



Marina Master Plan Update

Final Draft - February 15, 2024



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Special thanks to the following personnel for their participation in the process and for their commitment to enhancing the public's access to our waterways, both now and into the future:

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1.0 PURPOSE

The Village of Suttons Bay has developed this 5-year Marina Master Plan update after undertaking a thorough process of inventory, analysis, and public input collection. This plan incorporates past recommendations, discusses recent improvements, evaluates the current state of amenities and infrastructure, provides recommendations for future improvements and funding resources for the improvements. It was authored by Abonmarche Consultants, Inc, with contributions from the Village of Suttons Bay staff.

Priorities include:

- Boater services/bath house: Identify proposed location of the new boater services/bath house/public restroom building
- A-Dock: Replace A-Dock to optimize use of space; consider removing unused launch
- Office/Gas Hut: Consolidate office and gas hut buildings into one with sufficient space, if feasible
- Wave Attenuation: Basin calming/protection of the eastern limits of the docks from wave action
- North Parking Lot: Identify options for resiliency during high water and for control/detention/treatment of storm water runoff

Secondary improvements are further discussed herein so that they may be implemented as complimentary features to the above priorities or contemplated as standalone phases. Secondary improvements may include those identified and listed in previous plans, as well as new needs that have been identified.

2.0 EXECUTIVE SUMMARY

The Village of Suttons Bay has made great progress towards modernizing the marina. Several remaining key priority improvements are detailed herein with concepts drawings and opinions of probable cost. Opportunities for grant funding are available through both State of Michigan programs and Federal opportunities.

Through a phased approach, the Village will seek to complete the remaining priority improvements based upon the urgency of each need, potential grant funding opportunities, and upon the availability of local funding shares.

As an initial phase, the Village has identified two to three key projects and will seek funding opportunities that will help supplement and leverage local funding. The initial projects include:

- Boater services/public restroom building and/or A Dock reconstruction
- Resilient parking lot reconstruction with green infrastructure strategies and trail connections
- Basin calming measures to minimize the impacts of wave conditions at the eastern extents of C-Dock and D-Dock

3.0 MARINA BACKGROUND

3.1 Location & Project Limits

The Village of Suttons Bay Marina is located on the eastern edge of Leelanau County, along the clear waters of West Grand Traverse Bay, in Lake Michigan. The Suttons Bay Marina successfully obtained a designated Clean Marina Certification in 2014 and continues to implement best practices recommended by the Clean Water Program.

Past improvements include ADA compliant gangways, floating head piers with integrated electrical and water, a floating fuel service dock, and an ADA accessible beach area accessed by the marina parking area.

The Marina is bound by Suttons Bay Beach to the north, Suttons Bay to the east, Front Street to the west, and W. Broadway Street (extended) to the south.



Figure 1: Approximate Project Limits (Image credit: Village of Suttons Bay)

3.2 History of the Marina Master Plan

- This 2024 Marina Master Plan update continues to expand on the improvements outlined in the 2012 plan and implemented in 2018. In drafting this update, we found that numerous priorities identified in the 2014 Master Plan Implementation were still valid and therefore remain in this 2024 update.
- The 2018 Marina Project was implemented following in depth discussions, public input, and planning.
- In 2014, the Master Plan Implementation was adopted to include various drawings, cost estimates and funding options, which was the framework for a Marina upgrade.
- The 2012 Marina Master Plan proved very helpful in guiding the Village towards marina improvements and was the first Marina Plan to include focus on public participation.
- In 2012, the Village of Suttons Bay Master Plan illustrated a long-term vision for the marina. This plan was the catalyst for drafting a more in-depth Suttons Bay Marina Master Plan.

3.3 Five Year Parks and Recreation Master Plan

The current parks and recreation master plan was developed in 2022 for the 5-year period of 2022 to 2026. It includes several identified improvements within the project area which are related to the marina. The following improvements relate to discussions herein:

- Replace public bathrooms
- Incorporate additional Plantings/landscaping
- Create a designated drop off area for paddle sports
- Replace the pedestrian bridge over coastal wetland and add educational components
- Develop educational signage in partnership with Inland Seas Education Association
- Improve/expand walkable areas
- Protect shorelines from erosion

3.4 Relevant Construction History

Since adoption of the 2012 and 2014 plans, several phases of construction have been completed. These phases have included the following:

- ADA compliant floating gangways, and marina utilities of B-Dock, C-Dock, and D-Dock
- Accessibility gangways were added to C-Dock, B-Dock, and D-Dock (2018/2019)
- New upland primary electric and water infrastructure for basin docks
- Site landscape and native planting improvements (2021/2022/2023)
- Site/marina basin boat launch ramp has been closed due to the presence of a better launch option nearby and interference with basin navigation (2021)
- Marina floating service pier and dispenser (2013)
- Non-motorized trails added and enhanced (2019/2020)
- Shoreline protection enhancements to north side of north peninsula and coal dock shoreline sections (2020/2021)
- Stabilization of fuel tank and portion of North Pier and Coal Dock shoreline (2016)



Figure 2: Project Map; Drone image provided by Village of Suttons Bay

4.0 INITIAL SITE EVALUATION

A site evaluation was completed on June 26, 2023, to assess the general condition of key marina components and to review Village priorities and vision.

4.1 Initial Site Evaluation & Condition Assessment

The site evaluation was completed by Michael Morphey, PE, (Abonmarche Consultants, Inc.) and Edie Aylsworth (Village of Suttons Bay Harbormaster). It included a visual review of the marina project and specifically the components below. An aerial image-based map is attached with observation notes. The following summary is intended to capture the key observations and discussions during the assessment.

4.1.1 A-Dock



Figure 3: A-Dock drone image provided by Village of Suttons Bay

A-Dock consists of seven floating finger piers, each with a short, seasonal ramp connection to upland space. A-Dock provides a mix of 30% seasonal slips while 70% are reserved for transient mooring of smaller boats/dinghies as day use/shopper docks.

The longer piers can typically accommodate up to three vessels on each side while shorter piers accommodate up to two vessels on each side. This unconventional mooring practice creates challenges with the navigation and mooring at A-Dock

Updating the dock to meet ADA accessibility standards, reconfiguring the dock to incorporate a more modern dock configuration, and installing future marine utilities would bring A-Dock up to standard.

4.1.2 Launch Ramp

The 2012 Master Plan included many comments seeking to eliminate the launch ramp due to congestion. The existing concrete launch ramp measures approximately 80 feet long by 30 feet wide.

The launch was closed in 2021 to ensure safe basin navigation; to minimize pedestrian conflicts; and as a result of ramp undermining. A separate public boat launch is located just north of the marina on Front Street, which has essentially replaced the marina boat launch.

Removal of the ramp and excavation (dredging) would create additional mooring capacity within the marina basin and eliminate potential future boat launching conflicts with pedestrians.



Figure 4: Launch ramp with west marina office 'hut' in background

4.1.3 Bath House/Public Restroom Building

The bath house/public restroom building is located at the corner of Front Street and Adams Street. It includes separate bath house spaces for slipholders; two single-use public restrooms; and a maintenance/storage room. The building was constructed in 1978 and is identified for replacement in this plan.



Figure 5: Public restrooms/boater bath house building

4.1.4 Marina/Beach Parking Lot

The marina and marina beach asphalt parking lot appears to be reaching the end of its life cycle. Visible concerns (see Figure 6) include alligator cracking and potholes. The parking lot has been prone to flooding in recent years during high water level conditions and major storm events.

A more resilient parking lot incorporating additional green infrastructure practices is envisioned to resist future flooding and treat stormwater runoff.



Figure 6: Representative photo of main parking lot condition; note cracking and elevation relative to beach

4.1.5 Beach area

Marina Beach is a large multi-recreational beach located adjacent to the Village Marina. Improvements to Marina Beach include a large vegetative buffer strip of native plants to help pre-treat water runoff generated by the parking lot, as well as an ADA compliant recreation area utilizing mobility mats. (Figure 7)



Figure 7: Natural area buffer in foreground; beach and mobi-mat use area in background

4.1.6 West 'Hut'

A small marina office 'hut' is located adjacent to and just east of the closed boat launch. The building is sited above the parking lot elevation and was constructed in 1984. The building is approximately 140 square feet in size and is utilized by marina staff for operations.

