TECHNICAL MEMORANDUM



TO:	Carl Bach, The Boeing Company, and Allison Crowley, Seattle City Light
	Car VIII.
	KJAF

FROM: Colette Gaona and Kristy J. Hendrickson, P.E.

DATE: February 19, 2015

RE: ADDENDUM NO. 1 NORTH BOEING FIELD/GEORGETOWN STEAM PLANT SITE REMEDIAL INVESTIGATION/FEASIBILITY STUDY SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN SEATTLE, WASHINGTON

This technical memorandum presents Addendum No. 1 to the North Boeing Field/Georgetown Steam Plant Site (NBF/GTSP) Remedial Investigation/Feasibility Study (RI/FS) Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP, Leidos 2014). This addendum provides the revisions associated with the First Amendment to North Boeing Field/Georgetown Steam Plant Agreed Order No. DE 5685 (AO Amendment No. 1).

The SAP/QAPP describes the technical approach and procedures for the RI and identifies responsibilities for organizations and personnel involved in conducting the RI/FS. As a result of AO Amendment No. 1, some procedures and responsibilities have changed. The changes are summarized below, and a supplemental QAPP signature page is attached:

- Section 1.1. The Boeing Company (Boeing), the City of Seattle (City), and King County (County), the Potentially Liable Persons (PLPs) for the Site under the AO, will perform the RI/FS.
- Section 1.2. Landau Associates, Inc. (Landau) will conduct the RI/FS for the PLPs. References throughout the SAP/QAPP to Leidos performing specific actions should be changed to Landau. Leidos will now conduct oversight and review of the RI/FS on behalf of the Washington State Department of Ecology (Ecology).
 - Add: Landau Associates Edmonds, WA, Kris Hendrickson, RI/FS Project Manager Phone: (425) 778-0907, <u>khendrickson@landauinc.com</u>

Landau Associates – Portland, OR, Colette Gaona, RI/FS Task Manager Phone: (503) 542-1083, cgaona@landauinc.com.

- Section 1.3. Responsibilities will be: Rosemary Trimmer, Matt Moroney, and Evelyn Ives Field Managers; Rosemary Trimmer, Matt Moroney, and Evelyn Ives Landau Health and Safety Managers.
- Section 1.4. Responsibilities will be: Colette Gaona primary Laboratory Coordinator; Anne Halvorsen – Laboratory Quality Assurance/Quality Control Manager; Anne Halvorsen – Data Manager.

- Section 1.5. Subcontractors will be:
 - Analytical chemistry (all samples excluding soil vapor): Analytical Resources, Incorporated (ARI) Kelly Bottem 4611 South 134th Place Tukwila, WA 98166 Phone: (206) 695-6211 kellyb@arilabs.com
 - Data validation, except for dioxin/furan analyses: Landau Associates Anne Halvorsen 130 2nd Avenue South Edmonds, WA 98020 Phone: (425) 778-0907 <u>ahalvorsen@landauinc.com</u>
 - Confined space entry for storm drains (if needed): Landau Associates

Dylan Frazer 130 2nd Avenue South Edmonds, WA 98020 Phone: (425) 778-0907

Utility location: APS Bill Philips 43530 SE North Bend Way North Bend, WA 98045 Phone: (425) 954-8436

- Equipment supply:

Landau Associates owns all sampling equipment anticipated to be required to complete the activities described in the SAP/QAPP. Rentals from equipment supply stores are not anticipated to be needed.

- Section 1.6. Revised schedule is included in AO Amendment No. 1.
- Section 2.3.1. Soil vapor points will be installed using Teflon tubing.
- Section 2.2.3. Groundwater purging and sampling will be conducted using polyethylene tubing. The polyethylene tubing and the silicon tubing used for sampling via peristaltic pump will remain in the well during the RI period.
- Section 2.8. Analytical data, except for dioxin/furan data, will be validated by Landau. Dioxin/furan data will be validated by EcoChem, Inc.
- Section 3.2.3. Analytical laboratory deliverables will include information necessary for data validation to be performed in accordance with Section 3.2.4. For analytical results for chemicals other than dioxins/furans, information for EPA Stage 2b data validation is required; for dioxin/furan results information for EPA Stage 4 data validation is required.
- Appendix C, Field Forms. Copies of field forms that will be used for the RI are attached.

In addition to the procedural changes outlined above, changes to RI field activities (groundwater monitoring, sample locations, and analytes) have been made since the issuance of the final SAP/QAPP (Leidos 2014). These changes to RI field activities are summarized below.

- Groundwater Monitoring
 - Existing wells with four rounds of sampling completed: Boeing completed RI monitoring at existing groundwater monitoring wells in 2014 (Landau Associates 2014). During sampling events to be performed at new RI groundwater monitoring wells, Ecology may request resampling for limited chemicals at groundwater monitoring wells where sampling has already been completed and where there were exceedances of the RI screening levels (RISLs).
 - Groundwater monitoring in the Building 3-333 Area: Groundwater compliance monitoring in the Building 3-333 Area has been completed and additional monitoring is not planned due to concentrations of polychlorinated biphenyls (PCBs) below the RISLs. All existing groundwater monitoring wells in the Building 3-333 area will be maintained to allow for possible sampling during the RI activities to better characterize the extent of Volatile Organic Compounds (VOCs) in groundwater in this area.
 - Groundwater monitoring in the Fenceline Area: Semiannual groundwater compliance monitoring at the Fenceline Area groundwater monitoring wells (NGW521, NGW522, and NGW523) will continue during the RI field investigation due to detected concentrations of total PCBs greater than the RISL at all three monitoring locations.
 - Groundwater monitoring at GTSP: Semiannual groundwater compliance monitoring at groundwater monitoring well GTSP-7 will continue during the RI field investigation and will be conducted by the City. Groundwater monitoring at GTSP-2 and GTSP-8 has been completed for the purposes of the RIFS and additional monitoring is not planned.
- Sample Locations and Analyses
 - Soil borings, vapor points, and monitoring wells: Due to potential access impediments, known utility locations, and planned construction activities during the RI field investigation, planned locations for a number of soil borings, vapor points, and monitoring wells have been adjusted slightly. In addition, laboratory analytical requirements for some samples have been revised. Notes on planned location adjustments and the final laboratory analytical requirements for each location are provided in Table 1.
 - Future sample relocations: Sample locations may be relocated by no more than 10 feet from the original planned location, based on current site conditions, if the relocated sample location meets the sampling objectives of the RI/FS Work Plan. If a sample location is required to be moved more than 10 feet from the planned location, Ecology approval of the new location will be obtained. Sample location changes and final sample locations will be documented in the RI report.
 - Substation V-94 soil sampling: Boeing has completed a soil cleanup at Substation V-94 under the Toxic Substances Control Act (TSCA; Landau Associates 2015). Based on the results of confirmation samples, Ecology approved the deletion of the four soil borings (CFA-SB12 through CFA-SB-15) that were located in the vicinity of Substation V-94. This change is reflected in Table 1.

Building 3-350 soil sampling: Soil sample locations in the SAP/QAPP were based on available information on historical transformer locations. Based on further review of historical photographs and drawings of transformers formerly located near Building 3-350, soil sample locations at two possible transformer areas on the west and northeast sides of Building 3-350 (NFA-SB01, NFA-SB02, and NFA-SB05) are being relocated. The approximate locations of historical transformers, and the relocated soil borings are shown on Figure 1. This change is also reflected in Table 1.

Additional significant changes, as determined by Ecology, will be documented in separate addenda.

REFERENCES

Landau Associates. 2015. Self-Implementing TSCA Cleanup, Substation V-94 Removal and Disposal, North Boeing Field, Seattle, Washington. Prepared for The Boeing Company. January 28.

Landau Associates. 2014. Technical Memorandum to Carl Bach, the Boeing Company, re: 2014 Groundwater Monitoring Results, Remedial Investigation, North Boeing Field, Seattle, Washington. August 18.

Leidos (formerly SAIC). 2014. North Boeing Field/Georgetown Steam Plant Site, Remedial Investigation/Feasibility Study, Final Sampling and Analysis Plan and Quality Assurance Project Plan. Prepared for Toxics Cleanup Program, Northwest Regional Office, Washington State Department of Ecology, Bellevue, Washington. April.

Leidos. 2013. North Boeing Field/Georgetown Steam Plant Site, Remedial Investigation/Feasibility Study, Remedial Investigation/Feasibility Study Work Plan, Final. Prepared for the Washington State Department of Ecology, Toxics Cleanup Program, Bellevue, Washington. November 11.

CMG/KJH/tam

Attachments:

Table 1: Sample and Analyses Summary Table Figure 1: Building 3-350 and RI Monitoring Locations Supplemental QAPP Signature Page Field Forms



TABLE 1 NBF/GTSP REMEDIAL INVESTIGATION SAMPLE SUMMARY AND COORDINATION NOTES Revised with Ecology/Leidos Notes, 01/16/2015

Area of Concern	Proposed Sample ID	Figure Number	Sample Media	Final SAP/QAPP Addendum No. 1 Analyses	SAP/QAPP Addendum N Notes and Proposed Cha
GISP	GTSP-SB01	5	Soil	PCBs, Dioxins/Furans	
North Yard and East Yard Areas	GTSP-SB02	5	Soil	PCBs, Metals, SVOCs, VOCs, Dioxins/Furans	
NBF - PEL Area					
	PEL-SB01	6	Soil	PCBs, Metals, PAHs	
	PEL-SB02	6	Soil	PCBs, Metals, PAHs	
	PEL-SB03	6	Soil	PCBs, Metals, PAHs	
	PEL-SB04	6	Soil	PCBs, Metals, PAHs	Boring location may need to be adjusted based on numerous underground utilities in this area. Goal is to c
Bldg 3-323 Area	PEL-SB05	6	Soil	PCBs, Metals, PAHs	Boring location may need to be adjusted based on numerous underground utilities in this area. Goal is to c
	PEL-SB06	6	Soil	PCBs, Metals, PAHs	A limited-access drill rig may be required to locate the sample under the canopy on the northeast corner of possible
	VP01	6	Soil/Vapor	VOCs (Vapor and Soil)	
	VP02	6	Soil/Vapor	VOCs (Vapor and Soil)	
Pldg 2 202 and 2 222 Area	PEL-SB07	6	Soil	PCBs, Metals	
Blug 3-302 and 3-322 Alea	PEL-SB08	6	Soil	PCBs, Metals	
	NGW601	8	Soil/Groundwater	PCBs, VOCs (Soil), VOCs (GW)	
	NGW602	8	Soil/Groundwater	PCBs, VOCs (Soil), VOCs (GW)	
	NGW603	8	Soil/Groundwater	PCBs, TPH, VOCs (Soil and GW)	
	PEL-SB09	8	Soil	PCBs, TPH, VOCs	
	PEL-SB10	7	Soil	PCBs, TPH (see note 7)	
	PEL-SB11	7	Soil	PCBs, TPH (see note 7)	
Bldg 3-329, 3-333, 3-335 Area	PEL-SB12	7	Soil	PCBs, TPH, VOCs	
	PEL-SB13	7	Soil	PCBs, TPH, VOCs	
	PEL-SB14	7	Soil	PCBs, TPH, VOCs	
	VP03	7	Soil/Vapor	VOCs, TPH (Soil), VOCs (Vapor)	
	VP04	8	Soil/Vapor	VOCs, TPH (Soil), VOCs (Vapor)	
	VP05	8	Soil/Vapor	VOCs, TPH (see note 7) (Soil), VOCs (Vapor)	
	PEL-SB15	8	Soil	PCBs, TPH, PAHs, BTEX	
	PEL-SB16	8	Soil	PCBs, TPH, PAHs, BTEX	
Bida 3-324 Area	PEL-SB17	8	Soil	PCBs, TPH, PAHs, BTEX	
	PEL-SB18	8	Soil	PCBs, TPH, PAHs, BTEX	
	VP06	8	Soil/Vapor	TPH, VOCs (Soil); VOCs (Vapor)	
	NGW604	8	Soil/Groundwater	PCBs, Metals, TPH, PAHs, BTEX	
	PEL-SB19	7	Soil	PCBs, PAHs	
Bldg 3-315 and 3-326 Area	PEL-SB20	7	Soil	PCBs, PAHs	Planned location for boring was moved 5 to 10 feet west/southwest to avoid utilities and 3-315 building foot PCB-containing transformers at Building 3-315
	PEL-SB21	7	Soil	PCBs, PAHs	Planned location for boring was moved 5 to 10 feet west/southwest to avoid utilities and 3-315 building foot PCB-containing transformers at Building 3-315. Boring will be advanced as close to the building as possibl
	PEL-SB22	7	Soil	PCBs, TPH, PAHs, BTEX	
Blda 3-353	VP07	9	Soil/Vapor	TPH, VOCs (Soil); VOCs (Vapor)	
	NGW605	7	Soil/Groundwater	PCBs, Metals, TPH, SVOCs, BTEX (Soil and GW)	
	PEL-SB23	9	Soil	TPH, SVOCs, PCBs, VOCs	
	PEL-SB24	9	Soil	TPH (see note 7), SVOCs, PCBs, VOCs	
	PEL-SB25	9	Soil	TPH (see note 7), SVOCs, PCBs, VOCs	
	PEL-SB26	9	Soil	TPH, SVOCs, PCBs, VOCs	
Green Hornet Area	PEL-SB27	9	Soil	TPH, SVOCs, PCBs, VOCs	
	PEL-SB28	9	Soil	TPH, SVOCs, PCBs, VOCs	
	PEL-SB29	9	Soil	TPH, SVOCs, PCBs, VOCs	
	NGW606	9	Soil/Groundwater	TPH, SVOCs, PCBs, VOCs (Soil), TPH, SVOCs, BTEX (GW)	

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harasterize soil in area parthurat of Building 2,202
naracterize soil in area northwest of Building 5-525
haracterize soil in area north of Building 3-323 , in area west of LAI-SB74 and SB-17
Duilding 2, 202, Cool is to not the complete section of slope to Duilding 2, 202 of
Building 3-323. Goal is to get the sample location as close to Building 3-323 as
print; goal is to determine presence/absence of contamination resulting from potential
print; goal is to determine presence/absence of contamination resulting from potential
9.

