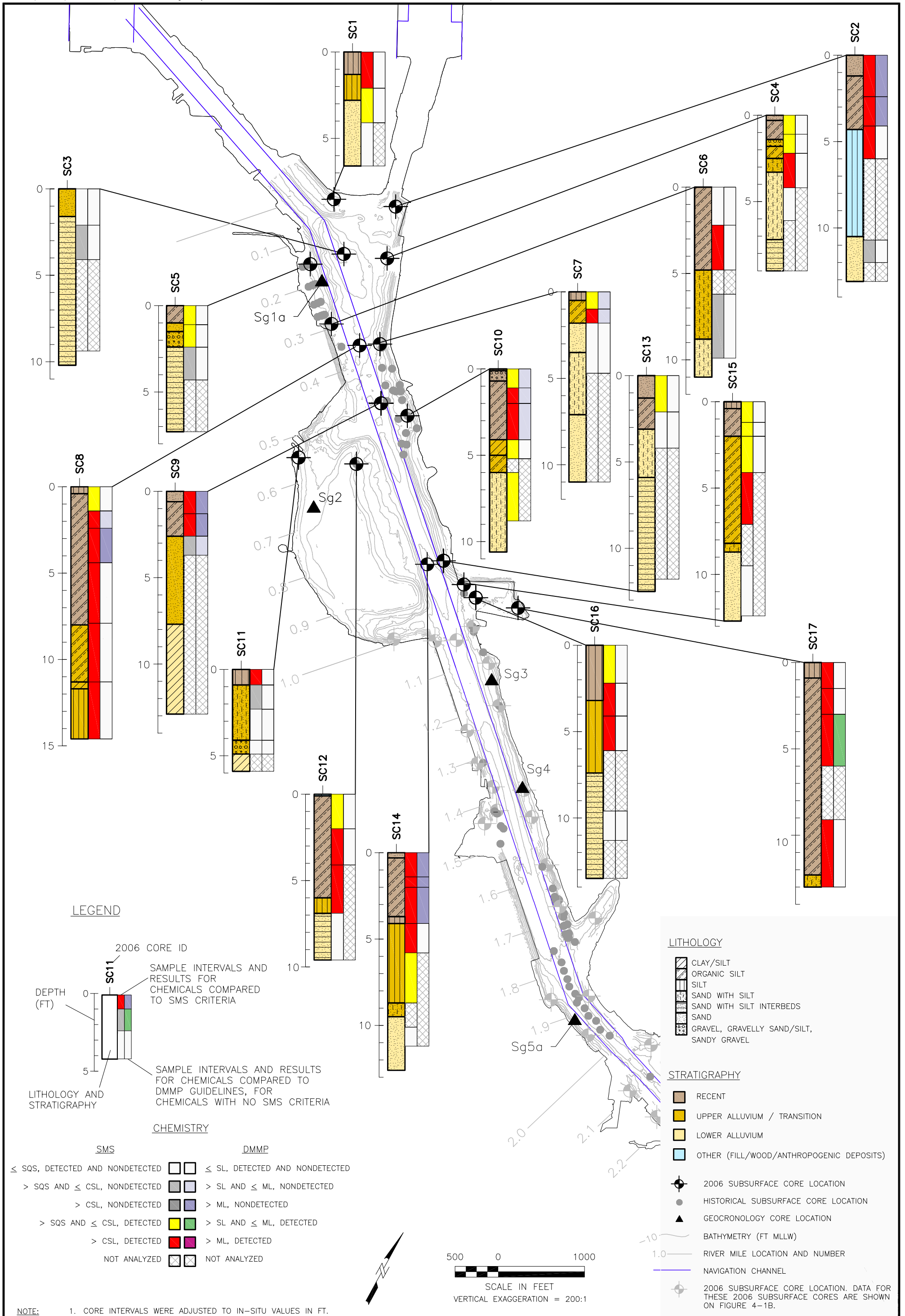


Prepared by STS 04/1/005, mod CEF 08/07/06, 11/06/06, Map 21 of 24 (a) Subsurface

**Figure 2-1. Target and actual Phase 2 subsurface sediment sampling locations**



**LEGEND**

2006 CORE ID

DEPTH (FT)

SAMPLE INTERVALS AND RESULTS FOR CHEMICALS COMPARED TO SMS CRITERIA

SAMPLE INTERVALS AND RESULTS FOR CHEMICALS COMPARED TO DMMP GUIDELINES, FOR CHEMICALS WITH NO SMS CRITERIA

LITHOLOGY AND STRATIGRAPHY

**CHEMISTRY**

SMS		DMMP	
≤ SQS, DETECTED AND NONDETECTED	[Symbol]	≤ SL, DETECTED AND NONDETECTED	[Symbol]
> SQS AND ≤ CSL, NONDETECTED	[Symbol]	> SL AND ≤ ML, NONDETECTED	[Symbol]
> CSL, NONDETECTED	[Symbol]	> ML, NONDETECTED	[Symbol]
> SQS AND ≤ CSL, DETECTED	[Symbol]	> SL AND ≤ ML, DETECTED	[Symbol]
> CSL, DETECTED	[Symbol]	> ML, DETECTED	[Symbol]
NOT ANALYZED	[Symbol]	NOT ANALYZED	[Symbol]

**LITHOLOGY**

- [Symbol] CLAY/SILT
- [Symbol] ORGANIC SILT
- [Symbol] SILT
- [Symbol] SAND WITH SILT
- [Symbol] SAND WITH SILT INTERBEDS
- [Symbol] SAND
- [Symbol] GRAVEL, GRAVELLY SAND/SILT, SANDY GRAVEL

**STRATIGRAPHY**

- [Symbol] RECENT
- [Symbol] UPPER ALLUVIUM / TRANSITION
- [Symbol] LOWER ALLUVIUM
- [Symbol] OTHER (FILL/WOOD/ANTHROPOGENIC DEPOSITS)

- [Symbol] 2006 SUBSURFACE CORE LOCATION
- [Symbol] HISTORICAL SUBSURFACE CORE LOCATION
- [Symbol] GEOCRONOLOGY CORE LOCATION
- [Symbol] BATHYMETRY (FT MLLW)
- [Symbol] RIVER MILE LOCATION AND NUMBER
- [Symbol] NAVIGATION CHANNEL
- [Symbol] 2006 SUBSURFACE CORE LOCATION. DATA FOR THESE 2006 SUBSURFACE CORES ARE SHOWN ON FIGURE 4-1B.

NOTE: 1. CORE INTERVALS WERE ADJUSTED TO IN-SITU VALUES IN FT.

