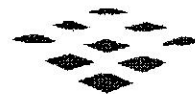


Keanland Park
Thurston County, WA

Stormwater Maintenance Agreement
March 2015



SCJ ALLIANCE
CONSULTING SERVICES

Stormwater Maintenance Agreement

Project Information

Project: **Keanland Park**
Prepared for: **Keanland Park HOA**
17348 Marsh St. SW
Tenino, WA 98589

Reviewing Agency

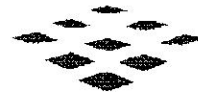
Jurisdiction: **Thurston County**

Project Representative

Prepared by: **SCJ Alliance**
8730 Tallon Lane NE, Suite 200
Lacey, WA 98516
360.352.1465
scjalliance.com

Contact: **Brandon Johnson, PE**

Project Reference: **SCJ #575.12**



SCJ ALLIANCE
CONSULTING SERVICES

1. STORMWATER OVERVIEW

Keeneland Park is a proposed Planned Rural Residential Development (PRRD) project in Thurston County. The proposal is to develop a total of 315 acres situated on seven legal lots into 91 single family residential lots and one 269 acre resource parcel.

The project is located on what is commonly known as Schneider's Prairie, it is bounded by the Elwanger PRRD to the north, Ayer Rd to the east, private property and the Deschutes River to the west and private property to the south.

The proposed development has been separated into two clusters, Keeneland Park North and Keeneland Park South. The north cluster is accessed off of Rixie Rd through the proposed Elwanger PRRD project. The south cluster is accessed off of Ayer Rd.

The stormwater management system generally consists of roadside swales to collect, convey and treat the stormwater. Flow control will be provided by either full dispersion or infiltration. Per the Hearing Examiner's Conditions of Approval, the stormwater system has been designed to meet the 1994 Thurston County Design and Erosion Control Manual (DDECM) with the exception of the Full Dispersion Best Management Practice (BMP) which has been designed per LID.11 of the 2009 DDECM.

Table 1. Development Coverage Summary

Resource Parcel	269 Acres (85.4%)
Developed Area	46 Acres (14.6%)
Total Area	315 Acres

Stormwater Treatment:

Stormwater treatment will be provided in each basin by roadside swales. In order to meet the requirements of the 1994 DDECM, check dams have been placed in the portions of the swales where the longitudinal slope exceed 4%.

Flow Control:

Full Dispersion

North Basins 1-4 as well as South Basins 1-2 will utilize Full Dispersion per LID.11 for runoff flow control. Each basin was modeled with the continuous runoff stormwater WWHM3 to determine the post development 100yr flow. The table below provides the calculated post development 100 year flows for each basin utilizing Full Dispersion:

Table 2. Full Dispersion Table

Basin	Post Development 100yr Flow	Dispersion Method
North Basin 1	0.18 CFS	Rock Pad
North Basin 2A	0.47 CFS	Dispersion Trench
North Basin 2B	0.16 CFS	Rock Pad
North Basin 3A	0.40 CFS	Dispersion Trench
North Basin 3B	0.47 CFS	Dispersion Trench
North Basin 4	0.10 CFS	Rock Pad
South Basin 1	0.33 CFS	Dispersion Trench
South Basin 2	0.35 CFS*	Dispersion Trench
South Basin 3	N/A	N/A
Off-Site Basin 1	1.90	N/A

See Appendix B for copies of the WWHM3 modeling for each basin.

Infiltration Pond

Flow control for South Basin 3 will be obtained via an infiltration pond. Per the hearing examiner's decision, the proposed pond was sized using Table 4.1 of the DDECM, with an infiltration rate of 2"/hr. Table 4.1 requires a minimum storage volume of 99,085 CF.

The proposed facility will have a bottom surface area of 14,928 square feet at elevation 190 and a top surface area of 38,635 square feet at elevation 195. This provides a total storage volume of 133,900 cubic feet. In addition to Table 4.1, the pond was modeled in WWHM3, where a maximum ponding depth of 3.3' was calculated.

APPENDIX A
STORMWATER FACILITY MAINTENANCE PROGRAM

Appendix V-C – Maintenance Guidelines

This appendix provides facility-specific maintenance standards. The standards are intended to provide conditions for determining, through inspection, if maintenance actions are required. Failure to meet these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, the inspection and maintenance schedules must be adjusted to minimize the length of time that a facility is in a condition that requires a maintenance action.

