



King County

Department of Natural Resources and Parks
King Street Center, KSC-NR-5700
201 South Jackson Street
Seattle, WA 98104-3855

July 28, 2021

Shawn McKone, P.E.
Municipal Facility Manager
Washington State Department of Ecology
Northwest Regional Office
PO Box 330316
Shoreline, WA 98133-9716

Vashon Wastewater Treatment Plant, Application for Renewal of the NPDES Permit (#WA0022527)

Dear Mr. McKone:

Enclosed please find the application for renewal of the National Pollutant Discharge Elimination System (NPDES) permit #WA0022527 for King County's Vashon Wastewater Treatment Plant. This application package includes the following materials as required by the federal permit application form, requirements of the currently effective NPDES permit, and supplemental information provided in support of the application:

- Completed Environmental Protection Agency (EPA) NPDES Form 2A Parts with accompanying maps, treatment plant schematics, and supplemental data attachments.
- Supplemental effluent dilution modeling report for the Vashon effluent outfall to Puget Sound.

Additionally, King County requests that Ecology convert the current BOD₅-based effluent limitations and monitoring requirements to CBOD₅-based requirements to provide consistency with the other King County wastewater facilities, and because it provides a similar measure of plant performance as the BOD₅-based measures. Associated with this request, King County would appreciate Ecology's consideration of an attached memorandum and proposed approach to CBOD₅ monitoring to assess loading relative to the plant's design BOD₅ treatment capacity. We also are available to discuss these requests, and any other potential permit modifications that may be considered for the renewal of the NPDES permit.

Shawn McKone

July 28, 2021

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Please contact Wastewater Treatment Division (WTD) Director Kamuron Gurol at 206-263-5767 or kgurol@kingcounty.gov; or WTD NPDES Permit Administrator Jeff Lafer at 206-477-6315 or jeff.lafer@kingcounty.gov if you have any questions regarding the NPDES permit application.

Sincerely,

DocuSigned by:



1BD15B1B73AE4A0...

Christie True, Director

King County Department of Natural Resources and Parks

Attachment: (1) July 8, 2021, Memorandum to Ecology

Enclosure: NPDES permit application package

cc: Kamuron Gurol, Division Director, Wastewater Treatment Division (WTD), Department of Natural Resources and Parks (DNRP)
Robert Waddle, Operations Manager, WTD, DNRP
Jeff Lafer, NPDES Permit Administrator, WTD, DNRP
Laura Fricke, Municipal Unit Supervisor, Washington State Department of Ecology, Northwest Regional Office



King County

Department of Natural Resources and Parks

Wastewater Treatment Division

South Treatment Plant
1200 Monster Road SW
Renton, WA 98057

MEMORANDUM

Shawn McKone, P.E.
Municipal Facilities Manager
Washington State Department of Ecology
Northwest Regional Office
PO Box 330316
Shoreline, WA 98133-9716

July 8, 2021

Vashon Treatment Plant NPDES Permit (WA0022527) – Proposed Conversion of BOD₅ Effluent Limits to CBOD₅, and Monitoring Approach

King County proposes to convert the existing monthly and weekly effluent BOD₅ limits, and the monthly 85% BOD₅ removal requirement, for the Vashon NPDES permit to equivalent limits based on CBOD₅ (i.e., weekly 40-mg/L, monthly 25-mg/L). The current NPDES permits for South Plant and West Point are already based on CBOD₅. King County supports analysis of CBOD₅ because it provides a better indicator of overall removal performance since it is less affected by any potential confounding of the data by recycle streams containing nitrogenous oxygen demand.

Condition S4 of the permit, which addresses the need to plan for maintaining capacity, is based on comparing the influent load to a maximum month capacity rating of 671-lbs/day based on influent BOD₅. King County understands that Ecology can only change the capacity rating to be based on CBOD₅ through the submittal and approval of an engineering analysis of the treatment plant's capacity based on CBOD₅. Accordingly, King County expects that concurrent monitoring for both BOD₅ and CBOD₅ would be required in the renewed permit to evaluate compliance with both the effluent limits and S4 requirements.

The current inflow BOD₅ loading to the Vashon treatment plant is stable and below the design capacity, and the service area loading is not expected to approach either of the S4 thresholds of 85% of capacity (570 lbs/day), or design capacity, within the next five years. Therefore, concurrent BOD₅ and CBOD₅ monitoring is unnecessary to evaluate the plant inflow loading status for the foreseeable future. Consequently, King County proposes that instead of performing influent BOD₅ monitoring to address S4, the influent CBOD₅ monitoring data would be sufficient to estimate the BOD₅ loading from the existing empirical influent CBOD₅:BOD₅ ratio.

Ecology has stated that effluent CBOD₅ is typically approximately 85% of effluent BOD₅ at treatment plants in Washington State and has used this data in other NPDES permits to convert effluent water quality limits from BOD₅ to CBOD₅. Instead of relying on the 85% effluent ratio for an influent ratio estimate, we tested the Vashon influent for CBOD₅ and BOD₅ from 4/21/2021 to 6/16/2021 (see Table 1 for the data results). The average influent CBOD₅/BOD₅ ratio for that data was 88%. Therefore, King County proposes to use an 88% CBOD₅/BOD₅ conversion factor throughout the next permit cycle to estimate the influent BOD₅ loading for evaluation to the S4 requirements.

This proposal would eliminate the need to perform concurrent influent and effluent BOD₅ testing which will help to reduce unnecessary lab work while providing an equivalent level of information on effluent quality and performance. King County would support a permit condition that requires additional evaluation, if the estimated influent Vashon BOD₅ loading and trending indicate that either of the S4 thresholds related to rated capacity are reached. A suitable condition could include additional influent testing for both CBOD₅ and BOD₅ to evaluate how well the 88% ratio reflects the actual conditions, and a commitment to initiate the capacity evaluation and planning process.

Sincerely,

DocuSigned by:

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Rick Butler, Process Control Supervisor
Wastewater Treatment Division
King County Department of Natural Resources and Parks

cc: Robert Waddle, Operations Manager, Wastewater Treatment Division (WTD),
Department of Natural Resources and Parks (DNRP)
Jeff Lafer, NPDES Permit Administrator, WTD, DNRP
Mathew Macdonald, Wastewater Process Engineer, WTD, DNRP

Table 1. Vashon Treatment Plant influent CBOD₅ and BOD₅ Data

	Influent BOD (mg/l)	Influent CBOD (mg/l)	CBOD/BOD
4/21/2021	393	259	65.9%
4/22/2021	360	340	94.4%
4/27/2021	402	365	90.8%
4/28/2021	352	299	84.9%
5/4/2021	445	406	91.2%
5/5/2021	305	314	103.0%
5/11/2021	510	390	76.5%
5/12/2021	406	390	96.1%
5/18/2021	331	319	96.4%
5/19/2021	394	353	89.6%
5/25/2021	627	508	81.0%
5/26/2021	540	421	78.0%
6/1/2021	431	399	92.6%
6/2/2021	450	419	93.1%
6/8/2021	474	390	82.3%
6/9/2021	460	389	84.6%
6/15/2021	331	353	106.6%
6/16/2021	379	310	81.8%
Average	421.7	368.0	88.3%

Vashon Wastewater Treatment Plant

Application for Renewal of the NPDES Permit (WA0022527)



King County Department of Natural Resources and Parks
Wastewater Treatment Division

July 2021

Vashon Wastewater Treatment Plant
Application for Renewal of the NPDES Permit (WA0022527)
July 2021

Table of Contents

1. NPDES Form 2A (including maps, treatment plant schematics, and supplemental data attachments)
2. Effluent Dilution Modeling for Vashon Treatment Plant Outfall

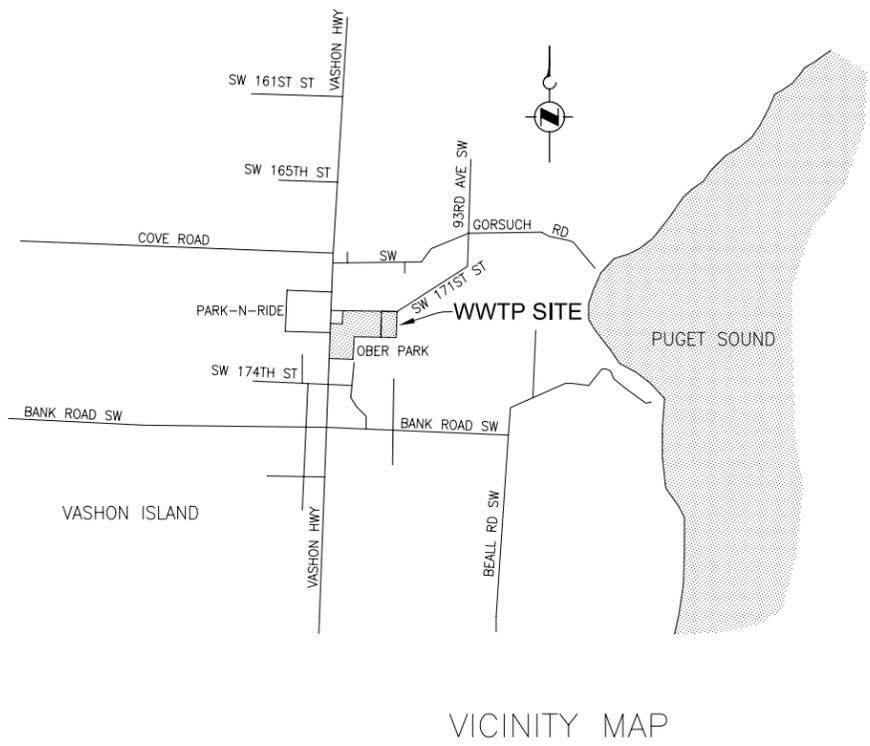
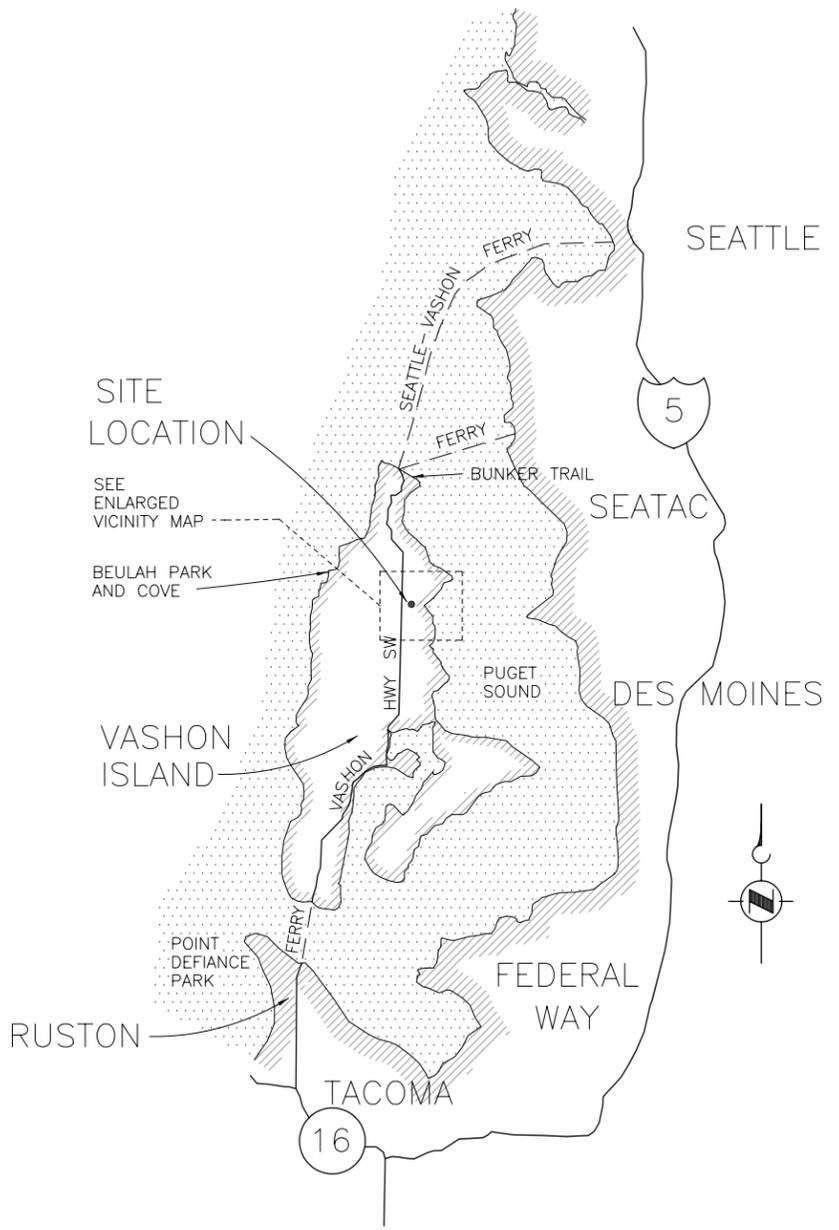
Attachment 1

NPDES Form 2A

(including maps, treatment plant schematics, and
supplemental data attachments)

Vashon Wastewater Treatment Plant
Application for Renewal of the NPDES Permit (WA0022527)
(July 2021)

Path: \\kcmsefp1\data\CADD\2030013\RecordDrawings\VASHON\CONTR File name: KAA11G01 Plot date: Jan 10, 2008-03:02:43pm CAD User: jesse.forsythe
 Xref File name: VICMAP LOC



ONE INCH
 AT FULL SIZE, IF NOT ONE
 INCH SCALE ACCORDINGLY
 LOC. VICMAP

No.	REVISION	BY	APP'D	DATE

Tetra Tech/KCM, Inc.
 1917 First Avenue
 Seattle, Washington 98101
 206-443-5300 Fax: 206-443-5372