The Village would like to remove this building from service and consolidate its operations within a larger and more modern ADA compliant structure. The new "hut" would be located where the service pier and east marina office 'hut' (see 4.1.8) is currently located, essentially consolidating services from both 'huts' while increasing efficiency, accessibility, and safety.



Figure 8: West 'hut' in foreground; B-Dock at right; East 'hut' in background

4.1.7 B-Dock

B-Dock was improved as a part of the 2018/2019 marina project. This floating timber dock is accessed by an ADA compliant 60-foot-long gangway and features modern marina utilities such as improved electrical and water. Due to the recent upgrades this plan does not contemplate improvements to this dock.



Figure 9: B-Dock, rip rap shoreline, public pathway, native plantings buffer strip to filter runoff

4.1.8 Service Pier/East 'Hut'

The service pier and east marina office 'hut' are located just east of B-Dock. (Figure 11).

The hut, built in 1984, is constructed on timber piles within the marina basin. It is connected to the fixed service pier, which contains a fuel dispenser and sanitary pumpout. A floating dock, accessed by a set of articulating stairs, is also anchored broadside to the fixed pier to help service vessels in all high/low water level conditions (Figure 12).

The Village has identified this building for replacement. The intent is to consolidate operations from both the east and west huts into a new, more modern, ADA compliant structure in this location. This location improves efficiency, customer service, and safety by consolidating services at one location. Minimizing boat traffic from unnecessarily entering the inland portions of the marina basin is a priority of this plan.

Several improvements have been implemented along the path, including a new upland concrete path, seating area, and native plantings (Figure 10).



Figure 10: Path, seating areas (at left and center), native planting areas



Figure 11: East 'hut' and connection to land



Figure 12: Service pier, fuel dispensers, sanitary pumpout

4.1.9 C-Dock

C-Dock was improved as a part of the 2018/2019 marina project. This floating timber dock is accessed by an ADA compliant 60-foot-long gangway and features modern marina utilities.

C-Dock contains 5 seasonal slips (Slips 57-61) and 13 transient slips (Slips 62-74). The north interior wall (see Figure 13) of the basin is a vertical timber sheet wall, which was constructed in 1962 as part of the original marina Waterways Grant. It was later modified in 1988 with State emergency management grant funding to stabilize the wall during high water conditions. This wall has been identified for future improvement.

Due to C-Docks location and lack of a wave attenuator, the east end of the pier is exposed and susceptible to current, unpredictable short-term wave conditions, and ice heave. Due to these concerns, a portion of C-Dock was designed with an electrical disconnect to allow it to be removed and relocated during the off-season and protected from open lake conditions.



Figure 13: C-Dock with adjacent timber sheeting wall and pathway

4.1.10 D-Dock

D-Dock was improved as a part of the 2018/2019 marina project. This floating timber dock features modern marina utilities and is accessed by three gangways. Two western gangways are approximately 60 feet long and the eastern gangway is approximately 50 feet long.

Due to D-Docks location and lack of a wave attenuator, the east end of the pier is exposed and susceptible to current, unpredictable wave conditions, and ice heave. Due to these concerns, a portion of D-Dock was designed with an electrical disconnect to allow it to be removed and relocated during the off-season and protected from open lake conditions.

Limited parking is available near D-Dock at the end of West Madison Street. An asphalt lot is located here, with approximately 20 to 25 parking spaces. Two portable restrooms are placed each season in the parking lot.



Figure 14: D-Dock gangway and pier in background

4.1.11 South Pier Near D-Dock

A 335-foot long, 10-foot-wide fixed pier is located near the southern side of the main marina basin, parallel to D-Dock. The pier was constructed with funds from a 1990 DNR Recreation (discretionary) Grant. The pier is connected to the landside trails and provides a public amenity. Prior to the addition of new gangways in 2019, the fixed pier provided access to D-Dock.



Figure 15: Fixed pier at left; D-Dock (east extent) at right

4.1.12 Pedestrian Connection from Main Basin to South Docks

To access the Coal docks from the marina basin on foot, one must traverse the edge of private property along the west edge of the large coastal wetland area.

Access was once provided by a bridge located on the east side of the marina, or by a boardwalk also located on east side of the marina. The bridge was located near D-Dock and traversed the coastal wetlands connecting both sides of the marina and providing access to Coal Dock Park and the fishing pier. Due to damage caused by record high water level conditions, the bridge became a safety risk and required removal. The boardwalk traversed the western edge of the coastal wetland area and had to be removed due to advanced deterioration and safety concerns during the high water.

Both the bridge and boardwalk provided a looping, pedestrian connection around the wetlands and between the marina basin and coal dock. Neither route is currently accessible, however the replacement of the pedestrian bridge and boardwalk is a high priority. When replaced the pathways would once again provide a recreational waterfront trail for pedestrians.



Figure 16: Current pedestrian path of travel from main basin to south docks

4.1.13 Coal Dock

The coal dock is comprised of individual floating finger piers with short ramp access points to land. There are 18 piers, each 32 feet in length, which provide 36 seasonal slips.

Although not identified as a priority, the coal dock should be updated to modern standards at some point. This would include a fixed or floating, accessible dock system with modern utilities.

A small, unpaved parking lot has space for approximately ten to fifteen vehicles near the South Docks, at the end of Dame Street.

Although much of the shoreline in this reach was stabilized with rip rap stone in recent years, stone has not yet been placed within the western 100 feet of the shoreline. Some erosion has occurred in this area and stabilization measures are warranted to avoid further recession.



Figure 17: South docks; note stabilized shoreline in background, none in foreground

4.1.14 Inland Seas Dock

The Inland Seas dock is a fixed, timber, broadside dock which is leased by Inland Seas Education Association from the Village of Suttons Bay.

The shoreline in the vicinity of the dock required emergency stabilization in 2021 due to the high levels of erosion associated with the high-water level conditions. This area rapidly lost approximately 10 feet of shoreline to erosion threatening the ISEA dock itself. Trap bags were installed to stabilize the shoreline and prevent further erosion of the shoreline.

In the western portion of the area, a recent decline in Lake Michigan still water levels have exposed some portions of the shoreline which were previously submerged. These locations may provide prime locations for the installation of 'soft' shoreline protection measures such as coir logs, plantings, limited stone placement, and other features which would help to increase resiliency before high water levels return.



Figure 18: Inland Seas dock; note Trap Bag shoreline to right

4.1.15 Fishing Pier

A fixed, timber fishing pier is located near the end of the peninsula in Coal Dock Park. It was funded by a Great Lakes Fishery Trust grant in 1992 therefore, the pier lacks ADA Accessibility and does not meet current ADA standards. In addition to the general maintenance of this pier, future improvements include improving ADA accessibility, incorporating energy efficient lighting, and fixing the ice heave and ice jacking on the north end of the pier.



Figure 19: Fishing pier; note lack of ADA-compliant rail; note uneven deck/rail

4.1.16 General/Misc.

Portable restrooms are located in the beach/marina parking lot, the D-Dock parking lot, and the South Dock parking lot. A more permanent solution or, at minimum, enclosures could help improve the aesthetics and/or function of this amenity.



