

RECEIVED

OCT - 8 2001

POLLUTION CONTROL HEARINGS BOARD
FOR THE STATE OF WASHINGTON

ENVIRONMENTAL
HEARINGS OFFICE

AIRPORT COMMUNITIES COALITION,	)	No. 01-133
	)	No. 01-160
Appellant,)	
	)	DECLARATION OF DR. PETER WILLING
v.	)	IN SUPPORT OF ACC'S REPLY ON
	)	MOTION FOR STAY
STATE OF WASHINGTON,)	
DEPARTMENT OF ECOLOGY; and	)	(Section 401 Certification No.
THE PORT OF SEATTLE,	)	1996-4-02325 and CZMA concurrency
	)	statement, issued August 10, 2001, Reissued
Respondents.	)	September 21, 2001, under No. 1996-4-
	)	02325 (Amended-1))
)	

Dr. Peter Willing declares as follows:

1. I am over the age of 18, am competent to testify, and have personal knowledge of the facts stated herein.

2. I have reviewed the Port of Seattle and Department of Ecology declarations, briefs, and exhibits submitted in opposition to ACC's motion for stay. I have also reviewed additional documents, including but not limited to the Stormwater Management Manual for Western Washington, and scientific literature related to the scope of my review.

3. I have reviewed the Department of Ecology's Water Quality Certification No. 1996-4-02325 for construction of a third runway at SeaTac Airport, issued on August 10, 2001 and then amended and re-issued on September 26, 2001. The certification contains a number of defects that cause it to fall considerably short of reasonable assurance that the construction will

DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-1

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

ORIGINAL

AR 007302

1 protect water quality standards. The two particulars to which I will address my statement are the
2 augmentation of stream flow in SeaTac area streams, and the management of stormwater. Both
3 have severe and unacceptable implications for the quality of waters of the state of Washington.
4

5 4. During my professional career I served for five years as general manager of a
6 water supply utility that operated its own direct filtration potable water treatment system. I
7 trained water treatment plant operators in water treatment methods and related scientific
8 principles, supervised major overhauls and construction in the treatment plant, reviewed
9 engineering submittals, and held managerial responsibility for the operations, compliance, and
10 reporting for the plant. I held a Class 3 Water Treatment Operator certification from the State of
11 Washington for ten years.
12

13 5. In my consulting career I have designed and built water treatment systems based
14 on slow sand filtration, coagulation, and disinfection. I have spent much of my professional
15 career on assignments involving the relationship between land use and water quality, both surface
16 and groundwater. I am familiar with the King County Surface Water Design Manual, as well as
17 stormwater management guidance from other jurisdictions.
18

19 **Flow augmentation with stored stormwater is an unproven concept**

20 6. The Port of Seattle intends to augment the low summer flows of the streams in the
21 vicinity of SeaTac airport with stormwater from storage vaults. The Port relies on the success of
22 this plan to provide an element of reasonable assurance that the SeaTac Master Plan Update
23 construction will not violate water quality standards. The Port has not offered any precedent for
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-2

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007303

1 this scheme, and the description of the project have been limited to vague generalities and
2 unsupported claims. The Port has furnished no design details for the flow augmentation
3 facilities, but has confined itself to promises only. Fendt (26) promises that the next iteration of
4 the Low Flow Analysis will contain all the identified missing pieces, and argues that this promise
5 is equivalent to reasonable assurance that the scheme will be implemented and will work.
6 Ecology did not have these essential elements when they issued the 401 certification, and the
7 PCHB does not have them now. Ecology even agrees that the Low Flow Analysis is incomplete
8 without these pieces, but attempted to fill the gap by making their submittal into a permit
9 condition. King County found the scheme to have some “unresolved design challenges”
10 (Whiting at 2).

11
12
13 7. The Port promises installation of floating orifices in stormwater storage basins.
14 The Port has provided no design detail, manufacturer’s specifications, documentation, or
15 substantiation of the concept. It appears to have been mentioned for the first time in October
16 2001, by Fendt (28), and the reference is so general as to leave it entirely to the reviewer’s
17 imagination what he is talking about.

18
19 8. The reviewer should expect to find dimensions and details of stormwater storage
20 vaults in the CSMP. They are not there. Fendt at 29 informs us that the CSMP is not intended to
21 show precise size of low flow mitigation vaults, only their probable locations. He suggests that
22 we look in the “Low Flow Mitigation Plan (sic - presumably the Low Streamflow Analysis -
23 Summer Low Flow Impact Offset Facility Proposal) as the place to find details for those systems.
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC’S MOTION FOR STAY-3

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007304

1 They are not there, either. The Port has failed to provide even the most basic information needed
2 to evaluate its low flow mitigation proposal.

3 9. The Port has not refined the concept of stormwater for flow augmentation even to
4 the extent of being sure which streams will receive it. The low flow augmentation plans before
5 December 2000 were limited to Des Moines Creek. The December 2000 Low Flow Analysis
6 said flows would be augmented in Des Moines and Miller Creeks. The “final” Low Streamflow
7 Analysis/Summer Low Flow Impact Offset Facility Proposal of July 2001 showed an intention to
8 apply augmentation flows to all three streams. Fendt (17) says flow augmentation will be applied
9 to Des Moines and Walker Creeks. The flow augmentation proposal is no more than a draft
10 concept, with uncertainty and questions of feasibility behind every detail. It will not serve as a
11 basis for reasonable assurance that it will work.
12
13

