



Michigan City, Indiana Uses Trail Creek Dredged Material for Landfill Cover

Demand for Fill Meets Need for Disposal

In 2001, Michigan City, IN was able to solve two environmental problems facing the city through implementation of an upland beneficial use of Trail Creek dredged material. An increased dredging requirement in Michigan City harbor was caused by a combination of low lake levels and high sedimentation rates. The city was seeking a place to dispose of the sediments obtained from dredging Trail Creek, which drains into the city's Lake Michigan harbor. Open water disposal of sediments was ruled out due to the physical characteristics and the contamination profile of the dredged material. Placement in a Confined Disposal Facility (CDF) was ruled out as being too costly. The Michigan City CDF, the disposal site for all dredging material prior to 1994, had been capped in 1992. Transportation to the next nearest CDF, in Chicago harbor, would require moving the dredged material 50 miles or more.

By using the dredged material as daily cover for the Deercroft Landfill, the city found a single low cost solution to two environmental problems.

At the same time, residents of the city were complaining about numerous problems caused by LaPorte County's only active waste disposal site, Deercroft Landfill. Deercroft is a municipal solid waste (MSW) landfill, which began operating in 1978. In 1999 it received over a half-million tons of

municipal waste. The complaints of the neighboring community included odor, litter, and birds swarming. The relations between the city and the landfill manager, Waste Management Inc.(WMI), were already strained. This was partly due to another capped landfill in the city, managed by the same company, being listed as a Superfund National Priority List site. The landfill facility had been blamed by residents for everything from contamination of well water to impairment of the city's real estate market. By using the dredged material as daily cover for the Deercroft Landfill, the city found a low cost solution to both of these problems.

Beneficial Use as a Political and Legal Solution

The mayor of Michigan City had taken legal action against the landfill in early 2001. During the settlement of this suit, the landfill's managers agreed to formalize and implement plans to minimize nuisances caused by odor, litter, and birds. Waste Management and the City hired an environmental engineering consultant as part of the settlement to make recommendations concerning the best way to reduce the

environmental burdens from the landfill. One major recommendation for preventing the cited problems was to increase the amount of daily cover placed in the landfill. This action would, however, be an added cost to the landfill manager, which would be passed onto Michigan City citizens through trash disposal costs.

At the same time, the Port Authority was struggling to find a low-cost disposal option for the sediments scheduled to be dredged from the Trail Creek harbor in 2001-2002. The Port Authority contacted the mayor's office to discuss disposal options. The mayor's office was aware of the consultant's recommendation that the landfill apply a daily cover. The mayor's office arranged with the landfill to use the Trail Creek dredging sediments for this purpose. The WMI agreed to accept this material at no charge to the city. The landfill had previously charged for the disposal of dredged material from the harbor which had been landfilled in 1994. Disposal fees were waived in this case in an effort to improve relations between the city and the landfill.

This arrangement benefited the citizens of Michigan City in a number of ways. If the landfill were required to obtain a daily cover material other than the sediments, this cost would have been passed on to the landfill's users. The savings to the landfill in acquiring this material were reflected in a reduced tipping fee for the city's municipal waste. In addition to saving citizens money by reducing disposal fees, this action would also save taxpayers money by reducing the cost of the dredging operations, many of which were locally funded or cost-shared. This arrangement both avoided the adverse environmental consequences of other disposal options and reduced the environmental nuisances presented by the landfill. Taking full advantage of this

This strategy reduced both the cost of dredging the harbor and landfill tipping fees for the city and its residents.

situation, the mayor and city council were able to convince local property owners to participate in a pier-to-pier dredging of the harbor at significantly reduced cost. The combination of the free disposal with the efficiency of dredging a large area at one time greatly reduced the cost of this operation for the local taxpayers.

The Deercroft landfill had been slated for closure by the LaPorte County Commissioner on July 1, 2002 after a long but unsuccessful period of seeking approval to expand the site. The dredging project was scheduled to be completed in mid-July, causing a conflict with the plan to have the landfill accept the materials. Although the County Commissioners were hesitant to allow the landfill to remain open for any additional time, the Michigan City mayor was able to broker an arrangement allowing the landfill to remain open for three extra weeks in order to receive the dredged material from Trail Creek.

Regional guidance and state standards used to determine suitability

Dredging was not scheduled to begin in trail creek until 2001-2002. However, the lowest lake levels in nearly 40 years required dredging to begin early, in 2000. Tests of the sediment in 2000 revealed that they were not suitable for open water disposal, unlike the sediments from the outer harbor. These tests identified the sediment as a mix of fine silty sand and sandy silt. The contaminant profile was typical of urban runoff and combined sewer overflows (CSOs), including moderate levels of metals, nutrients, and polynuclear aromatics (PNAs). As dredging discharges to Lake Michigan cannot exceed background concentrations of any contaminant, open water disposal was precluded. Similarly, the test results ruled out beach nourishment. Landfilling of the sediments was identified as a potential option.

