

PUBLIC NOTICE

In accordance with the Statutes of the State of Illinois and the Ordinances of the City of Highland Park, the next meeting of the Natural Resources Commission of the City of Highland Park is scheduled to be held at the hour of 6:30 p.m. on Wednesday, April 8, 2015 at the City of Highland Park City Hall, 1707 St. Johns Avenue, Highland Park, Illinois, during which it is anticipated there will be a discussion of the following:

CITY OF HIGHLAND PARK  
NATURAL RESOURCES COMMISSION  
WEDNESDAY, APRIL 8, 2015  
HIGHLAND PARK CITY HALL  
1707 ST. JOHNS AVENUE  
HIGHLAND PARK, ILLINOIS  
6:30 P.M.

**MEETING AGENDA**

**I. Call to Order**

**II. Roll Call**

**III. Approval of Minutes:** March 11, 2015

**IV. Business from the Public**

**V. New Business**

- A. Presentation on the City's Steep Slope Zone and Lake Michigan Protection Zone Regulations
- B. 55-57 Deere Park Drive – Consideration of a Beach Structure Permit for Regulated Activities in the Lake Michigan Protection Zone
- C. Discussion on Earth Day Activities
- D. Discussion on Highland Park Community Gardens

**VI. Old Business**

- A. Status Update on the Electricity Aggregation Program

**VII. Other Business**

- A. Commissioner Comments
- B. Administrative Items

**VIII. Adjournment**

**MINUTES OF A REGULAR MEETING OF  
THE NATURAL RESOURCES COMMISSION OF THE CITY OF HIGHLAND  
PARK, ILLINOIS**

**MEETING DATE:** March 11, 2015

**MEETING LOCATION:** Presession Conference Room, Highland Park City Hall, 1707 St. Johns Avenue, Highland Park, Illinois

**CALL TO ORDER**

At 6:31 p.m., Chairwoman Coyle called the meeting to order and the Staff Liaison called the roll.

**ROLL CALL**

Members Present: Coyle, Pagoria, Matthews, Hannick, Wagenius, Ross, Stone, Dotson, and Grill

Members Absent: Rheinstrom, Lewittes, and Theodosakis

The Chairwoman declared that there was a quorum of the Commission present.

Staff Present: Staff Liaison Karen Berardi

**MINUTES**

**A. Regular Meeting of the Natural Resources Commission—December 10, 2014**

Commissioner Matthews moved to approve the minutes of a regular meeting held on January 14, 2015. Commissioner Wagenius seconded the motion. On a voice vote, Chairwoman Coyle declared that the motion passed unanimously (6-0).

**BUSINESS FROM THE PUBLIC**

Joel Cahn, 26 Lakeview Terrace, objected to the January 14, 2015 meeting minutes as approved because he believes the minutes do not accurately report what occurred at the meeting. Mr. Cahn read a statement into the record. Chair Coyle noted that Mr. Cahn's statement will be attached to the meeting minutes.

**NEW BUSINESS**

A. **Ravine Drive Beach Rock Garden Installation Project Overview**

Park District Representative and Natural Areas Manager Rebecca Grill presented on the rock garden installation to be constructed at Ravine Drive Beach as designed by John Dalton and donated by Highland Park resident Marjie Ettlinger. The pebble harp that will be constructed as part of the project was also demonstrated. Chair

Coyle thanked the Ettlengers, Dalton and the Boy Scout Troop for their contributions.

**B. Status Report on Sustainability Code Review**

Grace Rink, the City's Sustainability Consultant, provided an update on the code review initiative that she and Primera are undertaking as part of the 2015 Sustainability Work Plan. The code review entails an evaluation of whether sustainable practices are either enabled or prohibited, specifically regarding alternative power, green infrastructure, bird-safe design and light pollution.

Rink stated that many of these practices are allowable by code and that this may provide an opportunity for educating City staff. Chair Coyle and Councilwoman Stone stated that City staff have been resistant to allowing rain barrels and other alternative methods of managing storm water and indicated there may be a misinterpretation of the code. Rink clarified that the code does indicate that any additional storm water overflow must be directed into a storm sewer, but that it does not prohibit rain barrels. Commissioner Hannick noted that the code should still be changed to address reevaluation of drainage after changes have been made to homes, regardless of whether there is a change to their footprints. Commissioner Pagoria and Councilwoman Stone concurred that the code should be clarified. Rink will take the feedback received to evaluate what changes can be made to clarify the code.

Rink confirmed the commission's interest in amending the building code to regulate bird friendly designs on multi-family and commercial buildings. Rink will provide recommended code amendments as a next step.

Rink stated that she will continue to look at wind turbines and solar panel installations and ensure these forms of alternative energy sources are permitted within the code. Rink also noted that the City's tree protection ordinances may limit the installation of some wind turbines or solar panels.

In regards to light pollution, Rink will begin recommending code amendments and will work with City staff to move recommendations forward. Vice Chair Ross stated that with a written directive to ComEd they could begin to replace street lights with LEDs and change one street or neighborhood at a time. Berardi will follow up with the ComEd Representative and report back to the commission.

**C. Discussion on Electricity Aggregation 100% Green Power Program**

Staff Liaison Berardi provided an overview of the City's Electricity Aggregation Program and provided an update on the current contract recommendation with Integrys. Berardi noted that an update was presented to City Council on March 9, 2015 and discussion led to renewable energy credits (RECs) and whether or not to include 100% RECs in the volume energy mix. Councilwoman Stone provided an overview of the Council discussion pertaining to the Green Power Program and the 100% REC consideration. Councilwoman Stone sought commission direction on providing a recommendation to Council regarding the 100% REC.

Commissioner Wagenius left the meeting at 7:45 p.m.

Chair Coyle stated that Highland Park brands itself as a leader in sustainability and supported sending a recommendation to City Council.

Commissioner Matthews moved to direct the Chair to write a letter on behalf of the commission in support of 100% RECs with a provision that residents can opt out. Vice Chair Ross seconded the motion. On a voice vote, Chairwoman Coyle declared that the motion passed unanimously (5-0).

## **OLD BUSINESS**

### **A. Status Report on Environmental Movie Screenings**

Councilwoman Stone presented on the City's Bike Month activities and suggested that the commission co-sponsor a series of short films on biking in conjunction with the Highland Park Bike Fair on May 16, 2015. The commission was supportive of showing a series of short films on biking in conjunction of the fair. It was noted that the Library Auditorium is available on May 17 from 2:00 p.m. – 4:00 p.m. but the commission supported the idea of coordinating the screening on the same day and time as the bike fair.

Additional future films were discussed including *Food Patriots* and *Wild Things*. Commissioner Hannick suggested coordination with the Come Alive Outside campaign for a *Wild Things* screening. Chair Coyle suggested that a spring 2016 showing of *Wild Things* should be coordinated.

Councilwoman Stone also suggested bringing a Great Lakes exhibit to the Highland Park Library. Park District Representative Grill suggested the exhibit could be done in conjunction with Beach Clean-up in September.

## **OTHER BUSINESS**

### **A. Commissioner Comments**

Vice Chair Ross stated that he has an interest in bringing in outside coastal engineers to provide education on coastal management in addition to staff. Commissioner Hannick and Chair Coyle agreed. Commissioner Matthews suggested the City retain an unbiased coastal engineer to review applications and provide their recommendations to staff and to the commission as part of the review process. Staff Liaison Berardi noted that professional services agreements may have to be bid and the fee resolution would have to be amended.

Commissioner Matthews left the meeting at 8:45 p.m.

The commission directed staff to invite an unbiased coastal engineer to the April 8<sup>th</sup>, 2015 meeting for education on hard coastal structures and erosion. City staff will still provide an overview of City code and the application process.

Staff Liaison Berardi reported on the fourth quarter clothing and textile results, and provided an update on the City's waste hauling agreements.

B. Administrative Items

There were no administrative items this evening.

**ADJOURNMENT**

Commissioner Hannick motioned to adjourn the meeting. Vice Chair Ross seconded the motion. Chairwoman Coyle adjourned the meeting at 8:56 p.m.

Respectfully Submitted,

Karen Berardi, Assistant to the City Manager

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MINUTES APPROVED BY THE NATURAL RESOURCES COMMISSION ON

- WITH NO CORRECTIONS \_\_\_\_\_
- WITH CORRECTIONS \_\_\_\_\_  
(SEE MINUTES OF [ \_\_\_\_\_ ] MEETING FOR CORRECTIONS)

March 11, 2015

Ms. Ann Coyle, Chairwomen  
City of Highland Park  
Natural Resources Commission  
Highland Park City Hall  
1704 St. Johns Avenue  
Highland Park, IL60035

Re: Objection to the Approval of the minutes for  
the January 15, 2015 HPNRC meeting

To the Natural Resources Commission Members:

I object to the approval of the minutes as is. I request a commission member make a motion to amend the minutes and properly report in the minutes what occurred and what I said to the Commission on January 14, 2014.

The minutes should state that I distributed copies of "Living on the Coast" by the U. S. Army Corps of Engineers-Detroit Branch and the University of Wisconsin Sea Grant to commission member Pagoria, Ross, Matthews, and Hannick. The document contains state of the art science based information on shore protection structures and directed by a label on the front cover, commission members to the state of the art guidance on the impacts of groins, revetments, and breakwaters on pages 30-31 and informative information on safe setback distances on page 16. Also, I distributed an article from Michigan State University Extension titled: "With higher Great Lakes, review zoning for coastal resiliency" which urges public bodies such as the NRC to review zoning for setbacks for property near Lake Michigan stating "From a strictly ecological perspective, construction of seawalls should be avoided in favor of other erosion control measures because **hard surfaces reflect wave energy and increase erosion in the vicinity of the structure.**"

Further, I object to the statement in the minutes that "Mr. Cahn stated that the commission does not have the expertise to make permitting decisions." Commissioner Hannick made this statement to the Commission at a prior commission meeting. I wanted to call to the Commission's attention that there are resources available to them, many without cost, such as the coastal engineers at Sea

Grant University of Wisconsin and the U.S. Army Corp of Engineers-Detroit Branch to help the commission evaluate permitting issues.

Further, I want to comment on Commissioner Brent Ross's statement made at the January 14, 2015 meeting regarding the commissions responsibility to review permits he said that that before coastal structure permits come to the commission they are reviewed and approved by the USACE and the ILDNR and therefore this means the Commission doesn't need to review coastal structure permits as this work has already been done and the commission should approve these permits without further review. Commissioner Ross's statement is incorrect because the review standards under Highland Park's Section 150.703.1(E)(3)(f) Standards for issuing permits in the Lake Michigan Protection Zone are different from the standards applied by the USACE and ILDNR. The standard applied by the USACE is "to protect and maintain the navigable capacity...protecting the Nations's aquatic resources..." and the standard applied by the ILDNR is the 120% overfill requirement that is unsupported by mainstream coastal engineer science. I have brought with me USACE and ILDNR documents that address the standards they use to permit coastal projects.

One of the standards under Highland Park's Section 150.703.1(E)(3)(f) Standards for issuing permits in the Lake Michigan Protection Zone is "**The proposed Regulated Activity and/or Structure shall not create new nor amplify existing erosion problems on the Subject Property and on Adjacent Properties.**" This is the standard that this Commission needs to address as the USACE and ILDNR have not done your work for you on this standard.

The coastal literature strongly supports that groins, revetments, and breakwaters interfere with the beach building conditions for nature's natural erosion defenses to work. The literatures says that hard shore protection structures are the cause of deeper water near the shore which allows large waves with high energy to pound the shoreline which is a cause of accelerated erosion and shore protection structures interrupt the flow of sand which also causes accelerated erosion.

Adjacent property owners land should not be taken away from them and given to an applicant. The taking is often not obvious and may occur over a long period of time, but these structures of groins, revetments, and breakwater unjustly take property at the expense of adjacent property owners. I ask you to put a ban on construction of groins, revetments, and breakwaters in place because it is consistent with the wise Standard (f) and it is the just thing to do.

Again I request that the Commission adopt science based rules and regulations and stop permitting hard shore protection structures.

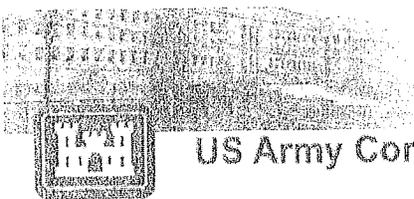
Respectfully submitted



Joel M. Cahn

26 Lakeview Terrace

Highland Park, IL 60035



# US Army Corps of Engineers

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### Regulatory Program Links

- [Emergency Actions](#)
- [Obtain a Permit](#)
- [Nationwide Permits](#)
- [Video Library](#)
- [National Notices/Program Initiatives and Announcements](#)
- [Related Resources](#)
- [Regulatory Contacts](#)
- [Frequently Asked Questions](#)
- [Jurisdictional Information](#)
- [Mitigation Information](#)
- [Appeals Program](#)

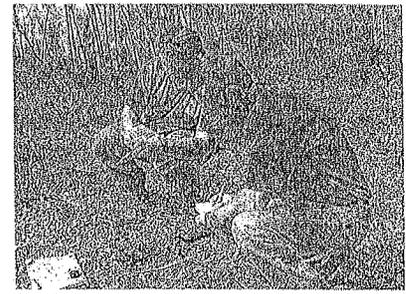
### Frequently Visited Links

- [Regulatory In-lieu fee and Bank Information Tracking System \(RIBITS\)](#)
- [Regional Supplements to Corps Delineation Manual](#)
- [Individual Permits – Pending and Issued Actions](#)
- [Customer Survey](#)
- [Federal Regulation](#)
- [Regulatory Guidance letters](#)
- [National Wetland Plant List](#)

### Latest News

- 29 January 2015 - Memorandum withdrawing the 25 Mar 2014 Interpretative Rule Regarding the Applicability of Clean Water Act Section 404 (f)(1)(A). For additional information click [here](#).
- 3 December 2014 - The U.S. Army Corps of Engineers has received a final biological opinion from National Oceanic and Atmospheric Administration Fisheries on the USACE nationwide permits that were reissued on Feb. 13, 2012, and went into effect on March 19, 2012. The biological opinion was issued on Nov. 24, 2014, and it concludes the re-initiated programmatic consultation on the Endangered Species Act that began in July 2012 between the two agencies. To view the biological opinion click [here](#). For more general information click [here](#).
- 6 November 2014 - The U.S. Army Corps of Engineers has established a streamlined process to request an evaluation of the wetland rating for plants on the National Wetland Plant List (NWPL). A request can be completed by submitting an online questionnaire on the NWPL website between 10 November 2014 and 31 January 2015. For additional information click [here](#).
- 6 October 2014 - The comment period for the Clean Water Act proposed rule for defining "waters of the United States" has been extended until 14 November 2014. Please click [here](#) for additional information.
- 10 June 2014 - In response to numerous requests, the comment period for the Clean Water Act rule announced on 21 April 2014 has been extended for 91 days until 20 Oct 2014. Please click [here](#) for the Public Notice.
- 21 April 2014 - The U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency announce the publication of a joint proposed rule for the definition of Waters of the U.S. under the Clean Water Act in the Federal Register for a 90-day public comment period. For the Public Notice with additional information on the proposed rule and how to submit comments, click [here](#). More information on the proposed rule can also be found by clicking [here](#).

### Regulatory (Permits)



The Department of the Army Regulatory Program is one of the oldest in the Federal Government. Initially it served a fairly simple, straightforward purpose: to protect and maintain the navigable capacity of the nation's waters. Time, changing public needs; evolving policy, case law, and new statutory mandates have changed the complexion of the program, adding to its breadth, complexity, and authority.

The Regulatory Program is committed to protecting the Nation's aquatic resources, while allowing reasonable development through fair, flexible and balanced permit decisions. The Corps evaluates permit applications for essentially all construction activities that occur in the Nation's waters, including wetlands.

### How Do I ...

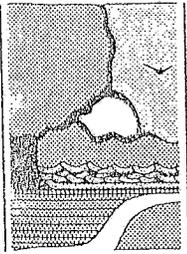
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ILLINOIS  
DEPARTMENT OF  
**NATURAL RESOURCES**  
Office of Water Resources

Illinois Department of Natural Resources  
Office of Water Resources  
36 S. Wabash Avenue/Suite 1415  
Chicago, IL 60603

March 21, 2006

Summary of Responses from the Private Shore Protection Review Committee

Introduction

To assist the technical review committee in providing comment and input to the Department concerning private shore protection structures that extend out into the bed of Lake Michigan, a series of questions were posed to help focus discussion on the issues involved with the review and potential permitting of these types of projects. All of the committee members prepared written responses to these questions, as well as several private shore property owners. As an aid to the committee members, we have prepared a short summary of the comments, but we would still request that each committee member carefully review the full package of attached comments.

The comments received indicate that there is a wide variety of opinion concerning all aspects of these types of shore protection projects. This is consistent with the discussions that have occurred during the prior three meetings of the technical review committee. However, as Department staff reviewed the written comments, it appeared that there are some issues on which there is a general consensus of the committee. These include:

1. The Department should either require, or recommend, that private shore protection projects provide some type of access over or around the proposed project.
2. The Department should consider increasing the length and scope of the public notice period.
3. For projects that involve structures that are built out onto the bed of Lake Michigan and have the ability to trap littoral drift sand, the Department should require pre and post construction surveys.
4. Permit applications for projects of this nature should be by or under the supervision of a professional with coastal expertise.
5. The Department should require additional documentation explaining why the proposed project is necessary.
6. Proposed projects should be of similar size as those in the surrounding area.
7. Wave and littoral drift analysis should be required on projects proposed for areas where no offshore projects currently exist, or when a project exceeds the size of structures in the area.

By way of reminder, please remember that the Department has not made any decisions regarding the merits of the items listed above.

## Summary of Responses to the Department's Questions

### 1) Do private shore protection projects cause instability on downdrift properties?

There was no general consensus to this question. While some felt that these types of projects had a negative effect on downdrift properties, others felt that a properly designed structure would have little, if no effect, on downdrift properties. Almost all agreed that designs should consider the effect shore perpendicular structures have on local wave patterns and littoral sediment transfer. It was generally agreed that each project should be looked at on a case-by-case basis. Some felt that these projects should be located away from the adjacent property lines and that the impacts should be contained on the applicant's property. It was also mentioned that alternative solutions should be evaluated and that the project should be the minimal size needed to protect the property. Pre and post-construction surveys of downdrift and updrift shorelines was considered a good idea. A greater involvement of potentially impacted shoreline owners was suggested.

### 2) Is the IDNR/OWR's 120% sand fill requirement adequate and appropriate?

The general consensus was that this requirement was adequate as long as the calculations were done correctly and that they were based on an analysis of the littoral drift near the project site. Some questioned why a 20% overfill was used and not 100%. Others suggested that the sand should be refilled each year; that mitigation should be required for the life of the project and be tied to the property's deed.

There seemed to be some confusion as to the reason the Department uses the overfill requirement. A shore perpendicular structure can only retain a certain amount of sand. In order to prevent that structure from initially filling with sand from the littoral drift, the Department requires the applicant to pre-fill it to capacity. In order to compensate for the inherent inexactness of littoral drift calculations and sand loss during placement, the Department requires a 20% overfill. The filling of the structure is not meant to be an ongoing project. Once the structure has been filled, it acts like any other section of shoreline, losing and gaining sand in response to storms, wave action and water levels. It is only the initial filling of the structure with littoral material that the Department is trying to prevent.

### 3) Should there be a size limit on private shore protection projects?

Most responses indicated that setting size limits would be difficult, and that projects should be reviewed on a case by case basis. However, several responses recommended that the Department develop rigid height and length criteria. It was generally agreed that structures should not be larger than other structures in the area. If a larger structure is proposed, or a structure will be built in an area where no structures exist, a wave and littoral drift analysis should be undertaken. Several responders stated that projects should be for shore protection only, not to build a recreational beach, and should be as minimally invasive as possible. Some provision for mitigation for the life of the project was suggested.

### 4) Do private shore protection projects diminish/impair aquatic habitat?

The only consensus on this question was that there is a general lack of scientific studies available on this subject. Part of the group felt that these projects provided better aquatic habitats than what exists; others felt that they destroyed or significantly changed existing habitats. Some felt that applicants should have to perform biological



# Memorandum

To: Members of the Natural Resources Commission

From: Karen Berardi, Assistant to the City Manager

Date: April 3, 2015

Re: Agenda Items for the April 8<sup>th</sup> Meeting of the Natural Resources Commission

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## NEW BUSINESS:

### A. **Presentation on the City's Steep Slope Zone and Lake Michigan Protection Zone Regulations**

City Planner Eric Olson will present a brief overview of the City's Steep Slope Zone and Lake Michigan Protection Zone. To review the regulations electronically, they can be accessed online using the following links:

**Lake Michigan Protection Zone Regulations, Found in Chapter 150, Article 7, Section 150.703.1, Pages 2-10**

<http://www.cityhpil.com/DocumentCenter/View/5754>

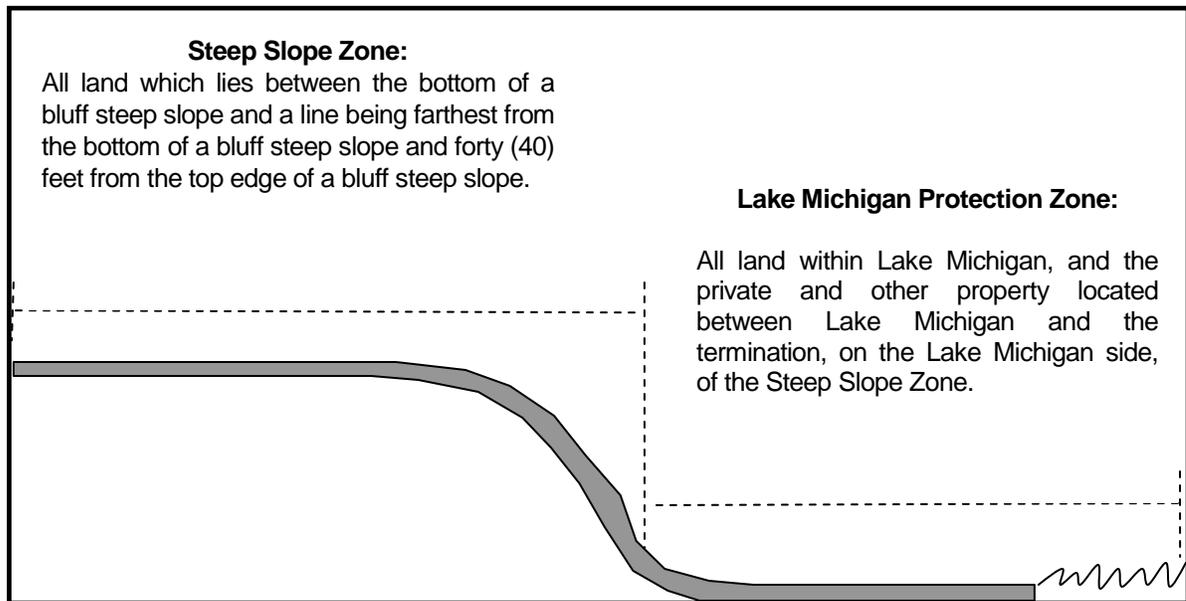
**Steep Slope Zone Regulations, Found in Chapter 150, Article 19, Pages 1-14**

<http://www.cityhpil.com/DocumentCenter/Home/View/702>

### B. **55 – 57 Deere Park Drive – Consideration of a Beach Structure Permit for Regulated Activities in the Lake Michigan Protection Zone**

The applicants, Jerry Senser and Mark Gerstein, are requesting a Beach Structure Permit for regulated activities within the City's designated "Lake Michigan Protection Zone" at 55-57 Deere Park Drive. A diagram illustrating this zone designation follows on the next page.

