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28 February to 1 March 2019

Wishram Railyard

Well	Transducer S/N	DTP	DTW	Time
WMW-1 <sup>N 17/19</sup>	10960233	-	10.27	1359
WMW-3	10922785			
WMW-14 <sup>N 21</sup>	10462914	-	15.17	1359
WMW-16 <sup>N 21</sup>	10462913	-	<del>15.17</del> 14.88	1401
WMW-18 <sup>N 21</sup>	10445230	-	14.83	1402
River	10329394			
Barometric	10445227			

2/27/19

deployed @ 1217

1255

1230

1302

In well WMW-1

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:

Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
OHM-1					
OHM-2					
OHM-3					
OHM-4					
RMD-1					
RMD-2					
RMD-3					
RMD-4					
RMD-5					
RMD-6					
WMW-1					
WMW-3					
WMW-5					
WMW-7					
WMW-8					
WMW-9					
WMW-10	3/11/19 1158	—	10.63	—	
WMW-11					
WMW-12					
WMW-13	3/11/19 1140	—	11.07	—	
WMW-14					
WMW-15					
WMW-16					
WMW-17					
WMW-18					
WMW-19					
WMW-20					

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:

Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
WMW-21					
WMW-22	3/11 1247 G	—	14.39	—	
WMW-23	3/11 1249 U	—	14.19	—	
WMW-24	3/11/19 1212	—	10.55	—	
WMW-26	1434 A	—	10.54 <sub>a</sub>	—	
WMW-27	3/11/19 1235		10.51		underwater
WMW-28					"
WMW-29	3/11/19 1239	—	10.50	—	
WMW-30	3/11/19 1243	—	9.72	—	
WMW-31					
WMW-32					

3/27

Additional Notes:

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 3-1-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: Matt Gregorowik  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1100  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-14  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 14.85  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

**Total Containers 8**

Time	1030	1035	1040	1045	1050			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	14.95	14.96	14.96	14.96	14.96			
Temperature (°C), (± 0.2)	13.16	13.01	12.46	12.31	12.27			
pH, (± 0.1)	7.29	7.44	7.48	7.45	7.44			
Sp. Conductance (uS/cm), (± 3%)	0.259	0.244	0.246	0.244	0.243			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	13.39	2.60	1.90	1.86	1.71			
ORP (mV), (± 10%)	51.2	50.8	51.8	52.2	52.6			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	11.33	7.84	6.67	4.81	5.19			
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 3-1-  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: Matt Grzegorzewski  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1000  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-15  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 14.75  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

**Total Containers 8**

Time	930	935	940	945	950			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	14.85	14.87	14.87	14.87	14.87			
Temperature (°C), (± 0.2)	13.14	13.85	13.84	13.91	14.04			
pH, (± 0.1)	6.78	6.84	6.86	6.86	6.86			
Sp. Conductance (µS/cm), (± 3%)	0.796	0.716	0.716	0.715	0.713			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.14	1.17	0.93	0.85	0.79			
ORP (mV), (± 10%)	59.0	59.7	59.7	59.5	59.9			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	12.84	8.67	7.21	2.95	1.52			
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewaterers, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 3-1-19 Well Number: WMW-16  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: Matt Grzegorzewski Well Condition:  
 Water Level Meter: Solinst or Gebtech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 11.33-26.33  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 8:50 Depth to Groundwater (ft): 14.36 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: Overcast, 19°F 3mph SE

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	2	VOA	HCl	40 mL	No	BTEX (8260)		
	2 ✓	VOA	HCl	40 mL	No	NWTPH-Gx	X	
	2 ✓	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2 ✓	VOA	-	40 mL	No	PAHs (8270 SIM)	X	
	2 ✓	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1 ✓	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1 ✓	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1 ✓	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)		
	1 ✓	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	
<b>Total Containers</b>		<b>12</b>						

Time	815	820	825	830	835	840	845	
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Volume Purged (Liters)	0.0	0.0	2.0	3.0	4.0	5.0	6.0	
Water Depth (ft)	14.39	14.40	14.40	14.41	14.41	14.41	14.41	
Temperature (°C), (± 0.2)	10.45	13.03	13.74	13.81	13.67	13.48	13.36	
pH, (± 0.1)	8.30	7.61	7.32	7.04	6.87	6.78	6.75	
Sp. Conductance (µS/cm), (± 3%)	0.374	0.360	0.363	0.370	0.371	0.372	0.372	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	20.32	2.80	1.82	1.47	1.12	1.10	1.07	
ORP (mV), (± 10%)	76.2	61.5	60.4	64.4	66.3	67.6	66.5	
Turbidity (NTU), (± 10% or 3 <10 NTUs)	1.72	2.05	3.14	4.01	1.96	2.56	3.11	
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2-28-19 Well Number: WMW-17  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: Matthew Gregorowski Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 12-27  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 1700 Depth to Groundwater (ft): 14.57 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: Overcast 22°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		Duplicate	D-1-2019-0228	1740
Other:			Dup on 15 or 16 if seen in 17		

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
L	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, As)	X
<b>Total Containers</b>		<b>11</b>					

Time	1630	1635	1640	1645	1650	1655		
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0	5.0		
Water Depth (ft)	14.70	14.70	14.71	14.71	14.71	14.71		
Temperature (°C), (± 0.2)	13.36	14.08	14.16	14.15	14.14	14.15		
pH, (± 0.1)	6.80	6.60	6.58	6.61	6.61	6.61		
Sp. Conductance (µS/cm), (± 3%)	1.089	1.025	0.910	0.747	0.693	0.677		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.34	0.62	0.48	0.37	0.35	0.31		
ORP (mV), (± 10%)	110.7	55.3	14.2	-18.4	-21.9	-22.6		
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	6.24	4.58	3.54	3.23	5.98	3.01		
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2-28-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: Matt Grzegorzewski  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1500?  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums  
 Weather: Partly cloudy 28°F

Well Number: WMW-18  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 14.85  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe, As)	X

**Total Containers** 9

	Time	1435	1440	1445	1450	1455			
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2				
Volume Purged (Liters)	0.0	2.0	2.0	3.0	4.0				
Water Depth (ft)	14.87	14.87	14.87	14.87	14.87				
Temperature (°C), (± 0.2)	14.18	14.39	14.25	14.23	14.22				
pH, (± 0.1)	6.89	6.88	6.88	6.88	6.89				
Sp. Conductance (µS/cm), (± 3%)	0.584	0.588	0.587	0.587	0.587				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.50	0.47	0.34	0.31	0.28				
ORP (mV), (± 10%)	64.7	61.1	65.4	69.5	72.2				
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	4.93	2.87	3.25	4.20	3.67				
Color									
Odor/Evidence of LNAPL									

**Notes:** (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 3-1-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-19  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: Math Gregoriewk  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): \_\_\_\_\_

Sampling Time: 1200  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Depth to Groundwater (ft) 14.72  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	3	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (Pb only) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

**Total Containers 11**

Time	1125	1130	1135	1140				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2				
Volume Purged (Liters)	0.0	1.0	2.0	3.0				
Water Depth (ft)	15.18	15.29	15.24	15.29				
Temperature (°C), (± 0.2)	12.80	13.31	13.20	13.26				
pH, (± 0.1)	7.46	7.31	7.27	7.22				
Sp. Conductance (µS/cm), (± 3%)	0.272	0.271	0.269	0.267				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.66	2.51	2.45	2.29				
ORP (mV), (± 10%)	54.8	54.9	52.8	53.6				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	21.74	13.16	8.77	4.84				
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewaterers, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, Lead + MNA for metals



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2-28-19 Well Number: WMW-21  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: Matthew Gropewski Well Condition: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 21.5  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 11.5-21.5  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): \_\_\_\_\_  
 Sampling Time: 1:05 Depth to Groundwater (ft) 14.36 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: Partly sunny, 28°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

**Total Containers 11**

Time	1240	1245	1250	1255	1300			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	14.61	14.61	14.61	14.62	14.62			
Temperature (°C), (± 0.2)	12.90	14.99	15.21	15.05	15.08			
pH, (± 0.1)	7.16	7.03	6.99	6.97	6.97			
Sp. Conductance (µS/cm), (± 3%)	0.529	0.527	0.524	0.523	0.524			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	7.45	1.50	0.79	0.74	0.69			
ORP (mV), (± 10%)	84.5	105.2	113.8	116.8	117.8			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	11.21	3.28	2.95	4.32	3.69			
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2-28-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: Matt Gregorzewski  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1140  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-22  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 14.92  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WTH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals Mn, Fe)	X

**Total Containers 11**

Time	1100	1105	1110	1115	1120	1125		
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2		
Volume Purged (Liters)	0	1.0	2.0	3.0	4.0	5.0		
Water Depth (ft)	14.95	14.96	14.96	14.96	14.96	14.96		
Temperature (°C), (± 0.2)	14.20	15.02	15.19	15.09	15.07	15.07		
pH, (± 0.1)	7.46	7.23	7.04	7.02	7.01	7.20		
Sp. Conductance (µS/cm), (± 3%)	0.961	0.960	0.959	0.956	0.929	0.917		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.46	0.69	0.54	0.63	0.66	0.71		
ORP (mV), (± 10%)	149.1	153.1	131.3	127.0	125.8	126.0		
Turbidity (NTU), (± 10% or 3 <10 NTUs)	7.76	5.43	3.20	2.99	4.08	5.31		
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2/28/19 Well Number: **WMW-23**  
 Project Name: **BNSF Wishram** Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: **1996120\*00** Well Diameter (in): 2-inch PVC  
 Sampling Personnel: Matthew Gregorzewski Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 21.5  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 11.5-21.5  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft):                       
 Sampling Time: 0935 Depth to Groundwater (ft): 14.73 **TOC**  
 Total Discharge (gal):                      Depth to LNAPL (ft):                       
 Water Disposal: On-Site 55-gallon drums Water Column (ft):                       
 Weather: 20°F, Overcast, No precip, Snow on ground

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	BTEX (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X		
<b>Total Containers</b>		<b>11</b>						

Time	910	915	920	925	930			
Parameter (every 5 min)	0 min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0	1.0	2.0	3.0	4.0			
Water Depth (ft)	14.92	14.93	14.93	14.93	14.98			
Temperature (°C), (± 0.2)	13.33	14.68	15.02	14.79	14.96			
pH, (± 0.1)	6.61	6.86	6.92	7.07	7.05			
Sp. Conductance (µS/cm), (± 3%)	0.838	0.852	0.846	0.850	0.853			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.35	0.85	0.80	0.55	0.51			
ORP (mV), (± 10%)	241.3	185.6	176.0	153.0	154.3			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	8.84	3.43	4.62	3.55	2.89			
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: BTEX, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2/28/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1430  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-24  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 10.65  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: SUN + SNOW

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

Total Containers **11**

Time	1350	1355	1400	1405	1410	1415	1420	1425
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)	11.23	11.18	11.12	11.12	11.09	11.10	11.11	11.11
Temperature (°C), (± 0.2)	11.50	11.18	10.24	11.12	11.10	11.55	11.51	11.50
pH, (± 0.1)	7.70	7.47	7.44	7.47	7.55	7.59	7.62	7.55
Sp. Conductance (µS/cm), (± 3%)	0.556	0.555	0.555	0.548	0.558	0.546	0.556	0.541
DO (mg/L), (± 10% or 10% of 0.2mg/l)	6.01	4.82	4.26	3.70	3.52	3.05	2.88	2.74
ORP (mV), (± 10%)	-93.6	-89.5	-90.3	-98.0	-104.7	-110.0	-115.9	-111.7
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.05	1.17	0.93	0.92	1.01	0.42	1.41	0.10
Color	clear							
Odor/Evidence of LNAPL	NO O/S							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2/27/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET/IMG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0750  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-26  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 10.54  
 Depth to LNAPL (ft): —  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: SNOW

WMW-26-20190228

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				—
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	—	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	

Total Containers **11**

Time	1445	1450	1455	1500	1505	1510	1515	1520
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.2	—	—	—	—	—	—	—
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
Water Depth (ft)	11.79	12.72	13.87	14.41	15.16	15.65	16.20	16.99
Temperature (°C), (± 0.2)	13.79	13.83	13.83	13.65	13.71	13.71	13.92	13.84
pH, (± 0.1)	7.28	7.26	7.21	7.23	7.21	7.19	7.19	7.19
Sp. Conductance (µS/cm), (± 3%)	0.557	0.563	0.563	0.562	0.561	0.558	0.557	0.556
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.18	3.07	2.25	1.92	1.59	1.21	1.04	0.97
ORP (mV), (± 10%)	-62.3	-57.2	-56.7	-58.0	-60.6	-65.4	-71.3	-73.1
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	1.76	1.31	1.93	7.81	8.54	6.66	3.61	3.77
Color	clear	—	—	—	—	—	—	—
Odor/Evidence of LNAPL	nois	—	—	—	—	—	—	—

Notes: (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

Well dewatered

2/29  
0739  
10.5  
11.50  
2.69  
0.541  
49.53  
-122.0  
3.32



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2/20/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1710  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums  
 Weather: clouds/snow

Well Number: **WMW-27**  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: under water  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 11.83  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

bto  
 TOC  
 stick up

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WTH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

Total Containers 11

Time	1605	1610	1615	1620	1625	1630	1635	1650	1705
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min		
Flow Rate (L/min)		0.2	2.0	3.0	4.0	4.5	6.0		
Volume Purged (Liters)		1.0	7.5	7.8	7.5	4.5	6.0		
Water Depth (ft)		11.95	11.98	11.20	12.13	12.10	12.20	12.14	12.06
Temperature (°C), (± 0.2)		10.99	11.02	12.10	10.65	10.86	11.06	11.81	11.34
pH, (± 0.1)		8.06	8.02	7.99	7.97	7.90	7.90	7.91	7.75
Sp. Conductance (µS/cm), (± 3%)		0.228	0.211	0.190	0.166	0.174	0.200	0.232	0.245
DO (mg/L), (± 10% or 10% of 0.2mg/l)		6.31	6.60	7.02	7.95	7.89	7.88	5.47	4.98
ORP (mV), (± 10%)		-95.2	-99.4	-101.2	-98.3	-97.5	-99.5	-106.0	-104.1
Turbidity (NTU), (± 10% or 3 <10 NTUs)		691.1	695.0	750.1	585.0	375.4	326.0	200.3	180.8
Color		murky	murky						
Odor/Evidence of LNAPL		no/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

21 stickup due to puddle

Called RH, says to sample. Filter metals sample. turbidity after sampling & sitting for ~10 min = 223.4

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2/28/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1530  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: **WMW-28**  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 9.80  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: cloudy, snow

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		DUP	D-1-2019	
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WTH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	

Total Containers **11**

Time	1505	1510	1515	1520	1525			
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min			
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5			
Water Depth (ft)	9.87	9.87	9.87	9.85	9.86			
Temperature (°C), (± 0.2)	10.81	11.08	11.39	11.38	11.14			
pH, (± 0.1)	7.88	7.80	7.84	7.83	7.78			
Sp. Conductance (µS/cm), (± 3%)	0.316	0.313	0.313	0.313	0.312			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	5.76	5.28	5.08	4.95	4.79			
ORP (mV), (± 10%)	-71.5	-79.6	-86.8	-92.0	-91.8			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	0.60	0.62	1.39	0.34	0.39			
Color	clear							
Odor/Evidence of LNAPL	no							

Notes: (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 2/27/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: VOT/IMG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0955  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-29  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 10.95  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: snowing

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	

**Total Containers 11**

Parameter (every 5 min)	Time	1535	1540	1545	1550	1555	1600	2/28/19 0910
	5 min	10 min	15 min	20 min	25 min	30 min		
Flow Rate (L/min)		0.2						
Volume Purged (Liters)		1.0	2.0	3.0	4.0	5.0	6.0	
Water Depth (ft)		11.55	12.43	13.14	13.70	14.50	15.11	11.58
Temperature (°C), (± 0.2)		13.81	13.44	13.97	14.08	14.13	10.86	10.96
pH, (± 0.1)		7.01	7.13	7.12	7.12	7.11		7.24
Sp. Conductance (µS/cm), (± 3%)		1.240	1.241	1.236	1.244	1.248		1.170
DO (mg/L), (± 10% or 10% of 0.2mg/l)		1.81	1.30	1.11	1.05	0.94		
ORP (mV), (± 10%)		-58.8	-60.7	-64.4	-66.0	-67.6		-55.6
Turbidity (NTU), (± 10% or 3 < 10 NTUs)		2.40	3.61	3.48	3.07	3.88		6.51
Color		clear						
Odor/Evidence of LNAPL		no						

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

Rain dry after 1555 reading.

ice blocking tubing / flow thru cell

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 2/20/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1025  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-30  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 9.85  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: SUN + SNOW

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	

Total Containers 11

Parameter (every 5 min)	Time	1250	1255	1300	1305	1310	1315	1020	
	5 min	5 min	10 min	15 min	20 min	25 min	30 min		
Flow Rate (L/min)		0.1						0.1	
Volume Purged (Liters)		0.5	1.0	1.5	2.0	2.5		0.5	
Water Depth (ft)		11.29	11.70	12.24	12.91	13.83		9.73	
Temperature (°C), (± 0.2)		13.57	13.80	13.72	14.13	14.45		12.55	
pH, (± 0.1)		8.28	8.13	8.02	7.98	7.93		7.82	
Sp. Conductance (µS/cm), (± 3%)		0.504	0.501	0.497	0.494	0.496		0.498	
DO (mg/L), (± 10% or 10% of 0.2mg/l)		6.93	5.28	4.56	4.08	4.30		7.59	
ORP (mV), (± 10%)		-79.1	-80.2	-90.7	-91.3	-88.5		-18.21	
Turbidity (NTU), (± 10% or 3 <10 NTUs)		3.57	3.50	3.25	3.48	3.87		3.22	
Color		Clear						Clear	
Odor/Evidence of LNAPL		NO						NO	

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

Purged only after 1310 reading.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 3/1/19 Well Number: **WMW-31**  
 Project Name: **BNSF Wishram** Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: **1996120\*00** Well Diameter (in): 2-inch PVC  
 Sampling Personnel: VET Well Condition: frozen  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): \_\_\_\_\_  
 Sampling Time: 0825 Depth to Groundwater (ft): 9.19 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: cloudy / ice

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	
<b>Total Containers</b>				<b>11</b>				

Time	0755	0800	0805	0810	0815	0820		
<b>Parameter (every 5 min)</b>	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2							
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	9.30	9.30	9.35	9.31	9.31	9.30		
Temperature (°C), (± 0.2)	12.37	12.95	12.97	12.85	12.59	13.03		
pH, (± 0.1)	7.68	7.60	7.55	7.51	7.46	7.45		
Sp. Conductance (µS/cm), (± 3%)	0.707	0.722	0.727	0.730	0.727	0.723		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.43	2.62	2.07	1.71	1.74	1.84		
ORP (mV), (± 10%)	-51.9	-50.4	-40.8	-45.1	-43.4	-43.5		
Turbidity (NTU), (± 10% or 3 <10 NTUs)	21.82	10.00	5.41	3.35	3.45	2.88		
Color	clear							
Odor/Evidence of LNAPL	no/c							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

*tubing freezing & coming apart from flow thru cell. wrapped extra insulating tape on it.*

