## TAC Meeting 3: Key Questions

Curtis Hinman WSU Extension Faculty 1-24-10

### HYDROLOGIC PERFORMANCE STANDARD(S)

**Numeric standards**

The committee has discussed hydrological performance standards (HPS) in terms of site specific opportunities and limitations. While these are important factors, the discussions have not addressed a critical consideration: protection of receiving waters and the watershed processes associated with that goal. In the context of our current approach, site limitations would potentially allow for flow control and water quality treatment standards that are inadequate to protect high quality and sensitive streams and wetlands. This scenario is likely new green field development in relatively undeveloped sub-basins, but may also include some limited cases where a basin is in advanced stages of development. The committee has not addressed this central issue.

A hydrologic performance standard will likely have to vary given setting (i.e. level of development) and receiving water condition and value.

For high quality, sensitive or wetlands and streams that show promise for rehabilitating valuable systems: match historic, pre-development peak flows and duration for all flows. In this scenario set a firm standard and do not consider minimum infiltration rates or other site constraints.

For all other cases, the standard should include a volume reduction and duration. The TAC cannot estimate impacts to receiving water for given levels of volume and duration increases and will have to rely on best professional judgment for estimating degradation of those systems from change in hydrologic regime.

**Redevelopment**

#4: Agree that evaluation process is appropriate for redevelopment. HPS should be linked, at a minimum, to improving conditions through volume reduction and water quality treatment.

#5: Non flow control settings must have a water quality treatment component preferable through LID practices because treatment of dissolved constituents is superior with LID practices compared to conventional. Primary challenge for treatment at elevated flows will be adequate management of dissolved pollutants know to have significant impacts to fresh and marine biota.

### FEASIBILITY CONSTRAINTS

**Engineering**

#6:Generally agree with guidance for where LID should not be required except for bullet 1 under Bioretention limiting bioretention application to 0.1in/hr. Perhaps change wording to:

- Bioretention can be used on soils with low infiltration rates.
- Performance will be determined by soil infiltration rates AND contributing area.

#17: Realistic conservative assessment of performance. Start calibration of models to existing performance data. Develop a strategic monitoring program to assess LID flow control performance and perform LID calibration of WWHM and MGS with data.

**PERMIT FRAMEWORK**

Recommend a hybrid approach that requires meeting a hydrologic standard and provides at least a general framework that encourages best application of LID principles and practices. To allow flexibility this framework would not dictate specific practices applied across all sites, but rather guidance that project proponents must consider to encourage good site analysis, site layout and strategic use of LID practices. LID design capability varies widely across Washington and some level of guidance to encourage good analysis and design is necessary to manage that variability.

A purely prescriptive framework is not appropriate given that we are still assessing performance capability of LID practices.

DeeAnn Kirkpatrick Responses to TAC #3 Questions

**HYDROLOGIC PERFORMANCE STANDARD**

KEY QUESTIONS*:* **Volume vs Flow.**

**1. D**o you prefer a volume-based performance standard or a flow duration-based performance standard?

I prefer a combination standard, one that preserves the pre-development hydrology, including the rate, volume, duration, and temperature of the historical forested runoff.

KEY QUESTIONS: **Numeric Standards**

2. In light of the computer modeling results, what numeric standard do you prefer?

In light of the results, I prefer a flow duration standard, although I think the model needs work on it to more accurately reflect what is happening with surface flow, interflow and groundwater. I also think we may need to have a different standard to address the smaller rain events – such as a requirement for keeping vegetation and mimimizing impervious surface.

3. .Is there a lower limiting site infiltration rate below which achievement of the numeric standard should not apply? For instance, the lower the onsite infiltration rate, the harder it will be to meet a hydrologic performance standard.

No, many experts have stated that LID is still feasible on slowly draining and/or till soils.

KEY QUESTIONS: **Redevelopment Projects**

4. Redevelopment Standard: Given the range in opportunities for improvements in stormwater management at a site depending upon the extent of redevelopment, the existing on-site topography, and the surrounding stormwater infrastructure, do you agree that a mandated evaluation process intended to determine the extent to which LID should/can be used in a project is the reasonable approach? Would you prefer a variable hydrologic performance standard that could be tied to one or more of the factors listed above?