The proposed activities consist of the construction of a 30' long quarystone breakwater spur and sandfill. This proposed improvement will augment the existing breakwater previously permitted and constructed in 2009. According to the applicants, "the proposed project is designed to reduce the gap between breakwater helping sand to stay in the bay beach system, reducing lakebed downcutting and wave impacts on the revetment."



### *Required Agency Reviews*

The applicant has submitted permit applications required from the U.S. Army Corps of Engineers, the Illinois Environmental Protection Agency, and the Illinois Department of Natural Resources, as required by the Beach Structure Application regulations. The IDNR has issued their permit, whereas the IEPA and U.S. Army Corps of Engineers are still nearing their approval for the proposed work. The applicant has verified, within the attached letter dated March 4, 2015, that the proposed plans are the same which were reviewed and approved by the required agencies.

### *Engineering Division Review*

The Engineering Division has reviewed the application materials and submitted the attached memorandum, dated March 31, 2015, and found that the report should be revised so that each statement in response to the required information is supported with a detailed explanation. Upon completion of the project, the applicant's consultant will be responsible for certifying that all of the work has been completed in accordance with the approved plan and project specifications.

### *Forestry Division Review*

The City Forester has not reviewed the application materials. A tree survey was not prepared or submitted by the applicant as the bluff and tableland will not be impacted by the construction. All materials and equipment will be delivered to and removed from the site via barge on Lake Michigan.

### *Beach Structure Ordinance Policy & Standards*

The Beach Structure Ordinance regulates and requires permits for all activity in the City's "Lake Michigan Protection Zone," an area comprised of all land between Lake Michigan and

the toe of the bluff. Per Section 150.703.1(E)(5(a), **the Commission is being asked to consider the proposed Beach Structure Permit under the following standards and vote to direct staff to draft Findings of Fact for future Commission approval and City Council determination.** Please note that within attached cover memo, the applicant addresses these standards.

Standards:

**No permit for a Regulated Activity in the Lake Michigan Protection Zone shall be approved unless all of the following standards have been met or satisfied:**

(a) The proposed Regulated Activity and/or Structure shall not unreasonably impede access to or pedestrian movement along the beach or to Lake Michigan;

(b) The proposed Regulated Activity and/or Structure shall not unnecessarily impede navigability within Lake Michigan;

(c) The proposed Regulated Activity and/or Structure shall not unreasonably impact the Subject Property or the Adjacent Properties;

(d) The Applicant has proposed appropriate long-term maintenance requirements and plans, as necessary, for the proposed Regulated Activity and/or Structure;

(e) The proposed means and methods of undertaking the Regulated Activity and/or Structure are consistent with appropriate design and aesthetics principles;

(f) The proposed Regulated Activity and/or Structure shall not create new nor amplify existing erosion problems on the Subject Property and on Adjacent Properties;

(g) The proposed Regulated Activity and/or Structure shall be for the purposes of erosion control, water gathering, and/or public access only;

(h) There will not be an unnecessary adverse environmental or ecological impact on the Subject Property or on any of the Adjacent Properties as a result of the proposed Structure and/or the Regulated Activity;

(i) The proposed Structure and/or the Regulated Activity is the least environmentally and ecologically intrusive means of achieving the stated purpose of the Structure; and

(j) The Applicant has properly obtained any and all permits required by the federal, state, and county governments for the Regulated Activity and/or the Structure.

Feel free to contact Karen Berardi for any questions regarding this matter, or to further discuss the Beach Structure Ordinance prior to the meeting. Per the Commission's direction, a brief presentation will be prepared summarizing the proposed project. The above list of Beach Structure Ordinance standards will also be available on the table for the Commission's reference and discussion.

*Please note that a special meeting will be held at the property at 5:00 p.m. prior to the Commission meeting on April 8<sup>th</sup> to give the Commission the opportunity to inspect the property as a group.*

**C. Discussion on Earth Day Activities**

Staff Liaison Berardi will lead a discussion on possible Earth Day activities and promotions. This topic was referred to the commission by the City Manager based on resident inquiries.

The following are examples of how the commission could become involved in Earth Day activities:

- Develop educational material on the following:
  - o The City's Tree City USA designation
  - o Recycling initiatives
  - o Composting at Home
  - o Energy Saving Techniques
  - o Reusable Items such as bags, water bottles, etc.
- Partner with SWALCO on an educational display in City Hall

Staff is seeking feedback to see if the commission is interested in participating in Earth Day or Earth Month in any capacity.

**D. Discussion on Highland Park Community Gardens**

Chair Coyle will lead a discussion on the Highland Park community gardens.

**OLD BUSINESS:**

**A. Status Update on Electricity Aggregation Program**

Staff Liaison Berardi will provide an update on the next steps for the electricity aggregation program.

**ATTACHMENTS:**

- 55 Deere Park Drive Beach Structure Application
- 57 Deere Park Drive Beach Structure Application



**Shoreline Stabilization at  
55 S. Deere Park Drive  
Highland Park**

**Submittal to  
Community Development Department  
March 4, 2015**

**Prepared By:**

**Shabica & Associates, Inc.  
We Build Beaches  
550 Frontage Road, Suite 3735  
Northfield, Illinois 60093  
Tel. 847-446-1436  
Fax 847-716-200**



**Shabica & Associates, Inc.**  
WE BUILD BEACHES

Eric Olson  
City of Highland Park  
Community Development Department  
1150 Half Day Road  
Highland Park, Illinois 60035

Dear Mr. Olson:

March 4, 2015

Attached please find a submittal to the City of Highland Park's Community Development Department for a Shoreline Stabilization project at the property of Jerrold and Naomi Senser at 55 S. Deere Park Drive, Highland Park. Proposed work includes construction of a short quarystone breakwater spur and sandfill as required for this work. This submittal includes required documents for review and approval by the Natural Resources Commission and City Council.

This project was submitted to the state and federal regulators in October 2014 and is under final review. All Federal and State permits have gone through the public notice stage. The IDNR has issued the permit. The IEPA and US Army Corps of Engineers are nearing approval for the proposed work (see Appendix).

The property at 55 S. Deere Park Drive has existing shore protection in the form of a breakwater protected beach at the south end of the property with a quarystone revetment at the north end. This shore protection was the first beach system to be permitted by the IDNR after the 2 ½ year moratorium on structures extending on the bed of Lake Michigan lifted January 2008. As this was the first project reviewed, the scope was kept at a minimum, see article entitled, *Beach project a model in many ways*. The sand at the north end of the property has eroded over the years and with the lake level rising after a long period of low lake levels, the lakebed has been downcut causing deeper water and larger waves impacting the revetment. The proposed project is designed to reduce the gap between breakwaters, helping sand to stay in the bay beach system, reducing lakebed downcutting and wave impacts on the revetment.

The City's Standards for Review, as outlined in the "Lake Michigan Protection Regulations" from Section 150.703.1 *Special Regulations for the LFOZ Lakefront Density and Character Overlay Zone*, are outlined below with our responses following:

- a. *The proposed Regulated Activity and/or Structure shall not unreasonably impede access to or pedestrian movement along the beach or to Lake Michigan.*

This project will not impede pedestrian access or movement along the beach or to Lake Michigan.

- b. *The proposed Regulated Activity and/or Structure shall not unnecessarily impede navigability within Lake Michigan*

As the breakwaters will not extend further east than other existing structures, the proposed project will not have any impact on the navigability of Lake Michigan.

- c. *The proposed Regulated Activity and/or Structure shall not unreasonably impact the Subject Property or the Adjacent Properties*

The project will protect the Subject Property from shoreline erosion, and the sandfill, as required by the IDNR will assure that the project will not negatively impact the adjacent properties.

- d. *The Applicant has proposed appropriate long-term maintenance requirements and plans, as necessary, for the proposed Regulated Activity and/or Structure*

The project has a long-term maintenance plan. Monitoring of the project is also required for 5 years post construction by the IDNR.

- e. *The proposed means and methods of undertaking the Regulated Activity and/or Structure are consistent with appropriate design and aesthetics principles*

The means and methods of construction are consistent with design and aesthetics; all work will be completed via marine mobilization. A similar structure has been constructed on the south side of the property.

- f. *The proposed Regulated Activity and/or Structure shall not create new nor amplify existing erosion problems on the Subject Property and on Adjacent Properties*

The project will prevent future bluff erosion on the subject property, and will not affect adjacent properties. As the construction will be completed via marine access, the bluff will not be disturbed.

- g. *The proposed Regulated Activity and/or Structure shall be for the purposes of erosion control, water gathering, and/or public access only*

The proposed shore protection will reduce and/or prevent future sand loss and bluff erosion on the subject property and allow access to the beach from the tableland.

- h. *There will not be an unnecessary adverse environmental or ecological impact on the Subject Property or on any of the Adjacent Properties as a result of the proposed Structure and/or the Regulated Activity*

The proposed structure will not cause unnecessary adverse environmental or ecological impact. The quarystone breakwater provides improved habitat for fish. Sand acts as a natural filter for stormwater runoff.

- i. *The proposed Structure and/or Regulated Activity is the least environmentally and ecologically intrusive means of achieving the stated purpose of the Structure*

The proposed system is a viable, environmentally-correct means of achieving the stated purpose.

- j. *The Applicant has properly obtained any and all permits required by the federal, state, and county governments for the Regulated Activity and/or the Structure*

All Federal, State and County permits are under review and nearing issuance. The state and federal permit application is attached. All permits will be issued prior to any work commencing.

A Permit Application has been filed with the Department of Public Works for the proposed project. In conformance to the City's Application Guidelines, the following documents and information are included:

- i. A statement of the purpose and planning objectives to be achieved by the proposed Regulated Activity*  
The proposed breakwater-protected pocket beach system will help protect the north half of the property during average to high lake levels. The proposed system will move the locus of wave action further offshore where lakebed downcutting will be reduced.
- ii. A plat of survey of the Subject Property*  
A Plat of Survey is attached as well as a recent hydrographic survey showing the entire work area. A tree survey has not been prepared as the bluff and tableland will not be impacted by the construction. All access will be via barge on Lake Michigan.
- iii. A conceptual plan showing the Subject Property and the Adjacent Properties, including any and all existing Structures in the portion of the Lake Michigan Protection Zone abutting those properties*  
A Plan View is attached.
- iv. Development and site plans showing the proposed Structure, if applicable*  
Same as Conceptual Plan in Item iii
- v. A demolition plan, if applicable*  
N/A
- vi. An elevation plan, which shall include sectional views of the proposed Structure, if applicable*  
Cross-sectional drawings are attached.
- vii. Copies of any and all permits required by the federal, state, and county governments for the Regulated Activity and/or the Structure*  
Federal and State permits are attached.
- viii. Engineering details of the proposed Structure and/or the Regulated Activity, which shall include, if applicable:*
  - A. Structure height: N/A, see Coastal Engineering Report in the cover letter to the state and federal regulators and plans in the Appendix*  
*Structure Length: System extends about 112' lakeward from the seawall*  
*Structure Width: N/A, see plans*
  - B. The spacing between the proposed Structure and other Structures in the Lake Michigan Protection Zone abutting any of the Adjacent Properties*  
No spacing is applicable.
  - C. The materials of which the proposed Structure will be composed*

The breakwater will be quarried quartzite. Sand will be placed as required by the IDNR as beach fill.

- ix. *A geo-technical investigation report of the site*  
As there will be no major earthmoving or structures built on the bluff slope, this project does not require a geotechnical investigation.
- x. *A statement outlining structure success in various water levels*  
The breakwater is designed to function during varying lake levels.
- xi. *A statement describing the long-term maintenance requirements and plan for the proposed Structure*  
The proposed structure has a 20-year design-life, and the stone that will be used will last thousands of years. Periodic maintenance is recommended as necessary based on biannual visual inspections. Typically, at the time of recommended maintenance, additional stone will be brought in and placed over the existing revetment to bring it back to the original specification.
- xii. *A written description of the proposed means and methods of undertaking the Regulated Activity*  
All materials and equipment will be delivered to and removed from the site via barge on Lake Michigan. The beach work will be completed using a backhoe and crane as needed.
- xiii. *An explanation, in narrative form, of the following:*
  - A. *Any and all erosion problems on the Subject Property for which the Structure and/or Regulated Activity is designed to correct or remedy*  
This system is designed to protect the Subject Property from future sand loss, lakebed downcutting and bluff erosion due to stormwave damage.
  - B. *The environmental and ecological impact on the Property and the Adjacent Properties that are expected to result from the Structure and/or Regulated Activity*  
The environmental impact of this project is that the stormwater will be filtered by the beach. This will reduce sediment and non-point source pollution from flowing into Lake Michigan.
  - C. *How the proposed Structure and/or Regulated Activity is the least environmentally and ecologically intrusive means of achieving the stated purpose*  
The design of this system is minimally intrusive to the environment. The project design mimics mother nature by creating a rocky headland to create a calm bay where wave energy is reduced and sand can remain to provide shore protection.
  - D. *The nature and composition of existing protections, including existing Structures, of the shoreline in that portion of the Lake Michigan Protection Zone abutting either the Subject Property or the Adjacent Properties, and the impact and effectiveness of those protections on the shoreline, the lakebed, and on erosion of the Subject Property and Adjacent Properties*

The existing form of shore protection at the Subject Property is a quarystone breakwater at the south property line and a steel groin at the north property line. A quarystone revetment has been placed along the existing bluff toe. Sand has eroded severely from the north half of the current system due to increased lake water levels and extreme storms.

- xiv. *A non-refundable application fee, in the amount set forth in the City's Annual Fee Resolution*  
The application fee is attached.

An Appendix of attachments is included with this letter.

This information addresses the application requirements for submission. Please let us know if you require any further information.

Sincerely,



Jon Shabica  
Vice President



# Appendix

FIRST TO BE OK'D BY LAKEFRONT COMMISSOIN

# Beach project a model in many ways

By CHARLES BERMAN  
cberman@pioneerlocal.com

An exciting scene stretched deep over the Lake Michigan shoreline Nov. 20 as crews put the final touches on the gold standard of beach-restoration projects.

Cranes reached over the side of a barge and dropped tons of sand and stone onto a newly constructed private, residential beach on the southeast corner of Highland Park.

Shabica and Associates, a Northfield-based shoreline protection firm, designed the project to correct years of damage caused by erosion and to withstand years of natural destruction.

Jon Shabica, the firm's vice president, said what once was up to 50-feet of sandy beach was reduced to less than half its previous size during the last two years.

"There was very little natural sand left and the beaches were deteriorating to just cobble and lakebed clay," Shabica said.

Shabica said once sand disappears and lake-bed clay begins to erode, the natural process is unable to repair itself, resulting in larger waves and additional destruction to the bluffs and beaches.

So quarry stone breakwater stones were installed, a concrete pier was removed, a new curbstone groin was constructed with steps built into it, which extended into the lake. A limestone revetment was added, new sand was deposited, the beach was regraded and a dune grass system was installed.

That type of complete restoration project can cost between \$400,000 and \$1 million depending on finishes, the size of the property and the level of damage, Shabica said.

"My guess is that like the ravines, the amount of (property) loss we've seen has come more toward the

*"We want to prevent any negative impact from the construction onto neighbors. The lake is constantly moving and shifting sand; we want to make sure nothing impedes its flow."*

Barbara Cates

end of the season and we typically see healthier beaches before winter," Shabica said. "So we might see some panicked people in the spring.

"This really hasn't been a good summer weather wise," he continued. "We think it has to do with the rising lake. It's up 1 foot, 3 inches since January."

The project also proved noteworthy because it was the first to go through the Highland Park Lakefront Commission's new process and the first state project to be completed since the Illinois Department of Natural Resources put a moratorium on all private coastal engineering projects.

"The city recognizes that the lakefront is a defining element of the city's character," said Barbara Cates, city planner and staff liaison to the Lakefront Commission. "We want to promote activities on the beach in the most ecological manner possible, so we established a process of approvals at the Lakefront Commission.

"There are a lot of natural processes going on at the lakefront."

Cates said the most important aspect of the city's new guidelines is the requirement for a resident to obtain all necessary state



Sand is moved into place Nov. 20 as a barge drops sand on the shoreline for a restoration project at a Highland Park homeowner's private beach. The barge was dropping off tons of sand to replenish the sand bank of the beach, which has been deteriorating because of higher lake-water levels. (Buzz Orr/Staff Photographer)

and county permits before the commission would make a recommendation to the city council.

"The (homeowners) were required to get six approvals before we considered this," Cates said. "We want to prevent any negative impact from the construction onto neighbors. The lake is constantly moving and shifting sand; we want to make sure nothing impedes its flow."

City Engineer John Welch said the work on South Deere Park Drive was a model project.

"We aren't saying people have to do this system," he said. "This is the Bentley of improvements that can be done on the lake shore. Their situation was probably worse than (most other situations) to begin with."

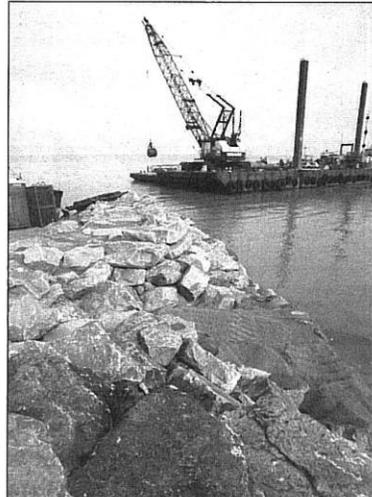
Welch recommends that residents employ a shoreline expert and take preventative measures to maintain their property, as it is cheaper to repair problems

that are found earlier. Cates said the Lakefront Commission found that this project will retain sand, prevent erosion and ultimately protect the shoreline in that area. The commission is also using this project as an education tool.

In the city's conditional approval, the homeowners were required to provide updated reviews of the improvements at its one-year and five-year anniversaries. The site was also extensively photographed before, during and after project was completed. Ongoing inspections and supervision of the project was required as well.

"It's a good learning process for the commission," Cates said. "We were making sure what they proposed, in the end, is what is being installed."

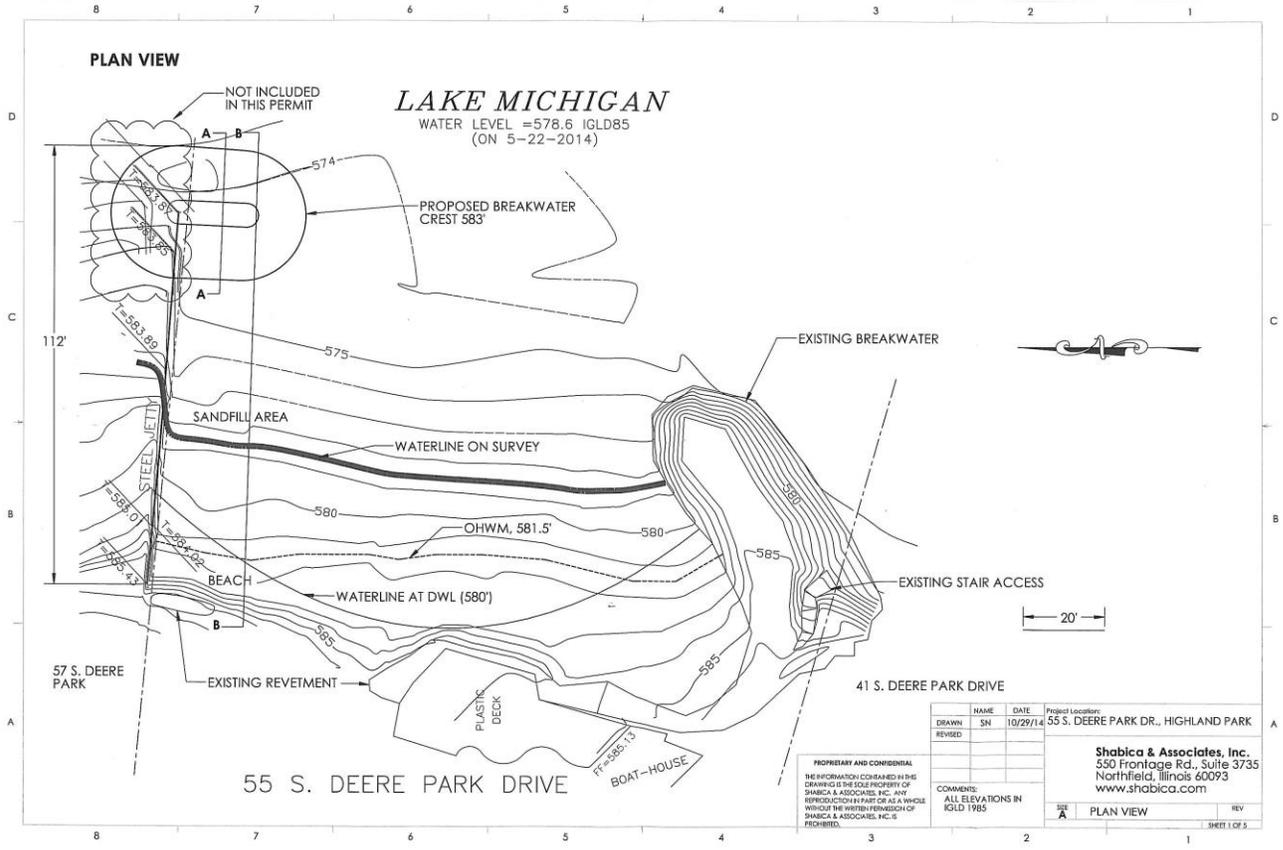
"These were vast improvements," Cates continued. "It's striking how much has changed. It looks very natural."



A barge (background) hauls sand to the shoreline for a restoration project at a Highland Park homeowner's private beach Nov. 20. In the foreground is a human-made stone breakwater that acts as an arm for an engineered beach. (Buzz Orr/Staff Photographer)

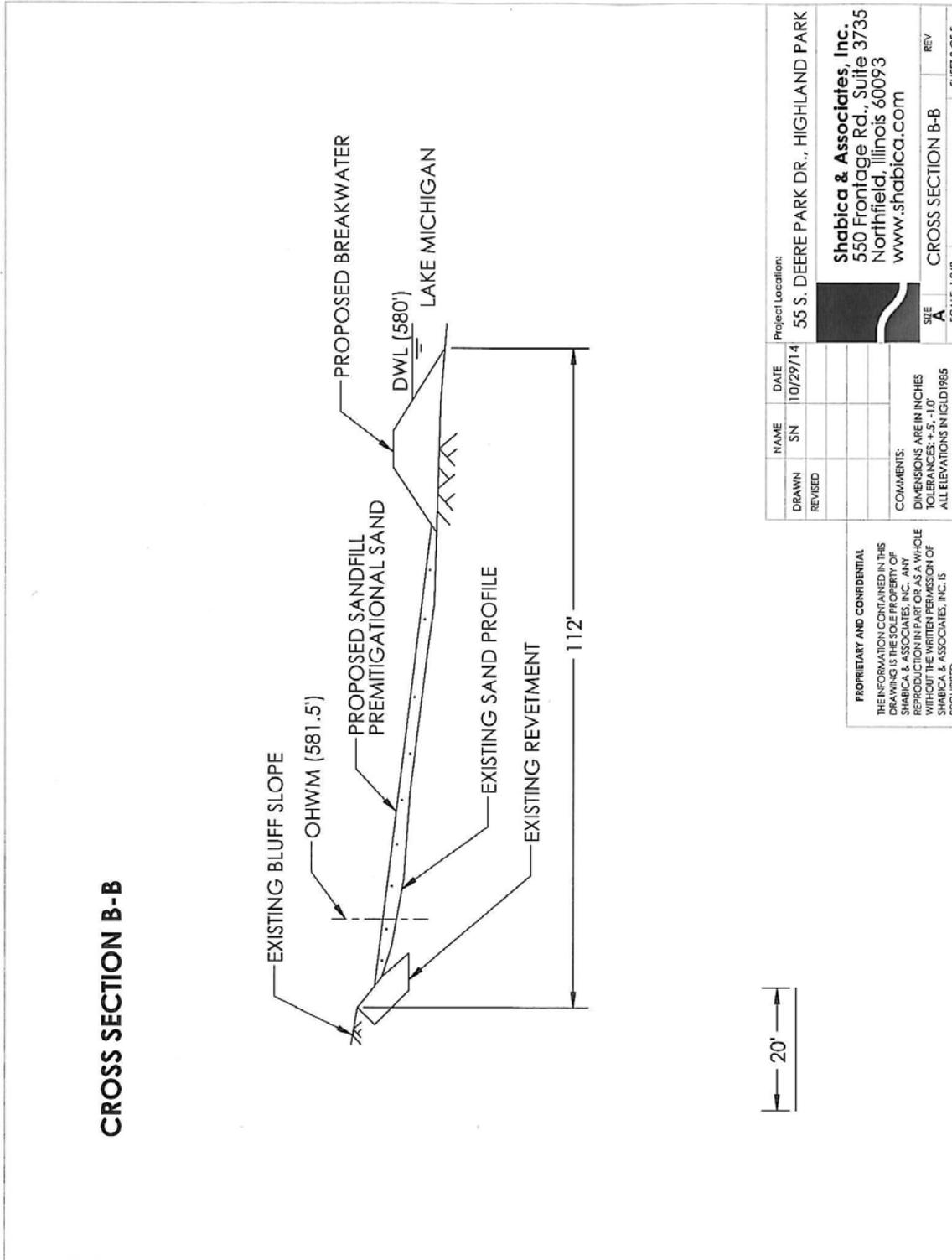


### Permit Drawings





Permit Drawings (cont.)



