



MEMO

To: Tim R. Horanburg, Supervisor, Town of Newfane
CC:
From: Wendel
Date: 1/15/2014
RE: Olcott Harbor Sediment Sampling Results

Olcott Harbor Sediment Sampling Results

Project Description

The NYSDEC sediment evaluation process was used to determine how the dredged sediment will be handled through open water, riparian placement, or offsite disposal. For freshwater dredged materials specifically, NYSDEC has developed a classification system where each sample is placed in a class dependent upon its chemistry. Tables 2 and 3 are attached from NYSDEC Dredged Material Technical Guide 5.1.9. Table 2 shows the sediment quality threshold values for different types of in-water placement (referenced on the results below). Class A represents the lowest chemical concentration and is approved for any generally accepted placement practices. Class B represents sediment with moderate chemical concentration where sediment placement often requires a soil cap to limit risk of human contact with sediment. Class C represents sediment with higher chemical concentrations where riparian placement is ordinarily not allowed, or is completed through placement of a clay lining and cover material to ensure long-term isolation. Further analysis will need to be conducted in conjunction with the NYSDEC to determine acceptable disposal methods for the Olcott Harbor dredged sediment. Generally the sediment testing data showed Class B sediment with some pesticide concentrations on the low end Class C range. The NYSDEC will ultimately determine if the presence of such compounds require specific disposal or cover methods. Below is the sediment testing data for Metals, Petroleum Compounds, Pesticides, and Chlorinated Hydrocarbons, as determined through field sampling.



Results and Discussion

Summary of Metals Testing

NYSDEC Quality Level	Arsenic			Copper			Lead			Mercury		
	A	B	C	A	B	C	A	B	C	A	B	C
(mg/kg dry)	<14	14 - 53	>53	<33	33 - 207	>207	<33	33 - 166	>166	<0.17	0.17 - 1.6	> 1.6
Sample 1	3.7				37		9			0.037		
Sample 2	2.4			22			26			0.055		
Sample 3	4				48			53			0.26	
Sample 4	5.3				100			120			0.17	
Sample 5	4.5				79			98			0.21	
Sample 6	3.1			30			27			0.08		
Sample 7	3.8				49			48		0.094		
Sample 8	3.3				81			94			0.17	
Sample 9	7.5					230			300		0.22	
Sample 10	3.7				52			56			0.18	
Sample 11	3				48			50		0.13		
Sample 12	3.4				61			67			0.22	
Sample 13	3				33		31			0.15		
Sample 14	4				54			55		0.14		
Sample 15	3.5				45			45		0.1		
Sample 16	2.5			28				36		0.084		
Sample 17	3				40			37		0.14		
Sample 18	3.2			18			14			0.086		
Sample 19	2.7				33			34		0.065		
Sample 20	3.3				61			71			0.22	
Sample 21	2.3			27			32			0.046		
Sample 22	2.9			14			5.3			0.023		

Table 1a: Sediment testing data for Metals

Arsenic, Copper, Lead and Mercury were chosen due to their presence in prior sediment testing data from 2012. Generally the Metals were consistently in the Class A or B range with the exception of Sample 9, which recorded elevated Copper and Lead of Class C. The NYSDEC allows for reasonable judgment to be applied when interpreting the results and it is very likely the high concentrations for a single sample represent a testing anomaly that is not representative of the localized sediment concentrations.



NYSDEC Quality Level	Benzene			Total BTEX			Total PAH		
	A	B	C	A	B	C	A	B	C
	(mg/kg dry)	<0.59	0.59 - 2.16	>2.16	< 0.96	0.96-5.9	>5.9	<4	4 - 35
Sample 1	0.053			0.501				4.504	
Sample 2	0.0013			0.01116			2.551		
Sample 3	0.00031			0.00671			3.399		
Sample 4	0.068			0.628			3.907		
Sample 5	0.0008			0.005			3.866		
Sample 6	0.00027			0.00617			3.063		
Sample 7	0.00031			0.00741			3.859		
Sample 8	0.00059			0.01099			3.572		
Sample 9	0.00068			0.00538			3.791		
Sample 10	0.00036			0.00646				4.968	
Sample 11	0.073			0.683				4.044	
Sample 12	0.00067			0.00757				4.511	
Sample 13	0.00044			0.00604				4.268	
Sample 14	0.00069			0.01049				4.481	
Sample 15	0.00032			0.00622			3.098		
Sample 16	0.00016			0.00518			2.914		
Sample 17	0.00024			0.00574			3.521		
Sample 18	0.00048			0.00608				4.298	
Sample 19	0.00015			0.00526			3.175		
Sample 20	0.00088			0.00468			3.294		
Sample 21	0.00034			0.00677			2.975		
Sample 22	0.00021			0.00841				5.27	

