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February 3, 2012

Carrie Gaul
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Water Quality Program
PO Box 47696
Olympia, WA 98504-7696

**SUBJECT: Comments on the Proposed Stormwater Management Manual for
Western Washington (2012)**

Dear Ms. Gaul:

Thank you for the opportunity to submit comments on the proposed Stormwater Management Manual for Western Washington (2012).

Cowlitz County has provided specific comments regarding our concerns in the SMMWW as follows.

VOLUME I

**Volume I, Acknowledgements, Page I
SMMWW Discrepancies**

The Stormwater Management Manual for Western Washington has multiple acronyms within the manual and the permit (SWMMWW, SMMWW, etc). Consistency is helpful.

We recommend the acronym for the manual be ‘SMMWW’ as used throughout the permit and in places within the Manual itself.

**Volume I, Section 1.2, Page 1-2
Expanded in Title**

The title of Section 1.2 starts with the word ‘Expanded’ “Expanded Applicability to Western Washington”. This appears to be confusing for the new manual.

The title for this section is a carryover from the previous SMMWW and the SMMWW has not been expanded within its applicability to Western Washington with this update. New permittees and secondary permittees are proposed but the manual does not discuss individual permittees, it discusses the geographical area that the manual is applicable. That area has not expanded from the last manual.

We recommend removing the word ‘Expanded’ from the title of this section. “**Expanded** Applicability to Western Washington”

Volume I, Section 1.5.1, Page 1-4

On-site Stormwater Management as a separate BMP type?

The second to last paragraph adds ‘on-site stormwater management’ as a fourth type of BMP within this manual. “The types of BMPs are source control, treatment, flow control, and on-site stormwater management.”

If on-site stormwater management is considered a separate type of BMP, then it should be a separate volume. Even though it is considered under a separate Minimum Requirement, on-site stormwater management is currently classified under treatment BMPs within the manual. On-site BMPs have always been an important part of the manual. It does not appear that expanding the list of BMPs being offered here warrants adding a whole new classification.

We recommend the discussion on on-site stormwater management be located under Section 1.5.3 (Treatment BMPs) and limit this section to the manner in which the SMMWW is currently proposed to be set up.

Volume I, Section 1.5.5, Page 1-6

Misplaced Discussion on On-Site Stormwater Management

This section should be moved into Section 1.5.3 Treatment BMPs as discussed in the previous comment.

Volume I, Section 1.6.15, Page 1-25

More Discussion on UIC

It appears that this section stops short of discussing the UIC program that Ecology has instituted. Although Underground Injection Control (UIC) registration is not within NPDES program, it is a closely related program that Ecology also regulates. Any infiltration facility required by this manual (Onsite Stormwater Management facilities, Bio-infiltration facilities, etc.) that has a pipe in it is considered an UIC. Requirements within this manual can require UIC’s suggesting that a brief discussion of Ecology’s UIC program should be located in this section.

We recommend a brief discussion on Ecology’s UIC program that directs readers where to find more information on Ecology’s website.

Volume I, Section 2.2, Page 2-3

Missing Subtitle

The first paragraph in Section 2.2 should be subtitled similar to the rest of the exemptions in the section, “Commercial Agriculture” and “Road Maintenance”.

We recommend ‘Forest Practices’ be added above the first paragraph.

Volume I, Section 2.3, Page 2-5 Unclear Definition of Converted Pervious Surface

The definition of ‘Converted Pervious Surface’ is limited to sites with native vegetation that are being converted to Lawn or Pasture. “*Converted Pervious Surface* – The surfaces on a project site where native vegetation is converted to lawn or landscaped areas or where native vegetation is converted to pasture.”

The Fact Sheet discusses deleting the word “native” from the land conversion threshold. It appears the wording ‘native’ was removed from Figure 3.2, but should also be applied to the definition of Converted Pervious Surface. We agree that the existing vegetation to be required to be native to trigger stormwater requirements, but just removing the word native appears to open the issue up to possible negative impacts on developers. The economy in Cowlitz County is slowing down and large estates that were previously professionally landscaped and maintained are being returned into pasture for livestock grazing.

We also foresee, as the requirements for Low Impact Development (LID) are implemented and full dispersion is the first BMP to be utilized, that road projects, as well as developments, will start to convert areas that were previously encumbered with land cover of lower permeability (landscaping being the most prevalent) into land cover with higher permeability (pasture or dispersion acceptable land cover). The phrase ‘vegetation to pasture’ would create extraneous submittal requirements and expensive work that does not provide any benefit except that it is being required by the permit and Figure 3.2.

