Low Flow Analysis
Flow Impact Offset Facility Proposal

Port of Seattle

July 2001

Parametrix, Inc.

Port of Seattle

July 23, 2001

Ann E. Kenny
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Dear Ms. Kenny:

SUBJECT: Low Streamflow Analysis, Summer Low Flow Impact Offset Facility Proposal, Seattle–Tacoma International Airport

This letter summarizes the Port of Seattle's evaluation of summer low streamflow impacts in Des Moines, Miller, and Walker Creeks calculated to result from proposed airport Master Plan Update projects. This letter also summarizes the Port's proposal to offset these impacts to maintain existing summer low streamflow conditions in these creeks post project. The methodology used to determine the effects and the plan to offset the impacts was developed and discussed in a series of meetings between the Port of Seattle (Port), Department of Ecology (Ecology), and King County, with staff from Floyd Snider McCarthy, Inc., acting as facilitators.

The evaluation and low streamflow impact offset proposal is final, subject to potential conditions associated with your review during 401 permit deliberations. The Port plans to submit final documentation of the low streamflow evaluation and operational plan for mitigation facilities in the form of a detailed Low Streamflow Analysis Report and Summer Low Flow Impact Offset Facility Operational Plan, outlines of which are included as an attachment to this letter.

<u>Summary</u>

The Port's proposal is to detain stormwater in underground vaults and release the detained water continuously into each creek during the summer low streamflow period at a rate equal to the calculated summer low streamflow impact to that creek from planned Port projects. The summer low streamflow impacts in each creek were determined through detailed modeling analysis. The summer low streamflow periods were determined through statistical analyses of modeled streamflow from the calibrated HSPF models and discussions with biologists on the effects of low streamflow periods on stream biology. Details of the analysis used to arrive at the proposed summer low streamflow offset periods, low streamflow magnitudes, impacts to summer low streamflows from Port projects, and sizing of the vaults are included as attachments to this letter A summary of the calculated summer low streamflow impacts and flow impact-offset proposal is listed below:

Seattle-Tacoma
International Airport
P.O. Box 68727
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TELEX 703433
FAX (206) 431-5912

AR 051730

	Des Moines Creek	Miller Creek	Walker Creek
Summer low flow period	July 24-October 24	August 1-October 31	August 1-October 31
2-year 7-day low flow (1994)	0.35 cfs	0.74 cfs	0.79 cfs
Port impact on streamflow[1]	0.10 cfs	0.13 cfs	0.09 cfs
Vault size needed	12.2 acre-feet	18.8 acre-feet	15.0 acre-feet
Maximum vault fill time	32 days[2]	58[3] days	282 days[3]

1 Difference between 1994 and 2006 2-year, 7-day low flow, including non-hydrologic impacts.
2 Vault filling starts January 1.
3 Vault starts filling November 30.

Vaults to detain stormwater for release during summer low streamflow periods were sized based on the duration within which summer low streamflows have historically occurred (generally +/- 90 days from late July through late October), the modeled impact to streamflow in each creek, and an allowance for precipitation events during the summer low streamflow periods that will partially refill the vaults. The resulting storage volumes (12.2 acre-feet in Des Moines Creek, 18.8 acre-feet in Miller Creek, 15.0 acre-feet in Walker Creek) will provide enough water every year to offset the impacts to streamflow throughout the historic summer low streamflow period. For two years within the period of record (1977 and 1979), the Walker Creek vault does not fill up entirely by the start of the summer low streamflow period. However, in these two years, rainfall that occurs during the summer low streamflow period provides enough water so that offset flows are provided throughout the entire summer low streamflow period. The vaults will include features (both structural and operational) for managing water quality to ensure there are no adverse impacts from discharges from the flow impact offset facility. Additional details on all these issues are presented in this letter.

Determination of the Duration of Summer Low Streamflow Periods

Determination of the summer low streamflow period for each creek was done by analyzing modeled streamflow from the calibrated HSPF model for each creek, which used 1994 (existing) land use conditions. The HSPF models for each watershed were calibrated by comparing model output with streamgauge data and adjusting model parameters until a satisfactory match was obtained. Additional low streamflow calibration information is provided in the attachments. Assumptions of model parameters (land use, basin delineations, impervious areas, etc.) are the same as detailed in the Comprehensive Stormwater Management Plan. The seven-day low flow period for each year (using 1994 flow conditions) in the 47-year period (1949-1995) for each creek was determined at points of compliance near the airport (200th Street in Des Moines Creek, SR 509 in Miller Creek, and at the outlet of the wetland near Des Moines Memorial Drive in Walker Creek). The seven-day low flow was selected as an indicator of persistent dry season flow. For example, a longer low streamflow would have the same or higher flow, since flows tend to have a downward trend (flows become gradually lower) before a storm increases flow. In addition, summer low streamflows tend to decrease gradually, therefore, a shorter low streamflow period is unlikely to result in significantly lower average flows or target flows. Finally, consultation with biologists concludes that summer low flows with durations of less than two weeks do not affect the carrying capacity of the creeks or cause behavioral changes to salmonids (see attachment).

The occurrences of the annual seven-day low flow periods were plotted and a histogram showing the distribution of the summer low flow periods was developed for each creek. The summer low streamflow period for each creek was selected to include all the historical seven-day low flow occurrences, with the exception of three specific occurrences during the forty-seven year record that occurred during November and December – periods typically associated with two of the three wettest months of the rainy season. The summer low streamflow periods for each creek are:

Des Moines Creek	July 24 through October 24
Miller Creek	August 1 through October 31
Walker Creek	August 1 through October 31

The Port's proposal is to provide water to offset the impacts to summer low streamflows throughout these time periods in each creek.

Determination of Streamflow Magnitudes (Target Streamflows)

The magnitude of existing summer low streamflow (target streamflow) in each creek was determined through analysis of the seven-day low flow periods under existing (1994) conditions described above. The annual seven-day low flows for each creek were ranked and recurrence intervals were determined based on this ranking. The seven-day low flow with a two-year (50 percent) recurrence interval was selected as the streamflow target in each creek. The two-year seven-day low flow was selected because the magnitude of the estimated impact to seven-day low flows decreases with greater recurrence interval; i.e., the estimated reduction in the seven-day two-year frequency low flow rate is greater than that for the seven-day, ten-year frequency low flow rate. Therefore, providing mitigation equivalent to the seven-day, two-year frequency impact will provide mitigation sufficient to mitigate all of the more extreme summer low streamflow events. Based on this analysis, the existing summer low streamflows (two-year, seven-day pre-project conditions) are determined to be:

Des Moines Creek	0.35 cfs
Miller Creek	0.74 cfs
Walker Creek	0.79 cfs

Determination of Impacts to Streamflow

The effects to flow during the summer low streamflow periods were determined by comparing modeled streamflows before project construction to modeled streamflows after project construction. Each creek has different post-development conditions that potentially affect low streamflow; therefore each has a different approach for determining impacts. In Des Moines Creek, 2006 land use conditions ("post-project") were modeled for the full 1949-1995 period of record. The seven-day low flow for each year was selected, ranked, and the streamflow with a two-year recurrence interval was determined. In Des Moines Creek, the two-year post project summer low streamflow is 0.25 cfs. The impact to streamflow from proposed Port projects is the difference between this flow and the existing pre-project summer low streamflow described above, as determined from the modeled 1994 ("existing") land use conditions (0.35 cfs). Therefore, the impact to summer low streamflows in Des Moines Creek from proposed Port projects is the difference between the post project and existing condition flows, or 0.10 cfs. The flow rate is the magnitude of offset that will be provided during the summer low streamflow period for Des Moines Creek described above (July 24 through October 24).

In Miller Creek, a different approach was applied because of the need to model the effect of the proposed runway embankment on streamflows. In areas where the embankment is proposed, recharge entering the embankment was calculated using the post-project HSPF model. The recharge was then input to the Hydrus-2D model, which simulated the spreading of recharge fronts through the unsaturated zone of the embankment fill. Output from the Hydrus-2D model were input to the "slice" model, which is a finite-difference groundwater model used to simulate flow through the proposed embankment underdrain layer. Output from the "slice" model was then input back into the HSPF model to determine the quantity and timing of discharge from the embankment, and the groundwater effects on Miller Creek. This approach was selected to accurately simulate the flow of groundwater through the proposed embankment. The analysis was a more discrete application of the Hydrus-2D and "slice" modeling approaches used in the Runway Fill Hydrologic Studies Report (Pacific Groundwater Group, June 19, 2000), prepared for Ecology.

For the post-project conditions in Miller Creek, the four-year period from 1991 through 1994 was modeled. This period was chosen as a representative dry period in the precipitation record. Output from the HSPF model was analyzed to determine the annual seven-day low streamflows for each of the four years. To determine the impact between 1994 (existing) low streamflow and 2006 (post-project) flows, the impact during 1991 was used. This year was selected because it was the only year in the four years of detailed embankment flow analysis that low streamflows were greater than the two-year flow. In Miller Creek, the estimated summer low streamflow impact due to the project is 0.11 cfs.

In addition to hydrologic impacts in Miller Creek, additional impacts, both positive and negative, will result from removal of septic tank flows (negative impact) and cessation of water uses for residential and agricultural uses (positive impact). The impact of these "non-hydrologic" changes in Miller Creek is an additional net -0.02 cfs (-0.08 cfs for septic tanks which is then adjusted by 0.7 for loss to DEEPFR; water use withdrawals are +0.04 cfs). The total Miller Creek impact (both hydrologic and non-hydrologic) is 0.13 cfs.

For the post-project conditions in Walker Creek, the entire record from 1949 through 1995 was used. To determine hydrologic impacts, it was assumed in the post-project (2006) model that new impervious areas and new fill area is simply removed from the model and can no longer contribute to low streamflow. This is a conservative assumption, since some precipitation will undoubtedly contribute to groundwater flow. This approach was chosen to allow for the largest impervious area possible to refill the Walker Creek low streamflow vault. The Port proposes to line the filter strips with impermeable material to collect infiltrated stormwater that will be directed to the low streamflow vault. The lined area (approximately six acres) does not exceed the effective impervious area used in the Comprehensive Stormwater Management Plan.

In Walker Creek, much of the groundwater that supports summer low streamflows comes from areas where surface water drains to Des Moines Creek or Miller Creek. Under existing (1994) conditions, approximately 630 acres of pervious land is included in the Walker Creek groundwater basin, which contributes to Walker Creek summer streamflows. Thirty-eight acres of new impervious area is proposed in the approximate area of the 630 acres pervious acre area. The thirty-eight acre area is adjusted (multiplied) by 0.86 to reduce the area to effective impervious area. The result (32.7 acres) is deducted from the 630-acre pervious area in the existing conditions model to determine the post project (2006) contribution to the Walker Creek groundwater basin.

To determine the magnitude of the hydrologic impact in Walker Creek, the seven-day low flow for each year was selected, ranked, and the streamflow with a two-year recurrence interval was determined for existing (1994) and post-project (2006) conditions. The two-year 1994 seven-day low streamflow is 0.79 cfs; the 2006 summer low streamflow is 0.71 cfs. Therefore, the impact to summer low streamflow in Walker creek from proposed Port projects is the difference between the post-project and existing conditions flow, or 0.08 cfs.

In addition to hydrologic impacts in Walker creek, additional impacts will result from the removal of septic tanks. The impact of this change in Walker Creek is an additional 0.01 cfs (0.014 cfs for septic tanks which is then adjusted by 0.7 for loss to DEEPFR). The total Walker Creek impact (both hydrologic and non-hydrologic) is 0.09cfs.

Based on the analyses described above, total net summer low streamflow impacts that the Port proposes to offset throughout the summer low streamflow periods in each creek are:

Des Moines Creek	0.10 cfs
Miller Creek	0.13 cfs
Walker Creek	0.09 cfs

Sizing/Filling of Vaults and Vault Release

Several of the stormwater vaults proposed in the Comprehensive Stormwater Management Plan will have storage areas sized and designed to detain the volume of water needed to continuously release a flow equivalent to the calculated summer low streamflow impacts throughout the summer low streamflow duration in each creek. The vault sizes were calculated in the following manner: the offset flow rate was multiplied by the duration of the summer low streamflow period. Analysis of precipitation records show that some amount of rainfall always occurs during the summer low streamflow period. Rainfall amounts during the summer low streamflow period from the worst (driest) year on record were converted into a volume based on the amount of impervious area that drains to each vault. This water was subtracted from the total volume to arrive at the final volume. These calculations were done on a daily basis to account for the dynamics of filling and draining the vaults throughout the summer low streamflow period in each creek. This conservative approach assures that the volume of water needed to offset the impacts to summer low streamflow will be available in a range of extreme conditions such as those found in the 47-year period of record. The net storage volumes of water needed for each creek are:

Des Moines Creek	12.2 acre-feet
Miller Creek	18.8 acre-feet
Walker Creek	15.0 acre-feet

The vaults will be filled each year during the winter. by closing the flow offset discharge outlet no later than January 1 each year, allowing stormwater to accumulate in the vaults. Analysis of historical rainfall records and the amount of impervious area that drains to each vault were used to determine the length of time required to fill the vaults. This length of time was applied to the beginning of the summer low streamflow period in each creek (the date the flow impact offset would start each year) to determine when to begin accumulating water. Based on this analysis, the maximum time needed to fill the vaults during the period of record are:

Creek	Closure Date	Longest Fill Time in Record
Des Moines Creek	January 1	32 days
Miller Creek	January 1	58 days
Walker Creek	December 1	282 days

The impervious area in each basin used to fill the vaults is as follows:

Des Moines Creek	234 acres impervious area
Miller Creek	82 acres impervious area
Walker Creek	3.5 acres impervious area
	6 acres lined pervious area
	2 acres Pond F cover

It is important to note that using the period of record (except for the worst (driest) year on record), the vaults will always have water remaining in them at the end of the summer low streamflow period. The Port proposes to continue releasing this water at the determined flow rate for as long as possible before the vault outlets are actually closed (after the end of the summer low streamflow periods). The operational plan will call for the vaults' outlets to be closed no later than January 1 each year to allow the filling of the vaults to take place when precipitation is generally most abundant.

Water Quality Considerations

The Summer Low Streamflow Impact Offset Facilities will be designed and operated to avoid in-stream water quality violations. Class AA water quality standards are used as the applicable in-stream standards. Water quality parameters of concern include dissolved oxygen, temperature, turbidity, copper, lead, and zinc. A variety of best management practices (BMPs), facility designs, and monitoring programs are proposed (or already in place) to ensure that in-stream water quality violations will not result from operation of the flow offset facility.

Structural features of the vaults include sediment traps, settling areas, and special placement of inflow and outflow pipes to reduce turbidity, vents to allow air circulation to enhance aeration, placement of inlets to facilitate periodic flushing with "fresh" stormwater, and discharge pipes configured to enhance passive aeration. The underground configuration of the vaults will facilitate temperature management. Provisions are included to allow for additional filtration and aeration of discharges, as needed. BMPs in place in the drainage areas on the airfield will minimize the amount of sediment that will enter the vaults. An extensive water quality monitoring program is proposed to characterize the water discharged from the offset facility, and to ensure that the facilities can be managed and operated without causing in-stream water quality violations.

Operational Plan

A detailed operation, maintenance, and monitoring plan will be completed for the summer low streamflow impact offset facilities. The operational plan proposes an annual schedule of activities to ensure that the facilities are meeting performance goals. An adaptive management system is proposed to allow the operation of the facilities to be refined as experience is gained. The vaults will be monitored as they are filled and as water is released. Periodic monitoring of water quality will be completed, both of the discharge water and in the creeks, to ensure that water quality criteria are not violated in the creeks. Biological monitoring is proposed as part of the Natural Resources Mitigation Plan. This monitoring will evaluate changes in the Benthic Index of Biotic Integrity (BIBI) over a ten-year period.

Information provided for review attached to this letter include:

- Outline of Summer Low Streamflow Flow Analysis and Summer Low Streamflow Impact Offset Facility Operations Plan
- Selected Draft sections of Summer Low Streamflow Impact Offset Facility Operations Plan
- Technical backup material for low flow impact evaluation and impact offset proposal including the following
  - Des Moines Creek
  - Miller Creek
  - Walker Creek
  - Stream Biology Information
  - Embankment Modeling Information
  - Non-Hydrologic Analysis
    - Methodology
    - Data (electronic only)
  - Daily Average Creek Flows (electronic only)

In addition, selected model data files have been electronically sent to Kelly Whiting for his review.

Please contact me at 206/988-5528 if you have any questions.

Sincerely,

Keith R. Smith
Water Resources Manager

C: Kelly Whiting, KCDNR

AR 051736

Draft Low Flow Analysis/Flow Effect Offset Facility Report

- **Executive Summary**
    - Report summarizes effects to streamflow in Miller, Walker, and Des Moines Creeks caused by proposed Port projects and associated "non-hydrologic" effects (buyouts, displaced water use/irrigation/septics/etc.) and provides a flow offset facility/plan
    - Impacts of embankment seepage were modeled using a combination of tools (HSPF, Hydrus, Slice) for an agreed upon dry period (1991-1994)
    - Non-hydrologic effects were combined with modeled effect to determine net effects to streamflow
    - Result was the effect on streamflow from the project (CFS)
    - That impact was used to calculate the amount of stormwater needed to be detained for release during summer low flow periods
    - This calculation was based on release rates, refilling (precip), and vaults not going dry
    - Seven vaults will provide reserved storage and release at appropriate rates to offset impacts
    - Vaults will include design considerations for water quality treatment
    - Operational plan will include test releases and monitoring to ensure water quality meets standards
    - Regular maintenance will be performed to ensure proper function
    - Performance standards will be (have been) developed
        - Water always available to discharge at needed Q throughout summer low streamflow period
        - In-stream WQ standards met throughout operation
    - Refinements can be made based on observed performance

- **Introduction**
    - Purpose of Report
    - Organization of Report
    - Relationship to other documents (SMP)
    - Project description
        - Master Plan, Third Runway Embankment
        - Impacts to Streamflow
        - Low Flow Analysis
        - Mitigation Plan
        - Objectives of flow offset plan

- **Determination of impacts to streamflow**
    - Brief description of overall approach
        - Compare modeling of existing conditions to modeling of post project conditions to determine effect to streamflow
        - Existing condition determined by HSPF modeling in SMP
        - Post project condition (embankment) determined by slice, hydrus, and HSPF modeling to determine flow and timing impacts of embankment

- Post project condition modeling uses 1991-1994 precipitation (dry period)
- Non-hydrologic effects conservatively estimated, converted into daily time series, and input to model of built condition
- Result of post project condition modeling gives (total) impact to streamflow of Port's projects
- This results is applied to a spreadsheet analysis and used to size storage to provide offset water throughout summer

  - Modeling of Existing (Pre-embankment) Conditions -HSPF approach – pull language from SMP and frame for low flow
  - Modeling of Proposed (Built embankment) Conditions
    - Summary of HSPF/Hydrus/Slice Modeling Approach
    - Results of Embankment Modeling
  - Non-hydrologic effects on flows
    - Changes/revisions based on SMP
    - Conversion to time series for inclusion in HSPF modeling
  - Results of all impacts to streamflow/net effect to streamflow

- **Mitigation of Impacts (Reserved Stormwater Release)**
  - Methodology used to size/design stormwater vaults
    - Criteria
    - Spreadsheet analysis based on discharge rates and periodic refilling from rainfall
    - Refilling based on rainfall in driest year in period of record (1949-1995)
  - Performance standards
    - Always able to meet flow offset requirements (vaults never go dry during summer low streamflow periods)
    - Instream water quality standards met
  - Water Quality Design Aspects
    - Sediments/Turbidity
      - Discussion of water quality standards for turbidity
      - Airfield BMPs minimize sediments/turbidity getting into vaults (typical)
      - Compartmentalized dead storage (typical)
      - Floor sloped away from outlet (typical)
      - Allow for installation/operation of filters if test releases show turbidity of reserved releases won't meet standards (reserved outlets only)
    - Temperature
      - Discussion of water quality standards for temperature
      - No special design considerations for temperature

- Nature of underground vaults ensures that water will be relatively cool compared to typical summer stream temperatures
- Port collecting temperature data from existing vaults starting summer 2001 to provide baseline data

▪ Dissolved Oxygen
  - Discussion of water quality standards for DO
  - No oxygen consumption in vaults (low BOD, no solar radiation driving biological activity that would consume oxygen)
  - Inlet to vaults positioned to allow flushing of reserved area to prevent accumulation of stagnant (potential low DO) water
  - Passive aeration provided by turbulent flow in steep discharge pipes and energy dissipaters at/near outlets
  - Air vents provided to allow supply of fresh air for passive aeration
  - Provide for (portable) aerators if DO still too low or if slopes not sufficient to aerate water
    - o List possible/applicable technologies (microbubble diffusers, gas injection, air injection, aeration hose)
    - o Discuss each reserved stormwater outlet
    - o Selection will be made as part of final design

▪ Nutrients
  - No water quality standards to meet, but possibility of algae blooms in summer has been raised as a concern
  - Usually a concern in lakes and ponds, none in creeks downstream of airport, residence time of water in creek only a few hours
  - No special design considerations proposed for nutrients
  - No fertilizers used on airfield
  - Bioswales provide treatment
  - No solar radiation in vaults to stimulate algae growth

▪ Metals
  - Discussion of water quality standards for metals
  - Airport water quality data show that (total recoverable) metals in airfield runoff lower than typical urban stormwater
  - Higher metals in airport runoff associated with non-airfield basins, which won't be providing water to reserved stormwater vaults
  - Most metals associated with particulates, data shows low dissolved metals in discharges
  - Vault design and BMPs for turbidity will be effective in reducing total metals (list again)

o Other
  ▪ Reserved stormwater discharge points will be the same as normal stormwater discharge points – no additional HPAs needed

- Discussion of valve/outlet location for each proposed reserved stormwater vault relative to creeks
- Security – facilities and controls located inside airport fence to minimize vandalism potential
- Performance – POS will continue to operate/inspect/monitor/report/maintain system throughout its life; adjustments/refinements can be made based on observed performance

- **Operational Plan/Annual schedule of activities**
  - Before initial operation port will submit to Ecology a operations/maintenance/monitoring plan containing:
    - Monitoring/sampling protocols (follow NPDES permit requirements) and schedule
    - Specific monitoring locations (discharge and in-stream)
    - Recording/reporting plan
    - Detailed operation plan based on proposal below
    - Inspection/maintenance plan
    - Summary of characterization of discharge and creeks' water quality during summer seasons, based on existing data or data collected prior to implementing facilities
  - Calendar Year Operating Schedule
    - Jan – June (varies by vault)– operate as normal stormwater vaults, flow offset outlet closed to accumulate water
    - June/July – small test release from each vault
      - Confirm discharge rate (gage/measure flow)
      - Sample specified in monitoring plan
      - Compare samples to existing or collected data from creeks from summer (when reserved stormwater discharges would be occurring)
      - Review existing data to see if summer low flow water quality is adequately characterized by data. If not, collect during next few summers (prior to facilities going on-line) to characterize. This work will be included/discussed in final monitoring plan submitted to Ecology prior to implementation.
      - If potential water quality violations are indicated, take appropriate actions prior to initiating operational discharge, such as:
        - Install/maintain filters for sediments/turbidity/metals
        - Install portable aerators for DO
        - No actions proposed for temperature and nutrients
    - July/August - Open each flow offset outlet on date specified in analysis
    - July – October – inspect/monitor operation of each discharge
      - Sample per monitoring plan
      - Any water quality violations will be immediately investigated and corrected

        - If data show water quality standards are consistently being met after (at least) one year of operation, Port may submit/modify monitoring plan.
    - November – December – Drain, inspect, maintain, operate as normal stormwater vault
    - December/January – close flow offset outlet to begin accumulating water

  - Monitoring Plan
    - Characterization of expected water quality
    - Monitoring of Test Discharges
    - Operational Monitoring
    - NRMP BIBI monitoring
    - Reporting
    - Monitoring/Analysis Protocols

  - Maintenance Plan
    - Refer to Port's stormwater maintenance plans for typical vault maintenance
    - Each reserved stormwater vault will have an operational manual/maintenance plan and schedule developed for it as part of final design which will be submitted to Ecology prior to implementation
    - Typical maintenance includes periodic inspection of vaults, discharge structures, valves, discharge points, etc.
    - At least annual removal of sediments, etc.

- **Summary**
  - Effects to streamflows calculated based on modeling and spreadsheet analysis, both based on selected period (1991-1994) representing dry period
  - Design, operation, and monitoring plan will ensure that system operates as designed and water quality standards are met
  - Airport/POS staff will be managing facility in perpetuity.
  - Adjustments/refinements to system can be made based on observed performance

- Appendices
  - Non-Hydrologic Impacts
  - Modeling
    - Existing Conditions (HSPF)
    - Built Conditions (Slice/Hydrus/HSPF)
  - Design Considerations
    - Aerators
    - Filters (media?)
  - Sample O&M Plan
- Other Appendices?

Executive Summary

This report presents the analyses performed to estimate the timing and volume of discharges to local receiving streams and wetlands during low flow periods from Seattle-Tacoma International Airport (STIA) considering improvements defined in the Port of Seattle's Master Plan Update. This report also presents a Flow Impact Offset Facility Plan, which is the Port's proposal to offset impacts to flows in the receiving waters during annual low streamflow periods, typically experienced in late summer/early fall. The plan is based on a detailed evaluation of the hydrologic impacts of the proposed third runway embankment and associated non-hydrologic impacts on streamflow in Miller, Walker, and Des Moines Creeks. This report, an update of the Low Flow Analysis prepared by Earth Tech in December 2000, is submitted for consideration by the Washington State Department of Ecology in reviewing permit applications related to the proposed Third Runway project. This report builds upon previous reports by Earth Tech and Pacific Groundwater Group. Analyses presented in this report were prepared by Earth Tech, Pacific Groundwater Group, AquaTerra, and Parametrix. The Washington Department of Ecology was consulted throughout the development of the plan to ensure that agency concerns are addressed in this report.

Impacts to streamflow in the three creeks were evaluated using a suite of modeling tools. The Hydrologic Simulation Program – FORTRAN (HSPF) was used to develop overall stormwater models of STIA (existing conditions and proposed conditions), as described in the Comprehensive Stormwater Management Plan (CSMP) (Parametrix 2000). These models were also used to evaluate stormwater flows and volumes in the low flow analysis. The hydrologic properties of the proposed third runway embankment were modeled using a combination of

Hydrus-2D and a finite-difference "slice" model. Hydrus-2D was used to simulate the movement of water between the root zone and water table in the proposed embankment, and the slice model was used to simulate the movement of water through the saturated portion of the proposed embankment. Results of the Hydrus and Slice modeling, along with the associated non-hydrologic impacts, were incorporated back into the HSPF model to estimate the post construction flows. By comparing these model results to the pre-project conditions model, the impacts of the proposed embankment on streamflows were determined. Statistical analyses of model output, precipitation and streamflow data for the available period of record predicted a net low-flow impact to Miller Creek of 0.19 cubic feet per second (cfs) 0.08 cfs in Walker Creek, and 0.10 cfs in Des Moines Creek..

The Port's proposal to offset effects to low streamflow is to detain stormwater runoff and release it to the impacted creeks during the predicted annual low streamflow period. The volume of water required to offset the predicted impacts was determined by multiplying the predicted impact for each creek by the duration of the summer low streamflow period (+/- 90 days from late July through late October). The resulting volumes of stormwater (__ acre-feet for Miller Creek, __ acre-feet for __ Creek) were incorporated into selected proposed stormwater vaults in each watershed. Several considerations are proposed to be included in the design of these vaults to allow the management of stormwater discharges to offset the predicted low-flow impacts. Additional considerations in the design and operation of the proposed stormwater vaults to improve the water quality of discharges will also be included. In addition, an analysis of the availability of stormwater required to fill the vaults showed that even during the driest years in the period of record, enough water can be collected and stored to offset the impacts to streamflow during the annual low streamflow period.

Key goals and objectives (performance standards) of the proposed Flow Impact Offset Facility include:

- Always being able to provide flow at the rate required to offset the predicted impacts of the proposed embankment for the entire 92-day annual low streamflow period each year.
- Operate the facility to prevent in-stream water quality violations during the annual low streamflow periods.
- To design the facility and its operation, monitoring, and maintenance plan so that an adaptive management strategy can be applied.

As stated in Ecology's draft Stormwater Management Manual for Western Washington, the objective of stormwater management is to "control the quantity and quality of stormwater produced by new development and redevelopment such that they comply with water quality standards and protect beneficial uses of the receiving water." The Department of Ecology has determined that stormwater management activities in Washington state do not require a water right. Since the Port's proposal to offset flow impacts to the receiving waters consists of stormwater management activities, a water right is not required for the flow Impact Offset Facility.

Introduction

The purpose of this report is to evaluate the impacts to streamflows in Miller, Walker, and Des Moines Creeks resulting from construction projects included in the Master Plan Update for Seattle-Tacoma International Airport, and to propose a Flow Impact Offset Facility to mitigate the impacts during low streamflow periods. The principal projected expected to impact streamflows in the creeks is the third runway embankment.

Section not complete

Water Quality Design Aspects

The Washington State Department of Ecology (Ecology) has defined standards for water quality related to stormwater release, including periods of low flow. Ecology has jurisdiction to monitor and enforce these standards through their National Pollution Discharge Elimination System (NPDES) Permit. These standards include turbidity, dissolved oxygen, temperature, and dissolved metals. The Port's current stormwater design plans for the third runway expansion include a stormwater system and operational procedures to provide the storage and managed release of stormwater during low flow periods. These stormwater storage facilities employ biofiltration strips, catchbasins, detention ponds and vaults to meet current King County water quality requirements. In addition, the facilities are designed to be retrofit according to the Ecology water quality measures if specific water quality concerns are identified during post construction monitoring. The Port's monitoring and reporting program (see Section XX) is proposed to assess the performance of the facilities, allowing adaptive management to be used in the implementation of additional water quality measures to ensure that standards will continue to be met.

Des Moines, Miller, and Walker Creeks are all assumed to be Class AA (extraordinary) waters (WAC 173-201A-030). As such, the water quality standards discussed in this report are those listed for Class AA water bodies, which are the most stringent standards. Water quality standards for metals are based on toxicity, are independent of the receiving water classification, and are listed in WAC 173-201A-040 (Toxic substances). Although Ecology's proposed revisions to water quality standards from a class-based system to a use-based system is not expected to impact the design and operation of the proposed facility, the Port will further evaluate the proposed changes as part of the final design process and make any needed changes to the facility.

The state water quality standards applicable to the managed release of stormwater to offset flow impacts are discussed below. Specific design features, assumptions and other information considered in the design of the facility are included. Operational and monitoring proposals are presented in section xxxx. References to stormwater vaults refer only to those vaults proposed to detain stormwater to offset impacts to streamflows. Likewise, references to stormwater and stormwater discharges refer only to the managed release of stormwater to offset flow impacts.

Turbidity

The state water quality standard for turbidity in class AA waters is a two tier standard. For receiving water with turbidity less than or equal to 50 NTU (background flow), discharged water may not increase the receiving waters more than 5 NTU over background. For receiving water with turbidity greater than 50 NTU, discharged water may not increase turbidity of the receiving waters more than 10 percent. Turbidity levels in the creeks vary between less than 5 NTU to over 1,000 NTU. The lowest turbidity levels in the creeks generally occur during low streamflow (baseflow) conditions, which correspond to the majority of periods when the stormwater would be released to the creeks to offset flow impacts. It is assumed that the releases of stormwater to offset flow impacts would have to meet the 5 NTU standard most, if not all of the time. To minimize the need to provide constant background level monitoring of the creek above and below the release locations, releases can be limited to 5 NTU or less in order to be in compliance at all times.

There are several operational considerations and water quality Best Management Practices (BMPs) on the airfield to reduce the sediment and turbidity levels in runoff water going into stormwater storage. The Port uses catchbasins, the Industrial Wastewater System (IWS) system, and biofiltration strips as BMPs on the existing airfield, and the SMP proposes to retrofit the existing airfield with additional sediment trap BMPs in the bottom of each new detention vault facility. The new airfield surface will incorporate similar BMP's to minimize the amount of sediment and suspended solids that get into the stormwater vaults. The primary BMP consists of the construction of biofiltration strips in the new and existing airfield areas that treat stormwater as it drains directly from impervious areas of runways and taxiways. The Port will also maintain catch basins to ensure they continue to trap sediments. Filter strips are already in place in the existing Taxiway "C" airfield area that drains to the stormwater vault (SDS3) located in the Des Moines Creek watershed (see Section 7 in the Comprehensive Stormwater Management Plan). In addition, the airfield is a controlled area subject to very low levels of travel by ground vehicles and frequent cleaning and inspection for debris that could be harmful to aircraft. Consequently, the airfield is generally much cleaner than most urban areas that generate stormwater runoff.

There are also operational procedures outlined in the airport's Stormwater Pollution Prevention Plan (SWPPP) that will minimize opportunities for sediment and suspended solids to enter the stormwater vaults. These include:

- Sweeping ramp areas several times per week.

- Annual inspection of catch basins and cleaning if the depth of sediment equals or exceeds one-third the depth from bottom of the basin to the invert of the lowest pipe.

- Proper storage and disposal of sediment removed from catch basins.

- Hydroblasting of runway skid-mark rubber. Water and removed rubber is vacuumed by the same machine, drained, and deposited at the decant station until disposed as solid waste.

All of these BMPs will limit the amount of sediments and suspended solids that enter the stormwater vaults, and therefore will reduce the turbidity of the water stored in the vaults and discharged to the creeks.

All of the proposed stormwater vaults, including those associated with the Flow Impact Offset Facility, employ features designed to provide treatment (settling and removal) of suspended solids and turbidity. These features include:

- Dividing the dead storage area (similar to the areas in the vaults where the stormwater detained to offset flow impacts will be held) into several compartments by constructing short walls within the dead storage area of each vault. The compartments allow areas for suspended solids to settle out and be contained. Each compartment's outlet will be configured so that the suspended solids are captured in the compartments during low flow release periods. Design considerations of this type are typically included in stormwater vaults. Details will be provided at final design of the stormwater vaults.

- The vaults will include an extra 6-inch depth for the first third of the bottom (minimum) to facilitate trapping sediment that reaches the vault.

- Maintenance of the vaults will remove and properly dispose of collected sediments prior to the anticipated low flow release periods.

- The vaults will be designed to allow installation of additional water quality measures, if needed. Additional water quality features may include filtration of the discharges.

The design of the stormwater vaults, in combination with the operational and monitoring considerations discussed below, will assure that release of stormwater will not cause violations in the turbidity standards. The Port is currently investigating filtration of stormwater associated with discharges from a landside drainage basin. This research includes determining the effectiveness of several filtration media in treating the stormwater. The results of this study will be completed before final design of the flow offset facilities, and the data will be used to select the filtration method most appropriate to treat the stormwater discharge, if needed.

Operational and monitoring considerations for the Flow Impact Offset Facility for turbidity are discussed in Section xxxx.

Temperature

The state water quality standard for temperature in class AA waters is not to raise the temperature of the receiving water to over 16 degrees Celsius. If the baseline temperature of the receiving water is greater or equal to 16°C discharges cannot raise the temperature more than 0.3 ° C. To date, Ecology has not applied these requirements to stormwater discharges, although they have required temperature monitoring of certain stormwater discharges. Ecology could apply the temperature standard to future stormwater discharges.

The highest annual temperatures in the creeks are usually reached during the summer months, which is the period when the Flow Impact Offset Facility is expected to be in operation. Solar radiation is the primary mechanism by which stormwater temperatures increase in detention ponds. Since the stormwater vaults are typically underground structures (although some be partially exposed), there will be no direct solar warming. Underground storage provides a constant temperature that will be lower than open storage facilities, more closely matching a native seep temperature. Water release from the Flow Impact Offset Facility is not expected to increase the in-stream water temperature at all. Since the proposed underground stormwater vaults will result in relatively cool water being discharged, no special design considerations are proposed to manage water temperatures in the vaults associated with the Flow Impact Offset Facility.

The Port is collecting water temperature data from existing stormwater vaults in order to characterize the expected temperatures of the reserved stormwater discharges. Commencing in the summer of 2001, average daily water temperature data is being collected from the North

Employee Parking Lot vault and the SDS3 vault located near the south end of the airfield. Data will be collected from June though October of each year from the dead storage area of each vault. These existing vaults were selected because they are similar in size to the proposed stormwater volumes associated with the Flow Impact Offset Facility. The NEPL vault is partially exposed to sunlight (on its west side and top), while the SDS3 vault is completely underground. By collecting temperature data from both vaults, a range of expected temperatures can be established. Temperature data will be collected from the dead storage zone in each vault in order to approximate the vaults associated with the Flow Impact Offset Facility. This data will be compared to stream temperature data also being collected by the Port to characterize any cooling effects of stormwater releases on water temperatures in the creeks.

Operational and monitoring procedures for the Flow Impact Offset Facility for temperature are discussed in Section xxxx.

Dissolved Oxygen

The state water quality standard for dissolved oxygen (DO) in Class AA waters is 9.5 milligrams per liter (mg/l). Low DO levels in creeks during summer low flow periods is a potential water quality concern. The Flow Impact Offset Facility will be designed and operated in a manner that will not decrease the DO levels in the creeks, and under typical conditions, may actually increase DO levels.

Dissolved oxygen levels in the stormwater vaults will not be significantly reduced while the water is stored. There will be little, if any, biological activity in the vaults that could consume oxygen as a result of the lack of sunlight and the low biological oxygen demand (BOD) typically seen in stormwater runoff from the airfield (Annual Stormwater Monitoring Report, September 2000). The infrequent and short-lived episodes of elevated BOD due to runway deicing activities are not expected to impact the DO concentrations of the stormwater detained in the Flow impact Offset Facility because the stormwater associated with these events moves through the stormwater management system in a matter of hours, is replaced with runoff with the low BOD concentrations more typical of airport runoff (Deicing/DO Study Report, November 2000), and typically happens during the early winter months when reserved stormwater releases from the Flow Impact Offset Facility would not take place. In addition, the Port operates BMPs to remove snow containing deicing chemicals (a potential source of BOD) to snowmelt areas that drain to the Industrial Wastewater System, further reducing the BOD in water that drains to stormwater vaults.

Vents will be included in the stormwater vaults associated with the Flow Impact Offset Facility to allow for the circulation of fresh air to occur. This will help maintain the dissolved oxygen concentration of the stormwater.

An additional design consideration is the positioning of the inlet(s) to the stormwater vaults associated with the Flow Impact Offset Facility. The inlet(s) will be placed lower in the vault in order to facilitate flushing of the vault each time there is sufficient rainfall to generate stormwater runoff. Typically, stormwater inlets in vaults are placed at higher elevations within the vault. As a result, water in the lower or dead storage areas may not be circulated and may stagnate. By placing the inlet at a lower elevation, water already in the lower portions of the vault will be displaced by the incoming water and will not have the opportunity to stagnate. By continually replacing the water in the stormwater vaults, the dissolved oxygen levels in the stormwater in the vaults will benefit. Each stormwater vault associated with the Flow Impact Offset Facility will have its inlet position carefully considered during the final design phase, and placed to enhance this circulating effect.

Passive aeration of stormwater can be achieved through natural turbulence or agitation of the discharges. Steeply sloped pipes with periodic drop structures will be required to move the water from the vault outlets to the creek elevation. An energy dissipating structure will be required near the release point at creek level to slow the velocity adequately for entering the creek safely, without causing scour or erosion. Both the steeply sloped discharge pipes and the energy dissipating structures will provide the turbulence or agitation needed to provide passive aeration. The Pond G storage vault is located within the runway embankment and has adequate fall from the vault outlet to the creek discharge location to provide aeration.

Where insufficient fall is available for this natural aeration process, the installation and operation of aeration devices may be necessary. Other vaults are located near the level of the creek discharge elevation such that active aeration measures may be required through the installation of some type of aeration device. Active aeration systems that could be utilized include microbubble diffusers, gas injection, air injection, mechanical aerators, or aeration hoses. Microbubble diffusers consist of a porous ceramic plate (similar to aquarium aeration stones) and a pump to inject air through the plate. Gas and air injection systems inject a controlled amount of gas or air under pressure into the discharge water pipe. Mechanical aerators physically agitate water and allow air to become mixed with the water. Aeration hoses are flexible porous rubber hose, and have air pumped through them similar to the microbubble diffusers. Information on each of these devices is included in Appendix xx. Although the selection of the device(s) to be installed will be made during the final design of the Flow Impact Offset Facility, it is likely that the microbubble diffuser will be selected and installed because of their simplicity, effectiveness, cost, and ability to be installed in the discharge pipes. Other attractive features of the microbubble diffuser include low maintenance requirements, their use of a small compressor or pump to provide air instead of the use of compressed gas tanks, and their ability to be automated to function anytime the reserved stormwater discharge valve is open. Currently, the Flow Impact Offset Facility vaults associated with SDN3X, SDN2X/4X, SDN1, Cargo, NEPL, SDS4, SDW3A, and SDW2 may require aeration of their discharges through the installation of aeration devices. ***(need to update this section based on final selection of vaults in facility)***

Operational and monitoring considerations for the Flow Impact Offset Facility related to managing dissolved oxygen are discussed in Section xxxx.

Nutrients

There are no water quality standards for nutrients in the current water quality standards. However, nutrients typically found in stormwater could be of potential concern. If nutrient-rich stormwater is stored for long periods of time, exposure to solar radiation can cause algae blooms. However, it is expected that there will be no adverse water quality impacts associated with nutrients in the release of stormwater for the following reasons:

- There is no significant source of nutrients associated with the airfield areas (i.e., sources of water for the Flow Impact Offset Facility). Primary sources for nutrients in urban stormwater are fertilizers applied to lawns and landscaped areas. However, the grass infield areas of the airfield are not fertilized or irrigated because lush growth could become a wildlife attractant concern. Any landscaped areas to which fertilizers are applied are located near the terminal, and drain to stormwater basins that do not contribute flow to the Flow Impact Offset Facility. The Port's use of fertilizers includes applying the BMPs listed in the airport's Stormwater Pollution Prevention Plan, which further reduces the amount of fertilizers and nutrients that enter stormwater. With careful management of fertilizer use at the airport, there is no major source of nutrients for the drainage areas that contribute stormwater to the Flow Impact Offset Facility.

- The operation of BMPs on the airfield (biofiltration swales) would reduce the opportunity and concentrations of any nutrients that exist prior to the stormwater entering the vaults.

- Since the vaults are underground facilities, there is no sunlight that would stimulate the growth of algae often associated with elevated nutrient levels.

- In-stream residence time for the stormwater discharged from the Flow Impact Offset Facility is only a matter of hours (the time it takes water to flow from the discharge points in the airport vicinity to the creeks' discharge points in Puget Sound). Therefore, there will be minimal opportunity for biological activity (algae blooms) in the creeks. Such water quality impacts from nutrients are typically associated with lakes and ponds, where long residence time would provide the opportunity for excess algae growth to occur. Since no lakes or ponds occur in the creeks between the airport and Puget Sound, this is not an issue.

Given the above, the Port does not propose any monitoring for nutrients in the discharges from the Flow Impact Offset Facility. Through continued implementation of the SWPPP, the BMPs currently in place that manage the use of fertilizers will continue to minimize the opportunities for nutrients to enter stormwater runoff.

Metals

Metals of concern include copper, lead, and zinc. Water quality standards for metals are based on the dissolved fraction, are dependant of the hardness of the water, and are applicable to the receiving waters. Chemistry data from existing airfield stormwater discharges (which are typical of the stormwater that would be reserved for release during low flow periods) have been reported in the Annual Stormwater Monitoring Reports. Metal concentrations in these discharges are reported as total recoverable metals, which are not directly comparable to the dissolved fraction listed in the water quality standards. However, this data does serve as an indication of metal concentrations to be expected in the discharges of stormwater from the Flow Impact Offset Facility. Median metals concentrations from airfield stormwater range from 0.014 – 0.031 mg/l copper, 0.001 – 0.002 mg/l lead, and 0.020 – 0.052 mg/l zinc. Note that these values are for end-of-pipe or within-pipe discharges, not the receiving waters. These metal concentrations are also less than typical urban runoff, as discussed in the Annual Stormwater Monitoring Reports. In addition, the Port has conducted Whole Effluent Toxicity testing of stormwater discharges, as required by its NPDES permit, as discussed in the Annual Monitoring Reports. Stormwater associated with airfield sub-basins met the performance standards for whole effluent toxicity according to Ecology guidelines. All this information indicates that the Flow impact Offset Facility can be managed to meet the water quality standards for metals in the receiving waters

The following items should be considered in the management of the Flow Impact Offset Facility for compliance with state water quality standards:

- A large portion of metals in urban stormwater is attributed to motor vehicle activity. This is illustrated in the Annual Stormwater Monitoring Reports that show higher metal concentrations are associated with the landside basins where motor vehicle activity is concentrated. Since access to the airfield is strictly controlled, motor vehicle activity is kept to a minimum, therefore, metal concentrations in stormwater runoff is minimized. The airfield basins are the areas that will be providing stormwater to the Flow Impact Offset Facility, and these areas typically have the lowest lead and zinc concentrations of all airport stormwater discharges (copper concentrations are more consistent in all airport stormwater discharges, but are still relatively low in airfield stormwater).

- Data collected by the Port show that a large fraction of the metal concentrations are associated with particulates, i.e., the metal ions are bound to particulate matter. Therefore, the design and management practices proposed to minimize or reduce particulates and turbidity will also reduce total metal concentrations in the stormwater discharges. Biofiltration swales, settling in vaults, and (additional) filtration are all effective in reducing particulates, and therefore total metal concentrations will be reduced as well. Although these BMPs are not effective in removing dissolved metals, the majority of the metals are bound to particulates and will be removed. The design features proposed for the reserved stormwater vaults (compartmentalized storage, sloping the vault floor away from the stormwater outlets, careful placement of the stormwater outlets, and the provision for installation of filters) will ensure that the discharge of sediments and metals bound to particles will be minimized.

- The Port is currently investigating filtration of stormwater associated with discharges from a landside basin. This research includes determining the effectiveness of several filtration media in treating the stormwater. The results of this study will be completed before final design of the flow offset facilities, and the data will be used to select the filtration method most appropriate to treat the discharge from the Flow Impact Offset Facility, if needed.

Operational and monitoring considerations for the Flow Impact Offset Facility related to managing metals are discussed in Section xxxx.

Other Considerations

There are several other considerations relating to the design and operation of the Flow Impact Offset Facility. They include:

- The discharge points for Flow Impact Offset Facility will be the same as the typical ("live") discharge point for each vault or pond they are associated with. This eliminates the need to permit and construct additional discharge points to the creeks. The proposed location of each stormwater discharge point for the Flow Impact Offset Facility are illustrated in the drawings in Appendix xx.

- All stormwater management facilities, including those associated with the Flow impact Offset facility, will be located within the airport's perimeter fencing, thereby controlling access to the facilities and reducing the potential for damage to the facilities from vandalism.

- The Port will operate, inspect, monitor, and maintain the Flow impact Offset Facility as long as there is an airport at the site. In addition, the Port will provide annual monitoring reports to ensure that the Flow Impact Offset Facility is meeting its performance goals. An adaptive management method will be used to allow for needed adjustments in the operation of the facilities, and to allow for the installation of new management/monitoring technology, if needed.

Operation and Monitoring Plan/Annual Schedule of Activities

This section discusses details of the Port's proposed Operation and Monitoring Plan for the Flow Impact Offset Facility. The Operation and Monitoring Plan will be finalized and submitted to Ecology after final design of the facility is competed and before operation commences. The final plan will be based on the proposal discussed in this section, and will include:

- A detailed annual schedule of operation for each stormwater vault associated with the Flow Impact Offset Facility
- A monitoring plan, including specific monitoring locations, sampling protocols, etc.
- A reporting plan
- An inspection/maintenance plan
- Characterization of the stormwater quality associated with the Flow Impact Offset Facility, based on existing data and data currently being collected.

The proposal discussed in this section includes information on all the points listed above. However, slight changes in configurations of vaults and conveyance may take place during final design of the facilities, and data currently being collected by the Port may suggest other modifications to the proposed facilities. The Final Plan will include the details and specificity that is not available at the present time.

Annual Operating Schedule

This section contains the proposed annual operating schedule for the Flow Impact Offset Facility. The schedule is based on a calendar year for ease of presentation. The proposed schedule also combines the four proposed stormwater vaults associated with the Flow Impact Offset Facility into a common schedule. It is envisioned that each vault may have a specific operating schedule once final design details are available. The specific operating schedule for an individual vault may be determined based on the final size of the vault, the contributing drainage area to the vault, the time required to fill the vault, and the hydrologic regime of the stream system to which it discharges. Specific operating schedules for each vault will be submitted to Ecology in the Final plan.

Following is the proposed general operating schedule for the Flow impact Offset Facility:

- January through May
    - Operate as "normal" stormwater detention vaults
        - Flow Impact Offset outlet closed to accumulate water
        - Placement of inlet will allow stormwater to be flushed with "fresh" water
        - Monitor filling of stormwater vault (see monitoring plan for details)

- June/July
    - Continue to accumulate stormwater
    - Conduct small test release from each vault associated with the Flow Impact Offset Facility
        - Confirm/adjust discharge rates for Flow Impact Offset Facility (gauge/measure flow)

- Collect water quality samples from each discharge (see monitoring section for details)
- Compare test discharge water quality samples to existing water quality collected data from creeks during summer periods (corresponding to the periods when the Flow Impact Offset Facility would be discharging)
- If potential water quality violations are indicated, take appropriate actions prior to initiating operational discharge, such as:
  - Install/maintain filters for sediments/turbidity/metals
  - Install portable aerators for DO
  - No actions proposed for temperature and nutrients
- Continue to monitor filling of vaults associated with the Flow Impact Offset Facility

- July/August
  - Open each outlets associated with the Flow Impact Offset Facility
    - July 24th for Des Moines Creek facility
    - August 1 for Miller and Walker Creek Facilities
  - Conduct sampling as described in monitoring plan

- August through October
  - Operation of Flow Impact Offset Facility
    - Inspection/monitoring of each discharge

- Inspect/monitor (sample) weekly throughout duration of operation
- Any water quality violations will be immediately investigated and corrected
- Continue to monitor water levels in reserved stormwater storage areas

- November 1 (or later, upon commencement of seasonal rains)
  - Close outlets associated with the Flow Impact Offset Facility
    - If water remains in vaults and seasonal rains have not commenced, allow discharge to continue until water is exhausted or rains begin
  - Inspect vaults/complete annual maintenance
  - Compile collected data
  - Begin accumulating water in vaults associated with the Flow Impact Offset Facility
    - Close outlets associated with Flow Impact Offset Facility upon completion of inspection/maintenance, but no later that January 1
  - Continue monitoring water levels in vaults associated with the Flow Impact Offset Facility
- December 31
  - Submit annual data report to Ecology by December 31

Monitoring Plan

The Port is proposing a comprehensive monitoring plan for the Flow Impact Offset Facility to ensure that the water quality performance standards are met and no violations of state water quality standards occur in the receiving waters. Monitoring consists of three elements: characterization of existing/expected water quality, monitoring of annual test releases from the Flow Impact Offset Facility, and monitoring of the discharges and receiving waters during operation of the facility. Each element is discussed below.

Characterization of existing/expected water quality

A great deal of water quality data already exists on the Port's stormwater discharges and on the creeks. This data has been collected for a variety of purposes including satisfying the Port's NPDES permit requirements, basin planning activities, and other studies done in the area by the Port and others. The data set includes water quality measurements within the stream systems during the summer periods when the Flow Impact Offset Facility will be scheduled to discharge to the streams. In addition, the Port has started to collect data to characterize the discharges from the Flow impact Offset Facility. Temperature data is being collected starting in 2001 from the NEPL vault and the SDS3 vault in order to characterize the expected temperatures of the Flow Impact Offset Facility. The Port has collected temperature data in the creeks since September 2000, so comparisons can be made. The NEPL vault is partially exposed to sunlight (on its west side and top), while the SDS3 vault is completely underground. By collecting temperature data from both vaults, a range of expected temperatures can be established for each type of vault (buried and partially exposed). Temperature data will be collected from the dead storage zone in each vault in order to approximate the Flow impact Offset Facility. Other data may be collected, as needed, prior to the operation of the Flow Impact Offset Facility, that can be used to characterize the proposed discharges and expected water quality within the creeks during the summer months, when the facility will be discharging. All of this data will be analyzed and presented in the Final Operation and Monitoring Plan, which will be submitted to Ecology prior to the initial operation of the Flow Impact Offset Facility.

<u>Monitoring of annual test releases from the Flow Impact Offset Facility:</u>

Each year, in May or June, prior to the operation of the Flow Impact Offset Facility, the Port proposes to conduct small test discharges from each outlet. The test discharges are intended to confirm the operation of each discharge, and to detect and respond to potential problems prior to the annual operation of the Flow Impact Offset Facility. For example, because of the small orifices needed to control discharges to the required rate, small amount of debris in the orifice could significantly impact the discharge rates. Debris can be removed at this time to prevent impacts to the annual operation of the facility. Any other problems that may occur within the facility can be detected and corrected at this time.

Water quality sampling of small-volume test discharges is proposed. By conducting this sampling, potential water quality problems can be detected and corrective measures taken prior to scheduled annual releases to the stream systems. Water quality data obtained from the test discharges will be compared to the characterization data in the creeks to determine the potential for water quality violations. If any are indicated, the Port will take corrective action prior to the annual operation of the facility, such as installing portable aerators or additional filtration in the discharges prior to their entry into the creeks.

Water quality sampling of the test discharges will include:

- Flow (measured/gauged in the field)
- Turbidity (field measurement)
- Dissolved Oxygen (field measurement)
- Temperature (field measurement)
- Metals (copper, lead, and zinc, (grab samples)

<u>Operational Monitoring</u>

The Port is proposing to monitor the operation of the Flow Impact Offset Facility to provide assurance that the facility is achieving its performance goals and not causing any water quality violations in the receiving waters. This will be accomplished by periodic monitoring of both the discharge and receiving waters during the annual operation of the facility. The specific monitoring proposal for the Flow Impact Offset Facility includes:

- Water levels within the stormwater vaults
    - Installation of a pressure transducer and datalogger in each vault will allow daily water levels to be collected
    - This data can be applied to the vault geometry to calculate the volume of water in the stormwater vaults
    - Vault filling and emptying (average daily water levels) will be monitored throughout the year

- Flow
    - Measured/gauged in the field
    - Taken upon opening of the Flow Impact Offset Facility outlets
    - Taken weekly throughout annual operation of facility
- Turbidity
    - Field Measurements
    - Measured in discharges, upstream in receiving waters, downstream in receiving waters after thorough mixing
    - Taken upon opening of Flow impact Offset Facility outlets
    - Taken weekly throughout operation of facility
- Dissolved Oxygen
    - Field Measurements
    - Measured in discharges and downstream in receiving waters after thorough mixing
    - Taken upon opening of Flow Impact Offset Facility outlets
    - Taken weekly throughout operation of facility
- Temperature
    - Field Measurements

- Measured in discharges, upstream in receiving waters, downstream in receiving waters after thorough mixing
- Taken upon opening of Flow Impact Offset Facility outlets
- Taken weekly throughout operation of facility

- Metals
  - Grab samples analyzed for copper, lead, and zinc
  - Measured in discharges and receiving waters downstream after thorough mixing
  - Measured upon opening of Flow impact Offset Facility outlets
  - Measured monthly throughout operation of facility

Weekly monitoring of the discharges for the quality parameters (except metals) is sufficient because the facility will be discharging from a stored volume of water, i.e., the water quality of the discharges is not expected to change. In the event of a significant rainfall event during the operation of the facility (greater than 0.5 inches in a 24-hour period), the Port will conduct additional sampling to ensure that the rainfall did not substantially change the character of the water within the Flow Impact Offset Facility that could potentially cause a violation of in-stream water quality standards. Monthly sampling for metals is sufficient because existing data shows that the metals concentrations in stormwater runoff from the airfield is relatively consistent and low compared to stormwater discharges from other urban areas.

Specific monitoring locations, both of the discharges and in-stream, will be included in the Final Operation and Monitoring Plan to be submitted to Ecology prior to the initial operation of the

Flow impact Offset Facility. All water quality data will be recorded and reported in an annual monitoring report to be submitted to Ecology by December 31 of each year. If the monitoring data show that the discharges from the Flow Impact Offset Facility consistently meet water quality standards within the receiving waters, the Port may propose a modified monitoring plan for subsequent operation of the facility. If any water quality problems were encountered during operation of the facilities, the Annual Report will include a discussion of the immediate actions taken to address the problem, and actions taken or proposed to prevent a reoccurrence of the problem in the future. All sampling and analytical methods used to monitor the Flow Impact Offset Facility will conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 or to the latest revision of *Standard Methods for the Examination of Water and Wastewater* (APHA). This will make the monitoring methods for the Flow Impact Offset Facility consistent with other water quality monitoring done under the NPDES permit for the airport.

Biological Monitoring

Biological monitoring is proposed as part of the Natural Resources Mitigation Plan. This monitoring will evaluate changes in the Benthic Index of Biotic Integrity (BIBI) over a ten-year period. This monitoring will be able to be used in assessing any biological effects of the flow offset facility in the receiving waters.

Maintenance Plan

The Port develops operation and maintenance manuals for all of its stormwater facilities. While the manuals follow the same generalized schedule for inspection and maintenance, each facility has its own specific manual to address the unique features of each facility. Following is an outline of what is contained in existing operation and maintenance plans for facilities including the Tyee Pond Detention Facility, the Miller Creek Detention Facility, the North Employee Parking Lot, the North Cargo Area Pump Station, the North End Snow Melt Facility, the North Satellite Snow Melt Facility, and the South End Snow Melt Facility. Typical inspection/maintenance activities occur on monthly, quarterly, semi-annual, or annual intervals, depending on the facility and activity. Operation and maintenance manuals developed for the stormwater vaults associated with the Flow Impact Offset Facility will contain similar elements and at least the same frequency of activities.

General Operation and Maintenance Manual Outline

- Purpose of Facility/Purpose of Manual
- Description of Facility and Operation
    - General Description
    - Hydraulic Properties
    - Water Quality Properties
    - Monitoring Systems/Alarms
- Historical Maintenance Operations (as applicable)
- Site/Facility Access
- Personnel and Emergency Contacts

- Inspection and Maintenance Procedures (items included as applicable to each facility)
  - Culverts
  - Ponds
  - Vegetation
  - Inlet Structure(s)
  - Outlet Structure(s)
  - Sensors and Alarms
  - Pumps and Valves
  - Filters/other water quality facilities
  - Access Roads/Hatches
  - Berms/Dikes/Levees
  - Spillways/Slopes
  - Creek/Stream Protection
  - Photographs
- Inspection and Maintenance Schedule
- Sediment/Waste Disposal Requirements
- Inspection Forms and Maintenance Checklist
- Maintenance Work Order Request Form
- Maintenance Crew/Shop Crew Responsibilities
- Health and Safety Plan
- Combined Space Entry Program
- Drawings/As Built Diagrams
- Process Diagrams

- References/Equipment Manuals

A sample operation and maintenance manual is included in Appendix XX. Each stormwater vault associated with the Flow Impact Offset Facility will have its own operation and maintenance manual developed as part of the final design process. The operation and maintenance manual for these stormwater vaults will be included in the overall operation and maintenance manual for the Flow Impact Offset Facility to be submitted to Ecology prior to initial operation of the facility.

DES MOINES CREEK

DES MOINES CREEK

7-DAY LOW FLOW OCCURRENCES IN DES MOINES CREEK (1994)

Start of 7-Day Low Flows
with Average Flow Rates

Date			1994 HSPF Des Moines Creek at 200th St. / Flow cfs Average 7-Day Low Flow
1949	SEP	7	0.19
1950	SEP	17	0.40
1951	AUG	20	0.36
1952	OCT	13	0.22
1953	SEP	15	0.35
1954	AUG	7	0.48
1955	SEP	6	0.35
1956	SEP	3	0.44
1957	SEP	20	0.33
1958	SEP	2	0.29
1959	AUG	24	0.40
1960	AUG	7	0.40
1961	AUG	23	0.42
1962	SEP	2	0.34
1963	SEP	27	0.37
1964	AUG	31	0.48
1965	AUG	3	0.39
1966	AUG	19	0.33
1967	AUG	25	0.35
1968	AUG	6	0.47
1969	SEP	6	0.39
1970	AUG	27	0.33
1971	AUG	14	0.42
1972	AUG	8	0.53
1973	SEP	11	0.28
1974	OCT	13	0.32
1975	AUG	11	0.34
1976	OCT	17	0.34
1977	AUG	16	0.15
1978	OCT	16	0.42
1979	AUG	7	0.23
1980	AUG	23	0.35
1981	SEP	11	0.30
1982	AUG	6	0.42
1983	OCT	10	0.48
1984	AUG	29	0.37
1985	AUG	29	0.27
1986	SEP	5	0.27
1987	SEP	7	0.30
1988	SEP	11	0.26
1989	OCT	3	0.37
1990	SEP	25	0.31
1991	OCT	9	0.34
1992	SEP	16	0.31
1993	SEP	29	0.28
1994	AUG	26	0.23
1995	SEP	20	0.35

Statistical Ranking of Average 7-Day Low Flows
Period of Record: 1949-1995

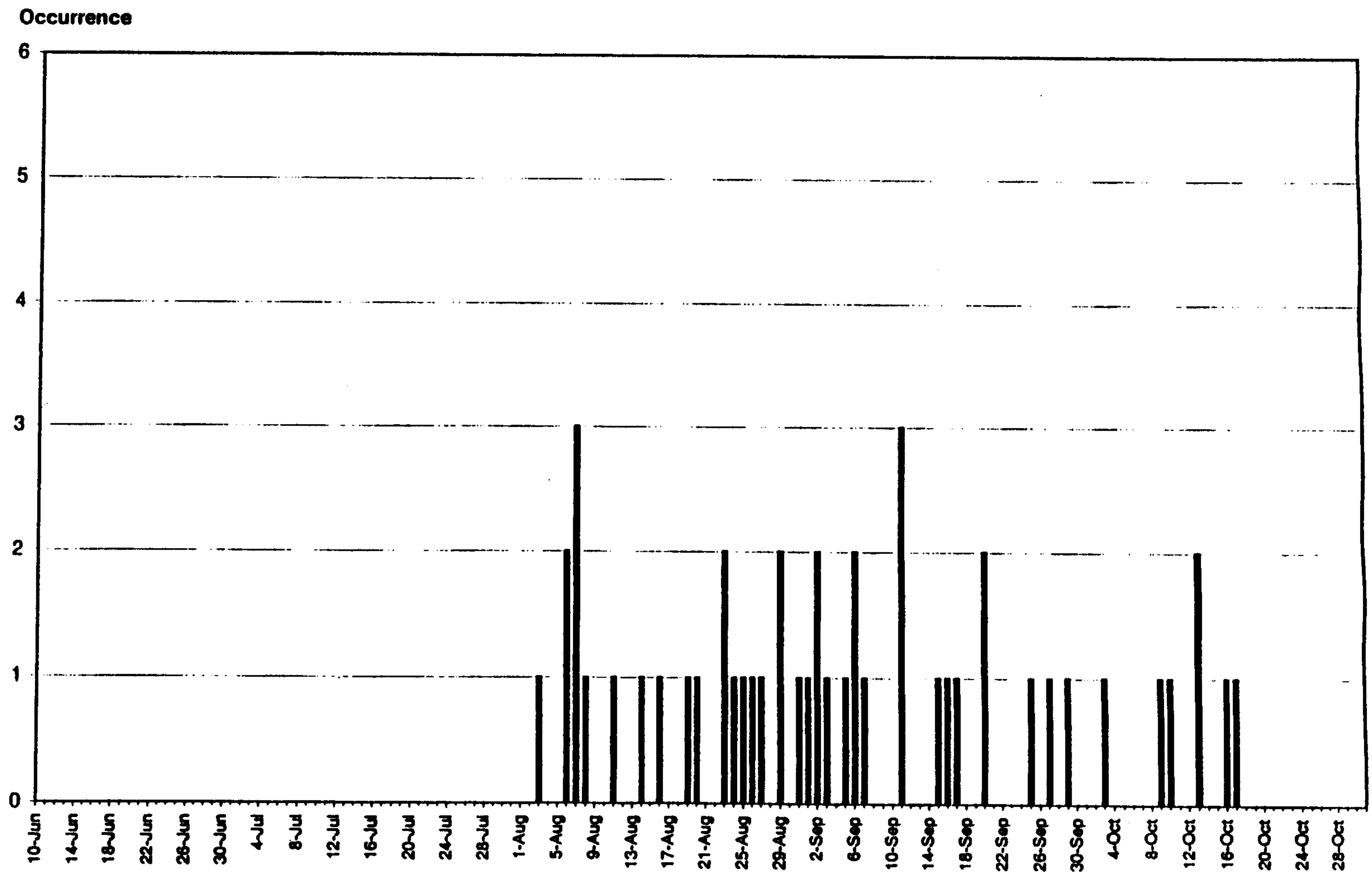
Date	Average 7-Day Lows Ordered	Rank	Rank/47+1	Return Frequency
1977	0.15	1	0.02	2.1
1949	0.19	2	0.04	4.2
1952	0.22	3	0.06	6.3
1979	0.23	4	0.08	8.3
1994	0.23	5	0.10	10.4
1988	0.26	6	0.13	12.5
1985	0.27	7	0.15	14.6
1986	0.27	8	0.17	16.7
1973	0.28	9	0.19	18.8
1993	0.28	10	0.21	20.8
1958	0.29	11	0.23	22.9
1981	0.30	12	0.25	25.0
1987	0.30	13	0.27	27.1
1990	0.31	14	0.29	29.2
1992	0.31	15	0.31	31.3
1974	0.32	16	0.33	33.3
1957	0.33	17	0.35	35.4
1966	0.33	18	0.38	37.5
1970	0.33	19	0.40	39.6
1962	0.34	20	0.42	41.7
1975	0.34	21	0.44	43.8
1976	0.34	22	0.46	45.8
1991	0.34	23	0.48	47.9
1953	0.35	24	0.50	50.0
1955	0.35	25	0.52	52.1
1967	0.35	26	0.54	54.2
1980	0.35	27	0.56	56.3
1995	0.35	28	0.58	58.3
1951	0.36	29	0.60	60.4
1963	0.37	30	0.63	62.5
1984	0.37	31	0.65	64.6
1989	0.37	32	0.67	66.7
1965	0.39	33	0.69	68.8
1969	0.39	34	0.71	70.8
1950	0.40	35	0.73	72.9
1959	0.40	36	0.75	75.0
1960	0.40	37	0.77	77.1
1961	0.42	38	0.79	79.2
1971	0.42	39	0.81	81.3
1978	0.42	40	0.83	83.3
1982	0.42	41	0.85	85.4
1956	0.44	42	0.88	87.5
1968	0.47	43	0.90	89.6
1954	0.48	44	0.92	91.7
1964	0.48	45	0.94	93.8
1983	0.48	46	0.96	95.8
1972	0.53	47	0.98	97.9

Rank = Numerical position of ordered average 7-day low flow values with the driest year equal to one.
N = 47

DES MOINES CREEK

HISTOGRAM LOW FLOW OCCURRENCES IN DES MOINES CREEK (1994)

7-Day Low Flow Occurences in Des Moines Creek, 1949-1995 (1994 HSPF)



AR 051778

DES MOINES CREEK

7-DAY LOW FLOW OCCURRENCES IN DES MOINES CREEK (2006)

Start of 7-Day Low Flows with Average Flow Rates			2006 HSPF Des Moines Creek at 200th St. / Flow cfs	Statistical Ranking of Average 7-Day Low Flows Period of Record: 1949-1995				
Date			Average 7-Day Low Flow	Date	Average 7-Day Lows Ordered	Rank	Rank/47+1	Return Frequency
1949	SEP	7	0.14	1977	0.12	1	0.02	2.1
1950	SEP	17	0.32	1949	0.14	2	0.04	4.2
1951	AUG	20	0.25	1952	0.15	3	0.06	6.3
1952	OCT	13	0.15	1994	0.16	4	0.08	8.3
1953	SEP	15	0.28	1979	0.17	5	0.10	10.4
1954	AUG	7	0.37	1988	0.18	6	0.13	12.5
1955	SEP	6	0.25	1958	0.19	7	0.15	14.6
1956	SEP	3	0.35	1985	0.19	8	0.17	16.7
1957	SEP	20	0.25	1986	0.19	9	0.19	18.8
1958	SEP	2	0.19	1993	0.19	10	0.21	20.8
1959	AUG	24	0.28	1973	0.20	11	0.23	22.9
1960	AUG	7	0.28	1981	0.21	12	0.25	25.0
1961	AUG	23	0.30	1974	0.22	13	0.27	27.1
1962	SEP	3	0.27	1987	0.22	14	0.29	29.2
1963	SEP	27	0.31	1990	0.23	15	0.31	31.3
1964	AUG	31	0.39	1966	0.24	16	0.33	33.3
1965	AUG	3	0.30	1967	0.24	17	0.35	35.4
1966	AUG	19	0.24	1975	0.24	18	0.38	37.5
1967	AUG	25	0.24	1992	0.24	19	0.40	39.6
1968	AUG	7	0.38	1951	0.25	20	0.42	41.7
1969	SEP	6	0.29	1955	0.25	21	0.44	43.8
1970	JUL	18	0.25	1957	0.25	22	0.46	45.8
1971	AUG	14	0.31	1970	0.25	23	0.48	47.9
1972	AUG	8	0.42	1980	0.25	24	0.50	50.0
1973	SEP	11	0.20	1991	0.25	25	0.52	52.1
1974	OCT	13	0.22	1962	0.27	26	0.54	54.2
1975	AUG	11	0.24	1976	0.27	27	0.56	56.3
1976	OCT	17	0.27	1984	0.27	28	0.58	58.3
1977	AUG	16	0.12	1953	0.28	29	0.60	60.4
1978	JUL	9	0.33	1959	0.28	30	0.63	62.5
1979	AUG	7	0.17	1960	0.28	31	0.65	64.6
1980	AUG	23	0.25	1969	0.29	32	0.67	66.7
1981	SEP	12	0.21	1995	0.29	33	0.69	68.8
1982	AUG	6	0.32	1961	0.30	34	0.71	70.8
1983	OCT	10	0.40	1965	0.30	35	0.73	72.9
1984	AUG	29	0.27	1989	0.30	36	0.75	75.0
1985	AUG	29	0.19	1963	0.31	37	0.77	77.1
1986	SEP	5	0.19	1971	0.31	38	0.79	79.2
1987	SEP	6	0.22	1950	0.32	39	0.81	81.3
1988	SEP	11	0.18	1982	0.32	40	0.83	83.3
1989	AUG	7	0.30	1978	0.33	41	0.85	85.4
1990	SEP	25	0.23	1956	0.35	42	0.88	87.5
1991	OCT	9	0.25	1954	0.37	43	0.90	89.6
1992	SEP	16	0.24	1968	0.38	44	0.92	91.7
1993	SEP	29	0.19	1964	0.39	45	0.94	93.8
1994	AUG	26	0.16	1983	0.40	46	0.96	95.8
1995	SEP	20	0.29	1972	0.42	47	0.98	97.9

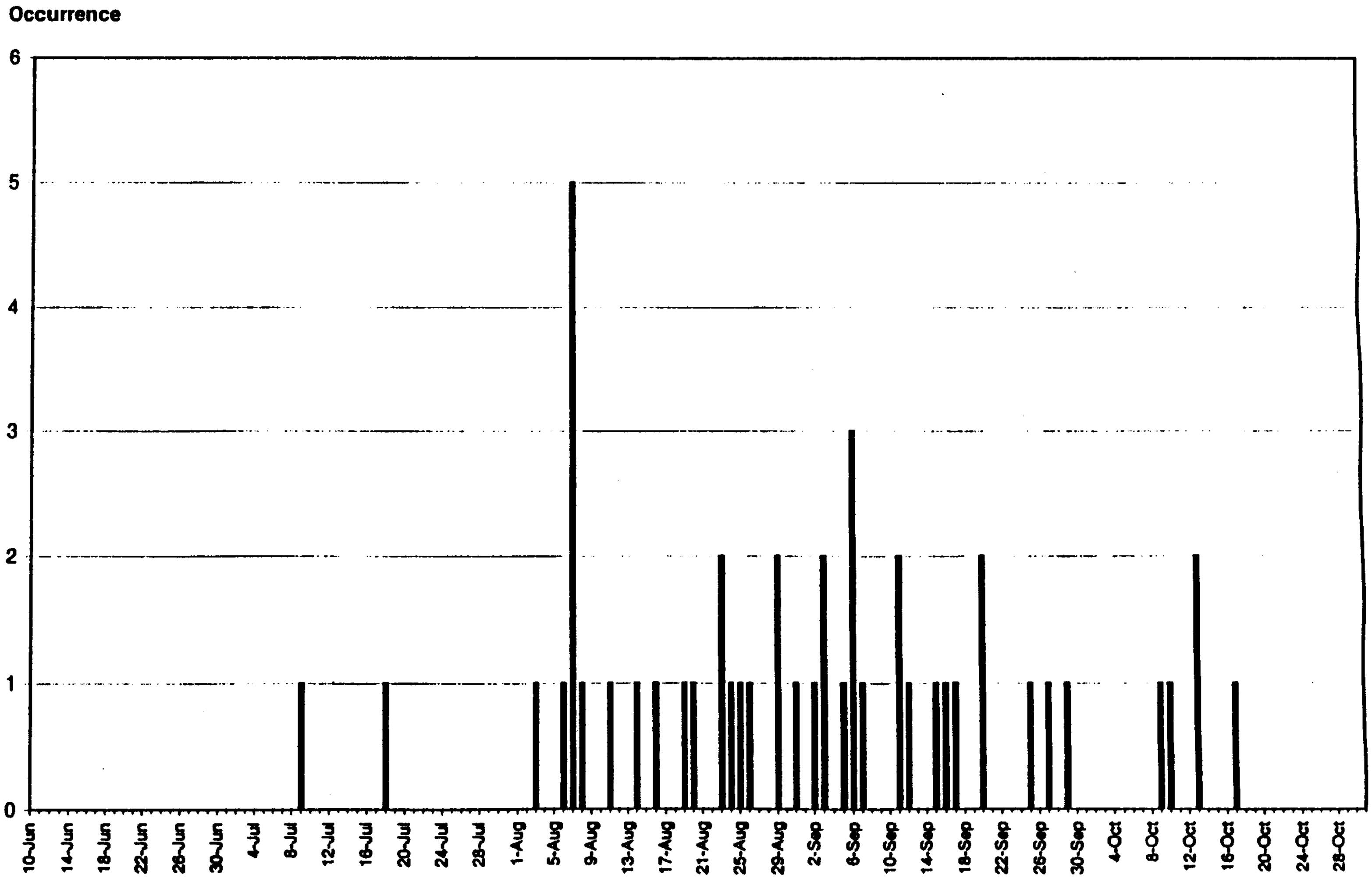
Rank = Numerical position of ordered average 7-day low flow values with the driest year equal to one.

N = 47

DES MOINES CREEK

HISTOGRAM LOW FLOW OCCURRENCES IN DES MOINES CREEK (2006)

7-Day Low Flow Occurrences in Des Moines Creek, 1949-1995 (2006 HSPF)



DES MOINES CREEK

7-DAY LOW FLOW OCCURRENCES IN DES MOINES CREEK (WITH MITIGATION)

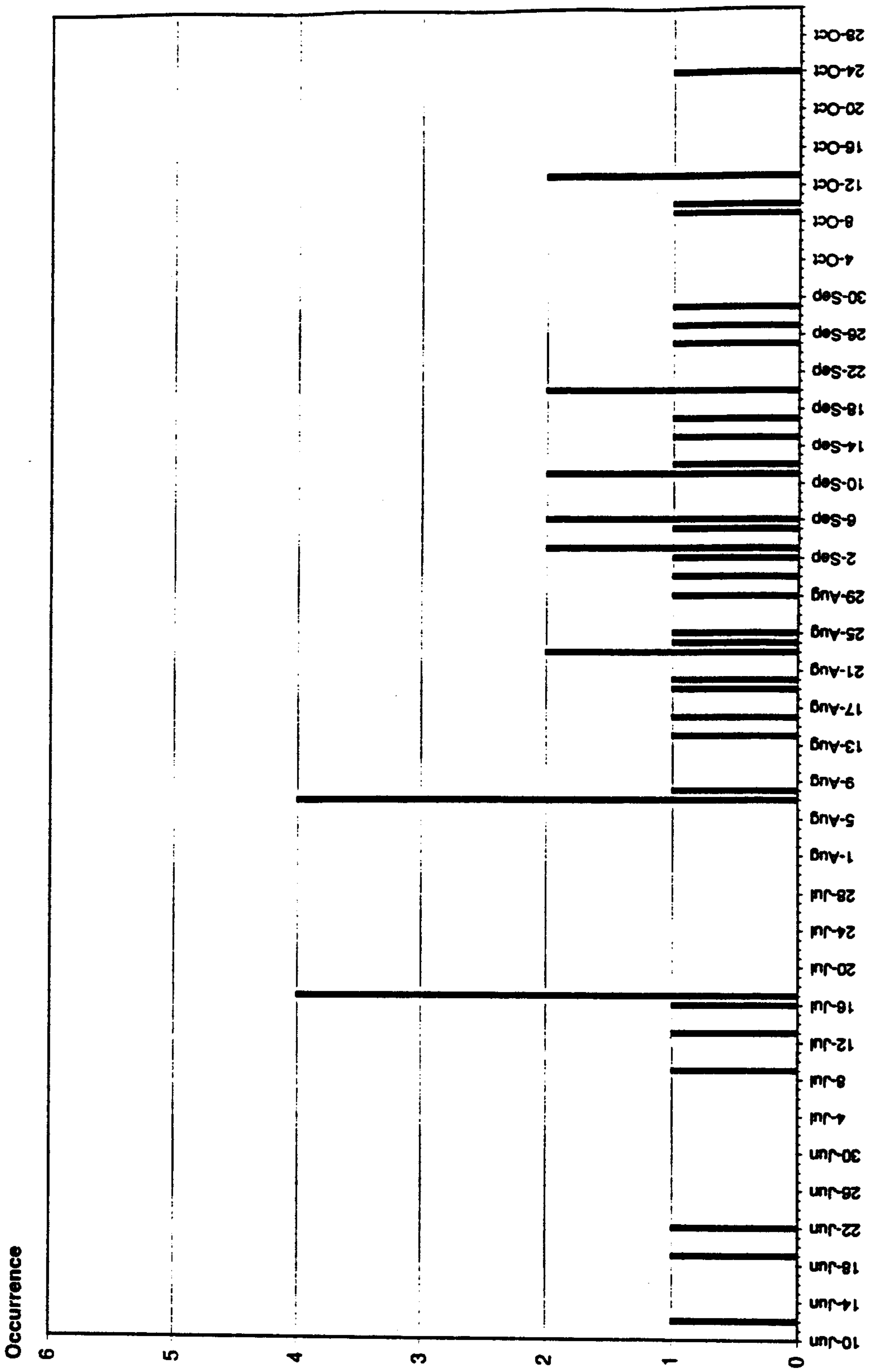
Start of 7-Day Low Flows with Average Flow Rates			2006 HSPF Des Moines Creek at 200th St. / Flow cfs	Statistical Ranking of Average 7-Day Low Flows Period of Record: 1949-1995				
Date			Average 7-Day Low Flow Jul 24 Release 0.10 cfs	Date	Average 7-Day Lows Ordered	Rank	Rank/47+1	Return Frequency
1949	JUL	16	0.22	1977	0.22	1	0.02	2.1
1950	SEP	17	0.42	1949	0.22	2	0.04	4.2
1951	AUG	20	0.35	1979	0.23	3	0.06	6.3
1952	OCT	13	0.25	1994	0.23	4	0.08	8.3
1953	SEP	15	0.38	1985	0.24	5	0.10	10.4
1954	AUG	7	0.47	1952	0.25	6	0.13	12.5
1955	SEP	6	0.35	1970	0.25	7	0.15	14.6
1956	SEP	3	0.45	1987	0.26	8	0.17	16.7
1957	SEP	20	0.35	1988	0.28	9	0.19	18.8
1958	SEP	2	0.29	1986	0.29	10	0.21	20.8
1959	AUG	24	0.38	1958	0.29	11	0.23	22.9
1960	AUG	7	0.38	1993	0.29	12	0.25	25.0
1961	AUG	23	0.40	1973	0.30	13	0.27	27.1
1962	SEP	3	0.37	1981	0.31	14	0.29	29.2
1963	SEP	27	0.41	1974	0.32	15	0.31	31.3
1964	AUG	31	0.49	1978	0.33	16	0.33	33.3
1965	JUL	13	0.35	1990	0.33	17	0.35	35.4
1966	AUG	19	0.34	1976	0.33	18	0.38	37.5
1967	AUG	25	0.34	1966	0.34	19	0.40	39.6
1968	AUG	7	0.48	1992	0.34	20	0.42	41.7
1969	SEP	6	0.39	1967	0.34	21	0.44	43.8
1970	JUL	17	0.25	1975	0.34	22	0.46	45.8
1971	AUG	14	0.41	1957	0.35	23	0.48	47.9
1972	AUG	8	0.52	1951	0.35	24	0.50	50.0
1973	SEP	11	0.30	1991	0.35	25	0.52	52.1
1974	OCT	13	0.32	1955	0.35	26	0.54	54.2
1975	JUL	17	0.34	1965	0.35	27	0.56	56.3
1976	DEC	10	0.33	1980	0.35	28	0.58	58.3
1977	AUG	16	0.22	1982	0.36	29	0.60	60.4
1978	JUL	9	0.33	1984	0.37	30	0.63	62.5
1979	JUN	12	0.23	1962	0.37	31	0.65	64.6
1980	AUG	23	0.35	1959	0.38	32	0.67	66.7
1981	SEP	12	0.31	1953	0.38	33	0.69	68.8
1982	JUN	19	0.36	1960	0.38	34	0.71	70.8
1983	OCT	10	0.50	1969	0.39	35	0.73	72.9
1984	AUG	29	0.37	1995	0.39	36	0.75	75.0
1985	JUL	17	0.24	1961	0.40	37	0.77	77.1
1986	SEP	5	0.29	1989	0.40	38	0.79	79.2
1987	OCT	24	0.26	1971	0.41	39	0.81	81.3
1988	SEP	11	0.28	1963	0.41	40	0.83	83.3
1989	AUG	7	0.40	1950	0.42	41	0.85	85.4
1990	SEP	25	0.33	1956	0.45	42	0.88	87.5
1991	OCT	9	0.35	1954	0.47	43	0.90	89.6
1992	JUN	22	0.34	1968	0.48	44	0.92	91.7
1993	SEP	29	0.29	1964	0.49	45	0.94	93.8
1994	JUL	17	0.23	1983	0.50	46	0.96	95.8
1995	SEP	20	0.39	1972	0.52	47	0.98	97.9

Rank = Numerical position of ordered average 7-day low flow values with the driest year equal to one.
N = 47

DES MOINES CREEK

HISTOGRAM LOW FLOW OCCURRENCES IN DES MOINES CREEK (WITH MITIGATION)

7-Day Low Flow Occurrences in Des Moines Creek 1949-1995 (24 Jul 2006 HSPF + 0.10 cfs)



AR 051786

DES MOINES CREEK

COMPARISON OF 7-DAY LOW FLOW BY YEAR

Comparison o[illegible]y Low Flow By Year
for Des Moines Creek

	Date		1994 HSPF Des Moines Creek at 200th St. / Flow cfs Average 7-Day Low Flow		Date		2006 HSPF Des Moines Creek at 200th St. / Flow cfs Average 7-Day Low Flow	-1994		Date		2006 HSPF Des Moines Creek at 200th St. / Flow cfs Average 7-Day Low Flow Jul 24 Release 0.10 cfs	-1994
1949	SEP	7	0.19	1949	SEP	7	0.14	-0.05	1949	JUL	16	0.22	0.03
1950	SEP	17	0.40	1950	SEP	17	0.32	-0.08	1950	SEP	17	0.42	0.02
1951	AUG	20	0.36	1951	AUG	20	0.25	-0.11	1951	AUG	20	0.35	-0.01
1952	OCT	13	0.22	1952	OCT	13	0.15	-0.07	1952	OCT	13	0.25	0.03
1953	SEP	15	0.36	1953	SEP	15	0.28	-0.07	1953	SEP	15	0.38	0.03
1954	AUG	7	0.48	1954	AUG	7	0.37	-0.11	1954	AUG	7	0.47	-0.01
1955	SEP	6	0.35	1955	SEP	6	0.25	-0.10	1955	SEP	6	0.35	0.00
1956	SEP	3	0.44	1956	SEP	3	0.35	-0.09	1956	SEP	3	0.45	0.01
1957	SEP	20	0.33	1957	SEP	20	0.25	-0.09	1957	SEP	20	0.35	0.01
1958	SEP	2	0.29	1958	SEP	2	0.19	-0.09	1958	SEP	2	0.29	0.01
1959	AUG	24	0.40	1959	AUG	24	0.28	-0.12	1959	AUG	24	0.38	-0.02
1960	AUG	7	0.40	1960	AUG	7	0.28	-0.12	1960	AUG	7	0.38	-0.02
1961	AUG	23	0.42	1961	AUG	23	0.30	-0.12	1961	AUG	23	0.40	-0.02
1962	SEP	2	0.34	1962	SEP	3	0.27	-0.07	1962	SEP	3	0.37	0.03
1963	SEP	27	0.37	1963	SEP	27	0.31	-0.07	1963	SEP	27	0.41	0.03
1964	AUG	31	0.48	1964	AUG	31	0.39	-0.09	1964	AUG	31	0.49	0.01
1965	AUG	3	0.39	1965	AUG	3	0.30	-0.09	1965	JUL	13	0.35	-0.03
1966	AUG	19	0.33	1966	AUG	19	0.24	-0.10	1966	AUG	19	0.34	0.00
1967	AUG	25	0.35	1967	AUG	25	0.24	-0.11	1967	AUG	25	0.34	-0.01
1968	AUG	6	0.47	1968	AUG	7	0.38	-0.10	1968	AUG	7	0.48	0.00
1969	SEP	6	0.39	1969	SEP	6	0.29	-0.10	1969	SEP	6	0.39	0.00
1970	AUG	27	0.33	1970	JUL	18	0.25	-0.08	1970	JUL	17	0.25	-0.08
1971	AUG	14	0.42	1971	AUG	14	0.31	-0.11	1971	AUG	14	0.41	-0.01
1972	AUG	8	0.53	1972	AUG	8	0.42	-0.11	1972	AUG	8	0.52	-0.01
1973	SEP	11	0.28	1973	SEP	11	0.20	-0.08	1973	SEP	11	0.30	0.02
1974	OCT	13	0.32	1974	OCT	13	0.22	-0.10	1974	OCT	13	0.32	0.00
1975	AUG	11	0.34	1975	AUG	11	0.24	-0.10	1975	JUL	17	0.34	0.00
1976	OCT	17	0.34	1976	OCT	17	0.27	-0.08	1976	DEC	10	0.33	-0.01
1977	AUG	16	0.15	1977	AUG	16	0.12	-0.03	1977	AUG	16	0.22	0.07
1978	OCT	16	0.42	1978	JUL	9	0.33	-0.09	1978	JUL	9	0.33	-0.09
1979	AUG	7	0.23	1979	AUG	7	0.17	-0.07	1979	JUN	12	0.23	0.00
1980	AUG	23	0.35	1980	AUG	23	0.25	-0.09	1980	AUG	23	0.35	0.01
1981	SEP	11	0.30	1981	SEP	12	0.21	-0.08	1981	SEP	12	0.31	0.02
1982	AUG	6	0.42	1982	AUG	6	0.32	-0.10	1982	JUN	19	0.36	-0.06
1983	OCT	10	0.48	1983	OCT	10	0.40	-0.07	1983	OCT	10	0.50	0.03
1984	AUG	29	0.37	1984	AUG	29	0.27	-0.11	1984	AUG	29	0.37	-0.01
1985	AUG	29	0.27	1985	AUG	29	0.19	-0.07	1985	JUL	17	0.24	-0.03
1986	SEP	5	0.27	1986	SEP	5	0.19	-0.08	1986	SEP	5	0.29	0.02
1987	SEP	7	0.30	1987	SEP	6	0.22	-0.08	1987	OCT	24	0.26	-0.04
1988	SEP	11	0.26	1988	SEP	11	0.18	-0.07	1988	SEP	11	0.28	0.03
1989	OCT	3	0.37	1989	AUG	7	0.30	-0.07	1989	AUG	7	0.40	0.03
1990	SEP	25	0.31	1990	SEP	25	0.23	-0.08	1990	SEP	25	0.33	0.02
1991	OCT	9	0.34	1991	OCT	9	0.25	-0.09	1991	OCT	9	0.35	0.01
1992	SEP	16	0.31	1992	SEP	16	0.24	-0.06	1992	JUN	22	0.34	0.03
1993	SEP	29	0.26	1993	SEP	29	0.19	-0.08	1993	SEP	29	0.29	0.02
1994	AUG	26	0.23	1994	AUG	26	0.16	-0.07	1994	JUL	17	0.23	0.00
1995	SEP	20	0.36	1995	SEP	20	0.29	-0.06	1995	SEP	20	0.39	0.04
			16.32				12.29					16.45	

AR 051788

DES MOINES CREEK

COMPARISON OF 7-DAY LOW FLOW BY RANK

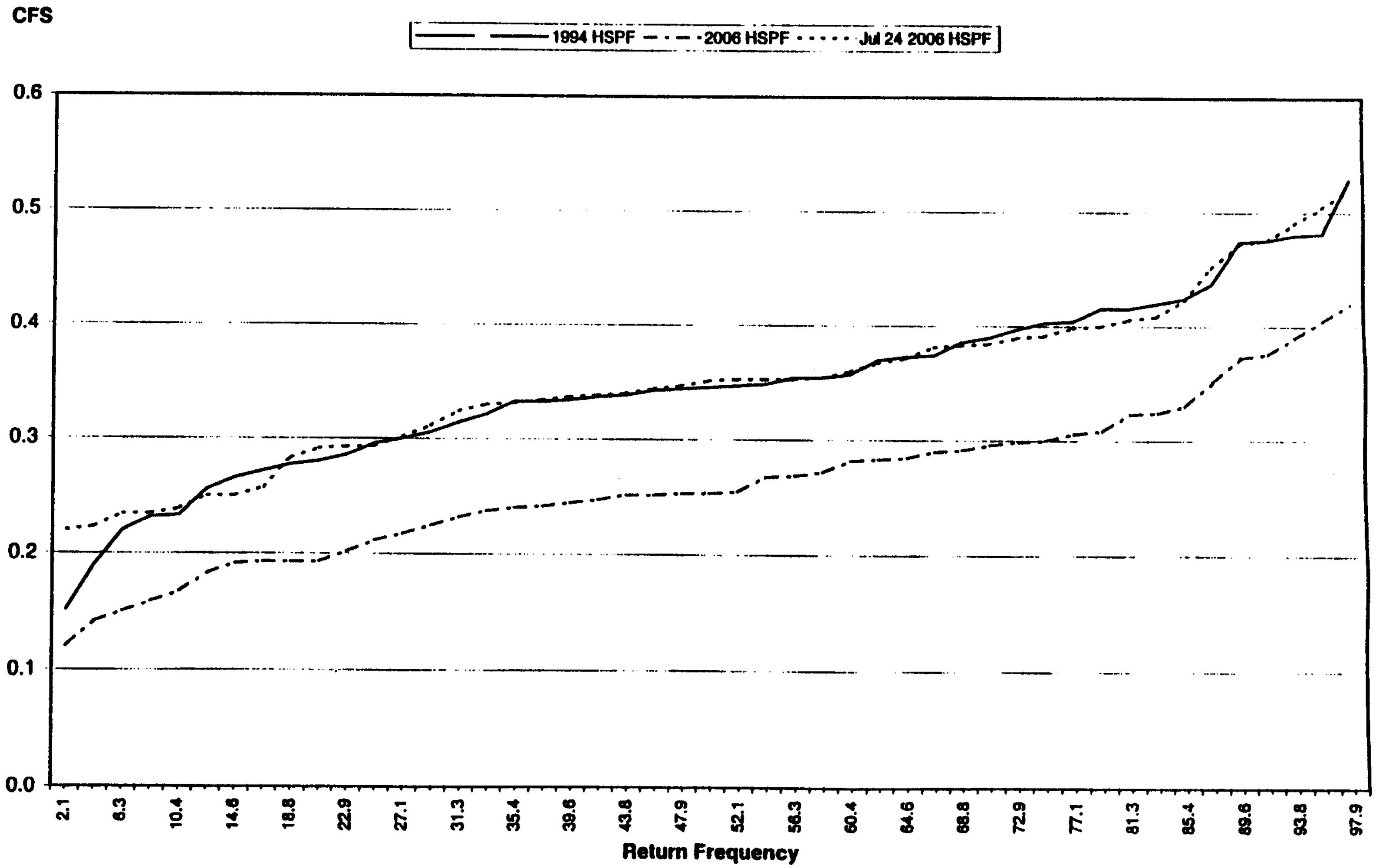
Comparison of 7-Day Low Flow by Rank
for Des Moines Creek

Rank	1994	2006	-1994	2006 Release Jul 24	-1994
1	0.15	0.12	-0.03	0.22	0.07
2	0.19	0.14	-0.05	0.22	0.03
3	0.22	0.15	-0.07	0.23	0.01
4	0.23	0.16	-0.07	0.23	0.00
5	0.23	0.17	-0.07	0.24	0.01
6	0.26	0.18	-0.07	0.25	-0.01
7	0.27	0.19	-0.07	0.25	-0.02
8	0.27	0.19	-0.08	0.26	-0.01
9	0.28	0.19	-0.08	0.28	0.01
10	0.28	0.19	-0.09	0.29	0.01
11	0.29	0.20	-0.08	0.29	0.01
12	0.30	0.21	-0.08	0.29	0.00
13	0.30	0.22	-0.08	0.30	0.00
14	0.31	0.22	-0.08	0.31	0.01
15	0.31	0.23	-0.08	0.32	0.01
16	0.32	0.24	-0.08	0.33	0.01
17	0.33	0.24	-0.09	0.33	0.00
18	0.33	0.24	-0.09	0.33	0.00
19	0.33	0.24	-0.09	0.34	0.00
20	0.34	0.25	-0.09	0.34	0.00
21	0.34	0.25	-0.09	0.34	0.00
22	0.34	0.25	-0.09	0.34	0.00
23	0.34	0.25	-0.09	0.35	0.00
24	0.35	0.25	-0.09	0.35	0.01
25	0.35	0.25	-0.09	0.35	0.01
26	0.35	0.27	-0.08	0.35	0.00
27	0.35	0.27	-0.09	0.35	0.00
28	0.35	0.27	-0.08	0.35	0.00
29	0.36	0.28	-0.08	0.36	0.00
30	0.37	0.28	-0.09	0.37	0.00
31	0.37	0.28	-0.09	0.37	0.00
32	0.37	0.29	-0.08	0.38	0.01
33	0.39	0.29	-0.09	0.38	0.00
34	0.39	0.30	-0.09	0.38	-0.01
35	0.40	0.30	-0.10	0.39	-0.01
36	0.40	0.30	-0.10	0.39	-0.01
37	0.40	0.31	-0.10	0.40	-0.01
38	0.42	0.31	-0.11	0.40	-0.02
39	0.42	0.32	-0.09	0.41	-0.01
40	0.42	0.32	-0.10	0.41	-0.01
41	0.42	0.33	-0.09	0.42	0.00
42	0.44	0.35	-0.09	0.45	0.01
43	0.47	0.37	-0.10	0.47	0.00
44	0.48	0.38	-0.10	0.48	0.00
45	0.48	0.39	-0.09	0.49	0.01
46	0.48	0.40	-0.08	0.50	0.02
47	0.53	0.42	-0.11	0.52	-0.01

DES MOINES CREEK

PLOTTED 7-DAY LOW FLOWS BY PERCENT RETURN FREQUENCY

Des Moines Creek 7-Day Low Flow Values



DES MOINES CREEK

SUMMARY OF LOW STREAM FLOW MITIGATION
VAULT STORAGE AND FILLING

Reserve Storage Vaults for Des Moines Creek.

