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LABORATORIES

December 8, 1988

Mr. John Helbig
Adams, Rehmann & Heggan
850 S. White Horse Pike
Hammonton, New Jersey, 08037

Reference: **HAMMONTON LAKE**
Shoreline Maintenance Excavation
Bottom Sediment Analysis
EMA C/P #2262

Dear John:

This report covers the analysis of three (3) sediment core composite samples as per your request in accordance with dredging requirements of the NJDEP/DWR for the above referenced project site.

The samples were collected on 11 November 1988 and transported to our laboratory facility for subsequent preparation prior to chemical analysis. The sediment core samples was taken using a standard subaqueous coring device in the proximity of the proposed excavation area as designated by your office.

Accordingly, we are pleased to submit for your review, this report which presents the results of our findings. The report has been organized as follows:

- Introduction
- Sample Designations/Core Description
- Sample Preparation and Analysis Methods
- Results of EP Toxicity and Chemical Analysis

Should clarification concerning any aspect of this report be required, please do not hesitate to contact our office at (609) 561-4330.

Sincerely,

EMA LABORATORIES

Timothy W. Johnson, M.S.,
Director

TWJ/jah
Enclosure

HAMMONTON LAKE
HAMMONTON, NEW JERSEY

Shoreline Maintenance Excavation
Bottom Sediment Analysis

INTRODUCTION

Pursuant to requirements for maintenance excavation, a request was made for the collection, analysis and reporting of results on bottom sediment material. The protocols and analytical methods employed for this purpose followed those specified by the NJDEP/DWR for Dredge Spoil Analyses Criteria (2-84). Furthermore, due to the spoil disposal considerations for this site, it has been determined that the material may be used for landfill cover or agricultural uses, thus adding test parameters. The analytical protocol was performed in reference to Pages 1 and 2 of 3 taken from guidelines issued by the NJDEP/DWR.

SAMPLE DESIGNATION/CORE DESCRIPTION

A total of six (6) sediment core samples were collected and subsequently submitted for compositing and chemical analyses. The individual cores were designated according to a sample coding system of C #1 thru C #6 within the existing lake area. Three cove/inlet areas to the main lake were included for sediment analysis. Those areas being Fowler Creek Channel area, Public Beach area and the Southeast Cove area. The cores were spaced equi-distant within the proposed areas to be excavated in order to be representative of the spoil material.

All cores were found to be similar in consistency and texture for the project depth. The cores ranged in length from 0.5 feet to 1.5 feet at the various locations. The core locations were established by the optical positioning technique which required the selection of two transit stations on shore. The position of each sediment sample was approximated by this technique.

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SEDIMENT CORE NUMBER	CORE LOCATION/DESCRIPTION
FOWLER CREEK CHANNEL Bottom Sediment Core Composite C #1 & #2	Cores 1 and 2 were collected within the proposed excavation area towards the inlet to the main lake. These cores were found to be quite homogenous from top to bottom having textural characteristics of a soft silt and fine sand. The cores showed a predominance of brown in color with organic detritus and muck.
PUBLIC BEACH AREA Bottom Sediment Core Composite C #3 & #4	Cores 3 and 4 were collected from the Public Beach section of the lake equally spaced within this area. These cores were represented by a predominance of brown soft, silty organic detritus with a very slight cohesive property The USDA classification would be silty loam.
SOUTHEAST COVE AREA Bottom Sediment Core Composite C #5 & #6	Cores 5 and 6 were collected equidistant within the Southeast Cove area. These cores were found to be quite homogenous from top to bottom having textural characteristics of a soft silt/loam and some fine sand. The cores showed a predominance of dark brown in color with a high composition of organic vegetative debris.

The sediment core locations have been shown on a reproduction of a plan as prepared by Adams, Rehmann & Heggan for the Hammonton Lake (Figure 4). The approximate core locations are shown in Figure 1 of this report.

The sediment core was collected using a standard 1-3/4 inch lexan lined coring device. The liner was removed from the corer and transported to the laboratory within coolers maintained at 4°C.

SAMPLE PREPARATION AND ANALYSIS METHODS

Due to the homogeneity found for the entire length of each core within a given area, cores were blended in total and then composited on an equal weight proportion basis yielding three sediment core composites for the proposed excavation area. The core composites were thus formulated from six core locations and have been identified as bottom sediment core composites - BS #1/2 Core Composite, BS #3/4 Core Composite and BS #5/6 Core Composite.

