King County
Department of Natural Resources
Director's Office
King Street Center
201 South Jackson Street, Suite 700
Seattle, WA 98104-3855

August 3, 2001

Ann Kenny, Senior Permit Specialist
Washington Department of Ecology
Northwest Regional Office
3190 – 160th Avenue Southeast
Bellevue, WA 98008-54552

Dear Ms. Kenny:

King County is pleased to have had the opportunity to assist the Department of Ecology by making its technical review capacity and knowledge of local stormwater conditions available for the review of the Port of Seattle's *Comprehensive Stormwater Management Plan* (SMP) for Master Plan Improvements at SeaTac International Airport. This effort has set an excellent example of how state and local government can work cooperatively in addressing pressing issues facing the region.

As with our previous reviews of this project, it is important to keep in mind the limitations of the work that we have performed. First, this review is limited to ascertaining whether the SMP attained minimum compliance with the 1998 *King County Surface Water Design Manual.* Compliance with the technical provisions of the Design Manual does not mitigate all potential impacts of development and may not provide sufficient information to allow for approval under other codes and regulations. Compliance with the Design Manual is, however, a good start towards mitigating the impacts of this large and complex project.

It is also important to remember that this review is limited to those development activities identified by the Port of Seattle as being Master Plan Update Improvements. While other projects of varying magnitude are being proposed for this area, only those projects included in the formal SMP submission were reviewed for this comment letter. No assumption of concurrence with the technical details or effectiveness of additional projects should be assumed without our specific written comment.

Our reviewers found this version of the SMP is consistent with the technical requirements of the *King County Surface Water Design Manual.* The SMP demonstrates a feasible conceptual strategy for complying with the technical provisions of the *King County Surface Water Design Manual* and effectively demonstrates that the proposed improvements could fully comply with Design Manual requirements.

Enclosure 1 provides general commentary on how the SMP responds to the specific core and special requirements of the *King County Surface Water Design Manual*, as well as an overview of the review scope and limitations.

Enclosure 2 provides a summary of the various surface water facilities proposed for construction, along with specific information on each facility, such as the volume of the facility, the drainage area served, and the amount of impervious area tributary to each facility.

Thank you for this opportunity to work together on behalf of the region. If you have any questions, please contact David Masters, Senior Policy Analyst, or Kelly Whiting, Senior Engineer, both with the Water and Land Resources Division. David can be reached at (206) 296-1982 or via e-mail at david.masters@metrokc.gov. Kelly can be reached at (206) 296-8327 or via e-mail at kelly.whiting@metrokc.gov.

Sincerely,

Pam Bissonnette
Director

PB:tv F968

Enclosures

cc: The Honorable Ron Sims, King County Executive
Ray Helwig, Northwest Regional Director, Washington Department of Ecology
Paul Tanaka, County Administrative Officer, Department of County Administration
Tim Ceis, Chief of Staff, King County Executive Office
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Debbie Arima, Assistant Manager, WLRD, DNR
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Kelly Whiting, Senior Engineer, Engineering Studies and Standards, WLRD, DNR
Joanna Richey, Manager, Strategic Development Section, WLRD, DNR
David Masters, Senior Policy Analyst, Watershed Coordination Unit, WLRD, DNR

ENCLOSURE 1
OVERVIEW OF REVIEW SCOPE AND LIMITATIONS

The December 2000 Comprehensive Stormwater Management Plan (SMP), as revised in July, 2001 has been reviewed for consistency with the technical provisions of the 1998 King County Surface Water Design Manual (KCSWDM). The review has concluded that the SMP has demonstrated that the mitigations proposed in the SMP are consistent with the standards set forth in the KCSWDM. This enclosure details key findings regarding this compliance assessment.

Review has been limited to those development activities identified by the SMP as being Master Plan Update (MPU) Improvements (see SMP Table A-3). Projects not included in the SMP were not reviewed and therefore no presumption of consistency with KCSWDM should be drawn for these projects. Review was performed per the KCSWDM technical requirements which would have applied under Full Drainage Review (see KCSWDM excerpts in text box on page 2), except where the SMP identifies performance goals exceeding the KCSWDM standards. Compliance with King County's technical standards may not be sufficient for project approval under other codes and regulations, and these standards are known to be insufficient to fully mitigate all potential impacts of development. Specifically excluded from the review scope are all procedural requirements of the KCSWDM.

