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,FT DISCUSSION PAPER ON TECHNICAL CONSIDERATIONS FOR A POTENTIAL NEW BEDFORD SUPERFUND PILOT STUDY ON DREDGING AND DISPOSAL ALTERNATIVES

;ite Description -

Bedford Harbor, a tidal estuary, is situated between the City of New ,ford on the west and the towns of Fairhaven and Acushnet on the east at a head of Buzzards Bay, Massachusetts. The site can be divided into two :ographic areas. The most northern portion of the site extends from the oggeshall Street Bridge north to Wood Street in Acushnet. The remainder of the site extends south from the Coggeshall Street Bridge through the New Bedford Hurricane Barrier and into Buzzards Bay as far as the southern limit of PCB Shellfish Closure Zone 3. Geographic boundaries include the shoreline, wetlands and peripheral upland areas.

PCB contamination in New Bedford was first documented by both academic researchers and the Federal Government between the years 1974-1976. Testing revealed that Aerovox and Cornell-Dubilier were discharging wastewaters containing PCBs to New Bedford Harbor by both direct discharge and indirectly via the New Bedford municipal waterwater treatment facility.

Since this initial survey of the New Bedford area, a much better understanding of the extent of PCB contamination has been gained. The entire area north of the Hurricane Barrier, an area of 985 acres, is underlain by sediments containing elevated levels of PCBs and heavy metals including copper, chromium, zinc and lead. PCB concentrations range from a few parts per million (ppm) to over 30,000 ppm. Portions of western Buzzards Bay sediments are also contaminated, with concentrations occasionally exceeding 50 ppm. The water column in New Bedford Harbor has been measured to contain PCBs in the parts per billion range well in excess of EPA's "1 part per trillion" guideline.
A fast track Feasibility Study of remedial action alternatives for the highly-contaminated mudflats and sediments of the Acushnet River Estuary, north of the Coggeshall Street Bridge was requested by the EPA and the Commonwealth of Massachusetts. since the extremely high levels of PCBs and heavy metals in these locations appeared to pose an immediate risk to public health, public welfare, and the environment.

Upon completion of this Feasibility Study in August 1984, EPA sought public review and comment on five cleanup options for controlling 1 million cubic yards of contaminated sediment from the Upper Acushnet River Estuary. Construction costs ranged from 25 to 80 million dollars.

The options were:

- Channeling the Acushnet River north of the Coggeshall Street Bridge and capping contaminated sediments in the remaining open water areas.

- Dredging contaminated sediments and disposing of them in a partially lined containment site in the northern part of the estuary, along the eastern shore. (Dike Disposal Area)

Same option as above, except that the containment site would be lined on the bottom, as well as on the sides.

Dredging contaminated sediments and disposing of them in a nearby upland containment site (no site presently available).

Dredging contaminated sediments (which lay over clean sediments) and dredging clean sediments, temporarily storing both before returning the contaminated sediments to the bottom and covering with clean sediments. (Confined Aquatic Disposal)

EPA received extensive comments on the options from other federal, state and local officials, potentially responsible parties, and individuals. Many of these comments expressed concern regarding the adequacy of available dredging techniques and the potential impacts of dredging on the Harbor dut to re-suspension of contaminated sediments. The potential release of contaminated water ("leachate") from an unlined disposal site was another area of concern.

The U.S. Army Corps of Engineers, at EPA request, is conducting studies to address these questions and further evaluate the engineering feasibility of the dredging and disposal alternatives. The study will address the potential for contaminated migration from the upper estuary through the Coggeshall Street Bridge during dredging operations and for estimating leachate contaminate levels and release rates from a dike disposal area. Also, other tests will be performed to identify proper disposal alternatives (liner types, size of facilities, efficient treatment).

The present schedule calls for an overall New Bedford Harbor (combined upper estuary and lower harbor/bay areas) Feasibility Study to be completed by January 1988.

2. Need -

The pilot study need derives from the problem of applying conventional or special dredging techniques to a Superfund clean up action. In the past we have not apolied laboratory tests to determine the results of disturbing the contaminated sediment by dredging, i.e. contaminant resuspension and degree of cleanup achieved. Although we believe that a specific clean up level can be obtained by dredging, the number of dredge passes over the same area to achieve that level is unknown. Additional passes may greatly increase the amount of sediment handled and the associated effects and costs.

