

Tracey Redd

From: Kristen Bryant <kristenbry@gmail.com>
Sent: Friday, December 19, 2014 4:59 PM
To: Phil Olbrechts; MDRT User
Subject: Black Diamond Plat 2C Wetlands Testimony
Attachments: Applicable Sections of Code and DA contions that support Wetland Expert Testimony.pdf; Black Diamond Villages Hearing Plat 2C Lider Supplemental Review 17Dec2014 FINAL.pdf; Wtld E1 Buffer Comment_TES_12-19-14.pdf; Wetland Hydrology-Stormwater_TES_12-19-14.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Attention Mr. Phil Olbrechts,
City of Black Diamond Hearing Examiner
Re: Plat 2C Plat Hearing Schedule
Cc: City of Black Diamond MDRT for distribution to parties
Dear Mr. Olbrechts:

With this email with expert testimony requested by myself, and William and Karen Bryant of Black Diamond regarding wetlands on the above referenced Plat.

Attached are four documents:

- Two Reports prepared by Ms Diane Brewster.
- A Report prepared by Mr. Bill Lider. This report was submitted earlier, but much of it is directly related to the wetlands issue and helped inform Ms Brewster's report.
- A summary of the Black Diamond Municipal Code and Development Agreement provisions that support this Wetland testimony and recommendations.

Thank you for your consideration,
Kristen Bryant and William and Karen Bryant

Black Diamond Villages, Plat 2C Hearing
Date: December 19, 2014

**Applicable Sections from the Black Diamond Municipal Code and the
Development Agreement that Support Expert Testimony Regarding
Wetlands in Plat 2C**

The proposed plat conditions regarding wetlands must be consistent with the BDMC, MPD Permit Approval, the Development Agreement, the NPDES permit for Phase II cities, and various provisions in State law and Administrative Procedures.

These various requirements set forth specific requirements, but they also apply “performance standards” that must inform the review of implementing projects. Conditions of approval to ensure that these “performance standards” are met should be based, in part, on these requirements.

The following is a partial list of these “performance standard” provisions from the BDMC:

17.15.020 A(6)

All environmental impacts have been addressed consistent with the public health, safety and welfare and city goals and policies;

19.10.020 B (2)

Any area within the city meeting the definition of one or more sensitive area, regardless of any formal mapping, identification or delineation, are hereby designated as sensitive areas and are subject to the provisions of this chapter.

19.10.030 A

These sensitive areas regulations shall apply as an overlay and in addition to zoning and other regulations adopted by the city.

19.10.050 A

Project action. Any project action taken pursuant to this chapter shall be mitigated and result in equivalent or greater functions and values of the sensitive areas associated with the proposed action.

19.10.130 D(6)

A statement documenting sources of best available science and all assumptions made and relied upon;

19.10.130 (D)(9)

A discussion of the performance standards applicable to the sensitive area and proposed activity; and

A.

Requirements. When mitigation is required, the applicant shall submit for approval by the city, a mitigation plan as part of the sensitive area report. The mitigation plan shall include:

1.

A description of the anticipated adverse impacts to the sensitive areas and the mitigating actions proposed and the purposes of the compensation measures (if applicable), including the site selection criteria; identification of compensation goals; identification of resource functions; and dates for beginning and completion of site compensation construction activities. The goals and objectives shall be related to the functions and values of the impacted sensitive area;

2.

A review of the best available science supporting the proposed mitigation; and

19.10.220 B(3)(e)

Any adverse impacts on wetland functions and values are mitigated in accordance with Section 19.10.240.

19.10.220 C(5)(c)

A hydroperiod analysis is conducted and no impact is demonstrated by the study.

4.

Management of surface runoff from adjacent land shall minimize adverse effects on wetland ecological functions and shall include:

a.

Control of surface water peak flow and duration of flow should be maintained at rates typical of native forest cover;

b.

Low impact development measures shall be incorporated to the maximum extent feasible, including but not limited to:

(i)

Site design to maximize preservation of existing patterns of overland water flow and of groundwater interflow;

(ii)

Vehicle and pedestrian circulation systems that minimize alteration of topography and natural hydrologic features and processes through following the natural contours of the land;

(iii)

Road location and circulation patterns shall reduce or eliminate stream crossings and encroachment on sensitive areas and their buffers;

(iv)

Utilities consolidated within roadway and driveway corridors to avoid additional clearing for multiple corridors;

(v)

Layout of lots and or structures to minimize alteration of existing topography, disturbance to soils and native vegetation;

(vi)

Runoff should be routed to infiltration systems, to the maximum extent feasible, to provide groundwater interflow recharge to wetlands and/or water bodies and to limit overland flow and erosion:

(1)

Use of permeable pavement;

(2)

Dispersion of runoff into areas that permit infiltration;

(3)

Engineered facilities designed for bioretention and infiltration ranging from swales to ponds to tree wells to engineered wetlands.

c.

Surface or piped stormwater should be routed to existing conveyances or to other areas, wherever hydraulic gradients allow. Where stormwater is routed to wetlands, system design shall assure that erosion and sedimentation will be avoided to the maximum extent feasible;

d.

To prevent channelized flow from lawns and other landscaped areas from entering the buffer, and to prevent washing of fertilizers, herbicides and pesticides into the buffer, if slopes adjacent to the buffer exceed fifteen percent, a ten-foot wide swale to intercept runoff shall be provided at the edge of the buffer or other effective surface water interception design approved by the mayor or his/her designee;

e.

Adopt and implement an integrated pest management system including limiting use of fertilizers, herbicides and pesticides within twenty-five feet of the buffer of category III, or IV wetland, within fifty feet of the buffer of a category I, II, or headwaters wetland, and within one hundred feet of the buffer of a wetland in the core complex.

19.10.230 G

G.

Increased wetland buffer widths. The mayor or his/her designee shall require increased buffer widths in accordance with the recommendations of an experienced, qualified professional wetland scientist, and the best available science on a case-by-case basis when a larger buffer is necessary to protect wetland functions and values based on site-specific characteristics. This determination shall be based on one or more of the following criteria:

1.

A larger buffer is needed to protect other sensitive areas;

2.

The buffer or adjacent uplands has a slope greater than fifteen percent or is susceptible to erosion and standard or proposed erosion-control measures will not prevent adverse impacts to the wetland

19.10.235 D (1)(2)

1.

Depressional wetlands recharged only by precipitation, interflow or groundwater shall be assured a source of recharge through stormwater infiltration, or other means, to maintain the wetland's hydrologic character.

2.

Wetlands that have a potential to reduce flooding or erosion, or have the potential and opportunity to maintain or improve water quality as evidenced by a score of at least ten points on the applicable criteria of the Wetland Rating Form for Western Washington, shall maintain a hydraulic connection to surface water that maintains effective wetland function for flood or erosion reduction or water quality and does not substantially alter the existing hydroperiod of the wetland.

19.10.240 Mitigation requirements.

A.

Mitigation plan. A mitigation plan that achieves equivalent or greater biologic functions will be required for all proposed wetland alterations or to mitigate unavoidable adverse impacts to the wetland functions and values resulting from a proposed action. Mitigation plans shall be prepared consistent with the minimum requirements of Section 19.10.140.

14.04.330 C

Where requirements in this chapter are covered in any other law, ordinance, resolution, rule or regulation, the more restrictive of the two shall govern.

Applicable Sections from the Development Agreement

The Development Agreement also contains provisions that can be considered as “performance standards” for the protection of wetlands:

The Development Agreement acknowledges that revisions to the sensitive area delineations on Exhibit “G” may occur consistent with SAO requirements:

Development Agreement

2.3.2 The boundaries and categories of sensitive areas, as shown on the scaled Constraints Map contained in the section entitled “Existing Conditions” of the MPD Permit Application and attached hereto as Exhibit “G,” are based on actual field data presented in The Villages Final Environmental Impact Statement (“EIS”) dated December 2009. The City and Master Developer both agree to the boundaries set forth in the Constraints Map, attached hereto as Exhibit “G”. (The full size version of the Constraints Map shall be kept on file with the City.) Sensitive areas may be modified from those shown on Exhibit “G” only as allowed by and in compliance with the City’s Sensitive Areas Ordinance (SAO). See Section 8.0, Sensitive Area Standards for additional discussion of sensitive areas. A copy of the SAO is contained in Exhibit “E”.

The Development Agreement acknowledges that “surface water and groundwater quality and quantities” must be maintained “consistent with the requirements of the Department of Ecology’s 2005 Stormwater Manual (“2005 DOE Manual”) for Western Washington. It should additionally be noted that the reference is to the entire manual, not the manual with deleted sections that was adopted by the City prior the approval of the Development Agreement:

7.4.3 Stormwater Management

The Master Developer shall comply with the stormwater management provisions provided below. In the event of a conflict between these provisions and the Stormwater Management Design Standards set forth in Section 7.4.4 of this Agreement, the Stormwater Management Design Standards shall prevail.

- A. Minimize impacts to water quality in Lake Sawyer by assuring no net increase in phosphorus to Lake Sawyer occurs associated with MPD development within basins that drain to Lake Sawyer. No net increase can be accomplished by on-site or off-site source or mechanical controls, control of phosphorus from off-site compensating projects, or other methods approved by the Designated Official.
- B. Pursuant to BDMC 14.04.020 (Exhibit "E"), maintain surface water and groundwater quality and quantities consistent with the requirements of the Department of Ecology's 2005 Stormwater Manual ("2005 DOE Manual") for Western Washington.

