

Manistee Harbor Commission Agenda

Tuesday, October 17, 2017 at 1:00 p.m. – Second Floor Conference Room
City Hall, 70 Maple Street, Manistee MI 49660

Call to Order

Approval of Agenda

Public Comments on Agenda Items (5 minute limit)

Approval of Minutes

- Minutes of August 15, 2017

Reports

- Harbormaster – Review of Boating Season (slip days and revenue)
- City Manager – Launch Ramp Revenue

Unfinished Business

- Marina Dock Repairs / Replacement
- Patio Options / Cost Estimates – DPW Director / City Engineer
- Sponsorship Idea for Marina Patio Area – Glenn Zaring & Ty Cook

New Business

- Marina – Slip Rates for 2018
- Set Meeting Dates for 2018

Public Comment (5 minute limit)

Comments by Harbor Commissioners

Adjourn

Strategic Plan Action Items:

- 1.1.1 Ordinance Review
- 1.1.2 Recruitment
- 2.1.1 Skid Piers
- 2.1.2 Docks
- 2.1.3 Boat Launches
- 3.1.1 Loss Revenue
- 3.1.2 Revenue Sources
- 3.1.3 Expenses
- 4.1.1 Transient Users Needs
- 4.1.2 Change of Focus
- 4.1.3 Early & Late Season
- 5.1.1 Around the Lake Discussions
- 5.1.2 Sister Marina
- 5.1.3 Reach Out to Key Stakeholders
- 6.1.1 Update Website Info
- 6.1.2 Marina Relationships / DDA
- 6.1.3 Update Info in Visitors Guide

**HARBOR COMMISSION MINUTES
MEETING OF AUGUST 15, 2017**

A regular meeting of the Manistee Harbor Commission was held on Tuesday, August 15, 2017 at 1:00 p.m. in the Second Floor Conference Room, City Hall, 70 Maple Street, Manistee MI 49660. The meeting was called to order by the Chair.

Roll Call	Present	Excused Absence	Unexcused Absence
Commissioner Fritz Boehm	✓		
Commissioner Ty Cook	✓		
Commissioner Tim Kozal	✓		
Commissioner Jim Smith	✓		
Commissioner Alex Zaccanelli	✓		
Commissioner Glenn Zaring	✓		
Commissioner Roger Zielinski		✓	
City Manager Thad Taylor		✓	

OTHERS PRESENT: Marketing Vendor Maralee Cook, Ed Tegler

APPROVAL OF AGENDA

MOTION by Jim Smith, second by Glenn Zaring, to approve the agenda as presented. Voice vote - Motion carried.

PUBLIC COMMENTS ON AGENDA ITEMS None

APPROVAL OF MINUTES

MOTION by Jim Smith, second by Glenn Zaring, to approve the minutes for the July 18, 2017 meeting as presented. Voice vote - Motion carried.

STAFF REPORTS

Harbormaster. Hired one more staff member, still one short. Met with Swidorski on marina docks. Requested a cost estimate, using a phased approach, for dock/piling repairs and/or replacement. The estimate to do one dock is \$24,000; \$1,250 just for the gas dock area. Has discussed grant options with the Waterways Commission. Matching funds are not available. Discussed options, floating docks, etc.

- Very good comments on staff from recent survey cards; dock issues were also mentioned. Marina has been full.
- Some MAC racers stopped on their way back.
- No issues with recent events held near or on marina property.
- Glenn Zaring noted that Frank Beaver of the Little River Band of Ottawa Indians could be a good contact for grants or funding options.
- Kozal noted the recently reported “sheen” in the river channel was coming from a source upstream of the marina.
- Discussed catamaran races at First Street Beach. Jim Smith noted this event was in direct violation of city ordinances for camping and fires on the beach. No sense having ordinances if they are not enforced. Ed Tegler noted that City Council and the Parks Commission gave their blessings for the event on a trial basis.

- Discussed dogs on the Riverwalk.
- Police Department continues to monitor launch ramp parking lot and issues citations when necessary.

City Manager. Launch ramp revenue report distributed.

Marketing Vendor. Maralee Cook provided a written update for marketing efforts in July and August. Marketing efforts will be reviewed at the end of the season for effectiveness. Noted that boosted posts resulted in more followers to the Marina Facebook page.

UNFINISHED BUSINESS

- Sponsorship Idea for Marina Patio Area. Glenn Zaring reported that the requested estimates from the DPW Director had not yet been received.

NEW BUSINESS

- Marina – Seasonal Allotment. The City Marina currently uses 8 seasonal docks. The State of Michigan advised that the City had previously been approved for 10 seasonal slips. Tim Kozal asked the Commission to consider increasing the number of seasonal slips to 10. Discussion followed, if more seasonal slips are warranted following the season, we can approach the State to increase the number allowed.

MOTION by Glenn Zaring, second by Fritz Boehm, that the Harbor Commission endorses increasing the number of seasonal slips at the Municipal Marina to ten. Voice vote – Motion carried.

PUBLIC COMMENTS

- Ed Tegler – As a new boater on a recent trip up and down the river channel, he noted that there was no place for someone to tie up and take a look downtown or get something to eat. Members noted that if space is available staff at the City Marina will allow temporary dockage as a courtesy. Discussed good and bad points of signage for a courtesy dock. Suggestion to approach the DDA to rent a seasonal dock or provide other courtesy dockage along the river. Tegler noted that all the negative Private Do Not Enter signs along the river are not inviting to the general boater.

OTHER COMMENTS

- Ty Cook requested a review of season numbers for slip days and revenue at the next meeting.

ADJOURNMENT

Next meeting is scheduled for October 17, 2017 at 1:00 p.m. in the Second Floor Conference Room, City Hall, 70 Maple Street, Manistee, Michigan.

MOTION to adjourn by Jim Smith, second by Glenn Zaring at 1:40 p.m.

