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DEPARTMENT OF RESOURCE STEWARDSHIP
WATER RESOURCES UNIT

Cliff Moore
Director

June 17, 2011

Harriet Beale
Washington Department of Ecology
Water Quality Program
PO Box 47696
Olympia, WA 98504-7696

RE: Thurston County Comments on Preliminary Draft Western Washington Phase II NPDES Permit Requirements

Dear ~~Ms. Beale~~: Harriet,

Thurston County appreciates Ecology's initiative in releasing the preliminary draft permit language for monitoring and LID requirements for the next municipal National Pollution Discharge Elimination System (NPDES) Phase II permit for informal review. We are providing narrative and detailed comments (Attachment A) on this draft permit language for your consideration and attention. In providing comments, staff focused on ease and feasibility of implementation should the new language be included in the new permit. Specifically, staff asked themselves how effective and practical are the new requirements in providing cost-effective reduction of stormwater pollution. Thurston County, like other municipalities, must operate with limited resources yet meet increasing regulatory demands. Our comments and suggestions have strived to balance these competing demands and increase our effectiveness for improving water quality.

We understand Ecology has announced it will not be preparing responses to comments received from this informal comment period. Thurston County recommends Ecology prepare written responses and utilize the publication of the agency's responses as an opportunity to invite municipalities and other stakeholders to form an advisory group. This advisory group, similar to past permit reissuance processes, could assist Ecology staff in refining this draft language and the entire permit. Using this process could substantially reduce the level and scope of concerns the agency is undoubtedly receiving during this comment period. Additionally, our ability to effectively comment was greatly limited by the fact that several key guidance documents referenced in the draft language were not available for review. Those missing documents need to be made available before the final draft language is published and ideally circulated for comment as part of the suggested consultative process recommended above. The changes being proposed by Ecology are significant for all Phase II permittees. We believe the effectiveness of the permit and ultimate cooperation from municipalities would be significantly improved via this consultative approach. We strongly urge Ecology to revamp its permit consultation strategy.

Thurston County is actively engaged in watershed planning. We have completed numerous basin plans and are nearly complete in characterizing all watersheds draining into Puget Sound under an EPA funded grant. These plans and watershed characterization analyses have informed our stormwater, water quality and other water resource projects. The draft permit language does not acknowledge these prior planning efforts and instead directs the use of an incomplete model. We see great utility to controlling stormwater according to watershed, not political, boundaries. However, the draft language does not support that type of collaboration of true watershed planning. We encourage Ecology to substantially revise the existing language and instead propose an optional, pilot effort for interested permittees to develop stormwater planning on a watershed basis. Thurston County would be very interested in assisting in the drafting of this revised language.

We are encouraged that Ecology has incorporated many of the recommendations from the stormwater monitoring group in the proposed regional stormwater monitoring program (RSMP). The RSMP is a substantial additional permit requirement with a unique and complicated pay-in option from the permittee to the regulator. Thurston County has conducted a well-established cooperative status and trends water quality monitoring program with the cities of Olympia, Lacey and Tumwater for more than a decade. We appreciate the potential benefits and efficiencies of a regional monitoring program as long as the results are applicable at the local level. However, due to the complexity of the proposed regional program, omission of an opt-out/applied credit for existing municipal monitoring program and significant increased permit costs, we strongly recommend Ecology scale back the scope and funding of the RSMP during this permit cycle to no more than the proposed Year 1 levels. A longer roll-out of RSMP will provide time to integrate existing local monitoring programs and establish the operational procedures and responsibilities necessary to successfully operate a multi-million dollar regional monitoring program. Finally, several of the stormwater workgroup recommendations (modified to reflect Thurston County's views) need to be reinforced here:

1. The option for municipalities to conduct their own effectiveness studies must be included in the permit. We understand the complications this option raises with implementing a regional program and with increased permit complexity and oversight, but we continue to believe that this would provide additional flexibility to permittees to cost-effectively address local needs while still providing regional benefits.
2. Cost allocations for permittees must be established with the flexibility to allow for adjustments to be made whenever annexations and incorporations occur during the permit cycle. Consistent with the existing requirement of reporting changes in the regulated area, the selected adjustment methodology would not require reopening of permit conditions.
3. Ecology should use the SWG's Pooled Resources Oversight subcommittee as described by the subcommittee charter. Further, clear permit language a permittee is exempt from liability if the researcher fails to complete the monitoring work.
4. Ecology must review and update the cost estimates for the coordinated monitoring program to ensure that the funds generated are accurately calculated, sufficient to implement the described program, and contain appropriate contingency funds.

The LID requirements have elicited substantial comment and concern. Thurston County supports the many benefits of LID and has already integrated LID best management practices (BMP) into its Drainage Manual. Our experience with implementing LID and observation of the successes and failure of neighboring jurisdictions with LID has taught us that these BMP's are not feasible on all projects. Yet, the draft language effectively directs permittees to use LID in every project, including certain mandatory BMP's, such as pervious pavement, irrespective of cost, maintenance requirements or feasibility. We strongly recommend Ecology revise its list of mandatory BMPs and allow for a broader range of BMP's for use in meeting design flows to make it clear that all tools are available to manage stormwater, not just LID. The additional LID BMP's should include, at a minimum, natural and engineered dispersion, compost amended vegetated filter strip, bioinfiltration pond, bioinfiltration swale, infiltration pond, infiltration trench and media filter drains.

The mandatory requirement for the use of pervious pavement elicited the most comment from County staff. The overwhelming conclusion was there have been insufficient time to adequately assess life cycle costs, performance, and maintenance/repair characteristics of pervious pavement. The technology of pervious pavement continues to change, although the costs of installation and maintenance continue to exceed those of traditional paved surfaces. Ecology will need to fully consider how well pervious pavement performs under heavier traffic, spill containment, underground utility impacts and life-cycle costs. Until these questions can be answered, the use or pervious pavement in the permit for all roadways should be encouraged but not mandatory.