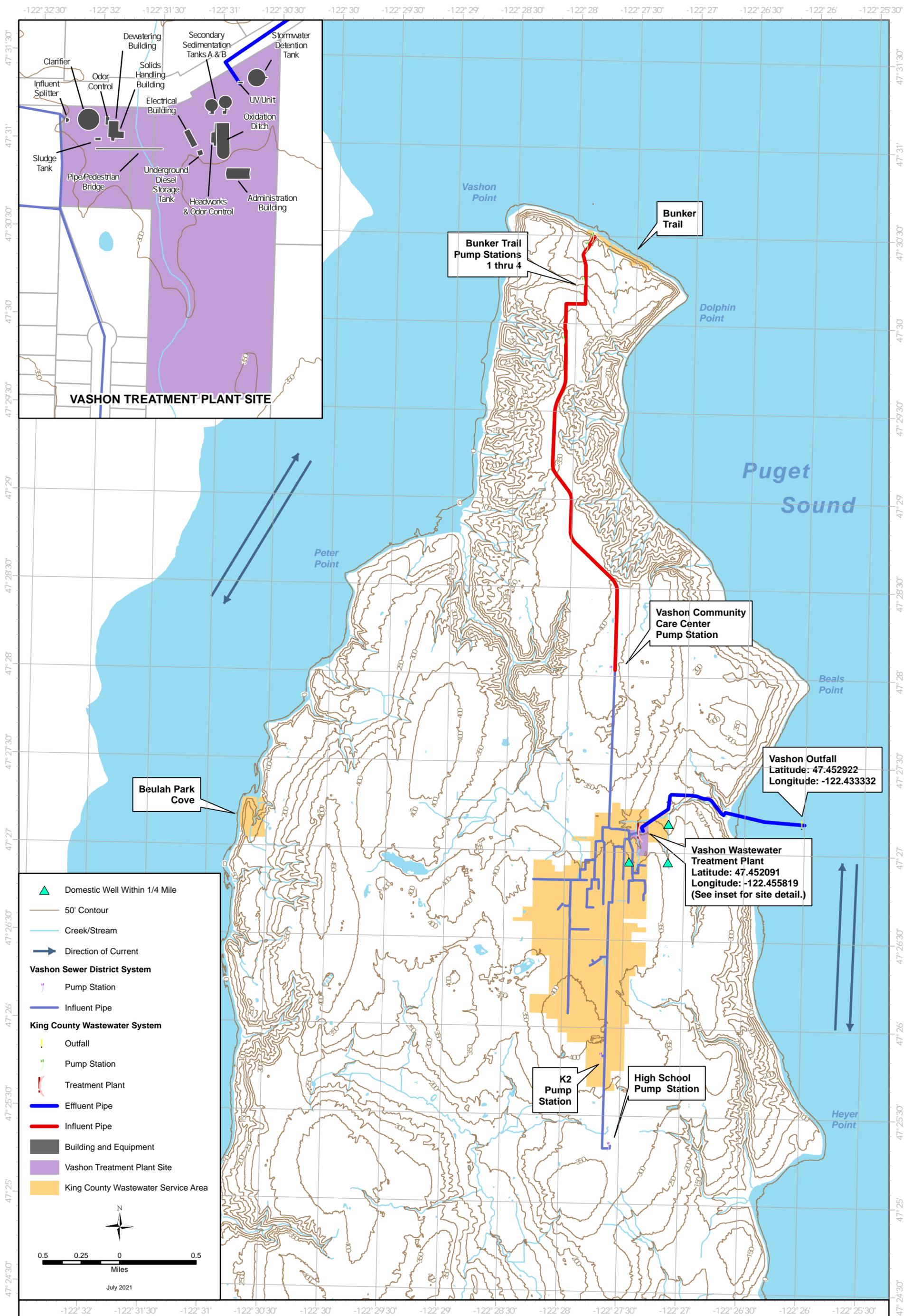


DESIGNED:	CHECKED:
DRAWN:	SCALE:
RECOMMENDED:	NO SCALE
APPROVED:	CONTRACT NO: C43003C

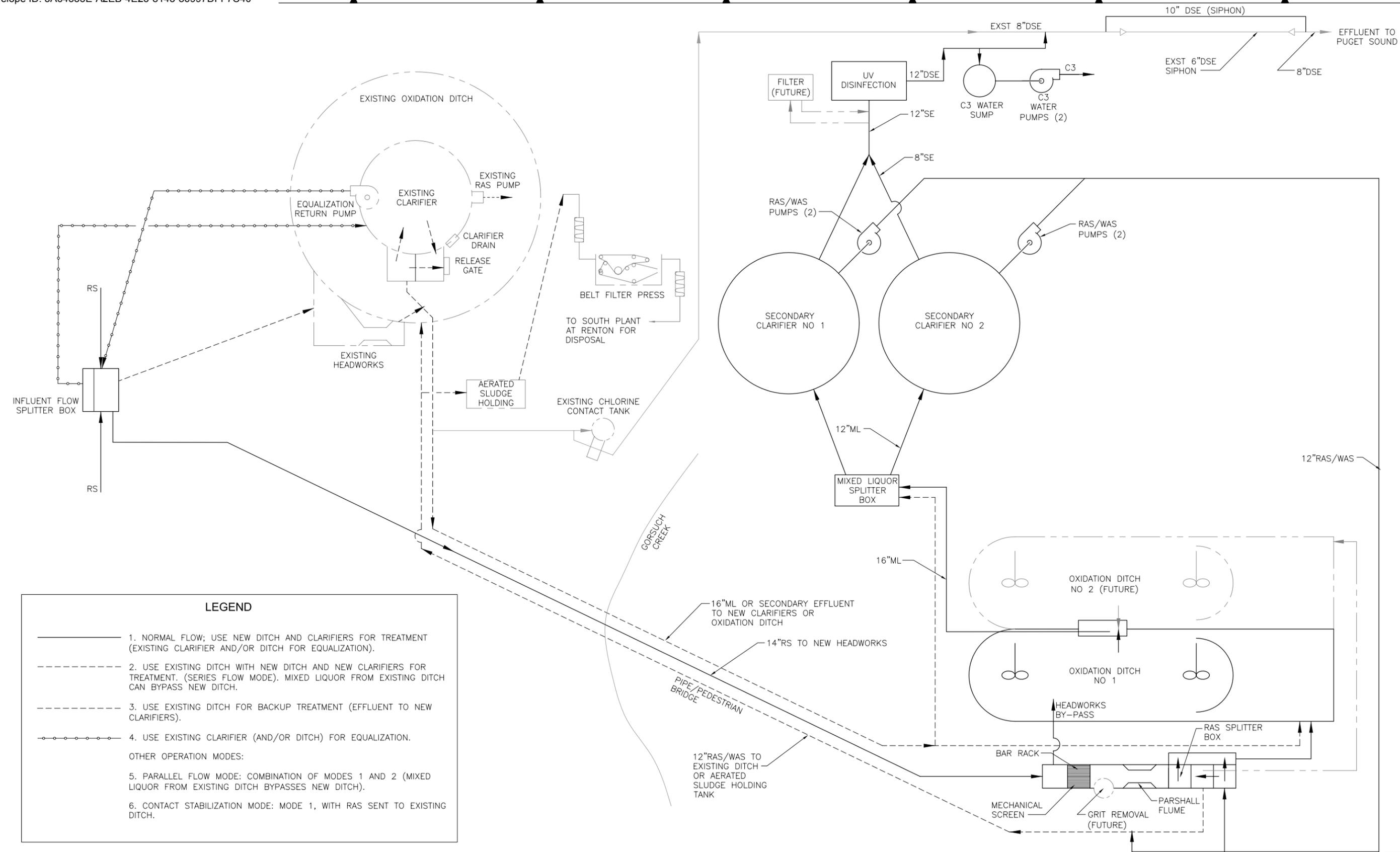


DEPARTMENT OF NATURAL RESOURCES AND PARKS
 VASHON ISLAND
 WASTEWATER TREATMENT PLANT UPGRADE
**LOCATION MAP
 AND VICINITY MAP**

DATE:	DEC 2003
FILE NO:	
DRAWING NO:	G1
SHEET NO:	OF



Path: \\kcmsefp1\data\CADD\2030013\RecordDrawings\WASHON\CONTR File: KAA11G07 Plot date: Jan 10, 2008-03:18:12pm CAD User: jesse.forsythe
 Xref File:



LEGEND

- 1. NORMAL FLOW; USE NEW DITCH AND CLARIFIERS FOR TREATMENT (EXISTING CLARIFIER AND/OR DITCH FOR EQUALIZATION).
- - - 2. USE EXISTING DITCH WITH NEW DITCH AND NEW CLARIFIERS FOR TREATMENT. (SERIES FLOW MODE). MIXED LIQUOR FROM EXISTING DITCH CAN BYPASS NEW DITCH.
- - - 3. USE EXISTING DITCH FOR BACKUP TREATMENT (EFFLUENT TO NEW CLARIFIERS).
- ○ ○ ○ 4. USE EXISTING CLARIFIER (AND/OR DITCH) FOR EQUALIZATION.

OTHER OPERATION MODES:

- 5. PARALLEL FLOW MODE: COMBINATION OF MODES 1 AND 2 (MIXED LIQUOR FROM EXISTING DITCH BYPASSES NEW DITCH).
- 6. CONTACT STABILIZATION MODE: MODE 1, WITH RAS SENT TO EXISTING DITCH.

ONE INCH
 AT FULL SIZE, IF NOT ONE
 INCH SCALE ACCORDINGLY

No.	REVISION	BY	APP'D	DATE

Tetra Tech/KCM, Inc.
 1917 First Avenue
 Seattle, Washington 98101
 206-443-5300 Fax: 206-443-5372



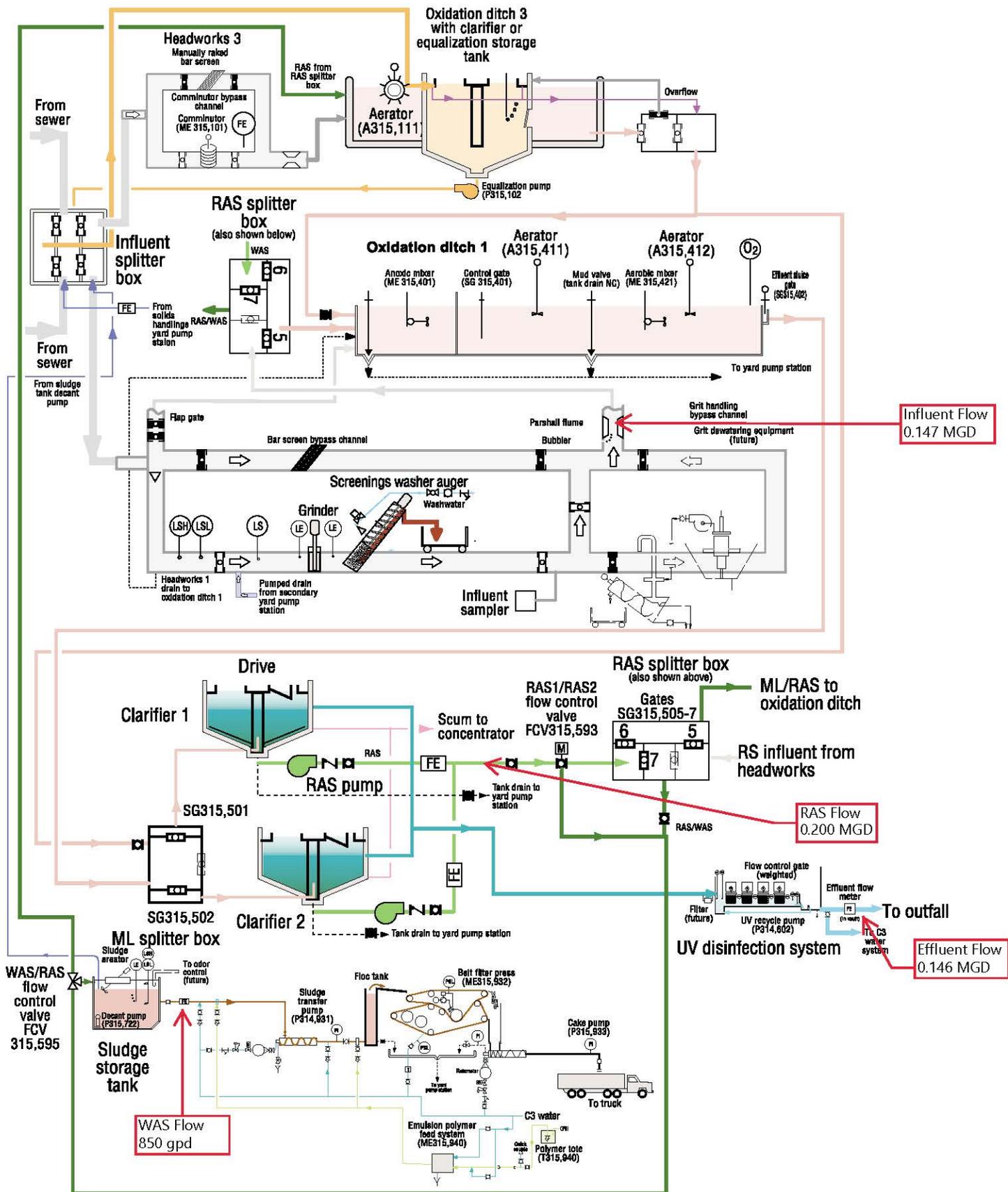
DESIGNED:	CHECKED:
DRAWN:	SCALE:
RECOMMENDED:	NONE
APPROVED:	CONTRACT NO: C43003C



DEPARTMENT OF NATURAL RESOURCES AND PARKS
 VASHON ISLAND
 WASTEWATER TREATMENT PLANT UPGRADE
PROCESS FLOW DIAGRAM

DATE:	DEC 2003
FILE NO:	
DRAWING NO:	G7
SHEET NO:	OF

Item 2.4 - Vashon Wastewater Treatment Plant Process Flow Diagram



United States
Environmental Protection Agency

Office of Water
Washington, D.C.

EPA Form 3510-2A
Revised March 2019

Water Permits Division



Application Form 2A

New and Existing Publicly Owned Treatment Works

NPDES Permitting Program

Note: Complete this form if your facility is a new or existing publicly owned treatment works.

