

Appendix A

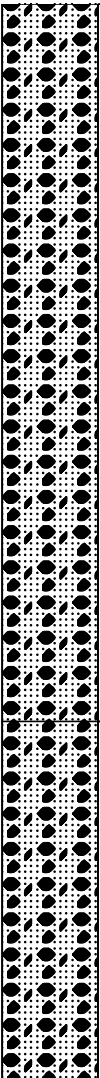
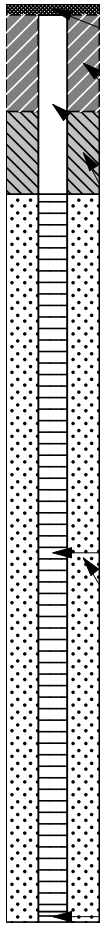
Boring and Monitoring Well Logs

This page intentionally left blank.

WELL LOG

BORING/WELL ID: **MW-7**
 INSTALLED DEPTH: **12.85-ft bgs**

PROJECT INFORMATION				DRILLING INFORMATION			
PROJECT: Jensen & Sons Shipyard and Marina				DRILLING CO.: Holt Services/Michael Running			
SITE LOCATION: 1293 Turn Point Road Friday Harbor, WA				DRILLING METHOD: Hollow Stem Auger			
LOGGED BY: Rusty Jones				EQUIPMENT TYPE: Geoprobe 7822 DT Macrocore			
PROJECT MANAGER: G. Hainsworth				SAMPLING METHOD: MC5 5-ft cores			
DATES DRILLED/INSTALLED: 7/27/2022				TOC Elevation 8.87 ft MLLW			
LATITUDE: 48.525961° N				DRILLED DEPTH: 15-ft bgs			
LONGITUDE: 122.99990417° W				INITIAL WATER DEPTH: ~5-ft bgs			
				SCREENED INTERVAL: 2.6-12.6 ft bgs			

DEPTH	SOIL LOG	USCS	DESCRIPTION	SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) DPT	WELL CONSTRUCT.	WELL DESC.
0		GW	GRAVELLY SAND, fine to coarse-grained, well-rounded, poorly-sorted, brown colors, dry to slightly moist. Mixed grains (mixed source rock). At 5 to 10 ft bgs - NO RECOVERY. GRAVELLY SAND, loose, wet.					
				MW-7 2-3'	2 - 3 ft	5.5		
				MW-7 3-5'	3 - 5 ft	5.6		
5								
10								
		GW	GRAVELLY SAND, well-rounded, poorly-sorted, brown color with abundant black coarse-grained sand, saturated.	MW-7 10-11'	10 - 11 ft	5.3		
15								

NOTES: Installed adjacent to shoreline. Lithology logged from split spoon core samples.
 Washington Department of Ecology Well ID BPK-577



Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

- ☒ Construction
☐ Decommission \Rightarrow Original NOI No. _____

Ecology Well ID Tag No. BRK 577

Site Well Name _____

Consulting Firm Crete

Was a variance approved for this well/boring? ☐ Yes ☐ No

If yes, what was the variance for? _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer

Name (Print Last, First Name) Running Michael

Driller/Engineer/Trainee Signature [Signature]

License No. 3905

Company Name Nolt Geosocial Inc

If trainee box is checked, sponsor's license number: _____

Sponsor's signature _____

Notice of Intent No. PE23242

Type of Well:

- ☒ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other _____

☒ Soil- ☐ Vapor- ☐ Water-sampling

Property Owner Pt. of Friday Harbor

Well Street Address 1000 1/2 Turn Point Rd

City Friday Harbor County San Juan

Tax Parcel No. _____

Location (see instructions):

WWM ☐ or EWM ☐

SW 1/4-1/4 NE 1/4, Section 13 Town 35N Range 3W

Latitude (Example: 47.12345) 48.526004

Longitude (Example: -120.12345) -122.9999230

(WGS 84 Coordinate System)

Borehole diameter 4.25 inches Casing diameter 2 inches

Static water level 5 ft below top of casing Date 7/27/22

☐ Above-ground completion with bollards ☒ Flush monument

☒ Stick-up of top of well casing _____ ft above ground surface

Start Date 7/27/22 Completed Date 7/28/22

Construction/Design

Well Data

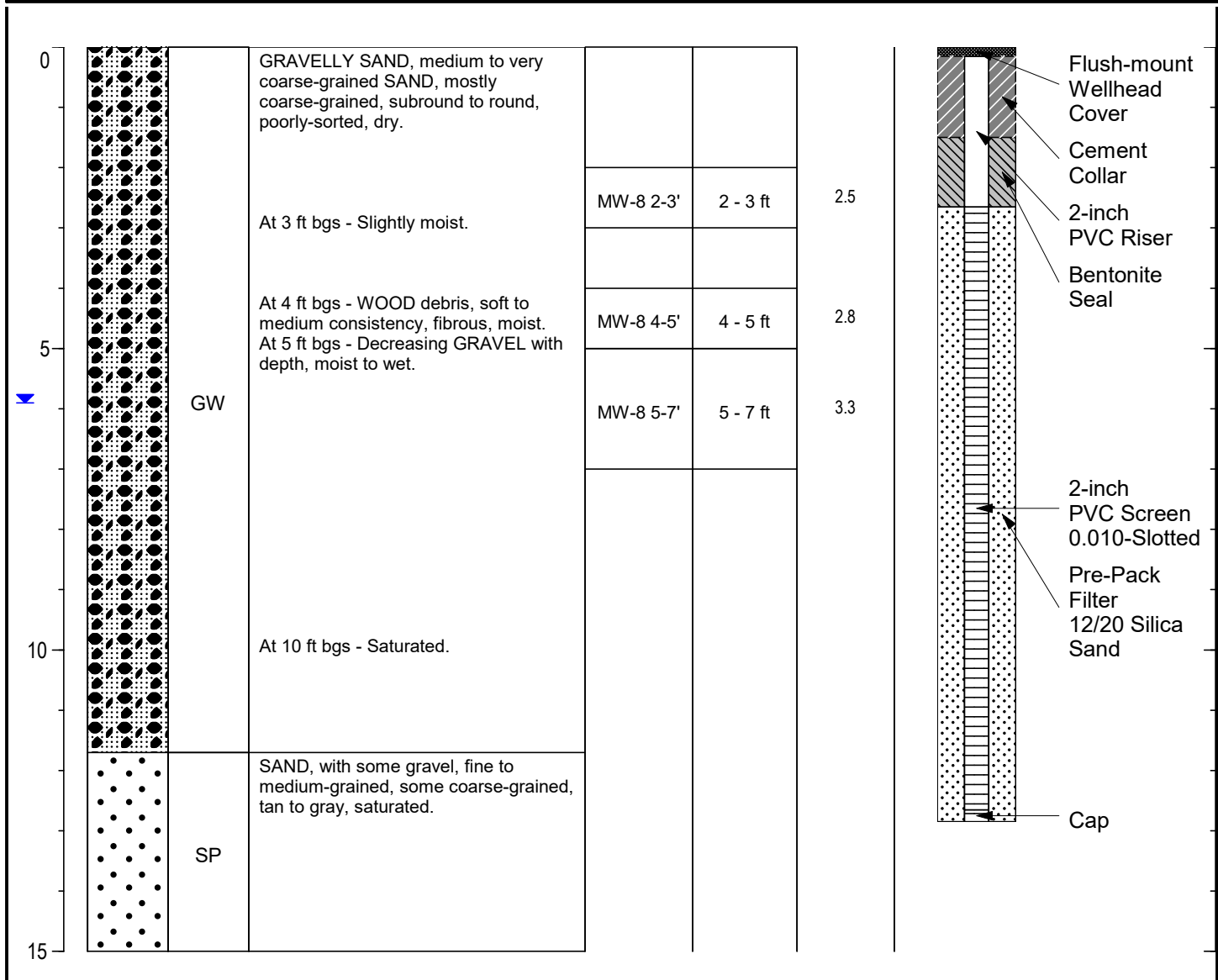
Formation Description

	MONUMENT TYPE: <u>9" Augh</u>	<p>0 - 5 ft. sand & gravel</p> <p>5 - 10 ft. sand w/ coarse gravel</p> <p>10 - 15 ft. silty sand and gravel</p> <p>ft.</p> <p>ft.</p> <p>ft.</p> <p>REMARKS</p>
	CONCRETE SURFACE SEAL <u>1 ft.</u>	
	PVC BLANK <u>2" x 3'</u>	
	BACKFILL <u>1.5 ft.</u> TYPE: <u>Medium Barbonate Chips</u>	
	PVC SCREEN <u>2" x 10'</u> SLOT SIZE: <u>10</u> TYPE: _____	
	GRAVEL PACK <u>10.5 ft.</u> MATERIAL: <u>12-20 Silicon Sand</u>	
	WELL DEPTH <u>13'</u>	

WELL LOG

BORING/WELL ID: **MW-8**
INSTALLED DEPTH: **12.80-ft bgs**

PROJECT INFORMATION				DRILLING INFORMATION				
PROJECT: Jensen & Sons Shipyard and Marina				DRILLING CO.: Holt Services/Michael Running				
SITE LOCATION: 1293 Turn Point Road Friday Harbor, WA				DRILLING METHOD: Hollow Stem Auger				
LOGGED BY: Rusty Jones				EQUIPMENT TYPE: Geoprobe 7822 DT Macrocore				
PROJECT MANAGER: G. Hainsworth				SAMPLING METHOD: MC5 5-ft cores				
DATES DRILLED/INSTALLED: 7/28/2022				TOC Elevation 9.39 ft MLLW				
LATITUDE: 48.52586639° N				DRILLED DEPTH: 15-ft bgs				
LONGITUDE: 122.99955889° W				INITIAL WATER DEPTH: 6-ft bgs				
				SCREENED INTERVAL: 2.6-12.6 ft bgs				
DEPTH	SOIL LOG	USCS	DESCRIPTION	SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) DPT	WELL CONSTRUCT.	WELL DESC.





Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

☒ Construction

☐ Decommission \Rightarrow Original NOI No. _____

Ecology Well ID Tag No. BPK 578

Site Well Name _____

Consulting Firm Crete

Was a variance approved for this well/boring? ☐ Yes ☐ No

If yes, what was the variance for? _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer

Name (Print Last, First Name) Runnins Michael

Driller/Engineer/Trainee Signature [Signature]

License No. 3205

Company Name Molt Serial Inc

If trainee box is checked, sponsor's license number: _____

Sponsor's signature _____

Notice of Intent No. DE23242

Type of Well:

☒ Resource Protection Well

☐ Remediation Well

☐ Geotechnical Soil Boring

☐ Environmental Boring

☐ Injection Point

☐ Grounding Well

☐ Ground Source Heat Pump

☐ Other _____

☐ Soil- ☐ Vapor- ☐ Water-sampling

Property Owner Pt of Friday Harbor

Well Street Address 1000000 Turn Point Rd

City Friday Harbor County San Juan

Tax Parcel No. _____

Location (see instructions):

WWM ☐ or EWM ☐

SW $\frac{1}{4}$ - $\frac{1}{4}$ NE $\frac{1}{4}$, Section 13 Town 35n Range 3w

Latitude (Example: 47.12345) 48.5260774

Longitude (Example: -120.12345) -123.0011354

(WGS 84 Coordinate System)

Borehole diameter 4.25 inches Casing diameter 2 inches

Static water level 5 ft below top of casing Date 7/27/22

☐ Above-ground completion with bollards ☒ Flush monument

☒ Stick-up of top of well casing _____ ft above ground surface

Start Date 7/27/22 Completed Date 7/28/22

Construction/Design

Well Data

Formation Description

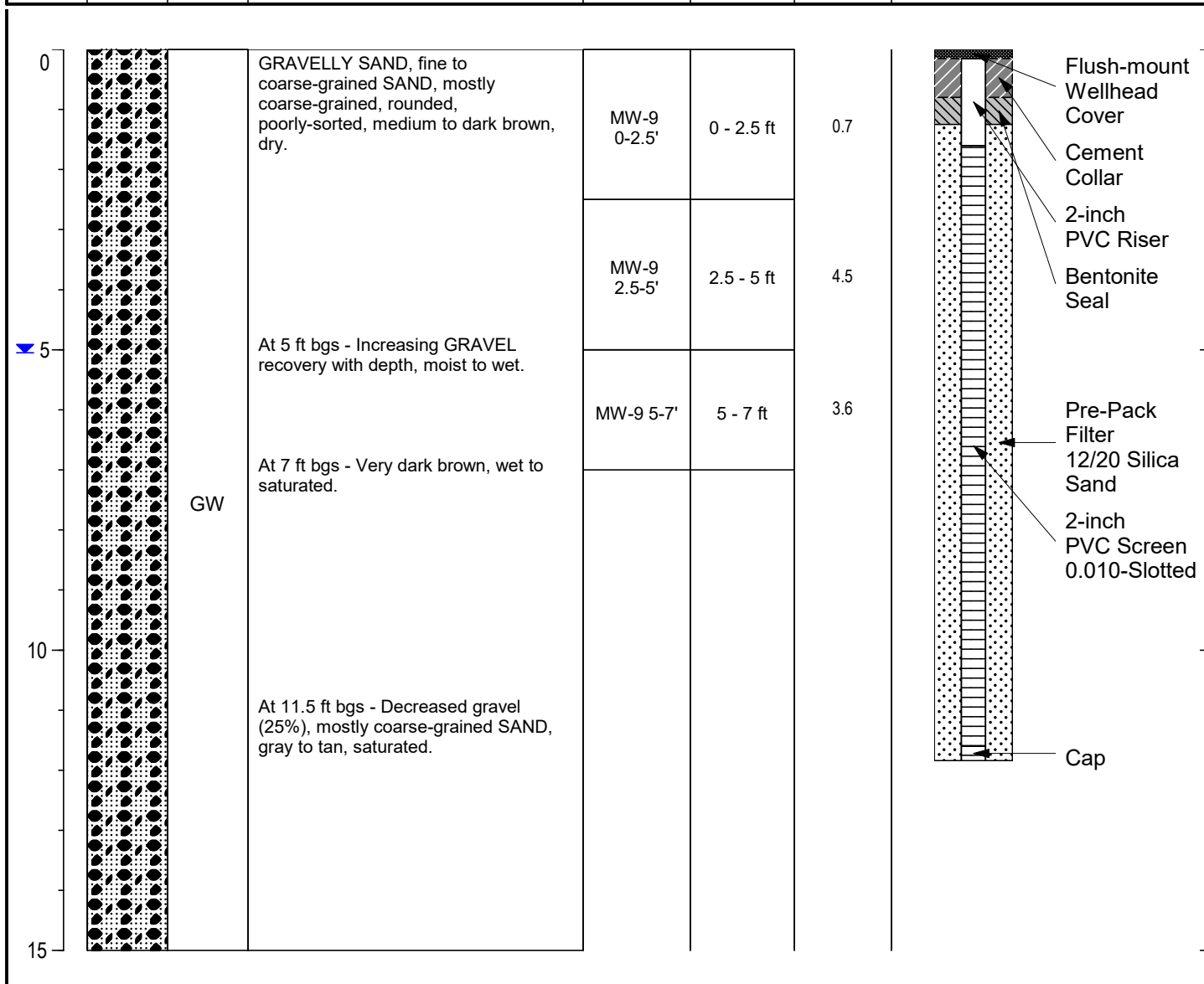
	MONUMENT TYPE:	<u>9" Flush</u>
	CONCRETE SURFACE SEAL	<u>1 ft</u>
	PVC BLANK	<u>2" x 3'</u>
	BACKFILL	<u>1.5 ft</u>
	TYPE:	<u>Medium Bentonite Chips</u>
	PVC SCREEN	<u>2" x 10'</u>
	SLOT SIZE:	<u>.10</u>
	TYPE:	
	GRAVEL PACK	<u>10.5 ft</u>
	MATERIAL:	<u>12-20 Silica Sand</u>
WELL DEPTH <u>13</u> ft		
Formation Description		
<u>0 - 5 ft</u> <u>sand & gravel</u>		
<u>5 - 10 ft</u> <u>sand w/ coarse gravel</u>		
<u>10 - 15 ft</u> <u>silty sand and gravel</u>		
<u>- ft</u>		
<u>- ft</u>		
REMARKS		

WELL LOG

BORING/WELL ID: **MW-9**
INSTALLED DEPTH: **11.84-ft bgs**

PROJECT INFORMATION				DRILLING INFORMATION			
PROJECT: Jensen & Sons Shipyard and Marina				DRILLING CO.: Holt Services/Michael Running			
SITE LOCATION: 1293 Turn Point Road Friday Harbor, WA				DRILLING METHOD: Hollow Stem Auger			
LOGGED BY: Rusty Jones				EQUIPMENT TYPE: Geoprobe 7822 DT Macrocore			
PROJECT MANAGER: G. Hainsworth				SAMPLING METHOD: MC5 5-ft cores			
DATES DRILLED/INSTALLED: 7/27/2022				TOC Elevation 9.34 ft MLLW			
LATITUDE: 48.52584028° N				DRILLED DEPTH: 15-ft bgs			
LONGITUDE: 122.99919278° W				INITIAL WATER DEPTH: ~5-ft bgs			
				SCREENED INTERVAL: 1.6-11.6 ft bgs			

DEPTH	SOIL LOG	USCS	DESCRIPTION	SAMPLE ID	SAMPLE DEPTH (ft bgs)	PID (ppm) DPT	WELL CONSTRUCT.	WELL DESC.
-------	----------	------	-------------	-----------	-----------------------	---------------	-----------------	------------





Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

☒ Construction

☐ Decommission \Rightarrow Original NOI No. _____

Ecology Well ID Tag No. BPK 576

Site Well Name _____

Consulting Firm Crete

Was a variance approved for this well/boring? ☐ Yes ☐ No

If yes, what was the variance for? _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer

Name (Print Last, First Name) Running Michael

Driller/Engineer/Trainee Signature [Signature]

License No. 3205

Company Name Molt Service Inc

If trainee box is checked, sponsor's license number: _____

Sponsor's signature _____

Notice of Intent No. PE23242

Type of Well:

☒ Resource Protection Well

☐ Remediation Well

☐ Geotechnical Soil Boring

☐ Environmental Boring

☐ Soil- ☐ Vapor- ☐ Water-sampling

☐ Injection Point

☐ Grounding Well

☐ Ground Source Heat Pump

☐ Other _____

Property Owner Pt. of Friday Harbor

Well Street Address 1000 1/2 Turn Post Rd

City Friday Harbor County San Juan

Tax Parcel No. _____

Location (see instructions):

WWM ☐ or EWM ☐

SW 1/4-1/4 NE 1/4, Section 13 Town 35N Range 3W

Latitude (Example: 47.12345) 48.5260774

Longitude (Example: -120.12345) -123.0011354

(WGS 84 Coordinate System)

Borehole diameter 4.25 inches Casing diameter 2 inches

Static water level 5 ft below top of casing Date 7/27/22

☐ Above-ground completion with bollards ☒ Flush monument

☒ Stick-up of top of well casing _____ ft above ground surface


Start Date 7/27/22 Completed Date 7/28/22


Construction/Design

Well Data


Formation Description

	MONUMENT TYPE:	<u>9" Plug</u>
	CONCRETE SURFACE SEAL	<u>1 ft</u>
	PVC BLANK	<u>2" x 3</u>
	BACKFILL	<u>1.5 ft</u>
	TYPE:	<u>Medium Bentonite Chips</u>
	PVC SCREEN	<u>2" x 10</u>
	SLOT SIZE:	<u>10</u>
	TYPE:	_____
	GRAVEL PACK	<u>10.5 ft</u>
	MATERIAL:	<u>12-20 Silica Sand</u>
WELL DEPTH <u>13</u> ft		
FORMATION DESCRIPTION		
<u>0 - 5 ft</u> <u>Sand & gravel</u>		
<u>5 - 10 ft</u> <u>Sand w/ coarse gravel</u>		
<u>10 - 15 ft</u> <u>silty sand and gravel</u>		
_____ ft		
_____ ft		
_____ ft		
REMARKS		


Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SWP-1		 Sheet 1 of 1		
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor				
Logged By: Rusty Jones (CRETE)		Date	Started: 7/25/2022 1100		Tooling: MacroCore MC5		Drilling Contractor: Holt Services	
Drill Crew: Michael Running			Completed: 7/25/2022 1155				Borehole Diameter: ~2" 3/4" PVC	
USA Ticket Number:			Backfilled: Bentonite Chips		Hammer Type/Weight:		Drill Rig Type: GeoProbe 7822 BT	
		Groundwater Depth (ft bgs): ~9 (very approximate)				Total Depth of Boring (ft bgs): 15		
Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/feet)	Sample ID, Depth, Time	Lithology/Notes			
	0-5'	0.7	45%	1-3' 1105	0-5' Mixed Fill, sandy gravel, well-rounded, med.-dk brown, poor REC. med-c.g., dry-sli. moist			
	5-10'	0.8	15%	3-5' 1110	5-10' v. poor REC. SAA, dry-sli. moist			
	10-15'	0.8	70%	5-10' 1115	10-12' SAA or slough, sl. moist			
	5-10'			10-12' 1125	~12' moist to wet			
				10-12' 1140	~13' Inc. Gravel, dec. c.g. sand, wet GRAVEL w/ c.g. sand,			
SWP-1 GW 1140					PVC temp well 3/4" screened 5-15', no filter pack - would go dry w/ per. pump readily, but wait 1-2 minutes to recharge - Collected filtered & unfiltered metals - DW @ ~9' bgs in PVC @ very end			

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. AST-Z		
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor		
Logged By: Rusty Jones (CRETE)				Tooling: Macrocore MCS		
Drill Crew: Michael Running		Date	Started: 7.26.22 0730		Drilling Contractor: Holt Services	
USA Ticket Number:			Completed: 7.26.22 0845		Borehole Diameter: 2+ "	
		Backfilled: Bentonite Chips		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT
Rec %		Groundwater Depth (ft bgs): 8.7 @ 0845				Total Depth of Boring (ft bgs): 15


Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
0-5'	0-2.5'	0.4	50%	AST-Z @ 0830 10+2	0-5' Poor RECOVERY Gravelly SAND, poorly-sorted, med-cq, well-rounded, med-dk brown, dry - sl. moist
5-10'	2.5-5'	0.5	50%	AST-Z @ 0830 10+2	5-10' S&A mostly 5-8' S&A, sl. moist @ 8-9' moist, inc. organic fines (minor) dk brown-black, 9-10' dk brown-black, no odor, moist to wet V. faint HC odor
10-15'	5-7.5'	0.9	85%	AST-Z @ 0830 10+2	10-15' Gravelly Sand, med-cq, poorly-sorted, well-rounded, GRAY, wet, faint hydrocarbon odors
10-12'	7.5-10'	41.2	25.4	AST-Z @ 0830 10+2	Grab sample pre-purged ~1-2 gal. PVC 3/4" Screen @ 4-14' Duplicate for TPH-Dx -Gx — DUP-220726- Low RS @ 0730 1-grab WQM reading after sampling temp 18°C DO 1.37 mg/L SPC 550 uS/cm TDS 358 mg/L PH 7.89 ORP -162.3 mV NTU 92.52 NTU

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. AST-3				
Location: 1293 Turn Point Road, Friday Harbor WA		Client: Port of Friday Harbor		Sheet 1 of 1				
Logged By: Rusty Jones (CRETE)		Date	Started: 7.28.22 1035		Tooling: Macrocore MC5		Drilling Contractor: Holt Services	
Drill Crew: Michael Running			Completed: 7.28.22 1150				Borehole Diameter: 2+ inches	
USA Ticket Number:			Backfilled: Bentonite chips		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT	
		Groundwater Depth (ft bgs): ~6.55 @ 1143		Total Depth of Boring (ft bgs): 15				


Depth (feet)	Sample Depth	PID (ppm)	Rec. %	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
0-5'	2-4'	4.8	50%		1110	1 x 0-5' DPT core
5-10'	4-5'	3.9	70%		1115	20-4' GRAVELLY SAND, fq-veg, mostly med-cg, poorly-sorted subrd-rd, dry-sl. moist, ~1.5" dia @ ~1.5-2' large wood (3-4" thick)
10-15'	5-7'	6.1	95%		1120	4-5' SAND, some Gravel, black, fq-cg (fq-med. mostly), moist-wet, rd, 31 cm dia, v. faint HC odor, fq organics
	8-10'	4.0			1120	5-10' SAT, dk brown-black, moist-wet, minor woody debris, v. faint reducing odors, fq organics
	10-12'	4.2			1130	10-15' SAT, dec. Gravel, smaller gravel, sat dk gray
					1130	Grab GW sample from temp well 3/4" PVC screened 3.5-13.5' bgs no filter pack ~2-2.5-gal. pre-purged 1-grab WQAM reading: 18.3 °C DO 2.15 ↓ mg/L spc 1952 uS/cm TDS 1269 mg/L pH 9.41 ORP -58.2 mV Turb 143 NTU

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. AST-4		 Sheet 1 of 1		
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor				
Logged By: Rusty Jones (CRETE)		Date	Started: 7.29.22 0645		Tooling: Hand auger		Drilling Contractor: Holt Services RS	
Drill Crew: NONE			Completed: 7.29.22 0800		4" sand bucket		Borehole Diameter:	
USA Ticket Number:			Backfilled: Soil cuttings		Hammer Type/Weight:		Drill Rig Type: N/A	
Groundwater Depth (ft bgs): N/A				Total Depth of Boring (ft bgs): 5				

Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
			100%		No appreciable odors other than septic-related
4-5'	3-4'	1.9	1.7	4-5' 3-4' 0755	<p>Hand auger buckets ~2 buckets / 0.5' depth</p> <p>SAND w/ GRAVEL, fq-vcq, mostly med.-cg, subrd to rd grains of gravel, sl. moist, ≤3" gravel observed</p> <p>topsoil organics ~0-1' @ ~2' increase gray-black organics possibly staining BUT no appreciable odors associated w/ black packets</p> <p>@ ~3-3.5' + Bec. med. gray Faint fetid or reducing odors (adjacent septic system)</p> <p>4-5' Gray-black, sl. moist to moist</p>
	2.5-3'	3.5	2.5	2.5-3' 0750	
	2-2.5'	7.6	2.5	2-2.5' 0745	
	1-2'			1-2' 0-1'	
	0-1'	0.6		0-1' 0745	

Project: Jensen's Marina	Project Number: Agreed Order DE18071	Boring No. SFD-4	
Location: 1293 Turn Point Road, Friday Harbor WA	Client: Port of Friday Harbor	Sheet 1 of 1	
Logged By: Rusty Jones (CRETE)	Started: 1/25/2022 1300	Tooling: Macrocore MCS	Drilling Contractor: Holt Services
Drill Crew: Michael Running	Completed: 1/25/2022 1350		Borehole Diameter: 2+ "
USA Ticket Number:	Backfilled: Bentonite chips	Hammer Type/Weight:	Drill Rig Type: GeoProbe 7822 DT
	Groundwater Depth (ft bgs): ~9 (very approximate)		Total Depth of Boring (ft bgs): 15 ft

Depth (feet)	Sample Depth	PID (ppm)	Rec. %	Blew Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
	0-1.5'	0.5	40%		0-1.5' 1310	0-5' PER RECOVER. C.G. sandy GRAVEL, dry-sl. moist, med-dk brown, well-rounded, up to 1.5" gravel
	1.5-3'	0.4			1.5-3' 1315	5-10' Gravelly sand, med-cg, sl. moist, moist by 8' med-dk brown
	3-5'	0.3			3-5' 1320	10-15' SAA, wet, dk brown @ ~12.5/13-15' dk gray
	5-10'	0.5	35%		5-10' 1325	Installed temp well 5-15' (screen)
	10-15'	—	45%		10-15' 1335	1335 Grab GW sample for NWTPH-Gx, -Dx, metals,
					SFD-4 5-15' 1335	


Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. BLWA-10		
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor		
Logged By: Rusty Jones (CRETE)		Date Started: 7.28.22 0710		Tooling: Macrocore MCS		
Drill Crew: Michael Running		Date Completed: 7.28.22 0745				Drilling Contractor: Holt Services
USA Ticket Number:		Backfilled: Bentonite chip		Hammer Type/Weight:		Borehole Diameter: 2+ inches
Recovery %		Groundwater Depth (ft bgs):				Drill Rig Type: Geoprobe 7822 DT
						Total Depth of Boring (ft bgs): 15

Lithology/Notes


No observed odors, staining, or artificial debris

Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
0-5'	0-1'	2.3	20% 35%	0-1' 0740	2 x 0-5' DPT cores 20, 35% Rec POOR RECOVERY
5-6'	1-3'	3.7	45%	1-3' 0745	0-5' GRAVELLY SAND, dry, med-veg, poorly-sorted sub to rounded; 51.5" dia gravel (variable source rock) disturbed FILL
6-7'	3-5'	5.9	80%	3-5' 0750	5-6.5' SAA, sl. moist, dec. sand in core
7-8'	5-6'	1.3		5-6' 0755	6.5-10' SANDY GRAVEL (GRAVELLY SAND) c9-veg, 52 cm dia wet-sat., sub-rd dk brown / some organics 7-9'
8-9'					10-11.5' SAA
9-10'					11.5-15' SAND, w/ GRAVEL dec. gravel, tan-gray, saturated sub-rd, fq-c9 (dec. grain size), sand is better sorted


7/28/2022 @ 1601 TO 11.81' BTOC DTW N/A post-development F

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. BLWA-11		
Location: 1293 Turn Point Road, Friday Harbor WA		Client: Port of Friday Harbor		Sheet 1 of 1		
Logged By: Rusty Jones (CRETE)		Started: 7.25.2022 1505		Tooling: MacroCore MCS		
Drill Crew: Michael Running		Date	Completed: 7.25.2022 1615		Drilling Contractor: Holt Services	
USA Ticket Number:			Backfilled: Bentonite chips		Borehole Diameter: 2+"	
		Hammer Type/Weight:		Drill Rig Type: GeoProbe 7822 DT		
Rel. %		Groundwater Depth (ft bgs): ~6.2' bgs @ 1605		Total Depth of Boring (ft bgs): 15		


Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
0-5'	0-5'	0-2.5' 0-2.5'	45%	57' 2.5-5' 0-2.5' 1525	0-5' GRAVELLY SAND, med.-cq @ 0-2' trace roots, dry, light-med. brown, well-rounded, 2-4' sl. moist @ 3' rust-red sand layer @ 4' black sand layer, cq sand
5-10'	5-10'	5-7' 2.5-5' 0-2.5'	55%	57' 2.5-5' 0-2.5' 1535	5-10' SAA, med-dk brown, med-cq, wet by 7'
10-15'	10-15'	10-12' 2.5-5' 0-2.5'	70%	57' 2.5-5' 0-2.5' 1550	10-13' SLOUGH (dry) 13-15 Sandy Gravel, mostly cq, wet-sat, dk brown - dk gray, well-rounded, gravel up to 1.25"
				BLWA-11 @ 1650 1550	Grab Gw sample 16+4 bottles Pre-purged ~3-4 gal. (recharged very well) ran mostly clear by sampling time


Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. BLWA-12		 Sheet 1 of 1
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor		
Logged By: Rusty Jones (CRETE)		Started: 7.25.22 1405		Tooling: Macrocore MCS		
Drill Crew: Michael Running		Date	Completed: 7.25.22 1435		Drilling Contractor: Holt Services	
USA Ticket Number:			Backfilled: Bentonite chips		Borehole Diameter: 2+ "	
		Groundwater Depth (ft bgs):		Drill Rig Type: GeoProbe 7822 DT		Total Depth of Boring (ft bgs): 15
Rec %						

