

TECHNICAL MEMORANDUM

To: Mr. Larry Burke, Davis Wright Tremaine LLP
From: Brad Berggren and Samantha Biles
Date: March 23, 2015
Subject: February 2015 Focused Soil Removal, Salem Park Parcel

INTRODUCTION

At the request of the City of Salem, PNG Environmental, Inc. (PNG) has prepared this technical memorandum summarizing focused soil removal and restoration activities completed at the Park Parcel property located at approximately 315 Commercial Street SE, Salem, Oregon (Figure 1). The focused soil removal and surface restoration of a slope area at the southeastern corner of the Park Parcel property was completed as one of several conditions included in a pending Prospective Purchaser Agreement (PPA) between the City of Salem and Oregon Department of Environmental Quality (DEQ). The City of Salem anticipates acquiring the Park Parcel property from Minto View, LLC, who was the owner of the property at the time the focused soil removal was completed.

This memorandum was prepared to document soil removal activities completed by the City of Salem remediation contractor (Emery & Sons) between February 18th and 20th, 2015, as well as present the results of soil quality samples collected from the base of the soil excavation area on February 19, 2015. PNG was present to observe and document the soil removal, collect soil samples, and observe and document surface restoration of the excavated area. The soil removal, sampling, and excavation restoration activities were completed in accordance with PNG's Work Plan (2015) as approved by DEQ.

PLANNING ACTIVITIES

Prior to mobilization, a site pre-construction meeting was held by the City of Salem (Mr. Howard Biskie, Mr. Nitin Joshi, and Mr. Clinton Dameron) and attended by their construction contractor Emery and Sons (Mr. John Moore) and PNG. The pre-construction meeting provided the framework for the soil removal and restoration activities.

Preliminary evaluations suggested that the planned soil excavation area is above the ordinary high water mark (OHWM) of Pringle Creek and outside areas of wetland habitat. Consequently, the need for Section 404 U.S. Army Corps of Engineers (ACOE) or Division of State Land (DSL) permitting was not expected. However, to confirm that the proposed excavation did not require ACOE or DSL review or coordination, a wetlands and waters determination was completed and an evaluation of the ordinary high water mark (OHWM).

Verification of the OHWM was provided by Mason, Bruce & Girard, Inc. (MB&G), a City of Salem ecological consultant. MB&G previously completed an OHWM determination in 2010 (approved by the DSL) for the Willamette Slough immediately downstream of the site. MB&G reported the OHWM for the slough to be 121.12 feet mean sea level (MSL)

(MB&G 2014). In addition, MB&G also reviewed the City of Salem permit application prepared for the Commercial Street Bridge replacement, immediately up-stream of the Park Parcel property soil removal area. The OHWM for the bridge crossing was 129 feet MSL.

Additionally, a wetland determination was completed by SWCA Environmental Consultants (2015). The report concluded no jurisdictional wetlands or waters were present on the soil removal area. The report is included in Attachment A.

Following the above-mentioned ecological evaluations, a City of Salem surveyor established the 130 foot elevation contour at the base of the slope; excavation was not completed below this contour (base of the retaining wall). In addition, the surveyor established the eastern property line with the railroad property; excavation did not encroach across the property line.

Additional planning activities included soil disposal permitting that was completed by the property owner, Minto View LLC.

FIELD ACTIVITIES

Site work was completed between February 18 and 20, 2015. All excavation work was overseen by an archaeologist from Historical Research Associates, Inc.; potential historic artifacts were not observed over the course of the work activities. In addition, at various times representatives of the City of Salem were present to provide oversight of Emery & Sons. PNG was on-site to observe and document excavation activities, collect soil samples, and document the surface restoration. Photos documenting site work activities are included in Attachment B.

Soil Removal

On February 18, 2015, Emery & Sons initiated site work. Initially, Emery & Sons established an erosion control barrier with silt fencing just below the 130 foot MSL contour. The barrier was installed to prevent any soil or rip-rap from encroaching into jurisdictional waters of the state (i.e. Pringle Creek). Subsequently, the area of planned excavation (measuring approximately 6 feet wide by 40 feet long and parallel to the north-south trending retaining wall) was cleared of vegetation and loose debris (Figure 2).

Emery & Sons initiated excavation at the most-upslope portion of the removal area. Soil was excavated following the original slope to a depth of approximately two feet across the entire excavation area. Field observations (visual and odor) did not identify any potentially contaminated soils.

During the course of excavation, a 16-inch diameter capped steel pipe was uncovered and slightly protruded from the face of the slope. The pipe was located at approximately 29 feet downslope from the northern retaining wall, and appeared to be free of holes or other damage. Discussions between PNG and the City of the Salem in consultation with DEQ concluded that the pipe could be left in place and did not warrant further examination at that time. However, a tracer wire was run from the end of the pipe and connected to the fence atop the adjacent retaining wall such that the pipe could be located in the future if desired.

On February 19, 2015, the lateral limits of the excavation adjacent to the property line with the railroad as well as near the 130 foot MSL contour were completed by hand tool. All soils removed during the excavation activities were placed directly into a dump truck for transport to the approved landfill disposal facility.

Observation of the final excavation area suggested the underlying material consisted of fill as evidenced by the presence of brick, concrete, rebar and general debris.

In total, 32.55 tons of soil were removed and disposed under a Minto View LLC permit to Riverbend Landfill in McMinnville, Oregon. Soil disposal tipping documentation is included in Attachment C.

Soil Sampling

After completion of soil removal, PNG collected five discreet soil samples from the floor or base of the excavation/trench consistent with the DEQ approved work plan. Considering the discovery of the capped steel pipe on the slope face, soil sample locations were selected to allow for two samples downslope and three upslope from the pipe. Site features and soil sample locations are shown on Figure 2.

All samples were sent to Pace Analytical Services, Inc. (Minneapolis, Minnesota). Soil samples were analyzed for dioxins by U.S. Environmental Protection Agency (EPA) Method 1613b. Laboratory data and chain-of-custody documentation is provided in Attachment D.

Excavation Area Restoration

The surface of the soil excavation area was restored on February 20, 2015 consistent with the DEQ approved work plan. Initially, a non-woven geotextile fabric was laid on the base of the excavated area. Subsequently, the geotextile was covered with 10.5 cubic yards of control density fill (CDF) resulting in a surface thickness of approximately one foot. The CDF was overlain by ten cubic yards of rip-rap rock material (approximate thickness of one foot over the restoration area). The rip-rap was placed while the CDF was still wet, allowing the rocks to become seated in the top of the CDF for greater stability.

RESULTS

Table 1 summarizes the laboratory analytical results of dioxin-like congeners for the five soil samples collected from the base of the soil excavated area. The 2,3,7,8-TCDD toxic equivalency (TEQ) concentrations ranged from 33 to 88 nanograms/kilogram (ng/Kg) when calculated using the World Health Organization's suggested toxicity equivalent factors (TEFs). For soil samples with congeners that were not detected at the laboratory method reporting limit concentration, a value of half the reporting limit concentration was assumed in TEQ calculations. The mean TEQ concentration of all five soil samples was 48 ng/Kg.

The two soil samples (Trench 1 and Trench 2), located along the slope below the discovered pipe, have TEQ concentrations of 49.6 and 34.5 ng/Kg, respectively. These concentrations are generally consistent with the other three samples collected from upslope of the pipe.

All TEQ concentrations are below the DEQ RBC for soil ingestion, dermal contact, and inhalation for construction worker (150 ng/Kg) and excavation worker (4,200 ng/Kg) pathway-receptor scenarios. All of the soil sample total TEQ concentrations are greater than the Oregon DEQ risk-based concentrations (RBCs) for an occupational direct contact pathway-receptor scenario of 15 ng/Kg (Table 1). However, none of the individual congener TEQ concentrations for any of the five soil samples exceed the DEQ RBC for occupational direct contact.

The CDF and rip-rap rock surface cover placed over the soil excavation area is expected to prevent potential direct contact exposure, as well as prevent migration of the underlying soil with residual dioxin concentrations away from the slope.

ATTACHMENTS

Table 1 - Soil Analytical Results - Dioxins

Figure 1 – Site Features

Figure 2 – Soil Removal and Cover Area

Attachment A – SWCA Technical Memorandum

Attachment B – Photos

Attachment C – Riverbend Landfill Soil Disposal Documentation

Attachment D – Laboratory Report and Chain-of-Custody Documentation

REFERENCES

- DEQ. 2015 (February 2). *City of Salem PPA Work Plan*. Electronic mail communication from Don Hanson (DEQ) to Guy Tanz (PNG). Oregon Department of Environmental Quality.
- MB&G. 2014 (December 20). *Privileged and Confidential: City of Salem River Park Parcel*. Electronic mail communication from Stuart Myers, MB&G to Mr. Guy Tanz, PNG. Mason, Bruce & Girard, Inc.
- PNG. 2015 (January 28). *Salem Park Parcel Focused Soil Removal Work Plan*. PNG Environmental, Inc.
- SWCA. 2015 (February 17). *Technical Memorandum, Salem River Park Parcel Soil Removal – Wetland Determination*. SWCA Environmental Consultants

TABLES

Table 1
Slope Soil Excavation Analytical Results - Dioxins (ng/Kg)
City of Salem Park Parcel
Salem, Oregon

