

Neighborhood Partnerships for Community Research

...a program of the Center for Urban and Regional Affairs (CURA)

The Safe Route System in District 1

Prepared in partnership with

District 1 Community Council

Prepared by

Jong Choi
Research Assistant
University of Minnesota

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Center for Urban and Regional Affairs (CURA)
University of Minnesota
330 HHH Center
301--19th Avenue South
Minneapolis, Minnesota 55455
Phone: (612) 625-1551
Fax: (612) 626-0273
E-mail: cura@umn.edu
Web site: <http://www.cura.umn.edu>

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Table of Contents

Executive Summary	3
Introduction	4
What are a safe routes system and Safe Routes to School?	4
Why we need a safe routes system	4
Traffic Calming Toolbox	5
Types of Bicycle Lanes	7
Success Stories	9
The Jefferson Avenue Bikeway	9
Timeline for Jefferson Avenue Bikeway	10
Funding for Safe Routes System	11
Overall Source of Funding	11
Safe Routes to School from MnDot	11
Process	13
Good Examples	14
CIB (Capital Improvement Budget) Funding from St. Paul City Hall	16
District 1 Community	18
Demographics	18
Survey of Community Needs	18
Where District 1 needs a safe routes system	19
Demand & Benefits	26
Further Discussions	27
Appendix	28
References	33

Executive Summary

A Safe Route system is drafted for the District 1 community, representing the Eastview, Conway, Battle Creek and Highwood Hills neighborhoods of east St. Paul. Where and what kinds of safe routes systems could be built are discussed in detail. Funding opportunities and sources are scrutinized as well.

I. Introduction

1) What are safe routes systems and Safe Routes to School?

Broadly, a safe routes system offers a community an opportunity to repair or build sidewalks, upgrade crosswalks or give educational programs that help children to walk to school. Narrowly, it represents a bicycle route to schools or community facilities for children to get around safely. More specifically, “Safe Routes to School (SRTS)” is a national and international movement to create safe, convenient, and fun opportunities for children to bicycle and walk. “Safe Routes to School” can also play a significant role in reversing the decline in numbers of children walking and bicycling to schools.

2) Why we need a safe routes system

Communities around schools suffer from the impacts of traffic congestion. Neighborhood environments suffer from toxins released by cars exhaust. At the same time, children are becoming less active and more overweight. Also, there has been an unstable oil supply and rising energy costs, and there is evidence that use of cars has contributed to climate change. People have become concerned about environmental sustainability and are interested in changing their life styles. Uncertainty and growing concern over environmental sustainability has already begun to change travel behavior and land development. Despite this, there has been an increase in traffic incidents happening at school zones.

Specifically, “in May 2012, Hennepin County Medical Center admitted more than two times as many children ages 1-14 who were struck by vehicles than were treated for similar injuries in May of 2010 and 2011 combined (KSTP-TV, 2012).” “Safe Routes System” could offer not only safe routes to schools but also ways to calm traffic. Bike boulevards are one of the best examples for how to calm traffic and how to connect roads to schools. In St. Paul’s transportation plan 3.8, the city has a goal to “promote bicycle boulevards as a new type of bikeway. The implementation of bicycle boulevards should be explored, particularly to connect neighborhoods and major destinations and to provide convenient nearby alternatives to bicycling on major streets.”

Further, we could have found a demographic change in St. Paul and the district 1. People those who live in district 1 are younger than other districts. The percentage of people 17 years and younger people (28.1%) are higher than average of St. Paul (25.1%). The change makes a bike route system worth setting up. As population increases, congestion will likely grow worse on neighborhood streets and at intersections and overall vehicular mobility may continue to decline. Parking and other automobile-oriented uses are becoming increasingly difficult to accommodate in a fully built-out city. In addition, aging infrastructure of roads and bridges will also add pressure to maintenance budgets, at a time when overall budgets are decreasing.

There are many benefits to a Safe Routes System. Most importantly, however, it provides safety for children getting around within communities. Children who start their day with a

healthy activity may be more focused on their studies and are more likely to adapt healthier habits at home.

3) Traffic Calming Toolbox

In order to create an effective Safe Routes System, a variety of traffic calming methods can be used along the routes. What follows is a listing and illustrations of the traffic calming methods used by St. Paul Public Works.

- Bump outs



- Colored pavement markings



- Roadways Art



- Sharrows



- Signage and wayfinding



- Speed display sign



- Speed humps



from www.stpaul.gov/trafficcalming

4) Types of Bicycle Lanes



- Usually established on streets with lots of traffic.
- Special pavement markings and signs identify the lanes.
- Ruth Street and Burns Avenue: only one side parking.



- Cars and bicycles share the street.
- Usually established on streets with lots of traffic that are too narrow for bike lanes.
- Markings and signs also encourage cars to share the lane with bicyclists.



- Cars and bicycles share the lane.
- Many bike routes have signs showing the direction and distance to the destinations.
- Bike routes are usually on streets that aren't wide enough for bike lanes but are good streets for biking.



- Paved paths separated from the road for bicyclists, walkers, runners, and in-line skaters (such as the Battle Creek Park Paved Trail).

from <http://www.cityofchicago.org/cityinfo/cdot/bikemap/types.html>

II. Success Stories

There are many success stories around creating safe and environmentally friendly communities. One of them is Jefferson Ave Bikeway in St. Paul.

1) The Jefferson Avenue Bikeway

The Jefferson Avenue Bikeway Project had a purpose to increase trips made by walking, bicycling, and public transit and to decrease congestion and energy use at the west side of St. Paul. It was designed to meet Transportation Plan policy 3.4; “Develop and maintain a complete and connected bikeway system. Generally, bikeways should be no more than a half-mile apart, and arterial striped bike lanes and/or off-street trails should be no more than one mile apart.”

The Jefferson Avenue Bikeway Project will implement roadway improvements along the length of Jefferson Avenue, from Mississippi River Boulevard to West Seventh Street, as shown in the following diagram.



