

# Initial Review Comments on the Draft Pierce County Stormwater Management and Site Development Manual

Ed O'Brien

April 1, 2008

Ecology's position on the proposed Pierce County responses in this document and as discussed in the May 15<sup>th</sup> telephone conversation are in blue font.

Ed O'Brien – May 19, 2008

Pierce County responses to your comments are in **Bold**. We have numbered the comments and added "comment" bubbles at topics where we would like to have more discussion during our scheduled May 15<sup>th</sup> conference call.

Regards

Dennis Dixon

## Volume 1

### Chapter 1

1) Section 1.6.4.: This section indicates that "project-specific stream restoration measures that accomplish the flow control goals of this manual may also be considered by the County on a case-by-case basis." This will require an explanation. Generally, Ecology does not consider stream restoration proposals as a viable option to project-level flow control.

**Deleted this sentence**

**Done**

2) The last sentence of this section references "section 1.6.3 below." Does it intend to reference section 1.6.5?

**Yes, corrected the reference**

**Will confirm in next submittal**

### Chapter 2

3) Section 2.2 Exemptions

To complete its review, the County must submit its proposed Title 17A, including the section concerning exemptions. We suggest that when revising Title 17A, the County indicate that although listed project types are exempted from most stormwater management requirements, they are all responsible for taking measures to prevent erosion and to control sediment on their project sites.

**This applies to 17A.10.050: we will add a statement to Title 17A that says "however all work is still responsible for taking measures to limit erosion and to minimize sediment from leaving the project site."**

**OK. Will confirm in next submittal**

4) Section 2.3.1. New Development

Should the last sentence refer to requirements 1 – 11 rather than 1 – 10? A project may exceed the listed thresholds but not have to build an engineered facility. Do you intend a financial guarantee in such a case?

**Yes.**

OK. Will confirm in next submittal

5) Please provide your rationale for using 4,000 sq. ft impervious surface as your default for each lot within a residential subdivision. 4,000 square feet is approximately the same as the 4,200 sq. ft. default in the WWHM. Does the County have default guidance for rural (i.e., outside the urban growth management boundary) residential development, or will you require actual estimates of impervious surface based on development proposals?

**This was deemed necessary and we used the same value as King County. A simple GIS analysis confirmed that 4000 s.f. was a conservative typical range to require. No differentiation is made between urban and rural.**

Please respond to Ecology's suggestion that Pierce County assume a higher default level of impervious surface in rural residential projects. Ecology referred Pierce County to page 3-27 of the King County manual. K.C. assumes the lesser of 8,000 sq. ft. or the max. allowed by ordinance. Also, please confirm that assumed defaults are overridden wherever project-specific development details are known so that impervious surface and other land covers can be directly calculated. Also, consider the King County guidance on pages 3-26 and 3-27 concerning assumptions for pre- and post-development land cover types for modeling purposes.

Ecology committed to check whether the default of 4,200 sq. ft. of impervious area per lot in the WWHM can be changed to 4,000 sq. ft. per lot in the Pierce County area.

6) Section 2.3.2. Redevelopment

The text references the "assessed value" of existing site improvements as a trigger for applying stormwater controls to replaced impervious surfaces. If the County intends to use only the assessed value for this decision, the corresponding box in Figure 2.3 should eliminate the reference in parentheses to "replacement value."

**Good catch, Replacement value will be removed from table.**

OK. Will confirm in next submittal

Section 2.4.1

7) The bolded statement indicates the County requires Abbreviated Plan submittals for projects below the M.R. #1 threshold. What threshold is intended by this statement?

**We are reworking the paragraph to state clarify our intent, which is that additional requirements per Table 3.1 are still applicable to projects below the Min Req #1 threshold.**

OK. Will confirm in next submittal

Section 2.4.2.

8) Do projects have to comply with each of the detailed statements for each element listed in Volume II, Chapter 2, Section 2.2.3?

**Yes, we are adding a line in Vol I, Section 2.4.2 pointing Vol II and a summary is below.**

**OK. Will confirm in next submittal. Suggested addition for this section proposed in the telephone conversation on 5/15 will provide adequate clarity.**

Section 2.4.5 M.R. #5:

9) The cross references need to be completed. Because Volume VI describes LID as voluntary, are the referenced downspout, dispersion, and soil quality BMP's mandatory at all development sites – even those not claiming to be LID?

**We will be revising Volume VI to make it clear that MR #5 and the associated BMPs are mandatory. See also DOE's Volume VI comments.**

**OK. Will confirm in next submittal**

Section 2.4.6 M.R. #6, page 2-17:

10) The last sentence indicates that PGIS that is dispersed in accordance with Volume VI is not considered effective pollution-generating impervious surface. This definition is too broad. Only impervious surfaces that are “fully dispersed” in accordance with BMP T5.30 should be considered non-effective surfaces. This is a permit requirement in accordance with the definition of effective impervious surface in Section 2 of Appendix 1 of your permit. Impervious surfaces that are dispersed in accordance with your proposed sections 1.5.5.7 through 9 are still considered effective. They may be modeled as effective pollution-generating pervious surfaces if the dispersion areas meet certain design criteria as specified in your proposal.

**Agree. The Last paragraph in Min Req#6 will be revised to meet the permit intent. Only Fully Dispersed surfaces will not be considered effective impervious surfaces.**

**OK. Will confirm in next submittal**

Section 2.4.7.