Analyte	TEF	Trench-1			Trench-2			Trench-3			Trench-4			Trench-5			TEQ Statistics		
		Concentration	DV	TEQ (1/2 RL)	Concentration	DV	TEQ (1/2 RL)	Concentration	DV	TEQ (1/2 RL)	Concentration	DV	TEQ (1/2 RL)	Concentration	DV	TEQ (1/2 RL)	Max	Mean	Median
2,3,7,8-TCDF	0.1	6.3 IJ	J	0.63	11		1.1	32		3.2	83		8.3	21		2.1	8.3	3.07	2.1
Total TCDF		17			49			47			110			26					
2,3,7,8-TCDD	1	2.3 U		1.15	1.8 U		0.9	2.6 U		1.3	5.4 J		5.4	3.8 U		1.9	5.4	2.13	1.3
Total TCDD		2.3 U			1.8 U			10			12			3.8 U					
1,2,3,7,8-PeCDF	0.03	6.5 IJ	J	0.195	4.8 J	J	0.144	3.4 IJ	J	0.102	12 J		0.36	3.6 U		0.054	0.36	0.17	0.144
2,3,4,7,8-PeCDF	0.3	11 IJ	J	3.3	20 J	J	6	7.7 J	J	2.31	13 J		3.9	6.9 IJ	J	2.07	6	3.52	3.3
Total PeCDF		140			130			57			43 J			15 J	J				
1,2,3,7,8-PeCDD	1	5.1 IJ	J	5.1	3.0 IJ	J	3	5.3 J	J	5.3	6.9 J		6.9	3.7 J	J	3.7	6.9	4.80	5.1
Total PeCDD		14 J	J		2.1 U			5.3 J	J		23 J			3.7 J	J				
1,2,3,4,7,8-HxCDF	0.1	23 J	J	2.3	28 IJ	J	2.8	10 IJ	J	1	26 J		2.6	15 J	J	1.5	2.8	2.04	2.3
1,2,3,6,7,8-HxCDF	0.1	20 J	J	2	14 J	J	1.4	5.8 J	J	0.58	14 J		1.4	9.7 J	J	0.97	2	1.27	1.4
2,3,4,6,7,8-HxCDF	0.1	23 J	J	2.3	16 J	J	1.6	9.8 J	J	0.98	20 J		2	7.1 IJ	J	0.71	2.3	1.52	1.6
1,2,3,7,8,9-HxCDF	0.1	18 J	J	0	7.8 J	J	0.78	5.2 J	J	0.52	12 J		1.2	3.8 J	J	0.38	1.2	0.58	0.52
Total HxCDF		510			260			260			680			220					
1,2,3,4,7,8-HxCDD	0.1	15 J	J	1.5	7.4 IJ	J	0.74	7.4 J	J	0.74	15 J		1.5	10 IJ	J	1	1.5	1.10	1
1,2,3,6,7,8-HxCDD	0.1	78		7.8	38 J	J	3.8	38 J	J	3.8	100		10	36 J	J	3.6	10	5.80	3.8
1,2,3,7,8,9-HxCDD	0.1	25 J	J	2.5	14 IJ	J	1.4	9.6 IJ	J	0.96	20 J		2	11 J	J	1.1	2.5	1.59	1.4
Total HxCDD		480			110			150			430			92					
1,2,3,4,6,7,8-HpCDF	0.01	220		2.2	130		1.3	150		1.5	430		4.3	140		1.4	4.3	2.14	1.5
1,2,3,4,7,8,9-HpCDF	0.01	20 J	J	0.2	17 J	J	0.17	12 J	J	0.12	35 J		0.35	13 J	J	0.13	0.35	0.19	0.17
Total HpCDF		680			450			670			1900			540					
1,2,3,4,6,7,8-HpCDD	0.01	1500		15	740		7.4	880		8.8	2600		26	860		8.6	26	13.16	8.8
Total HpCDD		4800			1400			1600			5000			1700					
OCDF	0.0003	310		0.093	270		0.081	420		0.126	1300		0.39	380		0.114	0.39	0.16	0.114
OCDD	0.0003	11,000		3.3	6,300		1.89	11,000		3.3	38000		11.4	13,000		3.9	11.4	4.76	3.3
Total Toxic Equivalency (TEQ)																			
2,3,7,8-TCDD TEQ (with 1/2 reporting limits)				49.6			34.5			34.6			88.0			33.2	91.7	48.0	37.8
2,3,7,8-TCDD TEQ (without no-detects)				48.4			33.6			33.3			88.0			31.3			
DEQ Screening Level Criteria in Soil																			
Soil Ingestion, Dermal Contact, and Inhalation																			
Residential ^a				4.4			4.4			4.4			4.4			4.4	4.4	4.4	4.4
Urban Residential ^b				12			12			12			12			12	12	12	12
Occupational ^c				15			15			15			15			15	15	15	15
Construction Worker ^d				150			150			150			150			150	150	150	150
Excavation Worker ^e				4,200			4,200			4,200			4,200			4,200	4,200	4,200	4,200

Table 1
Slope Soil Excavation Analytical Results - Dioxins (ng/Kg)
City of Salem Park Parcel
Salem, Oregon

Notes:

^a Oregon Department of Environmental Quality (DEQ) Generic Risk-Based Concentration (RBC) for Soil Ingestion, Dermal Contact, and Inhalation in a residential setting (DEQ RBDM, rev. June 2012)

^b DEQ Generic (RBC for Soil Ingestion, Dermal Contact, and Inhalation in an occupational setting (DEQ RBDM, rev. June 2012))

^c DEQ Generic (RBC for Soil Ingestion, Dermal Contact, and Inhalation in a construction worker setting (DEQ RBDM, rev. June 2012))

^d DEQ Generic (RBC for Soil Ingestion, Dermal Contact, and Inhalation in an excavation worker setting (DEQ RBDM, rev. June 2012))

^e DEQ Generic (RBC for Soil Ingestion, Dermal Contact, and Inhalation in an urban residential setting (DEQ RBDM, rev. June 2012))

ng/Kg = nanogram per kilogram

RL = Reporting limit

U = Undetected at method reporting limit shown

I = Interference present

J = Sample result is qualified as an estimated value, below the method reporting limit.

J¹ = Data Validation Qualifier. Result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample. See data validation report for further information.

P = PCDE interference

TCDD = Tetrachlorodibenzodioxin

TEF = Toxicity equivalent factor (World Health Organization's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information (Van den Berg et al. 2006))

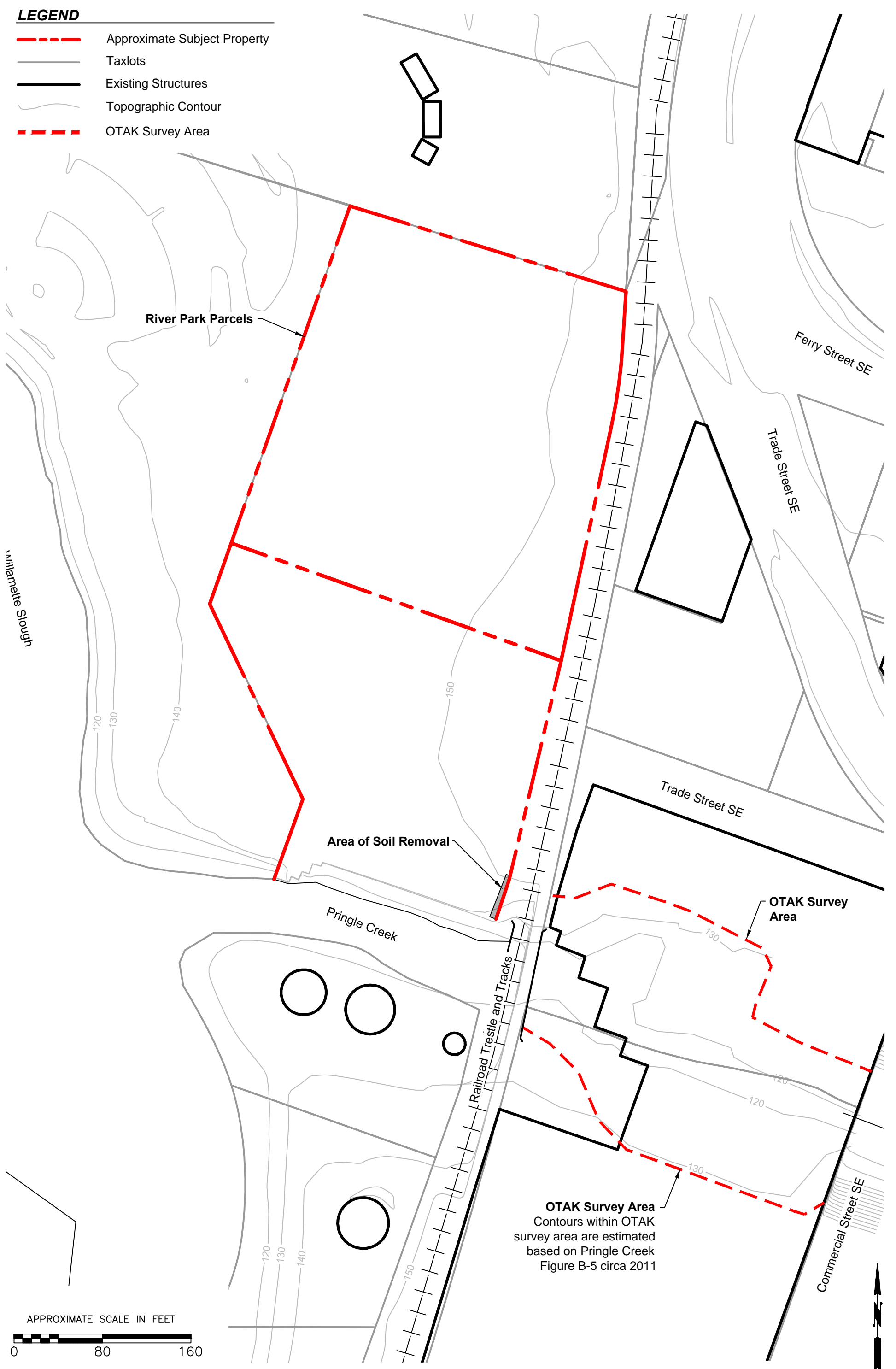
TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as a single 2,3,7,8-TCDD equivalent

All samples collected February 19, 2015 and analyzed by EPA Method 1613b.

