



CITY OF KIRKLAND
123 Fifth Avenue, Kirkland, WA 98033 425.587.3225
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MEMORANDUM

Date: June 18, 2008

To: David Ramsay, City Manager

From: Kirkland Green Team

Subject: Kirkland Green – Environmental Stewardship and Sustainability

RECOMMENDATION

The Green Team recommends the Council review the discussion items outlined in this memo and provide direction as appropriate.

INTRODUCTION, BACKGROUND AND STUDY SESSION FORMAT

Introduction

Beginning in 2006, the City Council has met annually in a study session with the Green Team to receive an update on the City's environmental stewardship efforts to implement the Natural Resource Management Plan and the Climate Protection Program.

The purpose of the meeting is to review the progress on these efforts as well as to confirm that the team is moving in the appropriate direction that reflects the Council's philosophy and priorities. The City has significantly expanded its green programs and initiatives over the past couple of years. For the next couple of years a key issue is whether the City can sustain this effort and what resources are needed to do this given our budget considerations.

Background

Since we last met with the Council at a study session in May 2007, the Green Team has significantly expanded its participation. The original team (aka Natural Resource Management Team) consisted of three core departments (Planning, Parks and Public Works). In the past year, representatives from other departments have been added to include Fire & Building, Information Technology, the City Manager's Office and Finance. Not only does this bring fresh perspectives to the team but it broadens the citywide effort. The following are the representatives from their respective departments.

Parks & Community Services	Jennifer Schroder, Director (Green Team Co-Chair) Michael Cogle, Park Planning & Development Manager Jason Filan, Park Operations Manager Sharon Rodman, Environmental Education & Outreach Specialist
Information Technology	Chuck Saunders, Network Administrator
Planning & Community Development	Paul Stewart, Deputy Planning Director (Green Team Co-Chair) David Barnes, Planner Deb Powers, Urban Forester
Building	Tom Jensen, Plan Review Supervisor
City Manager's Office	Marie Stake, Communications Manager Ellen Miller-Wolfe, Economic Development Manager
Finance and Administration	Sheila Sigmond, Purchasing, Buyer
Public Works	Jenny Gaus, Senior Surface Water Utility Engineer Erin Leonhart, Facilities & Admin Manager Wendy Kremer, Public Grounds Supervisor Bobbi Wallace, Surface & Wastewater Manager John MacGillivray, Solid Waste Coordinator Betsy Adams, Education/Outreach Specialist Tim Llewellyn, Fleet Supervisor

As a result of this expansion, the Green Team held a retreat in October, 2007. The retreat focused on our mission, organizational structure and how best to coordinate our efforts. The team met again at a "mini-retreat" in April, 2008 to review the status of all the environmental stewardship programs and activities underway, look at next steps, and identify needed resources. Typically the team meets monthly on a variety of issues and topics. Along with coordination on projects, the team schedules the "Green Tips" items on the Council agenda.

As a result of all these efforts, Kirkland is gaining recognition around the state for its green programs. We have been contacted by other communities regarding our approach and organizational framework. Of particular interest are our Green Building program, the City's Climate Action Plan, our urban forest program and tree regulations, recycling, the Green Kirkland partnership with the Cascade Land Conservancy and how the Green Team functions. The City has also been the recipient of several "green" awards.

Study Session Format

Our intent is to provide as much information as possible in the packet materials and then have a focused discussion on key items. We have four primary topics we would like to present and discuss with the Council. We would suggest that for each of these we have a very staff short presentation to introduce the topic and then open it up for Council questions, comments and discussion. At the study session we will be addressing the following:

- | | |
|------------------------------|----------------------------|
| • Introduction | Paul Stewart |
| • Climate Protection Program | Erin Leonhart |
| • Low Impact Development | Jenny Gaus |
| • Green Building Program | David Barnes & Tom Jensen |
| • Community Outreach | Marie Stake & Paul Stewart |

Other items are also included in the packet as background and Green Team staff members will be available if the Council has any questions.

Discussion Topics

A. Green Team Action Items

As an outcome from last year's study session, the Green Team created a list of action items. Attachment A is a matrix that shows the task, the primary staff contact, the status of the project as well as next steps, timing and the resources needed to complete the task. With current staffing and resource levels and also in light of the upcoming budget, staff is not looking at taking on any new major initiatives or action items at this time.

B. Climate Protection

The Green Team and other staff experts have been developing the Climate Protection Action Plan, the next milestone in the ICLEI/Local Governments for Sustainability process. As a reminder, the milestones are:

- ✓ Conduct a greenhouse gas emissions inventory and forecast to determine the source and quantity of greenhouse gas emissions in the City;
- ✓ Establish a greenhouse gas emissions reduction target;
-  Develop an action plan with both existing and future actions which when implemented will meet the local greenhouse gas reduction target;
-  Implement the action plan; and
-  Monitor and report progress.

Kirkland has completed the first two milestones and received an award from ICLEI, displayed in the Kirkland Green display case in the City Hall lobby. Originally, the intent was to present the plan to Council in 2008; however, as the attached memorandum (Attachment B) explains, there has been a delay for several reasons. We now hope to have a draft plan, including input from the community, to Council in 2009. Any input about the measures developed to date are encouraged.

C. Urban Forestry and Environmental Education & Outreach Staffing and Resources

Since 2003 with the adoption of the Natural Resource Management Plan (see Attachment C), the City has been undertaking a more active role in managing and enhancing its urban forest through a variety of activities with the long term goal of achieving a 40% tree canopy throughout the city. These activities and programs are currently spread through three departments (Planning, Public Works and Parks). The City hired its first half-time Urban Forester in 2002. This position in Planning focused on developing our adopted set of tree regulations. The City's Urban Forester, Deb Powers, is currently devoting 90% of her time on reviewing permits. With the new regulations, the City also increased the penalties and enforcement procedures for illegal tree cutting. The City is working on a report to the Council on updating the tree regulations. This update is tentatively scheduled for the August 5th Council meeting.

A second half-time field arborist (temporary) was hired in the Public Grounds section of Public Works in 2005. The field arborist (Mark Padgett) works primarily with the City's 21,000 street trees and with Parks on the pruning, or removal of damaged and hazardous trees. In April 2007, Parks hired an Environmental Education & Outreach Specialist (Sharon Rodman). This position is also a half-time and temporary position. The Outreach Specialist has been instrumental in coordinating the effort to implement the Council adopted 20-year forestation plan to restore the City's forested natural areas. To date this program has involved thousands of hours of volunteer time.

As a result of all of these efforts, the City has now been recognized as a Tree City USA for the past six years. However, many of these programs and activities are being staffed through part time and temporary positions. Permanent funding of these staff would help sustain current efforts to the extent that resources are available including:

- Field Arborist (Public Works) and Urban Forester (Planning) to be full time at 40 hours/week each.
- Continue the Education and Outreach Specialist position (Parks) and increase the number of hours to full time at 40 hours/week.
- Need for additional field crew with tree experience to work with the field arborist on planting, pruning, removal of hazards, inventory of assets, permitting, and maintenance on the city's trees and the ability to collect and analyze data related to the health of the city's urban forest. In addition this would enable the city to track performance, carbon offset and storm water benefits.
- Review and improve regulations on both private and public trees and additional Code Enforcement staff to enforce.

D. Low Impact Development

Awareness of Low Impact Development (LID) is increasing in our community, and LID is being used more frequently on public and private construction projects. The Cottage Housing portion of the Zoning Code was added this year. This is a big step forward, as the chapter requires LID for cottage developments, and also allows land use patterns such as clustering that make its use feasible. Staff continues education and outreach efforts, and to research regulatory changes and incentives that would further increase LID usage. A significant tool to help incorporate LID into transportation capital projects was completed this year, and is already being put to use. In addition, significant progress has been made on creation of an updated soils map for the City, which will add in LID projects. As Council considers how/whether to further increase LID usage, Council may wish to consider whether to allow, encourage, or require LID, and to look at where and how much LID should be expected if it is encouraged or required (See Attachment D, Attachment D-1, and Attachment D-2).

E. Green Building Program

The Green Building Team implemented phase one of the green building action plan in January 2008. This pilot program provides expedited review of new single family building permits that meet Built Green, LEED for Homes and Energy Star requirements. Since the new single family market has slowed down, it brought an opportunity to focus on a green remodeling campaign to provide education and technical advice to homeowners and contractors. Our goal is to continue to expand the green building program to include all residential building permits including additions/alterations and multifamily development with a target implementation date of September 2008. The next steps are outlined below as the team moves toward full implementation of a comprehensive green building program for all building permits types. There are staffing and resource issues that should be considered at budget time if the program is to be expanded

The Green Building Program has been broken down into three phases. The first phase included implementation of an expedited review for new single family building permits. We have an incentive program that is now positioned to work effectively with the City's new Cottage Home regulations and encourage more sustainably built dense communities. The Green building team has partnered with Northwest University to research a green remodeling guide and to create two public service announcements. This will help promote the second phase of the program which is a focus on green remodeling and multifamily building permits. We hope to have the second phase completed by September 2008.

In addition, September 2008 will be a great opportunity to promote, educate and inform the community about the new facets of the Green Building program. We anticipate holding more Kirkland Developers Forums, Staff Training and providing educational outreach as part of the Sustainable September event. More printed and electronic materials will be provided to citizens in our kiosks at City Hall and on our website to keep the community aware of program additions.

The third phase of the Green Building Program will cover commercial buildings. It is anticipated that this could be done by January 2009. The necessary next steps to move towards the third phase milestone will be completion of the LEED Accreditation professional (LEED AP) training. This training will provide the necessary expertise and knowledge to assist commercial and large project applicants navigate the LEED program requirements. Funding has been secured via a grant for this training for all four of the Green Building Team members.

The Green Building Team would like to continue these efforts in expanding the program and welcome any suggestions or areas of additional focus that will help us maintain our position as leaders in the sustainable building movement.

F. Outreach & Education

The City's education and outreach efforts associated with its "green" initiatives have targeted not only the City organization but the resident, business and development communities in and around Kirkland. These efforts have included using print, web, television and public presentations to promote the various programs and provide information on sustainable practices for home and business life.

Highlights

Some highlights of external and internal communications include:

External efforts

- *Kirkland Green website:* The Kirkland Green website (www.ci.kirkland.wa.us/kirklandgreen) was launched in September 2007.
 - The site includes webpages on: Natural Resource Management, Sustainable Development, Green Building, Climate Protection, Urban Forestry, Green Business Program, Waste Reduction, Green Kirkland Partnership, and Green Links & Library.
 - Visits to the "homepage" have increased from 596 in September, 2007 to 1,687 in May, 2008.
- *City Publications*
 - Several articles about the City's sustainability efforts were published in "City Update" newsletters printed in the Kirkland Reporter.
 - The "Reuse-Recycle-Conserve" newsletter published by the Public Works Department continues to be mailed to single and multi-family residents.
 - The Green Kirkland Partnership "20 Year Forest Restoration Plan" was adopted by the City Council and printed for distribution.
- *Television promotions:*
 - The City's government access channels (KLIFE/Channel 75 and KGOV/Channel 21) often announce educational seminars and events.



- A recent partnership with Northwest University resulted in the student production of two public service announcements to promote green remodeling that will be aired on the City's KLIFE and posted to www.YouTube.com.
- *Special, community and neighborhood events:*
 - The City's Green Business Program was introduced at the 2007 Sustainable September expo event and now has 14 participating companies.
 - Waste reduction and recycling information and support was provided at the 2007 "Kirkland Uncorked" event.
 - The Green Kirkland Partnership gained momentum since its inception in 2005. 83 events have been held netting over 2,000 volunteers contributing 6,400+ volunteer hours and resulting in a \$120,000 value to the City. Over 1,000 native plants have been planted and hundreds of invasive trees and 2+ acres of invasive plants have been removed from parkland areas.
 - The City hosted a free green building seminar in January 2008 and had approximately 60 attendees.
 - The Public Works Department provides ongoing education efforts:
 - Waste reduction/recycling, water conservation and surface water information is provided at the Wednesday and Friday farmers markets.
 - Informational brochures are prepared and educational outreach is undertaken on topics related to pollution prevention, including natural yard care, car washing and streamside living
 - Climate change, waste reduction/recycling and surface water quality information is presented at neighborhood meetings.

Internal efforts

- "Green Scene" is a dedicated page on KirkNet, the City's Intranet that posts the latest updates on the various Green initiatives. It's intended to be a resource for employees so they know what policies are being developed or adopted that support the City's sustainability goals.
- Food recycling, in addition to commingled recycling, is available at City facilities (except fire stations).
- City departments are organizing "Zero Waste" events, where waste is reduced to the greatest extent possible through the use of recyclable, reusable and compostable products.
- The Green Team held two informational retreats.



Achievements

- *Green Hammer Award:* Recognition from the Master Builder's Association of King & Snohomish Counties for the City's Green Building Program.
- *Excellence in Communications & Conservation:* Public Works' "Reuse-Recycle- Conserve" newsletter recognized by the American Water Works Association/Pacific Northwest Section.

- *ICLEI-Local Governments for Sustainability's Five Milestone Award*. For completing greenhouse gas emissions inventory and setting emission reduction targets.
- *Cascade Land Conservancy's Stewardship Legacy Award*. Recognition for Kirkland's commitment to forest restoration and the efforts of the Green Kirkland Partnership.
- *Kirkland joins the Cascade Agenda Cities Program* as a "Leadership City" sponsored by the Cascade Land Conservancy.
- *Going Green Strategies: 2008 Association of Washington Cities Conference*. Dave Ramsay's presentation on the cost-benefits for Kirkland's sustainable programs.

Goals

The City has achieved several major milestones in promoting its green initiatives. Below are communication goals the Green Team will be working on in the coming year:

- Continue Green Tips, Green EUpdates, "Did You Know," and water conservation tips
- Maintain Kirkland Green webpage and Green Scene
- Continue to have presence at city/community/neighborhood events
 - The City will participate in the 2008 Sustainable September event and will host educational seminars, interactive events and educational materials.
 - Better inter-departmental collaboration between Parks, Public Works and Planning departments for urban forestry issues and goals.
- Incorporate Green Team members into a City Speakers Bureau
- Develop Green Program Overview brochure
- Host short "green flicks" as part of the City's summer movie events
- Develop public participation strategies to inform and consult with the community about sustainability issues such as climate protection and low impact development.

Public Participation: Community Conversation

Much of our education and outreach efforts have focused on informing target audiences about certain programs and encouraging participation (i.e. Green Building, Green Business). It's time to gauge public awareness about our efforts to date, share our goals for the future and hear from the community on how to achieve those goals.

Staff recommends two public participation events intended to engage the public in discussing stewardship and sustainability issues. The first community conversation would be a roundtable type of forum bringing together community leaders, interested citizens and subject matter experts. This event is intended to gauge public awareness and interest around the following questions:

- Is the City "on the right track" with its green initiatives?
- What does sustainability mean for Kirkland?
- How do we engage the larger community in our efforts?

The first "conversation" is tentatively scheduled during the 2008 Sustainable September event. The second "conversation", anticipated to be held within the first quarter of 2009, would focus

around one specific topic - the City's Climate Action Protection Plan. Attachment E provides more details.

G. Other Items

A variety of projects, activities and programs are underway throughout the City. These are highlighted below.

Green Kirkland Partnership

The goal of the Green Kirkland Partnership is to restore the 372 acres of natural areas to a sustainable condition and create an aware and energized community in which individuals, neighborhoods, nonprofit organizations, businesses and City government are working together to protect and maintain Kirkland's natural areas.

There are three main goals that summarize the program:

- Restore Kirkland's natural areas by removal of invasive plants and planting native species for the sustainability of the urban forests, wetlands and their associated habitats.
- Build the community's capacity for long-term stewardship of the natural areas through increased public awareness of and engagement in protecting, restoring and helping to maintain healthy urban forests and wetlands.
- Establish resources to sustain the forest restoration program long-term.

To achieve these goals, the Green Kirkland Partnership program includes the following strategies: 1) develop and implement a 20-year restoration plan for the City's open space and natural areas; 2) implement an Environmental Education and Outreach program to educate and engage the community in stewardship projects to remove invasive plants and to replant with native species, seek support from businesses in both funding and stewardship, and seek grants to support stewardship activities; 3) create a sustainable volunteer stewardship program for ongoing restoration and care of our urban forests; and 4) acquire land that has ecological and habitat benefits. The attached memorandum provides a status report of each strategy (Attachment F).

Sustainable September

Sustainable September 2008 will reach a greater share of businesses and organizations that are interested in green business practices and will reach an increased number of consumers who want to learn more about sustainable products, services and programs. The preliminary program includes the following:

Business Programming

- Green Collar Jobs Symposium featuring a keynote speaker from the clean technology cluster together with break out sessions for industry leaders and eastside educators to discuss training for the jobs of the future. A business kickoff breakfast tentatively set for the Master Builders Headquarters in Bellevue is planned.
- Continuing education classes for professionals
- Tours/case studies of area businesses with a focus on best sustainable practices

- A series of professional networking opportunities including an Eastside Business luncheon
- Partner events hosted by other regional chambers, associations, municipalities and educational institutions
- Green Celebration and awards program honoring regional leaders in sustainability

Community Programming

- Retail *Eco-market* in conjunction with Kirkland's successful Wednesday Farmer's Market (we are encouraging other communities to partner with their Farmer's Markets as well)
- Outreach and consumer education programs - topics could include green building/remodeling, sourcing eco-friendly materials, energy efficiency, water conservation and organic foods/gardening
- Partner events including regional tours of new and remodeled Green Homes, Downtown Kirkland Street Dance and Celebration featuring local leaders, highlighting of green programs such as Kirkland's Green Business Recognition Program and Expedited Permitting for Green Buildings to attract area residents, business owners and workers.

Economic Sustainability Assessment

The Kirkland Economic Sustainability Assessment, the first phase of a project funded by a grant from CTED, is nearing completion. The mission of the study is to:

- Discover where there are gaps in the Kirkland economy for residents and businesses that may be filled by recruiting environmentally-friendly businesses;
- Identify types of green strategies that businesses and residents are implementing; and ways that the City of Kirkland can provide or improve programs to meet business and resident needs in order to achieve a more sustainable economy.

Consultants E.D. Hovee, economists, and O'Brien & Company, sustainability experts, have used a variety of current data to assess the level of sustainability of the Kirkland economy including demographic and economic data, tax revenue data, and household income data. Seventy-seven businesses and 272 residents responded to a survey, and interviews took place with 7 business stake holders. Marketing efforts to promote survey and meeting participation included press releases, a Kirkland television interview with Kathleen and Ellen, paper flyers, emailing outreach, attendance at community and business meetings, and personal phone calls.

On June 3, 2008, a community meeting to present the initial survey and data results was held. Twenty-three citizens and business leaders attended the meeting. Attendees provided valuable feedback that will inform the final report. A Council presentation of the consultants' findings is expected to take place in July.

Green Fleets Initiative

Thirty municipal, county, and other governmental agencies such as the Puget Sound Clean Air Agency, and the Puget Sound Clean Cities Coalition have been meeting monthly since November 2007 to draft the "Puget Sound Green Fleets Initiative" which will develop the standards for being recognized as a Green Fleet in the region. The effort will incorporate best practices, as well as cooperative purchasing efforts. A completed draft of the initiative should be completed by August, 2008.

Kirkland's "Green" Flicks:

The City of Kirkland's Green Team has coordinated with the non-profit, "Hazel Wolf Environmental Film Network", whose mission is to bring filmmakers together with environmental activists, educators, government, scientists, business, and concerned citizens, to improve the quality and effective use of environmental media. The Kirkland Park Department has scheduled three summer outdoor movies on Friday nights, (July 18, August 22 and September 5th), and welcomed the opportunity to add "pre-films" with environmental and sustainability themes. The films to be shown are; *Fisheye Fantasea*, *Conversing with Aotearoa/New Zealand*, and *The Story of Stuff*. All are top rated short films from the recent film festival hosted in Seattle by the Film Network. This is just the beginning of a "green" viewing to the public, with hopes to provide an annual night out at the Kirkland Performance Center to watch films hosted by the City and its "Green" partners.

Information Technology

IT will be utilizing software at the desktop to shutdown inactive computers after hours. This will aid in reducing power costs as well as contribute to reducing the carbon footprint associated with it.

Finance & Administration

Finance & Administration is working is closely with our office supplier to carry more environmentally friendly products. Our supplier now publishes a monthly list of such products which is forwarded to department administrative staff. This information has also been added to the vendor website so can be easily accessed. For internal printing we purchase recycled content paper. For outside print jobs we require our print vendors to use recycled paper as well as soy inks. We recycle our printer toner cartridges and purchase recycled toners. We encourage all vendors to minimize packing materials whenever possible.

SUMMARY

The City has stepped up its level of effort with a variety of green initiatives and programs. The Green Team provides the overall coordination framework for managing the city's air, land and water natural systems. We are making progress in implementing the Council's adopted Natural Resource Management Plan. The following are summary points for the Council's consideration:

- Kirkland has demonstrated a strong commitment to protecting and enhancing our natural systems. Environmental stewardship and sustainability has become an integral part of our planning, operations, programs, practices and funding.

- As a result of these efforts, Kirkland has a reputation for being a leader in being green. On June 19, City Manager David Ramsay gave a presentation at the AWC Annual Conference on “Going Green – Strategies for Success.” The city has also been the recipient of several awards for its programs (i.e. green building, Tree City USA, forest restoration, climate action planning).

Attachments:

- A. Kirkland Green Action Items
- B. Climate Protection Action Plan – Status Report (originally from May 8, 2008 Council Packet)
- C. Natural Resource Management Plan – Urban Forest Guiding Principles
- D. Memo on Low Impact Development Progress
- D-1 Memo on LID Feasibility Study
- D-2 LID Feasibility Study
- E. Public Participation/Community Conversation
- F. Green Kirkland Partnership

Attachment A
KIRKLAND GREEN ACTION ITEMS

	Task	Contact	Status	Next Steps	Timing	Resources
CLIMATE PROTECTION	Address Climate Change	Erin Leonhart	Baseline emissions inventory and targets established.	Developing Action Plan & public outreach strategy	Draft to Council in 2009	Staff time
	Pursue a regional bio-diesel supply strategy	Tim Llewellyn	Cooperative regional purchasing is part of the "Puget Sound Green Fleets Initiative" currently being jointly drafted by 30 governmental agencies.	Contribute monthly meeting/work sessions.	Draft to Council in Fall, 2008	Staff time.
KIRKLAND GREEN ORGANIZATION	Study potential addition of Manager/Board	Paul Stewart	Program manager not being considered at this time due to budget and outcome of community conversation.	Conduct community involvement event.	Fall, 2008	Staff time.
	Finish Kirkland Green website	Marie Stake	<ul style="list-style-type: none"> ▪ Done (to be removed from action list) ▪ Site launched Sept. 2007 ▪ 596 hits (9/07); 1,600+ hits (5/08) 	<ul style="list-style-type: none"> ▪ Team members to maintain appropriate WebPages with current content 	Ongoing	Staff time
	Develop Kirkland Green library and speaker bureau	Paul Stewart Marie Stake	<ul style="list-style-type: none"> ▪ Decided to use website for access to info & resources ▪ Consider speakers panel as part of community conversation/outreach 	<ul style="list-style-type: none"> ▪ Community conversations proposed 	Fall, 2008 & early 2009	Staff time
WASTE REDUCTION	Provide more recycling containers at parks, City buildings and at special events.	Erin Leonhart	<p>Three combination recycling/waste containers installed in the downtown core.</p> <p>Working w/Waste Management providing commingled & food recycling at markets and events (Uncorked).</p>	Applying for a grant to fund additional containers in the CBD. Draft submitted.	Fall 2008	Staff time & funding

**Attachment A
KIRKLAND GREEN ACTION ITEMS**

Task	Contact	Status	Next Steps	Timing	Resources	
URBAN FOREST	Educate public about removal of invasive plants	Sharon Rodman	38 Green Kirkland events were held in 2007 28 Green Kirkland events held as of 6/16/08 3355 Volunteer hours in 2007 1383 Volunteer hours as of 6/16/08	Continue restoration events at Carillon Woods, Watershed Park, Cotton Hill Park and Kiwanis Park	2008	Position needs funding for 2009/2010
	Prepare legislation to prohibit planting of ivy	Lauri Anderson	Done (will come off list)			
	Explore Notable Tree program	Deb Powers	May be concurrent with tree regulation amendments	Status report of current reg's due August 5, 2008		Staff time & funding

**Attachment A
KIRKLAND GREEN ACTION ITEMS**

Task	Contact	Status	Next Steps	Timing	Resources
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SUSTAINABLE DEVELOPMENT	Incorporate LID strategies in City projects whenever possible	Jenny Gaus	Completed review of transportation projects for LID feasibility and concepts	Incorporate LID into capital improvement program	Will occur with 2008 CIP update	Staff time
	Pursue incentives for wastewater reuse and rainwater reclamation	Jenny Gaus	State legislature passed a bill that requires 10% reduction in surface water fee for projects that harvest rainwater	Investigate whether code changes or fee structure changes are needed to City codes in order to offer discount. Continue to pursue other potential incentives	On-going	Staff time
SUSTAINABLE DEVELOPMENT	Pursue opportunities for using porous pavement	Jenny Gaus	This is occurring on individual projects both private and public as feasible. Staff offers technical assistance as appropriate.	On-going	On-going	Staff time
	Organize tour for City Council to see 'green walls' and porous pavement	Jenny Gaus	Check in with Council about whether this is still needed/desired	Arrange tour for fall 2008 if appropriate	Fall 2008	Staff time

SU	Prepare Green Building	David Barnes	Completed	Implementation of phase	Current	Staff Time
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**Attachment A
KIRKLAND GREEN ACTION ITEMS**

Task	Contact	Status	Next Steps	Timing	Resources
	Action Plan			2(See Below)	
	Organize a LEED building tour and provide information about LEED buildings	David Barnes	Organize with Sustainable September	Next meeting July 2008	Fall 2008 Staff Time
	Pursue LEED certification for all new and renovated City buildings	David Barnes & Facilities	Bring proposal to Council with Facility Manager	City Hall Annex renovation	Fall 2008 Staff time
	Green Building: Phase 1 – NSFR Priority Review Pilot Program Phase 2 – Remodels and multi-family Phase 3 – Expand to commercial	David Barnes, PCD Scott Guter, PCD Stacy Rush, PW Tom Jensen, F & B	Phase 1 – Done Phase 2 – Program details in progress Phase 3 – Studying for LEED –AP	Increase staff training on green building requirements. Determining how best to incentivize Provide LEED – AP technical assistance	Sept. 2008 January 2009 Staff time and approved service package
NATURAL RESOU	Pursue the goal of zero use of herbicides	Jason Filan Wendy Kremer	Its status quo.....we are continuing to approach the use of herbicides in a very conscientious and environmental way. Our goal is still to try and some day use zero. Realistically that may be some time but nonetheless we are researching, studying,	Continuing education and pilot programs.	ongoing More FTE staff. Additional budget to purchase

**Attachment A
KIRKLAND GREEN ACTION ITEMS**

Task	Contact	Status	Next Steps	Timing	Resources
		and implementing pilot programs in our efforts of continuous improvement. Staff is engaged in finding new and improved ways to keep our current level of service while using as little herbicide as possible.			products/services to reduce usage.
Add or update review of plantings that are installed with CIP projects to make sure they can be maintained without use of herbicides and that they are generally low maintenance and low in water use.	Wendy Kremer	A selection of plants and planting guidelines has been drafted by staff for general ROW plantings keeping low maintenance and drought tolerance in mind. They have an option to present a plant list to us for review. I have also requested Dream Turf be a consideration. We have started converting over a few medians as we have budget for and recommended it on future projects. Dream Turf requires no water/irrigation, no fertilizers or sprays, no mowing and just an occasional touch up of weeds. In addition, my work group has asked to do the design/plantings when we have the time and manpower to do so because we have the expertise.	Work with CIP project engineers to incorporate and expand these ideas. With upcoming budget constraints, we are being asked to look at reducing service levels and staff so that could change how they are maintained.	When we have the budget answers, we'll know what we have to work with and what we can do.	Budget to convert islands to Dream Turf; more full time staff to be able to better maintain without the use of herbicides.



CITY OF KIRKLAND

Department of Public Works

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MEMORANDUM

To: David Ramsay, City Manager

From: Erin J. Leonhart, Public Works Facilities & Administrative Manager
Van Ingram-Lock, Public Works Management Analyst
Daryl Grigsby, Public Works Director

Date: May 8, 2008

Subject: CLIMATE PROTECTION ACTION PLAN – STATUS REPORT

RECOMMENDATION

It is recommended that Council do the following:

- Receive a status report on the Climate Protection Action Plan;
- Ask clarifying questions; and
- Provide comments as appropriate.

