Water Resources Consulting L.L.C.
Peter Willing, Ph.D.

September 19, 2000

Mr. Ray Hellwig, Regional Director
Northwest Regional Office
Washington State Department of Ecology
3190 160th Ave. S.E.
Bellevue, Washington 98008-5452

RE: Comments on SeaTac Stormwater Master Plan

Dear Mr. Hellwig,

The following review of the most recent version of the Stormwater Master Plan for SeaTac Airport comes to you at the request of the Airport Communities Coalition. This review is oriented to water quality considerations. I have had less than a week to make a review of an incomplete copy of the Plan. I am thus not in a position to say that my comments are complete and would not expand on further analysis.

I have referred to the following documents in the course of this review:

- Preliminary Comprehensive Stormwater Management Plan, Seattle Tacoma International Airport Master Plan Update Improvements. Prepared for the Port of Seattle by Parametrix, Inc. August 2000; Sections 1, 2, 4 (part), and 7; Appendices E, F, H, I, M, N, T, U, V. Hereinafter cited as "the Plan."
- NPDES Permit No. WA-002465-1, dated January 25, 1999, and its appurtenant Fact Sheet.
- Des Moines Creek Basin Plan, November 1997
- King County Surface Water Design Manual, September 1998
- National Pollutant Discharge Elimination System Discharge Monitoring Reports for SeaTac Airport, Port of Seattle, Permit no. WA-002465-1.

The following section is a summary of my analysis:

- A recurring theme in the Plan is that pollution problems will be dealt with by diverting the flow from the stormwater system to the industrial waste system. This in effect diverts it from the Des Moines and Miller Creek basins, through the Renton treatment plant discharge, to Puget Sound. This hydrologic redefinition of the SeaTac area watersheds has the effect of concentrating a modestly reduced pollutant load into a greatly reduced annual runoff volume. While this approach reflects one perspective on current stormwater management, it has the potential to aggravate water quality problems in streams that are already sorely

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Exhibit 349
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pressed. It also contravenes Governor Locke's certification, which specified that the drainage divide between the two local creeks not be disturbed.

- A consistent direction in the Plan is the disposal of water-borne pollutants to biofiltration swales and filter strips. This approach anticipates permanent shallow soil disposal for long-lived pollutants. The consequences of this commitment have not been thought out in the Plan.

- Existing Best Management Practices at the airport are not working, and the Port of Seattle plans to install more that are just like them. The Port offers no inventory of dimensions or efficacy of the existing facilities, with data to show whether they work under storm conditions.

- The Port has failed to come to grips with a substantial pollution load from existing metal roofs, and the Stormwater Plan defers meaningful action on this problem into the indefinite future beyond the year 2007.

- A major study of the dissolved oxygen and biological oxygen demand problems around the airport was rejected by Ecology, and has not been upgraded and re-submitted to Ecology to substantiate the Port's case that it has the dissolved oxygen problem under control.

- Existing stormwater discharges from SeaTac Airport exceed the Washington State Water Quality Standards on a regular basis. These discharges are routed to Class AA streams that are on the 303(d) list of impaired waters. The streams themselves do not meet the state water quality standards, and many of the beneficial uses they should support have been compromised. There is no doubt that the state water quality standards are being violated. The stormwater plan embodies the acceptance of measures that will result in the future in the standards continuing to go unmet. Therefore the August 2000 version of the Stormwater Management Plan fails to constitute reasonable assurance that water quality standards will be met.

The next section of this letter sets forth comments in order of the parts of the plan that they refer to, rather than in order of importance.

Volume I, page 1-2 mentions the Port of Seattle's plan to supplement base flow in Des Moines Creek. This scheme is rudimentary at best, and neither of the two sources of water that have been proposed by the Port have been secured. One is a well that withdraws water in part from the upper unconfined aquifer, and is therefore interconnected with surface waters; the other is in the hands of the City of Seattle. Neither has a certainty of being approved, and both await the resolution of long procedural complications.

