

Memorandum

June 11, 2025

To: Tyler Litzenberger, Vector Development Company

From: Jakob Rowny, PWS, Anchor QEA; Dan Berlin, PWS, Anchor QEA

cc: Meredith Neal, Director, Puyallup Development and Permitting Services
Chris Larson, Director, Fife Community Development Department

Re: Response to SEPA Comments – Stormwater Design and Water Quality Measures for 6PPD Removal

This memo responds to the City of Puyallup (City) SEPA Determination co-lead agencies P-21-0136 comment letter dated March 19, 2025, which identifies remaining concerns regarding the potential discharge of the tire-derived contaminant 6PPD from impervious surfaces associated with the Freeman Road Logistics Project. We provide a summary of the Project's stormwater treatment design and demonstrate its compliance with City and state standards.

6PPD and Regulatory Context

6PPD, a widely used tire preservative, has been identified as a precursor to 6PPD-quinone (6PPD-q), a transformation product now recognized as highly toxic to salmonids and other aquatic organisms (Tian et al 2021). While 6PPD is not currently subject to compound-specific effluent limits under state or City codes, its documented effects on aquatic organisms have prompted increased regulatory and scientific attention to the performance of stormwater treatment systems within watersheds that support salmon populations, particularly in areas located upstream of or adjacent to known salmon habitat.

The Washington State Department of Ecology, informed by ongoing research in partnership with the Washington Stormwater Center, Washington State University, and the University of Washington, has recognized 6PPD as a high-priority emerging contaminant in urban runoff (Ecology 2022a). This research includes evaluating the bioavailability and toxicity of 6PPD and its transformation products under varying environmental conditions, developing analytical methods to detect their presence in water and sediment, and assessing the effectiveness of stormwater Best Management Practices (BMPs) in removing these compounds from runoff (Ecology 2022b). The 2024 Stormwater Management Manual for Western Washington (SWMMWW) supports the use of Enhanced Treatment BMPs including bioretention and media filtration systems which have demonstrated high removal efficiencies for 6PPD in lab testing (Ecology 2022b; Washington State University et al 2024), controlled field simulation studies (McIntyre et al 2023), and field-based monitoring of highway runoff (Hererra Environmental Consultants 2024).

Applicable Standards and Project Stormwater Design

The Project's stormwater system has been designed to comply with applicable local and state stormwater management standards, including those addressing conventional and emerging pollutants such as 6PPD.

City of Puyallup Stormwater Code (PMC Chapter 21.10)

Under PMC 21.10, the Project is subject to all the minimum requirements including the most relevant Minimum Requirement #6 (Runoff Treatment) and Minimum Requirement #7 (Flow Control). These provisions require permanent facilities to provide enhanced treatment and flow control for pollutant-generating impervious surfaces (PGIS), which include roads, truck circulation areas, loading docks, and driveways. These surfaces are categorized as high-use due to their traffic volumes and potential pollutant loads.

Washington State Stormwater Manual (2024 SWMMWW)

The City of Puyallup adopts the 2024 Stormwater Management Manual for Western Washington (SWMMWW) by reference. The manual provides updated performance-based standards for the selection, sizing, and integration of treatment systems. Relevant provisions include:

- Guidance for Enhanced and Basic Treatment BMPs.
- Emerging guidance for pollutant removal performance, particularly for dissolved metals and hydrophobic organics, such as 6PPD.

Project Stormwater Facility Design

To meet these regulatory standards, the Project incorporates a system of detention and treatment vaults along with bioretention-based facilities, summarized as follows:

- Three detention vaults will be installed: two on-site (located within the truck court of each proposed building) and one in the 22nd Avenue NW frontage to manage public roadway runoff. These detention vaults provide flow control in accordance with Ecology SWMMWW standard.
- Two treatment vaults (one for private stormwater and one for public improvements) will be installed and receive stormwater released from the detention vaults. These treatment vaults will provide Enhanced Treatment per Ecology SWMMWW Standard. Treated flows will combine at a lift station where it is pumped to the downstream system on Levee Road.
- An additional bioretention/infiltration pond at the northeast corner of the Levee Road and Freeman Road intersection will serve public improvements south of 52nd Street East. This facility will use Bioretention Soil Media (BSM) to meet Enhanced Treatment standards and is designed to infiltrate treated runoff, thereby satisfying flow control through volume reduction.

Conclusion

6PPD is identified as a pollutant of concern due to its toxic transformation product, 6PPD-quinone. The Project's stormwater facility design incorporates treatment and flow control measures that address current regulatory requirements under PMC Chapter 21.10 and the 2024 SWMMWW, which recognizes 6PPD as a significant emerging contaminant in urban runoff with emerging guidance aimed to address this pollutant.

The design includes three detention vaults to manage stormwater volume and peak discharge rates in accordance with Ecology flow control standards, and two Enhanced Treatment vaults (one serving the private development and one serving the public frontage improvements) to remove pollutants from stormwater runoff. Additionally, a bioretention/infiltration pond at the Levee Road and Freeman Road intersection serves the public improvements south of 52nd Street East. This facility is designed with Bioretention Soil Media (BSM) that meets Enhanced Treatment standards and provides volume reduction through infiltration, satisfying both runoff treatment and flow control requirements.

References

Cited sources should be referenced at the end of a memorandum. Refer to Anchor QEA's *Style Guide* for guidance on how to compose reference entries and correctly cite them throughout a document.

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https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/Content/Resources/DocsForDownload/2022_SWTreatmentOfTireContaminants-BMPEffectiveness.pdf

Herrera Environmental Consultants, 2024. 2023–2024 Summary Report: 6PPD-q in Highway Runoff and BMP Effectiveness. Prepared for the Washington State Department of Ecology, Olympia, WA. Available at: <https://www.herrerainc.com/publications/2023-2024-summary-report-6ppdq-in-highway-runoff-and-bmp-effectiveness/>

McIntyre, J. K., Spromberg, J. A., Cameron, J., Incardona, J. P., Davis, J. W., and N. L. Scholz, 2023.

Bioretention filtration prevents acute mortality and reduces chronic toxicity for early life stage coho salmon (*Oncorhynchus kisutch*) episodically exposed to urban stormwater runoff.

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Tian, Z., Zhao, H., Peter, K. T., Gonzalez, M., Wetzel, J., Wu, C., Hu, X., Prat, J., Mudrock, E., Hettinger, R., Cortina, A. E., Biswas, R. G., Kock, F., Soong, R., & E. P. Kolodziej, 2021. A ubiquitous tire rubber-derived chemical induces acute mortality in coho salmon. *Science*, 371(6525), 185–189. <https://doi.org/10.1126/science.abd6951>