Instructions for Use of Maintenance Checklists

The following pages contain maintenance tables for most of the BMPs included in Volume V. Where private developers, rather than Thurston County staff, are responsible for facility maintenance, they should plan to complete a checklist for all system components on the following schedule:

- (M) Monthly from October through April.
- Annually, once in late summer (preferably September)
- (S) Storm-based, after any major storm (use 1 inch in 24 hours as a guideline).

The tables contained in this appendix may be used as checklists. Maintenance personnel may use photocopies of these pages and check off items inspected and problems noted during each inspection. Actions taken and corrective action recommended should also be noted.

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Table C-3A. Maintenance Checklist for Detention Ponds (BMP D.01), and Wetponds (BMP WP.02)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris buildup in pond.	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam, and coated paper.	Remove trash and debris and dispose as prescribed by Thurston County Department of Resource Stewardship.
M,S			Trash rack plugged or missing	Bar screen over outlet more than 25% covered by debris or missing.	Replace screen. Remove trash and debris and dispose as prescribed by City Waste Management Section.
M			Poisonous Vegetation	Any poisonous vegetation which may constitute a hazard to the public. Examples of poisonous vegetation include: tansy ragwort, poison oak, stinging nettles, devilsclub.	Remove poisonous vegetation. Do not spray chemicals on vegetation without obtaining guidance from the County.
M,S			Fire hazard or pollution	Presence of chemicals such as natural gas, oil, and gasoline, obnoxious color, odor, or sludge noted.	Find sources of pollution and eliminate them. Water is free from noticeable color, odor, or contamination.
M			Vegetation not growing or is overgrown	For grassy ponds, grass cover is sparse and weedy or is overgrown.	For grassy ponds, selectively thatch, aerate, and reseed ponds. Grass cutting unnecessary unless dictated by aesthetics. Contact the Thurston County Noxious Weed program for direction on invasive species such as purple loosestrife and reed canary grass. Pond bottoms shall have uniform dense coverage of desired plant species.
M			Rodent Holes	If the facility is constructed with a dam or berm, look for rodent holes or any evidence of water piping through the dam or berm.	Rodents destroyed and dam or berm repaired. Contact the Thurston County Public Health and Social Services Department for guidance.

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M			Insects	When insects such as wasps and hornets interfere with maintenance activities, or when mosquitoes become a nuisance.	Insects destroyed or removed from site. Contact Cooperative Extension Service for guidance.
A			Tree Growth	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, or equipment movements). If trees are not interfering with access, leave trees alone.	Trees do not hinder maintenance activities. Selectively cultivate trees such as alders for firewood. Remove species that are not part of recorded planting plan.
M	Side Slopes of Pond		Erosion on berms or at entrance/exit	Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
M	Storage Area		Sediment buildup in pond	Accumulated sediment that exceeds 10 percent of the designed pond depth. Buried or partially buried outlet structure probably indicates significant sediment deposits.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
A	Pond Dikes		Settlements	Any part of dike which has settled 4 inches lower than the design elevation.	Dike is built back to the design elevation.
A	Emergency Overflow/Spillway		Rock Missing	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Replace rocks to design standards.
A	Wet Pond		Permanent Water Volume	Check that pond has a permanent water volume and does not drain between storm events.	A permanent water volume is necessary to provide water quality treatment. If no water volume, pond lining needs to be evaluated.
One time	Emergency Overflow/Spillway		Overflow Missing	Side of pond has no area with large rocks to handle emergency overflows.	Contact County for guidance.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Table C-8. Maintenance Checklist for Compost Amended Soil for Post-Construction Soil Quality and Depth (BMP LID.02) and Compost-Amended Vegetated Filter Strip (BMP BF.06)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A	General		Soil media (maintain high organic soil content)	Vegetation not fully covering ground surface.	Re-mulch landscape beds with 2-3 inches of mulch until the vegetation fully closes over the ground surface
Ongoing				None. Preventative maintenance.	Return leaf fall and shredded woody materials from the landscape to the site as mulch.
Ongoing				None. Preventative maintenance.	On turf areas, "grasscycle" (mulch-mow or leave the clippings) to build turf health
Ongoing				None. Preventative maintenance.	Avoiding broadcast use of pesticides (bug and weed killers) like "weed & feed," which damage the soil life.
A				None. Preventative maintenance.	Where fertilization is needed (mainly turf and annual flower beds), a moderate fertilization program which relies on natural organic fertilizers (like compost) or slow release synthetic balanced fertilizers.
A			Compaction	Soils become waterlogged, do not appear to be infiltrating.	To remediate, aerate soil, till or further amend soil. If drainage is still slow, consider investigating alternative causes (e.g., high wet-season groundwater levels, low permeability soils). Also consider land use and protection from compacting activities. If areas are turf, aerate compacted areas and top dress them with 1/4 to 1/2 inch of compost to renovate them.