Depth (feet)	Sample Depth	PID (ppm)	Blow-Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
	0-5'	7.5	0-5' 40%	0-2' 1435 0.2	0-5' POOR RECOVERY. GRAVELLY SAND, dry, med-cg, poorly-sorted, well-rounded
	5-10'	0.8	5-10' 45%	3-5' 1435 0.8	5-10' POOR RECOVERY ~5-6' silt, sl moist ~6-8' becoming moist, silt @ ~8' CLAYEY SILT, w/ fq-med SAND, dk tan, moist-wet
	10-15'	0.4	10-15' 80%	5-7' 1435 0.4	9-10' GRAVELLY SILTY SAND, fq-med, black, abundant organics, minor small roots, wet @ ~9' minor wood seam, roots, wet, black
					10-15' decent Rec. 10-11.5' Gravelly sand, saturated, dk brown, well-rounded 11.5-15' med-cg, sandy GRAVEL, DK-GRAV, wet-saturated, well-rounded
					No Groundwater sample


Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. BLWA-13		
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor		
Logged By: Rusty Jones (CRETE)		Started: 7.27.22 0715		Tooling: Macrocore MCS		
Drill Crew: Michael Running		Date	Completed: 7.27.22 0822		Drilling Contractor: Holt Services	
USA Ticket Number:			Backfilled:		Borehole Diameter: 2+ inches	
			Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 BT	
			Groundwater Depth (ft bgs):		Total Depth of Boring (ft bgs):	

Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
0-5'	0-2'	0.4	40% 45 35 40	0-2' 0740	No odors, no staining, no artificial debris observed No shells, no obvious contamination impacts
5-10'	3-5'	0.4	60% 45 35 40	3-5' 0750	0-5' GRAVELLY SAND, med-cg, well-rounded, browns, dk brown, sl. moist, poor RECOVERY
10-15'	5-8'	0.4	80% 45 35 40	5-8' 0800	~1' SLOUGH, SAA 5-8' SAA, more GRAVEL, less sand in core, wet ~8-10 SAND, black-dk brown, moist - wet, med. -cg, minor gravel, well-rounded
	8-10'	0.4	80% 45 35 40	8-10' 0810	~10-12.5' SAA (5-8') GRAVEL w/ SAND, slough? saturated ~12.5-15' SAA 8-10' SAND, saturated
				Grab Gwl sample from temporary, well 3/4" PVC, screen ~5-15' No filter pack Recharge nicely, but moderately turbid 1 x 1 Lumber for cPAPs or PCB duplicate No worm or ganging	


Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SRWA-8				
Location: 1293 Turn Point Road, Friday Harbor WA		Client: Port of Friday Harbor		Sheet 1 of 1				
Logged By: Rusty Jones (CRETE)		Date	Started: 7.26.22 1305		Tooling: Macrocore MCS		Drilling Contractor: Holt Services	
Drill Crew: Michael Ranning			Completed: 7.26.22 1340				Borehole Diameter: 2 1/2 inches	
USA Ticket Number:			Backfilled: Bentonite chips		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT	
		Groundwater Depth (ft bgs):				Total Depth of Boring (ft bgs): 10		
Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot) %	Sample ID, Depth, Time	Lithology/Notes			
0-5'	0-1'	1.6	60%, 65%	0-1' 1330	2 x 0-5' DPT pushes, 100%, 65% recovery Some GRASS at surface, minor roots 0-1' SAND w/ Gravel (some), well-rounded, vfg-med, mostly fg med. brown, sl. moist 1-5' SAA, minor variable GRAVEL, sl moist-moist, firm 5-10', SAA, SAND, vfg-fg mostly, minor med. dense sl. moist-moist, brown, rather some GRAVEL, well * Jammed core barrel (dense) * No wet cuttings observed to 10' bgs			
	2-3'	1.7		2-3' 1340				
	4-5'	1.8		4-5' 1350				
5-10'			75%					

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SRWA-9			
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor			
Logged By: Rusty Jones (CRETE)		Started: 7.26.2022 1445		Tooling: Macrocore M65		Drilling Contractor: Holt Services	
Drill Crew: Michael Running		Completed: 7.26.2022 1645				Borehole Diameter: 2+ inches	
USA Ticket Number:		Backfilled: Bentonite chips		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT	
		Groundwater Depth (ft bgs):				Total Depth of Boring (ft bgs): 15	


Depth (feet)	Sample Depth	PID (ppm)	Blew Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
0-5'	0-2.5'	2.2	45%	0-2.5' 22A	temporary well in "lowland" area by old boat building structure in area where old barge was anecdotally/reported shored and "buried"
5-10'	2.5-5'	1.6	50%	2.5-5' 22A	0-5' 2 DPT pushes 45-50% GRASS @ surface 0-5' POOR RECOVERY GRAVELLY SAND, dry, loose-med. dense, weathered rocks easily fractured w/ DPT
10-15'	5-10'	2.2	80%	5-10' 22A	5-10' 2.5-5' Slough SAND, fq-med, moist to wet, dk brown, minor-some well-rd gravel, <1" dia' rusty brown mottling (pockets & seams) throughout sampler jammed briefly (dense material, squished liner)
			90-100%	SRWA-9 @ 1545 6+4	Grab water from temp. well 3/4" PVC screened 3-13' bgs (13-15' collapsed prior to PVC insert) POOR RECHARGE → TOOK TO 1645 TO OBTAIN H ₂ O for bottle (2+ hour) INSUFFICIENT WATER FOR SPEC/COND./TEMP visually very turbid, no recharge to clear

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SRWA-10		
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor		
Logged By: Rusty Jones (CRETE)		Started: 7.28.22 1325		Tooling: Macrocore MCS		
Drill Crew: Michael Running		Date	Completed: 7.28.22 1450		Drilling Contractor: Holt Services	
USA Ticket Number:			Backfilled: Bentonite chips		Borehole Diameter: 2+ inches	
		Groundwater Depth (ft bgs): 7.75' @ 1440		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT
				Total Depth of Boring (ft bgs): 15		

Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
0-5'	3-5'	1.8	40%	7-5-10' 5-7.5' 3-5' 1410 7	0-5' Limited Recovery SAND, some GRAVEL, subd-rd, fq-cg, minor veg, tan-med. brown, dry, gravel up to 1.5" observed 0-3', recently dug up and re-backfilled 3-5' appears relatively undisturbed, recent undisturbed bl. moist - moist
5-10'	5-7.5'	1.8	70%	7-5-10' 5-7.5' 3-5' 1410 7	5-10' Slough @ top of core SAND, less gravel, fq-cg, mostly fq-med, sat, @ 84 moist - wet
10-15'		2.1	85%	7-5-10' 5-7.5' 3-5' 1420 1	10-15 wet-sat, abundant gravel, some org. fines
SRWA-10 @ 1440 7+4					Grab GW sample from temp well 3/4" PVC, screened ~5-15' bgs Pre-purged ~1-1.5 gal. water 1-Grab GW at Readings temp 13.2°C DO 1.65 mg/L SpC 251.3 us/cm TDS 163 mg/L pH 9.42 ORP 34.0 mV Turb. 189 NTU

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SRWA-11		
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor		
Logged By: Rusty Jones (CRETE)		Date	Started: 7.26.22 1400		Tooling: Macrocore MCS	
Drill Crew: Michael Running			Completed: 7.26.22 1418		Drilling Contractor: Holt Services	
USA Ticket Number:			Backfilled: Bentonite chips		Borehole Diameter: 2+ inches	
		Groundwater Depth (ft bgs): Probably dry, not checked		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT
				Total Depth of Boring (ft bgs): 10		

Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot) %	Sample ID, Depth, Time	Lithology/Notes
0-5'	0-2.5'	1.9	50%	0-2.5' 1451	1 x 0-5' DPT core ~50-60% Minor GRASS @ surface 0-1' Sand, some gravel, vfq-med, loose-firm, tan-brown, dry 1-5' SAA, dry-sl. moist, dec. GRAVEL
5-10'	2.5-5'	1.0		2.5-5' 1451	5-10' Variable lithology 5-5.5' med-cq SAND, rusty brown bands/scams, sl. moist-moist dk brown 5.5-10' SILTY SAND w/ GRAVEL, vfq-med, dk brown, moist, various weathered minerals throughout (regolith), peppered stains (organics or minerals, well-rounded no noticeable artificial debris

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SRWA-12		
Location: 1293 Turn Point Road, Friday Harbor WA		Client: Port of Friday Harbor		Sheet 1 of 1		
Logged By: Rusty Jones (CRETE)		Date		Tooling: Macrocore MCS		Drilling Contractor: Holt Services
Drill Crew: Michael Running		Started: 7.28.22 1250				Borehole Diameter: 2+ inches
USA Ticket Number:		Completed: 7.28.22 1319		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT
		Backfilled: Bentonite chips		Groundwater Depth (ft bgs):		Total Depth of Boring (ft bgs): 10


Lithology/Notes


No observed odors, staining, or debris


3 x 0-5 DPT cores, 25, 20, 40% POOR RECOVERIES
 0-5' GRAVELLY SAND, fq-cg, well-sorted, sl. moist,
 med. brown, ≤ 2" dia gravel, minor vfg

5-10' SAA
 @ 7' dec. gravel, sl. moist - moist, med. dense
 dk tan - med. brown

Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time
0-5'	0-1'			
5-10'	2-3' 0-1'			
	4-5' 2-3' 0-1'			
	7-10' 5-10'			
	1.3 5.6			
	4.9 2.6 1.8			
	25%			
	40%			
	20%			
	50%			
	4-5' 2-3' 0-1'			
	1320 1315 1310			


Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SRWA-13				
Location: 1293 Turn Point Road, Friday Harbor WA		Client: Port of Friday Harbor		Sheet of				
Logged By: Rusty Jones (CRETE)		Date	Started: 7.26.22 0855		Tooling: Macrocore MC5		Drilling Contractor: Holt Services	
Drill Crew: Michael Running			Completed: 7.26.22 0955				Borehole Diameter: 2+ "	
USA Ticket Number:			Backfilled: Bentonite chips		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822DT	
		Groundwater Depth (ft bgs): ~1 (approx.)		Total Depth of Boring (ft bgs): 10				
		<div style="display: flex; justify-content: space-between;"> <div> <div>Depth (feet)</div> <div>Sample Depth</div> <div>PID (ppm)</div> <div>Blow Counts (blows/foot)</div> <div>Sample ID, Depth, Time</div> </div> <div> <div>5-10'</div> <div>3-5' 0.5-1'</div> <div>0.5</div> <div>70%</div> <div>3-5' 0.5-1'</div> <div>1000</div> </div> <div> <div>0-5'</div> <div>0.5-1'</div> <div>4.0</div> <div>33%</div> <div>0.5-1'</div> <div>0950</div> </div> <div> <div>0-5'</div> <div>0.5-1'</div> <div>2.4</div> <div>25%</div> <div>0.5-1'</div> <div>0940</div> </div> </div>						
		<div> <div>Lithology/Notes</div> <div> <p>No observed odors, staining, or obvious contamination</p> <p>3 x 0-5' pushes → POOR RECOVERY</p> <p>SANDY GRAVEL med-cg, well-rounded, poorly-sorted, trace shell fragments</p> <p>0-1 moist-wet 1+ wet-saturated thin concrete @ 0.5'</p> <p>*Combined 3 x 0-5' cores due to limited soil volume recovery.*</p> <p>Abundant gravel, limited sand matrix for Terracores</p> <p>5-6/7' sat, saturated</p> <p>6/7'-9' dec. gravel, most vcg sand, sat, gray</p> <p>~9-10' FIRM, fq-med, compacted sand, wet, well-drained, tan, undisturbed/native</p> </div> </div>						

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SRWA-14				
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor				
Logged By: Rusty Jones (CRETE)		Date	Started: 7-26-22 1000		Tooling: Macrocore MCS		Drilling Contractor: Holt Services	
Drill Crew: Michael Running			Completed: 7-26-22 1057				Borehole Diameter: 2+ inch	
USA Ticket Number:			Backfilled: Bentonite chips		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT	
Rec %		Groundwater Depth (ft bgs):				Total Depth of Boring (ft bgs): 10		
Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes			
5-10'	0-5'	4.0	2x 35-40%	0-1	<p>No observed contamination odors, staining, etc.</p> <p>2 x 0-5' DPT cores 35%-40%</p> <p>0-1' Grass (sea-grass?) at surface, abundant roots (0-0.5')</p> <p>gravelly SAND, moist-wet, mostly med-cg, well-round</p> <p>1-5' dec. gravel SAND, med-cg, browns to dk brown</p> <p>@ 1' wood or root (3-inch thick), wet, well-rounded .5-0.75"</p> <p>5-10' 5-6.5' SAND, wet-sat.</p> <p>6.5-10' SAND, firm-hard vfg-fg, trace med-cg, tan-gray</p> <p>well-rounded, undisturbed/native</p> <p>@ 8' small pocket peaty brown sand, native glittery</p> <p>@ 9' up to 0.75" minor gravel, well-rounded</p>			

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SRWA-15		
Location: 1293 Turn Point Road, Friday Harbor WA		Client: Port of Friday Harbor		Sheet 1 of 1		
Logged By: Rusty Jones (CRETE)		Started: 07/26/22 1200		Tooling: Macrocore MCS		Drilling Contractor: Holt Services
Drill Crew: Michael Running		Completed: 07/26/22 1225				Borehole Diameter: 2 1/2 inches
USA Ticket Number:		Backfilled: Bentonite chips		Hammer Type/Weight:		Drill Rig Type: Geoprobe 7822 DT
		Groundwater Depth (ft bgs): 3.7' @ 1222		Total Depth of Boring (ft bgs): 10		

Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
5-10'	0-5'				
	2-3' 0.5-1' 0-0.5	1.0 1.5 2.9	95-100%	2-3' 0.5-1' 0-0.5 1230	2 x 0-5' DPT pushes FULL RECOVERY: 2-10 to 0.5' GRAVELLY SAND, med.-cg, well-rounded, poorly-sorted moist to wet, med-dk brown
				2-3' 0.5-1' 1240	0.5-5 SAND, vfg-fg, trace-minor med-cg, well-rounded v. trace small gravel, dk tan/med.-brown, dense UNDISTURBED/no indications of FILL, well-sorted trace rusty brown mottling in sparse pockets
			95%	2-3' 1250	5-10' SAND, vfg-med, w/ minor gravel, variable source rock gravel, well-rounded, wet, dense, less sorted than 0.5-5' more grain size variability

Collected
DUP-220726
@ 0800
for TPH-GX

Project: Jensen's Marina		Project Number: Agreed Order DE18071		Boring No. SYC-7, -6, -5		
Location: 1293 Turn Point Road, Friday Harbor WA				Client: Port of Friday Harbor		
Logged By: Rusty Jones (CRETE)		Date		Tooling: Macrocore MCS		
Drill Crew: Michael Running		Started: 7.27.22 1445		Completed: 7.27.22 1515		Drilling Contractor: Holt Services
USA Ticket Number:		Backfilled: Bentonite chips		Hammer Type/Weight:		Borehole Diameter: 2+ inches
Rec. %		Groundwater Depth (ft bgs):				Drill Rig Type: Geoprobe 7822 DT.
						Total Depth of Boring (ft bgs): 5 each

Depth (feet)	Sample Depth	PID (ppm)	Blow Counts (blows/foot)	Sample ID, Depth, Time	Lithology/Notes
0-5'	0-1'	3.2	40%	SYC-7 0-1' @ 1530	SYC-7 1 x 0-5' DPT core → POOR RECOVERY Asphalt @ surface 0-5' Gravelly Sand, dry-sl. moist, ^{sub to} well-sorted, browns, fq-veg, 51.5" dia, poorly sorted no odors, staining, or debris
0-5'	0-1'	3.3	DPT 10%	SYC-6 0-1' @ 1540	SYC-6 1 x 0-5' DPT core → No appreciable recovery LOIS' recovery *SAME AS SYC-7* but GRASS @ surface, v. dry used hand auger 0-1' loose sand w/ gravel, med-cg
0-5'	0-1'	4.3	60%	SYC-5 0-1' @ 1550	SYC-5 1 x 0-5' DPT core 0-5' GRAVELLY SAND, med-veg, poorly-sorted sub to well-sorted, sl. moist rocks/gravel easily fractured by DPT

Appendix B

Analytical Laboratory Reports

This page intentionally left blank.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 11, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 28, 2022 from the Port of Friday Harbor Jensen's Marina R.I., F&BI 207490 project. There are 36 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: Grant Hainsworth, Jamie Stevens, Peter Leon (peter@leon-environmental.com)
CTC0811R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 28, 2022 by Friedman & Bruya, Inc. from the Crete Consulting Port of Friday Harbor Jensen's Marina R.I., F&BI 207490 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
207490 -01	SWP-1 1-3'
207490 -02	SWP-1 3-5'
207490 -03	SWP-1 5-10'
207490 -04	SWP-1 10-12'
207490 -05	SFD-4 0-1.5'
207490 -06	SFD-4 1.5-3'
207490 -07	SFD-4 3-5'
207490 -08	SFD-4 5-6.5'
207490 -09	SFD-4
207490 -10	BLWA-12 0-2'
207490 -11	BLWA-12 3-5'
207490 -12	BLWA-12 5-7'
207490 -13	BLWA-11 0-2.5'
207490 -14	BLWA-11 2.5-5'
207490 -15	BLWA-11 5-7'
207490 -16	BLWA-11

Several cPAHs were detected in the 8270E water method blank greater than one tenth the concentration detected in sample BLWA-11. The data were flagged accordingly.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

Date Extracted: 08/02/22

Date Analyzed: 08/02/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 50-150)
SFD-4 0-1.5' 207490-05	<5	113
BLWA-12 0-2' 207490-10	<5	106
BLWA-11 0-2.5' 207490-13	<5	104
Method Blank 02-1717 MB	<5	109

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

Date Extracted: 08/02/22

Date Analyzed: 08/03/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 50-150)
SFD-4 207490-09	<100	112
BLWA-11 207490-16	<100	105
Method Blank 02-1718 MB	<100	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

Date Extracted: 07/29/22

Date Analyzed: 07/29/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
SFD-4 0-1.5' 207490-05	<50	<250	97
BLWA-12 0-2' 207490-10	<50	<250	94
BLWA-11 0-2.5' 207490-13	<50	<250	101
Method Blank 02-1864 MB	<50	<250	108

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

Date Extracted: 08/05/22

Date Analyzed: 08/05/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 41-152)
SFD-4 207490-09	<50	<250	100
BLWA-11 207490-16	<50	<250	58
Method Blank 02-1858 MB	<50	<250	86

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

Date Extracted: 07/29/22

Date Analyzed: 07/29/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 41-152)
SFD-4 207490-09	160 x	<250	105
BLWA-11 207490-16	63 x	<250	92
Method Blank 02-1858 MB	<50	<250	78

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SWP-1 1-3'	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	207490-01
Date Analyzed:	08/01/22	Data File:	207490-01.196
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.41
Cadmium	<1
Lead	10.6
Mercury	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SWP-1 1-3'	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	207490-01 x2
Date Analyzed:	08/02/22	Data File:	207490-01 x2.074
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Chromium	14.6
Copper	51.2
Zinc	41.3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SFD-4 0-1.5'	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	207490-05
Date Analyzed:	08/01/22	Data File:	207490-05.197
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.41
Cadmium	1.37
Chromium	10.0
Copper	172
Lead	71.8
Mercury	<1
Zinc	150

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-12 0-2'	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	207490-10
Date Analyzed:	08/01/22	Data File:	207490-10.198
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	6.84
Cadmium	<1
Lead	147
Mercury	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-12 0-2'	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	207490-10 x5
Date Analyzed:	08/02/22	Data File:	207490-10 x5.079
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Chromium	17.0
Copper	629
Zinc	291

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	I2-518 mb
Date Analyzed:	08/01/22	Data File:	I2-518 mb.139
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Mercury	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

Date Extracted: 08/01/22

Date Analyzed: 08/03/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
SWP-1 1-3' 207490-01	0.085
SFD-4 0-1.5' 207490-05	0.21
BLWA-12 0-2' 207490-10	0.80
Method Blank i2-518 MB	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	BLWA-12 0-2'	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/05/22	Lab ID:	207490-10 1/25
Date Analyzed:	08/05/22	Data File:	080509.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	65 d	39	103
Phenol-d6	76 d	48	109
Nitrobenzene-d5	71 d	23	138
2-Fluorobiphenyl	80 d	50	150
2,4,6-Tribromophenol	74 d	40	127
Terphenyl-d14	89 d	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.053
Chrysene	0.12
Benzo(a)pyrene	0.083
Benzo(b)fluoranthene	0.19
Benzo(k)fluoranthene	0.053
Indeno(1,2,3-cd)pyrene	0.083
Dibenz(a,h)anthracene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	BLWA-11 0-2.5'	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	207490-13 1/25
Date Analyzed:	08/01/22	Data File:	080120.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	64 d	24	111
Phenol-d6	75 d	37	116
Nitrobenzene-d5	68 d	38	117
2-Fluorobiphenyl	80 d	45	117
2,4,6-Tribromophenol	76 d	11	158
Terphenyl-d14	90 d	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.33
Chrysene	0.68
Benzo(a)pyrene	0.39
Benzo(b)fluoranthene	0.83
Benzo(k)fluoranthene	0.27
Indeno(1,2,3-cd)pyrene	0.29
Dibenz(a,h)anthracene	0.062

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	02-1871 mb 1/5
Date Analyzed:	08/01/22	Data File:	080112.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	87	39	103
Phenol-d6	96	48	109
Nitrobenzene-d5	96	23	138
2-Fluorobiphenyl	101	50	150
2,4,6-Tribromophenol	97	40	127
Terphenyl-d14	108	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/05/22	Lab ID:	02-1896 mb 1/5
Date Analyzed:	08/05/22	Data File:	080510.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	89	24	111
Phenol-d6	97	37	116
Nitrobenzene-d5	91	38	117
2-Fluorobiphenyl	98	45	117
2,4,6-Tribromophenol	97	11	158
Terphenyl-d14	107	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	BLWA-11	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	207490-16
Date Analyzed:	08/01/22	Data File:	080119.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	22	10	60
Phenol-d6	17	10	49
Nitrobenzene-d5	84	15	144
2-Fluorobiphenyl	80	25	128
2,4,6-Tribromophenol	44	10	142
Terphenyl-d14	97	41	138

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	0.20
Chrysene	0.53
Benzo(a)pyrene	0.17
Benzo(b)fluoranthene	0.44
Benzo(k)fluoranthene	0.16 fb
Indeno(1,2,3-cd)pyrene	0.14 fb
Dibenz(a,h)anthracene	0.030 fb

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	02-1865 mb2
Date Analyzed:	08/01/22	Data File:	080110.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	27	10	60
Phenol-d6	14	10	49
Nitrobenzene-d5	93	15	144
2-Fluorobiphenyl	89	25	128
2,4,6-Tribromophenol	96	10	142
Terphenyl-d14	104	41	138

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	0.017 j lc
Indeno(1,2,3-cd)pyrene	0.018 j lc
Dibenz(a,h)anthracene	0.019 j lc

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	BLWA-11 0-2.5'	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	207490-13 1/6
Date Analyzed:	08/02/22	Data File:	080128.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	76 ca	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	0.25
Aroclor 1260	0.21
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/01/22	Lab ID:	02-1870 mb cl 1/6
Date Analyzed:	08/01/22	Data File:	080112.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower	Upper
TCMX	97 ca	Limit:	Limit:
		23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	BLWA-11	Client:	Crete Consulting
Date Received:	07/28/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207490-16
Date Analyzed:	08/03/22	Data File:	080228.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	MG

Surrogates:	% Recovery:	Lower	Upper
TCMX	38 ca	Limit:	Limit:
		24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	02-1875 mb
Date Analyzed:	08/02/22	Data File:	080221.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	MG

Surrogates:	% Recovery:	Lower	Upper
TCMX	59 ca	Limit:	Limit:
		24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 207505-02 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	90	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 207458-09 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	102	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 207468-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	112	110	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	110	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	80	92	63-142	14

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	100	63-142	4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 207458-32 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<1	91	93	75-125	2
Cadmium	mg/kg (ppm)	10	<1	96	98	75-125	2
Chromium	mg/kg (ppm)	50	7.97	76	76	75-125	0
Copper	mg/kg (ppm)	50	13.9	80	79	75-125	1
Lead	mg/kg (ppm)	50	2.12	91	92	75-125	1
Mercury	mg/kg (ppm)	5	<1	84	95	75-125	12
Zinc	mg/kg (ppm)	50	16.8	79	78	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	101	80-120
Cadmium	mg/kg (ppm)	10	98	80-120
Chromium	mg/kg (ppm)	50	105	80-120
Copper	mg/kg (ppm)	50	107	80-120
Lead	mg/kg (ppm)	50	100	80-120
Mercury	mg/kg (ppm)	5	100	80-120
Zinc	mg/kg (ppm)	50	106	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 207458-32 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<0.1	114	121	71-125	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	124	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 207505-02 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	85	85	50-150	0
Chrysene	mg/kg (ppm)	0.83	<0.01	85	83	50-150	2
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	87	85	50-150	2
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	84	85	50-150	1
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	85	81	50-150	5
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	87	88	50-150	1
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	86	90	50-150	5

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.83	93	64-116
Chrysene	mg/kg (ppm)	0.83	92	66-119
Benzo(a)pyrene	mg/kg (ppm)	0.83	93	62-116
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	94	61-118
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	90	65-119
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	90	64-130
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	93	67-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 208068-02 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	90	95	50-150	5
Chrysene	mg/kg (ppm)	0.83	<0.01	89	94	50-150	5
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	92	97	50-150	5
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	92	112	50-150	20
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	94	99	50-150	5
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	98	108	41-134	10
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	99	108	44-130	9

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.83	96	70-130
Chrysene	mg/kg (ppm)	0.83	94	70-130
Benzo(a)pyrene	mg/kg (ppm)	0.83	96	68-120
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	109	69-125
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	100	70-130
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	108	67-129
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	107	67-128

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E**

Laboratory Code: Laboratory Control Sample 1/0.5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	ug/L (ppb)	5	99	99	70-130	0
Chrysene	ug/L (ppb)	5	97	97	70-130	0
Benzo(a)pyrene	ug/L (ppb)	5	100	98	70-130	2
Benzo(b)fluoranthene	ug/L (ppb)	5	100	97	62-130	3
Benzo(k)fluoranthene	ug/L (ppb)	5	105	101	70-130	4
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	104	101	70-130	3
Dibenz(a,h)anthracene	ug/L (ppb)	5	105	103	70-130	2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
POLYCHLORINATED BIPHENYLS AS
AROCOR 1016/1260 BY EPA METHOD 8082A**

Laboratory Code: 207505-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Control Limits	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	<0.02	74	72	29-125	3
Aroclor 1260	mg/kg (ppm)	0.25	<0.02	78	76	25-137	3

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	96	55-137
Aroclor 1260	mg/kg (ppm)	0.25	100	51-150

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/22

Date Received: 07/28/22

Project: Port of Friday Harbor Jensen's Marina R.I., F&BI 207490

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES FOR
POLYCHLORINATED BIPHENYLS AS
AROCOR 1016/1260 BY EPA METHOD 8082A**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	0.25	69	68	25-111	1
Aroclor 1260	ug/L (ppb)	0.25	78	74	23-123	5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

207440

Report to: Rusty Jones, Steven P. LeonCompany: Crete Consulting, LLC

Address: _____

City, State, ZIP: _____

Phone: _____ Email: _____

SAMPLE CHAIN OF CUSTODY 07-28-22

SAMPLERS (signature) <u>Rusty Jones</u>		PO #
PROJECT NAME <u>Port of Friday Harbor Tensen's Marine R.I.</u>		INVOICE TO <u>Leon Environmental</u>
REMARKS <u>*As, Cd, Cr, Cu, Pb, Hg, Zn PCBs, PAHs, BTEX</u>		
Project specific RIs? <u>Yes, No</u>		

Page # <u>1</u>	TURNAROUND TIME <input checked="" type="checkbox"/> Standard turnaround <input type="checkbox"/> RUSH Rush charges authorized by: _____
ED3/BL/01/12	SAMPLE DISPOSAL <input type="checkbox"/> Archive samples <input type="checkbox"/> Other Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Metals*	Notes
SWP-1 1-3'	01	7.25.22	1105	Soil	1									(X) per RS 8/4/22 ME
SWP-1 3-5'	02		1110		1									per RS 8/10/22 ME
SWP-1 5-10'	03		1115		1									
SWP-1 10-12'	04		1125		1									
SFD-4 0-1.5'	05 A-E		1310	Soil	5									
SFD-4 1.5-3'	06		1315		5									
SFD-4 3-5'	07		1320		5									
SFD-4 5-6.5'	08		1325		5									
SFD-4	09 A-D		1335	WATER	4									with + without 3cc
BLWA-12 0-2'	10 A-B		1425	Soil	5									

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>Rusty Jones</u>		<u>Rusty Jones</u>		<u>CRETE</u>		1.10.22	1125
Received by: <u>James Bruya</u>		<u>James Bruya</u>		<u>CRETE</u>		7/28/23	1410
Relinquished by:							
Received by:							

207490

SAMPLE CHAIN OF CUSTODY

07-28-22

ED3/B14/G1/vm1

Page # 2 of 2

Report to: James Hainsworth, Stevens, P. Leon

Company: Crest Consulting / Leon Env.

Address:

City, State, ZIP:

Phone: Email:

SAMPLERS (signature)
Rusty JonesR. Jones
PO #

TURNAROUND TIME

Standard turnaround

Rush charges authorized by:

SAMPLE DISPOSAL

Archive samples

Other

Default: Dispose after 30 days

PROJECT NAME
Port of Friday Harbor
Jensen's Marina P.I.

INVOICE TO

Project specific RLS? - Yes / No

Leon Environmental

ANALYSES REQUESTED

NWTPH-Dx
NWTPH-Gx
BTEX EPA 8021
NWTPH-HCID
VOC EPA 8260
PAHs EPA 8270
PCBs EPA 8082

Metals

Notes

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOC EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Notes
BLWA-12 3-5'	11 A-R	7.25.2022	1430	Soil	6								
BLWA-12 5-7'	12		1435	↓	6								
BLWA-11 0-2.5'	13		1525	soil	6	✓	✓						
BLWA-11 2.5-5'	14		1530	↓	6								
BLWA-11 5-7'	15		1535	↓	6								
BLWA-11	16		1550	water	6	✓	✓						with twillhead SGC

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Relinquished by: R. Jones

Received by: Rusty Jones

Relinquished by: James Brya

James Brya

CREC

7.26.22

1125

Received by:

Samples received at 4 °C

Friedman & Bruya, Inc.
Ph. (306) 285-8282



Test Report



August 19, 2022

Mr. Michael Erdahl
Friedman and Bruya, Inc.
3012 16th Ave. W
Seattle, WA 98119

Dear Mr. Erdahl,

The following results are associated with Frontier Analytical Laboratory project **14541**. This corresponds to your project number **208001** and purchase order number **C-264**. Two soil samples were received on 8/3/2022 in good condition. These samples were extracted and analyzed by EPA Method 1613 for tetra through octa chlorinated dibenzo dioxins and furans. The Toxic Equivalency (TEQ) for your samples has been calculated using the 2005 World Health Organization's (WHO's) toxic equivalency factors (TEFs). Friedman and Bruya, Inc. requested a turnaround time of fifteen business days for project **14541**.

The following report consists of an Analytical Data section and a Sample Receipt section. The Analytical Data section contains our sample tracking log and the analytical results. The Sample Receipt section contains your chain of custody, our sample login form and a sample photo. The enclosed results and electronic data deliverable (EDD) are specifically for the samples referenced in this report only. These results meet all NELAP requirements and shall not be reproduced except in full. Frontier Analytical Laboratory's State of Oregon NELAP certificate number is **4041**, our State of California ELAP certificate number is **2934** and our State of Washington certificate number is **C844**. This report along with the associated EDD has been emailed to you. A hardcopy of this report will not be sent to you unless specifically requested.