DATE: December 19, 2014

TO: Kristen Bryant, William Bryant, and Karen Bryant
Black Diamond, WA

RE: **Wetland E1 Buffer Issues of Concern**
Public Hearing on Yarrow Bay Plat 2C

Dear Ms, Bryant,

Per your request, I have reviewed your comments on the reduced buffer widths at the north end of Wetland E1 and concur with your statements.

Regarding the **BDMC 19.10.230** on Wetland buffers, it is true that an abandoned logging road does not constitute a human made feature that functionally and effectively separates the buffer from Wetland E1. There is no asphalt or infrastructure that stopped wildlife from using the area. It is common practice based on Best Available Science to simply remove an abandoned gravel road and restore the buffer in situations like this one. There is no reasonable explanation as to why an abandoned, non-asphalt road is being used as an excuse for reducing the buffer width.

In the Wetland Rating System for Wetlands in Western Washington, the Washington State Department of Ecology defines an Ecological Break as a human made structure with high intensity, such as dense residential areas, parks, heavily used roads, sidewalks, or driveways. The structure must have regular human use to qualify as an ecological break. These have negative impacts on habitat due to noise, light and toxic runoff. None of these are currently present in the Wetland E1 buffer.

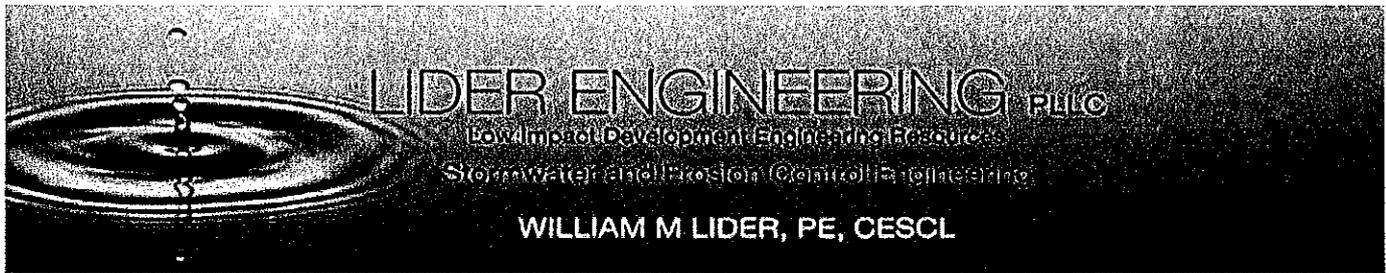
City code (BDMC 19.10.210(B)3b) states that "Category II wetlands have significant value based on their function as indicated by a rating system score of between fifty-one and sixty-nine points. They do not meet the criteria for category I rating but occur infrequently and have qualities that are difficult to replace if altered." Making the existing abandoned road into the trail that is expected to be used frequently by people and their pets not only cuts off the wetland from its buffer, it also exposes the wetland to high intensity use. Wetland E1 needs to have the entire 110-ft buffer due to the increased density of housing and the proposed trail through the buffer. In addition, the trail needs to be moved to the outer 50% of the buffer with removal of the abandoned road and restoration of the buffer along the section of removed road per BDMC 19.10.210(B)3a-e.

Respectfully,



Diane Brewster
Professional Wetland Scientist, Cert # 1721

cc: Brian Derdowski



DATE: December 17, 2014

TO: Kristen Bryant, Judith Carrier, Gil Bortleson
King County, WA

SUBJECT: Villages MPD Phase 2, Plat Hearing
Review for Rebuttal to new Exhibits

Pursuant to your request, I offer the following comments related to Exhibit 71, The Villages MPD-Preliminary Plat Phase 2 Plat C. This review was informed by additional information posted on the City of Black Diamond's website, and in particular the Road, Storm Drainage and Grading plans RS1 through RS4 in Exhibit 2:

1. The Applicant's responses and attachments in Exhibit 71 still fail to demonstrate that the proposed plat will be able to maintain the wetland hydroperiod

Golder references Section 1.5.4 Volume I of the SWMMWW, 2012 but fails to note that that document also describes how it is extremely difficult, if not impossible, to divert stormwater and not disrupt a wetland's hydroperiod. The proposal to divert stormwater away from the wetland complex is apparently intended to reduce phosphorous loads to Lake Sawyer, but by doing so makes it nearly impossible in my opinion to not disrupt the wetlands hydroperiod. The proposal to infiltrate stormwater that is not diverted is beneficial to the wetland, but there is no documentation in the record that describes the volume and timing of flows to be infiltrated. By approving the plat without determining whether the proposed infiltration areas are sufficient to handle accurately predicted runoff, we may preclude the ability to employ other surface water management facilities. My review of the plat configuration indicates that to install LID treatments for infiltration, lot sizes must be increased in area.

The plat's lot sizes appear to be extremely small in the 3,600 to 4,600 square foot range with a few lots slightly exceeding 5,000 square feet. There is no data on the percent lot coverage, but given the proposed lot sizes the percent coverage could exceed 80% of impervious surfaces including roofs and driveways or nearly impervious surfaces such as lawn areas. In order to maintain the Wetland E-1 hydroperiod, it necessary to infiltrate stormwater from the development along the entire perimeter that borders the wetland. Larger lot sizes would allow for more LID features such as engineered Bioinfiltration facilities with native plantings between houses to permit infiltration necessary to maintain the wetland hydroperiod along the entire development.

2. Golder's defense of the applied methodology also overlooks the fact that Threshold Discharge Areas (TDA's) are not called out on the drawings nor is their size in acres noted on the drawings. The natural discharge areas are not called out for each TDA. Without an accurate determination of TDA's and their surface makeup, an accurate modeling of the stormwater flow cannot be accomplished nor can it be shown that the proposed stormwater flow control and water quality measures are adequate to protect the wetlands. Again the

Applicant's response in Exhibit 71 fails to demonstrate that the proposed plat will be able to maintain the wetland hydroperiod.

It is my opinion that the WWHM analysis required by the SWMMWW, 2005 has not been accomplished, and that if its provisions are not applied there will be substantial impact to the wetland from the proposed stormwater diversions. It is my understanding that the City did not adopt Volume 1, Chapter 2 of the SWMMWW, titled "Minimum Requirements for New Development and Redevelopment" was not adopted; rather Appendix 1 of the NPDES Phase II Municipal Stormwater Permit, titled "Minimum Technical Requirements for New Development and Redevelopment" was adopted in lieu of Volume 1, Chapter 2. Nonetheless, Guide Sheet 2 of Appendix 1-D of the SWMMWW 2005 states that WWHM is the preferred method to determine hydroperiod. Furthermore, the BDMC, MDP permit approval, DA, and SEPA review all make reference to the application of the SWMMWW, 2005 without reference to the deletion of the critical chapter whose requirements are necessary to meet the various adopted performance standards related to protection of the function and values of wetlands.

The technical reports attached to the Applicant's response to comments (Exhibit 71) and the comments made by the Applicant to Exhibit 6 (1,1), Exhibit 7 (2), Exhibit 10 (7 on page 7; 2,3,4,5 on pages 12-14; 2,3 on pages 14; Exhibit 51 (4 on page 20 and 8,9,10 and 3 on page 24 are all intended to defend the proposal's methodology, design and adequacy. My response to those comments is inextricably linked to the many inadequacies that my review of the proposal and its supporting documents has identified:

3. There appears to be only one stormwater pond shown in Plat C, at Tract 917. There are no details provided for these ponds and it is unclear if they are intended to be water quality treatment, flow control, or both. The contributory area to these ponds is unknown. There are no calculations supporting the pond layout on the plat map to determine whether or not the allotted size for Tract 917 is adequate. This could result in a significant revision to the approved plat drawing should a future revision be required. Exhibit 71, page 7 of 112, Response 7 indeed does not provide a meaningful review of the impacts as the stormwater management has not been properly analyzed. The city cannot sign off on the plat if it cannot analyze the impacts.
4. No tracts or other locations are called out for rain gardens. Rain gardens should be engineered biofiltration facilities using WWHM methods to show that they are adequately sized to accommodate and treat their anticipated stormwater flows and where their 100-year storm overflows will be diverted. Again Exhibit 71, page 7 of 112, Response 7 indeed does not provide a meaningful review of the SEPA impacts as the stormwater management has not been properly analyzed.
5. Stormwater sheet flows into wetland E-1 along the entire west perimeter of the proposed Plat C development. However, there are only two discharge points from the Phase 2, Plat C development to wetland E-1 at Tracts 923 and 924. Although flow spreaders are proposed at these two locations, the flow into the wetland will not be adequately dispersed. Flow spreaders function to uniformly spread flows across the inflow portion of small water quality facilities (e.g., sand filter, biofiltration swale, or filter strip) or for energy dissipation to prevent erosion at outfall pipes. Flow spreaders tend to concentrate stormwater very close

to outfall location and will not adequately disperse stormwater along the entire wetland perimeter. This will result in a detrimental concentration of water at two locations in wetland E-1 and a drying out effect in other areas wetland E-1. This impact has not been properly analyzed and is not addressed by the Exhibit 71 responses to comments.