CROSS SECTION B-B

NAME	DATE	Project Location:
DRAWN	10/29/14	55 S. DEERE PARK DR., HIGHLAND PARK
REVISED		
COMMENTS: DIMENSIONS ARE IN INCHES TOLERANCES: +.5", -1.0" ALL ELEVATIONS IN IGLD1985		

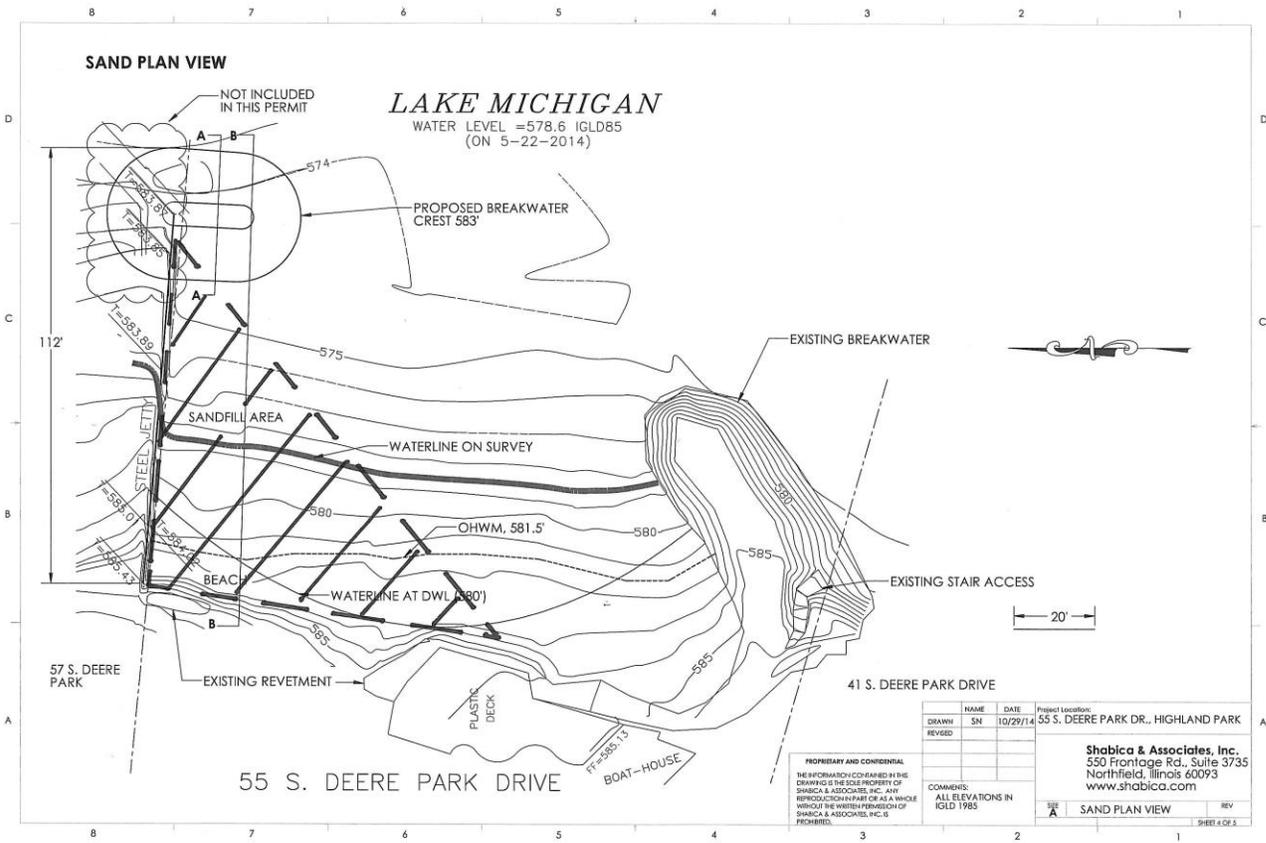
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**Shabica & Associates, Inc.**  
 550 Frontage Rd., Suite 3735  
 Northfield, Illinois 60093  
 www.shabica.com

SCALE: 1/2" = 1'-0"  
 SHEET 3 OF 5

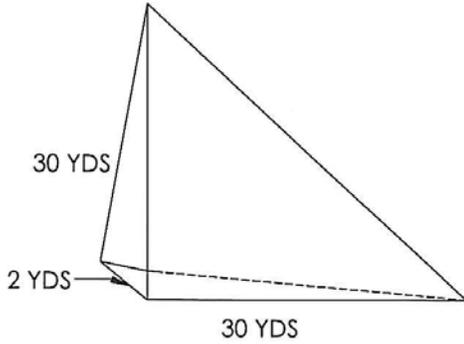
1  
2  
3  
4  
5

Permit Drawings (cont.)



Permit Drawings (cont.)

**SAND CALCULATIONS**



$$\frac{30 \text{ YDS} \times 30 \text{ YDS} \times 2 \text{ YDS}}{6} = 300 \text{ CUBIC YDS}$$

$$300 \text{ CUBIC YDS} \times 20\% = 60 \text{ CUBIC YDS}$$

$$300 \text{ CUBIC YDS} + 60 \text{ CUBIC YDS} = 360 \text{ CUBIC YDS}$$

$$360 \text{ CUBIC YARDS} \times 1.25 \text{ YDS/TON} = 450 \text{ TONS}$$

**PLACE 450 TONS OF CLEAN SAND FOR MITIGATION**

**PROPRIETARY AND CONFIDENTIAL**  
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	NAME	DATE	Project Location:
DRAWN	SN	10/29/14	55 S DEERE PARK DR., HIGHLAND PARK
CHECKED			
COMMENTS:			<b>Shabica &amp; Associates, Inc.</b> 550 Frontage Rd., Suite 3735 Northfield, Illinois 60093 847-446-1436 www.shabica.com
DIMENSIONS ARE IN FEET TOLERANCES: +.5', -1' ALL ELEVATIONS IN IGLD 1985			
SEE	<b>A</b>		<b>SAND CALCULATIONS</b>
SCALE	1"=5'		SHEET 5 OF 5

## State and Federal Permit Application



Shabica & Associates, Inc.

WE BUILD BEACHES

Ms. Kathy Chernich  
East Section Chief, Regulatory Branch  
Chicago District  
U.S. Army Corps of Engineers  
231 S. LaSalle Street, Suite 1500  
Chicago, IL 60604

Dear Ms. Chernich:

October 31, 2014

Please find enclosed a permit application for shore protection for the property located at 55 South Deere Park Drive, Highland Park, Illinois, 60035, owned by Mr. and Mrs. Jerrold Senser. Proposed work includes construction of a short quarystone spur breakwater and sandfill, as required. A letter of support is attached from the adjacent north property owner, Mr. Mark Gerstein, who has submitted a permit application for work to be completed in conjunction with this project on the north property.

A *Design of Shoreline Erosion Protection* report has been attached to this cover letter as the coastal design specifications component of this permit. All references, photographs and figures referred to in the cover letter and the following report can be found in the Appendix.

The proposed activity complies with the approved Illinois Coastal Management Program (ICMP) and will be conducted in a manner consistent with such policies. A separate letter has been submitted to the ICMP office.

### Project Purpose Statement

The property owner has retained Shabica & Associates (SA) to design and engineer enhancement to the shore protection system for his property. Shortly after the moratorium on lakefront structures was lifted in 2008, the homeowner permitted and built a breakwater protected pocket beach on his property. The proposed work was originally recommended at that time in 2008, but the north neighbor did not want to participate in the project or sign off on any work attached to his property, because he was in the process of selling his residence. As this was one of the first projects to be reviewed after the moratorium, a minimal design was recommended to help protect the property. The original project has been monitored for the past 5 years. This system is still not holding a stable beach profile. During the recent low lake levels, the property has continued to experience beach erosion. Waves impact the north half of the revetment that was designed to be a last line of defense; not a full line of defense. Now after monitoring the system's performance for 5 years, the homeowner is working in conjunction with his north neighbor, Mr. Mark Gerstein of 57 South Deere Park Drive, to install his own shore protection system. The north neighbor, Mr. Gerstein, is simultaneously moving forward with his own shore protection system that shares one common structure with this property, the breakwater that crosses the steel sheetpile groin at the property line.

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COVER LETTER

55 South Deere Park Drive, Highland Park • October 31, 2014

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The homeowner would like to have peace of mind that his property is stable and secure from the lake by constructing a 33-foot long quarystone breakwater spur extending south from the lakeward end of the existing steel groin to the north on his lakefront at 55 South Deere Park Drive, Highland Park. This would help break waves in the north section of the beach cell and help to retain the sand cover over the lakebed as well as the beach. The homeowner wants to provide additional shore protection and reduce lakebed downcutting that will eventually destabilize the bluff and steel groin.

A 33-foot long quarystone spur breakwater (groin to toe) is proposed extending south from the breakwater along the north property line. The lakeward toe of the structure will extend to about 112 feet east of the toe of the bluff and the breakwater will have a crest elevation of 583' (IGLD 1985). The slope of the breakwater will be 1v:1.5h. This quarystone spur breakwater will be placed at the lakeward end of the existing steel sheetpile groin to help reduce scour in this area to reduce wave energy in the north end of the beach system. Mitigational sand will be placed in a quantity of 450 tons in the system.

This section of coastline has historically lost sand due to lakebed downcutting especially during prolonged periods of low water. Sand deposits are thin here (Figure 1, Appendix) and scientists estimate that the rate of lakebed erosion averages 6 inches per year (Nairn, 1997). The net result is similar to the effects of global warming and rising sea level on marine coasts. This includes deeper water nearshore, larger stormwaves and progressively narrower beaches as the nearshore lakebed continues to erode. This has resulted in bluff toe erosion especially during average to high lake levels. While a narrow beach has been present at this site during higher lake levels, stormwaves have scoured the glacial clay till at the bluff toe. If ignored, this will lead to destabilization of the bluff face causing loss of tableland and infrastructure.

The Illinois Lake Michigan shoreline is considered "sediment starved" by coastal scientists. This is in contrast to East Coast and Gulf Coast open ocean shores where tens of thousands of tons of sand are found in the nearshore system that provide a primary line of defense against stormwaves. On most Great Lakes shores including southern Lake Michigan, natural sand beaches are not able to protect the lakeshore (exceptions may be during very low lake levels like 1964 or 2004-07). Large quantities of sand have been trapped or diverted offshore by municipal structures that extend 900 feet or more into the lake. Today, the main sand supply is wave erosion of the nearshore glacial clay lakebed that contains only about 10% sand (Shabica and Pranschke, 1994). The result is that groins are losing their effectiveness at holding a sandy beach during average to high lake levels. To retain a sand covering of the shallow lakebed (where downcutting is most active), as well as to protect the revetment and bluff toe, SA has designed an open breakwater beach system to hold sand, as necessary, to protect the lakebed and bluff during higher lake levels.

If beach and nearshore sand is lost, degradation of the nearshore ecosystem will result. Meadows et al., (2005) reports an increase in zebra mussels *Dreissena polymorpha*, and a decrease in native zooplankton in waters where the lakebed is eroding clay and rocks. In comparison, a nearshore area with 100% sand cover supports a species-rich community. The report concludes, "it [is] nonetheless clear that sand-based areas were characterized by sufficient shallow water fish CPUE and species richness to suggest that these are important habitats within the context of the Great Lakes Basin and not simply 'wet deserts' as they are often considered."

#### Design Options

The site at 55 South Deere Park Drive, Highland Park has been inspected and options for shore protection were studied based on monitoring the previous work completed on this property using desktop coastal engineering, site conditions from the 2014 bathymetric survey, and studying local prototypes. Given the sand loss over the last several years including during extreme low lake levels, as well as the uncertainty of future lake levels, it is prudent to engineer and design a system that will anticipate greater lakebed downcutting, higher amounts of beach erosion, more extreme storm events with larger waves, and potential loss of land. These three options were considered:

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COVER LETTER  
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**OPTION 1**

**Do Nothing –**

The first option of "Do Nothing" results in leaving the currently eroding shoreline and exposed revetment in its existing state. This will allow lakebed erosion to continue allowing larger stormwaves to impact the lakebed and revetment. Over time, the beaches along Illinois' North Shore coastline have continued to narrow due to being in a sand starved system. At this site, the beach continues to narrow even with lower than average lake levels. Now with the water level rising, Lake Michigan waves are impacting the seawall.

**OPTION 2**

**Encapsulate the North Groin in Quarrystone–**

This option would help to hold sand in the beach cell at a much reduced rate than the preferred option. This property is located at the north end of a groin field. The beach is narrow at the north end and with the deflation seen recently, the bluff toe would remain at risk. Additionally, the cost of encapsulating the existing structures in stone and adding sand is almost as expensive as constructing a more sustainable coastline.

**OPTION 3**

**Preferred Option: Design a 33-foot Long Spur Breakwater –**

The preferred option is to reduce the breakwater gap with a 33-foot breakwater spur extending south from the existing groin to the north in conjunction with the north neighbor's shore protection project. The proposed breakwater will extend east from the bluff toe approximately 112 feet. This plan will help to break wave energy during high lake levels as well as help the system to retain sand. The proposed plan will help protect the glacial clay lakebed, as well as the beach and bluff, while allowing safe access to Lake Michigan. With proper maintenance, a structure like this could be expected to continue functioning for 30 plus years.

**OPTION 4**

**Larger Breakwater Protected Beach –**

Options were discussed with the homeowner for larger breakwaters. The homeowner did not entertain larger options as the south end of the property already has a small breakwater that was constructed in 2009.

**Public Benefits of Sandy Beaches**

The Great Lakes represent the most important natural resource in the United States. Sandy beaches play an important role in keeping the lakes clean and safely accessible. Furthermore, a sandy beach makes a better ecotone (transitional environment) for flora and fauna than seawalls and revetments. Summary arguments supporting a sandy beach system include:

- 1) Beaches are filters for non-point source runoff.
- 2) Beaches reduce lakebed downcutting, a source of fine clay pollutants.
- 3) Beaches support endangered species such as sea rocket, marram grass, and seaside spurge.
- 4) Beaches make better wildlife habitat than actively eroding bluffs or seawalls.
- 5) Stone headlands make better fish habitat than eroding lakebed clay.
- 6) Beaches protect the lakebed from erosion that causes larger stormwaves to impact the shore.
- 7) Beaches are far safer for swimmers and boaters than a coast lined with seawalls or revetments, especially in an emergency.
- 8) Beaches, unlike most steel or concrete seawalls, are not visual pollution.

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#### **Impacts to Downdrift Properties**

The proposed project will have minimal impact on the property immediately downdrift of the subject property. The adjacent property to the south has a quarrrystone revetment immediately south of the subject property. Additionally, there is already a quarrrystone breakwater at the south end of this property.

#### **Impact to Littoral Drift System**

The proposed plan for this site includes the construction of a short quarrrystone spur breakwater and placement of sandfill as required for permit.

The section of Lake Michigan shoreline north and south of 55 South Deere Park Drive, Highland Park is fully engineered with steel groins, revetments, seawalls, and quarrrystone breakwaters. Based on our experience, as the proposed structure is immediately north of a quarrrystone breakwater and extends minimally lakeward, it will not negatively impact the littoral system after the sandfill is placed (anticipated quantity plus 20% overfill). According to the Illinois State Coastal Geologist (Chrzaszowski, 2005), "the design to contain placed sand is becoming necessary because of reduced volume of littoral sand in transport." He further states, "beach-cell systems may represent the future for beaches along much of the Illinois bluff coast from Waukegan south to Evanston."

The beach system will be nourished with sand including a 20% overfill placed north and south of the system. The new IDNR regulations for structures that will retain sand require pre- and post-construction surveys, as well as surveys at the one and five-year intervals. This new requirement will help assure that a sand equilibrium is met and that the new project is gaining and losing sand at a similar rate to neighboring properties.

#### **Impact on Public Uses**

Public access will not be impacted by the modifications to the existing system. No additional public access structures will be built as part of this project, however, public access should be improved by the engineered beach system retaining more sand and holding a higher beach profile during all lake levels. The beach will provide a safe place for boaters and swimmers in distress. Fishing will not be impacted negatively, as the underwater area of the quarrrystone protection will create an improved fish habitat. Additionally, navigation of water craft will not be impacted, as the proposed construction will not extend further east than the existing structure.

#### **Impact on Natural Resources**

Quarrrystone structures in the nearshore waters of Lake Michigan and sandy beaches improve native species habitat. The LandOwner Resource Centre with support from the Canadian Wildlife Service and the Ontario Ministry of Natural Resources states that, "unstable shorelines can release silt that can choke nearby aquatic habitats." Additionally, underwater structures such as artificial reefs constructed of large boulders and clean riprap material "in large water bodies, such as the Great Lakes . . . are often the best method of creating habitat." As stated above, according to Meadows, et al., 2005, "a nearshore area with 100% sand cover support[s] a species rich community." As the design does not impact the bluff and vegetation, the local terrestrial wildlife will continue to inhabit this property.

#### **Type of Permit**

The scope of this project requires an individual permit.

#### **Description and Schedule of Proposed Activity**

All of the proposed work will be completed via marine access. A barge will deliver a backhoe to work on land to place the materials. All stone will be delivered by barge to the site. Sand will be delivered by truck. Work will not begin until all necessary permits have been received. This work will require approximately 3 weeks to complete.

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**Type and Quantity of Fill/Measures Taken to Avoid Impact/Erosion and Sediment Control Plan**

All material will be clean and from inland quarries. Approximately 300 tons of new, clean quarried stone will be placed to construct the revetment and breakwater. Approximately 450 tons of clean sand will be placed on the existing beach. All clay displaced from the lakebed for installation of the breakwater toe stone will be placed on the barge and removed from the site and disposed of properly. Acreage of stone placed on the lakebed east of the OHWM is less than 0.02 acres.

**Summary**

All of the above described activities and plans will follow IPP terms and conditions. All of the proposed work adheres to the guidelines prescribed by the Illinois Environmental Protection Agency and its Anti-Degradation Assessment. U.S. Fish & Wildlife Service and the Illinois Historic Preservation Association will be updated on all relevant correspondence.

If you have any questions please feel free to call me at the phone number below.

Sincerely,



Jon Shabica, Vice President

C: IDNR (Casey)  
IEPA (Heacock)  
U.S. Fish & Wildlife Service  
Illinois Historic Preservation Agency (Haaker)  
Jerrold and Naomi Senser

### DESIGN OF SHORELINE EROSION PROTECTION

#### Introduction

The following report summarizes assumptions and design criteria for a quarystone breakwater and sandfill mitigation to help reduce erosion and protect the property located at 57 South Deere Park Drive, Highland Park. The design is based on the drawings included in the permit application to the U.S. Army Corps of Engineers dated October 29, 2014.

The site lies within a fully engineered section of urban lakeshore that is typically protected with revetments, seawalls, impermeable piers, steel sheetpile groins and breakwater protected beaches that may hold narrow beaches.

This section of coast is sand-starved due to municipal structures (littoral barriers) constructed over the past 100 years that extend lakeward beyond the littoral zone and reduce sand bypass as well as due to lakebed downcutting causing a steeper lakebed profile leading to increased sand loss. Although there is currently an exposed sandy beach due to extreme low lake levels, the beach width varies greatly due to the vulnerability of this location. According to the Illinois State Geological Survey, there is almost no sand moving along this section of coast. All structures in the area have been steadily losing their effectiveness at holding beach sand. This problem is exacerbated by lakebed erosion. In many cases where all the sand has been lost, the adjacent bluffs have begun to erode. To provide adequate protection for the upland property, solutions have typically been of two types: breakwater- or groin-anchored beaches to protect the bluffs, or large quarystone revetments placed against the toe of the bluff that prevent stormwave erosion but at the expense of the beach.

#### Project Description

Construction of a short quarystone spur breakwater and sandfill mitigation are proposed that fulfill the design requirements of 20-year stormwave erosion protection. The proposed system is designed for all lake level conditions.

#### Summary Specifications

Using the Army Corps of Engineers Shore Protection Manual (1984), performance of nearby prototypes and other sources, the following specifications were developed for this site (elevations are based on IGLD 1985):

##### Stone Breakwater Specifications

Lakeward Crest Elevation:	583 ft
Toe of Structure:	573 ft (average)
Crest Width:	6 ft
Average Armor Size:	2.5 tons
"B" Stone	200 lbs to 1000 lbs
Slope:	1:1.5
Tons/linear feet:	11.5 tons

##### Assumptions

• Design High Water (DHW):	582.0 ft *
• Design Water Level:	580.0 ft
• Design Low Water (DLW):	577.5 ft *
• Existing clay till elevation at breakwater toe:	573.0 ft
• 20-yr lakebed erosion at toe of breakwater:	3 ft**
• Design wave height (Hs):	9.36 ft

COASTAL DESIGN SPECIFICATIONS  
55 South Deere Park Drive, Highland Park • October 31, 2014

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**Assumptions (continued)**

• Nearshore Slope:	1:30 – 1:40
• Design Wave Period (T):	9.9 s ***
• Depth at Structure Toe DHW (Ds):	9'
• Design Deepwater Wave (Ho):	18.0'
• Design Wave Length (Lo):	501.8'
• Structure Porosity:	37%

\* DHW includes 2 ft storm setup; DLW is equivalent to Low Water Datum

\*\* 2.5 ft sand and gravel (thickness varies) plus 2 ft clay till, Nairn, 1997

\*\*\* Resio & Vincent, 1976

**Stone Breakwater Stability, Armorstone**

The proposed quarystone breakwater has two layers of 1 – 5 ton armorstone built on a 1:1.5. Overtopping of the structure is expected during storms and higher water levels. Design conditions include:

- Lakeward breakwater crest elevation is at DHW 4.5 ft above DLW
- Depth-limited breaking waves will break on the stone breakwater and sand beach
- Depth at the toe of the structure is 9 ft (573.0) at design high water
- Incident wave directions: NE, E and SE
- Wave period for DHW T = 9.9 seconds
- Wave period for average conditions T = 6 seconds

For a quarystone breakwater, structural integrity may depend on the ability of the foundation to resist the erosive scour by the highest waves. Therefore, it is suggested that the selected design wave height  $H_s$  for such structures be based on the design wave height H being the average height of the top 10 percent of waves expected during an extreme event. Based on the deepwater significant wave height  $H_s$  corrected for refraction and shoaling.