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Erosion/scouring	Areas of potential erosion are visible.	Take steps to repair or prevent erosion. Identify and address the causes of erosion.
A			Grass/vegetation	Less than 75% of planted vegetation is healthy with a generally good appearance.	Take appropriate maintenance actions (e.g., remove/replace plants)
M			Noxious weeds	Listed noxious vegetation is present. See Pierce County noxious weed list.	By law, noxious weeds must be removed and disposed immediately. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.
Q			Weeds	Weeds are present.	Remove and dispose of weed material. It is strongly encouraged that herbicides and pesticides not be used in order to protect water quality.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

- A = Annual (March or April preferred)
- M = Monthly (see schedule)
- S = After major storms.
- Q = Quarterly

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Table C-13. Maintenance Checklist for Catch Basins and Inlets

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	General		Trash and Debris	Trash, debris, and sediment in or on basin	No trash or debris located immediately in front of catch basin opening. Grate is kept clean and allows water to enter.
M				Sediment or debris (in the basin) that exceeds 1/3 the depth (1-ft minimum storage remaining) from the bottom of basin to invert of the lowest pipe into or out of the basin.	No sediment or debris in the catch basin. Catch basin is dug out and clean.
M,S				Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
M			Structural Damage to Frame and/or Top Slab	Corner of frame extends more than 3/4 inch past curb face into the street (if applicable).	Frame is even with curb.
M				Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
M				Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached.	Frame is sitting flush on the riser rings or top slab and firmly attached.
A			Cracks in Basin Walls/ Bottom	Cracks wider than 1/2 inch and longer than 3 feet, any evidence of soil particles entering catch basin through cracks, or maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
A				Cracks wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	No cracks more than 1/4 inch wide at the joint of inlet/outlet pipe.

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Settlement/ Misalignment	Basin has settled more than 1 inch or has rotated more than 2 inches out of alignment.	Basin replaced or repaired to design standards. Contact a professional engineer for evaluation.
A			Illicit discharges to Catch Basin	Look for connections from adjacent businesses, residences that are not part of drainage plan. If detected identify source of connection and notify Thurston County.	No connections to Catch Basins are allowed that are not part of the approved plans or authorized by permit from Thurston County.
M			Vegetation	Vegetation growing across and blocking more than 10 percent of the basin opening.	No vegetation blocking opening to basin.
M			Vegetation	Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.	No vegetation or root growth present.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Table C-14. Maintenance Checklist for Energy Dissipators

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A	Rock pad		Missing or moved rock	Only one layer of rock exists above native soil in area 5 square feet or larger, or any exposure of native soil.	Replace rocks to design standard.
A	Rock pad		Vegetation	Vegetation growth in and around dispersion pad area prevents proper inspection or interferes with flows.	Remove vegetation growth and plants that are not part of approved planting plan.
A	Rock-filled trench for discharge from pond		Missing or moved rock	Trench is not full of rock.	Add large rock (~30 lbs each) so that rock is visible above edge of trench.
M	Dispersion trench		Pipe plugged with sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/flushed.
M			Perforations plugged	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Clean or replace perforated pipe.
M,S			Not discharging water properly	Visual evidence of water discharging at concentrated points along trench (under normal conditions, there should be a "sheet flow" of water along trench.) Intent is to prevent erosion damage.	Trench must be rebuilt or redesigned to standards. Pipe is probably plugged or damaged and needs replacement.
M,S			Water flows out top of "distributor" catch basin	Maintenance person observes water flowing out during any storm less than the design storm or it is causing or appears likely to cause damage.	Facility must be rebuilt or redesigned to standards. Pipe is probably plugged or damaged and needs replacement.
M,S			Receiving area over-saturated	Water in receiving area is causing or has potential of causing landslide.	Stabilize slope with grass or other vegetation, or rock if condition is severe.
A	Gabions		Damaged mesh	Mesh of gabion broken, twisted or deformed so structure is weakened or rock may fall out.	Mesh is intact, no rock missing.
A			Corrosion	Gabion mesh shows corrosion through more than ¼ of its gage	All gabion mesh capable of containing rock and retaining designed form.
A			Collapsed or deformed baskets	Gabion basket shape deformed due to any cause.	All gabion baskets intact, structure stands as designed.