Finally, the several proposed changes in Appendix 1 are problematic. The expansion of the definition of "receiving waters" to include saturated soils under infiltration BMP's would unnecessarily increase permittee obligations for inspections and compliance without a corresponding benefit of improved stormwater management. We strongly recommend deleting any reference to groundwater from this definition. Also, we understand the Pollution Control Hearings Board ruling to require the use of LID to the "maximum extent feasible" yet another term of "maximum extent practicable" is introduced. We suggest omitting the latter and using the former as the operative standard for LID.

Thurston County looks forward to continuing dialogue with you and your colleagues to improve the permit language and requirements. We are pleased to share the goals and responsibilities of improving water quality through improved stormwater management with the Department of Ecology. Our partnership is most likely to succeed if we can focus regulations on what actions produce the best improvements in a predictable, cost-efficient manner. Thank you again for the opportunity to comment. Please feel free to contact me at (360) 754-4275 with any questions.

Sincerely,

for Jim Bachmeier
Water Resource Program Manager

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Thurston County comments on Western Washington Phase II Municipal Stormwater

Attachment A.

Comments on draft LID language
June 17, 2011

Document	Section	COMMENT	RECOMMENDATION
Draft Permit Language	4. Controlling Runoff from New Development, Redevelopment and Construction Sites	Draft permit deletes reference to 1-acre threshold for which permit conditions apply. While understanding the logic for doing this (that most permittees already regulate to a lesser level than 1-acre), is it necessary to remove this constraint. The benefit of the 1-acre threshold is that it allows somewhat more flexibility for small projects and particularly single family residential projects that are the most sensitive to increased permitting conditions and result in the greatest amount of political opposition. Additionally, if this language is removed, does it now require that inspection of stormwater facilities required by the permit must be performed on single family residences including individual rain gardens, downspout dispersion systems, on-site porous pavements, etc. If so this is a tremendous increased burden on Phase II permittees with little perceived benefit.	Retain 1-acre threshold for projects to which the permit conditions apply, consider an analysis of the probable impact through permittee surveys to understand the consequences before implementation.
Draft Permit Language	4. Controlling Runoff from New Development, Redevelopment and Construction Sites – iv. Low Impact Development – (1)	This section requires a process "similar" to that proposed in Puget Sound Partnership Guidance document to perform code reviews. While the intent of this permit condition is understandable, the guidance document (draft of June 2011) is relatively broad with little specific guidance on how to retain native vegetation or limit impervious surface. Ecology has stated that going through the process and not making substantive code changes would be a violation of the permit (Ed O'Brian, June 7, 2011); however, since neither the guidance document nor Ecology specifies enforceable criteria that will demonstrate that code revisions meet the goal of making "LID the preferred and commonly-used approach" this provision appears to be highly subjective and unenforceable.	Either strengthen the guidance document prepared by Puget Sound Partnership to include minimum necessary provisions to make code compliant with the NPDES permit or Ecology should specify these minimums.

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Document	Section	COMMENT	RECOMMENDATION
Draft Permit Language	4. Controlling Runoff from New Development, Redevelopment and Construction Sites – iv. Low Impact Development – (2)	Typographical error in this paragraph – "summary of the results" is repeated.	Fix typographical error.
Draft Permit Language	4. Controlling Runoff from New Development, Redevelopment and Construction Sites–iv.LID– (2)	The summary of the results of the code revisions process are required to be submitted with the 4th year annual report. Ecology should provide more specificity about what that summary should/must include and the format. Lacking that guidance it is unclear what would be sufficient to meet this requirement.	Provide guidance on content of 4th year annual report submittal regarding code revisions.
Draft Permit Language	Note to reviewers – 4.b.iv – Re: impacts of removing 1-acre threshold.	Ecology request input on impact on inspections, reviews, and maintenance of removing the 1-acre threshold for Phase II permittees. For Thurston County, generally there will be minimal impact as far as project reviews and inspections since for the most part projects less than 1-acre are already subject to drainage requirements and reviewed and inspected generally the same as larger projects covered by the NPDES permit. However, there are great concerns regarding required ongoing inspections to confirm post-construction functionality. The increased number of facilities requiring inspection under current inspection standards will greatly increase, with uncertain impacts on staffing levels in the inspection and compliance group. Additional permit language allowing perhaps a different inspection standard for smaller projects, or at a minimum clarifying what will be considered a stormwater facility for purposes of these compliance inspections is desired – will rain gardens, cisterns, drywells, porous pavements, etc. on individual single family residential sites be required to execute maintenance agreements with the county? Will annual inspection of these types of facilities be required by the permit? A lesser standard or at least clarifying language as to which facilities inspection requirements are applicable to are needed.	If the removal of the 1-acre threshold is retained in the final permit provide additional guidance and/or permit conditions related to what constitutes stormwater facilities subject to inspection requirements for small projects like single family residences – or even outbuilding/shop construction projects. Consider an alternative to annual inspection requirements for small projects such as requiring inspection prior to property transfer (similar to on-site septic system requirements).