Vault sizes (dead storage in acre ft) required for 92-day release of 0.13 cfs (1949 – 1995).

	SDS3	SDS4
Mean	4.31	0.75
Median	3.9	0.67
Max	10.4	1.8
Min	1.87	0.32

Contributing Drainage Areas

Subbasin	Vault	Area	% Contribution
SDS3	SDS3	199.22	85.25
SDS4	SDS4	34.47	14.75
Total		233.69	

Fill time for 12.2 acre foot volume / Days to fill after closing vault on January 1.

Mean	8.0
Media	6.0
Max	32.0
Min	2.0

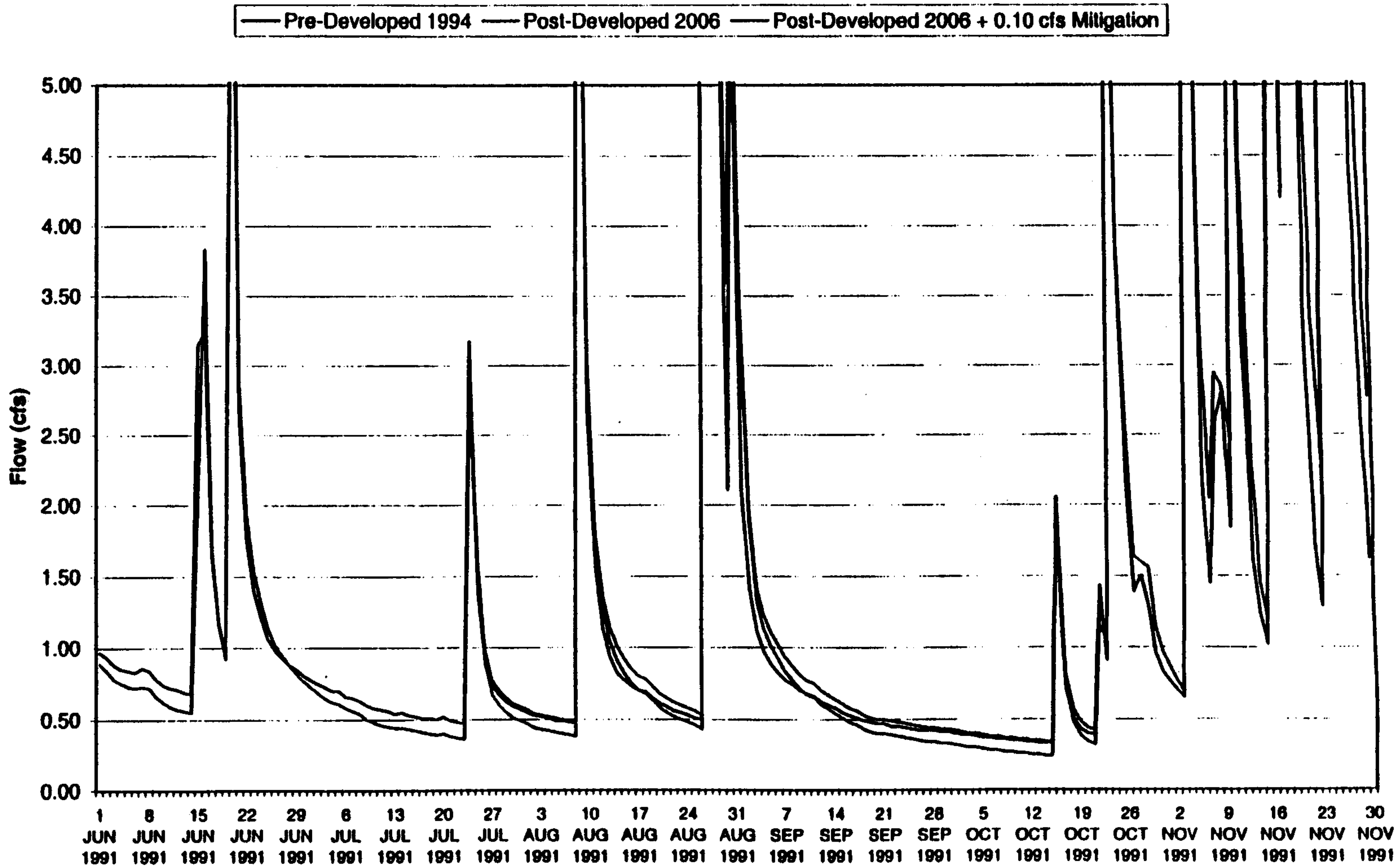
Remaining volume in vaults on October 23

	Volume ac ft	Remaining Days
Mean	11.40	57
Median	12.00	60
Max	12.20	61
Min	7.23	36

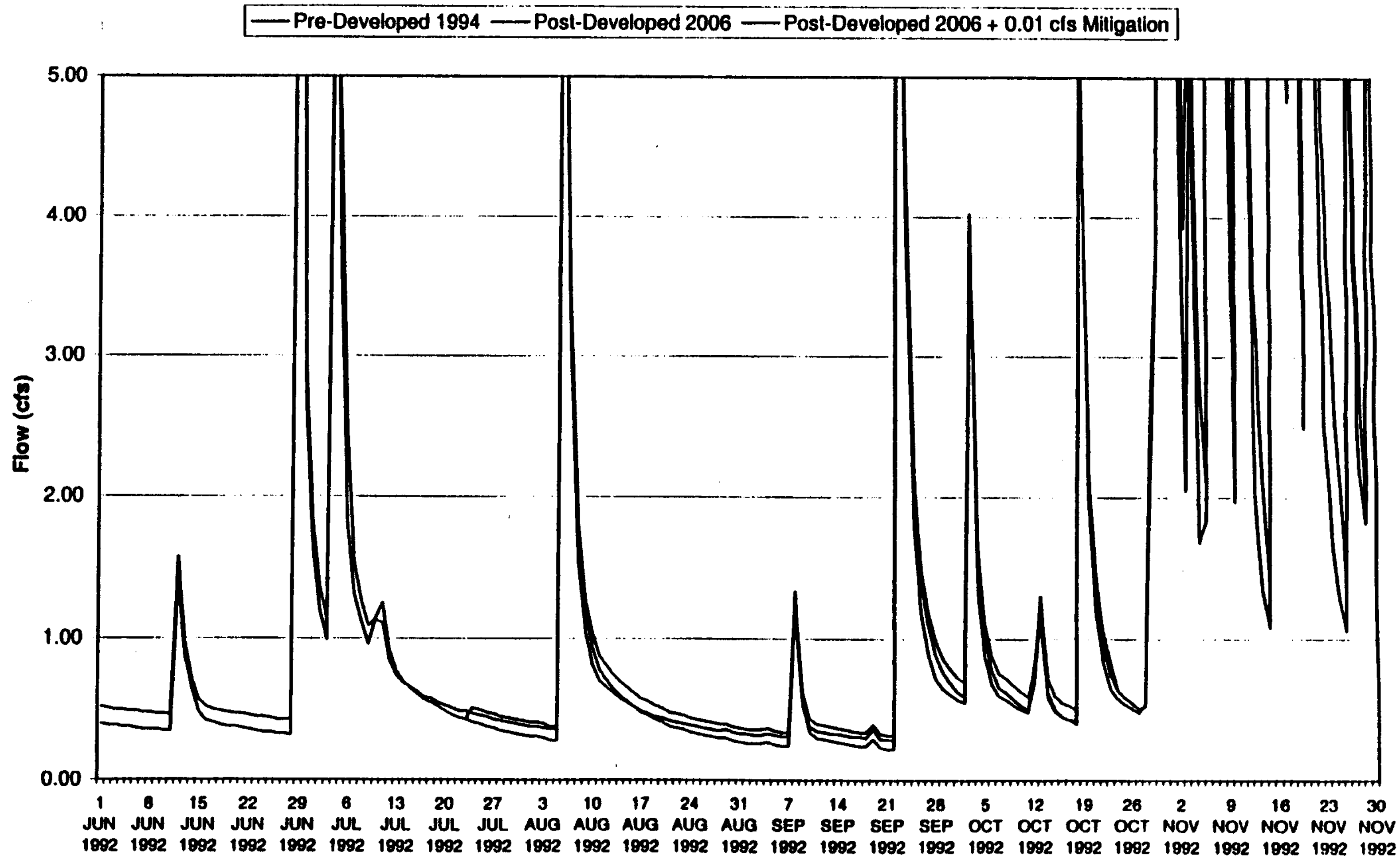
DES MOINES CREEK

LOW FLOW HYDROGRAPHS WITH MITIGATION (1991-1994)

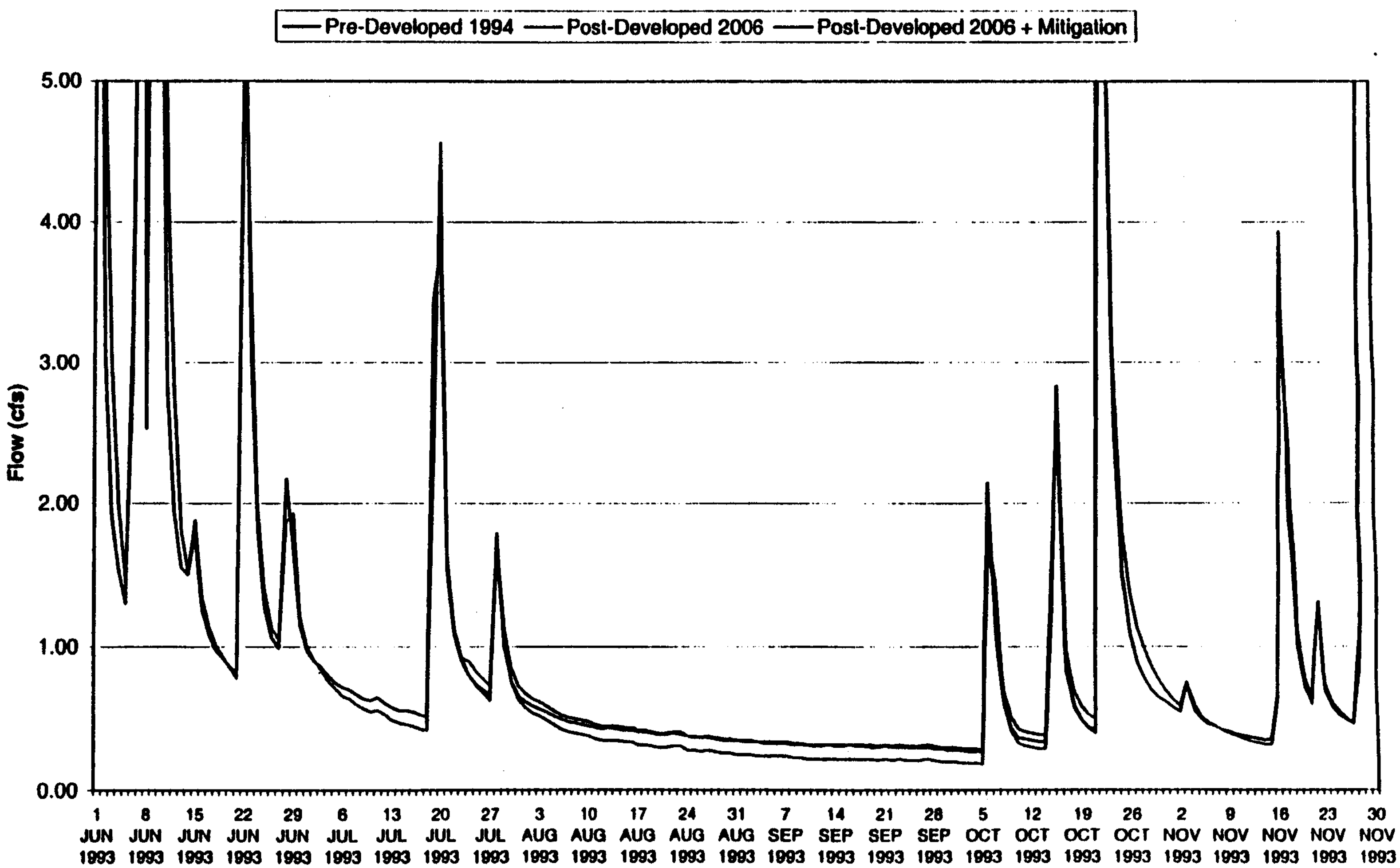
Des Moines Creek Low Flow 1991 + Mitigation



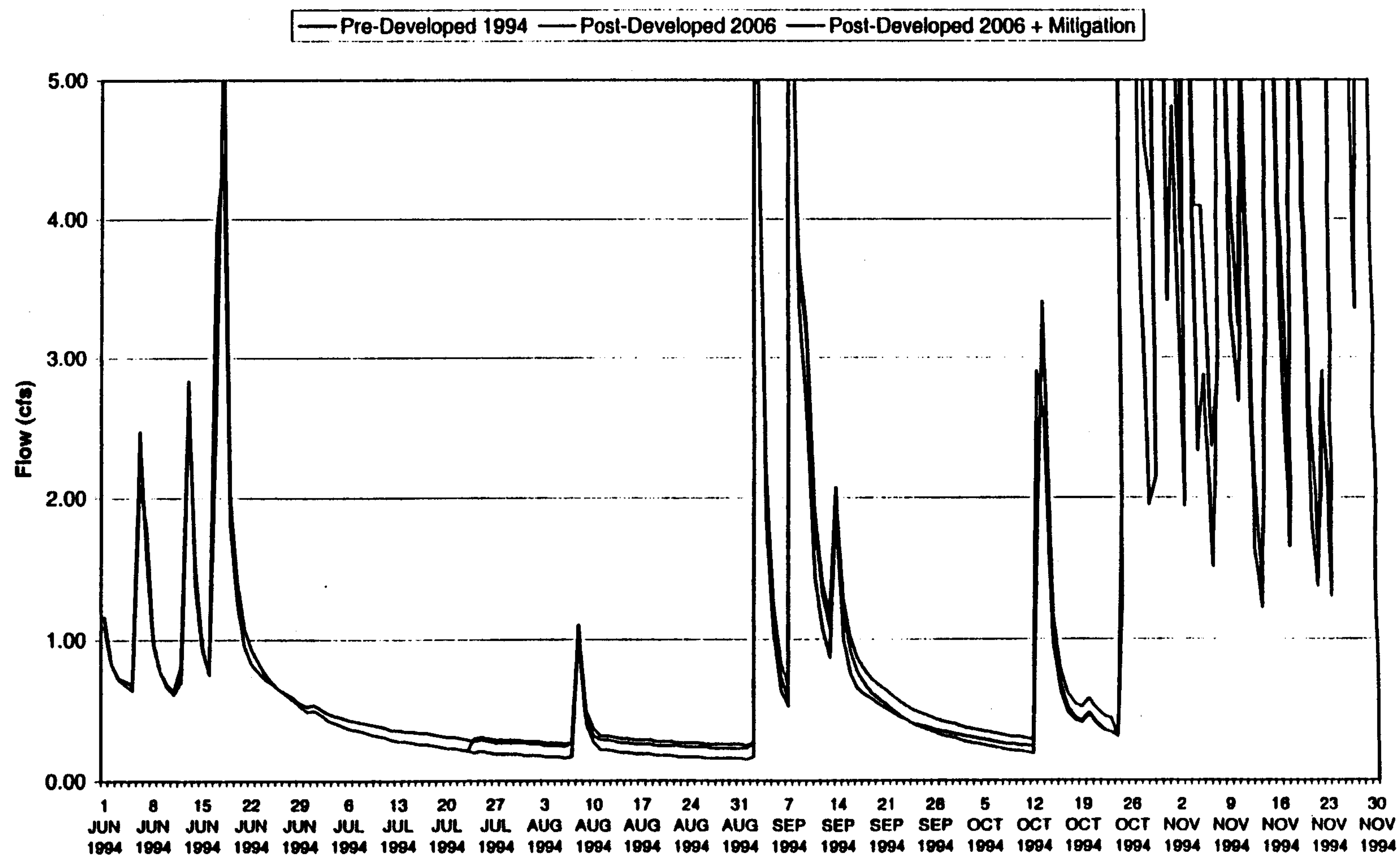
Des Moines Creek Low Flow 1992 + Mitigation



Des Moines Creek Low Flow 1993 + Mitigation



Des Moines Creek Low Flow 1994 + Mitigation



AR 051799

MILLER CREEK

7-DAY LOW FLOW OCCURRENCES IN MILLER CREEK (1994 HSPF)

HISTOGRAM LOW FLOW OCCURRENCES IN MILLER CREEK (1994)

7-DAY LOW FLOW OCCURRENCES IN MILLER CREEK 1991 – 1994, POST-PROJECT CONDITIONS (2006)

HISTOGRAM LOW FLOW OCCURRENCES IN MILLER CREEK 1991 – 1994, POST-PROJECT CONDITIONS (2006)

7-DAY LOW FLOW OCCURRENCES IN MILLER CREEK, 1991 – 1994, POST-PROJECT CONDITIONS (2006+ MITIGATION)

HISTOGRAM LOW FLOW OCCURRENCES IN MILLER CREEK 1991 – 1994, POST-PROJECT CONDITIONS (2006+ MITIGATION)

COMPARISON OF 7-DAY LOW FLOW BY YEAR, 1991-1994

COMPARISON OF 7-DAY LOW FLOW BY RANK, 1991-1994

PLOTTED 7-DAY LOW FLOWS BY PERCENT RETURN FREQUENCY, 1991-1994

SUMMARY OF LOW STREAM FLOW MITIGATION VAULT STORAGE AND FILLING

LOW FLOW HYDROGRAPHS WITH MITIGATION (1991-1994)

7-DAY LOW FLOW OCCURRENCES IN MILLER CREEK (1991-1994)

MILLER CREEK

7-DAY LOW FLOW OCCURRENCES IN MILLER CREEK
(1994 HSPF)

Start of 7-Day Low Flows with
Average Flow Rates

Date			1994 Miller Creek at Hwy 509 Flow / cfs
1949	SEP	7	0.42
1950	SEP	17	0.85
1951	SEP	17	0.78
1952	NOV	23	0.52
1953	SEP	15	0.74
1954	OCT	3	0.86
1955	SEP	6	0.82
1956	SEP	3	0.86
1957	SEP	20	0.77
1958	SEP	30	0.62
1959	AUG	24	0.87
1960	SEP	29	0.83
1961	SEP	21	0.82
1962	SEP	3	0.72
1963	SEP	27	0.70
1964	OCT	25	0.87
1965	SEP	27	0.77
1966	SEP	4	0.77
1967	SEP	22	0.73
1968	AUG	7	0.96
1969	SEP	6	0.81
1970	AUG	27	0.71
1971	AUG	14	0.91
1972	SEP	11	1.00
1973	SEP	12	0.64
1974	OCT	13	0.71
1975	AUG	11	0.77
1976	DEC	10	0.68
1977	AUG	16	0.52
1978	AUG	17	0.79
1979	OCT	7	0.54
1980	OCT	17	0.66
1981	SEP	12	0.68
1982	SEP	17	0.80
1983	OCT	10	0.89
1984	OCT	1	0.77
1985	SEP	29	0.61
1986	OCT	18	0.58
1987	OCT	24	0.57
1988	SEP	11	0.59
1989	OCT	3	0.66
1990	SEP	26	0.70
1991	OCT	9	0.79
1992	SEP	16	0.64
1993	NOV	9	0.57
1994	OCT	6	0.49
1995	SEP	20	0.75

Statistical Ranking of Average 7-Day Low Flows
Period of Record: 1949-1995

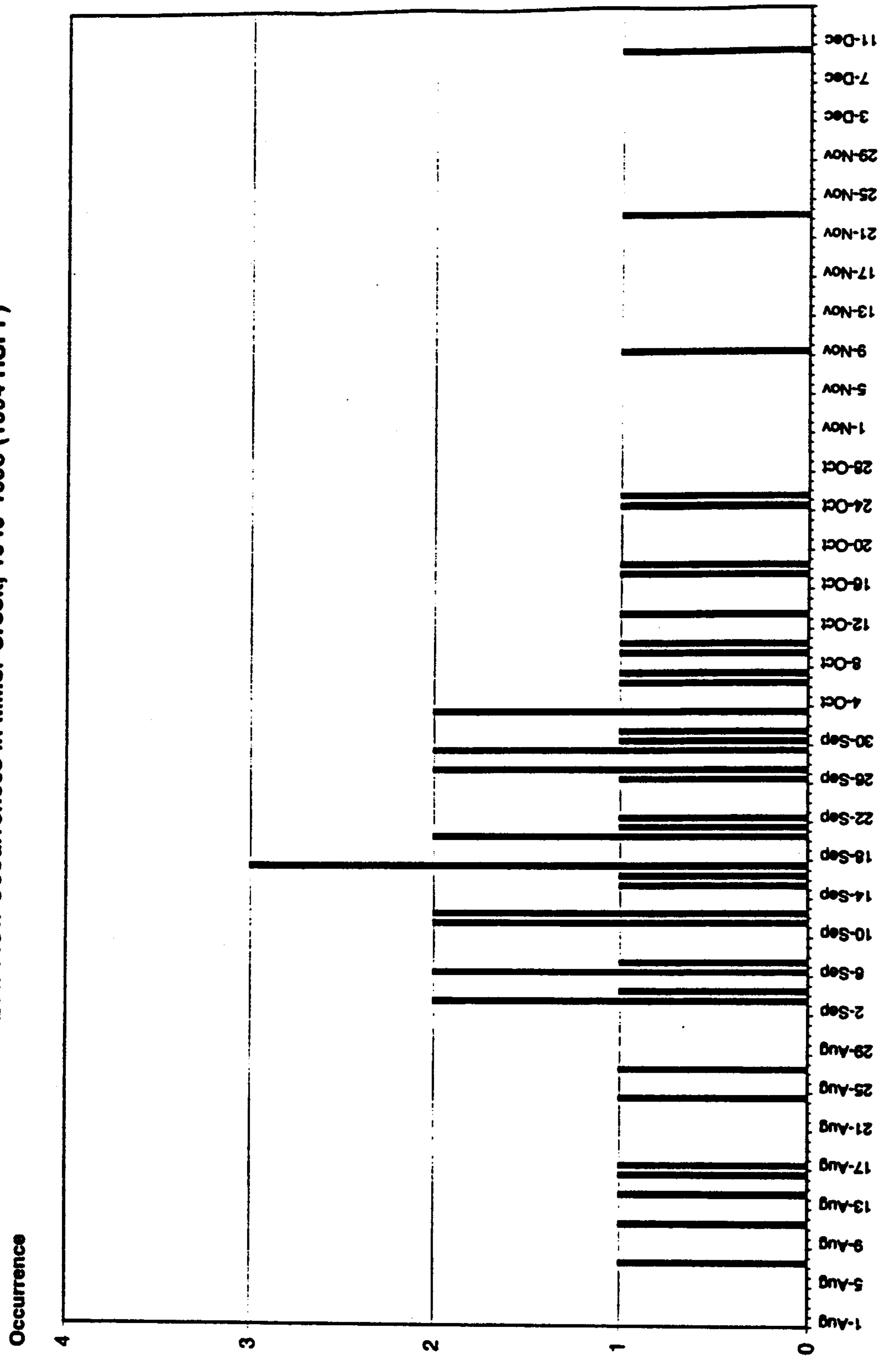
Date	Average 7-Day Lows Ordered	Rank	Rank/N+1	Return Frequency
1949	0.42	1	0.02	2.1
1994	0.49	2	0.04	4.2
1952	0.52	3	0.06	6.3
1977	0.52	4	0.08	8.3
1979	0.54	5	0.10	10.4
1987	0.57	6	0.13	12.5
1993	0.57	7	0.15	14.6
1986	0.58	8	0.17	16.7
1988	0.59	9	0.19	18.8
1985	0.61	10	0.21	20.8
1958	0.62	11	0.23	22.9
1973	0.64	12	0.25	25.0
1992	0.64	13	0.27	27.1
1980	0.66	14	0.29	29.2
1989	0.66	15	0.31	31.3
1981	0.68	16	0.33	33.3
1976	0.68	17	0.35	35.4
1963	0.70	18	0.38	37.5
1990	0.70	19	0.40	39.6
1974	0.71	20	0.42	41.7
1970	0.71	21	0.44	43.8
1962	0.72	22	0.46	45.8
1967	0.73	23	0.48	47.9
1953	0.74	24	0.50	50.0
1995	0.75	25	0.52	52.1
1957	0.77	26	0.54	54.2
1966	0.77	27	0.56	56.3
1975	0.77	28	0.58	58.3
1965	0.77	29	0.60	60.4
1984	0.77	30	0.63	62.5
1951	0.78	31	0.65	64.6
1991	0.79	32	0.67	66.7
1978	0.79	33	0.69	68.8
1982	0.80	34	0.71	70.8
1969	0.81	35	0.73	72.9
1961	0.82	36	0.75	75.0
1955	0.82	37	0.77	77.1
1960	0.83	38	0.79	79.2
1950	0.85	39	0.81	81.3
1956	0.86	40	0.83	83.3
1954	0.86	41	0.85	85.4
1964	0.87	42	0.88	87.5
1959	0.87	43	0.90	89.6
1983	0.89	44	0.92	91.7
1971	0.91	45	0.94	93.8
1968	0.96	46	0.96	95.8
1972	1.00	47	0.98	97.9

Rank = Numerical position or ordered low flow data
with driest year equal to one.
N = 47

MILLER CREEK

HISTOGRAM LOW FLOW OCCURRENCES IN MILLER CREEK (1994)

Low Flow Occurrences in Miller Creek, 1949-1995 (1994 HSPF)



AR 051804

MILLER CREEK

7-DAY LOW FLOW OCCURRENCES IN MILLER CREEK (1991-1994)

Start of 7-Day Low Flows with
Average Flow Rates

Date			1994 Miller Creek at Hwy 509 Flow / cfs
1991	OCT	9	0.79
1992	SEP	16	0.64
1993	NOV	9	0.57
1994	OCT	6	0.49

Statistical Ranking of Average 7-Day Low Flows
Period of Record: 1949-1995

Date	Average 7-Day Lows Ordered	Rank	Rank/N+1	Return Frequency
1994	0.49	1	0.20	20.0
1993	0.57	2	0.40	40.0
1992	0.64	3	0.60	60.0
1991	0.79	4	0.80	80.0

Rank = Numerical position or ordered low flow data
with driest year equal to one.
N = 4

MILLER CREEK

7-DAY LOW FLOW OCCURRENCES IN MILLER CREEK 1991 – 1994, POST-PROJECT CONDITIONS (2006)

Start of 7-Day Low Flows with
Average Flow Rates

Date			2006 Miller Creek at Hwy 509 Flow / cfs
1991	OCT	9	0.67
1992	SEP	16	0.54
1993	NOV	9	0.49
1994	SEP	24	0.46

Statistical Ranking of Average 7-Day Low Flows
Period of Record: 1941-1994

Date	Average 7-Day Lows Ordered	Rank	Rank/N+1	Return Frequency
1994	0.46	1	0.20	20.0
1993	0.49	2	0.40	40.0
1992	0.54	3	0.60	60.0
1991	0.67	4	0.80	80.0

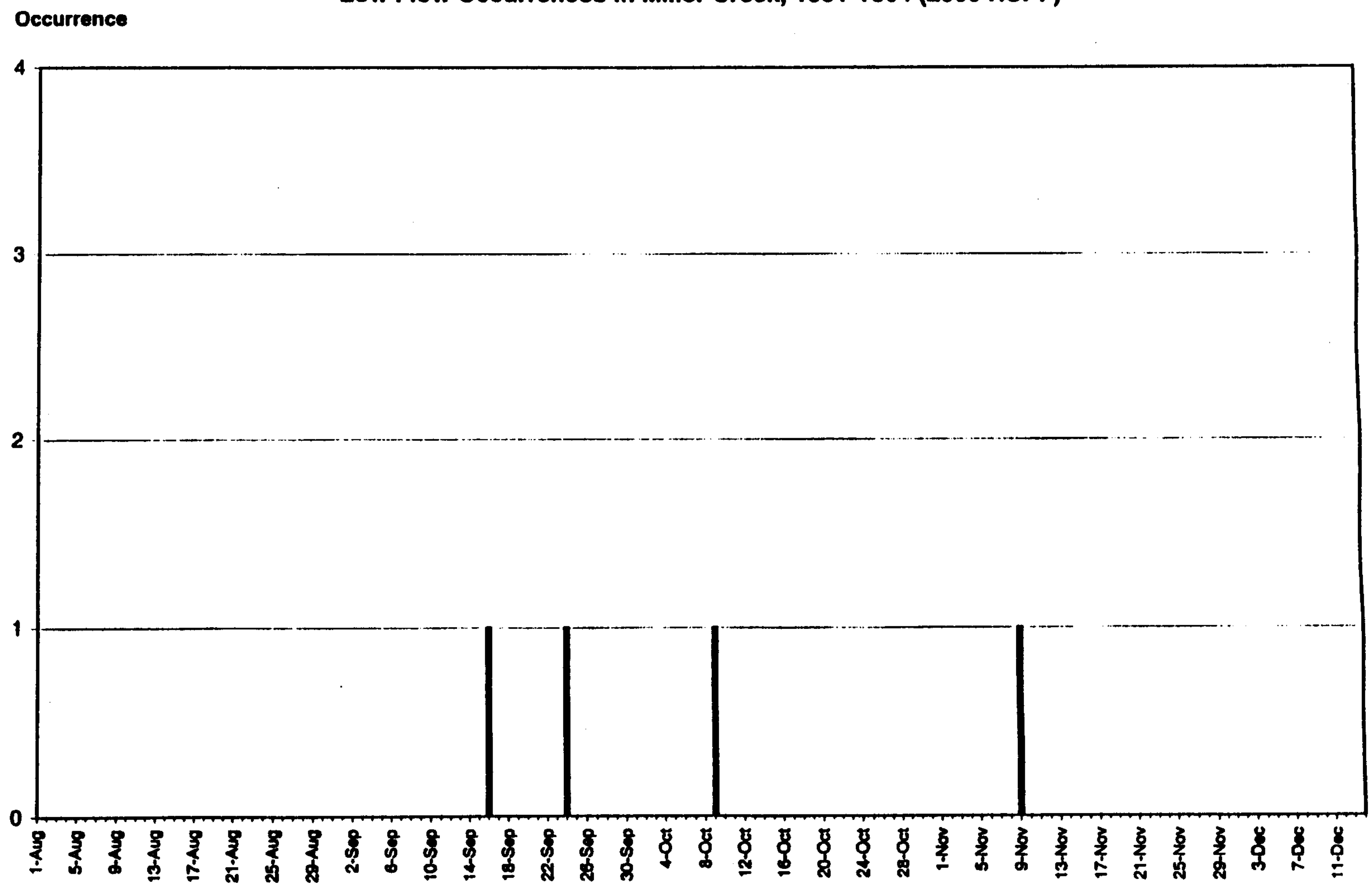
Rank = Numerical position or ordered low flow data
with driest year equal to one.
N = 4

AR 051808

MILLER CREEK

HISTOGRAM LOW FLOW OCCURRENCES IN MILLER CREEK 1991 – 1994, POST-PROJECT CONDITIONS (2006)

Low Flow Occurrences in Miller Creek, 1991-1994 (2006 HSPF)



MILLER CREEK

7-DAY LOW FLOW OCCURRENCES IN MILLER CREEK, 1991 – 1994, POST-PROJECT CONDITIONS (2006+ MITIGATION)

Start of 7-Day Low Flows with
Average Flow Rates

Date			2006 + Mitigation Miller Creek at Hwy 509 Flow / cfs
1991	OCT	9	0.80
1992	SEP	16	0.67
1993	NOV	9	0.62
1994	SEP	24	0.59

Statistical Ranking of Average 7-Day Low Flows
Period of Record: 1941-1994

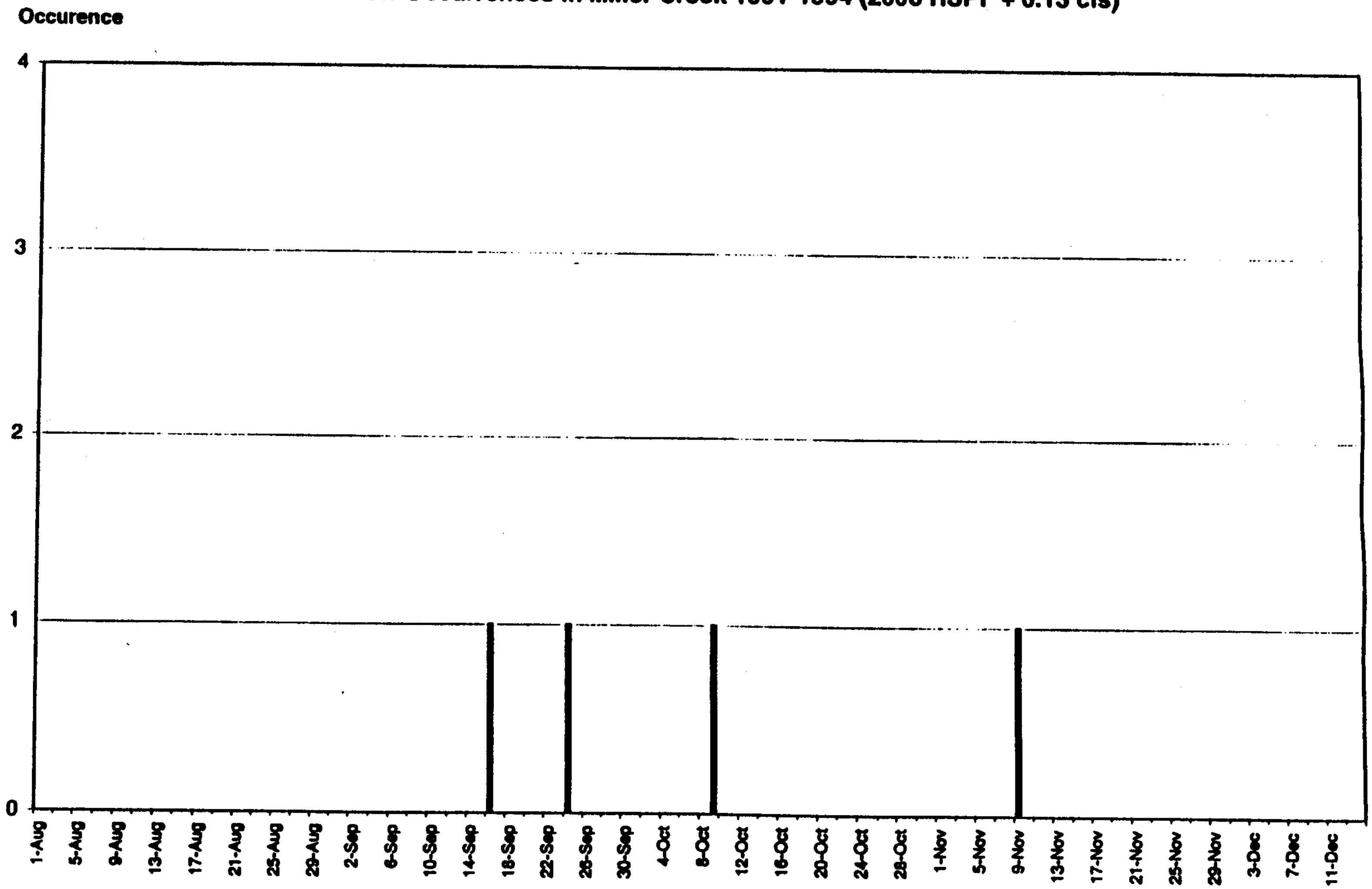
Date	Average 7-Day Lows Ordered	Rank	Rank/N+1	Return Frequency
1994	0.59	1	0.20	20.0
1993	0.62	2	0.40	40.0
1992	0.67	3	0.60	60.0
1991	0.80	4	0.80	80.0

Rank = Numerical position or ordered low flow data
with driest year equal to one.
N = 4

MILLER CREEK

**HISTOGRAM LOW FLOW OCCURRENCES IN MILLER CREEK
1991 – 1994, POST-PROJECT CONDITIONS
(2006+ MITIGATION)**

Low Flow Occurrences in Miller Creek 1991-1994 (2006 HSPF + 0.13 cfs)



AR 051814

MILLER CREEK

COMPARISON OF 7-DAY LOW FLOW BY YEAR, 1991-1994

Comparison of 7-Day Low Flows by Year
for Miller Creek

	Date		1994 Miller Creek at Hwy 509 Flow / cfs		Date		2006 Miller Creek at Hwy 509 Flow / cfs	-1994		Date		2006 + Mitigation Miller Creek at Hwy 509 Flow / cfs	-1994
1991	OCT	9	0.79	1991	OCT	9	0.67	-0.12	1991	OCT	9	0.80	0.01
1992	SEP	16	0.64	1992	SEP	16	0.54	-0.10	1992	SEP	16	0.67	0.03
1993	NOV	9	0.57	1993	NOV	9	0.49	-0.08	1993	NOV	9	0.62	0.05
1994	SEP	24	0.49	1994	SEP	24	0.46	-0.03	1994	SEP	24	0.59	0.10

MILLER CREEK

COMPARISON OF 7-DAY LOW FLOW BY RANK, 1991-1994

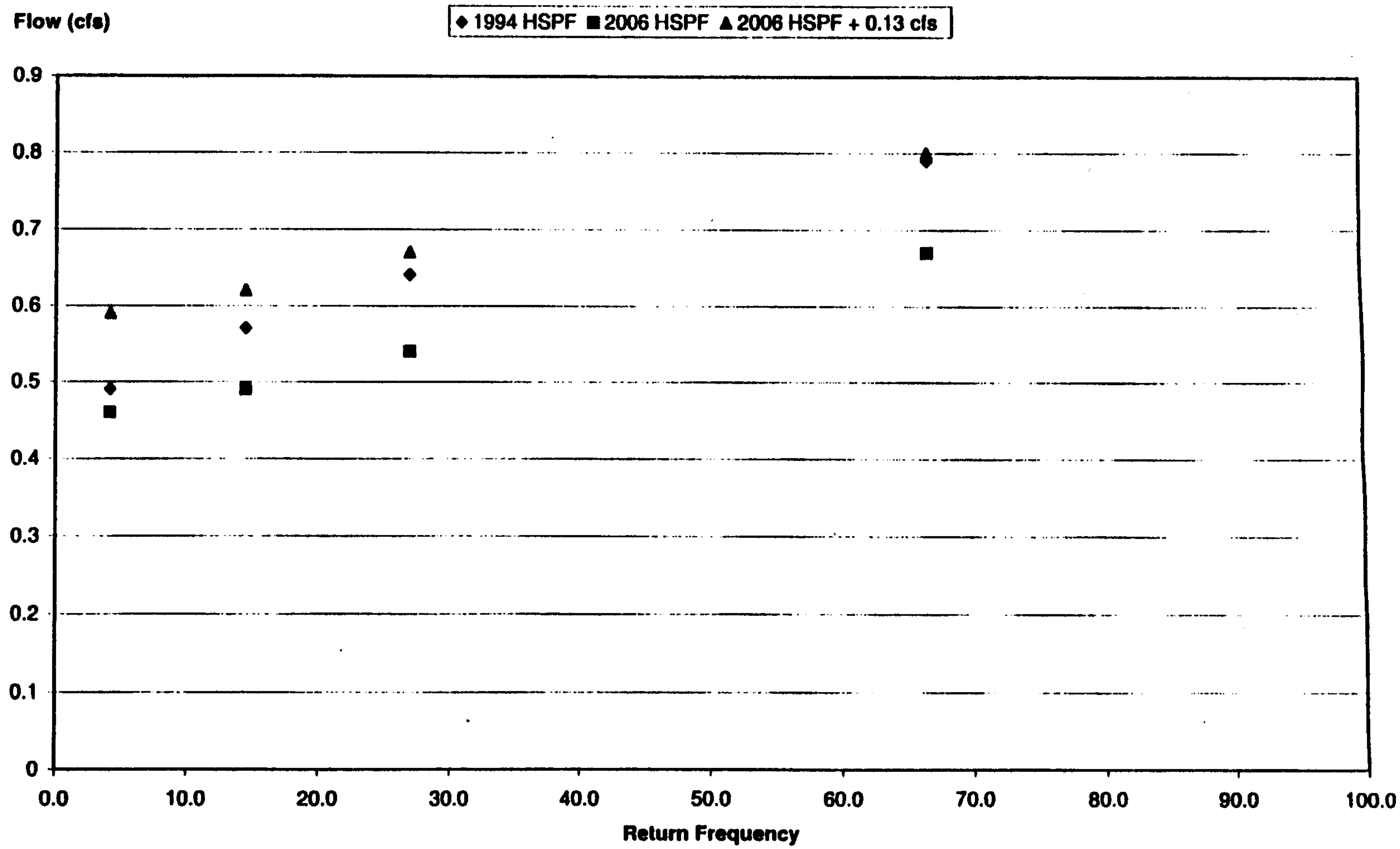
Comparison of 7-Day Low Flow by Rank
for Miller Creek

Rank	1994 HSPF	2006 HSPF	-1994	2006 + Mitigation Miller Creek at Hwy 509 Flow / cfs	-1994
1	0.49	0.46	-0.03	0.59	0.10
2	0.57	0.49	-0.08	0.62	0.05
3	0.64	0.54	-0.10	0.67	0.03
4	0.79	0.67	-0.12	0.80	0.01

MILLER CREEK

PLOTTED 7-DAY LOW FLOWS BY PERCENT RETURN FREQUENCY, 1991-1994

Miller Creek 7-Day Low Flow Values



MILLER CREEK

SUMMARY OF LOW STREAM FLOW MITIGATION
VAULT STORAGE AND FILLING

Reserve Storage Vaults for Miller Creek.

Vault sizes (dead storage in acre ft) required for 92-day release of 0.13 cfs (1949 – 1995).

Mean	8.25
Median	7.71
Max	18.79
Min	3.47

Contributing Drainage Areas

Subbasin	Vault	Area	% Contribution
NEPL	NEPL	32.31	39.62
Cargo	Cargo	8.12	9.95
SDN2X	SDN2X/4X	0.36	20.64
SDN4		12.26	
SDN4X		4.21	
SDN3	SDN3X	24.30	29.79
SDN3X		0.00	
	Total	81.56	

Fill time for 18.8 acre foot volume / Days to fill after closing vault on January 1.

Mean	20.56
Media	16.00
Max	58.00
Min	4.0

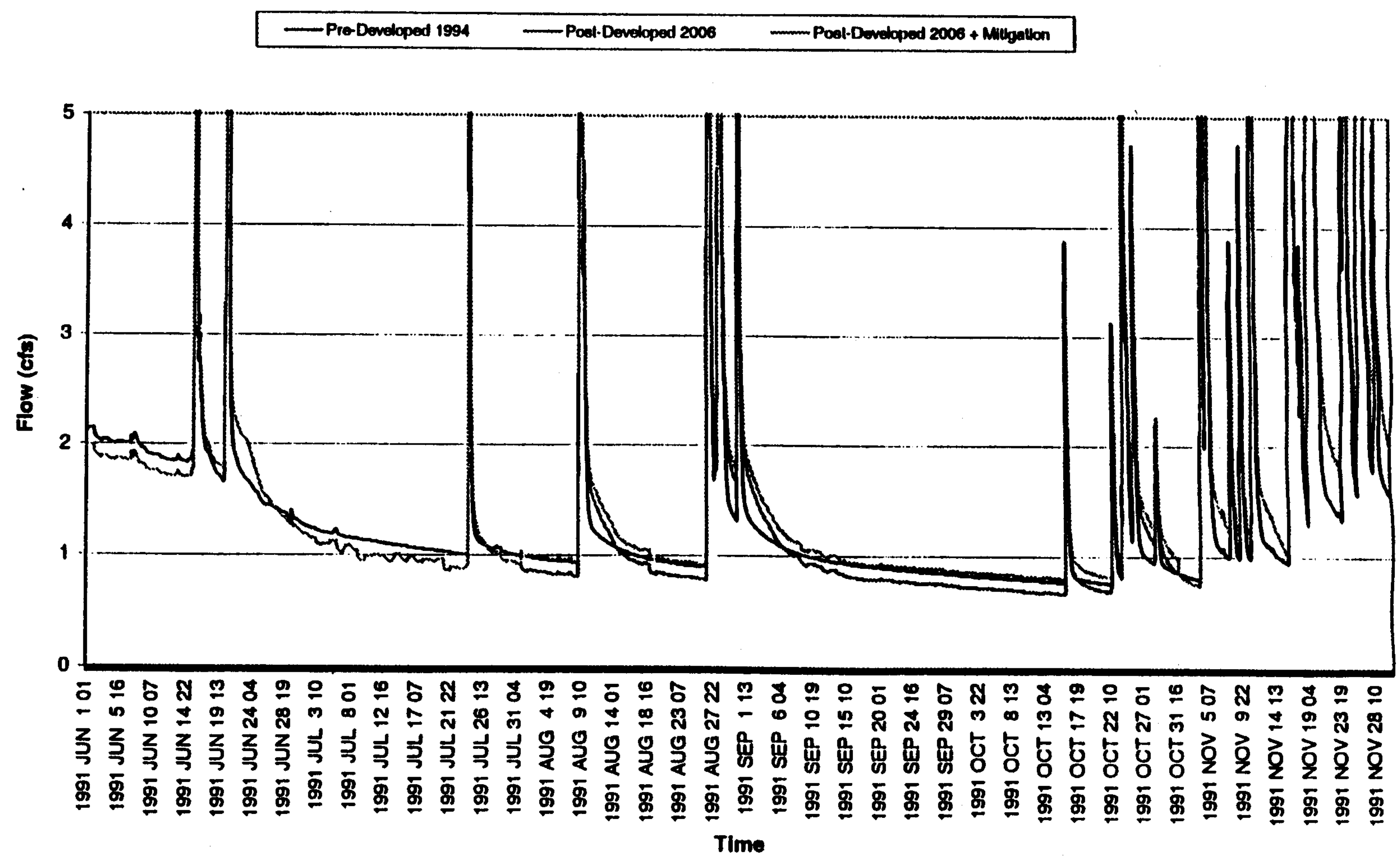
Remaining volume in vaults on Oct 31

	Volume ac ft	Remaining Days
Mean	16.99	65
Median	18.24	70
Max	18.80	72
Min	5.34	20

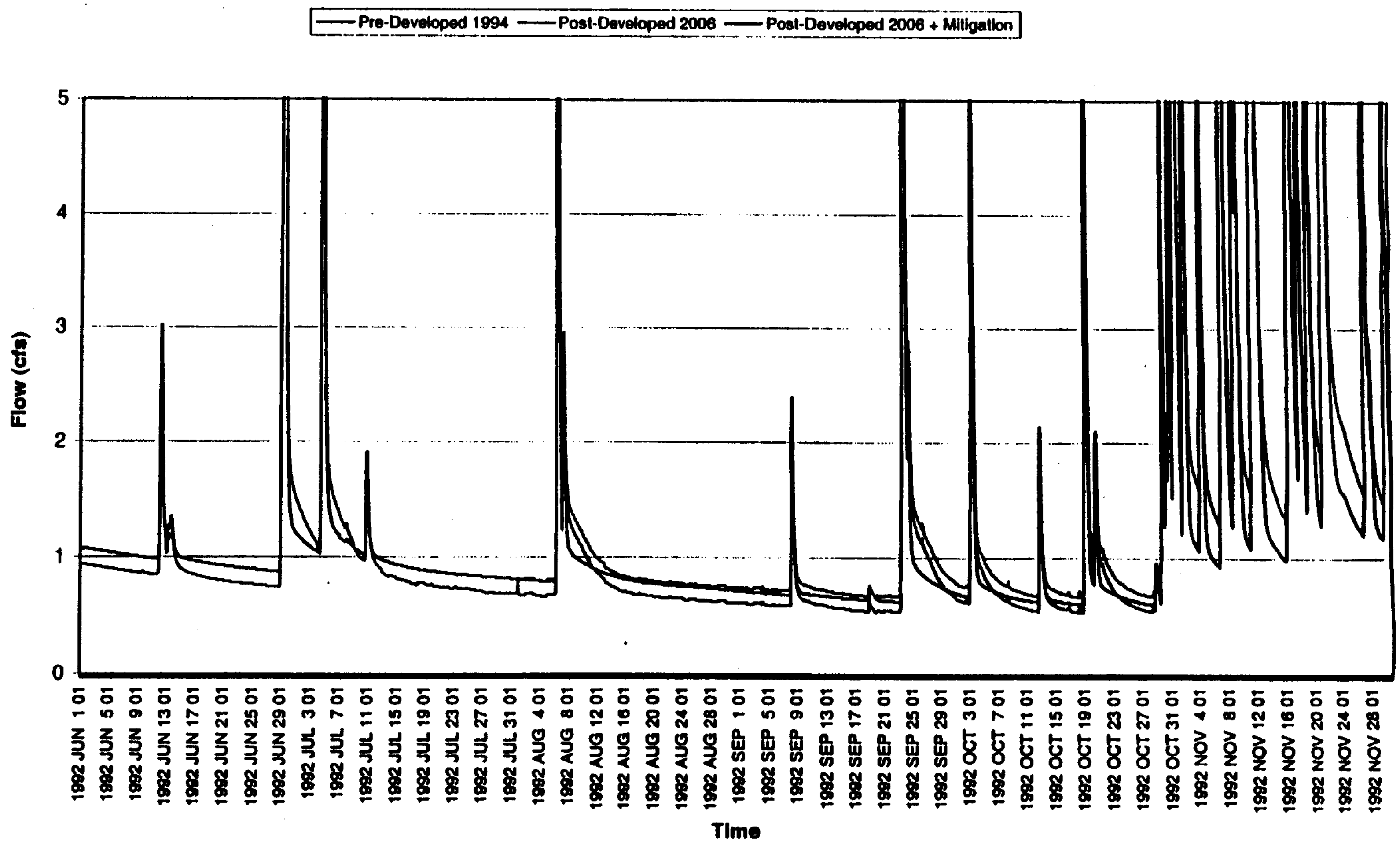
MILLER CREEK

LOW FLOW HYDROGRAPHS WITH MITIGATION (1991-1994)

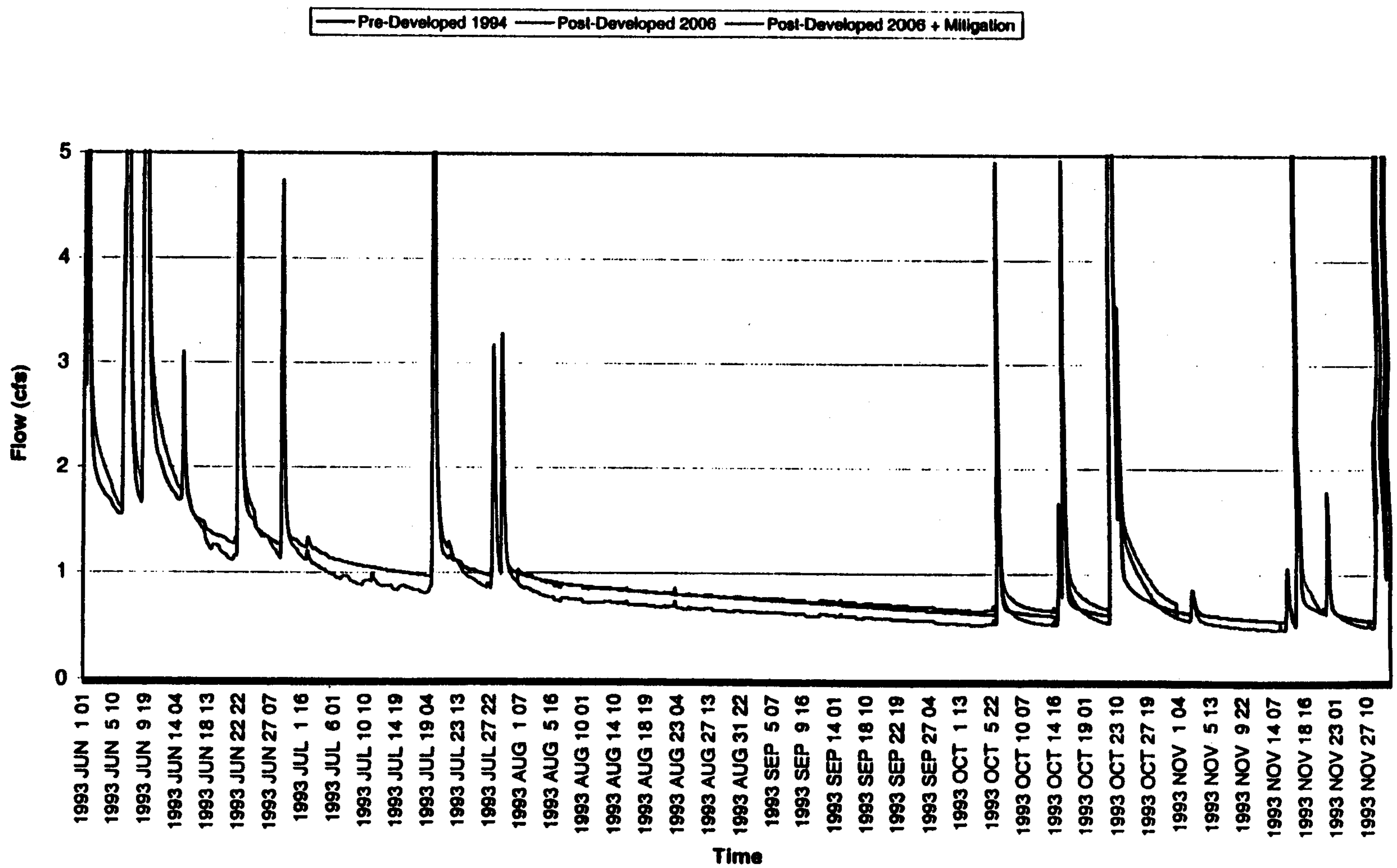
Miller Creek Low Flow 1991 + Mitigation



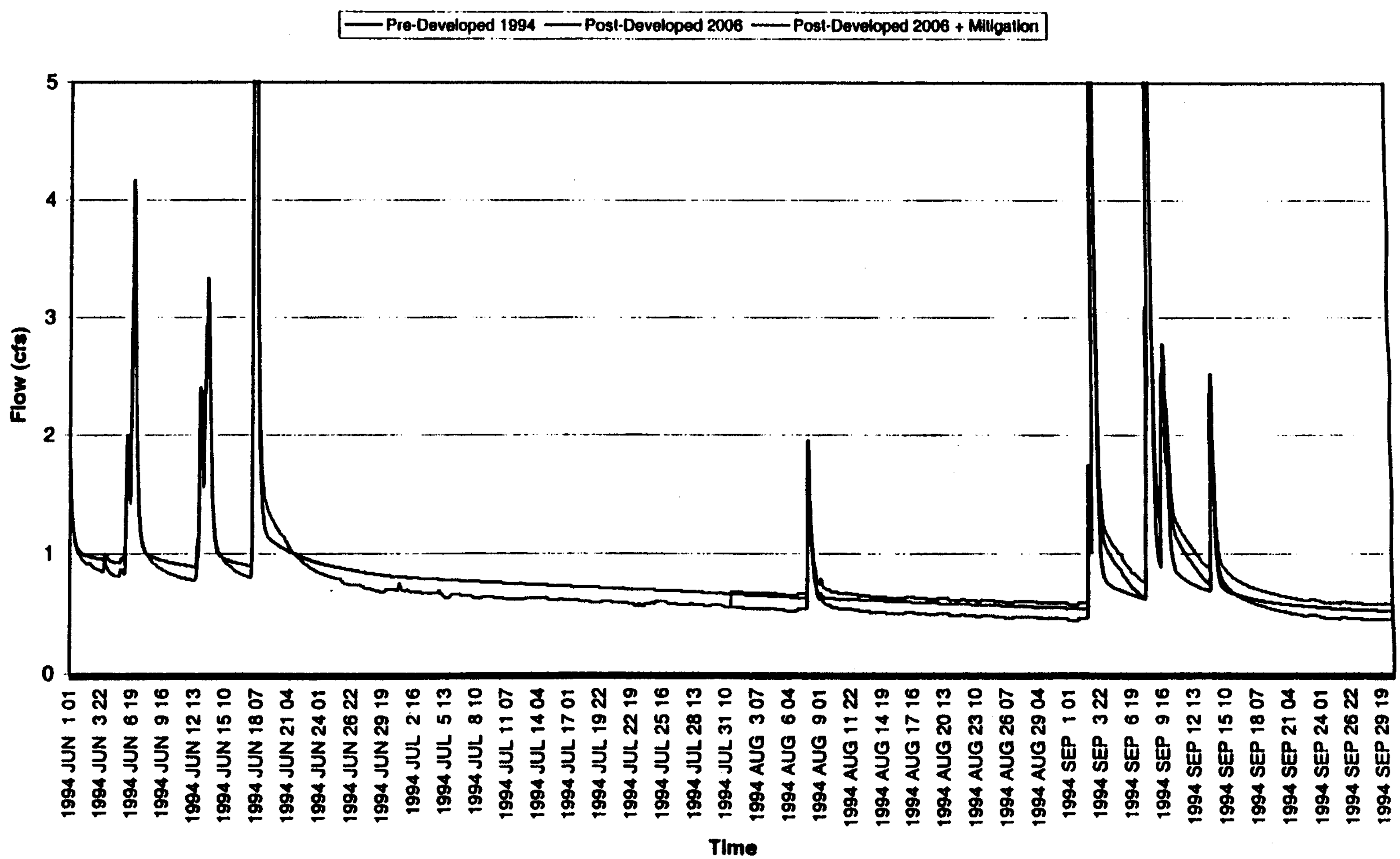
Miller Creek Low Flow 1992 + Mitigation



Miller Creek Low Flow 1993 + Mitigation



Miller Creek Low Flow 1994 + Mitigation



WALKER CREEK

7-DAY LOW FLOW OCCURRENCES IN WALKER CREEK (1994)

HISTOGRAM LOW FLOW OCCURRENCES IN WALKER CREEK (1994)

7-DAY LOW FLOW OCCURRENCES IN WALKER CREEK (2006)

HISTOGRAM LOW FLOW OCCURRENCES IN WALKER CREEK (2006)

7-DAY LOW FLOW OCCURRENCES IN WALKER CREEK
(WITH MITIGATION)

HISTOGRAM LOW FLOW OCCURRENCES IN WALKER CREEK
(WITH MITIGATION)

COMPARISON OF 7-DAY LOW FLOW BY YEAR

COMPARISON OF 7-DAY LOW FLOW BY RANK

PLOTTED 7-DAY LOW FLOWS BY PERCENT RETURN FREQUENCY

SUMMARY OF LOW STREAM FLOW MITIGATION VAULT
STORAGE AND FILLING

LOW FLOW HYDROGRAPHS WITH MITIGATION (1991-1994)

WALKER CREEK

7-DAY LOW FLOW OCCURRENCES IN WALKER CREEK (1994)

Start of 7-Day Low Flows with Average Flow Rates		[redacted] Statistical Ranking of Average 7-Day Low Flows Period of Record: 1949-1995				
Date	1994 HSPF Walker Creek at POC	Date	Average 7-Day Lows Ordered	Rank	Rank/N+1	Return Frequency
19-Oct-49	0.63	1994	0.61	1	0.02	2.1
17-Sep-50	0.83	1949	0.63	2	0.04	4.2
17-Sep-51	0.79	1979	0.64	3	0.06	6.3
23-Nov-52	0.66	1987	0.66	4	0.08	8.3
15-Sep-53	0.79	1952	0.66	5	0.10	10.4
12-Oct-54	0.89	1993	0.67	6	0.13	12.5
6-Sep-55	0.86	1988	0.67	7	0.15	14.6
18-Sep-56	0.88	1986	0.68	8	0.17	16.7
20-Sep-57	0.83	1977	0.68	9	0.19	18.8
30-Sep-58	0.72	1992	0.68	10	0.21	20.8
24-Aug-59	0.88	1985	0.70	11	0.23	22.9
15-Oct-60	0.86	1980	0.70	12	0.25	25.0
30-Sep-61	0.82	1989	0.71	13	0.27	27.1
20-Sep-62	0.81	1958	0.72	14	0.29	29.2
6-Oct-63	0.76	1981	0.73	15	0.31	31.3
25-Oct-64	0.93	1990	0.74	16	0.33	33.3
27-Sep-65	0.80	1976	0.75	17	0.35	35.4
30-Sep-66	0.79	1995	0.75	18	0.38	37.5
22-Sep-67	0.78	1963	0.76	19	0.40	39.6
7-Aug-68	0.97	1973	0.76	20	0.42	41.7
6-Sep-69	0.84	1982	0.77	21	0.44	43.8
10-Oct-70	0.78	1967	0.78	22	0.46	45.8
25-Aug-71	0.91	1970	0.78	23	0.48	47.9
11-Sep-72	0.96	1953	0.79	24	0.50	50.0
12-Sep-73	0.76	1966	0.79	25	0.52	52.1
13-Oct-74	0.79	1991	0.79	26	0.54	54.2
11-Aug-75	0.82	1974	0.79	27	0.56	56.3
15-Dec-76	0.75	1951	0.79	28	0.58	58.3
16-Aug-77	0.68	1984	0.80	29	0.60	60.4
25-Aug-78	0.81	1965	0.80	30	0.63	62.5
7-Oct-79	0.64	1978	0.81	31	0.65	64.6
17-Oct-80	0.70	1962	0.81	32	0.67	66.7
12-Sep-81	0.73	1975	0.82	33	0.69	68.8
29-Sep-82	0.77	1961	0.82	34	0.71	70.8
10-Oct-83	0.93	1957	0.83	35	0.73	72.9
1-Oct-84	0.80	1950	0.83	36	0.75	75.0
9-Oct-85	0.70	1969	0.84	37	0.77	77.1
18-Oct-86	0.68	1960	0.86	38	0.79	79.2
2-Nov-87	0.66	1955	0.86	39	0.81	81.3
6-Oct-88	0.67	1956	0.88	40	0.83	83.3
3-Oct-89	0.71	1959	0.88	41	0.85	85.4
25-Sep-90	0.74	1954	0.89	42	0.88	87.5
28-Oct-91	0.79	1971	0.91	43	0.90	89.6
22-Oct-92	0.68	1964	0.93	44	0.92	91.7
9-Nov-93	0.67	1983	0.93	45	0.94	93.8
18-Oct-94	0.61	1972	0.96	46	0.96	95.8
20-Sep-95	0.75	1968	0.97	47	0.98	97.9

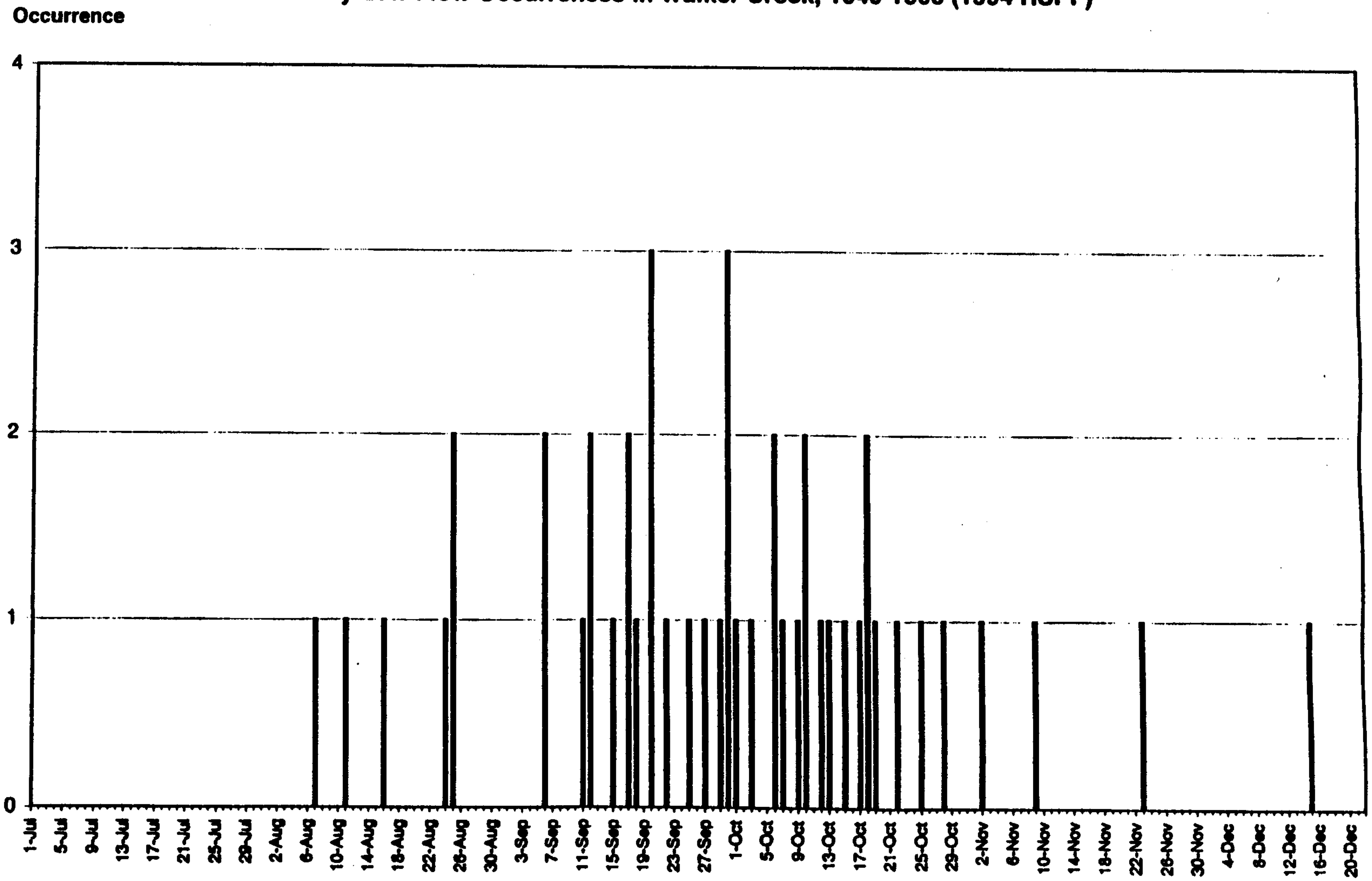
Rank = Numerical position of ordered low flow data with the driest year equal to one.
N = 47

WALKER CREEK

**HISTOGRAM LOW FLOW OCCURRENCES
IN WALKER CREEK (1994)**

AR 051831

7-Day Low Flow Occurrences In Walker Creek, 1949-1995 (1994 HSPF)



WALKER CREEK

7-DAY LOW FLOW OCCURRENCES IN WALKER CREEK (2006)

Start of 7-Day Low Flows with
Average Flow Rates

Date	2006 HSPF Walker Creek at POC
19-Oct-49	0.57
17-Sep-50	0.75
17-Sep-51	0.71
23-Nov-52	0.59
15-Sep-53	0.71
12-Oct-54	0.81
6-Sep-55	0.77
18-Sep-56	0.79
20-Sep-57	0.75
30-Sep-58	0.65
24-Aug-59	0.79
15-Oct-60	0.77
30-Sep-61	0.74
20-Sep-62	0.73
6-Oct-63	0.69
25-Oct-64	0.84
27-Sep-65	0.72
30-Sep-66	0.71
22-Sep-67	0.70
7-Aug-68	0.87
6-Sep-69	0.76
27-Aug-70	0.71
25-Aug-71	0.82
11-Sep-72	0.87
12-Sep-73	0.69
13-Oct-74	0.71
11-Aug-75	0.74
15-Dec-76	0.68
16-Aug-77	0.62
25-Aug-78	0.73
7-Oct-79	0.58
17-Oct-80	0.63
12-Sep-81	0.65
17-Sep-82	0.70
10-Oct-83	0.84
1-Oct-84	0.72
9-Oct-85	0.63
18-Oct-86	0.61
2-Nov-87	0.60
6-Oct-88	0.60
3-Oct-89	0.64
25-Sep-90	0.66
9-Oct-91	0.71
22-Oct-92	0.62
9-Nov-93	0.60
18-Oct-94	0.55
20-Sep-95	0.67

[redacted]

Statistical Ranking of Average 7-Day Low Flows
Period of Record: 1949-1995

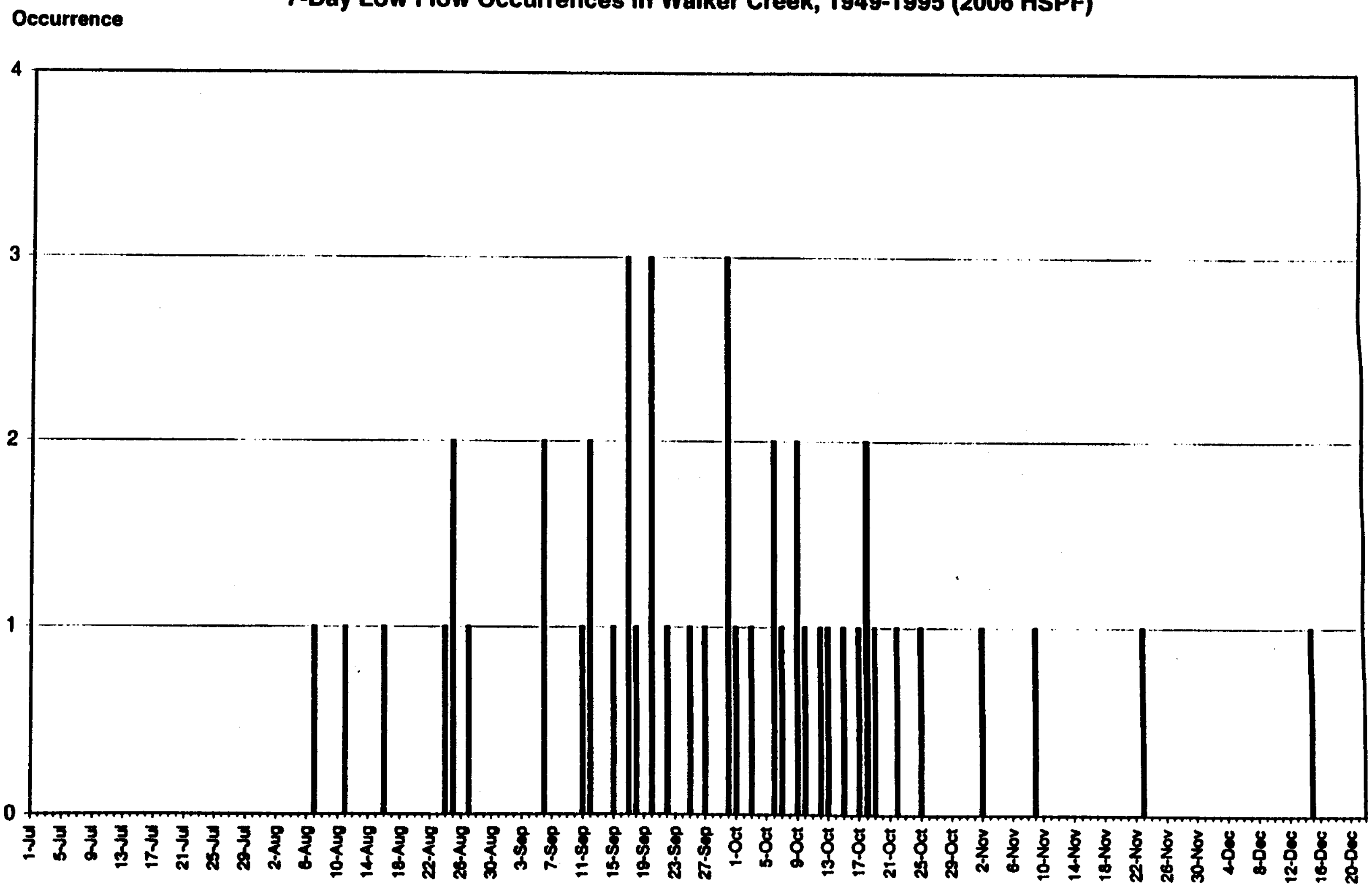
Date	Average 7-Day Lows Ordered	Rank	Rank/N+1	Return Frequency
1994	0.55	1	0.02	2.1
1949	0.57	2	0.04	4.2
1979	0.58	3	0.06	6.3
1952	0.59	4	0.08	8.3
1987	0.60	5	0.10	10.4
1993	0.60	6	0.13	12.5
1988	0.60	7	0.15	14.6
1986	0.61	8	0.17	16.7
1977	0.62	9	0.19	18.8
1992	0.62	10	0.21	20.8
1980	0.63	11	0.23	22.9
1985	0.63	12	0.25	25.0
1989	0.64	13	0.27	27.1
1958	0.65	14	0.29	29.2
1981	0.65	15	0.31	31.3
1990	0.66	16	0.33	33.3
1995	0.67	17	0.35	35.4
1976	0.68	18	0.38	37.5
1973	0.69	19	0.40	39.6
1963	0.69	20	0.42	41.7
1967	0.70	21	0.44	43.8
1982	0.70	22	0.46	45.8
1970	0.71	23	0.48	47.9
1953	0.71	24	0.50	50.0
1974	0.71	25	0.52	52.1
1991	0.71	26	0.54	54.2
1966	0.71	27	0.56	56.3
1951	0.71	28	0.58	58.3
1984	0.72	29	0.60	60.4
1965	0.72	30	0.63	62.5
1978	0.73	31	0.65	64.6
1962	0.73	32	0.67	66.7
1975	0.74	33	0.69	68.8
1961	0.74	34	0.71	70.8
1957	0.75	35	0.73	72.9
1950	0.75	36	0.75	75.0
1969	0.76	37	0.77	77.1
1955	0.77	38	0.79	79.2
1960	0.77	39	0.81	81.3
1956	0.79	40	0.83	83.3
1959	0.79	41	0.85	85.4
1954	0.81	42	0.88	87.5
1971	0.82	43	0.90	89.6
1964	0.84	44	0.92	91.7
1983	0.84	45	0.94	93.8
1972	0.87	46	0.96	95.8
1968	0.87	47	0.98	97.9

Rank = Numerical position of ordered low flow data with the driest year equal to one.
N = 47

WALKER CREEK

HISTOGRAM LOW FLOW OCCURRENCES IN WALKER CREEK (2006)

7-Day Low Flow Occurrences in Walker Creek, 1949-1995 (2006 HSPF)



WALKER CREEK

7-DAY LOW FLOW OCCURRENCES IN WALKER CREEK (WITH MITIGATION)

Start of 7-Day Low Flows with
Average Flow Rates

Date	Walker Creek at POC 2006 + AUGMENT Aug 1 - Oct 31 0.09 cfs
2-Nov-49	0.64
17-Sep-50	0.84
17-Sep-51	0.80
23-Nov-52	0.59
15-Sep-53	0.80
28-Oct-54	0.87
6-Sep-55	0.86
18-Sep-56	0.88
5-Nov-57	0.83
30-Sep-58	0.74
24-Aug-59	0.88
15-Oct-60	0.86
30-Sep-61	0.83
20-Sep-62	0.82
6-Oct-63	0.78
25-Oct-64	0.93
27-Sep-65	0.81
4-Nov-66	0.79
22-Sep-67	0.79
7-Aug-68	0.96
6-Sep-69	0.85
10-Oct-70	0.80
25-Aug-71	0.91
11-Sep-72	0.96
12-Sep-73	0.78
13-Oct-74	0.80
25-Jul-75	0.80
15-Dec-76	0.68
25-Jul-77	0.68
9-Jul-78	0.80
25-Jul-79	0.65
17-Oct-80	0.72
12-Sep-81	0.74
17-Sep-82	0.79
10-Oct-83	0.93
1-Oct-84	0.81
9-Oct-85	0.72
18-Oct-86	0.70
2-Nov-87	0.60
6-Oct-88	0.69
3-Oct-89	0.73
25-Sep-90	0.75
28-Oct-91	0.72
22-Oct-92	0.71
9-Nov-93	0.60
18-Oct-94	0.64
20-Sep-95	0.76

[redacted]

Statistical Ranking of Average 7-Day Low Flows
Period of Record: 1949-1995

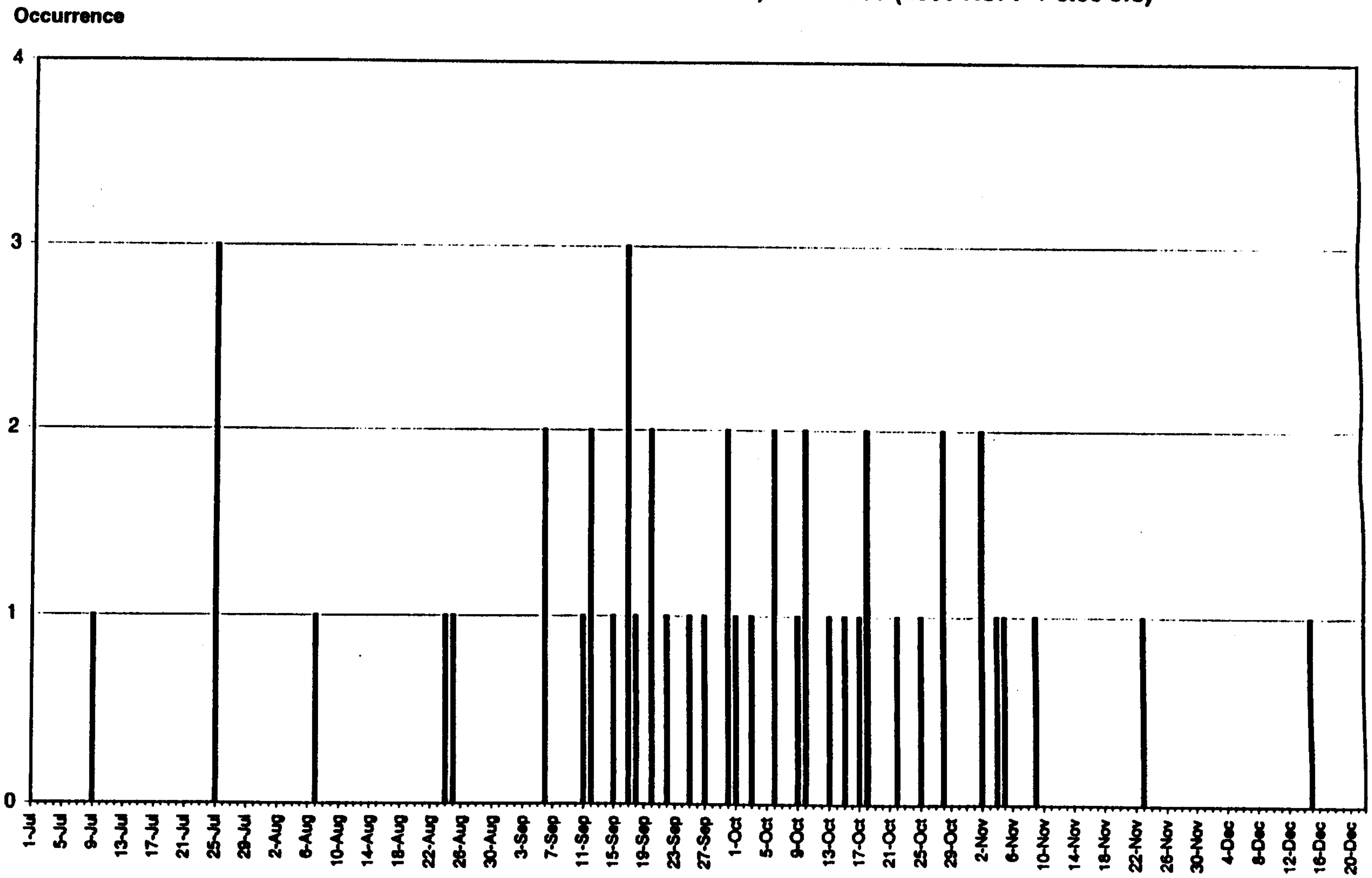
Date	Average 7-Day Lows Ordered	Rank	Rank/N+1	Return Frequency
1952	0.59	1	0.02	2.1
1987	0.60	2	0.04	4.2
1993	0.60	3	0.06	6.3
1949	0.64	4	0.08	8.3
1994	0.64	5	0.10	10.4
1979	0.65	6	0.13	12.5
1976	0.68	7	0.15	14.6
1977	0.68	8	0.17	16.7
1988	0.69	9	0.19	18.8
1986	0.70	10	0.21	20.8
1992	0.71	11	0.23	22.9
1991	0.72	12	0.25	25.0
1980	0.72	13	0.27	27.1
1985	0.72	14	0.29	29.2
1989	0.73	15	0.31	31.3
1958	0.74	16	0.33	33.3
1981	0.74	17	0.35	35.4
1990	0.75	18	0.38	37.5
1995	0.76	19	0.40	39.6
1973	0.78	20	0.42	41.7
1963	0.78	21	0.44	43.8
1967	0.79	22	0.46	45.8
1982	0.79	23	0.48	47.9
1966	0.79	24	0.50	50.0
1970	0.80	25	0.52	52.1
1975	0.80	26	0.54	54.2
1953	0.80	27	0.56	56.3
1974	0.80	28	0.58	58.3
1951	0.80	29	0.60	60.4
1978	0.80	30	0.63	62.5
1984	0.81	31	0.65	64.6
1965	0.81	32	0.67	66.7
1962	0.82	33	0.69	68.8
1957	0.83	34	0.71	70.8
1961	0.83	35	0.73	72.9
1950	0.84	36	0.75	75.0
1969	0.85	37	0.77	77.1
1955	0.86	38	0.79	79.2
1960	0.86	39	0.81	81.3
1954	0.87	40	0.83	83.3
1956	0.88	41	0.85	85.4
1959	0.88	42	0.88	87.5
1971	0.91	43	0.90	89.6
1964	0.93	44	0.92	91.7
1983	0.93	45	0.94	93.8
1972	0.96	46	0.96	95.8
1968	0.96	47	0.98	97.9