Figure 20: Portable restroom locations (Image credit: Village of Suttons Bay)

4.2 Meeting Summary (June 26, 2023)

A kickoff meeting was held on June 26, 2023, between Rob Larrea, AICP (Village Manager), Edie Aylsworth (Harbor Master), and Michael Morphey, PE (Abonmarche) to identify and confirm priority improvements and secondary improvements. The following is intended to summarize key discussion points:

1. Complete the updated plan by January to allow for potential April grant applications.
2. The fishing pier was built in 90s thanks to a 1992 Grant.
3. Marina harbor debris cleaning has been completed intermittently through the use of a Pixie Drone (remote-controlled robot), in partnership with the Watershed Council of Grand Traverse Bay.
4. The beach was recently surveyed, and Village will provide a copy, if available.
5. Village Parks and Recreation plan will be provided by the Village. It includes plans for an 'Educational Trail' around the wetland with interpretive signage.
6. A bridge across the mouth of the wetland was previously removed because of high water conditions. A new pedestrian connection is envisioned.
7. Dredging was completed in 2013, within both the main basin and Coal Dock.
8. Shoreline protection improvements (placement of rip rap stone) were completed along the north/outer shoreline of the North Pier. No work was done to the shorelines within basin.
9. No grants have been sought for marina since its initial construction in the 1960s. The development of the marina was funded in part from a 1962 DNR Waterways Grant.
10. Primary goals:
 - a. Eliminate ramp to increase safety to pedestrian traffic and use the space for creation/expansion of slips
 - b. Reconfigure/improve A-Dock area
 - c. Eliminate 1 of 2 staff 'huts' and combine in to one to increase efficiency
 - d. Evaluate locations and opportunities for a new public restroom and slip leaseholder bath house/boater services building
 - e. Attenuate wave energy, particularly near east ends of both main piers
11. Longer term goal/secondary goal:
 - a. Look for ways/locations to add larger slips, potentially broadside outside of the basin

5.0 LONG-TERM MAINTENANCE SCHEDULES

As plans are implemented, long-term maintenance schedules will include the following:

5.1 Maintenance Dredging

Maintenance dredging may be required on an intermittent basis but is not a major concern due to site characteristics. Dredging needs within the marina are generally due to water level conditions rather than siltation. During extreme low water conditions, slips which accommodate deep draft vessels, and the service pier may require maintenance dredging. On average, dredging may be needed every five to ten years, with minimal volumes of dredging below 2,500 cubic yards reasonably expected.

5.2 Dock Replacements

Floating docks should be evaluated annually, but a replacement cycle of approximately 20 to 25 years may be reasonably expected.

5.3 Building Maintenance

Typical major capital building maintenance needs include:

- Roof replacement on 15-20 year cycle
- Restroom/shower renovations on a 10-15 year cycle

5.4 Annual Maintenance Procedures

The following annual maintenance procedures are anticipated:

- Dock inspections – spring and fall
- Electrical and plumbing annual inspections/testing, winterization, and spring activation
- Fall ice suppression installation and removal
- Upland maintenance activities – cleaning, rubbish pickup, snow removal, plant irrigation and trimming, etc.
- Building winterization and spring opening
- Fuel system winterization and spring startup

6.0 PRIORITY IMPROVEMENT RECOMMENDATIONS

The following priority improvements have been evaluated and recommendations are provided along with the attached concept plans and opinions of costs.

6.1 A-Dock and Launch Removal

Through removal of the launch ramp and dredging the basin to meet adjacent existing depths, the capacity for more and larger slips can be achieved. The attached concept depicts a new A-Dock layout, which will replace the existing A-Dock with a floating system. As shown, a total of 25 slips would be possible, including 16-25' slips and 8-60' slips. The 60' slips would provide an opportunity for larger vessels, or based upon demand, could be utilized in a similar manner as the current piers, with two smaller vessels. An additional, smaller slip would be possible between the new A-Dock and existing B-Dock.

The floating pier would be accessed by a 60-foot gangway from the same general area as B-Dock. Main pier widths as shown are eight feet but could be reduced if needed. ADA-compliance, fire protection, and modern utility systems would replace the old land-based systems. Appropriate fairways would be maintained for both the small boat area and the larger 60-foot slips.

6.2 Boater Services/Public Restroom Building

The current location of the boater services/public restroom building is ideal, as it is accessible and visible from both the main marina basin and the Suttons Bay commercial district. The site is located near pedestrian routes and alongside the TART Trail.

Combining the uses into a new, single structure will result in the greatest cost economy and ease the burden of maintenance. Existing utility systems are present and would provide sanitary sewers, water, and electricity to the new structure.

The topography of the existing site provides opportunities to separate uses by floor and to capture views of the marina, especially if a viewing deck and/or lounge is included in the new structure (see image below). The lower floor could be accessible via a 'walk-out' basement and the upper floor would be accessible from the elevation of Front Street. The attached concepts depict a new structure in this location.



Figure 21: Viewshed from existing public restroom/boater bath house building

6.3 West Hut/East Hut

The attached concepts depict removal of the western 'hut' and expansion of the eastern/gas 'hut.' Creating an expanded marina operations structure in this location will allow staff to better address marina operation needs and to service fueling and pumpout needs. An alternative location is depicted just east of the fuel storage tank. This location does not provide the same level of access, but may need to be considered, pending regulatory processes.

Some modification to the service pier is also shown to create an opportunity for a small slip along the east side of the pier, The slip could be utilized for temporary queuing, a shopper/diner dock, or as a seasonal slip, if demand warrants the use. The existing broadside floating pier is shown without change to allow continued access during a range of water levels. This overall concept is intended to minimize modifications to the existing pier, but to provide improved operational capacity.

As an alternative, a larger scale modification of the dock could be undertaken to create an entirely new floating service pier. The large, fixed service pier would be replaced with a floating service pier with sanitary pumpout and fuel dispensers, eliminating the need for a separate broadside floating pier and saving space.

6.4 North Parking Lot

As described above, the north parking lot is in poor to fair condition and will soon need resurfacing or full reconstruction. In order to minimize the risk of future flooding and to create a more resilient solution, the attached concept alternatives depict a new parking lot constructed at a higher elevation. Stone placement along the northern edge of the parking lot would help to separate the beach from parking and to mitigate the effects of erosion during future high-water events. Each of the concepts envision a modified entry at Front Street to create space for the new boater services/restroom building and for a new eight-foot pedestrian pathway. The parking lot would remain one-way in the counterclockwise direction in both concepts. An 8' pathway would be constructed in both concepts along the edge of the marina to connect to the existing pedestrian pathway along the north marina edge.

Concept one depicts 52 angled (45°) spaces, including two ADA-designated spaces. This concept envisions a large first-flush drainage basin for collection of parking lot runoff and filtration before discharging back to the waters of Lake Michigan. Pending final design, it may be possible for the basin to filter the outflow from the drainage system located at the west end of the marina. This option may provide an opportunity to cut down on sedimentation into the marina basin by providing an accessible location where sediment would be collected and removed on a regular basis.

Concept two depicts 49 mostly angled (60°) spaces, including two ADA-designated spaces. It includes a long first-flush drainage basin between the entry drive and the parking area to filter parking lot runoff prior to discharge to Lake Michigan.

6.5 Basin Calming

The eastern extents of both C-Dock and D-Dock are exposed to wave conditions during even mild wind events. Impacts from waves make slips undesirable at times and unusable during extreme events. Over the long term, this exposure will shorten the useful life of the floating docks, wearing connections and anchor systems.

To mitigate these impacts, several schematic concepts are depicted in the attached concept drawings. Each of the concepts is intended to avoid construction of rubble mound breakwaters, due to likely regulatory challenges and bottomland impacts.

The following are depicted:

- **Option 1, Segmented Floating Wave Attenuators:** Introduce a series of segmented floating wave attenuators to absorb waves from the most common directions. Segmented attenuators, when installed in a multi-layer series, will minimize the propagation of short period waves into the marina basin. Segmentation allows some flexibility and movement between individual pontoons, minimizing the risk of failure during extreme events. This solution has been deployed with success in other Northern Michigan communities.

- **Option 2, Entry Floating Wave Attenuators:** Introduce long, wave attenuators at each side of the basin entrance to absorb and reflect wave energy. This option likely results in the greatest basin calming, but longer, rigid attenuator assemblies may act as a large sail during extreme events, potentially requiring repairs or maintenance. Further evaluation would be needed to better estimate the risks associated with this solution.

6.6 Construction Cost Opinions

The following opinions of probable construction cost are intended to illustrate general order of magnitude, based upon the concept plans, current construction market costs, and bid history from recent similar projects.

