenities for consideration in qualified street projects:

- Street and sidewalk lighting
- Sidewalks and pedestrian safety improvements such as median refuges or crosswalk improvements
- Improvements that provide ADA (Americans with Disabilities Act) compliant accessibility
- Transit accommodations including improved pedestrian access to transit stops and bus shelters
- Bicycle accommodations including bicycle storage, bicycle parking, bicycle routes, shared-use lanes, wide travel lanes or bike lanes as appropriate
- Street trees, boulevard landscaping, street furniture
- Drainage facilities



Many cities are making an effort to cultivate and support a way of life that encourages physical activity.

The **City of St. Paul** passed a complete streets resolution in 2009 directing staff to complete an implementation plan in 2010.

Implementation of a complete streets philosophy is an integral component of "Access Minneapolis," the **City of Minneapolis**' transportation plan.

In 2005, **Ramsey County Active Living (ALRC)** was created. This collaborative effort of county, city, school, health plans and residents is working to bring about and sustain changes in design, transportation, and public/private policies to cultivate and support a way of life that integrates physical activity into daily lives.

Ramsey County Active Living Goals

Improve Health by increasing the number of:

- Adults who engage in leisure time physical activity
- Trips made by walking and bicycling

Enhance the Built Environment by:

- Promoting the pedestrian and bicycle system in new construction and reconstruction projects
- Encouraging a comprehensive multi-modal transportation system in Ramsey County
- Identifying and reducing barriers to active living through physical projects

Influence Policy by:

- Supporting and encouraging local government policies that integrate active living principles into plans, ordinances, and zoning codes
- Identifying and reducing barriers to active living through policy influence
- Identifying and working to reduce health disparities in physical activity in target populations

Hennepin County developed a complete streets policy in 2009. The policy applies to all corridors under county jurisdiction. The County is committed to working with other transportation agencies to incorporate a complete streets philosophy in adjacent jurisdictions.

The **State of Minnesota** adopted a complete streets policy on May 15, 2010. The policy is intended to promote context-sensitive street designs on state-aid roadways. This is the first such state policy in the nation.

Living Streets Implements the North St. Paul Comprehensive Plan

This project is an expression of the goals contained in North St. Paul's Comprehensive Plan, which is the city's guide for development, redevelopment and preservation of the community. Living streets provide a comprehensive and effective strategy for realizing the city's vision of becoming **"an extraordinary small town in the Cities!"** and achieving many goals of the Comprehensive Plan. This Living Streets plan will help North St. Paul achieve five of the Comprehensive Plan's nine goals:

Goal 1: Image

Develop themes, prepare plans, and implement plans which will enhance and improve the image of the city in downtown, the highway 36 corridor, and in each of the city's residential neighborhoods.

Goal 4: Transportation

Achieve a functional, aesthetic, and balanced system which includes pedestrian ways, sidewalks, trails, local streets, collectors, arterials, a freeway and transit.

Goal 7: Parks, Open Spaces and Trails

Enhance and expand the park, open space and trail system, especially in the highway 36 corridor.

Goal 8: Environment

Protect and enhance the lakes, wetlands, woods, and wildlife and promote actions, practices and developments which tend to sustain the environment.

Goal 9: Active Living

Establish a climate and an urban pattern for active living to create and sustain changes in land use design, building design, transportation, public policies and project to cultivate, support and integrate physical activity into daily life.

Youth and seniors are growing proportion of North St. Paul's population

Population projections for Ramsey County show that the percentage of the population that is both under 20 and 65 and older will grow significantly over the next 25 years. These populations are the most dependent on alternatives to the car for mobility. The age distribution of the population for North St. Paul was very similar to that of Ramsey County in the 2000 Census and is assumed to be similar to the projections for Ramsey County.

Year	Percent of Ramsey County population dependent on alternatives to motorized transportation (people under 20 *and* 65 and older)
2000	40%
2010	39%
2020	42%
2035	46%

Source: 2000 Census and MN Department of Administration/Office of Geographic and Demographic Analysis for 2010, 2010, and 2035 Ramsey County projections.

The 15-member task force toured the streets of North St. Paul.

Community Task Force Involvement

It was important from the start to have citizen involvement in the creation of this plan. Feedback from those who will use and maintain the streets was critical. The City Council appointed a task force to guide the development of this plan. The 15-member task force was comprised of North St. Paul residents, businesses, city staff and a council representative. The task force met six times from June through October 2009. Involvement of the task force focused on:

- **Learning about living streets.** The task force reviewed studies and literature about green streets, discussed current opportunities for walkers and bikers, shared ideas about environmental quality, discussed costs and benefits, and conducted a field trip to inspect local examples in the Twin Cities.
- **Developing Design Objectives.** This process included identifying community concerns and needs. This discussion was followed by clarifying Comprehensive Plan goals and policies into specific project design objectives that would address the identified concerns and needs. The design objectives guided the development of recommended design guidelines in Section 2.
- **Identifying locations and priorities for bike trails and sidewalks to better connect the community.** The bike trail and sidewalk plan will supplement the transportation plan chapter of the Comprehensive Plan. (Refer to Appendix C.)
- **Reviewing and giving feedback on proposed design strategies for different types of streets found in North St. Paul.** The design objectives developed by the task force were used to evaluated design alternatives and for making recommendations on preferred design alternatives.

Design Objectives

The Task Force developed the following design objectives to provide guidance for developing Living Streets design concepts. Each design objective is listed along with the comprehensive plan goal it supports. Specific design strategies identified for achieving the objectives are also listed.

Objective 1: Improve stormwater runoff quality

Strategy: Infiltrate at least the first inch of rainfall from city streets near the street edge.

Supports the city's environmental goal and RWMWD goal.

Objective 2: Reduce impervious surfaces

Strategy: Convert some parking lanes for water treatment & bike/pedestrian circulation on:

- Residential streets, but retain enough parking to meet demand
- Collector/arterial streets where side yards typically abut the street
- Other corridors where parking demand is low.

Supports the city's environmental goal

Objective 3: Calm traffic

Strategy: Use rainwater gardens, curb bump outs and other techniques as appropriate to slow traffic.

Supports the city's active living and transportation goals.

Objective 4: Improve bike/pedestrian connectivity

Strategy: Create bike lanes/trails along major transportation roads (e.g. South Ave. 17th Ave.).

Strategy: Connect schools, parks, commercial areas, and downtown with sidewalks and bike routes.

Supports the city's transportation and active living goals.

Objective 5: Protect and enhance the urban forest

Strategy: Protect and retain existing street trees as much as possible.

Strategy: Meander new sidewalks around existing trees in order to protect them.

Strategy: Use vegetation and other physical features to create a look unique to city.

Supports the city's environmental and image goals.

Objective 6: Minimize long-term maintenance costs

Strategy: Reduce amount of pavement to maintain and to replace in the future.

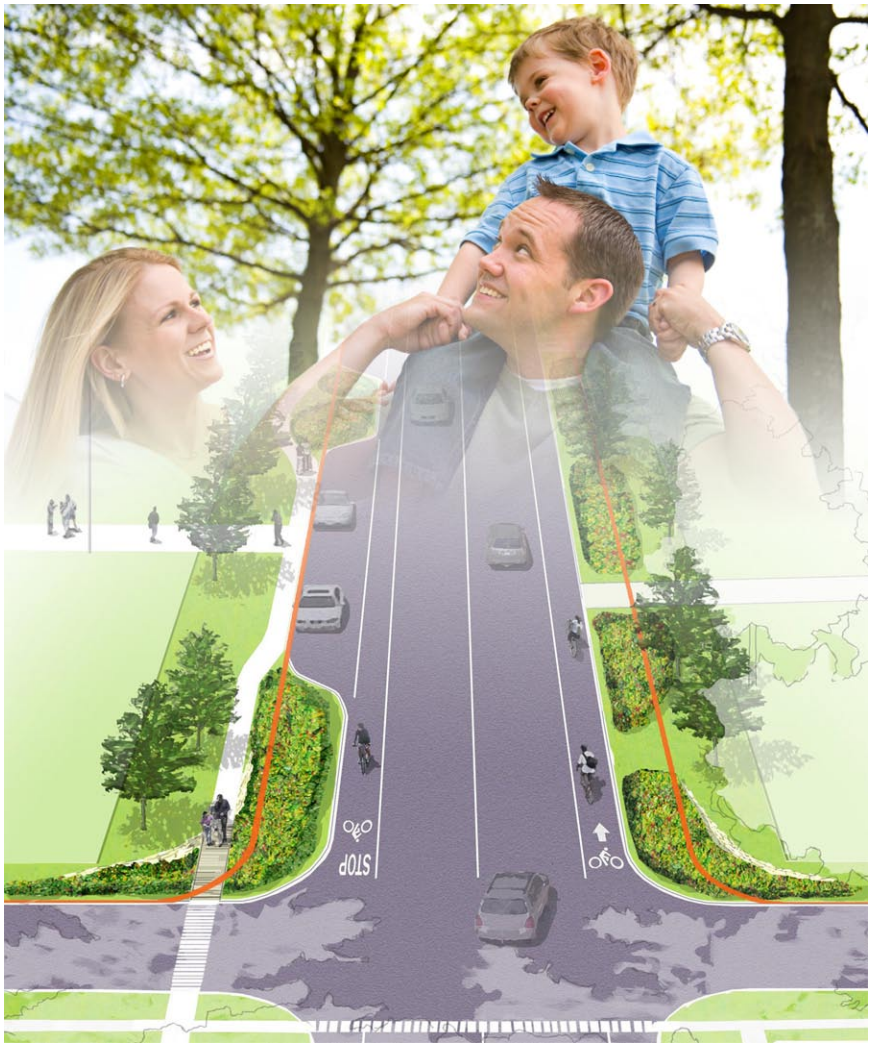
Strategy: Design for ease of maintenance.

Supports the city's goal of cost effective management of infrastructure.

The Vision

By incorporating North St. Paul's values, needs and concerns expressed by the Task Force, this plan envisions the city becoming:

A city with healthy residents and attractive, safe streets characterized by natural systems that integrate throughout the city. Through the use of vegetation and a reduction in paved surface, the city makes room for nature and its restorative benefits for people of all ages and ability to travel safely throughout the city.



2.0 Living Streets Plan

This section describes the plan for making improvements to the city's street system. It describes the various street types found in North St. Paul and the opportunities for converting these streets, over time, into Living Streets.

Assessment of Existing Streets

It is important to understand the different types of streets (based on traffic volume) that exist in North St. Paul. The successful creation of Living Streets will respond to the important needs of moving traffic, accommodating differences in neighborhood character, supporting land use type (residential, commercial, industrial) and improving environmental quality. This plan recognizes the existing functional classification of the city's streets as determined by Minnesota transportation agencies and officials. This plan emphasizes the importance of retaining "functional" classification of streets and an emphasis on vehicle mobility. North St. Paul's streets are generally classified as either local (residential streets), collector streets (busier streets like Margaret or 17th St.), and arterial (very busy streets like McKnight Rd. and Century Ave.).

Residential Street—15th Ave. E.

North-south Arterial/Collector—Margaret Street

East-West Arterial/Collector—17th Ave. E.

Types of Living Streets

This plan considers three general street types currently found in North St. Paul. The street types are described below and shown in the map on the opposite page.

Residential Streets—Low traffic streets with slower speeds.

North-South Arterials/Collectors—Higher traffic streets that connect neighborhoods with commercial areas, downtown and adjacent communities. (e.g., McKnight Rd., Margaret St., Helen St., First St., Century Ave.)

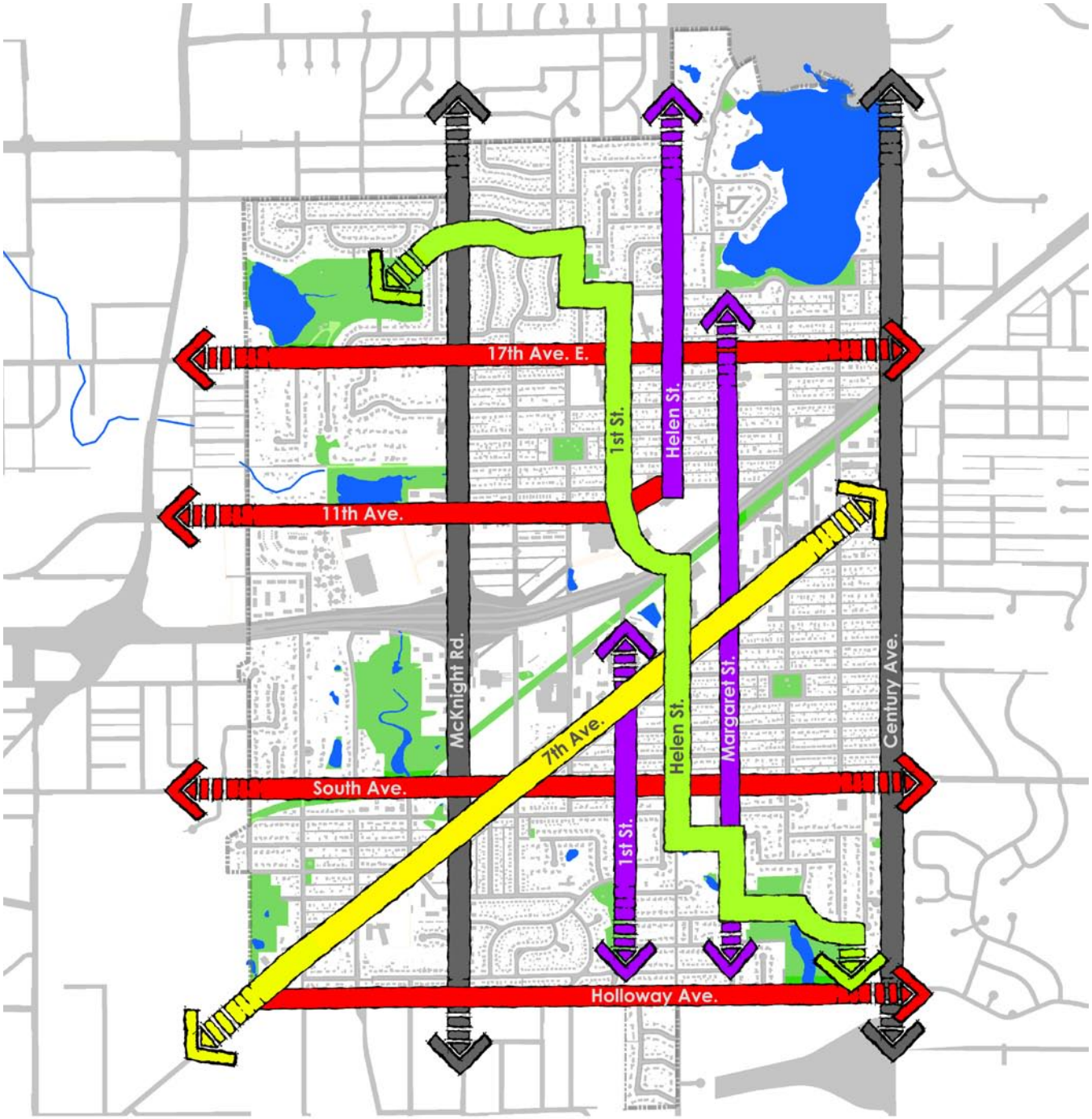
East-West Arterials/Collectors—Higher traffic streets that connect neighborhoods with commercial areas and adjacent communities. (e.g., 17th Ave., South Ave. and Holoway Ave.)