We recommend that the word ‘native’ be removed from the definition and that ‘vegetation’ be more clearly defined, namely: “*Converted Pervious Surface* – The surfaces on a project site where ~~native~~ vegetation is converted to lawn or landscaped areas or where ~~native~~-vegetation is converted to pasture. When referencing Converted Pervious Surface, vegetation refers to pervious surfaces that have a higher permeability than the pervious surface being converted to.”

Volume I, Figure 2.4.1, Page 2-11 Broad Definition of “Vegetation”

The term ‘vegetation’ is undefined in Figure 3.2 and could have significant impacts that do not provide any benefit for stormwater. Figure 3.2 states “Does the project convert $\frac{3}{4}$ acres or more of vegetation to lawn or landscaped areas, or convert 2.5 acres or more of vegetation to pasture?”

This issue is the same issue discussed above related to ‘Converted Pervious Surface.’ Please see previous discussion titles “Unclean Definition of Converted Pervious Surface”.

We recommend defining vegetation to more clearly define the intent suggested in the Fact Sheet. “Does the project convert $\frac{3}{4}$ acres or more of higher permeability vegetation to lawn or landscaped areas, or convert 2.5 acres or more of higher permeability vegetation to pasture?”

Volume I, Chapter 3, Page 3-1 Consistency in how On-Site Stormwater Management is Referenced

On-site Stormwater Management is discussed as a type of BMP in Chapter 1 of Volume I. If it is retained in that section, we recommend also including a discussion of it here and within Chapter 4 to maintain internal consistency throughout the permit.

Volume I, Section 3.1.5, Page 3-6 **Low Impact Development Performance Standard Consistency**

The fourth to last paragraph on the page discusses the Low Impact Development Performance Standard. “If the applicant is choosing the Performance Standard Option: provide...”.

The last time the Low Impact Development Performance Standard is referenced within the manual is on page 2-35 and is referred to by its full title. To maintain internal consistency within the SMMWW, the full title should be referenced or should be defined in other ways. Although ‘performance standard’ as defined in this paragraph is easily understood, ‘performance standard’ has such a broad use and meaning that this particular SMMWW use could easily be confused with other uses of this term.

We recommend referencing the Low Impact Development Performance Standard by its full name anytime it is referenced in the document. “If the applicant is choosing the [Low Impact Development](#) Performance Standard Option: provide...”

Volume I, Section 3.1.5, Page 3-7 **Misnamed BMPs**

The title “Permanent Stormwater Control Plan – Low Impact Development Features” appears to be a different term than is used in the permit and manual requirements. The requirement to list each LID BMP is also a different term than appears to be used in the permit and manual requirements. (See discussion, above, regarding internal consistency in content.)

The manual also does not contain anything that references LID BMPs. These are referred to as on-site stormwater management BMPs. The requirement to reference them in the Permanent Stormwater Plan should also require them to reference the appropriate BMPs, as called for in both the permit and the Manual.

We recommend changing ‘Low Impact Development’ or ‘LID’ to On-site Stormwater Management. “Permanent Stormwater Control Plan —~~Low Impact Development~~[On-Site Stormwater Management](#) Features” and “...~~LID~~[on-site stormwater management](#) BMP”

Volume I, Section 4.2, Page 4-1 **Missing a Verb**

The last sentence in step one appears to be missing a verb. “Total new hard surfaces, replaced hard surfaces, and converted pervious surfaces to determine which minimum requirements apply to the project.”

We recommend adding ‘use’ to the beginning of the sentence. “[Use](#) Total new hard surfaces, replaced hard surfaces, and converted pervious surfaces to determine which minimum requirements apply to the project.”

Volume I, Section 4.2, Page 4-2
Add MR#5 to TDA Threshold

Step III discusses determining the Threshold Discharge Area (TDA) for MR#6 and MR#7, “Minimum Requirements #6 (Runoff Control) and #7 (Flow Control) have size thresholds that determine their applicability (see Sections 2.5.6 and 2.5.7).”

As with runoff and flow control, on-site stormwater management should be based on the threshold discharge area within which it is located. On-site stormwater management is based on applicable size thresholds as called out in Section 2.5.5 and should be included in with the discussion on TDA thresholds.