Closed Depressions:

11) The requirement for closed depressions may not be implementable. The requirement involves “matching the pre-project land cover flow rates, durations, and volumes from the 2-year up to the 100-year event. Excess volumes must be retained on site per the infiltration requirements of Chapter 3.3.” When using continuous runoff modeling, you don't have “events.” You have hourly flow rates generated from the input precipitation file. It may be more accurate to require matching rates and durations through the 100-year flow rate. You can't use a continuous runoff model to match volumes from an event. You can take an approach whereby you require matching water level elevations in the closed depression at certain flood frequencies, e.g., 2-year through 100-year frequencies. This requires modeling the entire depressional drainage area in the pre- and post-project condition. But unless you require the post-development project site to match its pre-development flow duration curve for the entire range of flows, you will have more water going into the depression. So, you will have to increase

flood frequencies below some range. You may want to investigate how King County tries to manage these situations.

This is not an issue for permit compliance unless the area receiving the water is a wetland.

**Good catch. We will rewrite this using continuous simulation language, but we will still require on-site retention of all excess volumes.**

OK. Will read re-write. We do not expect to have an objection.

Category C: Regional retention/detention facilities (page 2-22):

12) Uncontrolled discharges to publicly or privately owned regional retention or detention facilities that were designed based on a lesser flow control standard are acceptable only if those discharges have a vested right in that facility. Facilities constructed to lesser standards that do not have legal commitments to specific properties before August 2008 cannot be used to fully meet the flow control requirements for those properties.

**We actually only allow buy-in to retention (infiltration) facilities not detention. In our old manual we allowed buy in to detention in theory but never did it in practice. In the new manual we have removed the detention option and only allow retention, the points you made above were factored into that decision. Additionally we only accept buy-in when there is sufficient excess capacity to infiltrate.**

OK.

Supplemental Guidelines:

13) The guidelines suggesting land conversions that are likely to exceed the 0.1 cfs increase do not correspond to our calculations. Our calculations indicate that the increase occurs with larger conversions. You may want to re-check your calculations. **See attached Excel spreadsheet with example modeling results from Herrera analysis.** The Herrera analysis looks acceptable. We noted that the County used the 15-minute time steps. Ecology had used the 1-hour time steps, which explains the difference in areas corresponding to the 0.1 cfs increase. Pierce County's proposal is acceptable.

Section 2.4.8 MR #8

14) The standard requirement does not include reference to Guide Sheet 1B in Appendix 1-D in the '05 Western Wash. Manual.

**This was removed intentionally to ensure the most current Critical Area regulations and other regulatory agencies rules are applied to these activities as referenced in the Additional Requirements section on page 2-26.**

The County must submit documentation demonstrating a regulatory approach similar or more stringent than what is suggested in Guide Sheet 1B. Primarily that means that the County should not allow hydroperiod alterations of Class I and II wetlands. The County can allow hydromodification and use of Class IV wetlands as treatment systems provided they base that decision on some or all of the criteria or similar criteria to what are in Guide Sheet 1B. The County can make case-by-case decisions on Class III wetlands, but should generally be more protective of them than Class IV wetlands.

Section 2.5.6. and 7. Adjustments and Exceptions/Variances

15) These sections indicate that revised text will be developed. Ecology will need those proposed revisions to complete its review. Note that your NPDES permit includes requirements for granting Exceptions/Variances that differ from what was published in the '05 West. Washington manual. You must comply with the permit's requirements.

**We will review permit Appendix 1 Section 6 (page 27) and compare it to current 18A.75.040 and 18A.85.**

Ecology will review when the proposal is submitted. Ecology cautioned Pierce County to compare their proposal to what is in Appendix 1 of the permit. This has been a difficult issue for other municipal stormwater permittees.

### Chapter 3

Table 3.1:

16) The footnotes to the table are missing.

**Oops...Footnote text is in Section 3.2.5 and will be reconnected to the table.**

**OK. Will confirm in next submittal**

17) Does the table properly represent the text? The implication of the table is that projects above the thresholds for M.R. #1 - #5 but below the thresholds triggering M.R. #6 - #10 do not have to submit a Permanent Water Quality Control Plan. That would not meet the NPDES permit requirement. The text indicates that an AP or an EAP is necessary for all projects not meeting the threshold for a DCP. So, the table seems to not be an accurate representation of the text.

**We will modify to make it clear that an Abbreviated Plan must be consistent with MR #1 requirements when they apply.**

**OK. Will confirm in next submittal**

18) How is the table intended to be read? Do you identify your project based on the descriptions in the left column, and then read across all the columns to see what plan types apply?

**Your interpretation is correct. We will add a note describing how to read the table for the other readers.**

**OK. Will confirm in next submittal**

#### Section 3.2.1

19) The last sentence indicates that projects that must submit a DCP "may" be required to submit an E&SC Plan too. It seems that a project that has triggered the thresholds for a DCP must in all cases also submit an E&SC Plan. Please explain if you do not agree.

**Propagating table to show when all ESCP and EAP/AP are required.**

**OK. Will confirm in next submittal**

Section 3.2.4.

20) The text refers to the thresholds in the table for AP's. But the only thresholds are in the footnote. Are those the thresholds referred to? If so, the text indicates that if those thresholds aren't exceeded, the project is exempt from all submittals. That is OK as far as NPDES permit compliance, but it is not consistent with the bulleted thresholds in Section A.0 of Appendix 1-A.

**Will add clarification in Section 3.2 and refer to Ordinance 17A.10.40 (Applicability) and 17A.10.50 (Exemptions).**

OK. Will confirm in next submittal

Section 3.2.5

21) I do not understand the first statement on page 3-6. If the threshold for an ESCP is met, why should that exempt a site from an AP or an EAP?