This plan also creates a new street type:

The Parkway—A visually prominent recreational corridor that includes bike trails, sidewalks, stormwater treatment, and enhanced vegetation. It will create a central parkway though town connecting Casey Lake Park to Polar Park to downtown and down to Southwood Nature Preserve.

The map on the following page illustrates the pattern of Living Streets for North St. Paul. Each of these street types is described on the following pages.

This plan does not currently address the city's downtown main street (7th Avenue) or new streets envisioned as part of the Diversified District. These street types are very important elements within the fabric of the current and future city. However, a separate concentrated effort is required to develop living street concepts to address the unique challenges in these two environments. These areas are not included in this report.


17th Ave. E.
11th Ave.
South Ave.
Holloway Ave.
7th Ave.
McKnight Rd.
Century Ave.
Helen St.
1st St.
Margaret St.
Helen St.
1st St.
legend
main street
north/south arterial
north/south collector
east/west collector/arterial
parkway
street templates map

Streets, such as this one, present the greatest opportunity to create new landscape space for stormwater treatment and trees, and sidewalks for pedestrians.

Yield Streets

A yield lane can be used where traffic flow is low to accommodate two-lane traffic with a single lane. One vehicle passes the other by slowing and waiting in the parking lane for the other vehicle to pass.

Residential Streets

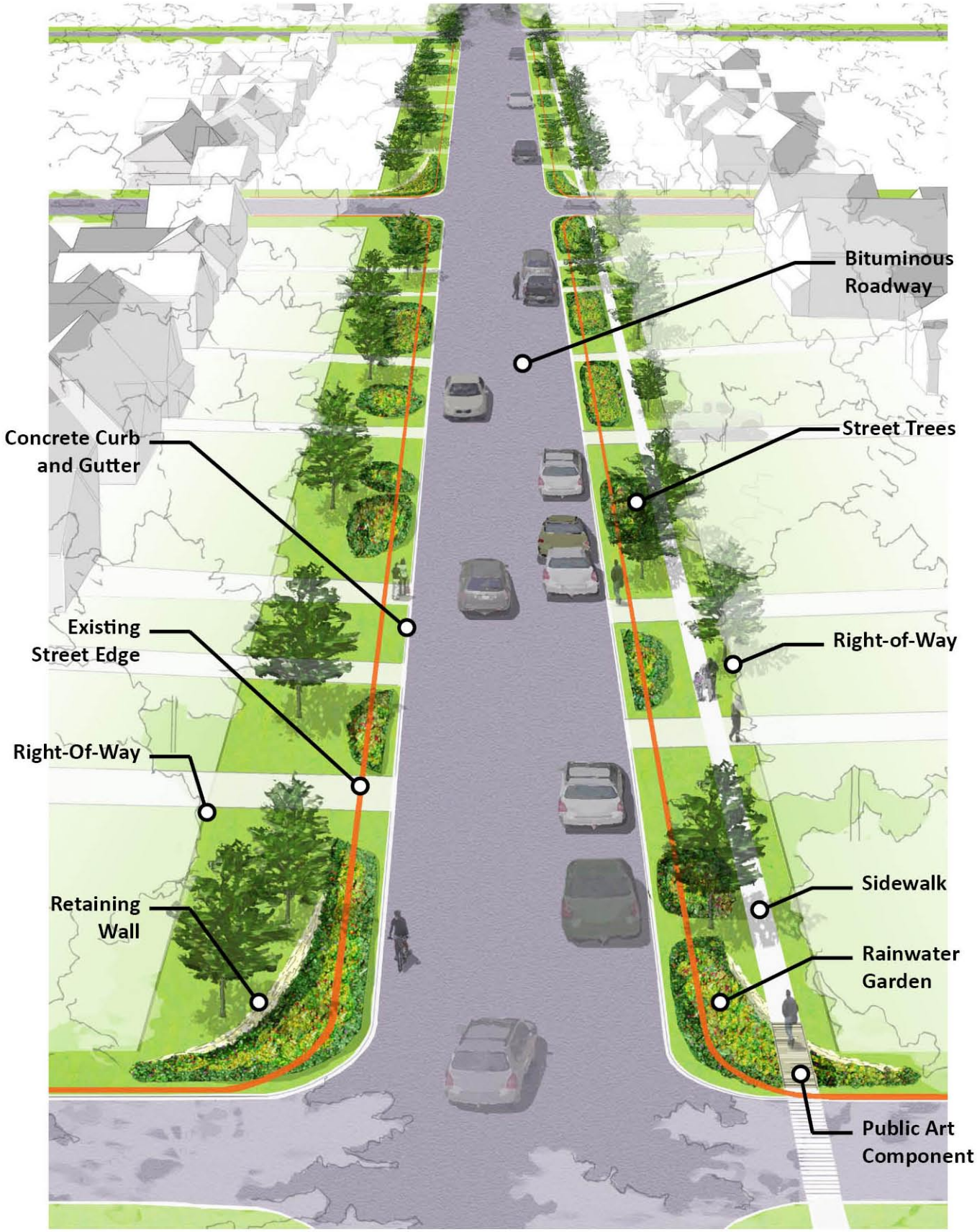
As the most common street type in North St. Paul, residential streets offer the best opportunities for living streets design solutions. These streets have the fewest conflicts with underground utilities and have under-used parking zones. As a result, they present the greatest opportunity to create new landscape space for stormwater treatment and trees, and sidewalks for pedestrians. Most residential streets will be reconstructed in the near future as water mains are replaced and sanitary sewers are repaired.

Recommended features of Living Streets include:

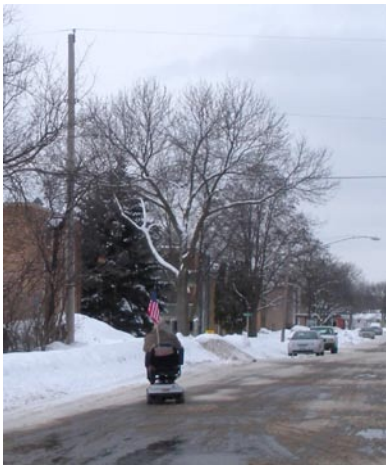
- Street trees
- Rainwater gardens flanking the street
- Sidewalks on one side of the street (as per the Draft Bicycle and Sidewalk Plan—see Appendix C)
- Street width of 22 feet to accommodate one parking lane and a single yield lane (queuing lane)
- Curbs
- Public art/artful design

Existing residential street layout

Proposed residential street layout


Bituminous Roadway
Concrete Curb and Gutter
Street Trees
Existing Street Edge
Right-of-Way
Right-Of-Way
Sidewalk
Retaining Wall
Rainwater Garden
Public Art Component

Margaret Street, a North-South Arterial/Collector street



The plan will safely accommodate pedestrians and people on bikes and in wheelchairs on the city's busier streets.

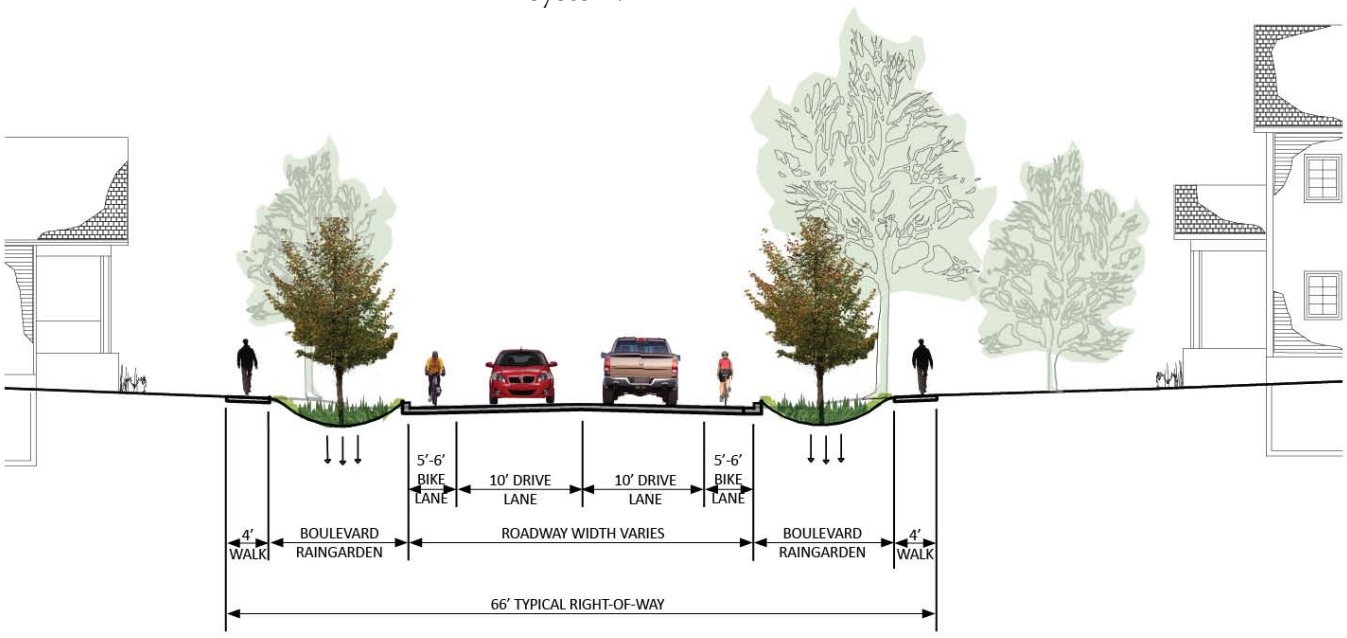
North-South Collectors

These roads connect residential areas to schools and commercial areas. However, many of these roads are without sidewalks and bike facilities which present safety concerns for walkers and bicyclists. These roads are State Highways or State Aid roads and thus reconstruction plans must also meet design standards determined by the Ramsey County and the State of Minnesota.

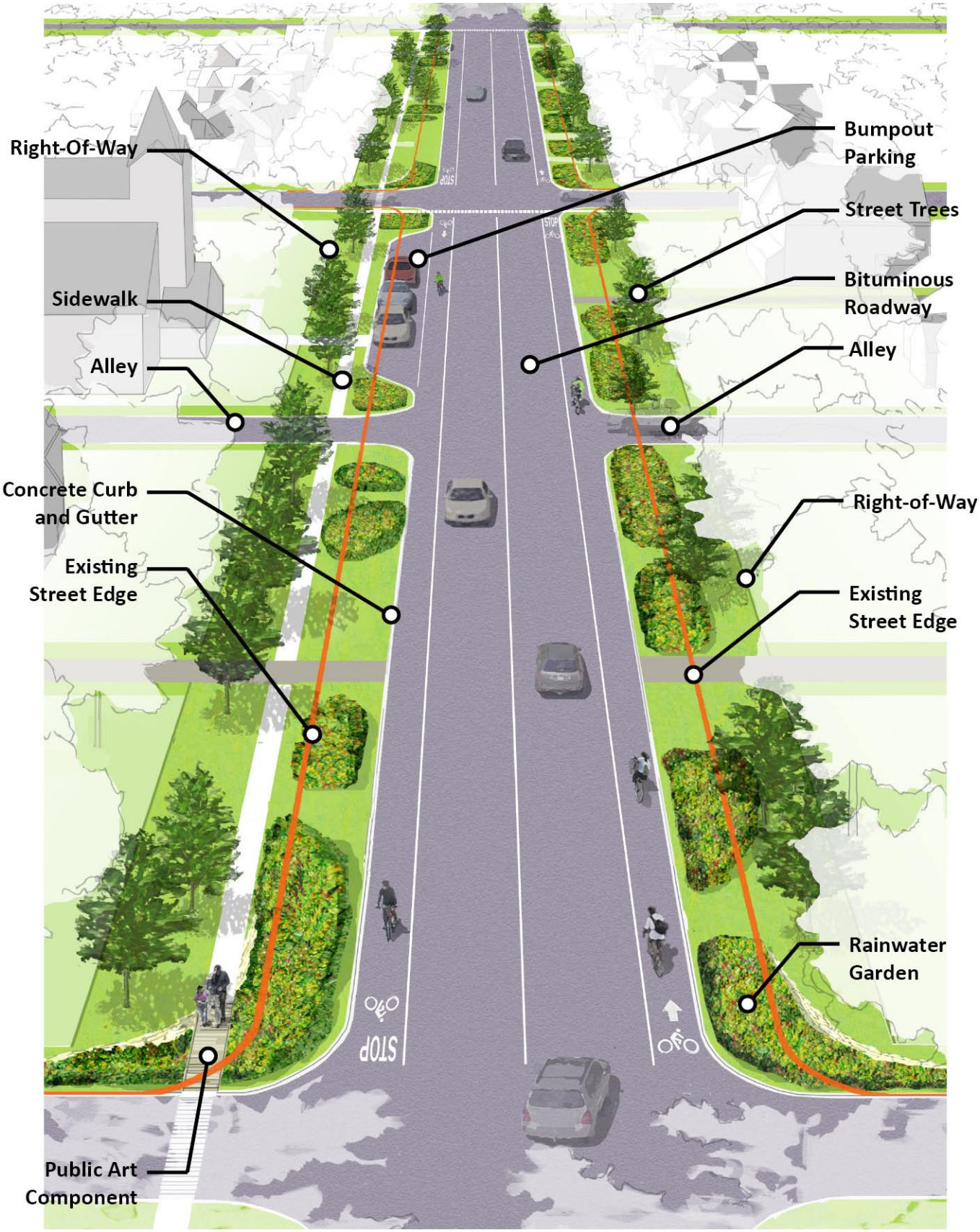
Because of the configuration of North St. Paul's blocks (primary streets run east-west), most homes and businesses face east-west streets. Most parking demand is on these streets. Conversely, parking demand on north-south streets is fairly low because few homes or businesses face them. This creates opportunities to convert existing and often unused parking areas on north-south streets to bike lanes, sidewalks, street trees and rainwater gardens.

Features of the North-South arterial/collector streets include:

- Street trees
- Rainwater gardens flanking the street
- Bike lanes on both sides of the street
- Sidewalks on at least one side of the street
- Parking where needed by adjacent property owners (e.g., churches, businesses); otherwise, no parking. Parking created by extending curb into the right-of-way.
- Two 10-foot driving lanes
- Arterial streets like McKnight Rd. and Century Ave. have very high traffic and are not considered part of the Living Street system.



NOTE: State Aid Roadways will require special coordination with jurisdictional authorities regarding design criteria.