Rank = Numerical position of ordered low flow data with the driest year equal to one.
N = 47

WALKER CREEK

HISTOGRAM LOW FLOW OCCURRENCES IN WALKER CREEK (WITH MITIGATION)

7-Day Low Flow Occurrences In Walker Creek, 1949-1995 (2006 HSPF + 0.09 cfs)



WALKER CREEK

COMPARISON OF 7-DAY LOW FLOW BY YEAR

Comparison of [illegible] Low Flow by Year
for Walker Creek

Date	1994 HSPF Walker Creek at POC	Date	2006 HSPF Walker Creek at POC	-1994	Date	Walker Creek at POC 2006 + Mitigation Aug 1 - Oct 31 0.09 cfs	-1994
19-Oct-49	0.63	19-Oct-49	0.57	-0.06	2-Nov-49	0.64	0.01
17-Sep-50	0.83	17-Sep-50	0.75	-0.08	17-Sep-50	0.84	0.01
17-Sep-51	0.79	17-Sep-51	0.71	-0.08	17-Sep-51	0.80	0.01
23-Nov-52	0.66	23-Nov-52	0.59	-0.07	23-Nov-52	0.59	-0.07
15-Sep-53	0.79	15-Sep-53	0.71	-0.08	15-Sep-53	0.80	0.01
12-Oct-54	0.89	12-Oct-54	0.81	-0.08	28-Oct-54	0.87	-0.02
6-Sep-55	0.86	6-Sep-55	0.77	-0.09	6-Sep-55	0.86	0.00
18-Sep-56	0.88	18-Sep-56	0.79	-0.09	18-Sep-56	0.88	0.00
20-Sep-57	0.83	20-Sep-57	0.75	-0.08	5-Nov-57	0.83	0.00
30-Sep-58	0.72	30-Sep-58	0.65	-0.07	30-Sep-58	0.74	0.02
24-Aug-59	0.88	24-Aug-59	0.79	-0.09	24-Aug-59	0.88	0.00
15-Oct-60	0.86	15-Oct-60	0.77	-0.08	15-Oct-60	0.86	0.01
30-Sep-61	0.82	30-Sep-61	0.74	-0.08	30-Sep-61	0.83	0.01
20-Sep-62	0.81	20-Sep-62	0.73	-0.08	20-Sep-62	0.82	0.01
6-Oct-63	0.76	6-Oct-63	0.69	-0.07	6-Oct-63	0.78	0.02
25-Oct-64	0.93	25-Oct-64	0.84	-0.09	25-Oct-64	0.93	0.00
27-Sep-65	0.80	27-Sep-65	0.72	-0.08	27-Sep-65	0.81	0.01
30-Sep-66	0.79	30-Sep-66	0.71	-0.07	4-Nov-66	0.79	0.01
22-Sep-67	0.78	22-Sep-67	0.70	-0.08	22-Sep-67	0.79	0.01
7-Aug-68	0.97	7-Aug-68	0.87	-0.10	7-Aug-68	0.96	-0.01
6-Sep-69	0.84	6-Sep-69	0.76	-0.09	6-Sep-69	0.85	0.00
10-Oct-70	0.78	27-Aug-70	0.71	-0.07	10-Oct-70	0.80	0.02
25-Aug-71	0.91	25-Aug-71	0.82	-0.09	25-Aug-71	0.91	0.00
11-Sep-72	0.96	11-Sep-72	0.87	-0.09	11-Sep-72	0.96	0.00
12-Sep-73	0.76	12-Sep-73	0.69	-0.07	12-Sep-73	0.78	0.02
13-Oct-74	0.79	13-Oct-74	0.71	-0.08	13-Oct-74	0.80	0.01
11-Aug-75	0.82	11-Aug-75	0.74	-0.08	25-Jul-75	0.80	-0.02
15-Dec-76	0.75	15-Dec-76	0.68	-0.07	15-Dec-76	0.68	-0.07
16-Aug-77	0.68	16-Aug-77	0.62	-0.06	25-Jul-77	0.68	0.00
25-Aug-78	0.81	25-Aug-78	0.73	-0.08	9-Jul-78	0.80	0.00
7-Oct-79	0.64	7-Oct-79	0.58	-0.06	25-Jul-79	0.65	0.01
17-Oct-80	0.70	17-Oct-80	0.63	-0.07	17-Oct-80	0.72	0.02
12-Sep-81	0.73	12-Sep-81	0.65	-0.07	12-Sep-81	0.74	0.02
29-Sep-82	0.77	17-Sep-82	0.70	-0.07	17-Sep-82	0.79	0.02
10-Oct-83	0.93	10-Oct-83	0.84	-0.09	10-Oct-83	0.93	0.00
1-Oct-84	0.80	1-Oct-84	0.72	-0.08	1-Oct-84	0.81	0.01
9-Oct-85	0.70	9-Oct-85	0.63	-0.07	9-Oct-85	0.72	0.02
18-Oct-86	0.68	18-Oct-86	0.61	-0.06	18-Oct-86	0.70	0.03
2-Nov-87	0.66	2-Nov-87	0.60	-0.06	2-Nov-87	0.60	-0.06
6-Oct-88	0.67	6-Oct-88	0.60	-0.07	6-Oct-88	0.69	0.02
3-Oct-89	0.71	3-Oct-89	0.64	-0.07	3-Oct-89	0.73	0.02
25-Sep-90	0.74	25-Sep-90	0.66	-0.07	25-Sep-90	0.75	0.02
28-Oct-91	0.79	9-Oct-91	0.71	-0.08	28-Oct-91	0.72	-0.07
22-Oct-92	0.68	22-Oct-92	0.62	-0.06	22-Oct-92	0.71	0.03
9-Nov-93	0.67	9-Nov-93	0.60	-0.06	9-Nov-93	0.60	-0.06
18-Oct-94	0.61	18-Oct-94	0.55	-0.06	18-Oct-94	0.64	0.03
20-Sep-95	0.75	20-Sep-95	0.67	-0.08	20-Sep-95	0.76	0.01
	36.59		33.02			36.65	

WALKER CREEK

COMPARISON OF 7-DAY LOW FLOW BY RANK

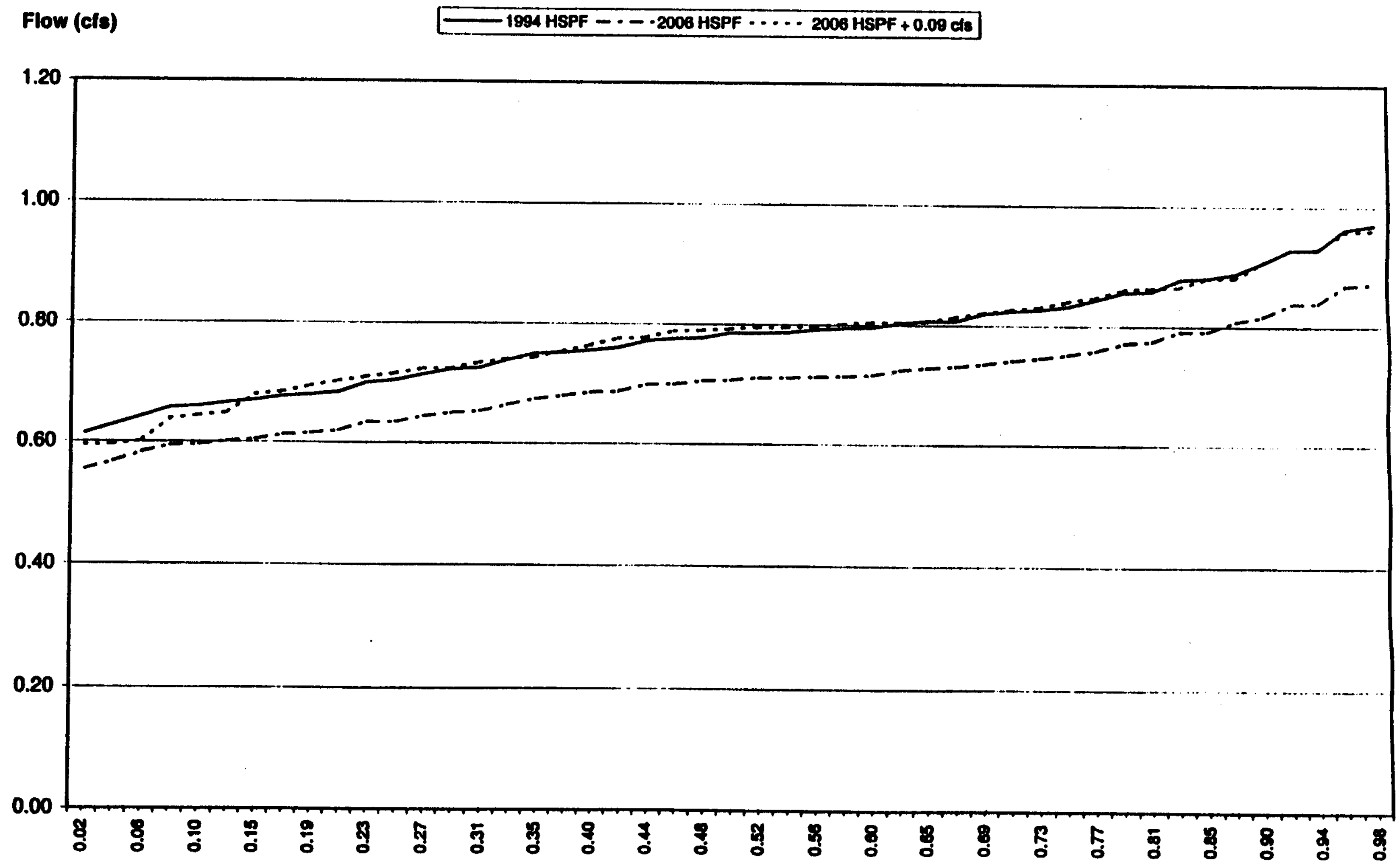
Comparison of 7-Day Low Flows by Rank
for Walker Creek

Date	Rank	1994 HSPF Walker Creek at POC	2006 HSPF Walker Creek at POC	-1994	Walker Creek at POC 2006 + Mitigation Aug 1 - Oct 31 0.09 cfs	-1994
19-Oct-49	1	0.63	0.57	-0.06	0.59	-0.03
17-Sep-50	2	0.83	0.75	-0.08	0.60	-0.24
17-Sep-51	3	0.79	0.71	-0.08	0.60	-0.19
23-Nov-52	4	0.66	0.59	-0.07	0.64	-0.02
15-Sep-53	5	0.79	0.71	-0.08	0.64	-0.14
12-Oct-54	6	0.89	0.81	-0.08	0.65	-0.24
6-Sep-55	7	0.86	0.77	-0.09	0.68	-0.18
18-Sep-56	8	0.88	0.79	-0.09	0.68	-0.19
20-Sep-57	9	0.83	0.75	-0.08	0.69	-0.13
30-Sep-58	10	0.72	0.65	-0.07	0.70	-0.02
24-Aug-59	11	0.88	0.79	-0.09	0.71	-0.17
15-Oct-60	12	0.86	0.77	-0.08	0.72	-0.14
30-Sep-61	13	0.82	0.74	-0.08	0.72	-0.10
20-Sep-62	14	0.81	0.73	-0.08	0.72	-0.08
6-Oct-63	15	0.76	0.69	-0.07	0.73	-0.02
25-Oct-64	16	0.93	0.84	-0.09	0.74	-0.19
27-Sep-65	17	0.80	0.72	-0.08	0.74	-0.06
30-Sep-66	18	0.79	0.71	-0.07	0.75	-0.03
22-Sep-67	19	0.78	0.70	-0.08	0.76	-0.01
7-Aug-68	20	0.97	0.87	-0.10	0.78	-0.19
6-Sep-69	21	0.84	0.76	-0.09	0.78	-0.07
10-Oct-70	22	0.78	0.71	-0.07	0.79	0.01
25-Aug-71	23	0.91	0.82	-0.09	0.79	-0.12
11-Sep-72	24	0.96	0.87	-0.09	0.79	-0.17
12-Sep-73	25	0.76	0.69	-0.07	0.80	0.04
13-Oct-74	26	0.79	0.71	-0.08	0.80	0.00
11-Aug-75	27	0.82	0.74	-0.08	0.80	-0.02
15-Dec-76	28	0.75	0.68	-0.07	0.80	0.05
16-Aug-77	29	0.68	0.62	-0.06	0.80	0.12
25-Aug-78	30	0.81	0.73	-0.08	0.80	0.00
7-Oct-79	31	0.64	0.58	-0.06	0.81	0.16
17-Oct-80	32	0.70	0.63	-0.07	0.81	0.11
12-Sep-81	33	0.73	0.65	-0.07	0.82	0.10
29-Sep-82	34	0.77	0.70	-0.07	0.83	0.06
10-Oct-83	35	0.93	0.84	-0.09	0.83	-0.10
1-Oct-84	36	0.80	0.72	-0.08	0.84	0.05
9-Oct-85	37	0.70	0.63	-0.07	0.85	0.15
18-Oct-86	38	0.68	0.61	-0.06	0.86	0.18
2-Nov-87	39	0.66	0.60	-0.06	0.86	0.21
6-Oct-88	40	0.67	0.60	-0.07	0.87	0.20
3-Oct-89	41	0.71	0.64	-0.07	0.88	0.17
25-Sep-90	42	0.74	0.66	-0.07	0.88	0.14
28-Oct-91	43	0.79	0.71	-0.08	0.91	0.12
22-Oct-92	44	0.68	0.62	-0.06	0.93	0.24
9-Nov-93	45	0.67	0.60	-0.06	0.93	0.26
18-Oct-94	46	0.61	0.55	-0.06	0.96	0.34
20-Sep-95	47	0.75	0.67	-0.08	0.96	0.21
		36.59	33.02		36.65	

WALKER CREEK

PLOTTED 7-DAY LOW FLOWS BY PERCENT RETURN FREQUENCY

Walker Creek 7-Day Low Flow Values



WALKER CREEK

SUMMARY OF LOW STREAM FLOW MITIGATION
VAULT STORAGE AND FILLING

Reserve Storage Vaults for Walker Creek.

Vault sizes (dead storage in acre ft) required for 92-day release of 0.09 cfs (1949 – 1995).

	Vault F
Mean	11.02
Median	11.22
Max	15.02
Min	6.04

Contributing Drainage Areas

Subbasin	Vault		Area	% Contribution
SDW2	F		3.5	30
SDW2 Lined Area	F		6.0	52
SDW2 Pond Cover	F		2.0	18
		Total	11.5	

Fill time for 15.0 acre foot volume / Days to fill after closing vault on November 30

	Vault F
Mean	102.33
Media	81.50
Max *	282.00
Min	47.00

Remaining volume in vaults on October 31

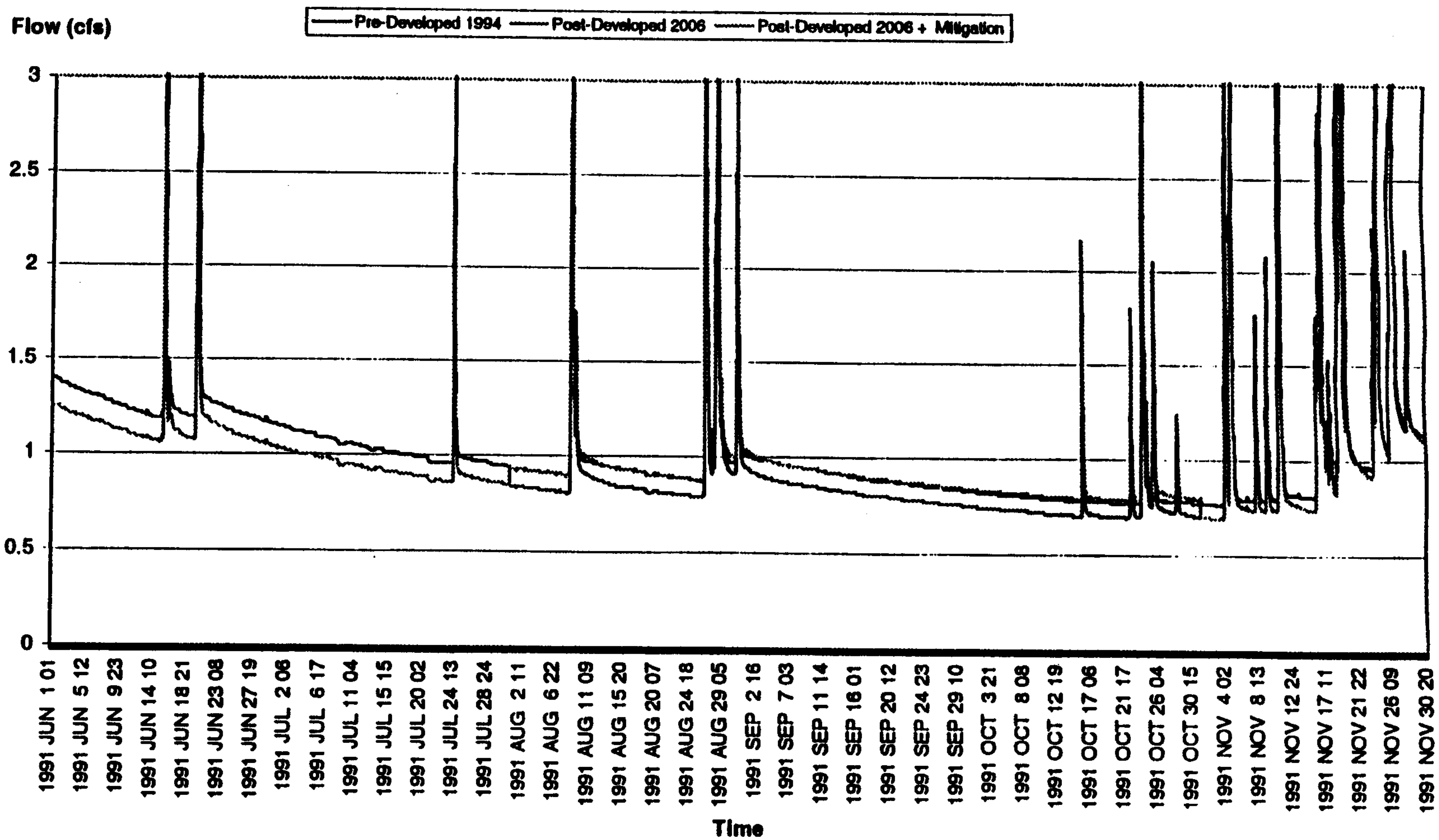
	Volume ac ft	Remaining Days
Mean	4.62	25.8
Median	4.52	25.3
Max	10.42	58.4
Min	0.04	0.2

* Vault fills all years except 1977 and 1979

WALKER CREEK

LOW FLOW HYDROGRAPHS WITH MITIGATION (1991-1994)

Walker Creek Low Flow 1991 + Mitigation



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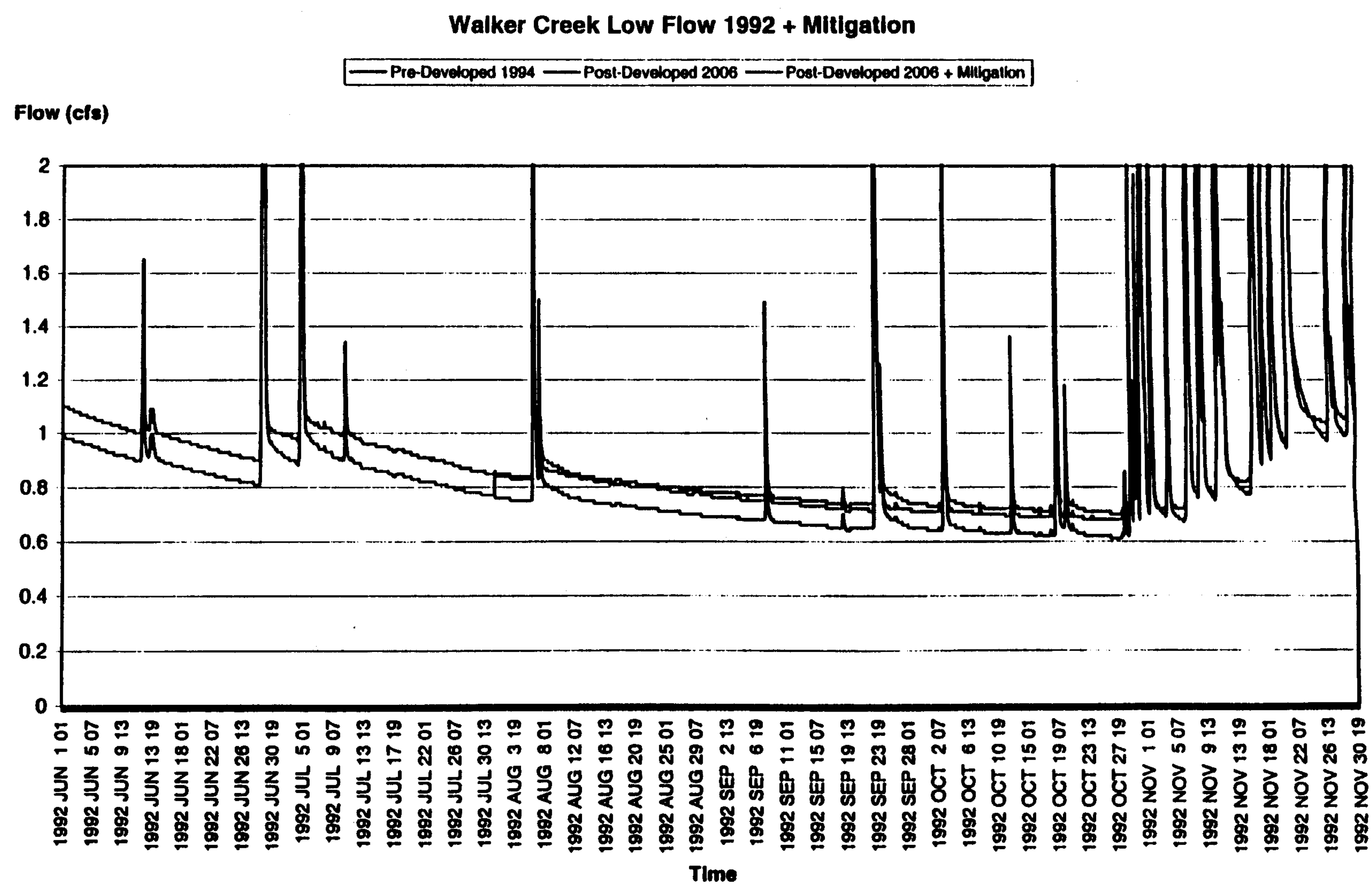
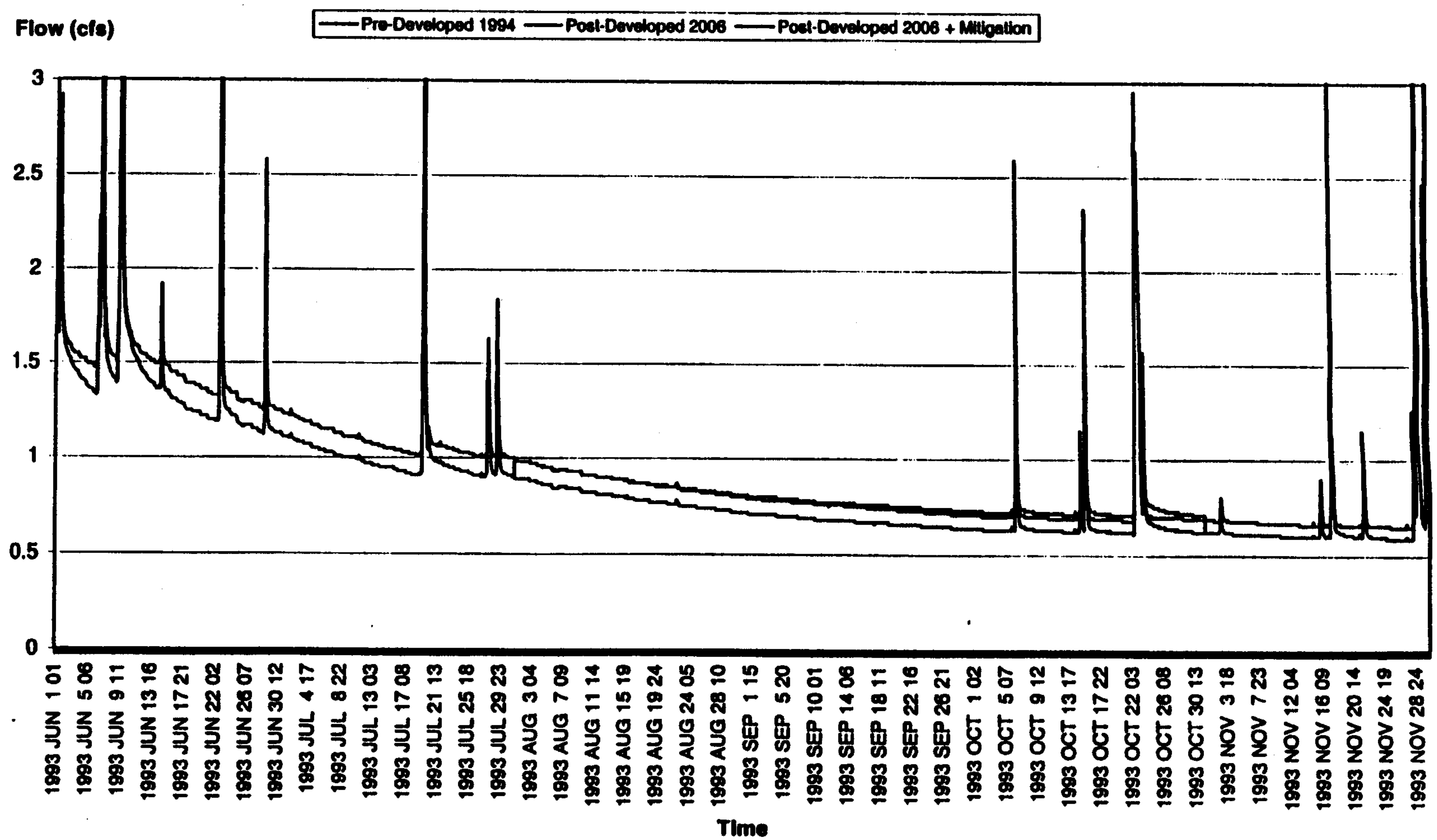
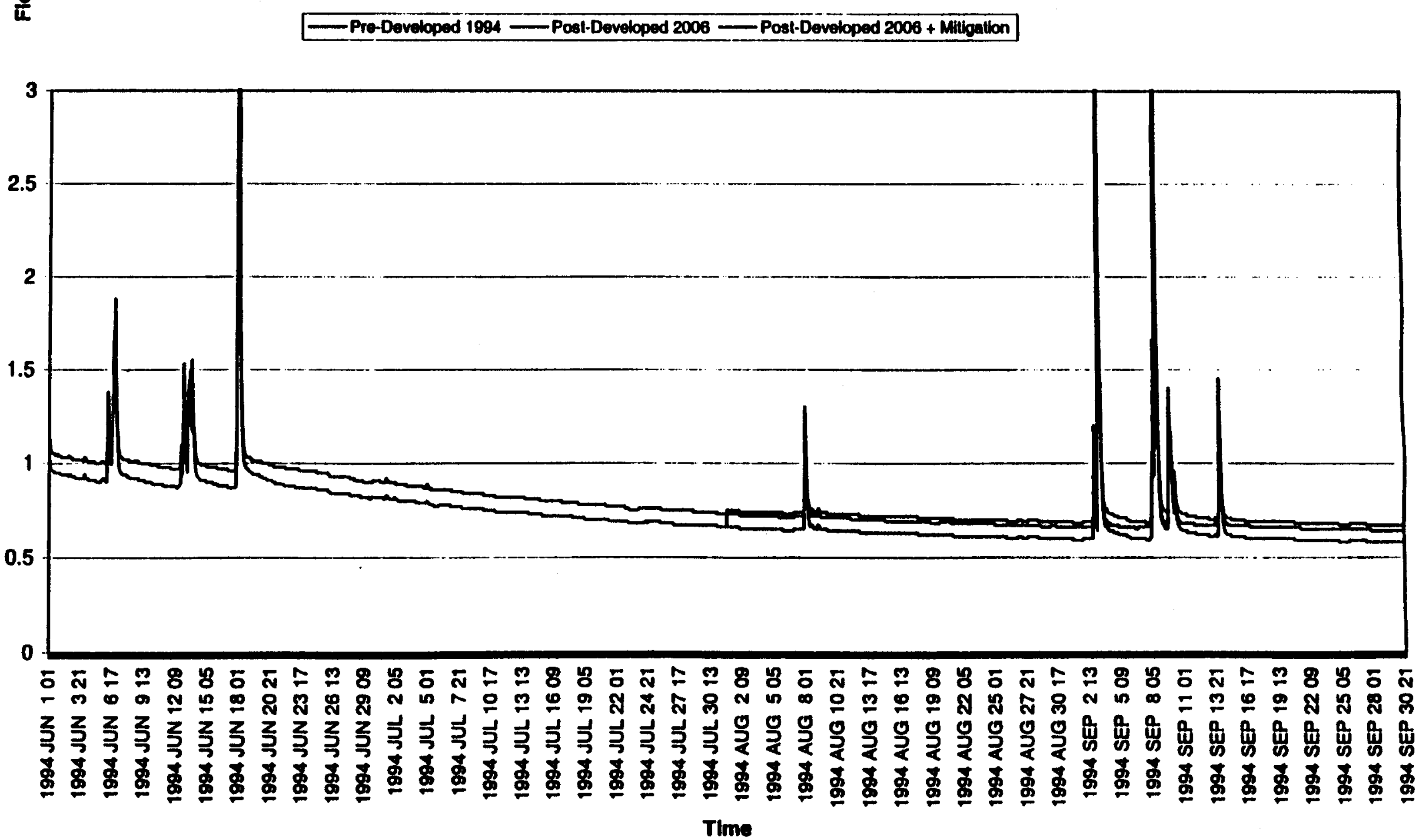

Walker Creek Low Flow 1992 + Mitigation
Pre-Developed 1994
Post-Developed 2006
Post-Developed 2006 + Mitigation
Flow (cfs)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1992 JUN 1 01
1992 JUN 5 07
1992 JUN 9 13
1992 JUN 13 19
1992 JUN 18 01
1992 JUN 22 07
1992 JUN 26 13
1992 JUN 30 19
1992 JUL 5 01
1992 JUL 9 07
1992 JUL 13 13
1992 JUL 17 19
1992 JUL 22 01
1992 JUL 26 07
1992 JUL 30 13
1992 AUG 3 19
1992 AUG 8 01
1992 AUG 12 07
1992 AUG 16 13
1992 AUG 20 19
1992 AUG 25 01
1992 AUG 29 07
1992 SEP 2 13
1992 SEP 6 19
1992 SEP 11 01
1992 SEP 15 07
1992 SEP 19 13
1992 SEP 23 19
1992 SEP 28 01
1992 OCT 2 07
1992 OCT 6 13
1992 OCT 10 19
1992 OCT 15 01
1992 OCT 19 07
1992 OCT 23 13
1992 OCT 27 19
1992 NOV 1 01
1992 NOV 5 07
1992 NOV 9 13
1992 NOV 13 19
1992 NOV 18 01
1992 NOV 22 07
1992 NOV 26 13
1992 NOV 30 19
Time

Walker Creek Low Flow 1993 + Mitigation



Walker Creek Low Flow 1994 + Mitigation



MEMORANDUM

to: Paul Fendt — July 20, 2001

from: Don Weitkamp — 556 2912 001 1 28

re: Low Stream Flow Fish Behavior and Stream Characteristics

The following are some thoughts on the issues raised in the e-mail message from Kelly Whiting to Ann Kenny of July 2, 2001 which we discussed at our meeting with the agencies.

1. Migrations of juvenile and adult salmonids appear to be stimulated/regulated by a variety of biological and physical factors of which flow is one. Young fish generally require growth to a certain size range before migration will occur. The physiological processes (smoltification) that ready them for migration also depend of a sequence of events that appears to be triggered by a combination of temperature, photoperiod, and phase of the moon that stimulate hormonal mediated physiological changes. Once these fish are prepared to migrate a substantial change in flow will often trigger the initiation of migration. However, flow increases alone are not likely to initiate a process that depends on many factors.

   Likewise the migrations of adult salmonids are commonly the result of a variety of factors. Adults commonly do not approach streams or prepare to move into headwaters until specific times apparently regulated by photoperiod, temperature, potentially food supply, etc. When ready to migrate the adults are commonly stimulated by freshet conditions that involve both a flow increase and runoff from riparian areas. The chemical cues in the runoff appear to play some role in triggering the migrations. The relationship to flow is far from certain. Sometimes minor increases in flow will stimulate migrations, sometimes minor increases are ignored, and sometimes migrations occur in the absence of flow increases. A minor flow supplementation during normal low flow periods is not likely to provide a trigger for biological processes that would not normally occur during that time period.

2. Severe drought conditions are generally a habitat-limiting factor that can severely limit the carry capacity of a stream. In most Puget Sound lowland streams the low flow conditions of late July to mid-September determine the minimum habitat available to support the resident fish populations including juvenile salmon and trout. Prolonged low flows of several weeks to months during this period are commonly the factor that establishes the carrying capacity of a stream.

   Protection or restoration of stream flows during the late July through September period will maintain the habitat that sustains and controls fish populations remaining within the stream through out the year. Stream flow supplementation during this period can have a substantial influence on the abundance of resident and anadromous salmonids. Providing flow outside this late summer low flow period is unlikely to provide an increase in the fish population that can be sustained within the stream. Additional habitat provided by flow increases preceding the limiting low flow period is unlikely to provide an increase in the fish population following the low flow period. The potential effects of providing additional habitat outside the limiting flow period would likely be negated by the subsequent low flows. Maintaining existing flow conditions during the common low flow period will ensure that habitat does not become more of a limiting factor than it is under existing conditions.

3. Water quality can be a critical factor in determining salmonid habitat. However, sudden changes of a moderate degree are naturally common in small streams. Freshet conditions (storm events) can naturally change temperature and chemical parameters within hours. depending on the nature of the storm event, the drainage basin, stream characteristics and ambient conditions. Generally decreasing temperatures have little immediate effect on salmonids other than reduced activity for a brief period. Decreasing temperatures rapidly within the range of a few degrees can be a benefit if temperatures are near the upper end of the range of acceptable temperatures or greater. Decreases in DO appear to have little effect on behavior when they remain within a range acceptable for survival and growth. The relatively small amount of water provided during low flow mitigation together with the proposed oxygenation techniques is likely to maintain adequate DO conditions.

Pacific Groundwater Group
2377 Eastlake Ave. E.
Seattle, Washington 98102
206.329.0141 FAX 329.6968

Memorandum

To: Keith Smith – Port of Seattle

From: Crispin Prahl, Charles Ellingson – Pacific Groundwater Group

Date: 05/25/01

Re: Selection of Cross Sections for Third Runway Slice Modeling

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This memorandum documents basin fill geometries and the selection of hydrogeologic cross sections required as input to low flow analyses for the SeaTac third runway fill. This memorandum and the attached figures serve as the Task 1 deliverable of Pacific Groundwater Group's Hydrus+Slice (H-S) modeling scope dated May 22, 2001. We welcome your comments on the cross section locations presented herein.

PGG used existing GIS coverages of existing topography, "built" topography, and third runway pavement distribution to calculate areas for H-S modeling. The areas to be removed from HSPF and modeled by Hydrus and Slice are shown on Figure 1. The area includes all contiguous fill areas in Miller and Walker Creek basins planned for the third runway, minus the steep apron slopes at the perimeter of the fill. The areas are as follows:

	Miller Creek Basin	Walker Creek Basin
Pervious Fill Area	2,836,250 sq. ft. (65.2 ac)	645,000 sq. ft. (14.8 ac)
Runway and Taxiway Impervious Area	1,722,328 sq. ft. (39.6 ac)	372,343 sq. ft. (8.6 ac)
Total Area in Basin to be modeled by H-S	4,558,578 sq. ft. (104.8 ac)	1,017,343 sq. ft. (23.4 ac)

PGG reviewed hydrogeologic conditions and embankment geometries along the extent of the embankment fill. Three representative hydrogeologic cross sections were selected using available subsurface data and interpretations. Cross sections 1 and 2 are representative of conditions within the Miller Creek basin fill while cross section 3 is representative of conditions in the Walker Creek basin fill. Hydrogeologic cross sections will be used to create slice models under Task 4 of our work scope.

Cross sections are based on subsurface data described in available geotechnical and hydrogeologic reports and from the existing and "built" topography of the third runway area. PGG compiled and reviewed consulting reports completed since the Ecology Study in order to select cross section alignments. Structural surface maps (AESI, 1999) for glacial till will be used to refine hydrogeologic conditions in the final cross sections and related slice models.

The following is a brief summary of each cross section and the extent of embankment fill that each cross section represents.

MILLER CREEK SECTIONS

For purposes of developing the slice models and low flow estimates, two cross sections represent subsurface conditions within the Miller Creek basin fill. Both cross sections are oriented parallel to horizontal groundwater flow directions expected in the fill. **Figure 1** shows the approximate locations of cross sections proposed through the Miller Creek fill.

Cross Section 1 (Slice 1): This cross section is located through the thickest portion of the fill embankment with a fill thickness of up to 160 feet. Cross section 1 is located at the same location as the original slice model used by PGG in the Ecology study. **Figure 2** presents a working draft of the Slice 1 model, with implied hydrogeologic conditions. Fill located behind the West MSE wall will be modeled using Slice 1. This represents approximately 1,640 linear feet (30%) of the fill embankment within the Miller Creek basin area.

Cross Section 2 (Slice 2): This cross section is located through the northern portion of the fill embankment near the northern end of the third runway. Cross section 2 will be developed from a generalized hydrogeologic cross section originally created by Hart Crowser through the northern toe of the fill embankment (Hart Crowser, 1999). The slice location is based on availability of suitable subsurface data. **Figure 3** presents Hart Crowser's Section A-A' which will be used as the basis for the Slice 2 model. Working drafts of soilunit designations to be used in the slice are also shown. Modifications that will be made to the final cross section through this area include the use of existing topography (thereby more accurately defining the drain slope) and "built" fill topography (thereby defining fill thickness), with consideration of till surface configurations defined by AESI (1999). For purposes of the low flow analysis, cross section 2 represents subsurface conditions in the bulk of Miller Creek embankment fill. It will be used to model subsurface conditions for all fill in the Miller Creek basin not modeled using Slice 1 as described above. Approximately 3,760 linear feet (70%) of fill will be represented by fill geometry and hydrogeologic conditions described by cross section 2.

WALKER CREEK SECTION

For purposes of developing the slice models, one cross section will be used to represent subsurface conditions within the Walker Creek basin fill. The section was chosen through fill of intermediate thickness. (Although this single section will not accurately represent the variety of fill thicknesses in Walker Creek basin fill, the thick portion of the fill is of small areal extent.) **Figure 1** shows the approximate cross section location proposed through the Walker Creek fill.

Cross Section 3 (Slice 3): This cross section is located immediately north of the South MSE wall. A fill thickness of up to 40 feet occurs in this slice. Cross section 3 will be based on a generalized hydrogeologic cross section originally created by Hart Crowser through the northern end of the MSE wall study area (Hart Crowser, 2000b). It will be updated base on supplemental geotechnical data (Hart Crowser, 2000c), existing and "built" topography, and available till mapping data. **Figure 4** presents Hart Crowser's Section E-E' which will be used as the basis for cross section 3. Working drafts of soil-unit designations to be used in the slice are also shown.

REFERENCES CITED

Associated Earth Sciences, Inc. (AESI), 1999. *Seattle-Tacoma International Airport Ground Water Study – Model Boundary Presentation.* Unpublished figures and cross sections prepared for The Port of Seattle dated October 15, 1999.

Hart Crowser, Inc., 1999a. *Subsurface Conditions Data Report 404 Support Third Runway Embankment.* Unpublished consulting report prepared for HNTB and The Port of Seattle dated July 1999.

Hart Crowser, Inc., 2000a. *Draft Subsurface Conditions Data Report Additional Field Explorations and Advanced Testing, Third Runway Project Sea-Tac International Airport.* Unpublished consulting report prepared for HNTB dated September 5, 2000.

Hart Crowser, Inc., 2000b. *Draft Subsurface Conditions Data Report South MSE Wall and Adjacent Embankment Third Runway Project Sea-Tac International Airport.* Unpublished consulting report prepared for Port of Seattle and HNTB dated April 7, 2000.

Hart Crowser, Inc., 2000c. *Subsurface Conditions Data Report Phase 4 Fill, Third Runway Project Sea-Tac International Airport.* Unpublished consulting report prepared for Port of Seattle and HNTB dated November 29, 2000.

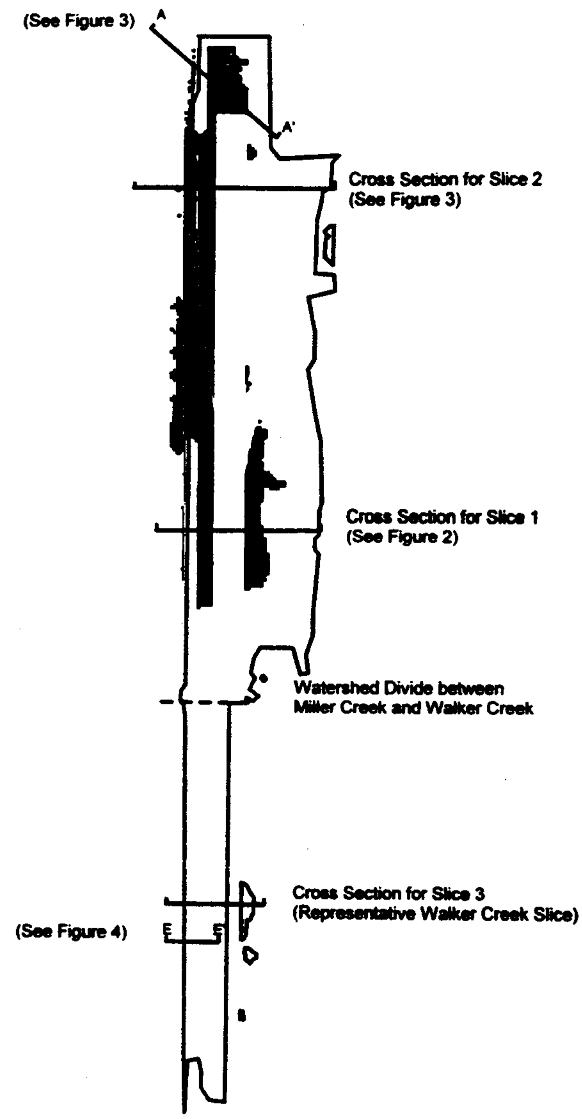
ATTACHMENTS

Figure 1 – Cross section locations, fill thickness intervals, and model area designation

Figure 2 – Draft cross section for Slice 1 (Figure 3-5 of Ecology Study)

Figure 3 - Draft cross section for Slice 2 (H-C generalized geologic cross section A-A' with markups)

Figure 4 - Draft cross section for Slice 3 (H-C generalized subsurface cross section E-E' with markups)



Depth of Fill (feet)

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100
- 101 - 120
- 121 - 140
- 141 - 160

Area to be Modeled by Hydrus and Slice

Impervious Area

As-Built Elevation Contours (25 ft interval)

N

400 0 400 800 1200 Feet

Figure 1

AR 051859

May 24, 2001

k:/pony/seatac_ll/3rdrunway_depthoffill/3rdrunway_010511.apr (figure 1), 5/24/01

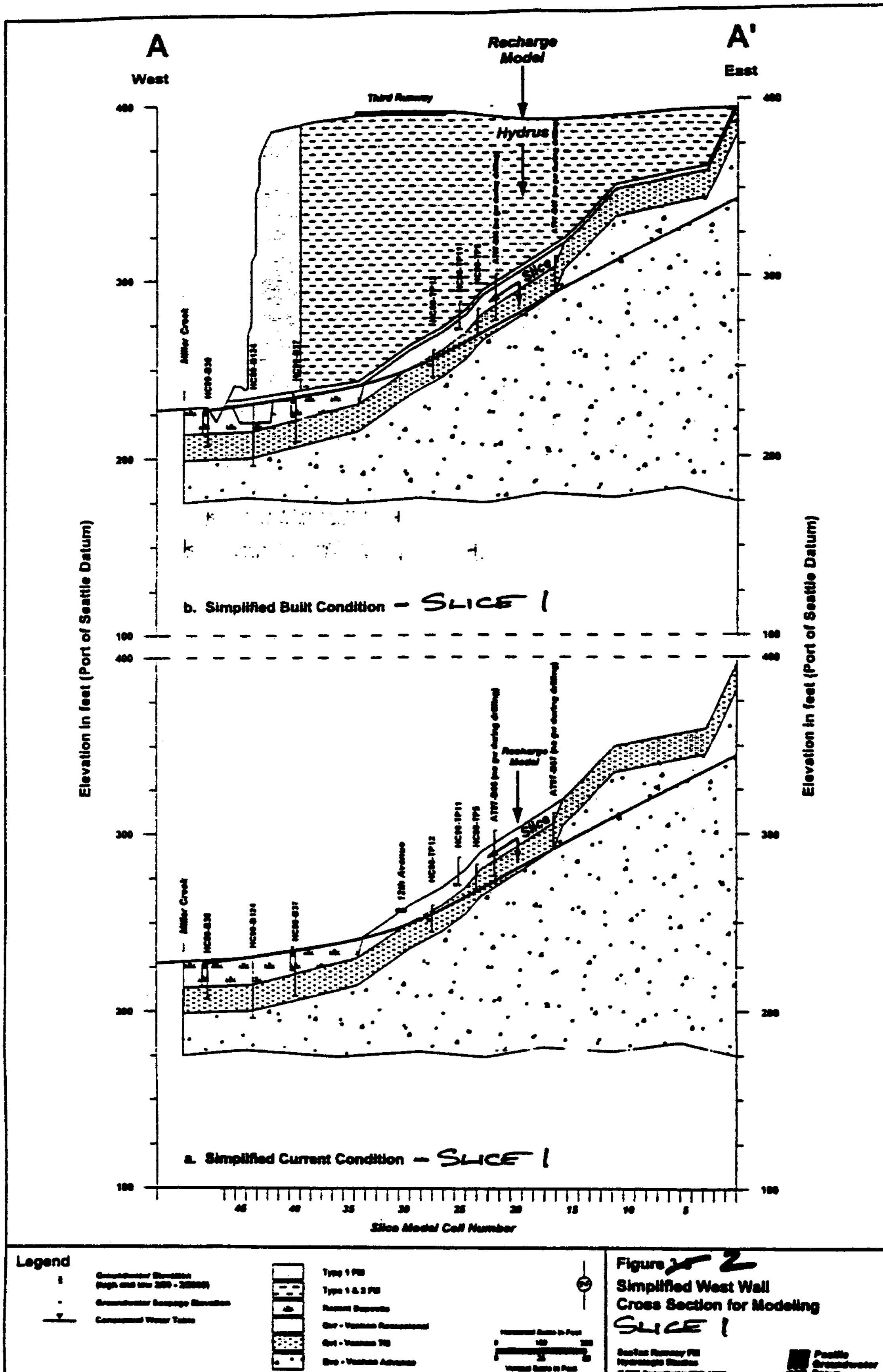
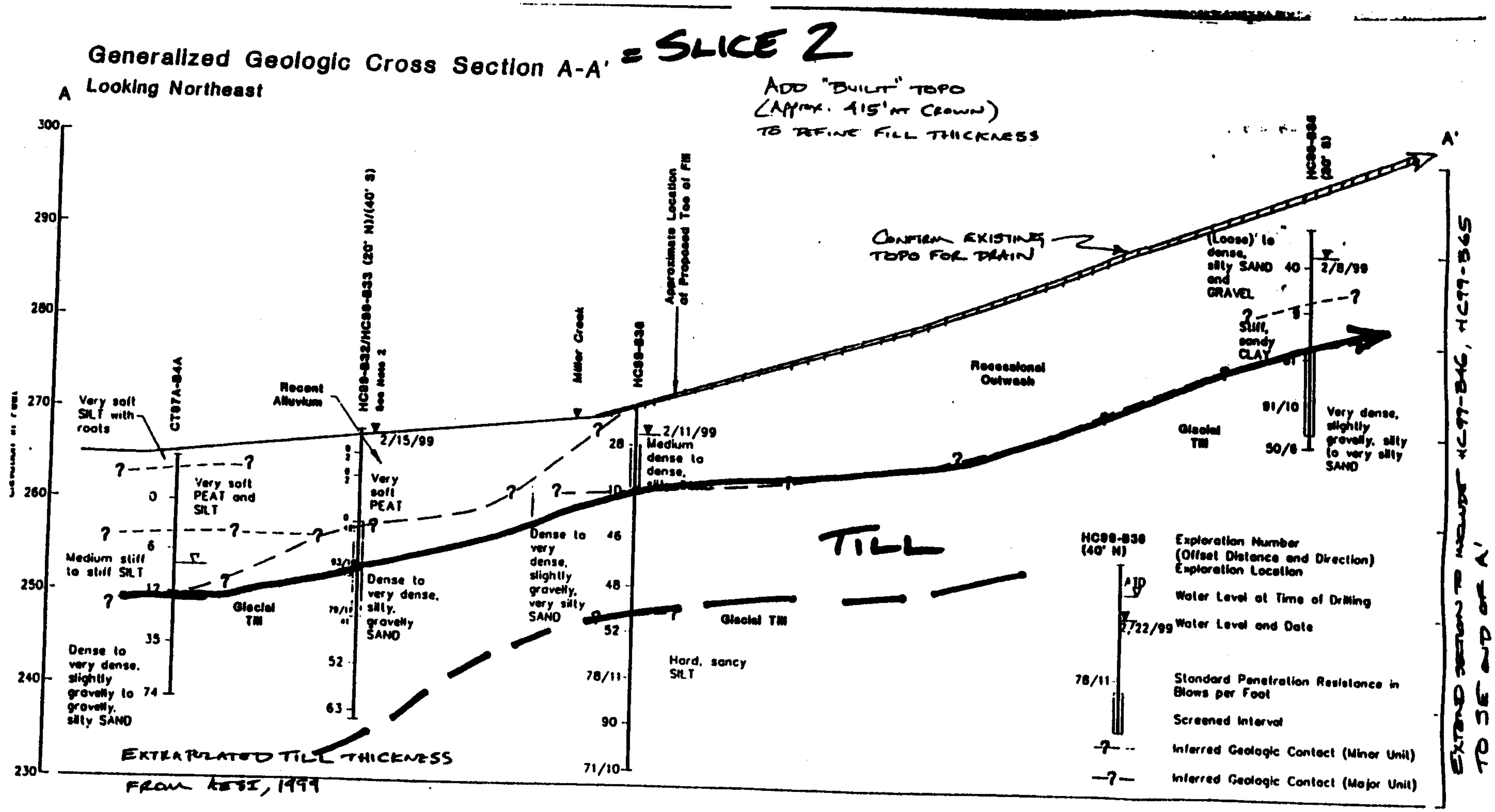


Figure ~~1~~ 2
Simplified West Wall
Cross Section for Modeling
SLICE 1

AR 051860



Note: 1) Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.

2) Screened interval and groundwater level shown is for HC99-B32; however, HC99-B33 is similar.

SOURCE: HART CROWSER, 1999a

HARTCROWSER

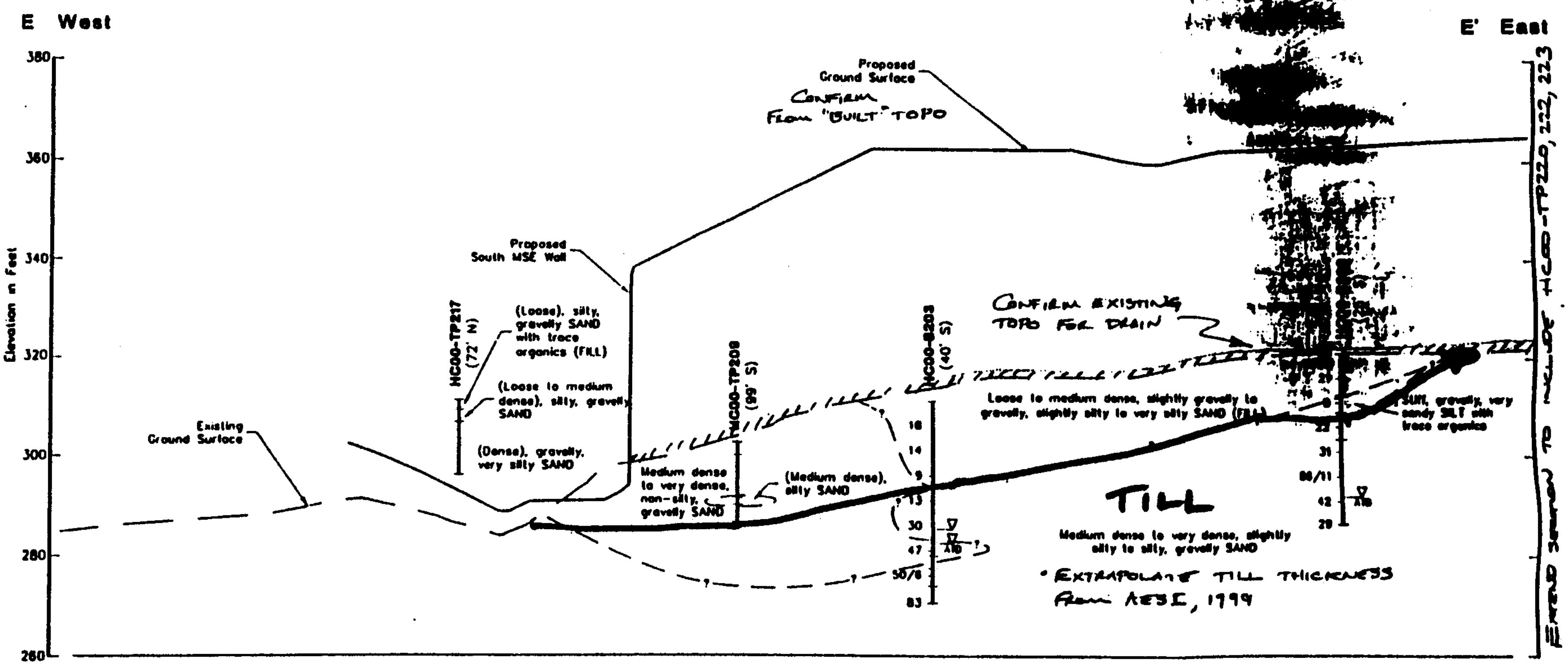
J-4978-06 7/99

~~Figure~~

FIGURE 3 - ~~DRAFT~~ CROSS SECTION FOR SLICE 2

Generalized Subsurface Cross Section E-E' = SLICE 3

South MSE Wall (Station 145+44) (Looking North)



Note: Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data. See exploration logs for detailed information at specific locations.

SOURCE: HART CROWSER, 2000b

HC00-TP217 Exploration Number
(72' N) (Offset Distance and Direction)

Exploration Location

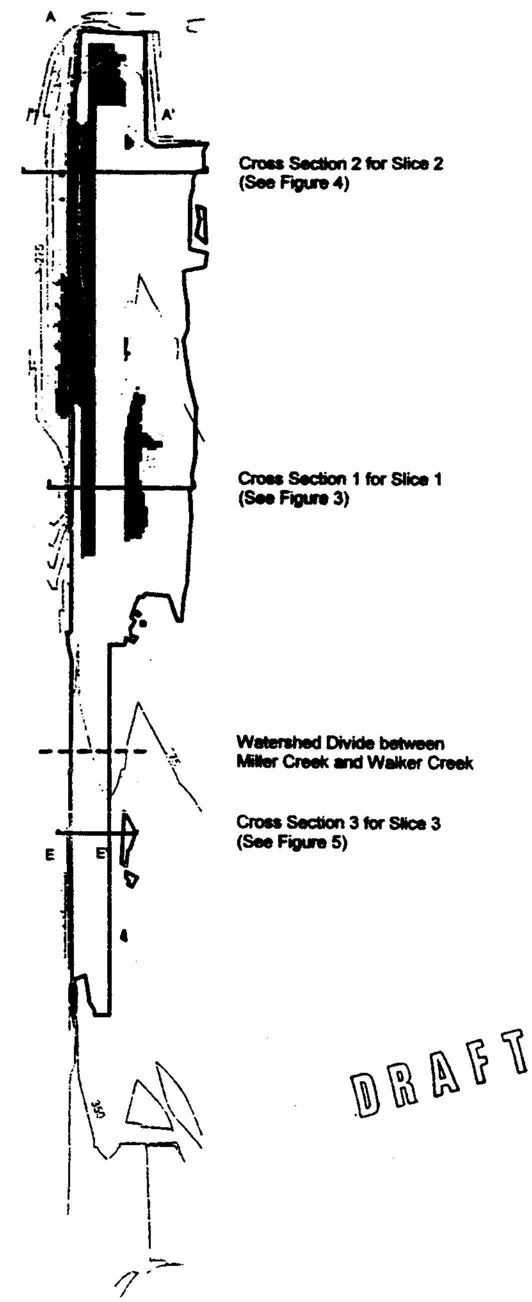
Water Level

50/6 N Value

0 20 40
Scale in Feet

HARTCROWSER
J-4978-23 4/00
~~Figure 5~~

FIGURE 4 - DRAFT CROSS SECTION FOR SLICE 3



Depth of Fill (feet)

- 0 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100
- 101 - 120
- 121 - 140
- 141 - 160

- Area to be Modeled by Hydrus and Slice
- Impervious Area
- As-Built Elevation Contours (25 ft interval)

N

0 1000 Feet

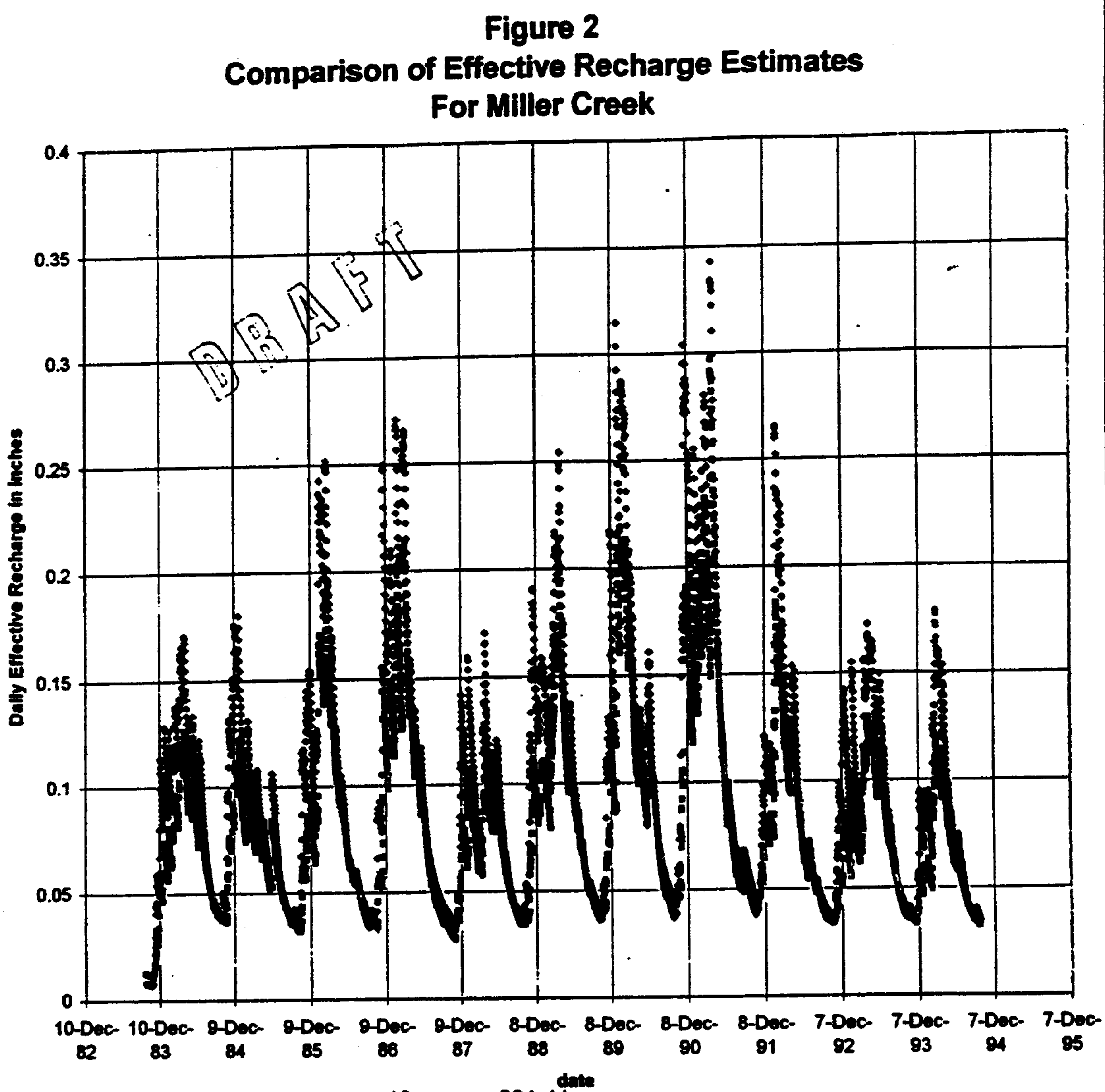
1:12000

Figure 1

SeaTac Third Runway

Site Features for Hydrus-Slice Modeling

Pacific Groundwater Group



Recharge 1 total inches over 10 years = 331.44
Recharge 2 total inches over 10 years = 407.48
Difference = 18.7% ((R2-R1)/R2)

- Recharge 2 - ER from scaled EP->HSPF
- Recharge 1 - ER from P->HSPF then scaled

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Memorandum

To:	Keith Smith, Port of Seattle
From:	Charles Ellingson, Pacific Groundwater Group
Re:	Modeled Area and Hydrus Model Results Draft Interim Deliverables
Date:	June 25, 2001

This memo presents the following interim draft deliverables related to Hydrus/Slice modeling of third runway fill:

- Definition of the area to be modeled by Hydrus/Slice instead of HSPF
- Effective Recharge
- Selection of Cross Sections (locations for Slice models)
- Fill thickness
- Definition of soil as modeled in Hydrus
- Draft Interim Hydrus Modeling Results

Definition of the Area to be Modeled by Hydrus/Slice Instead of HSPF

PGG used existing GIS coverages of existing topography, "built" topography, and third runway pavement distribution to calculate areas for Hydrus/Slice modeling. The areas to be modeled by Hydrus and Slice (and therefore removed from HSPF) are shown on **Figure 1** and **Table 1**. The areas include proposed additional runway fill in the Miller and Walker Creek basins minus the steep slopes along the western edge of the constructed fill.

The north-south extent of the fill within the Miller Creek and Walker Creek basins will be used along with other data to integrate Slice model results along the respective basin lengths. A dashed line is drawn on **Figure 1** between the Miller and Walker Creek Basins. The location of the line is approximately the same as the co-incident surface water and groundwater basin boundaries used within the HSPF models (Parametrix SMP Figure B2-2). The areas indicated in **Table 1** below are consistent with the line drawn on **Figure 1**. The basin areas to be modeled by Hydrus/Slice are as follows:

Table 1

Summary of Areas to be Modeled by Hydrus/Slice

	Miller Creek Basin	Walker Creek Basin
Pervious Fill Area	3,030,620 sq ft	450,630 sq ft
Runway and Taxiway Impervious Area	1,833,928 sq ft	260,743 sq ft
Total Area in Basin to be modeled by H-S	4,864,548 sq ft	711,373 sq ft

Runoff from impervious area (IA) is assumed to infiltrate in pervious areas (PA). Therefore the impervious and pervious areas in **Table 1** above are used to calculate effective recharge on pervious areas. IA in Walker creek consists of only the western half of the runway because runoff from the eastern half will not flow onto new third runway fill.

Effective Recharge

Effective recharge was calculated using the following algorithm which is called "recharge 1":

- *AquaTerra applied daily precipitation between 1984 and 1994 to grass on flat outwash in HSPF (regional parameters)*
- *the resulting daily recharge (R) was increased to account for secondary infiltration of runoff from impervious surfaces using the following formula for effective recharge (ER):*

$$ER=R+(R*(IA/PA))$$

While this method accounts for runoff from the impervious areas, we acknowledge that it employs a lower-end estimate of impervious runoff. Impervious runoff is underestimated because it is assumed equal to the recharge rate below grass on outwash soils. In actuality, the impervious areas will lose less water to evapotranspiration than grass would, and would therefore have more water available for runoff to the pervious area. The simplifying assumption that runoff rates equal calculated recharge rates was adopted to facilitate the timeline of the modeling exercise. However, we performed additional analysis on whether an upper-end estimation of runoff from impervious areas is not likely to cause significant overland flow in the pervious areas. Based on conversations with team members, the following algorithm (called "recharge 2") was used to assess the upper-end estimation of runoff:

- *AquaTerra increased precipitation (P) to account for runoff from impervious surfaces to pervious surfaces using the following formula for effective precipitation:*

$$EP=P+(P*IA/PA))$$

- *AquaTerra applied EP between water years 1984 to 1994 for grass on flat outwash in HSPF (regional parameters)*

The sum of daily "recharge 1" over the 11-year period was 18.7% less than the sum of daily "recharge 2" over the same period. This result suggests that the difference in runoff from the two methods is relatively small, and that recharge 1 may underestimate actual recharge. **Figure 2** is a plot of Miller Creek ER as calculated by "recharge 1" and "recharge 2". Walker Creek has a very similar IA/PA ratio and therefore similar ER.

Selection of Cross Sections (Locations for Slice Models)

PGG reviewed hydrogeologic conditions and embankment geometries along the extent of the embankment fill. Three representative hydrogeologic cross sections were selected using available subsurface data and interpretations. Cross sections 1 and 2 are representative of conditions within the thicker Miller Creek basin fill while cross section 3 is representative of conditions in the Walker Creek basin fill and the southern, thinner portion of the Miller Creek fill. Hydrogeologic cross sections will be used to create Slice models.

Cross sections are based on subsurface data described in available geotechnical and hydrogeologic reports and from the existing and proposed topography of the third runway area. PGG compiled and reviewed consulting reports completed since the Ecology Study in order to select cross section alignments. The following is a brief summary of each cross section. **Figure 1** shows the approximate locations of cross sections.

Cross Section 1 (Slice 1): This cross section is located through the thickest portion of the fill embankment with a fill thickness of up to 160 feet. Cross section 1 is located at the same location as the original slice model used by PGG in the Ecology study. **Figure 3** presents the schematic cross section upon which the Slice 1 model will be based.

Cross Section 2 (Slice 2): This cross section is located through the northern portion of the fill embankment near the northern end of the proposed third runway. Cross section 2 was developed from a generalized hydrogeologic cross section originally created by Hart Crowser through the northern toe of the fill embankment (Hart Crowser, 1999) and from supplemental test pit data in this area. **Figure 4** presents the schematic cross section which will be used as the basis for the Slice 2 model. The third runway fill in Cross Section 2 is thinner than Cross Section 1. Soil unit designations to be used in the slice model are also shown.

Cross Section 3 (Slice 3): This cross section is located immediately north of the South MSE wall. A fill thickness of up to 23 feet occurs in this slice. Cross section 3 was based on a generalized hydrogeologic cross section originally created by Hart Crowser through the northern end of the MSE wall study area (Hart Crowser, 2000b). It was updated based on supplemental geotechnical data (Hart Crowser, 2000c), existing and proposed topography, and available till mapping data. **Figure 5** presents the schematic cross section which will be used as the basis for the Slice 3 model. Soil-unit designations to be used in the slice model are also shown.

Only Cross Section 3 will be used to represent subsurface conditions within the Walker Creek basin fill. The section was chosen through fill of intermediate thickness. Although this single section will not accurately represent the variety of fill thicknesses in Walker Creek basin fill, the thick portion of the fill is of small areal extent.

Fill Thickness

The thickness of fill is mapped on **Figure 1** based on pre- and post- construction topography as provided in existing GIS coverages. A series of Hydrus models was used to represent discrete values of fill thickness over the observed range.

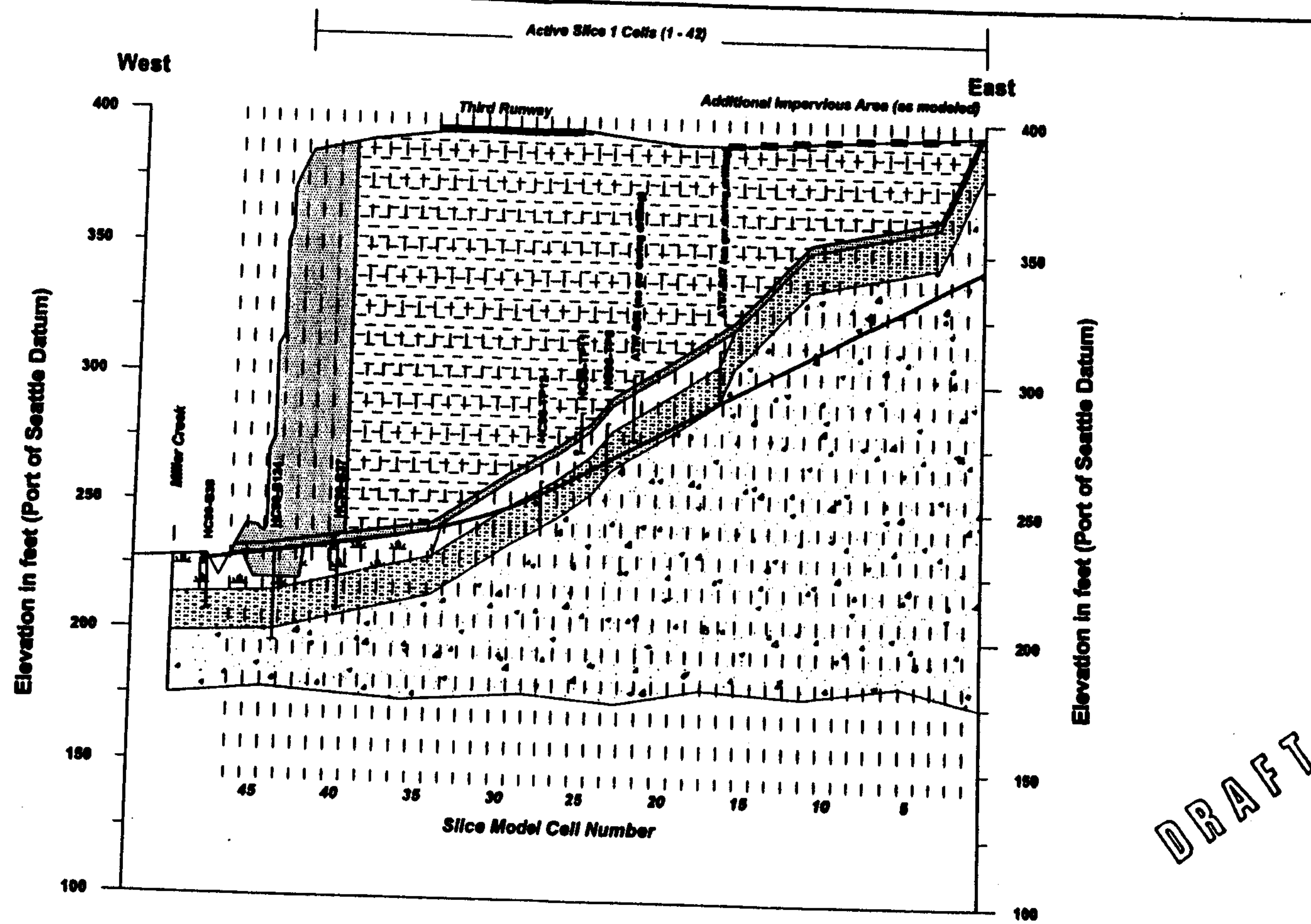
Definition of Soil as Modeled in Hydrus

Soils are defined in Hydrus using variables that relate hydraulic conductivity to moisture content and soil tension. For this modeling exercise, soils were defined the same way as they were for the modeling work done for the Ecology project (Sea-Tac Runway Fill Hydrologic Studies Report, PGG, 2000). Appendix C of PGG (2000) provides a detailed description of the fill soils and modeled soil parameters.

Draft Interim Hydrus Modeling Results

Separate one-dimensional Hydrus models were run for fill thicknesses of 10, 30, 50, 70, 90, 110, 130, and 150 feet in both the Miller and Walker Creek basins (as dictated by the thicknesses observed on the cross sections). In addition, a 20-foot model was developed for Walker Creek only. **Figure 6** shows daily effective recharge (input to the top boundary of all Hydrus models) and eight daily outflow graphs (flow out of the bottom boundary of the Hydrus model) for the Miller Creek basin over the "test period" of October 1, 1990 through September 30, 1994. Conservation of mass was confirmed for each model by comparing the total effective recharge and total outflow. Time series outflow from Hydrus runs of varying thicknesses will be used as input to the three Slice models.

Figure 6 shows that the seasonal recharge pulse introduced at the land surface (ER) is predicted to be lagged and dampened as a function of the thickness of the fill. Lagging causes the arrival of the recharge pulse to be delayed from its introduction at the land surface to its arrival at the bottom of the fill. Dampening causes a reduction in the overall range of recharge values (high minus low) due to uptake and subsequent release of recharge inflow into the soil's pore water. Lagging and dampening both increase with increasing thicknesses of fill. These effects on the timing of recharge will impact the arrival of flow to the top of the slice model, and ultimately the arrival of baseflow to the steams bordering the study area.



LEGEND

- Groundwater Elevation
- Groundwater Seepage Elevation
- Conceptual Water Table
- Fill
- Qvr - Vashon Recessional
- Qvt - Vashon Till
- Qva - Vashon Advance

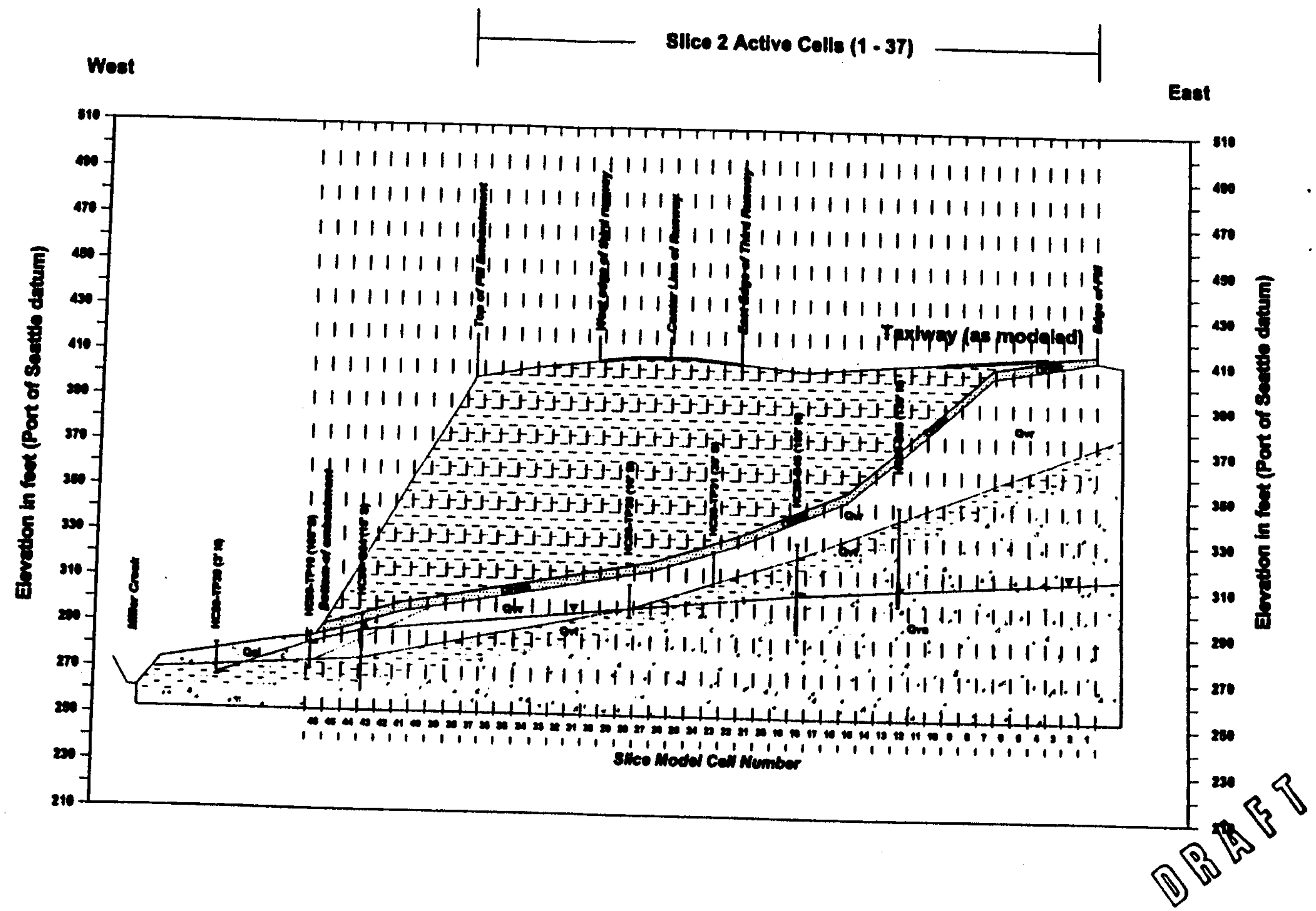
Horizontal Scale in Feet: 0, 100, 200
Vertical Scale in Feet: 0, 25, 50

FIGURE 3
Simplified Cross Section for Slice 1

SeaTac Third Runway
Embankment Fill Modeling

Pacific Groundwater Group

AR 051870



LEGEND

- Groundwater Elevation
- Groundwater Seepage Elevation
- Conceptual Water Table
- Fill
- Qvr - Vashon Recessional
- Qvt - Vashon Till
- Qva - Vashon Advance

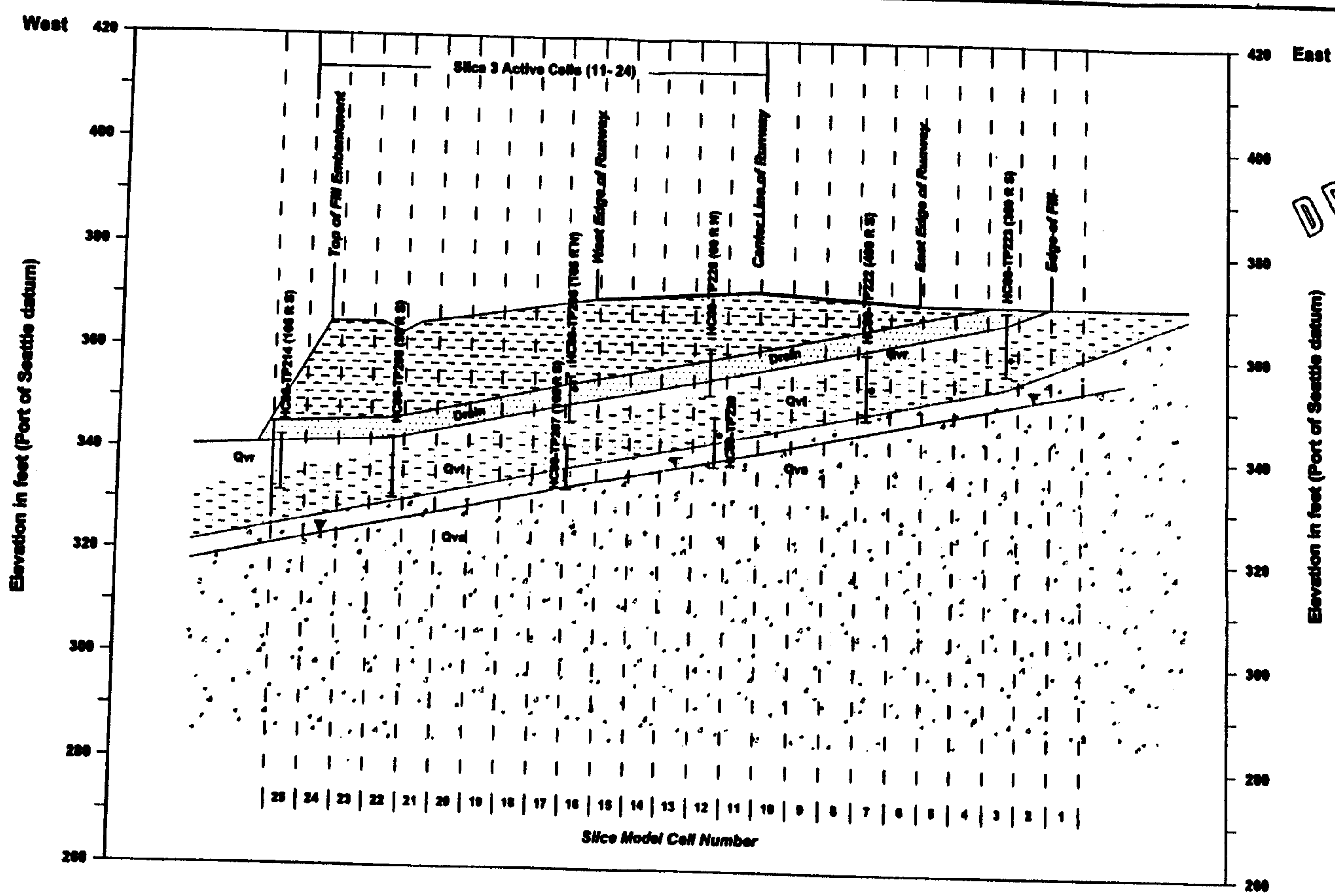
Horizontal Scale in Feet: 0, 100, 200

Vertical Scale in Feet: 0, 25, 50

FIGURE 4
Simplified Cross Section for Slice 2

SeaTac Third Runway
Embankment Fill Modeling

Pacific Groundwater Group



LEGEND

- Groundwater Elevation
- Groundwater Seepage Elevation
- Conceptual Water Table
- Fill
- Qvr - Vashon Recessional
- Qvt - Vashon Till
- Qva - Vashon Advance

Horizontal Scale in Feet: 0, 40, 80
Vertical Scale in Feet: 0, 10, 20

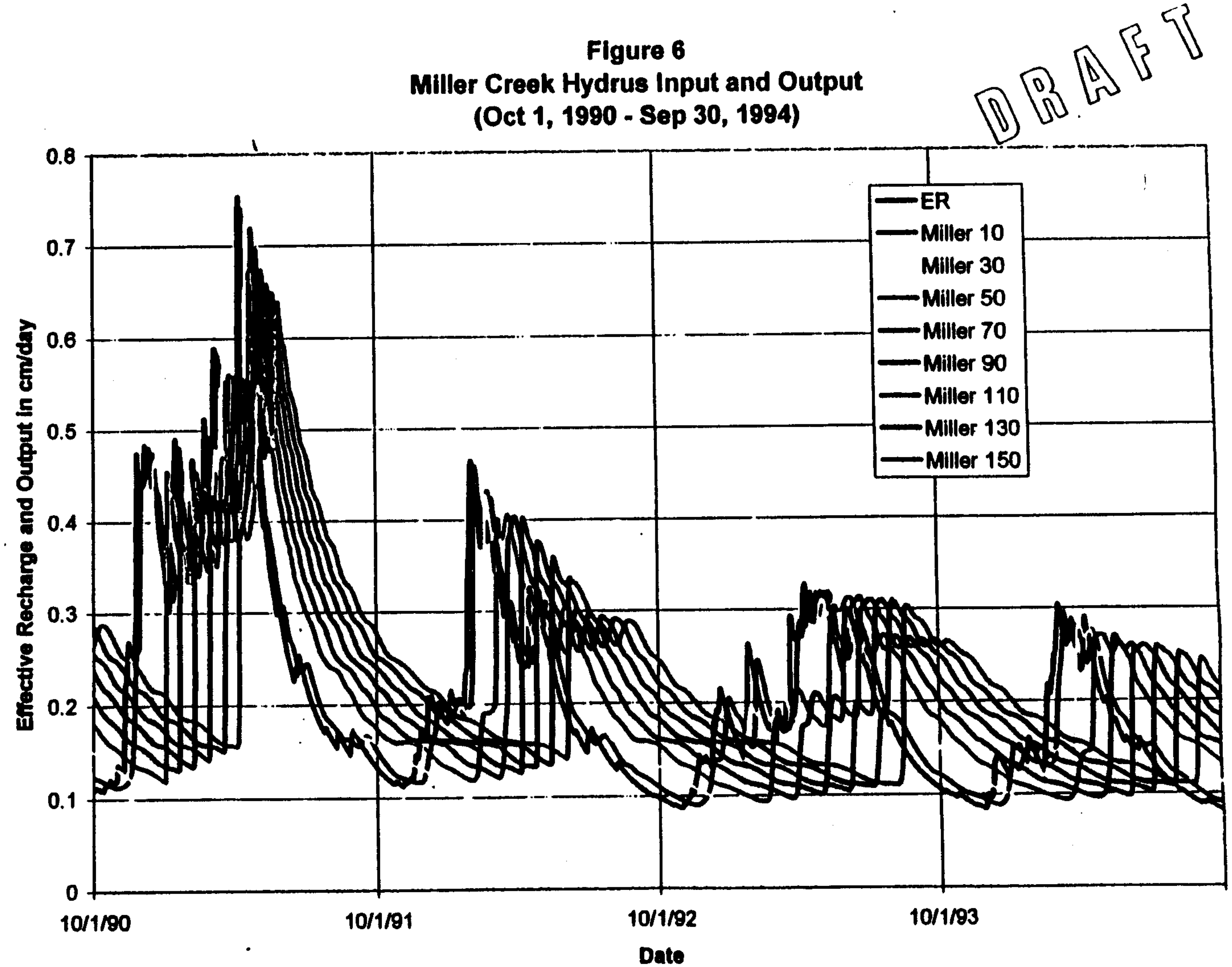
FIGURE 5
Simplified Cross Section for Slice 3

SeaTac Third Runway
Embankment Fill Modeling

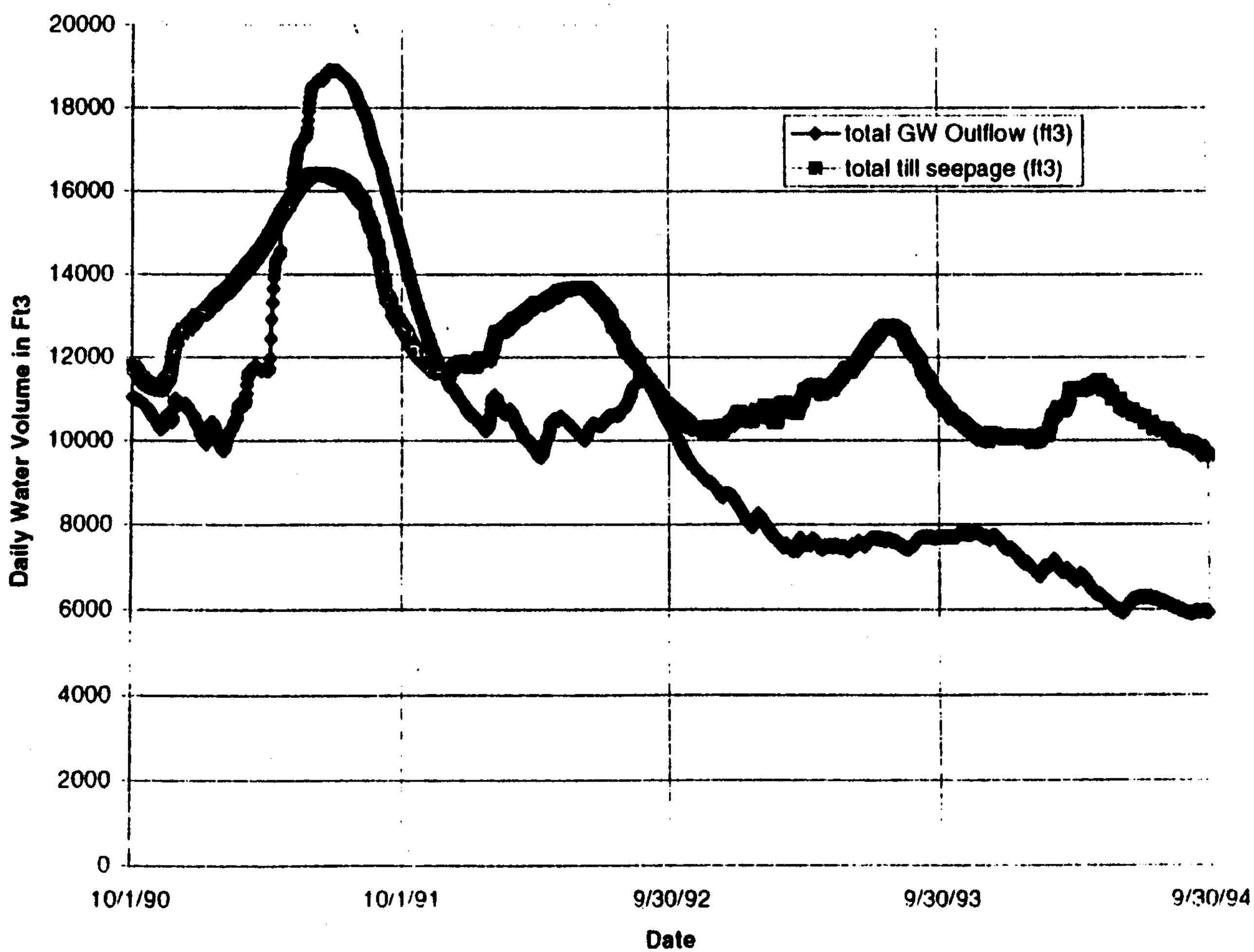
Pacific Groundwater Group

DRAFT

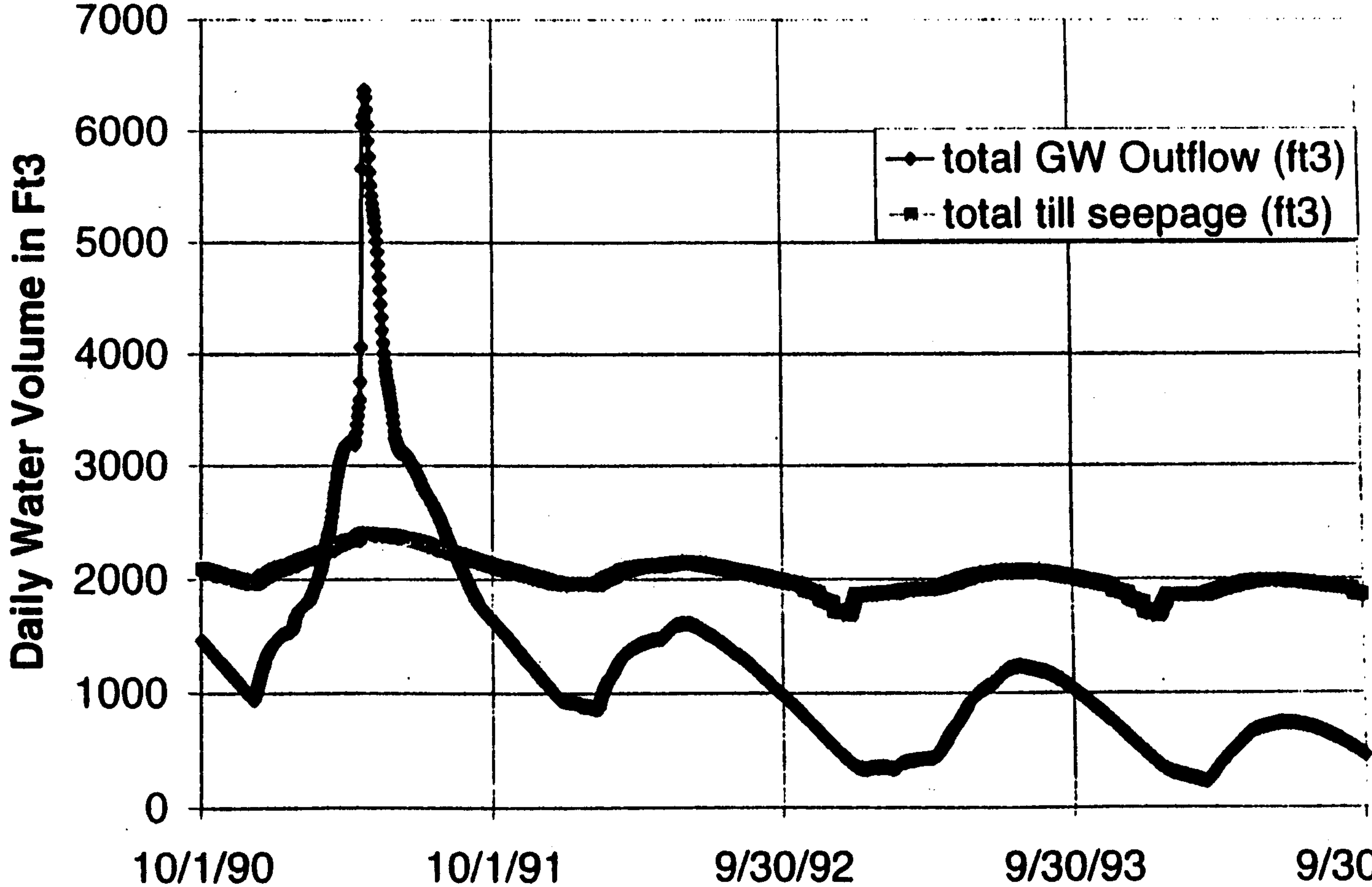
Figure 6
Miller Creek Hydrus Input and Output
(Oct 1, 1990 - Sep 30, 1994)



Integrated Flows for Miller Creek Embankment



Integrated Flows for Walker Creek Embankment



6/28/01

test period integrated results jun271.xlsWalker Creek Chart

Summary of non-hydrologic impacts.