6. As previously stated, the wetland hydroperiods have not been determined using the approved continuous simulation model such as the Western Washington Hydraulic Model (WWHM), version 2012. The Applicant has failed to determine wetland hydroperiods or to show that proposed off site diversion of stormwater will not adversely affect the wetlands adjacent to Plat C. Even using WWHM it is extremely difficult to maintain a wetland's natural hydroperiod. Therefore TDA basin diversions such as is proposed here should be prohibited. These SEPA impacts are not addressed by the Exhibit 71 responses.
7. Calculations have not been provided to show that conveyance piping to the offsite water quality/flow control ponds are adequately sized to accommodate the 100 year flow from Plat C or how they will be routed from Plat C to its point of compliance. In adequately sized conveyance piping could result in downstream flooding and this impact has not been addressed by the Applicant or in the Exhibit 71 responses.
8. WWHM calculations have not been provided as required by the City of Black Diamond's Municipal Code to show that the proposed offsite water quality/flow control pond has been adequately sized to accommodate the offsite flow from Plat C as well as other contributory areas that it must treat. This could result in the offsite water quality/flow control pond being overwhelmed and not provide adequate stormwater treatment.

Recommendations:

Prior to plat approval, the following recommendations are made:

1. For each lot state a maximum allowable cover level for:
 - Non-pollution generating impervious surfaces (NPGIS) e.g. roofs;
 - Pollution generating impervious surfaces (PGIS) e.g. driveways;
 - Non-pollution generating pervious surfaces (NPGPS) e.g. rain gardens, native vegetation;
 - Pollution generating pervious surfaces (PGPS) e.g. lawns.

This information should be included in a table format on the drawing along with similar surfaces in the public right-of-way for each TDA. On the plat map, show the location and size of all engineered biofiltration and other proposed LID stormwater facilities. It must be shown by the WWHM modeling that the small lot sizes proposed for Plat C will not harm the wetland.

2. Show all TDA's on the plat map, call out their size in acres, and note the types of coverage outlined in recommendation 1 above.
3. Based on the types of coverages determined in recommendation 2 above, provide WWHM calculations showing that stormwater pond at Tract 917 is adequately sized to

accommodate stormwater flow control and water quality treatment per the SWMMWW, 2005, prior to plat approval.

4. Call out locations of engineered bioretention facilities and provide WWHM calculations showing that adequately sized tracks have been allocated on the plat map.
5. Provide a design showing how the pre-developed stormwater into the wetlands will be maintained along the entire wetland perimeter of the project.
6. Provide WWHM calculations showing that the wetland hydroperiods will be maintained.
7. Provide drawings showing the how water will be routed to the proposed off site water quality/flow control pond and that the piping is adequately sized to convey 100-year plus storm events.
8. Provide WWHM calculations showing that the proposed off site water quality/flow control pond is adequately sized to treat its current stormwater obligation as well as the additional Plat C flow.

Thank you for your consideration of these comments and recommendations.

Respectfully submitted,
LIDER ENGINEERING, PLLC



December 17, 2014

William M. Lider, PE, CESCL
Principal Engineer

cc: Brian Derdowski

DATE: December 19, 2014

TO: Kristen Bryant, William Bryant, and Karen Bryant
Black Diamond, WA

RE: **Wetland Hydrology and Stormwater Design Issues of Concern
Public Hearing on Yarrow Bay Plat 2C**

Dear Ms, Bryant,

Per your request, I have reviewed documents pertaining to The Villages MPD Phase 2, Plat 2C hearing. I submit the following comments:

Introduction

As the basis for my review of documents, I used the following recommendation and agreement:

Preliminary Plat Report for The Villages Preliminary Plat – Phase 2C, PLN 13-0027 (dated November 25, 2014), Section IV-Recommended Conditions of Approval prepared by Black Diamond City staff states, “**Stormwater design for Plat 2C plat must not modify the pre-development hydrology for the adjacent receiving waters**” (Item 8, page 183). While no direct definition of “receiving waters” was found in the Black Diamond municipal code (BDMC), BDMC 14.04.005 provides the following definition: “Black Diamond Waterway means lake, wetland, creek, stream, and secondary channels leading to these water features.” Thus, the term receiving waters is assumed to include wetlands.

The Villages **Development Agreement (DA)**, section 7.4.3, state that **the hydrology of the wetlands within and bordering the preliminary plat site will be maintained.**

Volume 1, Chapter 1 in the Washington State Department of Ecology’s 2005 edition Stormwater Manual for Western Washington (SWMMWW) encourages local government to create basin plans in which stormwater management measures protect sensitive resources, such as wetlands, within a basin or sub-basin (pp 1-12 through 1-24). It specifically states that as land is logged and cleared for the addition of impervious surfaces, lawns and landscaped areas the hydrology of these area is also changed. Runoff is increased, there is decreased time for runoff to reach the natural receiving waters, runoff peaks are higher, there is reduced groundwater recharge, and there is increased frequency and duration of high stream flows and wetland inundation during and after rain events, along with reduced stream flows and wetland water levels during the dry season. These changes in hydroperiods severely impacts biological communities in wetlands and; thus, the wetlands’ functional performance for water quality improvement, flood attenuation, and wildlife habitat. BDMC 19.10.010(A) and (B) specifically states the purpose of the Sensitive Areas chapter of the code is, “To designate and classify sensitive areas and their ecosystems and to protect these areas and their functions and values using the best available science....” and “To limit development and alteration of sensitive areas to achieve the goal of no net loss of sensitive areas or their functions and values.”

It was noted that in Exhibit 71 there is some confusion over whether Chapter 2 of Volume 1 of the 2005 SWMMWW is adopted for The Villages development. However, whether that chapter applies is not germane to this testimony. However, to avoid confusion, this subject is addressed in a separate section at the end of this document.

Water velocity, water quality, and hydroperiod control (that is, the depth, duration, frequency and pattern of wetland inundation) are issues in maintaining the health of wetlands when the stormwater drainage in the upstream watershed changes (USEPA 1993). Increased water velocity can result in a decrease in infiltration of stormwater to groundwater and less attenuation of stormwater entering the wetlands. Changes in average water levels or duration or frequency of flooding may alter vegetation and may change the way in which a wetland stores or transforms pollutants (Azous et.al 1997; Horner et.al. 1997; and Minore 1968).

Wetland Hydroperiod Stability

In order to determine whether the stormwater design modifies pre-development hydrology of adjacent wetlands, a wetland hydrology study is necessary to establish pre-construction hydroperiod conditions. Without knowing the existing floodwater depth, duration and frequency of occurrences; it is unlikely that a stormwater plan can be designed that will not modify existing wetland conditions. **A baseline wetland hydrology study would need to be done for at least one year** during a year where precipitation falls within the 30-year norm, in accordance the Guidelines in Appendix 1-D of the SWMMWW.

A review of documentation for the plat did not find a hydrology study of the wetlands that will receive stormwater runoff from the completed project. The only document addressing a portion of site specific sensitive area hydrology is the *2012-2013 Pre-construction Stormwater Monitoring in Rock Creek to Establish Baseline Phosphorus Load* by Tetra Tech (dated November 2013 and revised January 2014). This is a water quality report and not a stormwater report. The Rock Creek flow and depth data included was needed to obtain accurate phosphorus readings rather than to conduct a formal evaluation of creek hydrology. Also reviewed was, Figure 7 – Site and Exploration Map in Exh. 71 (p. 79) that shows all the monitoring wells, piezometers, exploration pits, infiltration/drain test sites, and staff gauges installed by AESI. It also shows exploratory borings/monitoring wells and exploration/test pits by others. The figure clearly shows that AESI conducted no hydrology monitoring in Plat 2c because there were no wells, piezometers, gauges or any other test sites by AESI in the entirety of Plat 2c. The figure shows only three test pits by others in the northern area of Wetland E1. While the test pits are given no specific designation, it is assumed that these are wetland data plots that provide only a one-time snapshot of hydrologic conditions taken within a 15- to 30 minute period during the wetland delineation. These test pits have no bearing whatsoever in determination of the soils infiltration capacity. No other documentation presenting specific onsite hydrology monitoring data has been found. Industry standards would require that this monitoring be done prior to preliminary plat approval, and if it were done it would be posted with the other exhibits and reviews on the city web site. None of the city review letters reference the necessary monitoring study. Thus, it appears there has been no site-specific wetland hydrology study or evaluation completed to determine baseline wetland hydroperiods.

The Puget Sound Wetlands Research Program (PSWRP) prepared a report as a principal vehicle for stormwater planning and management practice involving discharges to wetlands; including comprehensive planning research that covers evaluation of current and built-out watershed conditions to assist in evaluating cumulative impacts to the adjacent wetlands in the watershed. The report

documents comprehensive research that can be used to protect wetland resources in urban and urbanizing areas, while also benefiting the management of urban stormwater runoff. Chapter 14 in the *Wetlands and Urbanization: Implications for the Future – Final Report of the Puget Sound Wetlands and Stormwater Management Research Program* (Azous and Horner 1997) provides preliminary management guide sheets to evaluate baseline wetland hydroperiods and forecast future wetland hydroperiods using several methods. This element of the guide sheets is invaluable for wetlands that rarely fit the topographic parameters necessary for typical engineering programs. The PSWRP methodology was used successfully by the Green River Community College to obtain local and federal permits for their Woodland Detention System.

Post-construction wetland hydrology monitoring is a necessary element so that post-construction conditions can be evaluation against the baseline hydroperiod data. This is the only way to ensure that Item 8 in the Recommended Conditions of Approval in the Staff Report and the requirement of Villages Development Agreement section 7.4.3 are met.