Right-Of-Way
Bumpout Parking
Street Trees
Sidewalk
Bituminous Roadway
Alley
Alley
Concrete Curb and Gutter
Right-of-Way
Existing Street Edge
Existing Street Edge
Rainwater Garden
Public Art Component
STOP

17th Ave, an East-West Arterial/ Collector street

17th Ave, an East-West Arterial/ Collector street

South Ave, an East-West Arterial/ Collector street

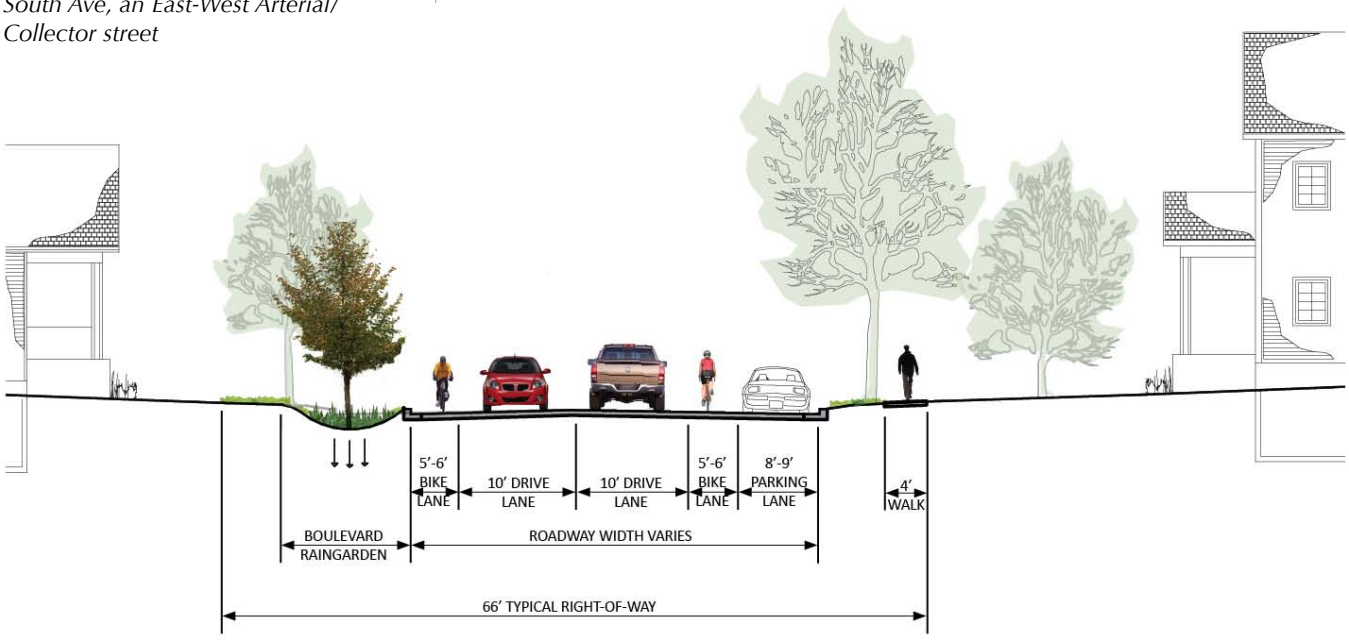
East-West Arterial/Collectors

These higher traffic volume streets serve to connect North St. Paul to adjacent cities and connect residential areas to schools and commercial areas. Portions of these roads are currently without sidewalks and bike facilities. This presents safety concerns for walkers and bicyclists wishing to travel these routes. These roads are State Highways or State Aid facilities and thus reconstruction plans must also meet design standards created by Ramsey County and the State of Minnesota.

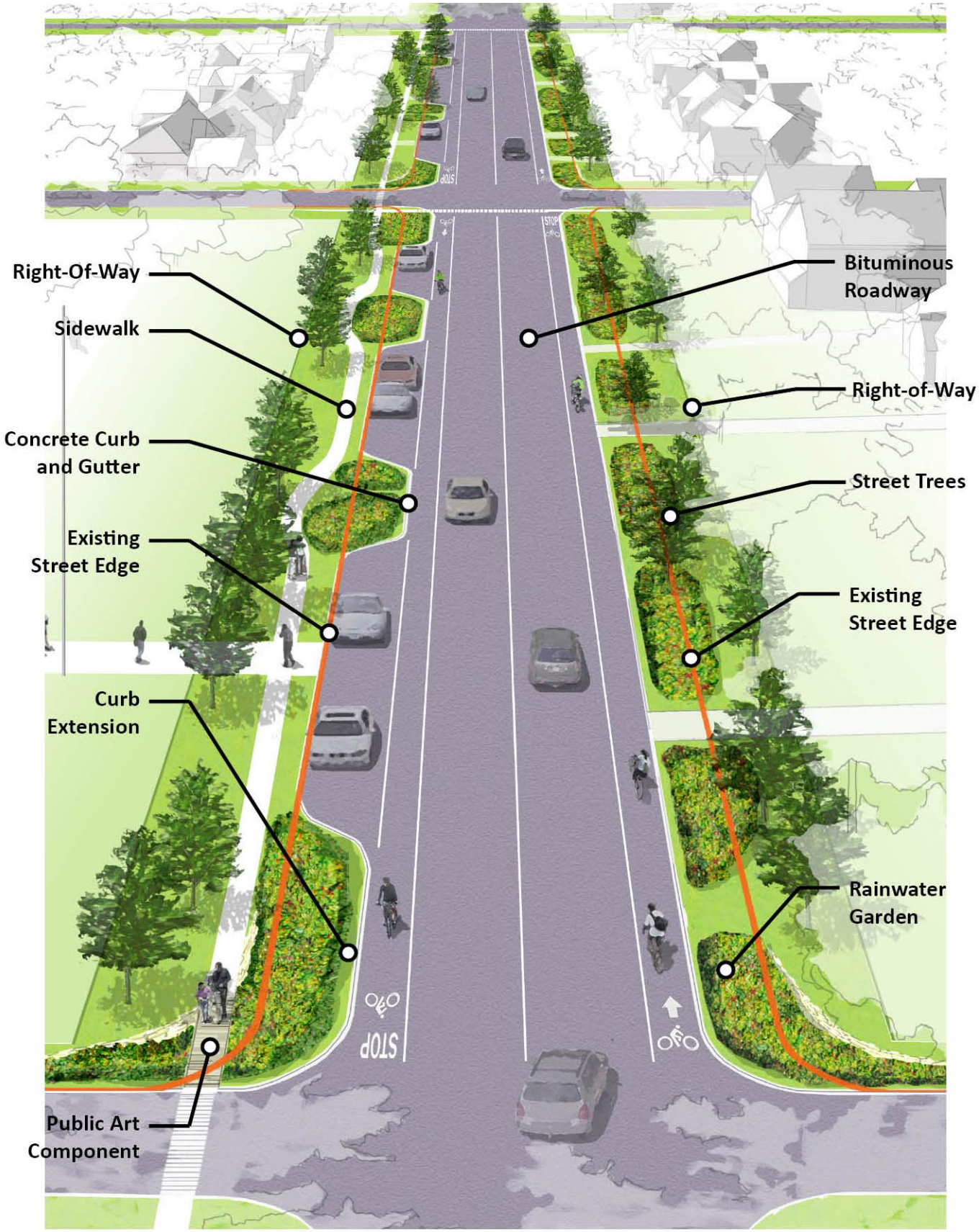
Homes and businesses front on these streets, creating some parking demand. However, parking demand is relatively low and parking is banned during the winter. Since these streets are not used heavily for parking, opportunities exist to convert some existing parking to bike lanes, sidewalks, street trees and rainwater gardens.

Features of the East-West arterial/collector streets include:

- Street trees
- Rainwater gardens flanking the street
- Bike lanes on both sides of the street
- Sidewalks on one side of the street
- Parking on one side of the street, contained within curb extensions
- Two 10-foot driving lanes



NOTE: State Aid Roadways will require special coordination with jurisdictional authorities regarding design criteria.


Right-Of-Way
Sidewalk
Concrete Curb and Gutter
Existing Street Edge
Curb Extension
Public Art Component
Bituminous Roadway
Right-of-Way
Street Trees
Existing Street Edge
Rainwater Garden
STOP

The trail will stretch through Southwood Nature Preserve.

The Parkway

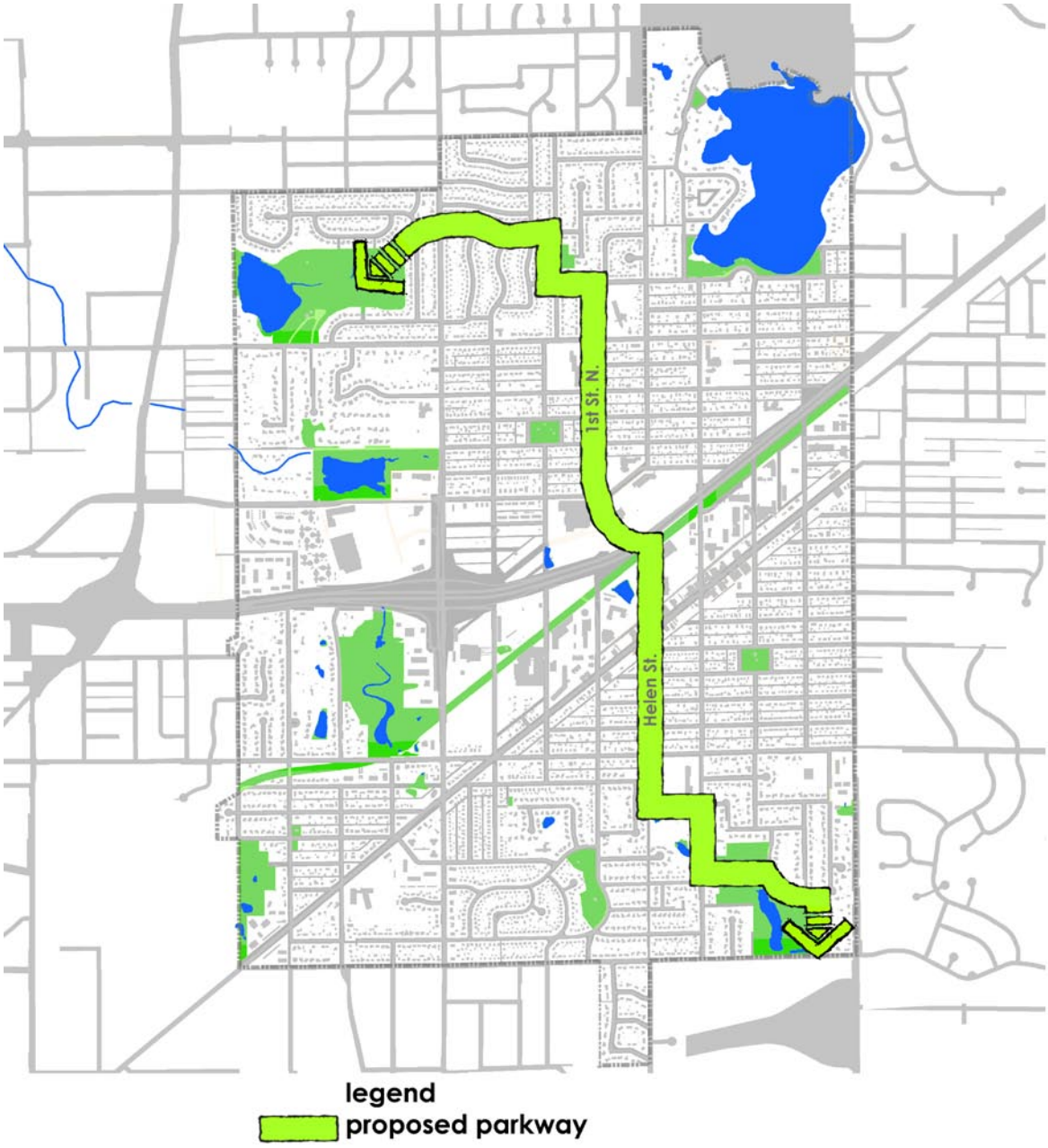
A north-south recreational parkway is proposed to connect Casey Lake Park and Polar Park to downtown and down to Southwood Nature Preserve (see figure on the facing page). The intent is to create a beautiful North St. Paul amenity that links walkers and bikers to primary destinations (businesses and parks) and adds value to the city. This central green spine through the city is meant to easily and safely bring people to three schools and into downtown. It will also serve as the perfect location for an evening stroll or a safe bikeway for families with small children.

The greenway will look as described above as North-South Collectors, but will be inherently quieter because it runs through residential neighborhoods. It will vary, however, depending on the neighborhood through which it passes. For example, the southern reach does not accommodate cars but provides for continuous biking.

Features of the parkway include:

- Street trees
- Rainwater gardens flanking the street
- Bike lanes on both sides of the street
- Sidewalks on one side of the street
- Two 10-foot driving lanes
- A 10-foot walk/bikeway where paths are created through parks and public lands.

Source: The Headwaters at Tryon Creek, Portland, OR


1st St. N.
Helen St.
legend
proposed parkway

Cost of Living Streets

North St. Paul streets will require reconstruction to replace water mains and pavement. It is of primary concern to the citizen task force that Living Streets not be more expensive than reconstructing streets as they exist today.

This is indeed the case. There are trade-offs between what is gained with Living Streets and what is eliminated in the streets that exist today. The advantages of Living Streets are numerous. The expense of constructing new elements such as rainwater gardens (now required by law), sidewalks, public art and trees is compensated by savings accomplished through eliminating parking on one side of the street. For example, a savings of 15% or more on pavement (the most expensive ticket item on a street reconstruction project) occurs by reducing the width of a residential street from 30 feet to 22 feet.

By building less roadway, future maintenance and replacement costs are also reduced. For example, narrowing a residential street from 30 feet to 22 feet could result in a 25% reduction in maintenance costs; as much as $1,000 per mile per year. These ongoing savings provide financial resources from which to provide maintenance for street trees and other green infrastructure if needed.

Typical street maintenance costs include:

- Crack fill/seal coat within five years of initial construction
- Mill/overlay at around 20-25 years
- Crack fill/seal coat within 5 years of mill/overlay

Based on the assumptions above, the city could realize $50,000 in life-cycle maintenance cost savings per mile of roadway over the life of the road. There would be additional saving in the cost of snow plowing since there would be less street to plow.

Like every street, each reconstruction project is unique. Costs will vary depending on the scope of each project.

Why Create Living Streets?

Issue	Existing Big Streets	Living Streets
Construction Cost	Expensive because the cost of blacktop is skyrocketing.	25% less pavement reduces street construction cost by 15% or more.
Maintenance Cost	Cost the city more to plow in the winter and contains more pavement to repair and replace.	Living streets reduce maintenance cost by $1,000 per mile of street per year.
Safety	Wide streets tell people it is safe to drive fast.	Narrower streets, gardens, and trees slow down drivers because objects in their periphery signal them to slow down.
Pollution	Pollutes the water.	A Burnsville, MN study shows that treating stormwater in rain gardens reduced phosphorus discharge to Crystal Lake by 89%.
Trees	Treeless streets are hot in the summer.	Healthy trees in neighborhoods enhance property values; increasing sale prices by 1% for each large front yard tree.

