APPENDIX D

Field Forms

Form 1: Typical Bore Log Form Used to Describe Split Spoon Samples

Form 2: The Unified Soil Classification System (USCS)

Form 3: Soil Classification Log

Form 4: Overburden Monitoring Well Construction Diagram

Form 5: Field Activity Daily Log

Form 6: Analytical Request/Chain of Custody

Form 7: Test Equipment and Calibration Log

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Form 1. Typical Bore Log Form used to Describe Split-Spoon Samples

HTRW DRILLING LOG		
1.COMPANY NAME	2.DRILL SUBCONTRACTOR	SHEET 1 OF
3.SITE	4.LOCATION	
5.NAME OF DRILLER	6.MANUFACTURER'S DESIGNATION OF DRILL	
7.SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	8.HOLE LOCATION	
	9.SURFACE ELEVATION	
	10.DATE STARTED	11.DATE COMPLETED
12.OVERBURDEN THICKNESS	13.DEPTH GROUNDWATER ENCOUNTERED	
14.DEPTH DRILLED INTO ROCK	15.DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
16.TOTAL DEPTH OF HOLE	17.OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	

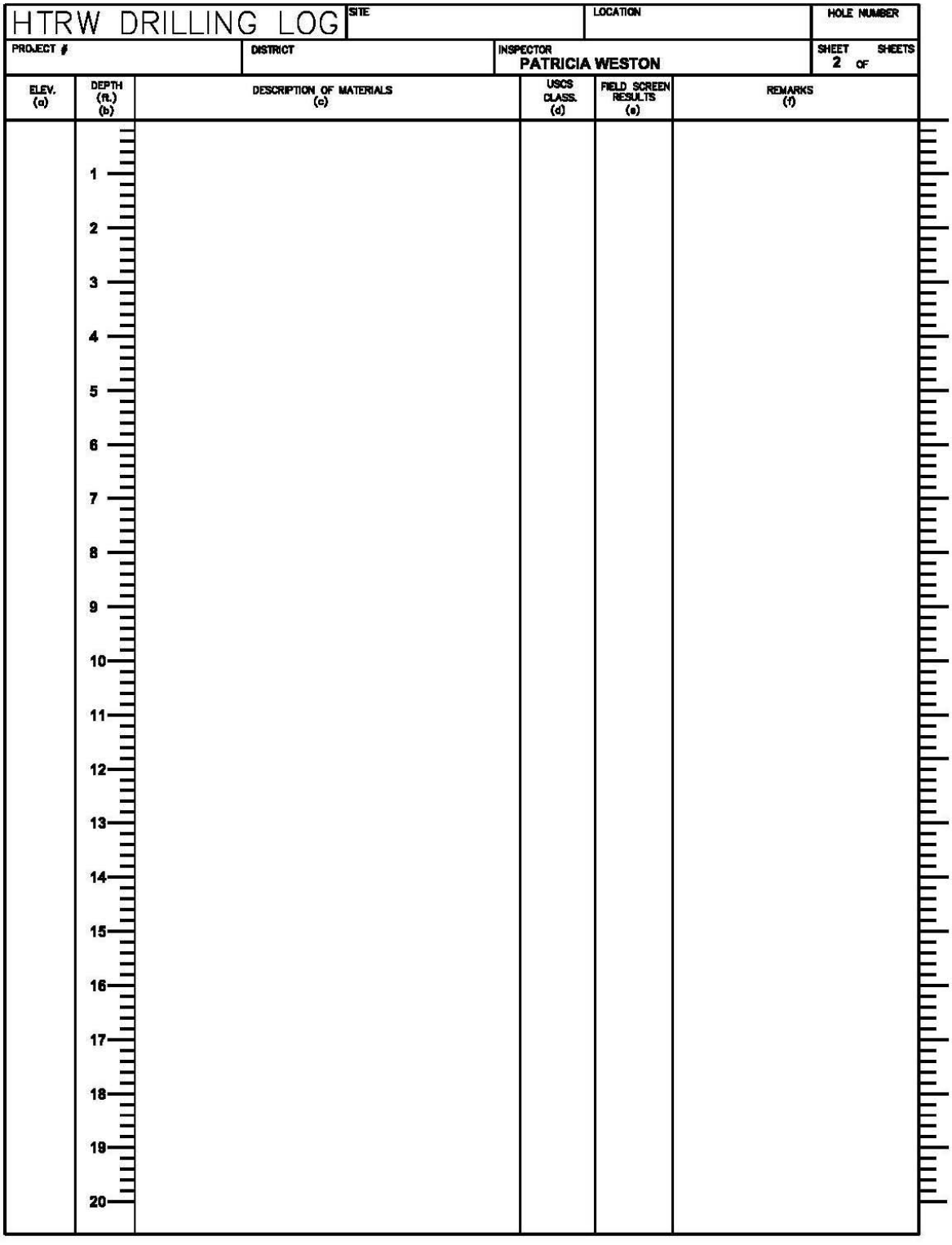
18.GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19.TOTAL NUMBER OF CORE BOXES