Draft – cl

Cynthia Lokovich, CAP-OM
Recording Secretary

BOAT LAUNCH REVENUES**2012 - 2013 Rate Structure: \$5 / Daily, \$35 / Seasonal****2013 - 2016 Rate Structure: \$10 / Daily, \$40 / Seasonal****2017 BOAT LAUNCH REVENUE****(As of 10/9/17)**

	PRESEASON	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTALS
Seasonal Permits	42 = \$1,680	148 = \$5,920	79 = \$3,160	99 = \$3,960	146 = \$5,840	19 = \$760	533 = \$21,320
Daily Permits	0	86 = \$860	101 = \$1,010	226 = \$2,260	534 = \$5,340	290 = \$2,900	1,237 = \$12,370
Annual Total							\$33,690

2016 BOAT LAUNCH REVENUE

	PRESEASON	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTALS
Seasonal Permits	113 = \$4,520	63 = \$2,520	102 = \$4,080	91 = \$3,640	159 = \$6,360	35 = \$1,400	563 = \$22,520
Daily Permits	41 = \$410	72 = \$720	106 = \$1,060	229 = \$2,290	732 = \$7,320	383 = \$3,830	1,563 = \$15,630
Annual Total							\$38,150

2015 FIRST STREET BOAT LAUNCH REVENUE

	PRESEASON	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTALS
Seasonal Permits	84 = \$3,360	69 = \$2,760	78 = \$3,120	106 = \$4,240	109 = \$4,360	52 = \$2,080	498 = \$19,920
Daily Permits	31 = \$310	39 = \$390	64 = \$640	219 = \$2,190	338 = \$3,380	459 = \$4,590	1,150 = \$11,500
Annual Total							\$31,420

2014 FIRST STREET BOAT LAUNCH REVENUE

	PRESEASON	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTALS
Seasonal Permits	35 = \$1,400	113 = \$4,520	95 = \$3,800	126 = \$5,040	159 = \$6,360	22 = \$880	550 = \$22,000
Daily Permits	0	65 = \$650	100 = \$1,000	198 = \$1,980	687 = \$6,870	255 = \$2,550	1,305 = \$13,050
Annual Total							\$35,050

2013 FIRST STREET BOAT LAUNCH REVENUE

	PRESEASON	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTALS
Seasonal Permits	39 = \$1,365	78 = \$2,730	54 = \$1,890	104 = \$4,160	224 = \$8,960	23 = \$920	522 = \$20,025
Daily Permits	14 = \$70	137 = \$685	109 = \$545	199 = \$1,990	734 = \$7,340	285 = \$2,850	1,478 = \$13,480
Annual Total							\$33,505

BOAT LAUNCH REVENUES**2012 - 2013 Rate Structure: \$5 / Daily, \$35 / Seasonal****2013 - 2016 Rate Structure: \$10 / Daily, \$40 / Seasonal****2012 FIRST STREET BOAT LAUNCH REVENUE**

	PRESEASON	MAY	JUNE	JULY	AUGUST	SEPTEMBER	TOTALS
Seasonal Permits	31 = \$1,085	89 = \$3,115	69 = \$2,415	150 = \$5,250	96 = \$3,360	8 = 280	443 = \$15,505
Daily Permits	0	114 = \$570	137 = \$685	687 = \$3,435	1,279 = \$6,395	626 = \$3,130	2,843 = \$14,215
Annual Total							\$29,720



MEMO

TO: Jeff Mikula, DPW Director, City of Manistee
Tim Kozal, Public Safety Director, City of Manistee

FROM: Shawn Middleton, PE, Spicer Group Inc.

DATE: October 2nd, 2017

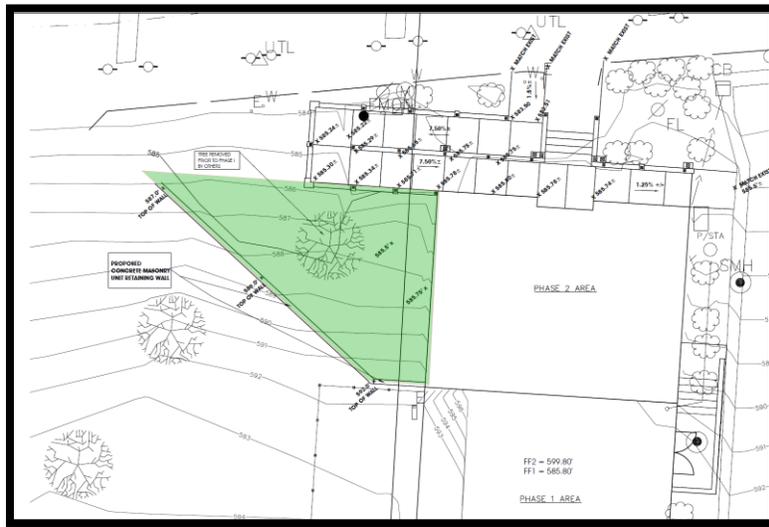
RE: Manistee Municipal Marina – Patio Surface Treatment Recommendations

BACKGROUND

We have been requested to evaluate options for improving the surface of an unimproved area adjacent to the City of Manistee’s Municipal Marina Building. This area is bounded by the Marina building to the east, the barrier free access ramp to the north and a retaining wall to the west. Please refer to the sketch below and attached photographs depicting this location.

It is our understanding the Harbor Commission wishes to utilize this space as a patio and provide for outside seating. Any proposed surface would need to accommodate chairs and tables and be barrier free. Access to this area could be provided by providing an opening in the current handicap accessible ramp or providing an access via ramps and/or steps from the existing sidewalk located to the north.

Additionally, this location is prone to being inundated with water and in the past, has experienced some flooding. A new roof gutter system was installed earlier this year and the downspout from these gutters discharged to the southerly end of this unimproved area. After installation of the gutter and downspout system a pipe was connected to the downspout and directed to an infiltration barrel. This barrel was buried in the approximate center of the unimproved area.