I prefer the example variable performance standard because of its similarity to the performance standards that will be applied to new development, and a guarantee of a specific hydrologic outcome. A mandated evaluation process sounds like a good approach that perhaps should be applied to all development sites to ensure that site planning preserves maximum vegetation and soils and minimizes effective impervious surfaces on all sites.

5. What would you prefer within non flow-controlled settings (eg: drainage areas that discharge directly to marine waters)?

In non flow control settings including sites too small to come under the existing flow control standard, a variable performance standard should be used with site planning as described above. Drainage areas that discharge directly to marine waters should also use a variable performance standard with site planning to look at the feasibility of LID in addressing water quality concerns.

## FEASIBILITY CONSTRAINTS

### Engineering Feasibility

1 Review the text from the "Guidance to Help Local Governments Determine When Low Impact Development Practices Should Not Be Required", (attached). Do you agree with the criteria presented for which the use of the identified LID technique should not be required?

Generally yes, but I have two concerns: 1) The statement about bioretention is contradictory. It is acknowledged that bioretention can still be effective on sites with infiltration rates less than 0.1 inches per hour. So bioretention should not be outright eliminated as a requirement on these sites. Applicants should have to show that bioretention will not be effective even if using an underdrain and engineered soil mix.2) I am uncomfortable with vegetated roofs and roof rainwater collection systems not being required based on cost. The applicant should have to show why it is not a reasonable cost before it can be eliminated as a requirement.

2 Using the APWA Matrix, Do you agree with the site conditions under which specific LID techniques should not be required? These are areas identified with shades of red.

Generally yes, except the criteria for steep slopes should be changed to >20%.

### Competing Needs Feasibility

1 Do you agree that there are times in which competing needs for space (i.e., not related to stormwater) can make an LID technique or principle not feasible? Examples identified in the APWA text include: pedestrian and vehicle mobility, and housing unit demands. Examples identified by the November edition of the proposed Seattle Public Utilities Director's rule (2009-007) include: historical designation, pedestrian access, usable open space.

I agree that some of these space needs may at times preclude certain LID techniques or principles, but the site still would need to utilize LID to accomplish a performance standard. LID has to be a higher priority and should not be excluded outright for the uses mentioned above.

2. Should the decision about deferring compliance with stormwater LID requirements due to a competing demand be left to the local government on a case-by-case basis? Or, should there be an attempt made to develop more defined guidance for instances where deferring to another demand is acceptable?

No, decision should not be left to local governments. Ecology should develop guidance for this situation and require doing LID off site elsewhere in the stream reach or basin if space limitations make it infeasible on site.

### Cost Feasibility

1. Relative to new development, do you agree/disagree with the APWA paper that cost is only a factor for vegetated roofs and rainwater collection systems? Why or why not?

   Yes I agree that cost as a factor should be considered only for vegetated roofs and rainwater collection systems. But, cost should not be the only factor in determining the feasibility of these systems.

2. If you agree with the APWA paper, do you have a suggestion for a cost threshold above which vegetated roofs and rain collection systems would be considered infeasible or unreasonable?

   I think that decision has to be made based on the possibilities for using other LID techniques on the site to meet a performance standard. If roofs/collection are the only option on the site the cost threshold (if identified) should be higher.

3. Relative to redevelopment: Do you agree that cost should routinely be considered in redevelopment projects on the premise that we want to encourage redevelopment in preference to new development, but we still want to achieve some improvement in stormwater management at these sites?

   No. I agree that we want to encourage redevelopment vs. new development. But I do not agree that costs should routinely be considered in redevelopment projects. Improvements in stormwater management should generally take precedence, especially in areas of high existing or historical resource value.

4. Do you have a suggestion for a generic cost threshold for limiting the application of LID at redevelopment sites? e.g., the cost of implementing LID strategies should not exceed 10% of the total redevelopment project cost.

5. Should the decision about deferring compliance with stormwater LID requirements due to a cost feasibility be left to the local government on a case-by-case basis? Or, should there be an attempt made to develop more defined state-wide guidance?
   No not left to local governments. Ecology should provide state-wide guidance

**General**

15. Should any type of feasibility constraints be considered for new greenfields development? Why or why not?

Just steep slopes, high groundwater, and contaminated soils. No other feasibility constraints should be considered for new greenfield development, as these sites should have many options for LID techniques.

