

Technical Memorandum

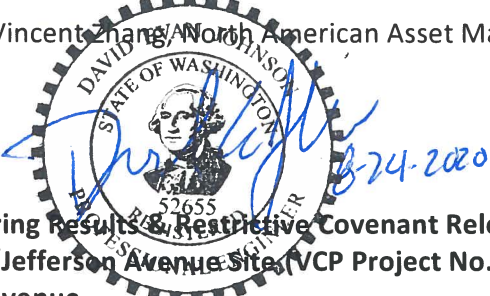
TO: Panjini Balaraju, Washington State Department of Ecology

CC: Herman Setijono and Vincent Zhang, North American Asset Management Group, LLC

FROM: Dave Johnson, PE

DATE: August 24, 2020

RE: **Groundwater Monitoring Results & Restrictive Covenant Release Tacoma Town Center/Jefferson Avenue Site (VCP Project No. SW1315) 2100-2300 Jefferson Avenue Tacoma, Washington Project No. 1848001.010.013**



Introduction

Landau Associates, Inc. (LAI) has prepared this technical memorandum on behalf of North America Asset Management Group, LLC (NAAMG) to present the results of quarterly groundwater monitoring, and to request removal of the existing Restrictive Environmental Covenant No. A-406 (Covenant) for groundwater located in the northeast corner of the Tacoma Town Center property boundary. The Tacoma Town Center property is in downtown Tacoma and spans the blocks between Jefferson Avenue and Tacoma Avenue, south of South 21st Street, and includes current Pierce County Parcel No. 2021090112, which replaced and made inactive the former Pierce County Parcel No. 2021080011, upon which the Covenant No. A-406 is recorded (herein referred to as site). The location of the site vicinity is shown on Figure 1. Prior to the Tacoma Town Center development project, the site was known as the Jefferson Avenue Site, but also referred to as City Properties Cleanup. The site was previously owned by the City of Tacoma (City) and was sufficiently cleaned up to receive a No Further Action (NFA) determination under the Washington State Department of Ecology's (Ecology's) Volunteer Cleanup Program (VCP; Cleanup Site ID No. 7037 and VCP Project No. SW1315). This technical memorandum summarizes the results of the three quarterly groundwater monitoring events conducted at the site as required by the Covenant, and requests a release from the Covenant.

Project Background

The site has been in use since 1896, and an investigation of historical operations at the site identified areas of potential concern include gasoline stations, a car wash, a printing operation, an automobile repair business, and a pest control business. Extensive investigation and cleanup of the site was completed and Ecology issued an NFA determination for the Site in 2014, stating that the site was compliant with cleanup standards with the exception of groundwater, due to elevated arsenic in the vicinity of monitoring well MW-9. Ecology agreed that no additional remediation work, including groundwater monitoring, was required as long as institutional controls in the form of a restrictive environmental covenant were implemented. The Covenant, as a form of institutional control in accordance with the NFA determination, was filed with Pierce County in response to the arsenic

concentrations in groundwater identified at MW-9 in the northeastern most portion of Parcel 2021080011 (now inactive and superseded by current Parcel No. 2021090112, as shown on Figure 2) above the Model Toxics Control Act (MTCA) Method A Cleanup Levels (CULs) for unrestricted land use. The groundwater impacts were limited to this single well (MW-9). The Covenant restricts the extraction of the groundwater located beneath the defined area for domestic use, for purposes other than temporary construction dewatering, investigation, monitoring, or remediation (Figure 2). In accordance with the issuance of the NFA and Ecology's determination that groundwater monitoring at the site was no longer required, MW-9 was decommissioned to accommodate development construction activities at the site.

NAAMG has been in recent discussions with the Ecology project manager about potential removal of the existing Covenant. Ecology has started the 5-year periodic review process and will be preparing a periodic review report. If the Covenant was to be removed by the current property owners, Ecology requested a replacement groundwater monitoring well be installed in the vicinity of MW-9, and three to four quarters of groundwater monitoring and sampling be conducted. Ecology has since agreed to require only three quarterly groundwater monitoring events, in place of the typical four events, if the results were stable and fully representative of current site conditions. On behalf of NAAMG, LAI installed replacement monitoring well MW-9R and sampled groundwater consecutively for three quarters to investigate the current status of groundwater conditions.

Monitoring Well Installation

LAI installed replacement well MW-9R on July 23, 2019, approximately 3 feet south of the previously decommissioned well MW-9. The well completion log for monitoring well MW-9R is provided in Attachment 1. Drilling services for the advancement of the boring and installation of monitoring well MW-9R were provided by Holocene Drilling, Inc. of Puyallup, Washington. Installation at the site of monitoring well MW-9R included the following elements:

- Preparing a Site-specific Health and Safety Plan in accordance with Washington Administrative Code (WAC) 296-62 and Part 1910.120 of Title 29 of the Code of Federal Regulations prior to initiating field activities
- Performing a utility locate at the boring location for the monitoring wells using a private utility location service and contacting the One-Call Center for utility locating
- Installing monitoring well MW-9R at the location shown on Figure 2, approximately 3 feet south of decommissioned monitoring well MW-9
- Describing subsurface conditions encountered during advancement of the boring in accordance with the Unified Soil Classification System (USCS)
- Developing the monitoring wells following installation.

Groundwater was encountered during drilling at approximately 22 feet (ft) below ground surface (bgs), but quickly recovered during well installation to 16 ft bgs. An 8-inch diameter borehole was drilled to approximately 25 ft bgs, and monitoring well MW-9R was constructed using 2-inch schedule 40 polyvinyl chloride (PVC) pipe with 20 ft of pre-packed screen installed from 5 to 25 ft bgs. The well was completed using a surface finished flush-mount well cover.

Monitoring well MW-9R was developed on July 29, 2019 using a bailer and groundwater pump. Approximately 22 gallons of groundwater was removed during well development. All investigation derived waste (IDW), including drilling cuttings and spoils, and development water was drummed and properly labeled in steel drums and placed on site.