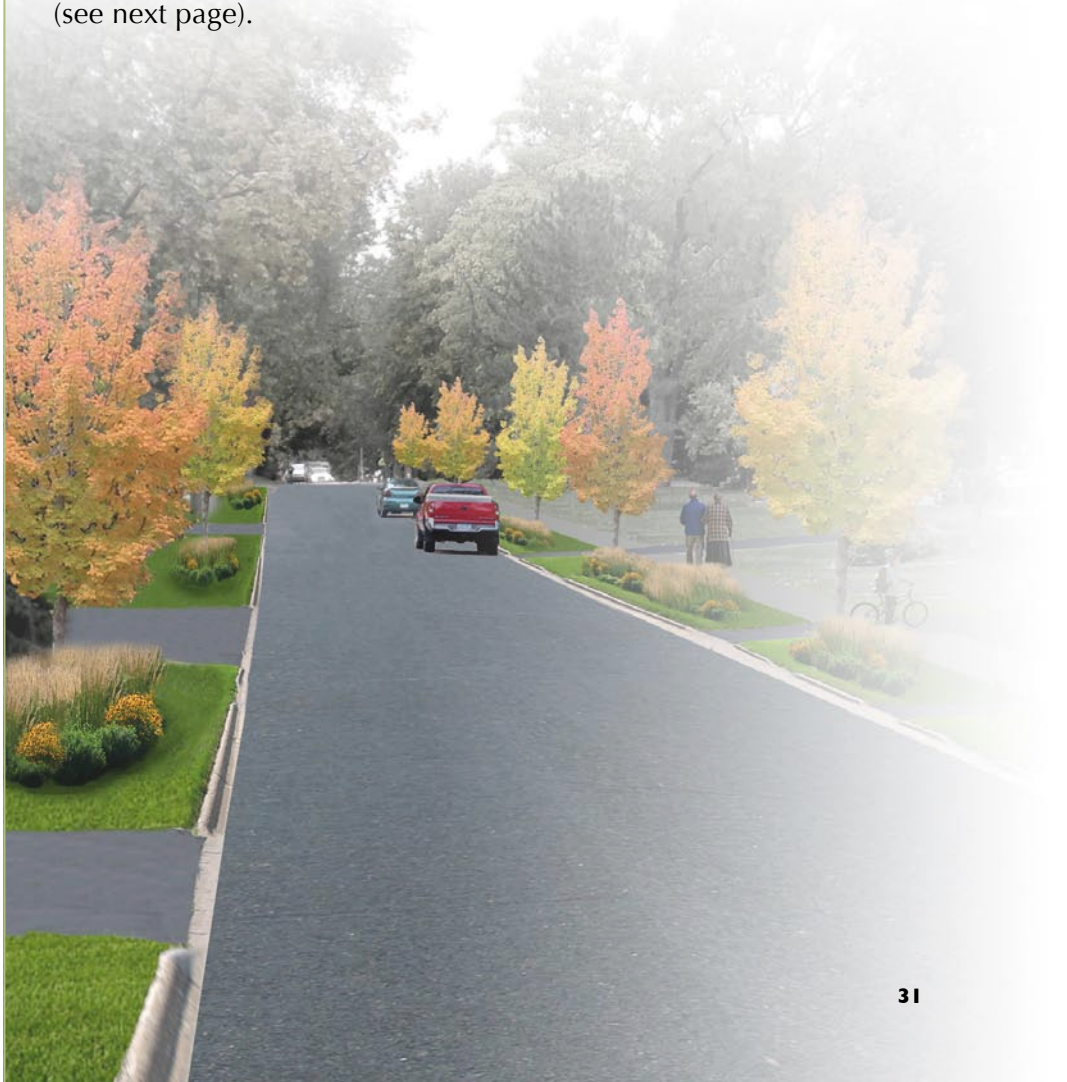
3.0 Design Guidelines

This section describes guidelines to be used to direct the design and construction process for street reconstruction projects. They are intended to supplement and guide standing practices related to City of North Saint Paul streets. The street templates and guidelines are to be implemented in a flexible manner on a project-by-project basis to achieve impervious surface reduction and stormwater treatment in the right-of-way, and to create less resource consumptive streets that serve the people of North St. Paul.

Overall Design Approach

In partnership, the City, Ramsey-Washington Metro Watershed District (RWMWD) and the people of North St. Paul will create Living Streets for the health of their citizens and the watershed. The City and RWMWD will work together through the design process to share ideas, facilitate public engagement, and coordinate roadway reconstruction with stormwater pollution prevention.

A holistic re-invention of North Saint Paul Streets is intended. Three principles set the individual project design team's direction and priorities regarding design, material selections, construction and ongoing stewardship of the public realm. Design elements used in the streetscape should be planned in the spirit of these principles (see next page).



Specific Design Elements

Detailed guidelines for specific design elements are included in Appendix A. Elements discussed there include:

1. Design Process
2. Street Design
3. Infiltration Basins
4. Filtration Basins
5. Soil Preparation and Soil Amendments
6. Plantings and Street Trees
7. Curbs and Curb Extensions
8. Sidewalks and Crosswalks
9. Bicycle Lanes
10. Public Art
11. Utilities

Design Principles for North Saint Paul Streets

1. Every street reconstruction project will create valuable places for neighborhood activity and active living.

- Connect neighborhoods and daily destinations with a comfortable, safe walking and biking network for people of all ages and abilities.
- Calm auto traffic.
- Identify and build upon the assets of each neighborhood in every project.
- Showcase natural resources in the streetscape.

2. Design infrastructure to mimic the natural hydrologic cycle.

- Manage precipitation where it falls by promoting infiltration into conditioned soils with deep-rooted vegetation.
- Reduce hard surface area (pavement).
- Manage rainwater as a resource, not a waste product.
- Practice water conservation (reduce irrigation) to reduce drinking water treatment and to save energy.

3. Establish living systems to function as infrastructure.

- Utilize the robust natural processes of trees, deep-rooted vegetation and soil life to treat pollutants in stormwater and the atmosphere, combat urban heat island effect, sequester carbon and reduce runoff.
- Promote habitat connectivity and biodiversity.
- Properly utilize sun and shade to reduce energy consumption in buildings.
- Utilize construction materials and methods with reduced ecological footprints, including material recycling practices.

Design Process for Planning a Street Reconstruction Project

The following general design process is intended to be flexible. It is intended to identify the major steps that apply to each street segment reconstruction, but is not considered all inclusive. The design process must be considered in conjunction with the implementation process set forth in the public participation and Living Streets Design and Implementation Process featured in Section 4.0 of this document.

Depending on the extent of reconstruction required for any given street, projects could typically take on of the following forms:

Street Reconstruction Option	Stormwater Treatment	Street Pavement	Underground Utilities
Option 1	Retrofit BMPs	Protect pavement with remaining usable life	Protect utilities with remaining usable life
Option 2	Retrofit BMPs	Protect pavement with remaining usable life	Replace/recondition utilities in-place
Option 3	Retrofit BMPs	Replace/recondition	Protect utilities with remaining usable life
Option 4	Full construction	Full reconstruction	Full reconstruction

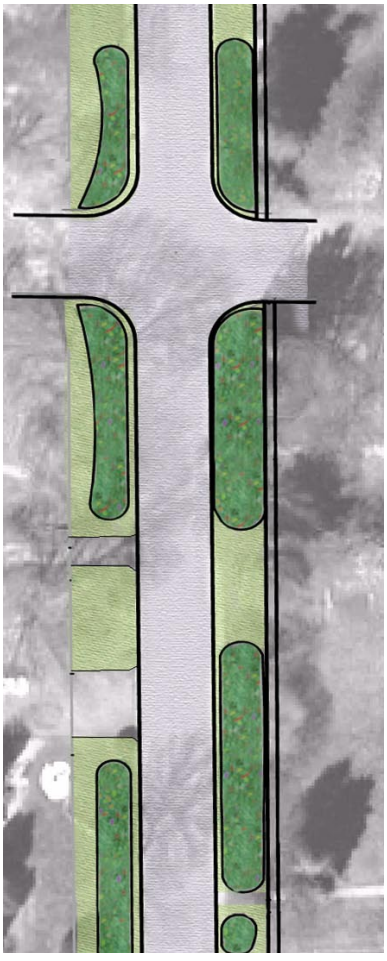
Once a reconstruction project is identified, a four-step design sequence should be used. Start off on the right path by involving a design team with experienced engineer(s) and landscape architect(s) from the beginning.

Step 1 – Conduct Public Meeting—The city announces its intent to reconstruct a street:

- Conduct a public meeting to announce the project, to inform citizens about the Living Streets approach, and to obtain public "buy-in."

Step 2 – Site Analysis—The site analysis will gather necessary data and identify key design constraints and opportunities for the street:

- Using the appropriate street template presented in this plan as a starting point, perform site analysis for the concept street layout.
- If a street under consideration is in the jurisdiction of a non-city entity (such as county, state or federal), begin project discussions with those entities as early as possible in the design process to discuss roadway design criteria such as lane widths, relative to legal standards. Determine if a variance to standards is necessary, and identify an authorization path forward.



- Obtain detailed existing topographic, existing utility and soils data.
- Identify any special roadway needs related to traffic, pavements, intersections, parking, etc.
- Identify storm sewer overflow locations for storm flows. Reuse the existing system of storm sewer catch basins, manholes and pipes if possible.
- Identify permitting requirements for the reconstruction project.
- Determine BMP sizing requirements based on RWMWD criteria.
- Perform infiltration BMP site sensitivity analysis and determine in concept the locations of stormwater BMPs in the street right-of-way.
- Identify utility conflicts. Practice avoidance as a first step to resolving utility conflicts. If necessary, meet with utility entities and discuss if relocation or utility upgrades are necessary, and can be coordinated with the street reconstruction.
- Identify how mature trees will be protected during construction and where new street trees will be planted.

Step 3 – Design Development—Develop a preliminary design considering constraints, criteria and opportunities identified in Step 1.

- Customize the concept street layout to the context and citizen needs of the particular street. For more information regarding specific streetscape elements, refer to the Appendix A: Design Guidelines.
- Identify opportunities for public art and for residents to creatively contribute to design features.
- Conduct a design meeting with RWMWD:
  - Discuss the concept street layout and results of the site analysis.
  - Consider if there are opportunities to add supplemental stormwater BMPs to the design, above the minimums required by the District. These BMPs could be paid for by the District. This meeting and information exchange is not for permitting, but for design development.
  - Incorporate these additional stormwater BMPs into the preliminary design.

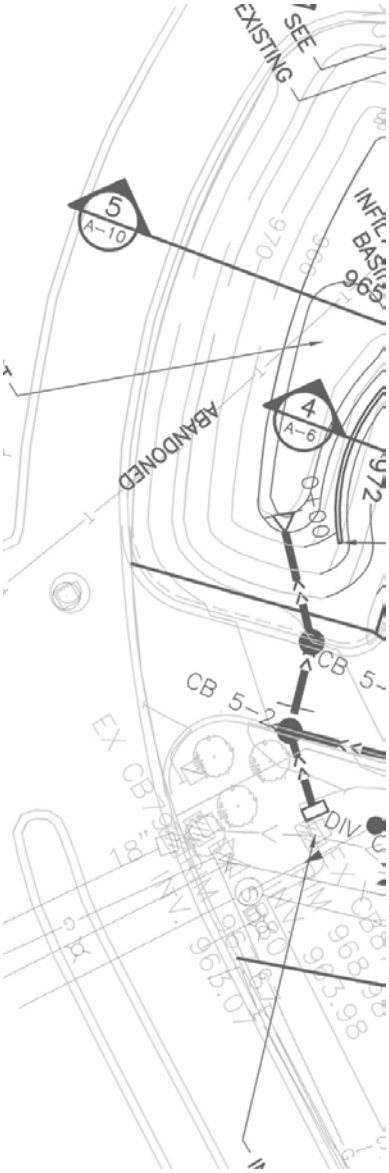
- Perform stormwater modeling, if necessary.
- Determine the level of maintenance acceptable for the hard features, BMPs and landscape. Determine how this will be funded and who will conduct the maintenance work. Put this into budget plans
- Create a preliminary design and construction cost estimate.

Step 4 - Conduct Public Meeting

- Proceed with public engagement of the neighborhood for resident education and input as described in the Implementation section of this document.
- Conduct public meeting for the street reconstruction project.
- Incorporate stakeholder feedback and contributions as appropriate.

Step 5 - Proceed with Final Design and Construction

- Proceed with final detailed design of all project features.
- Write a management plan pertaining to “Green” features.
- Proceed with the permitting process, including RWMWD permitting.
- Proceed with construction documents, contracting and construction.
- Implement management plan.



4.0 Implementation

This section looks at specific ways the city can implement Living Streets. There are two types of implementation programs described below. The first includes items that the city can implement through city staff or through direct involvement of City Council. The second group of items are tasks to be stewarded by engaged citizens.

Special Assessments

A special assessment is a charge imposed on real property to help pay for a local improvement that benefits the property. The state constitution allows the legislature to authorize local governments to use special assessments to help pay for local improvements based on the benefit the improvement gives the property. MN statutes authorize cities, towns, urban towns, and counties to make specific improvements, including: streets, sidewalks, pavement, gutters, curbs, vehicle parking strips, grading, trees, beautification, and storm sewers including holding areas and ponds, or other street drainage and connections from sewer, water or similar mains to curb lines.

Staff and Council Directed Implementation Programs

Use Assessment Policy to Communicate the Cost Savings of Living Streets Compared to Conventional Streets

As in most cities, North St. Paul uses Special Assessments to help finance street reconstruction projects. The street reconstruction and assessment processes the city uses could be enhanced to communicate the lower costs for Living Streets compared to a conventional street project. During this process, residents are keenly aware of the project and what it is going to cost them in special assessments. This heightened level of awareness can be used to communicate that the City's policy of replacing conventional streets with living streets is helping to keep street construction costs, and hence assessments as low as possible. For example, the narrower streets associated with Living Streets have lower construction costs than reconstructing streets to their current width because less pavement is put down.

In communicating special assessments to residents, the city could illustrate the cost difference between conventional streets and living streets. Through this communication, the city can help improve acceptance of Living Streets and communicate city efforts to keep costs as low as possible.

Develop and Implement a Living Street Reconstruction Process

Converting city streets into Living Streets represents change to the landscape with which city residents and business owners are so familiar. It is important to build awareness of living streets when it comes time for their street to be reconstructed. Involving citizens early in the process promotes civic vitality, fosters ownership and allows room for unique expressions of neighborhood identity. The following public participation implementation and design process is suggested for all Living Street reconstruction projects.

Public Participation and Living Streets Design and Implementation Process

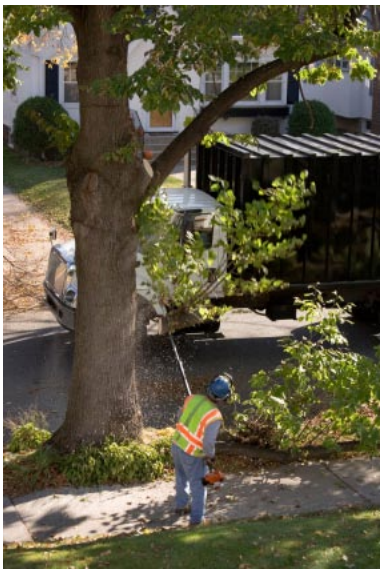
Time Frame	Project Step	Communications Element[1]	Communications Objectives
March	Preliminary design and feasibility study begins		
April	City and RWMWD design living street elements and explore funding options		
July	Informational letter & brochure mailed to affected residents & businesses announcing the project on their street	Informational Letter	Notice open house, reconstruction process, how streets are selected, assessments/financing, construction impacts
		Living Streets Brochure	What living streets are; living street benefits
		Project Website launched	Project updates; hosts all communications generated for project
Mid-September-October	Neighborhood open house	Presentation Boards	What living streets are; living street benefits
November	Preliminary design study completed		
	Public meeting held to share results of feasibility study and the preliminary street design	Feasibility results letter	Estimated cost, net cost savings, living street components
January-March	Final design, construction document preparation, permitting, bidding, contracting	Construction letter	Construction time frame; issues during construction
April-May	Construction starts		
October-November	Construction finishes		
Spring	Warranty work completed; maintenance plan initiated		
Summer/Fall	Final assessment hearing	Final assessment results letter	Final proposed assessments; financing options; rainwater garden maintenance tutorial given

[1]Each element is included in the Appendix or on the web site.

Develop an Asset Management Plan

The overall purpose of an Asset Management Plan is to both properly maintain the City's infrastructure and to manage related finances in a sustainable manner. It looks into the future and provides direction on the repair and replacement of utilities, sewer and street infrastructure. It is important to plan ahead for the maintenance of new green infrastructure elements in town such as street trees and rainwater gardens. An Asset Management Plan includes an inventory of the infrastructure and evaluates these assets in terms of what and when they will require repairs and/or replacement. It also identifies expansion areas and what new assets are needed to serve expansion or new service capabilities. The Asset Management Plan is a capital budgeting tool and is used for updating the city's capital improvement plan.

This report recommends an Asset Management Plan be produced for the infrastructure (including green infrastructure) of North St. Paul.