14 10. The Port’s concept of low flow augmentation with stored stormwater would be
15 strengthened by a demonstration that a comparable scheme has been successfully implemented
16 elsewhere. The Port offers no such demonstration, even for separate elements of the concept
17 such as the ability of a vault to maintain water quality at the end of six months of storage. The
18 Port offers a promise to figure out the details in the future.
19

20 11. I have encountered numerous low flow augmentation projects in the course of
21 more than two decades of work in the water resources field. I have not encountered any low flow
22 augmentation plan that depended on multiple season storm water storage for a water source.
23

24 12. I have had experience with low flow augmentation plans, and will briefly describe
25

DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC’S MOTION FOR STAY-4

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007305

1 three of them for illustrative purposes. One is a flow-proportional discharge required under a
2 water rights certificate for a municipal water supply well. Because of a finding that the well
3 withdrawal depleted stream flow, the certificate was conditioned on release to the stream of a
4 portion of the withdrawal. The release to the stream is part of the water right. The second
5 instance involves a new appropriator who changed the place of use of a water diversion and in
6 the process wished to discontinue the use of a ditch. The amended water right requires that the
7 new appropriator continue a part of the flow in the ditch to provide for wetlands and a stream that
8 depend on conveyance losses, or seepage. The portion required for flow augmentation is the
9 subject of a water right. The third instance includes the common requirement that releases from
10 a surface reservoir provide for minimum downstream flows and specified ramping rates. The
11 flow releases for streamflow maintenance are the subject of both a water right and a storage
12 permit.
13

14
15 **Stormwater quality will not be acceptable**

16 13. POS has claimed to be investigating the feasibility of emerging BMP technologies
17 and doing research on filter media for metals removal (Logan, 7; 16). Media filtration is widely
18 known in the drinking water industry. Typically it forms one component of a water treatment
19 train that includes such steps as chemical conditioning, coagulation, and flocculation. The newly
20 released Stormwater Management Manual for Western Washington, Volume V - Runoff
21 Treatment BMP's, clearly expects the application of such advanced treatment technologies where
22 removal of dissolved metals is an issue (p. 141). The 401 Certification contains no requirement
23
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-5

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007306

1 for the Port to implement any measures beyond the King County Basic Water Quality Menu,
2 which is designed for sediment removal. Ecology has accepted this simplistic approach, despite
3 the demonstrated problems of dissolved metals in the Port's stormwater discharges and the
4 widespread recognition, including in Ecology's new manual, that means are available to address
5 these types of pollution problems. The Port and Ecology are incorrect to assert that compliance
6 with the King County Surface Water Design Manual equates to compliance with water quality
7 standards.
8

9 14. The Port chose their stormwater BMP's from the King County Basic Water
10 Quality Menu, which is designed to remove 80% of total suspended solids and not designed to
11 remove other pollutants. Filter strips are part of the Basic Water Quality Menu (KCSWDM, p. 6-
12 4). Stormwater treatment means filter strips (Fendt 41). Filter strips have been shown to vary
13 widely in their removal performance for metals, even showing negative removals or re-
14 mobilization (EPA Urban Stormwater Best Management Practices Study referred to in first
15 Willing Decl., Exhibit G).
16

17 15. The Port (p. 26) claims that its selection of BMP's are effective at removing
18 "many organic and inorganic particles." They make no claim that they effectively remove metals
19 in the dissolved state. Ecology (p.22) says that "although the Port's proposed BMP's are not
20 designed to treat metals, they may be partially effective in doing so . . . to the extent metal
21 particulates comprise a portion of total suspended solids in the Port's stormwater discharges, the
22 BMP's may be partially effective in removing them." The "partially effective" language appears
23
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-6

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007307

1 to have come from Whiting (declaration p. 5). However Ecology chose not to quote it in its
2 entirety. He went on to say, “However, the effectiveness of the proposed BMP’s, primarily
3 biofiltration, at removing non-particulate (soluble) metals is expected to be minimal.” (*Id.*) Mr.
4 Whiting is correct. The Port’s BMP’s will not remove a large portion of the metals from the
5 airport stormwater. If the Hearings Board is looking for the language of reasonable assurance, it
6 will be sorely disappointed: all it will find is that Ecology’s provisions in the 401 certification “. .
7 . may be partially effective . . .”

9 16. Ecology relies heavily on King County’s ostensible stamp of approval for the low
10 flow mitigation and stormwater management plans. On close scrutiny however, the King County
11 review is not a stamp of approval at all. The review, carried out by stormwater engineer Kelly
12 Whiting, was very limited in scope and critical in content.

14 17. The scope of Mr. Whiting’s review was limited to ascertaining whether the
15 Comprehensive Stormwater Master Plan for the SeaTac Master Plan Update attained minimum
16 compliance with the technical provisions of the 1998 King County Surface Water Design
17 Manual. The review did not evaluate compliance with other King County or state documents
18 such as the Governor’s Certification. It did not consider whether the proposed stormwater plan is
19 in compliance with the Federal Clean Water Act or state water quality standards. (Scope of
20 work, attachment 1 to King County DNR Interagency Agreement #C0000141, September 8,
21 2000, attached hereto as Exhibit A). Specifically excluded from the review scope were all
22 procedural requirements of the KCSWDM. If processed under King County regulations, this
23
24

1 project would have exceeded the threshold for Large Site Drainage Review and would have been
2 subject to the procedural requirements whereby performance standards are tailored specific to the
3 proposed development (King County Final Review Comments, August 2000 Preliminary
4 Comprehensive Stormwater Management Plan, September 14, 2000, attached hereto as Exhibit
5 B). Mr. Whiting did not review the models for the proposed embankment and offers no
6 comments on the accuracy of predictions derived from these models. (Whiting Exhibit 2 p 2).
7 Review of the Low Flow Analysis was added to the King County scope after the appearance of
8 the December 2000 version.
9