Quarterly Groundwater Monitoring and Sampling

Groundwater monitoring and sampling events were conducted at the site by LAI on August 6, 2019; November 11, 2019; and February 6, 2020. Groundwater monitoring and sampling included measuring the depth to groundwater and collecting groundwater samples from monitoring well MW-9R for laboratory analysis for total and dissolved arsenic by U.S. Environmental Protection Agency (EPA) Method 6010B.

For each groundwater monitoring and/or sampling event, the monitoring wells were opened and allowed to equilibrate with atmospheric pressure for a minimum of 15 minutes before the depth to groundwater was measured.

Groundwater samples were collected in accordance with the EPA (2010) *Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells* guidance, dated January 19, 2010. The monitoring wells were purged using a peristaltic pump, with flow rates of between 100 and 200 milliliters per minute. During purging, the groundwater geochemical parameters temperature, specific conductance, pH, dissolved oxygen, oxidation-reduction potential, and/or turbidity were recorded approximately every 3 minutes using a multi-parameter meter equipped with a flow-through cell. Upon stabilization of the geochemical parameters, groundwater samples were collected directly from the pump outlet and placed into laboratory-provided sample containers. Groundwater sample containers were placed on ice in a cooler and transported to Eurofins TestAmerica, under standard chain-of-custody protocols, for laboratory analysis for total and dissolved arsenic by EPA Method 6010B.

Groundwater generated from the purging of the monitoring well MW-9R was placed into labeled 55-gallon steel drums that were sealed and placed on the Site.

Results and Conclusions

Table 1 summarizes the groundwater analytical results for samples collected from the replacement monitoring well MW-9R. The groundwater laboratory analytical reports are provided as Attachment 2.

Total arsenic was detected in groundwater at MW-9R at concentrations ranging from 5.4 to 8.2 micrograms per liter (ug/L). Dissolved arsenic was detected in groundwater at MW-9R at concentrations 5.1 to 8.1 ug/L. The average total and average dissolved arsenic concentration detected during the three quarterly groundwater monitoring events was 6.8 and 6.7 ug/L respectively.

Field collected groundwater geochemical data from MW-9R is also presented in Table 1. Aquifer redox conditions provide an indication of whether the aquifer conditions are oxidizing or reducing. Aquifer redox conditions are determined by evaluating the concentrations of dissolved oxygen (DO) and oxidative-reduction potential (ORP). Groundwater ORP values less than 50 millivolt (mV) are associated with low DO and are indicative of reduced geochemical aquifer conditions. MW-9R contained a DO range of 0.39 to 1.5 milligrams per liter, and an ORP range of -148.4 to -121.2 mV. Redox conditions can influence the speciation of various naturally occurring metals (i.e., whether arsenic will be present in the solid phase in the aquifer soil matrix or in the dissolved phase in groundwater).

Arsenic is highly sensitive to reduced geochemical aquifer environments. Negative ORP and the associated low DO at MW-9R, indicate anaerobic (i.e., highly-reducing) aquifer redox conditions in groundwater within the vicinity of MW-9R.

The most recent quarterly monitoring results from monitoring well MW-9R still exceed the MTCA Method A CULs of 5 ug/L, but it should be noted both total and dissolved concentrations are significantly lower than the previously collected samples from decommissioned monitoring well MW-9. Total arsenic was detected previously in groundwater at MW-9 at 41.1 ug/L and dissolved arsenic was detected at 42.9 ug/L.

Within the State of Washington, background arsenic often can occur at concentrations higher than MTCA Method A CULs, especially in areas of known reducing aquifer conditions. In accordance with WAC 173-340-700 (6)(d), when MTCA cleanup levels are less than natural background levels or levels that can be reliably measured, the cleanup level shall be established at a concentration equal to the practical quantitation limit or natural background concentration, whichever is higher. The State-wide accepted 90th percentile natural background concentration for arsenic in groundwater is 8.0 ug/L if non-detect sample results are included (Table 3, PTI 1989). The State-wide accepted 90th percentile natural background concentration for arsenic in groundwater is 9.0 ug/L if non-detect sample results are excluded (Table 4, PTI 1989).

Results from MW-9R indicate that the localized arsenic concentrations are below natural background concentrations, but remain slightly above the MTCA Method A CULs. The average total and dissolved arsenic concentration detected in MW-9R during the three recent quarterly groundwater monitoring events were 6.8 and 6.7 ug/L, respectively. The groundwater monitoring data indicate that while the arsenic concentration remains slightly above MTCA Method A CULs, it remains stable and

comparatively low, and can be attributed to background concentrations and observed highly-reducing aquifer conditions. Prior to obtaining the NFA determination, no other contaminants of concern were detected in soil or groundwater throughout the site and elevated arsenic was limited to a single location, the now-decommissioned monitoring well MW-9 (Ecology 2014)(Ecology 2014).

Based on these results, LAI believes that the detected arsenic concentrations within monitoring well MW-9R collected at the Tacoma Town Center/Jefferson Avenue site can be considered background and related to the observed highly-reducing aquifer conditions in the vicinity of MW-9R and, therefore, the Restrictive Environmental Covenant No. A-406 can be released. Maintaining a Covenant does not pose a benefit to this site since the site location already ensures groundwater will never be used for domestic purposes. The site is serviced by City of Tacoma municipal drinking water supply, and all current and future development within this area is required to be connected to the municipal water supply. The City does not allow drinking water wells to be installed within this area.

LAI has prepared this technical memorandum on behalf of NAAMG to summarize the results of the replacement monitoring well MW-9R installation and groundwater monitoring data, and requests a release from the Restrictive Environmental Covenant No. A-406 for the site.

Use of this Report

This Technical Memorandum has been prepared for the exclusive use of Washington State Department of Ecology and North American Asset Management Group, LLC for specific application to the Tacoma Town Center/Jefferson Avenue site. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. LAI makes no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff.