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
A			Missing rock	Any rock missing that could cause gabion to lose structural integrity	No rock missing.
A	Manhole/Chamber		Worn or damaged post, baffles or side of chamber	Structure dissipating flow deteriorates to ½ of original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Structure is in no danger of failing.
A			Damage to wall, frame, bottom, and/or top slab	Cracks wider than ½-inch or any evidence of soil entering the structure through cracks. Or maintenance inspection personnel determine that the structure is not structurally sound.	Manhole/chamber is sealed and structurally sound.
A			Damaged pipe joints.	Cracks wider than ½-inch at the joint of the inlet/outlet pipes or any evidence of soil entering the structure at the joint of the inlet/outlet pipes.	No soil or water enters and no water discharges at the joint of inlet/outlet pipes.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

- A = Annual (March or April preferred)
- M = Monthly (see schedule)
- S = After major storms

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Table C-17. Maintenance Checklist for Access Roads/Easements

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
One Time	General		No access road exists	If ponds or other drainage system features needing maintenance by motorized equipment are present, either an access road or access from public streets is required.	Determine whether an easement to drainage feature exists. If yes, obtain County permits and construct gravel (or equal) access road. If not report lack of easement to County attention.
M			Block roadway	Debris which could damage vehicle tires (glass or metal)	Roadway free of debris which could damage tires.
A				Any obstructions which reduce clearance above road surface to less than 14 feet.	Roadway overhead clear to 14 feet high.
A				Any obstructions restricting access to less than 15 feet width.	Obstruction removed to allow at least a 15 foot wide access.
A	Easement Markers		Easement Not Clearly Identified	Check that easement markers are in place identifying limits of easement	Easement markers installed at 100-ft intervals and changes in direction along easement lines.
A,S	Road surface		Settlement, potholes, mush spots, ruts	When any surface exceeds 6-inches in depth and 6 square feet in area. In general, any surface defect which hinders or prevents maintenance access.	Road surface uniformly smooth with no evidence of settlement, potholes, mush spots, or ruts. Occasionally application of additional gravel or pit run rock will be needed.
M			Vegetation in road surface	Woody growth that could block vehicular access. Excessive weed cover.	Remove woody growth at early stage to prevent blockage. Cut back weeds if they begin to encroach on road surface.
M,S	Shoulders and ditches		Erosion damage	Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep	Shoulder free of erosion and matching the surrounding road.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Table C-18. Conveyance Pipes and Ditches

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M,S	Pipes		Sediment & Debris	Accumulated sediment that exceeds 20% of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
M			Vegetation	Vegetation that reduces free movement of water through pipes.	All vegetation removed so water flows freely through pipes.
A			Damaged (rusted, bent, or crushed)	Protective coating is damaged, rust is causing more than 50% deterioration to any part of pipe.	Pipe repaired or replaced.
M				Any dent that significantly impedes flow (i.e. decreases the cross section area of pipe by more than 20%)	Pipe repaired or replaced
M				Pipe has major cracks or tears allowing groundwater leakage.	Pipe repaired or replaced.
M,S	Open ditches		Trash & debris	Dumping of yard wastes such as grass clippings and branches into basin. Unsightly accumulation of non-degradable materials such as glass, plastic, metal, foam and coated paper.	Remove trash and debris and dispose as prescribed by solid waste regulations.
M			Sediment buildup	Accumulated sediment that exceeds 20% of the design depth.	Ditch cleared of all sediment and debris so that it matches design.
A			Vegetation	Vegetation (e.g. weedy shrubs or saplings) that reduces free movements of water through ditches.	Water flows freely through ditches. Grass vegetation should be left alone.
M			Erosion on	Check around inlets and outlets for signs of erosion. Check berms for signs of sliding or settling. Action is needed where eroded damage over 2 inches deep and where there is potential for continued erosion.	Find causes of erosion and eliminate them. Then slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
A			Rock lining out of place or missing (if applicable)	Maintenance person can see native soil beneath the rock lining.	Replace rocks to design standard.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

THURSTON COUNTY DRAINAGE DESIGN AND EROSION CONTROL MANUAL

Table C-21. Maintenance Checklist for Dispersion BMPs (BMP LID.05,06,07,11,12,13)

