

APPENDIX D

LID and Green Building Code Assessment

Project Memo



TO: Juniper Nammi

FROM: Alyse Nelson and Wayne Carlson, AICP, LEED® AP and Gabe Snedeker, AICP

DATE: February 13, 2007

PROJECT: Shoreline Sustainability Strategy

OUR FILE NO.: 207323.30

SUBJECT: Regulatory Code & Engineering Development Guide
Gap Analysis for Low Impact Development

As a piece of this effort, AHBL has reviewed portions of Shoreline’s Municipal Code and its Engineering Development Guide to better understand the challenges to the application of Low Impact Development Best Management Practices (BMPs) within the City of Shoreline. This analysis also highlighted areas of the code and standards that were supportive of Low Impact Development (LID) techniques. This summary memo introduces key themes found in the municipal code (SMP) and the Engineering Development Guide (EDG). It also underlines considerations for providing a greater foundation for LID within these documents. Finally, it summarizes the next steps of the project.

User Guide to the Gap Analysis Table

The attached Gap Analysis Table is ordered by code reference, which appear in column one. A second column calls out the LID Principle or Best Management Practice that largely defines what the referenced code or standard is addressing (or not addressing). A third column further explains the LID concept behind the Principle or BMP. The fourth column lists a description of the referenced code or standard. Finally, a brief explanation of the problem or “gap” is provided.

Summary of Findings

Shoreline’s code offers a good base to support LID BMPs and techniques, including tree conservation, flexible setback standards, parking regulations that allow reductions in minimum standards and encourage compact stalls, incentives for tree protection and retention, and acceptable site development standards. Areas where there was an opportunity to expand support for LID or remove impediments include:

TACOMA

2215 North 30th Street
Suite 300
Tacoma, WA 98403-3350
253.383.2422 TEL
253.383.2572 FAX

www.ahbl.com



- The Shoreline Municipal Code does not include provisions for Planned Unit Developments (PUD), Cottage Housing Developments, or Master Planned Developments. While they utilize a master planning process on large sites, there seems to be minimal code language to support such processes. Flexible zoning regulations such as the PUD or other discretionary process could provide developers with an opportunity for flexibility from the dimensional standards of the code in exchange for the provision of benefits. LID could be used as one of the potential methods to receive a PUD/Cottage Housing incentive, such as relaxed dimensional standards or bonus density.
- Communities have considered a broad range of incentives - the most common incentive being relief from bulk and dimensional standards and identifying a dedicated review team for projects. We can provide you with a matrix detailing some of the ideas that local communities are considering as a follow-up.
- The Engineering Development Guide would benefit from alternative LID road sections that encourage open conveyance and other LID features. For example:
 - Medians and cul-de-sacs could be utilized for bioretention,
 - Road widths could be reduced in some instances, particularly for low volume roadways such as local streets,
 - Pervious pavement should be encouraged where feasible, particularly for sidewalks, alleys, residential streets, on- and off-street parking areas, trails, and bicycle paths.
- Encourage amenity zones and other landscape areas, such as areas within parking lots, to function as places for bioretention. While landscape areas are typically considered chiefly for their aesthetic value, they also present an important opportunity to utilize LID.
- Consider expanding the protection of trees that are retained on a site to include the critical tree root zone, which has been found to be a better method of protection than the dripline method currently used by Shoreline.
- Expand site development code language to incorporate support for LID tools such as protecting and stockpiling native soils, reducing compaction by limiting building footprint pads and construction roadway access, and encouraging clearing and grading activities during the dry season.

Next Steps

APPENDIX D — LID and Green Building Code Assessment

Page 3



This gap analysis of the Shoreline Municipal Code and Engineering Development Standards is a portion of the larger Shoreline Sustainability Strategy effort taken on by the City at this time. This summary memo and attached table will be used as a basis for future efforts to implement Low Impact Development within the municipal code and development standards. We look forward to discussing the ideas presented in this memo and how LID can be integrated into the City of Shoreline Municipal Code and Engineering Development Standards.



APPENDIX D - LID and Green Building Code Assessment

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
EDG 1.2.9	LID Concept Overall		Alternative Methods As provided for in Section 20.10.050 of the SMC and for the purpose of meeting the need to consider Low Impact Development (LID) and LEED systems as acceptable "alternate facility designs", LID designs that are consistent with the BMPs outlined in Low Impact Development Technical Guidance Manual for Puget Sound, the 2005 King County Surface Water Design Manual, and/or LEED techniques employed to meet the intent of the adopted Surface Water Management Code shall be considered a Blanket Stormwater Adjustment and individual variances to use these design methodologies are not required. Provided, developments that employ LID BMPs and LEED technologies must be designed using the methodologies outlined in the 2005 KCSWDM.	It is good that they are providing an easier method to utilize LID BMPs. It would be even better if Shoreline provides alternative sections to give developers a clear sense of what they want for broader objectives, such as minimizing impervious surface.
EDG 2.03	P: Narrow Streets	Minimize total imperviousness	Private Streets - Minimum Width Minimum widths are 20' of pavement/traveled way width for those serving 4 or fewer lots and 24' for those serving more than 4	These widths seem reasonable. Pervious pavement and open drainage should be used to further minimize impervious surface coverage.
EDG 2.05.A	P: Loop Roads in Preference to Cul-de-sacs	Minimize total imperviousness	Cul-de-sacs Cul-de-sac Islands are optional features for any cul-de-sac. If provided, it must have a full-depth vertical curb. The island shall be landscaped.	Cul-de-sacs and dead-ends should be discouraged for LID projects. Where unavoidable, they should allow for biofiltration/bioretenion facilities within the landscape area. Curb cuts to allow water to enter this area and/or a no curb design should be allowed.
EDG 2.05.A	P: Loop Roads in Preference to Cul-de-sacs	Minimize total imperviousness	Cul-de-sacs - Minimum Width Minimum right-of-way diameter across a bulb section shall be 100 feet in a permanent cul-de-sac and 84 feet in a temporary cul-de-sac. Right-of-way may be reduced, provided utilities and necessary drainage are accommodated on permanent easements w/n the development. Minimum surfacing across the bulb shall be 90 feet of paving in curb type road. Sidewalks shall be constructed on both sides of the stem and on the bulb.	Consider LID alternative designs, including the reduction of width, encouraging bioretention, and using pervious pavement.
EDG 2.05.C	P: Loop Roads in Preference to Cul-de-sacs	Minimize total imperviousness	The Director of Public Works may require an off-street walk or an emergency vehicle access to connect a cul-de-sac at its terminus with other streets, parks, schools, bus stops, or other pedestrian traffic generators, if the need exists. Off-street sidewalks shall be contained in the right-of-way or a sidewalk easement.	These pedestrian/emergency vehicle access easements could be encouraged to be paved with pervious surfaces where feasible.
EDG 2.05.G	P: Loop Roads in Preference to Cul-de-sacs	Minimize total imperviousness	Hammerheads A hammerhead per Standard Detail 209 may be used to fulfill the requirement to provide a turnaround facility where the street serves (or will serve) 4 or fewer single family residential units.	It is good that hammerheads can be used without special approval requirements. Hammerheads may be a feasible option in more cases than presented here. They are beneficial over cul-de-sac designs for LID projects because they minimize impervious surface.
EDG 2.06	P: Alley Access	Minimize total imperviousness	Alleys Alleys shall have a minimum easement/tract width of 20' with a paved surface of 16', based on a 10' structure setback. For differing structure setback requirements, alley configuration shall be designated to provide for safe turning access to properties. Paved surface shall have a thickened edge on one side and cross slope in one direction. Public streets to which an alley connects or which provide access to the front boundary of the properties served by the alley shall be 28' minimum paved width with vertical curb. Alley entry shall be provided by a driveway approach.	There may be additional ways to incorporate LID into alley designs, such as using pervious pavers with reinforced grass in between as is done with Vancouver, B.C.'s Country Lane model.

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
EDG 2.12	P: Minimize Curb & Gutter	Minimize effective imperviousness	Medians Edges shall be similar to outer road edges: formed vertical curb; except that median shoulders shall be minimum five feet in width. Twenty feet of drivable surface (which includes traveled way and paved shoulders) shall be provided on either side of the median. Median may be landscaped or planted. Street trees shall be planted in median subject to approval by the Director of Public Works.	Medians offer an opportunity to utilize a part of the road right-of-way for biofiltration. Instead of the typical design, medians could be lower than the road with curb cuts to allow water to flow into it. Landscaping should be required, with trees and shrubs particularly suited for biofiltration/bioretenion utilized. Special approval by the Director of Public Works should not be required if using trees from a City-approved list.
EDG 2.15	P: Narrow Streets	Minimize total imperviousness	Right-of-Way Reduction on Local Streets In proposed developments served by underground utilities within easements, the right-of-way may be reduced to the minimum roadway width plus sidewalk and amenity zones with the approval of the City. Where it is desired to reduce right-of-way to a minimum width, the right-of-way, plus easement, shall allow for construction and maintenance of the following as appropriate, sidewalks, amenity zone, drainage facilities, sign placement, and also allow sidewalk widening around mailbox locations. On local streets, installation of fixed objects, other than required above ground utility structures, greater than four inches in diameter within four feet of back of sidewalk shall not be permitted.	It is good that Shoreline allows right-of-way reductions when underground utilities are in easements. ROW reductions for LID utilization could be considered, but the width of the ROW is not as important as the width of paved area. The City of Woodinville is considering road sections that are slightly more narrow than existing Shoreline standards. To acquire support by the Fire Marshall, City staff offered to support an ordinance that would require sprinklers on structures smaller than IBC would require. Also see Vancouver, B.C. as a model for alternative residential alleys/access streets. http://www.city.vancouver.bc.ca/engsvcs/streets/design/enviro.htm
EDG 201	P: Narrow Streets	Minimize total imperviousness	Typical Local Street Section	Shoreline should create an alternative local street section that incorporates LID principles and BMPs such as open drainage, narrow street design, and pervious pavement.
EDG 202	P: Narrow Streets	Minimize total imperviousness	Typical Arterial Street Section	An alternative arterial street section may allow for open drainage and pervious pavement where feasible (perhaps over on-street parking/sidewalk areas).
EDG 203	P: Narrow Streets	Minimize total imperviousness	Typical Alley Section	The alley section does not feature curb/gutter/sidewalk, but could offer additional options such as pervious pavement.
EDG 204	P: Narrow Streets	Minimize total imperviousness	Half Street Section	An alternative half street section could allow for LID principles and BMPs.
EDG 205	P: Minimize Curb & Gutter	Minimize effective imperviousness	Shoulder Treatment Section	Shoulder treatment section shows a ditch conveyance, but lacks detail. An alternative shoulder treatment might provide for LID provisions such as biofiltration in the ditch area. Consider requiring existing ditches on redeveloped sites to be brought up to swale specs.
EDG 207	P: Minimize Curb & Gutter	Minimize effective imperviousness	Median Section/Plan View	This section/plan shows the typical raised median with curb. An alternative could be a LID-inspired median with curb cuts and a depressed median with bioretention facilities. Specific planting requirements may also be needed.
EDG 209	P: Narrow Streets	Minimize total imperviousness	Street Ends Plans	These drawings show the cul-de-sac and hammerhead standard designs. They should be evaluated for the potential to reduce widths. The ability to utilize pervious pavement should also be included where it would be feasible.
EDG 211/212	P: Minimize Curb & Gutter	Minimize effective imperviousness	Traffic Circle Details	Traffic circles are a good place to use bioretention facilities - curb cuts and a depressed landscape area inside the traffic circle would be an alternative design that would make this possible.

APPENDIX D - LID and Green Building Code Assessment

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
EDG 217	P: Minimize Curb & Gutter	Minimize effective imperviousness	Chicane	A chicane is a traffic calming technique that incorporates raised areas that requires cars to slow down and weave around the obstacles. These raised areas might be a place to incorporate bioretention facilities through the use of curb cuts and depressed landscape areas. Sight distance would be a key issue to deal with in this alternative section.
EDG 3.01.A.13/14	P: Driveways	Minimize total imperviousness	A residential driveway shall serve no more than two parcels. A joint use driveway easement may be used to serve two adjacent parcels: Minimum width shall be sufficient to accommodate the driveway, cross slope in one direction and curb or thickened edge on one side. Minimum easement length shall extend 20 feet from right-of-way line. Driving surface shall be paved with appropriate materials. A paved approach shall be provided from the edge of pavement of the intersecting street to the edge of the right-of-way consistent with Details 301-304.	It is good that Shoreline allows joint use driveways, it could encourage them and also encourage pervious pavement options.
EDG 3.01.B	P: Driveways	Minimize total imperviousness	Minimum Driveway Approach Widths Sets minimum and maximum widths: 1-2 Dwelling Units (attached or detached) on a local or arterial street 10 foot min, 20 foot max; Multifamily on a local street 20' min, 30' max; on an arterial street 24' min, 36' max ; Commercial on a local street 24' min, 30' max; on an arterial street 30' min, 36' max Thirty-six foot wide driveways may be allowed when separate left- and right-turn exist lanes are approved by the Director. A commercial driveway wider than 36' requires an Engineering Variance. Joint use single family and multifamily driveway approaches may be reduced to a minimum of 16 feet in width, subject to approval of the Director and the Fire Marshal.	It is good to set both minimum and maximum driveway approach widths. It is also good to allow reductions to the standards - perhaps specific approval from the Director and Fire Marshal wouldn't be required when utilizing LID.
EDG 3.02	BMP: Permeable Paving	Runoff flow and volume control	Concrete Sidewalks All sidewalks shall be constructed with Class 4000 concrete 5-inches thick with a non-slip broom finish. All local streets and arterials abutting residential areas shall have a 6-foot wide sidewalk on either side of the street. All arterial streets abutting zoning designations CB, I, NB, O, or RB zones - 8' on both sides of the street. Alleys - no sidewalks are required.	Pervious surfacing should be allowed where feasible.
EDG 3.03.A	P: Minimize Curb & Gutter	Minimize effective imperviousness	Curbs, Gutters, and Sidewalks Type A vertical curb and gutter shall be used for street edges and shall always be used under the following conditions: (1) on all arterials, neighborhood collectors, and local streets (2) in drainage low spots where special drainage facilities are required (3) on streets with grades greater than 8%. Type A vertical curb and gutter shall be used on all street classifications. All curb and gutter shall be constructed with Class 4000 concrete. Rolled curbs may only be used to replace or match existing conditions as approved by the Director of PW.	Curb and gutter concentrates surface flows, increasing effective imperviousness. Where possible, runoff should be dispersed to open areas or diverted to infiltration facilities. Where infiltration is not possible, runoff should be diverted to biofiltration areas for water quality treatment before final disposal to the storm sewer system. Curb and gutter can still be used if desired. However, breaks in the curb which allow stormwater to flow to roadside bioinfiltration areas should be allowed.
EDG 3.05	P: Pedestrian Paths	Minimize total imperviousness	Soft-Surface Path Construction Minimum 5' width; acceptable surface materials are crushed rock, wood chips, and asphalt or other materials as approved by the Director of PW. Maximum grade shall not exceed 10% - depending on site conditions, stairs and/or switchbacks may be required. For grades greater than 5%, the Director of PW may specify the type of paving material to be used.	Great that pervious pavement standards are given here - soft-surface paths should be required in LID projects.