If you have any questions regarding project **14541**, please feel free to contact me at (916) 934-0900. Thank you for choosing Frontier Analytical Laboratory for your analytical testing needs.

Sincerely,

A handwritten signature in dark ink, reading "Thomas C. Crabtree". The signature is written in a cursive, flowing style.

Thomas C. Crabtree
Director

FRONTIER ANALYTICAL LABORATORY

5172 Hillsdale Circle * El Dorado Hills, CA 95762

Tel (916) 934-0900 * Fax (916) 934-0999

www.frontieranalytical.com



Frontier Analytical Laboratory

Sample Tracking Log

FAL Project ID: 14541

Received on: 08/03/2022

Project Due: 08/25/2022 Storage: R-4

FAL Sample ID	Dup	Client Project ID	Client Sample ID	Requested Method	Matrix	Sampling Date	Sampling Time	Hold Time Due Date
14541-001-SA	0	208001	MW-9 0-2.5	EPA 1613 D/F	Soil	07/27/2022	09:00 am	07/27/2023
14541-002-SA	0	208001	SRWA-10 3.5	EPA 1613 D/F	Soil	07/28/2022	02:10 pm	07/28/2023

EPA Method 1613 PCDD/F



FAL ID: 14541-001-MB
Client ID: Method Blank
Matrix: Soil
Batch No: X6168

Date Extracted: 08-16-2022
Date Received: NA
Amount: 10.0 g

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-17-2022
2005 WHO TEQ: 0.0
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	ND	0.0394		-	0.0286				
1,2,3,7,8-PeCDD	ND	0.0746		-	0.0515				
1,2,3,4,7,8-HxCDD	ND	0.173		-	0.0555				
1,2,3,6,7,8-HxCDD	ND	0.172		-	0.0558	Total TCDD	ND	0.0394	
1,2,3,7,8,9-HxCDD	ND	0.160		-	0.0528	Total PeCDD	ND	0.0746	
1,2,3,4,6,7,8-HpCDD	ND	0.180		-	0.0712	Total HxCDD	ND	0.173	
OCDD	ND	0.391		-	0.195	Total HpCDD	ND	0.180	
2,3,7,8-TCDF	ND	0.0421		-	0.0231				
1,2,3,7,8-PeCDF	ND	0.0550		-	0.0324				
2,3,4,7,8-PeCDF	ND	0.0606		-	0.0322				
1,2,3,4,7,8-HxCDF	ND	0.0679		-	0.0339				
1,2,3,6,7,8-HxCDF	ND	0.0650		-	0.0340				
2,3,4,6,7,8-HxCDF	ND	0.0677		-	0.0353				
1,2,3,7,8,9-HxCDF	ND	0.0775		-	0.0451	Total TCDF	ND	0.0421	
1,2,3,4,6,7,8-HpCDF	ND	0.0576		-	0.0350	Total PeCDF	ND	0.0606	
1,2,3,4,7,8,9-HpCDF	ND	0.0739		-	0.0421	Total HxCDF	ND	0.0775	
OCDF	ND	0.158		-	0.0820	Total HpCDF	ND	0.0739	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	71.9	25.0 - 164	
13C-1,2,3,7,8-PeCDD	86.7	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	88.7	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	87.6	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	84.5	23.0 - 140	
13C-OCDD	68.1	17.0 - 157	
13C-2,3,7,8-TCDF	88.4	24.0 - 169	
13C-1,2,3,7,8-PeCDF	91.5	24.0 - 185	
13C-2,3,4,7,8-PeCDF	90.0	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	110	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	106	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	107	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	102	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	96.5	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	92.5	26.0 - 138	
13C-OCDF	78.5	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD 84.0 35.0 - 197

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
- B Analyte is present in Method Blank
- C Chemical Interference
- D Presence of Diphenyl Ethers
- DNQ Analyte concentration is below calibration range
- E Analyte concentration is above calibration range
- F Analyte confirmation on secondary column
- J Analyte concentration is below calibration range
- M Maximum possible concentration
- ND Analyte Not Detected at Detection Limit Level
- NP Not Provided
- P Pre-filtered through a Whatman 0.7um GF/F filter
- S Sample acceptance criteria not met
- X Matrix interferences
- * Result taken from dilution or reinjection

Analyst: 

Date: 8/19/2022

Reviewed By: 

Date: 8/19/2022

EPA Method 1613 PCDD/F



FAL ID: 14541-001-OPR
Client ID: OPR
Matrix: Soil
Batch No: X6168

Date Extracted: 08-16-2022
Date Received: NA
Amount: 10.00 g

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: ng/ml

Acquired: 08-17-2022
2005 WHO TEQ: NA

Compound	Conc	QC Limits	Qual
2,3,7,8-TCDD	9.19	6.70 - 15.8	
1,2,3,7,8-PeCDD	52.7	35.0 - 71.0	
1,2,3,4,7,8-HxCDD	60.1	35.0 - 82.0	
1,2,3,6,7,8-HxCDD	60.7	38.0 - 67.0	
1,2,3,7,8,9-HxCDD	60.2	32.0 - 81.0	
1,2,3,4,6,7,8-HpCDD	56.7	35.0 - 70.0	
OCDD	118	78.0 - 144	
2,3,7,8-TCDF	10.6	7.50 - 15.8	
1,2,3,7,8-PeCDF	52.2	40.0 - 67.0	
2,3,4,7,8-PeCDF	53.1	34.0 - 80.0	
1,2,3,4,7,8-HxCDF	53.0	36.0 - 67.0	
1,2,3,6,7,8-HxCDF	53.1	42.0 - 65.0	
2,3,4,6,7,8-HxCDF	53.0	35.0 - 78.0	
1,2,3,7,8,9-HxCDF	53.4	39.0 - 65.0	
1,2,3,4,6,7,8-HpCDF	53.6	41.0 - 61.0	
1,2,3,4,7,8,9-HpCDF	54.1	39.0 - 69.0	
OCDF	105	63.0 - 170	
Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	71.9	20.0 - 175	
13C-1,2,3,7,8-PeCDD	89.3	21.0 - 227	
13C-1,2,3,4,7,8-HxCDD	93.9	21.0 - 193	
13C-1,2,3,6,7,8-HxCDD	90.3	25.0 - 163	
13C-1,2,3,4,6,7,8-HpCDD	91.3	26.0 - 166	
13C-OCDD	74.9	13.0 - 198	
13C-2,3,7,8-TCDF	96.1	22.0 - 152	
13C-1,2,3,7,8-PeCDF	101	21.0 - 192	
13C-2,3,4,7,8-PeCDF	97.7	13.0 - 328	
13C-1,2,3,4,7,8-HxCDF	118	19.0 - 202	
13C-1,2,3,6,7,8-HxCDF	111	21.0 - 159	
13C-2,3,4,6,7,8-HxCDF	112	22.0 - 176	
13C-1,2,3,7,8,9-HxCDF	107	17.0 - 205	
13C-1,2,3,4,6,7,8-HpCDF	104	21.0 - 158	
13C-1,2,3,4,7,8,9-HpCDF	99.7	20.0 - 186	
13C-OCDF	86.0	13.0 - 198	
Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	86.4	31.0 - 191	

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
- B Analyte is present in Method Blank
- C Chemical Interference
- D Presence of Diphenyl Ethers
- DNQ Analyte concentration is below calibration range
- E Analyte concentration is above calibration range
- F Analyte confirmation on secondary column
- J Analyte concentration is below calibration range
- M Maximum possible concentration
- ND Analyte Not Detected at Detection Limit Level
- NP Not Provided
- P Pre-filtered through a Whatman 0.7um GF/F filter
- S Sample acceptance criteria not met
- X Matrix interferences
- * Result taken from dilution or reinjection

Analyst: 

Date: 8/19/2022

Reviewed By: 

Date: 8/19/2022

EPA Method 1613 PCDD/F



FAL ID: 14541-001-SA
Client ID: MW-9 0-2.5
Matrix: Soil
Batch No: X6168

Date Extracted: 08-16-2022
Date Received: 08-03-2022
Amount: 10.1 g
% Solids: 82.28

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-17-2022
2005 WHO TEQ: 20.7
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	0.186	-	J	0.186	0.0286				
1,2,3,7,8-PeCDD	1.33	-	J	1.33	0.0515				
1,2,3,4,7,8-HxCDD	5.88	-		0.588	0.0555				
1,2,3,6,7,8-HxCDD	21.3	-		2.13	0.0558	Total TCDD	3.25	-	M
1,2,3,7,8,9-HxCDD	7.42	-		0.742	0.0528	Total PeCDD	23.9	-	
1,2,3,4,6,7,8-HpCDD	1040	-		10.4	0.0712	Total HxCDD	622	-	
OCDD	5760	-		1.73	0.195	Total HpCDD	5580	-	
2,3,7,8-TCDF	0.965	-		0.0965	0.0231				
1,2,3,7,8-PeCDF	0.994	-	J	0.0298	0.0324				
2,3,4,7,8-PeCDF	5.50	-		1.65	0.0322				
1,2,3,4,7,8-HxCDF	2.54	-		0.254	0.0339				
1,2,3,6,7,8-HxCDF	3.15	-		0.315	0.0340				
2,3,4,6,7,8-HxCDF	4.70	-		0.470	0.0353				
1,2,3,7,8,9-HxCDF	1.08	-	J	0.108	0.0451	Total TCDF	34.4	-	D,M
1,2,3,4,6,7,8-HpCDF	62.0	-		0.620	0.0350	Total PeCDF	70.7	-	D,M
1,2,3,4,7,8,9-HpCDF	2.64	-		0.0264	0.0421	Total HxCDF	107	-	D,M
OCDF	176	-		0.0528	0.0820	Total HpCDF	185	-	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	84.4	25.0 - 164	
13C-1,2,3,7,8-PeCDD	82.2	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	86.5	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	82.8	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	96.3	23.0 - 140	
13C-OCDD	88.9	17.0 - 157	
13C-2,3,7,8-TCDF	96.1	24.0 - 169	
13C-1,2,3,7,8-PeCDF	100	24.0 - 185	
13C-2,3,4,7,8-PeCDF	94.6	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	94.8	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	90.8	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	95.2	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	92.9	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	92.7	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	107	26.0 - 138	
13C-OCDF	85.7	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD 83.5 35.0 - 197

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1

B Analyte is present in Method Blank

C Chemical Interference

D Presence of Diphenyl Ethers

DNQ Analyte concentration is below calibration range

E Analyte concentration is above calibration range

F Analyte confirmation on secondary column

J Analyte concentration is below calibration range

M Maximum possible concentration

ND Analyte Not Detected at Detection Limit Level

NP Not Provided

P Pre-filtered through a Whatman 0.7um GF/F filter

S Sample acceptance criteria not met

X Matrix interferences

* Result taken from dilution or reinjection

Analyst: 

Date: 8/19/2022

Reviewed By: 

Date: 8/19/2022

EPA Method 1613 PCDD/F



FAL ID: 14541-002-SA
Client ID: SRWA-10 3.5
Matrix: Soil
Batch No: X6168

Date Extracted: 08-16-2022
Date Received: 08-03-2022
Amount: 10.3 g
% Solids: 95.49

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-17-2022
2005 WHO TEQ: 1.62
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	ND	0.0586		-	0.0286				
1,2,3,7,8-PeCDD	0.295	-	J	0.295	0.0515				
1,2,3,4,7,8-HxCDD	0.596	-	J	0.0596	0.0555				
1,2,3,6,7,8-HxCDD	1.73	-	J	0.173	0.0558	Total TCDD	0.732	-	
1,2,3,7,8,9-HxCDD	0.952	-	J	0.0952	0.0528	Total PeCDD	3.38	-	M
1,2,3,4,6,7,8-HpCDD	40.4	-		0.404	0.0712	Total HxCDD	13.9	-	
OCDD	314	-		0.0942	0.195	Total HpCDD	81.4	-	
2,3,7,8-TCDF	0.329	-	J	0.0329	0.0231				
1,2,3,7,8-PeCDF	ND	0.0720		-	0.0324				
2,3,4,7,8-PeCDF	0.615	-	J	0.185	0.0322				
1,2,3,4,7,8-HxCDF	0.450	-	J	0.0450	0.0339				
1,2,3,6,7,8-HxCDF	0.539	-	J	0.0539	0.0340				
2,3,4,6,7,8-HxCDF	0.685	-	J	0.0685	0.0353				
1,2,3,7,8,9-HpCDF	0.194	-		0.0194	0.0451	Total TCDF	8.68	-	
1,2,3,4,6,7,8-HpCDF	8.74	-		0.0874	0.0350	Total PeCDF	7.00	-	
1,2,3,4,7,8,9-HpCDF	0.426	-		0.00426	0.0421	Total HxCDF	12.1	-	
OCDF	18.6	-		0.00558	0.0820	Total HpCDF	24.1	-	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	92.5	25.0 - 164	
13C-1,2,3,7,8-PeCDD	91.2	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	92.7	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	87.0	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	93.2	23.0 - 140	
13C-OCDD	85.0	17.0 - 157	
13C-2,3,7,8-TCDF	90.4	24.0 - 169	
13C-1,2,3,7,8-PeCDF	94.8	24.0 - 185	
13C-2,3,4,7,8-PeCDF	90.1	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	101	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	99.7	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	98.7	28.0 - 136	
13C-1,2,3,7,8,9-HpCDF	98.1	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	95.8	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	99.1	26.0 - 138	
13C-OCDF	91.2	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD 91.9 35.0 - 197

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
- B Analyte is present in Method Blank
- C Chemical Interference
- D Presence of Diphenyl Ethers
- DNQ Analyte concentration is below calibration range
- E Analyte concentration is above calibration range
- F Analyte confirmation on secondary column
- J Analyte concentration is below calibration range
- M Maximum possible concentration
- ND Analyte Not Detected at Detection Limit Level
- NP Not Provided
- P Pre-filtered through a Whatman 0.7um GF/F filter
- S Sample acceptance criteria not met
- X Matrix interferences
- * Result taken from dilution or reinjection

Analyst: 

Date: 8/19/2022

Reviewed By: 

Date: 8/19/2022

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTOR	
Frontier	
PROJECT NAME/NO.	PO #
208001	C-264
REMARKS	
14541 000	

Page # 1 of 1

TURNAROUND TIME 12

~~Standard TAT~~

RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Dispose after 30 days

- Return samples

- ☐ Will call with instructions



[illegible]

Friedman & Bruya, Inc.
3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: 	Michael Erdahl	Friedman & Bruya	8/2/22	0745
Received by: 	Kathy Zipp	Frontier	8/03/22	945
Relinquished by:				
Received by:				

Frontier Analytical Laboratory

Sample Login Form

FAL Project ID: 14541

Client:	Friedman & Bruya, Inc.
Client Project ID:	208001
Date Received:	08/03/2022
Time Received:	09:45 am
Received By:	KZ
Logged In By:	KZ
# of Samples Received:	2
Duplicates:	0
Storage Location:	R-4

Method of Delivery:	Fed-Ex
Tracking Number:	816717801817
Shipping Container Received Intact	Yes
Custody seals(s) present?	No
Custody seals(s) intact?	No
Sample Arrival Temperature (C)	0
Cooling Method	Blue Ice
Chain Of Custody Present?	Yes
Return Shipping Container To Client	Yes
Test aqueous sample for residual Chlorine	No
Sodium Thiosulfate Added	No
Adequate Sample Volume	Yes
Appropriate Sample Container	Yes
pH Range of Aqueous Sample	N/A
Anomalies or additional comments:	



Analytical Resources, LLC
Analytical Chemists and Consultants

22 August 2022

Michael Erdahl
Friedman & Bruya Inc.
3012 16th Avenue West
Seattle, WA 98119-2029

RE: 208001 (208001)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
22H0038

Associated SDG ID(s)
N/A

Susan
Dunniho

Digitally signed by Susan
Dunniho
Date: 2022.08.22
14:28:09 -07'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunniho, Director, Client Services

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.





Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-9 0-2.5'	22H0038-01	Solid	27-Jul-2022 09:00	02-Aug-2022 10:30
SRWA-10 3-5'	22H0038-02	Solid	28-Jul-2022 14:10	02-Aug-2022 10:30



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

Work Order Case Narrative

Client: Friedman & Bruya Inc.
Project: 208001
Work Order: 22H0038

Sample receipt

Samples as listed on the preceding page were received 02-Aug-2022 10:30 under ARI work order 22H0038. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Butyl Tin(s) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The batch BKH0105 matrix spike/matrix spike duplicate (MS/MSD) percent recoveries were within limits. The relative percent difference (RPD) was outside advisory control limits for the butyl tin ion and has been flagged on the summary sheet, reported under work order 22H0039.



Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman & Bruyn

Project Name: _____

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 22H0038

Tracking No: 5909 4343 5553 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? _____

YES ☐ NO ☒

Were custody papers included with the cooler? _____

YES ☒ NO ☐

Were custody papers properly filled out (ink, signed, etc.) _____

YES ☒ NO ☐

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1030

6.8

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID# 9705

Cooler Accepted by: HV

Date: 08/02/22

Time: 10:30

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____

YES ☐ NO ☒

What kind of packing material was used? ... Bubble Wrap-Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____

NA ☐ YES ☒ NO ☐

How were bottles sealed in plastic bags? _____

Individually ☐ Grouped ☒ Not ☐

Did all bottles arrive in good condition (unbroken)? _____

YES ☒ NO ☐

Were all bottle labels complete and legible? _____

YES ☒ NO ☐

Did the number of containers listed on COC match with the number of containers received? _____

YES ☒ NO ☐

Did all bottle labels and tags agree with custody papers? _____

YES ☒ NO ☐

Were all bottles used correct for the requested analyses? _____

YES ☒ NO ☐

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...

NA ☒ YES ☐ NO ☐

Were all VOC vials free of air bubbles? _____

NA ☒ YES ☐ NO ☐

Was sufficient amount of sample sent in each bottle? _____

YES ☒ NO ☐

Date VOC Trip Blank was made at ARI: _____

NA ☒

Were the sample(s) split

NA ☒

YES ☐

Date/Time: _____

Equipment: _____

Split by: _____

Samples Logged by: HV Date: 08/02/22 Time: 13:48 Labels checked by: _____

** Notify Project Manager of discrepancies or concerns **

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

MW-9 0-2.5'
22H0038-01 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/27/2022 09:00

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 14:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 22H0038-01 A 01

Preparation Batch: BKH0105

Sample Size: 5.24 g (wet)

Dry Weight: 5.01 g

Prepared: 08/05/2022

Final Volume: 0.5 mL

% Solids: 95.69

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.85	38.5	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.73	5.76	62.7	ug/kg	
Butyltin Ion	78763-54-9	1	1.88	4.07	86.8	ug/kg	
Tetrabutyltin	1461-25-2	1	4.99	4.99	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	84.1	%	
Surrogate: Tripropyltin				30-160 %	69.0	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

SRWA-10 3-5'
22H0038-02 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/28/2022 14:10

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 14:51

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BKH0105
Prepared: 08/05/2022

Sample Size: 5.37 g (wet)
Final Volume: 0.5 mL

Extract ID: 22H0038-02 A 01
Dry Weight: 5.04 g
% Solids: 93.78

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.447	3.83	9.86	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.72	5.74	5.30	ug/kg	J
Butyltin Ion	78763-54-9	1	1.88	4.05	3.76	ug/kg	J
Tetrabutyltin	1461-25-2	1	4.96	4.96	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	90.4	%	
Surrogate: Tripropyltin				30-160 %	71.6	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

Analysis by: Analytical Resources, LLC

Butyl Tins - Quality Control

Batch BKH0105 - EPA 3546 (Microwave)

Instrument: NT12 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKH0105-BLK1) Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 13:59											
Tributyltin Ion	ND	0.450	3.86	ug/kg							U
Dibutyltin Ion	ND	1.73	5.78	ug/kg							U
Butyltin Ion	ND	1.89	4.08	ug/kg							U
Tetrabutyltin	ND	5.00	5.00	ug/kg							U
Surrogate: Triphenyltin	40.6			ug/kg	45.2	90.0		30-160			
Surrogate: Tripropyltin	33.8			ug/kg	43.7	77.3		30-160			
LCS (BKH0105-BS1) Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 14:16											
Tributyltin Ion	32.9	0.450	3.86	ug/kg	44.6	73.8		30-160			
Dibutyltin Ion	35.7	1.73	5.78	ug/kg	38.4	93.1		30-160			
Butyltin Ion	22.9	1.89	4.08	ug/kg	31.2	73.4		30-160			
Surrogate: Triphenyltin	42.2			ug/kg	45.2	93.4		30-160			
Surrogate: Tripropyltin	31.1			ug/kg	43.7	71.0		30-160			



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 8270E-SIM in Solid</i>	
Tributyltin Ion	WADOE,DoD-ELAP,NELAP
Dibutyltin Ion	WADOE,DoD-ELAP,NELAP
Butyltin Ion	WADOE,NELAP
Tetrabutyltin	NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2023



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

Notes and Definitions

D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
J	Estimated concentration value detected below the reporting limit.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

22 August 2022

Michael Erdahl
Friedman & Bruya Inc.
3012 16th Avenue West
Seattle, WA 98119-2029

RE: 207511

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
22H0039

Associated SDG ID(s)
N/A

Susan
Dunnihoo

Digitally signed by
Susan Dunnihoo
Date: 2022.08.22
14:31:55 -07'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunnihoo, Director, Client Services

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.





Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SRWA-13 0-0.5'	22H0039-01	Solid	26-Jul-2022 09:40	02-Aug-2022 10:30
SRWA-14 0-1'	22H0039-02	Solid	26-Jul-2022 10:20	02-Aug-2022 10:30
SRWA-14 1-2'	22H0039-03	Solid	26-Jul-2022 10:30	02-Aug-2022 10:30
SRWA-15 0-0.5'	22H0039-04	Solid	26-Jul-2022 12:30	02-Aug-2022 10:30
SRWA-8 0-1'	22H0039-05	Solid	26-Jul-2022 13:30	02-Aug-2022 10:30
SRWA-9 2.5-5'	22H0039-06	Solid	26-Jul-2022 15:30	02-Aug-2022 10:30
SRWA-9	22H0039-07	Water	26-Jul-2022 15:45	02-Aug-2022 10:30



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Work Order Case Narrative

Client: Friedman & Bruya Inc.
Project: 207511
Work Order: 22H0039

Sample receipt

Samples as listed on the preceding page were received 02-Aug-2022 10:30 under ARI work order 22H0039. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Butyl Tin(s) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The batch BKH0105 matrix spike/matrix spike duplicate (MS/MSD) percent recoveries were within limits. The relative percent difference (RPD) was outside advisory control limits for the butyl tin ion and has been flagged on the summary sheet.



Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman, C. Bump

COC No(s): _____ NA

Assigned ARI Job No: 22H0039

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: 5909 4343 5553 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? _____

YES NO

Were custody papers included with the cooler? _____

YES NO

Were custody papers properly filled out (ink, signed, etc.) _____

YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1030

6.8

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID# 9708

Cooler Accepted by: HN

Date: 08/02/22

Time: 10:30

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____

YES NO

What kind of packing material was used? ... Bubble Wrap-Wet Ice-Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____

NA YES NO

How were bottles sealed in plastic bags? _____

Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? _____

YES NO

Were all bottle labels complete and legible? _____

YES NO

Did the number of containers listed on COC match with the number of containers received? _____

YES NO

Did all bottle labels and tags agree with custody papers? _____

YES NO

Were all bottles used correct for the requested analyses? _____

YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...

NA YES NO

Were all VOC vials free of air bubbles? _____

NA YES NO

Was sufficient amount of sample sent in each bottle? _____

YES NO

Date VOC Trip Blank was made at ARI: _____

NA

Were the sample(s) split by ARI? NA

YES

Date/Time: _____

Equipment: _____

Split by: _____

Samples Logged by: HN

Date: 08/02/22

Time: 14:01

Labels checked by: _____

** Notify Project Manager of discrepancies or concerns **

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
SRWA 0-1	SRWA-8 0-1		

Additional Notes, Discrepancies, & Resolutions:

By: HN

Date: 08/02/22



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-13 0-0.5'
22H0039-01 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/26/2022 09:40

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 15:09

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BKH0105
Prepared: 08/05/2022

Sample Size: 6.86 g (wet)
Final Volume: 0.5 mL

Extract ID: 22H0039-01 A 01
Dry Weight: 5.00 g
% Solids: 72.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.450	3.86	486	ug/kg	E
Dibutyltin Ion	14488-53-0	1	1.73	5.78	79.7	ug/kg	
Butyltin Ion	78763-54-9	1	1.89	4.08	759	ug/kg	E
Tetrabutyltin	1461-25-2	1	5.00	5.00	5.07	ug/kg	
Surrogate: Triphenyltin				30-160 %	111	%	
Surrogate: Tripropyltin				30-160 %	63.3	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-13 0-0.5'
22H0039-01RE1 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT12 Analyst: JZ

Sampled: 07/26/2022 09:40
Analyzed: 08/08/2022 17:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave) Extract ID: 22H0039-01RE1 A 01
Preparation Batch: BKH0105 Sample Size: 6.86 g (wet) Dry Weight: 5.00 g
Prepared: 08/05/2022 Final Volume: 0.5 mL % Solids: 72.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	5	2.25	19.3	508	ug/kg	D
Dibutyltin Ion	14488-53-0	5	8.64	28.9	85.6	ug/kg	D
Butyltin Ion	78763-54-9	5	9.44	20.4	921	ug/kg	D
Tetrabutyltin	1461-25-2	5	25.0	25.0	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	107	%	
Surrogate: Tripropyltin				30-160 %	64.0	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-14 0-1'
22H0039-02 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT12 Analyst: JZ

Sampled: 07/26/2022 10:20
Analyzed: 08/08/2022 15:27

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave) Extract ID: 22H0039-02 A 01
Preparation Batch: BKH0105 Sample Size: 5.67 g (wet) Dry Weight: 5.05 g
Prepared: 08/05/2022 Final Volume: 0.5 mL % Solids: 89.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	I	0.446	3.82	2.18	ug/kg	J
Dibutyltin Ion	14488-53-0	I	1.71	5.72	7.67	ug/kg	
Butyltin Ion	78763-54-9	I	1.87	4.04	11.7	ug/kg	
Tetrabutyltin	1461-25-2	I	4.95	4.95	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	115	%	
Surrogate: Tripropyltin				30-160 %	76.2	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-15 0-0.5'
22H0039-04 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT12 Analyst: JZ

Sampled: 07/26/2022 12:30
Analyzed: 08/08/2022 15:44

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave) Extract ID: 22H0039-04 A 01
Preparation Batch: BKH0105 Sample Size: 5.96 g (wet) Dry Weight: 5.03 g
Prepared: 08/05/2022 Final Volume: 0.5 mL % Solids: 84.35

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.448	3.84	0.624	ug/kg	J
Dibutyltin Ion	14488-53-0	1	1.72	5.75	2.21	ug/kg	J
Butyltin Ion	78763-54-9	1	1.88	4.06	2.83	ug/kg	J
Tetrabutyltin	1461-25-2	1	4.97	4.97	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	98.4	%	
Surrogate: Tripropyltin				30-160 %	60.4	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-8 0-1'
22H0039-05 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT12 Analyst: JZ

Sampled: 07/26/2022 13:30
Analyzed: 08/08/2022 16:02

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave) Extract ID: 22H0039-05 A.01
Preparation Batch: BKH0105 Sample Size: 5.98 g (wet) Dry Weight: 5.00 g
Prepared: 08/05/2022 Final Volume: 0.5 mL % Solids: 83.66

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.450	3.86	7.22	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.73	5.78	6.40	ug/kg	
Butyltin Ion	78763-54-9	1	1.89	4.08	2.59	ug/kg	J
Tetrabutyltin	1461-25-2	1	5.00	5.00	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	84.5	%	
Surrogate: Tripropyltin				30-160 %	61.1	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-9 2.5-5'
22H0039-06 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/26/2022 15:30

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 16:19

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BKH0105
Prepared: 08/05/2022

Sample Size: 5.42 g (wet)
Final Volume: 0.5 mL

Extract ID: 22H0039-06 A 01
Dry Weight: 5.01 g
% Solids: 92.36

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.86	ND	ug/kg	U
Dibutyltin Ion	14488-53-0	1	1.73	5.77	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.89	4.08	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.99	4.99	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	105	%	
Surrogate: Tripropyltin				30-160 %	68.5	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-9
22H0039-07 (Water)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT14 Analyst: VTS

Sampled: 07/26/2022 15:45
Analyzed: 08/09/2022 09:04

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BKH0047
Prepared: 08/02/2022

Sample Size: 150 mL
Final Volume: 0.5 mL

Extract ID: 22H0039-07 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.0052	ND	ug/L	U
Dibutyltin Ion	14488-53-0	1	0.0077	ND	ug/L	U
Butyltin Ion	78763-54-9	1	0.0060	0.0215	ug/L	B
Tetrabutyltin	1461-25-2	1	0.0300	ND	ug/L	U
Surrogate: Triphenyltin			30-160 %	71.7	%	
Surrogate: Tripropyltin			30-160 %	47.2	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Analysis by: Analytical Resources, LLC

Butyl Tins - Quality Control

Batch BKH0047 - EPA 3510C SepF

Instrument: NT14 Analyst: VTS

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKH0047-BLK1) Prepared: 02-Aug-2022 Analyzed: 09-Aug-2022 08:25										
Tributyltin Ion	ND	0.0052	ug/L							U
Dibutyltin Ion	ND	0.0077	ug/L							U
Butyltin Ion	0.0068	0.0060	ug/L							
Tetrabutyltin	ND	0.0300	ug/L							U
Surrogate: Triphenyltin	0.0655		ug/L	0.0753		87.0	30-160			
Surrogate: Tripropyltin	0.0390		ug/L	0.0729		53.4	30-160			
LCS (BKH0047-BS1) Prepared: 02-Aug-2022 Analyzed: 09-Aug-2022 08:50										
Tributyltin Ion	0.0984	0.0052	ug/L	0.149		66.3	30-160			
Dibutyltin Ion	0.118	0.0077	ug/L	0.128		92.0	30-160			
Butyltin Ion	0.0597	0.0060	ug/L	0.104		57.5	30-160			B
Surrogate: Triphenyltin	0.0695		ug/L	0.0753		92.3	30-160			
Surrogate: Tripropyltin	0.0446		ug/L	0.0729		61.1	30-160			
Matrix Spike (BKH0047-MS1) Source: 22H0039-07 Prepared: 02-Aug-2022 Analyzed: 09-Aug-2022 09:18										
Tributyltin Ion	0.0978	0.0057	ug/L	0.163	ND	60.1	30-160			
Dibutyltin Ion	0.120	0.0084	ug/L	0.140	ND	85.4	30-160			
Butyltin Ion	0.0956	0.0066	ug/L	0.114	0.0215	65.2	30-160			B
Surrogate: Triphenyltin	0.0693		ug/L	0.0824	0.0540	84.1	30-160			
Surrogate: Tripropyltin	0.0419		ug/L	0.0798	0.0344	52.5	30-160			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BKH0047-MSD1) Source: 22H0039-07 Prepared: 02-Aug-2022 Analyzed: 09-Aug-2022 09:32										
Tributyltin Ion	0.0891	0.0057	ug/L	0.163	ND	54.8	30-160	9.32	30	
Dibutyltin Ion	0.111	0.0084	ug/L	0.140	ND	79.2	30-160	7.53	30	
Butyltin Ion	0.0868	0.0066	ug/L	0.114	0.0215	57.5	30-160	9.59	30	B
Surrogate: Triphenyltin	0.0622		ug/L	0.0824	0.0540	75.4	30-160			
Surrogate: Tripropyltin	0.0371		ug/L	0.0798	0.0344	46.5	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Analysis by: Analytical Resources, LLC