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Document	Section	COMMENT	RECOMMENDATION
Draft Permit Language	Note to reviewer – 4.c.i – Re: Maintenance Standards for LID	Primary LID components of LID such as porous pavement and bioretention need standards for performance testing and maintenance. A study by the University of Minnesota developed a quick in-situ infiltration test for bioretention facilities. While this testing could not feasibly be performed annually on all bioretention facilities, a description of a testing protocol and a testing frequency – say average once every 5-years per facility would identify when these facilities may have lost functionality. For porous pavement a similar testing protocol needs to be developed. Is the "bucket test" adequate? Is there another test of infiltration capacity that can be developed? For larger infiltration ponds/facilities evidence of failure is typically visual and represented by overflow during large storm events—given the potential greater number and smaller size of dispersed BMPs this basis for determining system problems is less useful.	Develop performance testing protocols for bioretention and porous pavements and a recommended frequency (greater than annual). And define the responsibilities of the owner to complete the testing...for public facilities only?
Draft Permit Language	4.d – Re: Inspection records	Language in this section is not clear... still retains a reference to common plan of development and one acre threshold. The wording as proposed appears to indicate that records are only required to be kept on small projects that are part of a larger plan of development? Is this the intent? If so then section as written is ok. If intent is record keeping on all projects, this will create a significant burden since small projects including shops, outbuildings, gravel parking areas, clearing projects, etc. will be required to have records and inspections.	Evaluate language of this section – is it correctly written? Clarify what types of projects need to have inspection records kept. Clearing projects? Grading? Small out-buildings? Remodels?

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Draft Permit Language	4.g. Watershed-scale stormwater planning	The Center for Watershed Protection – Stream Restoration Series indicates that the sub-watershed is the appropriate scale for watershed based evaluations. With sub-watershed being defined from 1.5 to 10 square miles. Watershed planning within a watershed defined as up to 40 square miles is unnecessarily large and any impacts from the UGA expansion would likely be "invisible" to a hydrologic model established on that large an area. Modeling a 40 square mile watershed (or even a 10 square mile watershed) accurately enough to predict impacts from an 80 acre UGA expansion will be difficult and as Chris May stated at the LID Committee Meeting, no hydrologic model available today is sufficient to perform this modeling. Additionally, the lack of guidance on how the modeling needs to be conducted will likely generate inconsistent impact analysis resulting from the use of different models. Accurate modeling of a watershed/subwatershed requires accurate data input for the entire watershed, stream flow and water quality monitoring to provide a means of calibrating the model, potential groundwater modeling to accommodate groundwater inflows, etc. No guidance is available on how this modeling requirement needs to be performed and the jury is out on whether this type of watershed modeling is suitable for establishing land use decisions. Furthermore, it is unclear what parameters are to be modeled. What flow measures are to be used? Current research indicates that flow measures other than peak flows are important to stream health. What water quality parameters are to be modeled? What land use loading rates are to be used? Too many uncertainties exist to make this a requirement under this permit. Furthermore – who does the modeling? The County in which the UGA is located or the City that is requesting the UGA expansion? Who pays the bill?	Eliminate or substantially modify this requirement until such time as specific guidance is provided that will ensure that the modeling can accomplish the intended objective. A more generic requirement that for the specified UGA expansions the permittee must evaluate the impacts to water quality and stream health as part of the process. Reduce the scale of the watershed to 10 square miles or less. Clarify whether the associated city or the County is responsible for the watershed modeling. Thurston County has completed Watershed characterizations which incorporate completes analytical processes, this is a comprehension approach. This is an unrealistic model to due to cost, to deploy for this analysis

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	Section 2: Definitions: Converted Pervious Surface	Application of this definition in practice has been difficult. Many development projects occur on lands that have already been modified to some extent. If a development converts existing pasture land, a tree farm, an old cleared area that has grown up with a mix of indigenous and invasive species (scotch broom, blackberries) to lawn and/or landscape, is this considered converted pervious surface?	Expand and clarify this definition to allow for better application to projects in practice.
Appendix 1	Section 2: Definitions: Effective Impervious Surface	This definition needs to be clarified. If an impervious surface sheet flows across 10-ft of lawn on till soils, under this definition it could be considered not effective impervious surface. Other definitions (BMP T5-30) indicate that only those surfaces dispersed through 100-ft of native vegetation or infiltrated 100% are considered non-effective impervious surfaces. The examples given, supplementing the definition are helpful, but not complete. Why does dispersion through 100-ft of vegetation have to be per BMP T5.30. If dispersion of impervious surface through 100-ft is creates a non-effective impervious surface, then it should be non-effective whether conditions of BMP T5.30 are met or not. What about downspout infiltration? Similar to pervious pavement, if downspout infiltration is for 100% of the runoff, it should likewise be considered non-effective impervious surface.	Expand and clarify this definition to allow for better application to projects in practice.

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Appendix 1	Section 2: Definitions: Impervious surface	Reference a "non-vegetated" surface – Assume this is a reference to green roofs. However, green roofs can come in a multitude of different forms including intensive and extensive with differing properties. There should be a distinction, or a minimum standard to make green roofs non-impervious.	Consider types of green roofs and minimum standard for when green roof is considered non-impervious. . A practical caution is encouraged for the green roof BMP; in Western WA, after early Nov. the effectiveness of runoff retention is generally very limited. This aspect could allow facilities to be undersized as the retention value of the roof may be overstated.
Appendix 1	Section 2: Definitions: New Development	This definition includes: "subdivision, short subdivision and binding site plans" – However, in practice it is difficult to know how to regulate these types of development under the NPDES rules. For example; how do the impervious surface, land conversion, and clearing thresholds apply to a 2 lot subdivision that requires no construction of roads, etc. but simply intends to divide the property for future purchase and construction by another party at some indefinite future date? Should these be regulated as development? Thurston County has seen many of these types of large lot and short plat developments that have intense opposition to our requiring drainage plans for a project where no construction occurs (but will occur at some time in the future).	Clarify how development thresholds apply to simple divisions of land without any infrastructure construction at the time of land division.
Appendix 1	Section 2: Definitions: Pollution Generating Impervious Surface	Since under the new definition of impervious surface, a green roof is not considered "impervious" but roof vegetation may be subject to fertilizer, etc. – green roof areas should be considered pollution generating pervious surface for purposes of water quality regulation. Pastures are not listed and pollution generating pervious surface, but in practice are sources of sediment and bacterial pollutants. Pastures should be added to list of pollution generating pervious surfaces and be subject to appropriate treatment standards.	Add green roof and pastures to list of pollution generating pervious surface.