The stability coefficient ( $K_d$ ) varies primarily with the shape of armor units, roughness of armor unit surface, sharpness of edges and degree of interlocking obtained in placement.

The equation below is Hudson's formula and is used to determine the armor stone weight needed to support a particular structure.

$$W = (W_r * H_s^3) / (K_d [(W_r / W_w) - 1]^3 * \cot(\beta))$$

W = weight of individual armor units in lbs

$W_r$  = Unit weight of armor units

$W_w$  = unit weight of water

$H_s$  = the design wave height for the structure

$K_d$  = the design stability coefficient for rubble and toe protection

$\beta$  = the angle of incline of the structure

Quartzite armorstone is recommended as it is highly durable and is locally available in most gradations under 5 tons. Hudson's formula was used to estimate armorstone size. An armorstone of 1.83 tons is predicted for special placement stone based on the design conditions. As the lakeward face of the breakwater will be built random placement, 1 – 5 ton quartzite will be utilized for the construction of this project.

**Bathymetry**

Bathymetric profiling was performed on 5/21/2014. Five transects were completed in the project area. The profiles extend up to 450 ft east of the existing seawall. Survey work was completed by Terra Technology.

**Water Levels**

The following table summarizes water level data representing daily highest extremes measured at Calumet Harbor, Illinois, approximately 31 miles to the south of Highland Park. Note: Low water datum = 577.5 ft (IGLD 1985).

<u>Lake Level</u>	<u>LWD</u>	<u>IGLD 1985</u>
Record High	+5.5	583.0
Record Low	-1.4	576.1

**Project Supporting Data**

To help facilitate project review, SA offers the following supporting data based on standard coastal engineering practices:

1. **Sediment Transport Around Structure** The structure is designed to lie within the surf zone (zone of breaking waves), therefore allowing sediment transport around the structure. The range of breaking wave heights is from 7.4 ft based on a 6-second wave with a wave length of 184 ft (using  $1/25 L_o$ ) to 18 ft based on a 9.9-second wave with a wave length of 501.8 ft (Resio and Vincent, 1976). The commonly accepted zone of sediment transport is to 18 ft (depth of closure) in this section of Lake Michigan, which is a function of the design wave parameters. Based on this data, once the structure has been filled with sand, it will continue to bypass littoral drift sand. Rod and transit survey monitoring will be conducted, as required by the IDNR, to assure that the system performs as designed.

The IDNR requires sand fill in areas where sediment will be trapped by the new system. Sand volume quantities have been calculated as shown in the permit drawings. As required by the IDNR, a 20% overfill will be added to the calculated volume. Additionally, the new pre- and post-construction monitoring will be performed and submitted to the IDNR to verify the impacts to the system.

2. **Effect on Adjacent Shorelines** A wave diffraction diagram (Figure 2, Appendix) has been overlain on the proposed shore protection system. Using a refracted incident wave angle of 90 degrees (USACE, Shore Protection Manual), with average and design waves, there will be a decrease in wave energy on adjacent properties. The wave diffraction pattern shows that the coefficient of diffraction (K) reduces the wave energy to a distance of about  $1/2$  the wave length downdrift and does not have an impact further downdrift. For the average 6-second wave, that distance of reduced wave energy is about 90 ft and for the design wave, the protected distance is about 250 ft. This protected area close to the structure has diminished wave energy that will in turn reduce erosion in the area.
3. **Wave Reduction in Rubble-Mound Structures** The Iribarren number ( $\xi$ ), or surf similarity number, is used to determine the wave reflection coefficient. For rubble-mound structures, wave reflection (and wave energy) is reduced by one half or more (0.2 to 0.53) (Figure 3, Appendix). For example, a wave reflection of 0.25 means that the wave energy is reduced by 75%. The range of wave reflection for beaches peaks at about 0.44. The range for plane slopes, however, quickly rises to 0.5 and peaks at .91. This illustrates that rubble-mound structures reduce wave energy almost as well as beaches.

**Lakebed Erosion**

Lakebed erosion, active in water depths of 10 ft or less, is a design component of this plan. This section of Highland Park lakeshore is considered sediment-starved. Sand deposits were measured near this site (Ravine Drive, Highland Park) from the backshore to a depth of 6.1 m (20 ft). Sand deposits were thin to non-existent to a distance of 250 ft from shore (Shabica & Pranschke, 1994). Also, the site is underlain by highly-erodible, cohesive glacial clay-till. See Shabica survey cross-section (see, Figure 1) showing loss of lakebed sand from 1975 to 1989. According to Robert Nairn, approximately 200 m<sup>3</sup> of sand cover per meter of lakeshore (out to a depth of 4 m) is necessary to protect the underlying cohesive profile from lakebed erosion under most conditions. Sand and coarser sediments represent typically less than 15% of the material eroding from the lakebed and bluffs. Using the historic rate of lakebed downcutting of 0.15 ft/yr (Nairn, 1997), an irreversible lowering of the nearshore lakebed clay of approximately 3.0 ft over a 20-year period is predicted in unprotected areas. With the stone breakwater, revetment and sandfill installed, the lakebed erosion will be reduced.

**Project Monitoring**

As the performance of shore protection structures cannot be predicted with absolute certainty, the shore protection system for 55 South Deere Park Drive in Highland Park will be inspected as required by IDNR guidelines. This includes topographic and hydrographic surveys beginning at an elevation of 581.5 ft (IGLD 1985) and progressing to 300 ft lakeward of the lakeward end of the project, within the north and south property lines. Additionally, all structures should be inspected to assure that they continue to meet design specifications.

#### References

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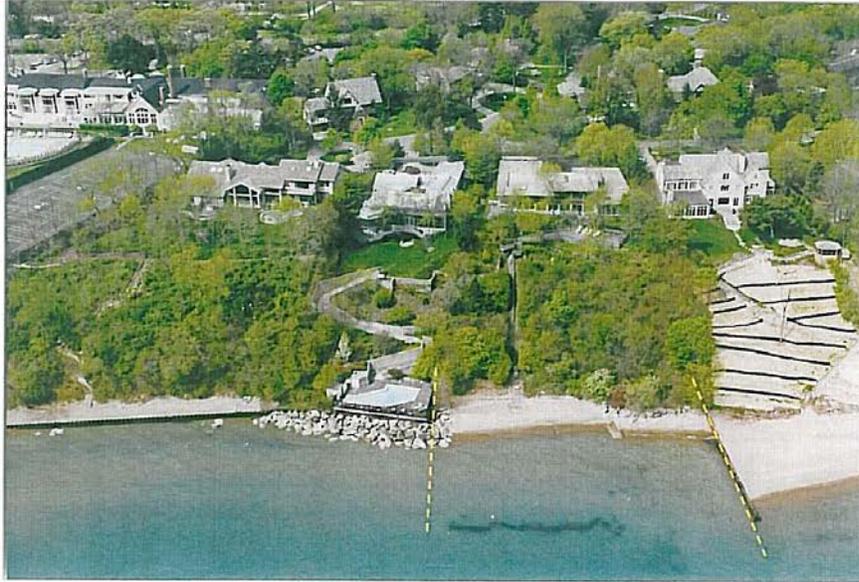
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APPENDIX  
55 South Deere Park Drive, Highland Park • October 31, 2014

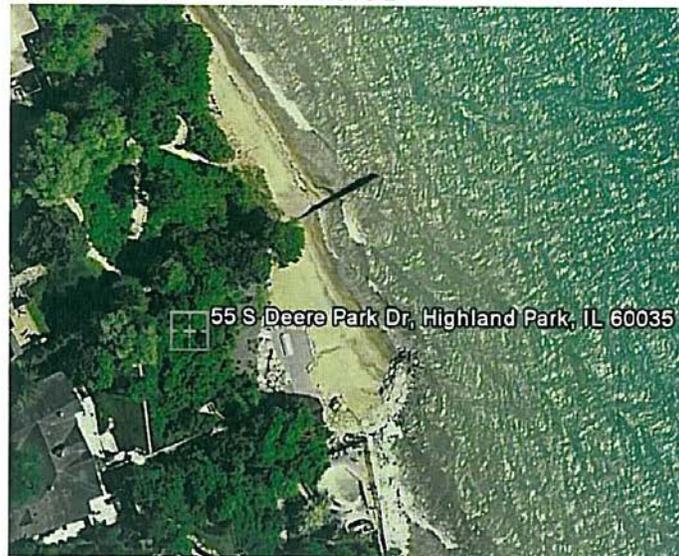
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**PHOTO 1**



1997 Aerial Photo Approximate Property Lines in Yellow

**PHOTO 2**



2010 Google Earth Photo shows the breakwater constructed in 2009

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APPENDIX  
55 South Deere Park Drive, Highland Park • October 31, 2014

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**PHOTO 3**

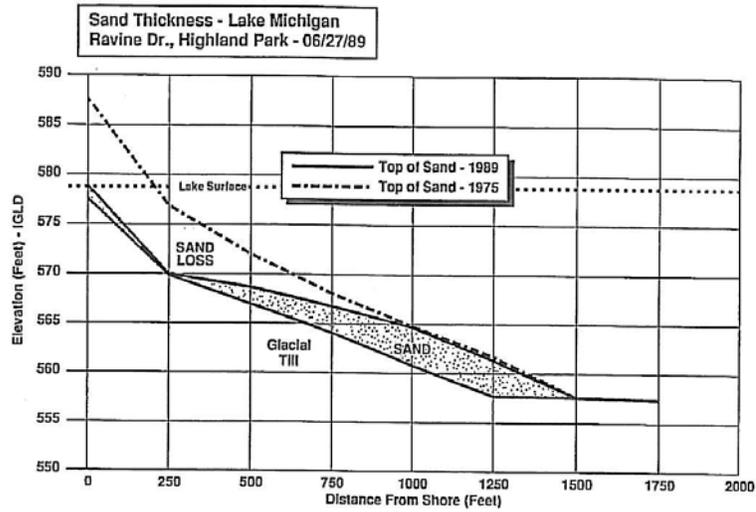


Spring 2014 photo depicts the conditions as the lake was beginning to rise from low lake levels.  
Note revetment is becoming exposed at the north end of the property.

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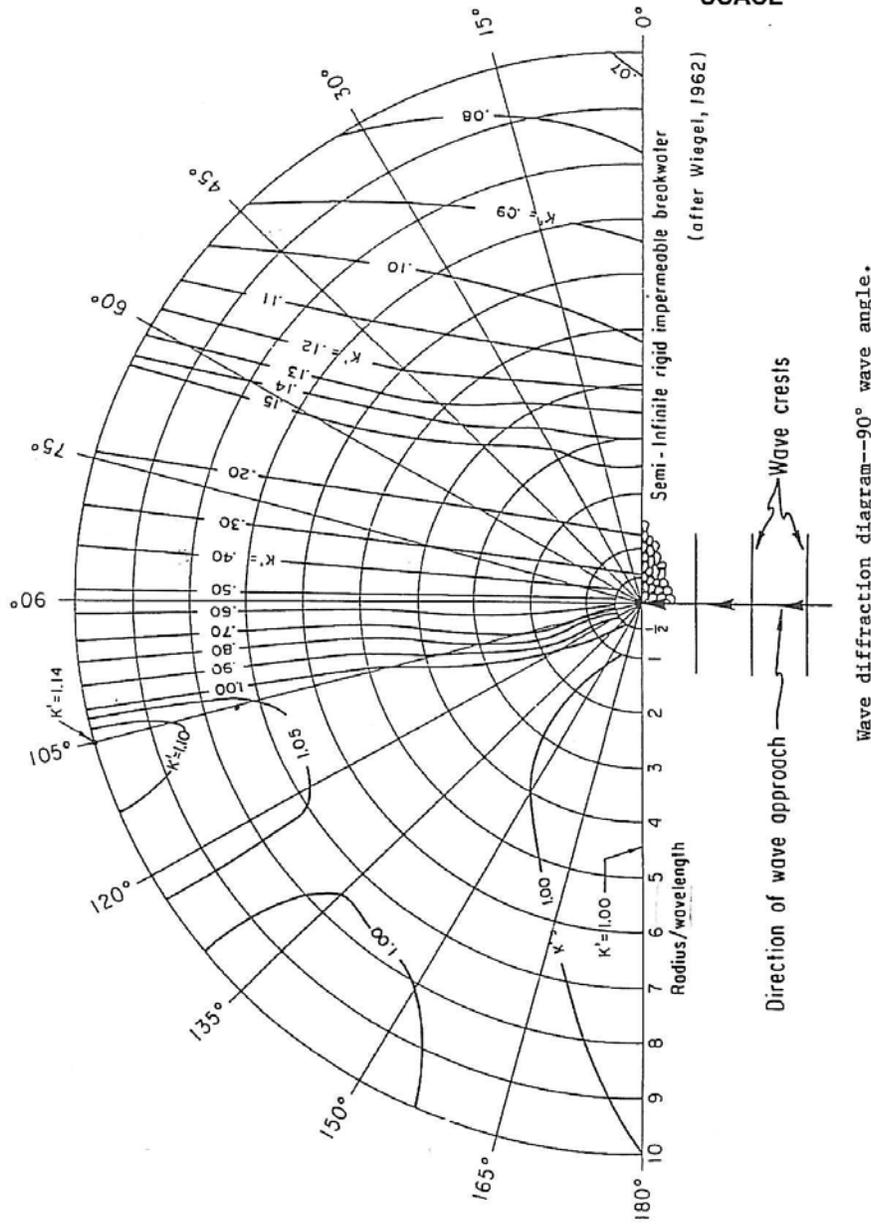
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**FIGURE 1**



**FIGURE 2**

**Shore Protection Manual  
USACE**

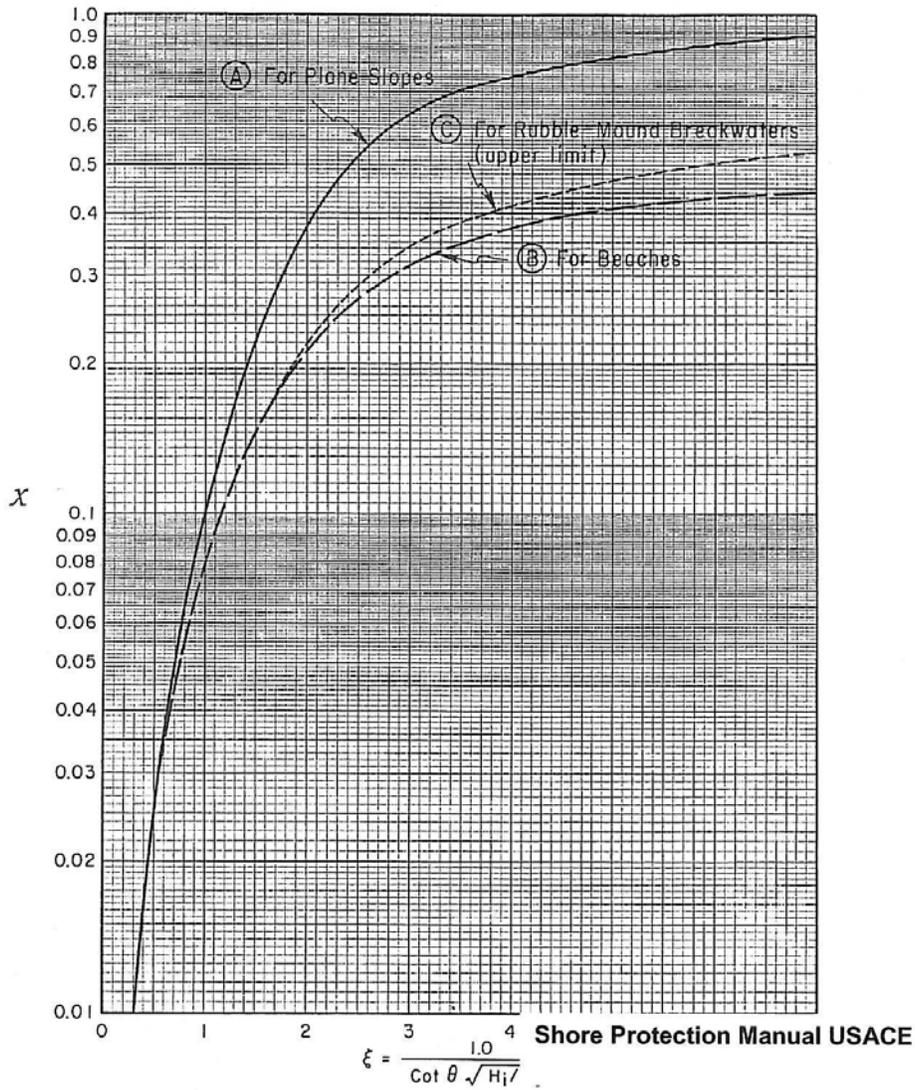


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APPENDIX  
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**FIGURE 3**



Wave reflection coefficients for slopes, beaches, and rubble-mound breakwaters as a function of the surf similarity parameter  $\xi$ .

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JOINT APPLICATION FORM FOR ILLINOIS							
ITEMS 1 AND 2 FOR AGENCY USE							
1. Application Number			2. Date Received				
3. and 4. (SEE SPECIAL INSTRUCTIONS) NAME, MAILING ADDRESS AND TELEPHONE NUMBERS							
3a. Applicant's Name: <b>Jerrold and Naomi Senser</b> Company Name (if any):  Address: 55 S. Deere Park Drive Highland Park, IL 60035  Email Address: jsenser@icapusa.com		3b. Co-Applicant/Property Owner Name (if needed or if different from applicant):  Company Name (if any):  Address:   Email Address:		4. Authorized Agent (an agent is not required): <b>Jon Shabica</b> Company Name (if any): Shabica & Associates, Inc. Address: 550 Frontage Road Suite 3735 Northfield, IL 60093  Email Address: jon@shabica.com			
Applicant's Phone Nos. w/area code Business: 312-424-9157 Residence: 847-266-0622 Cell: Fax:		Applicant's Phone Nos. w/area code Business: Residence: Cell: Fax:		Agent's Phone Nos. w/area code Business: 847-446-1436 Residence: Cell: Fax: 847-716-2007			
<b>STATEMENT OF AUTHORIZATION</b>							
I hereby authorize, <u>Shabica &amp; Associates, Inc.</u> to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.							
_____ Applicant's Signature			_____ Date				
5. ADJOINING PROPERTY OWNERS (Upstream and Downstream of the water body and within Visual Reach of Project)							
Name		Mailing Address		Phone No. w/area code			
a. see attached vicinity map							
b.							
c.							
d.							
6. PROJECT TITLE: Breakwater-Protected Beach							
7. PROJECT LOCATION: 57 S. Deere Park Drive, Highland Park, IL							
LATITUDE: 42.15336 °N			UTMs				
LONGITUDE: -87.75982 °W			Northing: 4667082.16m				
			Easting: 437221.26m				
STREET, ROAD, OR OTHER DESCRIPTIVE LOCATION			LEGAL DESCRIPT	QUARTER	SECTION	TOWNSHIP NO.	RANGE
55 S. Deere Park Drive				SE	31	43N	13E
<input checked="" type="checkbox"/> IN OR <input type="checkbox"/> NEAR CITY OF TOWN (check appropriate box)			WATERWAY			RIVER MILE (if applicable)	
Municipality Name Highland Park			Lake Michigan				
COUNTY	STATE	ZIP CODE					
Lake	IL	60035					

Revised 2010

Corps of Engineers

IL Dep't of Natural Resources

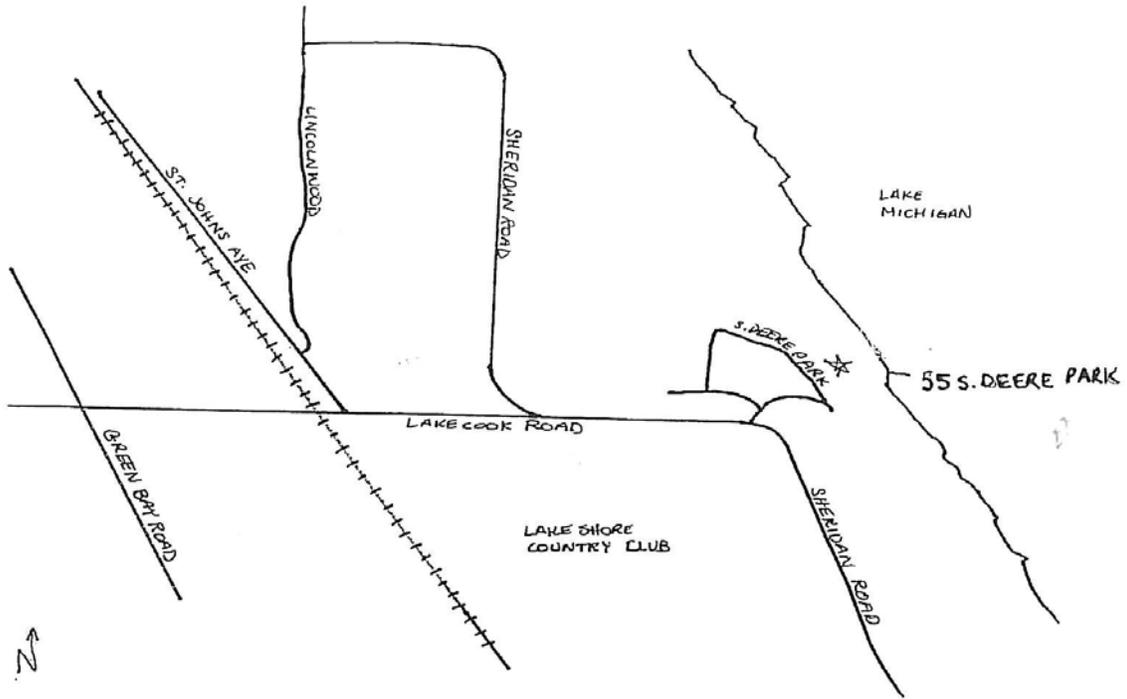
IL Environmental Protection Agency

Applicant's Copy

<b>8. PROJECT DESCRIPTION (Include all features):</b> A 33-foot long quarystone spur breakwater (groin to toe) will be built extending south from the breakwater along the north property line. The lakeward toe of the structure will extend to about 112 feet east of the toe of the bluff and the breakwater will have a crest elevation of 583' (IGLD 1985). The slope of the breakwater will be 1v:1.5h. This quarystone spur breakwater will be placed at the lakeward end of the existing steel sheetpile groin to help reduce scour in this area to reduce wave energy in the north end of the beach system. Mitigational sand will be placed in a quantity of 450 tons in the system.													
<b>9. PURPOSE AND NEED OF PROJECT:</b> To stabilize the north end of the site as well as reduce deepening of the lakebed caused by lakebed erosion.													
<b>COMPLETE THE FOLLOWING FOUR BLOCKS IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED</b>													
<b>10. REASON(S) FOR DISCHARGE:</b> Shore protection in the form of a breakwater-protected beach.													
<b>11. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS FOR WATERWAYS:</b> TYPE: Stone and Sand AMOUNT IN CUBIC YARDS: Sand: 360 cu. yds Stone:122 cu. yds.													
<b>12. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED (See Instructions)</b> 0.02 acres													
<b>13. DESCRIPTION OF AVOIDANCE, MINIMIZATION AND COMPENSATION (See instructions)</b> By designing smaller structures, the footprints will be minimized on the lakebed.													
<b>14. Date activity is proposed to commence</b> July 10, 2015													
<b>Date activity is expected to be completed</b> July 31, 2015													
<b>15. Is any portion of the activity for which authorization is sought now complete?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NOTE: If answer is "YES" give reasons in the Project Description and Remarks section. Indicate the existing work on drawings.													
<b>16. List all approvals or certification and denials received from other Federal, interstate, state, or local agencies for structures, construction, discharges or other activities described in this application.</b> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="text-align: left;">Issuing Agency</th> <th style="text-align: left;">Type of Approval</th> <th style="text-align: left;">Identification No.</th> <th style="text-align: left;">Date of Application</th> <th style="text-align: left;">Date of Approval</th> <th style="text-align: left;">Date of Denial</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Issuing Agency	Type of Approval	Identification No.	Date of Application	Date of Approval	Date of Denial						
Issuing Agency	Type of Approval	Identification No.	Date of Application	Date of Approval	Date of Denial								
<b>17. CONSENT TO ENTER PROPERTY LISTED IN PART 7 ABOVE IS HEREBY GRANTED.</b> Yes <input checked="" type="checkbox"/> No													
<b>18. APPLICATION VERIFICATION (SEE SPECIAL INSTRUCTIONS)</b> Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.													
_____ Signature of Applicant or Authorized Agent	_____ Date 10/29/14												
_____ Signature of Applicant or Authorized Agent	_____ Date 10/29/14												
_____ Signature of Applicant or Authorized Agent	_____ Date												
<input type="checkbox"/> Corps of Engineers Revised 2010 <input type="checkbox"/> IL Dep't of Natural Resources <input type="checkbox"/> IL Environmental Protection Agency <input type="checkbox"/> Applicant's Copy													