Review and concurrence of a stormwater management plan is primarily a review of design concepts and assumptions to determine if the proposed mitigations demonstrate a feasible approach to comply with the identified performance goals. As the proposed MPU development projects move from the planning stages to development of construction plans, the proposed stormwater mitigations may need to be updated to reflect any changed conditions. Prior to construction of specific projects, additional review and approval of the final construction drawings and associated technical information report is typically required. Oversight and monitoring are key elements to successful implementation of any stormwater management plan. It is recommended that Ecology and the Port develop a plan to oversee and monitor compliance with the mitigations set forth in the SMP. One option is to create an Ecology "Compliance Team", representing the necessary disciplines, to work with the Port to achieve compliance with the goals and objectives laid out in the SMP and related documents.

It has not been determined what legal vesting an Ecology approved SMP affords the future development activities identified within. The SMP includes projects where specific flow control and water quality mitigation approaches and conceptual plans have been identified, but which may be adjusted during final design. The SMP also lists other development projects which do not have specific mitigations identified (see SMP Table A-3). Ecology and King County are working on updated stormwater standards needed to implement Clean Water Act and Endangered Species Act protection objectives. Review of the SMP against these draft standards was not performed. If final facility designs include revised on-site performance goals, Ecology may wish to review the final proposed facilities against the standards in effect at that time.

EXCERPT FROM 1998 KCSWDM

1.1.4 DRAINAGE DESIGN BEYOND MINIMUM COMPLIANCE

This manual presents King County's minimum standards for engineering and design of drainage facilities. While the County believes these standards are appropriate for a wide range of development proposals, compliance solely with these requirements does not relieve the professional engineer submitting designs of his or her responsibility to ensure drainage facilities are engineered to provide adequate protection for natural resources and public and private property.

Compliance with the standards in this manual does not necessarily mitigate all probable and significant environmental impacts to aquatic biota. Fishery resources and other living components of aquatic systems are affected by a complex set of factors. While employing a specific flow control standard may prevent stream channel erosion or instability, other factors affecting fish and other biotic resources (such as increases in stream flow velocities) are not directly addressed by this manual. Likewise, some wetlands, including bogs, are adapted to a very constant hydrological regime. Even the most stringent flow control standard employed by this manual does not prevent increases in runoff volume which can adversely affect wetland plant communities by increasing the duration and magnitude of water level fluctuations. Thus, compliance with this manual should not be construed as mitigating all probable and significant stormwater impacts to aquatic biota in streams and wetlands, and additional mitigation may be required.

In addition, the requirements in this manual primarily target the types of impacts associated with the most typical land development projects occurring in the lowland areas of the County. Applying these requirements to vastly different types of projects, such as rock quarries or dairy farms, or in different climatic situations, such as for ski areas, may result in poorer mitigation of impacts. Therefore, different mitigation may be required.

OVERVIEW OF CORE AND SPECIAL REQUIREMENTS

Core Requirement #1 Discharge at Natural Location
The Master Plan Update (MPU) development activities will result in modifications to the constructed and natural drainage systems within the Seattle-Tacoma International Airport (STIA) area. Below is a summary of STIA areas per the landuse tables in Appendices A and B. The differences in basin sizes can mostly be attributed to the collection and conveyance of potentially polluted stormwater runoff to the Industrial Waste Treatment System (IWS).

