



City of Seattle

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**Seattle Public Utilities**

Ray Hoffman, Director

October 5, 2010

Mr. Ed O'Brien, P.E.  
Water Quality Program  
Washington State Department of Ecology  
P.O. Box 47600  
Olympia, WA 98504-7600

**Re: City of Seattle Response to August 2010 LID Proposal**

Dear Mr. O'Brien:

The City of Seattle commends the Washington State Department of Ecology's efforts to articulate clear low impact development (LID) requirements for municipalities as part of future municipal stormwater NPDES permits ("Permit(s)"). Seattle has long believed that LID is an integral part of stormwater management, and where appropriate, looks forward to seeing the increased use of LID in Western Washington. An effective set of stormwater Permit requirements for LID has the potential not only to improve regional water quality, but to further build regional expertise in designing and building LID facilities.

Seattle appreciates the opportunities for input that Ecology has provided over the past year. The advisory committee meetings have been valuable forums to raise questions and concerns. In particular, Seattle is appreciative that Ecology has carefully considered Seattle's draft Directors' Rule, "Requirements for Green Stormwater Infrastructure to the Maximum Extent Feasible". Extensive work has gone into creating this approach and while the result will warrant revisions in the future, Seattle thinks it is an important step toward defining a workable approach for urban areas.

After reviewing Ecology's August 2010 proposal, Seattle is concerned that the proposal does not appear to give adequate consideration to urban areas already characterized by dense development. In addition to concerns about how the proposal could affect residential development in Seattle, Seattle is concerned about the broader implications; standards which appear to be written primarily for suburban development and small cities could inadvertently discourage urban density, encourage sprawl and all of the associated impacts to water resources

(and farmland, air quality, climate, terrestrial habitat, etc.). The proposal does not provide sufficient guidance for industrial, manufacturing, factory and other similar uses and occupancies. Seattle also has questions and recommendations relating to technical details.

## **Update Development Codes to Incorporate LID**

### Deadline to Update Development Codes

Conducting a comprehensive review and update of Seattle's codes and rules will be a multi-department and multi-jurisdictional endeavor that will require extensive public involvement.

The deadline for adopting LID stormwater site and subdivision performance standards, checklists and technical practices by December 1, 2014 appears to be challenging but feasible, if permit language adequately provides for the extension of deadlines in the event of appeals or other legal actions that can slow the process or alter the regulatory requirements for either Growth Management Act compliance or MS4 LID compliance. However, the deadline of December 1, 2014 for revising ordinances and other enforceable documents that apply to site and subdivision development does not appear feasible. Ecology should prioritize, or allow Permittees to prioritize with Ecology's approval, code updates based on the magnitude of the code impact and create timelines that will result in meaningful and comprehensive code revisions.

### Specific questions/request for clarification for Update Development Codes section

Prior to being able to provide comments, Seattle requests additional clarification about Ecology's proposal in several areas.

- What level of clustering and impervious surface limits is required? For roads, how narrow is narrow enough? What is the timeline for Ecology providing this guidance?
- Please provide specific guidance related to native vegetation retention and its direct benefit to stormwater flow control and water quality.
- Please clarify what is meant by "reduced lot setbacks (zoning and utilities code)". If the attempt is to achieve smaller building footprints, lot setbacks would be *increased*. Additionally, setbacks to utilities are often a life/safety issue and/or access maintenance issue associated with widths of maintenance vehicles and typically cannot be reduced.

## **Basin-Scale Approach**

Because this is a wholly new proposal which elicited a wide range of reactions and responses, further information is needed before detailed comments on any basin-scale analysis requirement. However, one important consideration is that any mechanism for triggering basin scale analysis of the effects of increased development needs to consider differences between urban, built-out areas and more rural areas. Zoning changes that would affect density in an established urban area generally result in building up (more stories), not out, resulting in reduced stormwater impacts compared to sprawling development. Changes in impervious surface would be a more appropriate metric than density because it would better reflect stormwater impacts.