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 3/1/19 Well Number: **WMW-32**  
 Project Name: **BNSF Wishram** Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: **1996120\*00** Well Diameter (in): 2-inch PVC  
 Sampling Personnel: KJT Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft):                       
 Sampling Time: 0940 Depth to Groundwater (ft): 9.52 **TOC**  
 Total Discharge (gal):                      Depth to LNAPL (ft):                       
 Water Disposal: On-Site 55-gallon drums Water Column (ft):                       
 Weather: snowing

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments	
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	
<b>Total Containers</b>		<b>11</b>						

Time	0905	0910	0915	0920	0925	0930	0935	0940
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)	10.31	10.45	10.44	10.42	10.34	10.53	10.58	10.60
Temperature (°C), (± 0.2)	13.76	13.76	13.64	13.35	13.50	14.00	13.91	14.05
pH, (± 0.1)	7.78	7.79	7.78	7.73	7.64	7.74	7.75	7.73
Sp. Conductance (µS/cm), (± 3%)	0.849	0.860	0.860	0.850	0.850	0.855	0.824	0.785
DO (mg/L), (± 10% or 10% of 0.2mg/l)	5.66	5.23	5.09	4.88	4.66	4.49	4.18	3.64
ORP (mV), (± 10%)	-32.7	-37.7	-42.2	-50.7	-62.2	-62.8	-60.0	-63.0
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	2.91	1.85	0.67	0.80	0.45	0.60	0.96	0.58
Color	clear							
Odor/Evidence of LNAPL	no							

**Notes:** (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: Full VOCs list, NWTPH-Gx, RCRA8 + MNA for metals

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7 to 9 May 2019

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:					
Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
OHM-1					
OHM-2					
OHM-3					
OHM-4	5-6-19 1632		19.58		
RMD-1	5-6-19 1130	—	14.58	—	
RMD-2	5-6-19 1149	—	13.68	—	
RMD-3	5-6-19 1159	—	13.95	—	
RMD-4	5-6-19 1205	—	13.82	—	
RMD-5	5-6-19 1122	—	13.76	—	
RMD-6	5-6-19 1214	—	13.59	—	
WMW-1					
WMW-3					
WMW-5					
WMW-7	5-6-19 1306	—	10.87	—	
WMW-8	5-6-19 1311		10.43		
WMW-9	5-6-19 1115	—	10.18	—	
WMW-10	5-6-19 1112	—	10.06	—	
WMW-11	5-6-19 1140	—	10.00	—	
WMW-12	5-6-19 1317	—	10.09	—	
WMW-13	5-6-19 1108	—	10.66	—	
WMW-14	5-6-19 1119	—	14.22	—	
WMW-15	5-6-19 1127	—	14.08	—	
WMW-16	5-6-19 1145	—	13.82	—	
WMW-17	5-6-19 1156	—	13.63	—	
WMW-18	5-6-19 1202		13.79		
WMW-19	5-6-19 1056	—	14.09	—	
WMW-20	5-6-19 1210	—	13.98'	—	

no sheen



FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:					
Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
WMW-21	5-6-19 1216	—	13.17	—	
WMW-22	5-6-19 1220	—	13.48	—	
WMW-23	5-6-19 1223	—	13.25	—	
WMW-24					
WMW-26					
WMW-27					
WMW-28					
WMW-29					
WMW-30					
WMW-31	5-6-19 1329	—	8.72	—	
WMW-32	5-6-19 1338	—	8.79	—	
<u>Additional Notes:</u>					



WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:

M  
↓  
↓  
↓

Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
WMW-21					
WMW-22					
WMW-23					
WMW-24	1059	—	10.08	—	
WMW-26	1122	—	10.14	—	
WMW-27	1112	—	9.05	—	MONUMENT dry
WMW-28	1102	—	9.18	—	
WMW-29	1117	—	10.07	—	
WMW-30	1127	—	9.33	—	
WMW-31					
WMW-32					

M

Additional Notes:

1036 probe on ice  
1107 in OHM-2  
1200 probe on ice  
1332 in OHM-1

KT  
OHM-1 @ 1520 ① 402  
OHM-3 @ 1645 ①

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 5-9-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1005  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-01  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 20.0  
 Screened Interval (ft): 10-20  
 Purge Depth (ft): 15.0  
 Depth to Groundwater (ft): 9.61  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe)	X

Total Containers **8**

Time	940	945	950	955	1000			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	9.83	9.84	9.84	9.84	9.84			
Temperature (°C), (± 0.2)	16.20	16.21	16.42	16.42	16.37			
pH, (± 0.1)	7.25	7.03	7.09	7.07	7.08			
Sp. Conductance (uS/cm), (± 3%)	446	445	445	447	446			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.97	0.29	0.19	0.17	0.15			
ORP (mV), (± 10%)	-109.3	-101.1	-102.8	-102.8	-102.9			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	21.01	20.17	8.72	6.34	5.61			
Color	clear							
Odor/Evidence of LNAPL	no sheen							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Set purge depth tubing inlet at approx middle of screen if fully saturated or middle of water column height.

8 bottles total

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/9/19 Well Number: WMW-03  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: KET Well Condition: Well buried, casing nearly buried  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 20.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 10-20  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 15.0  
 Sampling Time: 1015 Depth to Groundwater (ft): 9.97 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments	
	No.	Type	Pres.	Vol.				
	2	VOA	HCl	40 mL	No	BTEX (8260)		
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	
<b>Total Containers</b>		<b>10</b>						

Time	0935	0940	0945	0950	0955	1000	1005	1010
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)	10.02	10.03	10.03	10.02	10.03	10.03	10.03	10.03
Temperature (°C), (± 0.2)	17.98	18.18	18.05	18.02	18.07	18.06	17.84	17.85
pH, (± 0.1)	6.86	6.87	6.92	6.92	6.92	6.92	6.94	6.96
Sp. Conductance (µS/cm), (± 3%)	1.238	1.243	1.244	1.245	1.249	1.249	1.249	1.248
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.84	0.70	0.47	0.42	0.24	0.32	0.31	0.27
ORP (mV), (± 10%)	-106.6	-109.9	-116.6	-120.5	-120.9	-124.0	-125.6	-129.5
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	8.80	7.99	8.68	9.24	7.71	7.42	9.16	6.73
Color	Clear							
Odor/Evidence of LNAPL	Odor ns							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

possible slight sheen on purge water noticed after purge ended

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/8/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: JET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1230  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-05  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 15-25  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 9.59  
 Depth to LNAPL (ft): —  
 Water Column (ft): \_\_\_\_\_

Weather: cloudy, hot

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments	
	No.	Type	Pres.	Vol.				
	2	VOA	HCl	40 mL	No	BTEX (8260)		
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	
<b>Total Containers</b>		<b>10</b>						

Time	1200	1205	1210	1215	1220	1225		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0		
Water Depth (ft)	9.60	9.60	9.61	9.61	9.62	9.63		
Temperature (°C), (± 0.2)	16.38	16.59	16.59	16.17	16.16	16.07		
pH, (± 0.1)	7.85	7.77	7.75	7.75	7.71	7.72		
Sp. Conductance (µS/cm), (± 3%)	0.374	0.373	0.372	0.372	0.371	0.372		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.80	2.40	2.17	2.10	1.96	1.78		
ORP (mV), (± 10%)	127.8	122.9	120.4	120.0	120.4	118.8		
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	5.71	3.90	3.39	3.30	3.29	2.57		
Color	clear							
Odor/Evidence of LNAPL	no/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/8/19 Well Number: WMW-07  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: KET Well Condition: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 20.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 10-20  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): ~15  
 Sampling Time: — Depth to Groundwater (ft): 10.88 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): —  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: not sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe)	X
<b>Total Containers</b>	<b>8</b>						

Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)								
Volume Purged (Liters)								
Water Depth (ft)								
Temperature (°C), (± 0.2)								
pH, (± 0.1)								
Sp. Conductance (uS/cm), (± 3%)								
DO (mg/L), (± 10% or 10% of 0.2mg/l)								
ORP (mV), (± 10%)								
Turbidity (NTU), (± 10% or 3 < 10 NTUs)								
Color								
Odor/Evidence of LNAPL								

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
Started purge @ 1430, water had strong odor & sheen. No sample.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/8/19 Well Number: WMW-09  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: KET Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 25.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 8.5-23.5  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 15.0  
 Sampling Time: 1355 Depth to Groundwater (ft): 10.20 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: not, sunny, 80s

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

**Total Containers 10**

Time	1320	1325	1330	1335	1340	1345	1350	
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	
Water Depth (ft)	10.24	10.23	10.24	10.24	10.24	10.24	10.24	
Temperature (°C), (± 0.2)	16.09	16.38	16.47	16.36	16.50	16.57	16.70	
pH, (± 0.1)	7.14	7.20	7.23	7.23	7.24	7.23	7.24	
Sp. Conductance (µS/cm), (± 3%)	0.648	0.653	0.653	0.653	0.655	0.652	0.656	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.36	0.28	0.28	0.33	0.38	0.38	0.35	
ORP (mV), (± 10%)	135.5	128.1	123.6	122.4	121.1	119.8	118.9	
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	2.03	2.01	2.96	2.27	1.36	1.15	1.19	
Color	clear							
Odor/Evidence of LNAPL	no O/S							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/9/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1230  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-10  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: good  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 7.5-22.5  
 Purge Depth (ft): 15.0  
 Depth to Groundwater (ft): 10.10  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: SUNNY

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe)	X

**Total Containers 8**

Time	1205	1210	1215	1220	1225			
1200								
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5			
Water Depth (ft)	10.21	10.22	10.21	10.21	10.21			
Temperature (°C), (± 0.2)	18.34	17.89	18.17	18.21	18.13			
pH, (± 0.1)	7.33	7.22	7.27	7.30	7.32			
Sp. Conductance <sup>VA</sup> (µS/cm), (± 3%)	0.727	0.725	0.723	0.720	0.723			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.62	2.54	2.40	2.56	2.55			
ORP (mV), (± 10%)	109.0	110.4	104.7	100.3	97.4			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	6.26	5.10	5.20	4.10	6.90			
Color	clear							
Odor/Evidence of LNAPL	NO/S							

Notes: (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-9-14 Well Number: WMW-11  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: MG Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 25.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-22  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 15.0  
 Sampling Time: 1130 Depth to Groundwater (ft): 10.12' **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe)	X

**Total Containers 8**

Time	1055	1100	1105	1110	1115	1120	1125	
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	
Water Depth (ft)	10.27	10.29	10.29	10.30	10.30	10.30	10.30	
Temperature (°C), (± 0.2)	17.91	16.19	16.53	16.71	16.77	16.67	16.57	
pH, (± 0.1)	7.01	7.17	7.28	7.36	7.39	7.40	7.41	
Sp. Conductance (uS/cm), (± 3%)	1064	1050	1057	1055	1058	1058	1060	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.33	0.12	0.14	1.04	0.24	0.22	0.20	
ORP (mV), (± 10%)	99.6	93.0	78.0	68.3	52.0	46.4	42.3	
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	19.82	13.39	52.87	7.4	5.05	4.85	1.70	
Color	clear							
Odor/Evidence of LNAPL	no sheen							

**Notes:** (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

8 bottles total

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/0/19 Well Number: WMW-12  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: KET Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 25.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 6-21  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 15.0  
 Sampling Time: 0745 Depth to Groundwater (ft): 10.10 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: Sunny MS/MSD on 27

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		MS	<del>WMW-12-2019</del> MS	
Other:			MSD	<del>WMW-12-2019</del> MSD	

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X 2 X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X 2 X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X 1 X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X 1 X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X 1 X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X 1 X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X 1 X

**Total Containers 8**

	Time	0730	0735	0740					
<u>0725</u>									
Parameter (every 5 min)		5 min	10 min	15 min	min	min	min	min	min
Flow Rate (L/min)		0.1							
Volume Purged (Liters)		0.5	1.0	1.5					
Water Depth (ft)		10.12	10.13	10.13					
Temperature (°C), (± 0.2)		15.84	15.85	16.03					
pH, (± 0.1)		7.72	7.68	7.68					
Sp. Conductance <u>MS/cm</u> , (± 3%)		0.913	0.914	0.914					
DO (mg/L), (± 10% or 10% of 0.2mg/l)		4.07	3.87	3.68					
ORP (mV), (± 10%)		118.0	119.9	115.5					
Turbidity (NTU), (± 10% or 3 < 10 NTUs)		3.58	2.37	3.90					
Color		clear							
Odor/Evidence of LNAPL		NO O/S							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/9/19 Well Number: WMW-13  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: VET Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 25.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 6-21  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 15.0  
 Sampling Time: 1130 Depth to Groundwater (ft): 10.69 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: SUNNY

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

**Total Containers 8**

Time	1110	1115	1120	1125				
<b>Parameter (every 5 min)</b>	5 min	10 min	15 min	20 min	min	min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0				
Water Depth (ft)	10.75	10.76	10.75	10.75				
Temperature (°C), (± 0.2)	17.17	17.35	17.37	17.45				
pH, (± 0.1)	7.40	7.41	7.44	7.45				
Sp. Conductance (µS/cm), (± 3%)	0.816	0.816	0.817	0.815				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.96	0.86	0.81	0.81				
ORP (mV), (± 10%)	123.9	116.9	111.0	109.0				
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	6.16	1.80	1.44	1.24				
Color	clear							
Odor/Evidence of LNAPL	NOO/S							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/7/19 Well Number: WMW-14  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: MG Well Condition: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 12-27  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 9:50 Depth to Groundwater (ft): 14.22 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe)	X

**Total Containers 10**

Time	9:30	9:35	9:40	9:45				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2				
Volume Purged (Liters)	0.0	1.0	2.0	3.0				
Water Depth (ft)	14.29	14.30	14.30	14.31				
Temperature (°C), (± 0.2)	14.35	14.27	14.33	14.33				
pH, (± 0.1)	8.03	7.70	7.72	7.77				
Sp. Conductance (uS/cm), (± 3%)	242	242	242	242				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.24	2.18	2.01	1.87				
ORP (mV), (± 10%)	131.3	141.8	139.7	138.6				
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	10.41	7.35	5.99	4.83				
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

YSI pH checked with buffer solutions.  
4.05 6.99 10.07

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-7-19 Well Number: WMW-15  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: MG Well Condition: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 12-27  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 1150 Depth to Groundwater (ft): 14.14 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X
<b>Total Containers</b>	<b>8</b>						

Time	1135	1142	1145	1150				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2				
Volume Purged (Liters)	0.0	1.0	2.0	3.0				
Water Depth (ft)	14.38	<del>14.38</del>	14.39	14.39				
Temperature (°C), (± 0.2)	15.01	14.93	14.82	14.86				
pH, (± 0.1)	7.53	7.22	7.21	7.21				
Sp. Conductance (uS/cm), (± 3%)	779	781	781	780				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.33	0.28	0.27	0.26				
ORP (mV), (± 10%)	116.1	95.1	86.3	77.4				
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	4.46	3.14	3.04	2.79				
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-7-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1405  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums  
 Weather: Sunny & hot

Well Number: WMW-16  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 11.33-26.33  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 14.1  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe)	X

**Total Containers 14**

Time	1340	1345	1350	1355	1400			
<b>Parameter (every 5 min)</b>	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	1.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	14.12	14.13	14.13	14.13	14.13			
Temperature (°C), (± 0.2)	14.57	14.52	14.50	14.63	14.59			
pH, (± 0.1)	6.96	6.89	6.90	6.92	6.93			
Sp. Conductance (uS/cm), (± 3%)	368	377	379	389	392			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.39	0.22	0.15	0.12	0.11			
ORP (mV), (± 10%)	-5.1	-27.5	-34.7	-39.6	-52.1			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	3.39	2.59	2.86	2.76	1.97			
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 5-8-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 820  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-17  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 13.60  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: Sunny DUP-2-27190508

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		Duplicate	<del>82016</del>	830
Other:			Dup on 15 or 16 if sheen in 17		

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (8020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, As)	X

Total Containers 11

Time	740	745	750	755	800	805	810	815
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
Water Depth (ft)	13.69	13.71	13.73	13.74	13.74	13.74	13.74	13.74
Temperature (°C), (± 0.2)	13.62	13.51	13.11	13.08	13.06	13.12	13.13	13.14
pH, (± 0.1)	6.72	6.59	6.65	6.66	6.66	6.67	6.76	6.78
Sp. Conductance (uS/cm), (± 3%)	1018	980	735	695	660	650	641	621
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.73	0.93	3.62	2.88	2.13	1.80	1.61	1.51
ORP (mV), (± 10%)	-132.5	-129.5	-75.6	-85.0	-91.7	-98.2	-104.2	-107.3
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	22.10	30.82	17.92	8.50	7.39	4.00	3.38	4.11
Color								
Odor/Evidence of LNAPL								

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-9-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 755, 805(MS), 815(MSD)  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-18  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 13.90  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		MS	WMW-18-20190509-MS 805	
Other:			MSD	WMW-18-20190509-MSD 815	

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X X
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn, Fe, As)	X X

**Total Containers 11**

Time	730	735	740	745	750			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	13.93	13.93	13.93	13.93	13.93			
Temperature (°C), (± 0.2)	14.06	13.84	13.89	13.83	13.83			
pH, (± 0.1)	7.64	7.27	7.25	7.25	7.23			
Sp. Conductance (uS/cm), (± 3%)	558	557	556	557	556			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.23	0.61	0.49	0.51	0.53			
ORP (mV), (± 10%)	84.7	95.3	91.3	90.9	91.3			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	4.75	2.32	1.07	0.71	1.98			
Color	clear							
Odor/Evidence of LNAPL	no sheen							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

3 & 10 bottles

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 5/7/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: ~~9:00~~ 9:00  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums  
 Weather: Sunny 60°F

Well Number: **WMW-19**  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 14.09'  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	3	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (Pb) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, Pb)	X

Total Containers **14**

Time	830	835	840	845	850			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.2	1.0	2.0	3.0	4.0			
Water Depth (ft)	<del>14.40</del>	14.42	14.42	14.42	14.42			
Temperature (°C), (± 0.2)	13.52	13.44	13.40	13.43	13.38			
pH, (± 0.1)	7.40	7.09	7.25	7.38	7.40			
Sp. Conductance (µS/cm), (± 3%)	301	306	310	308	303			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.71	4.25	3.91	3.66	3.48			
ORP (mV), (± 10%)	159.1	155.7	145.1	139.5	140.5			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	5.57	3.71	2.99	1.75	2.23			
Color								
Odor/Evidence of LNAPL								

Notes: (i.e. actions taken if well dewaterers, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, Lead + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 5-8-19 Well Number: WMW-20  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: MG Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 21.5  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 11.5-21.5  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft):                       
 Sampling Time: 11:0 Depth to Groundwater (ft): 14.16 **TOC**  
 Total Discharge (gal):                      Depth to LNAPL (ft):                       
 Water Disposal: On-Site 55-gallon drums Water Column (ft):                       
 Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	BTEX (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe, RCRA8)	X	