**LOWER DUWAMISH WATERWAY  
SUBSURFACE DATA REPORT**

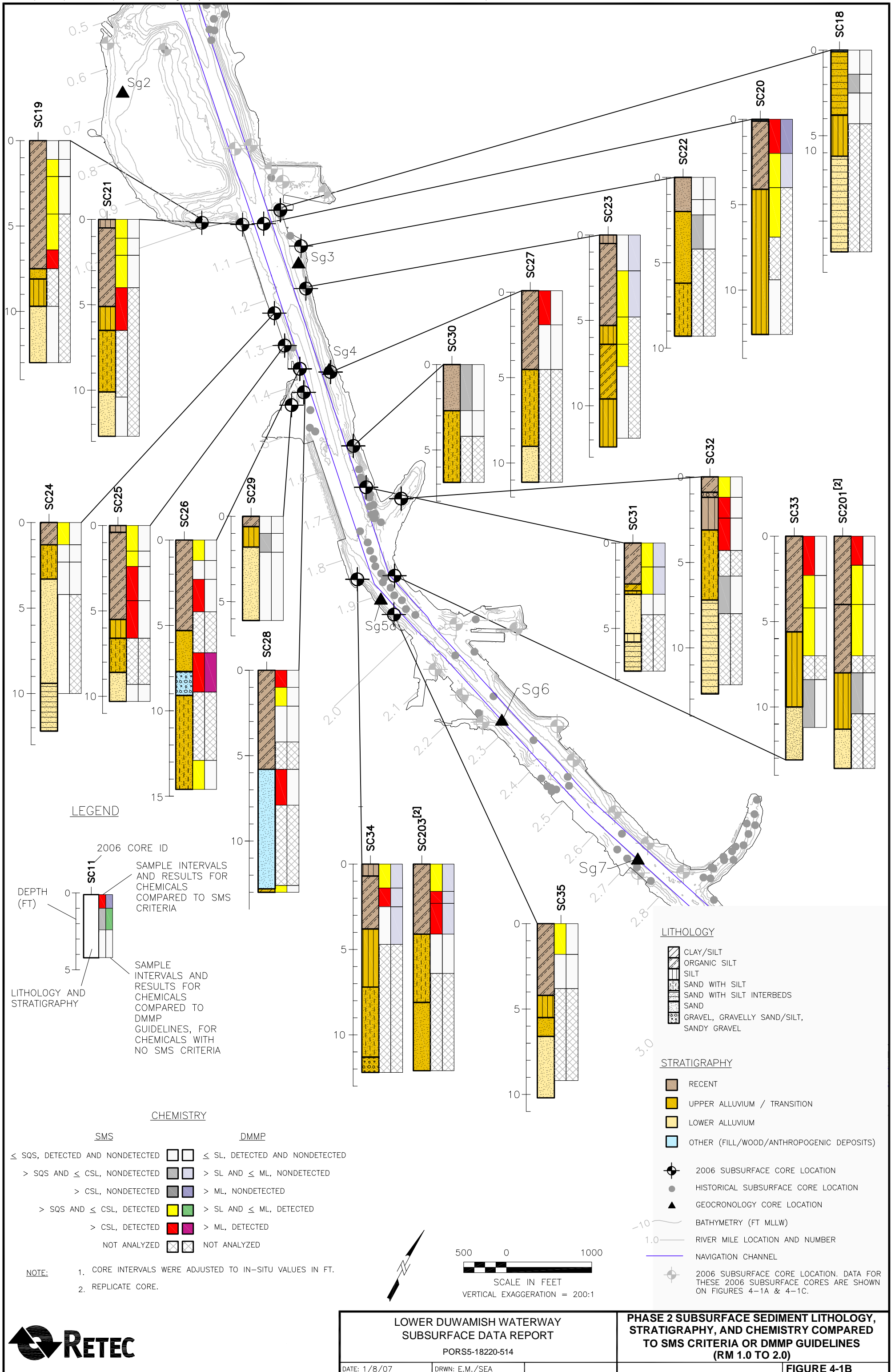
PORS5-18220-514

DATE: 1/8/07      DRWN: E.M./SEA

**PHASE 2 SUBSURFACE SEDIMENT LITHOLOGY,  
STRATIGRAPHY, AND CHEMISTRY COMPARED  
TO SMS CRITERIA OR DMMP GUIDELINES  
(RM 0 TO 1.0)**