**This was an error in text, we will remove the reference to ESCP.**

OK. Will confirm in next submittal

Section 3.3.2

22) The last paragraph of the section describing requirements for section 1 of drainage reports asks for square footage of "vegetated (biofiltration) swales incorporated into the design and other conveyance systems." Note that the term "biofiltration swales" is a specific engineered treatment facility type. The term should not be used to describe swales or trenches used for conveyance purposes. Please change the text so that the reader will not infer that it is referring to biofiltration swales.

**The last paragraph of 3.3.2 will remove the biofiltration example and just require that the Stormwater BMPs be fully described.**

OK. Will confirm in next submittal

23) The next-to-last paragraph on page 3-12 instructs the engineer to submit "digital copies of model output files to the County." Your intent about the scope of such output files is unclear. The currently approved models for your area, MGS Flood and WWHM produce reports that indicate both model input and output information. You may consider the model input information as an "output file," but project engineers may not. They may only submit the pages that indicate water quality flow rates and volumes, and successful sizing of facilities. They may not submit any pages showing the information that they entered into the model. We suggest that you revise the wording to indicate that you are interested in both information input to the model, and the model's outputs. This section does not include some of the information required to be submitted with the

**Thanks, language will be revised as you suggested.**

OK. Will confirm in next submittal

24) "Permanent Water Quality Control Plan" (a.k.a. "Drainage Control Plan" per the County's use of terms) as listed on pages 3-4 and 3-5, Chapter 3, of the SMMWW. The information listed in those sections is necessary to allow your design reviewers to perform a thorough and efficient review of the drainage report.

**We will add language to our Section 3.3.2 Drainage Report Section 1 to require documentation about what Minimum Requirements they are achieving and how.**

OK. Will confirm in next submittal

### Section 3.3.3

25) This section does not instruct the designer to indicate sufficient details such that the reviewer can confirm the total square footage of impervious and pervious surfaces, and PGIS & PGPS by threshold discharge areas. We suggest that such instruction could be added to the description of “work maps” on page 3-16, and to the instructions for Section 9 of the drainage report (page 3-12).

**Good suggestion, we will add this to the Work Map requirement on page 3-16. In Section 9 first paragraph, it references the features shown on the work map so we don't feel a second listing is necessary.**

[OK. Will confirm in next submittal](#)

### Section 3.7

26) The second paragraph indicates that if Minimum Requirement #2 applies, the project is subject to SWPPP and erosion and control requirements. How could M.R. #2 not apply to these projects? It seems that it must apply. So this conditional statement should be removed.

**We will change this confusing language, we were intending to refer back to the original threshold requiring MRs 1 - 5, obviously this wasn't how it will always be read.**

[OK. Will confirm in next submittal](#)

27) The last paragraph concerning utility projects is confusing. It references utility projects mentioned in section 2.2., but 2.2 only refers to drainage facility projects. Should this paragraph be restricted to drainage facilities? Secondly, it seems to indicate that DCP's and ESC plans aren't required, but goes on to list certain ESC requirements that must be addressed in an abbreviated plan. Does that mean that the abbreviated plan covers TESC? Where in the text does it indicate that utility (or drainage facility) projects are subject to Abbreviated Plans?

**This is somewhat circular but Section 2.2 redirects the reader to Title 17A.10.50 (exemptions) and Section 3.7 adds some Temporary ESC requirements to an otherwise exempted activity. We need to amend PCC 17A.10.050 to add an additional requirement to the exemption list.**

[OK. Will confirm in next submittal. Also please submit PCC 17A.10.050.](#)

## Appendix 1-A

### Section A.O.

28) Are the thresholds in bullet format on page A-1 correct? Do you intend that all projects of less than 2,000 sq. ft. impervious area to submit an Abbreviated Plan? Or, do you intend that projects which don't exceed the DCP thresholds to submit AP's?

**These are intended to be guidelines not thresholds. We will make it explicitly clear that the applicant must refer to Table 3.1 and Volume 1 for applicability.**

[OK. Will confirm in next submittal](#)

Section A.3.

29) The second paragraph reference to Chapter 2 of Volume 1 should be changed to Chapter 2 of Volume II.

**Yes it should, thanks for the catch.**

[OK. Will confirm in next submittal](#)

30) The second paragraph indicates that each of the listed elements must be considered. It is the intent of the NPDES Permit that projects exceeding the 2,000/7,000 sq. ft. thresholds must comply with every statement under each of the element headings (unless the applicant demonstrates why that statement is not applicable). The County's construction of this section does not deliver the same message.

**This is all addressed in the first paragraph and required when you produce an Erosion and Sediment Control Report (section 3.4.2) but it makes a very strong statement to the small projects that are below the thresholds as it is written.**

[OK.](#)

Section A.4.

31) The NPDES permit requires that the County mandate the use of Roof Downspout Control BMP's and Dispersion and Soil Quality BMP's functionally equivalent to those described in the Ecology manual. This section, in combination with Volume VI, does not seem to accomplish that.

The County does not require use of roof infiltration systems in porous soils. In tighter soils, the County does not specify required dispersion systems for roofs and other impervious surfaces on individual lots. Finally, the County does not mandate implementation of the Soil Quality and Depth BMP.

**The minimum requirements still apply to this appendix and we will make that more specific in the introduction to Appendix 1-A. In function, Table A.1 will direct the applicant to first do Low Impact Development to minimize the runoff but this still does not free the applicant to have an increased offsite discharge. Connection to the county drainage system is only allowed when on-site soils are not adequate for infiltration (A1 A.4.1) hence infiltration is required on good soils, we just allow for LID-based infiltration as well as roof downspouts.**

[OK. Will confirm in next submittal.](#)

32) The design criteria for trenches and drywells are acceptable with the exception of the allowance of up to 5,000 square feet of impervious area draining to a typical drywell that is 4 feet in diameter and 4 feet deep. The Ecology manual specifies that size of dry well for up to 1,000 sq. ft. The County will have to supply continuous runoff calculations to prove that the drywell can manage the runoff without overflow.

