1.0 Executive Summary

This report summarizes investigations conducted to assess the hydrologic effects of constructing a fill embankment for a third runway at Seattle-Tacoma International Airport. In 1999, public concerns prompted the Washington State Legislature and Governor Locke to approve this study, which focuses on aquifers, wetlands, and Des Moines, Miller, and Walker Creeks, which drain the area. The study was conducted under the Washington State Department of Ecology's oversight by a team of consultants: Pacific Groundwater Group (PGG); Earth Tech, Inc.; and Ecology and Environment, Inc., (E & E).

The study area varies depending on the issue evaluated. The largest areas considered are the Miller Creek and Des Moines creek watersheds which comprise a total of about 15 square miles surrounding the airport and include the fill borrow sources. The smallest areas considered are local drainages in the middle reach of Miller Creek where extensive riparian wetlands will be affected.

The scope of work for this project contained the following tasks:

- Reviewing existing documents
- Interviewing Port staff, community organizations, individuals, and consultants
- Collecting additional field data
- Reviewing models used by Port consultants to assess hydrologic impacts
- Providing independent evaluation of certain hydrologic effects using new and existing data
- Reviewing Port mitigation proposals
- Informing stakeholders and the public on project progress
- Reporting

Existing data were compiled and analyzed to characterize land use, surface water flow, geologic conditions, groundwater flow, groundwater recharge, wetlands, and fish in the study area. These data were used to assess potential impacts associated with the proposed runway construction. Where existing data were insufficient or required independent confirmation, additional data were collected in the field, including borehole data, streamflow quantity and quality, wetland delineations and functions, and fish population and habitat information. This study also reviewed impact assessments previously completed by the Port.

Although the study considered many potentially important effects of the proposed runway embankment and borrow-area excavations, it did not consider all Master Plan Improvements proposed by the Port. Furthermore, not all of the possible effects related to the embankment and borrow areas were evaluated. Therefore, this report does not address all hydrologic issues requiring satisfactory resolution for permitting. Consequently, it is not intended for use as a checklist by agencies during permit review.

1.1 Project Background

The Port of Seattle has purchased, or is in the process of purchasing, properties in a "buy-out area" west of Sea-Tac Airport. This area contained more than 400 homes, five farms, 17 domestic water rights or claims, neighborhood and arterial roads, 380 septic drain fields, and numerous water wells. The Port has demolished many structures and removed debris.

1.1.1 Proposed Construction

An embankment of fill soil is proposed to create a high, flat surface upon which the third runway would be built. The fill would be more than 150 feet thick in places. The west margin of the fill would be bounded by a slope or wall, depending on location. The east margin of the new fill would abut the existing fill, upon which the current runways are built. The volume of the fill required for the third runway embankment is reported to be 16.5 million cubic yards. It will consist of about 40 percent sand and gravel that is relatively silt-free and about 60 percent silty sand. These materials originate from glacial till and outwash soils. Additional fill is proposed for other Master Plan Improvements.

A bottom drain layer, in combination with coarse soils near the walls, has been included in the fill-embankment design. It is intended to prevent groundwater pressures near the west wall from building, a condition that could result in seepage through the wall. This drain layer is designed to direct groundwater seepage below the base of the wall to the remaining wetlands and Miller Creek.

1.1.2 Proposed Stormwater Controls

The Port proposes a strategy for controlling stormwater flows for existing and future facilities. This strategy is intended to lower peak flow rates in Miller, Des Moines, and Walker Creeks below pre-1994 rates. Within the fill area, the Port proposes to reduce flows by allowing some precipitation to infiltrate the fill and by storing runoff in local and regional detention ponds and vaults while restricting the rate stormwater is released from storage. This strategy relies on the expansion and construction of large regional ponds in Miller and Des Moines Creeks.

The third runway and connecting taxiways will be paved and cover about 32 percent of the new embankment surface. In the unpaved 68 percent, the embankment will likely grow grass. Water running off the paved surfaces is proposed to flow into “filter strips,” which are water-quality treatment features. Water would flow into low areas at the bottom of the filter strips, then into catch basins. Water entering the catch basins would be conveyed through pipes under the runways to detention vaults or other detention facilities prior to discharge to Miller, Walker, or Des Moines Creek. The use of perforated conveyance pipes is being considered (which would enhance infiltration).