Frequency	Drainage Systems Feature	√	Problem	Conditions to Check For	Conditions that Shall Exist
M	General		Vegetation management	Any presence invasive plants, poison ivy, poison oak or other poisonous vegetation or insect nests.	No poisonous vegetation or insect nests present in landscaped area.
M			Disturbance	Area designated for dispersion is no encroached upon vegetation is healthy and functioning.	Restore disturbed native vegetation areas (see BMP LID.01). Remove encroachments.
M,S			Trash or litter	In general there should be no evidence of visual dumping.	Remove/dispose of waste in accordance with solid waste regulations.
M,S			Erosion of ground surface	Noticeable rills or channeling is seen in dispersion areas.	Causes of erosion are identified and steps taken to slow down/spread out the water. Eroded areas are filled, contoured, and seeded.
A	Drainage		Bypass flow	Dispersed flow concentrates and isn't spread evening through dispersion area.	No evidence of dispersed flow bypassing dispersion area.
M			Inlets & Outlets	Dispersion pads and spreaders functioning correctly. See outfall maintenance checklist.	Dispersion device functions as designed.
A	Controls		Signage & fencing	Signs removed, fencing damaged or missing.	Restore fencing & signage per design.
M,S	Sedimentation		Sediment buildup	Sediment buildup around outlet of dispersion device.	Hand remove sediment buildup and replant disturbed area.

If you are unsure whether a problem exists, please contact Thurston County and ask for technical assistance.

Key:

A = Annual (March or April preferred)

M = Monthly (see schedule)

S = After major storms

The maintenance activities at Keanland Park and Keanland Park II will consist of the following:

Mowing KP pond (2 hours @ \$75 per hour= 150, twice per year)	300
Mowing KPII pond (1 hour @ \$75 per hour = 75 twice per year)	75
Mowing Swales (7 hours @ 75 per hour = 525 twice per year)	1,050
Brush removal at storm outlets (16 hours @ 15 per hour annually)	240
<u>Erosion repair as needed first year</u>	<u>500</u>
ESTIMATED TOTAL MAINTENANCE	\$2,165

*Estimated
Budget
Items?*

**THURSTON COUNTY
FACILITY SUMMARY FORM**

Complete one (1) for each facility on the project site including flow control and water quality treatment facilities (BMPs) such as, but not limited to: detention ponds, vaults, or tanks; infiltration ponds, trenches, swales, or vaults; bioretention facilities (rain gardens, bioretention swales/slopes); biofiltration BMPs (filter strip, biofiltration swale); oil/water separators; wet ponds; constructed wetlands; dispersion areas & flow spreaders; StormFilters™ & other proprietary devices; sand filters; etc. Attach 8 1/2 x 11 sketch showing location of facility. Applicant may prepare one copy of pages 1 to 4 for the project and then attach multiple copies of pages 5 & 6 for each separate facility.

Facility Name or Identifier (e.g., Pond A): KEANLAND PARK I

Total Number of Facilities Associated with Project: 9
(For which a Facility Summary Form is being prepared)

Name of Road or Street to Access Facility: AYER ROAD

Name of Nearest Major Cross Street: 83RD

Hearings Examiner Case Number: _____

Thurston County Project No./Bldg Permit No.: 2004102027

Parcel Number(s): 11707310000, 11707310100, 1718200000, 11718120200,
11718130000, 1718320000, 11718120102

To be completed by Utility Staff:

Utility Facility Number _____

Project Number (num) _____

Parcel Number Status, (num, 1ch) _____
(0, Known; 1, Public; 2 Unknown; 3, Unassigned)

Basin and Subbasin: (num, 6ch) _____
(2ch for basin, 2ch for subbasin, 2ch future)

Part 1 - Project Name and Proponent

Project Name: KEANLAND PARK I

Project Owner: HANSEN/LUFCO LLC

Project Contact: TODD HANSEN

Address: 17438 MARSH RD SW, TENINO, WA 98589

Phone: 360.534.0360 X 102

Project Proponent: (if different) _____

Address: _____

Phone: _____

Project Engineer: BRANDON JOHNSON, PE

Firm: SCJ ALLIANCE Phone: 360.352.1465

Part 2 - Project Location

Section SEC. 7 & 18

Township 17N

Range 1W

Names and Addresses of Adjacent Property Owners: (attach add'l sheet if required)

SEE ATTACHED

Part 3 - Type of Permit Application

Type of permit (e.g., Building, Plat, etc.): PLAT

Other Permits (circle)