Each of the following cost opinions includes 20% construction contingency and typical engineering, permitting, and construction administration costs. Additional details regarding the cost opinions may be found in Appendix B.

| | |
|--|------------------------------|
| A-Dock and Launch Removal * | \$ 1,324,000 |
| Boater Services/Public Restroom Building | \$ 550,000 – 850,000+ |
| Assume 2,000 square-foot structure | |
| Assume site work in immediate vicinity | |
| Office/Gas ‘Hut’ Consolidation | \$ 150,000 – 250,000 |
| Assume 300 square-foot structure | |
| Assume pier addition beneath expansion | |
| North Parking Lot Reconstruction | |
| Concept 1 Plan * | \$ 1,024,000 |
| Concept 2 Plan * | \$ 1,010,000 |
| Basin Calming | |
| Concept A, Floating Entry Attenuators * | \$ 431,000 |
| Concept B, Segmented Floating Attenuators * | \$ 416,000 |

* See attached opinion of probable cost

7.0 SECONDARY IMPROVEMENT RECOMMENDATIONS

This section is intended to capture the improvements which are envisioned in the long term but may not fit within immediate project scopes unless specific funding opportunities are available. Most secondary improvements are not depicted in concept drawings.

7.1 Trail Enhancements

As noted in the Village's Parks and Recreation Plan, a boardwalk and bridge are shown across the opening from the coastal wetland to Suttons Bay. This boardwalk and bridge would restore the non-motorized connection between the main basin area to the south dock area, while providing opportunities for wildlife viewing and educational signage. Based upon the attached opinion of probable cost, this improvement would cost approximately \$ 360,000, assuming a portion of the bridge is constructed as a free span. Pending design and regulatory process, value-engineered options may be possible.

7.2 Fixed Pier Extension for Transient/Day Use

As shown in the concepts, an extension to the fixed pier near D-Dock could be considered. The extension could provide opportunities for additional transient and/or day use mooring. It would also extend public access to the waterfront, adding a pedestrian destination to the trail system within the project area. Unless dredging is included, the northern portion of the pier would not accommodate mooring needs due to depth limitations. Based upon the attached opinion of probable cost, this improvement would cost approximately \$ 225,000.

7.3 Coal Dock Shoreline Stabilization and Softening

As noted above, portions of the Coal Dock shoreline have been stabilized with sand-filled Trap Bags, installed during recent high-water events to minimize erosion. Improvements to the installation may include introduction of supplemental soft measures such as plantings, coir logs, and stone, where needed. These supplements would help to absorb wave energy, minimize reflection and scour, and to create habitat opportunities.

In addition, the portion of the Coal Dock shoreline which was not previously stabilized should be addressed with a long-term approach, likely including placement of geotextile, stone installation, and soft shoreline protection measures, if feasible.

7.4 Fishing Pier Accessibility Enhancements

The existing fishing pier should be evaluated for long term needs and opportunities due to its condition and location. Depending upon grant conditions which may still restrict its use to fishing, the pier may have other uses as a broadside pier. Eventually, the pier itself will need heavy maintenance or reconstruction.

In the near future, however, the railings which are intended for fishing should be modified to incorporate sections with ADA-compliant height. In doing so, the use of the pier will be possible for all.

7.5 Coal Dock and Parking Lot Improvements

The Coal Dock piers are narrow and not accessible. Modern dock utilities are not provided. Long term plans should include the modernization of the docks in a way that compliments and maintains the natural state of the area. Fixed piers or floating piers may be considered, along with new utility system and accessibility.

The parking lot is currently an aggregate lot with informal parking. As part of a future phase, the lot could be formalized and paved. Features such as permanent restrooms, portable restroom enclosures, sidewalks, educational signage, bike racks, and lighting could be considered.

7.6 Portable Restroom Enclosures

In areas which are served by portable restrooms, such as D-Dock, the south side, Coal Dock, and the main parking lot, enclosures could be constructed for enhanced aesthetics. The enclosures could be designed to mask the temporary appearance of a portable restroom, while fitting in with the surrounding landscape and use.

7.7 Main Basin Wall Replacements

A maintenance plan for the main basin wall is recommended. A full evaluation of the edge condition throughout the project area is outside of the scope of this document. A new steel sheet pile wall will likely be the most cost effective, least impactful, and best long term solution in that area.

7.8 Stormwater Filtration

Portions of the Village's stormwater collection and conveyance system ultimately discharge to the main marina basin. Although best management practices have been recently incorporated, some sediment and nutrients continue to discharge to the basin. The addition of bio swales, hydrodynamic separators, first flush basins, or other approaches could be considered to mitigate this impact upon the marina basin.

8.0 IMPLEMENTATION PLAN

Upon confirmation of the Village's preferred direction, implementation of the proposed plan will include the regulatory process (state and federal) and the pursuit of funding assistance.

8.1 Regulatory

Any proposed work within Lake Michigan will require permits from both the U.S. Army Corps of Engineers (USACE) and the Michigan Department of Environment, Great Lakes, and Energy (EGLE). Depending upon the project type and scale, the state and federal permitting process should be expected to take three to six months or longer. Permits can be issued for a period of five years, so if several phases are anticipated, it can be advantageous to seek permits for the full scope of the planned work.

8.2 Funding Opportunities

The following grant programs may provide funding opportunities for the improvements outlined herein, both primary and secondary. Each of the grant programs are restricted to various types of projects and grant shares vary by program.

- Michigan Natural Resources Trust Fund (MNRTF)
- Land and Water Conservation Fund (LWCF)
- State of Michigan Waterways Grants
- U.S. Fish and Wildlife Service Boating Infrastructure Grants (BIG)
- Michigan Recreation Passport
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) High Water Grant
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Coastal Zone Management (CZM) Grant
- Great Lakes Fisheries Trust (GLFT)

8.3 Phasing Options

The priority improvements will likely require construction in phases, pending the availability of local and grant funding. Several potential phasing plans are possible, and each may qualify for different funding programs.

Initially, grant funding applications could be submitted to the Michigan Waterways Grant program for marina improvements. A-Dock, boater services/public restroom reconstruction, and/or basin calming would likely be prioritized in the application and could be constructed under a single contract. Other marina improvements such as the service 'hut' consolidation would also qualify for the Waterways Grant program. The grant program will fund up to fifty percent of a project costs, but typically grant share is limited to approximately \$500,000 to 600,000. Projects which address accessibility and safety are likely to be prioritized.

Concurrently, funding for park/pedestrian improvements could be sought for pedestrian bridge, parking lot, or other non-marina dependent needs. These improvements would not qualify for the Waterways program but would be a better fit for other grant funds shown above, such as the MNRTF, LWCF, or others. Some of the secondary improvements described above could be combined with the pedestrian bridge to help create a stronger application.

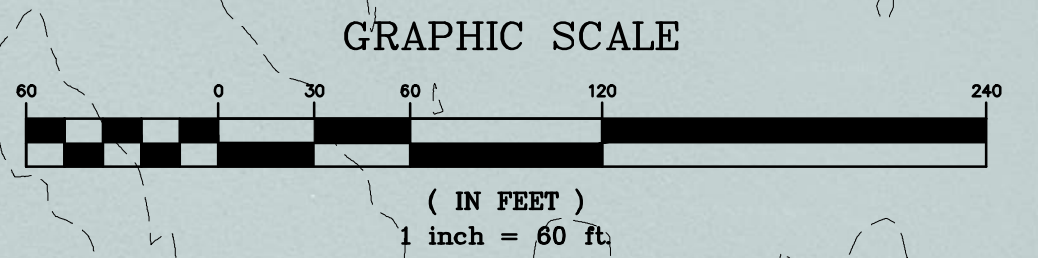
Recommended Initial Phase

- Apply for DNR Waterways Grant for boater services/public restroom building and/or A Dock reconstruction
- Concurrently apply for grants to fund the resilient parking lot reconstruction with green infrastructure strategies and trail connections, if feasible, given local match budgets

APPENDIX A



- NOTE:**
1. EXISTING HORIZONTAL DATA IN REFERENCE TO NAD83 MICHIGAN STATE PLANE, NORTH ZONE, INTERNATIONAL FOOT.
 2. EXISTING VERTICAL DATUM IS IGLD85.
 3. AERIAL PHOTOGRAPH IS PROPERTY OF GOOGLE EARTH, DATED (03/19/2021).
 4. PARCEL INFORMATION UPDATED (03/23/2023).
 5. NOAA LIDAR DATED (2012).