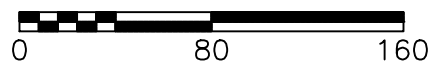
FIGURES

LEGEND

- - - - Approximate Subject Property
- Taxlots
- Existing Structures
- Topographic Contour
- - - - OTAK Survey Area







APPROXIMATE SCALE IN FEET

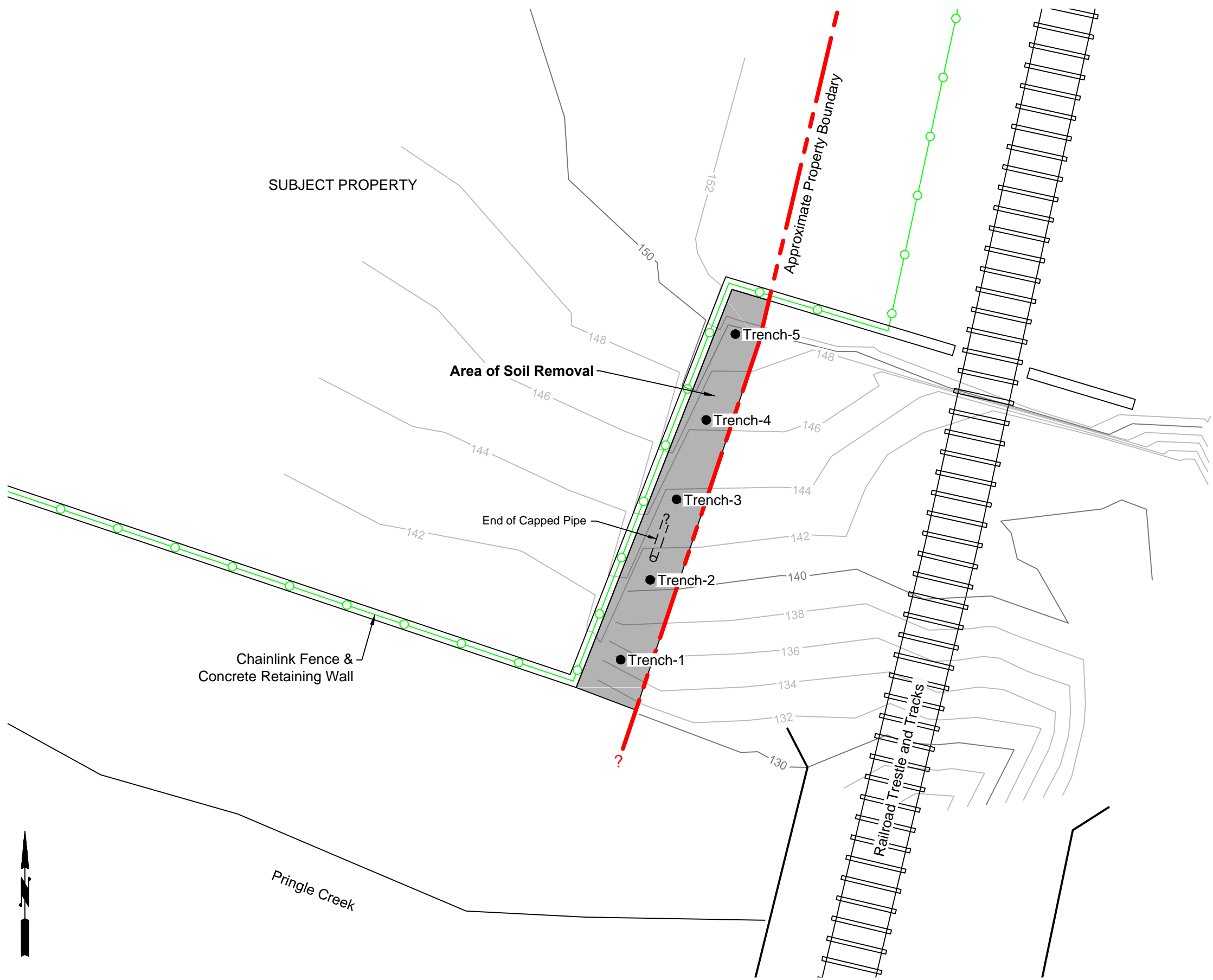


PNG ENVIRONMENTAL, INC.		DATE: 1-19-15	CITY OF SALEM SALEM, OR	SITE FEATURES	Project No. 1199-01
6665 SW Hampton St., Ste. 101		FILE NAME: 1199-01			Figure No. 1
Tigard, OR 97223		DRAWN BY: JJT			
TEL (503) 620-2387		APPROVED BY: SV			
FAX (503) 620-2977					

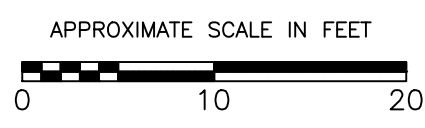
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LEGEND

-  Approximate Subject Property
-  Topographic Contour
-  Fence
-  Trench-1 ● Soil Sample Location (Feb. 2015, PNG)



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<p>PNG ENVIRONMENTAL, INC. 6665 SW Hampton St., Ste. 101 Tigard, OR 97223 TEL (503) 620-2387 FAX (503) 620-2977</p>		<p>DATE: 1-15-15 FILE NAME: 1199-01 DRAWN BY: JJT APPROVED BY: SV</p>	<p>CITY OF SALEM SALEM, OR</p>	<p>SOIL REMOVAL AND COVER AREA</p>	<p>Project No. 1199-01 Figure No. 2</p>
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ATTACHMENT A
Wetland Determination Technical Memorandum



ENVIRONMENTAL CONSULTANTS

Sound Science. Creative Solutions.

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Technical Memorandum

To: Guy Tanz, R.G, L.G., PNG Environmental, Inc.
From: C. Mirth Walker, Senior Wetland Scientist, PWS
Date: February 17, 2015
Subject: Salem River Park Parcel Soil Remediation – Wetland Determination
West of Front Street, Trade Street, and Commercial Street, Salem, Oregon
Tax map 7 3W 27BA, tax lot 1700 (portion), Marion County

INTRODUCTION

The project site is very small section of the subject tax lot, approximately 6 feet wide by 40 feet long, located near the south end of the subject tax lot, west of the Burlington Northern rail road and north of Pringle Creek (Figures 1 and 2). The City of Salem, through its outside counsel, is proposing to remediate dioxin-contaminated soils by removing them from the subject area. SWCA Environmental Consultants (SWCA) was contracted by PNG Environmental, Inc. to conduct a wetland determination on the project site to ensure that no state or federal permits would be required to remove soils from or to place clean fill within the subject area.

SITE DESCRIPTION

The general site was formerly a Boise Cascade pulp and paper mill and currently consists of paved areas and mowed grass park land with hard surface trails along the Willamette Slough. The old acid bath globe from the mill has been transformed into artwork for the park.

The project site is fenced and surrounded by a concrete retaining wall, but a small hole in the fence allowed access. The project site consists of rubble, non-native and noxious grass, weeds, shrubs, and one tree. The slope below the project site is covered with Himalayan blackberry (*Rubus armeniacus*) down to the edge of Pringle Creek. The general site layout is shown in Figure 3.

Pringle Creek discharges to the Willamette Slough, which forms the eastern boundary of Minto Island. The discharge point is near Willamette River mile 85, on the west side of Minto Island.

METHODS

The methodology used for determining the presence of wetlands followed the U.S. Army Corps of Engineers' (Corps') *Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers' Wetland Delineation Manual for the Western Mountains, Valleys, and Coast Region (Version 2.0)* (Corps 2010), used by both the Corps and the Oregon Department of State Lands (DSL).

Fieldwork for documenting site conditions was conducted on January 29, 2015, by C. Mirth Walker and Guy Tanz. Soils, vegetation, and indicators of hydrology were recorded at one sample plot location to

document the site's condition (see attached wetland determination form). The project site area and location of the sample plot are shown in Figure 4.

Soils mapped on the site consist of Clackamas gravelly loam, which may have hydric inclusions of Courtney gravelly silt loam on terraces. No wetlands were mapped on the site on the City of Salem Local Wetland Inventory (LWI) or on the National Wetlands Inventory (NWI) Salem West, Oregon, quadrangle. Pringle Creek is mapped as Mill Creek, Reach AA, Riverine Lower Perennial (MC-AA R2) on the LWI map, although upstream reaches of one of the tributaries are labeled as Pringle Creek. Pringle Creek is mapped as riverine, intermittent, streambed, semipermanent, excavated (R4SBFx) on the Salem West NWI map.

RESULTS

Wetlands

No wetlands are present on the site. Vegetated consisted of one black locust (*Robinia pseudoacacia*) tree, Himalayan blackberry, poison-hemlock (*Conium maculatum*), and creeping wild rye grass (*Elymus repens*), and did not meet hydrophytic vegetation criteria. Soils were very disturbed, with cobbles and gravels, brick, rebar, concrete rubble, bolts, and other debris and were very hard to dig. The small amount of soil present displayed no indicators of hydric soils. No wetland hydrology was noted within the surface 6 inches of soil. No indicators of water flow on the site were noted.

Waters

No waters are present on the site. Pringle Creek is present just south of the site. Pringle Creek is tributary to the Willamette Slough, immediately west of the site.

CONCLUSION

No further work is recommended. A wetland determination report could be prepared to meet DSL report standards as listed under Oregon Administrative Rules (OAR) 141-090-0035, and submitted for concurrence with a \$406 report review fee, but then the document would become part of the public record. While this would allow DSL concurrence of our opinion that no jurisdictional wetlands or waters are present on the site, we are very confident that no wetlands or waters are present on the subject site, and no further work is recommended. Sediment erosion prevention and control will be an important best management practice during soil removal activities.

Please do not hesitate to contact me with any questions regarding this memorandum.