We recommend MR#5 be added to this section. “Minimum Requirements [#5 \(On-Site Stormwater Management\)](#), #6 (Runoff Control) and #7 (Flow Control) have size thresholds that determine their applicability (see sections [2.5.5](#), 2.5.6 and 2.5.7).”

Volume I, Appendix I-D, Page D-10
Conflicting Treatment Protocols

Guide Sheet 3C, #3 discusses “Provide a water quality control facility consisting of one or more treatment BMPs to treat all urban runoff entering the wetland.” Guide Sheet 2 discusses using wetlands for treatment. Query: Why would stormwater be treated and then enter a wetland for treatment?

Guide Sheet 2 allows certain types of wetlands to be used for treatment if certain guidelines are followed. Guide Sheet 3C conflicts with Guide Sheet 2 in that it does not classify its guidelines depending on the value of the wetland. The third guideline in Guide Sheet 3C supersedes Guide Sheet 2 and creates a conflict.

We recommend classifying the statements in Guide Sheet 3 depending on the value of the wetland.

Volume I, Appendix I-D, Page D-11
Misleading statement

The last paragraph on the page discusses the fact that development on deforested land is less expensive than development on forest covered land. “Develop on deforested land. This affects the water flows in a basin less than building on land that requires removing forest cover. Loss of forest cover increases peak runoff requiring expensive structural solutions.” This appears to be confusing and conflicting to the average reader.

The requirement to control flows to pre-european flow rates, or forested condition, requires development to construct stormwater facilities similar to the facilities that would need to be constructed if the development was replacing a fully forested site. This makes the cost related to stormwater for development on deforested land equal to the cost to stormwater for development on forested land. It will have less impact if development occurs on deforested land, but the reference to being less expensive should be removed.

We recommend removing the last sentence in this paragraph. “Develop on deforested land. This affects the water flows in a basin less than building on land that requires removing forest cover. ~~Loss of forest cover increases peak runoff requiring expensive structural solutions.~~”

Volume I, Appendix I-D, Page D-17 Clarification of Definitions

The Definitions Section in Appendix D should be clarified with a brief sentence at the beginning that these definitions relate to Appendix D only. [“The following terms are provided for reference and use with Appendix D in Volume I only.”](#)

Volume I, Appendix I-F, Page F-2 Permeable Pavement required below a collector

The requirement that all roads that are smaller than a collector be constructed utilizing permeable pavement does not appear to take into consideration the impacts this mandate will have on permittees. Impacts such the financial impact, the large mileage impact, and the impact of unproven or unknown long term maintenance approaches are uncertainties and unknowns that do not appear to have been taken into account when requiring permeable pavement.

The urban nature of roads smaller than a collector (roads classified as arterials and collectors are considered infeasible on page 38 in section 8 of Appendix 1) suggests that full dispersion will not be feasible, leaving permeable pavement as the next BMP in line to be required by both mandatory lists. The Fact Sheet discusses the issue regarding the high cost of construction, shown below, but says that as they become common the cost will decrease.

“Pervious asphalt and concrete currently cost more than the standard impervious versions. But as pervious pavements become common in construction (as these stormwater requirements will demand), the cost difference will shrink as many suppliers have batches in frequent production and contractors gain experience in placement.”

This discussion does not take into account the additional cost of maintenance. Cowlitz County has multiple concerns regarding maintenance of permeable pavements, including, but not limited to: Cowlitz County’s rural nature; our frequent geological landslides; and long term roadway maintenance.

The urbanized area of Cowlitz County would likely be considered ‘rural’ in nature when compared to other urbanized areas. Tree cover abuts large amounts of the roadways in Cowlitz County, and foliage, leaves and needles that constantly fall onto those roadways would create a significant maintenance challenge for permeable pavements. Section 8 does not provide an option to factor in tree cover over permeable pavements for purposes of infeasibility of these regulations.

Cowlitz County lands are comprised of glacial outwash soils over hardpan soils or rock. This results in frequent landslides. These slides are often onto roadways that, as currently constructed, allow us to clean and sweep the road before stabilizing the landslide. By contrast, landslides onto permeable pavement would require complete reconstruction of the pavement similar to major maintenance discussed below.

Cowlitz County currently maintains over 52 miles of roadway within the urbanized area that are not classified as either an arterial or a collector. Converting these roadways to pervious pavement as they need to be upgraded and/or maintained will place a disproportionate and financially unsupportable burden on Cowlitz County.