# Discussion Topics and Key Questions
# TAC Meeting #3

## HYDROLOGIC PERFORMANCE STANDARD

Please refer to the SVR summary of modeling results.

### Volume vs Flow

KEY QUESTIONS:

1. Do you prefer a volume-based performance standard or a flow duration-based performance standard?

Response: Flow duration. There is extensive regional experience among designers using flow duration methods to protect downstream resources. There is essentially no practical experience in the region related to volume-based standards, and under many common development scenarios and precipitation patterns there is no reasonably feasible method to achieve a volume-based standard. How would volume based standards be determined? How would the storage requirements be determined? Any volume based standard would be faced with the reality that not all storm event sequences could be stored, requiring excess flows to be released. Back to back storm events, especially during higher than normal precipitation periods, could easily overwhelm volume standard restrictions identified below.

### Numeric Standards

Volume examples:

a) Match the volume of runoff produced by the historic condition
b) Increase the volume of runoff produced by the historic condition by no more than X%

Duration of Flow Rates examples:

a) Match the historic flow duration curve for all flows
b) Match the flow duration curve for flows in the range of 10% exceedance to 1% exceedance
c) In the range of 10% exceedance to 1% exceedance, do not allow durations to increase by more than X% over the historic condition.

KEY QUESTIONS:

2. In light of the computer modeling results, what numeric standard do you prefer?
Response: Are the Ecology 2009 flow exceedance standards considered inadequate? The standard should use "feasible" LID techniques, then apply flow duration based control standards from the 2009 Ecology Manual to avoid adverse downstream impacts

from "excess" flows when full infiltration is not realistic. Note: The SvR model scenario for till soils used an unrealistic "infiltration" rate of 0.02 inches per hour. A more realistic rate of 0.002 inches per hour is consistent with field infiltration tests on glacial till and laboratory tests performed by geotechnical engineering firms in the region, and with U.S. Geological Survey Water Resources Reports on recharge through glacial till. The SvR model does not account for a reduction in "infiltration" rate due to the effects of ground water mounding that will occur when the infiltrated storm water reaches the un-weathered glacial till surface (hard pan) which is typically only 2 – 4 feet below the forest duff horizon in forested settings. When an LID facility is sited on weathered till soils, ground water mounding may cause bioretention (or infiltration) facilities to act as flow through systems during back-to-back storm events. In this commonly seen condition, the LID facility will not be able to meet even the current flow-control and stream protection performance requirements. Conventional detention systems do meet current DOE flow control and stream protection standards, and will likely be required as a costly back-up system.

3. Is there a lower limiting site infiltration rate below which achievement of the numeric standard should not apply? For instance, the lower the onsite infiltration rate, the harder it will be to meet a hydrologic performance standard.

Response: "Feasible" LID methods should still be applied in an attempt to reduce flows even on low permeability sites. However, flow control requirements consistent with the 2009 Ecology Manual should still be required to protect downstream resources for "excess" flows.

**Redevelopment Projects**

Example of a mandated evaluation process: Seattle's Director's Rule 19-2009

Note that adherence to a process does not guarantee a specific hydrologic outcome. It does guarantee that all sites use the same approach and criteria for determining what LID techniques can be done at redevelopment sites.

Example of a variable performance standard:

Runoff from all new impervious and pervious surfaces must meet the same LID standard as new development projects. If the cost of improvements at the site exceeds 50% of the value of the existing site improvements, any replaced impervious and pervious surfaces must also meet the LID standard.

4. KEY QUESTIONS: Redevelopment Standard: Given the range in opportunities for improvements in stormwater management at a site depending upon the extent of redevelopment, the existing on-site topography, and the surrounding stormwater infrastructure, do you agree that a mandated evaluation process intended to determine the extent to which LID should/can be used in a project is the reasonable approach? Would you prefer a variable hydrologic performance standard that could be tied to one or more of the factors listed above?