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Engineering - Architecture - Land Surveying

**MARINA MASTER PLAN
 SUTTONS BAY, MI.**

EXISTING CONDITIONS

PROJECT:

SHEET TITLE:

DRAWN BY: CES
 DESIGNED BY: NB/MCM
 PM REVIEW: MCM
 QA/QC REVIEW: MCM

DATE: OCTOBER 4, 2023

SEAL:

SIGNATURE:

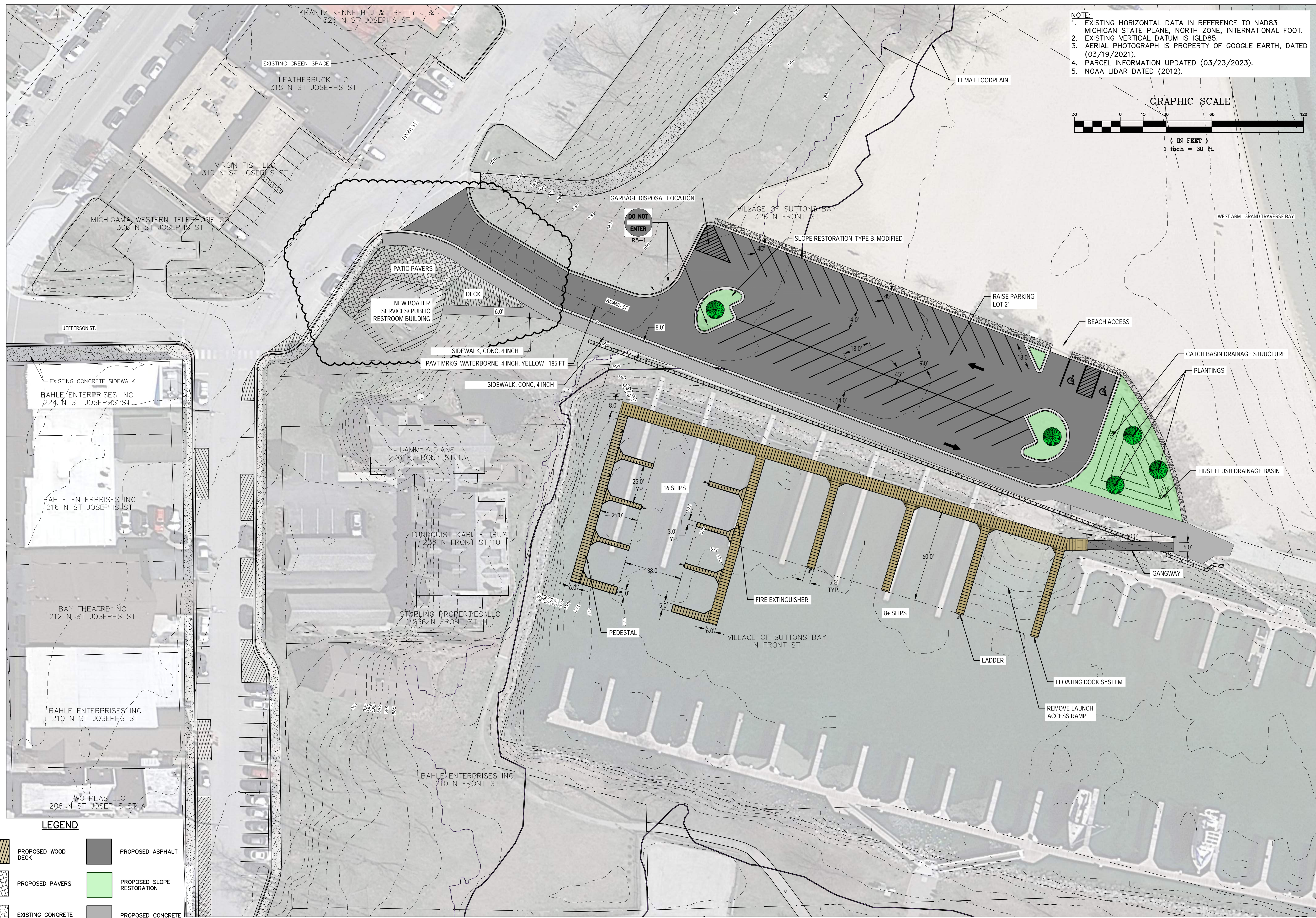
DATE:

SCALE:
 HORZ: 1"=60'
 VERT: N/A

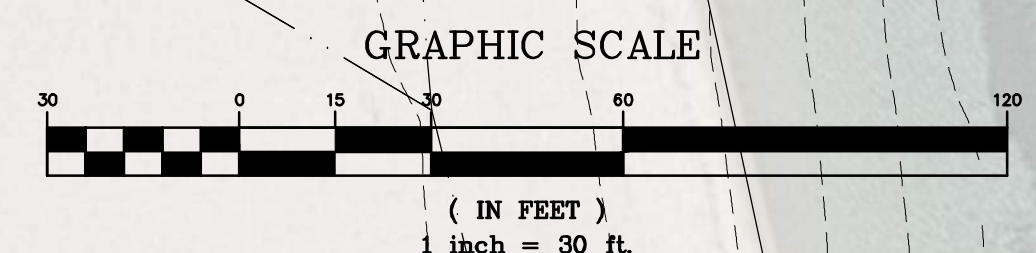
ACI JOB #
23-1068

SHEET NO.
1 of 5

| NO. | REVISION DESCRIPTION | BY: | DATE: |
|-----|----------------------|-----|-------|
| | | | |



NOTE:
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MARINA MASTER PLAN
SUTTONS BAY, MI.

A DOCK CONCEPT WITH PARKING
CONCEPT 1

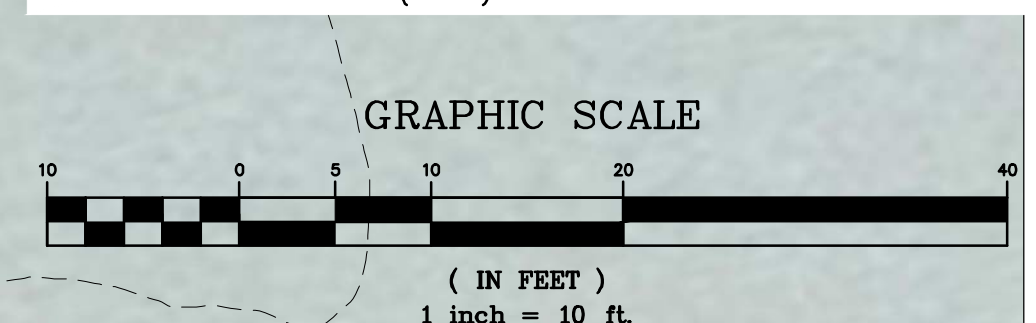
DRAWN BY: CES
DESIGNED BY: NB/MCM
PM REVIEW: MCM
QA/QC REVIEW: MCM
DATE: OCTOBER 4, 2023
SEAL:

SIGNATURE:
DATE:
SCALE:
 HORZ: 1"=30'
 VERT: N/A
ACI JOB #
23-1068

SHEET NO.
2 of 5

| NO. | REVISION DESCRIPTION | BY: | DATE: |
|-----|----------------------|-----|-------|
| | | | |

- NOTE:**
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LEGEND

- PROPOSED WOOD DECK
- PROPOSED SERVICE HUT

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**MARINA MASTER PLAN
 SUTTONS BAY, MI.**

PROJECT:

**SERVICE PIER AND SERVICE
 OFFICE EXPANSION CONCEPT**

SHEET TITLE:

DRAWN BY: CES
 DESIGNED BY: NB/MCM
 PM REVIEW: MCM
 QA/QC REVIEW: MCM
 DATE: OCTOBER 4, 2023

SEAL:

SIGNATURE:

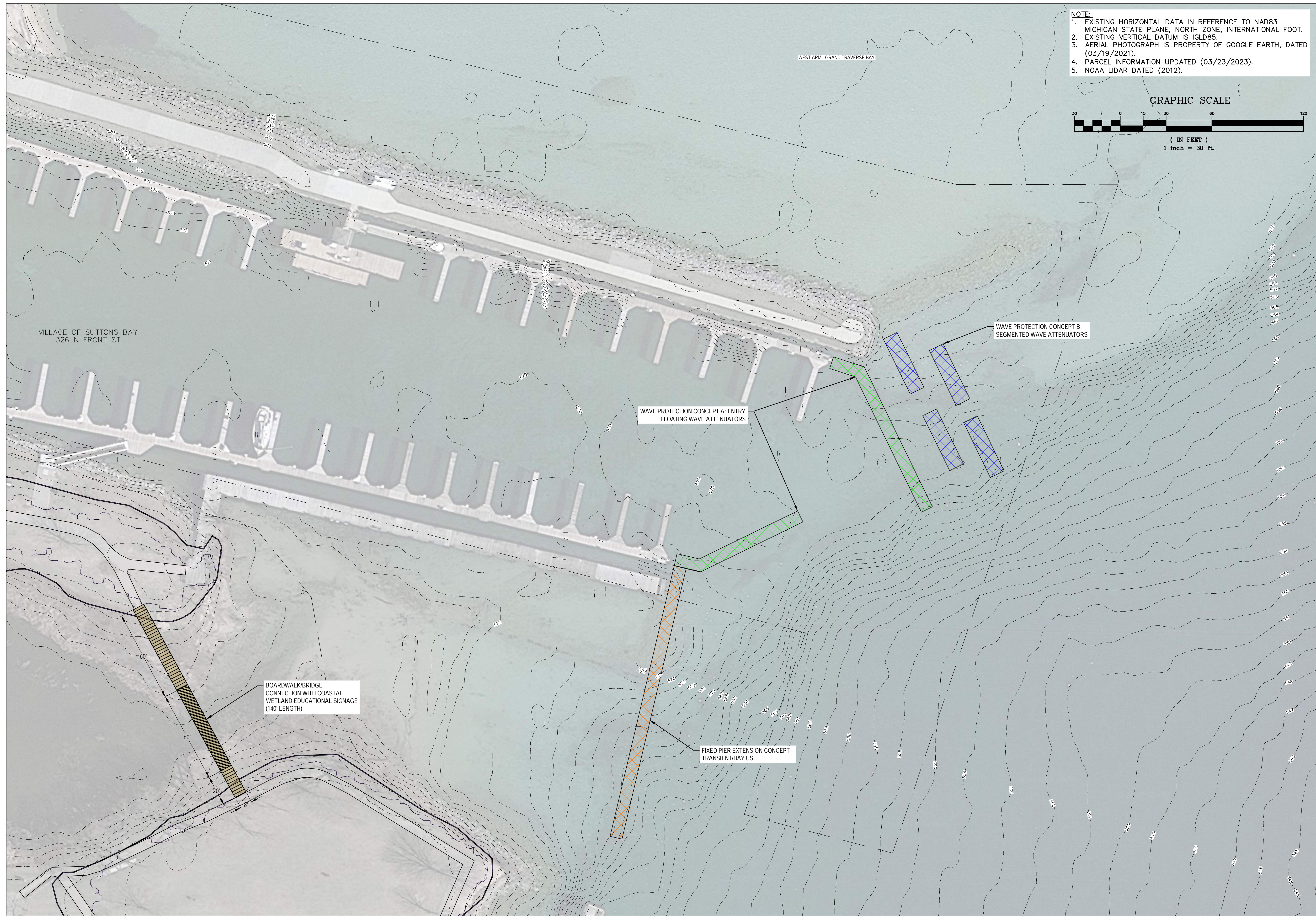
DATE:

SCALE:
 HORZ: 1"=10'
 VERT: N/A

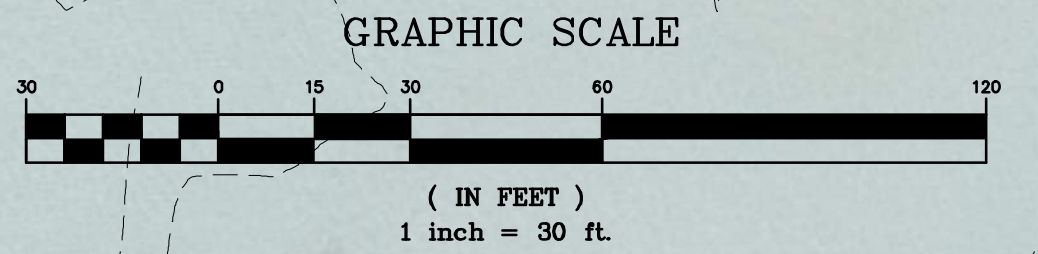
ACI JOB #
 23-1068

SHEET NO.
 4 of 5

| NO. | REVISION DESCRIPTION | BY | DATE |
|-----|----------------------|----|------|
| | | | |



NOTE:
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 5. PARCEL INFORMATION UPDATED (03/23/2023).
 6. NOAA LIDAR DATED (2012).



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**MARINA MASTER PLAN
 SUTTONS BAY, MI.**

**ENTRY WAVE CALMING CONCEPTS;
 TRANSIENT PIER EXTENSION;
 NON-MOTORIZED TRAIL BRIDGE**

DRAWN BY: CES
DESIGNED BY: NB/MCM
PM REVIEW: MCM
QA/QC REVIEW: MCM
DATE: OCTOBER 4, 2023

SIGNATURE:

DATE:

SCALE:
 HORIZ: 1"=30'
 VERT: N/A

ACI JOB #
 23-1068

SHEET NO.
 5 of 5

| NO. | REVISION DESCRIPTION | BY: | DATE: |
|-----|----------------------|-----|-------|
| | | | |

APPENDIX B

Engineer's Opinion of Probable Project Cost

| | |
|--------------|--|
| Project: | Suttons Bay Marina Improvements |
| Project No: | 23-1068 |
| Description: | Basin Calming & Fixed Pier Extension |
| Stage: | Feasibility |
| Date: | 1/5/2024 |
| Prepared By: | MCM/MR |
| Notes: | Fixed Pier Extension is a standalone concept |
| Assumptions | Assume no dredging for fixed pier extension and no handrails |

| Miscellaneous | | | | | Concept A | Concept B | Fixed Pier Ext |
|--------------------------------|---|----------|------|-----------|---------------------|---------------------|-----------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost | Item Cost | Item Cost |
| 1 | Mobilization & Demobilization | 1.00 | LSUM | \$ 1.00 | \$ 40,000.00 | \$ 40,000.00 | \$ 50,000.00 |
| 2 | General Conditions (Marine-Based Construction | 1.00 | LSUM | \$ 1.00 | \$ 25,000.00 | \$ 25,000.00 | \$ 30,000.00 |
| Subtotal: Miscellaneous | | | | | \$ 65,000.00 | \$ 65,000.00 | \$ 80,000.00 |

| Proposed Improvements | | | | | Concept A | Concept B | Fixed Pier Ext |
|--|---|----------|------|------------|---------------------|---------------------|-----------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost | Item Cost | Item Cost |
| 3 | A - Entry Floating Wave Attenuators & Anchorage System | 1680.00 | Sft | \$ 140.00 | \$235,200.00 | - | - |
| 4 | A - Solar Navigation Light & Stand | 4.00 | Ea | \$2,000.00 | \$ 8,000.00 | - | - |
| 5 | B - Segmented Wave Attenuators & Anchorage System | 1600.00 | Sft | \$ 140.00 | - | \$224,000.00 | - |
| 6 | B - Solar Navigation Light & Stand | 4.00 | Ea | \$2,000.00 | - | \$ 8,000.00 | - |
| 7 | C - Fixed Pier Extension | 1500.00 | Sft | \$ 150.00 | - | - | \$ 225,000.00 |
| 8 | C - Fixed Pier Extension Handrails [370' - not needed if mooring pier] | 0.00 | Ft | \$ 200.00 | - | - | \$ - |
| 9 | C - Dredging [Assumed no dredging, only south portion of pier utilized] | 0.00 | Cyd | \$ 25.00 | - | - | \$ - |
| Subtotal: Proposed Improvements | | | | | \$243,200.00 | \$232,000.00 | \$ 225,000.00 |

| Summary | | | | | Concept A | Concept B | Fixed Pier Ext | |
|---|--|--|--|--|---------------------|---------------------|-----------------------|----------------------|
| Construction Subtotal: | | | | | \$308,200.00 | \$297,000.00 | \$ 305,000.00 | |
| Contingency, Design, Regulatory, Permitting, Const. Admin: | | | | | 40% | \$123,280.00 | \$118,800.00 | \$ 122,000.00 |
| Project Total: Basin Calming & Fixed Pier Extension | | | | | \$431,480.00 | \$415,800.00 | \$ 427,000.00 | |