Summary of Drainage Basin Areas (acres)

	Calibration	PreDev	PostDev
Des Moines STIA	1672	1585	1577
Walker STIA	234	234	234
Miller STIA	1247	1212	1184
Total STIA Storm	3153	3031	2995
Des Moines IWS	285	331	375
Walker IWS	0	0	0
Miller IWS	0	86	80
Total STIA	3438	3448	3450

Note: numbers taken from landcover tables dated 12/00

Core Requirement #2: Downstream Analysis
Downstream analysis is provided in Appendix P of the document. Identified downstream problems include channel erosion and potential existing flooding problems in Miller Creek. The associated on-site mitigations for these problem types include,

Channel erosion - apply Level 2 streambank erosion standard

- The Level 2 standard is the base standard being applied across the project site. The entire airport site is being retrofitted back to predevelopment conditions corresponding to 75% forested, 15% grass, and 10% effective impervious. This will serve to reduce the existing rates of erosion, although the benefit will be diminished further downstream due to other existing development not having been retrofitted to the same level of protection. Implementation of the Des Moines Creek Basin Plan and development and implementation of a Miller/Walker Creek Basin Plan will help address stormwater needs across the entire basins.

Existing flooding problem - match 100-year peak flows in addition to the Level 2 standard.

- The SMP includes the matching of 100-year peak flows as a specific performance goal and was achieved through the flow control mitigations proposed.

Core Requirement #3: Flow Control
The SMP uses a flow control performance standard equivalent to the KCSWDM Level 3 standard. This includes the control of the duration of high flow discharges between 50% of the 2-year and the full 50-year peak flows. In addition, the 100-year peak discharge is controlled to the predeveloped 100-year level.

The SMP predevelopment landcover assumptions of 75% forest, 15% grass, and 10% maximum impervious provides a target flow regime that is more protective than the current "Existing Site Condition" requirements of the KCSWDM. Using general stream stability guidelines a basin consisting of 75% forest, 15% grass and 10% impervious would provide a flow regime predicted to be geomorphically stable, but

which may have some water quality and base flow concerns. However, since the airport drainage areas comprise a small portion of the entire stream basin, the instream benefits will be less than if all properties in these basins were retrofitted to this standard. Additional mitigations are being proposed to address summer low-flow impacts through a series of low-flow augmentation vaults. Water quality treatment and monitoring is proposed to help ensure that water quality standards would be met.

Under the KCSWDM, flow controls (detention/infiltration) would only be required for new added impervious. Under the draft updates to the Ecology stormwater manual and KCSWDM currently in preparation, flow control retrofits would likely be required for any replaced impervious surfaces. The Port is providing flow control retrofits for all impervious surfaces to the 75/15/10 landcover conditions described above, although this would not be required by the Ecology manual or by KCSWDM.

The enclosed table (Enclosure 2) provides an overview of the storage reservoirs reviewed under the SMP and the associated landcover (impervious and pervious) assumptions used to size these facilities. Enclosure 2 also provides a list of MPU projects identified to be served by each proposed facility.

The detention ponds located around the toe of the fill embankment could potentially be deep enough to intercept seasonal high groundwater. The SMP proposes that final facility design may be altered to maintain the live storage volume above the groundwater level. If this occurs, it may require raising of berm heights, increasing side slopes, or as a last resort, expanding the facility footprint. Facility footprints may not be able to increase due to site constraints. Modifications to SDN3A may result in that facility exceeding the threshold of State Dam Safety regulations.

The SMP uses a special PERLND calibration for the embankment fill. This calibration was based on limited monitoring data collected from a 1998 embankment area. The effect of this calibration is for fill soils to produce higher runoff than till-grass, but less than impervious. The SMP assumption is that the final embankment will react hydrologically similar to the smaller 1998 embankment area. The SMP has not changed this assumption since it was first proposed during the Miller Creek calibration meetings in Spring of 2000. Ecology's June, 2000 PGG report provides a range of expected soil characteristics for the fill embankment. The expectation is that fill soils will have a hydrologic response more similar to outwash grass with flat slopes than to the previous embankment fill calibration work. At this point in time there was a separation in assumptions between how the fill is characterized in the embankment modeling (used primarily for low stream flow assessment and wetland mitigation) and the SMP modeling (used primarily for high flow assessments, and flow control mitigation sizing). Based on the June 2000 characterization of the embankment's hydrologic response, the SMP assumptions would provide some conservatism in the design of flow control mitigations.