City of Manistee Municipal Marina – Location of Proposed Surface Improvements (Green)

ALTERNATIVES

Stormwater/Groundwater Management

If a permanent improved surface is to be installed at this location it will be important to ensure stormwater runoff from the roof or adjacent areas is not allowed to directly discharge onto or under the proposed surface. Prolonged moisture on or beneath any of the proposed surface treatments will likely result in shortening the design life of the material.

A. Extend Westside Gutter to the Existing Downspout on North Side of Building

An option to remove the source of stormwater runoff from this area could be to modify the gutter along the west side of the building and wrap it around, creating positive drainage to the north side of the building to utilize the existing downspout located east of the entrance way.

This option would be dependent on being able to provide an adequate slope over this distance and will require using an adequate gutter size to handle the estimated stormwater runoff from this roof area. We are assuming this option was previously evaluated and it was determined not feasible for these or other reasons.

B. Install Permanent Drain and Underdrain from Existing Downspout to the River.

Since access to any pipe or stormwater collection system will be difficult to access after installation of a permanent surface at this location we recommend a permanent pipe be installed from the downspout under the proposed surface with a direct outlet to the river. This option will ensure no water is collecting on or under the proposed surface.

We recommend this pipe should be a minimum 6 inches in diameter, non-perforated pipe of either PVC or Dual Wall HDPE material. The pipe should be non-perforated to prevent any roof water from leaving the pipe and reentering the ground beneath the proposed surface resulting in potential impacts to the proposed surface from below.

We also recommend a separate 4-inch perforated tile with sock be ran alongside this pipe to act as an underdrain for this area. This pipe would ensure any potential high groundwater in the area is captured and conveyed away to the River. This pipe could be reconnected to the non-perforated roof drain pipe using a wye connection at a point that is downstream of the proposed patio area.

This option will require a penetration of the existing seawall and either mining under the sidewalk or removing and replacing a portion of the sidewalk to install.

Surface Treatment Options for the Unimproved Area

Several Options exist for installing a surface that would be suitable for a patio while also providing for adequate drainage either through the proposed surface or by sloping the proposed surface to a drain or spillway. The following are some options that could be considered for the proposed improvements.

A. Composite Wood Decking or PVC Dock Decking

Standard composite wood decking could be an option for this area. Standard deck construction could be used to install this surface. This would require the installation of joists, beams and columns to support the system. This system could be installed level and drainage would be through the joints in the decking to the underdrained unimproved ground below.

Estimated cost per square foot installed: \$25-30/SFT



B. Pervious Pavers

Typical block pavers could be placed at this location. They can be installed to be pervious by using blocks with open cells or open joints that are backfilled with a pervious media such as pea stone or similar material. Like pervious concrete, water is transferred vertically through the pavers to a pervious compacted base material below. Pervious pavers will require maintenance in the long term when they become blocked with debris. Since the pervious material is removable, maintenance would consist of vacuuming the paved surface with a special street sweeper type machine. If the surface fails for some reason, it would be relatively simple to remove and replace the necessary pavers, replace the top few inches of pervious material, if required, and reset the pavers. Pavers can be selected and designed to be aesthetically pleasing through the use of patterns and designs

Estimated cost per square foot installed: \$12-\$14/ SFT



C. Grassed Pavers

Block pavers with open areas can also be used to provide for a green grassed surface. Pavers with open joints or cells would typically have the bottom 1/2 or 2/3 filled with pea stone and the top 1/2 or 1/3 filled with topsoil that would be seeded and allowed to grow. The resulting appearance is a mix of grass and block pavers. This system is dependent on the ability to grow grass at this location and if grass is able to grow will require maintenance by mowing.

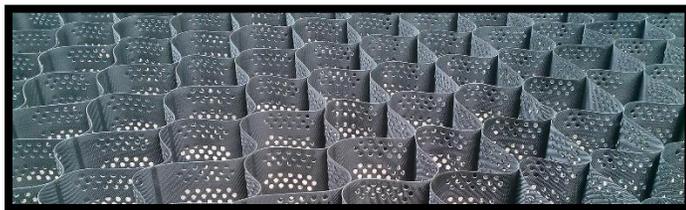
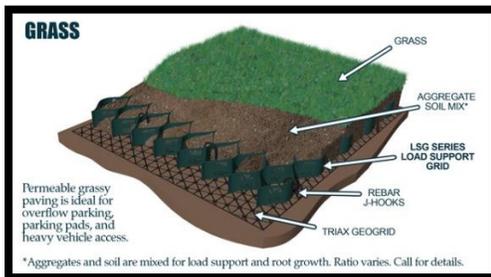
Estimated cost per square foot installed: \$10-\$12/ SFT



D. Grassed Geocellular Surface

This alternative involves the use of a geocellular materials. These materials are made of strong plastic and unfold to create cells. These cells can be filled with stone and topsoil similar to the openings in pavers. This system would result in a surface that appears to be a typical grass surface, but has added strength provided by the geocellular system and stone backfill. Similar to the grassed pavers this system is dependent on the ability to grow grass at this location and if grass is able to grow will require maintenance by mowing.

Estimated cost per square foot installed: \$8-\$10/ SFT



E. Pervious Concrete

Pervious Concrete is a potential option for this location. Pervious concrete allows stormwater to flow vertically through the concrete to the subbase below. The subbase would typically be compacted sand to allow for drainage to underdrains or the water table below. Pervious concrete can require maintenance over time. If the pore spaces become blocked over time they may need to be cleaned by vacuum or high pressure washing techniques.

Estimated cost per square foot installed: \$8-\$12/ SFT



F. Conventional Concrete

Conventional Concrete is an option at this location provided the base is underdrained and adequate slope is provided to drain the surface. The surface of the concrete would need to be sloped in a manner to drain away from the building. For this relatively small site this could be accomplished by sloping the concrete to the west and northwest and allowing water to runoff onto the grass or a drain could also be installed in the center of the patio area and connected to the roof drain outlet. Concrete could also be stained or finished as desired to improve the appearance.