BACKGROUND DISCUSSION

By signing the Mayors' Climate Protection Agreement, the City of Kirkland committed to helping reverse global warming by reducing greenhouse gas emissions. To help accomplish that goal Kirkland joined the International Council for Local Environmental Initiatives (ICLEI) and began following the ICLEI milestones:

- ✓ Conduct a greenhouse gas emissions inventory and forecast to determine the source and quantity of greenhouse gas emissions in the City;
- ✓ Establish a greenhouse gas emissions reduction target;
- 🌍 Develop an action plan with both existing and future actions which when implemented will meet the local greenhouse gas reduction target;
- 🌍 Implement the action plan; and
- 🌍 Monitor and report progress.

To date, Kirkland conducted greenhouse gas emissions inventories for our municipal government and the community at large and the City Council formally adopted greenhouse gas emissions targets. The next step in this process is development of an action plan.

Emissions Targets and Green Power Purchase

In August 2007, Council adopted the following emissions targets for Kirkland government and community:

- 🌍 Interim: 10% reduction in 2005 emissions by 2012
- 🌍 Primary: 20% reduction in 2005 emissions by 2020
- 🌍 Long-term: 80% reduction in 2007 levels by 2050

Council also supported the staff recommendation to purchase Green Power for City facilities at the rate of 50%, starting in 2008, and record it as a reduction in emissions. This recommendation was funded with

one-time budget funds in 2008. In order to count this purchase as an ongoing reduction in emissions, Public Works will submit a Service Package for ongoing funding during the 2009-2010 Budget process. If ongoing funds are approved, Kirkland will meet the Interim emissions goal for government operations.

CLIMATE PROTECTION ACTION PLAN – POSTPONEMENT TO 2009

When Council adopted the emissions goals, staff planned to return to Council in early 2008 with a draft Climate Protection Action Plan. Staff proposes that the draft action plan be postponed until 2009 for three primary reasons.

First, Governor Gregoire signed House Bill 2815 to be effective June 12, 2008. The Bill requires the Department of Ecology to develop “a design for a regional multisector market-based system to limit and reduce emissions of greenhouse gas...” and to provide a report to the legislature by December 1, 2008 to include rules requiring annual reporting of greenhouse gas emissions. In addition, the Department of Transportation is required to “adopt broad statewide goals to reduce annual per capita vehicle miles traveled by 2050...” Legislative requirements pertaining to emissions reductions and annual reporting, once established and adopted, will be considered in developing our own action plan and this information is currently unknown. Guidance provided by the State will help make jurisdictional comparisons easier, be consistent with statewide efforts and instill increased confidence in those comparisons.

Second, staff would like to involve the public in development of the action plan to raise awareness about the issue of climate change and to develop solutions that will resonate with the community. This can be done through existing outreach efforts and community events.

Finally, ICLEI is testing improved software (due out later this spring) that will assist in the development of our action plan. Staff believes that the improved software will result in a better action plan product especially in the area of determining how much potential reduction the various measures will obtain.

CLIMATE PROTECTION ACTION PLAN – PROGRESS TO DATE

The City’s interdepartmental Green Team has been guiding the effort to identify measures that will help reach the reduction targets for the community as well as government operations. We have expanded staff involvement and created work groups comprised of City experts in the following areas:

- Commuting/transportation
- Energy efficiency
- Fuel efficiency/alternative fuels
- Waste reduction
- Carbon offsets
- Land use
- Outreach
- Policy/legislative

These work groups have developed lists of ideas/measures to reduce emissions. The ideas gathered to date are at the end of this report. More analysis is required to determine the resources required to accomplish each item; whether the measure falls under the interim, primary, or long-term target category; how progress will be determined; and the likely reduction in emissions related to each measure. Staff plans to engage the community to develop additional ideas for both government and the community at

large. The action plan will consolidate this information and will ultimately be used as a reference for future budget processes.

CONCLUSION & NEXT STEPS

The Climate Protection Action Plan is consistent with the City Council's Environmental Stewardship Philosophy, the Natural Resource Management Plan and the U.S. Mayors' Agreement. Ongoing efforts are coordinated through the Green Team, who will continue to be involved in the creation and implementation of the Climate Protection Action Plan. Staff will return to Council at a Study Session this summer with an update on all Green Team activities and in 2009 with the proposed action plan. Please direct any questions to Erin Leonhart.

CLIMATE PROTECTION MEASURES UNDER CONSIDERATION

COMMUTING/TRANSPORTATION		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
Programs for business community: o Commute Trip Reduction (CTR) – make it a requirement for more businesses o Require Transportation Management Plan as condition of new project o Tie in business license with CTR o Limit parking spaces through revised zoning codes o Tax incentive for green companies o Shared work stations	COMMUNITY	2020 2012 2012
Programs for citizens: o Green Bike Project o Vehicle registration based on miles o Partner with Metro for more transit service (i.e. 15 min. frequency on core routes) o Partner with Metro for 15 min. frequency on core routes o Flex Car o Ridematch o Lobby for higher tolls on Highway 520 o Buy local (i.e. produce) o Direct marketing to neighborhoods (i.e. Metro's In Motion Program) o Green vehicles o Alternate fuel availability o Bicycle rental for a day o Affordable housing in Kirkland - land use o Create a GTEC in Totem Lake	COMMUNITY	2012 2012 2020 2012
Flexpass provided to all full-time benefited employees - expand to include other transit agencies	GOVERNMENT	2012
New employees are informed of City's TDM Program	GOVERNMENT	Currently but can we expand?
Participate in Metro Promotions: (currently – 70% drive alone) o Supercommuter o Commuter Challenge o Wheel Options o Ride Share Online	GOVERNMENT	By 2012 - 65/35 By 2020 - 55/45
Guaranteed Ride Home Incentive (part of TDM)	GOVERNMENT	

COMMUTING/TRANSPORTATION		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
Shared Work Stations	GOVERNMENT	
Participate in Bike to Work Month	GOVERNMENT	
Employees are encouraged to use the bus, carpool, or teleconference to meetings	GOVERNMENT	
Launch an anti-idling message	GOVERNMENT	
Pay to park	GOVERNMENT	
Buy local (i.e. produce) - contracting or purchasing from	GOVERNMENT	
Alternate start times/flex schedules	GOVERNMENT	
Telecommuting	GOVERNMENT	
Flex Car	GOVERNMENT	

ENERGY EFFICIENCY		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
Energy efficient behaviors: <ul style="list-style-type: none"> o Turn thermostat to 55 @ night & when away o Turn off and unplug electronic equipment & lights when not in use o Spread the word, tell a friend o Turn your water heater down to 120' 	COMMUNITY	2012
Energy efficient home improvements: <ul style="list-style-type: none"> o Weather-seal your windows, doors, ducts & plumbing o Improve insulation in your attic, crawlspace & walls o Change to compact fluorescent bulbs o Choose water & energy efficient appliances (EnergyStar & WaterSense) 	COMMUNITY	2012
Water/energy efficient home improvements: <ul style="list-style-type: none"> o High efficiency showerheads o Toilet leak detection/repair o Install rain sensor/weather-based irrigation controller o Use a rain barrel for irrigating & watering plants o Plant native and drought-tolerant species 	COMMUNITY	2012
Purchase Green Power	COMMUNITY	2012
Buy locally produced food	COMMUNITY	2020
"Lights Out/Earth Hour" Campaign	COMMUNITY	2012

ENERGY EFFICIENCY		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
Building Code Revisions o Increased Energy Efficiency o Increased Water Efficiency	COMMUNITY	2020
Green Building/LEED Codes & Incentives	COMMUNITY	2012
Energy efficient behaviors: o Turn off and unplug electronic equipment o Disallow use of personal appliances (i.e. heaters, refrigerators) o Turn off PCs and lights when leaving a room	GOVERNMENT	2012
Energy efficient field operations: o Retrofit traffic signals & pedestrian indicators with LED o Convert streetlights from incandescent to high pressure sodium o Decrease average daily time streetlights are on for ones on timers o Investigate where solar or other alternate power may be an option (i.e. neighborhood signs) o Improve water pumping energy efficiency	GOVERNMENT	2020
Energy efficient office operations: o Software that will do a safe shut-down after a predetermined period of no use on PCs o Use power-save mode for printers o Alternate power source (i.e. solar or wind) for Uninterrupted Power Source (UPS) charger o Require power and heat standards for new IT equipment purchases	GOVERNMENT	2012/2020
Water/energy efficiency o Leak Adjustment Policy – change to allow only for service line leaks (2008) o Buy only Energystar appliances (2008) o Install Watersense appliances and fixtures o High efficiency showerheads o Cisterns for truck washing, irrigating, toilet flushing o Plant drought-tolerant species only in City ROW o Central irrigation control systems where applicable o Wash City cars at local car washes	GOVERNMENT	2012/2020

WASTE REDUCTION/RECYCLING		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
Waste Reduction Opportunities: o Bi-weekly garbage service	GOVERNMENT	2020
Zerowaste City events o Supply durable utensils and plates to replace plastic and paper plates at City events o Educate staff to use washable coffee mugs instead of disposable cups o Establish a "Paper Cup Free Week"	GOVERNMENT	2012
Mandatory Compostable and Recyclable Products at Community and Council Meetings	GOVERNMENT	2012
Open Session "Recycling Refresher Course" presentations	GOVERNMENT	2012
"Paperless Office" Training	GOVERNMENT	2012
Paper Saving o Scrap Paper Notepads o Eliminate 5.5" x 8.5" Name Notepads o Default Double-sided Copies on All Printers o Option Not to Print Fax Confirmations o Provide printed copies by request only o Use Electronic, Editable .pdfs for Forms o Paper Reduction Competition o Implement a "Do you need to print this?" popup message o Before printing a large number of copies, do a one-page test print o City Council packets electronic only	GOVERNMENT	2012
Phonebook Stewardship/Opt-out	GOVERNMENT	2012
Install hand blowers in bathrooms	GOVERNMENT	
Purchasing o Specify "Recycled Content" in RFQs/RFBs o Local Preference in Purchasing Policy o Provide an Electronic Billing Option o Request/Purchase durable shipping containers (i.e. for PC boxes) o Request Minimal Packaging	GOVERNMENT	2012
Use Refillable Ink Pens	GOVERNMENT	2012
No Color Copies Unless Requested	GOVERNMENT	2012
Spoil Material Reclamation	GOVERNMENT	2020
Universal use of 100% post consumer paper	GOVERNMENT	2020
Participate in a one hour "Lights Out/Earth Hour" Campaign	GOVERNMENT	2012

WASTE REDUCTION/RECYCLING		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
Apply & Qualify for the Kirkland Green Business Waste Reduction and Recycling Category	GOVERNMENT	2012
Include Recycling and Waste Reduction Information at New Staff Orientation	GOVERNMENT	2012
Install Reusable Furnace and A/C Filters	GOVERNMENT	2012
Reuse Packaging Materials From Incoming Shipments (i.e. peanuts, boxes, Styrofoam)		2012
Universal Use of Rechargeable Batteries	GOVERNMENT	2012
Provide Durable Cups, Dishes, Silverware in Employee Lunch Rooms	GOVERNMENT	2020
Provide Cloth Towels as an Alternative to Paper Towels	GOVERNMENT	2020
Use mulching mowers	GOVERNMENT	2012
Junk mail list opt-out	GOVERNMENT	2012
Physical manifestations of waste demonstrations at City Hall or other public facilities	GOVERNMENT	2012
Provide labeled recycling containers in public spaces	GOVERNMENT	2012

CARBON OFFSETS		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
Private Land Tree Replacements	COMMUNITY	
Shade tree placement	COMMUNITY	
School Walk Zones - increase trees (Science indicates more trees on planting strips increases numbers of walkers)	COMMUNITY	
Parkland Planting Enhancement	GOVERNMENT	
Renewable Energy - Pool water & lift stations	GOVERNMENT	
Light Fixtures in Parks	GOVERNMENT	
Refine Current Tree List for Canopy Enhancement	GOVERNMENT	
Biomass Management	GOVERNMENT	
Shade/Cooling Public Bldg.	GOVERNMENT	
Create a Urban Forest Development Density Credit Program	GOVERNMENT	

LAND USE		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
<p>Efficient Use of Land:</p> <ul style="list-style-type: none"> ○ Provide a compact land-use pattern ○ Allow small-scale neighborhood retail and personal services within residential neighborhoods ○ Allow for the maintenance and redevelopment of existing developments that do not conform to current density standards in planned multifamily areas ○ Facilitate infill development to ensure that land is used in the most efficient manner ○ Consider transfer of development rights to concentrate development in urban areas and limit suburban sprawl ○ Encourage infill and redevelopment/intensification of existing commercial areas 	COMMUNITY	
<p>Compact Mixed-Use Centers:</p> <ul style="list-style-type: none"> ○ Provide a land use pattern that promotes mobility and access to goods and services ○ Provide employment opportunities and shops and services within walking or biking distance of home ○ Encourage residential development within commercial areas ○ Locate dense residential development close to shops, services and transportation hubs ○ Facilitate development in the Totem Lake Urban Center to allow development of a significant concentration of employment and housing, with direct service by high-capacity transit and a wide range of land uses, such as retail, recreational, public facilities, parks and open space ○ Facilitate development in the Downtown Activity Area to create a compact area to support a transit center and promote pedestrian activity. Promote a mix of uses, including retail, office and housing ○ Consider housing, offices, shops, and services at or near park & ride lots 	COMMUNITY	

LAND USE		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
<p>Non-motorized Transportation Planning:</p> <ul style="list-style-type: none"> ○ Incorporate features in new development projects which support transit and non-motorized travel (e.g. covered and secure bike racks, storage lockers, showers, guaranteed ride-home programs, commute trip reduction information, etc.) ○ Encourage vehicular and non-motorized connections between adjacent properties ○ Promote an intensity and density of land uses sufficient to support effective transit and pedestrian activity ○ Encourage pedestrian travel to and within the commercial area by providing safe and attractive walkways, close groupings of stores and offices, structured and underground parking and fewer curb cuts to reduce walking distances, and overhead weather protection ○ Offer financial incentives for commute trip reduction (e.g. discount on business tax for businesses that meet aggressive commute trip reduction targets) ○ Discounts on road impact fees for projects which place a mix of uses within walkable distance to one another and with aggressive TDM/CTR programs ○ Pedestrian Master Plan to create a comprehensive network of routes and trails that make walking easy and safe ○ Improve pedestrian crossings at priority locations such as schools, high-density commercial areas and at transit stops ○ Bicycle Master Plan to improve the on-street bicycle network by increasing the number of striped bike lanes and by more clearly marking bike lanes 	<p>COMMUNITY</p>	

LAND USE		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
<p>Sustainable Development Practices</p> <ul style="list-style-type: none"> ○ Explore opportunities to employ the principles of the Living Building Challenge (buildings generate their own energy with renewable resources, use resources efficiently, etc.) ○ Promote zero carbon demonstration project ○ Promote non-single occupant vehicle travel by reducing total parking where transit service is frequent ○ Promote innovative housing techniques, including compact development and cottage housing ○ Encourage sustainable building practices ○ Encourage retention of existing housing stock ○ Develop/implement parking regulations that reduce or eliminate minimum parking requirements for new development and also establish a maximum amount of allowed parking spaces ○ Require new development to account and mitigate for greenhouse gas emissions ○ Promote local food production ○ Review regulations to ensure that zoning control barriers to energy efficiency (e.g. solar panels, micro-wind turbines, etc.) are addressed ○ Promote car-sharing programs in new developments ○ Partner with real estate and lending industries to promote sustainable building practices (e.g. green mortgages, energy performance certificates, etc.) ○ Explore opportunities to encourage reuse and salvage with building demolition ○ Encourage use of design for deconstruction techniques in all new construction ○ Explore 'greening' of urban environment by use of green walls, green roofs, etc. (Seattle's Green Factor landscape standards) ○ Explore code revisions to require energy efficiency improvements to the existing structure when the carbon footprint of a home is increased (e.g. through extension) 	<p>COMMUNITY</p>	

LAND USE		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
<p>Economic Development:</p> <ul style="list-style-type: none"> ○ Support home-based businesses that are compatible w/the neighborhood character ○ Encourage clusters of complementary businesses ○ Strive to maintain a balance between jobs and housing ○ Facilitate development of cooperative office space providing fully supported office space for remote working to enable residents to work closer to home ○ Work to attract potential biodiesel refiners and vendors by helping identify appropriate sites, designating a single point of contact for permit issues, and addressing any fire code issues associated with biodiesel ○ Provide audit service for businesses to improve their sustainability practices ○ Promote green workforce housing ○ Explore potential sites for electrical charging stations to support electric vehicle infrastructure 	COMMUNITY	
<p>Natural Environment:</p> <ul style="list-style-type: none"> ○ Protection of existing landscaping and trees ○ Maintain healthy urban forests ○ Establish an on-going tree planting program ○ Refine open space network maps, identify missing links and develop preservation techniques ○ Shade tree plantings in the right-of-way ○ Enhance the city's tree canopy through the Urban Forestry Program 	COMMUNITY	

LAND USE		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
<p>Legislative/Regional Issues:</p> <ul style="list-style-type: none"> ○ Create long-term roadmap for achieving a one-planet footprint (e.g. incorporate basic principles of "One Planet Living" in ordinances (zero carbon, zero waste, sustainable transport, local and sustainable materials, local and sustainable food, sustainable water, natural habitat/wildlife, equity and fair trade, health and happiness) ○ Puget Sound counties coordinate planning efforts to show that their future planning scenarios will result in a reduction in carbon emissions ○ Work with other local governments and agencies to create a regional partnership to formulate a targeted and comprehensive education and awareness campaign focused on fuel efficiency and less driving. ○ Explore potential for local energy production (e.g. cogeneration plants) ○ Consider regulations to ensure only efficient appliances can be installed ○ Legislate against inefficient appliances that can be left on standby ○ Funding for mass retrofitting of residential properties to include microgeneration (e.g. solar panels and micro-wind turbines) 	<p>COMMUNITY</p>	
<p>Public Outreach:</p> <ul style="list-style-type: none"> ○ Partner with businesses, organizations and individuals to provide local citizens with tools they can use ○ Compare ecological footprints of Kirkland's neighborhoods and create challenge to reduce footprint ○ Offer three or four streets at a time access to energy efficiency technologies. Energy competitions between areas or streets could be set up, with prizes offered to streets with lowest energy use (per occupied household). Bulk retrofitting could also lead to cost savings due to bulk purchasing and workmanship. 	<p>COMMUNITY</p>	

LAND USE		
ACTION	GOVERNMENT/COMMUNITY	TARGET DATE
Allocate a set percentage of the capital improvement budget for major transportation projects to fund bicycle and pedestrian projects	GOVERNMENT	
Adopt a policy ensuring that new and existing facilities will meet green building, LEED (Leadership in Energy and Environmental Design) standards	GOVERNMENT	2012
Continue to support a standing sustainability committee to assist the city in the significant sustainability effort	GOVERNMENT	

C. Land And Vegetation

URBAN FOREST

1. TREE CANOPY COVER

The ecological and economic benefits of a significant tree canopy cover in an urban area are optimized at an overall coverage of 40%.

If the average tree cover were increased to 40% in the urban areas of the Puget Sound Region, the environment would be significantly improved in terms of storm water management and air quality². With an estimated current tree cover of 32%, Kirkland is aiming to increase the tree canopy long term toward 40% -- to the extent feasible when balancing other City goals -- in order to approach measurable economic and ecologic benefits. The challenge will be to increase the City's tree cover wherever feasible to the extent necessary to compensate for those highly urbanized areas in Kirkland where significantly less cover can be sustained. The City has identified the following strategies in which to strive toward that goal:

- Proactive Public Tree Management
- Private Tree Preservation
- Appropriate Transportation Standards for new Street Trees
- Notable Tree Program and other public outreach

Tree management goals should favor preservation over tree replacement. More tree management budget and staff resources should be directed toward education and incentives than toward enforcement. Use of native vegetation on public and private property should be promoted where appropriate, because it can require less maintenance and watering, is essential for fish and wildlife, and contributes to the unique character of our region.

2. PROACTIVELY MANAGE PUBLIC TREES

Trees in City parks, rights-of-way, and on other City-owned properties constitute valuable public assets.

Kirkland's public trees constitute important "green" infrastructure in the community. Their contribution to the overall urban forest and their associated benefits are significant. Proper maintenance of existing healthy trees and adequate planting efforts are critical components to ensure that the trees remain assets, and do not become liabilities.

Gathering useful data on the public trees through an inventory will help the City determine maintenance needs and areas to enhance, thus investing in and increasing the value of Kirkland's public trees.

The most effective way to ensure proper maintenance for the City to commit to a comprehensive public tree management program. All City and ROW trees should be maintained by ISA-certified arborists and tree workers according to a sound plan and following the national (ANSI) standards. At some point, the City may wish to explore the feasibility of adding an Adopt-a-Street program that could train interested citizens to properly maintain designated groupings of street trees for which they wish to assume responsibility.



C. Land and Vegetation, continued

Planting trees is an important component of proactive, public tree management. The City will need to explore funding options, such as a dedicated tree fund, to support the planting of trees as well as proper care of existing trees in public spaces. Kirkland's Public Works Department and Parks and Community Services Department have started to develop a tree nursery as a source of new public trees, but its success will depend upon the availability of funding and staff.

3. PRIVATE TREE PRESERVATION

Ensure more effective retention and preservation efforts for mature trees during development.

The Kirkland Department of Planning and Community Development should explore several ways to approach revision of the current tree regulations to ensure feasible tree retention efforts on private property.

One approach could be based on the fact that Kirkland neighborhoods differ in character, particularly in the extent of their tree cover. To address these differences and where feasible, tree regulations could be tailored to fit the concerns and character of City neighborhoods, drainage basins, or other logical sub-areas. At the same time, it is essential that care is taken to ensure that sub-area variations in tree regulations will result collectively in achieving the City's ecosystem goals.

Effective tools for preservation of healthy, mature wooded stands could include use of Natural Growth Protection Easements, increased dedication of landscape buffers, and standards that help preserve perimeter trees.

In some areas, dense development limits space available for trees to the extent that the City may benefit from a "tree bank" for developers to pay into when tree replacement is not feasible on site. The funds would be dedicated to tree planting in other more appropriate locations in the community, thereby maintaining and enhancing the overall tree canopy. Since the replacement trees may go to City parks or other public spaces, this practice may result in shifting some of the City's tree cover and its maintenance from private to public land.

Restrict removal of mature trees from developed properties unless deemed nuisances or hazards or an appropriate replacement plan is in place.

Recognizing that mature trees exponentially provide great benefit to the community, the City should explore restriction of removal of such trees without good reason. Limiting tree removal to those trees determined to be hazards or nuisances is a sensible approach when combined with flexible options for replacements to ensure "no net loss". Concepts of thinning forest stands for tree health and solar access may also need to be considered when proposing final zoning code amendments dealing with private trees.

Provide education on the benefits of trees on private property and on alternatives to removal.

Through public outreach with brochures and programs (Tree City USA, Arbor Day, Notable Tree Program, Neighborhood tree projects), the City can demonstrate the local and community-wide benefits of trees and foster positive stewardship among the residents and neighborhoods.

C. Land and Vegetation, continued

4. TRANSPORTATION STANDARDS FOR A GREEN AND SAFE STREETScape

Update street tree planting space standards and planting specifications to better accommodate a more diverse palette of tree species.

Ensure street trees are not planted in sub-standard strips, and encourage expanding the standard planting widths in specific areas to accommodate larger tree species. The City should also review and revise planting specifications for required trees, utilizing the latest research on best planting techniques and lessons learned from past installations.

5. TREE CITY U.S.A.

Strive to maintain Tree City USA status.

Achieving the first designation of Tree City USA for Kirkland in 2002 was done with minimal completion of the standards. In order to legitimately hold on to this title on an annual basis, the following must be developed:



Standard 1: Adopt a tree preservation ordinance.

The interim ordinance adopted in 2002 should be replaced by permanent code amendments.

Standard 2: Urban forestry budget of \$2 per capita.

This budget should be direct costs toward planting and maintaining community trees.

Standard 3: Designate a Board or group.

The Natural Resource Management Team was designated in 2002. The team must clearly show consistent work toward a community tree program.

Standard 4: Celebrate Arbor Day.

The City must embrace this event on its own and be clearly dedicated toward a community tree effort.

6. NOTABLE TREE PROGRAM

Develop and maintain a program to identify and preserve notable trees in Kirkland.

Such a program could raise awareness of trees in Kirkland that are of exceptional value to the community. Selection of notable trees could be based on tree age, size, rare species, landmark location, or a combination of attributes. The viability of Notable Trees on private property may be enhanced by offering incentives, such as maintenance service to be provided by City crews or sponsored by a local tree care company. When tree regulations are updated, new rules that would specifically protect Notable Trees could be explored as well.



CITY OF KIRKLAND

Department of Public Works

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MEMORANDUM

To: Dave Ramsay, City Manager

From: Jenny Gaus, Surface Water Engineering Supervisor

Date: June 13, 2008

Subject: LID Progress and Next Steps

Introduction

Low Impact Development (LID)¹ is now firmly in place in City policies such as the Comprehensive Plan, and is being used with increasing frequency on both public and private construction projects. Progress has been made in the past year on many aspects of LID, as described below. Further use of LID can be encouraged or required through incentives, and regulatory changes. Two questions that will need to be discussed as we move forward on LID implementation include:

- Does Council wish to allow, encourage or require LID? Each of these levels of city involvement in LID would produce different outcomes in terms of the number of projects using the practices, and the community and watershed benefits.
- If Council wishes to encourage or require LID, how much LID is desired and where? Are there priority areas or watersheds where Council wishes to see LID usage increased? Does Council wish to change land use regulations such as allowable lot coverage in order to aim for zero-discharge of stormwater for small storms, or would a lesser level of LID usage be acceptable?

¹ LID is a set of techniques that mimic natural watershed hydrology by slowing, evaporating/transpiring, and filtering water before it reaches a stream channel. LID contrasts with current drainage techniques that collect and convey water to streams quickly, damaging stream channels and degrading water quality. LID techniques include the following:

- Reduce creation of impervious surfaces
- Retain site vegetation
- Amend soils with compost to improve water retention
- Construct bio-retention swales or cells, which are natural areas that have specially chosen plants and engineered soils that slow, filter, and take up water
- Use permeable pavement for roadways driveways and walkways
- Install green roofs and/or rooftop gardens
- Install cisterns to hold and reuse rain water

When combined, such techniques can greatly reduce the amount, and can improve the quality of storm water runoff from developed sites. For further information on environmental benefits and engineering aspects of LID, see the Puget Sound Partnership website at [Puget Sound LID](http://www.pugetsoundpartnership.org).

LID Progress This Year

A. Construction Projects

LID usage has increased this year for both private development and public capital projects. LID practices will be used on 16%, or 9 of the 56 projects for which Land Surface Modification (grading) permits were issued in 2007-2008. Of the 9 projects, about half will use LID to completely fulfill stormwater flow control requirements, while the remainder will use LID for water quality treatment, and/or to reduce the size of flow control facilities.

The Public Works Department has 2 projects in design (Highlands/116th Ave NE Sidewalk and Bridle Trails/116th Ave NE), and 1 project that will be constructed this year that will use LID features (NE 73rd Street between 128th Ave NE and 132nd Ave NE). These projects will use bioretention swales, Filterra tree boxes, and other features for water quality and flow control. It is expected that these features will lead to cost savings in addition to environmental benefits. Feasibility and concepts for use of LID on other CIP projects is described in the SVR report that is discussed in the Education and Coordination section below.

Since 2006, the Public Works Department has been involving residents in decisions about street improvement that are required as part of private development projects. In certain instances, residents are given an opportunity to vote for either traditional, or SEA-street (Street Edge Alternatives – Seattle – project that combine pedestrian improvements, skinny streets, and bioretention swales to provide multiple benefits) type improvements. In order to qualify for construction, the SEA-Street alternative must receive 70% of the votes, with ballots that are not cast counting as “No” votes. So far, of 4 neighborhoods polled, 2 have expressed a preference for the SEA-Street type of improvements. This shows that there is a growing appreciation of the aesthetics of LID projects, and that community acceptance may be on the rise.

B. Regulations

The Cottage Housing portion of the Zoning Code (KZC Chapter 113) which was passed in 2008 requires that projects incorporate LID features to meet stormwater requirements. The degree to which LID must be used is not defined. As we saw with the two cottage housing projects submitted under the interim ordinance (Danielson Grove, and the Stacy Property), the clustering allowed with cottage housing provides wonderful opportunities for use of LID, and this is a big step forward.