10 18. Even within his constrained scope of review, Mr. Whiting did not find adequate
11 provision for protecting water quality in the Port's selection of stormwater best management
12 practices. He said, "Discharge monitoring data indicates high copper (Cu) concentrations and
13 low total suspended solids off of the existing runway areas. This would tend to indicate most of
14 the Cu is in the more toxic dissolved form. As current runways are being treated with the same
15 water quality treatment BMP's as proposed for the third runway, similar results may be expected.
16 Compliance with KCSWDM basic water quality menu may not be sufficient to control metals,
17 nor are the BMP's found in the basic menu intended to adequately control metals." This
18 comment went unanswered and was repeated verbatim in review comments on the December
19 2000 version of the stormwater plan. Whiting continued: "Filter Strips - removal of metals is not
20 the performance goal of this facility. The existing relatively high Cu concentrations off the
21 runways indicate they are not great at metals removal. Since the 3rd runway will be treated with
22
23
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-8

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

1 the same filter strip BMP's, the water quality off the 3rd runway would be expected to be
2 similarly high. If SMP is targeting enhanced water quality treatment for metals removal, BMP's
3 should be selected from the KCSWDM Resource Stream Water Quality Menu. This level of
4 treatment is consistent with previous 401 conditions. Note: Under the KCSWDM Large Site
5 Drainage Review process, mitigations are tailored specific to each project. If this project was to
6 comply with the procedural requirements of the KCSWDM, enhanced water quality treatment
7 may have been required.” (King County Final Review Comments, August 2000 Preliminary
8 Comprehensive Stormwater Management Plan, September 14, 2000, Enclosure 1, p. 7; Enclosure
9 2, p.2). Enhanced water quality treatment consists of media filtration, two-facility treatment
10 trains, etc. (KCSWDM section 6.1.3). Whiting also commented on the Port's “ Inconsistencies
11 and gaps in data . . . several of them have the potential to affect facility design and plan
12 effectiveness beyond a trivial amount.” Whiting Exhibit 2 p 1 para 4.
13

14
15 19. The Port's stormwater management plan falls far short of All Known and
16 Reasonable Technology. They promise to “retrofit the airport for water quality BMP's to the
17 extent practicable” (Fendt 60). The Port understands Ecology to say that the Port's stormwater
18 plan constitutes AKART (Fendt 21). Ecology says water quality standards will be met because the
19 stormwater plan meets, and goes beyond, the technical requirements of the KCSWDM. But
20 Whiting says that KCSWDM is not AKART. First Eglick Decl., Exhibit J. In my opinion,
21 AKART for the Port's stormwater discharges would consist of a convincing demonstration that
22 the Port has researched and designed advanced treatment techniques, as described in both the
23
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-9

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007310

1 King County and Ecology stormwater manuals, and devised a suite of best management practices
2 tailored to the constraints and flow characteristics of the airport.

3 20. The concept of a Water Effects Ratio Study, under which modifications to water
4 quality standards may be proposed and granted, appears several places in Port declarations (Port
5 24; Logan 19-27; Fendt 43). The relevant authority is in WAC 173.201A.040. The essence of
6 the Port's purpose in discussing it is that it allows them to argue for a relaxation of the water
7 quality standards that apply to the Port. This is a curious stance, in light of Port claims to be
8 meeting existing water quality standards (Port 23). The WAC says "the department shall ensure
9 there are early opportunities for public review and comment on proposals to develop revised
10 criteria." So far there has been no such review and comment. The attachment of the Port's
11 February 1999 Water Effects Ratio Study to the Logan Declaration (Attachment C) is the first
12 public release of this information.

13 21. The Port (Logan 23 et seq; Fendt 43; memorandum 23) and Ecology (Kenny 23;
14 Fitzpatrick 5) devote considerable space to the benefits of doing a WERS. The logic of the
15 WERS discussion is flawed however. The Port's memorandum and Logan both claim that two
16 range-finding WERS studies have been done by the Port. One has been furnished for the record;
17 the other is not in evidence in this case to the best of my knowledge. By way of arguing for the
18 sufficiency of the 401 certification, Fitzpatrick explains that it requires an as-yet-to-be-completed
19 WERS study which will supply new water quality criteria for copper and other metals that can be
20 incorporated in the next renewal of the Port's NPDES permit. Fendt (43) interprets the
21
22
23
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-10

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007311

1 preliminary WER analysis (without saying which one, or explaining the logic) to show that the
2 BMP's from the King County Basic Water Quality Menu are adequate to treat SeaTac
3 stormwater. Logan (25) reports that copper water effects ratios for Miller, Walker, and Des
4 Moines Creeks ranged from 7 to 16. She did not show a derivation for these values nor explain
5 how a derivation works. She then concludes that development of site-specific standards are
6 feasible for SeaTac airport.
7

8 22. The cryptic explanations found in Fendt and Logan entice the reader to look
9 closely at the actual document (Water Effect Ration Screening Study at Seattle-Tacoma
10 International Airport: Toxicity Evaluation of Site Water. Parametrix, February 1999). Important
11 pieces of information are missing from this report. The work was evidently intended to evaluate
12 the toxicity of stormwater, so it was carried out during a rainstorm. No hyetograph or
13 hydrograph of the rainstorm is included in the report. To form a judgment as to what the study
14 was actually investigating, the reviewer would need to understand the time distribution of rainfall
15 and resultant streamflow, and how the sample collection effort related to these time distributions.
16 The only information available on this point is that sample collection did not start until fourteen
17 hours after the onset of a substantial rainstorm. It is very likely that such a fourteen hour delay
18 would result in very dilute stormwater that would not accurately represent the water quality or
19 metals concentrations in the streams or stormwater discharges.
20
21

22 23. Instead of showing actual stream hydrographs from available gauging stations for
23 the period of the tests, the 1999 WERS report shows hydrographs that were produced with the
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-11

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007312

1 HSPF model. The report does not say which implementations of the HSPF model were used, or
2 how well they were calibrated, or if they were calibrated. The report also fails to relate the
3 ostensible streamflow to either the rainfall or to the sampling events.

