

## Portage Point Inn Marina Technical Review

Final Report, March 10, 2017

Prepared for Onekama Township







## INTRODUCTION

The purpose of this report is to assess the technical merits of the proposed marina renovation and expansion at Portage Point Inn. This assessment will include a technical assessment of the proposed project considering the standards outlined in the following documents:

- American Society of Civil Engineers (ASCE) Manuals and Reports on Engineering Practice Number 50, Planning and Design Guidelines for Small Craft Harbors
- Permanent International Association of Navigation Congresses (PIANC) Report Number 149 Parts I and II – 2016 Guidelines for Marina Design
- Americans with Disabilities Act 2010 Standards for Recreational Boating Facilities
- Sustainable Marina Development, John Hogan and Lyndall De Marco, 2011
- Michigan Clean Marina Standards – Michigan Sea Grant, Michigan Department of Environmental Quality, and Michigan Boating Industries Association
- NFPA
- NEC – Electrical Shock Drowning Prevention

Additionally, this report provides an assessment of the project based on nearly forty years of experience in the design, permitting, planning, engineering, construction, and operation of more than 300 marina projects across the Great Lakes and around the world. Our staff includes accredited licensed Professional Engineers, Architects, Landscape Architects, and Surveyors, as well as LEED Accredited Professionals and Regional Clean Marina Specialists who work with Michigan Boating Industries Association, Michigan Department of Environmental Quality, and Michigan Sea Grant to certify compliance with Clean Marina Standards.

## PROJECT OVERVIEW

The proposed marina project is an expansion and enhancement of the existing marina located at the Portage Point Inn in Onekama, Michigan. The existing marina includes a total of 48 existing slips, provided by a mix of fixed and floating docks. The proposed expansion will add 32 new slips ranging in length from 30'-60', a new pier with gazebo, lift well, fuel dock, pump out, and separate protected swim areas. The slips will provide a mix of seasonal and transient docks, which will be available for lease to the public. The proposed marina is part of a larger renovation of the Portage Point Inn property.

Most of the Portage Lake shoreline is privately owned with the exception of DNR boat launch in the western bay. The proposed project will be privately owned, however, it will be open to the public allowing access to the public on the western bay of the lake. The project is within the riparian rights of the Portage Point Inn parcels and does not encroach upon the neighboring properties. Additionally, the proposed marina site plan has been designed to allow plenty of room for boat egress/ingress without infringing upon neighboring (north and south) parcel's riparian rights.

The project site is located in the western portion of Portage Lake, which is approximately 2,110 acres, and the site meets the criteria outlined in ASCE Manual 50, Planning and Design Guidelines for Small Craft Harbors:



*“Characteristics of a good small craft harbor site include access to navigable water, safe mooring at a reasonable cost, good vehicular and pedestrian access, environmental sensitivities, proper zoning, and compatibility between the proposed development and surrounding land uses.”*

## Planning and Zoning

There is broad community support for improved boating access on Portage Lake. The current Future Land Use Plan for the Onekama Community designates the project site as Commercial Use. The Recreational Needs and Use section of the Community Master Plan indicates a need for additional marina capacity within the Village, as well as additional transient boat slips and access points. In particular, the Plan states:

- *“Input received during the planning process indicates strong support for a public marina. Given the limited amount of improved public access facilities along the waterfront, a public marina could reduce the existing conflicts between waterfront residents and those utilizing public road ends for access to Portage Lake.” – page 42*
- *“There’s a strong interest in using the lakes as a major draw for recreation.” – page 63*
- *“There’s an increased demand for public access to the water. This includes an interest in a public marina.” – page 63*

The Portage Lake Watershed Forever Plan is a document outlining a vision for the preservation of the Portage Lake Watershed forever by investing in protection and enhancement of natural and related cultural and historical resources in the watershed to provide economic benefit and to improve the quality of life for present and future residents and visitors. The plan addresses boating specifically and indicates the following:

- *“Conclusions and Recommendations”*
  - *“Boating, fishing, and swimming/snorkeling/scuba are the most frequent activities, with most respondents unable to recall observing any conflicts between different types of lake users.”*
  - *“Motorboats were the most frequent type of boating, and respondents specifically mention the need to dredge the Portage Lake Channel, indicating that Portage Lake is used as a means to access Lake Michigan.”*
  - *“Respondents have a favorable opinion of the current water quality in the Portage Lake watershed and feel that it compares favorably to other inland lakes.”*
- *“Objectives, Goal 3 – Water-based Recreation: Protect and enhance the quality of and access to water-based recreational opportunities within the Portage Lake watershed for people of all ages and abilities.”*
  - *“3.A Maintain adequate depths in the Portage Lake Channel to assure safe, easy access to and from Portage Lake from Lake Michigan and adequate boating access to Portage Lake.”*
  - *“3.A.1 Actively support and participate in the efforts of the Portage Lake Harbor Commission to secure adequate, sustained funding for the dredging of Portage Lake Channel to depths required to accommodate recreational boating access to and from Portage Lake and Lake Michigan.”*



- *“3.A.2 Support improvement of existing boating access and public marina facilities an acquisition of additional properties for boating and non-boating public access to Portage Lake (also supports 3.C.3 below).”*
- *“3.A.3 Support completion of north and south piers of the Portage Lake Channel breakwall to reduce the frequency of maintenance dredging and at the same time accommodate larger vessels.”*
- *“3.A.4 Maintain and enhance quality of current public access sites for launching of watercraft into Portage Lake and monitor use to identify capacity of other concerns at these sites.*
- *“3.B.3 Determine, in conjunction with other local, state, federal, and tribal resource management agencies, locations on Portage Lake where shore-based fishing opportunities can be enhanced through the use of fishing piers or platforms and/or how accessibility to the existing fishery by those with physical limitation could be enhanced.”*
- *“3.C.3 Endorse the purchase or acquisition of property within the Portage Lake watershed for habitat protection, public use, access, and recreation.”*

The Owner of the project is currently in the process of obtaining a Special Use Permit (SUP) for the proposed project from Onekama Township. The SUP process included several public meetings where the public and other stakeholders have the opportunity to provide comments regarding the project. The SUP proposes a number of conditions applicable to final approvals, including:

- Achieving Michigan Clean Marina Certification, which will ensure that the marina is designed and operated to achieve Best Management Practices both at construction and over time during operations
- Light spill will be minimized by properly directed light fixtures
- The marina layout shall respect riparian rights and allow access to and from the marina by boats without encroaching on neighboring properties
- Limitations on the use of the boat ramp for launch and retrieval to shoulder seasons, and for inspection / survey during summer months, with no use of the ramp for routine launch and retrieval of small trailered boats
- Designated quiet hours in the marina
- Designation of at least 10% of slips for transient boaters
- Limitation to one charter fishing operator at a time
- Designation of the marina and associated operations as an accessory use of the resort hotel



## Marina Design Assessment

The proposed project will expand the existing marina from 48 to 80 slips. The slips will be organized into two basins separated by a central pier, with the majority of the slips provided in traditional double loaded configuration. Twenty three slips will be provided through broadside mooring along the central pier and the outer dock sections. ASCE Manual 50, Planning and Design Guidelines for Small Craft Harbors provides specific recommendations for safe navigation in terms of the following criteria:

- **Entry Fairway Width** – For moderate conditions allowing for two vessels to pass one another, the recommended fairway entry width is 1.5x the beam of the vessels, plus another 1.5x the beam separating them, with a minimum dimension of 50'. The narrowest point of entry into the northern basin is 60' when accounting for a moored vessel on the central pier. A dimension of 60' is sufficient for two vessels with a 12' beam to pass one another safely in moderate sea conditions, which is sufficient per ASCE Manual 50. Further, the entrance fairways to not encroach on neighboring riparian boundaries.
- **Internal Fairway Widths** – A conservative width between the ends of finger piers is 1.5x the length of the longest vessel. The largest slips in the basin are 60' in length, which would suggest a fairway dimension of 90', which is provided in the north basin. The southern basin fairway measures 80', slightly below the conservative standard, but well within reasonable design criteria for a marina of this size.
- **Finger Spacing** – The typical standard for spacing between finger piers for double loaded docks such as those proposed is 44'-46' for 60' slips. The proposed design meets this criterion.
- **Main Pier Widths** – The proposed main pier dock widths of 12'-16' are well within safe standards
- **Finger Pier Widths** – The proposed finger pier widths of 4'-5' are within safe and appropriate standards for the slip lengths proposed
- **Fuel Dock**- The fuel dock is ideally situated outside of the mooring basins along a wider main pier. No navigational conflicts are anticipated with this arrangement.
- **Pump-out** – Pump-out facilities are proposed within the docks, so each vessel will be served at its slip. This approach provides the most convenient pump-out possible, thereby encouraging boaters to utilize the pump-out. This minimizes offshore dumping of sanitary waste.
- **Launch Ramp** – The launch ramp is ideally situated outside of the mooring basins. No navigational conflicts are anticipated with this arrangement.
- **Swim Areas** – The proposed facility provides four distinct swim areas separated from adjacent marina traffic by floating docks or other barriers. While this arrangement eliminates the likelihood of conflicts between swimmers and boating traffic, we are concerned about the potential risk of stray electrical current impacting the two swim areas within the marina basin. We recommend that the two swim basins to the south, within the marina basin, be eliminated as there is little opportunity to provide adequate separation between these swim areas and adjacent electrical infrastructure. Please see the section on Electrical Safety under Additional Considerations later in this document for more detail.
- **Dockage System** – The documents provided do not indicate the specific docking system proposed, so we are unable to provide specific comments on the dockage design.
- **Anchorage System** – The documents provided do not indicate the specific mooring system proposed, so we are unable to provide specific comments on the anchorage design