Figure 1: from <http://www.stpaul.gov/DocumentCenter/Home/View/20405>

“The bikeway will promote better health and a cleaner environment within the city of St. Paul. In addition to bike access in the Highland Park and Mac-Groveland areas, it gives a valuable opportunity to improve east/west pedestrian and bicycle facilities on Jefferson Avenue and local streets south of West Seventh and to the West Side via Cliff Road and the Smith Avenue High Bridge. (St. Paul, 2012)”

This project was funded from the Federal Non-Motorized Transportation Pilot Program (\$750,000) and with \$250,000 from City of St. Paul’s CIB (Capital Improvement Budget) dollars. Total cost for the project was one million dollars. On April 4, 2012 the Saint Paul City Council approved an amended version of the Jefferson Avenue Bikeway project. Construction of this amended project is anticipated to take place in 2012.

from <http://www.stpaul.gov/DocumentCenter/Home/View/20405>

2) Timeline for Jefferson Avenue Bikeway

Time Line for Jefferson Ave Bikeway	
February 2008	City applied for funding for complimentary bike boulevards on Highland Parkway and Jefferson Avenue. Only Highland Parkway was awarded funding at the time.
January 2009	City staff considered re-applying for Jefferson Avenue.
February 2009	Macalester Groveland Community Council and West Seventh/Fort Road Federation issued letters of support for the Jefferson Avenue project.
March 2009	Funding allocated by Bike Walk Twin Cities, a program of Transit for Livable Communities, which was designated by the United States Congress to administer the Minneapolis-area location of the Federal Non-Motorized Transportation Pilot Program authorized by the last large transportation law.
May 2010	Public hearing at City Council on design elements of project. Project was approved, on first of June 2010.
August - October 2010	Pedestrian refuge test at Cleveland Avenue and Jefferson Avenue.
August 2011	Project status update at city's Transportation Committee. Following this meeting, staff began working with community members to develop a public process for Fall 2011 to revisit design possibilities on the western portion of the project.
December 2011	Three meetings to discuss potential traffic calming treatments and online survey to gather input.
2012	Open house to share the draft design plan with the community, presentation to Macalester Groveland Transportation Committee, and proposed design approved unanimously with amendments by the city's Transportation Committee and the Planning Commission.

Figure 2: from <http://www.stpaul.gov/index.aspx?NID=4620>

III. Funding for Safe Routes System

1) Overall Source of Funding

Federal funding for Bicycle and Pedestrian Facilities has been used for Safe Routes Programs

Title	Institution
Funding Sources for Bicycle and Pedestrian Projects	U.S. Department of Transportation Federal Highway Administration
National Scenic Byways Program	U.S. Department of Transportation Federal Highway Administration
Environmental Protection Agency-Smart Growth	U.S. Environmental Protection Agency
Federal Transit Administration Grant Programs	U.S. Department of Transportation Federal Highway Administration
Safe Routes to School	Minnesota Department of Transportation
Non-Motorized Transportation Pilot Program	Transit for Livable Communities

2) Safe Routes to School from MnDOT

“Basically, SRTS funding will provide opportunities for schools to make improvements to the routes children use to walk and bike to school. These improvements may include physical infrastructure changes such as sidewalks and pathways or non-infrastructure programs such as incentives and educational materials for families. The first goal of the program is to enable and encourage children, including those with disabilities, to walk and bicycle to school. A second goal of the program is to make bicycling and walking to school a safer and more appealing transportation alternative, thereby encouraging a healthy and active lifestyle from an early age. The last goal is to facilitate the planning, development, and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption, and air pollution in the vicinity of schools (MnDOT, 2012).”

Infrastructure projects	
the planning, design and construction of physical improvements to roads, trails, and sidewalks projects that will greatly enhance the safety and the ability of children to walk and bicycle to school. The following is provided as guidance regarding the types of infrastructure projects that may be approved for SRTS funds.	
Sidewalk improvements	new sidewalks, sidewalk gap closures, and curbs
Traffic calming and speed reduction improvements	roundabouts, bulb-outs, speed humps, raised crossings, raised intersections, median refuges, narrowed traffic lanes, and lane reductions
On-street bicycle facilities	new or upgraded bicycle lane, widened outside lanes or roadway shoulders, geometric improvements, channelization and roadway realignment, traffic signs, and pavement markings
Off-street bicycle and pedestrian facilities	exclusive multi-use bicycle and pedestrian trails and pathways that are separated from a roadway
Secure bicycle parking facilities	bicycle parking racks, bicycle lockers with safety lighting, and covered bicycle shelters

Non-infrastructure projects	
generally involve smaller amounts of money and could be used to promote and encourage walking and bicycling to and from school or might include initial funds to create a more comprehensive SRTS plan	
<ul style="list-style-type: none"> • Creation and reproduction of promotional and educational materials 	<ul style="list-style-type: none"> • Bicycle and pedestrian safety curricula, materials and trainers
<ul style="list-style-type: none"> • Training, including SRTS training workshops that target school- and community-level audiences 	<ul style="list-style-type: none"> • Safety and educational tokens that also advertise the program
<ul style="list-style-type: none"> • Photocopying, duplicating, and printing costs, including CDs, DVDs, etc 	<ul style="list-style-type: none"> • Costs for data gathering, analysis, and evaluation reporting at the local project level
<ul style="list-style-type: none"> • Pay for substitute teacher if needed to cover for faculty attending SRTS functions during school hours 	<ul style="list-style-type: none"> • Costs for additional law enforcement or equipment needed for enforcement activities
<ul style="list-style-type: none"> • Equipment and training needed for establishing crossing guard programs 	<ul style="list-style-type: none"> • Mailing costs