4
5 24. The reviewer is forced to the conclusion that the 1999 WERS study does not show
6 anything, certainly not that the development of site specific standards is feasible, or that it
7 provides a basis for determining that water quality standards will not be violated.

8 **Stormwater violations of water quality standards has not been acceptable**

9 25. The only reason Ecology is able to claim that there is no violation of water quality
10 standards is that they do not require the Port to take sufficient samples to show a violation. This
11 is not a basis for reasonable assurance. Even if standards did apply to receiving waters only,
12 which they do not, the discharge concentrations are sufficiently high and the receiving flows are
13 sufficiently small that a violation in the receiving water is inevitable.

15 26. Ecology's position on mixing zones is confusing and contradictory.

16 Some amount of mixing should be allowed given that the application of BMP's satisfies
17 the requirement for AKART. Mixing zone analysis to determine dilution factors is a very
18 complicated modeling problem for stormwater. Assuming no mixing zone, the
19 stormwater discharges from Sea-Tac Airport show reasonable potential to violate the
water quality criteria for copper, lead, and zinc.

20 Port NPDES Fact Sheet, p. 29, February 20, 1998. Notwithstanding this statement, the Port's
21 NPDES permit does not authorize mixing zones at its outfalls to Des Moines, Miller, and other
22 streams. Allowing the Port to discharge stormwater at pollutant concentrations above water
23 quality standards is a de facto authorization of a mixing zone, because the concentrations in the
24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-12

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007313

EXHIBIT

AR 007314

1 end of the pipe cannot meet the standards without dilution. The flows available for dilution are
2 potentially very low in receiving waters.

3 **Violations impossible to document under current sampling regime:**

4 27. POS has adopted, and Ecology has approved, water quality sampling practices
5 that make it impossible for the Port, Ecology, or the public to know whether or not a violation of
6 water quality standards has happened. This avoidance of unpleasant data is now used as a basis
7 for reasonable assurance that there are no violations (Fitzpatrick at 6).

- 8
- 9 • NPDES permit no. WA-002465-1 does not require the permittee to collect or report water
10 quality data that are necessary to ascertain whether a given concentration of metals is
11 above or below water quality criteria. First Willing Decl., Exhibit F.
 - 12 • Stormwater is inherently variable - depending upon the nature of the storm event, the
13 number of dry days prior to the storm event, the nature of the surface over which it drains,
14 and other factors (Logan at 9). Thus it is impossible for the Port or Ecology to know
15 whether the Port's sparse sampling regime catches samples that are representative of true
16 pollutant concentrations.
 - 17 • Numeric water quality criteria for metal pollutants are a function of hardness (WAC 173-
18 201A-040). Hardness data is not reported on the monthly DMR's (Discharge Monitoring
19 Reports).
 - 20 • The Port of Seattle's Annual Stormwater Monitoring Reports for SeaTac Airport have the
21 same deficiency concerning hardness data as the DMR's. First Willing Decl., Exhibit F.
 - 22
 - 23
 - 24

25
DECLARATION OF DR. PETER WILLING IN
SUPPORT OF ACC'S MOTION FOR STAY-13

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

AR 007315

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

I declare under penalty of perjury under the laws of the State of Washington that the foregoing is true and correct.

DATED this 24 day of October, 2001, at Bellingham, Washington.

Peter Willing
Peter Willing, Ph.D.

g:\h\acc\pchs\willing-decl-reply.doc

AR 007316

DECLARATION OF DR. PETER WILLING IN SUPPORT OF ACC'S MOTION FOR STAY-14

HELSELL FETTERMAN LLP
1500 Puget Sound Plaza
1325 Fourth Avenue
Seattle, WA 98101-2509

Rachael Paschal Osborn
Attorney at Law
2421 West Mission Avenue
Spokane, WA 99201

Amendment No. 1 to
Interagency Agreement No. C0000141
 between the
State of Washington Department of Ecology (Ecology) and
King County Department of Natural Resources (King County DNR)
Project: King County Drainage Review Services for
Washington State Department of Ecology

PURPOSE: This agreement is hereby amended to revise the scope of work, extend the period of performance and increase the budget due to the addition of work items to be completed by King County DNR for Ecology.

IT IS MUTUALLY AGREED THAT THE AGREEMENT IS AMENDED AS FOLLOWS:

1. **Period of Performance** is amended to read as follows:
 Subject to its other provisions, the period of performance of this Agreement shall commence on February 7, 2000, and be completed by December 31, 2000, unless terminated sooner as provided herein.
2. **Payment** is amended to read as follows:
 Compensation for the work provided in accordance with this Agreement has been established under the terms of RCW 39.34.130. The parties have estimated that the cost of accomplishing the work herein will not exceed \$60,000. Payment for satisfactory performance of the work shall not exceed this amount unless the parties mutually agree to a higher amount prior to the commencement of any work which will cause the maximum payment to be exceeded. Compensation for services shall be based on the Cost Estimate included in the attached Scope of Work.
3. The Scope of Work is hereby deleted and replaced with the text on pages two through six.