Stormwater Design

These comments address the stormwater plan in relation to protecting the wetland hydrology. There are numerous documents that state onsite wetland hydrology will be maintained by placing dispersion trenches for outfall of roof and driveway runoff; with no mention of flow control measures. Plat drawings do not show the location or size of the dispersion trenches. The “stormwater mitigation plan” presented in The *Preliminary Drainage Analysis for Preliminary Plat Phase 2 – Plat C* by Triad Associates (dated November 8, 2013) in Exh. 20 states that at least 12 trenches will be provided for the basin draining to Wetland TOS and at least 10 trenches will be provided for the basin draining to Wetland E1. However, there is no site-specific evaluation for how much runoff is needed to ensure that wetlands receive adequate hydrologic inputs along the entire perimeter of the wetland.

Triad’s *Preliminary Drainage Analysis for Preliminary Plat Phase 2 – Plat C* (Exh. 20) states that:

“Runoff from roof tops will be routed to Wetland TOS and Wetland E1 to approximately match the annual average volume of runoff that is generated by the existing forested site condition.” (p. 6).

“For the purposes of wetland hydrology calculations, average annual rainfall along with runoff, evapotranspiration and recharge volumes from various land coverage types were taken from Appendix D of the FEIS the Environmental Impact Statement Technical Report on Geology, Soils, and Groundwater for The Villages dated September 26, 2008, prepared by Associated Earth Sciences, Inc.” (p. 6).

“The average annual volume to the wetlands is assumed to consist of runoff from the existing till forest to be developed. Recharge from the till forest areas are assumed to reach the lower aquifer and not the wetland and are therefore not included in the wetland recharge calculation” (p. 7)

The assumption that an approximation of rainfall and runoff will ensure that wetland hydroperiods will not be modified is false. Maintaining wetland hydrology requires more detailed monitoring and evaluation than simply diverting roof and driveway runoff into the wetlands. Golder Associates’ response to a comment regarding the flawed drainage analysis (Exh. 28f) states, “It is our opinion that the methodology used by Triad maintains the hydrologic conditions of discharges to the wetlands....Therefore, we believe no substantial impact to wetland hydrology is demonstrated by Triad’s preliminary drainage analysis” (p1-2). This statement confuses the requirement to maintain wetland hydrology vs. maintaining existing runoff volumes in the plat. They are not the same thing.

Triad's evaluation ignores groundwater flow, a significant source of wetland hydrology. Groundwater movement after construction will be highly disrupted through addition of impervious surfaces, compaction of lawn and landscaping areas, and filling of microtopography and swales to create roads and residential lots. Triad's evaluation needs to include groundwater volume in addition to runoff volume in order to maintain wetland hydrology.

Calculations for the volume and timing of runoff distribution to the wetland are dependent on understanding the hydroperiod of each wetland. Instead, Triad's evaluation is based on a broad brush approach that uses general information that has not yet been field verified or refined for this particular Plat. Using this information for their evaluation provides a large picture view of groundwater and surface water flows across a sub-basin, but does not provide results specific to the hydroperiod of each wetland. Triad's one-size fits all evaluation is based on an erroneous assumption that all the wetlands have the same hydrology when in reality, wetlands in close proximity to each other can have very different hydroperiods. The model used and assumptions made are not Best Available Science and in fact are completely discredited and go against well-established industry-standards.

Site specific monitoring is necessary to meet the requirements in the DA and Recommended Conditions of Approval. Without hydrologic study for each wetland it is highly likely the onsite wetlands' hydroperiods will change; with a portion of each wetland experiencing greater flood peaks with more flood events of longer duration. While another portion of the wetlands would receive less water. Over the long term, both conditions will result in a degradation of the wetlands; and thus, a reduced functional performance for water quality improvement and stormwater attenuation. Plat drawing PP5 shows two elongated wetlands and four small wetlands. Wetlands that are near each other can have very distinct hydroperiods. A study is needed for each separate wetland in which hydrologic inputs will be changed by development of adjacent lands.

Recommendations Conditions for Denial to be met prior to Re-Application

The basin plan for the Villages is remanded back to the applicant and revised to show how downstream receiving waters such as wetlands, streams and lakes will be protected on a watershed level rather than on a piecemeal basis.

The applicant be required to complete at least one-year wetland hydrology study to establish baseline hydroperiods for each affected wetland (according to the 2005 SWMMWW Appendix I-D). Even wetlands that are near each other can have very distinct hydroperiods. A study is needed for each separate wetland in which hydrologic inputs will be changed by the development of adjacent lands.

Based on the one-year wetland monitoring, the applicant shall prepare a computer simulation using Western Washington Hydraulic Model (WWHM) software to help predict impacts to the wetland hydroperiod after project development.

The Applicant be required to prepare a post-construction Wetland Hydrology Monitoring Plan to be conducted annually in order to 1) verify whether the stormwater design and WWHM modeling has modified wetland hydroperiods, and 2) to allow for a vehicle to evaluate the need for contingency actions to alleviate adverse effects on wetland hydrology; and 3) prepare a detailed action plan should wetland hydrology not meet the WWHM model.

References

Azous, Amanda L. & R. Horner; eds. 1997. *Wetlands and Urbanization: Implications for the Future – Final Report of the Puget Sound Wetlands and Stormwater Management Research Program*. In

association with the Washington State Department of Ecology, King County Water and Land Resources Division, and the University of Washington. Access on December 18, 2014 at URL: <http://your.kingcounty.gov/dnrp/library/archive-documents/wlr/wetlands-urbanization-report/wet-rept.pdf>

Horner, R.R., A.L. Azous, K.O. Richter, S.S. Cooke, L.E. Reinelt, and K. Ewing. 1997. *Wetlands and Stormwater Management Guidelines*. In: Final Report of the Puget Sound Wetlands and Stormwater Management Program. Department of Ecology, Olympia Washington.

Minore, D. 1968. *Effects of Artificial Flooding on Seedlings Survival and Growth of Six Northwestern Tree Species*. USDA Forest Service Reserve, PNW-92. PNW Forest and Range Experimental Station, 12 pp.

U.S. Environmental Protection Agency (USEPA). 1993. *Natural Wetlands and Urban Stormwater: Potential Impacts and Management*. Office of Wetlands, Oceans and Watersheds, Wetlands Division, Washington, D.C

Thank you for your consideration of these comments.

Respectfully,



Diane Brewster
Professional Wetland Scientist, Cert # 1721

cc: Brian Derdowski

Tracey Redd

From: Kristen Bryant <kristenbry@gmail.com>
Sent: Friday, December 19, 2014 8:04 PM
To: Phil Olbrechts; MDRT User
Subject: Re: Black Diamond Plat 2C Wetlands Testimony
Attachments: Firm Description_DB.doc; Diane Brewster resume.pdf; Wtld E1 Buffer Comment 2_TES_12-19-14.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Mr. Olbrechts,

In our earlier submittal, I thought the report Wtld E1 Buffer Comment contained several issues that we asked Ms. Brewster to review and I submitted a doc that I thought was the final version she sent me. However, I misunderstood, and she had actually put her Wetland Buffer comments into 2 files. I should have sent an additional one. So, the file "Wtld E1 Buffer Comment 2" is attached and is in addition to the documents sent earlier so that you have all the wetland expert testimony.

Diane's resume and Firm Description are also attached so that you have her qualifications.

Thank you,
Kristen Bryant and William and Karen Bryant

On Fri, Dec 19, 2014 at 4:58 PM, Kristen Bryant <kristenbry@gmail.com> wrote:
Attention Mr. Phil Olbrechts,
City of Black Diamond Hearing Examiner
Re: Plat 2C Plat Hearing Schedule
Cc: City of Black Diamond MDRT for distribution to parties
Dear Mr. Olbrechts:

With this email with expert testimony requested by myself, and William and Karen Bryant of Black Diamond regarding wetlands on the above referenced Plat.

Attached are four documents:

- Two Reports prepared by Ms Diane Brewster.
- A Report prepared by Mr. Bill Lider. This report was submitted earlier, but much of it is directly related to the wetlands issue and helped inform Ms Brewster's report.
- A summary of the Black Diamond Municipal Code and Development Agreement provisions that support this Wetland testimony and recommendations.

Thank you for your consideration,
Kristen Bryant and William and Karen Bryant

FIRM DESCRIPTION

Touchstone EcoServices is a specialty firm, owned by Diane Brewster, a certified Professional Wetland Scientist (PWS #1721). Established in 2006, TES focuses on environmental services, including wetlands and riparian ecosystems, environmental documentation, and permitting assistance. As a certified Professional Wetland Scientist, Ms. Brewster's work is well respected by regulatory agency staff. She has demonstrated expertise in wetland delineation and functional performance assessment, report writing, developing cost-effective wetland and riparian mitigation plans, mitigation installation supervision and monitoring, and agency negotiation.

Ms. Brewster began her career as wetland ecologist working with Pierce and Thurston Counties in 1986 to complete their county-wide wetland inventories as required by the Washington State Department of Ecology. Her skill has been gained through roles as project manager or lead biologist where wetlands are present in support of road, residential, commercial and industrial, parks and wetland mitigation banking projects. She has worked in both the private and public sectors in 10 counties throughout Washington; primarily within the Puget Sound Basin.

Since its inception in 2006, TES has supplied a full range of wetland and riparian services to a broad cross-section of clients, including government agencies, commercial firms, developers and non-profit groups. Currently, TES is providing wetland services for the Port of Port Townsend, the City of Shoreline, and Green River Community College. Diane's senior level expertise, commitment to delivering professional and thorough work, and familiarity with project issues is exemplified in her long-term relationships with her clients.