LANDAU ASSOCIATES, INC.



Dave Johnson
Associate Project Engineer

DRJ/JWW/kjg

[LAI_NAAMG GW Mon & Env Covenant Release Request TM_8-24-2020.docx](#)

References

Ecology. 2014. No Further Action at the following Site: Jefferson Avenue Site (aka City Properties Cleanup), 2112-2122 Jefferson Ave, Tacoma, Facility Site No. 1277004, Cleanup Site ID No. 7037, VCP Project No. SW1315. edited by Scott Rose: Unit Supervisor, SWRO Toxics Cleanup Organization. February 12.

PTI. 1989. Draft Report Section 1-7: *Background Concentrations of Selected Chemicals in Water, Soil, Sediments, and Air of Washington State*. Prepared for Washington State Department of Ecology, Bellevue, Washington, by PTI Environmental Services. April.

Attachments

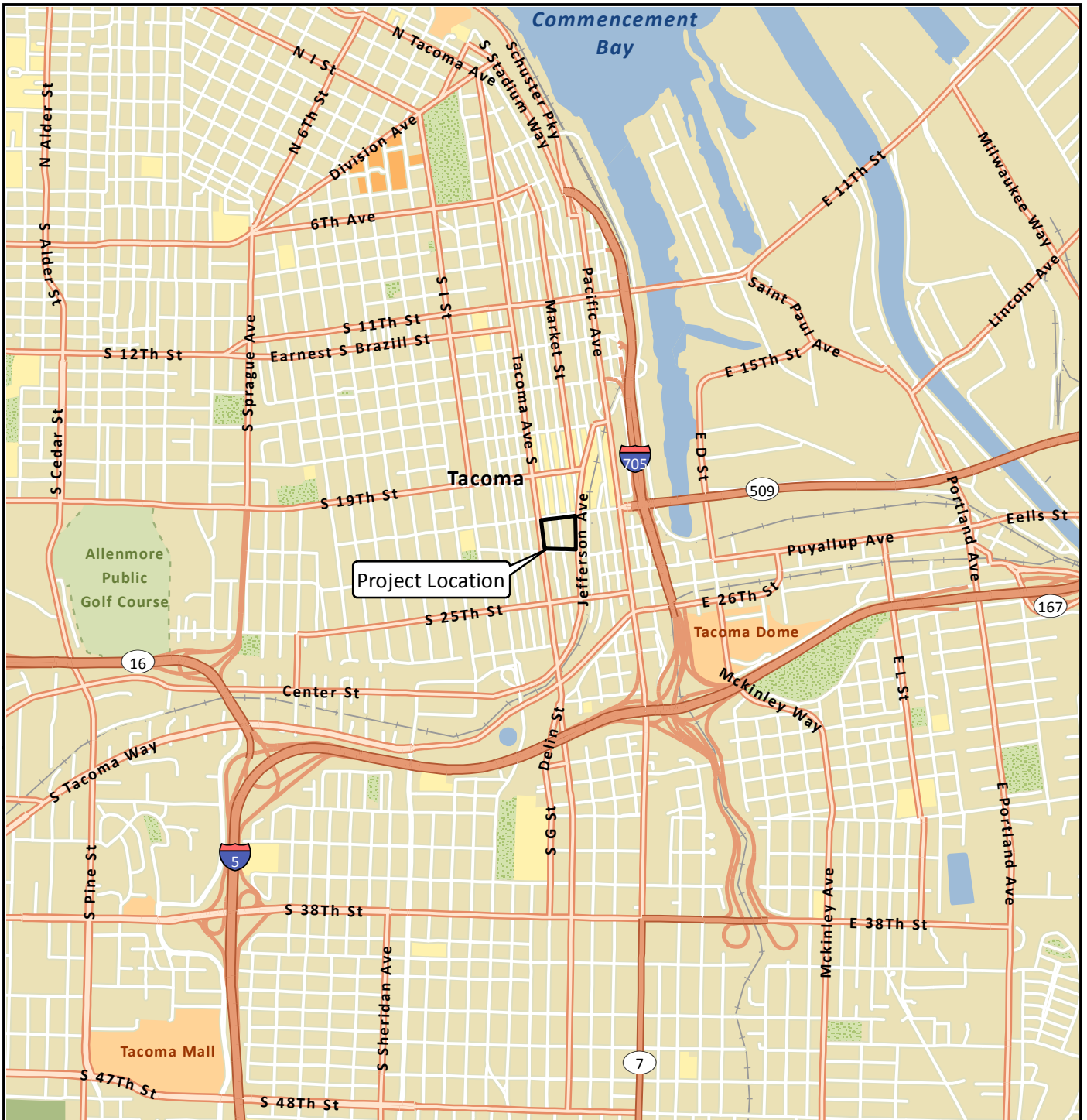
Figure 1: Vicinity Map

Figure 2: Site Map

Table 1: Analytical Results

Attachment 1: MW-9R Well Log

Attachment 2: Laboratory Data Reports



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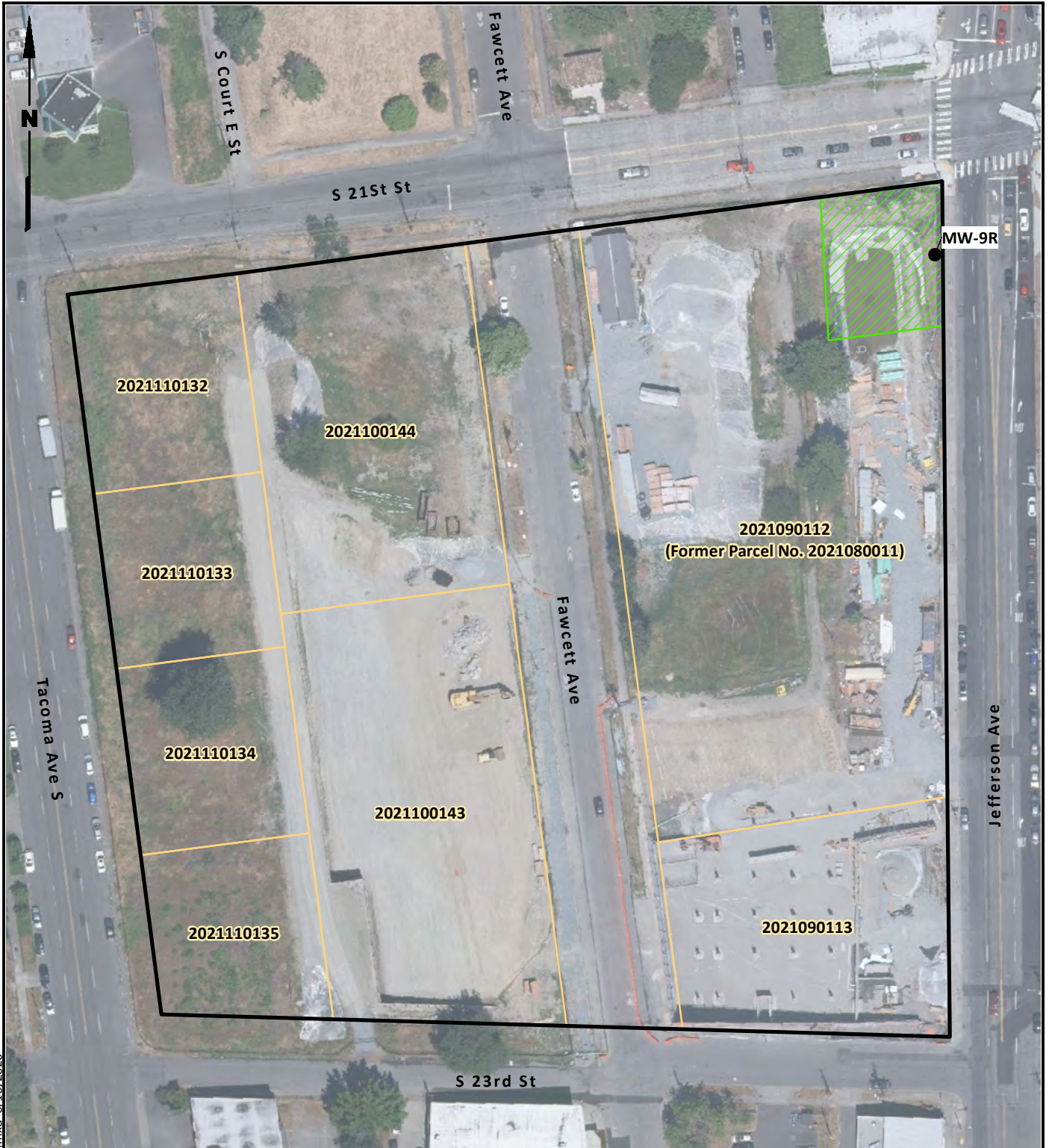
Data Sources: Pierce County GIS; Esri.



Tacoma Town Center/
Jefferson Avenue Site
Tacoma, Washington

Vicinity Map

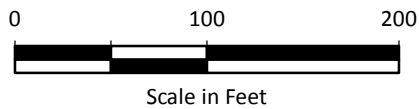
Figure
1



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Legend

- Monitoring Well
- Subject Property
- ▨ Restrictive Environmental Covenant
No. A-406 Area (Groundwater Only)
- Tax Parcels



Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Sources: Exhibit B-Property Map from Ecology NFA Letter Jefferson Ave Site (aka City Properties Cleanup) dated February 12, 2014; City of Tacoma GIS; Pierce County GIS.



Tacoma Town Center/
Jefferson Avenue Site
Tacoma, Washington

Site Plan

Figure
2

Table 1
Groundwater Analytical Results
Tacoma Town Center (Jefferson Avenue Site VCP No. SW1315)
Tacoma, Washington