Except as expressly provided by this amendment, all other terms and conditions of the original agreement including any amendments thereto remain in full force and effect.

IN WITNESS WHEREOF, the parties hereby execute this amendment:

STATE OF WASHINGTON
 DEPARTMENT OF ECOLOGY

KING COUNTY
 DEPARTMENT OF NATURAL RESOURCES

Gordon White 10/15/00
 Gordon White Date
 Program Manager
 Shorelands & Environmental
 Assistance Program

Pam Bissonnette 11/1/00
 Pam Bissonnette, Director Date

Approved as to form only by
 the Assistant Attorney General

**KING COUNTY DRAINAGE REVIEW SERVICES FOR WASHINGTON STATE DEPARTMENT OF
ECOLOGY**

**SCOPE OF WORK
(ATTACHMENT 1 TO INTERAGENCY AGREEMENT #C0000141)**

General Description:

The King County Department of Natural Resources (King County DNR) will provide technical support to the Washington State Department of Ecology (Ecology) by reviewing the Port of Seattle's (the Port's) proposed stormwater plan at SeaTac Airport for compliance with the technical elements of the 1998 King County Surface Water Design Manual (KC-SWDM).

Review Objectives:

King County DNR will review documents provided to Ecology by the Port of Seattle as part of Ecology's review of the Port's request for water quality certification under Section 401 of the federal Clean Water Act. These documents include: the Port's Preliminary Comprehensive Stormwater Management Plan for Master Plan Update Improvements, Seattle-Tacoma International Airport - Review Draft, dated November 1999 (the Plan) with technical appendices, and associated technical documents; subsequent versions of this document received prior to September 1st, 2000; and the Hydraulic Report: SeaTac International Airport Third Runway Direct Access (April 12, 2000).

This review is meant to determine whether the Port's proposed Plan complies with the technical provisions of the KC-SWDM. The review should determine if the assumptions, analyses, level of detail, data, and information presented are adequate to ensure that "on the ground" implementation of the Port's proposal is consistent with the KC-SWDM's technical provisions. The review is not intended to determine whether the procedural requirements of the KC-SWDM will be met.

The Port's proposal will be reviewed for compliance with the technical provisions of the KC-SWDM identified in the Scope of Review and the Specific Questions for Review below. In addition to specific answers for each technical provision, the review should provide, where applicable, the following information:

- Where the Port's proposal is not consistent with the technical provisions of the KC-SWDM, the review should identify what additional information is needed, or what changes in assumptions, analyses, level of detail, additional information, etc. would be needed for the Plan to be consistent.
- Will the facilities proposed by the Port, in addition to the proposed Des Moines Creek Regional Detention Facility, comply with the goals and objectives of the Des Moines Creek Basin Plan? If not, please identify what changes in assumptions, analyses, level of detail, additional information, etc. would be needed for the Plan to be consistent.

Period of Performance:

February 7, 2000 to December 31, 2000.

Staff Allocation:

Primary:

- One senior engineering staff, Water and Land Resources Department, Drainage Services (Reviewer). Total review not to exceed 490 hours. Ecology will be billed only for hours spent.

AR 007319

Additional:

- Other reviewers, as required, for specific elements of the Port's proposed plan, including reviewers for the proposed stormwater models, water quality Best Management Practices, etc. Total review not to exceed 100 hours. Ecology will be billed only for hours spent.
- One contract manager to oversee technical staff and provide assistance on contract implementation, as needed. Total work not to exceed 40 hours. Ecology will be billed only for hours spent.

Cost Estimate:

Total review time is estimated at 625 hours. Ecology will be billed for services on an hourly basis (in 0.5 hour minimum increments). Since staff hours are limited, overtime will be used. The hourly billing rate will be at \$98.42 per hour. Therefore, the expected review cost is \$58,215.

The parties have estimated that the cost of accomplishing the work herein will not exceed \$60,000. Payment for satisfactory performance of the work shall not exceed this amount unless the parties mutually agree to a higher amount prior to the commencement of any work that will cause the maximum payment to be exceeded.

Scope of Review:

The review will evaluate the Port's proposed stormwater management plan as described in the Preliminary Comprehensive Stormwater Management Plan - Master Plan Update Improvements Seattle-Tacoma International Airport (Review Draft, November 1999), with Technical Appendices A - H (November 1999) and associated documents provided by the Port as necessary to allow the County to determine consistency with the technical provisions of the KC-SWDM. This review will also evaluate any resubmissions or subsequent drafts of the Comprehensive Stormwater Management Plan received prior to September 1, 2000 and the Hydraulic Report: SeaTac International Airport Third Runway Direct Access (April 12, 2000).

The review will also evaluate compliance with the objectives of the Des Moines Creek Basin Plan (November 1997), as required by KC-SWDM Special Requirement #1. Technical provisions of the KC-SWDM to be evaluated include, but are not limited to, the following:

- adequacy of analyses, models, and assumptions used to develop the Plan;
- adequacy of information provided in the Plan; and,
- level of detail necessary to be consistent with the KC-SWDM.