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Page 2-7 reports in narrative form an optimistic and idealized view of stormwater quality at the Port:

> Source controls and treatment facilities are implemented throughout STIA for all activities. This infrastructure is continually updated via an adaptive management process by which (1) BMP's are implemented, (2) monitoring and inspections demonstrate BMP effectiveness, (3) BMP improvements are made when necessary, and (4) follow-up sampling demonstrates that the improvements are effective. . . .

This description greatly exceeds the actual experience, which is a record of permit violations, unmet water quality criteria, and 303(d) listings for SeaTac area streams.

The Plan details numerous facilities and practices that will be used to manage the quality of water running off airport properties. The Plan does not mention the loading rates, ultimate fates, and mass balance relationships for major pollutants. They are all treated as if they just go away. At anticipated rates of input, many pollutants will build up to substantial amounts. The dissolved air floatation sludge resulting from the industrial wastewater treatment process is classified as a hazardous waste, but the same materials in the stormwater system are simply disposed to land. Re-mobilization in relatively large slugs by heavy rains has not been assessed.

Page 4-13 says that 68% of the existing airport area that generates pollution is treated by facilities that are up to modern design standards. This would leave 32% that is not so treated, under existing conditions. These percentages do not agree with the accompanying table (4-6), which does not total treated and untreated acreages. If it did, it would show 55% treated and 45% not fully treated.

Page 4-15, Section 4.5.1.2, Subbasin PGIS Areas, informs us that "for the purposes of this initial assessment, roof tops were assumed to be non-PGIS [non-pollution-generating impervious surface]." Appendix T, however, shows building roof surfaces that add up to approximately 4.3 acres of bare metal roof, plus a substantial area that has not been inventoried. These areas are mostly in subbasin SDN1, which has shown numerous permit violations for zinc, copper, and lead. It is not clear how the metal roofs have been counted in Table 4-6. A plan based on the Port's assumption will inevitably underestimate the magnitude of the quality problem associated with the Port's storm water.

Page 4-15, Section 4.5.1.3, BMP Inventory, says that "Bioswales were conservatively assumed to be trapezoidal, 6-ft-wide at the base, 2-inch-deep flow (regularly mowed), with 3:1 side slopes." One would expect a Stormwater Management Plan to have more than "conservative assumptions" about the geometry of existing bioswales. A specific inventory of dimensions and treatment capacity would be a much more useful basis for subsequent computations.

Page 4-15, Section 4.5.2, SDS Water Quality, claims that

> overall, the data show that the concentration of various constituents in STIA stormwater are generally less than those in runoff from other residential, urban, and industrial areas in the region. For example, the median concentrations for STIA constituents are lower than those in urban stormwater , with the exception of total recoverable copper. These data provide evidence for the efficacy of BMP's that have been implemented by the Port . . .

This set of claims is misleading on four counts: 1) it deflects attention from the fact that there has been a consistent history of permit violations; 2) it is of no relevance how the airport compares to the region; 3) a median of reported values is a meaningless indicator of water quality performance; and 4) the efficacy of existing BMP's in meeting water quality standards has been unsatisfactory.

Table 4-8 (page 4-17) purports to back up the claim that SeaTac runoff is better than other developed areas in the region. However the metal values do not show any accompanying hardness values, in the absence of which they cannot be compared. Furthermore, they are "median" values for subbasin SDS3, which has a history of permit violations for metals.

On p. 4-18, the Port mentions only one specific discharge point, SDS1, for which "copper and zinc concentrations have dropped significantly," but shows no data to back up the claim. The Port does not mention the other outfalls in the stormwater system, which have not had a clean record. A far more useful way to portray the relevant information would be a tabulation of outfalls, with a water quality summary of each, and the state water quality standards for comparison. This would let the reviewer see what the situation is, where the problems are, and what needs to be done about them.