One disposal approach (underwater confined disposal site) used successfully overseas had very limited application in the United States. The technology for construction of an underwater large pit, and subsequent backfilling with contaminated sediment and capping with clean sediment by using a submerged diffuser has not been demonstrated in this country.

, the actions and reactions of the particular contaminated
its during the dredging and the disposal process at field scale
ed to bench scale are unclear. These factors could cause the
ng and disposal alternatives to become unattractive. To discover
problems during design or construction would be costly requiring a
lete redesign of the remedial action. Another question the pilot
dy will address is whether the contaminated sediment can be stabilized
solidified in the field for use as a liner for a disposal site or as a
parate remedial action alternative to removal or covering. Acceptance
this method could greatly reduce the cost of a liner (previously
stimated at 40 million dollars). Or if dredging proves unattractive,
these demonstrated stabilization techniques may allow the development of
an alternative to the very disruptive cover and hydraulic control option.

Finally, the evaluation of the operational aspects of the dredging and disposal alternatives would provide data necessary to provide actual cost information rather than conservative extrapolated costs. The control of the dredge cut holds the biggest potential cost savings since for this option it determines the amount of contaminated sediment to be handled and disposed of safely. Normal production dredge controls result in an overcut of approximately one foot. A 25 to 50% increase in material handled with its associated costs can be anticipated. The need to demonstrate various equipment performances is critical for determining implementable dredging alternatives and their associated costs.

Additional associated benefits of performing this pilot study include refining of laboratory tests for effluent/leachate/runoff treatment from the dike disposal area, testing of construction techniques for dikes and disposal cells, and field testing a monitoring program. The information gathered will aid not only in the design of dredging and disposal alternatives but in most other options as well; most alternatives will require the movement and storage of the contaminated sediment either permanently or temporarily utilizing some of these techniques.

3. Objectives -

The primary objective of the study is to demonstrate dredging as a feasible alternative for cleanup. This involves monitoring the water column during actual dredging operations for sediment resuspension and testing the bottom sediments after the dredging for residual contamination. The scope of the test dredging must be large enough to represent a prototype cleanup yet small enough to be economical and logistically practical.

The results of the study should be available before the Feasibility Study is released to the public in early 1988. This may generate and focus State and public comment on the remedial action alternatives. Development and acceptance of the Record of Decision will be enhanced when people have seen the actual operation.

The study should fit in with and prepare for the overall cleanup. This may be difficult since all laboratory and site investigation data will not be available during design if the study is to be completed in 1987. Flexibility in contractual arrangements will be pursued to meet

jective. This may result in continual modifications and redesigns n actual implementation with an attendent increase in cost. The ate objective being that a specific area will be cleaned up such that er remedial action is not required in that area.

lly, we should field test methods that have not been routinely applied highly contaminated sediments in the past. This may include abilization, confined aquatic disposal, dredging equipment controls, fluent treatment, construction and monitoring techniques. Depending on esults of the laboratory testing progress and the major configuration of che study, some or all of these techniques may be demonstrated. Whatever is done must fit in and provide meaningful results.

4. Conceptual design -

For discussion purposes since the initial laboratory tests will not be available until November we have developed the following pilot study design:

a. Removing approximately 25,000 cubic yards of contaminated (approximately 100 ppm PCB) sediment by conventional hydraulic dredge from a cove, north of the Coggeshall Street Bridge, off playground areas in New Bedford.

b. Disposing of the sediment in both a four acre diked disposal area and in a confined aquatic disposal site. In this process approximately another 25,000 cubic yards of clean sediment will be dredged for capping the sites. All disposal sites will be located within the cove area. See attached sheets for a schematic of the construction steps and maps showing the area to be dredged and the location of the disposal sites.

The concept design has evolved over the past months from discussions with members of the study team and represents a minimum amount of dredging that will produce reproducible and reliable results for the various disposal options tested. Also, flexibility is provided to address other techniques that show promise during the pilot study development. These techniques discussed include cutter head modification, operational controls and testing different dredging equipment, and additional stabilization studies.