WDFW HPA

COE 404

COE Wetlands

DOE Dam Safety

FEMA Floodplain

Shoreline Mgmt

Rockery/Retaining Wall

Encroachment

Grading

NPDES Construction Storm

NPDES Industrial

Forest Practices/Clearing

Other _____

Other Agencies (Federal, State, Local, etc.) that have had or will review this Drainage and Erosion Control Plan:

NONE

Part 4 - Proposed Project Description

What stream/lake/saltwater basin is this project in (e.g., Salmon, Green Cove, Woodland):

DESCHUTES

Project Area, acres (total area of all parcels) 315 ACRES

Project Area Disturbed, acres (total of all areas disturbed by project) 46 ACRES
(Include all area cleared, graded, etc. as part of this project)

Onsite Impervious Surfaces: (excluding offsite public / private street frontage)

Existing Impervious Surface, acres: 0 ACRES

Replaced Impervious Surface, acres: 1.2 ACRES

Existing Impervious Converted to Landscape, acres: 0 ACRES

New Impervious Surface, acres: 0 ACRES

Total Impervious, acres (existing, new, and replaced): 5.14 ACRES

Zoning: RRR 1/5

Onsite:

Residential Subdivision:

Number of Lots: 91

Lot size (average), acres: 13,000 SF

Building Permit/Commercial Plat:

Building(s) Footprint, acres: _____

Concrete Paving, acres: _____

Gravel Surface, acres: _____

Lattice Block or Porous Paving, acres: _____

New Public Roads (including gravel shoulder), acres: 1.20 ACRES

New Private Roads (including gravel shoulder), acres: 3.94 ACRES

Frontage Improvements (including gravel shoulder), acres: _____

Existing road frontage to center of right-of-way, acres: _____

Part 5 - Pre-Developed Project Site Characteristics

Stream through site, y/n: YES

Name: AYERS CREEK

DNR Type: _____

Type of feature this facility discharges to (i.e., lake, stream, intermittent stream, pothole, roadside ditch, sheet flow to adjacent private property, etc):

Swales, Ravines, y/n: NO

Steep slopes, (steeper than 15%) y/n: YES

Erosion hazard, y/n: NO
(soil types classified "highly erodible" by NRCS soil survey)

100 yr. Floodplain, y/n: YES

Lakes or Wetlands, y/n: YES

Seeps/Springs, y/n: NO

High Groundwater Table, y/n: YES
(depth to seasonal high groundwater table less than 5-feet)

Wellhead Protection or Aquifer Sensitive Area, y/n: NO

Other: _____

Part 6 - Facility Description

Facility Type: **FULL DISPERSION**

Facility Description: **NORTH BASIN #1 - DISPERSION**

Total Area Tributary to Facility Including Offsite (acres): **0.36**

Total Onsite Area Tributary to Facility (acres): **0.36**

Design Impervious Area Tributary to Facility (acres): **0.22**

Design Landscaped Area Tributary to Facility (acres): **0.14**

Design Native Vegetation Area Tributary to Facility (acres): **0**

Design Total Tributary Area to Facility (acres): **0.36**

Water Quality Design Volume: **N/A**

Water Quality Design Flow: **0.18 CFS**

100 Year return interval, 24-hr Design Flow: **0.18 CFS**

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate _____ in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: _____

Designed for Infiltration Treatment Y/N: _____

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
Spillway _____ Elev. _____ Max Elev. _____
Pump(s) _____ Model/Type: _____ Rating: _____
Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
Design Maximum pond depth: _____ ft
Pond Volume at Max design water level: _____ cubic feet
Overflow water elevation: _____ ft (msl)
Sediment storage volume: _____ ft (depth below outlet)

Part 6 - Facility Description

Facility Type: FULL DISPERSION

Facility Description: NORTH BASIN #2A - DISPERSION

Total Area Tributary to Facility Including Offsite (acres): 0.91

Total Onsite Area Tributary to Facility (acres): 0.91

Design Impervious Area Tributary to Facility (acres): 0.54

Design Landscaped Area Tributary to Facility (acres): 0.37

Design Native Vegetation Area Tributary to Facility (acres): 0

Design Total Tributary Area to Facility (acres): 0.91

Water Quality Design Volume: N/A

Water Quality Design Flow: 0.47 CFS

100 Year return interval, 24-hr Design Flow: 0.47 CFS

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate _____ in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: _____

Designed for Infiltration Treatment Y/N: _____

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
 Spillway _____ Elev. _____ Max Elev. _____
 Pump(s) _____ Model/Type: _____ Rating: _____
 Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
 Design Maximum pond depth: _____ ft
 Pond Volume at Max design water level: _____ cubic feet
 Overflow water elevation: _____ ft (msl)
 Sediment storage volume: _____ ft (depth below outlet)