TES' small size and location in Shoreline allows her to provide clients with direct access to her expertise in natural resource consulting at lower overhead cost. With extensive experience throughout the Puget Sound Region, Ms. Brewster has developed a strong network of independent contractors and firms that can contribute drafting, geotechnical, biological, planning and surveying assistance on large projects.

Diane founded Touchstone EcoServices to provide specific services including:

- Wetland and riparian habitat reconnaissance
- Wetland delineation and functional performance assessment
- Mitigation design, installation supervision and monitoring for wetlands and riparian areas
- Critical area reports
- Mitigation installation supervision and monitoring
- Design support through recommendations to avoid and minimize sensitive area impacts
- Peer review of wetland delineation and mitigation reports
- Environmental Documentation including Joint Aquatic Resource Permit Application (JARPA) for State and Federal permits, State Environmental Protection Act (SEPA) checklist, supporting documentation for SEPA and NEPA documents, and Mitigation Banking Instrument documents
- Permitting assistance and preparing permit submittals for local critical area regulations, state administrative rules, and federal Clean Water Act Section 404
- Vegetation management plans (for long-term native habitat restoration and exotic/invasive species control).
- Vegetation and habitat mapping

Relevant Experience

Second Party Review; Various Cities, Washington. Conducted peer review of development submittals for local jurisdictions. Reviews were completed for wetlands, shoreline management zones, geologic hazard areas, and fish and wildlife conservation areas associated with single-family and commercial developments and the 150-acre Talus urban village in Issaquah and residential development in the Cities of Edmonds, Issaquah, Seattle and Duvall. Work included conducting site visits and preparing reports to assist city staff during their review of critical area report submittals. Also provided technical guidance at meetings with city staff, developers and their consultants, and at review board meetings and hearings.

NE 116th Street Road Improvements. Redmond, Washington. Reviewed previous wetland delineation report and was hired to delineate additional wetlands. Conducted and managed wetland delineation, stream survey, and urban wildlife habitat assessment. Co-authored the Sensitive Areas Study report of sensitive area findings and presented options for compensatory mitigation within the project vicinity. Prepared an updated programmatic SEPA checklist.

Shoreline Community College Master Plan Update. Shoreline, Washington. Conducted an 83-acre campus-wide inventory of habitat types, wetlands, streams and fish and wildlife habitat conservation areas. Prepared a report documenting existing conditions for wetlands, streams, wildlife habitat and use; a description of regulatory implications for the proposed master plan; and potential mitigation options for unavoidable impacts to critical areas.

Blue Heron Slough Conservation Bank, Wetland Delineation and Functional Assessment. Snohomish County, Washington. Conducted wetland delineation on the 365-acre agricultural Biringner Farm site as part of a joint mitigation bank venture by the Port of Everett and Wildlands, Inc. Managed a team of biologists, delineated 44 wetlands, surveyed wetland flagging using global satellite positioning; prepared a map of wetland boundaries, and conducted the Washington State Wetland Function Assessment Methodology. Prepared the wetland delineation and functional assessment reports. Provided technical support during the U.S. Army Corps of Engineers field verification of wetlands, technical assistance regarding wetlands permitting requirements; and wrote portions of the banking application prospectus relating to existing conditions and proposed functional lift. Provided installation supervision for onsite riparian habitat plantings and currently provides technical guidance for invasive species control.

Nookachamps Wetland Mitigation Bank, Skagit County, Washington. Provided technical assistance and wrote portions of the Mitigation Banking Instrument and supporting documentation for this 260-acre agricultural site. Provided technical review for and updated existing documentation for site habitat conditions, mitigation objectives and performance standards, invasive plant species control, functional lift, and the 10-year monitoring plan. Mapped invasive species throughout the site using GPS and provided documentation for manual and chemical control methods specific to each species. Documented volunteer recruitment of native species. Provided supervision during site preparation in the northeastern 90-acres of the site. Assisted in the design and installation of experimental planting stations to determine survival of various native trees and shrubs and maintenance requirements for plantings.

Hylebos Creek Estuary Habitat Restoration Project, Tacoma, Washington. Prepared a reconnaissance wetland report for the west end of the project, reviewed the proposed planting list, and assisted with soil testing. Prepared an ecological functional lift evaluation documenting the changes to restored wetland and upland habitat due to returning fragmented freshwater habitats to one consolidated brackish intertidal system. Using the quantitative scores from the revised Washington State Wetlands Rating System for Western Washington, compared the improvements in higher productivity in the food chain, increased water quality, greater floodwater storage, and improved wildlife habitat. Provided supervision during intertidal and upland planting and is currently providing monitoring.

Auburn Environmental Park. Auburn, Washington. Managed and conducted wetland delineation, wetland and upland habitat type mapping, and functional performance evaluation of all onsite habitat types at

this approximately 100-acre natural city park. Prepared a report documenting site findings and identified wetland mitigation options. Assisted the City during preliminary project phases in identifying park design options and provided guidance regarding permitting implications for design alternatives at Technical Advisory Committee meetings. Provided permitting and other wetland information during Master Plan development.

Mill Pond Wetland Delineation. Pend Oreille County, Washington. Diane managed and conducted wetland delineation at an approximately 82-acre site compassing a pond, river, and mountainous terrain for Mill Pond dam removal and Lower Sullivan Creek restoration project being done under an Interlocal Agreement with Seattle City Light and Pend Oreille County PUD. Along with her team, Diane delineated twenty-eight jurisdictional palustrine, lacustrine and riverine wetlands and prepared a delineation report.

Richmond Beach Saltwater Park. Shoreline, Washington. The City has adopted a Master Plan for the 42-acre Saltwater Park including an improved and expanded trail and viewpoint system, improved parking and picnic areas, ADA access to the pedestrian bridge over the BNSF railroad tracks, and native habitat restoration. Diane conducted wetland delineation and a plant and habitat survey, prepared a habitat and vegetation map for the entire park, and provided recommendations for habitat restoration opportunities and invasive species control using non-chemical methods. She has co-authored a Vegetation Management Plan focused on a long-term native habitat restoration plan geared toward using community volunteers. She worked closely with the design team on the park infrastructure improvement design relating to critical area permitting at the local, state and federal levels, and prepared the wetland buffer mitigation plan. She conducted installation supervision of the mitigation and is currently providing annual monitoring and preparing annual reports.

SEPA EIS Support for the Shaw Road E./Military Rd. E./122nd Avenue E. Corridor Alignment Study, Pierce County, Washington. Worked in coordination with the county Public Works department and project engineers to prepare sections of the draft and final EIS for this approximately 4-mile road improvement project. Sensitive areas within the 90-foot improvement footprint were identified using public domain resources and then field verified. Prepared a technical memorandum as background documentation for existing conditions and wetland regulatory issues. Also prepared a conceptual mitigation option to compensate for wetlands and buffer impacts. Prepared the surface water, plants, and animal sections of the EIS for this project. In addition, technical information was presented at a public open house on wetland issues relevant to project alternatives.

Port of Port Townsend, Airport Master Plan Update and Airport Improvements; Jefferson County, Washington. Verified a previous wetland study and delineation of additional land holdings on approximately 200 acres. As part of the master plan development, prepared a report on wetland conditions, newly delineated wetlands, jurisdictional requirements, and recommended design revisions to minimize the need for mitigation. Presented information at public meetings on critical area impacts, permitting requirements, and FAA land use restrictions for four development alternatives. Wetland boundaries associated with proposed development have been verified and approved by the U. S. Army Corps of Engineers. During a later phase in which the Port procured an FAA grant for hangar, taxiway and stormwater detention development, Diane provided natural environment conditions and impact assessment text for the NEPA documentation. Because the project had no adverse impacts on critical areas, stormwater quality and quantity, and species listed under the Endangered Species Act, a categorical exclusion was obtained. She prepared the wetland mitigation plan for this project, completed JARPA submittal and obtained Corps authorization for wetland impacts and mitigation. She is currently assisting the Port with mitigation installation and monitoring.

Jefferson Transit Authority Maintenance Facility Site Selection; Jefferson County, Washington. Managed and conducted reconnaissance level wetland studies on five 10-acre sites to determine a suitable site for the Jefferson Transit Authority (JTA) maintenance facility. Identified and evaluated wetlands and streams in forested, shrub, and meadow habitat. Prepared a report describing each site, regulatory constraints, and mapping showing wetland boundaries, classification, and buffers. Presented information regarding wetlands, streams, and regulatory issues at several JTA Board meetings to assist the Board with final site selection.

Diane Brewster
Professional Wetland Scientist

Expertise:

- Wetland, stream and riparian reconnaissance and delineation
- Wetland functional performance assessment
- Critical area reports
- Mitigation design (creation, restoration, enhancement, design) and monitoring plans for wetlands and riparian areas
- Mitigation installation supervision and monitoring
- Environmental Documentation including Joint Aquatic Resource Permit Application (JARPA), State Environmental Protect Act (SEPA) checklist and EIS, and National Environmental Protection Act (NEPA) environmental assessment checklist.
- Permitting assistance with local critical area regulations, state administrative rules, and the federal Clean Water Act Section 404
- Native habitat restoration and exotic/invasive species control

Work History:

Senior Wetland Scientist

Sole Proprietor, Touchstone EcoServices, 2006 - present

Provide services for public agency, residential, industrial, and mitigation banking properties. Responsible for critical area feasibility studies, wetland delineations, second-party verification of wetland delineations functional evaluations; and critical area mitigation designs (including mitigation installation specifications) and monitoring plans. Provide critical area impact analysis and advise clients regarding permitting implications for development projects. Presentations at public meetings and provide technical guidance and information at planning meetings with agencies. Provide critical area permitting assistance and coordinates environmental documentation between planners and engineers for State Environmental Policy Act (SEPA) and Joint Aquatic Resource Permit Application (JARPA) documentation. During construction, provide vegetation installation coordination, contractor supervision; and long-term monitoring of mitigation projects.