- Wave Climate – The documents do not provide specific information on wave climate within Portage Lake, so we are unable to provide specific comments on the wave climate. However the presence and past occupancy of the existing marina suggest that the proposed design will perform at least as well as the existing facilities.
- Utility System – The proposed water, fuel, electrical, pumpout systems will meet current industry standards.
  - Fuel system – Two double-walled underground storage tanks (one 10,000-gallon diesel and one 5,000-gallon gasoline) are proposed in an upland location with fuel lines along the main pier to the fuel pumps. The location of the pumps follows ASCE Manual 50 standards to allow for easy access and maneuverability for boaters. The State regulatory process for fuel systems of this type will ensure compliance with all relevant regulations. Nearby electrical systems will be required to follow NEC requirements for electrical equipment within the influence area of the fuel system.
- Boat Wash – The proposed boat wash area will provide appropriate drainage grates with underground collection and drainage systems to prevent contamination to Portage Lake.
- Drainage – Drainage swales are provided within parking lot, reducing the potential for stormwater runoff to enter Portage Lake
- SESC Measures – Soil Erosion and Sedimentation Control Measures are a requirement for compliance with the National Pollution Discharge Elimination System and permitting. Measures will likely include turbidity curtains during dredging and landside measures to prevent sediment from entering Portage Lake.



## Clean Marina Standards

The Michigan Clean Marina Program is a collaborative effort of Michigan Sea Grant, Michigan Department of Environmental Quality, and the Michigan Boating Industries Association. It is a voluntary program promoting environmentally sound marina and boating best practices. As participants in the Michigan Clean Marina Program, marinas voluntarily pledge to maintain and improve Michigan's waterways by reducing or eliminating releases of harmful substances and phasing out practices that can damage aquatic environments. To date, more than 50 marinas have been awarded certification. Since the program began in 2005, more than 30 marinas have been recertified, showing continued commitment to keeping Michigan waters clean. The first step in the Clean Marina certification process is the completion of the Certification Checklist, which is included in the appendix of this report. Key elements of the certification process include the following mandatory practices which the proposed facility will comply with:

- Completion of Joint Agency Permit Process
- Fuel Storage System criteria, including double walled tanks, barriers, labels, and installation of automatic back pressure shut off nozzles
- USEPA Spill Prevention, Control, and Countermeasure (SPCC) Plan, and proper posting of National Response Center and MDEQ contact information
- Use of non-toxic antifreeze
- Provision of required fire extinguishers
- Appropriate storage of Material Safety Data Sheets (MSDS) as required by Occupational Safety and Health Act (OSHA) Standards
- Provision of pump-outs and restrooms open 24 hours per day
- Contractually required proper disposal of fish and pet waste
- Compliance with all aspects of the NREPA Act 451, Part 91 and establishment of a Stormwater Pollution Prevention Plan (SWPPP)

Additionally, the proposed facility complies with the following Recommended Best Management Practices:

- Written Emergency Response Plan
- Use of floating piers to encourage water circulation, limit the number of covered slips to minimize shaded areas (zero covered slips proposed), and construct facilities without use of exotic or creosote treated woods
- Upland operations, boat storage, and parking situated away from water where feasible
- Managing stormwater runoff into Portage Lake through provision of vegetated buffers where feasible, paving only necessary areas, and properly labeling drains
- Restriction of boat washing to dedicated areas
- Regular inspection of fuel transfer equipment
- Training of staff to promote environmental precautions while fueling
- Regular maintenance of all equipment to minimize any grease or oil spills and leaks
- Provision of convenient and adequate trash receptacles to prevent trash from ending up in the water
- Requirement for employees to monitor the grounds, waters, and shoreline for trash and litter





- Proper hazardous materials best management practices
- Proper communication of Clean Marina Best Management Practices to employees and tenants

The Owner is required to achieve Michigan Clean Marina Certification, and we believe the facility and operations proposed will be compliant.

### **Accessibility and Compliance with the Americans with Disabilities Act 2010 Standards for Recreational Boating**

Compliance with the Americans with Disabilities Act (ADA) is required for all facilities serving the public such as Portage Point Inn. Prior to 2010, the only recommendations related to ADA for marinas were in the form of non-binding guidelines. In 2010, formal requirements for Recreational Boating Facilities were incorporated into the ADA standards, which apply to the proposed project. A checklist of requirements is included in the appendices of this report. Key elements required for compliance include the following:

- **Access:** Compliant accessible routes must be provided from designated ADA compliant parking spaces to ADA compliant slips and facilities. The facility as designed will provide sufficient accessible parking adjacent to ADA compliant accessible routes to all areas of the dock system and boater facilities. The facility has been designed to utilize fixed docks without any barriers to access.
- **Widths:** The ADA requirements call for a minimum width of 5' for designated ADA compliant slip finger piers. If at least one 5' wide finger pier is provided, additional slips may be served by a 5' wide main pier at the stern of the vessel. The design complies with this requirement.
- **Utilities:** The ADA requirements call for compliance with designated "reach range", which means proper placement of electrical and water connections at appropriate heights above the surface of the dock. The utility pedestals at the designated ADA compliant slips will comply with this requirement.
- **Quantity:** A minimum of three designated slips are required for a facility of this size, and will be provided. Unlike car parking spaces, these slips are not required to be reserved for disabled boaters.
- **Distribution:** The designated slips must be distributed across the facility, and provide an ADA compliant option for all slip types offered by the facility. The design of the proposed facility makes it possible for any slip in the marina to be modified to be compliant if necessary.

### **Public Access**

The proposed facility provides expanded access to Portage Lake for boaters, as well as expanded public access to the waterfront for neighbors and visitors. The marina, while privately owned, will make slips available for lease to the general public without requiring any special association memberships or other similar restrictions. The facility will operate similarly to many publicly owned and operated marinas that make slips available for lease to the general public. Rates charged will be based on market demand. The proposed facility includes a public walkway along the water's edge, where neighbors and visitors will be welcome to walk. The proposed facility will support water taxi access to the general public and neighbors from the marina to downtown Onekama, reducing vehicular traffic between the point and downtown.



## PORTAGE LAKE IMPACTS

### Dredging / Environmental Impacts

The proposed project requires dredging of approximately 4,000 cubic yards of material. While not an insignificant volume of dredging, this is not a particularly large dredging effort either. In comparison, the US Army Corp of Engineers indicates that Arcadia Harbor, just eight miles north of Portage Lake, requires 5,000 cubic yards of maintenance dredging every year (see USACE document in appendix). During the recent Emergency Dredging Program completed in 2013, the State of Michigan funded 56 dredging projects across the state for 637,075 cubic yards, which is 11,376 cubic yards per project on average.

At 4,000 cubic yards, the project will require a full Michigan Department of Environmental Quality and US Army Corps of Engineers permit. This will involve sediment testing and other efforts to define material types and allowable disposal locations. In summary, the MDEQ and USACE will determine if the proposed dredging presents significant environmental impacts.

### Navigational Density / Safety

Portage Lake is a kettle-bottom lake of approximately 2,110 acres with a maximum depth of 60'. Until 1871, the lake was separate from Lake Michigan until a channel connecting the two lakes was constructed. Efforts to create a harbor of refuge began in 1879. Portage Lake has an oblong shape with overall dimensions of approximately 3.1 miles long and 1.4 miles wide.

Portage Lake is currently home to approximately 405 slips, 48 of which are located within the existing marina at Portage Point Inn. In consideration of the overall size of Portage Lake at 2,110 acres, the density of boats per surface acre of the lake is only 0.19. The proposed expansion will add only 32 slips, which will increase the boat density to 0.21 boat per acre. This is a very low ratio of boats per acre when compared to similar bodies of water along the West Michigan coastline, which follow:



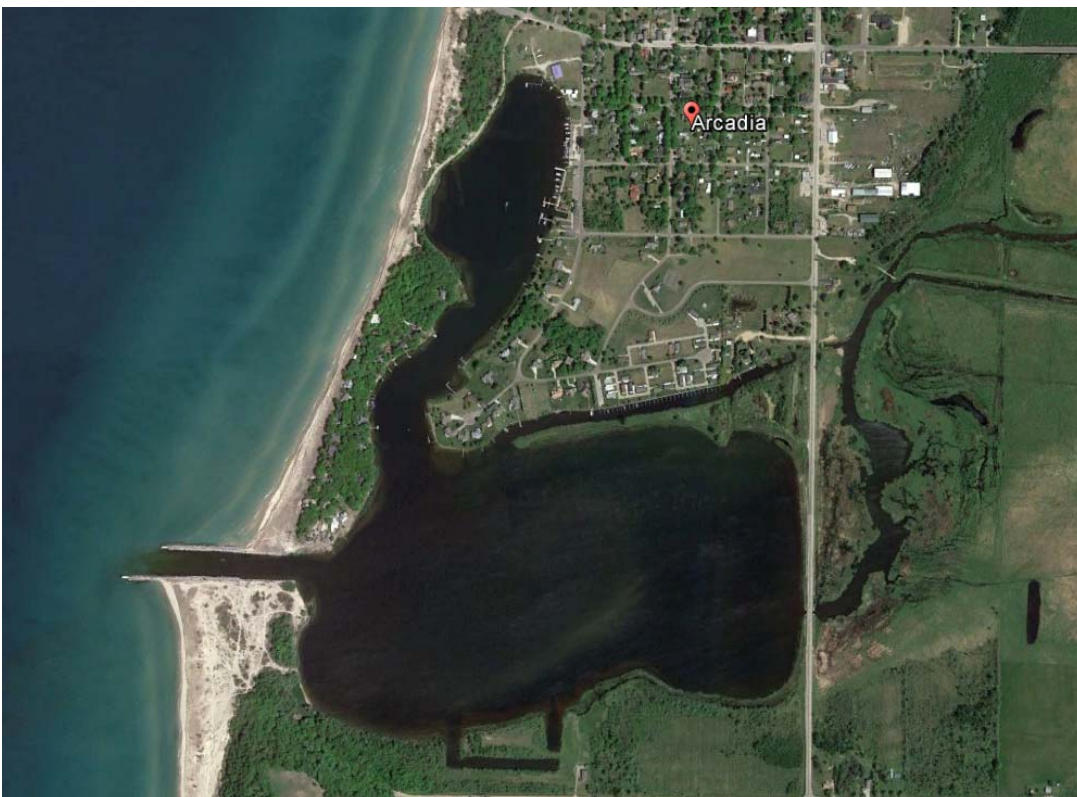
Spring Lake – approximately 1,020 acres; approximately 1,800 boat slips

