Shabica & Associates, Inc.
WE BUILD BEACHES

Federal Consistency Coordinator
Illinois Coastal Management Program
Illinois Department of Natural Resources
160 N. LaSalle Street, Suite 700
Chicago, IL 60601

To Whom It May Concern:

October 9, 2014

In compliance with the Illinois Coastal Management Federal Consistency Review Procedures, we provide the following information for a proposed breakwater-protected beach system for the property located at 57 S. Deere Park Drive, Highland Park, Illinois 60035, owned by Mark Gerstein.

Location of Project
The proposed breakwater-protected beach system will be built on the lakefront of the property located at 57 S. Deere Park Drive, Highland Park, Illinois 60035, owned by Mark Gerstein.

550 Frontage Road • Suite 3735 • Northfield, Illinois 60093 • Tel 847.446.1436 • Fax 847.716.2007
www.shabica.com

Project Start Date and Duration

Work will not begin until all necessary permits have been received. It is anticipated that the project can begin by August 1, 2015. This work will require approximately 10 weeks to complete.

Extent of Work to be Conducted

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.

Contact Information

All questions pertaining to this project can be submitted to:

Jon Shabica
Shabica & Associates, Inc.
550 Frontage Road, Suite 3735
Northfield, IL 60093
jon@shabica.com
847-446-1436 Tel
847-716-2007 Fax

The proposed activity complies with Illinois' approved Coastal Management Program and will be conducted in a manner consistent with such policies.

Sincerely,

Jon Shabica
Vice President

1997 Aerial Photo Approximate Property Lines in Yellow

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www.shabica.com

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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 quarrystone breakwater, quarrystone toe protection for the lakeward end of the existing steel groin, a short quarrystone 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 as 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.

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:

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:

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 quarrrystone 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 (Chrzastowski, 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,

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.

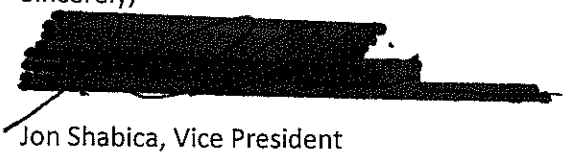
Description and Schedule of Proposed Activity
All of the proposed work will be completed via marine access. A barge will deliver a backhoe to work on land to place the materials. All stone will be delivered by barge to the site. Sand will be delivered by truck. Work will not begin until all necessary 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

DESIGN OF SHORELINE EROSION PROTECTION

Introduction

The following report summarizes assumptions and design criteria for a quarrystone 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 quarrystone 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 disconnnected quarrystone breakwater, groin toe protection, a quarrystone 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

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 quarrystone 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 quarrystone 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
β = 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).

Lake Level	LWD	IGLD 1985
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 Lo) 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 ½ 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 (ξ), 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-erodable, 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^3 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.

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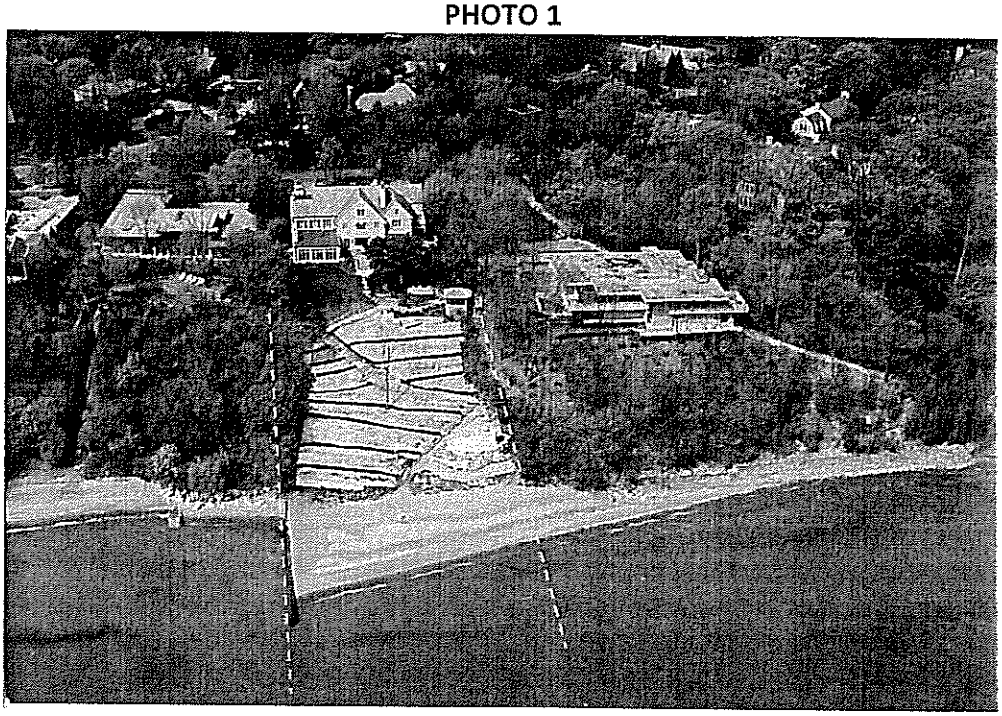
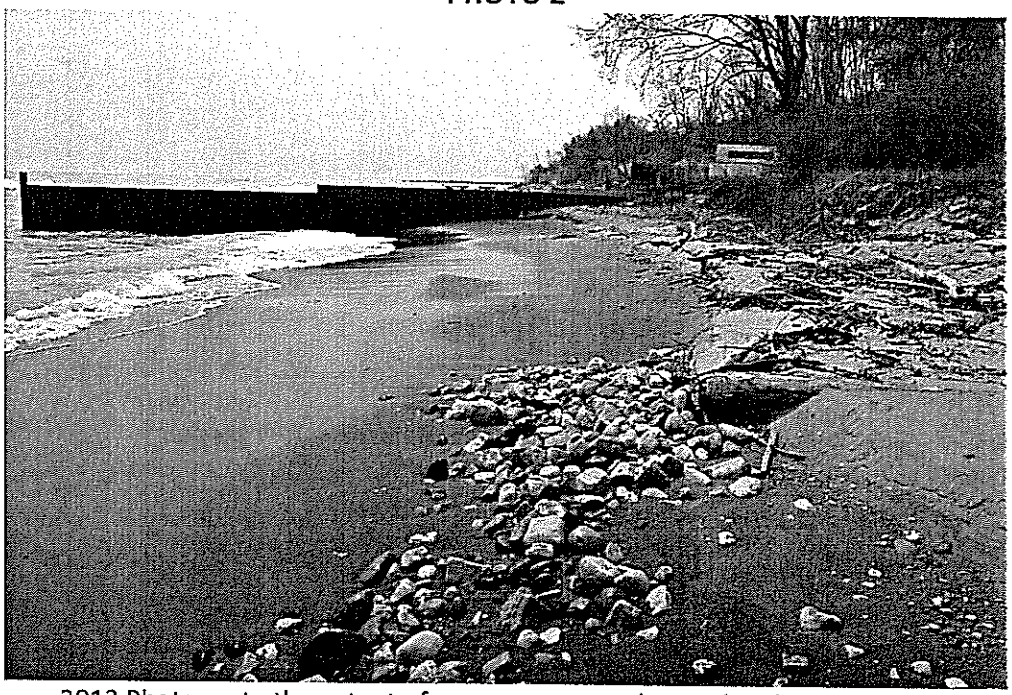
PHOTO 1