20.SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	SVOC	Pest/PCB	Cyanide/TRPH	21.TOTAL CORE RECOVERY %
	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	22.SIGNATURE OF INSPECTOR		
23.DISPOSITION OF HOLE				SCALE	1 inch = 1 foot	

LOCATION SKETCH/COMMENTS

PROJECT	HOLE NO.

Form 1. Typical Bore Log Form used to Describe Split-Spoon Samples (Concluded)



Form 2. The Unified Soil Classification System (USCS)

Revised 07-12-02

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

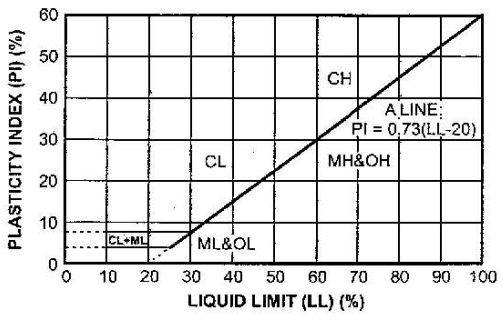
LABORATORY CLASSIFICATION CRITERIA

GW	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent ..... GW, GP, SW, SP
More than 12 percent ..... GM, GC, SM, SC
5 to 12 percent ..... Borderline cases requiring dual symbols

PLASTICITY CHART



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Form 3. Soil Classification Log