Butyl Tins - Quality Control

Batch BKH0105 - EPA 3546 (Microwave)

Instrument: NT12 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKH0105-BLK1) Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 13:59											
Tributyltin Ion	ND	0.450	3.86	ug/kg							U
Dibutyltin Ion	ND	1.73	5.78	ug/kg							U
Butyltin Ion	ND	1.89	4.08	ug/kg							U
Tetrabutyltin	ND	5.00	5.00	ug/kg							U
Surrogate: Triphenyltin	40.6			ug/kg	45.2		90.0	30-160			
Surrogate: Tripropyltin	33.8			ug/kg	43.7		77.3	30-160			
LCS (BKH0105-BS1) Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 14:16											
Tributyltin Ion	32.9	0.450	3.86	ug/kg	44.6		73.8	30-160			
Dibutyltin Ion	35.7	1.73	5.78	ug/kg	38.4		93.1	30-160			
Butyltin Ion	22.9	1.89	4.08	ug/kg	31.2		73.4	30-160			
Surrogate: Triphenyltin	42.2			ug/kg	45.2		93.4	30-160			
Surrogate: Tripropyltin	31.1			ug/kg	43.7		71.0	30-160			
Matrix Spike (BKH0105-MS1) Source: 22H0039-06 Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 16:37											
Tributyltin Ion	29.7	0.449	3.86	ug/kg	44.5	ND	66.7	30-160			
Dibutyltin Ion	36.5	1.73	5.77	ug/kg	38.3	ND	95.3	30-160			
Butyltin Ion	22.6	1.89	4.08	ug/kg	31.1	ND	72.6	30-160			
Surrogate: Triphenyltin	47.4			ug/kg	45.1	47.5	105	30-160			
Surrogate: Tripropyltin	27.5			ug/kg	43.7	29.9	62.9	30-160			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BKH0105-MSD1) Source: 22H0039-06 Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 16:54											
Tributyltin Ion	29.3	0.449	3.86	ug/kg	44.5	ND	65.9	30-160	1.22	30	
Dibutyltin Ion	33.1	1.73	5.77	ug/kg	38.3	ND	86.4	30-160	9.78	30	
Butyltin Ion	11.9	1.89	4.08	ug/kg	31.1	ND	38.4	30-160	61.70	30	*
Surrogate: Triphenyltin	44.5			ug/kg	45.1	47.5	98.5	30-160			
Surrogate: Tripropyltin	23.1			ug/kg	43.7	29.9	52.9	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Certified Analyses included in this Report

Analyte	Certifications
EPA 8270E-SIM in Solid	
Tributyltin Ion	WADOE, DoD-ELAP, NELAP
Dibutyltin Ion	WADOE, DoD-ELAP, NELAP
Butyltin Ion	WADOE, NELAP
Tetrabutyltin	NELAP
EPA 8270E-SIM in Water	
Tributyltin Ion	NELAP, WADOE, DoD-ELAP
Dibutyltin Ion	NELAP, WADOE, DoD-ELAP
Butyltin Ion	NELAP, WADOE, DoD-ELAP
Tetrapentyltin	NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2023



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Notes and Definitions

- * Flagged value is not within established control limits.
- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- J Estimated concentration value detected below the reporting limit.
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 29, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 1, 2022 from the Port of Friday Harbor Jensen's Marina RI, F&BI 208001 project. There are 86 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: Grant Hainsworth, Jamie Stevens, Peter Leon (peter@leon-environmental.com)
CTC0829R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 1, 2022 by Friedman & Bruya, Inc. from the Crete Consulting Port of Friday Harbor Jensen's Marina RI, F&BI 208001 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
208001 -01	BLWA-13 0-2'
208001 -02	BLWA-13 3-5 '
208001 -03	BLWA-13 5-8'
208001 -04	BLWA-13 8-9'
208001 -05	BLWA-13
208001 -06	MW-9 0-2.5'
208001 -07	MW-9 2.5-5'
208001 -08	MW-9 5-7'
208001 -09	MW-7 2-3'
208001 -10	MW-7 3-5'
208001 -11	MW-7 10-11'
208001 -12	SYC-7 0-1'
208001 -13	SYC-6 0-1'
208001 -14	SYC-5 0-1'
208001 -15	BLWA-10 0-1'
208001 -16	BLWA-10 1-3'
208001 -17	BLWA-10 3-5'
208001 -18	BLWA-10 5-6'
208001 -19	MW-8 2-3'
208001 -20	MW-8 4-5'
208001 -21	MW-8 5-7'
208001 -22	AST-3 2-4'
208001 -23	AST-3 5-7'
208001 -24	AST-3 8-10'
208001 -25	AST-3
208001 -26	SRWA-12 0-1'
208001 -27	SRWA-12 2-3'
208001 -28	SRWA-12 4-5'
208001 -29	SRWA-10 3-5'
208001 -30	SRWA-10 5-7.5'
208001 -31	SRWA-10 7.5-10'
208001 -32	SRWA-10
208001 -33	AST-4 1-2'
208001 -34	AST-4 2.5-3'
208001 -35	AST-4 4-5'

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE (continued)

Samples MW-9 0-2.5' and SRWA-10 3-5' were sent to Frontier Analytical for dioxin and furan analysis and to ARL for tributyltin analysis. The reports are enclosed.

Mercury in the 1631E matrix spike and matrix spike duplicate failed the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect.

The 8081B matrix spike and matrix spike duplicate failed the relative percent difference for several pesticides. The analytes were not detected therefore the data were acceptable.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/03/22, 08/05/22, 08/08/22 and 08/11/22

Date Analyzed: 08/04/22, 08/08/22, 08/09/22 and 08/11/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
BLWA-13 0-2' 208001-01	<5	113
MW-9 0-2.5' 208001-06	<5	103
MW-7 3-5' 208001-10	<5	102
BLWA-10 3-5' 208001-17	7.0	96
MW-8 4-5' 208001-20	<5	109
AST-3 5-7' 208001-23	<5	98
SRWA-10 3-5' 208001-29	<5	115
AST-4 1-2' 208001-33	37	108
AST-4 4-5' 208001-35	<5	101
Method Blank 02-1719 MB	<5	111
Method Blank 02-1723 MB2	<5	93

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/03/22, 08/05/22, 08/08/22 and 08/11/22

Date Analyzed: 08/04/22, 08/08/22, 08/09/22 and 08/11/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 50-150)
Method Blank 02-1725 MB	<5	102
Method Blank 02-1730 MB	<5	91

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/09/22

Date Analyzed: 08/09/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 50-150)
BLWA-13 208001-05	<100	101
AST-3 208001-25	<100	101
Method Blank 02-1724 MB	<100	107

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/03/22, 08/05/22, 08/08/22 and 08/12/22

Date Analyzed: 08/03/22, 08/05/22, 08/08/22 and 08/12/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 48-168)
BLWA-13 0-2' 208001-01	<50	<250	108
MW-9 0-2.5' 208001-06	<50	<250	110
MW-7 3-5' 208001-10	<50	<250	113
BLWA-10 3-5' 208001-17	<50	<250	113
MW-8 4-5' 208001-20	61 x	440	109
AST-3 5-7' 208001-23	<50	<250	111
SRWA-10 3-5' 208001-29	<50	<250	112
AST-4 1-2' 208001-33	5,300	2,200	118
AST-4 4-5' 208001-35	<50	<250	106
Method Blank 02-1879 MB	<50	<250	108

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/03/22, 08/05/22, 08/08/22 and 08/12/22

Date Analyzed: 08/03/22, 08/05/22, 08/08/22 and 08/12/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
Method Blank 02-1898 MB	<50	<250	109
Method Blank 02-1905 MB	<50	<250	111
Method Blank 02-1986 MB	<50	<250	103

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/04/22

Date Analyzed: 08/04/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx
Sample Extracts Passed Through a
Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 47-140)
BLWA-13 208001-05	<50	<250	89
AST-3 208001-25	<50	<250	95
Method Blank 02-1884 MB	<50	<250	103

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/03/22

Date Analyzed: 08/03/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 41-152)
BLWA-13 208001-05	<50	<250	85
AST-3 208001-25	290 x	<250	97
Method Blank 02-1884 MB	<50	<250	105

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-13 0-2'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-01
Date Analyzed:	08/02/22	Data File:	208001-01.160
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.48
Cadmium	<1
Chromium	9.97
Lead	57.8
Zinc	140

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-13 0-2'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-01 x5
Date Analyzed:	08/03/22	Data File:	208001-01 x5.211
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Copper	295
--------	-----

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-13 3-5 '	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-02
Date Analyzed:	08/11/22	Data File:	208001-02.076
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	1.85
Cadmium	<1
Chromium	8.82
Copper	20.9
Lead	1.79
Zinc	17.9

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-9 0-2.5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-06
Date Analyzed:	08/02/22	Data File:	208001-06.188
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.59
Cadmium	<1
Chromium	8.69
Copper	173
Lead	35.0
Zinc	83.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-9 2.5-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-07
Date Analyzed:	08/11/22	Data File:	208001-07.077
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	1.21
Cadmium	<1
Chromium	4.60
Copper	24.1
Lead	5.17
Zinc	32.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-9 5-7'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/22/22	Lab ID:	208001-08
Date Analyzed:	08/22/22	Data File:	208001-08.069
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.29
Cadmium	<1
Chromium	7.63
Copper	80.7
Lead	165
Nickel	7.33
Zinc	67.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-7 2-3'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-09
Date Analyzed:	08/02/22	Data File:	208001-09.189
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	1.59
Cadmium	<1
Chromium	8.50
Copper	15.9
Lead	1.84
Zinc	18.0

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-7 3-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-10
Date Analyzed:	08/02/22	Data File:	208001-10.190
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	1.98
Cadmium	<1
Chromium	8.82
Copper	18.5
Lead	5.45
Zinc	54.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-7 10-11'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/22/22	Lab ID:	208001-11
Date Analyzed:	08/22/22	Data File:	208001-11.070
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	4.01
Cadmium	<1
Chromium	10.3
Copper	39.3
Lead	70.8
Nickel	13.7
Zinc	61.9

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SYC-7 0-1'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-12
Date Analyzed:	08/02/22	Data File:	208001-12.191
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	5.75
Cadmium	<1
Chromium	11.4
Copper	143
Lead	56.0
Zinc	91.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SYC-6 0-1'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-13
Date Analyzed:	08/02/22	Data File:	208001-13.192
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.21
Cadmium	<1
Chromium	10.5
Copper	60.7
Lead	22.2
Zinc	68.3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SYC-5 0-1'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-14
Date Analyzed:	08/02/22	Data File:	208001-14.193
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.98
Cadmium	<1
Chromium	9.92
Copper	32.2
Lead	4.62
Zinc	24.6

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-10 0-1'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-15
Date Analyzed:	08/03/22	Data File:	208001-15.196
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.70
Cadmium	<1
Chromium	11.4
Lead	73.3
Zinc	92.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-10 0-1'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/03/22	Lab ID:	208001-15 x5
Date Analyzed:	08/03/22	Data File:	208001-15 x5.070
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Copper	350
--------	-----

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-10 3-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/08/22	Lab ID:	208001-17
Date Analyzed:	08/08/22	Data File:	208001-17.108
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<5
Cadmium	<1
Chromium	16.3
Copper	54.2
Lead	98.1
Zinc	58.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-10 5-6'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-18
Date Analyzed:	08/11/22	Data File:	208001-18.078
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.41
Cadmium	<1
Lead	94.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	BLWA-10 5-6'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-18 x5
Date Analyzed:	08/11/22	Data File:	208001-18 x5.102
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Chromium	8.90
Copper	112
Zinc	65.3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-8 4-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-20
Date Analyzed:	08/03/22	Data File:	208001-20.197
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.08
Cadmium	<1
Chromium	10.4
Copper	58.3
Lead	64.9
Zinc	156

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-8 5-7'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-21
Date Analyzed:	08/11/22	Data File:	208001-21.081
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.44
Cadmium	<1
Lead	2.47

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	MW-8 5-7'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-21 x5
Date Analyzed:	08/11/22	Data File:	208001-21 x5.103
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Chromium	9.43
Copper	43.6
Zinc	31.9

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	AST-3 5-7'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-23
Date Analyzed:	08/03/22	Data File:	208001-23.198
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	4.56
Cadmium	2.01
Chromium	17.1
Copper	110
Lead	73.9
Zinc	47.0

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	AST-3 8-10'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-24
Date Analyzed:	08/11/22	Data File:	208001-24.082
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	4.84
Cadmium	<1
Chromium	9.30
Copper	8.66
Lead	1.67
Zinc	22.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-10 3-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-29
Date Analyzed:	08/03/22	Data File:	208001-29.199
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	6.30
Cadmium	<1
Lead	16.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-10 3-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/03/22	Lab ID:	208001-29 x2
Date Analyzed:	08/03/22	Data File:	208001-29 x2.071
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Chromium	12.1
Copper	34.1
Zinc	51.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-10 5-7.5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-30
Date Analyzed:	08/11/22	Data File:	208001-30.083
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	1.71
Cadmium	<1
Chromium	12.2
Copper	14.3
Lead	2.68
Zinc	35.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	AST-4 1-2'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-33
Date Analyzed:	08/03/22	Data File:	208001-33.200
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.05
Cadmium	<1
Chromium	9.27
Copper	53.3
Lead	95.4
Zinc	91.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	AST-4 4-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	208001-35
Date Analyzed:	08/11/22	Data File:	208001-35.084
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	1.62
Cadmium	<1
Chromium	7.15
Copper	17.8
Lead	3.02
Zinc	20.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	I2-523 mb
Date Analyzed:	08/02/22	Data File:	I2-523 mb.117
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/08/22	Lab ID:	I2-538 mb
Date Analyzed:	08/08/22	Data File:	I2-538 mb.053
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<5
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/11/22	Lab ID:	I2-547 mb
Date Analyzed:	08/11/22	Data File:	I2-547 mb.058
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/22/22	Lab ID:	I2-569 mb
Date Analyzed:	08/22/22	Data File:	I2-569 mb.047
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Nickel	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/04/22, 08/11/22, and 08/22/22

Date Analyzed: 08/04/22, 08/15/22, 08/16/22, and 08/23/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
BLWA-13 0-2' 208001-01	0.28
BLWA-13 3-5 ' 208001-02	<0.1
MW-9 0-2.5' 208001-06	0.12
MW-9 2.5-5' 208001-07	<0.1
MW-9 5-7' 208001-08	0.22
MW-7 2-3' 208001-09	<0.1
MW-7 3-5' 208001-10	<0.1
MW-7 10-11' 208001-11	<0.1
SYC-7 0-1' 208001-12	0.40
SYC-6 0-1' 208001-13	0.68
SYC-5 0-1' 208001-14	0.14

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/04/22, 08/11/22, and 08/22/22

Date Analyzed: 08/04/22, 08/15/22, 08/16/22, and 08/23/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
BLWA-10 0-1' 208001-15	<0.1
BLWA-10 3-5' 208001-17	<0.1
BLWA-10 5-6' 208001-18	<0.1
MW-8 4-5' 208001-20	0.23
MW-8 5-7' 208001-21	<0.1
AST-3 5-7' 208001-23	0.20
AST-3 8-10' 208001-24	<0.1
SRWA-10 3-5' 208001-29	<0.1
SRWA-10 5-7.5' 208001-30	<0.1
AST-4 1-2' 208001-33	0.16
AST-4 4-5' 208001-35	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

Date Extracted: 08/04/22, 08/11/22, and 08/22/22

Date Analyzed: 08/04/22, 08/15/22, 08/16/22, and 08/23/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
Method Blank i2-531 MB	<0.1
Method Blank i2-538 MB	<0.1
Method Blank i2-547 MB	<0.1
Method Blank i2-569 MB	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	BLWA-13 0-2'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-01 1/25
Date Analyzed:	08/03/22	Data File:	080310.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	79 d	24	111
Phenol-d6	91 d	37	116
Nitrobenzene-d5	89 d	38	117
2-Fluorobiphenyl	108 d	45	117
2,4,6-Tribromophenol	100 d	11	158
Terphenyl-d14	116 d	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.094
Chrysene	0.17
Benzo(a)pyrene	0.10
Benzo(b)fluoranthene	0.23
Benzo(k)fluoranthene	0.075
Indeno(1,2,3-cd)pyrene	0.089
Dibenz(a,h)anthracene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW-9 0-2.5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/08/22	Lab ID:	208001-06 1/5
Date Analyzed:	08/09/22	Data File:	080910.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	52	39	103
Phenol-d6	64	48	109
Nitrobenzene-d5	58	23	138
2-Fluorobiphenyl	72	50	150
2,4,6-Tribromophenol	82	40	127
Terphenyl-d14	85	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.013
Chrysene	0.032
Benzo(a)pyrene	0.034
Benzo(b)fluoranthene	0.067
Benzo(k)fluoranthene	0.017
Indeno(1,2,3-cd)pyrene	0.015
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW-7 3-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/08/22	Lab ID:	208001-10 1/5
Date Analyzed:	08/09/22	Data File:	080911.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	54	39	103
Phenol-d6	69	48	109
Nitrobenzene-d5	62	23	138
2-Fluorobiphenyl	75	50	150
2,4,6-Tribromophenol	86	40	127
Terphenyl-d14	84	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	BLWA-10 0-1'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-15 1/5
Date Analyzed:	08/03/22	Data File:	080308.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	82	24	111
Phenol-d6	92	37	116
Nitrobenzene-d5	91	38	117
2-Fluorobiphenyl	97	45	117
2,4,6-Tribromophenol	103	11	158
Terphenyl-d14	107	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.048
Chrysene	0.12
Benzo(a)pyrene	0.050
Benzo(b)fluoranthene	0.14
Benzo(k)fluoranthene	0.039
Indeno(1,2,3-cd)pyrene	0.047
Dibenz(a,h)anthracene	0.011

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW-8 4-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/08/22	Lab ID:	208001-20 1/25
Date Analyzed:	08/09/22	Data File:	080913.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	57 d	39	103
Phenol-d6	68 d	48	109
Nitrobenzene-d5	65 d	23	138
2-Fluorobiphenyl	76d	50	150
2,4,6-Tribromophenol	82 d	40	127
Terphenyl-d14	90 d	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.05
Chrysene	<0.05
Benzo(a)pyrene	<0.05
Benzo(b)fluoranthene	<0.05
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	SRWA-10 3-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	208001-29 1/5
Date Analyzed:	08/03/22	Data File:	080309.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	84	24	111
Phenol-d6	100	37	116
Nitrobenzene-d5	90	38	117
2-Fluorobiphenyl	102	45	117
2,4,6-Tribromophenol	115	11	158
Terphenyl-d14	110	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.024
Chrysene	0.034
Benzo(a)pyrene	0.036
Benzo(b)fluoranthene	0.053
Benzo(k)fluoranthene	0.017
Indeno(1,2,3-cd)pyrene	0.026
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/02/22	Lab ID:	02-1877 mb 1/5
Date Analyzed:	08/02/22	Data File:	080209.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	88	24	111
Phenol-d6	99	37	116
Nitrobenzene-d5	85	38	117
2-Fluorobiphenyl	110	45	117
2,4,6-Tribromophenol	110	11	158
Terphenyl-d14	115	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/08/22	Lab ID:	02-1903 mb 1/5
Date Analyzed:	08/08/22	Data File:	080807.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	85	24	111
Phenol-d6	96	37	116
Nitrobenzene-d5	84	38	117
2-Fluorobiphenyl	94	45	117
2,4,6-Tribromophenol	89	11	158
Terphenyl-d14	94	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	BLWA-13	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/03/22	Lab ID:	208001-05
Date Analyzed:	08/03/22	Data File:	080321.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	43	10	60
Phenol-d6	36	10	49
Nitrobenzene-d5	83	15	144
2-Fluorobiphenyl	88	25	128
2,4,6-Tribromophenol	94	10	142
Terphenyl-d14	100	41	138

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	0.068
Chrysene	0.069
Benzo(a)pyrene	0.080
Benzo(b)fluoranthene	0.13
Benzo(k)fluoranthene	0.043
Indeno(1,2,3-cd)pyrene	0.074
Dibenz(a,h)anthracene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/03/22	Lab ID:	02-1866 mb2
Date Analyzed:	08/03/22	Data File:	080319.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	45	10	60
Phenol-d6	31	10	49
Nitrobenzene-d5	92	15	144
2-Fluorobiphenyl	89	25	128
2,4,6-Tribromophenol	91	10	142
Terphenyl-d14	98	41	138

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	MW-9 0-2.5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/10/22	Lab ID:	208001-06 1/6
Date Analyzed:	08/10/22	Data File:	081015.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	90	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	0.022
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	MW-7 3-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/10/22	Lab ID:	208001-10 1/6
Date Analyzed:	08/10/22	Data File:	081016.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	88	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	MW-8 4-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/10/22	Lab ID:	208001-20 1/6
Date Analyzed:	08/10/22	Data File:	081017.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	101	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	0.14
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/10/22	Lab ID:	02-1911 mb 1/6
Date Analyzed:	08/10/22	Data File:	081004.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower	Upper
TCMX	99	Limit:	Limit:
		23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	MW-9 0-2.5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/03/22	Lab ID:	208001-06 1/6
Date Analyzed:	08/03/22	Data File:	080320.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	77	41	106
DBC	90	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	<0.01
Endosulfan II	<0.01
4,4'-DDT	<0.01
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	SRWA-10 3-5'	Client:	Crete Consulting
Date Received:	08/01/22	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/03/22	Lab ID:	208001-29 1/6
Date Analyzed:	08/03/22	Data File:	080321.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	58	41	106
DBC	84	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	<0.01
Endosulfan II	<0.01
4,4'-DDT	<0.01
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Jensen's Marina RI, F&BI 208001
Date Extracted:	08/03/22	Lab ID:	02-1880 mb 1/6
Date Analyzed:	08/03/22	Data File:	080314.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	89	41	106
DBC	103	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	<0.01
Endosulfan II	<0.01
4,4'-DDT	<0.01
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 208016-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 208052-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	200	160	22 hr

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	90	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 208068-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 208001-35 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	120	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 208053-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	107	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 208032-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	108	108	73-135	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	106	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 207201-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	106	106	63-146	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	114	79-144

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 208102-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	110	112	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	114	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 208001-35 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	120	113	114	73-135	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	116	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	100	116	61-133	15

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	116	116	63-142	0

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 208001-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	3.30	95	95	75-125	0
Cadmium	mg/kg (ppm)	10	<1	97	93	75-125	4
Chromium	mg/kg (ppm)	50	9.47	78	78	75-125	0
Copper	mg/kg (ppm)	50	214	18 b	113	75-125	145 b
Lead	mg/kg (ppm)	50	54.9	70 b	117	75-125	50 b
Zinc	mg/kg (ppm)	50	133	54 b	115	75-125	72 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	94	80-120
Cadmium	mg/kg (ppm)	10	93	80-120
Chromium	mg/kg (ppm)	50	100	80-120
Copper	mg/kg (ppm)	50	101	80-120
Lead	mg/kg (ppm)	50	100	80-120
Zinc	mg/kg (ppm)	50	99	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 208068-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	35.6	70 b	166 b	75-125	81 b
Cadmium	mg/kg (ppm)	10	82.0	0 b	383 b	75-125	200 b
Chromium	mg/kg (ppm)	50	98.9	15 b	93	75-125	144 b
Copper	mg/kg (ppm)	50	15,900	0 b	0 b	75-125	0 b
Lead	mg/kg (ppm)	50	33,700	0 b	0 b	75-125	0 b
Zinc	mg/kg (ppm)	50	31,200	0 b	0 b	75-125	0 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	100	80-120
Cadmium	mg/kg (ppm)	10	95	80-120
Chromium	mg/kg (ppm)	50	100	80-120
Copper	mg/kg (ppm)	50	99	80-120
Lead	mg/kg (ppm)	50	103	80-120
Zinc	mg/kg (ppm)	50	100	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 208153-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.47	92	95	75-125	3
Cadmium	mg/kg (ppm)	10	<1	104	105	75-125	1
Chromium	mg/kg (ppm)	50	13.2	88	87	75-125	1
Copper	mg/kg (ppm)	50	10.1	87	86	75-125	1
Lead	mg/kg (ppm)	50	2.50	103	103	75-125	0
Zinc	mg/kg (ppm)	50	19.5	83	84	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	87	80-120
Cadmium	mg/kg (ppm)	10	100	80-120
Chromium	mg/kg (ppm)	50	102	80-120
Copper	mg/kg (ppm)	50	104	80-120
Lead	mg/kg (ppm)	50	102	80-120
Zinc	mg/kg (ppm)	50	102	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 208306-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	106	99	75-125	7
Cadmium	mg/kg (ppm)	10	<5	102	97	75-125	5
Chromium	mg/kg (ppm)	50	10.4	108	98	75-125	10
Copper	mg/kg (ppm)	50	<25	110	97	75-125	13
Lead	mg/kg (ppm)	50	<5	111	103	75-125	7
Nickel	mg/kg (ppm)	25	10.1	118	96	75-125	21 b
Zinc	mg/kg (ppm)	50	30.7	110	94	75-125	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	92	80-120
Cadmium	mg/kg (ppm)	10	95	80-120
Chromium	mg/kg (ppm)	50	102	80-120
Copper	mg/kg (ppm)	50	103	80-120
Lead	mg/kg (ppm)	50	102	80-120
Nickel	mg/kg (ppm)	25	102	80-120
Zinc	mg/kg (ppm)	50	103	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 208001-01(Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	0.282	77	91	71-125	17

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	122	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 208153-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	5	0.11	136 vo	133 vo	71-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	5	123	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 208068-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	5	0.38	173 vo	132 vo	71-125	27 vo

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	5	113	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 208306-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	6.4	114	33 b	71-125	110 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	69	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 208007-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	101	91	50-150	10
Chrysene	mg/kg (ppm)	0.83	<0.01	100	89	50-150	12
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	103	92	50-150	11
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	102	88	50-150	15
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	105	91	50-150	14
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	117	113	41-134	3
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	114	111	44-130	3

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.83	99	70-130
Chrysene	mg/kg (ppm)	0.83	99	70-130
Benzo(a)pyrene	mg/kg (ppm)	0.83	99	68-120
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	102	69-125
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	106	70-130
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	110	67-129
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	109	67-128

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 208090-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	94	99	50-150	5
Chrysene	mg/kg (ppm)	0.83	<0.01	92	97	50-150	5
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	95	98	50-150	3
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	91	94	50-150	3
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	96	99	50-150	3
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	111	117	41-134	5
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	112	119	44-130	6

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.83	101	70-130
Chrysene	mg/kg (ppm)	0.83	99	70-130
Benzo(a)pyrene	mg/kg (ppm)	0.83	102	68-120
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	101	69-125
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	100	70-130
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	119	67-129
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	122	67-128

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	ug/L (ppb)	5	95	93	70-130	2
Chrysene	ug/L (ppb)	5	96	94	70-130	2
Benzo(a)pyrene	ug/L (ppb)	5	96	96	70-130	0
Benzo(b)fluoranthene	ug/L (ppb)	5	98	99	70-130	1
Benzo(k)fluoranthene	ug/L (ppb)	5	93	94	70-130	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	105	102	70-130	3
Dibenz(a,h)anthracene	ug/L (ppb)	5	106	101	70-130	5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
POLYCHLORINATED BIPHENYLS AS
AROCOR 1016/1260 BY EPA METHOD 8082A**

Laboratory Code: 208130-03 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Control Limits	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	<0.02	104	98	29-125	6
Aroclor 1260	mg/kg (ppm)	0.25	<0.02	106	100	25-137	6

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	104	55-137
Aroclor 1260	mg/kg (ppm)	0.25	108	51-150

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR ORGANOCHLORINE PESTICIDES BY EPA METHOD 8081B

Laboratory Code: 208007-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
alpha-BHC	mg/kg (ppm)	0.1	<0.01	47	77	45-111	48 vo
gamma-BHC (Lindane)	mg/kg (ppm)	0.1	<0.01	53	81	50-117	42 vo
beta-BHC	mg/kg (ppm)	0.1	<0.01	64	83	49-109	26 vo
delta-BHC	mg/kg (ppm)	0.1	<0.01	64	80	39-114	22 vo
Heptachlor	mg/kg (ppm)	0.1	<0.01	52	79	40-131	41 vo
Aldrin	mg/kg (ppm)	0.1	<0.01	55	82	44-121	39 vo
Heptachlor Epoxide	mg/kg (ppm)	0.1	<0.01	66	83	46-122	23 vo
trans-Chlordane	mg/kg (ppm)	0.1	<0.01	70	84	41-129	18
cis-Chlordane	mg/kg (ppm)	0.1	<0.01	71	83	44-120	16
4,4'-DDE	mg/kg (ppm)	0.1	<0.01	76	85	41-118	11
Endosulfan I	mg/kg (ppm)	0.1	<0.01	69	83	45-124	18
Dieldrin	mg/kg (ppm)	0.1	<0.01	75	89	45-130	17
Endrin	mg/kg (ppm)	0.1	<0.01	80	94	50-140	16
4,4'-DDD	mg/kg (ppm)	0.1	<0.01	96	99	26-155	3
Endosulfan II	mg/kg (ppm)	0.1	<0.01	78	86	40-135	10
4,4'-DDT	mg/kg (ppm)	0.1	<0.01	59	73	39-123	21 vo
Endrin Aldehyde	mg/kg (ppm)	0.1	<0.01	51	74	35-139	37 vo
Methoxychlor	mg/kg (ppm)	0.1	<0.01	75	87	28-162	15
Endosulfan Sulfate	mg/kg (ppm)	0.1	<0.01	78	85	40-141	9
Endrin Ketone	mg/kg (ppm)	0.1	<0.05	78	83	41-147	6
Toxaphene	mg/kg (ppm)	4	<1	92	83	36-133	10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/29/22

Date Received: 08/01/22

Project: Port of Friday Harbor Jensen's Marina RI, F&BI 208001

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
ORGANOCHLORINE PESTICIDES
BY EPA METHOD 8081B**

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
alpha-BHC	mg/kg (ppm)	0.1	86	58-117
gamma-BHC (Lindane)	mg/kg (ppm)	0.1	89	60-121
beta-BHC	mg/kg (ppm)	0.1	91	66-120
delta-BHC	mg/kg (ppm)	0.1	89	67-124
Heptachlor	mg/kg (ppm)	0.1	90	58-131
Aldrin	mg/kg (ppm)	0.1	90	63-124
Heptachlor Epoxide	mg/kg (ppm)	0.1	89	67-123
trans-Chlordane	mg/kg (ppm)	0.1	91	60-123
cis-Chlordane	mg/kg (ppm)	0.1	93	70-130
4,4'-DDE	mg/kg (ppm)	0.1	95	70-130
Endosulfan I	mg/kg (ppm)	0.1	92	62-124
Dieldrin	mg/kg (ppm)	0.1	96	70-130
Endrin	mg/kg (ppm)	0.1	112	56-147
4,4'-DDD	mg/kg (ppm)	0.1	105	54-137
Endosulfan II	mg/kg (ppm)	0.1	94	42-140
4,4'-DDT	mg/kg (ppm)	0.1	103	25-169
Endrin Aldehyde	mg/kg (ppm)	0.1	75	21-135
Methoxychlor	mg/kg (ppm)	0.1	116	44-160
Endosulfan Sulfate	mg/kg (ppm)	0.1	95	39-148
Endrin Ketone	mg/kg (ppm)	0.1	95	46-134
Toxaphene	mg/kg (ppm)	4	118	56-145