Total Containers **14**

Time	1030	1035	1040	1045	1050	1055	1100	1105
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Volume Purged (Liters)	0.2	1.0	2.0	3.0	4.0	5.0	6.0	7.0
Water Depth (ft)	15.13	15.44	15.56	15.62	15.71	15.74	15.74	15.74
Temperature (°C), (± 0.2)	14.06	13.69	13.55	13.65	13.60	13.60	13.67	13.73
pH, (± 0.1)	7.91	7.24	7.11	7.18	7.17	7.16	7.14	7.17
Sp. Conductance (uS/cm), (± 3%)	405	406	427	459	463	463	461	463
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.88	1.74	1.11	0.41	0.35	0.45	0.47	0.48
ORP (mV), (± 10%)	80.9	97.1	92.4	73.3	50.1	33.1	16.3	8.6
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	1005	631.0	306.4	148.3	72.94	49.54	26.40	14.23
Color	turbid brown				clearing up			
Odor/Evidence of LNAPL	no sheen							

Notes: (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: BTEX, RCRA8 + MNA for metals 14 bottles total

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-8-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1300  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-21  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 13.35'  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
			Type	Sample ID	Time
Temp/pH/SC/ORP/DO:	YSI 556				
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	BTEX (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

**Total Containers 16**

Time	1240	1245	1250	1255				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2				
Volume Purged (Liters)	0.0	1.0	2.0	3.0				
Water Depth (ft)	13.58	13.58	13.58	13.58				
Temperature (°C), (± 0.2)	16.52	15.13	15.07	15.15				
pH, (± 0.1)	7.71	7.26	7.21	7.31				
Sp. Conductance (uS/cm), (± 3%)	510	499	497	496				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	12.21	1.85	1.89	<del>1.89</del> 1.54				
ORP (mV), (± 10%)	66.7	82.7	80.4	77.7				
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	4.43	1.17	0.93	2.84				
Color	clear	→						
Odor/Evidence of LNAPL	no sheen							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

16 total bottles

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-8-19 Well Number: WMW-22  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: \_\_\_\_\_ Well Condition: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 21.5  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 11.5-21.5  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 13.89 **TOC**  
 Sampling Time: 1440 Depth to Groundwater (ft): \_\_\_\_\_  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

**Total Containers 16**

Time	1420	1425	1430	1435				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2				
Volume Purged (Liters)	0.0	1.0	2.0	3.0				
Water Depth (ft)	13.91	13.93	13.95	13.96				
Temperature (°C), (± 0.2)	16.74	15.82	15.78	15.69				
pH, (± 0.1)	7.98	7.37	7.28	7.30				
Sp. Conductance (uS/cm), (± 3%)	914	907	905	904				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.48	0.56	0.60	0.59				
ORP (mV), (± 10%)	57.4	73.6	72.8	73.0				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	6.70	6.16	1.59	3.83				
Color	clear	→						
Odor/Evidence of LNAPL	no shoen							

**Notes:** (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

16 to tal bottles

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-8-19 Well Number: WMW-23  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: MG Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 21.5  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 11.5-21.5  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 13.76 **TOC**  
 Sampling Time: 1615 Depth to Groundwater (ft): 13.76  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: Sunny & hot

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X

**Total Containers 14**

Time	1550	1555	1600	1605	1610			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	13.79	13.79	13.79	13.79	13.79			
Temperature (°C), (± 0.2)	15.84	16.24	16.12	16.00	16.08			
pH, (± 0.1)	8.01	7.57	7.57	7.56	7.59			
Sp. Conductance (uS/cm), (± 3%)	813	804	793	787	781			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	5.22	0.35	0.27	0.31	0.33			
ORP (mV), (± 10%)	42.6	59.8	57.0	57.6	58.4			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	138.7	34.51	6.40	1.02	3.39			
Color	milky	clearing up						
Evidence of LNAPL	No sheen							

\_\_\_\_\_ns taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

\_\_\_\_\_eters.

\_\_\_\_\_alyses: BTEX, RCRA8 + MNA for metals

14 bottles total

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/7/19 Well Number: WMW-24  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: KET Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 10.05 **TOC**  
 Sampling Time: 1530 Depth to Groundwater (ft): 10.05  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: hot, sunny 80s

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

**Total Containers 14**

Time	1455	1500	1505	1510	1515	1520	1525	
Parameter (every 5 min)	5 min	10 min	15 min	20 min	30 min	35 min	35 min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	3.0	3.0	3.5	
Water Depth (ft)	10.70	10.53	10.51	10.51	10.50	10.48	10.48	
Temperature (°C), (± 0.2)	16.61	17.38	17.31	17.40	17.48	17.53	17.46	
pH, (± 0.1)	7.45	7.41	7.42	7.40	7.40	7.40	7.39	
Sp. Conductance (µS/cm), (± 3%)	0.605	0.612	0.610	0.609	0.606	0.603	0.604	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	3.04	2.25	2.01	1.88	1.50	1.37	1.18	
ORP (mV), (± 10%)	140.9	137.1	135.4	134.4	133.3	132.8	132.3	
Turbidity (NTU), (± 10% or 3 <10 NTUs)	1.23	1.90	2.22	2.15	1.62	1.81	1.57	
Color	clear							
Odor/Evidence of LNAPL	no/s							

**Notes:** (i.e. actions taken if well dewaterers, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-6-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG / KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0920  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-26  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft) 10.12  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				--
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	✓
	2	VOA	HCl	40 mL	No	NWTPH-Gx		✓
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	✓
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	✓
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	✓
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	✓
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	✓
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	✓
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	✓
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	✓
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	✓

**Total Containers 16**

Time	1420	1425	1430	1435	1440	1445	1450	0915
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Volume Purged (Liters)	0.0	0.0	2.0	3.0	4.0	5.0	6.0	
Water Depth (ft)	11.71	12.46	13.28	14.10	14.65	15.80	17.20	10.10
Temperature (°C), (± 0.2)	15.70	15.45	15.40	15.37	15.50	15.35	15.27	15.80
pH, (± 0.1)	6.64	6.80	6.89	6.94	7.01	7.01	7.03	7.12
Sp. Conductance (µS/cm), (± 3%)	536	536	536	538	537	538	542	0.781
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.58	4.20	3.81	3.43	2.89	2.53	2.47	6.02 ↓
ORP (mV), (± 10%)	166.1	168.7	169.8	167.2	164.7	163.8	163.6	190.2
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	6.93	4.57	3.21	4.18	1.79	2.53	1.99	4.99
Color								clear
Odor/Evidence of LNAPL								NO/S

**Notes:** (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

Dewatered on 5-6-19



Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 5/9/19 Well Number: WMW-27  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: KET Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): ~13  
 Sampling Time: 1400 Depth to Groundwater (ft): 9.09 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): —  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: SUNNY + WINDY

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		MS/MSD		1405
Other:					1410

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

Total Containers 14

Time	1320	1325	1330	1335	1340	1345	1350	1355
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)	9.22	9.19	9.19	9.19	9.20	9.18	9.19	9.19
Temperature (°C), (± 0.2)	18.29	17.92	17.98	18.27	17.66	18.65	18.00	18.05
pH, (± 0.1)	7.36	7.22	7.29	7.40	7.43	7.42	7.47	7.46
Sp. Conductance (µS/cm), (± 3%)	0.335	0.335	0.339	0.342	0.344	0.343	0.343	0.345
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.54	2.28	2.23	2.12	2.15	1.95	2.06	2.03
ORP (mV), (± 10%)	106.0	110.2	106.7	99.4	98.7	98.2	96.4	97.0
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	11.70	14.38	10.42	13.20	6.54	8.14	6.52	6.76
Color	clear							
Odor/Evidence of LNAPL	noo/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/7/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1225  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-28  
 Monument Type: Stickup: (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 9.11  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: Sunny DUP-01-20190507

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		DUP	D-1-2019	1235
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

**Total Containers 14**

	Time	1155	1200	1205	1210	1215	1220		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min		min	min
Flow Rate (L/min)	0.1								
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0			
Water Depth (ft)	9.25	9.25	9.25	9.26	9.21	9.21			
Temperature (°C), (± 0.2)	15.75	15.93	15.91	15.82	16.12	16.35			
pH, (± 0.1)	7.61	7.56	7.57	7.57	7.59	7.61			
Sp. Conductance (µS/cm), (± 3%)	0.382	0.381	0.386	0.386	0.389	0.392			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	5.82	5.46	4.83	4.35	4.02	3.83			
ORP (mV), (± 10%)	139.6	138.9	137.6	136.2	134.2	132.2			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	4.20	2.63	2.29	2.39	1.24	1.95			
Color	Clear								
Odor/Evidence of LNAPL	noojs								

Notes: (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.  
 Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-6-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-29  
 Monument Type: Stickup: (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: MG/VET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_

Sampling Time: 1010  
 Total Discharge (gal): \_\_\_\_\_

Depth to Groundwater (ft): 12.06  
 Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: SUNNY & HOT

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

Total Containers **14**

Parameter (every 5 min)	Time	min	min	min	min	min	min	min
Flow Rate (L/min)	1545	1550	<del>1600</del>	1600	1605	1610	1000	
Volume Purged (Liters)	0.2	1.0	2.0	3.0	4.0			
Water Depth (ft)	11.35	12.72	13.83	15.84	16.92	10.05		
Temperature (°C), (± 0.2)	15.98	15.96	16.04	16.08	16.22	17.27		
pH, (± 0.1)	7.30	7.14	7.02	7.02	7.08	7.10		
Sp. Conductance (uS/cm), (± 3%)	1260	1257	1256	1265	1243	1.324ms		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	5.49	2.83	2.44	1.81	1.55	3.90		
ORP (mV), (± 10%)	164.4	171.8	163.7	79.4	35.8	173.2		
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	2.29	1.75	1.54	2.07	2.63	2.47		
Color						clear		
Odor/Evidence of LNAPL						nois		

Notes: (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

dewatered on 5-6-19

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/7/19 Well Number: WMW-30  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: KET Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): \_\_\_\_\_  
 Sampling Time: 13400 KT Depth to Groundwater (ft): 9.31 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): —  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe,RCRA8)	X	

**Total Containers 16**

Time	1050	1055	1100	1105	1110	1115	1250	
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.2							
Volume Purged (Liters)	1.0	2.0	3.0	4.0	5.0	6.0		
Water Depth (ft)	10.29	10.61	10.80	10.93	11.21	11.39	9.31	
Temperature (°C), (± 0.2)	15.91	15.97	16.22	16.13	16.28	16.26	17.63	
pH, (± 0.1)	7.44	7.43	7.48	7.49	7.46	7.46	7.64	
Sp. Conductance <sup>m</sup> (µS/cm), (± 3%)	0.549	0.550	0.551	0.551	0.551	0.548	0.552	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.25	3.95	3.71	3.55	3.34	3.05	5.03	
ORP (mV), (± 10%)	160.9	151.4	145.3	143.5	143.8	142.6	147.7	
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	0.74	2.07	3.63	3.27	3.45	3.36	4.05	
Color	clear							
Odor/Evidence of LNAPL	no/s							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

purged until dewatered 5/7/19 @ 1135  
WL = 13.33

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/8/19 Well Number: WMW-31  
 Project Name: BNSF Wishram Monument Type: Stickup: (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: KET Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 8.73 **TOC**  
 Sampling Time: 1545 Depth to Groundwater (ft): 8.73  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): —  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: Wet & sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X

**Total Containers 14**

Time	1500	1505	1510	1515	1520	1525	1530	1535	1540
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)		0.1							
Volume Purged (Liters)		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)		8.94	8.88	8.91	8.90	8.90	8.92	8.90	8.90
Temperature (°C), (± 0.2)		16.89	18.64	17.71	17.85	18.16	17.99	17.73	17.78
pH, (± 0.1)		7.33	7.36	7.39	7.37	7.37	7.38	7.37	7.38
Sp. Conductance (µS/cm), (± 3%)		0.596	0.598	0.607	0.608	0.608	0.612	0.611	0.612
DO (mg/L), (± 10% or 10% of 0.2mg/l)		1.21	1.05	0.91	0.85	0.71	0.67	0.67	0.63
ORP (mV), (± 10%)		128.6	122.0	117.0	112.0	110.2	108.2	107.2	105.8
Turbidity (NTU), (± 10% or 3 <10 NTUs)		1.98	2.54	1.23	1.69	1.41	1.58	2.31	0.57
Color		clear							
Odor/Evidence of LNAPL		no/s							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5/9/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-32  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_

Sampling Time: 1535  
 Total Discharge (gal): \_\_\_\_\_

Depth to Groundwater (ft): 8.80  
 Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: NOT, Sunny, Windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	(17)

**Total Containers 16**

Time	1515	1520	1525	1530				
Parameter (every 5 min)	5 min	10 min	15 min	20 min	min	min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0				
Water Depth (ft)	9.21	9.22	9.23	9.22				
Temperature (°C), (± 0.2)	19.95	20.49	20.60	20.83				
pH, (± 0.1)	7.33	7.36	7.38	7.41				
Sp. Conductance (µS/cm), (± 3%)	0.689	0.694	0.694	0.696				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.11	3.87	3.73	3.65				
ORP (mV), (± 10%)	120.7	117.7	114.6	111.9				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	3.57	5.41	2.29	3.25				
Color	clear							
Odor/Evidence of LNAPL	NO/S							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, NWTPH-Gx, RCRA8 + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 5-7-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: ML  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1905  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: RMD-1  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 44.5  
 Screened Interval (ft): 29.6-44.6  
 Purge Depth (ft): 37.5  
 Depth to Groundwater (ft): 14.15  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X
	<b>Total Containers</b>		<b>12</b>				

Time	1245	1250	1255	1300	1305			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	15.22	15.23	15.27	15.28	15.28			
Temperature (°C), (± 0.2)	15.81	15.96	16.17	16.18	16.16			
pH, (± 0.1)	7.30	7.05	7.06	7.09	7.10			
Sp. Conductance (uS/cm), (± 3%)	964	962	963	965	968			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.02	0.30	0.23	0.19	0.18			
ORP (mV), (± 10%)	-105.1	-95.6	-104.2	-112.3	-118.7			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	32.34	29.34	26.31	15.67	13.88			
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-7-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1505  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: RMD-2  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 50.0  
 Screened Interval (ft): 30-50  
 Purge Depth (ft): 40.0  
 Depth to Groundwater (ft): 13.98  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		<i>Duplicate</i>	D-2-2019	--
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

**Total Containers 12**

Time	1445	1457	1455	1500	1505			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	14.04	14.05	14.05	14.05	14.05			
Temperature (°C), (± 0.2)	16.00	16.02	16.13	16.25	16.22			
pH, (± 0.1)	7.38	7.18	7.17	7.14	7.14			
Sp. Conductance (uS/cm), (± 3%)	1161	1159	1157	1157	1156			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.46	0.52	0.27	0.25	0.23			
ORP (mV), (± 10%)	-141.2	-124.9	-120.6	-131.9	-13			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	8.76	6.04	6.51	4.55	3.70			
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-7-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1620  
 Total Discharge (gal): None  
 Water Disposal: On-Site 55-gallon drums  
 Weather: Sunny 80°F

Well Number: RMD-3  
 Monument Type: Stickup: (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition:  
 Total Casing Depth (ft): 60.0  
 Screened Interval (ft): 40-60  
 Purge Depth (ft): 50.0  
 Depth to Groundwater (ft): 14.22  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

**Total Containers 10**

Time	1545	1550	1555	1600	1605	1610	1615	1620
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
Water Depth (ft)	14.27	14.28	14.28	14.28	14.28	14.29	14.29	14.29
Temperature (°C), (± 0.2)	16.67	16.02	15.99	15.90	15.91	16.16	16.25	16.21
pH, (± 0.1)	7.99	7.42	7.32	7.30	7.34	7.35	7.36	7.37
Sp. Conductance (uS/cm), (± 3%)	660	596	593	592	591	590	589	589
DO (mg/L), (± 10% or 10% of 0.2mg/l)	3.50	0.46	0.32	0.30	0.27	0.23	0.26	0.25
ORP (mV), (± 10%)	-53.7	-71.9	-69.0	-71.7	-74.7	-81.0	-85.1	-87.5
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	46.22	40.05	11.6	83.13	72.81	38.41	29.37	27.88
Color								
Odor/Evidence of LNAPL								

**Notes:** (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-8-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1015  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: RMD-4  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 65.0  
 Screened Interval (ft): 45-65  
 Purge Depth (ft): 55.0  
 Depth to Groundwater (ft): 13.95  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

**Total Containers 12**

Time	950	955	1000	1005	1010			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2	0.2			
Volume Purged (Liters)	0.0	1.0	2.0	3.0	4.0			
Water Depth (ft)	13.99	14.00	14.00	14.00	14.00			
Temperature (°C), (± 0.2)	15.67	15.67	15.78	15.82	15.81			
pH, (± 0.1)	7.78	7.74	7.28	7.30	7.31			
Sp. Conductance (µS/cm), (± 3%)	835	814	831	851	861			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	5.53	5.16	1.01	0.92	0.85			
ORP (mV), (± 10%)	162.3	132.6	113.0	104.5	99.1			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	18.01	1.56	0.48	1.98	2.56			
Color	slight yellow	clear						
Odor/Evidence of LNAPL	no sheen							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

951 checked for pH, ORP, conductivity  
 12 bottles total

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-7-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*05  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1045  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: RMD-5  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 45.0  
 Screened Interval (ft): 30-45  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 13.80  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	2	VOA	HCl	40 mL	No	BTEX (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (Pb) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Pb, Mn, Fe)	X	

**Total Containers 15**

Time	1025	1030	1035	1040				
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	0.2	0.2	0.2	0.2				
Volume Purged (Liters)	0.0	0.0	2.0	3.0				
Water Depth (ft)	13.93	13.93	13.93	13.93				
Temperature (°C), (± 0.2)	15.62	15.57	15.61	15.72				
pH, (± 0.1)	7.57	7.44	7.41	7.43				
Sp. Conductance (uS/cm), (± 3%)	832	830	828	828				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.20	0.14	0.12	0.10				
ORP (mV), (± 10%)	137.2	138.8	139.6	139.4				
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	4.70	2.40	2.43	1.90				
Color								
Odor/Evidence of LNAPL								

Notes: (i.e. actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX; NWTPH-Dx with AND without SGC; Lead + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 5-8-19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*05  
 Sampling Personnel: MG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1145  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: RMD-6  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 65.0  
 Screened Interval (ft): 45-65  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 13.76  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	2	VOA	HCl	40 mL	No	BTEX (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (RCRA8, Mn, Fe)	X	

**Total Containers 15**

Parameter (every 5 min)	Time	1125	1130	1135	1140				
		min	min	min	min	min	min	min	min
Flow Rate (L/min)		0.2	0.2	0.2	0.2				
Volume Purged (Liters)		0.0	1.0	2.0	3.0				
Water Depth (ft)		13.79	13.80	13.80	13.81				
Temperature (°C), (± 0.2)		15.93	16.07	16.08	16.12				
pH, (± 0.1)		7.45	7.38	7.36	7.35				
Sp. Conductance (uS/cm), (± 3%)		874	890	890	890				
DO (mg/L), (± 10% or 10% of 0.2mg/l)		0.67	0.25	0.19	0.18				
ORP (mV), (± 10%)		51.0	61.6	62.9	63.4				
Turbidity (NTU), (± 10% or 3 < 10 NTUs)		51.28	9.81	6.23	2.77				
Color		clear							
Odor/Evidence of LNAPL		No sheen							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