SEE INSTRUCTIONS FOR ADDRESS

Vicinity Map



Breakwater-Protected Beach

55 S. Deere Park Drive  
Highland Park, IL 60035



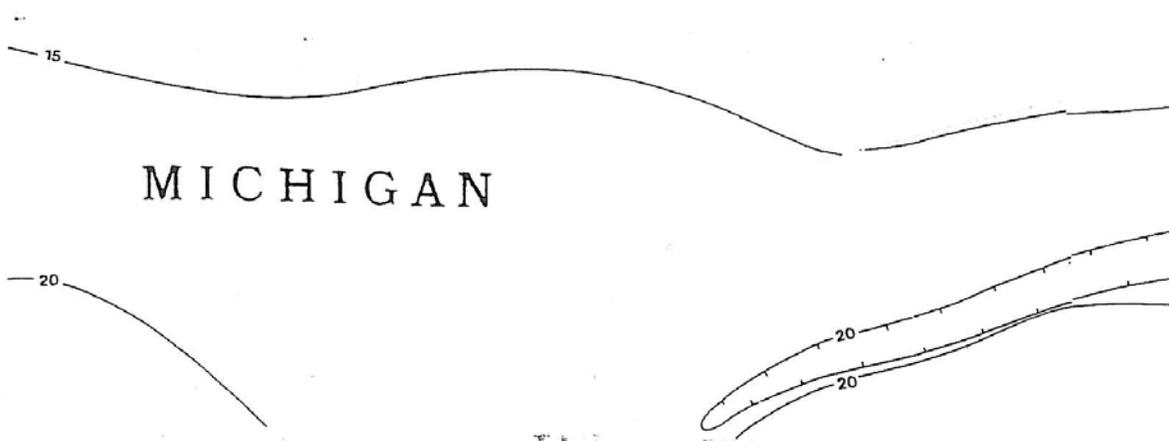
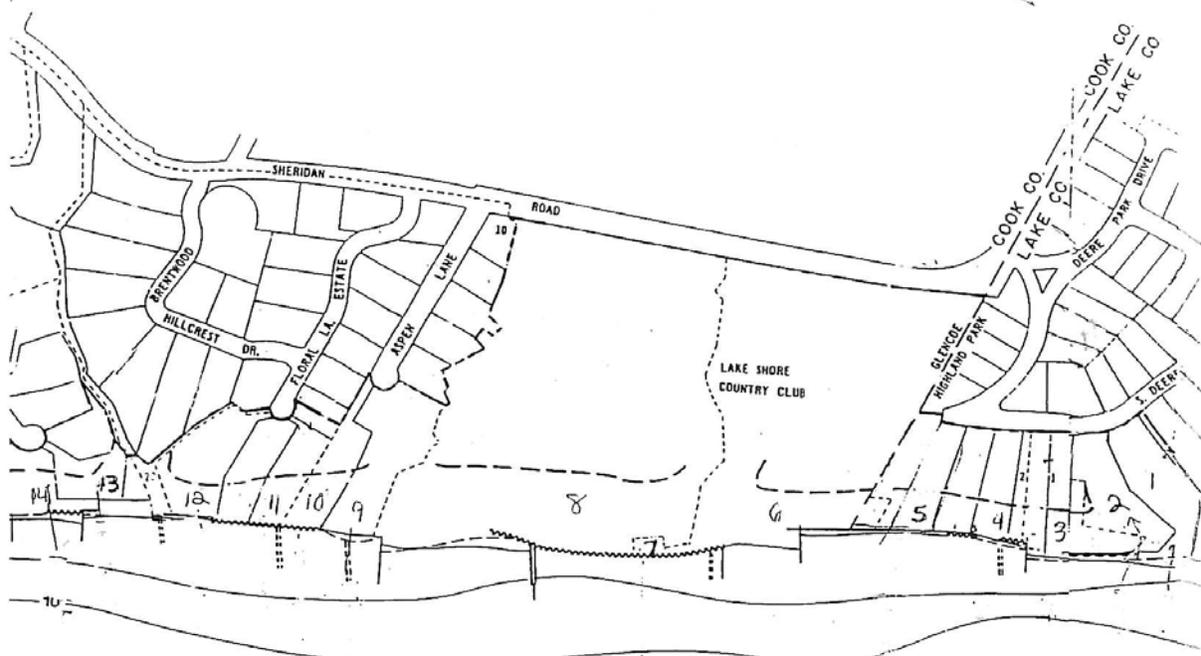
**Shabica & Associates, Inc.**  
WE BUILD BEACHES

**Location of Project:** 55 Deere Park Drive, Highland Park, Illinois 60035

List of property owners (from North to South):

1. Andrew S. and Laura C. Hochberg, 77 S. Deere Park Drive, Highland Park, IL 60035
2. Cynthia B. Hirsch Trust, 65 S. Deere Park Drive, Highland Park, IL 60035
3. Mark and Julia Gerstein, 57 S. Deere Park Drive, Highland Park, IL 60035
4. Subject Property: Jerrold and Naomi Senser, 55 S. Deere Park Drive, Highland Park, IL 60035
5. Michael and Janet Krasny, 41 S. Deere Park Drive, Highland Park, IL 60035
6. Lake Shore Country Club, 1255 Sheridan Road, Glencoe, IL 60022
7. Village of Northbrook, Public Works Department, 655 Huehl Road, Northbrook, IL 60062
8. North Shore Congregation Israel, 1195 Sheridan Road, Glencoe, IL 60022
9. Milton Vainer, 35 Aspen Lane, Glencoe, IL 60022  
(mailing: 191 Apple Tree Road, Winnetka, IL 60093)
10. Nena Addis, 25 Aspen Lane, Glencoe, IL 60022
11. David Muslin, 35 Estate Drive, Glencoe, IL 60022
12. Robert Price, 30 Estate Drive, Glencoe, IL 60022
13. Shayle P. Fox, 1 Rockgate Lane, Glencoe, IL 60022
14. Property Owner, 6 Rockgate Lane, Glencoe, IL 60022

E N C O E



MICHIGAN

**Mark Gerstein**  
**57 South Deere Park Drive**  
**Highland Park, Illinois 60035**

Construction Operations Div. Regulatory Branch  
Corps of Engineers, Chicago District  
111 N. Canal Street  
Chicago, IL 60606-7206

September 25, 2014

Dear Sir or Madam,

I hereby request that Shabica & Associates, Inc. be authorized to act in my behalf in filing a permit application for shore protection work at the Senser property, 55 South Deere Park Drive, Highland Park, Illinois. I understand that the lakeward end of the steel groin on my property will be encapsulated with stone. I convey permission for representatives of Shabica & Associates, Inc. to enter my property for consulting purposes.

If additional information is required, please contact me at the above address.

Sincerely,



Mark Gerstein  
Owner

cc: Illinois Department of Natural Resources  
Illinois Environmental Protection Agency  
Shabica & Associates, Inc.  
Jerry Senser



**Shoreline Stabilization at  
57 S. Deere Park Drive  
Highland Park**

**Submittal to  
Community Development Department  
March 4, 2015**

**Prepared By:**

**Shabica & Associates, Inc.  
We Build Beaches  
550 Frontage Road, Suite 3735  
Northfield, Illinois 60093  
Tel. 847-446-1436  
Fax 847-716-200**



**Shabica & Associates, Inc.**  
We Build Beaches

Eric Olson  
City of Highland Park  
Community Development Department  
1150 Half Day Road  
Highland Park, Illinois 60035

Dear Mr. Olson:

March 4, 2015

Attached please find a submittal to the City of Highland Park's Community Development Department for a Shoreline Stabilization project at the property of Mark and Julia Gerstein at 57 S. Deere Park Drive, Highland Park. Proposed work includes construction of a breakwater protected beach system with sandfill as required for this work. All Federal and State permits have gone through the public notice stage and are nearing approval for the proposed work (see Appendix).

This project was submitted to the state and federal regulators in October 2014 and is under final review. All Federal and State permits have gone through the public notice stage. The IEPA and IDNR have issued permits, see Appendix The US Army Corps of Engineers are nearing approval for the proposed work (see Appendix).

The shoreline at this site has been losing sand at a fast rate due to the lake level rising and higher intensity lake storms. As the sand level is lowering, the bluff toe has become vulnerable to erosion and the base of the stair access to the beach has been compromised.

The City's Standards for Review, as outlined in the "Lake Michigan Protection Regulations" from Section 150.703.1 *Special Regulations for the LFOZ Lakefront Density and Character Overlay Zone*, are outlined below with our responses following:

- a. *The proposed Regulated Activity and/or Structure shall not unreasonably impede access to or pedestrian movement along the beach or to Lake Michigan.*  
This project will not impede pedestrian access or movement along the beach or to Lake Michigan.
- b. *The proposed Regulated Activity and/or Structure shall not unnecessarily impede navigability within Lake Michigan*  
As the breakwaters will not extend further east than other existing structures, the proposed project will not have any impact on the navigability of Lake Michigan.
- c. *The proposed Regulated Activity and/or Structure shall not unreasonably impact the Subject Property or the Adjacent Properties*

The project will protect the Subject Property from shoreline erosion, and the sandfill, as required by the IDNR will assure that the project will not negatively impact the adjacent properties.

- d. *The Applicant has proposed appropriate long-term maintenance requirements and plans, as necessary, for the proposed Regulated Activity and/or Structure*  
The project has a long-term maintenance plan. Monitoring of the project is also required for 5 years post construction by the IDNR.
- e. *The proposed means and methods of undertaking the Regulated Activity and/or Structure are consistent with appropriate design and aesthetics principles*  
The means and methods of construction are consistent with design and aesthetics; all work will be completed via marine mobilization. A similar structure has been constructed on the south side of the property.
- f. *The proposed Regulated Activity and/or Structure shall not create new nor amplify existing erosion problems on the Subject Property and on Adjacent Properties*  
The project will prevent future bluff erosion on the subject property, and will not affect adjacent properties. As the construction will be completed via marine access, the bluff will not be disturbed. As the construction will be completed via marine access, the bluff will not be disturbed except the location where the north spur breakwater is placed abutting the toe of the bluff.
- g. *The proposed Regulated Activity and/or Structure shall be for the purposes of erosion control, water gathering, and/or public access only*  
The proposed shore protection will reduce and/or prevent future sand loss and bluff erosion on the subject property and allow access to the beach from the tableland.
- h. *There will not be an unnecessary adverse environmental or ecological impact on the Subject Property or on any of the Adjacent Properties as a result of the proposed Structure and/or the Regulated Activity*  
The proposed structure will not cause unnecessary adverse environmental or ecological impact. The quarrystone breakwater provides improved habitat for fish. Sand acts as a natural filter for stormwater runoff.
- i. *The proposed Structure and/or Regulated Activity is the least environmentally and ecologically intrusive means of achieving the stated purpose of the Structure*  
The proposed system is a viable, environmentally-correct means of achieving the stated purpose.
- j. *The Applicant has properly obtained any and all permits required by the federal, state, and county governments for the Regulated Activity and/or the Structure*  
All Federal, State and County permits are under review and nearing issuance. The state and federal permit application is attached. All permits will be issued prior to any work commencing.

A Permit Application has been filed with the Department of Public Works for the proposed project. In conformance to the City's Application Guidelines, the following documents and information are included:

- i. *A statement of the purpose and planning objectives to be achieved by the proposed Regulated Activity*  
The proposed breakwater-protected pocket beach system will help protect the bluff from erosion during all lake levels. The proposed system will move the locus of wave action further offshore where lakebed downcutting will be reduced.
- ii. *A plat of survey of the Subject Property*  
A Plat of Survey is attached as well as a recent hydrographic survey showing the entire work area. A tree survey has not been prepared as the bluff and tableland will not be impacted by the construction. All access will be via barge on Lake Michigan.
- iii. *A conceptual plan showing the Subject Property and the Adjacent Properties, including any and all existing Structures in the portion of the Lake Michigan Protection Zone abutting those properties*  
A Plan View is attached.
- iv. *Development and site plans showing the proposed Structure, if applicable*  
Same as Conceptual Plan in Item iii
- v. *A demolition plan, if applicable*  
N/A
- vi. *An elevation plan, which shall include sectional views of the proposed Structure, if applicable*  
Cross-sectional drawings are attached.
- vii. *Copies of any and all permits required by the federal, state, and county governments for the Regulated Activity and/or the Structure*  
Federal and State permits are attached.
- viii. *Engineering details of the proposed Structure and/or the Regulated Activity, which shall include, if applicable:*
  - A. *Structure height:* N/A, see Coastal Engineering Report in the cover letter to the state and federal regulators and plans in the Appendix  
*Structure Length:* System extends about 116' lakeward from the bluff toe  
*Structure Width:* N/A, see plans
  - B. *The spacing between the proposed Structure and other Structures in the Lake Michigan Protection Zone abutting any of the Adjacent Properties*  
No spacing is applicable.
  - C. *The materials of which the proposed Structure will be composed*  
The breakwater will be quarried quartzite. Sand will be placed as required by the IDNR as beach fill.
- ix. *A geo-technical investigation report of the site*

As there will be no major earthmoving or structures built on the bluff slope, this project does not require a geotechnical investigation.

- x. *A statement outlining structure success in various water levels*  
The breakwater is designed to function during varying lake levels.
- xi. *A statement describing the long-term maintenance requirements and plan for the proposed Structure*  
The proposed structure has a 20-year design-life, and the stone that will be used will last thousands of years. Periodic maintenance is recommended as necessary based on biannual visual inspections. Typically, at the time of recommended maintenance, additional stone will be brought in and placed over the existing revetment to bring it back to the original specification.
- xii. *A written description of the proposed means and methods of undertaking the Regulated Activity*  
All materials and equipment will be delivered to and removed from the site via barge on Lake Michigan. The beach work will be completed using a backhoe and crane as needed.
- xiii. *An explanation, in narrative form, of the following:*
  - A. *Any and all erosion problems on the Subject Property for which the Structure and/or Regulated Activity is designed to correct or remedy*  
This system is designed to protect the Subject Property from future sand loss, lakebed downcutting and bluff erosion due to stormwave damage.
  - B. *The environmental and ecological impact on the Property and the Adjacent Properties that are expected to result from the Structure and/or Regulated Activity*  
The environmental impact of this project is that the stormwater will be filtered by the beach. This will reduce sediment and non-point source pollution from flowing into Lake Michigan.
  - C. *How the proposed Structure and/or Regulated Activity is the least environmentally and ecologically intrusive means of achieving the stated purpose*  
The design of this system is minimally intrusive to the environment. The project design mimics mother nature by creating a rocky headland to create a calm bay where wave energy is reduced and sand can remain to provide shore protection.
  - D. *The nature and composition of existing protections, including existing Structures, of the shoreline in that portion of the Lake Michigan Protection Zone abutting either the Subject Property or the Adjacent Properties, and the impact and effectiveness of those protections on the shoreline, the lakebed, and on erosion of the Subject Property and Adjacent Properties*  
The existing form of shore protection at the Subject Property is a steel groin along the south property line to help to hold a narrowing sandy beach. There is no engineered protection at the base of the bluff. Sand has eroded severely from the current system.

- xiv. *A non-refundable application fee, in the amount set forth in the City's Annual Fee Resolution*  
The application fee is attached.

An Appendix of attachments is included with this letter.

This information addresses the application requirements for submission. Please let us know if you require any further information.

Sincerely,



Jon Shabica  
Vice President



# Appendix

FIRST TO BE OK'D BY LAKEFRONT COMMISSOIN

# Beach project a model in many ways

By CHARLES BERMAN  
cberman@pioneerlocal.com

An exciting scene stretched deep over the Lake Michigan shoreline Nov. 20 as crews put the final touches on the gold standard of beach-restoration projects.

Cranes reached over the side of a barge and dropped tons of sand and stone onto a newly constructed private, residential beach on the southeast corner of Highland Park.

Shabica and Associates, a Northfield-based shoreline protection firm, designed the project to correct years of damage caused by erosion and to withstand years of natural destruction.

Jon Shabica, the firm's vice president, said what once was up to 50-feet of sandy beach was reduced to less than half its previous size during the last two years.

"There was very little natural sand left and the beaches were deteriorating to just cobble and lakebed clay," Shabica said.

Shabica said once sand disappears and lake-bed clay begins to erode, the natural process is unable to repair itself, resulting in larger waves and additional destruction to the bluffs and beaches.

So quarry stone breakwater stones were installed, a concrete pier was removed, a new curbstone groin was constructed with steps built into it, which extended into the lake. A limestone revetment was added, new sand was deposited, the beach was regraded and a dune grass system was installed.

That type of complete restoration project can cost between \$400,000 and \$1 million depending on finishes, the size of the property and the level of damage, Shabica said.

"My guess is that like the ravines, the amount of (property) loss we've seen has come more toward the

*"We want to prevent any negative impact from the construction onto neighbors. The lake is constantly moving and shifting sand; we want to make sure nothing impedes its flow."*

Barbara Cates

end of the season and we typically see healthier beaches before winter," Shabica said. "So we might see some panicked people in the spring.

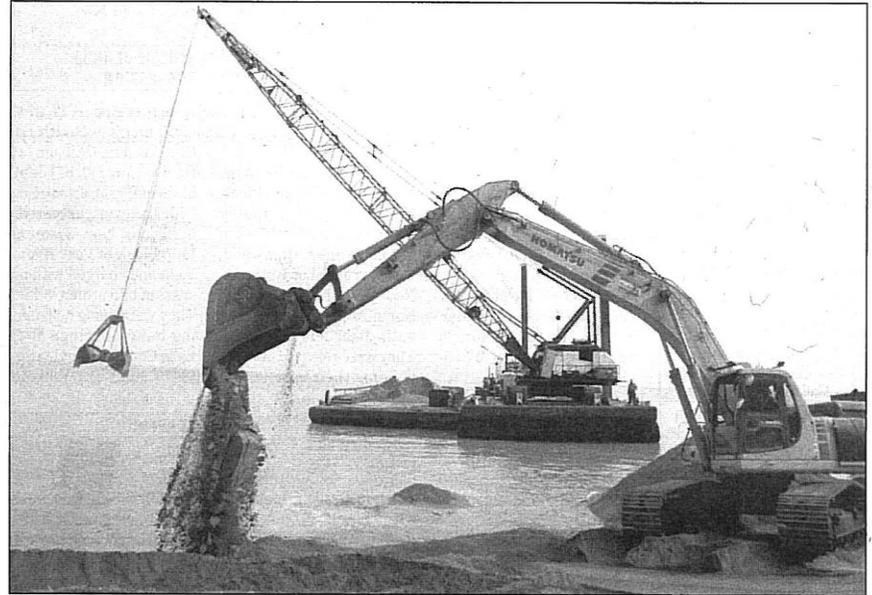
"This really hasn't been a good summer weather wise," he continued. "We think it has to do with the rising lake. It's up 1 foot, 3 inches since January."

The project also proved noteworthy because it was the first to go through the Highland Park Lakefront Commission's new process and the first state project to be completed since the Illinois Department of Natural Resources put a moratorium on all private coastal engineering projects.

"The city recognizes that the lakefront is a defining element of the city's character," said Barbara Cates, city planner and staff liaison to the Lakefront Commission. "We want to promote activities on the beach in the most ecological manner possible, so we established a process of approvals at the Lakefront Commission.

"There are a lot of natural processes going on at the lakefront."

Cates said the most important aspect of the city's new guidelines is the requirement for a resident to obtain all necessary state



Sand is moved into place Nov. 20 as a barge drops sand on the shoreline for a restoration project at a Highland Park homeowner's private beach. The barge was dropping off tons of sand to replenish the sand bank of the beach, which has been deteriorating because of higher lake-water levels. (Buzz Orr/Staff Photographer)

and county permits before the commission would make a recommendation to the city council.

"The (homeowners) were required to get six approvals before we considered this," Cates said. "We want to prevent any negative impact from the construction onto neighbors. The lake is constantly moving and shifting sand; we want to make sure nothing impedes its flow."

City Engineer John Welch said the work on South Deere Park Drive was a model project.

"We aren't saying people have to do this system," he said. "This is the Bentley of improvements that can be done on the lake shore. Their situation was probably worse than (most other situations) to begin with."

Welch recommends that residents employ a shoreline expert and take preventative measures to maintain their property, as it is cheaper to repair problems

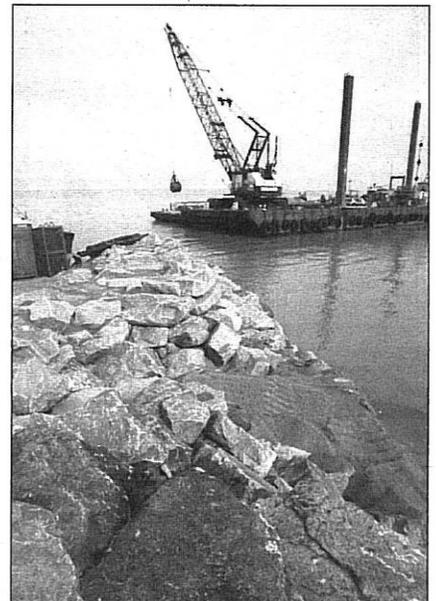
that are found earlier.

Cates said the Lakefront Commission found that this project will retain sand, prevent erosion and ultimately protect the shoreline in that area. The commission is also using this project as an education tool.

In the city's conditional approval, the homeowners were required to provide updated reviews of the improvements at its one-year and five-year anniversaries. The site was also extensively photographed before, during and after project was completed. Ongoing inspections and supervision of the project was required as well.