EPA Identification Number	NPDES Permit Number	Facility Name		
Form 2A NPDES		U.S. Environmental Protection Agency Application for NPDES Permit to Discharge Wastewater NEW AND EXISTING PUBLICLY OWNED TREATMENT WORKS		
SECTION 1. BASIC APPLICATION INFORMATION FOR ALL APPLICANTS (40 CFR 122.21(j)(1) and (9))				
Facility Information	1.1	Facility name		
		Mailing address (street or P.O. box)		
		City or town	State	ZIP code
		Contact name (first and last)	Title	Phone number Email address
		Location address (street, route number, or other specific identifier) <input type="checkbox"/> Same as mailing address		
		City or town	State	ZIP code
	1.2	Is this application for a facility that has yet to commence discharge? <input type="checkbox"/> Yes → See instructions on data submission requirements for new dischargers. <input type="checkbox"/> No		
Applicant Information	1.3	Is applicant different from entity listed under Item 1.1 above? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 1.4.		
		Applicant name		
		Applicant address (street or P.O. box)		
		City or town	State	ZIP code
		Contact name (first and last)	Title	Phone number Email address
		1.4	Is the applicant the facility's owner, operator, or both? (Check only one response.) <input type="checkbox"/> Owner <input type="checkbox"/> Operator <input type="checkbox"/> Both	
	1.5	To which entity should the NPDES permitting authority send correspondence? (Check only one response.) <input type="checkbox"/> Facility <input type="checkbox"/> Applicant <input type="checkbox"/> Facility and applicant (they are one and the same)		
Existing Environmental Permits	1.6	Indicate below any existing environmental permits. (Check all that apply and print or type the corresponding permit number for each.)		
		Existing Environmental Permits		
		<input type="checkbox"/> NPDES (discharges to surface water)	<input type="checkbox"/> RCRA (hazardous waste)	<input type="checkbox"/> UIC (underground injection control)
		<input type="checkbox"/> PSD (air emissions)	<input type="checkbox"/> Nonattainment program (CAA)	<input type="checkbox"/> NESHAPs (CAA)
	<input type="checkbox"/> Ocean dumping (MPRSA)	<input type="checkbox"/> Dredge or fill (CWA Section 404)	<input type="checkbox"/> Other (specify)	

EPA Identification Number	NPDES Permit Number	Facility Name																
Outfalls Other Than to Waters of the United States																		
1.12	Does the POTW discharge wastewater to basins, ponds, or other surface impoundments that do not have outlets for discharge to waters of the United States? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 1.14.																	
1.13	Provide the location of each surface impoundment and associated discharge information in the table below.																	
Surface Impoundment Location and Discharge Data																		
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:40%; padding: 5px;">Location</th> <th style="width:20%; padding: 5px;">Average Daily Volume Discharged to Surface Impoundment</th> <th style="width:40%; padding: 5px;">Continuous or Intermittent (check one)</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px; text-align: right;">gpd</td> <td style="padding: 5px;"><input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px; text-align: right;">gpd</td> <td style="padding: 5px;"><input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px; text-align: right;">gpd</td> <td style="padding: 5px;"><input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent</td> </tr> </tbody> </table>			Location	Average Daily Volume Discharged to Surface Impoundment	Continuous or Intermittent (check one)		gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent		gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent		gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent				
Location	Average Daily Volume Discharged to Surface Impoundment	Continuous or Intermittent (check one)																
	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent																
	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent																
	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent																
1.14	Is wastewater applied to land? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 1.16.																	
1.15	Provide the land application site and discharge data requested below.																	
Land Application Site and Discharge Data																		
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:30%; padding: 5px;">Location</th> <th style="width:20%; padding: 5px;">Size</th> <th style="width:20%; padding: 5px;">Average Daily Volume Applied</th> <th style="width:30%; padding: 5px;">Continuous or Intermittent (check one)</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px; text-align: center;">acres</td> <td style="padding: 5px; text-align: right;">gpd</td> <td style="padding: 5px;"><input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px; text-align: center;">acres</td> <td style="padding: 5px; text-align: right;">gpd</td> <td style="padding: 5px;"><input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent</td> </tr> <tr> <td style="padding: 5px;"></td> <td style="padding: 5px; text-align: center;">acres</td> <td style="padding: 5px; text-align: right;">gpd</td> <td style="padding: 5px;"><input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent</td> </tr> </tbody> </table>			Location	Size	Average Daily Volume Applied	Continuous or Intermittent (check one)		acres	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent		acres	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent		acres	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent
Location	Size	Average Daily Volume Applied	Continuous or Intermittent (check one)															
	acres	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent															
	acres	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent															
	acres	gpd	<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent															
1.16	Is effluent transported to another facility for treatment prior to discharge? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 1.21.																	
1.17	Describe the means by which the effluent is transported (e.g., tank truck, pipe).																	
1.18	Is the effluent transported by a party other than the applicant? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 1.20.																	
1.19	Provide information on the transporter below.																	
Transporter Data																		
Entity name		Mailing address (street or P.O. box)																
City or town	State	ZIP code																
Contact name (first and last)		Title																
Phone number		Email address																

Outfalls and Other Discharge or Disposal Methods

	EPA Identification Number	NPDES Permit Number	Facility Name	
Outfalls and Other Discharge or Disposal Methods Continued	1.20	In the table below, indicate the name, address, contact information, NPDES number, and average daily flow rate of the receiving facility.		
	Receiving Facility Data			
	Facility name		Mailing address (street or P.O. box)	
	City or town		State	ZIP code
	Contact name (first and last)		Title	
	Phone number		Email address	
	NPDES number of receiving facility (if any) <input type="checkbox"/> None		Average daily flow rate mgd	
Variance Requests	1.21	Is the wastewater disposed of in a manner other than those already mentioned in Items 1.14 through 1.21 that do not have outlets to waters of the United States (e.g., underground percolation, underground injection)? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 1.23.		
	1.22	Provide information in the table below on these other disposal methods.		
	Information on Other Disposal Methods			
	Disposal Method Description	Location of Disposal Site	Size of Disposal Site	Annual Average Daily Discharge Volume
			acres	gpd
		acres	gpd	
		acres	gpd	
			<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent	
			<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent	
			<input type="checkbox"/> Continuous <input type="checkbox"/> Intermittent	
Contractor Information	1.23	Do you intend to request or renew one or more of the variances authorized at 40 CFR 122.21(n)? (Check all that apply. Consult with your NPDES permitting authority to determine what information needs to be submitted and when.) <input type="checkbox"/> Discharges into marine waters (CWA Section 301(h)) <input type="checkbox"/> Water quality related effluent limitation (CWA Section 302(b)(2)) <input type="checkbox"/> Not applicable		
	1.24	Are any operational or maintenance aspects (related to wastewater treatment and effluent quality) of the treatment works the responsibility of a contractor? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Section 2.		
	1.25	Provide location and contact information for each contractor in addition to a description of the contractor's operational and maintenance responsibilities.		
	Contractor Information			
		Contractor 1	Contractor 2	Contractor 3
	Contractor name (company name)			
	Mailing address (street or P.O. box)			
	City, state, and ZIP code			
	Contact name (first and last)			
Phone number				
Email address				
Operational and maintenance responsibilities of contractor				

EPA Identification Number	NPDES Permit Number	Facility Name
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SECTION 2. ADDITIONAL INFORMATION (40 CFR 122.21(j)(1) and (2))

Design Flow	Outfalls to Waters of the United States				
	2.1	Does the treatment works have a design flow greater than or equal to 0.1 mgd? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Section 3.			
Inflow and Infiltration	2.2	Provide the treatment works' current average daily volume of inflow and infiltration.	Average Daily Volume of Inflow and Infiltration		
		Indicate the steps the facility is taking to minimize inflow and infiltration.	gpd		
Topographic Map	2.3	Have you attached a topographic map to this application that contains all the required information? (See instructions for specific requirements.) <input type="checkbox"/> Yes <input type="checkbox"/> No			
Flow Diagram	2.4	Have you attached a process flow diagram or schematic to this application that contains all the required information? (See instructions for specific requirements.) <input type="checkbox"/> Yes <input type="checkbox"/> No			
Scheduled Improvements and Schedules of Implementation	2.5	Are improvements to the facility scheduled? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Section 3.			
		Briefly list and describe the scheduled improvements.			
		1.			
		2.			
		3.			
		4.			
	2.6	Provide scheduled or actual dates of completion for improvements.			
	Scheduled or Actual Dates of Completion for Improvements				
	Scheduled Improvement (from above)	Affected Outfalls (list outfall number)	Begin Construction (MM/DD/YYYY)	End Construction (MM/DD/YYYY)	Begin Discharge (MM/DD/YYYY)
	1.				
	2.				
	3.				
	4.				
	2.7	Have appropriate permits/clearances concerning other federal/state requirements been obtained? Briefly explain your response. <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> None required or applicable			
		Explanation:			

EPA Identification Number	NPDES Permit Number	Facility Name
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SECTION 3. INFORMATION ON EFFLUENT DISCHARGES (40 CFR 122.21(j)(3) to (5))

Description of Outfalls	3.1	Provide the following information for each outfall. (Attach additional sheets if you have more than three outfalls.)		
		Outfall Number _____	Outfall Number _____	Outfall Number _____
	State			
	County			
	City or town			
	Distance from shore	ft.	ft.	ft.
	Depth below surface	ft.	ft.	ft.
	Average daily flow rate	mgd	mgd	mgd
	Latitude	° ' "	° ' "	° ' "
	Longitude	° ' "	° ' "	° ' "
Seasonal or Periodic Discharge Data	3.2	Do any of the outfalls described under Item 3.1 have seasonal or periodic discharges? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 3.4.		
	3.3	If so, provide the following information for each applicable outfall.		
		Outfall Number _____	Outfall Number _____	Outfall Number _____
	Number of times per year discharge occurs			
	Average duration of each discharge (specify units)			
	Average flow of each discharge	mgd	mgd	mgd
Months in which discharge occurs				
Diffuser Type	3.4	Are any of the outfalls listed under Item 3.1 equipped with a diffuser? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 3.6.		
	3.5	Briefly describe the diffuser type at each applicable outfall.		
		Outfall Number _____	Outfall Number _____	Outfall Number _____
Waters of the U.S.	3.6	Does the treatment works discharge or plan to discharge wastewater to waters of the United States from one or more discharge points? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Section 6.		

EPA Identification Number		NPDES Permit Number		Facility Name	
3.7 Provide the receiving water and related information (if known) for each outfall.					
Receiving Water Description		See attachment; dilution modeling of Vashon outfall		Outfall Number _____	Outfall Number _____
		Receiving water name			
		Name of watershed, river, or stream system			
		U.S. Soil Conservation Service 14-digit watershed code			
		Name of state management/river basin			
		U.S. Geological Survey 8-digit hydrologic cataloging unit code			
		Critical low flow (acute)	cfs	cfs	cfs
		Critical low flow (chronic)	cfs	cfs	cfs
		Total hardness at critical low flow	mg/L of CaCO ₃	mg/L of CaCO ₃	mg/L of CaCO ₃
3.8 Provide the following information describing the treatment provided for discharges from each outfall.					
Treatment Description			Outfall Number _____	Outfall Number _____	Outfall Number _____
		Highest Level of Treatment (check all that apply per outfall)	<input type="checkbox"/> Primary <input type="checkbox"/> Equivalent to secondary <input type="checkbox"/> Secondary <input type="checkbox"/> Advanced <input type="checkbox"/> Other (specify) _____	<input type="checkbox"/> Primary <input type="checkbox"/> Equivalent to secondary <input type="checkbox"/> Secondary <input type="checkbox"/> Advanced <input type="checkbox"/> Other (specify) _____	<input type="checkbox"/> Primary <input type="checkbox"/> Equivalent to secondary <input type="checkbox"/> Secondary <input type="checkbox"/> Advanced <input type="checkbox"/> Other (specify) _____
		Design Removal Rates by Outfall			
		BOD ₅ or CBOD ₅	%	%	%
		TSS	%	%	%
		Phosphorus	<input type="checkbox"/> Not applicable %	<input type="checkbox"/> Not applicable %	<input type="checkbox"/> Not applicable %
		Nitrogen	<input type="checkbox"/> Not applicable %	<input type="checkbox"/> Not applicable %	<input type="checkbox"/> Not applicable %
		Other (specify) _____	<input type="checkbox"/> Not applicable %	<input type="checkbox"/> Not applicable %	<input type="checkbox"/> Not applicable %

EPA Identification Number		NPDES Permit Number		Facility Name		
Treatment Description Continued	3.9	Describe the type of disinfection used for the effluent from each outfall in the table below. If disinfection varies by season, describe below.				
			Outfall Number _____	Outfall Number _____	Outfall Number _____	
		Disinfection type				
		Seasons used				
		Dechlorination used?	<input type="checkbox"/> Not applicable <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Not applicable <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Not applicable <input type="checkbox"/> Yes <input type="checkbox"/> No	
Effluent Testing Data	3.10	Have you completed monitoring for all Table A parameters and attached the results to the application package? <input type="checkbox"/> Yes <input type="checkbox"/> No				
	3.11	Have you conducted any WET tests during the 4.5 years prior to the date of the application on any of the facility's discharges or on any receiving water near the discharge points? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 3.13.				
	3.12	Indicate the number of acute and chronic WET tests conducted since the last permit reissuance of the facility's discharges by outfall number or of the receiving water near the discharge points.				
			Outfall Number _____	Outfall Number _____	Outfall Number _____	
			Acute	Chronic	Acute	Chronic
		Number of tests of discharge water				
		Number of tests of receiving water				
	3.13	Does the treatment works have a design flow greater than or equal to 0.1 mgd? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 3.16.				
	3.14	Does the POTW use chlorine for disinfection, use chlorine elsewhere in the treatment process, or otherwise have reasonable potential to discharge chlorine in its effluent? <input type="checkbox"/> Yes → Complete Table B, including chlorine. <input type="checkbox"/> No → Complete Table B, omitting chlorine.				
	3.15	Have you completed monitoring for all applicable Table B pollutants and attached the results to this application package? <input type="checkbox"/> Yes <input type="checkbox"/> No				
3.16	Does one or more of the following conditions apply? <ul style="list-style-type: none"> The facility has a design flow greater than or equal to 1 mgd. The POTW has an approved pretreatment program or is required to develop such a program. The NPDES permitting authority has informed the POTW that it must sample for the parameters in Table C, must sample other additional parameters (Table D), or submit the results of WET tests for acute or chronic toxicity for each of its discharge outfalls (Table E). <input type="checkbox"/> Yes → Complete Tables C, D, and E as applicable. <input type="checkbox"/> No → SKIP to Section 4.					
3.17	Have you completed monitoring for all applicable Table C pollutants and attached the results to this application package? <input type="checkbox"/> Yes <input type="checkbox"/> No					
3.18	Have you completed monitoring for all applicable Table D pollutants required by your NPDES permitting authority and attached the results to this application package? <input type="checkbox"/> Yes <input type="checkbox"/> No additional sampling required by NPDES permitting authority.					