10 bottles total

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19 to 22 August 2019

**FIELD FORM**

**WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM**

<b>Monitoring Personnel:</b>		<b>KEH/GG</b>			
<b>Well</b>	<b>Date / Time</b>	<b>Depth to LNAPL (feet btoc)</b>	<b>Depth to Water (feet btoc)</b>	<b>LNAPL Thickness (feet)</b>	<b>Well Status</b>
OHM-1	8/19/2019	9.76	18.10	8.34	
OHM-2	8/19/2019	11.94	18.68	6.74	
OHM-3	8/19/2019	11.64	13.68	2.04	
OHM-4	8/19/2019	--	10.88	--	No sheen
RMD-1	8/19/2019	--	14.49	--	
RMD-2	8/19/2019	--	14.12	--	
RMD-3	8/19/2019	--	14.39	--	
RMD-4	8/19/2019	--	14.28	--	
RMD-5	8/19/2019	--	14.19	--	
RMD-6	8/19/2019	--	14.05	--	
WMW-1	8/19/2019	--	9.90	--	
WMW-3	8/19/2019	--	10.39	--	
WMW-5	8/19/2019	--	9.94	--	Buried
WMW-7	8/19/2019	--	11.48	--	
WMW-8	8/19/2019	--	11.09	--	
WMW-9	8/19/2019	--	10.54	--	
WMW-10	8/19/2019	--	10.39	--	
WMW-11	8/19/2019	--	10.32	--	
WMW-12	8/19/2019	--	10.74	--	
WMW-13	8/19/2019	--	11.02	--	
WMW-14	8/19/2019	--	14.62	--	
WMW-15	8/19/2019	--	14.48	--	
WMW-16	8/19/2019	--	14.25	--	
WMW-17	8/19/2019	--	14.14	--	
WMW-18	8/19/2019	--	14.24	--	
WMW-19	8/19/2019	--	14.57	--	
WMW-20	8/19/2019	--	14.41	--	

**FIELD FORM**

**WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM**

<b>Monitoring Personnel:</b>		<b>KEH/GG</b>			
<b>Well</b>	<b>Date / Time</b>	<b>Depth to LNAPL (feet btoc)</b>	<b>Depth to Water (feet btoc)</b>	<b>LNAPL Thickness (feet)</b>	<b>Well Status</b>
WMW-21	8/19/2019	--	13.56	--	
WMW-22	8/19/2019	--	13.98	--	
WMW-23	8/19/2019	--	13.79	--	
WMW-24	8/19/2019	--	10.50	--	
WMW-26	8/19/2019	--	10.61	--	
WMW-27	8/19/2019	--	9.41	--	
WMW-28	8/19/2019	--	9.55	--	
WMW-29	8/19/2019	--	10.56	--	
WMW-30	8/19/2019	--	9.94	--	
WMW-31	8/19/2019	--	9.52	--	
WMW-32	8/19/2019	--	10.35	--	
<u>Additional Notes:</u>					

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/21/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0915  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-01  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 20.0  
 Screened Interval (ft): 10-20  
 Purge Depth (ft): 15.0  
 Depth to Groundwater (ft): 9.74  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: SUNNY + WINDY

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑧	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	

Total Containers 8

	Time	0835	0840	0845	0850	0855	0900	0905	0910
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)		0.1							
Volume Purged (Liters)		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)		9.90	9.91	9.91	9.91	9.91	9.91	9.90	9.90
Temperature (°C), (± 0.2)		19.66	19.55	19.45	19.09	19.34	19.62	19.74	19.83
pH, (± 0.1)		6.85	6.85	6.85	6.85	6.84	6.88	6.91	6.91
Sp. Conductance (µS/cm), (± 3%)		0.509	0.509	0.509	0.508	0.506	0.507	0.503	0.503
DO (mg/L), (± 10% or 10% of 0.2mg/l)		0.49	0.41	0.34	0.32	0.31	0.30	0.27	0.26
ORP (mV), (± 10%)		-128.3	-130.6	-132.1	-136.2	-137.7	-142.1	-145.4	-145.7
Turbidity (NTU), (± 10% or 3 < 10 NTUs)		4.53	7.36	3.08	4.94	6.78	6.04	5.26	6.95
Color		clear							
Odor/Evidence of LNAPL		NO O/S							

Notes: (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Set purge depth tubing inlet at approx middle of screen if fully saturated or middle of water column height.



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/21/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-03  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: ~6" below road grade  
 Total Casing Depth (ft): 20.0  
 Screened Interval (ft): 10-20  
 Purge Depth (ft): 15.0  
 Depth to Groundwater (ft): 10.34  
 Depth to LNAPL (ft): —

Sampling Time: 0755  
 Total Discharge (gal): —  
 Water Disposal: On-Site 55-gallon drums

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑩	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	—	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	

Total Containers 10

Time	0715	0720	0725	0730	0735	0740	0745	0750
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)	10.40	10.41	10.41	10.42	10.42	10.42	10.42	10.42
Temperature (°C), (± 0.2)	19.33	19.11	19.03	18.95	19.06	18.99	19.08	19.18
pH, (± 0.1)	6.84	6.81	6.82	6.83	6.81	6.84	6.86	6.87
Sp. Conductance (µS/cm), (± 3%)	1.281	1.278	1.278	1.280	1.278	1.282	1.284	1.288
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.01	0.69	0.61	0.53	0.46	0.43	0.36	0.36
ORP (mV), (± 10%)	-120.7	-127.0	-129.7	-132.9	-130.8	-134.0	-135.4	-134.4
Turbidity (NTU), (± 10% or 3 <10 NTUs)	16.43	11.13	8.72	6.62	11.40	6.96	6.16	5.75
Color	clear							
Odor/Evidence of LNAPL	odor							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

strong petrol. odor

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/20/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-05  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 15-25  
 Purge Depth (ft): 20.0

Sampling Time: 1255

Depth to Groundwater (ft): 9.93

Total Discharge (gal): \_\_\_\_\_

Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: hot + sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	<u>8/16/19</u>	Type	Sample ID	Time
Turbidity:	Micro TPI	<u>"</u>			
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
(10)	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	

Total Containers 10

Time	1225	1230	1235	1240	1245	1250		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	<u>0.1</u>							
Volume Purged (Liters)	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>		
Water Depth (ft)	<u>9.95</u>	<u>9.95</u>	<u>9.95</u>	<u>9.95</u>	<u>9.95</u>	<u>9.95</u>		
Temperature (°C), (± 0.2)	<u>19.60</u>	<u>19.59</u>	<u>19.43</u>	<u>18.64</u>	<u>18.89</u>	<u>18.78</u>		
pH, (± 0.1)	<u>7.38</u>	<u>7.46</u>	<u>7.49</u>	<u>7.53</u>	<u>7.49</u>	<u>7.53</u>		
Sp. Conductance (µS/cm), (± 3%)	<u>0.470</u>	<u>0.468</u>	<u>0.469</u>	<u>0.468</u>	<u>0.467</u>	<u>0.468</u>		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	<u>0.75</u>	<u>0.54</u>	<u>0.47</u>	<u>0.41</u>	<u>0.39</u>	<u>0.37</u>		
ORP (mV), (± 10%)	<u>105.6</u>	<u>102.5</u>	<u>102.3</u>	<u>102.3</u>	<u>105.4</u>	<u>104.6</u>		
Turbidity (NTU), (± 10% or 3 <10 NTUs)	<u>10.69</u>	<u>3.61</u>	<u>2.93</u>	<u>4.85</u>	<u>1.59</u>	<u>3.08</u>		
Color	<u>clear</u>							
Odor/Evidence of LNAPL	<u>no/s</u>							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/22/19 Well Number: WMW-07  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: KET Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 20.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 10-20  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft):             
 Sampling Time:            Depth to Groundwater (ft): 11.50 **TOC**  
 Total Discharge (gal):            Depth to LNAPL (ft):             
 Water Disposal: On-Site 55-gallon drums Water Column (ft):             
 Weather: Sunny + Windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments	
	No.	Type	Pres.	Vol.				
	2	VOA	HCl	40 mL	No	BTEX (8260)		
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	
<b>Total Containers</b>		<b>8</b>						

Time									
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)									
Volume Purged (Liters)									
Water Depth (ft)									
Temperature (°C), (± 0.2)									
pH, (± 0.1)									
Sp. Conductance (uS/cm), (± 3%)									
DO (mg/L), (± 10% or 10% of 0.2mg/l)									
ORP (mV), (± 10%)									
Turbidity (NTU), (± 10% or 3 <10 NTUs)									
Color									
Odor/Evidence of LNAPL									

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.  
Strong odor & moderate sheen on probe. Not sampled.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/21/19  
 Project Name: BNSF Wisram  
 Project Number: 1996120\*00

Well Number: WMW-08  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 7-22  
 Purge Depth (ft): \_\_\_\_\_

Sampling Time: \_\_\_\_\_  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Depth to Groundwater (ft): \_\_\_\_\_  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WTH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X
<b>Total Containers</b>		<b>8</b>					

Time									
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)									
Volume Purged (Liters)									
Water Depth (ft)									
Temperature (°C), (± 0.2)									
pH, (± 0.1)									
Sp. Conductance (uS/cm), (± 3%)									
DO (mg/L), (± 10% or 10% of 0.2mg/l)									
ORP (mV), (± 10%)									
Turbidity (NTU), (± 10% or 3 <10 NTUs)									
Color									
Odor/Evidence of LNAPL									

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Sheen (MS) in water. Not sampled. + strong odor

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/20/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-09  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 8.5-23.5  
 Purge Depth (ft): 15.0

Sampling Time: 1525  
 Total Discharge (gal): \_\_\_\_\_

Depth to Groundwater (ft): 10.54  
 Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: hot + sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	<u>8/16/19</u>	Type	Sample ID	Time
Turbidity:	Micro TPI	<u>h</u>			
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
10	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	

Total Containers 10

Parameter (every 5 min)	Time	1435	1500	1505	1510	1520	1525		
Flow Rate (L/min)		0.1							
Volume Purged (Liters)		0.5	1.0	1.5	2.0	2.5	3.0		
Water Depth (ft)		10.57	10.57	10.59	10.59	10.59	10.58		
Temperature (°C), (± 0.2)		20.94	21.15	20.74	20.12	20.33	20.25		
pH, (± 0.1)		7.12	7.14	7.15	7.10	7.12	7.16		
Sp. Conductance (µS/cm), (± 3%)		0.566	0.568	0.568	0.566	0.568	0.568		
DO (mg/L), (± 10% or 10% of 0.2mg/l)		0.64	0.48	0.42	0.36	0.34	0.34		
ORP (mV), (± 10%)		140.4	137.7	136.7	136.4	137.5	135.0		
Turbidity (NTU), (± 10% or 3 <10 NTUs)		4.32	4.22	3.68	3.44	2.08	1.74		
Color		clear							
Odor/Evidence of LNAPL		noo/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/22/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0835  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-10  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 7.5-22.5  
 Purge Depth (ft): 15.0  
 Depth to Groundwater (ft): 10.33  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: SUNNY + WINDY

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑧	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	

Total Containers 8

Parameter (every 5 min)	Time	0820	0825	0830	0835				
		5 min	10 min	15 min	20 min	min	min	min	min
Flow Rate (L/min)		0.1							
Volume Purged (Liters)		0.5	1.0	1.5	2.0				
Water Depth (ft)		10.34	10.34	10.34					
Temperature (°C), (± 0.2)		17.74	17.79	17.72					
pH, (± 0.1)		7.25	7.25	7.27					
Sp. Conductance (µS/cm), (± 3%)		0.710	0.710	0.710					
DO (mg/L), (± 10% or 10% of 0.2mg/l)		1.55	1.43	1.37					
ORP (mV), (± 10%)		42.0	42.1	42.7					
Turbidity (NTU), (± 10% or 3 <10 NTUs)		3.76	3.85	2.97					
Color		clear							
Odor/Evidence of LNAPL		no O/S							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/22/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: VET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0745  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums  
 Weather: Sunny + Windy

Well Number: WMW-11  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 7-22  
 Purge Depth (ft): 15.0  
 Depth to Groundwater (ft): 10.27  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑧	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WTH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

Total Containers **8**

Time	0715	0720	0725	0730	0735	0740		
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0		
Water Depth (ft)	10.36	10.35	10.35	10.34	10.33	10.33		
Temperature (°C), (± 0.2)	17.80	17.95	18.05	18.30	18.29	18.33		
pH, (± 0.1)	7.31	7.30	7.30	7.31	7.32	7.32		
Sp. Conductance (µS/cm), (± 3%)	1.164	1.162	1.163	1.164	1.164	1.163		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.71	0.59	0.50	0.47	0.44	0.40		
ORP (mV), (± 10%)	-60.0	-87.3	-103.7	-115.0	-118.9	-121.3		
Turbidity (NTU), (± 10% or 3 <10 NTUs)	21.20	11.43	8.37	6.42	8.19	7.71		
Color	clear							
Odor/Evidence of LNAPL	no o/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

0715 - small white particles in water

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/21/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1410  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-12  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: 21.5' from open trench - suno  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 6-21  
 Purge Depth (ft): 15.0  
 Depth to Groundwater (ft): 10.73  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: cloudy + windy

Did MS/MSD on WMW-27

Stuck  
piled  
Soi

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		<u>MS</u>	WMW-12-2019 MS	
Other:			<u>MSD</u>	WMW-12-2019 MSD	

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑧	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

Total Containers 8

Time	1355	1400	1405	1410				
Parameter (every 5 min)	5 min	10 min	15 min	20 min	min	min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	7.0				
Water Depth (ft)	10.70	10.77	10.78					
Temperature (°C), (± 0.2)	19.86	19.73	19.55					
pH, (± 0.1)	7.48	7.48	7.49					
Sp. Conductance (µS/cm), (± 3%)	0.903	0.901	0.959					
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.18	1.11	1.18					
ORP (mV), (± 10%)	94.9	95.6	95.5					
Turbidity (NTU), (± 10% or 3 <10 NTUs)	3.53	4.38	4.07					
Color	clear							
Odor/Evidence of LNAPL	nois							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/20/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-13  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 25.0  
 Screened Interval (ft): 6-21  
 Purge Depth (ft): 15.0

Sampling Time: 1615  
 Total Discharge (gal): \_\_\_\_\_

Depth to Groundwater (ft): 11.02  
 Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: hot + partly cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑧	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

**Total Containers 8**

Time	1550	1555	1600	1605	1610			
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5			
Water Depth (ft)	11.09	11.10	11.10	11.10	11.10			
Temperature (°C), (± 0.2)	21.19	21.64	21.79	22.02	21.90			
pH, (± 0.1)	7.39	7.33	7.35	7.41	7.46			
Sp. Conductance (µS/cm), (± 3%)	0.697	0.697	0.697	0.699	0.700			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.99	1.60	1.39	1.33	1.26			
ORP (mV), (± 10%)	148.2	148.9	146.0	140.1	136.0			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.12	2.09	2.63	1.88	2.03			
Color	clear							
Odor/Evidence of LNAPL	no O/S							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/22/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GRG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 13:45  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-14  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: good  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 14.26  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
WMW-14- 20190822	2	VOA	HCl	40 mL	No	BTEX (8260)		
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)		
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X		

Total Containers 10

Time	13:28	13:28	13:33	13:38	13:43				
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10					
Volume Purged (Liters)	.50	1.0	1.5	2.0					
Water Depth (ft)	14.29	14.30	14.31	14.31	14.31				
Temperature (°C), (± 0.2)	17.82	17.61	17.70	17.70	17.57				
pH, (± 0.1)	8.04	8.01	7.98	7.96	7.93				
Sp. Conductance (µS/cm), (± 3%)	0.388	0.295	0.293	0.293	0.295				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.75	2.33	1.96	1.96	2.03				
ORP (mV), (± 10%)	92.1	81.9	87.0	100.4	112.9				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	42.46	23.59	9.98	7.87	4.03				
Color	none	none	none	none	none				
Odor/Evidence of LNAPL	none	none	none	none	none				

Notes: (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

10 bottles

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/22/19 Well Number: WMW-15  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: BRG Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 12-27  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 12:38 Depth to Groundwater (ft): 14.17 14.16 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: sunny, light-moderate wind.

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
to WMW-15- 20190822	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	

Total Containers **8**

	Time	12:21	12:26	12:31	12:36				
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)		.10	.10	.10	.10				
Volume Purged (Liters)		.50	1.00	1.5	2.0				
Water Depth (ft)		14.25	14.25	14.25	14.25				
Temperature (°C), (± 0.2)		17.36	17.37	17.45	17.43				
pH, (± 0.1)		7.35	7.34	7.33	7.31				
Sp. Conductance (µS/cm), (± 3%)		0.923	0.924	0.923	0.923				
DO (mg/L), (± 10% or 10% of 0.2mg/l)		1.29	1.08	0.87	0.75				
ORP (mV), (± 10%)		111.1	103.9	105.9	106.3				
Turbidity (NTU), (± 10% or 3 <10 NTUs)		6.53	3.23	3.71	2.94				
Color		none	none	none	none				
Odor/Evidence of LNAPL		none	none	none	none				

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

8 bottles

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/21/19 Well Number: WMW-16  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: GRBT Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 11.33-26.33  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 12:35 Depth to Groundwater (ft): 14.90 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-16 - 20190821	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

Total Containers 14

Time	12:12	12:17	12:22	12:27	12:32			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10			
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5			
Water Depth (ft)	14.90	14.90	14.89	14.49	14.49			
Temperature (°C), (± 0.2)	17.95	18.10	18.36	18.42	18.38			
pH, (± 0.1)	7.58	7.43	7.32	7.26	7.19			
Sp. Conductance (uS/cm), (± 3%)	0.242	0.242	0.241	0.240	0.241			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.63	4.15	3.88	3.81	3.34			
ORP (mV), (± 10%)	62.0	76.7	83.2	89.4	94.7			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.32	2.10	3.83	2.65	3.02			
Color	none	none	none	none	none			
Odor/Evidence of LNAPL	none	none.	none.	none	none			

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 08/21/2019 Well Number: WMW-17  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: GRB Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 12-27  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 08:30 Depth to Groundwater (ft): 13.73  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: 72°F, sunny, blue skies

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		Duplicate	D-1-2019	-
Other:				Dup on 15 or 16 if sheen in 17	

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-17- 20190821 08/21/2019 DUP-08	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, As)	X

Total Containers 11

Time	07:55	08:00	08:05	08:10	08:15	08:20	08:25	08:30	
Parameter (every 5 min)		min	min	min	min	min	min	min	min
Flow Rate (L/min)		.01	.01	.01	.01	.01	.01	.01	
Volume Purged (Liters)		.05	.10	.15	.20	.25	0.30	.35	
Water Depth (ft)		13.80	13.82	13.80	13.79	13.76	13.76	13.78	
Temperature (°C), (± 0.2)		16.88	16.95	16.61	16.89	17.20	17.31	17.32	
pH, (± 0.1)		6.86	6.90	6.96	6.98	6.99	6.97	6.97	
Sp. Conductance (uS/cm), (± 3%)		0.371	0.363	0.322	0.298	0.287	0.290	0.293	
DO (mg/L), (± 10% or 10% of 0.2mg/l)		2.50	1.55	2.18	3.57	4.35	4.58	4.65	
ORP (mV), (± 10%)		51.2	37.3	34.2	37.7	42.1	43.9	44.8	
Turbidity (NTU), (± 10% or 3 <10 NTUs)		5.75	3.96	3.86	3.29	4.11	5.80	6.14	
Color		none	none	none	none	none	none	none	
Odor/Evidence of LNAPL		none	none	none	none	none	none	none	