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
EDG 3.06	P: Pedestrian Paths	Minimize total imperviousness	Paved Path Construction Width minimum 5'; acceptable surface materials are asphalt concrete and Portland cement concrete or other materials as approved by the Director of PW. Max grade shall not exceed 10% (5% where bicycle use is anticipated). Director may specify type of paving for grades greater than 5%. Paths shall be a minimum 5' from the edge of the vehicular travel way (or require a physical barrier). A 2' graded shoulder is required on either side of a paved bicycle pathway. When asphalt paths are used, the widths shall correspond to the widths required for concrete sidewalks.	Materials, separation between roadway and path could be a place for biofiltration facilities.
EDG 3.09	BMP: Bioretention Areas	Runoff quality and volume control	Amenity Zone All streets shall have an amenity zone except where protection of critical areas requires special consideration. Minimum width is 4'. Amenity zone shall be located between the curb and the sidewalk on all streets. Street tree type and placement shall conform to section 20.50.480 SMC. Utilities, street light poles, and traffic signs may be located in the amenity zone.	This amenity zone may be a place to use for biofiltration/bioretention facilities.
EDG 3.11	P: Pedestrian Paths	Minimize total imperviousness	Separated Walkways, Bikeways, and Trails Gives specific details of widths/allowed materials for different types of paths	Should provide incentives/encourage pervious pavement options. Bicycle lanes/paths could be pervious.
EDG 301-305	P: Minimize Curb & Gutter	Minimize effective imperviousness	Curb and Gutter Section Driveway Approach Standards	An alternative LID design could be appropriate (particularly in amenity zones or for open drainage crossings).
EDG 306	P: Minimize Curb & Gutter	Minimize effective imperviousness	Shoulder & Ditch Section Driveway	An alternative LID design should show more "ditch" detail, where the ditch could be used for biofiltration.
EDG 307	P: Shared Driveways	Minimize total imperviousness	Joint Use Driveway	It is good that Shoreline encourages joint use driveways. Pervious pavement and other LID alternatives should be encouraged.
EDG 312	P: Minimize Curb & Gutter	Minimize effective imperviousness	Curb Sections	Type A curb and gutter could allow breaks in the curb to allow water to enter bioretention areas.
EDG 329	P: Pedestrian Paths	Minimize total imperviousness	Typical Section for Trails	Drainage/pavement - could allow for LID features
EDG 4.01.A	BMP: Permeable Paving	Runoff quality and volume control	Local and Arterial Streets, Pedestrian Facilities, and Bikeways - Surfacing See Standard Details 201 or 202 and Appendix A and B for the minimum paved section. Any proposed exception to these materials will be subject to soils strength testing and traffic loading analysis and subject to review and approval by the Director of PW as outlined in EDG 4.02.	Pervious pavement options should be an allowed alternative where feasible without unnecessary difficulty of requiring studies and approval by the Director of PW. Pervious pavement would be particularly viable on pedestrian and bikeways, alleys, and residential access streets.
EDG 4.01.C	BMP: Permeable Paving	Runoff quality and volume control	Driveway Approaches - Surfacing Surface material depends on street type - curbed street requires driveway approach paved with portland cement concrete Class 4000 from curb to back edge of sidewalk. Shoulder and ditch sections require driveway approaches surfaces as required by SD 306. Thickened edge roadways with underground utilities, portland cement concrete may be used for driveways between the thickened edge and the right-of-way line provided that a construction joint is installed at the right-of-way line.	Pervious surfacing should be allowed where feasible.
EDG 5.03	BMP: Bioretention Areas	Runoff quality and volume control	Street Trees & Amenity Zones Landscaping in the right-of-way shall be coordinated with off-street landscaping required on developer's property under the provisions of Chapter 20.50 SMC. Existing trees and landscaping shall be preserved where desirable and placement of new trees shall be compatible with other features of the environment. New trees must be consistent with the approved street tree list (App C).	Amenity zones may be a useful place for LID features. Street trees/landscaping should be compatible with LID BMPs. It is good that they are encouraging tree/landscaping retention. Tree box design for street trees might be something to consider.
EDG 7.01	LID Concept Overall		Drainage Drainage facilities shall be designed consistent with the 1998 King County Surface Water Design Manual (urban environments only) and Chapter 20.60, subchapter 3 or the SMC and the City of Shoreline Surface Water Design Code (Section 1: Addendum to the 1998 KCSWDM).	While the '98 KCSWDM is weak in terms of LID principles, Section 1 provides for alternative methods in 1.2.9 to encourage LID/LEED projects. This could be expanded to incorporate alternative LID sections for additional support.

APPENDIX D - LID and Green Building Code Assessment

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
EDG 739	P: Minimize Curb & Gutter	Minimize effective imperviousness	Rock Lined Shoulder Ditches & Curbed or Turnpike Shoulders	Consider providing alternative sections that include bioretention.
EDG Appendix A	P: Narrow Streets	Minimize total imperviousness	Street Minimum Widths Alley Minimum Pavement Width: 16' Neighborhood Collector Min. Pavement Width: 28' Local Street Min. Pavement Width: 24'	It may be possible to further reduce these minimum pavement widths in some cases. In particular, the local street minimum pavement width might be reduced. However, Shoreline has done a good job of minimizing road widths and these standards are reasonable.
EDG Appendix A	P: Minimize Curb & Gutter	Minimize effective imperviousness	Street Curb Requirements Alleys: no curb requirement Neighborhood Collectors: Type A curb required Local Streets: Type A curb required	Alternative standards should be considered where curb and gutter are not required for all street sections.
EDG Appendix C	BMP: Bioretention Areas	Runoff quality and volume control	Street Tree Planting Schedule	This street tree list should be evaluated to determine if it includes trees that will be effective for LID purposes. Comments/notes section could incorporate those trees good for LID bioretention areas.
SMC 15.05.030	BMP: Minimal excavation foundations	Runoff flow and volume control	International Building Code Amendments	Minimal excavation foundations (pin foundations) should be evaluated to ensure that the IBC does not preclude them. Further, a local amendment might be incorporated to encourage pin foundations.
SMC 20.30.410	P: Cluster Development/ Open Space	Minimize total imperviousness	Preliminary subdivision review procedures and criteria. A. Environmental. 1. Where environmental resources exist, such as trees, streams, ravines or wildlife habitats, the proposal shall be designed to fully implement the goals, policies, procedures and standards of the critical areas chapter, Chapter 20.80 SMC, Critical Areas, and the tree conservation, land clearing and site grading standards sections. 2. The proposal shall be designed to minimize grading by using shared driveways and by relating street, house site and lot placement to the existing topography. 3. Where conditions exist which could be hazardous to the future residents of the land to be divided, or to nearby residents or property, such as, flood plains, steep slopes or unstable soil or geologic conditions, a subdivision of the hazardous land shall be denied unless the condition can be permanently corrected, consistent with subsections (A)(1) and (2) of this section. 4. The proposal shall be designed to minimize off-site impacts, especially upon drainage and views.	There is good language here that would encourage LID. With more regulations, guidance, and engineering design standards, LID could be a feasible approach for developers to use when designing subdivisions. Since there seems to be limited application of such zoning techniques as PRD/PUD/Cottage Housing, a LID incentive program tied to such techniques could be considered.
SMC 20.30.410.B	P: Pedestrian Paths	Minimize total imperviousness	Pedestrian paths w/n subdivisions 4. Pedestrian walks or bicycle paths shall be provided to serve schools, parks, public facilities, shorelines and streams where street access is not adequate.	Should allow such paths to use pervious materials.
SMC 20.30.410.D	P: Minimize Curb & Gutter	Minimize effective imperviousness	1. Improvements which may be required, but are not limited to, streets, curbs, pedestrian walks and bicycle paths, critical area enhancements, sidewalks, street landscaping, water lines, sewage systems, drainage systems and underground utilities. 2. Improvements shall comply with the development standards of Chapter 20.60 SMC, Adequacy of Public Facilities.	Chapter 20.60 contains general language that wouldn't preclude LID. Alternative sections and standards for LID would be one way to encourage LID projects.
SMC 20.30.420.J	P: Alley Access	Minimize total imperviousness	Alleys Alleys shall be used for loading and vehicle access wherever practicable.	Good opportunity to reduce impervious surface and reduce front yard setbacks.

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
SMC 20.50.020	P: Cluster Development/ Open Space	Minimize total imperviousness	Impervious Surface Coverage R-4 45%, R-6 50%, R-8 65%, R-12 75%, R-18 85%, R-24 85%, R-48 90%	Impervious surface reduction would be an asset to LID - perhaps a reduced coverage for lower density development might be considered. In addition, higher density development could be encouraged to use pervious pavement and other LID BMPs that would reduce impervious coverage consistent with the modeling assumptions in the DOE Manual. The 2005 DOE Manual allows pervious pavement to be modeled at the half the area (e.g., 5,000 square feet of pervious pavement is only modeled as 2,500 square feet). Until the City adopts the 2005 DOE Manual (or equivalent), most public works professionals would not recommend this reduction because it is widely believed that the predicted
SMC 20.50.020, .040, .070, .080	P: Cluster Development/ Open Space	Minimize total imperviousness	Dimensional Standards Min Front Yard/Rear Yard/Side Yard setbacks and exceptions, such as: 20.50.040.F - Allowance for Optional Aggregate Setback, for lots w/ unusual geometry, flag lots, an existing cluster of significant trees, etc. City may reduce the individual required setbacks.	Shoreline has relatively small setback requirements and a variety of exceptions that offer developers a chance to preserve native vegetation or unique characteristics of the site. They offer opportunities to use zero lot line and alley loaded designs.
SMC 20.50.140.E	P: Cluster Development/ Open Space	Minimize total imperviousness	Parking Break large parking areas into smaller ones to reduce their visual impact and provide easier access for pedestrians. Limit individual parking areas to no more than 30 parking spaces.	While this standard is meant to serve urban design purposes, it could also be an opportunity to utilize LID BMPs for stormwater management by utilizing the landscape areas for bioretention.
SMC 20.50.140.F	P: Cluster Development/ Open Space	Minimize total imperviousness	Individual Garages/Curb Cuts Minimize the impact of individual garage entrances where they face the street by limiting the curb cut width and visually separating the garage entrance from the street with landscaped areas. Emphasize pedestrian entrances in order to minimize the garage entrances.	This is another urban design standard which could serve LID purposes as well. The landscaped areas could be used for stormwater management with features such as raingardens or biofiltration areas. Moreover, minimizing driveway cuts serves to maximize uninterrupted flow paths.
SMC 20.50.160	P: Cluster Development/ Open Space	Minimize total imperviousness	Open Space Standards for Multifamily development Multifamily projects are required to set aside a certain square footage of the site for common recreational open space. Exception 20.50.160(A)(3) provides an opportunity to use stormwater runoff tracts as credit up to 50% for the open space requirement.	Open space areas, particularly stormwater runoff tracts, could be a good place to encourage LID features such as raingardens and preservation of native vegetation.
SMC 20.50.170	P: Pedestrian Paths	Minimize total imperviousness	Pedestrian circulation and safety Provide direct pedestrian access from building entries to public sidewalks, other buildings, on site open space, and parking spaces. Connect buildings in multifamily complexes such as courtyard bungalows with sidewalks or paved paths.	Pedestrian paths/sidewalks could be encouraged to utilize pervious pavement where feasible.
SMC 20.50.230	P: Cluster Development/ Open Space	Minimize total imperviousness	Impervious Surface Coverage NB & O 85%, CB 85%, RB & I 90%	While commercial and industrial uses demand a higher impervious surface coverage, it could be possible to encourage LID BMPs such as the use of pervious pavement, native vegetation preservation, and biofiltration systems in landscape areas as development incentives.
SMC 20.50.230	P: Cluster Development/ Open Space	Minimize total imperviousness	Bonus for Mixed-Use Projects in NB/O Zones (3) Bonus for mixed-use development in NB and O zones: In order to provide flexibility in types of housing and to meet the policies of the Comprehensive Plan, the base height may be increased for mixed-use development to four stories or up to 50 feet, if the added story is stepped back from the third story walls at least eight feet, and subject to the following requirement: Residential dwelling units shall occupy a minimum of 25 percent to a maximum of 90 percent of the total floor area of the building.	This bonus density opportunity for mixed-use projects could be a model for how to utilize bonuses for projects that incorporate LID BMPs. It should be evaluated where bonus density would make sense.
SMC 20.50.240(A)(1)	P: Cluster Development/ Open Space	Minimize total imperviousness	Street Frontage/Exception for Plazas In order to form an outdoor plaza or courtyard with a clear walkway connecting the sidewalk to the building entry, the 50 percent building street frontage may be reduced.	Plazas present a place to encourage the incorporation of bioretention facilities in landscaped areas and pervious pavement in more dense situations.