Figure 3: from <http://www.dot.state.mn.us/saferoutes/grants.html>

3) Process

Building a Safe Routes to School program

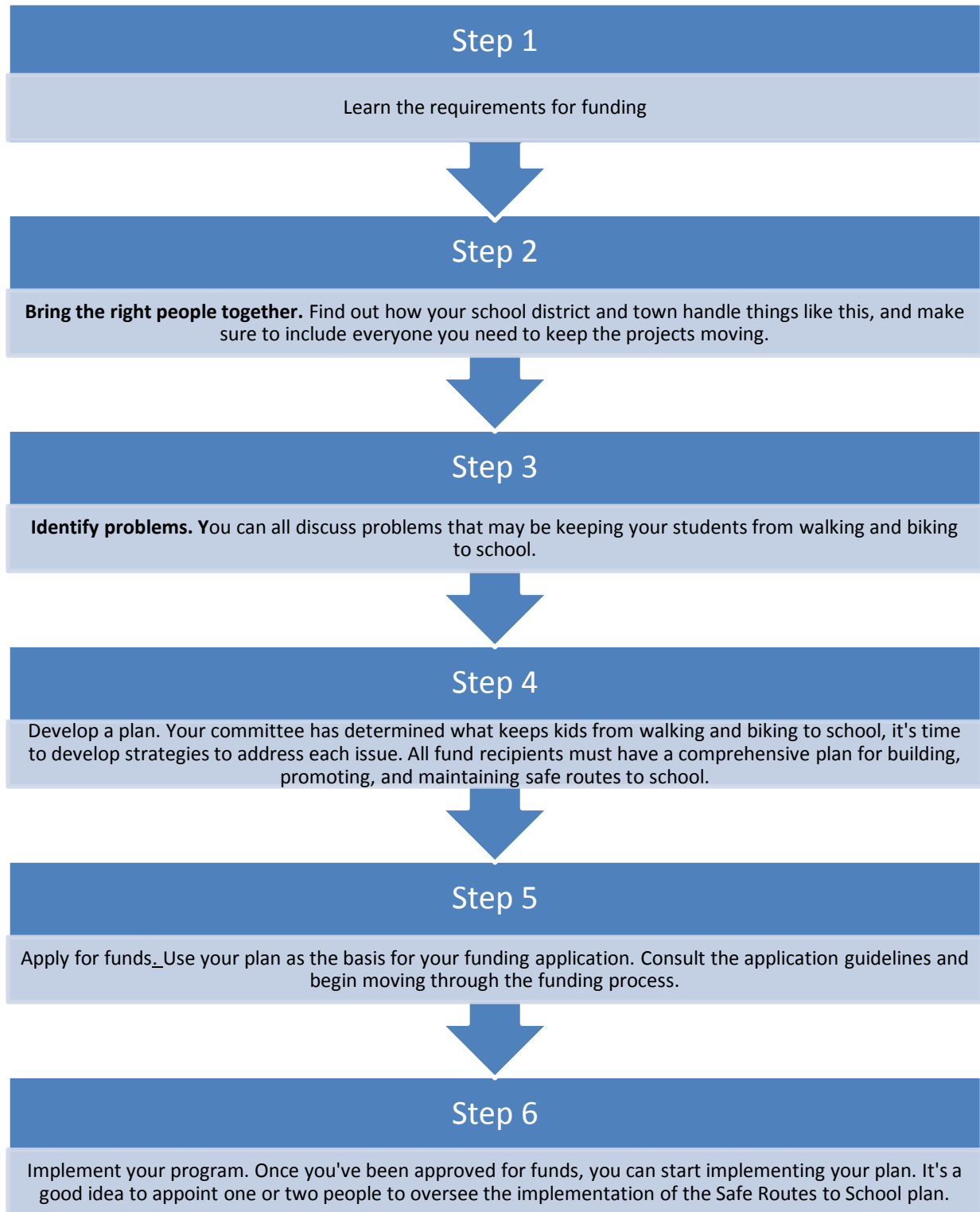


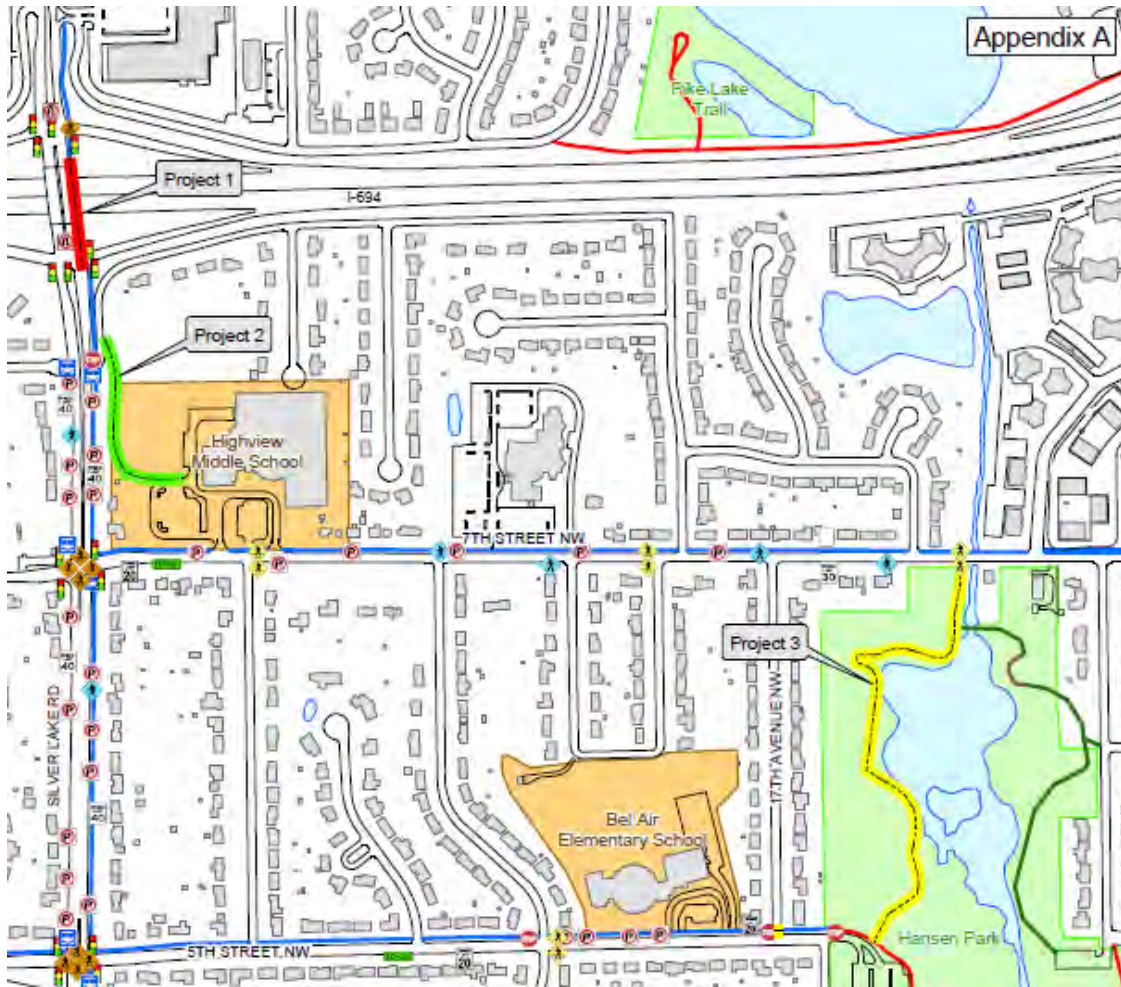
Figure 4: from <http://www.dot.state.mn.us/saferoutes/>