- o Boat density is equal to 1.8 boats per acre
- o SLYC clearance is only 1,250' between the sailing club and the adjacent shoreline.



Arcadia Lake – approximately 275 acres; approximately 150 boat slips

- o Boat density is equal to .55 boats per acre

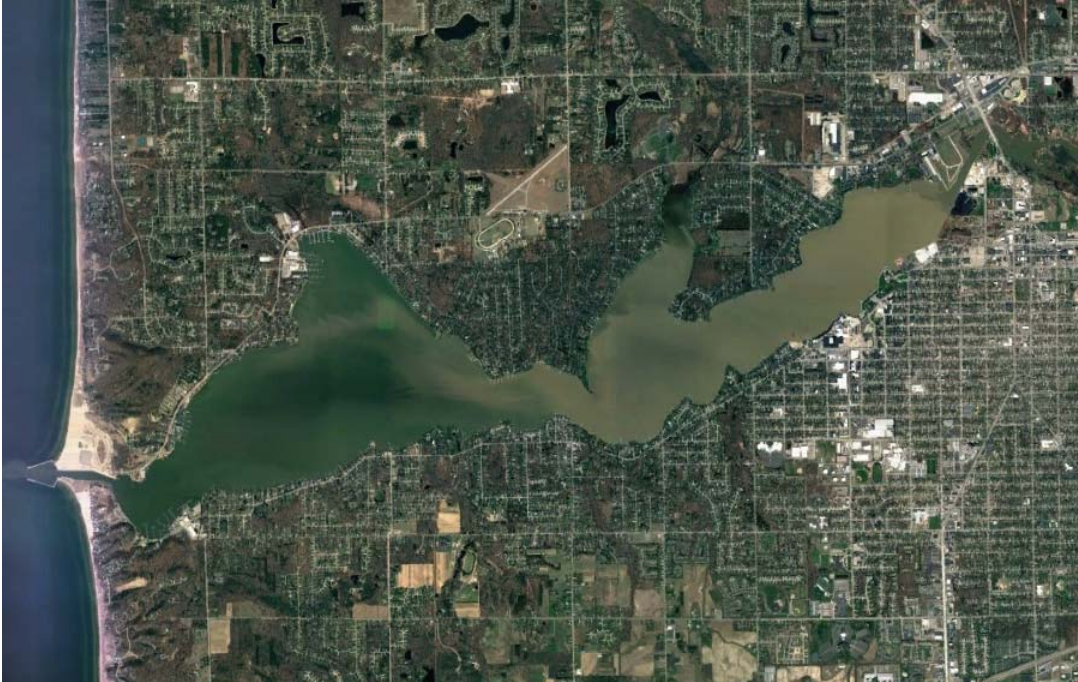






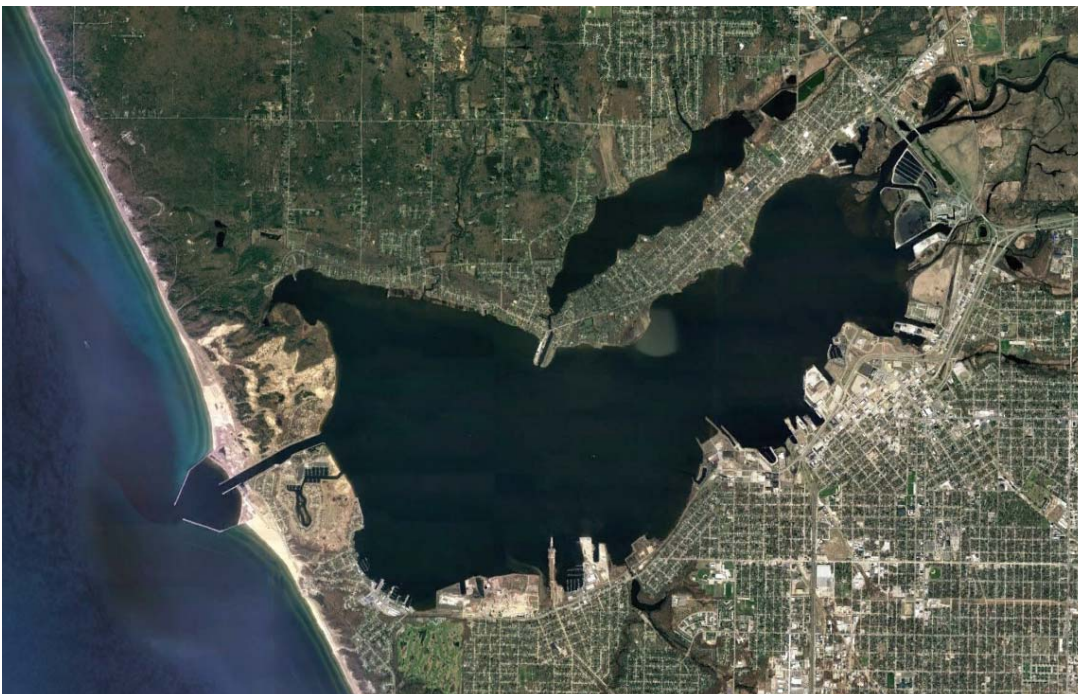
Lake Macatawa – approximately 1,780 acres; approximately 1,950 boat slips

- o Boat density is equal to 1.1 boat per acre
- o Approximately 5 miles long and the largest width is 1.2 miles with most of the lake only 0.5 miles wide.



Muskegon Lake – approximately 4,150 acres; approximately 1,980 boat slips

- o Boat density is equal to 0.48 boat per acre







Round Lake – Charleviox – approximately 56 acres; approximately 330 boat slips  
o Boat density is equal to 5.9 boat per acre



Bay Harbor – approximately 68 acres; approximately 390 boat slips  
o Boat density is equal to 5.7 boat per acre





While every area is different, the examples described above indicate a range of densities from 0.48 boats per acre up to 5.9 boats per acre. The most relevant examples would be Spring Lake, Lake Macatawa, and Muskegon Lake, which all have the following similar characteristics:

- All three have multiple public boat ramps that expand access and the number of boats on the water well beyond the resident boats identified (which in all cases would increase density ratios identified)
- All three are much closer to larger resident and visitor populations, which suggest that the number of boats utilizing the public ramps at a minimum matches the number of boats utilizing the public ramp at Portage Lake
- All three have significant resident populations, which suggest a greater usage of the lake across all time periods when compared to Portage Lake
- While it can be argued that a large portion of the boats present at Bay Harbor and Round Lake spend most of their time offshore in Lake Michigan; Spring Lake, Muskegon Lake, and Lake Macatawa all see significant use by inshore boats on a daily basis.
- All three have a similar mix of residents, public and private marinas, and yacht club type facilities with junior sailing programs

In summary, the number of boats present on Portage Lake is very low compared to other similar lakes. Muskegon Lake has a density more than twice that of Portage Lake, Lake Macatawa has a density that is more than five times that of Portage Lake; and Spring Lake has a density that is approximately nine times that of Portage Lake. It has been suggested that the presence of the additional 32 slips in the proposed facility would create a potential hazard to children sailing from the sailing club further down the point. In comparison, the Spring Lake Yacht Club is home to dozens of boats in all classes including the Optimist, Open Bic, Butterfly, MC, 420, and scows for boaters of all ages. They regularly hosts sailing classes, events, and regattas for fleets of over 30, all within a shared waterway as narrow as 1,000 feet and no more than 2,000 feet. When compared to the open waters of Portage Lake, these narrow waters with a boating density nine times that of Portage Lake suggest that any safety concerns related to increased boat traffic from an additional 32 vessels is unfounded.



## ADDITIONAL CONSIDERATIONS

### Electrical Safety

Awareness of electrical safety issues in and around marinas has increased dramatically over the past five years, in particular issues surrounding a situation known as Electrical Shock Drowning (ESD). ESD occurs when stray electrical current enters fresh water and encounters a human body. As fresh water is a relatively poor conductor of electricity, a nearby swimmer offers the path of least resistance for stray current in the water. When this current approaches 30 milliamps, the swimmer may become paralyzed and drown. For this reason, swimming should always be prohibited within marinas.