Response: Since the current aquatic resource degradation of Puget Sound is directly related to development and land use practices that have already occurred it is reasonable to require redevelopment of those sites to achieve the same resource protection standards required for new development projects. Strict flow control and water quality control standards are already required, and will continue to be required on new development to protect aquatic resources. Redevelopment projects should also be required to achieve similar levels of resource protection.

5. What would you prefer within non flow-controlled settings (eg: drainage areas that discharge directly to marine waters)?

Response: Flow control for direct discharge into marine waters is unnecessary. However, achieving required water quality criteria is necessary. Flow control criteria to achieve treatment would likely require site specific analysis unrelated to LID standards.

## FEASIBILITY CONSTRAINTS

The PCHB Ruling requires a permitting process that requires LID for stormwater management "where feasible". The proposed Permit Framework allows for off-ramps and other avenues of compliance when preferred LID techniques are determined infeasible. The following questions are intended to facilitate discussion on what should or shouldn't be allowed as a feasibility-based off ramp and what impact that has on additional LID requirements.

### Engineering Feasibility

6. Review the text from the "Guidance to Help Local Governments Determine When Low Impact Development Practices Should Not Be Required", (attached). Do you agree with the criteria presented for which the use of the identified LID technique should not be required?

Bioretention – The realities of onsite soil and ground water conditions must be considered in site design and stormwater analysis. Bioretention facilities could result in unintended adverse impacts if they are mandated under all scenarios other than the limited exceptions listed in the Guidance. Conversely bioretention facilities may be feasible even in shallow water table settings (identified in the Guidance) if design flexibility is allowed. Although Guidance is required, the Ecology stormwater Manual should encourage designers to develop solutions to achieve aquatic resource protection that may be different and more effective than "allowable" LID techniques. Infiltration ponds, trenches, vaults and dry wells should be considered part of the primary tool box for managing storm water to meet aquatic resource protection goals, particularly for sites when infiltrative soils (outwash) are limited to small portions of the site, or require deeper excavation to access suitable receptor soils. Adherence to a limited list of approved LID techniques could preclude the potential for significant ground water recharge opportunities that ultimately maintain or improve aquifer water levels and their associated seeps and springs that enhance base flow to streams while avoiding potential geologic hazards.

Soil Amendments – The existing soil amendment criteria (specifications) presented in the LID manual have been difficult to achieve in practice. This topic requires a significant effort to make soil "amendment" specifications readily achievable and predictable.

6. Using the APWA Matrix, Do you agree with the site conditions under which specific LID techniques should not be required? These are areas identified with shades of red.

The use of any Matrix requires simplifying assumptions that can not anticipate all possible site specific conditions. There are some site specific conditions where LID practices could be safely and effectively implemented even in the "red" areas. Conversely there are site specific conditions where LID practices could lead to unintended adverse impacts in the non-red fields presented on the Matrix. The Matrix or equivalent should only be used as general guidance, and not be used as the criteria for determining if LID practices make sense for a specific site.

**Competing Needs Feasibility**

8. Do you agree that there are times in which competing needs for space (i.e., not related to stormwater) can make an LID technique or principle not feasible? Examples identified in the APWA text include: pedestrian and vehicle mobility, and housing unit demands. Examples identified by the November edition of the proposed Seattle Public Utilities Director's rule (2009-007) include: historical designation, pedestrian access, usable open space.

Yes. Also, competing needs for space is not the only factor that could make a LID technique or principle infeasible.

9. Should the decision about deferring compliance with stormwater LID requirements due to a competing demand be left to the local government on a case-by-case basis? Or, should there be an attempt made to develop more defined guidance for instances where deferring to another demand is acceptable?

**Cost Feasibility**

10. Relative to new development, do you agree/disagree with the APWA paper that cost is only a factor for vegetated roofs and rainwater collection systems? Why or why not?

Cost must be considered in any project analysis. It is a certainty that in some cases, the underlying goal of achieving aquatic resource protection can be achieved at lower cost by site specific design solutions that are not part of the "allowable" LID techniques.

11. If you agree with the APWA paper, do you have a suggestion for a cost threshold above which vegetated roofs and rain collection systems would be considered infeasible or unreasonable?

12. Relative to redevelopment: Do you agree that cost should routinely be considered in redevelopment projects on the premise that we want to encourage redevelopment in preference to new development, but we still want to achieve some improvement in stormwater management at these sites?