The decision to work in areas of lower contamination in the upper estuary rather than higher (average or worst case) is based on minimizing the risk of release. The decision is similar to one made over a year ago not to proceed to a Record of Decision until additional detailed dredging and disposal studies are complete. Contaminate release testing should be completed during the study design period, at which time we will have laboratory data on release from 1000 ppm PCB contaminated sediment. If the tests show minimal release we will incorporate dredging higher contaminated material as a second step in the plan. Correlation between the lab test and actual contaminate release is not well documented, suggesting linkage be made at the lower, less risky level first. To move into the most contaminated area (36000 ppm PCB) does not seem prudent until additional testing of that sediment is accomplished and experience is gained in the less contaminated area.

completion of the initial laboratory tests in November 1986, a detailed pilot study design will be developed. We anticipate modification changes to that detailed design as additional data and decisions are leading up to the development of the Feasibility Study.

Monitoring Plan -

It is critical to obtain before, during and after the pilot study the appropriate type and detail level of reliable data necessary to evaluate the pilotted dredging and disposal operations. To accomplish this the monitoring plan will be developed in concert with the detailed design.

The major effort will be the data gathering during the pilot dredging and disposal test, and the immediate analysis of that data. We anticipate establishing an on-site lab for the data reduction so operational changes can be accomplished during the test. To do otherwise would result in additional costs for personnel and equipment downtime or for mobilization and demobilization. Long delays in data analysis would result in no meaningful results by early 1988 when the Feasibility Study is being reviewed.

Both water and air samples will be taken. Previous studies have identified both as pathways of contaminant release. Limited sampling before the pilot test is recommended to establish background conditions. Testing to insure against contaminant migration and impacts on public health and safety will be performed. The results of primary interest are the performance data during the pilot test which are critical to evaluating the study and confirming benefits of the study. Limited air and water monitoring will continue after the pilot operation stops to insure that there are no problems regarding the environment or public health. In addition, sediment in the area will be tested before and after the operation to assess the efficiency of the dredge.

6. Preliminary Engineering and Construction schedule and Cost Estimate-

The schedule is broken down into five major parts -

a. Identify type, size and location of the various test components (dredges, disposal site, stabilization techniques, etc.) to be performed in October and November of 1986.

b. Development of a detailed pilot study design (December through February 1987). This includes Safety, QA/QC and monitoring plans.

c. Preparation of construction drawings and specifications for the contract. (March and April 1987)

d. Solicit, receive and review bids; award construction contract. (May through July 1987).

e. Implementation of pilot study (August 1987 through January 1988).

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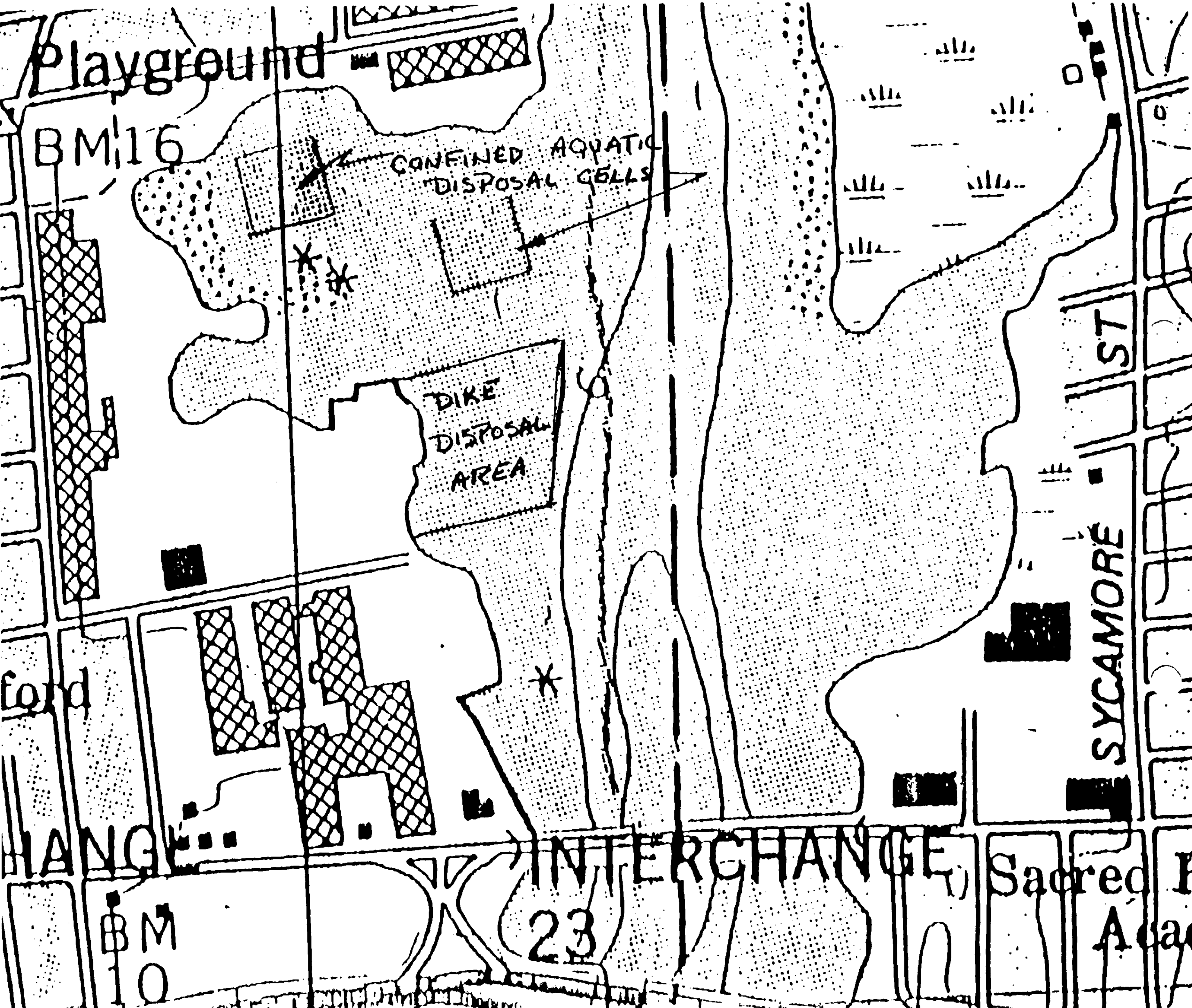
Other tasks such as obtaining lands and permits; obtaining monitoring, test and any other special equipment; and any additional field sampling must be accomplished before May 1987.