It is important to plan ahead for maintenance items, such as pruning street trees.

Determine Appropriate and Feasible Municipal Funding Mechanisms for Living Street Elements

There are various funding mechanisms for different elements within Living Streets. Funding options are illustrated in the table below. Funding these elements from different sources is a policy decision of the city and the RWMWD. Both parties should discuss these funding options for potential projects and develop a mutually supportive policy to fund and therefore implement Living Streets in the city.

	Living Street Element						
	Curb to Curb Pavement (including on-street bike lanes)		Sidewalks	Rain Gardens & Storm Sewer	Street Trees	Art	Other?
Funding Source	State Aid Roads	Local Streets					
State Aid	X		X[2]				
Assessments	X	X	●	●	●		
Surface Water Quality Funds				X			
City General Fund			X		X	●	
RWMWD				X	●	X	
TMDL Grant	●	●		X	●		
DNR Trail Connect Program[3]	X	X					

X = Existing funding approach

● = Potential funding approach with broader perspective for goal achievement

[2]For sidewalks along state aid roads

[3]Includes bike facilities: on-street and off-road trail

Other Funding Sources (Grant Programs)

Living Streets are comprised of many elements (streets, sidewalks, bike facilities, stormwater treatment facilities, landscaping, signage, and art). There are many approaches to funding Living Streets. Some approaches will work for individual elements while other approaches could apply to multiple elements or entire projects. With city resources in tight supply, a creative approach to funding will be needed. A variety of local, state and federal programs are available for funding many of the elements found in Living Streets. A summary of currently known programs, and how they might contribute to funding Living Street projects, is located in Appendix D.

Implementation Items Requiring Citizen Involvement and Participation

Create an Advisory Board for Plan Stewardship

The success of implementing Living Streets is highly dependent on involving citizens in their implementation. The creation of a citizen advisory board or some other citizen group that meets regularly is recommended to provide oversight and on-going stewardship of these implementation items. A new advisory group could be formed using the Citizen Task Force that oversaw the creation of this Living Streets Plan. Providing stewardship responsibility to the Planning Commission, the Environmental Commission, or a special joint committee of these two existing advisory groups is also an option.

Citizen involvement is critical to the success of implementing Living Streets.

Implement a City-Wide Communications Program

The awareness and support for the benefits of Living Streets among city residents is also critical to the successful implementation of specific Living Street reconstruction projects. A comprehensive and consistent communications/education campaign is needed to create broad support. A strategy for such a campaign is included in Appendix B. The communications plan includes key action steps and the materials/tools needed to build awareness and community support. It is anticipated that an advisory board and RWMWD staff will share implementation responsibility.

Develop a Comprehensive Sidewalk and Bicycle Plan

Sidewalks and bike facilities are key elements of Living Streets. They are a critical element in creating a safe community accessible to all. This plan does not indicate exactly where sidewalks or bike lanes should be placed in North St. Paul, but recommends that a separate study be conducted to create a city-wide plan to specify placement of sidewalks and bike facilities. Such a plan should be developed through a community engagement process which is especially important given previous conflicts over sidewalk construction.

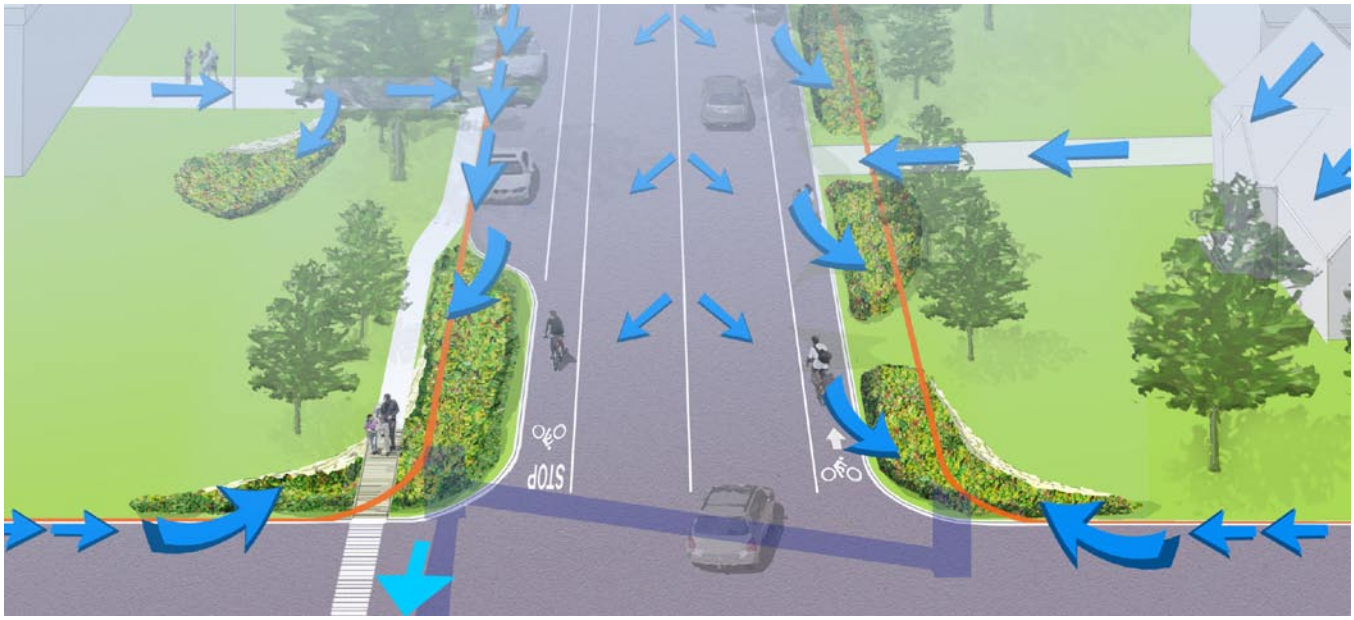
As part of this planning process, the Citizen Task Force that oversaw the creation of this Living Streets plan developed a *preliminary* sidewalk and bike plan, found in Appendix C. This preliminary plan is a starting point for a future effort to develop a city-wide sidewalk and bike plan. The preliminary plan developed goals and strategies, and suggests specific locations for facilities based on the local knowledge of the Task Force members.

This plan includes a preliminary sidewalk and bike plan, found in Appendix C.

Appendix A—Design Element Guidelines

Design guidelines for each street design element have been broken down into four categories:

- Design Objective—the primary intent of the element.
- Design Standard—the intent is to make this standard practice for street reconstruction work in the City of North Saint Paul public right-of-way.
- Design Considerations—the intent is to provide additional alternatives, resources and strategies. Though not required for every project, these strategies may reduce system conflicts, aide system compatibility, add value, promote sustainability and inform the designer.
- Construction and Maintenance Considerations—the intent is to provide additional alternatives, resources and strategies to apply to the construction, operation and maintenance of the design element.



Design elements must be considered in an integrated approach to maximize streetscape benefits.

Street Design

See the Design Summary Table at the end of this section for a summary of street guidelines.

Design Objective

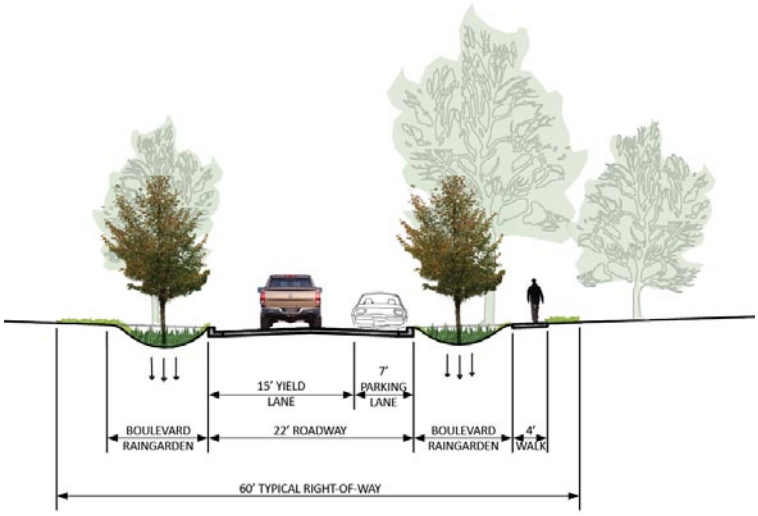
- To minimize impervious surface area while providing essential auto transportation services in a safe environment. Reduce pavement impervious area where possible.
- Integrate roadway, pedestrian/bike and green infrastructure elements to accomplish multiple functions.
- Provide on-street parking in appropriate quantity only where necessary.
- Provide driveway and alleyway extensions to connect to narrowed roadways.
- Improve the sustainability of paving practices with material recycling practices.
- Reduce urban heat island effect by reducing the thermal impact of pavement.
- Improve durability to extend the usable life of reconstructed pavement.

Design Standard

- Evaluate pedestrian, automobile and bicycle traffic needs on a project-by-project basis to determine safety requirements, especially at intersections and on Collector/Arterial streets. Prioritize the needs and safety of pedestrians and bicyclists.
- Roadways must be designed for safe intersection turning and passage of emergency vehicles, school buses, occasional garbage collection trucks, delivery trucks, etc.
- Design cross slopes and curb profile to move stormwater to vegetated BMPs within the right-of-way.
- Perform soil correction where roads are narrowed and green space is created. Loosen or replace compacted soil under the removed roadway section or areas compacted during construction. See Soil Preparation and Soil Amendment Design Guidelines.
- Identify where new street trees will be planted and how mature trees will be protected when designing the street layout.
- Educate landowners on the street design approach prior to design. Establish a public engagement process. Engage community leaders first.

For Residential (Local) Roads:

- A street width of 22 feet is recommended for low traffic local streets (ADT<400).
- A single drive lane (also known as a queue lane or yield lane) of 15 foot width is recommended.
- Provide on-street parking on one side of the street only, at a width of 7 feet. At each intersection approach, enforce a no-parking zone to provide space for vehicle turning.
- Provide for safe intersection turning by utilizing large curb radii and/or slight widening of approaches to intersections. This is particularly important where local streets meet collector/arterial streets.
- Additional parking can be provided in the form of 7 or 8 foot wide parking bays near institution locations, businesses or multifamily housing, if necessary.
- Provide space to install storm water treatment BMPs in the right-of-way.



For Collector/Arterial Roads:

- Drive lane width of 10 feet is recommended. On state-aid roadways, 11 feet is the minimum drive lane width by MN Rules. Efforts across Minnesota are underway to make 10 foot wide drive lanes and complete streets possible. Drive lanes of 10 feet width should be pursued, if allowed by law in the future. Alternatively, 10 feet wide drive lanes could be pursued through a state-aid variance process.
- Install bicycle lanes. See Bicycle Lanes Design Guidelines for additional information.
- Install curb extensions at the ends of blocks, and between parking bays mid-block. See Curbs and Curb Extensions Design Guidelines for additional information.

An example of a 22-foot local street with parking on one side.

Narrow streets are snow plowable.

Parking bay example.

Local roads present opportunities for impervious surface reduction through narrowing.

Minimum Allowable Posted Speed Limit

30 mph is currently the minimum allowable posted speed limit on local roads by MN Statute 169.14. A speed limit of 25 mph can be posted provided the local road authority erects signs designating the speed limit and indicating the beginning and end of the specific residential roadway segment on which the speed limit applies.

Coordination and Permitting

Reconstruction work on state-aid roadways as shown in this plan will require coordination and permitting with Ramsey County and MN/DOT. See the MN/DOT State Aid web site for additional information.

http://www.dot.state.mn.us/stateaid/index.html

http://www.dot.state.mn.us/stateaid/manual/sam07/chapter1/1-7.html

Minnesota Complete Streets

On May 15, 2010, the governor signed Omnibus Transportation Bill (SF-2540) which makes Complete Streets policy a statewide priority and is intended to promote context-sensitive street designs on state-aide roadways.

- Dimensional criteria for on-street parking, bicycle lanes and drive lanes should be determined by the context and traffic level of each street segment. For example, wider parking bays may be desirable in front of businesses.
- Provide space to install storm water treatment BMPs in the right-of-way.

Design Considerations

For Collector/Arterial Roads:

- Consider on-street parking bay width of 8 feet for streets where ADT<10,000 and 10 feet for streets where ADT > or equal to 10,000 or where frequent use is expected, such as in front of businesses.
- The necessity, dimensions and coordination of turn lanes, signalization and signage must be approached on a project-by-project basis.
- Consider a maximum speed limit of 30 mph.

- Consider using a curbless “rural residential section” where curb currently does not exist.
- Reorganizing the right-of-way to accommodate sidewalks, rain gardens and trees may require relocation of existing underground utilities, catch basins, hydrants, valves and sanitary sewer manholes. This reorganization should be addressed on a project-by-project basis.
- Consider using decorative pervious pavers at pedestrian drop-off areas and transit stops for a visual indicator of pedestrian activity.
- Consider carrying sidewalks through driveways with a visual cue such as a pavement material change to alert drivers and improve safety.
- Consider strictly enforcing soils compaction, aggregate specifications, and pavement specifications where roadway sections are replaced due to utility cuts.
- Consider encouraging homeowners to eliminate street accessible driveways if an alleyway accessible driveway exists or is proposed on the same property.
- If homeowners request additional parking, consider providing a parking space in a widened portion of the driveway as

opposed to an on-street parallel-parking bay. A driveway space could (in some cases) be constructed for a lower cost and generate less impervious surface than on on-street parking bay. Such driveways could be a potential location for installing pervious pavers. For example, a disabled resident may require an accessible parking space.

- Consider enhancing the sustainability of paving practices by:
  - Evaluating existing materials and performing selective demolition. Recycle valuable materials such as base aggregate materials and pavement whenever possible.
  - Specifying recycled materials in pavement sub-base aggregates, such as recycled concrete aggregate or other recycled materials.
  - Minimizing the use of construction materials that are emitting high levels of volatile organic compounds (VOCs).
  - Modifying pavement mixes to achieve a higher albedo, and absorb less solar radiation.
  - Specifying asphalt mixtures that utilize appropriate amounts of recycled materials in asphalt pavements, such as recycled asphalt pavement (RAP) or other materials.
  - Specifying Portland cement concrete mixtures that utilize appropriate amounts of recycled materials, such as recycled concrete aggregate (RCA)
- Consider utilizing pervious pavements in select locations:
  - Using pervious pavements and underlying aggregates to infiltrate rainwater where it falls on pedestrian areas, low-traffic roads or parking areas. Give preference to low-traffic locations where pavement will not be frequently dirtied, salted or overly costly to maintain.
  - When considering pervious pavements for larger applications, compare the increased cost of pervious pavements/pavers and underlying aggregate reservoirs with the cost tradeoff of reduced storm water infrastructure.
  - Avoid using pervious pavements in areas subject to significant amounts of sedimentation and large amounts of traffic.
  - Pervious pavements require seasonal maintenance, such as vacuuming or water jet cleaning.

Recycling Options

For additional information about recycling pavement, waste reduction and construction and demolition (C&D) debris recycling see:

- Minnesota Asphalt Pavement Association at http://www.asphaltisbest.com/
- The State of Minnesota Sustainable Building Guidelines at www.msdg.umn.edu/
- Asphalt Recycling and Reclamation Association at www.arra.org
- Concrete recycling at www.concreterecycling.org
- The Environmental Council of Concrete Organizations (ECCO) at www.ecco.org
- Minnesota Pollution Control Agency at http://www.pca.state.mn.us/oea/greenbuilding/waste.cfm
- Minnesota Materials Exchange
- Twin Cities FreeMarket for recycling construction wastes

Pervious pavers installed at the Headwaters on Tryon Creek in Portland, OR.