TABLE 1 NBF/GTSP REMEDIAL INVESTIGATION SAMPLE SUMMARY AND COORDINATION NOTES Revised with Ecology/Leidos Notes, 01/16/2015

Area of Concern	Proposed Sample ID	Figure Number	Sample Media	Final SAP/QAPP Addendum No. 1 Analyses	SAP/QAPP Addendum Notes and Proposed Cha
NBF - North Flightline	•		•	•	
Fmr Bldg 3-360 and 3-361 Area	NGW607	11	Soil/Groundwater	VOCs (Soil and GW)	
	NFA-SB01	11	Soil	PCBs, Metals	Boring relocated to the north side of Building 3-350 based on former location of Substation No. 87. See Fig to include this boring within an area of concern.
Bldg 3-380 Storm Drain Area	NFA-SB02	11	Soil	PCBs, Metals	Boring relocated to the north side of Building 3-350 based on former location of Substation No. 87. See Fig to include this boring within an area of concern.
	NFA-SB03	12	Soil	PCBs, TPH, SVOCs, VOCs	
	NFA-SB04	12	Soil	PCBs, TPH, SVOCs, VOCs	
Pldg 2 280 Area	NGW608	13	Soil/Groundwater	PCBs, Metals, SVOCs (Soil and GW)	
Bidy 3-360 Area	NGW609	13	Soil/Groundwater	PCBs, Metals, SVOCs (Soil and GW)	
Bldg 3-390 Area	NGW610	14	Soil/Groundwater	PCBs, Metals, TPH, SVOCs, VOCs (see note 8) (Soil and GW)	
	NFA-SB05	14	Soil	PCBs, Metals, TPH, SVOCs, VOCs (see note 8)	Boring relocated to the south side of Building 3-350 based on historical temporary location of Substation Ne redrawn in the RI to include this boring within an area of concern.
	NFA-SB06	14	Soil	PCBs, Metals, TPH, SVOCs, VOCs (see note 8)	Planned location for boring was moved approximately 10 feet to the north (approximately 12 feet from the e
	NFA-SB07	15	Soil	PCBs, Metals, TPH, SVOCs, VOCs (see note 8)	
Concourse A Area	NFA-SB08	15	Soil	PCBs, Metals, TPH (see note 7), SVOCs, VOCs (see note 8)	
	NFA-SB09	15	Soil	PCBs, Metals, TPH, SVOCs, VOCs (see note 8)	
	NGW611	14	Soil/Groundwater	PCBs, Metals, TPH, SVOCs, VOCs (see note 8) (Soil and GW)	
	NGW612	15	Soil/Groundwater	PCBs, Metals, TPH, SVOCs, VOCs (see note 8) (Soil and GW)	
NBF - Central Flightline	1	1		1	Γ
	CFA-SB01	18	Soil	TPH (see note 7), VOCs	
Pldg 2 901 Area	CFA-SB02	18	Soil	TPH (see note 7), VOCs	
Blug 3-601 Area	VP08	18	Soil/Vapor	VOCs (Soil and Vapor)	
	NGW613	19	Soil/Groundwater	Metals, VOCs, SVOCs (Soil) Metals, VOCs (GW)	
Bldg 3-800 Area	VP09	18	Soil/Vapor	VOCs (Soil and Vapor)	
	NGW614	18	Soil/Groundwater	Metals, VOCs (Soil and GW)	
	CFA-SB03	20	Soil	TPH (see note 7), PAHs, BTEX	
	CFA-SB04	20	Soil	TPH (see note 7), PAHs, BTEX	
	CFA-SB05	20	Soil	TPH, PAHs, BTEX	
Main Fuel Farm Area	NGW615	20	Soil/Groundwater	TPH, PAHs, BTEX	
	NGW616	20	Soil/Groundwater	TPH, PAHs, BTEX	Planned groundwater monitoring well location was moved approximately 10 to 20 feet southeast to avoid c
	NGW617	20	Soil/Groundwater	TPH, PAHs, BTEX	Planned groundwater monitoring well location was moved approximately 10 feet southwest into pedestrian
	VP10	20	Soil/Vapor	TPH, VOCs (Soil), VOCs (Vapor)	Vapor point will be installed when Building 3-818 construction is completed. Date to be determined.
	NGW618	17	Soil/Groundwater	PCBs, Metals (Soil), PCBs, Metals, SVOCs, VOCs (GW)	
Concourse B Area	NGW619	17	Soil/Groundwater	PCBs, Metals, SVOCs, VOCs (Soil and GW)	
	CFA-SB06	17	Soil	PCBs, Metals	
	CFA-SB07	19	Soil	PCBs, Metals	
	CFA-SB08	19	Soil	PCBs, Metals	
	CFA-SB09	19	Soil	PCBs, Metals	
	CFA-SB10	19	Soil	PCBs, Metals	
Central Flightline Transformer Area	CFA-SB11	19	Soil	PCBs, Metals	
	CFA-SB12	19	Soil	PCBs, Metals	In area of Substation V-94 TSCA cleanup, completed in November 2014. Sampling location removed.
	CFA-SB13	19	Soil	PCBs, Metals	In area of Substation V-94 TSCA cleanup, completed in November 2014. Sampling location removed.
	CFA-SB14	19	Soil	PCBs, Metals	In area of Substation V-94 TSCA cleanup, completed in November 2014. Sampling location removed.
	CFA-SB15	19	Soil	PCBs, Metals	In area of Substation V-94 TSCA cleanup, completed in November 2014. Sampling location removed.

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ure 1 of SAP/QAPP Addendum No. 1. The AOC boundaries will be redrawn in the RI
ure 1 of SAP/QAPP Addendum No. 1. The AOC boundaries will be redrawn in the RI
. 89. See Figure 1 of SAP/QAPP Addendum No. 1. The AOC boundaries will be
dge of the blast fence) to clear the utility corridor in this area.
onflicts with traffic and construction activities.
traffic lane, to clear distance from nearby electrical utilities.

TABLE 1 NBF/GTSP REMEDIAL INVESTIGATION SAMPLE SUMMARY AND COORDINATION NOTES Revised with Ecology/Leidos Notes, 01/16/2015

Area of Concern	Proposed Sample ID	Figure Number	Sample Media	Final SAP/QAPP Addendum No. 1 Analyses	SAP/QAPP Addendum Notes and Proposed Cha
NBF - South Flightline					
Bldg 3-380, 3-831, and 3-832 Area	NGW620	21	Soil/Groundwater	PCBs, TPH	
Site-Wide Groundwater Investigation		-		•	•
	NGW621	12	Soil/Groundwater	PCBs, Metals, TPH, SVOCs (GW), Soil TBD	
	NGW622	17	Soil/Groundwater	PCBs, Metals, TPH, SVOCs (GW), Soil TBD	Planned groundwater monitoring well location was moved approximatley 20 to 30 feet south outside of the
	NGW623	19	Soil/Groundwater	PCBs, Metals, TPH, SVOCs (GW), Soil TBD	
	NGW624	19	Soil/Groundwater	PCBs, Metals, TPH, SVOCs (GW), Soil TBD	
	NGW625	21	Soil/Groundwater	PCBs, Metals, TPH, SVOCs (GW), Soil TBD	

TSCA = Toxic Substances Control Act SVOC = semivolatile organic compound PAH = polycyclic aromatic hydrocarbon TPH = total petroleum hydrocarbon PCB = polychlorinated biphenyl VOC = volatile organic compound BTEX = benzene, toluene, ethylbenzene, xylenes GW = groundwater TBD = to be determined

Notes:

1. Soil boring depths for locations without wells or vapor points are generally expected to continue to at least the depth of the water table or to the base of contamination as identified in the field or previous investigations, whichever is deeper.

2. Borings for monitoring wells are expected to reach an approximate depth of 10 feet below the water table (for well completion) or until field or previous indications of contamination are no longer present, whichever is deeper.

3. Borings for soil vapor points will be completed to approximately 5 to 6 feet below ground surface.

4. The anticipated minimum number of analytical soil samples submitted per boring is two; an overall average number of 2.5 samples per boring is assumed.

5. For soil vapor points, only one soil sample, collected at the base of the hand auger boring near the probe screen depth, is anticipated for analysis.

6. Depth of monitoring wells will be determined by the groundwater table. Well screens will generally be set so that the water table intersects the well screen.

7. VPH/EPH fractions (Method B suite) will be analyzed on one or more samples in areas with petroleum contamination, to be determined in the field.

The following borings have been tentatively identified for these analyses: NGW603, PEL-SB10, PEL-SB11, VP05, PEL-SB24, PEL-SB25, NFA-SB08, CFA-SB01, CFA-SB02, CFA-SB03, and CFA-SB04.

8. VOCs in soil will only be analyzed if field indications suggest their presence.

No. 1 anges runway ramp between NBF and KCIA, behind the blast fence.

QUALITY ASSURANCE PROJECT PLAN SUPPLEMENTAL SIGNATURE PAGE

Site: North Boeing Field / Georgetown Steam Plant

Document Name: North Boeing Field / Georgetown Steam Plant Site Remedial Investigation/ Feasibility Study, Sampling and Analysis Plan and Quality Assurance Project Plan.

Document Date: April 16, 2014

Supplemental Signature Page Date: January 13, 2015

Signature below indicates review and approval of the Quality Assurance Project Plan and agreement that the anticipated sampling and analytical methods are sufficient to meet the quality objectives of the NBF-GTSP Remedial Investigation.

The Boeing Company

Carl Bach EH&S Remediation Project Manager Phone: (206) 898-0438 carl.m.bach@boeing.com

Seattle City Light

Allison Crowley

Allison Crowley Date Environmental Affairs and Real Estate Division Environmental Remediation Advisor Phone: (206) 684-3167 allison.crowley@seattle.gov

King County

eter Dumaliang

Airport Environmental Scientist Airport Engineering King County International Airport/Boeing Field Phone: (206) 296-7597 Peter.Dumaliang@kingcounty.gov

Landau Associates, Inc. (data validation except dioxin/furan data)

wors 1/13/15

Anne S. Halvorsen Data Manager Phone: (425) 778-0907 ahalvorsen@landauinc.com

Date

12/15

Landau Associates, Inc.

Krjsty J. Hendrickson RI/FS Project Manager Phone: (425) 778-0907 khendrickson@landauinc.com

Forms



FIELD EQUIPMENT CALIBRATION SHEET

Client:

Project:

Comments:

Date / Time / Initials	Instrument (Make and Model)	Serial or ID Number	Calibration Gas or Substance	Concentration or Value	Instrument Reading	Comments	OK?



One-Call Utility Locate Record

Project Name	Project No.
Client	Date/Time
One-Call (1-800-424-5555)	Landau Rep.

UTILITY LOCATE REQUEST INFORMATION

Request # (Provided by Utility Loca	ate Service)					
Caller ID: (Edmonds #15763) (Por	rtland #24570) (Spoka	ane #30033) (7	Facoma #30319))	County	
City, Town, or Area Name:			Insi	ide/C	Outside City Lim	its
Street Address:						
Property Owner:						
Township/Range/Section/Qtr Section	on:					
Type of work:						
Overhead utilities:						
Extent of work:						
Start Date:		Start Time:				
Name of Caller: (And second contact if caller is not)	available)					
Title:		Phone #: (Cell #)			Retur	n Call Requested:
Contractor (Landau Associates)						
Contractor Address:						
		Utilities To	Be Notified			

(1) Have all necessary information complete before calling for request.

(2) Important to record request number. Original request can not be recovered otherwise, if questions or problems arise.