Estimated cost per square foot installed: \$4-\$10/ SFT



RECOMMENDATIONS

Stormwater/Groundwater Management

Unless it is feasible to convey the additional roof water around to the downspout on the north side of the building we would recommend a permanent pipe and underdrain (Option B) be installed from the existing downspout to the river. For planning purposes, we would estimate the cost of construction to range between \$2,000 and \$5,000. Since this is a small project and will be driven by mobilization as much as the unit pricing we highly recommend obtaining quotes or bids from a contractor for planning or budgeting purposes.

Surface Treatment Options for the Unimproved Area

The recommended option for the proposed surface treatment will be dependent on a balance of costs, maintenance, longevity, and appearance. Therefore, it is difficult for us to make this determination. This decision will ultimately need to be determined by the stakeholders. However, we can provide the following input for the stakeholders to use in the decision-making process.

The grassed surface options would provide a natural looking setting, though it may be difficult to fully establish uniform grass growth in some areas. There are currently areas where grass is not fully established. In addition, mowing of this area would require the removal of chairs and tables if that were to become the preferred use in the summer. These surfaces, though reinforced with pavers or GeoCellular systems could be soft in locations for chairs and tables.

Pervious concrete is typically more expensive and takes special installation techniques. Similar results can be obtained from pervious pavers using stone to fill in open cells and joints. Therefore, if a permeable surface is recommended it may be more cost effective and potentially more aesthetically pleasing to use pervious pavers.

The use of composite/PVC decking or conventional concrete would ensure a sound stable surface is provided for any potential use of this area. A deck system would require the installation of columns, beams, and joists, but would not require the existing subbase material to be replaced or compacted. A concrete system would require a compacted sand base with underdrainage and the surface would need to be graded for positive drainage. A deck appearance could be enhanced by using varying deck board colors and patterns. A concrete surface could also be enhanced by using various staining and texturing techniques.

There is an estimated 620 square feet of surface area that could be improved. Using the range of unit costs and assuming some demolition items for the existing rail/wall at the ramp, grading, restoration, etc. the surface improvement could range from \$3,000 to \$18,600 to install. Since this is a small site and mobilization and unit costs could vary we would highly recommend obtaining quotes or bids from a contractor.

Please refer to the attached sketch for the approximate location of the roof drain outlet and underdrain improvements.

Recommended Roof Drain outlet to manistee River if permanent surface is installed, 6" PVC for the roof drain and a separate 4" underdrain, minimum 1% Slope, a penetration of seawall and sidewalk repair will be required

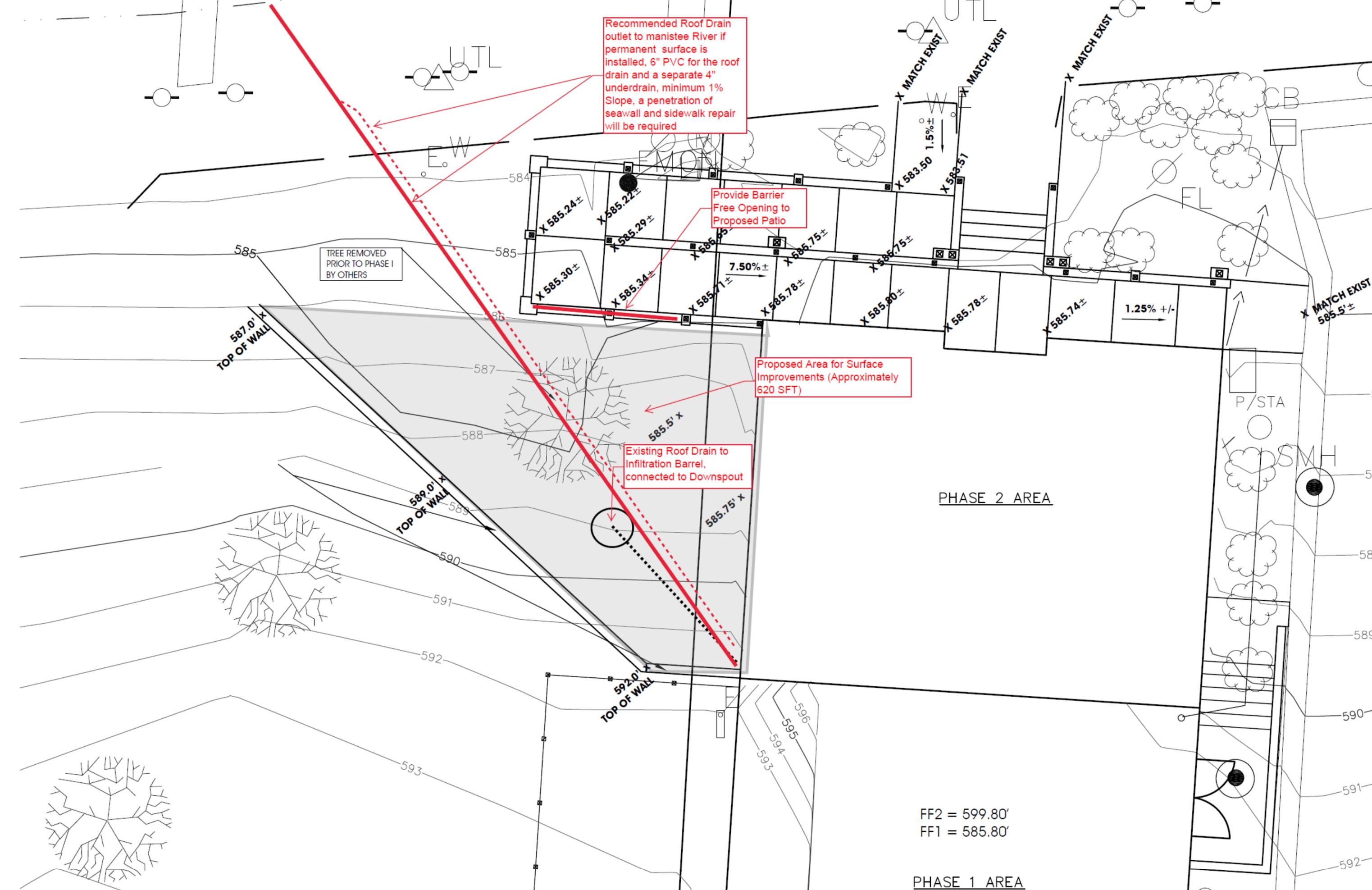
Provide Barrier Free Opening to Proposed Patio

