

Erie Canal Harbor Development Corp.

Gallagher Beach Sand Sustainability Study



Prepared for:

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July 2013

**GALLAGHER BEACH/NYPA PARCEL
SAND SUSTAINABILITY STUDY**

TABLE OF CONTENTS

	<u>Page No.</u>
1.0 INTRODUCTION	1
2.0 STUDY DESIGN	2
3.0 PERMITTING	4
4.0 CONSTRUCTION.....	6
5.0 INSPECTION AND MONITORING.....	7
6.0 SUMMARY OF OBSERVATIONS	8
7.0 ANALYSIS.....	9
8.0 SUMMARY AND RECOMMENDATIONS.....	10

ATTACHMENTS

- A. Contract Drawings
- B. Permits
- C. Construction Photographs
- D. Approved Submittal – Sand Gradation
- E. Survey Drawings
- F. Inspection Reports

1. INTRODUCTION

The Gallagher Beach Sand Sustainability Study (GBSSS) was performed to determine if a more sandy beach could be established at either of two existing, stony beaches on the Buffalo waterfront: Gallagher Beach, and a small beach on a parcel formerly owned by the New York Power Authority (NYPA).

The study was originally intended to address only Gallagher Beach, and so is termed the Gallagher Beach Sand Sustainability Study (GBSSS). The scope of the study was expanded to include the second location, the NYPA parcel, shortly after the contract for the design and monitoring of the study was awarded to URS Corporation-New York (URS).

Gallagher Beach is owned by the Niagara Frontier Transit Authority; the NYPA parcel was, until recently, owned by the New York Power Authority, but is now part of the newly-opened Wilkeson Pointe park.

The Erie Canal Harbor Development Corporation (ECHDC) issued a Request for Proposal (RFP) on May 10, 2011 for engineering services to conduct a sand sustainability study to “apply ... sand along Gallagher Beach’s waterfront ... The Consultant shall monitor the sand’s sustainability throughout Buffalo’s winter months (November 1st – April 1st) and determine if a full-scale application is feasible.” Shortly after award of that contract, the ECHDC expanded the scope of the study with the second location, the NYPA parcel. The two locations are shown on Figure 1.

The ECHDC originally intended the study to be constructed in 2011 and monitored through the winter of 2011 and 2012. However, permitting issues delayed the start of the project until the Fall of 2012.

The study is now complete and this report summarizes the observations made and the resulting recommendations.

2. STUDY DESIGN

a. Existing Conditions

Both beaches are located at the inland ends of embayments in the outer harbor of the Buffalo, NY waterfront, as shown on Figure 1.

Gallagher Beach: The Gallagher Beach embayment is approximately 1500 feet wide, within walls of 800 and 1000 feet on the north and south side, respectively. The south outer breakwater is approximately one-half mile from the beach. The exposure of the beach is to the west-southwest.

The existing surface of the beach comprises a mixture of well-rounded pea gravel and sand-size particles. The pea gravel surface material was placed on the pre-existing underlying sediments as part of the boardwalk and pier development in 2001.

The current beach slopes uniformly at 6 to 7 percent grade from the upslope riprap revetment approximately 70 feet to the water's edge. Lakeward below water beyond that is a zone of concentrated exposed bricks and stone, and then extending to at least the limits of the test area is a soft layer of fine sand at a slope of approximately 2.5 percent. That layer is continually submerged (except during periods of extreme negative seiche, such as occurred during construction as a result of the passage to the west by the remnants of Hurricane Sandy).

Minimal submerged aquatic vegetation was encountered at this location during the preconstruction investigation by the NYSDEC or during actual construction.

NYPA Parcel: The embayment in which the NYPA parcel beach is located is significantly smaller than that of Gallagher Beach: approximately 300 feet wide, within walls of approximately that length on both sides. The outer breakwater is approximately 2000 feet from the beach. The exposure of the beach is to the west-southwest.

The existing surface of the beach, both above and below water, comprises a mixture of material sizes ranging from coarse brick and slag particles several inches on a side, and occasionally larger, down to a medium sand. There is a surface concentration of the larger particles in the foreshore. The exposed portion of the beach is only slightly steeper than the submerged (nearshore) portion; it slopes at approximately 8 percent upslope from the water's edge, and at approximately 5½ to 7 percent downslope lakeward into the water. The submerged surface of the beach is uniformly covered with exposed brick and other larger materials.

Significant submerged aquatic vegetation was noted during the preconstruction inspection by the NYSDEC.

b. Study Objectives and Methodology

The GBSSS is a pilot-scale study of the performance of beach sands at the proposed locations under actual site conditions during the winter of 2012-2013. The ECHDC defined the scope of the GBSSS in the Request for Proposal as to “apply ... sand along Gallagher Beach’s waterfront ... [and to] monitor the sand’s sustainability throughout Buffalo’s winter months (November 1st – April 1st) and determine if a full-scale application is feasible.”

c. Physical Design

The design and construction drawings of the test areas are contained in Attachment A. The study was initially designed to include placement of approximately 1,400 cubic yards of sand in three test areas: two at Gallagher Beach and one at the NYPA parcel. The second (northern) location at Gallagher Beach was eliminated as redundant during contract negotiations.

The test areas were designed to allow, to the degree practicable, the sand to respond to water and wave conditions as if part of a larger beach.

The thickness of the sand was selected to be 1 foot thick. The test areas were designed at 100 feet wide to be wide enough that lateral variation in the wave and water forces would be

evident, and so that any erosion patterns would not be completely governed by edge effects. The toe of the test areas was selected to extend to approximately el. 569 IGLD, so as to be as deep as practical (within the constraints of the study) while allowing at least one foot of water over the top of the sand under normal lake levels. (The long-term water surface elevation of the lake at the time of design was estimated at el. 571.2 IGLD.)

The sand was supported at its perimeter by edge restraints to mimic the effect of abutting sand in a larger beach. The edge restraint also bounded the toe of the test area. This was an acknowledgement that some form of toe structure may be necessary to support or retain the sand if full beach development is pursued.

The edge restraints were designed to be permeable, so that waves and wave energy would dissipate through them and not be reflected, as it would off of a hard boundary. The edge restraints were designed as geotextile tubes, normally filled with compost for erosion control, now filled with pea gravel, and held down by geogrid netting anchored to the lake bed.

The location of the plots was selected to avoid the corners of the rectangular embayments. In those portions of the beach, to minimize interference from the embayment walls.

Finally, it was decided that the test areas should be constructed “in the dry,” that is, behind coffer dam structures, allowing them to be constructed in a controlled manner so that the final results would be indicative of site conditions and not of construction difficulties.

3. PERMITTING

The project was subject to State and Federal permitting because it involved deposition of material below the regulatory limit of the lake, referred to as “ordinary high water” (OHW, elevation 573.4 International Great Lakes Datum, IGLD, 1985). Permitting for the study had five separate components (permits and approvals), several of which were sequential. Early in the project, two pre-application meetings were held with NYSDEC, the United States Army Corps of Engineers (USACE), and project stakeholders NFTA and ECHDC. Once the entire initial permit applications and consultations were prepared and submitted, it took approximately seven months (for review and public notice periods) to obtain the final

permission to construct the test areas. The construction of the test areas for the GBSSS required the following permits and approvals:

- USACE: Standard (Individual) Permit under Section 404 of the Clean Water Act, and Section 10 of the Rivers and Harbors Act
- NYSDEC: 401 Water Quality Certification
- NYS Department of State: Federal and State Coastal Zone Consistency Review
- NY State Historic Preservation Office: check for the known presence of historic or archaeological resources.
- NYSDEC Natural Heritage Program and US Fish and Wildlife Service: check for the known presence of Rare, Threatened and Endangered Plant or Animal Species
- State Environmental Quality Review. The ECHDC assumed Lead Agency status and issued a Negative Declaration for the study on June 13, 2012.

Copies of the relevant approvals are included in Attachment B. The permitting process resulted in the attachment of two conditions to the study:

- If necessary, the test areas would be adjusted in the field in consultation with the NYSDEC to avoid significant impacts to submerged aquatic vegetation (SAV).
- Construction operations in the water were prohibited from March 30 to July 1 to minimize adverse impacts to fish spawning. However, the last study observations did not occur until April and therefore, the edge restraints could not be removed before the prohibition period. A request for permit modification to allow work in the water in mid-June was made to (and subsequently received from) the NYSDEC, though the current schedule for removal of the edge restraints conforms to the original restriction.

The permits issued for this study covered only the study, and do not apply to additional studies that may be required or to the eventual development of the full beach. A separate permitting effort will need to be undertaken for any of those activities.

4. CONSTRUCTION

a. Bid and Award

On June 6, 2012, the ECHDC advertised the bid, and on September 12, 2012 awarded the contract to Nature's Way Environmental of Alden, NY. The Contract was signed on October 10, 2012, after revisions to the Scope of Work to increase the height of the coffer dam to 10 feet from 4 feet, and to decrease the number of test areas at the Gallagher Beach location to 1 from 2.

b. Construction

On October 17, 2012, Nature's Way began site mobilization, at the Gallagher Beach location. At that location and at the NYPA parcel, construction included a pre-construction survey, installation and dewatering of the cofferdam (by PortaDam of Williamstown, NJ), installation and anchoring of the edge restraints ("DuraSoxx HD" by Filtrexx International of Grafton, OH), placement and survey of the sand, and removal of the coffer dams. Construction was completed, at the NYPA parcel, on November 16, 2012.

Photographs taken during the construction are presented in Attachment C.

A total of 768.4 tons of sand was placed at Gallagher Beach, and 666.1 tons at the NYPA parcel. The sand conformed to NYSDOT item 703-07 and to concrete sand as specified in ASTM C-33. It was provided from the Countryside Sand and Gravel pit in South Dayton, NY. A copy of the approved gradation is included as Attachment D.

5. INSPECTION AND MONITORING

a. Submerged Aquatic Vegetation

As required by the terms of the Water Quality Certification provided for this project by the NYSDEC, a NYSDEC biologist inspected the proposed below-water construction area prior to the pre-construction survey, and staked out the acceptable limits of the test areas to minimize damage to any significant growths of submerged aquatic vegetation (SAV). The stakes are shown on the survey drawings and demonstrate that the test areas were installed to avoid damage to any SAV.

b. Initial Surveys

The test area and its vicinity were surveyed before and immediately after construction, and then again after overwintering, on April 17, 2013. These are referred to as the pre-construction, post-construction, and final surveys. Copies of all of the surveys are contained in Attachment E.

At both locations, the surveys were performed with respect a local grid system established for this project. At Gallagher Beach, the vertical datum was also developed specifically for this contract (i.e., an assumed datum). At the NYPA parcel, vertical control was obtained that allowed the survey to be performed with respect to the North American Vertical Datum of 1988.

c. Monthly Inspections

During the winter period, URS conducted four inspections of the test areas, starting on December 12, 2012 and finishing April 7, 2013. After each inspection, URS issued a report to the ECHDC summarizing its observations. Copies of those reports are included as Attachment F.

6. SUMMARY OF OBSERVATIONS

The change to the beach profile over winter, both above and below water, is shown in Figures 2 through 9, which are developed from the pre-construction, post-construction, and final surveys presented in Attachment E.

The beach profiles evolved in a similar manner and at a similar rate at both test areas. This is documented in the individual inspection reports contained in Attachment F as well as on Figures 2 through 9.

At both beaches, there have been three principal changes to the sand profile:

- The majority of the sand has been removed from the mid above-water portion of the beach. Above that point, the sand remains as placed.
- Sand has accumulated at the shoreline to a depth greater than was placed originally, burying the edge restraints.
- Some but not all of the sand has been lost from within the below-water portion of the test area.

The longitudinal sections (perpendicular to the shoreline) show these changes clearly. Section A on Figure 3, for instance, shows the loss of most sand at (assumed) elevation 93. Below that point, there is a significant increase in the thickness (depth) of sand at the water line. Then, further downslope, below water to the limit of the test area, approximately one-half of the thickness of placed sand has been lost. The other longitudinal sections show similar results.

The lateral sections agree with this summary. Section D on Figure 4, for instance, shows the loss of sand from the below-water portion of the Gallagher Beach test area. Section E on Figure 5 shows the accumulation at the shoreline. Note that the accumulation (berm) extends laterally beyond the limits of the test area. Section F on that same figure shows that the upper portion of the placed sand, above the level of wave action (swash zone) was essentially unchanged over winter. The NYPA Parcel sections show a similar pattern.

It is also worth noting one informal observation. At Gallagher Beach, berms are forming at the shoreline both within the test area, which has not been combed or regraded, as well as northward along the shoreline from the test area. That reach of the beach (to the pier) also has not been combed or regraded this year (spring, 2013). However, there is no berm along the shoreline south of the test area or north of the pier, both of which are areas that have been combed and regraded this year. Therefore, it appears that the current maintenance plan for the beach may be preventing the development of the shoreline berm.

7. ANALYSIS

At both beaches, the sand profiles show that the sand above the level of wave action last winter remains as placed. Sand from just below that level, down to the newly-formed berm at the water's edge, has been removed by wave action, and sand from below the waterline has also been lost. That profile would suggest that at least some of the placed sand was moved by wave action and deposited in the berm at the water's edge.

At this time, however, that process is only an assumption - neither the source of the accumulated sand (both within the test area, as well as in new berms formed along the shoreline just north of the test area), nor the current location of the lost sand can be known for certain. The accumulated sand is generally of the same texture as that placed for the test, so the assumption seems reasonable, but further analysis and testing is necessary to confirm the process.

URS has estimated the amount of sand lost during the test period. The calculation is summarized in the Table 1, below, and is based on the surveys described previously. This calculation incorporates the movement of sand within the test area, including deposition along the shoreline and loss above and below that level. Note that this loss occurred over a period of approximately 5 months, so annual losses may be greater. However, that loss is calculated only for the test areas. Any sand that was moved out of the test area but remains in other portions of the beach (i.e., along the shoreline in the new berms north of the test area) is not reflected here, and would not be lost to the beach system as a whole.

TABLE 1
SAND VOLUME SUMMARY

Location	Weight of Sand Placed ⁽¹⁾ (tons)	Volume of Sand Placed ⁽²⁾ (CY)	Net Volume of Sand Lost ⁽²⁾ (CY)	Proportion of Sand Lost (%)
Gallagher Beach	768.4	561	162	29%
NYPA Parcel	666.1	483	135	28%

Notes:

- (1) Taken from the Contractor's weigh slips for the delivery of sand from the quarry.
- (2) Calculated for the test areas by AutoCADD using surfaces developed from the survey data.

8. SUMMARY AND RECOMMENDATION

The addition of sand has resulted in changes to the Gallagher and NYPA Parcel beaches, including the development of a more natural beach profile. It appears that sand is being moved to form a natural berm at the shoreline, which may prove to be a stable feature under the actual site conditions, especially at Gallagher Beach. If those depositional conditions are confirmed, establishment of natural sand beaches that do not require high levels of maintenance may be possible.

Other structural alternatives such as headland or segmented breakwaters would likely be successful in stabilizing a beachfill, but the outcome of this study suggests that such measures may not be necessary.

Further studies to determine the likelihood of such a possibility should include the placement of a new test area at the southern portion of Gallagher Beach. Use of an edge restraint or coffer dam for placement would not be necessary, since the hypothesis is now that sand is generally maintained in the beach area. The test should encompass the

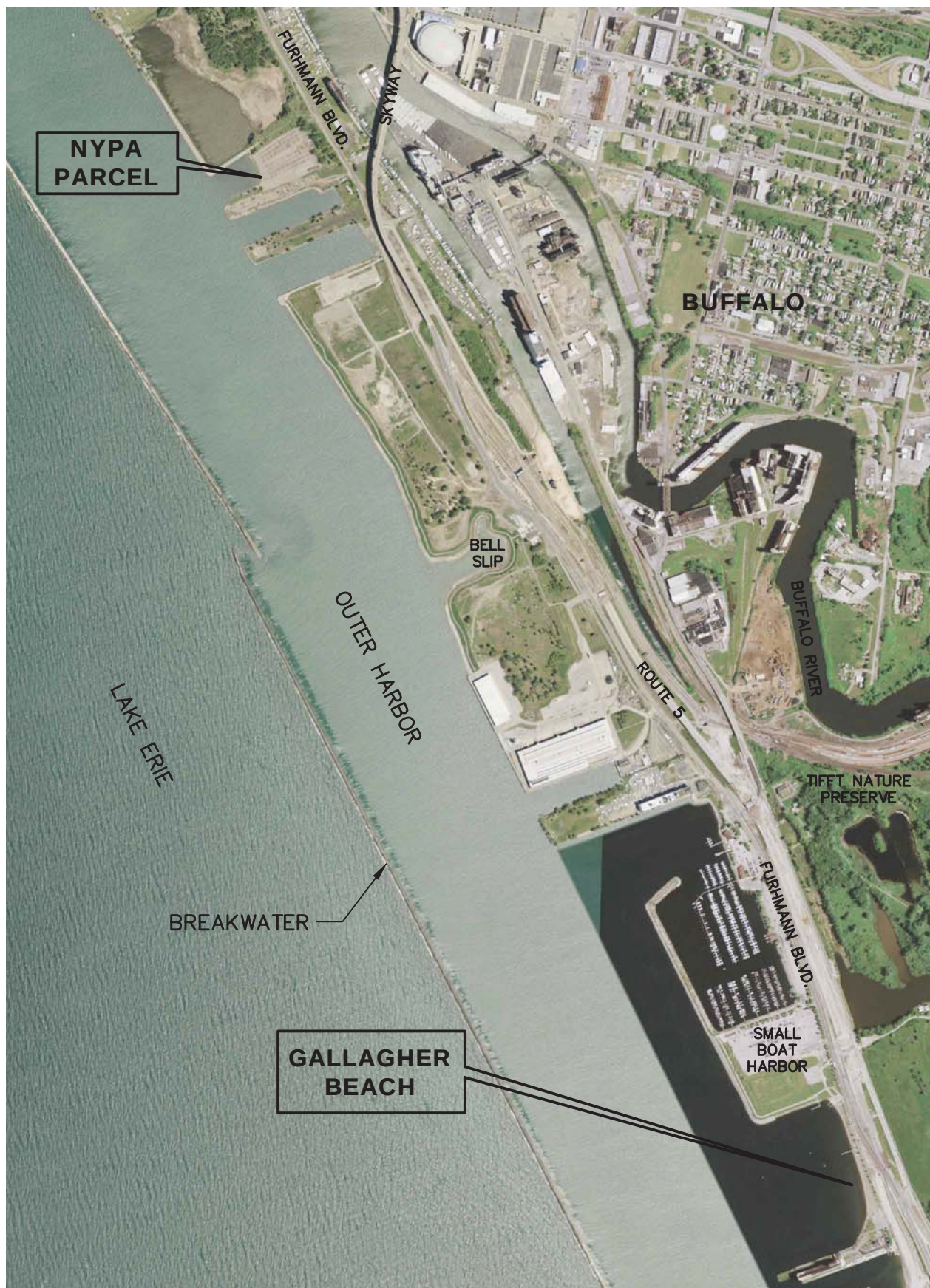
southern half of the beach, between the parking area and the pier, so as to allow the observation and tracking of the sand as it moves northward along the shoreline. Several hundred pounds of a tracer element (e.g., slightly discolored sand) could be admixed into that volume to facilitate that tracking. URS would also encourage consideration of placing the sand in a 2-foot thick layer, thicker layer than the 1-foot thick layer that was placed for the GBSSS.

A new round of permits for this effort will be required, since those discussed previously in this report were granted for the GBSSS only. These new or re-issued permits would include, preliminarily, the following:

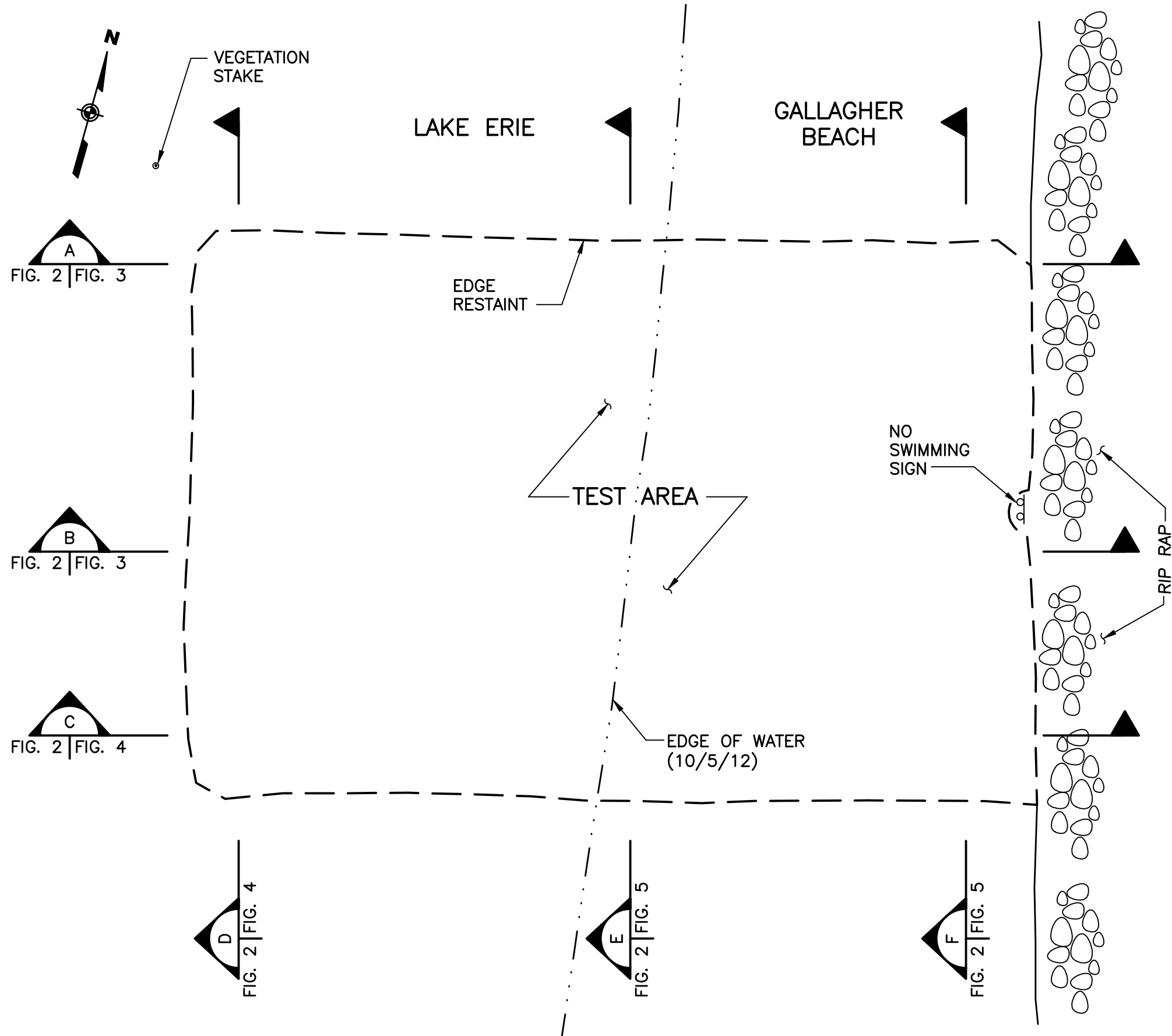
- USACE:
 - Standard (Individual) Permit under Section 404 Clean Water Act, and Section 10 of the Rivers and Harbors Act
 - NEPA - Environmental Assessment
- US Fish and Wildlife Service:
 - Clearance for Threatened and Endangered Species
- NYSDEC:
 - Excavation and Fill in Navigable Waters
 - Water Quality Certification (Section 401 of the Clean Water Act)
 - NYSDEC - Natural Heritage Program Consultations
 - SEQR – Environmental Impact Statement
- NYS Department of State:
 - Federal and State Coastal Zone Consistency Review
- NYS Office of Parks, Recreation and Historic Preservation – State Historic Preservation Office (SHPO):
 - Clearance for Cultural Resources
- City of Buffalo:
 - Local Waterfront Revitalization Program (LWRP) – Consistency Review

A similar trial could be performed at the NYPA Parcel, though the apparent deposition along the shoreline was not as pronounced there. This may be due to the steeper nearshore area. At this location, a mechanical method, such as a submerged berm or sill,

of creating a shallow wading zone may be desirable to minimize contact with the more-debris filled lake bottom and the greater quantity of submerged aquatic vegetation. Additionally, based upon feedback received during the permitting of the GBSSS, regulatory concerns for impacts to fish spawning habitat and the like can be expected to be much greater for this location than for Gallagher Beach.

