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TECHNICAL MEMORANDUM

Date:	October 13, 2008
To:	Susan Graham; Austin Fisher
From:	Jenna Friebel
Subject:	Black Diamond EIS Lawson Hills MPD Technical Peer Review EIS Element: Water Quality
cc:	Project File
Project Number:	217-3043-003
Project Name:	Lawson Hills and The Villages MPD EIS

EIS ELEMENT: Natural Environment – Water Quality

Original Documentation Prepared by: A.C. Kindig and Assoc. on: May 5, 2008

PMX Peer Review Author: Austin Fisher/Jenna Friebel

PEER REVIEW COMMENT SUMMARY

Both the reports concluded that by following the presumptive approach to managing stormwater described in the Ecology 2005 Manual (Ecology 2005) that the beneficial uses of the receiving waters will be protected and will fully mitigate the proposed projects. However, recent research has demonstrated that traditional stormwater management practices are not protective of stream resources (Booth and Jackson 1997, Booth 2000, Booth et al 2002). Ecology is now requiring the use of Low Impact Development (LID) where feasible for all projects. Therefore, both documents should discuss how potential increases in temperature and phosphorus loading that are likely to occur even with the use of traditional BMPs will be mitigated.

Phosphorus

The Lake Sawyer Management Plan, which was addressed in the document, states that future development can be accommodated without impacting the trophic state of the lake if phosphorus loading is limited to a 36 percent increase (King County 2000). However, it is not clear from the either report that the proposed projects are consistent with this statement. Based on a literature review it is known that urban/residential development increases phosphorus in stormwater runoff as compared to forested conditions.

In the study, Waschbusch et al. (1999) reported that lawns and streets were the largest sources of total phosphorus, dissolved phosphorus, and total suspended solids (TSS) with a combined contribution of 80 percent of the phosphorus load (Table 1). Lawns had the highest concentrations of both dissolved and total phosphorus as well as the highest load rates, with 56 percent and 70 percent of total phosphorus loading in each basin coming from lawns. Streets were the next largest contributor of phosphorus in both basins, while parking lots and roofs were the lowest contributors. Based on this study, it is not clear what suite of variables affects phosphorus loading from lawns; however, tree canopy was closely correlated with lawn phosphorus output.

Table 1. Phosphorus Loading from Two Residential Watersheds in Madison, Wisconsin
(Waschbusch et al. 1999.)

Harper Basin	Water Volume	Total Phosphorus
Streets	41%	20%
Parking Lots	4%	1%
Roofs	12%	3%
Driveways	20%	7%
Lawns	23%	70%
Monroe Basin	Water Volume	Total Phosphorus
Streets	46%	33%
Parking Lots	7%	2%
Roofs	9%	2%
Driveways	14%	7%
Lawns	24%	56%

Although results vary amongst studies based on the differences in the makeup of land uses present, they generally point towards lawns/landscaped areas, streets, and driveways/sidewalks, as being the three dominant phosphorus source areas in a low to medium density urban (Matthews 2005; Bar 2005). Given that total loads are likely to increase significantly under the proposed developments, and that the proposed BMPs are predicted to remove only 50 percent of the total phosphorus, it seems likely that the development would increase the phosphorus load to the watershed. Therefore, the document should discuss how the project will provide additional mitigation for the increase in phosphorus load needed to meet the total phosphorus load for Lake Sawyer.

Temperature

Section 3.2.2.8 of the report states that discharges from a wetpond were measured at about 60 degrees F (16 degrees C), which is in the range of the water quality standard criteria. Neither the reports or the supplemental information provided by A.C. Kindig have temperature data from the streams. In addition, the state water quality standard of 16 degrees C is for ambient water temperature and is not a standard for point source discharges (WAC 173-201A). The state standard for point sources of temperature for streams naturally colder than 16 degrees is calculated based on the allowable change in temperature over background conditions within a mixing zone. According to the findings in the affected environment section of the reports all of the streams in the project area are naturally colder than 16 degrees C. Therefore, it is not accurate to conclude that the stream temperature would not be impacted by discharge from a wetpond based on the referenced study. In addition, there are several studies that indicate that discharges from wetponds and urban development in general could have an affect on stream temperature particularly if the ponds are large and poorly shaded and if there is loss of riparian vegetation (Kieser et al 2003; Smith 2006; Rossi and Hari 2007). Therefore, the document should discuss how the project will provide additional mitigation for potential increases in temperature needed to minimize or prevent impacts to the streams and lakes.

Recommendations:

- The city should install continuous temperature monitors on the potentially affected streams to develop baseline temperature information. Instream temperature monitoring should be consistent with the guidelines in WAC 173-201A.
- The City should review the King County Lake Sawyer Management Plan and update it as needed based on resent literature and new land use plans.
- Review current LID Techniques, such as bioretention, dispersion, infiltration, that meet the necessary detention standards but avoid using large retention/detention ponds.
- Review current LID Techniques and research for innovative methods for reducing phosphorus loading from residential development. This may include requiring compost amended soils for all lawns and use of native vegetation to reduce the need for fertilizer.
- Update City ordinances to facilitate LID, such as adopting the 2005 Ecology Manual and the LID Manual for Puget Sound, developing new standard details for streets and sidewalks that reduce total impervious surface area.

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