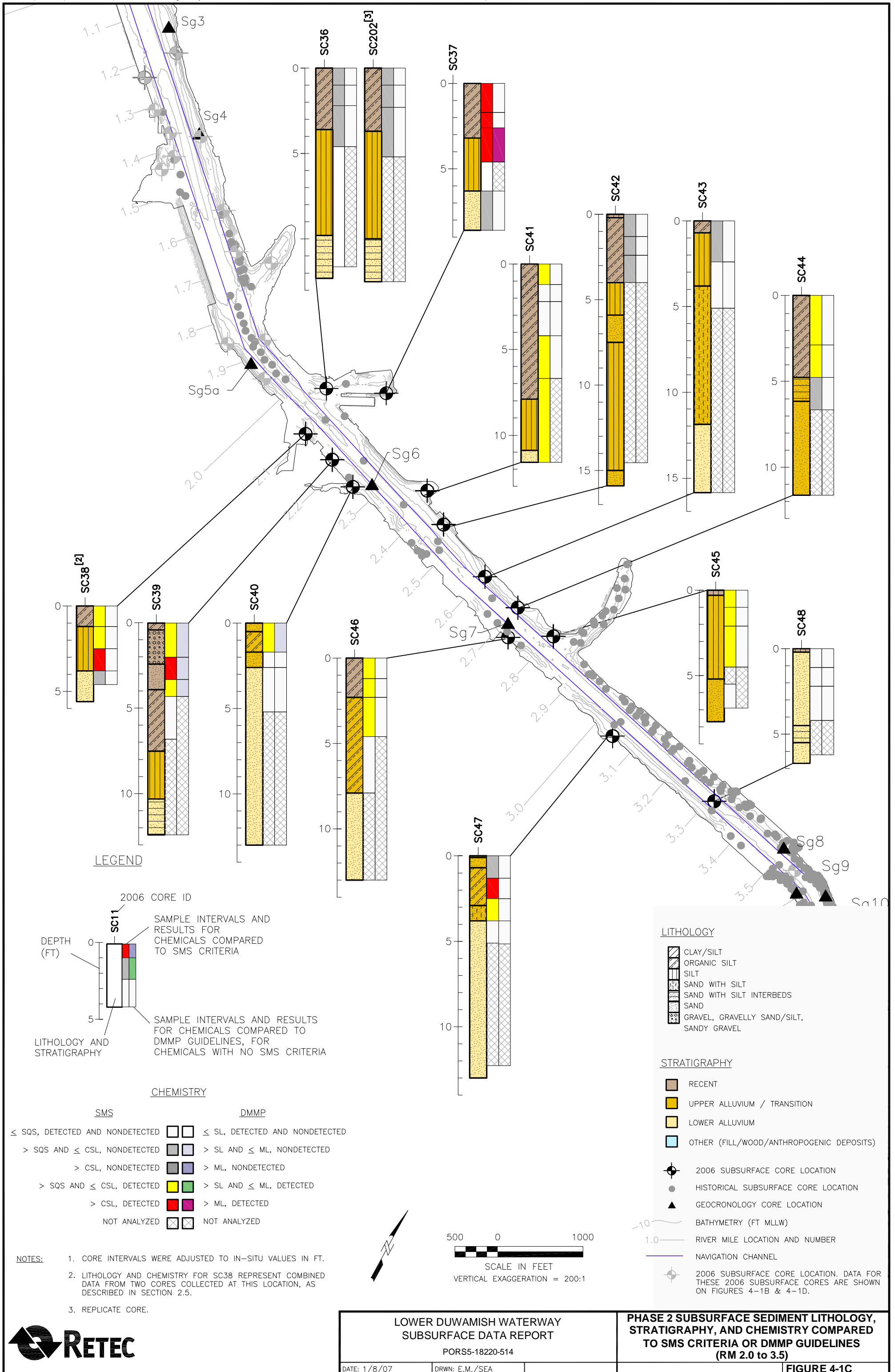
**FIGURE 4-1A**

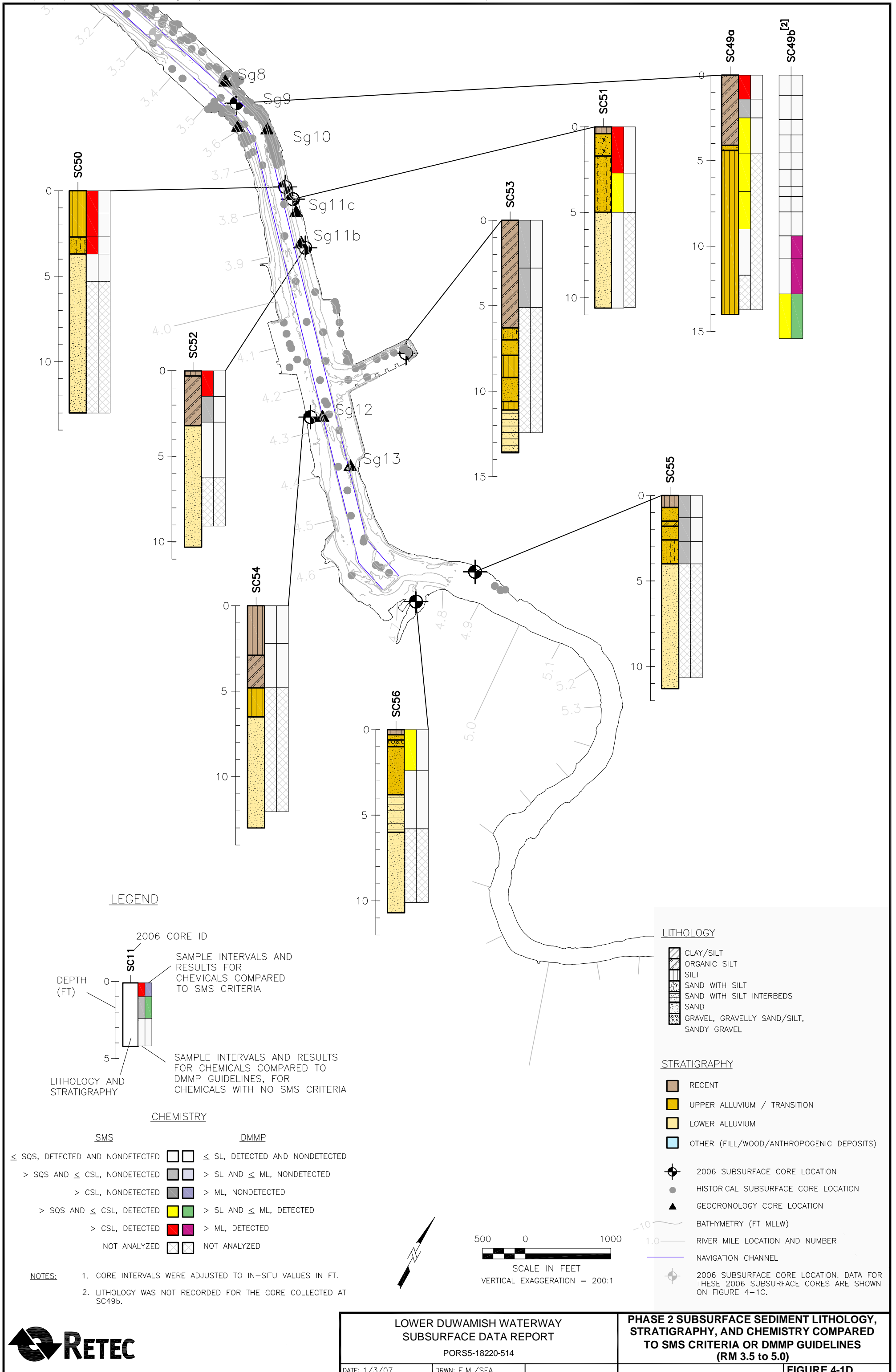




LOWER DUWAMISH WATERWAY  
SUBSURFACE DATA REPORT  
PORS5-18220-514  
DATE: 1/8/07 DRWN: E.M./SEA

PHASE 2 SUBSURFACE SEDIMENT LITHOLOGY,  
STRATIGRAPHY, AND CHEMISTRY COMPARED  
TO SMS CRITERIA OR DMMP GUIDELINES  
(RM 1.0 TO 2.0)  
FIGURE 4-1B





**LEGEND**

**2006 CORE ID**

**SC11**

DEPTH (FT)

0

5

SAMPLE INTERVALS AND RESULTS FOR CHEMICALS COMPARED TO SMS CRITERIA

SAMPLE INTERVALS AND RESULTS FOR CHEMICALS COMPARED TO DMMP GUIDELINES, FOR CHEMICALS WITH NO SMS CRITERIA

LITHOLOGY AND STRATIGRAPHY

**CHEMISTRY**

**SMS**

**DMMP**

≤ SQS, DETECTED AND NONDETECTED	□ □	≤ SL, DETECTED AND NONDETECTED	□ □
> SQS AND ≤ CSL, NONDETECTED	□ □	> SL AND ≤ ML, NONDETECTED	□ □
> CSL, NONDETECTED	□ □	> ML, NONDETECTED	□ □
> SQS AND ≤ CSL, DETECTED	■ ■	> SL AND ≤ ML, DETECTED	■ ■
> CSL, DETECTED	■ ■	> ML, DETECTED	■ ■
NOT ANALYZED	□ □	NOT ANALYZED	□ □