**On the drywell question we will strike the 5,000 square foot reference and direct the design to Table A.2 for the dry well footprint. This will be a more restrictive threshold than the 1,000 sf shown in the DOE manual. An engineer will be allowed to design a site specific design using Volume III methods. This mistake was also duplicated in Volume VI and will be corrected.**

[OK. Will confirm in next submittal](#)

## Appendix 1-B

33) The “Instructions for Person Assembling Maintenance Information” on page B-1 needs to be updated to refer to Volume IV of the Pierce County Manual.

**Will remove lines #4, 5, & 6 and add a line to reference Volume 1 section 3.3.4 which then references Volume IV.**

[OK. Will confirm in next submittal](#)

34) The maintenance table for the Ecology Embankment needs updating to correspond with the maintenance guidance at the Ecology website. Please note the additions of “System Bypass” and “Ecology mix replacement.”

**We will update this. Please note that the Ecology webpage link is broken so we cannot see your guidance.**

[OK. Will confirm in next submittal. Ecology will fix the broken webpage link.](#)

35) The maintenance tables include a page for the “Vortfilter.” This device is not designated for use in Washington. If this device has already been installed in the county, then including maintenance guidance is appropriate. If it has not been installed, we recommend removing it from the maintenance table so that users do not infer its approval for use in new and redevelopment.

**We are not aware of any of these devices installed in the county, this was added when the Vortfilter had CUD, now that it has been withdrawn we will remove this from the checklist.**

[OK. Will confirm in next submittal](#)

## Glossary

Please add definitions for the following terms to the Glossary. The definitions must be consistent with those in Appendix 1 of your NPDES Permit:

36) Certified Erosion and Sediment Control Lead

**Sorry, we copied the DOE manual here; we will move this to the alphabetically correct location and use the permit definition.**

[OK. Will confirm in next submittal](#)

37) The Glossary contains 2 definitions of Effective Impervious Surface. We suggest that you have only one definition. The definition given as a sub-heading under Impervious Surface would have to be revised to not restrict concentrated flow to that which is “shallow,” or revised to change concentrated flow to “discrete conveyance.”

**We will delete the sub-heading references to EIA, DIS, and TIA from the Impervious Surface definition.**

[OK. Will confirm in next submittal](#)

38) The definition of “disconnected impervious surface” is too broad. As noted already, the County’s suggestion for what constitutes “an appropriately sized and adjacent porous surface where infiltration can occur” is not the same as Ecology’s.

**This will be deleted, see above.**

[OK. Will confirm in next submittal](#)

39) The reference to Figure 2.1 in the definition of “threshold discharge area” should change to reference Figure 4.1. Note that you do not have a Figure 2.1. The first figure in section 2 is numbered figure 2.2.

**Will correct it to Figure 4.1, thanks**

[OK. Will confirm in next submittal](#)

40) The definition for wetland should reference the ordinance. The definition in section 18E.30.020 of Title 18E is acceptable.

**Will change this to: as defined by Title 18E PCC**

[OK. Will confirm in next submittal](#)

## **Volume II**

### **Chapter 2**

#### Section 2.2.3:

The County modeled its statements under the construction elements after those which appear in the Ecology manual. However, the statements in Appendix 1 of the County’s NPDES permit establish the requirements which the County must meet. Note that Ecology changed some of the statements when creating Appendix 1. Most of the statements that the County has proposed are acceptable for meeting the permit requirements. The following is a listing of issues that require resolution.

#### General Requirements:

41) Note that M.R. #2 in Appendix 1 of your NPDES permit has a different format than M.R. #2 in the Ecology manual. Ecology added a statement that the Construction SWPPP shall include a narrative and drawings. Can the County substantiate the enforceability of Section 2.3 of Volume II without a reference to it in its M.R. #2?

**The manual is adopted as Ordinance and all volumes and sections are enforceable. Volume II Section 2.3 calls out a requirement to have a narrative and drawing, this is enforceable.**

[OK with addition of statement in M.R. #2 that will refer to Section 2.3 of Volume II. Will confirm in next submittal.](#)

#### Construction Elements:

42) Ecology will need confirmation that the detailed statements within each construction element are requirements unless the narrative explains why it is not

applicable to the site. The description of Section 2.2 on page 2-1 brings into question whether the construction elements are “recommendations.”

**We will delete the word “recommended” to remove any confusion about what is process versus what is required.**

[OK. Will confirm in next submittal](#)

Element #2

43) Please change the wheel wash statement to be consistent with the statement in Appendix 1 of your NPDES permit.

**We will add the permit language giving guidance for what applicable means.**

[OK. Will confirm in next submittal](#)

44) In the second bulleted statement, we suggest adding “or other equivalent BMP.” (See statement in Appendix 1). There is at least one additional device (“Grizzley”) on the market which provides an alternative that that the County can accept.

**Good suggestion, we will add this phase.**

[OK. Will confirm in next submittal](#)

Element #5

45) The second bullet indicates that the time limits for soil stabilization may be adjusted by the County. If the County wishes to adjust the time limits, now is the time to propose an adjustment. Any proposed adjustment is subject to Ecology’s review and approval. Adjustment of time limits, whether generic or case-by-case, after adoption of the ordinance and manual is not acceptable.