(3) <u>Important</u> to record names of underground utility owners who were notified.

d Soil Classification Notes

Criteria

Angularity

Particles have sharp edges and relatively plane

ENVIRONMENTAL GI	EOTECHNICAL NATURAL RE				1101	u .
	То	ughness				
Description	Criteria		in the second second		Descr	iption
Low	Only slight pres	sure is req	uired to roll th	e thread near	Angul	ar
	the plastic limit.	. The threa	id and the lum	p are weak,	Subar	anula
Medium	Medium pressu	re is requir	ed to roll the t	hread to near	Subar	iguia
	the plastic limit.	The threa	id and the lum	p have	Subro	unde
1.Ph	medium stiffnes	SS.			-	
High	considerable p	limit The	thread and th	the thread to	Round	bet
	very high stiffne	ess.	and and and an	e lump nave		
	D	ilatanov		A lager of		CARGE SE
Description	Criteria	liatancy			Term	
None	No visible chang	ge in the sp	ecimen during	g shaking.	Weak	: 1
Slow	Water appears	slowly on th	ne surface of t	he specimen	Mada	rata
	during shaking a	and does n	ot disappear of	or disappears	Woder	ate
Rapid	Water appears	auickly on t	he surface of	the specimen	Strong	g
	during shaking a	and disapp	ears quickly u	pon squeezing.	C. 19.	
	Drv	Strength				
Description	Criteria	e a chigan	115 10 5		Symb	ol De
None	The dry specim	en crumble	es into powde	with mere		- A
Low	pressure of han	idling.	a into pourdo	with come	. Salation	A
LOW	finger pressure	ien crumble	es into powae	with some		Wa
Medium	The dry specim	ien breaks	into pieces or	crumbles with	Sec. 1	and a
	considerable fir	nger pressu	ire.	2		No. of the
High	The dry specim	en cannot	be broken wit	h finger	Descr	iptior
	thumb and a ha	ard surface	eak into piece	es between	None	<u></u>
Very high	The dry specim	en cannot	be broken bet	ween the	Strong	a
	thumb and a ha	ard surface.	ALL JAG DO		Cuons	3
	Р	lasticity				
Description	Criteria				Dia.	OD
Non-plastic	A 1/8" thread car	nnot be rolle	ed at any wate	r content.	1 25	1 66
Low	The thread can b	arely be rol	lled and the lu	mp cannot be	2	2.37
Medium	The thread is eas	sv to roll an	d not much is	required to	3	3.5
	reach the plastic	limit. The	thread cannot	be rerolled	4	4.5
	after reaching the	e plastic lim	nit. The lump of	rumbles when	8	8.62
High	drier than the pla	stic limit.	lling and knea	ding to reach	12	12.7
ingin	the plastic limit.	The thread	can be rerolle	d several times	Construction of the local division of the lo	1.1
	after reaching the	e plastic lim	it. The lump of	an be formed		
	without crumbling	g when drie	er than the plas	tic limit.		1.1/-1
and states and	Field	Index Test	s	and the second	Dia.	per
Plasticity	Toughness of	Dilatancy	Dry	Sample	(in.)	ft of
nonnlastic/lov	Plastic Thread	Reaction	Strength	Description		0.1
low	low/medium	rapid/slow	low/medium	SILT with clay	7 25	Gal
low/medium	medium	slow	medium	clayey SILT	7.25	2.14
medium	medium/high	slow/none	medium/high	silty CLAY	7.75	2.45
high	high	none	high	CLAY with silt	8.25	2.78
high	nign	slow	very nign		10.25	4.29
high nonplastic/lov	/ low/medium	01011	to very high	organic CLAY ^(a)	10.25	4.29
high nonplastic/lov medium/high	V low/medium medium/high	none		d on the	12.25	6.13
high nonplastic/lov medium/high (a) Organic S	V low/medium medium/high ILT or CLAY iden	none tification sh	ould be base	uonine	12.25	-
high nonplastic/low medium/high (a) Organic S presence of	V low/medium medium/high ILT or CLAY iden organic material i	none tification sh n addition t	ould be base to the index te	st results.	8.25	2.78
high nonplastic/lov medium/high (a) Organic S presence of Organic SIL SIL T or CLA	V low/medium medium/high ILT or CLAY iden organic material i Γ or CLAY may be	none tification sh n addition t e lighter in	ould be base to the index te weight than a	st results. n inorganic	8.25 10.25	2.78
high nonplastic/low medium/high (a) Organic S presence of Organic SIL SILT or CLA	Iow/medium medium/high ILT or CLAY iden organic material i Γ or CLAY may b Y.	none tification sh n addition f e lighter in	ould be base to the index te weight than a	st results. n inorganic	8.25 10.25 12.25 12.25	2.78 4.29 6.13 6.13
high nonplastic/lov medium/high (a) Organic S presence of Organic SIL SILT or CLA	Iow/medium medium/high ILT or CLAY iden organic material i T or CLAY may be Y. Miscellaneous [none tification sh n addition t e lighter in Data (Appr	ould be base to the index te weight than a oximations)	st results. n inorganic	8.25 10.25 12.25 12.25	2.78 4.29 6.13 6.13
high nonplastic/lov medium/high (a) Organic S presence of Organic SIL SILT or CLA	Iow/medium medium/high ILT or CLAY iden organic material i T or CLAY may br Y. Miscellaneous [none tification sh n addition f e lighter in Data (Appr 1 cfs = 44 psi = 0.43	ould be base to the index te weight than a oximations) 8.8 gpm	H2Q column/ft)	8.25 10.25 12.25 12.25	2.78 4.29 6.13 6.13
high nonplastic/low medium/high (a) Organic S presence of Organic SIL SILT or CLA 1 cf = 7.5 ga 1 gal = 0.134 1 cy = 202 g	Iow/medium medium/high ILT or CLAY iden organic material i T or CLAY may by Y. Miscellaneous I i cf al	none tification sh n addition f e lighter in Data (Appr 1 cfs = 44 psi = 0.43 1 psi = 2.3	ould be base to the index te weight than a oximations) 8.8 gpm 44 x height of 31 ft of water	st results. n inorganic H2O column(ft)	12.25 8.25 10.25 12.25 12.25	2.78 4.29 6.13 6.13
high nonplastic/low medium/high (a) Organic S presence of Organic SIL SILT or CLA 1 cf = 7.5 ga 1 gal = 0.134 1 cy = 202 g 1 gal of wate	Iow/medium medium/high ILT or CLAY iden organic material i T or CLAY may br Y. Miscellaneous I I I cf al r = 8.34 lb	none tification sh n addition f e lighter in Data (Appr 1 cfs = 44 psi = 0.43 1 psi = 2.3 1 cf/hr = .	ould be base to the index te weight than a oximations) 8.8 gpm 4 x height of 31 ft of water 1247 x gpm	H2O column(ft)	12.25 8.25 10.25 12.25 12.25	2.78 4.29 6.13 6.13

1 sack of cement = 1 cf (96 lb)

The case of	sides with unpolished surfaces.
Subangula	ar Particles are similar to angular description but
	have rounded edges.
Subround	ed Particles have nearly plane sides but have well rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.
	March Street Report
	Criteria for Describing Cementation
Term	Field Identification
Weak	Crumbles or breaks with handling or little finger
	pressure.
Moderate	Crumbles or breaks with considerable finger
	pressure.
Strong	Will not crumble or break with finger pressure.

Symbol Description A change in geologic units that was seen sample, or noted by cuttings or drilling be	11
A change in geologic units that was seen sample, or noted by cuttings or drilling be	
sample, or noted by cuttings or drilling be	in a
campie, et netes a) cattinge et anning se	navior.
A gradational change in the same geologi	c unit that
was noted during the exploration.	

HCL Reaction								
Description	Criteria							
None	No visible reaction.							
Weak	Some reaction, with bubbles forming slowly.							
Strong	Violent reaction, with bubbles forming immediately.							

Volume of Schedule 40 PVC Pipe										
Dia. (in.)	OD (in.)	ID (in.)	Volume (gal/linear ft)	Weight of Water (Ibs/linear ft)						
1.25	1.66	1.38	0.08	0.64						
2	2.375	2.067	0.17	1.45						
3	3.5	3.068	0.38	3.2						
4	4.5	4.026	0.66	5.51						
6	6.625	6.065	1.5	12.5						
8	8.625	7.981	2.6	21.65						
12	12.75	11.938	5.81	48.44						

	Volume of Open Borehole and Annulus Between Casing and Hole										
Hole Dia. (in.)	Volume per lineal ft of Hole		Nom. Casing Dia. (in.)	Volu per I ft of Ann	ime ineal ulus	Ib Sand per linear ft of Annulus	Ib 0.5 in. pellets per lineal ft of Annulus				
10	Gal	Cu.	5 m	Gal	Cu.						
7.25	2.14	0.29	1.25	2.03	0.27	27	21				
7.25	2.14	0.29	2	1.91	0.26	26	20				
7.75	2.45	0.33	2	2.22	0.3	30	23				
8.25	2.78	0.37	2	2.55	0.34	34	26				
10.25	4.29	0.57	2	4.06	0.54	54	41				
8.25	2.78	0.37	3	2.28	0.3	30	23				
10.25	4.29	0.57	3	3.79	0.51	51	38				
12.25	6.13	0.82	3	5.62	0.75	75	57				
8.25	2.78	0.37	4	1.95	0.26	26	20				
10.25	4.29	0.57	4	3.46	0.46	46	35				
12.25	6.13	0.82	4	5.3	0.71	71	54				
12.25	6.13	0.82	6	4.33	0.58	58	44				

VODO/-/

1 gal = 231 ci



ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

Sample	Description:
USCS Symbol	Color, secondary soil type, PRIMARY SOIL TYPE with modifiers, minor components, other features/descriptors/information
Examples:	 Gravish brown, gravelly, fine to medium SAND with silt and trace cobbles and scattered roots (dense moist)(weathered till)
	 Mottled black and green, silty SAND and clayey SILT; hydrocarbon sheen, faint hydrocarbon odor (loose and soft, moist)(fill)

Westland	A STREET	Soil Cl	assificatio	on System
	Major Divisions		USCS Letter Symbol	Typical Descriptions
J.	GRAVEL and GRAVELLY	Clean GRAVEL	GW	Well graded gravel; gravel/sand mixture(s); little or no fines.
s large	(50% or more of coarse	(Little of no fines)	GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines.
al is	fraction	GRAVEL with	GM	Silty gravel; gravel/sand/silt mixture(s).
ined S materia	retained on No. 4 sieve)	(Appreciable amount of fines)	GC	Clayey gravel; gravel/sand/clay mixture(s).
e-Gra 0% of 0	SAND and	Clean SAND	SW	Well-graded sand; gravelly sand; little or no fines.
Coars han 5(han No	(50% or more of coarse	(Little or no fines)	SP	Poorly graded sand; gravelly sand; little or no fines.
More t	fraction passed through No.	SAND with fines	SM	Silty sand; sand/silt mixture(s).
<u> </u>	4 sieve)	amount of fines)	SC	Clayey sand; sand/clay mixture(s).
al is size)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity.
ed Soil of materia 00 sieve	SILT (Liquid lim	and CLAY iit less than 50)	CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay.
Grain 50%			OL	Organic silt; organic, silty clay of low plasticity.
Fine. re thar er thar	SILT	and CLAY	MH	Inorganic silt; micaceous or diatomaceous fine sand.
Mol	(Liquid limit	greater than 50)	СН	Inorganic clay of high plasticity; fat clay.
1) L			ОН	Organic clay of medium to high plasticity; organic silt,
	Highly	Organic Soil	РТ	Peat; humus; swamp soil with high organic content.
Priman	Constituent:		>50%	"GRAVEL," "SAND," "SILT," "CLAY," etc.
Second	dary Constitue	nts:	≤50% and >30%	"very gravelly," "very sandy," "very silty," etc.
Additio	nal Constituen	its:	≤30% and >15%	"sandy," "gravelly," etc.
Additio	nal Constituen	its:	≤15% and >5%	"with gravel," "with sand," "with silt," etc.
Additio	nal Constituen	its:	≤5%	"with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

Other Materials		Typical Descriptions					
Pavement		AC or PC	Asphalt concrete pavement or Portland Cement pavement.				
Rock		RK	Rock (See rock classification).				
Wood/Organics	S	WD	Wood, lumber, wood chips, roots.				
Debris		DB	Construction debris, garbage.				
Primary Constituent:	>50%	1	"Rock," "Wood," "Debris."				
substantial	≤50%	and >30%	fine SAND with substantial debris.				
abundant	≤30%	and >15%	fine SAND with abundant debris.				
with	≤15%	and >5	fine SAND with debris.				
trace	≤5%	fine SAND with trace debris.					
Note: USCS letter symbol	s corresp	ond to the s	ymbols used by the Unified Soil				

Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM) for a sand or gravel indicate a soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.

Grain Size Definitions									
Term	Grain Size (Inches or Sieve #)	Term	Grain Size (Inches or Sieve #).						
Boulders	> 12 inches	Silt	Soil passing a No. 200 sieve, very slightly or						
Cobbles	12-3 inches		nonplastic, low to none dry strength.						
Gravel		Clay	Soil passing a No. 200 sieve, can exhibit						
Coarse	3 inches-3/4 inches		plasticity within a range of water contents, high						
Fine	3/4 inch-#4	1. * •	dry strength.						
Sand		Organic	Sufficient organic content to influence soil						
Coarse	#4-#10	Soil	properties.						
		Peat	Composed of primarily organic matter in						
Medium	#10-#40		stages of decomposition, usually organic odor, dark brown to black color, spongy consistency.						
Fine	#40-#200	1	texture fibrous to amorphous.						