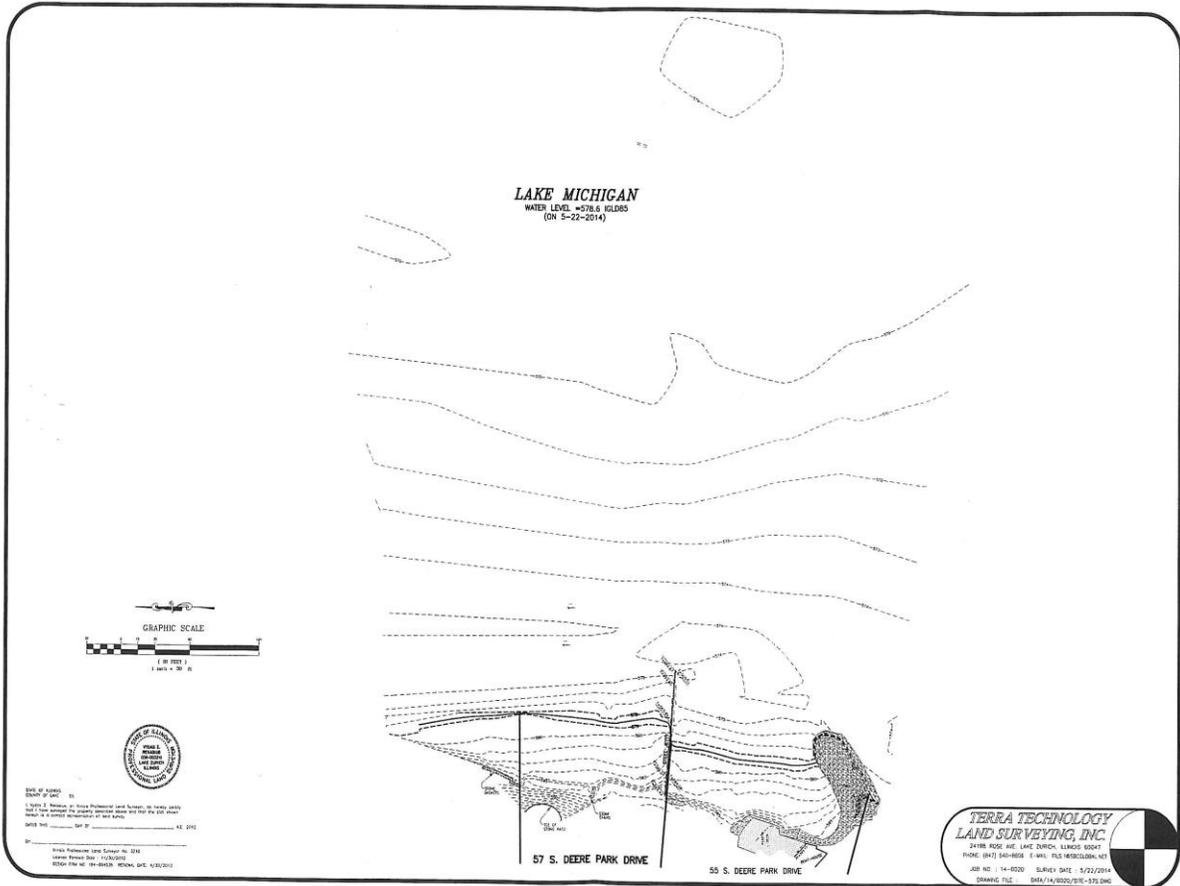
"It's a good learning process for the commission," Cates said. "We were making sure what they proposed, in the end, is what is being installed."

"These were vast improvements," Cates continued. "It's striking how much has changed. It looks very natural.

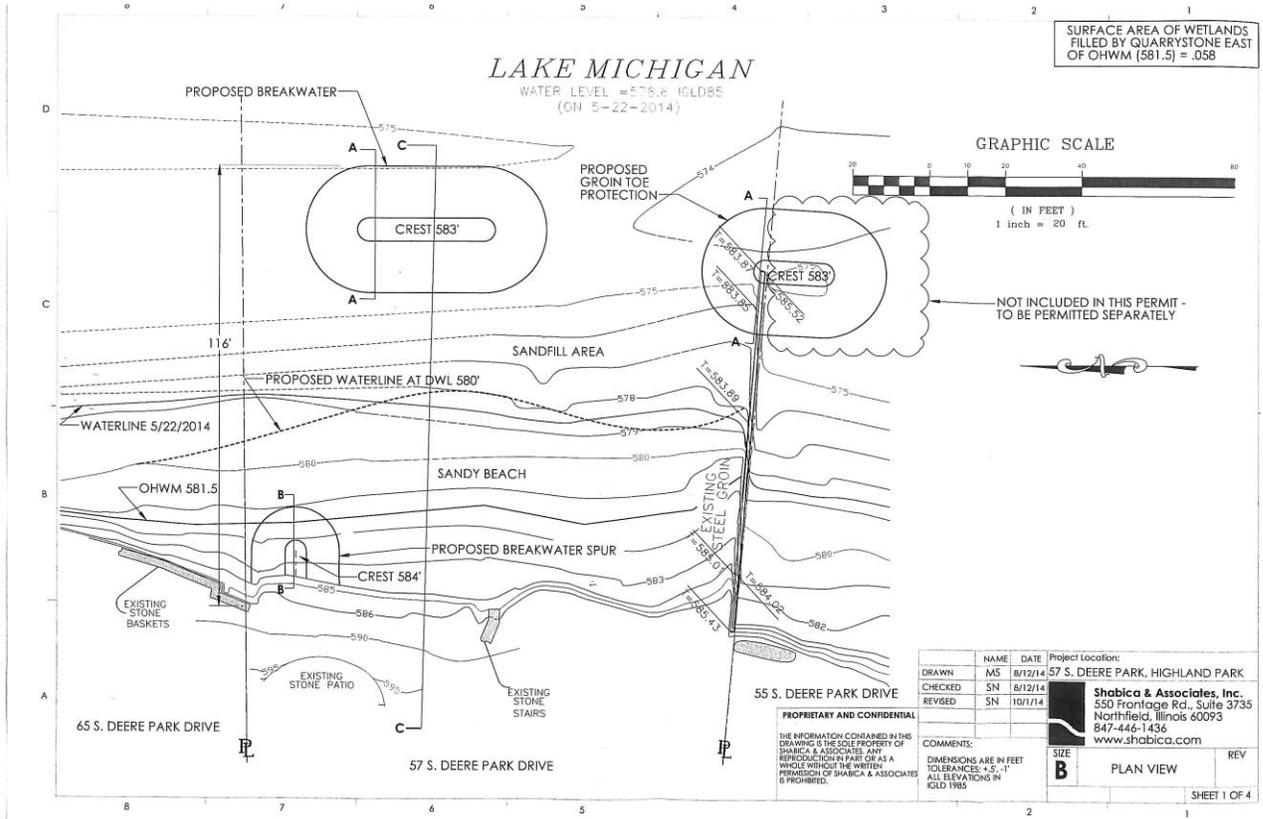


A barge (background) hauls sand to the shoreline for a restoration project at a Highland Park homeowner's private beach Nov. 20. In the foreground is a human-made stone breakwater that acts as an arm for an engineered beach. (Buzz Orr/Staff Photographer)

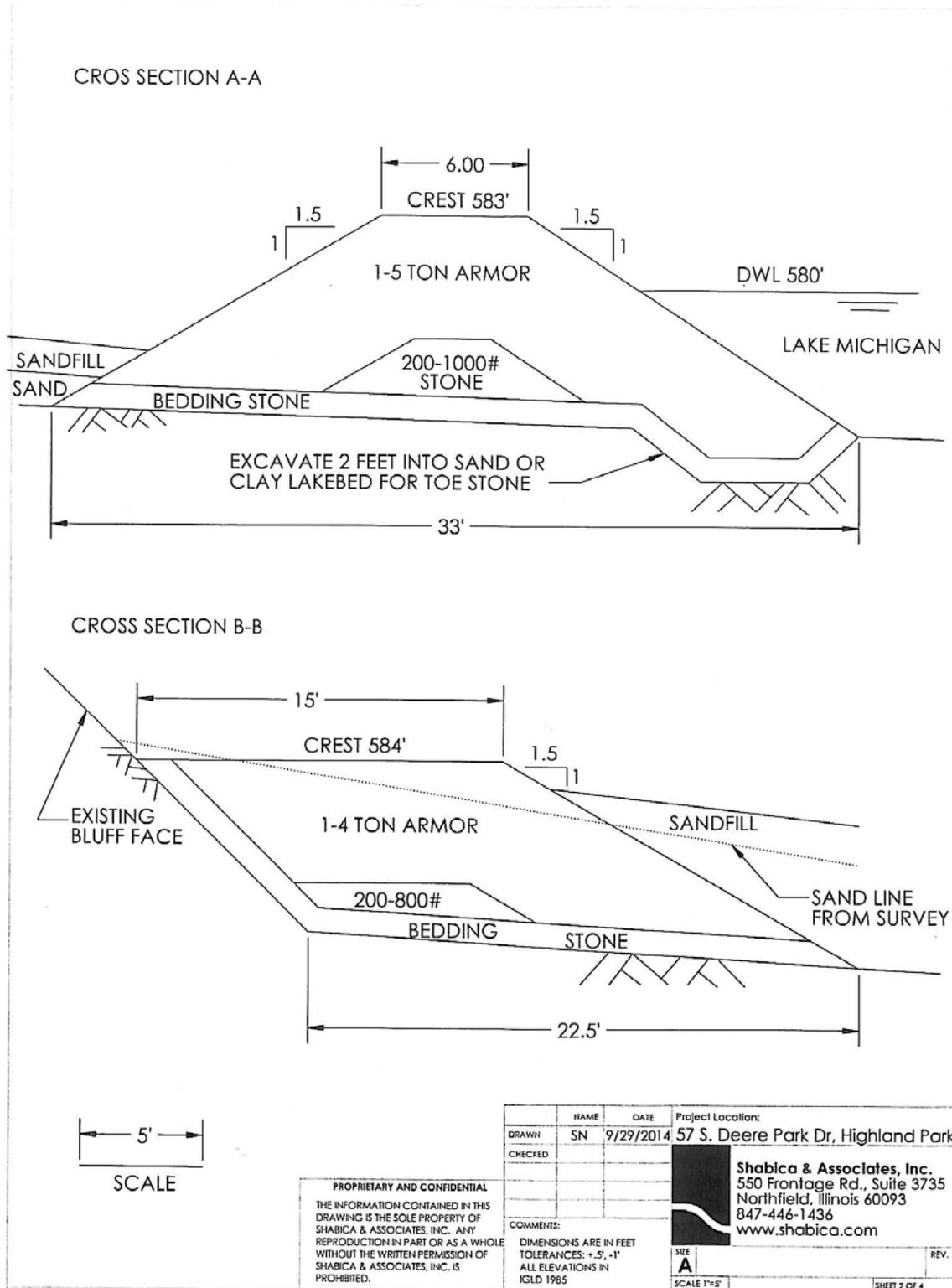
## Hydrographic Survey



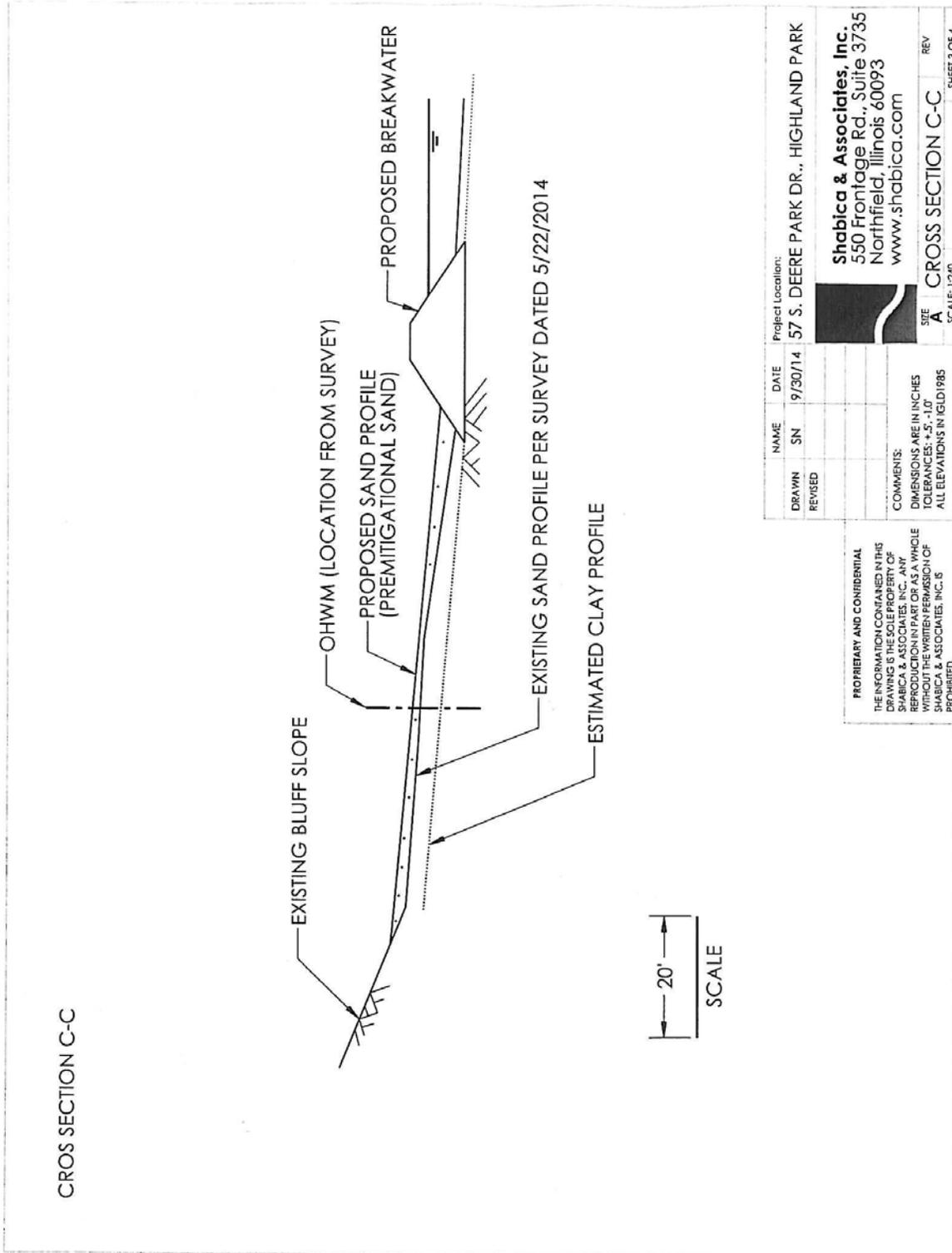
Permit Drawings



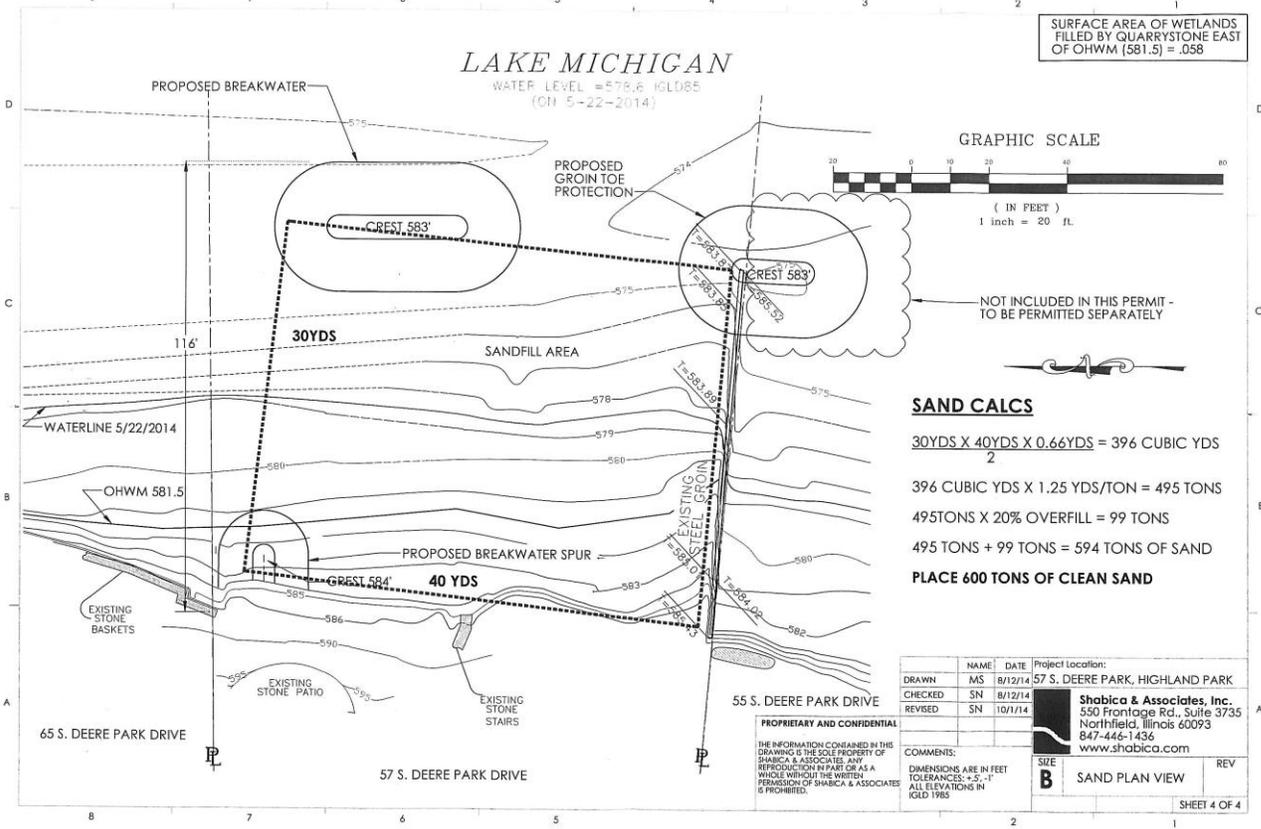
Permit Drawings (cont.)



Permit Drawings (cont.)



Permit Drawings (cont.)



## State and Federal Permit Application



**Shabica & Associates, Inc.**  
WE BUILD BEACHES

Ms. Kathy Chernich  
East Section Chief, Regulatory Branch  
Chicago District  
U.S. Army Corps of Engineers  
231 S. LaSalle Street, Suite 1500  
Chicago, IL 60604

Dear Ms. Chernich:

October 9, 2014

Please find enclosed a permit application for shore protection for the property located at 57 South Deere Park Drive, Highland Park, Illinois, 60035, owned by Mr. Mark Gerstein. Proposed work includes construction of a shore disconnected quarystone breakwater, quarystone toe protection for the lakeward end of the existing steel groin, a short quarystone spur adjacent to the north property line and sandfill, as required. A letter of support is attached from the adjacent south property owner, Mr. Jerry Senser, who will be submitting a permit application for work to be completed in conjunction with this project on the south property.

A *Design of Shoreline Erosion Protection* report has been attached to this cover letter as the coastal design specifications component of this permit. All references, photographs and figures referred to in the cover letter and the following report can be found in the Appendix.

The proposed activity complies with the approved Illinois Coastal Management Program (ICMP) and will be conducted in a manner consistent with such policies. A separate letter has been submitted to the ICMP office.

### **Project Purpose Statement**

The property owner has retained Shabica & Associates (SA) to design and engineer a shore protection system for his property. This project will be constructed on the lakefront of 57 South Deere Park Drive, Highland Park, where the homeowner wants to provide additional shore protection and reduce lakebed downcutting that will eventually destabilize the bluff and existing steel groin. The sandy beach at this site has deflated over the years. Even with recent low lake levels, the beach is narrower during all lake levels with stormwaves impacting the bluff toe and showing signs of eroding the bluff landward.

The bluff at this site has a vegetated slope face leading down to the beach and shoreline. The beach at this site has deflated an average of 3' in elevation as evidenced by the scarp at the back of the beach. This scarp has retreated west over time during storms and now, at the north end of the property, waves impact the bluff toe. Additionally, during a site visit in 2011, there was exposed lakebed clay near the waterline. This indicates that there is only a thin veneer of sand in this area increasing the amount of lakebed downcutting. At the south property line, there is an existing steel sheetpile groin that helps to hold the sand that does stay on the beach.

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A 60-foot long shore disconnected quarrystone breakwater (toe to toe) will be built approximately 50 feet north of the existing steel groin. The lakeward toe of the structure will extend to 116 feet east of the toe of the bluff and the breakwater will have a crest elevation of 583' (IGLD 1985). The slope of the breakwater will be 1v:1.5h. Quarrystone breakwater toe stone will be placed at the lakeward end of the existing steel sheetpile groin to help reduce scour in this area to improve the longevity of the groin. The crest elevation of the toe stone will be 583'. A short quarrystone spur breakwater will extend approximately 28 feet east of the bluff toe at the north end of the property. The crest elevation will be 584' with a slope of 1:1. This structure will help reduce loss of sand from the beach as well as break waves impacting the bluff toe during high lake levels. Mitigational sand will be placed in a quantity of 600 tons in the system.

This section of coastline has historically lost sand due to lakebed downcutting especially during prolonged periods of low water. Sand deposits are thin here (Figure 1, Appendix) and scientists estimate that the rate of lakebed erosion averages 6 inches per year (Nairn, 1997). The net result is similar to the effects of global warming and rising sea level on marine coasts. This includes deeper water nearshore, larger stormwaves and progressively narrower beaches as the nearshore lakebed continues to erode. This has resulted in bluff toe erosion especially during average to high lake levels. While a narrow beach has been present at this site during higher lake levels, stormwaves have scoured the glacial clay till at the bluff toe. If ignored, this will lead to destabilization of the bluff face causing loss of tableland and infrastructure.

The Illinois Lake Michigan shoreline is considered "sediment starved" by coastal scientists. This is in contrast to East Coast and Gulf Coast open ocean shores where tens of thousands of tons of sand are found in the nearshore system that provide a primary line of defense against stormwaves. On most Great Lakes shores including southern Lake Michigan, natural sand beaches are not able to protect the lakeshore (exceptions may be during very low lake levels like 1964 or 2004-07). Large quantities of sand have been trapped or diverted offshore by municipal structures that extend 900 feet or more into the lake. Today, the main sand supply is wave erosion of the nearshore glacial clay lakebed that contains only about 10% sand (Shabica and Pranschke, 1994). The result is that groins are losing their effectiveness at holding a sandy beach during average to high lake levels. To retain a sand covering of the shallow lakebed (where downcutting is most active), as well as to protect the revetment and bluff toe, SA has designed an open breakwater beach system to hold sand, as necessary, to protect the lakebed and bluff during higher lake levels.

If beach and nearshore sand is lost, degradation of the nearshore ecosystem will result. Meadows et al., (2005) reports an increase in zebra mussels *Dreissena polymorpha*, and a decrease in native zooplankton in waters where the lakebed is eroding clay and rocks. In comparison, a nearshore area with 100% sand cover supports a species-rich community. The report concludes, "it [is] nonetheless clear that sand-based areas were characterized by sufficient shallow water fish CPUE and species richness to suggest that these are important habitats within the context of the Great Lakes Basin and not simply 'wet deserts' as they are often considered."

#### Design Options

The site at 57 South Deere Park Drive, Highland Park has been inspected and options for shore protection were determined using desktop coastal engineering, site conditions from the 2014 bathymetric survey, studying local prototypes, and several years of observations of the deteriorating shoreline conditions at this site. Given the sand loss over the last several years including during extreme low lake levels, as well as the uncertainty of future lake levels, it is prudent to engineer and design systems that will anticipate greater lakebed downcutting, higher amounts of beach erosion, more extreme storm events with larger waves, and potential loss of land. These four design options were considered:

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**OPTION 1**

***Do Nothing –***

The first option of "Do Nothing" results in leaving the currently eroding beach in its existing state. This will allow lakebed erosion to continue allowing larger stormwaves to impact the coastline. Over time, the beaches along Illinois' North Shore coastline have continued to narrow due to being in a sand starved system. At this site, the beach continues to narrow even with lower than average lake levels. Now with the water level rising, Lake Michigan waves are impacting the seawall.

**OPTION 2**

***Construct a Revetment –***

The second option considered is to construct a quarrystone revetment. This option provides enhanced stormwater protection at the cost of the following:

1. Continued erosion of the lakebed, which will ultimately destabilize the revetment toe
2. The beach will erode over time, as there is less sand in the system.