## **Site and Subdivision Technical Requirements**

### **A. Table of LID Requirements**

1. Seattle supports the categories for Western Washington - Division of new development and redevelopment, inside and outside the UGA.
2. Regarding expansion of Minimum Requirement #5 to include 'infiltration below pavement unless engineering infeasibility': Infiltration below the pavement has not been discussed by the LID Committee as an LID technique. Seattle has strong reservations about collecting flow and redistributing it below pavement, as explained in section B below.
3. Seattle agrees that the site's native soil infiltration potential should be used to help to determine requirements. It is unclear whether the proposed rate of 0.15 in/hr is intended to be a design rate or a field-tested rate. In either case, the threshold for saturated hydraulic conductivity should be higher. Seattle collaborated with its geotechnical engineers on this topic during Seattle's stormwater manual development and established a long term design infiltration rate of 0.25 in/hr as the minimum threshold for locating infiltration facilities associated with stormwater code compliance. Although significant volumes of infiltration can be achieved at lower rates, a project starting with a design infiltration rate less than 0.25 in/hr leaves little buffer for long term system performance should any clogging occur during construction or the life of the project. If Seattle were to allow infiltration systems for code compliance at lower rates, Seattle would likely need to increase the recommended factors of safety in determining the long term design infiltration rate.
4. Seattle recommends a more flexible approach that incorporates the evaluation of multiple LID tools for a site, including and subject to feasibility constraints based on the site's hydraulic conductivity rate. Therefore, for development and redevelopment projects that have a saturated hydraulic conductivity > 0.25 in/hr, evaluation should be required for rain gardens and other infiltrating facilities. For

site with <0.25 in/hr hydraulic conductivity, evaluation of infiltration facilities including permeable pavements should not be required.

5. Please explain under what authority a stormwater performance standard could be required for sale of a property over 5 acres when there is no new or replaced impervious surface or land disturbing activity. Sale does not indicate development or redevelopment.

B. LID Requirements Table - The mandatory lists

1. For areas with existing high urban density, it is recommended that Ecology's proposal be modified to instead provide the option to use a calculator-based approach similar to Seattle's proposal whereby the applicant can demonstrate mitigation of the impervious area required to achieve a performance standard unless unachievable due to engineering, competing needs<sup>1</sup> or economic feasibility appropriate to an urban area. Instead of a mandatory list approach, Seattle recommends including an approach that is based on appropriate performance standards (which the local jurisdiction may adjust over time based on its experience and information about urban areas), allows consideration of a full range of suitable green stormwater infrastructure and requires GSI to the extent feasible. This would provide developers and local regulators the flexibility to determine how best to incorporate GSI into a site design which can be particularly challenging in developed, urban population centers.

Over time Seattle expects to normalize expectations of various types of development, but has not had time to develop the data to justify a more prescriptive approach. For example, if a project can mitigate flow from a sidewalk with a rain garden, why require that sidewalk to be permeable pavement as well if the impervious surface is already mitigated?

- a. Infiltration Below Pavement – This does not constitute an LID BMP that is well-defined nor was it recommended during development of the LID Techniques and Principles as shown on Ecology's website for December 9, 2009 meeting handouts. Seattle has strong reservations about including 'impermeable pavements with collection and redistribution below' as a required or even optional BMP due to concerns about long term functioning of the infiltration bed, the long term performance of the pavement itself, and the effect on existing public and private utilities when stormwater is introduced beneath streets in the public right of way. This is especially true for mitigation of runoff from PGIS surfaces. It is difficult to remove the majority of sediment prior to discharging the flow to the

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<sup>1</sup> Please see the Competing Needs section of this document for further comments.

subsurface infiltration system. Seattle's concern is that this would cause infiltration rates and associated effectiveness to diminish over time, possibly requiring removal and replacement of the full system. Since it is a non-vegetated system there would be less potential for biological activity to sustain infiltration rates. Also, for rigid and flexible pavements, the performance of the pavement itself is a function of the subgrade and subbase support. If a subgrade soil is saturated for extended periods of time, this can lead to a loss of support or swelling, which could in turn lead to degradation of the pavement. It is not recommended to proceed with this concept unless the Ecology LID Technical Committee or the committee for the 2011 LID Technical Guidance Manual for Puget Sound proposes this concept with a high degree of confidence that long-term function will be maintained.

If use of the "infiltration below pavement" BMP remains on DOE's Mandatory List, a section for the BMP's technical feasibility limitations in Attachment #1 Feasibility Review Criteria should be added. The following should be considered: (1) The system should have a significantly larger infiltration footprint compared to the footprint of the contributing drainage area (a significant engineering feasibility issue); (2) a subsurface backup system with under drain and orifice control should be included with an expectation that with time the system would eventually just be an underground detention system; and (3) the pavement and subbase should be designed with sufficient depth to account for the loss of subgrade support due to soil saturation (a significant increase in cost).

- b. Rain gardens. Sizing for rain gardens should be based on the area of the development's new plus replaced impervious surface, not the development's land area. Sizing should be modified based on native soils infiltration rates. Sizing should be determined in concert with other LID techniques based on feasibility and not a strict percentage if Ecology keeps the requirement to set aside property for this purpose. Also, the minimum sizes for residential rain gardens were presumably designed for single-family residential development. Multifamily residential development should be called out explicitly along with commercial development, since the two are more alike in terms of lot coverage, etc. As noted before, consideration for competing needs (e.g. encouraging higher density) in highly urbanized areas should be added.
- c. Commercial buildings. As noted above, Seattle has strong reservations about directing stormwater below an impervious surface, but if this remains on Ecology's Mandatory Lists, please clarify the language so that it is clear that

runoff is to be routed to below surface parking lots and not under parking structures.