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

FIGURE 1

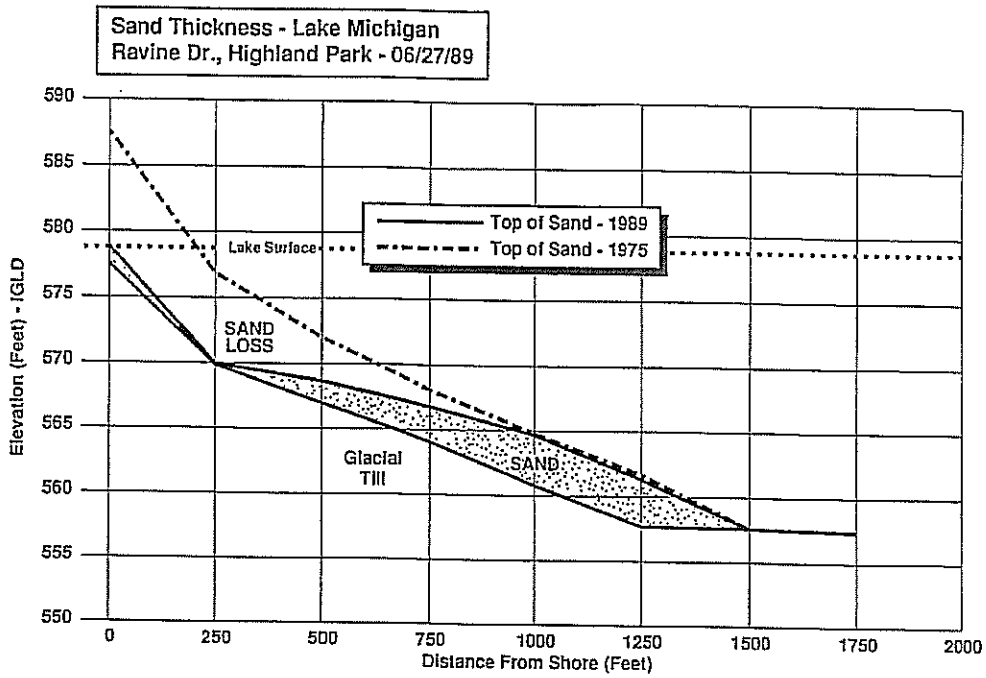

Sand Thickness - Lake Michigan
Ravine Dr., Highland Park - 06/27/89
590
585
580
575
570
565
560
555
550
Elevation (Feet) - IGLD
Lake Surface
Top of Sand - 1989
Top of Sand - 1975
SAND
LOSS
Glacial
Till
SAND
0
250
500
750
1000
1250
1500
1750
2000
Distance From Shore (Feet)