1.2 Physiographic Features Related to Habitat

Habitat conditions were evaluated by review of existing documents and collection of limited new field data. The team collected streamflow and water quality measurements on three occasions and at several locations. A stream habitat field survey was conducted on Walker Creek and fish presence and carcass surveys were conducted on all creeks. Team personnel also directly observed wetland conditions although a complete review of all previous delineations and function assessments was not conducted.

1.2.1 Land Use

Immediately west of the airport, land use is a mix of residential and agricultural, with development encroaching on the Miller Creek riparian corridor. This corridor features residential areas, agriculture, upland habitats, and slope and riparian wetlands, all of which lie adjacent to the creek. Outside this area west of the airport, the narrow riparian and ravine corridors associated with Miller and Walker Creeks are the primary areas that have not been extensively developed. Larger wetland complexes are associated with these drainages, including the Miller Creek Detention Facility and a large wetland complex that forms the headwaters of Walker Creek. About 40 acres of wetlands occur in the vicinity.

The area south of the airport contains a greater percentage of non-urban/residential land, including the Tyee Golf Course and acreage acquired by the Port as part of Noise Abatement Mitigation programs. In addition, Des Moines Creek has a significant forested riparian corridor that is undeveloped. Approximately 48.5 acres of wetlands lie near the Borrow Areas and Tyee Golf Course.

1.2.2 Surface Water

Miller and Walker Creeks drain the west side of the airport and the buy-out area. The watershed is approximately 9 square miles. Miller Creek originates from a number of sources; Arbor Lake, Lake Reba, Lora Lake, and Lake Burien; wetlands associated with the Miller Creek detention facility; and seeps along the west side of the airport. Streamflow increases downstream as groundwater discharges to the creeks, even during times of no rainfall. Miller Creek descends from an elevation of approximately 360 feet in its headwaters to Puget Sound at the Normandy Park Cove. The Miller Creek watershed contains significant residential and commercial development, resulting in approximately 23 percent impervious surfaces. Land use in the watershed is approximately 62 percent residential, 15 percent commercial, 3 percent airport, and 20 percent undeveloped.

Precipitation at SeaTac averages about 39 inches per year. An average of approximately 54 percent of the precipitation in the basin discharges through Walker and Miller Creeks at their mouths. The remainder of the precipitation in the Miller Creek basin evaporates or discharges as groundwater to Puget Sound.

Des Moines Creek drains the south part of the airport and the borrow areas. Its watershed covers 5.8 square miles. The creek drops from an elevation of approximately 350 feet to Puget Sound at Des Moines Creek Beach Park. The east fork of Des Moines Creek originates from Bow Lake where it flows through subsurface piping for approximately 1/2 mile. The west fork of Des Moines Creek originates in the Northwest Ponds in the northwest corner of the Tyee Valley Golf Course. The confluence of the two forks of Des Moines Creek lies in the central portion of the Tyee Valley Golf Course. As with Miller and Walker Creeks, streamflow increases downstream as groundwater discharges to the creek, even during times of no rainfall.

An average of approximately 41 percent of precipitation in the Des Moines Creek watershed discharges through Des Moines Creek at its mouth.

1.2.3 Fish Habitat

Despite the habitat degradation that has resulted from urbanization, anadromous and resident fish live in Miller and Walker Creeks. Adult Coho salmon use the Creeks from the mouth to the 1st Avenue South culvert and have been reported above 1st Avenue South. Juvenile Coho are distributed throughout, likely because of Trout Unlimited's releases from the Miller Creek Hatchery. A small population of resident cutthroat trout is distributed throughout much of the watershed. Water-quality data collected for this project during base flow periods indicate that low dissolved-oxygen levels may limit fish production. This project did not analyze or review stormwater quality data.

Despite habitat and water-quality degradation, anadromous and resident fish populations are also present in Des Moines Creek. Adult coho and chum salmon use the stream reach from the mouth to the Marine View Drive culvert. Juvenile coho salmon are distributed throughout Des Moines Creek, likely because of Trout Unlimited's releases from the Miller Creek Hatchery. Steelhead and pink salmon runs have also been reported on Des Moines Creek. A small population of resident cutthroat trout is distributed throughout much of the Des Moines Creek watershed. No water-quality concerns related to fish production were identified in the base-flow water-quality data collected for this project.

1.3 Hydrogeologic Characterization

Characterization of hydrogeology was limited to the embankment and borrow areas. Existing data were used to characterize deep geology and groundwater conditions. Shallow conditions were observed by team personnel during drilling of boreholes and collection of groundwater measurements.