The Army Corps of Engineer's testing protocols followed the tiered approach outlined in the *Great Lakes Dredged Material Testing and Evaluation Manual*, published by USEPA and USACE. Tier 1 testing had been conducted in 1995 for the area to be dredged. The 2000 testing was done to fulfill tier 2 and ensure compliance with sections 401 and 404(b)(1) of the Clean Water Act. A panel of landfill parameter tests were run, including reactive sulfide, paint filter tests, Toxicity Characteristic Leachate Procedure (TCLP), and ignitability. These tests indicated that the material would be suitable for MSW landfill disposal. The concentrations of numerous contaminants from the sediments were compared to Indiana's Risk Integrated System of Closure (RISC) tables to determine if these risk-based standards would be violated. The results of this comparison are shown in Table 1. MU1,2,&3 are three management units into which the creek was divided for sampling. The sampling locations and the area dredged are shown in Figure 1. Although a few contaminants exceeded the RISC standards for residential direct contact and migration to groundwater, the presence of a cap and liner on the landfill would eliminate these routes of exposure. It was therefore determined that landfill placement was consistent with the RISC standards.

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Between 5,000 and 7,000 cubic yards of sediment were dredged in the summer of 2000 as part of a federal project and placed in Deercroft landfill. The tests conducted by the Corps allowed the dredged material to be used beneficially. The 2001 and 2002 dredging, which included both federal and local portions of Trail Creek, were able to

use the testing results from the 2000 dredging. In 2002, approximately 72,400 cubic yards of material were dredged from the harbor. After being dredged, the material was dewatered prior to being transported by truck to the landfill. The water extracted from the sediments was treated by the Michigan City Wastewater Treatment Plant prior to release.

Conclusion, outcomes, and recommendations

The situation in Michigan City benefited greatly from the close cooperation of the numerous local, state, and federal agencies that were involved. Management of harbor-related issues in Michigan City has often been conducted as an open forum between such agencies as the Army Corps of Engineers, The Indiana Department of Natural Resources, the Michigan City Port Authority, and the Mayor's office. This teamwork approach allowed for rapid communication about problems and identification of potential solutions in the present case.

Communication, teamwork and shared commitment to a solution were key.

Another unique feature of this case is the cooperation between the local government and the landfill operator, parties that had previously been at odds. It is likely that this strained relationship, along with the legal case filed against the company by the mayor,

contributed to the company's willingness to accept the dredged materials at no charge.

Timeline

- April 2000 – sediment is tested and determined to be suitable for landfilling, but not open water placement or beach nourishment
- June 2000 – 5-7,000 cubic yards of material is dredged and placed in Deercroft landfill
- Jan 2001 – Mayor begins legal action against Waste Management Inc.
- Mar 2001 – Waste Management and the City hire an environmental consulting firm
- Nov 5, 2001 -- Plan to use dredged material as daily cover is announced
- May 31, 2002 – LaPorte County Commissioner granted an extension to the closure date for Deercroft landfill until July 21st to accommodate dredging schedule
- June-July 2002 – Approximately 72,400 cubic yards (50,000 from federal portion) of material were dredged from the harbor and placed in Deercroft landfill

Table 1: Comparison of sediment analyses and RISC levels

Compound	MU1 Ave. Conc. ¹ mg/Kg	MU2 Ave. Conc. mg/Kg	MU3 Ave. Conc. mg/Kg	RISC level for Residential Direct Contact (mg/Kg)	RISC level for Migration to Ground Water (mg/Kg)	RISC level for Construction (mg/Kg)
Arsenic	5.2	5.3	11	3.9 ⁴	29	320
Barium	103	75	167	23,000	1600	79,000
Cadmium	9.8	12	12	12	7.5	570
Chromium ²	60	48	70	430	38	3400
Copper	53	50	84	13,000	580	42,000
Lead	67	66	102	400	81	970
Mercury	0.27	0.27	0.31	55	2.1	270
Nickel	26	20	37	6900	950	23,000
Selenium	0.46	0.50	0.80	1700	5.2	5700
Silver	1.1	1.1	1.2	1700	31	5700
Zinc	495	427	750	100,000	14,000	340,000
Anthracene ³	<0.42	0.57	<0.42	47,000	51	250,000
Benzo(a)anthracene	<0.42	0.75	<0.42	5	19	790
Benzo(b)-fluoranthene	<0.42	0.71	0.45	5	57	790
Benzo(k)-fluoranthene	<0.42	0.61	<0.42	50	39	7900
Benzo(a)pyrene	<0.42	0.78	0.42	0.5	8.2	79
Chrysene	0.48	0.81	0.55	500	25	79,000
Fluoranthene	0.56	1.48	0.81	6300	880	33,000
Pyrene	0.58	1.25	0.76	5500	570	27,000
Carbazole	<0.42	0.69	<0.42	210	5.9	31,000
bis(2-Ethylhexyl)-phthalate	1.55	2.0	1.46	300		18,000
Indeno(1,2,3-cd)pyrene	<0.42	0.65	<0.42	5	3.1	790