FIGURE 2

Shore Protection Manual
USACE

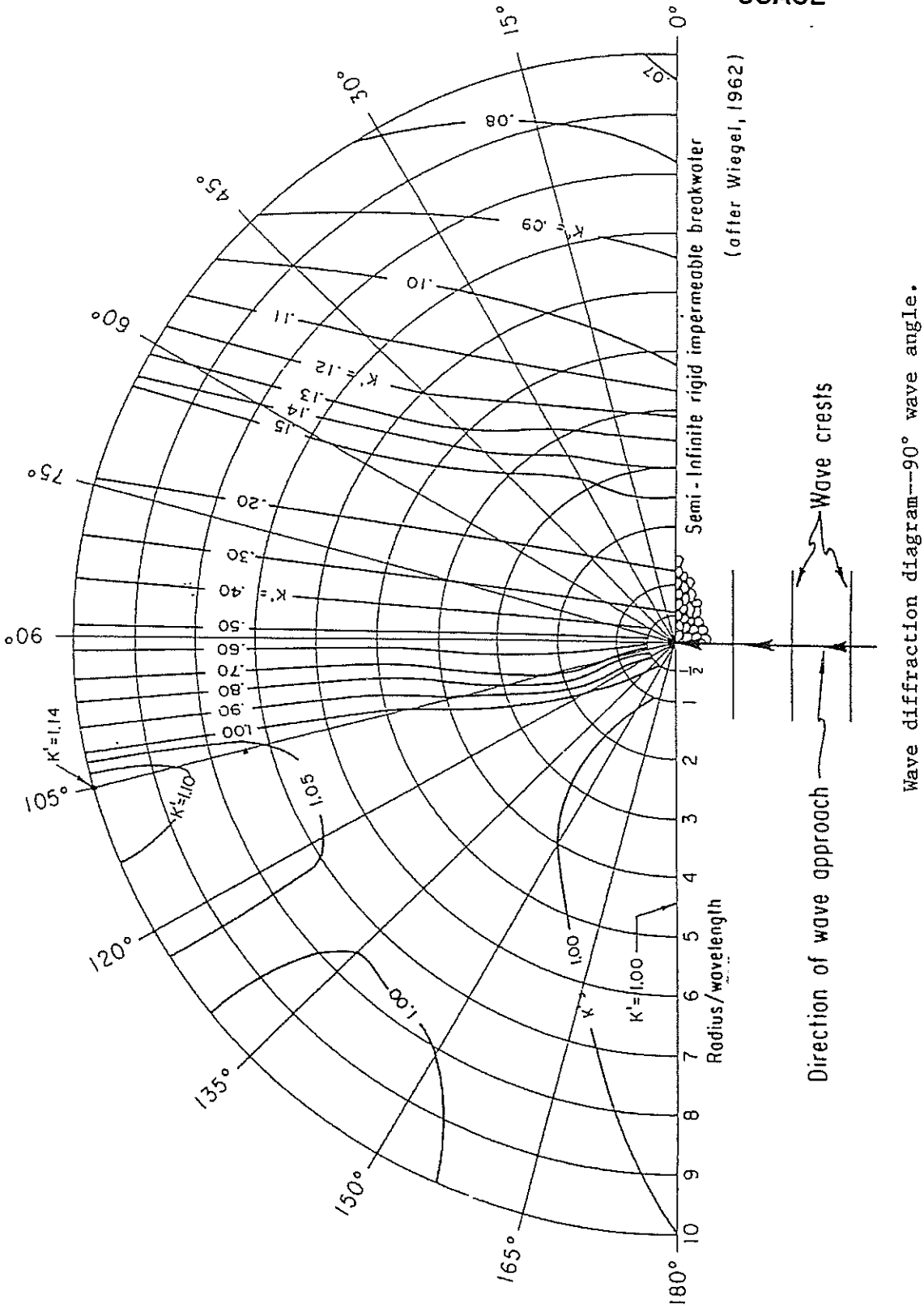
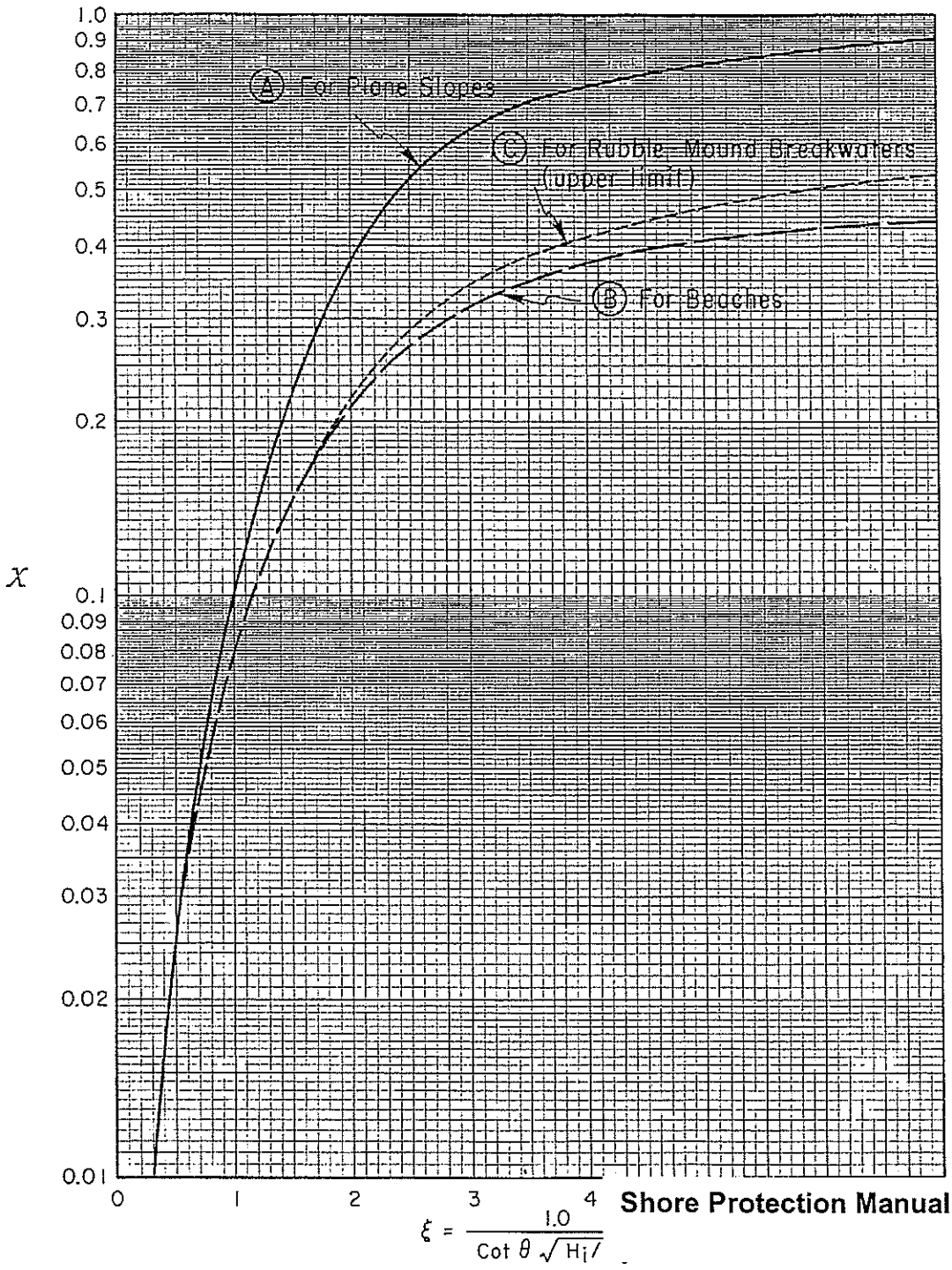