APPENDIX D - LID and Green Building Code Assessment

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
SMC 20.50.240(A)(2)	P: Parking	Minimize total imperviousness	Street Frontage/Parking Standards In cases where buildings have little relationship to pedestrians, pedestrian frontage may be created by connecting design elements to the street....Such pedestrian accesses through parking shall provide the following elements: 1. Vertical plantings, such as trees or shrubs; 2. Texture, pattern, or color to differentiate and maximize the visibility of the pedestrian path; 3. Emphasis on the building entrance by landscaping and/or lighting, and avoiding location of parking spaces directly in front of the entrance. 4. The pedestrian walkway or path shall be raised three to six inches above grade in a tapered manner similar to a speed table.	This might be a place to encourage the incorporation of bioretention facilities in landscaped areas and pervious pavement for walkways.
SMC 20.50.250	P: Pedestrian Paths	Minimize total imperviousness	Pedestrian circulation and safety A. Pedestrian and bicycle access shall be incorporated to and through all developments where the total site area exceeds 28,000 square feet (half a City block). B. Minimize curb cuts for vehicle access that will disrupt pedestrian and/or bicycle flow, and provide shared driveway access where possible.	Consider additional language encouraging pervious pavement for walkway material. It is good Shoreline encourages shared driveways as a mechanism to reduce impervious surface.
SMC 20.50.300	LID Concept Overall		20.50.300 General requirements. A. Tree cutting or removal by any means is considered a type of clearing and is regulated subject to the limitations and provisions of this subchapter. B. All land clearing and site grading shall comply with all standards and requirements adopted by the City of Shoreline. Where a Development Code section or related manual or guide contains a provision that is more restrictive or specific than those detailed in this subchapter, the more restrictive provision shall apply. C. Permit Required. No person shall conduct clearing or grading activities on a site without first obtaining the appropriate permit approved by the Director, unless specifically exempted by SMC 20.50.310. D. When clearing or grading is planned in conjunction with development that is not exempt from the provisions of this subchapter, all of the required application materials for approval of tree removal, clearing and rough grading of the site shall accompany the development application to allow concurrent review.	Site analysis requirements/encouragement could be incorporated into the Subchapter 5 - Tree Conservation, Land Clearing, and Site Grading Standards on tree retention/site development. In particular, this Subchapter lacks attention to the need to map and preserve native soils. It may fit here or merit an entirely new section.
SMC 20.50.300	BMP: Limit clearing, grading, and construction to dry season	Runoff reduction	General Requirements	There is no mention of encouraging clearing and grading activity during the dry season.
SMC 20.50.330.D	P: Soil Analysis	Maximize site infiltration capacity	Preconstruction Meeting Requirements An on-site meeting is required prior to the commencement of permitted clearing and grading activities. The site must be marked to indicate: (1) The extent of clearing and grading to occur, (2) Delineation of any critical areas and critical area buffers, (3) Trees to be removed and retained; and, (4) Property lines.	Add to this that native soils and vegetation protection areas should be delineated on-site with fencing.
SMC 20.50.330.D	P: ID and protect important tree and native vegetation stands from root damage, soil compaction, stockpiling	Runoff minimization	1. For the following areas, the retention and planting plan and any application and permit plans shall show all trees designated for protection.... 2. The Director may require that protected trees be permanently preserved within a tract, easement or other permanent protective mechanism.	It is great that Shoreline encourages retention areas to be designated and protected. This language could be expanded to offer additional support for LID principles and BMPs, provided those areas have water-tolerant plantings.

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
SMC 20.50.330.E	BMP: Write a site construction plan	Runoff minimization	Preconstruction Meeting E. Preconstruction Meeting Required. Prior to the commencement of any permitted clearing and grading activity, a preconstruction meeting shall be held on-site with the permittee and appropriate City staff. The project site shall be marked in the field as follows: 1. The extent of clearing and grading to occur; 2. Delineation of any critical areas and critical area buffers; 3. Trees to be removed and retained; and 4. Property lines.	A preconstruction meeting is an important way to educate permittees to the importance of clearing and grading activities and its impact on LID. A fifth item to delineate onsite might be native soil and vegetation protection areas. Trees to be retained should be fenced along their critical tree root zone. Perhaps add that areas to be preserved will be marked with fencing. This requirement may be useful in tandem with encouraging a site construction plan.
SMC 20.50.3370.B/C	BMP: Fence vegetation and soils that are to be protected	Runoff reduction	B. Tree dripline areas shall be protected. No fill, excavation, construction materials, or equipment staging or traffic shall be allowed in the dripline areas of trees that are to be retained. C. Prior to any land disturbance, temporary construction fences must be placed around the dripline of trees to be preserved. If a cluster of trees is proposed for retention, the barrier shall be placed around the edge formed by the drip lines of the trees to be retained.	This is great; however, Shoreline needs to determine if it should continue protecting driplines or move toward protecting critical tree root zones. Per the Technical Guidance Manual for LID: "The dripline method may be applicable for broad-canopy trees; however, this method will likely underestimate the extent of roots and lead to extensive root damage for narrow-canopied trees and leaning trees....As a general guideline, the trunk diameter method provides more design flexibility for variable growth patterns. Also - should consider incorporating similar requirements for soil preservation areas. Gig Harbor, for example, goes 10 feet beyond the dripline.
SMC 20.50.340.A	BMP: Establish Erosion and Sediment Controls just before or immediately after clearing and grading begins	Runoff reduction	A. Any activity that will clear, grade or otherwise disturb the site, whether requiring a clearing or grading permit or not, shall provide erosion and sediment control (ESC) that prevents, to the maximum extent possible, the transport of sediment from the site to drainage facilities, water resources and adjacent properties. Erosion and sediment controls shall be applied as specified by the temporary ESC measures and performance criteria and implementation requirements in the adopted stormwater management design manual.	Erosion and sediment control measures should be applied just before the commencement of site development activities.
SMC 20.50.340.B.4	BMP: Designate stockpile areas and establish away from protection areas	Runoff reduction	Fill Material Detrimental amounts of organic material shall not be permitted in fills. Only earth materials which have no rock or similar irreducible material with a maximum dimension greater than 12 inches shall be used. In absence of an approved soils engineering report, these provisions may be waved...	More could be said here about creating areas for stockpiling and keeping them separate from protection areas. Also, this could be a place to talk about amending site soils and the value of stockpiling on-site topsoil for later use in landscape areas.
SMC 20.50.340.B.4	BMP: Stockpile and reuse excavated soils	Runoff reduction	Fill Material	This could be a place to encourage the stockpiling and reuse of excavated soils. Also need to incorporate requirements to cover or seed stockpiled soils to prevent erosion (LID BMP).
SMC 20.50.340.C	BMP: Phase construction to limit activities that can damage vegetation and soil, this includes phasing clearing and grading activities	Runoff reduction	Access Roads Access roads to grading sites shall be maintained and located to the satisfaction of the Director to minimize problems of dust, mud and traffic circulation.	Access roads should be limited to one, if at all possible. In addition, if they can be located at the site of the future road, unnecessary soil compaction can be avoided.
SMC 20.50.340.F	BMP: Fence vegetation and soils that are to be protected	Runoff reduction	Temporary Fencing Temporary fencing, where required by the Director, to protect life, limb and property, shall be installed. Specific fencing requirements shall be determined by the Director.	Fencing is an important component in the protection of trees, vegetation, and soils from site development activities. More instruction about what is required to be fenced might be appropriate here.

APPENDIX D - LID and Green Building Code Assessment

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
SMC 20.50.350(B)1	P: Attempt to keep existing vegetation interconnected	Runoff minimization	1. The Director may allow a reduction in the minimum significant tree retention percentage to facilitate preservation of a greater number of smaller trees, a cluster or grove of trees, contiguous perimeter buffers, distinctive skyline features, or based on the City's concurrence with a written recommendation of an arborist certified by the International Society of Arboriculture and approved by the City that retention of the minimum percentage of trees is not advisable on an individual site.	This section gives an opportunity to maintain vegetation in an interconnected manner. More explicit support for such practices might be incorporated.
SMC 20.50.350.C	P: Attempt to keep existing vegetation interconnected	Runoff minimization	Incentives for Higher Levels of Tree Protection The Director may grant reductions or adjustments to other site development standards if the protection levels identified in subsection (B) of this section are exceeded. On a case-by-case review, the Director shall determine the balance between tree protection that exceeds the established minimum percentage and variations to site development requirements. If the Director grants adjustments or reductions to site development standards under this provision, then tree protection requirements shall be recorded on the face of the plat, as a notice to title, or on some other legal document that runs with the property. Adjustments that may be considered are: 1. Reductions or variations of the area, width, or composition of required open space and/or landscaping; 2. Variations in parking lot design and/or any access driveway requirements; 3. Variations in building setback requirements; 4. Variations of grading and stormwater requirements.	The minimum tree retention requirements are 20% of the significant trees on a given site, excluding critical areas and buffers, or at least 30% of the significant trees, including critical areas and buffers. If these are exceeded, this section provides incentives in the form of relaxed development standards (approved by the Director). This type of flexibility could be used with LID projects as well.
SMC 20.50.350.D	P: Attempt to keep existing vegetation interconnected	Runoff minimization	1. Trees should be protected within vegetated islands and stands rather than as individual, isolated trees scattered throughout the site.	This is good support for the LID principle to keep vegetation interconnected. More support might be considered for this principle.
SMC 20.50.350.D	P: Attempt to keep existing vegetation interconnected	Runoff minimization	2. Site improvements shall be designed to give priority to protection of trees with the following characteristics, functions, or location: •Existing stands of healthy trees that have a reasonable chance of survival once the site is developed, are well shaped to withstand the wind and maintain stability over the long term, and will not pose a threat to life or property. •Trees which exceed 50 feet in height. •Trees and tree clusters which form a continuous canopy. •Trees that create a distinctive skyline feature. •Trees that have a screening function or provide relief from glare, blight, commercial or industrial harshness. •Trees providing habitat value, particularly riparian habitat. •Trees within the required yard setbacks or around the perimeter of the proposed development. •Trees having a significant land stability function. •Trees adjacent to public parks, open space, and sensitive area buffers. •Trees having a significant water-retention function, such as cottonwoods.	This is good support/prioritization of trees to preserve that also supports LID. The prioritization of trees with water-retention function is particularly relevant for LID projects.
SMC 20.50.350.D	P: Attempt to keep existing vegetation interconnected	Runoff minimization	3. Building footprints, parking areas, roadways, utility corridors and other structures shall be designed and located with a consideration of tree protection opportunities.	This is good site analysis language - good to encourage developers to think up front about preserving native vegetation.
SMC 20.50.350.D	BMP: Fence vegetation and soils that are to be protected	Runoff reduction	Grading/Trees 4. The project grading plans shall accommodate existing trees and avoid alteration to grade around existing significant trees to be retained.	This is good - could be stronger and state that excavation or changing of grade near trees designated for protection will be limited to the absolute minimum within the trees' critical root zones. Trenching within the critical root zones should be restricted. Stockpiling/disposal of excavated or construction materials should be prohibited within vegetation retention areas. Efforts should be taken to minimize soil compaction within these zones.

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
SMC 20.50.360	BMP: Bioretention Areas	Runoff quality and volume control	Tree replanting and site restoration	Add language to encourage a selection of species based on the underlying soils and the historic, native indigenous plant community type for the site. Emphasize climax species and encourage a mix similar to native forests (2 evergreen to 1 deciduous)
SMC 20.50.360.K	BMP: Perform post-construction inspection to verify re-vegetated areas are stabilized and stormwater management systems are working properly	Runoff minimization	Performance Assurance - performance bond and maintenance bond for tree replacement and site restoration permits	Consider adding a section here that addresses the need for clearly written plans and tools are necessary to maintain the benefits of native vegetation/replanting areas over time. Key mechanisms include HOA covenants, transfers/dedication of land to City or land trusts, easements/tracts, and property owner education. Such language could be incorporated into this section.
SMC 20.50.360.L	BMP: Perform post-construction inspection to verify re-vegetated areas are stabilized and stormwater management systems are working properly	Runoff minimization	Monitoring - The Director may require submittal of periodic monitoring reports as necessary to ensure the survival of replacement trees.	Consider adding a section here that addresses the need for clearly written plans and tools are necessary to maintain the benefits of native vegetation/replanting areas over time. Key mechanisms include HOA covenants, transfers/dedication of land to City or land trusts, easements/tracts, and property owner education. Such language could be incorporated into this section.
SMC 20.50.390.C	P: Parking	Minimize total imperviousness	For all nonresidential uses, the maximum amount of allowed parking shall not exceed 50 percent over the minimum required number of stalls. Any proposal for parking that exceeds 10 percent over the minimum required number of stalls must be approved by the Director.	This is a good start to creating maximum standards. It is unclear as to if it applies to residential uses (second sentence seems to). The 50% maximum might be too high for nonresidential uses.
SMC 20.50.390A, B, C, D	P: Parking	Minimize total imperviousness	Minimum off-street parking requirements - Standards	Shoreline does not use maximum requirements, just minimum requirements. They could consider further reducing their minimum requirement and incorporating a maximum standard. (See below)
SMC 20.50.400	P: Parking	Minimize total imperviousness	Reductions to minimum parking requirements Required parking may be reduced by 20 percent with coordinated design and shared access to consolidated parking areas linked by pedestrian walkways. Multiple parcels may be treated as a single development site if all owners sign a binding and recorded agreement. The requirement for primarily nighttime uses, such as theaters, bowling alleys and restaurants, may be supplied in part by parking serving primarily daytime uses, such as banks, offices and retail stores. B. The Director may approve a reduction of up to 50 percent of the minimum required number of spaces if: 1. The applicant can prove that parking demand can be adequately met with a reduced parking requirement through measures such as proximity to transit routes, commuter trip reduction programs, supplementary on-site nonmotorized and high occupancy vehicle facilities, or 2. The applicant can prove that parking demand can be adequately met through a shared parking agreement.	A. Shoreline offers ways to reduce minimum parking requirements through shared parking agreements, commute trip reduction programs, and close proximity to transit routes. Parking is a key source of impervious surface, particularly in commercial, multifamily, and industrial projects. It is great that Shoreline is considering alternatives. Additional alternatives/incentives to minimize parking should be considered.
SMC 20.50.410	P: Parking	Minimize total imperviousness	4. No more than 50 percent of the required minimum number of parking stalls may be compact spaces.	It is good that Shoreline allows compact spaces - this percentage is respectable. Compact stalls could be encouraged or required in certain situations.
SMC 20.50.410	BMP: Permeable Paving	Runoff quality and volume control	A. All vehicle parking for single-family detached dwellings and duplexes must be in a garage, carport or on an approved impervious surface.	Pervious pavement should be allowed where it is feasible.
SMC 20.50.410(C)(1)	P: Parking	Minimize total imperviousness	In commercial zones, the Director may allow required parking to be supplied in a shared parking facility that is located more than 500 feet from the building it is designed to serve if adequate pedestrian access is provided and the applicant submits evidence of a long-term, shared parking agreement.	Shared parking agreements offer an opportunity to reduce impervious surfaces by sharing parking between uses with either day- or night-orientation.
SMC 20.50.410J, K	P: Parking	Minimize total imperviousness	Loading Requirements	The use of pervious pavement in loading zones should be considered.