The three (3) sediment core composites were prepared and analyzed according to techniques and methods established in the following manner and according to appropriate sections of these publications:

- USEPA - Manual of Methods for the Analysis of Pesticides in Human and Environmental Samples, June 1980.
- Federal Register, Vol 44 No. 233, December 3, 1979, Methods 601, 603, 606, and 608.
- Test Methods for the Evaluation of Solid Waste, Physical Chemical Methods, USEPA - SW-846, Third Edition, November 1986.
- Part 261 - Identification and Listing of Hazardous Waste (40 CFR Part 261); Subpart C-Characteristics of Hazardous Waste, FR/Vol. 45, No. 98/May 19, 1980.
- USEPA/Corps of Engineers Technical Committee on Criteria for Dredged and Fill Material - Procedures for Handling and Chemical Analysis of Sediment and Water Samples, May 1981.

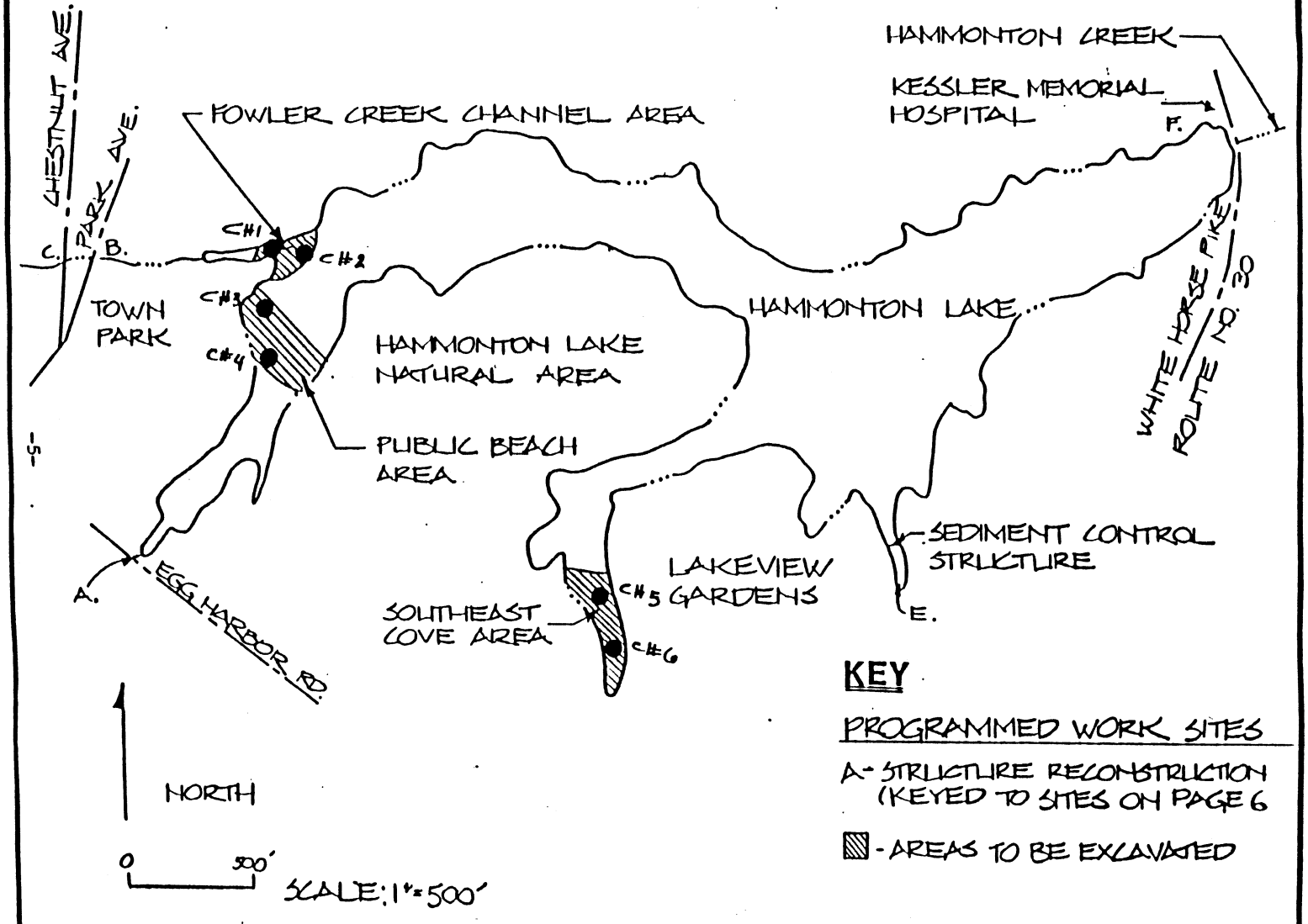

FIGURE 4

● DENOTES LOCATION OF SEDIMENT SAMPLES.