FIGURE 3



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

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:	3b. Co-Applicant/Property Owner Name (if needed or if different from applicant):	4. Authorized Agent (an agent is not required):
Mark Gerstein		Jon Shabica
Company Name (if any) :	Company Name (if any):	Company Name (if any): Shabica & Associates, Inc.
Address: 57 S. Deere Park Drive Highland Park, IL 60035	Address:	Address: 550 Frontage Road Suite 3735 Northfield, IL 60093
Email Address: [redacted]	Email Address:	Email Address: jon@shabica.com
Applicant's Phone Nos. w/area code Business: [redacted] Residence: [redacted] 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, Shabica & Associates, Inc. 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.

[redacted] Applicant's Signature

9/25/14 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: 42.15359 °N	UTMs
LONGITUDE: -87.75995 °W	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

☒ IN OR ☐ NEAR CITY OF TOWN (check appropriate box)
Municipality Name: Highland Park

COUNTY	STATE	ZIP CODE	WATERWAY	RIVER MILE (if applicable)
Lake	IL	60035	Lake Michigan	

Revised 2010

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

8. PROJECT DESCRIPTION (Include all features):

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.

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: August 1, 2015

Date activity is expected to be completed: October 15, 2015

15. Is any portion of the activity for which authorization is sought now complete? Yes [ ] No [X]

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.

Issuing Agency	Type of Approval	Identification No.	Date of Application	Date of Approval	Date of Denial

17. CONSENT TO ENTER PROPERTY LISTED IN PART 7 ABOVE IS HEREBY GRANTED. Yes [X] 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 _____

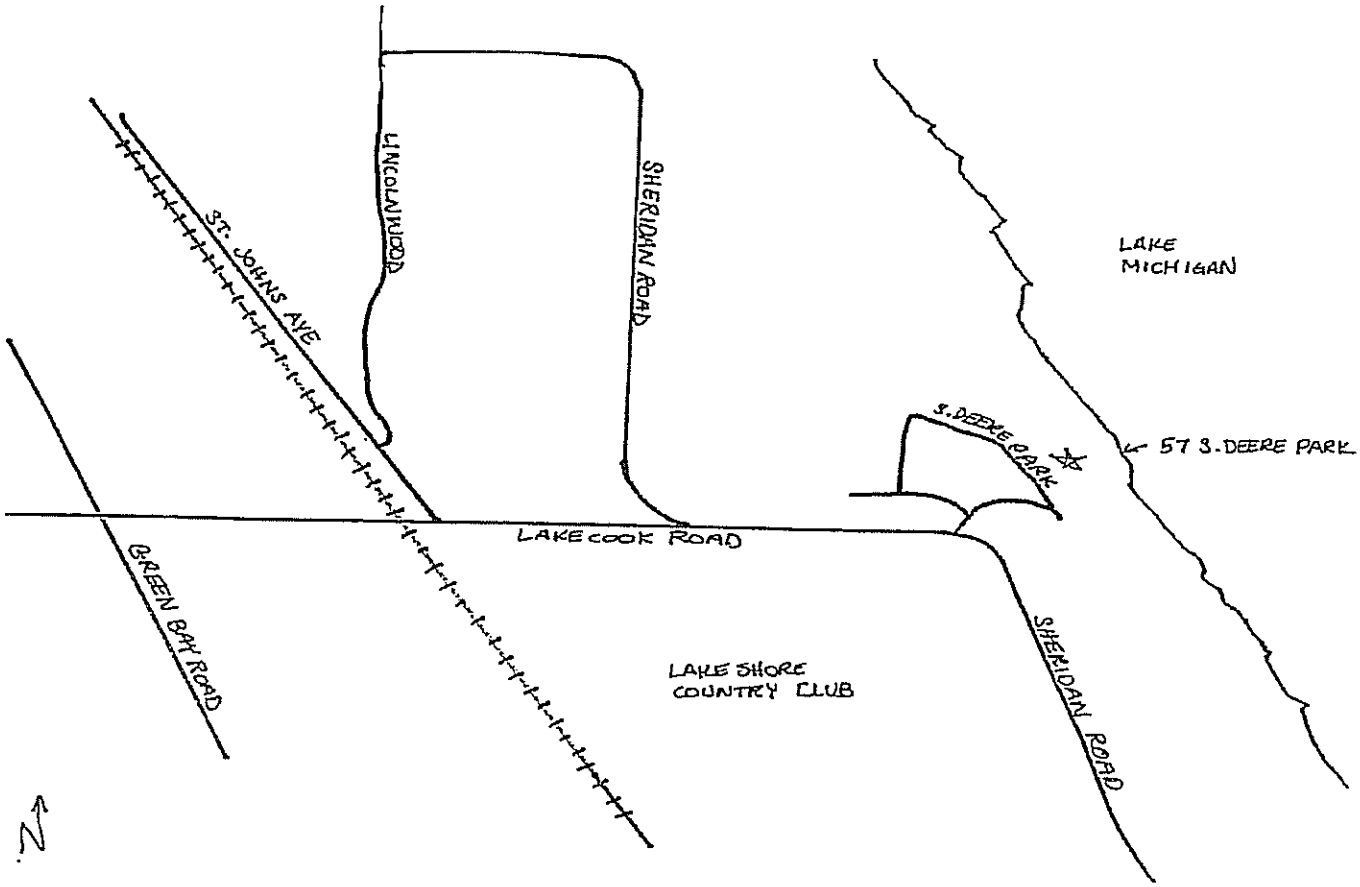
Signature of Applicant or Authorized Agent _____ Date _____