Creek	Number of Septic Tanks	Flows (cfs) Septic Tank Estimated	Septic Tank Adjusted[a]	Withdrawals[b]	Total Impact
Miller	236	-0.082	-0.057	+0.042	-0.02
Walker	41	-0.014	-0.009	N/A	-0.01

[a] Septic tank flow adjusted by percentage of seepage to DEEPFR (flow x 0.7)

[b] Assumed average withdrawal rates form June 1 through September 30.

Water Recharge from Imported Water

Documentation

This spreadsheet was created for the purpose of developing time series representing water recharge from water imported into the buyout area via water distribution systems. Recharge takes two potential forms: 1. recharge from septic systems; 2. recharge from infiltration of irrigation water. These time series is intended to represent conditions prior to the acquisition and removal of homes in the buyout area.

The time series on this worksheet (Recharge from Septic) represents water recharge from septic systems in the buyout area. The recharge to each watershed from septic systems was based on estimated water consumption. Recharge from septic systems is based on winter water use. Additional water use during summer months (above and beyond winter water use) is provided in a separate time series.

The estimated annual water recharge from septic systems in the buyout area to each of the three watersheds is provided below in Columns A - D. The time series is constructed with an hourly time step. However, the recharge rates reflect estimated daily recharge.

The estimated annual water recharge from infiltration of imported irrigation water in the buyout area to each of the three watersheds is provided on the "Infiltration" worksheet in Columns A - D. The time series is constructed with an hourly time step. However, the recharge rates reflect estimated daily recharge. It should be noted that this time series contains the quantity of imported water available for infiltration. It is recommended that losses due to evaporation be applied to the time series before it is added as recharge flow.

Estimated Recharge Quantity

Number of Active Septic Tanks	236	41	0	A total of 291 homes were served by septic in Walker and Miller Creek Basins prior to the buy-out. Some of these homes (14) were also served by sewer, and the septic systems were inactive. Based on an inventory of septic tanks removed, there were 41 active tanks in the Walker Creek basin buy-out area and 236 in the Miller Creek basin buy-out area. (277 total active tanks, 14 inactive tanks)
Summer Water Use (gallons per home per day)	349	349	349	Summer water use was not used to estimate recharge from septic systems. It was used to estimate the quantity of imported water potentially available for infiltration, with the assumption that the additional water use is for irrigation. Typical values for summer water use were provided by Water District #20 and Water District #125.
Summer Recharge via Infiltration (gallons per day)	23,539	4,089	-	Summer water use exceeding winter water use may be available for infiltration. The time series constructed on the "Infiltration" worksheet is based on this daily flow.
Winter Water Use (gallons per home per day)	249	249	249	Winter water use was used to estimate recharge from septic systems. Typical values for winter water use were provided by Water District #20 and Water District #125.
Recharge from Septic Systems (gallons per day)	52,962	9,201	-	Estimated recharge to each watershed expressed in gallons per day.

Documentation

This spreadsheet was created for the purpose of developing a time series representing water withdrawl from Miller Creek due to pumping. This time series is intended to represent conditions prior to the acquisition and removal of homes in the buyout area.

The worksheet "Annual Time Series" contains the estimated annual water withdrawl from Miller Creek. The total water withdrawl is shaded in yellow in Column B. It is the sum at each hour of the estimated water withdrawl from each parcel contained in Columns C - Y

The time series was constructed using the values and notes presented in Table G-2 that was provided on 6/11/01. A reproduction of the values included in Table G-2 is provided below.

Key notes from Table G-2 used to construct the time series are listed below:

The quantity of water withdrawn was estimated as follows:

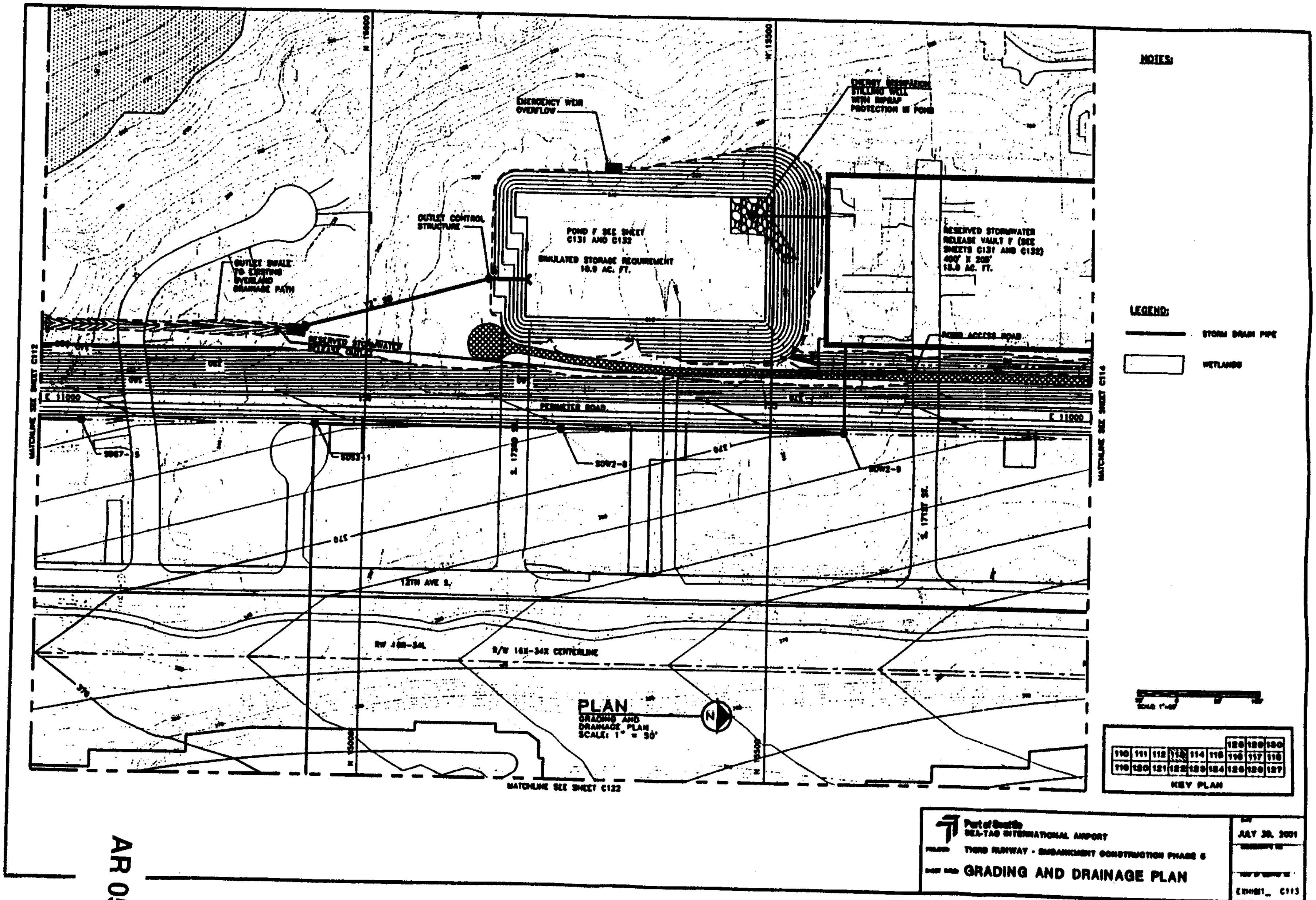
Available Pumping Rate x Estimated Months of Water Use Per Year x 0.5 (daily pumping duration)

The time series was constructed using the available pumping rate for 12 hours per day (6 am to 6 pm each day).

Estimated months of water use per year was assumed as follows:

6 Months = April 1 - Sep 30
4 Months = June 1 - Sep 30

RESERVE STORMWATER
RELEASE STORAGE DRAWINGS



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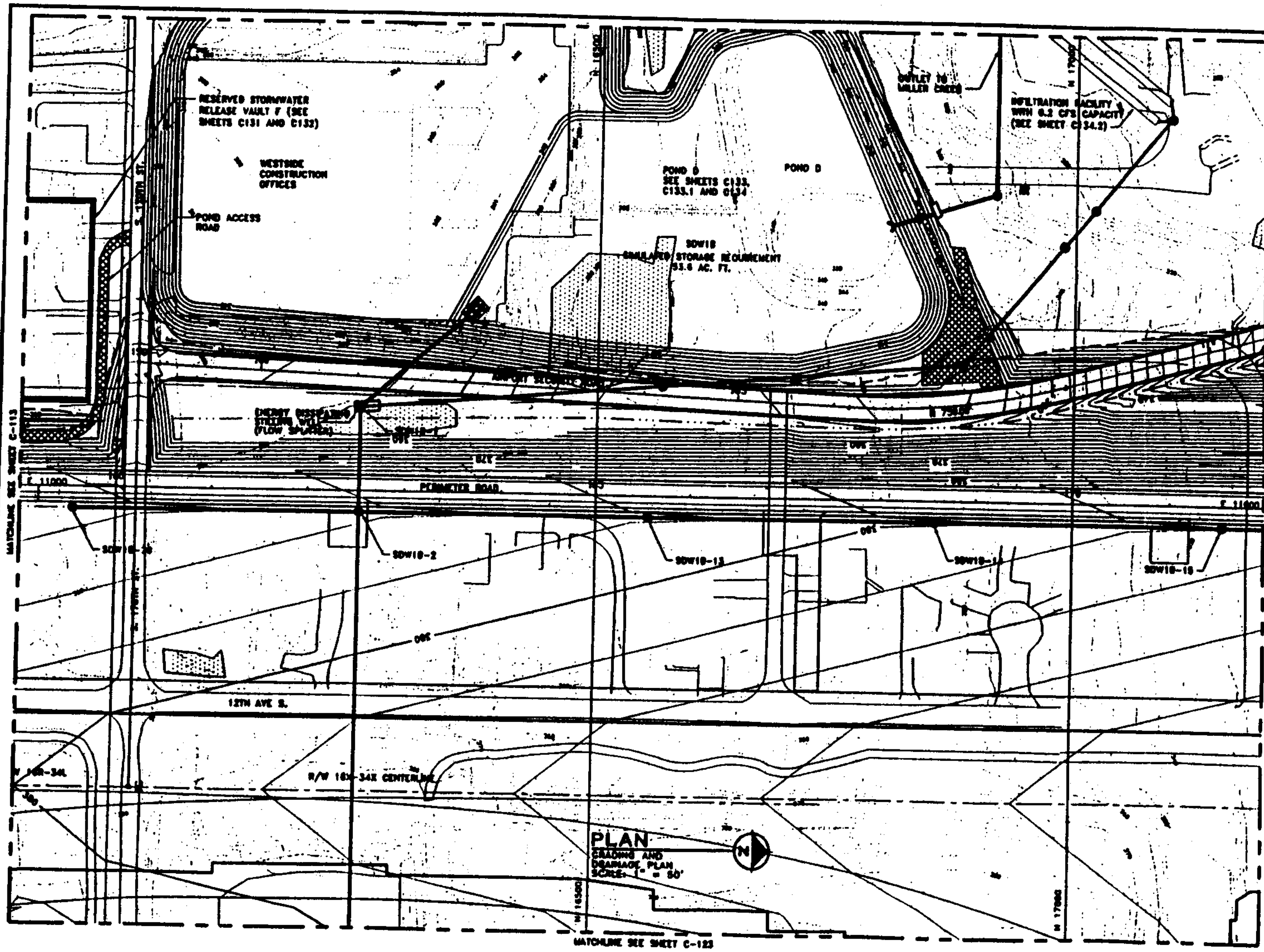

NOTES:

LEGEND:

- STORM DRAIN PIPE
- WETLANDS

						128	129	130
110	111	112	113	114	115	116	117	118
119	120	121	122	123	124	125	126	127

KEY PLAN

Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT

THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 5

GRADING AND DRAINAGE PLAN

JULY 30, 2001

EXHIBIT_ C114

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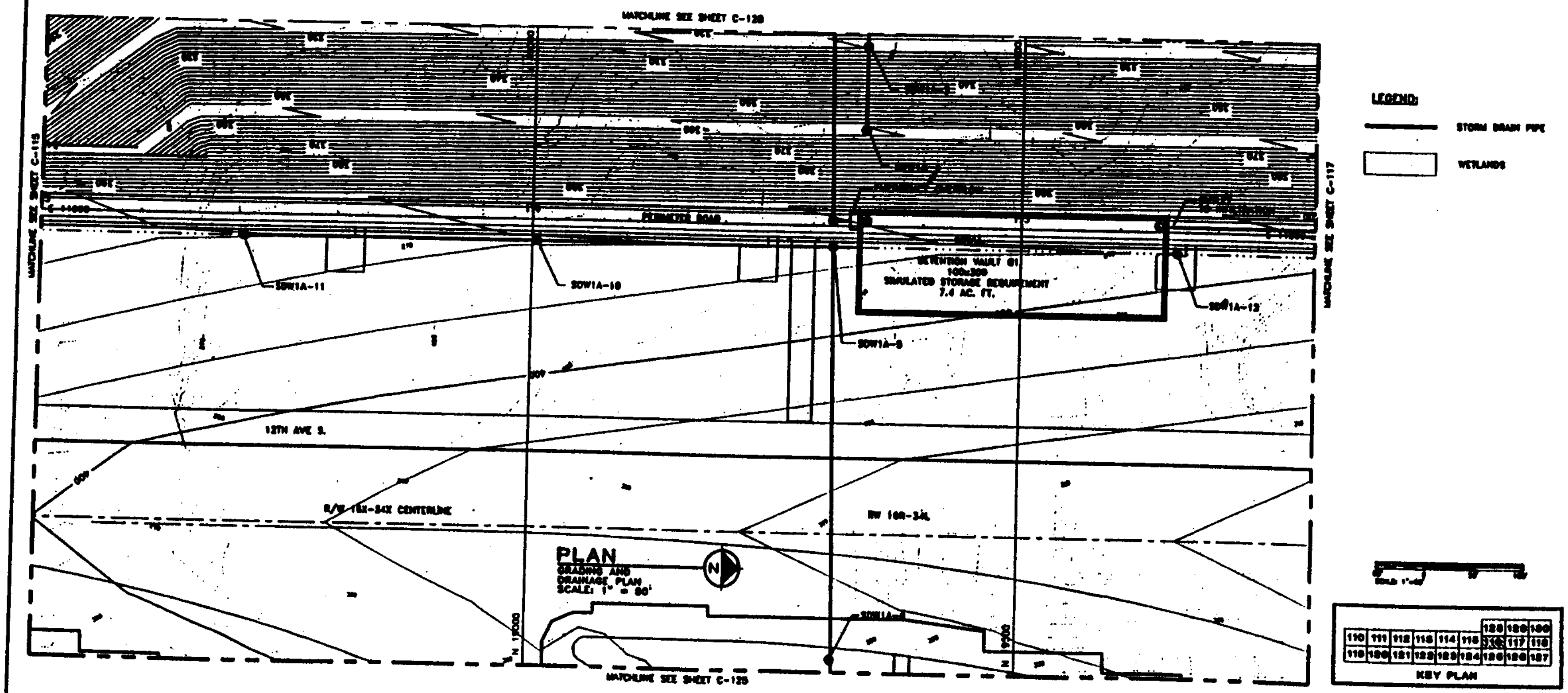
AR 051882

NOTES:



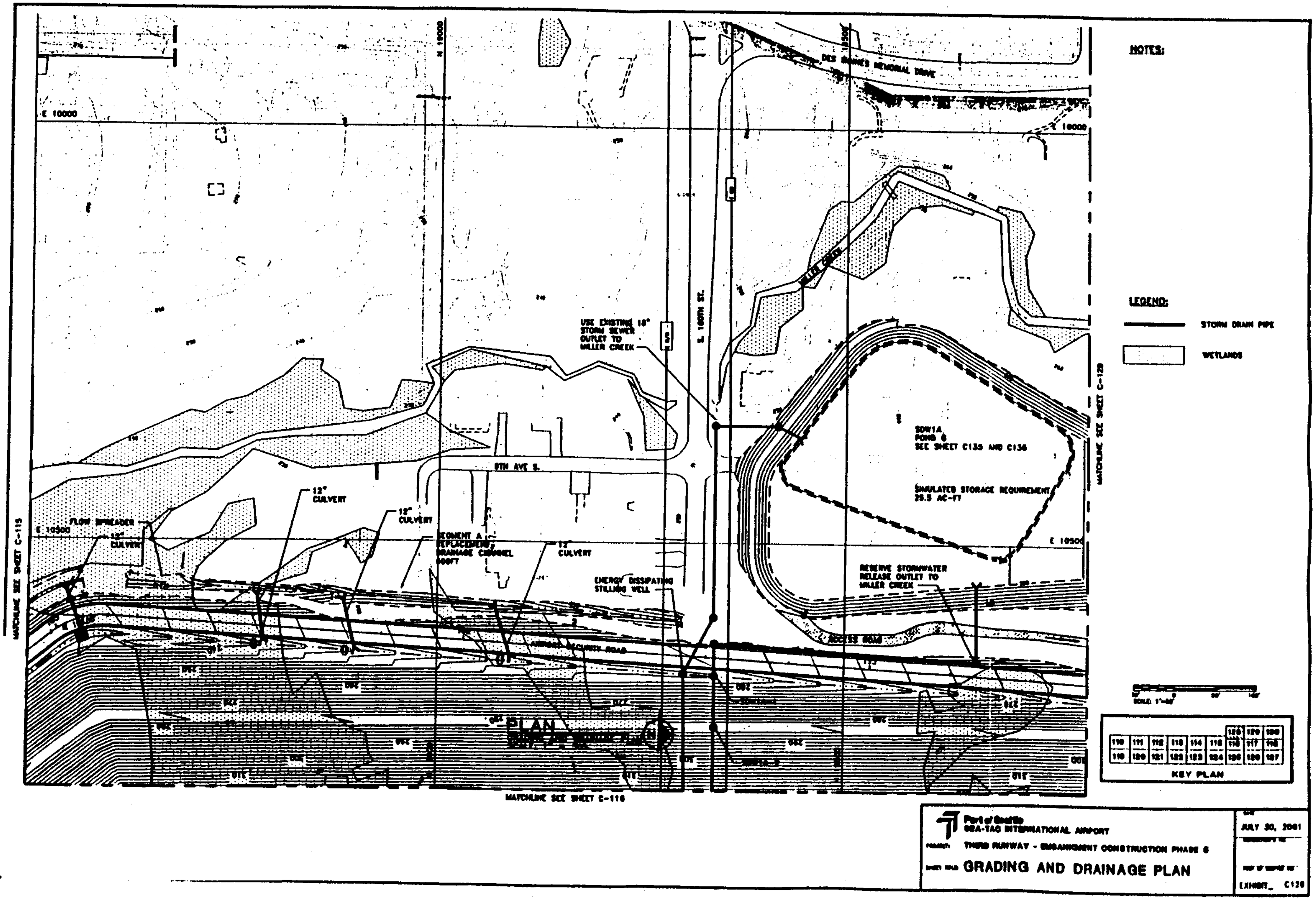
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT

THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 5

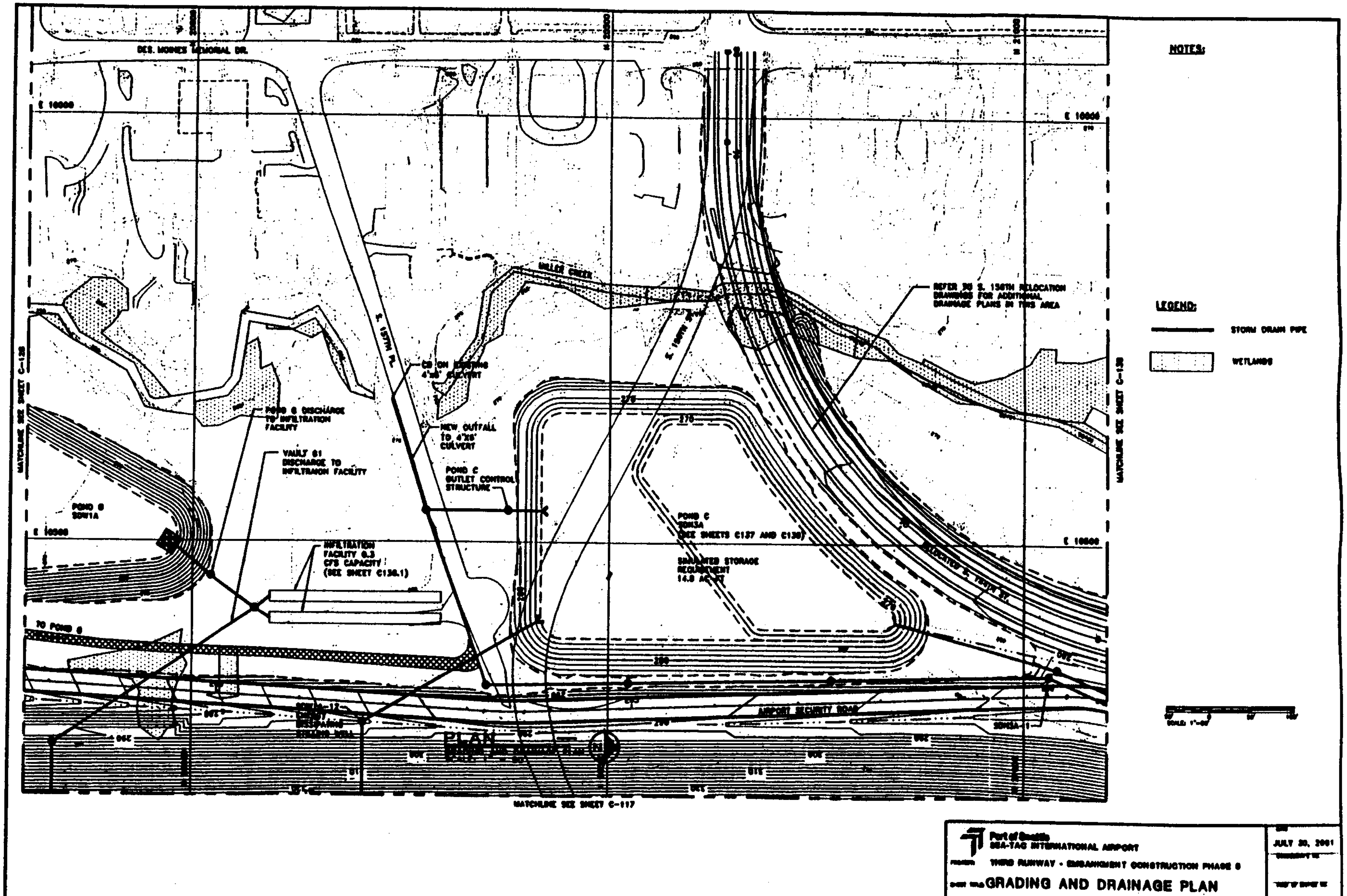
GRADING AND DRAINAGE PLAN

JULY 30, 2001

EXHIBIT_ C116

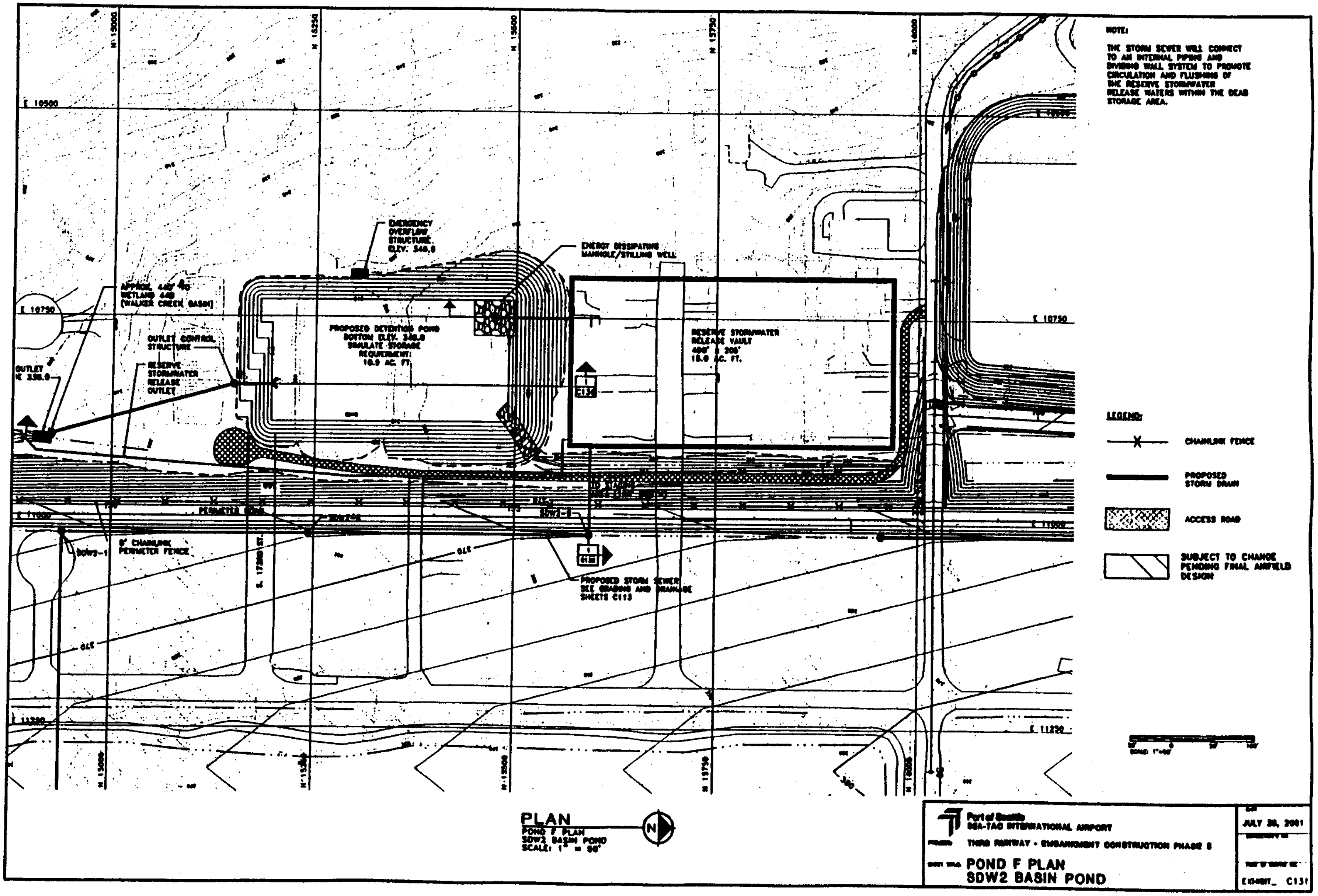

NOTES:
LEGEND:
STORM DRAIN PIPE
WETLANDS
DES MOINES MEMORIAL DRIVE
S. 160TH ST.
8TH AVE S.
MILLER CREEK
USE EXISTING 18" STORM SEWER OUTLET TO MILLER CREEK
SDW1A
POND 6
SEE SHEET C135 AND C136
SIMULATED STORAGE REQUIREMENT
28.5 AC-FT
RESERVE STORMWATER RELEASE OUTLET TO MILLER CREEK
ACCESS ROAD
SECURITY ROAD
ENERGY DISSIPATING STILLING WELL
12" CULVERT
12" CULVERT
12" CULVERT
12" CULVERT
SEGMENT A REPLACEMENT DRAINAGE CHANNEL
FLOW SPREADER
E 10000
E 10500
N 19000
PLAN
MATCHLINE SEE SHEET C-115
MATCHLINE SEE SHEET C-116
MATCHLINE SEE SHEET C-129
KEY PLAN
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 6
GRADING AND DRAINAGE PLAN
JULY 30, 2001
EXHIBIT C120

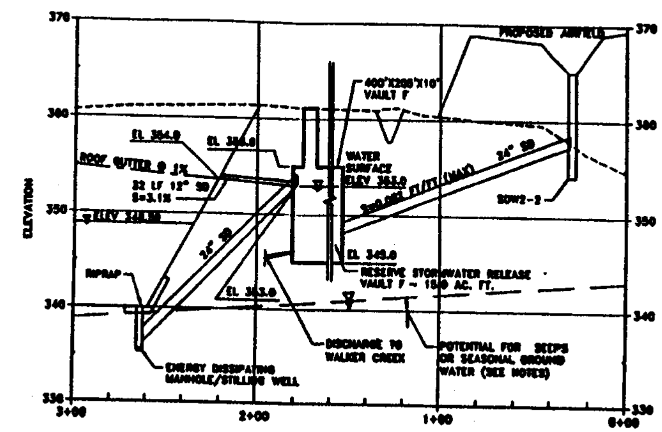
AR 051884



N:\20764\ds0u1005\permit\BV_C129.dwg, 07/27/01 01:50:57 PM, Cwetrushile

AR 051885


NOTE:
THE STORM SEWER WILL CONNECT TO AN INTERNAL PIPING AND DIVIDING WALL SYSTEM TO PROMOTE CIRCULATION AND FLUSHING OF THE RESERVE STORMWATER RELEASE WATERS WITHIN THE DEAD STORAGE AREA.
EMERGENCY OVERFLOW STRUCTURE. ELEV. 340.0
ENERGY DISSIPATING MANHOLE/STILLING WELL
APPROX. 440' 40 WETLAND 44B (WALKER CREEK BASIN)
OUTLET CONTROL STRUCTURE
RESERVE STORMWATER RELEASE OUTLET
OUTLET IE 338.0
PROPOSED DETENTION POND BOTTOM ELEV. 340.0 SIMULATE STORAGE REQUIREMENT: 10.9 AC. FT.
RESERVE STORMWATER RELEASE VAULT 400' x 200' 10.0 AC. FT.
PERIMETER ROAD
8' CHAINLINK PERIMETER FENCE
S. 172ND ST.
SDW2-1
SDW2-5
PROPOSED STORM SEWER SEE GRADING AND DRAINAGE SHEETS C113
LEGEND:
CHAINLINK FENCE
PROPOSED STORM DRAIN
ACCESS ROAD
SUBJECT TO CHANGE PENDING FINAL AIRFIELD DESIGN
PLAN
POND F PLAN
SDW2 BASIN POND
SCALE: 1" = 50'
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 5
POND F PLAN
SDW2 BASIN POND
JULY 30, 2001
EXHIBIT_ C131



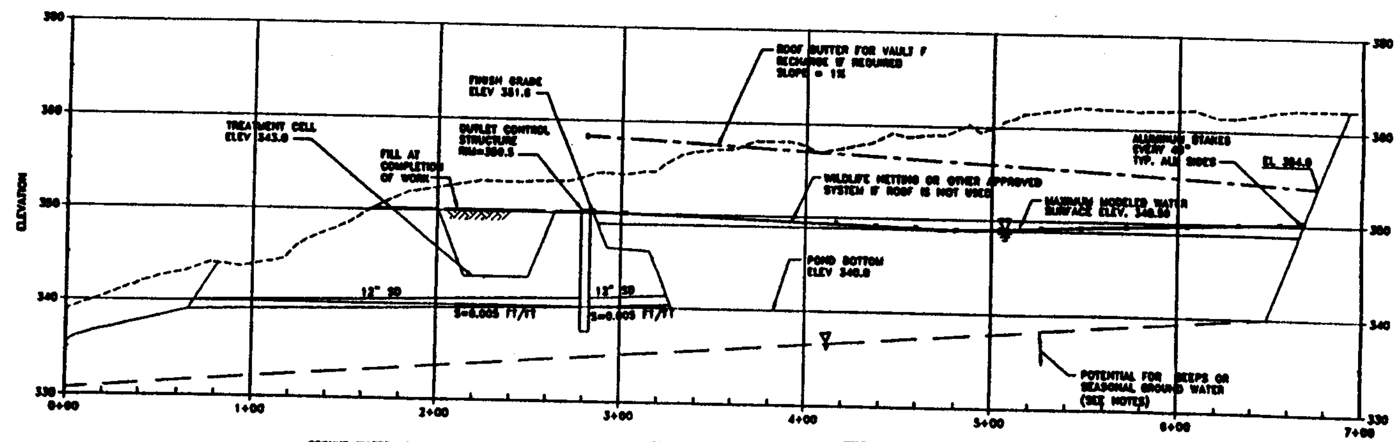
PROFILE
STORM DRAIN AND RESERVE STORMWATER RELEASE VAULT PROFILE
SCALE: HORZ 1" = 30'
VERT 1" = 6'

2 / C131

NOTES:

1. GROUND WATER ELEVATIONS ARE APPROXIMATE BASED ON AVAILABLE GEOTECHNICAL INVESTIGATIONS AND HYDROGEOLOGIC ELEVATION WILL BE INCLUDED AS PART OF THE FINAL DESIGN ANALYSIS.

2. FINAL POND CONFIGURATION MAY VARY TO MAINTAIN STORM WATER STORAGE ABOVE THE OBSERVED GROUND WATER.



GROUND WATER AT ELEV. 300±

PROFILE
POND F PROFILE
SDW-2 BASIN POND
SCALE: HORZ 1" = 30'
VERT 1" = 6'

1 / C131

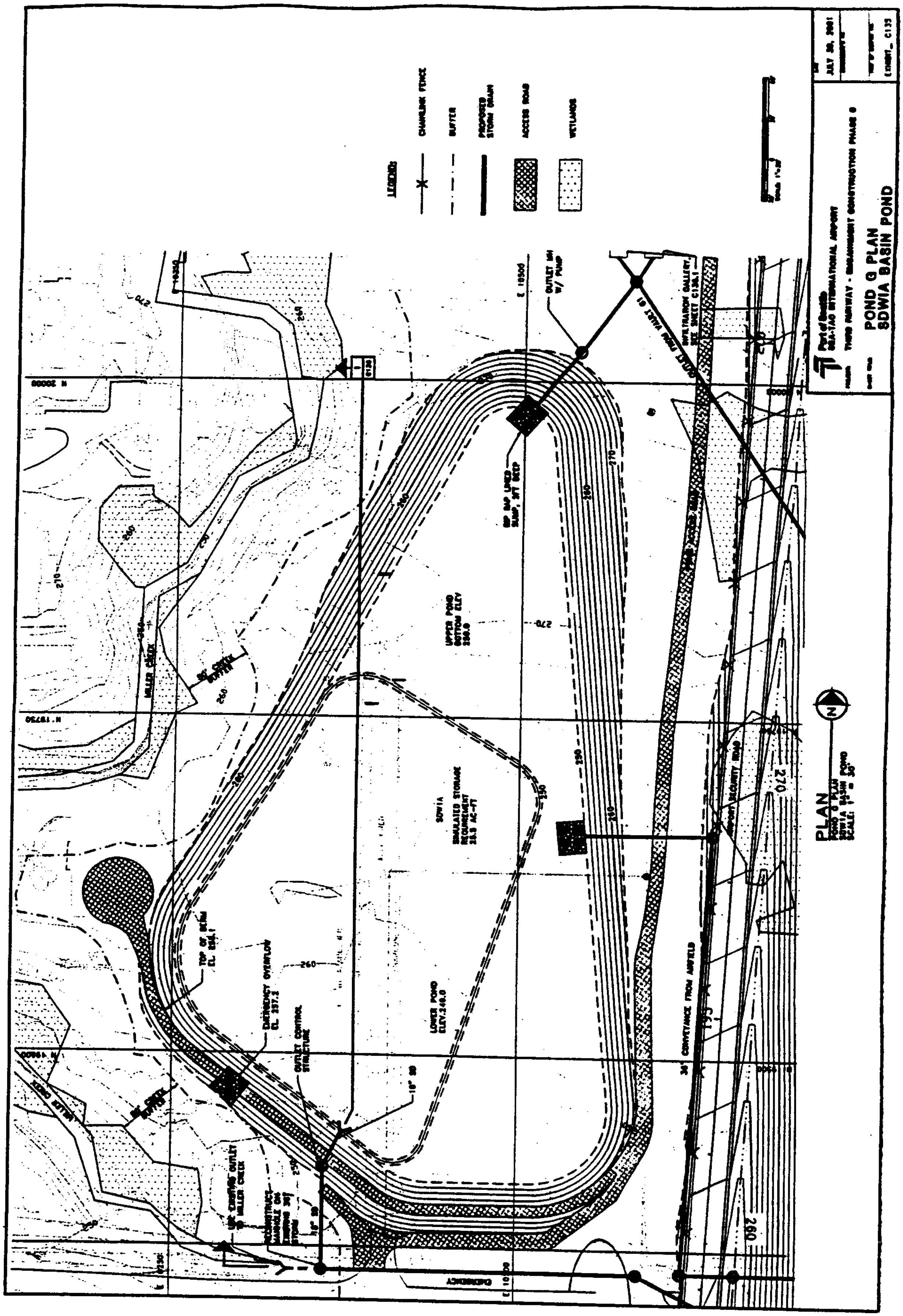
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 8

POND F PROFILE
SDW2 BASIN POND

JULY 30, 2001

EXHIBIT_C132

AR 051887



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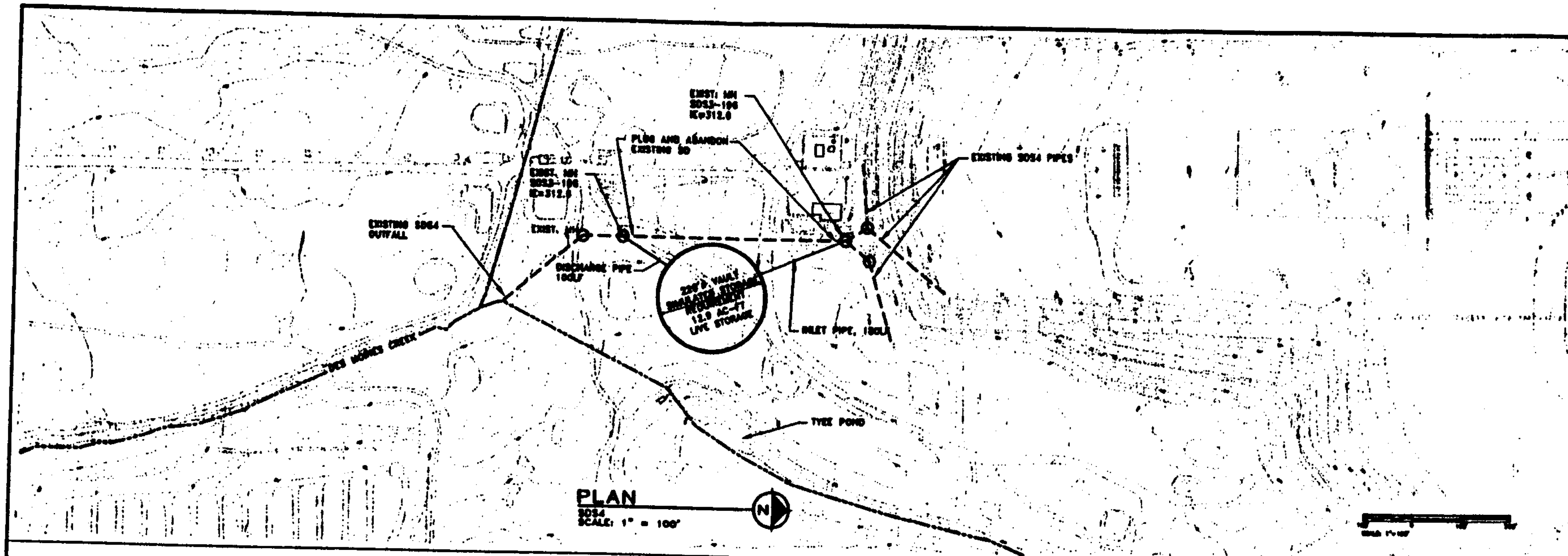
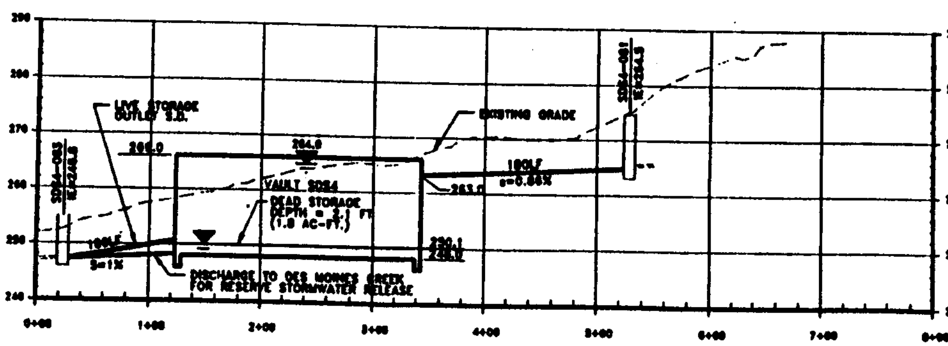


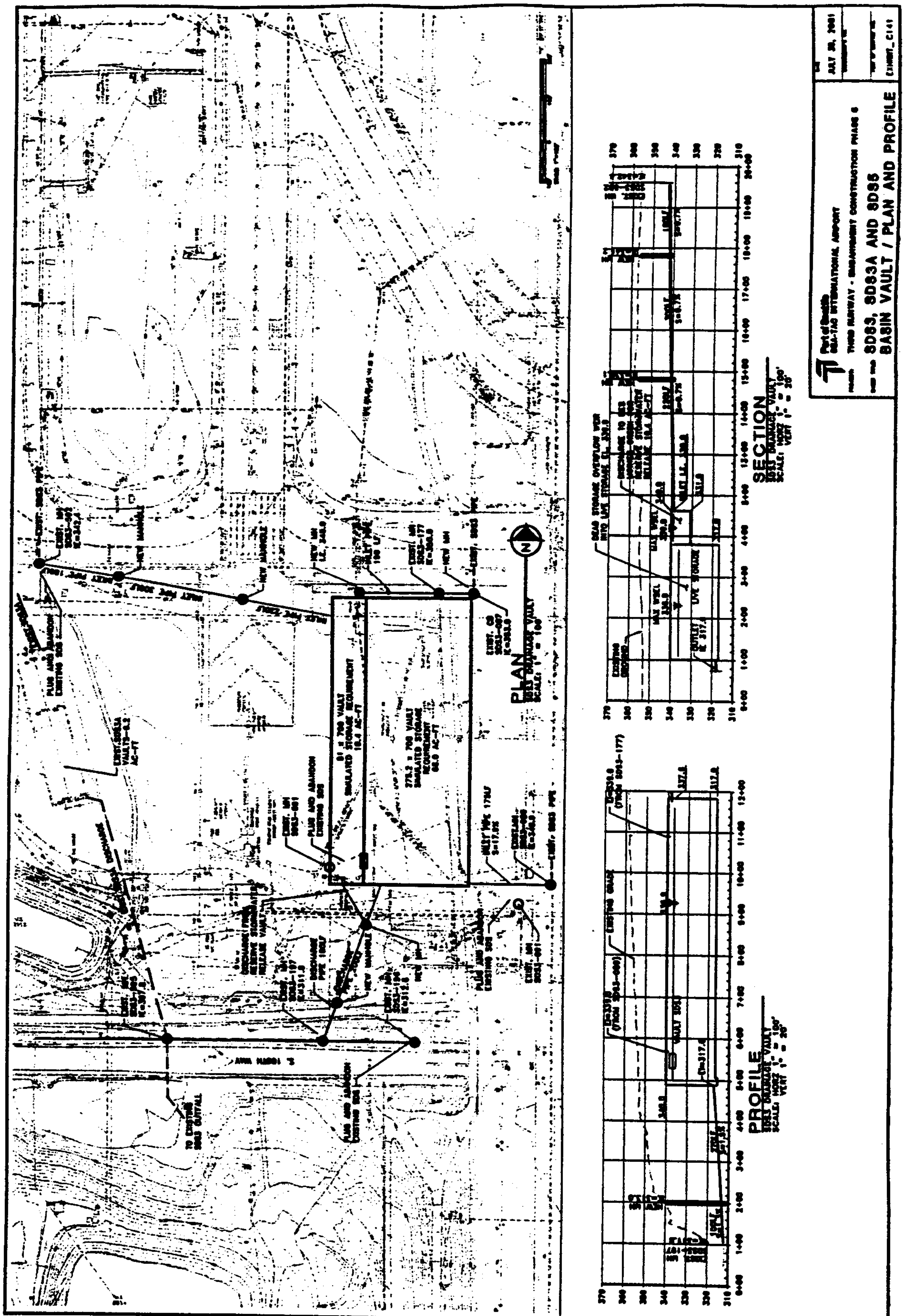
PLAN
SDS4
SCALE: 1" = 100'

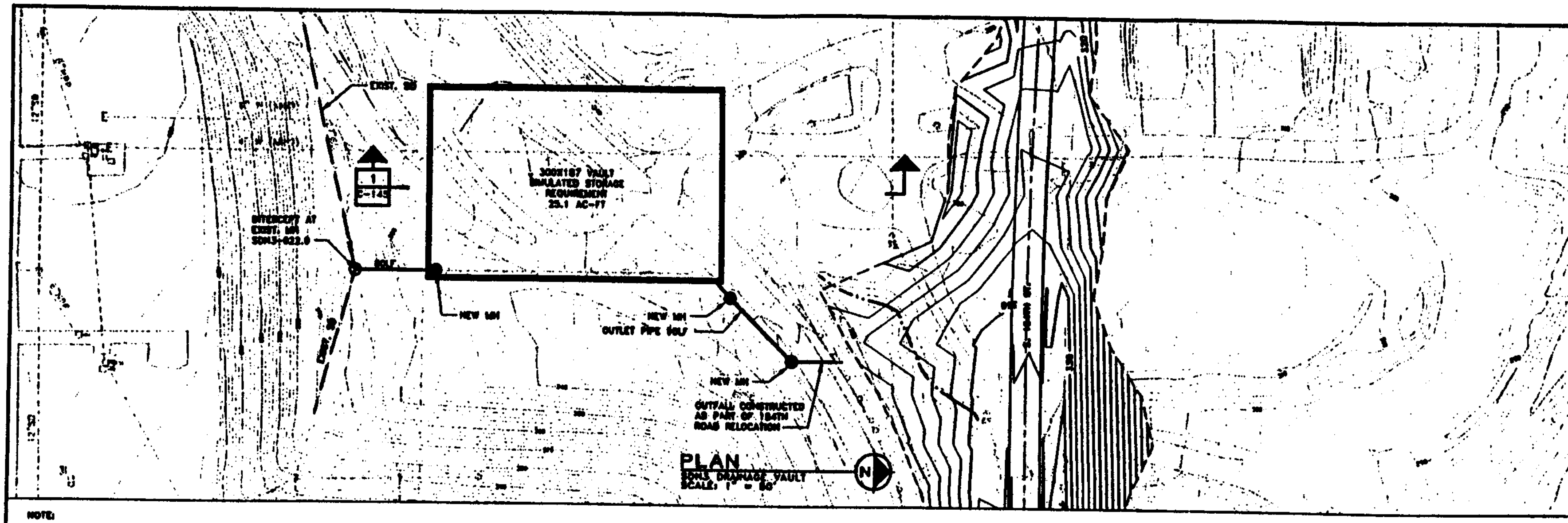


PROFILE
SDS4
SCALE: 1" = 50'

July 2001
556-2912-001 (28)

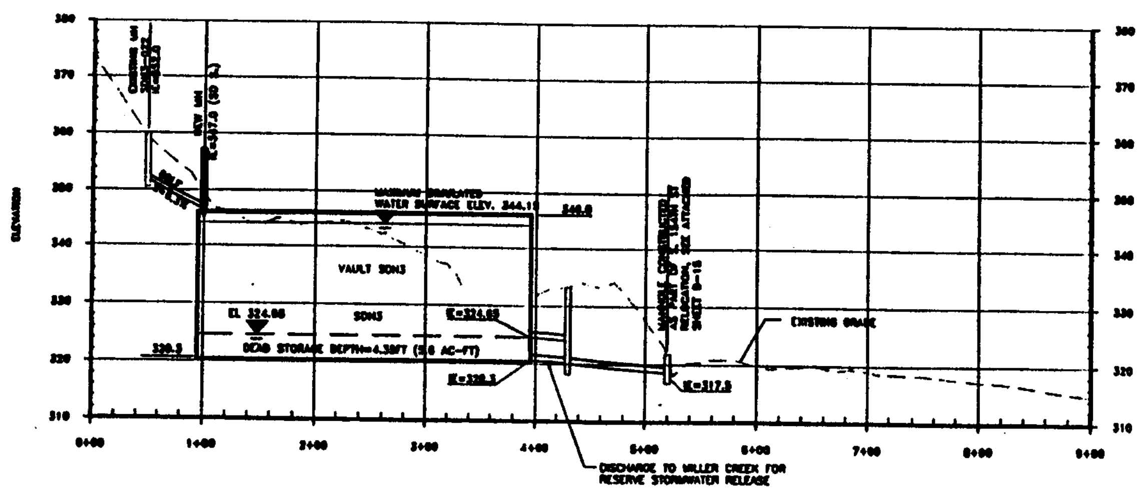
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 8
SDS4 BASIN VAULT
PLAN AND PROFILE
APRIL 18, 2001
EXHIBIT_ C130


SDS3, SDS3A AND SDS5
BASIN VAULT / PLAN AND PROFILE
PLAN
SECTION
PROFILE



PLAN
SDN3 DRAINAGE VAULT
SCALE: 1" = 50'

NOTE:
THE STORM SEWER WILL CONNECT TO AN INTERNAL PIPING AND DIVIDING WALL SYSTEM TO PROMOTE CIRCULATION AND FLUSHING OF THE RESERVE STORMWATER RELEASE WATERS WITHIN THE DEAD STORAGE AREA.



SECTION A
SDN3 DRAINAGE VAULT
SCALE: HORZ 1" = 50'
VERT 1" = 10'

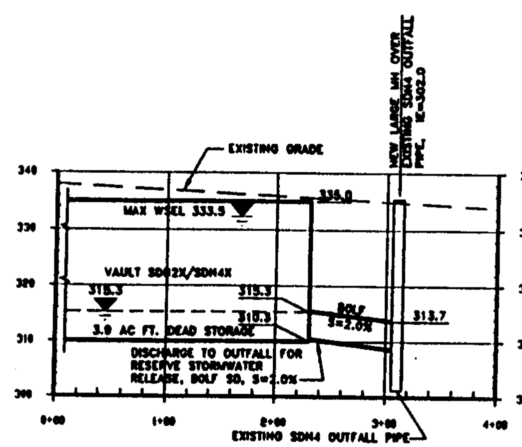
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT

THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 6

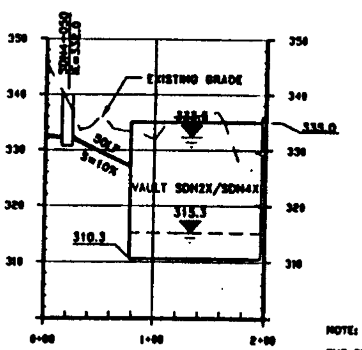
SDN3 BASIN VAULT
PLAN AND PROFILE

JULY 30, 2001

EXHIBIT_ C143

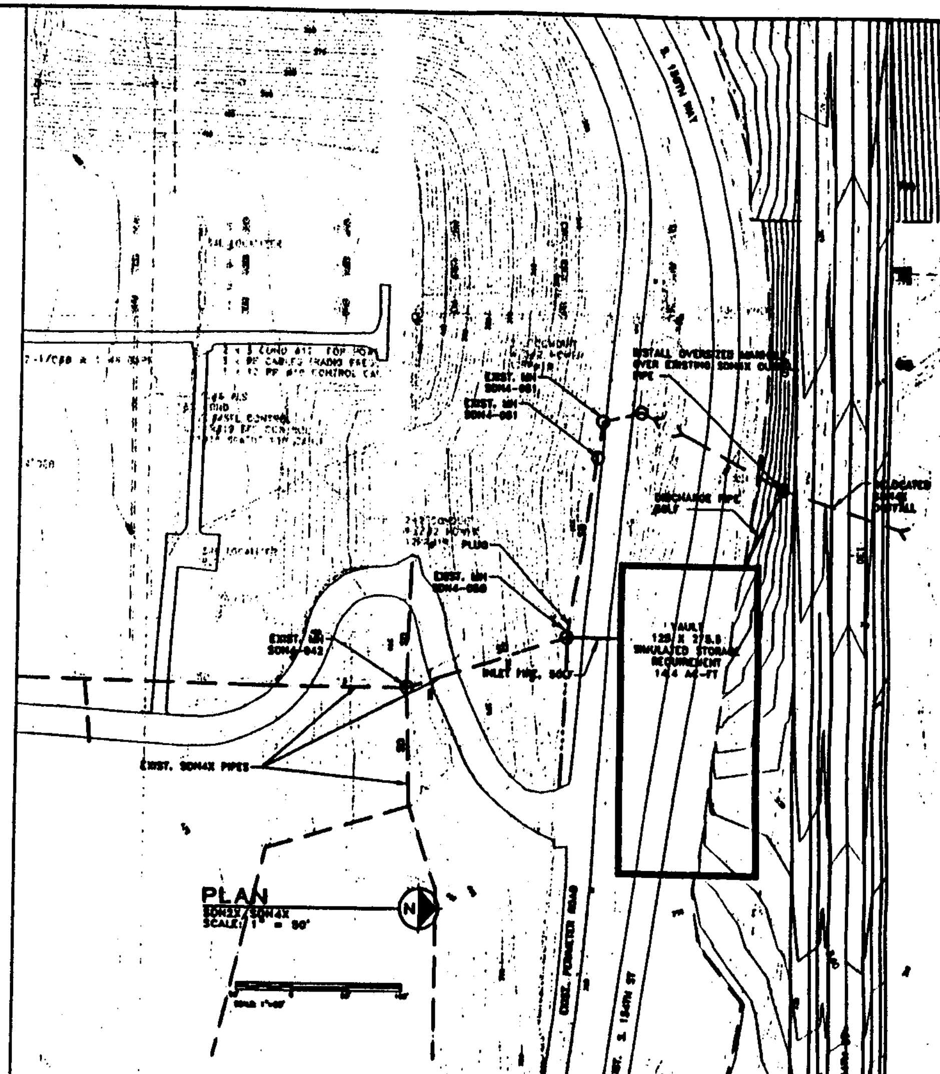


PROFILE
SDN2X/SDN4X
SCALE: HORZ 1" = 50'
VERT 1" = 10'



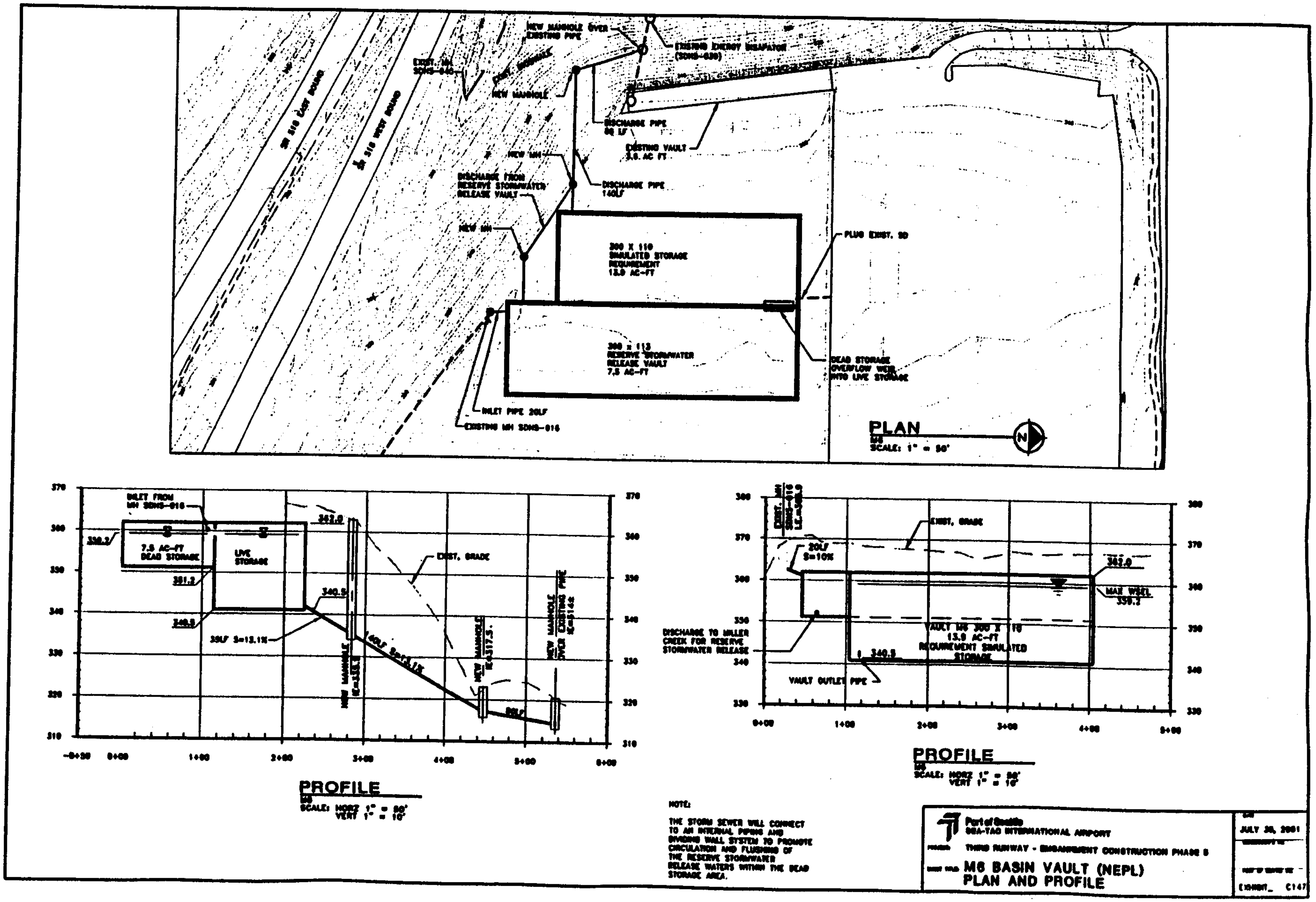
PROFILE
SDN2X/SDN4X
SCALE: HORZ 1" = 50'
VERT 1" = 10'

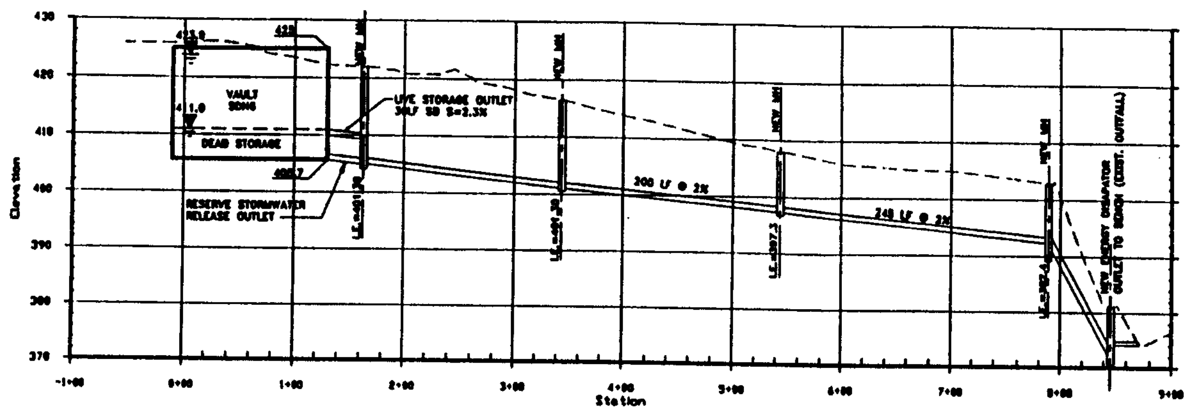
NOTE:
THE STORM SEWER WILL CONNECT TO AN INTERNAL PIPING AND DIVIDING WALL SYSTEM TO PROMOTE CIRCULATION AND FLUSHING OF THE RESERVE STORMWATER RELEASE WATERS WITHIN THE DEAD STORAGE AREA.



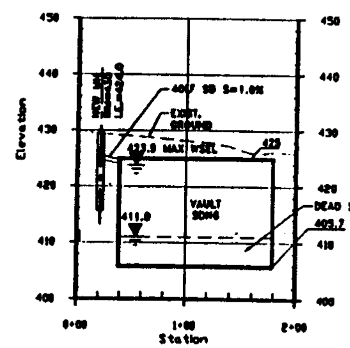
PLAN
SDN2X/SDN4X
SCALE: 1" = 50'

Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 6
SDN2X/SDN4X BASIN VAULT PLAN AND PROFILE
JULY 30, 2001
EXHIBIT C14


NEW MANHOLE OVER EXISTING PIPE
EXISTING ENERGY DISSIPATOR (SDNS-030)
EXIST. MH SDNS-040
NEW MANHOLE
DISCHARGE PIPE 80 LF
EXISTING VAULT 3.6 AC FT
NEW MH
DISCHARGE PIPE 140LF
DISCHARGE FROM RESERVE STORMWATER RELEASE VAULT
NEW MH
SR 518 EAST BOUND
SR 518 WEST BOUND
300 X 110 SIMULATED STORAGE REQUIREMENT 13.9 AC-FT
300 x 113 RESERVE STORMWATER RELEASE VAULT 7.5 AC-FT
PLUG EXIST. SD
DEAD STORAGE OVERFLOW WEIR INTO LIVE STORAGE
INLET PIPE 20LF
EXISTING MH SDNS-016
PLAN
SCALE: 1" = 50'
INLET FROM MH SDNS-016
7.5 AC-FT DEAD STORAGE
LIVE STORAGE
362.0
EXIST. GRADE
351.2
340.9
340.8
39LF S=13.1%
NEW MANHOLE
NEW MANHOLE IE=317.5
NEW MANHOLE OVER EXISTING PIPE
PROFILE
SCALE: HORZ 1" = 50' VERT 1" = 10'
EXIST. MH SDNS-016
20LF S=10%
EXIST. GRADE
362.0
MAX WSEL
DISCHARGE TO MILLER CREEK FOR RESERVE STORMWATER RELEASE
VAULT M6 300 X 110 13.9 AC-FT REQUIREMENT SIMULATED STORAGE
340.8
VAULT OUTLET PIPE
PROFILE
SCALE: HORZ 1" = 50' VERT 1" = 10'
NOTE:
THE STORM SEWER WILL CONNECT TO AN INTERNAL PIPING AND DIVIDING WALL SYSTEM TO PROMOTE CIRCULATION AND FLUSHING OF THE RESERVE STORMWATER RELEASE WATERS WITHIN THE DEAD STORAGE AREA.
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 5
M6 BASIN VAULT (NEPL)
PLAN AND PROFILE
JULY 30, 2001
EXHIBIT_ C147



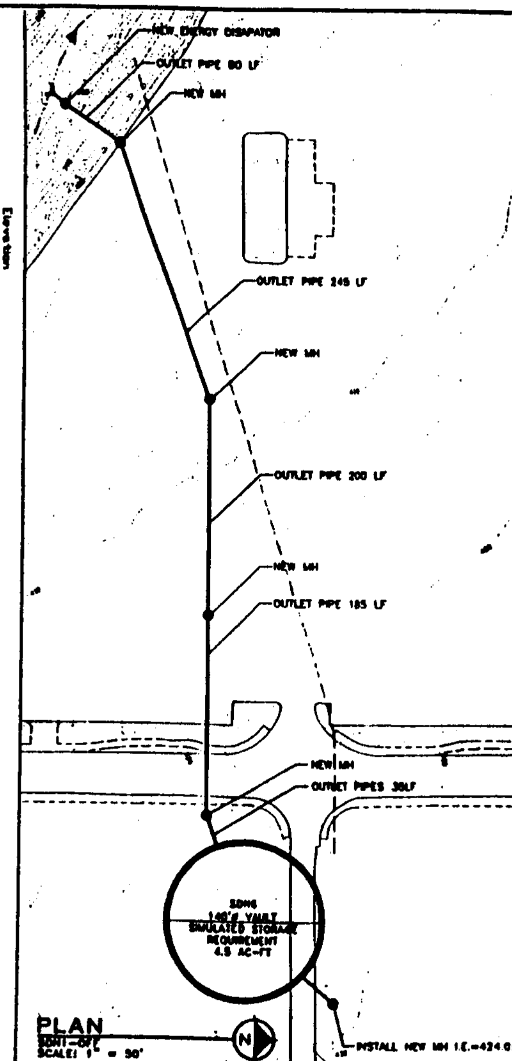
PROFILE
SDN6
SCALE: HORZ 1" = 50'
VERT 1" = 10'



PROFILE
SDN6
SCALE: HORZ 1" = 50'
VERT 1" = 10'

NOTE:

THE STORM SEWER WILL CONNECT TO AN INTERNAL PIPING AND DIVIDING WALL SYSTEM TO PROMOTE CIRCULATION AND FLUSHING OF THE RESERVE STORMWATER RELEASE WATERS WITHIN THE DEAD STORAGE AREA.



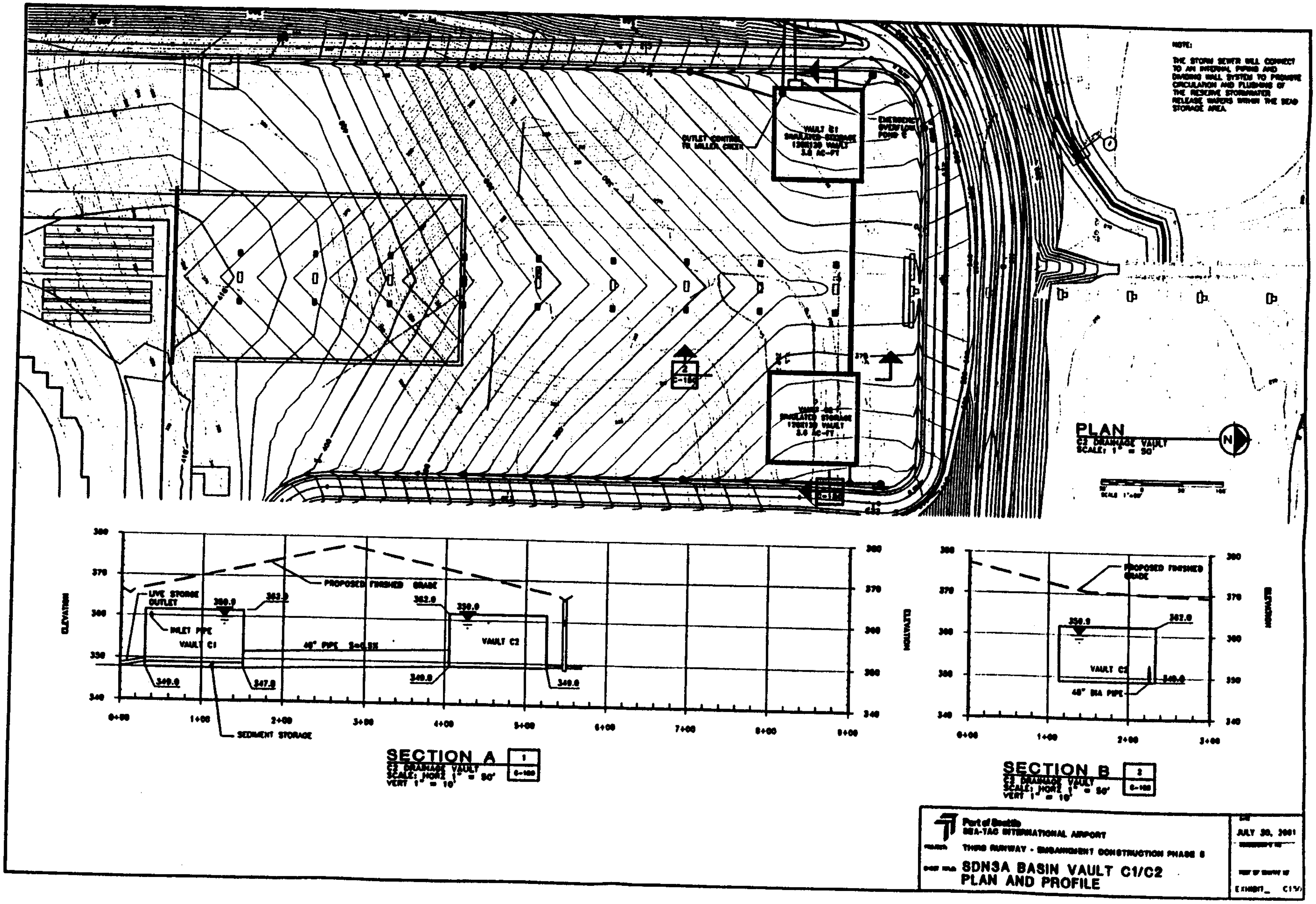
PLAN
SDN1-SDN7
SCALE: 1" = 50'

Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 6
SDN6 (CARGO) BASIN VAULT
PLAN AND PROFILE

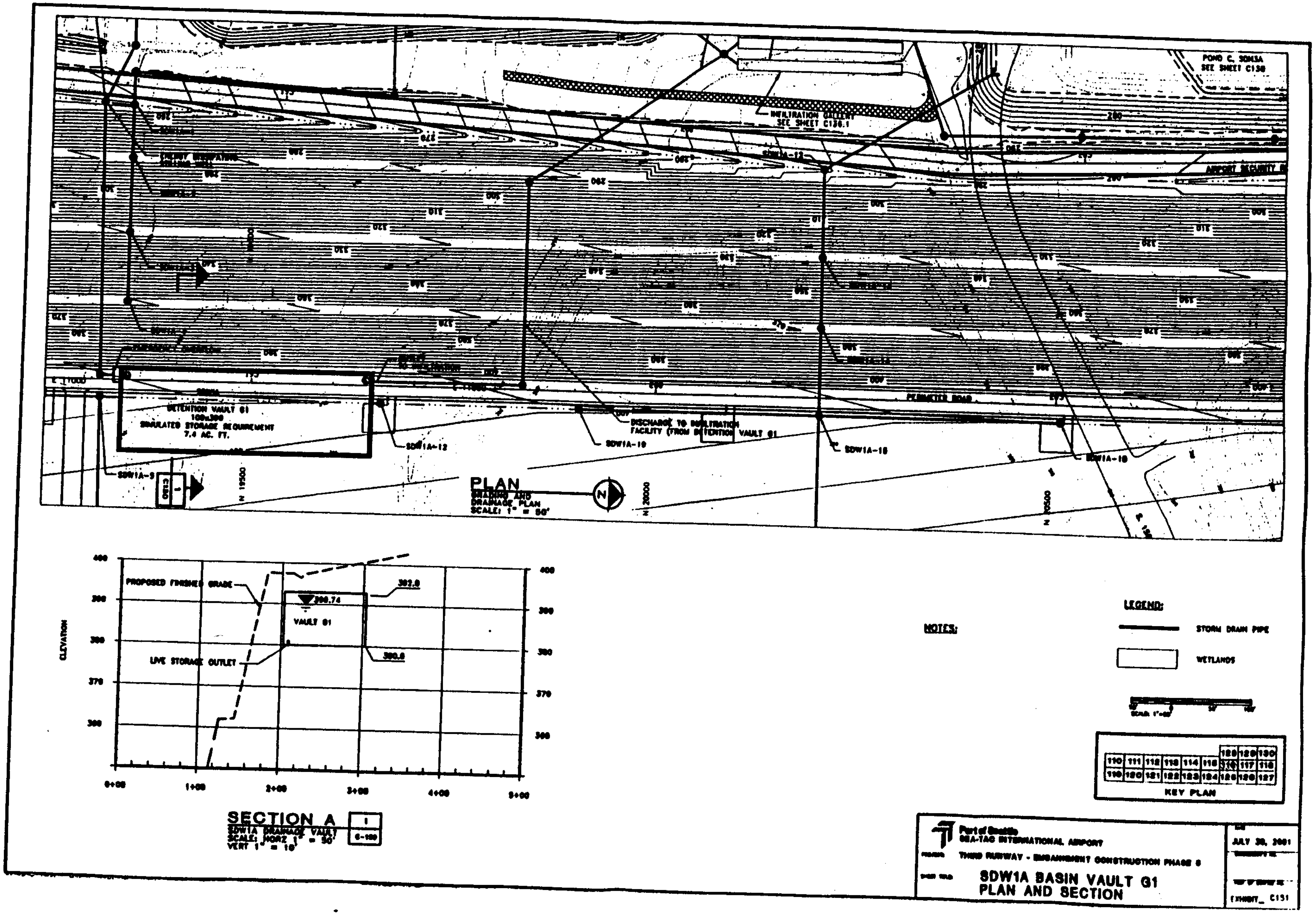
JULY 30, 2001

EXHIBIT_ C149

AR 051894


NOTE:
THE STORM SEWER WILL CONNECT TO AN INTERNAL PIPING AND DIVIDING WALL SYSTEM TO PROMOTE CIRCULATION AND FLUSHING OF THE RESERVE STORMWATER RELEASE WATERS WITHIN THE DEAD STORAGE AREA.
OUTLET CONTROL TO MILLER CREEK
EMERGENCY OVERFLOW POND C
PLAN
C2 DRAINAGE VAULT
SCALE: 1" = 50'
SECTION A
C2 DRAINAGE VAULT
SCALE: HORZ 1" = 50'
VERT 1" = 10'
LIVE STORAGE OUTLET
INLET PIPE
VAULT C1
VAULT C2
48" PIPE
PROPOSED FINISHED GRADE
SEDIMENT STORAGE
ELEVATION
SECTION B
C2 DRAINAGE VAULT
SCALE: HORZ 1" = 50'
VERT 1" = 10'
48" DIA PIPE
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 5
SDN3A BASIN VAULT C1/C2
PLAN AND PROFILE
JULY 30, 2001