In order to meet requirements in the City's NPDES Municipal Stormwater Permit, the City must adopt a surface water design manual that is equivalent to Ecology's 2005 Stormwater Manual for Western Washington August of 2009. Staff are developing a technical notebook, a public outreach/involvement process, and other materials that will be presented to Council for consideration late this fall. The Ecology manual requires that most projects amend site soils with compost, requires small projects to use LID features where feasible, and encourages use of LID on larger projects by providing credits that can be used to reduce the size of or eliminate traditional flow control facilities.

Further regulatory changes to encourage or require LID on a greater proportion of projects will require staff time from the Planning Department, or consultant services, which are not currently available. Grants may be available to help with this work.

C. Education and Coordination

The City continues to reach out to developers and engineers to encourage use of LID. Each time staff attends a pre-submittal meeting or review conceptual designs, effort is made to encourage applicants to use LID features wherever feasible. Technical assistance is offered and expedited review has been offered informally.

Staff also is reviewing internal practices that will lead to successful LID projects. For example, LID projects involve extensive use of plants, and so review and input from the Public Grounds Division (Wendy Kremer and Mark Padgett) and/or the Urban Forester in the Planning Department (Deb Powers) in addition to the Surface Water Engineer (Stacey Rush) is needed to insure that plants survive and thrive. Also, determining maintenance tasks and responsibility (i.e. whether maintenance will be public or private) is crucial to the long-term functionality of LID systems. Several staff have been attending classes sponsored by the WSU Extension to identify issues, and to work toward processes that will facilitate LID.

In discussion with the CIP group in Public Works about how to facilitate use of LID in transportation projects, it was found that LID needs to be included in the budget and conceptual design that forms the basis of the Capital Improvement Program. SVR Design was then hired to complete a review of transportation CIP projects in order to suggest LID features that could be included in each, and to estimate cost impacts of those features. This study has been completed, and the results have already been used to assist in including LID features in the two projects that are currently in design. The study is attached (Attachment D-2). For further information on this study, please see the attached reading file memo (Attachment D-1).

D. Tools

In addition to the SVR Design study mentioned above, Staff are also working with the University of Washington's Pacific Northwest Center for Geologic Mapping Studies to develop an improved geologic and soils map for the City. This map will assist in choosing LID features that may be feasible on a given project in addition to improved information on landslides and seismic hazard areas. Data collection has taken place, and field work and map updates are underway. This project is expected to be complete by early 2009, and results will be presented to Council in a reading file.

Questions for Discussion

A. Allow, Encourage, or Require LID?

Currently City regulations allow LID where feasible for all projects, and require its use for Cottage Housing projects. Staff also encourages LID by offering technical advice and expedited review of projects. With this level of City involvement, LID is used when it makes economic sense for developers, and when they have sufficient knowledge and expertise to design using LID principles. LID features would likely be provided in cases where they significantly reduce the size of or eliminate the need for traditional stormwater facilities, and where the cost of the LID alternative is relatively low in relation to the cost of the traditional alternative. An example of this would be a project where the soils drain well so that porous pavement could be used to provide flow control. The cost of shifting to porous pavement is low in relation to the cost of the stormwater flow control vault that would have been required under a traditional development scenario. If the soils had been poor-draining, it is likely that this project would have used a traditional stormwater vault rather than reduce lot coverage to create space for rain gardens or use green roofs.

Table 1 Amount of Low Impact Development that can be Expected in Kirkland Under Different Regulatory Environments

Type of Development	Current Regulations	2005 Stormwater Manual for Western Washington and Current Zoning Code	With future changes to Zoning and/or surface water design code
Small Projects – All types	Low	Moderate	Moderate
Single-family residential - new	Moderate/Low	Moderate/High	High
Single-family residential - redevelopment	Very Low	Moderate	Moderate
Multi-family/Commercial - new	Moderate/Low	Moderate	High
Multi-family/Commercial - redevelopment	Low	Moderate	High

Low = up to 20% of projects would be likely to provide LID features to replace or significantly reduce the size of flow control facilities

Moderate = all projects will provide some level of LID usage (i.e. soil amendment), and up to 50% of projects would provide LID features to replace or significantly reduce the size of flow control facilities

High = all projects will provide some level of LID usage (i.e. soil amendment), and most projects will provide zero discharge of runoff for small (< 2-yr) storm events.

If the City chose to provide further incentives for projects to include LID on a voluntary basis, economic incentives such as the following could be offered:

- Expedited review for LID projects
- Reduced Surface Water Utility fees
- Credit toward landscaping requirements for LID features (may already exist)

If the City chose to require LID as feasible on all projects, there would be many more projects providing such features. The costs and benefits of such a proposal would need to be carefully weighed. Whatcom County recently adopted regulations that require LID use on all projects within the Lake Whatcom watershed. Several other Puget Sound Cities have adopted similar ordinances, and in the next few years it will be interesting to see how the regulations are interpreted and used on projects.

B. How Much LID is Desired?

As Council considers LID, one discussion will be how much LID is desired, and where? LID provides improved water quality and green/open space benefits in most instances, but has the most beneficial impact where stormwater is discharged to streams because it reduces peak flows that can damage stream habitat and improves water quality. Thus one strategy would be to choose priority watersheds where LID would be required to the degree that it is feasible. An alternative would be to require LID as feasible for all projects.

LID will be voluntarily used for projects where it produces cost savings for developers, especially as awareness of design techniques and possible features grows. This will result in some degree of reduced runoff, and will produce water quality benefits. There are a large numbers of projects, however, where LID will likely not be used unless incentives are provided and/or unless land use regulations are changed to facilitate LID features. Council may wish to consider what LID goal is desired. If, for example, it is desired

to aim for zero runoff from most small storms, this would require extensive use of LID on all projects, and would require changes such as the following (this is a laundry list – not all of these would be necessary):

- Require that all projects use as much LID as feasible, even where traditional flow control or water quality facilities would not normally be required (could choose to do this in priority watersheds)
- Reduce lot coverage allowances in order to preserve space for use in LID design
- Increase building height allowances to encourage small footprint buildings
- Require that open grass-lined ditches be used in place of pipes for stormwater conveyance wherever feasible
- Allow clustering if there are ways in addition to Cottage Housing that this can be used
- Continue to invest in public projects that showcase LID and incorporate experimental LID features in order to push the envelope

A lesser goal such as reduction of runoff by half for small storms, would require developers to use some LID features, but would not require as many changes to items such as allowable lot coverage or building heights.

Summary and Next Steps

Significant progress was made this year in terms of the number of projects using LID, and the regulations that will encourage future use. This study session will provide limited time for discussion of the LID issues and questions presented here, but staff wish to provide a glimpse of issues that will affect how, where and when we see increased LID usage in Kirkland.

The next step in this process is to find staff time or funds for a consultant to research options for incentives and regulatory changes and return to Council for direction. Staff will research options for grants that could fund such assistance. In addition the following will take place in the next year:

- Public Works staff will come to Council in the fall to present updated surface water design regulations for consideration.
- Public Works will continue to use the SVR Design report to incorporate LID features into transportation projects as feasible.

Attachment D-1: Surface Water LID Feasibility Study Memo 6/19/08

Attachment D-2: Low Impact Development (LID) Feasibility Study, SVR Design Company, Dec 2007

**CITY OF KIRKLAND****Department of Public Works****123 Fifth Avenue, Kirkland, WA 98033 425.587.3800****www.ci.kirkland.wa.us****MEMORANDUM**

To: Dave Ramsay, City Manager

From: Stacey Rush, Surface Water Utility Engineer
Rob Jammerman, Development Engineering Manager
Daryl Grigsby, Public Works Director

Date: June 19, 2008

Subject: SURFACE WATER LID FEASIBILITY STUDY

The City Comprehensive Plan and several policy documents support use of Low Impact Development (LID) techniques for City Capital Projects. Specifically, Council has expressed an interest in seeing LID used on transportation projects in ways similar to Seattle's SEA-Streets (Street Edge Alternatives-Seattle). In addition to the environmental benefit to our watersheds, incorporating surface water LID techniques in public projects can provide benefits such as open/green space, and would set an example that may help to increase the use of LID in private development.

Some surface water LID has already occurred in City projects, especially those in Parks, but the use has been limited. In discussing this issue with Capital Projects staff in Public Works, it became apparent that for LID to be more commonly used in transportation projects, it needs to be incorporated into the budget and conceptual design that are used in developing the Capital Improvement Program. This would help project engineers to have a more realistic budget to aim for, and would help design consultants to know from the outset that the project will need to incorporate LID features. This would allow them to add sub-consultants with LID expertise to their project team if necessary. In essence, project engineers are very open to working with LID techniques, if the budget and scope incorporates them from the outset.

In order to address the issues noted above, the City hired SvR Design Company (SvR) in May 2007 to investigate LID options. Ten future transportation projects were selected for this study, and an analysis of the LID opportunities and constraints was prepared.

SvR produced a comprehensive report titled: *LID Feasibility Study* (Attachment D-2). It includes descriptions of the surface water LID features, and explains why these techniques are being considered. The majority of the report is a detailed study of each City transportation project; considering different LID options, comparing the costs of LID vs. traditional structures, and a comparison of other benefits. Other benefits include: ecological (stream, wetland, and tree canopy), habitat and human health, ecological connectivity, promotion of system wide carbon-neutral patterns, and consideration if the project encourages collaboration with other agencies, neighborhoods, schools, and local groups.

Having this wealth of information available at the start of the CIP process will give project managers a head start on incorporating LID; especially the cost implications. This will increase the likelihood that stormwater LID techniques will be implemented as part of the projects, and increase their functional success. Because this type of a comprehensive study has not been done by many other jurisdictions, SvR will be presenting this report and the conclusions at the APWA conference in fall of 2008.

Memo to Dave Ramsay from Stacey Rush
June 19, 2008
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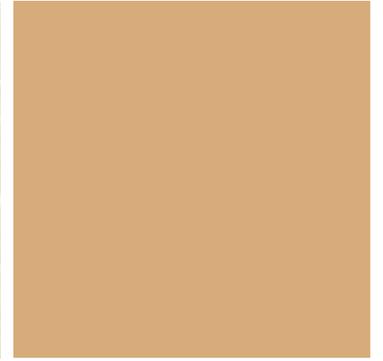
Next Steps

The information from this report will be presented to council as part of the CIP process. LID options will be considered in the early design phase of CIP projects, and implemented if feasible. Actual LID costs will be recorded and used for future project estimates. The Public Works department has two projects (Highlands/116th Ave NE and Bridle Trails/116th Ave NE) that are already using the results of the report to incorporate LID into the project design.

Attachment D-2: *Low Impact Development (LID) Feasibility Study*, SVR Design Company, December 2007

Low Impact Development (LID) Feasibility Study

Analysis of opportunities and constraints to incorporate LID elements into Capital Improvement Program (CIP) projects in Kirkland, Washington



Prepared for the City of Kirkland
by SvR Design Company
December 21, 2007



Kirkland Low Impact Development (LID) Feasibility Study Report

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Project Summary

City of Kirkland staff and SvR Design Company reviewed the upcoming Transportation Projects in the Capital Improvement Program (CIP) for opportunities to incorporate Low Impact Development elements into each project. For example, if a project description included street widening or installation of a sidewalk, SvR evaluated the opportunity to include porous pavements or bioretention swales within the right-of-way. The review of the projects not only considered the transportation elements listed in the CIP transportation project descriptions but also the stormwater benefit, pedestrian and other non-motorized users, and the information and demonstration potential of the recommended elements.

City of Kirkland staff selected the following CIP transportation projects for review:

- 116th Avenue NE sidewalk, bicycle lanes, and equestrian trail (CIP Project #: NM 0001 000)
- NE 100th Street at Spinney Homestead Park sidewalk (CIP Project #: NM 0034 000)
- 116th Avenue NE (Highlands)sidewalk: (CIP Project #: NM 0044 000)
- 13th Avenue sidewalk (CIP Project #: NM 0054 000)
- 122nd Avenue NE sidewalk (CIP Project#: NM 0055 000)
- 6th Street sidewalk (CIP Project #: NM 0059 000)
- 99th Place NE/100th Avenue NE sidewalk (CIP Project #: NM 0060 000)
- Park Lane pedestrian corridor enhancements (CIP Project #: NM 0064 000)
- Central Way pedestrian enhancements (CIP Project #: NM 0065 000)
- 120th Avenue NE roadway improvements (CIP Project #: ST 0063 000)

What is Low Impact Development?

Low Impact Development (LID) is an approach to stormwater management that integrates conservation of natural site features with small scale engineered landscape elements. These elements are designed to emulate natural hydrological and ecological processes to reduce water flows and improve water quality. Small LID elements can be distributed over residential, commercial, and/or industrial sites in order to further reduce peak water flows and provide water quality treatment (Puget Sound Action Team [PSAT], Washington State University [WSU], 2005).

Through incorporation of low impact development strategies, we attempt to mimic the natural ecosystem in the City of Kirkland by promoting natural vegetative processes including evaporation, transpiration, and infiltration of stormwater. By treating these elements *in situ*, the City of Kirkland has the potential to recreate the functional storage of and treatment that is supplied by native vegetation or historic forested conditions, while promoting a vibrant economy, creating healthy and aesthetically pleasing spaces for its residents, and protecting the ecology of the Lake Washington basin.



Bioretention system during large storm event at High Point Redevelopment, Seattle

Why is LID important?

Over the last 25 years, Western Washington has seen rapid development within urban areas. As more trees and native vegetation areas are replaced with roadways, shopping centers, and housing developments to support the growth, new impervious surfaces increase the stormwater runoff and pollutants into nearby water bodies. For example, during a storm event in a developed area, water levels may rise rapidly due to a reduced amount of pervious surfaces, changes to soil structure and lack of vegetation which results in a surge of stormwater conveyed via conventional pipe systems to discharge points in streams and lakes. In such storms, pollutants such as phosphorous, nitrogen, bacteria, heavy metals, hydrocarbons (i.e. oil and grease) are transported to aquatic ecosystems and can have impacts on plant, animal, and human health and activities (PSAT, WSU, 2005).

The LID approach emphasizes a distributed, “top-of-the-pipe” strategy to stormwater management by reducing water flow and providing treatment closer to the source of stormwater runoff. Conventional stormwater management tools utilize hard-surfaced, often subterranean structures to collect and rapidly convey stormwater from residential and commercial development to central control ponds for treatment and detention and/or direct discharge points in streams and lakes, often resulting in severe erosion and the transfer of pollutants to these discharge locations (PSAT, WSU, 2005).

Why incorporate LID in Capital Improvement Program (CIP) projects?

An LID approach to capital improvement programs works to control the volume of stormwater by integrating site planning and stormwater management from the beginning of the design process of a project to preserve a more hydrologically functional landscape (PSAT, WSU, 2005). Through an understanding of the fundamental functions of low impact development, a variety of strategies can be deployed at a small scale and often with modest project costs. For municipal CIP projects, this approach to building and infrastructure development will rely on solutions that protect and restore native soil and vegetation, which creates an overall cityscape that is more beautiful, environmentally sustainable, and healthy than using other conventional approaches. The City of Kirkland Natural Resource Management Plan and the Kirkland City Council Philosophy of Environmental Stewardship support LID in City of Kirkland projects.

The City of Kirkland is not alone in its work to investigate the potential to include LID in its CIP projects. For example, the Department of Planning and Development in the City of Seattle is currently working on a “Sustainable Infrastructure Initiative” that supports cross-departmental collaboration to incorporate a number of strategies to promote sustainability in its CIP projects, ranging from the inclusion of LID within public right-of-ways to water “swapping” to the reduction of carbon emissions in its ports (Presentation, Steve Moddemeyer, 7/12/2007). Seattle’s Sustainable Infrastructure Initiative builds on the prior enactment of the “Green Factor” point-based system in which developers can choose a variety of options to meet City of Seattle landscaping requirements. Bonus points are provided for landscape proposals that include rain water harvesting, low-water use plants, larger trees, tree preservation, green roofs and green walls (City of Seattle, 2007). Prior to the “Green Factor” ordinance, SvR Design Company provided consultation to the City of Seattle in publishing a “Client Assistance Memo” regarding Green Parking Lot design that utilizes permeable pavement and natural drainage systems (City of Seattle, 2005).



Case Studies of street projects in Seattle that included LID systems versus conventional systems suggest that an LID approach to stormwater management can not only provide reductions in stormwater volumes as well as improvements in water quality, but also decrease project costs. Table 1 provides a cost comparison of street projects with LID and conventional systems.

Table 1 Cost comparisons for LID natural drainage systems (NDS, i.e. a series of LID elements) and conventional drainage designs

Street Type	Local Street with Bioretention Swales (SEA Project) (LID)	Local Street (conventional)	Collector Street with a series of stair-stepping Bioretention Swales (Cascade Project) (LID)	Collector Street (conventional)	Broadview Green Grid (incorporates SEA & Cascade type designs) (LID)
Objectives & Measures					
Transportation & aesthetics	<ul style="list-style-type: none"> 1 sidewalk per block New street paving Traffic calming Enhanced landscaping 	<ul style="list-style-type: none"> 2 sidewalks per block New street paving No traffic calming Conventional landscaping 	<ul style="list-style-type: none"> No street improvement Enhanced landscaping 	<ul style="list-style-type: none"> No street improvement Conventional landscaping 	<ul style="list-style-type: none"> 1 sidewalk per block New paving Enhanced landscaping
Stormwater management	<ul style="list-style-type: none"> Higher protection for aquatic biota More closely mimics natural hydrology Bio-remediate pollutants 	<ul style="list-style-type: none"> Flood protection focus Water quality treatment 	<ul style="list-style-type: none"> Improved water quality treatment Some flood protection 	<ul style="list-style-type: none"> Flood protection focus Water quality treatment 	<ul style="list-style-type: none"> Higher water quality and aquatic biota protection Some flood protection
% impervious cover	35%	35%	35%	35%	35%
Cost per block (330 linear feet)	\$325,000	\$425,000	\$285,000	\$520,400	\$280,000

Based on case studies of the Seattle Public Utilities’ Street Edge Alternatives (SEA) Street project on 2nd Ave. NW and 110th Cascade Project in Seattle, Washington.

*2000-2003 dollars

Source: Adapted from Cost Analysis of Natural vs. Traditional Drainage Systems Meeting NDS Stormwater Goals (2004) in (PSAT, WSU, 2005, p.89).

Washington’s neighbors to the south are also finding ways to pair LID with CIP projects. The San Francisco Public Utilities Commission (SFPUC) expects to craft an evaluation process to review capital improvement projects for flood mitigation to determine the feasibility of LID approaches as part of its 5-year CIP program (SFPUC, 2007). Portland, Oregon has taken an even more comprehensive approach to LID by adopting a “Green Streets Policy” in April, 2007 that “directs City Bureaus and agencies to cooperatively plan and implement Green Streets as an integral part of the City’s maintenance, installation, and improvement programs for its infrastructure located in the public right of way, and to integrate the Green Street Policy into the City’s Comprehensive Plan, Transportation System Plan, and Citywide Systems Plan” (City of Portland, Auditor’s Office, 2007) In passing this resolution, the Portland City Council recognized that “60 to 70 % of Portland stormwater is attributable to paved streets and runoff directed from private property and concentrated in the public right of way” and streets with LID elements are “an effective way to help manage stormwater volume and water quality”. Portland’s Green Streets Policy emphasizes the need for “identifying and evaluating opportunities to partner” to coordinate land use planning and capital improvement projects as well as to encourage cross-bureau collaboration in planning (City of Portland, Auditor’s Office, 2007).

In addition to the inclusion of LID in CIP projects, a number of cities in Washington, including Kirkland, have adopted ordinances and/or revised their comprehensive plans to promote and/or require LID in private development (City of Kirkland, 2007, see Appendix A) (PSAT, 2000). For example, the City of Issaquah revised its municipal code to allow “deviations from stormwater design standards to achieve ‘low impervious surface development.’” Issaquah’s municipal code also provides up to a 50 percent reduction in stormwater utility fees for a project that infiltrates 100 percent of its stormwater. Employing more of an encouragement approach, the cities of Lacey and Tumwater have adopted ordinances which promote voluntary preservation of 60-65 percent of natural habitat or forested areas in developments. In order to achieve goals of “zero effect drainage,” the City of Lacey will “grant administrative variances from traditional standards to achieve the ordinance’s goal,” including “constructing narrower roads without curb and gutter” and “using pervious paving systems.” Island County adopted a stormwater ordinance that permits developers to include LID in their projects using design standards based on *Low Impact Development Design Strategies—An Integrated Design Approach*, Prince Georges County, Maryland, 2000. While the City of Issaquah offers incentives for LID and Lacey and Tumwater encourage the voluntary inclusion of LID in projects, the City of Olympia *requires* LID in projects within a specific drainage basin. Some of Olympia’s LID regulations include tree protection and replacement requirements, impervious surface limits, minimum tree density requirements, allowances for increased sidewalk planter widths (up to 25’), and matching post-development stormwater discharge rates to pre-development discharge rates (PSAT, 2000).

The examples of LID incorporated both in CIP and in private development projects suggest that this approach to stormwater management is gaining greater acceptance and implementation. The next section provides more detail about a number of specific elements that comprise LID.

LID in commercial areas



Vine Street, Seattle (before)



Vine Street, Seattle • Cistern Steps (after)



Vine Street, Seattle • Cistern Steps (after)

LID in residential areas



Highpoint, Seattle (before)



Highpoint Redevelopment (Bioretention swales & porous pavement) (after)



Highpoint Redevelopment (Bioretention swales) (after)

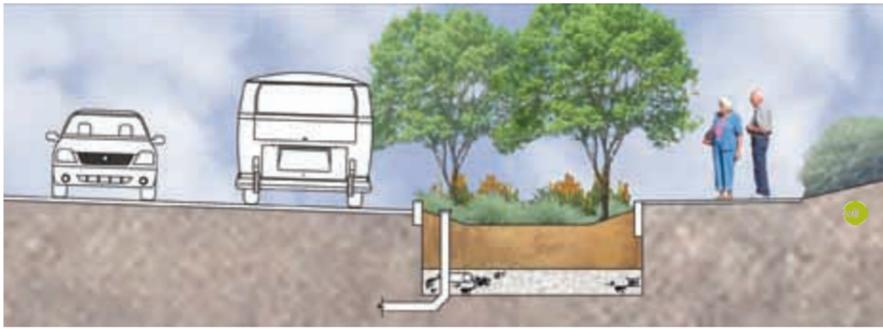
Bioretention and Bioinfiltration Facilities

Bioretention and bioinfiltration facilities commonly include swales, rain gardens, and planters. These facilities are vegetated conveyance or retention depressions that use soils and plants to improve water quality, reduce the runoff volume, and attenuate the peak runoff rate.

Bioretention and bioinfiltration swales perform similar functions as traditional grassed swales by serving as a conveyance structure and filtering and infiltrating runoff. However, the use of amended soils with bioretention media increases infiltration, water retention, nutrient and pollutant removal. (LID Center, Inc. 2005) In places within the Puget Sound basin where compacted, non-infiltrative native soils are often a problem, permeable materials such as gravel can be used to increase the retention capacity of the channel. Bioinfiltration swales work because they encourage infiltration into the existing landscape while also allowing the physical and chemical properties of the plants and soils to remove pollutants from the water that flows slowly, through them.



Bioretention Swale

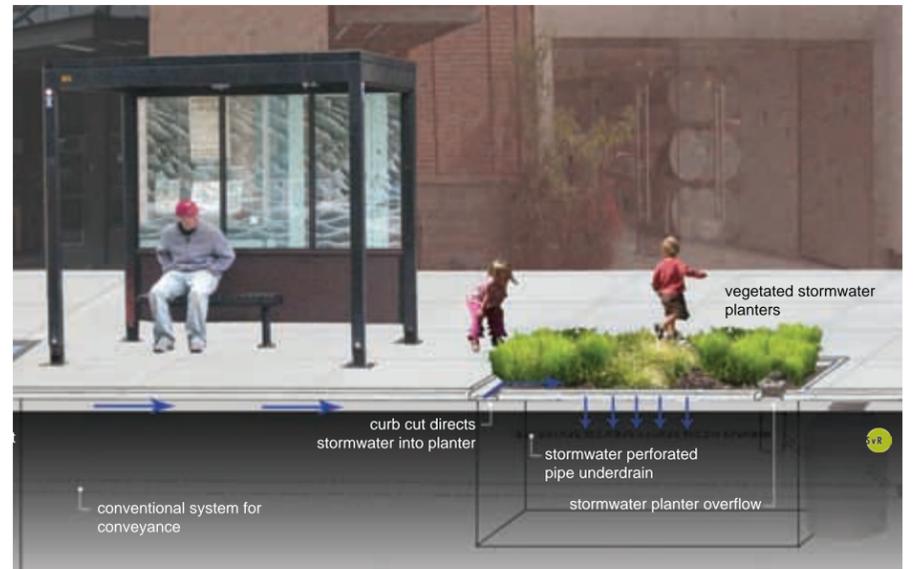


Rain garden

Rain gardens are depressions with amended soils and plants to soak up and retain water, and they typically have overflow control. Rain gardens provide water quality treatment and attenuate flows by filtering stormwater through both soil and vegetation and then allowing that water to infiltrate into the underlying subsoil. Properly constructed rain gardens attempt to replicate the ecosystem of an upland forest floor through the use of

specific shrubs, trees, groundcover, mulch, and soils. By intercepting, detaining, and infiltrating runoff, rain gardens reduce the energy of stormwater flows and reduce on-site erosion (Low Impact Development Center [LID], Inc. 2005).

Stormwater planter boxes are similar to rain gardens but usually are contained by small concrete walls along their perimeter with an open or closed bottom. Planter boxes have a more defined shape than rain gardens and are suitable for more confined urban settings. In general, planter boxes have minimal side slope, but function and are designed in a similar way to rain gardens. Planters typically have about one foot of ponding depth over three to five feet of amended soils, drought tolerant plants, and mulch. Stormwater planters can also be designed to overflow into the conveyance system. Stormwater planter boxes can be designed to meet regulatory requirements water quality treatment. Depending on the infiltration characteristics of native soils, stormwater planter boxes can also attenuate peak stormwater flows.



Stormwater Planter Box

A tree box filter is similar to a stormwater planter box, but includes a street tree or shrub. Tree box filters are primarily designed to provide water quality treatment.

Tree box filters function via a curb inlet that allows stormwater to enter, filter through amended soils, and then exits through an underdrain into the storm drain or infiltrates into the subsurface soils (LID Center, Inc., 2005).



Tree Box/Tree Pit Filter

Sizes for tree box filter range from four-foot-by-six-foot to ten-foot-by-twelve-foot and are sized to capture 91-percent total annual volume of rainfall. Tree box filters are designed to capture and filter stormwater from micro drainage areas, but many tree box filters can be distributed across a large drainage basin to effectively treat large volumes of stormwater. Detention or infiltration can be added below the tree box filters to meet flow control requirements.

Stormwater Flow Control and Attenuation

Bioretention swales, raingardens, and stormwater planters can reduce stormwater peak flows and volumes that enter a conventional conveyance system via subsurface storage in soil and gravel layers, absorption of stormwater by surrounding soils and/or the infiltration into subsoil (the layer below the topsoil). The possible reduction of stormwater volume is dependent on the available detention storage in the gravel layer and ponding area, the maximum flow rate into the subsoil, and the flow rate into the facility (related to storm intensity and drainage area) (LID Center, Inc., 2005). The cross-section of a bioretention swale can be sized to provide conveyance for any given storm, as required, though the more flat area there is at the bottom of a swale, the more pollutants are removed.

Water Quality Treatment

Studies suggest that LID strategies that include bioretention systems, which use plants to remove pollutants, can provide significant pollutant reductions for phosphorous, nitrogen, heavy metals, and hydrocarbons (i.e. oil and grease) as well as reduce stormwater volumes as outlined (PSAT, WSU, 2005, pps.85-88). Bioretention systems are effective in pollutant removal and flow reduction through processes of:

- Sedimentation—slowing water to allow settling of non-soluble particulates
- Filtration—straining of non-soluble particulates
- Adsorption—the binding of nutrients, metal, and organics to filter media particles
- Infiltration—downward movement of surface water to interstitial soil water which initiates adsorption
- Phytoremediation—extraction and absorption of metals, petroleum hydrocarbons, pesticides, chlorinated solvents, and surfactants (studies illustrate that vegetated soils are more effective at pollutant removal than non-vegetated soils).
- Plant resistance—plant materials reduce flow velocities
- Thermal attenuation—reduces water temperatures as storm flows move through subsurface soil layers, which is important for salmonid habitat

(PSAT, WSU, 2005, excerpts from pps. 85-86)

Table 2 provides a comparison of pollutant removal efficiency in conventional stormwater management systems versus LID approaches.

