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LAKE DREDGING PROJECT

Town Center Village

April 11, 2007



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BACKGROUND

August 2006

Staff & Consultants Present to CA Board of Directors
on the Dredging of Lakes Kittamaqundi and Elkhorn

- Includes Options for:
 - * Sediment Removal
 - * Staging Areas
 - * Material Placement



BACKGROUND

September 2006

Staff Makes Presentations to Village Boards of:

Owen Brown

Town Center

Options Are Reviewed and Comments Are Received



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BACKGROUND

Based on Comments Heard from CA BOD and Village Boards:

- Staff Researched Alternate Methods of:
 - Sediment Removal
 - Staging Areas
 - Placement

- Staff Researched Construction Techniques To:
 - Minimize Disruption to Residents



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The Next Slides Are the Results of the Research

First – Let's Review the Mechanics of Lake Dredging



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MECHANICS OF LAKE DREDGING

There are Two Methods to Remove Sediment

and

There are Two Options for Handling the Sediment



MECHANICS OF LAKE DREDGING

The Two Methods to Remove Sediment Are:

- 1) Mechanical – Scooped Out with Mechanized Buckets

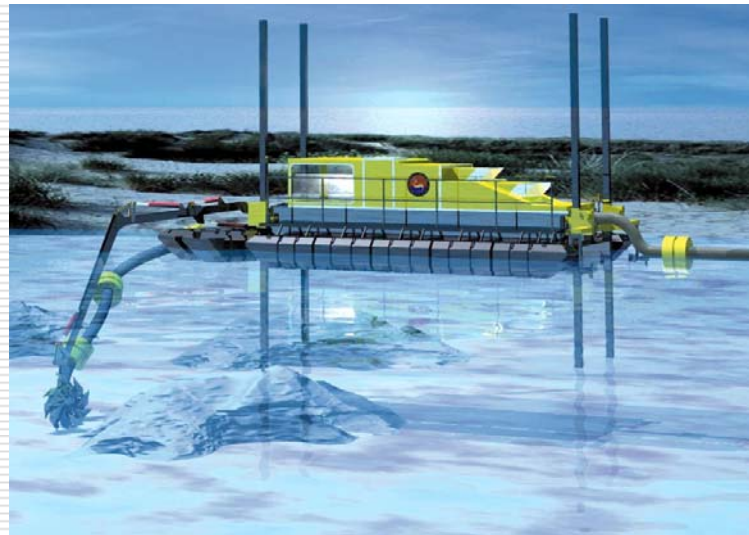




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MECHANICS OF LAKE DREDGING

2) Hydraulically – Vacuumed Out with Pumps



- Staff Believes that the Handling Cost Precludes “Mechanical” Dredging



MECHANICS OF LAKE DREDGING

Before Trucking, the Sediment is Handled at Staging Areas.

At the Staging Area the Material is Either:

- 1) Mechanically De-Watered





MECHANICS OF LAKE DREDGING

Or:

2) Loaded Wet into Water Tight Container Trucks

Staff Believes that the Handling Cost Precludes Loading Wet



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STAGING and PLACEMENT

Let's Review the Staging and Placement Options
for Lake Kittamaqundi

We'll Begin with Staging Options and then Placement Opportunities,
as well as Construction Cost Estimates

Note: The Cost for the Project is Energy Dependent

- Estimates Assume a 5% Inflation Factor for Crude Oil

LAKE KITTAMAQUUNDI





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LAKE KITTAMAQUNDI

Consultants and Staff Believe there are 3 POSSIBLE "STAGING" OPTIONS:

- 1) Vantage Point
- 2) South Entrance Property
- 3) Crescent Property

Each Option Has a Different Impact on the Community and Cost Varies Greatly by Set-up or Staging Costs

All Three Options Require Tree Removal – Either to Create the Staging Area, Access to the Haul Road or for Pipeline Access. Appropriate Site Restoration Will Be Required as Part of the Permitting Process.