**NOTES:**

1. CORE INTERVALS WERE ADJUSTED TO IN-SITU VALUES IN FT.
2. LITHOLOGY WAS NOT RECORDED FOR THE CORE COLLECTED AT SC49b.

**LITHOLOGY**

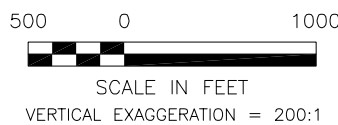
- CLAY/SILT
- ORGANIC SILT
- SILT
- SAND WITH SILT
- SAND WITH SILT INTERBEDS
- SAND
- GRAVEL, GRAVELLY SAND/SILT, SANDY GRAVEL

**STRATIGRAPHY**

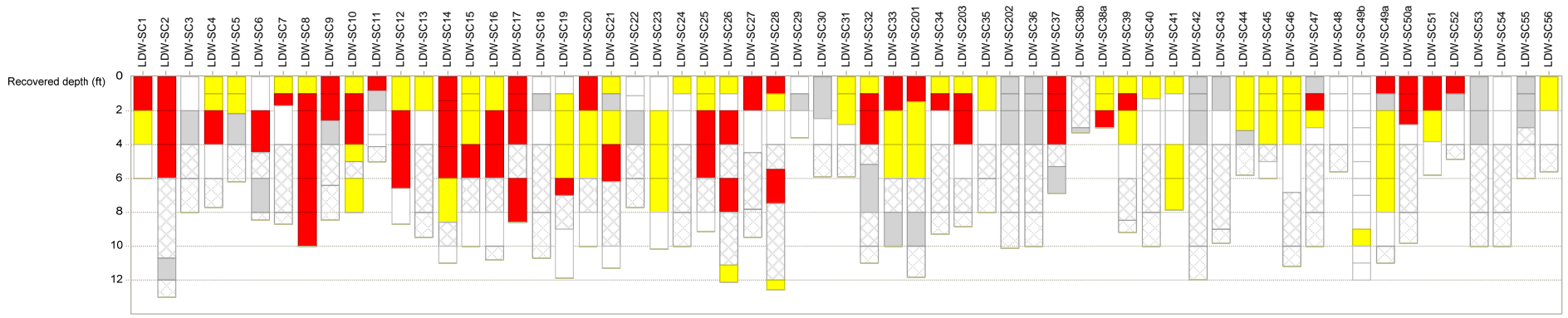
- RECENT
- UPPER ALLUVIUM / TRANSITION
- LOWER ALLUVIUM
- OTHER (FILL/WOOD/ANTHROPOGENIC DEPOSITS)

- 2006 SUBSURFACE CORE LOCATION
- HISTORICAL SUBSURFACE CORE LOCATION
- GEOCHRONOLOGY CORE LOCATION
- BATHYMETRY (FT MLLW)
- RIVER MILE LOCATION AND NUMBER
- NAVIGATION CHANNEL

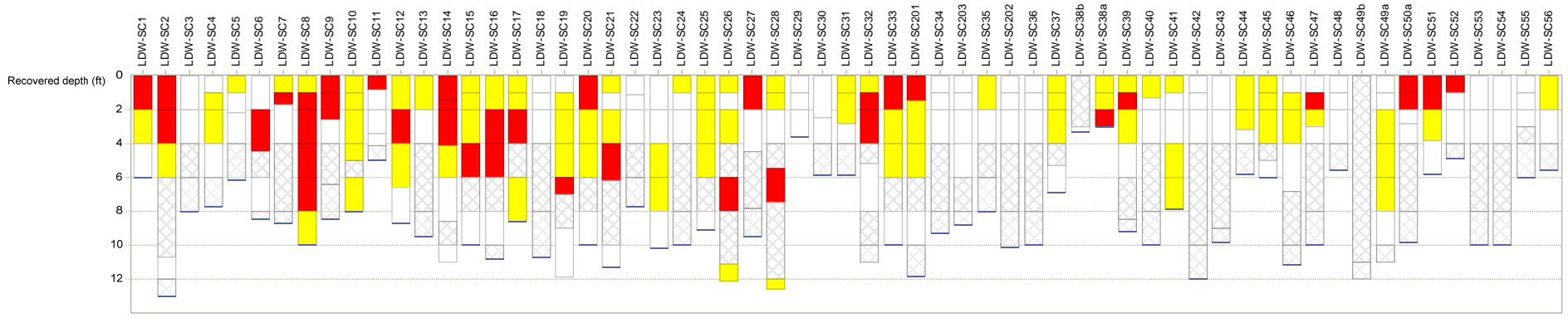
2006 SUBSURFACE CORE LOCATION. DATA FOR THESE 2006 SUBSURFACE CORES ARE SHOWN ON FIGURE 4-1C.