The sources of stray current can include damaged wiring within the dock system itself, but it is far more common that the electrical faults are found on the boats or shore power cords. For this reason, it is becoming more common practice that all boats are tested prior to being allowed to moor within the marina. We recommend the following Best Practices be considered:

- Comply with the current National Electric Code, and consider compliance with the proposed requirements of NEC 2017
- Provide 30 milliamp ground fault protection to every pedestal branch circuit at the panel
- Test each seasonal vessel at the beginning of every season, cycling individually through all electrical circuits on the vessel
- Use a clamp type voltage meter to test each shore cable weekly. Notify the vessel owner immediately of any current loss, and disconnect any vessel exhibiting noticeable current loss until repaired by a qualified technician
- Do not allow any vessel that trips the system's ground fault protection equipment to reconnect to the system until repaired by a qualified technician

Even when these Best Practices are implemented, there is no foolproof way to ensure the risk is eliminated entirely. We recommend that the owner eliminate the two proposed swim areas within the marina itself and consult with a qualified marine electrical engineer to assess strategies to ensure the safety of any potential swim basin. No electrical wiring or infrastructure should be included in any dock systems or infrastructure adjacent to swimming areas. Alternative approaches could include either a floating swimming pool or a pool within the upland areas of the project.

### Ice Damage Mitigation

Lakes such as Portage Lake located in geographic locations where temperatures reach below freezing temperatures can produce ice conditions that have the potential to damage structures within the lake or along the shoreline. Dockage systems found along the shoreline are susceptible to ice damage, and therefore operators must consider an effective ice suppression plan during the engineering and design phase of the project.

Ice formation and the resulting forces are highly unpredictable. Due to weather patterns associated with geographic location, inland lakes such as Portage Lake have the ability to freeze over with varying ice



depths throughout the lake. Storms, wind stresses, wave conditions, and spring melt can greatly affect the ice conditions experienced along the shoreline. The following is a brief discussion on typical ice forces that could be experienced within the proposed marina:

- **Compressive Forces** – When an enclosed area of surface water freezes over, specifically within a marina basin, destructive compressive forces are generated. The current marina design can reduce the possibility of impacts from these compressive ice forces by allowing for independent movement of dock system components, and by creating areas of relief through the use of water circulators and/or bubbling systems in strategic locations.
- **Moving Ice** – Typically, Portage Lake partially or completely freezes. During the periods of partially frozen conditions, ice may migrate to different locations within the lake. Movement of ice, even minor, can lead to damage of adjacent structures. Specifically, the spring break-up of ice has a high potential to damage structures. This movement of ice can be driven by wind stress or the wave energy generated by wind. The movement of ice can be somewhat unpredictable, but it still should be considered during ice damage prevention.
- **Ice Binding** – Lake water level fluctuations may occur due to waves, wind, or snowmelt during the winter/spring months. Once the ice has attached to structures such as piles or floating structures, water level changes can cause significant damage to the piles or dock structures because they are not free to move with the force of changing water levels and in turn must oppose it. Pile jacking can occur due to the ice binding to the piles, and then rising water levels exhibit an upward force on both the ice and the bound pile. Pile jacking can be costly to repair, especially if needed every year. Although marina conditions vary, typically, marinas prevent the ice binding to marina structures with the use of an ice suppression system and/or anchorage systems that allow for this movement to occur without binding.

### Ice Suppression Systems

As described above, there are many factors that influence ice conditions and the resulting forces. To combat the formation of ice near the docking system, several ice suppression systems are available. These ice suppression systems rely on the principle of moving the warmer, unfrozen water from the bottom of the lake near the surface, which prevents the formation of ice at the surface. The following are two types of these systems:

- A bubbler system type consists of an underwater pipe network near the bottom of the lake that is connected to an air compression. The compressor forces air through the perforated pipe network producing bubbles that produce current and reduce ice formation. Bubbler systems are usually an expensive initial investment and the location of the pipes makes them harder to access for maintenance or repairs during the winter months. In the event a bubbler system becomes inactive during winter conditions, there is a chance that the water in the lines can freeze and prevent the system from functioning.
- An aerator system/water circulator system is one that moves warmer water to the surface with the thrust of a powerful submerged motor often mounted to a dock. This water temperature differential that is created prevents the formation of ice. Careful consideration of water depth, facility size and unit locations will need to occur to ensure that the system is working efficiently and effectively.





## Anchorage Considerations

The design of an anchorage system is a critical component in a marina's ice plan. A marina's ice plan should consider how ice might affect the following anchorage systems:

- Timber/Steel Guide Piles – Traditional guide piles systems can be greatly affected by ice conditions within the marina basin. As described above, damage during the winter months, such as pile jacking, can occur. Special attention is needed for the pile guides to ensure they do not bind to the piling and put unplanned stress on the dock system. This is typically accomplished through the use of circulators.
- Telescoping Spud Piles – Spud piles are designed to allow the outer pile to move up and down as needed with fluctuating water levels. The freely moving spud pile can help mitigate the destructive binding ice force by allowing movement in the system below the ice depth.
- Chain/Anchor or Seaflex systems –This anchorage method allows the dockage system the range of motion needed to help prevent damage to the system due to changing water levels and ice conditions.
- Pile Coating – Coatings such as HDPE are applied to piles to produce less friction and lessen the ability of ice to form around them, allowing the docks to slide more freely during ice conditions. Please note that this is a supplemental effort and should be paired with other ice suppression measures described herein.



## SUMMARY

The marina as proposed is well designed and appears to meet or exceed many of the standards utilized by marina design professionals. With the exception of the concerns outlined above related to the proximity of the swim areas to nearby electrical services, we see no significant functional or safety issues with the design as presented.

We believe the environmental impacts of the proposed marina will be minor in nature, and the scale of the proposed dredging effort is not significant in comparison to nearby annual maintenance dredging requirements or typical dredging volumes for marinas of this size. The proposed facility will comply with all aspects of the permitting and regulatory processes of the USACE, MDNR, and MDEQ, as well as the Michigan Clean Marina Standards.

The potential impacts on the safety of navigation and density of boats on Portage Lake are very minor, and the number of boats present on Portage Lake is very low compared to other similar lakes. Muskegon Lake has a density more than twice that of Portage Lake, Lake Macatawa has a density that is more than five times that of Portage Lake; and Spring Lake has a density that is approximately nine times that of Portage Lake. The impact of an additional 32 slips will have no meaningful impact on the density of boats on the lake, and concerns over navigational safety are unfounded.

The elimination of the swimming areas within the marina basin creates two opportunities for consideration. First, the currently proposed swim areas could be replaced with two to four slips, and this increase would have no meaningful impact on the conclusions of this report in terms of safety, navigation, density, or environmental impact. Second, the elimination of the proposed swim areas within the marina may create the opportunity to reduce the size of the marina basin and expand the designated swim area to the north.

Overall, based on the drawings and documentation submitted for our review and the quality of infrastructure currently under construction at Portage Point Inn, we anticipate that the facility will be of high quality and will achieve many of the boating and public access goals of the community outlined in the public planning processes.

## Portage Point Inn Marina Technical Review Appendices

Final Report, March 10, 2017

Prepared for Onekama Township







# CERTIFICATION CHECKLIST

## TO BE COMPLETED CLEAN MARINA SPECIALIST

Marina Name: \_\_\_\_\_

Owner: \_\_\_\_\_

Manager: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ MI, Zip: \_\_\_\_\_

Phone: (      ) \_\_\_\_\_

Fax: (      ) \_\_\_\_\_

Cell phone: (      ) \_\_\_\_\_

Email 1: \_\_\_\_\_

Email 2: \_\_\_\_\_

Other Contact Information: \_\_\_\_\_

Date: \_\_\_\_\_

Certification Specialist: \_\_\_\_\_

Phone: (      ) \_\_\_\_\_

Email: \_\_\_\_\_

### DESCRIBE FACILITY

#### OPERATION (CHECK ONLY ONE):

- Operated by state or municipal government
- Privately owned/operated

#### TYPE OF FACILITY (CHECK ONLY ONE):

- Harbor of Refuge (limited services)
- Full service marina (dockage, pump-out, boat maintenance, etc.)
- Other (describe): \_\_\_\_\_

## CHECK ITEMS BELOW THAT APPLY

### BOAT STORAGE:

- Seasonal in-water slips, number: \_\_\_\_\_
- Transient in-water slips, number: \_\_\_\_\_
- Rack in-and-out service, number: \_\_\_\_\_
- Outside winter storage
- Inside cold winter storage
- Inside heated winter storage

### MARINA AMENITIES:

- On-site management
- Security at marina entrance
- Swimming pool
- Children's playground equipment
- Clubhouse or pavilion
- Restaurant
- Banquet facilities
- Tennis court
- Basketball court
- Fish cleaning station
- Cable TV
- WiFi

### INFRASTRUCTURE:

- Paved roads
- Storm drains
- Green belts between roads, lake and canals
- Bottom wash filtration
- Bottom wash water recycled
- Bottom wash discharged to sewer
- Floating docks
- Fixed docks
- Bulkheads
- Petroleum storage, aboveground, gallons: \_\_\_\_\_
- Petroleum storage, underground, gallons: \_\_\_\_\_

### ON-SITE MARINA SERVICES:

- New boat sales
- Used boat sales
- Brokered boat sales
- Diesel fuel pumps
- Gasoline fuel pumps
- Pump-out facilities
- Sundries store
- Mechanical/engine shop
- Canvas shop
- Fiberglass repair shop
- Boat bottom washing
- Hoist service
- Launch ramp for trailerable boats

### OUTSIDE CONTRACTORS ALLOWED ON-SITE TO PERFORM:

- Oil changes
- Winterization
- Other mechanical or engine work
- Bottom sanding and painting
- Fiberglass repairs
- Canvas work

### OTHER:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



## HOW TO COMPLETE THIS CHECKLIST

This checklist must be completed, signed and submitted to MBIA prior to requesting a marina site visit by a certification specialist. Completing this checklist is a key part of the certification process outlined below. This form is intended to be used by marina operators to conduct self assessments. The Clean Marina certification specialist and the Clean Marina Operations Committee will also use this checklist to evaluate your marina according to the standards of the Michigan Clean Marina Program.