4) Good Examples

“**New Brighton, MN** (2008) has been busy working on a project to put a paved trail through Hanson Park which will provide a convenient and safe route for students of Bel Air Elementary to reach the school. (MnDOT, 2012)”

New Brighton requested \$ 175,000 for three projects connecting two schools; Highview Middle School and Bel Air Elementary School. In 2006, New Brighton made an initial request, but failed to receive funding from MnDOT. Following this disappointing year, in 2007, New Brighton received funding of \$ 175,000. In the application, the I-694/Silver Lake Road intersection was identified as a large barrier to pedestrians and the applicants designated this intersection as a traffic conflict area. After completing the safe routes to these schools, there has been a significant reduction of traffic incidents in that area.

Project	Before	After
Project 1	Due to I-694 bisecting New Brighton into northern and southern regions students from two schools are forced to cross over the interstate utilizing the Silver Lake Road Bridge. Silver Lake Road/I-694 is one of New Brighton’s busiest intersections and is extremely noisy and frightening to younger pedestrians.	Creating a safer crossing. With these improvements this is the main method to cross I-694.
Project 2	An additional risk for students traveling to Highview Middle School and Bel Air Elementary School from the north is the amount of time spent adjacent to Silver Lake Road.	This improvement would provide students a direct route to Highview Middle School.
Project 3	The Hansen Park Trail System is used by students to walk/bicycle to and from school. The park trail is not conducive for biking or walking to school and is flooded during the spring season creating obstacles for pedestrian traffic.	This is a vital link for Highview Middle School and Bel Air Elementary School. This trail would also increase access to a heavily utilized local recreation facility.



- Contact: Jason West (jason.west@newbrightonmn.gov, 651-638-2122)

Eagan, MN (2008)

The school applied for and got a \$10,000 grant, along with the City of Eagan, from the Safe Routes to School Program. The Red Pine Elementary School doubled the number students walking and biking to school, and it cut the number of car pool vehicles by half. They received the grant about five years ago and implemented several new strategies including walking school buses (A walking school bus is a group of children walking to school with one or more adults), neighborhood signage, new bike racks, an online interactive safe routes map, walk/bike to school days, etc.

- Contact: Gary Anger (Gary.Anger@district196.org)

from <http://www.dot.state.mn.us/saferoutes/successtories.html>

7) CIB (Capital Improvement Budget) Funding from St. Paul City Hall

CIB Process Description

The CIB budget is prepared on a bi-annual basis. Projects are eligible if they finance the acquisition, betterment, physical development, redevelopment and other improvement of City-owned land and buildings, and have a useful life of at least ten years.

On Year Process: Starting in early odd-numbered years, the CIB Committee begins the process of developing the tentative capital budgets for the following two years by reviewing project proposals submitted by City departments, district councils, and neighborhood organizations. In summer of the same year, the Mayor presents the proposed Capital Improvement Plan, and the City Council adapts the final capital budgets in December of the same year. The plan includes tentative recommendations for two two-year cycles.

Off Year Process: In even-numbered years, the tentative budget for the second year of the biennium generally is recommended by the CIB Committee, proposed by the Mayor and approved by the City Council. Revisions to the tentative budget are allowed for projects that satisfy one of three conditions: 1) elimination of a life/safety hazard; 2) leverage of non-city funding; or 3) coordination with other projects.

Figure 5: from <http://stpaul.gov/index.aspx?NID=217>

District council rankings, City department rankings, and Task Force rankings and Scores are transmitted to the CIB Committee for review. After this, CIB Committee reviews project proposals and recommendations from District Councils, Task Forces, and City Departments. Then, the CIB Committee makes final recommendations to the Mayor and Council.

Proposed CIB Scoring and Ranking Process
Approved at 9/13/2010 CIB Committee Meeting