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 WMW-17-20190821 → 13 bottles  
 DUP-01-20190821 → 13 bottles

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/22/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-18  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0

Sampling Time: 10:15

Depth to Groundwater (ft): 13.88

Total Discharge (gal): \_\_\_\_\_

Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-18- 20190822	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, As)	X

Total Containers 11

Time	09:48	09:53	09:58	10:03	10:08	10:13			
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10				
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5				
Water Depth (ft)	13.85	13.83	13.83	13.83	13.83				
Temperature (°C), (± 0.2)	17.84	18.24	18.34	18.22	18.31				
pH, (± 0.1)	7.49	7.45	7.43	7.40	7.39				
Sp. Conductance (µS/cm), (± 3%)	0.541	0.539	0.539	0.538	0.537				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	3.61	3.57	3.56	3.83	3.85				
ORP (mV), (± 10%)	95.8	99.2	97.8	93.8	92.9				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.65	2.82	3.44	2.59	3.62				
Color	none	none	none	none	none				
Odor/Evidence of LNAPL	none	none	none	none	none				

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

12 bottles

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/22/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1215  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-19  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 14.11  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: Sunny + windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
15	3	VOA	HCl	40 mL	No	BTEX (8260)	X	
	3	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (Pb) (6020)	X	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, Pb)	X		

Total Containers 14

Time	1130	1135	1140	1145	1150	1155	1200	1205	1210
Parameter (every 5 min)		5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)		0.1							
Volume Purged (Liters)		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)		14.29	14.28	14.28	14.28	14.25	14.27	14.26	14.26
Temperature (°C), (± 0.2)		17.32	17.37	17.50	17.39	17.96	18.12	17.89	17.90
pH, (± 0.1)		7.17	7.19	7.22	7.22	7.21	7.28	7.25	7.23
Sp. Conductance (µS/cm), (± 3%)		0.313	0.310	0.309	0.305	0.304	0.303	0.297	0.299
DO (mg/L), (± 10% or 10% of 0.2mg/l)		1.22	0.99	1.02	1.15	1.19	1.25	1.35	1.38
ORP (mV), (± 10%)		113.4	105.1	98.2	94.6	92.0	86.4	86.2	85.2
Turbidity (NTU), (± 10% or 3 <10 NTUs)		7.39	6.23	4.63	4.37	4.23	4.17	4.84	3.74
Color		clear							
Odor/Evidence of LNAPL		no/15							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, Lead + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 08/20/2019  
 Project Name: BNSF Wisram  
 Project Number: 1996120\*00

Well Number: WMW-20  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: BREB  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: good  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): dedicated

Sampling Time: 15:50  
 Total Discharge (gal): \_\_\_\_\_

Depth to Groundwater (ft): 14.29  
 Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: hot, sunny, light wind

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-20 20190820	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

Total Containers 14

Time	15:10	15:15	15:20	15:25	15:30	15:35	15:40	15:45	15:50
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10	.10	.10	.10	
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5	3.0	3.5		
Water Depth (ft)	14.70	14.65	14.67	14.65	14.64	14.65	14.65	14.65	14.64
Temperature (°C), (± 0.2)	19.26	19.00	19.18	19.03	18.98	18.45	18.31	18.40	
pH, (± 0.1)	7.82	7.75	7.66	7.61	7.57	7.58	7.57	7.55	
Sp. Conductance (µS/cm), (± 3%)	0.371	0.335	0.338	0.352	0.362	0.364	0.367	0.375	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.16	3.17	3.13	2.56	2.28	2.22	2.12	1.90	
ORP (mV), (± 10%)	180.8	214.8	220.6	224.8	226.6	227.8	228.9	229.0	
Turbidity (NTU), (± 10% or 3 <10 NTUs)	28.85	21.35	29.20	14.36	11.82	14.00	26.73	18.37	
Color	none	none	none	none	none	none	none	none	
Odor/Evidence of LNAPL	none	none	none	none	none	none	none	none	

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

15 bottles

Special note re: analyses: BTEX, RCRA8 + MNA for metals



17 bottles

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/20/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: 61267  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 11.45  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums  
 Weather: sunny, dry

Well Number: WMW-21  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good.  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): dedicated.  
 Depth to Groundwater (ft): 13.55  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-21-20190820	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

Total Containers 16

Time	11:18	11:23	11:28	11:32	11:37	11:42			
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10					
Volume Purged (Liters)	.50	1.0	1.5						
Water Depth (ft)	13.64	13.64	13.64	13.64	13.64				
Temperature (°C), (± 0.2)	17.84	17.60	17.68	17.39	17.52				
pH, (± 0.1)	7.15	7.33	7.22	7.24	7.29				
Sp. Conductance (uS/cm), (± 3%)	0.581	0.576	0.575	0.573	0.572				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.43	1.91	1.55	1.34	1.23				
ORP (mV), (± 10%)	155.4	133.1	140.6	1328	126.2				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	1.91	2.70	2.49	2.33	0.40				
Color	none	none	none	none	none				
Odor/Evidence of LNAPL	none	none	none	none	none				

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/20/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GRG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 10:00  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums  
 Weather: Sunny, dry.

Well Number: WMW-22  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good.  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): degraded  
 Depth to Groundwater (ft): 13.88  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-22-20190820	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

Total Containers 16

Time	09:25	09:30	09:35	09:40	09:45	09:50		
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10	.10		
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5	3.0		
Water Depth (ft)	13.86	13.87	13.87	13.85	13.84	13.82		
Temperature (°C), (± 0.2)	18.59	18.54	18.83	18.89	19.00	18.99		
pH, (± 0.1)	7.49	7.45	7.44	7.42	7.47	7.42		
Sp. Conductance (µS/cm) (± 3%)	0.920	0.880	0.856	0.836	0.616	0.481		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.33	2.25	1.70	1.63	3.63	5.02		
ORP (mV), (± 10%)	106.4	95.1	88.8	82.1	77.9	80.6		
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.99	1.89	1.22	1.34	0.99	0.58		
Color	none	none	none	none	none	none		
Odor/Evidence of LNAPL	none	none	none	none	none	none		

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

17 bottles

Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/20/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-23  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: GRG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: good  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): dedicated

Sampling Time: 08:25

Depth to Groundwater (ft): 13.74

Total Discharge (gal): \_\_\_\_\_

Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: sunny, dny 70°

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-23 - 20190820	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

Total Containers 14

Time	07:55	08:00	08:05	08:10	08:15			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10	.10		
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5	3.0		
Water Depth (ft)	13.74	13.745	13.74	13.75	13.75	13.76		
Temperature (°C), (± 0.2)	17.57	17.80	17.92	17.98	18.06	18.19		
pH, (± 0.1)	7.14	7.29	7.37	7.42	7.44	7.46		
Sp. Conductance (µS/cm), (± 3%)	0.905	0.904	0.901	0.900	0.894	0.891		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.75	1.15	0.90	0.76	0.72	0.67		
ORP (mV), (± 10%)	75.8	69.6	67.6	67.5	67.0	68.6		
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.72	2.10	1.97	2.00	2.12			
Color	none	none	none	none	none	none		
Odor/Evidence of LNAPL	none	none	none	none	none	none		

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, RCRA8 + MNA for metals 15 bottles

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/20/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KE T  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1420  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-24  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 10.57  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: hot + sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	<u>8/16/19</u>	Type	Sample ID	Time
Turbidity:	Micro TPI	<u>11</u>			
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
13	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X

Total Containers 14

Time	1340	1345	1350	1355	1400	1405	1410	1415
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	20 min	35 min	40 min
Flow Rate (L/min)	<u>0.1</u>							
Volume Purged (Liters)	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>	<u>3.5</u>	<u>4.0</u>
Water Depth (ft)	<u>10.82</u>	<u>10.84</u>	<u>10.80</u>	<u>10.80</u>	<u>10.89</u>	<u>10.89</u>	<u>10.85</u>	<u>10.84</u>
Temperature (°C), (± 0.2)	<u>20.59</u>	<u>20.73</u>	<u>20.74</u>	<u>20.42</u>	<u>20.39</u>	<u>20.35</u>	<u>20.56</u>	<u>20.57</u>
pH, (± 0.1)	<u>7.16</u>	<u>7.22</u>	<u>7.23</u>	<u>7.30</u>	<u>7.21</u>	<u>7.24</u>	<u>7.25</u>	<u>7.26</u>
Sp. Conductance (µS/cm), (± 3%)	<u>0.621</u>	<u>0.621</u>	<u>0.611</u>	<u>0.613</u>	<u>0.608</u>	<u>0.609</u>	<u>0.604</u>	<u>0.603</u>
DO (mg/L), (± 10% or 10% of 0.2mg/l)	<u>0.64</u>	<u>0.53</u>	<u>0.55</u>	<u>0.69</u>	<u>0.83</u>	<u>0.85</u>	<u>1.02</u>	<u>0.99</u>
ORP (mV), (± 10%)	<u>113.4</u>	<u>107.2</u>	<u>106.7</u>	<u>103.9</u>	<u>109.0</u>	<u>108.4</u>	<u>107.9</u>	<u>107.6</u>
Turbidity (NTU), (± 10% or 3 <10 NTUs)	<u>2.05</u>	<u>1.52</u>	<u>2.07</u>	<u>1.90</u>	<u>3.29</u>	<u>2.30</u>	<u>1.49</u>	<u>2.61</u>
Color	<u>clear</u>							
Odor/Evidence of LNAPL	<u>no O/S</u>							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 08/19/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-26  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: GRB  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated

Sampling Time: 0830  
 Total Discharge (gal): \_\_\_\_\_

Depth to Groundwater (ft): 10.67  
 Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: dry, sunny, 85°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				--
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
(17)	3	VOA	HCl	40 mL	No	VOCs (8260)	X 3
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X 2
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X 2
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X 2
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X 2
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X 1
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X 1
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X 1
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X 1
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X 2	

Total Containers 16

8/16/19

Time	17:16	17:21	17:26	17:31	17:36	17:41	0900	
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	<u>0.5</u>	<u>0.5</u>	<u>1.15</u>	<u>.15</u>			<u>0.1</u>	
Volume Purged (Liters)	<u>2.5</u>	<u>1.50</u>					<u>-</u>	
Water Depth (ft)	<u>11.92</u>	<u>12.98</u>	<u>14.14</u>	<u>14.48</u>	<u>14.53</u>	<u>14.55</u>	<u>12.60</u>	
Temperature (°C), (± 0.2)	<u>18.81</u>	<u>19.09</u>	<u>18.80</u>	<u>20.75</u>	<u>20.90</u>	<u>20.99</u>	<u>18.09</u>	
pH, (± 0.1)	<u>7.05</u>	<u>7.17</u>	<u>7.21</u>	<u>7.30</u>	<u>7.33</u>	<u>7.37</u>	<u>7.05</u>	
Sp. Conductance (µS/cm), (± 3%)	<u>0.586</u>	<u>0.587</u>	<u>0.592</u>	<u>0.590</u>	<u>0.583</u>	<u>0.594</u>	<u>0.579</u>	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	<u>1.30</u>	<u>2.38</u>	<u>3.13</u>	<u>9.50</u>	<u>9.58</u>	<u>9.59</u>	<u>3.36</u>	
ORP (mV), (± 10%)	<u>117.6</u>	<u>100.4</u>	<u>94.9</u>	<u>94.1</u>	<u>94.6</u>	<u>95.4</u>	<u>148.1</u>	
Turbidity (NTU), (± 10% or 3 <10 NTUs)	<u>2.66</u>	<u>3.63</u>	<u>6.95</u>	<u>1.74</u>	<u>1.89</u>	<u>2.38</u>	<u>4.07</u>	
Color	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>clear</u>	
Odor/Evidence of LNAPL	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>no O/S</u>	

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

17:30 starting to suck-up air 17:34 DTW

Special note re: analyses: Full VOCs list, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

14.50

DTW 8/20/19 @ 0825 = 10.62

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/20/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-27  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 9.51  
 Depth to LNAPL (ft): —

Sampling Time: 1105  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Weather: SUNNY + hot

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		MS	WMW-27-201908_MS	1110
Other:			MSD	WMW-27-201908_MSD	1115

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑭ p3	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	—	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X	

Total Containers 14

Time	1025	1030	1035	1040	1045	1050	1055	1108
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)	9.55	9.54	9.54	9.54	9.55	9.55	9.55	9.56
Temperature (°C), (± 0.2)	19.51	19.70	20.20	19.80	19.87	19.80	20.32	19.87
pH, (± 0.1)	7.28	7.35	7.42	7.50	7.46	7.44	7.43	7.46
Sp. Conductance (µS/cm), (± 3%)	0.328	0.327	0.327	0.328	0.328	0.329	0.331	0.332
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.56	0.46	0.49	0.50	0.71	0.82	0.99	1.05
ORP (mV), (± 10%)	129.4	123.5	116.2	111.0	111.8	110.9	109.2	107.0
Turbidity (NTU), (± 10% or 3 <10 NTUs)	9.07	7.94	6.24	6.90	7.87	6.67	6.92	5.66
Color	clear							
Odor/Evidence of LNAPL	noo/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/22/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-28  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated

Sampling Time: 1335  
 Total Discharge (gal): \_\_\_\_\_

Depth to Groundwater (ft): 9.48  
 Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: sunny + hot

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		DUP	D-4-2019	1340
Other:				02	

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
15	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
9	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X

Total Containers 14

Time	1300	1305	1310	1315	1320	1325	1330	
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	
Water Depth (ft)	9.58	9.55	9.55	9.55	9.55	9.55	9.55	
Temperature (°C), (± 0.2)	18.94	19.25	19.82	19.71	19.25	19.30	19.44	
pH, (± 0.1)	7.29	7.35	7.41	7.49	7.49	7.45	7.46	
Sp. Conductance (µS/cm), (± 3%)	0.393	0.385	0.387	0.383	0.382	0.381	0.382	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.49	1.53	1.59	1.68	1.73	1.75	1.77	
ORP (mV), (± 10%)	78.9	76.8	75.7	74.5	78.3	83.2	85.3	
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.67	2.94	3.33	2.97	2.21	2.45	3.15	
Color	clear							
Odor/Evidence of LNAPL	noo/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

DL -0.  
 X (RCRA8 only)

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 08/19/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-29  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: GJGG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated

Sampling Time: 0745 8/20/19

Depth to Groundwater (ft): 10.56

Total Discharge (gal): \_\_\_\_\_

Depth to LNAPL (ft): —

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: dry, sunny 87°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
15	3	VOA	HCl	40 mL	No	VOCs (8260)	X 3
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X 2
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X 2
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X 2
	2	VOA	—	40 mL	No	PAHs (8270 SIM)	X 2
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X 2
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X 1
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X 1
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X 1
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X 1
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X 1	

Total Containers 14

Time	15:42	15:48	15:54	15:59	16:04	16:09	16:14	16:19	16:24
Parameter (every 5 min)		min	min	min	min	min	min	min	min
Flow Rate (L/min)		<del>1.0</del>	.10	.10	.10	.10	.10	.10	.10
Volume Purged (Liters)		.5	1.1	1.6	2.1	2.6	3.1	3.6	4.1
Water Depth (ft)		11.74	12.02	12.41	12.67	12.81	12.96	13.03	13.15
Temperature (°C), (± 0.2)		20.37	20.53	20.69	20.82	21.10	21.04	20.80	20.63
pH, (± 0.1)		6.80	6.95	6.98	7.02	7.04	7.07	7.08	7.09
Sp. Conductance (µS/cm), (± 3%)		1.412	1.403	1.375	1.376	1.366	1.368	1.372	1.372
DO (mg/L), (± 10% or 10% of 0.2mg/l)		1.63	1.54	1.30	1.07	1.03	1.24	1.35	1.37
ORP (mV), (± 10%)		103.5	90.5	86.3	80.9	79.4	74.3	72.9	70.6
Turbidity (NTU), (± 10% or 3 <10 NTUs)		1.63	1.63	1.97	1.25	1.90	1.74	2.92	1.70
Color		none.	none	none	none.	none	none	none	none
Odor/Evidence of LNAPL		none.	none	none	none	none	none	none	none

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

At 16:26 turned flow up to purge dry. Stopped 16:39 gw 16.81 ft

0/2  
081  
0.1  
11.9  
19.5  
6.87  
1.33  
2.8  
150.1  
2.25  
clear  
no,



Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/20/19  
 Project Name: BNSF Wisram  
 Project Number: 1996120\*00  
 Sampling Personnel: KET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0950  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-30  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition:  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 10.19  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: Sunny

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	<u>8/16/19</u>	Type	Sample ID	Time
Turbidity:	Micro TPI	<u>8/16/19</u>			
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
(17)	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X

Total Containers 16

Time	0925	0930	0935	0940	0945			
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5			
Water Depth (ft)	10.60	10.82	10.89	10.97	11.02			
Temperature (°C), (± 0.2)	18.49	18.71	18.93	18.93	19.07			
pH, (± 0.1)	7.36	7.27	7.34	7.38	7.38			
Sp. Conductance (µS/cm), (± 3%)	0.561	0.561	0.561	0.560	0.560			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.17	0.61	0.54	0.51	0.54			
ORP (mV), (± 10%)	69.0	76.4	75.2	76.1	77.6			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.76	1.83	1.72	1.95	2.26			
Color	Clear							
Odor/Evidence of LNAPL	NO OIS							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/21/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: VET  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1145  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-31  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 9.56  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: cloudy + windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
15	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X

Total Containers 14

Time	1120	1125	1130	1135	1140			
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5			
Water Depth (ft)	9.75	9.73	9.74	9.74	9.74			
Temperature (°C), (± 0.2)	17.75	18.26	18.16	18.21	18.16			
pH, (± 0.1)	7.14	7.17	7.21	7.23	7.23			
Sp. Conductance (µS/cm), (± 3%)	0.642	0.612	0.602	0.598	0.599			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.76	0.55	0.47	0.44	0.42			
ORP (mV), (± 10%)	50.3	52.0	49.7	48.2	46.8			
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	3.08	2.82	2.47	3.20	2.95			
Color	clear							
Odor/Evidence of LNAPL	noo/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/22/19 Well Number: WMW-32  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: KET Well Condition:  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): dedicated  
 Sampling Time: 1035 Depth to Groundwater (ft): 10.40 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: Sunny + Windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556	<u>8/16/19</u>	Type	Sample ID	Time
Turbidity:	Micro TPI	<u>11</u>			
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
(17)	3	VOA	HCl	40 mL	No	VOCs (8260)	X 3
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X 3
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X 2
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X 2
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X 2
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X 1
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X 1
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X 1
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X 1
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, RCRA8)	X 1	