Engineer's Opinion of Probable Project Cost

| | |
|--------------|--|
| Project: | Suttons Bay Marina Improvements |
| Project No: | 23-1068 |
| Description: | A-Dock Reconstruction |
| Stage: | Feasibility |
| Date: | 1/5/2024 |
| Prepared By: | MCM/MR |
| Notes: | |
| Assumptions | 1. Assume/estimate dredge volume under existing launch ramp (75' x 80' x max 8' dredge) 2. Assume minimal dredging needed along shoreline & no shoreline revetment work |

| Miscellaneous | | | | | |
|--------------------------------|--|----------|------|--------------|---------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost |
| 1 | Mobilization & Demobilization, Max 6% | 1.00 | LSUM | \$ 53,536.00 | \$ 53,536.00 |
| 2 | General Conditions (Marine-Based Construction) | 1.00 | LSUM | \$ 25,000.00 | \$ 25,000.00 |
| Subtotal: Miscellaneous | | | | | \$ 78,536.00 |

| Removals | | | | | |
|---------------------------|--|----------|------|-----------|---------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost |
| 3 | Remove Concrete Plank Boat Launch Ramp, Remove | 300.00 | Syd | \$ 60.00 | \$ 18,000.00 |
| 4 | Dredge & Haul to Upland Placement Site | 1066.67 | Cyd | \$ 25.00 | \$ 26,666.67 |
| 5 | Remove A-Dock Floating Timber Finger Piers & Ramps | 2600.00 | Sft | \$ 10.00 | \$ 26,000.00 |
| Subtotal: Removals | | | | | \$ 70,666.67 |

| Proposed Improvements | | | | | |
|--|---|----------|------|--------------|----------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost |
| 6 | Floating Timber Dock & Finger Pier System w/ Anchorage | 6100.00 | Sft | \$ 75.00 | \$ 457,500.00 |
| 7 | Egress Ladders for Docks | 6.00 | Ea | \$ 400.00 | \$ 2,400.00 |
| 8 | Aluminum Gangway System, 60', and Gangway Platform | 1.00 | Ea | \$ 50,000.00 | \$ 50,000.00 |
| 9 | Dock/Finger Pier Signage & Wayfinding | 1.00 | LSUM | \$ 10,000.00 | \$ 10,000.00 |
| 10 | Triangular Dock-Mounted Dock Boxes | 21.00 | Ea | \$ 700.00 | \$ 14,700.00 |
| 11 | Fire Extinguisher & Life Preserver Ring Cabinets | 4.00 | Ea | \$ 1,500.00 | \$ 6,000.00 |
| 12 | 3" Dry Standpipe Fire Suppression System (3-4 Hydrants) | 1.00 | LSUM | \$ 20,000.00 | \$ 20,000.00 |
| 13 | Slip Utilities - Power & Potable Water | 21.00 | Ea | \$ 5,500.00 | \$ 115,500.00 |
| 14 | Plumbing/Electric Permits, Testing, & Commissioning | 1.00 | LSUM | \$ 7,500.00 | \$ 7,500.00 |
| 15 | Marina Ice Suppression System (3/4hp 'KASCO' De-Icer Unit) | 12.00 | Ea | \$ 1,500.00 | \$ 18,000.00 |
| 16 | Marina Utility Pedestals w/ GFCI Protection (Furnish/Install) | 15.00 | Ea | \$ 3,000.00 | \$ 45,000.00 |
| 17 | Marina Electrical Substation (Furnish/Install) | 1.00 | Ea | \$ 50,000.00 | \$ 50,000.00 |
| Subtotal: Proposed Improvements | | | | | \$ 796,600.00 |

| Summary | | |
|---|------------|------------------------|
| Construction Subtotal: | | \$ 945,802.67 |
| Contingency, Design, Regulatory, Permitting, Const. Admin: | 40% | \$ 378,321.07 |
| Project Total: A-Dock Reconstruction | | \$ 1,324,123.73 |

Engineer's Opinion of Probable Project Cost

| | |
|--------------|-----------------------------------|
| Project: | Suttons Bay Marina Improvements |
| Project No: | 23-1068 |
| Description: | Pedestrian Bridge & Approaches |
| Stage: | Feasibility |
| Date: | 1/5/2024 |
| Prepared By: | MCM/MR |
| Notes: | |
| Assumptions | 1. Freespan bridge limited length |

| Miscellaneous | | | | | |
|--------------------------------|--|----------|------|--------------|---------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost |
| 1 | Mobilization & Demobilization, Max 7% | 1.00 | LSUM | \$ 16,814.00 | \$ 16,814.00 |
| 2 | General Conditions (Marine-Based Construction) | 1.00 | LSUM | \$ 25,000.00 | \$ 25,000.00 |
| Subtotal: Miscellaneous | | | | | \$ 41,814.00 |

| Proposed Improvements | | | | | |
|--|--|----------|-------|--------------|----------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost |
| 3 | Pile-Supported Approach Walkways | 640.00 | Sft | \$ 130.00 | \$ 83,200.00 |
| 4 | Handrails - Approach Walkways | 160.00 | Ea | \$ 200.00 | \$ 32,000.00 |
| 5 | Aluminum Pedestrian Bridge, 8'x60' Freespan, Install | 1.00 | Ea | \$ 75,000.00 | \$ 75,000.00 |
| 6 | Aggregate Path Connections | 1.00 | Allow | \$ 10,000.00 | \$ 10,000.00 |
| 7 | Lighting & Signage Allowance | 1.00 | Allow | \$ 15,000.00 | \$ 15,000.00 |
| Subtotal: Proposed Improvements | | | | | \$ 215,200.00 |

| Summary | | |
|---|------------|----------------------|
| Construction Subtotal: | | \$ 257,014.00 |
| Contingency, Design, Regulatory, Permitting, Const. Admin: | 40% | \$ 102,805.60 |
| Project Total: Pedestrian Bridge & Approaches | | \$ 359,819.60 |