APPENDIX D - LID and Green Building Code Assessment

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
SMC 20.50.430	P: Pedestrian Paths	Minimize total imperviousness	<p>Nonmotorized access and circulation - Pedestrians</p> <p>A. Commercial or residential structures with entries not fronting on the sidewalk should have a clear and obvious pedestrian path from the street front sidewalk to the building entry.</p> <p>B. Pedestrian paths should be separate from vehicular traffic where possible, or paved, raised and well marked to clearly distinguish it as a pedestrian priority zone.</p>	Pervious pavement options could be encouraged.
SMC 20.50.460	BMP: Bioretention Areas	Runoff quality and volume control	<p>Landscaping Standards</p> <p>C. Existing, healthy trees and shrubs, vegetated critical areas, landscaped bio-swales, or trees and their area within the dripline may substitute for required landscaping tree-for-tree and area-for-area. In order to promote the retention of existing mature trees during site development, credit shall be given for one additional required tree if the retained tree is significant (eight-inch diameter at breast height for conifer and 12-inch diameter at breast height if deciduous). (See Subchapter 5 of this chapter, Tree Conservation, Land Clearing, and Site Grading Standards, and Chapter 20.80 SMC, Critical Areas, for additional requirements).</p>	This is a good alternative that would encourage LID-type projects. It should be considered whether Shoreline wants to continue using the dripline approach or transition to critical tree root zone preservation.
SMC 20.50.470	BMP: Bioretention Areas	Runoff quality and volume control	<p>Street frontage landscaping Standards</p> <p>A. A 10-foot width of Type II landscaping for all development including parking structures, surface parking areas, service areas, gas station islands, and similar paved surfaces.</p> <p>B. A 20-foot width of Type II for institutional and public facilities in residential zone areas.</p> <p>C. Frontage landscaping can be substituted in multifamily, commercial, office, and industrial zones with two-inch caliper street trees 40 feet on center if they are placed in tree pits with iron grates or in planting strips along the backside of curbs. Institutional and public facilities may substitute 10 feet of the required 20 feet with street trees.</p> <p>D. Trees spacing may be adjusted to accommodate sight distance requirements for driveways and intersections. See SMC 20.50.520(O) for landscaping standards.</p>	Alternative frontage landscaping requirements for LID projects could be considered.
SMC 20.50.480	BMP: Bioretention Areas	Runoff quality and volume control	Street Tree Standards	Ensure that the City-approved list incorporates key native trees, specify which ones are appropriate with regard to soils/site constraints to encourage proper utilization. The Technical Guidance Manual for LID encourages creating multi-layer canopy structures with small, medium, and large trees and shrubs; emphasizing climax species; and mixing trees similarly to native forest situations with 2 evergreen trees to 1 deciduous.

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
SMC 20.50.490	BMP: Bioretention Areas	Runoff quality and volume control	Landscaping along interior lot lines A. Type I landscaping in a width determined by the setback requirement shall be included in all nonresidential development along any portion adjacent to single-family and multifamily residential zones or development. All other nonresidential development adjacent to other nonresidential development shall use Type II landscaping within the required setback. If the setback is zero feet then no landscaping is required. B. Multifamily development of more than four units shall use Type I landscaping when adjacent to single-family residential zones and Type II landscaping when adjacent to multifamily residential and commercial zoning within the required yard setback. C. A 20-foot width of Type I landscaping shall be provided for institutional and public facility development adjacent to single-family residential zones. Portions of the development that are unlit playgrounds, playfields, and parks are excluded.	Consider adding support for bioretention and native vegetation preservation.
SMC 20.50.500	BMP: Bioretention Areas	Runoff quality and volume control	Landscaping of Surface Parking Area - Standards Multifamily developments with common parking areas shall provide planting areas in parking lots at the rate of 20 square feet per parking stall. B. Commercial, office, industrial, or institutional developments shall provide landscaping at a rate of: 1. Twenty square feet per parking stall when 10 to 30 parking stalls are provided or; 2. Twenty-five square feet per parking stall when 31 or more parking stalls are provided. D. Permanent curbs or structural barriers shall be provided to protect shrub and trees from vehicle barriers....	A. Parking lot landscaping areas offer a place for bioretention facilities. Perhaps a less prescriptive approach could be used for LID projects that consider site characteristics as well as aesthetics.
SMC 20.50.510	BMP: Bioretention Areas	Runoff quality and volume control	Alternative landscape design Alternative landscape designs may be allowed, subject to City approval, if the design accomplishes equal or better levels of Type I or II landscaping.	This section might be a place to incorporate LID standards more explicitly.
SMC 20.50.520	BMP: Bioretention Areas	Runoff quality and volume control	General standards for landscape installation and maintenance E. Plant selection shall consider adaptability to climatic, geologic, and topographical conditions of the site. Preservation of existing vegetation is encouraged.	This is good language that is supportive of LID. Perhaps some of this information can be incorporated into the City approved lists of trees.
SMC 20.50.520	BMP: Bioretention Areas	Runoff quality and volume control	General standards for landscape installation and maintenance N. Applicants shall provide a landscape maintenance and replacement agreement to the City prior to issuance of a certificate of occupancy.	The LID Technical Guidance Manual supports clearly written management plans and protection mechanisms to maintain landscape/open space areas over time. HOA covenants, property owner education, dedicated tracts/easements, and dedication to City or land trusts are key methods.
SMC 20.60.090	LID Concept Overall		Core surface water and stormwater requirements This section features additional core requirements required for development proposals subject to drainage review and are additional requirements to those described in the Surface Water Design Manual. Core requirements include: (1) Discharge at a Natural Location (2) Off-site analysis (3) Flow control (4) Conveyance system (5) Erosion and sediment plan (6) Maintenance and operation (7) Financial guarantees and liability (8) Water quality	These are good additional requirements, which often are in line with LID principles and BMPs. Perhaps additional support for LID could be inserted here, either as separate core requirements in certain impacted drainage basins or revisions to include LID support within the existing core requirements.
SMC 20.60.100	LID Concept Overall		Any applicable special requirements are required to be met for all development proposals required to have drainage review. They include: (1) Other adopted area-specific requirements, such as critical areas (2) Floodplain/floodway delineation in areas adjacent to floodplains, streams, wetlands, etc. (3) Flood protection facilities when adjacent to a class 1 or 2 stream w/ existing flood protection facilities (4) Source control, where a proposal requires a commercial building or commercial site development permit, then water quality source controls are applied to prevent rainfall and runoff from coming into contact with pollutants, (5) Oil control, where developments are a high-use site or a redevelopment proposal is proposing \$100,000 or more of improvements to an existing high-use site, oil control shall be applied to all runoff from the high-use portion of the site.	Some of these special requirements might offer a place to encourage LID principles or BMPs, in certain sensitive basins.

APPENDIX D - LID and Green Building Code Assessment

Code Reference	LID Principle (P:) or BMP:	LID Concept	Description	Problem or Gap
SMC 20.60.130	LID Concept Overall		Best Management Practices A. The City adopts "Urban Landuse BMPs, Volume IV of the 1992 Stormwater Management Manual for the Puget Sound Basin" (DOE SWMM), and future amendments by reference as the Source Control BMP Manual for the City of Shoreline.	The City should additionally adopt the 2005 LID Technical Guidance Manual (PSAT).
SMC 20.100.010	P: Cluster Development/ Open Space	Minimize total imperviousness	Master Plans	Shoreline seems to use Master Planning processes, such as SMC 20.100.010, First Northeast Transfer Station Master Plan and the Fircrest Campus Excess Property Master Plan (in the works in Seattle's AHBL office). Master planning processes offer a great opportunity to utilize LID. There does not appear to be any code support for master planning processes w/n the SMC - but this could be a key place to encourage LID.
SMC 20.xx.xxx	P: Cluster Development/ Open Space	Minimize total imperviousness	No PUD/PRD/Cottage Housing regs	There are no provisions for PUDs/PRDs/Cottage Housing that were found in the SMC. Cottage housing was repealed by Ord 408. These types of regulations can encourage innovation through design flexibility. Affordable housing was the only density bonus found (SMC 20.40.230). LID could be encouraged/required as a mechanism to get additional density or other developer benefits.
SMC 20.xx.xxx	P: Establish Soil Conservation Areas	Runoff minimization	Except for erosion hazard areas, soil conservation areas are not specifically included in the SMC.	Soil conservation is a key principle of LID. This should be incorporated in a variety of places throughout the code.
SMC 20.xx.xxx	BMP: Vegetated Roofs	Runoff quality, flow, and volume control	No mention of green roof standards.	There should be standards/guidelines created to encourage green roofs in a variety of settings.

APPENDIX E
Sustainable Decision Making



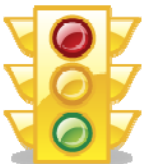

Sustainability Assessment: Draft Working Tool (Task 1.A.5)

Step 1: Identify and Distill Potential Action or Decision

Clearly identify a topic, policy issue, action or issue that you would like to evaluate for its impact on sustainability. The action should be phrased as a statement, such as “establish detailed sustainability purchasing policies and procedures” – and should be as specific and concrete as possible.

Step 2: Initial Qualitative Evaluation and Comparison


Evaluate each idea based on the sustainability criteria below (which are based on the Draft Guiding Principles) by putting a check in each box where the potential action, on balance, positively impacts the criterion listed. It is helpful to list potential actions and/or alternative actions within the same table to aid in benefit comparison, gap analysis and prioritization. Some users may also want to sum the checkmarks for each potential action, however certain criteria deserve greater emphasis. An action should address at least one of the four environmental focus areas (in green), to be considered a potential sustainability initiative or action. Preferred actions will also usually provide a clear or direct economic, social, and/or human health and safety benefit as well (in yellow).

POTENTIAL ACTION	SUSTAINABILITY					FEASIBILITY			
	Advances sustainable development & transportation	Directly + Impacts Energy Conservation and Carbon Reduction	Likely to result in Improved Local Ecosystem Health	Tangible Waste Reduction and Resource Efficiency Benefits	Provides Clear or Direct Economic, Social, or Human Health and Safety Benefits	Relies upon existing system, proven technology or incremental change	Promotes City Leadership and/or Broader Participation	Represents a Potential Quick Win	Recommendation:
Develop Sustainable Purchasing Guidelines for All Staff		✓	✓	✓	✓	✓	✓	✓	
									
									
									

If the initial evaluation indicates an idea presented is worthy of further thought, it should be given the “green light” for a modified SWOT analysis. Eliminate items (red light) or hold items (yellow light) for future consideration if more information is needed or there are higher priorities. When eliminating or “holding” ideas, record rationale for future reference.

Step 3: Modified SWOT Analysis

This step allows more detailed qualitative analysis of those potential actions that are able to pass through the filter of Step 2. Although presented here as Step 3, the Modified SWOT Analysis is also useful when evaluators find it difficult to establish whether an action is consistent with a criterion, and represents a “feedback” loop that provides an opportunity to revise the Step 2 evaluation.