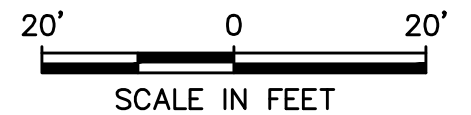


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NOTES:

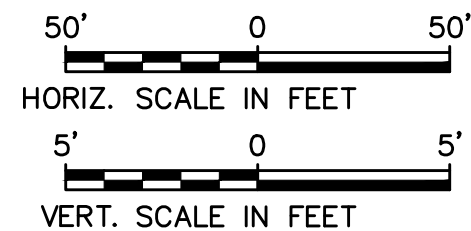
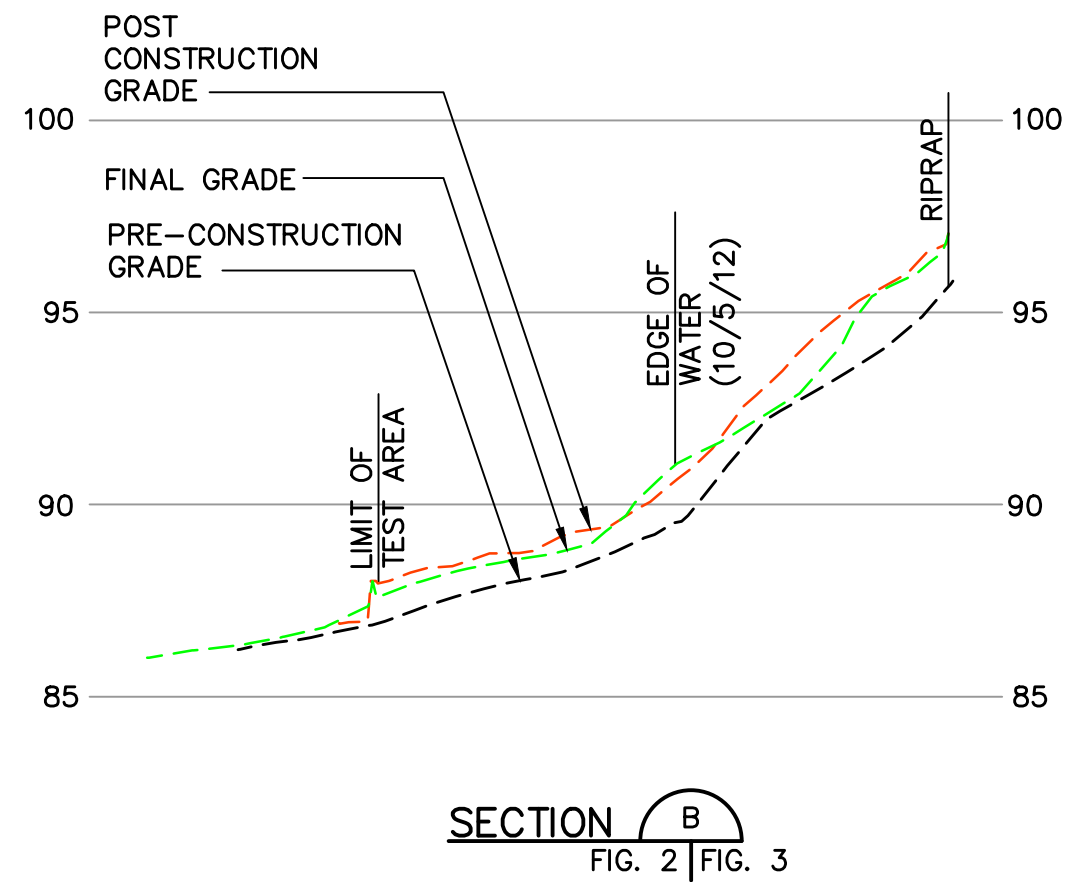
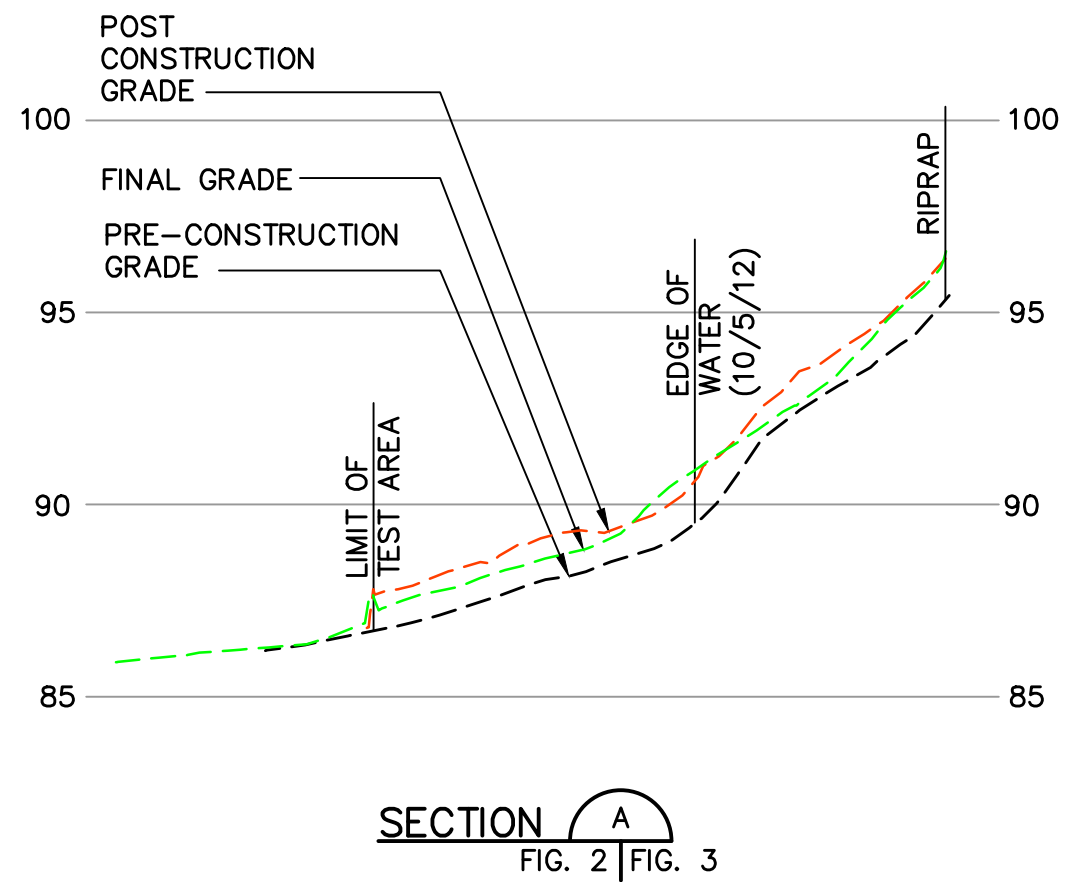
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2. VERTICAL DATUM SHOWN ON THE SECTIONS WAS ESTABLISHED IN THE FIELD BY THE SURVEYOR.



GALLAGHER BEACH
PLAN VIEW

URS

FIGURE 2

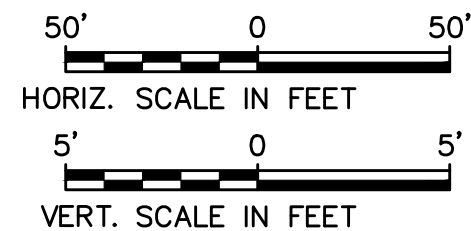
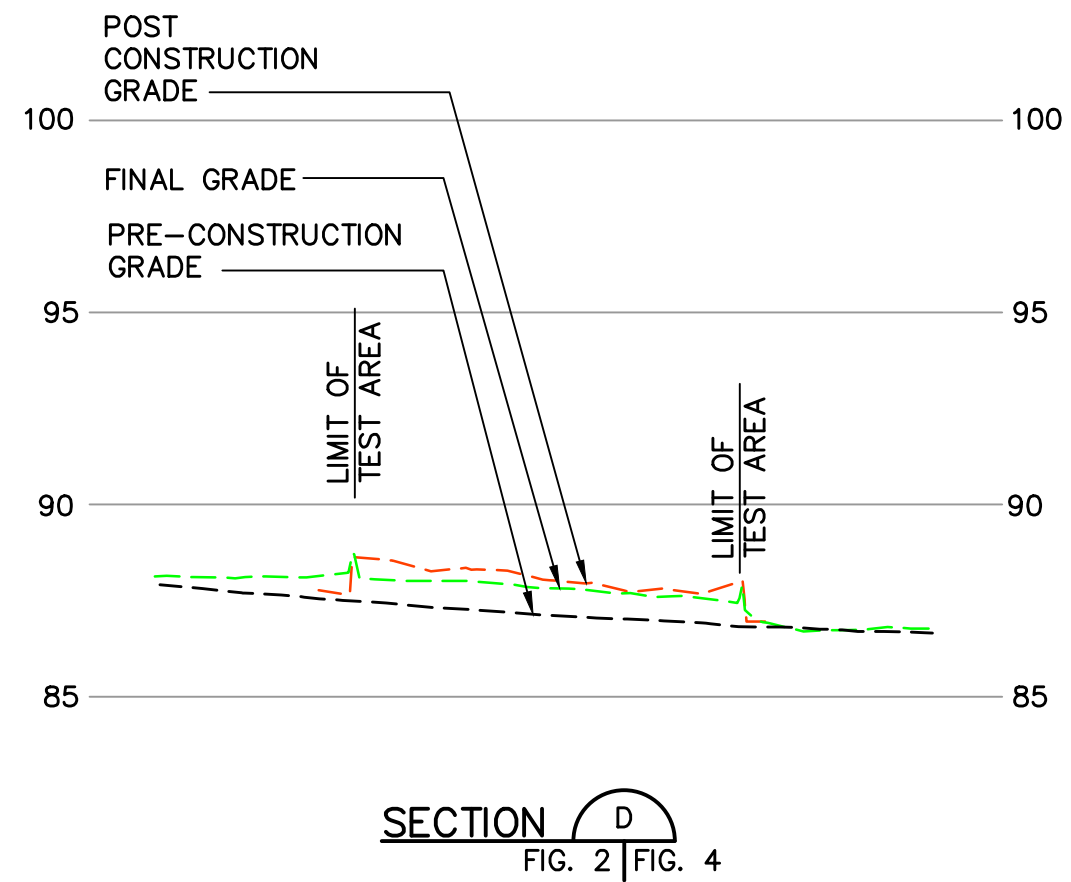
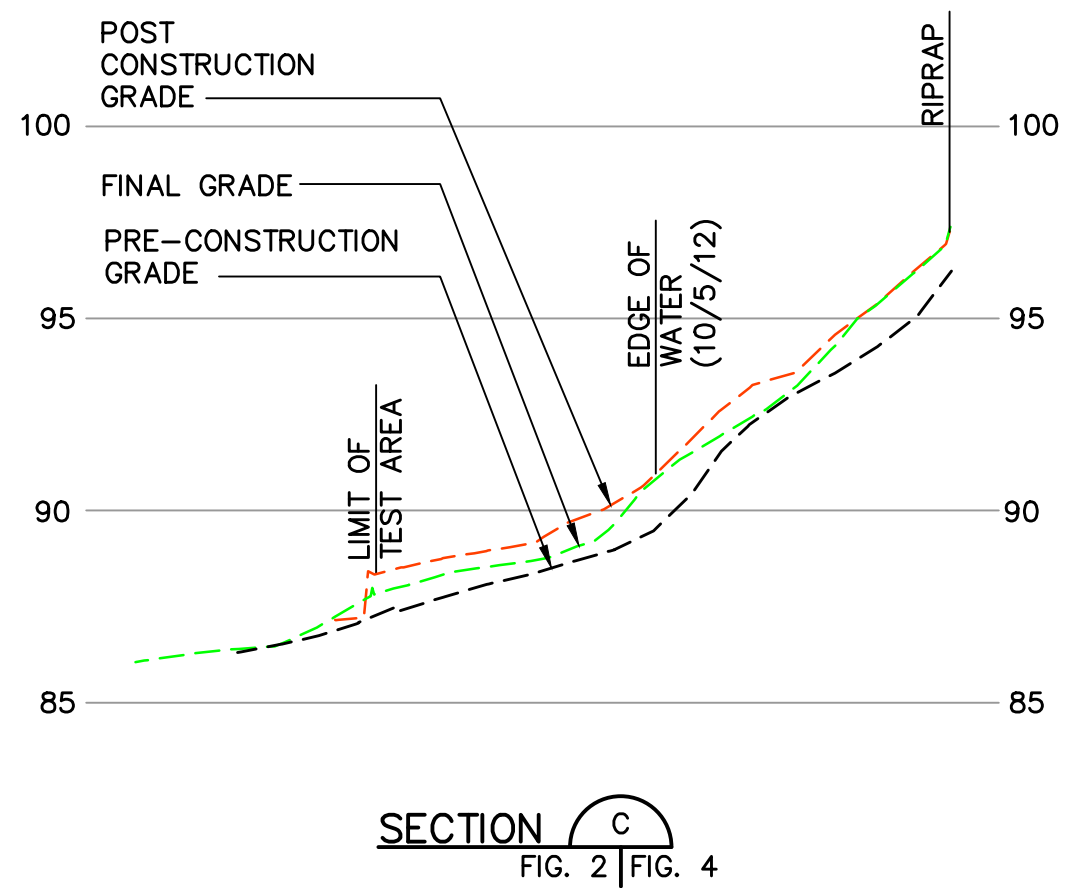


GALLAGHER BEACH
SECTION A-A AND B-B

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FIGURE 3

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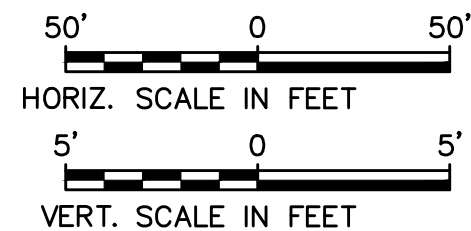
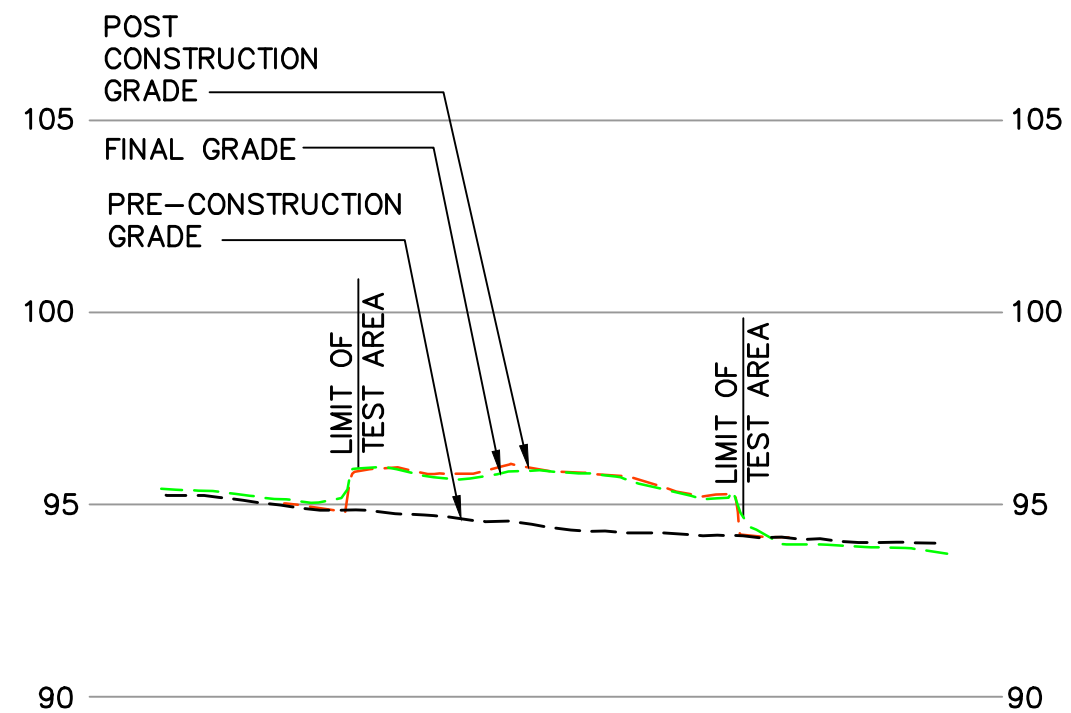
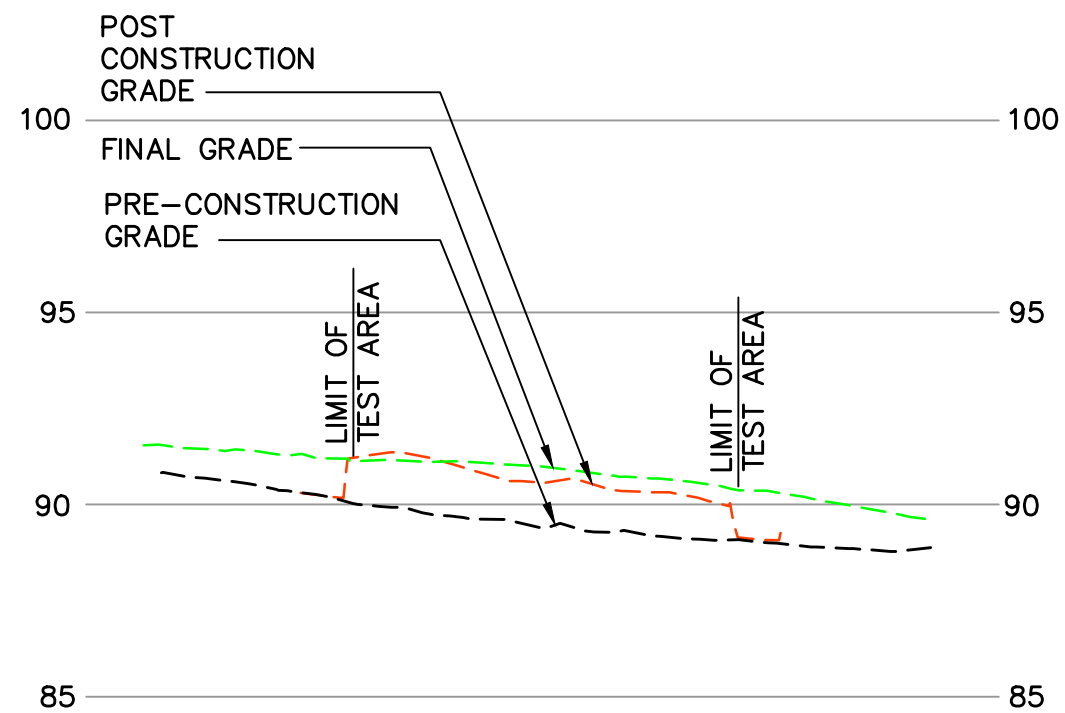


GALLAGHER BEACH
SECTION C-C AND D-D

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FIGURE 4

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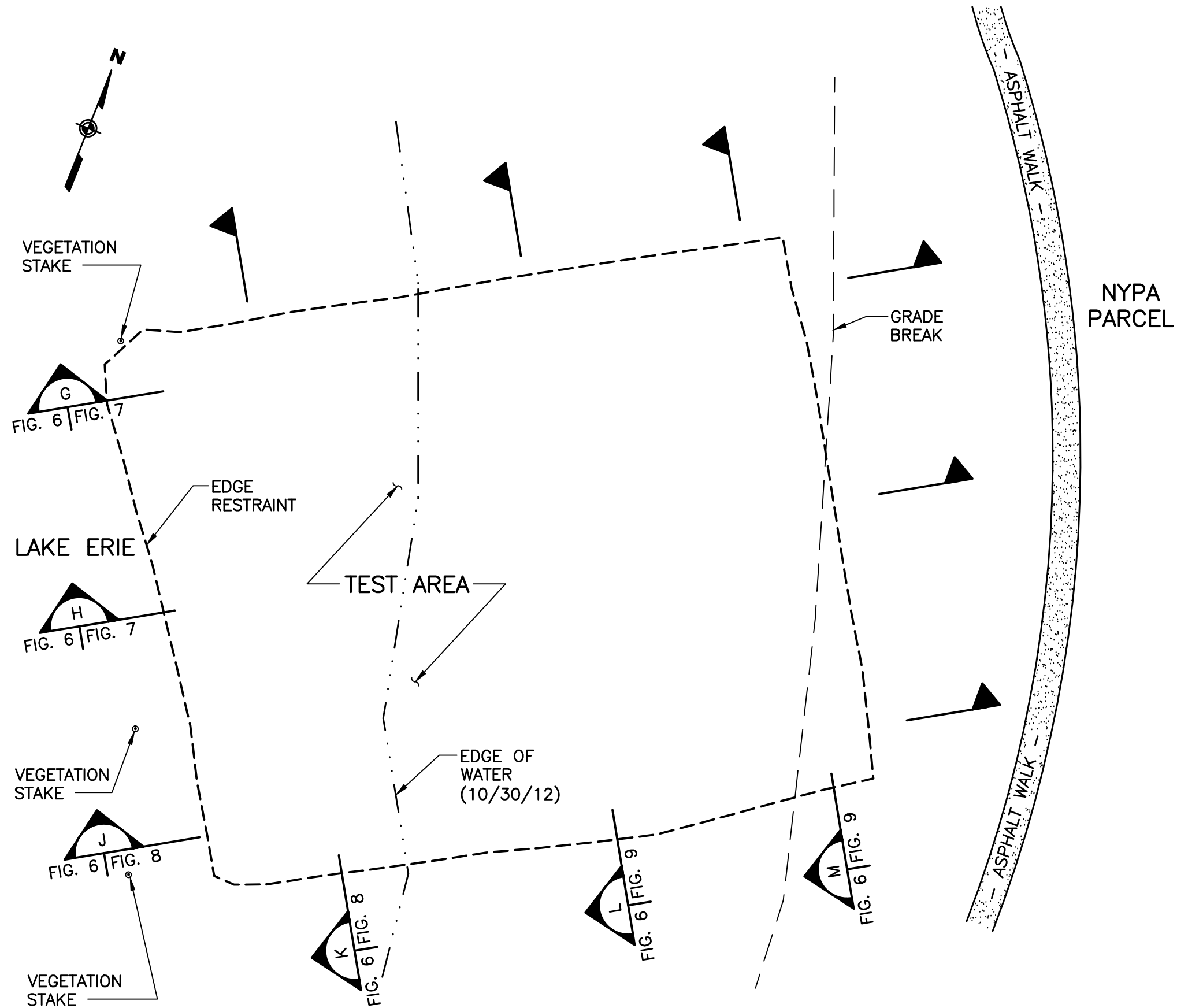


GALLAGHER BEACH
SECTION E-E AND F-F

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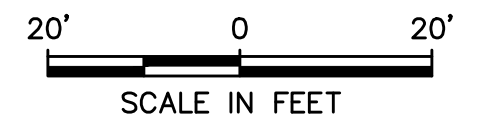
FIGURE 5

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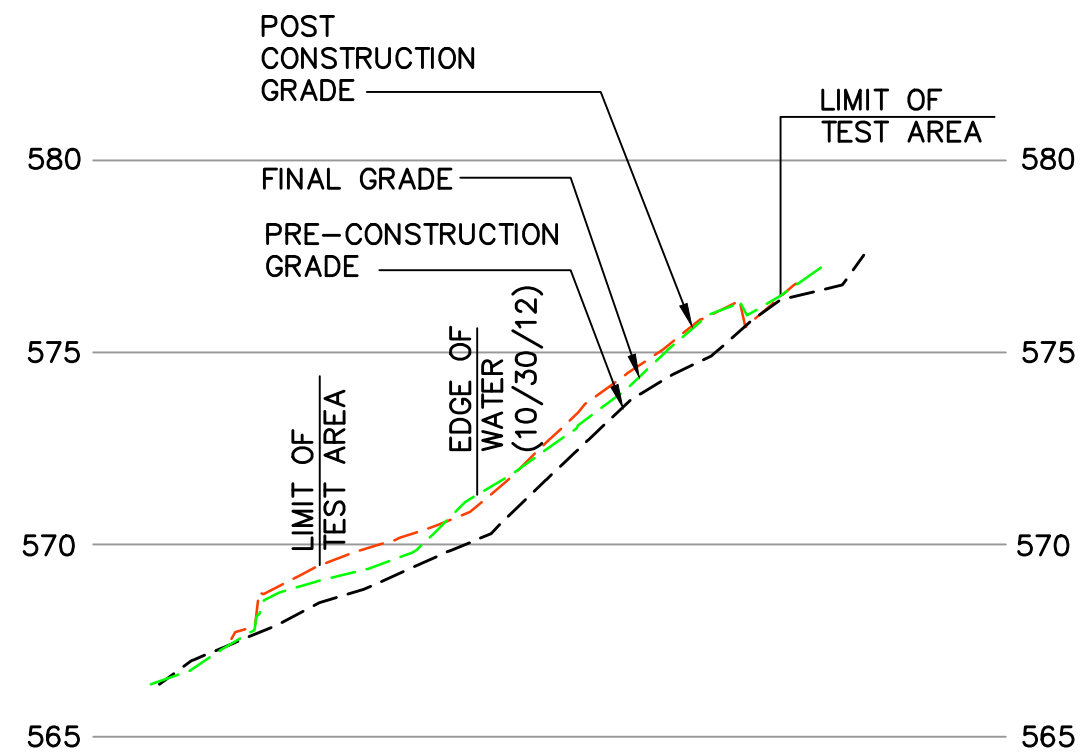
1. THIS FIGURE DEVELOPED FROM SURVEY INFORMATION BY FRANDINA ENGINEERING AND LAND SURVEYING, PC DATED OCTOBER 30, 2012, NOVEMBER 13, 2012 AND APRIL 17, 2013.