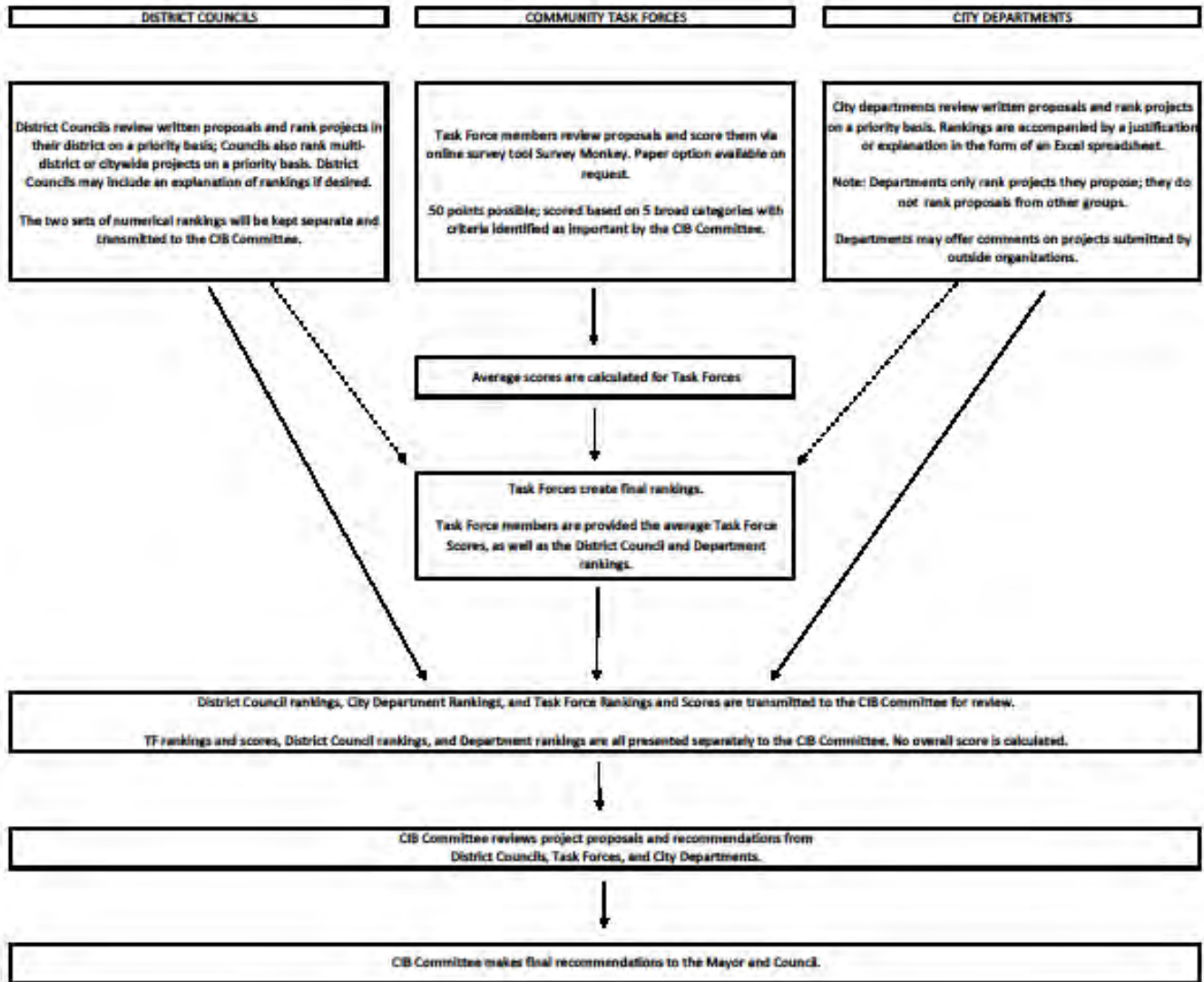


Figure 6: from <http://www.stpaul.gov/DocumentCenter/Home/View/14450>

IV. District 1 Community

1) Demographics

The Eastview/Conway/Battle Creek/Highwood Hills neighborhood is bordered by Minnehaha Avenue on the north, McKnight Road on the east, and Warner Road, the Mississippi River and Birmingham Street to the south and west. The total population of District 1 is 20,453. Those who live in district 1 are younger on average than other districts. The percentage of people 17 years and younger people (28.1%) is higher than the average percentage of St. Paul as a whole (25.1%). Also, 35.3% of households here have one or more children under 18 years compared to 30.4% of total households in St. Paul. More of District 1's population is African American or Black (20.3%) than other areas in St. Paul (15.3%). It also has relatively high percentages of persons of Asian and Hispanic/Latino descent. Asian or Pacific Islanders (16.6%) and Hispanics or Latinos (11.2%) represent higher percentages of District 1's population than in St. Paul as a whole (Asian: 14.9%, Latino: 9.6%). There are fewer Whites in District 1 on a percentage basis (47.8%) than in St. Paul as a whole (55.9%). In addition to this, 37.8% of people living in District 1 are earning \$1,250 monthly. Only 22.7% of those living in St. Paul have this average monthly income.

More significantly for the purposes of this study, fewer people in this district use some form of transportation other than cars than in the city as a whole. People who walked, biked, or worked at home are only 7.3% of the population of District 1. Generally, however, 10.7% of people did these things throughout St. Paul. As the District 1 Community Council began to assess transportation needs of residents, it was important to understand why so many fewer people were biking and walking than elsewhere in the city.

2) Survey of Community Needs

In 2010, District 1 sent surveys to every household in its service area asking people what roads were the most dangerous to drive, bike, or walk. About ten percent of responders answered that the intersection of Highway 61 and Burns Avenue was the most dangerous place to get around. Also, the intersections along McKnight at both Highway 94 and the Battle Creek Park were identified as hard to drive or bike.

"There needs to be bike lanes especially in busy areas."

"Bike lanes would be a lovely start. Bike-able/walkable paths that cut through neighborhoods would be a dream."

"I rarely bike because people do not see bikers. Don't feel safe. If I bike, use the sidewalk."

From the survey, residents identified the following streets as locations where speeding is a problem: McKnight Road, Ruth Street, Upper Afton Road, and White Bear Avenue. Despite the fact that there was a bike lane along Ruth Street, people did not think the street was safe to bike at all, because of heavy traffic and of turning vehicles.

3) Where District 1 needs a safe routes system

Residents within District 1 identify traffic safety issues in the northern parts of the area. In order to make residents feel comfortable and that it is safe to bike and walk, the District 1 Council wants to set up a safe routes system and apply traffic calming tools. The goals of the bike way project are to provide safe routes for residents throughout the district and to connect existing bike ways. Here are some candidates for bike ways.

Winthrop Street (0.7 mile)

This is a perfect street to get to Battle Creek Regional Park and Battle Creek Recreation Center. It connects a bike way on Lower Afton Road to Battle Creek Elementary School. In addition, there are large apartment complexes on the street. The Recreation Center and School are major destinations. The north end of this street leads to Larry Ho Drive and the Battle Creek Park paved trail.

Upper Afton Road (1.9 mile)

Each end of Upper Afton Road meets an existing bike lane; to the west side, there is Indian Mounds Park bikeway and at the eastern end, there is Water Park bikeway in the Maplewood section of Battle Creek Park. Also, this road connects to the bike lane on Ruth Street and a bikeway along Battle Creek through the Park. The most significant achievements of installing a lane on Upper Afton Road would be that it could promote safety at the intersection of Highway 61 and Burns Avenue, one of the most hazardous intersections in District 1. This Road is also wide enough to accommodate 2 lanes of traffic, parking, and bike lanes.

Third Street (1.4 mile)

There are many schools and public facilities on or near Third Street; Conway Park Recreation Center, Sun Ray Public Library, Sheridan Elementary School, Saint Pascal School, and Harding High School. It intersects with Ruth Street as well, which has an existing bike lane.

Margaret Street (1.4 mile)

Margaret Street is so wide that people can currently drive as if there were four lanes even though it has only two lanes. The street is unmarked. By marking the lanes and adding bike lanes, the street would be less dangerous. Also, it acts as a relatively direct route to downtown Saint Paul and meets Ruth Street on the east. It is a quiet residential street that goes from McKnight Road to East 7th Street in Dayton's Bluff. This street would be a good candidate for a bicycle boulevard.