Total Containers 16

Time	0915	0920	0925	0930	0935	0940	0945	0950
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)	11.30	11.56	11.87	12.04	12.20	12.46	12.54	12.59
Temperature (°C), (± 0.2)	19.41	19.93	19.94	20.13	20.21	19.90	19.92	20.11
pH, (± 0.1)	7.32	7.31	7.32	7.34	7.35	7.36	7.34	7.36
Sp. Conductance (µS/cm), (± 3%)	0.509	0.500	0.503	0.523	0.546	0.573	0.577	0.600
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.57	0.59	0.103	1.17	1.33	1.50	1.65	1.63
ORP (mV), (± 10%)	62.0	58.3	54.7	54.5	55.7	58.4	59.0	59.8
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	3.03	2.40	4.31	29.66	34.32	28.86	24.39	18.32
Color	clear							
Odor/Evidence of LNAPL	nois							

1055  
12.2  
20.4  
7.3  
0.64  
1.96  
101.1  
20.6

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: Full VOCs list, NWTPH-Gx, RCRA8 + MNA for metals  
Stop purge @ 0950 & wait for well to recharge  
1034: DTW = 10.40

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/22/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: RMD-1  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 44.5  
 Screened Interval (ft): 29.6-44.6  
 Purge Depth (ft): 37.5

Sampling Time: 11:48

Depth to Groundwater (ft): 14.17

Total Discharge (gal): \_\_\_\_\_

Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: sunny, windy, 78°

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
RMD-1- 20190822	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
Total Containers					12		

Time	11:21	11:26	11:31	11:34	11:41	11:46			
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10				
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5				
Water Depth (ft)	14.57	14.51	14.52	14.50	14.55				
Temperature (°C), (± 0.2)	17.05	17.16	17.23	17.30	17.28				
pH, (± 0.1)	7.26	7.31	7.30	7.29	7.29				
Sp. Conductance (µS/cm), (± 3%)	1.086	1.085	1.086	1.086	1.083				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.31	1.63	1.33	1.14	0.94				
ORP (mV), (± 10%)	85.4	73.8	36.1	19.0	8.9				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	1.96	0.60	1.24	1.03	2.11				
Color	none	none	none	none	none				
Odor/Evidence of LNAPL	none	none	none	none	none				

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
Iron precipitate on probe when dissolved lifted from well

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/21/2019 Well Number: RMD-2  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: GRB Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 50.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 30-50  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 40.0  
 Sampling Time: 11:38 Depth to Groundwater (ft): 13.85 TOC  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
RMD-2- 20190821	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X
	Total Containers		12				

Time	11:05	11:10	11:15	11:20	11:25	11:30	11:35		
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10	.10	.10		
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5	3.0			
Water Depth (ft)	13.87	13.87	13.88	13.86	13.86	13.85			
Temperature (°C), (± 0.2)	18.46	17.70	17.62	17.61	17.68	17.86			
pH, (± 0.1)	7.13	7.15	7.16	7.17	7.18	7.19			
Sp. Conductance (µS/cm), (± 3%)	1.288	1.286	1.281	1.285	1.281	1.284			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.30	1.20	1.04	0.98	0.94	0.89			
ORP (mV), (± 10%)	83.5	54.2	49.6	37.6	26.9	20.3			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	4.05	1.87	2.75	2.76	2.71	2.28			
Color	none	none	none	none	none	none			
Odor/Evidence of LNAPL	none	none	none	none	none	none			

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/21/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GR67  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 10:15  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: RMD-3  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2  
 Well Condition: good.  
 Total Casing Depth (ft): 60.0  
 Screened Interval (ft): 40-60  
 Purge Depth (ft): 50.0  
 Depth to Groundwater (ft): 14.18  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: warm, light clouds

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
RMD-3- 20190831	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

Total Containers 10

Time	09:43	09:48	09:53	09:58	10:03	10:08	10:13	
9:35								
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.20	.10	.10	.10	.10	.10		
Volume Purged (Liters)	.50	1.00	1.50	2.00	2.50	3.00		
Water Depth (ft)	14.19	14.20	14.19	14.20	14.20	14.19	14.19	
Temperature (°C), (± 0.2)	17.15	17.00	17.03	16.92	17.08	17.18	17.06	
pH, (± 0.1)	7.13	7.19	7.22	7.24	7.25	7.26	7.25	
Sp. Conductance (µS/cm); (± 3%)	0.662	0.662	0.662	0.662	0.662	0.684	0.663	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.76	1.21	0.99	0.87	0.79	0.75	0.69	
ORP (mV), (± 10%)	76.5	62.6	58.6	53.0	48.0	43.7	38.3	
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	11.83	20.87	26.60	19.36	15.01	10.39	8.62	
Color	none	none	none	none	none	none	none	
Odor/Evidence of LNAPL	none	none	none	none	none	none	none	

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

10 bottles

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 8/22/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: RMD-4  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel:  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition:  
 Total Casing Depth (ft): 65.0  
 Screened Interval (ft): 45-65  
 Purge Depth (ft): 55.0

Sampling Time: 08:15, 08:20, 08:25

Depth to Groundwater (ft): 14.03

Total Discharge (gal):

Depth to LNAPL (ft):

Water Disposal: On-Site 55-gallon drums

Water Column (ft):

Weather: very windy, blue skies, 72°F

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
RMD-4-20190822	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
RMD-4-20190822MS	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
RMD-4-20190822MSD	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

Total Containers 12

Time	07:47	07:53	07:58	08:03	08:08	08:13		
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10	.10		
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.0	2.0		
Water Depth (ft)	14.03	14.03	14.03	14.04	14.04	14.05		
Temperature (°C), (± 0.2)	16.85	16.80	16.79	16.69	16.70	16.60		
pH, (± 0.1)	7.35	7.34	7.35	7.37	7.37	7.38		
Sp. Conductance (uS/cm), (± 3%)	0.984	0.984	0.985	0.985	0.984	0.985		
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.27	1.61	1.15	1.14	0.95	0.96		
ORP (mV), (± 10%)	113.8	99.6	90.3	114.9	119.6	120.6		
Turbidity (NTU), (± 10% or 3 <10 NTUs)	1.55	0.51	0.68	1.22	0.32	0.46		
Color	none	none	none	none	none	none		
Evidence of LNAPL	none	none	none	none	none	none		

actions taken if well dewatered, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

3.8 Liters. 12 bottles per sample set, 36 total

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 8/22/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*05  
 Sampling Personnel: B. K. G.  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 14:53  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: RMD-5  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 45.0  
 Screened Interval (ft): 30-45  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 13.80  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

TOC

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
RMD-5 20190822	2	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (Pb) (6020)	X
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Pb, Mn, Fe)	X	

Total Containers 15

Time	14:30	14:35	14:40	14:45	14:50			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10			
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5			
Water Depth (ft)	13.89	13.89	13.89	13.91	13.91			
Temperature (°C), (± 0.2)	17.13	17.14	17.11	17.12	17.12			
pH, (± 0.1)	7.80	7.58	7.56	7.56	7.56			
Sp. Conductance (µS/cm), (± 3%)	0.862	0.855	0.853	0.849	0.848			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.77	1.02	0.80	0.67	0.63			
ORP (mV), (± 10%)	162.5	166.0	166.7	164.7	165.1			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	1.14	1.27	1.80	1.43	0.92			
Color	none	none	none	none	none			
Odor/Evidence of LNAPL	none	none	none	none	none			

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

17 bottles

Special note re: analyses: BTEX; NWTPH-Dx with AND without SGC; Lead + MNA for metals



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 08/20/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*05

Well Number: RMD-6  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: \_\_\_\_\_  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: good  
 Total Casing Depth (ft): 65.0  
 Screened Interval (ft): 45-65  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 13.90  
 Depth to LNAPL (ft): \_\_\_\_\_

Sampling Time: 14:20  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Weather: not, dry

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		MS		
Other:			MSD		

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
RMD-6- 20190820	2	VOA	HCl	40 mL	No	BTEX (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	X	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (RCRA8, Mn, Fe)	X	

Total Containers **15**

	13:55	14:00	14:05	14:10	14:15	14:20			
Parameter (every 5 min)	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	.10	.10	.10	.10	.10	.10			
Volume Purged (Liters)	.50	1.0	1.5	2.0	2.5				
Water Depth (ft)	13.93	13.93	13.93	13.93	13.93				
Temperature (°C), (± 0.2)	19.53	19.99	19.20	19.56	19.78				
pH, (± 0.1)	7.47	7.31	7.31	7.29	7.31				
Sp. Conductance (µS/cm), (± 3%)	0.454	0.276	0.986	0.986	0.986				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	4.08	0.78	0.57	0.54	0.51				
ORP (mV), (± 10%)	163.3	173.3	175.7	189.3	195.1				
Turbidity (NTU), (± 10% or 3 < 10 NTUs)	2.38	2.79	1.92	3.02	3.10				
Color	none	none	none	none	none				
Odor/Evidence of LNAPL	none	none	none	none	none				

Notes: (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters. 17 bottles  
 Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

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12 to 14 November 2019

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel: <i>KET</i>					
Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
OHM-1					
OHM-2					
OHM-3	1650	12.15	14.49		(from field notebook)
OHM-4					
RMD-1	<i>0938</i>	—	<i>15.04</i>	—	
RMD-2					
RMD-3					
RMD-4					
RMD-5	<i>0949</i>	—	<i>14.78</i>	—	
RMD-6					
WMW-1	<i>1002</i>	—	<i>10.49</i>	—	
WMW-3	<i>1016</i>	—	<i>10.95</i>	—	
WMW-5	<i>1032</i>	—	<i>10.55</i>	—	
WMW-7	<i>1215</i>	—	<i>11.98</i>	—	
WMW-8	<i>1208</i>	—	<i>10.55</i>	—	
WMW-9	<i>0907</i>	—	<i>11.16</i>	—	
WMW-10	<i>0901</i>	—	<i>11.05</i>	—	
WMW-11	<i>0919</i>	—	<i>10.98</i>	—	
WMW-12					<i>could not locate</i>
WMW-13	<i>0952</i>	—	<i>11.64</i>	—	
WMW-14	<i>0953</i>	—	<i>14.23</i>	—	
WMW-15	<i>0924</i>	—	<i>15.11</i>	—	
WMW-16					
WMW-17					
WMW-18					
WMW-19	<i>0956</i>	—	<i>15.11</i>	—	
WMW-20					

*h6*  
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*h6*

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel: KEH

Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
WMW-21					
WMW-22					
WMW-23					
WMW-24	1115	—	11.11	—	
WMW-26	1059	—	11.20	—	
WMW-27	1049	—	10.04	—	
WMW-28	1041	—	10.17	—	
WMW-29	1054	—	11.15	—	
WMW-30	1108	—	10.46	—	
WMW-31	1142	—	10.09	—	
WMW-32	1147	—	10.71	—	

Additional Notes:

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel: *Gloria Gonzalez*

Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
OHM-1	<i>11/21/19 / 1233</i>	<i>10.10</i>	<i>23.19</i>	<i>13.09</i>	
OHM-2	<i>11/21/19 / 1430</i>	<i>12.45</i>	<i>22.07</i>		
OHM-3					
OHM-4	<i>11/21/19 / 1413</i>	<i>—</i>	<i>11.55</i>	<i>—</i>	
RMD-1					
RMD-2	<i>11/12/19 / 1205</i>		<i>14.69</i>		
RMD-3	<i>11/12/19 / 1158</i>		<i>14.97</i>		
RMD-4	<i>11/12/19 / 1143</i>		<i>14.86</i>		
RMD-5					
RMD-6	<i>1058 / 11/12/19</i>	<i>—</i>	<i>14.63</i>		
WMW-1			<i>15.05</i>		
WMW-3					
WMW-5					
WMW-7					
WMW-8					
WMW-9					
WMW-10					
WMW-11					
WMW-12					
WMW-13					
WMW-14					
WMW-15					
WMW-16	<i>11/12/19 / 1210</i>		<i>14.84</i>		
WMW-17	<i>11/12/19 / 1200</i>		<i>14.70</i>		
WMW-18	<i>1058 / 11/12/19 / 1048</i>		<i>14.82</i> <del><i>15.05</i></del>		
WMW-19					
WMW-20	<i>1058</i>		<i>15.05</i>		

Notes

N.S.

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:					
Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
WMW-21	11/12/19 / 1045	—	14.19	—	good
WMW-22	11/12/19 / 1345	—	14.43	—	
WMW-23	11/12/19 / 1353		14.19		
WMW-24					
WMW-26					
WMW-27					
WMW-28					
WMW-29					
WMW-30					
WMW-31					
WMW-32					
Additional Notes:					

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 11/14/19 Well Number: WMW-14  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: KEIT Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 12-27  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 0730 Depth to Groundwater (ft): 15.24  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: 43°, cloudy

TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑧	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	

Total Containers 8

Time	0710	0715	0720	0725				
Parameter (every 5 min)	5 min	10 min	15 min	20 min	min	min	min	min
Flow Rate (L/min)	0.1	—	—	—				
Volume Purged (Liters)	0.5	1.0	1.5	2.0				
Water Depth (ft)	15.27	15.27	15.28	15.28				
Temperature (°C), (± 0.2)	15.4	15.6	15.8	15.9				
pH, (± 0.1)	7.39	7.51	7.57	7.60				
Sp. Conductance (uS/cm), (± 3%)	341.7	344.3	344.2	344.9				
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.12	1.05	1.03	1.01				
ORP (mV), (± 10%)	142.6	137.2	134.3	133.5				
Turbidity (NTU), (± 10% or 3 <10 NTUs)	7.69	6.94	5.93	4.39				
Color	clear	—	—	—				
Odor/Evidence of LNAPL	NOOIS	—	—	—				

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/14/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-15  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2

Sampling Personnel: GRG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: good  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0

Sampling Time: 0755  
 Total Discharge (gal): 0.92

Depth to Groundwater (ft): 15.12  
 Depth to LNAPL (ft): ---

Water Disposal: On-Site 55-gallon drums

Water Column (ft): ---

Weather: overcast + slightly foggy

TOC

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-15-20191114  ⑤	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WTH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	

Total Containers 8

Time	0720	0725	0730	0735	0740	0745	0750	
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min) <u>mL/min</u>	100	100	100	100	100	100	100	
Volume Purged (Liters) <u>mL</u>	500	1000	1500	2000	2500	3000	3500	
Water Depth (ft)	15.19	15.20	15.20	15.20	15.20	15.21	15.22	
Temperature (°C), (± 0.2)	15.56	15.91	16.10	16.05	16.04	16.04	16.04	
pH, (± 0.1)	7.21	7.22	7.22	7.20	7.18	7.17	7.17	
Sp. Conductance (uS/cm), (± 3%)	0.819	0.845	0.847	0.848	0.850	0.853	0.851	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.14	0.64	0.53	0.48	0.42	0.38	0.36	
ORP (mV), (± 10%)	77.6	13.1	-22.9	-47.3	-68.2	-77.4	-84.0	
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.74	1.71	0.82	0.78	0.64	0.32	0.79	
Color	none	none	none	none	none	none	none	
Odor/Evidence of LNAPL	none	none	none	none	none	none	none	

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.



**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/13/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GRB  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1445  
 Total Discharge (gal): 0.166  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-16  
 Monument Type: Stickup: (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: good  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 11.33-26.33  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 14.83  
 Depth to LNAPL (ft): —  
 Water Column (ft): —

TOC

Weather: overcast + windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
WMW-16-201911B	2	VOA	HCl	40 mL	No	BTEX (8260)		
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	—	40 mL	No	PAHs (8270 SIM)	X	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)		
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X		

Total Containers 12

Time	1420	1425	1430	1435	1440			
Parameter (every 5 min)	min	min	min	min	min	min	min	min
Flow Rate (L/min)	1.0	1.0	1.0	1.0	1.0			
Volume Purged (Liters)	5.0	10.0	15.0	20.0	25.0			
Water Depth (ft)	14.83	14.83	14.83	14.84	14.84			
Temperature (°C), (± 0.2)	15.49	16.04	16.21	16.25	16.13			
pH, (± 0.1)	6.93	6.94	6.92	6.91	6.89			
Sp. Conductance (uS/cm), (± 3%)	0.434	0.432	0.431	0.430	0.432			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.25	0.57	0.44	0.40	0.38			
ORP (mV), (± 10%)	-77.7	-94.8	-98.9	-100.7	-102.9			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	2.25	2.23	1.87	1.56	0.80			
Color	none	none	none	none	none			
Odor/Evidence of LNAPL	none	none	none	none	none			

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/14/19 Well Number: WMW-17  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2  
 Sampling Personnel: GRB Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 30.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 12-27  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): 20.0  
 Sampling Time: 0905 / 0910 (Dup) Depth to Groundwater (ft): 14.89 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_  
 Weather: cloudy + foggy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		Duplicate	D-1-2019	--
Other:			Dup on 15 or 16 if sheen in 17		

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
WMW-17 - 20191114  DUP-02 - 20191114	2	VOA	HCl	40 mL	No	BTEX (8260)		
	2	VOA	HCl	40 mL	No	NWTPH-Gx	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	(12)
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X	
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, As)	X		

Total Containers 11

Time	0835	0840	0845	0850	0855	0900			
Parameter (every 5 min)		min	min	min	min	min	min	min	min
Flow Rate (L/min)		1.00							
Volume Purged (Liters)		500	1.0	1.5	2.0	3.0			
Water Depth (ft)		14.95	14.94	14.94	14.94	14.95			
Temperature (°C), (± 0.2)		15.50	15.41	15.43	15.88	15.78			
pH, (± 0.1)		6.87	6.95	6.96	6.96	6.97			
Sp. Conductance (uS/cm), (± 3%)		1.113	1.106	1.092	1.068	1.039			
DO (mg/L), (± 10% or 10% of 0.2mg/l)		0.85	0.50	0.43	0.35	0.32			
ORP (mV), (± 10%)		-136.6	-150.5	-154.5	-158.5	-159.9			
Turbidity (NTU), (± 10% or 3 <10 NTUs)		2.45	2.95	1.58	3.05	1.90			
Color		none	none	none	none	none			
Odor/Evidence of LNAPL		none	none	none	none	none			

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/13/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GRG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1320  
 Total Discharge (gal): 0.126  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-18  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2  
 Well Condition: good  
 Total Casing Depth (ft): 30.0  
 Screened Interval (ft): 12-27  
 Purge Depth (ft): 20.0  
 Depth to Groundwater (ft): 14.78  
 Depth to LNAPL (ft): ---  
 Water Column (ft): ---

Weather: cloudy + overcast

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-18-20191113	2	VOA	HCl	40 mL	No	BTEX (8260)	
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	X
	2	VOA	--	40 mL	No	PAHs (8270 SIM)	X
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (As) (6020)	X
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe, As)	X	

Total Containers: 9      1300 1305 1310 1315

Parameter (every 5 min)	Time	min	min	min	min	min	min	min
Flow Rate (L/min)	<u>1250</u>	<u>1255</u>	<u>1305</u>	<u>1310</u>	<u>1315</u>	<u>1320</u>		
Volume Purged (Liters)		<u>5.0</u>	<u>10.0</u>	<u>15.00</u>	<u>20.0</u>	<u>25.0</u>		
Water Depth (ft)		<u>14.78</u>	<u>14.78</u>	<u>14.79</u>	<u>14.79</u>	<u>14.79</u>		
Temperature (°C), (± 0.2)		<u>14.61</u>	<u>15.11</u>	<u>15.22</u>	<u>15.46</u>	<u>15.43</u>		
pH, (± 0.1)		<u>7.34</u>	<u>7.39</u>	<u>7.37</u>	<u>7.35</u>	<u>7.34</u>		
Sp. Conductance (uS/cm), (± 3%)		<u>0.581</u>	<u>0.586</u>	<u>0.588</u>	<u>0.589</u>	<u>0.888</u>		
DO (mg/L), (± 10% or 10% of 0.2mg/l)		<u>1.21</u>	<u>0.58</u>	<u>0.41</u>	<u>0.36</u>	<u>0.38</u>		
ORP (mV), (± 10%)		<u>114.4</u>	<u>110.6</u>	<u>111.9</u>	<u>113.2</u>	<u>114.4</u>		
Turbidity (NTU), (± 10% or 3 <10 NTUs)		<u>7.57</u>	<u>2.89</u>	<u>3.51</u>	<u>2.05</u>	<u>1.52</u>		
Color		<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>		
Odor/Evidence of LNAPL		<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>		

