CITY OF EVANSTON

EVANSTON SHORELINE REPAIRS

DECEMBER 2024

SMITHGROUP

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EXECUTIVE SUMMARY

ADVANCING LONG-TERM LAKEFRONT RESILIENCE FOR EVANSTON'S FUTURE

Comprehensive preliminary engineering solutions rooted in community input for 6 key locations.

PROJECT INITIATION

During the winter of 2019/20, the City of Evanston, along with many other communities around the Lake Michigan coastline, was subjected to a series of damaging storm events with high winds and large waves resulting in flooding, erosion and lakefront property damage, which was exacerbated by the near-record lake levels. The City conducted a vulnerability assessment of the entire public lakefront and implemented a series of urgent repairs and temporary flood protection measures. Subsequently, in 2022, six sites were designated as highest priority and selected for further evaluation, preliminary design and community feedback.

PUBLIC ENGAGEMENT

Through 3 separate rounds of in-person public meetings and 2 e-mailed surveys, the public was able to weigh in on the overall condition of the lakefront and what's working and what needs attention, personal priorities, and preferred shoreline restoration typologies. Individual designs were presented for each site with iterative development incorporating public feedback. While this project focused on the six high-priority sections of the Lakefront, the feedback from the meetings and surveys made clear that the public treasures the lakefront and the adjacent open space, along with the opportunities for active and passive recreation that it offers. Indeed, the Lake Michigan shoreline is a defining feature of the City. Preserving the beaches, open spaces, natural areas, and views, while enhancing accessibility, mobility, ecology and natural resources, and the overall condition of the public space were prominent themes throughout the engagement process.

EXISTING CONDITIONS

Currently, the primary method of shore protection in Evanston is a series of rubblemound revetments, most of which were installed during the 1980s/90s in response to a previous episode of record-high water levels. It is apparent that the current state of the lakefront parks, and especially the vulnerability of several of the public beaches to erosion and the deteriorating nature of the existing flood protection structures, is suboptimal.

DESIGN & IMPLEMENTATION

This project has identified and described a series of interventions at the selected high-priority areas and the estimated capital costs associated with implementation. A wide range of solutions are proposed based on each site's unique characteristics and needs. Solutions include, complete revetment rehabiliatation, beach nourishment with additional stabilizations features, and addition of natural infrastructure.

Three implementation strategies (No Action, Opportunistic, and Programmatic) were compared, and SmithGroup recommends that the City adopt a programmatic approach to project implementation, which will require further prioritization of the six projects to be conducted, since simultaneous design/construction of all six is not practicable.

A No-Action alternative is not recommended. Postponing lakefront capital improvements has a number of significant drawbacks, including: increasing risk of catastrophic failure of critical infrastructure, increasing future rehabiliation costs, reduced level of service, and higher operation and maintenance costs.

EXECUTIVE SUMMARY

In order to evaluate relative priority, SmithGroup has compiled information related to estimated capital cost and coastal vulnerability that can easily be compared across all projects, as well as qualitative information related to potential for external funding sources, other benefits, impacts on operations and maintenance activities, and regulatory / permitting complexity. Recognizing that not all of these evaluation criteria are of equal importance, a weighting system has also been applied. This information is summarized in the table below, with an initial estimated Weighted Priority Score:

PROJECT PRIORITIZATION CHART

EVALUATION CRITERIA	EVALUATION WEIGHTING	SHERIDAN ROAD $4.3 M	CLARK SQUARE PARK $3.2 M	LEE STREET BEACH AND ELLIOT PARK $8.3 M	GREENWOOD BEACH $7.4 M	DOG BEACH $4.9 M	LINCOLN STREET END $0.9 M
COASTAL RISK	HIGH	HIGH	MEDIUM	HIGH	HIGH	LOW	MEDIUM
LIKELIHOOD OF FUNDING	HIGH	MEDIUM	HIGH	MEDIUM	HIGH	LOW	LOW
COST	MEDIUM	$$$	$$	$$$$$	$$$$$	$$$$	$
OTHER BENEFITS	MEDIUM	HIGH	LOW	MEDIUM	HIGH	LOW	LOW
PERMIT COMPLEXITY	LOW	MEDIUM	MEDIUM	COMPLEX	COMPLEX	MEDIUM	SIMPLE
EFFECTS ON O&M	LOW	LOW	HIGH	MEDIUM	LOW	MEDIUM	LOW
WEIGHTED PRIORITY SCORE		36	28	26	35	15	27

* Weighted Priority Score represents an assessment of each project on a 5-point scale for each criteria, using a multiplier of 2.0 for highly weighted criteria, 1.5 for medium weighted criteria, and 1.0 for lower weighted criteria, with a maximum score of 45.

LEGEND:

HIGH SCORING ATTRIBUTES

(i.e. more attractive attributes such as lower cost, simpler regulatory environment, or greater vulnerability)

MEDIUM SCORING ATTRIBUTES

LOW SCORING ATTRIBUTES

From this exercise, the highest priority projects are determined to be Sheridan Road and Greenwood Beach, with Clark Square, Lee Street Beach / Elliot Park, and Lincoln Street all scoring lower, and Dog Beach being the lowest scoring project.

It is apparent that all the projects have merit, and prioritization is ultimately somewhat subjective depending on an individual's (or institution's) values, preferences, and specific circumstances. The "Implementation" section of this report contains further discussion regarding prioritization and includes an additional ranking tool that allows decision makers to (a) compare and contrast specific technical aspects of the proposed projects, and (b) explore and share their own ranking and prioritization, based on their own weighting preferences and additional criteria.

PROJECT SUMMARY

The Evanston Shoreline Repair project includes the preliminary design of long-term capital improvements along the City of Evanston - owned shoreline of Lake Michigan, with the primary purposes of preventing loss of land due to erosion and protection of public infrastructure.

In 2020, the City of Evanston, along with other lakefront communities around Lake Michigan and across the Great Lakes, experienced flooding, erosion, land loss, and widespread damage due to the record high lake levels. After a particularly damaging storm which occurred on January 11, 2020, the City implemented emergency repair measures at several vulnerable locations, including Garden Park, Elliot Park, and at Greenwood and Dempster beaches. In addition, the City produced a Lakefront Implementation Roadmap which examined all the publicly-owned lakefront within the City of Evanston. From this roadmap, the City selected six high priority locations for further analysis and preliminary design of new, long-term shore protection.

This report documents the components of the project, including a summary of the public engagement process, a description of the regulatory framework within which implementation must conform, potential funding opportunities and initial estimates of Benefit/Cost ratios to assess suitability for Federal funding opportunities, and preliminary engineering plans, and initial estimates of probable construction costs.

The preliminary engineering plans have been developed based on an assessment of the coastal wave climate. In addition to the improvements to shore protection, each site was considered for further enhancements to Access & Circulation, Habitat & Vegetation, and Recreation.

The City of Evanston will use the preliminary engineering plans prepared as part of this project to develop a comprehensive Long-Term Lakefront Capital Investment Program, and will seek external funding where possible to assist with final engineering, permitting, construction and monitoring of the six sites.