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1) Vantage Point

- Immediately Adjacent to a Town Home Community
- The Only Viable Access Will Require Creation of a Substantial Haul Road



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VANTAGE POINT





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VANTAGE POINT





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2) Crescent Property

- Several Thousand Feet Away from Dredging Operation
- Will Require a Pipeline Approximately 6,000' with a Pumping Station and Burying Pipeline Under South Entrance Road



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CRESCENT PROPERTY





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CRESCENT PROPERTY





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CRESCENT PROPERTY





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3) South Entrance Property

- Adjacent to South Entrance Road
- Requires Some Sediment Transport Piping
- Staging Costs are the Lowest for this Option



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SOUTH ENTRANCE PROPERTY





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SOUTH ENTRANCE PROPERTY





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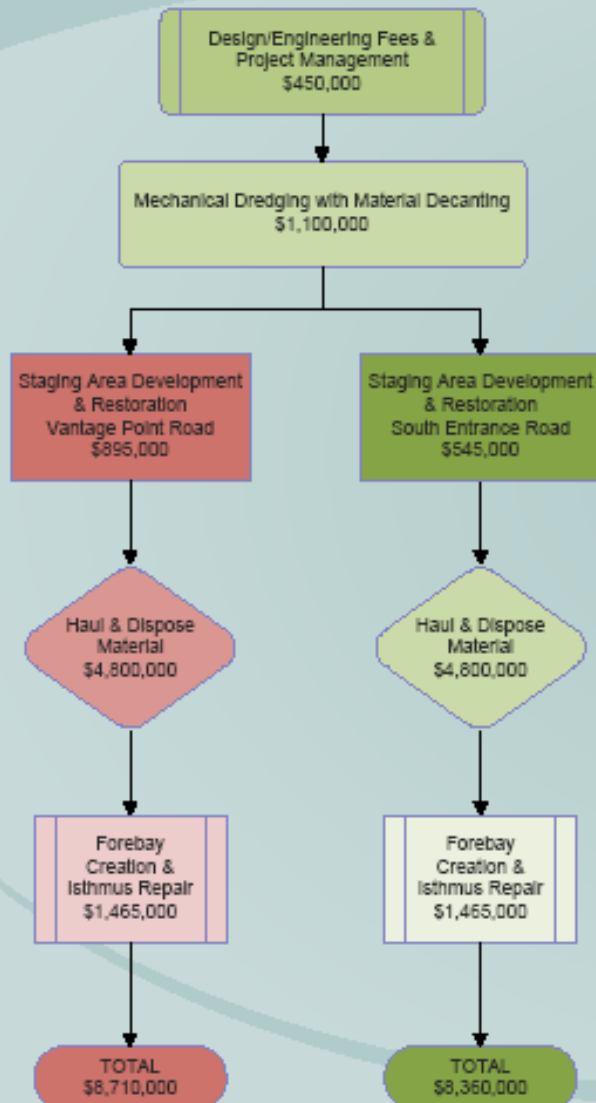
SOUTH ENTRANCE PROPERTY