**We will remove this.**

[OK. Will confirm in next submittal](#)

Element #6 and Element #8

46) Please add statements in regard to the land cover conditions to be used for hydrologic analyses. Note that these statements appear in Appendix 1 of your permit.

**We will add in the permit language on tributary cover.**

[OK. Will confirm in next submittal](#)

Element #7

47) Please delete the second bullet. Note that the statement does not appear in Appendix 1 of your permit. The statement conflicts with direction given under Element #2.

**We need to talk about this. The roads must be cleaned and not all sites allow for pumping dirty water back onto the project site e.g. a paved parking lot. We would recommend changing element 2 & 7 to have the wastewater adequately treated before discharging to a storm system since many sites cannot infiltrate on site.**

[Street wash water is not “stormwater.” It is considered process waste water. The statement on page 14 of Appendix 1, Section 4.2 of your permit is the same as appears in the Construction Stormwater General Permit. In addition, Special Condition S.1.C.3. of the Construction Permit does not identify street wash water as a non-stormwater that is conditionally authorized for discharge under that permit. The County should not adopt](#)

a statement that conflicts with the Construction Permit and authorizes a discharge of process waste water.

We suggest that the County delete the second bullet in this element so that the subject is only covered in Element #2 on page 2-8 of the County's manual. In Element #2, the County could leave the text as it appears now (consistent with the Construction Stormwater General Permit), or it could add options for disposal of the water, including: 1) infiltration on the project site; 2) transport offsite in a vehicle for legal disposal in a manner that does not pollute state waters (e.g., an approved vector waste treatment facility; or 3) sanitary sewer discharge with local sewer district approval.

Element #9

48) Please change "noninert wastes" to "other materials that have the potential to pose a threat to human health or the environment."

**We will make this change.**

OK. Will confirm in next submittal

49) In the second bullet on page 2-15, please delete "with significant concrete work."

**We will delete this phrase.**

OK. Will confirm in next submittal

50) Please add a statement that construction site operators obtain written approval from the Department of Ecology prior to using chemical treatment other than CO<sub>2</sub> or dry ice to adjust pH.

**We are adding this advice too.**

OK. Will confirm in next submittal

Element #12

51) Note that the text of element #12 in your permit is substantially different from the text of Appendix 1 of your NPDES permit. Ecology moved the statements in regard to seasonal work limitations into a "General Requirements" section. The text of this element is approvable as written but the County may choose to change this element and add a "General Requirements" section similar to those in Appendix 1.

**We think the placement of the seasonal work limits are more appropriate remaining in the 12<sup>th</sup> element on *Manage the Project*.**

OK.

### Chapter 3

BMP C108: Wheel Wash

52) Discharging Wheel wash water to a sediment pond or trap is not acceptable. The intent of the words "separate on-site treatment" were intended to exclude use of treatment devices used for stormwater from the other areas of the site. Wheel wash water can be very oily and laden with heavy metals. It needs to be handled separately on the site.

**We agree that it should be handled separately. We will remove the reference to the BMP C241 but we would like you to give some direction on how to treat/dispose of the wash water and what is an approve "land application"?**

Similar to street wash water, wheel wash water is process waste water. It should not be routed to stormwater facilities that are intended to handle just stormwater from the construction site. A land application option, at a minimum, should involve a treatment system to try to reduce sediments (provision should be made to remove the sediments for proper disposal as a street waste), and then application to an area that has the capability to treat the water as it infiltrates through the soil. You can reference the Soil Suitability Criterion #2 on page 6-3 of your draft.

Discharge to the local sanitary sewer with approval of the sewer district remains an option also. The closed-loop option mentioned in the Ecology manual would provide an on-site treatment mechanism to remove pollutants and return water to the wheel wash. However, the removed pollutants still have to be disposed of in a manner consistent with solid and hazardous waste requirements; and the wash water itself still needs to be changed periodically. The spent water needs management through land application on-site (as above), introduced to the sanitary sewer, or introduced into an approved off-site treatment system. The offsite treatment system should be a site permitted by Ecology.

BMP C220: Storm Drain Inlet Protection

53) Under the Maintenance Standards section, please explain why the County chose not to include the direction to not wash sediment into the storm drain while cleaning. **This was unintended, probably lost positioning the graphics in Word. It has been put back in.**

OK. Will confirm in next submittal

BMP C240 Sediment Trap:

54) Because Pierce County is not going to allow use of single event hydrographic methods, it will need to change the definition of Q2 on page 3-124. Ecology suggests the following:

Q2 = Design inflow (cfs) based on the 2-year flow rate (1 hour time step in an approved continuous runoff model) for the developed (unmitigated) site, multiplied by a factor of 1.3. The 10-year peak flow shall be used if the project size, expected timing and duration of construction, or downstream conditions warrant a higher level of protection. Q10 is the 10-year flow rate (1 hour time step in an approved continuous simulation model) for the developed (unmitigated) site multiplied by a factor of 1.6.

**Those old models keep sneaking in. For this problem we plan to use a 2-year, 15 minute time step or if the time of concentration is less than minutes 30 then use a 2-year, 5 minute time step.**

The WWHM does not provide flows in 5 or 15 minute time steps. That is why my recommendation says to increase the 2 and 10 year flows by correction factors of 1.3 and 1.6 respectively. Those convert the hourly flows to 15-minute flows.

BMP C241

55) The definitions for Q2 and Q10 are the same as those used above for traps. You will have to change your statements in the first bullet on page 3-128 to use continuous runoff model terms rather than single event terms.