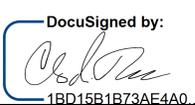
EPA Identification Number		NPDES Permit Number		Facility Name		
Effluent Testing Data Continued	3.19	Has the POTW conducted either (1) minimum of four quarterly WET tests for one year preceding this permit application or (2) at least four annual WET tests in the past 4.5 years?				
		<input type="checkbox"/> Yes		<input type="checkbox"/> No	Complete tests and Table E and SKIP to Item 3.26.	
	3.20	Have you previously submitted the results of the above tests to your NPDES permitting authority?				
		<input type="checkbox"/> Yes		<input type="checkbox"/> No	Provide results in Table E and SKIP to Item 3.26.	
	3.21	Indicate the dates the data were submitted to your NPDES permitting authority and provide a summary of the results.				
		Date(s) Submitted (MM/DD/YYYY)		Summary of Results		
		3.22	Regardless of how you provided your WET testing data to the NPDES permitting authority, did any of the tests result in toxicity?			
		<input type="checkbox"/> Yes		<input type="checkbox"/> No	SKIP to Item 3.26.	
	3.23	Describe the cause(s) of the toxicity:				
	3.24	Has the treatment works conducted a toxicity reduction evaluation?				
		<input type="checkbox"/> Yes		<input type="checkbox"/> No	SKIP to Item 3.26.	
	3.25	Provide details of any toxicity reduction evaluations conducted.				
	3.26	Have you completed Table E for all applicable outfalls and attached the results to the application package?				
		<input type="checkbox"/> Yes		<input type="checkbox"/> Not applicable	because previously submitted information to the NPDES permitting authority.	
SECTION 4. INDUSTRIAL DISCHARGES AND HAZARDOUS WASTES (40 CFR 122.21(j)(6) and (7))						
Industrial Discharges and Hazardous Wastes	4.1	Does the POTW receive discharges from SIUs or NSCIUs?				
		<input type="checkbox"/> Yes		<input type="checkbox"/> No	SKIP to Item 4.7.	
	4.2	Indicate the number of SIUs and NSCIUs that discharge to the POTW.				
		Number of SIUs		Number of NSCIUs		
		4.3	Does the POTW have an approved pretreatment program?			
		<input type="checkbox"/> Yes		<input type="checkbox"/> No		
	4.4	Have you submitted either of the following to the NPDES permitting authority that contains information substantially identical to that required in Table F: (1) a pretreatment program annual report submitted within one year of the application or (2) a pretreatment program?				
		<input type="checkbox"/> Yes		<input type="checkbox"/> No	SKIP to Item 4.6.	
	4.5	Identify the title and date of the annual report or pretreatment program referenced in Item 4.4. SKIP to Item 4.7.				
	4.6	Have you completed and attached Table F to this application package?				
		<input type="checkbox"/> Yes		<input type="checkbox"/> No		

	EPA Identification Number	NPDES Permit Number	Facility Name		
Industrial Discharges and Hazardous Wastes Continued	4.7	Does the POTW receive, or has it been notified that it will receive, by truck, rail, or dedicated pipe, any wastes that are regulated as RCRA hazardous wastes pursuant to 40 CFR 261? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Item 4.9.			
	4.8	If yes, provide the following information:			
		Hazardous Waste Number	Waste Transport Method (check all that apply)	Annual Amount of Waste Received	Units
			<input type="checkbox"/> Truck <input type="checkbox"/> Rail <input type="checkbox"/> Dedicated pipe <input type="checkbox"/> Other (specify) _____		
			<input type="checkbox"/> Truck <input type="checkbox"/> Rail <input type="checkbox"/> Dedicated pipe <input type="checkbox"/> Other (specify) _____		
			<input type="checkbox"/> Truck <input type="checkbox"/> Rail <input type="checkbox"/> Dedicated pipe <input type="checkbox"/> Other (specify) _____		
	4.9	Does the POTW receive, or has it been notified that it will receive, wastewaters that originate from remedial activities, including those undertaken pursuant to CERCLA and Sections 3004(7) or 3008(h) of RCRA? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Section 5.			
	4.10	Does the POTW receive (or expect to receive) less than 15 kilograms per month of non-acute hazardous wastes as specified in 40 CFR 261.30(d) and 261.33(e)? <input type="checkbox"/> Yes → SKIP to Section 5. <input type="checkbox"/> No			
	4.11	Have you reported the following information in an attachment to this application: identification and description of the site(s) or facility(ies) at which the wastewater originates; the identities of the wastewater's hazardous constituents; and the extent of treatment, if any, the wastewater receives or will receive before entering the POTW? <input type="checkbox"/> Yes <input type="checkbox"/> No			
SECTION 5. COMBINED SEWER OVERFLOWS (40 CFR 122.21(j)(8))					
CSO Map and Diagram	5.1	Does the treatment works have a combined sewer system? <input type="checkbox"/> Yes <input type="checkbox"/> No → SKIP to Section 6.			
	5.2	Have you attached a CSO system map to this application? (See instructions for map requirements.) <input type="checkbox"/> Yes <input type="checkbox"/> No			
	5.3	Have you attached a CSO system diagram to this application? (See instructions for diagram requirements.) <input type="checkbox"/> Yes <input type="checkbox"/> No			

EPA Identification Number		NPDES Permit Number		Facility Name	
CSO Outfall Description	5.4	For each CSO outfall, provide the following information. (Attach additional sheets as necessary.)			
		CSO Outfall Number ____	CSO Outfall Number ____	CSO Outfall Number ____	
	City or town				
	State and ZIP code				
	County				
	Latitude	° ' "	° ' "	° ' "	
	Longitude	° ' "	° ' "	° ' "	
	Distance from shore	ft.	ft.	ft.	
Depth below surface	ft.	ft.	ft.		
CSO Monitoring	5.5	Did the POTW monitor any of the following items in the past year for its CSO outfalls?			
		CSO Outfall Number ____	CSO Outfall Number ____	CSO Outfall Number ____	
	Rainfall	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	CSO flow volume	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	CSO pollutant concentrations	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	Receiving water quality	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
	CSO frequency	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Number of storm events	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No		
CSO Events in Past Year	5.6	Provide the following information for each of your CSO outfalls.			
		CSO Outfall Number ____	CSO Outfall Number ____	CSO Outfall Number ____	
	Number of CSO events in the past year	events	events	events	
	Average duration per event	hours <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated	hours <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated	hours <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated	
	Average volume per event	million gallons <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated	million gallons <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated	million gallons <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated	
Minimum rainfall causing a CSO event in last year	inches of rainfall <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated	inches of rainfall <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated	inches of rainfall <input type="checkbox"/> Actual or <input type="checkbox"/> Estimated		

EPA Identification Number		NPDES Permit Number		Facility Name	
CSO Receiving Waters	5.7	Provide the information in the table below for each of your CSO outfalls.			
			CSO Outfall Number ____	CSO Outfall Number ____	CSO Outfall Number ____
		Receiving water name			
		Name of watershed/ stream system			
		U.S. Soil Conservation Service 14-digit watershed code (if known)	<input type="checkbox"/> Unknown	<input type="checkbox"/> Unknown	<input type="checkbox"/> Unknown
		Name of state management/river basin			
		U.S. Geological Survey 8-Digit Hydrologic Unit Code (if known)	<input type="checkbox"/> Unknown	<input type="checkbox"/> Unknown	<input type="checkbox"/> Unknown
		Description of known water quality impacts on receiving stream by CSO (see instructions for examples)			

SECTION 6. CHECKLIST AND CERTIFICATION STATEMENT (40 CFR 122.22(a) and (d))

Checklist and Certification Statement	6.1	In Column 1 below, mark the sections of Form 2A that you have completed and are submitting with your application. For each section, specify in Column 2 any attachments that you are enclosing to alert the permitting authority. Note that not all applicants are required to provide attachments.			
		Column 1	Column 2		
		<input type="checkbox"/> Section 1: Basic Application Information for All Applicants	<input type="checkbox"/> w/ variance request(s)	<input type="checkbox"/> w/ additional attachments	
		<input type="checkbox"/> Section 2: Additional Information	<input type="checkbox"/> w/ topographic map <input type="checkbox"/> w/ additional attachments	<input type="checkbox"/> w/ process flow diagram	
		<input type="checkbox"/> Section 3: Information on Effluent Discharges	<input type="checkbox"/> w/ Table A <input type="checkbox"/> w/ Table B <input type="checkbox"/> w/ Table C	<input type="checkbox"/> w/ Table D <input type="checkbox"/> w/ Table E <input type="checkbox"/> w/ additional attachments	
		<input type="checkbox"/> Section 4: Industrial Discharges and Hazardous Wastes	<input type="checkbox"/> w/ SIU and NSCIU attachments <input type="checkbox"/> w/ additional attachments	<input type="checkbox"/> w/ Table F	
		<input type="checkbox"/> Section 5: Combined Sewer Overflows	<input type="checkbox"/> w/ CSO map <input type="checkbox"/> w/ CSO system diagram	<input type="checkbox"/> w/ additional attachments	
		<input type="checkbox"/> Section 6: Checklist and Certification Statement	<input type="checkbox"/> w/ attachments		
	6.2	Certification Statement			
		<i>I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.</i>			
	Name (print or type first and last name)			Official title	
	Signature 			Date signed 7/28/2021	

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
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Form Approved 03/05/19
OMB No. 2040-0004

TABLE A. EFFLUENT PARAMETERS FOR ALL POTWS							
Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method ¹	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Biochemical oxygen demand <input type="checkbox"/> BOD ₅ or <input type="checkbox"/> CBOD ₅ (report one)							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Fecal coliform							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Design flow rate							
pH (minimum)							
pH (maximum)							
Temperature (winter)							
Temperature (summer)							
Total suspended solids (TSS)							<input type="checkbox"/> ML <input type="checkbox"/> MDL

¹ Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

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TABLE B. EFFLUENT PARAMETERS FOR ALL POTWS WITH A FLOW EQUAL TO OR GREATER THAN 0.1 MGD

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method ¹	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Ammonia (as N)							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Chlorine (total residual, TRC) ²							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Dissolved oxygen							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Nitrate/nitrite							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Kjeldahl nitrogen							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Oil and grease							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Phosphorus							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Total dissolved solids							<input type="checkbox"/> ML <input type="checkbox"/> MDL

¹ Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR chapter I, subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

² Facilities that do not use chlorine for disinfection, do not use chlorine elsewhere in the treatment process, and have no reasonable potential to discharge chlorine in their effluent are not required to report data for chlorine.

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TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method ¹	ML or MDL (include units)	
	Value	Units	Value	Units	Number of Samples			
Metals, Cyanide, and Total Phenols								
Hardness (as CaCO ₃)							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Antimony, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Arsenic, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Beryllium, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Cadmium, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Chromium, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Copper, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Lead, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Mercury, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Nickel, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Selenium, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Silver, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Thallium, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Zinc, total recoverable							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Cyanide							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Total phenolic compounds							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Volatile Organic Compounds	Monitoring of organics not required in previous permit cycle							
Acrolein							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Acrylonitrile							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Benzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL	
Bromoform							<input type="checkbox"/> ML <input type="checkbox"/> MDL	

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TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method ¹	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Carbon tetrachloride							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Chlorobenzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Chlorodibromomethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Chloroethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2-chloroethylvinyl ether							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Chloroform							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Dichlorobromomethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,1-dichloroethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,2-dichloroethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
trans-1,2-dichloroethylene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,1-dichloroethylene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,2-dichloropropane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,3-dichloropropylene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Ethylbenzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Methyl bromide							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Methyl chloride							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Methylene chloride							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,1,1,2-tetrachloroethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Tetrachloroethylene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Toluene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,1,1-trichloroethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,1,2-trichloroethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL

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TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method ¹	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Trichloroethylene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Vinyl chloride							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Acid-Extractable Compounds	Monitoring of organics not required in previous permit cycle						
p-chloro-m-cresol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2-chlorophenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2,4-dichlorophenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2,4-dimethylphenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
4,6-dinitro-o-cresol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2,4-dinitrophenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2-nitrophenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
4-nitrophenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Pentachlorophenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Phenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2,4,6-trichlorophenol							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Base-Neutral Compounds	Monitoring of organics not required in previous permit cycle						
Acenaphthene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Acenaphthylene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Anthracene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Benzidine							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Benzo(a)anthracene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Benzo(a)pyrene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
3,4-benzofluoranthene							<input type="checkbox"/> ML <input type="checkbox"/> MDL

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TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method ¹	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
Benzo(ghi)perylene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Benzo(k)fluoranthene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Bis (2-chloroethoxy) methane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Bis (2-chloroethyl) ether							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Bis (2-chloroisopropyl) ether							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Bis (2-ethylhexyl) phthalate							<input type="checkbox"/> ML <input type="checkbox"/> MDL
4-bromophenyl phenyl ether							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Butyl benzyl phthalate							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2-chloronaphthalene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
4-chlorophenyl phenyl ether							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Chrysene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
di-n-butyl phthalate							<input type="checkbox"/> ML <input type="checkbox"/> MDL
di-n-octyl phthalate							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Dibenzo(a,h)anthracene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,2-dichlorobenzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,3-dichlorobenzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,4-dichlorobenzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
3,3-dichlorobenzidine							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Diethyl phthalate							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Dimethyl phthalate							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2,4-dinitrotoluene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
2,6-dinitrotoluene							<input type="checkbox"/> ML <input type="checkbox"/> MDL

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TABLE C. EFFLUENT PARAMETERS FOR SELECTED POTWS

Pollutant	Maximum Daily Discharge		Average Daily Discharge			Analytical Method ¹	ML or MDL (include units)
	Value	Units	Value	Units	Number of Samples		
1,2-diphenylhydrazine							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Fluoranthene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Fluorene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Hexachlorobenzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Hexachlorobutadiene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Hexachlorocyclo-pentadiene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Hexachloroethane							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Indeno(1,2,3-cd)pyrene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Isophorone							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Naphthalene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Nitrobenzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
N-nitrosodi-n-propylamine							<input type="checkbox"/> ML <input type="checkbox"/> MDL
N-nitrosodimethylamine							<input type="checkbox"/> ML <input type="checkbox"/> MDL
N-nitrosodiphenylamine							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Phenanthrene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
Pyrene							<input type="checkbox"/> ML <input type="checkbox"/> MDL
1,2,4-trichlorobenzene							<input type="checkbox"/> ML <input type="checkbox"/> MDL

¹ Sampling shall be conducted according to sufficiently sensitive test procedures (i.e., methods) approved under 40 CFR 136 for the analysis of pollutants or pollutant parameters or required under 40 CFR Chapter I, Subchapter N or O. See instructions and 40 CFR 122.21(e)(3).