Senior Wetland Ecologist

Landau Associates, Inc. 2002 – 2006

Responsible for critical area site creation, restoration and enhancement designs; feasibility studies; wetland delineations and functional evaluations; second-party verification of wetland delineations. Wrote delineation reports; mitigation plans for wetlands and riparian corridors, and monitoring reports. Provided mitigation installation supervision, monitored mitigation projects, critical area impact analysis, advised clients regarding permitting implications for development projects. Designed project approach, managed staff on large natural resources projects and conducted habitat and vegetation mapping, and bird surveys. Presentations at public meetings. Critical area permitting assistance and coordinated environmental documentation between planners, engineers, and biologists for NEPA/SEPA checklists and the natural environment sections of SEPA EIS and NEPA documentation. Addressed federal, state, and local permit rules and coordinated JARPA documentation.

Senior Wetland Biologist

Cooke Scientific Services 1998 – 2002

Responsible for wetland delineation and reports, wetland functional assessments, wetland mitigation plans and reports, wetland mitigation installation supervision, mitigation monitoring and monitoring reports. Wrote Habitat Management Plans and Biological Evaluations/Assessments and provided assistance with regulatory and permitting requirements. Conducted second-party review of wetland delineations and mitigation plans. Presented information at public meetings.

Wetland Biologist

Pentec Environmental 1994 – 1995

Responsible for wetland delineation and reports, wetland functional assessments. Assisted with wetland mitigation design, wetland mitigation reports, wetland sections for SEPA documentation. Conducted vegetative mapping.

Wetland Biologist

Sheldon and Associates, Inc. 1990

Responsible for wetland delineation, wetland functional assessments, wetland delineation reports.

Wetland Biologist

David Evans and Associates, Inc. 1989 – 1990

Responsible for wetland delineation, wetland reports, wetland site feasibility studies, wetland sections for Environmental Checklists and Environmental Impact Statements. Designed conceptual wetland mitigation alternatives, provided wetland permitting assistance, managed and conducted wetland inventories for portions of Kitsap, Jefferson, and Mason Counties, designed plans for project-specific water quality improvement involving wetlands. Conducted second party review of wetland delineations for local jurisdictions.

Wetland Biologist

Shapiro and Associates, Inc. 1987-1989

Responsible for wetland delineations and reports, co-designed wetland mitigation plans, prepared wetland portions for environmental impact statements, co-designed Habitat Management Plan for the Snohomish River estuary. Conducted waterfowl and endangered species surveys.

Wetland Biologist

Pierce County Planning and Development 1987

Responsible for planning, conducting and managing the Pierce County wetland inventory under a grant from the Washington State Department of Ecology. Designed a field methodology to assess location and functions of wetlands. Trained and supervised four field teams. Provided technical assistance to County planners regarding wetland functions and regulatory requirements. Co-wrote a Wetlands Management Study to provide technical information about wetlands and introduce management options for the County.

Wetland Biologist

Thurston Regional Planning Council 1986-1987

Responsible for completing a field study of wetlands in northern Thurston County to verify the accuracy of existing County wetland maps under a grant from the Washington State Department of Ecology. Wrote two technical critical area reports to introduce wetland management options to the County, including The Functions, Values, and Urban Trends of Wetlands and Stream Corridors and Buffer Zone Delineations for Wetlands and Stream Corridors.

Select Projects:

Green River Community College Wetland Stormwater Storage, Auburn, Washington. Lead wetland biologist for this 'out of the box' stormwater design that uses existing wetlands to detain stormwater and improve water quality. As part of a new development project, the college chose to retain native vegetation and alleviate flooding by enhancing existing wetlands along a stormwater corridor;

placing berms and weirs to alleviate flashy hydrologic conditions and detail stormwater. Updated a previous wetland delineation and provided guidance regarding state, federal, and local permitting issues; including required limits on changes to the wetland hydroperiods as specified in the Washington State Department of Ecology's 2005 Stormwater Manual. Following pre-application meetings with regulatory agencies, worked closely with project team and college staff during design and installation of the woodlands stormwater project. The design accounted for hydrologic constraints for changes to flood depth, duration, and frequency to ensure the integrity and viability of the existing wetlands were not jeopardized; while also allowing for increased water quality improvement and stormwater detention, and the long-term protection of natural resources. Wrote updated Wetland Delineation Report, Wetland Impact Analysis and Proposed Mitigation Report. Wrote the Wetland Monitoring Plan and Significant Tree Monitoring Plan that college students use to conduct long-term monitoring and Assisted with JARPA preparation. Authorization to proceed was obtained from the U.S. Army Corps of Engineers, Washington State Department of Natural Resources, Washington Department of Fish and Wildlife, the City of Auburn and the Muckleshoot Tribe. Installation of berms, weirs and wetland vegetation mitigation plan in Fall 2012. Currently assisting college interns with long-term monitoring preparing annual monitoring reports.

City of Seattle Development Submittal Review: Critical Area Code; Seattle, Washington. Diane assisted the Seattle Department of Planning and Development with review of residential development submittals; several of which were located along the North Branch of Thornton Creek and the Lake Washington shoreline. For each submittal, a site reconnaissance was conducted to verify wetland boundaries. Diane also reviewed the development submittals for compliance with the city's critical area code for wetlands, streams, steep slopes and fish and wildlife habitat conservation areas. She prepared Wetland Determination Forms, Environmentally Critical Areas (ECA) Exemption Forms and/or ECA Correction Forms for each submittal for use by the city planning staff in processing development permits.

Shoreline Community College Critical Areas Study; Shoreline, WA. Provided a reconnaissance-level evaluation of critical areas throughout the college property including the developed campus, undeveloped forests, and Boeing Creek easement. Critical areas included wetlands, streams, steep slopes, and fish and wildlife habitat conservation areas. Prepared the Critical Area Report that included figures showing the location and approximate extent of each area with a brief description of each area. Boeing Creek was evaluated for salmonid use from the college downstream to Puget Sound. Forest habitat was divided into seven separate habitat areas based on topography, aspect and plant communities. Provided a map of each area and a complete listing of native vegetation, the dominant species, and invasive species present in each area. Wildlife species of local significance were addressed in the report. Regulatory implications at the local level was discussed for each identified critical area.

Jefferson County International Airport - Eco-Industrial Park Feasibility Study; Jefferson County, WA. Conducted a wetland reconnaissance to assist in the assessment of the economic and design feasibility of developing an ecologically-friendly light industrial park on an undeveloped 24-acre parcel owned by the Port of Port Townsend. Provided a report describing wetland areas, wetland categories and buffers, and regulatory constraints at local, state and federal levels. Participated on the design team to provide guidance in design option development in order to reduce critical area permitting where possible and to minimize mitigation costs if critical area impacts were unavoidable. Prepared a cost estimate for permitting and mitigation requirements under several different design options.

Jefferson Transit Authority Maintenance Facility Site Selection; Jefferson County, WA. Managed and conducted the reconnaissance level wetland studies on 5 sites, each one approximately 10 acres, in Jefferson County to determine a suitable site for the Jefferson Transit Authority maintenance facility. Identified and evaluated wetlands and streams. Prepared a report for each site including wetland categories and buffers, and regulatory constraints. Presented information regarding

wetlands, streams, geotechnical concerns, and environmental remediation issues at several JTA Board meetings to assist the Board with final site selection.

Wetland-Related Verification and Review for the Talus Development; Issaquah, WA. Managed and conducted second-party wetland verification for this 150-acre urban village. Reviewed, commented and negotiated on numerous wetland mitigation designs associated with road alignments, a recreational trail system, and residential project designs that affected wetlands, streams, and steep slopes. Reviewed a stormwater filtration system using an existing wetland. Work was accomplished through meetings with City planners, the developer, and the project engineers and biologists, and by providing technical assistance at the City's Stream and Wetland Review Board. Second-party review provided the City with information and recommendations that allowed the development to proceed and remain in compliance with sensitive areas regulations.

Second Party Review of Sound Transit's Sensitive Area Study and Mitigation Plan, Tukwila, WA. Reviewed the Tukwila Freeway Route (TFR) Light Link Rail Sensitive Areas Study for Wetlands and Streams (2004) at the request of the City of Tukwila. This report includes a description of 17 wetlands and four streams areas within and adjacent to the proposed TFR alignment; proposed project impacts to wetlands, streams, and their buffers; and a proposed conceptual mitigation plans. Diane evaluated the TFR report based on information gathered during site visits and review of jurisdictional agency regulations, including the City, Department of Ecology, and U.S. Army Corps of Engineers, and the King County Shoreline Management Plan. She provided comments and recommendations on the compliance of the TFR report with the City's sensitive areas and shoreline overlays and the adequacy of the mitigation plan in meeting state and federal permitting requirements, identified information gaps, and provided technical comments and specific recommendations to the City to increase the successful completion of proposed mitigation actions. Comments ranged from specific requests concerning construction plans to avoid dewatering wetlands, concerns regarding indirect long-term impacts such as shading, and cumulative loss of functional performance. As a result of her recommendations, Sound Transit chose a new mitigation site that provides more beneficial improvements within the watershed for wetland functions such as water quality improvement, flood storage, organic export, and wildlife habitat; and for stream bank stabilization functions.