The preliminary cost estimate for performing the design and construction is approximately 2.5 million dollars. An additional one million dollars is required to develop and implement the monitoring plan. Costs for obtaining lands and permits and other special equipment are not included in these costs.


Agushnet
Normandin Jr High Sch
HARWICH
WOOD
Ashley Sch
Brooklawn Park
St Joseph Sch
Library
Quarries
Burt Sch
Substation
LAWSON
TOOTLE LANE
CENTRAL
Lincoln Sch
HATHAWAY
Gifford Sch
St Kilians Sch
DAVIS
Phillips Ave Sch
Playground
DEANE
Confined Aquatic Disposal Cells
Diked Disposal Area
North Fairhaven
HARDING RD
Woodside Cem
MORGAN
Livesey Park
Oxford
COGGESHALL
Sacred Heart Cem
Sacred Heart Academy
INTERCHANGE
Riverside Cem
Radio Towers (WBSM)
ADAMS
RIVER


Playground
BM16
CONFINED AQUATIC DISPOSAL CELLS
DIKE DISPOSAL AREA
ford
HANGE
INTERCHANGE
23
BM 10
SYCAMORE ST
Sacred
Acad

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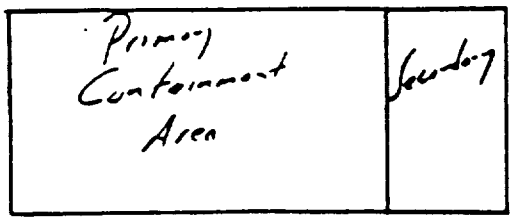
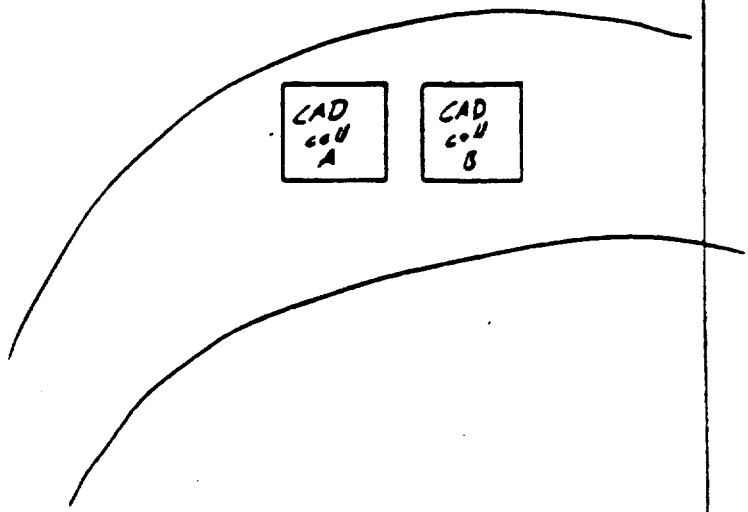
Concepts for New Bedford Dem.	CHECKED BY:	DATE:	SHEET NO.