Engineer's Opinion of Probable Project Cost

| | |
|--------------|--|
| Project: | Suttons Bay Marina Improvements |
| Project No: | 23-1068 |
| Description: | Parking Lot Concept 1 |
| Stage: | Feasibility |
| Date: | 1/5/2024 |
| Prepared By: | MR/MCM |
| Notes: | |
| Assumptions | |

| Miscellaneous | | | | | |
|--------------------------------|---|----------|------|--------------|---------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost |
| 1 | Mobilization & Demobilization, Max 5% | 1.00 | LSUM | \$ 34,836.00 | \$ 34,836.00 |
| 2 | General Conditions (Landside Construction) | 1.00 | LSUM | \$ 10,000.00 | \$ 10,000.00 |
| 3 | Temporary Traffic Control Measures | 1.00 | LSUM | \$ 2,000.00 | \$ 2,000.00 |
| 4 | SESC Permit & SESC Measures (Silt Fence, Turbidity Curtain) | 1.00 | LSUM | \$ 5,000.00 | \$ 5,000.00 |
| Subtotal: Miscellaneous | | | | | \$ 51,836.00 |

| Removals | | | | | |
|---------------------------|------------------------------|----------|------|--------------|---------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost |
| 5 | HMA Surface, Rem | 4168.00 | Syd | \$ 15.00 | \$ 62,520.00 |
| 6 | Earthwork/Grading | 1.00 | LSUM | \$ 15,000.00 | \$ 15,000.00 |
| 7 | Tree, Rem, 6 inch to 18 inch | 7.00 | Ea | \$ 400.00 | \$ 2,800.00 |
| 8 | Fence, Rem | 150.00 | Ft | \$ 4.00 | \$ 600.00 |
| 9 | Sign, Rem | 1.00 | LSUM | \$ 150.00 | \$ 150.00 |
| 10 | Post, Rem | 1.00 | LSUM | \$ 2,500.00 | \$ 2,500.00 |
| Subtotal: Removals | | | | | \$ 83,570.00 |

| Proposed Improvements | | | | | |
|--|--|----------|------|--------------|----------------------|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost |
| 11 | Sidewalk, Conc, 4 inch | 5600.00 | Sft | \$ 9.00 | \$ 50,400.00 |
| 12 | Segmented Block Retaining Wall & Edge Protection | 445.00 | Ft | \$ 150.00 | \$ 66,750.00 |
| 13 | HMA (3" total) | 547.00 | Ton | \$ 110.00 | \$ 60,170.00 |
| 14 | Aggregate Base, 8 in | 3315.00 | Syd | \$ 13.00 | \$ 43,095.00 |
| 15 | Subbase, CIP (12") | 3315.00 | Cyd | \$ 17.00 | \$ 56,355.00 |
| 16 | Embankment, CIP (18" fill material) | 6329.00 | Cyd | \$ 20.00 | \$ 126,580.00 |
| 17 | Curb and Gutter, Conc, Det | 1175.00 | Ft | \$ 24.00 | \$ 28,200.00 |
| 18 | Rain Gardens | 1.00 | LSUM | \$ 25,000.00 | \$ 25,000.00 |
| 19 | Drainage Structures and System | 1.00 | LSUM | \$ 45,000.00 | \$ 45,000.00 |
| 20 | Slope Armor | 108.00 | Ton | \$ 200.00 | \$ 21,600.00 |
| 21 | Filter Fabric | 1.00 | LSUM | \$ 5,000.00 | \$ 5,000.00 |
| 22 | Pavement Markings and Signage | 1.00 | LSUM | \$ 8,000.00 | \$ 8,000.00 |
| Subtotal: Proposed Improvements | | | | | \$ 536,150.00 |

| Allowances | | | | | |
|-----------------------------|---------------------------------|------|-----------|--------------|---------------------|
| Item | Quantity | Unit | Unit Cost | Item Cost | |
| 23 | Landscape Plantings/Restoration | 1.00 | LSUM | \$ 30,000.00 | \$ 30,000.00 |
| 24 | Landside Lighting Upgrades | 1.00 | LSUM | \$ 30,000.00 | \$ 30,000.00 |
| Subtotal: Allowances | | | | | \$ 60,000.00 |

| Summary | | | | | |
|---|--|--|--|------------|------------------------|
| Construction Subtotal: | | | | | \$ 731,556.00 |
| Contingency, Design, Regulatory, Permitting, Const. Admin: | | | | 40% | \$ 292,622.40 |
| Project Total: Parking Lot Concept 1 | | | | | \$ 1,024,178.40 |

Engineer's Opinion of Probable Project Cost

| | |
|--------------|--|
| Project: | Suttons Bay Marina Improvements |
| Project No: | 23-1068 |
| Description: | Parking Lot Concept 2 |
| Stage: | Feasibility |
| Date: | 1/5/2024 |
| Prepared By: | MR/MCM |
| Notes: | |
| Assumptions | |

| Miscellaneous | | | | | | |
|--------------------------------|--|----------|------|--------------|---------------------|--|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost | |
| 1 | Mobilization & Demobilization, Max 5% | 1.00 | LSUM | \$ 34,351.90 | \$ 34,351.90 | |
| 2 | General Conditions (Landside Construction) | 1.00 | LSUM | \$ 10,000.00 | \$ 10,000.00 | |
| 3 | Temporary Traffic Control Measures | 1.00 | LSUM | \$ 2,000.00 | \$ 2,000.00 | |
| 4 | SESC Permit & SESC Measures (Silt Fence, Turbidity Curtain | 1.00 | LSUM | \$ 5,000.00 | \$ 5,000.00 | |
| Subtotal: Miscellaneous | | | | | \$ 51,351.90 | |

| Removals | | | | | | |
|---------------------------|------------------------------|----------|------|--------------|---------------------|--|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost | |
| 5 | HMA Surface, Rem | 4168.00 | Syd | \$ 15.00 | \$ 62,520.00 | |
| 6 | Earthwork/Grading | 1.00 | LSUM | \$ 15,000.00 | \$ 15,000.00 | |
| 7 | Tree, Rem, 6 inch to 18 inch | 7.00 | Ea | \$ 400.00 | \$ 2,800.00 | |
| 8 | Fence, Rem | 150.00 | Ft | \$ 4.00 | \$ 600.00 | |
| 9 | Sign, Rem | 1.00 | LSUM | \$ 150.00 | \$ 150.00 | |
| 10 | Post, Rem | 1.00 | LSUM | \$ 2,500.00 | \$ 2,500.00 | |
| Subtotal: Removals | | | | | \$ 83,570.00 | |

| Proposed Improvements | | | | | | |
|--|--|----------|------|--------------|----------------------|--|
| Line | Item | Quantity | Unit | Unit Cost | Item Cost | |
| 11 | Sidewalk, Conc, 4 inch | 5500.00 | Sft | \$ 9.00 | \$ 49,500.00 | |
| 12 | Segmented Block Retaining Wall & Edge Protection | 445.00 | Ft | \$ 150.00 | \$ 66,750.00 | |
| 13 | HMA (3" total) | 530.00 | Ton | \$ 110.00 | \$ 58,300.00 | |
| 14 | Aggregate Base, 8 in | 3553.00 | Syd | \$ 13.00 | \$ 46,189.00 | |
| 15 | Subbase, CIP (12") | 3553.00 | Syd | \$ 17.00 | \$ 60,401.00 | |
| 16 | Embankment, CIP (18" fill material) | 4850.00 | Cyd | \$ 20.00 | \$ 97,000.00 | |
| 17 | Curb and Gutter, Conc, Det | 1822.00 | Ft | \$ 24.00 | \$ 43,728.00 | |
| 18 | Rain Gardens | 1.00 | LSUM | \$ 25,000.00 | \$ 25,000.00 | |
| 19 | Drainage System | 1.00 | LSUM | \$ 45,000.00 | \$ 45,000.00 | |
| 20 | Slope Armor | 108.00 | Ton | \$ 200.00 | \$ 21,600.00 | |
| 21 | Filter Fabric | 1.00 | LSUM | \$ 5,000.00 | \$ 5,000.00 | |
| 22 | Pavement Markings and Signage | 1.00 | LSUM | \$ 8,000.00 | \$ 8,000.00 | |
| Subtotal: Proposed Improvements | | | | | \$ 526,468.00 | |

| Allowances | | | | | | |
|-----------------------------|---------------------------------|------|-----------|--------------|---------------------|--|
| Item | Quantity | Unit | Unit Cost | Item Cost | | |
| 23 | Landscape Plantings/Restoration | 1.00 | LSUM | \$ 30,000.00 | \$ 30,000.00 | |
| 24 | Landside Lighting Upgrades | 1.00 | LSUM | \$ 30,000.00 | \$ 30,000.00 | |
| Subtotal: Allowances | | | | | \$ 60,000.00 | |

| Summary | | | | | | |
|---|--|--|--|--|------------------------|----------------------|
| Construction Subtotal: | | | | | \$ 721,389.90 | |
| Contingency, Design, Regulatory, Permitting, Const. Admin: | | | | | 40% | \$ 288,555.96 |
| Project Total: Parking Lot Concept 2 | | | | | \$ 1,009,945.86 | |