The **six sites** included in this project are listed and are illustrated below with oblique aerials taken in October 2022:

- Sheridan Road (at Calvary Catholic Cemetery)
- Clark Square Park (between Kedzie Street and Main Street)
- Lee Street Beach and Elliot Park (between Lee Street and Dempster Street)
- Greenwood Beach (between Greenwood Street and Lake Street)
- Dog Beach (between Church Street and Clark Street)
- Lincoln Street End

SHERIDAN ROAD SITE LOOKING NORTH WEST

CLARK SQUARE PARK SITE LOOKING NORTH WEST

LEE STREET BEACH AND ELLIOT PARK SITE LOOKING NORTH WEST

GREENWOOD BEACH SITE LOOKING NORTH WEST

DOG BEACH SITE LOOKING NORTH WEST

LINCOLN STREET END SITE LOOKING SOUTH WEST

PUBLIC ENGAGEMENT

Public engagement for the Evanston Shoreline Repairs project included 2 electronic surveys and 3 in-person open house public information sessions. The purpose of the engagement was to first listen to, and learn from, Evanston residents, and to collect information regarding preferences for shoreline improvements, and then to share iteratively developed site concepts that responded to the public input.

The first survey was conducted in September 2022, and the final meeting was held in August 2023. Both surveys garnered over 1,300 individual responses, and each open house meeting was attended by approximately 50 – 75 individuals. The presentation materials from the third public meeting, which include the survey results and a summary of the entire public process, are included in Appendix 1.

SURVEY #1

Survey #1 (September 2022) focused on exploring who uses the public lakefront, how it is used, and what residents think is currently working and what is in need of improvement. As well as general demographic information, the survey focused on exploring what makes the Evanston lakefront so special and collected answers to questions such as "What aspects of Evanston's lakefront are of most critical concern to you?" and "What aspects of the Evanston lakefront do you most appreciate?".

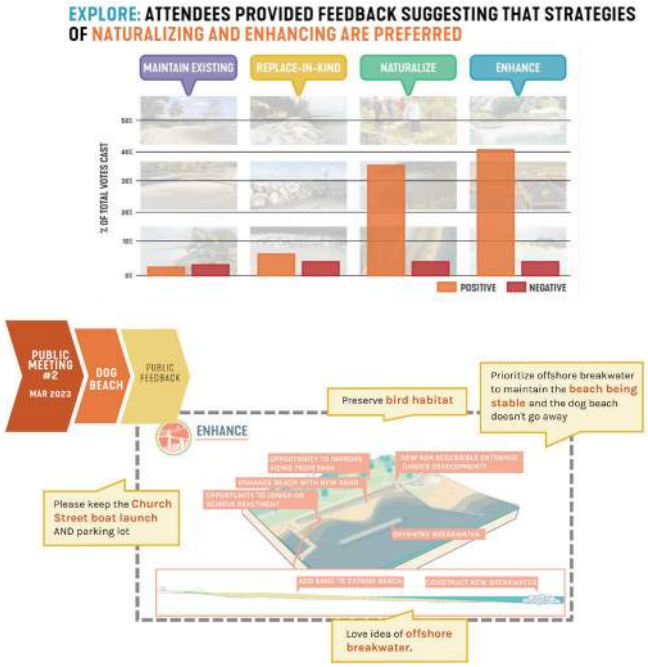
SURVEY #2

Survey #2 (February 2023) built on the initial responses from the first public meeting by further sharing precedent imagery to solicit feedback focused on exploring residents' preferences. Respondents were invited to react to different styles of shoreline improvement and erosion protection types, as well different lakefront park amenities. The over 1,300 responses to the survey helped the consultant team develop different overall design strategies that could be applied to some, or all, of the study sites. The feedback on shoreline protection types included a clear message that the status quo (or do nothing option) is undesirable and that accessibility was a key consideration.

PUBLIC ENGAGEMENT

PUBLIC MEETING #1

Public Meeting #1 was held on October 25, 2022, at the Evanston Public Library. from 6-8pm. Four stations, each with multiple exhibits, were setup to create a self-guided experience for attendees, who were encouraged to engage with the exhibits, consultants, and staff. Station 1 focused on informing residents why the project was happening and outlined key project objectives. Station 2 contained summaries of the responses from Survey #1. Stations 3 and 4 focused on the specific sites that were included within the scope of the project and solicited input from attendees about potential opportunities for improvements. The feedback from this meeting signaled consistent interest in beaches, naturalization, and pedestrian access



PUBLIC MEETING #2

Public Meeting #2 was held on March 8, 2023, at the Robert Crown Community Center. Similarly to the first meeting, stations were set up, each with multiple exhibits, to create a self-guided experience for attendees, who were encouraged to engage with the exhibits, consultants, and staff. One station focused on key project objectives and some of the coastal engineering principles governing the design process. Another station contained summaries of the responses from Survey #2, as well as an overview of the 4 primary design strategies. The remaining stations focused on how the different design strategies might be implemented at each of the specific sites that were included within the scope of the project. The exhibits also addressed site-specific existing conditions, issues, opportunities, and Public Open House #1 feedback. Of the 4 strategies presented (Maintain Existing, Replace-In-Kind, Naturalize, and Enhance) the feedback strongly supported naturalizing and enhancing as preferred.

PUBLIC MEETING #3

Public Meeting #3 was held on August 29, 2023, at the Robert Crown Community Center. In contrast to the first two meetings, the third meeting included a formal presentation, which summarized the entirety of the engagement process and key findings, and how the resident feedback had been incorporated by the design team. Critical feedback included prioritizing protection of existing trees, including upgrades to paths and increasing accessibility, and the preservation and enhancement of lake views. The presentation concluded with the preferred design concepts for each of the study sites, illustrated with plans, section views, and artistic renderings.

REGULATORY REVIEW MEETING PROCESS

Consultation with regulatory agencies such as the US Army Corps of Engineers (USACE) and Illinois Department of Natural Resources - Office of Water Resources (IDNR-OWR) is an important step in identifying potential challenges the projects may face in implementation. Early engagement with these agencies was conducted to understand the concerns of the agencies with potential project impacts to the environment. Based on this input, project concepts are further refined to address the concerns of the regulatory agencies.

Virtual meetings with the USACE and IDNR-OWR staff were held on November 30, 2023 and December 22, 2023, respectively. During each of these meetings, the City of Evanston and SmithGroup presented each of the project sites, describing the issues and proposed improvements. The presentation and meeting minutes from the conversation with each agency are provided in Appendix 2. The details relevant to project impacts and next steps related to permitting, by site, are summarized below. Representatives from USACE and IDNR-OWR included Soren Hall (USACE) and James Casey and Russell Flinchum (IDNR-OWR). Both agencies recommended follow-up pre-application meetings be held when projects advance toward permit applications, which is currently contingent upon future project funding.

SHERIDAN ROAD

- Potential permit path: Lake Michigan Regional General Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA).
- No concerns from either agency regarding potential impacts.