Sample Location	Sample Date	Laboratory Sample ID	Metals ($\mu\text{g/L}$; SW-846 6010B)		Field Parameters			
			Total Arsenic	Dissolved Arsenic	DO (mg/L)	pH	ORP (mV)	Turbidity (NTU)
MW9R	8/6/2019	580-88155-1	8.2	8.1	3.59	7.81	-148.4	6.84
	11/21/2019	580-90970-1	6.8	6.9	0.39	7.56	-127.7	11.86
	2/6/2020	580-92611-1	5.4	5.1	0.46	7.51	-121.2	22.46
	Quaterly Average		6.8	6.7	1.5	7.6	-132.4	13.7
MTCA Method A CULs			5	5	-	-	-	-
CUL Adjusted to Natural Background			9	9	-	-	-	-

Notes:

Bold text indicates detected analyte exceeds MTCA Method A CUL

Acronyms/Abbreviations:

CUL = cleanup level

DO = Dissolved Oxygen

ID = Identification

$\mu\text{g/L}$ = micrograms per liter

mg/L = milligrams per liter

mV = Millivolts

MTCA = Model Toxics Control Act

NTU = nephelometric turbidity units

ORP = Oxidative Reduction Potential

Monitoring Well MW-9R Well Log

Soil Classification System

	MAJOR DIVISIONS	CLEAN GRAVEL (Little or no fines)	GRAPHIC SYMBOL	LETTER SYMBOL ⁽¹⁾	TYPICAL DESCRIPTIONS ⁽²⁾⁽³⁾
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
		CLEAN SAND (Little or no fines)		SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)	SILT AND CLAY (Liquid limit less than 50)		ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
		SILT AND CLAY (Liquid limit less than 50)		CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
		SILT AND CLAY (Liquid limit less than 50)		OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)	SILT AND CLAY (Liquid limit greater than 50)		MH	Inorganic silt; micaceous or diatomaceous fine sand
		SILT AND CLAY (Liquid limit greater than 50)		CH	Inorganic clay of high plasticity; fat clay
		SILT AND CLAY (Liquid limit greater than 50)		OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL		PT	Peat; humus; swamp soil with high organic content	