Proposed Area for Surface Improvements (Approximately 620 SFT)

Existing Roof Drain to Infiltration Barrel, connected to Downspout

TREE REMOVED PRIOR TO PHASE I BY OTHERS

FF2 = 599.80'
FF1 = 585.80'











MANISTEE CITY HARBOR COMMISSION

2017 MEETING SCHEDULE

Chapter 266 of the Manistee Code of Ordinances requires the Commission to meet at least quarterly each year, and more frequently as needed. The date and time of each meeting will, where practicable, be agreed upon by the consensus of the Commission and City Staff assigned to the Commission. Consensus to schedule quarterly meetings in January, April, July and October on the Third Tuesday of the month, and also during the Marina season in June and August. Additional meetings can be scheduled as necessary. Meetings are held in the Second Floor Conference Room, City Hall at 1 p.m.

January 16, 2018
July 17, 2018

April 17, 2018
August 21, 2018

June 19, 2018
October 16, 2018

This notice is given pursuant to provisions of the Michigan Open Meetings Act.

Posted _____, 2017

Cindy Lokovich, Secretary
Manistee Harbor Commission

2018

January							February							March							April							
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MANISTEE HARBOR COMMISSION
ANNUAL REPORT 19 SEPTEMBER 2017

COMMISSION MEMBERS

HARBORMASTER TIM KOZAL, COMMISSIONER FRITZ BOEHM, COMMISSIONER TY COOK,
COMMISSIONER JIM SMITH, COMMISSIONER ALEX ZACCANELLI, COMMISSIONER GLEN ZARING,
COMMISSIONER ROGER ZIELEINSKI, CITY MANAGER THAD TAYLOR

2017 SEASON

YEAR END STATS ARE NOT AVAILABLE AT THIS TIME, HOWEVER, LAST YEARS NUMBERS SHOWED LAUNCH FEE'S THE HIGHEST THEY HAVE BEEN IN 5 YEARS AND GAS SALES SHOWED A PROFIT OF \$13,302 FOR A 16.7% PROFIT MARGIN. THE LAUNCH RAMP REVENUE INCREASE IS ATTRIBUTED TO CHARGING AT THE ARTHUR STREET LAUNCH RAMP.

MARALEE COOK IS NOW THE CITY MARINA'S FACEBOOK ADMINISTRATER, ALL INDICATIONS HAVE BEEN POSITIVE, SHE HAS BEEN GETTING POSITIVE RESPONSES FROM BOATERS FROM ALL OVER LAKE MICHIGAN. BOATS ON THE "GREAT LOOP" ARE MAKING MANISTEE A STOP ON THEIR SCHEDULE AND WE ARE NOW ON THE CHICAGO-MAC SAILBOAT RACE'S TRIP BACK GUIDE. WE DON'T HAVE FINAL NUMBERS YET BUT WE EXPECT THEM TO BE GOOD.

WE PARTNERED WITH "TIGHT LINES FOR TROOPS " THIS YEAR AND WERE ABLE TO GET A 100 BAGS OF ICE DONATED. WE ARE ALSO TRYING TO PARTNER WITH THE DDA AND PARKS COMMISSION, TYLER LEPPANEN FROM THE DDA HAS BEEN ATTENDING OUR MEETINGS AND WE HAVE GONE TO A PARKS COMMISSION MEETING AND THE PARKS CHAIR HAS ATTENDED ONE OF OURS. WE SHALL SEE HOW THIS WORKS OUT.

WE GAVE PERMISSION TO THE LITTLE RIVER BAND OF OTTAWA INDIANS NATURAL RESOURCES BIOLOGIST TO PLACE "WILD RICE ZONE" SIGNS AT THE ARTHUR ST RAMPS AND WE WERE ASKED TO PLACE A WOLVERINE SCULPTURE AT THE MARINA, WE FEEL IF WE DO THAT, WE SHOULD HAVE A SPARTY SCULPTURE ALSO, NO DECISION HAS BEEN MADE.

DUE TO HIGH WATER LEVELS THERE ARE IMMEDIATE DOCK REPAIRS NEEDED, OUR NEW HARBORMASTER HAS BEEN WORKING WITH SWIDORSKI BROS. AND HAS ALSO HAS HAD EMERGENCY REPAIRS DONE AT THE ARTHUR ST LAUNCH RAMP RETAINING WALL.

WE WOULD LIKE TO INCREASE THE NUMBER OF SEASONAL DOCKS, INCREASE THE NUMBER OF TRANSIENT SLIPS, AND POSSIBLY HAVE A COURTESY DOCK.

OUR GOAL IS TO GET THE WORD OUT THAT WE HAVE A GREAT FACILITY AND INCREASE MARINA REVENUES, WE THINK OUR FACEBOOK PRESENCE IS STARTING TO ACCOMPLISH THAT GOAL.

THANKS FOR YOUR ATTENTION.