CLARK SQUARE PARK

- Potential permit path: Individual Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA).
- Historic designation at the project site, no impacts to historic designation identified based on initial concepts. (USACE)
- Need for clear description of need for lake fill created, what is at risk, what are the project goals, how does the proposed project meet those goals, etc. to help reviewer assess potential project impacts. (USACE)

LEE STREET BEACH

- Potential permit path: Individual Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA).
- Beach Restoration will include a 5-year monitoring plan requirement with surveys pre-project, post-project, 1-yr and 5-years following construction. (IDNR-OWR)
- Consultation with Fish and Wildlife Service regarding Piping Plover impacts may result in construction work windows. (USACE)
- Historic designation at the project site, no impacts to historic designation identified based on initial concepts. (USACE)

ELLIOT PARK

- Potential permit path: Individual Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA).
- Headland Structure will require pre-fill of 120% of the estimated volume of sediment impounded by the structure. This may be offset by the beach restoration volume depending on the volume of sand in the beach restoration and the analysis of sediment impounded by the headland. (IDNR-OWR)
- Open water habitat impacts created by headland structure will need further assessment to understand if additional mitigation is required. Permit shall provide (USACE):
  - A shoreline evolution analysis to help reviewers understand what happens to the shoreline if no action is taken,
  - support/reasoning behind use of headlands over other stabilization approaches,
  - discussion of the feasibility of long-term stability and maintenance of beaches and headlands,
  - Detail the types of habitat the beach, dynamic revetment, and upland native planting areas create (e.g. migratory bird, fisheries, spawning, aquatic vegetation, etc.) this help in understanding potential impacts and project benefits.
- Historic designation at the project site, no impacts to historic designation identified based on initial concepts. (USACE)

GREENWOOD BEACH

- Potential permit path: Individual Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA).
- Beach Restoration will include a 5-year monitoring plan requirement with surveys pre-project, post-project, 1-yr and 5-years following construction. (IDNR-OWR)
- Headland Structure will require pre-fill of 120% of the estimated volume of sediment impounded by the structure. This may be offset by the beach restoration volume depending on the volume of sand in the beach restoration and the analysis of sediment impounded by the headland. (IDNR-OWR)
- Open water habitat impacts created by headland structure will need further assessment to understand if additional mitigation is required. Permit shall provide (USACE):
  - a shoreline evolution analysis to help reviewers understand what happens to the shoreline if no action is taken,
  - support/reasoning behind use of headlands over other stabilization approaches,
  - discussion of the feasibility of long term stability and maintenance of beaches and headlands,
  - Detail the types of habitat the beach, dynamic revetment, and upland native planting areas create (e.g. migratory bird, fisheries, spawning, aquatic vegetation, etc.) this help in understanding potential impacts and project benefits.
- Consultation with Fish and Wildlife Service regarding Piping Plover impacts may result in construction work windows. (USACE)
- Historic designation at the project site, no impacts to historic designation identified based on initial concepts. (USACE)

DOG BEACH

- Potential permit path: Individual Permit (USACE); Individual Permit (SHERIDAN-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA).
- Beach Restoration will include a 5-year monitoring plan requirement with surveys pre-project, post-project, 1-yr and 5-years following construction. (IDNR-OWR)
- Offshore breakwater structure will require pre-fill of 120% of the estimated volume of sediment impounded by the structure. This maybe offset by the beach restoration volume depending on the volume of sand in the beach restoration and the analysis of sediment impounded by the breakwater. (IDNR-OWR)
- Consultation with Fish and Wildlife Service regarding Piping Plover impacts may result in construction work windows. (USACE)
- Historic designation at the project site, no impacts to historic designation identified based on initial concepts. (USACE)

LINCOLN STREET END

- Potential permit path: Lake Michigan Regional General Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA).
- Consultation with Fish and Wildlife Service regarding Piping Plover impacts may result in construction work windows. (USACE)

FUNDING OPPORTUNITIES

A variety of funding programs and grant sources exist for shoreline improvement and flood protection projects. The sources of funding can include state, federal, local, and private (philanthropic) programs that may support a project at various stages of implementation, ranging from planning through construction. These sources can fully fund or help stretch the City's financial resources to maximize community benefit. The various types of funding opportunities are grouped into five categories:

MOBILITY

RECREATION

RESILIENCE / SHORELINE ENHANCEMENT

GREEN INFRASTRUCTURE

ECOLOGY / HABITAT

The following matrices highlight some of the key state, federal, local, and private programs that may support the next phases of the recommended improvements. For each funding opportunity the applicable project phase(s) supported by the program and other relevant information (grant size, match requirements and schedule) are summarized. Within each Site Overview the applicable funding opportunities are listed.

A successful funding approach is going to look at leveraging several opportunities across multiple categories. In general, local, state and federal sources can be leveraged to meet the match requirements of each other's respective grants, reducing the community's required commitment of funding while also increasing the total funds for the project.

Programs do change with respect to evaluation criteria, program priorities and the amount of funding available on a year-to-year basis. Therefore, engaging funding agency staff early in the application development process is often beneficial, in identifying competitiveness of a proposal and key project components to emphasize for a specific grant. This is not an exhaustive list and new funding sources or programs may be established each year depending on state and federal budgets. However, the listed programs represent a suite of sources that SmithGroup has found success in leveraging for projects similar to the various improvements described for each site.

MOBILITY

SOURCE	PROGRAMS	PHASES	OTHER INFO
FEDERAL (DOT)	CONGESTION MITIGATION AND AIR QUALITY FUND (CMAQ)	ACQUISITION DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** VARIES **MATCH:** 20% MATCH **APP DUE DATE:** EVERY OTHER YEAR, NEXT 2025 **AWARD DATE:** TBD
	PROMOTING RESILIENT OPERATIONS TRANSPORTATION (PROTECT)	PLANNING DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** TBD **MATCH:** VARIES 0% - 20% **APP DUE DATE:** LATE SUMMER/FALL **AWARD DATE:** N/A
	REBUILDING AMERICAN INFRASTRUCTURE (RAISE)	DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** MIN: 5M, MAX: 25M **MATCH:** 20% NON-FEDERAL **APP DUE DATE:** JAN/FEB, ANNUALLY **AWARD DATE:** JULY, ANNUALLY
	SURFACE TRANSPORTATION BLOCK GRANT PROGRAM (STGB)	DESIGN & ENGINEERING	**TYPICAL GRANT SIZE:** TBD **MATCH:** N/A **APP DUE DATE:** TBD **AWARD DATE:** N/A
	RECREATIONAL TRAILS PROGRAM (RTP)	ACQUISITION DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** N/A **MATCH:** 20% NON-FEDERAL **APP DUE DATE:** MARCH, ANNUALLY **AWARD DATE:** 180 DAYS

*GRANT APPLICATION CALENDAR BASED ON PRIOR YEAR INFORMATION, FUTURE YEARS' GRANT CALENDAR MAY VARY.

FUNDING OPPORTUNITIES

RECREATION

SOURCE	PROGRAMS	PHASES**	OTHER INFO
FEDERAL (NPS)	LAND&WATERCONSERVATIONFUND(LWCF)	ACQUISITION DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** UP TO $750,000 **MATCH:** 1:1 NON - FEDERAL **APP DUE DATE:** MARCH* **AWARD DATE:** FOLLOWING SPRING/SUMMER*
STATE (REAL ESTATE TAX)	OPENSPACELANDACQUISITION&DEVEL (OSLAD)	ACQUISITION DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** $600,000 - $1,725,000 **MATCH:** 50% MATCH **APP DUE DATE:** SEPTEMBER* **AWARD DATE:** FIRST HALF OF FOLLOWING YEAR*

*GRANT APPLICATION CALENDAR BASED ON PRIOR YEAR INFORMATION, FUTURE YEARS' GRANT CALENDAR MAY VARY.
** GRANTS ONLY APPLY TO PHASES LISTED BELOW.