The SMP hydrologic models have assumed that all airport impervious areas are 100% effectively connected to the downstream drainage system. Therefore, the modeled impervious areas equal the total impervious areas. This assumption was used consistently in the HSPF models for all 3 stream basins for the calibration, future and predeveloped (meaningful where use of an effective impervious fraction would result in less than 10% effective impervious) landcover assumptions. If runoff from the runway does infiltrate into the fill embankment as indicated by the June 2000 PGG report, the effective impervious assumptions would provide some conservatism in the design of flow control mitigations.

Core Requirement #4: Conveyance Systems

The SMP indicates that all existing conveyance systems provide at least a 10-year level of capacity. All new conveyance systems will be designed to at least a 25-year level of capacity and will meet the spill containment provisions of the KCSWDM.

The project site includes the challenge of conveying flows down from the runway elevation to the detention and sediment control ponds at the foot of the embankment. The SMP provides, in Appendix W, conceptual designs for energy dissipation structures that will be used to control the high velocity flows at those outfalls.

Core Requirement #5: Erosion and Sediment Control
The SMP provides preliminary erosion and sediment control plans for the proposed 3rd runway embankment. Additionally, the SMP indicates that an erosion control specialist will be responsible for overseeing the installation and performance of these facilities. This is an important aspect of achieving effective erosion/sediment controls on projects of this size.

Of concern is the close proximity of some sediment ponds to the stream channels. However, this cannot be avoided due to the close proximity of the final embankment to the stream channels. Any overtopping, bypassing, or failure of these ponds may result in sediment being discharged to Miller Creek due to the short flowpaths from the ponds to the stream. Extra diligence on erosion control is warranted to minimize sediment transport from disturbed soils (e.g., the embankment fill) to the final sediment ponds. This would include, but is not limited to,

- soil stabilization and cover measures on all disturbed soils.
- minimizing the "open" (without cover measures) areas to only those portions of the project site which are being actively worked.
- further minimizing the areas being actively worked during the wet season (October 1 through April 30), and before forecasted precipitation events.
- frequent inspections of the erosion and sediment control facilities by the erosion control specialist.
- daily inspections of the sediment ponds in close proximity to the stream channels during the wet season, and
- contingency plans developed beforehand to address potential problems which may be encountered with any of the erosion and sediment control BMPs, with emphasis on the sediment ponds serving as the last line of defense prior to discharge to stream.

Core Requirement #6: Maintenance and Operation
This KCSWDM Core Requirement is mostly procedural in nature, written specifically to implement King County's policies and codes. This review is limited to compliance with the technical aspects of the KCSWDM and specifically excludes procedural requirements specific to King County. Therefore, Ecology should ascertain that adequate provisions and agreements are made to ensure the proper maintenance and operation of stormwater facilities on this project site.

The following is the reviewers understanding of maintenance and operation responsibilities at the project site: All facilities on the project site are to be maintained by the Port of Seattle, or their designee. Where maintained by others, Port of Seattle is ultimately responsible for proper maintenance and operations under their NPDES permit.

Some of the deeper vaults exceed the maximum allowable depth to invert (measured from final surface grade) of 20 feet. The SDS7 vault is proposed as an above ground storage structure. An assessment of maintenance feasibility has been provided which supports the SMP position that the Port will be able to perform necessary maintenance activities.

Core Requirement #7: Financial Guarantees and Liability
This SWDM Core Requirement is specific to procedures required under King County policy and code. The intent is to ensure that there is adequate funding available to ensure completion of the required mitigations. It requires that construction be completed, or the posting of bonds and other financial guarantees occur prior to final permit approval.

There are substantial costs associated with the proposed mitigations. Many of the facilities are proposed as underground vaults to avoid the wildlife attraction associated with open ponds. The largest of the eight flow control vaults will have 88 acre-feet of storage, nearly 4 acres in area at 25 feet of live storage depth. The Port has provided a memo indicating the feasibility of the structural design of this facility. A commonly used estimate of vault construction costs is $5- per cubic-foot. With a total volume for new vaults for flow control (347.1 acre-feet), water quality (4.5 acre-feet), and reserve storage (46.1 acre-feet) of 397.7 acre-feet, the total cost in vaults is at $86.6 million. Note: SMP uses a vault cost of about $12- per

cubic foot in assessing feasibility of some water quality retrofits. This value would put the total estimated total vault cost at $207.9 million.