Table 1b: Sediment Testing Data for PAH's and Petroleum Related Compounds

Benzene, BTEX and Total PAH were chosen due to their presence in prior sediment testing data from 2012. Generally the Petroleum Related Compounds were consistently in the Class A range with some Class B samples for Total PAH. Given that approximately half of the samples indicated concentrations in the Class B range, it is likely the Petroleum Related Compounds indicate a Class B sediment. Additionally, reasonable judgment indicates that Total PAH compounds are on the very lowest level of Class B and therefore present considerably less impact than those near the average of the Class B range.



NYSDEC Quality Level	Sum of DDT+ DDD + DDE			Mirex			Chlordane			Dieldrin		
	A	B	C	A	B	C	A	B	C	Class A	Class B	Class C
(mg/kg dry)	<0.003	0.003 - 0.03	>0.03	<0.0014	0.0014 - 0.014	>0.014	<0.003	0.003 - 0.036	> 0.036	< 0.11	0.11 - 0.48	> 0.48
Sample 1		0.0105			0.0015			0.03		0.0015		
Sample 2		0.019		0.001				0.02		0.001		
Sample 3		0.0158			0.0019				0.039	0.0019		
Sample 4		0.021			0.0019				0.038	0.0019		
Sample 5		0.0219			0.002				0.04	0.002		
Sample 6		0.0141			0.0018			0.036		0.0018		
Sample 7		0.0159			0.002				0.04	0.002		
Sample 8		0.0141			0.0019				0.038	0.0019		
Sample 9		0.0252			0.0022				0.044	0.0022		
Sample 10		0.0211			0.0019				0.038	0.0019		
Sample 11		0.0195			0.002				0.041	0.002		
Sample 12		0.0174			0.002				0.04	0.002		
Sample 13		0.0193			0.0018				0.037	0.0018		
Sample 14		0.0176			0.002				0.04	0.002		
Sample 15		0.0186			0.0019				0.038	0.0019		
Sample 16		0.0237			0.0016			0.032		0.0016		
Sample 17		0.0168			0.0017			0.034		0.0017		
Sample 18		0.0159			0.0017			0.034		0.0017		
Sample 19		0.0167			0.0017			0.034		0.0017		
Sample 20		0.0167			0.0018			0.036		0.0018		
Sample 21		0.0114			0.0015			0.031		0.0015		
Sample 22		0.0114			0.0016			0.033		0.0016		

Table 1c: Sediment Testing Data for Pesticides

The Pesticide compounds above were chosen due to their presence in prior sediment testing data from 2012. Generally Pesticides were in the Class A or B range with approximately half of the samples testing as Class C, specifically for Chlordane. Even though many of these pesticide components have been banned for almost 10 years it is reasonable to expect they are in the area due to the abundance of farms, especially those growing fruit that require pesticides. Generally the samples that exceed the Class B/C threshold for Chlordane are not significantly higher than those from Class B, and therefore the NYSDEC may indicate it is reasonable to interpret the pesticide testing data is a Class B type sediment.



NYSDEC Quality Level (mg/kg dry)	PCB's (sum of aroclors)		
	Class A	Class B	Class C
	< 0.1	0.1 -1	> 1
Sample 1	0.059		
Sample 2	0.048		
Sample 3		0.12	
Sample 4		0.21	
Sample 5		0.19	
Sample 6		0.12	
Sample 7		0.11	
Sample 8		0.21	
Sample 9		0.25	
Sample 10		0.19	
Sample 11		0.14	
Sample 12		0.12	
Sample 13		0.14	
Sample 14		0.15	
Sample 15		0.16	
Sample 16		0.13	
Sample 17		0.13	
Sample 18	0.08		
Sample 19	0.066		
Sample 20	0.28		
Sample 21	0.026		
Sample 22	0.064		

Table 1c: Sediment Testing Data for Pesticides

Chlorinated Hydrocarbons, specifically PCB's, were tested due to their presence in prior sediment testing data from 2012. Generally PCB concentrations were all in the Class A or B range. Additionally, it can be noted that the Class B samples were generally at the very low end of the range, and based on environmental impact, may be most similar to Class A sediments.

