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TECHNICAL MEMORANDUM **CH2MHILL**

Stones Bay Sediment and Water Quality Sampling Results

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Introduction and Background

Marine Corp Base (MCB), Camp Lejeune provides specialized training to prepare troops for amphibious and land combat operations. The buildings and facilities onsite support 144,000 marines, sailors and their families. A new 15-million gallon per day (mgd) advanced wastewater treatment facility is being constructed; and due to strong public reaction, the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Coastal Management, has required Camp Lejeune to conduct in-stream sediment and water quality monitoring.

A monitoring program was initiated in June 1998 to quantify the discharge's impact, if any, on the estuarine environment. Ten transects were sampled at locations between Wilson Bay and Courthouse Bay. A modification to the monitoring program was requested by LANTDIV and required additional sediment and water quality sampling at five stations in an area of the New River Estuary known as Stones Bay.

Field Sampling

On September 16, 1998, CH2M HILL collected sediment and water quality samples from five stations in Stones Bay. Bob Deppen navigated the boat provided by Camp Lejeune. Dave Marasco, Camp Lejeune contact, was also in attendance. The sampling plan, Attachment 1, identifies the sampling locations, the sample matrix, chemical analysis that was performed, and the sampling methods used. The plan was followed as described with the exception of the following deviations.

- SB-3 could not be reached due to a water depth of less than two feet. SB-3 was sampled at an alternate location that was at the mouth of the stream. The final locations of all sites are noted on the attached map.
- As noted in Exhibit 3 of the attached sampling plan, a new polyethylene pail and spoon, each of which had been decontaminated previously, were supplied and used at each site instead of completing the decontamination process on a single pail and spoon between sites.
- The metals samples were filtered between 26 and 29 hours after the samples were first taken.
- Sampling was completed two weeks after Hurricane Bonnie, and the river was still turbid.

Results

The tables below summarize the sediment and water quality results from the attached lab reports from En Chem and Frontier Geosciences. Table 1, Sediment Inorganic Results, includes the metals, solids percent, acid volatile sulfide (AVS) and total organic carbon (TOC) results from the sediment samples, as well as the ER-L and ER-M levels established by the National Oceanic and Atmospheric Administration (NOAA). Graph 1, Grain Size Distribution, represents the grain size distribution from the same sediment samples, and the graph reveals that more fines are present at stations SB-3 and SB-4, while more sand is present at stations SB-1 and SB-5. Table 2, Water Quality Metals Results, summarizes the water quality results, as well as includes the NCDENR Water Quality Standards for tidal saltwaters with a classification of SA. There are no sediment standards to report in Table 1.

TABLE 1: SEDIMENT INORGANIC RESULTS

		Sampling Staions					NOAA Guidlines	
Analyte	**Units**	**CLMSDSB101**	**CLMSDSB201**	**CLMSDSB301**	**CLMSDSB401**	**CLMSDSB501**	**ER-L**	**ER-M**
As	mg/kg	< 1.3	3.6	2.2	< 1.4	< 1.4	33	85
Cd	mg/kg	< 0.13	< 0.21	< 0.15	< 0.14	< 0.14	5	9
Cr	mg/kg	2.4	15	4.6	3.6	4.7	80	145
Cu	mg/kg	< 1.3	18	5.7	15	< 1.4	70	390
Pb	mg/kg	1.5	12	4	3.5	3.5	35	110
Hg	mg/kg	< 0.13	< 0.21	< 0.15	< 0.14	< 0.14	0.15	1.30
Ni	mg/kg	< 0.67	3.10	< 0.77	< 0.70	0.98	30	50
Se	mg/kg	< 1.3	< 2.1	< 1.5	< 1.4	< 1.4	NA	NA
Ag	mg/kg	< 0.67	< 1.1	< 0.77	< 0.70	< 0.70	1	2.2
Zn	mg/kg	3.7	19	5.5	4.2	4.0	120	270
Solids	%	74.4	47	65.3	71.8	71.9	NA	NA
TOC as NPOC	mg/kg	2000	11000	3300	2600	2000	NA	NA
AVS	mg/kg	130	270	< 61	51	< 56	NA	NA