RESILIENCE / SHORELINE ENHANCEMENT

SOURCE	PROGRAMS	PHASES**	OTHER INFO
FEDERAL(USDA,EPA,8STATES)	GREATLAKESCOMMISSION'SGREATLAKES SEDIMENTANDNUTRIENTREDUCTION PROGRAM	DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** UP TO $300,000 **MATCH:** 25% NON-FEDERAL **APP DUE DATE:** APRIL* **AWARD DATE:** OCTOBER*
FEDERAL (NFWF/NOAA)	NATIONALCOASTALRESILIENCEFUND	PLANNING DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** VARIES $100K - $10M **MATCH:** NON-FEDERAL NOT REQUIRED, BUT ENCOURAGED **APP DUE DATE:** APRIL (PRE-APP), MAY (FULL APP BY INVITE)* **AWARD DATE:** NOVEMBER / DECEMBER *
FEDERAL (FEMA)	BUILDINGRESILIENTINFRASTRUCTURE& COMMUNITIES (BRIC)	ACQUISITION PLANNING DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** VARIES **MATCH:** 25% STATE/LOCAL **APP DUE DATE:** JUNE (NOTICE OF INTENT) **AWARD DATE:** N/A
FEDERAL	ARMYCORPSOFENGINEERSPLANNING ASSISTANCE STATES (PAS)	PLANNING DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** VARIES **MATCH:** 1:1 NON FEDERAL **APP DUE DATE:** ROLLING **AWARD DATE:** ROLLING
FEDERAL (NOAA)	LAKEMICHIGANCOASTALPROGRAM(LMCP)(CZA)	PLANNING	**TYPICAL GRANT SIZE:** APPROX $100,000 **MATCH:** 1:1 NON FEDERAL **APP DUE DATE:** OCT (PRE-APP), JAN (FULL-APP BY INVITE)* **AWARD DATE:** JULY-AUGUST*
	MIDWEST COASTAL PROGRAM	DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** $250,000 MAX **MATCH:** NO SET AMOUNT **APP DUE DATE:** SEPTEMBER, ANNUALLY **AWARD DATE:** TBD

*GRANT APPLICATION CALENDAR BASED ON PRIOR YEAR INFORMATION, FUTURE YEARS' GRANT CALENDAR MAY VARY.
** GRANTS ONLY APPLY TO PHASES LISTED BELOW.

FUNDING OPPORTUNITIES

GREEN INFRASTRUCTURE

SOURCE	PROGRAMS	PHASES**	OTHER INFO
WATER DISTRICT	GREENINFRASTRUCTUREPARTNERSHIP PROGRAM (MWRD)	CONSTRUCTION	**TYPICAL GRANT SIZE:** TBD **MATCH:** TBD **APP DUE DATE:** PRE (DEC) ; FINAL (SPRING)* **AWARD DATE:** MAY*
STATE	GREEN INFRASTRUCTURE GRANT OPPORTUNITIES (GIGO)	DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** $75,000 UP TO $2.5M **MATCH:** 25% **APP DUE DATE:** OCTOBER* **AWARD DATE:** N/A
FEDERAL (NFWF)/PRIVATE	SUSTAIN OUR GREAT LAKES (SOGL)	PLANNING DESIGN & ENGINEERING	**TYPICAL GRANT SIZE:** $200,000 - $1,000,000 **MATCH:** 1:1 NON-FEDERAL (NOT REQUIRED) **APP DUE DATE:** PRE (FEB) ; FULL (APR) * **AWARD DATE:** OCTOBER*
	CHI-CAL RIVERS FUND	DESIGN & ENGINEERING CONSTRUCTION	**TYPICAL GRANT SIZE:** $150,000 - $400,000 **MATCH:** NOT REQUIRED, BUT ENCOURAGED **APP DUE DATE:** AUGUST* **AWARD DATE:**NOVEMBER *

*GRANT APPLICATION CALENDAR BASED ON PRIOR YEAR INFORMATION, FUTURE YEARS' GRANT CALENDAR MAY VARY.
** GRANTS ONLY APPLY TO PHASES LISTED BELOW.

ECOLOGY / HABITAT

SOURCE	PROGRAMS	PHASES**	OTHER INFO
FEDERAL (NOAA)	COASTALHABITATRESTORATIONAND RESILIENCE	PLANNING DESIGN & ENGINEERING	**TYPICAL GRANT SIZE:** $75,000 -$3M **MATCH:** NO MATCH REQUIRED **APP DUE DATE:** SEPTEMBER THROUGH DECEMBER* **AWARD DATE:** N/A
PRIVATE	GREAT LAKES PROTECTION FUND	PLANNING DESIGN & ENGINEERING	**TYPICAL GRANT SIZE:** VARIES **MATCH:** TBD **APP DUE DATE:** ROLLING **AWARD DATE:** ~6-8 MONTHS POST APPLICATION

*GRANT APPLICATION CALENDAR BASED ON PRIOR YEAR INFORMATION, FUTURE YEARS' GRANT CALENDAR MAY VARY.
** GRANTS ONLY APPLY TO PHASES LISTED BELOW.

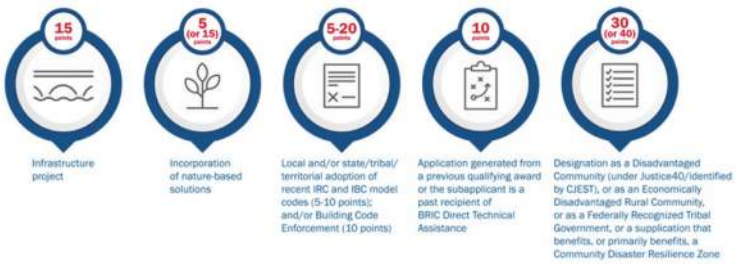
BENEFIT COST ANALYSIS

Benefit Cost Analysis (BCA) is a critical component to qualifying for several federally funded grant programs under the administration of the Federal Emergency Management Agency (FEMA). As a part of the Evanston Shoreline Improvements Project the consultant team of GHD and SmithGroup worked with the City of Evanston to explore the applicability of the project sites to FEMA grant programs and the potential for the sites to meet the required BCA ratio of 1.0 or greater.

This portion of the project consisted of three parts, 1) screen the proposed projects and project sites for potential for funding through a FEMA program such as Building Resilient Infrastructure and Communities (BRIC), 2) developing preliminary BCA spreadsheets and documentation for applicable projects and 3) educate the City Staff on the factors that go into identifying applicability and the types of supporting documentation and studies required to complete a BCA.

The screening process was conducted over a series of interactive work sessions between GHD, SmithGroup and the City of Evanston. The screening process began with a qualitative assessment of each project site to determine if the site and proposed project aligned with the BRIC program priorities. This was done prior to development of a BCA since if the base criteria for applicability are not well aligned then the project would not be considered for funding, regardless of the BCA ratio. The 2023 BRIC program identified the following criteria for project evaluation:

- The project is an infrastructure project.
- The project incorporates nature-based solutions.
- The Applicant (State of Illinois) has State-wide Building Code Adoption and/or The Sub-applicant (City of Evanston) has Building Code Effectiveness Grading Schedule Rating of 1 to 5.
- The application is generated from a previous qualifying award or the sub-applicant is a past recipient of BRIC non-financial Direct Technical Assistance (referred to as a Pipeline Project).
- Designation as underserved or disadvantaged.



Of these evaluation criteria, the last three apply uniformly to all project sites with the building code and Pipeline Project evaluation criteria assumed to not be met based on available knowledge. Considering the first two evaluation criteria, 4 project sites were identified as potentially applicable projects as they have a infrastructure component. A preliminary BCA was developed for Sheridan Rd, Lee Street Beach and Elliot Park, Greenwood Beach and Dog Beach. Input to the BCA included:

- Approximate project construction costs.
- Assumed annual maintenance costs.
- Potential impacts, based on FEMA guidance, included roadway damage, sewer damage and life safety risks.
- Potential ecological benefits, including beach restoration and green space creation.