There is insufficient information on long term maintenance of permeable pavement or on how to extend the life of its structural integrity. All of the maintenance standards being provided advise to vacuum sweep the pavement and then jet wash it as necessary. These maintenance approaches do not take into account the long term maintenance of the structural integrity of the pavement. Cowlitz County currently has a program to overlay and chip seal its roadways approximately once every seven years. This schedule allows us to prevent replacing the roadways and impacting our stormwater during the construction process. We estimate we would need to complete major maintenance on permeable pavement every 10-15 years at a cost which is approximately twenty-five (25) times the cost of our current maintenance program not including any additional permitting, design or stormwater requirements and regulations that may be in place once the pavement is replaced.

In our opinion, the technology of permeable pavements its associated maintenance is unproven technology and has not been field tested enough to be required in this permit. There are still too many engineering unknowns and cost variables. We recommend removing permeable pavement from both mandatory lists in section 4.5 of Appendix 1 or making permeable pavement infeasible within the public right-of-way.

**Volume I, Glossary and Notations, Page Glossary-8
Certified Pervious Surface**

The term ‘Certified Pervious Surface’ is defined with the definition for Converted Pervious Surface.

We recommend removing ‘Certified Pervious Surface’ and its definition.

**Volume I, Glossary and Notations, Page Glossary-11
Unclear Definition of Converted Pervious Surface.**

Please see the discussion and recommendations above from Page 2-5.

VOLUME II

**Volume II, Section 3.3.3, Page 3-11
Confusing Permit References**

It appears that in an effort to clarify what elements pertain to what permit, the statement “Construction Stormwater General Permit and Municipal Stormwater Permit Requirements” have been added at the beginning. This is a confusing addition.

We recommend revising the statement as follows; “[Pertains to the](#) Construction Stormwater General Permit and Municipal Stormwater Permit Requirements”

**Volume II, Section 3.3.3 - Element #5, Page 3-18
Restating information**

The soil disturbance timelines that are discussed under ‘Additional Guidance’ are discussed on the previous page. “From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days.” and “From October 1 through April 30 no soils shall remain exposed and unworked for more than 2 days and”

Discussions that are exactly the same and under the same BMP (or element) should not be repeated. The bulleted item on page 3-18 discusses linear construction activities that would fall under the all encompassing bulleted item on page 3-17. There is no need to repeat.

We recommend removing the sentence referencing the soil disturbance timelines and the timelines themselves from page 3-18. “Contractors shall install the bedding materials, roadbeds, structures, pipelines, or utilities and re-stabilize the disturbed soils so that ~~they~~ they meet the time periods noted previously in this section.”

Volume II, Section 3.3.3 - Element #8, Page 3-21 Extra Bullet

The information in the second bullet in element #8 “Channels must handle the peak 10-minute velocity...” references the paragraph above “Design, construct, and stabilize all on-site conveyance channels to prevent erosion from the following expected peak flows:”. They should not be separated by paragraphs.

Only one ‘bullet’ exists that describes the peak flows, therefore a list is unnecessary.

We recommend rewording the following; “Design, construct, and stabilize all on-site conveyance channels to prevent erosion ~~from the following expected peak flows: Channels must~~ and handle the peak 10-minute velocity...”.

VOLUME III

Volume III, Size the Facility, Page 3-102 Conflict in Drawdown Time

The second paragraph in this section has a conflict in drawdown time. Underlines have been added to highlight the problem text.

“Where the infiltration facility is being used to meet treatment requirements, check that the 91st percentile, 24-hour runoff volume... can infiltrate through the infiltration basin surface within 48 hours... Finally check to make sure that the basin can drain its maximum ponded water depth within 24 hours.”

By definition, the water quality (wq) storm (91st percentile, 24-hour volume) is less than the maximum ponded water depth of the pond. The wq storm has 48 hours to drain but the entire pond only has 24 hours. Those two timelines conflict with each other. In a related note, Section SSC-4 on pages 3-91 in Volume III states;

“For infiltration facility designed strictly for flow control purposes, there isn’t a maximum drawdown time. If sizing a treatment facility, document that the 91st percentile, 24-hour runoff volume... can infiltrate through the infiltration basin surface within 48 hours...”

Maximum pond volume will incorporate volume used for flow control purposes. Any volume above the wq volume should not have a drawdown time associated with it.