Summary of Results

The next step is to further develop the testing report for submission to the NYSDEC. Ultimately they will determine the overall Class of the sediment and what placement/disposal techniques will be acceptable. This Class will be officially determined by NYSDEC, but we feel that with reasonable judgment the department will classify the sediment as Class B and the following Dredging Management Options will apply (from Table 3 attached).

Class B sediment allows for use of a closed bucket dredging unit with riparian placement allowed with a sediment cover placed on top that consists of Class A sediment or better. The department will determine the required depth of this cover based on site specific requirements. In water placement is



generally discouraged, however when applicable, sites can be capped to ensure isolation of the dredged material.

Once the NYSDEC has been presented the results, they will make a decision on sediment classification. Then we can move forward with the permitting process and logistics associated with the dredging operation. Following approval notice of the permit, quotes will be obtained for completion of the work.

Table 2 Sediment Quality Threshold Values for Dredging, Riparian or In-water Placement

Threshold values are based on known and presumed impacts on aquatic organisms/ecosystem. Where fresh water and marine threshold values differ sufficiently, the marine value is presented in parentheses. All concentrations are in mg/kg dry weight.

Compound	Class A	Class B	Class C	Derivation Code
Metals (mg/kg)				
Arsenic	< 14 (8.2)	(8.2) 14 - 53	> 53	1
Cadmium	< 1.2	1.2 - 9.5	> 9.5	1
Copper*	< 33	33 - 207 (270)	> 207 (270)	1
Lead	< 33 (47)	33 (47) - 166 (218)	> 166 (218)	1
Mercury ⁺	< 0.17	0.17 - 1.6 (1.0)	> 1.6 (1.0)	1
PAHs and Petroleum-Related Compounds (mg/kg)				
Benzene	< 0.59	0.59 - 2.16	> 2.16	2
Total BTEX*	< 0.96	0.96 - 5.9	> 5.9	2
Total PAH ¹	< 4	4 - 35 (45)	> 35 (45)	1
Pesticides (mg/kg)				
Sum of DDT+DDD+DDE ⁺	< 0.003	0.003 - 0.03	> 0.03	2
Mirex**	< 0.0014	0.0014 - 0.014	> 0.014	2
Chlordane**	< 0.003	0.003 - 0.036	> 0.036	1
Dieldrin	< 0.11	0.11 - 0.48	> 0.48	2
Chlorinated Hydrocarbons (mg/kg)				
PCBs (sum of aroclors) ²	< 0.1	0.1 - 1	> 1	3
2,3,7,8-TCDD* ³ (sum of toxic equivalency)	< 0.000045	0.000045 - 0.00005	> 0.00005	4

* Threshold values lower than the Method Detection Limit are superseded by the Method Detection Limit. (See Table 1)

** Indicates case-specific parameter (see Chapter II, Section A) .

¹For Sum of PAH, see Appendix E

²For the sum of the 22 PCB congeners required by the USACE NYD or EPA Region 2, the sum must be multiplied by two to determine the total PCB concentration.

³TEQ calculation as per the NATO - 1988 method (see Appendix D)

Note: The proposed list of analytes can be augmented with additional site specific parameters of concern. Any additional analytes suggested will require Division approved sediment quality threshold values for the A, B and C classifications.