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 11/13/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00

Well Number: WMW-19  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC

Sampling Personnel: KEH  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing

Well Condition: good  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): \_\_\_\_\_

Sampling Time: 1515  
 Total Discharge (gal): \_\_\_\_\_

Depth to Groundwater (ft): 15.10  
 Depth to LNAPL (ft): \_\_\_\_\_

Water Disposal: On-Site 55-gallon drums

Water Column (ft): \_\_\_\_\_

Weather: cloudy + windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑪	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	3	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (Pb only) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

Total Containers 11

Parameter (every 5 min)	Time	1455	1500	1505	1510				
	5 min	10 min	15 min	20 min	min	min	min	min	
Flow Rate (L/min)	<u>0.1</u>	_____	_____	_____	_____				
Volume Purged (Liters)	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>					
Water Depth (ft)	<u>15.29</u>	<u>15.28</u>	<u>15.28</u>	<u>15.27</u>					
Temperature (°C), (± 0.2)	<u>14.8</u>	<u>15.2</u>	<u>15.2</u>	<u>15.1</u>					
pH, (± 0.1)	<u>7.19</u>	<u>7.18</u>	<u>7.20</u>	<u>7.25</u>					
Sp. Conductance (uS/cm), (± 3%)	<u>277.3</u>	<u>274.9</u>	<u>276.4</u>	<u>277.6</u>					
DO (mg/L), (± 10% or 10% of 0.2mg/l)	<u>0.44</u>	<u>0.34</u>	<u>0.31</u>	<u>0.33</u>					
ORP (mV), (± 10%)	<u>96.7</u>	<u>95.0</u>	<u>97.5</u>	<u>100.6</u>					
Turbidity (NTU), (± 10% or 3 <10 NTUs)	<u>3.26</u>	<u>5.11</u>	<u>3.28</u>	<u>2.13</u>					
Color	<u>clear</u>	_____	_____	_____					
Odor/Evidence of LNAPL	<u>noo's</u>	_____	_____	_____					

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, Lead + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/13/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GRGT  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1200  
 Total Discharge (gal): 1.05  
 Water Disposal: On-Site 55-gallon drums

Well Number: **WMW-20**  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 14.94  
 Depth to LNAPL (ft): ---  
 Water Column (ft): ---

**TOC**

Weather: overcast + windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-20 -20191113	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe)	X	

**Total Containers 11**

Time	1115	1120	1125	1130	1135	1140	1145	1150	1155
Parameter (every 5 min)		min	min	min	min	min	min	min	min
Flow Rate (L/min)		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Volume Purged (Liters)		5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
Water Depth (ft)		15.42	15.42	15.42	15.42	15.45	15.45	15.49	15.50
Temperature (°C), (± 0.2)		15.68	15.72	15.85	15.98	15.95	15.94	16.02	16.03
pH, (± 0.1)		7.20	7.20	7.18	7.16	7.14	7.13	7.13	7.11
Sp. Conductance (uS/cm), (± 3%)		0.542	0.540	0.531	0.535	0.533	0.532	0.532	0.532
DO (mg/L), (± 10% or 10% of 0.2mg/l)		0.74	0.43	0.37	0.33	0.31	0.30	0.30	0.31
ORP (mV), (± 10%)		99.2	98.3	96.0	93.2	88.6	86.4	80.2	74.5
Turbidity (NTU), (± 10% or 3 <10 NTUs)		354.8	56.98	28.77	29.70	82.92	29.35	15.16	41.98
Color		light brown	cloudy	none	none	none	none	none	none
Odor/Evidence of LNAPL		none	none	none	none	none	none	none	none

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: BTEX, RCRA8 + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 11/13/2019 Well Number: **WMW-21**  
 Project Name: **BNSF Wishram** Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: **1996120\*00** Well Diameter (in): 2-inch PVC  
 Sampling Personnel: GIRG Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 21.5  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 11.5-21.5  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): dedicated  
 Sampling Time: 10:30 Depth to Groundwater (ft): 14.20  
 Total Discharge (gal): 0.166 Depth to LNAPL (ft): ---  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): ---  
 Weather: overcast + windy

TOC

Water Quality Meter(s)	Model	Calibration/Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
WMW-21 -2019113	3	VOA	HCl	40 mL	No	BTEX (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WTH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	(11)
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss.Metals (Mn,Fe)	X	
<b>Total Containers</b>		<b>11</b>						

Parameter (every 5 min)	Time	1005	1010	1015	1020	1025			
	min	min	min	min	min	min	min	min	min
Flow Rate (L/min)	<u>1000</u> mL/min	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>			
Volume Purged (Liters)	<u>500</u> mL	<u>1000</u>	<u>1500</u>	<u>2000</u>	<u>2500</u>				
Water Depth (ft)		<u>14.30</u>	<u>14.31</u>	<u>14.31</u>	<u>14.31</u>	<u>14.31</u>			
Temperature (°C), (± 0.2)		<u>15.03</u>	<u>15.34</u>	<u>15.45</u>	<u>15.45</u>	<u>15.48</u>			
pH, (± 0.1)		<u>7.31</u>	<u>7.37</u>	<u>7.35</u>	<u>7.32</u>	<u>7.31</u>			
Sp. Conductance (uS/cm), (± 3%)		<u>0.561</u>	<u>0.551</u>	<u>0.548</u>	<u>0.547</u>	<u>0.545</u>			
DO (mg/L), (± 10% or 10% of 0.2mg/l)		<u>1.37</u>	<u>0.85</u>	<u>0.67</u>	<u>0.60</u>	<u>0.58</u>			
ORP (mV), (± 10%)		<u>127.3</u>	<u>115.7</u>	<u>114.3</u>	<u>114.5</u>	<u>114.7</u>			
Turbidity (NTU), (± 10% or 3 <10 NTUs)		<u>0.85</u>	<u>0.76</u>	<u>1.22</u>	<u>0.81</u>	<u>0.74</u>			
Color		<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>			
Odor/Evidence of LNAPL		<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>	<u>none</u>			

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/13/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GRBT  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0915  
 Total Discharge (gal): 0.66  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-22  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 14.58  
 Depth to LNAPL (ft): —  
 Water Column (ft): —

Weather: overcast + windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
WMW-22-20191113	3	VOA	HCl	40 mL	No	BTEX (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	—	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
1	HDPE	HNO3	250 mL	Yes	Diss.Metals Mn,Fe)	X	

Total Containers **11**

Parameter (every 5 min)	Time	0852	0857	0902	0907	0912			
		min	min	min	min	min	min	min	min
Flow Rate (L/min) <del>ml/min</del>	0847	100	100	100	100	100			
Volume Purged (Liters) <del>ml</del>		300	1000	1500	2000	2500			
Water Depth (ft)		14.59	14.59	14.59	14.59	14.58			
Temperature (°C), (± 0.2)		15.46	15.69	15.87	15.98	16.01			
pH, (± 0.1)		7.38	7.39	7.39	7.38	7.38			
Sp. Conductance (uS/cm), (± 3%)		0.934	0.941	0.943	0.944	0.944			
DO (mg/L), (± 10% or 10% of 0.2mg/l)		0.71	0.48	0.37	0.34	0.31			
ORP (mV), (± 10%)		127.8	126.6	126.1	125.7	125.2			
Turbidity (NTU), (± 10% or 3 <10 NTUs)		5.64	4.30	3.43	1.60	1.60			
Color		none	none	none	none	none			
Odor/Evidence of LNAPL		none	none	none	none	none			

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: BTEX, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/13/2019  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GTBGT  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0815  
 Total Discharge (gal): 0.79  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-23  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 21.5  
 Screened Interval (ft): 11.5-21.5  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 14.36  
 Depth to LNAPL (ft): ---  
 Water Column (ft): ---

Weather: overcast + cold + windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	BTEX (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	--	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	(11)
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	

Total Containers **11**

Time	0740	0745	0750	0755	0800	0805	0810		
Parameter (every 5 min)		min	min	min	min	min	min	min	min
Flow Rate (L/min) <u>mL/min</u>		100	100	100	100	100	100		
Volume Purged (Liters) <u>mL</u>		500	1000	1500	2000	2500	3000		
Water Depth (ft)		14.36	14.36	14.36	14.34	14.34	14.34		
Temperature (°C), (± 0.2)		14.90	15.56	15.96	16.00	16.03	15.98		
pH, (± 0.1)		7.54	7.66	7.67	7.66	7.65	7.63		
Sp. Conductance (uS/cm), (± 3%)		0.837	0.856	0.861	0.855	0.850	0.848		
DO (mg/L), (± 10% or 10% of 0.2mg/l)		1.43	0.79	0.52	0.45	0.40	0.40		
ORP (mV), (± 10%)		129.2	118.3	112.4	110.3	110.3	110.4		
Turbidity (NTU), (± 10% or 3 <10 NTUs)		3.17	2.56	0.75	0.51	0.52	0.40		
Color		none	none	none	none	none	none		
Odor/Evidence of LNAPL		none	none	none	none	none	none		

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: BTEX, RCRA8 + MNA for metals



Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 11/12/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: GRG  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1435  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-24  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 11.09  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: slightly overcast

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
WMW-24 - 20191112	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
DUP-01 - 20191112	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	(11)
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X	
Total Containers 11								

Parameter (every 5 min)	Time	16:08	16:13	16:18	16:23	16:28	16:33		
		min	min	min	min	min	min	min	min
Flow Rate (L/min) <u>gpm</u>		1.00	0.50	0.50	0.50	0.50	0.50		
Volume Purged (Liters) <u>ML</u>		50.0	7.50	10.00	12.50	15.00	17.50		
Water Depth (ft)		11.71	11.58	11.49	11.50	11.51	11.55		
Temperature (°C), (± 0.2)		17.17	16.42	16.38	16.61	16.67	16.89		
pH, (± 0.1)		7.35	7.43	7.39	7.37	7.35	7.34		
Sp. Conductance (uS/cm), (± 3%)		0.580	0.583	0.584	0.586	0.595	0.598		
DO (mg/L), (± 10% or 10% of 0.2mg/l)		1.29	1.33	1.23	1.23	1.12	0.99		
ORP (mV), (± 10%)		178.1	170.2	167.8	165.8	163.9	162.9		
Turbidity (NTU), (± 10% or 3 < 10 NTUs)		2.31	2.01	1.06	0.56	0.96	0.49		
Color		none	none	none	none	none	none		
Odor/Evidence of LNAPL		none	none	none	none	none	none		

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 11/12/19 + 11/13/19 Well Number: **WMW-26**  
 Project Name: **BNSF Wishram** Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: **1996120\*00** Well Diameter (in): 2-inch PVC  
 Sampling Personnel: KEH Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): dedicated to 11.22 **TOC**  
 Sampling Time: 0725 11/13/19 Depth to Groundwater (ft): 11.22  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: cloudy, 50s

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:			Type	Sample ID	Time
<u>pro</u>	<del>YSI 556</del>	<u>11/11/19</u>			
Turbidity:	Micro TPI				--
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
(11)	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

Total Containers **11**

Time	1400	1405	1410	1415	1420	1425	1430	1435
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	<u>0.1</u>							
Volume Purged (Liters)	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>	<u>3.5</u>	<u>—</u>
Water Depth (ft)	<u>12.49</u>	<u>13.00</u>	<u>13.30</u>	<u>13.70</u>	<u>14.05</u>	<u>14.72</u>	<u>15.11</u>	<u>13.29</u>
Temperature (°C), (± 0.2)	<u>16.4</u>	<u>16.6</u>	<u>16.6</u>	<u>16.6</u>	<u>17.0</u>	<u>17.0</u>	<u>17.0</u>	<u>15.3</u>
pH, (± 0.1)	<u>6.71</u>	<u>6.93</u>	<u>7.02</u>	<u>7.07</u>	<u>7.06</u>	<u>7.05</u>	<u>7.05</u>	<u>6.86</u>
Sp. Conductance (uS/cm), (± 3%)	<u>443.8</u>	<u>443.9</u>	<u>441.4</u>	<u>440.8</u>	<u>445.8</u>	<u>452.2</u>	<u>458.2</u>	<u>543.4</u>
DO (mg/L), (± 10% or 10% of 0.2mg/l)	<u>0.48</u>	<u>0.76</u>	<u>1.40</u>	<u>1.63</u>	<u>1.92</u>	<u>1.78</u>	<u>1.65</u>	<u>4.38</u>
ORP (mV), (± 10%)	<u>183.1</u>	<u>170.2</u>	<u>168.3</u>	<u>168.0</u>	<u>167.2</u>	<u>169.6</u>	<u>168.7</u>	<u>158.9</u>
Turbidity (NTU), (± 10% or 3 <10 NTUs)	<u>1.57</u>	<u>1.66</u>	<u>1.49</u>	<u>2.02</u>	<u>1.77</u>	<u>2.54</u>	<u>2.96</u>	<u>2.23</u>
Color	<u>clear</u>							
Odor/Evidence of LNAPL	<u>nois</u>							

Notes: (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals

parameters stable at 1430 wait for WL to recharge.  
11/13/19 0650: WL = '11.22'

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 11/13/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KEH  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0935  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-27  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 10.03  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: \_\_\_\_\_

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		MS/MSD		0940
Other:					0945

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	

Total Containers **11**

Time	0855	0900	0905	0910	0915	0920	0925	
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	
Water Depth (ft)	10.44	10.39	10.37	10.44	10.40	10.38	10.41	
Temperature (°C), (± 0.2)	15.0	14.6	14.6	15.0	15.1	15.0	15.1	
pH, (± 0.1)	7.39	7.37	7.36	7.35	7.35	7.36	7.35	
Sp. Conductance (uS/cm), (± 3%)	309.4	305.4	304.6	305.2	305.2	304.2	303.7	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	1.06	1.12	1.32	1.46	1.27	1.41	1.29	
ORP (mV), (± 10%)	135.2	135.5	136.1	136.5	136.4	136.0	136.6	
Turbidity (NTU), (± 10% or 3 <10 NTUs)	8.03	9.45	8.12	7.94	5.67	6.80	6.71	
Color	clear							
Odor/Evidence of LNAPL	no							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/12/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KEH  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 11:15  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: **WMW-28**  
 Monument Type: Stickup (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 10.18  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: cloudy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI		<del>DUP</del>	<del>D-1-2019</del>	
Other:			<u>DUP on WMW-24</u>		

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
⑪	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X

**Total Containers 11**

Parameter (every 5 min)	Time							
	1535	1540	1545	1550	1555	1600	1605	1610
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	
Water Depth (ft)	10.28	10.24	10.26	10.27	10.28	10.28	10.26	
Temperature (°C), (± 0.2)	16.3	16.2	15.9	16.3	16.4	16.2	16.2	
pH, (± 0.1)	7.47	7.43	7.42	7.40	7.40	7.41	7.41	
Sp. Conductance (uS/cm), (± 3%)	319.5	324.4	337.7	322.9	322.5	326.6	330.3	
DO (mg/L), (± 10% or 10% of 0.2mg/l)	2.68	2.42	2.43	2.45	2.47	2.28	2.19	
ORP (mV), (± 10%)	84.9	91.5	97.5	97.9	101.2	104.9	107.4	
Turbidity (NTU), (± 10% or 3 <10 NTUs)	3.22	1.81	1.31	1.10	1.08	0.96	0.86	
Color	clear							
Odor/Evidence of LNAPL	NOIS							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/12/19 + 11/13/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KEH  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 0810  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-29  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush:   
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): dedicated  
 Depth to Groundwater (ft): 11.15  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: cloudy, 51°

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:			Type	Sample ID	Time
<u>pro</u>	<u>YSL 556</u>				
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn,Fe)	X	

Total Containers 11

Time	1445	1450	1455	1500	1505	1510	1515	1520
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	<u>0.1</u>							
Volume Purged (Liters)	<u>0.5</u>	<u>1.0</u>	<u>1.5</u>	<u>2.0</u>	<u>2.5</u>	<u>3.0</u>	<u>3.5</u>	<u>4.0</u>
Water Depth (ft)	<u>12.00</u>	<u>12.33</u>	<u>12.59</u>	<u>13.03</u>	<u>13.38</u>	<u>13.71</u>	<u>14.08</u>	<u>14.31</u>
Temperature (°C), (± 0.2)	<u>16.7</u>	<u>16.7</u>	<u>16.9</u>	<u>17.3</u>	<u>17.1</u>	<u>17.4</u>	<u>17.5</u>	<u>17.5</u>
pH, (± 0.1)	<u>6.90</u>	<u>6.89</u>	<u>6.89</u>	<u>6.91</u>	<u>6.94</u>	<u>6.96</u>	<u>6.96</u>	<u>6.97</u>
Sp. Conductance (uS/cm), (± 3%)	<u>1048</u>	<u>1033</u>	<u>1022</u>	<u>1021</u>	<u>1016</u>	<u>1030</u>	<u>1042</u>	<u>1047</u>
DO (mg/L), (± 10% or 10% of 0.2mg/l)	<u>0.47</u>	<u>0.23</u>	<u>0.20</u>	<u>0.21</u>	<u>0.43</u>	<u>0.82</u>	<u>0.93</u>	<u>1.17</u>
ORP (mV), (± 10%)	<u>167.4</u>	<u>167.2</u>	<u>168.7</u>	<u>163.2</u>	<u>136.8</u>	<u>105.0</u>	<u>85.2</u>	<u>80.0</u>
Turbidity (NTU), (± 10% or 3 <10 NTUs)	<u>1.52</u>	<u>1.79</u>	<u>0.88</u>	<u>0.91</u>	<u>1.55</u>	<u>0.65</u>	<u>0.92</u>	<u>1.90</u>
Color	<u>clear</u>						<u>0.19</u>	
Odor/Evidence of LNAPL	<u>noo/s</u>							

Notes: (i.e. actions taken if well dewateres, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals-

11/13/19 @ 0802 WL = 11.17'

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 11/23/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KEH  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1050  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-30  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: good  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 10.50  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

Weather: cloudy, windy, 40'

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)		MS/MSD & Comments
	No.	Type	Pres.	Vol.				
+ 7 & d Barium	3	VOA	HCl	40 mL	No	VOCs (8260)	X	
	2	VOA	HCl	40 mL	No	NWTPH-Gx		
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X	
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC		
	2	VOA	-	40 mL	No	PAHs (8270 SIM)		
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X	
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X	(12)
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X	
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X	
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)		
1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe) + BQ	X		

