

PHASE ONE: HARBOR ANALYSIS

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

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KICKOFF MEETING

A project kickoff meeting was held on November 14, 2006, at Saugatuck City Hall. The purpose of the meeting was to define the project goals and gather pertinent data for the Master Plan. The meeting focused on four main points:

1. Understand how the harbor is currently utilized.
2. Review past studies and maintenance dredging efforts.
3. Discuss environmental issues that may impact harbor development.
4. Define the overall goals of this planning effort (i.e., What does success look like?).

The following summarizes the topics discussed and the community input gathered from the kickoff meeting.

Harbor Use

1. Who are typical users of the harbor?

The users of the harbor can be categorized into the following groups:

- Ten percent of users are transient day users who utilize local boat launches.
- Thirty-five to forty percent of users are recreational visitors based in other harbors. Some stay as overnight transient visitors.
- Fifty percent of the users are moored in the harbor at marinas or condominium/home-based docks.

The harbor attracts a diversity of users, from jet skiers to kayakers to fishermen to large power boaters. The community believes that the diverse use of the harbor contributes to the economic viability of the harbor communities by creating more interest and energy at the waterfront.

There are several commercial businesses that rely on the harbor for their livelihood including charter/tour boats, boat rentals and marine contractors.

The harbor hosts several annual events including a fishing tournament, Venetian Festival/boat parade, July 4th fireworks, river fire event, and in the past, visits from Great Lakes cruise ships. The Saugatuck Chain Ferry connects downtown Saugatuck with the Saugatuck Peninsula and is a main attraction to harbor visitors.

The natural environment is also considered an important “user” of the harbor area.

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

The harbor is used as a harbor of refuge and/or overnight transient harbor. Most of this use is boat anchoring in open water southwest of downtown Saugatuck; however, since there is a limited dinghy dock and no dinghy service, the harbor is not very welcoming. The volume of transient boaters does not appear adequate to support a dinghy service.

2. Where are key bottlenecks in the harbor/river?

The following conflicts and problems of use were noted by community members:

- There is limited maneuver room in the river and lake due to shallows.
- Visitors lack knowledge of the shallow areas and Saugatuck Chain Ferry.
- The Saugatuck Chain Ferry causes back-ups, but they are not unmanageable.
- The “No Wake Zone” at the river narrows north of Saugatuck; the definition of “no wake” is often in question.

The Allegan County Sheriff’s Office and U.S. Coast Guard both maintain a positive relationship with the community, and their frequent presence in the harbor is welcomed.

3. Is there capacity and demand for additional users?

Despite the bottlenecks noted above, the community believes that there is additional capacity in the harbor to expand facilities and use. The river channel handles traffic reasonably well, even at peak flow times. Removing the shallow water areas would significantly contribute to improving the function of the harbor. The community strongly believes that if the harbor had more usable lake area and more predictable water depths, the demand for harbor facilities would increase dramatically.

Harbor Facilities

1. Identify key facilities in the harbor.

The public and private marinas, as well as personal boat docks, are essential elements of the harbor and adjacent communities. Tower Marine, as the only large full-service marina, is significantly important to the local economy.

The harbor has three public boat launch facilities for power boats: a single-lane launch in downtown Saugatuck with no dedicated parking; a single-lane launch in Douglas with no dedicated parking; and a four-lane launch at Schultz Park with approximately 40 parking spaces. A fourth boat launch exists at the east end of Center Street in Douglas that provides access for canoes and kayaks only.

Two publicly accessible fueling docks exist near downtown Saugatuck. Pump-out facilities are provided at most of the private marinas. These private facilities for fuel and pump-out appear to be adequately serving the boating public. Concern was expressed regarding potential impacts of these private facilities going out of business.

There are no public shower and washroom facilities to serve transient boaters in the harbor.

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

2. What are the impressions of harbor facilities users?
Harbor visitors are frustrated by the presence of shallow water zones covering a great deal of the harbor water. Local people report complaints from visitors and anecdotal evidence that the lack of open water has dissuaded many boaters from coming into the harbor for fear of getting stuck.
3. Are existing public boating facilities well located?
The best boat launch in the harbor is located at the far east end in Schultz Park. Unfortunately, this launch is furthest from Lake Michigan, and shallow water depths could inhibit its use.