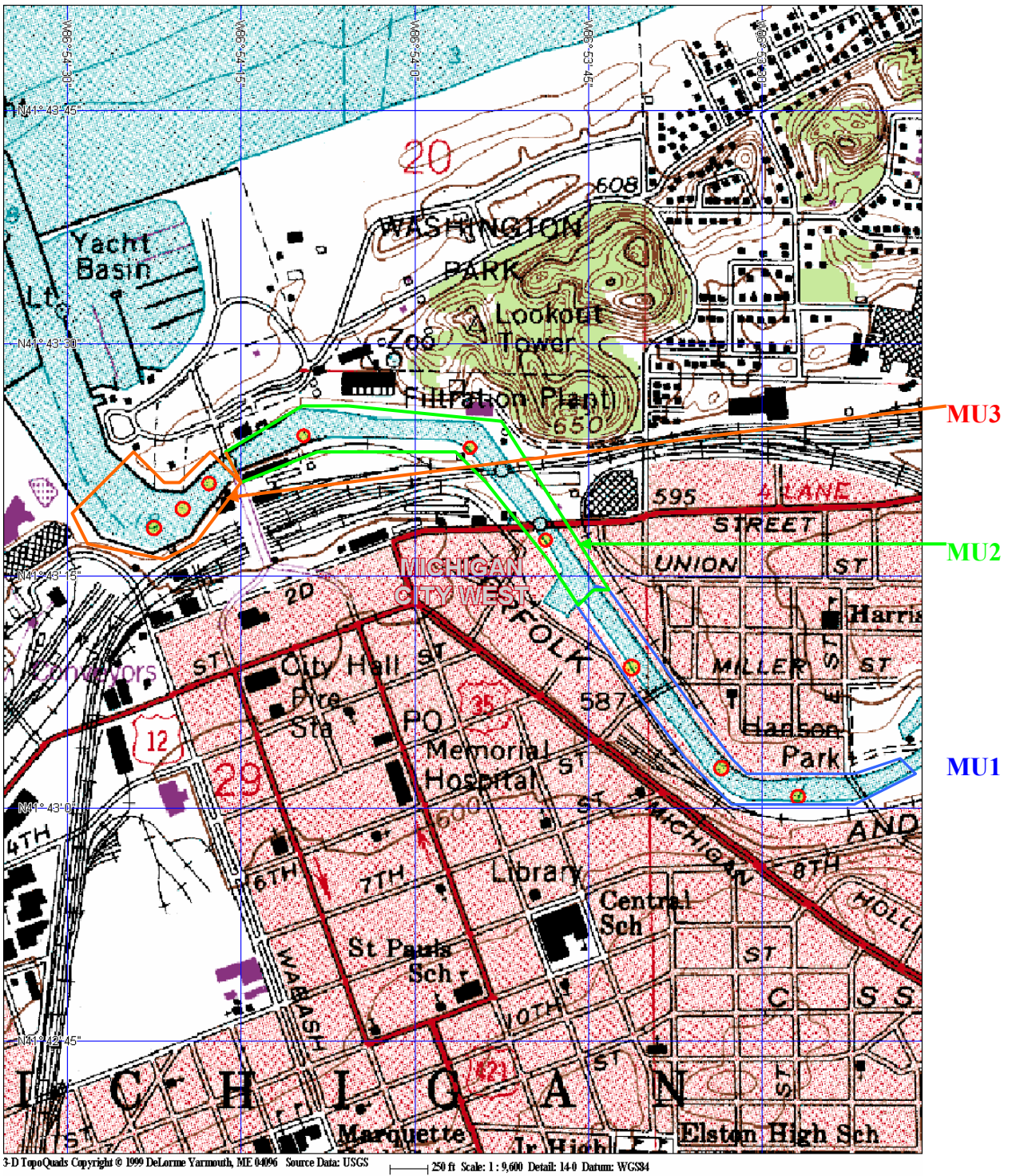
1: Arithmetic average. Reporting limit was used for any non-detectable results.

2: The RISC levels are for Chromium VI. The Trail Creek analytical results are for total Chromium.

3: Reporting limit for Semi-volatile compounds is 0.42 mg/Kg.

4: Grey shaded boxes are RISC levels that are exceeded in the sediment.

Figure 1: Project Area Map and Sampling Locations



Note: This case study was prepared in April 2004.

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