1.3.1 Geologic Units

The following geologic units underlie the study area:

- Recent deposits
- Qvr (Vashon recessional outwash)
- Qvt (Vashon till)
- Qva (Vashon advance outwash)
- Transitional beds
- Deeper units

These deposits are discussed below, from youngest to oldest. The Qvr, Qvt, and Qva were deposited by the Vashon glacier, which covered the study area from about 10,000 to 14,000 years ago.

The youngest natural soil unit comprises recent deposits of peat and highly organic, fine-grained soils. These deposits cover the low elevations near Lora Lake and the area surrounding the central reach of Miller Creek. They probably also cover the upper reaches of Walker Creek. The recent deposits are typically 10 to 20 feet thick near Lora Lake but are thinner along Miller Creek, to the south. Brown silt and medium sand layers are mixed with the peat. These layers form the bulk of the recent deposits in the central Miller Creek reach.

The recent deposits are underlain by a layer of silty sand with some gravel that forms the Qvr, or Vashon recessional outwash, a regionally extensive deposit. The Qvr is the uppermost unit along the east flank of the central Miller Creek valley, near the proposed fill embankment. It may also underlie the recent deposits in the valley bottoms. The Qvr ranges in thickness from 0 to about 30 feet in the project area and is missing in places. The degree of saturation of this unit by groundwater varies widely.

The Qvr is usually underlain by Vashon till (Qvt), a dense layer of gravel and silt in a sandy matrix. This unit is often referred to as "hardpan" in driller's logs. The Qvt ranges in thickness from 0 to 20 feet in the study area. The degree of saturation of the unit by groundwater varies widely. This layer restricts the vertical migration of groundwater and promotes horizontal "interflow" on its upper surface.

The Qvt is commonly underlain by the Vashon advance outwash (Qva), another regionally extensive layer of sand with varying amounts of silt and gravel. The Qva was encountered in almost all borings that penetrated through glacial till in the area. It is the uppermost unit to be modeled by the Port's environmental consultants and comprises the "shallow regional aquifer" identified by previous investigators.

The transitional beds underlie the Qva, Qvt, Qvr, and recent deposits where they are present. These beds were deposited in quiet waters prior to advances of the Vashon glacier. They consist of silt and clay and restrict the movement of groundwater.

Several deeper geologic units are recorded in logs for deep wells in the area, including the "intermediate" and "deep aquifers" described in the South King County Ground Water Management Plan. Because of their depth and large extent, these units are not as sensitive to local changes in recharge as are shallow deposits and groundwater-fed streams that depend entirely on local recharge. Furthermore, changes in recharge to deep units depend on changes in recharge to shallow units. Consequently, for this project, local changes to shallow groundwater recharge and discharge were analyzed and changes to deeper groundwater recharge were inferred from them.

1.3.2 Current Groundwater Flow Conditions

The shallow aquifers in the region are recharged by local precipitation. In the buy-out area, they are also recharged by water that discharged from septic drain fields which was imported from outside the local area as a public water supply. In the study area, groundwater is recharged by up to an estimated 24 inches of precipitation per year depending largely on land use, soil type, and vegetation. In the residential area acquired by the Port of Seattle, an additional 3 inches of septic discharge per year contribute to groundwater recharge.

Two groundwater flow regimes were identified in the Miller Creek basin—a shallow one and a deep one. The shallow system involves the recent deposits, the Qvr, and, in some areas, the Qva. Groundwater in the recent deposits and Qvr discharges to the middle reach of Miller Creek and the upper reach of Walker Creek. The uppermost Qva groundwater may also discharge to the creeks, especially in the Walker Creek headwaters. Groundwater in the deeper system discharges year-round to deep wells, to the lower reaches of the creeks, and to Puget Sound. Near the headwaters of Walker Creek, groundwater in the Qva may discharge more easily to the creek than within the Miller Creek basin, creating an extensive wetland.

1.4 Impact Assessments

1.4.1 Fill Chemistry Effects

Gravel from a mine on Maury Island is being considered as fill for the proposed runway expansion. The top eighteen inches of gravel at Maury Island contain high levels of arsenic, cadmium, and lead originating from the former ASARCO smelter in Tacoma. The top 18 inches of soil at Maury Island are proposed to be contained at the island mine prior to aggregate extraction. Ecology must have assurance that the fill used for the airport project will not result in exceedances of state water quality criteria. The Port and Ecology are working to determine what screening methods and contingencies are necessary to ensure that water quality criteria are met.