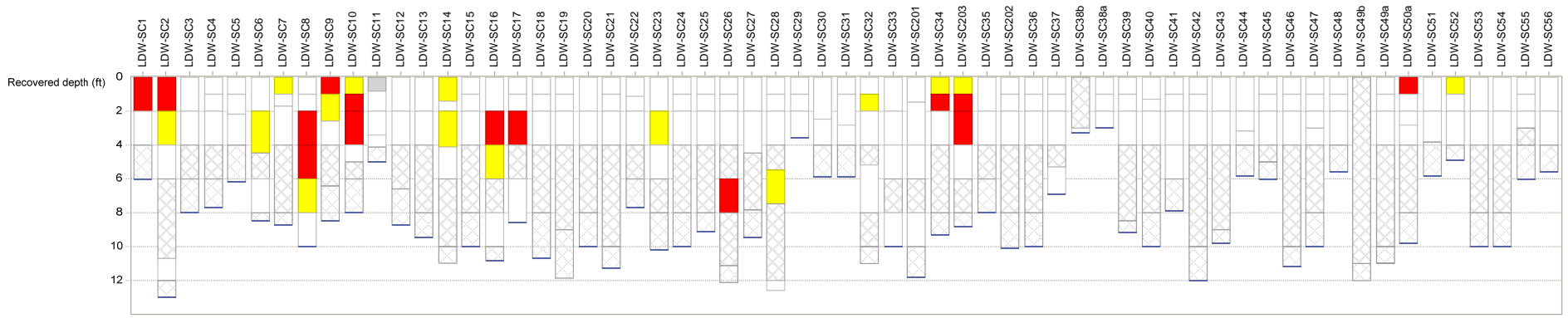
**All chemicals**



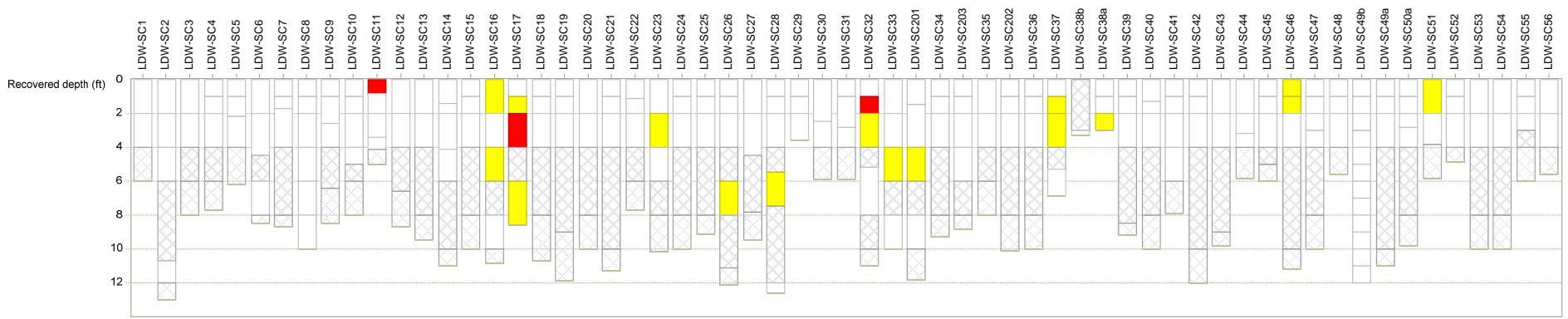
**PCBs**



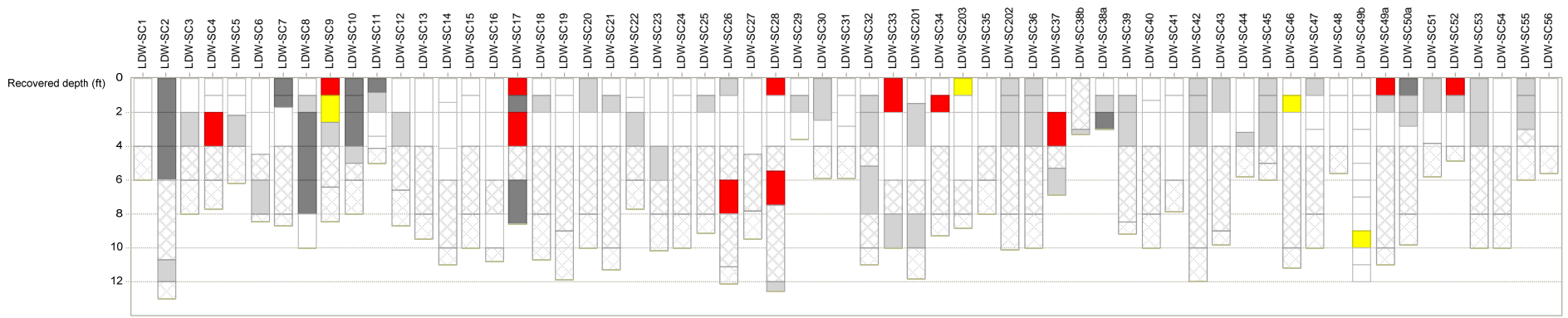
**Phthalates**



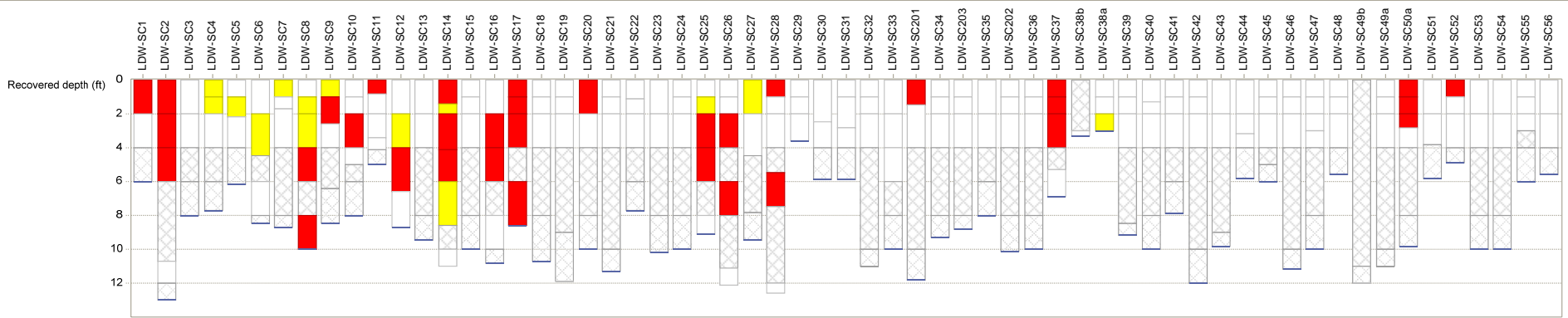
**PAHs**



**SVOCs other than phthalates or PAHs**



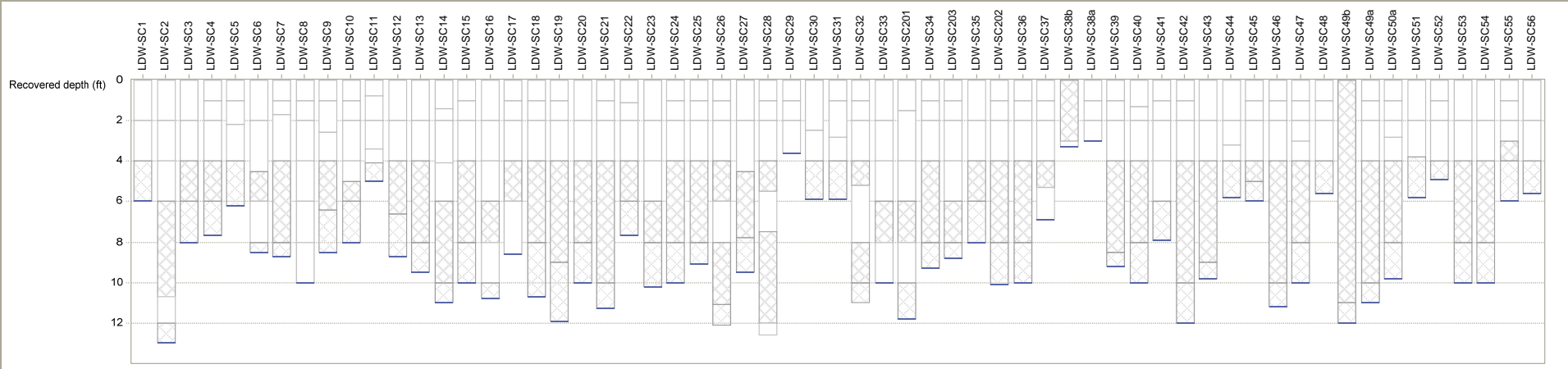
**Metals and trace elements**



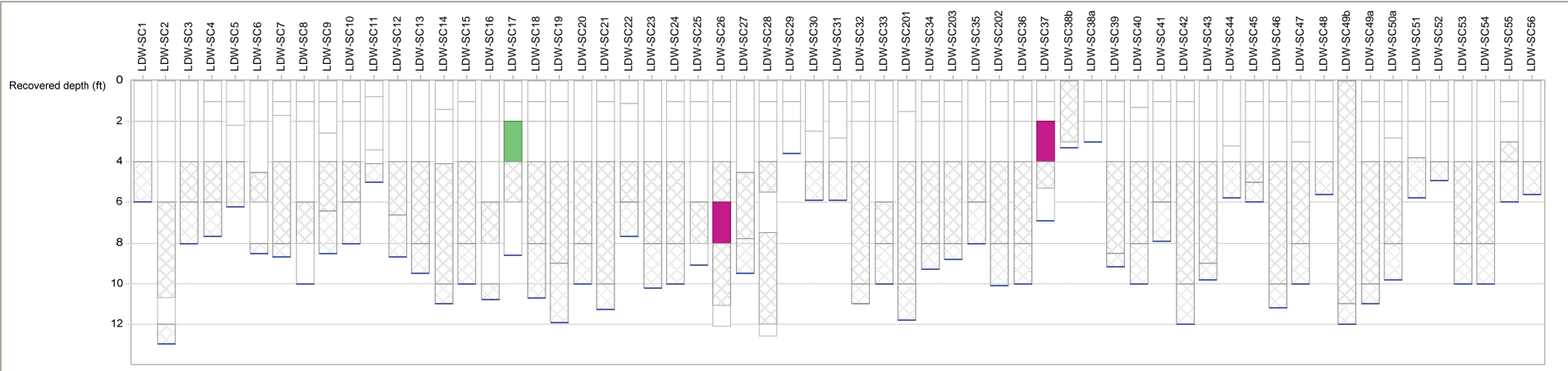
**Figure 4-2. Comparison of Phase 2 subsurface sediment chemical data to SMS criteria by chemical group**



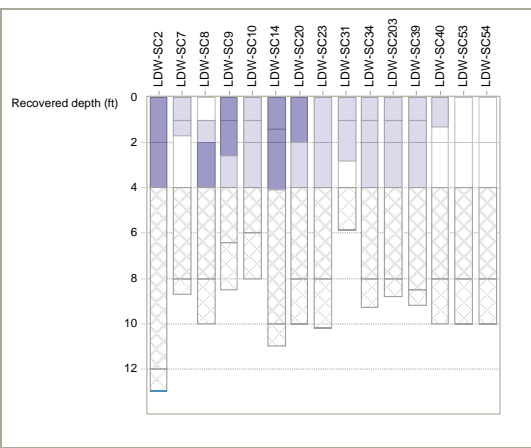
**SVOCs (1,3-dichlorobenzene and hexachloroethane)**



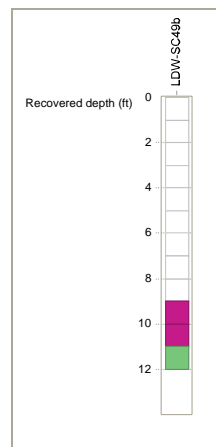
**Metals and trace elements (nickel and antimony)**



**Pesticides (aldrin, chlordane, DDTs, dieldrin, gamma-BHC, and heptachlor)**



**VOCs (1,3-dichlorobenzene, ethylbenzene, tetrachloroethene, trichloroethene, and xylenes)**



- > ML, detected
- > SL and ≤ ML, detected
- > ML, non-detect
- > SL and ≤ ML, non-detect
- ≤ SL, detected and non-detect
- Not analyzed

**Figure 4-3. Comparison of Phase 2 subsurface sediment chemical data to DMMP guidelines for chemicals without SMS criteria**

Recovered depth (ft)	Total PCBs (mg/kg OC)
0	7.0
0.5	5.1
1	11
1.5	5.0
2	7.8
2.5	26
3	31
3.5	200
4	120
4.5	A
5	A
5.5	A
6	A
8	0.73 J
8.5	A

LDW-SC6

Recovered depth (ft)	Total PCBs (mg/kg OC)
0	4.8
0.5	5.4
1	7.2
1.5	16
2	89 J
2.5	38
3	8.8
3.5	49
4	A
4.5	A
5	A
5.5	A
6	A
6.7	nc
8.7	0.45 U

LDW-SC12

nc: Sample was not collected at this interval

Recovered depth (ft)	Bis(2-ethylhexyl) phthalate (mg/kg OC)	Total LPAH (mg/kg OC)	Total HPAH (mg/kg OC)
0	17	19 J	240 J
0.5	19	11	150 J
1	18	34 J	240 J
1.5	6.9	41 J	260 J
2	6.2	150 J	610
2.5	4.9	97	200 J
3	60	1,900	4,900
3.5	17	200 J	1,100