Page 4-18, Section 4.5.2.1, Metals and Hydrocarbons, offers a summary of water quality results based on relative statistics:

> Concentrations of these pollutants in STIA runoff are typically lower . . . more than 95% were below levels found in urban runoff . . . 53% of samples have had concentrations less than the detectable limit . . . 75% of the lead . . . were below . . .comparable regional urban data . . . 97% of the zinc were below the median . . .

There is little information in this summary. Average and median values are meaningless, because they say nothing about total mass loading or extreme concentrations; the argument is like the driver of an automobile claiming to drive the speed limit more than other drivers.

Page 4-18, Section 4.5.2.2, Fecal Coliforms, says: " A fecal coliform genetic source tracing study found that bacteria from human sources dominated the identifiable strains of coliforms in the stream [Des Moines Creek], especially downstream of residential areas serviced by septic systems (Des Moines Creek Basin Plan Committee, 1997)." This conclusion applies an unwarranted interpretation to the data. It ignores the Des Moines Creek Basin Plan's warnings about the limitations of the rRNA method. A Department of Ecology technical publication (Sargeant, 1999) says of this method, "Quantification from each source is not possible at this time." The Port also ignored cautions about the small sample size and resulting low statistical validity of the results. A casual reading would allow one to arrive at the misleading conclusion that the Port deserves credit for cleaning up bacterial contamination sources.

Page 4-18, Section 4.5.2.3, Suspended Solids: The median values of Total Suspended Solids tell us nothing . The important number to notice is the water quality criterion, which for AA waters is 5 NTU or 10% over background . Without the background levels, the suspended solids information has little meaning.

Page 4-19, Section 4.5.2.6, Dissolved Oxygen and Biochemical Oxygen Demand, gives the impression that de-icing chemicals are a "potential source" of low dissolved oxygen problems, and that the Port is studying the matter. The first attempt at a study of this subject was rejected as unusable by Ecology: "Unfortunately, given the deficiencies of the final draft study, Ecology cannot make a fully informed decision as to whether or not the Port is properly managing de-icing agents in use at Sea-Tac International Airport to prevent water quality impacts to Miller and Des Moines Creeks." (Letter from K.C. Fitzpatrick to Tom Hubbard, October 21, 1999) With a whole year to remedy the defects of the study, a reviewer of the Stormwater Plan might expect to have definitive information about the problem and intended remedies. Ecology should not proceed to issue a water quality certification until it is satisfied that its concerns have been met on this important pollution source.

Page 4-20, Section 4.5.3, IWS [industrial waste system] Treatment Performance, announces that according to data from Port Discharge Monitoring Reports, effluent water quality limitations have been met since November 1996. There are two limitations to the statement that affect the quality of stormwater. One is that the discharge monitoring reports reflect composite samples on a routine schedule, and do not represent higher values that would be collected during storm events. These events are when IWS overflows would be likely to happen. The second is that no recurrence intervals or volume estimates for bypass flows have been offered. The claim to be in compliance is notable for its absence in the part of the Plan that discusses stormwater. Nor does that part of the plan say anything about the violation record shown in the Discharge Monitoring Reports for the stormwater outfalls that drain to local streams.

Page 7-1 (last two lines) leaves the Port considerable unwarranted room to maneuver by defining a category of existing subbasins for which "retrofitting is not practicable." Also "For non-Port PGIS [pollutant generating impervious surface] draining to Port outfalls, nothing is proposed." without knowing what areas this description refers to, it becomes a potential contamination source of unknown dimension.

Page 7-3 announces that "water quality for the third runway drainage is expected to be similar to that measured in subbasin SDS3 in recent years." This news is not reassuring, in light of the fact that the Port's Discharge Monitoring Reports show that this discharge has a sustained record of violation of the copper and zinc water quality standards.

Page 7-4 describes proposed expansion of the south aviation support area (SASA). Of 93 acres of new impervious surface, 58 will be diverted out of the basin to the industrial wastewater system; 35 acres will be routed to Des Moines Creek either through biofiltration swales or through a new detention pond. These changes will bring about a massive hydrological redirection of the basin. Essentially 8 bioswales and a detention pond will replace the varied wetland functional values of the existing land use.