SIGNED,

ALEX ZACCANELLI



**US Army Corps
of Engineers**
Detroit District

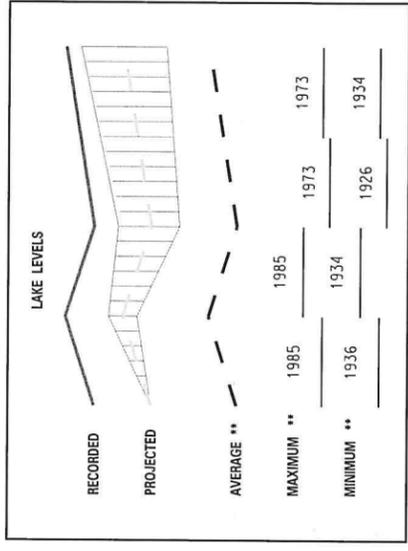


**MONTHLY BULLETIN OF
LAKE LEVELS FOR THE
GREAT LAKES**

SEPTEMBER 2017

Water levels for the previous year and the current year to date are shown as a solid line on the hydrographs. A projection for the next six months is given as a dashed line. This projection is based on the present condition of the lake basin and anticipated future weather. The shaded area shows a range of possible levels over the next six months dependent upon weather variations. Current and projected levels (solid and dashed lines) can be compared with the 1918-2016 average levels (dotted line) and extreme levels (shown as bars with their year of occurrence). The legend below further identifies the information on the hydrographs.

LEGEND



The levels on the hydrographs are shown in both feet and meters above (+) or below (-) Chart Datum. Chart Datum, also known as Low Water Datum, is a reference plane on each lake to which water depth and Federal navigation improvement depths on navigation charts are referred.

All elevations and plots shown in this bulletin are referenced to International Great Lakes Datum 1985 (IGLD 1985). IGLD 1985 has its zero base at Rimouski, Quebec near the mouth of the St. Lawrence River (approximate sea level).