The following reference documents may be used in the review as necessary to assist in determining compliance:

- Des Moines Creek Basin Plan (November 1997);
- Natural Resources Mitigation Plan (Port, Revised Draft, August 1999);
- FEIS, Appendix G (February 1996) to confirm the findings of the current, updated models;
- Public comments received through Ecology/Corps 401/404 process; and,
- Port's response to those comments.

The review will not evaluate compliance with the King County Sensitive Areas Code or other documents (e.g., Master Plan Update, Governor's Certification, previous Section 401 certification, etc). The review will also not consider whether the proposed stormwater plan is in compliance with the federal Clean Water Act or state water quality standards. Where referenced, reviewer will assume that the review draft accurately portrays the objectives of referenced documents not included in the above description. If others more familiar with these past planning documents wish to identify specific drainage issues from those plans, reviewer may be able to incorporate review of specific issues.

AR 007320

Limit of Review: this scope of review is limited to the documents specified above. Review of additional drafts, and/or the final Plan may be possible, but are outside this limited scope of work, and may require a scope and cost adjustment. Questions relating to the scope of work will be directed to Ecology for resolution.

Modeling: the County will review the adequacy of stormwater modeling done by the Port to ensure that proposed modeling assumptions, parameters, and calibrations are accurate and based on valid technical data. The review will evaluate whether the assumptions, models, parameters, calibrations and analyses used are consistent with the KC-SWDM provisions.

Timing of design elements considered in the Plan: there may be timing or sequencing issues if the required level of protection for downstream resources is dependent on both the Port facilities and regional capital improvements as described in the Des Moines Creek Basin Plan. Typically, the implementation of Basin Plan capital improvements such as the RDF system is independent of review standards applied to new development in the basin (such as the Port's proposed development). However, the Port's project is anticipated to exceed the threshold for Large Site Drainage Review and would require a "master drainage plan" type analysis. Under an MDP the development mitigations are tailored to downstream conditions and therefore the plan could be required to address any relevant timing issues, if any.

Meetings: the King County DNR reviewer will be available for a pre-application meeting with Ecology and the Port, a meeting at the conclusion of the review period, and will be available for follow-up phone calls, if necessary. Additional meetings will be scheduled as needed, within the budgetary constraints of the Scope of Work.

Final Product: the final product will be a technical memo from King County Water and Land Resources to Ecology outlining specific findings from the Review. Findings will describe parts of the Plan that are consistent or inconsistent with the technical provisions of the KC-SWDM, and for any parts that may be inconsistent, what further information is needed or what changes are necessary to ensure consistency. Minor review comments may be provided in the form of a marked up review draft.

Deliverables:

All products, reports, and payment requests shall be sent to the attention of:

Tom Luster
Department of Ecology, Headquarters Office
Shorelands and Environmental Assistance Program
PO Box 47775
Olympia, WA 98504-7775

Specific Questions for Review:

Chapter 1 - Drainage Review and Requirements:

Section 1.1 Drainage Review: Does the Port's proposal include adequate information and the necessary level of detail for the appropriate review under the applicable project type - i.e., "High-Use Site", "Redevelopment Project", and/or "Large Site Drainage Review"?

Note: Typically, projects subject to Large Sites Drainage Review go through an initial scoping process with the review agency to determine potential issues and level of analysis. It appears likely that this project will exceed those thresholds. Scoping issues to be resolved will be identified for Ecology to consider.

Section 1.2 Core Requirements: Does the Port's proposal meet the applicable Core Requirements (e.g., Discharge at Natural Location, Offsite Analysis, Flow Control, etc.)?

Section 1.3 Special Requirements: Does the Port's proposal meet the applicable Special Requirements (e.g., Source Control, Oil Control, etc.)?

Section 1.4 Adjustment Process: Are there parts of the Port's proposal that would require an adjustment as described in this section if County approval was required? If so, do these parts of the proposal include adequate technical information for the County to determine that an adjustment would be warranted?

Unless identified in the report, reviewers will not know whether the plan will be modified to be consistent with requirements or whether some regulatory adjustment will be needed. Comments not directly related to specific technical requirements of the KC-SWDM will be identified (e.g., scope of analysis, see above) and left to DOE to determine appropriate response. Technical comments will be referenced with specific SWDM Core/Special requirements or sections. Technical comments not addressed in final plan will likely require approval via some type of formal exception to the standards.

Chapter 2 - Drainage Plan Submittal:

Does the Port's proposal provide adequate information to determine technical compliance with the KC-SWDM requirements for Large Site Drainage Review?

The following reports are generally reviewed during project specific review of Master Drainage Plans, but will not be available for this review of the Plan:

- Technical Information Report
- Site Improvement Plan
- TESC Plan
- Landscape Management Plan

Is the Port's proposal based on assumptions, analyses, models, and other information that would be acceptable to use in the above plans? If not, what additional information is needed (e.g., for offsite analysis, flow control design, etc?),

Note: The stormwater management plan will be reviewed for consistency with adopted policies and standards, identification of downstream conditions/resources, mitigations proposed based on downstream conditions/resources, levels of analysis (tailored to downstream conditions and resources), and feasibility of proposed mitigations for design, construction, and maintained performance. The specific design features included in the Plan will be reviewed for compliance with the KC-SWDM. Conceptual design features included in the Plan will be reviewed for consistency with the KC-SWDM and to identify what additional information is needed to ensure specific designs developed from the conceptual designs are in compliance with the KC-SWDM.

Chapter 3 - Hydrologic Analysis and Design:

Did the Port use acceptable assumptions and models in their hydrologic analyses and design (e.g., did the Port properly use HSPF modeling and the KCRTS simulation)? If not, please identify what changes or additional information is needed.