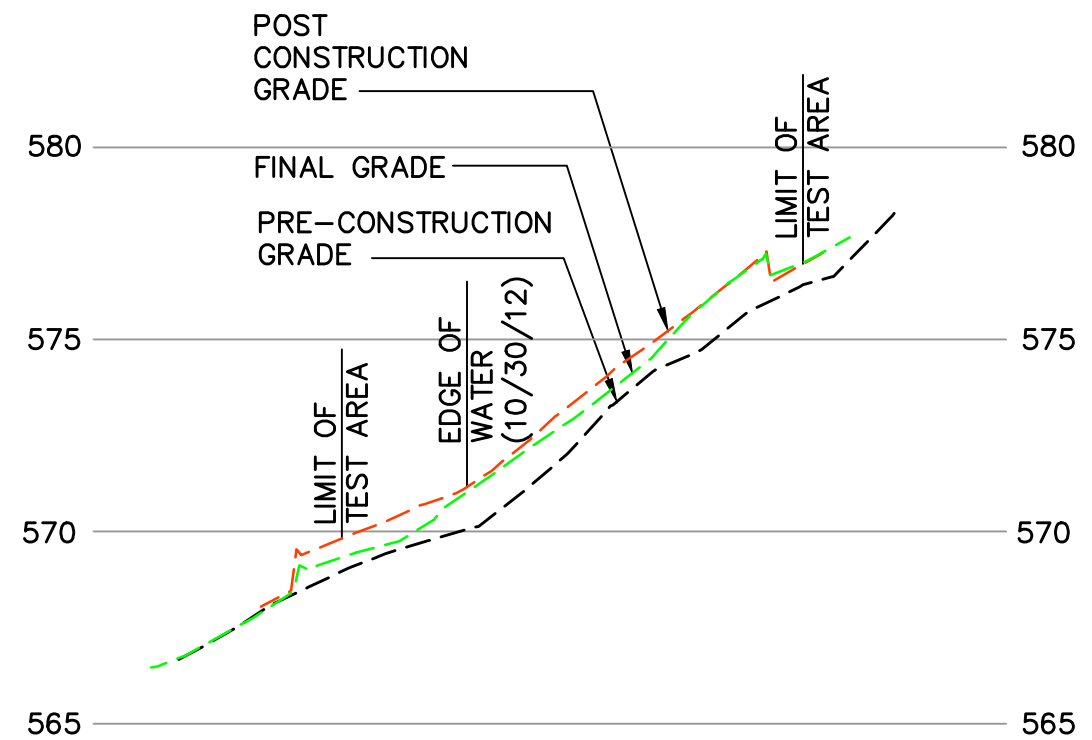
NYPA PARCEL
PLAN VIEW

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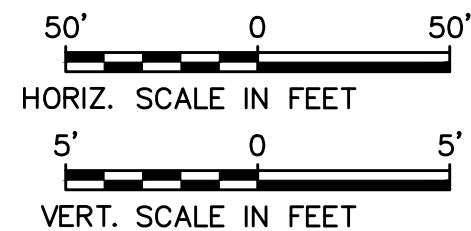
FIGURE 6



SECTION 
FIG. 6 | FIG. 7



SECTION 
FIG. 6 | FIG. 7

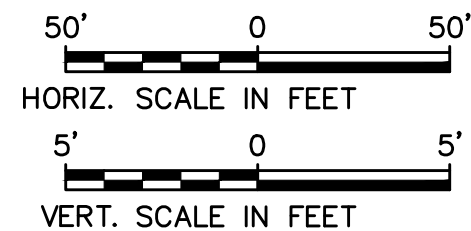
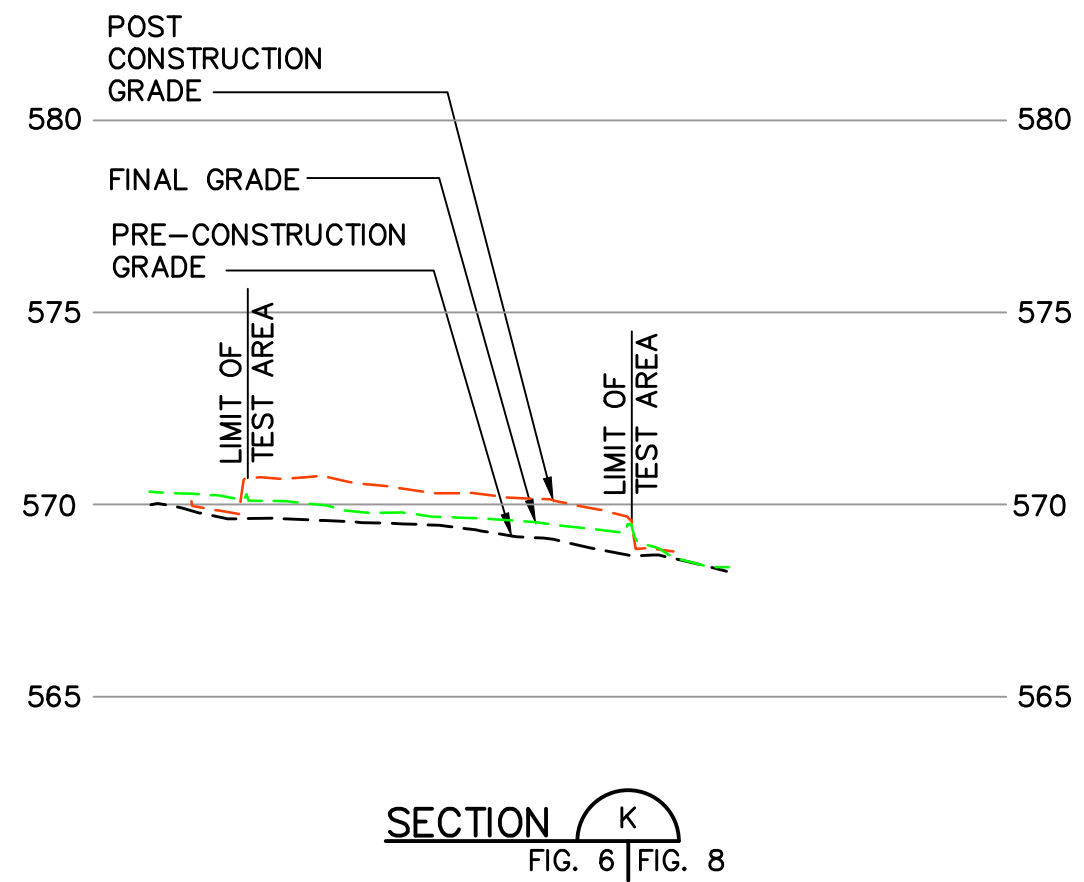
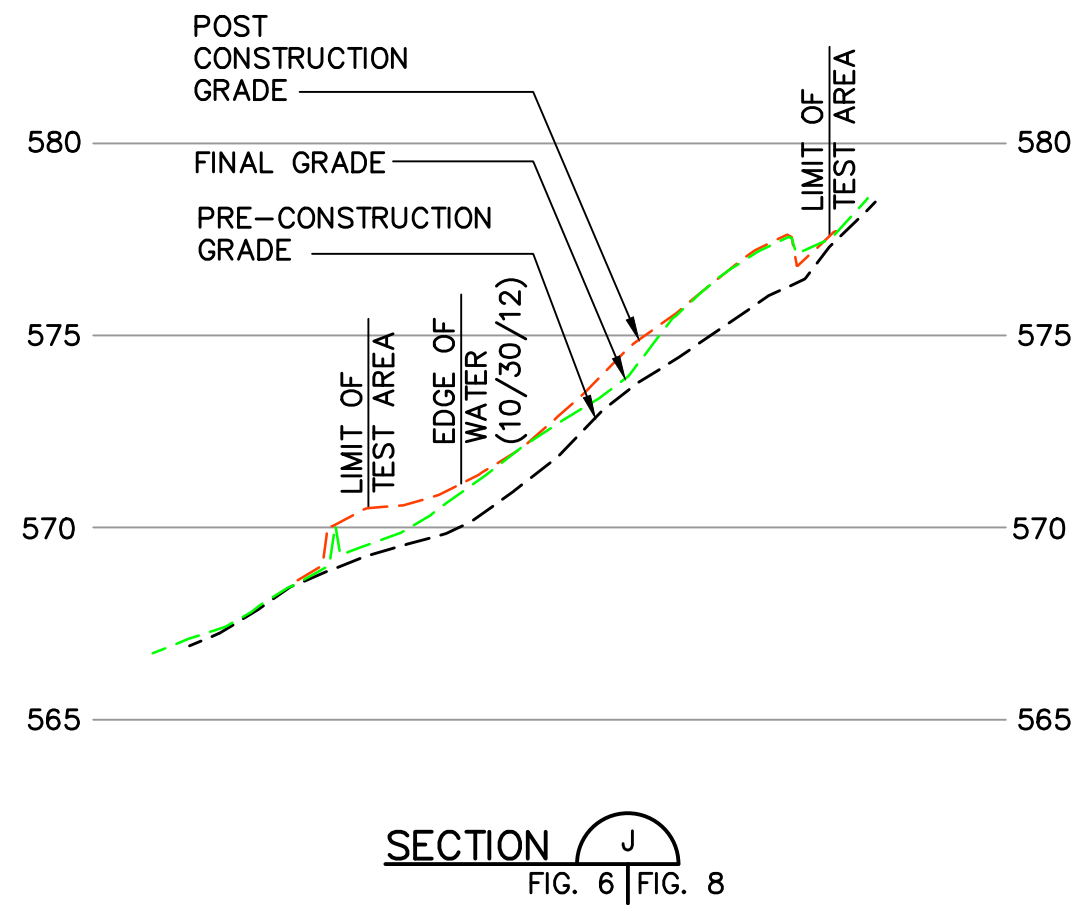


NYPA PARCEL
SECTION G-G AND H-H

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FIGURE 7

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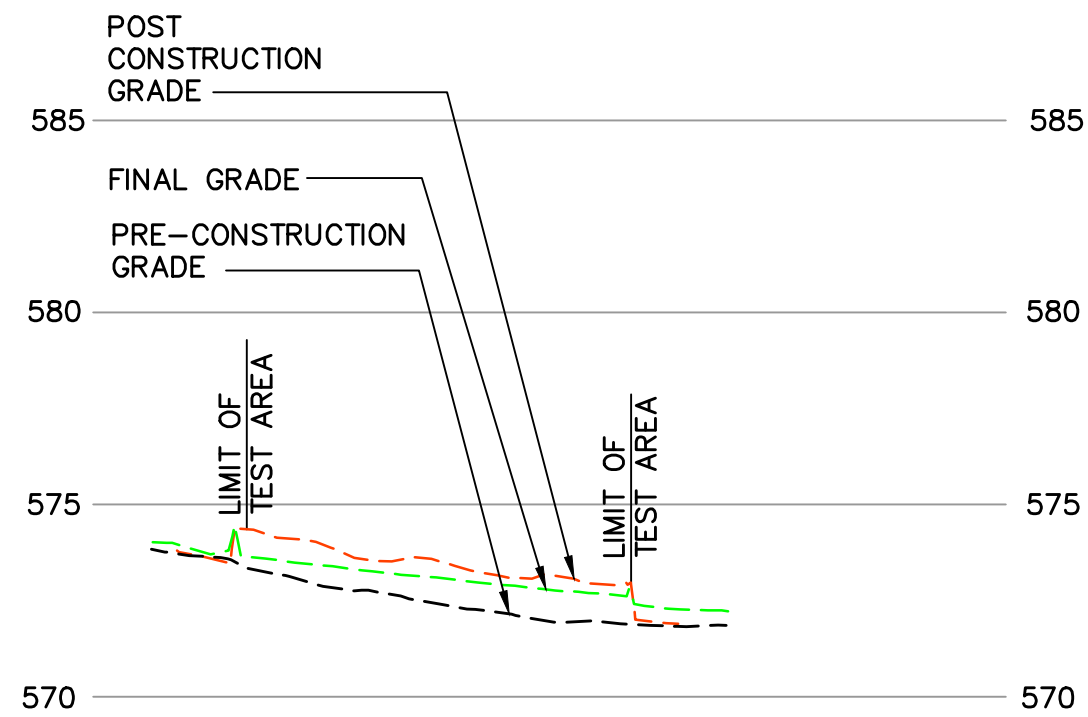


NYPA PARCEL
SECTION J-J AND K-K

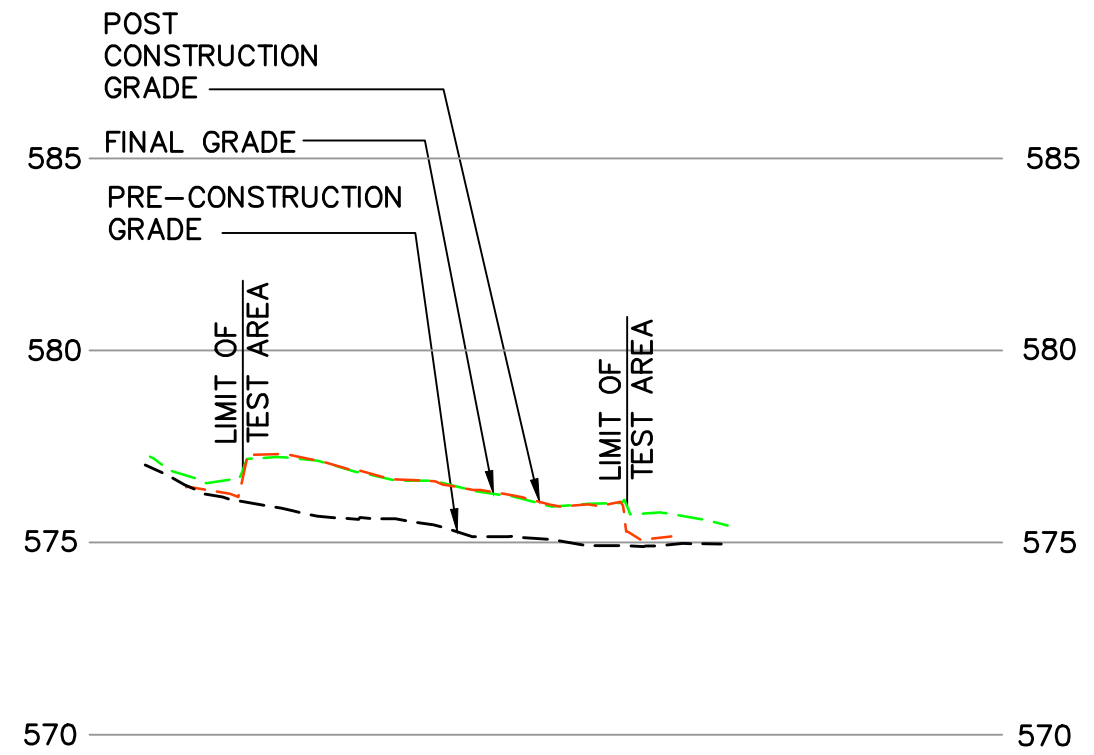
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FIGURE 8

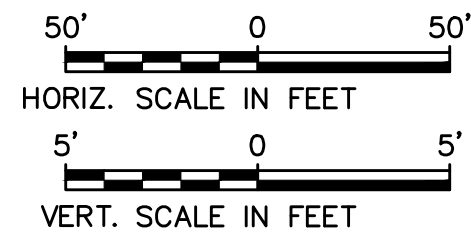
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SECTION 
FIG. 6 | FIG. 9



SECTION 
FIG. 6 | FIG. 9



NYPA PARCEL
SECTION L-L AND M-M

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FIGURE 9

ATTACHMENT A
Contract Drawings

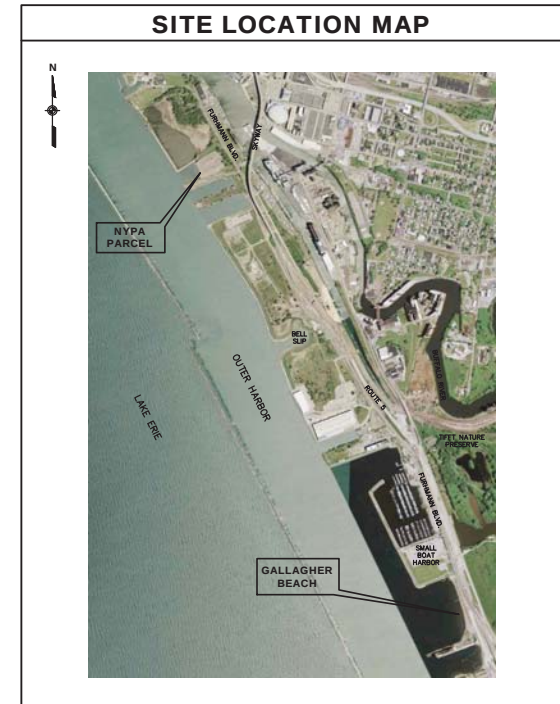
SAND SUSTAINABILITY STUDY FOR NYPA PARCEL AND GALLAGHER BEACH ERIE COUNTY, NEW YORK



PREPARED FOR:
ERIE CANAL HARBOR
DEVELOPMENT CORPORATION
BUFFALO, NEW YORK

INDEX OF DRAWINGS

G-001	COVER
C-001	LEGEND, ABBREVIATIONS, GENERAL NOTES & SPECIFICATIONS
C-002	GALLAGHER BEACH PLAN
C-003	NYPA PARCEL PLAN
C-004	SECTIONS (1 OF 2)
DT-001	SECTIONS (2 OF 2)
ES-001	DETAILS
	EROSION AND SEDIMENT CONTROL DETAILS



NOVEMBER 2011

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**PERMIT
DRAWING**

ABBREVIATIONS

CY	— CUBIC YARD
ECHDC	— ERIE CANAL HARBOR DEVELOPMENT CORPORATION
GBSSS	— GALLAGHER BEACH SAND SUSTAINABILITY STUDY
IGLD	— INTERNATIONAL GREAT LAKES DATUM OF 1985
NYPA	— NEW YORK POWER AUTHORITY
NYSDEC	— NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
NYSDOT	— NEW YORK STATE DEPARTMENT OF TRANSPORTATION
OWNL	— ORDINARY HIGH WATER LEVEL OF LAKE ERIE, EL. 573.4 IGLD
SPDES	— STATE POLLUTION DISCHARGE ELIMINATION SYSTEM

GENERAL NOTES

- THE CONTRACTOR SHALL CONFORM TO ALL REQUIREMENTS AND CONDITIONS OF ALL PERMITS ISSUED FOR THE GBSSS, WHETHER OR NOT THEY ARE SPECIFICALLY IDENTIFIED IN THE CONTRACT DOCUMENTS. COPIES OF ALL PERMITS ARE AVAILABLE FROM THE ECHDC.
- THE CONTRACTOR SHALL ADAPT ITS OPERATIONS TO THE ACTUAL CONDITIONS OF THE WEATHER, WATER, AND BEACH (INCLUDING THE LAKE BOTTOM) ENCOUNTERED DURING THE CONSTRUCTION.
- THE CONTRACTOR MAY DRIVE VEHICLES AND EQUIPMENT ON TO THE EXISTING SURFACE OF GALLAGHER BEACH AND THE NYPA PARCEL AS NEEDED TO PERFORM SPECIFIC TASKS, BUT SHALL NOT LEAVE ANY VEHICLES OR EQUIPMENT ON EITHER BEACH AFTER WORK HOURS.
- ALL VEHICLES, EQUIPMENT, AND NON-GRANULAR MATERIAL SHALL BE STORED AFTER WORK HOURS OFF OF THE BEACH IN DESIGNATED STAGING AREAS. GRANULAR MATERIALS (I.E., SAND AND PEA GRAVEL) SHALL NOT BE STOCKPILED IN THE STAGING AREAS, BUT SHALL BE HAULED DIRECTLY FROM THE PIT OR QUARRY TO THE TEST AREAS FOR PLACEMENT.

SCOPE/SEQUENCE OF WORK

THE FOLLOWING ARE THE MAJOR COMPONENTS OF THE GBSSS, IN THE GENERAL ORDER IN WHICH THEY SHALL BE PERFORMED. THE CONTRACTOR MAY ALTER THIS SCHEDULE WITH THE PRIOR WRITTEN APPROVAL OF THE ECHDC. THE LIST IS NOT COMPREHENSIVE, HOWEVER, AND THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK REQUIRED, SHOWN, AND/OR SPECIFIED, WHETHER OR NOT SPECIFICALLY IDENTIFIED HERE.

- SURVEY:** THE CONTRACTOR SHALL PERFORM THE TOPOGRAPHIC AND BATHYMETRIC SURVEY OF THE AREA SHOWN ON DRAWING ES-001, AND SHALL SUBMIT THE RESULTS OF THAT TO THE ECHDC AT LEAST ONE MONTH PRIOR TO THE START OF CONSTRUCTION.
- SIGNS:** THE CONTRACTOR SHALL INSTALL THE TEMPORARY WARNING SIGNS AT THE LOCATIONS SHOWN ON DRAWINGS C-001 AND C-002.
- COFFERDAM:** THE CONTRACTOR SHALL INSTALL AND OPERATE A COFFERDAM AND DEWATERING SYSTEM TO ALLOW THE TEST AREAS TO BE CONSTRUCTED IN THE DRY. THE DEWATERING SYSTEM SHALL DISCHARGE TO THE LAKE.
- EDGE RESTRAINT:** EDGE RESTRAINT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS IN THE LOCATIONS SHOWN ON DRAWINGS C-001 AND C-002, OR AS DIRECTED BY THE ECHDC. A SMALL LENGTH OF THE EDGE RESTRAINT MAY BE TEMPORARILY OMITTED FROM THE UPLAND PORTION OF THE TEST AREA TO ALLOW SAND-HAULING VEHICLES TO DUMP WITHIN THE FOOTPRINT OF THE TEST AREA.
- TEST AREAS:** SAND FOR THE TEST AREAS SHALL BE HAULED DIRECTLY FROM THE PIT OR QUARRY. EACH LOAD SHALL BE DUMPED AS CLOSE TO ITS ULTIMATE PLACEMENT LOCATION AS POSSIBLE. THE SAND SHALL BE SPREAD IN A SINGLE LIFT.
- POST-CONSTRUCTION SURVEY:** THE CONTRACTOR SHALL SURVEY THE PLACED SAND, THE EDGE RESTRAINT, AND THE AREA OF THE INITIAL PRE-CONSTRUCTION SURVEY.
- REMOVAL OF THE COFFERDAM:** THE CONTRACTOR SHALL REMOVE THE COFFERDAM IN SUCH A WAY THAT THE RETURN OF THE WATER DOES NOT CREATE CURRENTS OR FORCES THAT SIGNIFICANTLY DISTURB THE PLACED SAND.
- RESTORATION:** AT A TIME THE FOLLOWING SPRING TO BE DESIGNATED BY THE ECHDC (NO EARLIER THAN THE FOLLOWING APRIL), THE CONTRACTOR SHALL REMOVE THE WARNING SIGNS AND THE GEOSYNTHETIC PORTION (AT LEAST) OF THE EDGE RESTRAINT FROM THE THREE TEST AREAS, AND SHALL DISPOSE OF SUCH MATERIALS OFF-SITE. THE CONTRACTOR SHALL SPREAD THE ABOVE-WATER PORTION OF THE SAND AND ANY REMAINING PEA GRAVEL TO A UNIFORM LAYER OF ONE OR TWO INCHES THICK.