Table 2 Comparative pollutant removal capability of stormwater treatment practices (in percentages).

Stormwater Management System	Dry Extended Detention Pond (Conventional)	Wetlands (LID)	Water Quality Swales (LID)	Ditches (Conventional)
Pollutant				
TN (mg/L)	31	30	84	-9
NO3 (mg/L)	No data available (ND)	ND	ND	ND
P (mg/L)	20	49	34	-16
Cu (µg/L)	26	40	51	14
Pb (µg/L)	54	68	67	17
Zn (µg/L)	26	44	71	0

Source: Adapted from CWP, 2000b (removal percentages are for total metals) in (PSAT, WSU, 2005, p.87)

Note: The negative numbers for Total Nitrogen (TN) and Phosphorous (P) in the Ditches column of Table 2 are possibly due to biological processes occurring in the ditch. These processes may actually be contributing to a net increase of TN and P rather than the decrease seen in the other LID elements described in the table.

Bioretention swales, raingardens, and stormwater planters that capture a stormwater volume equal to 0.5" of runoff from an impervious area (or the water quality volume) have a 50 percent phosphorous removal efficiency. This phosphorous removal efficiency increases to 65 percent for bioretention and biofiltration facilities that capture a stormwater volume equal to 1.0" of runoff from an impervious area, providing significant reductions in phosphorous loading (LID Center, Inc., 2005).

Bioretention swales, raingardens, stormwater planters, and tree box filters can be used in commercial, residential, and industrial areas, but should not be located in areas of high sediment loads or where the site is not entirely stabilized (LID Center, Inc., 2005). They can be used in conjunction with other LID elements that filter or capture sediment.

Maintenance Needs & Costs

To ensure hydraulic efficiency of the bioretention and bioinfiltration facilities, the health and effectiveness of soil and plants, periodic inspection and maintenance to remove trash, debris, and collected sediment is required. In the event of an extreme drought, trees and shrubs may need to be watered in a similar manner as other landscaping.

Porous or Permeable Pavement

Porous/permeable pavement provides a hard surface for walking and driving, but also allows for water to flow through the pavement section due to the incorporation of void spaces within the paving system. One method is to use an open graded asphalt or concrete with reduced fines and a special binder that allows for the rapid flow of water. Water is able to pass through the pavement by flowing through voids between the aggregate. Another way to construct a permeable paving surface is to use paver blocks. The paver blocks themselves are not permeable, but are installed with gaps between the pavers to allow stormwater to percolate into the subsurface.

Porous paving must be thought of as a system of horizontal layers to effectively control and detain stormwater. Beneath the porous paving material, a sub-base composed of a layer of fine aggregate above a layer of larger aggregate both reduces runoff volume and peak discharge as well as provides water quality benefits. Stormwater, which passes through the sub-base filters out the suspended solids. Some studies suggest that total phosphorous and nitrogen removal for porous pavements is estimated at 62% and 88% respectively (LID Center, Inc., 2005).

Location

Permeable pavements are suitable for a variety of locations with light traffic loading such as residential streets, parking lots, driveways, and walkways. Permeable pavement is not appropriate for roadways with high and heavy traffic loading, except potentially on shoulders.

Maintenance Needs & Costs

In order to prevent clogging by fine sediment particles, it may be necessary to vacuum the pavement up to four times per year depending on localized sediment loads. Porous and permeable pavements and pavers should not be pressure-washed as this may force particles deeper into the pavement material (LID Center, Inc., 2005).



Porous Pavement (left) & Standard Pavement (right)



Porous Pavement Sidewalk



Pavers (with permeable gaps)



Porous Pavement Bike Lanes
Olympia, Washington



As part of the evaluation process, a matrix comparing LID benefits and opportunities was created to summarize each project. This matrix is meant to be used as a tool for Kirkland to compare the various projects considering not only the stormwater benefits but additional benefits associated that can result from incorporating LID elements into the right-of-way. The following matrix is broken into six sections:

- CIP Info – This section lists the general CIP project information including what the drainage basin where the project is located.
- LID Approach – This column lists the proposed LID elements.
- Low Impact Development (LID) Criteria – Stormwater function, demonstration potential, capital cost, and baseline maintenance efforts were scored high (value of 3), moderate (value of 2), or low (value of 1). This rating system was used to quantify the incorporation of LID. The range for the cumulative scoring in the last column is as follows: High 12-11, Moderate 10-8, and Low 7-4.
- Other Benefits from Proposed LID Elements – Additional benefits of LID elements include ecological function, habitat and human health, and ecological connectivity. In addition, the projects were evaluated for how they aligned with the Kirkland Comprehensive Plan Framework Goals and encourage interagency collaboration. Finally, the proposed elements were evaluated for the promotion of carbon neutral patterns including increase of pedestrian and bicycle facilities as opposed to increased street width for vehicular traffic. These benefits were also scored as either high (value of 3), moderate (value of 2), or low (value of 1). The range for the cumulative scoring in the last column is as follows: High 21-18, Moderate 17-14, and Low 13-7.
- Cumulative Priority Valuation – This column totals the cumulative valuation score for the Cumulative LID Valuation Score and the Cumulative Benefit Valuation Score. The range for the scoring is as follows: High 33-28, Moderate 27-21, and Low 20-11
- Collaboration Opportunities – These columns indicate the potential for Kirkland to engage the community, other agencies, and organizations through the design and even the maintenance of the proposed LID elements.

The results of the evaluation matrix should be used in conjunction with the following conceptual cross sections and images of how LID elements could be incorporated within the right-of-way. In addition, a map indicating the geographical context of the project and where it is in relation to nearby waterbodies, schools, and parks.

Kirkland Low Impact Development Feasibility Study for Capital Improvement Program Transportation Projects - Matrix

LEGEND
for Matrix
Score

	High
	Moderate
	Low

CIP Info				LID Approach	Low Impact Development (LID) Criteria					Other Benefits from Proposed LID Elements							Cumulative Priority Valuation	Collaboration Opportunities		
CIP Location (CIP Project Number)	% Funded	CIP w/ ROW acquisition	Stormwater Basin Information	Proposed LID Elements	LID Stormwater Function Flow Control or Treatment Compared to CIP (High = 3, Low = 1)	LID demonstration potential (High = 3, Low = 1)	LID Element Capital Cost - Compared to "Conventional" Stormwater Management (Low Cost = 3, High Cost = 1)	Baseline LID Maintenance needs/costs (Low Cost = 3, High Cost = 1)	Cumulative LID Valuation Score (High = 12-11, Moderate = 10-8, Low = 7-4)	Ecological: stream, wetland, and/or tree canopy (High = 3, Low = 1)	Habitat and Human health (High = 3, Low = 1)	Ecological Connectivity (High = 3, Low = 1)	Other benefits (High = 3, Low = 1)	Comprehensive Plan Framework Goal (FG) Alignments High = 3, Low = 1 (See Appendix B)	Encourages Inter-agency Collaboration (High = 3, Low = 1)	Promotes System wide Carbon-neutral Patterns (High = 3, Low = 1)	Cumulative Benefit Valuation Score (High = 21-18, Moderate = 17-14, Low = 13-7)	Total LID and Benefits Valuation Score (High = 33-28, Moderate = 27-21, Low = 20-11)	Possibility of pairing with future redevelopment of adjacent site(s)	Possible Public and Private Maintenance Partnerships
116 th Ave. - NE 40 th St to NE 60 th St. (0001000)	83%	No	Yarrow Creek (Preliminary report for stormwater management requirements being prepared by Pertee)	Swales, Porous Pavement for Multi-use trail, Reduction of Current Lane Widths	High (3) Reduction of impervious surface versus original CIP strategy, Improved water quality treatment within Sensitive Areas	High (3) LID adjacent to Sensitive areas: Yarrow Creek; Function of LID along a Multi-modal use corridor; Visible to other adjacent property owners: City of Bellevue, State Parks, WSDOT	Low Cost (3) A reduction of new impervious surfaces could reduce or eliminate detention and/or treatment structures	Moderate (2) Increased in some areas due to proximity of Yarrow Creek	11	High (3) Reduces pollutants and peak flows to Yarrow Creek	High (3) Improve downstream surface water quality	High (3) Stream restoration/ invasive plant removal; improve access to Bridle Trails State Park for equestrians and other users	High (3) Traffic calming via road diet and delineated separation for users	High (3) FG-1, FG-2, FG-5, FG-7, FG-9, FG-10, FG-11, FG-13	Moderate (2) Project may engage Kirkland Planning + Public Works. Possibly Kirkland + WSDOT or WA State Parks	Moderate (2) This project encourages alternative transportation, while using local resources to manage stormwater.	19	30	No	Bridle Trails State Park, Local Equestrian Association, and WSDOT
NE 100 th St. (0034000)	100%	No	100th - Moss Bay 116th Ave NE - Forbes Creek (Stream Protection Flow Control)	Rain gardens, Swales, Porous Sidewalks, Reduction of Impervious Surface	Moderate (2) Reduction of impervious surfaces	Moderate (2) Function of porous pavements	Low Cost (3) Difference in cost of concrete vs. porous concrete is not significant.	Low Cost (3)	10	Low (1) This is an opportunity for a demonstration project	High (3) Improve downstream surface water quality	Low (1)	Moderate (2) LID feature is visible to cyclists and pedestrians crossing over 405 completing a bicycle connection	High (3) FG-1, FG-2, FG-3, FG-5, FG-7, FG-9, FG-10, FG-11, FG-13	Moderate (2) Project may engage Kirkland Planning + Public Works	Moderate (2) This project encourages alternative transportation, while using local resources to manage stormwater.	12	22	No	Adjacent homeowners and surrounding community
116 th Ave. NE - NE 94 th St. to NE 100 th St. (0044000)	100%	No	100th - Moss Bay 116th Ave NE - Forbes Creek (Stream Protection Flow Control) Soils may have a high infiltration rate	Swale at NE 95th St, Rain gardens, Tree pits, Porous Sidewalks, Reduction of Pervious Surface	High (3) Water quality treatment	Moderate (2) Function of bioretention swale and rain gardens along a roadway	Low Cost (3) Existing ditch will have to be regraded and enhanced with amended soils and vegetation	Low Cost (3)	11	High (3) Removal of pollutants from street runoff into storm drainage system	High (3) Improve downstream surface water quality	Moderate (2) maintaining existing vegetated ditch network	Moderate (2) LID feature is visible to cyclists and pedestrians crossing over 405 completing a bicycle connection	High (3) FG-1, FG-2, FG-3, FG-5, FG-7, FG-9, FG-10, FG-11, FG-13	Moderate (2) Project may engage Kirkland Planning + Public Works	Moderate (2) This project encourages alternative transportation, while using local resources to manage stormwater.	17	28	No	Adjacent homeowners and surrounding community
13 th Ave. (0054000)	100%	No	Moss Bay	Porous Sidewalk through Van Aalst Park	High (3) Reduction of impervious surface	Moderate (2) Function of porous pavements	Low Cost (3) Difference in cost of concrete vs. porous concrete is not significant. No curb will have to be replaced	Low Cost (3)	11	Moderate (2) nearby wetlands; stream on southern edge of park	Low (1)	Moderate (2)	High (3) Opportunity to educate park visitors	High (3) FG-1, FG-2, FG-3, FG-5, FG-7, FG-9, FG-10, FG-11, FG-13	High (3) Project may engage Kirkland Planning, Public Works and Parks	Moderate (2) This project encourages alternative transportation, while using local resources to manage stormwater.	16	27	No	Parks & Recreation Department; Local community
122 nd Ave. NE (0055000)	100%	No	70th to 73rd - Moss Bay 73rd to 80th - Forbes Creek	Swales, Rain gardens, Porous Sidewalk	High (3) Improve function of existing swales and porous pavements while maintaining pedestrian safety	High (3) Function of LID in front of school and homes	Low Cost (3) Difference in cost of concrete vs. porous concrete is not significant. Swales may have to be regraded and enhanced with amended soils and vegetation	Low Cost (3)	12	High (3) Reduce drainage to Forbes Creek	High (3) Improve downstream surface water quality	Moderate (2) maintaining existing vegetated ditch network	High (3) Opportunity to combine function with education at the high school. Use public art to bridge between the school, neighborhood and LID project	High (3) FG-1, FG-2, FG-3, FG-5, FG-7, FG-9, FG-10, FG-11, FG-13	Moderate (2) Project may engage Kirkland Planning + Public Works, possibly include cooperation between Kirkland and Lake Washington High School	Moderate (2) This project encourages alternative transportation, while using local resources to manage stormwater.	18	30	Yes: Washington High School is planning to re-build on-site in near future	Iraq Veterans group, Earth Corps, & Lake Washington High School

Kirkland Low Impact Development Feasibility Study for Capital Improvement Program Transportation Projects - Matrix

LEGEND
for Matrix
Score

High
Moderate
Low

CIP Info				LID Approach	Low Impact Development (LID) Criteria					Other Benefits from Proposed LID Elements							Cumulative Priority Valuation	Collaboration Opportunities		
CIP Location (CIP Project Number)	% Funded	CIP w/ ROW acquisition	Stormwater Basin Information	Proposed LID Elements	LID Stormwater Function Flow Control or Treatment Compared to CIP (High = 3, Low =1)	LID demonstration potential (High = 3, Low =1)	LID Element Capital Cost - Compared to "Conventional" Stormwater Management (Low Cost = 3, High Cost =1)	Baseline LID Maintenance needs/costs (Low Cost =3, High Cost = 1)	Cumulative LID Valuation Score High = 12-11 Moderate = 10-8 Low = 7-4	Ecological: stream, wetland, and/or tree canopy (High = 3, Low =1)	Habitat and Human health (High = 3, Low =1)	Ecological Connectivity (High = 3, Low =1)	Other benefits (High = 3, Low =1)	Comprehensive Plan Framework Goal (FG) Alignments High = 3 Low =1 (See Appendix B)	Encourages Inter-agency Collaboration (High = 3, Low =1)	Promotes System wide Carbon-neutral Patterns (High = 3, Low =1)	Cumulative Benefit Valuation Score High = 21-18 Moderate = 17-14 Low = 13-7	Total LID and Benefits Valuation Score High = 33-28 Moderate = 27-21 Low = 20-11	Possibility of pairing with future redevelopment of adjacent site's)	Possible Public and Private Maintenance Partnerships
6th St. (0059000)	100%	No	Moss Bay	Porous Sidewalk and Rain garden in Pocket Park, Reduction of Impervious Surface	Moderate (2)	Moderate (2)	Low Cost (3)	Low Cost (3)	10	High (3)	Low (1)	High (3)	High (3)	High (3) FG-1, FG-2, FG-3, FG-5, FG-7, FG-9, FG-10, FG-11, FG-13	High (3) Project may engage Kirkland Planning + Public Works + Parks	High (3) This project reduces automotive lane width and promotes alternative transportation, while using local resources to manage stormwater.	19	29	Yes: New residential redevelopment along 6th Ave. just north of proposed CIP project	Adjacent homeowners and surrounding community
99th Pl. NE & 100th Ave. (0060000)	100%	No	South Slope Juanita Direct Discharge to Lake Washington	Swales, Stormwater Planters and/or Rain gardens, Porous Pavements, Reduction of Impervious Surface	High (3)	High (3)	Moderate (2)	Moderate (2)	10	High (3)	High (3)	High (3)	High (3)	High (3) FG-1, FG-2, FG-3, FG-5, FG-7, FG-8, FG-9, FG-10, FG-11, FG-13	Moderate (2) Project may engage Kirkland Planning + Public Works	High (3) This project reduces automotive lane width and promotes alternative transportation, while using local resources to manage stormwater.	20	30	Yes: Condos are being built on Shumway property; other indications of future redevelopment	Adjacent homeowners and surrounding community
Central Way (0065000)	100%	No	Moss Bay - Direct Discharge to Lake Washington	Stormwater planters within "Bump-outs", Porous Pavements, Reduction of Impervious Surface	Low (1)	High (3)	Moderate (2)	High (1) due to visibility of the site; some maintenance may be conducted by adjacent business owners	7	Low (1) this is more of a demonstration project	High (3)	Low (1)	High (3)	High (3) FG-1, FG-2, FG-3, FG-4, FG-5, FG-7, FG-8, FG-9, FG-10, FG-11, FG-13	High (3) Project may engage Kirkland Planning, Public Works and Parks	High (3) This project reduces automotive lane width and promotes alternative transportation, while using local resources to manage stormwater.	17	24	Yes: Lake Shore Plaza Mall may be redeveloped	Kirkland Downtown Association
120th Ave. NE (0063000)	100%	Yes (\$5,483,400 in budget)	Juanita Creek Basin	Swales within area that drains directly to Juanita Creek (132nd to Creek)	Moderate (2)	High (3)	High (1)	High (1) Due to proximity of Juanita Creek	7	High (3)	High (3)	High (3)	Low (1)	Moderate (2) FG-1, FG-2, FG-4, FG-5, FG-7, FG-13	Moderate (2) Project may engage Kirkland Planning + Public Works, Kirkland + WA Dept of Fish and Wildlife	Low (1) Despite the application of LID elements, this project prioritizes increasing automobile capacity	15	22	Yes: New transit center at NE 78th; Planned "urban center" for area; zoning changing to Office/Multi-family	Evergreen Hospital Medical Center and adjacent businesses
Park Lane (0064000)	5%	No	Moss Bay - Direct Discharge to Lake Washington	Stormwater Planters and/or Rain gardens with Porous Pavements, Reduction of Impervious Surface	Moderate (2)	High (3)	High (1)	High (1) Due to visibility of the site; some maintenance may be conducted by adjacent business owners	7	High (3) A LID approach could potentially save much of the existing canopy cover by providing more water access to tree roots will improve tree health	Low (1)	Moderate (2)	High (3)	High (3) FG-1, FG-2, FG-3, FG-4, FG-5, FG-7, FG-8, FG-9, FG-10, FG-11, FG-13	High (3) Project may engage Kirkland Planning, Public Works and Parks	High (3) This project reduces automotive lane width and promotes alternative transportation, while using local resources to manage stormwater.	18	25	Yes: New transit center will be located on 3rd St. & Park Lane, Antique Mall site in next five years, and remote possibility of corner Lake St. & Central Way in distant future	Kirkland Downtown Association



116th Ave. NE (NE 60th St. - Kirkland City Limits) (CIP Project #: NM 0001 000)

CIP Project Description

Install Bike & Pedestrian facilities on the 116th Ave. NE corridor between NE 60th Street and Bellevue city limits.

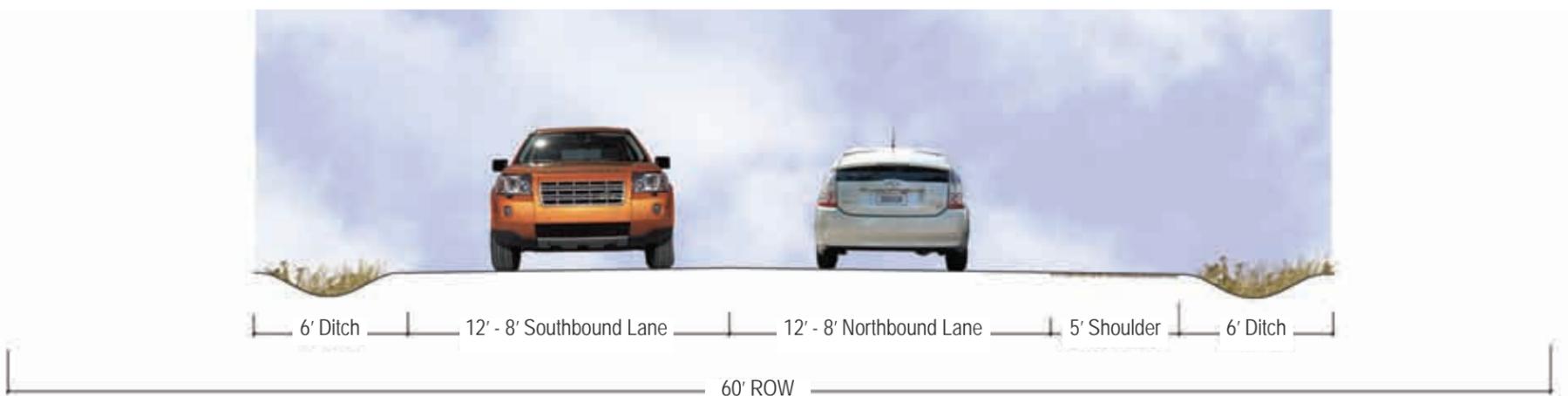
LID Opportunities and Benefits

- Bioretention swales can treat runoff from roadway prior to directly discharging to Yarrow Creek.
- Porous pavements for the bike lane on the west side and the sidewalk on the east side will reduce new impervious surfaces.
- Narrow the width of the proposed equestrian trail will reduce new impervious surfaces.

Bioretention swales can provide flow control and water quality treatment of roadway runoff required for Yarrow Creek and the associated wetlands. While the planned bike lane on the west side of the street will improve bicyclist safety, the use of porous pavement for the bike lane will provide some water quality treatment and attenuation of runoff from the roadway. Working with the equestrian community, Kirkland may be able to install a permeable trail surface that is safe for horses and better for Yarrow Creek. If one is not available, a narrow trail with areas for the horses to pass each other will reduce the impervious surface required within the right-of-way. Using the existing paving in a more efficient way, Kirkland can achieve all of the city's goals on this complex project.

General existing conditions & considerations

- Active equestrian community that wants safe access for horses and riders to Bridle Trails State Park.
- Existing bicycle network from Bellevue ends at city limits.
- Travel lanes are wider (12.5') along corridor than Kirkland's standard (lane widths begin at 11' and increase depending on conditions and traffic demand).
- Impervious surfaces impact adjacent Yarrow Creek and wetlands.



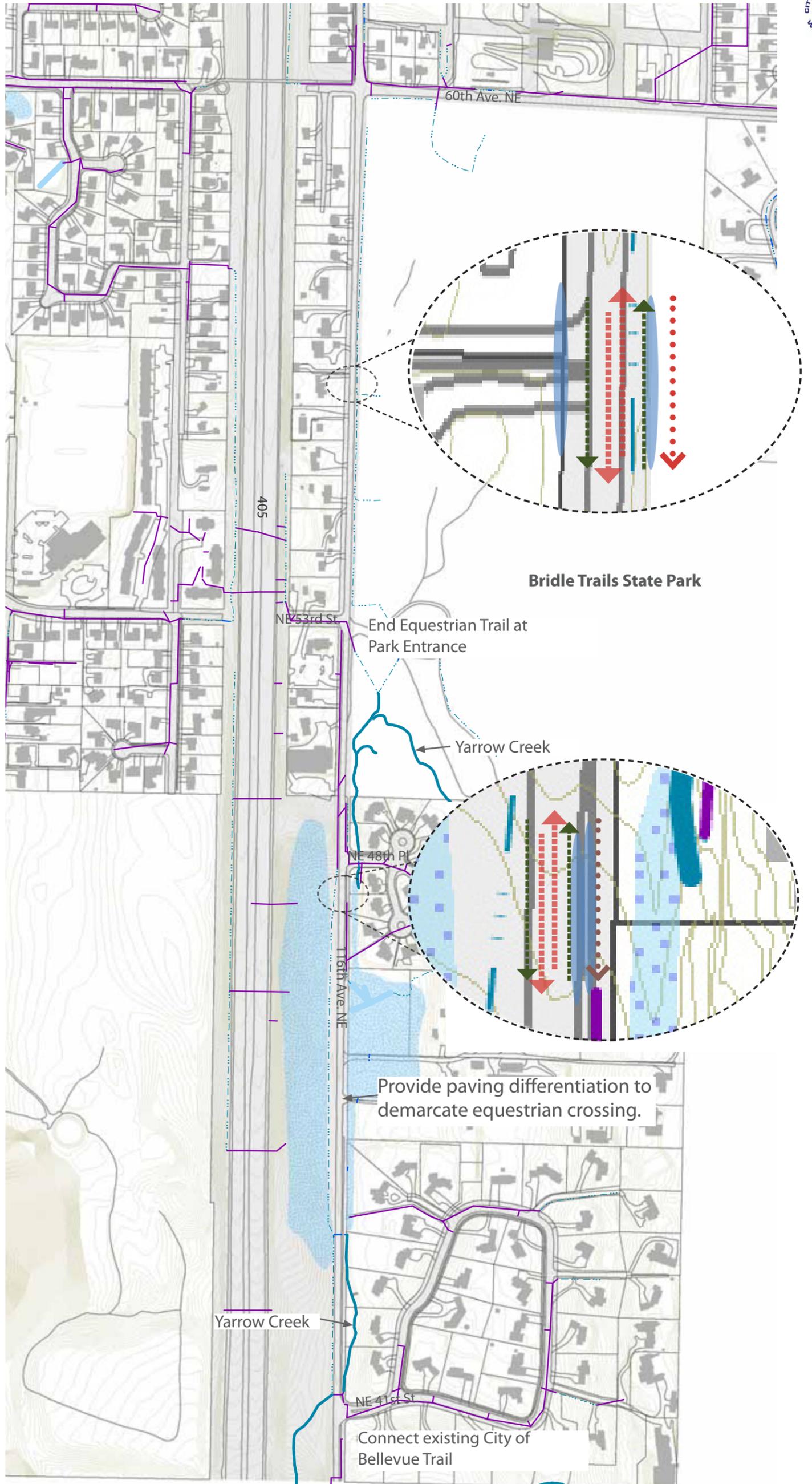
116th Avenue NE looking north at NE 41st Street - existing

Proposed concept

- Bioretention swales on both east and west sides
- Reduction of existing travel lanes width to 10' or 11' on each side
- Create a 5' climbing bike lane from existing paved shoulder on east side
- Create a 5' bike lane with porous pavement on west side
- Equestrian trail ranging from 3' to 8' in width on east side from city limits to Bridle Trails State Park entrance.

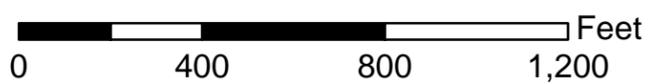


116th Avenue NE looking north at NE 41st St. - proposed



Legend

- Bicycle Circulation
- Equestrian & Pedestrian Circulation
- Pedestrian Circulation
- Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- Culvert
- Ditch
- Wetland
- Bioretention swale
- Rain garden



NE 100th St. (CIP Project #: NM 0034 000)

CIP Project Description

Install ~620 ft. of sidewalk along the north side of 100th St. between 116th Ave. NE and 120 ft. west of 114th Ave. NE. Project will consist of concrete curb, gutter, and planter strip with street trees

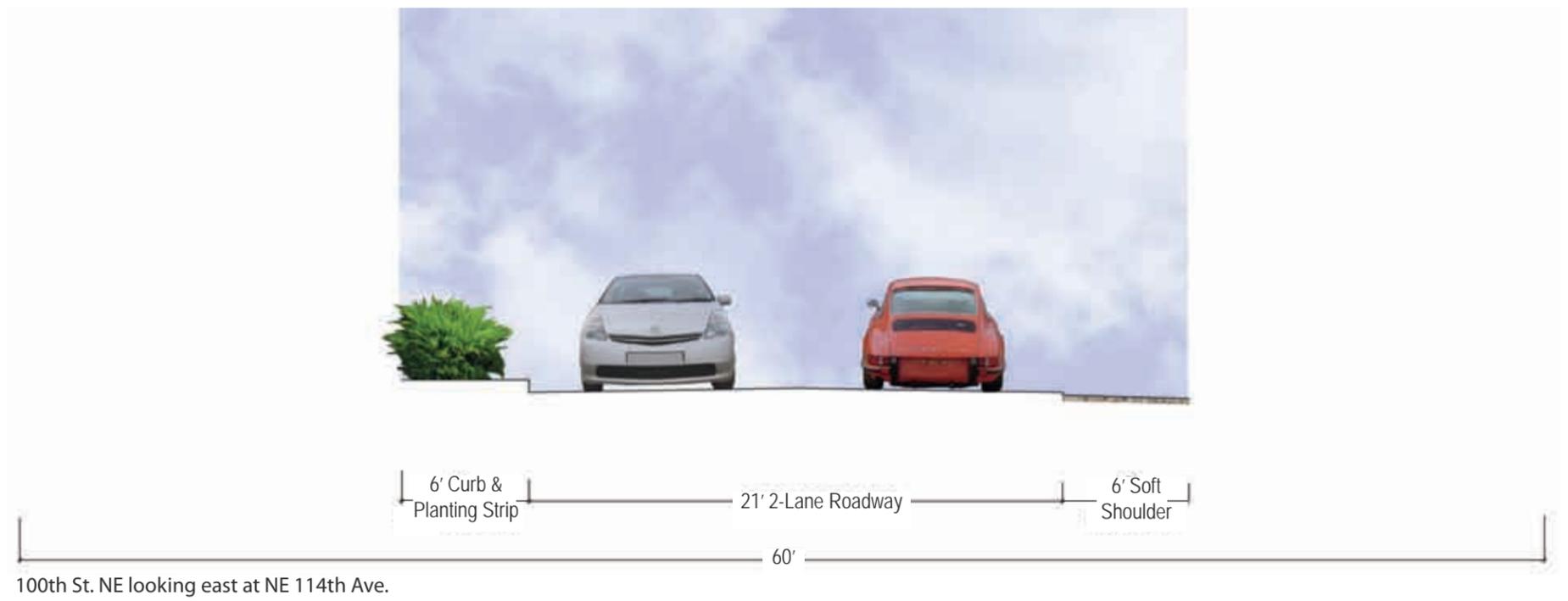
LID Opportunities and Benefits

- Installing porous pavement sidewalks will reduce the runoff from the shoulders.
- Rain gardens and bioretention swales can provide stormwater treatment from the north side the roadway.