We recommend clarifying that the 24-hour drawdown time discussed in the ‘Size the Facility’ section be clarified to be recommended to be used for sizing calculation purposes and is in addition to the 48-hour or after the wq storm has infiltrated.

“Where the infiltration facility is being used to meet treatment requirements, check that the 91st percentile, 24-hour runoff volume... can infiltrate through the infiltration basin surface within 48 hours... Finally, for sizing calculation purposes, check to make sure that the basin can drain its maximum ponded water depth within 24 hours after the 91st percentile, 24-hour runoff volume has completely infiltrated.”

Volume III, Groundwater Mounding Analysis, Page 3-102 **Applicability Criteria Confusing**

The applicability criteria for requiring a mounding analysis are hard to follow, limited and exclusive. The applicability criteria states, “On residential projects larger than short plats, or commercial projects larger than 1 acre, served by a single infiltration facility, the final design infiltration rate shall be determined using an analytical groundwater model to investigate the effects of the local hydrologic conditions on the facility performance.”

Our interpretation of the applicability criteria is that if a 10 acre commercial project discharges to two infiltration facilities; they do not fall under the requirement to do a mounding analysis. The definition of infiltration facility is also unclear. Query: Is on-site stormwater management considered an infiltration facility? Query: If a small bioretention facility is installed and then a large infiltration pond does that remove the development from the criteria? Query: How is permeable pavement addressed? Query: Is one acre of permeable pavement, with one acre of runoff conveyed to it, considered an infiltration facility?

What the one acre threshold is intended to apply to is also vague. The one acre threshold could be applied to the parcel size, amount of disturbed soil or effective impervious area. Application to parcel size does not make sense, however, as on-site stormwater management BMP’s can remove parts of the parcel from effectively discharging to the facility. It also doesn’t make sense to have the total area discharging to the facility. Large portions of pasture are equal to small portions of asphalt, etc...

Industrial projects that are not required to obtain an industrial NPDES permit should also fall under the same criteria as a commercial project. About one-half of the industrial projects in a jurisdiction are not activities that would fall under an industrial NPDES permit. Warehouse storage, mini-storage, and industrial office parks are an example of activities that are considered industrial that would not trigger the groundwater mounding criteria in the current draft of the manual. They are projects that would examine the possibility of infiltration within their project.

Neighboring infiltration facilities in the vicinity of the facility being analyzed could also play a factor in the performance of those facilities. If two large facilities are located in close proximity to each other, they can affect each other’s infiltration rate greatly.

We recommend basing the requirement to complete a Groundwater Mounding Analysis on the amount of area discharging to a facility. There should be some given credit for pervious areas as compared to impervious etc.

~~“Groundwater Mounding Analysis: On residential projects larger than short plats, or commercial projects larger than 1 acre, served by a single infiltration facility~~ When designing a facility that will receive runoff from one acre of impervious area or its equivalent, as defined below, or is located within 1,000 feet of an existing or proposed infiltration facility meeting the same criteria, the final design infiltration rate shall be determined using an analytical groundwater model to investigate the effects of the local hydrologic conditions on the facility performance. One and one-half acres of lawn/landscape, two acres of pasture and three acres of forest is equal to one acre of impervious area when calculating applicability for a Groundwater Mounding Analysis.”

The conversions attached are recommendations and have no scientific basis behind them.

Volume III, Maintenance Criteria, Page 3-106 Conflicting Drawdown Time

The ‘Maintenance Criteria’ calls for maintenance to be conducted when water remains in the basin for more than 24 hours. “Maintenance should be conducted when water remains in the basin or trench for more than 24 hours after the end of a rainfall event.” and “Removal of accumulated debris/sediment in the basin/trench should be conducted... when water remains in the pond for greater than 24 hours after the end of a rainfall event.”

Both the facility sizing criteria on page 3-102 and the drawdown criteria on page 3-91 call for a 48 hour treatment facility drawdown time and no maximum drawdown time for facilities that are used as flow control. This does not take into effect the ‘time of concentration’ for the stormwater or the time it takes for the stormwater to flow from the farthest point to the facility. It is possible for a facility to still be receiving stormwater from the conveyance system 24 hours after a rain event has stopped, especially if on-site stormwater management techniques are used, as required with this permit, to slow the flow of water to the conveyance system throughout the project.