LITERATURE REVIEWED

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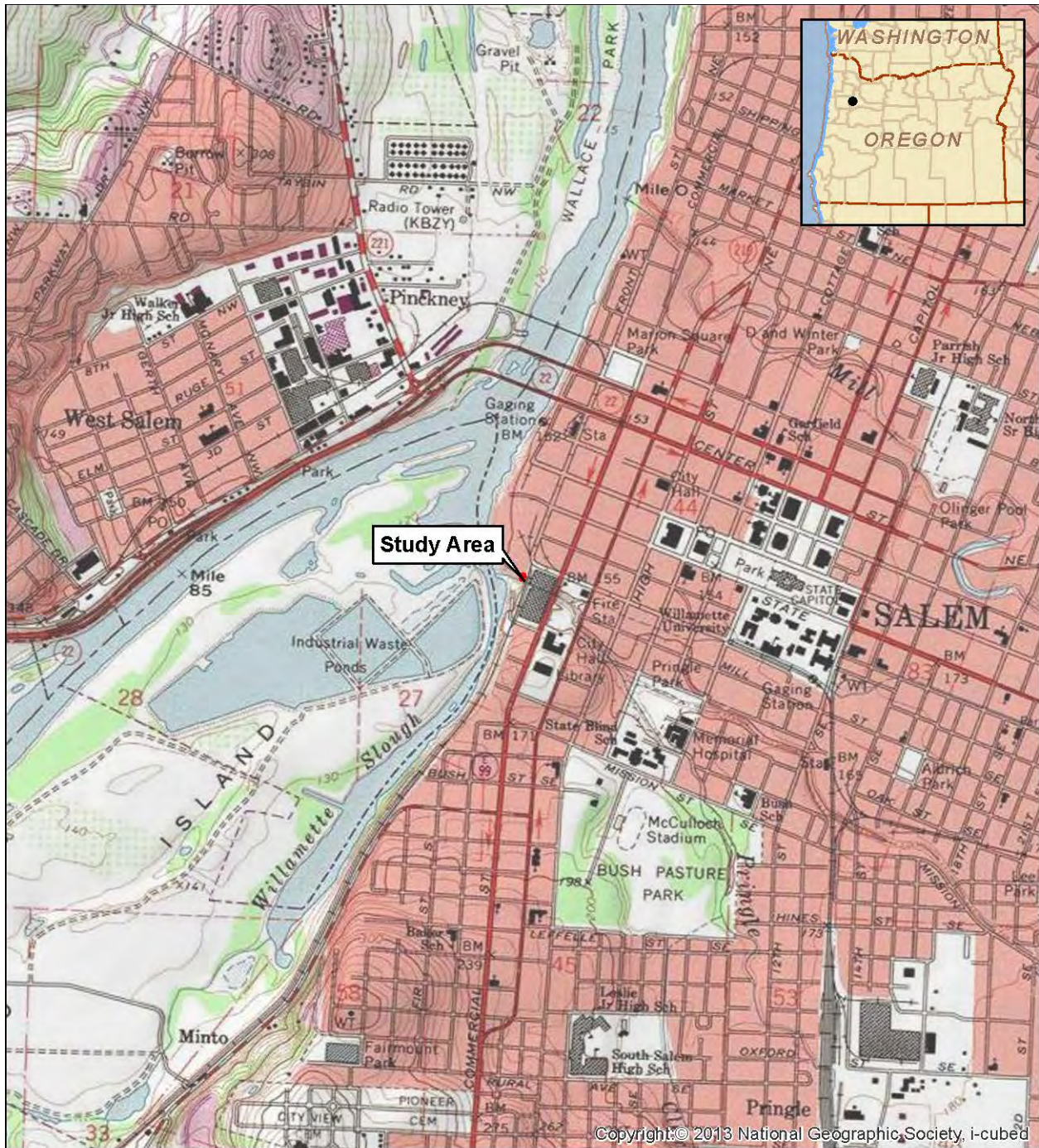
U.S. Geological Survey (USGS). 1969, photorevised 1986. Salem West, Oregon. 7.5-minute topographic quadrangle. 1:24,000. Reston, VA: U.S. Geological Survey.

List of Figures:

- Figure 1. Site location map
- Figure 2a. Tax lot map paper base
- Figure 2b. Tax lot map aerial base
- Figure 3. Project area plan
- Figure 4. Sample plot location map

Attachments:

- Wetland Determination Data Form
- On-site Photographs



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<p>Legend</p> <p> Study Area Boundary</p>	<p>0 1,000 2,000 Feet</p> <p>0 250 500 Meters</p>	<p>Salem River Park Parcel Soil Remediation Wetland Determination</p>
<p>Source: USGS 7.5' topographic quadrangle: Salem West, OR (1986).</p>		<p style="text-align: center;">SWCA ENVIRONMENTAL CONSULTANTS 1220 SW Morrison, Suite 700 Portland, OR 97205-2235 www.swca.com 503.224.0333</p> <p>Project: 31908 February 06, 2015</p>

Figure 1. Site location map.

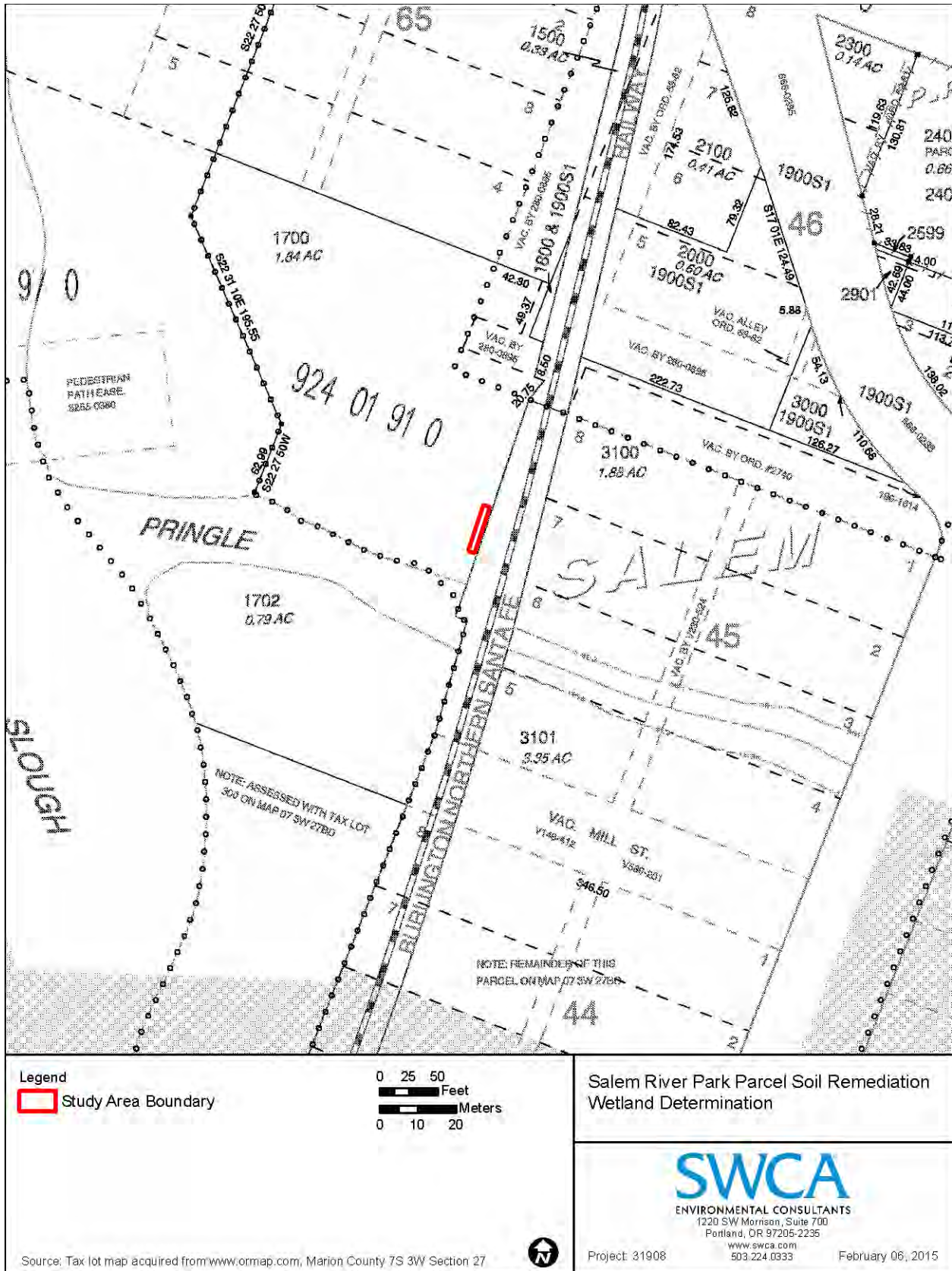


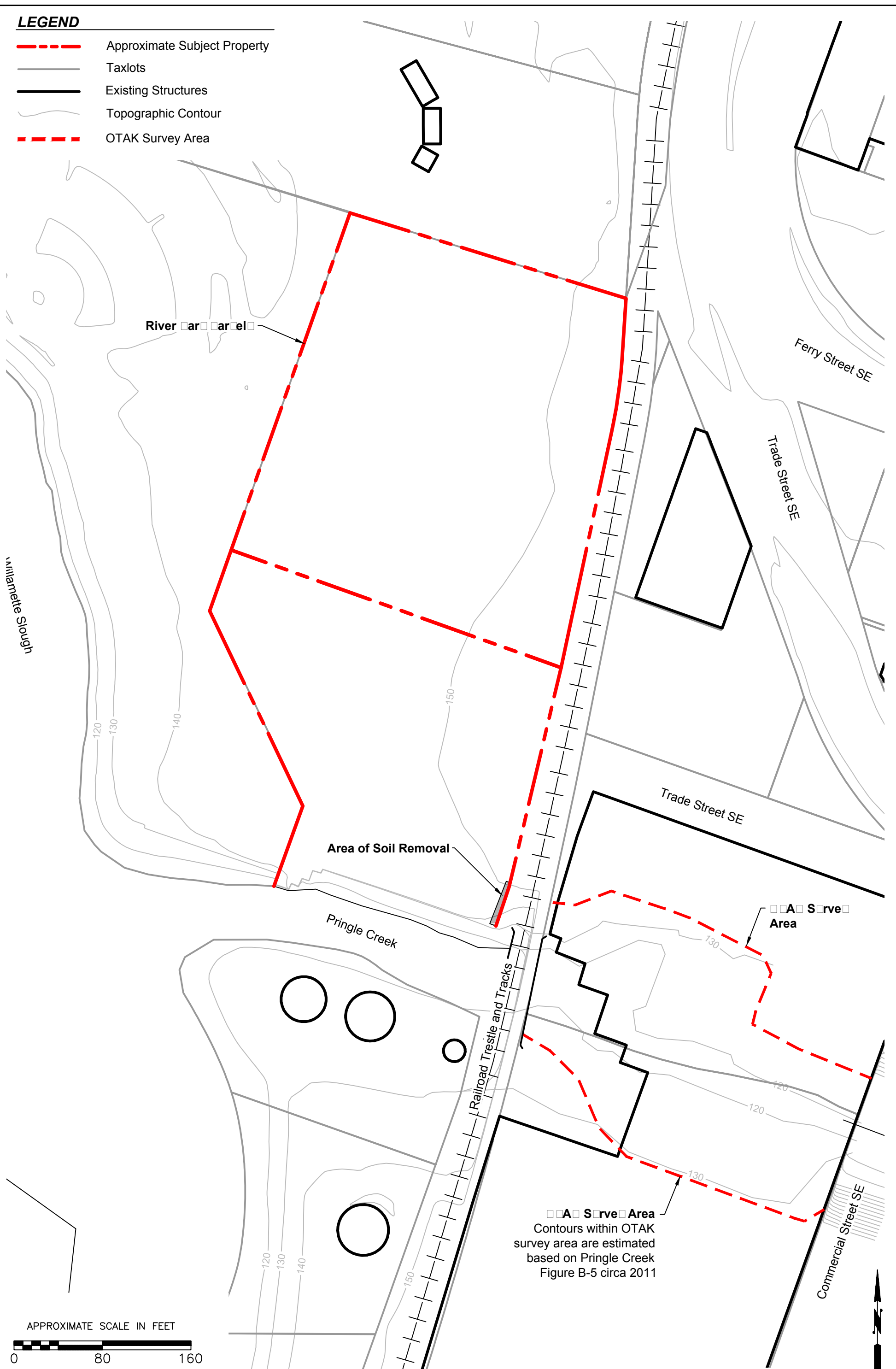
Figure 2a. Tax lot map paper base.