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

LOCATION MAP

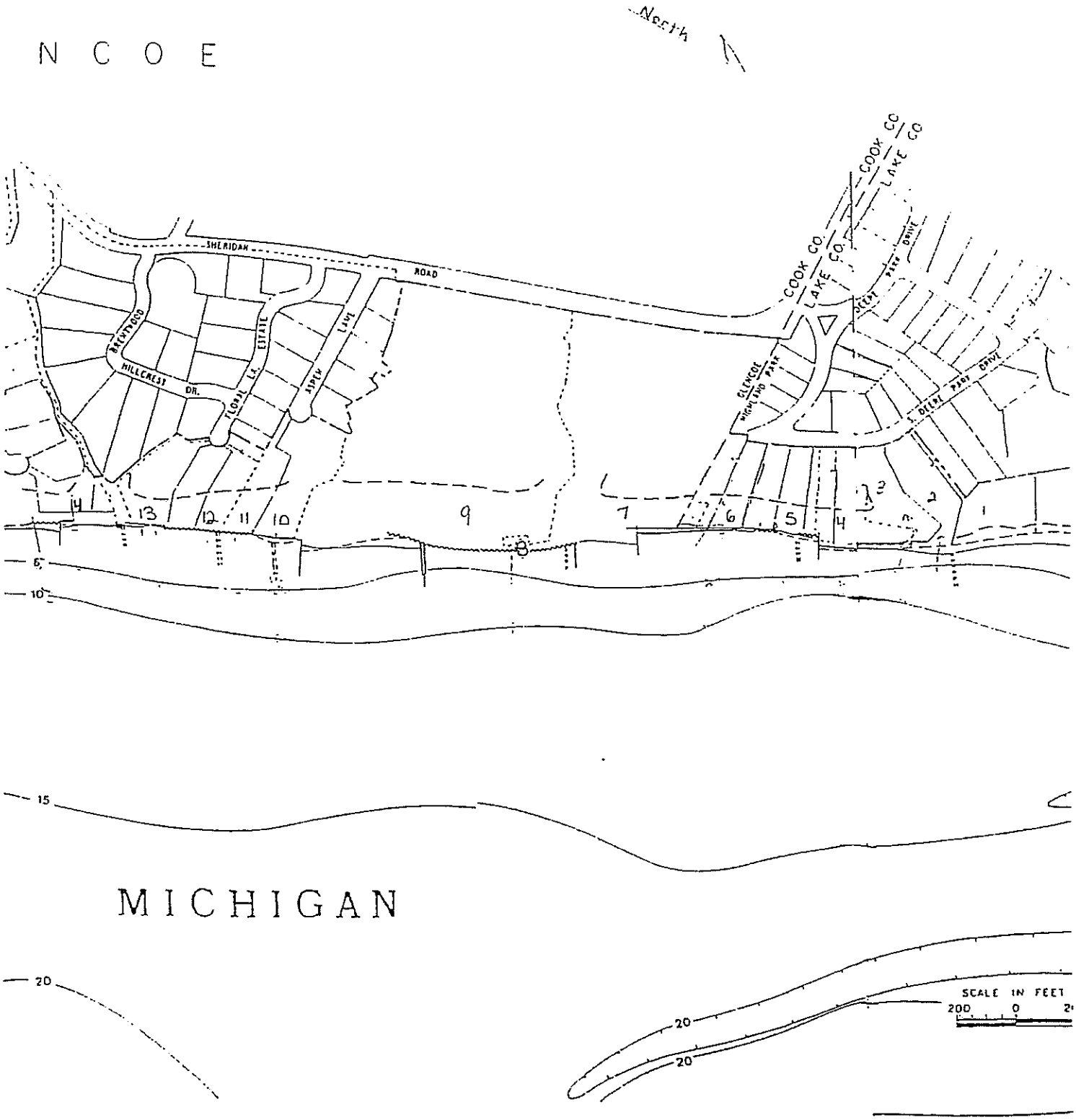


Breakwater-Protected Beach

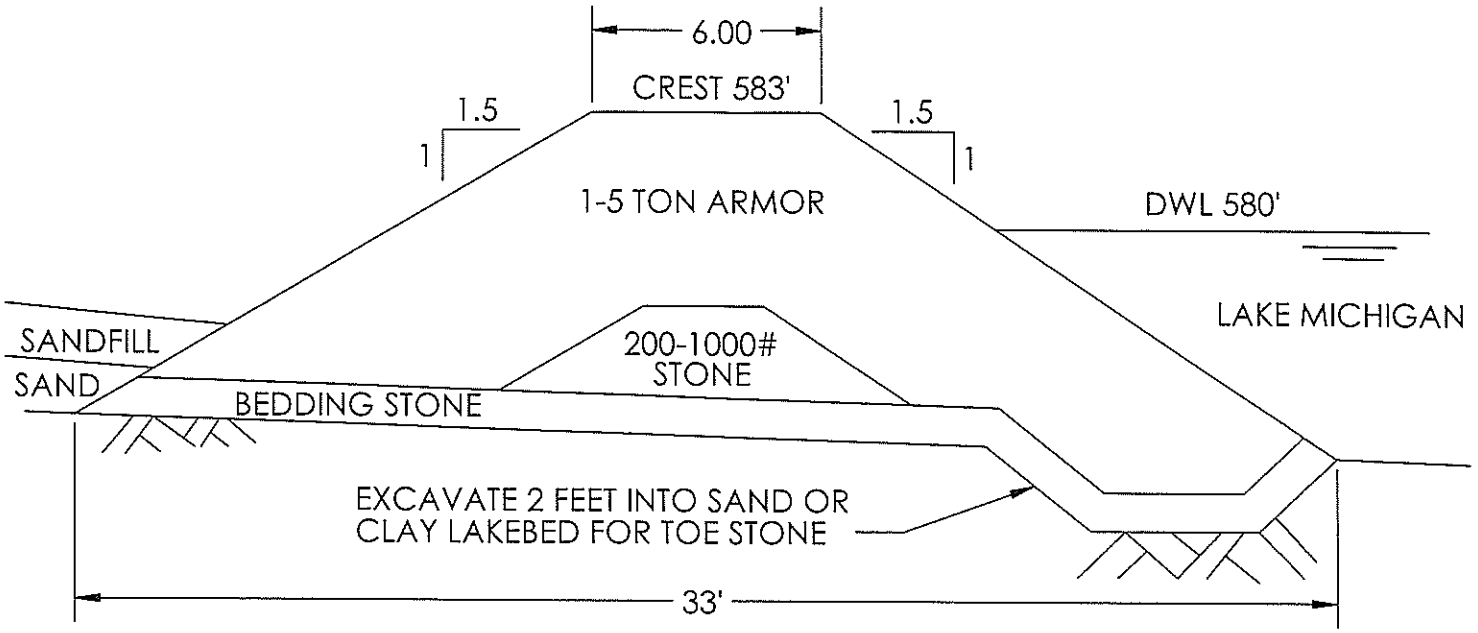
57 S. Deere Park Drive
Highland Park, IL 60035

Revised 2010

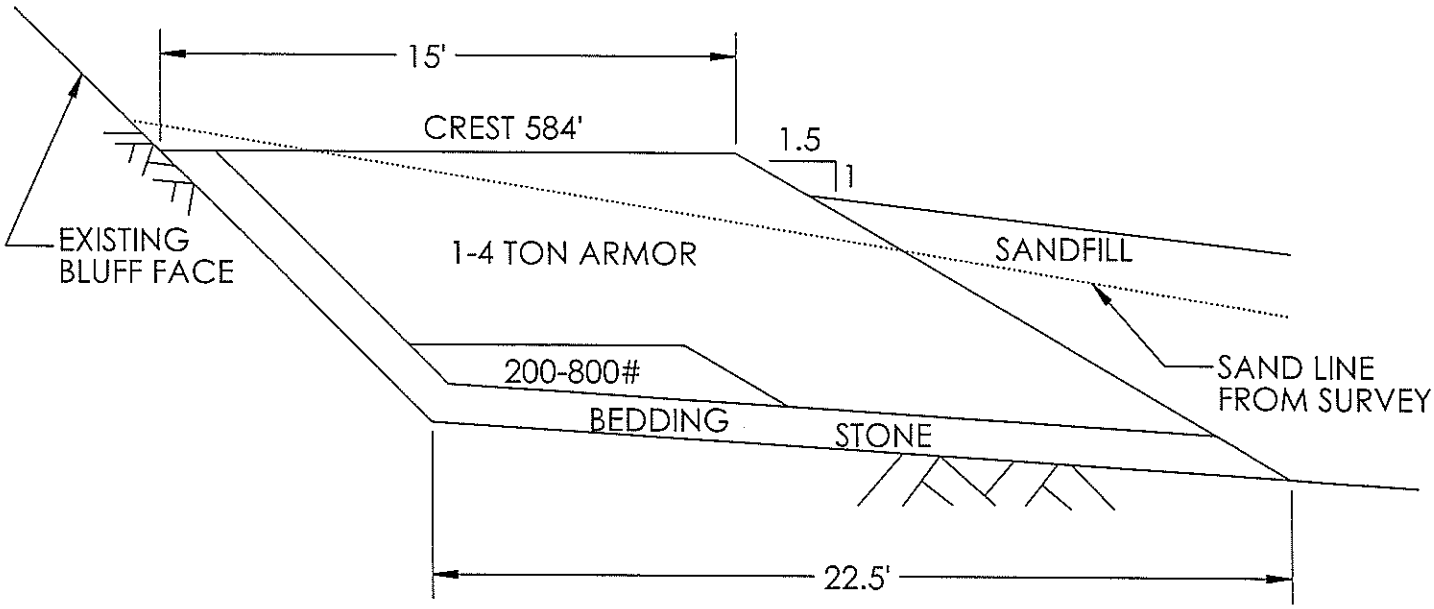
☐ Corps of Engineers ☐ IL Dep't of Natural Resources ☐ IL Environmental Protection Agency ☐ Applicant's Copy


N C O E
North
SHERIDAN ROAD
COOK CO
LAKE CO
COOK CO
LAKE CO
ELMWOOD
HILLCREST DR.
FLORAL LA.
ESTATE
ASPEN LANE
GLENCOE HIGHLAND PARK
DEERE PARK DRIVE
DEERE PARK DRIVE
14
13
12
11
10
9
8
7
6
5
4
3
2
1
5
10
15
20
20
20
MICHIGAN
SCALE IN FEET
200 0

CROS SECTION A-A



CROSS SECTION B-B



5'

SCALE

	NAME	DATE
DRAWN	SN	9/29/2014
CHECKED		

Project Location:
57 S. Deere Park Dr, Highland Park

Shabica & Associates, Inc.
550 Frontage Rd., Suite 3735
Northfield, Illinois 60093
847-446-1436
www.shabica.com