4	A	A	A
4.5	A	A	A
5	A	A	A
5.5	A	A	A
6	A	A	A
8	A	A	A
10.2	A	A	A

LDW-SC23

Note: Results for individual PAHs are represented in Tables A-6f and A-8c of Appendix A.

Recovered depth (ft)	Bis(2-ethylhexyl) phthalate (mg/kg OC)	Butyl benzyl phthalate (mg/kg OC)	Mercury (mg/kg dw)	Total PCBs (mg/kg OC)
0	32	2.1 J	0.27	3.9
0.5	20	1.9	0.33	18
1	120	5.0 J	1.27	340
1.5	42	3.9 J	1.22	180
2	A	A	A	A
2.5	A	A	A	A
3	A	1.0	A	A
3.5	A	A	A	A
4	A	A	A	A
4.5	A	A	A	A
5	A	A	A	A
5.5	A	A	A	A
6	A	A	A	A

na: Not applicable because the TOC was < 0.5%, so the value was not OC-normalized. The dry weight concentration was 3.8 U µg/kg dw.

LDW-SC1

Recovered depth (ft)	Total PCBs (mg/kg OC)
0	30
0.5	14
1	11
1.5	11
2	3.5
2.5	0.21 U
3	0.25 U
3.5	A
4	A
4.5	A
5	A
5.5	A
6	A
6.5	A
7	A
7.5	A
8	A
8.5	A
9	A
9.5	A

LDW-SC13

Recovered depth (ft)	Total PCBs (mg/kg OC)
0	16
0.5	110
1	260
1.5	83
2	39
2.5	13
3	3.3
3.5	0.34 U
4	0.20 U
4.5	A
5	A
5.5	A
6	A
7.8	A
9.5	A

LDW-SC27

Recovered depth (ft)	Lead (mg/kg dw)	Total PCBs (mg/kg OC)
0	72	28
0.5	177	37
1	117	190
1.5	84	100 J
2	21	16
2.5	45	47
3	A	A
3.5	A	A
4	A	A
4.5	A	A
5	A	A
5.5	A	A
6	A	A
8	A	A
9.5	A	0.25 UJ
10	A	A

LDW-SC33

- 2006 Subsurface core location
- ⊕ Geochronology core location
- Navigation channel
- River mile
- Intertidal zone

Note: SC201 is a field replicate of SC33  
 SC202 is a field replicate of SC36  
 SC203 is a field replicate of SC34

<b>Bold</b> – detected value	A – archived sample
≤ SQS	J – estimated concentration
> SQS and ≤ CSL	U – not detected at reporting limit shown
> CSL	UJ – not detected at estimated reporting limit shown

Note: Results are shown only for chemicals analyzed in both the 0.5-ft intervals and associated 0-to-2-ft intervals.