There are two main sections to this checklist: the mandatory practices section (M1 – M16) and the recommended practices section (R1 – R10). To the extent

possible, compliance with all mandatory practices is required. **Note:** it is not necessary to implement all of the recommended practices to be certified as a Michigan Clean Marina.

Please answer each question by checking either “Yes,” “No,” or “N/A” (not applicable). The “N/A” option allows for items that may not apply to the operation. Selecting “N/A” will not be counted against the marina in the scoring process.

To learn more about the program and Best Management Practices, visit: [michigancleanmarina.org](http://michigancleanmarina.org)

### 10-STEPS TO CERTIFICATION AND RE-CERTIFICATION

#### STEP 1

Marina contacts a Michigan Clean Marina representative.

#### STEP 2

Marina enrolls in program through Clean Marina website, signs pledge statement, pays training fee, and begins self-paced training through the Clean Marina Classroom program.

**Online Training:** Designed for marina owners and operators, the Clean Marina Classroom focuses on best management practices for petroleum control, sewage handling, stormwater management and other issues that impact water quality. The Classroom includes 10 units.

#### STEP 3

Marina completes Clean Marina Classroom training and receives Classroom certificate from Michigan Sea Grant.

#### STEP 4

Marina performs self-evaluation using Clean Marina certification checklist form and sends a copy to the Clean Marina certification specialist.

#### STEP 5

Marina contacts MBIA to schedule a site visit and pays fee for Clean Marina certification specialist to perform an evaluation of the facility.

#### STEP 6

Certification specialist completes a final checklist and may include recommendations.

#### STEP 7

Marina incorporates recommendations from certification specialist noted on final checklist. Certification specialist sends final checklist to MBIA.

#### STEP 8

Clean Marina Operations Committee recommends certification after reviewing final checklist and certification specialist’s recommendations.

#### STEP 9

Marina receives official notice of certification and benefits as a certified Michigan Clean Marina.

#### STEP 10

Recertification at the third-year anniversary, and then every five years. A Clean Marina representative sends a reminder notice of recertification date to marina.

### CONTACT

Michigan Boating Industries Association (MBIA) Clean Marina Program  
(734) 261-0123



# MANDATORY PRACTICES

YES	NO	N/A		YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M1. Marina development and expansion projects along the Great Lakes, including dredging, will require a joint permit from the U.S. Army Corps (USACE) and the Michigan Department of Environmental Quality (MDEQ). These agencies will ensure that marina construction and dredging will be done in an environmentally sensitive manner.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M7. Have you provided the required number of fire extinguishers for all marina buildings and prepared for annual inspections as required by the National Fire Protection Association's standards for marinas and by the local fire authorities?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. Have you received the proper permits for all past marina construction and dredging?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M8. Do you keep a file of Material Safety Data Sheets (MSDS) for all products used at your facility, as required by the Occupational Safety and Health Act (OSHA) of 1970 (29 USC Sec. 657) stored in an office away from material storage areas?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Do you pledge that proper permits will be obtained for all future marina construction and dredging?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M9. Because of the harm associated with petroleum, the discharge of oil is prohibited. The Federal Water Pollution Control Act prohibits the discharge of oil or oily waste into or upon the navigable waters of the United States. The United States Coast Guard must be notified any time a spill produces a sheen on the water. Have you posted the National Response Center phone number (800) 424-8802 in appropriate areas of your marina to allow for the proper notification of a spill?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M2. Proper fuel storage is critical, particularly for marinas with aboveground fuel systems that are on or near bodies of water.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M10. All spills must also be reported immediately to MDEQ. Have you incorporated this step in your protocol?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. Does your fuel system have a double walled configuration or a secondary containments system (or both) to prevent accidental fuel releases?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M11. Michigan is a "No Discharge" state (effective on all freshwater bodies). It is illegal to discharge raw and/or treated sewage from a watercraft. Michigan law, NREPA Act 451, Part 95, requires that all docking facilities provide pumpout stations or have a signed agreement with another facility to accommodate pumpouts for vessels. Does your marina have a signed agreement or provide a pumpout that will empty boat holding tanks and porta-potties and dispose of waste in an acceptable manner?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Do you have appropriate barriers (guard posts) to protect storage tanks and dispensing systems from damage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M12. Does your marina provide clean, functional restrooms, that are open 24-hours a day to encourage people not to use their boat's bathrooms while in port?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Are your tanks properly labeled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M13. It is illegal to dispose of fish waste in the water. Does your marina provide a fish cleaning station or contractually bind your customers to the proper disposal of fish waste?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M3. A marina located on Great Lakes public trust bottomlands will require authorization from MDEQ in the form of a lease under Part 325, Great Lakes Submerged Lands of the Natural Resources and Environmental Protection Act (NREPA). The lease requires an annual fee be paid to MDEQ and will contain conditions for the use and occupancy of bottomlands. If applicable, does your marina have a valid lease with the MDEQ?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M14. The dumping of pet waste into the water is illegal. Does your marina provide dog walks or contractually bind your customers to the proper disposal of pet waste?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M4. The use of ethylene glycol antifreeze for winterization is prohibited. Do your best management practices require the use of propylene glycol, a non-toxic antifreeze?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M5. At your marina fuel dock, have you removed all fuel nozzle holding clips and installed automatic back pressure shutoff nozzles on fuel pump discharge hoses in accordance with Michigan law?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M6. The U.S. Environmental Protection Agency's (EPA) Oil Pollution Prevention Regulation requires that marinas prepare and implement a plan to prevent any discharge of oil into navigable waters or adjoining shorelines if the facility has an aggregate above ground oil storage capacity greater than 1,320 gallons. If your marina falls under these guidelines, have you prepared a Spill Prevention, Control, and Countermeasure (SPCC) Plan?				

## MANDATORY PRACTICES CONT.

YES	NO	N/A		YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M15. To protect the waters of the state by minimizing erosion and controlling sediment, NREPA Act 451, Part 91 requires a permit for any earth change that disturbs 1 or more acres, or is within 500 feet of a lake or stream.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D. Installation of low-flow faucets, toilets and/or shower heads?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. Have you received the proper erosion permits for all past marina construction?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	E. Installation of automatic faucets and/or toilet fixtures, including waterless urinals?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Do you pledge that proper erosion permits will be obtained for all future marina construction?				R7. Stormwater runoff is precipitation that has not been absorbed by the ground. Do your best management practices include:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M16. If required, do you have a Stormwater Pollution Prevention Plan (SWPPP)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. Cultivated vegetated areas particularly as buffers between parking lots, roads, upland property and the water's edge?
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Only paving necessary areas?
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Labeling storm drains, stating "no dumping" and indicating that the drain empties to the lake?

## RECOMMENDED BEST MANAGEMENT PRACTICES

YES	NO	N/A		YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R1. Do you have a current written emergency response plan that is readily accessible to trained staff?				R8. Your best management practices also apply to any of the services which you may sublease at your marina. You may not answer "N/A" to any of the questions that apply to service tenants. You must, at a minimum, tie your best management practices into those lease agreements. Do your best management practices for boat repair and maintenance include:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R2. Do you use best management practices, such as fixed or floating piers to enhance water circulation, avoid using exotic timbers or wood treated with creosote, and limit the number of covered slips to reduce shaded areas of water?				A. No sanding or blasting work of any sort carried out by individual boat owners or their contractors, unless it is done inside a designated shop or a vacuum sander is used and the residue properly disposed?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R3. Dry-stack storage provides various environmental benefits compared to adding additional wet slips.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Renting or loaning vacuum sanders for use by tenants and contractors?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. Do you operate a dry-stack facility (If no dry-stack facility, mark "N/A" on B-D)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Restricting the power washing of boats to a designated area within the marina?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Do you control stormwater runoff from dry-stack areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D. Have you installed infrastructure improvements to your power washing area which include:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Do you keep your dry-stack forklifts well-tuned to prevent grease or oil from dripping onto staging areas or into the water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Filtration of particles?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D. Do you have provisions in place to handle accidental spills and absorbent booms to collect any grease or oil in the dry-stack launching and retrieval area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Recycling the wash water?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R4. If your marina owns any upland property, have you used this property to stage service operations, parking and boat storage away from the water where feasible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	E. Have you restricted spray painting, spraying of fiberglass or other chemicals, unless it is done inside a designated shop?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R5. If the marina owns sensitive adjacent land, have you placed or explored the protection of this land in a conservation trust?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	F. Have you restricted painting outside of designated shops to the use of rollers and brushes, with proper use of tarps and tenting to protect the surrounding area?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R6. Do you practice water conservation through the use of:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	G. Have you implemented procedures for proper and environmentally sensitive engine maintenance?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. Measured watering and water-wise landscaping (e.g., watering deeply and infrequently, selecting native plants, only watering "thirsty" plants)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H. Do you regularly inspect and repair fuel transfer equipment?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Promoting hand weeding and efficient landscaping, including mulch to reduce use of toxic chemicals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	I. Do you train staff to promote environmental precautions while fueling?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Proper installation and maintenance of freshwater outlets?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