**Same response as above.**

[Same Ecology response as in #54 above.](#)

56) The guidance for the Principal Spillway will need to change also. We suggest changing the second sentence as follows. "The diameter shall be the minimum necessary to pass the site's 15 minute, 10-year flow rate (Q10). If using the WWHM or MGS Flood, Q10 is the 10-year flow rate (1 hour time step) for the developed, unmitigated site multiplied by a factor of 1.6.

**We will use the 10-year, 15 minute time step to size the emergency overflow and we are also making this change in Volume III.**

[Same Ecology response as in #54 above.](#)

57) For the Emergency Spillway, also note that the 100-year peak flow identified by the approved runoff models is a 1-hour flow rate. If you want to estimate a flow rate appropriate for a 15-minute time step (single event methods use a 6 or 10 minute time step), we suggest multiplying the 1-hour rate by 1.6.

**Changing to 100-year, 15 minute requirement**

[Same Ecology response as in #54 above.](#)

BMP C251: Construction Stormwater Filtration

58) Ecology published a revised version of this BMP at its stormwater website. Please use that update. It includes a number of significant changes that make the BMP more effective.

Ecology has also published two additional BMP's at its website that should also be specified by the County:

BMP C252: pH Neutralization (CO2)

BMP C253: pH Control

**We will update BMPs C250, C251 and insert C252 and C253 as found on the Ecology website.**

[OK. Will confirm in next submittal](#)

## **Volume III**

### **Chapter 3**

59) In equation 8 on page 3-42, the square root symbol should not extend over the quantity  $(h-a/3)$ . This is a mistake in the Ecology manual.

**We will fix the error in the equation.**

[OK. Will confirm in next submittal](#)

60) Section 3.3.4 Verification of Performance:

The County requires testing and monitoring of an infiltration facility before accepting the facility. However, a test method is not specified. Specifying a method would seem in the County's best interest. I have attached a document that explains the method King County uses.



INFILTRATION\_RAT  
E\_TESTING.doc

The last paragraph on page 3-56 "recommends" verification testing on all facilities, not just those that the County is being asked to accept responsibility for. The paragraph is modeled after a statement in the Ecology manual. That statement was intended for local governments, i.e., it was encouraging them to adopt a requirement for verification testing. We suggest that the County require such verification testing for all infiltration facilities, even those it is not accepting responsibility for. Given the vaguaries and difficulties in predicting large scale infiltration rates, it seems wise to verify performance. That could also help establish a feedback loop for revising the standard design procedures.

**We have added language clarifying a falling head perc test must be done (min of two) for verification of the facility before release of financial guarantees. The county must be notified prior to the test. We also have added performance monitoring of the pond through a wet season by having a reading of the Crest Gage after each major storm event and a requirement that a stage storage table be in the O&M manual to compare the events to design performance.**

**OK. Will confirm in next submittal**

### Appendix III-A

Correction Factor:

Pierce County has proposed the same safety factor equation as is proposed in King County. I recently sent correspondence to King County urging them to revise their guidance in regard to a correction factor for plugging. I have copied that correspondence below with a couple minor changes for context.

Your safety factor equation includes a number of correction factors. The last factor explained is the factor for plugging. A correction factor of 1.0 (in other words, no correction) is listed for "coarse sands or cobbles, *or any soil type in an infiltration facility preceded by a water quality facility.*" It is that last phrase that concerns me.

Adjustment factors for infiltration facilities is not a hard science. There's plenty of room for "best professional judgment" involved. But I thought I should let you know my thoughts on the matter.

Does the term "water quality facility" in the above phrase mean a facility that listed in the Basic Treatment Menu, at a minimum? Or, does it include use of a "presettling"

device as described on page 5-60 of the KCSWDM? In either case, I think it is not a good basis for exempting a facility from a correction factor for plugging. There just is no way that our standard treatment devices remove all of the suspended sediment in runoff. Our goal of 80% removal or 20 mg/l acknowledges that. And even if the facility is "maintained" through occasional tilling. The soil will still generally have a build-up of this fine material that will reduce the average infiltration rate. The finer the native material in and below the basin, the more plugging will be a factor. So, I think the larger correction factors for finer soils are appropriate in your manual. But not using those correction factors when a "water quality facility" precedes the basin is, in my opinion, not a good idea.

61) So, my pitch to you is to delete the phrase "or any soil type in an infiltration facility preceded by a water quality facility" from your manual. I understand that you have a post-construction testing requirement that acts as a bit of a backstop. But, I think the phrase sets us all up for an increased chance of long-term failures that will be headaches to get corrected.

**We agree, we have struck everything after the 1.0 for course sands or cobbles.**

[OK. Will confirm in next submittal](#)

## Volume IV

### Section 3.1 Automobile Washing

62) The third bulleted statement in this section clearly indicates that wash water can discharge to the storm drain. That is expressly not allowed by the County's NPDES permit. The County should re-write this section to expressly indicate that car wash water is prohibited from entering the MS4.

**We will remove the 3<sup>rd</sup> Bullet.**

[OK. Will confirm in next submittal](#)

## Volume V

### Chapter 2

63) Figure 2.1 includes a "Sand Filter Blanket" as a Basic Treatment option. Did you intend a "Sand Filter Basin," or are you introducing a new treatment facility type?

**This was supposed to be Sand Filter BASIN, "blanket" was a typo.**

[OK.](#)

### Section 2.1, Step 6:

64) The listing of project sites needing to apply Enhanced Treatment does not include multi-family sites. If Pierce County wants to exclude multi-family sites, it will have to present an argument and evidence concerning why it does not expect those sites to generate higher levels of dissolved metals as compared to single family residential areas. The higher density of cars in these developments combined with a higher potential for multiple daily trips (as opposed to commercial parking lots for employees

only) indicated to Ecology that they have a higher potential for dissolved metals generation.