This project analyzed the potential effects to ecological receptors, such as the benthic community and wildlife-consuming benthic organisms, if contaminants in the Maury Island fill were to migrate from soils to nearby sediments. Surface and subsurface soil data of the potential Maury Island fill were compared to ecological benchmarks to assess whether unacceptable ecological risks may occur. Based on the above analysis, use of subsurface soils as fill should not pose an unacceptable risk to ecological receptors.

1.4.2 Groundwater Recharge Effects

The Project team assessed groundwater recharge in the project area and found that recharge could change because of the following actions:

- Changing infiltration of precipitation by changing land cover, soil type, and slope
- Conveying runoff from impervious surfaces away from local recharge areas

- Eliminating the discharge of imported water through leaks and septic systems throughout the year
- Eliminating irrigation with local and imported water sources in summer

The net effect of the changes to irrigation and imported domestic water appears to be about zero in the irrigation season (summer). In winter, recharge will be reduced by eliminating the septic discharge and leaks.

The change to *precipitation-derived* recharge was evaluated in a cross section of the proposed fill. This calculation considered the conversion of wetlands and forest to grass on the embankment fill. It also considered the widths of the only two impervious surfaces on the cross section (12^{th} Avenue South and the third runway). The calculation suggests about an 11 percent decrease in groundwater recharge along the cross section, largely as a result of the large increase in impervious area. However, this estimated magnitude of change is probably high because no secondary infiltration of runoff from the third runway was assumed, and modeled water use by grass on the new embankment was possibly higher than expected for the fill soils.

The quantity of water seeping downward through the glacial till was also simulated with the cross-section model. The *volume* of seepage would likely change only slightly under the built condition; however, because total recharge would be reduced, the *percentage* of recharge seeping through the till would increase substantially.

The 11 percent reduction in local recharge is large, but dependent flows to local wetlands and the creeks will be reduced only in winter when abundant water is typically present anyway. A similar reduction in recharge basin-wide would cause a major impact to baseflows. To assess basin-wide impacts, the Port's recharge calculations that considered all Master Plan Improvements were reviewed. The HSPF model parameters used in the Port's recharge analysis do not appear to correspond to those used in actual basin modeling also conducted by the Port. Therefore, a confident assessment of basin-wide recharge and baseflow impacts is currently lacking. A confident assessment of basin-wide recharge and baseflow effects should be possible by analyzing a properly implemented and documented HSPF model.

A small reduction in recharge to deeper aquifers of the Des Moines Creek upland may occur; however, the small reduction would not affect these aquifers' ability to supply water to wells. This conclusion is based on the relatively large recharge areas of these aquifers compared to the airport, the fact that the effects will be apportioned between shallow and deep aquifers, and the reported estimates of shallow recharge.

1.4.3 Fisheries Effects

No direct effects on fish habitat are expected in Walker or Des Moines Creek because of construction. Miller Creek would be relocated in the Vacca Farm area but this reach currently provides poor habitat for salmonids because it features sparse riparian vegetation, a substrate dominated by sand and silt, little complexity, and no instream structure. The proposed Miller Creek channel construction will provide a net gain in habitat since it will feature a mixture of pools and riffles, gravel and cobble substrate, riparian vegetation, and replacement of woody debris. Proper construction and long-term monitoring are vital to successful Miller Creek relocation including control of turbidity during initial wetting. Some sediment transport during initial wetting is likely, and has the potential to damage habitat downstream.

An uncontrolled release of stormwater is likely at some time during construction given the size of the project and human error; however, the size and quality of a release cannot be predicted, nor can its impacts on fish be quantified. If habitat quality is further degraded because of indirect construction effects such as an uncontrolled release of turbid water, resident populations of cutthroat trout and anadromous Coho salmon would likely decline.

The enhancements to the riparian buffer corridor and instream habitat of Miller Creek will undoubtedly benefit local stream habitat for resident cutthroat trout if they are implemented and maintained properly. However, the proposed mitigation is limited in that it will only affect localized Miller Creek habitat and resident cutthroat trout. Indirect construction and post-construction effects such as alterations to base flow, peak flow, and sediment input could affect the entire stream systems, not just the airport project area. The Port predicts reduction in summer base flow in Des Moines Creek as a result of reduced groundwater recharge and supports augmenting low summer stream flows by pumping from a Port-owned well and discharging the water into the creek.