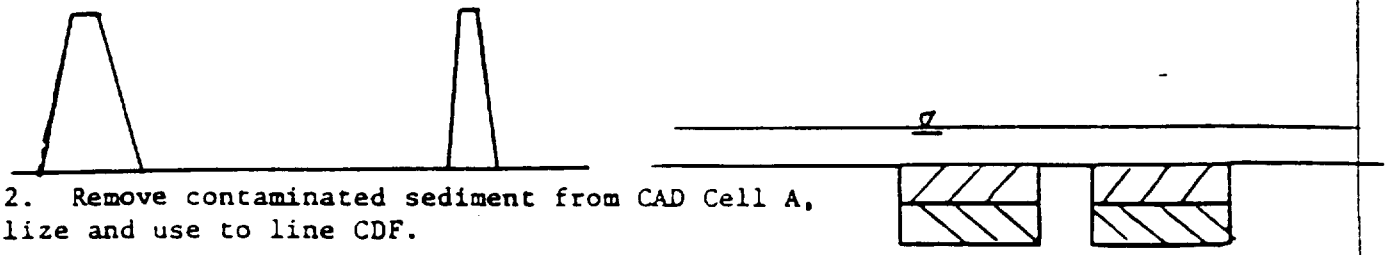
Confined Disposal Facility (Intertidal)



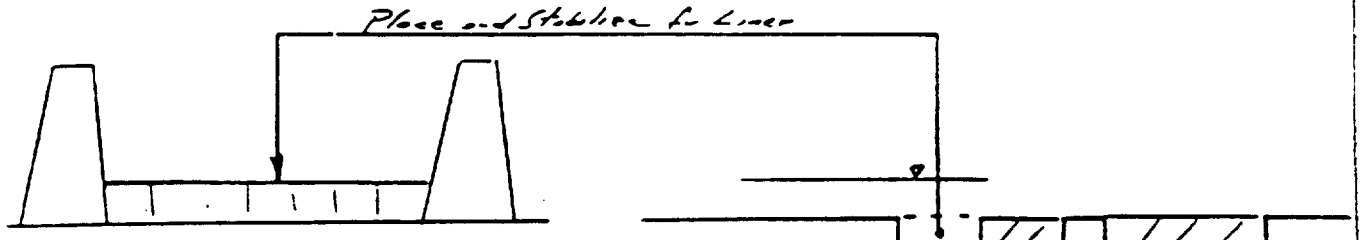
Confined Aquatic Disposal Cell



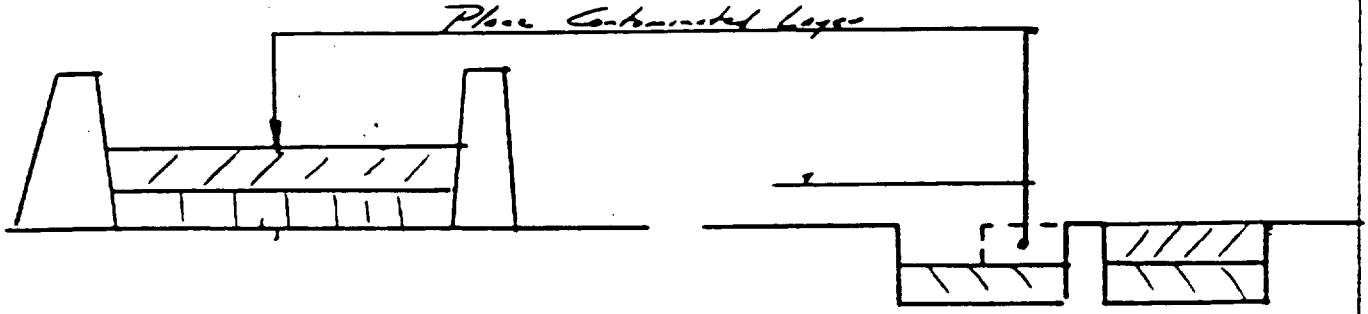
Step 1. Construct CDF. Primary area for settling, secondary for chemical clarification. Size to be determined but 5-10 acres likely.