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Hammonton Lake "Sediment Location" Map

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Figure 1.

EP Toxicity Test - The core composites as prepared above were extracted in accordance with Section 7.4 - Method 1310 of USEPA SW-846. In summary, the methodology required the core material to be:

- Separated into solid/liquid phases.
- Preserve liquid fraction at 4°C and subject solid material to extraction with acidified water (pH 5.0 ± 0.2) under constant agitation for 24 ± 0.5 hours using 0.5N acetic acid.
- Separate solid and liquid phases from extraction using 0.45 u filtration.
- Combine liquid fraction with that obtained before extraction.
- Analyze combined liquid for desired contaminants by using the method of "Standard Addition". Parameters are shown on the analysis report attached herewith on Pages 7 thru 11.

Sediment Analysis - Chemical analysis for individual constituents was accomplished in the following manner:

- Heavy Metals - Samples were analyzed by conventional atomic absorption techniques following acid digestion of 2.0 ± 0.005 grams of sample.
- Cyanide - Samples were subjected to cyanide distillation apparatus for total cyanide as per USEPA SW-846 Method 9010.
- Oil & Grease - Samples were prepared for gravimetric analysis via the Soxhlet Extraction Method, USEPA/CE-81 Page 283-284.
- Semi-Volatile (Base/Neutrals) - Samples were prepared and analyzed similar to Method 625 with modification for base/neutral chemical properties - USEPA Method SW 846-8270.

- Pesticides and PCB's - Sample preparation consisted of extraction of 5-10 grams ± 0.05 of sample in a Soxhlet Extraction apparatus followed by routine GC setup as specified in USEPA Method 608/8080.

- Phenolic Compounds as Phenol - Sample preparation followed that technique employed for Pesticides and PCB's except for adjustment of pH to 12. USEPA Method SW 846-9065 was utilized for analysis.

RESULTS OF EP TOXICITY AND CHEMICAL ANALYSIS

The results of sediment core analysis are presented on the following pages numbered 7 thru 11.

Bottom Sediment Results - The composite core sample analysis presented herein were subjected to two types of analytical protocols. The USEPA EP Toxicity results do not indicate contaminants of the sediment to be leachable in excess of the maximum contaminant levels established by Part 261.24 CFR. Furthermore, the standard USEPA methods representing the second type of protocol revealed that quality levels for the constituents tested are typical of non-hazardous bottom spoils.

Recommendation - The bottom material composition is predominantly a mat of deteriorating aquatic weed detritus from years of growth and sediment build-up. This soft high organic and nutrient rich sediment should be mixed with wood chips, leaves or other suitable compost material to produce a mulch base for horticultural applications.

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December 8, 1988

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ANALYSIS REPORT

HAMMONTON LAKE
MAINTENANCE EXCAVATION
BOTTOM SEDIMENT ANALYSIS

SAMPLE DESCRIPTION ID

Project No.: 2262 Collected by: EMA

Sample Collection Date: November 11, 1988
Sample ID: Bottom sediment core composites taken along existing lake areas and prepared according to NJDEP criteria for dredge spoil analyses (2-84).

Results (mg/L or PPM)