Since the current aquatic resource degradation of Puget Sound is directly related to development and land use practices that have already occurred it is reasonable to require redevelopment of those sites to achieve the same resource protection standards required for new development projects. Strict flow control and water quality control standards are already required, and will continue to be required on new development to protect aquatic resources. Redevelopment projects should also be required to achieve similar levels of resource protection.

13. Do you have a suggestion for a generic cost threshold for limiting the application of LID at redevelopment sites? e.g., the cost of implementing LID strategies should not exceed 10% of the total redevelopment project cost.

14. Should the decision about deferring compliance with stormwater LID requirements due to a cost feasibility be left to the local government on a case-by-case basis? Or, should there be an attempt made to develop more defined state-wide guidance?

**General**

15. Should any type of feasibility constraints be considered for new greenfields development? Why or why not?

Response: Feasibility constraints must be considered. The reality of site characteristics must be analyzed on a site by site basis. Constraints related to soil type, topography, geologic hazards, and nearby aquatic resources require integrated analyses for each project. Design solutions that are not included as “allowable” LID techniques may be more effective at meeting aquatic resource protection goals, and should be allowed and encouraged in the Ecology stormwater manual. Infiltration ponds, trenches, vaults and dry wells should be considered part of the primary tool box for managing storm water to meet aquatic resource protection goals, particularly for sites when infiltrative soils (outwash) are limited to small portions of the site, or require deeper excavation to access suitable receptor soils. Adherence to a limited list of approved LID techniques could preclude the potential for significant ground water recharge opportunities that ultimately maintain or improve aquifer water levels and their associated seeps and springs that enhance base flow to streams while avoiding potential geologic hazards.

**IMPLEMENTATION BARRIERS**

This discussion will outline the range of implementation barriers members have experienced and others that can be anticipated. Refer to the Herrera memo to the APWA Managers Meeting, May 15, 2009.

KEY QUESTIONS:

16. What are the key barriers to implementing LID, and what are their implications to this permit process?

17. What are recommended approaches to removing those barriers?

# John Palmer Responses to TAC #3 Questions

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|---|---|
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| **To:** | Tina Gary |
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| **Subject:** | Ecology LID TAC #3 Meeting follow up |
| **Date:** | Tuesday, February 02, 2010 10:05:18 AM |

Hi Tina,

I'd like to offer up the following additional suggestions related to the questions posed at the last tech meeting (in addition to my email below on the flow duration curves).

Timing of Implementation (Implementation committee item mostly)

1) I'm concerned about not getting additional LID reqs until 2014 and 2015. These dates maybe ok for the full blown deal (new perf std plus revised development codes), but I'd like to consider some modification to the current Phase I permit in 2010. I suggest the Phase I permit be modified to require the checklist approach (Seattle) or some variant. I'd like to discuss if jurisdictions would necessarily need to revise their ordinances to meet this new requirement.

LID Std

Based on the info thus far, I tentatively support the following. However, very much still weighing all the approaches and specific thresholds noted below.

1) New Development with infiltration rate higher than 0.25 in/hr: Match the historic flow duration curve in the 1 to 10% range.

2) New Development with infiltration rate lower than 0.25 in/hr: No more than X% above the historic flow duration curve in the 1 to 10% range.

3) Low density (1 du/acre or less) Residential New Development: Match the historic flow duration curve in the 1 to 10% range. Must be achieved through full dispersion. In essence, 65 forest cover/10% impervious limits. No conversion of interflow to surface flow.

4) Redevelopment: LID "checklist" - incorporate LID to the extent feasible to help meet current flow control requirements.

5) Commercial Redevelopment greater than 1 acre: No more than X% above the historic flow duration curve in the 1 to 10% range.

6) Small sites (less than 10,000): LID "checklist"

7) Current flow control exempt areas: LID "checklist" with the target of matching 1 - 10% historic flow duration curve.

Development Codes

1) Require revision of codes to maximize LID. Specify certain provisions: street width, sidewalk width, setbacks, clustering allowance, etc.

Basin Planning

1) Require a basin planning exercise where the jurisdiction reviews and modifies land use ordinances (eg critical areas, shoreline materplans, and zoning) to protect the hydrology

of the basin.