## RECOMMENDED BEST MANAGEMENT PRACTICES (BMP)

YES	NO	N/A		YES	NO	N/A	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	J. Have you implemented procedures for the proper and environmentally sensitive operation of the fuel dock facility?				R10. Once you have adopted Clean Marina best management practices, have you communicated BMPs to your employees, tenants and contractors by:
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	K. Do you offer spill-proof oil changes or have a recycling center to contain used oil for boaters who perform their own oil changes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. Properly training your employees so they comply with BMPs, including stormwater pollution, equipment and chemical use, emergency response procedures and fuel spills or inappropriate discharges?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	L. Do you perform regular maintenance on your yard equipment (forklifts, tugs, trailers, hoists, etc.) and machinery, taking precautions to minimize any grease or oil spills and leaks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Maintaining training records?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	M. Do you provide for oil filter disposal, preferably with a oil filter crusher, to reduce the size of the disposal waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Developing a procedure to approach boaters or contractors who are not following BMPs?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	N. Do you store oil spill response equipment in readily accessible locations such as the fuel dock and any launch areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D. Including language regarding BMPs in your contracts?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	O. Is the operation of the fuel pumps and sewage pumpout restricted to trained personnel only?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	E. Posting signs regarding your BMPs throughout the marina?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	P. Is your pumpout connected to the municipal sewer?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	F. Providing ongoing education for your boaters and contractors through direct mail, email or other sources?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Q. If you are not connected to a public sewer, is your septic or private sewage treatment system regularly maintained?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	G. Hosting walking tours of the facility or using public relations and customer recognition to demonstrate and promote BMPs?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	R. Do you provide convenient, adequate and screened dumpsters that are away from the water to prevent trash from ending up in the water?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H. Using signage and/or other notices to inform boaters about their role in controlling the spread of aquatic invasive species?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	S. Do you require your employees to monitor the marina grounds, waters and shoreline for trash and litter?				
			R9. In addition to the MSDS files required by OSHA and covered under question M8 of this Checklist, do your hazardous materials best management practices require the following:				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A. Proper storage, use and disposal of hazardous materials?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B. Minimizing your use and storage of hazardous materials?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	C. Proper disposal of plastics such as shrink-wrap?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	D. Proper disposal of batteries?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	E. Working with your local trash hauler to participate in any recycling programs?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	F. Tracking incidents of pollution?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	G. Keeping all hazardous materials on an impervious (non-porus) surface, away from floor drains?				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H. Following recommended waste disposal methods?				

### TO BE COMPLETED BY MARINA OWNER OR OPERATOR

I certify that the answers to this form are accurate and answered to the best of my abilities.

\_\_\_\_\_  
Marina Owner, Operator or Manager Signature

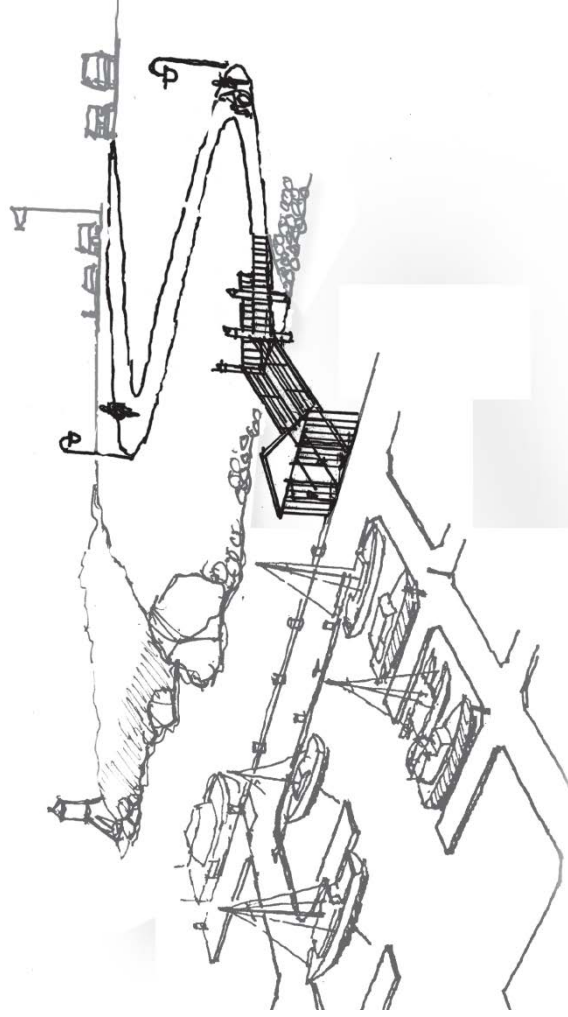
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Date



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## ADA Checklist for Existing Facilities

# Recreational Boating Facilities



Project

Building

Location

Date

Surveyors

Contact Information

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**Recreational boating facilities should be accessible to everyone, including people with disabilities.**



Institute for Human Centered Design  
[www.HumanCenteredDesign.org](http://www.HumanCenteredDesign.org)

2014




ADA National Network  
Questions on the ADA 800-949-4232 voice/tty  
[www.ADAchecklist.org](http://www.ADAchecklist.org)

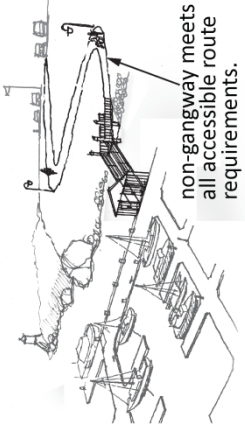
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This checklist was produced by the New England ADA Center, a project of the Institute for Human Centered Design and a member of the ADA National Network. This checklist was developed under a grant from the Department of Education, NIDRR grant number H133A060092-09A. However the contents do not necessarily represent the policy of the Department of Education, and you should not assume endorsement by the Federal Government.

Questions or comments on the checklist contact the New England ADA Center at 617-695-0085 voice/tty or [ADAinfo@NewEnglandADA.org](mailto:ADAinfo@NewEnglandADA.org)

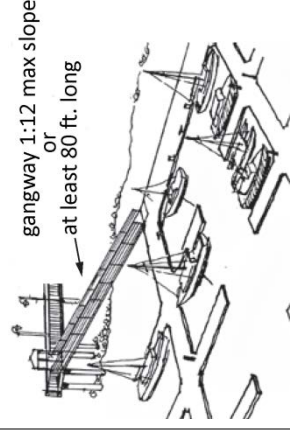
For the full set of checklists, including the checklists for recreation facilities visit [www.ADAchecklist.org](http://www.ADAchecklist.org).

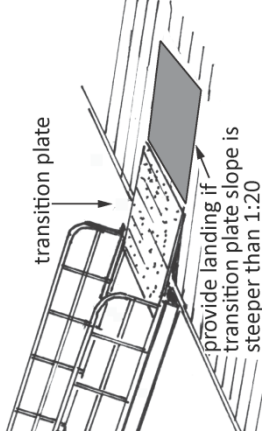
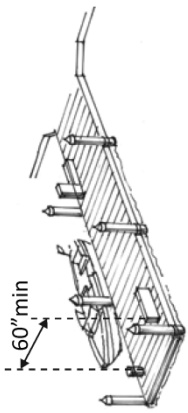
Recreational Boating Facilities		Comments		Possible Solutions																													
<p><b>Boating Facilities (Recreational)</b> (2010 Standards – 206, 235 &amp; 1003)</p>																																	
<p><b>B1</b> Is there an accessible route to the entrance of the boating facility?  Use the checklist for <i>Priority 1: Approach &amp; Entrance</i>.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>Photo #:</p>		<ul style="list-style-type: none"> <li>• Add a ramp</li> <li>• Regrade to 1:20 maximum slope</li> <li>• Widen route</li> <li>• Change route surface</li> <li>• Add a platform lift, limited use/limited application elevator or a regular elevator</li> </ul>																												
<p><b>B2</b> <u>BOAT SLIPS</u>  Where boat slips are provided are there an adequate number of accessible slips?  Note: If slips are not demarcated by length, count each 40 feet of slip edge along the pier perimeter as one slip.  A boat slip is the portion of a pier, main pier, finger pier or float where a boat is berthed or moored or used for embarking or disembarking that is not part of a boat launch ramp. A boat launch ramp is a sloped surface designed for launching and retrieving trailed boats and other watercraft to and from a body of water.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Total slips:</p> <p>Accessible slips:</p>	<table border="1"> <thead> <tr> <th>Total Slips</th> <th>Accessible Slips</th> </tr> </thead> <tbody> <tr><td>1 - 25</td><td>1</td></tr> <tr><td>26 - 50</td><td>2</td></tr> <tr><td>51 - 100</td><td>3</td></tr> <tr><td>101 - 150</td><td>4</td></tr> <tr><td>151 - 300</td><td>5</td></tr> <tr><td>301 - 400</td><td>6</td></tr> <tr><td>401 - 500</td><td>7</td></tr> <tr><td>501 - 600</td><td>8</td></tr> <tr><td>601 - 700</td><td>9</td></tr> <tr><td>701 - 800</td><td>10</td></tr> <tr><td>801 - 900</td><td>11</td></tr> <tr><td>901 - 100</td><td>12</td></tr> <tr><td>1001 and over</td><td>12 plus 1 for each 100 or fraction</td></tr> </tbody> </table>	Total Slips	Accessible Slips	1 - 25	1	26 - 50	2	51 - 100	3	101 - 150	4	151 - 300	5	301 - 400	6	401 - 500	7	501 - 600	8	601 - 700	9	701 - 800	10	801 - 900	11	901 - 100	12	1001 and over	12 plus 1 for each 100 or fraction	<p>Photo #:</p>		<ul style="list-style-type: none"> <li>• Create accessible slips</li> <li>•</li> <li>•</li> </ul>
Total Slips	Accessible Slips																																
1 - 25	1																																
26 - 50	2																																
51 - 100	3																																
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701 - 800	10																																
801 - 900	11																																
901 - 100	12																																
1001 and over	12 plus 1 for each 100 or fraction																																