Field Soil Classification Notes

				Mainter		and an		-	10000				and the second sec				
				Moistu	re D	esigi	nation	S	_								
Term	Field	Ider	ntificatio	n				in and			1. 1. 1.						
Dry	Appai	rent	absence	of moisture.	Dus	sty. D	ry to th	e touc	h.	١.,		1 King					
Damp	Betwe	en c	dry and r	noist. Some	mois	sture is	s prese	ent, bu	t us	sua	lly insu	ufficient	to				
	devel	op a	pparent	cohesion (bu	lk) in	sand	and be	elow th	ne p	la	stic lim	it in clay	/				
1.1	Below	opti	imum m	oisture conte	nt.												
Moist	Grain	s api	pear dar	kened, but no	o visi	ble wa	ater. S	and w	ill e	xh	ibit apr	parent	1				
1.1	cohes	ion	(bulk) an	d silt/clay wil	l clun	np. N	ear opt	imum	mo	oist	ure co	ntent.					
Wet	Vet Visible water on larger grain surfaces. Sand and cohesionless silt exhibit																
dilatancy. Cohesiye silt/clay can be readily remolded. Soil leaves wetroes on																	
the hand when squeezed. Over optimum maintum content																	
	the ne		when squ	deezed. Ove	a opt	mum	moistu	ire cor	iteri								
Cav	ving M	lodi	fiers	See	pag	e Mo	difier	5				Sheen					
None None NS- None																	
Minor- Isolated Slow- <1 opm SS- Slight																	
Moderate- Frequent Moderate- 1-3 gpm MS- Moderate																	
Severe- General Rapid- > 3 gpm HS_ Hostor																	
Jeve	16-	Oe	nera	TRA	Jiu-		5 gpn		-	-	110	- Tiea	vy				
Contraction of the	1826 6	C	onsist	ency and F	Relat	tive [Densit	v Pro	one	rti	es	100					
			0113130	chey and i	tora		Jenish	yrre	pe								
		_	ACCOUNT OF A	1-	Hai	mmer			Co	ons	sistend	:y					
SII T an		V S	Sampler	Sampler ID		2.8	Very	Color	Me	d		Very					
	IU OLA	1	Туре	(inches)	Wt.	Drop	Soft	Soft	Sti	ff	Stiff	Stiff	Hard				
Penetra	ation		SPT	1.50	140	30	0-2	4-2	4-8	3	8-15	15-30	>30				
Resista	ance		D&M	2.42	300	30	0-2	4-2	4-8	3	8-16	16-31	>31				
(blows/	/ft)	1	D&M	2.42	140	30	0-3	3-6	6-1	12	12-25	25-65	>65				
		1	WSDOT	2.00	140	30	0-3	3-5	5-1	0	10-19	19-38	>38				
		M	OD. CAI	2.375	140	30	0-4	4-7	7-1	5	15-29	29-53	>53				
-		1.44			-	-	0-	250-	50	0-	1000-	2000-					
Shear S	Strengt	n (ps	Sf)		13.10	1. 1. 1.	250	500	100	00	2000	4000	>4000				
		-			1	1			110	0-	120-	120-					
		U	Jnit weig	ht (pcf) satur	rated		1		130		140	140	>130				
		-	-		Har	amor	1	P		in	Der	ity					
	1. Lines in	C.	amplor	Sampler ID	Han	nmer	Man	R	elat		e Dens	sity	Man				
SAN	D	00	ampier	Sampler ID	100	-	very	in the second		N	lea	-	very				
-		-	Туре	(inches)	VVt.	Drop	Loose	Loos	e	De	ense	Dense	Dense				
Penetra	ation	SP	Т	1.50	140	30	0-4	4-10)	10	0-30	30-50	>50				
Resista	ance	D&I	M	2.42	300	30	0-6	6-15	5	15	5-42	42-73	>73				
(blows/	′ft)	D&I	M	2.42	140	30	0-11	11-2	6	26	6-74	74-120	>120				
		WS	SDOT	2.00	140	30	0-5	5 5-12			2-38	38-63	>63				
		MO	D. CAL.	2.375	140	30	0-7	7-19)	19	9-53	53-92	>92				
Unit We	eight (p	cf)	19-11-024		and the second		- Alter	-		A.N		the second					
Moist		1	- the second second	and the second			-100	95-12	25 1	110	0-130 1	10-140	+130				
Subm	nerged	14		and the second			-60	55-6	5	60	0-70	65-85	+75				
			0.11														
	and the		SIL	T and CLA	Y (S	treng	gth Es	timat	tes)	1.200	194					
Consist	tency	Tor	vane,	Pocket P	en. (t	tsf),	Field A	Appro	xim	at	ion of	Hand					
		(tsf)) Shear	Unconfin	ed		Penetr	ation									
		Stre	ength	Strength													
Verv So	oft	<	0.13	< 0.25	<0.25 Easy se					he	s by fis	st.					
Soft	100		20.25	0.05.0.5	0.25-0.5 Easy s					he	s by th	umb.					
Medium		0.1	3-0.23	0.25-0.5		IE	Easy se	everal			chos	ov thum	b				
	n Stiff	0.1	25-0.5	0.25-0.5	-	E	Lasy se Modera	te sev	era	l ir	ILIE3 I	dily indented by thumb.					
Stiff	n Stiff	0.1	25-0.5	0.25-0.5		E N	Lasy se Modera Readily	inden	rera	l ir	thum	b					
Stiff Very St	n Stiff	0.1	25-0.5 0.5-1	0.25-0.5		F	Andera Readily Readily	inden	ted	l ir by	thum	b. bnail					
Stiff Very St	n Stiff tiff	0.1	25-0.5 0.5-1 1-2	0.25-0.5 0.5-1 1-2 2-4		E N F	And the second s	inden	ted	by by	/ thum / thum	b. bnail.					
Stiff Very St Hard	n Stiff tiff	0.1 0.1 (25-0.5 0.5-1 1-2 >2	0.25-0.5 0.5-1 1-2 2-4 >4	Fined	F F C	Andera Readily Readily Difficult	inden y by th	ted ted	by by by	thum thum nail.	b. bnail.	iolds				
Stiff Very St Hard Note: F	n Stiff tiff Pocket	0.1 0.2 (Pene	25-0.25 25-0.5 0.5-1 1-2 >2 etromete	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf	fined	F F Comp	Lasy se Modera Readily Readily Difficult ression	inden y by th	ted ted uted yie	by by by Id	thum thum nail. qu. To	b. bnail. rvane y	ields				
Stiff Very St Hard Note: F Su; Su=	n Stiff tiff Pocket I =qu/2.	0.1 0.2 (25-0.23 25-0.5 0.5-1 1-2 >2 etromete	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf	fined	F F Comp	asy se Modera Readily Readily Difficult ression	inden inden y by th tests	ted ted num yie	l ir by by nbr	y thum y thum nail. qu. To	b. bnail. rvane y	ields				
Stiff Very St Hard Note: P Su; Su=	n Stiff tiff Pocket =qu/2.	0.1 0.2 (25-0.23 25-0.5 0.5-1 1-2 >2 etromete	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf	fined	F Comp	A sy se Modera Readily Readily Difficult ression	inden inden y by th tests	ted ted ted num yie	l ir by by nbr	y thum y thum nail. qu. To	b. bnail. rvane y	ields				
Stiff Very St Hard Note: F Su; Su=	n Stiff tiff Pocket i =qu/2.	0.1 0.2 (25-0.23 25-0.5 0.5-1 1-2 >2 etromete	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf	fined reng	F F C Comp	A sy se Modera Readily Readily Difficult ression	inden inden inden y by th tests	ited ited ited ited ited	ll ir by by nbr	y thum y thum nail. qu. To	b. bnail. rvane y	ields				
Stiff Very St Hard Note: F Su; Su=	n Stiff	0.1 0.2 (Pene	25-0.23 25-0.5 0.5-1 1-2 >2 etromete	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf	fined reng	F F C Comp	And the second s	inden inden y by th tests	ited ited ited ited	l ir by by nbr	y thum y thum nail. qu. To	b. bnail. rvane y	ields				
Stiff Very St Hard Note: F Su; Su= Relativ	n Stiff tiff Pocket I =qu/2. e Dens	0.1 0.2 (Pene	5-0.23 25-0.5 0.5-1 1-2 >2 etromete	0.25-0.5 0.5-1 1-2 2-4 >4 r and uncont Sand (Stu	fined reng	F F C comp	Andera Readily Readily Difficult ression	inden inden y by th tests	ited ited ited ited	l ir by by br	y thum y thum nail. qu. To	b. bnail. rvane y.	ields				
Stiff Very St Hard Note: F Su; Su= Relative Very Lo	n Stiff tiff Pocket =qu/2. e Dens pose	0.1 0.2 (Pene	5-0.23 25-0.5 0.5-1 1-2 >2 etromete Field A Easily	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Stu	fined reng	th Es	A sy se Modera Readily Readily Difficult ression stimat	with 1	rera ted ted num yie	ll ir by by nbr Id	y thum y thum nail. qu. To	b. bnail. rvane y	ields				
Stiff Very St Hard Note: F Su; Su= Relative Very Lo	n Stiff tiff Pocket I =qu/2. e Dens pose	0.1 0.2 (Pene	25-0.5 0.5-1 1-2 >2 etromete Field A Easily hand.	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str Spproximatic penetrated m	fined reng	th Es	A sy se Modera Readily Readily Difficult ression stimat	with 1	vera ted ted num yie	ll ir by by nbr Id	y thum y thum nail. qu. To	b. bnail. rvane y	ields				
Stiff Very St Hard Note: F Su; Su= Relativ Very Lo	n Stiff Liff Pocket =qu/2. e Dens pose	0.1 0.2 Pene	5-0.23 25-0.5 0.5-1 1-2 >2 etromete Field A Easily hand. Easily	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str pproximatic penetrated m penetrated set	fined reng on hany i	th Es	A sy se Modera Readily Readily Difficult ression stimat s (>12) es with	with 1	vera ted ted num yie /2"	ll ir by by nbr Id rel	y thumi y thum nail. qu. To bar pus	b. bnail. rvane y shed by	ields				
Stiff Very St Hard Note: F Su; Su= Relative Very Lo Loose Medium	n Stiff tiff Pocket I =qu/2. e Dens oose n Dens	0.1 0.2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	5-0.23 25-0.5 0.5-1 1-2 >2 etromete Field A Easily hand. Easily hand. Easily	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str pproximatic penetrated sc o moderately	fined reng on nany i evera	th Es	Asy se Modera Readily Readily Difficult ression stimat s (>12) es with ed with	with 1	rera ted ted num yie /2"	ll ir by by hbr Id rel	pushed riven b	b. bnail. rvane y shed by I by han y 5 lb	ields				
Stiff Very St Hard Note: F Su; Su= Relative Very Lo Loose Medium	n Stiff tiff Pocket I =qu/2. e Dens oose n Dens	0.1 0.: (Pene	Field A Easily hand. Easily haml.	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str Sand (Str Sometrated second connetrated second	fined reng on nany i evera y pen	th Es	A sy se Modera Readily Difficult ression stimat s (>12) es with ed with	with 1	/2" /2"	ll ir by by hbr Id rel	y thumi y thumi nail. qu. To bar pus bushed riven b	b. bnail. rvane y shed by I by han y 5 lb	ields d.				
Stiff Very St Hard Note: F Su; Su= Relative Very Lo Loose Medium Dense	n Stiff Liff Pocket I =qu/2. e Dens oose n Dens	0.1 0.: (Pene	Field A Easily hand. Easily hamme Penetric	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Stu peretrated so o moderately pr. ated 1 ft with	fined reng on hany i evera y pen diffic	th Es	A sy se Modera Readily Pifficult ression stimat s (>12) es with ed with sing 1/2	with 1 1/2" re 2" reb	/2" /2" /2"	I ir by by br Id rel ar p r d	par pushed riven by	b. bnail. rvane y shed by l by han y 5 lb 5 lb	ields d.				
Stiff Very St Hard Note: F Su; Su= Relative Very Lo Loose Medium Dense	n Stiff Liff Pocket I =qu/2. e Dens Dose n Dens	0.1 0.2 (Pene	Field A Easily (hand. Easily (hamme Penetrin hamme	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str Sand (Str penetrated so penetrated so o moderately er. ated 1 ft with ar.	fined reng on any i evera y pen diffic	th Es	As y set Modera Readily Difficult ression stimat s (>12) es with ed with sing 1/	with 1 1/2" re 2" reb.	/era ted ted num yie /2"	l ir by br Id rel ar p driv	thumi y thumi y thumi nail. qu. To bar pus bar pus bushed riven by	b. bnail. <i>rvane y</i> shed by l by han ny 5 lb 5 lb	ields d.				
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Stiff Very St Hard Note: F Su; Su= Relativ Very Lo Loose Medium Dense Very Do	n Stiff Liff Pocket =qu/2. e Dens oose n Dens ense	0.1 0.2 (Pene	Field A Easily phant. Easily phant. Easily phant. Easily phant. Easily phant. Easily phant. Penetr. hamme Penetr. hamme	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Stripproximation opproximation openetrated set openetrated set or ated 1 ft with er. ated only a fer.	fined reng on aany i evera y pen diffic ew ind	th Es	Modera Modera Readily Readily Difficult ression stimat stimat s (>12) es with ed with sing 1/2 with 1/2	with 1 1/2" reba	/2" /2" /2" eba ar d	I ir by br Id rel ar p Ir d	thumi y thumi y thumi nail. qu. To. bar pus bar pus pushed riven by ren by en by 5	b. bnail. rvane y shed by I by han y 5 lb 5 lb	ields d.				
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Stiff Very St Hard Note: F Su; Su= Relativ Very Lo Loose Medium Dense Very Du Very Du	n Stiff Riff Pocket e Dens oose n Dens ense Str	0.1 0.: (Pene iity ee	Field A Field A Easily I hand. Easily I hamme Penetrin hamme C ure titeria termating	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str Sand (Str Sand (Str Sand (Str ated only a fear. riteria for I	fined reng on aany i v pen diffic ew ind	th E:	Modera Modera Readily Difficult ression stimat s (>12) es with es with sing 1/2 with 1/2	with 1 1/2" re 2" reba with 2 1/2" re 1/2" re 1/2" re Term Term Parti	/2" /2" /2" eba ar d	l ir by by hbr Id rel ar p driv	y thum y thum nail. qu. To oar pus oushed riven b en by 5 Bee Criter Criter	b. bnail. Invane yn shed by 1 by han by 5 lb 5 lb 5 lb 5 lb 5 lb	ields d.				
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Stiff Very St Hard Note: F Su; Su= Relative Very Lo Loose Medium Dense Very Do Very Do Term Stratific Lamina Fissure	n Stiff Pocket I =qu/2. e Dens oose n Dens ense Sti ed ited ad	0.1 0.: Pene iity iity ee	Field A Field A Easily I hand. Easily I hand. Easily I hamme Penetri- hamme C ure iteria ternating tern	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str Sand (Str Spproximatic penetrated se to moderately ated 1 ft with ar. riteria for I payers payers > 1/4 payers > 1/4 payers > 1/4 payers > 1/4	fined reng on aany i v pen diffic ew ind Desc 	I inches ulth Es comp anches ulty u ches v cribin	Modera Modera Readily Pression stimat s (>12) es with ed with sing 1/2 with 1/2 ng Stru-	verail inden inden y by th t tests vers) with 1 1/2" re 2" reba version 2" reb	/2" eba ar di ar di ng n r	I ir by by by lor Id rel ar p rd driv	the second secon	b. bnail. <i>rvane y</i> shed by l by han y 5 lb 5 lb 5 lb 5 lb 5 lb 1 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1	ields				
Stiff Very St Hard Note: F Su; Su= Relative Very Lo Loose Medium Dense Very Do Very Do Very Do Term Stratifie Lamina Fissure Slicken	n Stiff Bocket I =qu/2. e Dens oose n Dens ense Str ed ited ed	0.1 0.: Pene sity se ce Cr Al Al Sh Sh Ea	Field A Field A Easily [hand. Easily [hand. Easily [hamme Penetrin hamme C ure iteria ternating ternati	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str Sand (Str Sometrated set or moderately ated 1 ft with ated only a fe pr. iteria for I layers > 1/4 parations alo glossy, striate	fined reng on aany i diffic ew inc Desc 	I inches anes of ctured	Modera Modera Readily Pression stimat s (>12) es with ed with sing 1/2 with 1/2 ng Stru- of	with 1 1/2" reba 2" re	/2" eba ar di ar di re ng n r	rel	the second secon	b. bnail. Invane y. shed by by han by 5 lb 5 lb 5 lb 5 lb 5 lb 1/2" to 12" lar,< 1 f	ields id.				
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Stiff Very St Hard Note: F Su; Su= Relativ Very Lo Loose Medium Dense Very Du Very Du Very Du Very Du Stratifie Lamina Fissure Slicken Blocky	n Stiff tiff Pocket =qu/2. e Dens oose n Dens ense stated ed isided	0.1 0.:: Pene sity se ructi All All Sr we Sr	Field A Field A Easily I hand. Easily I hamme Penetro hamme Penetro hamme C Ure riteria ternating	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str Sand (Str Sand (Str Sand (Str ated only a feat ated 1 ft with ar. riteria for I alayers layers > 1/4 barations alo glossy, striated aks into small kets of differe	Fined reng on any i evera diffic ew ind Desc 	I inches i i i inches i i i inches i i i i i i i i i i i i i i i i i i i	Modera Modera Readily Pifficult ression stimat s (>12) es with sing 1/2 with 1/2 ng Stru- of	with 1 1/2" re 2" reba 2" reba	/2" /2" /2" eba ar di ar di ar di ar di ar di ar di ar di ar di ar di	I ir by by hbr Id rel ar p r d driv	thum i thum i thum ail. qu. To bar pushed bar pushed bar pushed criter bar by 5 Ber Criter 0-1/16 1/16"- >1/2" Inregu Alterm lamina	b. bnail. bnail. bnail. bnail. brand	ields id.				
Stiff Very St Hard Note: F Su; Su= Relative Very Lo Loose Medium Dense Very Do Very Do Very Do Very Do Stratifie Lamina Fissure Slicken Blocky Lensed	n Stiff Cocket =qu/2. e Dens oose n Dens ense sti ed tted ad usided	0.1 0.:: Penee sity se Cr Cr All Sr Sr Sr Ss Ss	Field A Field A Easily I hand. Easily I hand. Easily I hand. Easily I hand. Cure riteria temating	0.25-0.5 0.5-1 1-2 2-4 >4 r and unconf Sand (Str Sand (Str Sand (Str Sand (Str pproximatic benetrated se o moderately ated 1 ft with ated only a fe ar. 1 ayers 1 ayers 1 ayers > 1/4 barations alo glossy, striate aks into small cets of differe r and appear	Fined reng on lany i evera diffic ew ind Desc " ng pl ed fra I ang ent so rance	I inches I inches Comp I inches I inches Cribir anes Cribir anes I inches I	Modera Modera Readily Pression stimat s (>12) es with es with sing 1/2 with 1/2 ng Stru- of	verain inden inden y by th t tests vers) with 1 1/2" re 2" rebo 2" rebo 2" rebo 2" rebo 2" rebo 2" rebo Strat Pockk Varv Scat	/2" /2" /2" /2" /2" eba ar di ar di	rel ar p rd	tories i the second s	b. bnail. Invane yn shed by I by han by 5 lb 5 lb 5 lb 5 lb 5 lb 1/2" to 12" lar,< 1 f ating se ations r foot	ields id.				