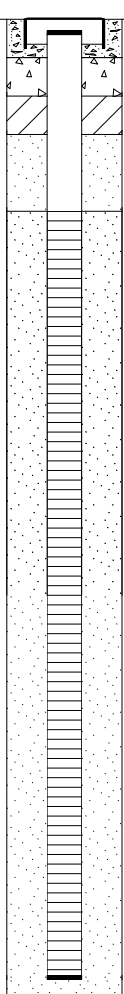

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

- Notes:
- USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
 - Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
 - Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:
 - Primary Constituent: > 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
 - Secondary Constituents: > 30% and ≤ 50% - "very gravelly," "very sandy," "very silty," etc.
 - > 15% and ≤ 30% - "gravelly," "sandy," "silty," etc.
 - Additional Constituents: > 5% and ≤ 15% - "with gravel," "with sand," "with silt," etc.
 - ≤ 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.
 - Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key		Field and Lab Test Data
SAMPLER TYPE	SAMPLE NUMBER & INTERVAL	
Code	Description	Code
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon	PP = 1.0
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon	TV = 0.5
c	Shelby Tube	PID = 100
d	Grab Sample	W = 10
e	Single-Tube Core Barrel	D = 120
f	Double-Tube Core Barrel	-200 = 60
g	2.50-inch O.D., 2.00-inch I.D. WSDOT	GS
h	3.00-inch O.D., 2.375-inch I.D. Mod. California	AL
i	Other - See text if applicable	GT
1	300-lb Hammer, 30-inch Drop	CA
2	140-lb Hammer, 30-inch Drop	
3	Pushed	
4	Vibrocore (Rotasonic/Geoprobe)	
5	Other - See text if applicable	

Groundwater	
	Approximate water level at time of drilling (ATD)
	Approximate water level at time after drilling/excavation/well

MW-9 (R)

SAMPLE DATA						SOIL PROFILE			GROUNDWATER	
Depth (ft)	Elevation	Sample Number & Interval	Sampler Type	Blows/Foot	Test Data	Graphic Symbol	USCS Symbol	Drilling Method: <u>Hollow-Stem Auger</u>	Water Level	Monitoring Well Detail (DOE#: BLT 956)
								Ground Elevation (ft): <u>Not Measured</u>		
						SP		1 inch of grass and sod over gray to brown, fine SAND with gravel and trace silt (GLACIAL DRIFT) - Soil cuttings were damp - Grades to blueish-gray, fine to coarse, and without gravel - Grades to gravelly and moist		8-inch diameter borehole Flush-mounted monument with concrete backfill Bentonite seal 2-inch diameter, Schedule 40, PVC well casing Sand filter 2-inch diameter, Schedule 40, PVC screen (0.010-inch slot size)
						SP-SM		Blueish-gray, fine to coarse SAND with gravel, silt, and trace clay - Perched water observed at 16 ft bgs - Soil cuttings were damp to wet - Grades to gravelly and wet - Groundwater observed at 22.7 ft bgs		

Boring Completed 07/23/19
Total Depth of Boring = 25.5 ft.

Monitoring Well Completed 07/23/19
Total Depth of Monitoring Well = 25.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

1848001.010_8/24/20 T:\1848\001\T\1848001.010.GPJ WELL LOG W/ ELEVATION



Tacoma Town Center
Tacoma, Washington

Log of Monitoring Well MW-9 (R)

Figure
A-2

Laboratory Data Reports

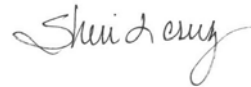
ANALYTICAL REPORT

Eurofins TestAmerica, Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-88155-1
Client Project/Site: Tacoma Town Center

For:
Landau & Associates, Inc.
955 Malin Ln SW
Suite B
Tumwater, Washington 98501

Attn: Dave Johnson



*Authorized for release by:
8/22/2019 10:58:45 AM*

Sheri Cruz, Project Manager I
(253)922-2310
sheri.cruz@testamericainc.com

LINKS

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results through
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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-88155-1

Job ID: 580-88155-1

Laboratory: Eurofins TestAmerica, Seattle

Narrative

Job Narrative
580-88155-1

Comments

No additional comments.

Receipt

The samples were received on 8/6/2019 12:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.7° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

- 1
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- 6
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- 11

Definitions/Glossary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-88155-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-88155-1

Client Sample ID: MW9R-20190806

Lab Sample ID: 580-88155-1

Date Collected: 08/06/19 10:31

Matrix: Water

Date Received: 08/06/19 12:00

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0082		0.0010		mg/L		08/16/19 09:28	08/16/19 19:12	1

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0081		0.0010		mg/L		08/19/19 17:32	08/21/19 20:05	1

QC Sample Results

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-88155-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-308534/11-A
Matrix: Water
Analysis Batch: 308684

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 308534

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		08/16/19 09:28	08/16/19 19:08	1

Lab Sample ID: LCS 580-308534/12-A
Matrix: Water
Analysis Batch: 308684

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 308534

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	1.00	0.890		mg/L		89	80 - 120

Lab Sample ID: LCSD 580-308534/13-A
Matrix: Water
Analysis Batch: 308684

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 308534

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	1.00	0.897		mg/L		90	80 - 120	1	20

Lab Sample ID: MB 580-308768/24-A
Matrix: Water
Analysis Batch: 309065

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 308768

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		08/19/19 17:32	08/21/19 19:56	1

Lab Sample ID: LCS 580-308768/25-A
Matrix: Water
Analysis Batch: 309065

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 308768

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	1.00	0.915		mg/L		92	80 - 120

Lab Sample ID: LCSD 580-308768/26-A
Matrix: Water
Analysis Batch: 309065

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 308768

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	1.00	0.912		mg/L		91	80 - 120	0	20