Installing porous sidewalks and bioretention swales or raingardens will reduce the existing impervious areas of the shoulder. In addition to the bioretention swales and rain gardens between the sidewalk and the roadway providing water quality treatment and some flow attenuation, there will be a vegetated horizontal buffer between the pedestrians and the roadway. As a high point with territorial views, the site is extremely photogenic and as such, could compellingly extend Kirkland's "brand" as a green city. The site is often used by pedestrians and bicyclists and would benefit from a complete street approach that accommodates all of these user groups.

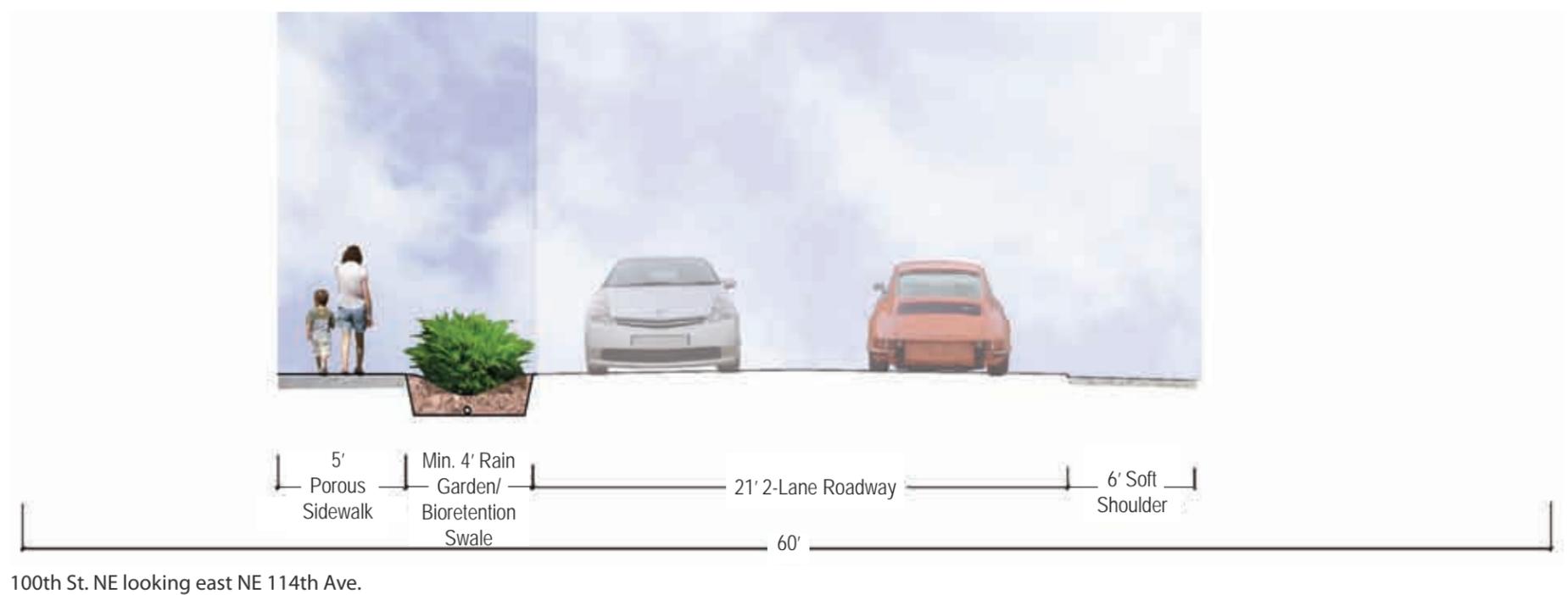
General existing conditions & considerations

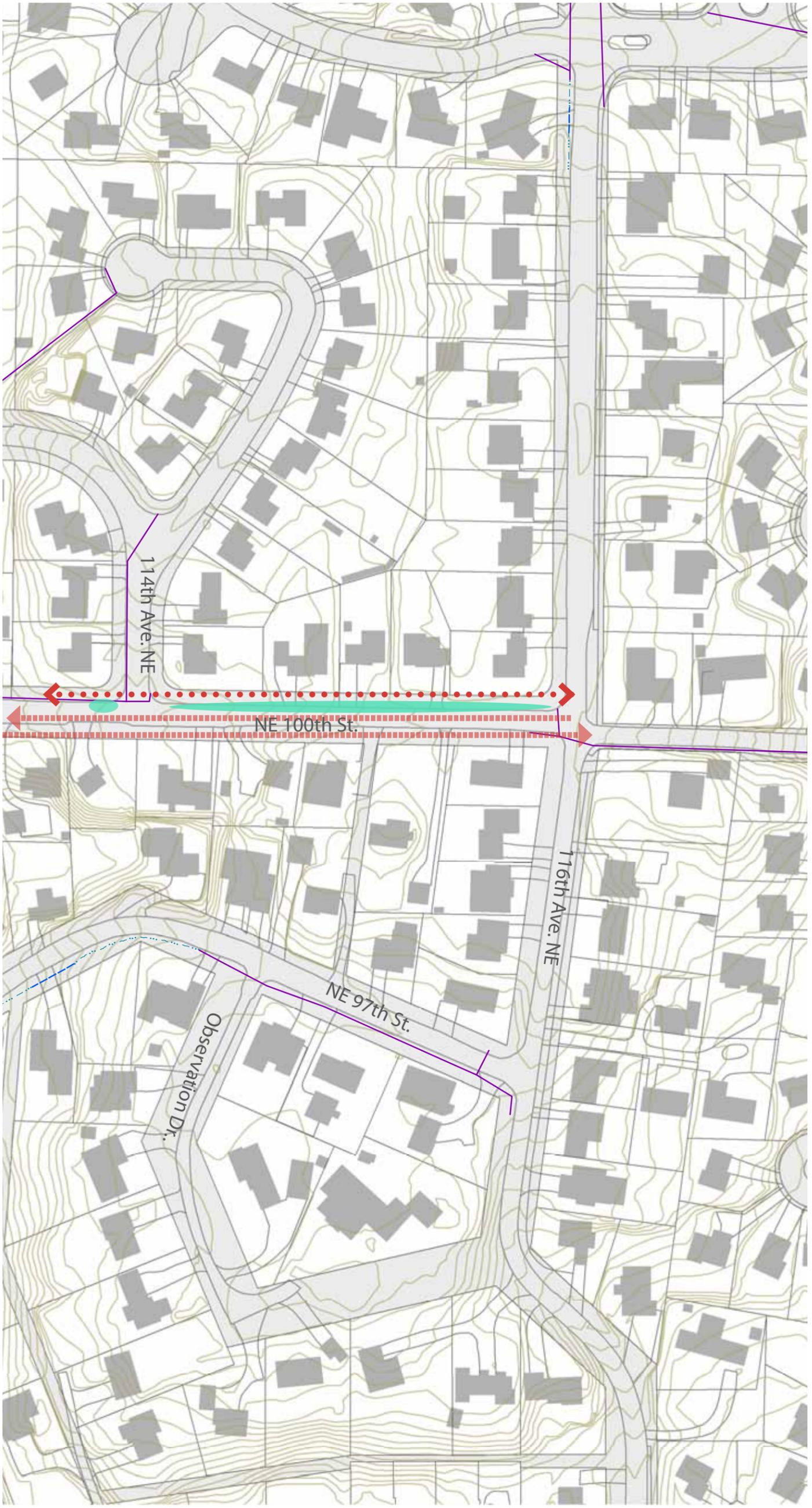
- No sidewalk on either north or south side of street
- In some locations the slope will be a LID design driver, e.g. slope 4.6% just east of 114th St. NE
- There is currently encroachment in the ROW (residential landscaping and fences)



Proposed concept

- Porous pavement sidewalks on north side of NE 100th St.
- Rain garden/bioretention swales within planting strip





Legend

- Pedestrian Circulation
- Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- Culvert
- Ditch
- Wetland
- Bioretention swales/Rain gardens



116th Ave. NE (NE 100th St. - NE 94th Pl.) (CIP Project #: NM 0044 000)

CIP Project Description

Install ~1,900 ft. of concrete curb, gutter, sidewalk, and street trees along east side of 116th Ave. NE from the existing sidewalk north of NE 100th St. to NE 94th St.

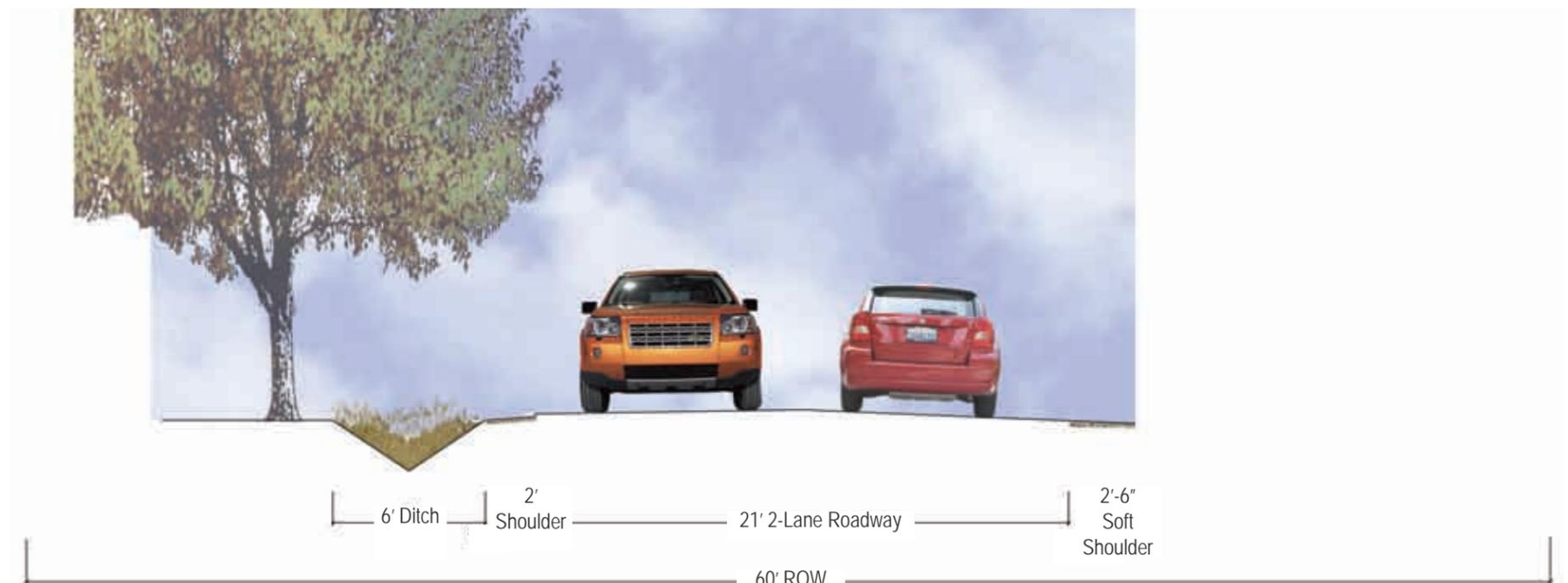
LID Opportunities and Benefits

- Installing porous pavement sidewalks will reduce the runoff from the shoulders.
- Rain gardens and bioretention swales can provide flow attenuation and stormwater treatment of roadway runoff.

Soil and plant treatments in bioretention swales and rain gardens can provide flow attenuation and water quality treatment to meet Forbes Creek Basin requirements for Stream Protection Flow Control. Porous pavement sidewalks will improve pedestrian safety and provide information about stormwater management particularly for children en route to Peter Kirk Elementary School.

General existing conditions & considerations

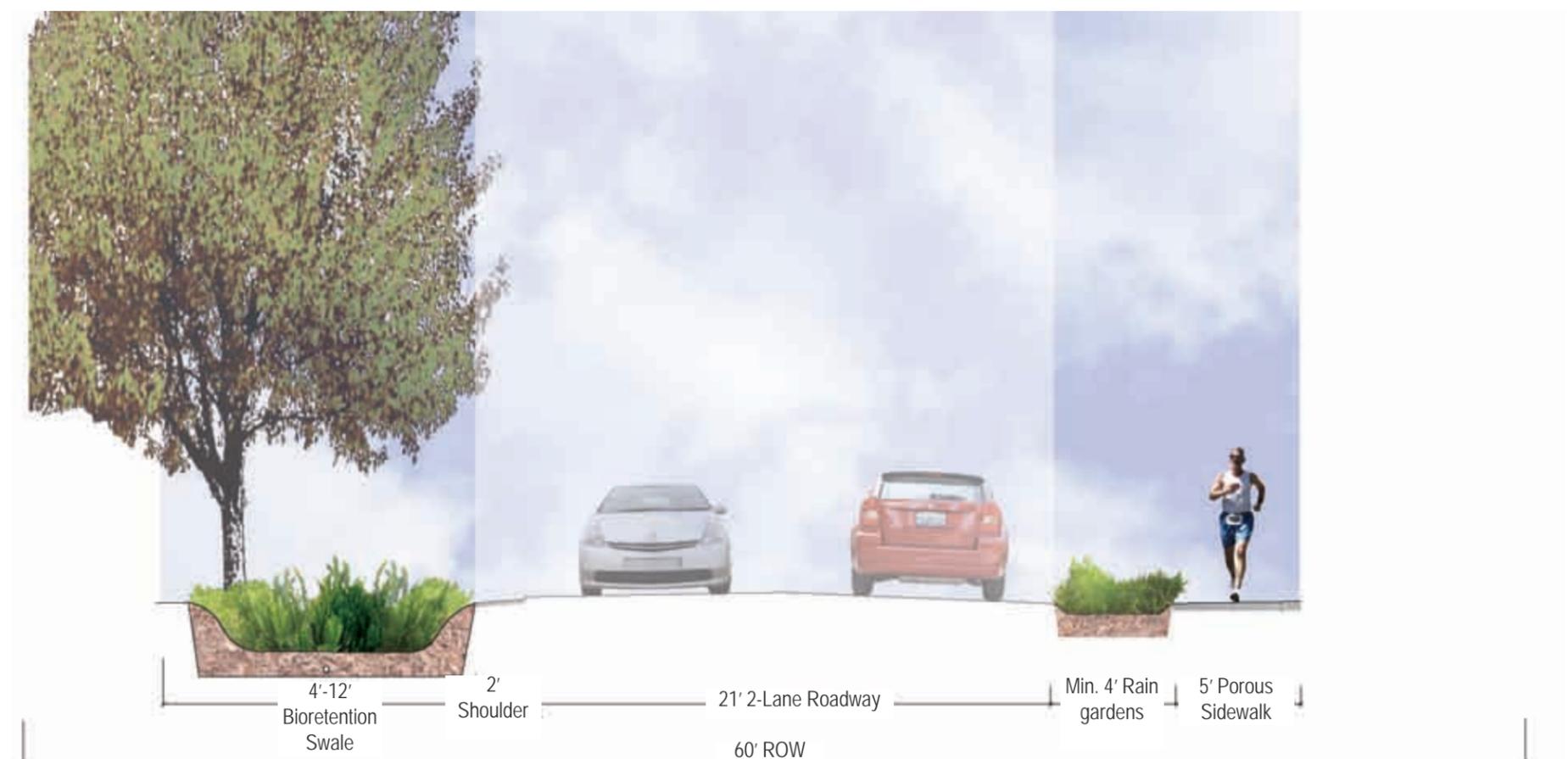
- No sidewalk on either east or west side of street
- Designated walk route to Peter Kirk Elementary School
- Steep slopes between NE 97th Lane and NE 95th St
- Ditch at 116th Ave. NE and NE 95th St.



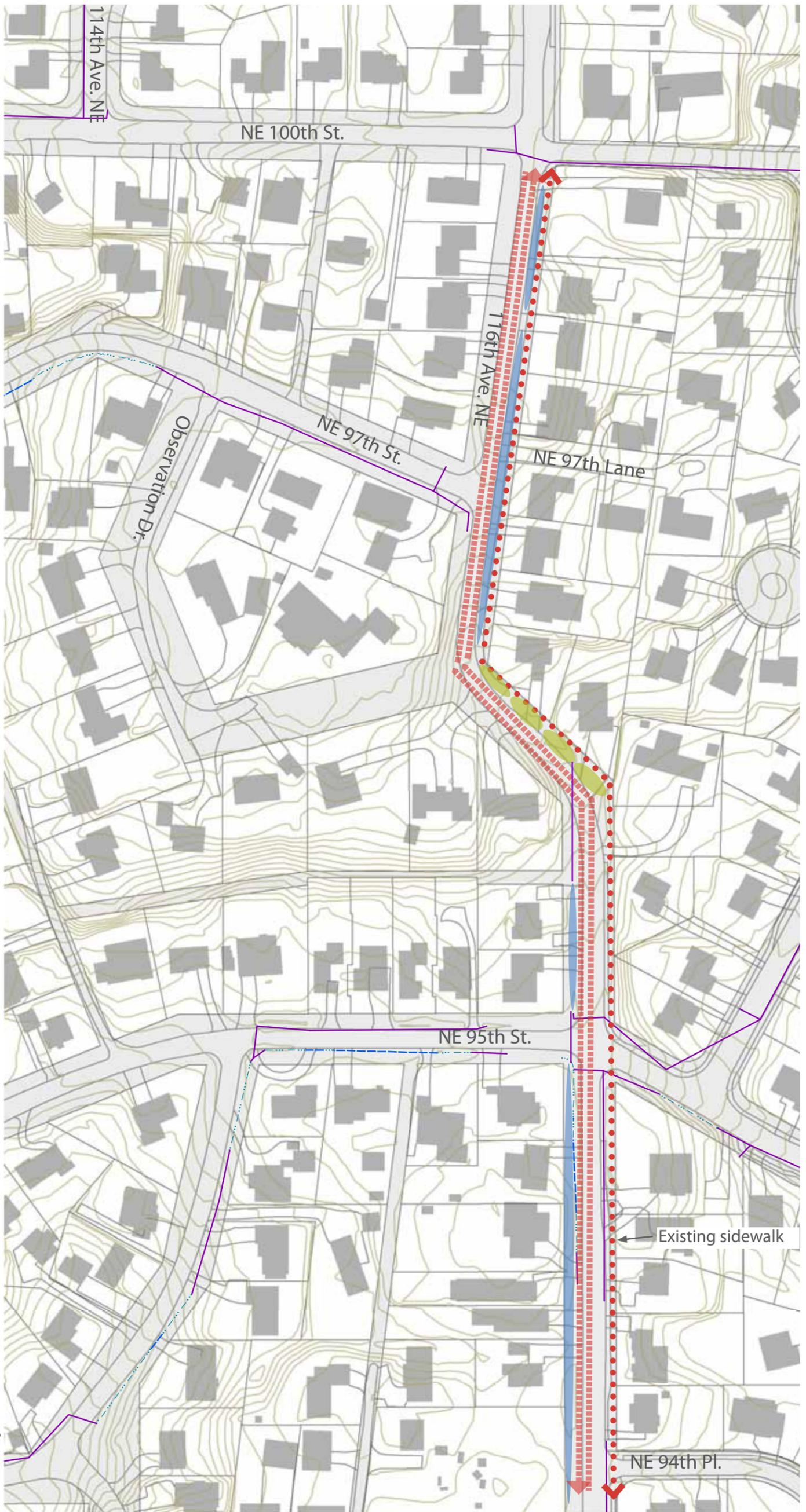
116th Ave. NE looking north at NE 95th St. - existing

Proposed concept

- Porous pavement sidewalks on east side
- Rain gardens on some parts of east side (overflow to bioswale below)
- Bioretention swale on west side beginning at NE 95th St. and extending to the north ~150-250'

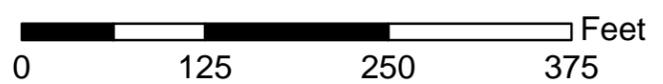


116th Ave. NE looking north at NE 95th St. - proposed



Legend

- Pedestrian Circulation
- Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- Culvert
- Ditch
- Wetland
- Bioretention swale
- Rain garden or Stormwater Planter



13th Ave. (CIP Project #: NM 0054 000)

CIP Project Description

Install ~815 ft. of concrete sidewalk on the south side of 13th Ave. between 3rd St. and 4th St. (Van Aalst Park). Project will also include concrete curb and gutter.

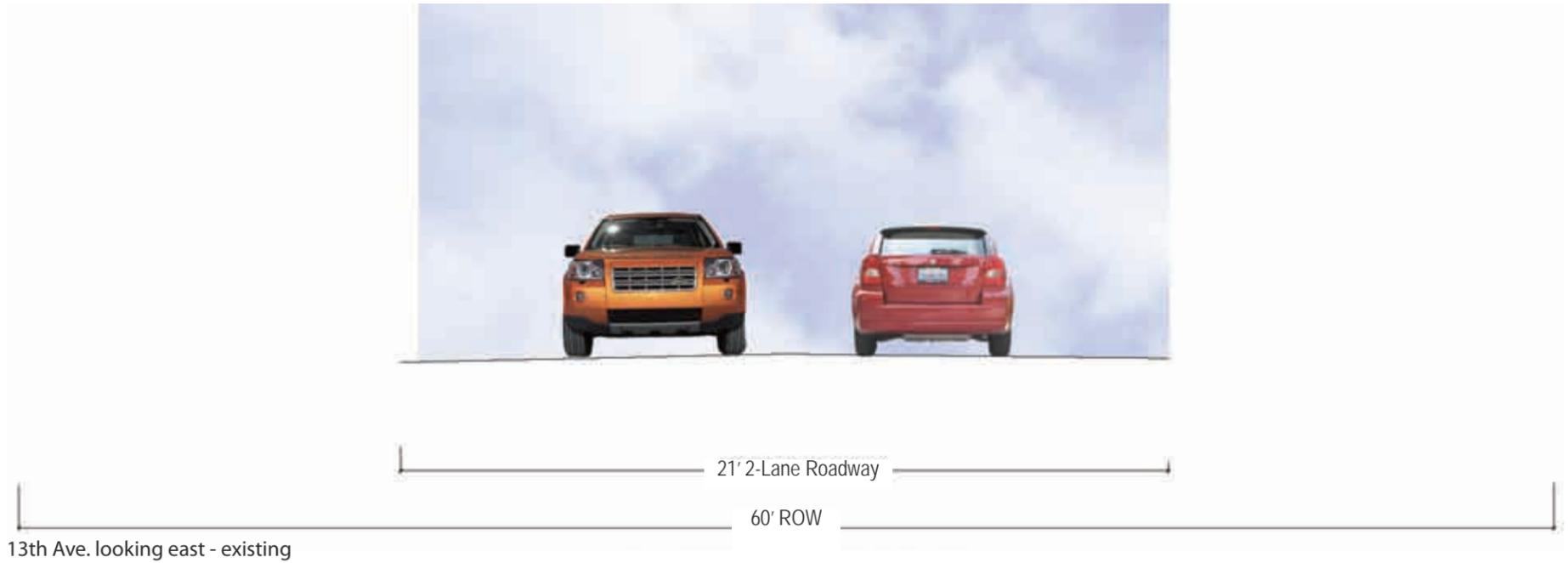
LID Opportunities and Benefits

- Installing porous pavements will reduce the amount of new impervious surface.

While the planned sidewalks will improve pedestrian safety, particularly for children en route to Van Aalst Park, using porous pavement will reduce runoff from the right-of-way.

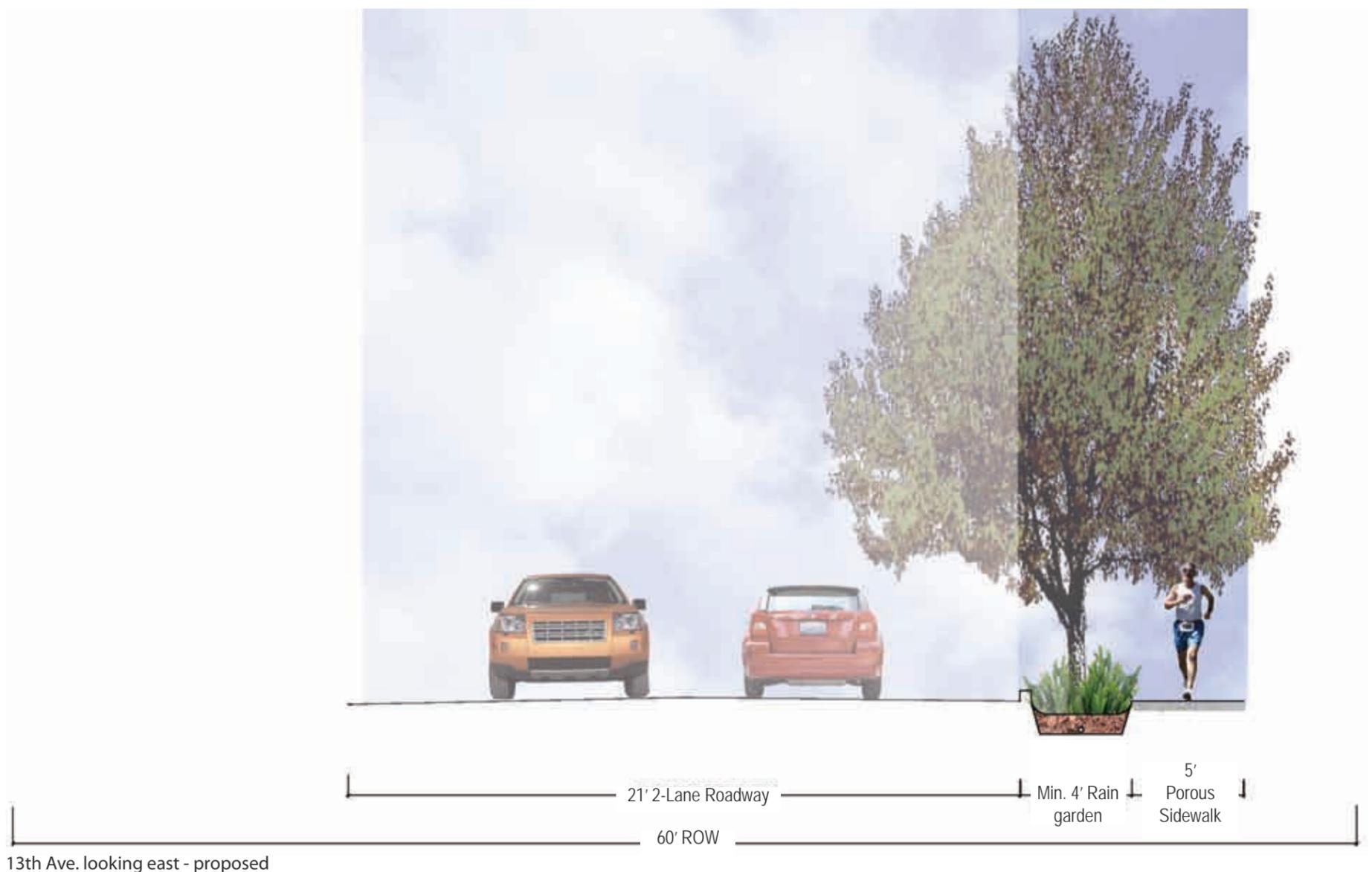
General existing conditions & considerations

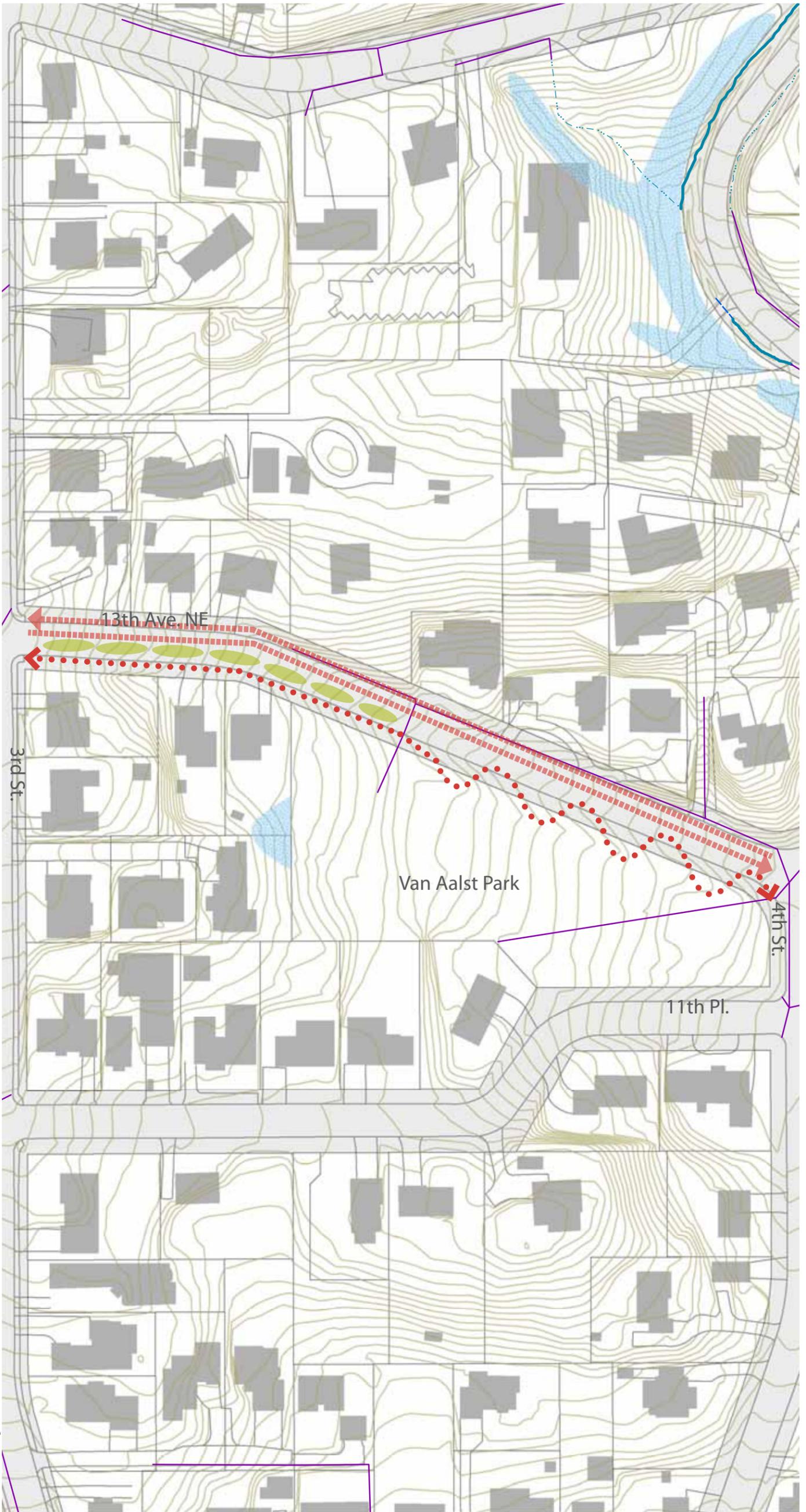
- Adjacent to Van Aalst Park
- Walking route to park
- Nearby wetlands on southern edge of park
- 13.8% slope just east of 3rd St.