For additional information regarding Pavement Management, see Chapter 3 of the Metropolitan Council Urban Small Sites Best Management Practice (BMP) Manual.

Construction and Maintenance Considerations

- Recycle valuable materials such as bituminous pavement, metals, aggregates and concrete generated during construction. Compost removed vegetation.
- Properly sequence construction and drainage to avoid soil compaction, erosion and sedimentation in green space and stormwater treatment areas.
- Consider reducing sand and salt application during winter to save money, promote stormwater BMP functionality, lessen pavement degradation and reduce this source of stormwater pollution.
- Minimize or eliminate the application of sand and salt in porous pavement areas.
- Sweep streets as early as possible in spring, following snowmelt and before rains wash sediment downstream.
- Consider sweeping in June, following the drop of tree seeds and flowers.
- Sweep sediment generating hot spots, such as near construction sites and aggregate/salt stockpile transfer sites.
- Vacuum sweepers are preferable to broom sweepers.
- Consider convertible sweeping equipment that can perform cleaning as well as plowing, or other functions.

For best practices related to complete street design refer to:

- Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: an ITE Proposed Recommended Practice. Institute of Transportation Engineers. 2005.
- A Policy on Geometric Design of Highways and Streets, 5th Edition, AASHTO. 2004.
- The National Complete Streets Coalition. www.completestreets.org
- Minnesota Department of Transportation: Planning and Design Tools for Construction Projects. www.dot.state.mn.us/tecsup/design2.html

Infiltration Basins

Design Objective

- To harvest street runoff to water street trees.
- To provide a place for soil life and plant life to treat storm water.
- To achieve water quality treatment and volume reduction goals.
- To reduce the rate of stormwater runoff by retaining stormwater in the gardens.

Design Standard

- Perform a site analysis to determine site suitability for infiltration.
- Use information in the RWMWD Kohlman Infiltration Study to help plan infiltration basin locations.
- Perform soil boring(s) to confirm on-site soils are suitable for infiltration. Plan locations of infiltration systems where soils allow infiltration. Hydrologic soil groups A & B typically allow for the construction of infiltration basins whereas C & D soils typically require filtration basins.
- Obtain detailed site topographic information, including the elevations of low openings for existing habitable adjacent buildings.
- Prevent the unwanted migration of stormwater into sensitive areas, such as basements and road gravel base material. A vertical impermeable barrier can help direct water downward and away from a sensitive area as opposed to laterally or toward it.
- A desirable length to width ratio for an infiltration basin is 3:1 or greater.
- Basin side slopes should be 4H:1V or flatter. Construct a retaining wall if space is limited.
- The depth of ponding in the shallow depression shall not exceed 18 inches.
- Stormwater runoff must be pretreated to remove solids before discharging to infiltration basins to maintain their long-term viability. At inlets to basins install easily maintainable sediment pre-treatment devices (forebays, catch basin sumps, grit chambers and turf filter strips are options).

Infiltration areas promote robust plant growth.

www.rwmwd.org

Refer to the rules of Ramsey-Washington Metro Watershed District for the design of all stormwater BMPs.

Rainwater gardens in boulevards along residential streets

For Additional Information

For additional information regarding Site Sensitivity Analysis, Soils Investigations, Infiltration Systems and Rainwater Gardens, see Chapter 3 of the Metropolitan Council Urban Small Sites Best Management Practice (BMP) Manual. www.metrocouncil.org\environment

Infiltration BMPs

Design and placement of infiltration BMPs shall be done in accordance with the Minnesota Department of Health guidance called "Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas."

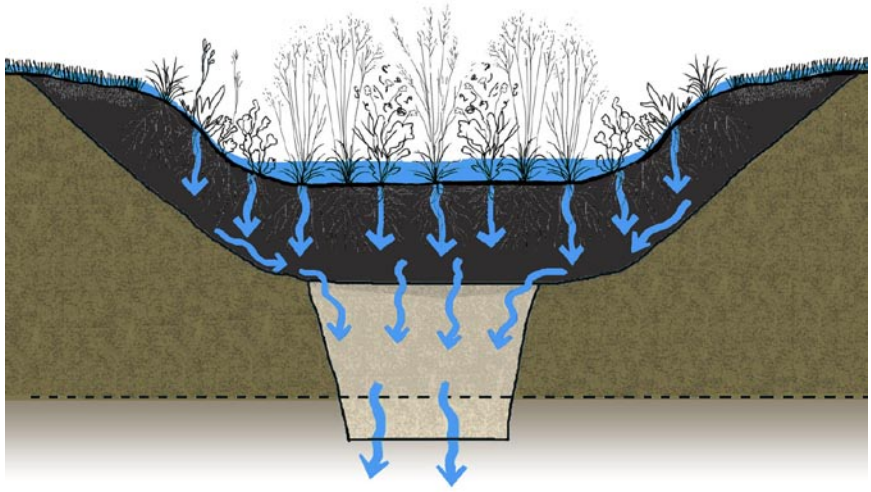
- Design the basin to safely overflow and be bypassed by flood flows. Do not create flow-through rainwater gardens.
- Install a minimum of 12 inches percolation-friendly planting soil.
- Plant perennials and shrubs rather than turf grass.
- Place edging around rainwater gardens.

Design Considerations

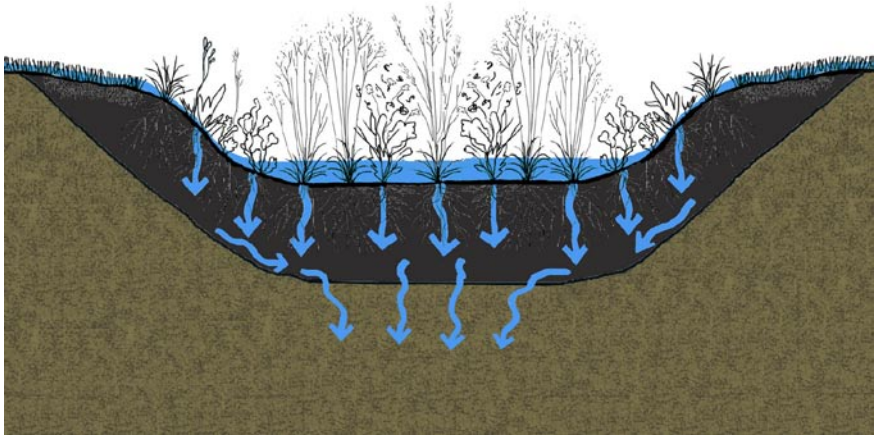
- Plants in the gardens should be selected to allow for low maintenance.
- Consider using shredded hardwood mulch around plantings.
- Consider installing retaining walls on the side opposite the street edge to maximize storage volume or accommodate a smaller footprint.

Construction and Maintenance Considerations

- Prevent rainwater garden soil compaction during construction. Do not allow construction equipment into basins during or after their construction.
- Properly sequence construction work to avoid rainwater garden inundation and sedimentation prior to plant establishment.
- Divert stormwater, especially large flows, around basin during vegetation establishment period.
- Apply shredded hardwood mulch to the surface of rainwater gardens as necessary (typically every second year). Decaying mulch will add to the fertility of the soil.
- Bring basin on-line once vegetation is established and not before upstream portions of the site are stabilized.
- Sediment pre-treatment devices (forebays, catch basin sumps, grit chambers and filter strips) will require periodic sediment removal to maintain filtering ability. Clean them at least annually, and more often as necessary.
- Basins will require weeding at least monthly during the first 2 years of establishment.
- Maintenance after establishment period will include cutting back standing herbaceous material in the spring along with weeding and mulching. After that walk through the garden about every six weeks and pull weeds.



Infiltration basins may require soil corrections, such as the sand trench shown above, to promote infiltration into subsoils.



Some infiltration basins may be constructed in percolation-friendly soils without the need for a sand trench or other soil corrections, as shown above.

Filtration Basins

Design Objective

- Filtration basins are used when soils do not allow for stormwater infiltration.
- To provide a place for soil life and plant life to treat stormwater.
- To achieve water quality treatment goals by filtering stormwater rather than infiltrating stormwater as accomplished by infiltration basins.
- To reduce the rate of stormwater runoff by retaining stormwater in the gardens.

Design Standard

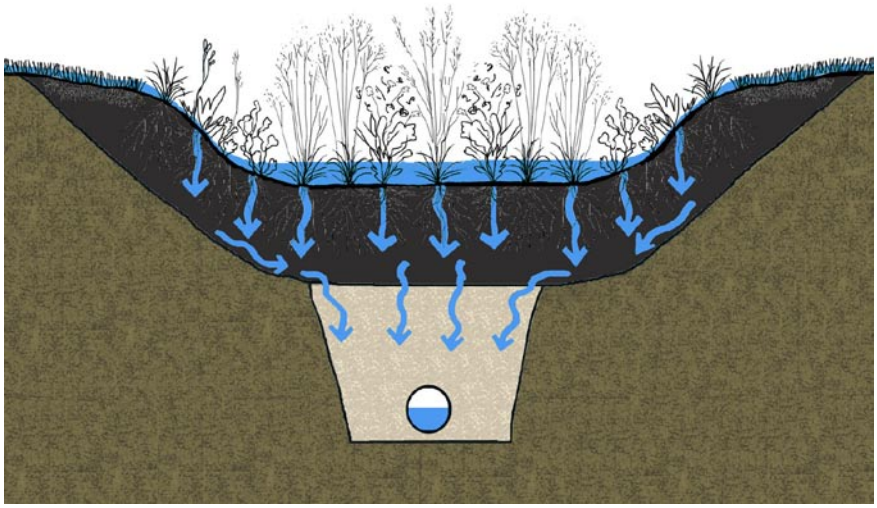
- Filtration basins are similar to infiltration basins, but are constructed with an underdrain which flows to the storm sewer system or daylights to grade.
- See Infiltration Basins Design Guidelines for all other standards.

Design Considerations

- See Infiltration Basins Design Guidelines for considerations.

Construction and Maintenance Considerations

- See Infiltration Basins Design Guidelines for considerations.



A filtration basin collects stormwater in an underdrain system for discharge downstream.

Soil Preparation and Soil Amendments

Design Objective

- Create rainwater garden soil environments teaming with microorganisms and plant roots to treat stormwater.
- Create permeable top soils and sub-soils that readily infiltrate stormwater, and allow plant roots to extend deep into the soil.
- Create fertile, loose soils along road sides that support robust trees, shrubs and perennials.

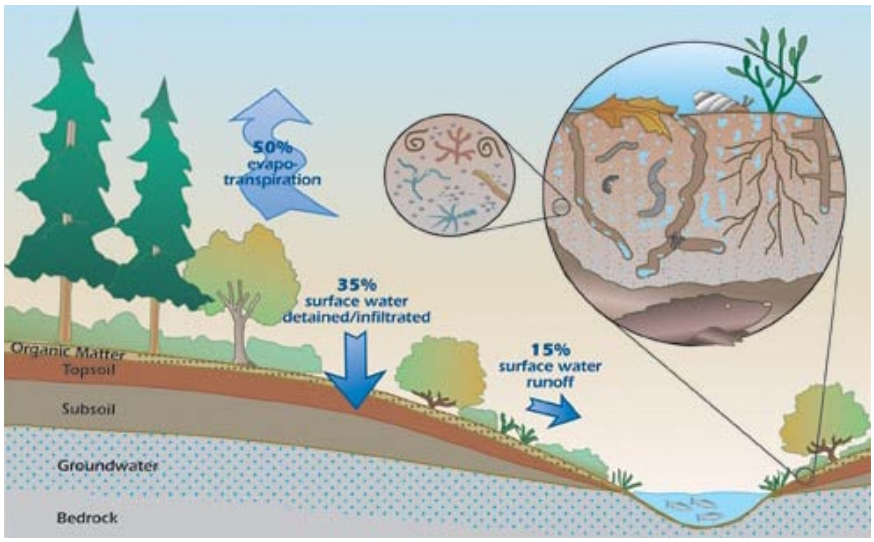


Image courtesy of Soils for Salmon: www.soilsforsalmon.org

Design Standard

- Loosen sub-soils at the bottom of rainwater gardens to a minimum depth of 18″ before planting soils are placed. Do this from the side of the basin with a backhoe, or equivalent.
- Place 12″ of percolation-friendly planting soil within rainwater gardens.
- Where possible amend existing top soils with locally available, sustainably produced amendments, such as organic compost to produce planting soils.
- Avoid the use of synthetic fertilizers. Instead, compost planting areas.
- Soils along roadsides should be loosened to a minimum depth of 24″ after road construction is complete, and a minimum of 6″ of topsoil should be placed in order to allow stormwater infiltration and to allow for the healthy growth of trees.

- Keep mechanical equipment off loosened soils to prevent recompaction.

Design Considerations

- Consider sourcing compost locally whenever possible.

Construction and Maintenance Considerations

- During construction do not allow mechanical equipment into rainwater gardens. All work should be done from the side to avoid soil compaction.
- Apply shredded hardwood mulch to the surface of rainwater gardens as necessary (typically every second year). Decaying mulch will add to the fertility of the soil.
- Compost dead or cut vegetation.

Plantings and Street Trees

Design Objective

- Shade pavement during summer months to reduce ambient air temperatures, increase comfort and reduce urban heat island effect.
- Design easy to maintain yet beautiful rainwater garden plantings.
- Create a unified feel between rainwater gardens along a given street.
- Plant street trees to create a canopy over the street.

Design Standard

- Plant a diversity of street trees to avoid complete die-out from rampant disease.
- Street tree species should be selected to avoid those that tend to heave pavement or penetrate utility pipes. Avoid using species like elm, birch and poplars. Plant species such as oaks, Kentucky coffee tree, honey locust and basswood.
- Avoid planting trees where they will interfere with driver sight lines and adequate street lighting.
- Design simple rainwater garden plantings that are easy to maintain. Consider the ability and time constraints of property owners that will maintain rainwater gardens. Most gardens should be planted with just a few species of robust horticultural perennials and low growing shrubs to keep maintenance low.
- Native herbaceous plants are difficult to manage to a neat and tidy appearance. They should be considered high maintenance gardens. Native herbaceous plants should only be planted for individuals that fully understand their maintenance requirements.
- Repeat a few of the boldest species in every garden in a neighborhood. This will provide visual unity and tie the neighborhood together in a pleasing appearance.
- Install edging around rainwater gardens to keep lawn from moving into the garden and therefore reducing maintenance.
- In the bidding documents, request experience qualifications from contractors, in particular landscaping contractors.
- Protect existing vegetation during construction. Avoid soil compaction over roots during construction.

- Plant and seed following proper soil preparation work. See Soil Preparation and Soil Amendment Guidelines.

Design Considerations

- Consider using a dominance of ornamental grasses such as silver plume grass and reed canary grass in rainwater gardens. They are deep rooted, form a good weed barrier and look great. They are simple to maintain.

Construction and Maintenance Considerations

- Replant vegetated areas as necessary.
- Street trees must be planted as per MN/DOT's standard planting details. Soils must be properly prepared as described above.
- Street trees should be pruned regularly; especially during the first five years after planting. This will extend the life of the trees.
- Cut back herbaceous plants in rainwater gardens each spring. At this time also weed and refresh shredded hardwood mulch. Rainwater gardens should be weeded regularly. Weeding frequency may be reduced to three or four times per growing season with proper mulching.

Rainwater garden at Swede Hollow Cafe in St. Paul.