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation

SAMPLE CHAIN OF CUSTODY

8/11/22 - CI3/1501/B12/1503/1W6
Page # 4 of 4

208001
Report To: Jerry, Hartsworth, Stevens, P. Leon
Company: Crete Consulting / Leon Environmental
Address: _____
City, State, ZIP: _____
Phone: _____ Email: _____

SAMPLERS (signature) <u>R. Jones</u>		PROJECT NAME <u>Port of Friday Harbor Tensen's Marina R.T.</u>	PO #
REMARKS		INVOICE TO <u>Leon Environmental</u>	
Project specific RIs? - Yes / No			

TURNAROUND TIME <input checked="" type="checkbox"/> Standard turnaround <input type="checkbox"/> RUSH Rush charges authorized by: _____	SAMPLE DISPOSAL <input type="checkbox"/> Archive samples <input type="checkbox"/> Other Default: Dispose after 30 days
--	---

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Metals * (see list)	TBT	D/F	Pesticides	Notes
BLWA-13 0-2'	01 A-F	7.27.22	0740	soil	6	X	X				X		X				pe 25 8/3/22 me
BLWA-13 3-5'	02		0750		1												pe 25 8/3/22 me
BLWA-13 5-8'	03		0800		1												pe 25 8/3/22 me
BLWA-13 8-9'	04		0810	↓	1												pe 25 8/3/22 me
BLWA-13	05 A-F		0810	water	7												pe 25 8/3/22 me
MW-9 0-2.5'	06 1		0900	soil	7	X	X										pe 25 8/3/22 me
MW-9 2.5-5'	07 A-B		0910	↓	2												pe 25 8/3/22 me
MW-9 5-7'	08		0915	↓	1												pe 25 8/3/22 me
MW-7 2-3'	09		1250	soil	1												pe 25 8/3/22 me
MW-7 3-5'	10 A-F	↓	1305	↓	6												pe 25 8/3/22 me

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>R. Jones</u>		Fusty Jones		CRETE		8/11/22	0947
Received by: <u>W. Madden</u>		W. Madden		F+BT		8/11/22	0947
Relinquished by:							
Received by:				Samples received at 0°C			

Friedman & Bruya, Inc.
Ph (206) 285-8282

SAMPLE CHAIN OF CUSTODY

Report # 208001 Crete + Leon

Company Crete Consulting / Leon Environmental
Address _____
City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) <u>P. Jones</u>		PO #
PROJECT NAME <u>Port of Friday Harbor</u>		
REMARKS <u>Tensen's Marina RI</u>		
INVOICE TO <u>Leon Env.</u>		
Project specific RLS? - Yes / No		

8/11/22 CI 31521/031145
Page # 2 of 4

TURNAROUND TIME
Standard turnaround
RUSH
Rush charges authorized by: _____

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Metals <u>(see list)</u>	TBT	D/F	Pesticides	Notes
MW-7 10-11'	11	7.27.22	1315	Soil	1								<input checked="" type="checkbox"/>				
SYC-7 0-1'	12		1530	Soil	1												
SYC-6 0-1'	13		1540	Soil	1												
SYC-5 0-1'	14		1550	Soil	1												
BLWA-10 0-1'	15	7.28.22	0740	Soil	1												
BLWA-10 1-3'	16		0745	Soil	1												
BLWA-10 3-5'	17A-E		0750	Soil	5												
BLWA-10 5-6'	18		0755	Soil	1												
MW-8 2-3'	19		0855	Soil	1												
MW-8 4-5'	20A-E		0900	Soil	4												

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>P. Jones</u>		<u>P. Jones</u>		<u>CRETE</u>		8/11/2022	0947
Received by: <u>W. Madden</u>		<u>W. Madden</u>		<u>FBI</u>		8/11/22	0947
Relinquished by:							
Received by:							

Samples received at 2000

SAMPLE CHAIN OF CUSTODY

8/11/22

208001

Report To C. KETE & LEON

Company Cete Consulting / Leon Environmental

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)
Rush Jones

PROJECT NAME
Port of Friday Harbor

PO #

REMARKS

INVOICE TO

Project specific RLS? Yes / No

Leon Environmental

TURNAROUND TIME

Standard turnaround
RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

Archive samples

Other

Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Metals * / see list	TRT	D/F	Postcard	Notes
MW-8 5-7'	2-1	7.28.22	0805	soil	1												per RS
AST-3 2-4'	22		1110	soil	1												8/12/22 ME
AST-3 5-7'	23 AE		1115	soil	5	✓											
AST-3 8-10'	24		1120	soil	5												
AST-3	25		1130	water	5	●	●										W4 w/o silicagel
SRWA-12 0-1'	26		1310	soil	1												
SRWA-12 2-3'	27		1315	soil	1												
SRWA-12 4-5'	28		1320	soil	1												
SRWA-10 3-5'	29 AE		1410	soil	7	✓	✓										
SRWA-10 5-7.5'	30 AE		1415	soil	4												

SIGNATURE

Relinquished by: R. Jones

Received by: W. Madden

Relinquished by:

Received by:

PRINT NAME

Rush Jones

W. Madden

COMPANY

CETE

F+BI

DATE

8/11/2022

8/1/22

TIME

0947

0947

Samples received at 0900

Friedman & Bruya, Inc.
Ph. (206) 285-8282

108001
Report To CRETE & LEON

SAMPLE CHAIN OF CUSTODY

8/1/22

CI 31812/EO3/WW6
Page # 4 of 4

Company Crete Consulting, Leon Environmental
Address _____
City, State, ZIP _____
Phone _____ Email _____

SAMPLES (signature) <u>Kusty Jones</u>		PROJECT NAME <u>Port of Friday Harbor Jensen's Marina RI</u>	PO #
REMARKS		INVOICE TO <u>Leon Environmental</u>	
Project specific RI's? Yes / No			

TURNAROUND TIME <input checked="" type="checkbox"/> Standard turnaround <input type="checkbox"/> RUSH Rush charges authorized by: _____	SAMPLE DISPOSAL <input type="checkbox"/> Archive samples <input type="checkbox"/> Other Default: Dispose after 30 days
--	---

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED											Notes	
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	FAHs EPA 8270	PCBs EPA 8082	Metals * / acc. limit	TBT	D/F	Pesticides		
SWA-10 7.5-10'	31	7.28.22	1420	seil	1													
AST-4 SWA-10	32 A-E	↓	1440	water	7													
AST-4 1-2'	33 A-E	7.29.22	0745	soil	5	✓	✓											Herb
AST-4 2.5-3'	34 A-E	↓	0750	↓	5													
AST-4 4-5'	35 A-E	↓	0755	↓	5													u4 w/o silica gel
									</									

Friedman & Bruya, Inc.
Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Received by: <u>F. Jones</u>		<u>Kusty Jones</u>		<u>CRETE</u>		<u>8/1/22</u>	<u>0947</u>
Relinquished by: <u>W. Madden</u>		<u>W. Madden</u>		<u>F+BT</u>		<u>8/1/22</u>	<u>0947</u>
Received by:				Samples received at <u>DOC</u>			



Analytical Resources, LLC
Analytical Chemists and Consultants

22 August 2022

Michael Erdahl
Friedman & Bruya Inc.
3012 16th Avenue West
Seattle, WA 98119-2029

RE: 208001 (208001)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
22H0038

Associated SDG ID(s)
N/A

Susan
Dunnihoo

Digitally signed by Susan
Dunnihoo
Date: 2022.08.22
14:28:09 -07'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunnihoo, Director, Client Services

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.





Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-9 0-2.5'	22H0038-01	Solid	27-Jul-2022 09:00	02-Aug-2022 10:30
SRWA-10 3-5'	22H0038-02	Solid	28-Jul-2022 14:10	02-Aug-2022 10:30



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

Work Order Case Narrative

Client: Friedman & Bruya Inc.
Project: 208001
Work Order: 22H0038

Sample receipt

Samples as listed on the preceding page were received 02-Aug-2022 10:30 under ARI work order 22H0038. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Butyl Tin(s) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The batch BKH0105 matrix spike/matrix spike duplicate (MS/MSD) percent recoveries were within limits. The relative percent difference (RPD) was outside advisory control limits for the butyl tin ion and has been flagged on the summary sheet, reported under work order 22H0039.



Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman & Bruyn

Project Name: _____

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 22H0038

Tracking No: 5909 4343 5553 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? _____

YES ☐ NO ☒

Were custody papers included with the cooler? _____

YES ☒ NO ☐

Were custody papers properly filled out (ink, signed, etc.) _____

YES ☒ NO ☐

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1030

6.8

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID# 9705

Cooler Accepted by: HV

Date: 08/02/22

Time: 10:30

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____

YES ☐ NO ☒

What kind of packing material was used? ... Bubble Wrap-Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____

NA ☐ YES ☒ NO ☐

How were bottles sealed in plastic bags? _____

Individually ☐ Grouped ☒ Not ☐

Did all bottles arrive in good condition (unbroken)? _____

YES ☒ NO ☐

Were all bottle labels complete and legible? _____

YES ☒ NO ☐

Did the number of containers listed on COC match with the number of containers received? _____

YES ☒ NO ☐

Did all bottle labels and tags agree with custody papers? _____

YES ☒ NO ☐

Were all bottles used correct for the requested analyses? _____

YES ☒ NO ☐

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...

NA ☒ YES ☐ NO ☐

Were all VOC vials free of air bubbles? _____

NA ☒ YES ☐ NO ☐

Was sufficient amount of sample sent in each bottle? _____

YES ☒ NO ☐

Date VOC Trip Blank was made at ARI: _____

NA ☒

Were the sample(s) split

NA ☒

YES ☐

Date/Time: _____

Equipment: _____

Split by: _____

Samples Logged by: HV Date: 08/02/22 Time: 13:48 Labels checked by: _____

** Notify Project Manager of discrepancies or concerns **

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____

Date: _____



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

MW-9 0-2.5'
22H0038-01 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/27/2022 09:00

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 14:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 22H0038-01 A 01

Preparation Batch: BKH0105

Sample Size: 5.24 g (wet)

Dry Weight: 5.01 g

Prepared: 08/05/2022

Final Volume: 0.5 mL

% Solids: 95.69

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.85	38.5	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.73	5.76	62.7	ug/kg	
Butyltin Ion	78763-54-9	1	1.88	4.07	86.8	ug/kg	
Tetrabutyltin	1461-25-2	1	4.99	4.99	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	84.1	%	
Surrogate: Tripropyltin				30-160 %	69.0	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

SRWA-10 3-5'
22H0038-02 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/28/2022 14:10

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 14:51

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BKH0105
Prepared: 08/05/2022

Sample Size: 5.37 g (wet)
Final Volume: 0.5 mL

Extract ID: 22H0038-02 A 01
Dry Weight: 5.04 g
% Solids: 93.78

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.447	3.83	9.86	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.72	5.74	5.30	ug/kg	J
Butyltin Ion	78763-54-9	1	1.88	4.05	3.76	ug/kg	J
Tetrabutyltin	1461-25-2	1	4.96	4.96	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	90.4	%	
Surrogate: Tripropyltin				30-160 %	71.6	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

Analysis by: Analytical Resources, LLC

Butyl Tins - Quality Control

Batch BKH0105 - EPA 3546 (Microwave)

Instrument: NT12 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKH0105-BLK1) Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 13:59											
Tributyltin Ion	ND	0.450	3.86	ug/kg							U
Dibutyltin Ion	ND	1.73	5.78	ug/kg							U
Butyltin Ion	ND	1.89	4.08	ug/kg							U
Tetrabutyltin	ND	5.00	5.00	ug/kg							U
Surrogate: Triphenyltin	40.6			ug/kg	45.2	90.0		30-160			
Surrogate: Tripropyltin	33.8			ug/kg	43.7	77.3		30-160			
LCS (BKH0105-BS1) Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 14:16											
Tributyltin Ion	32.9	0.450	3.86	ug/kg	44.6	73.8		30-160			
Dibutyltin Ion	35.7	1.73	5.78	ug/kg	38.4	93.1		30-160			
Butyltin Ion	22.9	1.89	4.08	ug/kg	31.2	73.4		30-160			
Surrogate: Triphenyltin	42.2			ug/kg	45.2	93.4		30-160			
Surrogate: Tripropyltin	31.1			ug/kg	43.7	71.0		30-160			



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 8270E-SIM in Solid</i>	
Tributyltin Ion	WADOE, DoD-ELAP, NELAP
Dibutyltin Ion	WADOE, DoD-ELAP, NELAP
Butyltin Ion	WADOE, NELAP
Tetrabutyltin	NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2023



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 208001
Project Number: 208001
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:53

Notes and Definitions

D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
J	Estimated concentration value detected below the reporting limit.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 8, 2022

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 29, 2022 from the Port of Friday Harbor Jensen's Harbor RI, F&BI 207511 project. There are 87 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: Grant Hainsworth, Jamie Stevens, Peter Leon (peter@leon-environmental.com)
CTC0908R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 29, 2022 by Friedman & Bruya, Inc. from the Crete Consulting Port of Friday Harbor Jensen's Harbor RI, F&BI 207511 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
207511 -01	DUP-220726-2
207511 -02	DUP-220726
207511 -03	AST-2 5-7.5'
207511 -04	AST-2 7.5-10'
207511 -05	AST-2 10-12'
207511 -06	AST-2
207511 -07	SRWA-13 0-0.5'
207511 -08	SRWA-13 0.5-1'
207511 -09	SRWA-13 3-5'
207511 -10	SRWA-14 0-1'
207511 -11	SRWA-14 1-2'
207511 -12	SRWA-14 3-5'
207511 -13	SRWA-15 0-0.5'
207511 -14	SRWA-15 0.5-1'
207511 -15	SRWA-15 2-3'
207511 -16	SRWA-8 0-1'
207511 -17	SRWA-8 2-3'
207511 -18	SRWA-8 4-5'
207511 -19	SRWA-11 0-2.5'
207511 -20	SRWA-11 2.5-5'
207511 -21	SRWA-11 5-6'
207511 -22	SRWA-9 0-2.5'
207511 -23	SRWA-9 2.5-5'
207511 -24	SRWA-9 5-6'
207511 -25	SRWA-9

Samples SRWA-13 0-0.5', SRWA-14 0-1', SRWA-15 0-0.5', SRWA-8 0-1', SRWA-9 2.5-5', and SRWA-9 were sent to Frontier Analytical for dioxin and furan analysis and to ARL for tributyltin analysis. Sample SRWA-11 0-2.5' was sent to ARL for tributyltin analysis. The first reports are enclosed. The additional report from ARL for tributyltin for sample SRWA-11 0-2.5' and the additional report from Frontier Analytical for sample SRWA-9 for dioxins and furans will be forwarded upon receipt.

The NWTPH-Gx sample SRWA-9 2.5-5' was taken from a four ounce glass jar. The data were flagged accordingly.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE (continued)

The 8270E sample SRWA-11 0-2.5' was requested to be analyzed outside of the holding time. The data were flagged accordingly.

The 8081B calibration standard failed the acceptance criteria for several pesticides. The data were flagged accordingly.

Mercury in the 1631E matrix spike exceeded the control limit. The laboratory control samples passed the acceptance criteria, therefore the results were due to matrix effect.

The 8081B matrix spike and matrix spike duplicate failed the relative percent difference for several compounds. The laboratory control samples passed the acceptance criteria, therefore the results were due to matrix effect.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

Date Extracted: 08/03/22

Date Analyzed: 08/04/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
DUP-220726 207511-02	<5	105
AST-2 7.5-10' 207511-04	<5	106
SRWA-13 0-0.5' 207511-07	<5	108
SRWA-14 0-1' 207511-10	<5	109
SRWA-15 0-0.5' 207511-13	<5	99
SRWA-8 0-1' 207511-16	<5	117
SRWA-9 2.5-5' pc 207511-23	<5	104
Method Blank 02-1719 MB	<5	111

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

Date Extracted: 08/05/22

Date Analyzed: 08/05/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 51-134)
DUP-220726-2 207511-01	290	123
AST-2 207511-06	290	117
SRWA-9 207511-25	<100	104
Method Blank 02-1721 MB	<100	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

Date Extracted: 08/03/22

Date Analyzed: 08/03/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 48-168)
AST-2 7.5-10' 207511-04	<50	<250	108
SRWA-13 0-0.5' 207511-07	<50	<250	106
SRWA-14 0-1' 207511-10	<50	<250	119
SRWA-15 0-0.5' 207511-13	<50	<250	117
SRWA-8 0-1' 207511-16	<50	360	108
SRWA-9 2.5-5' 207511-23	<50	<250	109
Method Blank 02-1874 MB2	<50	<250	105

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

Date Extracted: 08/02/22

Date Analyzed: 08/02/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> (% Recovery) (Limit 41-152)
DUP-220726-2 207511-01	290 x	<250	79
AST-2 207511-06	290 x	<250	75
SRWA-9 207511-25 1/1.3	130 x	<320	ip
Method Blank 02-1867 MB2	<50	<250	77

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	AST-2 7.5-10'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-04
Date Analyzed:	08/03/22	Data File:	207511-04.201
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.21
Cadmium	<1
Chromium	9.49
Copper	18.1
Lead	2.72
Zinc	17.9

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	AST-2 10-12'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/22/22	Lab ID:	207511-05
Date Analyzed:	08/22/22	Data File:	207511-05.064
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.30
Cadmium	<1
Chromium	10.8
Copper	18.8
Lead	3.79
Zinc	20.0

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-13 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-07
Date Analyzed:	08/03/22	Data File:	207511-07.202
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	11.9
Cadmium	<1
Chromium	11.7
Lead	170

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-13 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-07 x5
Date Analyzed:	08/03/22	Data File:	207511-07 x5.064
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Copper	2,140
Zinc	519

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-13 0.5-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/11/22	Lab ID:	207511-08
Date Analyzed:	08/11/22	Data File:	207511-08.085
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	10.6
Cadmium	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-13 0.5-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/11/22	Lab ID:	207511-08 x5
Date Analyzed:	08/11/22	Data File:	207511-08 x5.104
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Chromium	12.7
Copper	919
Lead	389
Zinc	317

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-13 3-5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/22/22	Lab ID:	207511-09
Date Analyzed:	08/22/22	Data File:	207511-09.065
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	6.56
Cadmium	<1
Chromium	8.71
Copper	20.8
Lead	11.6
Zinc	31.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-14 0-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-10
Date Analyzed:	08/03/22	Data File:	207511-10.203
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.91
Cadmium	<1
Chromium	5.13
Copper	59.1
Lead	115
Zinc	52.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-14 1-2'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/11/22	Lab ID:	207511-11
Date Analyzed:	08/11/22	Data File:	207511-11.086
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.30
Cadmium	<1
Chromium	6.96
Copper	14.3
Lead	2.58
Zinc	28.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-15 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-13
Date Analyzed:	08/03/22	Data File:	207511-13.205
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	1.80
Cadmium	<1
Chromium	7.68
Copper	12.5
Lead	35.1
Zinc	26.7

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-8 0-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-16
Date Analyzed:	08/03/22	Data File:	207511-16.208
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	7.14
Cadmium	<1
Chromium	10.4
Copper	87.3
Lead	49.9
Zinc	79.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-8 2-3'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/11/22	Lab ID:	207511-17
Date Analyzed:	08/11/22	Data File:	207511-17.087
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.62
Cadmium	<1
Lead	3.04

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-8 2-3'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/11/22	Lab ID:	207511-17 x2
Date Analyzed:	08/11/22	Data File:	207511-17 x2.105
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Chromium	20.4
Copper	12.6
Zinc	20.3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-8 4-5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/22/22	Lab ID:	207511-18
Date Analyzed:	08/22/22	Data File:	207511-18.066
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.93
Cadmium	<1
Lead	3.24

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-8 4-5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/22/22	Lab ID:	207511-18 x2
Date Analyzed:	08/23/22	Data File:	207511-18 x2.108
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Chromium	21.1
Copper	26.8
Zinc	36.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-11 0-2.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/26/22	Lab ID:	207511-19
Date Analyzed:	08/26/22	Data File:	207511-19.067
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.24
Cadmium	<1
Chromium	16.8
Copper	69.3
Lead	75.0
Zinc	105

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-9 2.5-5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-23
Date Analyzed:	08/03/22	Data File:	207511-23.082
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	2.94
Cadmium	<1
Chromium	7.78
Copper	8.32
Lead	2.18
Zinc	18.6

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	I2-523 mb
Date Analyzed:	08/02/22	Data File:	I2-523 mb.117
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Port of Friday Harbor
Date Extracted:	08/11/22	Lab ID:	I2-547 mb
Date Analyzed:	08/11/22	Data File:	I2-547 mb.058
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Port of Friday Harbor
Date Extracted:	08/26/22	Lab ID:	I2-589 mb
Date Analyzed:	08/26/22	Data File:	I2-589 mb.063
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Port of Friday Harbor
Date Extracted:	08/22/22	Lab ID:	I2-569 mb
Date Analyzed:	08/22/22	Data File:	I2-569 mb.047
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-9	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-25
Date Analyzed:	08/08/22	Data File:	207511-25.139
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
----------	-----------------------------

Cadmium	<1
Chromium	2.85
Copper	5.37
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	SRWA-9	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-25 x5
Date Analyzed:	08/08/22	Data File:	207511-25 x5.138
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
----------	-----------------------------

Arsenic	<5
---------	----

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	I2-526 mb
Date Analyzed:	08/03/22	Data File:	I2-526 mb.116
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1
Cadmium	<1
Chromium	<1
Copper	<5
Lead	<1
Zinc	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

Date Extracted: 08/04/22, 08/11/22, 08/22/22, and 08/26/22

Date Analyzed: 08/04/22, 08/15/22, 08/16/22, 08/23/22, and 09/02/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
AST-2 7.5-10' 207511-04	<0.1
AST-2 10-12' 207511-05	<0.1
SRWA-13 0-0.5' 207511-07 x5	1.5
SRWA-13 0.5-1' 207511-08 x10	3.5
SRWA-13 3-5' 207511-09	<0.1
SRWA-14 0-1' 207511-10	0.30
SRWA-14 1-2' 207511-11	<0.1
SRWA-15 0-0.5' 207511-13	<0.1
SRWA-8 0-1' 207511-16	0.30
SRWA-8 2-3' 207511-17	<0.1
SRWA-8 4-5' 207511-18	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

Date Extracted: 08/04/22, 08/11/22, 08/22/22, and 08/26/22

Date Analyzed: 08/04/22, 08/15/22, 08/16/22, 08/23/22, and 09/02/22

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Total Mercury</u>
SRWA-11 0-2.5' ht 207511-19	0.15
SRWA-9 2.5-5' 207511-23	<0.1
Method Blank i2-531 MB	<0.1
Method Blank i2-547 MB	<0.1
Method Blank i2-569 MB	<0.1
Method Blank i2-589 MB	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

Date Extracted: 08/02/22

Date Analyzed: 08/03/22

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Results Reported as ug/L (ppb)

Sample ID

Total Mercury

Laboratory ID

SRWA-9

0.022

207511-25

Method Blank

<0.2

I2-525 MB

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	SRWA-13 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-07 1/25
Date Analyzed:	08/03/22	Data File:	080325.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	60 d	24	111
Phenol-d6	68 d	37	116
Nitrobenzene-d5	61 d	38	117
2-Fluorobiphenyl	74 d	45	117
2,4,6-Tribromophenol	80 d	11	158
Terphenyl-d14	89 d	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.35
Chrysene	0.54
Benzo(a)pyrene	0.43
Benzo(b)fluoranthene	0.76
Benzo(k)fluoranthene	0.24
Indeno(1,2,3-cd)pyrene	0.34
Dibenz(a,h)anthracene	0.074

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	SRWA-14 0-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-10 1/5
Date Analyzed:	08/03/22	Data File:	080312.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	83	24	111
Phenol-d6	92	37	116
Nitrobenzene-d5	82	38	117
2-Fluorobiphenyl	91	45	117
2,4,6-Tribromophenol	100	11	158
Terphenyl-d14	102	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.048
Chrysene	0.054
Benzo(a)pyrene	0.055
Benzo(b)fluoranthene	0.060
Benzo(k)fluoranthene	0.024
Indeno(1,2,3-cd)pyrene	0.032
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	SRWA-15 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-13 1/5
Date Analyzed:	08/03/22	Data File:	080324.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	74	24	111
Phenol-d6	86	37	116
Nitrobenzene-d5	74	38	117
2-Fluorobiphenyl	90	45	117
2,4,6-Tribromophenol	98	11	158
Terphenyl-d14	104	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	SRWA-8 0-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-16 1/25
Date Analyzed:	08/03/22	Data File:	080326.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	60 d	24	111
Phenol-d6	76 d	37	116
Nitrobenzene-d5	72 d	38	117
2-Fluorobiphenyl	90 d	45	117
2,4,6-Tribromophenol	88 d	11	158
Terphenyl-d14	96 d	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.05
Chrysene	<0.05
Benzo(a)pyrene	<0.05
Benzo(b)fluoranthene	0.051
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	SRWA-11 0-2.5' ht	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/29/22	Lab ID:	207511-19 1/50
Date Analyzed:	08/29/22	Data File:	082913.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Terphenyl-d14	86 d	31	167

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.1
Chrysene	<0.1
Benzo(a)pyrene	0.087 j
Benzo(b)fluoranthene	0.12
Benzo(k)fluoranthene	<0.1
Indeno(1,2,3-cd)pyrene	<0.1
Dibenz(a,h)anthracene	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	SRWA-9 2.5-5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-23 1/5
Date Analyzed:	08/03/22	Data File:	080314.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	85	24	111
Phenol-d6	95	37	116
Nitrobenzene-d5	90	38	117
2-Fluorobiphenyl	96	45	117
2,4,6-Tribromophenol	99	11	158
Terphenyl-d14	104	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	02-1877 mb 1/5
Date Analyzed:	08/02/22	Data File:	080209.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	88	24	111
Phenol-d6	99	37	116
Nitrobenzene-d5	85	38	117
2-Fluorobiphenyl	110	45	117
2,4,6-Tribromophenol	110	11	158
Terphenyl-d14	115	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/26/22	Lab ID:	02-2048 mb 1/5
Date Analyzed:	08/29/22	Data File:	082913.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Terphenyl-d14	115	50	124

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.005 j
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	SRWA-9	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-25
Date Analyzed:	08/03/22	Data File:	080317.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	6 vo	10	60
Phenol-d6	16	10	49
Nitrobenzene-d5	79	15	144
2-Fluorobiphenyl	74	25	128
2,4,6-Tribromophenol	4 vo	10	142
Terphenyl-d14	101	41	138

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	02-1866 mb
Date Analyzed:	08/03/22	Data File:	080308.D
Matrix:	Water	Instrument:	GCMS12
Units:	ug/L (ppb)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	20	11	65
Phenol-d6	13	11	65
Nitrobenzene-d5	94	50	150
2-Fluorobiphenyl	88	44	108
2,4,6-Tribromophenol	84	10	140
Terphenyl-d14	107	50	150

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	SRWA-13 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-07 1/6
Date Analyzed:	08/03/22	Data File:	080327.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	88 ca	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	0.76
Aroclor 1254	0.65
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	SRWA-13 0.5-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/12/22	Lab ID:	207511-08 1/6
Date Analyzed:	08/12/22	Data File:	081207.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	70	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	0.30
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	SRWA-14 0-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-10 1/6
Date Analyzed:	08/03/22	Data File:	080328.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower	Upper
TCMX	71 ca	Limit:	Limit:
		23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	0.19
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	SRWA-15 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-13 1/6
Date Analyzed:	08/03/22	Data File:	080330.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	65 ca	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	SRWA-8 0-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-16 1/6
Date Analyzed:	08/03/22	Data File:	080331.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	86 ca	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	0.081
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	SRWA-9 2.5-5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-23 1/6
Date Analyzed:	08/03/22	Data File:	080332.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	83 ca	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	02-1880 mb 1/6
Date Analyzed:	08/03/22	Data File:	080314.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	111	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/12/22	Lab ID:	02-1983 mb 1/6
Date Analyzed:	08/12/22	Data File:	081204.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	50	23	127

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	SRWA-9	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-25
Date Analyzed:	08/02/22	Data File:	080215.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	42	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	02-1875 mb2
Date Analyzed:	08/02/22	Data File:	080210.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	78	24	127

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	SRWA-13 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-07 1/6
Date Analyzed:	08/03/22	Data File:	080327.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	76	41	106
DBC	84	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	0.038 ca
Endosulfan II	<0.01
4,4'-DDT	0.063 ca
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	SRWA-14 0-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-10 1/6
Date Analyzed:	08/03/22	Data File:	080328.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	58	41	106
DBC	81	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	<0.01
Endosulfan II	<0.01
4,4'-DDT	0.023 ca
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	SRWA-15 0-0.5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-13 1/6
Date Analyzed:	08/03/22	Data File:	080330.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	54	41	106
DBC	88	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	<0.01
Endosulfan II	<0.01
4,4'-DDT	<0.01 ca
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	SRWA-8 0-1'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-16 1/6
Date Analyzed:	08/03/22	Data File:	080331.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	70	41	106
DBC	74	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	<0.01
Endosulfan II	<0.01
4,4'-DDT	<0.01 ca
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	SRWA-9 2.5-5'	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	207511-23 1/6
Date Analyzed:	08/03/22	Data File:	080332.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	68	41	106
DBC	75	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	<0.01
Endosulfan II	<0.01
4,4'-DDT	<0.01 ca
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/03/22	Lab ID:	02-1880 mb 1/6
Date Analyzed:	08/03/22	Data File:	080314.D
Matrix:	Soil	Instrument:	GC7
Units:	mg/kg (ppm) Dry Weight	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	89	41	106
DBC	103	32	150

Compounds:	Concentration mg/kg (ppm)
alpha-BHC	<0.01
gamma-BHC (Lindane)	<0.01
beta-BHC	<0.01
delta-BHC	<0.01
Heptachlor	<0.01
Aldrin	<0.01
Heptachlor Epoxide	<0.01
trans-Chlordane	<0.01
cis-Chlordane	<0.01
4,4'-DDE	<0.01
Endosulfan I	<0.01
Dieldrin	<0.01
Endrin	<0.01
4,4'-DDD	<0.01
Endosulfan II	<0.01
4,4'-DDT	<0.01
Endrin Aldehyde	<0.01
Methoxychlor	<0.01
Endosulfan Sulfate	<0.01
Endrin Ketone	<0.05
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	SRWA-9	Client:	Crete Consulting
Date Received:	07/29/22	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	207511-25
Date Analyzed:	08/02/22	Data File:	080215.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	40	20	121
DBC	60	18	174

Compounds:	Concentration ug/L (ppb)
alpha-BHC	<0.1
gamma-BHC (Lindane)	<0.1
beta-BHC	<0.1
delta-BHC	<0.1
Heptachlor	<0.1
Aldrin	<0.1
Heptachlor Epoxide	<0.1
trans-Chlordane	<0.1
cis-Chlordane	<0.1
4,4'-DDE	<0.1
Endosulfan I	<0.1
Dieldrin	<0.1
Endrin	<0.1
4,4'-DDD	<0.1
Endosulfan II	<0.1
4,4'-DDT	<0.1
Endrin Aldehyde	<0.1
Methoxychlor	<0.1
Endosulfan Sulfate	<0.1
Endrin Ketone	<0.1
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Organochlorine Pesticides By EPA Method 8081B

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	Port of Friday Harbor
Date Extracted:	08/02/22	Lab ID:	02-1875 mb2
Date Analyzed:	08/02/22	Data File:	080210.D
Matrix:	Water	Instrument:	GC7
Units:	ug/L (ppb)	Operator:	MG