Figure 2b. Tax lot map aerial base.

LEGEND

- - - - Approximate Subject Property
- Taxlots
- Existing Structures
- Topographic Contour
- - - - OTAK Survey Area



River Bar Channel

Ferry Street SE

Trade Street SE

Trade Street SE

Area of Soil Removal

Pringle Creek

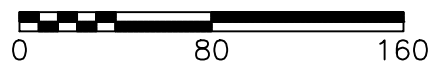
AServe Area

AServe Area
Contours within OTAK survey area are estimated based on Pringle Creek Figure B-5 circa 2011

Commercial Street SE

Railroad Trestle and Tracks




APPROXIMATE SCALE IN FEET

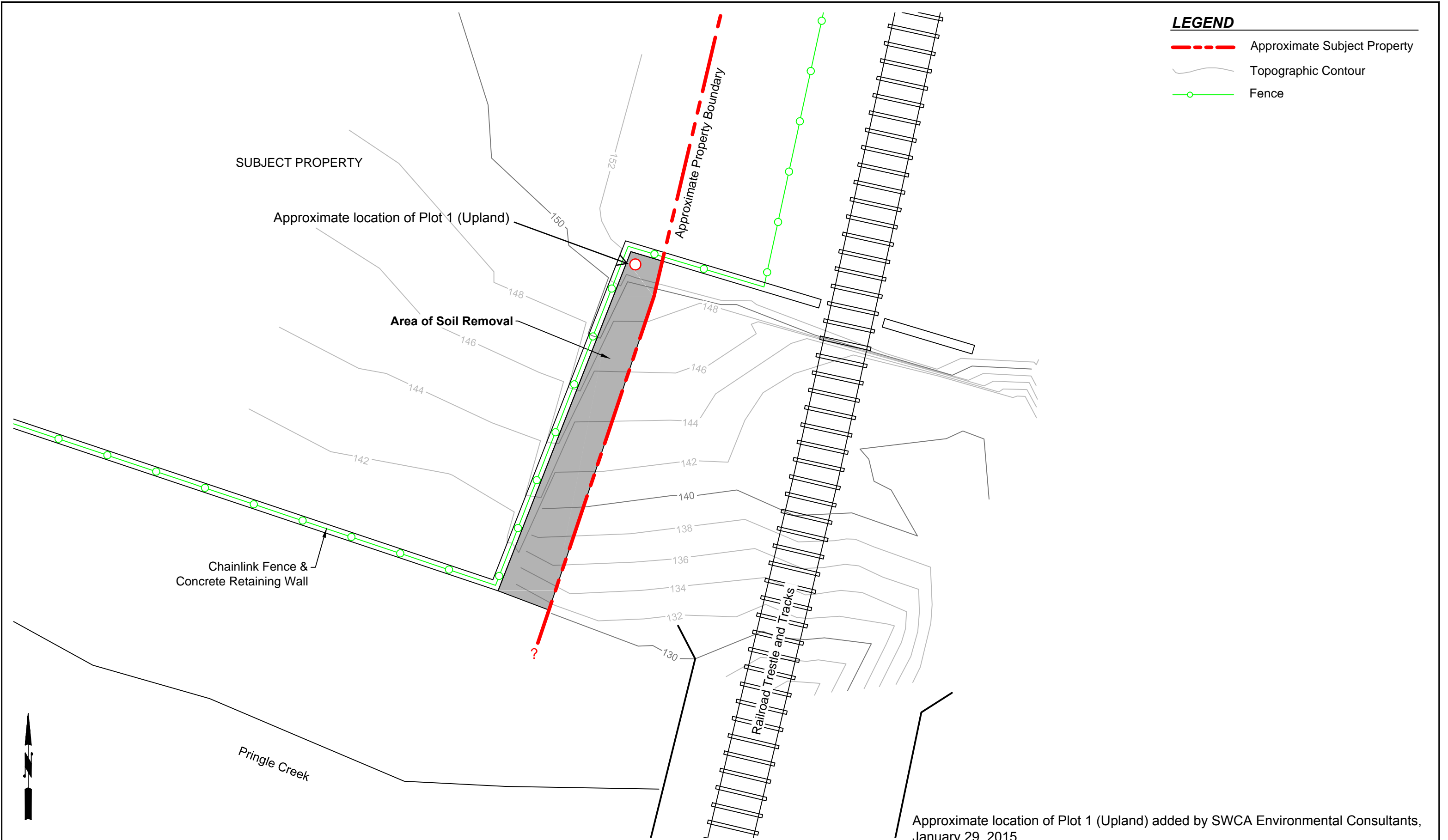


PNG ENVIRONMENTAL, INC.		DATE: 1-19-15	CITY OF SALEM SALEM, OR	SITE FEATURES	Project No. 1199-01
6665 SW Hampton St., Ste. 101		FILE NAME: 1199-01			Figure No. 3
Tigard, OR 97223		DRAWN BY: JJT			
TEL (503) 620-2387		APPROVED BY: SV			
FAX (503) 620-2977					

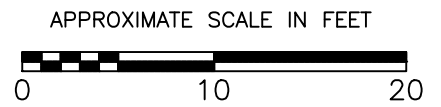
\\10.1.1.10\project\Autocad\PNG-AutoCAD\1199-01_COS\2015\1199-01_BM-011515.dwg 2.17.2014

LEGEND

-  Approximate Subject Property
-  Topographic Contour
-  Fence



Approximate location of Plot 1 (Upland) added by SWCA Environmental Consultants, January 29, 2015



\\10.1.1.10\project\Autocad\PNG-AutoCAD\1199-01_COS\2015\1199-01_BM-011515.dwg 2.17.2014

PNG ENVIRONMENTAL, INC. 6665 SW Hampton St., Ste. 101 Tigard, OR 97223	DATE: 1-15-15	CITY OF SALEM SALEM, OR	SOIL REMOVAL AND COVER AREA	Project No. 1199-01
	FILE NAME: 1199-01			Figure No. 4
TEL (503) 620-2387	DRAWN BY: JJT			
FAX (503) 620-2977	APPROVED BY: SV			

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Salem River Park Parcel - Soil Remediation City/County: Salem / Marion Sampling Date: 1/29/2015
 Applicant/Owner: PNG Environmental / City of Salem State: OR Sampling Point: P1
 Investigator(s): C. Mirth Walker and Guy Tanz Section, Township, Range: 27BA, T7S, R3W
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): <3
 Subregion (LRR): A, Northwest Forests and Coast Lat: 44.938418 Long: -123.043201 Datum: WGS 1984
 Soil Map Unit Name: Clackamas gravelly loam (unit Ck) NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks)
 Are Vegetation _____, Soil X, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>	
Wetland Hydrology Present?	Yes _____	No <u>X</u>	
Precipitation prior to fieldwork: <u>2.79</u> inches prior two weeks (mostly around Jan. 17), <u>2.4</u> inches below normal month to date.			
Remarks: <u>Dryer than normal. Soil consists of mostly fill material.</u>			

VEGETATION

Tree Stratum (Plot size: <u>30' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)
1. <u>Robinia pseudoacacia</u>	<u>20%</u>	<u>Yes</u>	<u>FACU</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
<u>20%</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>10' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>0</u> x 2 = <u>0</u> FAC species <u>60</u> x 3 = <u>180</u> FACU species <u>20</u> x 4 = <u>80</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>80</u> (A) <u>260</u> (B) Prevalence Index = B/A = <u>3.25</u>
1. <u>Rubus armeniacus</u>	<u>20%</u>	<u>Yes</u>	<u>FACU</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>20%</u> = Total Cover				
Herb Stratum (Plot size: <u>5' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation _____ 2 - Dominance Test is >50% _____ 3 - Prevalence Index is ≤3.0 ¹ _____ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) _____ 5 - Wetland Non-Vascular Plants ¹ _____ _____ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present.
1. <u>Conium maculatum</u>	<u>40%</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Elymus repens</u>	<u>20%</u>	<u>Yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>60%</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>10' r</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
<u>0%</u> = Total Cover				
% Bare Ground in Herb Stratum <u>40%</u>				
Hydrophytic Vegetation Present? Yes _____ No <u>X</u>				
Remarks: _____ Entered by: <u>cmw</u> QC by: _____				

SOIL

Sampling Point: **P1**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6+	10YR 3/2	10					SaL	
		90					cobbles and gravels, brick, rebar,	
								bolts, concrete, other debris
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix.								
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)								
<input type="checkbox"/> Histosol (A1)			<input type="checkbox"/> Sandy Redox (S5)			Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/> Histic Epipedon (A2)			<input type="checkbox"/> Stripped Matrix (S6)			<input type="checkbox"/> 2 cm Muck (A10)		
<input type="checkbox"/> Black Histic (A3)			<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)			<input type="checkbox"/> Red Parent Material (TF2)		
<input type="checkbox"/> Hydrogen Sulfide (A4)			<input type="checkbox"/> Loamy Gleyed Matrix (F2)			<input type="checkbox"/> Very Shallow Dark Surface (TF12)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)			<input type="checkbox"/> Depleted Matrix (F3)			<input type="checkbox"/> Other (Explain in Remarks)		
<input type="checkbox"/> Thick Dark Surface (A12)			<input type="checkbox"/> Redox Dark Surface (F6)			³ Indicators of hydrophytic vegetation and		
<input type="checkbox"/> Sandy Mucky Mineral (S1)			<input type="checkbox"/> Depleted Dark Surface (F7)			wetland hydrology must be present,		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			<input type="checkbox"/> Redox Depressions (F8)			unless disturbed or problematic.		
Restrictive Layer (if present):						Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/>		
Type: _____ Depth (inches): _____								
Remarks: S = sand; Si = silt; C = clay; L = loam or loamy; co = coarse; f = fine; vf = very fine; + = heavy (more clay); - = light (less clay)								

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			
Field Observations:			
Surface Water Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): _____	Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>
Water Table Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): <u>>6"</u>	
Saturation Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth (inches): <u>>6"</u>	
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: _____ Entered by: <u>cmw</u> QC by: _____			



Photo A. View of project site in vicinity of Plot 1.



Photo B. Downslope of Photo A.



Photo C. Downslope of Photo B.



Photo D. Downslope of Photo C. Pringle Creek at bottom. Railroad trestle to my left.