Curbs and Curb Extensions

Design Objective

- Narrow streets widths and reduce impervious surfaces using curb extensions.
- Curb extensions provide space for stormwater treatment facilities and reduce pedestrian crossing distance.

Design Standard

- Consider a curbless road section on residential streets that do not have curbs.
- Concrete curb and gutter should be given preference over bituminous curb.
- Design roadway cross slopes and curb profile to move stormwater first to pretreatment areas, then vegetated BMPs in the right-of-way. Allow excess storm flows to safely overflow down the gutter line to the storm sewer without unacceptable roadway inundation. Size overflow structures accordingly.
- Provide catch basin drop inlet structures as inlets to rainwater garden pretreatment where appropriate.
- Curb cut inlets (curbless sections) should have a minimum bottom opening length of 4 feet (not including tapers). Provide a minimum 4″ drop from gutter elevation into the edge of the pretreatment facility. Protect this drop area from erosion with appropriate material, such as splash blocks or a concrete transition.
- For street edges along bike lanes, choose catch basin inlet grates that are not hazards to bicyclists
- Where a curb extension is installed, the extension shall be offset from the incoming curb line a minimum of 4 feet to aide visibility to oncoming drivers and snow plows. A minimum transition length of 12 feet shall be used for transitions from straight curb lines. The minimum back-of-curb radius for the transition shall be 10 feet. Other transition lengths and shapes can be configured on a project-by-project basis.
- Design curb extensions to best accommodate snow plowing. Avoid blunt edges and sharp corners. Consider using gradual curves for the transitions. Consider modified curb designs to reduce snowplow blade impacts.

An example of a curb cut inlet.

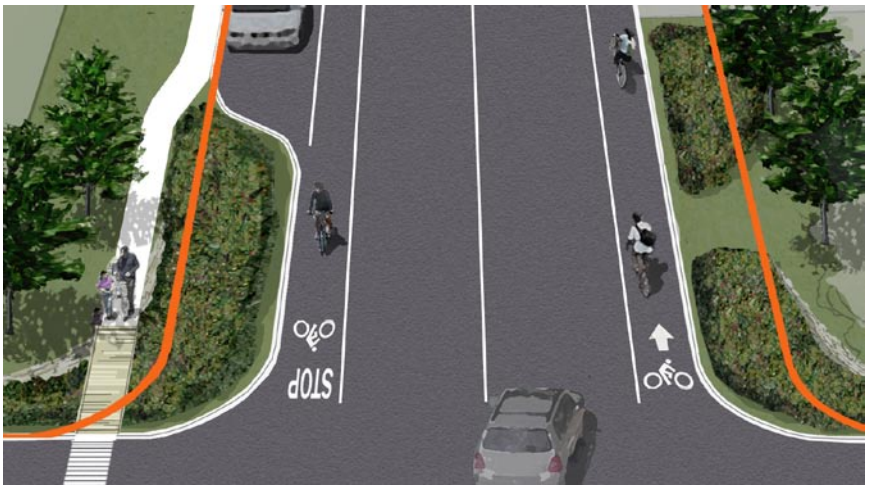
Curb extensions can be used to reduce pedestrian crossing distance.

Design Considerations

- Consider marking curb extension transitions with visual cues for traffic and snow plows, such as vegetation changes or other design elements.
- Design curb inlet to prevent flow-by. Depress the curb inlet slightly. Take measures to prevent the creation of hazards for bicyclists.
- Consider mountable and vertical curb designs for flexibility.

Construction and Maintenance Considerations

- Snow plowing patterns will need to be modified to account for curb extensions.



Curb extensions are an integral part of organizing intersections for the needs of pedestrians and bicyclists, and to provide space for stormwater treatment.

Sidewalks and Crosswalks

Design Objective

- To encourage walking.
- To provide safe walking outside of the roadway.
- To organize intersections for safe use by all users.

Design Standard

- Sidewalks shall be a minimum width of 4 feet. This is intended to accommodate walkers and reduce cost while avoiding the over-creation of impervious surfaces.
- The costs of sidewalks should be shared project-wide and not allocated to individual homeowners.
- Sidewalks on one side of the street on single family residential streets are recommended. Institutions may require sidewalk on both sides.
- Sidewalks, pedestrian ramps, ramp slopes, walkways and surfacing should be ADA-compliant and in accordance with statute.
- Avoid obstructions to pedestrian areas.
- Top of sidewalk elevation must be set above rainwater garden inlet and outlet elevations.
- Utilize curb extensions to slow traffic and shorten pedestrian crossing distance at intersections and crossings. See Curb and Curb Extensions design guidelines.
- Plant appropriate tree species that will not heave sidewalks. See Plantings and Street Trees design guidelines.
- Coordinate pedestrian ramp locations with stormwater management facilities to avoid conflicts and unacceptable inundation of walking areas and waiting areas.
- Intersections must function safely for bicyclists, pedestrians and drivers. Safety should be the design priority.
- Use recycled materials where possible, such as in aggregates, pavement materials, bridge materials, wall materials, etc.

Lighting Considerations

Install adequate lighting in the streetscape. Lighting should be addressed on a project by project basis. For additional information refer to:

- MN/DOT Roadway Lighting Design Manual (2003)
- Illuminating Engineering Society of North America (IESNA) Lighting Handbook, Recommended Practice for Roadway Lighting (RP-8-00) and Recommended Practice: Lighting for Exterior Environments (RP-33-99).

Design Considerations

- Signalization must be considered on a project-by-project basis to enhance safety at higher-traffic intersections.
- Place sidewalks a minimum of 6 feet from the curb, unless it is a drop-off/pick up location.
- Consider enhancing higher-traffic pedestrian nodes (such as drop-offs, transit stops, and waiting areas) with decorative pervious pavers, trash receptacles, seating and enhanced landscaping. Provide tree shade at these locations.
- Where possible, use pedestrian waiting locations at pedestrian nodes as opportunities to showcase green infrastructure by contrasting places of human activity with natural green space, especially stormwater-treatment areas.
- Consider installing miniature pedestrian bridges over rainwater gardens and swales to enhance streetscape aesthetics and allow for a continuous storm water treatment area beneath the bridge.
- Consider placing artistic way finding signage, artistic neighborhood identifiers or public art at pedestrian nodes and along key routes. Source imagery for this kind of creative product locally whenever possible within the North Saint Paul arts community and, if at all possible, by the citizens actually living on that street.
- Take advantage of intersections and pedestrian routes as gateways to neighborhoods and individual streets. Consider placing decorative neighborhood identifiers, retaining walls or public art at intersections.

Construction and Maintenance Considerations

- Temporary offsetting of roadway centerlines may occur as individual streets are narrowed, and perhaps shifted within the right-of-way. Consistency and predictability of the streetscape will increase as more streets are reconstructed in the spirit of this plan.
- Construct sidewalks before excavating rainwater gardens.

Bicycle Lanes

Design Objective

- To encourage bicycling as an alternative to automobile driving.
- To provide safe bicycling routes for people of all abilities throughout North Saint Paul.
- To reduce the number of cars on the road, lessening dependence on street parking, and reducing impervious surfaces.

Design Standard

- Create bike lanes 5 feet wide where ADT<5,000 and 6 feet wide where ADT>5,000 on 2-lane Collector/Arterial streets, per the MN/DOT Bikeway Facility Design Manual.
- Design intersections for the safe waiting, turning and movement of bicycles, especially in higher-traffic areas. Address this priority prior to addressing automobile needs.
- Accommodate bicycles at intersections, particularly in high-traffic areas. Provide pavement markings and signage to alert drivers to their presence.
- Install appropriate signage, signalization and pavement markings.
- For street edges along bike lanes, select storm water grates that prevent bike tires from becoming trapped.

Sources of Additional Information	
Source	**website**
Minnesota DOT Bicycle and Pedestrian	http://www.dot.state.mn.us/bike/
Complete the Streets	www.completestreets.org
Walk and Bike for Life	www.walkandbikeforlife.com
The Pedestrian and Bicycle Information Center	www.pedbikeinfo.org
State Bicycle Advisory Committee	www.mnsbac.org
Share the Road	www.sharetheroadmn.org
Manual on Uniform Traffic Control Devices, 2003. Federal Highway Administration.	

Coordination and Permitting

Reconstruction work on state-aid roadways as shown in this plan, including adding bicycle lanes, will require coordination and permitting with Ramsey County and MN/DOT. Under current practices, narrowed drive lanes and bicycle lanes on any county or state aid road would require an Administrative Variance. See the website for MN/DOT State Aid for additional information. Future implementation of the MN Complete Streets policy may provide other methods to accomplish this.

http://www.dot.state.mn.us/stateaid/index.html

http://www.dot.state.mn.us/stateaid/manual/sam07/chapter1/1-7.html

Additional Design Information

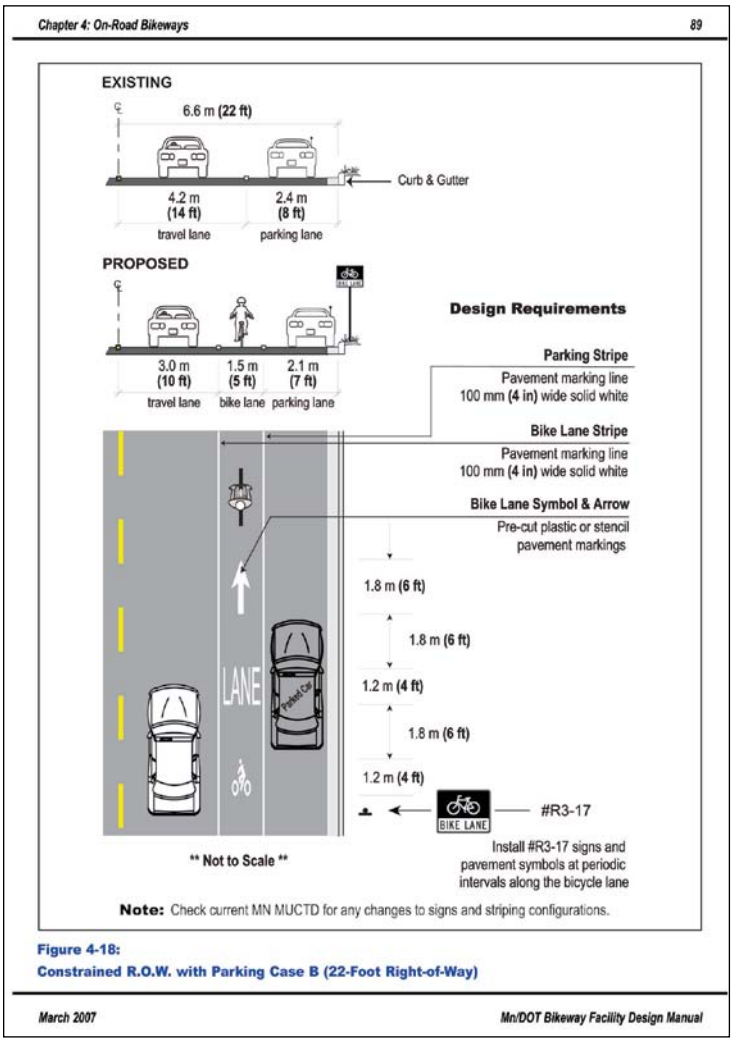
For additional design information see the Mn/DOT Bikeways Facility Design Manual. Find this and other resources at the Mn/DOT Designing for Bicycles and Pedestrians website: http://www.dot.state.mn.us/bike/bikewaysdesign.html

Design Considerations

- For safety, consider narrowing automobile lanes and lowering posted speeds to accommodate on-street bicycle lanes, where feasible. See Street Design Guidelines for additional information.
- Consider installing vegetated soil reinforcement pavers at bicycle storage rack locations to infiltrate stormwater.
- Install bicycle storage racks in the right-of-way near businesses and institutions.
- Ensure bicycle storage rack areas are well-lit for safety.

Construction and Maintenance Considerations

- Bicycle markings, signage, and signalization require periodic maintenance and adjustment



An example of a design aide from the Mn/DOT Bikeway Facility Design Manual.

Public Art

Design Objective

- Use street reconstruction projects as opportunities to improve neighborhood aesthetics and express local identity.
- Accomplish watershed-wide community art initiatives.

Design Standard

- Integrate public art into public-realm infrastructure when appropriate. Public art in infrastructure can be creatively designed site elements, individual art pieces, experiences or any other product of creativity of the residents, designers and artists involved in the project. Public art consists of:
  - Work resulting from or including artists or artful designers on professional design teams
  - Physical works of art, including site-specific objects that beautify the public realm and express the creativity and identity of the community
  - Experiential works of art, including site-specific activities and experiences of various forms and media
- Identify and discuss opportunities during the street design process to incorporate public art. Public art should be included in the initial stages of design and included in the processes of public engagement early in the design process.

Design Considerations

- Consider art as an opportunity to celebrate unique neighborhood identities by encouraging an eclectic mix of aesthetic styles.
- Consider collaborative city partnerships with community groups, nonprofit arts organizations and educational institutions to identify opportunities for art to be integrated into reconstruction projects.
- Consider showcasing natural resources by developing public art that make stormwater treatment facilities and natural systems educational and interesting.

Construction and Maintenance Considerations

- Request contractor qualifications when issuing a project for bid that incorporates public art or artful design.
- Designate an entity to perform public art maintenance.
- Consider city insurance policies in selecting public art.

Public art should beautify the public realm and express the creativity and identity of the community.

Source: Brian Collins

Public art can include individual art pieces.

An example of artful stormwater design from the South Waterfront in Portland, OR.

Utilities

Design Objective

- Coordinate the locations of water supply pipes, sanitary sewer pipes, shallow buried utilities and other utilities with the reorganization of other "Green" right-of-way elements to avoid conflicts.
- Minimize costs associated with construction.
- Improve utility location and coordination for less intrusive access, maintenance and replacement.
- Reduce the cost, inconvenience and degradation caused by utility cuts in roadways.

Design Standard

- Identify locations of all underground utilities when planning stormwater BMP locations. Discuss with utility entities any necessary upgrades to buried utilities.
- Practice avoidance as a first alternative to expensive relocation. Protect in-place utilities that are in good condition, and design work to accommodate them whenever possible.
- Consider grouping shallow buried utilities in a narrowed corridor along one side of single-family residential streets. When utilities are located, every effort will be made to consolidate in a combined utility trench.
- Avoid placing sanitary manholes within storm water basins or where vegetation obstructs access. Ensure manholes are accessible.
- Where possible, install sanitary manhole covers above inundation levels. Where inundation appears likely, install bolted watertight castings to inhibit inflow.
- Avoid placing water service valves, curb stops, isolation valves or fire hydrants within stormwater basins or where vegetation obstructs access.
- Avoid placing street light poles within stormwater basins.
- Avoid placing shallow buried utilities beneath stormwater basins or tree plantings whenever possible.
- Avoid placing utility vaults where they could be flooded by stormwater management facilities.

- Strictly enforce soils compaction, aggregate specifications, and pavement specifications where roadway sections are replaced due to utility cuts.

Design Considerations

- Consider minimum cover requirements over all underground utilities when planning stormwater basin grading.
- Consider techniques to prevent water service pipe freezing, such as insulation, to better locate bioretention facilities within the right-of-way.
- Consider the use of impermeable liners to protect utilities where infiltration is proposed. A vertical impermeable barrier can help direct water downward and away from a utility as opposed to laterally or toward it.
- Avoid significant grading where shallow buried utilities are present, such as gas service (particularly laterals), fiber optic, etc. whenever possible. Work with utility-owning entities to relocate utilities if necessary.
- Consider in-place replacement or rehabilitation of pipes and manholes.
- Certain projects may warrant the use of a utility duct to group and contain important buried utilities. This method is attractive if frequent maintenance to the utility is necessary or space is limited.