City-wide Sewer System Natural Resource Inventory, City of Carnation. As part of the vacuum conveyance sewer system project in Carnation, Landau Associates completed an inventory of critical environmental areas within city limits along and in the vicinity of the proposed system alignment and vacuum stations. Biologists conducted a reconnaissance-level study to identify wetlands, streams, rivers, and critical wildlife habitat using aerial photographic interpretation, review of existing public domain resources, and field verification. Overlays on aerial photographs showing the presence of wetland, river, and wildlife habitat were produced as part of the report documenting existing conditions, wetland and stream classifications and buffers, and the potential regulatory implications for development in and adjacent to these areas, including a discussion of Shoreline Management permits. This information was used to support the proposed alignment for the new city-wide vacuum sewer system and to prepare environmental permit applications.

Twin Ponds Park Shoreline, WA. Diane conducted a wetland reconnaissance at this 22-acre park as part of the permitting requirements for recreational upgrades at the park, including a soccer field and associated walkways. She prepared a letter documenting permitting requirements at the local level for wetland and stream buffer impacts. She also provided recommendations for low-cost design revisions in order to compensate for proposed buffer impacts and protect the adjacent wetland and stream from encroachment due to recreational use of the park and invasion by non-native and exotic plant species.

NE 116th Street Corridor Project, SR 202 to Avondale Road NE; Redmond, WA. Project manager for natural resources services for this approximately 2-mile road improvement project. Managed the streams and priority habitat critical area studies in the 74-acre right-of-way area, and conducted the wetland delineation. Fifteen wetlands were identified along the corridor; three were delineated and the remainder used existing wetland surveys to reduce costs to the city. Managed the team of biologists conducting the reconnaissance study on six stream reaches, salmonid use, and a wildlife habitat survey. Coordinated closely with the project engineers and City staff as design parameters changed to ensure that environmental permitting needs and mitigation requirements were minimized. Under an accelerated project schedule, reports were produced to identify, evaluate, and quantify impacts to critical areas, and discuss permitting implications. A habitat management program was created to address impacts to lost and fragmented habitat, changes in water quality, and decreases in species diversity. Prepared the conceptual mitigation plan that integrated both wetland and stream habitat through restoration of wet pastures. Prepared the SEPA checklist for this project.

Snohomish County Marine Shoreline Inventory. Managed and conducted a field inventory of the County's marine shoreline from the King County line to the Skagit County line, including the Tulalip Reservation, Hat Island and Jetty Island. Data on physical and biological marine backshore features were documented, including seeps and streams, wetlands, invasive species, bluffs, riparian habitat, and built structures such as bulkheads, shoreline armoring, pipe outlets, and docks. Data was collected by walking the shoreline or by boat and digitally entering data into a global positioning system (GPS) unit, including location and specific information for each backshore feature. This information was added to the County's GIS database and used for planning purposes.

Port of Port Townsend, Comprehensive Plan Scheme; Jefferson County, WA. As part of the Port of Port Townsend Comprehensive Scheme Update, a document that the Port will use to shape long-term development and conservation plans for the next decade, Diane was task manager for a wetland evaluation on the Kah Tai lagoon, specifically in relation to the local Shoreline Master Plan. A field reconnaissance was conducted to identify wetland habitat along the lake edge. A technical memorandum was prepared discussing the permitting implications associated with development options within the 200 ft. shoreline buffer and included recommendations regarding the type of allowable development, wetland buffers, and the typical local review process under both the shoreline plan and the local wetland code.

Green River Community College Wetland Stormwater Storage, King County, WA. Diane Brewster was the wetland biologist working with Susan Black and Associates on this 'out of the box' stormwater design. The college was exploring options to retain native vegetation and alleviate degradation of a nearby creek within a steep ravine by creating a series of detention ponds in forested wetland and upland. Diane provided guidance to her client regarding state, federal, and local permitting issues. She introduced the woodland stormwater detention concept to the Department of Ecology and Corps of Engineers, both agencies agreed that the concept was a sound and viable stormwater solution. Diane delineated the wetlands, prepared the JARPA documentation and provide technical information to the State and US Army Corps of Engineers during site visits. She initiated the hydrology study being carried out by college students to gather background data to document that project design meets the hydrologic constraints for changes in flood depth, duration, and frequency; ensuring that the integrity and viability of the forested habitats will not be jeopardized while allowing for greater stormwater detention. The JARPA is currently being reviewed by regulating agencies.

Port of Port Townsend, Airport Master Plan Update; Jefferson County, WA. Conducted wetland delineation and verification of previously delineated wetlands. Reviewed information from U.S. Army Corps of Engineers permit files and documented boundary changes on four wetlands, delineated additional wetlands on land acquired after the original wetland inventory, and evaluated wetland functional performance. Prepared wetland report documenting existing conditions; wetland categories and buffers; functional performance; regulatory implications at local, state, and federal

levels; and site design recommendations to reduce critical area impacts. Presented information at two public meetings and provided an analysis of three proposed design alternatives including impacts to onsite and downstream critical areas, permit implications, and recommendations for alternative development options and mitigation approaches for each design alternative. This information was used by the Port to prepare their Airport Master Plan Update.

Port of Port Townsend, North Hangar Project; Jefferson County, WA. Provided technical expertise as part of the north hangars and stormwater pond project under the Phase I development of the Master Plan Update. Completed under an FAA grant, Diane provided technical support and wrote select sections for the natural environment portion of the required NEPA documentation. The Port obtained a categorical exclusion for the project. Completed a wetland delineation in the vicinity of the proposed hangar project and associated stormwater pond being constructed in Phase I implementation of the airport's Master Plan. Prepared the wetland delineation report, including the wetland mitigation plan and installation specifications, including restoration of degraded wetland and creation of palustrine forested and scrub/shrub wetland habitat. Worked closely with the project engineers to ensure no impacts to adjacent existing wetlands and to prepare the wetland mitigation drawings. Assisted with obtaining authorization for wetland impacts from the U.S. Army Corps of Engineers by completing the JARPA submittal and coordinating with the Corps and Washington State Department of Ecology. Oversaw installation of mitigation area and currently conducting annual monitoring and preparing the annual monitoring report.

Richmond Beach Saltwater Park; Shoreline, WA. Conducted a plant and habitat survey at this 42-acre park as part of the Master Plan Update, which includes an expanded trail and viewpoint system, improved parking and picnic areas, a new pedestrian bridge across the BNSF railroad tracks, and native habitat restoration. Diane prepared a habitat and vegetation map for the entire park, and provided recommendations for habitat restoration opportunities and invasive species control using non-chemical methods. As part of the Phase I implementation of the Park Master Plan, Diane conducted a wetland delineation, and prepared a wetland delineation and mitigation report associated with stormwater system upgrades and re-design of pedestrian trails. Diane attended site design meetings to provide recommendations to avoid and minimize wetland impacts and assisted the City in obtaining required permits. Diane also prepared a Vegetation Management Plan for the entire park that includes invasive species management, restoration of native habitats, erosion control through bio-engineering techniques, specific habitat restoration design and plant schedules, and implementation plans geared toward a city-directed volunteer effort to restore and maintain native habitat over a 20-year period. She is currently providing technical guidance for volunteer-based habitat restoration projects at the park and conducting annual monitoring of the wetland buffer mitigation.

Auburn Environmental Park; Auburn, WA. Diane managed and conducted wetland delineation, wetland and upland habitat type mapping, and functional performance evaluation of all onsite habitat types at this approximately 100-acre natural City park. She prepared a report documenting site findings and identified wetland mitigation options. Diane assisted the City during preliminary project phases in identifying park design options and provided guidance regarding permitting implications for design alternatives for the park design Technical Advisory Committee.

Green River Community College Wetland Stormwater Storage, King County, WA. Diane Brewster was the wetland biologist working with Susan Black and Associates on this 'out of the box' stormwater design. The college was exploring options to retain native vegetation and alleviate degradation of a nearby creek within a steep ravine by creating a series of detention ponds in forested wetland and upland. Diane provided guidance to her client regarding state, federal, and local permitting issues. She introduced the woodland stormwater detention concept to the Department of Ecology and Corps of Engineers, both agencies agreed that the concept was a sound and viable stormwater solution. Diane delineated the wetlands, prepared the JARPA documentation and provide technical information to the State and US Army Corps of Engineers during site visits. She initiated the hydrology study being carried out by college students to gather background data to document that

project design meets the hydrologic constraints for changes in flood depth, duration, and frequency; ensuring that the integrity and viability of the forested habitats will not be jeopardized while allowing for greater stormwater detention. The JARPA is currently being reviewed by regulating agencies.