Core Requirement #2: Water Quality

The SMP has provided conceptual designs for water quality treatment facilities consistent with those found in the KCSWDM Basic Water Quality Treatment Menu. The performance goal of basic water quality treatment is 80% TSS removal. The SMP proposes to provide treatment for all new pollution generating surfaces and for all existing pollution generating surfaces through a combination of biofiltration, wetvaults and reroutes to IWS system. Review of these conceptual designs has concluded that they are sized appropriately for the assumed service areas and that they can feasibly be constructed consistent with KCSWDM design standards. STIA areas not proposed for water quality treatment include:

- Approximately 80 acres of existing pollution generating impervious surfaces as shown in SMP Figure 4.4 and Table 7-8. The SMP indicates that the high cost and disruption to airport operations associated with construction of underground wetvaults for these areas make water quality retrofits impractical.

Two instances where source controls are proposed in-lieu of water quality treatment include;

- Landscape Management Plans which implement the source control objectives of the KCSWDM are proposed for all managed landscaped areas, including the runway/taxiway infields.
- Uncoated Metal Roofs are proposed to be coated to prevent leaching. Although not specifically mentioned as an option in the KCSWDM, this approach is consistent with the intent of requiring water quality treatment only for uncoated metal roofs. If the coating process is not successfully completed, water quality treatment would be required.

The above approaches were determined to be consistent with the KCSWDM application of water quality treatment standards for new and redeveloping properties. SMP Table 7-8 provides an overview of the proposed water quality treatment facilities for new and existing pollution generating impervious surfaces.

Previous comments have been provided in regards to copper (Cu) concentrations from some of the existing STIA outfalls. The SMP indicates that the stormwater collection and conveyance system design can accommodate additional water quality treatment measures if deemed necessary through continued monitoring.

The STIA Industrial Wastewater System (IWS) is regulated by Ecology under the Clean Water Act Section 402. The KCSWDM does not set standards for industrial wastewater systems, such as the IWS. The TSS removal efficiency of the IWS is not presented in the SMP. Evaluation of the IWS storage capacity using future landcover, storage capacity, and processing rates indicated that the IWS lagoons are not predicted to overtop to stream. The biggest concern is the sustainability of the assumed future processing rate. As the IWS outfall is proposed to be redirected to the sanitary sewer which may include constraints on allowable processing rates, the issue of potential overtopping should be addressed once future maximum discharge rates to sanitary sewer have been determined. The SMP results do not support the contention of the IWS feasibility report that sufficient storage exists to allow the IWS discharge to be slowed or stopped during storm events. It may be necessary for the Port to retain the use of the current outfall to Puget Sound depending on conditions placed on the proposed connection to sanitary sewer. Since specific future storm volumes cannot be reliably predicted, the IWS operation appears to require near maximum processing rates (3.2 to 4.0 mgd) whenever lagoon #3 is receiving inflows. Any additional areas being rerouted to IWS and not included in the analysis would also warrant evaluation. Note: The modeled future IWS service area includes approximately 410 acres of impervious and 24.6 acres of grassed pervious area. The ultimate storage volume is modeled as 76.9 million gallons, and the maximum sustained processing rate is assumed whenever lagoon #3 is storing wastewater.

Special Requirement #1: Adopted Area Specific Requirements

This would include the Des Moines Creek Basin Plan. The SMP mitigations do not rely on construction of the regional detention facility, or low flow augmentation facility for mitigating existing or new impervious

areas. However, the SMP indicates that if conditions change (e.g., the regional facility is constructed prior to MPU development), that the SMP mitigations may be revised. Since this alternative approach was not analyzed by the SMP, Ecology review and approval of the plans and sizing for final construction may be necessary. The Port is an active member of the Des Moines Creek Basin Committee.