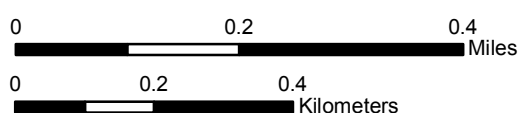
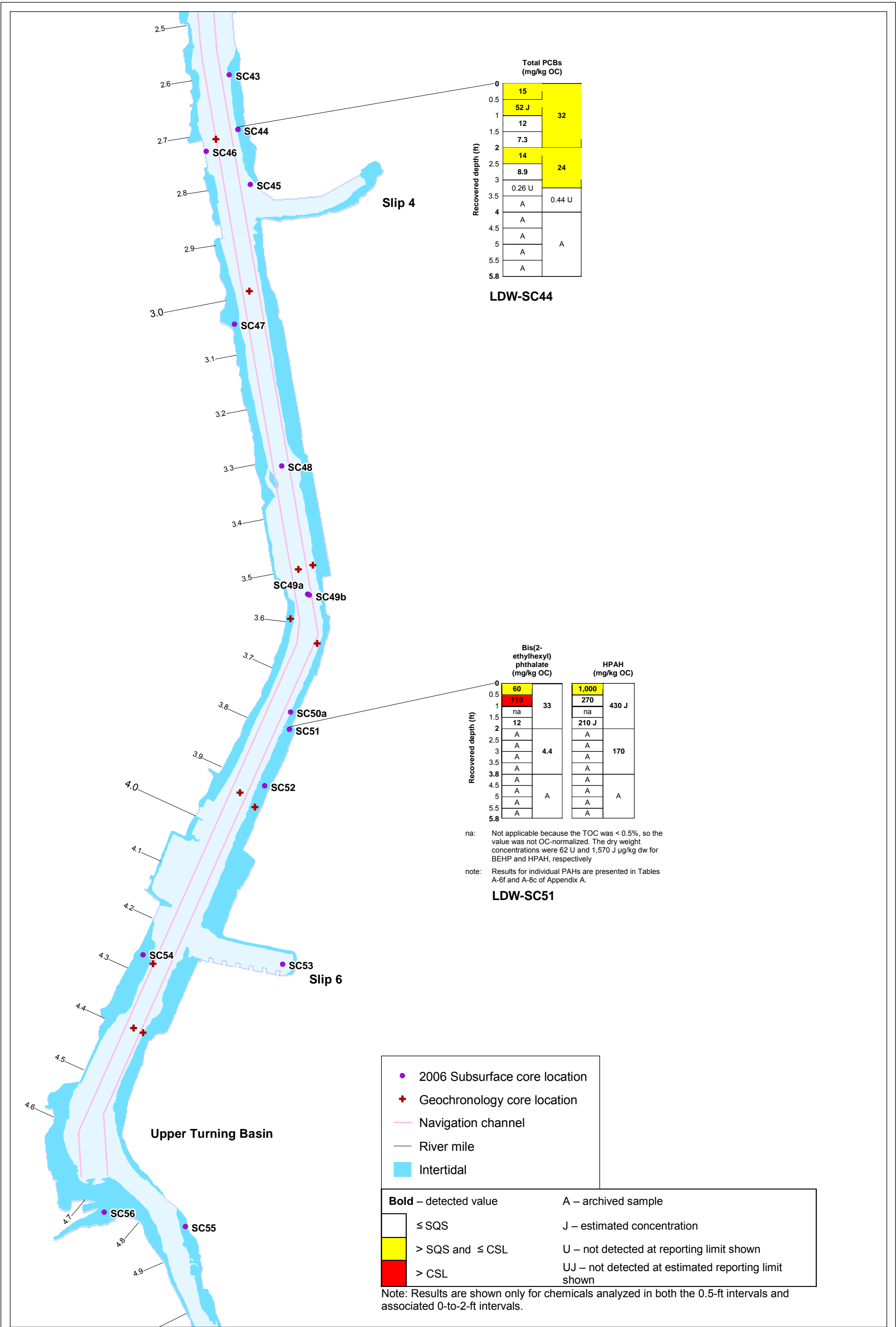


Figure 4-4a. Phase 2 subsurface sediment results for chemicals analyzed in the 0.5-ft interval samples compared to SMS criteria, including associated 0-to-2-ft interval results (RM 0 to 2.5)





**Figure 4-4b. Phase 2 subsurface sediment results for chemicals analyzed in the 0.5-ft interval samples compared to SMS criteria, including associated 0-to-2-ft interval results (RM 2.5 to 5)**