Proposed concept

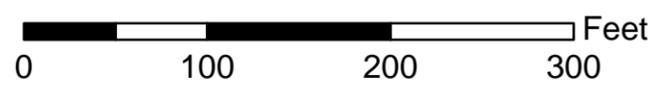
- Porous pavement sidewalk on south side of 13th Ave
- Within Van Aalst Park the sidewalk will meander through existing street trees, thus precluding the need to plant new trees





Legend

- Pedestrian Circulation
- Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- Culvert
- Ditch
- Wetland
- Bioretention swale
- Rain garden or Stormwater Planter



122nd Ave. (CIP Project #: NM 0055 000)

CIP Project Description

Install ~2,100 ft. of five-foot concrete sidewalk along the east side of 122nd Ave. between NE 70th St. and NE 75th St. a five-foot concrete sidewalk along west side of 122nd Ave. NE between NE 75th St. and NE 80th St. Project will evaluate the use of Low Impact Development standards.

LID Opportunities and Benefits

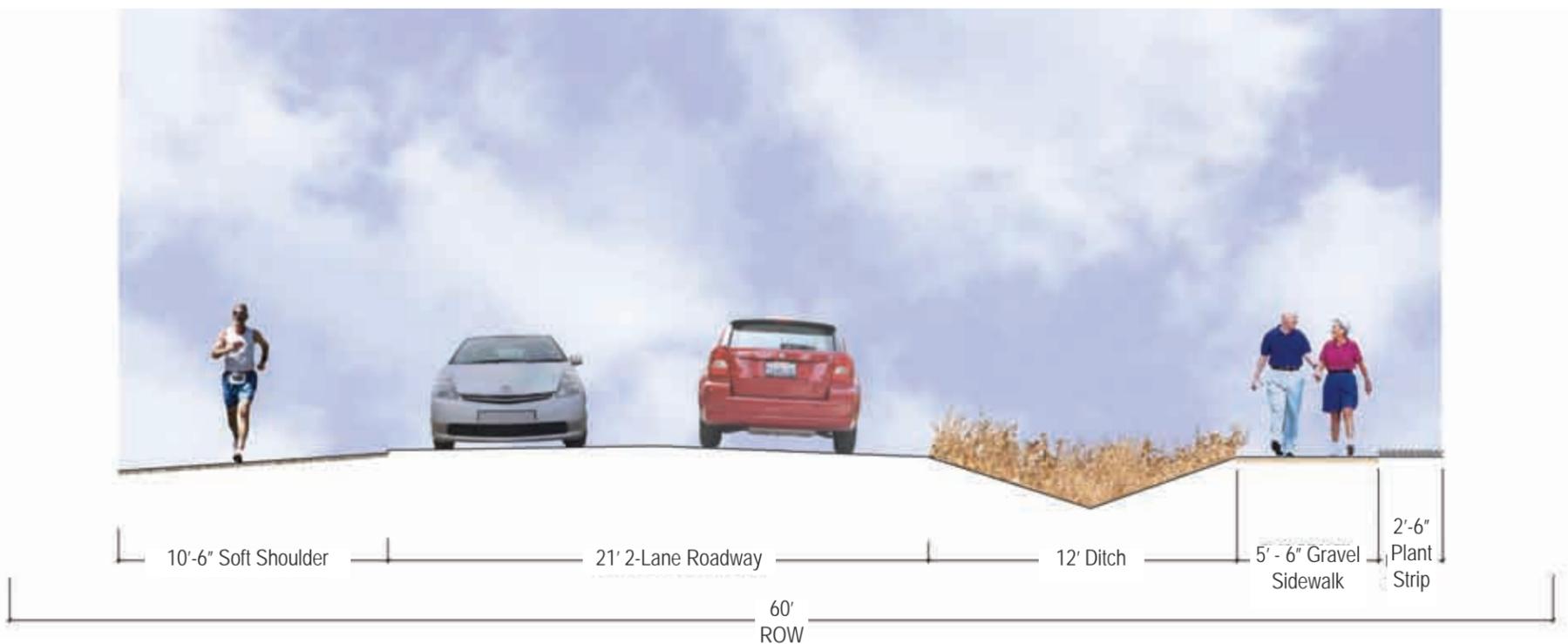
- Enhancing the existing ditch network to include bioretention swales and rain gardens can provide flow attenuation and stormwater treatment for the existing roadway runoff.
- Installing porous pavements will reduce the amount of impervious surface.

Amending the soils and plant treatments in bioretention swale will improve the function of existing ditches by increasing flow attenuation and water quality treatment. In addition to maintaining pedestrian safety by installing bioretention swales between the roadway and the sidewalk, there is an educational opportunity for the students en route to Lake Washington High School. If there are high infiltration rates, LID elements could decrease discharge into the Forbes Creek Basin.

Zone 1 (between NE 80th St. & NE 75th St.)

General existing conditions & considerations

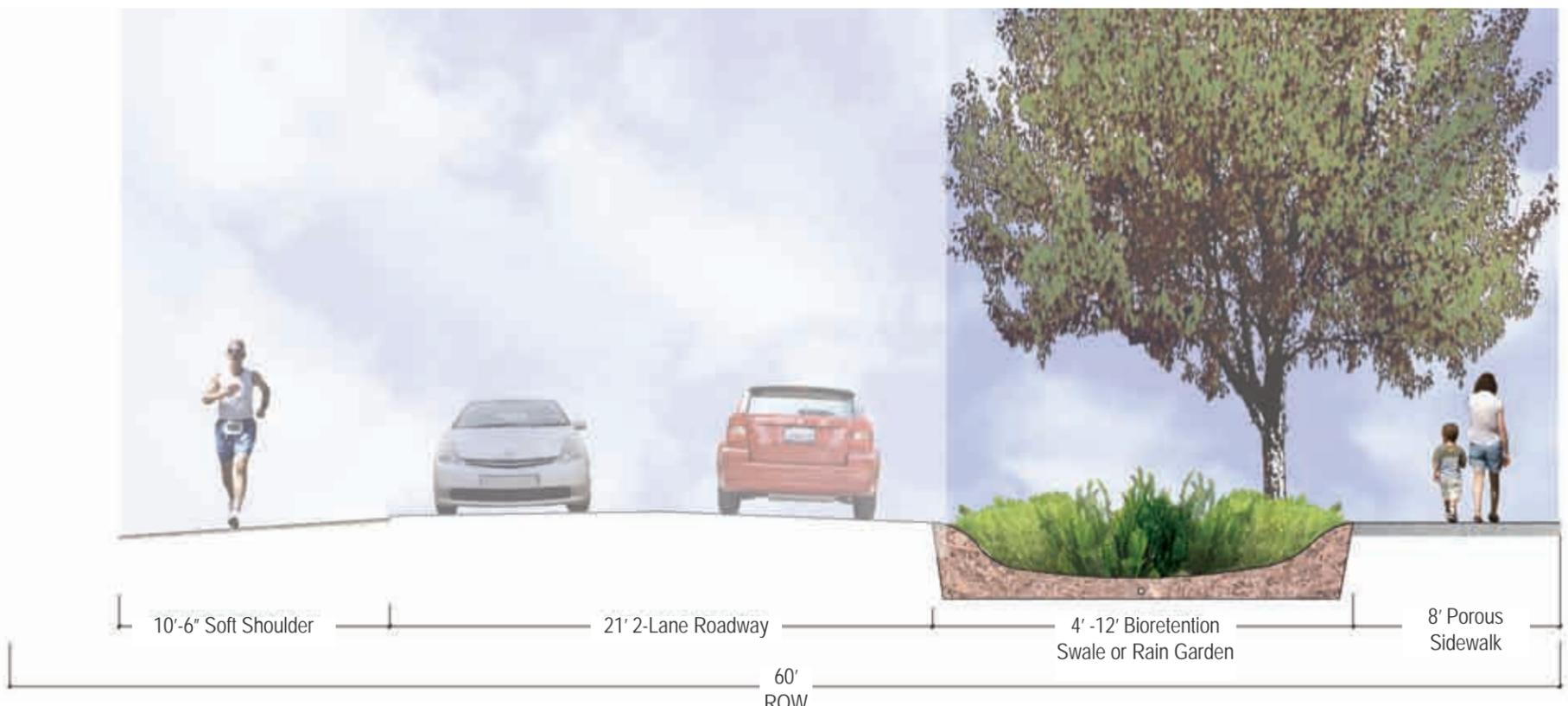
- Ditches on west side and along east side near NE 78th St.
- Gravel sidewalk along west side
- Adjacent to Lake Washington High School



122nd Avenue NE looking south at NE 80th St. - existing

Proposed concept

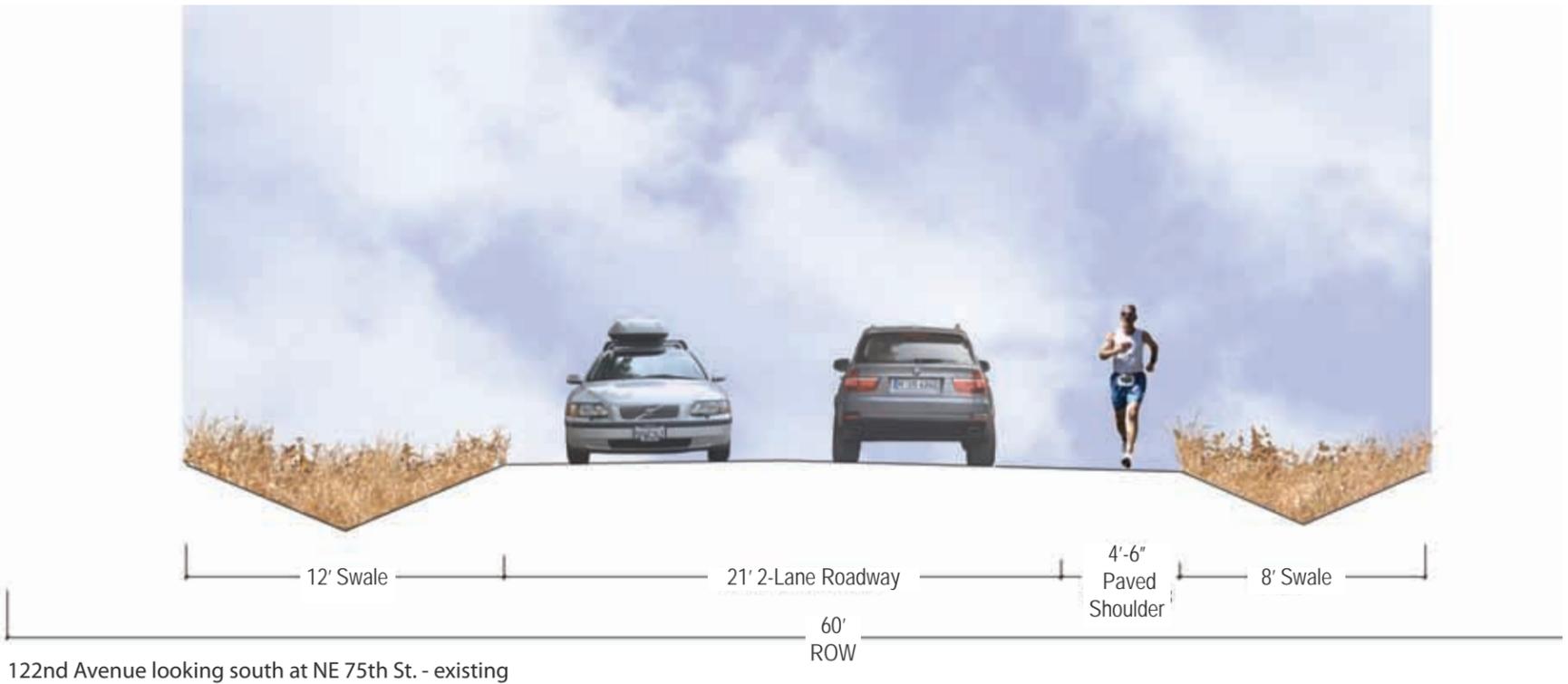
- Bioretention swales or rain gardens on west side
- Porous pavement sidewalk along west side
- Educational/interpretive signage



122nd Avenue NE looking south at NE 80th St. - proposed

General existing conditions & considerations

- No sidewalks
- Ditches on both east and west sides



Proposed concept

- Porous pavement sidewalk along west side
- Bioretention swale on west side (enhance ditch on east side for bioretention)

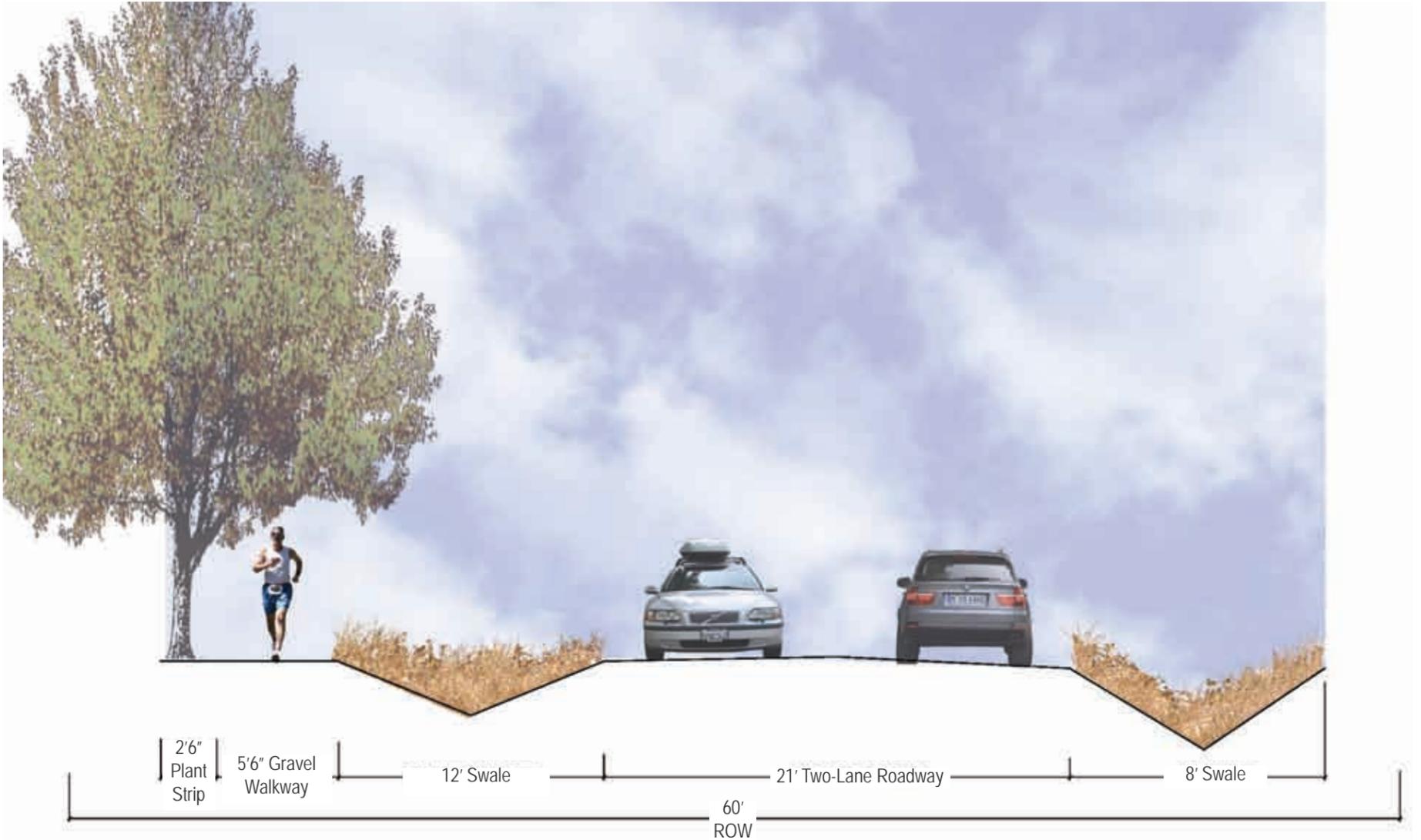


122nd Ave. (CIP Project #: NM 0055 000)

Zone 3 (between NE 73rd St. and NE 70th St.)

General existing conditions & considerations

- Ditches on west side
- Paved shoulder on west side
- Sidewalk on east side



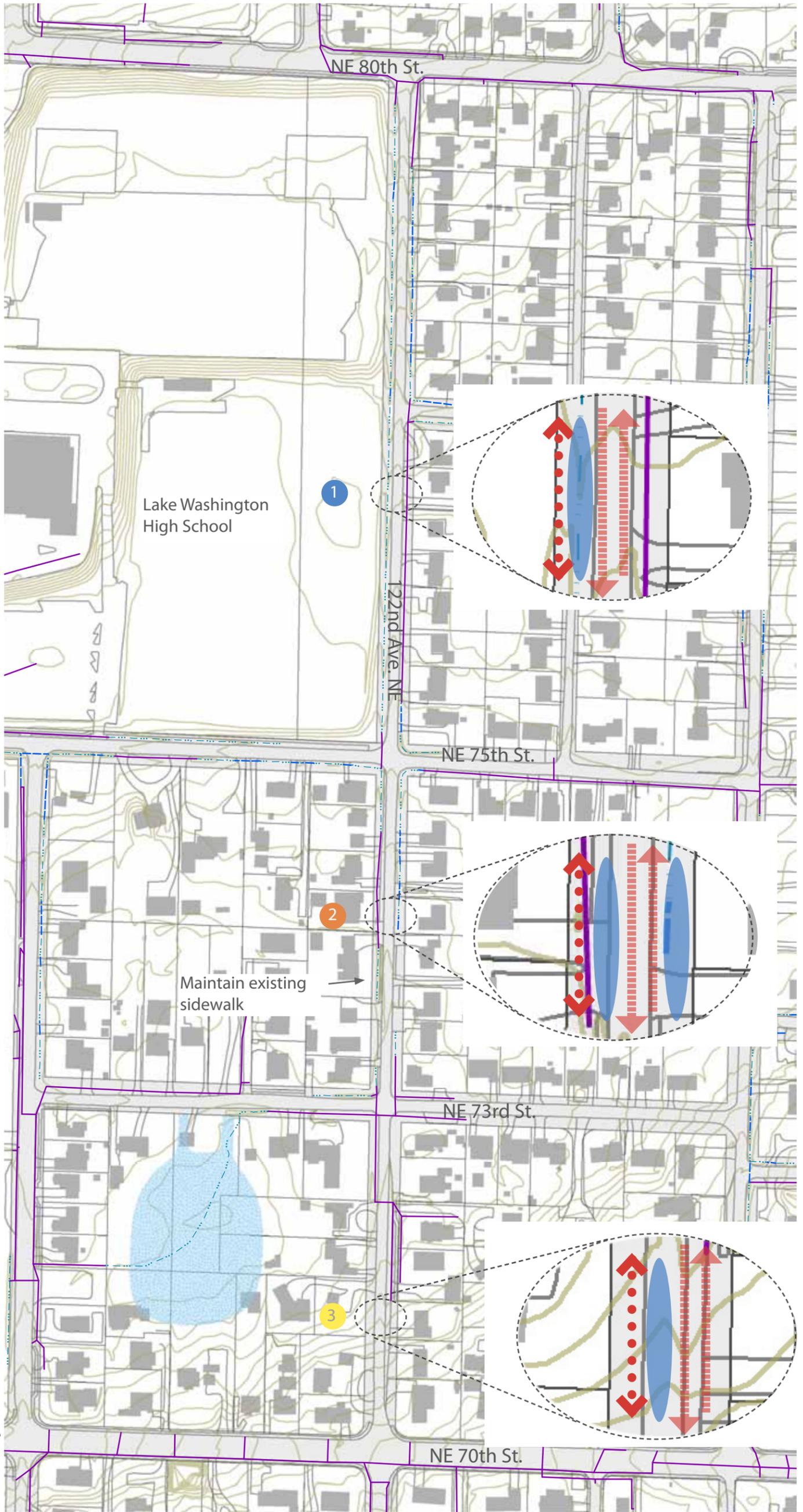
122nd Ave. NE looking north at 78th Pl. - existing

Proposed concept

- Bioswale/rain gardens on both sides of street
- Maintain existing concrete sidewalk on east side



122nd Ave. NE looking north at 78th Pl. - proposed



Legend

- Pedestrian Circulation
- Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- Culvert
- Ditch
- Wetland
- Bioretention swale
- Rain garden or Stormwater Planter



6th St. Sidewalk (CIP Project#: NM 0059 000)

CIP Project Description

Install ~ 500 linear ft. of five-foot cement concrete sidewalk and crossing improvements at Kirkland Ave. In locations where applicable a planter strip will be installed.

LID Opportunities and Benefits

- Installing porous pavement sidewalks will reduce the runoff from the shoulders.
- Rain gardens and bioretention swales can provide flow attenuation and stormwater treatment of roadway runoff.

Porous sidewalks will reduce the amount of new impervious surfaces. In addition to installing porous sidewalks along 6th St, creating areas for stormwater collection and treatment in an underutilized pocket park, there is an opportunity to provide demonstration of stormwater management to pedestrians. Rain gardens and bioretention swales will provide flow attenuation and water quality treatment for runoff collected from the roadway.

General existing conditions & considerations

- No sidewalk on 6th St. from Kirkland Ave. to 1st Ave. S.
- Pedestrian crossing at corner of 6th St. S. & Kirkland Ave.
- Road cross section crowns east of center; only 8' of roadway drains to east side of the street
- Small triangular pocket park at corner of 6th St. S. and north side of Kirkland Ave.