AR 051895


POND C, SDW3A
SEE SHEET C130
INFILTRATION GALLERY
SEE SHEET C130.1
AIRPORT SECURITY R
DETENTION VAULT G1
SIMULATED STORAGE REQUIREMENT
7.4 AC. FT.
DISCHARGE TO INFILTRATION
FACILITY (FROM DETENTION VAULT G1
PERIMETER ROAD
SDW1A-9
SDW1A-12
SDW1A-10
SDW1A-18
N 19500
N 20000
N 20500
PLAN
GRADING AND
DRAINAGE PLAN
SCALE: 1" = 50'
PROPOSED FINISHED GRADE
VAULT G1
LIVE STORAGE OUTLET
392.0
390.0
ELEVATION
SECTION A
SCALE: HORZ 1" = 50'
VERT 1" = 10'
NOTES:
LEGEND:
STORM DRAIN PIPE
WETLANDS
KEY PLAN
Port of Seattle
SEA-TAC INTERNATIONAL AIRPORT
THIRD RUNWAY - EMBANKMENT CONSTRUCTION PHASE 6
SDW1A BASIN VAULT G1
PLAN AND SECTION
JULY 30, 2001

```
RUN
GLOBAL
  ***  SEATAC AIRPORT HSPF BASIN MODEL OF MILLER CREEK
  ***  FILE: MLOWFLOW2.INP - 2006 future condition
  ***  LOW FLOW ANALYSIS
  ***  BASED ON MILL65.INP FILE FROM AQUA TERRA
  ***  REMOVED FILL AREAS
  ***  PERLND 80 is the groundwater PERLND for the Fill area.
  ***  FOLLOWING STATEMENTS MAY NOT APPLY
  ***  ADDED PERLND 47,57,
  ***  ADDED GROUND WATER INFILTRATION TO WDM FOR USE WITH MCAGWO.INP
  ***  FK revised SDW1A and SDW1B with flow splitters, storages at SDN3/3X,
SDN2X/4X;
  ***  FK revised MC-1 and SDN-2X land uses, added POC at Lake Reba, removed
run-of-river tables
  ***  FOUR YEAR RUN USING LONG TERM 1990 INITIAL CONDITIONS
MILLER CREEK BASIN HSPF MODEL
***  START       1994  1  1  0  0  END    1996  8 30 24  0
  START       1990 10  1  0  0  END    1994  9 30 24  0
  RUN INTERP OUTPUT LEVEL    3
  RESUME     0 RUN     1
END GLOBAL

FILES
<type>  <fun>***<------------fname---------------------------------------------->
MESSU      24    D:\PARA\SEATAC\MILLER\LOWFLOW\MLOWFLOW3.MES
WDM        25    D:\PARA\SEATAC\MILLER\LOWFLOW\MLOWFLOW.WDM
           61    D:\PARA\SEATAC\MILLER\LOWFLOW\PER.L61
           62    D:\PARA\SEATAC\MILLER\LOWFLOW\RCH.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 01:00
      PERLND      16
      PERLND      26
      PERLND      34
      PERLND      44
      PERLND      45
  *** special PERLND for infiltration SDW1A
      PERLND      47
      PERLND      54
  *** special PERLND for infiltration SDW1B
      PERLND      57
  *** PERLNDS FOR INFLOW OF LOW FLOW FROM FILL PGG
      PERLND      80
      IMPLND      14
      RCHRES       1
      RCHRES      23
      RCHRES      24
      RCHRES       2
      RCHRES       3
      RCHRES      33
      RCHRES       4
      RCHRES       5
      RCHRES      50
      RCHRES     242
      RCHRES     240
```

```
      COPY        61
      COPY        44
      RCHRES      51
      RCHRES      43
      RCHRES     451
      RCHRES     452
      COPY        45
      COPY       645
      RCHRES      46
      RCHRES     552
      RCHRES      52
      RCHRES      53
      COPY        53
      RCHRES      54
      RCHRES      37
      RCHRES     237
      COPY        37
      RCHRES     147
      RCHRES     247
      COPY        66
      COPY        69
      RCHRES      47
      COPY        62
      COPY        63
      COPY        67
      COPY        68
  *** output special PERLND outflow to check
      COPY        47
      COPY        70
      RCHRES      34
      RCHRES     135
      RCHRES     570
      RCHRES      57
      RCHRES     257
      COPY        64
      COPY        65
      COPY       357
      COPY        56
  *** output special PERLND outflow to check
      COPY        57
      COPY        71
      RCHRES      35
      COPY        55
      RCHRES      10
      RCHRES      16
      RCHRES      11
      RCHRES      13
      RCHRES      12
      RCHRES      15
      RCHRES      14
      RCHRES      17
    END INGRP
END OPN SEQUENCE
                                                                                ***
PERLND
  GEN-INFO
    <PLS >      Name          NBLKS   Unit-systems   Printer                    ***
```

```
                                         User  t-series Engl Metr                ***
  # -  #                                          in   out                      ***
  16      TFM- TILL FOR MOD        1    1    1    1   61     0
  26      TGM- TILL GR MOD         1    1    1    1   61     0
  34      OF - OUTWASH FOR         1    1    1    1   61     0
  44      OG - OUTWASH GR          1    1    1    1   61     0
***PERLND FOR NEW AIRPORT FILL; NONE IN CALIBRATION
  45      AIRPORT FILL             1    1    1    1   61     0
  47      OG - INFILTRATION 1      1    1    1    1   61     0
  54      SA - WETLANDS            1    1    1    1   61     0
  57      OG - INFILTRATION 3      1    1    1    1   61     0
  80      LOW FLOW                 1    1    1    1   61     0
END GEN-INFO
ACTIVITY
  <PLS > ************* Active Sections *****************************
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC           ***
  14  200    0    0    1    0    0    0    0    0    0    0    0    0
END ACTIVITY
PRINT-INFO
  <PLS > ********************* Print-flags ************************ PIVL  PYR
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC *********
  14  200    0    0    5    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO
PWAT-PARM1
  <PLS > **************** Flags *******************
  # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE                         ***
  14  200    0    0    0    0    0    0    0    0    0
END PWAT-PARM1
PWAT-PARM2
  <PLS > ***
  # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  16                  9.0000    0.3200    400.00    0.1000    0.5000    0.9960
  26                  9.0000    0.1200    400.00    0.1000    0.5000    0.9960
  34                 10.0000    2.0000    400.00    0.0500    0.3000    0.9960
  44                 10.0000    0.8000    400.00    0.0500    0.3000    0.9960
  45                  7.5000    0.0200    300.00    0.0700    0.0000    0.9960
  47                 10.0000    0.8000    400.00    0.0500    0.3000    0.9960
  54                  8.0000    2.0000    100.00    0.0010    0.5000    0.9960
  57                 10.0000    0.8000    400.00    0.0500    0.3000    0.9960
  80                  9.0000    0.1200    400.00    0.1000    0.5000    0.9960
END PWAT-PARM2
PWAT-PARM3
  <PLS >***
  # -  #*** PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  16                            2.0000    2.0000      0.33      0.00       0.0
  26                            2.0000    2.0000      0.33        0.        0.
  34                            2.0000    2.0000      0.33      0.00       0.0
  44                            2.0000    2.0000      0.33        0.        0.
  47                            2.0000    2.0000      0.33        0.        0.
  45                            2.0000    2.0000      0.33        0.        0.
  54                            10.000    2.0000      0.33        0.       0.7
  57                            2.0000    2.0000      0.33        0.        0.
  80                            2.0000    2.0000      0.33        0.        0.
END PWAT-PARM3
PWAT-PARM4
  <PLS >                                                             ***
  # -  #     CEPSC      UZSN      NSUR     INTFW       IRC    LZETP***
```

```
 16          0.2000     0.7500     0.3500     9.000     0.7000     0.7000
 26          0.1000     0.3750     0.2500     9.000     0.7000     0.2500
 34          0.2000     0.7500     0.3500     0.000     0.7000     0.7000
 44          0.1000     0.7500     0.2500     0.000     0.7000     0.2500
 47          0.1000     0.7500     0.2500     0.000     0.7000     0.2500
 45          0.1000     0.2800     0.2500     6.000     0.1500     0.6000
 54          0.1000     2.2500     0.5000     1.000     0.7000     0.8000
 57          0.1000     0.7500     0.2500     0.000     0.7000     0.2500
 80          0.1000     0.3750     0.2500     9.000     0.7000     0.2500

  END PWAT-PARM4
  PWAT-STATE1
    <PLS >  PWATER state variables***
    # -  #***    CEPS       SURS        UZS      IFWS       LZS       AGWS      GWVS
 16             0.000         0.    0.0010      0.00     0.941     3.108     0.048
 26             0.000         0.    0.0010      0.00     7.672     3.341     0.071
 34             0.000         0.    0.0010      0.00     1.187     3.776     0.052
 44             0.000         0.    0.0040      0.00     9.402     4.905     0.104
 45             0.000         0.    0.0000      0.00     2.000     2.000     0.000
 54             0.000         0.    0.0960      0.00     3.211     0.000     0.000
 47             0.000         0.    0.0000      0.00     2.000     2.000     0.000
 57             0.000         0.    0.0000      0.00     2.000     2.000     0.000
 80             0.000         0.    0.0000      0.00     7.672     3.341     0.071
  END PWAT-STATE1
END PERLND

IMPLND
  GEN-INFO
    <ILS >       Name                 Unit-systems   Printer                    ***
    # -  #                          User  t-series Engl Metr                    ***
                                           in   out                             ***
   14       IMPERVIOUS                 1    1    1   60    0
  END GEN-INFO
  ACTIVITY
    <ILS > ************* Active Sections ****
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL  ***
   14         0    0    1    0    0    0
  END ACTIVITY
  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL *********
   14         0    0    6    0    0    0    1    9
  END PRINT-INFO
  IWAT-PARM1
    <ILS >           Flags           ***                                        ***
    # -  # CSNO RTOP  VRS  VNN RTLI  ***                                        ***
   14         0    0    0    0    0
  END IWAT-PARM1
  IWAT-PARM2
    <ILS >                                                                      ***
    # -  #       LSUR     SLSUR      NSUR     RETSC                           ***
   14          100.00    0.0100    0.1000    0.1000
  END IWAT-PARM2
  IWAT-PARM3
    <ILS >                                                                      ***
    # -  #     PETMAX    PETMIN                                                 ***
   14
```

```
  END IWAT-PARM3
  IWAT-STATE1                                                                 ***
    <ILS >  IWATER state variables                                            ***
    # -  #       RETS      SURS
   14      1.0000E-3 1.0000E-3
  END IWAT-STATE1
END IMPLND                                                                    ***

EXT SOURCES                                                                   ***

*** NOTE: The only RCHRES that precip and PET are applied to are lakes and ponds
*** FOLLOWING RCHRES ARE PONDS: 57, 247, 237
                                                                              ***
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
*** PRECIP/EVAP TO PERVIOUS/IMPERV SURFACES
WDM   1002 PREC     ENGLZERO  1.00         PERLND  14  65 EXTNL  PREC
WDM   1002 PREC     ENGLZERO  0.0          PERLND  80     EXTNL  PREC
WDM   1002 PREC     ENGLZERO  1.00         IMPLND  14     EXTNL  PREC
WDM      1 EVAP     ENGLZERO  0.8          PERLND  14  65 EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.0          PERLND  80     EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.8          IMPLND  14     EXTNL  PETINP
  ***  --> lateral inflow from reinfiltration chamber for SDW1A
*** WDM      5 FLOW     ENGLZERO  1.0          PERLND  47     EXTNL  AGWLI
  ***  --> lateral inflow from reinfiltration chamber for SDW1B
*** WDM      6 FLOW     ENGLZERO  1.0          PERLND  57     EXTNL  AGWLI
*** PRECIP/EVAP TO LAKES
WDM   1002 PREC     ENGLZERO               RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES   1     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES   4     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES   4     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES  11     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  11     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES  13     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  13     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES  23     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  23     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES  34     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  34     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES  53     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  53     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES  54     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  54     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES 237     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES 237     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES 247     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES 247     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES  57     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  57     EXTNL  POTEV
*** till seapage groundwater flow from Fill area.  PGG time series
WDM   7001 FLOW     ENGLZERO.000000099     PERLND  80     EXTNL  AGWLI
*** Fill flow directly to stream
WDM   7000 FLOW     ENGL     .000000957    RCHRES  35     INFLOW IVOL

END EXT SOURCES

EXT TARGETS
```

```
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
***PROJECT CONDITION FLOWS
*** RCHRES=LOCATION:
*** 54=MCDF      47=SDW1A INFILTRATION TANK      43=SDN3X      247=SDW1A POND G
*** 17=MOUTH     49=SDW2          44=SDN4X       52=SDN1       451= EXISTING NEPL
*** 61=SDN2X     57=SDW1B         51=SDN2X+SDN4X 53=Lake Reba  452=NEW NEPL
*** 45=NEPL POC  55=SR509         39=SDN3A/SDW1A POC
*** 46=CARGO     37=SDN3AI VAULT 237=SDN3AO POND
*** GAUGE POINTS (17=MOUTH, 54=MILLER RDF, 55=SR509)
RCHRES  17 HYDR   RO      1 1                   WDM   7017 FLOW     ENGL      REPL
RCHRES  35 HYDR   RO      1 1                   WDM   7036 FLOW     ENGL      REPL
***COPY    55 OUTPUT MEAN   1 1 12.1              WDM    118 FLOW     ENGL      REPL
RCHRES  54 HYDR   RO      1 1                   WDM   7054 FLOW     ENGL      REPL
*** DETENTION POND FLOWS
***COPY    61 OUTPUT MEAN   1 1 12.1              WDM    101 FLOW     ENGL      REPL
***RCHRES 552 HYDR   RO     1 1                   WDM    102 FLOW     ENGL      REPL
***RCHRES 451 HYDR   RO     1 1                   WDM    105 FLOW     ENGL      REPL
***RCHRES 452 HYDR   RO     1 1                   WDM    119 FLOW     ENGL      REPL
***RCHRES  46 HYDR   RO     1 1                   WDM    106 FLOW     ENGL      REPL
*** write RCHRES 47 (Inf. Area # 1)outlet 1 and 2 to WDM 107 and 108 like so:
***COPY    62 OUTPUT MEAN   1 1 12.1              WDM    107 FLOW     ENGL      REPL
***COPY    63 OUTPUT MEAN   1 1 12.1              WDM    108 FLOW     ENGL      REPL
***COPY    66 OUTPUT MEAN   1 1 12.1              WDM    112 FLOW     ENGL      REPL
***COPY    69 OUTPUT MEAN   1 1 12.1              WDM   1120 FLOW     ENGL      REPL
*** write SDW1a vault flows to WDM:
***COPY    67 OUTPUT MEAN   1 1 12.1              WDM    109 FLOW     ENGL      REPL
***COPY    68 OUTPUT MEAN   1 1 12.1              WDM   1090 FLOW     ENGL      REPL
*** write RCHRES 570 outlet 1 and 2 to WDM 110 and 115 like so:
***RCHRES 570 HYDR   RO     1 1                   WDM    210 FLOW     ENGL      REPL
***COPY    64 OUTPUT MEAN   1 1 12.1              WDM    110 FLOW     ENGL      REPL
***COPY    65 OUTPUT MEAN   1 1 12.1              WDM    115 FLOW     ENGL      REPL
***COPY   357 OUTPUT MEAN   1 1 12.1              WDM    211 FLOW     ENGL      REPL
***COPY    56 OUTPUT MEAN   1 1 12.1              WDM    121 FLOW     ENGL      REPL
*** write RCHRES 37 vault to WDM 111
***RCHRES  37 HYDR   RO     1 1                   WDM    111 FLOW     ENGL      REPL
***RCHRES 237 HYDR   RO     1 1                   WDM    122 FLOW     ENGL      REPL
***RCHRES  43 HYDR   RO     1 1                   WDM    103 FLOW     ENGL      REPL
***COPY    44 OUTPUT MEAN   1 1 12.1              WDM    104 FLOW     ENGL      REPL
***RCHRES  51 HYDR   RO     1 1                   WDM    139 FLOW     ENGL      REPL
*** DETENTION STAGES
***RCHRES  47 HYDR   STAGE                        WDM    652 STAG     ENGL      REPL
***RCHRES 147 HYDR   STAGE                        WDM    657 STAG     ENGL      REPL
***RCHRES 247 HYDR   STAGE                        WDM    654 STAG     ENGL      REPL
***RCHRES 552 HYDR   STAGE                        WDM    601 STAG     ENGL      REPL
***RCHRES  57 HYDR   STAGE                        WDM    651 STAG     ENGL      REPL
***RCHRES 257 HYDR   STAGE                        WDM    655 STAG     ENGL      REPL
***RCHRES 237 HYDR   STAGE                        WDM    656 STAG     ENGL      REPL
***RCHRES  37 HYDR   STAGE                        WDM    650 STAG     ENGL      REPL
***RCHRES  54 HYDR   STAGE                        WDM     61 STAG     ENGL      REPL
***RCHRES 451 HYDR   STAGE                        WDM    662 STAG     ENGL      REPL
***RCHRES 452 HYDR   STAGE                        WDM    667 STAG     ENGL      REPL
***RCHRES  46 HYDR   STAGE                        WDM    663 STAG     ENGL      REPL
***RCHRES  43 HYDR   STAGE                        WDM    664 STAG     ENGL      REPL
***RCHRES  44 HYDR   STAGE                        WDM    665 STAG     ENGL      REPL
***RCHRES  51 HYDR   STAGE                        WDM    666 STAG     ENGL      REPL
*** DETENTION VOLUMES
```

```
***RCHRES  47 HYDR   VOL                             WDM     752 VOL      ENGL          REPL
***RCHRES 147 HYDR   VOL                             WDM     757 VOL      ENGL          REPL
***RCHRES 247 HYDR   VOL                             WDM     754 VOL      ENGL          REPL
***RCHRES 552 HYDR   VOL                             WDM     602 VOL      ENGL          REPL
***RCHRES  57 HYDR   VOL                             WDM     751 VOL      ENGL          REPL
***RCHRES 257 HYDR   VOL                             WDM     755 VOL      ENGL          REPL
***RCHRES 237 HYDR   VOL                             WDM     756 VOL      ENGL          REPL
***RCHRES  37 HYDR   VOL                             WDM     750 VOL      ENGL          REPL
***RCHRES  54 HYDR   VOL                             WDM      62 VOL      ENGL          REPL
***RCHRES 451 HYDR   VOL                             WDM     762 VOL      ENGL          REPL
***RCHRES 452 HYDR   VOL                             WDM     767 VOL      ENGL          REPL
***RCHRES  46 HYDR   VOL                             WDM     763 VOL      ENGL          REPL
***RCHRES  43 HYDR   VOL                             WDM     764 VOL      ENGL          REPL
***RCHRES  44 HYDR   VOL                             WDM     765 VOL      ENGL          REPL
***RCHRES  51 HYDR   VOL                             WDM     766 VOL      ENGL          REPL
*** POINT OF COMPLIANCE (POC)FLOWS
***COPY     37 OUTPUT MEAN   1 1 12.1                WDM     125 FLOW     ENGL          REPL
***COPY     45 OUTPUT MEAN   1 1 12.1                WDM     199 FLOW     ENGL          REPL
***COPY     53 OUTPUT MEAN   1 1 12.1                WDM     399 FLOW     ENGL          REPL
***COPY     70 OUTPUT MEAN   1 1 12.1                WDM    7000 FLOW     ENGL          REPL
***COPY     71 OUTPUT MEAN   1 1 12.1                WDM    7001 FLOW     ENGL          REPL
*** SPECIAL PERLND REINFILTRATION RESULTS
  ***  --> output special PERLND parameters to check operations:
  ***  --> PERLND 47 active ground water storage depth (in)
*** PERLND  47 PWATER AGWS                            WDM     471 AGWS     ENGL
REPL
  ***  --> PERLND 47 active ground water outflow (acft/2ac -> in/acre)
***COPY     47 OUTPUT MEAN   1 1 12                  WDM     472 FLOW     ENGL          REPL
  ***  --> PERLND 57 active ground water storage depth (in)
***PERLND   57 PWATER AGWS                           WDM     571 AGWS     ENGL          REPL
  ***  --> PERLND 57 active ground water outflow (acft/2ac -> in/acre)
***COPY     57 OUTPUT MEAN   1 1 12                  WDM     572 FLOW     ENGL          REPL

END EXT TARGETS

SCHEMATIC
<-Source->                   <--Area-->    <-Target->  MBLK   ***
<Name>   #                   <-factor->    <Name>   #  Tbl#   ***
  *** SUB-CATCHMENT 1 all agwo goes to sound
PERLND  16                         3.41    RCHRES   1     6
PERLND  26                       232.36    RCHRES   1     6
PERLND  34                         3.07    RCHRES   1     6
PERLND  44                        38.03    RCHRES   1     6
PERLND  54                         3.87    RCHRES   1     6
IMPLND  14                        56.14    RCHRES   1     2
 *** SUB-CATCHMENT 2 10% of area GW goes to vaca 90% goes to sound
PERLND  16                         5.56    RCHRES   2     6
PERLND  26                       200.05    RCHRES   2     6
PERLND  34                         0.46    RCHRES   2     6
PERLND  44                        38.71    RCHRES   2     6
PERLND  16                         0.56    RCHRES 135     7
PERLND  26                        20.00    RCHRES 135     7
PERLND  34                         0.05    RCHRES 135     7
PERLND  44                         3.87    RCHRES 135     7
IMPLND  14                        42.22    RCHRES   2     2
 *** SUB-CATCHMENT 23 New subbasin 15 % OF GW GOES TO VACCA 85% TO SOUND
PERLND  16                         3.09    RCHRES  23     6
```

```
PERLND  26                    156.15     RCHRES  23        6
PERLND  34                      2.25     RCHRES  23        6
PERLND  44                     45.84     RCHRES  23        6
PERLND  16                      0.46     RCHRES 135        7
PERLND  26                     23.42     RCHRES 135        7
PERLND  34                      0.34     RCHRES 135        7
PERLND  44                      6.88     RCHRES 135        7
IMPLND  14                     58.44     RCHRES  23        2
 *** SUB-CATCHMENT 24 New subbasin 60 % OF GW GOES TO 11 40% TO SOUND
PERLND  26                    135.43     RCHRES  24        6
PERLND  34                      2.02     RCHRES  24        6
PERLND  44                     69.29     RCHRES  24        6
PERLND  26                     81.26     RCHRES  11        7
PERLND  34                      1.21     RCHRES  11        7
PERLND  44                     41.57     RCHRES  11        7
IMPLND  14                     79.98     RCHRES  24        2
  *** SUB-CATCHMENT 3 agwo goes to vaca(135)
PERLND  16                      8.26     RCHRES   3        6
PERLND  26                    108.38     RCHRES   3        6
PERLND  34                     16.02     RCHRES   3        6
PERLND  44                    102.89     RCHRES   3        6
PERLND  54                      0.04     RCHRES   3        6
PERLND  16                      8.26     RCHRES 135        7
PERLND  26                    108.38     RCHRES 135        7
PERLND  34                     16.02     RCHRES 135        7
PERLND  44                    102.89     RCHRES 135        7
PERLND  54                      0.04     RCHRES 135        7
IMPLND  14                     27.30     RCHRES   3        2
  *** SUB-CATCHMENT 4 10% of agwo goes to rchres 90% goes to sound
PERLND  16                      2.95     RCHRES   4        6
PERLND  26                     85.95     RCHRES   4        6
PERLND  34                      3.75     RCHRES   4        6
PERLND  44                     92.06     RCHRES   4        6
PERLND  16                      0.30     RCHRES   4        7
PERLND  26                      8.59     RCHRES   4        7
PERLND  34                      0.38     RCHRES   4        7
PERLND  44                      9.21     RCHRES   4        7
IMPLND  14                     18.43     RCHRES   4        2
  *** SUB-CATCHMENT 4a 70% of agwo goes to rchres 30% goes to sound
PERLND  16                      8.66     RCHRES   4        6
PERLND  26                     61.64     RCHRES   4        6
PERLND  34                     22.06     RCHRES   4        6
PERLND  44                     78.09     RCHRES   4        6
PERLND  54                     12.50     RCHRES   4        6
PERLND  16                      6.06     RCHRES   4        7
PERLND  26                     43.15     RCHRES   4        7
PERLND  34                     15.44     RCHRES   4        7
PERLND  44                     54.66     RCHRES   4        7
PERLND  54                      8.75     RCHRES   4        7
IMPLND  14                     29.14     RCHRES   4        2
  *** SUB-CATCHMENT 5
PERLND  26                     10.29     RCHRES   5        1
PERLND  44                     50.05     RCHRES   5        1
PERLND  54                     10.74     RCHRES   5        1
IMPLND  14                     16.31     RCHRES   5        2
  *** SUB-CATCHMENT 6
PERLND  16                      1.42     COPY   645       26
```

PERLND 26	20.38	COPY	645	26
PERLND 34	13.44	COPY	645	26
PERLND 44	11.79	COPY	645	26
PERLND 54	0.82	COPY	645	26
PERLND 16	1.42	RCHRES	53	7
PERLND 26	20.38	RCHRES	53	7
PERLND 34	13.44	RCHRES	53	7
PERLND 44	11.79	RCHRES	53	7
PERLND 54	0.82	RCHRES	53	7
IMPLND 14	6.23	COPY	645	22
*** SUB-CATCHMENT 8				
PERLND 44	22.21	RCHRES	35	1
IMPLND 14	6.60	RCHRES	35	2
*** SUB-CATCHMENT 9				
PERLND 16	4.98	RCHRES	34	1
PERLND 26	14.38	RCHRES	34	1
PERLND 34	0.05	RCHRES	34	1
PERLND 44	56.71	RCHRES	34	1
PERLND 54	0.01	RCHRES	34	1
IMPLND 14	22.47	RCHRES	34	2
*** SUB-CATCHMENT 10				
PERLND 16	4.15	RCHRES	10	1
PERLND 26	31.94	RCHRES	10	1
PERLND 44	95.22	RCHRES	10	1
IMPLND 14	71.98	RCHRES	10	2
*** SUB-CATCHMENT 11 25% OF AGWO GOES TO 15				
PERLND 16	0.89	RCHRES	11	6
PERLND 26	217.92	RCHRES	11	6
PERLND 34	1.32	RCHRES	11	6
PERLND 44	65.65	RCHRES	11	6
PERLND 16	0.67	RCHRES	11	7
PERLND 26	163.44	RCHRES	11	7
PERLND 34	0.99	RCHRES	11	7
PERLND 44	49.24	RCHRES	11	7
PERLND 16	0.22	RCHRES	15	7
PERLND 26	54.48	RCHRES	15	7
PERLND 34	0.33	RCHRES	15	7
PERLND 44	16.41	RCHRES	15	7
IMPLND 14	230.80	RCHRES	11	2
*** SUB-CATCHMENT 12				
PERLND 16	0.39	RCHRES	12	1
PERLND 26	101.18	RCHRES	12	1
PERLND 34	5.64	RCHRES	12	1
PERLND 44	54.98	RCHRES	12	1
PERLND 54	0.64	RCHRES	12	1
IMPLND 14	79.83	RCHRES	12	2
*** SUB-CATCHMENT 13				
PERLND 16	0.79	RCHRES	13	1
PERLND 26	197.68	RCHRES	13	1
IMPLND 14	27.66	RCHRES	13	2
*** SUB-CATCHMENT 14 50% OF AGWO GOES TO SOUND				
PERLND 16	0.24	RCHRES	14	6
PERLND 26	118.67	RCHRES	14	6
PERLND 34	13.46	RCHRES	14	6
PERLND 44	41.91	RCHRES	14	6
PERLND 16	0.12	RCHRES	14	7
PERLND 26	59.34	RCHRES	14	7

```
PERLND  34                      6.73     RCHRES  14        7
PERLND  44                     20.95     RCHRES  14        7
IMPLND  14                     20.66     RCHRES  14        2
  *** SUB-CATCHMENT 15
PERLND  16                      6.59     RCHRES  15        1
PERLND  26                     49.55     RCHRES  15        1
PERLND  34                     50.09     RCHRES  15        1
PERLND  44                     86.52     RCHRES  15        1
IMPLND  14                     19.47     RCHRES  15        2
  *** SUB-CATCHMENT 16
PERLND  16                     10.93     RCHRES  16        1
PERLND  26                     29.93     RCHRES  16        1
PERLND  34                     20.03     RCHRES  16        1
PERLND  44                     31.83     RCHRES  16        1
IMPLND  14                     15.58     RCHRES  16        2
  *** SUB-CATCHMENT 17 AGWO GOES TO SOUND
PERLND  16                      0.90     RCHRES  17        6
PERLND  26                     16.31     RCHRES  17        6
PERLND  34                     34.82     RCHRES  17        6
PERLND  44                     82.11     RCHRES  17        6
PERLND  54                      2.19     RCHRES  17        6
IMPLND  14                     10.49     RCHRES  17        2
  *** SUB-CATCHMENT MC-1
PERLND  26                      0.14     RCHRES  52        1
PERLND  44                      9.44     RCHRES  52        1
PERLND  45                      0.14     RCHRES  52        1
PERLND  54                      0.27     RCHRES  52        1
IMPLND  14                      1.98     RCHRES  52        2
  *** SUB-CATCHMENT MC-2
PERLND  16                      0.08     RCHRES  53        1
PERLND  26                      0.53     RCHRES  53        1
PERLND  34                      3.60     RCHRES  53        1
PERLND  44                      9.20     RCHRES  53        1
PERLND  45                      2.22     RCHRES  53        1
PERLND  54                     15.14     RCHRES  53        1
IMPLND  14                      2.54     RCHRES  53        2
  *** SUB-CATCHMENT MC-3
PERLND  34                      3.70     RCHRES  54        1
PERLND  44                      4.91     RCHRES  54        1
PERLND  45                      1.07     RCHRES  54        1
PERLND  54                      1.84     RCHRES  54        1
IMPLND  14                      1.42     RCHRES  54        2
  *** SUB-CATCHMENT MC-4
PERLND  34                      0.27     RCHRES 135        1
PERLND  44                     16.51     RCHRES 135        1
PERLND  45                      4.23     RCHRES 135        1
PERLND  54                     11.98     RCHRES 135        1
IMPLND  14                      3.31     RCHRES 135        2
  *** SUB-CATCHMENT MC-5
PERLND  26                     13.43     RCHRES  35        1
PERLND  44                     33.84     RCHRES  35        1
PERLND  54                      7.44     RCHRES  35        1
IMPLND  14                      0.02     RCHRES  35        2
  *** SUB-CATCHMENT MC-6
  ***   --> reduce by 2 acres to make special PERLND 47 for SDW1A
***PERLND  44                      14.10     RCHRES  35        1
PERLND  44                     12.10     RCHRES  35        1
```

```
PERLND  45                          0.09      RCHRES  35        1
PERLND  54                          0.90      RCHRES  35        1
IMPLND  14                          0.26      RCHRES  35        2
  ***  --> add 2 acres from special PERLND 47 for SDW1A
PERLND  47                          2.00      RCHRES  35        1
  ***  --> output outflow from special PERLND 47 (acft/ac)
PERLND  47                          1.00      COPY    47       21

  *** SUB-CATCHMENT MC-7
  ***  --> reduce by 2 acres to make special PERLND 57 for SDW1B
PERLND  26                         11.26      COPY    55       21
  ***  --> reduce by 2 acres to make special PERLND 57 for SDW1B
***PERLND  44                        31.80      COPY    55       21
  ***  --> add 2 acres from special PERLND 57 for SDW1B
PERLND  57                          2.00      COPY    55       21
  ***  --> output outflow from special PERLND 57 (acft/ac)
PERLND  57                          1.00      COPY    57       21
PERLND  44                         29.80      COPY    55       21
PERLND  54                          3.20      COPY    55       21
IMPLND  14                          0.03      COPY    55       22

***note: SDN AGWO TO VACCA FARMS (135)NOT TO PONDS

  *** SUB-CATCHMENT SDN-1
PERLND  26                          1.97      RCHRES 552        6
PERLND  44                          1.29      RCHRES 552        6
PERLND  54                          0.20      RCHRES 552        6
PERLND  26                          1.97      RCHRES 135        7
PERLND  44                          1.29      RCHRES 135        7
PERLND  54                          0.20      RCHRES 135        7
IMPLND  14                         12.68      RCHRES 552        2

  *** SUB-CATCHMENT SDN-1-LWR
PERLND  44                          4.79      RCHRES 552        6
PERLND  54                          0.07      RCHRES 552        6
PERLND  44                          4.79      RCHRES 135        7
PERLND  54                          0.07      RCHRES 135        7
IMPLND  14                          0.56      RCHRES 552        2

  *** SUB-CATCHMENT SDN-1-OFF
PERLND  26                         23.01      RCHRES  52        6
PERLND  44                          3.58      RCHRES  52        6
PERLND  54                          1.67      RCHRES  52        6
PERLND  26                         23.01      RCHRES 135        7
PERLND  44                          3.58      RCHRES 135        7
PERLND  54                          1.67      RCHRES 135        7
IMPLND  14                          8.00      RCHRES  52        2

  *** SUB-CATCHMENT SDN-2X (TO POND)
PERLND  26                          0.63      COPY    61       26
PERLND  44                          2.40      COPY    61       26
PERLND  45                          0.86      COPY    61       26
PERLND  26                          0.63      RCHRES 135        7
PERLND  44                          2.40      RCHRES 135        7
PERLND  45                          0.86      RCHRES 135        7
IMPLND  14                          0.36      COPY    61       22
```

```
  *** SUB-CATCHMENT SDN-3 (TO POND)
PERLND  26                          23.56     RCHRES  43        6
PERLND  26                          23.56     RCHRES 135        7
IMPLND  14                          24.30     RCHRES  43        2

  *** SUB-CATCHMENT SDN-3X (TO POND)
PERLND  26                           1.61     RCHRES  43        6
***original PERLND area
***PERLND  45                          23.77     RCHRES  43        6
***PERLND AREA TO BE REMOVED = 0.29 AC
PERLND  45                          23.48     RCHRES  43        6
PERLND  80                           0.29     RCHRES 135        7
PERLND  26                           1.61     RCHRES 135        7
PERLND  45                          23.48     RCHRES 135        7

  *** SUB-CATCHMENT SDN-4 (TO POND)
PERLND  26                          15.75     COPY    44       26
PERLND  44                           1.31     COPY    44       26
PERLND  45                           0.99     COPY    44       26
PERLND  26                          15.75     RCHRES 135        7
PERLND  44                           1.31     RCHRES 135        7
PERLND  45                           0.99     RCHRES 135        7
IMPLND  14                          12.26     COPY    44       22

  *** SUB-CATCHMENT SDN-4X (TO POND)
PERLND  26                           1.92     COPY    44       26
PERLND  44                           0.75     COPY    44       26
PERLND  45                           8.31     COPY    44       26
PERLND  26                           1.92     RCHRES 135        7
PERLND  44                           0.75     RCHRES 135        7
PERLND  45                           8.31     RCHRES 135        7
IMPLND  14                           4.21     COPY    44       22

  *** SUB-CATCHMENT IWS-NCPS (TO POND)
PERLND  26                           4.78     RCHRES 242        6
PERLND  26                           4.78     RCHRES 135        7
IMPLND  14                          30.93     RCHRES 242        2

  *** SUB-CATCHMENT IWS-NSMPS (TO POND)
PERLND  26                           2.69     RCHRES 240        6
PERLND  44                           1.97     RCHRES 240        6
PERLND  45                           0.01     RCHRES 240        6
PERLND  26                           2.69     RCHRES 135        7
PERLND  44                           1.97     RCHRES 135        7
PERLND  45                           0.01     RCHRES 135        7
IMPLND  14                           1.95     RCHRES 240        2

  *** SUB-CATCHMENT NEPL (TO POND)
PERLND  26                          10.00     RCHRES 452        6
PERLND  26                          10.00     RCHRES 135        7
IMPLND  14                           6.00     RCHRES 451        2
IMPLND  14                          26.29     RCHRES 452        2

  *** SUB-CATCHMENT CARGO (TO POND)
IMPLND  14                           8.12     RCHRES  46        2

  *** SUB-CATCHMENT SDN3AI (TO VAULT)
```

```
***original IMPLND area
***IMPLND  14                              5.67       RCHRES  37         2
***IMPLND AREA TO BE REMOVED = 5.69 AC
IMPLND  14                            0.18       RCHRES  37       2
PERLND  80                            5.69       RCHRES 135       7

  *** SUB-CATCHMENT SDN3AO (TO POND)
PERLND  26                            0.08       RCHRES 237       6
PERLND  44                            0.03       RCHRES 237       6
***original PERLND area
***PERLND  45                             22.12       RCHRES 237         6
***PERLND AREA TO BE REMOVED = 11.16 AC
***PERLND AREA TO BE REMOVED = 4.56 AC
PERLND  45                            6.40       RCHRES 237       6
PERLND  80                           11.16       RCHRES 135       7
PERLND  80                            4.56       RCHRES 135       7
PERLND  26                            0.08       RCHRES 135       7
PERLND  44                            0.03       RCHRES 135       7
PERLND  45                            6.40       RCHRES 135       7
***original IMPLND area
***IMPLND  14                              2.35       RCHRES 237         2
***IMPLND AREA TO BE REMOVED = 2.19 AC
IMPLND  14                            0.16       RCHRES 237       2
PERLND  80                            2.19       RCHRES 135       7

  *** SUB-CATCHMENT SDW1AO (TO POND)
***original PERLND area
***PERLND  26                              4.28       RCHRES 247         6
***PERLND AREA TO BE REMOVED = 0.67 AC
PERLND  26                            3.61       RCHRES 247       6
PERLND  80                            0.67       RCHRES 135       7
PERLND  44                            0.69       RCHRES 247       6
***original PERLND area
***PERLND  45                             32.44       RCHRES 247         6
***PERLND AREA TO BE REMOVED = 18.06 AC
***PERLND AREA TO BE REMOVED = 0.60 AC
PERLND  45                           13.78       RCHRES 247       6
PERLND  80                           18.06       RCHRES 135       7
PERLND  80                            0.60       RCHRES 135       7
PERLND  26                            3.61       RCHRES 135       7
PERLND  44                            0.69       RCHRES 135       7
PERLND  45                           13.78       RCHRES 135       7
***original IMPLND area
***IMPLND  14                              1.64       RCHRES 247         2
***IMPLND AREA TO BE REMOVED = 0.93 AC
IMPLND  14                            0.71       RCHRES 247       2
PERLND  80                            0.93       RCHRES 135       7
  *** PERVIOUS AREA FOR 1AI IS IN 1AO
  *** SUB-CATCHMENT SDN1AI (TO VAULT)
***original IMPLND area
***IMPLND  14                             13.78       RCHRES 147         2
***IMPLND AREA TO BE REMOVED = 13.07 AC
IMPLND  14                            0.71       RCHRES 147       2
PERLND  80                           13.07       RCHRES  35       7
  *** CONTAINS BOTH I AND O
  *** SUB-CATCHMENT SDW1B (TO POND)
  *** AGWO TO 35, AS 57 IS D/S OF VACCA FARMS (135)
```

```
***original PERLND area
***PERLND  26                          21.25      RCHRES 570       6
***PERLND AREA TO BE REMOVED = 0.54 AC
PERLND  26                          20.71     RCHRES 570       6
PERLND  80                           0.54     RCHRES  35       7
PERLND  44                           2.39     RCHRES 570       6
***original PERLND area
***PERLND  45                          46.26      RCHRES 570       6
***PERLND AREA TO BE REMOVED = 34.71 AC
***PERLND AREA TO BE REMOVED =  1.34 AC
PERLND  45                          10.21     RCHRES 570       6
PERLND  80                          34.71     RCHRES  35       7
PERLND  80                           1.34     RCHRES  35       7
PERLND  26                          20.71     RCHRES  35       7
PERLND  44                           2.39     RCHRES  35       7
PERLND  45                          10.21     RCHRES  35       7
***original IMPLND area
***IMPLND  14                          26.95      RCHRES 570       2
***IMPLND AREA TO BE REMOVED = 20.79 AC
***IMPLND AREA TO BE REMOVED =  1.62 AC
IMPLND  14                           4.54     RCHRES 570       2
PERLND  80                          20.79     RCHRES  35       7
PERLND  80                           1.62     RCHRES  35       7

  *** ADD SUB-CATCHMENT IWS-PRIMARY TO PREDEVELOPEMENT ONLY

***ROUTING FOR MILLER CREEK
 *** M1 TO M2 TO M3 TO STORAGE 50.  M4 TO M5 TO STORAGE 50
RCHRES   1                                    RCHRES   2       4
RCHRES  23                                    RCHRES  24       4
RCHRES  24                                    RCHRES   3       3
RCHRES   2                                    RCHRES   3       3
RCHRES   3                                    RCHRES  33       3
RCHRES  33                                    RCHRES  50       3
RCHRES   4                                    RCHRES   5       4
RCHRES   5                                    RCHRES  50       3
 *** PONDS TO 52, 53 & 54
RCHRES 242                                    RCHRES 240       5
 *** OVERFLOW ONLY TO 61
RCHRES 240                                    RCHRES  51       5
COPY    61                                    RCHRES  51      12
COPY    44                                    RCHRES  51      12
RCHRES  51                                    RCHRES  52       3
RCHRES  43                                    RCHRES  54       3
 *** 2 NEPL VAULTS* (FK-Changed to eliminate run-of-river tables)
RCHRES 451                                    COPY    45      11
RCHRES 452                                    COPY    45      11
COPY    45                                    COPY   645      10
COPY   645                                    RCHRES  53      12
RCHRES  46                                    RCHRES  53       3
 *** NEW STREAM REACH 52 TO LAKE REBA 53 TO RDF 54 (FK-changed to insert new POC
at Lake Reba)
RCHRES 552                                    RCHRES  52       3
RCHRES  52                                    RCHRES  53       3
RCHRES  53                                    COPY    53      11
COPY    53                                    RCHRES  54      12
RCHRES  50                                    RCHRES  54       3
```

```
 *** RDF 54 TO 35
RCHRES  54                                 RCHRES 135       3
<-Source->                <--Area-->       <-Target->    MBLK     ***
<Name>   #                <-factor->       <Name>   #    Tbl#     ***
 *** PONDS TO 34
RCHRES  37                                 COPY    37      11
RCHRES 237                                 COPY    37      11
COPY    37                                 RCHRES 135      12
 *** SDW1A flow to bypass added (FK, June 2001)
SDW1AI VAULT FLOW TO INFILTRATION 1                                  ***
RCHRES 147                                 RCHRES  47       4
SDW1AI VAULT FLOW TO BYPASS                                          ***
RCHRES 147                                 COPY    70      15
STORMWATER Q 1ST EXIT AT POND G (Bypass)                             ***
RCHRES 247                                 COPY    70      14
RCHRES 247                                 COPY    66      14
RCHRES 247                                 COPY    69      15
2ND EXIT TO INFILTRATION TANK-MILLER CREEK                            ***
RCHRES 247                                 RCHRES  47       5
STORMWATER Q 1ST EXIT TO BYPASS                                      ***
RCHRES  47                                 COPY    70      14
*** 2ND EXIT TO SOIL AND MILLER CREEK (2nd exit intr. as AGWLI)***
*** RCHRES  47                                 COPY    70      15
COPY BLOCK FOR OUTPUT PURPOSES                                       ***
RCHRES  47                                 COPY    62      14
RCHRES  47                                 COPY    63      15
RCHRES 147                                 COPY    67      14
RCHRES 147                                 COPY    68      15
COPY    70                                 RCHRES 135      12
RCHRES  34                                 RCHRES 135       4
RCHRES  34                                 RCHRES 135       5
RCHRES 135                                 RCHRES  35       3
RCHRES  10                                 RCHRES  16       3
 *** PONDS TO 35
 *** Configuration changed to flow splitter to Pond D and Infiltration Basin 3
(FK, June 2001)
STORM Q - 1ST EXIT OF FLOW SPLITTER TO POND D                        ***
RCHRES 570                                 RCHRES  57       4
***INFILTRATION Q - 2ND EXIT OF FLOW SPLITTER TO SOIL                ***
*** RCHRES 570                                 RCHRES 257       5
STORM Q EXIT OF POND D TO MILLER CREEK                           ***
RCHRES  57                                 COPY    71      11
COPY BLOCK FOR OUTPUT PURPOSES                                       ***
RCHRES 570                                 COPY    64      14
RCHRES 570                                 COPY    65      15
RCHRES  57                                 COPY   357      11
RCHRES 257                                 COPY    56      14
RCHRES 257                                 COPY    71      14
RCHRES 257                                 COPY    71      15
COPY    71                                 RCHRES  35      12
RCHRES  35                                 COPY    55      11
COPY    55                                 RCHRES  16      12
RCHRES  11                                 RCHRES  15       3
RCHRES  13                                 RCHRES  12       4
RCHRES  13                                 RCHRES  12       5
RCHRES  12                                 RCHRES  15       3
RCHRES  16                                 RCHRES  15       3
```

```
RCHRES  14                                      RCHRES  17       3
RCHRES  15                                      RCHRES  17       3
END SCHEMATIC

NETWORK
***         <MEMBER> SSYSSGAP<--MULT-->TRAN <-TARGET VOLS>         <-MEMBER->
<NAME>    # <NAME>    TEM STRG<-FACTOR->STRG <NAME>    #    # <-GRP> <NAME> # # ***
END NETWORK
                                                                            ***
RCHRES
  GEN-INFO
    RCHRES       Name          Nexits   Unit Systems   Printer              ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                             in   out                       ***
    1     Arbor Lake  M 1         2    1    1    1   62    0    0
    2     Arbor Ck -03710 M 2     1    1    1    1   62    0    0
    3     Arbor Ck    M 3         1    1    1    1   62    0    0
    4     Tub Lake    M 4         2    1    1    1   62    0    0
    5     Miller Ck SR518 M5      1    1    1    1   62    0    0
   10     Trib (0371G)    M 10    1    1    1    1   62    0    0
   11     M11 Ambaum Detention    1    1    1    1   62    0    0
   12     Trib(0354)   M 12       1    1    1    1   62    0    0
   13     Burien Lake M 13        2    1    1    1   62    0    0
   14     Trib (0353) M 14        1    1    1    1   62    0    0
   15     M/S U/S OF 17           1    1    1    1   62    0    0
   16     U/S OF 15 M/S           1    1    1    1   62    0    0
   17     GAGE                    1    1    1    1   62    0    0
   23     BASIN M23               2    1    1    1   62    0    0
   24     BASIN M24               1    1    1    1   62    0    0
   33     detention m3            1    1    1    1   62    0    0
   34     LORA LAKE               2    1    1    1   62    0    0
   35     D/S OF VACA FARM        1    1    1    1   62    0    0
   37     sdn3ai vault            1    1    1    1   62    0    0
   38     MC basins               1    1    1    1   62    0    0
***   39     SDN3A/SDW1A POC         1    1    1    1   62    0    0
   43     sdn3 pond               1    1    1    1   62    0    0
***   44     sdn4 pond               1    1    1    1   62    0    0
***   45     nepl poc                1    1    1    1   62    0    0
   46     cargo pond              1    1    1    1   62    0    0
   47     sdw1a infiltration      2    1    1    1   62    0    0
   50     sr 518                  1    1    1    1   62    0    0
   51     SDN2X+SDN4X             1    1    1    1   62    0    0
   52     U/S OF LAKE REBA        1    1    1    1   62    0    0
   53     Reba outflow            1    1    1    1   62    0    0
   54     Miller RDF outflow      1    1    1    1   62    0    0
   57     sdw1b pond              1    1    1    1   62    0    0
  135     VACA FARMS              1    1    1    1   62    0    0
  147     sdw1a vault             2    1    1    1   62    0    0
  237     sdn3ao-pond c           1    1    1    1   62    0    0
  240     iws-ncps                2    1    1    1   62    0    0
  242     iws-nsmps               2    1    1    1   62    0    0
  247     sdw1a pond g            2    1    1    1   62    0    0
  257     sdw1b infiltration      2    1    1    1   62    0    0
  451     nepl VAULT              1    1    1    1   62    0    0
  452     nepl VAULT              1    1    1    1   62    0    0
  552     SDN1 POC                1    1    1    1   62    0    0
  570     SDW1B flow splitter     2    1    1    1   62    0    0
```

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```
*** 645    nep1 POC                          1    1    1    1   62    0    0
END GEN-INFO

ACTIVITY
  RCHRES *************** Active Sections *****************                        ***
  # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG
  1  999    1    0    0    0    0    0    0    0    0    0
END ACTIVITY

PRINT-INFO
  RCHRES *************** Printout Flags ****************** PIVL  PYR
  # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB *********
  1  999    5    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO

HYDR-PARM1                                                                       ***
  RCHRES  Flags for each HYDR Section                             FUNCT  for each
  # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each        possible   exit
          FG FG FG FG  possible   exit *** possible   exit               ***
           *  *  *  *   *  *  *  *  *        *  *  *  *  *
  1        0  1  0  0   4  5  0  0  0        0  0  0  0  0        2  2  2  2  2
  2        0  0  0  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
  3        0  0  0  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
  4        0  1  0  0   4  5  0  0  0        0  0  0  0  0        2  2  2  2  2
  5    12  0  0  0  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
 13        0  1  0  0   4  5  0  0  0        0  0  0  0  0        2  2  2  2  2
 14    22  0  0  0  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
 23        0  1  0  0   4  5  0  0  0        0  0  0  0  0        2  2  2  2  2
 24    33  0  0  0  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
 34        0  1  0  0   4  5  0  0  0        0  0  0  0  0        2  2  2  2  2
 35    46  0  1  0  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
 47        0  1  0  0   4  5  0  0  0        0  0  0  0  0        2  2  2  2  2
 48   146  0  1  0  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
147        0  1  1  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
148   239  0  1  1  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
240   257  0  1  1  0   4  5  0  0  0        0  0  0  0  0        2  2  2  2  2
258   552  0  1  0  0   4  0  0  0  0        0  0  0  0  0        2  2  2  2  2
553   570  0  1  1  0   4  5  0  0  0        0  0  0  0  0        2  2  2  2  2
END HYDR-PARM1

HYDR-PARM2
  RCHRES                                                                         ***
  # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50             ***
<------><--------><--------><--------><--------><--------><-------->            ***
  1              1   0.010                            0.3
  2              2   0.776                            0.3
  3              3   0.980                            0.3
  4              4   0.010                            0.3
  5              5   0.380                            0.3
 10             10   0.380                            0.3
 11             11   0.010                            0.3
 12             12   1.000                            0.3
 13             13   0.015                            0.3
 14             14   0.450                            0.3
 15             15   0.735                            0.3
 16             16   0.587                            0.3
 17             17   0.379                            0.3
```

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```
 23                 23   0.379                         0.0          0.3
 24                 24   0.379                                      0.3
 33                 33   0.200                                      0.3
 34                 34   0.852                                      0.3
 35                 35   0.663                                      0.3
 37                 37   0.010                         0.0          0.3
 38                 38   0.010                                      0.3
 43                 43   0.010                                      0.3
 46                 46   0.010                                      0.3
 47                 47   0.010                         0.0          0.3
 50                 50   0.010                                      0.3
 51                 51   0.010                                      0.3
 52                 52   0.010                                      0.3
 53                 53   0.010                                      0.3
 54                 54   0.010                         0.0          0.3
 57                 57   0.010                         0.0          0.3
135                135   0.350                                      0.3
147                147   0.010                                      0.3
237                237   0.010                         0.0          0.3
240                240   0.010                                      0.3
242                242   0.010                                      0.3
247                247   0.010                         0.0          0.3
257                257   0.010                         0.0          0.3
451                451   0.010                         0.0          0.3
452                452   0.010                         0.0          0.3
552                552   0.010                         0.0          0.3
570                570   0.010                         0.0          0.3
END HYDR-PARM2

HYDR-INIT
  RCHRES  Initial conditions for each HYDR section                        ***
  # -  # ***   VOL      Initial  value  of COLIND     Initial  value  of OUTDGT
        *** ac-ft      for each possible exit        for each possible exit
<------><-------->      <---><---><---><---><---> *** <---><---><---><---><--->
  1     2.0              4.0  5.0
  2     0.0              4.0
  3     0.0              4.0
  4     2.0              4.0  5.0
  5     0.0              4.0
 10     0.0              4.0
 11     0.0              4.0
 12     0.0              4.0
 13    10.0              4.0  5.0
 14     0.0              4.0
 15     0.0              4.0
 16     0.0              4.0
 17     0.0              4.0
 23     6.0              4.0  5.0
 24     0.0              4.0
 33     0.0              4.0
 34     9.0              4.0  5.0
 35     0.1              4.0
 37     0.0              4.0
 38     0.1              4.0
 43     0.0              4.0
 46     0.0              4.0
 47     0.0              4.0  5.0
```

```
    50      0.0                4.0
    51      0.0                4.0
    52      0.0                4.0
    53      0.1                4.0
    54      2.25               4.0
    57      0.0                4.0
   237      0.00               4.0
   147      0.00               4.0  5.0
   135      0.00               4.0
   240      0.0                4.0  5.0
   242      0.0                4.0  5.0
   247      0.0                4.0  5.0
   257      0.0                4.0  5.0
   451      0.0                4.0
   452      0.0                4.0
   552      0.0                4.0
   570      0.0                4.0  5.0
  END HYDR-INIT
END RCHRES

FTABLES
***UPPER BASIN
***===========

  FTABLE      1
          *** REVISED 8/16/00 ADDED 2ND OUTFLOW
 ROWS COLS ***
   11    5
     DEPTH      AREA    VOLUME   OUTFLOW OUTFLOW2***
     0.00       3.00     0.00      0.00     0.00
     2.50       3.00     7.50      0.00     0.11
     3.00       3.00     9.00      1.80     0.11
     3.50       3.30    10.58      5.00     0.11
     4.00       3.60    12.30     10.90     0.11
     4.50       3.90    14.18     17.50     0.11
     5.00       4.10    16.18     26.20     0.11
     5.50       4.30    18.28     32.50     0.11
     6.00       4.50    20.48     35.90     0.11
     7.00       5.00    25.23     38.10     0.11
     8.00       5.50    30.48     46.40     0.11
  END FTABLE  1

  FTABLE      2
 ROWS COLS ***
    9    4
     DEPTH      AREA    VOLUME   OUTFLOW   ***
     0.000    0.0000    0.0000      0.00
     0.100    0.2571    0.0129      0.16
     0.500    0.3873    0.1417      6.53
     1.000    0.5501    0.3761     25.95
     1.500    0.7128    0.6918     59.86
     2.000    0.8756    1.0889    110.67
     3.000    1.2011    2.1273    272.24
     3.500    1.3639    2.7685    387.38
     4.000    1.5266    3.4912    528.19
  END FTABLE  2
```

```
FTABLE       3
ROWS COLS ***
 12    4
   DEPTH       AREA     VOLUME    OUTFLOW     ***
   0.000     0.0000     0.0000       0.00
   0.100     0.9669     0.0483       0.13
   0.500     1.0637     0.4545       4.92
   1.000     1.1846     1.0165      17.12
   1.500     1.3055     1.6390      34.92
   2.000     1.4264     2.3220      57.95
   2.500     1.5473     3.0654      86.14
   3.000     1.6682     3.8693     119.53
   3.500     1.7891     4.7336     158.24
   4.000     1.9100     5.6584     202.41
   4.500     2.0294     6.6310     251.52
   5.000     2.1488     7.6624     306.28
END FTABLE  3

FTABLE       4
          *** REVISED 8/16/00 ADDED 2ND OUTFLOW
ROWS COLS ***
  7    5
   DEPTH       AREA     VOLUME    OUTFLOW OUTFLOW2***
    0.00     3.00      0.00       0.00       0.00
    2.50     4.50      9.38       0.00       0.11
    3.00     6.00      12.00      6.00       0.11
    4.00     10.00     20.00      13.00      0.11
    5.00     15.00     32.50      20.00      0.11
    6.00     20.00     50.00      26.00      0.11
    7.00     25.00     72.50      168.00     0.11
END FTABLE  4

FTABLE       5
ROWS COLS ***
 10    4
   DEPTH       AREA     VOLUME    OUTFLOW     ***
   0.000     0.0000     0.0000       0.00
   0.100     0.1010     0.0051       0.03
   0.500     0.1754     0.0603       1.46
   1.000     0.2684     0.1713       6.16
   1.500     0.3614     0.3288      14.89
   2.000     0.4544     0.5327      28.48
   2.500     0.5474     0.7832      47.70
   3.000     0.6404     1.0801      73.29
   3.500     0.7334     1.4236     105.94
   4.000     0.8264     1.8136     146.33
END FTABLE  5

FTABLE      10
ROWS COLS ***
  9    4
   DEPTH       AREA     VOLUME    OUTFLOW     ***
   0.000     0.0000     0.0000       0.00
   0.100     0.1010     0.0051       0.06
   0.500     0.1660     0.0585       2.27
   1.000     0.2472     0.1618       9.32
   1.500     0.3285     0.3057      22.08
```

2.000	0.4097	0.4902	41.66
2.500	0.4909	0.7154	69.09
3.000	0.5722	0.9511	105.37
4.000	0.6887	1.6116	209.70

END FTABLE 10

POST AMBAUM DETENTION ***
FTABLE 11
ROWS COLS ***
12 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
1.000	0.1000	0.2300	3.90
2.000	0.2000	0.6000	6.30
3.000	0.3000	0.9700	8.10
4.000	0.4000	1.3400	11.10
5.000	0.5000	1.8200	16.00
6.000	0.6000	2.2700	19.10
7.000	0.7000	2.8300	21.60
8.000	0.8000	3.3700	30.80
9.000	0.9000	4.0000	38.10
10.000	1.0000	4.6500	74.10
10.500	1.1000	5.2000	133.00
11.000	1.1500	6.0000	500.00
11.500	1.3000	11.000	1300.00

END FTABLE 11

FTABLE 12
ROWS COLS ***
6 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.100	0.6327	0.0316	0.15
0.500	0.7960	0.3174	5.87
1.000	1.0002	0.7664	21.53
1.500	1.2043	1.3176	46.43
2.000	1.4085	1.9708	81.20
3.000	1.8168	3.5834	183.79
4.000	2.2251	5.6044	336.22
5.000	2.6335	8.0337	545.30
6.000	3.0418	10.8713	817.51

END FTABLE 12

FTABLE 13
*** REVISED 8/16/00 ADDED 2ND OUTFLOW
ROWS COLS ***
7 5

DEPTH	AREA	VOLUME	OUTFLOW	OUTFLOW2***
0.000	40.000	0.0000	0.00	0.00
1.000	41.400	40.000	0.00	0.11
1.500	42.000	60.000	10.00	0.11
2.000	42.700	80.000	16.00	0.11
2.500	43.300	100.00	20.00	0.11
3.000	44.000	120.00	28.00	0.11
5.000	45.000	210.00	45.00	0.11

END FTABLE 13

```
 FTABLE      14
ROWS COLS ***
   8     4
    DEPTH       AREA      VOLUME    OUTFLOW    ***
    0.000     0.0000     0.0000        0.00
    0.100     0.3361     0.0168        0.24
    0.500     0.3809     0.1602        9.04
    1.000     0.4370     0.3647       31.61
    1.500     0.4930     0.5972       65.00
    2.000     0.5491     0.8577      108.85
    2.500     0.6051     1.1462      163.33
    3.000     0.6612     1.4628      228.78
 END FTABLE 14

 FTABLE      15
ROWS COLS ***
   4     4
    DEPTH       AREA      VOLUME    OUTFLOW    ***
     0.00       0.10       0.00        0.00
     1.00       1.00       0.55       91.00
     2.00       1.10       1.60      268.00
     3.00       1.20       2.75      493.00
 END FTABLE 15

 FTABLE      16
ROWS COLS ***
   4     4
    DEPTH       AREA      VOLUME    OUTFLOW    ***
     0.00       0.10       0.00        0.00
     1.00       1.00       0.55       74.00
     2.00       1.10       1.60      219.00
     3.00       1.20       2.75      403.00
 END FTABLE 16

 FTABLE      17
ROWS COLS ***
   5     4
    DEPTH       AREA      VOLUME    OUTFLOW    ***
     0.00       0.10       0.00        0.00
     1.00       1.00       0.55       59.00
     2.00       1.10       1.60      173.00
     3.00       1.20       2.75      318.00
     4.00       1.30       4.00      484.00
 END FTABLE 17

 FTABLE      23
ROWS COLS ***   HERMES
   9     5
    DEPTH       AREA      VOLUME    OUTFLOW OUTFLOW    ***
     0.00       0.00       0.00       0.00     0.00               0.00
     5.00       0.50       1.91       0.00     0.00             305.00
    11.00       0.79       5.79       0.00     0.00             311.00
    15.00       1.13       9.64       0.50     0.01             315.00
    19.00       1.72      15.34       0.50     0.05             319.00
    29.00       2.86      38.25       0.50     0.10             329.00
    39.00       4.40      74.55       0.50     0.20             339.00
    50.00       6.22     132.98       0.50     0.30             350.00
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    60.00     10.00    1212.98       0.50     0.40         360.00
 END FTABLE 23

 FTABLE     24
ROWS COLS ***
   9    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0000     0.0000       0.00
    0.100     0.2571     0.0129       0.16
    0.500     0.3873     0.1417       6.53
    1.000     0.5501     0.3761      25.95
    1.500     0.7128     0.6918      59.86
    2.000     0.8756     1.0889     110.67
    3.000     1.2011     2.1273     272.24
    3.500     1.3639     2.7685     387.38
    4.000     1.5266     3.4912     528.19
 END FTABLE 24

 FTABLE     33
ROWS COLS ***
  11    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00       1.00       0.00       0.00
     0.50       1.20       0.55       2.00
     1.00       1.40       1.20       6.00
     1.50       1.60       1.95       9.00
     2.00       1.80       2.80      13.00
     2.50       2.00       3.75      16.50
     3.00       2.20       4.80      20.00
     3.50       2.40       5.95      23.00
     4.00       2.60       7.20      26.00
     5.00       2.80       9.90     104.00
     6.00       3.00      12.80     246.00
 END FTABLE 33

 FTABLE     34
ROWS COLS *** REVISED 11/19/97 BASED ON HEC-RAS MODEL
          *** REVISED 8/16/00 ADDED 2ND OUTFLOW
   6    5
    DEPTH       AREA     VOLUME    OUTFLOW OUTFLOW2***
     0.00       3.00       0.00       0.00     0.00
     3.00       3.05       9.08       0.00     0.11
     4.00       3.10      12.15       0.00     0.11
     5.00       3.15      15.28       0.00     0.11
     6.00       3.20      18.45       72.0     0.11
     7.00       3.25      21.68      225.0     0.11
 END FTABLE 34

 FTABLE     35
ROWS COLS *** REVISED 11/19/97 BASED ON HECRAS MODEL
   5    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00       0.10       0.00       0.00
     1.00       1.10       0.60      38.00
     2.00       1.20       1.75     108.00
     3.00       1.30       3.00     194.00
     4.00       1.40       4.35     290.00
```

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 END FTABLE 35

 FTABLE     38
ROWS COLS ***
   7    4
    DEPTH      AREA     VOLUME   OUTFLOW   ***
    0.000    0.0000    0.0000      0.00
    1.000    0.4000    0.4000      2.00
    1.500    0.5000    1.0000      4.00
    2.000    0.9000    1.3000     11.00
    2.500    1.3000    1.6000     15.00
    3.000    1.6000    2.0000     18.00
    3.500    1.9000    2.5000     20.80
 END FTABLE 38

 FTABLE     45
ROWS COLS ***
   4    4
    DEPTH      AREA     VOLUME   OUTFLOW   ***
    0.000    0.0010    0.0000      0.00
    0.000    0.0100    0.0100     10.00
    0.100    0.1000    0.1000    100.00
    1.000    1.0000    1.0000   1000.00
   10.000   10.0000   10.0000  10000.00
 END FTABLE 45

 FTABLE    645
ROWS COLS ***
   4    4
    DEPTH      AREA     VOLUME   OUTFLOW   ***
    0.000    0.0010    0.0000      0.00
    0.000    0.0100    0.0100     10.00
    0.100    0.1000    0.1000    100.00
    1.000    1.0000    1.0000   1000.00
   10.000   10.0000   10.0000  10000.00
 END FTABLE645

 FTABLE     50
ROWS COLS ***
  10    4
    DEPTH      AREA     VOLUME   OUTFLOW   ***
     0.00      1.00      0.00      0.00
     0.50      1.10      0.53      5.00
     1.00      1.20      1.10     15.00
     1.50      1.30      1.73     25.00
     2.00      1.40      2.40     35.00
     2.50      1.50      3.13     52.00
     3.00      1.60      3.90     70.00
     3.50      1.70      4.73     87.00
     4.00      1.80      5.60    105.00
     6.00      1.90      9.30    165.00
 END FTABLE 50

 FTABLE     52
ROWS COLS ***
   6    4
```

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    DEPTH      AREA     VOLUME   OUTFLOW   ***
    0.000     0.0000    0.0000      0.00
    0.100     0.3680    0.0184      0.25
    0.500     0.3717    0.1664      9.39
    1.000     0.3763    0.3534     31.06
    2.000     0.3819    0.7325     94.37
    3.000     0.3874    1.1171    174.33
 END FTABLE 52

 FTABLE    552
ROWS COLS ***  SDN1 VAULT EFFECTIVE DEPTH=12 FT  RISER=24 INCHES
  15    4
    DEPTH      AREA     VOLUME   OUTFLOW   ***
    0.000     0.4308    0.0000      0.00
    1.290     0.4308    0.6520     0.111
    2.130     0.4308    1.0760     0.143
    3.530     0.4308    1.7830     0.184
    4.640     0.4308    2.3430     0.211
    5.200     0.4308    2.6260     0.223
    6.320     0.4308    3.1920     0.246
    7.430     0.4308    3.7530     0.267
    8.200     0.4308    4.1410     0.280
    9.220     0.4308    4.6570     0.407
   10.190     0.4308    5.1460     0.567
   11.250     0.4308    5.6820     0.954
   12.100     0.4308    6.1110     2.130
   12.300     0.4308    6.2120     4.730
   13.700     0.4308    6.9190    21.360
 END FTABLE552

 FTABLE     53
OLD LAKE REBA                                ***
MAX DEPTH = 4.9 FEET                         ***
30" CMP, 40 CFS DISCHARGE AT MAX DEPTH       ***
ROWS COLS ***
   7    4
    DEPTH      AREA     VOLUME   OUTFLOW   ***
    0.000     2.4000    0.0000      0.00
    1.000     2.5800    2.5000     18.00
    2.000     2.9400    5.3000     26.00
    3.000     3.4100    8.4000     31.00
    4.000     3.8800    12.100     36.00
    4.900     4.3000    15.800     40.00
    6.000     4.3000    15.810    500.00
 END FTABLE 53

 FTABLE     54
EXISTING MILLER CREEK DETENTION FACILITY*** REVISED STORAGE/Q DATA
GATE SETTING: 2.0 FEET***  BASED ON CALIBRATION FILE
ROWS COLS ***
  12    4
    DEPTH      AREA     VOLUME   OUTFLOW   ***
    0.000      0.00       0.00      0.00
    1.300      0.01       0.01     10.00
    2.000      0.01       0.02     20.00
    2.900      0.70       0.40     30.00
    4.000      1.50       1.50     40.00
```

5.400	3.50	4.90	50.00
7.000	8.60	13.30	60.00
8.800	15.60	34.80	70.00
10.000	19.90	57.30	76.00
10.500	21.50	68.00	92.00
11.000	23.10	78.80	179.00
11.500	24.70	88.60	303.00

END FTABLE 54

FTABLE 104
MILLER CREEK DETENTION FACILITY*** WITH ADD'L AREA 1+AREA 2 55.5 ACFT @ 10FT
GATE SETTING: 2.0 FEET*** EXISTING OUTLET NO LOW FLOW CONTROL
ROWS COLS ***
17 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.500	0.0100	0.0100	2.50
1.500	0.0300	0.2800	14.29
2.500	1.1100	1.3900	24.88
3.500	2.6100	4.0000	34.51
4.500	4.6100	9.1400	43.20
5.500	7.1200	19.600	50.98
6.000	8.3600	21.180	54.53
6.500	11.870	30.060	57.87
7.000	15.370	38.930	61.00
7.500	18.870	47.800	63.91
8.000	21.860	59.160	66.62
8.500	24.850	70.510	69.12
9.000	27.340	84.160	71.42
9.500	29.820	97.820	73.53
10.000	32.050	112.83	75.44
10.500	34.275	127.84	90.74
11.500	38.220	161.54	320.00

END FTABLE104

FTABLE 69
PRE-MILLER CREEK DETENTION FACILITY***
ROWS COLS ***
12 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.100	0.1860	0.0093	0.12
0.500	0.2552	0.0975	4.84
1.000	0.3417	0.2467	18.49
1.500	0.4282	0.4392	41.30
2.000	0.5148	0.6750	74.40
2.500	0.6013	0.9540	119.01
3.000	0.6878	1.2763	176.30
3.500	0.7744	1.6418	247.41
4.000	0.8609	2.0506	333.43
4.500	0.9470	2.4992	434.59
5.000	1.0331	2.9905	552.33

END FTABLE 69

*** PROJECT CONDITION PONDS/VAULTS
FTABLE 452
ROWS COLS ***

*** NEW NORTH EMPLOYEE PARKING LOT VAULT (NEPL)
*** PARALLEL VAULT BASED ON KCRTS EFFECTIVE DEPTH=20 FT
20 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	3.214	0.000	0.000
1.11	3.214	0.826	0.129
1.57	3.214	1.168	0.154
3.43	3.214	2.551	0.227
4.83	3.214	3.593	0.269
8.08	3.214	6.010	0.348
10.41	3.214	7.743	0.395
12.74	3.214	9.476	0.437
14.00	3.214	10.413	0.458
14.65	3.214	10.897	0.557
16.09	3.214	11.968	0.665
16.23	3.214	12.072	0.754
17.92	3.214	13.329	1.140
18.22	3.214	13.552	1.310
18.81	3.214	13.991	1.860
19.11	3.214	14.214	2.190
20.00	3.214	14.876	3.350
20.20	3.214	15.025	5.110
20.70	32.14	15.397	14.820
21.00	32.14	15.620	18.560

END FTABLE452

FTABLE 451
ROWS COLS ***
*** NORTH EMPLOYEE PARKING LOT VAULT (NEPL)
*** EXISTING VAULT W/MODIFIED OUTLET EFFECTIVE DEPTH= 18.0 FT
14 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.2240	0.0000	0.00
2.170	0.2240	0.4860	0.031
4.260	0.2240	0.9550	0.043
5.930	0.2240	1.3290	0.051
8.030	0.2240	1.8000	0.059
10.120	0.2240	2.2680	0.066
12.210	0.2240	2.7360	0.073
14.040	0.2240	3.1460	0.109
15.510	0.2240	3.4760	0.166
16.220	0.2240	3.6350	0.295
18.000	0.2240	4.0340	1.080
18.400	0.2240	4.1240	5.400
19.000	0.2240	4.2580	12.680
19.900	0.2240	4.4600	17.080

END FTABLE451

FTABLE 46
ROWS COLS ***
SDN-6: 24TH STREET CARGO VAULT *** EFFECTIVE DEPTH=14 FT RISER DIA=12 IN
20 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.35	0.000	0.000
0.37	0.35	0.131	0.021
1.19	0.35	0.421	0.037

3.39	0.35	1.198	0.063
5.03	0.35	1.778	0.077
7.23	0.35	2.556	0.092
9.15	0.35	3.235	0.104
10.25	0.35	3.624	0.110
10.53	0.35	3.723	0.111
10.92	0.35	3.861	0.128
12.00	0.35	4.242	0.165
12.13	0.35	4.288	0.190
12.95	0.35	4.578	0.245
13.77	0.35	4.868	0.282
14.00	0.35	4.949	0.291
14.10	0.35	4.985	0.910
14.20	0.35	5.020	2.040
14.30	0.35	5.056	3.500
14.50	0.35	5.126	7.200
14.70	0.35	5.197	11.720

END FTABLE 46

*** SDW-1A: 3RD RUNWAY POND G TO MILLER CREEK (LEVEL 2): ***

FTABLE 47

*** PROJECT SDW1A EFFECTIVE DIAMETER=3.0 FT

ROWS COLS *** INFILTRATION TANK TO OBTAIN 0.3 CFS

14 5

DEPTH	AREA	VOLUME	STORMQ	INFILTRQ ***
0.000	0.000	0.000	0.000	0.000
0.250	0.002	0.002	0.000	0.027
0.500	0.004	0.004	0.000	0.054
1.000	0.012	0.012	0.000	0.109
1.500	0.020	0.020	0.000	0.164
2.000	0.029	0.029	0.000	0.218
2.500	0.036	0.036	0.000	0.272
3.000	0.041	0.0406	0.000	0.327
3.100	0.041	0.0419	0.596	0.338
3.200	0.041	0.0420	1.685	0.349
3.300	0.041	0.0421	3.096	0.360
3.400	0.041	0.0422	4.766	0.371
3.500	0.041	0.0423	6.661	0.382
3.750	0.041	0.0424	12.237	0.409

END FTABLE 47

*** SDW-1A: 3RD RUNWAY NORTH POND G TO MILLER CREEK (LEVEL 2): ***

FTABLE 147

*** PROJECT SDW1A EFFECTIVE DEPTH=14.0 FT RISER DIA 24 INCHES

ROWS COLS *** VAULT BASED ON INFILTRATION=0.15CFS

17 5

DEPTH	AREA	VOLUME	INFILTRQ	BYPASS Q***
0.000	0.689	0.000	0.0000	0.0000
0.010	0.689	0.007	0.1400	0.0000
1.000	0.689	0.689	0.1408	0.0000
2.000	0.689	1.377	0.1417	0.0000
4.000	0.689	2.755	0.1432	0.0000
6.000	0.689	4.132	0.1446	0.0000
8.000	0.689	5.510	0.1461	0.0000
10.000	0.689	6.887	0.1475	0.0000
12.000	0.689	8.264	0.1489	0.0000

14.000	0.689	9.642	0.1503	0.0000
16.000	0.689	11.019	0.1517	0.0000
16.750	0.689	11.536	0.1517	10.7600
16.900	0.689	11.639	0.1517	13.9600
17.000	0.689	11.708	0.1517	16.1000
17.100	0.689	11.777	0.1517	18.5700
17.300	0.689	11.915	0.1517	23.8600
18.000	0.689	12.397	0.1517	45.5400

END FTABLE147

*** SDW-1A: 3RD RUNWAY NORTH POND G TO MILLER CREEK (LEVEL 2): ***

FTABLE 247

*** PROJECT SDW1A EFFECTIVE DEPTH=12.0 FT RISER DIA 12 INCHES

ROWS COLS *** POND BASED ON INFILTRATION=0.15CFS

17 5

DEPTH	AREA	VOLUME	STORMQ	INFILTRQ ***
0.000	1.300	0.000	0.00	0.00
0.010	1.310	0.010	0.001	0.15
1.000	1.320	1.320	0.007	0.15
2.000	1.342	2.650	0.010	0.15
3.000	1.363	4.000	0.012	0.15
4.000	1.385	5.370	0.013	0.15
5.000	2.672	8.000	0.015	0.15
6.000	2.739	10.700	0.017	0.15
7.000	2.807	13.470	0.018	0.15
8.000	2.876	16.300	0.019	0.15
8.300	2.896	17.176	0.031	0.15
9.000	2.945	19.210	0.041	0.15
10.000	3.014	22.180	0.051	0.15
11.000	3.084	25.228	0.058	0.15
11.100	3.092	25.540	0.675	0.15
11.300	3.106	26.162	3.260	0.15
12.000	3.155	28.340	15.190	0.15

END FTABLE247

*** SDN3A: 3RD RUNWAY VAULT TO MILLER CREEK (LEVEL 2): ***

FTABLE 37

*** PROJECT C SDN3A EFFECTIVE DEPTH=11.0FT RISER DIA=24 INCHES

ROWS COLS *** VAULT BASED ON IMPERVIOUS TOP SURO

14 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.644	0.000	0.000
0.010	0.644	0.006	0.001
1.000	0.644	0.643	0.016
3.980	0.644	2.558	0.033
6.030	0.644	3.876	0.041
9.010	0.644	5.792	0.050
10.00	0.644	6.428	0.052
10.46	0.644	6.724	0.072
11.00	0.644	7.071	0.082
11.10	0.644	7.135	0.699
11.20	0.644	7.199	1.830
11.30	0.644	7.264	3.290
11.40	0.644	7.328	5.020
11.60	0.644	7.456	9.140

END FTABLE 37

*** SDN3A: 3RD RUNWAY POND C TO MILLER CREEK (LEVEL 2): ***

FTABLE 237

*** PROJECT C SDN3A EFFECTIVE DEPTH= 9.0FT RISER DIA=24 INCHES

ROWS COLS *** POND BASED ON INTERFLOW AND PERVIOUS TOP SURC

19 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	1.3090	0.000	0.00
0.020	1.3120	0.026	0.009
1.020	1.3550	1.358	0.070
2.070	1.4030	2.806	0.100
3.130	1.4530	4.320	0.123
4.020	1.4980	5.632	0.139
5.070	1.5460	7.229	0.156
7.750	1.6720	11.549	0.193
7.800	1.6800	11.633	0.199
7.850	1.6840	11.718	0.213
8.250	1.7050	12.395	0.249
8.340	1.7090	12.549	0.270
8.570	1.7210	12.944	0.313
8.950	1.7410	13.601	0.354
9.500	1.7690	14.567	0.399
9.600	1.7740	14.744	0.714
9.800	1.7850	15.100	2.020
10.300	1.8110	15.999	3.840
10.900	1.8430	17.095	4.960

END FTABLE237

*** SDN-3X: 3RD RUNWAY NORTH VAULT (LEVEL 2): ***

FTABLE 43

ROWS COLS *** EFFECTIVE DEPTH=20 FT RISER DIA=24 INCHES

21 4

DEPTH (FT)	AREA (ACRES)	VOLUME (ACRE-FT)	FLOW (FT3/S) ***
0.00	1.288	0.00	0.00
0.14	1.288	0.180	0.067
1.39	1.288	1.790	0.216
3.35	1.288	4.314	0.336
5.31	1.288	6.839	0.423
8.06	1.288	10.380	0.521
8.84	1.288	11.385	0.545
10.02	1.288	12.905	0.580
11.98	1.288	15.429	0.635
12.37	1.288	15.931	0.645
14.00	1.288	18.030	0.686
14.10	1.288	18.159	0.705
14.91	1.288	19.202	0.757
16.09	1.288	20.722	0.810
18.00	1.288	23.182	0.881
18.32	1.288	23.594	1.150
18.76	1.288	24.161	1.360
20.00	1.288	25.758	1.680
20.10	1.288	25.886	2.320
20.50	1.288	26.402	8.620
20.80	1.288	26.788	15.370

END FTABLE 43

*** SDN-4X/2X: 3RD RUNWAY NORTH VAULT (COMBINED FACILITY)

FTABLE 51
ROWS COLS *** EFFECTIVE DEPTH=19FT RISER DIA=24 INCHES
20 4 ***

DEPTH (FT)	AREA (ACRES)	VOLUME (ACRE-FT)	OUTFLOW (FT3/S)	***
0.00	0.789	0.000	0.000	
0.16	0.789	0.126	0.056	
1.51	0.789	1.192	0.169	
3.28	0.789	2.588	0.249	
5.49	0.789	4.332	0.322	
7.26	0.789	5.729	0.370	
10.35	0.789	8.168	0.442	
12.12	0.789	9.564	0.478	
13.44	0.789	10.606	0.503	
14.33	0.789	11.308	0.520	
15.57	0.789	12.287	0.654	
16.72	0.789	13.194	0.828	
17.19	0.789	13.565	0.950	
17.63	0.789	13.913	1.030	
18.00	0.789	14.205	1.080	
19.00	0.789	14.994	1.960	
19.10	0.789	15.073	2.580	
19.40	0.789	15.309	6.930	
19.60	0.789	15.467	11.080	
20.00	0.789	15.783	17.190	

END FTABLE 51

*** SDW-1B:3RD RUNWAY CENTRAL SOUTH POND D TO MILLER CREEK (LEVEL 2): ***
FTABLE 57
ROWS COLS *** EFFECTIVE DEPTH = 14.0 FT
17 4

DEPTH (FT)	AREA (ACRES)	VOLUME (ACRE-FT)	STORMQ (FT3/S)	***
0.00	2.430	0.000	0.000	
0.01	2.430	0.041	0.010	
1.00	2.680	2.411	0.183	
2.00	2.760	4.860	0.257	
3.00	2.818	7.370	0.319	
4.00	3.079	9.945	0.366	
5.00	5.832	15.320	0.411	
6.00	5.927	20.742	0.450	
7.00	6.022	26.264	0.481	
8.00	6.118	31.888	0.518	
9.00	6.210	37.613	0.550	
10.00	6.311	43.441	0.583	
11.00	6.408	49.372	0.609	
12.00	6.607	55.406	0.634	
13.00	6.405	61.543	0.764	
14.00	6.504	67.786	1.320	
15.00	7.000	70.000	16.600	

END FTABLE 57

*** SDW-1B:3RD RUNWAY CENTRAL SOUTH POND D TO MILLER CREEK (LEVEL 2): ***
FTABLE 257
*** PROJECT SDW1B EFFECTIVE DIAMETER=3.0 FT
ROWS COLS *** INFILTRATION TANK TO OBTAIN 0.2 CFS
15 5

DEPTH	AREA	VOLUME	STORMQ	INFILTRQ ***
0.000	0.001	0.000	0.000	0.000
0.010	0.001	0.001	0.000	0.002
0.250	0.002	0.002	0.000	0.017
0.500	0.004	0.004	0.000	0.035
1.000	0.012	0.012	0.000	0.071
1.500	0.020	0.020	0.000	0.106
2.000	0.029	0.029	0.000	0.142
2.500	0.036	0.036	0.000	0.178
3.000	0.041	0.0406	0.000	0.213
3.100	0.041	0.0420	0.596	0.220
3.200	0.041	0.0421	1.685	0.227
3.300	0.041	0.0422	3.096	0.233
3.400	0.041	0.0423	4.766	0.241
3.500	0.041	0.0424	6.661	0.248
3.750	0.041	0.0425	12.237	0.266

END FTABLE257

FTABLE 570
*** PROJECT SDW1B FLOW SPLITTER (to 257 and 57)
ROWS COLS ***
15 5

DEPTH	AREA	VOLUME	STORMQ	INFILTRQ ***
0.000	0.00	0.000	0.000	0.000
0.100	0.01	0.0002	0.000	0.050
0.400	0.01	0.0009	0.000	0.110
0.600	0.01	0.0014	0.000	0.130
0.750	0.01	0.0017	0.000	0.150
0.800	0.01	0.0018	0.720	0.150
1.000	0.01	0.0023	8.050	0.170
1.100	0.01	0.0025	13.330	0.180
1.200	0.01	0.0027	19.440	0.190
1.300	0.01	0.0030	26.270	0.190
1.400	0.01	0.0032	33.750	0.200
1.420	0.01	0.0033	35.320	0.200
1.440	0.01	0.0033	36.910	0.200
1.450	0.01	0.0034	37.920	0.200
1.460	0.01	0.0035	38.530	0.200