<p><b>B3</b> Are the accessible boat slips dispersed among the different types of boat slips?</p> <p>Note: Accessible boat slips must be dispersed throughout the various types of slips, but a facility does not have to provide more accessible boat slips than required in the table. Accessible slips may be grouped on one pier if the requirement for different types of slips is met. Types could include shallow-water or deep water; transient or longer-term lease; covered or uncovered; and whether slips are equipped with features such as telephone, water, electricity, or cable connections.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<ul style="list-style-type: none"> <li>• Relocate accessible slips</li> <li>•</li> <li>•</li> </ul>
<p><b>B4</b> Is there an accessible route to the accessible boat slips?</p> <p>Use the checklist for <i>Priority 1: Approach and Entrance</i></p> <p>To deal with varying water levels, exceptions apply when gangways are part of the accessible route. A gangway is a variable-sloped pedestrian walkway that links a fixed structure or land with a floating structure.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Photo #:</p> 
		<ul style="list-style-type: none"> <li>• Add a ramp</li> <li>• Regrade to 1:20 maximum slope</li> <li>• Widen route</li> <li>• Change route surface</li> <li>• Add a platform lift, limited use/limited application elevator or a regular elevator</li> </ul>

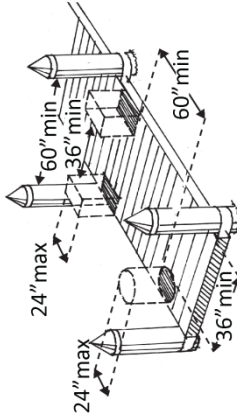
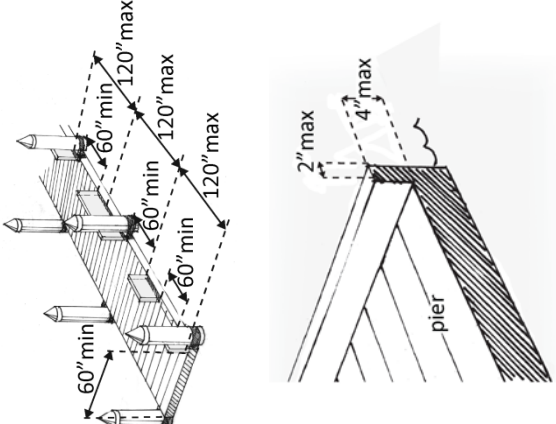
Exceptions:

1. Gangway rises may be greater than 30 inches. Therefore gangways may be any length and no intermediate landings are required.
2. Gangway slopes may be greater than 1:12 if the total length of a gangway or series of gangways serving as part of the accessible route is at least 80 feet.
3. Gangway slopes may be greater than 1:12 if the facility contains fewer than 25 boat slips and the total length of the gangway or series of gangway serving as part of the accessible route is at least 30 feet.
4. Level landings are not required where gangways connect to transition plates. A transition plate is a sloped pedestrian surface at the end of a gangway.
5. Where gangways and transition plates connect, handrail extensions are not required.
6. If there are handrail extensions on gangways or transition plates, the extensions

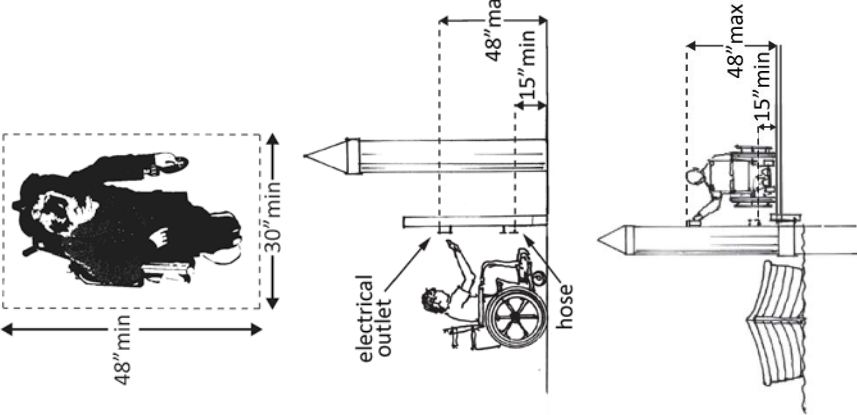
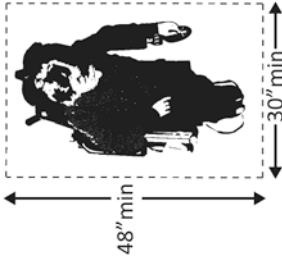


<p>are not required to be parallel with the ground surface.</p> <p>7. Changes in level ¼ to ½ inch high, beveled with a slope no steeper than 1:20 are permitted on gangway surfaces.</p> <p>Note: When gangways, transition plates and floating piers and platforms are part of an accessible route, the cross slope requirement of 1:48 maximum is measured when they are in the static position, i.e. absence of movement that results from waves and wind.</p>			
<p><b>B5</b> If there are transition plates the slope of transition plates no greater than 1:20?</p> <p>If the slope is greater than 1:20 is there a landing at the end of the transition plate?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p>		<p>Photo #:</p> <ul style="list-style-type: none"> <li>• Regrade to 1:20 maximum slope</li> <li>•</li> <li>•</li> </ul>
<p><b>B6</b> Is there clear pier space at the accessible boat slips that is:</p> <p>At least as long as the slip by at least 60 inches wide?</p> <p>Or</p> <p>At least 36 inches wide for a</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>Photo #:</p> <ul style="list-style-type: none"> <li>• Add clear space</li> <li>• Reconfigure clear space</li> <li>•</li> </ul>

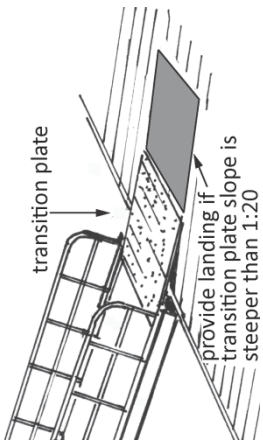


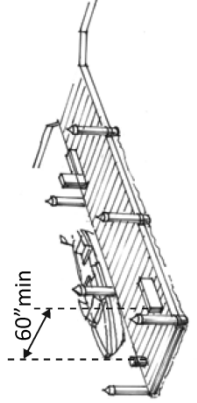
<p>length no greater than 24 inches, if multiple 36 inch wide segments are separated by segments that are at least 60 inches wide and at least 60 inches long?</p> <p>Note: Clear pier space may be perpendicular to the boat slip if the space extends the width of the slip and the facility has at least one accessible boat slip parallel to the pier.</p>	<p>Measurement:</p>	<p>Or</p> 	<p>Photo #:</p>
<p><b>B7</b> For every 120 inches (10 feet) of linear pier edge serving the slips, is there a continuous clear opening at least 60 inches wide?</p> <p>If there is edge protection at the clear opening, is it no higher than 4 inches and no wider than 2 inches?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p>		<p>Photo #:</p>