Page 7-10 reports that retrofitting over 80 acres in subbasins SDS3 and SDE4 with conventional treatment BMP's will be impracticable. These are two of the subbasins that have reported discharge permit violations for metals in the last two years. It appears that the Port plan is to continue to discharge flows above the water quality criteria into the stormwater system as before, and hope to encounter some cheap new BMP ideas that no one has thought of along the way. The same approach is anticipated for the Terminal drives.

Page 7-14 classifies road shoulders used primarily for emergency parking as non-pollution generating impervious surface, runoff from which therefore presumably does not require treatment. How one separates the flow from the non-polluting shoulder from the polluting road surface draining across it is not specified. Once the flows have been commingled, it will all have to be treated as polluted flow.

This page also proposes a scheme for rooftops under which they are either made out of a surface material that does not leach metals to rainwater, or the rainwater will be treated as a pollution-generating impervious surface, with BMP's from the King County Basic Water Quality Menu. The trouble with the second approach is that the Basic Water Quality Menu does nothing to remove metals, but is designed to remove suspended solids. Presumably there will be little suspended solids from roof tops, which means that the leaching metals will have few adsorption sites and will be predominantly in biologically active form. The measures in the King County Design Manual that deal with metals are in the Resource Stream Protection Menu, which has as a treatment goal the removal of 50% total zinc removal. This menu envisions sand filters, stormwater wetlands, and two-facility treatment trains including organic filter media, as BMP's. Even if 50% zinc removal were attained for some of the flows reported in the DMR's, the remaining concentrations would still violate the discharge permit. The Plan wastes the reviewer's time and trouble with a dead-end alternative that will not work, and diverts attention from the one that will work; namely source control, i.e. replacing the roof surfaces. The Resource Stream Menu from the King County Design Manual should be applied in situations where source control has been applied and stormwaters still do not meet the water quality standards.

For the metal-leaching roofs shown in Appendix T, The Plan contemplates merely developing a retrofit schedule by the end of the next NPDES permit cycle, which is in 2007. Notwithstanding the record of water quality violations resulting in part from these roofs, any action that might be expected to remediate the problem is left till some indefinite time after that.

Page 7-15 lays out a plan for outfall SDN1, where there are two polluting rooftops (the number does not agree with Appendix T). This consists of retrofit coating, BMP's from the Basic menu, or roof replacement. "The Port is implementing the process described above . . ." This language is totally non-committal and vague about Port intentions for fixing a serious known water quality problem.

Page 7-18 discusses elimination of existing pollution sources from redevelopment areas. The Plan is inconsistent, because it neglects completely the loading effect of long-lasting water pollutants being skimmed off by various BMP's and essentially disposed to soils at shallow depths. Nonetheless the Port is quick to take credit for eliminating septic tanks. The presumption in the Plan is that all 380 septic tanks were failing, which is not likely. Presumably the single family land use in the acquisition area will be replaced by more dense pollution generating impervious surface, unless the Port intends to institutionalize the undeveloped state in some easement arrangement it has not described.

Page 7-21, Section 7.7.5, Baseflow Augmentation in Des Moines Creek: this brief description promises that the Port will "work with" the Des Moines Creek Basin Committee to implement the flow augmentation project. Mitigation for the third runway construction is a sole responsibility of

the Port, and should not be confused with the purpose of the Committee's Basin Plan, which was to identify and remediate long-standing existing water quality problems.

Thank you for taking into account these thoughts on the adequacy of the Port of Seattle's Stormwater Management Plan to support your decision on its 401 water quality certification.

Sincerely,

Peter Willing, Ph. D.

Reference:

Sargeant, D. 1999. Fecal Contamination Source Identification Methods in Surface Water. Department of Ecology Report #99-345. 19 p.