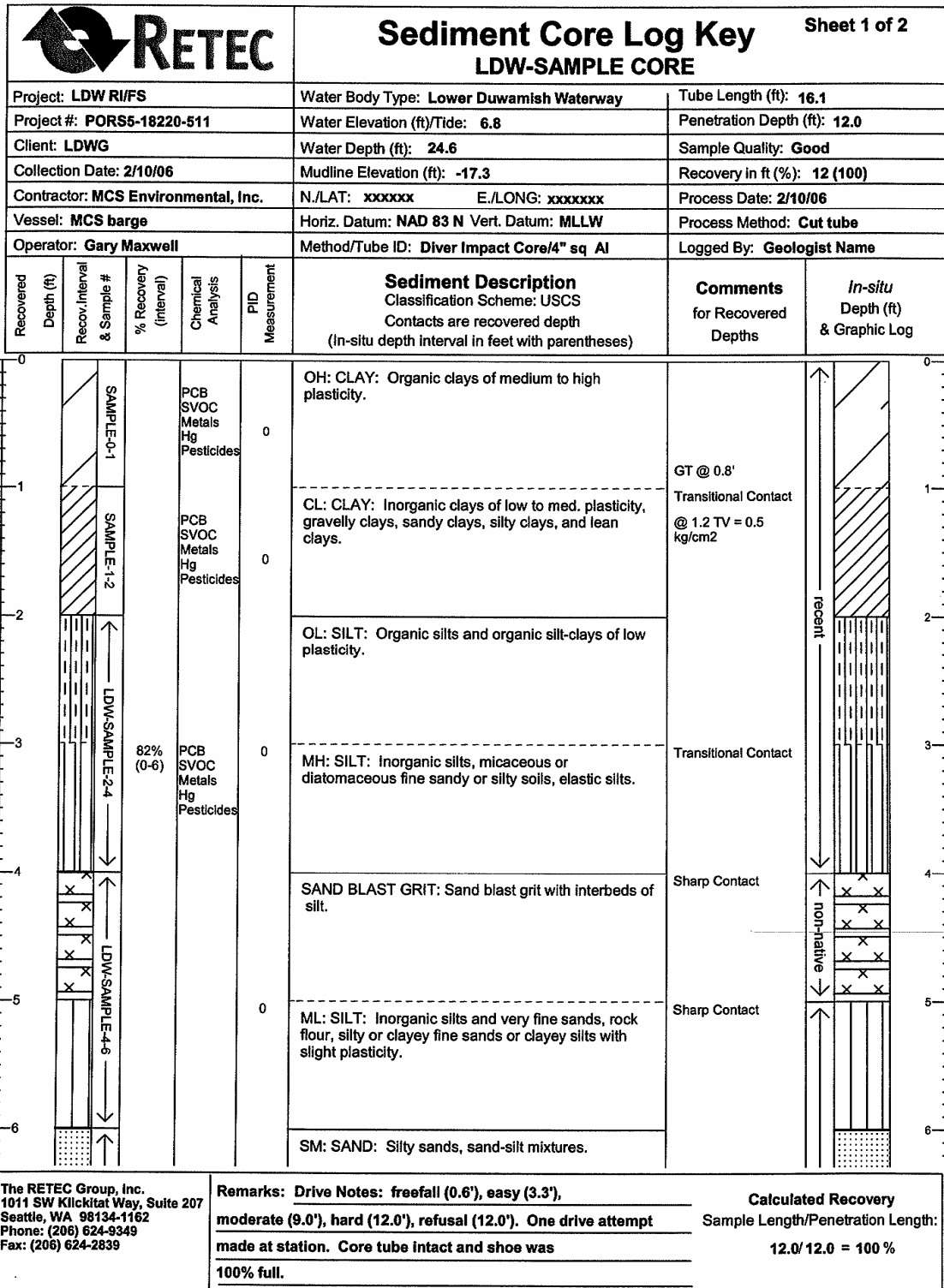
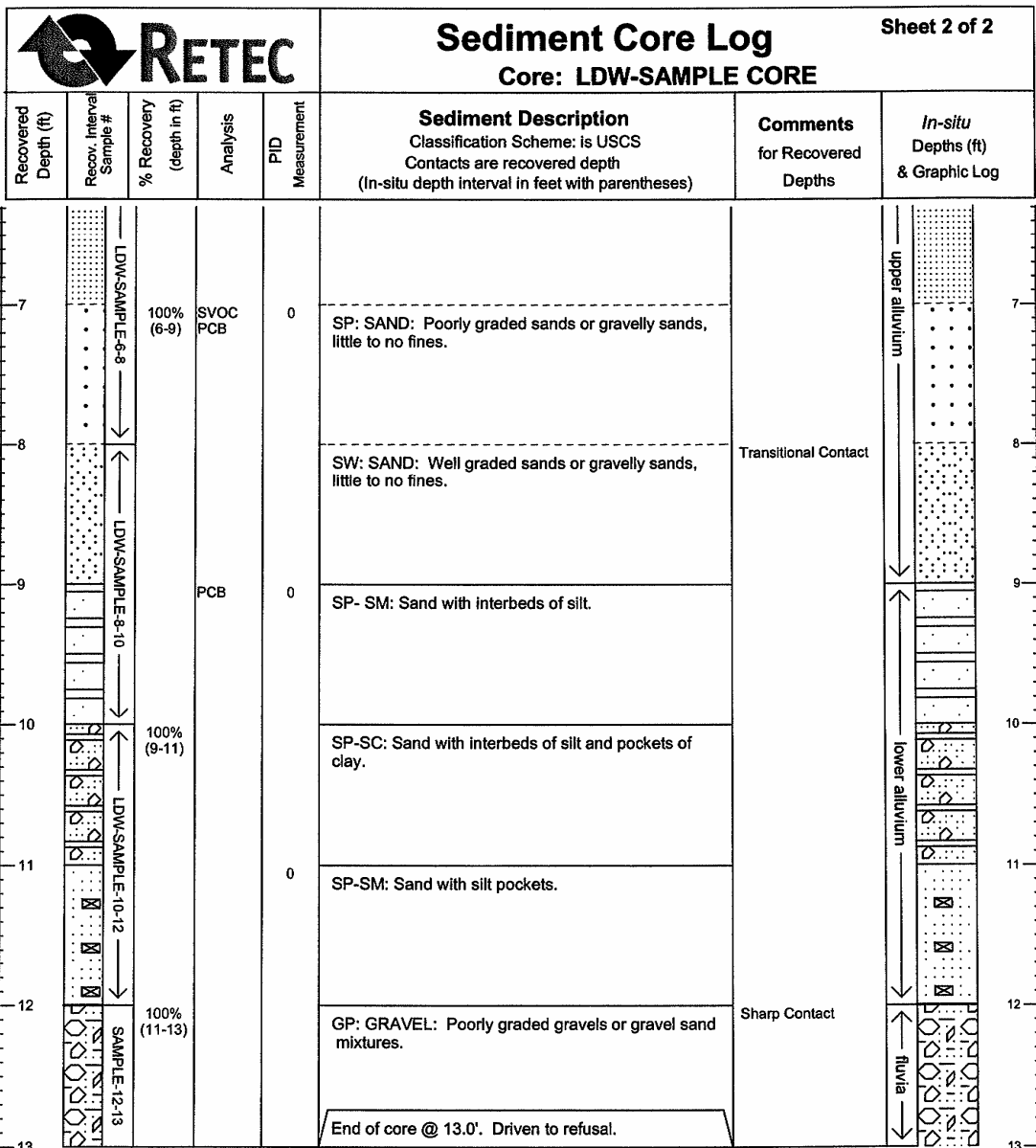


Figure 4-5a. Example of sediment core log format with key for sediment descriptions—Sheet 1



The RETEC Group, Inc. 1011 SW Klickitat Way, Suite 207 Seattle, WA 98134-1162 Phone: (206) 624-9349 Fax: (206) 624-2839	<b>Remarks:</b> Drive Notes: freefall (0.6'), easy (3.3'),	<b>Calculated Recovery</b> Sample Length/Penetration Length: 12.0/ 12.0 = 100 %
	moderate (9.0'), hard (12.0'), refusal (12.0'). One drive attempt	
	made at station. Core tube intact and shoe was	
	100% full.	

Figure 4-5b. Example of sediment core log format with key for sediment descriptions—Sheet 2