POTENTIAL ACTION:		RECOMMENDATION & RATIONALE:	
Develop Sustainable Purchasing Guidelines for All Staff			
			
Evaluation Criterion	Strengths	Weakness	Unknowns or Level of Control Over Outcome
Advances sustainable development & transportation	None.	None.	Not clear how this would impact criterion.
Directly Impacts Energy Conservation and Carbon Reduction	Products purchased under sustainable purchasing guidelines would be more energy efficient and have lower carbon emissions.		
Likely to result in Improved Local Ecosystem Health	Products purchased under sustainable purchasing guidelines would reduce impacts to local air and water quality.		Benefits to local ecosystem health may be difficult to quantify. Measurement of change could be difficult.
Tangible Waste Reduction and Resource Efficiency Benefits	Products purchased under sustainable purchasing guidelines would emphasize reducing, reusing, and recycling resources.	Adjustments to perceived quality of sustainable products may be slow.	
Provides clear or direct economic, social, or human health and safety benefits	Products purchased under sustainable purchasing guidelines should be more economical in the long term, less harmful to ecosystem/human health., and promote sustainable business .		Unknowns regarding lifecycle costs could require more investigation and documentation.
Relies upon existing system, proven technology or incremental change	Existing sustainable products could be substituted for less sustainable products and more could be added as they become available or more cost effective.	Unproven, yet potentially beneficial products may be dismissed.	
Promotes City Leadership and/or Broader Participation	City leadership in the purchase of sustainable products would strengthen the market for sustainable goods leading to greater availability.		City’s ability to influence availability of sustainable products and purchasing by general public could be limited.
Represents a Potential Quick Win	Using sustainable purchasing guidelines could be implemented quickly and benefits documented.	Documenting benefits would require coordination and training city-wide. Product lists would be very useful, but would take a greater level of effort.	

APPENDIX E — Sustainable Decision Making

If, on balance, the idea seems worthy of further analysis, it should be given the “green light” for cost and resource evaluation. Eliminate (red light) or table (yellow light) items. When eliminating or “holding” ideas, be sure to record rationale for future reference.

Step 4: Preliminary Cost and Resource Evaluation

Evaluate potential actions that are given the “green light” in Step 2 on the basis of cost and other resource availability factors. Red should be selected if costs appear to be an insurmountable barrier when compared to potential benefits, yellow if costs represent a barrier to short term implementation and possible long term implementation, and green should be selected if after evaluation of costs, the idea appears to be worthy of further consideration.

POTENTIAL ACTION	Initial Cost Increase?	Lifecycle Cost Savings?	Cost Estimate (if known)	Able to Accomplish Using Existing Resources?	Resource Assistance Availability and Details	Summary Cost Evaluation (TBD)
Develop Sustainable Purchasing Guidelines for All Staff	No, not if done by existing staff	Yes	TBD	Yes, with implementation steps to be described in Sustainability Strategy	Yes, details TBD	
						
						
						
						
						

APPENDIX F
Draft Indicators

Energy Conservation and Carbon Reduction	
Internal/Operations:	
1)	<p>Objective: Reduce energy consumption in City facilities.</p> <p>Target: Reduce energy consumption in City facilities from baseline by 5% per year and 20% by 2012.</p> <p>Indicator: Percentage decrease in City’s monthly electric and gas usage bills (measured in consumption unit/sf) -- obtainable from SCL and PSE.</p> <p>Discussion: 2012 is both consistent with the US Mayors Climate Protection Agreement language and aligned with the City of Shoreline update to its Comprehensive Plan.</p> <p>Dept/Data Source: PW-F/O or PCRS – whoever manages each facility. Data from PSE and SCL bills or directly from utility companies</p>
2)	<p>Objective: Increase reliance on Green Power in City facilities, in order to reduce carbon emissions from facilities, consistent with US Mayors Climate Protection Agreement and Kyoto Protocol target of 7% reduction from 1990 levels by 2012.</p> <p>Target: Increase Green Power consumption as a proportion of total electricity consumption in City facilities by 10% per year, and 50% by 2012.</p> <p>Indicator: Proportion of City Consumption supplied by alternative energy sources though Seattle City Light "Green Up" Program.</p> <p>Discussion: Could also offset carbon emissions from natural gas and other sources through various initiatives.</p> <p>Dept/Data Source: PW-F/O or PCRS – whoever manages each facility. Data from PSE and SCL bills or directly from utility companies</p>
3)	<p>Objective: Reduce carbon emissions from fleet vehicles and equipment, consistent with US Mayors Climate Protection Agreement and Kyoto Protocol target of 7% reduction from 1990 levels by 2012.</p> <p>Target: Reduce carbon emissions from city fleet vehicles and equipment by increasing average miles/gallon of fleet 5% per year and 25% by 2012.</p> <p>Indicator: Average fleet miles per gallon</p> <p>Dept/Data Source: PW-F/O – fleet manager</p>
4)	<p>Objective: Increase use of alternative fuel vehicles in City fleet.</p> <p>Target: Reduce carbon emissions from city fleet vehicles and equipment by replacing 2% of petroleum-based-fuel vehicles per year with hybrid or alternative fuel vehicles.</p> <p>Indicator: Percentage of fleet that is hybrid or alternative fuel</p> <p>Discussion: This target is consistent with the existing vehicle purchase and replacement policy.</p>

APPENDIX F — Draft Indicators

	Dept/Data Source:	PW-F/O – fleet manager
External/Public:		
5)	Objective:	Reduce energy consumption
	Target:	Reduce per capita/per household energy consumption by 10% in the first year and an additional 3% per year through 2012
	Indicator:	Percentage decrease in consumption units of electric and gas annually (measured in % change per capita or per household)
	Discussion:	Further discussion with PSE and SCL needed, but appears feasible. Could also potentially get at this through statistically valid survey.
	Dept/Data Source:	PW-ES, Data from PSE and SCL directly or through survey
Resource Conservation and Waste Reduction		
Internal/Operations		
6)	Objective:	Reduce solid waste landfilled as a result of City operations
	Target:	Downward (positive) trend. Specific target TBD. E.g. Reduce by 10% per year total volume directed to landfills from City operations
	Indicator:	Volume of total waste generated (as compared to previous 4 years)
	Discussion:	Internal discussion necessary to establish target, but this appears to be plausible at least in the short to medium term.
7)	Objective:	Increase recycling in City operations
	Target:	Upward trend. Specific target TBD. E.g. Increase by 10% the percentage of materials sorted and recycled from City operations waste stream.
	Indicator:	Percentage of total waste recycled (as compared to previous 4 years)
	Discussion:	Internal discussion necessary to establish target, but this appears to be plausible at least in the short to medium term.
8)	Objective:	Increase purchasing of environmentally preferred products for City operations.
	Target:	Adopt a comprehensive Environmental Purchasing Policy (EPP) with specific targets in four key areas: Reduce consumption, reduce toxic materials, increase use of recycled-content materials, and increase use of recyclable materials.
	Indicator:	Percentage of purchases that meet top-tier EPP requirements.
	Discussion:	Shoreline can adapt policies already in place in Seattle, King County, and Washington State.
9)	Objective:	Reduce potable water use in City outdoor operations
	Target:	Downward (positive) trend. Specific target TBD. E.g. Reduce total potable water use for irrigation by 100% by 2012.
	Indicator:	Consumption units per year for outdoor operations based on utility billing.

	Discussion:	Data based on water bill. Potential strategies include stormwater storage and reuse, and Citywide moisture sensors, centrally controlled. Need to investigate how and if consumption units for irrigation are or can be separated.
10)	Objective: Target: Indicator: Discussion:	Reduce potable water use in City indoor operations Downward (positive) trend. Specific target TBD. E.g. Reduce water use in City office facilities by 50% by 2012. Consumption units per year for indoor operations based on utility billing. Baseline will be established to include new City Hall/Civic Center facility. Need to investigate how and if consumption units for indoor operation are or can be separated. Probably want to calibrate this by units/per square foot of space or per employee.
External/Public		
11)	Objective: Target: Indicator: Discussion:	Increase recycling rates in the community Upward trend. Specific target TBD. E.g. Divert an additional 10% per year of total volume from landfills. Percentage of total solid waste recycled by the Community (via CleanScapes) City to determine if this can be measured or monitored through existing waste contract.
12)	Objective: Target: Indicator: Discussion:	Reduce residential potable water consumption Downward (positive) trend. Specific target TBD. E.g. Reduce water use in Shoreline households by 50% by 2012. Consumption units per year per residential customer Data would be gathered from water district billing data. Potential strategies include information outreach, changes to plumbing code interpretation, subsidization for the installation of low-flow and waterless fixtures, and grey water re-use for toilet flushing and irrigation. City will need to coordinate data collection with Shoreline Water District. Could broaden measure to include commercial customers, but size of business customers is more diverse. Could do measures of both units/per employee and units/per resident.
13)	Objective: Target: Indicator: Discussion:	Promote sustainability among Shoreline businesses Upward trend. Specific target TBD. E.g. Increase by 10% each year the number of participating green businesses for the next five years. Number of participating (or certified) green businesses (per year as compared to previous 4 years) Requires establishment of green business program. Sustainable Business Extension program (contracted to ECOSS by the City) does not currently have a CERTIFICATION component. Could track number of businesses that participate in program based on criteria that they offer an environmentally preferable product or service alternative (similar to Chinook book criteria) and implement recommended changes to ECOSS.
Sustainable Development and Green Infrastructure		
Transportation: Transit		

APPENDIX F — Draft Indicators

<p>14)</p>	<p>Objective: Target: Indicator: Discussion:</p>	<p>Increase use of modes of transportation other than single occupant vehicles Upward trend (relative to increasing population), specific number TBD based on review of data Public transit rider-ship or number of transit boardings per year in Shoreline (as compared to previous 4 years) Obtain data from 3 transit agencies, could establish a specific target after baseline data collection. This indicator could also be combined with change in transit rider-ship compared with employment growth and/or park and ride usage (e.g. King County Benchmarks Program) when establishing a trend. Note: The City already conducts a statistically valid survey for "Strategic Objectives and we could get more directly at mode split by asking about it in the survey. Please see "potential future indicator" for additional suggestions.</p>
<p>15)</p>	<p>Objective: Target: Indicator: Discussion:</p>	<p>Increase number of new households (density) near transit Upward trend, specific number could be established through housing strategy or in future comprehensive plan update Percentage of new residential units within 1/4 mile of transit stop with 30 minute minimum headway Requires integrating permit data with GIS analysis, could establish a specific target after baseline data collection and policy discussion.</p>
<p>Transportation: Non-motorized Facilities</p>		
<p>16)</p>	<p>Objective: Target: Indicator: Discussion:</p>	<p>Increase pedestrian facility network length on major streets to make walking to destinations easier and safer Upward trend; specific target TBD Percentage of the total major street length (principal arterials, minor and neighborhood collector) citywide that has separated pedestrian facilities (sidewalk or paved off street trail) on at least one side of the street Target TBD by City based on analysis of GIS data, CIP and internal discussion. Future Transportation Plan update is an opportunity to set the target. May also want to consider establishing a target and indicator for trail improvements as well. Additional investigation of sidewalk connectivity measurements may also be needed - see Pedestrian LOS indicator.</p>
<p>17)</p>	<p>Objective: Target: Indicator: Discussion:</p>	<p>Increase number of bicycle facilities throughout the city to encourage this mode and improve safety Upward trending number, specific target TBD Total miles of designated bicycle routes meeting minimum standard Bike lanes and interurban trail will be measured using GIS. City would need to define a minimum standard for other bike improvements that constitute a "bike route", map these and track year to year or change over 5 years.</p>
<p>Smart Growth</p>		
<p>18)</p>	<p>Objective: Target:</p>	<p>Concentrate new growth in proximity of services and transit Upward trending number, specific numeric goal TBD</p>

	Indicator:	Number of new residential units and total units (or average density) within a designated commercial center (and perhaps a 1/8 mile or other distance from boundary)
	Discussion:	Would need to define boundaries of designated commercial centers, 1/8 mile may be appropriate to the size of the centers themselves
19)	Objective:	Improve pedestrian/bicyclist access to open space and parks
	Target:	Upward trending number, specific numeric goal TBD
	Indicator:	Percentage of households within a 1/4 mile of a neighborhood park or 1/2 mile of a community/regional park
	Discussion:	Similar to measure currently identified in Parks Plan. An alternative measure could also try to get at accessibility through the presence of sidewalks/bicycle facilities on major streets within 1/4 and 1/2 mile of park boundary.
Green Building		
20)	Objective:	Promote efficient energy and material use in buildings
	Target:	Upward trending number, Potential goal might be 3 projects in 2008
	Indicator:	Number of certified LEED and 3+ star BuiltGreen projects within the City (by public and private).
	Discussion:	Seems like an easy measure, but current permit system does not appear to track this.
Potential Future Indicator(s)		
	Objective:	Reduce the number of single occupant vehicle commuters (SOV)
	Target:	TBD by City after collection and analysis of baseline data
	Indicator:	Percent of commute trips taken by a mode other than SOV
	Discussion:	More info needed to develop and apply this, but this is a more encompassing indicator than #1. The City collects Commute Trip Reduction (CTR) data from the City's largest employers and this data could be reported, however it would over estimate the number of workers who take alternative modes if extrapolated and it does not capture people who commute from Shoreline to jobs elsewhere. The City should consider using a statistically valid phone survey to get this data (e.g. expand the existing survey used to obtain the "strategic objectives" measurements). Census numbers can be compared with the phone survey every 10 years. Could also do this in conjunction with an expansion of the CTR program.
	Objective:	Measure and improve the overall pedestrian "level of service"
	Target:	TBD by City after collection of baseline data and refinement of the methodology to match local conditions and factors
	Indicator:	Pedestrian LOS - combination of measuring continuity and directness of pedestrian network