END FTABLE570

FTABLE 61
ROWS COLS ***
*** SDN-2X: DETAIN OVERFLOW FROM NCPS AND NSMPS-
17 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.5740	0.0000	0.00
1.200	0.5740	0.7710	0.151
2.220	0.5740	1.4270	0.205
3.240	0.5740	2.0830	0.247
3.650	0.5740	2.3460	0.262
4.260	0.5740	2.7380	0.283
4.660	0.5740	2.9950	0.296
5.680	0.5740	3.6510	0.327
6.640	0.5740	4.2680	0.517
7.650	0.5740	4.9170	0.644
8.670	0.5740	5.9710	0.739
9.810	0.5740	6.3570	0.836

```
    10.700     0.5740     6.8780      0.894
    11.000     0.5740     7.7130      0.978
    12.100     0.5740     7.7780      1.600
    12.300     0.5740     7.9060      4.200
    12.800     0.5740     8.2280     14.560
  END FTABLE 61

  PRE AMBAUM DETENTION ***
  FTABLE     111
 ROWS COLS ***
   15    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.000     0.0000     0.0000       0.00
     0.500     0.2160     0.0750       5.30
     1.000     0.2730     0.1990      21.10
     1.500     0.2890     0.3410      43.90
     2.000     0.2900     0.4830      68.80
     2.500     0.2910     0.6070      89.10
     3.000     0.2950     0.6820      90.00
     3.500     0.3000     2.1000     100.00
     4.000     0.3050     2.5000     105.00
     4.500     0.3100     3.0000     110.00
     5.000     0.3200     3.5000     120.00
     5.500     0.3300     4.0000     130.00
     6.000     0.3800     5.0530     166.48
     6.500     0.3980     5.9430     225.31
     7.000     0.4150     6.9040     320.10
  END FTABLE111

  FTABLE     135
 ROWS COLS *** VACA FARM
    6    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
      0.00       0.10       0.00       0.00
      1.00       0.10       0.10       4.00
      2.00       0.11       0.21       8.00
      2.50       1.00       0.48      13.00
      3.50       6.50       4.23      86.00
      4.50      13.00      13.98     235.00
  END FTABLE135

  FTABLE     240
*** NORTH SNOWMELT PUMP STATION (SDN-2) (INSTALLED IN LATE 1997/1998)
 ROWS COLS                                                           ***
   14    5
     DEPTH       AREA     VOLUME      (IWS)      (SDS)               ***
      (FT)    (ACRES) (ACRE-FT)       (CFS)      (CFS)               ***
       0.0      0.002       0.00       0.00       0.00
      1.00      0.002     0.0023       0.00       0.00
      2.00      0.002     0.0046       1.67       0.00
      3.00      0.002     0.0069       1.67       0.00
      4.00      0.002     0.0092       1.67       0.00
      5.00      0.002     0.0115       1.67       0.00
      5.25      0.002     0.0121       1.67       1.53
      5.50      0.002     0.0126       1.67       6.06
      5.75      0.002     0.0132       1.67      12.65
      6.00      0.002     0.0138       1.67      19.83
```

```
    6.25      0.002    0.0144       1.67      25.66
    6.50      0.002    0.0149       1.67      25.70
    6.75      0.002    0.0155       1.67      26.70
    7.00      0.002    0.0161       1.67      50.00
  END FTABLE240

  FTABLE    242
*** NORTH CARGO PUMP STATION (SDN-2) (INSTALLED IN OCTOBER 1997)                ***
 ROWS COLS
  14    5
   DEPTH     AREA     VOLUME       (IWS)      (SDS)                               ***
    (FT)    (ACRES)  (ACRE-FT)     (CFS)      (CFS)                             ***
     0.0      0.002       0.00      0.00       0.00
    1.00      0.002     0.0023      0.00       0.00
    2.00      0.002     0.0046      6.13       0.00
    3.00      0.002     0.0069      6.13       0.00
    4.00      0.002     0.0092      6.13       0.00
    5.00      0.002     0.0115      6.13       0.00
    5.25      0.002     0.0121      6.13       0.28
    5.50      0.002     0.0126      6.13       1.16
    5.75      0.002     0.0132      6.13       2.53
    6.00      0.002     0.0138      6.13       4.23
    6.25      0.002     0.0144      6.13       6.05
    6.50      0.002     0.0149      6.13       7.72
    6.75      0.002     0.0155      6.13       8.50
    7.00      0.002     0.0161      6.13       20.0
  END FTABLE242

END FTABLES

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>        <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                 <Name> # #***
  MASS-LINK        1
  conversion from acre-inches to acre-ft (1/12)              ***
PERLND     PWATER PERO       0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    1

  MASS-LINK        2
IMPLND     IWATER SURO       0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
RCHRES     ROFLOW                          RCHRES          INFLOW
  END MASS-LINK    3

  MASS-LINK        4
RCHRES     OFLOW  OVOL   1                 RCHRES          INFLOW IVOL
  END MASS-LINK    4

  MASS-LINK        5
RCHRES     OFLOW  OVOL   2                 RCHRES          INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
PERLND     PWATER SURO       0.0833333     RCHRES          INFLOW IVOL
PERLND     PWATER IFWO       0.0833333     RCHRES          INFLOW IVOL
```

```
  END MASS-LINK     6

  MASS-LINK         7
PERLND     PWATER AGWO        0.0833333    RCHRES          INFLOW IVOL
  END MASS-LINK     7

  MASS-LINK        10
COPY       OUTPUT MEAN                     COPY            INPUT  MEAN
  END MASS-LINK    10

  MASS-LINK        11
RCHRES     ROFLOW                          COPY            INPUT  MEAN
  END MASS-LINK    11

  MASS-LINK        12
COPY       OUTPUT MEAN                     RCHRES          INFLOW IVOL
  END MASS-LINK    12

  MASS-LINK        14
RCHRES     OFLOW  OVOL   1                 COPY            INPUT  MEAN
  END MASS-LINK    14

  MASS-LINK        15
RCHRES     OFLOW  OVOL   2                 COPY            INPUT  MEAN
  END MASS-LINK    15

  MASS-LINK        21
PERLND     PWATER PERO        0.0833333    COPY            INPUT  MEAN
  END MASS-LINK    21

  MASS-LINK        22
IMPLND     IWATER SURO        0.0833333    COPY            INPUT  MEAN
  END MASS-LINK    22

  MASS-LINK        26
PERLND     PWATER SURO        0.0833333    COPY            INPUT  MEAN
PERLND     PWATER IFWO        0.0833333    COPY            INPUT  MEAN
  END MASS-LINK    26

  MASS-LINK        27
PERLND     PWATER AGWO        0.0833333    COPY            INPUT  MEAN
  END MASS-LINK    27

END MASS-LINK

COPY
  TIMESERIES
  Copy-opn                                                                ***
    # -  #  NPT  NMN                                                      ***
   37   71          1
  240  242          1
  357  357          1
  645  645          1
  END TIMESERIES
END COPY

END RUN
```

```
RUN
GLOBAL
  ***  FILE: mill65F.inp REVISED Aug 2000  Joe Brascher(atc)
  *** for parameterix
  ***  SEATAC AIRPORT HSPF BASIN MODEL OF MILLER CREEK
  ***  - POST-MILLER CK DETENTION FACITY 10/92-6/93
  *** m23 AND M24 new area west of m2.  Flows to rdf
  *** Calibration file run for full length of record
  MILLER CREEK BASIN HSPF MODEL
  START       1948 10  1  0  0  END    1996  9 30 24  0
  RUN INTERP OUTPUT LEVEL    3
  RESUME     0 RUN     1
END GLOBAL

FILES
<type>  <fun>***<------------fname--------------------------------------------->
MESSU       24    D:\PARA\SEATAC\MILLER\lowflow\MILL.MES
WDM         25    D:\PARA\SEATAC\MILLER\lowflow\Mlowflow.wdm
            61    D:\PARA\SEATAC\MILLER\lowflow\PER.L61
            62    D:\PARA\SEATAC\MILLER\lowflow\RCH.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 01:00
      PERLND      14
      PERLND      16
      PERLND      18
      PERLND      24
      PERLND      26
      PERLND      28
      PERLND      34
      PERLND      44
      PERLND      54
      IMPLND      14
      RCHRES       1
      RCHRES      23
      RCHRES      24
      RCHRES       2
      RCHRES       3
      RCHRES      33
      RCHRES       4
      RCHRES       5
      RCHRES      50
      RCHRES      52
      RCHRES      53
      RCHRES      54
      RCHRES      34
      RCHRES     135
      RCHRES      35
      RCHRES      10
      RCHRES      16
      RCHRES      11
      RCHRES      13
      RCHRES      12
      RCHRES      15
      RCHRES      14
      RCHRES      17
```

```
    END INGRP
END OPN SEQUENCE                                                                        ***

COPY
  TIMESERIES                                                                            ***
  Copy-opn                                                                              ***
    # -  #  NPT  NMN
    1    5         1
  END TIMESERIES
END COPY

PERLND
  GEN-INFO
    <PLS >       Name            NBLKS  Unit-systems   Printer                          ***
    # -  #                              User  t-series Engl Metr                        ***
                                              in  out                                   ***
   14       TFF- TILL FOR FLT       1     1     1    1   61    0
   16       TFM- TILL FOR MOD       1     1     1    1   61    0
   18       TFS- TILL FOR STP       1     1     1    1   61    0
   24       TGF- TILL GR FLT        1     1     1    1   61    0
   26       TGM- TILL GR MOD        1     1     1    1   61    0
   28       TGS- TILL GR STP        1     1     1    1   61    0
   34       OF - OUTWASH FOR        1     1     1    1   61    0
   44       OG - OUTWASH GR         1     1     1    1   61    0
 ***PERLND FOR NEW AIRPORT FILL; NONE IN CALIBRATION
   45       AIRPORT FILL            1     1     1    1   61    0
   54       SA - WETLANDS           1     1     1    1   61    0
   64       RES- GROUNDWATER        1     1     1    1   61    0
  END GEN-INFO
  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC               ***
   14  200    0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
  PRINT-INFO
    <PLS > ******************** Print-flags ************************* PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC *********
   14  200    0    0    5    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
  PWAT-PARM1
    <PLS > ***************** Flags *******************
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE                              ***
   14         0    0    0    0    0    0    0    0    0
   16         0    0    0    0    0    0    0    0    0
   18         0    0    0    0    0    0    0    0    0
   24         0    0    0    0    0    0    0    0    0
   26         0    0    0    0    0    0    0    0    0
   28         0    0    0    0    0    0    0    0    0
   34         0    0    0    0    0    0    0    0    0
   44         0    0    0    0    0    0    0    0    0
   45         0    0    0    0    0    0    0    0    0
   54         0    0    0    0    0    0    0    0    0
   64         0    0    0    0    0    0    0    0    0
  END PWAT-PARM1
  PWAT-PARM2
    <PLS > ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
```

```
  14                   9.0000    0.3200    400.00    0.0500    0.5000    0.9960
  16                   9.0000    0.3200    400.00    0.1000    0.5000    0.9960
  18                   9.0000    0.3200    200.00    0.2000    0.5000    0.9960
  24                   9.0000    0.1200    400.00    0.0500    0.5000    0.9960
  26                   9.0000    0.1200    400.00    0.1000    0.5000    0.9960
  28                   9.0000    0.1200    200.00    0.2000    0.5000    0.9960
  34                  10.0000    2.0000    400.00    0.0500    0.3000    0.9960
  44                  10.0000    0.8000    400.00    0.0500    0.3000    0.9960
  45                   7.5000    0.0200    300.00    0.0700    0.0000    0.9000
  54                   8.0000    2.0000    100.00    0.0010    0.5000    0.9960
END PWAT-PARM2
PWAT-PARM3
  <PLS >***
  # -  #*** PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  14                            2.0000    2.0000      0.33      0.00       0.0
  16                            2.0000    2.0000      0.33      0.00       0.0
  18                            2.0000    2.0000      0.33      0.00       0.0
  24                            2.0000    2.0000      0.33      0.00        0.
  26                            2.0000    2.0000      0.33        0.        0.
  28                            2.0000    2.0000      0.33        0.        0.
  34                            2.0000    2.0000      0.33      0.00       0.0
  44                            2.0000    2.0000      0.33        0.        0.
  54                            10.000    2.0000      0.33        0.       0.7
END PWAT-PARM3
PWAT-PARM4
  <PLS >                                                          ***
  # -  #     CEPSC      UZSN      NSUR     INTFW       IRC    LZETP***
  14        0.2000    1.5000    0.3500     9.000    0.7000    0.7000
  16        0.2000    0.7500    0.3500     9.000    0.7000    0.7000
  18        0.2000    0.4500    0.3500     9.000    0.3000    0.7000
  24        0.1000    0.7500    0.2500     9.000    0.7000    0.2500
  26        0.1000    0.3750    0.2500     9.000    0.7000    0.2500
  28        0.1000    0.2250    0.2500     9.000    0.3000    0.2500
  34        0.2000    0.7500    0.3500     0.000    0.7000    0.7000
  44        0.1000    0.7500    0.2500     0.000    0.7000    0.2500
  54        0.1000    2.2500    0.5000     1.000    0.7000    0.8000
END PWAT-PARM4
PWAT-STATE1
  <PLS >  PWATER state variables***
  # -  #***   CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
  14         0.078        0.    0.2500      0.10     2.000     2.000     0.000
  16         0.078        0.    0.2500      0.10     2.000     2.000     0.000
  18         0.078        0.    0.2500      0.10     2.000     2.000     0.000
  24         0.051        0.    0.2500      0.10     2.000     2.000     0.000
  26         0.051        0.    0.2500      0.10     2.000     2.000     0.000
  28         0.051        0.    0.2500      0.10     2.000     2.000     0.000
  34         0.078        0.    0.2500      0.10     2.000     2.000     0.000
  44         0.051        0.    0.2500      0.10     2.000     2.000     0.000
  45         0.051        0.    0.2500      0.10     2.000     2.000     0.000
  54         0.051        0.    0.2500      0.10     2.000     2.000     0.000
  64         0.051        0.    0.2500      0.10     2.000     2.000     0.000
END PWAT-STATE1
END PERLND
IMPLND
  GEN-INFO
    <ILS >     Name            Unit-systems   Printer                     ***
    # -  #                   User  t-series Engl Metr                     ***
```

```
                                                 in  out                                                ***
 14      IMPERVIOUS                1    1    1   60     0
END GEN-INFO
ACTIVITY
  <ILS > ************* Active Sections ****
  # -  # ATMP SNOW IWAT  SLD  IWG IQAL  ***
 14         0    0    1    0    0    0
END ACTIVITY
PRINT-INFO
  <ILS > ******** Print-flags ******** PIVL  PYR
  # -  # ATMP SNOW IWAT  SLD  IWG IQAL *********
 14         0    0    6    0    0    0    1    9
END PRINT-INFO
IWAT-PARM1
  <ILS >          Flags              ***                                                                ***
  # -  # CSNO RTOP  VRS  VNN RTLI    ***                                                                ***
 14         0    0    0    0    0
END IWAT-PARM1
IWAT-PARM2
  <ILS >                                                                                                ***
  # -  #       LSUR     SLSUR      NSUR     RETSC                                                       ***
 14          100.00    0.0100    0.1000    0.1000
END IWAT-PARM2
IWAT-PARM3
  <ILS >                                                                                                ***
  # -  #     PETMAX    PETMIN                                                                           ***
 14
END IWAT-PARM3
IWAT-STATE1
  <ILS >  IWATER state variables                                                                        ***
  # -  #       RETS      SURS                                                                           ***
 14       1.0000E-3 1.0000E-3
END IWAT-STATE1
END IMPLND
                                                                                                        ***
EXT SOURCES
                                                                                                        ***
*** NOTE: The only RCHRES that precip and PET are applied to are lakes.
                                                                                                        ***
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
*** PRECIP/EVAP TO PERVIOUS/IMPERV SURFACES
WDM   1002 PREC     ENGLZERO  1.00         PERLND  14 200 EXTNL  PREC
WDM   1002 PREC     ENGLZERO  1.00         IMPLND  14     EXTNL  PREC
WDM      1 EVAP     ENGLZERO  0.8          PERLND  14  18 EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.8          PERLND  24  28 EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.8          PERLND  34  54 EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.8          PERLND  64     EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.8          IMPLND  14     EXTNL  PETINP
*** PRECIP/EVAP TO LAKES
WDM   1002 PREC     ENGLZERO               RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES   1     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES   4     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES   4     EXTNL  POTEV
WDM      1 EVAP     ENGLZERO    0.8        RCHRES   1     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES   1     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES   4     EXTNL  POTEV
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WDM    1002 PREC      ENGLZERO                     RCHRES   4      EXTNL   PREC
WDM    1002 PREC      ENGLZERO                     RCHRES  11      EXTNL   PREC
WDM       1 EVAP      ENGLZERO       0.8           RCHRES  11      EXTNL   POTEV
WDM    1002 PREC      ENGLZERO                     RCHRES  13      EXTNL   PREC
WDM       1 EVAP      ENGLZERO       0.8           RCHRES  13      EXTNL   POTEV
WDM    1002 PREC      ENGLZERO                     RCHRES  23      EXTNL   PREC
WDM       1 EVAP      ENGLZERO       0.8           RCHRES  23      EXTNL   POTEV
WDM    1002 PREC      ENGLZERO                     RCHRES  34      EXTNL   PREC
WDM       1 EVAP      ENGLZERO       0.8           RCHRES  34      EXTNL   POTEV
WDM    1002 PREC      ENGLZERO                     RCHRES  53      EXTNL   PREC
WDM       1 EVAP      ENGLZERO       0.8           RCHRES  53      EXTNL   POTEV
WDM    1002 PREC      ENGLZERO                     RCHRES  54      EXTNL   PREC
WDM       1 EVAP      ENGLZERO       0.8           RCHRES  54      EXTNL   POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
*** UPPER MILLER CREEK GROUNDWATER PUMPING
COPY *** 1 OUTPUT MEAN   1    12.1         WDM     18 FLOW     ENGL      REPL
*** GAUGE POINTS (17=MOUTH, 54=MILLER RDF, 50=SR 518, 18=WALKER CK)
RCHRES  35 HYDR   RO                       WDM   7035 FLOW     ENGL      REPL
RCHRES  17 HYDR   RO                       WDM     33 FLOW     ENGL      REPL
RCHRES  54 HYDR   RO                       WDM     34 FLOW     ENGL      REPL
RCHRES  50 HYDR   RO        ***            WDM     35 FLOW     ENGL      REPL
RCHRES  18 HYDR   RO        ***            WDM     36 FLOW     ENGL      REPL
*** MISC (20=WALKER WETLAND, 55=SR509, 56=1ST AVE, 1=ARBOR LAKE)
RCHRES  23 HYDR   STAGE  ***               WDM     91 STAG     ENGL      REPL
RCHRES  20 HYDR   RO     ***               WDM     37 FLOW     ENGL      REPL
RCHRES  55 HYDR   RO     ***               WDM     38 FLOW     ENGL      REPL
RCHRES  62 HYDR   RO     ***               WDM     39 FLOW     ENGL      REPL
RCHRES   1 HYDR   RO     ***               WDM     80 FLOW     ENGL      REPL
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
 ***MOUTH
RCHRES  54 HYDR   RO     1 1 0.000419   *** WDM    60 SIMQ     ENGL      REPL
RCHRES  17 HYDR   RO     1 1 0.000213   *** WDM    70 SIMQ     ENGL      REPL
END EXT TARGETS
                                                                             ***

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK    ***
<Name>   #                  <-factor->     <Name>   #   Tbl#    ***
  *** SUB-CATCHMENT 1 all agwo goes to sound
PERLND  16                        3.41     RCHRES   1      6
PERLND  26                      232.36     RCHRES   1      6
PERLND  34                        3.07     RCHRES   1      6
PERLND  44                       38.03     RCHRES   1      6
PERLND  54                        3.87     RCHRES   1      6
IMPLND  14                       56.14     RCHRES   1      2
 *** SUB-CATCHMENT 2 10% of area GW goes to vaca 90% goes to sound
PERLND  16                        5.56     RCHRES   2      6
PERLND  26                      200.05     RCHRES   2      6
PERLND  34                        0.46     RCHRES   2      6
PERLND  44                       38.71     RCHRES   2      6
PERLND  16                        0.56     RCHRES 135      7
PERLND  26                       20.01     RCHRES 135      7
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PERLND  34          0.05     RCHRES 135     7
PERLND  44          3.67     RCHRES 135     7
IMPLND  14         42.22     RCHRES   2     2
 *** SUB-CATCHMENT 23 New subbasin 15 % OF GW GOES TO VACCA 85% TO SOUND
PERLND  16          3.09     RCHRES  23     6
PERLND  26        156.15     RCHRES  23     6
PERLND  34          2.25     RCHRES  23     6
PERLND  44         45.84     RCHRES  23     6
PERLND  16          0.46     RCHRES 135     7
PERLND  26         23.42     RCHRES 135     7
PERLND  34          0.34     RCHRES 135     7
PERLND  44          6.88     RCHRES 135     7
IMPLND  14         58.44     RCHRES  23     2
 *** SUB-CATCHMENT 24 New subbasin 60 % OF GW GOES TO 11 40% TO SOUND
PERLND  26        135.43     RCHRES  24     6
PERLND  34          2.02     RCHRES  24     6
PERLND  44         69.29     RCHRES  24     6
PERLND  26         81.26     RCHRES  11     7
PERLND  34          1.21     RCHRES  11     7
PERLND  44         41.57     RCHRES  11     7
IMPLND  14         79.98     RCHRES  24     2
  *** SUB-CATCHMENT 3 agwo goes to vaca(135)
PERLND  16          8.26     RCHRES   3     6
PERLND  26        108.38     RCHRES   3     6
PERLND  34         16.02     RCHRES   3     6
PERLND  44        102.89     RCHRES   3     6
PERLND  54          0.04     RCHRES   3     6
PERLND  16          8.26     RCHRES 135     7
PERLND  26        108.38     RCHRES 135     7
PERLND  34         16.02     RCHRES 135     7
PERLND  44        102.89     RCHRES 135     7
PERLND  54          0.04     RCHRES 135     7
IMPLND  14         27.30     RCHRES   3     2
  *** SUB-CATCHMENT 4 10% of agwo goes to rchres 90% goes to sound
PERLND  16          2.95     RCHRES   4     6
PERLND  26         85.95     RCHRES   4     6
PERLND  34          3.75     RCHRES   4     6
PERLND  44         92.06     RCHRES   4     6
PERLND  16          0.30     RCHRES   4     7
PERLND  26          8.60     RCHRES   4     7
PERLND  34          0.38     RCHRES   4     7
PERLND  44          9.21     RCHRES   4     7
IMPLND  14         18.43     RCHRES   4     2
  *** SUB-CATCHMENT 4a 70% of agwo goes to rchres 30% goes to sound
PERLND  16          8.66     RCHRES   4     6
PERLND  26         61.64     RCHRES   4     6
PERLND  34         22.06     RCHRES   4     6
PERLND  44         78.09     RCHRES   4     6
PERLND  54         12.50     RCHRES   4     6
PERLND  16          6.06     RCHRES   4     7
PERLND  26         43.15     RCHRES   4     7
PERLND  34         15.44     RCHRES   4     7
PERLND  44         54.66     RCHRES   4     7
PERLND  54          8.75     RCHRES   4     7
IMPLND  14         29.14     RCHRES   4     2
  *** SUB-CATCHMENT 5
PERLND  26         10.29     RCHRES   5     1
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PERLND 44	50.04	RCHRES	5	1
PERLND 54	10.74	RCHRES	5	1
IMPLND 14	16.31	RCHRES	5	2
*** SUB-CATCHMENT 6				
PERLND 16	10.66	RCHRES	53	1
PERLND 26	41.08	RCHRES	53	1
PERLND 34	21.75	RCHRES	53	1
PERLND 44	13.39	RCHRES	53	1
PERLND 54	0.82	RCHRES	53	1
IMPLND 14	7.14	RCHRES	53	2
*** SUB-CATCHMENT 8				
PERLND 44	22.21	RCHRES	35	1
IMPLND 14	6.60	RCHRES	35	2
*** SUB-CATCHMENT 9				
PERLND 16	4.94	RCHRES	34	1
PERLND 26	14.32	RCHRES	34	1
PERLND 34	0.05	RCHRES	34	1
PERLND 44	56.70	RCHRES	34	1
PERLND 54	0.01	RCHRES	34	1
IMPLND 14	22.46	RCHRES	34	2
*** SUB-CATCHMENT 10				
PERLND 16	4.15	RCHRES	10	1
PERLND 26	31.94	RCHRES	10	1
PERLND 44	95.23	RCHRES	10	1
IMPLND 14	71.97	RCHRES	10	2
*** SUB-CATCHMENT 11 25% OF AGWO GOES TO 15				
PERLND 16	0.89	RCHRES	11	6
PERLND 26	217.92	RCHRES	11	6
PERLND 34	1.32	RCHRES	11	6
PERLND 44	65.65	RCHRES	11	6
PERLND 16	0.67	RCHRES	11	7
PERLND 26	163.44	RCHRES	11	7
PERLND 34	0.99	RCHRES	11	7
PERLND 44	49.24	RCHRES	11	7
PERLND 16	0.22	RCHRES	15	7
PERLND 26	54.48	RCHRES	15	7
PERLND 34	0.33	RCHRES	15	7
PERLND 44	16.41	RCHRES	15	7
IMPLND 14	230.80	RCHRES	11	2
*** SUB-CATCHMENT 12				
PERLND 16	0.39	RCHRES	12	1
PERLND 26	101.18	RCHRES	12	1
PERLND 34	5.64	RCHRES	12	1
PERLND 44	54.98	RCHRES	12	1
PERLND 54	0.64	RCHRES	12	1
IMPLND 14	79.83	RCHRES	12	2
*** SUB-CATCHMENT 13				
PERLND 16	0.79	RCHRES	13	1
PERLND 26	197.68	RCHRES	13	1
IMPLND 14	27.66	RCHRES	13	2
*** SUB-CATCHMENT 14 50% OF AGWO GOES TO SOUND				
PERLND 16	0.24	RCHRES	14	6
PERLND 26	118.67	RCHRES	14	6
PERLND 34	13.46	RCHRES	14	6
PERLND 44	41.91	RCHRES	14	6
PERLND 16	0.12	RCHRES	14	7
PERLND 26	59.34	RCHRES	14	7

PERLND	34	6.73	RCHRES	14	7
PERLND	44	20.95	RCHRES	14	7
IMPLND	14	20.66	RCHRES	14	2
*** SUB-CATCHMENT 15					
PERLND	16	6.59	RCHRES	15	1
PERLND	26	49.55	RCHRES	15	1
PERLND	34	50.09	RCHRES	15	1
PERLND	44	86.52	RCHRES	15	1
IMPLND	14	19.47	RCHRES	15	2
*** SUB-CATCHMENT 16					
PERLND	16	10.93	RCHRES	16	1
PERLND	26	30.30	RCHRES	16	1
PERLND	34	20.03	RCHRES	16	1
PERLND	44	31.42	RCHRES	16	1
IMPLND	14	15.54	RCHRES	16	2
*** SUB-CATCHMENT 17 AGWO GOES TO SOUND					
PERLND	16	0.90	RCHRES	17	6
PERLND	26	16.31	RCHRES	17	6
PERLND	34	34.82	RCHRES	17	6
PERLND	44	82.11	RCHRES	17	6
PERLND	54	2.19	RCHRES	17	6
IMPLND	14	10.49	RCHRES	17	2
*** SUB-CATCHMENT MC-1					
PERLND	26	0.17	RCHRES	52	1
PERLND	44	8.21	RCHRES	52	1
PERLND	54	0.27	RCHRES	52	1
IMPLND	14	0.09	RCHRES	52	2
*** SUB-CATCHMENT MC-2					
PERLND	16	0.08	RCHRES	53	1
PERLND	26	0.64	RCHRES	53	1
PERLND	34	6.72	RCHRES	53	1
PERLND	44	10.43	RCHRES	53	1
PERLND	54	15.25	RCHRES	53	1
IMPLND	14	0.27	RCHRES	53	2
*** SUB-CATCHMENT MC-3					
PERLND	34	5.44	RCHRES	54	1
PERLND	44	5.03	RCHRES	54	1
PERLND	54	2.28	RCHRES	54	1
IMPLND	14	0.11	RCHRES	54	2
*** SUB-CATCHMENT MC-4					
PERLND	44	17.32	RCHRES	135	1
PERLND	54	14.41	RCHRES	135	1
IMPLND	14	1.77	RCHRES	135	2
*** SUB-CATCHMENT MC-5					
PERLND	26	13.49	RCHRES	35	1
PERLND	44	31.06	RCHRES	35	1
PERLND	54	5.95	RCHRES	35	1
IMPLND	14	2.50	RCHRES	35	2
*** SUB-CATCHMENT MC-6					
PERLND	44	17.75	RCHRES	35	1
PERLND	54	6.54	RCHRES	35	1
IMPLND	14	0.95	RCHRES	35	2
*** SUB-CATCHMENT MC-6B					
PERLND	26	34.94	RCHRES	35	1
PERLND	34	7.81	RCHRES	35	1
PERLND	44	52.91	RCHRES	35	1
PERLND	54	4.61	RCHRES	35	1

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IMPLND  14                     3.14     RCHRES  35       2
  *** SUB-CATCHMENT MC-7
PERLND  26                    12.66     RCHRES  16       1
PERLND  44                    33.53     RCHRES  16       1
PERLND  54                     4.16     RCHRES  16       1
IMPLND  14                     3.88     RCHRES  16       2
  *** SUB-CATCHMENT MC-7B
PERLND  26                    36.16     RCHRES  16       1
PERLND  44                     8.46     RCHRES  16       1
PERLND  54                     1.92     RCHRES  16       1
IMPLND  14                     2.12     RCHRES  16       2
***all sdn basin agwo goes to 35
  *** SUB-CATCHMENT SDN-1
PERLND  26                     3.23     RCHRES  52       6
PERLND  44                     2.11     RCHRES  52       6
PERLND  54                     0.20     RCHRES  52       6
PERLND  26                     3.23     RCHRES 135       7
PERLND  44                     2.11     RCHRES 135       7
PERLND  54                     0.20     RCHRES 135       7
IMPLND  14                     8.29     RCHRES  52       2

  *** SUB-CATCHMENT SDN-1-LWR
PERLND  44                     4.97     RCHRES  52       6
PERLND  54                     0.07     RCHRES  52       6
PERLND  44                     4.97     RCHRES 135       7
PERLND  54                     0.07     RCHRES 135       7
IMPLND  14                     0.38     RCHRES  52       2

  *** SUB-CATCHMENT SDN-1-OFF
PERLND  26                    29.12     RCHRES  52       6
PERLND  44                     3.62     RCHRES  52       6
PERLND  54                     1.67     RCHRES  52       6
PERLND  26                    29.12     RCHRES 135       7
PERLND  44                     3.62     RCHRES 135       7
PERLND  54                     1.67     RCHRES 135       7
IMPLND  14                    11.50     RCHRES  52       2

  *** SUB-CATCHMENT SDN-2
PERLND  26                    10.41     RCHRES  52       6
PERLND  44                     3.04     RCHRES  52       6
PERLND  26                    10.41     RCHRES 135       7
PERLND  44                     3.04     RCHRES 135       7
IMPLND  14                    33.22     RCHRES  52       2

  *** SUB-CATCHMENT SDN-2X
PERLND  26                     1.37     RCHRES  52       6
PERLND  44                     5.84     RCHRES  52       6
PERLND  26                     1.37     RCHRES 135       7
PERLND  44                     5.84     RCHRES 135       7
IMPLND  14                     0.28     RCHRES  52       2

  *** SUB-CATCHMENT SDN-3
PERLND  26                    49.79     RCHRES  54       6
PERLND  26                    49.79     RCHRES 135       7
IMPLND  14                    15.82     RCHRES  54       2

  *** SUB-CATCHMENT SDN-3X
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PERLND  16                          0.65     RCHRES  54        6
PERLND  26                          5.17     RCHRES  54        6
PERLND  34                         13.64     RCHRES  54        6
PERLND  44                          5.34     RCHRES  54        6
PERLND  54                          0.57     RCHRES  54        6
PERLND  16                          0.65     RCHRES 135        7
PERLND  26                          5.17     RCHRES 135        7
PERLND  34                         13.64     RCHRES 135        7
PERLND  44                          5.34     RCHRES 135        7
PERLND  54                          0.57     RCHRES 135        7

  *** SUB-CATCHMENT SDN-4
PERLND  26                         24.43     RCHRES  52        6
PERLND  44                          3.19     RCHRES  52        6
PERLND  26                         24.43     RCHRES 135        7
PERLND  44                          3.19     RCHRES 135        7
IMPLND  14                          2.61     RCHRES  52        2

  *** SUB-CATCHMENT SDN-4X
PERLND  26                          1.57     RCHRES  52        6
PERLND  34                          1.16     RCHRES  52        6
PERLND  44                         10.01     RCHRES  52        6
PERLND  26                          1.57     RCHRES 135        7
PERLND  34                          1.16     RCHRES 135        7
PERLND  44                         10.01     RCHRES 135        7

***ROUTING FOR MILLER CREEK
*** M1 TO M2 TO M3 TO STORAGE 50.  M4 TO M5 TO STORAGE 50
RCHRES   1                                   RCHRES   2        4
RCHRES  23                                   RCHRES  24        4
RCHRES  24                                   RCHRES   3        3
RCHRES   2                                   RCHRES   3        3
RCHRES   3                                   RCHRES  33        3
RCHRES  33                                   RCHRES  50        3
RCHRES   4                                   RCHRES   5        4
RCHRES   5                                   RCHRES  50        3
*** NEW STREAM REACH 52 TO LAKE REBA 53 TO RDF 54
RCHRES  52                                   RCHRES  53        3
RCHRES  53                                   RCHRES  54        3
RCHRES  50                                   RCHRES  54        3
*** RDF 54 TO 35
RCHRES  54                                   RCHRES 135        3
RCHRES  34                                   RCHRES 135        4
RCHRES  34                                   RCHRES 135        5
RCHRES 135                                   RCHRES  35        3
RCHRES  10                                   RCHRES  16        3
RCHRES  35                                   RCHRES  16        3
RCHRES  11                                   RCHRES  15        3
RCHRES  13                                   RCHRES  12        4
RCHRES  13                                   RCHRES  12        5
RCHRES  12                                   RCHRES  15        3
RCHRES  16                                   RCHRES  15        3
RCHRES  14                                   RCHRES  17        3
RCHRES  15                                   RCHRES  17        3
END SCHEMATIC

NETWORK
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```
                                                                                                ***
***       <MEMBER> SSYSSGAP<--MULT-->TRAN <-TARGET VOLS>          <-MEMBER->
<NAME>    # <NAME>    TEM STRG<-FACTOR->STRG <NAME>    #    # <-GRP> <NAME> # # ***
                                                                                                ***

END NETWORK                                                                                     ***

RCHRES
  GEN-INFO                                                                                      ***
    RCHRES          Name            Nexits   Unit Systems   Printer                             ***
    # -   #<------------------><---> User T-series  Engl Metr LKFG                             ***
                                                  in   out
    1       Arbor Lake   M 1             2     1     1     1    62     0     0
    2       Arbor Ck -03710 M 2          1     1     1     1    62     0     0
    3       Arbor Ck     M 3             1     1     1     1    62     0     0
    4       Tub Lake     M 4             2     1     1     1    62     0     0
    5       Miller Ck SR518 M5           1     1     1     1    62     0     0
   10       Trib (0371G)     M 10        1     1     1     1    62     0     0
   11       M11 Ambaum Detention         1     1     1     1    62     0     0
   12       Trib(0354)   M 12            1     1     1     1    62     0     0
   13       Burien Lake M 13             2     1     1     1    62     0     0
   14       Trib (0353) M 14             1     1     1     1    62     0     0
   15       M/S U/S OF 17                1     1     1     1    62     0     0
   16       U/S OF 15 M/S                1     1     1     1    62     0     0
   17       GAGE                         1     1     1     1    62     0     0
   23       BASIN M23                    2     1     1     1    62     0     0
   24       BASIN M24                    1     1     1     1    62     0     0
   33       detention m3                 1     1     1     1    62     0     0
   34       LORA LAKE                    2     1     1     1    62     0     0
   35       D/S OF VACA FARM             1     1     1     1    62     0     0
   38       MC basins                    1     1     1     1    62     0     0
   50       sr 518                       1     1     1     1    62     0     0
   52       U/S OF LAKE REBA             1     1     1     1    62     0     0
   53       Reba outflow                 1     1     1     1    62     0     0
   54       Miller RDF outflow           1     1     1     1    62     0     0
  135       VACA FARMS                   1     1     1     1    62     0     0
  END GEN-INFO
  ACTIVITY
    RCHRES *************** Active Sections *****************
    # -   # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG                                    ***
    1  999    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
  PRINT-INFO
    RCHRES *************** Printout Flags ****************** PIVL  PYR
    # -   # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB *********
    1  999    5    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                                         ***
    # -   #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each      FUNCT  for each
             FG FG FG FG  possible   exit *** possible   exit      possible   exit
              *  *  *  *    *  *  *  *  *      *  *  *  *  *          ***
    1         0  1  0  0    4  5  0  0  0      0  0  0  0  0       2  2  2  2  2
    2         0  0  0  0    4  0  0  0  0      0  0  0  0  0       2  2  2  2  2
    3         0  0  0  0    4  0  0  0  0      0  0  0  0  0       2  2  2  2  2
    4         0  1  0  0    4  5  0  0  0      0  0  0  0  0       2  2  2  2  2
    5    12   0  0  0  0    4  0  0  0  0      0  0  0  0  0       2  2  2  2  2
   13         0  1  0  0    4  5  0  0  0      0  0  0  0  0       2  2  2  2  2
```

```
 14   22   0  0  0  0     4  0  0  0  0          0  0  0  0  0          2  2  2  2  2
 23        0  1  0  0     4  5  0  0  0          0  0  0  0  0          2  2  2  2  2
 24   33   0  0  0  0     4  0  0  0  0          0  0  0  0  0          2  2  2  2  2
 34        0  1  0  0     4  5  0  0  0          0  0  0  0  0          2  2  2  2  2
 35  999   0  0  0  0     4  0  0  0  0          0  0  0  0  0          2  2  2  2  2
END HYDR-PARM1
HYDR-PARM2                                                                       ***
  RCHRES                                                                         ***
  # -  #     FTABNO       LEN     DELTH     STCOR        KS      DB50            ***
<------><--------><--------><--------><--------><--------><-------->
  1              1   0.010                             0.3
  2              2   0.776                             0.3
  3              3   0.980                             0.3
  4              4   0.010                             0.3
  5              5   0.380                             0.3
 10             10   0.380                             0.3
 11             11   0.010                             0.3
 12             12   1.000                             0.3
 13             13   0.015                             0.3
 14             14   0.450                             0.3
 15             15   0.735                             0.3
 16             16   0.587                             0.3
 17             17   0.379                             0.3
 23             23   0.379             300.0           0.3
 24             24   0.379                             0.3
 33             33   0.200                             0.3
 34             34   0.852                             0.3
 35             35   0.663                             0.3
 38             38   0.010                             0.3
 50             50   0.010                             0.3
 52             52   0.010                             0.3
 53             53   0.010                             0.3
 54             54   0.010                             0.3
135            135   0.350                             0.3
END HYDR-PARM2
HYDR-INIT
  RCHRES  Initial conditions for each HYDR section                               ***
  # -  # ***   VOL     Initial  value  of COLIND    Initial  value  of OUTDGT
         *** ac-ft     for each possible exit       for each possible exit
<------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  1      2.0             4.0  5.0
  2      0.0             4.0
  3      0.0             4.0  5.0
  4      2.0             4.0
  5      0.0             4.0
 10      0.0             4.0
 11      0.0             4.0
 12      0.0             4.0
 13     10.0             4.0  5.0
 14      0.0             4.0
 15      0.0             4.0
 16      0.0             4.0
 17      0.0             4.0
 23      6.0             4.0  5.0
 24      0.0             4.0
 33      0.0             4.0
 34      9.0             4.0  5.0
```

```
  35      0.1                4.0
  38      0.1                4.0
  50      0.0                4.0
  52      0.0                4.0
  53      0.1                4.0
  54      2.25               4.0
 135      0.00               4.0
  END HYDR-INIT
END RCHRES

FTABLES
***UPPER BASIN
***===========

  FTABLE      1
 ROWS COLS ***
   11    5
     DEPTH       AREA     VOLUME    OUTFLOW OUTFLOW2***
     0.00        3.00      0.00      0.00     0.00
     2.50        3.00      7.50      0.00     0.11
     3.00        3.00      9.00      1.80     0.11
     3.50        3.30     10.58      5.00     0.11
     4.00        3.60     12.30     10.90     0.11
     4.50        3.90     14.18     17.50     0.11
     5.00        4.10     16.18     26.20     0.11
     5.50        4.30     18.28     32.50     0.11
     6.00        4.50     20.48     35.90     0.11
     7.00        5.00     25.23     38.10     0.11
     8.00        5.50     30.48     46.40     0.11
  END FTABLE  1

  FTABLE      2
 ROWS COLS ***
    9    4
     DEPTH       AREA     VOLUME    OUTFLOW     ***
     0.000     0.0000    0.0000       0.00
     0.100     0.2571    0.0129       0.16
     0.500     0.3873    0.1417       6.53
     1.000     0.5501    0.3761      25.95
     1.500     0.7128    0.6918      59.86
     2.000     0.8756    1.0889     110.67
     3.000     1.2011    2.1273     272.24
     3.500     1.3639    2.7685     387.38
     4.000     1.5266    3.4912     528.19
  END FTABLE  2

  FTABLE      3
 ROWS COLS ***
   12    4
     DEPTH       AREA     VOLUME    OUTFLOW     ***
     0.000     0.0000    0.0000       0.00
     0.100     0.9669    0.0483       0.13
     0.500     1.0637    0.4545       4.92
     1.000     1.1846    1.0165      17.12
     1.500     1.3055    1.6390      34.92
     2.000     1.4264    2.3220      57.95
     2.500     1.5473    3.0654      86.14
```

```
     3.000    1.6682    3.8693    119.53
     3.500    1.7891    4.7336    158.24
     4.000    1.9100    5.6584    202.41
     4.500    2.0294    6.6310    251.52
     5.000    2.1488    7.6624    306.28
  END FTABLE  3

  FTABLE      4
 ROWS COLS ***
    7    5
     DEPTH       AREA     VOLUME    OUTFLOW OUTFLOW2***
      0.00    3.00     0.00       0.00       0.00
      2.50    4.50     9.38       0.00       0.11
      3.00    6.00     12.00      6.00       0.11
      4.00    10.00    20.00      13.00      0.11
      5.00    15.00    32.50      20.00      0.11
      6.00    20.00    50.00      26.00      0.11
      7.00    25.00    72.50      168.00     0.11
  END FTABLE  4

  FTABLE      5
 ROWS COLS ***
   10    4
     DEPTH       AREA     VOLUME    OUTFLOW     ***
     0.000    0.0000    0.0000      0.00
     0.100    0.1010    0.0051      0.03
     0.500    0.1754    0.0603      1.46
     1.000    0.2684    0.1713      6.16
     1.500    0.3614    0.3288     14.89
     2.000    0.4544    0.5327     28.48
     2.500    0.5474    0.7832     47.70
     3.000    0.6404    1.0801     73.29
     3.500    0.7334    1.4236    105.94
     4.000    0.8264    1.8136    146.33
  END FTABLE  5

  FTABLE     10
 ROWS COLS ***
    9    4
     DEPTH       AREA     VOLUME    OUTFLOW     ***
     0.000    0.0000    0.0000      0.00
     0.100    0.1010    0.0051      0.06
     0.500    0.1660    0.0585      2.27
     1.000    0.2472    0.1618      9.32
     1.500    0.3285    0.3057     22.08
     2.000    0.4097    0.4902     41.66
     2.500    0.4909    0.7154     69.09
     3.000    0.5722    0.9811    105.37
     4.000    0.6887    1.6116    209.70
  END FTABLE 10

  POST AMBAUM DETENTION ***
  FTABLE     11
 ROWS COLS ***
   11    4
     DEPTH       AREA     VOLUME    OUTFLOW     ***
     0.000    0.0000    0.0000      0.00
```

```
     1.000    0.1000    0.2300      3.90
     2.000    0.2000    0.6000      6.30
     3.000    0.3000    0.9700      8.10
     4.000    0.4000    1.3400     11.10
     5.000    0.5000    1.8200     16.00
     6.000    0.6000    2.2700     19.10
     7.000    0.7000    2.8300     21.60
     8.000    0.8000    3.3700     30.80
     9.000    0.9000    4.0000     38.10
    10.000    1.0000    4.6500     74.10
    10.500    1.1000    5.2000    133.00
    11.000    1.1500    5.3000    500.00
  END FTABLE 11

  FTABLE     12
 ROWS COLS ***
    6    4
     DEPTH      AREA    VOLUME   OUTFLOW    ***
     0.000    0.0000    0.0000      0.00
     0.100    0.6327    0.0316      0.15
     0.500    0.7960    0.3174      5.87
     1.000    1.0002    0.7664     21.53
     1.500    1.2043    1.3176     46.43
     2.000    1.4085    1.9708     81.20
     3.000    1.8168    3.5834    183.79
     4.000    2.2251    5.6044    336.22
     5.000    2.6335    8.0337    545.30
     6.000    3.0418   10.8713    817.51
  END FTABLE 12

  FTABLE     13
 ROWS COLS ***
    7    5
     DEPTH      AREA    VOLUME   OUTFLOW OUTFLOW2***
     0.000    40.000    0.0000      0.00     0.00
     1.000    41.400    40.000      0.00     0.11
     1.500    42.000    60.000     10.00     0.11
     2.000    42.700    80.000     16.00     0.11
     2.500    43.300    100.00     20.00     0.11
     3.000    44.000    120.00     28.00     0.11
     5.000    45.000    210.00     45.00     0.11
  END FTABLE 13

  FTABLE     14
 ROWS COLS ***
    6    4
     DEPTH      AREA    VOLUME   OUTFLOW    ***
     0.000    0.0000    0.0000      0.00
     0.100    0.3361    0.0168      0.24
     0.500    0.3809    0.1602      9.04
     1.000    0.4370    0.3647     31.61
     1.500    0.4930    0.5972     65.00
     2.000    0.5491    0.8577    108.85
     2.500    0.6051    1.1462    163.33
     3.000    0.6612    1.4628    228.78
  END FTABLE 14
```

```
 FTABLE     15
ROWS COLS ***
   4    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00      0.10      0.00       0.00
     1.00      1.00      0.55      91.00
     2.00      1.10      1.60     268.00
     3.00      1.20      2.75     493.00
 END FTABLE 15

 FTABLE     16
ROWS COLS ***
   4    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00      0.10      0.00       0.00
     1.00      1.00      0.55      74.00
     2.00      1.10      1.60     219.00
     3.00      1.20      2.75     403.00
 END FTABLE 16

 FTABLE     17
ROWS COLS ***
   5    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00      0.10      0.00       0.00
     1.00      1.00      0.55      59.00
     2.00      1.10      1.60     173.00
     3.00      1.20      2.75     318.00
     4.00      1.30      4.00     484.00
 END FTABLE 17

 FTABLE     23
ROWS COLS ***  HERMES
   9    5
    DEPTH       AREA     VOLUME    OUTFLOW OUTFLOW    ***
     0.00      0.00      0.00      0.00     0.00          0.00
     5.00      0.50      1.91      0.00     0.00        305.00
    11.00      0.79      5.79      0.00     0.00        311.00
    15.00      1.13      9.64      0.50     0.01        315.00
    19.00      1.72     15.34      0.50     0.05        319.00
    29.00      2.86     38.25      0.50     0.10        329.00
    39.00      4.40     74.55      0.50     0.20        339.00
    50.00      6.22    132.98      0.50     0.30        350.00
    60.00     10.00   1212.98      0.50     0.40        360.00
 END FTABLE 23

 FTABLE     24
ROWS COLS ***
   9    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0000    0.0000       0.00
    0.100     0.2571    0.0129       0.16
    0.500     0.3873    0.1417       6.53
    1.000     0.5501    0.3761      25.95
    1.500     0.7128    0.6918      59.86
    2.000     0.8756    1.0889     110.67
    3.000     1.2011    2.1273     272.24
```

```
   3.500    1.3639    2.7685    387.38
   4.000    1.5266    3.4912    528.19
 END FTABLE 24

 FTABLE      33
ROWS COLS ***
  11    4
   DEPTH        AREA      VOLUME    OUTFLOW     ***
    0.00       1.00      0.00       0.00
    0.50       1.20      0.55       2.00
    1.00       1.40      1.20       6.00
    1.50       1.60      1.95       9.00
    2.00       1.80      2.80      13.00
    2.50       2.00      3.75      16.50
    3.00       2.20      4.80      20.00
    3.50       2.40      5.95      23.00
    4.00       2.60      7.20      26.00
    5.00       2.80      9.90     104.00
    6.00       3.00     12.80     246.00
 END FTABLE 33

 FTABLE      34
ROWS COLS *** REVISED 11/19/97 BASED ON HEC-RAS MODEL
   6    5
   DEPTH        AREA      VOLUME     OUTFLOW OUTFLOW2***
    0.00        3.00      0.00        0.00     0.00
    3.00        3.05      9.08        0.00     0.11
    4.00        3.10     12.15        0.00     0.11
    5.00        3.15     15.28        0.00     0.11
    6.00        3.20     18.45        72.0     0.11
    7.00        3.25     21.68       225.0     0.11
 END FTABLE 34

 FTABLE      35
ROWS COLS *** REVISED 11/19/97 BASED ON HECRAS MODEL
   5    4
   DEPTH        AREA      VOLUME     OUTFLOW     ***
    0.00       0.10       0.00        0.00
    1.00       1.10       0.60       38.00
    2.00       1.20       1.75      108.00
    3.00       1.30       3.00      194.00
    4.00       1.40       4.35      290.00
 END FTABLE 35

 FTABLE      38
ROWS COLS ***
   7    4
   DEPTH        AREA      VOLUME     OUTFLOW     ***
   0.000      0.0000     0.0000        0.00
   1.000      0.4000     0.4000        2.00
   1.500      0.5000     1.0000        4.00
   2.000      0.9000     1.3000       11.00
   2.500      1.3000     1.6000       15.00
   3.000      1.6000     2.0000       18.00
   3.500      1.9000     2.5000       20.80
 END FTABLE 38
```

```
 FTABLE      45
ROWS COLS ***
NORTH EMPLOYEE PARKING LOT VAULT (AS-BUILT)***
  12    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.000     0.2200     0.0000       0.00
     2.000     0.2200     0.4500       1.20
     4.000     0.2200     0.9000       1.70
     6.000     0.2200     1.3400       2.10
     8.000     0.2200     1.7900       2.40
    10.000     0.2200     2.2400       2.70
    12.240     0.2200     2.7400       3.00
    14.000     0.2200     3.1400       6.90
    15.440     0.2200     3.4600       8.30
    16.000     0.2200     3.5800      10.30
    18.000     0.2200     4.0300      13.60
    20.000     0.2200     4.4800      30.79
 END FTABLE 45

 FTABLE      50
ROWS COLS ***
  10    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
      0.00       1.00       0.00       0.00
      0.50       1.10       0.53       5.00
      1.00       1.20       1.10      15.00
      1.50       1.30       1.73      25.00
      2.00       1.40       2.40      35.00
      2.50       1.50       3.13      52.00
      3.00       1.60       3.90      70.00
      3.50       1.70       4.73      87.00
      4.00       1.80       5.60     105.00
      6.00       1.90       9.30     165.00
 END FTABLE 50

 FTABLE      52
ROWS COLS ***
   6    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.000     0.0000     0.0000       0.00
     0.100     0.3680     0.0184       0.25
     0.500     0.3717     0.1664       9.39
     1.000     0.3763     0.3534      31.06
     2.000     0.3819     0.7325      94.37
     3.000     0.3874     1.1171     174.33
 END FTABLE 52

 FTABLE      53
OLD LAKE REBA                                 ***
MAX DEPTH = 4.9 FEET                          ***
30" CMP, 40 CFS DISCHARGE AT MAX DEPTH        ***
ROWS COLS ***
   7    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.000     2.4000     0.0000       0.00
     1.000     2.5800     2.5000      18.00
     2.000     2.9400     5.3000      26.00
```

3.000	3.4100	8.4000	31.00
4.000	3.8800	12.100	35.00
4.900	4.3000	15.800	40.00
6.000	4.3000	15.810	500.00

END FTABLE 53

FTABLE 54
EXISTING MILLER CREEK DETENTION FACILITY*** REVISED STORAGE/Q DATA
GATE SETTING: 2.0 FEET***
ROWS COLS ***
12 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.00	0.00	0.00
1.300	0.01	0.01	10.00
2.000	0.01	0.02	20.00
2.900	0.70	0.40	30.00
4.000	1.50	1.50	40.00
5.400	3.50	4.90	50.00
7.000	8.60	13.30	60.00
8.800	15.60	34.80	70.00
10.000	19.90	57.30	76.00
10.500	21.50	68.00	92.00
11.000	23.10	78.80	179.00
11.500	24.70	88.60	303.00

END FTABLE 54

PRE AMBAUM DETENTION ***
FTABLE 111
ROWS COLS ***
12 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.500	0.2160	0.0750	5.30
1.000	0.2730	0.1990	21.10
1.500	0.2890	0.3410	43.90
2.000	0.2900	0.4830	68.80
2.500	0.2910	0.6070	89.10
3.000	0.2950	0.6820	90.00
3.500	0.3000	2.1000	100.00
4.000	0.3050	2.5000	105.00
4.500	0.3100	3.0000	110.00
5.000	0.3200	3.5000	120.00
5.500	0.3300	4.0000	130.00

END FTABLE111

FTABLE 135
ROWS COLS *** VACA FARM
6 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.10	0.00	0.00
1.00	0.10	0.10	4.00
2.00	0.11	0.21	8.00
2.50	1.00	0.48	13.00
3.50	6.50	4.23	86.00
4.50	13.00	13.98	235.00

END FTABLE135

```
                                                                         ***
END FTABLES


MASS-LINK
<Volume>    <-Grp> <-Member-><--Mult-->      <Target>        <-Grp> <-Member->***
<Name>             <Name> # #<-factor->      <Name>                 <Name> # #***
  MASS-LINK        1
  conversion from acre-inches to acre-ft (1/12)              ***
PERLND      PWATER PERO        0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    1

  MASS-LINK        2
IMPLND      IWATER SURO        0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
RCHRES      ROFLOW                           RCHRES          INFLOW
  END MASS-LINK    3

  MASS-LINK        4
RCHRES      OFLOW  OVOL   1                  RCHRES          INFLOW IVOL
  END MASS-LINK    4

  MASS-LINK        5
RCHRES      OFLOW  OVOL   2                  RCHRES          INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
PERLND      PWATER SURO        0.0833333     RCHRES          INFLOW IVOL
PERLND      PWATER IFWO        0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    6

  MASS-LINK        7
PERLND      PWATER AGWO        0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
PERLND      PWATER PERO        0.0833333     COPY            INPUT  MEAN
  END MASS-LINK    8
  MASS-LINK        12
PERLND      PWATER AGWO        0.0833333     COPY            INPUT  MEAN
  END MASS-LINK    12

  MASS-LINK        9
IMPLND      IWATER SURO        0.0833333     COPY            INPUT  MEAN
  END MASS-LINK    9

  MASS-LINK        10
COPY        OUTPUT MEAN                      RCHRES          INFLOW IVOL
  END MASS-LINK    10

END MASS-LINK
END RUN
```

```
RUN
GLOBAL
  ***  FILE: mill65.inp REVISED Aug 2000  Joe Brascher(atc)
  *** for parameterix
  ***  SEATAC AIRPORT HSPF BASIN MODEL OF MILLER CREEK
  ***  - POST-MILLER CK DETENTION FACIITY 10/92-6/93
  *** m23 AND M24 new area west of m2.  Flows to rdf
  *** Calibration file run for four years using full length calibration run 1990
  *** data for initial conditions
  MILLER CREEK BASIN HSPF MODEL
  START       1990 10  1  0  0  END    1994  9 30 24  0
  RUN INTERP OUTPUT LEVEL    3
  RESUME     0 RUN     1
END GLOBAL

FILES
<type>  <fun>***<------------fname-------------------------------------------->
MESSU      24    D:\PARA\SEATAC\MILLER\lowflow\MILL.MES
WDM        25    D:\PARA\SEATAC\MILLER\lowflow\Mlowflow.wdm
           61    D:\PARA\SEATAC\MILLER\lowflow\PER.L61
           62    D:\PARA\SEATAC\MILLER\lowflow\RCH.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 01:00
      PERLND     14
      PERLND     16
      PERLND     18
      PERLND     24
      PERLND     26
      PERLND     28
      PERLND     34
      PERLND     44
      PERLND     54
      IMPLND     14
      RCHRES      1
      RCHRES     23
      RCHRES     24
      RCHRES      2
      RCHRES      3
      RCHRES     33
      RCHRES      4
      RCHRES      5
      RCHRES     50
      RCHRES     52
      RCHRES     53
      RCHRES     54
      RCHRES     34
      RCHRES    135
      RCHRES     35
      RCHRES     10
      RCHRES     16
      RCHRES     11
      RCHRES     13
      RCHRES     12
      RCHRES     15
      RCHRES     14
```

```
      RCHRES       17
    END INGRP
END OPN SEQUENCE                                                                          ***

COPY
  TIMESERIES                                                                              ***
  Copy-opn                                                                                ***
    # -  #  NPT  NMN
    1    5         1
  END TIMESERIES
END COPY

PERLND
  GEN-INFO
    <PLS >      Name           NBLKS  Unit-systems   Printer                                  ***
    # -  #                            User  t-series Engl Metr                                ***
                                             in  out                                          ***
   14       TFF- TILL FOR FLT       1    1    1    1   61    0
   16       TFM- TILL FOR MOD       1    1    1    1   61    0
   18       TFS- TILL FOR STP       1    1    1    1   61    0
   24       TGF- TILL GR FLT        1    1    1    1   61    0
   26       TGM- TILL GR MOD        1    1    1    1   61    0
   28       TGS- TILL GR STP        1    1    1    1   61    0
   34       OF - OUTWASH FOR        1    1    1    1   61    0
   44       OG - OUTWASH GR         1    1    1    1   61    0
 ***PERLND FOR NEW AIRPORT FILL; NONE IN CALIBRATION
   45       AIRPORT FILL            1    1    1    1   61    0
   54       SA - WETLANDS           1    1    1    1   61    0
   64       RES- GROUNDWATER        1    1    1    1   61    0
  END GEN-INFO
  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC                     ***
   14  200    0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
  PRINT-INFO
    <PLS > ********************* Print-flags ************************* PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC *********
   14  200    0    0    5    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
  PWAT-PARM1
    <PLS > ***************** Flags ********************
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE                                    ***
   14         0    0    0    0    0    0    0    0    0
   16         0    0    0    0    0    0    0    0    0
   18         0    0    0    0    0    0    0    0    0
   24         0    0    0    0    0    0    0    0    0
   26         0    0    0    0    0    0    0    0    0
   28         0    0    0    0    0    0    0    0    0
   34         0    0    0    0    0    0    0    0    0
   44         0    0    0    0    0    0    0    0    0
   45         0    0    0    0    0    0    0    0    0
   54         0    0    0    0    0    0    0    0    0
   64         0    0    0    0    0    0    0    0    0
  END PWAT-PARM1
  PWAT-PARM2
    <PLS > ***
```

```
  # -  # ***FOREST          LZSN      INFILT      LSUR      SLSUR      KVARY      AGWRC
 14                       9.0000     0.3200    400.00     0.0500     0.5000     0.9960
 16                       9.0000     0.3200    400.00     0.1000     0.5000     0.9960
 18                       9.0000     0.3200    200.00     0.2000     0.5000     0.9960
 24                       9.0000     0.1200    400.00     0.0500     0.5000     0.9960
 26                       9.0000     0.1200    400.00     0.1000     0.5000     0.9960
 28                       9.0000     0.1200    200.00     0.2000     0.5000     0.9960
 34                      10.0000     2.0000    400.00     0.0500     0.3000     0.9960
 44                      10.0000     0.8000    400.00     0.0500     0.3000     0.9960
 45                       7.5000     0.0200    300.00     0.0700     0.0000     0.9000
 54                       8.0000     2.0000    100.00     0.0010     0.5000     0.9960
END PWAT-PARM2
PWAT-PARM3
  <PLS >***
  # -  #*** PETMAX    PETMIN     INFEXP    INFILD     DEEPFR     BASETP     AGWETP
 14                              2.0000    2.0000       0.33       0.00        0.0
 16                              2.0000    2.0000       0.33       0.00        0.0
 18                              2.0000    2.0000       0.33       0.00        0.0
 24                              2.0000    2.0000       0.33       0.00         0.
 26                              2.0000    2.0000       0.33         0.         0.
 28                              2.0000    2.0000       0.33         0.         0.
 34                              2.0000    2.0000       0.33       0.00        0.0
 44                              2.0000    2.0000       0.33         0.         0.
 54                              10.000    2.0000       0.33         0.        0.7
END PWAT-PARM3
PWAT-PARM4
  <PLS >                                                           ***
  # -  #      CEPSC      UZSN      NSUR     INTFW       IRC     LZETP***
 14          0.2000    1.5000    0.3500     9.000    0.7000    0.7000
 16          0.2000    0.7500    0.3500     9.000    0.7000    0.7000
 18          0.2000    0.4500    0.3500     9.000    0.3000    0.7000
 24          0.1000    0.7500    0.2500     9.000    0.7000    0.2500
 26          0.1000    0.3750    0.2500     9.000    0.7000    0.2500
 28          0.1000    0.2250    0.2500     9.000    0.3000    0.2500
 34          0.2000    0.7500    0.3500     0.000    0.7000    0.7000
 44          0.1000    0.7500    0.2500     0.000    0.7000    0.2500
 54          0.1000    2.2500    0.5000     1.000    0.7000    0.8000
END PWAT-PARM4
PWAT-STATE1
  <PLS >  PWATER state variables***
  # -  #***    CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
 16           0.000        0.    0.0010      0.00     0.941     3.108     0.048
 26           0.000        0.    0.0010      0.00     7.672     3.341     0.071
 34           0.000        0.    0.0010      0.00     1.187     3.776     0.052
 44           0.000        0.    0.0040      0.00     9.402     4.905     0.104
 45           0.000        0.    0.0000      0.00     2.000     2.000     0.000
 54           0.000        0.    0.0960      0.00     3.211     0.000     0.000
 14           0.078        0.    0.2500      0.10     2.000     2.000     0.000
 18           0.078        0.    0.2500      0.10     2.000     2.000     0.000
 24           0.051        0.    0.2500      0.10     2.000     2.000     0.000
 28           0.051        0.    0.2500      0.10     2.000     2.000     0.000
 64           0.051        0.    0.2500      0.10     2.000     2.000     0.000
 END PWAT-STATE1
END PERLND
IMPLND
 GEN-INFO
  <ILS >      Name              Unit-systems   Printer                          ***
```

```
  # -  #                          User  t-series Engl Metr                  ***
                                          in  out                            ***
 14      IMPERVIOUS                  1     1    1   60    0
 END GEN-INFO
 ACTIVITY
   <ILS > ************** Active Sections ****
   # -  # ATMP SNOW IWAT  SLD  IWG IQAL  ***
 14        0    0    1    0    0    0
 END ACTIVITY
 PRINT-INFO
   <ILS > ******** Print-flags ******** PIVL  PYR
   # -  # ATMP SNOW IWAT  SLD  IWG IQAL *********
 14        0    0    6    0    0    0    1    9
 END PRINT-INFO
 IWAT-PARM1
   <ILS >          Flags           ***                                      ***
   # -  # CSNO RTOP  VRS  VNN RTLI   ***                                     ***
 14        0    0    0    0    0
 END IWAT-PARM1
 IWAT-PARM2
   <ILS >                                                                    ***
   # -  #      LSUR     SLSUR      NSUR     RETSC                            ***
 14          100.00    0.0100    0.1000    0.1000
 END IWAT-PARM2
 IWAT-PARM3
   <ILS >                                                                    ***
   # -  #    PETMAX    PETMIN                                                ***
 14
 END IWAT-PARM3
 IWAT-STATE1
   <ILS >  IWATER state variables                                            ***
   # -  #      RETS      SURS                                                ***
 14       1.0000E-3 1.0000E-3
 END IWAT-STATE1
END IMPLND
                                                                             ***
EXT SOURCES
                                                                             ***
*** NOTE: The only RCHRES that precip and PET are applied to are lakes.
                                                                             ***
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>    #   #        <Name> # #  ***
*** PRECIP/EVAP TO PERVIOUS/IMPERV SURFACES
WDM    1002 PREC     ENGLZERO  1.00         PERLND  14 200 EXTNL  PREC
WDM    1002 PREC     ENGLZERO  1.00         IMPLND  14     EXTNL  PREC
WDM       1 EVAP     ENGLZERO  0.8          PERLND  14  18 EXTNL  PETINP
WDM       1 EVAP     ENGLZERO  0.8          PERLND  24  28 EXTNL  PETINP
WDM       1 EVAP     ENGLZERO  0.8          PERLND  34  54 EXTNL  PETINP
WDM       1 EVAP     ENGLZERO  0.8          PERLND  64     EXTNL  PETINP
WDM       1 EVAP     ENGLZERO  0.8          IMPLND  14     EXTNL  PETINP
*** PRECIP/EVAP TO LAKES
WDM    1002 PREC     ENGLZERO               RCHRES   1     EXTNL  PREC
WDM       1 EVAP     ENGLZERO    0.8        RCHRES   1     EXTNL  POTEV
WDM    1002 PREC     ENGLZERO               RCHRES   4     EXTNL  PREC
WDM       1 EVAP     ENGLZERO    0.8        RCHRES   4     EXTNL  POTEV
WDM       1 EVAP     ENGLZERO    0.8        RCHRES   1     EXTNL  POTEV
WDM    1002 PREC     ENGLZERO               RCHRES   1     EXTNL  PREC
```

```
WDM       1 EVAP      ENGLZERO     0.8          RCHRES    4       EXTNL    POTEV
WDM    1002 PREC      ENGLZERO                  RCHRES    4       EXTNL    PREC
WDM    1002 PREC      ENGLZERO                  RCHRES   11       EXTNL    PREC
WDM       1 EVAP      ENGLZERO     0.8          RCHRES   11       EXTNL    POTEV
WDM    1002 PREC      ENGLZERO                  RCHRES   13       EXTNL    PREC
WDM       1 EVAP      ENGLZERO     0.8          RCHRES   13       EXTNL    POTEV
WDM    1002 PREC      ENGLZERO                  RCHRES   23       EXTNL    PREC
WDM       1 EVAP      ENGLZERO     0.8          RCHRES   23       EXTNL    POTEV
WDM    1002 PREC      ENGLZERO                  RCHRES   34       EXTNL    PREC
WDM       1 EVAP      ENGLZERO     0.8          RCHRES   34       EXTNL    POTEV
WDM    1002 PREC      ENGLZERO                  RCHRES   53       EXTNL    PREC
WDM       1 EVAP      ENGLZERO     0.8          RCHRES   53       EXTNL    POTEV
WDM    1002 PREC      ENGLZERO                  RCHRES   54       EXTNL    PREC
WDM       1 EVAP      ENGLZERO     0.8          RCHRES   54       EXTNL    POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
*** UPPER MILLER CREEK GROUNDWATER PUMPING
COPY *** 1 OUTPUT MEAN   1    12.1          WDM     18 FLOW     ENGL      REPL
*** GAUGE POINTS (17=MOUTH, 54=MILLER RDF, 50=SR 518, 18=WALKER CK)
RCHRES  35 HYDR   RO                        WDM   8035 FLOW     ENGL      REPL
RCHRES  17 HYDR   RO          ***           WDM     33 FLOW     ENGL      REPL
RCHRES  54 HYDR   RO          ***           WDM     34 FLOW     ENGL      REPL
RCHRES  50 HYDR   RO          ***           WDM     35 FLOW     ENGL      REPL
RCHRES  18 HYDR   RO          ***           WDM     36 FLOW     ENGL      REPL
*** MISC (20=WALKER WETLAND, 55=SR509, 56=1ST AVE, 1=ARBOR LAKE)
RCHRES  23 HYDR   STAGE  ***                WDM     91 STAG     ENGL      REPL
RCHRES  20 HYDR   RO     ***                WDM     37 FLOW     ENGL      REPL
RCHRES  55 HYDR   RO     ***                WDM     38 FLOW     ENGL      REPL
RCHRES  62 HYDR   RO     ***                WDM     39 FLOW     ENGL      REPL
RCHRES   1 HYDR   RO     ***                WDM     80 FLOW     ENGL      REPL
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
 ***MOUTH
RCHRES  54 HYDR   RO     1 1 0.000419  *** WDM     60 SIMQ     ENGL      REPL
RCHRES  17 HYDR   RO     1 1 0.000213  *** WDM     70 SIMQ     ENGL      REPL
END EXT TARGETS
                                                                              ***
SCHEMATIC
<-Source->                 <--Area-->    <-Target->    MBLK    ***
<Name>   #                 <-factor->    <Name>   #    Tbl#    ***
  *** SUB-CATCHMENT 1 all agwo goes to sound
PERLND  16                       3.41    RCHRES   1       6
PERLND  26                     232.36    RCHRES   1       6
PERLND  34                       3.07    RCHRES   1       6
PERLND  44                      38.03    RCHRES   1       6
PERLND  54                       3.87    RCHRES   1       6
IMPLND  14                      56.14    RCHRES   1       2
 *** SUB-CATCHMENT 2 10% of area GW goes to vaca 90% goes to sound
PERLND  16                       5.56    RCHRES   2       6
PERLND  26                     200.05    RCHRES   2       6
PERLND  34                       0.46    RCHRES   2       6
PERLND  44                      38.71    RCHRES   2       6
PERLND  16                       0.56    RCHRES 135       7
```

```
PERLND  26                20.01    RCHRES 135     7
PERLND  34                 0.05    RCHRES 135     7
PERLND  44                 3.87    RCHRES 135     7
IMPLND  14                42.22    RCHRES   2     2
 *** SUB-CATCHMENT 23 New subbasin 15 % OF GW GOES TO VACCA 85% TO SOUND
PERLND  16                 3.09    RCHRES  23     6
PERLND  26               156.15    RCHRES  23     6
PERLND  34                 2.25    RCHRES  23     6
PERLND  44                45.84    RCHRES  23     6
PERLND  16                 0.46    RCHRES 135     7
PERLND  26                23.42    RCHRES 135     7
PERLND  34                 0.34    RCHRES 135     7
PERLND  44                 6.88    RCHRES 135     7
IMPLND  14                58.44    RCHRES  23     2
 *** SUB-CATCHMENT 24 New subbasin 60 % OF GW GOES TO 11 40% TO SOUND
PERLND  26               135.43    RCHRES  24     6
PERLND  34                 2.02    RCHRES  24     6
PERLND  44                69.29    RCHRES  24     6
PERLND  26                81.26    RCHRES  11     7
PERLND  34                 1.21    RCHRES  11     7
PERLND  44                41.57    RCHRES  11     7
IMPLND  14                79.98    RCHRES  24     2
  *** SUB-CATCHMENT 3 agwo goes to vaca(135)
PERLND  16                 8.26    RCHRES   3     6
PERLND  26               108.38    RCHRES   3     6
PERLND  34                16.02    RCHRES   3     6
PERLND  44               102.89    RCHRES   3     6
PERLND  54                 0.04    RCHRES   3     6
PERLND  16                 8.26    RCHRES 135     7
PERLND  26               108.38    RCHRES 135     7
PERLND  34                16.02    RCHRES 135     7
PERLND  44               102.89    RCHRES 135     7
PERLND  54                 0.04    RCHRES 135     7
IMPLND  14                27.30    RCHRES   3     2
  *** SUB-CATCHMENT 4 10% of agwo goes to rchres 90% goes to sound
PERLND  16                 2.95    RCHRES   4     6
PERLND  26                85.95    RCHRES   4     6
PERLND  34                 3.75    RCHRES   4     6
PERLND  44                92.06    RCHRES   4     6
PERLND  16                 0.30    RCHRES   4     7
PERLND  26                 8.60    RCHRES   4     7
PERLND  34                 0.38    RCHRES   4     7
PERLND  44                 9.21    RCHRES   4     7
IMPLND  14                18.43    RCHRES   4     2
  *** SUB-CATCHMENT 4a 70% of agwo goes to rchres 30% goes to sound
PERLND  16                 8.66    RCHRES   4     6
PERLND  26                61.64    RCHRES   4     6
PERLND  34                22.06    RCHRES   4     6
PERLND  44                78.09    RCHRES   4     6
PERLND  54                12.50    RCHRES   4     6
PERLND  16                 6.06    RCHRES   4     7
PERLND  26                43.15    RCHRES   4     7
PERLND  34                15.44    RCHRES   4     7
PERLND  44                54.66    RCHRES   4     7
PERLND  54                 8.75    RCHRES   4     7
IMPLND  14                29.14    RCHRES   4     2
  *** SUB-CATCHMENT 5
```

PERLND 26	10.29	RCHRES	5	1
PERLND 44	50.04	RCHRES	5	1
PERLND 54	10.74	RCHRES	5	1
IMPLND 14	16.31	RCHRES	5	2
*** SUB-CATCHMENT 6				
PERLND 16	10.66	RCHRES	53	1
PERLND 26	41.08	RCHRES	53	1
PERLND 34	21.75	RCHRES	53	1
PERLND 44	13.39	RCHRES	53	1
PERLND 54	0.82	RCHRES	53	1
IMPLND 14	7.14	RCHRES	53	2
*** SUB-CATCHMENT 8				
PERLND 44	22.21	RCHRES	35	1
IMPLND 14	6.60	RCHRES	35	2
*** SUB-CATCHMENT 9				
PERLND 16	4.94	RCHRES	34	1
PERLND 26	14.32	RCHRES	34	1
PERLND 34	0.05	RCHRES	34	1
PERLND 44	56.70	RCHRES	34	1
PERLND 54	0.01	RCHRES	34	1
IMPLND 14	22.46	RCHRES	34	2
*** SUB-CATCHMENT 10				
PERLND 16	4.15	RCHRES	10	1
PERLND 26	31.94	RCHRES	10	1
PERLND 44	95.23	RCHRES	10	1
IMPLND 14	71.97	RCHRES	10	2
*** SUB-CATCHMENT 11 25% OF AGWO GOES TO 15				
PERLND 16	0.89	RCHRES	11	6
PERLND 26	217.92	RCHRES	11	6
PERLND 34	1.32	RCHRES	11	6
PERLND 44	65.65	RCHRES	11	6
PERLND 16	0.67	RCHRES	11	7
PERLND 26	163.44	RCHRES	11	7
PERLND 34	0.99	RCHRES	11	7
PERLND 44	49.24	RCHRES	11	7
PERLND 16	0.22	RCHRES	15	7
PERLND 26	54.48	RCHRES	15	7
PERLND 34	0.33	RCHRES	15	7
PERLND 44	16.41	RCHRES	15	7
IMPLND 14	230.80	RCHRES	11	2
*** SUB-CATCHMENT 12				
PERLND 16	0.39	RCHRES	12	1
PERLND 26	101.18	RCHRES	12	1
PERLND 34	5.64	RCHRES	12	1
PERLND 44	54.98	RCHRES	12	1
PERLND 54	0.64	RCHRES	12	1
IMPLND 14	79.83	RCHRES	12	2
*** SUB-CATCHMENT 13				
PERLND 16	0.79	RCHRES	13	1
PERLND 26	197.68	RCHRES	13	1
IMPLND 14	27.66	RCHRES	13	2
*** SUB-CATCHMENT 14 50% OF AGWO GOES TO SOUND				
PERLND 16	0.24	RCHRES	14	6
PERLND 26	118.67	RCHRES	14	6
PERLND 34	13.46	RCHRES	14	6
PERLND 44	41.91	RCHRES	14	6
PERLND 16	0.12	RCHRES	14	7

PERLND 26	59.34	RCHRES	14	7
PERLND 34	6.73	RCHRES	14	7
PERLND 44	20.95	RCHRES	14	7
IMPLND 14	20.66	RCHRES	14	2
*** SUB-CATCHMENT 15				
PERLND 16	6.59	RCHRES	15	1
PERLND 26	49.55	RCHRES	15	1
PERLND 34	50.09	RCHRES	15	1
PERLND 44	86.52	RCHRES	15	1
IMPLND 14	19.47	RCHRES	15	2
*** SUB-CATCHMENT 16				
PERLND 16	10.93	RCHRES	16	1
PERLND 26	30.30	RCHRES	16	1
PERLND 34	20.03	RCHRES	16	1
PERLND 44	31.42	RCHRES	16	1
IMPLND 14	15.54	RCHRES	16	2
*** SUB-CATCHMENT 17 AGWO GOES TO SOUND				
PERLND 16	0.90	RCHRES	17	6
PERLND 26	16.31	RCHRES	17	6
PERLND 34	34.82	RCHRES	17	6
PERLND 44	82.11	RCHRES	17	6
PERLND 54	2.19	RCHRES	17	6
IMPLND 14	10.49	RCHRES	17	2
*** SUB-CATCHMENT MC-1				
PERLND 26	0.17	RCHRES	52	1
PERLND 44	8.21	RCHRES	52	1
PERLND 54	0.27	RCHRES	52	1
IMPLND 14	0.09	RCHRES	52	2
*** SUB-CATCHMENT MC-2				
PERLND 16	0.08	RCHRES	53	1
PERLND 26	0.64	RCHRES	53	1
PERLND 34	6.72	RCHRES	53	1
PERLND 44	10.43	RCHRES	53	1
PERLND 54	15.25	RCHRES	53	1
IMPLND 14	0.27	RCHRES	53	2
*** SUB-CATCHMENT MC-3				
PERLND 34	5.44	RCHRES	54	1
PERLND 44	5.03	RCHRES	54	1
PERLND 54	2.28	RCHRES	54	1
IMPLND 14	0.11	RCHRES	54	2
*** SUB-CATCHMENT MC-4				
PERLND 44	17.32	RCHRES	135	1
PERLND 54	14.41	RCHRES	135	1
IMPLND 14	1.77	RCHRES	135	2
*** SUB-CATCHMENT MC-5				
PERLND 26	13.49	RCHRES	35	1
PERLND 44	31.06	RCHRES	35	1
PERLND 54	5.95	RCHRES	35	1
IMPLND 14	2.50	RCHRES	35	2
*** SUB-CATCHMENT MC-6				
PERLND 44	17.75	RCHRES	35	1
PERLND 54	6.54	RCHRES	35	1
IMPLND 14	0.95	RCHRES	35	2
*** SUB-CATCHMENT MC-6B				
PERLND 26	34.94	RCHRES	35	1
PERLND 34	7.81	RCHRES	35	1
PERLND 44	52.91	RCHRES	35	1

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PERLND  54                             4.61      RCHRES  35        1
IMPLND  14                             3.14      RCHRES  35        2
  *** SUB-CATCHMENT MC-7
PERLND  26                            12.66      RCHRES  16        1
PERLND  44                            33.53      RCHRES  16        1
PERLND  54                             4.16      RCHRES  16        1
IMPLND  14                             3.88      RCHRES  16        2
  *** SUB-CATCHMENT MC-7B
PERLND  26                            36.16      RCHRES  16        1
PERLND  44                             8.46      RCHRES  16        1
PERLND  54                             1.92      RCHRES  16        1
IMPLND  14                             2.12      RCHRES  16        2
***all sdn basin agwo goes to 35
  *** SUB-CATCHMENT SDN-1
PERLND  26                             3.23      RCHRES  52        6
PERLND  44                             2.11      RCHRES  52        6
PERLND  54                             0.20      RCHRES  52        6
PERLND  26                             3.23      RCHRES 135        7
PERLND  44                             2.11      RCHRES 135        7
PERLND  54                             0.20      RCHRES 135        7
IMPLND  14                             8.29      RCHRES  52        2

  *** SUB-CATCHMENT SDN-1-LWR
PERLND  44                             4.97      RCHRES  52        6
PERLND  54                             0.07      RCHRES  52        6
PERLND  44                             4.97      RCHRES 135        7
PERLND  54                             0.07      RCHRES 135        7
IMPLND  14                             0.38      RCHRES  52        2

  *** SUB-CATCHMENT SDN-1-OFF
PERLND  26                            29.12      RCHRES  52        6
PERLND  44                             3.62      RCHRES  52        6
PERLND  54                             1.67      RCHRES  52        6
PERLND  26                            29.12      RCHRES 135        7
PERLND  44                             3.62      RCHRES 135        7
PERLND  54                             1.67      RCHRES 135        7
IMPLND  14                            11.50      RCHRES  52        2

  *** SUB-CATCHMENT SDN-2
PERLND  26                            10.41      RCHRES  52        6
PERLND  44                             3.04      RCHRES  52        6
PERLND  26                            10.41      RCHRES 135        7
PERLND  44                             3.04      RCHRES 135        7
IMPLND  14                            33.22      RCHRES  52        2

  *** SUB-CATCHMENT SDN-2X
PERLND  26                             1.37      RCHRES  52        6
PERLND  44                             5.84      RCHRES  52        6
PERLND  26                             1.37      RCHRES 135        7
PERLND  44                             5.84      RCHRES 135        7
IMPLND  14                             0.28      RCHRES  52        2

  *** SUB-CATCHMENT SDN-3
PERLND  26                            49.79      RCHRES  54        6
PERLND  26                            49.79      RCHRES 135        7
IMPLND  14                            15.82      RCHRES  54        2
```

```
  *** SUB-CATCHMENT SDN-3X
PERLND  16                      0.65    RCHRES  54       6
PERLND  26                      5.17    RCHRES  54       6
PERLND  34                     13.64    RCHRES  54       6
PERLND  44                      5.34    RCHRES  54       6
PERLND  54                      0.57    RCHRES  54       6
PERLND  16                      0.65    RCHRES 135       7
PERLND  26                      5.17    RCHRES 135       7
PERLND  34                     13.64    RCHRES 135       7
PERLND  44                      5.34    RCHRES 135       7
PERLND  54                      0.57    RCHRES 135       7

  *** SUB-CATCHMENT SDN-4
PERLND  26                     24.43    RCHRES  52       6
PERLND  44                      3.19    RCHRES  52       6
PERLND  26                     24.43    RCHRES 135       7
PERLND  44                      3.19    RCHRES 135       7
IMPLND  14                      2.61    RCHRES  52       2

  *** SUB-CATCHMENT SDN-4X
PERLND  26                      1.57    RCHRES  52       6
PERLND  34                      1.16    RCHRES  52       6
PERLND  44                     10.01    RCHRES  52       6
PERLND  26                      1.57    RCHRES 135       7
PERLND  34                      1.16    RCHRES 135       7
PERLND  44                     10.01    RCHRES 135       7

***ROUTING FOR MILLER CREEK
*** M1 TO M2 TO M3 TO STORAGE 50.  M4 TO M5 TO STORAGE 50
RCHRES   1                              RCHRES   2       4
RCHRES  23                              RCHRES  24       4
RCHRES  24                              RCHRES   3       3
RCHRES   2                              RCHRES   3       3
RCHRES   3                              RCHRES  33       3
RCHRES  33                              RCHRES  50       3
RCHRES   4                              RCHRES   5       4
RCHRES   5                              RCHRES  50       3
*** NEW STREAM REACH 52 TO LAKE REBA 53 TO RDF 54
RCHRES  52                              RCHRES  53       3
RCHRES  53                              RCHRES  54       3
RCHRES  50                              RCHRES  54       3
*** RDF 54 TO 35
RCHRES  54                              RCHRES 135       3
RCHRES  34                              RCHRES 135       4
RCHRES  34                              RCHRES 135       5
RCHRES 135                              RCHRES  35       3
RCHRES  10                              RCHRES  16       3
RCHRES  35                              RCHRES  16       3
RCHRES  11                              RCHRES  15       3
RCHRES  13                              RCHRES  12       4
RCHRES  13                              RCHRES  12       5
RCHRES  12                              RCHRES  15       3
RCHRES  16                              RCHRES  15       3
RCHRES  14                              RCHRES  17       3
RCHRES  15                              RCHRES  17       3
END SCHEMATIC
```

```
NETWORK                                                                            ***
                                                                     <-MEMBER->
***       <MEMBER> SSYSSGAP<--MULT-->TRAN <-TARGET VOLS>        <-MEMBER->
<NAME>    # <NAME>   TEM STRG<-FACTOR->STRG <NAME>    #    # <-GRP> <NAME> # # ***
                                                                                   ***
END NETWORK                                                                        ***

RCHRES
  GEN-INFO                                                                         ***
    RCHRES         Name           Nexits   Unit Systems   Printer                  ***
    # -   #<------------------><---> User T-series  Engl Metr LKFG                 ***
                                               in   out                            ***
    1     Arbor Lake   M 1           2     1     1     1    62    0    0
    2     Arbor Ck -03710 M 2        1     1     1     1    62    0    0
    3     Arbor Ck     M 3           1     1     1     1    62    0    0
    4     Tub Lake     M 4           2     1     1     1    62    0    0
    5     Miller Ck SR518 M5         1     1     1     1    62    0    0
   10     Trib (0371G)    M 10       1     1     1     1    62    0    0
   11     M11 Ambaum Detention       1     1     1     1    62    0    0
   12     Trib(0354)   M 12          1     1     1     1    62    0    0
   13     Burien Lake M 13           2     1     1     1    62    0    0
   14     Trib (0353) M 14           1     1     1     1    62    0    0
   15     M/S U/S OF 17              1     1     1     1    62    0    0
   16     U/S OF 15 M/S              1     1     1     1    62    0    0
   17     GAGE                       1     1     1     1    62    0    0
   23     BASIN M23                  2     1     1     1    62    0    0
   24     BASIN M24                  1     1     1     1    62    0    0
   33     detention m3               1     1     1     1    62    0    0
   34     LORA LAKE                  2     1     1     1    62    0    0
   35     D/S OF VACA FARM           1     1     1     1    62    0    0
   38     MC basins                  1     1     1     1    62    0    0
   50     sr 518                     1     1     1     1    62    0    0
   52     U/S OF LAKE REBA           1     1     1     1    62    0    0
   53     Reba outflow               1     1     1     1    62    0    0
   54     Miller RDF outflow         1     1     1     1    62    0    0
  135     VACA FARMS                 1     1     1     1    62    0    0
  END GEN-INFO
  ACTIVITY
    RCHRES *************** Active Sections *****************
    # -   # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG                        ***
    1  999    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
  PRINT-INFO
    RCHRES *************** Printout Flags ***************** PIVL  PYR
    # -   # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB *********
    1  999    5    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                             ***
    # -   #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each      FUNCT  for each
             FG FG FG FG  possible   exit *** possible   exit      possible   exit
              *  *  *  *    *  *  *  *  *       *  *  *  *  *          ***
    1         0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    2         0  0  0  0    4  0  0  0  0       0  0  0  0  0        2  2  2  2  2
    3         0  0  0  0    4  0  0  0  0       0  0  0  0  0        2  2  2  2  2
    4         0  1  0  0    4  5  0  0  0       0  0  0  0  0        2  2  2  2  2
    5    12   0  0  0  0    4  0  0  0  0       0  0  0  0  0        2  2  2  2  2
```

```
 13         0  1  0  0    4  5  0  0  0     0  0  0  0  0     2  2  2  2  2
 14   22    0  0  0  0    4  0  0  0  0     0  0  0  0  0     2  2  2  2  2
 23         0  1  0  0    4  5  0  0  0     0  0  0  0  0     2  2  2  2  2
 24   33    0  0  0  0    4  0  0  0  0     0  0  0  0  0     2  2  2  2  2
 34         0  1  0  0    4  5  0  0  0     0  0  0  0  0     2  2  2  2  2
 35  999    0  0  0  0    4  0  0  0  0     0  0  0  0  0     2  2  2  2  2
END HYDR-PARM1
HYDR-PARM2
  RCHRES                                                                  ***
  # -  #     FTABNO       LEN     DELTH     STCOR        KS      DB50     ***
<------><--------><--------><--------><--------><--------><-------->      ***
  1              1     0.010                               0.3
  2              2     0.776                               0.3
  3              3     0.980                               0.3
  4              4     0.010                               0.3
  5              5     0.380                               0.3
 10             10     0.380                               0.3
 11             11     0.010                               0.3
 12             12     1.000                               0.3
 13             13     0.015                               0.3
 14             14     0.450                               0.3
 15             15     0.735                               0.3
 16             16     0.587                               0.3
 17             17     0.379                               0.3
 23             23     0.379               300.0           0.3
 24             24     0.379                               0.3
 33             33     0.200                               0.3
 34             34     0.852                               0.3
 35             35     0.663                               0.3
 38             38     0.010                               0.3
 50             50     0.010                               0.3
 52             52     0.010                               0.3
 53             53     0.010                               0.3
 54             54     0.010                               0.3
135            135     0.350                               0.3
END HYDR-PARM2
HYDR-INIT
  RCHRES  Initial conditions for each HYDR section                        ***
  # -  # ***   VOL     Initial  value  of COLIND    Initial  value  of OUTDGT
         *** ac-ft     for each possible exit       for each possible exit
<------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  1     2.0              4.0  5.0
  2     0.0              4.0
  3     0.0              4.0  5.0
  4     2.0              4.0
  5     0.0              4.0
 10     0.0              4.0
 11     0.0              4.0
 12     0.0              4.0
 13    10.0              4.0  5.0
 14     0.0              4.0
 15     0.0              4.0
 16     0.0              4.0
 17     0.0              4.0
 23     6.0              4.0  5.0
 24     0.0              4.0
 33     0.0              4.0
```

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  34      9.0                 4.0  5.0
  35      0.1                 4.0
  38      0.1                 4.0
  50      0.0                 4.0
  52      0.0                 4.0
  53      0.1                 4.0
  54      2.25                4.0
 135      0.00                4.0
 END HYDR-INIT
END RCHRES

FTABLES
***UPPER BASIN
***===========

 FTABLE       1
 ROWS COLS ***
   11    5
    DEPTH       AREA     VOLUME    OUTFLOW OUTFLOW2***
    0.00        3.00      0.00      0.00     0.00
    2.50        3.00      7.50      0.00     0.11
    3.00        3.00      9.00      1.80     0.11
    3.50        3.30     10.58      5.00     0.11
    4.00        3.60     12.30     10.90     0.11
    4.50        3.90     14.18     17.50     0.11
    5.00        4.10     16.18     26.20     0.11
    5.50        4.30     18.28     32.50     0.11
    6.00        4.50     20.48     35.90     0.11
    7.00        5.00     25.23     38.10     0.11
    8.00        5.50     30.48     46.40     0.11
 END FTABLE  1

 FTABLE       2
 ROWS COLS ***
    9    4
    DEPTH      AREA     VOLUME    OUTFLOW    ***
    0.000    0.0000    0.0000       0.00
    0.100    0.2571    0.0129       0.16
    0.500    0.3873    0.1417       6.53
    1.000    0.5501    0.3761      25.95
    1.500    0.7128    0.6918      59.86
    2.000    0.8756    1.0889     110.67
    3.000    1.2011    2.1273     272.24
    3.500    1.3639    2.7685     387.38
    4.000    1.5266    3.4912     528.19
 END FTABLE  2

 FTABLE       3
 ROWS COLS ***
   12    4
    DEPTH      AREA     VOLUME    OUTFLOW    ***
    0.000    0.0000    0.0000       0.00
    0.100    0.9669    0.0483       0.13
    0.500    1.0637    0.4545       4.92
    1.000    1.1846    1.0165      17.12
    1.500    1.3055    1.6390      34.92
    2.000    1.4264    2.3220      57.95
```

```
     2.500    1.5473    3.0654     86.14
     3.000    1.6682    3.8693    119.53
     3.500    1.7891    4.7336    158.24
     4.000    1.9100    5.6584    202.41
     4.500    2.0294    6.6310    251.52
     5.000    2.1488    7.6624    306.28
  END FTABLE  3

  FTABLE      4
 ROWS COLS ***
    7    5
     DEPTH      AREA     VOLUME    OUTFLOW OUTFLOW2***
      0.00    3.00     0.00      0.00       0.00
      2.50    4.50     9.38      0.00       0.11
      3.00    6.00     12.00     6.00       0.11
      4.00    10.00    20.00     13.00      0.11
      5.00    15.00    32.50     20.00      0.11
      6.00    20.00    50.00     26.00      0.11
      7.00    25.00    72.50     168.00     0.11
  END FTABLE  4

  FTABLE      5
 ROWS COLS ***
   10    4
     DEPTH      AREA     VOLUME    OUTFLOW    ***
     0.000    0.0000    0.0000      0.00
     0.100    0.1010    0.0051      0.03
     0.500    0.1754    0.0603      1.46
     1.000    0.2684    0.1713      6.16
     1.500    0.3614    0.3288     14.89
     2.000    0.4544    0.5327     28.48
     2.500    0.5474    0.7832     47.70
     3.000    0.6404    1.0801     73.29
     3.500    0.7334    1.4236    105.94
     4.000    0.8264    1.8136    146.33
  END FTABLE  5

  FTABLE     10
 ROWS COLS ***
    9    4
     DEPTH      AREA     VOLUME    OUTFLOW    ***
     0.000    0.0000    0.0000      0.00
     0.100    0.1010    0.0051      0.06
     0.500    0.1660    0.0585      2.27
     1.000    0.2472    0.1618      9.32
     1.500    0.3285    0.3057     22.08
     2.000    0.4097    0.4902     41.66
     2.500    0.4909    0.7154     69.09
     3.000    0.5722    0.9811    105.37
     4.000    0.6887    1.6116    209.70
  END FTABLE 10

  POST AMBAUM DETENTION ***
  FTABLE     11
 ROWS COLS ***
   11    4
     DEPTH      AREA     VOLUME    OUTFLOW    ***
```

0.000	0.0000	0.0000	0.00
1.000	0.1000	0.2300	3.90
2.000	0.2000	0.6000	6.30
3.000	0.3000	0.9700	8.10
4.000	0.4000	1.3400	11.10
5.000	0.5000	1.8200	16.00
6.000	0.6000	2.2700	19.10
7.000	0.7000	2.8300	21.60
8.000	0.8000	3.3700	30.80
9.000	0.9000	4.0000	38.10
10.000	1.0000	4.6500	74.10
10.500	1.1000	5.2000	133.00
11.000	1.1500	5.3000	500.00

END FTABLE 11

FTABLE 12
ROWS COLS ***
6 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.100	0.6327	0.0316	0.15
0.500	0.7960	0.3174	5.87
1.000	1.0002	0.7664	21.53
1.500	1.2043	1.3176	46.43
2.000	1.4085	1.9708	81.20
3.000	1.8168	3.5834	183.79
4.000	2.2251	5.6044	336.22
5.000	2.6335	8.0337	545.30
6.000	3.0418	10.8713	817.51

END FTABLE 12

FTABLE 13
ROWS COLS ***
7 5

DEPTH	AREA	VOLUME	OUTFLOW	OUTFLOW2***
0.000	40.000	0.0000	0.00	0.00
1.000	41.400	40.000	0.00	0.11
1.500	42.000	60.000	10.00	0.11
2.000	42.700	80.000	16.00	0.11
2.500	43.300	100.00	20.00	0.11
3.000	44.000	120.00	28.00	0.11
5.000	45.000	210.00	45.00	0.11

END FTABLE 13

FTABLE 14
ROWS COLS ***
6 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.100	0.3361	0.0168	0.24
0.500	0.3809	0.1602	9.04
1.000	0.4370	0.3647	31.61
1.500	0.4930	0.5972	65.00
2.000	0.5491	0.8577	108.85
2.500	0.6051	1.1462	163.33
3.000	0.6612	1.4628	228.78

END FTABLE 14

FTABLE 15
ROWS COLS ***
4 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.10	0.00	0.00
1.00	1.00	0.55	91.00
2.00	1.10	1.60	268.00
3.00	1.20	2.75	493.00

END FTABLE 15

FTABLE 16
ROWS COLS ***
4 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.10	0.00	0.00
1.00	1.00	0.55	74.00
2.00	1.10	1.60	219.00
3.00	1.20	2.75	403.00

END FTABLE 16

FTABLE 17
ROWS COLS ***
5 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.10	0.00	0.00
1.00	1.00	0.55	59.00
2.00	1.10	1.60	173.00
3.00	1.20	2.75	318.00
4.00	1.30	4.00	484.00

END FTABLE 17

FTABLE 23
ROWS COLS *** HERMES
9 5

DEPTH	AREA	VOLUME	OUTFLOW	OUTFLOW ***	
0.00	0.00	0.00	0.00	0.00	0.00
5.00	0.50	1.91	0.00	0.00	305.00
11.00	0.79	5.79	0.00	0.00	311.00
15.00	1.13	9.64	0.50	0.01	315.00
19.00	1.72	15.34	0.50	0.05	319.00
29.00	2.86	38.25	0.50	0.10	329.00
39.00	4.40	74.55	0.50	0.20	339.00
50.00	6.22	132.98	0.50	0.30	350.00
60.00	10.00	1212.98	0.50	0.40	360.00

END FTABLE 23

FTABLE 24
ROWS COLS ***
9 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.100	0.2571	0.0129	0.16
0.500	0.3873	0.1417	6.53
1.000	0.5501	0.3761	25.95
1.500	0.7128	0.6918	59.86
2.000	0.8756	1.0889	110.67

3.000	1.2011	2.1273	272.24
3.500	1.3639	2.7685	387.38
4.000	1.5266	3.4912	528.19

END FTABLE 24

FTABLE 33
ROWS COLS ***
11 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	1.00	0.00	0.00
0.50	1.20	0.55	2.00
1.00	1.40	1.20	6.00
1.50	1.60	1.95	9.00
2.00	1.80	2.80	13.00
2.50	2.00	3.75	16.50
3.00	2.20	4.80	20.00
3.50	2.40	5.95	23.00
4.00	2.60	7.20	26.00
5.00	2.80	9.90	104.00
6.00	3.00	12.80	246.00

END FTABLE 33

FTABLE 34
ROWS COLS *** REVISED 11/19/97 BASED ON HEC-RAS MODEL
6 5

DEPTH	AREA	VOLUME	OUTFLOW	OUTFLOW2***
0.00	3.00	0.00	0.00	0.00
3.00	3.05	9.08	0.00	0.11
4.00	3.10	12.15	0.00	0.11
5.00	3.15	15.28	0.00	0.11
6.00	3.20	18.45	72.0	0.11
7.00	3.25	21.68	225.0	0.11

END FTABLE 34

FTABLE 35
ROWS COLS *** REVISED 11/19/97 BASED ON HECRAS MODEL
5 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.10	0.00	0.00
1.00	1.10	0.60	38.00
2.00	1.20	1.75	108.00
3.00	1.30	3.00	194.00
4.00	1.40	4.35	290.00

END FTABLE 35

FTABLE 38
ROWS COLS ***
7 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
1.000	0.4000	0.4000	2.00
1.500	0.5000	1.0000	4.00
2.000	0.9000	1.3000	11.00
2.500	1.3000	1.6000	15.00
3.000	1.6000	2.0000	18.00
3.500	1.9000	2.5000	20.80

END FTABLE 38

```
 FTABLE     45
ROWS COLS ***
NORTH EMPLOYEE PARKING LOT VAULT (AS-BUILT)***
  12    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.2200     0.0000       0.00
    2.000     0.2200     0.4500       1.20
    4.000     0.2200     0.9000       1.70
    6.000     0.2200     1.3400       2.10
    8.000     0.2200     1.7900       2.40
   10.000     0.2200     2.2400       2.70
   12.240     0.2200     2.7400       3.00
   14.000     0.2200     3.1400       6.90
   15.440     0.2200     3.4600       8.30
   16.000     0.2200     3.5800      10.30
   18.000     0.2200     4.0300      13.60
   20.000     0.2200     4.4800      30.79
 END FTABLE 45

 FTABLE     50
ROWS COLS ***
  10    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00       1.00       0.00       0.00
     0.50       1.10       0.53       5.00
     1.00       1.20       1.10      15.00
     1.50       1.30       1.73      25.00
     2.00       1.40       2.40      35.00
     2.50       1.50       3.13      52.00
     3.00       1.60       3.90      70.00
     3.50       1.70       4.73      87.00
     4.00       1.80       5.60     105.00
     6.00       1.90       9.30     165.00
 END FTABLE 50

 FTABLE     52
ROWS COLS ***
   6    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0000     0.0000       0.00
    0.100     0.3680     0.0184       0.25
    0.500     0.3717     0.1664       9.39
    1.000     0.3763     0.3534      31.06
    2.000     0.3819     0.7325      94.37
    3.000     0.3874     1.1171     174.33
 END FTABLE 52

 FTABLE     53
OLD LAKE REBA                                 ***
MAX DEPTH = 4.9 FEET                          ***
30" CMP, 40 CFS DISCHARGE AT MAX DEPTH        ***
ROWS COLS ***
   7    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     2.4000     0.0000       0.00
    1.000     2.5800     2.5000      18.00
```

```
      2.000     2.9400     5.3000      26.00
      3.000     3.4100     8.4000      31.00
      4.000     3.8800     12.100      36.00
      4.900     4.3000     15.800      40.00
      6.000     4.3000     15.810     500.00
  END FTABLE 53

  FTABLE     54
 EXISTING MILLER CREEK DETENTION FACILITY*** REVISED STORAGE/Q DATA
 GATE SETTING: 2.0 FEET***
 ROWS COLS ***
   12    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.000       0.00       0.00       0.00
     1.300       0.01       0.01      10.00
     2.000       0.01       0.02      20.00
     2.900       0.70       0.40      30.00
     4.000       1.50       1.50      40.00
     5.400       3.50       4.90      50.00
     7.000       8.60      13.30      60.00
     8.800      15.60      34.80      70.00
    10.000      19.90      57.30      76.00
    10.500      21.50      68.00      92.00
    11.000      23.10      78.80     179.00
    11.500      24.70      88.60     303.00
  END FTABLE 54

  PRE AMBAUM DETENTION ***
  FTABLE    111
 ROWS COLS ***
   12    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.000     0.0000     0.0000       0.00
     0.500     0.2160     0.0750       5.30
     1.000     0.2730     0.1990      21.10
     1.500     0.2890     0.3410      43.90
     2.000     0.2900     0.4830      68.80
     2.500     0.2910     0.6070      89.10
     3.000     0.2950     0.6820      90.00
     3.500     0.3000     2.1000     100.00
     4.000     0.3050     2.5000     105.00
     4.500     0.3100     3.0000     110.00
     5.000     0.3200     3.5000     120.00
     5.500     0.3300     4.0000     130.00
  END FTABLE111

  FTABLE    135
 ROWS COLS *** VACA FARM
    6    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
      0.00       0.10       0.00       0.00
      1.00       0.10       0.10       4.00
      2.00       0.11       0.21       8.00
      2.50       1.00       0.48      13.00
      3.50       6.50       4.23      86.00
      4.50      13.00      13.98     235.00
  END FTABLE135
```