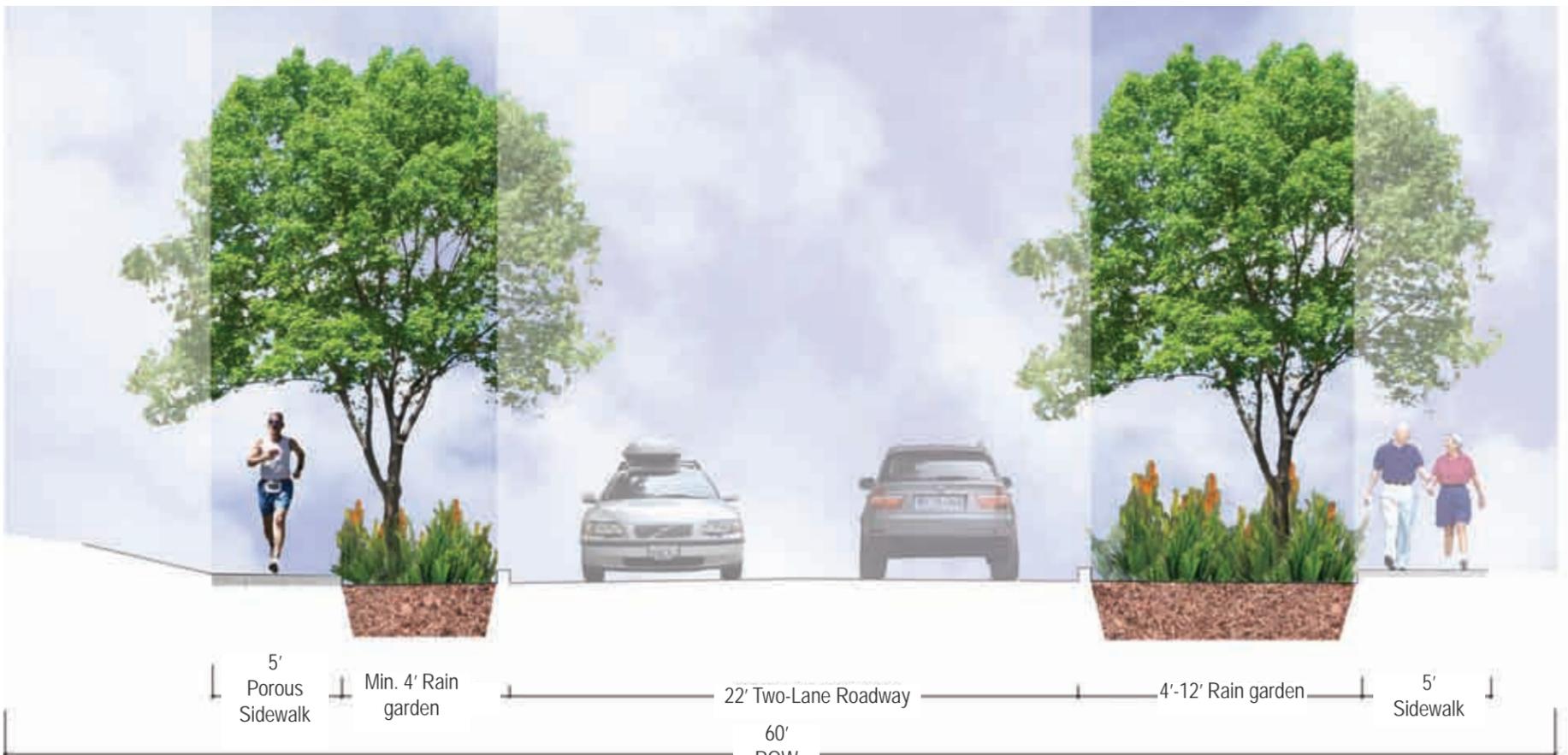
Pocket Park at 6th St. S. and Kirkland Avenue looking north - existing (see on diagram)



Pocket Park with rain garden at 6th St. S. and Kirkland Avenue looking north - proposed

Proposed concept

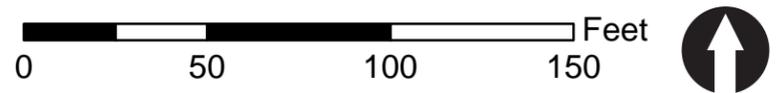
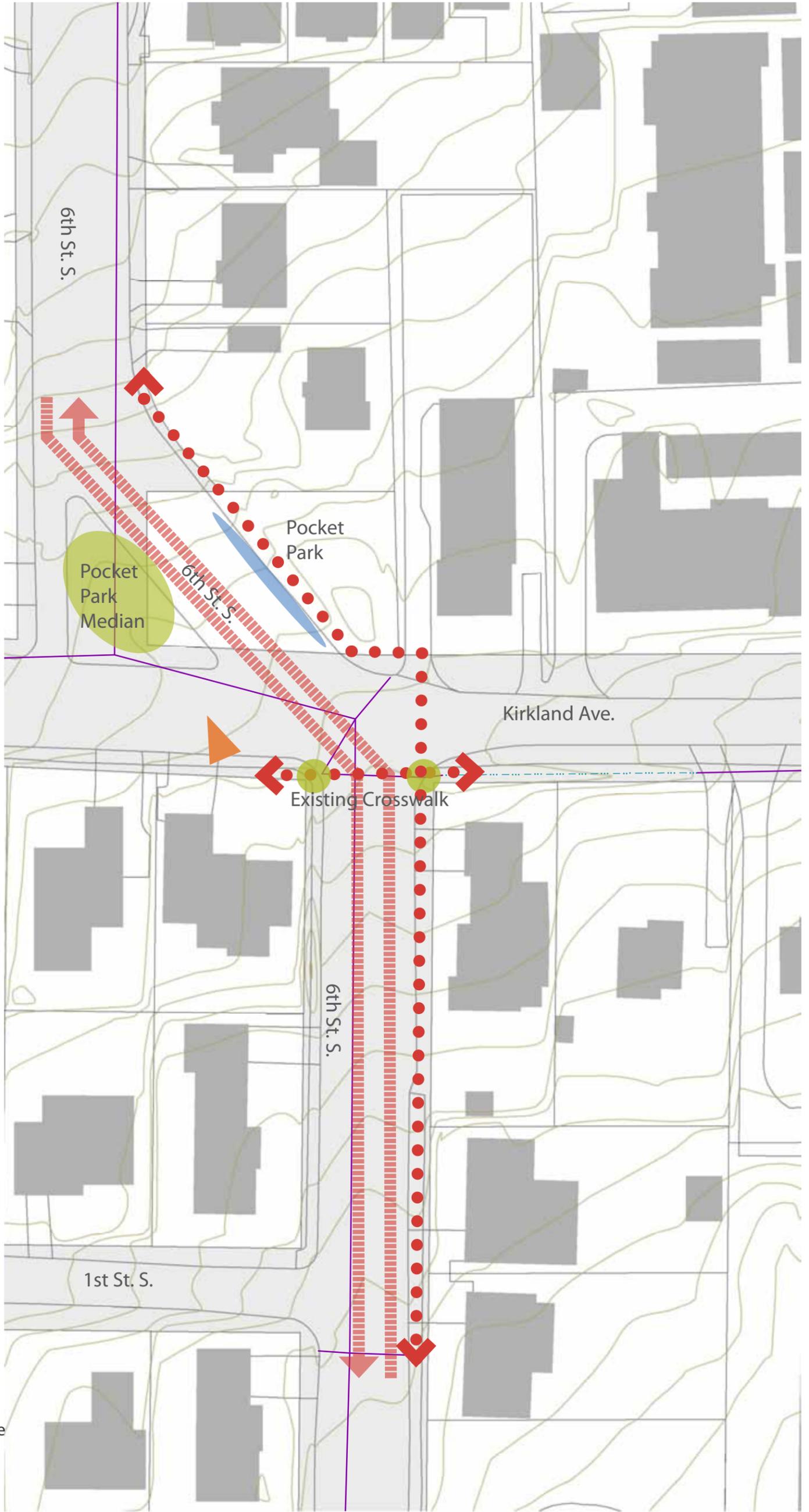
- Porous pavement sidewalk on east side of 6th St. S.
- Rain garden in pocket park
- Possible rain garden along sidewalk and bulb-out extensions at crosswalk



6th Street sidewalk looking south at Kirkland Ave. - proposed

Legend

- Pedestrian Circulation
- Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- Culvert
- Ditch
- Wetland
- Bioretention swale
- Rain garden
- Photo (taken from this point)



99th Pl. NE/100th Ave. NE (CIP Project#: NM 0060 000)

CIP Project Description

Install ~1350 linear ft. of curb, gutter, and sidewalk and five-foot planter strip in some areas. Available right-of-way and steep slopes may preclude the planter strip in some areas. ADA compliant wheelchair ramps will also be required at cross-walk locations.

LID Opportunities and Benefits

- Installing porous pavement sidewalks will reduce the runoff from the shoulders.
- Rain gardens can provide flow attenuation and stormwater treatment of roadway runoff.

Creating singular or a series of rain gardens near the existing catch basins will attenuate peak flows and treat the stormwater before discharging to Lake Washington and the adjacent wetlands. Based on the location of the property lines and the edge of the travel lanes, there is available right-of-way to install these LID elements to benefit stormwater and pedestrian safety.

General existing conditions & considerations

- Road undulates along longitudinal axis creating drainage pockets (see profile to right)
- Road cross slope consistently slopes to west
- Some structures along the west side of the road are lower than the roadway
- Sub-basins may drive up project costs



Profile view of 99th Pl./100th Ave. NE



99th Pl. NE /100th Ave. NE existing conditions (looking south)



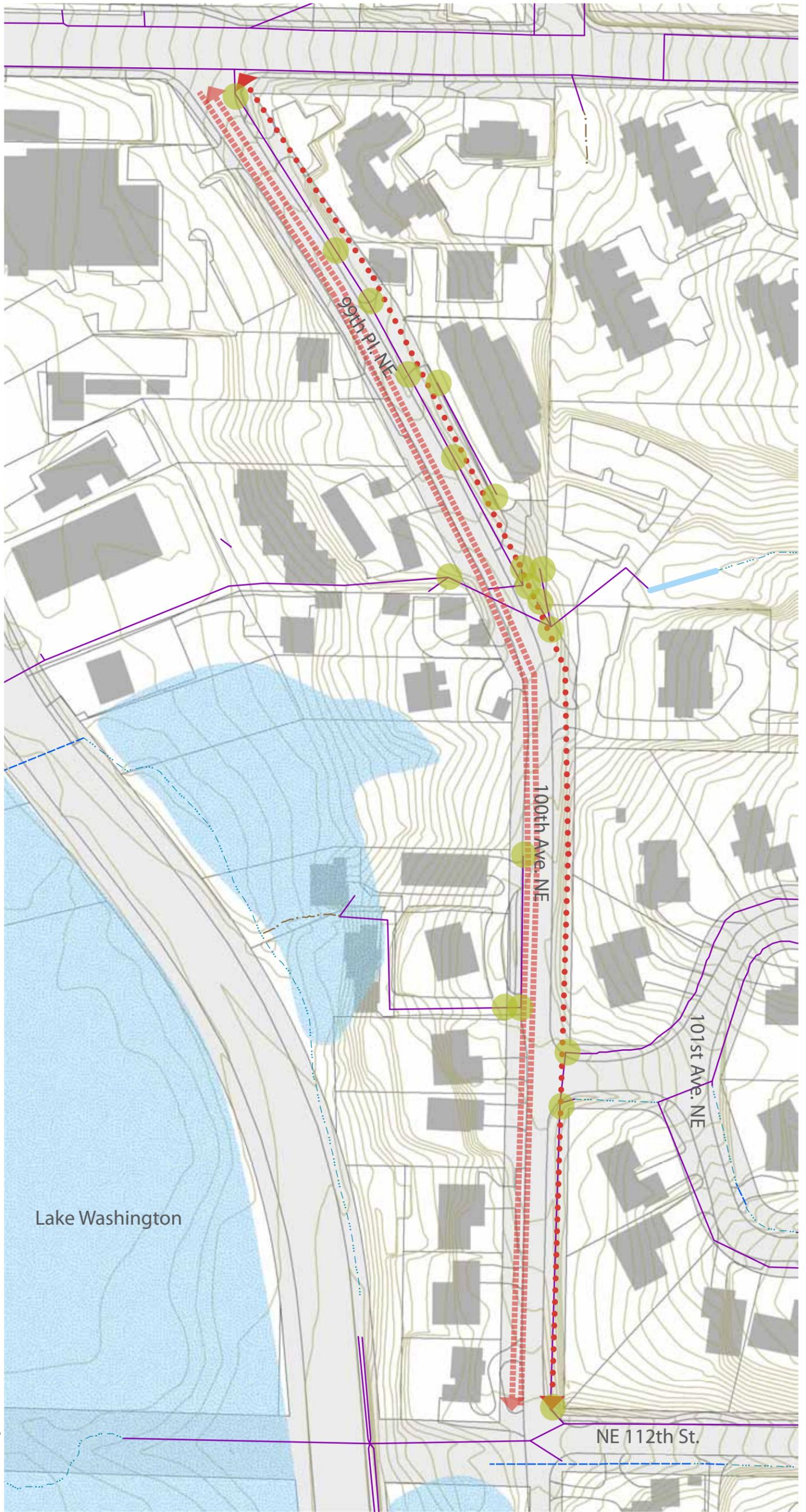
99th Pl. NE /100th Ave. NE existing conditions (looking north)

Proposed concept

- Connect existing sidewalk segments on east side with porous pavement
- Rain gardens at existing catch basin locations, possibility of stepped or cascading stormwater planter or rain garden design depending on size of catchment area

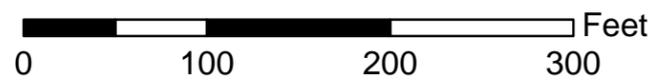


99th Pl. NE /100th Ave. NE cascading rain gardens - proposed



Legend

- Pedestrian Circulation
- - - - - Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- Culvert
- Ditch
- Wetland
- Bioretention swale
- Rain garden or Stormwater Planter



Central Way (CIP Project #: NM 0065 000)

CIP Project Description

Central Way at Lake St. design and construction of pedestrian “bump-outs” at key crosswalks along Central Way

LID Opportunities and Benefits

- Stormwater planters near existing catch basin can attenuate flow and treat some of the runoff from the roadway.
- Stormwater planters and porous pavements will reduce existing impervious areas and reduce runoff from the right-of-way.

Due to the large amount of impervious cover in adjacent areas versus the amount of space available for LID elements, stormwater planters can provide nominal flow attenuation and water quality treatment, but their high visibility will provide enormous public awareness and demonstration benefits of what LID elements look like and how they can be incorporated into the existing right-of-way. In addition, to providing some stormwater benefit, the stormwater planters will provide some safety for pedestrians crossing Central Way.

Zones 1 & 3

General existing conditions & considerations

Crosswalks with no bulb-out

Proposed concept

- Add bulb-out to create a refuge for pedestrians crossing street and promote traffic calming
- Incorporate stormwater planters within bulb-out to serve as a LID demonstration feature as well as to provide nominal water quality improvements

Zone 2

General existing conditions & considerations

- Crosswalk with no bulb-out
- Striped (unused) parking space surrounding catch basin

Proposed concept

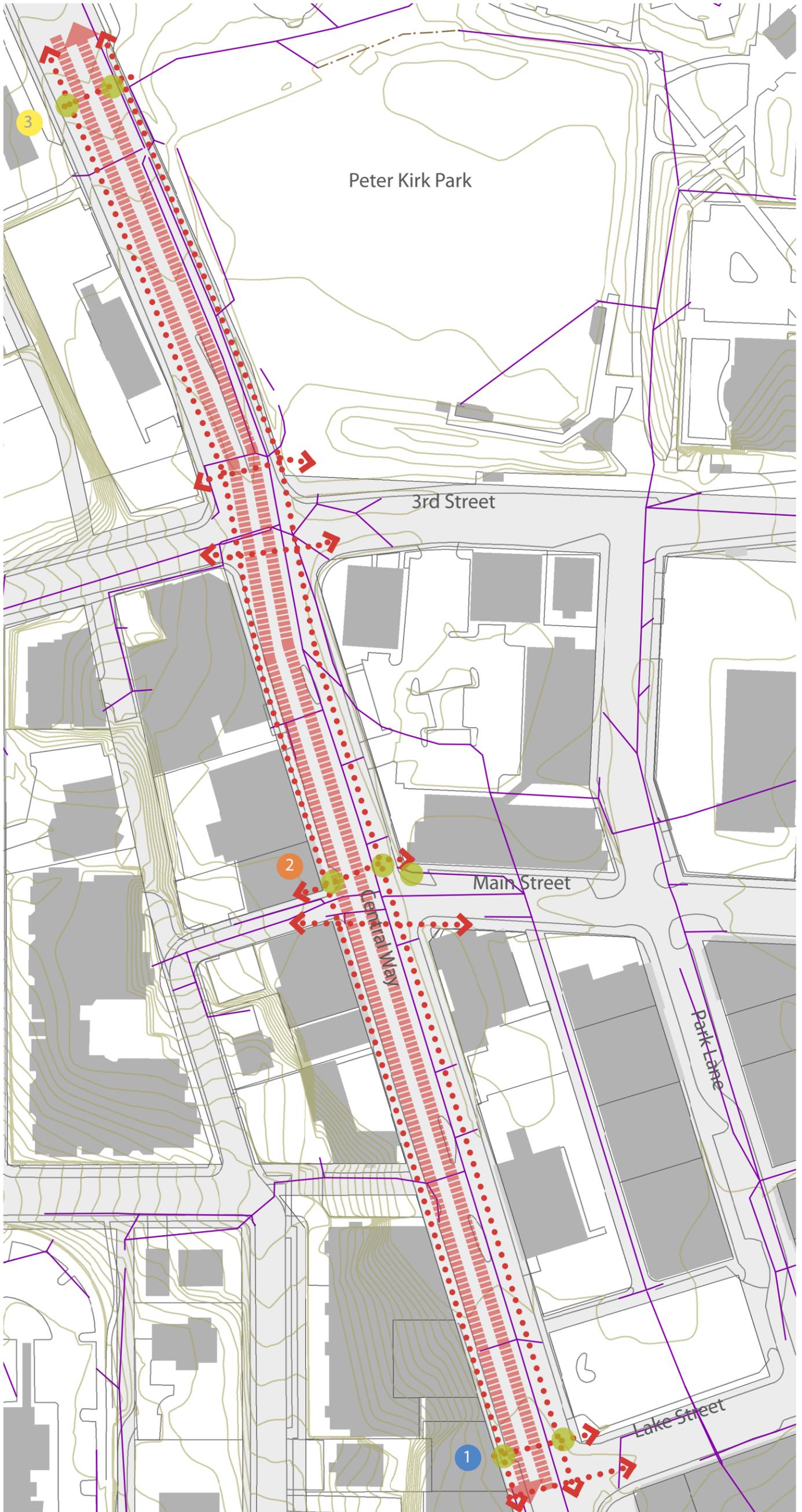
- Add bulb-out to create a refuge for pedestrians crossing street and promote traffic calming
- Incorporate stormwater planters within bulb-out to serve as a LID demonstration feature as well as to provide nominal water quality improvements [same as proposed in zone #1]

In addition:

Utilize striped area and parking spot for stormwater planter to treat runoff from adjacent impervious surfaces



Stormwater planters in bulb-out at Central Way & Main Street - proposed



Legend

- Pedestrian Circulation
- ||||| Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- - - Culvert
- · - · - Ditch
- Wetland
- Bioretention swale
- Rain garden or Stormwater Planter



120th Ave. NE (CIP Project #: ST 0063 000)

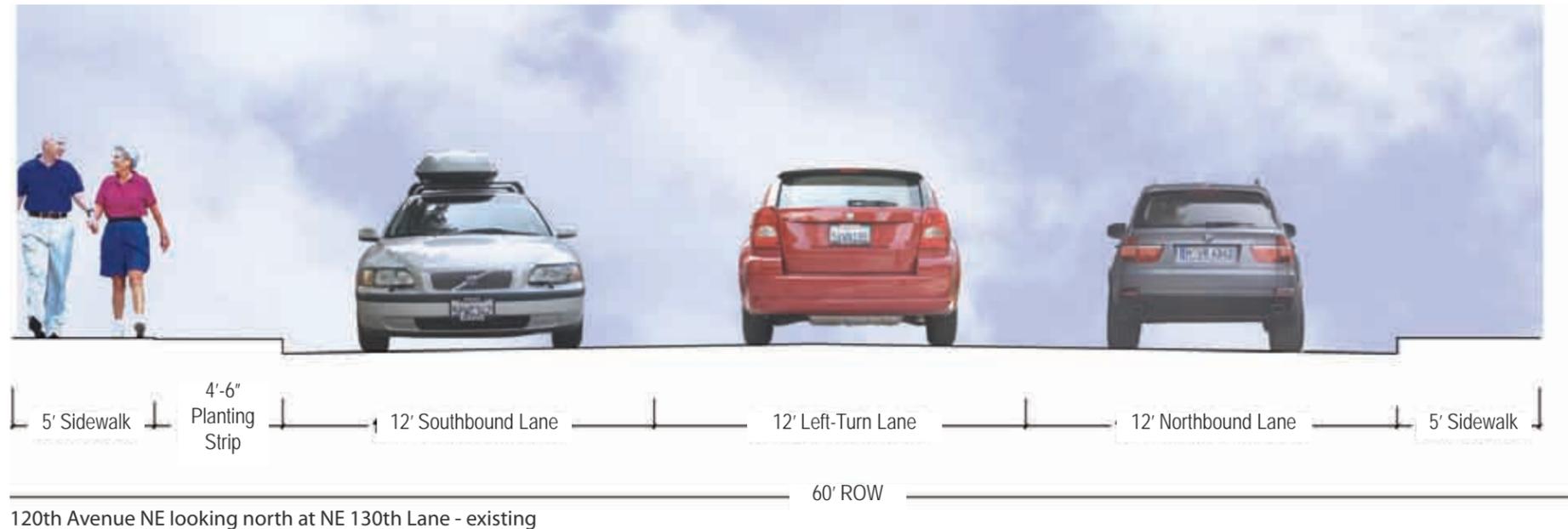
CIP Project Description

Widen 120th Ave. to a five-lane cross section between north of Totem Lake Mall at approximately NE 128th St. NE and NE 132nd St. Final alignment includes two travel lanes in each direction and a two-way left-turn lane along with landscaped median islands, curb, gutter, sidewalk and bicycle lanes. Three signalized intersections will be reconstructed. Project length: ~1,650 ft. LID opportunities include use of bioswales.

LID Opportunities and Benefits

- North of the Juanita Creek culvert, bioretention swales and rain gardens can treat stormwater runoff from the roadway.
- Additional vegetation and porous pavements will reduce impervious surfaces.
- South of the Juanita Creek crossing, porous pavement sidewalks can provide flow attenuation prior to discharge into the conventional system.

Bioretention swales will provide flow attenuation and water quality treatment for the increased impervious roadway surface prior to direct discharge into Juanita Creek. South of Juanita Creek crossing, porous sidewalks can be used to decrease the amount of new impervious surface that needs to be collected and treated in the conventional system. Demonstrating the importance of localized retention and treatment prior to directly discharging into Juanita Creek is beneficial in this location where commercial transitions to a residential neighborhood within a highly used corridor.

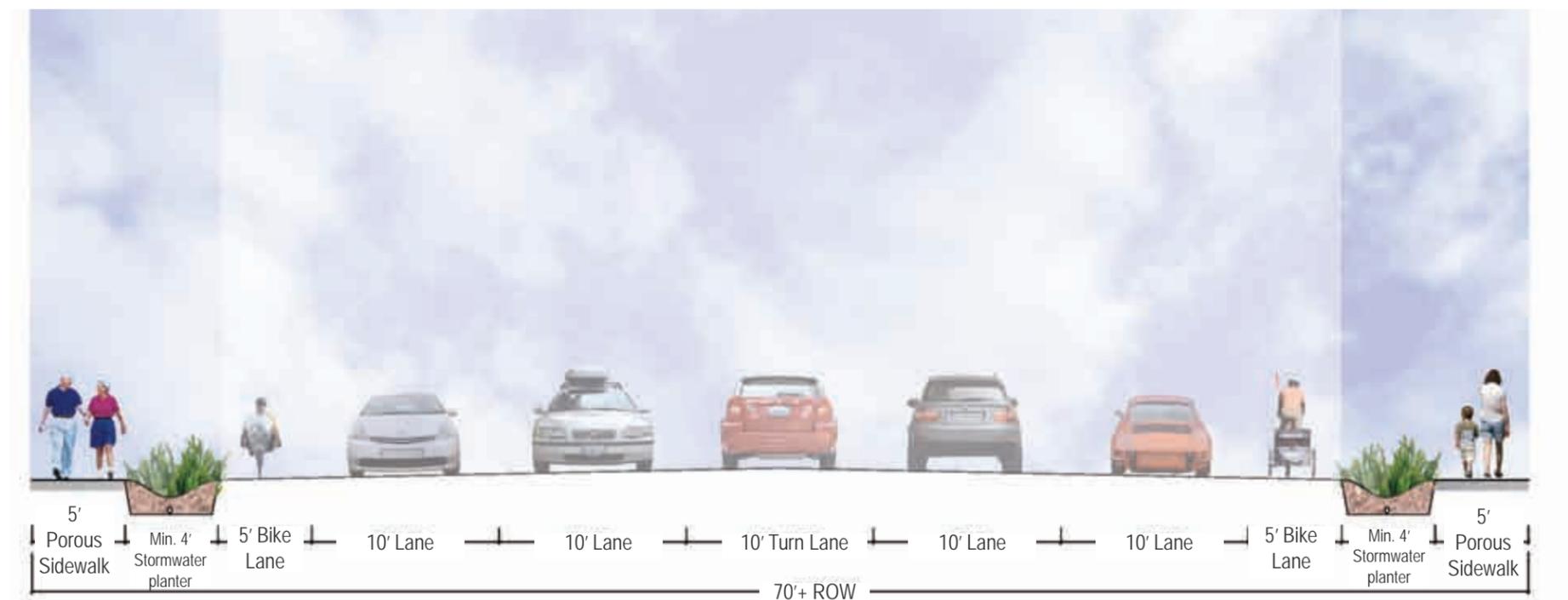


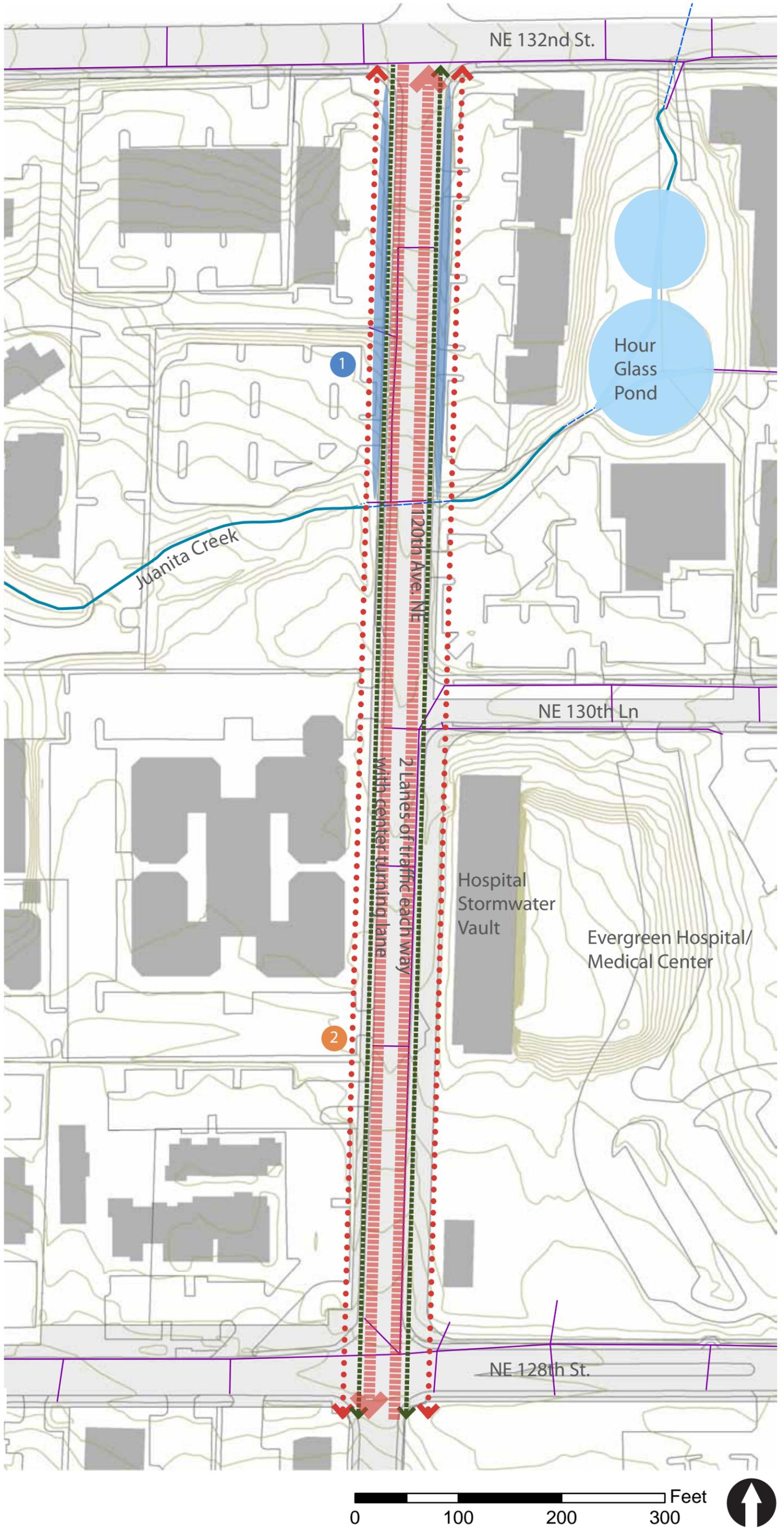
General existing conditions & considerations

- Stream piped underneath 120th Ave. NE & adjacent parking lots
- ~4% slope between 128th St. & 130th Ln.; ~9% slope between 130th Ln. & NE 132nd St.
- Evergreen Hospital emergency entrance at NE 130th Ln
- Underground stormwater vault for hospital located on east side of 120th Ave. NE south of NE 130th Ln (~200')

Proposed concept

- Stormwater planters on both east and west sides of 120th Ave. NE within area that drains directly to Juanita Creek (north of creek to 132nd)
- Porous sidewalks on both east and west sides of 120th Ave. NE





Legend

- Bicycle Circulation
- Pedestrian Circulation
- Vehicular Travel Lanes
- Right-of-Way
- Pavement Edges
- Contour Lines (2')
- Stream
- Pipe
- Culvert
- Ditch
- Wetland
- Stormwater Planter
- Rain garden

Park Lane Pedestrian Corridor Enhancements (CIP Project #: NM 0064 000)

CIP Project Description

Aged and failing sidewalks along this corridor due to tree roots that have impacted sidewalk panels between Lake Street and Main Street are a continued maintenance issue. This study will look for opportunities for pedestrian connections to transit and design standards along this corridor. Additionally the valued existing tree canopy will be evaluated and possible solutions for urban trees will be developed.

LID Opportunities and Benefits

- Porous pavements can provide flow attenuation prior to discharge into the conventional system.
- Bioretention swales and rain gardens can treat stormwater runoff from parking areas.
- Additional vegetation and porous pavements will reduce impervious surfaces.

Both LID elements can be designed to treat runoff for Park Lane to meet water quality requirements. Some stormwater attenuation will be provided, but is not required since Park Lane directly discharges to Lake Washington. Use of porous pavements and raingardens can provide more water to existing trees. LID elements can incorporate “eco-revelatory” design features to showcase water as intrinsic to Kirkland’s identity with the inclusion of rain gardens, conservation of existing tree canopy, artistic downspouts and other water features from existing buildings, and porous pavement. These features will help to preserve the natural feel of Park Lane as a connection from the waterfront business area to Peter Kirk Park. In addition, this location will be a “green gateway” from the proposed Downtown Kirkland Transit Center on 3rd Street.