APPENDIX F — Draft Indicators

	Discussion:	More info needed to develop and apply this. Adapt Fort Collins Pedestrian LOS methodology, assigning a LOS of A,B,C,D,E, or F in terms of continuity, directness, street crossings, visual interest, and security. Concurrency requirements currently focus on cars and concurrency for other modes, especially pedestrians, is not currently measured in Shoreline. http://www.ci.fortcollins.co.us/transportationplanning/pdf/levelofservice.pdf
Ecosystem Conservation and Resource Stewardship		
Stormwater and Water Quality		
21)	Objective:	Decrease stormwater impacts through use of natural drainage techniques
	Target:	Upward trending number, specific target could be established
	Indicator:	Area (square feet) of new natural drainage constructed (by both private applicants and through public CIP projects) and total system area meeting defined minimum standard.
	Discussion:	Realistic goal can be set for public improvements following review of CIP. Target for private development will be harder to establish, should be modest at first, but should be attempted. Need to define a minimum standard, e.g. consistent with LID Manual and King County Surface Water Design Manual.
22)	Objective:	Reduce impervious surfaces in new development
	Target:	Downward trending number or possibly the goal of no net increase over existing baseline is more realistic given increasing population and density
	Indicator:	Median percentage of effective impervious surface in new projects (as compared to previous 4 years)
	Discussion:	Could also establish a defined numeric target, calculations derived from permitting data that is not currently tracked or aggregated. Current calculations do not identify "effective" impervious or distinguish between pervious and impervious paving systems.
23)	Objective:	Improve surface water quality
	Target:	Upward trend. Specific target could be established through trend analysis
	Indicator:	Washington Department of Ecology (DOE) Water Quality Index (WQI)
	Discussion:	The City has begun collecting data to use in the WQI and is determining whether or not it is appropriate as a reporting tool for the sustainability indicators. The WQI is intended as a tool to summarize and report Ecology's Freshwater Monitoring Unit's routine stream monitoring data. The WQI is a unit less number ranging from 1 to 100; a higher number is indicative of better water quality. Scores are determined for temperature, pH, fecal coliform bacteria, dissolved oxygen, total suspended sediment, turbidity, total phosphorus, and total nitrogen. Constituent scores are then combined and results aggregated over time to produce a single yearly score for each sample station.
Potential Future Indicator(s)		
	Objective:	Reduce impervious surfaces citywide

	Target:	Downward trend or possibly the goal of no net increase from baseline is more realistic given increasing population and density. A specific goal could also be established.
	Indicator:	Percentage of impervious surface citywide
	Discussion:	LIDAR data can be interpreted to create an impervious data layer - research partnership, internship or thesis opportunity with UW. Given cost and rate of change considerations, data would be updated perhaps every 5 years.
	Objective:	Improve surface water quality
	Target:	Upward trending number for each stream reach and other surface water body as compared to previous 4 years or other study period, specifics TBD
	Indicator:	Index of Benthic Invertebrate Diversity (IBID)
	Discussion:	IBID was developed and used by UW - Derek Booth. There is an opportunity to partner with the Homewaters project and schools like Evergreen and Meridian Park that have done IBID sampling over the years in Thornton creek.
Vegetation and Habitat		
24)	Objective:	Improve/restore habitat areas
	Target:	Upward trending number, specific goal TBD based on City input
	Indicator:	Acres of stream, wetland and related buffers that are enhanced and/or restored (as compared to previous 4 years).
	Discussion:	City does not currently track and aggregate this data. Data should be broken out by voluntary/public projects and those done as permit requirements and mitigation. Invasive species removal could be tracked as a subset.
25)	Objective:	Improve health of public forests
	Target:	Upward trending number, specific acreage goal TBD based on City input
	Indicator:	Acres (and percentage) of public forests enhanced that year through removal of invasive species, replacement of dead or dying, thinning and other forest health management practices (as compared to previous 4 years).
	Discussion:	This is most actively occurring under Urban Forests Program and Ivy out efforts in parks. SF can be hard to track but should be measured. We will continue to study the Green Seattle program to look at ways to improve and refine this indicator.
26)	Objective:	Increase citywide tree canopy and natural vegetation through strategic use of the right of way
	Target:	Upward trending number, Specific target TBD following collection of baseline data and City review of existing, planned and possible CIP efforts.
	Indicator:	Number of street trees and square feet of landscaping planted in the right-of-way (ROW) per year by city services or programs (or private development in the ROW) as compared to previous 4 years

APPENDIX F — Draft Indicators

	Discussion:	Data from CIP projects, operations and DSG permit data related to right of way improvements would be combined. Might want to measure every 2 to 5 years to be more tangible and show change.
Potential Future Indicator(s)		
	Objective:	Increase and maintain citywide tree canopy
	Target:	Target to be established following collection of baseline data. E.g. 40% or potentially break down further by broad zoning category using American Forest's goals
	Indicator:	Percentage of tree canopy coverage citywide
	Discussion:	Establish baseline in medium term and update every 5 to 10 years based on remote sensing imagery. Consider use of CityGreen software.
	Objective:	Measure and reduce the rate of tree canopy loss due to permitted development
	Target:	Target to be established following collection of baseline data and further discussion. No net loss at least in single family areas may not be realistic given increasing density.
	Indicator:	Median tree retention percentage achieved (better to use canopy coverage) and replacement trees planted on lots reviewed under the tree code.
	Discussion:	Data could be tracked, but is tedious and replacement trees may not survive. More input from City needed to establish an appropriate indicator for private development. Overall City canopy coverage is a better potential future indicator and may be sufficient.
General		
27)	Objective:	Increase volunteer hours devoted to sustainability projects
	Target:	Upward trending number, based on current City "strategic objectives" program, target is 3,800 for <u>all</u> volunteer programs in 2008
	Indicator:	Number of volunteer hours and distinct individuals devoted to sustainability projects per year (as compared to previous 4 years)
	Discussion:	The City already gathers and tracks volunteer hours through "strategic objectives" program and could track hours in future years devoted to sustainability projects, e.g. habitat, recycling, right-of-way landscaping and other similar projects with a sustainability benefit.
28)	Objective:	Increase staff training on sustainability issues
	Target:	Upward trending number for next 5 years, than stabilize at appropriate level based on FTE, specific number TBD, including targets for certain positions.
	Indicator:	Number of staff hours devoted to sustainability training per year per full time employee equivalent (as compared to previous 4 years)
	Discussion:	The City already gathers and tracks training hours and establishes a training budget by department and by employee for some departments. A specific amount could be devoted to sustainability.

Department Acronyms:

C - Clerks

CMO – City Manager’s Office

CS – Community Services

ED – Economic Development

F/IT – Finance and Information Technology

HR – Human Resources

PDS – Planning and Development Services

PRCS – Parks, Recreation and Cultural Services

PW – Public Works

PW-E – Public Works-Engineering

PW-ES – Public Works-Environmental Services

PW-F/O – Public Works-Facilities/Operations

PW-S/A – Public Works-Streets/Aurora

PW-SW – Public Works-Surface Water

APPENDIX G
Implementation Resources

Appendix G: Implementation Resources

In performing the Capacity Assessment process, it was important to identify resources that may assist the City directly or indirectly in achieving specific recommendations. Resources may facilitate sustainability either by promoting it or simply by removing barriers. For this Strategy, research on resources for three areas was conducted: Funding, Regulations and Planning Policy, and Business Partnerships. For each suggested resource, possible models have been provided, along with recommendations for City action with regard to the resource type. A summary of this research is provided in Chapter IV of the Strategy Document.

Funding

Sustainable Enterprise Funds

This funding type helps municipalities invest in sustainability projects that require additional incentive to overcome technical or financial risks. The City of Shoreline should explore partnerships with other municipalities to maximize available resources.

Sustainable Enterprise Fund (GVRD)

An example of a successful partnership involves six BC municipalities including Vancouver, Richmond, Whistler, Delta, Burnaby and North Vancouver. These communities will purchase up to 80 million liters of biodiesel blend for use in vehicle fleets during the next five years. Delta's participation in this project is being supported by the GVRD's Sustainability Enterprise Fund. The Corporation applied to the fund last year and was awarded \$12,000 to test the use of biodiesel to demonstrate operational, technical and economic feasibility.

Greater Vancouver Regional District (GVRD) member municipalities have access to money that complements municipal, provincial and federal funding sources. This funding is for projects that utilize technology established elsewhere but is new to the region, or to adapt best practices to conditions specific to the region. The focus is on improving sustainability in parks, housing, air quality and energy management, drinking water supply and treatment, wastewater conveyance and treatment, storm water management and solid waste management. A maximum contribution guideline of \$25,000 covers up to 1/3 of costs for projects that derive regional benefits, and 10% of costs for projects that focus on single municipal sustainability issues.

Contact Info

Name: Kim Parmentier
Title: Senior Project Engineer, P.Eng.
Organization: Greater Vancouver Regional District
Department: GVRD DSM - Innovative Technologies
Phone: (604) 436-6855
Email: kim.parmentier@gvrd.bc.ca

Sustainability Grants

Cities can leverage substantial amounts of work by having a volunteer coordinator on staff who seeks out community groups willing to dedicate labor and resources to sustainability efforts. Often, seed money in the form of a grant is used for first-year costs (e.g., salary, administrative

APPENDIX G — Implementation Resources

needs). The benefits often lead to City Councils approving permanent allocations for volunteer coordinator positions.

Some resources for sustainability grants specific to volunteerism include:

- The Abell Foundation, Inc.
- Atherton Family Foundation
- Brico Fund
- Claneil Foundation, Inc.
- Cottonwood Foundation
- Elkind Family Foundation
- The Hugh and Jane Ferguson Foundation
- Gates Family Foundation
- Walter and Duncan Gordon Foundation
- Levi Strauss Foundation
- Massachusetts Environmental Trust
- New England Grassroots Environment Fund
- Norcross Wildlife Foundation, Inc.
- Patagonia, Inc.
- Recreational Equipment, Inc. (REI)
- Russell Family Foundation

Recommendation: We recommend the City create a job description for a Volunteer Coordinator position and pursue grants to fund the first year of expenses for the position. A second, less-secure option would be to approach the Retired Senior Volunteer Program (RSVP) or similar group to solicit a retiree to coordinate the program on a voluntary basis. Some funding or the coordinator's activities should still be secured.

Creative Tax Programs

Tax Incentives:

Berkeley and San Francisco have created programs for residential solar electricity implementation. The cities pay installation costs up-front, and the loans are repaid via property taxes over a 20-year period. Installations are required to be maintained and remain with the property. The extra property tax includes administrative fees and interest, predicted to be lower than for private loans because the city will secure low-interest bonds and loans. Over two decades, the total taxes are approximately what property owners would save on electric bills.

Many tax programs are applied at the State level, e.g. Oregon and New Mexico:

- The Oregon Department of Energy offers the Business Energy Tax Credit to those who invest in energy conservation, recycling, renewable energy resources and less-polluting transportation fuels. The tax credit is 35 percent of the eligible project costs — the incremental cost of the system or equipment that's beyond standard practice. Recipients take the credit over five years: 10 percent in the first and second years and 5 percent each year thereafter. If recipients cannot take the full tax credit each year, they can carry the unused credit forward up to eight years. Those with eligible project costs of \$20,000 or less may take the tax credit in one year.
- New Mexico Senate Bill 463 (SB463) encourages private sector design and construction of energy efficient, sustainable buildings for commercial and residential use. The amount of the tax credit is based on the qualified occupied square footage of the building and the

sustainable building rating achieved. The tax credit can be substantial: A LEED Silver-certified 2,000 square foot home that is at least 40% more energy efficient than a home built to the standard building code can receive a \$10,000 tax credit.

Analysis: Shoreline may find that its citizens are willing to take the lead in sustainability efforts – i.e., voting with their pocketbooks – through creative property tax programs. Residents may approve higher property tax rates in exchange for improved waste management programs, green building assistance, or alternative energy strategies, for example. Because repayment is tied to property taxes, the City’s can project annual budgets with little additional risk.

Tax Penalties:

Portland city officials are proposing a “carbon tax” on new homes and commercial buildings – in reality, this “tax” is a fee penalty. Program components include:

- For new homes and commercial buildings, there are three options for energy efficiency: 1) Meet the state's code and pay a fee to the city; 2) beat the code's efficiency requirements by 30 percent and pay no fee but qualify for incentives from the state and local non-profits; 3) beat the code by 45 percent and get a cash rebate from the city in addition to the other incentives.
- For existing homes and commercial buildings, owners would be required to disclose energy and storm water performance to potential buyers or tenants.
- Incentives for developers building green, and energy efficiency training for building trades workers.
- As part of every existing home sale, an energy efficiency report must be done by home inspectors.

Recommendation: Both the construction industry and realtors associations are fighting the proposal, citing prohibitive costs. As in Portland, tax or fee penalties may meet substantial opposition from builders, developers, owners, and others in Shoreline. We recommend alternative strategies to encourage and provide incentives for sustainability initiatives. Where proposed strategies may encounter opposition, a dedicated public involvement process is recommended.

Utility and Permit Fees

Enterprise Fund – Santa Monica has its own water and waste utilities, so the city can impose a fee on levels-of-service that is directed to related improvement programs; e.g., a portion of water and sewer bills directed to improved treatment facilities and storm water management education programs

Permit Fees – Portland imposes a fee on every building permit, which is directed toward green building mini-grants, education and outreach, and staff training. The key is volume – demand within the UGB (Urban Growth Boundary) will remain high, and the small fee is acceptable to most developers. While there is no threshold for the number of permits necessary to support a related green building program, Shoreline likely receives substantially fewer than Portland, so Shoreline may choose to dedicate fees to a limited set of initiatives. For instance, fees can be dedicated to obtaining green building accreditations for staff and to education/outreach efforts.

Recommendation: We recommend an additional fee for each building permit application, dedicated to staff training and accreditation. Internal capacity is essential to subsequent education/outreach efforts and code revisions.

APPENDIX G — Implementation Resources

Utility Rebate Programs

Puget Sound Energy

- Commercial HVAC Equipment Energy Efficiency Rebate Program
- Commercial Kitchen and Refrigeration Energy Efficient Equipment Rebate Programs
- Commercial Lighting & Lighting Controls Energy Efficiency Rebate Programs
- High Efficiency Commercial Clothes Washer Rebate Program
- High Efficiency ENERGY STAR® Qualified Transformer Rebate Program
- Manufactured Home Rebate Program
- Portable Classroom Energy Efficient Controls Rebate Program
- Residential Energy Efficiency Rebate Programs

Puget Sound Energy

- Commercial Energy Efficiency Rebate Programs
- Cool Rebates Program
- Multi-Family Residential Energy Efficiency Rebate Program
- New Construction Incentive Program
- Residential Energy Efficiency Rebate Program
- Vending Machine Rebate Program

Recommendation: The City can use web resources and other outreach/education tools to inform developers of rebate opportunities. All rebates should be pursued in new City-owned and operated projects, in order to gain first-hand knowledge of application processes.