SAMPLE ID/Number	BS #1/2	BS #3/4	BS #5/6		USEPA MCL
PARAMETERS	Core Comp.	Core Comp.	Core Comp.		
EP TOXICITY TEST (CFR 261.24)					
Arsenic	0.002	L 0.002	L 0.002		5.0
Barium	L 0.10	L 0.10	0.10		100.0
Cadmium	0.006	L 0.005	L 0.005		1.0
Lead	L 0.11	0.07	0.05		5.0
Mercury	L 0.001	L 0.001	L 0.001		0.2
Selenium	L 0.017	0.011	0.017		1.0
Silver	L 0.01	L 0.01	L 0.01		5.0
Chromium, Total	L 0.05	L 0.05	L 0.05		5.0
Endrin	L 0.002 ND	L 0.002 ND	L 0.002 ND		0.02
Lindane	L 0.002 ND	L 0.002 ND	L 0.002 ND		0.4
Methoxychlor	L 0.002 ND	L 0.002 ND	L 0.002 ND		10.0
Toxaphene	L 0.002 ND	L 0.002 ND	L 0.002 ND		0.5
2,4 - D	L 0.002 ND	L 0.002 ND	L 0.002 ND		10.0
2,4,5 - TP Silvex	L 0.002 ND	L 0.002 ND	L 0.002 ND		1.0

MCL denotes maximum contaminant level.

Results expressed as mg/L or ppm.

L Denotes less than N.D.Denotes non-detected G.GreaterThan

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Timothy W. Johnson, Director

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Results (mg/Kg dry wt.)

SAMPLE ID/Number	BS #1/2	BS #3/4	BS #5/6		
PARAMETERS	Core Comp.	Core Comp.	Core Comp.		
Arsenic	L 0.1	L 0.1	L 0.1		
Copper	26.7	29.2	21.6		
Cadmium	1.3	0.9	0.7		
Chromium, Total	2.1	3.3	1.9		
Lead	27	22	18		
Mercury	0.03	0.08	0.09		
Nickle	4.9	3.8	2.6		
Zinc	298	114	143		
Calcium	461	392	411		
Magnesium	101	97	106		
Potassium	262	253	208		
PCB's	L 0.02 ND	L 0.02 ND	L 0.02 ND		
DDT/DDE	L 0.004 ND	L 0.004 ND	L 0.004 ND		
Chlordane	L 0.02 ND	L 0.02 ND	L 0.02 ND		
Phenols	L 0.5 ND	L 0.5 ND	L 0.5 ND		
Total Nitrogen (NH_3+NO_3)	692	704	689		
TKN (TKN-N)	11,401	9,653	10,203		
Sulfur (sulfate, sulfide)	1,108	1,084	1,056		
Chloride	17	26	38		
Oil/Grease	209	317	169		
pH units	5.20	5.65	5.75		
Phosphorus, T	1,638	1,643	1,741		
% Solids	7.6	6.4	8.9		
Sulfate Reactivity	7.3	8.2	9.1		
Cyanide Reactivity	L 0.3 ND	L 0.3 ND	L 0.3 ND		

Results reported as ppm or mg/Kg dry wt. basis.

L Denotes less than N.D.Denotes non-detected G Greater Than

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Sample Collection Date: November 11, 1988
Sample ID: Bottom sediment core composites taken along existing lake areas and prepared according to NJDEP criteria for dredge spoil analyses (2-84).

Results (ug/Kg dry wt. or PPB)

SAMPLE ID/Number	BS #1/2	BS #3/4	BS #5/6		
PARAMETERS	Core Comp.	Core Comp.	Core Comp.		
BASE/NEUTRAL EXTRACTABLE ORGANICS -					
N-Nitrosodimethyl-amine	L 330 ND	L 330 ND	L 330 ND		
Aniline	L 330 ND	L 330 ND	L 330 ND		
bis(2-Chloroethyl) ether	L 330 ND	L 330 ND	L 330 ND		
1,3-Dichlorobenzene	L 330 ND	L 330 ND	L 330 ND		
1,4-Dichlorobenzene	L 330 ND	L 330 ND	L 330 ND		
1,2-Dichlorobenzene	L 330 ND	L 330 ND	L 330 ND		
bis(2-Chloroisopropy II) ether	L 330 ND	L 330 ND	L 330 ND		
N-Nitroso-Dipropyl amine	L 330 ND	L 330 ND	L 330 ND		
Hexachloroethane	L 330 ND	L 330 ND	L 330 ND		
Nitrobenzene	L 330 ND	L 330 ND	L 330 ND		
Isophorone	L 330 ND	L 330 ND	L 330 ND		
bis(2-Chloroethoxy methane)	L 330 ND	L 330 ND	L 330 ND		
1,2,4-Trichloro benzene	L 330 ND	L 330 ND	L 330 ND		
Naphthalene	L 330 ND	L 330 ND	L 330 ND		
4-Chloroaniline	L 330 ND	L 330 ND	L 330 ND		
Hexachlorobuta diene	L 330 ND	L 330 ND	L 330 ND		
2-Methylnaphtha lene	L 330 ND	L 330 ND	L 330 ND		