Special Requirement #2: Floodplain/Floodway Delineation
A copy of the floodplain analysis on Miller Creek is included in SMP Appendix J. MPU development has been identified within the floodplain delineation, specifically the 156th/154th roadway realignment in the Vacca farm area, and a relatively small displacement from the 3rd runway embankment near where Miller Creek turns west towards SR509. Calculations provided demonstrate that the roadway realignment is fully compensated for in the Vacca farm area at the 100-year level flood. The embankment calculations indicate that an additional 5 cubic yards is displaced by the embankment footing. The indication is that the base floodplain elevation was determined to not rise due to this amount of displacement, which in turn will not affect the flood carrying capacity of the stream.

Special Requirement #3: Flood Protection Facilities
This special requirement is not applicable as none of the streams are restrained by levees or revetments in the vicinity of the project site.

Special Requirement #4: Source Control
The SMP proposes the use of source control BMPs, many of which are currently being applied to maintenance and operations of the site. Two new source control BMPs are proposed for the site under the SMP. These include retrofitting of existing non-coated metal roofs to prevent leaching of metals, and the implementation of improved landscape management guidelines to minimize the use of pesticides and fertilizers to managed landscape areas including the infield areas surrounding the runways and taxiways. Both of these source control BMPs are consistent with the requirements of the KCSWDM.

Special Requirement #5: Oil Control
Several areas within the project site meet the threshold for high-use sites under the KCSWDM criteria. Most of these areas are being, or are proposed to be, diverted to the IWS which has oil control and spill containment provisions and is regulated as an industrial wastewater discharge rather than a stormwater discharge. One additional area was identified under the SMP as meeting the high-use threshold, the Terminal Drives. The SMP proposes to either install treatment BMPs to this area, or to divert these areas to the IWS. Both alternatives appear to be feasible and consistent with the requirements of the KCSWDM.

Year Project to be Constructed	Comments	LANDCOVER ASSUMPTIONS BY FACILITY (acres) EIA = Effective Impervious Area			IMPERVIOUS SURFACES (acres) (MITIGATION BREAKDOWN)		
		Effective Impervious or Total Area	Existing Conditions 1994	Predeveloped Conditions (flow control targets) PRE	Future Conditions (Area Served by Facility) FUTURE	Existing/Replaced Impervious to be Retrofitted RETROFIT (=1994 - PRE)	Post-1994 and Future Added Impervious (Controlled) NEW (=FUTURE-1994)	Impervious Surfaces Mitigated TOTAL (=FUTURE - PRE)
1996	retrofit	EIA	19.2	6.5	32.5			
10 -- 15	retrofit	Total Area	64.6	64.6	64.6	12.7	13.3	26.0
06 -- 10	retrofit and new							
1995	retrofit	EIA	178.3	37.6	203.4			
1997	new	Total Area	376.0	375.7	375.9	140.8	25.0	165.8
1998	new	****Includes SDS3 and SDS5 landcover						
1999	new							
1998	new	EIA	7.1	7.0	35.1			
1999	new	Total Area	69.8	69.8	69.8	0.1	28.1	28.2
04 -- 06	new	EIA	13.8	10.5	40.4			
		Total Area	117.2	117.1	117.1	3.3	26.6	29.8
00 -- 00	retrofit	EIA	141.2	21.8	176.7			
00 -- 02	retrofit	Total Area	218.2	218.2	218.2	119.4	35.5	154.9
02 -- 04	retrofit							
99 -- 04	retrofit							
1998	retrofit	DES MOINES TOTALS	1994	PRE	FUTURE	RETROFIT	NEW	TOTAL
04 -- 07	new	EIA	359.6	83.3	488.0			
02 -- 04	retrofit	Total Area	845.7	845.5	845.6	276.3	128.4	404.7
02 -- 05	retrofit and new	Total Live Storage		161.4 Ac-Ft				
02 -- 05	retrofit and new							
04 -- 06	new							
04 -- 06	new							
04 -- 06	new							
01 -- 05	retrofit							
06 -- 08	retrofit							
06 -- 08	retrofit							
06 -- 07	retrofit							
06 -- 08	retrofit and new							
06 -- 09	retrofit							
06 -- 10	retrofit							
06 -- 10	retrofit							