Hudson Pedestrian Bridge

At the western side of the district, riders and pedestrians can use the Hudson Pedestrian Bridge at Hudson Rd and Hazelwood Ave to cross I-94. This bridge needs to be made wheelchair accessible and friendlier to bicycles, however.







Narrowing Hudson
Pedestrian Bridge



Hudson Pedestrian
Bridge Stairs



Hudson Pedestrian
Bridge Stairs



Hudson Pedestrian
Bridge



Hudson Pedestrian
Bridge



Looking Northbound on
Hudson Pedestrian Bridge



As observed in these pictures, the Pedestrian Bridge has a set of stairs at the northern end. On the stairs, there is a metal tube into which a bike rider can insert his or her bike tires so that the bike does not need to be carried up or down the stairs. But there is only one of these devices, making it difficult for multiple riders to use the bridge or for children to push their bikes up to the bridge. The bridge needs to be reconstructed or upgraded not only for children but also the handicapped. This would be a great chance to cross I-94 for residents because it will connect between Burns Ave bikeway and Third Street bikeway.

Burns Avenue (0.8 mile)

A bikeway has already been set up at the east side of the avenue to connect McKnight Road and the Ruth Street bike lane. The west end of the avenue at Highway 61, however, is the one of the most dangerous intersections in the district, which needs to be transformed. Also, the west side of the avenue connects to the proposed Hazelwood Street and Upper Afton Road bikeways. This is the main hub for the south part of District 1 because it leads to south Hudson Pedestrian Bridge, which allows riders (and pedestrians) to cross I-94.

Hazelwood Street (0.2 mile)

This street is a direct route from Burns Avenue to the south end Hudson Pedestrian Bridge, which crosses I-94. The street is in a quiet residential area.

Birmingham Street (0.2 mile)

This street is the main way to Third Street bikeway from the north end of the Hudson Pedestrian Bridge. It leads to Harding High School and Harding Area Arena.

Kennard Street (0.6 mile)

This proposed connection is the only way to both the Third Street and Margaret Street bikeways from Hudson Pedestrian Bridge. Residents from south District 1 could use this bikeway to cross I-94 and commute to St. Paul downtown or reach the East 7th Street businesses along either the Third Street or Margaret Street bikeway.

4) Demand & Benefits

Demand

In a one and half mile (2,400 m) radius around the proposed facility:

	Low Estimate	Mid Estimate	High Estimate
Residents	21,346	21,346	21,346
Existing Commuters	38	38	38
New Commuters	13	13	13
Total Existing Cyclists	251	3,674	5,449
Total New Cyclists	100	1,288	1,904

Annual Benefits

	Low Estimate	Mid Estimate	High Estimate
Recreation	\$317,960	\$4,653,470	\$6,902,120

Mobility - Proposed Facility Type	Per Trip	Daily	Annually
Bicycle lane with parking	\$3.17	\$160	\$37,699

	Low Estimate	Mid Estimate	High Estimate
Health	\$12,819	\$164,859	\$243,716
	Urban	Suburban	Rural
Decreased Auto Use	\$5,735	\$3,529	\$441

Figure 7: from <http://www.bicyclinginfo.org/bikecost/>

For a discussion of how these values were calculated and more details of the method, see the Appendix.

5) Further Discussions

As noted in Saint Paul's Comprehensive Plan, the city has a vision for its bicycling infrastructure, "*Saint Paul will become a world-class bicycling city that accommodates cyclists of varying skill levels riding bicycles for both transportation and recreation and encourages bicycle use as a part of everyday life.*"

After deciding where to build bikeways that will fit into this city vision, District 1 needs to estimate building costs and maintenance costs. What types of bike lanes District 1 has to build and what calming methods are the best need to be discussed. Communications with residents, schools, and churches are a very significant step toward setting up bike lanes. Non-infrastructure activities including educating bicyclists and distributing flyers might be one of the main expenditures as well. Also, bikeways in District 1 should connect to other bike lanes in other districts so that residents are able to get around in St. Paul.

As an alternative to the Hudson Pedestrian Bridge, there might be a great opportunity to cross I-94 starting from the Target parking lot at Suburban and Kennard Street and ending at Margaret Street. This new bike/pedestrian bridge would be located just west of the White Bear Avenue bridge over the freeway, and would be closed to destinations in District 1's business areas.

Appendix

From the National Cooperative Highway Research Program, 2012.

<http://www.bicyclinginfo.org/bikecost/docs/Translating%20Demand%20and%20Benefits%20Research%20into%20Guidelines.pdf>

a) Calculating Demands

They, the National Cooperative Highway Research Program, estimated existing and induced demand using 800, 1,600, and 2,400 meter buffers around a facility.

Daily existing bicycle commuters = $R \cdot C \cdot 0.4$

- R : the number of residents in each buffer
- C : the number of commuters in each buffer by the region's bicycle commute share

$T_{\text{high}} = 0.6 + 3C$

$T_{\text{moderate}} = 0.4 + 1.2C$

$T_{\text{low}} = C$

- T : Census commute shares to extrapolate total adult bicycling rates

Total daily existing adult cyclists = $R \cdot T_i \cdot 0.8$

Daily child cyclists = $R \cdot 0.2 \cdot 0.05$

New commuters = existing commuters $\cdot L$

New adult cyclists = existing adult cyclists $\cdot L$

New child cyclists = existing child cyclists $\cdot L$

- L : the likelihood multipliers found in their research for each buffer
- $L_{800m} = 0.51$, $L_{1600m} = 0.44$, $L_{2400m} = 0.15$

b) Calculating Annual Benefits

Annual mobility benefit = $M \cdot V/60 \cdot (\text{existing commuters} + \text{new commuters}) \cdot 47 \cdot 5 \cdot 2$

- V : An hourly value of time of \$12, the per-trip benefit is \$4.08, \$3.60, and \$3.17
- M : Minutes; commuters are willing to spend 18.02 minutes for an on-street bicycle lane without parking and 15.83 minutes for a lane with parking
- 47 weeks per year and 5 days per week