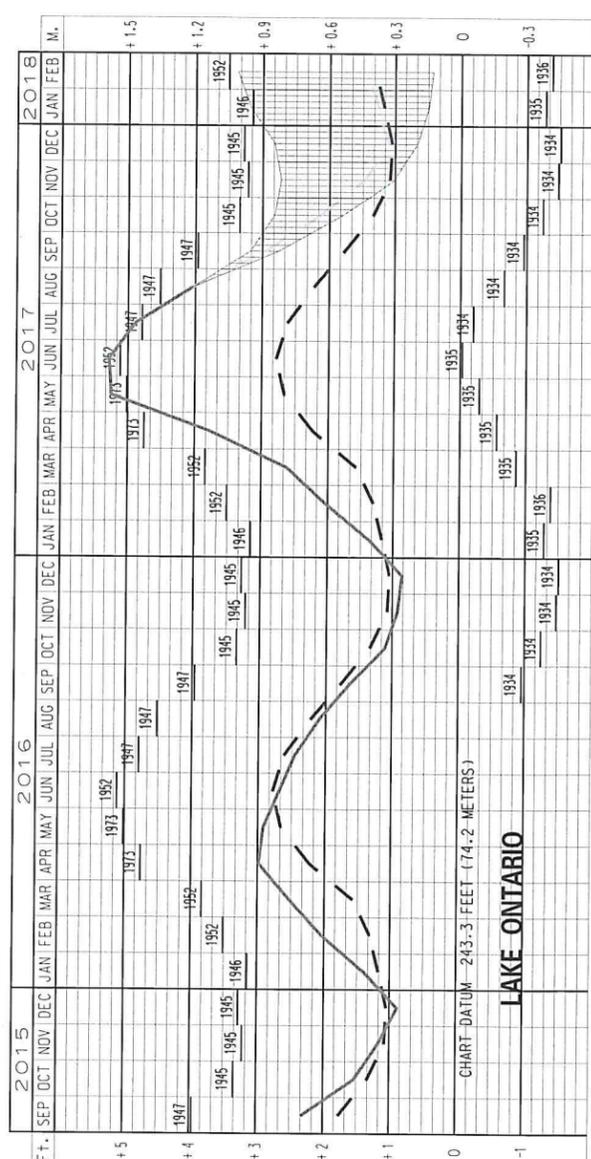
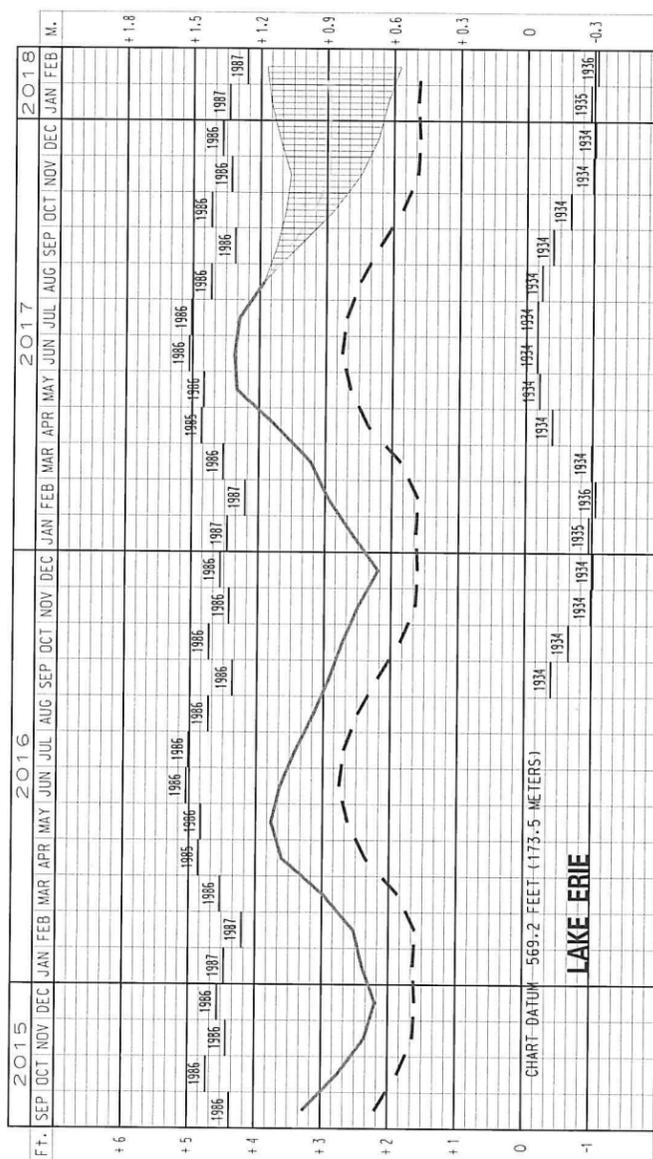
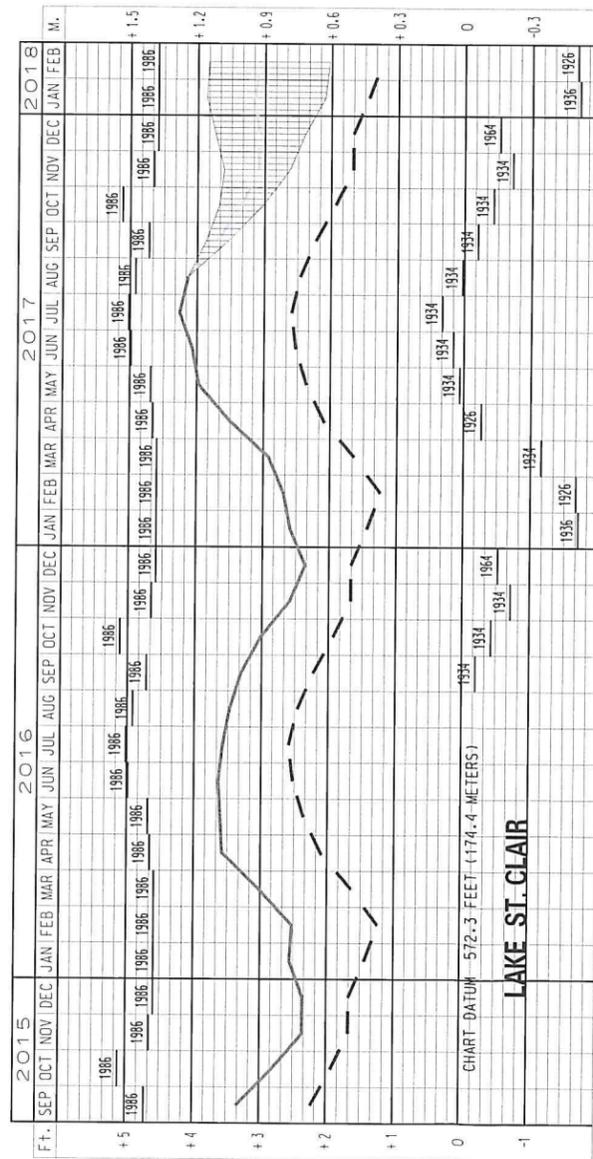
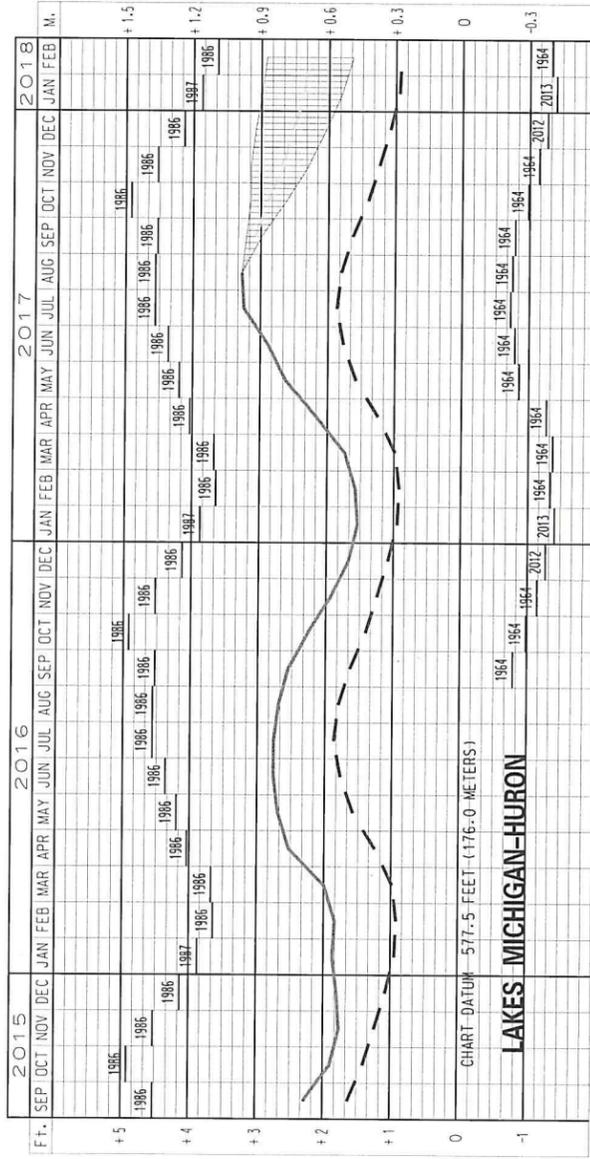
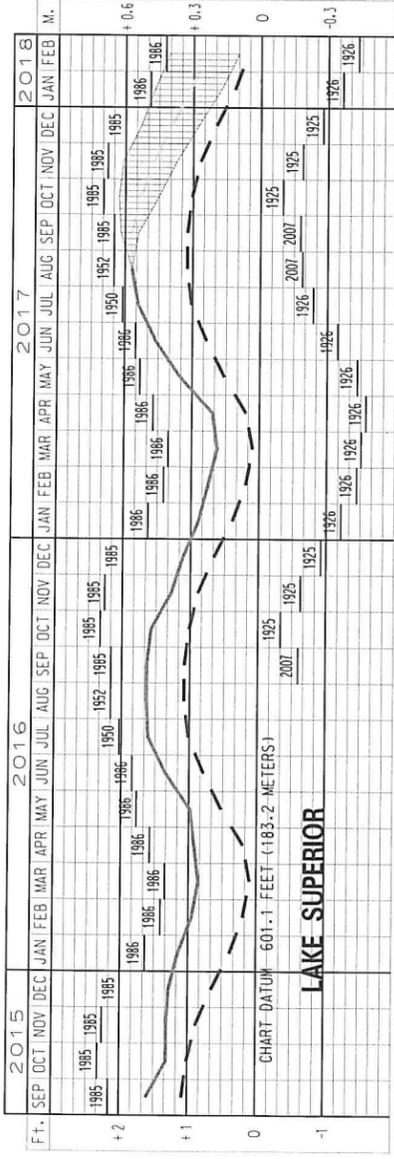
AUGUST MEAN LAKE LEVELS