Part 6 - Facility Description

Facility Type: FULL DISPERSION

Facility Description: NORTH BASIN #2B - DISPERSION

Total Area Tributary to Facility Including Offsite (acres): 0.24

Total Onsite Area Tributary to Facility (acres): 0.24

Design Impervious Area Tributary to Facility (acres): 0.16

Design Landscaped Area Tributary to Facility (acres): 0.08

Design Native Vegetation Area Tributary to Facility (acres): 0

Design Total Tributary Area to Facility (acres): 0.24

Water Quality Design Volume: N/A

Water Quality Design Flow: 0.16 CFS

100 Year return interval, 24-hr Design Flow: 0.16 CFS

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate _____ in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: _____

Designed for Infiltration Treatment Y/N: _____

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
Spillway _____ Elev. _____ Max Elev. _____
Pump(s) _____ Model/Type: _____ Rating: _____
Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
Design Maximum pond depth: _____ ft
Pond Volume at Max design water level: _____ cubic feet
Overflow water elevation: _____ ft (msl)
Sediment storage volume: _____ ft (depth below outlet)

Part 6 - Facility Description

Facility Type: FULL DISPERSION

Facility Description: NORTH BASIN #3A - DISPERSION

Total Area Tributary to Facility Including Offsite (acres): 1.20

Total Onsite Area Tributary to Facility (acres): 1.20

Design Impervious Area Tributary to Facility (acres): 0.43

Design Landscaped Area Tributary to Facility (acres): 0.77

Design Native Vegetation Area Tributary to Facility (acres): 0

Design Total Tributary Area to Facility (acres): 1.20

Water Quality Design Volume: N/A

Water Quality Design Flow: 0.40 CFS

100 Year return interval, 24-hr Design Flow: 0.40 CFS

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate _____ in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: _____

Designed for Infiltration Treatment Y/N: _____

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
Spillway _____ Elev. _____ Max Elev. _____
Pump(s) _____ Model/Type: _____ Rating: _____
Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
Design Maximum pond depth: _____ ft
Pond Volume at Max design water level: _____ cubic feet
Overflow water elevation: _____ ft (msl)
Sediment storage volume: _____ ft (depth below outlet)

Part 6 - Facility Description

Facility Type: FULL DISPERSION

Facility Description: NORTH BASIN #3B - DISPERSION

Total Area Tributary to Facility Including Offsite (acres): 1.74

Total Onsite Area Tributary to Facility (acres): 1.74

Design Impervious Area Tributary to Facility (acres): 0.47

Design Landscaped Area Tributary to Facility (acres): 1.27

Design Native Vegetation Area Tributary to Facility (acres): 0

Design Total Tributary Area to Facility (acres): 1.74

Water Quality Design Volume: N/A

Water Quality Design Flow: 0.47 CFS

100 Year return interval, 24-hr Design Flow: 0.47 CFS

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate _____ in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: _____

Designed for Infiltration Treatment Y/N: _____

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
 Spillway _____ Elev. _____ Max Elev. _____
 Pump(s) _____ Model/Type: _____ Rating: _____
 Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
 Design Maximum pond depth: _____ ft
 Pond Volume at Max design water level: _____ cubic feet
 Overflow water elevation: _____ ft (msl)
 Sediment storage volume: _____ ft (depth below outlet)

Part 6 - Facility Description

Facility Type: FULL DISPERSION

Facility Description: NORTH BASIN #4 - DISPERSION

Total Area Tributary to Facility Including Offsite (acres): 0.18

Total Onsite Area Tributary to Facility (acres): 0.18

Design Impervious Area Tributary to Facility (acres): 0.13

Design Landscaped Area Tributary to Facility (acres): 0.05

Design Native Vegetation Area Tributary to Facility (acres): 0

Design Total Tributary Area to Facility (acres): 0.18

Water Quality Design Volume: N/A

Water Quality Design Flow: 0.10 CFS

100 Year return interval, 24-hr Design Flow: 0.10 CFS

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate _____ in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: _____

Designed for Infiltration Treatment Y/N: _____

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
 Spillway _____ Elev. _____ Max Elev. _____
 Pump(s) _____ Model/Type: _____ Rating: _____
 Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
 Design Maximum pond depth: _____ ft
 Pond Volume at Max design water level: _____ cubic feet
 Overflow water elevation: _____ ft (msl)
 Sediment storage volume: _____ ft (depth below outlet)