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	Section 2: Definitions: Replaced Impervious Surface	Given new definitions for hard surface and impervious surface, how will porous pavement or vegetated roof areas that are installed over existing impervious surface be treated? Since a green roof is not considered "impervious" would it be considered replaced impervious surface?	Clarify how pervious pavement and green roofs will be treated for purposes of "replaced impervious surface"
Appendix 1	Section 3.1: Thresholds	If the 1-acre threshold for regulation under the NPDES permit is removed it is unclear what the language in this section (paragraph 2) is saying. Is it referring to the thresholds for determining minimum requirements? If so the last sentence of the 2nd paragraph appears to state that one can relax more stringent requirements to meet the minimum requirements of the appendix. Is the 2nd paragraph even necessary in this section?	Remove 2nd paragraph or revise to better reflect what is intended – as written is confusing.
Appendix 1	Section 3.1: Thresholds	3rd paragraph relating to subdivisions plats or short plats – Does this paragraph mean that a short plat where no construction, clearing, grading, etc. will be performed is essentially exempt from applying the thresholds? And the thresholds apply at the time of permit application, i.e. submittal of building permit for construction on the lot? If so, then would the thresholds only apply to development of the individual lot? But if there are several lots, once all are built out the entire subdivision might exceed thresholds for requiring flow control of runoff treatment. How should this be dealt with? Thurston County treats subdivisions without any construction (ie. No access roads, etc. required) as a common plan of development and development on each individual lot has to meet flow control and runoff treatment standards based on the projected impervious and pollution generating surfaces of the entire subdivision. General assumptions regarding how much impervious and landscape area will be generated per lot have been developed to assist in this determination. More clarification is needed on how this provision applies to subdivisions without any proposed construction.	Clarify how development thresholds apply to simple divisions of land without any infrastructure construction at the time of land division.

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	Figure 3.1: Flow Chart for Determining Whether the Permittee Must Regulate the Project	If a project infiltrates 100% of stormwater on-site and there is no discharge to the MS-4 or alternatively, if the project abuts a lake, stream or Puget sound and the discharge is directly to that body of water is it correct that there is not a discharge to the MS-4. In these examples, is it true then that a permittee is not required to apply the same rules as contained within the NPDES permit? This is not to imply that a permittee would not regulate those types of projects, but it is important to know whether this is a legally correct interpretation in the event that a jurisdiction desired to apply alternative regulatory rules to those situations. One can see the irony of this in that if LID measures are applied and/or all stormwater is infiltrated in an on-site infiltration pond then technically the NPDES thresholds do not apply to the project.	Confirm that discharge from a development site directly to a body of water or 100% infiltration of stormwater on-site means that permittee is not required to apply the thresholds of the NPDES permit but may regulate those cases in an alternative manner, if desired.
Appendix 1	Figure 3.2: Flow Chart for Determining Requirements for New Development	No definition is provided for replaced "hard" surface only replaced impervious surface. If a "hard surface" that is not considered impervious (porous pavement) replaces an impervious surface how is that treated?	Add definition of "replaced hard surface" to definitions section. Clarify how replacement of existing impervious surface by non-impervious hard surface is to be treated.
Appendix 1	Figure 3.2: Flow Chart for Determining Requirements for New Development	In conjunction with previous comments regarding whether pasture should be considered pollution generating pervious surface and definition of native vegetation – If a pasture is converted to lawn is this considered a conversion? If an area has been previously logged and is now overgrown with invasive plants (scotch broom for example) is conversion to pasture or lawn a conversion from native vegetation?	Need to more tightly define conversions, pollution generating pervious surface, and native vegetation to allow for consistent application of rules to actual development sites.

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	Figure 3.3: Flow Chart for Determining Requirements for Redevelopment	Same comments as above for Figure 3.2. Additionally, for determining whether all minimum requirements apply, suggest leaving the 5,000 square foot and 50% added criteria still be applied to impervious surface and not hard surface. One goal of stormwater rules should be to encourage redevelopment. By leaving impervious surface changes (versus hard surfaces) as the threshold for applying all minimum requirements to a redevelopment project, reduces one barrier to redevelopment projects.	Same recommendations as for Figure 3.2 plus suggest leaving changes in impervious surface as the threshold for when all minimum requirements apply for redevelopment projects.
Appendix 1	3.2: New Development	Same comment as above for Figure 3.2 – need to define replaced hard surfaces and better define land conversions.	See recommendation above.
Appendix 1	3.3: Redevelopment	Same comment as above for Figure 3.3 – need to define replaced hard surfaces and consider allowing continued use of impervious surface for whether all minimum requirements must be met.	See recommendation above.
Appendix 1	4.1: Minimum Requirement #1: Preparation of Stormwater Site Plan	States: "Stormwater Site Plans shall use site-appropriate development principles to retain native vegetation and minimize impervious surfaces to the extent feasible." Why state this if it is not defined in an enforceable way. This type of provision, in practice, means nothing. How is feasible defined, how does one measure compliance?	Delete proposed new insertion to this section or provide specific rule or guidance on how this is met.
Appendix 1	4.1: Minimum Requirement #1: Preparation of Stormwater Site Plan	With removal of the 1-acre threshold for applicability of NPDES permit requirements this will now require small projects such as shops, small SFR, etc. to submit a complete stormwater site plan; whereas previously jurisdictions (such as Thurston County) had provisions in place for lesser submittals (abbreviated drainage plan) that did not necessarily meet all requirements for a stormwater site plan which were tied to the 1-acre threshold and NPDES permit boundary. Depending on what the 2012 SWMMWW requires for MR #1 this may substantially impact small project applicants in terms of cost, convenience and frustration. If 1-acre threshold is retained, consider two levels of stormwater site plan, one for smaller projects and one for larger projects.	Consider two levels of stormwater site plan – one for projects less than 1-acre that are only required to meet MR 1-5 and those larger than 1-acre and/or must meet all minimum requirements.