Note that the County can specify Basic Treatment for runoff from roof and landscaping at these sites if it does not mix with runoff from the parking area, or if the roof surface area is greater than the parking area.

**Pierce County defines multi family as any project from a duplex to large condo developments. DOE does not define multi family. We are fine with setting a trip count that larger projects would trigger but are reluctant to require enhanced treatment for a duplex which has very few trips. What do you think about setting a trip threshold at 7,500 similar to the road standard?**

We agree that there may not be an adequate basis to require enhanced treatment at multi-family sites that are on the lower end of size. Duplexes and four-plexes, for instance, would not have such increased levels of traffic over single family residential properties that would warrant enhanced treatment options. Your idea of using 7,500 AADT may not be the best idea. 7,500 AADT is used for roads in the urban area. Parking lots could have higher metals and oil loadings than roads because of more frequent braking, turning, and trip ends (when cars are more likely to leak). So, something lower than 7,500 would seem appropriate. As another comparison marker, I mentioned King County's use of 2,000 ADT as an enhanced treatment threshold (See pages 1-60 and 1-61 of the KCSWDM). Ecology does not have more specific guidance to offer. The County can consider a dwelling unit size based upon an assumption of #'s of cars per dwelling and #'s of trips per car.

### Chapter 3

65) On page 3-4 and page 3-6, please explain why the County does not allow the option of Infiltration preceded by Basic Treatment as an option for Phosphorus or Enhanced Treatment.

**We will insert the DOE bullet point. It was pulled as a derivative decision from early internal opinion not to allow for infiltration basin treatment and was not re-inserted when we reversed course.**

OK.

### Chapter 7: Sand Filtration Treatment Facilities

66) We suggest that the County add a required design hydraulic conductivity of 1 inch per hour. This design criterion does not expressly appear in the Ecology manual. It is listed under the maintenance section as the rate at which maintenance is required. The implication is that if the facility falls below that rate, it is not treating an adequate volume of water. However, it would facilitate consistent design to add this to your manual as the rate which should be entered into an approved continuous runoff model to determine filter sizing. That rate should be used for all filters that use the sand specification indicated in the chapter.

**This points out that we need a sand filter sizing procedure. We will add a procedure similar to the City of Seattle's proposed guidance (which is based on King County's). In reading the King County manual it seems that we want to have minimum**

**maintenance criteria for “V” infiltration rate rather than “K” hydraulic conductivity. KCSWDM page 6-106.**

OK. Will confirm in next submittal. My understanding is that the guidance will include use of an approved continuous runoff model.

## **Chapter 8: Biofiltration**

67) On pages 8-16, 8-26, and 8-29, change the reference from Figure 8.5a to Figure 8.6a.

**Thanks we have made this change.**

OK.

68) In Table 8.4 on page 8-21, we suggest that you delete St. John’s Wort from the list of ground covers. It is listed as a noxious weed in Washington State.

**Good point, we will delete the plant.**

OK.

## **Chapter 9: Wetpool Facilities**

69) On page 9-8, we suggest that the text direct the reader to comply with the liner requirements in Section 4.3 (note change from Section 4.4). We acknowledge that the Ecology text uses the permissive “may” at this location. However, that permissive language conflicts with the mandatory requirements of Chapter 4.

**We will change this bullet to require the wetpool cell to follow the criteria in Section 4.3.**

OK. Will confirm in next submittal

70) Page 9-14 includes direction for designing a wet vault in an “off-line” mode for situations not involving flow control. This is not an acceptable design. Wet Vaults must be designed in an on-line mode in order to serve as an acceptable basic treatment option. **Please explain your reasoning for passing the 100-year storm through the wetvault. We feel that the flow above the water quality design storm will re-entrain the sediment that the vault has captured previously and send it on to the main basin leading to potential early failure of the basin. Unlike a wetpond a wetvault will be a narrower facility and more susceptible to erosive forces even with the same volume.** In our 5/15 telephone conversation, Ecology concurred that long, narrow vault designs could have sediment scour in large events. So, in some instances, a bypass should be allowed. Ecology suggested the County establish: 1) a maximum length to width ratio for no-bypass facilities (i.e., above a certain length: width, bypasses should be designed); 2) a design flow rate at which the bypass would engage. (Post conversation note: In regard to the former, the SMMWW recommends at least a 3:1 ratio in standard ponds. It also recommends a 5:1 ratio in single cell ponds of 4,000 sq. ft. or less. So, the County’s length to width ratio should be greater than that.) In regard to the latter, Ecology did not specify a particular flow rate. Ecology suggested that the “on-line” water quality

design flow rate indicated by the WWHM would be the minimum it could consider. The County will propose a flow rate.

## **Chapter 10: Oil and Water Separators**

71) In the next-to-last line of the first paragraph on page 10-7, change “areas” to “acres.”

**We will make the corrections, thanks.**

OK. Will confirm in next submittal

## **Chapter 11: Emerging Technologies**

72) Section 11.3: The Public Works Director’s authority is restricted to allowing CUD technologies in accordance with or more stringent than the criteria under which Ecology has approved them.

**We will do this.**

OK.

73) The second bulleted statement needs editing for its intent to be clear.

**We have changed it to make it clear that new technologies can be added to a treatment train that already meets water quality standards.**

Do you intend “water quality standards,” or do you intend to say “that already meets the treatment requirements outlined in this Manual?”