The watershed trust funds for the Miller and Des Moines Creek watersheds can be beneficial. However, significant habitat restoration in Miller, Walker, and Des Moines Creeks will require substantially more funding than what is currently offered through the basin trust funds.

1.4.4 Effects on the Hydroperiod in Local Wetlands

A hydroperiod is the seasonal change in the timing of groundwater discharge to wetlands and streams. For this project, effects to the hydroperiod were evaluated using a cross section of the proposed embankment fill near Miller Creek. The following effects are predicted if the embankment is built:

- Recharge would be 11 percent less along the cross section, and would spread-out within the fill, causing a significant timing lag in discharge to the wetlands and creek west of the embankment compared to the current condition.

- Discharge to remaining wetlands and the creek under the built condition would vary less throughout the year and the period of minimum discharge would be shorter. Flows would be lower in winter than under the current condition, and greater in summer compared to the current condition. The total quantity of water flowing to the wetlands would decrease because total recharge would decrease.

The timing changes would generally benefit the local wetlands that remain after filling and would slightly moderate seasonal low base flows and temperatures in Miller Creek. However, all water quantities are reduced on an average annual basis because total recharge is smaller under the built condition. Also, since the embankment is a small part of the Miller Creek watershed, the overall effect on streamflow is small. If the constructed fill has a lower silt content than was assumed for this analysis, the lag may be overestimated and the recharge volume may be underestimated.

1.4.5 Effects on Wetland Area and Functions

The fill activities associated with the improvement projects would result in the permanent loss of 13.88 acres of wetland in the Miller Creek watershed. In addition to the permanent impacts, construction activities would also result in the temporary loss of 1.86 acres.

Of equal importance to the acreage loss are the functional impacts that would occur. The effectiveness and opportunity for wetlands to improve water quality, provide suitable habitat, and function as floodplains were considered. An additional 1.68 acres of secondary effects may occur if the functionality of the remaining wetlands cannot be maintained. This acreage is attributed to the Wetland 18/37 complex adjacent to Miller Creek.

Given the urban character of the area, the wildlife expected to inhabit the area is restricted to common, highly adaptive species that use both wetland and adjacent upland areas. Species integrally tied to the wetland areas are likely restricted to waterfowl, amphibians, and small mammals. The construction of the airport improvements would affect local wildlife populations simply due to the size of the fill area. As indicated previously, the extent of fragmentation due to urbanization currently limits the viability of existing habitat. Reducing habitat size and availability would further reduce the suitability for small mammals and amphibians. To prevent a significant decline in the local populations, mitigation would be required to provide supplemental/alternative habitat on-site. However, the extent to which habitat could be provided is limited by the nature of the proposed project. FAA requirements limit the development of avian habitat within 10,000 feet of existing facilities to minimize the hazard of potential air strike by birds.

1.4.6 Review of Wetland Mitigation Proposal

Mitigation for the proposed third runway fill and safety areas must account for the permanent loss of 13.88 acres, and temporary effects in 1.86 acres within the Miller Creek watershed.

The preferred regulatory hierarchy for wetland mitigation is:

- On-site, in-kind
- Off-site, within the watershed, in kind
- Off-site, out of the watershed, in kind
- Off-site, out of watershed, out of kind

Because of environmental and regulatory constraints, it is not feasible for the Port to mitigate on-site and in-kind (on-site mitigation is restricted by FAA safety regulations).

The Port proposes the following on-site wetland mitigation measures:

- Removing existing development
- Establishing a vegetated buffer along Miller Creek
- Enhancing wetlands within the Miller Creek buffer
- Enhancing or restoring wetlands within the Des Moines Creek watershed
- Excavating the floodplain to compensate for lost flood storage
- Developing stormwater management facilities
- Restoring and enhancing 11 acres of farmland and farmed wetlands

Off-site mitigation includes developing a 67-acre site for wildlife habitat. The Port also proposes to establish Trust Funds to promote restoration projects for the Miller and Des Moines Creek basins downstream of the project area.

The overall mitigation plan is reasonably designed to compensate for wetland impacts and has the potential for success. The plan provides for in-basin compensation for the impacts to water quality and water quantity, as well as some mitigation for wildlife compensation. However, not all habitat mitigation is proposed to occur in the basin. For those impacts that cannot be entirely mitigated for in-basin, an off-site, out-of-basin mitigation plan has been developed by the Port.