Photo E. View of Pringle Creek and Himalayan blackberry.



Photo F. View west of Pringle Creek, Willamette Slough, Minto Island, and acid bath globe in the City River Park.



Photo G. Plot 1 location after digging amidst the cobble, rubble, and debris.



Photo H. Former Boise Cascade pulp and paper mill acid bath globe now in Salem River Park.

ATTACHMENT B
Photos



PHOTO 1
Soil removal area and adjacent property prior to commencement of excavation.



PHOTO 2
Soil removal area after demarcation of property boundary as seen from the northern retaining wall.



PHOTO 3
Completed soil removal prior to restoration as seen from the OHWM.

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PHOTO 4
Placement of CDF as part of cover and site restoration.



PHOTO 5
Completed restoration as seen from the northern retaining wall.



PHOTO 6
Completed restoration as seen from the southern extent of the excavated area.

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ATTACHMENT C
Riverbend Landfill Soil Disposal Documentation

Riverbend Landfill
 13469 SW HIGHWAY 18,
 MCMINNVILLE, OR, 97128-8634
 Ph: (503) 472-8788

Reprint Ticket # 987394

Customer Name	KTEC	Carrier	EMERY EMERY & SONS
Ticket Date	02/19/2015	Vehicle#	362 Volume
Payment Type	Credit Account	Container	
Manual Ticket#		Driver	
Hauling Ticket#		Check#	
Route		Billing#	0000739
StateWasteCode		Gen EPA ID	.
Manifest	NA	Grid	
Destination			
PO#			
Profile	116484OR(DIOXIN CONATMINATED SOIL~KTEC LLC~MINTO VIEW~116484OR)		
Generator	1717133 OR-MINTO VIEW LLC 315		

Time	Scale	Operator	Inbound	Gross	101640 lb
In 02/19/15 11:14:34 AM	Inbound	Ashley		Tare	36540 lb
Out 02/19/15 11:31:51 AM	Outbound	Ashley		Net	65100 lb
				Tons	32.55

Comments

Products	LD%	Qty	UOM	Rate	Fee	Amount	Origin
Daily Cover-PCS-Tons-Oregon Pet	100	32.55	Tons	21.70	9.77	\$706.34	MARION
FEA-FUEL,ENV,ADMIN	100	32.55	Tons	3.85		\$125.32	MARION

Driver's Signature _____ Total Fees \$9.77
 Total Ticket \$841.43

ATTACHMENT D
Laboratory Report and Chain-of-Custody Documentation

Report Prepared for:

Brad Berggren
PNG Environmental
6665 SW Hampton Street
Portland OR 97223

**REPORT OF
LABORATORY
ANALYSIS FOR
PCDD/PCDF**

Report Prepared Date:

March 10, 2015

Report Information:

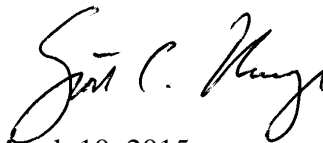
Pace Project #: 10297373
Sample Receipt Date: 02/20/2015
Client Project #: Trench Dioxin
Client Sub PO #: N/A
State Cert #: MN200001-005

Invoicing & Reporting Options:

The report provided has been invoiced as a Level 2 PCDD/PCDF Report. If an upgrade of this report package is requested, an additional charge may be applied.

Please review the attached invoice for accuracy and forward any questions to Scott Unze, your Pace Project Manager.

This report has been reviewed by:



March 10, 2015

Scott Unze, Project Manager
(612) 607-6383
(612) 607-6444 (fax)
scott.unze@pacelabs.com



Report of Laboratory Analysis

This report should not be reproduced, except in full, without the written consent of Pace Analytical Services, Inc.

The results relate only to the samples included in this report.



DISCUSSION

This report presents the results from the analyses performed on five samples submitted by a representative of PNG Environmental, Inc. The samples were analyzed for the presence or absence of polychlorodibenzo-p-dioxins (PCDDs) and polychlorodibenzofurans (PCDFs) using USEPA Method 1613B. This report was revised to provide reporting limits based on signal-to-noise measurements and mid-bound toxic equivalence values.

Second column confirmation analyses of 2,3,7,8-TCDF values obtained from the primary (DB5-MS) column are performed only when specifically requested for a project and only when the values are above the concentration of the lowest calibration standard. Typical resolution for this isomer using the DB5-MS column ranges from 25-30%.

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the sample extracts ranged from 52-96%. All of the labeled standard recoveries obtained for this project were within the target ranges specified in Method 1613B. Also, since the quantification of the native 2,3,7,8-substituted congeners was based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

In some cases, interfering substances impacted the determinations of PCDD or PCDF congeners; the affected values were flagged "I" where incorrect isotope ratios were obtained. Concentrations below the calibration range were flagged "J" and should be regarded as estimates.

A laboratory method blank was prepared and analyzed with the sample batch as part of our routine quality control procedures. The results show the blank to contain trace levels of selected congeners. These levels were below the calibration range of the method. The levels reported for the affected congeners in the field samples were higher than the corresponding blank levels by one or more orders of magnitude. These results indicate that the sample processing steps did not contribute significantly to the levels reported for the field samples.

A laboratory spike sample was also prepared using clean sand that had been fortified with native standard materials. The recoveries of the native compounds ranged from 87-122%, indicating a high degree of accuracy for these determinations. Matrix spikes were prepared with the sample batch using sample material from a separate project; results from these analyses will be provided upon request.

REPORT OF LABORATORY ANALYSIS

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Minnesota Laboratory Certifications

Authority	Certificate #	Authority	Certificate #
A2LA	2926.01	Mississippi	MN00064
Alabama	40770	Montana	92
Alaska	MN00064	Nebraska	
Arizona	AZ0014	Nevada	MN_00064_200
Arkansas	88-0680	New Jersey (NE)	MN002
California	01155CA	New York (NEL)	11647
Colorado	MN00064	North Carolina	27700
Connecticut	PH-0256	North Dakota	R-036
EPA Region 8	8TMS-Q	Ohio	4150
Florida (NELAP)	E87605	Oklahoma	D9922
Georgia (DNR)	959	Oregon (ELAP)	MN200001-005
Guam	959	Oregon (OREL)	MN300001-001
Hawaii	SLD	Pennsylvania	68-00563
Idaho	MN00064	Puerto Rico	MN00064
Illinois	200012	Saipan	MP0003
Indiana	C-MN-01	South Carolina	74003001
Indiana	C-MN-01	Tennessee	TN02818
Iowa	368	Texas	T104704192-08
Kansas	E-10167	Utah (NELAP)	MN00064
Kentucky	90062	Virginia	00251
Louisiana	03086	Washington	C755
Maine	2007029	West Virginia	9952C
Maryland	322	Wisconsin	999407970
Michigan	9909	Wyoming	8TMS-Q
Minnesota	027-053-137		

REPORT OF LABORATORY ANALYSIS

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Report No.....10297373

Appendix A

Sample Management



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1
10297373

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: PNG Environmental	Report To:	Attention:
Address: 6665 SW Hemlock St.	Copy To:	Company Name:
Email To: Suited 101	Purchase Order No.:	Address:
Phone: 503-620-2387	Project Name:	Pace Quote Reference:
Requested Due Date/TAT:	Project Number:	Pace Project Manager:
		Pace Profile #:

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER

Site Location _____

STATE: _____

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
				COMPOSITE START	COMPOSITE END/GRAB						
1	Trench-1	Drinking Water DW	SLG 2/19/15	2/19/15 0908		1					001
2	Trench-2	Water WT		0915		1					002
3	Trench-3	Waste Water WW		0920		1					003
4	Trench-4	Product P		0926		1					004
5	Trench-5	Soil/Solid SL		0932		1					005
6		Oil OL									
7		Wipe WP									
8		Air AR									
9		Tissue TS									
10		Other OT									
11											
12											

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	<i>Jamie Sub</i>	2/19/15	1010	<i>Wm (Pace)</i>	2/20/15	10:30	Y N Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: *Samantha Biles*

SIGNATURE of SAMPLER: *Jamie Sub*

DATE Signed (MM/DD/YYYY): 02/19/15

Temp in °C _____

Received on _____

Sealed Cooler (Y/N) _____

Custody (Y/N) _____

Samples Intact (Y/N) _____

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Sample Condition Upon Receipt

Client Name: PNG Env.

Project #: **WO# : 10297373**



Courier: Fed Ex UPS USPS Client
 Commercial Pace Speedee Other: _____
 Tracking Number: 7802 3517 2248

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No Optional: Proj. Due Date: _____ Proj. Name: _____

Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No

Thermom. Used: B88A9130516413 B88A912167504 B88A9132521491 Type of Ice: Wet Blue None Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.9 Cooler Temp Corrected (°C): 0.7 Biological Tissue Frozen? Yes No N/A
 Temp should be above freezing to 6°C Correction Factor: -0.2 Date and Initials of Person Examining Contents: 2/20/15 wmm

				Comments:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		1.
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		2.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		3.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		4.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		5.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A		6.
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A		7.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		8.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		9.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		10.
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A		11.
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A		12.
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>				
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A		13.
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A		Sample #
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A		14.
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A		15.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased): _____				

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: 0 Date: 02/20/15

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

Reporting Flags

- A = Reporting Limit based on signal to noise
- B = Less than 10x higher than method blank level
- C = Result obtained from confirmation analysis
- D = Result obtained from analysis of diluted sample
- E = Exceeds calibration range
- I = Interference present
- J = Estimated value
- Nn = Value obtained from additional analysis
- P = PCDE Interference
- R = Recovery outside target range
- S = Peak saturated
- U = Analyte not detected
- V = Result verified by confirmation analysis
- X = %D Exceeds limits
- Y = Calculated using average of daily RFs
- * = See Discussion

REPORT OF LABORATORY ANALYSIS

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Report No.....10297373

Appendix B

Sample Analysis Summary

Method 1613B Sample Analysis Results

Client - PNG Environmental

Client's Sample ID	Trench-1		
Lab Sample ID	10297373001		
Filename	F150305C_05		
Injected By	BAL		
Total Amount Extracted	1.10 g	Matrix	Solid
% Moisture	15.2	Dilution	NA
Dry Weight Extracted	0.933 g	Collected	02/19/2015 09:08
ICAL ID	F141223	Received	02/20/2015 10:30
CCal Filename(s)	F150305C_02	Extracted	02/27/2015 19:20
Method Blank ID	BLANK-44225	Analyzed	03/05/2015 21:36