**OPTION 3**

***Preferred Option: Design an Open Breakwater Beach System –***

The preferred option is to protect the property with a pocket beach breakwater system. Based on research of prototypes along the Illinois North Shore, structures that extend less than around 125 feet offshore with a wide gap opening between structures, do not dissipate enough wave energy to hold a stable beach with fluctuating lake levels. This system is less than 125 feet offshore and due to its design will greatly enhance the level of shore protection at this property. The proposed breakwater will extend east from the bluff toe approximately 116 feet. This plan also includes quarrystone toe protection for the lakeward end of the existing steel sheetpile groin and a short breakwater spur near the north property line that will help to break wave energy during high lake levels as well as help the system to retain sand. The proposed plan will help protect the glacial clay lakebed, as well as the beach and bluff, while allowing safe access to Lake Michigan. This option will help stabilize the sand on the adjacent beaches by reducing wave energy in the immediate area. With proper maintenance, a structure like this could be expected to continue functioning for 30 plus years.

**OPTION 4**

***Encapsulate the Groin in Quarrystone –***

This option would help to hold sand in the beach cell at a much reduced rate than the preferred option. This property is located at the north end of a groin field. The beach is narrow at the north end and with the deflation seen recently, the bluff toe would remain at risk. Additionally, the cost of encapsulating the existing structures in stone and adding sand is almost as expensive as constructing a more sustainable coastline.

**OPTION 5**

***Larger Bay Beach System-***

Options for a larger bay beach were studied but were cost preventative for the client.

**Public Benefits of Sandy Beaches**

The Great Lakes represent the most important natural resource in the United States. Sandy beaches play an important role in keeping the lakes clean and safely accessible. Furthermore, a sandy beach makes a better ecotone (transitional environment) for flora and fauna than seawalls and revetments. Summary arguments supporting a sandy beach system include:

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- 1) Beaches are filters for non-point source runoff.
- 2) Beaches reduce lakebed downcutting, a source of fine clay pollutants.
- 3) Beaches support endangered species such as sea rocket, marram grass, and seaside spurge.
- 4) Beaches make better wildlife habitat than actively eroding bluffs or seawalls.
- 5) Stone headlands make better fish habitat than eroding lakebed clay.
- 6) Beaches protect the lakebed from erosion that causes larger stormwaves to impact the shore.
- 7) Beaches are far safer for swimmers and boaters than a coast lined with seawalls or revetments, especially in an emergency.
- 8) Beaches, unlike most steel or concrete seawalls, are not visual pollution.

**Impacts to Downdrift Properties**

The proposed project will have minimal impact on the property immediately downdrift of the subject property. The adjacent property to the south has a breakwater protected beach and is currently applying for a permit to install a short breakwater spur on the existing steel groin that separates the properties.

**Impact to Littoral Drift System**

The proposed plan for this site includes the construction of a shore-disconnected quarrystone breakwater, groin toe protection, a short quarrystone spur at the bluff toe and placement of sandfill as required for permit.

The section of Lake Michigan shoreline north and south of 57 South Deere Park Drive, Highland Park is fully engineered with steel groins, revetments, seawalls, and quarrystone breakwaters. Based on our experience, as the proposed structure is immediately north of a steel sheetpile groin and extends minimally lakeward, it will not negatively impact the littoral system after the sandfill is placed (anticipated quantity plus 20% overfill). According to the Illinois State Coastal Geologist (Chrastowski, 2005), "the design to contain placed sand is becoming necessary because of reduced volume of littoral sand in transport." He further states, "beach-cell systems may represent the future for beaches along much of the Illinois bluff coast from Waukegan south to Evanston."

The beach system will be nourished with sand including a 20% overfill placed north and south of the system. The new IDNR regulations for structures that will retain sand require pre- and post-construction surveys, as well as surveys at the one and five-year intervals. This new requirement will help assure that a sand equilibrium is met and that the new project is gaining and losing sand at a similar rate to neighboring properties.

**Impact on Public Uses**

Public access will not be impacted by the modifications to the existing system. No additional public access structures will be built as part of this project, however, public access should be improved by the engineered beach system retaining more sand and holding a higher beach profile during all lake levels. Although the spur will extend 28' lakeward from the bluff toe, the modified sand elevation will accommodate for pedestrian access. During high lake levels, the beaches to the north tend to be submerged cutting off access for beach walkers. The beach will provide a safe place for boaters and swimmers in distress. Fishing will not be impacted negatively, as the underwater area of the quarrystone protection will create an improved fish habitat. Additionally, navigation of water craft will not be impacted, as the proposed construction will not extend further east than the existing structure.

**Impact on Natural Resources**

Quarrystone structures in the nearshore waters of Lake Michigan and sandy beaches improve native species habitat. The LandOwner Resource Centre with support from the Canadian Wildlife Service and the Ontario Ministry of Natural Resources states that, "unstable shorelines can release silt that can choke nearby aquatic habitats." Additionally, underwater structures such as artificial reefs constructed of large boulders and clean riprap material "in large water bodies, such as the Great Lakes . . . are often the best method of creating habitat." As stated above,

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according to Meadows, et al., 2005, "a nearshore area with 100% sand cover support[s] a species rich community." As the design does not impact the bluff and vegetation, the local terrestrial wildlife will continue to inhabit this property.

**Type of Permit**

The scope of this project requires an individual permit.

**Description and Schedule of Proposed Activity**

All of the proposed work will be completed via marine access. A barge will deliver a backhoe to work on land to place the materials. All stone will be delivered by barge to the site. Sand will be delivered by truck. Work will not begin until all necessary permits have been received. This work will require approximately 10 weeks to complete.

**Type and Quantity of Fill/Measures Taken to Avoid Impact/Erosion and Sediment Control Plan**

All material will be clean and from inland quarries. Approximately 850 tons of new, clean quarried stone will be placed to construct the revetment and breakwater. Approximately 600 tons of clean sand will be placed on the existing beach. All clay displaced from the lakebed for installation of the breakwater toe stone will be placed on the barge and removed from the site and disposed of properly. Acreage of stone placed on the lakebed east of the OHWM is less than 0.058 acres.

**Summary**

All of the above described activities and plans will follow IPP terms and conditions. All of the proposed work adheres to the guidelines prescribed by the Illinois Environmental Protection Agency and its Anti-Degradation Assessment. U.S. Fish & Wildlife Service and the Illinois Historic Preservation Association will be updated on all relevant correspondence.

If you have any questions please feel free to call me at the phone number below.

Sincerely,



Jon Shabica, Vice President

C: IDNR (Casey)  
IEPA (Heacock)  
U.S. Fish & Wildlife Service  
Illinois Historic Preservation Agency (Haaker)  
Mark Gerstein

COASTAL DESIGN SPECIFICATIONS  
57 South Deere Park Drive, Highland Park • October 9, 2014

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## DESIGN OF SHORELINE EROSION PROTECTION

### Introduction

The following report summarizes assumptions and design criteria for a quarystone breakwater and sandfill mitigation to help reduce erosion and protect the property located at 57 South Deere Park Drive, Highland Park. The design is based on the drawings included in the permit application to the U.S. Army Corps of Engineers dated September 25, 2014.

The site lies within a fully engineered section of urban lakeshore that is typically protected with revetments, seawalls, impermeable piers, steel sheetpile groins and breakwater protected beaches that may hold narrow beaches.

This section of coast is sand-starved due to municipal structures (littoral barriers) constructed over the past 100 years that extend lakeward beyond the littoral zone and reduce sand bypass as well as due to lakebed downcutting causing a steeper lakebed profile leading to increased sand loss. Although there is currently an exposed sandy beach due to extreme low lake levels, the beach width varies greatly due to the vulnerability of this location. According to the Illinois State Geological Survey, there is almost no sand moving along this section of coast. All structures in the area have been steadily losing their effectiveness at holding beach sand. This problem is exacerbated by lakebed erosion. In many cases where all the sand has been lost, the adjacent bluffs have begun to erode. To provide adequate protection for the upland property, solutions have typically been of two types: breakwater- or groin-anchored beaches to protect the bluffs, or large quarystone revetments placed against the toe of the bluff that prevent stormwave erosion but at the expense of the beach.

### Project Description

Construction of a shore disconnected quarystone breakwater, groin toe protection, a quarystone spur at the bluff toe and sandfill mitigation are proposed that fulfill the design requirements of 20-year stormwave erosion protection. The proposed system is designed for all lake level conditions.

### Summary Specifications

Using the Army Corps of Engineers Shore Protection Manual (1984), performance of nearby prototypes and other sources, the following specifications were developed for this site (elevations are based on IGLD 1985):

#### Stone Breakwater Specifications

Lakeward Crest Elevation:	583 ft
Toe of Structure:	573 ft (average)
Crest Width:	6 ft
Average Armor Size:	2.5 tons
"B" Stone	200 lbs to 1000 lbs
Slope:	1:1.5
Tons/linear feet:	11.5 tons

#### Assumptions

• Design High Water (DHW):	582.0 ft *
• Design Water Level:	580.0 ft
• Design Low Water (DLW):	577.5 ft *
• Existing clay till elevation at breakwater toe:	573.0 ft
• 20-yr lakebed erosion at toe of breakwater:	3 ft**
• Design wave height (Hs):	9.36 ft

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COASTAL DESIGN SPECIFICATIONS  
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**Assumptions (continued)**

• Nearshore Slope:	1:30 – 1:40
• Design Wave Period (T):	9.9 s ***
• Depth at Structure Toe DHW (Ds):	9'
• Design Deepwater Wave (Ho):	18.0'
• Design Wave Length (Lo):	501.8'
• Structure Porosity:	37%

\* DHW includes 2 ft storm setup; DLW is equivalent to Low Water Datum

\*\* 2.5 ft sand and gravel (thickness varies) plus 2 ft clay till, Nairn, 1997

\*\*\* Resio & Vincent, 1976

**Stone Breakwater Stability, Armorstone**

The proposed quarystone breakwater has two layers of 1 – 5 ton armorstone built on a 1:1.5. Overtopping of the structure is expected during storms and higher water levels. Design conditions include:

- Lakeward breakwater crest elevation is at DHW 4.5 ft above DLW
- Depth-limited breaking waves will break on the stone breakwater and sand beach
- Depth at the toe of the structure is 9 ft (573.0) at design high water
- Incident wave directions: NE, E and SE
- Wave period for DHW T = 9.9 seconds
- Wave period for average conditions T = 6 seconds

For a quarystone breakwater, structural integrity may depend on the ability of the foundation to resist the erosive scour by the highest waves. Therefore, it is suggested that the selected design wave height  $H_s$  for such structures be based on the design wave height H being the average height of the top 10 percent of waves expected during an extreme event. Based on the deepwater significant wave height  $H_s$ , corrected for refraction and shoaling.

The stability coefficient ( $K_d$ ) varies primarily with the shape of armor units, roughness of armor unit surface, sharpness of edges and degree of interlocking obtained in placement.

The equation below is Hudson's formula and is used to determine the armor stone weight needed to support a particular structure.

$$W = (W_r * H_s^3) / (K_d ([W_r / W_w] - 1)^3 * \cot(\beta))$$

W = weight of individual armor units in lbs

$W_r$  = Unit weight of armor units

$W_w$  = unit weight of water

$H_s$  = the design wave height for the structure

$K_d$  = the design stability coefficient for rubble and toe protection

$\beta$  = the angle of incline of the structure

Quartzite armorstone is recommended as it is highly durable and is locally available in most gradations under 5 tons. Hudson's formula was used to estimate armorstone size. An armorstone of 1.83 tons is predicted for special placement stone based on the design conditions. As the lakeward face of the breakwater will be built random placement, 1 – 5 ton quartzite will be utilized for the construction of this project.

### Bathymetry

Bathymetric profiling was performed on 5/21/2014. Five transects were completed in the project area. The profiles extend up to 450 ft east of the existing seawall. Survey work was completed by Terra Technology.

### Water Levels

The following table summarizes water level data representing daily highest extremes measured at Calumet Harbor, Illinois, approximately 31 miles to the south of Highland Park. Note: Low water datum = 577.5 ft (IGLD 1985).

<u>Lake Level</u>	<u>LWD</u>	<u>IGLD 1985</u>
Record High	+5.5	583.0
Record Low	-1.4	576.1

### Project Supporting Data

To help facilitate project review, SA offers the following supporting data based on standard coastal engineering practices:

1. **Sediment Transport Around Structure** The structure is designed to lie within the surf zone (zone of breaking waves), therefore allowing sediment transport around the structure. The range of breaking wave heights is from 7.4 ft based on a 6-second wave with a wave length of 184 ft (using  $1/25 L_o$ ) to 18 ft based on a 9.9-second wave with a wave length of 501.8 ft (Resio and Vincent, 1976). The commonly accepted zone of sediment transport is to 18 ft (depth of closure) in this section of Lake Michigan, which is a function of the design wave parameters. Based on this data, once the structure has been filled with sand, it will continue to bypass littoral drift sand. Rod and transit survey monitoring will be conducted, as required by the IDNR, to assure that the system performs as designed.

The IDNR requires sand fill in areas where sediment will be trapped by the new system. Sand volume quantities have been calculated as shown in the permit drawings. As required by the IDNR, a 20% overfill will be added to the calculated volume. Additionally, the new pre- and post-construction monitoring will be performed and submitted to the IDNR to verify the impacts to the system.

2. **Effect on Adjacent Shorelines** A wave diffraction diagram (Figure 2, Appendix) has been overlain on the proposed shore protection system. Using a refracted incident wave angle of 90 degrees (USACE, Shore Protection Manual), with average and design waves, there will be a decrease in wave energy on adjacent properties. The wave diffraction pattern shows that the coefficient of diffraction (K) reduces the wave energy to a distance of about  $\frac{1}{2}$  the wave length downdrift and does not have an impact further downdrift. For the average 6-second wave, that distance of reduced wave energy is about 90 ft and for the design wave, the protected distance is about 250 ft. This protected area close to the structure has diminished wave energy that will in turn reduce erosion in the area.
3. **Wave Reduction in Rubble-Mound Structures** The Iribarren number ( $\xi$ ), or surf similarity number, is used to determine the wave reflection coefficient. For rubble-mound structures, wave reflection (and wave energy) is reduced by one half or more (0.2 to 0.53) (Figure 3, Appendix). For example, a wave reflection of 0.25 means that the wave energy is reduced by 75%. The range of wave reflection for beaches peaks at about 0.44. The range for plane slopes, however, quickly rises to 0.5 and peaks at .91. This illustrates that rubble-mound structures reduce wave energy almost as well as beaches.

**Lakebed Erosion**

Lakebed erosion, active in water depths of 10 ft or less, is a design component of this plan. This section of Highland Park lakeshore is considered sediment-starved. Sand deposits were measured near this site (Ravine Drive, Highland Park) from the backshore to a depth of 6.1 m (20 ft). Sand deposits were thin to non-existent to a distance of 250 ft from shore (Shabica & Pranschke, 1994). Also, the site is underlain by highly-erodible, cohesive glacial clay-till. See Shabica survey cross-section (see, Figure 1) showing loss of lakebed sand from 1975 to 1989. According to Robert Nairn, approximately 200 m<sup>3</sup> of sand cover per meter of lakeshore (out to a depth of 4 m) is necessary to protect the underlying cohesive profile from lakebed erosion under most conditions. Sand and coarser sediments represent typically less than 15% of the material eroding from the lakebed and bluffs. Using the historic rate of lakebed downcutting of 0.15 ft/yr (Nairn, 1997), an irreversible lowering of the nearshore lakebed clay of approximately 3.0 ft over a 20-year period is predicted in unprotected areas. With the stone breakwater, revetment and sandfill installed, the lakebed erosion will be reduced.

**Project Monitoring**

As the performance of shore protection structures cannot be predicted with absolute certainty, the shore protection system for 57 South Deere Park Drive in Highland Park will be inspected as required by IDNR guidelines. This includes topographic and hydrographic surveys beginning at an elevation of 581.5 ft (IGLD 1985) and progressing to 300 ft lakeward of the lakeward end of the project, within the north and south property lines. Additionally, all structures should be inspected to assure that they continue to meet design specifications.

APPENDIX  
57 South Deere Park Drive, Highland Park • October 9, 2014

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#### References

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Shabica, C.W., F. Pranschke, 1994, *Survey of Littoral Drift Sand Deposits Along the Illinois and Indiana Shores of Lake Michigan*, U.S. Geological Survey Symposium Volume, Journal of Great Lakes Research, vol. 20, no.1, pp 61-72.

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US Army Corps of Engineers, 1984, *Shore Protection Manual*, Coastal Engineering Research Center, Vicksburg, Mississippi.

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APPENDIX  
57 South Deere Park Drive, Highland Park • October 9, 2014

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**PHOTO 1**



1997 Aerial Photo Approximate Property Lines in Yellow

**PHOTO 2**



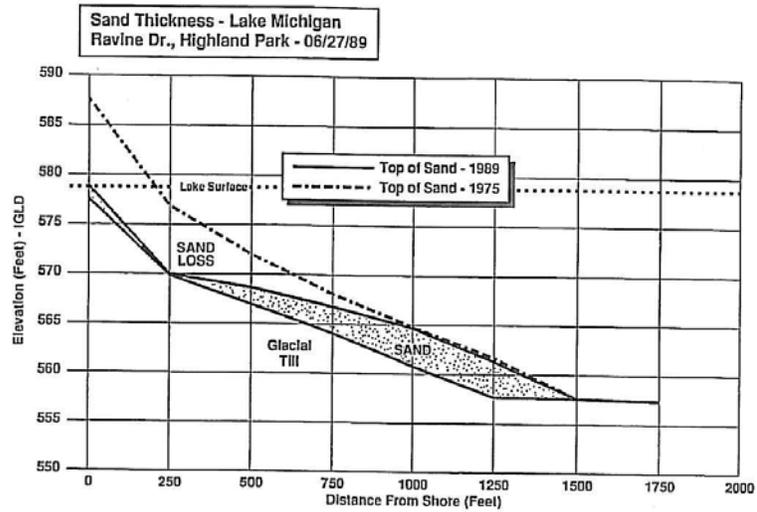
2013 Photo, note the extent of wave run-up on the sand and narrow beach

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APPENDIX  
57 South Deere Park Drive, Highland Park • October 9, 2014

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**FIGURE 1**

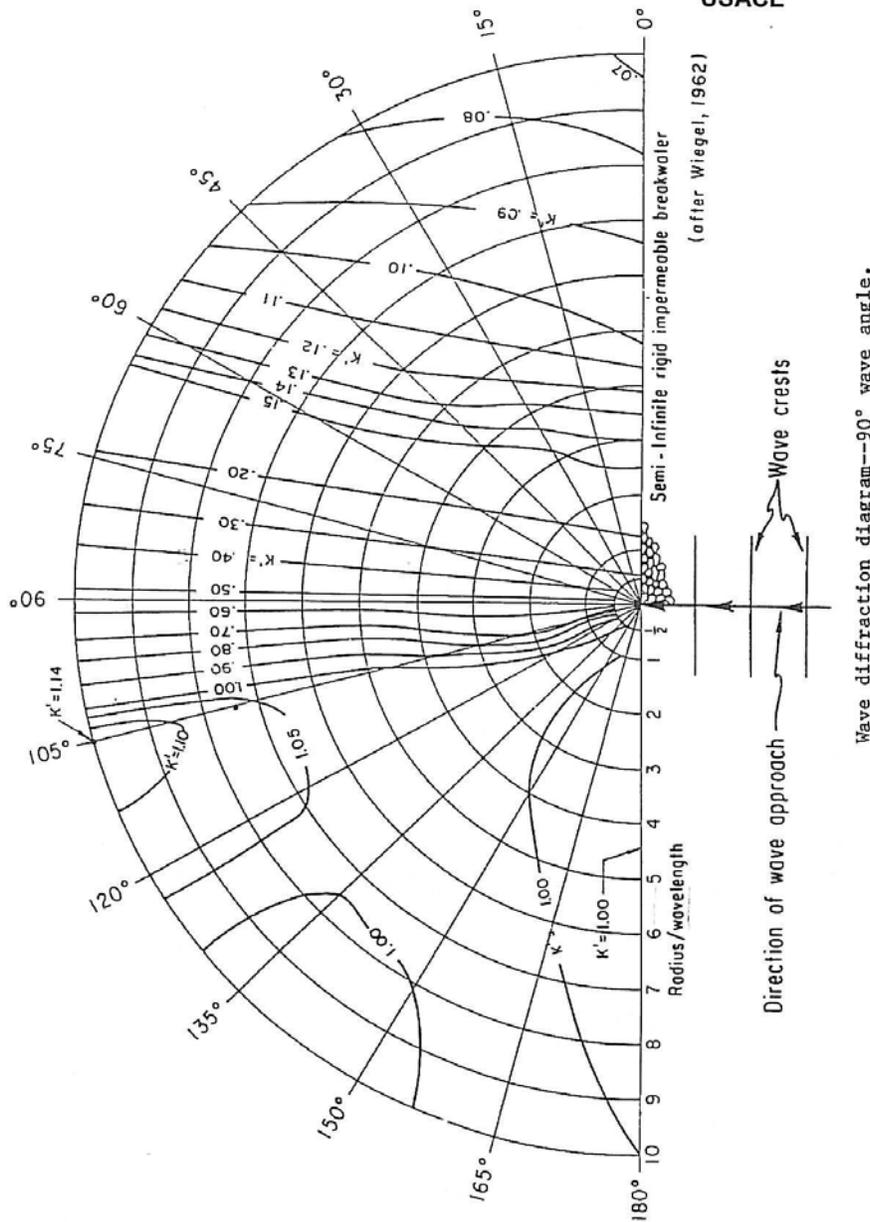


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**FIGURE 2**

**Shore Protection Manual  
USACE**

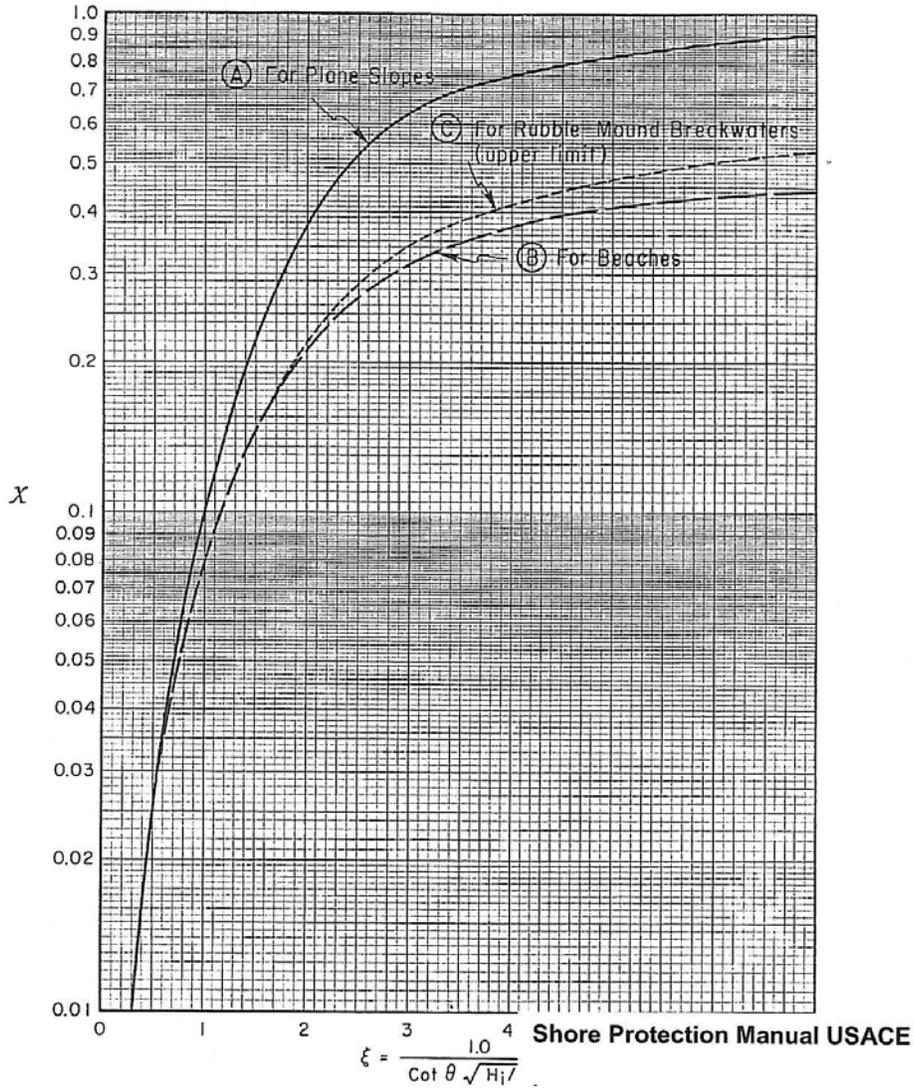


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APPENDIX  
57 South Deere Park Drive, Highland Park • October 9, 2014

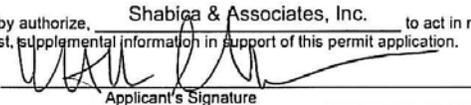
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**FIGURE 3**



Wave reflection coefficients for slopes, beaches, and rubble-mound breakwaters as a function of the surf similarity parameter  $\xi$ .