MATERIAL SPECIFICATIONS

- TEST SAND:** THE CONTRACTOR SHALL SUBMIT TO THE ECHDC DOCUMENTATION THAT THE PROPOSED SAND MEETS ALL REQUIREMENTS SPECIFIED HEREIN.

TEST SAND SHALL BE REASONABLY WELL-GRADED, SOUND, HARD, FREE OF ORGANICS AND OTHER FOREIGN AND OBJECTIONABLE MATERIALS. THE SAND SHALL BE FURNISHED FROM AN UPLAND SOURCE, AND SHALL BE MINED FROM CLZAN, FELSIC-RICH SAND AND GRAVEL PITS CONTAINING NO MORE THAN 2 PERCENT OF THE TOTAL PASSING THE #100 AND #200 SIEVES SHALL HAVE CARBONATE MINERALIZATION. THE TEST SAND SHALL MEET THE CONSTITUENT CRITERIA SPECIFIED IN 6 NYCRR SUBPART 375 TRACK 1 STANDARDS FOR UNRESTRICTED USE.

TEST SAND SHALL BE OBTAINED FROM A LICENSED PIT OR QUARRY THAT CURRENTLY HAS A MINIMUM OF AN ADDITIONAL 30,000 CY CAPACITY OF THE SAME MATERIAL, SO THAT THE SAME MATERIAL MAY BE ABLE TO BE CONSIDERED FOR ANY FUTURE BEACH CONSTRUCTION.

THE TEST SAND SHALL BE A NATURAL MATERIAL WITH THE FOLLOWING GRADATION.

U.S. STANDARD SIEVE SIZE	PERCENT FINER BY WEIGHT
NO. 4	100
NO. 10	90-100
NO. 20	70-100
NO. 40	45-85
NO. 60	20-60
NO. 80	10-34
NO. 100	0
NO. 200	0-2

- EDGE RESTRAINT:** THE EDGE RESTRAINT SHALL BE AN 18-INCH DIAMETER DURASOXX HD AS MANUFACTURED BY FILTREDX INTERNATIONAL OF GRAFTON, OHIO, OR APPROVED EQUAL. THE EDGE RESTRAINT SHALL BE ANCHORED WITH FILTREDX 5-MM LOCK DOWN NETTING, OR APPROVED EQUAL, IN A MANNER THAT ELIMINATES STAKES AND OTHER SIMILAR HAZARDS TO PEOPLE USING THE BEACHES.

THE EDGE RESTRAINT SHALL BE FILLED WITH PEA GRAVEL MEETING THE REQUIREMENTS OF NYSDOT UNDERDRAIN FILTER MATERIAL TYPE 1 OR 2, (NYSDOT STANDARD SPECIFICATION 733-20).

- COFFERDAM:** THE COFFERDAM SHALL BE A 5-FOOT PORTADAM AS MANUFACTURED BY PORTADAM, INC. OF WILLIAMSTOWN, NJ, OR APPROVED EQUAL.

THE AREA BEHIND THE COFFERDAM SHALL BE DEWATERED DURING WORK HOURS BY A LAND-BASED PUMP THAT DISCHARGES TO THE LAKE. THE INLET AND THE OUTLET OF THE PUMP SHALL BE DESIGNED BY THE CONTRACTOR TO MINIMIZE ENTRAPMENT OR SCOUR OF THE EXISTING LAKE-BOTTOM MATERIALS (INCLUDING SUBMERGED AQUATIC VEGETATION) DURING PUMPING. THE DESIGN OF THE INLET AND OUTLET STRUCTURES ARE SUBJECT TO THE REVIEW AND APPROVAL OF THE ECHDC AND SHALL BE SUBMITTED TO THE ECHDC AT LEAST TWO WEEKS PRIOR TO THE START OF CONSTRUCTION.

- SIGNS:** INFORMATION SIGNS SHALL BE INSTALLED AT THE SIX LOCATIONS SHOWN ON DRAWINGS C-001 AND C-002. THE SIGNS SHALL BE OF FIBERGLASS REINFORCED PLASTIC AT LEAST 2'-FT. BY 3'-FT. WITH GREEN LETTERS ON A WHITE BACKGROUND. EACH SIGN SHALL BE SUPPORTED BY TWO STAKES DRIVEN AT LEAST 2 FEET INTO EXISTING GRADE. THE SIGNS SHALL EACH DISPLAY THE FOLLOWING MESSAGE:

BEACH SAND TEST AREA

- THIS AREA HAS BEEN CONSTRUCTED AS PART OF A STUDY TO DETERMINE IF A SAND BEACH CAN BE ESTABLISHED ON THE BUFFALO WATERFRONT.
- PLEASE FEEL FREE TO USE THIS AREA AS YOU WOULD ANY BEACH: WALK ON IT, LAY ON IT, PLAY ON IT.
- PLEASE DO **NOT** REMOVE ANY SAND FROM THIS AREA.
- PLEASE DO **NOT** MOVE OR DAMAGE THE EDGE MATERIALS.

SPONSORED BY THE

ERIE CANAL HARBOR DEVELOPMENT CORPORATION

eriecanalharbor@empire.state.ny.us

716-846-2800

EXECUTION

- SURVEY:** PRE- AND POST-CONSTRUCTION SURVEYS SHALL BE PERFORMED ON (MAXIMUM) 10-FOOT SPACING, AND SHALL RECORD THE LOCATION OF THE EDGE RESTRAINT. THE SURVEY SHALL REFERENCE THE SAME DATUMS AS THE CONTRACT DRAWINGS. THE POST-CONSTRUCTION SURVEY OF THE TEST AREAS SHALL BE PERFORMED IN THE DRY. THE SURVEY SHALL BE PERFORMED BY A NYS-LICENSED SURVEYOR. THE CONTRACTOR SHALL PROVIDE STAMPED COPIES OF THE PRE- AND POST-CONSTRUCTION SURVEYS TO THE ECHDC WITHIN TWO WEEKS OF THE DATE OF THE SURVEY.

BASED UPON THE RESULTS OF THE SURVEY, THE ECHDC MAY ALTER THE LOCATION OR SIZE OF ONE OR MORE OF THE TEST AREAS.

- COFFERDAM:** THE COFFERDAM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS TO THE LOCATIONS SHOWN OR AS DIRECTED BY THE ECHDC, AND AS NECESSARY FOR THE CONTRACTOR'S DEWATERING OPERATIONS.

THE CONTRACTOR SHALL DEWATER THE AREA WITHIN THE COFFERDAM AS NECESSARY TO CONSTRUCT THE EDGE RESTRAIN AND THE TEST AREAS IN THE DRY. THE DEWATERING PUMP SHALL BE LOCATED ABOVE THE LAKE WATER LEVEL. THE INLET AND THE OUTLET OF THE PUMP SHALL BE DESIGNED BY THE CONTRACTOR TO MINIMIZE ENTRAPMENT OR SCOUR OF THE EXISTING LAKE-BOTTOM MATERIALS (INCLUDING SUBMERGED AQUATIC VEGETATION) DURING PUMPING. THE DESIGN OF THE INLET AND OUTLET STRUCTURES ARE SUBJECT TO THE REVIEW AND APPROVAL OF THE ECHDC AND SHALL BE SUBMITTED TO THE ECHDC AT LEAST TWO WEEKS PRIOR TO THE START OF CONSTRUCTION.

UPON COMPLETION OF THE INSTALLATION, THE COFFERDAM SHALL BE REMOVED IN SUCH A MANNER THAT THE RETURNING WATER DOES NOT SIGNIFICANTLY DISTURB THE PLACED TEST SAND.

- EDGE RESTRAINT:** EDGE RESTRAINT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTION TO THE LOCATIONS SHOWN OR AS DIRECTED BY THE ECHDC.

EDGE RESTRAINT SHALL BE PLACED IN A CONTINUOUS INSTALLATION, A SMALL LENGTH OF THE EDGE RESTRAINT MAY BE TEMPORARILY OMITTED FROM THE UPLAND PORTION OF THE TEST AREA(S) TO ALLOW SAND-HAULING VEHICLES TO DUMP WITHIN THE FOOTPRINT OF THE TEST AREA.

PEA GRAVEL FILL FOR THE EDGE RESTRAINT SHALL BE DELIVERED DIRECTLY TO THE PLACEMENT EQUIPMENT TO THE DEGREE POSSIBLE. STOCKPILING IN STAGING OR PARKING AREAS SHALL BE MINIMIZED.

- TEST SAND:** TEST SAND SHALL BE HAULED DIRECTLY FROM THE PIT OR QUARRY TO THE TEST AREAS AND SHALL NOT BE STOCKPILED IN STAGING OR PARKING AREAS. EACH LOAD OF SAND SHALL BE HAULED AND DUMPED AS CLOSE TO ITS ULTIMATE PLACEMENT LOCATION AS POSSIBLE.

THE TEST SAND SHALL BE PUSHED AND GRADED WITH LOW-GROUND-PRESSURE EQUIPMENT IN A SINGLE LIFT. THE CONTRACTOR SHALL USE GRADE STAKES OR OTHER SIMILAR MEANS TO DETERMINE THE THICKNESS OF THE LAYER DURING PLACEMENT.

LEGEND

— 575 —	CONTOUR
SS	SIGN
▽	WATER LEVEL
	RIP-RAP
	TEST AREA
— · — · — · —	LONG TERM AVERAGE STILL WATER LAKE ERIE LEVEL
— — — —	ORDINARY HIGH WATER LEVEL OF LAKE ERIE (LIMIT OF LAKE)
A	SECTION LETTER
C-001 C-003	SHEET ON WHICH SECTION IS LOCATED
—	SHEET ON WHICH SECTION IS CUT
17	DETAIL NUMBER
C-001 C-005	SHEET ON WHICH DETAIL IS LOCATED
—	SHEET ON WHICH DETAIL IS CALLED OUT

ABBREVIATIONS

CONC	CONCRETE
ELEV.	ELEVATION
TYP.	TYPICAL

PERMIT
DRAWING

REVISIONS

NO.	DATE	DESCRIPTION
0 <td>11/11 <td>INITIAL SUBMISSION PERMIT APPLICATIONS</td> </td>	11/11 <td>INITIAL SUBMISSION PERMIT APPLICATIONS</td>	INITIAL SUBMISSION PERMIT APPLICATIONS
1 <td>11/11 <td>REVISIONS</td> </td>	11/11 <td>REVISIONS</td>	REVISIONS

DESIGNED BY: RW
DRAWN BY: JUS
CHECKED BY: ---
PROJ. ENGR. RW

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New York
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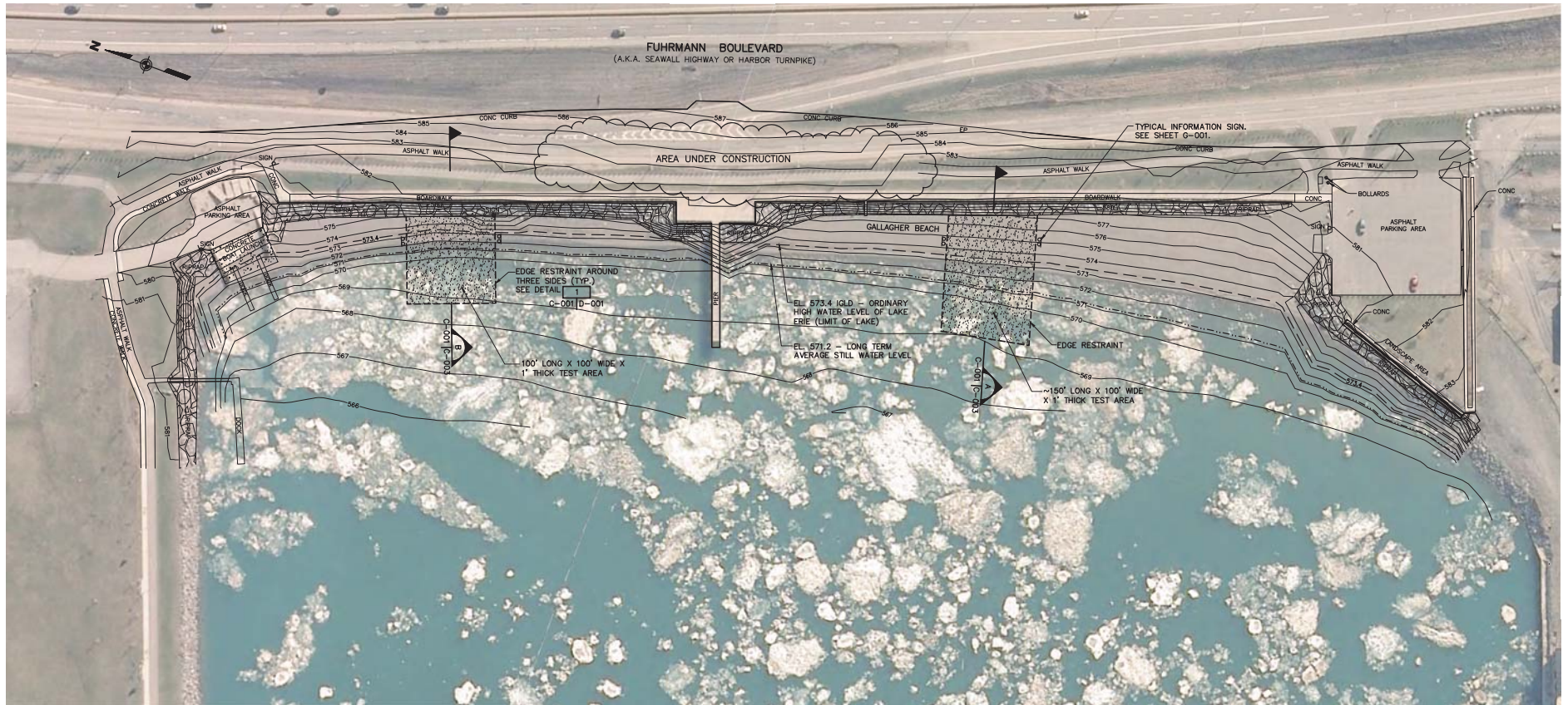
JOB NO. 11176512

ERIE COUNTY
**ERIE CANAL HARBOR
DEVELOPMENT CORPORATION**
CITY OF BUFFALO NEW YORK

SAND SUSTAINABILITY STUDY

**LEGEND, ABBREVIATIONS,
GENERAL NOTES &
SPECIFICATIONS**

Scale: AS SHOWN Date: NOV. 2011 **G-001**



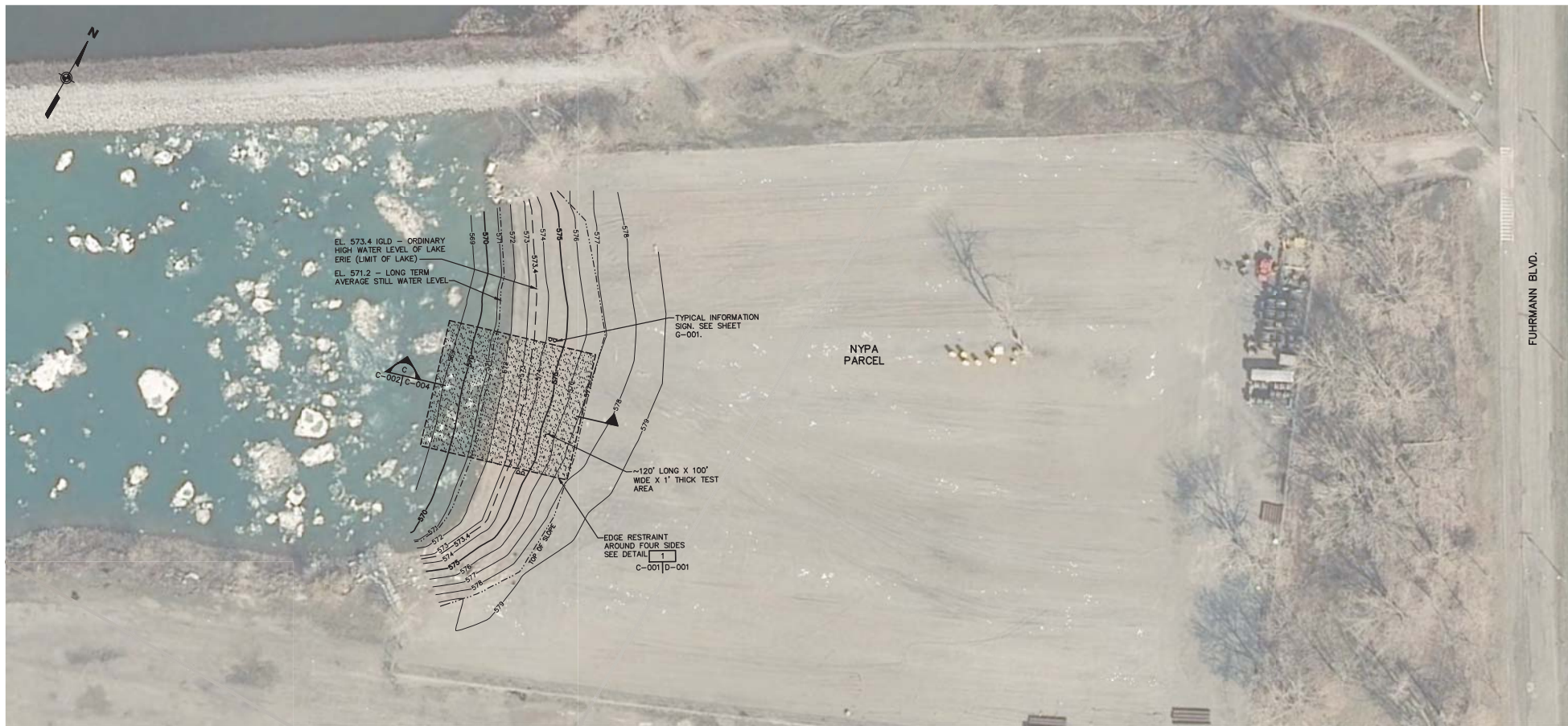
NOTES:

1. HORIZONTAL DATUM IS BASED UPON THE NEW YORK STATE PLANE COORDINATE SYSTEM, WEST ZONE, 1983 ADJUSTMENT; ELEVATIONS ARE BASED UPON INTERNATIONAL GREAT LAKES DATUM (IGLD 85).
2. TOPOGRAPHIC SURVEY PERFORMED BY URS CORPORATION ON JULY 6, 2011.
3. CONTOURS 569 AND LOWER TAKEN FROM NFTA BOAT HARBOR BEACH PROJECT RECORD DRAWINGS, DATED 1/23/01, PREPARED BY DIDONATO ASSOCIATES, P.E., P.C.
4. BACKGROUND ORTHOIMAGERY SHOWN WAS DOWNLOADED FROM NYSGIS CLEARINGHOUSE WEBSITE. ORTHOIMAGERY PROVIDED IN NEW YORK STATE PLANE, NAD 83 COORDINATE SYSTEM, COMPLETED IN APRIL 2008.

**PERMIT
DRAWING**

60' 0 60'
SCALE IN FEET

WARNING: IF THIS IS A REVISION OF SECTION 2204, SUBSECTION 2 OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON OTHER THAN WHOSE SEAL APPEARS ON THIS DRAWING, OR ANY OTHER SEAL, THIS DRAWING, IF AN ITEM IS ADDED, THE ALTERED DRAWER SHALL AFFIX HIS TO THE ITEM HIS SEAL AND THE REVISION "ALTERED" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.				DESIGNED BY: <u>RW</u>		URS Corporation New York 77 Goodell Street, Buffalo, New York 14203 (716)856-5636 • (716)856-2543 fax	ERIE COUNTY		ERIE CANAL HARBOR DEVELOPMENT CORPORATION		SAND SUSTAINABILITY STUDY		GALLAGHER BEACH PLAN																		
DRAWN BY: <u>JJS</u>		CHECKED BY: _____		CITY OF BUFFALO			NEW YORK		Scale: AS SHOWN		Date: NOV. 2011		C-001																		
PROJ. ENGR. <u>RW</u>		JOB NO. 11176512																													
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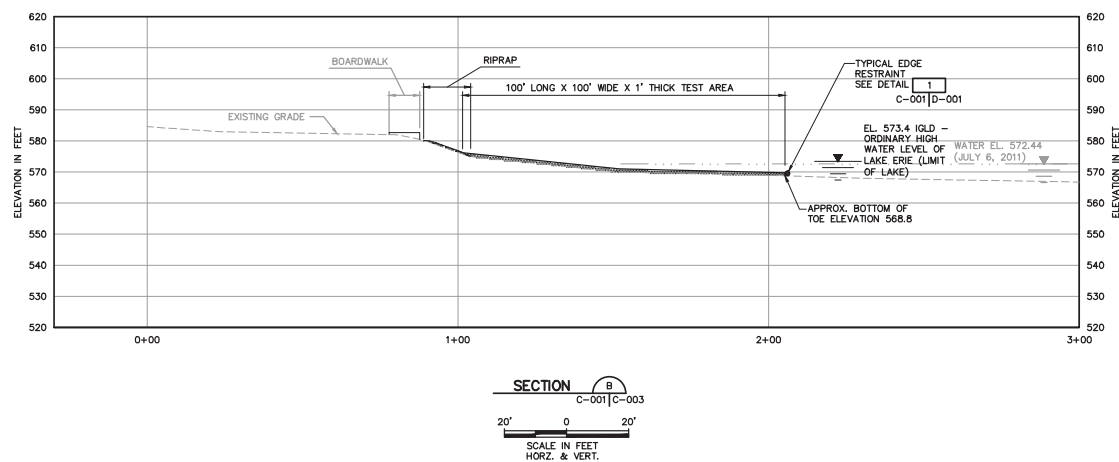
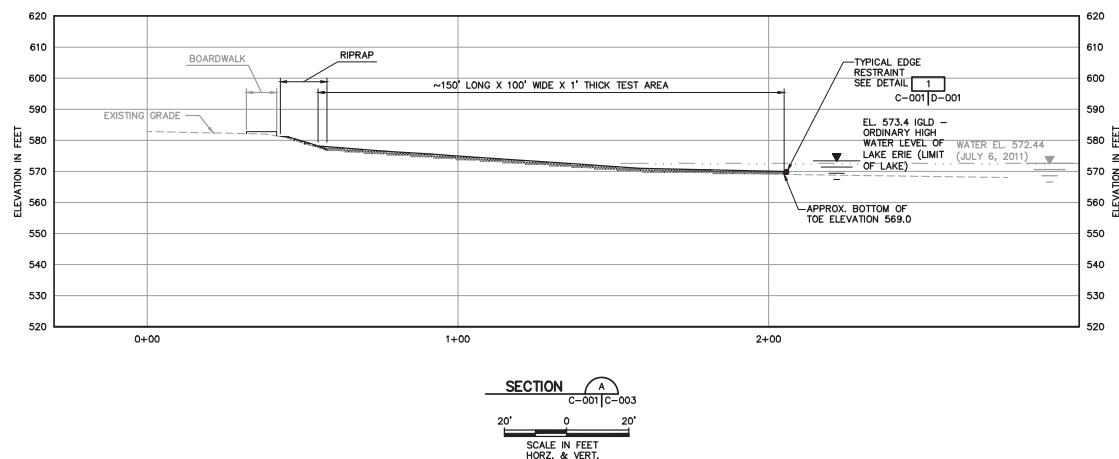
PERMIT
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SCALE IN FEET

WARNING: IF THIS IS A REVISION OF SECTION 2000, SUBSECTION 2 OF THE NEW YORK STATE EROSION LAW AND ANY PERSON OTHER THAN WHOSE SEAL APPEARS ON THIS DRAWING, OR THIS DRAWING, IF AN ITEM IS ADDED, THE ALTERED DRAWER SHALL AFFIX TO IT THE HIS SEAL AND THE NOTATION "ALTERED BY FOLLOWED BY THE SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION."				DESIGNED BY: <u>RW</u>		URS Corporation New York 77 Goodell Street, Buffalo, New York 14203 (716)856-5636 • (716)856-2543 fax		ERIE COUNTY		ERIE CANAL HARBOR DEVELOPMENT CORPORATION		SAND SUSTAINABILITY STUDY		NYPA PROPERTY PLAN	
				DRAWN BY: <u>J.S.</u>											
				CHECKED BY: <u>J.S.</u>											
				PROJ. ENGR. <u>RW</u>		JOB NO. 11176512		CITY OF BUFFALO		NEW YORK		Scale: AS SHOWN Date: NOV. 2011		C-002	
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PROJ. ENGR. R.W.