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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

See attached pages of other tests-results

Test Information

	Test Number _____	Test Number _____	Test Number _____
Test species			
Age at initiation of test			
Outfall number			
Date sample collected			
Date test started			
Duration			

Toxicity Test Methods

Test method number			
Manual title			
Edition number and year of publication			
Page number(s)			

Sample Type

Check one:	<input type="checkbox"/> Grab <input type="checkbox"/> 24-hour composite	<input type="checkbox"/> Grab <input type="checkbox"/> 24-hour composite	<input type="checkbox"/> Grab <input type="checkbox"/> 24-hour composite
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Sample Location

Check one:	<input type="checkbox"/> Before Disinfection <input type="checkbox"/> After Disinfection <input type="checkbox"/> After Dechlorination	<input type="checkbox"/> Before Disinfection <input type="checkbox"/> After Disinfection <input type="checkbox"/> After Dechlorination	<input type="checkbox"/> Before disinfection <input type="checkbox"/> After disinfection <input type="checkbox"/> After dechlorination
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Point in Treatment Process

Describe the point in the treatment process at which the sample was collected for each test.			
--	--	--	--

Toxicity Type

Indicate for each test whether the test was performed to assess acute or chronic toxicity, or both. (Check one response.)	<input type="checkbox"/> Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Both	<input type="checkbox"/> Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Both	<input type="checkbox"/> Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Both
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EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number _____	Test Number _____	Test Number _____
Test Type			
Indicate the type of test performed. (Check one response.)	<input type="checkbox"/> Static <input type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through	<input type="checkbox"/> Static <input type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through	<input type="checkbox"/> Static <input type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through
Source of Dilution Water			
Indicate the source of dilution water. (Check one response.)	<input type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water	<input type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water	<input type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water
If laboratory water, specify type.			
If receiving water, specify source.			
Type of Dilution Water			
Indicate the type of dilution water. If salt water, specify "natural" or type of artificial sea salts or brine used.	<input type="checkbox"/> Fresh water <input type="checkbox"/> Salt water (specify)	<input type="checkbox"/> Fresh water <input type="checkbox"/> Salt water (specify)	<input type="checkbox"/> Fresh water <input type="checkbox"/> Salt water (specify)
Percentage Effluent Used			
Specify the percentage effluent used for all concentrations in the test series.			
Parameters Tested			
Check the parameters tested.	<input type="checkbox"/> pH <input type="checkbox"/> Salinity <input checked="" type="checkbox"/> Temperature	<input checked="" type="checkbox"/> Ammonia <input checked="" type="checkbox"/> Dissolved oxygen	<input type="checkbox"/> pH <input type="checkbox"/> Salinity <input checked="" type="checkbox"/> Temperature
		<input checked="" type="checkbox"/> Ammonia <input checked="" type="checkbox"/> Dissolved oxygen	<input type="checkbox"/> pH <input type="checkbox"/> Salinity <input type="checkbox"/> Temperature
			<input type="checkbox"/> Ammonia <input type="checkbox"/> Dissolved oxygen
Acute Test Results			
Percent survival in 100% effluent		%	%
LC ₅₀			
95% confidence interval		%	%
Control percent survival		%	%

EPA Identification Number	NPDES Permit Number	Facility Name	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number _____	Test Number _____	Test Number _____
Acute Test Results Continued			
Other (describe)			
Chronic Test Results			
NOEC	%	%	%
IC ₂₅	%	%	%
Control percent survival	%	%	%
Other (describe)			
Quality Control/Quality Assurance			
Is reference toxicant data available?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was reference toxicant test within acceptable bounds?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
What date was reference toxicant test run (MM/DD/YYYY)?			
Other (describe)			

Acute #2 FS

EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

Test Information			
	Test Number <u>9423</u>	Test Number <u>9424</u>	Test Number _____
Test species	Fathead minnow	Daphnia pulex	
Age at initiation of test	10 days	< 24 hours	
Outfall number	Vashon	Vashon	
Date sample collected	01/29/2020	01/29/2020	
Date test started	01/29/2020	01/29/2020	
Duration	96 hours	48 hours	
Toxicity Test Methods			
Test method number	2000.00	2021.0	
Manual title	EPA 821-02-012	EPA 821-02-012	
Edition number and year of publication	5th, October 2002	5th, October 2002	
Page number(s)	Table 14, p 55	Table 13, p 53	
Sample Type			
Check one:	<input type="checkbox"/> Grab <input checked="" type="checkbox"/> 24-hour composite	<input type="checkbox"/> Grab <input checked="" type="checkbox"/> 24-hour composite	<input type="checkbox"/> Grab <input type="checkbox"/> 24-hour composite
Sample Location			
Check one:	<input type="checkbox"/> Before Disinfection <input checked="" type="checkbox"/> After Disinfection <input type="checkbox"/> After Dechlorination	<input type="checkbox"/> Before Disinfection <input checked="" type="checkbox"/> After Disinfection <input type="checkbox"/> After Dechlorination	<input type="checkbox"/> Before disinfection <input type="checkbox"/> After disinfection <input type="checkbox"/> After dechlorination
Point in Treatment Process			
Describe the point in the treatment process at which the sample was collected for each test.	UV treated secondary	UV treated secondary	
Toxicity Type			
Indicate for each test whether the test was performed to assess acute or chronic toxicity, or both. (Check one response.)	<input checked="" type="checkbox"/> Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Both	<input checked="" type="checkbox"/> Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Both	<input type="checkbox"/> Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Both

EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number <u>9423</u>	Test Number <u>9424</u>	Test Number _____			
Test Type						
Indicate the type of test performed. (Check one response.)	<input type="checkbox"/> Static <input checked="" type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through	<input checked="" type="checkbox"/> Static <input type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through	<input type="checkbox"/> Static <input type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through			
Source of Dilution Water						
Indicate the source of dilution water. (Check one response.)	<input checked="" type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water	<input checked="" type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water	<input type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water			
If laboratory water, specify type.	on-site well	on-site well				
If receiving water, specify source.						
Type of Dilution Water						
Indicate the type of dilution water. If salt water, specify "natural" or type of artificial sea salts or brine used.	<input checked="" type="checkbox"/> Fresh water <input type="checkbox"/> Salt water (specify)	<input checked="" type="checkbox"/> Fresh water <input type="checkbox"/> Salt water (specify)	<input type="checkbox"/> Fresh water <input type="checkbox"/> Salt water (specify)			
Percentage Effluent Used						
Specify the percentage effluent used for all concentrations in the test series.	0, 1.12 (ACEC), 6.25, 12.5, 25, 50, 100	0, 1.12 (ACEC), 6.25, 12.5, 25, 50, 100				
Parameters Tested						
Check the parameters tested	<input checked="" type="checkbox"/> pH <i>FS</i> <input type="checkbox"/> Salinity <input checked="" type="checkbox"/> Temperature	<input checked="" type="checkbox"/> Ammonia <input checked="" type="checkbox"/> Dissolved oxygen	<input checked="" type="checkbox"/> pH <i>FS</i> <input type="checkbox"/> Salinity <input checked="" type="checkbox"/> Temperature	<input checked="" type="checkbox"/> Ammonia <input checked="" type="checkbox"/> Dissolved oxygen	<input type="checkbox"/> pH <input type="checkbox"/> Salinity <input type="checkbox"/> Temperature	<input type="checkbox"/> Ammonia <input type="checkbox"/> Dissolved oxygen
Acute Test Results						
Percent survival in 100% effluent	100 %	100 %	%			
LC50	NA	NA				
95% confidence interval	NA %	NA %	%			
Control percent survival	100 %	100 %	%			

EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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Form Approved 03/05/19
OMB No. 2040-0004

TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number <u>9423</u>	Test Number <u>9424</u>	Test Number _____
Acute Test Results Continued			
Other (describe)			
Chronic Test Results			
NOEC	%	%	%
IC ₂₅	%	%	%
Control percent survival	%	%	%
Other (describe)			
Quality Control/Quality Assurance			
Is reference toxicant data available?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was reference toxicant test within acceptable bounds?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
What date was reference toxicant test run (MM/DD/YYYY)?	01/29/2020	01/28/2020	
Other (describe)			

Chronic #1

Form Approved 03/05/19
OMB No. 2040-0004

EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

Test Information			
	Test Number <u>9311</u>	Test Number <u>9312</u>	Test Number _____
Test species	Mysid	Topsmelt	
Age at initiation of test	7 days	10 days	
Outfall number	Vashon	Vashon	
Date sample collected	10/02/2019	10/02/2019	
Date test started	10/02/2019	10/02/2019	
Duration	7 days	7 days	
Toxicity Test Methods			
Test method number	1007.0	1006.0	
Manual title	EPA 821-R-02-014	EPA 600-R-95-136	
Edition number and year of publication	3rd, October 2002	1st, August 1995	
Page number(s)	214	72	
Sample Type			
Check one:	<input type="checkbox"/> Grab <input checked="" type="checkbox"/> 24-hour composite	<input type="checkbox"/> Grab <input checked="" type="checkbox"/> 24-hour composite	<input type="checkbox"/> Grab <input type="checkbox"/> 24-hour composite
Sample Location			
Check one:	<input type="checkbox"/> Before Disinfection <input checked="" type="checkbox"/> After Disinfection <input type="checkbox"/> After Dechlorination	<input type="checkbox"/> Before Disinfection <input checked="" type="checkbox"/> After Disinfection <input type="checkbox"/> After Dechlorination	<input type="checkbox"/> Before disinfection <input type="checkbox"/> After disinfection <input type="checkbox"/> After dechlorination
Point in Treatment Process			
Describe the point in the treatment process at which the sample was collected for each test.	UV treated secondary	UV treated secondary	
Toxicity Type			
Indicate for each test whether the test was performed to assess acute or chronic toxicity, or both. (Check one response.)	<input type="checkbox"/> Acute <input checked="" type="checkbox"/> Chronic <input type="checkbox"/> Both	<input type="checkbox"/> Acute <input checked="" type="checkbox"/> Chronic <input type="checkbox"/> Both	<input type="checkbox"/> Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Both

EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number <u>9311</u>	Test Number <u>9312</u>	Test Number _____
Test Type			
Indicate the type of test performed. (Check one response.)	<input type="checkbox"/> Static <input checked="" type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through	<input type="checkbox"/> Static <input checked="" type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through	<input type="checkbox"/> Static <input type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through
Source of Dilution Water			
Indicate the source of dilution water. (Check one response.)	<input checked="" type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water	<input checked="" type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water	<input type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water
If laboratory water, specify type.	RO and Hawaiian Marine Mix	RO and Hawaiian Marine Mix	
If receiving water, specify source.			
Type of Dilution Water			
Indicate the type of dilution water. If salt water, specify "natural" or type of artificial sea salts or brine used.	<input type="checkbox"/> Fresh water <input checked="" type="checkbox"/> Salt water (specify)	<input type="checkbox"/> Fresh water <input checked="" type="checkbox"/> Salt water (specify)	<input type="checkbox"/> Fresh water <input type="checkbox"/> Salt water (specify)
Percentage Effluent Used			
Specify the percentage effluent used for all concentrations in the test series.	0, 0.15 (CCEC), 1.12 (ACEC), 12.5, 25, 50, 100	0, 0.15 (CCEC), 1.12 (ACEC), 12.5, 25, 50, 100	
Parameters Tested			
Check the parameters tested.	<input checked="" type="checkbox"/> pH <i>FS</i> <input checked="" type="checkbox"/> Salinity <input checked="" type="checkbox"/> Temperature <input checked="" type="checkbox"/> Ammonia <input checked="" type="checkbox"/> Dissolved oxygen	<input checked="" type="checkbox"/> pH <i>FS</i> <input checked="" type="checkbox"/> Salinity <input checked="" type="checkbox"/> Temperature <input checked="" type="checkbox"/> Ammonia <input checked="" type="checkbox"/> Dissolved oxygen	<input type="checkbox"/> pH <input type="checkbox"/> Salinity <input type="checkbox"/> Temperature <input type="checkbox"/> Ammonia <input type="checkbox"/> Dissolved oxygen
Acute Test Results			
Percent survival in 100% effluent	%	%	%
LC50			
95% confidence interval	%	%	%
Control percent survival	%	%	%

EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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Form Approved 03/05/19
OMB No. 2040-0004

TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number <u>9311</u>	Test Number <u>9312</u>	Test Number _____
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Acute Test Results Continued

Other (describe)			
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Chronic Test Results

NOEC	100 %	100 %	%
IC ₂₅	>100 %	>100 %	%
Control percent survival	95 %	96 %	%
Other (describe)			

Quality Control/Quality Assurance

Is reference toxicant data available?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Was reference toxicant test within acceptable bounds?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
What date was reference toxicant test run (MM/DD/YYYY)?	10/02/2019		10/02/2019			
Other (describe)			Reference toxicant IC ₂₅ slightly exceeded upper control limit. All other QC acceptable and no sample toxicity.			