Detailed inputs and assumptions are provided in Appendix 3 for each of the four sites, along with a discussion of existing data gaps and additional studies recommended to complete documentation of the preliminary BCA. The intent of the Preliminary BCA is to understand which sites are a good fit for FEMA funding and identify for which sites additional efforts might be warranted to develop a full application.

The table below provides a summary of the preliminary BCA results for the four sites evaluated. The Table indicates that the Sheridan Road and Dog Beach Project sites have a potential fit for FEMA funding based on the current evaluation criteria and preliminary BCA. IT should be noted that effort and time required for completing a FEMA full application and BCA for grant funding under a program such as BRIC is not a minor effort.

PROJECT SITE	PRELIMINARY BCA RATIO
SHERIDAN ROAD WITHOUT ROAD ALIGNMENT	1.21
LEE STREET BEACH AND ELLIOT PARK	0.65
GREENWOOD AND DEMPSTER BEACH	0.41
DOG BEACH	2.56

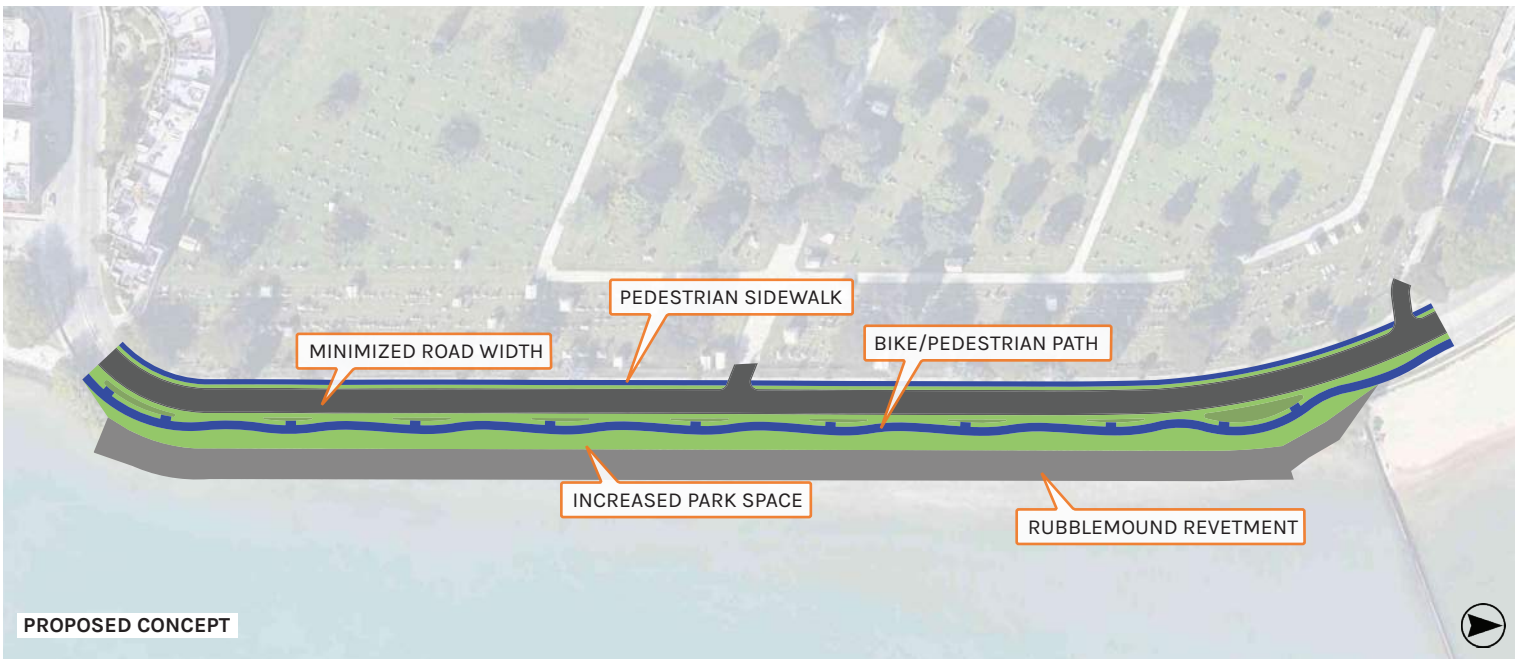
To fully document the supporting information for the BCA, several additional studies would be needed. These studies would include additional coastal engineering analysis, outside of the limits of this project, to support the recurrence interval of storm events that will cause damages and to document the damage that may occur at each site without project implementation. A discussion of the types of studies for each site and additional demographic and population growth statistics needed are provided in Appendix 3 along with an approach to right sizing projects to best fit with FEMA criteria.

SITE OVERVIEW

The Sheridan Road site is located at the far southern end of Evanston, immediately north of the city boundary with Chicago. The shoreline is protected with a rubblemound revetment. There is a narrow sidewalk, but no park space, between the shoreline and the roadway, which is a multi-lane IDOT road, with a wide, planted median. Running beneath the median is a large diameter MWRD interceptor sewer that serves thousands of north shore customers.

The sidewalk and roadway elevation is lower than the revetment crest, resulting in periodic flooding of the eastmost traffic lanes, and pedestrian safety issues on the sidewalk. The armor stones comprising the revetment are deteriorated, and the crest is narrow and irregular.

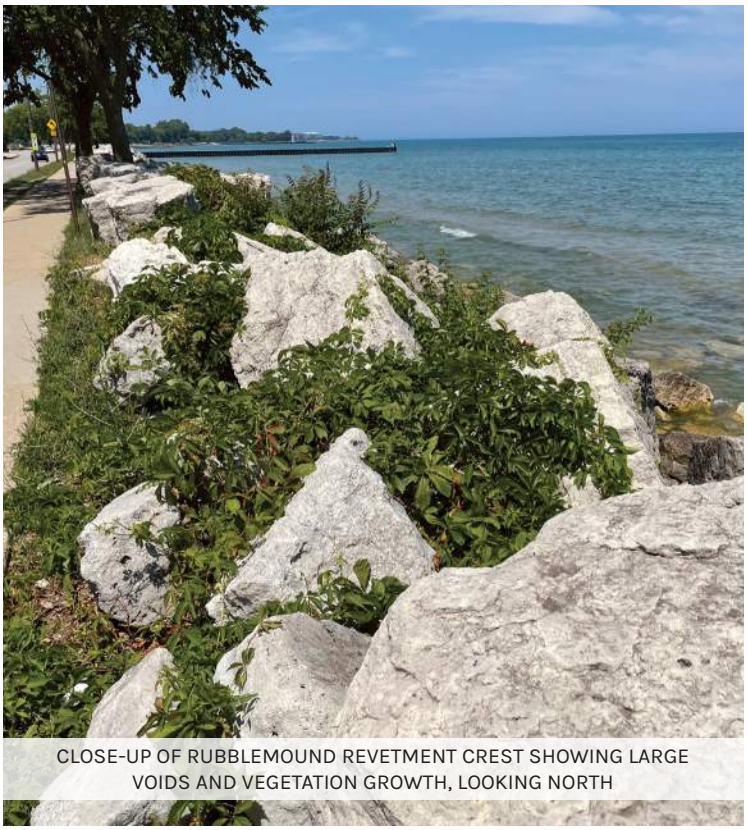
From a user perspective, the sidewalk next to the revetment is not sufficiently wide for two-way bicycle and pedestrian traffic, and is uncomfortably close to the fast-moving traffic, and does not offer any opportunity to stop and enjoy views of the lake. On the west side of the roadway there is no sidewalk, but a desire path has been created between the roadway and the adjacent cemetery.