Dredging Issues

1. What is the frequency and location of past dredging practices?
The U.S. Army Corp of Engineers (USACE) dredges the mouth of the river on a three year cycle that is not adequate according to reports by local boaters. Tower Marine performs maintenance dredging on a regular basis to provide access from the river channel to the marina. Some limited dredging has occurred in recent years related to boat launch construction and private docks.
2. What funding mechanisms have been considered or used?
The USACE's efforts are funded out of the federal harbor budget, and Tower Marine pays for its own dredging. No larger scale dredging or funding efforts have been pursued in recent years.
3. Where have dredge spoils been disposed of to date?
The USACE dredges sand and typically blows the material back onto the beach for beach nourishment. Tower Marine has its own upland disposal cells on the south side of Kalamazoo Lake.
4. Have the sediments been characterized for contaminants of concern and other parameters for disposal purposes?
Limited chemical data has been provided to the master planning team. This limited data indicates that the sediments contain polychlorinated biphenyls (PCBs).
5. Where are problem areas for sediment deposition?
Deposition is a problem on both sides of the river channel in Kalamazoo Lake and at the western edge of Douglas Harbor.
6. Have any disposal site candidates been identified?
The City of Saugatuck owns property that was purchased years ago for an airport that was never built. This site should be considered as a disposal site.

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

Other Issues (Identified by the Community)

- Piers at the mouth of the river are in poor condition and will likely need significant repair.
- Long term siltation – what happens if no measures are taken?
- If there is a dead zone in the harbor, the harbor will die. Since the harbor is the lifeblood of the community, it must remain functioning.
- Ambassadorship is an issue for the entire community. How do we collectively sell experience to visitors?
- Long term ownership of marinas needs to be resolved to prevent sales for condominium development.
- Large condominium developments need to be limited to preserve the great open views that now exist in both communities.
- Establishment of a harbor authority needs to be explored to manage and maintain harbor facilities and uses.

The Definition of Project Success

To conclude the kickoff meeting, the attendees were asked what their vision of a successful Master Plan is. The responses are recorded below in no particular order.

- A harbor that functions (i.e., has deeper water)
- Diverse users (i.e., room for everyone)
- Marina services with hours that are adequate and stable
- Full use without being over capacity
- Room for wildlife, fisheries and the environment to thrive
- Preservation of old harbor lands (i.e., Saugatuck Peninsula)
- Public awareness and knowledge of need for improving the harbor, and of the harbor's importance in the preservation of the community
- Saugatuck Township involvement in the effort to preserve the harbor
- Working boat ramps and public access
- Visual access to the harbor (do not overbuild condominiums and block views)
- A return of cruise ships to the harbor
- Walking access to water's edge
- Existing marinas kept viable (Butler, Saugatuck Yacht, etc.)
- Transition to condominiums managed
- Port Authority or other mechanism created to maintain harbor
- The report for this effort is not kept on a shelf

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

HARBOR AND DREDGE ANALYSIS

Following the kickoff meeting, the master planning team performed a review of site conditions, and researched existing data relative to the river flow conditions, history and presence of contaminants.

Harbor Analysis Plan

A Harbor Analysis Plan (refer to Appendix A, Diagram A) was prepared to summarize the conditions of the harbor and the facilities within the harbor. The results are categorized and summarized as follows:

1. Bathymetry

A bathymetric survey was prepared based on an actual survey of water depths in November 2006 (refer to Diagram B). A survey crew of two mapped Kalamazoo Lake and Douglas Harbor, and summarized their findings on a survey map. The survey demonstrates that significant portions of the harbor are less than 2 feet deep, even though this shallow water is not evident from a visual survey of the harbor. Approximately 27% of the middle of Kalamazoo Lake is less than 2 feet deep, and the shallow zones are located to either side of the river channel, which is the area most likely to be used for recreational boating.