***

```
END FTABLES


MASS-LINK
<Volume>    <-Grp> <-Member-><--Mult-->     <Target>        <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                 <Name> # #***
  MASS-LINK        1
  conversion from acre-inches to acre-ft (1/12)                ***
PERLND     PWATER PERO         0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    1

  MASS-LINK        2
IMPLND     IWATER SURO         0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
RCHRES     ROFLOW                            RCHRES          INFLOW
  END MASS-LINK    3

  MASS-LINK        4
RCHRES     OFLOW  OVOL   1                   RCHRES          INFLOW IVOL
  END MASS-LINK    4

  MASS-LINK        5
RCHRES     OFLOW  OVOL   2                   RCHRES          INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
PERLND     PWATER SURO         0.0833333     RCHRES          INFLOW IVOL
PERLND     PWATER IFWO         0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    6

  MASS-LINK        7
PERLND     PWATER AGWO         0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
PERLND     PWATER PERO         0.0833333     COPY            INPUT  MEAN
  END MASS-LINK    8
  MASS-LINK        12
PERLND     PWATER AGWO         0.0833333     COPY            INPUT  MEAN
  END MASS-LINK    12

  MASS-LINK        9
IMPLND     IWATER SURO         0.0833333     COPY            INPUT  MEAN
  END MASS-LINK    9

  MASS-LINK        10
COPY       OUTPUT MEAN                       RCHRES          INFLOW IVOL
  END MASS-LINK    10

END MASS-LINK
END RUN
```

```
RUN
GLOBAL
  ***  SEATAC AIRPORT HSPF BASIN MODEL OF MILLER CREEK
  ***  FILE: MLOWFLOW2.INP - 2006 future condition
  ***  LOW FLOW ANALYSIS
  ***  BASED ON MILL65.INP FILE FROM AQUA TERRA
  ***  REMOVED FILL AREAS
  ***  PERLND 80 is the groundwater PERLND for the Fill area.
  ***  FOLLOWING STATEMENTS MAY NOT APPLY
  ***  ADDED PERLND 47,57,
  ***  ADDED GROUND WATER INFILTRATION TO WDM FOR USE WITH MCAGWO.INP
  ***  FK revised SDW1A and SDW1B with flow splitters, storages at SDN3/3X,
SDN2X/4X;
  ***  FK revised MC-1 and SDN-2X land uses, added POC at Lake Reba, removed
run-of-river tables
  ***  FOUR YEAR RUN USING CALIBRATION INITIAL CONDITIONS
MILLER CREEK BASIN HSPF MODEL
***  START       1994  1  1  0  0  END    1996  8 30 24  0
  START       1990 10  1  0  0  END    1994  9 30 24  0
  RUN INTERP OUTPUT LEVEL    3
  RESUME     0 RUN     1
END GLOBAL

FILES
<type>  <fun>***<------------fname------------------------------------------->
MESSU      24    D:\PARA\SEATAC\MILLER\LOWFLOW\MLOWFLOW2.MES
WDM        25    D:\PARA\SEATAC\MILLER\LOWFLOW\MLOWFLOW.WDM
           61    D:\PARA\SEATAC\MILLER\LOWFLOW\PER.L61
           62    D:\PARA\SEATAC\MILLER\LOWFLOW\RCH.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 01:00
      PERLND     16
      PERLND     26
      PERLND     34
      PERLND     44
      PERLND     45
  *** special PERLND for infiltration SDW1A
      PERLND     47
      PERLND     54
  *** special PERLND for infiltration SDW1B
      PERLND     57
  *** PERLNDS FOR INFLOW OF LOW FLOW FROM FILL PGG
      PERLND     80
      IMPLND     14
      RCHRES      1
      RCHRES     23
      RCHRES     24
      RCHRES      2
      RCHRES      3
      RCHRES     33
      RCHRES      4
      RCHRES      5
      RCHRES     50
      RCHRES    242
      RCHRES    240
```

```
      COPY         61
      COPY         44
      RCHRES       51
      RCHRES       43
      RCHRES      451
      RCHRES      452
      COPY         45
      COPY        645
      RCHRES       46
      RCHRES      552
      RCHRES       52
      RCHRES       53
      COPY         53
      RCHRES       54
      RCHRES       37
      RCHRES      237
      COPY         37
      RCHRES      147
      RCHRES      247
      COPY         66
      COPY         69
      RCHRES       47
      COPY         62
      COPY         63
      COPY         67
      COPY         68
  *** output special PERLND outflow to check
      COPY         47
      COPY         70
      RCHRES       34
      RCHRES      135
      RCHRES      570
      RCHRES       57
      RCHRES      257
      COPY         64
      COPY         65
      COPY        357
      COPY         56
  *** output special PERLND outflow to check
      COPY         57
      COPY         71
      RCHRES       35
      COPY         55
      RCHRES       10
      RCHRES       16
      RCHRES       11
      RCHRES       13
      RCHRES       12
      RCHRES       15
      RCHRES       14
      RCHRES       17
    END INGRP
END OPN SEQUENCE
                                                                         ***
PERLND
  GEN-INFO
    <PLS >      Name          NBLKS   Unit-systems   Printer              ***
```

```
                                         User  t-series Engl Metr                    ***
  # -  #                                          in  out                            ***
 16      TFM- TILL FOR MOD         1    1    1    1   61    0
 26      TGM- TILL GR MOD          1    1    1    1   61    0
 34      OF - OUTWASH FOR          1    1    1    1   61    0
 44      OG - OUTWASH GR           1    1    1    1   61    0
***PERLND FOR NEW AIRPORT FILL; NONE IN CALIBRATION
 45      AIRPORT FILL              1    1    1    1   61    0
 47      OG - INFILTRATION 1       1    1    1    1   61    0
 54      SA - WETLANDS             1    1    1    1   61    0
 57      OG - INFILTRATION 3       1    1    1    1   61    0
 80      LOW FLOW                  1    1    1    1   61    0
END GEN-INFO
ACTIVITY
  <PLS > ************* Active Sections *****************************
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC             ***
 14  200    0    0    1    0    0    0    0    0    0    0    0    0
END ACTIVITY
PRINT-INFO
  <PLS > ******************** Print-flags ************************* PIVL  PYR
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC *********
 14  200    0    0    5    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO
PWAT-PARM1
  <PLS > **************** Flags *******************
  # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE                           ***
 14  200    0    0    0    0    0    0    0    0    0
END PWAT-PARM1
PWAT-PARM2
  <PLS > ***
  # -  # ***FOREST     LZSN     INFILT       LSUR      SLSUR      KVARY      AGWRC
 16                  9.0000     0.3200     400.00     0.1000     0.5000     0.9960
 26                  9.0000     0.1200     400.00     0.1000     0.5000     0.9960
 34                 10.0000     2.0000     400.00     0.0500     0.3000     0.9960
 44                 10.0000     0.8000     400.00     0.0500     0.3000     0.9960
 45                  7.5000     0.0200     300.00     0.0700     0.0000     0.9960
 47                 10.0000     0.8000     400.00     0.0500     0.3000     0.9960
 54                  8.0000     2.0000     100.00     0.0010     0.5000     0.9960
 57                 10.0000     0.8000     400.00     0.0500     0.3000     0.9960
 80                  9.0000     0.1200     400.00     0.1000     0.5000     0.9960
END PWAT-PARM2
PWAT-PARM3
  <PLS >***
  # -  #*** PETMAX    PETMIN     INFEXP     INFILD     DEEPFR     BASETP     AGWETP
 16                             2.0000     2.0000       0.33       0.00        0.0
 26                             2.0000     2.0000       0.33         0.          0.
 34                             2.0000     2.0000       0.33       0.00        0.0
 44                             2.0000     2.0000       0.33         0.          0.
 47                             2.0000     2.0000       0.33         0.          0.
 45                             2.0000     2.0000       0.33         0.          0.
 54                             10.000     2.0000       0.33         0.         0.7
 57                             2.0000     2.0000       0.33         0.          0.
 80                             2.0000     2.0000       0.33         0.          0.
END PWAT-PARM3
PWAT-PARM4
  <PLS >                                                                  ***
  # -  #      CEPSC      UZSN       NSUR      INTFW        IRC     LZETP***
```

```
    16          0.2000      0.7500      0.3500       9.000      0.7000      0.7000
    26          0.1000      0.3750      0.2500       9.000      0.7000      0.2500
    34          0.2000      0.7500      0.3500       0.000      0.7000      0.7000
    44          0.1000      0.7500      0.2500       0.000      0.7000      0.2500
    47          0.1000      0.7500      0.2500       0.000      0.7000      0.2500
    45          0.1000      0.2800      0.2500       6.000      0.1500      0.6000
    54          0.1000      2.2500      0.5000       1.000      0.7000      0.8000
    57          0.1000      0.7500      0.2500       0.000      0.7000      0.2500
    80          0.1000      0.3750      0.2500       9.000      0.7000      0.2500

  END PWAT-PARM4
  PWAT-STATE1
    <PLS >  PWATER state variables***
    # -   #***     CEPS       SURS        UZS       IFWS        LZS       AGWS       GWVS
    16            0.078         0.      0.2500      0.10      2.000      2.000      0.000
    26            0.051         0.      0.2500      0.10      2.000      2.000      0.000
    34            0.078         0.      0.2500      0.10      2.000      2.000      0.000
    44            0.051         0.      0.2500      0.10      2.000      2.000      0.000
    47            0.051         0.      0.2500      0.10      2.000      2.000      0.000
    45            0.051         0.      0.2500      0.10      2.000      2.000      0.000
    54            0.051         0.      0.2500      0.10      2.000      2.000      0.000
    57            0.051         0.      0.2500      0.10      2.000      2.000      0.000
    80            0.051         0.      0.2500      0.10      2.000      2.000      0.000
  END PWAT-STATE1
END PERLND

IMPLND
  GEN-INFO
    <ILS >       Name              Unit-systems   Printer                            ***
    # -  #                      User  t-series Engl Metr                             ***
                                      in  out                                        ***
   14       IMPERVIOUS             1     1    1   60    0
  END GEN-INFO
  ACTIVITY
    <ILS > ************* Active Sections ****
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL  ***
   14       0    0    1    0    0    0
  END ACTIVITY
  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL *********
   14       0    0    6    0    0    0    1    9
  END PRINT-INFO
  IWAT-PARM1
    <ILS >           Flags          ***                                              ***
    # -  # CSNO RTOP  VRS  VNN RTLI  ***                                             ***
   14       0    0    0    0    0
  END IWAT-PARM1
  IWAT-PARM2
    <ILS >                                                                           ***
    # -  #      LSUR     SLSUR      NSUR     RETSC                                   ***
   14         100.00    0.0100    0.1000    0.1000
  END IWAT-PARM2
  IWAT-PARM3
    <ILS >                                                                           ***
    # -  #    PETMAX    PETMIN                                                       ***
   14
```

```
  END IWAT-PARM3
  IWAT-STATE1                                                                        ***
    <ILS >  IWATER state variables                                                   ***
    # -  #        RETS       SURS
   14       1.0000E-3 1.0000E-3
  END IWAT-STATE1
END IMPLND                                                                           ***

EXT SOURCES                                                                          ***

*** NOTE: The only RCHRES that precip and PET are applied to are lakes and ponds
*** FOLLOWING RCHRES ARE PONDS: 57, 247, 237
                                                                                     ***
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->         ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #         ***
*** PRECIP/EVAP TO PERVIOUS/IMPERV SURFACES
WDM    1002 PREC     ENGLZERO  1.00          PERLND  14   65 EXTNL  PREC
WDM    1002 PREC     ENGLZERO  0.0           PERLND  80      EXTNL  PREC
WDM    1002 PREC     ENGLZERO  1.00          IMPLND  14      EXTNL  PREC
WDM       1 EVAP     ENGLZERO  0.8           PERLND  14   65 EXTNL  PETINP
WDM       1 EVAP     ENGLZERO  0.0           PERLND  80      EXTNL  PETINP
WDM       1 EVAP     ENGLZERO  0.8           IMPLND  14      EXTNL  PETINP
  ***  --> lateral inflow from reinfiltration chamber for SDW1A
*** WDM      5 FLOW     ENGLZERO  1.0          PERLND  47      EXTNL  AGWLI
  ***  --> lateral inflow from reinfiltration chamber for SDW1B
*** WDM      6 FLOW     ENGLZERO  1.0          PERLND  57      EXTNL  AGWLI
*** PRECIP/EVAP TO LAKES
WDM    1002 PREC     ENGLZERO                RCHRES   1      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES   1      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES   4      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES   4      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES  11      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES  11      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES  13      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES  13      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES  23      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES  23      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES  34      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES  34      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES  53      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES  53      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES  54      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES  54      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES 237      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES 237      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES 247      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES 247      EXTNL  POTEV
WDM    1002 PREC     ENGLZERO                RCHRES  57      EXTNL  PREC
WDM       1 EVAP     ENGLZERO     0.8        RCHRES  57      EXTNL  POTEV
*** till seapage groundwater flow from Fill area.  PGG time series
WDM    7001 FLOW     ENGLZERO.000000099      PERLND  80      EXTNL  AGWLI
*** Fill flow directly to stream
WDM    7000 FLOW     ENGL     .000000957     RCHRES  35      INFLOW IVOL

END EXT SOURCES

EXT TARGETS
```

```
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
***PROJECT CONDITION FLOWS
*** RCHRES=LOCATION:
*** 54=MCDF       47=SDW1A INFILTRATION TANK       43=SDN3X      247=SDW1A POND G
*** 17=MOUTH      49=SDW2         44=SDN4X         52=SDN1       451= EXISTING NEPL
*** 61=SDN2X      57=SDW1B        51=SDN2X+SDN4X   53=Lake Reba 452=NEW NEPL
*** 45=NEPL POC   55=SR509        39=SDN3A/SDW1A POC
*** 46=CARGO      37=SDN3AI VAULT 237=SDN3AO POND
*** GAUGE POINTS (17=MOUTH, 54=MILLER RDF, 55=SR509)
RCHRES  17 HYDR   RO      1 1                  WDM   7017 FLOW     ENGL      REPL
RCHRES  35 HYDR   RO      1 1                  WDM   7036 FLOW     ENGL      REPL
***COPY    55 OUTPUT MEAN   1 1 12.1              WDM    118 FLOW     ENGL      REPL
RCHRES  54 HYDR   RO      1 1                  WDM   7054 FLOW     ENGL      REPL
*** DETENTION POND FLOWS
***COPY    61 OUTPUT MEAN   1 1 12.1           WDM     101 FLOW     ENGL      REPL
***RCHRES 552 HYDR   RO     1 1                WDM     102 FLOW     ENGL      REPL
***RCHRES 451 HYDR   RO     1 1                WDM     105 FLOW     ENGL      REPL
***RCHRES 452 HYDR   RO     1 1                WDM     119 FLOW     ENGL      REPL
***RCHRES  46 HYDR   RO     1 1                WDM     106 FLOW     ENGL      REPL
*** write RCHRES 47 (Inf. Area # 1)outlet 1 and 2 to WDM 107 and 108 like so:
***COPY    62 OUTPUT MEAN   1 1 12.1           WDM     107 FLOW     ENGL      REPL
***COPY    63 OUTPUT MEAN   1 1 12.1           WDM     108 FLOW     ENGL      REPL
***COPY    66 OUTPUT MEAN   1 1 12.1           WDM     112 FLOW     ENGL      REPL
***COPY    69 OUTPUT MEAN   1 1 12.1           WDM    1120 FLOW     ENGL      REPL
*** write SDW1a vault flows to WDM:
***COPY    67 OUTPUT MEAN   1 1 12.1           WDM     109 FLOW     ENGL      REPL
***COPY    68 OUTPUT MEAN   1 1 12.1           WDM    1090 FLOW     ENGL      REPL
*** write RCHRES 570 outlet 1 and 2 to WDM 110 and 115 like so:
***RCHRES 570 HYDR   RO     1 1                WDM     210 FLOW     ENGL      REPL
***COPY    64 OUTPUT MEAN   1 1 12.1           WDM     110 FLOW     ENGL      REPL
***COPY    65 OUTPUT MEAN   1 1 12.1           WDM     115 FLOW     ENGL      REPL
***COPY   357 OUTPUT MEAN   1 1 12.1           WDM     211 FLOW     ENGL      REPL
***COPY    56 OUTPUT MEAN   1 1 12.1           WDM     121 FLOW     ENGL      REPL
*** write RCHRES 37 vault to WDM 111
***RCHRES  37 HYDR   RO     1 1                WDM     111 FLOW     ENGL      REPL
***RCHRES 237 HYDR   RO     1 1                WDM     122 FLOW     ENGL      REPL
***RCHRES  43 HYDR   RO     1 1                WDM     103 FLOW     ENGL      REPL
***COPY    44 OUTPUT MEAN   1 1 12.1           WDM     104 FLOW     ENGL      REPL
***RCHRES  51 HYDR   RO     1 1                WDM     139 FLOW     ENGL      REPL
*** DETENTION STAGES
***RCHRES  47 HYDR   STAGE                     WDM     652 STAG     ENGL      REPL
***RCHRES 147 HYDR   STAGE                     WDM     657 STAG     ENGL      REPL
***RCHRES 247 HYDR   STAGE                     WDM     654 STAG     ENGL      REPL
***RCHRES 552 HYDR   STAGE                     WDM     601 STAG     ENGL      REPL
***RCHRES  57 HYDR   STAGE                     WDM     651 STAG     ENGL      REPL
***RCHRES 257 HYDR   STAGE                     WDM     655 STAG     ENGL      REPL
***RCHRES 237 HYDR   STAGE                     WDM     656 STAG     ENGL      REPL
***RCHRES  37 HYDR   STAGE                     WDM     650 STAG     ENGL      REPL
***RCHRES  54 HYDR   STAGE                     WDM      61 STAG     ENGL      REPL
***RCHRES 451 HYDR   STAGE                     WDM     662 STAG     ENGL      REPL
***RCHRES 452 HYDR   STAGE                     WDM     667 STAG     ENGL      REPL
***RCHRES  46 HYDR   STAGE                     WDM     663 STAG     ENGL      REPL
***RCHRES  43 HYDR   STAGE                     WDM     664 STAG     ENGL      REPL
***RCHRES  44 HYDR   STAGE                     WDM     665 STAG     ENGL      REPL
***RCHRES  51 HYDR   STAGE                     WDM     666 STAG     ENGL      REPL
*** DETENTION VOLUMES
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***RCHRES  47 HYDR    VOL                       WDM     752 VOL      ENGL     REPL
***RCHRES 147 HYDR    VOL                       WDM     757 VOL      ENGL     REPL
***RCHRES 247 HYDR    VOL                       WDM     754 VOL      ENGL     REPL
***RCHRES 552 HYDR    VOL                       WDM     602 VOL      ENGL     REPL
***RCHRES  57 HYDR    VOL                       WDM     751 VOL      ENGL     REPL
***RCHRES 257 HYDR    VOL                       WDM     755 VOL      ENGL     REPL
***RCHRES 237 HYDR    VOL                       WDM     756 VOL      ENGL     REPL
***RCHRES  37 HYDR    VOL                       WDM     750 VOL      ENGL     REPL
***RCHRES  54 HYDR    VOL                       WDM      62 VOL      ENGL     REPL
***RCHRES 451 HYDR    VOL                       WDM     762 VOL      ENGL     REPL
***RCHRES 452 HYDR    VOL                       WDM     767 VOL      ENGL     REPL
***RCHRES  46 HYDR    VOL                       WDM     763 VOL      ENGL     REPL
***RCHRES  43 HYDR    VOL                       WDM     764 VOL      ENGL     REPL
***RCHRES  44 HYDR    VOL                       WDM     765 VOL      ENGL     REPL
***RCHRES  51 HYDR    VOL                       WDM     766 VOL      ENGL     REPL
*** POINT OF COMPLIANCE (POC)FLOWS
***COPY    37 OUTPUT MEAN   1 1 12.1            WDM     125 FLOW     ENGL     REPL
***COPY    45 OUTPUT MEAN   1 1 12.1            WDM     199 FLOW     ENGL     REPL
***COPY    53 OUTPUT MEAN   1 1 12.1            WDM     399 FLOW     ENGL     REPL
***COPY    70 OUTPUT MEAN   1 1 12.1            WDM    7000 FLOW     ENGL     REPL
***COPY    71 OUTPUT MEAN   1 1 12.1            WDM    7001 FLOW     ENGL     REPL
*** SPECIAL PERLND REINFILTRATION RESULTS
  ***  --> output special PERLND parameters to check operations:
  ***  --> PERLND 47 active ground water storage depth (in)
*** PERLND  47 PWATER AGWS                      WDM     471 AGWS     ENGL
REPL
  ***  --> PERLND 47 active ground water outflow (acft/2ac -> in/acre)
***COPY    47 OUTPUT MEAN   1 1 12              WDM     472 FLOW     ENGL     REPL
  ***  --> PERLND 57 active ground water storage depth (in)
***PERLND  57 PWATER AGWS                       WDM     571 AGWS     ENGL     REPL
  ***  --> PERLND 57 active ground water outflow (acft/2ac -> in/acre)
***COPY    57 OUTPUT MEAN   1 1 12              WDM     572 FLOW     ENGL     REPL

END EXT TARGETS

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
  *** SUB-CATCHMENT 1 all agwo goes to sound
PERLND  16                        3.41     RCHRES   1      6
PERLND  26                      232.36     RCHRES   1      6
PERLND  34                        3.07     RCHRES   1      6
PERLND  44                       38.03     RCHRES   1      6
PERLND  54                        3.87     RCHRES   1      6
IMPLND  14                       56.14     RCHRES   1      2
 *** SUB-CATCHMENT 2 10% of area GW goes to vaca 90% goes to sound
PERLND  16                        5.56     RCHRES   2      6
PERLND  26                      200.05     RCHRES   2      6
PERLND  34                        0.46     RCHRES   2      6
PERLND  44                       38.71     RCHRES   2      6
PERLND  16                        0.56     RCHRES 135      7
PERLND  26                       20.00     RCHRES 135      7
PERLND  34                        0.05     RCHRES 135      7
PERLND  44                        3.87     RCHRES 135      7
IMPLND  14                       42.22     RCHRES   2      2
 *** SUB-CATCHMENT 23 New subbasin 15 % OF GW GOES TO VACCA 85% TO SOUND
PERLND  16                        3.09     RCHRES  23      6
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PERLND  26                156.15   RCHRES  23     6
PERLND  34                  2.25   RCHRES  23     6
PERLND  44                 45.84   RCHRES  23     6
PERLND  16                  0.46   RCHRES 135     7
PERLND  26                 23.42   RCHRES 135     7
PERLND  34                  0.34   RCHRES 135     7
PERLND  44                  6.88   RCHRES 135     7
IMPLND  14                 58.44   RCHRES  23     2
 *** SUB-CATCHMENT 24 New subbasin 60 % OF GW GOES TO 11 40% TO SOUND
PERLND  26                135.43   RCHRES  24     6
PERLND  34                  2.02   RCHRES  24     6
PERLND  44                 69.29   RCHRES  24     6
PERLND  26                 81.26   RCHRES  11     7
PERLND  34                  1.21   RCHRES  11     7
PERLND  44                 41.57   RCHRES  11     7
IMPLND  14                 79.98   RCHRES  24     2
  *** SUB-CATCHMENT 3 agwo goes to vaca(135)
PERLND  16                  8.26   RCHRES   3     6
PERLND  26                108.38   RCHRES   3     6
PERLND  34                 16.02   RCHRES   3     6
PERLND  44                102.89   RCHRES   3     6
PERLND  54                  0.04   RCHRES   3     6
PERLND  16                  8.26   RCHRES 135     7
PERLND  26                108.38   RCHRES 135     7
PERLND  34                 16.02   RCHRES 135     7
PERLND  44                102.89   RCHRES 135     7
PERLND  54                  0.04   RCHRES 135     7
IMPLND  14                 27.30   RCHRES   3     2
  *** SUB-CATCHMENT 4 10% of agwo goes to rchres 90% goes to sound
PERLND  16                  2.95   RCHRES   4     6
PERLND  26                 85.95   RCHRES   4     6
PERLND  34                  3.75   RCHRES   4     6
PERLND  44                 92.06   RCHRES   4     6
PERLND  16                  0.30   RCHRES   4     7
PERLND  26                  8.59   RCHRES   4     7
PERLND  34                  0.38   RCHRES   4     7
PERLND  44                  9.21   RCHRES   4     7
IMPLND  14                 18.43   RCHRES   4     2
  *** SUB-CATCHMENT 4a 70% of agwo goes to rchres 30% goes to sound
PERLND  16                  8.66   RCHRES   4     6
PERLND  26                 61.64   RCHRES   4     6
PERLND  34                 22.06   RCHRES   4     6
PERLND  44                 78.09   RCHRES   4     6
PERLND  54                 12.50   RCHRES   4     6
PERLND  16                  6.06   RCHRES   4     7
PERLND  26                 43.15   RCHRES   4     7
PERLND  34                 15.44   RCHRES   4     7
PERLND  44                 54.66   RCHRES   4     7
PERLND  54                  8.75   RCHRES   4     7
IMPLND  14                 29.14   RCHRES   4     2
  *** SUB-CATCHMENT 5
PERLND  26                 10.29   RCHRES   5     1
PERLND  44                 50.05   RCHRES   5     1
PERLND  54                 10.74   RCHRES   5     1
IMPLND  14                 16.31   RCHRES   5     2
  *** SUB-CATCHMENT 6
PERLND  16                  1.42   COPY   645    26
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PERLND  26                    20.38    COPY   645      26
PERLND  34                    13.44    COPY   645      26
PERLND  44                    11.79    COPY   645      26
PERLND  54                     0.82    COPY   645      26
PERLND  16                     1.42    RCHRES  53       7
PERLND  26                    20.38    RCHRES  53       7
PERLND  34                    13.44    RCHRES  53       7
PERLND  44                    11.79    RCHRES  53       7
PERLND  54                     0.82    RCHRES  53       7
IMPLND  14                     6.23    COPY   645      22
  *** SUB-CATCHMENT 8
PERLND  44                    22.21    RCHRES  35       1
IMPLND  14                     6.60    RCHRES  35       2
  *** SUB-CATCHMENT 9
PERLND  16                     4.98    RCHRES  34       1
PERLND  26                    14.38    RCHRES  34       1
PERLND  34                     0.05    RCHRES  34       1
PERLND  44                    56.71    RCHRES  34       1
PERLND  54                     0.01    RCHRES  34       1
IMPLND  14                    22.47    RCHRES  34       2
  *** SUB-CATCHMENT 10
PERLND  16                     4.15    RCHRES  10       1
PERLND  26                    31.94    RCHRES  10       1
PERLND  44                    95.22    RCHRES  10       1
IMPLND  14                    71.98    RCHRES  10       2
  *** SUB-CATCHMENT 11 25% OF AGWO GOES TO 15
PERLND  16                     0.89    RCHRES  11       6
PERLND  26                   217.92    RCHRES  11       6
PERLND  34                     1.32    RCHRES  11       6
PERLND  44                    65.65    RCHRES  11       6
PERLND  16                     0.67    RCHRES  11       7
PERLND  26                   163.44    RCHRES  11       7
PERLND  34                     0.99    RCHRES  11       7
PERLND  44                    49.24    RCHRES  11       7
PERLND  16                     0.22    RCHRES  15       7
PERLND  26                    54.48    RCHRES  15       7
PERLND  34                     0.33    RCHRES  15       7
PERLND  44                    16.41    RCHRES  15       7
IMPLND  14                   230.80    RCHRES  11       2
  *** SUB-CATCHMENT 12
PERLND  16                     0.39    RCHRES  12       1
PERLND  26                   101.18    RCHRES  12       1
PERLND  34                     5.64    RCHRES  12       1
PERLND  44                    54.98    RCHRES  12       1
PERLND  54                     0.64    RCHRES  12       1
IMPLND  14                    79.83    RCHRES  12       2
  *** SUB-CATCHMENT 13
PERLND  16                     0.79    RCHRES  13       1
PERLND  26                   197.68    RCHRES  13       1
IMPLND  14                    27.66    RCHRES  13       2
  *** SUB-CATCHMENT 14 50% OF AGWO GOES TO SOUND
PERLND  16                     0.24    RCHRES  14       6
PERLND  26                   118.67    RCHRES  14       6
PERLND  34                    13.46    RCHRES  14       6
PERLND  44                    41.91    RCHRES  14       6
PERLND  16                     0.12    RCHRES  14       7
PERLND  26                    59.34    RCHRES  14       7
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PERLND  34                          6.73     RCHRES  14       7
PERLND  44                         20.95     RCHRES  14       7
IMPLND  14                         20.66     RCHRES  14       2
 *** SUB-CATCHMENT 15
PERLND  16                          6.59     RCHRES  15       1
PERLND  26                         49.55     RCHRES  15       1
PERLND  34                         50.09     RCHRES  15       1
PERLND  44                         86.52     RCHRES  15       1
IMPLND  14                         19.47     RCHRES  15       2
 *** SUB-CATCHMENT 16
PERLND  16                         10.93     RCHRES  16       1
PERLND  26                         29.93     RCHRES  16       1
PERLND  34                         20.03     RCHRES  16       1
PERLND  44                         31.83     RCHRES  16       1
IMPLND  14                         15.58     RCHRES  16       2
 *** SUB-CATCHMENT 17 AGWO GOES TO SOUND
PERLND  16                          0.90     RCHRES  17       6
PERLND  26                         16.31     RCHRES  17       6
PERLND  34                         34.82     RCHRES  17       6
PERLND  44                         82.11     RCHRES  17       6
PERLND  54                          2.19     RCHRES  17       6
IMPLND  14                         10.49     RCHRES  17       2
 *** SUB-CATCHMENT MC-1
PERLND  26                          0.14     RCHRES  52       1
PERLND  44                          9.44     RCHRES  52       1
PERLND  45                          0.14     RCHRES  52       1
PERLND  54                          0.27     RCHRES  52       1
IMPLND  14                          1.98     RCHRES  52       2
 *** SUB-CATCHMENT MC-2
PERLND  16                          0.08     RCHRES  53       1
PERLND  26                          0.53     RCHRES  53       1
PERLND  34                          3.60     RCHRES  53       1
PERLND  44                          9.20     RCHRES  53       1
PERLND  45                          2.22     RCHRES  53       1
PERLND  54                         15.14     RCHRES  53       1
IMPLND  14                          2.54     RCHRES  53       2
 *** SUB-CATCHMENT MC-3
PERLND  34                          3.70     RCHRES  54       1
PERLND  44                          4.91     RCHRES  54       1
PERLND  45                          1.07     RCHRES  54       1
PERLND  54                          1.84     RCHRES  54       1
IMPLND  14                          1.42     RCHRES  54       2
 *** SUB-CATCHMENT MC-4
PERLND  34                          0.27     RCHRES 135       1
PERLND  44                         16.51     RCHRES 135       1
PERLND  45                          4.23     RCHRES 135       1
PERLND  54                         11.98     RCHRES 135       1
IMPLND  14                          3.31     RCHRES 135       2
 *** SUB-CATCHMENT MC-5
PERLND  26                         13.43     RCHRES  35       1
PERLND  44                         33.84     RCHRES  35       1
PERLND  54                          7.44     RCHRES  35       1
IMPLND  14                          0.02     RCHRES  35       2
 *** SUB-CATCHMENT MC-6
 ***  --> reduce by 2 acres to make special PERLND 47 for SDW1A
***PERLND  44                         14.10     RCHRES  35       1
PERLND  44                         12.10     RCHRES  35       1
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PERLND  45                                    0.09      RCHRES  35        1
PERLND  54                                    0.90      RCHRES  35        1
IMPLND  14                                    0.26      RCHRES  35        2
  ***   --> add 2 acres from special PERLND 47 for SDW1A
PERLND  47                                    2.00      RCHRES  35        1
  ***   --> output outflow from special PERLND 47 (acft/ac)
PERLND  47                                    1.00      COPY    47       21

  *** SUB-CATCHMENT MC-7
  ***   --> reduce by 2 acres to make special PERLND 57 for SDW1B
PERLND  26                                   11.26      COPY    55       21
  ***   --> reduce by 2 acres to make special PERLND 57 for SDW1B
***PERLND  44                                   31.80      COPY    55       21
  ***   --> add 2 acres from special PERLND 57 for SDW1B
PERLND  57                                    2.00      COPY    55       21
  ***   --> output outflow from special PERLND 57 (acft/ac)
PERLND  57                                    1.00      COPY    57       21
PERLND  44                                   29.80      COPY    55       21
PERLND  54                                    3.20      COPY    55       21
IMPLND  14                                    0.03      COPY    55       22

***note: SDN AGWO TO VACCA FARMS (135)NOT TO PONDS

  *** SUB-CATCHMENT SDN-1
PERLND  26                                    1.97      RCHRES 552        6
PERLND  44                                    1.29      RCHRES 552        6
PERLND  54                                    0.20      RCHRES 552        6
PERLND  26                                    1.97      RCHRES 135        7
PERLND  44                                    1.29      RCHRES 135        7
PERLND  54                                    0.20      RCHRES 135        7
IMPLND  14                                   12.68      RCHRES 552        2

  *** SUB-CATCHMENT SDN-1-LWR
PERLND  44                                    4.79      RCHRES 552        6
PERLND  54                                    0.07      RCHRES 552        6
PERLND  44                                    4.79      RCHRES 135        7
PERLND  54                                    0.07      RCHRES 135        7
IMPLND  14                                    0.56      RCHRES 552        2

  *** SUB-CATCHMENT SDN-1-OFF
PERLND  26                                   23.01      RCHRES  52        6
PERLND  44                                    3.58      RCHRES  52        6
PERLND  54                                    1.67      RCHRES  52        6
PERLND  26                                   23.01      RCHRES 135        7
PERLND  44                                    3.58      RCHRES 135        7
PERLND  54                                    1.67      RCHRES 135        7
IMPLND  14                                    8.00      RCHRES  52        2

  *** SUB-CATCHMENT SDN-2X (TO POND)
PERLND  26                                    0.63      COPY    61       26
PERLND  44                                    2.40      COPY    61       26
PERLND  45                                    0.86      COPY    61       26
PERLND  26                                    0.63      RCHRES 135        7
PERLND  44                                    2.40      RCHRES 135        7
PERLND  45                                    0.86      RCHRES 135        7
IMPLND  14                                    0.36      COPY    61       22
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  *** SUB-CATCHMENT SDN-3 (TO POND)
PERLND  26                              23.56      RCHRES  43        6
PERLND  26                              23.56      RCHRES 135        7
IMPLND  14                              24.30      RCHRES  43        2

  *** SUB-CATCHMENT SDN-3X (TO POND)
PERLND  26                               1.61      RCHRES  43        6
***original PERLND area
***PERLND  45                              23.77      RCHRES  43        6
***PERLND AREA TO BE REMOVED = 0.29 AC
PERLND  45                              23.48      RCHRES  43        6
PERLND  80                               0.29      RCHRES 135       `7
PERLND  26                               1.61      RCHRES 135        7
PERLND  45                              23.48      RCHRES 135        7

  *** SUB-CATCHMENT SDN-4 (TO POND)
PERLND  26                              15.75      COPY    44       26
PERLND  44                               1.31      COPY    44       26
PERLND  45                               0.99      COPY    44       26
PERLND  26                              15.75      RCHRES 135        7
PERLND  44                               1.31      RCHRES 135        7
PERLND  45                               0.99      RCHRES 135        7
IMPLND  14                              12.26      COPY    44       22

  *** SUB-CATCHMENT SDN-4X (TO POND)
PERLND  26                               1.92      COPY    44       26
PERLND  44                               0.75      COPY    44       26
PERLND  45                               8.31      COPY    44       26
PERLND  26                               1.92      RCHRES 135        7
PERLND  44                               0.75      RCHRES 135        7
PERLND  45                               8.31      RCHRES 135        7
IMPLND  14                               4.21      COPY    44       22

  *** SUB-CATCHMENT IWS-NCPS (TO POND)
PERLND  26                               4.78      RCHRES 242        6
PERLND  26                               4.78      RCHRES 135        7
IMPLND  14                              30.93      RCHRES 242        2

  *** SUB-CATCHMENT IWS-NSMPS (TO POND)
PERLND  26                               2.69      RCHRES 240        6
PERLND  44                               1.97      RCHRES 240        6
PERLND  45                               0.01      RCHRES 240        6
PERLND  26                               2.69      RCHRES 135        7
PERLND  44                               1.97      RCHRES 135        7
PERLND  45                               0.01      RCHRES 135        7
IMPLND  14                               1.95      RCHRES 240        2

  *** SUB-CATCHMENT NEPL (TO POND)
PERLND  26                              10.00      RCHRES 452        6
PERLND  26                              10.00      RCHRES 135        7
IMPLND  14                               6.00      RCHRES 451        2
IMPLND  14                              26.29      RCHRES 452        2

  *** SUB-CATCHMENT CARGO (TO POND)
IMPLND  14                               8.12      RCHRES  46        2

  *** SUB-CATCHMENT SDN3AI (TO VAULT)
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***original IMPLND area
***IMPLND  14                         5.87     RCHRES  37       2
***IMPLND AREA TO BE REMOVED = 5.69 AC
IMPLND  14                       0.18     RCHRES  37       2
PERLND  80                       5.69     RCHRES 135       7

  *** SUB-CATCHMENT SDN3AO (TO POND)
PERLND  26                       0.08     RCHRES 237       6
PERLND  44                       0.03     RCHRES 237       6
***original PERLND area
***PERLND  45                        22.12     RCHRES 237       6
***PERLND AREA TO BE REMOVED = 11.16 AC
***PERLND AREA TO BE REMOVED = 4.56 AC
PERLND  45                       6.40     RCHRES 237       6
PERLND  80                      11.16     RCHRES 135       7
PERLND  80                       4.56     RCHRES 135       7
PERLND  26                       0.08     RCHRES 135       7
PERLND  44                       0.03     RCHRES 135       7
PERLND  45                       6.40     RCHRES 135       7
***original IMPLND area
***IMPLND  14                         2.35     RCHRES 237       2
***IMPLND AREA TO BE REMOVED = 2.19 AC
IMPLND  14                       0.16     RCHRES 237       2
PERLND  80                       2.19     RCHRES 135       7

  *** SUB-CATCHMENT SDW1AO (TO POND)
***original PERLND area
***PERLND  26                         4.28     RCHRES 247       6
***PERLND AREA TO BE REMOVED = 0.67 AC
PERLND  26                       3.61     RCHRES 247       6
PERLND  80                       0.67     RCHRES 135       7
PERLND  44                       0.69     RCHRES 247       6
***original PERLND area
***PERLND  45                        32.44     RCHRES 247       6
***PERLND AREA TO BE REMOVED = 18.06 AC
***PERLND AREA TO BE REMOVED = 0.60 AC
PERLND  45                      13.78     RCHRES 247       6
PERLND  80                      18.06     RCHRES 135       7
PERLND  80                       0.60     RCHRES 135       7
PERLND  26                       3.61     RCHRES 135       7
PERLND  44                       0.69     RCHRES 135       7
PERLND  45                      13.78     RCHRES 135       7
***original IMPLND area
***IMPLND  14                         1.64     RCHRES 247       2
***IMPLND AREA TO BE REMOVED = 0.93 AC
IMPLND  14                       0.71     RCHRES 247       2
PERLND  80                       0.93     RCHRES 135       7
  *** PERVIOUS AREA FOR 1AI IS IN 1AO
  *** SUB-CATCHMENT SDN1AI (TO VAULT)
***original IMPLND area
***IMPLND  14                        13.78     RCHRES 147       2
***IMPLND AREA TO BE REMOVED = 13.07 AC
IMPLND  14                       0.71     RCHRES 147       2
PERLND  80                      13.07     RCHRES  35       7
  *** CONTAINS BOTH I AND O
  *** SUB-CATCHMENT SDW1B (TO POND)
  *** AGWO TO 35, AS 57 IS D/S OF VACCA FARMS (135)
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***original PERLND area
***PERLND  26                          21.25     RCHRES 570       6
***PERLND AREA TO BE REMOVED = 0.54 AC
PERLND  26                          20.71     RCHRES 570       6
PERLND  80                           0.54     RCHRES  35       7
PERLND  44                           2.39     RCHRES 570       6
***original PERLND area
***PERLND  45                          46.26     RCHRES 570       6
***PERLND AREA TO BE REMOVED = 34.71 AC
***PERLND AREA TO BE REMOVED =  1.34 AC
PERLND  45                          10.21     RCHRES 570       6
PERLND  80                          34.71     RCHRES  35       7
PERLND  80                           1.34     RCHRES  35       7
PERLND  26                          20.71     RCHRES  35       7
PERLND  44                           2.39     RCHRES  35       7
PERLND  45                          10.21     RCHRES  35       7
***original IMPLND area
***IMPLND  14                          26.95     RCHRES 570       2
***IMPLND AREA TO BE REMOVED = 20.79 AC
***IMPLND AREA TO BE REMOVED =  1.62 AC
IMPLND  14                           4.54     RCHRES 570       2
PERLND  80                          20.79     RCHRES  35       7
PERLND  80                           1.62     RCHRES  35       7

 *** ADD SUB-CATCHMENT IWS-PRIMARY TO PREDEVELOPEMENT ONLY

***ROUTING FOR MILLER CREEK
 *** M1 TO M2 TO M3 TO STORAGE 50.  M4 TO M5 TO STORAGE 50
RCHRES   1                                    RCHRES   2       4
RCHRES  23                                    RCHRES  24       4
RCHRES  24                                    RCHRES   3       3
RCHRES   2                                    RCHRES   3       3
RCHRES   3                                    RCHRES  33       3
RCHRES  33                                    RCHRES  50       3
RCHRES   4                                    RCHRES   5       4
RCHRES   5                                    RCHRES  50       3
 *** PONDS TO 52, 53 & 54
RCHRES 242                                    RCHRES 240       5
 *** OVERFLOW ONLY TO 61
RCHRES 240                                    RCHRES  51       5
COPY    61                                    RCHRES  51      12
COPY    44                                    RCHRES  51      12
RCHRES  51                                    RCHRES  52       3
RCHRES  43                                    RCHRES  54       3
 *** 2 NEPL VAULTS* (FK-Changed to eliminate run-of-river tables)
RCHRES 451                                    COPY    45      11
RCHRES 452                                    COPY    45      11
COPY    45                                    COPY   645      10
COPY   645                                    RCHRES  53      12
RCHRES  46                                    RCHRES  53       3
 *** NEW STREAM REACH 52 TO LAKE REBA 53 TO RDF 54 (FK-changed to insert new POC
at Lake Reba)
RCHRES 552                                    RCHRES  52       3
RCHRES  52                                    RCHRES  53       3
RCHRES  53                                    COPY    53      11
COPY    53                                    RCHRES  54      12
RCHRES  50                                    RCHRES  54       3
```

```
 *** RDF 54 TO 35
RCHRES  54                                  RCHRES 135       3
<-Source->              <--Area-->          <-Target->    MBLK    ***
<Name>    #             <-factor->          <Name>    #   Tbl#    ***
 *** PONDS TO 34
RCHRES  37                                  COPY     37      11
RCHRES 237                                  COPY     37      11
COPY    37                                  RCHRES 135       12
 *** SDW1A flow to bypass added (FK, June 2001)
SDW1AI VAULT FLOW TO INFILTRATION 1                                   ***
RCHRES 147                                  RCHRES   47       4
SDW1AI VAULT FLOW TO BYPASS                                           ***
RCHRES 147                                  COPY     70      15
STORMWATER Q 1ST EXIT AT POND G (Bypass)                              ***
RCHRES 247                                  COPY     70      14
RCHRES 247                                  COPY     66      14
RCHRES 247                                  COPY     69      15
2ND EXIT TO INFILTRATION TANK-MILLER CREEK                            ***
RCHRES 247                                  RCHRES   47       5
STORMWATER Q 1ST EXIT TO BYPASS                                       ***
RCHRES  47                                  COPY     70      14
*** 2ND EXIT TO SOIL AND MILLER CREEK (2nd exit intr. as AGWLI)***
*** RCHRES  47                                  COPY     70      15
COPY BLOCK FOR OUTPUT PURPOSES                                        ***
RCHRES  47                                  COPY     62      14
RCHRES  47                                  COPY     63      15
RCHRES 147                                  COPY     67      14
RCHRES 147                                  COPY     68      15
COPY    70                                  RCHRES 135       12
RCHRES  34                                  RCHRES 135        4
RCHRES  34                                  RCHRES 135        5
RCHRES 135                                  RCHRES   35       3
RCHRES  10                                  RCHRES   16       3
 *** PONDS TO 35
 *** Configuration changed to flow splitter to Pond D and Infiltration Basin 3
(FK, June 2001)
STORM Q - 1ST EXIT OF FLOW SPLITTER TO POND D                         ***
RCHRES 570                                  RCHRES   57       4
***INFILTRATION Q - 2ND EXIT OF FLOW SPLITTER TO SOIL                 ***
*** RCHRES 570                                  RCHRES 257        5
STORM Q EXIT OF POND D TO MILLER CREEK                          ***
RCHRES  57                                  COPY     71      11
COPY BLOCK FOR OUTPUT PURPOSES                                        ***
RCHRES 570                                  COPY     64      14
RCHRES 570                                  COPY     65      15
RCHRES  57                                  COPY    357      11
RCHRES 257                                  COPY     56      14
RCHRES 257                                  COPY     71      14
RCHRES 257                                  COPY     71      15
COPY    71                                  RCHRES   35      12
RCHRES  35                                  COPY     55      11
COPY    55                                  RCHRES   16      12
RCHRES  11                                  RCHRES   15       3
RCHRES  13                                  RCHRES   12       4
RCHRES  13                                  RCHRES   12       5
RCHRES  12                                  RCHRES   15       3
RCHRES  16                                  RCHRES   15       3
```

```
RCHRES  14                                  RCHRES  17      3
RCHRES  15                                  RCHRES  17      3
END SCHEMATIC

NETWORK
***      <MEMBER> SSYSSGAP<--MULT-->TRAN <-TARGET VOLS>        <-MEMBER->
<NAME>   # <NAME>    TEM STRG<-FACTOR->STRG <NAME>    #    # <-GRP> <NAME> # # ***
END NETWORK
                                                                              ***
RCHRES
  GEN-INFO
    RCHRES       Name          Nexits  Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG             ***
                                          in  out                             ***
    1      Arbor Lake  M 1         2    1    1    1   62    0    0
    2      Arbor Ck -03710 M 2     1    1    1    1   62    0    0
    3      Arbor Ck    M 3         1    1    1    1   62    0    0
    4      Tub Lake    M 4         2    1    1    1   62    0    0
    5      Miller Ck SR518 M5      1    1    1    1   62    0    0
   10      Trib (0371G)    M 10    1    1    1    1   62    0    0
   11      M11 Ambaum Detention    1    1    1    1   62    0    0
   12      Trib(0354)   M 12       1    1    1    1   62    0    0
   13      Burien Lake M 13        2    1    1    1   62    0    0
   14      Trib (0353) M 14        1    1    1    1   62    0    0
   15      M/S U/S OF 17           1    1    1    1   62    0    0
   16      U/S OF 15 M/S           1    1    1    1   62    0    0
   17      GAGE                    1    1    1    1   62    0    0
   23      BASIN M23               2    1    1    1   62    0    0
   24      BASIN M24               1    1    1    1   62    0    0
   33      detention m3            1    1    1    1   62    0    0
   34      LORA LAKE               2    1    1    1   62    0    0
   35      D/S OF VACA FARM        1    1    1    1   62    0    0
   37      sdn3ai vault            1    1    1    1   62    0    0
   38      MC basins               1    1    1    1   62    0    0
***   39      SDN3A/SDW1A POC         1    1    1    1   62    0    0
   43      sdn3 pond               1    1    1    1   62    0    0
***   44      sdn4 pond               1    1    1    1   62    0    0
***   45      nepl poc                1    1    1    1   62    0    0
   46      cargo pond              1    1    1    1   62    0    0
   47      sdw1a infiltration      2    1    1    1   62    0    0
   50      sr 518                  1    1    1    1   62    0    0
   51      SDN2X+SDN4X             1    1    1    1   62    0    0
   52      U/S OF LAKE REBA        1    1    1    1   62    0    0
   53      Reba outflow            1    1    1    1   62    0    0
   54      Miller RDF outflow      1    1    1    1   62    0    0
   57      sdw1b pond              1    1    1    1   62    0    0
  135      VACA FARMS              1    1    1    1   62    0    0
  147      sdw1a vault             2    1    1    1   62    0    0
  237      sdn3ao-pond c           1    1    1    1   62    0    0
  240      iws-ncps                2    1    1    1   62    0    0
  242      iws-nsmps               2    1    1    1   62    0    0
  247      sdw1a pond g            2    1    1    1   62    0    0
  257      sdw1b infiltration      2    1    1    1   62    0    0
  451      nepl VAULT              1    1    1    1   62    0    0
  452      nepl VAULT              1    1    1    1   62    0    0
  552      SDN1 POC                1    1    1    1   62    0    0
  570      SDW1B flow splitter     2    1    1    1   62    0    0
```

```
***  645      nep1 POC                          1    1    1    1   62    0    0
  END GEN-INFO

  ACTIVITY
    RCHRES *************** Active Sections *****************                              ***
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG
    1  999    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    RCHRES *************** Printout Flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB *********
    1  999    5    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1                                                                             ***
    RCHRES  Flags for each HYDR Section                                  FUNCT  for each
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each             possible  exit
            FG FG FG FG  possible   exit *** possible   exit                   ***
            *  *  *  *    *  *  *  *  *       *  *  *  *  *
    1        0  1  0  0    4  5  0  0  0       0  0  0  0  0            2  2  2  2  2
    2        0  0  0  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
    3        0  0  0  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
    4        0  1  0  0    4  5  0  0  0       0  0  0  0  0            2  2  2  2  2
    5    12  0  0  0  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
   13        0  1  0  0    4  5  0  0  0       0  0  0  0  0            2  2  2  2  2
   14    22  0  0  0  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
   23        0  1  0  0    4  5  0  0  0       0  0  0  0  0            2  2  2  2  2
   24    33  0  0  0  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
   34        0  1  0  0    4  5  0  0  0       0  0  0  0  0            2  2  2  2  2
   35    46  0  1  0  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
   47        0  1  0  0    4  5  0  0  0       0  0  0  0  0            2  2  2  2  2
   48   146  0  1  0  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
  147        0  1  1  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
  148   239  0  1  1  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
  240   257  0  1  1  0    4  5  0  0  0       0  0  0  0  0            2  2  2  2  2
  258   552  0  1  0  0    4  0  0  0  0       0  0  0  0  0            2  2  2  2  2
  553   570  0  1  1  0    4  5  0  0  0       0  0  0  0  0            2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    RCHRES                                                                               ***
    # -  #     FTABNO       LEN     DELTH     STCOR        KS      DB50                  ***
  <------><--------><--------><--------><--------><--------><-------->                  ***
    1              1  0.010                                0.3
    2              2  0.776                                0.3
    3              3  0.980                                0.3
    4              4  0.010                                0.3
    5              5  0.380                                0.3
   10             10  0.380                                0.3
   11             11  0.010                                0.3
   12             12  1.000                                0.3
   13             13  0.015                                0.3
   14             14  0.450                                0.3
   15             15  0.735                                0.3
   16             16  0.587                                0.3
   17             17  0.379                                0.3
```

```
   23                 23   0.379                     0.0          0.3
   24                 24   0.379                                  0.3
   33                 33   0.200                                  0.3
   34                 34   0.852                                  0.3
   35                 35   0.663                                  0.3
   37                 37   0.010                     0.0          0.3
   38                 38   0.010                                  0.3
   43                 43   0.010                                  0.3
   46                 46   0.010                                  0.3
   47                 47   0.010                     0.0          0.3
   50                 50   0.010                                  0.3
   51                 51   0.010                                  0.3
   52                 52   0.010                                  0.3
   53                 53   0.010                                  0.3
   54                 54   0.010                     0.0          0.3
   57                 57   0.010                     0.0          0.3
  135                135   0.350                                  0.3
  147                147   0.010                                  0.3
  237                237   0.010                     0.0          0.3
  240                240   0.010                                  0.3
  242                242   0.010                                  0.3
  247                247   0.010                     0.0          0.3
  257                257   0.010                     0.0          0.3
  451                451   0.010                     0.0          0.3
  452                452   0.010                     0.0          0.3
  552                552   0.010                     0.0          0.3
  570                570   0.010                     0.0          0.3
END HYDR-PARM2

HYDR-INIT
  RCHRES  Initial conditions for each HYDR section                      ***
  # -  # ***    VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft      for each possible exit        for each possible exit
<-------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
   1      2.0             4.0  5.0
   2      0.0             4.0
   3      0.0             4.0
   4      2.0             4.0  5.0
   5      0.0             4.0
  10      0.0             4.0
  11      0.0             4.0
  12      0.0             4.0
  13      10.0            4.0  5.0
  14      0.0             4.0
  15      0.0             4.0
  16      0.0             4.0
  17      0.0             4.0
  23      6.0             4.0  5.0
  24      0.0             4.0
  33      0.0             4.0
  34      9.0             4.0  5.0
  35      0.1             4.0
  37      0.0             4.0
  38      0.1             4.0
  43      0.0             4.0
  46      0.0             4.0
  47      0.0             4.0  5.0
```

```
   50      0.0                 4.0
   51      0.0                 4.0
   52      0.0                 4.0
   53      0.1                 4.0
   54      2.25                4.0
   57      0.0                 4.0
  237      0.00                4.0
  147      0.00                4.0  5.0
  135      0.00                4.0
  240      0.0                 4.0  5.0
  242      0.0                 4.0  5.0
  247      0.0                 4.0  5.0
  257      0.0                 4.0  5.0
  451      0.0                 4.0
  452      0.0                 4.0
  552      0.0                 4.0
  570      0.0                 4.0  5.0
  END HYDR-INIT
END RCHRES

FTABLES
***UPPER BASIN
***===========

  FTABLE       1
           *** REVISED 8/16/00 ADDED 2ND OUTFLOW
 ROWS COLS ***
   11    5
    DEPTH       AREA     VOLUME    OUTFLOW OUTFLOW2***
    0.00        3.00     0.00        0.00     0.00
    2.50        3.00     7.50        0.00     0.11
    3.00        3.00     9.00        1.80     0.11
    3.50        3.30     10.58       5.00     0.11
    4.00        3.60     12.30      10.90     0.11
    4.50        3.90     14.18      17.50     0.11
    5.00        4.10     16.18      26.20     0.11
    5.50        4.30     18.28      32.50     0.11
    6.00        4.50     20.48      35.90     0.11
    7.00        5.00     25.23      38.10     0.11
    8.00        5.50     30.48      46.40     0.11
  END FTABLE   1

  FTABLE       2
 ROWS COLS ***
    9    4
    DEPTH       AREA     VOLUME    OUTFLOW   ***
    0.000     0.0000     0.0000      0.00
    0.100     0.2571     0.0129      0.16
    0.500     0.3873     0.1417      6.53
    1.000     0.5501     0.3761     25.95
    1.500     0.7128     0.6918     59.86
    2.000     0.8756     1.0889    110.67
    3.000     1.2011     2.1273    272.24
    3.500     1.3639     2.7685    387.38
    4.000     1.5266     3.4912    528.19
  END FTABLE   2
```

```
 FTABLE       3
ROWS COLS ***
  12    4
    DEPTH        AREA     VOLUME    OUTFLOW    ***
    0.000      0.0000     0.0000       0.00
    0.100      0.9669     0.0483       0.13
    0.500      1.0637     0.4545       4.92
    1.000      1.1846     1.0165      17.12
    1.500      1.3055     1.6390      34.92
    2.000      1.4264     2.3220      57.95
    2.500      1.5473     3.0654      86.14
    3.000      1.6682     3.8693     119.53
    3.500      1.7891     4.7336     158.24
    4.000      1.9100     5.6584     202.41
    4.500      2.0294     6.6310     251.52
    5.000      2.1488     7.6624     306.28
 END FTABLE   3

 FTABLE       4
          *** REVISED 8/16/00 ADDED 2ND OUTFLOW
ROWS COLS ***
   7    5
    DEPTH        AREA     VOLUME    OUTFLOW OUTFLOW2***
      0.00     3.00      0.00       0.00       0.00
      2.50     4.50      9.38       0.00       0.11
      3.00     6.00      12.00      6.00       0.11
      4.00     10.00     20.00      13.00      0.11
      5.00     15.00     32.50      20.00      0.11
      6.00     20.00     50.00      26.00      0.11
      7.00     25.00     72.50      168.00     0.11
 END FTABLE   4

 FTABLE       5
ROWS COLS ***
  10    4
    DEPTH        AREA     VOLUME    OUTFLOW    ***
    0.000      0.0000     0.0000       0.00
    0.100      0.1010     0.0051       0.03
    0.500      0.1754     0.0603       1.46
    1.000      0.2684     0.1713       6.16
    1.500      0.3614     0.3288      14.89
    2.000      0.4544     0.5327      28.48
    2.500      0.5474     0.7832      47.70
    3.000      0.6404     1.0801      73.29
    3.500      0.7334     1.4236     105.94
    4.000      0.8264     1.8136     146.33
 END FTABLE   5

 FTABLE      10
ROWS COLS ***
   9    4
    DEPTH        AREA     VOLUME    OUTFLOW    ***
    0.000      0.0000     0.0000       0.00
    0.100      0.1010     0.0051       0.06
    0.500      0.1660     0.0585       2.27
    1.000      0.2472     0.1618       9.32
    1.500      0.3285     0.3057      22.08
```

1.000	0.4097	0.4902	41.66
2.500	0.4909	0.7154	69.09
3.000	0.5722	0.9811	105.37
4.000	0.6887	1.6116	209.70

END FTABLE 10

POST AMBAUM DETENTION ***
FTABLE 11
ROWS COLS ***
12 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
1.000	0.1000	0.2300	3.90
2.000	0.2000	0.6000	6.30
3.000	0.3000	0.9700	8.10
4.000	0.4000	1.3400	11.10
5.000	0.5000	1.8200	16.00
6.000	0.6000	2.2700	19.10
7.000	0.7000	2.8300	21.60
8.000	0.8000	3.3700	30.80
9.000	0.9000	4.0000	38.10
10.000	1.0000	4.6500	74.10
10.500	1.1000	5.2000	133.00
11.000	1.1500	6.0000	500.00
11.500	1.3000	11.000	1300.00

END FTABLE 11

FTABLE 12
ROWS COLS ***
6 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.100	0.6327	0.0316	0.15
0.500	0.7960	0.3174	5.87
1.000	1.0002	0.7664	21.53
1.500	1.2043	1.3176	46.43
2.000	1.4085	1.9708	81.20
3.000	1.8168	3.5834	183.79
4.000	2.2251	5.6044	336.22
5.000	2.6335	8.0337	545.30
6.000	3.0418	10.8713	817.51

END FTABLE 12

FTABLE 13
*** REVISED 8/16/00 ADDED 2ND OUTFLOW
ROWS COLS ***
7 5

DEPTH	AREA	VOLUME	OUTFLOW	OUTFLOW2***
0.000	40.000	0.0000	0.00	0.00
1.000	41.400	40.000	0.00	0.11
1.500	42.000	60.000	10.00	0.11
2.000	42.700	80.000	16.00	0.11
2.500	43.300	100.00	20.00	0.11
3.000	44.000	120.00	28.00	0.11
5.000	45.000	210.00	45.00	0.11

END FTABLE 13

```
 FTABLE      14
ROWS COLS ***
   6     4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0000     0.0000       0.00
    0.100     0.3361     0.0168       0.24
    0.500     0.3809     0.1602       9.04
    1.000     0.4370     0.3647      31.61
    1.500     0.4930     0.5972      65.00
    2.000     0.5491     0.8577     108.85
    2.500     0.6051     1.1462     163.33
    3.000     0.6612     1.4628     228.78
 END FTABLE 14

 FTABLE      15
ROWS COLS ***
   4     4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00       0.10       0.00       0.00
     1.00       1.00       0.55      91.00
     2.00       1.10       1.60     268.00
     3.00       1.20       2.75     493.00
 END FTABLE 15

 FTABLE      16
ROWS COLS ***
   4     4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00       0.10       0.00       0.00
     1.00       1.00       0.55      74.00
     2.00       1.10       1.60     219.00
     3.00       1.20       2.75     403.00
 END FTABLE 16

 FTABLE      17
ROWS COLS ***
   5     4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00       0.10       0.00       0.00
     1.00       1.00       0.55      59.00
     2.00       1.10       1.60     173.00
     3.00       1.20       2.75     318.00
     4.00       1.30       4.00     484.00
 END FTABLE 17

 FTABLE      23
ROWS COLS ***   HERMES
   9     5
    DEPTH       AREA     VOLUME    OUTFLOW OUTFLOW    ***
     0.00       0.00       0.00       0.00    0.00          0.00
     5.00       0.50       1.91       0.00    0.00        305.00
    11.00       0.79       5.79       0.00    0.00        311.00
    15.00       1.13       9.64       0.50    0.01        315.00
    19.00       1.72      15.34       0.50    0.05        319.00
    29.00       2.86      38.25       0.50    0.10        329.00
    39.00       4.40      74.55       0.50    0.20        339.00
    50.00       6.22     132.98       0.50    0.30        350.00
```

60.00	10.00	1212.98	0.50	0.40	360.00

END FTABLE 23

FTABLE 24
ROWS COLS ***
9 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.100	0.2571	0.0129	0.16
0.500	0.3873	0.1417	6.53
1.000	0.5501	0.3761	25.95
1.500	0.7128	0.6918	59.86
2.000	0.8756	1.0889	110.67
3.000	1.2011	2.1273	272.24
3.500	1.3639	2.7685	387.38
4.000	1.5266	3.4912	528.19

END FTABLE 24

FTABLE 33
ROWS COLS ***
11 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	1.00	0.00	0.00
0.50	1.20	0.55	2.00
1.00	1.40	1.20	6.00
1.50	1.60	1.95	9.00
2.00	1.80	2.80	13.00
2.50	2.00	3.75	16.50
3.00	2.20	4.80	20.00
3.50	2.40	5.95	23.00
4.00	2.60	7.20	26.00
5.00	2.80	9.90	104.00
6.00	3.00	12.80	246.00

END FTABLE 33

FTABLE 34
ROWS COLS *** REVISED 11/19/97 BASED ON HEC-RAS MODEL
*** REVISED 8/16/00 ADDED 2ND OUTFLOW
6 5

DEPTH	AREA	VOLUME	OUTFLOW	OUTFLOW2***
0.00	3.00	0.00	0.00	0.00
3.00	3.05	9.08	0.00	0.11
4.00	3.10	12.15	0.00	0.11
5.00	3.15	15.28	0.00	0.11
6.00	3.20	18.45	72.0	0.11
7.00	3.25	21.68	225.0	0.11

END FTABLE 34

FTABLE 35
ROWS COLS *** REVISED 11/19/97 BASED ON HECRAS MODEL
5 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.10	0.00	0.00
1.00	1.10	0.60	38.00
2.00	1.20	1.75	108.00
3.00	1.30	3.00	194.00
4.00	1.40	4.35	290.00

```
 END FTABLE 35

 FTABLE      38
ROWS COLS ***
   7    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0000     0.0000       0.00
    1.000     0.4000     0.4000       2.00
    1.500     0.5000     1.0000       4.00
    2.000     0.9000     1.3000      11.00
    2.500     1.3000     1.6000      15.00
    3.000     1.6000     2.0000      18.00
    3.500     1.9000     2.5000      20.80
 END FTABLE 38

 FTABLE      45
ROWS COLS ***
   4    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0010     0.0000       0.00
    0.000     0.0100     0.0100      10.00
    0.100     0.1000     0.1000     100.00
    1.000     1.0000     1.0000    1000.00
   10.000    10.0000    10.0000   10000.00
 END FTABLE 45

 FTABLE     645
ROWS COLS ***
   4    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0010     0.0000       0.00
    0.000     0.0100     0.0100      10.00
    0.100     0.1000     0.1000     100.00
    1.000     1.0000     1.0000    1000.00
   10.000    10.0000    10.0000   10000.00
 END FTABLE645

 FTABLE      50
ROWS COLS ***
  10    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.00      1.00       0.00       0.00
     0.50      1.10       0.53       5.00
     1.00      1.20       1.10      15.00
     1.50      1.30       1.73      25.00
     2.00      1.40       2.40      35.00
     2.50      1.50       3.13      52.00
     3.00      1.60       3.90      70.00
     3.50      1.70       4.73      87.00
     4.00      1.80       5.60     105.00
     6.00      1.90       9.30     165.00
 END FTABLE 50

 FTABLE      52
ROWS COLS ***
   6    4
```

```
    DEPTH        AREA      VOLUME    OUTFLOW   ***
    0.000      0.0000     0.0000       0.00
    0.100      0.3680     0.0184       0.25
    0.500      0.3717     0.1664       9.39
    1.000      0.3763     0.3534      31.06
    2.000      0.3819     0.7325      94.37
    3.000      0.3874     1.1171     174.33
  END FTABLE 52

  FTABLE     552
 ROWS COLS ***   SDN1 VAULT EFFECTIVE DEPTH=12 FT  RISER=24 INCHES
   15    4
    DEPTH        AREA      VOLUME    OUTFLOW   ***
    0.000      0.4308     0.0000       0.00
    1.290      0.4308     0.6520      0.111
    2.130      0.4308     1.0760      0.143
    3.530      0.4308     1.7830      0.184
    4.640      0.4308     2.3430      0.211
    5.200      0.4308     2.6260      0.223
    6.320      0.4308     3.1920      0.246
    7.430      0.4308     3.7530      0.267
    8.200      0.4308     4.1410      0.280
    9.220      0.4308     4.6570      0.407
   10.190      0.4308     5.1460      0.567
   11.250      0.4308     5.6820      0.954
   12.100      0.4308     6.1110      2.130
   12.300      0.4308     6.2120      4.730
   13.700      0.4308     6.9190     21.360
  END FTABLE552

  FTABLE     53
 OLD LAKE REBA                                      ***
 MAX DEPTH = 4.9 FEET                               ***
 30" CMP, 40 CFS DISCHARGE AT MAX DEPTH             ***
 ROWS COLS ***
    7    4
    DEPTH        AREA      VOLUME    OUTFLOW   ***
    0.000      2.4000     0.0000       0.00
    1.000      2.5800     2.5000      18.00
    2.000      2.9400     5.3000      26.00
    3.000      3.4100     8.4000      31.00
    4.000      3.8800     12.100      36.00
    4.900      4.3000     15.800      40.00
    6.000      4.3000     15.810     500.00
  END FTABLE 53

  FTABLE     54
 EXISTING MILLER CREEK DETENTION FACILITY*** REVISED STORAGE/Q DATA
 GATE SETTING: 2.0 FEET***  BASED ON CALIBRATION FILE
 ROWS COLS ***
   12    4
    DEPTH        AREA      VOLUME    OUTFLOW   ***
    0.000        0.00       0.00       0.00
    1.300        0.01       0.01      10.00
    2.000        0.01       0.02      20.00
    2.900        0.70       0.40      30.00
    4.000        1.50       1.50      40.00
```

5.400	3.50	4.90	50.00
7.000	8.60	13.30	60.00
8.800	15.60	34.80	70.00
10.000	19.90	57.30	76.00
10.500	21.50	68.00	92.00
11.000	23.10	78.80	179.00
11.500	24.70	88.60	303.00

END FTABLE 54

FTABLE 104
MILLER CREEK DETENTION FACILITY*** WITH ADD'L AREA 1+AREA 2 55.5 ACFT @ 10FT
GATE SETTING: 2.0 FEET*** EXISTING OUTLET NO LOW FLOW CONTROL
ROWS COLS ***
17 4

DEPTH	AREA	VOLUME	OUTFLOW	***
0.000	0.0000	0.0000	0.00	
0.500	0.0100	0.0100	2.50	
1.500	0.0300	0.2800	14.29	
2.500	1.1100	1.3900	24.88	
3.500	2.6100	4.0000	34.51	
4.500	4.6100	9.1400	43.20	
5.500	7.1200	19.600	50.98	
6.000	8.3600	21.180	54.53	
6.500	11.870	30.060	57.87	
7.000	15.370	38.930	61.00	
7.500	18.870	47.800	63.91	
8.000	21.860	59.160	66.62	
8.500	24.850	70.510	69.12	
9.000	27.340	84.160	71.42	
9.500	29.820	97.820	73.53	
10.000	32.050	112.83	75.44	
10.500	34.275	127.84	90.74	
11.500	38.220	161.54	320.00	

END FTABLE104

FTABLE 69
PRE-MILLER CREEK DETENTION FACILITY***
ROWS COLS ***
12 4

DEPTH	AREA	VOLUME	OUTFLOW	***
0.000	0.0000	0.0000	0.00	
0.100	0.1860	0.0093	0.12	
0.500	0.2552	0.0975	4.84	
1.000	0.3417	0.2467	18.49	
1.500	0.4282	0.4392	41.30	
2.000	0.5148	0.6750	74.40	
2.500	0.6013	0.9540	119.01	
3.000	0.6878	1.2763	176.30	
3.500	0.7744	1.6418	247.41	
4.000	0.8609	2.0506	333.43	
4.500	0.9470	2.4992	434.59	
5.000	1.0331	2.9905	552.33	

END FTABLE 69

*** PROJECT CONDITION PONDS/VAULTS
FTABLE 452
ROWS COLS ***

*** NEW NORTH EMPLOYEE PARKING LOT VAULT (NEPL)
*** PARALLEL VAULT BASED ON KCRTS EFFECTIVE DEPTH=20 FT
20 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	3.214	0.000	0.000
1.11	3.214	0.826	0.129
1.57	3.214	1.168	0.154
3.43	3.214	2.551	0.227
4.83	3.214	3.593	0.269
8.08	3.214	6.010	0.348
10.41	3.214	7.743	0.395
12.74	3.214	9.476	0.437
14.00	3.214	10.413	0.458
14.65	3.214	10.897	0.557
16.09	3.214	11.968	0.665
16.23	3.214	12.072	0.754
17.92	3.214	13.329	1.140
18.22	3.214	13.552	1.310
18.81	3.214	13.991	1.860
19.11	3.214	14.214	2.190
20.00	3.214	14.876	3.350
20.20	3.214	15.025	5.110
20.70	32.14	15.397	14.820
21.00	32.14	15.620	18.560

END FTABLE452

FTABLE 451
ROWS COLS ***
*** NORTH EMPLOYEE PARKING LOT VAULT (NEPL)
*** EXISTING VAULT W/MODIFIED OUTLET EFFECTIVE DEPTH= 18.0 FT
14 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.2240	0.0000	0.00
2.170	0.2240	0.4860	0.031
4.260	0.2240	0.9550	0.043
5.930	0.2240	1.3290	0.051
8.030	0.2240	1.8000	0.059
10.120	0.2240	2.2680	0.066
12.210	0.2240	2.7360	0.073
14.040	0.2240	3.1460	0.109
15.510	0.2240	3.4760	0.166
16.220	0.2240	3.6350	0.295
18.000	0.2240	4.0340	1.080
18.400	0.2240	4.1240	5.400
19.000	0.2240	4.2580	12.680
19.900	0.2240	4.4600	17.080

END FTABLE451

FTABLE 46
ROWS COLS ***
SDN-6: 24TH STREET CARGO VAULT *** EFFECTIVE DEPTH=14 FT RISER DIA=12 IN
20 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.35	0.000	0.000
0.37	0.35	0.131	0.021
1.19	0.35	0.421	0.037

3.39	0.35	1.198	0.063
5.03	0.35	1.778	0.077
7.23	0.35	2.556	0.092
9.15	0.35	3.235	0.104
10.25	0.35	3.624	0.110
10.53	0.35	3.723	0.111
10.92	0.35	3.861	0.128
12.00	0.35	4.242	0.165
12.13	0.35	4.288	0.190
12.95	0.35	4.578	0.245
13.77	0.35	4.868	0.282
14.00	0.35	4.949	0.291
14.10	0.35	4.985	0.910
14.20	0.35	5.020	2.040
14.30	0.35	5.056	3.500
14.50	0.35	5.126	7.200
14.70	0.35	5.197	11.720

END FTABLE 46

*** SDW-1A: 3RD RUNWAY POND G TO MILLER CREEK (LEVEL 2): ***

FTABLE 47

*** PROJECT SDW1A EFFECTIVE DIAMETER=3.0 FT

ROWS COLS *** INFILTRATION TANK TO OBTAIN 0.3 CFS

14 5

DEPTH	AREA	VOLUME	STORMQ	INFILTRQ ***
0.000	0.000	0.000	0.000	0.000
0.250	0.002	0.002	0.000	0.027
0.500	0.004	0.004	0.000	0.054
1.000	0.012	0.012	0.000	0.109
1.500	0.020	0.020	0.000	0.164
2.000	0.029	0.029	0.000	0.218
2.500	0.036	0.036	0.000	0.272
3.000	0.041	0.0406	0.000	0.327
3.100	0.041	0.0419	0.596	0.338
3.200	0.041	0.0420	1.685	0.349
3.300	0.041	0.0421	3.096	0.360
3.400	0.041	0.0422	4.766	0.371
3.500	0.041	0.0423	6.661	0.382
3.750	0.041	0.0424	12.237	0.409

END FTABLE 47

*** SDW-1A: 3RD RUNWAY NORTH POND G TO MILLER CREEK (LEVEL 2): ***

FTABLE 147

*** PROJECT SDW1A EFFECTIVE DEPTH=14.0 FT RISER DIA 24 INCHES

ROWS COLS *** VAULT BASED ON INFILTRATION=0.15CFS

17 5

DEPTH	AREA	VOLUME	INFILTRQ	BYPASS Q***
0.000	0.689	0.000	0.0000	0.0000
0.010	0.689	0.007	0.1400	0.0000
1.000	0.689	0.689	0.1408	0.0000
2.000	0.689	1.377	0.1417	0.0000
4.000	0.689	2.755	0.1432	0.0000
6.000	0.689	4.132	0.1446	0.0000
8.000	0.689	5.510	0.1461	0.0000
10.000	0.689	6.887	0.1475	0.0000
12.000	0.689	8.264	0.1489	0.0000

14.000	0.689	9.642	0.1503	0.0000
16.000	0.689	11.019	0.1517	0.0000
16.750	0.689	11.536	0.1517	10.7600
16.900	0.689	11.639	0.1517	13.9600
17.000	0.689	11.708	0.1517	16.1000
17.100	0.689	11.777	0.1517	18.5700
17.300	0.689	11.915	0.1517	23.8600
18.000	0.689	12.397	0.1517	45.5400

END FTABLE147

*** SDW-1A: 3RD RUNWAY NORTH POND G TO MILLER CREEK (LEVEL 2): ***

FTABLE 247

*** PROJECT SDW1A EFFECTIVE DEPTH=12.0 FT RISER DIA 12 INCHES

ROWS COLS *** POND BASED ON INFILTRATION=0.15CFS

17 5

DEPTH	AREA	VOLUME	STORMQ	INFILTRQ ***
0.000	1.300	0.000	0.00	0.00
0.010	1.310	0.010	0.001	0.15
1.000	1.320	1.320	0.007	0.15
2.000	1.342	2.650	0.010	0.15
3.000	1.363	4.000	0.012	0.15
4.000	1.385	5.370	0.013	0.15
5.000	2.672	8.000	0.015	0.15
6.000	2.739	10.700	0.017	0.15
7.000	2.807	13.470	0.018	0.15
8.000	2.876	16.300	0.019	0.15
8.300	2.896	17.176	0.031	0.15
9.000	2.945	19.210	0.041	0.15
10.000	3.014	22.180	0.051	0.15
11.000	3.084	25.228	0.058	0.15
11.100	3.092	25.540	0.675	0.15
11.300	3.106	26.162	3.260	0.15
12.000	3.155	28.340	15.190	0.15

END FTABLE247

*** SDN3A: 3RD RUNWAY VAULT TO MILLER CREEK (LEVEL 2): ***

FTABLE 37

*** PROJECT C SDN3A EFFECTIVE DEPTH=11.0FT RISER DIA=24 INCHES

ROWS COLS *** VAULT BASED ON IMPERVIOUS TOP SURO

14 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.644	0.000	0.000
0.010	0.644	0.006	0.001
1.000	0.644	0.643	0.016
3.980	0.644	2.558	0.033
6.030	0.644	3.876	0.041
9.010	0.644	5.792	0.050
10.00	0.644	6.428	0.052
10.46	0.644	6.724	0.072
11.00	0.644	7.071	0.082
11.10	0.644	7.135	0.699
11.20	0.644	7.199	1.830
11.30	0.644	7.264	3.290
11.40	0.644	7.328	5.020
11.60	0.644	7.456	9.140

END FTABLE 37

*** SDN3A: 3RD RUNWAY POND C TO MILLER CREEK (LEVEL 2): ***
FTABLE 237
*** PROJECT C SDN3A EFFECTIVE DEPTH= 9.0FT RISER DIA=24 INCHES
ROWS COLS *** POND BASED ON INTERFLOW AND PERVIOUS TOP SURO
19 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	1.3090	0.000	0.00
0.020	1.3120	0.026	0.009
1.020	1.3550	1.358	0.070
2.070	1.4030	2.806	0.100
3.130	1.4530	4.320	0.123
4.020	1.4980	5.632	0.139
5.070	1.5460	7.229	0.156
7.750	1.6720	11.549	0.193
7.800	1.6800	11.633	0.199
7.850	1.6840	11.718	0.213
8.250	1.7050	12.395	0.249
8.340	1.7090	12.549	0.270
8.570	1.7210	12.944	0.313
8.950	1.7410	13.601	0.354
9.500	1.7690	14.567	0.399
9.600	1.7740	14.744	0.714
9.800	1.7850	15.100	2.020
10.300	1.8110	15.999	3.840
10.900	1.8430	17.095	4.960

END FTABLE237

*** SDN-3X: 3RD RUNWAY NORTH VAULT (LEVEL 2): ***
FTABLE 43
ROWS COLS *** EFFECTIVE DEPTH=20 FT RISER DIA=24 INCHES
21 4

DEPTH (FT)	AREA (ACRES)	VOLUME (ACRE-FT)	FLOW (FT3/S) ***
0.00	1.288	0.00	0.00
0.14	1.288	0.180	0.067
1.39	1.288	1.790	0.216
3.35	1.288	4.314	0.336
5.31	1.288	6.839	0.423
8.06	1.288	10.380	0.521
8.84	1.288	11.385	0.545
10.02	1.288	12.905	0.580
11.98	1.288	15.429	0.635
12.37	1.288	15.931	0.645
14.00	1.288	18.030	0.686
14.10	1.288	18.159	0.705
14.91	1.288	19.202	0.757
16.09	1.288	20.722	0.810
18.00	1.288	23.182	0.881
18.32	1.288	23.594	1.150
18.76	1.288	24.161	1.360
20.00	1.288	25.758	1.680
20.10	1.288	25.886	2.320
20.50	1.288	26.402	8.620
20.80	1.288	26.788	15.370

END FTABLE 43

*** SDN-4X/2X: 3RD RUNWAY NORTH VAULT (COMBINED FACILITY)

FTABLE 51
ROWS COLS *** EFFECTIVE DEPTH=19FT RISER DIA=24 INCHES
20 4 ***

DEPTH (FT)	AREA (ACRES)	VOLUME (ACRE-FT)	OUTFLOW (FT3/S) ***
0.00	0.789	0.000	0.000
0.16	0.789	0.126	0.056
1.51	0.789	1.192	0.169
3.28	0.789	2.588	0.249
5.49	0.789	4.332	0.322
7.26	0.789	5.729	0.370
10.35	0.789	8.168	0.442
12.12	0.789	9.564	0.478
13.44	0.789	10.606	0.503
14.33	0.789	11.308	0.520
15.57	0.789	12.287	0.654
16.72	0.789	13.194	0.828
17.19	0.789	13.565	0.950
17.63	0.789	13.913	1.030
18.00	0.789	14.205	1.080
19.00	0.789	14.994	1.960
19.10	0.789	15.073	2.580
19.40	0.789	15.309	6.930
19.60	0.789	15.467	11.080
20.00	0.789	15.783	17.190

END FTABLE 51

*** SDW-1B:3RD RUNWAY CENTRAL SOUTH POND D TO MILLER CREEK (LEVEL 2): ***
FTABLE 57
ROWS COLS *** EFFECTIVE DEPTH = 14.0 FT
17 4

DEPTH (FT)	AREA (ACRES)	VOLUME (ACRE-FT)	STORMQ (FT3/S) ***
0.00	2.430	0.000	0.000
0.01	2.430	0.041	0.010
1.00	2.680	2.411	0.183
2.00	2.760	4.860	0.257
3.00	2.818	7.370	0.319
4.00	3.079	9.945	0.366
5.00	5.832	15.320	0.411
6.00	5.927	20.742	0.450
7.00	6.022	26.264	0.481
8.00	6.118	31.888	0.518
9.00	6.210	37.613	0.550
10.00	6.311	43.441	0.583
11.00	6.408	49.372	0.609
12.00	6.607	55.406	0.634
13.00	6.405	61.543	0.764
14.00	6.504	67.786	1.320
15.00	7.000	70.000	16.600

END FTABLE 57

*** SDW-1B:3RD RUNWAY CENTRAL SOUTH POND D TO MILLER CREEK (LEVEL 2): ***
FTABLE 257
*** PROJECT SDW1B EFFECTIVE DIAMETER=3.0 FT
ROWS COLS *** INFILTRATION TANK TO OBTAIN 0.2 CFS
15 5

DEPTH	AREA	VOLUME	STORMQ	INFILTRQ ***
0.000	0.001	0.000	0.000	0.000
0.010	0.001	0.001	0.000	0.002
0.250	0.002	0.002	0.000	0.017
0.500	0.004	0.004	0.000	0.035
1.000	0.012	0.012	0.000	0.071
1.500	0.020	0.020	0.000	0.106
2.000	0.029	0.029	0.000	0.142
2.500	0.036	0.036	0.000	0.178
3.000	0.041	0.0406	0.000	0.213
3.100	0.041	0.0420	0.596	0.220
3.200	0.041	0.0421	1.685	0.227
3.300	0.041	0.0422	3.096	0.233
3.400	0.041	0.0423	4.766	0.241
3.500	0.041	0.0424	6.661	0.248
3.750	0.041	0.0425	12.237	0.266

END FTABLE257

FTABLE 570
*** PROJECT SDW1B FLOW SPLITTER (to 257 and 57)
ROWS COLS ***
15 5

DEPTH	AREA	VOLUME	STORMQ	INFILTRQ ***
0.000	0.00	0.000	0.000	0.000
0.100	0.01	0.0002	0.000	0.050
0.400	0.01	0.0009	0.000	0.110
0.600	0.01	0.0014	0.000	0.130
0.750	0.01	0.0017	0.000	0.150
0.800	0.01	0.0018	0.720	0.150
1.000	0.01	0.0023	8.050	0.170
1.100	0.01	0.0025	13.330	0.180
1.200	0.01	0.0027	19.440	0.190
1.300	0.01	0.0030	26.270	0.190
1.400	0.01	0.0032	33.750	0.200
1.420	0.01	0.0033	35.320	0.200
1.440	0.01	0.0033	36.910	0.200
1.450	0.01	0.0034	37.920	0.200
1.460	0.01	0.0035	38.530	0.200

END FTABLE570

FTABLE 61
ROWS COLS ***
*** SDN-2X: DETAIN OVERFLOW FROM NCPS AND NSMPS-
17 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.5740	0.0000	0.00
1.200	0.5740	0.7710	0.151
2.220	0.5740	1.4270	0.205
3.240	0.5740	2.0830	0.247
3.650	0.5740	2.3460	0.262
4.260	0.5740	2.7380	0.283
4.660	0.5740	2.9950	0.296
5.680	0.5740	3.6510	0.327
6.640	0.5740	4.2680	0.517
7.650	0.5740	4.9170	0.644
8.670	0.5740	5.9710	0.739
9.810	0.5740	6.3570	0.836

10.700	0.5740	6.8780	0.894
12.000	0.5740	7.7130	0.978
12.100	0.5740	7.7780	1.600
12.300	0.5740	7.9060	4.200
12.800	0.5740	8.2280	14.560

END FTABLE 61

PRE AMBAUM DETENTION ***
FTABLE 111
ROWS COLS ***
15 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.000	0.0000	0.0000	0.00
0.500	0.2160	0.0750	5.30
1.000	0.2730	0.1990	21.10
1.500	0.2890	0.3410	43.90
2.000	0.2900	0.4830	68.80
2.500	0.2910	0.6070	89.10
3.000	0.2950	0.6820	90.00
3.500	0.3000	2.1000	100.00
4.000	0.3050	2.5000	105.00
4.500	0.3100	3.0000	110.00
5.000	0.3200	3.5000	120.00
5.500	0.3300	4.0000	130.00
6.000	0.3800	5.0530	166.48
6.500	0.3980	5.9430	225.31
7.000	0.4150	6.9040	320.10

END FTABLE111

FTABLE 135
ROWS COLS *** VACA FARM
6 4

DEPTH	AREA	VOLUME	OUTFLOW ***
0.00	0.10	0.00	0.00
1.00	0.10	0.10	4.00
2.00	0.11	0.21	8.00
2.50	1.00	0.48	13.00
3.50	6.50	4.23	86.00
4.50	13.00	13.98	235.00