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	4.2: Minimum Requirement #2: Construction Stormwater Pollution Prevention Plan	Similar to above comment related to small projects and stormwater site plan submittal, small projects should be allowed to have a lesser submittal standard for a construction SWPPP and the projects that only are required to meet MR#2 should not have to make a submittal – but must manage their site consistent with MR#2 requirements. Allow jurisdictions some flexibility on applying this to small projects. Thurston County allows erosion controls to be shown on the site plan for small projects unless the project exceeds thresholds requiring MR 1-5. Consider a 500 square foot addition to an existing home. This would require a construction SWPPP. The typical homeowner/small contractor will have no idea how to do this and the "narrative and drawings" will add little to benefit water quality.	Provide for projects only subject to MR#2 to not have to submit a construction SWPPP – but meet construction SWPPP standards through other means. Retain language connecting the construction SWPPP submittal to those projects required to meet MR#1.
Appendix 1	4.2: Minimum Requirement #2: Construction SWPPP: 12. Protect Low Impact Development BMPs	This section should be broadened to include all infiltration BMPs including infiltration trenches, ponds, etc. The same issues apply to infiltration BMPs.	Add all protection of all infiltration BMPs to proposed new SWPPP element 12.
Appendix 1	4.5: Minimum Requirement #5: On-site Stormwater Management: Project Thresholds	Why distinguish between single-family residential projects and other projects. If downspout infiltration/dispersion is acceptable for one type of roof area why would it not be acceptable for commercial projects? "Single family residential project" is not defined. Does this include small commercial uses on a residential property?	Define single family residential project. Allow downspout infiltration and dispersion and driveway dispersion for residential or commercial.

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	4.5: Minimum Requirement #5: On-site Stormwater Management: Project Thresholds	For projects required to only comply with MR 1-5 it states that the listed BMPs are required. Is there a priority order for their being required? The menu of BMPs should be equally treated and equally applied whether to a commercial or residential project. If a project can infiltrate its downspouts and disperse its driveway runoff how are pervious pavements and rain gardens "required." A better approach to the whole on-site measures might be a requirement to "mitigate" impervious surface by providing selected BMPs. A model similar to Seattle Public Utilities might be used, which could include elements such as green roofs, tree retention, etc. Allow the builder to choose how.	Clarify how this requirement is met and whether there is a priority for implementation. Consider adopting an impervious surface "mitigation" requirement similar to Seattle Public Utilities that can also incorporate trees into mitigating impervious surface.
Appendix 1	4.5: Minimum Requirement #5: On-site Stormwater Management: Project Thresholds	Regarding permeable pavements – this provision appears to require permeable pavement for roads. Would this apply to frontage improvements? What if the project is a shoulder widening, does the widening have to be pervious pavement even if existing roadway is not pervious? Pervious pavement has not been demonstrated to be technically feasible in terms of long-term performance, maintenance, durability, etc. for many applications such as high use roadways, high traffic areas, intersections, etc. and this limitations should be recognized and not require installation of pervious pavements.	Clarify criteria for when pervious pavement is required and allow "off-ramps" for some elements such as high traffic areas, areas subject to heavy vehicle traffic and turning movements, etc.
Appendix 1	4.5: Minimum Requirement #5: On-site Stormwater Management: Project Thresholds	Under the current list, roofs for commercial and industrial facilities are not addressed. Is it to be required that roof runoff goes into rain gardens? Should allow roof runoff from any building to use infiltration, dispersion, rain gardens, or discharge to pervious pavements at the applicant's option.	Identify how commercial and industrial roof areas to be handled or change provision to eliminate limitation of downspout infiltration and dispersion to single-family residential projects.

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	4.5: MR #5: Requested input box "Should permeable pavements be included in the above list of required on-site management BMPs..."	See issues identified above. Permeable pavement should be one of the menu items for meeting MR#5 but should be combination with other alternatives.	
Appendix 1	4.5: MR#5: Requested input box "Should Ecology allow local governments to accept LID performance standard compliance as an option..."	Yes, Ecology should allow meeting the performance standard for any project. If a small project applicant wants to retain an engineer to make the appropriate demonstration, then it should be allowed. Of course some on-site measures would still be required such as downspout infiltration / dispersion where feasible and soil amendment.	Allow performance standard option for all projects at applicant's option.
Appendix 1	4.5: MR#5: [requirements for intermediate size projects]	Same comments as above as far as residential vs. commercial projects, allowing BMPs to be a menu of alternatives, clarification of how MR#5 is met when a multitude of different BMPs, some conflicting, are listed as "required."	See recommendations above.
Appendix 1	4.5: MR#5:Mandatory List	"Use all of the applicable BMPs on this list unless a BMP is considered infeasible in accordance with Section 8..." Section 8 does not address feasibility criteria for downspout infiltration or dispersion. Should add feasibility criteria for these BMPs. Same comments as previously regarding reference to single family residential projects and list being a menu...	Address feasibility of downspout infiltration and dispersion – currently not included in Section 8. Same recommendations as above for priority of the BMPs and single family residential designation.