Lab Chronicle

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-88155-1

Client Sample ID: MW9R-20190806

Lab Sample ID: 580-88155-1

Date Collected: 08/06/19 10:31

Matrix: Water

Date Received: 08/06/19 12:00

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Dissolved	Prep	3005A			308768	08/19/19 17:32	T1H	TAL SEA
Dissolved	Analysis	6020B		1	309065	08/21/19 20:05	FCW	TAL SEA
Total Recoverable	Prep	3005A			308534	08/16/19 09:28	ART	TAL SEA
Total Recoverable	Analysis	6020B		1	308684	08/16/19 19:12	FCW	TAL SEA

Laboratory References:

TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310



Accreditation/Certification Summary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-88155-1

Laboratory: Eurofins TestAmerica, Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-19-22
Alaska (UST)	State Program	17-024	01-19-20
ANAB	Dept. of Defense ELAP	L2236	01-19-22
ANAB	DoD	L2236	01-19-22
ANAB	ISO/IEC 17025	L2236	01-19-22
ANAB	ISO/IEC 17025	L2236	01-19-22
California	State	2901	11-05-19
California	State Program	2901	11-05-19
Montana (UST)	State Program	N/A	04-30-20
Oregon	NELAP	WA100007	11-05-19
Oregon	NELAP	WA100007	11-05-19
US Fish & Wildlife	Federal	LE058448-0	07-31-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	Federal	P330-14-00126	02-10-20
USDA	US Federal Programs	P330-17-00039	02-10-20
Washington	State	C553	02-17-20
Washington	State Program	C553	02-17-20

Sample Summary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-88155-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-88155-1	MW9R-20190806	Water	08/06/19 10:31	08/06/19 12:00	

- 1
- 2
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- 9
- 10
- 11



Chain-of-Custody Record

<input type="checkbox"/> Seattle/Edmonds (425) 778-0907	<input type="checkbox"/> Spokane (509) 327-9737	Date <u>8/6/2019</u>	Turnaround Time: <u>Standard</u>
<input checked="" type="checkbox"/> Tacoma (253) 926-2493	<input type="checkbox"/> Portland (503) 542-1080	Page <u>1</u> of <u>1</u>	Accelerated _____

Project Name Tauma Town Center Project No. 1848001.010
 Project Location/Event Tauma @ S 21st St & Jefferson Ave
 Sampler's Name Heather Rogers
 Project Contact Dave Johnson (360) 628-5243 djohnson@landauinc.com
 Send Results To Dani Jorgensen, for Dave Johnson

Testing Parameters

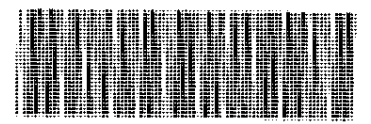
Special Handling Requirements: _____
 Shipment Method: _____
 Stored on ice: Yes / No

Dissolved As
Total As

Sample I.D.	Date	Time	Matrix	No. of Containers																																					
MW9R-20190806	8/6/2019	10:31	Aq	1	X																																				
MW9R-20190806	8/6/2019	10:31	Aq	1	X																																				

Observations/Comments

Allow water samples to settle, collect aliquot from clear portion
 NWTPH-Dx - Acid wash cleanup
 - Silica gel cleanup
 Dissolved metal samples were field filtered
 Other Dissolved metals have been field filtered (FF) w/ 0.45 um filter



530-88155 Chain of Custody

Therm. ID: A1 Cor: 5.7° Unc: 6.0°
 Cooler Dsc: Sim Red FedEx: _____
 Packing: _____ UPS: _____
 Cust. Seal: Yes No _____ Lab Cour: _____
 Blue Ice, Wet, Dry, None Other: CIDM

Relinquished by
 Signature [Signature]
 Printed Name Heather Rogers
 Company Landau Associates
 Date 8/6/2019 Time 12:00

Received by
 Signature [Signature]
 Printed Name Blankinskip
 Company TA-Sea
 Date 8/6/19 Time 12:50

Relinquished by
 Signature _____
 Printed Name _____
 Company _____
 Date _____ Time _____

Received by
 Signature _____
 Printed Name _____
 Company _____
 Date _____ Time _____

Login Sample Receipt Checklist

Client: Landau & Associates, Inc.

Job Number: 580-88155-1

Login Number: 88155

List Number: 1

Creator: Vallelunga, Diana L

List Source: Eurofins TestAmerica, Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

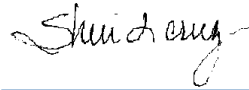
ANALYTICAL REPORT

Eurofins TestAmerica, Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-90970-1
Client Project/Site: Tacoma Town Center

For:
Landau & Associates, Inc.
955 Malin Ln SW
Suite B
Tumwater, Washington 98501

Attn: Dave Johnson



Authorized for release by:
11/27/2019 11:16:14 AM

Sheri Cruz, Project Manager I
(253)922-2310
sheri.cruz@testamericainc.com



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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Sample Summary	9
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Case Narrative

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-90970-1

Job ID: 580-90970-1

Laboratory: Eurofins TestAmerica, Seattle

Narrative

Job Narrative
580-90970-1

Comments

No additional comments.

Receipt

The sample was received on 11/21/2019 11:33 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



Definitions/Glossary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-90970-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-90970-1

Client Sample ID: MW9R-20191121

Lab Sample ID: 580-90970-1

Date Collected: 11/21/19 09:58

Matrix: Water

Date Received: 11/21/19 11:33

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0068		0.0010		mg/L		11/25/19 10:04	11/26/19 12:19	1

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0069		0.0010		mg/L		11/25/19 08:45	11/25/19 15:27	1

QC Sample Results

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-90970-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-317567/21-A
Matrix: Water
Analysis Batch: 317663

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 317567

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		11/25/19 08:45	11/25/19 14:42	1

Lab Sample ID: LCS 580-317567/22-A
Matrix: Water
Analysis Batch: 317663

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 317567

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.00	1.05		mg/L		105	80 - 120

Lab Sample ID: LCSD 580-317567/23-A
Matrix: Water
Analysis Batch: 317663

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 317567

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	1.00	1.02		mg/L		102	80 - 120	3	20