Is the Port's proposal to use "modified Levels 1 and 2" detention based on adequate technical information as required by the KC-SWDM? If this would require an adjustment under Section 1.4, please determine whether there is adequate justification and technical information to allow such an adjustment. Also, please identify the differences between the KC-SWDM's Level 1 and Level 2 detention, the Port's proposed detention levels, and the preferred stream flow regime described in the Basin Plan as they apply to technical consistency with the requirements of the KC-SWDM.

Chapter 4 - Conveyance Systems:

Does the Port's proposal use appropriate assumptions, analyses, and models to determine whether the conveyance systems meet the requirements of the KC-SWDM? If not, please identify what changes or additional information is needed. Conveyance analysis provided with the Plan will be reviewed for consistency with the technical provisions of the KC-SWDM, including standards and adequate level of mitigation.

Chapter 5 - Flow Control:

Does the Port's proposal use appropriate assumptions, analyses, and models to determine whether the flow control design meets the requirements of the KC-SWDM? If not, please identify what changes or additional information is needed.

Chapter 6 - Water Quality Requirements:

Does the Port's proposal include the water quality facilities necessary to be consistent with the technical provisions of the KC-SWDM? How does the Port's proposal compare with the applicable Menu Goals? Does any part of the Port's proposal require an "Experimental Design Adjustment", and if so, is there adequate information to determine whether an adjustment is warranted?

AR 007323

Enclosure #1 - Final Review Comments - August 2000 Preliminary Comprehensive Stormwater Management Plan - Master Plan Update Improvements - Seattle-Tacoma International Airport - Port of Seattle - Parametrix Inc.

ENCLOSURE 1

OVERVIEW OF REVIEW SCOPE AND LIMITATIONS

The current August, 2000 Stormwater Management Plan (SMP) was received by review staff on August 21, 2000. Errata replacement pages were received on August 28th and 4 additional packets of review materials were accepted up until September 1st. Therefore this review was performed under significant time constraints. Fortunately, review staff were familiar with the project and many of the proposed mitigations were therefore anticipated. Although time constraints did not afford detailed review of every aspect of this conceptual plan, these review comments are as thorough as possible. It is recommended the applicant submit a revised plan addressing the specific review comments outlined in the following pages. While the current plan is in need of some corrections, it is believed that the comments outlined can be addressed in a final plan without resulting in substantial differences in the proposed final mitigations.

Review is limited to those development activities identified by the Port of Seattle (POS) as being Master Plan Update Improvements. Projects not identified under the SMP were not reviewed and therefore no concurrence can be given. Additional review services are being provided to Department of Ecology (DOE) by King County for the temporary SR509 interchange. These are not included in this report and will be transmitted to Ecology under separate cover.

Review comments are limited to minimum compliance with technical standards of the 1998 King County Surface Water Design Manual (KCSWDM). Compliance with King County's technical standards may not be sufficient for project approval under other codes and regulations, and does not mitigate all potential impacts of development. Specifically excluded from the review scope are all procedural requirements of the KCSWDM. If processed under King County regulations, this project would have exceeded the threshold for Large Site Drainage Review and would have been subject to the procedural requirements whereby performance standards are tailored specific to the proposed development. Review was performed per the KCSWDM technical requirements which would have applied under Full Drainage Review for a project within a highly urbanized basin. (see excerpts from KCSWDM in text box on page 2)

Coordination with other documents (e.g., natural resource mitigation plan, biological assessment, etc.) is very important. Some inconsistencies are expected due to the time constraints this project has been under. It is recommended that a consistency review be performed to ensure any significant inconsistencies are corrected.

It is recommended that Ecology develop a plan to oversee and monitor compliance with the mitigations outlined in the final SMP. As the proposed Master Plan Update (MPU) development projects move from the planning stages to development of construction plans, the proposed stormwater mitigations will also need to be updated to reflect any changes. Oversight and monitoring are key elements to successful implementation of any stormwater management plan. One option is to create a "Compliance Team", representing the necessary disciplines, to work with the POS to achieve compliance with the goals and objectives laid out in this and other related documents.

AR 007324

ENCLOSURE 2

SPECIFIC REVIEW COMMENTS - VOLUME 1

Page 2-1, last paragraph, last sentence - The Level 1 standard is not effective in controlling streambank erosion because the standard does not control the amount of time that high flows are discharged. Most of the erosive work on stream channels occurs at flowrates less than the 10-year event so current statement is inaccurate. This is because erosive work is a function of force (flow) and time. The 10-year flows happen infrequently, therefore their contribution to overall erosive work is relatively small.

Figure 2-1 - While this figure indicates that 1994 base year is conservative for the Miller Creek basin, it does not support 1994 conditions in the Walker Creek basin. Page 2-4 provides the rationale which appears to be flawed in that it compares 1994 effective impervious with 1974 total impervious. The 1974 effective impervious would be considerably less than total impervious due to the residential nature of the 1974 residential area.

Note: it appears that the facility sizing for the Walker Creek facility was done using the 1994 subbasin delineation as appears in Appendix B. This is inconsistent with the indication that the facility release rates were determined using the proposed subbasins. This makes a big difference in the Walker Creek watershed. Whereas the existing 1994 impervious surface draining to Walker creek is 1.7 acres, the predeveloped impervious of the future subbasin is 3.05 acres. It appears that the more conservative subbasin configuration was used for these western draining facilities.