(IGLD 1985)

	Superior	Mich- Huron	St. Clair	Erie	Ontario
Ft.	602.95	580.71	576.31	573.16	247.47
M.	183.78	177.00	175.66	174.70	75.43
Ft.	602.69	580.12	575.66	572.38	245.54
M.	183.70	176.82	175.46	174.46	74.84
Ft.	603.22	581.99	577.10	573.95	247.97
M.	183.86	177.39	175.90	174.94	75.58
Yr.	1952	1986	1986	1986	1947
Ft.	600.43	576.67	572.21	569.00	242.78
M.	183.01	175.77	174.41	173.43	74.00
Yr.	2007	1964	1934	1934	1934
Ft.	602.13	579.23	574.64	571.72	245.67
M.	183.53	176.55	175.15	174.26	74.88

* provisional

** Average, Maximum and Minimum for period 1918-2016



ELEVATIONS REFERENCED TO THE CHART DATUM OF EACH RESPECTIVE LAKE

* 2017

2016

** MAX.

** MIN.

** AVG.

Information

Recorded water levels in this bulletin are derived from a representative network of water level gages on each lake (see cover map). Providers of these data are the U.S. Department of Commerce, NOAA, National Ocean Service, and Integrated Science Data Management, Department of Fisheries and Oceans, Canada. The Detroit District, Corps of Engineers and Environment Canada derive historic and projected lake levels under the auspices of the Coordinating Committee on Great Lakes Basic Hydraulic and Hydrologic Data.

This bulletin is produced monthly as a public service. The Corps also, on a weekly basis publishes online the *Great Lakes, Connecting Channels and St. Lawrence River Water Levels and Depths*, which provides a forecast of depths in the connecting rivers between the Great Lakes and the International Section of the St. Lawrence River. This *Monthly Bulletin of the Lake Levels for the Great Lakes* may be obtained free of charge by writing to the address shown on the front cover, by calling (313) 226-6442 or emailing hhpm@usace.army.mil. Notices of change of address should include the name of the publication. This information is available on the internet at <http://www.lre.usace.army.mil/Missions/GreatLakesInformation.aspx>.

**Great Lakes Basin Hydrology
August 2017**

According to preliminary estimates, precipitation during the month of August was near average for the Great Lakes basin. Lake Superior received 20% more precipitation and Lake Michigan-Huron 10% more than average, while lakes Erie and Ontario received 71% and 86% of average precipitation in August, respectively. The net basin supplies were above average for Lake Superior and Lake Erie, near average for Lake Ontario, and below for Lake Michigan-Huron. The outflows for August were above average for all lakes and for the third consecutive month, Lake Ontario's preliminary average monthly outflow estimate is a record high outflow based on the period of record³.

All of the lakes were above their August long-term average water levels. From July to August, Lake Superior rose just over an inch and Lake Michigan-Huron rose less than half of an inch. Lakes Erie and Ontario declined 4 inches and 10 inches, respectively. However, all of the lakes are still above last year's August water levels by 3 to 23 inches.

PRELIMINARY PRECIPITATION (INCHES)								
BASIN	August				12-Month Comparison			
	2017	Average (1900-2014)	Diff.	% of Average	Last 12 months	Average (1900-2014)	Diff.	% of Average
Superior	3.78	3.16	0.62	120	33.22	30.52	2.70	109
Michigan-Huron	3.42	3.12	0.30	110	35.50	32.57	2.93	109
Erie	2.29	3.22	-0.93	71	37.17	35.65	1.52	104
Ontario	2.69	3.13	-0.44	86	40.43	35.87	4.56	113
Great Lakes	3.27	3.14	0.13	104	35.68	32.76	2.92	109

LAKE	August Net Basin Supplies ¹ (cfs)		August Outflows ² (cfs)	
	2017	Average (1900-2008)	2017	Average ³ (1900-2008)
Superior	154,000	94,000	115,000	83,000
Michigan-Huron	41,000	53,000	216,000	195,000
Erie	18,000	-10,000	245,000	209,000
Ontario	8,000	8,000	351,000	256,000

Notes: Values (excluding averages) are based on preliminary computations; cfs denotes cubic feet per second.
¹ Net basin supply is the net result of precipitation falling on the lake, runoff from precipitation falling on the land which flows to the lake, and evaporation from the lake. Negative net basin supply denotes evaporation exceeded runoff and precipitation. The net total supply can be found by adding the net basin supply and the outflow from the upstream lake.
² Does not include diversions.
³ Lake Ontario average water supplies and average outflows are based on period of record 1900-2005

DEPARTMENT OF THE ARMY
 DETROIT DISTRICT CORPS OF ENGINEERS
 ATTN: CELRE-HH-W
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**MONTHLY BULLETIN
 OF LAKE LEVELS FOR
 THE GREAT LAKES**