-----Forwarded by John Palmer/R10/USEPA/US on 02/02/2010 08:57AM -----

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From: John Palmer/R10/USEPA/US
Date: 01/28/2010 03:16PM
Subject: Feedback on Flow Duration Charts

Hi all,

I wanted to provide some thoughts on the charts and what else might be useful. First, I thought the information provided by the contractors was helpful, but not yet sufficient. Ed's chart he handed out at the meeting made something very clear. We need to analyze the various LID scenarios with the current flow control std being attained. Ed's chart clearly showed that when the flow duration curve is lowered to meet the current flow control std (0.001 - 1 freq), it increases flow rates in the 1 to 10% range (the range we are considering for the LID perf std).

I recommend we run some (not necessarily all) of the scenarios with the flow control std attained like Ed did in his chart for Scenario 4 (0.02 and 0.25 in/hr). I think the interesting question for these scenarios is what is the infiltration rate which the forest condition can be met for the full 0.001 to 10% range. This would define an infiltration rate where it's reasonable to have the 1- 10% forest runoff rate be the LID performance std.

For example, for projects with an infiltration rate of 0.5 in/hr or higher, the LID perf std. would be to meet the forested conditions for the 1-10% flow rate. For projects with a lower infiltration rate, we'd have to come up with something else if we didn't think the forested conditions is feasible. From the charts, it appears 0.5 might work - so perhaps we run the scenarios at a 0.5 in/hr infiltration rate. I also think its helpful to have the curve on the charts that shows meeting the current flow control std *without* any LID (this shows the benefit were getting from LID).

I'd happy to discuss this further.

Thanks

John

Dave Tucker Responses to TAC #3 Questions

Question 1: Do you prefer a volume-based performance standard or a flow duration-based performance standard?

I prefer a performance standard that relates back to the purpose. Flow duration makes sense from a stream ecology standpoint. The lower the stream energy the less impact the water running of the site has in the freshwater environment.

The desire to use a volume based standard seems to be one of "this is what we can measure" rather than "this is what needs to happen on the site to make off site conditions better or at least not worse."

I recommend Ecology get some scientific perspective on what flow characteristic LID provides that their current duration standard does not provide.

Question 2: In light of the computer modeling results, what numeric standard do you prefer?

The option that extends the duration control to more frequent and less energy flows with a limit on the percentage of duration exceedance seems reasonable and appropriate to me based on protecting fresh water from flow damage. The range of flows from 1% to 10% appears arbitrary. If in fact it has a scientific basis or practical basis then that basis would be nice to know.

As an example if the duration std was extended to 2.5% and the flow durations between 1% and 2.5% could not increase more than 8% (And there was a basis for these numbers) it is likely that standard detention practices cannot provide this level of flow because orifice control and weir control have lower flow practical construction limits. If ecology removes the low head and minimum orfice size loop hole, then as a practical matter, LID principles such as site design, amended soils, rain gardens and the like would have to be employed to get compliance.

Question 3: Is there a lower limiting site infiltration rate below which achievement of the numeric standard should not apply? For instance, the lower the onsite infiltration rate, the harder it will be to meet a hydrologic performance standard.

It depends on the practice. Pervious pavement with ~ 18in of rock underneath can provide a lot of volume decrease at 0.001 inch per hour. Less diffuse practices such as rain gardens will not perform as well.

Other practices such as green roofs, limiting footprint, native canopy retention/replacement and such that do not depend on infiltration could still be done on the site.

Question 4: Redevelopment Standard: Given the range in opportunities for improvements in stormwater management at a site depending upon the extent of redevelopment, the existing on-site topography, and the surrounding stormwater infrastructure, do you agree that a mandated evaluation process intended to determine the extent to which LID should/can be used in a project is the reasonable approach? Would you prefer a variable hydrologic performance standard that could be tied to one or more of the factors listed above?

For all sites set a performance standard. Also provide guidance on how to allow exceptions when physical or financial obstacles come into play. Seattle's list is a great start as well as the list in the WSDOT Highway Runoff Manual.

Question 5: What would you prefer within non flow-controlled settings (eg: drainage areas that discharge directly to marine waters)?