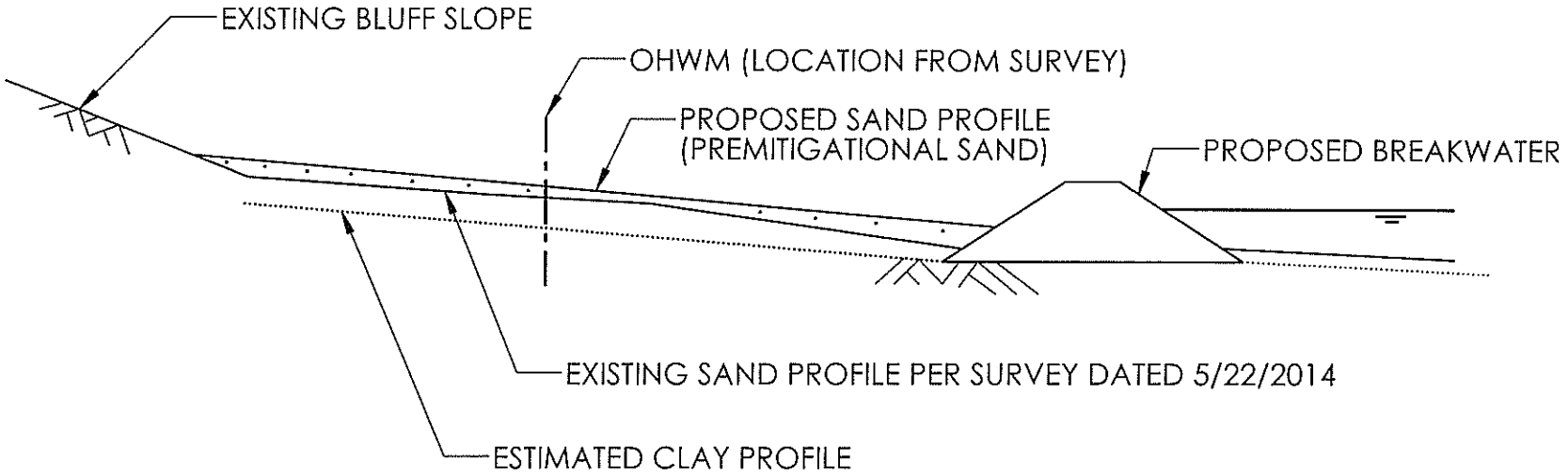
COMMENTS:

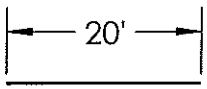
DIMENSIONS ARE IN FEET
TOLERANCES: +.5', -1'
ALL ELEVATIONS IN
IGLD 1985

SIZE A | REV.

SCALE 1"=5' | SHEET 2 OF 4

CROS SECTION C-C





SCALE

	NAME	DATE
DRAWN	SN	9/30/14
REVISED		

COMMENTS:

DIMENSIONS ARE IN INCHES
TOLERANCES: +.5', -1.0'
ALL ELEVATIONS IN IGLD1985

Project Location:
57 S. DEERE PARK DR., HIGHLAND PARK

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

SIZE A | CROSS SECTION C-C | REV

SCALE: 1:240

5 4 3 2 1

SURFACE AREA OF WETLANDS FILLED BY QUARRYSTONE EAST OF OHWM (581.5) = .058

LAKE MICHIGAN

WATER LEVEL =578.6 IGLD85
(ON 5-22-2014)

PROPOSED BREAKWATER

575

A

C

CREST 583'

A

PROPOSED GROIN TOE PROTECTION

574

A

T=583.87

575

CREST 583'

T=583.85

585.52

575

NOT INCLUDED IN THIS PERMIT - TO BE PERMITTED SEPARATELY

116'

SANDFILL AREA

A

PROPOSED WATERLINE AT DWL 580'

T=583.89

578

575

WATERLINE 5/22/2014

579

580

580

SANDY BEACH

OHWM 581.5

B

EXISTING STEEL GROIN

PROPOSED BREAKWATER SPUR

T=586.01

580

CREST 584'

583

T=584.02

B

585

586

T=585.43

582

EXISTING STONE BASKETS

590

595

EXISTING STONE PATIO

595

EXISTING STONE STAIRS

65 S. DEERE PARK DRIVE

C

55 S. DEERE PARK DRIVE

57 S. DEERE PARK DRIVE

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

	NAME	DATE
DRAWN	MS	8/12/14
CHECKED	SN	8/12/14
REVISED	SN	10/1/14

COMMENTS:

DIMENSIONS ARE IN FEET
TOLERANCES: +.5', -1'
ALL ELEVATIONS IN IGLD 1985

Project Location:
57 S. DEERE PARK, HIGHLAND PARK

Shabica & Associates, Inc.
550 Frontage Rd., Suite 3735
Northfield, Illinois 60093
847-446-1436
www.shabica.com

SIZE B

PLAN VIEW

REV

SHEET 1 OF 4

SURFACE AREA OF WETLANDS FILLED BY QUARRYSTONE EAST OF OHWM (581.5) = .058

LAKE MICHIGAN

WATER LEVEL =578.6 IGLD85
(ON 5-22-2014)

PROPOSED BREAKWATER

PROPOSED GROIN TOE PROTECTION

CREST 583'

CREST 583'

575

574

T=583.87

T=583.89

T=585.52

NOT INCLUDED IN THIS PERMIT - TO BE PERMITTED SEPARATELY

116'

30YDS

SANDFILL AREA

578

579

580

583

585

586

590

595

T=583.89

T=585.01

T=584.02

T=585.43

EXISTING STEEL GROIN

WATERLINE 5/22/2014

OHWM 581.5

PROPOSED BREAKWATER SPUR

CREST 584'