ASTM Soil Classification & USCS Group Symbols

					Group Symbol				Group Name
>50% Sand & Gravel	GRAVEL % gravel > % sand	≤5% fines	Well-graded		GW	<15% sand			Well-graded GRAVEL
						≥15% sand			Well-graded GRAVEL with Sand
			Poorly-graded		GP	<15% sand			Poorly graded GRAVEL
						≥15% sand			Poorly graded GRAVEL with Sand
		10% fines	Well-graded	fines - ML or MH	GW-GM	<15% sand			Well-graded GRAVEL with Silt
						≥15% sand			Well-graded GRAVEL with Silt and Sand
				fines - CL or CH	GW-GC	<15% sand			Well-graded GRAVEL with Clay
						≥15% sand			Well-graded GRAVEL with Clay and Sand
			Poorly-graded	fines - ML or MH	GP-GM	<15% sand			Poorly graded GRAVEL with Silt
						≥15% sand			Poorly graded GRAVEL with Silt and Sand
				fines - CL or CH	GP-GC	<15% sand			Poorly graded GRAVEL with Clay
						≥15% sand			Poorly graded GRAVEL with Clay and Sand
		≥15% fines		fines - ML or MH	GM	<15% sand			Silty GRAVEL
						≥15% sand			Silty GRAVEL with Sand
				fines - CL or CH	GC	<15% sand			Clayey GRAVEL
						≥15% sand			Clayey GRAVEL with Sand
	SAND % sand > % gravel	≤5% fines	Well-graded		SW	<15% gravel			Well-graded SAND
						≥15% gravel			Well-graded SAND with Gravel
			Poorly-graded		SP	<15% gravel			Poorly graded SAND
						≥15% gravel			Poorly graded SAND with Gravel
		10% fines	Well-graded	fines - ML or MH	SW-SM	<15% gravel			Well-graded SAND with Silt
						≥15% gravel			Well-graded SAND with Silt and Gravel
				fines - CL or CH	SW-SC	<15% gravel			Well-graded SAND with Clay
						≥15% gravel			Well-graded SAND with Clay and Gravel
			Poorly-graded	fines - ML or MH	SP-SM	<15% gravel			Poorly graded SAND with Silt
						≥15% gravel			Poorly graded SAND with Silt and Gravel
				fines - CL or CH	SP-SC	<15% gravel			Poorly graded SAND with Clay
						≥15% gravel			Poorly graded SAND with Clay and Gravel
		≥15% fines		fines - ML or MH	SM	<15% gravel			Silty SAND
						≥15% gravel			Silty SAND with Gravel
				fines - CL or CH	SC	<15% gravel			Clayey SAND
						≥15% gravel			Clayey SAND with Gravel
50% or More Fines	Low-Plasticity Clay				CL	<30% sand & gravel	<15% Sand and Gravel		Lean CLAY
							15-25% sand & gravel	% sand ≥ % gravel	Lean CLAY with Sand
								% sand < % gravel	Lean CLAY with Gravel
						≥30% sand & gravel	% sand ≥ % of gravel	< 15% gravel	Sandy lean CLAY
								≥ 15% gravel	Sandy lean CLAY with Gravel
							% sand < % gravel	< 15% sand	Gravelly lean CLAY
								≥ 15% sand	Gravelly lean CLAY with Sand
	Low-Permeability Silt				ML	<30% sand & gravel	15% sand & gravel		SILT
							15-25% sand & gravel	% sand ≥ % gravel	SILT with Sand
								% sand < % gravel	SILT with Gravel
						≥30% sand & gravel	% sand ≥ % of gravel	< 15% gravel	Sandy SILT
								≥ 15% gravel	Sandy SILT with Gravel
							% sand < % gravel	< 15% sand	Gravelly Silt
								≥ 15% sand	Gravelly Silt with Sand
	Plastic Clay				CH	<30% sand & gravel	< 15% sand & gravel		Fat CLAY
							15-25% sand & gravel	% sand ≥ % gravel	Fat CLAY with Sand
								% sand < % gravel	Fat CLAY with Gravel
						≥30% sand & gravel	% sand ≥ % of gravel	< 15% gravel	Sandy fat CLAY
								≥ 15% gravel	Sandy fat CLAY with Gravel
							% sand < % gravel	< 15% sand	Gravelly fat CLAY
								≥ 15% sand	Gravelly fat CLAY with Sand
	Plastic Silt				MH	<30% sand & gravel	< 15% sand & gravel		Elastic SILT
							15-25% sand & gravel	% sand > % gravel	Elastic SILT with Sand
								% sand < % gravel	Elastic SILT with Gravel
						≥30% sand & gravel	% sand ≥ % of gravel	< 15% gravel	Sandy elastic SILT
								≥ 15% gravel	Sandy elastic SILT with Gravel
							% sand < % gravel	< 15% sand	Gravelly elastic SILT
								≥ 15% sand	Gravelly elastic SILT with Sand
	Organics (Peat or Bay Mud)				OL/OH	<30% sand & gravel	< 15% sand & gravel		Organic SOIL
							15-25% sand & gravel	% sand ≥ % gravel	Organic SOIL with Sand
								% sand < % gravel	Organic SOIL with Gravel
						≥30% sand & gravel	% sand ≥ % of gravel	< 15% gravel	Sandy Organic SOIL
								≥ 15% gravel	Sandy Organic SOIL with Gravel
							% sand < % gravel	< 15% sand	Gravelly Organic SOIL
								≥ 15% sand	Gravelly Organic SOIL with Sand

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Form 3. Soil Classification Log (Continued 2 of 3)
Example
Visual Classification of Soils

PROJECT NUMBER:	PROJECT NAME:	
BORING NUMBER:	COORDINATES:	DATE:
ELEVATION:	GWL: Depth Date/Time	DATE STARTED:
ENGINEER/GEOLOGIST:	Depth Date/Time	DATE COMPLETED:
DRILLING METHODS:		PAGE: OF