Ecology and the King County Department of Development and Environmental Services have studied wetland mitigation successes and failures. King County concluded that mitigation, in general, is not being implemented, and when it has, it has often failed due to poor design, installation failure, and maintenance. Consequently, the studies call for more regulatory control and guidance during the planning, installation, and monitoring phases. They indicate that mitigation projects do not guarantee success and that closer regulatory oversight is merited for longer periods.

1.4.7 Shallow Groundwater and Wetland Effects in Borrow Areas

Des Moines Creek receives substantial base flow contributions from the Qva aquifer. It also receives contributions from shallow interflow soon after precipitation events, although this contribution is less critical for maintenance of low flows. Recharge to the Qva (shallow regional) aquifer is expected to increase slightly because of excavation in the borrow areas. The change in timing of discharge to the creek was not analyzed and could conceivably be faster or slower than under current conditions, and vary by location. Although the change is small, the change in recharge conditions would likely help dampen streamflow fluctuations and be beneficial in that regard.

Several depressional and slope wetlands may be negatively affected by excavation in borrow areas 3 and 4. The wetlands depend on perched groundwater flow above the Qva aquifer. The excavation is likely to redirect some of the perched flow, reducing discharge to the wetlands and potentially impacting wetland biota.

1.5 Review of Surface Water Management Proposals

The Project Team reviewed hydrologic analyses performed by the Port's consultants, including:

- Their approach to establishing a target flow regime for creeks
- The calibration of their surface water model
- Their designs for flow-control facilities

The results of these reviews are discussed below. The review distinguishes between *approaches* to issues and the *models* used to implement the approaches.

1.5.1 Target Flow Regime Approach

The Port consultant's approach for establishing hydraulic conditions that will preserve stable stream channels is reasonable. They characterized the current and proposed movement of surface water in the study area largely by developing hydrologic models of the watersheds. The models simulate the movement of rainfall under various land-use conditions and predict how slowly stormwater runoff from the airport should be released from storage facilities to achieve the desired flow conditions, or "target flow regime," in the creeks. Defining the target flow regime entailed calculating streamflows that would occur if the tributary drainage basins contained only 10 percent effectively impervious area (EIA). The Port used the Hydrologic Simulation Program-FORTRAN

(HSPF) model and assumed only 10 percent EIA in the watershed.

1.5.2 Surface-Water Model (HSPF) Calibration

Earth Tech reviewed the HSPF watershed models to assess how well they were calibrated by comparing the total flow volumes the models predicted to observed values at two locations each in the Des Moines Creek and Miller Creek watersheds. The Miller Creek HSPF model was found to overestimate water compared to the observed flows, indicating that it is not well calibrated, despite the matching of simulated and observed peak flows for selected storm events. The Des Moines Creek model was found to be more reliable.

The poor calibration of the Miller Creek models is related to the parameters selected for model input. There are several inconsistencies in the input data between models that simulate different land-use scenarios. In addition, since the model was constructed to simulate groundwater contributions to streamflow without considering prior precipitation or groundwater storage, it ignores the rigor offered by HSPF. This project team did not find sufficient confidence in the Miller / Walker Creek model to allow detailed evaluation of the model's results. In our opinion, the model would require modification before a thorough evaluation of the performance of the model, and a corresponding evaluation of proposed surface water controls, could be completed.

1.5.3 Flow Control Designs

The general approach used by the Port to size flow control facilities is appropriate. That approach involved applying the target flow regime concept, using local flow-control facilities in conjunction with regional facilities, and running the HSPF model to simulate the target, existing, and proposed watershed conditions. However, as noted above, the model used to size the flow-control facilities needs to be corrected to use this approach with confidence.

1.5.4 Construction Period (temporary) Impacts

The Stormwater Management Plan states the Port applies temporary erosion and sedimentation control measures that exceed minimum requirements of Ecology's manual. These measures include: developing construction stormwater pollution prevention plans for each capital improvement project; implementing conventional best management practices; applying advanced stormwater treatment techniques where necessary; supervising and monitoring contractor compliance; and funding independent oversight of construction erosion control compliance. This project's review of the plans, and field observations of current operations, generally supports the Port's opinion. However, an embankment construction of the magnitude and duration of the third runway project is subject to a range of climatic events and human errors, and an uncontrolled release of runoff from the disturbed site is probable despite proper implementation of construction BMPs.