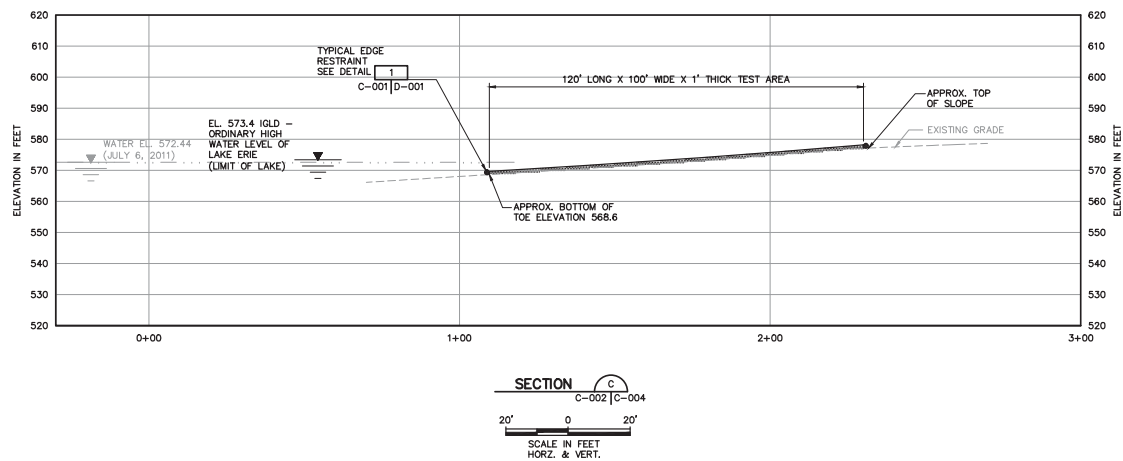
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ERIE COUNTY
**ERIE CANAL HARBOR
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CITY OF BUFFALO NEW YORK

SAND SUSTAINABILITY STUDY

**GALLAGHER BEACH
PARCEL SECTIONS**

Scale: AS SHOWN Date: NOV. 2011 **C-003**



PERMIT
DRAWING

AMENDMENTS				REVISIONS	
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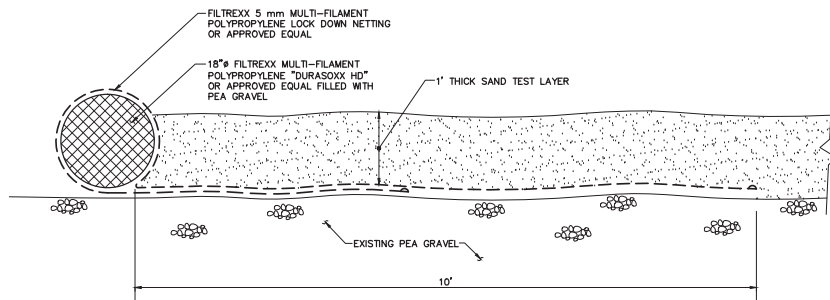
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ERIE COUNTY
**ERIE CANAL HARBOR
 DEVELOPMENT CORPORATION**
 CITY OF BUFFALO NEW YORK

SAND SUSTAINABILITY STUDY

**NYPA PARCEL
 SECTION**
 Scale: AS SHOWN Date: NOV. 2011 **C-004**



TYPICAL EDGE RESTRAINT DETAIL 1
NOT TO SCALE C-001|D-001

**PERMIT
DRAWING**

AMENDMENT
IF BY A VIOLATION OF SECTION 2209
SUBSECTION 2 OF THE NEW YORK
STATE EDUCATION LAW FOR AN
APPROVED EQUAL FILLING WITH
PEA GRAVEL. ON
THIS DRAWING, IF ANY TEXT IS
ALTERED, THE ALTERING ENGINEER
SHALL WRITE TO THE ITEM AND
SEAL AND THE NOTATION "ALTERED
BY" FOLLOWED BY HIS SIGNATURE
AND THE DATE OF SUCH ALTERATION
AND THE ALTERING DESCRIPTION OF
THE ALTERATION.

NO.	MADE BY	APPROVED BY	DATE	DESCRIPTION
0			11/11	INITIAL SUBMISSION PERMIT APPLICATIONS
REVISIONS				

DESIGNED BY: R.W.
DRAWN BY: JVS
CHECKED BY: _____
PROJ. ENGR. R.W.

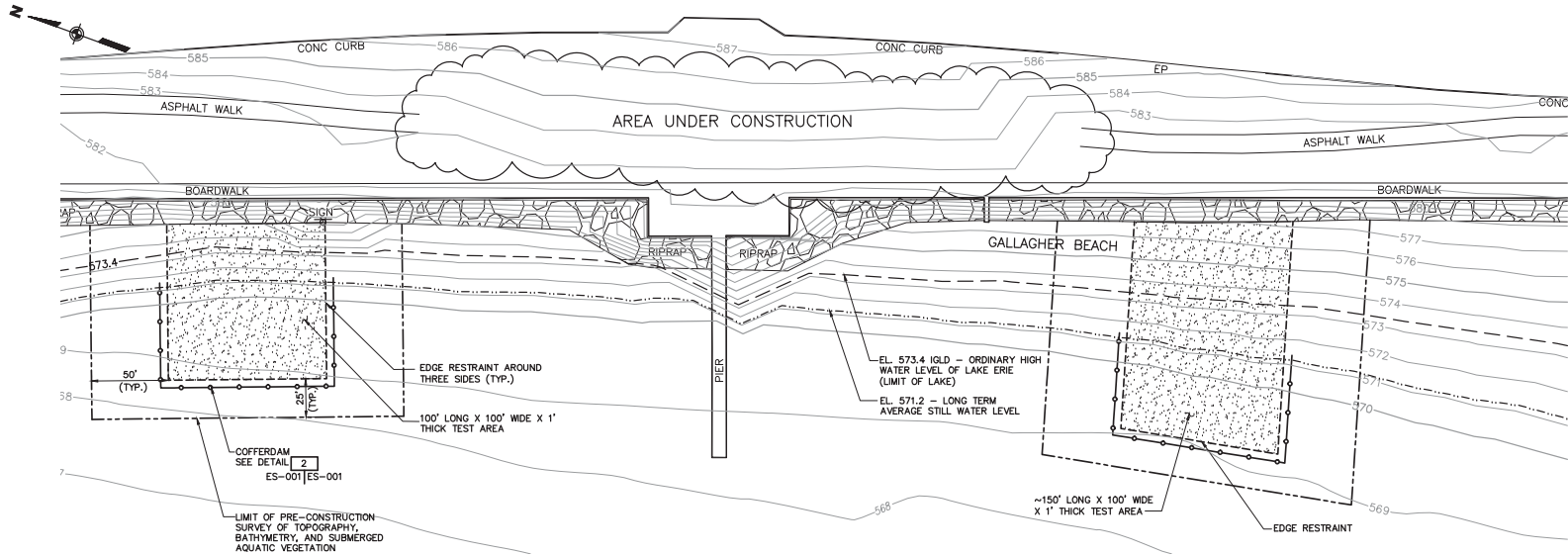
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CITY OF BUFFALO NEW YORK

SAND SUSTAINABILITY STUDY

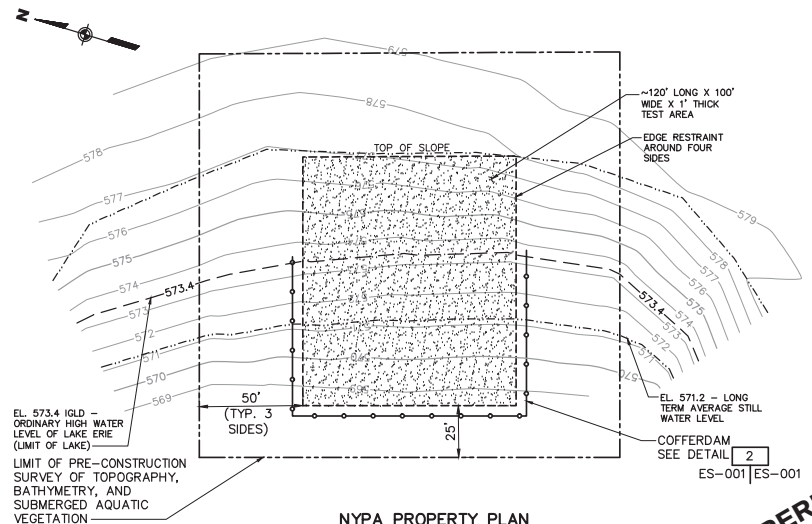
DETAILS

Scale: AS SHOWN Date: NOV. 2011 **DT-001**



GALLAGHER BEACH PLAN

40' 0 40'
SCALE IN FEET



NYPA PROPERTY PLAN

30' 0 30'
SCALE IN FEET

**PERMIT
DRAWING**

TYPICAL COFFERDAM DETAIL INSTALLATION DETAIL

NOT TO SCALE

ES-001 ES-001

- NOTES:
1. COFFERDAM SHALL BE AS MANUFACTURED BY PORTADAM (SHOWN) OR APPROVED EQUAL.
 2. THE CONTRACTOR SHALL DESIGN AND INSTALL THE COFFERDAM TO FUNCTION UNDER THE ACTUAL CONDITIONS OF THE WEATHER, WATER, AND LAKE BOTTOM, WHICH WILL VARY FROM THOSE SHOWN.

REVISIONS

NO.	MADE BY	APPROVED BY	DATE	DESCRIPTION
0			11/11	INITIAL SUBMISSION PERMIT APPLICATIONS

DESIGNED BY: <u>R.W.</u>	
DRAWN BY: <u>J.S.</u>	
CHECKED BY: <u></u>	
PROJ. ENGR. <u>R.W.</u>	

URS Corporation
New York
77 Goodell Street, Buffalo, New York 14203
(716)856-5636 • (716)856-2545 fax

JOB NO. 11176512

ERIE COUNTY
**ERIE CANAL HARBOR
DEVELOPMENT CORPORATION**
CITY OF BUFFALO NEW YORK

SAND SUSTAINABILITY STUDY

**EROSION AND
SEDIMENT CONTROL
DETAILS**
Scale: AS SHOWN Date: NOV. 2011 **ES-001**

ATTACHMENT B
Permits



PERMIT
Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:

ERIE CANAL HARBOR DEVELOPMENT
CORPORATION
95 PERRY ST 5TH FL
BUFFALO, NY 14203-3030
(716) 846-8200

Facility:

GALLAGHER BEACH

FUHERMANN BVLD (RTE 5) - W SIDE
BUFFALO, NY

Facility Location: in BUFFALO in ERIE COUNTY

Facility Principal Reference Point: NYTM-E: 184.538 NYTM-N: 4750.539
Latitude: 42°50'32.4" Longitude: 78°51'36.8"

Authorized Activity: The placement of a total of 950 cubic yards of sand in two test plot locations at Gallagher Beach. The sand will be placed in a continuous layer approximately one foot thick and 100 feet in width. The sand will extend approximately 100 feet in length at the northern test plot and 150 feet in length at the southern test plot. The sand in each test plot will extend into Lake Erie as shown on the referenced plans.

Permit Authorizations

Water Quality Certification - Under Section 401 - Clean Water Act

Permit ID 9-1402-01079/00001

New Permit

Effective Date: 6/25/2012

Expiration Date: 6/24/2014

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: DAVID S DENK, Regional Permit Administrator

Address: NYSDEC REGION 9 HEADQUARTERS
270 MICHIGAN AVE
BUFFALO, NY 14203 -2915

Authorized Signature: _____

Date 6/25/2012



Permit Components

NATURAL RESOURCE PERMIT CONDITIONS

WATER QUALITY CERTIFICATION SPECIFIC CONDITION

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

NATURAL RESOURCE PERMIT CONDITIONS - Apply to the Following Permits: WATER QUALITY CERTIFICATION

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such approved plans were prepared by URS Corporation dated November 2011 and are attached (4 pages).
2. **Work Prohibition Dates** Work operations in the water are prohibited from March 30 to July 1 to minimize adverse impacts to fish spawning.
3. **Sand Placed Landward of Submerged Aquatic Vegetation** All sand must be placed landward of areas of submerged aquatic vegetation.
4. **Location of Test Areas to be Approved by NYSDEC Staff** Prior to the placement of sand in the test areas, the footprint of the areas shall be staked for inspection and approval by Department staff. Mr. Michael Wilkinson or Mr. Timothy DePriest shall be contacted at (716) 851-7010 to arrange the inspection.
5. **Clean Sand Only** Sand placed in the test locations must be free of organic, other foreign or objectionable materials.
6. **Use Temporary Cofferdam** Prior to commencing the project, a temporary cofferdam shall be installed to isolate the sand placement area from the lake. The cofferdam shall be entirely removed upon completion of the placement of the edge restraint and sand.
7. **State Not Liable for Damage** The State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.
8. **State May Order Removal or Alteration of Work** If future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to



remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners, shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

9. State May Require Site Restoration If upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may lawfully require, remove all or any portion of the uncompleted structure or fill and restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

10. Precautions Against Contamination of Waters All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

WATER QUALITY CERTIFICATION SPECIFIC CONDITIONS

1. Water Quality Certification The NYS Department of Environmental Conservation hereby certifies that the subject project will not contravene effluent limitations or other limitations or standards under Sections 301, 302, 303, 306 and 307 of the Clean Water Act of 1977 (PL 95-217) provided that all of the conditions listed herein are met.

GENERAL CONDITIONS - Apply to ALL Authorized Permits:

1. Facility Inspection by The Department The permitted site or facility, including relevant records, is subject to inspection at reasonable hours and intervals by an authorized representative of the Department of Environmental Conservation (the Department) to determine whether the permittee is complying with this permit and the ECL. Such representative may order the work suspended pursuant to ECL 71- 0301 and SAPA 401(3).

The permittee shall provide a person to accompany the Department's representative during an inspection to the permit area when requested by the Department.

A copy of this permit, including all referenced maps, drawings and special conditions, must be available for inspection by the Department at all times at the project site or facility. Failure to produce a copy of the permit upon request by a Department representative is a violation of this permit.



2. Relationship of this Permit to Other Department Orders and Determinations Unless expressly provided for by the Department, issuance of this permit does not modify, supersede or rescind any order or determination previously issued by the Department or any of the terms, conditions or requirements contained in such order or determination.

3. Applications For Permit Renewals, Modifications or Transfers The permittee must submit a separate written application to the Department for permit renewal, modification or transfer of this permit. Such application must include any forms or supplemental information the Department requires. Any renewal, modification or transfer granted by the Department must be in writing. Submission of applications for permit renewal, modification or transfer are to be submitted to:

Regional Permit Administrator
NYSDEC REGION 9 HEADQUARTERS
270 MICHIGAN AVE
BUFFALO, NY 14203 -2915

4. Submission of Renewal Application The permittee must submit a renewal application at least 30 days before permit expiration for the following permit authorizations: Water Quality Certification.

5. Permit Modifications, Suspensions and Revocations by the Department The Department reserves the right to exercise all available authority to modify, suspend or revoke this permit. The grounds for modification, suspension or revocation include:

- a. materially false or inaccurate statements in the permit application or supporting papers;
- b. failure by the permittee to comply with any terms or conditions of the permit;
- c. exceeding the scope of the project as described in the permit application;
- d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;
- e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. Permit Transfer Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.



NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification

The permittee, excepting state or federal agencies, expressly agrees to indemnify and hold harmless the Department of Environmental Conservation of the State of New York, its representatives, employees, and agents ("DEC") for all claims, suits, actions, and damages, to the extent attributable to the permittee's acts or omissions in connection with the permittee's undertaking of activities in connection with, or operation and maintenance of, the facility or facilities authorized by the permit whether in compliance or not in compliance with the terms and conditions of the permit. This indemnification does not extend to any claims, suits, actions, or damages to the extent attributable to DEC's own negligent or intentional acts or omissions, or to any claims, suits, or actions naming the DEC and arising under Article 78 of the New York Civil Practice Laws and Rules or any citizen suit or civil rights provision under federal or state laws.

Item B: Permittee's Contractors to Comply with Permit

The permittee is responsible for informing its independent contractors, employees, agents and assigns of their responsibility to comply with this permit, including all special conditions while acting as the permittee's agent with respect to the permitted activities, and such persons shall be subject to the same sanctions for violations of the Environmental Conservation Law as those prescribed for the permittee.

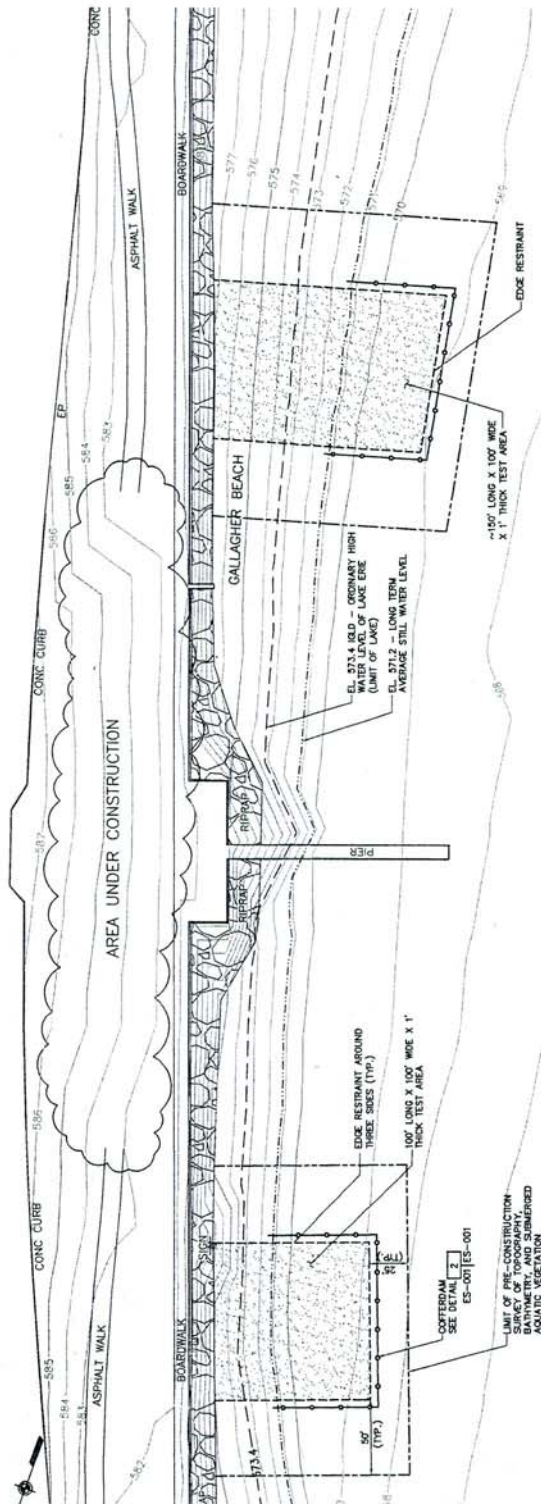
Item C: Permittee Responsible for Obtaining Other Required Permits

The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

Item D: No Right to Trespass or Interfere with Riparian Rights

This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.

- NOTES:
1. THE LAKE LEVEL SHOWN ON THIS DRAWING IS 571.2 OLD, WHICH IS THE LONG-TERM AVERAGE STILL WATER LEVEL OF LAKE ERIE.
 2. THE CONTRACTOR SHALL DESIGN AND INSTALL THE COFFERDAM AND ALL OTHER ENVIRONMENTAL CONTROLS TO ADDRESS THE ACTUAL CONDITIONS OF THE WEATHER, WATER, AND SUBMERGED AQUATIC VEGETATION, WHICH WILL VARY FROM THOSE SHOWN.





PERMIT
Under the Environmental Conservation Law (ECL)

Permittee and Facility Information

Permit Issued To:

ERIE CANAL HARBOR DEVELOPMENT
CORPORATION
95 PERRY ST 5TH FL

BUFFALO, NY 14203-3030
(716) 846-8200

Facility:

BUFFALO WATERFRONT OUTER HARBOR
PARCEL OH SITE IMPROVEMENTS
225 FUHRMANN BLVD|175 FUHRMANN
BLVD
BUFFALO, NY 14203

Facility Location: in BUFFALO in ERIE COUNTY

Facility Principal Reference Point: NYTM-E: 182.772 NYTM-N: 4753.822
Latitude: 42°52'16.0" Longitude: 78°53'01.1"

Project Location: 175 Fuhrmann Blvd

Authorized Activity: The placement of a total of 450 cubic yards of sand in one test plot location at the Buffalo Outer Harbor site (former NYPA parcel). The sand will be placed in a continuous layer approximately one foot thick and 100 feet in width. The sand will extend approximately 120 feet in length into Lake Erie as shown on the referenced plans.

Permit Authorizations

Water Quality Certification - Under Section 401 - Clean Water Act

Permit ID 9-1402-01078/00003

New Permit

Effective Date: 6/25/2012

Expiration Date: 6/24/2014

NYSDEC Approval

By acceptance of this permit, the permittee agrees that the permit is contingent upon strict compliance with the ECL, all applicable regulations, and all conditions included as part of this permit.

Permit Administrator: DAVID S DENK, Regional Permit Administrator

Address: NYSDEC REGION 9 HEADQUARTERS
270 MICHIGAN AVE
BUFFALO, NY 14203 -2915

Authorized Signature: _____

Date 6/25/2012



Permit Components

NATURAL RESOURCE PERMIT CONDITIONS

WATER QUALITY CERTIFICATION SPECIFIC CONDITION

GENERAL CONDITIONS, APPLY TO ALL AUTHORIZED PERMITS

NOTIFICATION OF OTHER PERMITTEE OBLIGATIONS

NATURAL RESOURCE PERMIT CONDITIONS - Apply to the Following Permits: WATER QUALITY CERTIFICATION

1. **Conformance With Plans** All activities authorized by this permit must be in strict conformance with the approved plans submitted by the applicant or applicant's agent as part of the permit application. Such approved plans were prepared by URS Corporation dated November 2011 and are attached (4 pages).
2. **Work Prohibition Dates** Work operations in the water are prohibited from March 30 to July 1 to minimize adverse impacts to fish spawning.
3. **Sand Placed Landward of Submerged Aquatic Vegetation** All sand must be placed landward of areas of submerged aquatic vegetation.
4. **Location of Test Areas to be Approved by NYSDEC Staff** Prior to the placement of sand in the test areas, the footprint of the areas shall be staked for inspection and approval by Department staff. Mr. Michael Wilkinson or Mr. Timothy DePriest shall be contacted at (716) 851-7010 to arrange the inspection.
5. **Clean Sand Only** Sand placed in the test locations must be free of organic, other foreign or objectionable materials.
6. **Use Temporary Cofferdam** Prior to commencing the project, a temporary cofferdam shall be installed to isolate the sand placement area from the lake. The cofferdam shall be entirely removed upon completion of the placement of the edge restraint and sand.
7. **State Not Liable for Damage** The State of New York shall in no case be liable for any damage or injury to the structure or work herein authorized which may be caused by or result from future operations undertaken by the State for the conservation or improvement of navigation, or for other purposes, and no claim or right to compensation shall accrue from any such damage.



8. State May Order Removal or Alteration of Work If future operations by the State of New York require an alteration in the position of the structure or work herein authorized, or if, in the opinion of the Department of Environmental Conservation it shall cause unreasonable obstruction to the free navigation of said waters or flood flows or endanger the health, safety or welfare of the people of the State, or cause loss or destruction of the natural resources of the State, the owner may be ordered by the Department to remove or alter the structural work, obstructions, or hazards caused thereby without expense to the State, and if, upon the expiration or revocation of this permit, the structure, fill, excavation, or other modification of the watercourse hereby authorized shall not be completed, the owners, shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may require, remove all or any portion of the uncompleted structure or fill and restore to its former condition the navigable and flood capacity of the watercourse. No claim shall be made against the State of New York on account of any such removal or alteration.

9. State May Require Site Restoration If upon the expiration or revocation of this permit, the project hereby authorized has not been completed, the applicant shall, without expense to the State, and to such extent and in such time and manner as the Department of Environmental Conservation may lawfully require, remove all or any portion of the uncompleted structure or fill and restore the site to its former condition. No claim shall be made against the State of New York on account of any such removal or alteration.