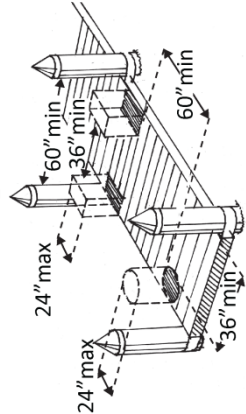
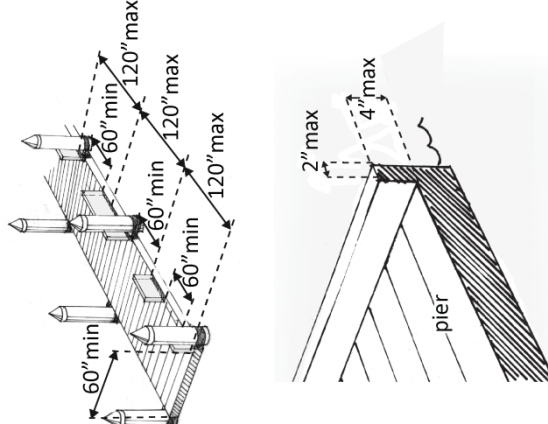
- Add clear openings
- Relocate clear openings
- Change edge protection
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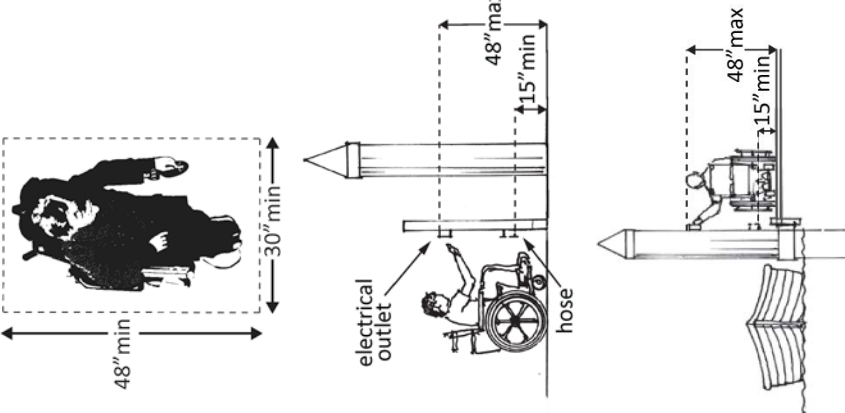
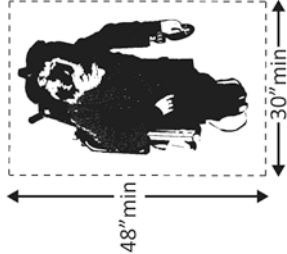
<p><b>B8</b> If there are controls and operating mechanisms, such as hose bibbs, water supply hoses, outlets for electrical power, telephones, or cable TV:</p> <p>Are they on an accessible route?</p> <p>Is there a clear floor space next to each that is at least 30 inches by at least 48 inches?</p> <p>Are operable parts no higher than 48 inches and no lower than 15 inches above the surface?*</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p>		<ul style="list-style-type: none"> <li>Relocate controls and/or operating mechanisms</li> <li>Relocate route</li> <li>Add clear floor space</li> <li>Change height of controls and/or operating mechanisms</li> </ul> <p>*If constructed before 3/15/2012 and a side reach is provided operable parts may be no higher than 54 inches and no lower than 9 inches above the surface.</p>
<p><b>B9</b> If there are cleats or other securement devices serving the accessible boat slips:</p> <p>Are they on an accessible route?</p> <p>Is there a clear floor space next to each that is at least 30 inches by at least 48 inches?</p> <p>Note: Cleats and other boat</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p>		<p>Photo #:</p> <ul style="list-style-type: none"> <li>Relocate securement devices</li> <li>Add clear floor space</li> </ul>

<p>seurement devices at accessible slips can be any height; they do not have to comply with reach range requirements.</p>		<p>Photo #:</p>	
<p><b>B10</b> <u>BOARDING PIERS AT BOAT LAUNCH RAMPS</u></p> <p>Where boarding piers are provided at boat launch ramps, are at least 5 percent, but no fewer than one, accessible?</p> <p>Note: A boarding pier (sometimes called a courtesy pier or a launch dock) is where a boat is temporarily moored for embarking and disembarking. A boat launch ramp is a sloped surface for launching and retrieving trailered boats to and from the water. For boarding piers that are not part of a boat launch ramp, use the boat slips section.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Number:</p>	<p>Photo #:</p>	<ul style="list-style-type: none"> <li>• Create accessible boarding piers</li> <li>•</li> <li>•</li> </ul>
<p><b>B11</b> Is there an accessible route to and connecting the accessible boarding piers?</p> <p>Use the checklist for <i>Priority 1: Approach &amp; Entrance</i>.</p> <p>To deal with varying water levels, exceptions apply when</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Photo #:</p>	<ul style="list-style-type: none"> <li>• Add a ramp</li> <li>• Regrade to 1:20 maximum slope</li> <li>• Lengthen gangway</li> <li>• Widen route</li> <li>• Change route surface</li> <li>• Add a platform lift, limited use/ limited application elevator or a</li> </ul>

<p>an accessible route connects to floating piers.</p> <p>Exceptions:</p> <ol style="list-style-type: none"> <li>1. Where the accessible route serving a floating boarding pier or skid pier is within a boat launch ramp, that portion does not have to comply with ramp requirements.</li> <li>2. Gangway rises may be greater than 30 inches. Therefore gangways may be any length and no intermediate landings are required. A gangway is a variable-sloped pedestrian walkway that links a fixed structure or land with a floating structure.</li> <li>3. Gangway slopes may be greater than 1:12 if the total length of a gangway or series of gangways serving as part of the accessible route is at least 30 feet.</li> <li>4. Landings are not required where gangways connect to transition plates. A transition plate is a sloped pedestrian surface at the end of a gangway.</li> <li>5. Where gangways and</li> </ol>	 <p>The diagram shows a perspective view of a gangway structure. It consists of a main sloped section and a horizontal section at the end. The horizontal section is labeled 'transition plate'. An arrow points to the transition plate with the text 'provide landing if transition plate slope is steeper than 1:20'. The main sloped section has a railing on one side.</p>		<p>regular elevator</p>
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<p>transition plates connect, handrail extensions are not required.</p> <p>6. If there are handrail extensions on gangways or transition plates, the extensions are not required to be parallel with the ground surface.</p> <p>7. Changes in level <math>\frac{1}{4}</math> to <math>\frac{1}{2}</math> inch high, beveled with a slope no steeper than 1:20 are permitted on gangway surfaces.</p> <p>Note: When gangways, transition plates and floating piers and platforms are part of an accessible route, the cross slope requirement of 1:48 maximum is measured when they are in the static position, i.e. absence of movement that results from waves and wind.</p>			
<p><b>B12</b> Is there clear pier space at the boarding pier that is the full length of the boarding pier and:  At least 60 inches wide?  Or At least 36 inches wide for a length of no greater than 24</p>	<p> <input type="checkbox"/> Yes   <input type="checkbox"/> No                  Measurement:  <input type="checkbox"/> Yes   <input type="checkbox"/> No             </p>		<ul style="list-style-type: none"> <li>• Add clear space</li> <li>• Reconfigure clear space</li> <li>•</li> </ul>

<p>inches if there are multiple 36-inch-wide segments that are separated by segments measuring at least 60 inches wide and at least 60 inches long?</p> <p>Note: There is no minimum length of the pier. The accessible boarding pier should be at least as long as other piers provided at the facility.</p>	<p>Measurement:</p>		<p>Photo #:</p>	
<p><b>B13</b> For every 120 inches (10 feet) of linear pier edge, is there a continuous clear opening at least 60 inches wide?</p> <p>If there is edge protection at the clear opening, is it no higher than 4 inches and no wider than 2 inches?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p>		<p>Photo #:</p>	<ul style="list-style-type: none"> <li>• Add clear openings</li> <li>• Relocate clear openings</li> <li>• Change edge protection</li> <li>•</li> <li>•</li> </ul>

<p><b>B14</b> If there are controls and operating mechanisms, such as hose bibbs, water supply hoses, outlets for electrical power:</p> <p>Are they on an accessible route?</p> <p>Is there a clear floor space next to each that is 30 inches by 48 inches minimum?</p> <p>Are operable parts no higher than 48 inches and no lower than 15 inches above the surface?*</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p>		<ul style="list-style-type: none"> <li>• Relocate controls and/or operating mechanisms</li> <li>• Relocate route</li> <li>• Add clear floor space</li> <li>• Change height of controls and/or operating mechanisms</li> <li>•</li> <li>•</li> </ul> <p>*If constructed before 3/15/2012 and a side reach is provided operable parts may be no higher than 54 inches and no lower than 9 inches above the surface.</p>
<p><b>B15</b> If there are cleats or other securement devices serving boarding piers at boat launch ramps:</p> <p>Are they on an accessible route?</p> <p>Is there a clear floor space next to each that is at least 30 inches by at least 48 inches?</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Measurement:</p>		<p>Photo #:</p> <ul style="list-style-type: none"> <li>• Relocate securement devices</li> <li>• Add clear floor space</li> <li>•</li> <li>•</li> </ul>

<p>Note: Cleats and other boat securement devices at boarding piers at boat launch ramps can be any height; they do not have to comply with reach range requirements.</p>	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>Photo #:</p>	<p>• • •</p>
	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>Photo #:</p>	<p>• • •</p>
	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>Photo #:</p>	<p>• • •</p>
	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>Photo #:</p>	<p>• • •</p>
	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>Photo #:</p>	<p>• • •</p>
	<p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		<p>Photo #:</p>	<p>• • •</p>





US Army Corps  
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## Arcadia Harbor, MI

### **Harbor Features**

- Located on the east shore of Lake Michigan, 193 miles northeast of Chicago, IL and 15 miles north of Manistee, MI
- Authorization: River & Harbor Act of 3 Mar 1905
- Shallow draft recreational harbor
- Project depth is 9 feet
- Approximately 1,100 feet of maintained federal channel between Lake Michigan and Bar Lake
- More than 2,400 feet of maintained piers
- Dredged material is placed along the beach as beach nourishment.
- Major stakeholders include Arcadia Township, County of Manistee, and several marinas and charter fishing interests.

### **Project Requirements**

- Requires annual maintenance dredging of approximately 5,000 cubic yards. Arcadia Harbor was last dredged in 2010. Limited dredging was completed by the community in 2012, but access to the harbor is still constricted.
- The harbor currently requires maintenance dredging.

### **Consequences of Not Maintaining the Project**

- Local economy would be devastated
- Loss of jobs locally
- Loss of destination for many transient boaters that fill the marinas
- Loss of recreational and charter fishing in the area
- Property values would plummet



### **Transportation Importance**

- This project serves as an important Harbor of Refuge and supports charter fishing and recreational navigation interests.
- The local community has established a significant infrastructure around the harbor facilities that generates income from harbor users and visitors to the area.
- Supports over 60 recreational boat slips