2. Harbor Use Areas

The Harbor Analysis Plan highlights use areas within the harbor, including travel lanes, marina facilities and informal anchorage areas in Kalamazoo Lake. The plan demonstrates that when these three uses are considered along with the locations of the shallow water areas, there is very little remaining open water within the harbor available for other recreational uses.

3. Wetland Systems and Public Lands

The Harbor Analysis Plan highlights the locations of regulated wetland systems as mapped by JJR staff biologists. There are significant wetland systems within the harbor, particularly in the Douglas Harbor basin. Land with public ownership is also highlighted on the map as assets to the harbor community. Of particular note are the public street ends that terminate at the water and provide important points of water access.

4. Launch and Marina Facilities

A review of launch facilities reveals that none of the harbor's public power boat launches have adequate parking for the number of launch lanes. The only launch that provides parking is at Schultz Park, which has approximately 40 parking spaces. Using a standard of 30 spaces per lane, the park should have at least 120 parking spaces. The Harbor Analysis Plan notes the location of the kayak launch at Wade's Bayou Memorial Park in Douglas.

The plan documents the number of marina slips within the harbor and groups the slips by size. Major marinas are listed on the plan.

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

Harbor Environmental Concerns

Given the shallow conditions within the harbor, removal of accumulated sediments through dredging will be required to maintain and restore the harbor. As such, it is critical to understand the chemical and physical condition of the sediments, and the status of the Superfund cleanup.

The Master Plan study area lies within the U.S. Environmental Protection Agency (EPA) Kalamazoo River Superfund site designation, which begins well upstream of Plainwell and extends to Lake Michigan. The funding and timing for cleanup of the river and harbor through the Superfund process is uncertain. Facilitated discussions are ongoing between the EPA, the Principal Responsible Parties and other stakeholders. It appears that an agreement to clean up the river from the Allegan Dam eastward is forthcoming. The EPA and the Principal Responsible Parties have not committed to fund work in the Kalamazoo Harbor project area.

The sediments in the harbor contain PCBs and other contaminants based on the data provided by the Harbor Committee. The master planning team evaluated this and other publicly available sediment data (chemistry and grain-size information) to understand more fully the extent of the PCB impacts.

Based on the data, federal solid and hazardous waste regulations will require that the sediment, if removed from the harbor, must be managed as a "special" solid waste. The material is not considered a TSCA (toxic substance (or hazardous waste) based on the available data.

Since the harbor sediments do contain contaminants, any dredge spoils will need to be properly managed, according to state and federal regulations. Disposal options for the sediments are discussed in later sections of this report.

River Flow and Sedimentation Characteristics

JJR reviewed the river hydraulic model prepared by the Federal Emergency Management Agency (FEMA), U.S. Geological Survey (USGS) river gauge data and other available sources for river flow data. Peak storm flows and normal flow rates were evaluated to better understand the dynamic flow of the river through normal and peak flow periods.

The median flow rate of the Kalamazoo River is approximately 1,600 cubic feet per second. At current water levels, the waterway opening under the Blue Star bridge is approximately 2,400 square feet. This calculates to a mean velocity of approximately 0.7 feet per second. At the same location, the FEMA 100-year flood flow is 12,400 cubic feet per second with a waterway area of 4,200 square feet and a mean velocity of 3 feet per second.

River velocities as low as 1.0 foot per second can be self-scouring and carry sediments within the flow. At slower rates, sediments can separate from river flow and settle on the river bottom. The two bridges within the study area have waterway openings that provide scouring velocities for flows above the mean river flow rate. As the river passes through these areas of restriction, it widens

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

considerably into Douglas Lake and Kalamazoo Lake. As the river cross-section gets larger, the velocity of the flow slows considerably, resulting in sedimentation of the open water areas.

History of Sediment Deposition and Dredging

Historic photographs of the harbor, dredging records and historic bathymetric surveys of the river have been studied to determine the nature and extent of the sedimentation problem in the harbor over the last 135 years.