CHRONIC #2

EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

Test Information

	Test Number <u>9491</u>	Test Number <u>9490</u>	Test Number _____
Test species	Mysid	Topsmelt	
Age at initiation of test	7 days	10 days	
Outfall number	Vashon	Vashon	
Date sample collected	06/24/2020	06/24/2020	
Date test started	06/24/2020	06/24/2020	
Duration	7 days	7 days	

Toxicity Test Methods

Test method number	1007.0	1006.0	
Manual title	EPA 821-R-02-014	EPA 600-R-95-136	
Edition number and year of publication	3rd, October 2002	1st, August 1995	
Page number(s)	214	72	

Sample Type

Check one:	<input type="checkbox"/> Grab <input checked="" type="checkbox"/> 24-hour composite	<input type="checkbox"/> Grab <input checked="" type="checkbox"/> 24-hour composite	<input type="checkbox"/> Grab <input type="checkbox"/> 24-hour composite
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Sample Location

Check one:	<input type="checkbox"/> Before Disinfection <input checked="" type="checkbox"/> After Disinfection <input type="checkbox"/> After Dechlorination	<input type="checkbox"/> Before Disinfection <input checked="" type="checkbox"/> After Disinfection <input type="checkbox"/> After Dechlorination	<input type="checkbox"/> Before disinfection <input type="checkbox"/> After disinfection <input type="checkbox"/> After dechlorination
------------	---	---	--

Point in Treatment Process

Describe the point in the treatment process at which the sample was collected for each test.	UV treated secondary	UV treated secondary	
--	----------------------	----------------------	--

Toxicity Type

Indicate for each test whether the test was performed to assess acute or chronic toxicity, or both. (Check one response.)	<input type="checkbox"/> Acute <input checked="" type="checkbox"/> Chronic <input type="checkbox"/> Both	<input type="checkbox"/> Acute <input checked="" type="checkbox"/> Chronic <input type="checkbox"/> Both	<input type="checkbox"/> Acute <input type="checkbox"/> Chronic <input type="checkbox"/> Both
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EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY			
The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.			
	Test Number <u>9491</u>	Test Number <u>9490</u>	Test Number _____
Test Type			
Indicate the type of test performed. (Check one response.)	<input type="checkbox"/> Static <input checked="" type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through	<input type="checkbox"/> Static <input checked="" type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through	<input type="checkbox"/> Static <input type="checkbox"/> Static-renewal <input type="checkbox"/> Flow-through
Source of Dilution Water			
Indicate the source of dilution water. (Check one response.)	<input checked="" type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water	<input checked="" type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water	<input type="checkbox"/> Laboratory water <input type="checkbox"/> Receiving water
If laboratory water, specify type.	RO and Hawaiian Marine Mix	RO and Hawaiian Marine Mix	
If receiving water, specify source.			
Type of Dilution Water			
Indicate the type of dilution water. If salt water, specify "natural" or type of artificial sea salts or brine used.	<input type="checkbox"/> Fresh water <input checked="" type="checkbox"/> Salt water (specify)	<input type="checkbox"/> Fresh water <input checked="" type="checkbox"/> Salt water (specify)	<input type="checkbox"/> Fresh water <input type="checkbox"/> Salt water (specify)
Percentage Effluent Used			
Specify the percentage effluent used for all concentrations in the test series.	0, 0.15 (CCEC), 1.12 (ACEC), 12.5, 25, 50, 100	0, 0.15 (CCEC), 1.12 (ACEC), 12.5, 25, 50, 100	
Parameters Tested			
Check the parameters tested.	<input checked="" type="checkbox"/> pH <i>FS</i> <input checked="" type="checkbox"/> Salinity <input checked="" type="checkbox"/> Temperature	<input checked="" type="checkbox"/> Ammonia <input checked="" type="checkbox"/> Dissolved oxygen	<input checked="" type="checkbox"/> pH <i>FS</i> <input checked="" type="checkbox"/> Salinity <input checked="" type="checkbox"/> Temperature
		<input checked="" type="checkbox"/> Ammonia <input checked="" type="checkbox"/> Dissolved oxygen	<input type="checkbox"/> pH <input type="checkbox"/> Salinity <input type="checkbox"/> Temperature
			<input type="checkbox"/> Ammonia <input type="checkbox"/> Dissolved oxygen
Acute Test Results			
Percent survival in 100% effluent			
LC ₅₀			
95% confidence interval			
Control percent survival			

EPA Identification Number	NPDES Permit Number WA0022527	Facility Name VASHON	Outfall Number
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TABLE E. EFFLUENT MONITORING FOR WHOLE EFFLUENT TOXICITY

The table provides response space for one whole effluent toxicity sample. Copy the table to report additional test results.

	Test Number <u>9491</u>	Test Number <u>9490</u>	Test Number _____
Acute Test Results Continued			
Other (describe)			
Chronic Test Results			
NOEC	100 %	100 %	%
IC ₂₅	>100 %	>100 %	%
Control percent survival	85 %	100 %	%
Other (describe)			
Quality Control/Quality Assurance			
Is reference toxicant data available?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Was reference toxicant test within acceptable bounds?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
What date was reference toxicant test run (MM/DD/YYYY)?	06/24/2020	06/24/2020	
Other (describe)			

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EPA Identification Number	NPDES Permit Number	Facility Name
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TABLE F. INDUSTRIAL DISCHARGE INFORMATION

Response space is provided for three SIUs. Copy the table to report information for additional SIUs.

	SIU ____	SIU ____	SIU ____
Name of SIU			
Mailing address (street or P.O. box)			
City, state, and ZIP code			
Description of all industrial processes that affect or contribute to the discharge.			
List the principal products and raw materials that affect or contribute to the SIU's discharge.			
Indicate the average daily volume of wastewater discharged by the SIU.	gpd	gpd	gpd
How much of the average daily volume is attributable to process flow?	gpd	gpd	gpd
How much of the average daily volume is attributable to non-process flow?	gpd	gpd	gpd
Is the SIU subject to local limits?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the SIU subject to categorical standards?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

EPA Identification Number	NPDES Permit Number	Facility Name
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TABLE F. INDUSTRIAL DISCHARGE INFORMATION

Response space is provided for three SIUs. Copy the table to report information for additional SIUs.

	SIU ____	SIU ____	SIU ____
Under what categories and subcategories is the SIU subject?			
Has the POTW experienced problems (e.g., upsets, pass-through interferences) in the past 4.5 years that are attributable to the SIU?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
If yes, describe.			

Supplemental Information - Form 2A, Section 4.11 _ Additional Industrial Waste Dischargers

Facility Name	Active (Y/N)	Address	Authorization Type	Permit	Customer Type	Effective Date	Expiration Date	Daily Discharge Volume (gal)	Regulated Discharge Volume (gal)
Chevron Service Station - Vashon Soil and Groundwater Remediation Project	Y	17817 VASHON HIGHWAY SW VASHON WA, 98070	MAJOR DISCHARGE AUTHORIZATION	4386-02	GROUNDWATER REMEDIATION - PETROLEUM	1/22/2019	10/2/2021		375
Treatment type: Groundwater contaminated with petroleum hydrocarbons is conveyed to an equalization/particle settling tank, followed by treatment with granular activated carbon filtration.									
Meadow Creature LLC	Y	18850 103RD AVE. SW VASHON WA, 98070	NO CONTROL DOCUMENT REQUIRED	400181-01	METAL FABRICATION	3/30/2015		200	
Treatment type: NA									

Attachment 2

Effluent Dilution Modeling for Vashon Treatment Plant Outfall

Vashon Wastewater Treatment Plant
Application for Renewal of the NPDES Permit (WA0022527)
(July 2021)

Effluent Dilution Modeling for Vashon Treatment Plant Outfall

NPDES Permit: WA-0022527

King County Department of Natural Resources and Parks
Wastewater Treatment Division
201 South Jackson Street
Seattle, WA 98104

Effluent Dilution Modeling-Vashon Wastewater Treatment Facility Marine Outfall

Model

PLUMES Edition 3/UM

The UM model component of PLUMES was used for this modeling effort. This model was chosen because the Vashon Wastewater Treatment Facility outfall conforms to the conditions specified for the suggested use the UM model in Dilution Models for Effluent Discharges, 3rd Edition, EPA/600/R-94/086. In summary these conditions include a buoyant plume discharging into a saline water column with a non-linear stratification profile, the predominant current normal to the axis of the outfall, a single port discharge, and finally the ability to introduce ambient pollutant concentrations and pollutant decay. The farfield predictions were used to model dilutions at the chronic mixing zone boundary, for this purpose the assumptions of a constant eddy diffusivity were used, this was the more conservative assumption as opposed to the assumption that the dispersion coefficient is increasing according to the 4/3 power law, the other farfield option offered by the model.

ZACE Estimation

The estimation of the dilution at the ZACE is made by using a linear regression for the nearfield dilutions at locations on either side of the ZACE. The distance of the plume centerline from the outfall is calculated from the horizontal and vertical components of the plume position as given by UM.

Modeling Conditions

Density Structure

King County measures density stratification at the Vashon WWTP outfall, at ambient monitoring station MSJN02. Monthly data has been collected at this monitoring station since 2005.

Ambient Currents

The data set chosen for ambient currents was taken from two series of Drogue releases conducted in the immediate area of the outfall by Cosmopolitan Engineering Group during April and July 2000. Drogue locations were obtained every 30 minutes and

the corresponding water velocity calculated from the drogue trajectories. A histogram (Figure 2) was constructed from the 137 drogue vector observations and used to evaluate the 10th, 50th, and 90th percentile currents as 22.7 cm/s, 8.4 cm/s, and 2.9 cm/s respectively. The current direction was assumed to be perpendicular to the outfall discharge. The 90th percentile current was determined to correspond to the least dilution, and was selected as the critical condition.

Plant Flows

Ecology's guidance for Conducting Mixing Zone Analysis recommends an effluent flow rate be selected based on the dry weather design flow and a peaking factor, or the highest daily effluent flow rate, depending on how close the plant is operating to the dry weather design flow (Permit Writer's Manual, Table 12). As the critical condition for the Vashon WWTP occurs during winter months, the Vashon WWTP currently operates at greater than 85% of its dry weather design flow during the critical period. The Vashon WWTP Design Flows and recent flow statistics are summarized in

Table 1. Vashon WWTP Historic and Design Flows

	Design Condition	2015	2016	2017	2018	2019	2020	through 3/31/2021	% of Design
Annual Average	0.18	0.14	0.17	0.17	0.15	0.13	0.15	NA	97%
Maximum Month	0.52	0.3	0.28	0.32	0.31	0.23	0.31	0.31	62%
Maximum Day	1.14	0.74	0.6	0.64	0.67	0.57	0.65	0.80	71%

Ecology's guidance suggests using an acute flow rate calculated from the DWDF and a peaking factor, where the peaking factor is the ratio of daily maximum to monthly average flows. As the maximum daily plant flow is higher than this calculation, the maximum daily plant flow was used for this analysis. The max day from 1/2015 through 3/2021 was 0.8048 MG on 1/12/2021. This is slightly higher than the previous maximum daily flow of 0.75 mgd, recorded on 3/18/97. The higher flow of 0.80 mgd was used for modeling dilution at the acute mixing zone.

Ecology's guidance suggests using a chronic flow rate equal to the DWDF if the facility is operating between 85 and 100% of design during the critical period. The maximum monthly flow in the period from 1/2015 through 3/2021 was 0.3235 MGD in Feb 2017. Again, this is higher than the previous peak monthly flow of 0.272 mgd (February 2000) used in the previous analysis. The higher flow of 0.324 mgd was used as the critical chronic flow for modeling dilutions at the chronic mixing zone as it is higher than the DWDF.

Diffuser Configuration

The Vashon WWTP outfall terminates in a single 8" port at a depth of -200 ft MLLW, orientated normal to the shoreline.

Critical Conditions-Selected Cases-Decision Path and Ecology Guidance

Zone of Acute Criteria Exceedance (ZACE) 20 ft or 6.1 m

Ecology guidance recommends that the critical receiving water condition be determined. At this location, the seasonal changes in the receiving water density structure have little effect upon the predicted effluent dilution. The peak one day flow used for determining the ZACE dilution for the Vashon facility. Ecology guidance also required modeling to be performed using the 10th and 90th percentile current values. These current conditions yielded a velocity of 2.9 cm/sec and 22.7 cm/s. A flow of 0.80 MGD was used for modeling and showed a dilution of approximately 92:1 at the acute mixing zone boundary.

Acute dilution factors varied from 92 to 97 with the 90th percentile currents, illustrating that seasonal changes in the receiving water density structure have little effect upon the predicted effluent dilution.

Chronic Mixing Zone: 200 ft. or 61 m. at Vashon

The historic maximum monthly flow of 0.325 MGD was used to model the dilution at the chronic mixing zone. The 50th percentile current (8.4 cm/sec) resulted in the lowest predicted dilution at the chronic mixing zone boundary of approximately 694:1.

Summary

ZACE

The dilution at the ZACE for the critical conditions detailed above yielded a dilution at the ZACE (6.1 m) of **92:1** for the plume discharging perpendicular to the direction of the 90th percentile current speed.

Chronic Mixing Zone

The dilution at the chronic mixing zone (61 m) for the critical conditions described above yielded a dilution of **694:1** for the plume discharging perpendicular to the direction of the 50th percentile current speed.