TOC = Total Organic Carbon

NPOC = Non-purgeable Organic Carbon

AVS = Acid Volatile Sulfide

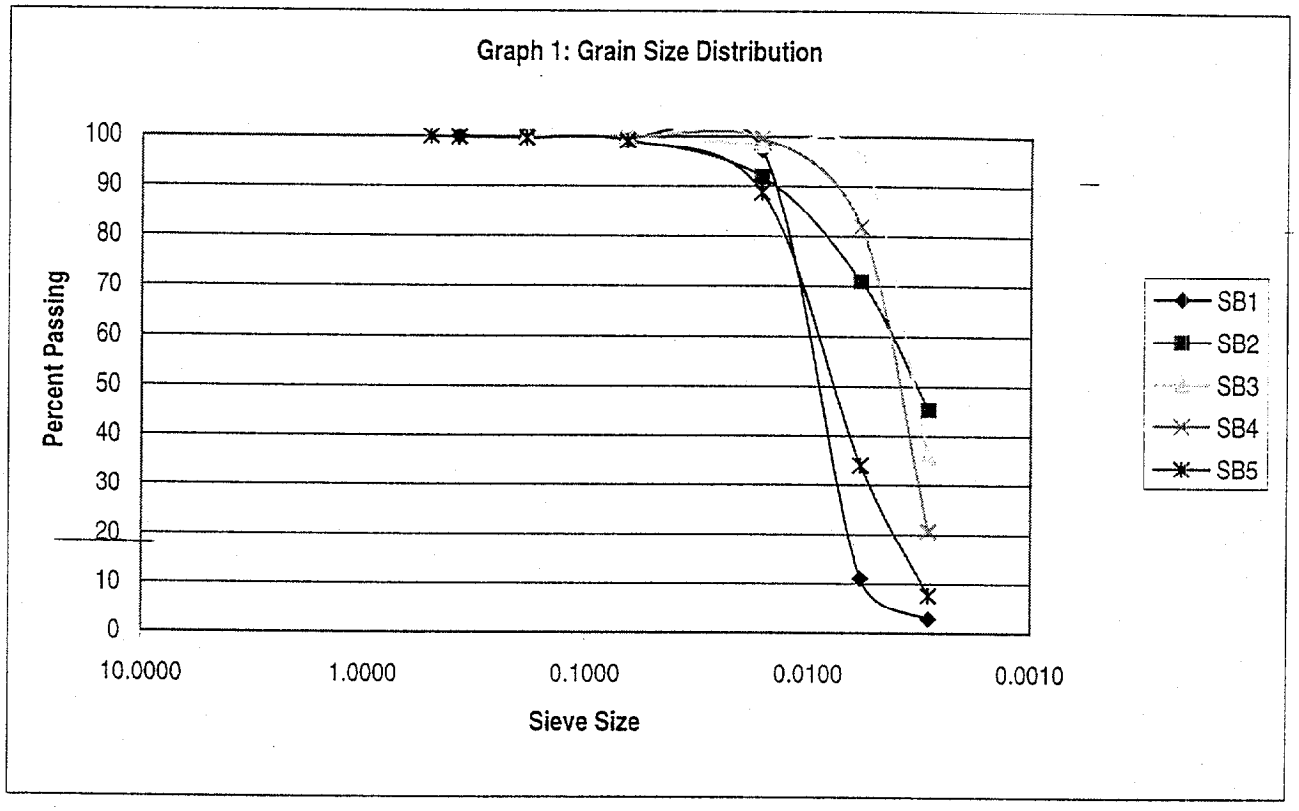


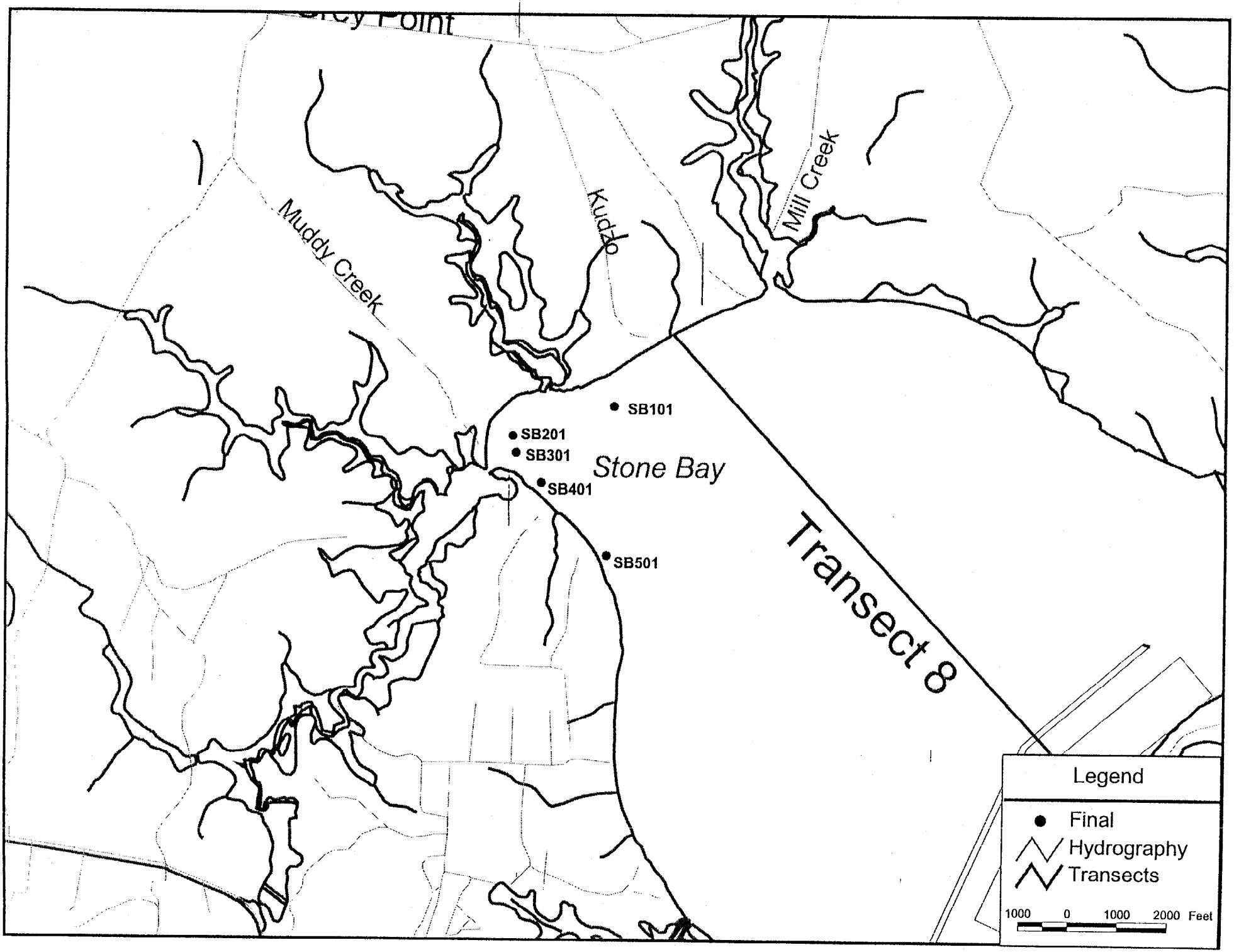
TABLE 3: WATER QUALITY METALS RESULTS

Metal	Units	Trip Blank		CLMSWSB101		CLMSWSB201		CLMSWSB301		CLMSWSB401		CLMSWSB501		W. Q. Stds.
		Total	Diss.	Total	Diss.	Total	Diss.	Total	Diss.	Total	Diss.	Total	Diss.	Aquatic Life
As	µg/L	ND	ND	1.06	0.943	1.16	1.03	1.27	1.02	1.44	1.04	1.37	1.05	50
Cd	µg/L	0.001	0	0.011	0.004	0.011	0.004	0.012	0.003	0.017	0.004	0.014	0.003	5.0
Cr	µg/L	ND	ND	0.29	0.13	0.56	0.10	0.72	0.06	1.37	0.06	1.30	0.07	20
Cu	µg/L	0.08	0.03	0.71	0.62	0.88	0.61	0.91	0.61	1.53	0.86	0.95	0.58	3 (AL)
Pb	µg/L	ND	ND	0.220	ND	0.415	ND	0.437	ND	0.926	ND	0.641	ND	25 (N)
Hg	ng/L	0.04	0.39	1.81	0.90	2.28	0.89	2.21	0.85	2.29	1.02	2.59	1.00	25
Ni	µg/L	0.02	0.02	0.24	0.24	0.30	0.25	0.31	0.26	0.48	0.25	0.44	0.29	8.3
Se	µg/L	ND	ND	0.120	0.095	0.126	0.099	0.122	0.103	0.157	0.102	0.153	0.102	71
Ag	µg/L	ND	ND	0.001	ND	0.004	ND	0.004	ND	0.005	ND	0.004	ND	0.1 (AL)
Zn	µg/L	ND	ND	0.84	ND	1.33	ND	1.28	ND	2.29	0.24	1.75	0.15	86 (AL)

ND = Analyte not detected above the estimated method detection limit (MDL)

AL = Values represent action levels as specified in 15A NCAC 2B .0220

N = See 15A NCAC 2B.0220 for narrative description of limits


Muddy Creek
Kuddo
Mill Creek
SB101
SB201
SB301
SB401
SB501
Stone Bay
Transect 8
Legend
Final
Hydrography
Transects
1000 0 1000 2000 Feet