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	67	20	121
DBC	105	18	174

Compounds:	Concentration ug/L (ppb)
alpha-BHC	<0.1
gamma-BHC (Lindane)	<0.1
beta-BHC	<0.1
delta-BHC	<0.1
Heptachlor	<0.1
Aldrin	<0.1
Heptachlor Epoxide	<0.1
trans-Chlordane	<0.1
cis-Chlordane	<0.1
4,4'-DDE	<0.1
Endosulfan I	<0.1
Dieldrin	<0.1
Endrin	<0.1
4,4'-DDD	<0.1
Endosulfan II	<0.1
4,4'-DDT	<0.1
Endrin Aldehyde	<0.1
Methoxychlor	<0.1
Endosulfan Sulfate	<0.1
Endrin Ketone	<0.1
Toxaphene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 208016-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 208011-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	114	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 208010-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	640	117 b	95 b	63-146	21 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	100	79-144

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	116	112	63-142	4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 208306-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	106	99	75-125	7
Cadmium	mg/kg (ppm)	10	<5	102	97	75-125	5
Chromium	mg/kg (ppm)	50	10.4	108	98	75-125	10
Copper	mg/kg (ppm)	50	<25	110	97	75-125	13
Lead	mg/kg (ppm)	50	<5	111	103	75-125	7
Zinc	mg/kg (ppm)	50	30.7	110	94	75-125	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	92	80-120
Cadmium	mg/kg (ppm)	10	95	80-120
Chromium	mg/kg (ppm)	50	102	80-120
Copper	mg/kg (ppm)	50	103	80-120
Lead	mg/kg (ppm)	50	102	80-120
Zinc	mg/kg (ppm)	50	103	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 207511-19 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	95	90	75-125	5
Cadmium	mg/kg (ppm)	10	<5	100	101	75-125	1
Chromium	mg/kg (ppm)	50	14.9	81	78	75-125	4
Copper	mg/kg (ppm)	50	67.2	74 b	80	75-125	8
Lead	mg/kg (ppm)	50	67.4	78	70 b	75-125	11
Zinc	mg/kg (ppm)	50	103	72 b	72 b	75-125	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	88	80-120
Cadmium	mg/kg (ppm)	10	95	80-120
Chromium	mg/kg (ppm)	50	92	80-120
Copper	mg/kg (ppm)	50	92	80-120
Lead	mg/kg (ppm)	50	94	80-120
Zinc	mg/kg (ppm)	50	93	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 208001-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	3.30	95	95	75-125	0
Cadmium	mg/kg (ppm)	10	<1	97	93	75-125	4
Chromium	mg/kg (ppm)	50	9.47	78	78	75-125	0
Copper	mg/kg (ppm)	50	214	18 b	113	75-125	145 b
Lead	mg/kg (ppm)	50	54.9	70 b	117	75-125	50 b
Zinc	mg/kg (ppm)	50	133	54 b	115	75-125	72 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	94	80-120
Cadmium	mg/kg (ppm)	10	93	80-120
Chromium	mg/kg (ppm)	50	100	80-120
Copper	mg/kg (ppm)	50	101	80-120
Lead	mg/kg (ppm)	50	100	80-120
Zinc	mg/kg (ppm)	50	99	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 208153-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.47	92	95	75-125	3
Cadmium	mg/kg (ppm)	10	<1	104	105	75-125	1
Chromium	mg/kg (ppm)	50	13.2	88	87	75-125	1
Copper	mg/kg (ppm)	50	10.1	87	86	75-125	1
Lead	mg/kg (ppm)	50	2.50	103	103	75-125	0
Zinc	mg/kg (ppm)	50	19.5	83	84	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	87	80-120
Cadmium	mg/kg (ppm)	10	100	80-120
Chromium	mg/kg (ppm)	50	102	80-120
Copper	mg/kg (ppm)	50	104	80-120
Lead	mg/kg (ppm)	50	102	80-120
Zinc	mg/kg (ppm)	50	102	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 207468-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	<1	98	102	75-125	4
Cadmium	ug/L (ppb)	5	<1	99	100	75-125	1
Chromium	ug/L (ppb)	20	1.85	85	85	75-125	0
Copper	ug/L (ppb)	20	8.72	80	75	75-125	6
Lead	ug/L (ppb)	10	<1	84	86	75-125	2
Zinc	ug/L (ppb)	50	<5	86	87	75-125	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	92	80-120
Cadmium	ug/L (ppb)	5	95	80-120
Chromium	ug/L (ppb)	20	94	80-120
Copper	ug/L (ppb)	20	102	80-120
Lead	ug/L (ppb)	10	99	80-120
Zinc	ug/L (ppb)	50	98	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 208153-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	0.11	136 b	133 b	71-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	123	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 208001-01(Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	0.282	77	91	71-125	17

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	122	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 208306-01 x10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	6.4	114	33 b	71-125	110 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	69	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS
OF SOIL SAMPLES FOR TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 207511-19 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	<0.1	139 vo	123	71-125	12

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	0.125	125	68-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES FOR
TOTAL MERCURY
USING EPA METHOD 1631E**

Laboratory Code: 207483-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	<0.0008	116	104	71-125	11

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	ug/L (ppb)	0.01	96	78-125

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR SEMIVOLATILES BY EPA METHOD 8270E**

Laboratory Code: 208007-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	101	91	50-150	10
Chrysene	mg/kg (ppm)	0.83	<0.01	100	89	50-150	12
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	103	92	50-150	11
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	102	88	50-150	15
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	105	91	50-150	14
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	117	113	41-134	3
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	114	111	44-130	3

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR SEMIVOLATILES BY EPA METHOD 8270E**

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.83	99	70-130
Chrysene	mg/kg (ppm)	0.83	99	70-130
Benzo(a)pyrene	mg/kg (ppm)	0.83	99	68-120
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	102	69-125
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	106	70-130
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	110	67-129
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	109	67-128

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR SEMIVOLATILES BY EPA METHOD 8270E**

Laboratory Code: 208363-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.83	0.032	99	100	50-150	1
Chrysene	mg/kg (ppm)	0.83	0.049	92	92	50-150	0
Benzo(a)pyrene	mg/kg (ppm)	0.83	0.075	104	102	50-150	2
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	0.081	108	108	50-150	0
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	0.022	106	101	50-150	5
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	0.070	98	96	41-134	2
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	97	92	44-130	5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR SEMIVOLATILES BY EPA METHOD 8270E**

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.83	96	70-130
Chrysene	mg/kg (ppm)	0.83	94	70-130
Benzo(a)pyrene	mg/kg (ppm)	0.83	96	68-120
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	97	69-125
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	97	70-130
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	92	67-129
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	94	67-128

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	ug/L (ppb)	5	95	93	70-130	2
Chrysene	ug/L (ppb)	5	96	94	70-130	2
Benzo(a)pyrene	ug/L (ppb)	5	96	96	70-130	0
Benzo(b)fluoranthene	ug/L (ppb)	5	98	99	70-130	1
Benzo(k)fluoranthene	ug/L (ppb)	5	93	94	70-130	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	105	102	70-130	3
Dibenz(a,h)anthracene	ug/L (ppb)	5	106	101	70-130	5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
POLYCHLORINATED BIPHENYLS AS
AROCOR 1016/1260 BY EPA METHOD 8082A**

Laboratory Code: 208007-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Control Limits	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	<0.02	96	86	29-125	11
Aroclor 1260	mg/kg (ppm)	0.25	<0.02	92	88	25-137	4

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	108	55-137
Aroclor 1260	mg/kg (ppm)	0.25	115	51-150

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
POLYCHLORINATED BIPHENYLS AS
AROCOR 1016/1260 BY EPA METHOD 8082A**

Laboratory Code: 208155-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Control Limits	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	<0.02	64	62	29-125	3
Aroclor 1260	mg/kg (ppm)	0.25	<0.02	55	52	25-137	6

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	120	55-137
Aroclor 1260	mg/kg (ppm)	0.25	126	51-150

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF WATER SAMPLES FOR
POLYCHLORINATED BIPHENYLS AS
AROCOR 1016/1260 BY EPA METHOD 8082A**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	0.25	69	68	25-111	1
Aroclor 1260	ug/L (ppb)	0.25	78	74	23-123	5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR ORGANOCHLORINE PESTICIDES BY EPA METHOD 8081B

Laboratory Code: 208007-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
alpha-BHC	mg/kg (ppm)	0.1	<0.01	47	77	45-111	48 vo
gamma-BHC (Lindane)	mg/kg (ppm)	0.1	<0.01	53	81	50-117	42 vo
beta-BHC	mg/kg (ppm)	0.1	<0.01	64	83	49-109	26 vo
delta-BHC	mg/kg (ppm)	0.1	<0.01	64	80	39-114	22 vo
Heptachlor	mg/kg (ppm)	0.1	<0.01	52	79	40-131	41 vo
Aldrin	mg/kg (ppm)	0.1	<0.01	55	82	44-121	39 vo
Heptachlor Epoxide	mg/kg (ppm)	0.1	<0.01	66	83	46-122	23 vo
trans-Chlordane	mg/kg (ppm)	0.1	<0.01	70	84	41-129	18
cis-Chlordane	mg/kg (ppm)	0.1	<0.01	71	83	44-120	16
4,4'-DDE	mg/kg (ppm)	0.1	<0.01	76	85	41-118	11
Endosulfan I	mg/kg (ppm)	0.1	<0.01	69	83	45-124	18
Dieldrin	mg/kg (ppm)	0.1	<0.01	75	89	45-130	17
Endrin	mg/kg (ppm)	0.1	<0.01	80	94	50-140	16
4,4'-DDD	mg/kg (ppm)	0.1	<0.01	96	99	26-155	3
Endosulfan II	mg/kg (ppm)	0.1	<0.01	78	86	40-135	10
4,4'-DDT	mg/kg (ppm)	0.1	<0.01	59	73	39-123	21 vo
Endrin Aldehyde	mg/kg (ppm)	0.1	<0.01	51	74	35-139	37 vo
Methoxychlor	mg/kg (ppm)	0.1	<0.01	75	87	28-162	15
Endosulfan Sulfate	mg/kg (ppm)	0.1	<0.01	78	85	40-141	9
Endrin Ketone	mg/kg (ppm)	0.1	<0.05	78	83	41-147	6
Toxaphene	mg/kg (ppm)	4	<1	92	83	36-133	10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES FOR
ORGANOCHLORINE PESTICIDES
BY EPA METHOD 8081B**

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
alpha-BHC	mg/kg (ppm)	0.1	86	58-117
gamma-BHC (Lindane)	mg/kg (ppm)	0.1	89	60-121
beta-BHC	mg/kg (ppm)	0.1	91	66-120
delta-BHC	mg/kg (ppm)	0.1	89	67-124
Heptachlor	mg/kg (ppm)	0.1	90	58-131
Aldrin	mg/kg (ppm)	0.1	90	63-124
Heptachlor Epoxide	mg/kg (ppm)	0.1	89	67-123
trans-Chlordane	mg/kg (ppm)	0.1	91	60-123
cis-Chlordane	mg/kg (ppm)	0.1	93	70-130
4,4'-DDE	mg/kg (ppm)	0.1	95	70-130
Endosulfan I	mg/kg (ppm)	0.1	92	62-124
Dieldrin	mg/kg (ppm)	0.1	96	70-130
Endrin	mg/kg (ppm)	0.1	112	56-147
4,4'-DDD	mg/kg (ppm)	0.1	105	54-137
Endosulfan II	mg/kg (ppm)	0.1	94	42-140
4,4'-DDT	mg/kg (ppm)	0.1	103	25-169
Endrin Aldehyde	mg/kg (ppm)	0.1	75	21-135
Methoxychlor	mg/kg (ppm)	0.1	116	44-160
Endosulfan Sulfate	mg/kg (ppm)	0.1	95	39-148
Endrin Ketone	mg/kg (ppm)	0.1	95	46-134
Toxaphene	mg/kg (ppm)	4	118	56-145

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/08/22

Date Received: 07/29/22

Project: Port of Friday Harbor Jensen's Harbor RI, F&BI 207511

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR ORGANOCHLORINE PESTICIDES BY EPA METHOD 8081B

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
alpha-BHC	ug/L (ppb)	0.25	72	72	41-101	0
gamma-BHC (Lindane)	ug/L (ppb)	0.25	77	77	43-105	0
beta-BHC	ug/L (ppb)	0.25	83	85	49-104	2
delta-BHC	ug/L (ppb)	0.25	82	85	45-108	4
Heptachlor	ug/L (ppb)	0.25	69	71	39-104	3
Aldrin	ug/L (ppb)	0.25	71	71	43-98	0
Heptachlor Epoxide	ug/L (ppb)	0.25	80	82	52-110	2
trans-Chlordane	ug/L (ppb)	0.25	82	85	39-119	4
cis-Chlordane	ug/L (ppb)	0.25	83	85	47-106	2
4,4'-DDE	ug/L (ppb)	0.25	85	87	48-114	2
Endosulfan I	ug/L (ppb)	0.25	82	83	10-140	1
Dieldrin	ug/L (ppb)	0.25	88	90	54-115	2
Endrin	ug/L (ppb)	0.25	103	104	39-136	1
4,4'-DDD	ug/L (ppb)	0.25	98	101	31-161	3
Endosulfan II	ug/L (ppb)	0.25	89	91	10-144	2
4,4'-DDT	ug/L (ppb)	0.25	94	97	50-121	3
Endrin Aldehyde	ug/L (ppb)	0.25	81	83	47-113	2
Methoxychlor	ug/L (ppb)	0.25	109	112	51-126	3
Endosulfan Sulfate	ug/L (ppb)	0.25	92	95	58-110	3
Endrin Ketone	ug/L (ppb)	0.25	92	94	57-120	2
Toxaphene	ug/L (ppb)	4	107	118	56-123	10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

207511

SAMPLE CHAIN OF CUSTODY

07-29-22

Page # 1 of 502

or 51113

Report: Joe Jones, Hahnsworth, Stokes, P.L. Co.

Company: Cete Consulting / Len Environmental

Address:

City, State, ZIP:

Phone: Email:

SAMPLES (signature) Rusty Jones

PROJECT NAME Port of Friday Harbor

Jensen's Harbor RI

REMARKS

PO #

INVOICE TO

Project specific RI's? Yes / No

TURNAROUND TIME
Standard turnaround 854
Rush charges authorized by CSSAMPLE DISPOSAL
Archive samples
Other
Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	CPAHs EPA 8270	POBs EPA 8082	Metals*	TBT	Distillates/Furans	Pesticides	Notes
DUP-220726-2	01A-D	7/16/2022	0730	WATER	4	✓	✓										per RS
DUP-220726-2	02		0800	SOIL	4	✓											8/10/22 ME
AST-2 2-2.5 RS 5-7.5'	03A-F		0805		6												per RS
AST-2 7.5-10'	04A-E		0810		5	✓											8/18/22 ME
AST-2 10-12'	05A-F		0815	↓	6	✓											per CH
AST-2	66		0830	WATER	6	✓											8/25/22 ME
SRWA-13 0-0.5'	07A-G		0940	SOIL	7	✓											Extra bottles
SRWA-13 0.5-1'	08		0950	↓	7	✓											
SRWA-13 3-5'	09		1000	↓	7	✓											
SRWA-14 0-1'	10		1020	SOIL	7	✓											

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Requisitioned by: R. Jones

Rusty Jones

CETE

7/27/22

1100

Friedman & Bruya, Inc.
Ph. (206) 285-8282

Requisitioned by: Liz Webster-Brya

Fib

7/27/22

1509

Received by:

Samples received at

5

00

207511

SAMPLE CHAIN OF CUSTODY

07-29-22

Page # 2 of 362

Report to: José Hainworth, Stevens, P. LeonCompany: Crete Consulting / Clean Environmental

Address: _____

City, State, ZIP: _____

Phone: _____ Email: _____

SAMPLERS (signature)

Rusty Jones

R. Jones

PROJECT NAME

Port of Friday Harbor

Jensen's Marina RTI

PO #

REMARKS

INVOICE TO

Project specific RLS? - Yes / No

Default: Dispose after 30 days

TURNAROUND TIME (hrs)

Standard turnaround 854

Rush charges authorized by CTS

SAMPLE DISPOSAL

Archive samples

Other

ANALYSES REQUESTED

NWTPH-Dx
 NWTPH-Gx
 BTEX EPA 8021
 NWTPH-HCID
 VOCs EPA 8260
 PAHs EPA 8270
 PCBs EPA 8082
 Metals*
 TBT
 Dioxins/Furans
 Pesticides

Notes

- HOLD

HOLD per RST

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED											
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Metals*	TBT	Dioxins/Furans	Pesticides	Notes
SRWA-14 1-2'	11 A-H	7/20/22	1050	soil	8	✓	✓				✓	✓	✓	✓	✓	✓	HOLD per RS
SRWA-14 3-5'	12		1040	soil	8	✓	✓				✓	✓	✓	✓	✓	✓	q
SRWA-15 0-0.5'	13		1230	soil	8	✓	✓				✓	✓	✓	✓	✓	✓	
SRWA-15 0.5-1'	14		1240	soil	8	✓	✓				✓	✓	✓	✓	✓	✓	
SRWA-15 2-3'	15 A-B		1250	soil	2	✓	✓				✓	✓	✓	✓	✓	✓	
SRWA-8 0-1'	16 A-H		1330	soil	8	✓	✓				✓	✓	✓	✓	✓	✓	
SRWA-8 2-3'	17 A-B		1340	soil	2	✓	✓				✓	✓	✓	✓	✓	✓	
SRWA-8 4-5'	18		1350	soil	2	✓	✓				✓	✓	✓	✓	✓	✓	
SRWA-11 0-2.5'	19		1425	soil	1	✓	✓				✓	✓	✓	✓	✓	✓	
SRWA-11 2.5-5'	20		1430	soil	1	✓	✓				✓	✓	✓	✓	✓	✓	

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Friedman & Bryna, Inc.
Ph. (206) 285-8282

Relinquished by:

Received by: Rusty Jones

Relinquished by: L2 Weber Bryna

Received by:

Relinquished by:	Received by:	Relinquished by:	Received by:
	Rusty Jones	L2 Weber Bryna	
	CRETE	CRETE	
	7/27/22 1150	7/29/22 1509	



Analytical Resources, LLC
Analytical Chemists and Consultants

22 August 2022

Michael Erdahl
Friedman & Bruya Inc.
3012 16th Avenue West
Seattle, WA 98119-2029

RE: 207511

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
22H0039

Associated SDG ID(s)
N/A

Susan
Dunnihoo

Digitally signed by
Susan Dunnihoo
Date: 2022.08.22
14:31:55 -07'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunnihoo, Director, Client Services

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.





Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SRWA-13 0-0.5'	22H0039-01	Solid	26-Jul-2022 09:40	02-Aug-2022 10:30
SRWA-14 0-1'	22H0039-02	Solid	26-Jul-2022 10:20	02-Aug-2022 10:30
SRWA-14 1-2'	22H0039-03	Solid	26-Jul-2022 10:30	02-Aug-2022 10:30
SRWA-15 0-0.5'	22H0039-04	Solid	26-Jul-2022 12:30	02-Aug-2022 10:30
SRWA-8 0-1'	22H0039-05	Solid	26-Jul-2022 13:30	02-Aug-2022 10:30
SRWA-9 2.5-5'	22H0039-06	Solid	26-Jul-2022 15:30	02-Aug-2022 10:30
SRWA-9	22H0039-07	Water	26-Jul-2022 15:45	02-Aug-2022 10:30



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Work Order Case Narrative

Client: Friedman & Bruya Inc.
Project: 207511
Work Order: 22H0039

Sample receipt

Samples as listed on the preceding page were received 02-Aug-2022 10:30 under ARI work order 22H0039. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Butyl Tin(s) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The batch BKH0105 matrix spike/matrix spike duplicate (MS/MSD) percent recoveries were within limits. The relative percent difference (RPD) was outside advisory control limits for the butyl tin ion and has been flagged on the summary sheet.



Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Friedman, E. Bump

COC No(s): _____ NA

Assigned ARI Job No: 22H0039

Project Name: _____

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: 5909 4343 5553 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? _____

YES ☐ NO ☒

Were custody papers included with the cooler? _____

YES ☒ NO ☐

Were custody papers properly filled out (ink, signed, etc.) _____

YES ☒ NO ☐

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 10:30

6.8

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID# 9708

Cooler Accepted by: HN

Date: 08/02/22

Time: 10:30

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____

YES ☐ NO ☒

What kind of packing material was used? ... Bubble Wrap-Wet Ice-Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____

NA ☐ YES ☒ NO ☐

How were bottles sealed in plastic bags? _____

Individually ☐ Grouped ☒ Not ☐

Did all bottles arrive in good condition (unbroken)? _____

YES ☒ NO ☐

Were all bottle labels complete and legible? _____

YES ☒ NO ☐

Did the number of containers listed on COC match with the number of containers received? _____

YES ☒ NO ☐

Did all bottle labels and tags agree with custody papers? _____

YES ☒ NO ☐

Were all bottles used correct for the requested analyses? _____

YES ☒ NO ☐

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...

NA ☒ YES ☐ NO ☐

Were all VOC vials free of air bubbles? _____

NA ☒ YES ☐ NO ☐

Was sufficient amount of sample sent in each bottle? _____

YES ☒ NO ☐

Date VOC Trip Blank was made at ARI: _____

NA ☒

Were the sample(s) split by ARI? ☒

YES

Date/Time: _____

Equipment: _____

Split by: _____

Samples Logged by: HN

Date: 08/02/22

Time: 14:01

Labels checked by: _____

** Notify Project Manager of discrepancies or concerns **

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC
SRWA 0-1	SRWA-8 0-1		

Additional Notes, Discrepancies, & Resolutions:

By: HN

Date: 08/02/22



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-13 0-0.5'
22H0039-01 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/26/2022 09:40

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 15:09

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BKH0105
Prepared: 08/05/2022

Sample Size: 6.86 g (wet)
Final Volume: 0.5 mL

Extract ID: 22H0039-01 A 01
Dry Weight: 5.00 g
% Solids: 72.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.450	3.86	486	ug/kg	E
Dibutyltin Ion	14488-53-0	1	1.73	5.78	79.7	ug/kg	
Butyltin Ion	78763-54-9	1	1.89	4.08	759	ug/kg	E
Tetrabutyltin	1461-25-2	1	5.00	5.00	5.07	ug/kg	
Surrogate: Triphenyltin				30-160 %	111	%	
Surrogate: Tripropyltin				30-160 %	63.3	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-13 0-0.5'
22H0039-01RE1 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT12 Analyst: JZ

Sampled: 07/26/2022 09:40
Analyzed: 08/08/2022 17:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave) Extract ID: 22H0039-01RE1 A 01
Preparation Batch: BKH0105 Sample Size: 6.86 g (wet) Dry Weight: 5.00 g
Prepared: 08/05/2022 Final Volume: 0.5 mL % Solids: 72.94

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	5	2.25	19.3	508	ug/kg	D
Dibutyltin Ion	14488-53-0	5	8.64	28.9	85.6	ug/kg	D
Butyltin Ion	78763-54-9	5	9.44	20.4	921	ug/kg	D
Tetrabutyltin	1461-25-2	5	25.0	25.0	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	107	%	
Surrogate: Tripropyltin				30-160 %	64.0	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-14 0-1'
22H0039-02 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/26/2022 10:20

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 15:27

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3546 (Microwave)

Extract ID: 22H0039-02 A 01

Preparation Batch: BKH0105

Sample Size: 5.67 g (wet)

Dry Weight: 5.05 g

Prepared: 08/05/2022

Final Volume: 0.5 mL

% Solids: 89.04

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	I	0.446	3.82	2.18	ug/kg	J
Dibutyltin Ion	14488-53-0	I	1.71	5.72	7.67	ug/kg	
Butyltin Ion	78763-54-9	I	1.87	4.04	11.7	ug/kg	
Tetrabutyltin	1461-25-2	I	4.95	4.95	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	115	%	
Surrogate: Tripropyltin				30-160 %	76.2	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-15 0-0.5'
22H0039-04 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT12 Analyst: JZ

Sampled: 07/26/2022 12:30
Analyzed: 08/08/2022 15:44

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave) Extract ID: 22H0039-04 A 01
Preparation Batch: BKH0105 Sample Size: 5.96 g (wet) Dry Weight: 5.03 g
Prepared: 08/05/2022 Final Volume: 0.5 mL % Solids: 84.35

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.448	3.84	0.624	ug/kg	J
Dibutyltin Ion	14488-53-0	1	1.72	5.75	2.21	ug/kg	J
Butyltin Ion	78763-54-9	1	1.88	4.06	2.83	ug/kg	J
Tetrabutyltin	1461-25-2	1	4.97	4.97	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	98.4	%	
Surrogate: Tripropyltin				30-160 %	60.4	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-8 0-1'
22H0039-05 (Solid)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT12 Analyst: JZ

Sampled: 07/26/2022 13:30
Analyzed: 08/08/2022 16:02

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BKH0105
Prepared: 08/05/2022

Sample Size: 5.98 g (wet)
Final Volume: 0.5 mL

Extract ID: 22H0039-05 A.01
Dry Weight: 5.00 g
% Solids: 83.66

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.450	3.86	7.22	ug/kg	
Dibutyltin Ion	14488-53-0	1	1.73	5.78	6.40	ug/kg	
Butyltin Ion	78763-54-9	1	1.89	4.08	2.59	ug/kg	J
Tetrabutyltin	1461-25-2	1	5.00	5.00	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	84.5	%	
Surrogate: Tripropyltin				30-160 %	61.1	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-9 2.5-5'
22H0039-06 (Solid)

Butyl Tins

Method: EPA 8270E-SIM

Sampled: 07/26/2022 15:30

Instrument: NT12 Analyst: JZ

Analyzed: 08/08/2022 16:19

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3546 (Microwave)
Preparation Batch: BKH0105
Prepared: 08/05/2022

Sample Size: 5.42 g (wet)
Final Volume: 0.5 mL

Extract ID: 22H0039-06 A 01
Dry Weight: 5.01 g
% Solids: 92.36

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.449	3.86	ND	ug/kg	U
Dibutyltin Ion	14488-53-0	1	1.73	5.77	ND	ug/kg	U
Butyltin Ion	78763-54-9	1	1.89	4.08	ND	ug/kg	U
Tetrabutyltin	1461-25-2	1	4.99	4.99	ND	ug/kg	U
Surrogate: Triphenyltin				30-160 %	105	%	
Surrogate: Tripropyltin				30-160 %	68.5	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

SRWA-9
22H0039-07 (Water)

Butyl Tins

Method: EPA 8270E-SIM
Instrument: NT14 Analyst: VTS

Sampled: 07/26/2022 15:45
Analyzed: 08/09/2022 09:04

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BKH0047
Prepared: 08/02/2022

Sample Size: 150 mL
Final Volume: 0.5 mL

Extract ID: 22H0039-07 A 01

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Tributyltin Ion	36643-28-4	1	0.0052	ND	ug/L	U
Dibutyltin Ion	14488-53-0	1	0.0077	ND	ug/L	U
Butyltin Ion	78763-54-9	1	0.0060	0.0215	ug/L	B
Tetrabutyltin	1461-25-2	1	0.0300	ND	ug/L	U
Surrogate: Triphenyltin			30-160 %	71.7	%	
Surrogate: Tripropyltin			30-160 %	47.2	%	



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Analysis by: Analytical Resources, LLC

Butyl Tins - Quality Control

Batch BKH0047 - EPA 3510C SepF

Instrument: NT14 Analyst: VTS

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKH0047-BLK1) Prepared: 02-Aug-2022 Analyzed: 09-Aug-2022 08:25										
Tributyltin Ion	ND	0.0052	ug/L							U
Dibutyltin Ion	ND	0.0077	ug/L							U
Butyltin Ion	0.0068	0.0060	ug/L							
Tetrabutyltin	ND	0.0300	ug/L							U
Surrogate: Triphenyltin	0.0655		ug/L	0.0753		87.0	30-160			
Surrogate: Tripropyltin	0.0390		ug/L	0.0729		53.4	30-160			
LCS (BKH0047-BS1) Prepared: 02-Aug-2022 Analyzed: 09-Aug-2022 08:50										
Tributyltin Ion	0.0984	0.0052	ug/L	0.149		66.3	30-160			
Dibutyltin Ion	0.118	0.0077	ug/L	0.128		92.0	30-160			
Butyltin Ion	0.0597	0.0060	ug/L	0.104		57.5	30-160			B
Surrogate: Triphenyltin	0.0695		ug/L	0.0753		92.3	30-160			
Surrogate: Tripropyltin	0.0446		ug/L	0.0729		61.1	30-160			
Matrix Spike (BKH0047-MS1) Source: 22H0039-07 Prepared: 02-Aug-2022 Analyzed: 09-Aug-2022 09:18										
Tributyltin Ion	0.0978	0.0057	ug/L	0.163	ND	60.1	30-160			
Dibutyltin Ion	0.120	0.0084	ug/L	0.140	ND	85.4	30-160			
Butyltin Ion	0.0956	0.0066	ug/L	0.114	0.0215	65.2	30-160			B
Surrogate: Triphenyltin	0.0693		ug/L	0.0824	0.0540	84.1	30-160			
Surrogate: Tripropyltin	0.0419		ug/L	0.0798	0.0344	52.5	30-160			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BKH0047-MSD1) Source: 22H0039-07 Prepared: 02-Aug-2022 Analyzed: 09-Aug-2022 09:32										
Tributyltin Ion	0.0891	0.0057	ug/L	0.163	ND	54.8	30-160	9.32	30	
Dibutyltin Ion	0.111	0.0084	ug/L	0.140	ND	79.2	30-160	7.53	30	
Butyltin Ion	0.0868	0.0066	ug/L	0.114	0.0215	57.5	30-160	9.59	30	B
Surrogate: Triphenyltin	0.0622		ug/L	0.0824	0.0540	75.4	30-160			
Surrogate: Tripropyltin	0.0371		ug/L	0.0798	0.0344	46.5	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Analysis by: Analytical Resources, LLC

Butyl Tins - Quality Control

Batch BKH0105 - EPA 3546 (Microwave)

Instrument: NT12 Analyst: JZ

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKH0105-BLK1) Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 13:59											
Tributyltin Ion	ND	0.450	3.86	ug/kg							U
Dibutyltin Ion	ND	1.73	5.78	ug/kg							U
Butyltin Ion	ND	1.89	4.08	ug/kg							U
Tetrabutyltin	ND	5.00	5.00	ug/kg							U
Surrogate: Triphenyltin	40.6			ug/kg	45.2		90.0	30-160			
Surrogate: Tripropyltin	33.8			ug/kg	43.7		77.3	30-160			
LCS (BKH0105-BS1) Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 14:16											
Tributyltin Ion	32.9	0.450	3.86	ug/kg	44.6		73.8	30-160			
Dibutyltin Ion	35.7	1.73	5.78	ug/kg	38.4		93.1	30-160			
Butyltin Ion	22.9	1.89	4.08	ug/kg	31.2		73.4	30-160			
Surrogate: Triphenyltin	42.2			ug/kg	45.2		93.4	30-160			
Surrogate: Tripropyltin	31.1			ug/kg	43.7		71.0	30-160			
Matrix Spike (BKH0105-MS1) Source: 22H0039-06 Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 16:37											
Tributyltin Ion	29.7	0.449	3.86	ug/kg	44.5	ND	66.7	30-160			
Dibutyltin Ion	36.5	1.73	5.77	ug/kg	38.3	ND	95.3	30-160			
Butyltin Ion	22.6	1.89	4.08	ug/kg	31.1	ND	72.6	30-160			
Surrogate: Triphenyltin	47.4			ug/kg	45.1	47.5	105	30-160			
Surrogate: Tripropyltin	27.5			ug/kg	43.7	29.9	62.9	30-160			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BKH0105-MSD1) Source: 22H0039-06 Prepared: 05-Aug-2022 Analyzed: 08-Aug-2022 16:54											
Tributyltin Ion	29.3	0.449	3.86	ug/kg	44.5	ND	65.9	30-160	1.22	30	
Dibutyltin Ion	33.1	1.73	5.77	ug/kg	38.3	ND	86.4	30-160	9.78	30	
Butyltin Ion	11.9	1.89	4.08	ug/kg	31.1	ND	38.4	30-160	61.70	30	*
Surrogate: Triphenyltin	44.5			ug/kg	45.1	47.5	98.5	30-160			
Surrogate: Tripropyltin	23.1			ug/kg	43.7	29.9	52.9	30-160			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Certified Analyses included in this Report

Analyte	Certifications
EPA 8270E-SIM in Solid	
Tributyltin Ion	WADOE, DoD-ELAP, NELAP
Dibutyltin Ion	WADOE, DoD-ELAP, NELAP
Butyltin Ion	WADOE, NELAP
Tetrabutyltin	NELAP
EPA 8270E-SIM in Water	
Tributyltin Ion	NELAP, WADOE, DoD-ELAP
Dibutyltin Ion	NELAP, WADOE, DoD-ELAP
Butyltin Ion	NELAP, WADOE, DoD-ELAP
Tetrapentyltin	NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2023



Friedman & Bruya Inc.
3012 16th Avenue West
Seattle WA, 98119-2029

Project: 207511
Project Number: [none]
Project Manager: Michael Erdahl

Reported:
22-Aug-2022 11:47

Notes and Definitions

- * Flagged value is not within established control limits.
- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- J Estimated concentration value detected below the reporting limit.
- U This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



Test Report



August 19, 2022

Mr. Michael Erdahl
Friedman and Bruya, Inc.
3012 16th Ave. W
Seattle, WA 98119

Dear Mr. Erdahl,

The following results are associated with Frontier Analytical Laboratory project **14540**. This corresponds to your project number **207511** and purchase order number **C-264**. Six soil samples and one aqueous sample were received on 8/3/2022 in good condition. Per your instructions, samples 14540-003-SA and 14540-007-SA (Friedman and Bruya Inc., sample IDs: SRWA-14 1-2 & SRWA-9 respectively) were placed on hold. The remaining samples were extracted and analyzed by EPA Method 1613 for tetra through octa chlorinated dibenzo dioxins and furans. The Toxic Equivalency (TEQ) for your samples has been calculated using the 2005 World Health Organization's (WHO's) toxic equivalency factors (TEFs). Friedman and Bruya, Inc. requested a turnaround time of fifteen business days for project **14540**.