DEPTH ( )	SAMPLE TYPE & NO.	BLOWS ON SAMPLER PER ( )	RECOVERY ( )	DESCRIPTION	USCS SYMBOL	MEASURED CONSISTENCY (TSF)	WELL CONSTRUCTION	REMARKS

NOTES:

Drilling Contractor: _____

Drilling Equipment: _____

Driller: _____

_____

1651-9-02

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Form 3. Soil Classification Log (Concluded 3 of 3)

CONSISTENCY OF COHESIVE SOILS

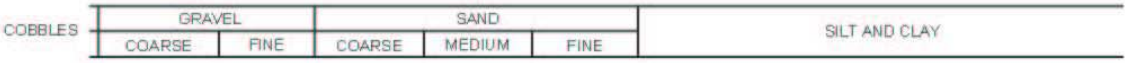
CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (TONS PER SQUARE FOOT)
VERY SOFT	LESS THAN 0.25
SOFT	0.25 to 0.50
FIRM	0.50 to 2.0
HARD	2.0 to 4.0
VERY HARD	MORE THAN 4.0

DENSITY OF GRANULAR SOILS

DENSITY	STANDARD PENETRATION RESISTANCE [1]
VERY LOOSE	0-4
LOOSE	5-10
MEDIUM DENSE	11-30
DENSE	31-50
VERY DENSE	OVER 50

[1] STANDARD PENETRATION RESISTANCE IS THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2-INCH O.D. SPLIT BARREL SAMPLER 12 INCHES USING A 140-POUND HAMMER FALLING FREELY THROUGH 30 INCHES. THE SAMPLER IS DRIVEN 18 INCHES AND THE NUMBER OF BLOWS RECORDED FOR EACH 6-INCH INTERVAL. THE SUMMATION OF THE FINAL TWO INTERVALS IS THE STANDARD PENETRATION RESISTANCE.

GRAIN SIZE IN MM



USCS CLASSIFICATION FOR SOILS

COARSE-GRAINED SOILS

CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
CLEAN SANDS (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES

FINE-GRAINED/HIGHLY ORGANIC SOILS

SILTS AND CLAYS LIQUID LIMIT (LESS THAN 50)	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS SILTY CLAYS, LEAN CLAYS
	OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
SILTS AND CLAYS LIQUID LIMIT (GREATER THAN 50)	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

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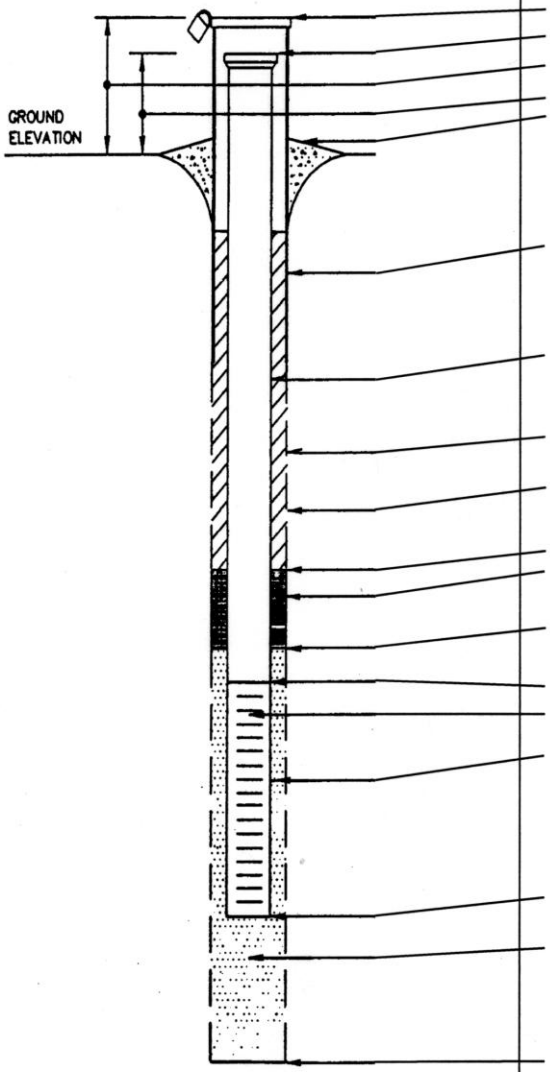
Form 4. Overburden Monitoring Well Construction Diagram