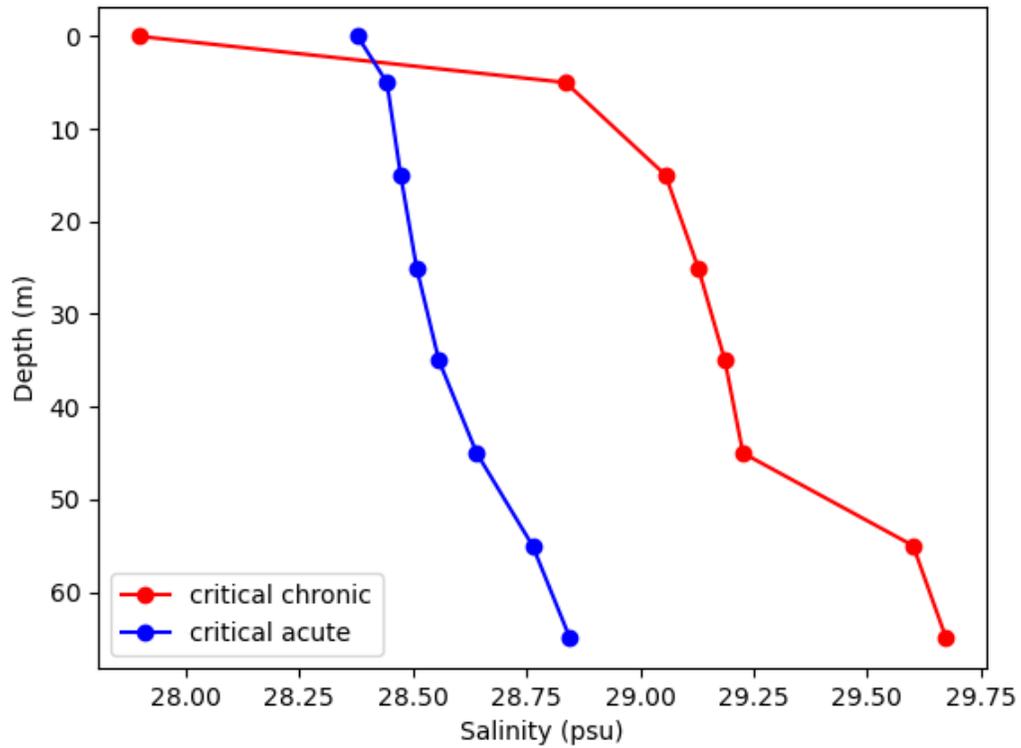


Figure 1. Salinity profiles for acute (20-Jun-2017) and chronic (18-Mar-2014) critical dilution conditions at locator MSJN02

Table 1.

Vashon Island Potential Density Profiles (MSJN02)

Date	Depth			
	0 m	15 m	35 m	55 m
25-Jan-05	22.443	22.928	23.07	23.209
1-Mar-05	22.828	22.876	22.888	22.973
30-Mar-05	22.729	22.881	23.044	23.143
26-Apr-05	22.076	22.52	22.725	22.814
24-May-05	21.947	22.528	22.681	22.708
29-Jun-05	21.947	22.451	22.473	22.512
19-Jul-05	22.284	22.373	22.376	22.461
23-Aug-05	22.416	22.535	22.575	22.614
27-Sep-05	22.816	22.822	22.881	22.977
25-Oct-05	23.107	23.177	23.188	23.201
30-Nov-05	23.136	23.184	23.342	23.419
20-Dec-05	23.331	23.347	23.348	23.349
8-Feb-06	21.038	22.094	22.464	22.572
28-Feb-06	22.283	22.344	22.402	22.511
28-Mar-06	22.531	22.615	22.672	22.846
25-Apr-06	22.303	22.409	22.633	22.857
31-May-06	21.755	22.328	22.494	22.585
27-Jun-06	21.59	21.831	22.253	22.609
25-Jul-06	22.053	22.133	22.303	22.734
23-Aug-06	22.224	22.324	22.588	22.994
26-Sep-06	22.778	22.877	22.925	22.96
25-Oct-06	23.182	23.197	23.215	23.216
27-Nov-06	23.119	23.162	23.183	23.193
19-Dec-06	22.379	22.788	22.9	23.037
17-Jan-07	22.421	22.495	22.687	23.012
21-Feb-07	22.41	22.737	22.84	23.039
20-Mar-07	21.857	22.484	22.63	22.896
18-Apr-07	22.015	22.386	22.489	22.71
22-May-07	22.001	22.292	22.44	22.469
19-Jun-07	22.031	22.337	22.462	22.48
17-Jul-07	22.04	22.331	22.406	22.457
18-Sep-07	22.593	22.66	22.714	22.792
16-Oct-07	23.001	23.028	23.05	23.111
27-Nov-07	23.25	23.252	23.257	23.262
18-Dec-07	22.773	23.017	23.074	23.093
30-Jan-08	22.969	23.006	23.041	23.108
26-Feb-08	22.938	22.958	22.972	23.043
18-Mar-08	22.426	22.924	23.211	23.301
22-Apr-08	22.851	22.91	23.02	23.093
21-May-08	21.602	22.513	22.931	23.122
17-Jun-08	21.106	22.109	22.633	22.902
22-Jul-08	21.856	22.032	22.269	22.666
21-Aug-08	22.5	22.566	22.624	22.824
16-Sep-08	22.529	22.626	22.736	23.203
21-Oct-08	23.075	23.102	23.117	23.126
18-Nov-08	22.687	22.894	22.992	23.178

Date	Depth			
	0 m	15 m	35 m	55 m
21-Jan-09	21.902	22.401	22.952	23.066
18-Feb-09	23.036	23.069	23.072	23.097
17-Mar-09	23.132	23.172	23.207	23.246
21-Apr-09	22.6	22.963	23.064	23.344
19-May-09	22.276	22.451	22.915	22.977
16-Jun-09	21.119	22.328	22.488	22.671
21-Jul-09	21.971	22.319	22.639	23.076
18-Aug-09	22.366	22.367	22.848	23.142
22-Sep-09	22.988	22.988	22.989	23.111
21-Oct-09	23.213	23.231	23.252	23.297
14-Dec-09	22.992	23.005	23.018	23.101
20-Jan-10	22.804	22.909	22.935	22.973
22-Feb-10	22.669	22.685	22.693	22.725
15-Mar-10	22.655	22.709	22.748	22.77
20-Apr-10	22.514	22.514	22.515	22.695
17-May-10	22.228	22.281	22.343	22.465
22-Jun-10	21.535	22.04	22.211	22.217
21-Jul-10	21.643	22.119	22.295	22.392
18-Aug-10	22.304	22.305	22.371	22.459
22-Sep-10	22.574	22.743	22.858	23.019
19-Oct-10	22.488	22.772	22.856	22.952
16-Nov-10	22.87	22.959	23.125	23.267
21-Dec-10	22.886	22.918	22.965	23.148
19-Jan-11	21.867	22.588	22.851	22.94
23-Feb-11	22.416	22.422	22.45	22.474
22-Mar-11	22.434	22.463	22.502	22.602
19-Apr-11	21.963	22.007	22.263	22.498
21-Jun-11	21.312	22.043	22.141	22.178
19-Jul-11	21.989	22.084	22.17	22.286
16-Aug-11	21.738	22.075	22.235	22.426
20-Sep-11	22.086	22.421	22.562	22.615
18-Oct-11	22.728	22.73	22.738	22.779
29-Nov-11	22.968	23.001	23.02	23.066
20-Dec-11	22.955	22.956	22.983	23.144
26-Jan-12	22.995	23.012	23.04	23.133
23-Feb-12	22.489	22.83	22.884	22.95
22-Mar-12	22.36	22.764	22.887	22.913
17-Apr-12	22.079	22.341	22.505	22.776
22-May-12	21.701	21.971	22.203	22.402
19-Jun-12	21.357	21.941	22.384	22.589
17-Jul-12	21.065	21.883	22.319	22.611
21-Aug-12	21.954	22.109	22.21	22.445
18-Sep-12	22.395	22.444	22.454	22.513
18-Oct-12	22.851	22.887	22.972	23.068
27-Nov-12	22.444	22.692	22.872	22.996
27-Dec-12	22.499	22.575	22.616	22.828
22-Jan-13	22.262	22.495	22.539	22.672
20-Feb-13	22.6	22.647	22.688	22.861
19-Mar-13	22.453	22.568	22.831	22.959

Date	Depth			
	0 m	15 m	35 m	55 m
15-Apr-13	22.031	22.582	22.699	22.795
21-May-13	21.581	22.095	22.38	22.565
17-Jun-13	21.927	22.211	22.393	22.558
17-Jul-13	21.733	21.971	22.148	22.157
27-Aug-13	22.374	22.499	22.534	22.552
17-Sep-13	22.514	22.617	22.818	23.058
22-Oct-13	22.737	22.741	22.763	22.853
17-Dec-13	23.18	23.206	23.239	23.418
28-Jan-14	23.056	23.103	23.135	23.32
6-Feb-14	24.86	24.861	24.867	24.918
18-Mar-14	21.666	22.612	22.72	23.061
21-Apr-14	21.754	22.222	22.398	22.534
6-May-14	21.622	22.197	22.321	22.479
20-May-14	21.359	22.035	22.146	22.257
3-Jun-14	21.616	21.945	22.087	22.217
17-Jun-14	21.86	22.018	22.127	22.183
8-Jul-14	21.114	21.93	22.16	22.422
22-Jul-14	21.638	22.034	22.211	22.337
9-Sep-14	22.41	22.466	22.609	22.957
23-Sep-14	21.982	22.389	22.655	22.834
7-Oct-14	22.636	22.711	22.795	23.11
21-Oct-14	22.684	22.842	22.94	23.11
4-Nov-14	22.545	22.842	22.911	22.937
18-Nov-14	21.608	22.379	22.56	22.735
16-Dec-14	22.355	22.438	22.475	22.52
21-Jan-15	21.933	22.174	22.345	22.397
3-Feb-15	21.932	22.116	22.305	22.574
18-Feb-15	19.921	20.718	22.21	22.308
23-Mar-15	22.025	22.095	22.183	22.215
7-Apr-15	22.108	22.153	22.256	22.264
21-Apr-15	22.103	22.104	22.113	22.213
6-May-15	21.939	22.093	22.197	22.391
19-May-15	21.986	22.277	22.365	22.58
3-Jun-15	22.094	22.275	22.45	22.749
16-Jun-15	22.247	22.37	22.447	22.7
7-Jul-15	22.108	22.301	22.346	22.357
23-Jul-15	21.973	22.288	22.386	22.49
4-Aug-15	22.326	22.381	22.404	22.457
18-Aug-15	22.278	22.488	22.545	22.692
9-Sep-15	22.531	22.634	22.703	22.74
22-Sep-15	22.523	22.635	22.742	22.76
6-Oct-15	22.876	22.876	22.876	22.887
20-Oct-15	22.876	22.924	22.942	22.978
3-Nov-15	22.183	22.971	23.002	23.013
18-Nov-15	22.064	22.815	22.934	23.092
15-Dec-15	22.685	22.685	22.685	22.685
20-Jan-16	22.337	22.442	22.578	22.72
2-Feb-16	21.443	22.382	22.406	22.44
17-Feb-16	21.281	22.158	22.203	22.385

Date	Depth			
	0 m	15 m	35 m	55 m
8-Mar-16	21.2	21.596	21.927	22.386
22-Mar-16	21.607	21.816	21.856	22.309
5-Apr-16	17.722	21.221	21.858	22.215
19-Apr-16	21.639	21.722	21.865	22.071
3-May-16	20.673	21.425	21.63	21.789
17-May-16	20.937	21.558	21.882	22.025
7-Jun-16	21.835	21.885	21.905	22.211
21-Jun-16	21.849	22.046	22.235	22.5
6-Jul-16	21.823	22.124	22.238	22.616
19-Jul-16	21.451	22.172	22.395	22.746
2-Aug-16	22.116	22.262	22.323	22.711
16-Aug-16	21.903	22.152	22.337	22.623
7-Sep-16	22.431	22.566	22.613	22.663
20-Sep-16	22.678	22.732	22.756	23.057
4-Oct-16	22.816	22.869	22.899	22.938
18-Oct-16	22.952	22.981	23.098	23.125
8-Nov-16	22.132	22.787	22.822	22.876
22-Nov-16	22.623	22.661	22.673	22.674
21-Dec-16	22.541	22.551	22.555	22.557
24-Jan-17	22.744	22.765	22.802	23.034
7-Feb-17	22.807	22.814	22.845	22.975
22-Feb-17	21.652	22.303	22.637	22.696
7-Mar-17	22.331	22.522	22.594	22.734
21-Mar-17	18.994	21.783	22.328	22.491
4-Apr-17	19.852	21.745	22.039	22.185
18-Apr-17	21.789	21.874	21.958	22.122
2-May-17	21.535	21.923	21.945	21.975
16-May-17	20.997	21.648	21.887	22.112
7-Jun-17	20.437	21.399	21.716	22.267
20-Jun-17	21.523	21.669	21.784	22.016
6-Jul-17	21.257	21.483	21.752	22.136
18-Jul-17	21.459	21.579	21.709	21.87
8-Aug-17	21.768	21.91	22.077	22.512
29-Aug-17	22.07	22.164	22.237	22.258
20-Sep-17	22.273	22.518	22.604	22.919
2-Oct-17	22.351	22.559	22.717	23.006
18-Oct-17	22.812	22.925	22.996	23.172
7-Nov-17	22.968	22.968	22.974	22.998
21-Nov-17	23.106	23.147	23.157	23.183
19-Dec-17	22.693	22.795	22.875	22.974
17-Jan-18	22.57	22.632	22.737	23.05
6-Feb-18	22.105	22.556	22.575	22.585
21-Feb-18	21.849	21.997	22.125	22.46
6-Mar-18	22.739	22.796	22.83	22.896
20-Mar-18	22.459	22.542	22.587	22.645
3-Apr-18	22.547	22.651	22.674	22.687
17-Apr-18	22.254	22.378	22.59	22.863
8-May-18	21.084	22.089	22.129	22.361
22-May-18	21.549	21.947	22	22.261