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JOINT APPLICATION FORM FOR ILLINOIS							
ITEMS 1 AND 2 FOR AGENCY USE							
1. Application Number			2. Date Received				
3. and 4. (SEE SPECIAL INSTRUCTIONS) NAME, MAILING ADDRESS AND TELEPHONE NUMBERS							
3a. Applicant's Name: <b>Mark Gerstein</b> Company Name (if any) :  Address: <b>57 S. Deere Park Drive                      Highland Park, IL 60035</b>  Email Address: mark.gerstein@lw.com		3b. Co-Applicant/Property Owner Name (if needed or if different from applicant):  Company Name (if any):  Address:   Email Address:		4. Authorized Agent (an agent is not required): <b>Jon Shabica</b> Company Name (if any): Shabica & Associates, Inc. Address: <b>550 Frontage Road                      Suite 3735                      Northfield, IL 60093</b>  Email Address: jon@shabica.com			
Applicant's Phone Nos. w/area code Business: 312-876-7666 Residence: 847-926-0226 Cell: Fax:		Applicant's Phone Nos. w/area code Business: Residence: Cell: Fax:		Agent's Phone Nos. w/area code Business: 847-446-1436 Residence: Cell: Fax: 847-716-2007			
STATEMENT OF AUTHORIZATION							
I hereby authorize, <u>Shabica &amp; Associates, Inc.</u> to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.							
 Applicant's Signature			<u>9/25/14</u> Date				
5. ADJOINING PROPERTY OWNERS (Upstream and Downstream of the water body and within Visual Reach of Project)							
Name		Mailing Address		Phone No. w/area code			
a. see attached vicinity map							
b.							
c.							
d.							
6. PROJECT TITLE:							
<b>Breakwater-Protected Beach</b>							
7. PROJECT LOCATION:							
57 S. Deere Park Drive, Highland Park, IL							
LATITUDE: 42.15359 °N LONGITUDE: -87.75995 °W			UTM's Northing: 4667107.66m Easting: 437212.53m				
STREET, ROAD, OR OTHER DESCRIPTIVE LOCATION			LEGAL DESCRIPT	QUARTER	SECTION	TOWNSHIP NO.	RANGE
57 S. Deere Park Drive				SE	31	43N	13E
<input checked="" type="checkbox"/> IN OR <input type="checkbox"/> NEAR CITY OF TOWN (check appropriate box) Municipality Name <b>Highland Park</b>			WATERWAY			RIVER MILE (if applicable)	
COUNTY <b>Lake</b>			STATE <b>IL</b>			ZIP CODE <b>60035</b>	
			Lake Michigan				

Revised 2010

- Corps of Engineers   
  IL Dep't of Natural Resources   
  IL Environmental Protection Agency   
  Applicant's Copy Agency

8. PROJECT DESCRIPTION (Include all features):  
 A 60-foot long shore disconnected quarystone breakwater (toe to toe) will be built approximately 50 feet north of the existing steel groin. The lakeward toe of the structure will extend to 116 feet east of the toe of the bluff and the breakwater will have a crest elevation of 583' (IGLD 1985). The slope of the breakwater will be 1v:1.5h. Quarystone breakwater toe stone will be placed at the lakeward end of the existing steel sheetpile groin to help reduce scour in this area to improve the longevity of the groin. The crest elevation of the toe stone will be 583'. A short quarystone spur breakwater will extend approximately 28 feet east of the bluff toe at the north end of the property. The crest elevation will be 584' with a slope of 1:1. This structure will help reduce loss of sand from the beach as well as break waves impacting the bluff toe during high lake levels. Mitigational sand will be placed in a quantity of 600 tons in the system.

9. PURPOSE AND NEED OF PROJECT:  
 To stabilize the site as well as reduce deepening of the lakebed caused by lakebed erosion.

**COMPLETE THE FOLLOWING FOUR BLOCKS IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED**

10. REASON(S) FOR DISCHARGE:  
 Shore protection in the form of a breakwater-protected beach.

11. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS FOR WATERWAYS:  
 TYPE: Stone and Sand  
 AMOUNT IN CUBIC YARDS:  
 Sand: 480 cu. yds Stone: 400 cu. yds

12. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED (See Instructions)  
 0.058 acres

13. DESCRIPTION OF AVOIDANCE, MINIMIZATION AND COMPENSATION (See instructions)  
 By designing smaller structures, the footprints will be minimized on the lakebed.

14. Date activity is proposed to commence Date activity is expected to be completed  
 August 1, 2015 October 15, 2015

15. Is any portion of the activity for which authorization is sought now complete? Yes  No  NOTE: If answer is "YES" give reasons in the Project Description and Remarks section. Indicate the existing work on drawings.  
 Month and Year the activity was completed

16. List all approvals or certification and denials received from other Federal, interstate, state, or local agencies for structures, construction, discharges or other activities described in this application.

<u>Issuing Agency</u>	<u>Type of Approval</u>	<u>Identification No.</u>	<u>Date of Application</u>	<u>Date of Approval</u>	<u>Date of Denial</u>

17. CONSENT TO ENTER PROPERTY LISTED IN PART 7 ABOVE IS HEREBY GRANTED. Yes  No

18. APPLICATION VERIFICATION (SEE SPECIAL INSTRUCTIONS)  
 Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

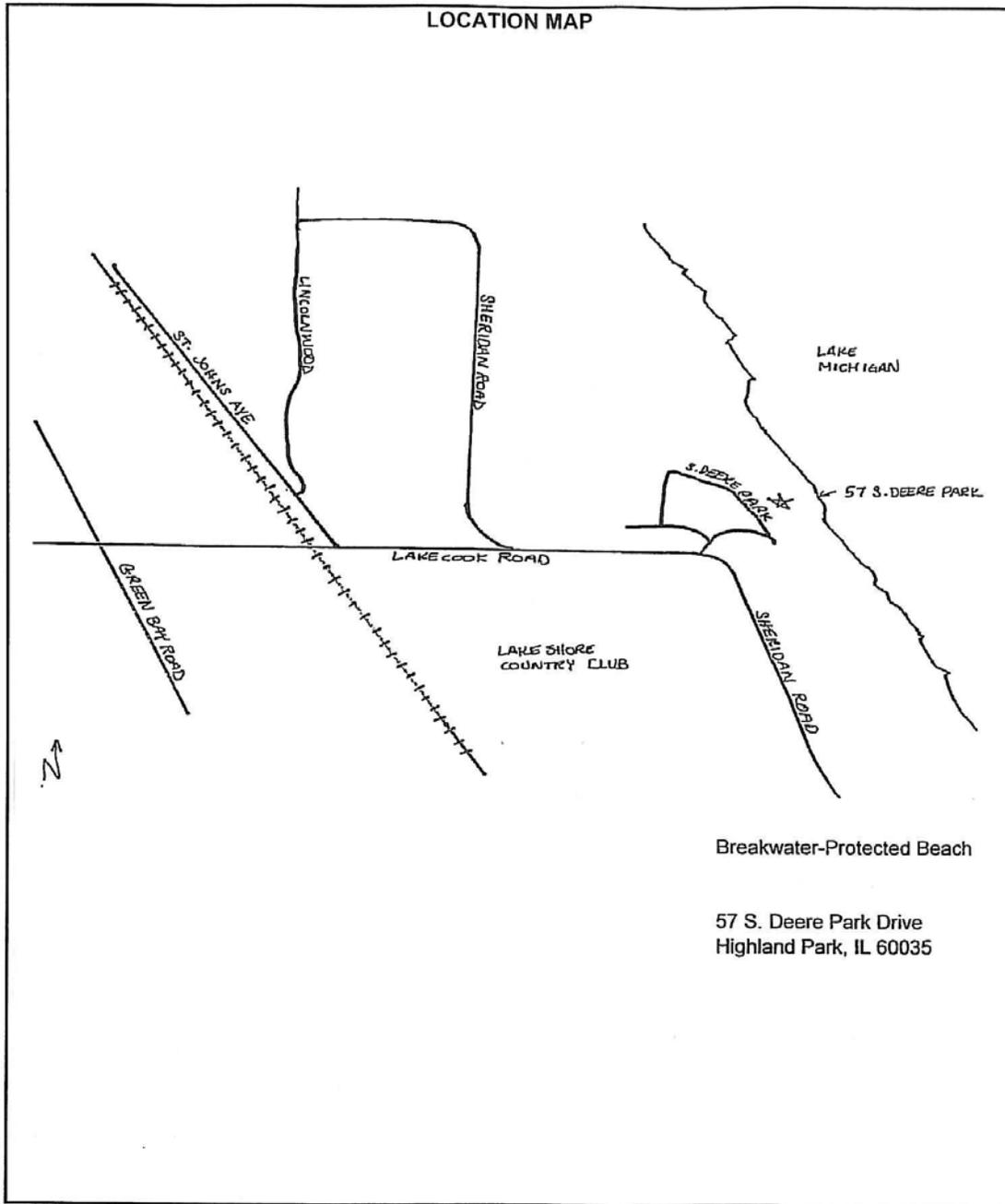
\_\_\_\_\_  
 Signature of Applicant or Authorized Agent \_\_\_\_\_  
 Date

\_\_\_\_\_  
 Signature of Applicant or Authorized Agent \_\_\_\_\_  
 Date

\_\_\_\_\_  
 Signature of Applicant or Authorized Agent \_\_\_\_\_  
 Date

Corps of Engineers Revised 2010     IL Dep't of Natural Resources     IL Environmental Protection Agency     Applicant's Copy

SEE INSTRUCTIONS FOR ADDRESS



Revised 2010

Corps of Engineers

IL Dep't of Natural Resources

IL Environmental Protection Agency

Applicant's Copy

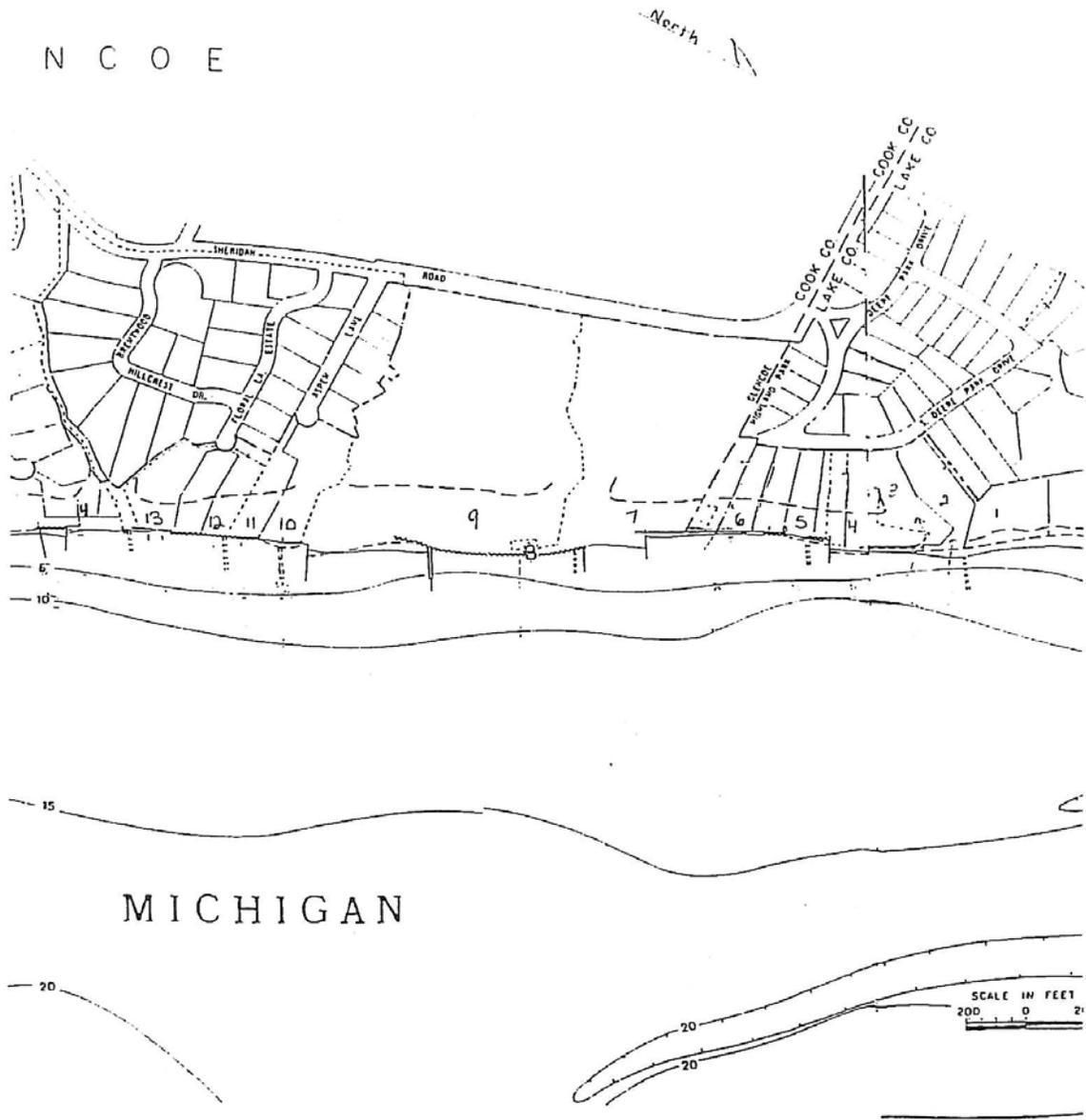


**Shabica & Associates, Inc.**  
WE BUILD BEACHES

**Location of Project:** 57 Deere Park Drive, Highland Park, Illinois 60035

List of property owners (from North to South):

1. Deere Park Neighborhood Association, c/o Rob Rubin 336 N. Deere Park Drive, Highland Park, IL 60035
2. Andrew S. and Laura C. Hochberg, 77 S. Deere Park Drive, Highland Park, IL 60035
3. Cynthia B. Hirsch Trust, 65 S. Deere Park Drive, Highland Park, IL 60035
4. Subject Property: Mark and Julia Gerstein, 57 S. Deere Park Drive, Highland Park, IL 60035
5. Jerrold and Naomi Senser, 55 S. Deere Park Drive, Highland Park, IL 60035
6. Michael and Janet Krasny, 41 S. Deere Park Drive, Highland Park, IL 60035
7. Lake Shore Country Club, 1255 Sheridan Road, Glencoe, IL 60022
8. Village of Northbrook, Public Works Department, 655 Huehl Road, Northbrook, IL 60062
9. North Shore Congregation Israel, 1195 Sheridan Road, Glencoe, IL 60022
10. Milton Vainer, 35 Aspen Lane, Glencoe, IL 60022  
(mailing: 191 Apple Tree Road, Winnetka, IL 60093)
11. Nena Addis, 25 Aspen Lane, Glencoe, IL 60022
12. David Muslin, 35 Estate Drive, Glencoe, IL 60022
13. Robert Price, 30 Estate Drive, Glencoe, IL 60022
14. Shayle P. Fox, 1 Rockgate Lane, Glencoe, IL 60022



**Jerry Senser**  
**55 South Deere Park Drive**  
**Highland Park, Illinois 60035**

Construction Operations Div. Regulatory Branch  
Corps of Engineers, Chicago District  
111 N. Canal Street  
Chicago, IL 60606-7206

October 2, 2014

Dear Sir or Madam,

I hereby request that Shabica & Associates, Inc. be authorized to act in my behalf in filing a permit application for shore protection work at my property as well as the Gerstein's property immediately to my north at 57 South Deere Park Drive, Highland Park, Illinois. I support the plan proposed by Shabica & Associates for the work to be completed on the Gerstein's property. I convey permission for representatives of Shabica & Associates, Inc. to access the beach for consulting purposes.

If additional information is required, please contact me at the above address.

Sincerely,



Jerry Senser  
Owner

cc: Illinois Department of Natural Resources  
Illinois Environmental Protection Agency  
Shabica & Associates, Inc.  
Mark Gerstein

State of Illinois Department of Natural Resources, Office of Water Resources  
and Illinois Environmental Protection Agency – Permit



**PERMIT NO. LM2015002**

DATE: February 6, 2015

State of Illinois  
Department of Natural Resources, Office of Water Resources  
and  
Illinois Environmental Protection Agency

Permission is hereby granted to: **Mark Gerstein**  
57 S. Deere Park Drive  
Highland Park, IL 60035

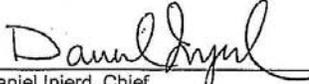
To construct two quarystone breakwaters, a shore attached quarystone spur and sand fill in Lake Michigan at 57 S. Deere Park Drive, Highland Park, Illinois 60035. The project is located in the Southeast Quarter of Section 31, Township 43 North, Range 13 East, of the 3<sup>rd</sup> Principal Meridian in Lake County.

In accordance with an application dated September 25, 2014, and the plans and specifications entitled:

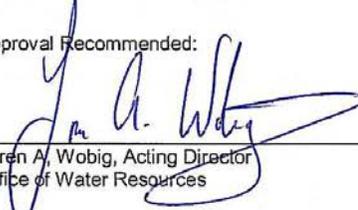
UNTITLED LOCATION MAP, ONE SHEET, UNDATED, RECEIVED OCTOBER 15, 2014.

57 S. DEERE PARK, HIGHLAND PARK, SHEET 1 OF 4, DATED AUGUST 12, 2014, REVISED OCTOBER 1, 2014;  
SHEET 2 OF 4, DATED SEPTEMBER 29, 2014; SHEET 3 OF 4, DATED SEPTEMBER 30, 2014; SHEET 4 OF 4,  
DATED AUGUST 12, 2014, REVISED OCTOBER 1, 2014, ALL SHEETS RECEIVED OCTOBER 15, 2014.

Examined and Recommended:

  
Daniel Injerd, Chief  
Lake Michigan Management Section

Approval Recommended:

  
Loren A. Wobig, Acting Director  
Office of Water Resources

Approved:

  
Wayne A. Rosenthal, Acting Director  
Department of Natural Resources

This PERMIT is subject to the terms and special conditions contained herein and in the attached NOTICE OF FINAL DETERMINATION of the Illinois Environmental Protection Agency. This PERMIT is not valid unless a NOTICE OF FINAL DETERMINATION of the Illinois Environmental Protection Agency as required by Section 39(a) of the Environmental Protection Act is attached.



# PUBLIC WORKS MEMORANDUM



DATE: March 31, 2015

TO: Karen Berardi, Natural Resources Commission Liaison

FROM: Joe Pasquesi, Civil Engineer

SUBJECT: 55 South Deere Park Drive, Shoreline Stabilization

I have reviewed the packet for the proposed work within the Lake Michigan Protection Zone at 55 South Deere Park Drive as detailed in the Shabica & Associates submittal dated March 4, 2015. The proposed improvement consists of additional stone breakwater constructed in Lake Michigan with sand fill augmenting the existing breakwater previously permitted and constructed in 2009. Construction of structures within the Great Lakes is under jurisdiction of the U.S. Army Corps of Engineers and the Illinois Department of Natural Resources. Permit applications for this project are being reviewed by those authorities.

The proposed work is within the "Lake Michigan Protection Zone" as defined by municipal Code Section 150.703(E)(1). Comments pertaining to the submittal are as follow:

The submittal addresses each of the standards of Section 150.703.1. However, each of the comments submitted by Shabica & Associates should be supported by a detailed explanation justifying the comment being made. The submittal generally lacks adequate information supporting and explaining the statements regarding Code compliance.

The following are responses to the requirements specified in Section 15-0.703(1):

- d. The Applicant has proposed appropriate long-term maintenance requirements and plans, as necessary, for the proposed Regulated Activity and/or Structure*

The project has a long-term maintenance plan. Monitoring of the project is also required for 5 years post construction by the IDNR.

(Provide specific details of the long-term maintenance plan. Describe the required monitoring and how it is to be accomplished.)

- g. The proposed Regulated Activity and/or Structure shall be for the purposes of erosion control, water gathering, and/or public access only*

The proposed shore protection will reduce and/or prevent future sand loss and bluff erosion on the subject property and allow access to the beach from the tableland.

(Explain how future sand loss will be prevented; especially during high lake levels or extreme storms. How will the proposed shore protection reduce or prevent bluff erosion?)

- h. There will not be an unnecessary adverse environmental or ecological impact on the Subject Property or on any of the Adjacent Properties as a result of the proposed Structure and/or the Regulated Activity*

The proposed structure will not cause unnecessary adverse environmental or ecological impact. The quarystone breakwater provides improved habitat for fish. Sand acts as a natural filter for stormwater runoff.

(Explain how the breakwater will not create an adverse environmental or ecological impact.)

- i. The proposed Structure and/or Regulated Activity is the least environmentally and ecologically intrusive means of achieving the stated purpose of the Structure*

The proposed system is a viable, environmentally-correct means of achieving the stated purpose.

(How is the proposed system a viable, environmentally-correct means of achieving the stated purpose?)

- j. The Applicant has properly obtained any and all permits required by the federal, state, and county governments for the Regulated Activity and/or the Structure*

All Federal, State and County permits are under review and nearing issuance. The state and federal permit application is attached. All permits will be issued prior to any work commencing.

(Federal and State permits have not been issued as of March 31, 2015; or provide copies if they have.)

- vii. Copies of any and all permits required by the federal, state, and county governments for the Regulated Activity and/or the Structure*

Federal and State permits are attached.

(Permits are not attached.)

- xiii. An explanation, in narrative form, of the following:*

- A. Any and all erosion problems on the Subject Property for which the Structure and/or Regulated Activity is designed to correct or remedy*

This system is designed to protect the Subject Property from future sand loss, lakebed downcutting and bluff erosion due to stormwave damage.

(This statement does not provide a satisfactory explanation.)

The report should be revised so that each statement in response to the required information in Section 150.703(1) is supported with a detailed explanation.

Upon completion of the project, a written statement from Shabica & Associates certifying that all of the work has been successfully completed in accordance with the approved plan and project specifications is required.

It is my opinion that the Shabica & Associated submittal for the proposed breakwater at 55 South Deere Park Drive meets the intent of Article VII of the Zoning Code, and I do not object to the construction of another breakwater at 55 South Deere Park Drive as long as the necessary Federal and State permits are issued. The report should be revised to include more supporting information and address the issues in this memo.

Please contact me with any comments regarding this memo.