OVERBURDEN WELL NO. _____

MONITORING WELL
CONSTRUCTION DIAGRAM

PROJECT _____
PROJECT NO. _____
DATE _____ BORING NO.: _____
ELEVATION _____
FIELD GEOLOGIST _____

DRILLER _____
DRILLING METHOD _____
DEVELOPMENT METHOD _____



NOT TO SCALE

ELEVATION OF TOP OF SURFACE CASING: _____
ELEVATION OF TOP OF RISER PIPE: _____
STICK-UP TOP OF SURFACE CASING: _____
STICK-UP RISER PIPE: _____
TYPE OF SURFACE SEAL: _____

I.D. OF SURFACE CASING: _____
TYPE OF SURFACE CASING: _____

RISER PIPE I.D. _____
TYPE OF RISER PIPE: _____

BOREHOLE DIAMETER: _____

TYPE OF BACKFILL: _____

ELEVATION/DEPTH TOP OF SEAL: _____
TYPE OF SEAL: _____

DEPTH TOP OF SAND PACK: _____

ELEVATION/DEPTH TOP OF SCREEN: _____
TYPE OF SCREEN: _____
SLOT SIZE X LENGTH: _____
TYPE OF SAND PACK: _____

ELEVATION/DEPTH BOTTOM OF SCREEN: _____

ELEVATION/DEPTH BOTTOM OF SAND PACK: _____
TYPE OF BACKFILL BELOW OBSERVATION WELL: _____

ELEVATION/DEPTH OF HOLE: _____

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Shaw Environmental, Inc.

DAILY LOG	DATE			
	NO.			
	SHEET OF			

Form 5. Field Activity Daily Log

PROJECT NAME:	PROJECT NO.:
FIELD ACTIVITY SUBJECT:	
DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:	

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
SHAW PERSONNEL ON SITE:	
SIGNATURE:	DATE:

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Form 6. Analytical Request/Chain-of-Custody

Ref. Document # _____

Page _____ of ____

Project Number: _____

Project Name / Location: _____

Purchase Order #: _____

Project Contact: _____ (Name & phone #)

Shipment Date: _____

Send Report To: _____

Waybill/Airbill Number: _____

Phone/Fax Number: _____

Lab Destination: _____

Address: _____

Lab Contact Name / ph. #: _____

City: _____

Sampler's Name(s): _____

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Container type	Preservative						Analyses Requested									Turn Around Time Requested
		Date	Time	G/C				HCL	NaOH	HNO_3	H_2SO_4	Ice											

Special Instructions:

QC/Data Package Level Required:

I II III IV/Project Specific: _____

Relinquished By:	Date:	Received By:	Date:
	Time:		Time:
Relinquished By:	Date:	Received By:	Date:
	Time:		Time:
Relinquished By:	Date:	Received By:	Date:
	Time:		Time:

G/C Codes

C = Composite G = Grab

Matrix Codes

DW = Drinking Water	SO =Soil
GW = Ground Water	SL = Sludge
WW = Waste Water	CP = Chip Samples
SW = Surface Water	WP = Wipe Samples
LIQ = Other Liquid	SOL = Other Solid
AS = Air Sample	SED = Sediment

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Form 6. Analytical Request/Chain-of-Custody (Concluded 2 of 2)

COC Ref. Document # _____ **Page** _____ **of** _____

Project Number: _____ **Shipment Date:** _____

Project Name / Location: _____

		Collection Information						Preservative						Analyses Requested										
Sample ID Number	Sample Description	Date	Time	G/C	Matrix	# of containers	Container type	HCL	NaOH	HNO_3	H_2SO_4	Ice												Turn Around Time Requested

Form 7. Test Equipment and Calibration Log

Project Name: _____ Project No. _____

Equipent Number and Use (Screening or Analytical)	Equipment Name (Manufacturer and Model ID)	Date and Time (of Califbration)	Calibration Standard Used (Mnaufacturer and Lot Number)	Equipment Reading (Include Units and Tolerances)	Comments (and/or Observations)	Initials (of Person)

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