Municipal Grants for Green Building

- King County's Department of Natural Resources and Parks provides financial grants and free technical assistance to new construction and major renovation commercial building projects in King County, outside the City of Seattle, seeking LEED* certification. Private, nonprofit, and public projects are eligible to apply for grant awards based on the level of certification achieved. Eligible projects can receive a grant in the amount of \$15,000 for achieving a certification level of LEED Silver, \$20,000 for LEED Gold, or \$25,000 for LEED Platinum. **Web site:** www.seattle.gov/dpd/GreenBuilding
- The Seattle/King County Built Green Grant Program provides competitive grants for single-family residential and community development projects to help offset the cost of certifying and designing innovative green projects throughout Seattle and King County. The grants are funded through the Department of Natural Resources and Parks, Water and Land Resource Division and Seattle Public Utilities. To be eligible for this grant, buildings need to achieve either Built Green 4-star or 5-star certification. **Web site:** <http://www.builtgreen.net>
- Puget Sound Energy (PSE) offers its commercial and industrial customers financing when building a new facility or expanding an existing one through the New Construction Grants program. Grants and rebates are available for many high-efficiency electric and natural gas applications that are at least 10% beyond the applicable energy code. **Web site:** http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=WA50F&state=WA&CurrentPageID=1&RE=1&EE=1
- Puget Sound Energy (PSE) offers grants to its customers who install efficiency upgrades to their existing equipment or facility. Grants often range from several hundred dollars to over a hundred thousand dollars, and typically pay for about 50% of a project's cost; sometimes up to 70% of the installed cost. **Web site:**

http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=WA49F&state=WA&CurrentPageID=1&RE=1&EE=1

- The City of Santa Monica offers a grant program to encourage construction of LEED™ certified buildings and implementation of Innovative Green Building Technologies. Grants for LEED™ certified buildings will range from \$20,000 to \$35,000 depending on the level of certification. Innovative Technology Grants will cover 50% of project costs up to \$5000 for new construction or renovation projects that involve cutting edge energy efficiency or urban runoff mitigation technologies.
- See available online resources for additional grant opportunities:
 - <http://www.dsireusa.org>
 - <http://www.epa.gov/greenbuilding/tools/funding.htm>
 - <http://www.mrsc.org/Subjects/Planning/GreenBuild.aspx#grants>

Recommendation: The City can use Web resources and other outreach/education tools to inform developers of grant opportunities. All possible grants should be pursued in new City-owned and operated projects, in order to gain first-hand knowledge of application processes.

Regulations and Planning Policy

Codes and Ordinances

Many major jurisdictions require public projects to be built green, typically meaning LEED (Leadership in Energy and Environmental Design) certified. Other cities, such as Arlington, Virginia and Seattle, also offer incentives such as floor area ratio bonuses or, as with the Austin, Texas Green Building Program, technical assistance for private construction projects. Some municipalities, such as Ft. Collins, Boston, and Washington, D.C., have even experimented with green requirements for private buildings.

Many small municipalities assume that more stringent codes will discourage development, thereby damaging economic growth. However, through a combination of expedited permitting and applications of existing green building standards, many small municipalities have found that developers save money – in construction time and operations and maintenance benefits. The key to most successful efforts is increasing city staff capacity to allow expedited permitting once new codes are in place.

The Mayor of Seattle signed new downtown zoning legislation on April 12, 2006 which established an incentive for the construction of green buildings. The incentive applies to buildings in the central office core and adjoining areas, including Denny Triangle and a portion of Belltown. Commercial and residential buildings in those portions of downtown which achieve a minimum LEED* certification at the Silver level can be built to greater heights and/or greater maximum floor areas. The Downtown Zoning Ordinance allows owners and developers to use either the LEED for New Construction (LEED–NC) or LEED for Core & Shell (LEED–CS) products.

Austin Energy, the City of Austin’s energy utility, has a full kit of resources available for developers and builders, including design assistance and education. The City and its utility partner on regular workshops.

APPENDIX G — Implementation Resources

Recommendation: Shoreline should systematically review current codes and compile a comprehensive list of proposed code revisions specific to green building strategies. This list should be vetted with representatives from development and construction fields in order to win support for proposed changes

Shoreline can devise a set of incentives, including variances and exceptions that can be applied to projects incorporating sustainability strategies. One example is a simple tradeoff such as allowing greater heights in exchange for smaller footprints and more open space and/or infiltration capability.

Design assistance and education resources should be pursued in Shoreline, especially if other small municipalities can pool resources and work with local utilities to share cost and take advantage of existing expertise.

Green Permitting Processes

The City of Issaquah passed Resolution #2004-11 in December, 2004, adopting a sustainable building and infrastructure policy. Developers intending to use LEED may receive free professional consultation. Projects achieving LEED certification are placed at the head of the building permit review line.

The City of Santa Monica has passed an ordinance that will expedite plan checks for LEED registered projects. This expediting process may take weeks off of the approval process. Applicants must submit their LEED checklist and proof of LEED registration (if any) for the project.

The Chicago Department of Construction and Permits Green Permit Program is the first of its kind in a large U.S. jurisdiction, and its success—from 19 permits in 2005 to 71 in 2006 and a goal of over 100 this year—has helped significantly accelerate the growth of private-sector green building in the city. Today, Chicago leads the nation in the number of LEED registered projects. Chicago's Green Permit Program offers two main incentives:

- First, permits for large or complex projects can be issued in as little as six weeks from the time of construction document submission—approximately half the typical time. This time savings can translate into substantial financial benefit for developers because earlier construction starts mean earlier sales or leasing and reduced interest on construction loans.
- The program also offers a more direct financial incentive in the form of reduced fees. Developers of larger projects typically pay additional fees for the services of city plan review consultants, and up to \$25,000 of these fees are waived for projects that qualify for Chicago's Green Permit Program. Whereas expedited permitting is mostly of interest to for-profit developers, the reduction of fees associated with permitting can be a major benefit to nonprofit and affordable housing developers. Even \$50,000 is a nearly invisible line item in a \$100 million development, but \$15,000 or \$20,000 is a substantial contribution to the bottom line of a proposed \$10 million affordable housing project with 10 different funders.

Recommendation: The City permitting department should begin training staff in green building strategies and standards, leading to proficiency that will allow for expedited permitting and technical assistance. Currently, residential permits require 2 to 6 weeks review time – quicker than many municipalities. However, permit applications for site development, subdivisions, and commercial projects with green building strategies that are departures from conventional practice

are subject to individual reviews, without predictability for builders and developers. This often leads to prolonged review periods and can discourage builders from incorporating strategies if there is no consistent standard.

Green Building Code(s)

Sustainable design strategies are considered by Shoreline’s permitting department on a case-by-case basis – no different than a conventional building permit. New, unfamiliar strategies and technologies must be researched and vetted, which often delays processing. Additionally, Shoreline does not emphasize green building beyond IBC and State requirements such as the Washington State Energy Code (which is more stringent than IECC), citing a lack of resources dedicated to code revisions and enforcement.¹

However, resource-constrained departments such as Shoreline’s can implement performance standards that do not require significant code changes and that are compatible with IBC standards. In a 2006 report issued to the ICC Industry Advisory Committee by its Task Group on Green Buildings, it concluded that there were very few, if any, serious barriers in the IBC that would inhibit green building techniques and methods as specified in the most commonly used green building guidelines in the U.S. — LEED, by the US Green Building Council (USGBC), and Green Globes, by the Green Building Initiative. A key element of that conclusion was the provisions of both the IBC and IRC that permits the use of alternative materials and methods of construction when those materials and methods of construction are demonstrated to be equivalent to that prescribed in the code in terms of quality, strength, effectiveness, fire resistance, durability and safety.

In other words, designs are in compliance with IBC as long as a proposed design is demonstrated to be as safe and durable as that which uses the more conventional materials and designs anticipated in the IBC and International Residential Code (IRC). The key to encouraging green building from the permitting side is increasing proficiency among permitting and review staff such that new green building strategies can be quickly reviewed and accepted or denied, thereby placing no undue additional burden on developers.

The ongoing development of the IECC, the National Green Building Standard (for residential construction), and ASHRAE/IESNA/USGBC 189 *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, are making it increasingly possible for the full range of concerns associated with sustainable and environmentally responsible building to be addressed. With regard to the IECC, more performance-based methods will be incorporated, according to ICC. The result will be a range of thresholds, up to and including the zero net energy goal envisioned by the 2030 Challenge, which will allow individual jurisdictions to designate achievable levels of energy conservation with few, if any, code amendments. This will in turn eliminate redundant or even contradictory regulations and levels of enforcement.

Recommendation: The City of Shoreline should focus resources on increasing staff proficiency to provide timely technical assistance and green building advocacy within the City’s own development initiatives and the private sector. Technical guidance via print materials is one way

¹ The International Code Council (ICC), a membership association dedicated to building safety and fire prevention, develops the codes used to construct residential and commercial buildings. Most U.S. cities, counties and states that adopt codes choose the International Codes developed by the ICC, specifically the International Building Code (IBC). Additionally, the U.S. Department of Energy continues to reference the International Energy Conservation Code (IECC) as the benchmark for conserving resources used in construction and daily living.

APPENDIX G — Implementation Resources

of providing assistance with limited resources. For example, the City of Seattle provides Client Assistance Memos for a variety of development strategies. CA Memos include design strategies and code compliance considerations. For a full list of City of Seattle CA Memos, visit <http://web1.seattle.gov/DPD/CAMs/CamList.aspx>. An example – Green Parking Lots – is included as Appendix 1. Made available both electronically and at permit counters, these technical resources can help promote green building without placing undue additional burden on staff.

Business Partnerships

Green Business Certification

A green-business program can be used to encourage sustainable practices within the private sector with minimal City investment. The City of Shoreline already partners with the Environmental Coalition of South Seattle (ECOSS) to help educate Shoreline businesses regarding sustainable business practices. ECOSS provides information and education on industrial innovations that will lead to energy and water conservation, and pollution prevention, in small- to medium-size businesses. According to the Shoreline Economic Development Program, businesses have been slow to take advantage of ECOSS services.

In late 2007, King County awarded a grant to the Shoreline Chamber of Commerce for development of a sustainable business program. Chamber of Commerce board member Maryne Wynne, also on the board of the Shoreline Solar Project, wrote the grant proposal and is directing the partnership program.² The Chamber is seeking to use the grant to create a “one-stop shop” to educate businesses to be more efficient – to use less, waste less, and save money – and to be recognized for sustainability efforts.

The Chamber is organizing a committee to develop the mission and scope of the program, and to identify key stakeholders. Interested parties include CleanScapes (the City’s solid waste contractor), Seattle City Light, and Puget Sound Energy. The Chamber is also working with Shoreline Community College to determine opportunities for a partnership in conjunction with the College’s increased focus on alternative energy. Next steps include branding – creation of a logo and website – and creation of an implementation and administration plan.

Some other municipalities are making sustainable businesses the centerpiece of their economic development programs, including Kirkland.

Kirkland Green Business Program

The Kirkland Green Business Program is an incentive program created in partnership between the City of Kirkland, Kirkland Chamber of Commerce and Puget Sound Energy to recognize Kirkland businesses for environmentally-friendly practices.³ The City’s Tourism Marketing Plan and tourism website, www.ExploreKirkland.com, feature certified Green Businesses.

Kirkland’s Sustainable Business Program includes certifications in six categories: Green Building, Waste Reduction and Recycling, Water



² Maryne Wynne: (206) 306-9233

³ Brenda Nunes, Associated Earth Sciences: (425) 827-7701

Conservation, Energy Efficiency, Transportation, and Pollution Prevention. Certification standards are either derived from existing standards, such as LEED and Built Green for Green Building Certification, or are simple checklists, as shown for Water Conservation in Appendix 1.

Bay Green Business Program

The Bay Area Green Business Program verifies that businesses meet higher standards of environmental performance. The program is a partnership of government agencies and utilities helps local businesses comply with all environmental regulations and take actions to conserve resources, prevent pollution, and minimize waste. More than 1,000 businesses and public agencies have been certified since 1997.

The Program was developed by Bay Area local governments in collaboration with US EPA, Cal EPA Department of Toxic Substances Control and the business community. The Association of Bay Area Governments coordinates the Program, which is implemented by Green Business Coordinators in 9 participating counties. The regional and local programs are funded by their partners, including local and regional government agencies, utilities, special districts and nonprofit organizations that promote environmental compliance, pollution prevention and resource conservation. Some funding also comes from government and non-profit foundation grants.

Santa Monica Sustainable Business Certification Program

The City of Santa Monica has based its tourism and business development initiatives on its Sustainable Business Certification program. Santa Monica’s Green Map is a web-based tool that guides residents and visitors to products and services provided by certified Sustainable Businesses. In part because of this program, the business community has adopted sustainability as its guiding development principle.

Through the program, Green Businesses receive recognition through:

- Local and Regional Green Business Program websites
- City and agency newsletters
- Press coverage, promotional events and special recognition
- Window decals, certificates and promotional materials
- Green Business logo to use in advertising

Recommendation: Shoreline should continue to partner with ECOSS and seek other partnerships to enhance offerings for the Sustainable Business Program.

The City can also use existing resources to promote sustainable business practices. Puget Sound Energy and Seattle City Light can provide data that can be used to create an overall “business footprint” for Shoreline businesses. This may be used to encourage businesses to pursue sustainable business strategies and take advantage of resources in order to promote their business and save money through operations and maintenance efficiencies.