Construction and Maintenance Considerations

- Wherever possible, practice avoidance as an alternative to expensive removal and replacement of stormwater facilities when utility maintenance is required.
- Establish a common practice for how the city is compensated by utility companies for the unexpected repair of stormwater facilities and landscaping damaged during unexpected utility cut activities.

For best practices related to pedestrian design and accessibility refer to:

- Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: an ITE Proposed Recommended Practice. Institute of Transportation Engineers. 2005.
- Accessible Public Rights of Way. Planning and Designing for Alterations. Institute for Transportation Engineers. 2007.
- Designing Sidewalks and Trails for Access. Federal Highway Administration. 2001.
- Accessible Public Rights of Way. United States Access Board. 2007. http://www.access-board.gov/prowac/index.htm
- Policy on Geometric Design of Highways and Streets, 5th Edition, AASHTO. 2004.
- Guide for the Planning, Design and Operation of Pedestrian Facilities. AASHTO. 2004.
- Wayfinding at Intersections. ITE Journal. April, 2005.
- Manual on Uniform Traffic Control Devices. FHWA. 2003.

Appendix B—Living Streets Communications Plan

Goal

Implement Living Street reconstruction projects consistent with the design guidelines of this plan.

Objectives

- Achieve broad community awareness and support of Living Streets and their benefits
- Achieve active and visible support of Living Streets among target audiences

Action Items

1. Create key messages. Build broad community awareness and support for Living Streets by using key messages (and slogans) and images in all communication programs (e.g., posters, mailers, websites).
    - The key messages will emphasize that Living Streets will encourage physical movement and health, that every neighborhood will benefit, and that Living Streets will connect neighborhoods to each other and create and a distinct image for the city.
    - This message will be delivered through the Living Street image below.

2. Direct communications and outreach efforts should be directed to the target audiences listed below. Messages in these outreach efforts should specifically highlight the identified benefits of living streets for each audience.

Communications and Outreach Efforts	
Target Audience	**Key Benefits and Messages**
Parents	• Children can walk and bike safely • Healthy children from greater exercise • More time for self because children are more independent and can get themselves to school and other places through safe walking and bike routes • More opportunities for kids to meet other kids and make friends • Parents won't have to watch their children every second because of increased safety • Parents worry less • Sidewalks are social spaces • Sidewalks/bike paths make it easier to meet other families
Children (age 6 – 20) and teachers	• Feelings of greater independence • Excitement of outdoor activities with friends • Walk and bide safely to school, home and to parks or downtown • City streets can provide creative expression for a community by featuring public art and unique character that develop neighborhood pride • Streets can be more environmentally friendly and help protect our water • Trees and rain garden plants are important tools in helping keep our water clean • We all live downstream—as a community we can work together to help protect and improve our water, and the animals and plants that live in our environment • We can work together to create safe and healthy streets • Schools can be role models for helping "stop water where it drops."
Seniors	• Greater mobility and health due to safe places to walk and bike (it's easier not to drive) • Freedom to be mobile in different ways • More opportunities to be present in neighborhood and meet neighbors • Plenty of people want to buy your house because your community has invested in what people value • Getting around takes less time and is easier
Bicyclists	• Greater comfort and safety • Easier access to regional trail systems
Business owners (Downtown especially)	• Increased sales due to greater access by surrounding population
Gardeners/Master Naturalists	• I can make a difference in my neighborhood • Enhanced community beauty • Opportunity to communicate environmental benefits of vegetation and water infiltration • Front yard gardens are social spaces
General community at-large	• Make North St. Paul the first choice for young families looking for homes • We save money later if we do this today • Houses sell more easily in North St. Paul because of Living Streets • Enhanced community beauty • Attractive identity for the city • Overall enhanced property values – realized at time of sale

3. Build coalitions with, and get endorsements from supportive organizations. Examples include:
    a. The 16 neighborhood watch groups
    b. Law enforcement agencies
    c. Civic groups (Lions, Rotary, KCs, VFW)
    d. Downtown Business Assoc.
    e. PTA
    f. Arts Council
    g. Health Partners
    h. Blue Cross Blue Shield
    i. Principal and teachers at city schools
    j. Beam Avenue residents
    k. Active Living Ramsey County
    l. Seniors at Southwood Nature Preserve
    m. North St. Paul Master Naturalists
    n. District 622 School Staff (principals and grounds staff)
    o. North St. Paul Greens

4. Build awareness and understanding of Living Streets:
    a. at special events:
        i. "Night Out" block/house parties
        ii. School open houses
        iii. Car show
        iv. Highway 36 planting initiative
    b. Through existing communications
        i. City utility bill newsletter and quarterly brochure
        ii. NSPtoday.org
        iii. City website
    c. Other opportunities:
        i. Community center bulletin boards
        ii. Patches on kid's backpacks
        iii. Kids' contest to create complete green streets images

5. Use the Living Streets Fact Sheet (to be developed) to communicate the basic information about living streets and their benefits.

6. Use the Living Street Reconstruction Process Fact Sheet to communicate the street design and assessment process the city uses for managing each street construction project. (to be developed anticipating a one page back to back fact sheet that is based on the process table/matrix and the City of Edina construction process brochure).

Appendix C—Draft Bicycle and Sidewalk Plan

Plan Goals

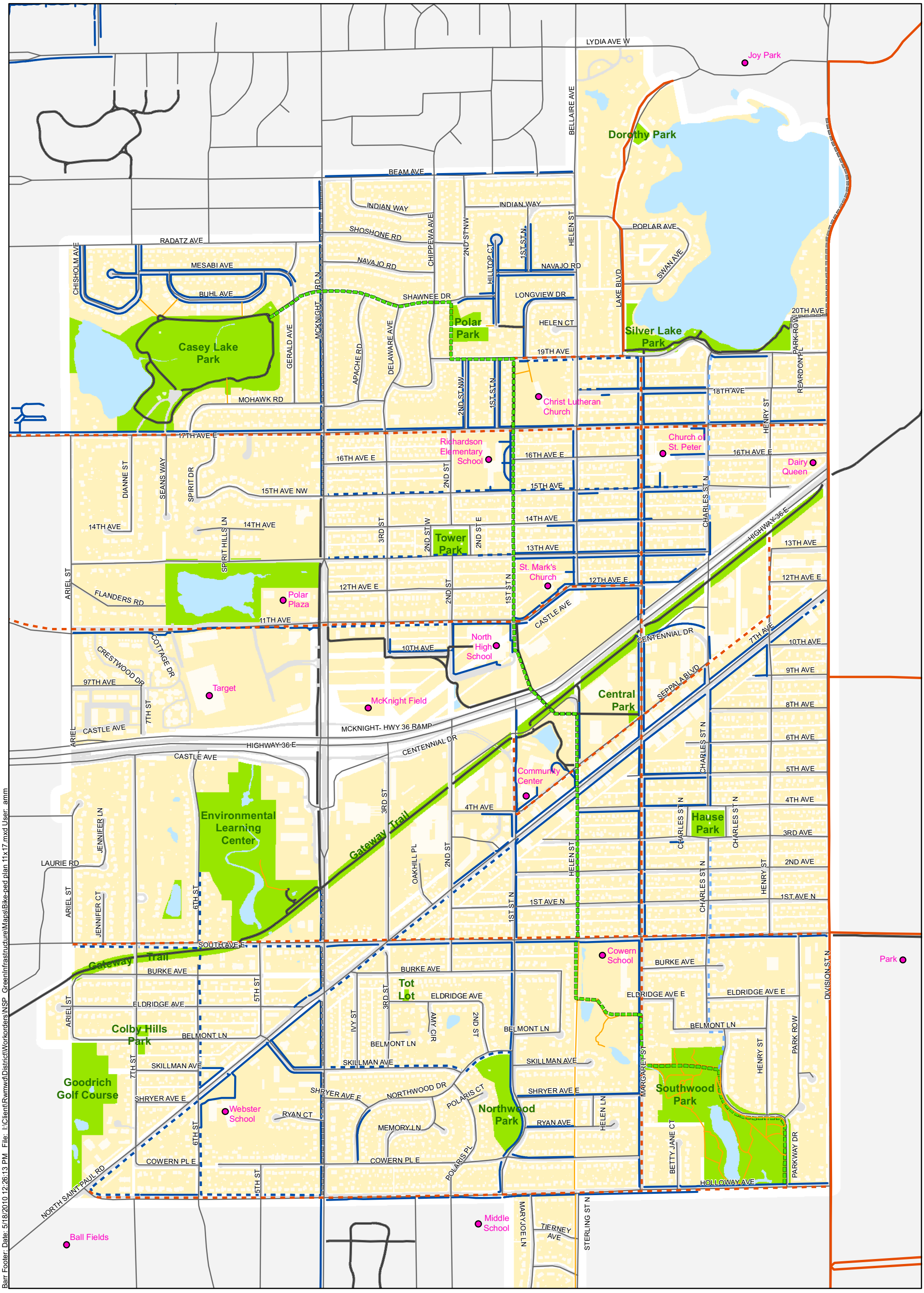
Early in the Living Streets planning process, the Citizen Task Force developed a preliminary city-wide bicycle and sidewalk Plan. This **draft** plan is intended to be a starting point for a larger comprehensive effort to develop a city-wide bicycle and sidewalk plan. Prior to mapping potential locations for bike facilities and sidewalks, the Task Force identified goals for new bike facilities and sidewalks:

- Develop safe and convenient links to schools, commercial hubs, employment centers, institutions, and transit facilities.
- Develop recreational pathways that link neighborhoods to parks and natural areas, especially the Gateway trail.

The plan shown in the following map is a compilation of "mapped" ideas from all Task Force members. The plan was created based on member's knowledge of local conditions. Specific mapping of bike facilities and sidewalk locations were intended to:

- Improve safety on busy streets
- Fill gaps in existing sidewalks
- Provide safe routes to schools and major destinations
- Connect neighborhoods to parks and natural areas
- Separate pedestrians from areas of high bicycle activity

The Task Force recognized that sidewalks are not needed on both sides of every street. The Task Force worked with the idea of developing a "right size" network that prioritizes needs.



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Bike & Pedestrian System

- EXISTING FOOTPATH
- EXISTING SIDEWALK
- PROPOSED SIDEWALK
- PROPOSED SIDEWALK-2
- EXISTING BIKELANE
- PROPOSED BIKELANE
- EXISTING TRAIL
- PROPOSED TRAIL
- PROPOSED PARKWAY

- Green Space
- Surface Water
- Community Facilities

Kohlman Creek Subwatershed
Green Infrastructure Project

City of North Saint Paul , MN
and
Ramsey-Washington Metro
Watershed District

0 450 900 1,800 Feet

Draft Bicycle and Sidewalk Plan
Appendix C

City of NORTH ST. PAUL

Ramsey-Washington Metro Watershed District

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Appendix D—Grant Funding Sources

Grant Funding Sources					
Sidewalk and Bike Facilities					
Agency	**Program Name & Description**	**Eligible Organizations**	**Assistance Available**	**Deadlines**	**Contact**
Funded by USDOT (SAFETEA-LU) Administered by MNDOT	Safe Routes to Schools Funds cover two elements: 1. Infrastructure Street crossing safety improvements, spot improvements in existing pedestrian/bike ways, creating new pedestrian/ bike ways, traffic calming, signing, bicycle parking, lighting. 2. Non Infrastructure Crosswalk guard training, enforcement, public awareness campaigns, walk/bike to school days public awareness campaigns and outreach to press and community leaders, traffic education and enforcement in the vicinity of schools, student sessions on bicycle and pedestrian safety, health, and environment. Project may include Engineering costs, and must include (either, directly or indirectly) Education, Enforcement, Encouragement, and evaluation program elements.	Schools (public & private), Parent/teacher organizations, Tribes, Local governments, Non-Profits, Metropolitan Planning Organizations, Regional development Commissions, Other educational organizations.	Funded at 100% of cost. No local match required. $25,000 - $175,000 for infrastructure.	SAFETEA-LU is up for re-authorization by Congress.	Mark Fiers: mark.fiers@state.mn.us or Kristie Billiar: (651) 366-3174

continued on the next page

Grant Funding Sources					
Sidewalk and Bike Facilities					
Agency	**Program Name & Description**	**Eligible Organizations**	**Assistance Available**	**Deadlines**	**Contact**
Metropolitan Council	Livable Communities Account Grant Program The Livable Communities Demonstration Account (LCDA) funds development and redevelopment projects that achieve connected development patterns linking housing, jobs and services, and maximize the development potential of existing infrastructure and regional facilities.	Application is open to cities participating in the Metropolitan Livable Communities Housing Incentives Program, on behalf of proposals in their communities; metropolitan-area counties or development authorities (e.g., housing and development authorities, economic development authorities, port authorities) on behalf of projects located in LCA participant communities.	No minimum or maximum award levels established. *Unclear if funding match is required.*	Applications due August 24, 2009.	Mary Baker 651-296-6300 or 1-800-657-3864 mary.baker@state.mn.us
Bike Trails					
MNDNR	Local Trail Connections Program Land acquisition and trail development program to promote relatively short trail connections between where people live and desirable locations and regional trails (e.g. Gateway).	Cities, counties, and townships	50% matching funds required. Grant awards may range between $5,000 and $100,000.	Applications due annually on March 31.	Andrew Korsberg, Trail Program Minnesota DNR, Trails and Waterways (651) 259-5642 andrew.korsberg@dnr.state.mn.us
MDNR	Regional Trail Grant Program Program to promote development of regionally significant trails. Primary determinants of significance include length, expected use, and resource quality/attractiveness.	Cities, counties, and townships.	50% matching funds required. Maximum grant award is $250,000.	Applications due annually on March 31	Andrew Korsberg, Trail Program Minnesota DNR, Trails and Water ways (651) 259-5642 andrew.korsberg@dnr.state.mn.us

Grant Funding Sources					
Bike Trails					
Agency	**Program Name & Description**	**Eligible Organizations**	**Assistance Available**	**Deadlines**	**Contact**
MDNR	Parks and Trails Legacy Grant Program To provide grants to local units of government to support parks and trails of regional or statewide significance. Funding for this grant program is from the Parks and Trails Fund created by the Minnesota Legislature from the Clean Water, Land and Legacy Amendment passed by the voters in 2008.	Eligible projects include acquisition, development, restoration, and maintenance of park and trail facilities that are considered of regional or statewide significance. Eligible applicants include counties, cities, townships, and legislatively designated regional parks and trails taxing authorities.	The minimum grant request is $20,000, and the maximum grant award is $500,000. 25% match is required.	Applications due by March 31, 2010	See website: http://www.dnr.state.mn.us/grants/recreation/pt_legacy.html
Stormwater Treatment					
MPCA	Environmental Assistance Grant Program Program for development of environmentally sustainable practices through voluntary partnerships and goal-oriented, economically-driven approaches to pollution prevention and resource conservation. Focus areas include: **Waste prevention and reduction**: implementing efficient and economically sound practices to prevent and reduce waste at the source **Source-separated composting:** reducing the amount of organic wastes entering disposal facilities **Stormwater Sources**: preventing impairment or degradation of state waters from National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) permitted stormwater sources. See website for specific types of stormwater projects being accepted.	Eligible applicants will vary per focus area (see RFP on website). Stormwater applicants limited to MN local units of government.	Maximum grant award is $75,000 or 75% of the total cost, whichever is less. 25% matching funds required.	Applications due by November 3, 2009 by 3 pm	Mary Baker 651-296-6300 or 1-800-657-3864 mary.baker@state.mn.us