40 YDS

EXISTING STONE BASKETS

EXISTING STONE PATIO

EXISTING STONE STAIRS

65 S. DEERE PARK DRIVE

55 S. DEERE PARK DRIVE

57 S. DEERE PARK DRIVE

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

SAND CALCS

30YDS X 40YDS X 0.66YDS / 2 = 396 CUBIC YDS

396 CUBIC YDS X 1.25 YDS/TON = 495 TONS

495TONS X 20% OVERFILL = 99 TONS

495 TONS + 99 TONS = 594 TONS OF SAND

PLACE 600 TONS OF CLEAN SAND

	NAME	DATE
DRAWN	MS	8/12/14
CHECKED	SN	8/12/14
REVISED	SN	10/1/14

COMMENTS:

DIMENSIONS ARE IN FEET
TOLERANCES: +.5', -1'
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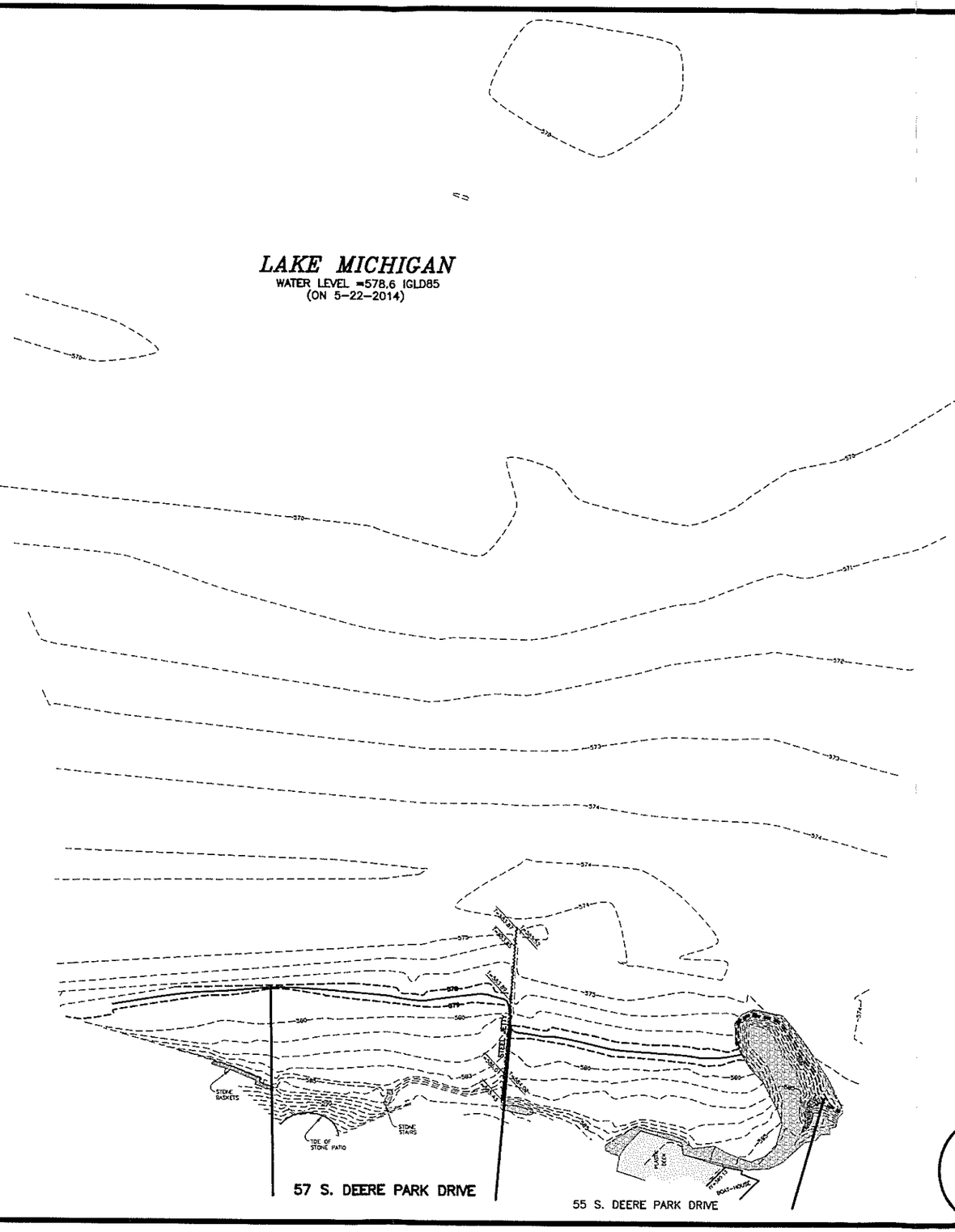
SIZE B

SAND PLAN VIEW

REV

SHEET 4 OF 4



GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

STATE OF ILLINOIS
VYDAS Z. REKASIUS
035-003210
LAKE ZURICH
ILLINOIS
PROFESSIONAL LAND SURVEYOR

STATE OF ILLINOIS
COUNTY OF LAKE SS

I, Vydas Z. Rekasius, an Illinois Professional Land Surveyor, do hereby certify that I have surveyed the property described above and that the plat shown hereon is a correct representation of said survey.

DATED THIS _____ DAY OF _____ A.D. 2012.

BY: _____

Illinois Professional Land Surveyor No. 3210
License Renewal Date : 11/30/2012
DESIGN FIRM NO. 184-004538 RENEWAL DATE: 4/30/2013

TERRA TECHNOLOGY
LAND SURVEYING, INC.
2419B ROSE AVE. LAKE ZURICH, ILLINOIS 60047
PHONE: (847) 540-8606 E-MAIL: TTLS.1@SBCGLOBAL.NET

JOB NO. : 14-0020 SURVEY DATE : 5/22/2014
DRAWING FILE : DATA/14/0020/SITE-57S.DWG