Education:

Bachelor of Science, Environmental Studies, Evergreen State College, Olympia, WA 1987

Professional Registrations:

- Certified Professional Wetland Scientist (Cert. No. 1721), Society of Wetland Scientists
- Certified Wetland Delineator, U.S. Army Corps of Engineers
- Member, Society of Wetland Scientists
- Member, Society of Ecological Restoration

Continuing Education:

Federal Interagency Wetland Delineation Training, U.S. Army Corps of Engineers (USACE), 1989
Washington State Wetland Functions Assessment Methodology Training, Washington State Department of Ecology (Ecology), 1998

Permit Requirements Update for the Endangered Species Act and Nationwide Permits, USACE, 2000

Classifying Wetlands Using Hydrogeomorphic Principles, Dr. Paul Adamus, 2002

Critical Areas: the latest regulatory complexities, Law Seminars International, 2002

Protecting and Managing Wetlands Using Best Available Science, Ecology Coastal Training Program, 2006

Planning Hydrology for Created Wetlands, Wetland Training Institute, 2006

2007 Nationwide Permit and Rapanos Ruling Workshop, USACE, 2007

Regional Western Mountain Delineation Methodology Training, USACE, 2008

Shoreline Management and Stabilization Using Vegetation; Ecology Coastal Training Program, 2009

Invasive Plant Management in the Pacific Northwest, PNW Invasive Plant Council, 2011

Credit-Debit Methodology for Mitigation, Ecology Coastal Training Program, 2011

DATE: December 19, 2014

TO: Kristen Bryant, William Bryant, and Karen Bryant
Black Diamond, WA

RE: **Wetland E1 Division and Land Use Intensity - Issues of Concern**
Public Hearing on Yarrow Bay Plat 2C

Dear Ms, Bryant,

Per your request, I have reviewed your comments and testimony regarding two wetland issues in the Plat 2C proposal. These are: 1) division of Wetland E1 into two separate units and 2) buffer width assignment based on land use intensity. I concur with your comments on both of these issues and have provided more information below.

Division of Wetland E1 is more complex than the Applicant response letter dated December 5, 2014 indicates. The Washington State Department of Ecology Wetland Rating System for Western Washington, Ecology Publication #04-06-025 (August 2004) is clear that the entire wetland system within the delineated boundary is to be rated as one wetland. The rating method is not sensitive enough or complex enough to allow division of a wetland into sub-units based on level of disturbance, vegetation patterns, property lines or hydrogeomorphic classes (p 12). It does allow for splitting the wetland into different units only under certain circumstances; all of which require an **abrupt change** in the volume, flow or velocity of water. Examples given include berms, dikes, cascades, rapids, falls, culverts and other natural or built features that change the water flow, volume or velocity of water over a short distance.

Reviewing the topography in Plat drawing PP5, slopes in the area indicated as the abrupt change show an **approximately 2- to 2.25-percent slope in every direction from the basin division line** (See Figure 1 on the next page; source: Plat drawing PP5). This is not in keeping with the direction from Tom Hruby (author of the rating system), who recommends that the wetland be rated as one unit. However, if the Applicant feels there is a basin line, in order to accurately place a dividing basin line would require a detailed topographic survey, lidar map or other measurement such as piezometer readings across the boundary to document detailed monitoring of water levels for at least a year. A monitoring study like this would require a reading once a week at the minimum.

Given the Applicant's statement that the determination was made through a formal topographic survey, that supporting data needs to be provided to support the placement of the basin line. In cases such as this, photographic documentation is also used to support the determination. Because the dividing line is a natural feature it is important to provide the formal topographic survey, photographs of the area, and a drawing showing the direction of water flow to provide documentation and support the placement of a basin line. If it is found that the division line is not warranted, Wetland E1 will need to be rating as one unit.

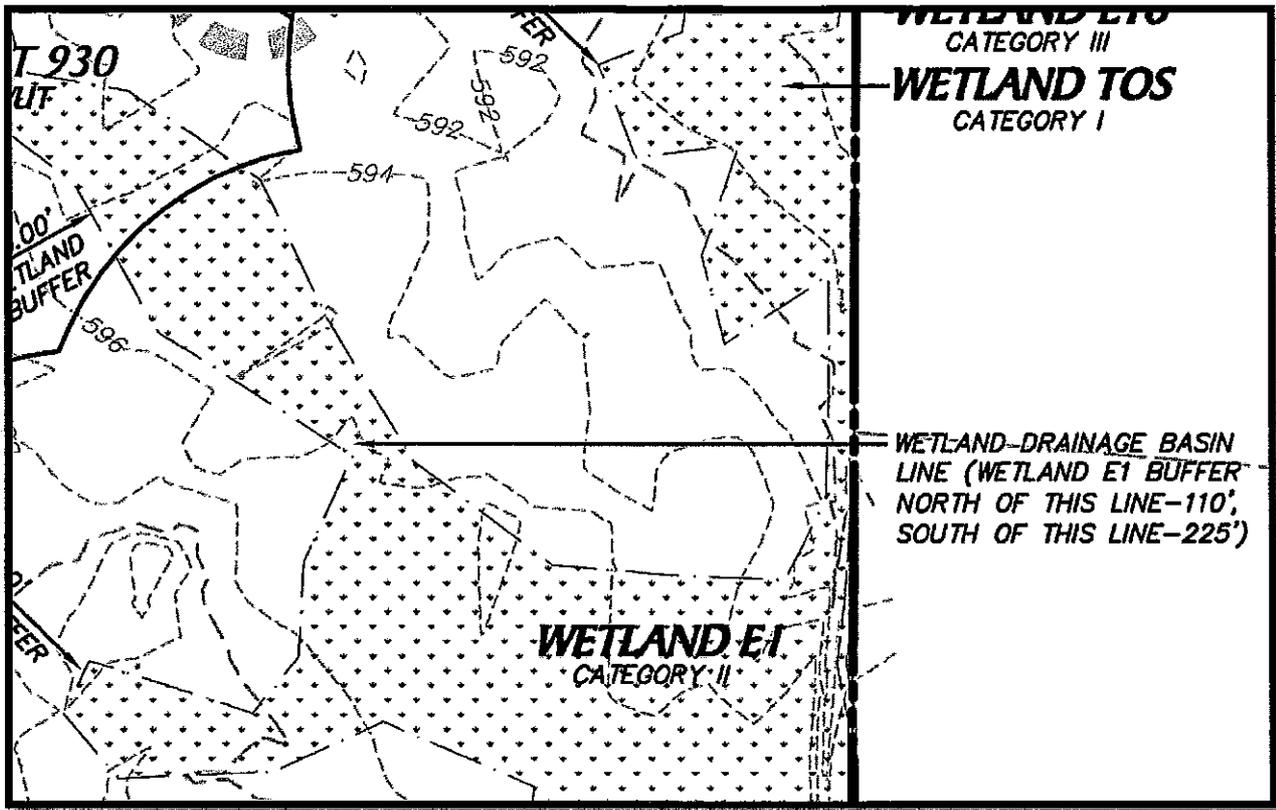


Figure 1: Location of Drainage Basin Divide in Wetland E1 (sources: Plat 2c drawing PP5)

Buffers and Land Use Intensity are important considerations when protecting wetlands. This is particularly important when the density of the development is increased due to the presence of sensitive areas. The buffer is the only protection available to the sensitive wetland habitat and, with high density of homes per acre (The *Department of Ecology's Guidance on Wetlands in Washington State (2005), Volume 2 - Protecting and Managing Wetlands, Appendix 8C* shows residential development greater than 1 home/acre as high impact land use), the buffer is the only protection from human and pet intrusion, pollutants from roadways and lawns, and noise and light pollution that disrupts wildlife. Of note, the BDMC chapters referenced are 19.10.230(D) for standard buffer widths and 19.10.230(G) for increased buffer widths. Both Wetlands TOS and EI are defined by the city as rare wetlands.

19.10.210(B)3a describes Category I wetlands as wetlands with exceptional value in terms of their water quality improvement, flood and stormwater attenuation, and wildlife habitat. These wetlands often support sensitive, threatened or endangered species and have attributes that are very difficult or impossible to replace if altered.

19.10.210(B)3b describes Category II wetlands as wetlands with significant value based on their functional performance. They occur infrequently and have qualities that are difficult to replace if altered.

Given this recognition, it is recommended that the northern end of Wetland E1 be given the full 110-ft. buffer. In places, its buffer of 40 ft. is inadequate to protect it from the high use of the northern

buffer of the wetland is expected to experience given the proximity of homes and the walking trail through the buffer. Humans and their pets will leave the trail and play in the buffer and wetland, disrupting the natural vegetative community and soil processes that makes this wetland so valuable.

The Category I Wetland TOS is also adjacent to high density residences and the south end of Wetland E1 has trails planned near and across it. It is important to be proactive in protecting the wetland as it has historically been shown to be nearly impossible to replace lost Category I wetland habitat (Johnson et al 2002). It is worth investigating the options to create greater buffer protection now than to suffer the loss of two very valuable and distinct wetland systems; which the loss of will affect not the adjacent community but also downstream communities.

Reference:

Patricia Johnson, Dana L. Mock, Andy McMillan, Lauren Driscoll, and Tom Hruby. 2002.
Washington State Wetland Mitigation Evaluation Study Phase 2: Evaluating Success,
Publication No. 02-06-009. Washington State Department of Ecology Shorelands &
Environmental Assistance Program, Lacey, WA

Recommendations:

- 1) Provide the detailed topographic drawing, photographs, and drawing showing the exact location of the topographic divide in Wetland E1.
- 2) Remand the reduced 40-ft. buffer on the northern portion of Wetland E1 and use the standard buffer width of 110-ft.
- 3) Investigate options to create greater buffer protection along Wetlands E1 and TOS.

Respectfully,



Diane Brewster
Professional Wetland Scientist, Cert # 1721

cc: Brian Derdowski