Please note sample 14540-001-SA (Friedman and Bruya Inc., sample ID: SRWA-13 0-0.5) had to be diluted and reanalyzed due to high levels of hepta chlorinated dibenzo dioxins (HpCDD) and octa chlorinated dibenzo dioxin (OCDD). Results taken from the dilution and reanalysis have been noted with the "*" qualifier.

The following report consists of an Analytical Data section and a Sample Receipt section. The Analytical Data section contains our sample tracking log and the analytical results. The Sample Receipt section contains your chain of custody, your email dated 8/3/22 placing sample 14540-003-SA (Friedman and Bruya Inc., sample ID: SRWA-14 1-2) on hold, our sample login form and a sample photo. The enclosed results and electronic data deliverable (EDD) are specifically for the samples referenced in this report only. These results meet all NELAP requirements and shall not be reproduced except in full. Frontier Analytical Laboratory's State of Oregon NELAP certificate number is **4041**, our State of California ELAP certificate number is **2934** and our State of Washington certificate number is **C844**. This report along with the associated EDD has been emailed to you. A hardcopy of this report will not be sent to you unless specifically requested.

If you have any questions regarding project **14540**, please feel free to contact me at (916) 934-0900. Thank you for choosing Frontier Analytical Laboratory for your analytical testing needs.

Sincerely,

Thomas C. Crabtree
Director

FRONTIER ANALYTICAL LABORATORY

5172 Hillsdale Circle * El Dorado Hills, CA 95762

Tel (916) 934-0900 * Fax (916) 934-0999

www.frontieranalytical.com

Frontier Analytical Laboratory

Sample Tracking Log

FAL Project ID: **14540**

Received on: **08/03/2022**

Project Due: **08/25/2022**

Storage: **R-4**

FAL Sample ID	Dup	Client Project ID	Client Sample ID	Requested Method	Matrix	Sampling Date	Sampling Time	Hold Time Due Date
14540-001-SA	0	207511	SRWA-13 0-0.5	EPA 1613 D/F	Soil	07/26/2022	09:40 am	07/26/2023
14540-002-SA	0	207511	SRWA-14 0-1	EPA 1613 D/F	Soil	07/26/2022	10:20 am	07/26/2023
14540-003-SA	0	207511	SRWA-14 1-2	EPA 1613 D/F	Soil	07/26/2022	10:30 am	07/26/2023
14540-004-SA	0	207511	SRWA-15 0-0.5	EPA 1613 D/F	Soil	07/26/2022	12:30 pm	07/26/2023
14540-005-SA	0	207511	SRWA-8 0-1	EPA 1613 D/F	Soil	07/26/2022	01:30 pm	07/26/2023
14540-006-SA	0	207511	SRWA-9 2.5-5	EPA 1613 D/F	Soil	07/26/2022	03:30 pm	07/26/2023
14540-007-SA	0	207511	SRWA-9	EPA 1613 D/F	Aqueous	07/26/2022	03:45 pm	07/26/2023

FAL Sample ID	Notes
14540-003-SA 14540-007-SA	'HOLD' Sample placed on hold via email dated 8/18/2022. BS

EPA Method 1613 PCDD/F



FAL ID: 14540-001-MB
Client ID: Method Blank
Matrix: Soil
Batch No: X6163

Date Extracted: 08-10-2022
Date Received: NA
Amount: 10.0 g

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-12-2022
2005 WHO TEQ: 0.0
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	ND	0.0945		-	0.0286				
1,2,3,7,8-PeCDD	ND	0.211		-	0.0515				
1,2,3,4,7,8-HxCDD	ND	0.216		-	0.0555				
1,2,3,6,7,8-HxCDD	ND	0.232		-	0.0558	Total TCDD	ND	0.0945	
1,2,3,7,8,9-HxCDD	ND	0.207		-	0.0528	Total PeCDD	ND	0.211	
1,2,3,4,6,7,8-HpCDD	ND	0.255		-	0.0712	Total HxCDD	ND	0.232	
OCDD	ND	0.487		-	0.195	Total HpCDD	ND	0.255	
2,3,7,8-TCDF	ND	0.0706		-	0.0231				
1,2,3,7,8-PeCDF	ND	0.100		-	0.0324				
2,3,4,7,8-PeCDF	ND	0.105		-	0.0322				
1,2,3,4,7,8-HxCDF	ND	0.0861		-	0.0339				
1,2,3,6,7,8-HxCDF	ND	0.0845		-	0.0340				
2,3,4,6,7,8-HxCDF	ND	0.0959		-	0.0353				
1,2,3,7,8,9-HxCDF	ND	0.119		-	0.0451	Total TCDF	ND	0.0706	
1,2,3,4,6,7,8-HpCDF	ND	0.158		-	0.0350	Total PeCDF	ND	0.105	
1,2,3,4,7,8,9-HpCDF	ND	0.202		-	0.0421	Total HxCDF	ND	0.119	
OCDF	ND	0.371		-	0.0820	Total HpCDF	ND	0.202	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	46.5	25.0 - 164	
13C-1,2,3,7,8-PeCDD	57.5	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	66.4	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	66.9	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	58.4	23.0 - 140	
13C-OCDD	51.3	17.0 - 157	
13C-2,3,7,8-TCDF	62.4	24.0 - 169	
13C-1,2,3,7,8-PeCDF	67.6	24.0 - 185	
13C-2,3,4,7,8-PeCDF	65.5	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	71.4	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	68.4	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	63.5	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	60.5	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	63.3	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	55.0	26.0 - 138	
13C-OCDF	48.3	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD 67.9 35.0 - 197

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
- B Analyte is present in Method Blank
- C Chemical Interference
- D Presence of Diphenyl Ethers
- DNQ Analyte concentration is below calibration range
- E Analyte concentration is above calibration range
- F Analyte confirmation on secondary column
- J Analyte concentration is below calibration range
- M Maximum possible concentration
- ND Analyte Not Detected at Detection Limit Level
- NP Not Provided
- P Pre-filtered through a Whatman 0.7um GF/F filter
- S Sample acceptance criteria not met
- X Matrix interferences
- * Result taken from dilution or reinjection

Analyst: 

Date: 8/15/2022

Reviewed By: 

Date: 8/18/2022

EPA Method 1613 PCDD/F



FAL ID: 14540-001-OPR
Client ID: OPR
Matrix: Soil
Batch No: X6163


Date Extracted: 08-10-2022
Date Received: NA
Amount: 10.00 g


ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: ng/ml

Acquired: 08-12-2022
2005 WHO TEQ: NA

Compound	Conc	QC Limits	Qual
2,3,7,8-TCDD	10.3	6.70 - 15.8	
1,2,3,7,8-PeCDD	49.4	35.0 - 71.0	
1,2,3,4,7,8-HxCDD	50.0	35.0 - 82.0	
1,2,3,6,7,8-HxCDD	51.0	38.0 - 67.0	
1,2,3,7,8,9-HxCDD	50.1	32.0 - 81.0	
1,2,3,4,6,7,8-HpCDD	52.5	35.0 - 70.0	
OCDD	106	78.0 - 144	
2,3,7,8-TCDF	8.92	7.50 - 15.8	
1,2,3,7,8-PeCDF	52.2	40.0 - 67.0	
2,3,4,7,8-PeCDF	52.2	34.0 - 80.0	
1,2,3,4,7,8-HxCDF	52.6	36.0 - 67.0	
1,2,3,6,7,8-HxCDF	52.9	42.0 - 65.0	
2,3,4,6,7,8-HxCDF	53.9	35.0 - 78.0	
1,2,3,7,8,9-HxCDF	53.7	39.0 - 65.0	
1,2,3,4,6,7,8-HpCDF	52.8	41.0 - 61.0	
1,2,3,4,7,8,9-HpCDF	52.3	39.0 - 69.0	
OCDF	108	63.0 - 170	
Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	54.6	20.0 - 175	
13C-1,2,3,7,8-PeCDD	79.4	21.0 - 227	
13C-1,2,3,4,7,8-HxCDD	85.7	21.0 - 193	
13C-1,2,3,6,7,8-HxCDD	84.6	25.0 - 163	
13C-1,2,3,4,6,7,8-HpCDD	72.9	26.0 - 166	
13C-OCDD	62.6	13.0 - 198	
13C-2,3,7,8-TCDF	84.7	22.0 - 152	
13C-1,2,3,7,8-PeCDF	86.7	21.0 - 192	
13C-2,3,4,7,8-PeCDF	86.1	13.0 - 328	
13C-1,2,3,4,7,8-HxCDF	88.6	19.0 - 202	
13C-1,2,3,6,7,8-HxCDF	84.1	21.0 - 159	
13C-2,3,4,6,7,8-HxCDF	82.3	22.0 - 176	
13C-1,2,3,7,8,9-HxCDF	78.0	17.0 - 205	
13C-1,2,3,4,6,7,8-HpCDF	78.1	21.0 - 158	
13C-1,2,3,4,7,8,9-HpCDF	72.4	20.0 - 186	
13C-OCDF	63.5	13.0 - 198	
Cleanup Surrogate			
37Cl-2,3,7,8-TCDD	91.4	31.0 - 191	

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
- B Analyte is present in Method Blank
- C Chemical Interference
- D Presence of Diphenyl Ethers
- DNQ Analyte concentration is below calibration range
- E Analyte concentration is above calibration range
- F Analyte confirmation on secondary column
- J Analyte concentration is below calibration range
- M Maximum possible concentration
- ND Analyte Not Detected at Detection Limit Level
- NP Not Provided
- P Pre-filtered through a Whatman 0.7um GF/F filter
- S Sample acceptance criteria not met
- X Matrix interferences
- * Result taken from dilution or reinjection

Analyst: 
Date: 8/15/2022

Reviewed By: 
Date: 8/18/2022

EPA Method 1613 PCDD/F



FAL ID: 14540-001-SA
Client ID: SRWA-13 0-0.5
Matrix: Soil
Batch No: X6163

Date Extracted: 08-10-2022
Date Received: 08-03-2022
Amount: 10.1 g
% Solids: 64.37

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-12-2022
2005 WHO TEQ: 103
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	1.88	-		1.88	0.0286				
1,2,3,7,8-PeCDD	20.7	-		20.7	0.0515				
1,2,3,4,7,8-HxCDD	35.0	-		3.50	0.0555				
1,2,3,6,7,8-HxCDD	122	-		12.2	0.0558	Total TCDD	18.4	-	
1,2,3,7,8,9-HxCDD	76.6	-		7.66	0.0528	Total PeCDD	104	-	
1,2,3,4,6,7,8-HpCDD	3350	-	*	33.5	0.0712	Total HxCDD	851	-	
OCDD	35600	-	*	10.7	0.195	Total HpCDD	6970	-	*
2,3,7,8-TCDF	3.20	-	F	0.320	0.0231				
1,2,3,7,8-PeCDF	2.30	-		0.0690	0.0324				
2,3,4,7,8-PeCDF	6.66	-		2.00	0.0322				
1,2,3,4,7,8-HxCDF	11.0	-		1.10	0.0339				
1,2,3,6,7,8-HxCDF	9.34	-		0.934	0.0340				
2,3,4,6,7,8-HxCDF	13.3	-		1.33	0.0353				
1,2,3,7,8,9-HxCDF	2.46	-		0.246	0.0451	Total TCDF	56.6	-	D,M
1,2,3,4,6,7,8-HpCDF	553	-		5.53	0.0350	Total PeCDF	114	-	D,M
1,2,3,4,7,8,9-HpCDF	20.0	-		0.200	0.0421	Total HxCDF	499	-	D,M
OCDF	2300	-		0.690	0.0820	Total HpCDF	2050	-	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	88.1	25.0 - 164	
13C-1,2,3,7,8-PeCDD	85.2	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	88.4	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	84.9	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	107	23.0 - 140	*
13C-OCDD	100	17.0 - 157	*
13C-2,3,7,8-TCDF	87.3	24.0 - 169	
13C-1,2,3,7,8-PeCDF	104	24.0 - 185	
13C-2,3,4,7,8-PeCDF	106	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	102	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	96.7	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	96.3	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	98.8	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	108	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	103	26.0 - 138	
13C-OCDF	117	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD 79.7 35.0 - 197

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1

B Analyte is present in Method Blank

C Chemical Interference

D Presence of Diphenyl Ethers

DNQ Analyte concentration is below calibration range

E Analyte concentration is above calibration range

F Analyte confirmation on secondary column

J Analyte concentration is below calibration range

M Maximum possible concentration

ND Analyte Not Detected at Detection Limit Level

NP Not Provided

P Pre-filtered through a Whatman 0.7um GF/F filter

S Sample acceptance criteria not met

X Matrix interferences

* Result taken from dilution or reinjection

Analyst: 

Date: 8/15/2022

Reviewed By: 

Date: 8/18/2022

EPA Method 1613 PCDD/F



FAL ID: 14540-002-SA
Client ID: SRWA-14 0-1
Matrix: Soil
Batch No: X6163

Date Extracted: 08-10-2022
Date Received: 08-03-2022
Amount: 10.1 g
% Solids: 41.43

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-12-2022
2005 WHO TEQ: 13.4
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	0.174	-	J	0.174	0.0286				
1,2,3,7,8-PeCDD	2.04	-	J	2.04	0.0515				
1,2,3,4,7,8-HxCDD	4.05	-		0.405	0.0555				
1,2,3,6,7,8-HxCDD	20.9	-		2.09	0.0558	Total TCDD	0.794	-	
1,2,3,7,8,9-HxCDD	9.78	-		0.978	0.0528	Total PeCDD	6.88	-	
1,2,3,4,6,7,8-HpCDD	468	-		4.68	0.0712	Total HxCDD	92.5	-	
OCDD	3390	-		1.02	0.195	Total HpCDD	804	-	
2,3,7,8-TCDF	0.921	-		0.0921	0.0231				
1,2,3,7,8-PeCDF	1.68	-	J	0.0504	0.0324				
2,3,4,7,8-PeCDF	2.31	-	J	0.693	0.0322				
1,2,3,4,7,8-HxCDF	2.74	-		0.274	0.0339				
1,2,3,6,7,8-HxCDF	1.31	-	J	0.131	0.0340				
2,3,4,6,7,8-HxCDF	1.92	-	J	0.192	0.0353				
1,2,3,7,8,9-HxCDF	1.49	-	J	0.149	0.0451	Total TCDF	11.5	-	D,M
1,2,3,4,6,7,8-HpCDF	39.4	-		0.394	0.0350	Total PeCDF	28.3	-	D,M
1,2,3,4,7,8,9-HpCDF	1.46	-	J	0.0146	0.0421	Total HxCDF	89.3	-	D,M
OCDF	62.9	-		0.0189	0.0820	Total HpCDF	127	-	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	89.9	25.0 - 164	
13C-1,2,3,7,8-PeCDD	80.8	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	93.7	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	93.1	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	102	23.0 - 140	
13C-OCDD	94.9	17.0 - 157	
13C-2,3,7,8-TCDF	90.8	24.0 - 169	
13C-1,2,3,7,8-PeCDF	103	24.0 - 185	
13C-2,3,4,7,8-PeCDF	107	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	110	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	103	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	102	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	100	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	101	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	96.4	26.0 - 138	
13C-OCDF	94.2	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD 83.9 35.0 - 197

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
- B Analyte is present in Method Blank
- C Chemical Interference
- D Presence of Diphenyl Ethers
- DNQ Analyte concentration is below calibration range
- E Analyte concentration is above calibration range
- F Analyte confirmation on secondary column
- J Analyte concentration is below calibration range
- M Maximum possible concentration
- ND Analyte Not Detected at Detection Limit Level
- NP Not Provided
- P Pre-filtered through a Whatman 0.7um GF/F filter
- S Sample acceptance criteria not met
- X Matrix interferences
- * Result taken from dilution or reinjection

Analyst: 

Date: 8/15/2022

Reviewed By: 

Date: 8/18/2022

EPA Method 1613 PCDD/F



FAL ID: 14540-004-SA
Client ID: SRWA-15 0-0.5
Matrix: Soil
Batch No: X6163

Date Extracted: 08-10-2022
Date Received: 08-03-2022
Amount: 10.1 g
% Solids: 88.83

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-12-2022
2005 WHO TEQ: 0.362
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	ND	0.0553		-	0.0286				
1,2,3,7,8-PeCDD	ND	0.0915		-	0.0515				
1,2,3,4,7,8-HxCDD	0.323	-	J	0.0323	0.0555				
1,2,3,6,7,8-HxCDD	0.522	-	J	0.0522	0.0558	Total TCDD	0.108	-	J
1,2,3,7,8,9-HxCDD	0.318	-	J	0.0318	0.0528	Total PeCDD	0.523	-	J,M
1,2,3,4,6,7,8-HpCDD	11.6	-		0.116	0.0712	Total HxCDD	4.29	-	
OCDD	97.8	-		0.0293	0.195	Total HpCDD	26.4	-	
2,3,7,8-TCDF	ND	0.0546		-	0.0231				
1,2,3,7,8-PeCDF	ND	0.0814		-	0.0324				
2,3,4,7,8-PeCDF	ND	0.0853		-	0.0322				
1,2,3,4,7,8-HxCDF	0.156	-	J	0.0156	0.0339				
1,2,3,6,7,8-HxCDF	0.137	-	J	0.0137	0.0340				
2,3,4,6,7,8-HxCDF	0.158	-	J	0.0158	0.0353				
1,2,3,7,8,9-HpCDF	0.122	-	J	0.0122	0.0451	Total TCDF	0.973	-	
1,2,3,4,6,7,8-HpCDF	3.82	-		0.0382	0.0350	Total PeCDF	1.33	-	J,M
1,2,3,4,7,8,9-HpCDF	0.219	-	J	0.00219	0.0421	Total HxCDF	3.53	-	
OCDF	7.31	-		0.00219	0.0820	Total HpCDF	8.91	-	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	88.4	25.0 - 164	
13C-1,2,3,7,8-PeCDD	82.7	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	101	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	97.1	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	95.7	23.0 - 140	
13C-OCDD	80.8	17.0 - 157	
13C-2,3,7,8-TCDF	91.4	24.0 - 169	
13C-1,2,3,7,8-PeCDF	104	24.0 - 185	
13C-2,3,4,7,8-PeCDF	104	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	113	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	104	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	114	28.0 - 136	
13C-1,2,3,7,8,9-HpCDF	97.6	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	99.1	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	92.9	26.0 - 138	
13C-OCDF	86.6	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD 85.9 35.0 - 197

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
- B Analyte is present in Method Blank
- C Chemical Interference
- D Presence of Diphenyl Ethers
- DNQ Analyte concentration is below calibration range
- E Analyte concentration is above calibration range
- F Analyte confirmation on secondary column
- J Analyte concentration is below calibration range
- M Maximum possible concentration
- ND Analyte Not Detected at Detection Limit Level
- NP Not Provided
- P Pre-filtered through a Whatman 0.7um GF/F filter
- S Sample acceptance criteria not met
- X Matrix interferences
- * Result taken from dilution or reinjection

Analyst:

Date: 8/15/2022

Reviewed By:

Date: 8/18/2022

EPA Method 1613 PCDD/F



FAL ID: 14540-005-SA
Client ID: SRWA-8 0-1
Matrix: Soil
Batch No: X6163

Date Extracted: 08-10-2022
Date Received: 08-03-2022
Amount: 10.3 g
% Solids: 54.89

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-12-2022
2005 WHO TEQ: 25.4
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	0.567	-		0.567	0.0286				
1,2,3,7,8-PeCDD	4.34	-		4.34	0.0515				
1,2,3,4,7,8-HxCDD	7.76	-		0.776	0.0555				
1,2,3,6,7,8-HxCDD	24.9	-		2.49	0.0558	Total TCDD	3.20	-	
1,2,3,7,8,9-HxCDD	18.9	-		1.89	0.0528	Total PeCDD	18.2	-	
1,2,3,4,6,7,8-HpCDD	934	-		9.34	0.0712	Total HxCDD	146	-	
OCDD	10300	-		3.09	0.195	Total HpCDD	1530	-	
2,3,7,8-TCDF	0.503	-		0.0503	0.0231				
1,2,3,7,8-PeCDF	0.821	-	J	0.0246	0.0324				
2,3,4,7,8-PeCDF	1.59	-	J	0.477	0.0322				
1,2,3,4,7,8-HxCDF	5.09	-		0.509	0.0339				
1,2,3,6,7,8-HxCDF	2.70	-		0.270	0.0340				
2,3,4,6,7,8-HxCDF	3.59	-		0.359	0.0353				
1,2,3,7,8,9-HxCDF	1.58	-	J	0.158	0.0451	Total TCDF	11.9	-	D,M
1,2,3,4,6,7,8-HpCDF	91.9	-		0.919	0.0350	Total PeCDF	29.3	-	
1,2,3,4,7,8,9-HpCDF	3.71	-		0.0371	0.0421	Total HxCDF	105	-	D,M
OCDF	294	-		0.0882	0.0820	Total HpCDF	293	-	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	86.6	25.0 - 164	
13C-1,2,3,7,8-PeCDD	87.8	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	83.9	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	83.0	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	93.7	23.0 - 140	
13C-OCDD	101	17.0 - 157	
13C-2,3,7,8-TCDF	86.0	24.0 - 169	
13C-1,2,3,7,8-PeCDF	98.8	24.0 - 185	
13C-2,3,4,7,8-PeCDF	102	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	95.2	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	88.3	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	89.0	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	87.3	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	89.8	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	91.3	26.0 - 138	
13C-OCDF	95.2	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD 79.6 35.0 - 197

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1

B Analyte is present in Method Blank

C Chemical Interference

D Presence of Diphenyl Ethers

DNQ Analyte concentration is below calibration range

E Analyte concentration is above calibration range

F Analyte confirmation on secondary column

J Analyte concentration is below calibration range

M Maximum possible concentration

ND Analyte Not Detected at Detection Limit Level

NP Not Provided

P Pre-filtered through a Whatman 0.7um GF/F filter

S Sample acceptance criteria not met

X Matrix interferences

* Result taken from dilution or reinjection

Analyst: 

Date: 8/15/2022

Reviewed By: 

Date: 8/18/2022

EPA Method 1613
PCDD/F



FAL ID: 14540-006-SA
Client ID: SRWA-9 2.5-5
Matrix: Soil
Batch No: X6163

Date Extracted: 08-10-2022
Date Received: 08-03-2022
Amount: 10.2 g
% Solids: 92.66

ICal: PCDDFAL3-4-29-22
GC Column: DB5MS
Units: pg/g

Acquired: 08-12-2022
2005 WHO TEQ: 0.00616
Basis: Dry Weight

Compound	Conc	DL	Qual	2005 WHO Tox	MDL	Compound	Conc	DL	Qual
2,3,7,8-TCDD	ND	0.0550		-	0.0286				
1,2,3,7,8-PeCDD	ND	0.123		-	0.0515				
1,2,3,4,7,8-HxCDD	ND	0.144		-	0.0555				
1,2,3,6,7,8-HxCDD	ND	0.147		-	0.0558	Total TCDD	ND	0.0550	
1,2,3,7,8,9-HxCDD	ND	0.135		-	0.0528	Total PeCDD	ND	0.123	
1,2,3,4,6,7,8-HpCDD	0.506	-	J	0.00506	0.0712	Total HxCDD	ND	0.147	
OCDD	3.66	-	J	0.00110	0.195	Total HpCDD	0.950	-	J
2,3,7,8-TCDF	ND	0.0586		-	0.0231				
1,2,3,7,8-PeCDF	ND	0.0804		-	0.0324				
2,3,4,7,8-PeCDF	ND	0.0852		-	0.0322				
1,2,3,4,7,8-HxCDF	ND	0.111		-	0.0339				
1,2,3,6,7,8-HxCDF	ND	0.112		-	0.0340				
2,3,4,6,7,8-HxCDF	ND	0.112		-	0.0353				
1,2,3,7,8,9-HxCDF	ND	0.151		-	0.0451	Total TCDF	ND	0.0586	
1,2,3,4,6,7,8-HpCDF	ND	0.127		-	0.0350	Total PeCDF	ND	0.0852	
1,2,3,4,7,8,9-HpCDF	ND	0.168		-	0.0421	Total HxCDF	ND	0.151	
OCDF	ND	0.231		-	0.0820	Total HpCDF	ND	0.168	

Internal Standards	% Rec	QC Limits	Qual
13C-2,3,7,8-TCDD	98.1	25.0 - 164	
13C-1,2,3,7,8-PeCDD	93.4	25.0 - 181	
13C-1,2,3,4,7,8-HxCDD	99.8	32.0 - 141	
13C-1,2,3,6,7,8-HxCDD	100	28.0 - 130	
13C-1,2,3,4,6,7,8-HpCDD	92.7	23.0 - 140	
13C-OCDD	77.6	17.0 - 157	
13C-2,3,7,8-TCDF	97.7	24.0 - 169	
13C-1,2,3,7,8-PeCDF	107	24.0 - 185	
13C-2,3,4,7,8-PeCDF	105	21.0 - 178	
13C-1,2,3,4,7,8-HxCDF	108	26.0 - 152	
13C-1,2,3,6,7,8-HxCDF	101	26.0 - 123	
13C-2,3,4,6,7,8-HxCDF	106	28.0 - 136	
13C-1,2,3,7,8,9-HxCDF	93.6	29.0 - 147	
13C-1,2,3,4,6,7,8-HpCDF	94.9	28.0 - 143	
13C-1,2,3,4,7,8,9-HpCDF	85.5	26.0 - 138	
13C-OCDF	79.2	17.0 - 157	

Cleanup Surrogate

37Cl-2,3,7,8-TCDD	90.8	35.0 - 197
-------------------	------	------------

- A Isotopic Labeled Standard outside QC range but signal to noise ratio is >10:1
- B Analyte is present in Method Blank
- C Chemical Interference
- D Presence of Diphenyl Ethers
- DNQ Analyte concentration is below calibration range
- E Analyte concentration is above calibration range
- F Analyte confirmation on secondary column
- J Analyte concentration is below calibration range
- M Maximum possible concentration
- ND Analyte Not Detected at Detection Limit Level
- NP Not Provided
- P Pre-filtered through a Whatman 0.7um GF/F filter
- S Sample acceptance criteria not met
- X Matrix interferences
- * Result taken from dilution or reinjection

Analyst:

Date: 8/15/2022

Reviewed By:

Date: 8/18/2022

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTOR <u>Frontier</u>	
PROJECT NAME/NO. <u>207511</u>	PO # <u>C-264</u>
REMARKS <u>14540</u> <u>50c</u>	

Page # 1 of 1

TURNAROUND TIME

☒ Standard TAT

☐ RUSH

Rush charges authorized by: _____

SAMPLE DISPOSAL

☐ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED										Notes
						8290 Dioxins/Furans	EPH	VPH								
SRWA-13 0.0.5'		7-26-22	0940	Soil	1	✓										
SRWA-14 0.1'			1020		1	✓										
SRWA-14 1.2'			1030		1	✓										HOLD.
SRWA-15 0.0.5'			1230		1	✓										
SRWA-8 0.1'			1330		1	✓										
SRWA-9 2.5-5'			1530		1	✓										
SRWA-9			1545	Water	1	✓										Aqueous sample placed on hold via email on 8/13/22
- michael to Kathy - use EPA method 1613. KZ 8/04/22.																
- OKay to leave the (') sign off Sample IDs KZ 8/18/22																

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <u>[Signature]</u>	Michael Erdahl	Friedman & Bruya	8/2/22	0745
Received by: <u>Kathy Zipp</u>	Kathy Zipp	Frontier	8/03/22	0945
Relinquished by:				
Received by:				

Appendix C

Tidal Study

This page intentionally left blank.

**PORT OF FRIDAY HARBOR
ALBERT JENSEN AND SONS INC. BOATYARD AND MARINA
FRIDAY HARBOR, WA**

**MODEL TOXICS CONTROL ACT (MTCA)
AGREED ORDER No. DE 18071**

**REMEDIAL INVESTIGATION REPORT – UPLAND AREA
TIDAL STUDY**

Prepared for
The Port of Friday Harbor
Friday Harbor, WA



Prepared by
Leon Environmental, LLC and CRETE Consulting Inc.
Seattle, WA



July 2025

Table of Contents

List of Tables	2
List of Figures	2
1 INTRODUCTION	3
2 DATA COLLECTION AND ANALYSIS.....	3
2.1 METHODOLOGY	3
2.2 WATER LEVEL ELEVATION CONVERSIONS.....	3
2.4 TIDAL EFFICIENCY	4
2.5 LAG TIME	4
2.6 NET GROUNDWATER FLOW	4
3 TIDAL STUDY RESULTS.....	5
3.1 TIDAL RANGE AND TIDAL EFFICIENCY RESULTS	5
3.2 LAG TIME RESULTS.....	5
3.3 NET GROUNDWATER FLOW	6
3.4 GROUNDWATER SAMPLE TIMING	6
4 REFERENCES	6

List of Tables

Table C-1 - Level Logger Type and Placement

Table C-2 - Monitoring Well Gauging, Select Transducer Readings

Table C-3 - Tidal Lag Time Analysis at Monitoring Wells

List of Figures

Figure C-1 Site Location Map

Figure C-2 Monitoring Well and Tide Water Levels (Unabridged)

Figure C-3 Monitoring Well and Tide Water Levels (Abridged)

Figure C-4 Net Groundwater Flow

1 INTRODUCTION

The Albert Jensen and Sons Inc. Marina and Boatyard (site) is located at 1293 Turn Point Road, Friday Harbor, Washington on San Juan Island in the Salish Sea. Shoreline properties bounding the Salish Sea are presumed to be tidally influenced. Until present, it was unclear if and how much the site and the extent of the tidal influence to shallow groundwater at the site. In tidally influenced groundwater monitoring wells, samples are typically collected during a negative low tide. In this area of the Salish Sea, negative low tides occur during approximately four-to-eleven-day periods that are approximately three to ten days apart. Groundwater is sampled during the time of low groundwater elevation in each well in order to collect samples that are most representative of the aquifer groundwater.