Zone 1 (Park Lane West)

General existing conditions & considerations

- Established tree canopy, but issues with tree root impacts on existing sidewalks
- One-lane, east-bound traffic
- Pull-in diagonal parking
- Sidewalk bulb-outs at cross-walks
- Thriving commercial district
- Popular pedestrian destination



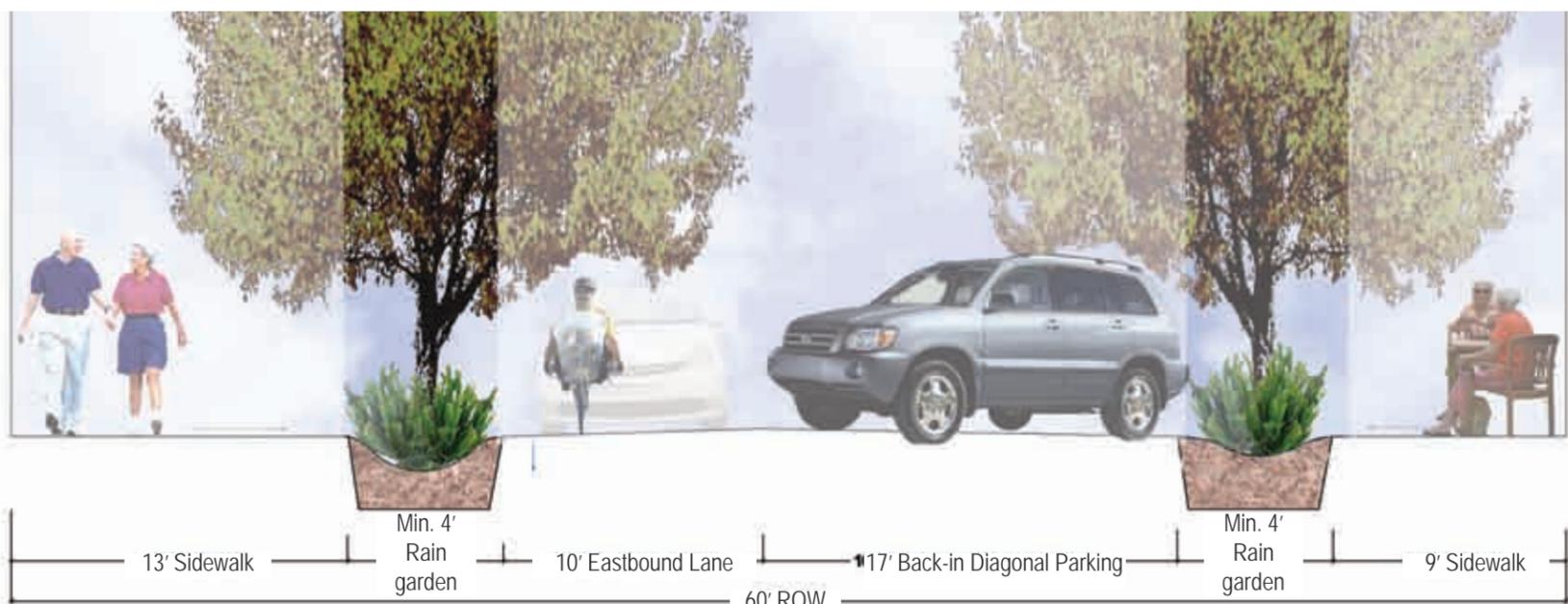
Park Lane looking west between Lake Street and Main Street - existing

Proposed concept

- Conserve existing tree canopy & improve sidewalks by using porous pavement, increasing tree pit size, and/or trimming roots
- Align bulb-outs with larger trees, plant new trees
- Incorporate rain gardens at bulb-outs
- Reveal existence of stormwater with artistic downspout features and/or other water features
- Porous or permeable pavement treatments (can connect to existing storm drainage)

Other considerations:

- Diagonal back-in parking to improve pedestrian and bicyclist safety
- Add plantings to create a buffer between car exhaust and sidewalk users

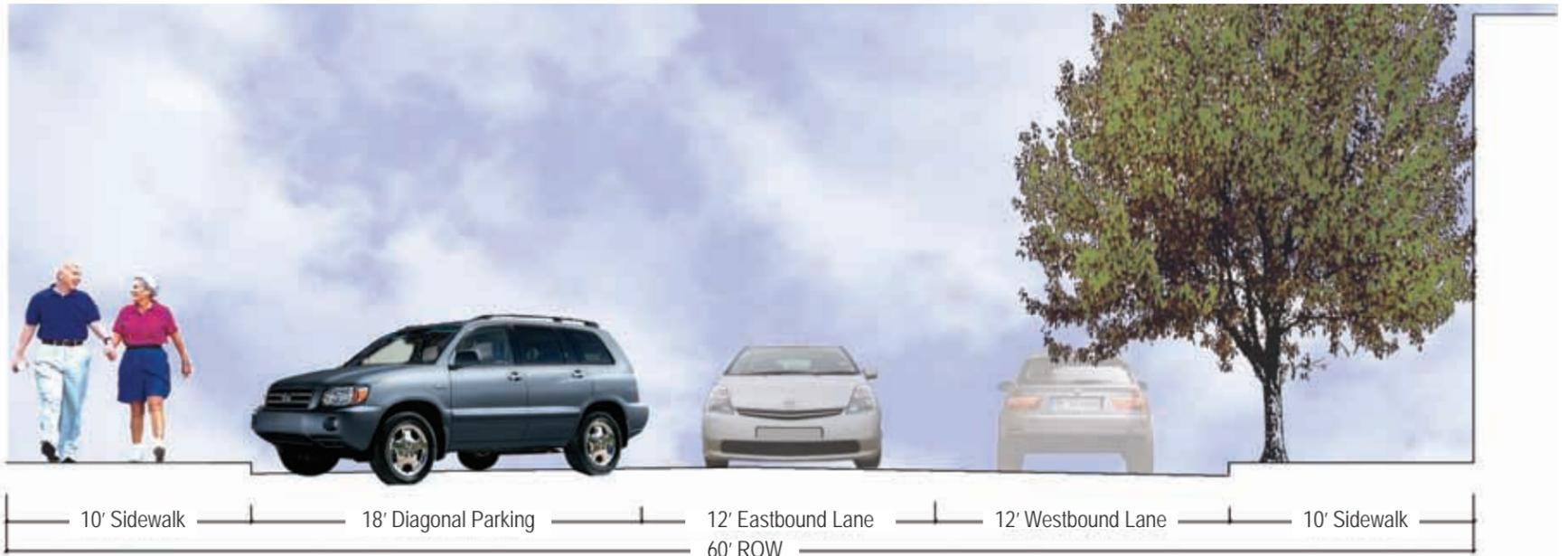


Park Lane looking west between Lake Street and Main Street - proposed

Zone 2 (Park Lane East)

General existing conditions & considerations

- Fewer established street trees than Park Lane west.
- Two-way traffic
- Pull-in diagonal parking
- Farmer's Market location (Wednesday afternoons, May-October)
- Lacks sense of enclosure--no distinct edge on southern side, smaller trees, wide street, and blank walls/rear orientation of businesses on the north side of Park Lane



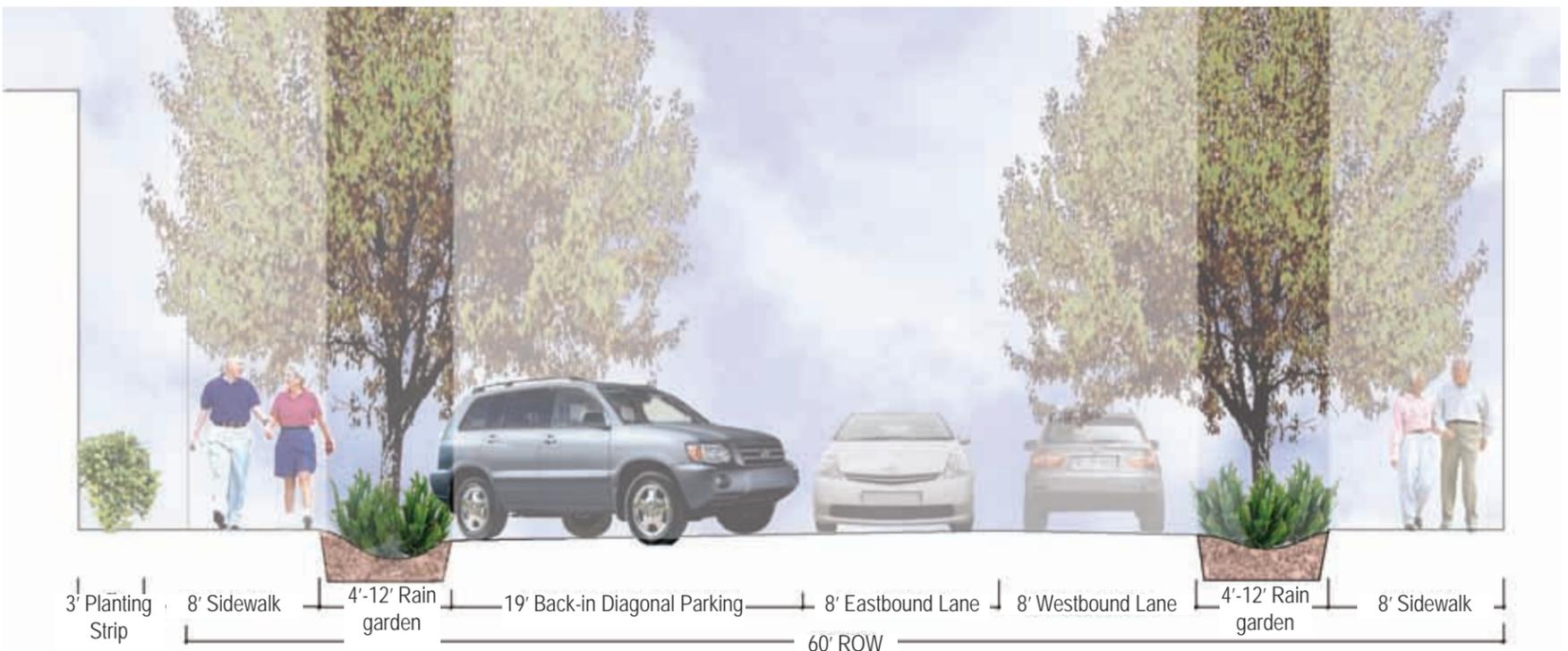
Park Lane looking west at 3rd Street (existing)

Proposed concept

- Plant new trees
- Incorporate rainwater gardens at pedestrian crossing bulb-outs
- Reveal existence of stormwater with artistic downspout features and/or other water features
- Porous pavement treatments can connect to existing storm drainage

Other considerations:

- Diagonal back-in parking to improve pedestrian and bicyclist safety
- Add plantings to create a buffer between car exhaust and sidewalk users
- Include design features to enhance farmer's market aesthetics and meet vendor needs
- Create/revise design guidelines to ensure that future development and businesses will be oriented towards Park Lane



Park Lane looking west at 3rd Street- proposed

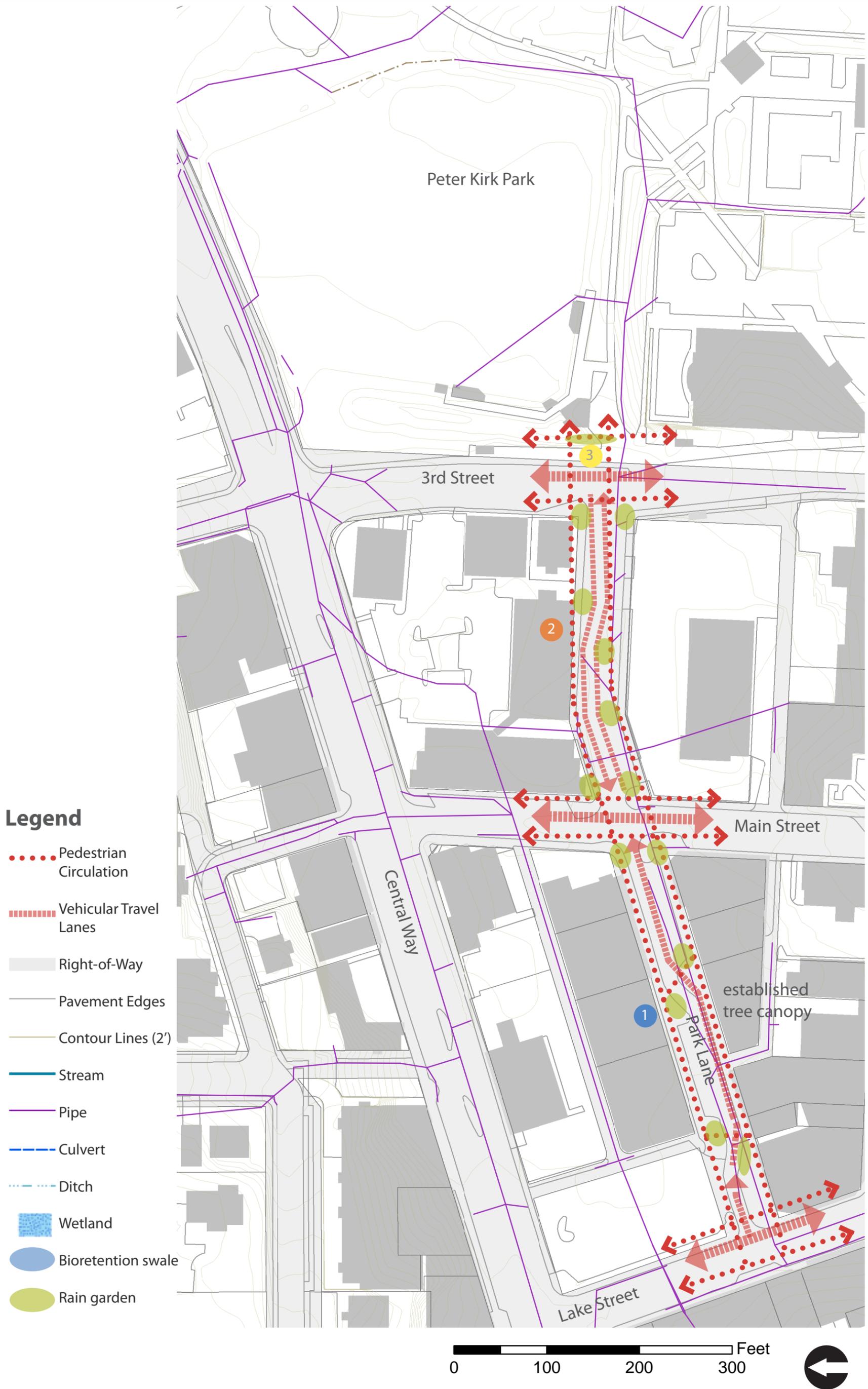
Zone 3

General existing conditions & considerations

Site of future Downtown Transit Center and entrance to Peter Kirk Park

Proposed concept

- Incorporate rainwater gardens at bulb-outs at pedestrian crossings to Transit Center
- Good location for an interpretive display regarding LID features (due to the large number of people who will be waiting in the area)
- Enhance connections between travel modes; provide amenities for pedestrians and transit clients such as benches and shelters



The following estimate of probable cost for each project includes a unit price for each of the LID elements recommended for the various CIP projects. The unit prices were provided so that as the design of the CIP projects progresses Kirkland staff will have a general idea of the costs for these elements. These unit prices are based on 2007 construction costs and will need to be adjusted for the year that the project is constructed.

The quantities listed for the LID elements was estimated based on the length of the transportation improvements listed in the CIP description. These quantities may increase or decrease based on project revisions and budget. The costs are also not meant to replace all stormwater improvement costs associated with the project. As the designs progress, conventional stormwater management facilities or conveyance pipes may also need to be included.

Estimate of Probable Cost for Installation of Low Impact Development Elements

LID Feasibility City of Kirkland CIP Projects
 Prepared By SvR Design Company
 1/4/2008

CIP Location (CIP Project Number)		116 th Ave. - NE 40 th St to NE 60 th St. (0001000)		NE 100 th St. (0034000)		116 th Ave. NE - NE 94 th St. to NE 100 th St. (0044000)		13 th Ave. (0054000)		122 nd Ave. NE (0055000)		6 th St. (0059000)		99 th Pl. NE & 100 th Ave. (0060000)		Central Way ⁺ (0065000)		120 th Ave. NE ⁺⁺ (0063000)		Park Lane (0064000)	
LID Element	LID Element Unit Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost	Quantity (sq. yards)	Cost
Bioretention / Bioinfiltration Rain garden*	\$120	0	\$0	0	\$0	500	\$60,000	10	\$1,200	0	\$0	100	\$12,000	500	\$60,000	0	\$0	170	\$20,400	0	\$0
Bioretention / Bioinfiltration Swale**	\$120	2,800	\$336,000	550	\$66,000	1,000	\$120,000	0	\$0	700	\$84,000	300	\$36,000	0	\$0	0	\$0	0	\$0	0	\$0
Bioretention / Bioinfiltration Stormwater Planter***	\$200	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	170	\$34,000	0	\$0	100	\$20,000
Porous Sidewalk - Concrete****	\$45	5,889	\$265,000	333	\$15,000	889	\$40,000	444	\$20,000	1,167	\$52,500	306	\$13,750	750	\$33,750	0	\$0	1,833	\$82,500	333	\$15,000
Total Estimated Cost for LID in CIP Projects (2007 Costs including installation)		\$601,000		\$81,000		\$220,000		\$21,200		\$136,500		\$61,750		\$93,750		\$34,000		\$102,900		\$35,000	

Cost Estimate Assumptions:
 *Cost for Rain gardens include 1 cubic yard of amended soil, 9 square feet of plantings, 1 cubic yard of excavation, and 3 feet of underdrain, and one overflow or curb cut.
 **Cost for Swales include 1 cubic yard of amended soil, 9 square feet of plantings, 1 cubic yard of excavation, and 3 feet of underdrain, and one overflow or curb cut.
 ***Cost for Stormwater Planter include include cast-in-place wall 2 foot deep along curb line, 1 cubic yard of amended soil, 9 square feet of plantings, 1 cubic yard of excavation, and 3 feet of underdrain, and one overflow or curb cut.
 ****Cost for Porous concrete include 4 inch thick sidewalk and 6 inch gravel subbase.
 +Costs assume ten 10 square yard stormwater planters along Central Way
 ++Costs do not account for additional right-of-way that may need to be purchased to accommodate LID elements, specifically for 120th Ave NE

Appendix A: Comprehensive Plan Framework Goals

According to the February 2007 City of Kirkland Comprehensive Plan, there are 17 Vision/Framework Goals that “express the fundamental planning principles for guiding growth and development in Kirkland over the 20-year horizon of the Comprehensive Plan.” These goals are reiterated here for your reference.

FG-1 Maintain and enhance Kirkland’s unique character

FG-2 Support a strong sense of community

FG-3 Maintain vibrant and stable residential neighborhoods and mixed-use development, with housing for diverse income groups, age groups, and lifestyles.

FG-4 Promote a strong and diverse economy

FG-5 Protect and preserve environmentally sensitive areas, and a healthy environment.

FG-6 Identify, protect and preserve the City’s historic resources, and enhance the identity of those areas and neighborhoods in which they exist.

FG-7 Encourage low impact development and sustainable building practices.

FG-8 Maintain and enhance Kirkland’s strong physical, visual, and perceptual linkages to Lake Washington.

FG-9 Provide safety and accessibility for those who use alternative modes of transportation within and between neighborhoods, public spaces, and business districts and to regional facilities.

FG-10 Create a transportation system which allows the mobility of people and goods by providing a variety of transportation options.

FG-11 Maintain existing park facilities, while seeking opportunities to expand and enhance the current range of facilities and recreational programs.

FG-12 Ensure public safety.

FG-13 Maintain existing adopted levels of service.

FG-14 Plan for a fair share of regional growth, consistent with State and regional goals to minimize low-density sprawl and direct growth to urban areas.

FG-15 Solve regional problems that affect Kirkland through regional coordination and partnerships.

FG-16 Promote active citizen involvement and outreach education in development decisions and planning for Kirkland’s future.

FG-17 Establish development regulations that are fair and predictable.

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[PSAT, WSU] Puget Sound Action Team & Washington State University Pierce County Extension (2005, May). *Low Impact Development: Technical Guidance Manual for Puget Sound*.

[PSAT] Puget Sound Action Team (2000). *Natural Approaches to Stormwater Management: Ordinances and Regulations*. Retrieved 7/20/07 from: http://www.psat.wa.gov/Publications/LID_studies/ordinances_regulations.htm#ord6

[SFPUC] San Francisco Public Utilities Commission (2007). *Low Impact Design*. Retrieved 7/20/07 from: http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/361/MTO_ID/541

Kirkland Green Program: Outreach Strategies

Kirkland's Green Initiatives:

- *Natural Resource Management Plan*
- *Climate Protection- Climate Protection Action Plan,*
- *Natural Resource Management - Shoreline Master Plan, 20 Year Forestation Plan, Urban Forestry*
- *Sustainable Development - Green Building, Low Impact Development*
- *Waste Reduction - Recycling*
- *Outreach & Community Involvement - Green Kirkland Partnership, Green Business Program*

Objectives

- *Educate/Inform about Kirkland's Green Initiatives*
 - Kirkland residents & businesses
 - Kirkland community organizations
 - Interested agencies
- *Receive feedback*
 - Gauge public awareness and interest
 - Is the City "on the right track" with its green initiatives?
 - What does sustainability mean for Kirkland?
 - How do we engage the larger community in our efforts?
- *Identify persons interested in future collaboration with City*

Proposed Outreach/Community Involvement

- I. *Outreach/Education*
 - a. Continue Green Tips, Green EUpdates, "Did You Know," & water conservation tips
 - b. Maintain current content on Kirkland Green webpage (www.ci.kirkland.wa.us/kirklandgreen)
 - c. Have presence at city/community events (including Sustainable September)
 - d. Incorporate Green Team members into City Speakers Bureau
 - e. Develop Green Program Overview brochure
- II. *Community Involvement*
 - a. Host a roundtable event involving subject matter experts/key stakeholders who can share & broaden perspectives about sustainability issues
 - i. To be held Fall, 2008
 - b. Community Conversation: Climate Protection Action Plan
 - i. How to meet greenhouse gas emission reduction targets (state & city goals)
 - ii. How to get community commitment
 1. To be held in 1st quarter 2009



CITY OF KIRKLAND
Department of Parks & Community Services
505 Market Street, Suite A, Kirkland, WA 98033 425.587.3300
www.ci.kirkland.wa.us

MEMORANDUM

To: Dave Ramsay, City Manager

From: Jennifer Schroder, CPRP, Director, Parks and Community Services
Sharon Rodman, Environmental Education and Outreach Specialist

Date: June 18, 2008

Subject: Green Kirkland Partnership Update

The purpose of this memorandum is to provide a status report on the Green Kirkland Partnership.

The Green Kirkland Partnership is between the City of Kirkland, the Cascade Land Conservancy (CLC) and the community and was created to restore and sustain Kirkland's natural areas. There are currently 372 acres of publicly owned natural areas within the City of Kirkland. The Green Kirkland Partnership's mission is to conserve and sustain natural areas for the benefit and enjoyment of current and future generations.

Invasive plants such as English ivy, Himalayan blackberry, and English holly are threatening the sustainability of this important natural resource. A healthy urban forest cleans the air, moderates temperatures, enhances aesthetics, can stabilize hazardous slopes, and absorbs surface water runoff, thus reducing erosion and flooding.

The goal of the Green Kirkland Partnership is to restore the 372 acres of natural areas to a sustainable condition and create an aware and energized community in which individuals, neighborhoods, nonprofit organizations, businesses and City government are working together to protect and maintain Kirkland's natural areas.

There are three main goals that summarize the program:

- Restore Kirkland's natural areas by removal of invasive plants and planting native species for the sustainability of the urban forests, wetlands and their associated habitats.
- Build the community's capacity for long-term stewardship of the natural areas through increased public awareness of and engagement in protecting, restoring and helping to maintain healthy urban forests and wetlands.
- Establish resources to sustain the forest restoration program long-term.

To achieve these goals, the Green Kirkland Partnership program includes the following strategies: 1) develop and implement a 20-year restoration plan for the City's open space and natural areas; 2) implement an Environmental Education and Outreach program to educate and engage the community in stewardship projects to remove invasive plants and to replant with native species, seek support from businesses in both funding and stewardship, and seek grants to support stewardship activities; 3) create a sustainable volunteer stewardship program for ongoing restoration and care of our urban forests; and 4) acquire land that has ecological and habitat benefits. The following is a status report on each strategy:

20-Year Forest Restoration Plan: The 20-year Forest Restoration plan was approved by resolution on February 19, 2008. The plan outlines the steps and resources necessary to create a sustainable restoration program of Kirkland's publicly owned natural areas, focusing on the forested areas.

The 20-Year Restoration Plan will be a tool that:

- will educate the community on the threat invasive plants have on urban forests
- quantifies the problem and resources necessary to reverse the decline of the natural areas and how to sustain healthy forests
- identifies and recommends best management practices to carry out a strategic work plan over the next 20 years
- identifies revenue sources to consider in funding the restoration work
- identifies a volunteer stewardship program to sustain a volunteer work force
- establishes a oversight role for the Park Board

Environmental Education and Outreach: In the 2007/2008 Biennium Budget, Council funded a 0.5 FTE Environmental Education and Outreach Specialist (Outreach Specialist) position with 1-time funding. This Outreach Specialist's primary role is to develop and implement long-term environmental stewardship and education strategies to support the Green Kirkland Program. This position began April 16, 2007 and it has been instrumental in developing volunteers, partnerships, as well as to increase the public's education and awareness of the threat invasive plants have on Kirkland's natural areas and how they can make a difference.

Performance measures to track the growth of the Green Kirkland Program include the number of volunteers participating in the restoration sites, the number of sites in restoration, the number of public and private partnerships supporting the program with labor and or funding, and the amount of presentations and educational materials completed each year:

The following is a summary of measurables achieved since the program began in 2005 through June 13, 2008

Total number of Green Kirkland Events held: 83

- 7 Green Kirkland events were held in 2005
- 11 Green Kirkland events were held in 2006
- 38 Green Kirkland events were held in 2007
- 27 Green Kirkland events held as of June 13, 2008

Total number of volunteer hours: 6,454

- 1066 hours - 2005
- 651 hours - 2006
- 3355 hours - 2007
- 1383 hours - as of June 13, 2008

Total number of trees girdled/freed of ivy: 128

Total number of square feet of invasive plants removed: 93,139 square feet (= 2.14 acres)

Total number of native plants planted: 1,017

Total number of invasive trees removed: 227

Total value of volunteer labor \$120,370

Total number of presentations: 22

Total number of groups involved: 24

The increase in the number of events and volunteers participating in the Green Kirkland Partnership program is the prescribed outcomes needed to implement this program. As identified in the 20-year forest restoration plan, it will take a significant amount of staff and volunteer resources to achieve restoration of Kirkland's 372 forested acres. However, these increases mean more coordination of restoration sites, more volunteer management, and more community involvement. It will be critical to the success of the program to continue and increase the amount of hours available for the Environmental Education and Outreach Specialist position to sustain the momentum of the

program and to support the increase public interest and demand to engage in a restoration project at a park /natural area with in each of the 13 Kirkland neighborhoods.

Acquisition: Public acquisition of land that meets the criteria of open space is action that protects critical habitat, improves air quality, provides recreation benefits and prevents these lands from being lost to development. Once natural areas are lost to development, they are almost impossible to restore to their original condition. Supporting this strategy, in 2007 the City purchased two parcels within the Everest Park Greenbelt (4.59 acres), one parcel in the Cotton Hill park greenbelt (11,386 sq.ft.) and four parcels contiguous to the Yarrow Bay Wetlands (.86 acres).

Next steps and milestones for 2008

- Continue coordinating work parties and recruiting volunteers for restoration events in the following parks: Carillon Woods, Kiwanis, and Watershed
- Begin restoration activities and events at Cotton Hill Park by partnering with the Highlands Neighborhood Association
- Begin implementation of the Juanita Bay vegetation management plan restoration work
- Identify and expand advertising and marketing opportunities
- Arrange restoration activities by contractors in areas unsuitable for volunteers, e.g., wetland areas and steep slopes. (Earth Corps, and others)
- Develop appropriate protocols for monitoring restored areas
- Partner with Washington Native Plant Society (WNPS) and find funding for conducting a Natural Area Stewardship Program for volunteer leaders in 2009
- Continue volunteer development
- Continue to seek grants to support Green Kirkland Partnership
- Establish a Green Kirkland Partnership fund through the Northwest Parks Foundation
- Submitted a grant to King Conservation District to fund the Environmental Education and Outreach Position for 2009/2010 at .5 FTE.