Date	Depth			
	0 m	15 m	35 m	55 m
5-Jun-18	21.752	22.046	22.124	22.201
19-Jun-18	22.026	22.219	22.301	22.327
10-Jul-18	21.484	22.169	22.315	22.648
24-Jul-18	21.932	22.154	22.286	22.561
21-Aug-18	22.064	22.306	22.448	22.657
5-Sep-18	22.462	22.512	22.589	22.598
18-Sep-18	22.544	22.695	22.787	22.837
3-Oct-18	22.814	22.846	22.901	22.902
16-Oct-18	23.035	23.042	23.045	23.045
14-Nov-18	22.977	23.042	23.073	23.209
27-Nov-18	23.221	23.235	23.244	23.271
18-Dec-18	23.148	23.253	23.352	23.363
15-Jan-19	22.651	22.762	22.924	22.969
7-Feb-19	22.705	22.755	22.775	22.798
20-Feb-19	22.83	22.87	22.878	22.906
5-Mar-19	22.936	22.944	22.949	23.016
19-Mar-19	22.933	22.981	23	23.1
2-Apr-19	22.885	22.901	22.961	23.124
16-Apr-19	22.292	22.916	23.026	23.16
7-May-19	22.201	22.518	22.681	23.028
21-May-19	21.711	22.547	22.724	22.764
4-Jun-19	22.336	22.494	22.615	22.911
18-Jun-19	22.186	22.394	22.617	22.756
2-Jul-19	22.248	22.504	22.69	22.957
16-Jul-19	22.346	22.585	22.707	22.981
6-Aug-19	22.593	22.668	22.716	22.732
20-Aug-19	22.24	22.739	22.842	22.9
4-Sep-19	22.701	22.819	22.852	22.921
17-Sep-19	22.815	22.91	23.038	23.11
8-Oct-19	23.066	23.124	23.195	23.254
22-Oct-19	23.06	23.08	23.123	23.14
5-Nov-19	23.099	23.103	23.104	23.104
19-Nov-19	23.213	23.227	23.232	23.238
11-Dec-19	23.409	23.409	23.418	23.474
8-Jan-20	22.567	23.165	23.367	23.533
4-Feb-20	21.343	22.7	22.828	22.865
19-Feb-20	20.823	22.134	22.321	22.373
3-Mar-20	22.067	22.315	22.407	22.608
17-Mar-20	22.169	22.186	22.276	22.465
2-Jun-20	21.612	22.006	22.379	22.381
16-Jun-20	21.751	22.493	22.546	22.614
7-Jul-20	22.187	22.285	22.42	22.595
21-Jul-20	21.635	22.013	22.377	22.723
4-Aug-20	21.972	22.279	22.381	22.483
18-Aug-20	21.997	22.237	22.335	22.362
9-Sep-20	22.507	22.538	22.556	22.625
22-Sep-20	22.652	22.749	22.777	22.827
6-Oct-20	22.827	22.841	22.853	22.882
21-Oct-20	22.919	22.969	22.976	22.984

Date	Depth			
	0 m	15 m	35 m	55 m
3-Nov-20	22.92	22.942	22.949	22.957
18-Nov-20	22.932	22.98	22.994	23.073
8-Dec-20	22.942	22.987	23.017	23.031
20-Jan-21	21.642	22.277	22.415	22.71
2-Feb-21	22.406	22.433	22.473	22.597
17-Feb-21	22.404	22.42	22.467	22.531
2-Mar-21	22.449	22.479	22.548	22.657
16-Mar-21	22.496	22.53	22.545	22.615
6-Apr-21	22.449	22.579	22.61	22.809
20-Apr-21	22.07	22.5	22.59	22.773
4-May-21	21.78	22.653	22.691	22.767
18-May-21	22.362	22.483	22.677	22.849
8-Jun-21	20.803	22.62	22.797	22.898
22-Jun-21	21.544	21.972	22.51	22.665
7-Jul-21	21.519	22.04	22.467	22.621

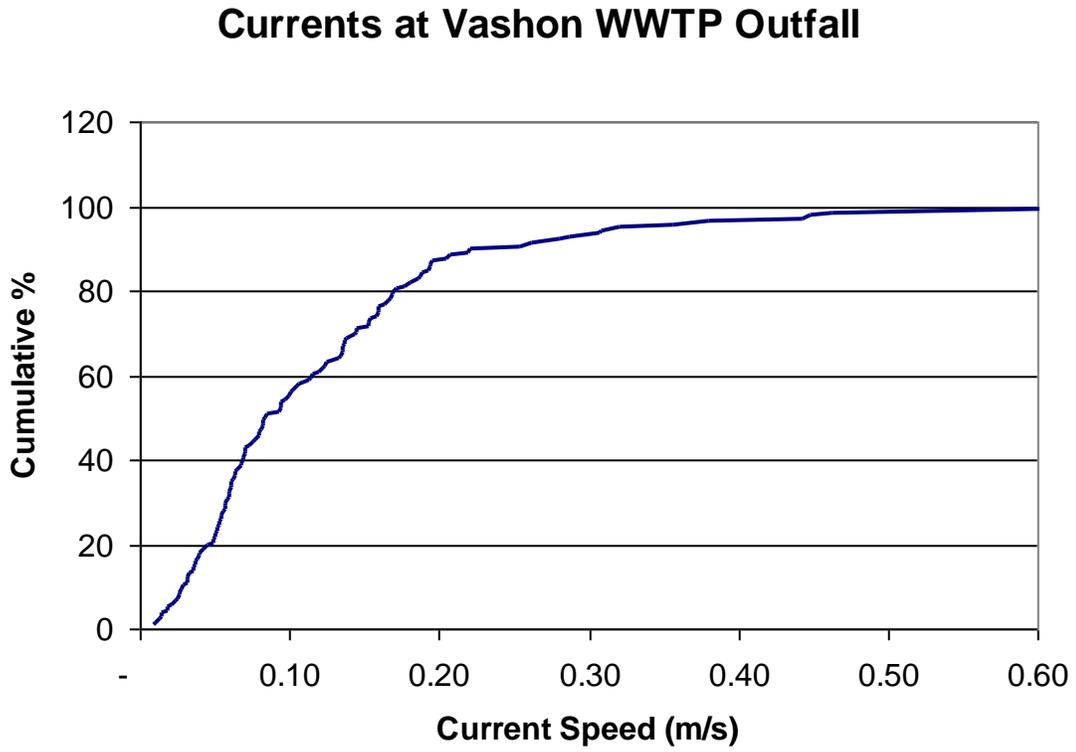


Figure 2. Cumulative probability plot of current speeds at Vashon Island Outfall based on drogue measurements.

PLUMES Output

/ UM3.

Case 522; ambient file M:\proj\plumes\vplumes\vashon\2021\vashon.001.db; Diffuser table record 1: -----

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	
Density										
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.227	90.0	28.38	11.6	0.0	0.0	0.084	90.0	0.0003	21.56
5.0	0.227	90.0	28.44	11.29	0.0	0.0	0.084	90.0	0.0003	21.66
15.0	0.227	90.0	28.47	11.18	0.0	0.0	0.084	90.0	0.0003	21.7
25.0	0.227	90.0	28.51	11.04	0.0	0.0	0.084	90.0	0.0003	21.75
35.0	0.227	90.0	28.56	10.89	0.0	0.0	0.084	90.0	0.0003	21.82
45.0	0.227	90.0	28.64	10.66	0.0	0.0	0.084	90.0	0.0003	21.92
55.0	0.227	90.0	28.76	10.45	0.0	0.0	0.084	90.0	0.0003	22.05
65.0	0.227	90.0	28.85	10.22	0.0	0.0	0.084	90.0	0.0003	22.15

Diffuser table:

P-dia	P-elev	V-angle	H-angle	Ports	SttTime	EndTime	Incrmnt	AcuteMZ	ChrcMZ	P-depth	Ttl-flo	Eff-sal		
(in)	(m)	(deg)	(deg)	()	(hr)	(hr)	(hr)	(ft)	(ft)	(ft)	(MGD)	(psu)	(C)	(kg/kg)
8.0	1.0	0.0	0.0	1.0	1.0	771.0	1.0	20.0	200.0	200.0	0.8	0.0	15.0	100.0

Simulation:

Froude number: 5.052; effluent density (sigma-T) -0.83634079; effluent velocity 1.081(m/s);

Step	Depth	Amb-cur	P-dia	Polutnt	P-speed	Dilutn	x-posn	y-posn
	(ft)	(m/s)	(in)	(kg/kg)	(m/s)	()	(ft)	(ft)
0	200.0	0.227	8.0	100.0	1.081	1.0	0.0	0.0;
93	199.7	0.227	36.23	18.35	0.28	5.349	2.181	0.795; begin overlap;
100	199.7	0.227	39.17	16.37	0.269	5.995	2.329	0.944;
102	199.6	0.227	40.05	15.83	0.266	6.199	2.371	0.991; end overlap;
200	196.9	0.227	111.2	2.34	0.234	41.8	4.567	9.18;
240	193.9	0.227	165.2	1.06	0.234	92.27	5.318	19.28; acute zone;
300	185.6	0.227	300.8	0.323	0.231	302.7	6.225	53.1;
344	175.4	0.227	467.7	0.135	0.229	723.4	6.797	112.9; trap level;
368	168.9	0.227	593.6	0.0846	0.227	1155.7	7.251	207.4; chronic zone;
370	169.0	0.227	598.7	0.0832	0.227	1175.4	7.313	223.2; local maximum rise or fall;

Outside chronic zone

/ UM3.

Case 106; ambient file M:\proj\plumes\vplumes\vashon\2021\vashon.001.db; Diffuser table record 2: -----

Ambient Table:

Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-spd	Far-dir	Disprsn	
Density										
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2	sigma-T
0.0	0.084	90.0	27.9	8.263	0.0	0.0	0.084	90.0	0.0003	21.7
5.0	0.084	90.0	28.84	8.083	0.0	0.0	0.084	90.0	0.0003	22.46
15.0	0.084	90.0	29.06	7.989	0.0	0.0	0.084	90.0	0.0003	22.64
25.0	0.084	90.0	29.13	7.961	0.0	0.0	0.084	90.0	0.0003	22.7
35.0	0.084	90.0	29.19	7.947	0.0	0.0	0.084	90.0	0.0003	22.75
45.0	0.084	90.0	29.23	7.936	0.0	0.0	0.084	90.0	0.0003	22.78

55.0	0.084	90.0	29.6	7.832	0.0	0.0	0.084	90.0	0.0003	23.09
65.0	0.084	90.0	29.67	7.813	0.0	0.0	0.084	90.0	0.0003	23.15

Diffuser table:

P-dia	P-elev	V-angle	H-angle	Ports	Spacing	SttTime	EndTime	Incrmnt	AcuteMZ	ChrcMZ	P-depth
Ttl-flo	Eff-sal	Temp	Polutnt								
(in)	(m)	(deg)	(deg)	()	(m)	(hr)	(hr)	(hr)	(ft)	(ft)	(ft)
8.0	1.0	0.0	0.0	1.0	100.0	2.0	771.0	3.0	20.0	200.0	200.0
									0.324	0.0	15.0

Simulation:

Froude number: 2.002; effluent density (sigma-T) -0.83634079; effluent velocity 0.438(m/s);

Step	Depth	Amb-cur	P-dia	Polutnt	P-speed	Dilutn	x-posn	y-posn
(ft)	(m/s)	(in)	(kg/kg)	(m/s)	()	(ft)	(ft)	
0	200.0	0.084	8.0	100.0	0.438	1.0	0.0	0.0;
100	199.1	0.084	23.54	25.05	0.198	3.922	1.702	0.392;
200	193.2	0.084	72.46	3.498	0.149	27.94	3.288	3.577;
300	177.6	0.084	226.7	0.483	0.11	202.3	4.189	17.7;
307	176.1	0.084	246.3	0.42	0.107	232.4	4.233	19.61; acute zone;
330	170.8	0.084	325.8	0.267	0.0962	366.4	4.369	27.46; trap level;
382	164.4	0.084	470.8	0.147	0.0839	663.8	4.603	52.1; local maximum rise or fall;

Const Eddy Diffusivity. Farfield dispersion based on wastefield width of 11.96 m

conc	dilutn	width	distnce	time
(kg/kg)	(m)	(m)	(hrs)	(kg/kg) (s-1) (cm/s)(m0.67/s2)
0.14083	694.2	15.77	60.96	0.149 0.0 0.0 8.4 3.00E-4

count: 1

Certificate Of Completion

Envelope Id: 3A64535EA2EB4E23814386997DFF7C40	Status: Completed
Subject: Please DocuSign: KingCo_Vashon-NPDES-permit-application_July2021.pdf	
Source Envelope:	
Document Pages: 69	Signatures: 2
Certificate Pages: 5	Initials: 0
AutoNav: Enabled	Envelope Originator:
Enveloped Stamping: Enabled	Christina Fredzess
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	cfredzess@kingcounty.gov
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Christie True
 Christie.True@kingcounty.gov
 Director, King County Department of Natural Resources and Parks
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 ID: 475f4df9-c0eb-4c06-93c1-8eb7941ee57e

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Editor Delivery Events

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Intermediary Delivery Events

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Status

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 Jeff.Lafer@kingcounty.gov
 Security Level: Email, Account Authentication (None)

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Jim Bolger
 jbolger@kingcounty.gov
 Jim Bolger
 King County General (ITD)
 Security Level: Email, Account Authentication (None)

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<p>Kamuron GuroI kguroI@kingcounty.gov WTD Director King County WTD Security Level: Email, Account Authentication (None)</p> <p>Electronic Record and Signature Disclosure: Accepted: 7/27/2021 11:02:14 AM ID: 8057ac5e-7556-4ba0-8aa6-9c7786343857</p>	COPIED	Sent: 7/27/2021 4:07:35 PM
<p>Lester Kinlow lkinlow@kingcounty.gov King County Security Level: Email, Account Authentication (None)</p> <p>Electronic Record and Signature Disclosure: Accepted: 8/13/2020 9:13:02 AM ID: 70c5c4da-a15e-4d6f-acbe-0f1b33d484d9</p>	COPIED	Sent: 7/27/2021 4:07:34 PM Viewed: 7/28/2021 8:39:08 AM
<p>Marla Oughton Marla.Oughton@kingcounty.gov King County-Department of Natural Resources and Parks-Wastewater Treatment Security Level: Email, Account Authentication (None)</p> <p>Electronic Record and Signature Disclosure: Not Offered via DocuSign</p>	COPIED	Sent: 7/27/2021 4:07:34 PM Viewed: 7/28/2021 9:23:43 AM
<p>Robert Waddle Robert.Waddle@kingcounty.gov Ops Manager King County General (ITD) Security Level: Email, Account Authentication (None)</p> <p>Electronic Record and Signature Disclosure: Accepted: 8/13/2020 7:33:46 AM ID: 80123045-1d65-4623-9004-aacb8005cd30</p>	COPIED	Sent: 7/27/2021 4:07:34 PM

Witness Events	Signature	Timestamp
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Notary Events	Signature	Timestamp
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Envelope Summary Events	Status	Timestamps
Envelope Sent	Hashed/Encrypted	7/27/2021 4:07:35 PM
Certified Delivered	Security Checked	7/28/2021 8:18:31 AM
Signing Complete	Security Checked	7/28/2021 8:18:53 AM
Completed	Security Checked	7/28/2021 8:18:53 AM

Payment Events	Status	Timestamps
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Electronic Record and Signature Disclosure
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