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Appendix 1	4.5: MR#5:Mandatory List	Reiterate that the application of the mandatory list can be contradictory. Is it equally acceptable to route downspouts to a rain garden or beneath a pavement or to a pervious pavement? If the roof is vegetated how does that affect where downspouts have to be routed? Again suggest using an impervious surface "mitigation" scheme similar to City of Seattle as a way of prioritizing these on-site measures. How many have to be used? Can credit be added for existing and new trees?	Clarify priority of mandatory list, or if no priority then state so. Consider using impervious surface mitigation scheme for applying on-site measures.
Appendix 1	4.5: MR#5:Mandatory List	Re: area requirements for bioretention. Is this based on the project area or the parcel area? Since bioretention is mostly applicable to impervious surface, suggest making the percentage associated with impervious area. This would incentive minimizing impervious area as well as be a better link to water quality benefit of bioretention. If a project already uses porous pavement and discharges downspouts to the porous pavement, what area will be treated by the bioretention BMP? Also, how is the area of bioretention defined? The bottom area? Area at the peak water volume? Does it include freeboard area?	Reference minimum bioretention area to impervious or hard surface area of project and not just total project area. Clarify how area of bioretention is defined. Define when minimum bioretention area not required ie. When all hard surface is infiltrated through BMPs such as downspout infiltration, porous pavement or infiltration BMPS.
Appendix 1	4.5: MR#5:Mandatory List	Re: Cost analysis for green roof feasibility. If a green roof costs more than a conventional roof is this justification? No guidance on what this cost analysis should look like, what criteria are to be applied to whether is demonstrates infeasibility, etc.	Clarify what cost analysis for green roof should include and criteria for when cost is basis for infeasibility. Or just delete requirement.
Appendix 1	4.6: MR#6:Runoff Treatment – *Project Thresholds*	1st bullet – Change PGIS to PGHS. 2nd bullet – Will green roofs – which may be subject to pesticides, fertilizers, etc. be considered PGPS? – If so, could these be exempted from the ¾ acre threshold?	Correct PGIS to PGHS. Address how green roofs will be treated (PGPS or Not).

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	4.7: MR#7: Flow Control: *Thresholds*	3rd bullet – refers to "effective hard surfaces" and "effective pervious surfaces" Neither of these terms are defined. What is the 0.1 cfs increased based on? The pre-developed (forested) condition or the pre-developed (what it is now) condition. This is a very important distinction for small projects such as shops/driveways on large lots or single family projects on lots that are previously cleared. Does this only apply to the increase from the disturbed area of the project or the entire parcel (if forested condition is considered pre-developed). It is good to acknowledging that 15 minute time step allows larger 100-year flow frequency value.	Reword bullet or provide definitive definitions of "effective hard surface" and "effective pervious surface" Address what pre-development condition the 0.1 cfs increase in flow rate is based on.
Appendix 1	4.7: MR#7: Flow Control: *Standard Flow Control Requirement*	Last sentence of this section refers again to "converted pervious surfaces" instead of "effective pervious surfaces" which was a term used previously in this section. Carefully consider definitions and appropriate use of these terms.	Evaluate use of terms "effective pervious" and "converted pervious" throughout document and include applicable definitions.
Appendix 1	4.9: MR#9: O&M	The implementation of rain gardens, bioretention, green roofs, porous pavements, etc. for projects not meeting thresholds for MR#9 is a concern. Should these facilities be installed without a requirement for maintenance guidance?	Consider requiring Maintenance Plans for smaller projects or provisions for maintenance for BMPs associated with MR#5.

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints A. Bioretention/Rain Gardens	Threshold for 1-foot separation is based on square feet of PGIS or Impervious surface. When is a facility considered a separate facility? How far apart do they have to be? 1-foot separation to seasonal high water table is too low to consider that there is any separation, unless detailed groundwater level monitoring occurred at the specific location for a period that reflects annual rainfall variations which influence GW variations. Will "other impervious layer" be better defined. The classic case is a shallow till layer – will "till" identified in a geotech report, even if not tested for hydraulic conductivity, be adequate to demonstrate infeasibility?	Clarify separation distance between facilities to use 1-ft separation rule. Consider eliminating 1-ft separation rule and using just 3-ft separation. Clarify if "till" layer will be considered an "other impervious layer" for purposes of feasibility.
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints A. Bioretention/Rain Gardens	RE: 0.15 inches/hour native soil saturated hydraulic conductivity as a criteria for "not feasible." If an applicant wants to demonstrate bioretention "infeasibility" based on this criteria, what level of soil testing is required over the project area? Test pits with a geotechnical opinion? Infiltration testing at all test pit locations? How deep are the test pits? How many tests per acre of development area? If site soils are all HSG D – is this adequate demonstration? If a general criteria for native soil permeability is to be used then must define the "what, where, when, and how many's"	Clarify how 0.15 inch/hr criteria can be met. How many tests, what type, etc.
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints A. Bioretention/Rain Gardens	If soils have less than 0.15 inches/hr infiltration it states that "In these instances bioretention/rain gardens can be built with an underdrain" - what does this mean? Are they still required? Or is this just for information purposes. Bioretention with an underdrain is simply a water quality treatment facility and shouldn't necessarily take precedent over any other alternative water quality treatment facility if infiltration can't be achieved.	Clarify what is meant by statement related to bioretention/rain gardens can be built with an underdrain? Informational or mandatory?

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints B. Permeable Pavements	Re: input on Road Type where pervious pavements are "infeasible" – Too many uncertainties existing regarding long term maintenance and performance to require pervious pavements on high use roadways. A suggested threshold is <500 ADT and also some percentage of parking areas – not the entire parking area. Allow conventional pavement for high use parking areas and drive aisles.	Limit pervious pavement to <500 ADT roadways and allow some conventional pavement in high use portions of parking lots.
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints B. Permeable Pavements	Re: Geotechnical evaluation... suggest rewording to say "any area where geotechnical evaluation recommends infiltration not be used" – this implies that some portions of the site might be feasible and others not feasible for pervious pavements. Existing wording requires the geotechnical evaluation to state infiltration cannot be used "anywhere within the project"	Revise wording to recognize infeasibility might be in some areas of project and not others.
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints B. Permeable Pavements	Re: Slope criteria. This section does not address permeable pavers, which in some cases can be feasible on steeper slopes. Distinguishing between permeable concrete and asphalt is minimal and suggest a single standard such as 5% for all permeable pavements.	Address slope requirements for permeable pavers. Alternatively consider a single slope standard of 5%.
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints B. Permeable Pavements	Re: Native soils to meet treatment requirements. – Not clear whether this provision still requires the pervious pavement or not. Suggest that it still be required but the 6-inch sand layer or amendment of soils be required to meet treatment requirements. Also suggest that further guidance be provided in SWMMWW on how to meet the treatment requirement and if research indicates that treatment soil is not necessary to meet treatment standard (at least for basic treatment) consider eliminating sand/soil requirement if a minimum thickness of storage course is provided.	Clarify whether pervious pavement is still required if soils don't meet treatment standards.