Step 2. Remove contaminated sediment from CAD Cell A, stabilize and use to line CDF.



Step 3. Remove remainder of contaminated sediment from CAD Cell A and add to CDF to demonstrate primary settling and additional treatment if necessary.



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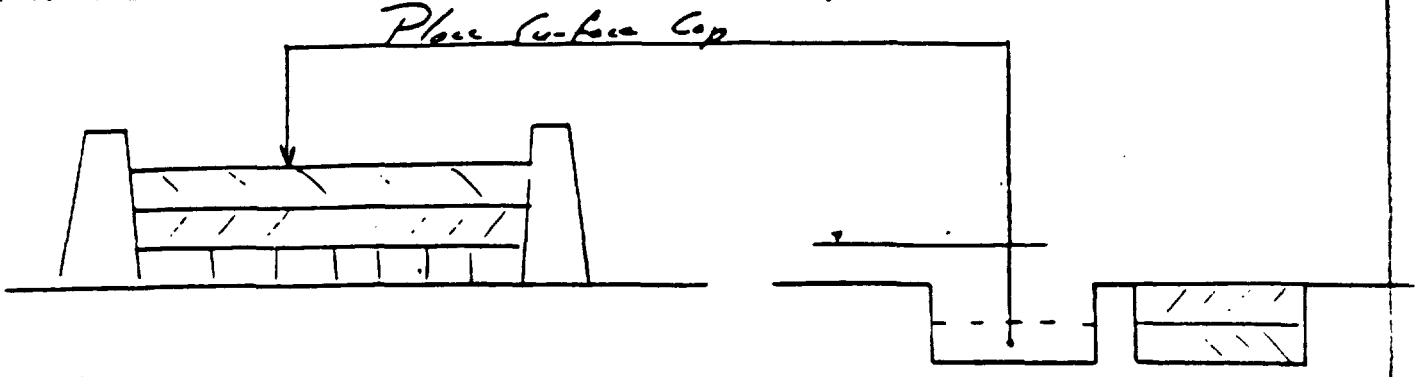
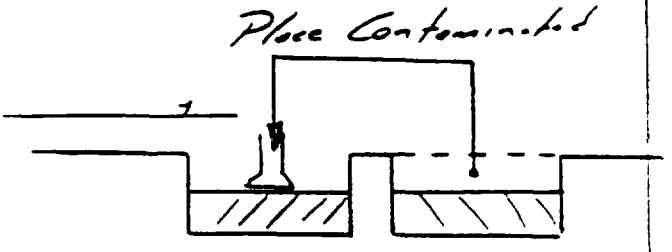
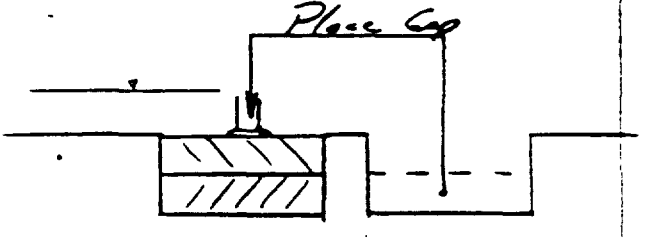
Step 4. Remove clean sediment from CAD Cell A and cap CDF.