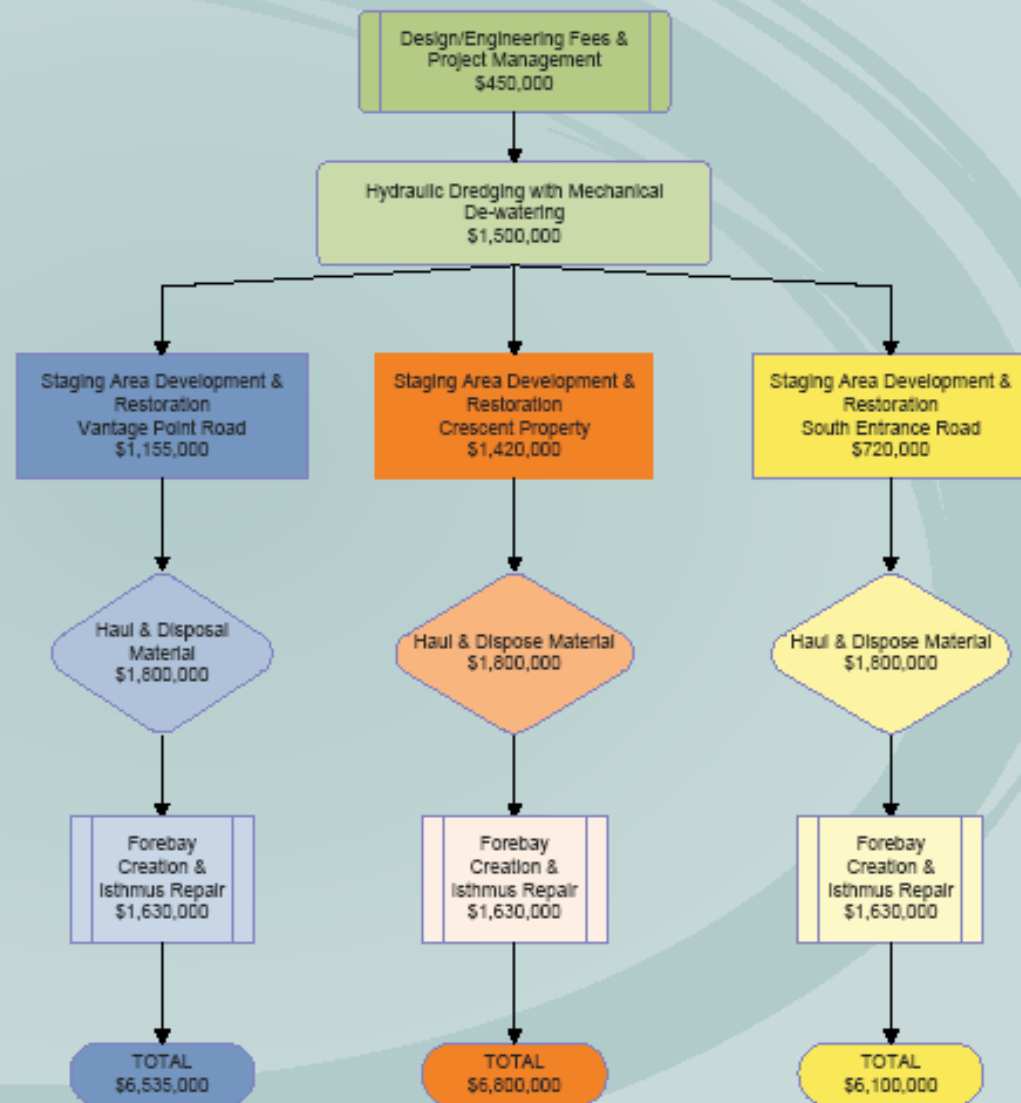
LAKE KITTAMAQUUNDI DREDGING

3/6/2007

MECHANICAL DREDGING WITH MATERIAL DECANTING



HYDRAULIC DREDGING WITH MECHANICAL DEWATERING





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COST ESTIMATE FLOW CHART REVIEW

- Design & Project Management Cost is Constant
- Estimated Cost of Hydraulic Dredging is Consistent
- The Project Cost Difference can be Found in the Staging Site Development and Restoration Costs



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COST ESTIMATE FLOW CHART REVIEW

- **Mechanical Dredging** with Wet Haul is Only Viable at Either Vantage Point Road or South Entrance Road because Direct Access to the Lake is Necessary
- Although the Staging Cost Using Mechanical Dredging are Lower than Hydraulic Dredging, Haul Off and Disposal Costs Bring Total Estimated Cost to at Least \$8.4M
- Staff Does Not Recommend Considering Mechanical Dredging



COST ESTIMATE FLOW CHART REVIEW

With **Hydraulic Dredging and Mechanical Dewatering** – Cost of Dredging is the Same for Each Option

- Vantage Point Road – Staging Area has Best Access to Lake, however, Cost of Haul Road Brings Estimated Cost to \$6.5M
- Crescent Property – Furthest From Dredge Area Requiring 6000' of Pipe with Booster Pump and Boring Under South Entrance Road. Estimated Cost is \$6.8
- South Entrance Property – Least Expensive to Develop and Good Access to Rt. 29. Estimated Cost is \$6.1



COST ESTIMATE FLOW CHART REVIEW

Staff Believes that Cost makes Mechanical Dredging Prohibitive,

And that Hydraulic Dredging is the Desirable Approach for

Lake Kittamaqundi



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