Note: Thickness of layers should be noted on logs.



Exploration No. _____ Date _____ Hour _____

Log of Exploration

Project Name Project No							Location Sketch (show dimensions to mapped features)						$\overline{)}$						
Clie	nt/o	wnei	r						Explo	rat	ion C	perator						N Ai	orth rrow
Exp	lora	tion	Meth	hod															
Log	ged	by _							Explora	atio	on Co	ompleted		(Eas	t)	(North)			
Gro	und	Surf	face	Co	nditio	ons								Coordinates: "x"		_ "y"	Method		
Wea	athe	r Co	nditi	ions	i								-	Elevations		Da	itum		
									ct			Sampler and Har	nme	r Information		Date			
()			(ft.)			les			Conta			a = 3.25-in. O.D. – D&M	1 =	300-lb./30-in. Drop	ion	Time			
t) (ft	ft.)	(ft.)	top)	(ft.)		r Coc			Jnit 0		t)	c = Shelby Tube	2 = 3 =	Pushed	er Le	Depth to Wa	ater		
oth (to	gth (I	ength	epth (ngth	nber	mme	ú	Data)) / loc		ale (f	d = Grab Sample g = 2.5-in. O.D WSDOT	4 = 5 =	Vibrocore	Wat Info	Hole Depth			
e Dep	e Len	ery Le	ed De	ed Le	e Nur	er/Ha	counts	Fest [Symt		th Sc	h = 3.0-in. O.D. – M.Calif. i =				Casing Dept	th		
Sample	Sample	Recove	Retain	Retain	Sample	Sample	Blow C	Other ⁻	nscs		Dep	Color, secondary soil ty minor components (d	Sar pe, F ensit	nple Description PRIMARY SOIL TYPE y/consistency, moistu	E with mo ure)(geolo	odifiers and ogic unit)	Commen Water (& Drill	ts on He Conditior ing Actic	eave, ns, on
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												Total Depth		Finish Date		Hour		Continu	ed



As-Built Well Completion Form

Exploration No.:

Well No. (If different than Expl. No.): ____

Client/Owner: Project No.:	Protective Well
Project Name:	Protective Monument
Drilling Co.:	in Feet Slip Cap Waterp
LAI Rep(s):	Concrete Well Se
Installation Start Date:Hour:	
Installation Finish Date:Hour:	
Well Type: 🗌 Single 🗌 Nested 🗌 Clustered	
BORING AND WELL DIMENSIONS AND INSTALLATION DETAILS	
DOE Unique Well No.:	
Number of Pipes in Boring:	
Boring Diameter at Top of Hole:	Surface Seal (Material)
Does Diameter of Hole Change?	-inch Diameter
Boring Diameter at First Step Down:	Borehole (Nominal)
Depth of First Step Down:	
Boring Diameter at Second Step Down:	-inch Diameter Schedule PVC Pipe
Depth of Second Step Down:	
Well Completion Date:	
Elevation of Well Cover:	
Elevation of Top of Well Pipe:	Annular Seal (Material)
Depth to Water:	
Date: Time:	
	- M Bentonite Seal (Material)
MATERIALS USED	
Sacks of Sand	
Sacks of Concrete/Cement	
Grout Mix Used	Screen(inch Slot
Sacks of Bentonite Chips	Size
Feet ofinch PVC Blank Casing	Sand Pack (Material)
Feet ofinch PVC Slotted Screen	
Threaded End Cap	Stainless Steel Centralizing Devices
Waterproof Well Seal/Slip Cap	(Indicate Location)
Flush Mount/Aboveground Protective Monument	Threaded End Cap
Protective Posts	



Well Development Record

Project Name: Location: Client:				Project No Date: Landau Representative:								
Well Number:				Time:								
Depth to Wate Well Depth: Casing Diamer Casing Volum	er: ter: e:			Diameter (inch) 1.25 2 4 6 Est. Purge	Volume O.D. (inch) 1.660 2.375 4.500 Volume:	of Schedule I.D. (inch) 1.380 2.067 4.026	40 PVC Pipe Volume (gal/ln ft) 0.08 0.17 0.66 1.47	Wt. Water (lbs/ln ft) 0.64 1.45 5.51 12.24				
Method of Dev	velopmer	nt:				Surge	Yes	No				
Begin Develop Finish Develop	oment: Ti pment: T	ime:		Final Volu Water Disp	ime Purgec osal: [Block: l: 55-gal drun Ground	m Storag	e Tank				
Initial Water (pH: Notes:	Quality: (' Temp:	Turbidity, Color, C	Odor, Other nductivity:)	_ Turbidity	y:	Initial Y	ield:				
Water Qualit	y Notes:											
Gallons	pН	Temperature	Con	ductivity	Turbic	lity	Comme	nts				
Final Water Q	uality: (T	urbidity, Color, O	dor, Other)									
Final Yield: pH:	Temper	rature:	Conductiv	vity:	Turbi	dity:						
Depth to Wate	er After D	Development:		V	Vell Depth	After Develo	pment:					

LANDAU ASSOCIATES



Groundwater Elevation Record

Project Name			Projec	et No.							
Location			Date								
			Landa	u Rep.							
Client	Client Weather										
Water Level In	dicator No	Sensi	tivity Setting								
Well I.D.	Time	Groundsurface Elevation (ft)	Depth to Water (ft)	Groundwater Elevation	Comments/Observations						

* From top of well casing.

** Record relative positions of ground surface, well casing, and protective casing (monument cover) if elevation of well casing is unknown. Record Datum if known.