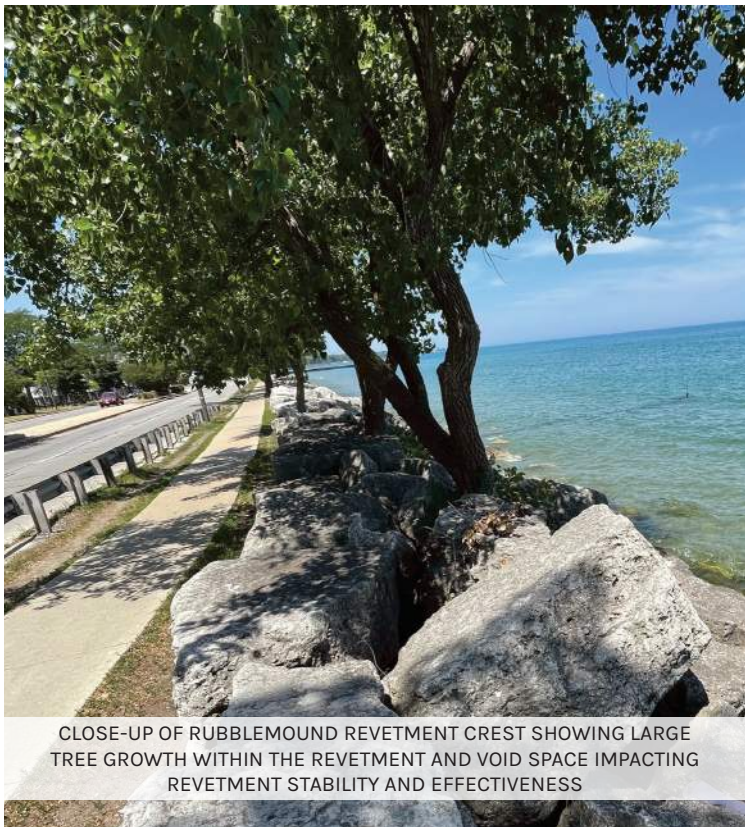
EXISTING CONDITIONS

VIEW OF RUBBLEMOUND REVETMENT, NARROW SIDEWALK AND NARROW SWALE SEPARATING SIDEWALK AND ROADWAY, LOOKING SOUTH

FLOODING AND DEBRIS ALONG SHERIDAN RD DUE TO WAVE OVERTOPPING THE RUBBLEMOUND REVETMENT



CLOSE-UP OF RUBBLEMOUND REVETMENT CREST SHOWING LARGE VOIDS AND VEGETATION GROWTH, LOOKING NORTH



CLOSE-UP OF RUBBLEMOUND REVETMENT CREST SHOWING LARGE TREE GROWTH WITHIN THE REVETMENT AND VOID SPACE IMPACTING REVETMENT STABILITY AND EFFECTIVENESS

PROPOSED IMPROVEMENTS

BASIS OF DESIGN

Conceptual design was guided by an assumed level of design life, risk tolerance (aka Encounter probability) and allowable overtopping rate. Based on the design life and encounter probability a design event was selected. This design event includes combined water levels of high lake levels and storm surge and wave conditions of wave height and period. The design event and other considerations such as allowable overtopping rate for, limiting damage to vegetation, vehicles or structures as well as pedestrian safety were used as the basis of design for the shoreline stabilization and flood protection elements.

RISK FACTORS	DESIGN EVENT	OTHER CONSIDERATIONS
DESIGN LIFE: 50 YEARS	WATER LEVEL: 100-YEAR STILL WATER LEVEL + 100-YEAR STORM SURGE	DAMAGE POTENTIAL TO CRITICAL INFRASTRUCTURE DUE TO EROSION; FLOOD PROTECTION TO CRITICAL INFRASTRUCTURE; PEDESTRIAN SAFETY
ENCOUNTER PROBABILITY: <1%	WAVE CONDITIONS: 100-YEAR	

REGULATORY

Potential permits required: Lake Michigan Regional General Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA), Watershed Management Permit (MWRD) and City of Evanston Building Permit.

Key project components and coordination: Additional documentation needed to complete regulatory applications will include a project narrative identifying what's at risk, the project goals and site constraints, and how the project minimizes environmental impacts to the Lake. The project will likely require a 30-60 day public notice period once permit applications have been submitted. Coordination with USACE, IDNR-OWR, IEPA and MWRD prior to completing the respective applications is recommended to discuss any changes to the project and the details included in the project narrative.

The City is considering adjusting the roadway layout, to reduce the existing 4 lanes to a single lane in each direction with no median, which would allow for an increase in the available space for bicycle / pedestrian amenities and park space. Such a realignment will require consultation with, and approval from, IDOT. In addition, the presence of the large diameter sewer will require detailed coordination with MWRD.

SITE ELEMENT DESCRIPTIONS

COASTAL PROTECTION
Replacement of the existing revetment with new angular 1.5-3 Ton armor stone with underlayer and geotextile. Revetment consists of a 2-3 stone wide crest and toe scour protection. Existing Crest elevations are maintained to limit impacts to views with the properly designed revetment reducing existing overtopping issues associated with the porous nature of the existing protection.

ACCESS/CIRCULATION
Pedestrian and bike access improvements include a 10 feet wide asphalt multi-use path connecting the project to existing sidewalks at the north and south ends. The multi-use path undulates adjacent to the revetment and provides seating amenities offset from the main path of travel. A pedestrian sidewalk will also be added to the west of the southbound lane.

HABITAT/VEGETATION
Existing trees along the revetment are undesirable Siberian Elms, which will be removed. Replacement trees will be native species, planted within the expanded green space. Rain garden plantings are anticipated at intervals as part of overall stormwater management practices.

RECREATION
No new programming anticipated. However, the expanded park zone and wider lakefront path will be augmented with benches to allow for lake viewing.

IMPLEMENTATION

COST ESTIMATE SUMMARY

Estimated Project Total (2023 $, without escalation) (including Construction, Engineering, Permitting, Contingency)

= $4.3 Million

Estimated Construction Cost Breakdown by Elements:

A. General Requirements, Mobilization	**$ 180,000**
B. Lakeside / Revetment Work	**$ 2,330,000**
C. Site Improvements	**$ 310,000**
D. Other	**$ 60,000**
Estimated Construction Subtotal	**= $ 2,880,000**

NOTE: Shoreline Protection and East Green Space only, does not include roadway or utility adjustments.

APPLICABLE GRANT OPPORTUNITIES

The Sheridan Road site is a candidate for Mobility-related external funding opportunities, due primarily to the potential for damage to adjacent critical infrastructure (MWRD sewer, 4 lane roadway) and some potential life safety impacts. Implementing a road diet by reducing the total number of traffic lanes from 4 to 2, and enhancing bicycle / pedestrian transportation may also open other funding avenues. Since the shoreline protection improvements comprise a more traditional armor stone revetment solution, funding from sources such as the NFWF National Coastal Resilience Fund are less likely.

Potential grant opportunities include:

- Congestion Mitigation and Air Quality Fund (CMAQ), DOT
- Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT), DOT
- Building Resilient Infrastructure & Communities (BRIC), FEMA

BENEFIT COST ANALYSIS

The preliminary BCA resulted in a benefit Cost Ratio of 1.21, which is greater than the minimum threshold of 1.0 for Federally-funded programs such as the Building Resilient Infrastructure and Communities (BRIC) program. However, this includes only the shoreline protection component of the project cost, and does not include the additional cost that would be required to reconfigure the roadway. Further data collection and analysis to support and finalize the BCA include:

- Refinement of the project into phases and the benefits that apply to each phase to optimize project costs, benefits and avoided costs.
- A detailed failure analysis of the shoreline protection, roads, and sewer infrastructure due to storm events of a defined recurrence interval.
- Map of the location of the MWRD sewer main and confirmation 8,300 customers served.
- Data on the daily average number of pedestrians and bikers who use the Sheridan Road sidewalk.
- Refined estimation of acreage of new green space proposed.
- Cost of existing annual maintenance efforts to keep Sheridan Road open.