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Document	Section	COMMENT	RECOMMENDATION
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints B. Permeable Pavements	Re: Seasonal high groundwater – Since saturated wearing course, or ground level necessarily is included if seasonal water level is greater than 1-ft from the bottom of the lowest gravel course, these statements can be deleted.	Reword provision to state that a 1-ft separation to seasonal high groundwater is required from the bottom of the lowest gravel base course. Delete reference to other conditions.
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints B. Permeable Pavements	Re: Request for input on minimum saturated hydraulic conductivity. – Since 0.15 in/hr is standard for bioretention, suggest a similar standard for porous pavements. This would allow site characterization to focus on one standard. Since design of pervious pavement would have to apply correction factors of 2 to 4 this results in a design infiltration rate as low as 0.0375 inches/hour, which likely would require a drain system for large storm events.	Use same standard as bioretention for feasibility of pervious pavements – ie. 0.15 in/hr.
Appendix 1	Section 8: Feasibility Criteria for LID BMPS: I. Site/Engineering Constraints C. Vegetated Roofs	What about circumstances where fire hazard is an issue such as public safety type structures? MR#5 has cost analysis requirement, but no guidance is provided. Can this section include guidance on when "cost" becomes a feasibility criteria? Since commercial facilities are only required to provide a cost analysis for green roof use, is it necessary to even have a feasibility criteria section for vegetated roofs?	Add public safety structures or where fire hazard is of greater risk/concern. Add discussion of cost as a feasibility factor.
Appendix 1	II. Competing Needs	Is this section even necessary, can these circumstances be addressed through exception or variance process? Paragraph "b." appears to refer to residential subdivisions, but this is a small subset of circumstances where this provision might come into play. Commercial development, redevelopment and infill is more likely to be candidate for this provision.	Delete reference to only subdivisions (ie. 75% or more of lots). Suggest making this section generic and allow exceptions process to handle it on a case-by-case basis.

Additional comments from Thurston County Public Works:

General Comments

- Overall look at developing a pilot project that includes O & M
- Develop reliable and long-term maintenance programs with clear and enforceable guidelines
- [1]There are numerous definitions in Appendix 1 of the Minimum Technical Requirements for New Development and Redevelopment which reference the 2012 Stormwater Management Manual for Western Washington. It is impossible to comment on definitions which reference something that does not exist
- [2]Permeable pavements should not be used in the traveled way for motor vehicles until more information becomes available on life cycle and maintenance costs. There is very little peer reviewed literature which documents what the lifecycle and maintenance costs are for permeable pavements and until more studies are done which answer these questions, permeable pavements should be limited to low risk areas such as sidewalks, parking lots, bike paths and non-motorized trails. Across the nation municipalities have amassed financially stifling backlogs of deferred maintenance and preservation needs, particularly for road, bridge and storm water assets

Section 2 – Definitions Related to Minimum Requirements

Page 2: Bioretention BMP's – A definition be freestanding and not reference an entire manual

Page 2: Converted Pervious Surface: How will this be defined for maintenance activities?

Page 3: Effective Impervious surface – What is this defining?

Impervious surfaces whose stormwater runoff is collected and redistributed below pavement are not considered effective if continuous runoff modeling indicates that all stormwater is infiltrated. Isn't the purpose of LID to infiltrate all stormwater onsite?

Page 3: Erodible or leachable materials – please define "measurably".

[1] Regional Road Maintenance ESA Form Letter 6-13-2011
[2] Regional Road Maintenance ESA Form Letter 6-13-2011

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Page 3: Hard Surface – a very confusing term! Is a gravel road a hard surface?

Page 3: Infiltration below pavement – Infiltration or percolation of water below a ~~hard surface~~. (replace with pavement) Examples include water infiltration below permeable pavement, or impermeable pavement with stormwater collection and redistribution into the base course below. If you use the definition of Hard Surface does this mean infiltration below a green roof is possible?

Page 4: Low Impact Development – How do we mimic pre-disturbance hydrologic process?

Page 4: LID BMP's – be consistent with above.

Page 4: LID Principles – Remove definition - NPDES should be geared towards stormwater and not land use.

Page 4: Permeable Pavement - Pervious concrete, porous (why not pervious) asphalt, permeable pavers or other forms of pervious or porous paving material intended to allow passage of water through the pavement. It often includes an aggregate base that provides structural support and acts as a stormwater reservoir. What is the difference between porous & pervious?
How is pervious Pavement Treatment?

Page 5: Pollution- generating impervious surface (PGIS) - Stormwater Management for Western Washington (what year)

Page 5: Rain Garden –these are sites that are not subjected to yearly inspections

Page 6: Receiving waters – Groundwater to which surface runoff is directed by infiltration. Please remove this last sentence - If there is separation between ground water and the stormwater LID, there is no discharge to groundwater and the discharge is to soil. If the last sentence is not removed then any LID that directs infiltration towards groundwater would be waters of the state and not part of the MS4

Page 7: Vehicular Use – How is this going to be used? Our preference is to have it removed.

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Page 12: 3.2 New Developments - remove" regardless of size" this could mean new roofs etc…and if so will they be required to have a metal baked on enamel roof?