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg		Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	----	6.3	1.8	U	2,3,7,8-TCDF-13C	2.00	79
Total TCDF	17	----	1.8		2,3,7,8-TCDD-13C	2.00	89
					1,2,3,7,8-PeCDF-13C	2.00	70
2,3,7,8-TCDD	ND	----	2.3		2,3,4,7,8-PeCDF-13C	2.00	70
Total TCDD	ND	----	2.3		1,2,3,7,8-PeCDD-13C	2.00	71
					1,2,3,4,7,8-HxCDF-13C	2.00	78
1,2,3,7,8-PeCDF	----	6.5	3.3	U	1,2,3,6,7,8-HxCDF-13C	2.00	91
2,3,4,7,8-PeCDF	----	11.0	2.8	U	2,3,4,6,7,8-HxCDF-13C	2.00	91
Total PeCDF	140	----	3.0		1,2,3,7,8,9-HxCDF-13C	2.00	83
					1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	----	5.1	2.3	U	1,2,3,6,7,8-HxCDD-13C	2.00	79
Total PeCDD	14	----	2.3	J	1,2,3,4,6,7,8-HpCDF-13C	2.00	77
					1,2,3,4,7,8,9-HpCDF-13C	2.00	66
1,2,3,4,7,8-HxCDF	23	----	4.9	J	1,2,3,4,6,7,8-HpCDD-13C	2.00	70
1,2,3,6,7,8-HxCDF	20	----	3.4	J	OCDD-13C	4.00	52
2,3,4,6,7,8-HxCDF	23	----	3.5	J			
1,2,3,7,8,9-HxCDF	18	----	3.7	J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	510	----	3.9		1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	15	----	9.4	J	2,3,7,8-TCDD-37Cl4	0.20	81
1,2,3,6,7,8-HxCDD	78	----	4.7				
1,2,3,7,8,9-HxCDD	25	----	4.5	J			
Total HxCDD	480	----	6.2				
1,2,3,4,6,7,8-HpCDF	220	----	4.7		Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	20	----	3.8	J	Equivalence: 51 ng/Kg		
Total HpCDF	680	----	4.3		(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	1500	----	2.3				
Total HpCDD	4800	----	2.3				
OCDF	310	----	7.5				
OCDD	11000	----	4.5				

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
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Method 1613B Sample Analysis Results

Client - PNG Environmental

Client's Sample ID	Trench-2		
Lab Sample ID	10297373002		
Filename	F150305C_06		
Injected By	BAL		
Total Amount Extracted	1.40 g	Matrix	Solid
% Moisture	14.4	Dilution	NA
Dry Weight Extracted	1.20 g	Collected	02/19/2015 09:15
ICAL ID	F141223	Received	02/20/2015 10:30
CCal Filename(s)	F150305C_02	Extracted	02/27/2015 19:20
Method Blank ID	BLANK-44225	Analyzed	03/05/2015 22:17

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	11.0	----	1.40	2,3,7,8-TCDF-13C	2.00	81
Total TCDF	49.0	----	1.40	2,3,7,8-TCDD-13C	2.00	88
				1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	1.80	2,3,4,7,8-PeCDF-13C	2.00	72
Total TCDD	ND	----	1.80	1,2,3,7,8-PeCDD-13C	2.00	73
				1,2,3,4,7,8-HxCDF-13C	2.00	76
1,2,3,7,8-PeCDF	4.8	----	4.10 J	1,2,3,6,7,8-HxCDF-13C	2.00	92
2,3,4,7,8-PeCDF	20.0	----	2.90 J	2,3,4,6,7,8-HxCDF-13C	2.00	86
Total PeCDF	130.0	----	3.50	1,2,3,7,8,9-HxCDF-13C	2.00	96
				1,2,3,4,7,8-HxCDD-13C	2.00	75
1,2,3,7,8-PeCDD	----	3.0	2.10 U	1,2,3,6,7,8-HxCDD-13C	2.00	78
Total PeCDD	ND	----	2.10	1,2,3,4,6,7,8-HpCDF-13C	2.00	74
				1,2,3,4,7,8,9-HpCDF-13C	2.00	70
1,2,3,4,7,8-HxCDF	----	28.0	3.80 U	1,2,3,4,6,7,8-HpCDD-13C	2.00	72
1,2,3,6,7,8-HxCDF	14.0	----	2.20 J	OCDD-13C	4.00	54
2,3,4,6,7,8-HxCDF	16.0	----	3.20 J			
1,2,3,7,8,9-HxCDF	7.8	----	2.10 J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	260.0	----	2.80	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	----	7.4	2.40 U	2,3,7,8-TCDD-37Cl4	0.20	78
1,2,3,6,7,8-HxCDD	38.0	----	2.00 J			
1,2,3,7,8,9-HxCDD	----	14.0	2.10 U			
Total HxCDD	110.0	----	2.20			
1,2,3,4,6,7,8-HpCDF	130.0	----	0.83	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	17.0	----	2.50 J	Equivalence: 34 ng/Kg		
Total HpCDF	450.0	----	1.70	(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	740.0	----	2.00			
Total HpCDD	1400.0	----	2.00			
OCDF	270.0	----	2.90			
OCDD	6300.0	----	2.70			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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Method 1613B Sample Analysis Results

Client - PNG Environmental

Client's Sample ID	Trench-3		
Lab Sample ID	10297373003		
Filename	F150305C_07		
Injected By	BAL		
Total Amount Extracted	1.20 g	Matrix	Solid
% Moisture	14.1	Dilution	NA
Dry Weight Extracted	1.03 g	Collected	02/19/2015 09:20
ICAL ID	F141223	Received	02/20/2015 10:30
CCal Filename(s)	F150305C_02	Extracted	02/27/2015 19:20
Method Blank ID	BLANK-44225	Analyzed	03/05/2015 22:58

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	32.0	----	1.9	2,3,7,8-TCDF-13C	2.00	82
Total TCDF	47.0	----	1.9	2,3,7,8-TCDD-13C	2.00	89
				1,2,3,7,8-PeCDF-13C	2.00	72
2,3,7,8-TCDD	ND	----	2.6	2,3,4,7,8-PeCDF-13C	2.00	73
Total TCDD	10.0	----	2.6	1,2,3,7,8-PeCDD-13C	2.00	76
				1,2,3,4,7,8-HxCDF-13C	2.00	77
1,2,3,7,8-PeCDF	----	3.4	3.3 U	1,2,3,6,7,8-HxCDF-13C	2.00	95
2,3,4,7,8-PeCDF	7.7	----	1.7 J	2,3,4,6,7,8-HxCDF-13C	2.00	90
Total PeCDF	57.0	----	2.5	1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	5.3	----	3.7 J	1,2,3,6,7,8-HxCDD-13C	2.00	85
Total PeCDD	5.3	----	3.7 J	1,2,3,4,6,7,8-HpCDF-13C	2.00	75
				1,2,3,4,7,8,9-HpCDF-13C	2.00	69
1,2,3,4,7,8-HxCDF	----	10.0	2.7 U	1,2,3,4,6,7,8-HpCDD-13C	2.00	72
1,2,3,6,7,8-HxCDF	5.8	----	2.2 J	OCDD-13C	4.00	56
2,3,4,6,7,8-HxCDF	9.8	----	2.5 J			
1,2,3,7,8,9-HxCDF	5.2	----	3.0 J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	260.0	----	2.6	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	7.4	----	3.3 J	2,3,7,8-TCDD-37Cl4	0.20	80
1,2,3,6,7,8-HxCDD	38.0	----	3.4 J			
1,2,3,7,8,9-HxCDD	----	9.6	2.4 U			
Total HxCDD	150.0	----	3.1			
1,2,3,4,6,7,8-HpCDF	150.0	----	3.0	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	12.0	----	4.1 J	Equivalence: 35 ng/Kg		
Total HpCDF	670.0	----	3.5	(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	880.0	----	4.5			
Total HpCDD	1600.0	----	4.5			
OCDF	420.0	----	4.9			
OCDD	11000.0	----	7.1			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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Method 1613B Sample Analysis Results

Client - PNG Environmental

Client's Sample ID	Trench-4		
Lab Sample ID	10297373004		
Filename	F150305C_08		
Injected By	BAL		
Total Amount Extracted	1.20 g	Matrix	Solid
% Moisture	20.6	Dilution	NA
Dry Weight Extracted	0.953 g	Collected	02/19/2015 09:26
ICAL ID	F141223	Received	02/20/2015 10:30
CCal Filename(s)	F150305C_02	Extracted	02/27/2015 19:20
Method Blank ID	BLANK-44225	Analyzed	03/05/2015 23:39

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	83.0	----	2.3	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	110.0	----	2.3	2,3,7,8-TCDD-13C	2.00	83
				1,2,3,7,8-PeCDF-13C	2.00	68
2,3,7,8-TCDD	5.4	----	3.0 J	2,3,4,7,8-PeCDF-13C	2.00	70
Total TCDD	12.0	----	3.0	1,2,3,7,8-PeCDD-13C	2.00	72
				1,2,3,4,7,8-HxCDF-13C	2.00	77
1,2,3,7,8-PeCDF	12.0	----	3.3 J	1,2,3,6,7,8-HxCDF-13C	2.00	91
2,3,4,7,8-PeCDF	13.0	----	2.4 J	2,3,4,6,7,8-HxCDF-13C	2.00	87
Total PeCDF	43.0	----	2.8 J	1,2,3,7,8,9-HxCDF-13C	2.00	83
				1,2,3,4,7,8-HxCDD-13C	2.00	73
1,2,3,7,8-PeCDD	6.9	----	2.8 J	1,2,3,6,7,8-HxCDD-13C	2.00	84
Total PeCDD	23.0	----	2.8 J	1,2,3,4,6,7,8-HpCDF-13C	2.00	73
				1,2,3,4,7,8,9-HpCDF-13C	2.00	68
1,2,3,4,7,8-HxCDF	26.0	----	3.7 J	1,2,3,4,6,7,8-HpCDD-13C	2.00	72
1,2,3,6,7,8-HxCDF	14.0	----	3.3 J	OCDD-13C	4.00	58
2,3,4,6,7,8-HxCDF	20.0	----	3.0 J			
1,2,3,7,8,9-HxCDF	12.0	----	2.7 J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	680.0	----	3.2	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	15.0	----	4.5 J	2,3,7,8-TCDD-37Cl4	0.20	73
1,2,3,6,7,8-HxCDD	100.0	----	1.8			
1,2,3,7,8,9-HxCDD	20.0	----	1.5 J			
Total HxCDD	430.0	----	2.6			
1,2,3,4,6,7,8-HpCDF	430.0	----	1.1	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	35.0	----	1.8 J	Equivalence: 88 ng/Kg		
Total HpCDF	1900.0	----	1.4	(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	2600.0	----	2.1			
Total HpCDD	5000.0	----	2.1			
OCDF	1300.0	----	7.3			
OCDD	38000.0	----	5.4			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
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Method 1613B Sample Analysis Results