OTHER IMPLEMENTATION CONSIDERATIONS

The City of Evanston can collaborate with both IDOT and MWRD to explore the potential for regional and state partnerships, since this location is known to be vulnerable and critical infrastructure risk will increase with time if no action is taken. The City also has an option to pursue a shoreline-only approach and defer roadway alterations until a future date. In the short-term, measuring and documenting interim data related to usage, safety, maintenance, etc., will provide useful supplemental information to enhance future grant applications.

CLARK SQUARE PARK

SITE OVERVIEW

Clark Square Park is located between Sheridan Road and Lake Michigan in the southern half of Evanston. The shoreline is protected with a rubblemound revetment in front of a sheet pile bulkhead. The lakeward most portion of the park is covered with a 18-foot wide concrete pedestrian promenade. Between the rubblemound / sheet pile and the promenade smaller stone is present within a gabion structure.

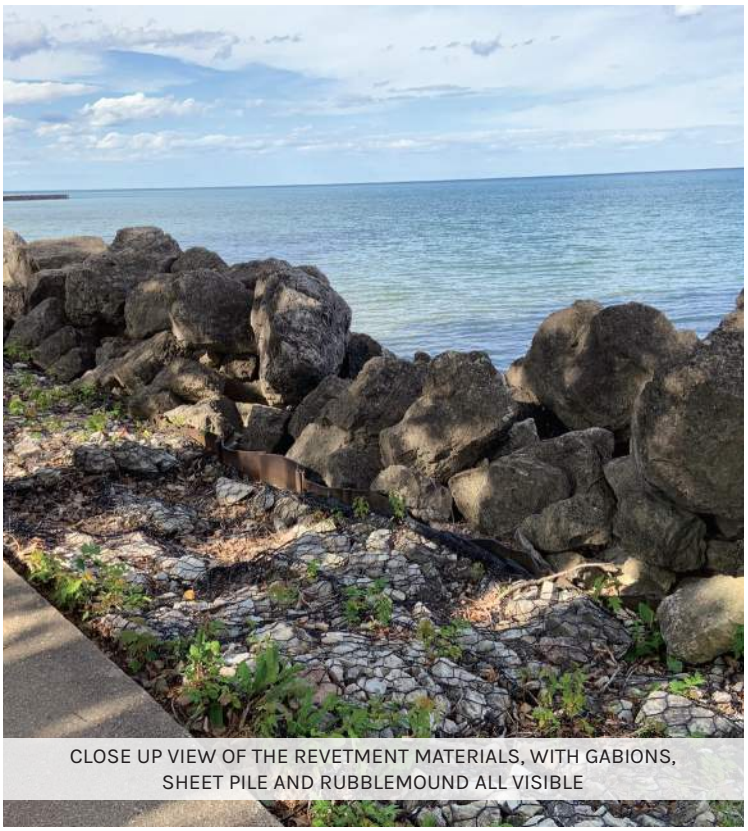
The park elevation is generally lower than the revetment crest, which is easily overtopped during high lake level periods, resulting in periodic flooding of the park and pedestrian safety issues on the promenade. The armor stones comprising the rubblemound revetment are showing signs of aging and deterioration, and the crest is very narrow and irregular.

From a user perspective, the park has been traditionally used for passive recreation, with an arboretum landscape of trees and lawn. There is no formal path or accessible route connecting the adjacent city sidewalks and the promenade.

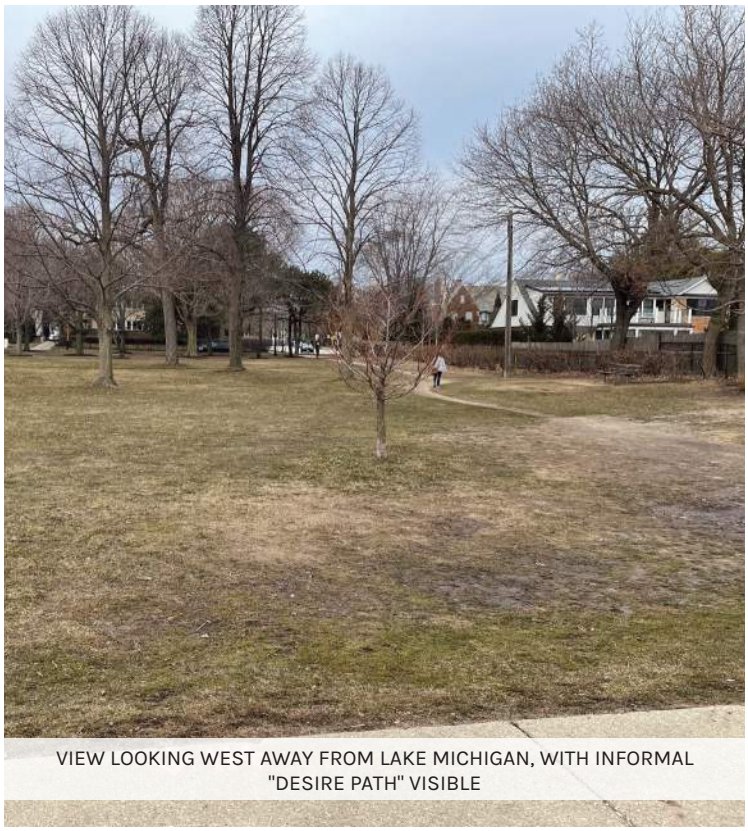
EXISTING CONDITIONS

VIEW OF CONCRETE PROMENADE AND RUBBLEMOUND REVETMENT, LOOKING NORTH

FLOODING AT CLARK SQUARE PARK CAUSED BY OVERTOPPING OF THE REVETMENT DURING 2020 STORM



CLOSE UP VIEW OF THE REVETMENT MATERIALS, WITH GABIONS, SHEET PILE AND RUBBLEMOUND ALL VISIBLE



VIEW LOOKING WEST AWAY FROM LAKE MICHIGAN, WITH INFORMAL "DESIRE PATH" VISIBLE

PROPOSED IMPROVEMENTS

BASIS OF DESIGN

Conceptual design was guided by an assumed level of design life, risk tolerance (aka Encounter probability) and allowable overtopping rate. Based on the design life and encounter probability a design event was selected. This design event includes combined water levels of high lake levels and storm surge and wave conditions of wave height and period. The design event and other considerations such as allowable overtopping rate for, limiting damage to vegetation, vehicles or structures as well as pedestrian safety were used as the basis of design for the shoreline stabilization and flood protection elements.

RISK FACTORS	DESIGN EVENT	OTHER CONSIDERATIONS
DESIGN LIFE: 50 YEARS	WATER LEVEL: 100-YEAR STILL WATER LEVEL + 10-YEAR STORM SURGE	PEDESTRIAN SAFETY; ECOLOGICAL ENHANCEMENT
ENCOUNTER PROBABILITY: 10%	WAVE CONDITIONS: 10-YEAR	

REGULATORY

Potential permits required: Individual Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA), Watershed Management Permit (MWRD) and City of Evanston Building Permit.