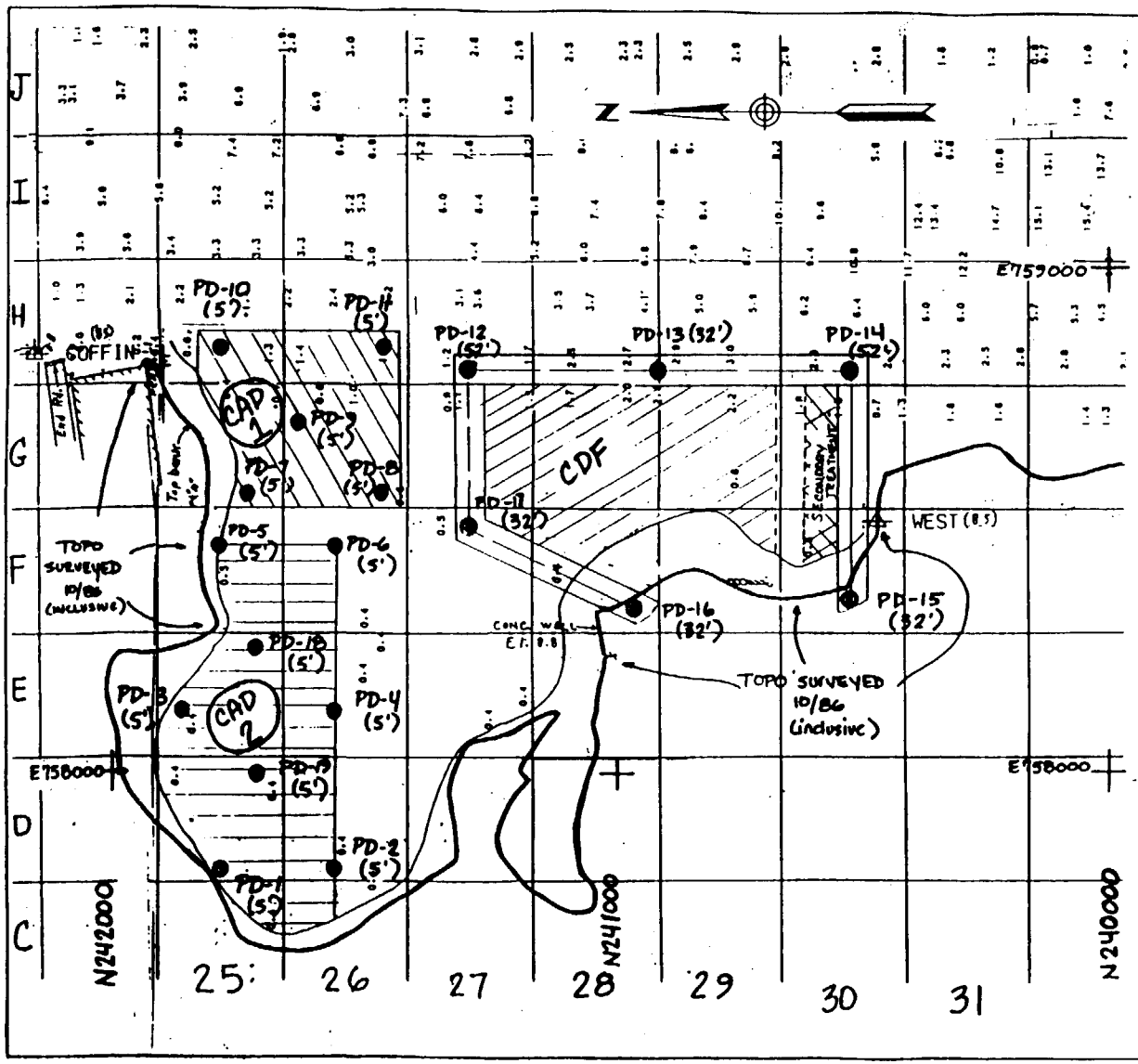


Step 5. Remove contaminated sediment from CAD Cell B and place in first CAD cell with submerged diffuser.



Step 6. Remove clean sediment from Cell B and place with submerged diffuser the cap on Cell A.





NOTES

- Soundings are in feet and tenths and are referred to the plane of Mean Low Water (MLW)
- Hydrography from survey of August 1985
- Topography not to scale, except where noted.
- Coordinates are based on the Lambert Grid System for the State of Massachusetts

LEGEND

- ● EXPLORATION LOCATION
- (5') DEPTH OF EXPLORATION
- PD PILOT DRIVE

SCALE

1" = 200' (APPROX.)

1"

	NORTHING	EASTING
PD-1	241780	757820
PD-2	241560	757820
[illegible]	241850	758125
[illegible]	241560	758125
[illegible]	241480	758450
[illegible]	241560	758450
[illegible]	241740	758550
[illegible]	241460	758550
PD-9	241630	758620
PD-10	241780	758840
PD-11	241460	758840
PD-12	241290	758795
PD-13	241900	758795
PD-14	241525	758795
PD-15	240520	758350
PD-16	240950	758325
PD-17	241290	758480
PD-18	241710	758250
PD-19	241710	758000

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY	NEW BEDFORD SUPERFUND
DR. BY	PILOT STUDY
CH. BY	EXPLORATION PLAN
GEOTECH. ENG BR.	SCALE: AS SHOWN
SK. NO. 1	DATE: 10/23/86