Operations and maintenance (O&M) manuals are also required for every post construction BMP. The O&M manuals are written and stamped by the design engineer and approved by the jurisdiction as required in section 2.5.10 of Volume I of the SMMWW. These manuals discuss maintenance inspections and what should trigger certain maintenance activities (such as how long water should remain in the BMP before it is considered a concern and what maintenance should be completed to alleviate that concern).

We recommend the 24 hour criteria for maintenance be removed and maintenance decisions be based more on the design of the basin/trench. “Maintenance should be conducted when water remains in the basin or trench for ~~more than 24 hours~~ longer than the design calls for after the end of a rainfall event. Review the facilities Operations and Maintenance Manual, as required under minimum requirement #9, for the design drawdown time.” and “Removal of accumulated debris/sediment in the basin/trench should be conducted... when water remains in the pond for longer than the design calls for ~~greater than 24 hours~~ after the end of a rainfall event. Review the facilities Operations and Maintenance Manual, as required under minimum requirement #9, for the design drawdown time.”

Volume III, Section 3.4.2, Page 3-115

Title Reference

The first sentence in this section references the LID Guidance Manual but does not properly call it out. “After developing a preliminary development layout in consideration of the procedures outlined in Chapter 3 of Volume 1 and XX of the LID Manual for the Puget Sound Basin, the designer...”.

We recommend referencing it as follows: “After developing a preliminary development layout in consideration of the procedures outlined in Chapter 3 of Volume ~~I~~ and XX of the ~~LID Manual for the Puget Sound Basin~~ Low Impact Development Technical Guidance Manual for Puget Sound, the designer...”.

Volume III, Runoff Credits, Page B-7

Confusing lists

The bottom of page B-7 lists the BMPs and then starts to discuss them individually. Placing the discussion of #1 directly below the list is a little confusing. Moving it to the next page or providing more room between the list and discussion can resolve this confusion.

Volume III; Appendix III-C – LID Design and Flow Modeling Guidance

Altering copied information

Appendix C is copied from Chapter 7 of the 2005 Low Impact Development Technical Guidance Manual for Puget Sound (LID Guidance Manual). The edits proposed will not be shown in the final draft while still formatted appearing like it was copied from the LID Guidance Manual, making it difficult to discern the differences between the two.

We recommend changing the formatting in Appendix C to resemble the formatting for the rest of the manual.

Volume III; Appendix III-C – LID Design and Flow Modeling Guidance

Wrong location for Appendix

Appendix III-C discusses the design and flow modeling guidance for BMPs located within Chapter 5 of Volume V. This section should be located within Volume V.

Most of the BMPs discussed in Appendix III-C; Permeable Pavements (BMP T5.15), Dispersion (BMPs T5.10, T5.11, T5.12 and T5.30), Vegetated Roofs (No BMP Available in SMMWW), Rainwater Harvesting (No BMP Available in SMMWW), Tree Retention and Planting (in essence BMP T5.20), Soil Quality and Depth (BMP T5.13), Reverse Slope Sidewalks (No BMP Available in SMMWW), Minimal Excavation Foundations (No BMP Available in SMMWW) and Bioretention Areas (BMP T7.30) are referencing on-site stormwater management BMPs in Chapter 5 of Volume V. Modeling treatment BMPs is not limited to Volume III and is discussed in Volume V. It is inefficient to put a reference “Please refer to Appendix C in Volume III of this manual for directions concerning flow reduction credits for using low impact development BMP’s.” in a volume that discusses the design and maintenance of on-site stormwater management BMPs, and that then directs you to an appendix in a volume that does not discuss the BMPs at all.

Vegetated roofs are being required in mandatory list #2 under Minimum Requirement #5 (page 2-37, Volume I). The SMMWW should list vegetated roofs as a BMP because they are being required as an on-site stormwater management BMP.

We recommend moving the information in Appendix III-C into the individual discussions of the BMPs in Volume V. BMPs for vegetated roofs, rainwater harvesting, reverse slope sidewalks, and minimal excavation foundations should also be added to the BMPs within the SMMWW. Section 7.10 in Appendix III-C is referring to permeable pavements and should be located within that BMP in Volume V.

Volume III, Appendix C, Section 7.2.4, Page C-10
Volume Indicator missing

The first sentence on this page references Section 3.3.6 but does not reference which volume. We recommend adding the volume for clarification. "...identified in Section 3.3.6 [of Volume III.](#)"

Volume III, Appendix C, Section 7.7.2, Page C-15
Clarification of Planter Box

This section states that "Credits are also not applicable to trees in planter boxes." It should be clarified what a 'planter box' is and is not.