Page 2-4 - Whiting, 2000 personal communication. Reviewer recommended adopting the same target flow regime approach used throughout the rest of the project site. Beyond that, SMP must provide 1979 landcover conditions, or better. Since it is believed that no net impervious surfaces removal occurred between 1974 and 1979, reviewer would accept 1974 as equivalent to 1979. The use of 1994 landuse can only be approved where demonstrated to be more conservative than 1974/1979.

Page 2-4 - Section 2.1.3 - The flow control performance goal used throughout the SMP is Level 2, which matches high flow durations, not just flow frequencies. Flow durations is the percent of time that a given flow rate is exceeded. Sentence should read "...regime, was determined based on flow duration analyses that protect the creeks from frequent, high velocity flows." Footnote 5 would be "A flow duration analysis depicts the percent of time that the range of flows are exceeded over the entire historical period of record."

Page 2-5, 1st paragraph, 2nd sentence - "...amount of time that streamflow ~~occurs~~ is exceeded at different..."

Page 2-5 1st paragraph, last sentence - Increases in runoff volume cannot be mitigated through detention. However, high-flow durations, and peak flows can be mitigated through detention.

Page 2-6 top of page - target flow regime landcover is 75% forest, <= 10% impervious, and remainder of grass. It is not correct to say that of the pervious area 75% was forest and 15% was grass. This is basically what was done in 11/99 SMP, which reviewer will not support as a stable flow regime.

Page 2-6, Section 2.1.4 - Due to potential downstream flooding problems identified in Appendix P, the stated performance goal should include matching of 100-year peak flows in addition to matching flow durations. The SMP facility performance appears to already achieve this, but should be included in the stated performance goals so it is clear that final designs also need to achieve this. Alternatively, a Level 2 or 3 downstream analysis would be needed to demonstrate no adverse impact to possible flooding locations as a result of this project.

Page 2-9, list of BMPs. King County does not allow combined detention and sandfilters. Sandfilters should have its own bullet in the list.

AR 007325

Enclosure #2 - Final Review Comments - August 2000 Preliminary Comprehensive Stormwater Management Plan - Master Plan Update Improvements - Seattle-Tacoma International Airport - Port of Seattle - Parametrix Inc.

Page 2-9. Filter Strips - removal of metals is not the performance goal of this facility. The existing relatively high Cu concentrations off the runways indicate they are not great at metals removal. Since the 3rd runway will be treated with the same filter strip BMPs, the water quality off the 3rd runway would be expected to be similarly high. If SMP is targeting enhanced water quality treatment for metals removal, BMPs should be selected from the KCSWDM Resource Stream Water Quality Menu. This level of treatment is consistent with previous 401 conditions. Note: Under the KCSWDM Large Site Drainage Review process, mitigations are tailored specific to each project. If this project was to comply with the procedural requirements of the KCSWDM, enhanced water quality treatment may have been required.

Page 3-8. Section 3.2 last paragraph. Project site encompasses 3 watersheds, separate HSPF models were developed for Miller, Walker and Des Moines creeks. *- See p. 1 of those comments*

Page 4-6 first paragraph. This is the first mention of the Gilliam creek basin. As there are no MPU projects identified in this basin, no conceptual designs are included in the SMP. Therefore, no review or concurrence can be granted for future development activities here. If future redevelopment projects occur, they will likely be subject to redevelopment standards under the Ecology manual, NPDES, and/or ESA initiatives.

Page 4-7. Section 4.2.2.1. 1st paragraph. HSPF model used 153 ac-ft of storage, where this section indicates that 249 ac-ft (81.4 million gallons) of storage will be provided. This is a significant difference that needs to be rectified.

Page 4-7 Section 4.2.2.1. There should be results from the HSPF model runs of the IWS system in this section. SBUH is a poor choice to use in determining size requirements of the storage reservoir, especially when the IWS system is already set up in the HSPF model. KCSWDM does not allow sizing of storage reservoirs using event based models.

Page 4-7. footnote 11. Personal discussions with reviewer was taken out of context. The use of an event model to model a system receiving storm flows where the inflow rates far exceed the processing rates should not be analyzed with an event model. And, in fact, the HSPF model already includes the IWS treatment system. An event model assumes the reservoirs are empty at the start of an event and are able to drain completely before the next storm event occurs. These assumptions are not consistent with local weather patterns and this system configuration. Reviewer indicated that as a check, an analysis was performed by the reviewer using 433 acres of impervious with a simplified reservoir. The reservoir included linearly increasing discharge/storage up to the point where the first reservoir cell was full (1.6 million gallons). At the same point maximum future processing was reached (4 MGD). Above this level, the processing rate was kept at the maximum rate up to the stated future storage capacity, 81.4 million gallons. Reviewer is not certain these assumptions are reasonable and asked designer to verify assumptions and include a similar analysis in the SMP.

Based on the reviewer's assumptions, the potential for overtopping of the IWS system will be reduced in the future. However, the analysis showed that the IWS system would need to be run at full processing capacity almost continuously during the wetter winter months. It is not known if this is realistic with this system. The analysis further showed that if either of the two improvements (doubling processing rate, and increasing storage capacity to 81.4 million gallons) did not occur, overtopping of the IWS lagoons would be significant issue.

Volume Discrepancy: The HSPF model for Des Moines Creek includes a model of the IWS system. There are inconsistencies in the amount of storage provided under future conditions. The HSPF model represents only 60% of the future storage volume indicated on page 4-7. This inconsistency needs to be resolved.

Model Results: No discussion of the results of the HSPF model of the IWS system. Did the system overtop to Des Moines Creek? What is the frequency, magnitude and duration of overtopping predicted by the HSPF model?

AR 007326