Lab Sample ID: MB 580-317597/22-A
Matrix: Water
Analysis Batch: 317769

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 317597

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		11/25/19 10:04	11/26/19 12:16	1

Lab Sample ID: LCS 580-317597/23-A
Matrix: Water
Analysis Batch: 317769

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 317597

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1.00	1.02		mg/L		102	80 - 120

Lab Sample ID: LCSD 580-317597/24-A
Matrix: Water
Analysis Batch: 317769

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 317597

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	1.00	1.02		mg/L		102	80 - 120	0	20

Lab Chronicle

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-90970-1

Client Sample ID: MW9R-20191121

Lab Sample ID: 580-90970-1

Date Collected: 11/21/19 09:58

Matrix: Water

Date Received: 11/21/19 11:33

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Dissolved	Prep	3005A			317567	11/25/19 08:45	JCP	TAL SEA
Dissolved	Analysis	6020B		1	317663	11/25/19 15:27	FCW	TAL SEA
Total Recoverable	Prep	3005A			317597	11/25/19 10:04	JCP	TAL SEA
Total Recoverable	Analysis	6020B		1	317769	11/26/19 12:19	FCW	TAL SEA

Laboratory References:

TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-90970-1

Laboratory: Eurofins TestAmerica, Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-19-22
ANAB	Dept. of Defense ELAP	L2236	01-19-22
ANAB	ISO/IEC 17025	L2236	01-19-22
Montana (UST)	State	NA	04-13-21
Oregon	NELAP	WA100007	11-06-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00039	02-10-20
Washington	State	C553	02-17-20



Sample Summary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-90970-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-90970-1	MW9R-20191121	Water	11/21/19 09:58	11/21/19 11:33	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11



Chain-of-Custody Record

<input type="checkbox"/> Seattle/Edmonds (425) 778-0907	<input type="checkbox"/> Spokane (509) 327-9737	Date <u>11/21/19</u>	Turnaround Time: Standard <input checked="" type="checkbox"/> Accelerated <input type="checkbox"/>
<input checked="" type="checkbox"/> Tacoma (253) 926-2493	<input type="checkbox"/> Portland (503) 542-1080	Page <u>1</u> of <u>1</u>	

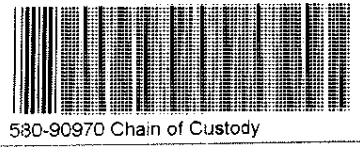
Project Name Tacoma Town Center Project No. 1848001.010
 Project Location/Event Tacoma Town Center / Tacoma, WA
 Sampler's Name Heather Rogers
 Project Contact Dave Johnson, Dani Jorgensen, Jen Wynkoop
 Send Results To Dave Johnson, Dani Jorgensen

6020B-LL - 6020As
 6020B-LL - 6020 Diss As

Loc: 550
90970 Requirements: _____
 Yes / No

Sample I.D.	Date	Time	Matrix	No. of Containers	Testing Parameters										Observations/Comments								
MW9R - 20191121	11/21/19	9:58	Aq	2	X	X																	Allow water samples to settle, collect aliquot from clear portion <input type="checkbox"/> NWTPH-Dx - Acid wash cleanup <input type="checkbox"/> - Silica gel cleanup <input type="checkbox"/> <input checked="" type="checkbox"/> Dissolved metal samples were field filtered Other <u>Dissolved metal samples were field filtered with 0.45 um filter</u>

Therm. ID: A1 Cor: 1.5 ° Unc: 1.6 °
 Cooler Dsc: SB
 Packing: _____ FedEx: _____
 Cust. Seal: Yes No UPS: _____
 Blue Ice, Dry, None Other: CO



Relinquished by Signature <u>[Signature]</u> Printed Name <u>Heather Rogers</u> Company <u>LANDAU ASSOCIATES</u> Date <u>11/21/19</u> Time <u>11:33</u>	Received by Signature <u>[Signature]</u> Printed Name <u>Jen Hobbs</u> Company <u>TASea</u> Date <u>11-21-19</u> Time <u>1133</u>	Relinquished by Signature <u>[Signature]</u> Printed Name _____ Company _____ Date _____ Time _____	Received by Signature _____ Printed Name _____ Company _____ Date _____ Time _____
---	---	---	--

Login Sample Receipt Checklist

Client: Landau & Associates, Inc.

Job Number: 580-90970-1

Login Number: 90970

List Source: Eurofins TestAmerica, Seattle

List Number: 1

Creator: Hobbs, Kenneth F

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

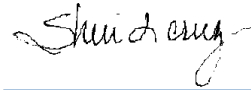
ANALYTICAL REPORT

Eurofins TestAmerica, Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-92611-1
Client Project/Site: Tacoma Town Center

For:
Landau & Associates, Inc.
955 Malin Ln SW
Suite B
Tumwater, Washington 98501

Attn: Dave Johnson



Authorized for release by:
2/20/2020 2:20:35 PM

Sheri Cruz, Project Manager I
(253)922-2310
sheri.cruz@testamericainc.com



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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-92611-1

Job ID: 580-92611-1

Laboratory: Eurofins TestAmerica, Seattle

Narrative

Job Narrative
580-92611-1

Comments

No additional comments.