Although the sedimentation process is a naturally occurring one, man's use of the land and river have modified its shape, and the pattern and rate of sedimentation. In the late nineteenth and early twentieth century, the use of the river to transport timber and the clearing of land resulted in the fairly rapid sedimentation of the river, which necessitated a regular program of large-scale dredging. Limits of past dredging activity generally show that Kalamazoo Lake was maintained to a navigable depth across the entire lake, while the Douglas Harbor was primarily dredged to allow use and access to the western portions of the harbor. The last comprehensive dredging of the harbor area was in the 1930s, although regular maintenance dredging has been ongoing since that effort.

Shifts in land use in the last 70 years away from timber production and toward agriculture have resulted in de-acceleration of the rate of sedimentation in the harbor, although the process continues to occur.

Analysis of Recent Sedimentation Trends

An analysis of sedimentation patterns from 1986 to 2006 was conducted as part of this study, based on USACE soundings, harbor navigation maps and the recent bathymetric survey completed by JJR. This analysis concluded that:

1. Over the past 20 years, sedimentation has proceeded at an average rate of approximately 36,000 cubic yards per year. It should be noted that this rate is highly variable from year to year and highly dependant of peak river flows.
2. Douglas Harbor is effectively full of sediments, and Kalamazoo Lake is steadily filling from east to west.
3. Ongoing maintenance dredging by Tower Marine has kept sedimentation at bay at the west end of Kalamazoo Lake, but the trend is for deposition areas to encroach westward at a rate that the current maintenance work cannot keep pace with.
4. Without benefit of a comprehensive dredging approach, the shallow water areas will continue to grow.

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

Harbor of the Future

A series of four alternative future scenarios were prepared to illustrate distinctly different visions for the future of the harbor (refer to Appendix A, Diagrams C and D). The first plan assumed that basic maintenance dredging would occur as necessary to maintain access to existing facilities, but no more. In this case, the sedimentation process would proceed largely unchecked, and would result in an even greater area of the harbor becoming “islands” of shallow water or mud flats.

The second alternative assumes the dredging of all or most of the harbor, and the creation of a “sediment trap” in Douglas Harbor that would collect the bulk of the sediment for later dredging and disposal.

The third and fourth alternatives show stone structures within the harbor that would concentrate the flow of the river in a channel, and thereby increase flow velocity and reduce future sedimentation in the harbor. The stone structures could also act to contain sediments that would be stored within the harbor in Confined Disposal Facilities (CDF). The plans were different with regard to the location of CDFs, river channel or active-use areas.

The four alternatives were presented as “what if” scenarios, and no conclusions or recommendations were presented.

WORKSHOP #1

JJR conducted a public workshop to present the findings discussed above and receive public input. The workshop was held at Saugatuck High School on December 14, 2006. Attendees included members of the Harbor Committee, residents, business owners, and representatives from the Michigan Department of Environmental Quality (MDEQ) Land and Water Management Division and Michigan Department of Natural Resources (MDNR) Fisheries Division.

Federal and state regulatory and resource experts were invited to attend the workshop in order to provide input into the process. These professionals were not invited to provide definitive opinions or findings on the ideas presented, but to make them aware of the community’s progress in defining a vision for the harbor and to provide them an opportunity to offer constructive input.

The most fruitful part of the workshop was the discussion regarding the four alternative future scenarios, which ranged from a minimal response to a dredge and channel approach. Key points learned from the discussion include:

1. The MDNR Fisheries Division is more receptive to dredging activity west of the Blue Star Highway, and may consider limited dredging to the east along the Douglas shore. Otherwise, they would support leaving Douglas Harbor untouched as shallow water fisheries habitat and would like to see some area of Kalamazoo Lake remain as shallow water.

KALAMAZOO HARBOR MASTER PLAN
Technical Report
August 14, 2007

2. Creating an in-basin CDF is unlikely to get MDEQ support, because it will fill existing lake bottom and shallow water habitat. While it could be argued that without dredging the lake bottom will be lost due to continued sedimentation, any proposal to fill the lake bottom will likely face significant scrutiny during the permitting process.
3. Channeling the river with stone structures raised the curiosity of the regulators and resource experts, but since it's not an approach with a substantial track record in Michigan, they were skeptical as to its feasibility.

Following the public workshop, the planning work entered the next phase in which harbor improvements and sedimentation management approaches were proposed.