Our interpretation of a planter box is an above ground box that does not allow the roots to reach the subgrade or native soil. In most cases we would anticipate that the planter box could be moved if necessary. It appears that a planter box could be interpreted to include an in ground square planter or tree grate.

We recommend defining planter box more concisely. "Credits are also not applicable to trees in planter boxes [as defined by a planting box that contains a physical barrier \(concrete bottom, geotextile, etc\) that prevents the root system from utilizing the native soil.](#)"

VOLUME IV

Volume IV; Page E-6
Mysterious *

The second to last paragraph on the page has an asterisk (*) tied to the term 'transportation facilities which have vehicle maintenance shops'. We are not sure if there is a reference.

Volume IV; Appendix IV-G
Page Numbering Issue

The page numbering in Appendix G is part carryover from Appendix F and part new. It should be reviewed and corrected.

VOLUME V

Volume V; Page 2-1 On-Site Stormwater Management Discussion

There should be a discussion regarding on-site stormwater management BMPs and proper selection method for the project somewhere in Chapter 2 of Volume V.

Volume V; Page 4-50 Maintenance Standards Updates

Maintenance standards that extend the structural integrity of BMP's needs to be addressed in the manual.

Permeable pavement maintenance recommendations include vacuum sweeping and jet washing to help maintain or extend the infiltrative life of permeable pavement. These methods do not promote extending the structural integrity of the pavement such as when garbage trucks and buses break down the road after 10 years. Our existing toolbox of maintenance techniques would be restricted because they will take away the permeability of the pavement.

If BMPs such as permeable pavement are going to be required, we recommend Ecology provide recommendations and procedures on how to extend the structural integrity of those BMPs.

Volume V, Figure 5.1, Page 5-5 Formatting and Unknown Callout

The beginning of the title for the figure disappears vertically into the figure. There is also a call out in the figure that is unknown and should be corrected, "...see Figure 4.2.2C of the Surface Water Design Manual".

It is unclear what the Surface Water Design Manual is and where to find it. We recommend correcting the formatting and callout associated with the figure.

Volume V, BMP T5.30, Page 5-18 Timber Harvest Activity Clarification

The seventh bullet on the page calls for all trees to be retained "...aside from approved timber harvest activities..."

It is unclear what is meant by 'timber harvest activity'. We would interpret a timber harvest activity to mean a forest practice regulated under WAC Title 222. That would include Class IV General Forest Practices that are conversions from timber land to other uses. We believe the intent of this wording is to include activities similar to the activities exempted in the first paragraph of Section 2.2 of Volume I (forest practices except Class IV conversions).

We recommend clarifying the statement to read, "[...aside from approved timber harvest activities regulated under WAC Title 222, except for Class IV General Forest Practices that are conversions from timber land to other uses...](#)".

Volume V, BMP T5.30, Page 5-20
Inconsistent distances

BMP T5.30 (Full Dispersion) calls out a minimum flow path of 100 feet for roof downspouts, driveway dispersion and roadway dispersion BMPs. A minimum flow path of 50' has been called out in each respective BMP on previous pages in the SMMWW. The distances required should be consistent.

We recommend making the numbers consistent among these BMPs.

Volume V; Chapter 7
Page Number Issues

The page numbers for chapter 7 start on 7-4.

Volume V, BMP T7.30, Page 7-9
BSM Acronym Use

The fourth bullet on the page uses an undefined acronym 'BSM', "When properly designed and constructed the BSM will provide very good water quality treatment...". We recommend defining the acronym on page 7-9.

Volume V, BMP T7.30, Page 7-13
Confusing Direction

The last paragraph on the page directs the reader to 'see below' "Hydraulic conductivities within recommended range (see below)..." Where 'below' may actually be confusing.

The second to last bullet on page 7-15 directs the reader to see below but tells where "...as explained below under "Determining Bioretention soil mix infiltration rate. Reading the 'see below' on page 7-13, we could not find where in the text 'below' was referring to.

We recommend directing readers to what section below is being referred to.