(Example) Client Assistance Memo:
Seattle -- Green Parking Lots (2 pp. of 8)



Green Parking Lots

September 30, 2005

WHO SHOULD CONSIDER GREEN PARKING LOTS?

If you're looking for a cost-effective option for meeting landscaping and water quality requirements when building or redeveloping a parking lot, consider "going green."

WHAT ARE GREEN PARKING LOTS?

Green parking lots reduce runoff that is discharged into local water bodies by using permeable paving and natural drainage landscapes.

Alone or together, these two strategies can be used to meet water quality and landscape requirements and provide credit toward flow control requirements for parking lots.

Permeable Paving

Permeable pavements include pavers, grid systems, porous asphalt and porous concrete. Pavers may be pre-cast sections or individual units that fit together. They are available in a variety of patterns and colors and can be used to enhance the project's aesthetic. Grid or lattice systems are rigid plastic forms that are filled with gravel or soil and vegetation. Porous asphalt and porous concrete are similar to conventional asphalt and concrete in structure and form except that the fines (sand and finer material) have been removed.

When installed over a drainage storage bed, these permeable pavements allow rain to infiltrate through the voids of the permeable surface. Beneath the permeable surface, runoff storage is achieved and/or infiltration occurs where soil permits. Surfaces that infiltrate 100% of the six-month storm runoff may be eligible to be removed from area calculations for water quality requirements. See attached handout for more information on different types of permeable paving.

Natural Drainage Landscapes

Natural drainage landscapes include bio-swales, rain gardens, and bioengineered planting strips that can improve water quality and reduce runoff.

Bio-swales are open, linear channels that filter stormwater as the water flows through vegetation to the discharge point. Although their width and length vary as needed to achieve function, at a minimum they are two feet wide at the bottom and have a maximum slope of 2.5:1.

Rain gardens are shallow depressions in the landscape and are designed to hold and infiltrate runoff. They are amended with bioengineered soil and vegetated with plants that are adapted to both wet and dry conditions.

Bioengineered planting strips are similar to bio-swales but they include an infiltration component. As with rain gardens, native soil below the swale is excavated and backfilled with gravel and loamy sand and planted with shrubs and groundcover.

All systems include an overflow system such as a perforated pipe or a raised overflow device to convey excess drainage to another system or discharge point. These natural drainage landscapes can help reduce the volume of runoff generated from parking lots and filter, infiltrate and store runoff for slower discharge. Existing landscape features such as planters and landscape strips can be converted to natural drainage landscapes.

HOW DO GREEN PARKING LOTS MEET REQUIREMENTS?

The green parking lot strategies described above may help meet requirements for several City codes, including:

- Seattle Municipal Code (SMC) Ch.22.800, Stormwater, Grading, and Drainage Control Code
- SMC 23.47.016, Screening and Landscape Standards
- DPD Director's Rule (DR) 26-2000, Volume 3, Flow Control Technical Requirements Manual



City of Seattle
Department of Planning & Development
Gregory J. Nickels, Mayor Diane Sugimura, Director

www.seattle.gov/dpd

700 5th Avenue, Suite 2000
P.O. Box 34019
Seattle, WA 98124-4019
(206) 484-8600

Printed on totally chlorine free paper made with 100% post-consumer fiber

- DPD DR 27-2000, Volume 4, Stormwater Treatment Technical Requirements Manual
- DPD DR 13-92, Landscape Standards for Compliance with the Land Use Code and SEPA Requirements

Stormwater Treatment Technical Requirements

Depending on the site, SMC 22.800-22.808 and DPD DR 27-2000 require new and redeveloped parking lots to meet water quality treatment requirements.

Landscaping Requirements

SMC 23.47.016 specifies landscaping requirements for parking lots. These requirements are articulated further in DPD DR 13-92.

Water Quality Treatment Requirements

Permeable paving can reduce the size of engineered stormwater treatment facilities by reducing the amount of runoff needing treatment. If designed to infiltrate the six-month storm, permeable pavement can be used to get a one-to-one impervious surface reduction credit for water quality treatment requirements.

Credit Toward Flow Control Requirements

DPD DR 26-2000 specifies how credit toward flow control requirements can be achieved.

Natural drainage landscapes may be used to meet both landscaping and water quality requirements. Parking lot areas that direct runoff to natural drainage landscapes may be eligible for water quality credit if they are sized to filter or infiltrate the six-month storm event. Permeable paving can be designed to meet water treatment requirements and provide credit toward flow control requirements. Refer to the codes and manuals listed above for design requirements.

ADDITIONAL BENEFITS FROM GREEN PARKING LOTS

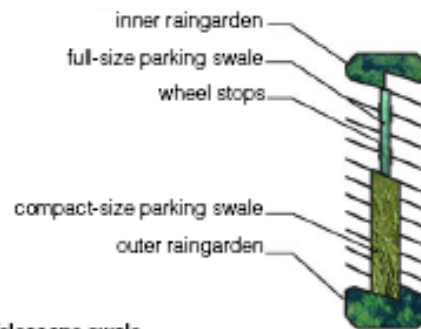
In addition to achieving landscaping, water quality treatment and flow control requirements, green parking lots may reduce capital costs and overall facility maintenance costs. Green parking lots also enhance the pedestrian experience for clients and customers by providing green islands in a sea of asphalt. Additional benefits include an increase in the amount of

infiltration surfaces that filter and attenuate stormwater runoff flows, which can enhance the protection of nearby water bodies. The next section illustrates how these benefits can be achieved.

GREEN PARKING LOT DESIGN OPTIONS

Three innovative design options were developed for an existing 15-acre commercial parking lot to evaluate the feasibility and cost-effectiveness of green parking lots. Each of the three options uses permeable pavements and/or natural drainage landscapes. These options demonstrate that parking lots can achieve water quality treatment requirements using green strategies. Although unquantified for this project, the use of a natural drainage landscape is anticipated to reduce the total volume of stormwater from the site through some infiltration. For this case study, each green parking lot design option was compared to a conventional parking lot design that was being considered. A long-term economic analysis of the capital and maintenance costs found the green parking lot design options to be equal to or less expensive than the conventional parking lot design.

The green parking lot design options demonstrate that different combinations of porous asphalt, unit pavers, rain gardens and telescope swales can be used to meet the water quality treatment requirement. With the exception of the telescope swale, each of these elements has specific technical requirements for their design and construction that can be found in DPD DR 26-2000. The telescope swales are a strategy specifically designed to integrate into parking lots. Telescope swales are designed to have multiple sections that vary in width over the length of the swale to accommodate both compact and standard size parking spaces (see figure).



Telescope swale
Image courtesy of SvR Design Company

LEGAL DISCLAIMER: This Client Assistance Memo (CAM) should not be used as a substitute for codes and regulations. The applicant is responsible for compliance with all code and rule requirements, whether or not described in this CAM.

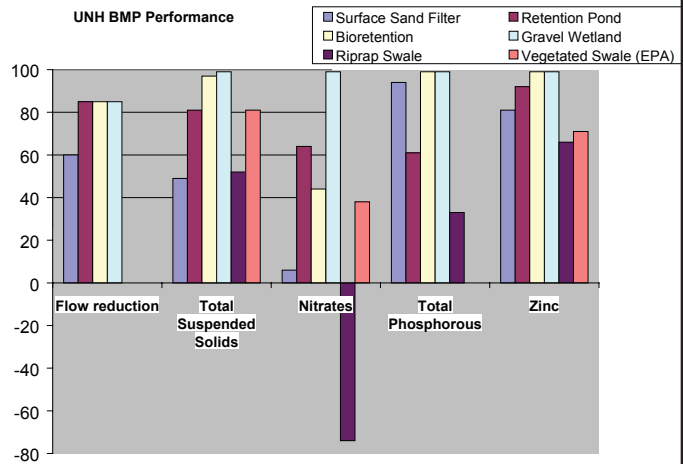
Source: <http://www.seattle.gov/dpd/publications/cam/CAM515.pdf>

Green Infrastructure Performance Results of Monitoring BMPs

Watershed Applications

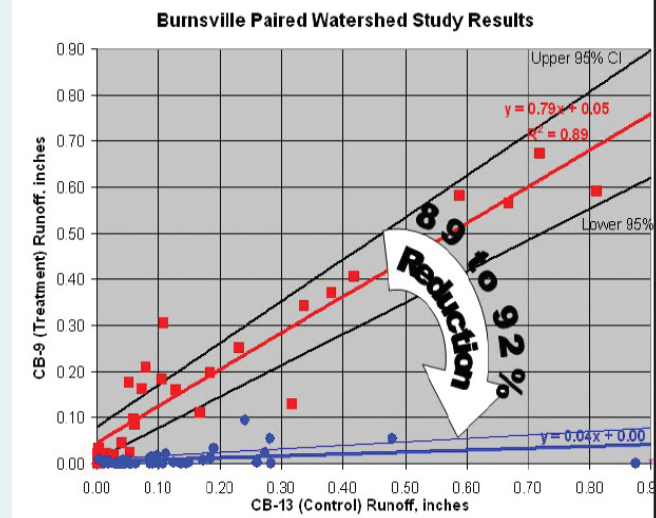
Paired watershed studies test the affects of BMP implementation on a water or sewershed scale. Two of the most prominent to date are the Burnsville, MN rain garden project, and the Seattle SEA Streets program.

The Burnsville study monitored two very similar residential areas—one was the study's control site while the other treatment watershed employed 17 new rainwater gardens within a 25-lot, 5.3-acre neighborhood with traditional curb and gutter. Both the control and treatment watersheds were monitored before and after rainwater garden construction to facilitate the statistical evaluation of the paired watershed data. The results show that there is an 89 to 92 percent reduction in the runoff volumes from the treatment watershed associated with the rainwater gardens.



Results from UNH study

Seattle's Street Edge Alternative project, known as SEA Streets, replaced a street's curb and gutter drainage system to reduce impervious area and install vegetated stormwater detention. Monitoring has demonstrated that the 2nd Avenue SEA Streets project has prevented the discharge of all dry season flow and 98 percent of the wet season runoff. It can fully attenuate the runoff volume produced by approximately 0.75 inch (19 mm) of rain on its catchment. The SEA Streets design saves 20% or more of the cost of conventional street drainage: \$280,000-\$325,000 per block for a green streets vs. \$425,000-\$525,000 for a traditional block.



Green Infrastructure Performance

Results of Monitoring Best Management Practices



Summary

Performance data for Green Infrastructure Best Management Practices under localized weather, soil, slope, and anticipated use conditions is one factor needed for widespread application of these approaches. CNT is working with the U.S. EPA, Illinois EPA, City of Chicago and its outlying communities in research projects to assess the performance and applicability of Green Infrastructure BMPs to local conditions. Results to date from sites across the country indicate that Green Infrastructure BMPs are consistently effective in reducing volumes of runoff, peak flows, and pollutant loads at a reduced cost.

Individual BMP Performance

Three centers of research have produced monitored or modeled performance results on individual BMPs: The Portland Bureau of Environmental Services; The Milwaukee Metropolitan Sewerage District (MMSD); and the University of New Hampshire Stormwater Center (UNH).

Portland

The Portland Bureau of Environmental Services performed an effectiveness evaluation of all the BMPs currently in use in the City. The number of pollutants considered was limited to enable comparisons. Portland estimates its Green Streets design saves 40% compared to conventional stormwater infrastructure.

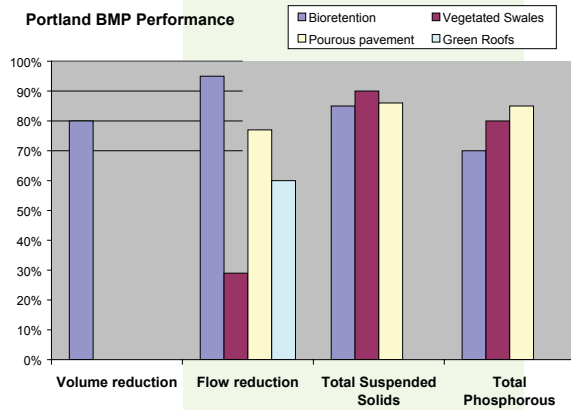
Milwaukee

The impact of selected BMPs on reducing the average annual stormwater runoff volumes and peak flows during historic storm events that caused combined sewer overflows was evaluated using the Hydrologic Simulation Program Fortran (HSPF). The analysis conducted continuous simulation modeling for the period from 1995-2002.

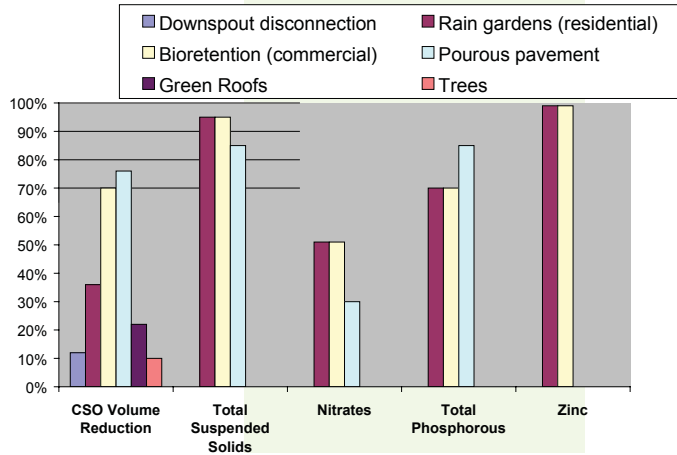
University of New Hampshire

The Stormwater Center compared the performance of conventional stormwater management practices to Green Infrastructure techniques and manufactured devices in a controlled field setting. The site was designed to test each BMP under similar conditions.
(see performance graph on reverse)

Portland BMP Performance



Milwaukee BMP Performance



For more information, contact Steve Wise, Natural Resources Portfolio Manager