Groundwater Low-Flow Sample Collection Form

1 TOJECT Nam	ne:				Project Numbe	er:			
Event:					Date/Time:				
Sample Nun	nber:				Weather:				
Landau Repr	resentative:								
WATER LEV	/EL/WELL/PU	JRGE DATA							
Well Condition	on:	Secure (YES	or NO)	Damaged (Y	ES or NO)	Describe:			
DTW Before	Purging (ft)		Time:		Flow through ce	ll vol.		GW Meter No.(s	3)
Begin Purge:	Date/Time:			End Purge:	Date/Time:			Gallons Purged:	<u>,</u>
Purge water d	lisposed to:		55-gal Drum	Ď	Storage Tank	Ground	Other	C	
U	, T	C 1	DO		ODD		DTW		a 44
Time	$(^{\circ}F/^{\circ}C)$	(uS/cm)	D.O. (mg/L)	рн	(mV)	(NTU)	DIW (ft)	Volume (gal)	Observations
	Purge Goal	s: Stablizatio	on of Parame	ters for three	consecutive rea	dings within the fol	lowing limits	>/= 1 flow	
	+/- 3%	+/- 3%	+/- 10%	+/- 0.1 units	+/ - 10 mV	+/- 10%	< 0.3 ft	through cell	
	·					·			
	·								
SAMPLE CO Sample Collec	DLLECTION I	ATA	Bailer		Pump/Pump Type	e		_	
SAMPLE CO Sample Colled Made of: Decon Proced (By Numerica	CLECTION E cted With:	OATA Stainless Ste Alconox Wa	Bailer el 🔲 sh 🗍	PVC Tap Rinse	Pump/Pump Type	Polyethylene	Other	Dedicated	
SAMPLE CO Sample Colled Made of: Decon Proced (<i>By Numerica</i> Sample Descr	DELECTION E cted With: lure: lure: ll Order) ription (color, t	Stainless Ste Alconox Wa	Bailer el 🗍 sh 🗍	PVC Tap Rinse	Pump/Pump Type	Polyethylene	D Other	Dedicated	
SAMPLE CC Sample Colled Made of: Decon Proced (By Numerica Sample Descr	DLLECTION E cted With:	Stainless Ste Alconox Wa Other urbidity, odor	Bailer el 🗍 sh 🗍	PVC Tap Rinse	Pump/Pump Type	Polyethylene	Other	Dedicated	
SAMPLE CC Sample Colled Made of: Decon Proced (By Numerical Sample Descr Replicate	DILLECTION I cted With: lure: ul Order) ription (color, t Temp	Stainless Ste Alconox Wa Other urbidity, odor	Bailer el \square sh \square , sheen, etc.): D.O.	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP	Polyethylene Dedicated Turbidity	DTW	Dedicated	Comments/
SAMPLE CC Sample Colled Made of: Decon Proced (By Numerical Sample Descr Replicate	CLLECTION E cted With: lure: il Order) ription (color, t Temp (°F/°C)	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm)	Bailer el sh , sheen, etc.): D.O. (mg/L)	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP (mV)	Polyethylene Dedicated Turbidity (NTU)	DTW (ft)	Dedicated Ferrous iron (Fe II)	Comments/ Observations
SAMPLE CC Sample Colled Made of: Decon Proced (By Numerica Sample Descr Replicate 1	DLLECTION E cted With: lure: ul Order) ription (color, t Temp (°F/°C)	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm)	Bailer el ish ; sheen, etc.): D.O. (mg/L)	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP (mV)	Polyethylene Dedicated Turbidity (NTU)	DTW (ft)	Dedicated Ferrous iron (Fe II)	Comments/ Observations
SAMPLE CC Sample Colled Made of: Decon Proced (<i>By Numerica</i> Sample Descr Replicate 1 2	DLLECTION E cted With: lure: al Order) ription (color, t Temp (°F/°C)	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm)	Bailer el sh sh built	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP (mV)	Polyethylene Dedicated Turbidity (NTU)	DTW (ft)	Dedicated Ferrous iron (Fe II)	Comments/ Observations
SAMPLE CC Sample Colled Made of: Decon Proced (<i>By Numerica</i> Sample Descr Replicate 1 2 3	DLLECTION E cted With: lure: il Order) ription (color, t Temp (°F/°C)	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm)	Bailer el sh , sheen, etc.): D.O. (mg/L)	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP (mV)	Polyethylene Dedicated Turbidity (NTU)	DTW (ft)	Dedicated Ferrous iron (Fe II)	Comments/ Observations
SAMPLE CC Sample Colled Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4	DLLECTION E cted With:	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm)	Bailer el sh sh b.O. (mg/L)	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP (mV)	Polyethylene Dedicated Turbidity (NTU)	DTW (ft)	Dedicated Ferrous iron (Fe II)	Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 4 Average:	DLLECTION E	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm)	Bailer el sh sh b.O. (mg/L)	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP (mV)	Polyethylene Dedicated Turbidity (NTU)	DTW (ft)	Dedicated Ferrous iron (Fe II)	Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (<i>By Numerica</i> Sample Descr Replicate 1 2 3 4 Average:	DLLECTION E	Stainless Ste Alconox Wa D Other urbidity, odor Cond. (uS/cm)	Bailer el sh sh b.O. (mg/L)	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP (mV)	Polyethylene Dedicated Turbidity (NTU)	DTW (ft)	Dedicated Ferrous iron (Fe II)	Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	DILLECTION I cted With:	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm)	Bailer el ish ish ish b.O. (mg/L)	PVC Tap Rinse pH	Pump/Pump Type Teflon DI Water ORP (mV) TYPE (Circle a	Polyethylene Dedicated Turbidity (NTU) pplicable or write n	DTW (ft) on-standard a	Dedicated Ferrous iron (Fe II) nalysis below)	Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	DLLECTION E cted With: lure: al Order) ription (color, t Temp (°F/°C) TYPICAL A (8260) (8010 (8270) (DAX)	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm)	Bailer el sh sh b.O. (mg/L)	PVC Tap Rinse pH ER BOTTLE (NWTPH-Gx	Pump/Pump Type Teflon DI Water ORP (mV) TYPE (Circle a) (BTEX)	Polyethylene Dedicated Turbidity (NTU) pplicable or write n	DTW (ft) on-standard a		Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	DLLECTION E cted With: lure: il Order) ription (color, t Temp (°F/°C)	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm) NALYSIS A)) (8020) (ft)) (NWTPH-	Bailer el sh sh b.O. (mg/L)	PVC Tap Rinse pH ER BOTTLE (NWTPH-Gx H-Dx) (TPH-	Pump/Pump Type Teflon DI Water ORP (mV) 		DTW (ft) on-standard a se)		Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	Typical A (°F/°C) Typical A (8260) (8010) (8270) (PAH) (COD) (TOO)	Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm) NALYSIS A)) (8020) (1) (NWTPH- ctivity) (TD	Bailer el ish ish ish ish ish ish ish ish	PVC Tap Rinse pH ER BOTTLE (NWTPH-Gx I-Dx) (TPH- 3OD) (Turbi	Pump/Pump Type Teflon DI Water ORP (mV) TYPE (Circle a) (BTEX) HCID) (8081) dity) (Alkalinity a) (NH3) (NO3)	Polyethylene Dedicated Turbidity (NTU) pplicable or write n (8141) (Oil & Grea (HCO3/CO3) (C /NQ2)	DTW (ft) on-standard a (se) 1) (SO4) (NC		Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	DLLECTION I cted With: lure: al Order) ription (color, t Temp (°F/°C) TYPICAL A (8260) (8010 (8270) (PAH (pH) (Condu (COD) (TOO (Total Cyanid	Stainless Ste Alconox Wa Dother urbidity, odor Cond. (uS/cm) NALYSIS A)) (8020) (1)) (NWTPH- ctivity) (TD C) (Total PO e) (WAD C)	Bailer el sh box	PVC Tap Rinse pH pH ER BOTTLE (NWTPH-Gx H-Dx) (TPH- 30D) (Turbi edahl Nitroger	Pump/Pump Type Teflon DI Water ORP (mV) TYPE (Circle a) (BTEX) HCID) (8081) dity) (Alkalinity h) (NH3) (NO3	Polyethylene Dedicated Turbidity (NTU) pplicable or write n (8141) (Oil & Grea) (HCO3/CO3) (C /NO2)	DTW (ft) on-standard a se) 1) (SO4) (NO		Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	DLLECTION I cted With: Image: Image of the system il Order) ription (color, the system) ription (color, the system) (°F/°C) Image of the system) TYPICAL A (8260) (8010) (8270) (PAH) (PH) (Condu (COD) (TOC) (Total Cyanid) (Total Metals)	ATA Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm) NALYSIS A) (8020) (ft) (NWTPH- ctivity) (TD C) (Total PO e) (WAD C) (As) (Sb) (Bailer el ish in the set of the	PVC Tap Rinse pH ER BOTTLE (NWTPH-Gx H-Dx) (TPH- 30D) (Turbi edahl Nitroger Cyanide) a) (Cd) (Co)	Pump/Pump Type Teflon DI Water ORP (mV) TYPE (Circle a) (BTEX) HCID) (8081) dity) (Alkalinity n) (NH3) (NO3	Polyethylene Dedicated Turbidity (NTU) Polyethylene (NTU) Polyethylene (NTU) Polyethylene (NTU) Polyethylene (NTU) (NTU) Polyethylene (NTU) Polyethylene (NTU) Polyethylene (NTU) Polyethylene (NTU) Polyethylenee (NTU) Polyethyleneee (NTU) Polyethyleneeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeeee	DTW (ft) on-standard a se) 1) (SO4) (NO		Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	CILECTION E Cted With: Lure: al Order) ription (color, t Temp (°F/°C) TYPICAL A (8260) (8010 (8270) (PAH (pH) (Condu (COD) (TOO (Total Cyanid (Total Metals) (Dissolved M	ATA Stainless Ste Alconox Wa Cond. (uS/cm) NALYSIS A) (8020) (1) (NWTPH- ctivity) (TD C) (Total PO e) (WAD C) (As) (Sb) etals) (As) (Sb)	Bailer el sh b.C. (mg/L) D.O. (mg/L) LLOWED PI WTPH-G) (0 D) (NWTPH S) (TSS) (E 4) (Total Kic yanide) (Free (Ba) (Be) (Ca b) (Ba) (Be) (Ca	PVC Tap Rinse pH pH ER BOTTLE (NWTPH-Gx 4-Dx) (TPH- 3OD) (Turbi edahl Nitrogen c Cyanide) a) (Cd) (Co) Ca) (Cd) (Co)	Pump/Pump Type Teflon DI Water ORP (mV) 	Polyethylene Dedicated Turbidity (NTU) Polyethylene (NTU) Polyethylene (NTU) (DTW (ft) on-standard a se) 1) (SO4) (NO [i) (Ag) (Se) (Ag) (Se) (T1) (V	Dedicated Ferrous iron (Fe II)	Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	DLLECTION I cted With: Image: Image of the state of the stateo	Stainless Ste Alconox Wa Dother urbidity, odor Cond. (uS/cm) NALYSIS A) (8020) (1) (NWTPH- ctivity) (TD C) (Total PO e) (WAD C) (As) (Sb) (etals) (As) (Sf g short list)	Bailer el sh b.O. (mg/L) D.O. (mg/L) LLOWED PI NWTPH-G) (0 -D) (NWTPH S) (TSS) (E 4) (Total Kie yanide) (Free (Ba) (Be) (Ca b) (Ba) (Be) (Ca	PVC Tap Rinse pH ER BOTTLE (NWTPH-Gx H-Dx) (TPH- 3OD) (Turbi edahl Nitrogen e Cyanide) a) (Cd) (Co) Ca) (Cd) (Co)	Pump/Pump Type Teflon DI Water ORP (mV) TYPE (Circle a) (BTEX) HCID) (8081) dity) (Alkalinity n) (NH3) (NO3 (Cr) (Cu) (Fe) (Fe) (Cr) (Cu) (Fe) (Fe)	Polyethylene Dedicated Turbidity (NTU) Pplicable or write n (8141) (Oil & Grea (8141) (Oil & Grea (8141) (Oil & Grea (1003/CO3) (C) (NO2) (Pb) (Mg) (Mn) (Ni) (A	DTW (ft) on-standard a se) 1) (SO4) (NO [i) (Ag) (Se) (Ag) (Se) (T1) (N	☐ Dedicated Ferrous iron (Fe II) 	Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	DLLECTION I cted With: Image:	ATA Stainless Ste Alconox Wa Other urbidity, odor Cond. (uS/cm) NALYSIS A (0) (8020) (12 (1) (NWTPH- ctivity) (TD C) (Total PO e) (WAD C; (1) (As) (Sb) (1) etals) (As) (Sl) g short list) ane Ethene A	Bailer el sh ., sheen, etc.): D.O. (mg/L) LLOWED PI WTPH-G) (0 	PVC Tap Rinse pH pH ER BOTTLE (NWTPH-Gx H-Dx) (TPH- 30D) (Turbi edahl Nitroger cCyanide) a) (Cd) (Co) Ca) (Cd) (Co)	Pump/Pump Type Teflon DI Water ORP (mV) TYPE (Circle a) (BTEX) HCID) (8081) dity) (Alkalinity h) (NH3) (NO3 (Cr) (Cu) (Fe) (Fe)	Polyethylene Dedicated Turbidity (NTU) (NT	DTW (ft) on-standard a se) 1) (SO4) (NO (h) (Ag) (Se) (Ag) (Se) (TI) (V	☐ Dedicated Ferrous iron (Fe II) 	Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	DLLECTION I cted With: Image:	ATA Stainless Ste Alconox Wa ☐ Other urbidity, odor Cond. (uS/cm) NALYSIS A 0) (8020) (ft 1) (NWTPH- ctivity) (TD C) (Total PO e) (WAD C 0) (As) (Sb) (st g short list) ane Ethene A	Bailer el ish ish sh ish b.O. (mg/L) b.O. (mg/L) b.O. (mg/L) b.C.	PVC Tap Rinse pH ER BOTTLE (NWTPH-Gx H-Dx) (TPH- 30D) (Turbi edahl Nitrogen cQanide) a) (Cd) (Co) Ca) (Cd) (Co)	Pump/Pump Type Teflon DI Water ORP (mV) 	Polyethylene Dedicated Turbidity (NTU) Pplicable or write n (8141) (Oil & Great (8141) (Oil & Great) (HCO3/CO3) (C /NO2) (Pb) (Mg) (Mn) (Ni) (A	DTW (ft) on-standard a se) 1) (SO4) (NO (i) (Ag) (Se) (Ag) (Se) (TI) (N	☐ Dedicated Ferrous iron (Fe II) 	Comments/ Observations
SAMPLE CC Sample Colle- Made of: Decon Proced (By Numerica Sample Descr Replicate 1 2 3 4 Average: QUANTITY	TYPICAL A (8260) (8010 (8270) (Total Cyanid (Total Metals) (Dissolved M VOC (Boein Methane Eth	ATA Stainless Ste Alconox Wa ☐ Other urbidity, odor Cond. (uS/cm) NALYSIS A 0) (8020) (ft 1) (NWTPH- ctivity) (TD C) (Total PO e) (WAD C) 0) (As) (Sb) (detals) (As) (Sl) g short list) ane Ethene A	Bailer el sh sh b.O. (mg/L) LLOWED PI WTPH-G) (0 	PVC Tap Rinse pH PH PH PH PH PH PH PH PH PH PH PH PH PH	Pump/Pump Type Teflon DI Water ORP (mV) TYPE (Circle a) (BTEX) HCID) (8081) dity) (Alkalinity h) (NH3) (NO3 (Cr) (Cu) (Fe) (Fe) (Cr) (Cu) (Fe) (Fe)	Polyethylene Dedicated Turbidity (NTU) Pplicable or write n (8141) (Oil & Grea (8141) (Oil & Grea (14CO3/CO3) (C /NO2) (Pb) (Mg) (Mn) (Ni) (A	DTW (ft) on-standard a se) 1) (SO4) (NC [i) (Ag) (Se) (Ag) (Se) (T1) (□ Dedicated Ferrous iron (Fe II) □ nalysis below) WA □ WA □ 03) (NO2) (F) (Tl) (V) (Zn) (Hg) (K) (Comments/ Observations