2. LID Performance Standard. Ecology proposes different performance standards depending on whether a basin is designated as “highly urbanized” or not. If highly urbanized, the performance standard is based on matching existing flow durations; if not, the performance standard is based on matching historic flow durations. This approach makes sense considering the realities of urban development and redevelopment, but it is not clear whether the mandatory lists are intended to meet a specific performance standard and, if so, whether additional lists need to be developed for highly urbanized areas.

Seattle intends to provide more detailed comments about LID performance standards after further evaluation.

- C. LID Requirements in Specific Areas – Flow Control Exempt. Additional sizing information is needed for mitigation of only pollution generating surfaces as the Mandatory List does not address that situation.
- D. Technical Considerations –
  1. Infiltration below pavement. Ecology requested input on infiltration below pavement technical feasibility criteria. Suggestions include:
    - a. Not applicable for runoff from PGIS
    - b. Ratio of infiltration facility footprint below the pavement and the impervious surface routed to it should be < 2:1 (on the basis that it should be more conservative than the ratio used for permeable pavement facilities, which is 3:1.)
    - c. Not applicable unless a geotechnical evaluation of the subgrade soil’s response to saturation is deemed adequate to support the pavement and associated loads. The paving section and subbase needs to be designed to take into account the potential loss of support or swelling that could result if the pavement subgrade is saturated for long periods of time.
    - d. Not applicable in locations where there is a shallow groundwater table.
    - e. Appropriate setbacks need to be established for the following: buildings with unknown foundation drainage systems, buildings with basements, structure foundations, utility poles, utility vaults, stairwells, tree roots, and public and private utilities.
  2. Permeable pavement. Ecology requested input on permeable pavement technical feasibility criteria. Suggestions include:

- a. Not applicable unless a geotechnical evaluation of the subgrade soil's response to saturation is deemed adequate to support the pavement and associated loads. The paving section and subbase needs to be designed to take into account the potential loss of support or swelling that could result if the roadway subgrade is saturated for long periods of time.
- b. Not applicable in locations where there is a shallow groundwater table.
- c. Not applicable in locations that are subject to significant clogging from tree and landscape litter, moss growth, and pollutants tracked onto the surface from vehicular traffic.
- d. Not applicable for pavements that are "High Use" and subject to Oil Control Treatment.
- e. Not applicable for pavements that are sanded during snow storm events.
- f. Not applicable in areas where a secondary stormwater collection system cannot be provided in the event the permeable pavement becomes clogged.
- g. Due to the lack of industry standards for the structural design of permeable pavements (Permeable Cement Concrete), they are not applicable for use in areas where they are subject to consistent freight, bus, or other heavy vehicle traffic.
- h. Appropriate setbacks need to be established for the following: buildings with unknown foundation drainage systems, buildings with basements, structure foundations, utility poles, utility vaults, stairwells, tree roots, and public and private utilities.

#### **Attachment #1 – Feasibility Review Criteria**

- I. Site/Engineering Constraints
  - A. Bioretention/ Rain Gardens
    1. Recommend bioretention slopes be reduced from 15% to 7%.
    2. Recommend setback from top of steep slopes be increased from 50 feet to a more substantial setback for slopes of greater than 40%. Seattle states "for slopes higher than 10 feet, the setback is calculated as 10 times the height of the Steep Slope Critical Area (to a 500 foot maximum setback). Infiltration within this setback may be feasible provided a detailed slope stability analysis is completed by a geotechnical engineer."
    3. Recommend native soil infiltration design rate be increased from 0.15 to 0.25 inches per hour.
  - B. Permeable Pavement
    1. Unclear if the requirement for native soils to meet suitability criteria for providing treatment should be a universal requirement, or only for under PGIS.
    2. Recommend adding "Test pits determined the native soil infiltration rate to be less than 0.25 inches per hour".

## II. Competing Needs

Thank you for including the concept of competing needs within the proposal. Evaluation of competing needs is an important tool necessary to the successful implementation of LID, but the current proposal does not provide adequate treatment of how to balance competing needs with LID in a constrained urban environment. A more thorough analysis and a more expansive list and concept of competing needs is necessary to align LID standards with GMA requirements and urban livability considerations.