Page 12: 3.3 Redevelopment - Has land disturbing activity of 7,000 square feet or greater (does this include tree planting etc.)

Page 13: 3.3 Leave "treatment" in second to last paragraph – by leaving it could mean entire drainage

Page 13: 3.4 Additional Requirements for Re-development Project Sites
The Permittee may grant a variance/exception to the application of the flow control requirements to replaced impervious surfaces if such application imposes a severe economic hardship. See Section 6 of this Appendix.

Page 14: 4.1 Minimum Requirement#1
The permittee shall require a Stormwater Site Plan from all projects meeting the thresholds in Section 3.1 of this Appendix. Stormwater Site Plans shall use site-appropriate development principles to retain native vegetation and minimize impervious surfaces to the extent feasible. Stormwater Site Plans shall be prepared in accordance with Chapter 3 of Volume 1 of the *Stormwater Management Manual for Western Washington* (20052012). Comment: What does extent feasible mean and who determines this? Please delete additional language, retention of native vegetation may not always prove beneficial and could impede proper function of LID BMPs. Leaving small parts of a 25 year old Alder stand around or in a stormwater facility or in the open after being part of a system results in short term and long term problems and cost without a short or long term water quality benefit. Trying to remove hazardous trees in the built environment can cause more damage than removal and replanting at the time of development with the right tree for the space

Page 22: 4.5 Minimum Requirements #5
Project Thresholds – Why single family vs. multiuse etc.

Page 23: Permeable Pavement for public and private walks, driveways, patios, plazas, sports/play courts, roads and parking lots at all projects to maximum extent feasible s determined using the feasibility criteria in Section 8 of this Appendix.

Less than 10,000 sf is currently exempt from flow control under 5,000 sf exempt from treatment – it is not feasible (let alone structurally sound) to add permeable pavement next to existing HMA at intersections, radius and shoulders. This will lead to premature failing,

Page 25: 4.6 Minimum Requirement #6
Project Thresholds - Projects in which the total of effective (remove the strike in effective and add new before), pollution-generating impervious hard surface (PGIS) is 5,000 square feet or more in a threshold discharge area of the project, or Table 4.1 & 4.2– Leave table for maintenance repairs

Page 32: Minimum Requirement #9

Page 35: Section 8: Feasibility Criteria I.

A. [3]There is an extraordinary amount of time and cost for public and private owners to determine the feasibility of a site for LID. Several feasibility criteria pertain to exclusion zones from structures such as underground storage tanks, drinking water wells and septic systems. Complete, accurate and accessible databases do not exist for all of the features listed, leaving developers and permittees unable to confidently apply these criteria to proposed LID projects. The Department of Ecology recommendations should be clear and based on Ecology's best available information. The best information should be listed to exempt the need to study a known LID failure type

The drainage area is less than 5,000 sq. ft. of pollution-generating impervious surface, or less than 10,000 sq. ft. of impervious surface; or less than ¾ acres of pervious surface, and the minimum vertical separation of 1 foot to the seasonal high water table, bedrock, or other impervious layer is not achieved. This does not seem feasible.

Page 36: B. Permeable Pavements

[3] Regional Road Maintenance ESA Form Letter 6-13-2011

[4]Determining appropriate surfacing materials/designs requires analysis of site specific factors such as soil properties, drainage, and traffic loading. The calculations for this analysis require inputs including the life cycle, which, at present, is poorly understood for permeable pavements. Current road safety standards may not allow deviations from traditional road surfacing materials and traditional roadway design seeks to divert water away from the road structure, not infiltrate or convey water into the substrate beneath roads. Until studies show that it is safe to have water beneath the roadway, permeable pavements should be restricted to low risk environments such as Islands, Shoulders Parking Areas, Sidewalks, and Trails.

One major concern of road maintenance organizations is how to clean up spills of harmful substances that occur routinely on roads. Spilled substances are relatively easy to clean up from an enclosed drainage system or gravel shoulder. It is entirely unclear how agencies should or could respond if a spilled substance is allowed to percolate through the wear course and into the road substrate. It is not feasible to tear up the road every time there is a vehicle accident or lost load that results in a spill.

[5]Permeable pavements by design contain a significant volume of air voids in the pavement (holes in the pavement). Rainfall then flows through these voids in the pavement, into a gravel bed for storage and ultimately percolates into the ground, mimicking natural infiltration. The necessary air voids reduce the strength of the pavement and reduce the pavement's ability to resist loading from high traffic volumes or from truck traffic. The infiltration of water into the soil below the pavement structure reduces the soil strength, again reducing the pavements ability to resist loading from high traffic volumes or from truck traffic. For these reasons most applications of permeable pavement are on facilities with no vehicle traffic (bike lanes, pedestrian paths, sidewalks, areas of parked traffic (parking lots) or areas of very low speed, very low-volume traffic (residential streets).

Life-Cycle Unknowns

By nature a structure with a lot of void space is weaker than one made of the same material with less void space. This means that permeable pavements may be less durable than conventional pavements, requiring more frequent rehabilitation or replacement.

Lastly, there are also concerns how pervious roads will react to snow and ice activities and what effect studded tires will have on pavement life.

[4] Regional Road Maintenance ESA Form Letter 6-13-2011

[5] WSDOT Strategies Regarding Preservation Of The State Road Network September 1, 2010

Page 37: Native soils below the permeable pavement do not meet the soil suitability criteria for providing treatment (pertinent to pollution-generating surfaces only). Note: In these instances, the applicant has the option of placing a six-inch layer of media meeting the site suitability criteria (Volume III, Section 3.3.7), or the sand filter specification (Volume V, Section 8.6).
Who would choose this and what about oil or hydraulic leaks?

Where the risk of concentrated pollutants spill is more likely such as gas stations, truck stops, and industrial chemical storage sites.
What about ADT?