Based on DOE's current method of flow control and water quality, I suggest to concentrate on water quality. The real goal is load, but the current DOE process does not directly address that element.

Question 6: Review the text from the "Guidance to Help Local Governments Determine When Low Impact Development Practices Should Not Be Required", (attached). Do you agree with the criteria presented for which the use of the identified LID technique should not be required?

I prefer the checklist developed by Tracey Tacket and the SPU gang. It is more specific. The floor on infiltration rate is a matter of professional opinion. A design rate of 0.125 which matches current DOE guidance for infiltration trenches (WW manual Vol III page 3-76 table 3.7) seems like the floor they recommend for other small hydraulic load infiltration systems.

Question 7: Using the APWA Matrix, Do you agree with the site conditions under which specific LID techniques should not be required? These are areas identified with shades of red.

Generally yes.

Question 8: Do you agree that there are times in which competing needs for space (i.e., not related to stormwater) can make an LID technique or principle not feasible? Examples identified in the APWA text include: pedestrian and vehicle mobility, and housing unit demands. Examples identified by the November edition of the proposed Seattle Public Utilities Director's rule (2009-007) include: historical designation, pedestrian access, usable open space.

Yes, there is a specific historic district in Kitsap County (Pt Gamble) recognized under GMA as having a specific importance. It is allowed some "exceptions to the rules" based on the value of retaining the historic building layout and architecture, etc of the district. Such a place should not have green roofs or other technologies that obviously conflict with the historic look imposed on it. Other arbitary items like downtown plans or items where local governments have choices are not good reasons to allow exceptions.

Life safety issues would be another legitimate conflict. An example would be trees and other native vegetation impeding sight distance for road entry safety. Much of the geometry of many existing roads and lots is predetermined and there would be an undue financial burden for a site developer to have to pay to straighten a road to improve sight distance vs allowing some vegetation to be permanently removed or replaced with lower growing veg to produce the same safety benefit.

Dave Tucker Responses to TAC #3 Questions

Question 9: Should the decision about deferring compliance with stormwater LID requirements due to a competing demand be left to the local government on a case-by-case basis? Or, should there be an attempt made to develop more defined guidance for instances where deferring to another demand is acceptable?

Provide default guidance but set a framework that locals can create other criteria that provide similar results.

Question 10: Relative to new development, do you agree/disagree with the APWA paper that cost is only a factor for vegetated roofs and rainwater collection systems? Why or why not?

Historic district architectural preservation. (A district recognized beyond local gov level)

Demonstrated on site use of water.

Question 11:If you agree with the APWA paper, do you have a suggestion for a cost threshold above which vegetated roofs and rain collection systems would be considered infeasible or unreasonable?

I think every physical BMP has a cost limitation. Pervious pavement with 6' of underdrain rock is probably too costly

Question 12:Relative to redevelopment: Do you agree that cost should routinely be considered in redevelopment projects on the premise that we want to encourage redevelopment in preference to new development, but we still want to achieve some improvement in stormwater management at these sites?

Yes

Question 13: Do you have a suggestion for a generic cost threshold for limiting the application of LID at redevelopment sites? e.g., the cost of implementing LID strategies should not exceed 10% of the total redevelopment project cost.

WSDOT Highway Runoff Manual numbers. $5 per sq ft of impervious surface being treated for rural land and $7 for urban. The HRM is the only publicly available resource I could find that provides a basis for what is cost prohibitive based on site conditions.

Question 14:. Should the decision about deferring compliance with stormwater LID requirements due to a cost feasibility be left to the local government on a case-by-case basis? Or, should there be an attempt made to develop more defined state-wide guidance?

State guidance that is guidance and not the only acceptable pathway.

Question 15: Should any type of feasibility constraints be considered for new greenfields development? Why or why not?

Yes, all sites may have limiting conditions beyond the control of the land developer. Topography, adjacent land uses, drinking well locations off site, on site septic systems, etc.

They are just more likely in densely developed urban settings.

Question 16: What are the key barriers to implementing LID, and what are their implications to this permit process?

Reliance on BMPs instead of on site design. Lack of education. (Perhaps make WSU Ext or other certificate required to some extent?? Similar to the Certified erosion control specialist process)

Question 17: What are recommended approaches to removing those barriers?