

## **8. EVALUATION OF ALTERNATIVE PLANS**

### **8.1 Alternative 1 - Develop the Zilwaukee Township Site, West of Saginaw River, into a Dredged Material Disposal Facility.**

By constructing a DMDF on 281 acres of the 581-acre site (the County of Saginaw will utilize the remaining 300 acres for wetland mitigation) the needed 3,100,000 CY capacity of containment can be achieved. As such, the site will meet the 20 - year capacity requirement, as mandated in ER 1105-2-100 (Federal Planning Guidance Notebook), Appendix E-15.

The Natural Resource Conservation Service (NRCS) evaluated the original 581 acres of farmland and determined that it is “Prior Converted cropland” and therefore is not considered a wetland. However, the Michigan Department of Environmental Quality (MDEQ) does not agree with NRCS’s position about the classification of the 581 acres. Therefore, the MDEQ requires Saginaw County to provide 300 acres of wetland mitigation if this alternative is executed. Further, this site is easily accessible by hydraulic dredging method. On-site substrate will be used to construct the containment dikes, which will contribute to easier construction and, therefore, reduce construction cost.

As such, this alternative has been determined to be the least costly and engineeringly feasible and therefore is the “recommended alternative”, which will be carried forward for more detailed analysis. Saginaw County has agreed to sponsor the project and is willing to sign a PCA upon approval of the DMMP.

### **8.2 Alternative 2 - Develop the Buena Vista Township Site, East of Saginaw River, into a Dredged Material Disposal Facility.**

This alternative consists of a 274-acre farm site of which the MDEQ also considers as farmed wetland, and therefore would also require wetland mitigation.

As is the case with Alternative 1, the MDEQ would require wetland mitigation at this site. As such, only 131 acres of land could be used for a DMDF; the reduced acreage will not meet requirements for the 20 - year capacity of 3,100,000 CY without constructing much larger perimeter dikes to create a taller facility. The much larger dikes would significantly increase construction costs, which would make the site more costly to develop than Alternative 1. Therefore, Alternative 2 will not be considered further.

### **8.3 Alternative 3 – Place Dredged Material at the General Motors Powertrain (Saginaw) Metal Casting Operation Landfill.**

This Type III landfill has adequate remaining capacity to satisfy the 20-year placement mandate, and is close to the dredging area.

However, the request from General Motors for indemnification for all dredged material placed in the landfill, and their sand casting material (through the MDEQ) was never resolved.

Eventually, without the backing of the MDEQ on the issue, General Motors withdrew its site from possible participation in this project. Also, operating expenses would be higher than using a typical CDF, since Type III landfills require that all placed material be considerably dryer than the dredging process normally produces. The triple handling of the dredge material through decanting, then trucking to the landfill, then placing the material (not including the tipping fee) makes this alternative costly. Therefore, Alternative 3 will not be considered further.

#### **8.4 Alternative 4 - Beach Nourishment**

This alternative considers the feasibility of using the material to enhance area beaches or return the material into the natural system from which it came.

Sediment analysis from December 1994 determined that the characteristics of the material are classified as "fine grained". Samples were taken at 7 locations in the river channel and 17 in the Bay channel. The fine grain material contains mainly silts and fine sand. The "fine grain" nature of this material makes it physically unsuitable for beach nourishment. In addition, the contaminate nature of the sediment makes it unsuitable for beneficial reuse. As such, Alternative 4 is not engineeringly feasible or environmentally acceptable and will not be considered as a candidate for implementation.

#### **8.5 Alternative 5 - Recycle the Dredged Material**

The Detroit District took part in a demonstration, which was part of the Environmental Protection Agency (EPA) Assessment and Remediation of Contaminated Sediments Program (ARCS) "PILOT-SCALE DEMONSTRATION OF SEDIMENT WASHING FOR THE TREATMENT OF SAGINAW RIVER SEDIMENTS" July 1994 (EPA 905-R94-019). The demonstration was held at the Saginaw Bay CDF beginning in October 1991.

During the demonstration, approximately 300 cubic yards of sediment dredged from Saginaw River was processed through a series of hydrocyclones (and other processing equipment) to separate the sediment into sand and silts. The sediment contaminants are generally associated with the fine-grained particles (silts and clays) and detritus and, upon separation, leave relatively clean sand. If the river sediments were predominantly clay and silt, the economics of the process would be severely affected, as little volume reduction would be achieved.

On the upper Saginaw River, the sand/clay ratio has been estimated at approximately 50/50. The hydrocyclone processing of the material cost \$23.17 per c/y in 1991, regardless of composition of the material. In 2004 dollars, the hydrocyclone process would cost approximately \$32.17 a c/y, even with considerable sand content. The original \$23.17 (and current \$32.17 rate) is based on 100,000 c/y; the cost would likely reduce by a percentage with volume (economy of scale), but would still be considerably higher than the current \$0.48 per c/y the proposed upland site would cost. The low yield of sand content makes the unit price for

processing the dredged material increase significantly. This unit cost does not include dredging and transporting the clean sand for marketing, or storing the fines.

In comparing the cost for Alternative 1 - Develop the Zilwaukee Township Site, West of Saginaw River, into a Dredged Material Disposal Facility - at \$1,500,000 (as shown in Table 4) which (at 3,100,000 c/y capacity) equates to \$0.48 per c/y versus \$32.17 per c/y for recycling, it is determined that the recycling alternative is not the least costly alternative and is inefficient. In addition, the contaminated nature of the sediment makes it unsuitable for beneficial reuse.

Lastly, there is an abundance of suitable sandy material available locally for less cost per cubic yard. Therefore this alternative is eliminated from further consideration.

### 8.6 Alternative 6 - No Action

Unless additional disposal areas are developed, dredging of material from designated navigation channels could not occur which would threaten the viability of the channel as a means to efficiently move goods and commodities. Under the "No Action" option, a backlog of maintenance dredging would grow, which will limit full utilization of the channel, resulting in increased transportation costs. Therefore, this alternative is not acceptable as a solution.

<b>TABLE 3 - Summary of Alternatives</b>				
Alternative	Placement	Capacity cubic yards	Construction Costs (\$)	Recommend to Phase II
Zilwaukee Twp. Site	Upland	3,100,000	1,800,000	Y
Buena Vista Twp. Site	Upland	3,100,000	2,200,000	N
General Motors	Upland	5,000,000	----- <sup>2</sup>	N
Beach Nourishment	Upland	Unlimited	-----	N
Recycle Dredged Material	Upland	Unknown <sup>1</sup>	-----	N
No Action	N/A	N/A	-----	N

1. The dredged material that was determined to be recyclable, yields only 15.86% clean sand.  
 2. Per discussion with General Motors, tipping fee range \$8-\$10 per yard equates to \$24.8M- 31.0M.