10. Precautions Against Contamination of Waters All necessary precautions shall be taken to preclude contamination of any wetland or waterway by suspended solids, sediments, fuels, solvents, lubricants, epoxy coatings, paints, concrete, leachate or any other environmentally deleterious materials associated with the project.

WATER QUALITY CERTIFICATION SPECIFIC CONDITIONS

1. Water Quality Certification The NYS Department of Environmental Conservation hereby certifies that the subject project will not contravene effluent limitations or other limitations or standards under Sections 301, 302, 303, 306 and 307 of the Clean Water Act of 1977 (PL 95-217) provided that all of the conditions listed herein are met.

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BUFFALO, NY 14203 -2915

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- b. failure by the permittee to comply with any terms or conditions of the permit;
- c. exceeding the scope of the project as described in the permit application;
- d. newly discovered material information or a material change in environmental conditions, relevant technology or applicable law or regulations since the issuance of the existing permit;
- e. noncompliance with previously issued permit conditions, orders of the commissioner, any provisions of the Environmental Conservation Law or regulations of the Department related to the permitted activity.

6. Permit Transfer Permits are transferrable unless specifically prohibited by statute, regulation or another permit condition. Applications for permit transfer should be submitted prior to actual transfer of ownership.



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Item A: Permittee Accepts Legal Responsibility and Agrees to Indemnification

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Item B: Permittee's Contractors to Comply with Permit

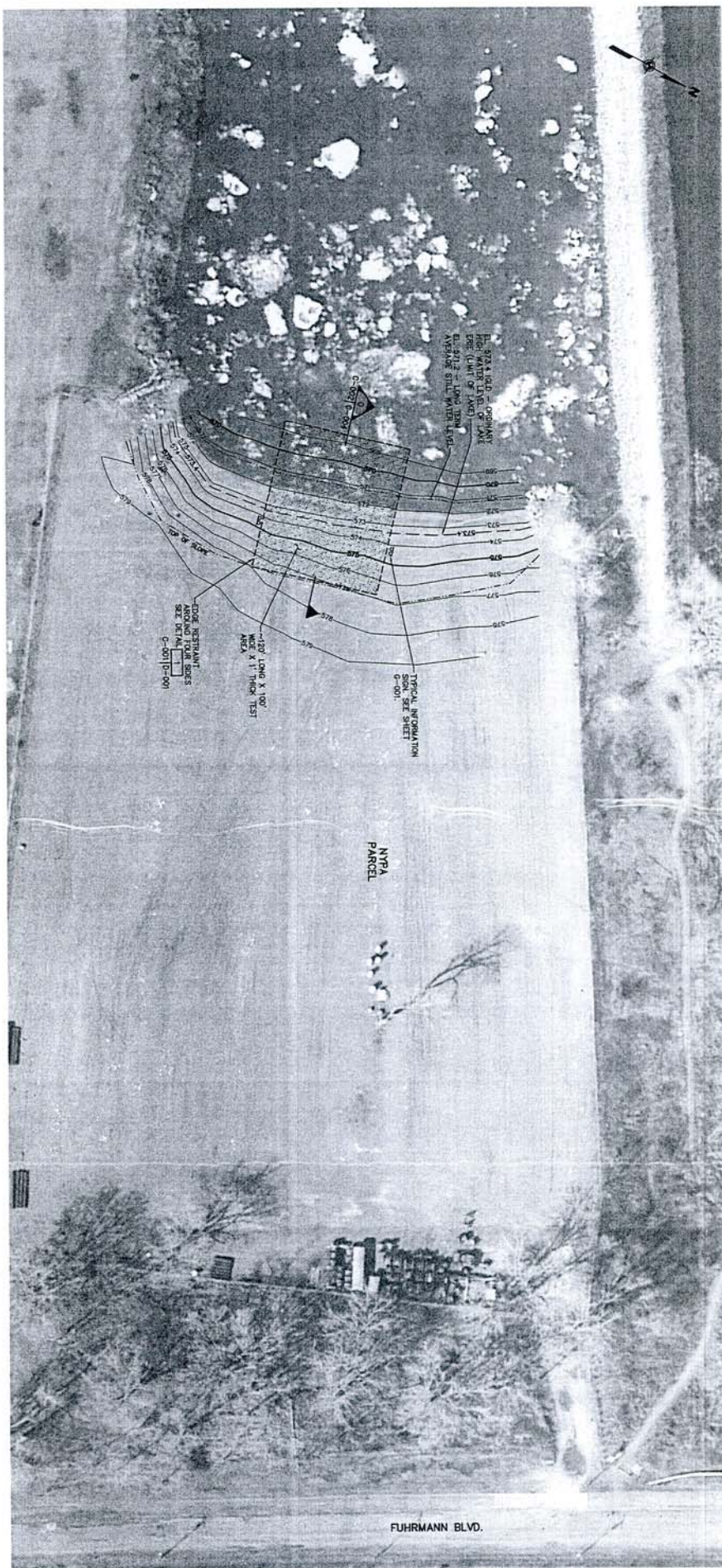
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The permittee is responsible for obtaining any other permits, approvals, lands, easements and rights-of-way that may be required to carry out the activities that are authorized by this permit.

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This permit does not convey to the permittee any right to trespass upon the lands or interfere with the riparian rights of others in order to perform the permitted work nor does it authorize the impairment of any rights, title, or interest in real or personal property held or vested in a person not a party to the permit.



- NOTES:**
1. HORIZONTAL DATUM IS BASED UPON THE NEW YORK STATE PLANE COORDINATE SYSTEM. VERTICAL DATUM IS BASED UPON THE ELEVATIONS ARE BASED UPON INTERNATIONAL GREAT LAKES DATUM (IGLD 85).
 2. TOPOGRAPHIC SURVEY PERFORMED BY URS CORPORATION ON JULY 6 & 7, 2011.
 3. BACKGROUND ORTHOPHOTOGRAPHY SHOWN WAS OBTAINED FROM AERIAL PHOTOGRAPHIC SYSTEM, ORTHOPHOTOGRAPHY PROVIDED IN NEW YORK STATE PLANE, NAD 83 COORDINATE SYSTEM, COMPLETED IN APRIL, 2008.

**PERMIT
DRAWING**

40' 0 40'
SCALE IN FEET

DESIGNED BY: JMK DRAWN BY: JMK CHECKED BY: JMK PROJ. ENGR. JMK		URS Corporation New York 77 Broad Street, Suite 200, New York, NY 10013 212.693.5000 • 212.693.5001		ERIE COUNTY ERIE CANAL HARBOR DEVELOPMENT CORPORATION NEW YORK		SAND SUSTAINABILITY STUDY		NYPA PROPERTY PLAN Scale: AS SHOWN Date: NOV 2011	
NO. 1 DATE 11/7/11 REVISIONS		REVISIONS		JOB NO. 11178512		C-002		C-002	

NO.	DATE	REVISIONS
1	11/11	INITIAL SUBMISSION FROM APPLICATION
2		DESIGNATION
3		
4		
5		
6		
7		
8		
9		
10		

DESIGNED BY: **R.W.**
 DRAWN BY: **J.S.**
 CHECKED BY: **---**
 PROJ. ENGR. **R.W.**

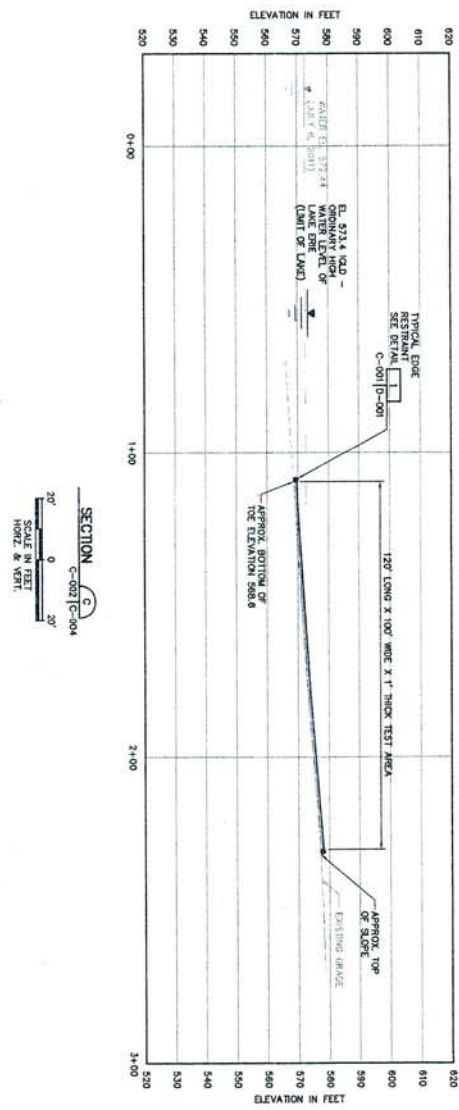
URS Corporation
 New York
 77 Gould Street, Buffalo, New York 14203
 (716) 836-3300 • (716) 836-3400
 JOB NO. **11176512**

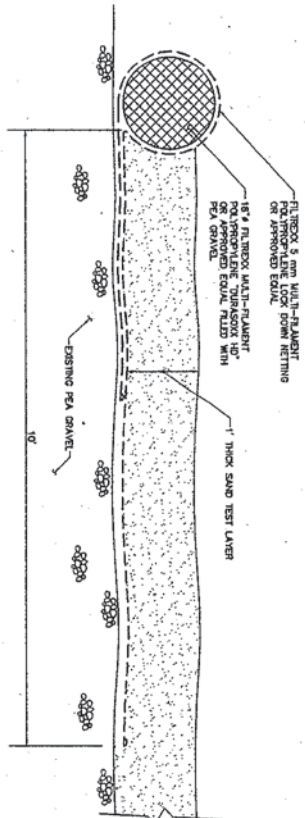
ERIE COUNTY
**ERIE CANAL HARBOR
 DEVELOPMENT CORPORATION**
 CITY OF BUFFALO
 NEW YORK

SAND SUSTAINABILITY STUDY

**NYPA PARCEL
 SECTION**
 Scale: AS SHOWN
 Date: NOV. 2011
C-004

**PERMIT
 DRAWING**





TYPICAL EDGE RESTRAINT DETAIL
NOT TO SCALE

PROJECT NO. 11176512 SHEET NO. 11176512-1 DATE 11/1/11 DRAWN BY JSE CHECKED BY JSE DESIGNED BY JSE PROJ. ENGR. JSE		URS Corporation 77 Gould Street, Buffalo, New York 14203 (716) 835-2200 (716) 835-2200 fax NEW YORK JOB NO. 11176512		ERIE COUNTY ERIE CANAL HARBOR DEVELOPMENT CORPORATION SAND SUSTAINABILITY STUDY CITY OF BUFFALO NEW YORK		DETAILS Scale: AS SHOWN Date: NOV. 2011 DT-001	
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PERMIT
DRAWING



DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

REPLY TO

May 4, 2012

Regulatory Branch

SUBJECT: Transmittal of **PROVISIONAL** Department of the Army Permit No. 2012-00011

Mr. Mark Smith
Erie Canal Harbor Development Corporation
95 Perry Street, 5th Floor
Buffalo, New York 14203

Dear Mr. Smith:

This pertains to the Department of the Army Permit application you submitted on behalf of Erie Canal Harbor Development Corporation to place 950 cubic yards of sand within Lake Erie to conduct the Gallagher Beach Sand Sustainability Study (GBSSS) at two locations, Gallagher Beach and the NYPA Parcel located at 175 & 1515 Fuhrmann Boulevard, City of Buffalo, Erie County, New York.

Enclosed is a "Provisional Department of the Army Permit." The provisional permit is **NOT VALID and does not authorize you to do your work.** The provisional permit describes the work that will be authorized, and the General and Special Conditions which will be placed on your final Department of the Army (DA) permit if the State of New York requirements are satisfied as described below. **No work is to be performed in the waterway or any wetlands until you have received a validated copy of the DA permit.**

By Federal law no Department of the Army permit can be issued until a Section 401 Water Quality Certification (WQC), or waiver thereof has been issued by the New York State Department of Environmental Conservation, and a Coastal Zone Management (CZM) Federal consistency determination has been issued by the New York State Department of State. As of May 4, 2012 neither Water Quality Certification, or waiver thereof, nor the Coastal Zone Management Federal consistency determination has been issued for your project. If the State fails or refuses to act by July 31, 2012 on the Coastal Zone Management consistency determination and by January 31, 2013 on the Water Quality Certification, the CZM consistency concurrence shall be conclusively presumed, and the Water Quality Certification requirement will be waived.

Conditions contained in the Water Quality Certification and Coastal Zone Management consistency determination will be incorporated into the final DA permit. Should the State's action preclude validation of the provisional permit in its current form, a modification to the

Regulatory Branch

SUBJECT: Transmittal of **PROVISIONAL** Department of the Army

Permit No. 2012-00011

provisional permit will be evaluated and you will be notified as appropriate. Substantial changes may require a new permit evaluation process, including issuing a new public notice.

When you have obtained a Water Quality Certification (WQC) and Coastal Zone Management consistency concurrence determination (CZM), please return this copy of the Provisional DA permit, a copy of the WQC and CZM and, if appropriate, a list of any inconsistencies you note between the WQC and CZM and the provisional DA permit and any objections you have to the terms and conditions of the permit. In the event that the State fails or refuses to act by July 31, 2012 on the CZM, and by January 31, 2013 on the WQC, please return this copy of the provisional DA permit and an outline of any objections to the terms and conditions of the permit.

If the State denies the required Water Quality Certification and/or Coastal Zone Management consistency, then your DA permit is denied without prejudice. Should you subsequently obtain the Water Quality Certification and Coastal Zone Management consistency, you should contact this office to determine how to proceed with your permit application.

If you have any questions concerning your State requirements, please contact:

Regional Permit Administrator
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203

and

NYS Department of State
Office of Coastal, Local Government
and Community Sustainability
Consistency Review Unit
One Commerce Plaza
99 Washington Avenue
Albany, NY 12231-0001
(518) 474-6000

Regulatory Branch

SUBJECT: Transmittal of **PROVISIONAL** Department of the Army

Permit No. 2012-00011

Questions pertaining to this matter should be directed to Mr. Joseph Rowley, who may be contacted by calling (716) 879-4279, by writing to the following address: U.S. Army Corps of Engineers, 1776 Niagara Street, Buffalo, New York 14207, or by e-mail at: joseph.m.rowley@usace.army.mil

Sincerely,


for Diane C. Kozlowski
Chief, Regulatory Branch

Enclosures

WARNING

THIS IS A **PROVISIONAL PERMIT**, IT
IS **NOT** A VALID PERMIT. PLEASE
READ THE TRANSMITTAL LETTER
CAREFULLY TO FIND OUT WHAT
YOU NEED TO DO TO VALIDATE THE
PERMIT ACTION.



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY

BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207-3199

PERMITTEE: ERIE CANAL HARBOR DEVELOPMENT AGENCY

PERMIT NUMBER: 2012-00011

EFFECTIVE DATE: _____

NOTE: The term you and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below. (and continue on page 5)

PROJECT DESCRIPTION: ERIE CANAL HARBOR DEVELOPMENT CORPORATION, 95 PERRY STREET, 5TH FLOOR, BUFFALO, NY 14203, IS HEREBY AUTHORIZED BY THE SECRETARY OF THE ARMY TO: PLACE 950 CUBIC YARDS OF SAND WITHIN LAKE ERIE TO CONDUCT THE GALLAGHER BEACH SAND SUSTAINABILITY STUDY (GBSS) AT GALLAGHER BEACH AND THE NYPA PARCEL IN ACCORDANCE WITH THE GENERAL AND SPECIAL CONDITIONS, AND THE PLANS AND DRAWINGS AND ANY ADDITIONAL SPECIAL CONDITIONS ATTACHED HERETO WHICH ARE INCORPORATED IN AND MADE A PART OF THIS PERMIT.

PROJECT LOCATION: THE PROJECT IS LOCATED IN LAKE ERIE, AT TWO LOCATIONS: 175 & 1515 FUHRMANN BOULEVARD, CITY OF BUFFALO, ERIE COUNTY, NEW YORK.

PERMIT CONDITIONS

GENERAL CONDITIONS:

1. The time limit for completing the work authorized ends on _____. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you must make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity, or should you desire to abandon it without a good faith transfer, you may obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archaeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.
7. The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

FURTHER INFORMATION:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

**Section 10 of the Rivers and Harbors Act of 1899 and
Section 404 of the Clean Water Act (33 U.S.C. 1344)**

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal project.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with

such directive, this office may in certain situations (such as this specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signatures below, as permittees, indicate you accept and agree to comply with the terms and conditions of this permit.

(PERMITTEE)

(DATE)

PROVISIONAL PERMIT
DO NOT SIGN OR YOU WAIVE
YOUR RIGHT TO APPEAL

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

(DISTRICT COMMANDER)

(DATE)

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE)

(DATE)

SPECIAL CONDITIONS:

1. That the Water Quality Certification issued for this project by the State of New York is part of this Department of the Army permit pursuant to Section 401(d) of the Clean Water Act. Noncompliance with any limitations or requirements stated in the certification may be a basis for suspension, revocation or modification of this permit.
2. That the Coastal Zone Management (CZM) Plan consistency certification issued by New York State Department of State is part of this Department of the Army permit. Noncompliance with any limitations or requirements stated in the certification may be a basis for suspension, revocation or modification of this permit.
3. The permittee must remove all of the temporary cofferdams within 15 days of completing the authorized work authorized by this permit.
4. The permittee is authorized to discharge only clean sand material that is free of oil and grease, debris, wood, general refuse, plaster, broken asphalt, or other potential pollutants.

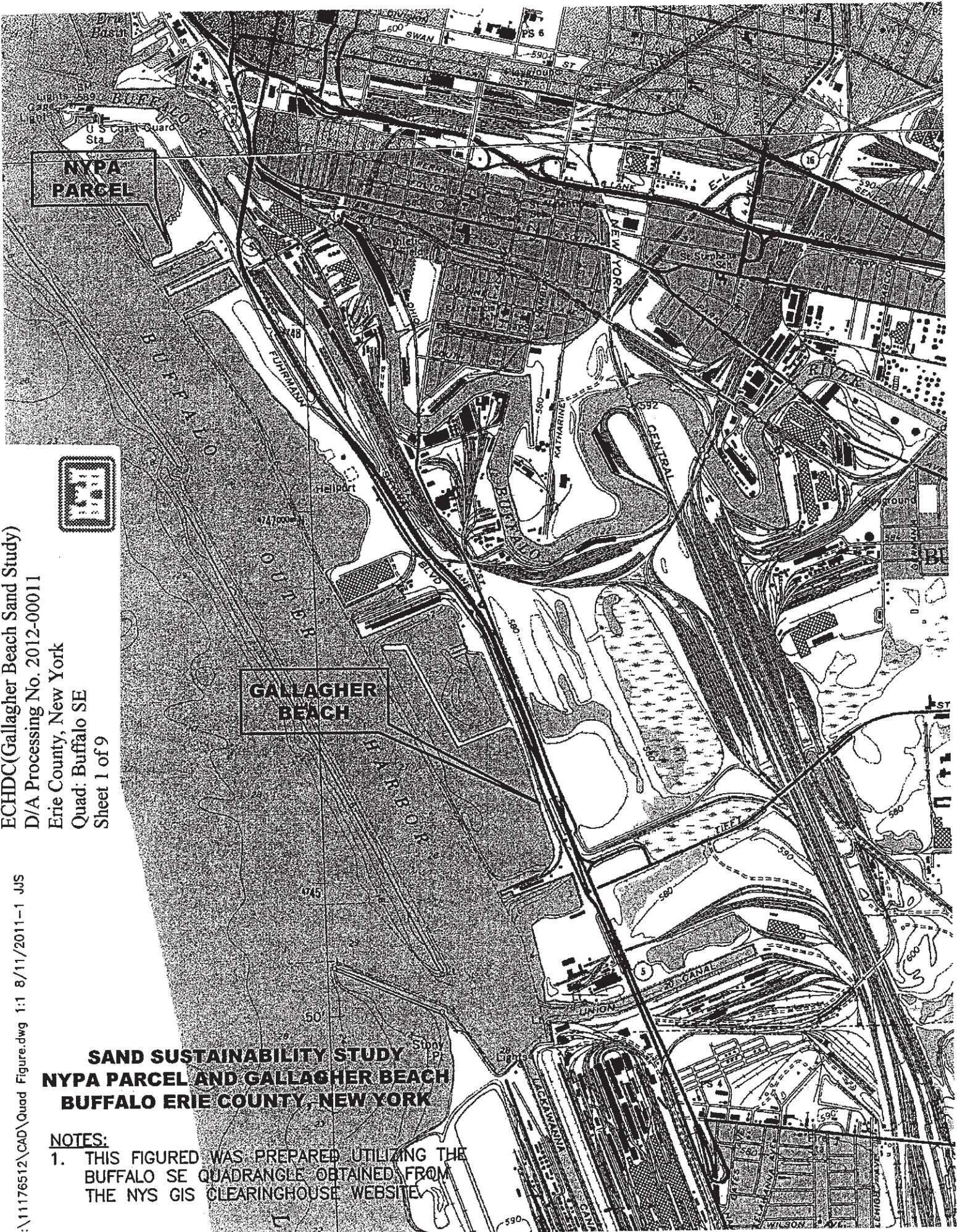
ECHDC(Gallagher Beach Sand Study)
 D/A Processing No. 2012-00011
 Erie County, New York
 Quad: Buffalo SE
 Sheet 1 of 9



SAND SUSTAINABILITY STUDY
NYPA PARCEL AND GALLAGHER BEACH
BUFFALO ERIE COUNTY, NEW YORK

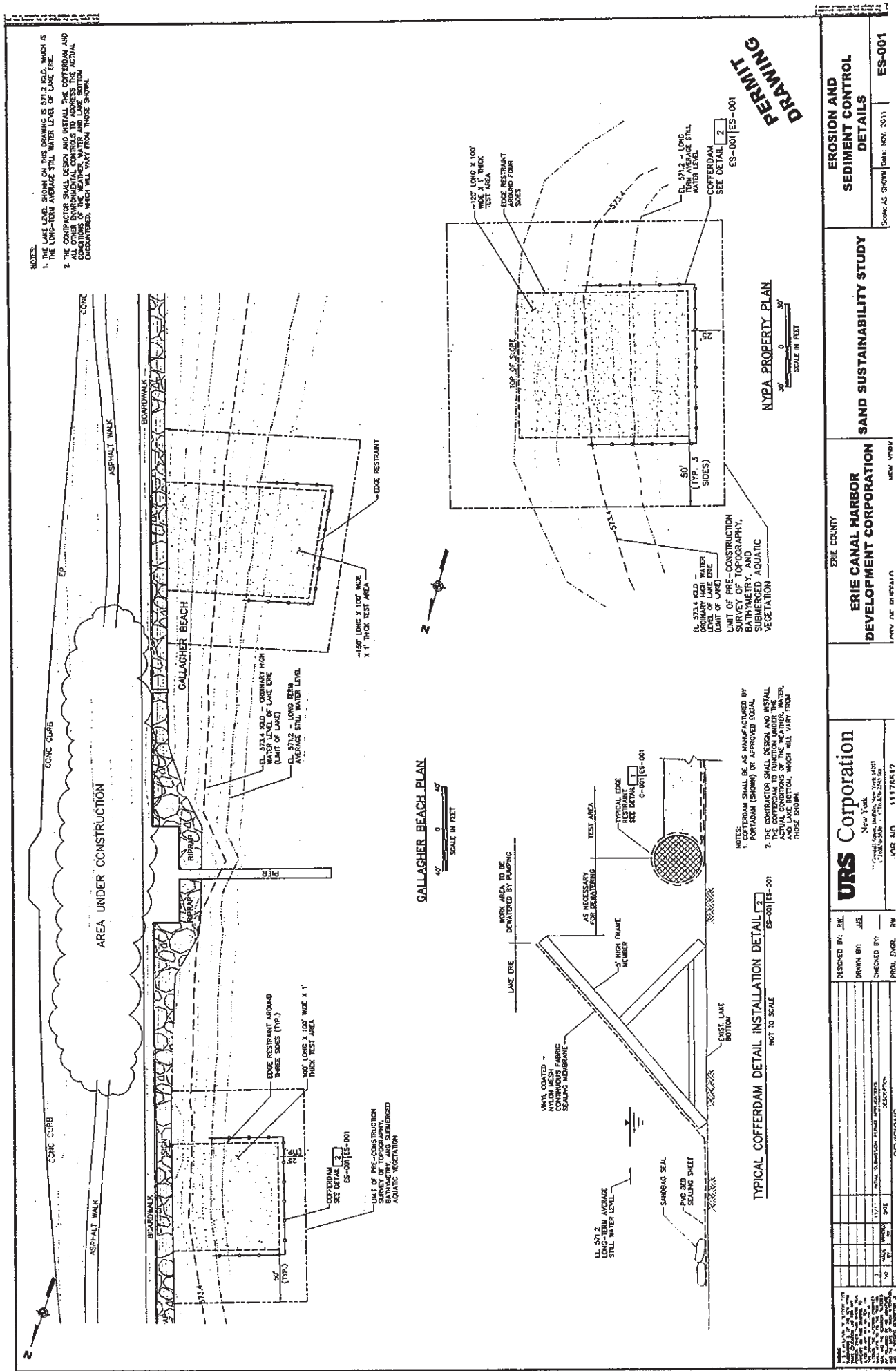
NOTES:

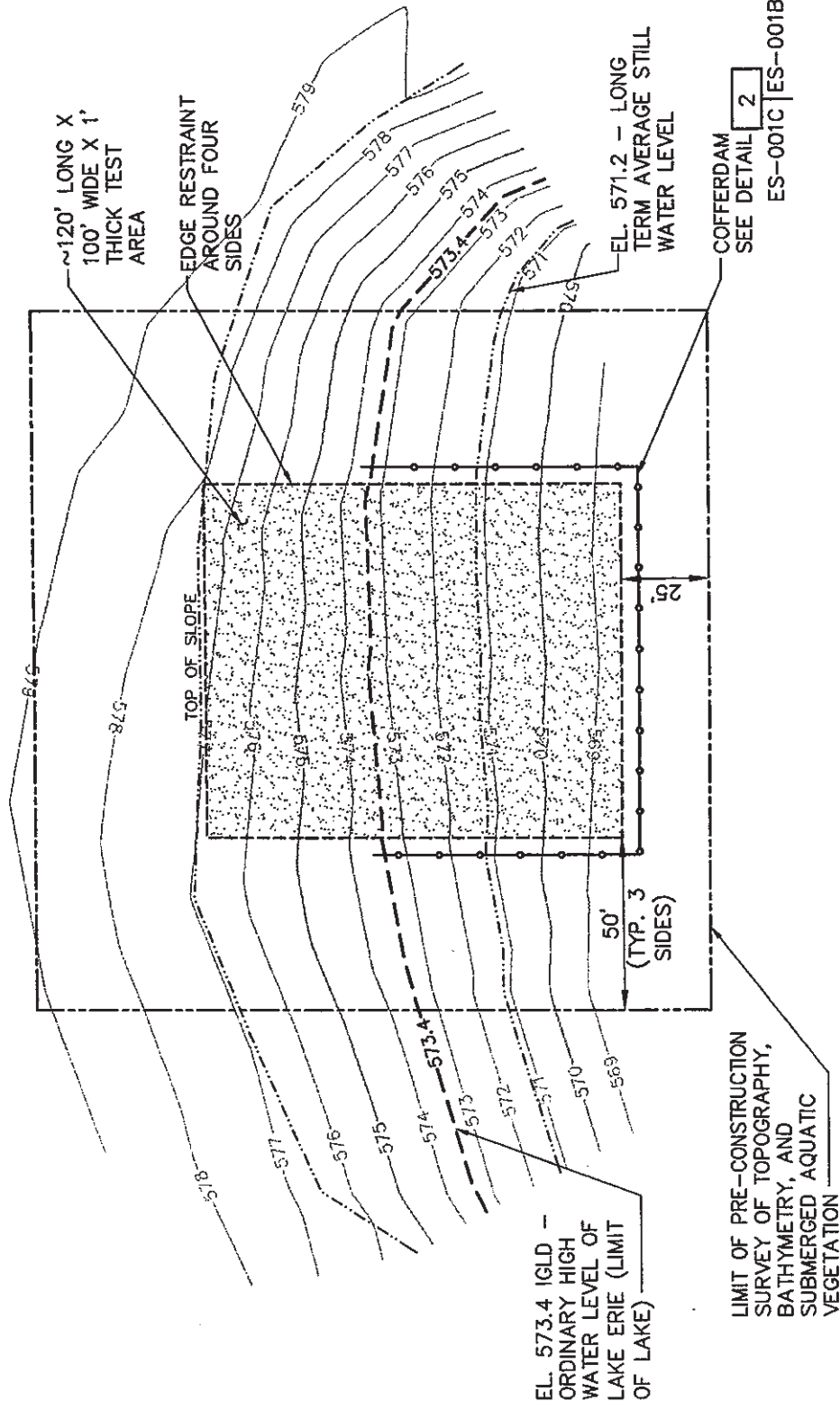
1. THIS FIGURE WAS PREPARED UTILIZING THE BUFFALO SE QUADRANGLE OBTAINED FROM THE NYS GIS CLEARINGHOUSE WEBSITE.

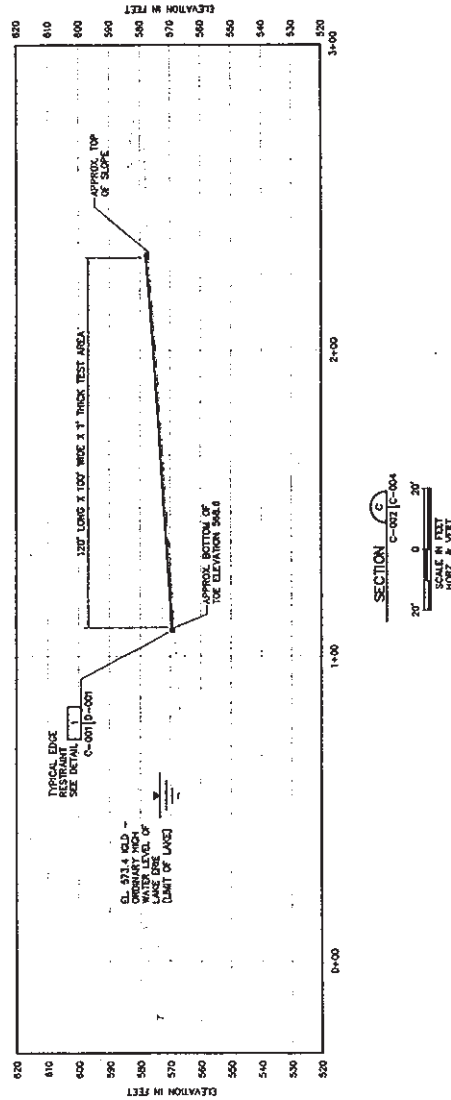


EC HDC (Gallagher Beach Sand Study)
D/A Processing No. 2012-00011
Erie County, New York
Quad: Buffalo SE
Sheet 2 of 9









PERMIT
 DRAWING

NYPA PARCEL
 SECTION

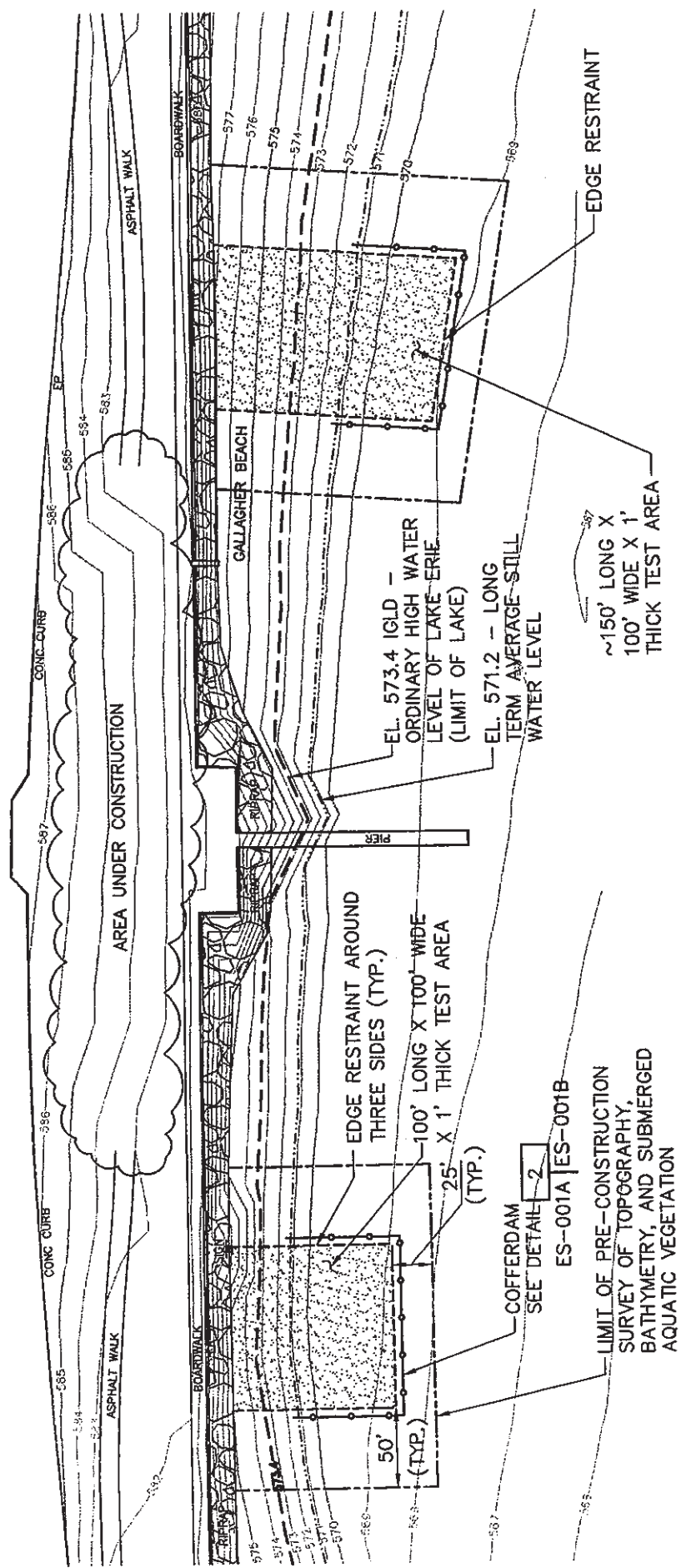
SAND SUSTAINABILITY STUDY

ERIE COUNTY
 ERIE CANAL HARBOR
 DEVELOPMENT CORPORATION

URS Corporation
 New York
 100 Hudson Street, 14th Floor
 New York, NY 10038

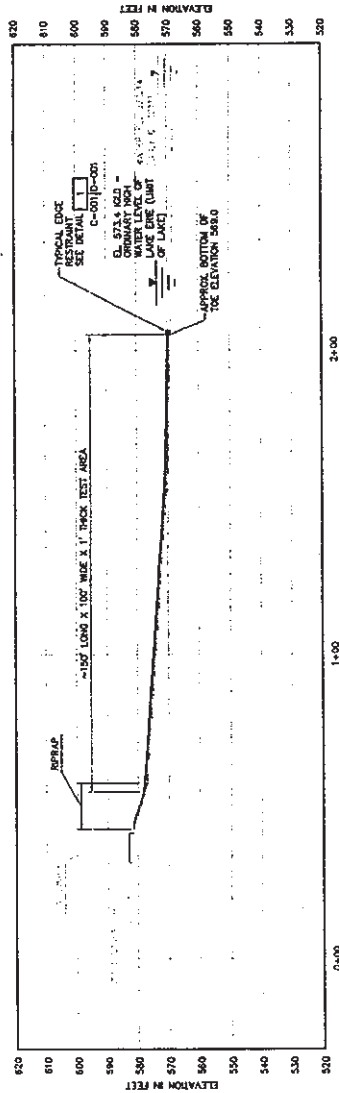
DESIGNED BY: JBL
 DRAWN BY: JBL
 CHECKED BY:

NO.	DATE	DESCRIPTION
1	01/11/11	INITIAL DESIGN AND CONSTRUCTION
2	02/01/11	REVISIONS
3	03/01/11	REVISIONS
4	04/01/11	REVISIONS
5	05/01/11	REVISIONS
6	06/01/11	REVISIONS
7	07/01/11	REVISIONS
8	08/01/11	REVISIONS
9	09/01/11	REVISIONS
10	10/01/11	REVISIONS
11	11/01/11	REVISIONS
12	12/01/11	REVISIONS

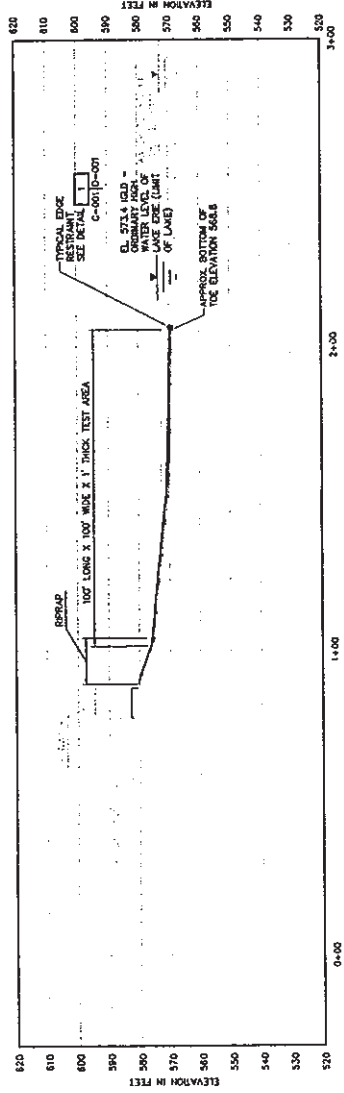




- NOTES:
1. HORIZONTAL DATUM IS BASED UPON THE NEW YORK STATE PLANE COORDINATE SYSTEM, WEST ZONE, 1983 ADJUSTMENT; ELEVATIONS ARE BASED UPON INTERNATIONAL GREAT LAKES DATUM (IGLD 85).
 2. CONTOURS 569 AND LOWER TAKEN FROM NYTA BOAT HARBOR BEACH PROJECT RECORD DRAWINGS, DATED 1/23/01, PREPARED BY GEORGIN ASSOCIATES, P.E., INC.



SECTION C-001(C-003)
20' SCALE IN FEET
HORIZ. & VERT.



SECTION C-001(C-003)
20' SCALE IN FEET
HORIZ. & VERT.

PERMIT
DRAWING

NO.	DATE	BY	DESCRIPTION
1	12/11	NYTA	DESIGNATION: NYTA
2	12/11	NYTA	DESIGNATION: NYTA
3	12/11	NYTA	DESIGNATION: NYTA
4	12/11	NYTA	DESIGNATION: NYTA
5	12/11	NYTA	DESIGNATION: NYTA
6	12/11	NYTA	DESIGNATION: NYTA
7	12/11	NYTA	DESIGNATION: NYTA
8	12/11	NYTA	DESIGNATION: NYTA
9	12/11	NYTA	DESIGNATION: NYTA
10	12/11	NYTA	DESIGNATION: NYTA

DESIGNED BY: JAL
DRAWN BY: JAL
CHECKED BY: JAL

URS Corporation
New York, New York
10017
TRANSPORTATION DIVISION

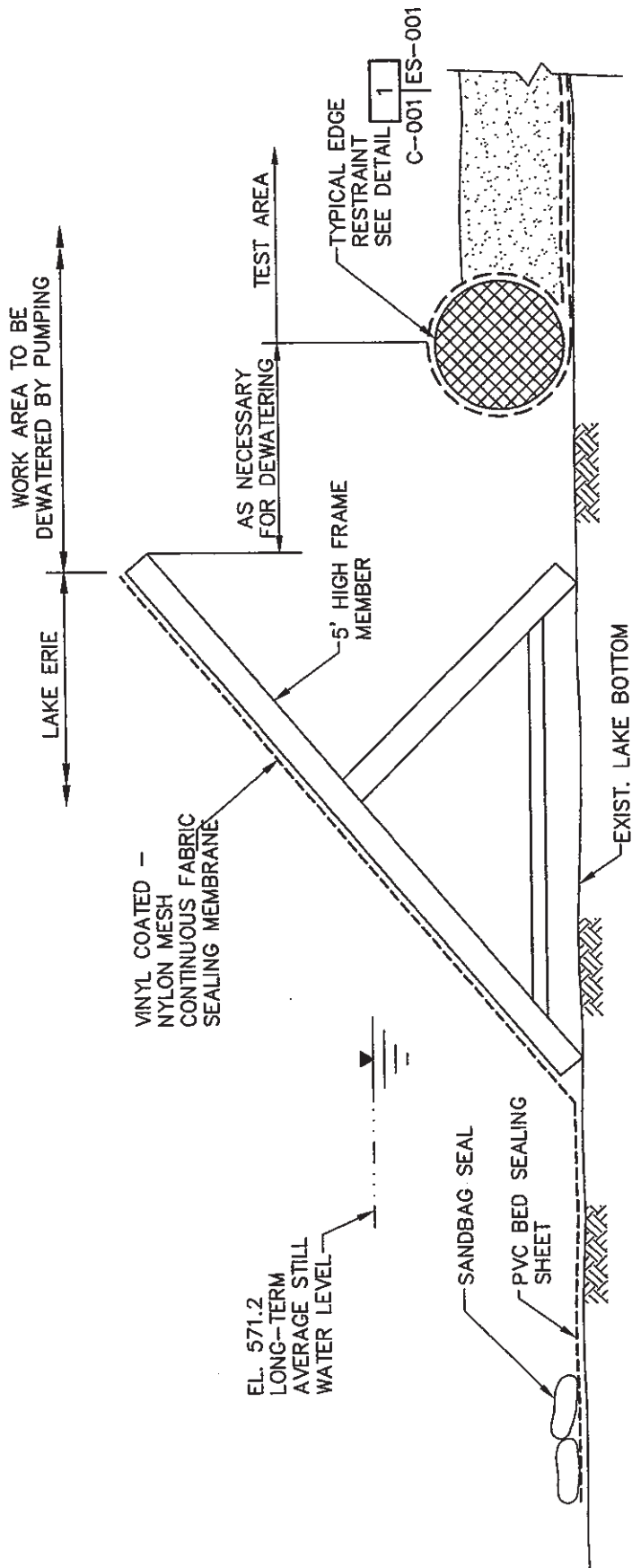
ERIE COUNTY
**ERIE CANAL HARBOR
DEVELOPMENT CORPORATION**

SAND SUSTAINABILITY STUDY

**GALLAGHER BEACH
PARCEL SECTIONS**



I: \\1176512\CAD\PERMIT DRAWINGS\REVISED NOV 11\ES-001A-ES-001C.dwg 1:1 11/23/2011-1 RAL



- NOTES:
1. COFFERDAM SHALL BE AS MANUFACTURED BY PORTADAM (SHOWN) OR APPROVED EQUAL.
 2. THE CONTRACTOR SHALL DESIGN AND INSTALL THE COFFERDAM TO FUNCTION UNDER THE ACTUAL CONDITIONS OF THE WEATHER, WATER, AND LAKE BOTTOM, WHICH WILL VARY FROM THOSE SHOWN.

TYPICAL COFFERDAM INSTALLATION DETAIL 2
NOT TO SCALE
ES-001A ES-001B

PERMIT
DRAWING

URS

ERIE COUNTY
ERIE CANAL HARBOR
DEVELOPMENT CORPORATION

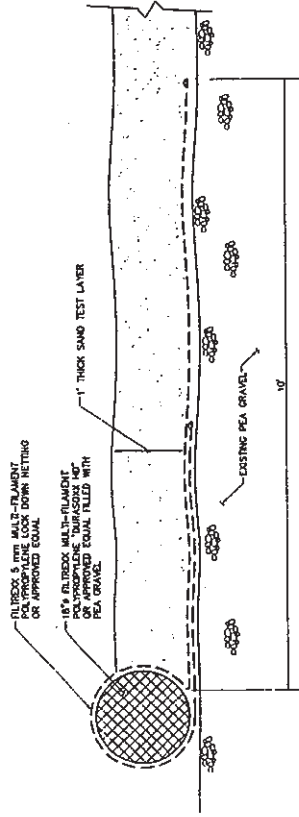
CITY OF BUFFALO NEW YORK

SAND SUSTAINABILITY STUDY

TYPICAL COFFERDAM
INSTALLATION DETAIL

Scale AS SHOWN Date NOV. 2011 ES-001B

ECHDC(Gallagher Beach Sand Study)
D/A Processing No. 2012-00011
Erie County, New York
Quad: Buffalo SE
Sheet 9 of 9



TYPICAL EDGE RESTRAINT DETAIL [7]
NOT TO SCALE C-0010-001

PERMIT
DRAWING

DETAILS

SAND SUSTAINABILITY STUDY

ERIE COUNTY
ERIE CANAL HARBOR
DEVELOPMENT CORPORATION

URS Corporation
New York
111 Hudson Street, 10th Floor, New York, NY 10013
TEL: 212-512-2000 FAX: 212-512-2001

DESIGNED BY: JLE
DRAWN BY: JLE
CHECKED BY: JLE

NO.	DATE	DESCRIPTION
1	11/11	FINAL TRANSMISSION DRAFT SUBMITTALS



STATE OF NEW YORK
DEPARTMENT OF STATE

ONE COMMERCE PLAZA
99 WASHINGTON AVENUE
ALBANY, NY 12231-0001

ANDREW M. CUOMO
GOVERNOR

CESAR A. PERALES
SECRETARY OF STATE

June 11, 2012

Mr. Gary Palumbo, Senior Planner
URS Corporation
77 Goodell Street
Buffalo, New York 14203

RE: F-2011-1077
U.S. Army Corps of Engineers/Buffalo District Permit
Application - Erie Canal Harbor Development Corporation
Placement of 1,400 cyds of sand in two locations
Lake Erie, City of Buffalo, Erie County
General Concurrence

Dear Mr. Palumbo:

The Department of State received your Federal Consistency Assessment Form and consistency certification and supporting information for this proposal on December 16, 2011.

The Department of State has determined that this proposal meets the Department's general consistency concurrence criteria. Therefore, further review of the proposed activity by the Department of State, and the Department's concurrence with an individual consistency certification for the proposed activity, are not required.

This General Concurrence is without prejudice to and does not obviate the need to obtain all other applicable licenses, permits, other forms of authorization or approval that may be required pursuant to existing State statutes.

When communicating with us regarding this matter, please contact us at (518) 474-6000 and refer to our file #F-2011-1077.

Sincerely,

Jeffrey Zappieri
Supervisor, Consistency Review Unit
Division of Coastal Resources

JZ/TS/dc
cc: COE/Buffalo - Steve Metivier
DEC/Region 9 - David Denk

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish, Wildlife & Marine Resources
625 Broadway, 5th Floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **Fax:** (518) 402-8925
Website: www.dec.ny.gov



Joe Martens
Commissioner

September 6, 2011

Gary Palumbo
U R S Corporation
77 Goodell Street
Buffalo, NY 14203

Dear Mr. Palumbo:

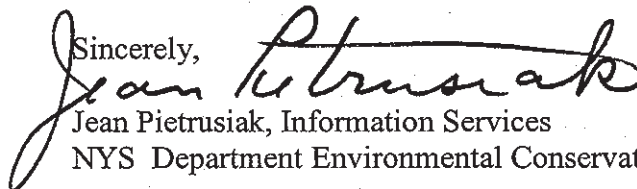
In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Gallagher Beach Sand Sustainability Study, Fuhrmann Blvd – Rte 5, Sites of Gallaghers Beach and the NY PA Parcel, as indicated on the map you provided, located in the City of Buffalo, Erie County.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

The enclosed report may be included in documents that will be available to the public. However, any enclosed maps displaying locations of rare species are considered sensitive information, and are intended only for the internal use of the recipient; they should not be included in any document that will be made available to the public, without permission from the New York Natural Heritage Program.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.htm.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,

Jean Pietrusiak, Information Services
NYS Department Environmental Conservation

Enc.
cc: Region 9

866

Gallagher's Beach

Natural Heritage Report on Rare Species and Ecological Communities



NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

~The information in this report includes only records entered into the NY Natural Heritage databases as of the date of the report. This report is not a definitive statement on the presence or absence of all rare species or significant natural communities at or in the vicinity of this site.

~Refer to the User's Guide for explanations of codes, ranks and fields.

~Location maps for certain species and communities may not be provided 1) if the species is vulnerable to disturbance, 2) if the location and/or extent is not precisely known, 3) if the location and/or extent is too large to display, and/or 4) if the animal is listed as Endangered or Threatened by New York State.