Total Containers 11

Time	1025	1030	1035	1040	1045			
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	min	min	min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5			
Water Depth (ft)	11.53	11.70	11.92	12.03	12.02			
Temperature (°C), (± 0.2)	15.2	15.0	15.1	14.9	15.1			
pH, (± 0.1)	7.44	7.48	7.50	7.51	7.50			
Sp. Conductance (uS/cm), (± 3%)	511.9	512.2	512.3	513.2	514.0			
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.33	0.27	0.22	0.22	0.22			
ORP (mV), (± 10%)	21.6	119.0	113.0	112.9	115.5			
Turbidity (NTU), (± 10% or 3 <10 NTUs)	3.15	1.10	1.17	1.02	0.94			
Color	clear							
Odor/Evidence of LNAPL	no/s							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.  
 Special note re: analyses: Full VOCs list, NWTPH-Dx with AND without SGC, RCRA8 + MNA for metals  
WL 11.93' just before sampling

**Groundwater Purge and Sample Form (Minimal Drawdown)**

**Kennedy/Jenks Consultants**

Date: 11/13/19  
 Project Name: BNSF Wishram  
 Project Number: 1996120\*00  
 Sampling Personnel: KEH  
 Water Level Meter: Solinst or Geotech OWI  
 Purging Equipment: Peristaltic Pump, Tubing  
 Sampling Equipment: Peristaltic Pump, Tubing  
 Sampling Time: 1415  
 Total Discharge (gal): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums

Well Number: WMW-31  
 Monument Type: Stickup: \_\_\_\_\_ (ft PVC) Flush: X  
 Well Diameter (in): 2-inch PVC  
 Well Condition: \_\_\_\_\_  
 Total Casing Depth (ft): 17.0  
 Screened Interval (ft): 7-17  
 Purge Depth (ft): \_\_\_\_\_  
 Depth to Groundwater (ft): 10.09  
 Depth to LNAPL (ft): \_\_\_\_\_  
 Water Column (ft): \_\_\_\_\_

**TOC**

Weather: cloudy, windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

**Total Containers 11**

Parameter (every 5 min)	Time	1345	1350	1355	1400	1405	1410		
		5 min	10 min	15 min	20 min	25 min	30 min	min	min
Flow Rate (L/min)		0.1							
Volume Purged (Liters)		0.5	1.0	1.5	2.0	2.5	3.0		
Water Depth (ft)		10.21	10.20	10.21	10.21	10.21	10.20		
Temperature (°C), (± 0.2)		14.6	14.5	14.7	14.7	14.8	14.8		
pH, (± 0.1)		7.14	7.21	7.22	7.23	7.23	7.23		
Sp. Conductance (uS/cm), (± 3%)		627	618	618	614	612	609		
DO (mg/L), (± 10% or 10% of 0.2mg/l)		0.62	0.32	0.29	0.22	0.20	0.19		
ORP (mV), (± 10%)		139.4	130.2	135.8	135.2	134.8	134.4		
Turbidity (NTU), (± 10% or 3 <10 NTUs)		3.25	2.57	2.22	1.40	0.92	1.54		
Color		Clear							
Odor/Evidence of LNAPL		NO							

**Notes:** (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)

1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, RCRA8 + MNA for metals

Groundwater Purge and Sample Form (Minimal Drawdown)

Kennedy/Jenks Consultants

Date: 11/13/19 Well Number: WMW-32  
 Project Name: BNSF Wishram Monument Type: Stickup (ft PVC) Flush: X  
 Project Number: 1996120\*00 Well Diameter (in): 2-inch PVC  
 Sampling Personnel: KEH Well Condition: good  
 Water Level Meter: Solinst or Geotech OWI Total Casing Depth (ft): 17.0  
 Purging Equipment: Peristaltic Pump, Tubing Screened Interval (ft): 7-17  
 Sampling Equipment: Peristaltic Pump, Tubing Purge Depth (ft): \_\_\_\_\_  
 Sampling Time: 1315 Depth to Groundwater (ft): 10.72 **TOC**  
 Total Discharge (gal): \_\_\_\_\_ Depth to LNAPL (ft): \_\_\_\_\_  
 Water Disposal: On-Site 55-gallon drums Water Column (ft): \_\_\_\_\_

Weather: cloudy + windy

Water Quality Meter(s)	Model	Calibration Date/Time	QA/QC Samples		
Temp/pH/SC/ORP/DO:	YSI 556		Type	Sample ID	Time
Turbidity:	Micro TPI				
Other:					

Sample ID	Sample Containers				Field Filtered	Analyses Requested (X)	MS/MSD & Comments
	No.	Type	Pres.	Vol.			
	3	VOA	HCl	40 mL	No	VOCs (8260)	X
	2	VOA	HCl	40 mL	No	NWTPH-Gx	
	2	VOA	HCl	40 mL	No	NWTPH-Dx NO SGC	X
	2	VOA	HCl	40 mL	No	NWTPH-Dx WITH SGC	
	2	VOA	-	40 mL	No	PAHs (8270 SIM)	
	2	VOA	HCl	40 mL	No	Methane (RSK 175)	X
	1	HDPE	H2SO4	250 mL	No	Nitrate-Nitrite (353.2) & Ammonia (350.1/350.3)	X
	1	HDPE	none	125 mL	No	Sulfate (300.0)	X
	1	HDPE	NaOH/ZnAc	125 mL	No	Sulfide (376.2)	X
	1	HDPE	HNO3	250 mL	No	Tot. Metals (RCRA8) (6020)	
	1	HDPE	HNO3	250 mL	Yes	Diss. Metals (Mn, Fe)	X

Total Containers 11

Time	1210	1215	1220	1225	1230	1235	1240	1245
Parameter (every 5 min)	5 min	10 min	15 min	20 min	25 min	30 min	35 min	40 min
Flow Rate (L/min)	0.1							
Volume Purged (Liters)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Water Depth (ft)	11.41	11.74	12.15	12.40	12.61	12.75	12.84	12.90
Temperature (°C), (± 0.2)	15.9	16.0	16.1	16.1	16.0	16.0	15.9	15.8
pH, (± 0.1)	7.22	7.22	7.23	7.27	7.25	7.25	7.26	7.27
Sp. Conductance (uS/cm), (± 3%)	769	665	666	734	693	748	759	777
DO (mg/L), (± 10% or 10% of 0.2mg/l)	0.50	0.33	0.24	0.31	0.51	0.68	0.60	0.63
ORP (mV), (± 10%)	133.2	132.9	134.3	134.9	134.8	136.3	137.4	138.5
Turbidity (NTU), (± 10% or 3 <10 NTUs)	5.46	2.62	2.42	1.90	4.15	4.76	5.43	5.82
Color	clear							
Odor/Evidence of LNAPL	woops							

Notes: (i.e. actions taken if well dewater, difficulties in sampling through LNAPL, problems during purging/sampling, etc.)  
 1 US Gallon = 3.8 Liters.

Special note re: analyses: Full VOCs list, NWTPH-Gx, RCRA8 + MNA for metals  
Let well recharge before sampling  
1315 WL = 11.23'



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## OHM Well Liquid Level Monitoring

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:		JS	12/13/2016		
Well	Date / Time	Depth to LNAPL (ft btoc)	Depth to Water (ft btoc)	LNAPL Thickness (ft)	Well Status
OHM-1	10:50	10.40	12.73	2.33	
OHM-2	10:25	10.60	10.63	0.03	
OHM-3	10:10	10.80	13.41	2.61	
OHM-4	9:49	11.44	11.45	0.01	

Additional Notes:

**FIELD FORM**

**WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM**

<b>Monitoring Personnel:</b>		<b>AR</b>			
<b>Well</b>	<b>Date / Time</b>	<b>Depth to LNAPL (ft btoc)</b>	<b>Depth to Water (ft btoc)</b>	<b>LNAPL Thickness (ft)</b>	<b>Well Status</b>
OHM-1	2/27/2017	10.20	17.52	7.32	
OHM-2	2/27/2017	10.53	17.80	7.27	
OHM-3	2/27/2017	10.38	15.40	5.02	
OHM-4	2/27/2017	--	10.23	--	
<u>Additional Notes:</u>					

**FIELD FORM**

**WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM**

<b>Monitoring Personnel:</b>		<b>AR</b>			
<b>Well</b>	<b>Date / Time</b>	<b>Depth to LNAPL (ft btoc)</b>	<b>Depth to Water (ft btoc)</b>	<b>LNAPL Thickness (ft)</b>	<b>Well Status</b>
OHM-1	3/28/2017	9.48	18.59	9.11	
OHM-2	3/28/2017	9.74	11.47	1.73	
OHM-3	3/28/2017	9.93	10.24	0.31	
OHM-4	3/28/2017	--	10.71	--	
<u>Additional Notes:</u>					

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel: <i>Robinson</i>					
Well	Date / Time	Depth to LNAPL (ft bgs)	Depth to Water (ft bgs)	LNAPL Thickness (ft)	Well Status
OHM-1	<i>4-18-17, 10:30</i>	<i>9.28</i>	<i>18.64</i>	<i>9.36</i>	<i>good</i>
OHM-2	<i>1:00</i>	<i>9.67</i>	<i>17.85</i>	<i>8.18</i>	<i>good</i>
OHM-3	<i>2:30</i>	<i>9.81</i>	<i>10.98</i>	<i>1.07</i>	<i>good</i>
OHM-4	<i>3:50</i>	<i>sheen only</i>	<i>10.63</i>	<i>—</i>	<i>good</i>
Additional Notes:					

Monitoring Personnel:					
Well	Date / Time	Depth to LNAPL (ft bgs)	Depth to Water (ft bgs)	LNAPL Thickness (ft)	Well Status
OHM-1					
OHM-2					
OHM-3					
OHM-4					
Additional Notes:					

Monitoring Personnel:					
Well	Date / Time	Depth to LNAPL (ft bgs)	Depth to Water (ft bgs)	LNAPL Thickness (ft)	Well Status
OHM-1					
OHM-2					
OHM-3					
OHM-4					
Additional Notes:					

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:					
Well	Date / Time	Depth to LNAPL (ft bgs)	Depth to Water (ft bgs)	LNAPL Thickness (ft)	Well Status
OHM-1	5-12-17 11:20	9.38	20.55	11.17	good
OHM-2	↓ 12:50	9.66	14.99	5.33	good
OHM-3	↓ 13:55	9.64	10.82	1.18	good
OHM-4	↓ 14:00	—	10.61	—	good
RMD-1					
RMD-2					
RMD-3					
RMD-4					
WMW-1					
WMW-3					
WMW-5					
WMW-7					
WMW-8					
WMW-9					
WMW-10					
WMW-11					
WMW-12					
WMW-13					
WMW-14					
WMW-15					
WMW-16					
WMW-17					
WMW-18					
<u>Additional Notes:</u>					

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:					
Well	Date / Time	Depth to LNAPL (ft btoc)	Depth to Water (ft btoc)	LNAPL Thickness (ft)	Well Status
OHM-1	1615	9.55	28.18	18.64	good
OHM-2	11/30/15	10.12	15.88	5.76	good
OHM-3	1330	10.26	14.12	3.86	good
OHM-4	1343	—	11.20	—	good
RMD-1	1302	—	14.75	—	good ↓
RMD-2	1313	—	14.52	—	
RMD-3	1407	—	14.85	—	
RMD-4	1416	—	14.68	—	
WMW-1	1250	—	10.26	—	good
WMW-3	1222	—	10.63	—	1 Bolt - stripped 2. minimum below grade
WMW-5	1230	—	10.20	—	good
WMW-7	11/29 0920	—	11.74	—	2 Stripped bolts
WMW-8	↓ 1008	Sween	11.50	Sween	good
WMW-9	10/5 1144	—	10.85	—	good
WMW-10	1200	—	10.88	—	good
WMW-11	1208	—	10.79	—	good - missing 1 bolt
WMW-12	1030	—	10.89	—	good
WMW-13	1149	—	11.35	—	good
WMW-14	1255	—	15.11	—	good
WMW-15	1301	—	14.97	—	good
WMW-16	1310	—	14.70	—	↓
WMW-17	1405	—	14.71	—	
WMW-18	1415	—	14.71	—	
Additional Notes:					

FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

12/21/2017

Monitoring Personnel: <i>REAN HULTZKEN, STEVE M. SWER</i>					
Well	Date / Time	Depth to LNAPL (ft btoc)	Depth to Water (ft btoc)	LNAPL Thickness (ft)	Well Status
OHM-1	1300	9.52	27.60	18.08	Good
OHM-2	1125	10.15	18.50	8.35	Good
OHM-3	1100	10.35	16.00	5.65	Good
OHM-4	1005	STEEN	11.25	STEEN	Good
RMD-1	1110	—	14.80		Good
RMD-2	1119	—	14.59		Good
RMD-3	11:06	—	14.87		Good
RMD-4	11:01	—	14.73		Good
WMW-1	11:23	—	10.31		Good
WMW-3	11:42	—	10.71		Good
WMW-5	10:56	—	10.25		Good
WMW-7	11:46	—	11.90		Good
WMW-8	11:48	—	11.42		Good
WMW-9	10:14	—	10.87		Good
WMW-10	1042	—	10.86		Good
WMW-11	11:17	—	10.81		Good
WMW-12	1035	—	11.00		Good
WMW-13	1032	—	11.35		Good
WMW-14	1040	—	15.12		Good
WMW-15	11:08	—	14.98		Good
WMW-16	11:21	—	14.69		Good
WMW-17	1107	—	14.72		Good
WMW-18	11:03	—	14.75		Good
Additional Notes:					



FIELD FORM

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

Monitoring Personnel:					
Well	Date / Time	Depth to LNAPL (ft bgs)	Depth to Water (ft bgs)	LNAPL Thickness (ft)	Well Status
OHM-1	2-28-18 10:55	9.79	27.4	17.61	good
OHM-2	12:15	10.27	21.33	11.06	good
OHM-3	1:35	16.30	14.60	4.30	good
OHM-4	1:45	-	11.39	-	good
RMD-1	2-27-18 11:35	-	14.82	-	good
RMD-2	11:24	-	14.69	-	good
RMD-3	11:16	-	14.93	-	good
RMD-4	11:05	14.79	14.79	-	good
WMW-1	12:09	-	10.91	-	good
WMW-3	1:09	-	10.73	-	well buried
WMW-5	12:14	-	10.33	-	good
WMW-7	12:34	-	11.79	-	good
WMW-8	12:31	-	11.27	-	good
WMW-9	11:58	-	10.94	-	good
WMW-10	11:47	-	10.96	-	good
WMW-11	12:03	-	10.92	-	good
WMW-12	12:26	-	10.89	-	good
WMW-13	11:53	-	10.43	-	good
WMW-14	11:48	-	15.20	-	good
WMW-15	11:41	-	15.06	-	good
WMW-16	11:31	-	14.81	-	good
WMW-17	11:20	-	14.74	-	good
WMW-18	11:11	-	14.81	-	good
Additional Notes:					

**FIELD FORM**

**WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM**

<b>Monitoring Personnel:</b>		<b>AR/KET</b>	<b>4/24/2018</b>		
<b>Well</b>	<b>Date / Time</b>	<b>Depth to LNAPL (ft btoc)</b>	<b>Depth to Water (ft btoc)</b>	<b>LNAPL Thickness (ft)</b>	<b>Well Status</b>
OHM-1	12:34	9.77	30.24	20.47	
OHM-2	15:30	10.30	17.06	6.76	
OHM-3	16:05	10.05	16.80	6.75	
OHM-4	16:30	--	11.48	--	
<u>Additional Notes:</u>					

**FIELD FORM**

**WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM**

<b>Monitoring Personnel:</b>		<b>AR</b>		<b>08/21/18</b>	
<b>Well</b>	<b>Date / Time</b>	<b>Depth to LNAPL (feet btoc)</b>	<b>Depth to Water (feet btoc)</b>	<b>LNAPL Thickness (feet)</b>	<b>Well Status</b>
OHM-1	12:00	9.47	31.01	21.54	
OHM-2	12:23	10.06	22.04	11.98	
OHM-3	14:26	10.29	22.46	12.17	
OHM-4	15:05	--	11.34	--	
RMD-1	14:58		14.76		
RMD-2	12:27		14.53		
RMD-3	12:18		14.81		
RMD-4	12:07		14.69		
RMD-5	14:49		14.59		
RMD-6	16:46		14.42		
WMW-1	13:33		10.27		
WMW-3	13:27		10.80		
WMW-5	11:58		10.36		
WMW-7	16:29		12.13		
WMW-8	16:27		11.65		
WMW-9	15:02		10.99		
WMW-10	13:39		10.86		
WMW-11	13:44		10.74		
WMW-12	16:19		11.28		
WMW-13	15:05		11.47		
WMW-14	14:44		15.07		
WMW-15	14:54		14.91		
WMW-16	12:31		14.62		
WMW-17	12:33		14.55		
WMW-18	12:13		14.65		
WMW-19	14:36		14.93		

**FIELD FORM**

**WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM**

<b>Monitoring Personnel:</b>		<b>AR</b>		<b>08/21/18</b>	
<b>Well</b>	<b>Date / Time</b>	<b>Depth to LNAPL (feet btoc)</b>	<b>Depth to Water (feet btoc)</b>	<b>LNAPL Thickness (feet)</b>	<b>Well Status</b>
WMW-20	16:42		14.83		
WMW-21	9:36		14.00		
WMW-22	9:04		14.39		
WMW-23	8:58		14.19		
WMW-24	9:41		10.92		
WMW-26	9:12		11.07		
WMW-27	9:20		9.81		
WMW-28	9:47		9.95		
WMW-29	9:17		11.04		
WMW-30	8:52		10.43		
WMW-31	11:30		10.45		
WMW-32	11:34		11.12		
<u>Additional Notes:</u>					

WATER TABLE/LNAPL THICKNESS MEASUREMENTS  
BNSF WISHRAM

11/5/18

Monitoring Personnel:

KEE & BR

Well	Date / Time	Depth to LNAPL (feet btoc)	Depth to Water (feet btoc)	LNAPL Thickness (feet)	Well Status
OHM-2	11/5/18 <sup>1055</sup>	9.99	21.95		Good
OHM-1	In: 1347 Out: 1431	9.40	30.09		
OHM-3	In: 1205 Out: 1300	10.26	11.24		
OHM-4	1247	-	11.25		
RMD-1	1117	-	14.61	-	
RMD-2	1122	-	14.32	-	
RMD-3	1127	-	14.63	-	
RMD-4	1126	-	14.52	-	
RMD-5	1111	-	14.38	-	
RMD-6	1120	-	14.28	-	
WMW-1	1232	-	10.13	-	
WMW-3	1407	-	10.78	-	
WMW-5	1315	-	10.31	-	
WMW-7	1335	-	12.14	-	
WMW-8	1341	-	11.63	-	
WMW-9	1226	-	10.93	-	
WMW-10	1222	-	10.73	-	
WMW-11	1228	-	10.64	-	
WMW-12	1344	-	11.10	-	
WMW-13	1219	-	11.39	-	
WMW-14	1108	-	14.89	-	
WMW-15	1114	-	14.73	-	
WMW-16	1119	-	14.50	-	
WMW-17	1124	-	14.23	-	
WMW-18	1128	-	14.93	-	
WMW-19	1105	-	14.78	-	good
WMW-20	1123	-	14.64	-	