Part 6 - Facility Description

Facility Type: **FULL DISPERSION**

Facility Description: **SOUTH BASIN #1 - DISPERSION**

Total Area Tributary to Facility Including Offsite (acres): **0.93**

Total Onsite Area Tributary to Facility (acres): **0.93**

Design Impervious Area Tributary to Facility (acres): **0.34**

Design Landscaped Area Tributary to Facility (acres): **0.0.59**

Design Native Vegetation Area Tributary to Facility (acres): **0**

Design Total Tributary Area to Facility (acres): **0.93**

Water Quality Design Volume: **N/A**

Water Quality Design Flow: **0.33 CFS**

100 Year return interval, 24-hr Design Flow: **0.33 CFS**

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate _____ in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: _____

Designed for Infiltration Treatment Y/N: _____

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
Spillway _____ Elev. _____ Max Elev. _____
Pump(s) _____ Model/Type: _____ Rating: _____
Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
Design Maximum pond depth: _____ ft
Pond Volume at Max design water level: _____ cubic feet
Overflow water elevation: _____ ft (msl)
Sediment storage volume: _____ ft (depth below outlet)

Part 6 - Facility Description

Facility Type: FULL DISPERSION

Facility Description: SOUTH BASIN #2 - DISPERSION

Total Area Tributary to Facility Including Offsite (acres): 0.59

Total Onsite Area Tributary to Facility (acres): 0.59

Design Impervious Area Tributary to Facility (acres): 0.34

Design Landscaped Area Tributary to Facility (acres): 0.25

Design Native Vegetation Area Tributary to Facility (acres): 0

Design Total Tributary Area to Facility (acres): 0.59

Water Quality Design Volume: N/A

Water Quality Design Flow: 0.35 CFS

100 Year return interval, 24-hr Design Flow: 0.35 CFS

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate _____ in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: _____

Designed for Infiltration Treatment Y/N: _____

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
Spillway _____ Elev. _____ Max Elev. _____
Pump(s) _____ Model/Type: _____ Rating: _____
Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
Design Maximum pond depth: _____ ft
Pond Volume at Max design water level: _____ cubic feet
Overflow water elevation: _____ ft (msl)
Sediment storage volume: _____ ft (depth below outlet)

Part 6 - Facility Description

Facility Type: INFILTRATION POND

Facility Description: SOUTH BASIN #3 - INFILTRATION POND

Total Area Tributary to Facility Including Offsite (acres): 21.02

Total Onsite Area Tributary to Facility (acres): 20.04

Design Impervious Area Tributary to Facility (acres): 6.65

Design Landscaped Area Tributary to Facility (acres): 14.37

Design Native Vegetation Area Tributary to Facility (acres): 0

Design Total Tributary Area to Facility (acres): 21.02

Water Quality Design Volume: N/A

Water Quality Design Flow: N/A

100 Year return interval, 24-hr Design Flow: N/A

Part 7 - Release to Groundwater (if applicable)

Design Infiltration Rate 2 in/hr

Average Annual Infiltration per WWHM _____

Designed for 100% Infiltration Y/N: YES

Designed for Infiltration Treatment Y/N: NO

Part 8 - Release to Surface Water (if applicable)

Discharge Structure: (check all that apply)

Single orifice _____ Elev. _____ Dia. _____

Multiple orifice _____ Elev. 1 _____ Dia. _____

Elev. 2 _____ Dia. _____

Elev. 3 _____ Dia. _____

Weir _____ Elev. _____ Type _____

Overflow Weir _____ Elev. _____ Dia/Width: _____
 Spillway _____ Elev. _____ Max Elev. _____
 Pump(s) _____ Model/Type: _____ Rating: _____
 Other _____

Discharge to surface water:

<u>Return Period</u>	<u>Pre Developed:</u>	<u>Post Developed:</u>
2 year:	_____	_____
5 year:	_____	_____
10 year:	_____	_____
25 year:	_____	_____
50 year:	_____	_____
100 year:	_____	_____

Pond Information:

Design Max surface water elevation: _____ ft (msl)
 Design Maximum pond depth: _____ ft
 Pond Volume at Max design water level: _____ cubic feet
 Overflow water elevation: _____ ft (msl)
 Sediment storage volume: _____ ft (depth below outlet)

APPENDIX B
POLLUTION SOURCE CONTROL PROGRAM