Annual health benefit = total new cyclists \cdot \$128

- An annual per-capita cost savings from physical activity of \$128

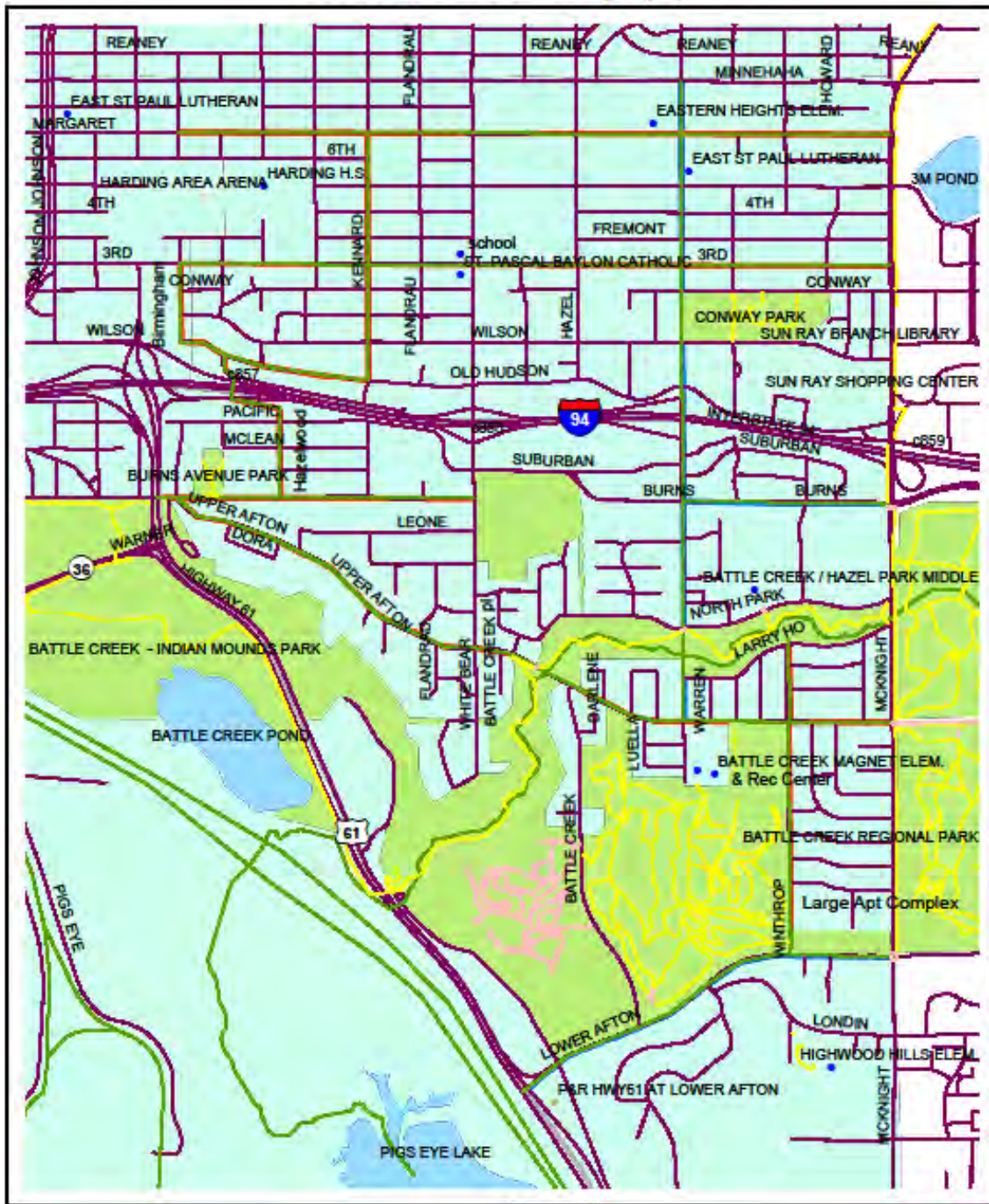
Annual recreation benefit = (New bicyclists – New commuters) * D · 365

- D : value a day at \$10

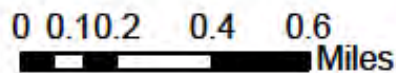
Annual decreased auto use benefit = new commuters · L · S · 47 · 5

- L : the average round trip length from NHTS
- S : the savings per mile are 13 cents in urban areas and 8 cents in suburban areas

District 1 Bike Ways(a)