Receipt

The sample was received on 2/6/2020 11:42 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 8.7° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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Definitions/Glossary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-92611-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-92611-1

Client Sample ID: MW9R-20200206

Lab Sample ID: 580-92611-1

Date Collected: 02/06/20 10:40

Matrix: Water

Date Received: 02/06/20 11:42

Method: 6020B - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0054		0.0010		mg/L		02/10/20 16:45	02/11/20 13:36	1

Method: 6020B - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0051		0.0010		mg/L		02/14/20 14:59	02/18/20 17:40	1

QC Sample Results

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-92611-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-322407/16-A
Matrix: Water
Analysis Batch: 322529

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 322407

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/10/20 16:46	02/11/20 13:31	1

Lab Sample ID: LCS 580-322407/17-A
Matrix: Water
Analysis Batch: 322529

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 322407

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	1.00	1.01		mg/L		101	80 - 120

Lab Sample ID: LCSD 580-322407/18-A
Matrix: Water
Analysis Batch: 322529

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 322407

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	1.00	1.02		mg/L		102	80 - 120	1	20

Lab Sample ID: 580-92611-1 MS
Matrix: Water
Analysis Batch: 322529

Client Sample ID: MW9R-20200206
Prep Type: Total Recoverable
Prep Batch: 322407

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.0054		1.00	0.983		mg/L		98	80 - 120

Lab Sample ID: 580-92611-1 MSD
Matrix: Water
Analysis Batch: 322529

Client Sample ID: MW9R-20200206
Prep Type: Total Recoverable
Prep Batch: 322407

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.0054		1.00	0.965		mg/L		96	80 - 120	2	20

Lab Sample ID: 580-92611-1 DU
Matrix: Water
Analysis Batch: 322529

Client Sample ID: MW9R-20200206
Prep Type: Total Recoverable
Prep Batch: 322407

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Arsenic	0.0054		0.00564		mg/L		4	20

Lab Sample ID: MB 580-322813/10-A
Matrix: Water
Analysis Batch: 323103

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 322813

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/14/20 15:02	02/18/20 17:03	1

Lab Sample ID: LCS 580-322813/11-A
Matrix: Water
Analysis Batch: 323103

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 322813

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	1.00	0.964		mg/L		96	80 - 120

Eurofins TestAmerica, Seattle

QC Sample Results

Client: Landau & Associates, Inc.
 Project/Site: Tacoma Town Center

Job ID: 580-92611-1

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: LCSD 580-322813/12-A
 Matrix: Water
 Analysis Batch: 323103

Client Sample ID: Lab Control Sample Dup
 Prep Type: Total Recoverable
 Prep Batch: 322813

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	1.00	0.962		mg/L		96	80 - 120	0	20

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

Lab Chronicle

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-92611-1

Client Sample ID: MW9R-20200206

Lab Sample ID: 580-92611-1

Date Collected: 02/06/20 10:40

Matrix: Water

Date Received: 02/06/20 11:42

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Dissolved	Prep	3005A			322813	02/14/20 14:59	ART	TAL SEA
Dissolved	Analysis	6020B		1	323103	02/18/20 17:40	FCW	TAL SEA
Total Recoverable	Prep	3005A			322407	02/10/20 16:45	ART	TAL SEA
Total Recoverable	Analysis	6020B		1	322529	02/11/20 13:36	FCW	TAL SEA

Laboratory References:

TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310



Accreditation/Certification Summary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-92611-1

Laboratory: Eurofins TestAmerica, Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-19-22
ANAB	Dept. of Defense ELAP	L2236	01-19-22
ANAB	ISO/IEC 17025	L2236	01-20-23
California	State	2901	11-05-20
Montana (UST)	State	NA	04-13-21
Oregon	NELAP	WA100007	11-06-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-20-00031	02-10-23
Washington	State	C553	02-18-21 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Seattle

Sample Summary

Client: Landau & Associates, Inc.
Project/Site: Tacoma Town Center

Job ID: 580-92611-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-92611-1	MW9R-20200206	Water	02/06/20 10:40	02/06/20 11:42	

1

2

3

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Chain-of-Custody Record

Seattle/Edmonds (425) 778-0907 Spokane (509) 327-9737
 Tacoma (253) 926-2493 Portland (503) 542-1080

Date 2/6/2020
 Page 1 of 1

Turnaround Time:
 Standard
 Accelerated

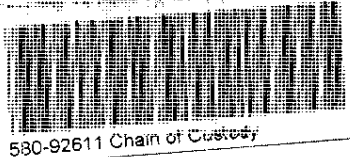
Project Name Tacoma Town Center Project No. 1848001.010.013
 Project Location/Event Tacoma Town Center / Tacoma, WA
 Sampler's Name Heather Rogers
 Project Contact Dave Johnson, Dani Jorgensen, Jen Nyntop
 Send Results To Dave Johnson, Dani Jorgensen

Testing Parameters
 Loc: 580
92611
 6020B-LL - 6020A6
 6020B-LL - 6020D5A6

Special Handling Requirements:

 Shipment Method:
 Stored on ice: Yes / No

Sample I.D.	Date	Time	Matrix	No. of Containers	Observations/Comments										
MW9R-20200206	2/6/20	1040	Aq	2	X	X									Allow water samples to settle, collect aliquot from clear portion <input type="checkbox"/> NWTPH-Dx - Acid wash cleanup <input type="checkbox"/> - Silica gel cleanup <input type="checkbox"/> <input checked="" type="checkbox"/> Dissolved metal samples were field filtered Other <u>Dissolved metal samples were field filtered with 0.45 µm filter</u>



Therm. ID: CR7 Cor: 8.7° Unc: 9.0°
 Cooler Disc: SA
 Packing: DAE FedEx: _____
 Cust. Seal: Yes No UPS: _____
 Blue Ice: Wet Dry None Lab Cour: _____
 Other: CD

Relinquished by
 Signature: *[Signature]*
 Printed Name: Heather Rogers
 Company: Landau Associates
 Date: 2/6/20 Time: 1142

Received by
 Signature: *[Signature]*
 Printed Name: DANA VALLEHAG
 Company: TASEA
 Date: 2-6-20 Time: 1142

Relinquished by
 Signature: _____
 Printed Name: _____
 Company: _____
 Date: _____ Time: _____

Received by
 Signature: _____
 Printed Name: _____
 Company: _____
 Date: _____ Time: _____

Login Sample Receipt Checklist

Client: Landau & Associates, Inc.

Job Number: 580-92611-1

Login Number: 92611

List Number: 1

Creator: Pilch, Andrew C

List Source: Eurofins TestAmerica, Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	