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SAMPLE ID/Number	BS #1/2	BS #3/4	BS #5/6	
PARAMETERS	Core Comp.	Core Comp.	Core Comp.	
Hexachlorocyclo-pentadiene	L 330 ND	L 330 ND	L 330 ND	
2-Chloronaphthalene	L 330 ND	L 330 ND	L 330 ND	
2-Nitroaniline	L 1600 ND	L 330 ND	L 330 ND	
Dimethyl Phthalate	L 330 ND	L 330 ND	L 330 ND	
Acenaphtylene	L 330 ND	L 330 ND	L 330 ND	
3-Nitroaniline	L 1600 ND	L 1600 ND	L 1600 ND	
Acenaphthene	L 330 ND	L 330 ND	L 330 ND	
2,4-Dinitrotoluene	L 330 ND	L 330 ND	L 330 ND	
2,6-Dinitrotoluene	L 330 ND	L 330 ND	L 330 ND	
Diethylphthalate	L 330 ND	L 330 ND	L 330 ND	
4-Chlorophenyl Phenyl ether	L 330 ND	L 330 ND	L 330 ND	
Fluorene	L 330 ND	L 330 ND	L 330 ND	
4-Nitroaniline	L 1600 ND	L 1600 ND	L 1600 ND	
N-nitrosodiphenyl amine	L 330 ND	L 330 ND	L 330 ND	
4-Bromophenyl Phenyl ether	L 330 ND	L 330 ND	L 330 ND	
Hexachlorobenzene	L 330 ND	L 330 ND	L 330 ND	
Phenanthrene	L 330 ND	L 330 ND	L 330 ND	
Anthracene	L 330 ND	L 330 ND	L 330 ND	
Di-n-butylphthalate	L 330 ND	L 330 ND	L 330 ND	
Fluoranthene	L 330 ND	L 330 ND	L 330 ND	
Benzidine	L 1600 ND	L 1600 ND	L 330 ND	

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Results (ug/Kg dry wt. or PPB)

SAMPLE ID/Number	BS #1/2	BS #3/4	BS #5/6		
PARAMETERS	Core Comp.	Core Comp.	Core Comp.		
Pyrene	L 330 ND	L 330 ND	L 330 ND		
Butyl Benzyl Phthalate	L 330 ND	L 330 ND	L 330 ND		
3,3'-Dichlorobenzidine	L 660 ND	L 660 ND	L 660 ND		
Benzo (a) anthracene	L 330 ND	L 330 ND	L 330 ND		
bis (2-ethylhexyl) phthalate	L 330 ND	L 330 ND	L 330 ND		
Chrysene	L 330 ND	L 330 ND	L 330 ND		
Di-n-octyl Phthalate	L 330 ND	L 330 ND	L 330 ND		
Benzo (b) fluoranthene	L 330 ND	L 330 ND	L 330 ND		
Benzo (k) fluoranthene	L 330 ND	L 330 ND	L 330 ND		
Benzo (a) pyrene	L 330 ND	L 330 ND	L 330 ND		

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Timothy W. Johnson, Director

engineers·surveyors·planners
arh
associates inc

adams, rehmann & heggan

Reply To: Hammonton

December 16, 1988

NJDEP, Division of Water Resources
Lakes Management Program
CN 029
35 Artic Parkway
Trenton, NJ 08625

Attn: Bud Cann

Re: Hammonton Lake Restoration Project
Town of Hammonton, Atlantic County
ARH Project #11-90016

Dear Bud:

I'm enclosing a copy of the initial sediment sampling results from selected locations within the lake for your review. In addition, per your request, I will obtain and forward to you information concerning the specific type of match (cash and/or payment-in-kind) which will be provided by both the Town and County of Atlantic.

Don't hesitate to contact me to set up a meeting to discuss the monitoring criteria which you mentioned.

Very truly yours,

John Helbig
Assistant Planner

Encl.

cc: Greg DeCicco, Chairman, Hammonton Environmental Commission

JH/dr

850 S. White Horse Pike, P.O. Box 579, Hammonton, NJ 08037, (609) 561-0482
2123 Route 33, Suite B, Lexington Square, Hamilton Square, NJ 08690, (609) 587-3433