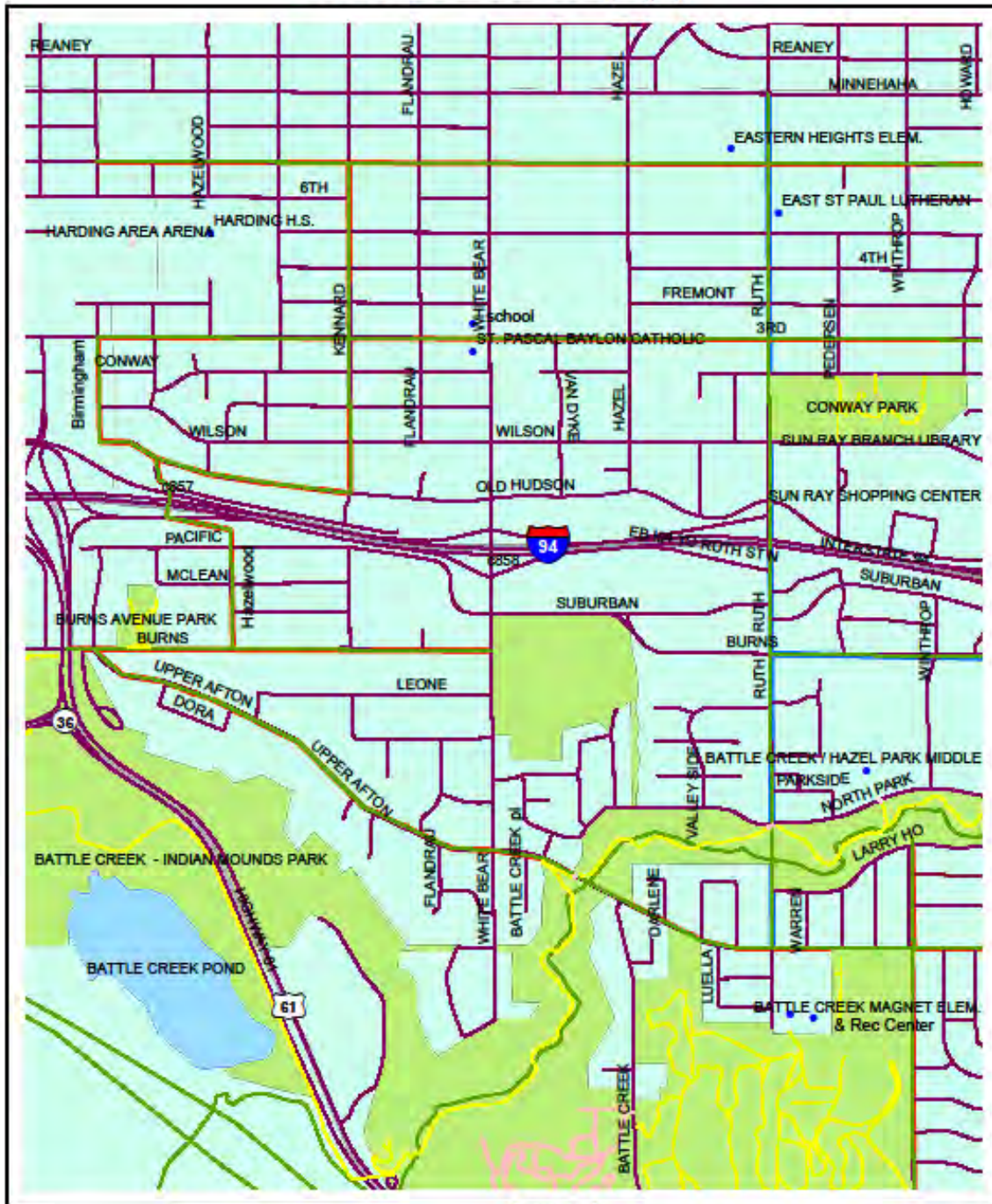
Legend



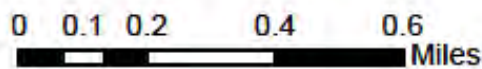
- Current Bikeway
- New Bikeway
- Park Trail
- Paved/ Mountain Trail

Created: Jul. 2012
 Data Sources: CURA
 Ramsey County

District 1 Bike Ways(b)



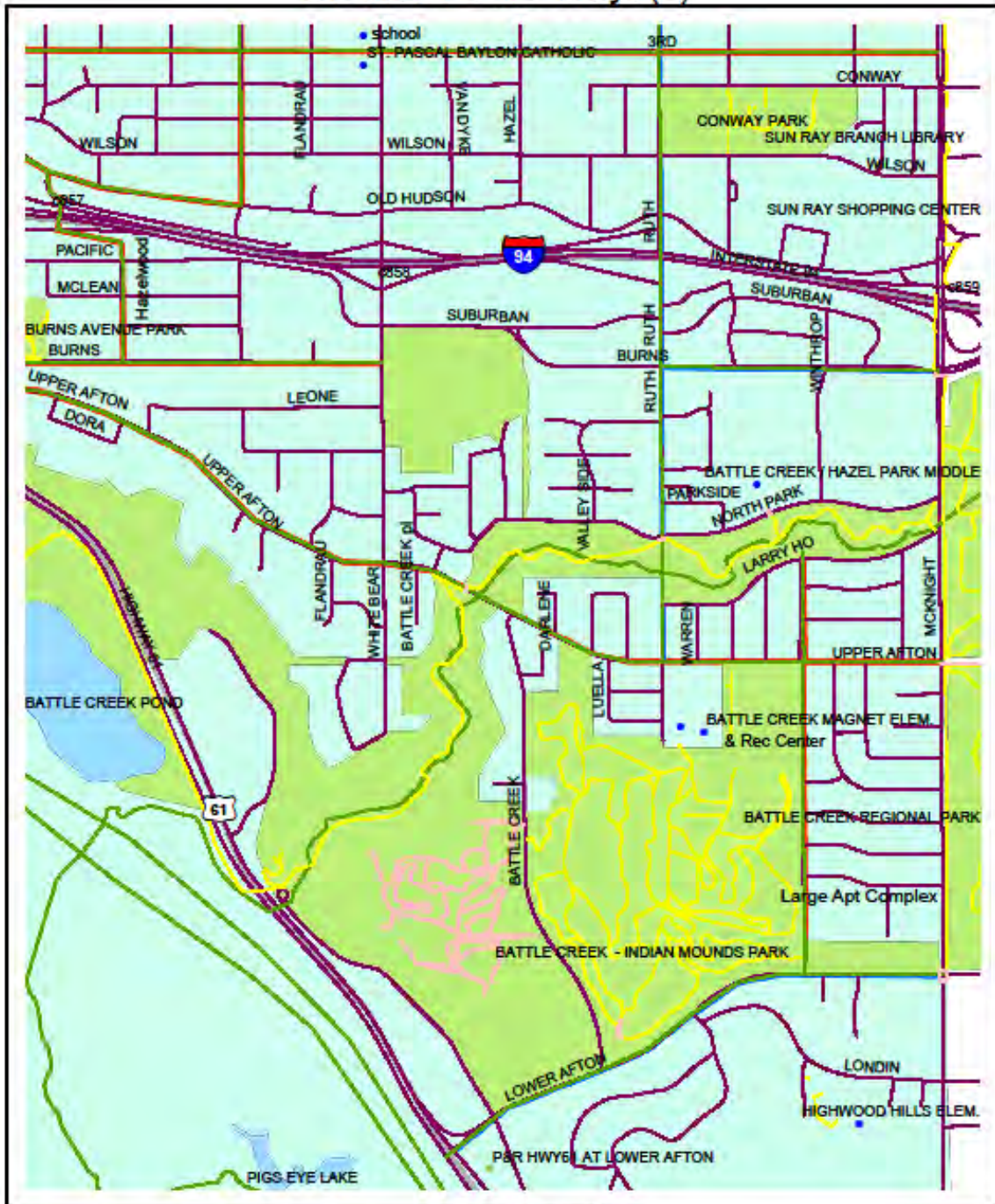
Legend



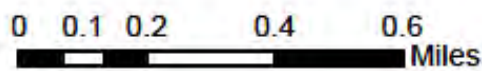
- Current Bikeway
- New Bikeway
- Park Trail
- Paved/ Mountain Trail

Created: Jul. 2012
 Data Sources: CURA
 Ramsey County

District 1 Bike Ways(c)



Legend



- Current Bikeway
- New Bikeway
- Park Trail
- Paved/ Mountain Trail

Created: Jul. 2012
 Data Sources: CURA
 Ramsey County

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