The purpose of the tidal study is to:

1. Determine if the Site monitoring wells are tidally influenced.
2. If tidally influenced, estimate tidal lag times for each monitoring well to determine when groundwater sampling should be performed relative to low tide.
3. Define net groundwater flow conditions.

2 DATA COLLECTION AND ANALYSIS

2.1 METHODOLOGY

The tidal study was conducted from August 5-16, 2022 during a time period including negative and non-negative low tides, allowing for observation across a full tidal response. A 72-hour subset of this transducer data was used for statistical evaluation. This subset data range was August 12 00:00 through August 14 23:59. A select six (6) monitoring wells and the nearest NOAA-monitored tidal station (ID# 94469880 in Friday Harbor, WA) were used to measure tidal variations. These six monitoring wells were the generally closest to the shoreline and spread across the site west to east.

2.2 WATER LEVEL ELEVATION CONVERSIONS

In-Situ pressure transducers level loggers, Rugged TROLL, were placed in each of the six selected monitoring wells and left undisturbed for the duration of the study. Transducer details are included on Table C-1. Water level measurements were collected by hand in all onsite wells using a water level meter at the time of transducer installation and transducer removal as spot checks of the transducer water level calculations (Table C-2). Raw data collected directly from the transducers (water depths as a function of water head pressure) were corrected against barometric pressure recorded concurrently at the site using a BaroTROLL. The barometric pressure corrections were performed using Win-Situ 5 software. This tidal study used top of casing reference elevation data for MW-2, MW-3, and MW-5 (Whatcom 2018) and survey data from Star Surveying for MW-7, MW-8, and MW-9. The reference point for each monitoring well is on the approximate north point of the top of well casing. The barometrically-corrected transducer pressure measurements (water head) were then subtracted from the surveyed well casing depth to calculate water level elevations from the transducer data. The barometrically-

corrected transducer data were used in the Serfes analysis. No monitoring wells went dry during the tidal study.

2.4 TIDAL EFFICIENCY

Tidal efficiency is the magnitude of the tidal fluctuation of a groundwater monitoring well, expressed as a percentage of the tidal fluctuation in the adjacent water body. Tidal efficiency is used to understand the hydrologic characteristics of the aquifer. The amplitude of the groundwater fluctuation is generally much less than the tidal range and is usually greatest nearest the shoreline and diminishes further from shoreline, although other factors may affect the groundwater level response observed in wells. The tidal efficiency was calculated by dividing the tidal range for one-quarter of a tidal cycle (lower low tide to the corresponding next higher high tide) by the same tidal range for the tidal station. Calculated tidal efficiencies for each monitoring well during each recorded lower low water to higher high water tidal cycles are summarized on Table C-3 and discussed in Section 3.1.

2.5 LAG TIME

In general, tidally influenced groundwater follows the tidal fluctuations of the adjacent waterway on a delayed cycle. The length of time it takes for water in a well to respond to the tidal cycle is known as the “tidal time lag” (Fetter 1994). The lag time was used to predict groundwater sample timing based on the low tides predicted for the reference station.

Tidal lag time was calculated by averaging the difference in time between the two higher high tides and two lower low tides in each monitoring well relative to the reference tidal station #9449880. Tidal Station 9449880 is at the Port of Friday Harbor on the Salish Sea (Figure C-1). The gauging station is a straight-line distance of less than 1.5-miles from the site. Calculated tidal lag times for each monitoring well during the tidal study period are summarized on Table C-3.

2.6 NET GROUNDWATER FLOW

Net groundwater elevation and flow direction are used to assess contaminant fate and transport at a site. In a tidally influenced area, groundwater elevations and flow directions may vary through the tidal cycle. As the tides rise and fall, they produce pressure waves in the adjacent aquifers and may cause groundwater levels and hydraulic gradients to fluctuate, resulting in a situation where a single synoptic set of groundwater levels may not adequately characterize the groundwater potentiometric surface. To evaluate net groundwater flow direction, average elevations are typically estimated using the Serfes (1991) method. Data from this tidal study was used to evaluate average elevations using a simple averaging and filtering from the modified method of Serfes (1991). Serfes developed a method based on the earlier work of Godin (1966) to filter out tidal influences. Serfes method uses hourly water-level readings taken over a three-day period (72 hours). The hourly readings from each well are processed using a moving average technique.

The Serfes moving average values for each well within the tidal study window (8/12/2022 00:00 to 8/14/2022 23:59) and final Serfes method averages summarized on Table C-3.

3 TIDAL STUDY RESULTS

3.1 TIDAL RANGE AND TIDAL EFFICIENCY RESULTS

The tidal range on the gauging station during this study period was up to 10.19 feet, ranging in elevation from -2.01 feet mean lower low water (MLLW) to 8.18 feet MLLW. Groundwater levels in the observed monitoring wells fluctuated up to 2.10 feet (MW-7) during a single tidal quarter cycle.

Calculated tidal efficiencies (i.e., magnitude of the tidal fluctuation of groundwater at a monitoring well expressed as a percentage of the tidal fluctuation in the adjacent water body) ranged from 2 percent at well MW-3 (within the SRWA), to 17 percent at MW-7 (near top of bank within the BLWA). While measured tidal efficiencies were relatively low for all wells, the wells near the top of bank within the Boat Lift Work Area (MW-7, -8 and -9) exhibited the most significant tidal influence (efficiencies ranging 8 to 17 percent). These wells also exhibited the greatest specific conductivity showing influence of marine water. See Table C-3 for tidal range and tidal efficiency. See Figure C-2 and Figure C-3 for monitoring well and tidal water level charts.

The northwestern one-third of the site comprises the greater Boat Lift Work Area and Former OPALCO Storage Area. This land area has undergone historical grading and fill operations which may affect soil density, porosity, and the permeability. Monitoring wells in this area include MW-7, MW-8, MW-9, and MW-2, with wells MW-4, MW-1, and MW-3 along the likely fill perimeter or outermost extents.

3.2 LAG TIME RESULTS

The average tidal lag time for wells at the site during the 72-hour tidal window described in Section 2.5 ranged from 7 hours and 43 minutes (MW-5) to 9 hours and 21 minutes (MW-3). Averaged LLW lag time for wells at the site during the 72-hour tidal ranged from 3 hours and 35 minutes (MW-5) to 6 hours and 55 minutes (MW-3). Both monitoring wells are considered nearshore wells and in areas understood to predominantly native soils with little to no fill material present, suggesting that the native, undisturbed soil properties are hydrogeologically different than the site fill soil properties. See Table C-3 for lag times and tidal efficiency. Considering the more immediate proximity of MW-7, MW-8, and MW-9 to the Salish Sea, it would typically be expected that these wells would have the shortest tidal lag times, but MW-3 has this shortest lag time. Due to the relative heterogeneity of the BLWA shoreline soils from the infilling and grading of the BLWA shoreline (sometime between 1941 and 1971), these variable shoreline soils are likely a main factor in tidal lag time variability among these BLWA shoreline wells (MW-7, MW-8, and MW-9) and MW-3. Considering the more immediate proximity of MW-7, MW-8, and MW-9 to the Salish Sea, it would typically be expected that these wells would have the shortest tidal lag times, but MW-3 has this shortest lag time.

3.3 NET GROUNDWATER FLOW

The net groundwater flow direction for the site was obtained by interpolating elevation contours from the average, filtered groundwater elevations for each well (Figure C-4). The net groundwater flow direction at the site is to the north towards the Salish Sea. The tidal station had an average water level elevation of 4.45 feet MLLW. The net groundwater flow direction was calculated using data during the 72-hour tidal study analyses. Of the six monitoring wells studied at the site, the Serfes average groundwater elevations during the tidal study period ranged from 3.44 feet MLLW (MW-7) to 5.76 feet MLLW (MW-3). Hydraulic gradient calculations for the water level elevations among the monitoring wells across the site range from 0.00413 to 0.03563 ft/ft. Majority of the gradient data transected the greater BLWA.

3.4 GROUNDWATER SAMPLE TIMING

Table C-3 also provides a summary of groundwater sample timing for each well included in the tidal study at the site based on the logic presented in the introduction to this report (Section 1). Suggested sample collection times based on observed tidal lag times are summarized on Table C-3 and discussed in Section 3.2. Suggested sample collection times vary from 4-hours to approximately 6.5-hours following the lower low tide of a given tidal diurnal tidal cycle. Although data logging was not conducted on MW-1, MW-4, or MW-6, estimated lag times can be inferred for these wells based on proximity and known lithology. MW-1 and MW-4 would likely have a similar or longer lag time than MW-2 and MW-3, so greater than 6-hours. MW-6 would likely have the longest lag time or no appreciable tidal efficiency.

4 REFERENCES

Fetter C. W. 1994. Applied Hydrogeology, 376 pp., Prentice-Hall, Englewood Cliffs, N. J., 1994

NOAA Tide Level Observations for Friday Harbor (Station 94498800) retrieved from: <https://tidesandcurrents.noaa.gov/noaatidepredictions.html?id=9449880>. Accessed October 2022.

Serfes 1991. Determining the Mean Hydraulic Gradient of Ground Water Affected by Tidal Fluctuations. Groundwater. July-August 1991.

Whatcom 2018. Draft Remedial Investigation Report, Jensen's Shipyard and Marina, 1293 Turn Point Road, Friday Harbor, Washington. Prepared by Whatcom Environmental Services, October 15, 2018.

TABLES

Table C-1 Albert Jensen and Sons Boatyard - Level Logger Type and P

Level Logger ID	Level Logger Serial Number	Level Logger Type	Total Well Depth (ft BTOC)
MW-2	675163	In-Situ Rugged TROLL 100	14.74
MW-3	675070	In-Situ Rugged TROLL 100	13.03
MW-5	675049	In-Situ Rugged TROLL 100	14.15
MW-7	675229	In-Situ Rugged TROLL 100	12.85
MW-8	675102	In-Situ Rugged TROLL 100	11.79
MW-9	675029	In-Situ Rugged TROLL 100	11.84
Barometer	643290	In-Situ Rugged BaroTROLL	N/A

NOTES:

BTOC - below top of casing

ft - feet

N/A - not applicable

Table C-2 Albert Jensen and Sons Boatyard - Monitoring Well Gauging, Select Transducer Readings

Well ID	Date	Time	Elevation Top of PVC Casing (ft)	Gauged DTW (ft BTOC)	Water Level Elevation (ft)	Transducer Level Reading (Head ft)	Difference in Gauged DTW and Transducer Measured Head (ft)
MW-2	8/5/2022	10:15	10.84	5.77	5.07	5.80	-0.03
	8/16/2022	8:28	10.84	5.59	5.25	5.63	-0.04
MW-3	8/5/2022	10:32	9.69	4.27	5.42	4.34	-0.07
	8/16/2022	8:11	9.69	4.15	5.54	4.21	-0.06
MW-5	8/5/2022	~10:55	15.89	10.44	5.45	10.45	-0.01
	8/16/2022	8:02	15.89	10.34	5.55	10.39	-0.05
MW-7	8/5/2022	9:47	8.40	6.05	2.35	6.05	0.00
	8/16/2022	8:41	8.40	5.43	2.97	5.66	-0.23
MW-8	8/5/2022	9:36	8.92	5.90	3.02	5.90	0.00
	8/16/2022	8:46	8.92	5.68	3.24	5.75	-0.07
MW-9	8/5/2022	9:30	8.87	5.85	3.02	5.85	0.00
	8/16/2022	8:52	8.87	5.60	3.27	5.77	-0.17

NOTES:

Top of casing data taken from Draft Remedial Investigation Report by Whatcom Environmental dated October 15, 2018 and Star Surveying Inc memorandum dated September 19, 2022.

PVC - polyvinyl chloride

ft - feet

DTW - depth to water

BTOC - below top of casing

Table C-3 - Albert Jensen and Sons Boatyard - Tidal Lag Time Analysis at Monitoring Wells

Well ID	Elevation	Tidal Range for a Quarter Cycle				Tidal Range for a Quarter Cycle				Tidal Range for a Quarter Cycle				Tidal Timing			Lag Time				Sample Collection Time
	Serfes Method Mean Elevation (72-Hour Period)	First Low Low Elevation	First High High Elevation	Tidal Range	Tidal Efficiency (Quarter Cycle)	Second Low Low Elevation	Second High High Elevation	Tidal Range	Tidal Efficiency (Quarter Cycle)	Third Low Low Elevation	Third High High Elevation	Tidal Range	Tidal Efficiency (Quarter Cycle)	Time of First Low Low Water Level	Time of Second Low Low Water Level	Time of Third Low Low Water Level	Lag Time (1st Low Low Tides Only)	Lag Time (2nd Low Low Tides Only)	Lag Time (3rd Low Low Tides Only)	Average Lag Time (3 Low Low tides)	Suggested Sample Collection Time
	MLLW	MLLW	MLLW	ft		MLLW	MLLW	ft		MLLW	MLLW	ft					hr:min	hr:min	hr:min	hr:min	
MW-2	5.62	5.28	6.02	0.74	7%	5.38	5.95	0.57	6%	5.12	5.63	0.51	6%	8/12/2022 18:02	8/13/2022 18:26	8/14/2022 18:56	6:26	6:14	6:08	6:16	6 hours after low low tide
MW-3	5.76	5.60	5.77	0.17	2%	5.74	5.85	0.11	1%	5.54	5.75	0.21	2%	8/12/2022 18:15	8/13/2022 19:15	8/14/2022 19:51	6:39	7:03	7:03	6:55	6.5-7 hours after low low tide
MW-5	5.75	5.36	6.01	0.65	6%	5.50	6.06	0.56	6%	5.37	5.93	0.56	7%	8/12/2022 15:09	8/13/2022 16:18	8/14/2022 15:54	3:33	4:06	3:06	3:35	3.5 hours after low low tide
MW-7	3.44	2.60	4.31	1.71	17%	2.61	4.13	1.52	16%	2.21	3.70	1.49	17%	8/12/2022 15:33	8/13/2022 16:12	8/14/2022 16:48	3:57	4:00	4:00	3:59	4 hours after low low tide
MW-8	3.72	3.38	4.24	0.86	8%	3.43	4.10	0.67	7%	3.07	3.69	0.62	7%	8/12/2022 17:20	8/13/2022 17:56	8/14/2022 18:44	5:44	5:44	5:56	5:48	5.5 hours after low low tide
MW-9	3.78	3.45	4.31	0.86	8%	3.48	4.11	0.63	7%	3.10	3.72	0.62	7%	8/12/2022 16:24	8/13/2022 17:03	8/14/2022 17:12	4:48	4:51	4:24	4:41	4.5 hours after low low tide
Tidal Station #9449880	4.45	-2.01	8.18	10.19	NA	-1.64	7.81	9.45	NA	-0.68	7.90	8.58	NA	8/12/2022 11:36	8/13/2022 12:12	8/14/2022 12:48	NA	NA	NA	NA	ND

Notes:

The tidal study window for this analysis and these table values is from 8/12/2022 00:00 (AM) to 8/14/2022 23:59 (PM).

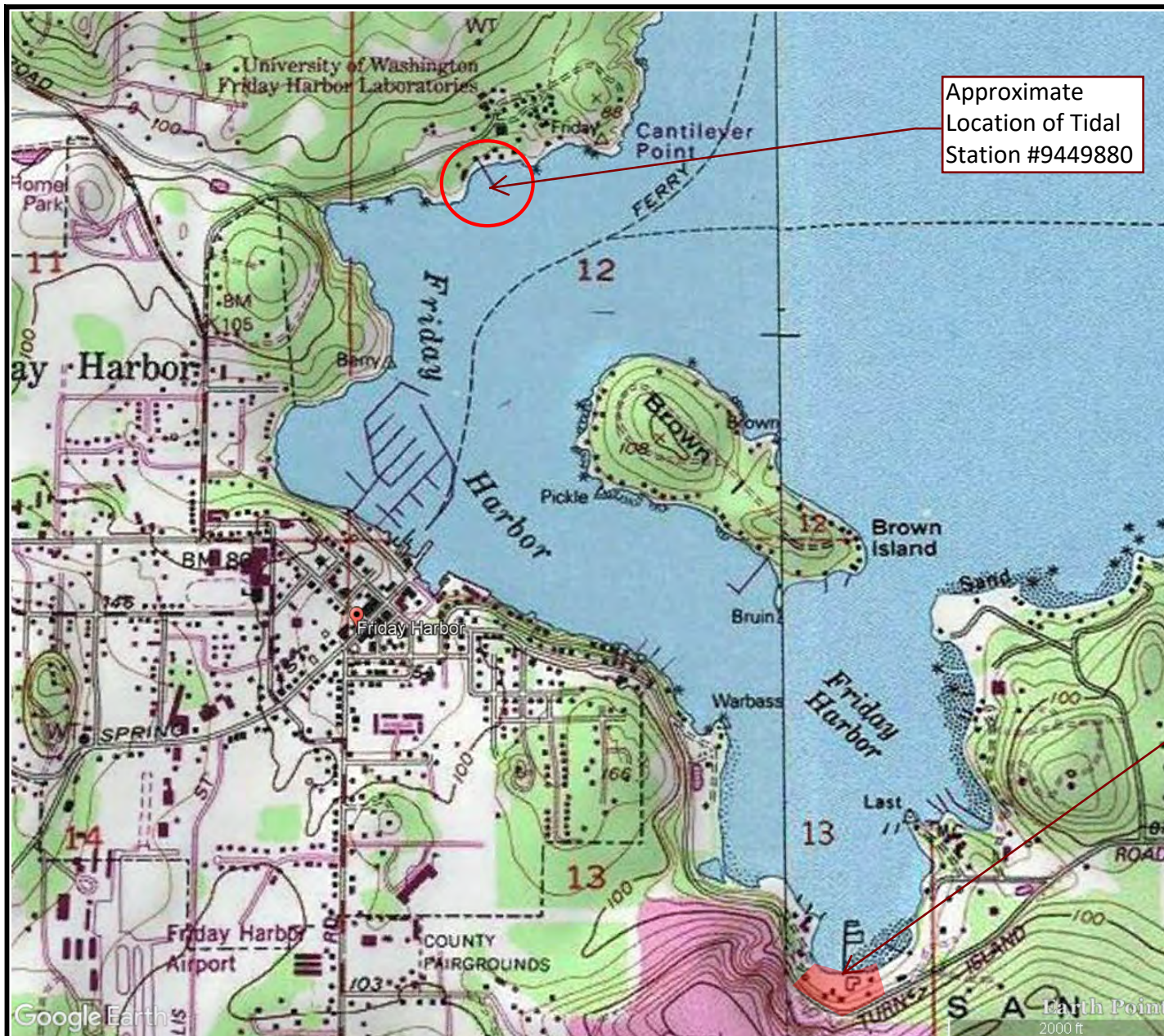
hr:min - Time in hours and minutes

ft - feet

MLLW - mean lower low water

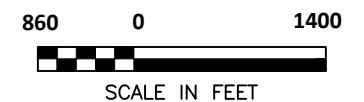
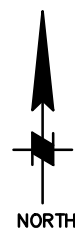
NA - not applicable

FIGURES



Approximate
Location of Tidal
Station #9449880

Albert Jensen and
Sons Boatyard (site)



CRETE
CONSULTING, INC.

LEON
Environmental, LLC

PORT OF FRIDAY HARBOR
Albert Jensen & Son Shipyard and Marina
1293 Turn Point Road, Friday Harbor, WA

DATE: 1/9/2023

DRWN: RJ

Site Location Map

FIGURE C-1

Figure C-2
Monitoring Well and Tide Water Levels (Unabridged)

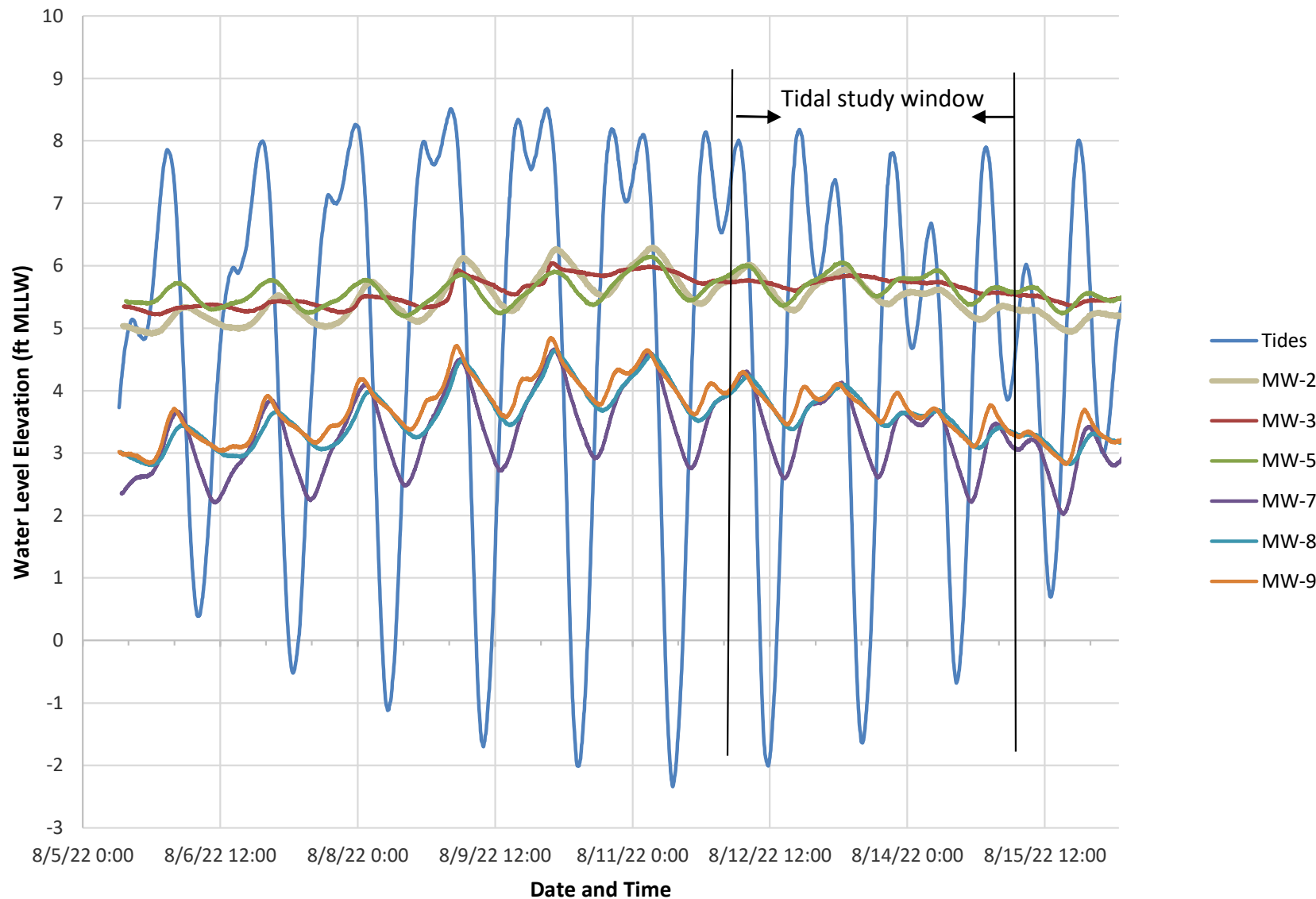
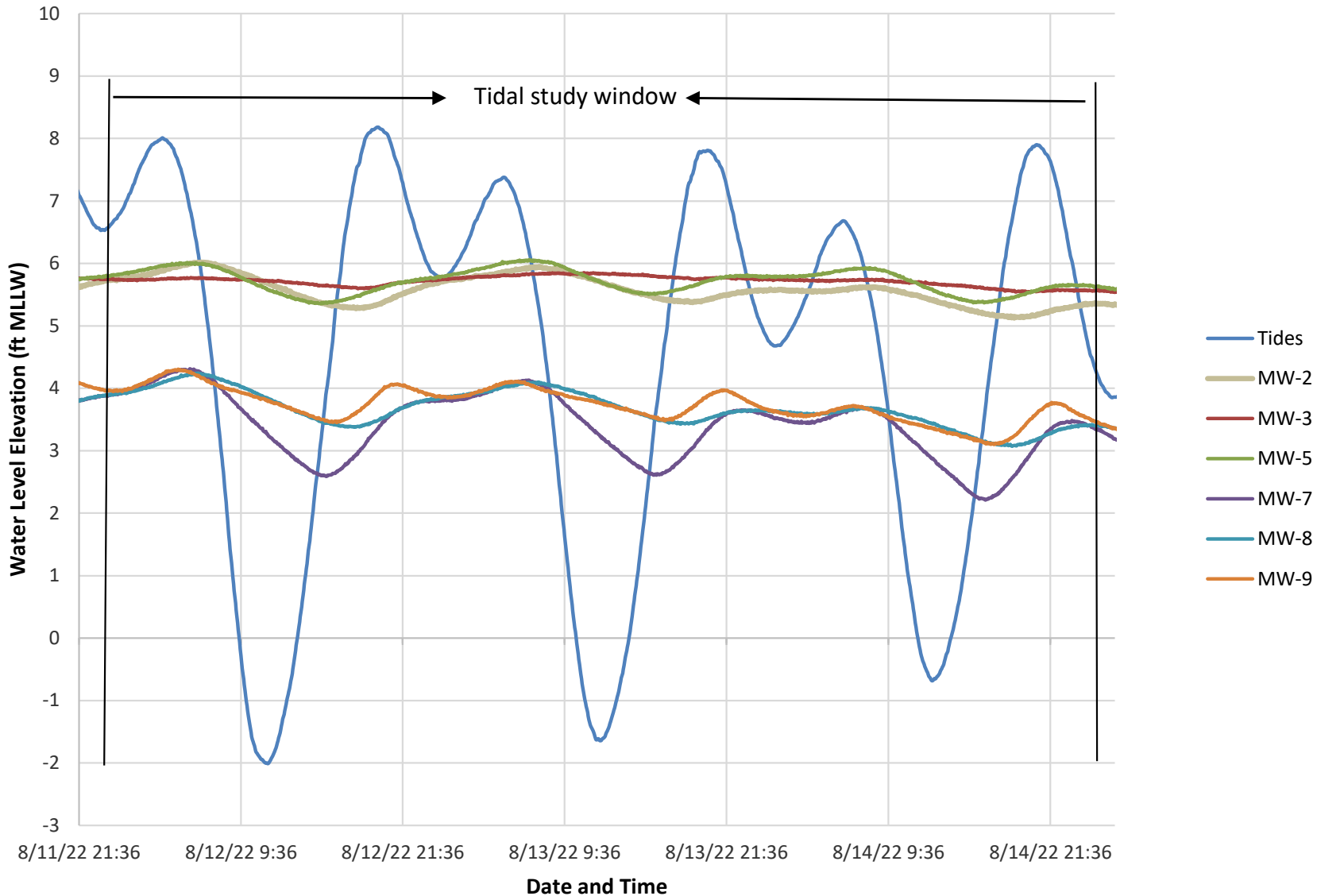
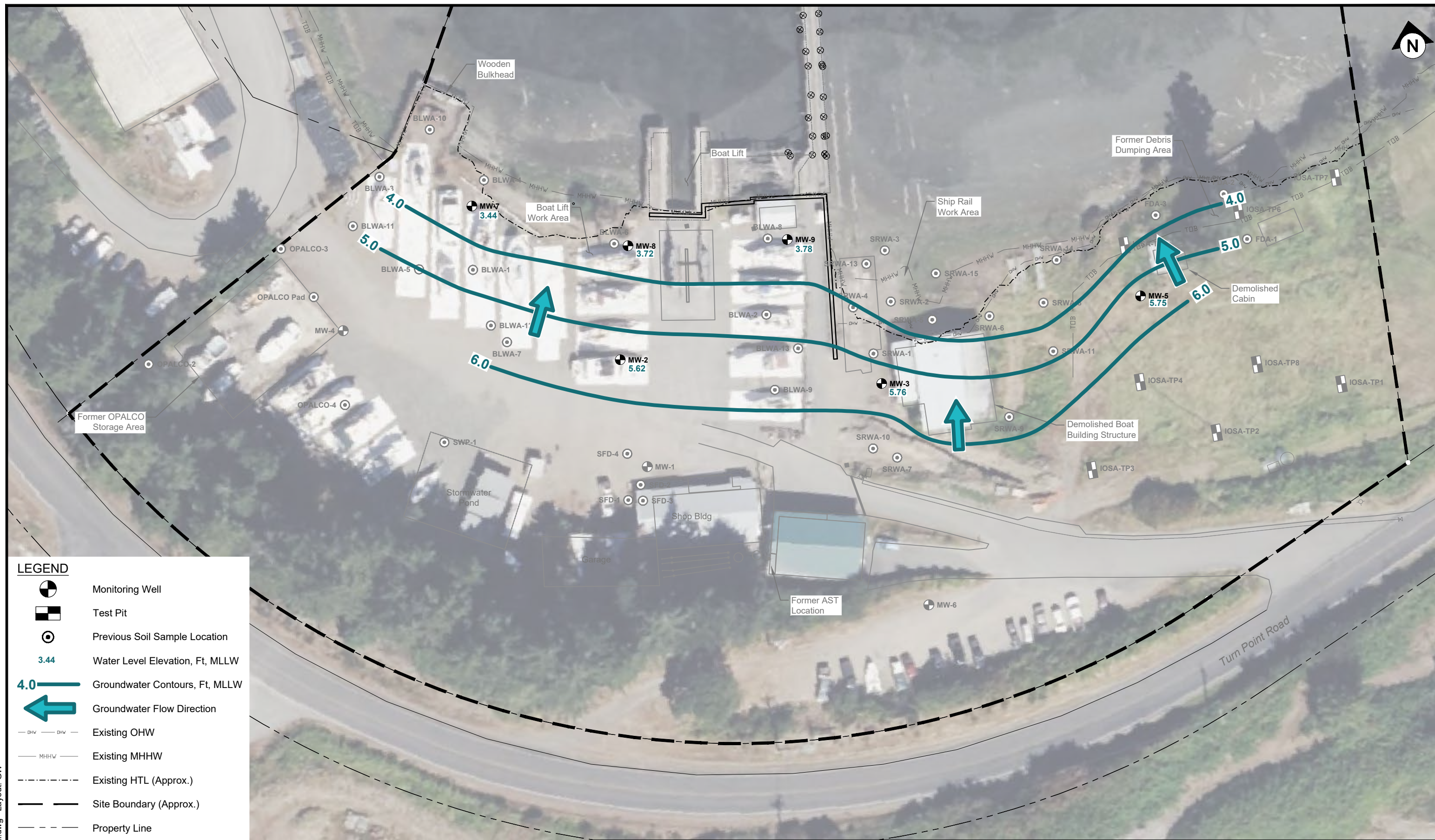


Figure C-3
Monitoring Well and Tide Water Levels (Abridged)



File: PoFH_2025_Tidal.dwg Layout: GW



LEGEND

- Monitoring Well
- Test Pit
- Previous Soil Sample Location
- Water Level Elevation, Ft, MLLW
- Groundwater Contours, Ft, MLLW
- Groundwater Flow Direction
- Existing OHW
- Existing MHHW
- Existing HTL (Approx.)
- Site Boundary (Approx.)
- Property Line