Duplicate Sample No(s):

Comments:

Signature:



Sub Slab Vapor / Soil Gas Sample Collection Form

Project Number: Project Number: Landau Rep: DateTime Collected: Landau Rep: DateTime Collected: SAMPLE TYPE Sub Stab Vapor Sub Stab Vapor Sol Gas Other:									
Client:	Project Name	:			Project Number:				
Landation Information:	Client	:			Sample Number:				
Location Information: SAMPLETYPE Sub Slab Vupor Gold Gas Back Slab Vupor Gold Gas Artificit 1' In 24 hs? (255.or.MO) Irrigation not win 5 hts? (255.or.MO) Starting Vacuum?	Landau Rep	:			Date/Time Collected:	:			
SAMPLE TYPE Gub Slub Vapor Soli Gas Oftwor: WEATHER DATA Rainfall <1* In 24 hts 7: (YES or NQ)	Location In	formation:							
Sub Slab Vapor Soli Gas Other:	SAMPLE TYPE								
WEATHER DATA Rainfall <1 in 24 in 24 in 24 in 24 in 24 in 27 (VES or NO)		Sub Slab Vapor	Soil Gas	Other:		_			
Rafial <1' in 24 fm 2 (VES or NO)	WEATHER DAT	A							
Air Temperature "F or 'C Wind Direction Wind Speed mph Humidry % Barometic Pressure in HG or mBar Is sampling occurring after frontal system during stable pressure? (VES or NO) SOIL GAS AND SUE SLa INFORMATION AND AND PURGE DATA Numer (Loadion: PERMENANT or TEMPORARY (crite one)	Rainfall < 1" in 24	1 hrs.? (<u>YES or NO</u>)	Irrigation not w/	'in 5 hrs.? (<u>YES or NO</u>)	Standing water near sampli	ng location? (Y	ES or NO)		
Baronelitic Pressure in MG or mBar Is sampling occurring after frontal system during stable pressure? (YES or NO) SOIL CASA AND SUB SLAB INFORMATION AND AND PURCE DATA	Air Temperature	°F or °C	Wind Directio	n	Wind Speed	mph	Humidity		%
SOL GAS AND SUB SLAB INFORMATION AND AND PURGE DATA Nature of Location: PERMENANT of TEMPORARY (circle one) Post-Run Tubing (PRT) Soll Gas Monitoring Well Other:	Barometric Pressure	e in HG (or mBar	ls sam	pling occurring after frontal syst	tem during stab	le pressure? (Y	ES or NO)	
Nature of Location: PERMENANT or TEMPORARY (circle one) Post-Run Tubing (PRT) Soli Gas Monitoring Weil Other:	SOIL GAS AND	SUB SLAB INFO	RMATION AND A	AND PURGE DATA					
Installation Method : bineted Push Drill Rig Half Driven Rotokammer Vapor Pin Manufacturer: Hermanert, Is Well Secure? (<u>VES or NO or NA</u>) Damaged (<u>VES or NO</u>) VES-Describe: Materials: PVC Pipe Stainless Steel Tellon Wylon or Polyathylene Tubing Other: Well/Nole Diameter: nches Total Depth of Well: ft Depth to Groundwater: ft <u>Volume ExaMPLES</u> <u>Diameter (m) OD (in) D (in) Volution</u> Purge: Begin Time End Time Casing Volume (It ²): 1 (p.t. 40) 1.515 1.022 0.0005 Prove Rate (liter or m/min): Volume Purged (It ¹): 1 (p.t. 40) 1.515 1.022 0.0005 Prove Rate (liter or m/min): Volume Purged (It ¹): 1 (p.t. 40) 1.515 1.022 0.0005 Prove Rate (liter or m/min): Volume Purged (It ¹): 2 (p.t. 40) 1.660 1.3380 0.010 2 (p.t. 40) 1.25 (p.t. 40	Nature of Location:	PERMENANT or TE	MPORARY (circle o	ne) Post-Run	Tubing (PRT) Soil Gas I	Monitoring Well		Other:	
It Permanent, Is Well Secure? (YES or NO or NA) Damaged (YES or NO) YES-Describe: Materials: PVC Pipe Stainless Steel Totlon Nylon or Polyethylene Tubing Other: Well/Hole Diameter: inches Total Depth of Well: ft Depth to Groundwater: ft Vacuum/Pressure of source (in. H ₂ O): Time:	Installation Method	Direct Push Drill	Rig Hollow Stem	n Auger Rotosonio	c Other: Vapor Pin Manufacture	r:			
Materiale: PVC Pipe Stainless Steel Tefton Nyton or Polyethylene Tubing Other: Wiell/Hole Diameter: inches Total Depth of Well: ft Depth to Groundwater: ft Purge Volume Calculation: Time:	If Permanent, Is We	ell Secure? (YES or N	O or NA)	Damaged (YES or NO)	YES-Describe	:			
Weil/Hole Diameter: inches Total Depth of Well: ft Depth to Groundwater: ft Purge Volume Calculation:	Materials:	PVC Pipe	Stainless Steel	Teflon	Nylon or Poly	ethylene Tubin	g 🗌 o	ther:	
Vacuumi/Pressure of source (in, H ₂ O): Time: Diameter (in) OD. (in) ID. (in) Value (in) Purge: Begin Time End Time Casing Volume (It ³): 0.25 (ubling) 0.250 0.170 0.00016 Flow Rate (liter or m/min): Temp. (YF/C) PID (ppm) Other Comments/Observations 1 (sch. 40) 1.315 1.029 0.005 Vol. Purged (It ³) Temp. (YF/C) PID (ppm) Other Comments/Observations 2 (sch. 40) 2.630 1.380 0.010 Z (sch. 40) 2.375 2.067 0.020 LEAK TEST OPTIONS	Well/Hole Diameter	: inches	Total Depth of \	Well: ft Dep	oth to Groundwater: ft		VOLUME EX	AMPLES	
Purge Volume Calculation:	Vacuum/Pressure o	f source (in. H ₂ O):		Time:		Diameter (in)	<u>OD (in)</u>	<u>ID (in)</u>	<u>Vol (ft³/ln f</u>
Purge: Begin TimeEnd Time Casing Volume (It ³):	Purge Volume Calc	ulation:				0.25 (tubing)	0.250	0.170	0.00016
Flow Rate (liter or mil/min):	Purae: Beain Time	Er	nd Time	Casing Volume (ft ³):		1 (sch. 40)	1.315	1.029	0.006
Vol. Purged (ft ²) Temp. (*F/C) PID (ppm) Other Comments/Observations 2 (sch. 40) 2.375 2.067 0.020 LEAK TEST OPTIONS	Flow Rate (liter or m			Volume Purged (ft ³):		1.25 (sch. 40)	1.660	1.380	0.010
LEAK TEST OPTIONS Shut-in Test Starting Vacuum: in H2O (target 100 inches H2O) Test Duration: minutes (target > 1 min) Ending Vacuum: in H2O (target no noticable vacuum decrease) Result:PASS_FAIL (circle one) Helium Shroud Design: minutes (target ± 10%) Tracer Equilibration Time: (target min. 5 min) Sample Air Tracer Concentration:% of Shroud Conc. (target <5%)	Vol. Purged (ft ³)	Temp. (°F/°C) PID (ppm)	Other	Comments/Observations	2 (sch. 40)	2.375	2.067	0.020
LEAK TEST OPTIONS Shut-in Test Starting Vacuum: in H2O (target 100 inches H2O) Test Duration: minutes (target > 1 min) Ending Vacuum: in H2O (target no noticable vacuum decrease) Result:PASSFAIL (circle one) Helium Shroud Design: Helium Source Concentration: % (target ± 10%) Tracer Equilibration Time: (target min. 5 min) Sample Air Tracer Concentration Fluctuation: % (target ± 10%) Tracer Equilibration Time: (target min. 5 min) Sample Air Tracer Concentration: % of Shroud Conc. (target <5%) Water Bath (vapor pins only) SAMPLE COLLECTION DATA Sample Container: Burma Canister, Size (liters) Canister #:] Tedlar Bag, Size (liters): Bample Type: Grab Integrated (composite sample over time) Sample Collection/Purge Pump (if used): in Hg Vacuum After Sample Collection: in Hg LABORATORY ANALYSES: Duplicate Sample Number(s) and Comments: Signature: Date:									
LEAK TEST OPTIONS Shut-in Test Starting Vacuum: in H2O (target 100 inches H2O) Test Duration: minutes (target > 1 min) Ending Vacuum: in H2O (target no noticable vacuum decrease) Result: PASS FAIL (circle one) Helium Shroud Design: Melium Source Concentration: Helium Source Concentration: Shroud Tracer Concentration Fluctuation:% (target ± 10%) Tracer Equilibration Time: (target min. 5 min) Sample Air Tracer Concentration:% of Shroud Conc. (target < 5%)									
LEAK TEST OPTIONS Shut-in Test Starting Vacuum: in H20 (target 100 inches H20) Test Duration: minutes (target > 1 min) Ending Vacuum: in H20 (target no noticable vacuum decrease) Result:PASSFAIL (circle one) Helium Shroud Design: Helium Source Concentration: Shroud Tracer Concentration Fluctuation:% (target ± 10%) Tracer Equilibration Time: (target min. 5 min) Sample Air Tracer Concentration:% of Shroud Conc. (target <5%)									
Shut-in Test Starting Vacuum: in H2O (target 100 inches H2O) Test Duration: minutes (target > 1 min) Ending Vacuum: in H2O (target 100 inches H2O) Result:PASSFAIL (circle one) Helium Shroud Design: MI2O (target 100 inches H2O) Result:PASSFAIL (circle one) Shroud Design: in H2O (target 100 inches H2O) Result:PASSFAIL (circle one) Helium Shroud Design: MI2O (target 100 inches H2O) Result:PASSFAIL (circle one) Shroud Tracer Concentration Fluctuation: % (target ± 10%) Tracer Equilibration Time: (target min. 5 min) Sample Air Tracer Concentration: % of Shroud Conc. (target <5%)	LEAK TEST OP	TIONS							
Ending Vacuum: in H2O (target no noticable vacuum decrease) Result: PASS FAL	Shut-in Test	Starting Vacuum:	in H2O (targ	get 100 inches H2O)	Test Duration: n	ninutes (target	> 1 min)		
Linking Volumining Volumini Volumining Volumining Volumin		Ending Vacuum:	in H2O <i>(t</i> a	arget no noticable vacuum	decrease) Result:	PASS	FAII (c	ircle one)	
Helium Shroud Design: Helium Helium Source Concentration: Helium Source Concentration: Shroud Tracer Concentration Fluctuation: % (target ± 10%) Tracer Equilibration Time: (target min. 5 min) Sample Air Tracer Concentration: % of Shroud Conc. (target < 5%)			III 120 (id				<u>, , , , , , , , , , , , , , , , , , , </u>		
Shroud Tracer Concentration Fluctuation: % (target ± 10%) Tracer Equilibration Time: (target min. 5 min) Sample Air Tracer Concentration: % of Shroud Conc. (target <5%)	📙 Helium	Shroud Design:				Helium Sourc	e Concentratior	า:	
Sample Air Tracer Concentration: % of Shroud Conc. (target <5%)		Shroud Tracer Cond	centration Fluctuation:	% (target ± 10	0%) Tracer Equili	bration Time: _	(ta	rget min. 5	min)
Water Bath (vapor pins only) SAMPLE COLLECTION DATA Sample Container: Summa Canister, Size (liters) Canister #: Passive / Diffusive Manufacturer: Tedlar Bag, Size (liters): Passive / Diffusive Manufacturer: Other: Sample Type: Grab Integrated (composite sample over time) Sample Collection/Purge Pump (if used): Summa Canister, Pre-Sampling and Post-Sampling: Initial Vacuum: Initial Vacuum: in Hg Vacuum After Sample Collection: in Hg LABORATORY ANALYSES:		Sample Air Tracer (Concentration:	% of Shroud Conc. (tai	rget <5%)				
SAMPLE COLLECTION DATA Sample Container: Summa Canister, Size (liters) Passive / Diffusive Manufacturer: Passive / Diffusive Manufacturer: Sample Type: Grab Sample Collection/Purge Pump (if used):	Water Bath (va	apor pins only)							
Sample Container: Summa Canister, Size (liters) Canister #:	SAMPLE COLL	ECTION DATA							
Passive / Diffusive Manufacturer: Other: Sample Type: Grab Integrated (composite sample over time) Sample Collection/Purge Pump (if used):	Sample Container:	Summa	Canister, Size (liters)	Canister #:] Tedlar Bag,	Size (liters):		
Sample Type: Grab Integrated (composite sample over time) Sample Collection/Purge Pump (if used):		Passive	/ Diffusive Manufact	urer:			Other:		
Sample Collection/Purge Pump (if used):	Sample Type:	Grab	[Integrated (composite s	ample over time)				
Summa Canister, Pre-Sampling and Post-Sampling: Initial Vacuum: in Hg Vacuum After Sample Collection: in Hg LABORATORY ANALYSES: Duplicate Sample Number(s) and Comments: Signature: Date:	Sample Collection/F	Purge Pump (if used):							
Summa Canister, Pre-Sampling and Post-Sampling: Initial Vacuum: in Hg Vacuum After Sample Collection: in Hg LABORATORY ANALYSES: Duplicate Sample Number(s) and Comments: Signature: Date:	-								
LABORATORY ANALYSES: Duplicate Sample Number(s) and Comments: Signature: Date:	Summa Canister, P	re-Sampling and Post	-Sampling:	Initial Vacuum:	in Hg Vacuum Afte	er Sample Colle	ction:	in Hg	
Duplicate Sample Number(s) and Comments:	LABORATORY AN	ALYSES:							
Signature: Date:	Duplicate Sample N	lumber(s) and Comm	ents:						
Signature: Date:									
	Signature:					Date:			