Client - PNG Environmental

Client's Sample ID	Trench-5		
Lab Sample ID	10297373005		
Filename	F150305C_09		
Injected By	BAL		
Total Amount Extracted	1.00 g	Matrix	Solid
% Moisture	15.3	Dilution	NA
Dry Weight Extracted	0.847 g	Collected	02/19/2015 09:32
ICAL ID	F141223	Received	02/20/2015 10:30
CCal Filename(s)	F150305C_02	Extracted	02/27/2015 19:20
Method Blank ID	BLANK-44225	Analyzed	03/06/2015 00:20

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	21.0	----	3.4	2,3,7,8-TCDF-13C	2.00	80
Total TCDF	26.0	----	3.4	2,3,7,8-TCDD-13C	2.00	89
				1,2,3,7,8-PeCDF-13C	2.00	75
2,3,7,8-TCDD	ND	----	3.8	2,3,4,7,8-PeCDF-13C	2.00	74
Total TCDD	ND	----	3.8	1,2,3,7,8-PeCDD-13C	2.00	79
				1,2,3,4,7,8-HxCDF-13C	2.00	79
1,2,3,7,8-PeCDF	ND	----	3.6	1,2,3,6,7,8-HxCDF-13C	2.00	92
2,3,4,7,8-PeCDF	----	6.9	2.8 J	2,3,4,6,7,8-HxCDF-13C	2.00	91
Total PeCDF	15.0	----	3.2 J	1,2,3,7,8,9-HxCDF-13C	2.00	90
				1,2,3,4,7,8-HxCDD-13C	2.00	74
1,2,3,7,8-PeCDD	3.7	----	3.1 J	1,2,3,6,7,8-HxCDD-13C	2.00	79
Total PeCDD	3.7	----	3.1 J	1,2,3,4,6,7,8-HpCDF-13C	2.00	73
				1,2,3,4,7,8,9-HpCDF-13C	2.00	71
1,2,3,4,7,8-HxCDF	15.0	----	5.4 J	1,2,3,4,6,7,8-HpCDD-13C	2.00	73
1,2,3,6,7,8-HxCDF	9.7	----	2.1 J	OCDD-13C	4.00	54
2,3,4,6,7,8-HxCDF	----	7.1	1.7 J			
1,2,3,7,8,9-HxCDF	3.8	----	2.4 J	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	220.0	----	2.9	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	----	10.0	5.5 J	2,3,7,8-TCDD-37Cl4	0.20	80
1,2,3,6,7,8-HxCDD	36.0	----	2.3 J			
1,2,3,7,8,9-HxCDD	11.0	----	3.9 J			
Total HxCDD	92.0	----	3.9			
1,2,3,4,6,7,8-HpCDF	140.0	----	4.2	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	13.0	----	5.6 J	Equivalence: 33 ng/Kg		
Total HpCDF	540.0	----	4.9	(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	860.0	----	4.7			
Total HpCDD	1700.0	----	4.7			
OCDF	380.0	----	7.2			
OCDD	13000.0	----	5.8			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).
EMPC = Estimated Maximum Possible Concentration
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Method 1613B Blank Analysis Results

Lab Sample ID	BLANK-44225	Matrix	Solid
Filename	F150306A_04	Dilution	NA
Total Amount Extracted	20.7 g	Extracted	02/27/2015 19:20
ICAL ID	F141223	Analyzed	03/06/2015 04:26
CCal Filename(s)	F150305C_11	Injected By	BAL

Native Isomers	Conc ng/Kg	EMPC ng/Kg	RL ng/Kg	Internal Standards	ng's Added	Percent Recovery
2,3,7,8-TCDF	ND	----	0.072	2,3,7,8-TCDF-13C	2.00	75
Total TCDF	ND	----	0.072	2,3,7,8-TCDD-13C	2.00	83
				1,2,3,7,8-PeCDF-13C	2.00	69
2,3,7,8-TCDD	ND	----	0.099	2,3,4,7,8-PeCDF-13C	2.00	71
Total TCDD	0.13	----	0.099 J	1,2,3,7,8-PeCDD-13C	2.00	74
				1,2,3,4,7,8-HxCDF-13C	2.00	75
1,2,3,7,8-PeCDF	ND	----	0.082	1,2,3,6,7,8-HxCDF-13C	2.00	90
2,3,4,7,8-PeCDF	ND	----	0.054	2,3,4,6,7,8-HxCDF-13C	2.00	86
Total PeCDF	ND	----	0.068	1,2,3,7,8,9-HxCDF-13C	2.00	78
				1,2,3,4,7,8-HxCDD-13C	2.00	72
1,2,3,7,8-PeCDD	ND	----	0.079	1,2,3,6,7,8-HxCDD-13C	2.00	76
Total PeCDD	ND	----	0.079	1,2,3,4,6,7,8-HpCDF-13C	2.00	71
				1,2,3,4,7,8,9-HpCDF-13C	2.00	64
1,2,3,4,7,8-HxCDF	ND	----	0.069	1,2,3,4,6,7,8-HpCDD-13C	2.00	71
1,2,3,6,7,8-HxCDF	ND	----	0.061	OCDD-13C	4.00	55
2,3,4,6,7,8-HxCDF	ND	----	0.050			
1,2,3,7,8,9-HxCDF	ND	----	0.080	1,2,3,4-TCDD-13C	2.00	NA
Total HxCDF	ND	----	0.065	1,2,3,7,8,9-HxCDD-13C	2.00	NA
1,2,3,4,7,8-HxCDD	ND	----	0.078	2,3,7,8-TCDD-37Cl4	0.20	72
1,2,3,6,7,8-HxCDD	ND	----	0.085			
1,2,3,7,8,9-HxCDD	ND	----	0.081			
Total HxCDD	ND	----	0.081			
1,2,3,4,6,7,8-HpCDF	ND	----	0.059	Total 2,3,7,8-TCDD		
1,2,3,4,7,8,9-HpCDF	ND	----	0.076	Equivalence: 0.13 ng/Kg		
Total HpCDF	ND	----	0.067	(Using 2005 WHO Factors - Using PRL/2 where ND)		
1,2,3,4,6,7,8-HpCDD	----	0.13	0.099 J			
Total HpCDD	0.14	----	0.099 J			
OCDF	ND	----	0.150			
OCDD	----	0.69	0.230 J			

Conc = Concentration (Totals include 2,3,7,8-substituted isomers).

EMPC = Estimated Maximum Possible Concentration

RL = Reporting Limit

Results reported on a total weight basis and are valid to no more than 2 significant figures.

J = Estimated value

I = Interference present

REPORT OF LABORATORY ANALYSIS

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Method 1613B Laboratory Control Spike Results

Lab Sample ID	LCS-44226	Matrix	Solid
Filename	F150306A_01	Dilution	NA
Total Amount Extracted	20.9 g	Extracted	02/27/2015 19:20
ICAL ID	F141223	Analyzed	03/06/2015 02:23
CCal Filename	F150305C_11	Injected By	BAL
Method Blank ID	BLANK-44225		

Compound	Cs	Cr	Lower Limit	Upper Limit	% Rec.
2,3,7,8-TCDF	10	10	7.5	15.8	102
2,3,7,8-TCDD	10	8.7	6.7	15.8	87
1,2,3,7,8-PeCDF	50	53	40.0	67.0	105
2,3,4,7,8-PeCDF	50	53	34.0	80.0	106
1,2,3,7,8-PeCDD	50	48	35.0	71.0	96
1,2,3,4,7,8-HxCDF	50	51	36.0	67.0	102
1,2,3,6,7,8-HxCDF	50	51	42.0	65.0	103
2,3,4,6,7,8-HxCDF	50	49	35.0	78.0	97
1,2,3,7,8,9-HxCDF	50	48	39.0	65.0	96
1,2,3,4,7,8-HxCDD	50	53	35.0	82.0	105
1,2,3,6,7,8-HxCDD	50	61	38.0	67.0	122
1,2,3,7,8,9-HxCDD	50	56	32.0	81.0	113
1,2,3,4,6,7,8-HpCDF	50	51	41.0	61.0	103
1,2,3,4,7,8,9-HpCDF	50	49	39.0	69.0	98
1,2,3,4,6,7,8-HpCDD	50	49	35.0	70.0	98
OCDF	100	120	63.0	170.0	117
OCDD	100	100	78.0	144.0	105
2,3,7,8-TCDD-37Cl4	10	6.8	3.1	19.1	68
2,3,7,8-TCDF-13C	100	70	22.0	152.0	70
2,3,7,8-TCDD-13C	100	77	20.0	175.0	77
1,2,3,7,8-PeCDF-13C	100	68	21.0	192.0	68
2,3,4,7,8-PeCDF-13C	100	71	13.0	328.0	71
1,2,3,7,8-PeCDD-13C	100	74	21.0	227.0	74
1,2,3,4,7,8-HxCDF-13C	100	75	19.0	202.0	75
1,2,3,6,7,8-HxCDF-13C	100	86	21.0	159.0	86
2,3,4,6,7,8-HxCDF-13C	100	88	22.0	176.0	88
1,2,3,7,8,9-HxCDF-13C	100	80	17.0	205.0	80
1,2,3,4,7,8-HxCDD-13C	100	71	21.0	193.0	71
1,2,3,6,7,8-HxCDD-13C	100	75	25.0	163.0	75
1,2,3,4,6,7,8-HpCDF-13C	100	72	21.0	158.0	72
1,2,3,4,7,8,9-HpCDF-13C	100	66	20.0	186.0	66
1,2,3,4,6,7,8-HpCDD-13C	100	69	26.0	166.0	69
OCDD-13C	200	110	26.0	397.0	57

Cs = Concentration Spiked (ng/mL)
Cr = Concentration Recovered (ng/mL)
Rec. = Recovery (Expressed as Percent)
Control Limit Reference: Method 1613, Table 6, 10/94 Revision
R = Recovery outside of control limits
Nn = Value obtained from additional analysis
* = See Discussion

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