END FTABLE135

FTABLE 240
*** NORTH SNOWMELT PUMP STATION (SDN-2) (INSTALLED IN LATE 1997/1998)
ROWS COLS ***
14 5

DEPTH	AREA	VOLUME	(IWS)	(SDS) ***
(FT)	(ACRES)	(ACRE-FT)	(CFS)	(CFS) ***
0.0	0.002	0.00	0.00	0.00
1.00	0.002	0.0023	0.00	0.00
2.00	0.002	0.0046	1.67	0.00
3.00	0.002	0.0069	1.67	0.00
4.00	0.002	0.0092	1.67	0.00
5.00	0.002	0.0115	1.67	0.00
5.25	0.002	0.0121	1.67	1.53
5.50	0.002	0.0126	1.67	6.06
5.75	0.002	0.0132	1.67	12.65
6.00	0.002	0.0138	1.67	19.83

```
      6.25       0.002      0.0144        1.67       25.66
      6.50       0.002      0.0149        1.67       25.70
      6.75       0.002      0.0155        1.67       26.70
      7.00       0.002      0.0161        1.67       50.00
  END FTABLE240

  FTABLE    242
*** NORTH CARGO PUMP STATION (SDN-2) (INSTALLED IN OCTOBER 1997)                    ***
 ROWS COLS
   14    5                                                                          ***
     DEPTH       AREA     VOLUME       (IWS)      (SDS)                             ***
      (FT)    (ACRES)  (ACRE-FT)       (CFS)      (CFS)
       0.0       0.002       0.00       0.00       0.00
      1.00       0.002     0.0023       0.00       0.00
      2.00       0.002     0.0046       6.13       0.00
      3.00       0.002     0.0069       6.13       0.00
      4.00       0.002     0.0092       6.13       0.00
      5.00       0.002     0.0115       6.13       0.00
      5.25       0.002     0.0121       6.13       0.28
      5.50       0.002     0.0126       6.13       1.16
      5.75       0.002     0.0132       6.13       2.53
      6.00       0.002     0.0138       6.13       4.23
      6.25       0.002     0.0144       6.13       6.05
      6.50       0.002     0.0149       6.13       7.72
      6.75       0.002     0.0155       6.13       8.50
      7.00       0.002     0.0161       6.13       20.0
  END FTABLE242

END FTABLES

MASS-LINK
<Volume>    <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        1
  conversion from acre-inches to acre-ft (1/12)              ***
PERLND      PWATER PERO        0.0833333    RCHRES         INFLOW IVOL
  END MASS-LINK    1

  MASS-LINK        2
IMPLND      IWATER SURO        0.0833333    RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
RCHRES      ROFLOW                          RCHRES         INFLOW
  END MASS-LINK    3

  MASS-LINK        4
RCHRES      OFLOW  OVOL   1                 RCHRES         INFLOW IVOL
  END MASS-LINK    4

  MASS-LINK        5
RCHRES      OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
PERLND      PWATER SURO        0.0833333    RCHRES         INFLOW IVOL
PERLND      PWATER IFWO        0.0833333    RCHRES         INFLOW IVOL
```

```
  END MASS-LINK     6

  MASS-LINK         7
PERLND     PWATER AGWO          0.0833333    RCHRES          INFLOW IVOL
  END MASS-LINK     7

  MASS-LINK         10
COPY       OUTPUT MEAN                       COPY            INPUT  MEAN
  END MASS-LINK     10

  MASS-LINK         11
RCHRES     ROFLOW                            COPY            INPUT  MEAN
  END MASS-LINK     11

  MASS-LINK         12
COPY       OUTPUT MEAN                       RCHRES          INFLOW IVOL
  END MASS-LINK     12

  MASS-LINK         14
RCHRES     OFLOW  OVOL  1                    COPY            INPUT  MEAN
  END MASS-LINK     14

  MASS-LINK         15
RCHRES     OFLOW  OVOL  2                    COPY            INPUT  MEAN
  END MASS-LINK     15

  MASS-LINK         21
PERLND     PWATER PERO          0.0833333    COPY            INPUT  MEAN
  END MASS-LINK     21

  MASS-LINK         22
IMPLND     IWATER SURO          0.0833333    COPY            INPUT  MEAN
  END MASS-LINK     22

  MASS-LINK         26
PERLND     PWATER SURO          0.0833333    COPY            INPUT  MEAN
PERLND     PWATER IFWO          0.0833333    COPY            INPUT  MEAN
  END MASS-LINK     26

  MASS-LINK         27
PERLND     PWATER AGWO          0.0833333    COPY            INPUT  MEAN
  END MASS-LINK     27

END MASS-LINK

COPY
  TIMESERIES
  Copy-opn                                                                ***
    # -  #  NPT  NMN                                                      ***
   37   71         1
  240  242         1
  357  357         1
  645  645         1
  END TIMESERIES
END COPY

END RUN
```

```
RUN
GLOBAL
  ***  FILE: WClowflo.inp REVISED July 2001. ATC
  ***  SEATAC AIRPORT HSPF BASIN MODEL OF WALKER CREEK
  ***  2006 FUTURE PROJECT CONDITION SIZING BASED
  ***  CHANGED PREC DSN 2 TO NEW PREC DSN 1002
  ***  WALKER CREEK FOUR YEAR RUN USING CALIBRATION INITIAL CONDITIONS
  WALKER CREEK BASIN HSPF MODEL
  START       1990 10  1  0  0  END    1994  9 30 24  0

  RUN INTERP OUTPUT LEVEL    3
  RESUME     0 RUN     1
END GLOBAL

FILES
<type>  <fun>***<------------fname------------------------------------------->
MESSU       24    D:\PARA\SEATAC\MILLER\LOWFLOW\WALKER.MES
WDM         25    D:\PARA\SEATAC\MILLER\LOWFLOW\mlowflow.WDM
            61    D:\PARA\SEATAC\MILLER\LOWFLOW\wPER.L61
            62    D:\PARA\SEATAC\MILLER\LOWFLOW\wRCH.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 01:00
      PERLND      14
      PERLND      16
      PERLND      18
      PERLND      24
      PERLND      26
      PERLND      28
      PERLND      34
      PERLND      44
      PERLND      45
      PERLND      54
      PERLND      64
      PERLND      65
      PERLND      80
      IMPLND      14
      RCHRES      49
      RCHRES      20
      RCHRES      19
      RCHRES      18
    END INGRP
END OPN SEQUENCE
                                                                          ***
COPY
  TIMESERIES
  Copy-opn                                                                ***
    # -  #  NPT  NMN                                                      ***
    1    5        1
  END TIMESERIES
END COPY

PERLND
  GEN-INFO
    <PLS >      Name          NBLKS   Unit-systems   Printer              ***
    # -  #                         User  t-series Engl Metr               ***
```

```
                                                          in  out                                ***
 14      TFF- TILL FOR FLT        1     1     1     1    61     0
 16      TFM- TILL FOR MOD        1     1     1     1    61     0
 18      TFS- TILL FOR STP        1     1     1     1    61     0
 24      TGF- TILL GR FLT         1     1     1     1    61     0
 26      TGM- TILL GR MOD         1     1     1     1    61     0
 28      TGS- TILL GR STP         1     1     1     1    61     0
 34      OF - OUTWASH FOR         1     1     1     1    61     0
 44      OG - OUTWASH GR          1     1     1     1    61     0
***PERLND FOR NEW AIRPORT FILL; NONE IN CALIBRATION
 45      AIRPORT FILL             1     1     1     1    61     0
 54      SA - WETLANDS            1     1     1     1    61     0
 64      TGM DES MOINES           1     1     1     1    61     0
 65      OG  DES MOINES           1     1     1     1    61     0
 80      Fill AGWO                1     1     1     1    61     0
END GEN-INFO
ACTIVITY
  <PLS > ************* Active Sections *****************************
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC        ***
 14  200    0    0    1    0    0    0    0    0    0    0    0    0
END ACTIVITY
PRINT-INFO
  <PLS > ******************** Print-flags ************************* PIVL  PYR
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC *********
 14  200    0    0    5    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO
PWAT-PARM1
  <PLS > ***************** Flags *******************
  # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE                        ***
 14         0    0    0    0    0    0    0    0    0
 16         0    0    0    0    0    0    0    0    0
 18         0    0    0    0    0    0    0    0    0
 24         0    0    0    0    0    0    0    0    0
 26         0    0    0    0    0    0    0    0    0
 28         0    0    0    0    0    0    0    0    0
 34         0    0    0    0    0    0    0    0    0
 44         0    0    0    0    0    0    0    0    0
 45         0    0    0    0    0    0    0    0    0
 54         0    0    0    0    0    0    0    0    0
 64         0    0    0    0    0    0    0    0    0
 80         0    0    0    0    0    0    0    0    0
END PWAT-PARM1
PWAT-PARM2
  <PLS > ***
  # -  # ***FOREST        LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 14                     4.5000    0.0800    400.00    0.0500    0.5000    0.9960
 16                     4.5000    0.0800    400.00    0.1000    0.5000    0.9960
 18                     4.5000    0.0800    200.00    0.2000    0.5000    0.9960
 24                     4.5000    0.0300    400.00    0.0500    0.5000    0.9960
 26                     4.5000    0.0300    400.00    0.1000    0.5000    0.9960
 28                     4.5000    0.0300    200.00    0.2000    0.5000    0.9960
 34                     5.0000    2.0000    400.00    0.0500    0.3000    0.9960
 44                     5.0000    0.8000    400.00    0.0500    0.3000    0.9960
 45                     7.5000    0.0200    300.00    0.0700    0.0000    0.9960
 54                     4.0000    2.0000    100.00    0.0010    0.5000    0.9960
 64                     4.5000    0.1200    400.00    0.1000    0.5000    0.9990
 65                     5.0000    0.8000    400.00    0.0500    0.5000    0.9960
```

```
WDM   7100 FLOW     ENGL     .000000957     RCHRES  20      INFLOW IVOL
END EXT SOURCES                                                               ***

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES  18 HYDR   RO                       WDM   7196 FLOW      ENGL      REPL
RCHRES  20 HYDR   RO                       WDM   7197 FLOW      ENGL      REPL
 ***PROJECT CONDITION FLOWS
RCHRES  49 HYDR   RO     1 1       ***     WDM    109 FLOW      ENGL      REPL
*** DETENTION STAGES
RCHRES  49 HYDR   STAGE            ***     WDM    649 STAG      ENGL      REPL
*** DETENTION VOLUME
RCHRES  49 HYDR   VOL              ***     WDM    749 VOL       ENGL      REPL
*** 39=SR509     37=SDW2
END EXT TARGETS                                                               ***

SCHEMATIC
<-Source->                 <--Area-->     <-Target->  MBLK     ***
<Name>   #                 <-factor->     <Name>   #  Tbl#     ***

***WALKER CREEK
*** SUB-CATCHMENT  MC 8
PERLND  26                      3.93     RCHRES  20       1
PERLND  44                     18.73     RCHRES  20       1
PERLND  54                      2.70     RCHRES  20       1
IMPLND  14                      0.01     RCHRES  20       2
***  *** SUB-CATCHMENT  SDW-2
***PERLND  26                     26.82     RCHRES  49       6
***PERLND  44                      1.42     RCHRES  49       6
***PERLND  45                      6.70     RCHRES  49       6
***PERLND  26                     26.82     RCHRES  20       7
***PERLND  44                      1.42     RCHRES  20       7
***PERLND  45                      6.70     RCHRES  20       7
***IMPLND  14                      9.51     RCHRES  49       2
***REPLACE SUBCATCHMENT SDW-2    WITH NEW SDW-2 SUBBASIN
***SUBBASIN SDW-2 ROUTING AS OF 4/19/01
*** old fill area
***PERLND  26                     26.88     RCHRES  49       6
*** area removed = 0.04 ac
PERLND  26                     26.84     RCHRES  49       6
PERLND  44                      1.51     RCHRES  49       6
*** old fill area
***PERLND  45                      6.700    RCHRES  49       6
*** area removed = 4.66 ac
PERLND  45                     2.040     RCHRES  49       6
PERLND  26                     26.84     RCHRES  20       7
PERLND  44                      1.51     RCHRES  20       7
PERLND  45                     2.040     RCHRES  20       7
*** old fill area
***IMPLND  14                      9.51     RCHRES  49       2
*** area removed = 3.35 ac
IMPLND  14                      6.16     RCHRES  49       2
*** FILL AGWO PERLND 80 ALL TO GROUNDWATER RCHRES 20
PERLND  80                      8.05     RCHRES  20       7
*** SUB-CATCHMENT  MC 9
PERLND  26                      9.28     RCHRES  20       1
```

```
PERLND  44                            0.76     RCHRES  20       1
IMPLND  14                            0.40     RCHRES  20       2
  *** SUB-CATCHMENT 18
PERLND  16                            0.76     RCHRES  18       1
PERLND  26                           16.08     RCHRES  18       1
PERLND  34                           20.95     RCHRES  18       1
PERLND  44                           49.22     RCHRES  18       1
IMPLND  14                            3.30     RCHRES  18       2
  *** SUB-CATCHMENT 19
PERLND  16                           12.72     RCHRES  19       1
PERLND  26                           92.07     RCHRES  19       1
PERLND  34                            8.39     RCHRES  19       1
PERLND  44                           95.55     RCHRES  19       1
IMPLND  14                           30.53     RCHRES  19       2
  *** SUB-CATCHMENT 20
PERLND  26                           12.54     RCHRES  20       1
PERLND  44                           53.42     RCHRES  20       1
PERLND  54                           33.43     RCHRES  20       1
IMPLND  14                           52.83     RCHRES  20       2
*** DOWN STREAM OF WALKER CREEK GAGE
  *** SUB-CATCHMENT 21 33% OF GW GOES TO GAGE REST GOES TO SOUND
PERLND  16                            2.54     RCHRES  18       7
PERLND  26                           44.30     RCHRES  18       7
PERLND  34                            2.03     RCHRES  18       7
PERLND  44                           41.13     RCHRES  18       7
PERLND  16                            2.54     RCHRES  21       6
PERLND  26                           44.30     RCHRES  21       6
PERLND  34                            2.03     RCHRES  21       6
PERLND  44                           41.13     RCHRES  21       6
IMPLND  14                           16.54     RCHRES  21       2
PERLND  16                            5.07     RCHRES  21       1
PERLND  26                           88.61     RCHRES  21       1
PERLND  34                            4.06     RCHRES  21       1
PERLND  44                           82.26     RCHRES  21       1
IMPLND  14                           33.09     RCHRES  21       2
  *** SUB-CATCHMENT 22
PERLND  34                            4.30     RCHRES  22       1
PERLND  44                           19.49     RCHRES  22       1
PERLND  54                            3.21     RCHRES  22       1
IMPLND  14                            3.95     RCHRES  22       2

***GROUNDWATER FROM OUTSIDE OF WALKER CREEK

PERLND  64        ***               630.00     RCHRES  20       7
*** reduced area because of new impervious
PERLND  64                          570.66     RCHRES  20       7
PERLND  65                ***       130.00     RCHRES  20       7


***STREAM ROUTING
RCHRES  49                                     RCHRES  20       3
RCHRES  20                                     RCHRES  19       3
RCHRES  19                                     RCHRES  18       3

END SCHEMATIC
```

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```
  80                    4.5000    0.0300    400.00    0.1000    0.5000    0.9960
 END PWAT-PARM2
 PWAT-PARM3
   <PLS >***
   # -  #***  PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  14                              2.0000    2.0000      0.00      0.00       0.0
  16                              2.0000    2.0000      0.00      0.00       0.0
  18                              2.0000    2.0000      0.00      0.00       0.0
  24                              2.0000    2.0000      0.00      0.00       0.0
  26                              2.0000    2.0000      0.00      0.00        0.
  28                              2.0000    2.0000      0.00        0.        0.
  34                              2.0000    2.0000      0.00        0.        0.
  44                              2.0000    2.0000      0.00      0.00       0.0
  45                              2.0000    2.0000      0.00        0.        0.
  54                              2.0000    2.0000      0.00        0.        0.
  64                              10.000    2.0000      0.00        0.       0.7
  80                              2.0000    2.0000      0.00        0.       0.0
                                  2.0000    2.0000      0.00        0.        0.
 END PWAT-PARM3
 PWAT-PARM4
   <PLS >                                                         ***
   # -  #       CEPSC      UZSN      NSUR     INTFW       IRC     LZETP***
  14           0.2000    1.0000    0.3500     2.000    0.1500    0.7000
  16           0.2000    0.5000    0.3500     2.000    0.1500    0.7000
  18           0.2000    0.3000    0.3500     2.000    0.1500    0.7000
  24           0.1000    0.5000    0.2500     2.000    0.1500    0.2500
  26           0.1000    0.2500    0.2500     2.000    0.1500    0.2500
  28           0.1000    0.1500    0.2500     2.000    0.1500    0.2500
  34           0.2000    0.5000    0.3500     0.000    0.5000    0.7000
  44           0.1000    0.5000    0.2500     0.000    0.5000    0.2500
  45           0.1000    0.2800    0.2500     6.000    0.1500    0.6000
  54           0.1000    3.0000    0.5000     1.000    0.7000    0.8000
  64           0.1000    0.2500    0.2500     3.000    0.5000    0.2500
  65           0.1000    0.5000    0.2500     0.000    0.5000    0.2500
  80           0.1000    0.2500    0.2500     2.000    0.1500    0.2500
 END PWAT-PARM4
 PWAT-STATE1
   <PLS >  PWATER state variables***
   # -  #***     CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
  14            0.078        0.    0.2500      0.10     2.500      2.00     0.000
  16            0.078        0.    0.2500      0.10     2.500      2.00     0.000
  18            0.078        0.    0.2500      0.10     2.500      2.00     0.000
  24            0.051        0.    0.2500      0.10     2.500      2.00     0.000
  26            0.051        0.    0.2500      0.10     2.500      2.00     0.000
  28            0.051        0.    0.2500      0.10     2.500      2.00     0.000
  34            0.078        0.    0.2500      0.10     0.000      2.00     0.000
  44            0.051        0.    0.2500      0.10     0.000      2.00     0.000
  45            0.051        0.    0.2500      0.10     0.000      2.00     0.000
  54            0.051        0.    0.2500      0.10     2.000      2.00     0.000
  64            0.051        0.    0.2500      0.10     2.000     20.00     0.000
  65            0.051        0.    0.2500      0.10     0.000     20.00     0.000
  80            0.051        0.    0.2500      0.10     2.500      2.00     0.000
 END PWAT-STATE1
END PERLND
IMPLND
  GEN-INFO
    <ILS >        Name              Unit-systems   Printer                    ***
    # -  #                        User  t-series Engl Metr                    ***
```

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```
                                                                                              ***
                                                  in  out
   14      IMPERVIOUS                        1    1    1   60    0
  END GEN-INFO
  ACTIVITY
    <ILS > ************** Active Sections ****
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL  ***
   14       0    0    1    0    0    0
  END ACTIVITY
  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL *********
   14       0    0    6    0    0    0    1    9
  END PRINT-INFO
  IWAT-PARM1                                                                                  ***
    <ILS >           Flags          ***                                                       ***
    # -  # CSNO RTOP  VRS  VNN RTLI    ***
   14       0    0    0    0    0
  END IWAT-PARM1
  IWAT-PARM2                                                                                  ***
    <ILS >                                                                                    ***
    # -  #       LSUR      SLSUR       NSUR      RETSC
   14          100.00     0.0100     0.1000     0.1000
  END IWAT-PARM2
  IWAT-PARM3                                                                                  ***
    <ILS >                                                                                    ***
    # -  #     PETMAX     PETMIN
   14
  END IWAT-PARM3
  IWAT-STATE1
    <ILS >  IWATER state variables                                                            ***
    # -  #       RETS       SURS                                                              ***
   14      1.0000E-3 1.0000E-3
  END IWAT-STATE1
END IMPLND
                                                                                              ***
EXT SOURCES
                                                                                              ***
*** NOTE: The only RCHRES that precip and PET are applied to are lakes.
                                                                                              ***
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->                   ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #                   ***
*** PRECIP/EVAP TO PERVIOUS/IMPERV SURFACES
WDM   1002 PREC     ENGLZERO  1.00          PERLND  14  65 EXTNL  PREC
WDM   1002 PREC     ENGLZERO  0.00          PERLND  80     EXTNL  PREC
WDM   1002 PREC     ENGLZERO  1.00          IMPLND  14     EXTNL  PREC
WDM      1 EVAP     ENGLZERO  0.8           PERLND  14  65 EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.0           PERLND  80     EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.8           IMPLND  14     EXTNL  PETINP
*** PRECIP/EVAP TO LAKES
WDM   1002 PREC     ENGLZERO                RCHRES  20     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8         RCHRES  20     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO                RCHRES  49     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8         RCHRES  49     EXTNL  POTEV

*** till seapage groundwater flow from Fill area.  PGG time series
WDM   7101 FLOW     ENGLZERO.000001426      PERLND  80     EXTNL  AGWLI
*** Fill flow directly to stream
```

```
NETWORK                                                                        ***

***          <MEMBER> SSYSSGAP<--MULT-->TRAN <-TARGET VOLS>        <-MEMBER->
<NAME>    # <NAME>   TEM STRG<-FACTOR->STRG <NAME>    #    # <-GRP> <NAME> # # ***
                                                                               ***

END NETWORK                                                                    ***

RCHRES
  GEN-INFO                                                                     ***
    RCHRES        Name          Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG             ***
                                              in  out                          ***
   18     Trib (0371A) M 18         1     1    1    1   62    0    0
   19     Trib (0371A) M 19         1     1    1    1   62    0    0
   20     Trib   M 20               1     1    1    1   62    0    1
   21     Trib (0371H) M 21         1     1    1    1   62    0    0
   22     Trib (0371A) M 22         1     1    1    1   62    0    0
   39     SR509                     1     1    1    1   62    0    0
   49     SDW2 POND                 1     1    1    1   62    0    0

  END GEN-INFO
  ACTIVITY
    RCHRES *************** Active Sections *****************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG                    ***
    1   63    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
  PRINT-INFO
    RCHRES *************** Printout Flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB *********
    1   63    5    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                        ***
    # -  #   VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
             FG FG FG FG  possible  exit  *** possible  exit      possible  exit
              *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1   99    0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1
  HYDR-PARM2
    RCHRES                                                                     ***
    # -  #     FTABNO        LEN      DELTH      STCOR         KS      DB50    ***
  <------><--------><--------><--------><--------><--------><-------->        ***
   18              18    0.800                                  0.3
   19              19    0.568                                  0.3
   20              20    0.379                                  0.3
   21              21    0.450                                  0.3
   22              22    0.300                                  0.3
   49              49    0.010                      0.0         0.3

  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                           ***
    # -  # ***    VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
           *** ac-ft      for each possible exit        for each possible exit
  <------><-------->      <---><---><---><---><---> *** <---><---><---><---><--->
   18     0.1               4.0
   19     0.1               4.0
```

```
   20      10.0               4.0
   21      0.1                4.0
   22      0.1                4.0
   49      0.0                4.0

  END HYDR-INIT
END RCHRES

FTABLES

  FTABLE      18
 ROWS COLS ***
    3    4
     DEPTH        AREA     VOLUME    OUTFLOW    ***
      0.00        1.30       0.00       0.00
      1.00        1.30       1.30     166.00
      2.00        1.40       2.65     490.00
  END FTABLE 18

  FTABLE      19
 ROWS COLS ***
    3    4
     DEPTH        AREA     VOLUME    OUTFLOW    ***
      0.00        1.10       0.00       0.00
      1.00        1.10       1.10      65.00
      2.00        1.20       2.25     223.00
  END FTABLE 19

  FTABLE      49
  *** PROJECT POND F SDW2
 ROWS COLS ***
   12    4
     DEPTH        AREA     VOLUME    OUTFLOW    ***
     0.000      0.8880     0.0000    0.00
     1.000      0.9270     1.0823    0.25
     2.000      0.9690     2.2096    0.35
     3.000      1.0450     3.3828    0.42
     4.000      1.0450     4.6027    0.49
     5.000      1.0860     5.8726    0.55
     6.000      1.1260     7.1935    0.60
     7.000      1.1670     8.5645    1.20
     8.000      1.2130     9.9861    2.69
     8.300      1.2560     10.454    3.09
     9.000      1.2560     11.459    7.57
    10.000      1.3000     12.987    16.88
  END FTABLE 49

  FTABLE      20
*** WALKER CREEK WETLAND
 ROWS COLS ***
   10    4
     DEPTH        AREA     VOLUME    OUTFLOW    OUTFLOW ***
      0.00        0.00       0.00       0.00
      1.00        2.50       1.25       7.04
      2.00        5.00       5.00      17.84
      3.00       12.00      13.50      32.17
      4.00       19.00      29.00      45.13
```

```
     5.00       22.00       49.50       54.95
     6.00       23.00       72.00       61.62
     6.10       23.00       74.30       62.15
     7.00       23.50       95.25       67.00
     7.24       24.10      101.10      100.00
 END FTABLE 20

 FTABLE      21
ROWS COLS ***
   8    4
    DEPTH        AREA     VOLUME    OUTFLOW    ***
    0.000      0.0000     0.0000       0.00
    0.100      0.2259     0.0113       0.11
    0.500      0.2707     0.1106       4.27
    1.000      0.3268     0.2600      15.13
    1.500      0.3828     0.4374      31.67
    2.000      0.4389     0.6428      54.02
    2.500      0.4949     0.8763      82.52
    3.000      0.5510     1.1377     117.55
 END FTABLE 21

 FTABLE      22
ROWS COLS ***
   9    4
    DEPTH        AREA     VOLUME    OUTFLOW    ***
    0.000      0.0000     0.0000       0.00
    0.100      0.3680     0.0184       0.25
    0.500      0.3717     0.1664       9.39
    1.000      0.3763     0.3534      31.06
    2.000      0.3819     0.7325      94.37
    3.000      0.3874     1.1171     174.33
    4.000      0.3930     1.5073     265.38
    5.000      0.3985     1.9030     364.68
    6.000      0.4040     2.3043     470.60
 END FTABLE 22
END FTABLES
MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>        <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                 <Name> # #***
  MASS-LINK       1
  conversion from acre-inches to acre-ft (1/12)            ***
PERLND     PWATER PERO        0.0833333    RCHRES          INFLOW IVOL
  END MASS-LINK   1

  MASS-LINK       2
IMPLND     IWATER SURO        0.0833333    RCHRES          INFLOW IVOL
  END MASS-LINK   2

  MASS-LINK       3
RCHRES     ROFLOW                          RCHRES          INFLOW
  END MASS-LINK   3

  MASS-LINK       4
RCHRES     OFLOW  OVOL    1                RCHRES          INFLOW IVOL
  END MASS-LINK   4

  MASS-LINK       5
```

```
RCHRES       OFLOW  OVOL     2                    RCHRES           INFLOW IVOL
  END MASS-LINK     5

  MASS-LINK         6
PERLND       PWATER SURO          0.0833333      RCHRES           INFLOW IVOL
PERLND       PWATER IFWO          0.0833333      RCHRES           INFLOW IVOL
  END MASS-LINK     6

  MASS-LINK         7
PERLND       PWATER AGWO          0.0833333      RCHRES           INFLOW IVOL
  END MASS-LINK     7

  MASS-LINK         8
PERLND       PWATER PERO          0.0833333      COPY             INPUT  MEAN
  END MASS-LINK     8
  MASS-LINK         12
PERLND       PWATER AGWO          0.0833333      COPY             INPUT  MEAN
  END MASS-LINK     12

  MASS-LINK         9
IMPLND       IWATER SURO          0.0833333      COPY             INPUT  MEAN
  END MASS-LINK     9

  MASS-LINK         10
COPY         OUTPUT MEAN                         RCHRES           INFLOW IVOL
  END MASS-LINK     10

END MASS-LINK
END RUN
```

```
RUN
GLOBAL
  ***  FILE: WClowFT.inp REVISED July 2001. ATC
  ***  SEATAC AIRPORT HSPF BASIN MODEL OF WALKER CREEK
  ***  2006 FUTURE PROJECT CONDITION SIZING BASED
  ***  CHANGED PREC DSN 2 TO NEW PREC DSN 1002
  ***  WALKER CREEK FOUR YEAR RUN USING FULL LENGTH 1990 DATA FOR
  ***  INITIAL CONDITIONS
  WALKER CREEK BASIN HSPF MODEL
  START       1990 10  1  0  0  END    1994  9 30 24  0

  RUN INTERP OUTPUT LEVEL    3
  RESUME     0 RUN     1
END GLOBAL

FILES
<type>  <fun>***<------------fname------------------------------------------->
MESSU       24    D:\PARA\SEATAC\MILLER\LOWFLOW\WALKER.MES
WDM         25    D:\PARA\SEATAC\MILLER\LOWFLOW\mlowflow.WDM
            61    D:\PARA\SEATAC\MILLER\LOWFLOW\wPER.L61
            62    D:\PARA\SEATAC\MILLER\LOWFLOW\wRCH.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 01:00
      PERLND      14
      PERLND      16
      PERLND      18
      PERLND      24
      PERLND      26
      PERLND      28
      PERLND      34
      PERLND      44
      PERLND      45
      PERLND      54
      PERLND      64
      PERLND      65
      PERLND      80
      IMPLND      14
      RCHRES      49
      RCHRES      20
      RCHRES      19
      RCHRES      18
    END INGRP
END OPN SEQUENCE
                                                                          ***
COPY
  TIMESERIES
  Copy-opn                                                                ***
    # -  #  NPT  NMN                                                      ***
    1    5        1
  END TIMESERIES
END COPY

PERLND
  GEN-INFO
    <PLS >      Name          NBLKS   Unit-systems   Printer              ***
```

```
                                                                        ***
 # -  #                           User  t-series Engl Metr
                                         in  out                        ***
 14     TFF- TILL FOR FLT      1    1    1    1   61    0
 16     TFM- TILL FOR MOD      1    1    1    1   61    0
 18     TFS- TILL FOR STP      1    1    1    1   61    0
 24     TGF- TILL GR FLT       1    1    1    1   61    0
 26     TGM- TILL GR MOD       1    1    1    1   61    0
 28     TGS- TILL GR STP       1    1    1    1   61    0
 34     OF - OUTWASH FOR       1    1    1    1   61    0
 44     OG - OUTWASH GR        1    1    1    1   61    0
***PERLND FOR NEW AIRPORT FILL; NONE IN CALIBRATION
 45     AIRPORT FILL           1    1    1    1   61    0
 54     SA - WETLANDS          1    1    1    1   61    0
 64     TGM DES MOINES         1    1    1    1   61    0
 65     OG  DES MOINES         1    1    1    1   61    0
 80     Fill AGWO              1    1    1    1   61    0
END GEN-INFO
ACTIVITY
  <PLS > ************* Active Sections *****************************
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC      ***
 14  200    0    0    1    0    0    0    0    0    0    0    0    0
END ACTIVITY
PRINT-INFO
  <PLS > ********************* Print-flags ************************ PIVL  PYR
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC *********
 14  200    0    0    5    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO
PWAT-PARM1
  <PLS > ***************** Flags *******************
  # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE                     ***
 14         0    0    0    0    0    0    0    0    0
 16         0    0    0    0    0    0    0    0    0
 18         0    0    0    0    0    0    0    0    0
 24         0    0    0    0    0    0    0    0    0
 26         0    0    0    0    0    0    0    0    0
 28         0    0    0    0    0    0    0    0    0
 34         0    0    0    0    0    0    0    0    0
 44         0    0    0    0    0    0    0    0    0
 45         0    0    0    0    0    0    0    0    0
 54         0    0    0    0    0    0    0    0    0
 64         0    0    0    0    0    0    0    0    0
 80         0    0    0    0    0    0    0    0    0
END PWAT-PARM1
PWAT-PARM2
  <PLS > ***
  # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 14                   4.5000    0.0800    400.00    0.0500    0.5000    0.9960
 16                   4.5000    0.0800    400.00    0.1000    0.5000    0.9960
 18                   4.5000    0.0800    200.00    0.2000    0.5000    0.9960
 24                   4.5000    0.0300    400.00    0.0500    0.5000    0.9960
 26                   4.5000    0.0300    400.00    0.1000    0.5000    0.9960
 28                   4.5000    0.0300    200.00    0.2000    0.5000    0.9960
 34                   5.0000    2.0000    400.00    0.0500    0.3000    0.9960
 44                   5.0000    0.8000    400.00    0.0500    0.3000    0.9960
 45                   7.5000    0.0200    300.00    0.0700    0.0000    0.9960
 54                   4.0000    2.0000    100.00    0.0010    0.5000    0.9960
 64                   4.5000    0.1200    400.00    0.1000    0.5000    0.9990
```

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 65                 5.0000    0.8000    400.00    0.0500    0.5000    0.9960
 80                 4.5000    0.0300    400.00    0.1000    0.5000    0.9960
END PWAT-PARM2
PWAT-PARM3
  <PLS >***
  # -  #*** PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 14                           2.0000    2.0000      0.00      0.00      0.0
 16                           2.0000    2.0000      0.00      0.00      0.0
 18                           2.0000    2.0000      0.00      0.00      0.0
 24                           2.0000    2.0000      0.00      0.00       0.
 26                           2.0000    2.0000      0.00        0.       0.
 28                           2.0000    2.0000      0.00        0.       0.
 34                           2.0000    2.0000      0.00      0.00      0.0
 44                           2.0000    2.0000      0.00        0.       0.
 45                           2.0000    2.0000      0.00        0.       0.
 54                           10.000    2.0000      0.00        0.      0.7
 64                           2.0000    2.0000      0.00        0.      0.0
 80                           2.0000    2.0000      0.00        0.       0.
END PWAT-PARM3
PWAT-PARM4
  <PLS >                                                          ***
  # -  #     CEPSC      UZSN      NSUR     INTFW       IRC    LZETP***
 14         0.2000    1.0000    0.3500     2.000    0.1500    0.7000
 16         0.2000    0.5000    0.3500     2.000    0.1500    0.7000
 18         0.2000    0.3000    0.3500     2.000    0.1500    0.7000
 24         0.1000    0.5000    0.2500     2.000    0.1500    0.2500
 26         0.1000    0.2500    0.2500     2.000    0.1500    0.2500
 28         0.1000    0.1500    0.2500     2.000    0.1500    0.2500
 34         0.2000    0.5000    0.3500     0.000    0.5000    0.7000
 44         0.1000    0.5000    0.2500     0.000    0.5000    0.2500
 45         0.1000    0.2800    0.2500     6.000    0.1500    0.6000
 54         0.1000    3.0000    0.5000     1.000    0.7000    0.8000
 64         0.1000    0.2500    0.2500     3.000    0.5000    0.2500
 65         0.1000    0.5000    0.2500     0.000    0.5000    0.2500
 80         0.1000    0.2500    0.2500     2.000    0.1500    0.2500
END PWAT-PARM4
PWAT-STATE1
  <PLS >  PWATER state variables***
  # -  #***   CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
 14          0.000        0.    0.0000      0.00     2.500      2.00     0.000
 16          0.000        0.    0.0010      0.00     0.020      3.51     0.047
 18          0.000        0.    0.0000      0.00     2.500      2.00     0.000
 24          0.000        0.    0.0000      0.00     2.500      2.00     0.000
 26          0.000        0.    0.0000      0.00     1.598      2.81     0.041
 28          0.000        0.    0.0000      0.00     2.500      2.00     0.000
 34          0.000        0.    0.0000      0.00     0.023      5.66     0.084
 44          0.000        0.    0.0000      0.00     2.756      6.25     0.134
 45          0.000        0.    0.0000      0.00     0.373      3.01     0.000
 54          0.000        0.    0.3650      0.00     0.561      0.00     0.000
 64          0.000        0.    0.0000      0.00     1.978     22.28     0.000
 65          0.000        0.    0.0000      0.00     0.000     20.00     0.000
 80          0.000        0.    0.0000      0.00     1.598      2.81     0.041
END PWAT-STATE1
END PERLND
IMPLND
GEN-INFO
  <ILS >      Name                Unit-systems   Printer                    ***
```

```
                                                                             ***
    # -  #                       User  t-series Engl Metr                    ***
                                           in  out
   14       IMPERVIOUS              1    1    1   60    0
  END GEN-INFO
  ACTIVITY
    <ILS > ************** Active Sections ****
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL  ***
   14        0    0    1    0    0    0
  END ACTIVITY
  PRINT-INFO
    <ILS > ******** Print-flags ********* PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL *********
   14        0    0    6    0    0    0    1    9
  END PRINT-INFO
  IWAT-PARM1                                                                 ***
    <ILS >        Flags            ***                                       ***
    # -  # CSNO RTOP  VRS  VNN RTLI    ***
   14        0    0    0    0    0
  END IWAT-PARM1
  IWAT-PARM2                                                                 ***
    <ILS >                                                                   ***
    # -  #      LSUR     SLSUR      NSUR     RETSC
   14         100.00    0.0100    0.1000    0.1000
  END IWAT-PARM2
  IWAT-PARM3                                                                 ***
    <ILS >                                                                   ***
    # -  #    PETMAX    PETMIN
   14
  END IWAT-PARM3
  IWAT-STATE1                                                                ***
    <ILS >  IWATER state variables                                           ***
    # -  #      RETS      SURS
   14      1.0000E-3 1.0000E-3
  END IWAT-STATE1
END IMPLND
                                                                             ***
EXT SOURCES
                                                                             ***
*** NOTE: The only RCHRES that precip and PET are applied to are lakes.
                                                                             ***
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
*** PRECIP/EVAP TO PERVIOUS/IMPERV SURFACES
WDM   1002 PREC     ENGLZERO  1.00         PERLND  14  65 EXTNL  PREC
WDM   1002 PREC     ENGLZERO  0.00         PERLND  80     EXTNL  PREC
WDM   1002 PREC     ENGLZERO  1.00         IMPLND  14     EXTNL  PREC
WDM      1 EVAP     ENGLZERO  0.8          PERLND  14  65 EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.0          PERLND  80     EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.8          IMPLND  14     EXTNL  PETINP
*** PRECIP/EVAP TO LAKES
WDM   1002 PREC     ENGLZERO               RCHRES  20     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  20     EXTNL  POTEV
WDM   1002 PREC     ENGLZERO               RCHRES  49     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  49     EXTNL  POTEV

*** till seapage groundwater flow from Fill area.  PGG time series
WDM   7101 FLOW     ENGLZERO.000001426     PERLND  80     EXTNL  AGWLI
```

```
*** Fill flow directly to stream
WDM   7100 FLOW      ENGL     .000000957      RCHRES  20      INFLOW IVOL
END EXT SOURCES                                                               ***

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES  18 HYDR   RO                       WDM    7196 FLOW      ENGL      REPL
RCHRES  20 HYDR   RO                       WDM    7197 FLOW      ENGL      REPL
 ***PROJECT CONDITION FLOWS
RCHRES  49 HYDR   RO      1 1      ***     WDM     109 FLOW      ENGL      REPL
*** DETENTION STAGES
RCHRES  49 HYDR   STAGE            ***     WDM     649 STAG      ENGL      REPL
*** DETENTION VOLUME
RCHRES  49 HYDR   VOL              ***     WDM     749 VOL       ENGL      REPL
*** 39=SR509     37=SDW2
END EXT TARGETS                                                               ***

SCHEMATIC
<-Source->                    <--Area-->    <-Target->  MBLK    ***
<Name>   #                    <-factor->    <Name>   #  Tbl#    ***

***WALKER CREEK
*** SUB-CATCHMENT  MC 8
PERLND  26                          3.93    RCHRES  20       1
PERLND  44                         18.73    RCHRES  20       1
PERLND  54                          2.70    RCHRES  20       1
IMPLND  14                          0.01    RCHRES  20       2
***  *** SUB-CATCHMENT  SDW-2
***PERLND  26                        26.82     RCHRES  49       6
***PERLND  44                         1.42     RCHRES  49       6
***PERLND  45                         6.70     RCHRES  49       6
***PERLND  26                        26.82     RCHRES  20       7
***PERLND  44                         1.42     RCHRES  20       7
***PERLND  45                         6.70     RCHRES  20       7
***IMPLND  14                         9.51     RCHRES  49       2
***REPLACE SUBCATCHMENT SDW-2    WITH NEW SDW-2 SUBBASIN
***SUBBASIN SDW-2 ROUTING AS OF 4/19/01
*** old fill area
***PERLND  26                        26.88     RCHRES  49       6
*** area removed = 0.04 ac
PERLND  26                         26.84    RCHRES  49       6
PERLND  44                          1.51    RCHRES  49       6
*** old fill area
***PERLND  45                        6.700     RCHRES  49       6
*** area removed = 4.66 ac
PERLND  45                         2.040    RCHRES  49       6
PERLND  26                         26.84    RCHRES  20       7
PERLND  44                          1.51    RCHRES  20       7
PERLND  45                         2.040    RCHRES  20       7
*** old fill area
***IMPLND  14                         9.51     RCHRES  49       2
*** area removed = 3.35 ac
IMPLND  14                          6.16    RCHRES  49       2
*** FILL AGWO PERLND 80 ALL TO GROUNDWATER RCHRES 20
PERLND  80                          8.05    RCHRES  20       7
*** SUB-CATCHMENT  MC 9
```

```
PERLND  26                       9.28     RCHRES  20       1
PERLND  44                       0.76     RCHRES  20       1
IMPLND  14                       0.40     RCHRES  20       2
  *** SUB-CATCHMENT 18
PERLND  16                       0.76     RCHRES  18       1
PERLND  26                      16.08     RCHRES  18       1
PERLND  34                      20.95     RCHRES  18       1
PERLND  44                      49.22     RCHRES  18       1
IMPLND  14                       3.30     RCHRES  18       2
  *** SUB-CATCHMENT 19
PERLND  16                      12.72     RCHRES  19       1
PERLND  26                      92.07     RCHRES  19       1
PERLND  34                       8.39     RCHRES  19       1
PERLND  44                      95.55     RCHRES  19       1
IMPLND  14                      30.53     RCHRES  19       2
  *** SUB-CATCHMENT 20
PERLND  26                      12.54     RCHRES  20       1
PERLND  44                      53.42     RCHRES  20       1
PERLND  54                      33.43     RCHRES  20       1
IMPLND  14                      52.83     RCHRES  20       2
*** DOWN STREAM OF WALKER CREEK GAGE
  *** SUB-CATCHMENT 21 33% OF GW GOES TO GAGE REST GOES TO SOUND
PERLND  16                       2.54     RCHRES  18       7
PERLND  26                      44.30     RCHRES  18       7
PERLND  34                       2.03     RCHRES  18       7
PERLND  44                      41.13     RCHRES  18       7
PERLND  16                       2.54     RCHRES  21       6
PERLND  26                      44.30     RCHRES  21       6
PERLND  34                       2.03     RCHRES  21       6
PERLND  44                      41.13     RCHRES  21       6
IMPLND  14                      16.54     RCHRES  21       2
PERLND  16                       5.07     RCHRES  21       1
PERLND  26                      88.61     RCHRES  21       1
PERLND  34                       4.06     RCHRES  21       1
PERLND  44                      82.26     RCHRES  21       1
IMPLND  14                      33.09     RCHRES  21       2
  *** SUB-CATCHMENT 22
PERLND  34                       4.30     RCHRES  22       1
PERLND  44                      19.49     RCHRES  22       1
PERLND  54                       3.21     RCHRES  22       1
IMPLND  14                       3.95     RCHRES  22       2

***GROUNDWATER FROM OUTSIDE OF WALKER CREEK

PERLND  64        ***          630.00     RCHRES  20       7
*** reduced area because of new impervious
PERLND  64                     570.66     RCHRES  20       7
PERLND  65                ***  130.00     RCHRES  20       7


***STREAM ROUTING
RCHRES  49                                RCHRES  20       3
RCHRES  20                                RCHRES  19       3
RCHRES  19                                RCHRES  18       3

END SCHEMATIC
```

```
NETWORK                                                                    ***

***       <MEMBER> SSYSSGAP<--MULT-->TRAN <-TARGET VOLS>       <-MEMBER->
<NAME>  # <NAME>   TEM STRG<-FACTOR->STRG <NAME>   #    # <-GRP> <NAME> # # ***
                                                                           ***

END NETWORK                                                                ***

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits  Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG          ***
                                          in  out                          ***
   18     Trib (0371A) M 18       1    1    1    1   62    0    0
   19     Trib (0371A) M 19       1    1    1    1   62    0    0
   20     Trib   M 20             1    1    1    1   62    0    1
   21     Trib (0371H) M 21       1    1    1    1   62    0    0
   22     Trib (0371A) M 22       1    1    1    1   62    0    0
   39     SR509                   1    1    1    1   62    0    0
   49     SDW2 POND               1    1    1    1   62    0    0

  END GEN-INFO
  ACTIVITY
    RCHRES *************** Active Sections *****************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG                ***
    1   63    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY
  PRINT-INFO
    RCHRES *************** Printout Flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB *********
    1   63    5    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *        *  *  *  *  *         ***
    1   99   0  1  0  0    4  0  0  0  0        0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1
  HYDR-PARM2
    RCHRES                                                                 ***
    # -  #    FTABNO      LEN     DELTH     STCOR        KS      DB50      ***
  <------><--------><--------><--------><--------><--------><-------->     ***
   18             18   0.800                               0.3
   19             19   0.568                               0.3
   20             20   0.379                               0.3
   21             21   0.450                               0.3
   22             22   0.300                               0.3
   49             49   0.010                0.0            0.3

  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***  VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
           *** ac-ft    for each possible exit        for each possible exit
  <------><-------->    <---><---><---><---><---> *** <---><---><---><---><--->
   18     0.1             4.0
```

```
    19      0.1              4.0
    20      10.0             4.0
    21      0.1              4.0
    22      0.1              4.0
    49      0.0              4.0

  END HYDR-INIT
END RCHRES

FTABLES

  FTABLE     18
 ROWS COLS ***
   3    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
      0.00       1.30       0.00       0.00
      1.00       1.30       1.30     166.00
      2.00       1.40       2.65     490.00
  END FTABLE 18

  FTABLE     19
 ROWS COLS ***
   3    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
      0.00       1.10       0.00       0.00
      1.00       1.10       1.10      65.00
      2.00       1.20       2.25     223.00
  END FTABLE 19

  FTABLE     49
  *** PROJECT POND F SDW2
 ROWS COLS ***
  12    4
     DEPTH       AREA     VOLUME    OUTFLOW    ***
     0.000     0.8880     0.0000    0.00
     1.000     0.9270     1.0823    0.25
     2.000     0.9690     2.2096    0.35
     3.000     1.0450     3.3828    0.42
     4.000     1.0450     4.6027    0.49
     5.000     1.0860     5.8726    0.55
     6.000     1.1260     7.1935    0.60
     7.000     1.1670     8.5645    1.20
     8.000     1.2130     9.9861    2.69
     8.300     1.2560     10.454    3.09
     9.000     1.2560     11.459    7.57
    10.000     1.3000     12.987    16.88
  END FTABLE 49

  FTABLE     20
*** WALKER CREEK WETLAND
 ROWS COLS ***
  10    4
     DEPTH       AREA     VOLUME    OUTFLOW   OUTFLOW ***
      0.00       0.00       0.00       0.00
      1.00       2.50       1.25       7.04
      2.00       5.00       5.00      17.84
      3.00      12.00      13.50      32.17
```

```
     4.00       19.00       29.00       45.13
     5.00       22.00       49.50       54.95
     6.00       23.00       72.00       61.62
     6.10       23.00       74.30       62.15
     7.00       23.50       95.25       67.00
     7.24       24.10      101.10      100.00
 END FTABLE 20

 FTABLE     21
ROWS COLS ***
   8    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0000     0.0000       0.00
    0.100     0.2259     0.0113       0.11
    0.500     0.2707     0.1106       4.27
    1.000     0.3268     0.2600      15.13
    1.500     0.3828     0.4374      31.67
    2.000     0.4389     0.6428      54.02
    2.500     0.4949     0.8763      82.52
    3.000     0.5510     1.1377     117.55
 END FTABLE 21

 FTABLE     22
ROWS COLS ***
   9    4
    DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.000     0.0000     0.0000       0.00
    0.100     0.3680     0.0184       0.25
    0.500     0.3717     0.1664       9.39
    1.000     0.3763     0.3534      31.06
    2.000     0.3819     0.7325      94.37
    3.000     0.3874     1.1171     174.33
    4.000     0.3930     1.5073     265.38
    5.000     0.3985     1.9030     364.68
    6.000     0.4040     2.3043     470.60
 END FTABLE 22
END FTABLES
MASS-LINK
<Volume>    <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        1
  conversion from acre-inches to acre-ft (1/12)              ***
PERLND      PWATER PERO        0.0833333     RCHRES         INFLOW IVOL
  END MASS-LINK    1

  MASS-LINK        2
IMPLND      IWATER SURO        0.0833333     RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
RCHRES      ROFLOW                           RCHRES         INFLOW
  END MASS-LINK    3

  MASS-LINK        4
RCHRES      OFLOW  OVOL   1                  RCHRES         INFLOW IVOL
  END MASS-LINK    4
```

```
  MASS-LINK        5
RCHRES     OFLOW  OVOL   2                     RCHRES        INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
PERLND     PWATER SURO        0.0833333        RCHRES        INFLOW IVOL
PERLND     PWATER IFWO        0.0833333        RCHRES        INFLOW IVOL
  END MASS-LINK    6

  MASS-LINK        7
PERLND     PWATER AGWO        0.0833333        RCHRES        INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
PERLND     PWATER PERO        0.0833333        COPY          INPUT  MEAN
  END MASS-LINK    8
  MASS-LINK       12
PERLND     PWATER AGWO        0.0833333        COPY          INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK        9
IMPLND     IWATER SURO        0.0833333        COPY          INPUT  MEAN
  END MASS-LINK    9

  MASS-LINK       10
COPY       OUTPUT MEAN                         RCHRES        INFLOW IVOL
  END MASS-LINK   10

END MASS-LINK
END RUN
```

```
RUN
GLOBAL
  ***  COPY COMMAND ADDED
  ***  FILE: WCPREDF.inp REVISED OCTOBER 2000
  ***  SEATAC AIRPORT HSPF BASIN MODEL OF WALKER CREEK
  ***  CALIBRATION FILE RUN FOR FULL LENGTH OF RECORD
  WALKER CREEK BASIN HSPF MODEL
  START       1948 10  1  0  0  END    1996  9 30 24  0
  RUN INTERP OUTPUT LEVEL    3
  RESUME     0 RUN     1
END GLOBAL

FILES
<type>  <fun>***<------------fname------------------------------------------->
MESSU      24    D:\PARA\SEATAC\MILLER\LOWFLOW\WALKER.MES
WDM        25    D:\PARA\SEATAC\MILLER\LOWFLOW\mlowflow.WDM
           61    D:\PARA\SEATAC\MILLER\LOWFLOW\wPER.L61
           62    D:\PARA\SEATAC\MILLER\LOWFLOW\wRCH.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 01:00
      PERLND      14
      PERLND      16
      PERLND      18
      PERLND      24
      PERLND      26
      PERLND      28
      PERLND      34
      PERLND      44
      PERLND      45
      PERLND      54
      PERLND      64
      PERLND      65
      IMPLND      14
      COPY         2
      COPY         1
      COPY         3
      RCHRES      20
      RCHRES      19
      RCHRES      18
    END INGRP
END OPN SEQUENCE
                                                                          ***
COPY
  TIMESERIES
  Copy-opn                                                                ***
    # -  #  NPT  NMN                                                      ***
    1    5         1
  END TIMESERIES
END COPY

PERLND
  GEN-INFO
    <PLS >      Name          NBLKS   Unit-systems   Printer              ***
    # -  #                          User  t-series Engl Metr              ***
                                           in  out                        ***
```

```
  14      TFF- TILL FOR FLT     1    1    1    1   61    0
  16      TFM- TILL FOR MOD     1    1    1    1   61    0
  18      TFS- TILL FOR STP     1    1    1    1   61    0
  24      TGF- TILL GR FLT      1    1    1    1   61    0
  26      TGM- TILL GR MOD      1    1    1    1   61    0
  28      TGS- TILL GR STP      1    1    1    1   61    0
  34      OF - OUTWASH FOR      1    1    1    1   61    0
  44      OG - OUTWASH GR       1    1    1    1   61    0
***PERLND FOR NEW AIRPORT FILL; NONE IN CALIBRATION
  45      AIRPORT FILL          1    1    1    1   61    0
  54      SA - WETLANDS         1    1    1    1   61    0
  64      TGM DES MOINES        1    1    1    1   61    0
  65      OG  DES MOINES        1    1    1    1   61    0
END GEN-INFO
ACTIVITY
  <PLS > ************* Active Sections *****************************
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC         ***
 14  200    0    0    1    0    0    0    0    0    0    0    0    0
END ACTIVITY
PRINT-INFO
  <PLS > ********************* Print-flags ************************ PIVL  PYR
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC *********
 14  200    0    0    5    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO
PWAT-PARM1
  <PLS > ***************** Flags *******************
  # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE                          ***
 14         0    0    0    0    0    0    0    0    0
 16         0    0    0    0    0    0    0    0    0
 18         0    0    0    0    0    0    0    0    0
 24         0    0    0    0    0    0    0    0    0
 26         0    0    0    0    0    0    0    0    0
 28         0    0    0    0    0    0    0    0    0
 34         0    0    0    0    0    0    0    0    0
 44         0    0    0    0    0    0    0    0    0
 45         0    0    0    0    0    0    0    0    0
 54         0    0    0    0    0    0    0    0    0
 64         0    0    0    0    0    0    0    0    0
END PWAT-PARM1
PWAT-PARM2
  <PLS > ***
  # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 14                   4.5000    0.0800    400.00    0.0500    0.5000    0.9960
 16                   4.5000    0.0800    400.00    0.1000    0.5000    0.9960
 18                   4.5000    0.0800    200.00    0.2000    0.5000    0.9960
 24                   4.5000    0.0300    400.00    0.0500    0.5000    0.9960
 26                   4.5000    0.0300    400.00    0.1000    0.5000    0.9960
 28                   4.5000    0.0300    200.00    0.2000    0.5000    0.9960
 34                   5.0000    2.0000    400.00    0.0500    0.3000    0.9960
 44                   5.0000    0.8000    400.00    0.0500    0.3000    0.9960
 45                   7.5000    0.0200    300.00    0.0700    0.0000    0.9960
 54                   4.0000    2.0000    100.00    0.0010    0.5000    0.9960
 64                   4.5000    0.1200    400.00    0.1000    0.5000    0.9990
 65                   5.0000    0.8000    400.00    0.0500    0.5000    0.9960
END PWAT-PARM2
PWAT-PARM3
  <PLS >***
```

```
  # -  #*** PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 14                             2.0000    2.0000      0.00      0.00       0.0
 16                             2.0000    2.0000      0.00      0.00       0.0
 18                             2.0000    2.0000      0.00      0.00       0.0
 24                             2.0000    2.0000      0.00      0.00        0.
 26                             2.0000    2.0000      0.00        0.        0.
 28                             2.0000    2.0000      0.00        0.        0.
 34                             2.0000    2.0000      0.00      0.00       0.0
 44                             2.0000    2.0000      0.00        0.        0.
 45                             2.0000    2.0000      0.00        0.        0.
 54                             10.000    2.0000      0.00        0.       0.7
 64                             2.0000    2.0000      0.00        0.       0.0
END PWAT-PARM3
PWAT-PARM4
  <PLS >                                                            ***
  # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP***
 14         0.2000    1.0000    0.3500     2.000    0.1500    0.7000
 16         0.2000    0.5000    0.3500     2.000    0.1500    0.7000
 18         0.2000    0.3000    0.3500     2.000    0.1500    0.7000
 24         0.1000    0.5000    0.2500     2.000    0.1500    0.2500
 26         0.1000    0.2500    0.2500     2.000    0.1500    0.2500
 28         0.1000    0.1500    0.2500     2.000    0.1500    0.2500
 34         0.2000    0.5000    0.3500     0.000    0.5000    0.7000
 44         0.1000    0.5000    0.2500     0.000    0.5000    0.2500
 45         0.1000    0.2800    0.2500     6.000    0.1500    0.6000
 54         0.1000    3.0000    0.5000     1.000    0.7000    0.8000
 64         0.1000    0.2500    0.2500     3.000    0.5000    0.2500
 65         0.1000    0.5000    0.2500     0.000    0.5000    0.2500
END PWAT-PARM4
PWAT-STATE1
  <PLS >  PWATER state variables***
  # -  #***   CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
 14          0.078        0.    0.2500      0.10     2.500      2.00     0.000
 16          0.078        0.    0.2500      0.10     2.500      2.00     0.000
 18          0.078        0.    0.2500      0.10     2.500      2.00     0.000
 24          0.051        0.    0.2500      0.10     2.500      2.00     0.000
 26          0.051        0.    0.2500      0.10     2.500      2.00     0.000
 28          0.051        0.    0.2500      0.10     2.500      2.00     0.000
 34          0.078        0.    0.2500      0.10     0.000      2.00     0.000
 44          0.051        0.    0.2500      0.10     0.000      2.00     0.000
 45          0.051        0.    0.2500      0.10     0.000      2.00     0.000
 54          0.051        0.    0.2500      0.10     2.000      2.00     0.000
 64          0.051        0.    0.2500      0.10     2.000     20.00     0.000
 65          0.051        0.    0.2500      0.10     0.000     20.00     0.000
END PWAT-STATE1
END PERLND
IMPLND
GEN-INFO
  <ILS >        Name            Unit-systems   Printer                      ***
  # -  #                    User  t-series Engl Metr                        ***
                                   in  out                                  ***
 14       IMPERVIOUS           1    1    1   60    0
END GEN-INFO
ACTIVITY
  <ILS > ************* Active Sections ****
  # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
 14         0    0    1    0    0    0
```

```
  END ACTIVITY
  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL *********
   14         0    0    6    0    0    0    1    9
  END PRINT-INFO
  IWAT-PARM1
    <ILS >           Flags             ***                                           ***
    # -  # CSNO RTOP  VRS  VNN RTLI    ***                                           ***
   14         0    0    0    0    0
  END IWAT-PARM1
  IWAT-PARM2
    <ILS >                                                                           ***
    # -  #       LSUR     SLSUR      NSUR     RETSC                                  ***
   14          100.00    0.0100    0.1000    0.1000
  END IWAT-PARM2
  IWAT-PARM3
    <ILS >                                                                           ***
    # -  #     PETMAX    PETMIN                                                      ***
   14
  END IWAT-PARM3
  IWAT-STATE1
    <ILS >  IWATER state variables                                                   ***
    # -  #       RETS       SURS                                                     ***
   14        1.0000E-3 1.0000E-3
  END IWAT-STATE1
END IMPLND
                                                                                     ***
EXT SOURCES
                                                                                     ***
*** NOTE: The only RCHRES that precip and PET are applied to are lakes.
                                                                                     ***
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->          ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #          ***
*** PRECIP/EVAP TO PERVIOUS/IMPERV SURFACES
WDM   1002 PREC     ENGLZERO  1.00         PERLND  14 200 EXTNL  PREC
WDM   1002 PREC     ENGLZERO  1.00         IMPLND  14     EXTNL  PREC
WDM      1 EVAP     ENGLZERO  0.8          PERLND  14  65 EXTNL  PETINP
WDM      1 EVAP     ENGLZERO  0.8          IMPLND  14     EXTNL  PETINP
*** PRECIP/EVAP TO LAKES
WDM   1002 PREC     ENGLZERO               RCHRES  20     EXTNL  PREC
WDM      1 EVAP     ENGLZERO    0.8        RCHRES  20     EXTNL  POTEV

END EXT SOURCES
                                                                                     ***
EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
***WALKER NR MTH
RCHRES  18 HYDR   RO                       WDM     96 FLOW     ENGL      REPL
*** MISC (20=WALKER WETLAND, 55=SR509, 56=1ST AVE)
RCHRES  20 HYDR   RO                       WDM     97 FLOW     ENGL      REPL
COPY *** 2 OUTPUT MEAN   1 1      12.1     WDM     89 FLOW     ENGL      REPL
END EXT TARGETS
                                                                                     ***
SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK    ***
```

```
<Name>    #                         <-factor->     <Name>   #    Tbl#    ***

***WALKER CREEK
  *** SUB-CATCHMENT  MC 8
PERLND  26                           4.10     COPY     1       8
PERLND  44                          18.57     COPY     1       8
PERLND  54                           2.72     COPY     1       8
IMPLND  14                           1.34     COPY     1       9
***  *** SUB-CATCHMENT  SDW2  10-75-15 PREDEVELOPMENT W/1994  IMP
***PERLND  16                          30.91     COPY     2      10
***PERLND  26                           7.16     COPY     2      10
***PERLND  34                           1.69     COPY     2      10
***PERLND  44                           0.39     COPY     2      10
***PERLND  54                           1.13     COPY     2      10
***PERLND  16                          30.91     COPY     1      11
***PERLND  26                           7.16     COPY     1      11
***PERLND  34                           1.69     COPY     1      11
***PERLND  44                           0.39     COPY     1      11
***PERLND  54                           1.13     COPY     1      11
***IMPLND  14                           3.31     COPY     2       9
  *** SUB-CATCHMENT  SDW2  10-75-15 PREDEVELOPMENT W/1994  IMP
PERLND  16                          16.38     COPY     2      10
PERLND  26                           4.37     COPY     2      10
PERLND  34                          16.47     COPY     2      10
PERLND  44                           4.39     COPY     2      10
PERLND  54                           1.05     COPY     2      10
PERLND  16                          16.38     COPY     1      11
PERLND  26                           4.37     COPY     1      11
PERLND  34                          16.47     COPY     1      11
PERLND  44                           4.39     COPY     1      11
PERLND  54                           1.05     COPY     1      11
IMPLND  14                           2.20     COPY     2       9
  *** SUB-CATCHMENT  MC 9
PERLND  26                           9.44     COPY     1       8
PERLND  44                           0.74     COPY     1       8
PERLND  54             ***           0.00     COPY     1       8
IMPLND  14                           0.24     COPY     1       9
  *** SUB-CATCHMENT 18
PERLND  16                           0.76     RCHRES  18       1
PERLND  26                          16.08     RCHRES  18       1
PERLND  34                          20.95     RCHRES  18       1
PERLND  44                          49.22     RCHRES  18       1
IMPLND  14                           3.30     RCHRES  18       2
  *** SUB-CATCHMENT 19
PERLND  16                          12.72     RCHRES  19       1
PERLND  26                          92.07     RCHRES  19       1
PERLND  34                           8.39     RCHRES  19       1
PERLND  44                          95.55     RCHRES  19       1
IMPLND  14                          30.53     RCHRES  19       2
  *** SUB-CATCHMENT 20
PERLND  26                          12.53     RCHRES  20       1
PERLND  44                          53.43     RCHRES  20       1
PERLND  54                          33.43     RCHRES  20       1
IMPLND  14                          52.83     RCHRES  20       2
*** DOWN STREAM OF WALKER CREEK GAGE
  *** SUB-CATCHMENT 21 33% OF GW GOES TO GAGE REST GOES TO SOUND
PERLND  16                           2.54     RCHRES  18       7
```

```
PERLND  26                    44.30    RCHRES  18      7
PERLND  34                     2.03    RCHRES  18      7
PERLND  44                    41.13    RCHRES  18      7
PERLND  16                     2.54    RCHRES  21      6
PERLND  26                    44.30    RCHRES  21      6
PERLND  34                     2.03    RCHRES  21      6
PERLND  44                    41.13    RCHRES  21      6
PERLND  16                     5.07    RCHRES  21      1
PERLND  26                    88.61    RCHRES  21      1
PERLND  34                     4.06    RCHRES  21      1
PERLND  44                    82.26    RCHRES  21      1
IMPLND  14                    33.09    RCHRES  21      2
IMPLND  14                    16.54    RCHRES  21      2
  *** SUB-CATCHMENT 22
PERLND  34                     4.30    RCHRES  22      1
PERLND  44                    19.49    RCHRES  22      1
PERLND  54                     3.21    RCHRES  22      1
IMPLND  14                     3.95    RCHRES  22      2

***GROUNDWATER FROM OUTSIDE OF WALKER CREEK

PERLND  64                   630.00    RCHRES  20      7
PERLND  65              ***  130.00    RCHRES  20      7

***STREAM ROUTING
COPY     2                             COPY     3     14
COPY     1                             COPY     3     14
COPY     3                             RCHRES  20     13
RCHRES  20                             RCHRES  19      3
RCHRES  19                             RCHRES  18      3

END SCHEMATIC


NETWORK
                                                                        ***
***        <MEMBER> SSYSSGAP<--MULT-->TRAN <-TARGET VOLS>        <-MEMBER->
<NAME>   # <NAME>   TEM STRG<-FACTOR->STRG <NAME>    #    # <-GRP> <NAME> # # ***
                                                                        ***
END NETWORK
                                                                        ***
RCHRES
  GEN-INFO
    RCHRES        Name          Nexits   Unit Systems   Printer         ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG       ***
                                          in  out                       ***
   18     Trib (0371A) M 18         1    1    1    1   62    0    0
   19     Trib (0371A) M 19         1    1    1    1   62    0    0
   20     Trib   M 20               1    1    1    1   62    0    1
   21     Trib (0371H) M 21         1    1    1    1   62    0    0
   22     Trib (0371A) M 22         1    1    1    1   62    0    0

  END GEN-INFO
  ACTIVITY
    RCHRES *************** Active Sections ****************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG              ***
    1   63    1    0    0    0    0    0    0    0    0    0
```

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```
  END ACTIVITY
  PRINT-INFO
    RCHRES *************** Printout Flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB *********
    1   63    5    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
  HYDR-PARM1
                                                                                 ***
    RCHRES  Flags for each HYDR Section
    # -  #   VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
             FG FG FG FG  possible   exit *** possible  exit      possible  exit
              *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1   99    0  1  0  0    4  0  0  0  0       0  0  0  0  0     2  2  2  2  2
  END HYDR-PARM1
  HYDR-PARM2
    RCHRES                                                                       ***
    # -  #     FTABNO        LEN      DELTH      STCOR         KS       DB50     ***
  <------><--------><--------><--------><--------><--------><-------->          ***
   18             18   0.800                                   0.3
   19             19   0.568                                   0.3
   20             20   0.379                                   0.3
   21             21   0.450                                   0.3
   22             22   0.300                                   0.3
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                             ***
    # -  # ***    VOL     Initial  value  of COLIND    Initial  value  of OUTDGT
           *** ac-ft      for each possible exit       for each possible exit
  <------><-------->      <---><---><---><---><---> *** <---><---><---><---><--->
   18      0.1             4.0
   19      0.1             4.0
   20     10.0             4.0
   21      0.1             4.0
   22      0.1             4.0
  END HYDR-INIT
END RCHRES

FTABLES

  FTABLE     18
 ROWS COLS ***
    3    4
     DEPTH       AREA     VOLUME    OUTFLOW   ***
      0.00       1.30       0.00       0.00
      1.00       1.30       1.30     166.00
      2.00       1.40       2.65     490.00
  END FTABLE 18

  FTABLE     19
 ROWS COLS ***
    3    4
     DEPTH       AREA     VOLUME    OUTFLOW   ***
      0.00       1.10       0.00       0.00
      1.00       1.10       1.10      65.00
      2.00       1.20       2.25     223.00
  END FTABLE 19

  FTABLE     20
```

```
*** WALKER CREEK WETLAND
 ROWS COLS ***
   10    4
     DEPTH       AREA     VOLUME    OUTFLOW   OUTFLOW ***
      0.00       0.00       0.00       0.00
      1.00       2.50       1.25       7.04
      2.00       5.00       5.00      17.84
      3.00      12.00      13.50      32.17
      4.00      19.00      29.00      45.13
      5.00      22.00      49.50      54.95
      6.00      23.00      72.00      61.62
      6.10      23.00      74.30      62.15
      7.00      23.50      95.25      67.00
      7.24      24.10     101.10     100.00
  END FTABLE 20

  FTABLE     21
 ROWS COLS ***
    8    4
     DEPTH       AREA     VOLUME    OUTFLOW   ***
     0.000     0.0000     0.0000       0.00
     0.100     0.2259     0.0113       0.11
     0.500     0.2707     0.1106       4.27
     1.000     0.3268     0.2600      15.13
     1.500     0.3828     0.4374      31.67
     2.000     0.4389     0.6428      54.02
     2.500     0.4949     0.8763      82.52
     3.000     0.5510     1.1377     117.55
  END FTABLE 21

  FTABLE     22
 ROWS COLS ***
    9    4
     DEPTH       AREA     VOLUME    OUTFLOW   ***
     0.000     0.0000     0.0000       0.00
     0.100     0.3680     0.0184       0.25
     0.500     0.3717     0.1664       9.39
     1.000     0.3763     0.3534      31.06
     2.000     0.3819     0.7325      94.37
     3.000     0.3874     1.1171     174.33
     4.000     0.3930     1.5073     265.38
     5.000     0.3985     1.9030     364.68
     6.000     0.4040     2.3043     470.60
  END FTABLE 22
END FTABLES
MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        1
  conversion from acre-inches to acre-ft (1/12)               ***
PERLND     PWATER PERO        0.0833333    RCHRES         INFLOW IVOL
  END MASS-LINK    1

  MASS-LINK        2
IMPLND     IWATER SURO        0.0833333    RCHRES         INFLOW IVOL
  END MASS-LINK    2
```

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```
  MASS-LINK        3
RCHRES      ROFLOW                                 RCHRES        INFLOW
  END MASS-LINK    3

  MASS-LINK        4
RCHRES      OFLOW  OVOL   1                        RCHRES        INFLOW IVOL
  END MASS-LINK    4

  MASS-LINK        5
RCHRES      OFLOW  OVOL   2                        RCHRES        INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
PERLND      PWATER SURO          0.0833333         RCHRES        INFLOW IVOL
PERLND      PWATER IFWO          0.0833333         RCHRES        INFLOW IVOL
  END MASS-LINK    6

  MASS-LINK        7
PERLND      PWATER AGWO          0.0833333         RCHRES        INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
PERLND      PWATER PERO          0.0833333         COPY          INPUT  MEAN
  END MASS-LINK    8

  MASS-LINK        9
IMPLND      IWATER SURO          0.0833333         COPY          INPUT  MEAN
  END MASS-LINK    9

  MASS-LINK        10
PERLND      PWATER SURO          0.0833333         COPY          INPUT  MEAN
PERLND      PWATER IFWO          0.0833333         COPY          INPUT  MEAN
  END MASS-LINK    10

  MASS-LINK        11
PERLND      PWATER AGWO          0.0833333         COPY          INPUT  MEAN
  END MASS-LINK    11

  MASS-LINK        12
PERLND      PWATER AGWO          0.0833333         COPY          INPUT  MEAN
  END MASS-LINK    12

  MASS-LINK        13
COPY        OUTPUT MEAN                            RCHRES        INFLOW IVOL
  END MASS-LINK    13

  MASS-LINK        14
COPY        OUTPUT MEAN                            COPY          INPUT  MEAN
  END MASS-LINK    14

END MASS-LINK
END RUN
```

```
RUN
GLOBAL
  ***  COPY COMMAND ADDED
  ***  FILE: WCPREDT.inp REVISED OCTOBER 2000
  ***  SEATAC AIRPORT HSPF BASIN MODEL OF WALKER CREEK
  ***  CALIBRATION FILE USING FULL LENGTH RUN 1990 DATA FOR INTITIAL CONDITIONS
  WALKER CREEK BASIN HSPF MODEL
  START       1990 10  1  0  0  END    1994  9 30 24  0
  RUN INTERP OUTPUT LEVEL    3
  RESUME     0 RUN     1
END GLOBAL

FILES
<type>  <fun>***<------------fname------------------------------------------->
MESSU      24    D:\PARA\SEATAC\MILLER\LOWFLOW\WALKER.MES
WDM        25    D:\PARA\SEATAC\MILLER\LOWFLOW\mlowflow.WDM
           61    D:\PARA\SEATAC\MILLER\LOWFLOW\wPER.L61
           62    D:\PARA\SEATAC\MILLER\LOWFLOW\wRCH.L62
END FILES

OPN SEQUENCE
    INGRP              INDELT 01:00
      PERLND      14
      PERLND      16
      PERLND      18
      PERLND      24
      PERLND      26
      PERLND      28
      PERLND      34
      PERLND      44
      PERLND      45
      PERLND      54
      PERLND      64
      PERLND      65
      IMPLND      14
      COPY         2
      COPY         1
      COPY         3
      RCHRES      20
      RCHRES      19
      RCHRES      18
    END INGRP
END OPN SEQUENCE
                                                                         ***
COPY
  TIMESERIES
  Copy-opn                                                               ***
    # -  #  NPT  NMN                                                     ***
    1    5       1
  END TIMESERIES
END COPY

PERLND
  GEN-INFO
    <PLS >      Name          NBLKS   Unit-systems   Printer             ***
    # -  #                          User  t-series Engl Metr             ***
                                         in   out                        ***
```

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```
  14       TFF- TILL FOR FLT        1    1    1    1   61     0
  16       TFM- TILL FOR MOD        1    1    1    1   61     0
  18       TFS- TILL FOR STP        1    1    1    1   61     0
  24       TGF- TILL GR FLT         1    1    1    1   61     0
  26       TGM- TILL GR MOD         1    1    1    1   61     0
  28       TGS- TILL GR STP         1    1    1    1   61     0
  34       OF - OUTWASH FOR         1    1    1    1   61     0
  44       OG - OUTWASH GR          1    1    1    1   61     0
***PERLND FOR NEW AIRPORT FILL; NONE IN CALIBRATION
  45       AIRPORT FILL             1    1    1    1   61     0
  54       SA - WETLANDS            1    1    1    1   61     0
  64       TGM DES MOINES           1    1    1    1   61     0
  65       OG  DES MOINES           1    1    1    1   61     0
END GEN-INFO
ACTIVITY
  <PLS > ************* Active Sections *****************************
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC         ***
 14  200    0    0    1    0    0    0    0    0    0    0    0    0
END ACTIVITY
PRINT-INFO
  <PLS > ********************* Print-flags ************************* PIVL  PYR
  # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC *********
 14  200    0    0    5    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO
PWAT-PARM1
  <PLS > ***************** Flags ********************
  # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE                        ***
 14         0    0    0    0    0    0    0    0    0
 16         0    0    0    0    0    0    0    0    0
 18         0    0    0    0    0    0    0    0    0
 24         0    0    0    0    0    0    0    0    0
 26         0    0    0    0    0    0    0    0    0
 28         0    0    0    0    0    0    0    0    0
 34         0    0    0    0    0    0    0    0    0
 44         0    0    0    0    0    0    0    0    0
 45         0    0    0    0    0    0    0    0    0
 54         0    0    0    0    0    0    0    0    0
 64         0    0    0    0    0    0    0    0    0
END PWAT-PARM1
PWAT-PARM2
  <PLS > ***
  # -  # ***FOREST      LZSN     INFILT      LSUR      SLSUR      KVARY      AGWRC
 14                   4.5000     0.0800    400.00     0.0500     0.5000     0.9960
 16                   4.5000     0.0800    400.00     0.1000     0.5000     0.9960
 18                   4.5000     0.0800    200.00     0.2000     0.5000     0.9960
 24                   4.5000     0.0300    400.00     0.0500     0.5000     0.9960
 26                   4.5000     0.0300    400.00     0.1000     0.5000     0.9960
 28                   4.5000     0.0300    200.00     0.2000     0.5000     0.9960
 34                   5.0000     2.0000    400.00     0.0500     0.3000     0.9960
 44                   5.0000     0.8000    400.00     0.0500     0.3000     0.9960
 45                   7.5000     0.0200    300.00     0.0700     0.0000     0.9960
 54                   4.0000     2.0000    100.00     0.0010     0.5000     0.9960
 64                   4.5000     0.1200    400.00     0.1000     0.5000     0.9990
 65                   5.0000     0.8000    400.00     0.0500     0.5000     0.9960
END PWAT-PARM2
PWAT-PARM3
  <PLS >***
```

```
  # -  #*** PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 14                             2.0000    2.0000      0.00      0.00       0.0
 16                             2.0000    2.0000      0.00      0.00       0.0
 18                             2.0000    2.0000      0.00      0.00       0.0
 24                             2.0000    2.0000      0.00      0.00        0.
 26                             2.0000    2.0000      0.00        0.        0.
 28                             2.0000    2.0000      0.00        0.        0.
 34                             2.0000    2.0000      0.00      0.00       0.0
 44                             2.0000    2.0000      0.00        0.        0.
 45                             2.0000    2.0000      0.00        0.        0.
 54                             10.000    2.0000      0.00        0.   0.[illegible]
 64                             2.0000    2.0000      0.00        0.       0.0
END PWAT-PARM3
PWAT-PARM4
 <PLS >                                                          ***
  # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP***
 14         0.2000    1.0000    0.3500     2.000    0.1500    0.7000
 16         0.2000    0.5000    0.3500     2.000    0.1500    0.7000
 18         0.2000    0.3000    0.3500     2.000    0.1500    0.7000
 24         0.1000    0.5000    0.2500     2.000    0.1500    0.2500
 26         0.1000    0.2500    0.2500     2.000    0.1500    0.2500
 28         0.1000    0.1500    0.2500     2.000    0.1500    0.2500
 34         0.2000    0.5000    0.3500     0.000    0.5000    0.7000
 44         0.1000    0.5000    0.2500     0.000    0.5000    0.2500
 45         0.1000    0.2800    0.2500     6.000    0.1500    0.6000
 54         0.1000    3.0000    0.5000     1.000    0.7000    0.8000
 64         0.1000    0.2500    0.2500     3.000    0.5000    0.2500
 65         0.1000    0.5000    0.2500     0.000    0.5000    0.2500
END PWAT-PARM4
PWAT-STATE1
 <PLS >  PWATER state variables***
  # -  #***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
 14         0.000        0.    0.0000      0.00     2.500      2.00     0.000
 16         0.000        0.    0.0010      0.00     0.020      3.51     0.047
 18         0.000        0.    0.0000      0.00     2.500      2.00     0.000
 24         0.000        0.    0.0000      0.00     2.500      2.00     0.000
 26         0.000        0.    0.0000      0.00     1.598      2.81     0.041
 28         0.000        0.    0.0000      0.00     2.500      2.00     0.000
 34         0.000        0.    0.0000      0.00     0.023      5.66     0.084
 44         0.000        0.    0.0000      0.00     2.756      6.25     0.134
 45         0.000        0.    0.0000      0.00     0.373      3.01     0.000
 54         0.000        0.    0.3650      0.00     0.561      0.00     0.000
 64         0.000        0.    0.0000      0.00     1.978     22.28     0.000
 65         0.000        0.    0.0000      0.00     0.000     20.00     0.000
END PWAT-STATE1
END PERLND
IMPLND
GEN-INFO
 <ILS >       Name             Unit-systems   Printer                    ***
  # -  #                     User  t-series Engl Metr                    ***
                                     in  out                             ***
 14     IMPERVIOUS              1    1    1   60    0
END GEN-INFO
ACTIVITY
 <ILS > ************* Active Sections ****
  # -  # ATMP SNOW IWAT  SLD  IWG IQAL  ***
 14         0    0    1    0    0    0
```

```
  END ACTIVITY
  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL *********
   14       0    0    6    0    0    0    1    9
  END PRINT-INFO
  IWAT-PARM1                                                                   ***
    <ILS >              Flags            ***                                   ***
    # -  # CSNO RTOP  VRS  VNN RTLI      ***
   14       0    0    0    0    0
  END IWAT-PARM1
  IWAT-PARM2                                                                   ***
    <ILS >                                                                     ***
    # -  #       LSUR      SLSUR       NSUR      RETSC
   14          100.00     0.0100     0.1000     0.1000
  END IWAT-PARM2
  IWAT-PARM3                                                                   ***
    <ILS >                                                                     ***
    # -  #     PETMAX     PETMIN
   14
  END IWAT-PARM3
  IWAT-STATE1                                                                  ***
    <ILS >  IWATER state variables                                             ***
    # -  #       RETS       SURS
   14      1.0000E-3 1.0000E-3
  END IWAT-STATE1
END IMPLND
                                                                               ***
EXT SOURCES
                                                                               ***
*** NOTE: The only RCHRES that precip and PET are applied to are lakes.
                                                                               ***
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>    # <Name> # tem strg<-factor->strg <Name>    #   #        <Name> # #  ***
*** PRECIP/EVAP TO PERVIOUS/IMPERV SURFACES
WDM    1002 PREC      ENGLZERO  1.00          PERLND  14 200 EXTNL  PREC
WDM    1002 PREC      ENGLZERO  1.00          IMPLND  14     EXTNL  PREC
WDM       1 EVAP      ENGLZERO  0.8           PERLND  14  65 EXTNL  PETINP
WDM       1 EVAP      ENGLZERO  0.8           IMPLND  14     EXTNL  PETINP
*** PRECIP/EVAP TO LAKES
WDM    1002 PREC      ENGLZERO                RCHRES  20     EXTNL  PREC
WDM       1 EVAP      ENGLZERO    0.8         RCHRES  20     EXTNL  POTEV

END EXT SOURCES
                                                                               ***
EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>    #       <Name> # #<-factor->strg <Name>    # <Name>    tem strg strg***
***WALKER NR MTH
RCHRES  18 HYDR   RO            ***       WDM      96 FLOW      ENGL      REPL
*** MISC (20=WALKER WETLAND, 55=SR509, 56=1ST AVE)
RCHRES  20 HYDR   RO                      WDM    8097 FLOW      ENGL      REPL
COPY *** 2 OUTPUT MEAN   1 1      12.1    WDM      89 FLOW      ENGL      REPL
END EXT TARGETS
                                                                               ***
SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK     ***
```

```
<Name>   #                     <-factor->    <Name>   #    Tbl#    ***

***WALKER CREEK
  *** SUB-CATCHMENT   MC 8
PERLND  26                        4.10     COPY      1       8
PERLND  44                       18.57     COPY      1       8
PERLND  54                        2.72     COPY      1       8
IMPLND  14                        1.34     COPY      1       9
***   *** SUB-CATCHMENT   SDW2   10-75-15 PREDEVELOPMENT W/1994 IMP
***PERLND  16                      30.91     COPY      2      10
***PERLND  26                       7.16     COPY      2      10
***PERLND  34                       1.69     COPY      2      10
***PERLND  44                       0.39     COPY      2      10
***PERLND  54                       1.13     COPY      2      10
***PERLND  16                      30.91     COPY      1      11
***PERLND  26                       7.16     COPY      1      11
***PERLND  34                       1.69     COPY      1      11
***PERLND  44                       0.39     COPY      1      11
***PERLND  54                       1.13     COPY      1      11
***IMPLND  14                       3.31     COPY      2       9
  *** SUB-CATCHMENT   SDW2   10-75-15 PREDEVELOPMENT W/1994 IMP
PERLND  16                       16.38     COPY      2      10
PERLND  26                        4.37     COPY      2      10
PERLND  34                       16.47     COPY      2      10
PERLND  44                        4.39     COPY      2      10
PERLND  54                        1.05     COPY      2      10
PERLND  16                       16.38     COPY      1      11
PERLND  26                        4.37     COPY      1      11
PERLND  34                       16.47     COPY      1      11
PERLND  44                        4.39     COPY      1      11
PERLND  54                        1.05     COPY      1      11
IMPLND  14                        2.20     COPY      2       9
  *** SUB-CATCHMENT   MC 9
PERLND  26                        9.44     COPY      1       8
PERLND  44                        0.74     COPY      1       8
PERLND  54           ***          0.00     COPY      1       8
IMPLND  14                        0.24     COPY      1       9
  *** SUB-CATCHMENT 18
PERLND  16                        0.76     RCHRES   18       1
PERLND  26                       16.08     RCHRES   18       1
PERLND  34                       20.95     RCHRES   18       1
PERLND  44                       49.22     RCHRES   18       1
IMPLND  14                        3.30     RCHRES   18       2
  *** SUB-CATCHMENT 19
PERLND  16                       12.72     RCHRES   19       1
PERLND  26                       92.07     RCHRES   19       1
PERLND  34                        8.39     RCHRES   19       1
PERLND  44                       95.55     RCHRES   19       1
IMPLND  14                       30.53     RCHRES   19       2
  *** SUB-CATCHMENT 20
PERLND  26                       12.53     RCHRES   20       1
PERLND  44                       53.43     RCHRES   20       1
PERLND  54                       33.43     RCHRES   20       1
IMPLND  14                       52.83     RCHRES   20       2
*** DOWN STREAM OF WALKER CREEK GAGE
  *** SUB-CATCHMENT 21 33% OF GW GOES TO GAGE REST GOES TO SOUND
PERLND  16                        2.54     RCHRES   18       7
```

```
PERLND  26                    44.30     RCHRES  18      7
PERLND  34                     2.03     RCHRES  18      7
PERLND  44                    41.13     RCHRES  18      7
PERLND  16                     2.54     RCHRES  21      6
PERLND  26                    44.30     RCHRES  21      6
PERLND  34                     2.03     RCHRES  21      6
PERLND  44                    41.13     RCHRES  21      6
PERLND  16                     5.07     RCHRES  21      1
PERLND  26                    88.61     RCHRES  21      1
PERLND  34                     4.06     RCHRES  21      1
PERLND  44                    82.26     RCHRES  21      1
IMPLND  14                    33.09     RCHRES  21      2
IMPLND  14                    16.54     RCHRES  21      2
  *** SUB-CATCHMENT 22
PERLND  34                     4.30     RCHRES  22      1
PERLND  44                    19.49     RCHRES  22      1
PERLND  54                     3.21     RCHRES  22      1
IMPLND  14                     3.95     RCHRES  22      2

***GROUNDWATER FROM OUTSIDE OF WALKER CREEK

PERLND  64                   630.00     RCHRES  20      7
PERLND  65              ***  130.00     RCHRES  20      7

***STREAM ROUTING
COPY     2                              COPY     3     14
COPY     1                              COPY     3     14
COPY     3                              RCHRES  20     13
RCHRES  20                              RCHRES  19      3
RCHRES  19                              RCHRES  18      3

END SCHEMATIC


NETWORK
                                                                                ***
***        <MEMBER> SSYSSGAP<--MULT-->TRAN <-TARGET VOLS>        <-MEMBER->
<NAME>   # <NAME>    TEM STRG<-FACTOR->STRG <NAME>    #    # <-GRP> <NAME> # # ***
                                                                                ***
END NETWORK
                                                                                ***
RCHRES
  GEN-INFO
    RCHRES       Name         Nexits   Unit Systems   Printer                   ***
    # -  #<------------------><----> User T-series  Engl Metr LKFG              ***
                                            in  out                             ***
   18     Trib (0371A) M 18       1     1    1    1   62    0    0
   19     Trib (0371A) M 19       1     1    1    1   62    0    0
   20     Trib    M 20            1     1    1    1   62    0    1
   21     Trib (0371H) M 21       1     1    1    1   62    0    0
   22     Trib (0371A) M 22       1     1    1    1   62    0    0

  END GEN-INFO
  ACTIVITY
    RCHRES *************** Active Sections *****************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG                     ***
    1   63    1    0    0    0    0    0    0    0    0    0
```

```
END ACTIVITY
PRINT-INFO
  RCHRES *************** Printout Flags ****************** PIVL  PYR
  # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB *********
  1  63    5    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO
HYDR-PARM1                                                                ***
  RCHRES  Flags for each HYDR Section
  # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each        FUNCT  for each
          FG FG FG FG  possible  exit  *** possible  exit        possible  exit
          *  *  *  *   *  *  *  *  *       *  *  *  *  *             ***

  1   99   0  1  0  0    4  0  0  0  0      0  0  0  0  0         2  2  2  2  2
END HYDR-PARM1
HYDR-PARM2                                                                ***
  RCHRES
  # -  #     FTABNO        LEN     DELTH      STCOR         KS      DB50   ***
<------><--------><--------><--------><--------><--------><-------->       ***
 18              18   0.800                                 0.3
 19              19   0.568                                 0.3
 20              20   0.379                                 0.3
 21              21   0.450                                 0.3
 22              22   0.300                                 0.3
END HYDR-PARM2
HYDR-INIT
  RCHRES  Initial conditions for each HYDR section                        ***
  # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
         *** ac-ft    for each possible exit        for each possible exit
<------><-------->    <---><---><---><---><---> *** <---><---><---><---><--->
 18      0.1            4.0
 19      0.1            4.0
 20      10.0           4.0
 21      0.1            4.0
 22      0.1            4.0
END HYDR-INIT
END RCHRES

FTABLES

 FTABLE     18
ROWS COLS ***
  3    4
   DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.00       1.30       0.00       0.00
    1.00       1.30       1.30     166.00
    2.00       1.40       2.65     490.00
 END FTABLE 18

 FTABLE     19
ROWS COLS ***
  3    4
   DEPTH       AREA     VOLUME    OUTFLOW    ***
    0.00       1.10       0.00       0.00
    1.00       1.10       1.10      65.00
    2.00       1.20       2.25     223.00
 END FTABLE 19

 FTABLE     20
```

```
*** WALKER CREEK WETLAND
 ROWS COLS ***
   10    4
     DEPTH       AREA     VOLUME   OUTFLOW  OUTFLOW ***
      0.00       0.00       0.00      0.00
      1.00       2.50       1.25      7.04
      2.00       5.00       5.00     17.84
      3.00      12.00      13.50     32.17
      4.00      19.00      29.00     45.13
      5.00      22.00      49.50     54.95
      6.00      23.00      72.00     61.62
      6.10      23.00      74.30     62.15
      7.00      23.50      95.25     67.00
      7.24      24.10     101.10    100.00
  END FTABLE 20

  FTABLE     21
 ROWS COLS ***
    8    4
     DEPTH       AREA     VOLUME   OUTFLOW  ***
     0.000     0.0000     0.0000      0.00
     0.100     0.2259     0.0113      0.11
     0.500     0.2707     0.1106      4.27
     1.000     0.3268     0.2600     15.13
     1.500     0.3828     0.4374     31.67
     2.000     0.4389     0.6428     54.02
     2.500     0.4949     0.8763     82.52
     3.000     0.5510     1.1377    117.55
  END FTABLE 21

  FTABLE     22
 ROWS COLS ***
    9    4
     DEPTH       AREA     VOLUME   OUTFLOW  ***
     0.000     0.0000     0.0000      0.00
     0.100     0.3680     0.0184      0.25
     0.500     0.3717     0.1664      9.39
     1.000     0.3763     0.3534     31.06
     2.000     0.3819     0.7325     94.37
     3.000     0.3874     1.1171    174.33
     4.000     0.3930     1.5073    265.38
     5.000     0.3985     1.9030    364.68
     6.000     0.4040     2.3043    470.60
  END FTABLE 22
END FTABLES
MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>        <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                 <Name> # #***
  MASS-LINK       1
  conversion from acre-inches to acre-ft (1/12)              ***
PERLND     PWATER PERO       0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    1

  MASS-LINK       2
IMPLND     IWATER SURO       0.0833333     RCHRES          INFLOW IVOL
  END MASS-LINK    2
```

```
  MASS-LINK        3
RCHRES     ROFLOW                               RCHRES       INFLOW
  END MASS-LINK    3

  MASS-LINK        4
RCHRES     OFLOW  OVOL   1                      RCHRES       INFLOW IVOL
  END MASS-LINK    4

  MASS-LINK        5
RCHRES     OFLOW  OVOL   2                      RCHRES       INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        6
PERLND     PWATER SURO         0.0833333        RCHRES       INFLOW IVOL
PERLND     PWATER IFWO         0.0833333        RCHRES       INFLOW IVOL
  END MASS-LINK    6

  MASS-LINK        7
PERLND     PWATER AGWO         0.0833333        RCHRES       INFLOW IVOL
  END MASS-LINK    7

  MASS-LINK        8
PERLND     PWATER PERO         0.0833333        COPY         INPUT  MEAN
  END MASS-LINK    8

  MASS-LINK        9
IMPLND     IWATER SURO         0.0833333        COPY         INPUT  MEAN
  END MASS-LINK    9

  MASS-LINK       10
PERLND     PWATER SURO         0.0833333        COPY         INPUT  MEAN
PERLND     PWATER IFWO         0.0833333        COPY         INPUT  MEAN
  END MASS-LINK   10

  MASS-LINK       11
PERLND     PWATER AGWO         0.0833333        COPY         INPUT  MEAN
  END MASS-LINK   11

  MASS-LINK       12
PERLND     PWATER AGWO         0.0833333        COPY         INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
COPY       OUTPUT MEAN                          RCHRES       INFLOW IVOL
  END MASS-LINK   13

  MASS-LINK       14
COPY       OUTPUT MEAN                          COPY         INPUT  MEAN
  END MASS-LINK   14

END MASS-LINK
END RUN
```