In Ecology's proposal, neither "local community values and vision" nor GMA requirements would supersede LID requirements because "GMA requirements are compatible with LID." This approach requires rethinking and revision. In practice, GMA compliance and "LID" are not always compatible. Local governments must balance competing GMA planning goals under the statute. See RCW 36.70A.020. The GMA directs municipalities to accommodate a certain amount of growth, and local governments implement this requirement via their Comprehensive Plan, Land Use Codes and policies. For example, Seattle designates urban villages and urban centers through our Comprehensive Plan, and concentrates density and services in these nodes. Development standards in these areas (including a frequent absence of building setbacks, i.e. "zero lot-line") contribute to accommodating growth targets, but considered individually they could appear to be based on "local... values and vision."

No matter how you classify these standards, they can conflict with LID requirements for legitimate reasons. Zero-lot-line development in UGAs often makes sense for growth management, and the resultant buildings could have green roofs, but there is nowhere to put a rain garden.

Ecology is likely to hear the argument that cities can meet growth targets by using towers with small floor plates to leave pervious area on the lot. However, even in Seattle the economics of land value and development costs do not always support towers. For example, additional Seattle Building Code requirements based upon the type of construction (concrete/steel vs. wood frame) and the need for additional life/safety provisions (ADA – elevators, fire suppression) can lead to an approximately 50% increase in the cost of construction<sup>2</sup>. Ecology could essentially be requiring a building type that is not financially viable, driving development out of the city and possibly out of the UGA. Ecology requirements should include a process for reconciling growth accommodation under GMA with stormwater management, allowing for "local values" and economic reality as part of that reconciliation.

Another urban constraint is the basic fact that there is limited space in parcels and the public right of way. Inflexible "competing needs" criteria interfere with other legitimate uses of space

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<sup>2</sup> DPD DR 1-2010 "Implementation of the Fee Subtitle; Building Valuation Data" Fees for Occupancy Group R-2 and R-3.

like usable open space and bike lanes. Bike lanes, while not required by federal, state, or GMA standards, can reduce car dependency, which allows narrowing roads elsewhere and/or reducing pollutant loads on existing roads. Usable open space helps make multifamily residential housing a more attractive option for families, who will then be less inclined to look for housing in single-family residential neighborhoods that have much bigger per capita impacts.

Obviously, to achieve the maximum benefit of LID, clearly defined standards are needed, but Ecology's proposal needs explicit acknowledgement that there are legitimate and priority uses of space other than LID, and the proposal needs to accommodate these other uses. To review Seattle's draft approach to this issue, see page 5 of the December 2009 draft GSI Director's Rule which can be found on Ecology's website under the Technical Committee references for the May 12, 2010 meeting.

Consideration of additional competing needs, at least within a highly urbanized area, must be allowed. For example, even if a site matches existing flow durations, there are instances where multiple dwelling units may replace an existing single family home on a double lot (18,200 sf). In this example, to require a site to use LID to meet a performance standard without the consideration of competing needs could have unintended consequences such as the loss of housing units. This would be in direct conflict with the goals of the GMA. As an alternative to any performance standard in urban areas, a more flexible tool such as a checklist with ample feasibility considerations, including competing needs, engineering and economic analysis, should be an option for applicants.

A LID regulatory approach that relies on variances, exceptions or exemptions to address competing needs is not feasible or sustainable for local government. This suggestion raises serious concerns and requires revision.

### **Closing Remarks**

As noted in Ecology's proposal, the draft LID requirements are intended to preserve high quality aquatic habitat and resources by keeping land disturbances to a minimum especially outside a UGA. Ecology acknowledges that within a UGA, there are confounding factors that make keeping runoff on-site more difficult and application of some LID techniques impractical or unwise.

Given this rationale, for a highly built out urban environment such as Seattle, overall land disturbance has already occurred for most basins. Therefore, for areas that are already highly urbanized, adding the option of a checklist approach like Seattle's draft that is flexible and incorporates LID BMPs while allowing for a wide range of legitimate competing needs and the review of cost feasibility that warrant relief from the LID standard will optimize keeping stormwater on-site while valuing the public interest to accept higher densities in UGAs.

Additionally, we look forward to Ecology's updated Stormwater Manual to further guide jurisdictions in the implementation of LID in Western Washington.

Thank you for taking the time to consider these comments. If you have any questions, please feel free to me at (206) 386-0052 or Tracy.Tackett@Seattle.gov.

Cordially,

A handwritten signature in black ink, appearing to read 'Tackett', with a long horizontal flourish extending to the right.

Tracy Tackett, P.E.  
Green Stormwater Infrastructure Program Manager  
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Utility Systems Management Branch  
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