Volume V; Page 7-14
Puget Sound Preference

The third bullet on the page under 'Compost' allows the C:N ratio to be altered if 'plantings composed entirely of plants native to the Puget Sound Lowlands region' are used. Plants native to the Puget Sound Lowlands region are most likely not appropriate to the Columbia basin region. The criterion does not limit SW Washington from taking advantage of the opportunity to be able to raise their C:N ratio but it does not seem appropriate to use plantings native to the Puget Sound area in the Columbia Basin. A similar opportunity needs to be made available if plantings from the Columbia River basin are used.

We recommend making a similar opportunity available if native plants from the Columbia River Basin are used in SW Washington. We also recommend limiting the Puget Sound Lowlands opportunity to the Puget Sound region.

Volume V; Page 7-14
Broken Internet Reference

The internet reference in the fourth bullet (“<http://www.ecy.wa.gov/programs/swfa/compost/>”) does not appear to be working and should be corrected.

Volume V; Page 7-14
Repeated Bullets

The third bullet and the last bullet contain and repeat the same information.

“Must have a carbon to nitrogen ration below 25:1 (the C:N ratio may be as high as 35:1 for plantings composed entirely of plants native to the Puget Sound Lowlands region.)” and

“Carbon to nitrogen ratio (TMECC 04.01 “Total Carbon” and 04.02D “Total Kjeldahl Nitrogen”) of less than 25:1. The C:N ratio may be up to 35:1 for plantings composed entirely of Puget Sound Lowland native species and up to 40:1 for course compost to be used as a surface mulch (not in a soil mix).”

The information in the two bullets should be combined into one bullet.

Volume V; Page 8-21 & 8-23
Referenced Missing Section

The title to ‘Additional Design Criteria’ for a Sand Filter Vault and a Linear Sand Filter has a reference “(See also Section 8.6)” that does not exist.

The intent here may be to reference the ‘Design Criteria’ section of BMP T8.10.

We recommend changing the reference to read “(See also ~~Section 8.6~~ [the Design Criteria for BMP T8.10](#))”

Volume V; Page 8-25
Missing Table Reference

Figure 8.8 references a table in one of the callouts “see table RT.07.1” and has notes that say “See ‘Structural Design Considerations’” These all appear to be a carryover from another figure.

Volume V; References
Unused References need Removed

It appears that the list of references still contains references that have been removed from the proposed text. We recommend updating the references by removing unused references and adding the new ones, such as the HRM and LID Guidance Manual.

Minor Changes

In the course of our review of the SMMWW, we noticed the following corrections or additions that appear to be necessary.

- Volume I, Appendix I-D, Page D-11; extra 'to' in the first sentence.
- Volume II, Section 3.3.3-Element #9, Page 3-22; misspelled the word 'tank' in the third bullet.
- Volume III, Section 2.1, Pages 2-4 and 2-5; remove the word 'the' when changing 'The Dept. of Ecology' to 'Ecology'.
- Volume III, Section 2.2.3, Page 2-12; the last sentence in the section is missing the word 'has'.
- Volume III, Section 3.4.2, Page 3-116; the last sentence on the page uses 're' in place of 'regarding'.
- Volume III, Runoff Credits, Page B-7; the last sentence in the first paragraph is missing a 'the'.
- Volume IV, Page 17; the note in the margin on the left side of the page appears to be misplaced.
- Volume IV, Page 18; in the sixth bullet on the page, the 'i' was missed in the strikeout.
- Volume V, BMP T5.10, Page 5-3; the paragraph on the page misspelled 'area.'
- Volume V, Section 7.1, Page 7-4; the title for BMP T7.30 has 'Bio' stricken.
- Volume V, Chapter 7; the page numbers for chapter 7 start on 7-4.
- Volume V, Page 7-20; the second sentence in the first paragraph has an extra 'be'.
- Volume V, Page 7-22; the third bullet under 'Maintenance' is missing two spaces.
- Volume V, Page 7-27; the second set of parentheses in the first bullet does not close.
- Volume V, Page 7-27; the space between the third and fourth bullet is missing.
- Volume V, Page 8-13; the space before 'Media filter drain' is missing.
- Volume V, Page 8-16; the word 'greater' is misspelled under 2b.

We appreciate the opportunity to comment on the permit. Please contact me at harbisonp@co.cowlitz.wa.us or 360-577-3030 x6536 if you have any questions or concerns regarding our comments or their intent.

Sincerely,



Patrick N. Harbison, P.E.
Engineer III – Stormwater/Development Review

PNH/ec

cc: Board of County Commissioners
Kent Cash; Public Works
Brad Bastin; Public Works