Table 2.1 Derivation Codes for Chemical Threshold Values

Derivation Code	Explanation
1	<p>Values are the geometric mean (GM) between Long & Morgan (1990) and Persaud (1992). Class A values are the GM of ER-L¹ and Lowest Effect Level. Class C values are the GM of the ER-M¹ and Severe Effect Levels. The resulting GMs were compared to marine water ER-L and ER-M values published by Long & Morgan (1992). When compared, the lowest of the two corresponding values was selected. When there was a large difference between a freshwater (Long & Morgan (1990) or Persaud (1992) GM) and a saltwater (Long & Morgan 1992) value, the marine value was recorded in parentheses, and is applicable to marine water dredging and management only. For total PAHs, Persaud (1992) had no toxicity values so only those of Long and Morgan (1990) were used. This approach is consistent with that described in the Technical Guidance for Screening Contaminated Sediments Document (DFW/DMR 1999). The Chlordane values were developed by NYSDEC generally following the Long and Morgan method.</p>
2	<p>NYSDEC water quality standards were used in conjunction with the U.S. EPA equilibrium partitioning methodology (see DFW/DMR 1993, pages 5-11) to calculate sediment quality threshold values for organic compounds assuming 2% organic carbon and equating K_{ow} to K_{oc}, consistent with the reality of contaminant uptake in biological organisms (Kenaga and Goring, 1980). Class A value is for the protection of benthic life from chronic toxicity. The Class C value is for the protection of benthic life from acute toxicity. If aquatic life standards were not available from 6NYCRR Part 703.5 to generate the sediment screening criterion, a guidance value was derived in accordance with 6 NYCRR Part 706.1. For total BTEX, the A and C values are the geometric means of the A and C values for benzene, xylene, ethylbenzene, and toluene. For DDT (sum of DDT, DDD, & DDE), the A value was based upon the 6 NYCRR 703.5 standard for the protection of wildlife. Because this value (0.00022 mg/l) was below the limit of analytical detection, the analytical detection limit of 0.003 mg/l was selected as a default value. The C value was the level at which significant mortality to <i>daphnia magna</i> has been documented (Long & Morgan, 1990). This approach is consistent with that described in the Technical Guidance for Screening Contaminated Sediments Document (DFW/DMR 1999).</p>
3	<p>Synthesis of Consensus Based Sediment Quality Assessment Values (D.D. MacDonald, et. al., Jan 2000), Marine and Estuarine Sediment Quality Values (E.R. Long, et. al., Nov 1993), PCB soil cleanup levels in NYSDEC Division of Environmental Remediation TAGM HWR-92-4046 and of sediment quality values from NYSDEC Division of Fish, Wildlife and Marine Resources Technical Guidance for Screening Contaminated Sediments, 1998.</p>
4	<p>A mean of the NYSDEC Fish and Wildlife bioaccumulation number, of the USEPA's low risk to mammals, the disposal of paper sludge in pasture land and the bioaccumulation protection of fish values, was calculated and rounded down to the nearest 0.5 ppt. This value is 0.0000045 ppm or 4.5 ppt. Additionally, the soil/sediment action level for 2,3,7,8 TCDD in the RCRA hazardous waste program (TAGM DHSR 3028, 1992) is 4.5 ppt. The on-land application limit of 50 ppt is used as the contaminated level from the USEPA - Paper Industry Agreement from Environment Reporter, 29 April 1994, pages 2222-3.</p>

¹ **Error! Main Document Only.** The ER-L values are the concentrations equivalent to the lower 10 percentile of the screened available data and indicated the low end of the range of concentrations in which effects were observed or predicted (concentrations above which adverse effects may begin). The ER-M values were the concentrations equivalent to the 50 percentile point in the screened available data (concentrations above which effects were frequently observed or predicted).

Table 3 RIPARIAN/IN-WATER Management Options

Activity	Class A	Class B	Class C
Dredging	Any means meeting generally accepted and approved practices	Closed bucket suggested or any means meeting environmental objectives	Closed bucket or other method minimizing loss of resuspended sediment ordinarily required
Riparian Placement	Any means meeting generally accepted and approved practices	Placement at riparian sites already containing more contaminated material. New riparian sites should be covered with Class A sediments to insure isolation of the dredged material. The depth of the cap will be determined on a site specific basis.	Riparian sites should be lined and capped with clay or other impermeable material and covered with Class A sediments to ensure long-term isolation of the dredged material from the environment. The depth of the cover material will be determined on a site specific basis.
In-water Placement	Any means meeting generally accepted and approved practices	In water placement discouraged. When applicable, sites should be capped with Class A sediment to insure isolation of the dredged material	In-water disposal ordinarily precluded.
Barge Overflow	Barge overflow may be allowed (site specific)	Usually, no barge overflow. May be allowed on site specific basis	No barge overflow
Post dredging Monitoring	May be required	See Chapter V	See Chapter V

NOTES:

1. Environmental Objectives for Dredging, Chapter IV, Section A applies to all classes.
2. Environmental Objectives for Dredged Material Management Placement at Riparian and/or In-water Sites, Chapter IV, Section B applies to all classes.
3. Riparian sites are adjacent to or within the 100-year flood plain of the surface waters in which dredging is proposed. These sites are typically diked with controlled outlets for retention of sediment and are typically regulated under Section 401 of the CWA. They do not constitute "on-land" placement.
4. Due to site specific circumstances, an applicant has full responsibility to justify all operations, including both those described above and any other selected alternatives.
5. Depending on conditions, hydraulic dredging to a confined disposal facility or excavation in the dry is the recommended method for PCB concentrations of greater than 10 ppm. Dredged material should be disposed of directly at final disposal sites. An applicant may justify another method of dredging and disposing of this material, as long as no net dumping of contaminated dredged material is proposed. If concentrations approach 50 ppm, Division of Environmental Remediation should be consulted.