Year Project to be Constructed	Comments	Effective Impervious or Total Area	Existing Conditions 1994	Predeveloped Conditions (flow control targets) PRE	Future Conditions (Area Served by Facility) FUTURE	Existing/Replaced Impervious to be Retrofitted RETROFIT (=1994 - PRE)	Post-1994 and Future Added Impervious (Controlled) NEW (=FUTURE-1994)	Impervious Surfaces Mitigated TOTAL (=FUTURE - PRE)
		LANDCOVER ASSUMPTIONS BY FACILITY (acres) EIA = Effective Impervious Area				IMPERVIOUS SURFACES (acres) (MITIGATION BREAK		
04 -- 05	new	EIA	32.5	7.0	49.7	25.5	17.2	42.7
1995	retrofit	Total Area	92.1	88.9	88.9			
1998	new							
1999	new							
2000	retrofit							
01 -- 05	retrofit	EIA	1.1	0.8	8.1	0.3	7.1	7.3
06 -- 10	new	Total Area	8.1	8.1	8.1			
01 -- 06	retrofit and new	EIA	41.2	6.4	13.2	34.9	-28.0	6.9
		Total Area	65.3	65.3	21.6	****includes diversion to IWS		
1995	retrofit	EIA	14.5	4.8	24.3	9.7	9.8	19.5
1998	new	Total Area	73.2	73.2	73.2			
1999	new							
1998	retrofit	EIA	0.9	4.2	32.3	-3.4	31.4	28.1
		Total Area	42.3	42.3	42.3	**** more EIA in PRE than 1994		
						****effectively 90% retrofit of NEPL		
04 - 06	new	EIA	0.9	0.9	15.4	0.0	14.6	14.6
		Total Area	52.8	53.0	52.8			
04 - 06	new	EIA	4.3	4.3	27.0	0.0	22.6	22.6
		Total Area	96.9	96.9	96.9			
04 - 06	new	EIA	1.9	1.9	8.2	0.0	6.4	6.4
		Total Area	30.5	30.5	30.5			
01 -- 04	new	EIA	1.0	0.1	0.8	0.8	-0.1	0.7
		Total Area	3.9	3.9	3.9			
02 - 03	154th/156th providing flow control for 10% of NEPL							
02 - 03	154th/156th							
2	temporary not included in SMP							
		MILLER TOTALS	1994	PRE	FUTURE	RETROFIT	NEW	TOTAL
		EIA	98.2	30.4	175	67.8	80.9	143.7
		Total Area	465.1	462.0	417			
		Total Live Storage		176.3 Ac-Ft				

Year Project to be Constructed	Comments	Effective Impervious or Total Area	Existing Conditions 1994	Predeveloped Conditions (flow control targets) PRE	Future Conditions (Area Served by Facility) FUTURE	Existing/Replaced Impervious to be Retrofitted RETROFIT (=1994 - PRE)	Post-1994 and Future Added Impervious (Controlled) NEW (=FUTURE-1994)	Impervious Surfaces Mitigated TOTAL (=FUTURE - PRE)
		OVER ASSUMPTIONS BY FACILITY (acres) EIA = Effective Impervious Area				IMPERVIOUS SURFACE (MITIGATION BREAK		
04 -- 06	new	EIA	3.3	2.2	9.5			
		Total Area	44.6	44.9	44.5	1.1	6.2	7.3
1	temporary not included in SMP							
no impervious								
no impervious								
no impervious								
no impervious								
impervious removed								
	TESC ponds							
	TESC ponds							
mid-project	TESC ponds							
mid-project	TESC ponds							
mid-project	TESC ponds							
00--05	IWS							
2000	IWS							
02--05	mid-project							
project cancelled								
01--05	IWS							
01 -- 05	not included in SMP							
06 -- 10	not included in SMP							
06 -- 10	not included in SMP							
06 -- 10	not included in SMP							
10 -- 13	not included in SMP							
10 -- 20	WSDOT project							
02 -- 04	not included in SMP							

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