Natural Heritage Report on Rare Species and Ecological Communities



BIRDS

Ixobrychus exilis

Least Bittern
Breeding

NY Legal Status: Threatened

Federal Listing:

Last Report: **

County: Erie

Town: Buffalo - City

Location: At, or in the vicinity of, the project site.

General Quality and Habitat: **For information on the population at this location and management considerations, please contact the NYS DEC Regional Wildlife Manager for the Region where the project is located.

NYS Rank: S3B,S1N - Vulnerable

Global Rank: G5 - Secure

EO Rank: **

Office Use
10893
ESU

Podilymbus podiceps

Pied-billed Grebe
Breeding

NY Legal Status: Threatened

Federal Listing:

Last Report: **

County: Erie

Town: Buffalo - City

Location: At, or in the vicinity of, the project site.

General Quality and Habitat: **For information on the population at this location and management considerations, please contact the NYS DEC Regional Wildlife Manager for the Region where the project is located.

NYS Rank: S3B,S1N - Vulnerable

Global Rank: G5 - Secure

EO Rank: **

Office Use
10636
ESU

CRAYFISH and AMPHIPODS

Cambarus diogenes

Devil Crawfish

NY Legal Status: Unlisted

Federal Listing:

Last Report: 2007-07-07

County: Erie

Town: Buffalo - City

Location: Tift Farm Marsh

General Quality and Habitat: The rank is based on NatureServe's draft Proposed Generic Ranking Definitions for Animals and Plants of September 22, 2007. The crayfish appear to have persisted for over twenty years at Lisa Pond and many sightings were reported at Beth Pond in the 1980s. Additional survey work could determine a population estimate and the extent of the occurrence. While the immediate area is on protected land, the habitat appears degraded and the surrounding landscape is industrial with roads and a powerline corridor. The area is a reclaimed cattail marsh and Lisa Pond is most likely man-made and appears degraded. Cattails, herbaceous plants, sedges, and shrubs were present. A deer was observed browsing in the pond perimeter and pond dwelling odonates (*Plathemis lydia* and *Anax junius*) were observed.

NYS Rank: S2 - Imperiled

Global Rank: G5 - Secure

EO Rank: Extant

Office Use
12691

FISH

***Acipenser fulvescens*****Lake Sturgeon****NY Legal Status:** Threatened**NYS Rank:** S1S2 - Critically imperiled

Office Use

Federal Listing:**Global Rank:** G3G4 - Vulnerable

11154

Last Report: ****EO Rank:** **

BOF

County: Erie, Lake Erie Open Waters**Town:** Buffalo - City, Hamburg, Lackawanna - City, Lake Erie Open Waters, Tonawanda - Town**Location:** At, or in the vicinity of, the project site.**General Quality and Habitat:** **For information on the population at this location and management considerations, please contact the NYS DEC Regional Wildlife Manager for the Region where the project is located.**OTHER****Gull Colony****NY Legal Status:** Unlisted**NYS Rank:** SNR - Rank not assigned

Office Use

Federal Listing:**Global Rank:** GNR - Not ranked

7534

Last Report: 1985-05-14**EO Rank:** Excellent**County:** Erie**Town:** Buffalo - City, Lackawanna - City**Location:** Stony Point**General Quality and Habitat:** More than 6000 nests, but colony is on diked dredge spoil disposal area. Dredge spoil disposal site separated by dikes from Lake Erie. Low lying, gravelly, sparsely vegetated beach. Open water will eventually be eliminated as dredge spoils fill site. Huge slag pile at southern end, with steep banks down to beach. Surrounding land use is industrial.

SL

5 Records Processed

More detailed information about many of the rare and listed animals and plants in New York, including biology, identification, habitat, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org, from NatureServe Explorer at <http://www.natureserve.org/explorer>, from NYSDEC at <http://www.dec.ny.gov/animals/7494.html> (for animals), and from USDA's Plants Database at <http://plants.usda.gov/index.html> (for plants).

More detailed information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org. For descriptions of all community types, go to <http://www.dec.ny.gov/animals/29384.html> and click on Draft Ecological Communities of New York State.

Natural Heritage Report on Rare Species and Ecological Communities



NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

~The information in this report includes only records entered into the NY Natural Heritage databases as of the date of the report. This report is not a definitive statement on the presence or absence of all rare species or significant natural communities at or in the vicinity of this site.
~Refer to the User's Guide for explanations of codes, ranks and fields.
~Location maps for certain species and communities may not be provided 1) if the species is vulnerable to disturbance, 2) if the location and/or extent is not precisely known, 3) if the location and/or extent is too large to display, and/or 4) if the animal is listed as Endangered or Threatened by New York State.

Natural Heritage Report on Rare Species and Ecological Communities



FISH

Acipenser fulvescens

Lake Sturgeon	NY Legal Status: Threatened Federal Listing: Last Report: ** County: Erie, Lake Erie Open Waters Town: Buffalo - City, Hamburg, Lackawanna - City, Lake Erie Open Waters, Tonawanda - Town Location: At, or in the vicinity of, the project site. General Quality and Habitat: **For information on the population at this location and management considerations, please contact the NYS DEC Regional Wildlife Manager for the Region where the project is located.	NYS Rank: S1S2 - Critically imperiled Global Rank: G3G4 - Vulnerable EO Rank: **	Office Use 11154 BOF
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OTHER

Waterfowl Winter Concentration Area

NY Legal Status: Unlisted Federal Listing: Last Report: 1994-01-25 County: Erie, Niagara Town: Buffalo - City, Grand Island, Niagara Falls - City, North Tonawanda - City, Tonawanda - City, Tonawanda Location: Upper Niagara River General Quality and Habitat: About 20 miles of a main channel river, with depths to 30 feet. Waterfowl use of the area each winter is influenced by the extent of ice cover. Three shallow sections serve as major feeding locations within this area: the shallow shoal area from motor island to upstream of Strawberry Island is less than 6 feet below mean low water, and contains beds of submergent aquatic vegetation (e.g., wild celery) and patches of emergent wetland vegetation along the shore. The wide shallow section from the western ends of Buckhorn and Navy Islands to the beginning of the rapids above Niagara Falls is less than 10 feet below mean low water, and has a sparsely vegetated bedrock substrate and extensive undisturbed areas with no excavation or filling. The open water of	NYS Rank: S3S4 - Vulnerable Global Rank: GNR - Not ranked EO Rank: Excellent	Office Use 6681 S
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2 Records Processed

More detailed information about many of the rare and listed animals and plants in New York, including biology, identification, habitat, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org, from NatureServe Explorer at <http://www.natureserve.org/explorer>, from NYSDEC at <http://www.dec.ny.gov/animals/7494.html> (for animals), and from USDA's Plants Database at <http://plants.usda.gov/index.html> (for plants).

More detailed information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org. For descriptions of all community types, go to <http://www.dec.ny.gov/animals/29384.html> and click on Draft Ecological Communities of New York State.



New York State Office of Parks, Recreation and Historic Preservation

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189

518-237-8643

www.nysparks.com

Andrew M. Cuomo
Governor

Rose Harvey
Commissioner

September 08, 2011

Gary Palumbo
URS Corporation
77 Goodell Street
Buffalo, New York 14203

Re: CORPS
Gallagher Beach sand sustainability study - Part
of 175 & 1515 Fuhrmann Blvd (Rte 5)
BUFFALO, Erie County
11PR06142

Dear Mr. Palumbo:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8).

Based upon this review, it is the SHPO's opinion that your project will have No Effect upon cultural resources in or eligible for inclusion in the National Registers of Historic Places.

If further correspondence is required regarding this project, please be sure to refer to the OPRHP Project Review (PR) number noted above.

Sincerely,

Ruth L. Pierpont
Acting Deputy Commissioner for Historic Preservation

ATTACHMENT C
Construction Photographs



Pre-construction conditions at Gallagher Beach, looking southward from the pier. The test area was constructed in the approximate area in which the birds are gathered.



Same as previous photo, looking northward from the pier.



Pre-Construction conditions at the NYPA Parcel



Installation of the southern edge restraint at Gallagher Beach.



Looking northeast at the fabric from the coffer dam blown off of its frame, as well as the sandy bottom of the Gallagher Beach nearshore area exposed during negative seiche due to passage to the west of the remnants of Hurricane Sandy.



Same vantage as in the previous photo, panning left, looking slightly more northward.



Final clean-up and demobilization of the Gallagher Beach test area



Set-up of Coffor Dam at NYPA Parcel.



Looking upslope along the north side of the test area during installation at the NYPA Parcel.



Looking along (south) the downslope toe of the test area behind the coffer dam at the NYPA parcel.

ATTACHMENT D
Approved Submittal – Sand Gradation



13870 Taylor Hollow Rd, Collins, New York, 14034 - 716-532-3371 - Fax 716-532-9000

9/12/2012

NATURE'S WAY ENVIRON. CONS.

VIA FAX: 716-937-9360

P.O. BOX 160

3553 CRITTENDEN ROAD

CRITTENDEN NY 14038

ATTENTION: Ms. Nicole Savage

RE: Material Submittal: Sand Sustainability NYPA Parcel and Gallagher Beach
703-07 Concrete Sand

Dear Ms. Savage

This is to certify that the NYSDOT Item 703-07, ASTM C-33, Concrete Sand proposed for use on the above listed project will be supplied in conformance with the requirements of the NYSDOT and project specifications.

The sand will be supplied from our NYSDOT and NYSDEC approved Country Side plant, which is NYSDOT approved source 5-22G and NYSDEC Mine file #9023-30-0044. The sand will be supplied from our current 40,000 cubic yard stockpile.

A Typical mechanical analysis of the proposed material is as follows:

Concrete Sand - NYSDOT 703-07, ASTM C-33 - Country Side Plant

Seive Size	Percent Passing	Specification
3/8	100	100
#4	99	90-100
#8	82	70-100
#16	65	45-83
#30	44	20-69
#50	18	10-34
#100	4.1	0-5
#200	1.5	0-2

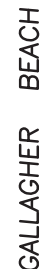
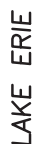
Sincerely,

Gernatt Asphalt Products, Inc.

David M. Gier

David M. Gier

ATTACHMENT E
Survey Drawings



INITIAL EXISTING CONDITIONS – OCTOBER 2012

[illegible]

This map void unless Embossed with New
York State Licensed Land Surveyors Seal
No. 50510

TOPOGRAPHIC MAP

GALLAGHER BEACH
CITY OF BUFFALO
COUNTY OF ERIE
STATE OF NEW YORK



FRANDINA ENGINEERING and LAND SURVEYING, PC
CIVIL ENGINEERS and LAND SURVEYORS

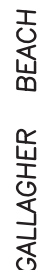
1807 Elmwood Avenue www.FRANDINA.com Phone: (716) 883-1299
Suite #176 FAX: (716) 883-1274
Buffalo, New York 14207

DATE : 10/5/2012	SHEET : 1 OF 1	DWN BY : MJC
JOB NO.: 3614	SCALE : 1" = 20'	CHK'D BY : RF

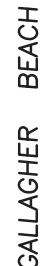
WARNING: ALTERING THIS DOCUMENT IS IN VIOLATION OF THE LAW EXCEPTING AS PROVIDED IN SECTION 7209, PART 2 OF THE NEW YORK STATE EDUCATION LAW.

CADD2012\3614 GALLAGHER BEACH.DWG

Rosanne Frandina, PE, LS



CADD2012\3614 GALLAGHER BEACH 10.30.12.DWG



WARNING: ALTERING THIS DOCUMENT IS IN VIOLATION OF THE LAW EXCEPTING AS PROVIDED IN SECTION 7209, PART 2 OF THE NEW YORK STATE EDUCATION LAW.

This map void unless Embossed with New
York State Licensed Land Surveyors Seal
No. 50510

TOPOGRAPHIC MAP
GALLAGHER BEACH
CITY OF BUFFALO
COUNTY OF ERIE
STATE OF NEW YORK



DATE : 4/17/2013	SHEET : 1 OF 1	DWN BY : MJC
JOB NO.: 3614	SCALE : 1" = 20'	CHK'D BY : RF

[illegible]

Rosanne Frandina, PE, LS

DATE : 10/30/2012	SHEET : 1 OF 1	DWN BY : MJC
JOB NO.: 3614	SCALE : 1" = 20'	CHK'D BY : RF

CADD2012\3614_NYPA_PARCEL.DWG



NYPA PROPERTY
CITY OF BUFFALO
COUNTY OF ERIE
STATE OF NEW YORK

FRANDINA ENGINEERING and LAND SURVEYING, PC
CIVIL ENGINEERS and LAND SURVEYORS

1807 Elmwood Avenue www.FRANDINA.com Phone: (716) 883-1299
Suite #176 FAX: (716) 883-1274
Buffalo, New York 14207

DATE : 11/13/2012	SHEET : 1 OF 1	DWN BY : MJC
JOB NO.: 3614	SCALE : 1" = 20'	CHK'D BY : RF

[illegible]

WARNING: ALTERING THIS DOCUMENT IS IN VIOLATION OF THE LAW EXCEPTING AS PROVIDED IN SECTION 7209, PART 2 OF THE NEW YORK STATE EDUCATION LAW.

CADD2012\3614 NYPA PARCEL 11_13_2012.DWG

Rosanne Frandina, PE, LS



120' LONG X 100' WIDE
X 1' THICK TEST AREA

Rosanne Frandina, PE, LS

ATTACHMENT F
Inspection Reports

Inspector:	Randy West
Weather Conditions:	Sunny, 30's, steady WSW wind 10 - 20 $\pm$ mph
Water Conditions:	Small waves, few white caps, occasional breakers over outer breakwall
Notable Water/Weather Conditions Since Last Inspection:	None

General Observations:

1. Beach in generally good condition. The sand persists in the general areas in which it was placed.
2. No evidence of vandalism.
3. The pattern of sand movement is very similar at both locations:
 - a. Sand has been redistributed: from the middle section of the beach areas downslope, creating a flatter area of sand within 10-15 feet of water line today.
 - b. A small, gentle scarp exists about 20 feet upslope of the buried portion (approx. 30 feet from the water line).
 - c. Above the upslope limit of sand movement the sand appears relatively undisturbed.
4. Edge restraints are in good condition.
 - a. Where the sand is accumulating the restraint appears buried – sand is at the tops of both the inside and outside of the restraint. It is unclear if the apparent burial is in fact the result of undermining of the restraint at that location.
 - b. (At Gallagher) Where the sand has moved from, the netting holding down the restraint is exposed.
5. Other observations as noted with the attached 18 photos.



Gallagher Beach Photo 1: Looking North along the shoreline – note the downslope movement of sand within the test area, and the burial of the restraint both inside and outside of the restraint.



Gallagher Beach Photo 2: Look NW at the test area.



Gallagher Beach Photo 3: Pan northward from previous photo. Sand apparently undisturbed by water in upper areas.



Gallagher Beach Photo 4: Look westward along southern edge restraint.



Gallagher Beach Photo 5 Look westward along northern edge restraint.



Gallagher Beach Photo 6: Look southwest at test area. Note apparent burial of edge restraint near waterline.



Gallagher Beach Photo 7: Look south at area of sand accumulation near waterline.



Gallagher Beach Photo 8: Look south at the area from which sand has been removed, upslope of the area in the previous photo. Note the slight scarp at the upslope edge of the area of removal.



Gallagher Beach Photo 9: Same as Photo 7, looking north.



Gallagher Beach Photo 10: Same as photo 8, looking north. Note exposed lock-down netting.



Gallagher Beach Photo 11: Northeast corner of test area showing exposed lock-down netting, loose anchor, and elevation difference between lock-down netting on the inside of the test area and “existing grade” on the outside.



NYPA Parcel Photo 1: Looking NW at the different colors of sand within and outside of the test area.



NYPA Parcel Photo 2: Same as above, panning westward.



NYPA Parcel Photo 3: Looking eastward (inland) from near waterline. Note apparent burial of the edge restraint in the foreground.



NYPA Parcel Photo 4: Looking southward at the test area – note the apparent burial of the edge restraint near the waterline.



NYPA Parcel Photo 5: Looking lakeward along north edge restraint. Burial in the foreground here is at least partially the result of placement of additional (light-colored) sand on the outside of the test area.



NYPA Parcel Photo 6: Looking south along the inland edge restraint – note the evidence of minor wave overtopping.



NYPA Parcel Photo 7: Look lakeward along southern edge restraint.

Inspector: Randy West

Weather Conditions: Sunny, 40's, light wind

Water Conditions: Calm

General Observations:

1. The sand movement pattern that was noted during the December inspection has continued and increased. Significant thickness of sand has been lost from the upper portions of the test areas, apparently re-deposited in the mid-sections. This (January) inspection, however, showed also the loss of a significant volume of sand from the lower reaches: almost one half of the thickness of sand has been removed from the lower, flatter areas behind the edge restraint (the portion that is usually below the waterline).
2. No evidence of vandalism.
3. Edge restraints are in good condition.
 - a. Where the sand is accumulating the restraint appears buried – sand is at the tops of both the inside and outside of the restraint. It does not appear that the burial is the result of undermining of the restraint at that location.
 - b. (At Gallagher) Where the sand has moved from, the netting holding down the restraint is exposed.
4. Other observations as noted with the attached 13 photos.



Gallagher Beach Photo 1: Look north at the middle and upper sections of the test area.



Gallagher Beach Photo 2: Look east at the south upper corner of the test area. Note the downslope movement of sand and the segregation by grain size. Note also drift line and exposed lock-down netting at the top of the eroded area.



Gallagher Beach Photo 3: Look east at the north upper corner of the test area. The evolution of the beach form here is remarkably similar to that on the southern side, shown in the previous photo.



Gallagher Beach Photo 4: Look south along the waterline showing the sand accumulation in the middle section as well as the area of sand loss (note exposed top of edge restraint) at the waterline and lower.



Gallagher Beach Photo 5: Look south, slightly eastward of previous photo.



Gallagher Beach Photo 6: Look northward along the waterline. Note exposed top of edge restraint at the waterline and lower.



Gallagher Beach Photo 7: Look northwest from just south of the southern edge restraint. Note the loss of sand from within the test area.



Gallagher Beach Photo 8: Look northeast at the southern midsection of the test area showing the significant sand accumulation there.



NYPA Parcel Photo 1: Look east along southern edge of test area.



NYPA Parcel Photo 2: Look southeast at the northern edge of the test area. Note the drift line and material segregation within the test area. The scarp outside of the test area (photo left) is evidently how that sand was placed (per ECHDC).



NYPA Parcel Photo 3: Look northeast from within the test area. Note the translocation of sand from the upper portions (where edge restraint is exposed) to the approximate mid section, similar to the process observed at Gallagher Beach.



NYPA Parcel Photo 4: Look southeast from within the test area. Processes here are similar to Gallagher Beach – a laterally (north-south) symmetrical translocation of sand from the upper reach to the midsection of the test area.



NYPA Parcel Photo 5: Look south along the waterline. Note again the process similar to Gallagher Beach: an accumulation of sand at the midsection, and loss of sand from the area at the waterline and below.

Inspector: Randy West

Weather Conditions: Sunny, 10's, steady WSW wind 10 - 20±
mph

Water Conditions: Lake frozen

General Observations:

1. The beach and adjacent lake are frozen – no water is visible. Approximately one half of the length of each of the test areas are covered with ice and snow.
2. The distribution of the sand is not noticeably different than at the last inspection.
3. No evidence of vandalism.
4. Sand has been deposited upslope of the upper edge restraint at Gallagher Beach (no photo – camera died) since the last inspection. This appears to be an aeolian (wind-driven) process:
 - a. The sand is of a uniform fine texture;
 - b. The deposition is on the lee side of the test area in the direction of the prevailing westward winds; and
 - c. There are no signs of wave action in the nearby portions of the sand within the test areas.
5. Edge restraints are in good condition where they are visible
6. Other observations as noted with the attached 11 photos.



Gallagher Beach Photo 1: Looking South along the revetment at the upper edge of the test area.



Gallagher Beach Photo 2: Look West over the north edge of the test area towards the (frozen) lake.



Gallagher Beach Photo 3: Looking northwest over the test area. Note the sand blown over the edge restraint.



Gallagher Beach Photo 4: Panning westward from previous photo. Note the edge restraint stakes in the frozen lake.



Gallagher Beach Photo 5 Looking southeast at the top of the test area. Note the sand mound that someone has placed over the edge restraint in the foreground. There is no apparent damage to the edge restraint.



NYPA Parcel Photo 1: Looking south along the top of the test area. The light-colored sand near the corner of the test area is from a nearby source, not from the test area itself.



NYPA Parcel Photo 2: Looking west from approximately the same vantage as the previous photo. The black material in the right of the picture is the remains of another project.



NYPA Parcel Photo 3: Looking northeast at the test area.



NYPA Parcel Photo 4: Panning north from the previous photo.



NYPA Parcel Photo 5: Same view as previous photo, from farther south of the test area.



NYPA Parcel Photo 6: Panning west from the previous photo.

April 7, 2013

Periodic Inspection Report No.4

Inspector: Randy West

Weather Conditions: Sunny, 40's, west wind 20 – 30 $\pm$ mph

Water Conditions: Lake un-frozen with floating ice

General Observations:

1. The lake has unfrozen, but there is much floating ice at both locations.
2. No evidence of vandalism. Edge restraints are in good condition.
3. The processes at work in previous IRs are still evident.
 - a. Wind-driven sand is more noticeable upslope of both test areas.
 - b. Sand persists at or near to original thickness in upper reaches of both test areas.
 - c. Sand continues to be slowly removed (by water) from the mid-portions of the above-water portions of both test areas. The sand is, however, still present at a significant thickness in those locations.
 - d. The thickness of sand remaining at the toe of the above-water portion of the test areas is difficult to determine, as there appears to have been a lateral movement of some of the sand to the outside of the edge restraints.
4. It is unclear if the edge restraint has moved downward into the sand. There are areas where the interior lockdown netting is exposed in the middle of the above-water portions, which correspond with areas from which test sand has been removed. The sand there is still present at thicknesses greater than outside of the test area. Farther downslope, the relative depth of the sand inside and outside of the test area is more similar (i.e, it appears that there's less sand remaining in the test area), but the edge restraint is buried and the lock-down netting is not exposed. The process at work here will be easier to evaluate after the final survey.
5. Other observations as noted with the attached photos.



Gallagher Beach Photo 1: Two-photo pan looking from south to southwest at the test area.



Gallagher Beach Photo 2: Looking west along north edge of test area. Note man-placed mound of sand over the edge restraint, and the exposed lock-down netting. The sand inside the test area there is “higher” than the sand outside.



Gallagher Beach Photo 3: Panning west from previous photo.



Gallagher Beach Photo 4: Looking north at upslope portion of the south edge of the test area. Note the drift line to the right of the test area.



Gallagher Beach Photo 5: Panning west from previous photo. Note the apparent burial of the edge restraint.



Gallagher Beach Photo 6: Looking south along the top of the test area. Note the uniform, fine wind-blown sand over the top of the edge restraint.

Periodic Inspection Report No.4



Gallagher Beach Photo 7: Looking westward along northern edge restraint from same vantage as the previous photo.



Gallagher Beach Photo 8: Looking north along drift line at the south edge of the test area. The burial of the edge restraint here appears to be man-made as it corresponds to the same condition on the north edge restraint.



Gallagher Beach Photo 9: Panning west from previous photo.



Gallagher Beach Photo 10: Looking north at the wind-blown sand in the upslope riprap



Gallagher Beach Photo 11: Looking westward along the southern edge restraint. This photo shows clearly the apparent



NYPA Parcel Photo 1: Looking south along the waterline. The dead fish have occurred recently on many beaches within this area according to news reports.

Periodic Inspection Report No.4



NYPA Parcel Photo 2: Looking upslope (eastward) along northern edge restraint.

Periodic Inspection Report No.4



NYPA Parcel Photo 4: Looking upslope (eastward) along southern edge restraint.

Periodic Inspection Report No.4



NYPA Parcel Photo 5: Looking north along upslope edge restraint. Note uniform, fine-grained wind-blown sand on upslope side.



NYPA Parcel Photo 6: Looking west along southern edge restraint. The light-colored sand that is apparent in footprints and other closed areas is from a separate development nearby, and has blown into the vicinity of the test area.



NYPA Parcel Photo 7: Same general vantage as NYPA Parcel Photo 5, from slightly farther away. Note the driftwood log on the test area.



NYPA Parcel Photo 8: Looking west over the northeast corner of the test area.