## **Volume VI**

74) The note at the beginning of the volume indicates that the county intends to make significant revisions to this volume before its adoption. The County will have to submit the revised volume to Ecology for review in accordance with its NPDES permit requirements.

**This draft is coming soon and you will have the opportunity to review the edits.**

OK.

### Section 1.5.5.9, Bioretention Facilities or Rain Gardens

75) On page 1-27, the fourth bulleted statement indicates that bioretention facilities may be used where seasonal high groundwater levels are at least 1 foot below the bottom of the subgrade. This is not consistent with the design criteria in the Ecology manual. As defined on page 1-26, the term, “bioretention facility,” refers to facilities that receive runoff from a combination of impervious and pervious areas in the development. Therefore, these systems are more likely to exceed the minimum 3 foot clearance requirement in the Ecology manual for bioretention systems that serve more than 5,000 sq. ft. of pollution-generating impervious surface, 10,000 square feet of impervious surface, or ¾ acres of pervious area. The County’s 1 foot clearance is

acceptable for facilities or “rain gardens” that serve smaller areas. The County must be consistent with this distinction, or, the County could indicate that systems that are inconsistent with these separation requirements will not receive any runoff modeling or treatment credits.

**We have changed the design standards to show the same limitations as the DOE manual Appendix C section 7.7.2 requiring 3 feet of clearance when the tributary areas are 5000 s.f., or 10,000 s.f. depending on if it is PGIS or other impervious, or  $\frac{3}{4}$  acre for pervious.**

[OK. Will confirm in next submittal](#)

76) Page 1-29 indicates that rain gardens serving roofs and driveways can have those areas modeled as a grassed surface. Where a rain garden-type system will serve an area less than the thresholds designated above, it can be acceptable to use simplified techniques for representing their potential runoff reducing benefits. However, when comparing the King and Pierce County modeling techniques, it appears that Pierce County is giving significantly more credit. To model an impervious area as 50% grass and 50% impervious, King County requires a wet pool volume that is 25% of the impervious area (e.g., 250 cu. ft. for a 1000 sq. ft. area). Pierce County seems to require as little as 67 cu. ft. of storage volume for a 1,000 sq. ft. area. To compute this, I used the first line (not sure if that is correct. The words “last row” in the directions are confusing. Last row of the last table, or just the last table without a row specified?) of the Type C soil in table 1.5-1 to get the square footage of the rain garden bottom. Assuming a rectangular shape with a 4:1 side slope and a maximum of 6-inch depth (all P.C. standard design criteria), I used the equation on page 9-6 to compute the volume. If my calculations follow the County’s intent, for a rain garden volume of almost  $\frac{1}{4}$ th the size, Pierce County allows the roof to be modeled as grass. Whereas King County models the roof as  $\frac{1}{2}$  grass,  $\frac{1}{2}$  impervious.

**For sizing tributary area less than 2000 sf we use the rain garden sizing table developed by Timothy Lowry. We will come up with a clear design criteria for larger areas that is consistent with DOE and PSAT guidance.**

[OK. Will confirm in next submittal](#)

77) Page 1-30 indicates that bioretention facilities serving roads or roads and other surfaces “will typically be larger than rain gardens,” and “will be” sized using the WWHM. Using the WWHM or MGS is necessary. However, as indicated above, the county must indicate that where the thresholds mentioned above are exceeded, the WWHM must be used. Also, the general guidance concerning the infiltration rates to use is not sufficiently specific. What rates would the county think are appropriate for type B and C soils? Also, the county makes no mention of reducing those infiltration rates by an appropriate correction factor. Because the County is accepting bioretention facilities as acceptable treatment systems, they must be designed using similar procedures as infiltration basins, such as the assignment of a correction factor. Ecology has indicated that a minimum factor of 4 is necessary. The County may choose to be more conservative, but not less conservative.

**We recognize these sizing guidelines are confusing and we will resubmit a new guideline section.**

[OK. Will confirm in next submittal](#)

Sections 1.5.5.4. through 1.5.5.10 (pages 1-31 to 1-57)

78) These sections are assigned numbers that are duplicative with the numbering system on pages 1-22 to 1-31.

**Our editors will fix the pagination on the next draft.**

[OK.](#)

79) The titles and subject matter of these sections are not consistent and not readily identifiable as the sections referred to in M.R. #5. Section 1.5.5.4 is entitled Roof Downspout Controls, but it only includes information on roof infiltration systems. Then, multiple sections are used to describe roof downspout dispersion and dispersion for other areas. Finally section 1.5.5.10 is entitled “soil amendments.” I am not convinced that this should be considered the required “soil quality” BMP referred to in M.R. #5. In addition, please explain how the soil quality requirements are mandatory for all projects, not just residential projects.

**We understand the concern and will revise this section to ensure soil quality is equal and to clarify when these BMPs are mandatory to meet Min Requirement 5.**

[OK. Will confirm in next submittal](#)

Section 1.5.5.4.

80) The use of “shoulds” at the bottom of page 1-31 and the top of 1-32 in regard to infiltration and dispersion seem to send a different message as compared to the third paragraph on page 1-32. Because the text already contains qualifiers in regard to not using infiltration or dispersion in some instances, these general statements should indicate mandatory use.

**We will use less permissible language and point to Min Req #5.**

[OK. Will confirm in next submittal](#)

81) Under the “Applicability” section, what is the intent with the permissive use of “other” downspout control BMP’s? It would be helpful to indicate that use of those other devices does not replace the infiltration or dispersion systems unless they are sized to retain all of the projected stormwater runoff from the roof.

**We will add a note that not only do other designs require county approval but the applicant must show how they meet all the Min Requirements.**

[OK. Will confirm in next submittal](#)