SAMPLE COLLECTION FORM STORM DRAIN SOLIDS, SURFACE DEBRIS, AND ANTHROPOGENIC MEDIA

Client:

Project:

Sampled By:

Sample ID	Sample Date	Sample Time	Nearest Building Number	Sample Media	Sample Description (Location Notes)



EQUIPMENT RINSE SAMPLE COLLECTION FORM

Projec	t:				Date/Time:		
Sample ID):				Weather:		
Analysis	S:						
EQUIPMEN	IT RINSE DATA						
Equipment Rir	nsed:						
Environmenta	I sample for which e	quipment was us	ed:				
Method of dec	contaminating:						
SAMPLE CON	NTAINER DATA				SAMPLE	METHOD:	
Turno	Procerticative	Volumo	No. Required	No. Filled			
Туре	Treservative	Volume	rtoquirou	T IIIOu			
					Photogra	aph taken?	
					Querral and a second		
					Sample entered	d on COC?	
SA	AMPLE PRESERVA	TION METHOD:					lced:
Comments:							
Signature	:					DateTime:	



Service Provider:	
Date:	
Boeing Onsite Activity Representative:	
Boeing EHS Representative:	
Project Number and Title:	

This workplace contains permit-required confined spaces. This communication provides notice to you that the job described below may involve entry into a "Permit Required Confined Space" (PRCS) as described in Chapter <u>296-809</u> WAC. In accordance with the WAC standard, entry into a PRCS requires a confined space entry permit program. As a condition of our contract or purchase order, The Boeing Company requires that all independent contractors comply with applicable WAC regulations.

Description of Confined Space:	
Building Location:	
Column or Location:	
Estimated Entry Date:	

The Boeing Company has identified the following potential hazards, which may, or may not, be present at the time of entry into the space. This notice does not relieve you of your duty to independently evaluate hazards presented by work in or around this confined space(s) and to implement the precautions and hazard controls necessary for safe entry into the space(s).

Prior to entry, please call Boeing Fire Department at **206 655-8800** to verify that the in-plant rescue team will be available for the duration of the entry or entries and call them when the entries have finished.

Report any confined space emergency immediately by calling 206 655-2222 from any cell phone.

Review list; NA if not applicable; circle or bold applicable items for this entry

Potential Atmospheric Hazards	N/A	Yes	No	Potential Physical Hazards	N/A	Yes	No
Oxygen deficiency				Mechanical Systems or Equipment Hazards			
Flammable/LEL (solvent/fuels/methane/coatings/etc):				Electrical Shock (high and low voltage)			
Carbon Monoxide				Engulfment/drowning			
Hydrogen Sulfide				Steam or high pressure systems			
Other Toxic (bold/circle below or specify)				Tripping and slipping hazards			
Solvents MEK/MPK/MBK/tolune/other				Falls over 4 feet			
Acids: Alodine/Nitric/other				Entrapment between inwardly converging walls			
Fuel: jet/gasoline/diesel/other				Chemical contact hazards			
Hydraulic Mist: skydrol/regular/other				Other (biological hazard/traffic/etc. specify below):			
Paint: vapors/residue/other				Foot traffic			
Chromates/Chromium				Pinch points: hatch and floor.			
Other:(specify):				Other (specify):.			



Boeing- North Boeing Field Service Providers Confined Space Notification

Hazard Control - Precautions and Procedures	N/A	Yes	No	Personal Protective Equipment:	N/A	Yes	No
Secure Area: (barricades / cones / railing /tape/ other:				Head			
Lighting: (explosion-proof / explosion-proof flashlights / other:)				Foot Protection			
Fire protection: (fire extinguisher / other:)				Hearing Protection			
Additional ventilation: (process / mechanical blower / continuous / other:)				Protective Clothing: (Tyvek [™] / Kleen Guard [™] / Fuel Cell [™] / cloth coveralls/ Tychem QC [™] / PVC Rain Suit / other:)			
NON-Energized work: Hazardous energy sources: lockout, tagout, tryout. (electrical / mechanical / pneumatic / hydraulic / per MES placard / other:)				Hand Protection: (leather / thin latex / med. latex / Chemipro™ / nitrile / PVC / Silver Shield™ / other:			
Ground fault protection:				Respiratory Protection: (½ face / full face/ airline) H2S: >10ppm do not enter. CO: >25ppm do not enter; Recommended: PID 0-50ppm half-face respirator (OV, P100I; 50-500 full face cartridge (OV, P 100); 500-1000 airline; >1000 do not enter.			
Other: (disconnect piping / blanking / inerting / purging				Eye / Face Protection: (safety glasses / goggles / face shield / other)			
Hot Work Permit Required (grinding, torch work, welding, etc.)?				Falls / Rescue Protection: (D-ring harness / lanyard / tripod / lifeline / other:			
Other:	•	•	•		•	•	

The Boeing Company has implemented the following precautions/procedures for Boeing personnel who will be working in, or near, the confined space described above. Service Providers are responsible to implement similar precautions as necessary.

	Standby attendant
	Training for entrants. entry supervisors, and attendants
	Written entry permit authorized by Entry Supervisor
	Continuous atmospheric sampling/monitoring for oxygen levels, flammable vapors or toxic conditions with periodic recording of data
	Ventilation whenever unsafe atmospheric conditions exist or have the potential to exist
	Appropriate personal protective equipment
	Provisions/equipment for emergency retrieval or rescue.
1	have received and understood the preceding notification.

Service Provider Designed Representative (print)

Signature

Date

Attach PRIOR to work being performed:

Copy of Service Provider Permit Required Confined Space Program

Copy of Service Provider Permit Required Confined Space Permit

If PRCS is reclassified by Service Provider to Non Permit Required Confined Space : Attach procedure and documentation for reclassification for review by EHS Representative



Debriefing must be done within 3 manufacturing days of completion of confined space entry or entries:

		Copy of Closed Permit
		Review of program followed during confined space entry
Yes	No	Hazards confronted or created? If so specify here or attach summary:

Debriefed:		
Service Provider Designed Representative (print)	Signature	Date
Boeing Representative (print)	Signature	Date

Copy to EHS Representative

Copy to Project File



Facility:	North Boeing F	ield, RI/FS				
Date and time:						
Permit Valid From:			To:			
Specific Entry Location:						
Purpose of Entry:						
(specify any additional)						
Entry Supervisor:			Date:		Time:	
Entry Attendant:			Date:		Time:	
(entrant may change, use pe	ersonnel list on f	ollowing page)				
Facility/Proj Manager(s):			Date:		Time:	
Emergency Contact Inform	ation:	(In case of emer	gency, ca	Il in the order listed)		
Boeing Emergency Dispatch		206-655-2222				
911		911				
Jennifer Parsons (Boeing)		206-715-7981				
or Fred Wallace (Bo	eing)	206-930-0461				
Jerry Ninteman (Landau Ass	oc.)	206-850-4503				
Potential Chemicals of Cor	ncern: (see HA	SP for more details	s)	Potential Physical	Hazards:	(see HASP for more details)
PCBs in storm drain system	solids			Equipment Hazards	;	
PAHs in storm drain system	solids			Slips, Trips, and Fa	lls	
Bis [2-ethylhexyl] phthalate ir	n storm drain sy	stem solids		Atmospheric Condit	ions in wo	rk area
Mercury in storm drain system	m solids					
Lead in storm drain system s	solids					
Arsenic in storm drain system	n solids					
Hydrogen Sulfide						
Coal tar pitch volatiles (e.g., chrysene, anthracene & benz	pyrene, phenan zo(a)pyrene)	threne, acridine,				
REVIEW THE PLAN, CHEC	K FOR THE FO	LLOWING:			YES	NO
Entry Plan Attached and Rev	viewed					
Area Secured (barricades, co	ones, other)					
Ventilation Equip. in Place, C	Operating and G	rounded				
(minimum of 2 air influent and	d effluent locati	ons)				
Communication Equipment T	Fested (Voice a	nd Visual)				
Body Harness Checked						
Rescue Equipment In Place						
Required PPE Equipment in (Half Face Respirators, PI Gloves, Eye Protection [ar	Place & Availat Ds, Hardhat, St round drilling or	ble eel Toe Boots, He concrete equip.])	earing Pro	tection,		
Fire Protection Equipment Av	vailable					
Standby Personnel Available)					
Pre-Entry Atmospheric Cond	litions Within Ac	ceptable Levels				
All Personnel Understand Pl	D Action Levels	i				
Entry Conditions Acceptab	ole					

Oxygen >19.5%	L.E.L <10%	PID* <15ppm	H2S Other 10 ppm		Other	Other			
<23.5%									
* For PID Readings: < 15 ppm			Then: No Action Required						
> 15 ppm	but	< 75 ppm	Evacuate Work Work Area and Organic Vapor/I	/ork Area or Establish Exclusion Zone Around and Upgrade to Level C Half Face Respirator with por/HEPA					
>75 ppm			Evacuate Work Area						
Types and Quantities of Monitoring Equipment: MultiRAE Plus multi-gas meter w/ 10.6 ev PID lamp and O2, H2S, & LEL									
Monitoring Instrument Calibration Data Log:									
			Oxygen (%)	L.E.L (%)	H2S (ppm)	PID (ppm)			
Calibration leve MultiRAE Plus	els multi-gas meter	readings							

Atmospheric Hazards to be Monitored, and Acceptable Levels:

Monitoring Schedule:

Prior to entry, monitors & equipment will be run & watched continuously with readings documented every <u>5</u> minutes for 2 consecutive readings. During CSE work, document results every 30 minutes. Double check that PID alarm levels have been set at lowest setting (15 ppm - action Level for half face respirators)

Gas Testing Logsheet Dxygen L.E.L. H2S PID Other Image: Strategy of the strategy o

Entry/Attendant Personnel: All entrants & attendants listed below have completed confined space entry

	Entrant /	Entry	Exit								
Name	Attendant	Time	Time								

Entry Supervisor Signature (sign at end of each shift and save permit in project file for 1 year)

date