Key project components and coordination: Additional analysis needed to complete regulatory applications will include an alternatives analysis identifying what's at risk, the project goals and site constraints, how the project minimizes environmental impacts to the Lake and the ecological and fisheries benefits provided. Coordination with USACE, IDNR-OWR, IEPA and MWRD prior to completing the respective applications is recommended to discuss any changes to the project and the details included in the alternatives analysis. The project will likely require a 30-60 day public notice period once permit applications have been submitted.

SITE ELEMENT DESCRIPTIONS

COASTAL PROTECTION
Replacement of the existing revetment with a new revetment and cobble beach/dynamic revetment provide more resilient flood protection and shoreline stabilization. Replacement of the existing revetment with new angular 1.5-3 Ton armor stone with underlayer and geotextile. Revetment consists of a 2-3 stone wide crest and toe scour protection. Existing Crest elevations are raised to the level of the existing concrete walkway to balance the need for improved flood protection, limit impacts to views and provide pedestrian safety. The Cobble Beach/dynamic revetment is a flat sloped beach/berm extending inland from the shoreline consisting of gravel and cobble sized stones. Allows for lower crest heights, reducing impacts to access and views, and can provide ecological and habitat benefits.

ACCESS/CIRCULATION
Pedestrian access improvements include replacement of the existing concrete walkway with a 6 foot wide concrete trail that connects to the existing sidewalks and cross-walks along Sheridan Road. The trail provides improved ADA access throughout the park. In the vicinity of the cobble beach/dynamic revetment the path becomes an elevated boardwalk allowing for Park users to engage with the cobble beach/dynamic revetment. The path undulates along the shoreline to reduce potential impacts to the existing mature trees.

HABITAT/VEGETATION
Maintain existing mature trees. Add native shoreline plantings behind dynamic revetment. Add rain gardens with deep-rooted natives in backshore area.

RECREATION
Recreation within the park to stay predominantly passive. Add benches and other seating elements close to the lake.

IMPLEMENTATION

COST ESTIMATE SUMMARY

Estimated Project Total (2023 $, without escalation) (including Construction, Engineering, Permitting, Contingency)

= $3.0 Million

Estimated Construction Cost Breakdown by Elements:

A. General Requirements, Mobilization	**$ 180,000**
B. Lakeside / Revetment Work	**$ 1,130,000**
C. Site Improvements	**$ 670,000**
D. Other	**$ 40,000**
Estimated Construction Subtotal	**= $ 2,010,000**

APPLICABLE GRANT OPPORTUNITIES

Comparatively fewer infrastructure grant opportunities exist for the Clark Square Park site, since there is no record of damage to critical infrastructure or significant transportation / life safety impacts. However, portions of the proposed project may be better candidates for ecological funds since it has the "living shoreline" component. Removing concrete pavement and adding rain gardens may be eligible for green infrastructure funds.

Potential grant opportunities include:

- National Coastal Resilience Fund, NOAA/NFWF
- Lake Michigan Coastal Program, NOAA
- Chi-Cal Rivers Fund, NFWF
- Coastal Habitat Restoration and Resilience

BENEFIT COST ANALYSIS

This site was not considered in the Benefit /Cost Analysis, since there are no opportunities to generate widespread benefits to attract large shoreline grants.

OTHER IMPLEMENTATION CONSIDERATIONS

Clark Square is bounded on both the north and south by private property, which sets it apart from the other sites, and will require formal notification through the permit process.

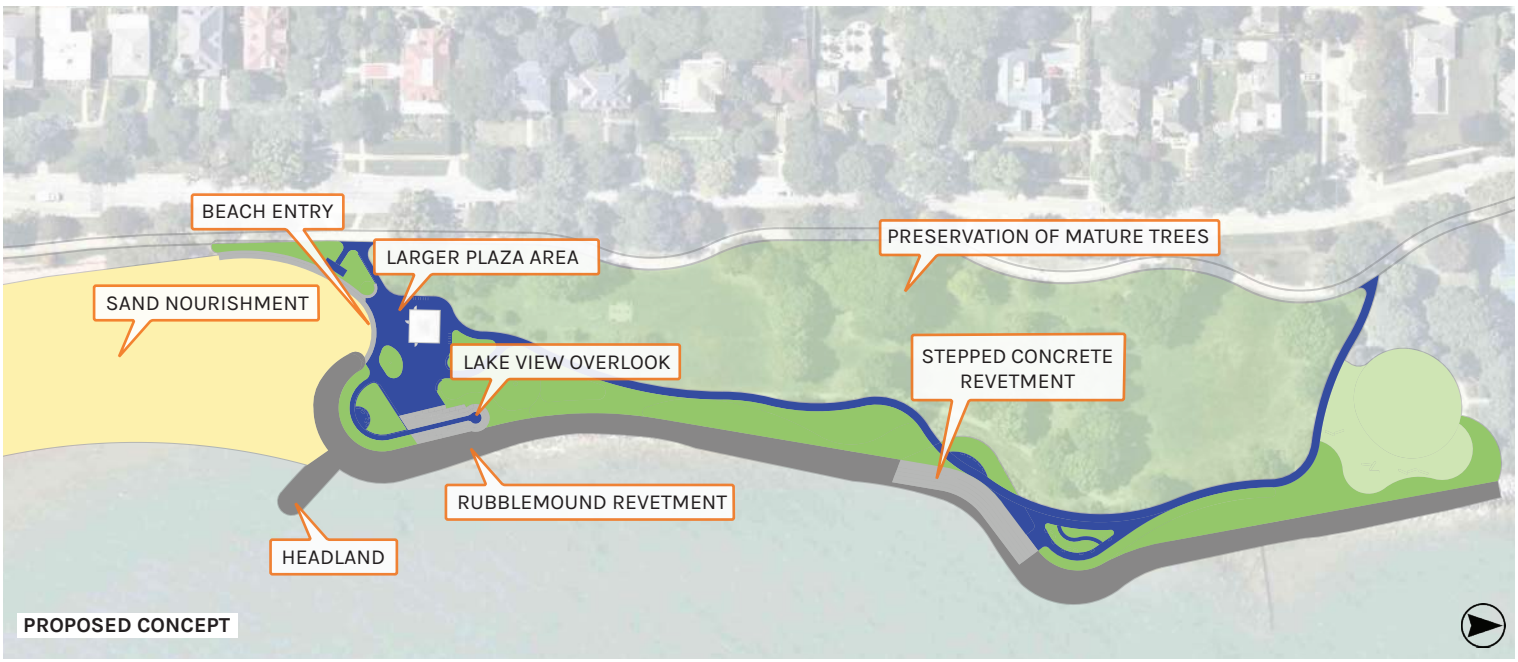
SITE OVERVIEW

The Lee Street Beach / Elliot Park site marks the southern terminus of the contiguous public lakefront which starts at Clark Street Beach (immediately south of Northwestern University). The shoreline comprises a public bathing beach (Lee Street Beach) which is held with a shore-perpendicular sheet pile groin, and a rubblemound revetment along the edge of Elliot Park.

The beach eroded during the high lake levels of 2019-2021, and at the northern end, the dry beach width was temporarily reduced to zero, with backshore protection of concrete plank retaining wall and gabions exposed. As lake levels have receded, the beach profile has naturally restored itself.

The park elevation in Elliot Park is lower than the revetment crest, resulting in periodic flooding of the park. The armor stones comprising the revetment are deteriorated, and the crest is narrow and irregular. After flooding in 2020, the City stabilized part of the revetment, and added TrapBags as temporary flood protection.

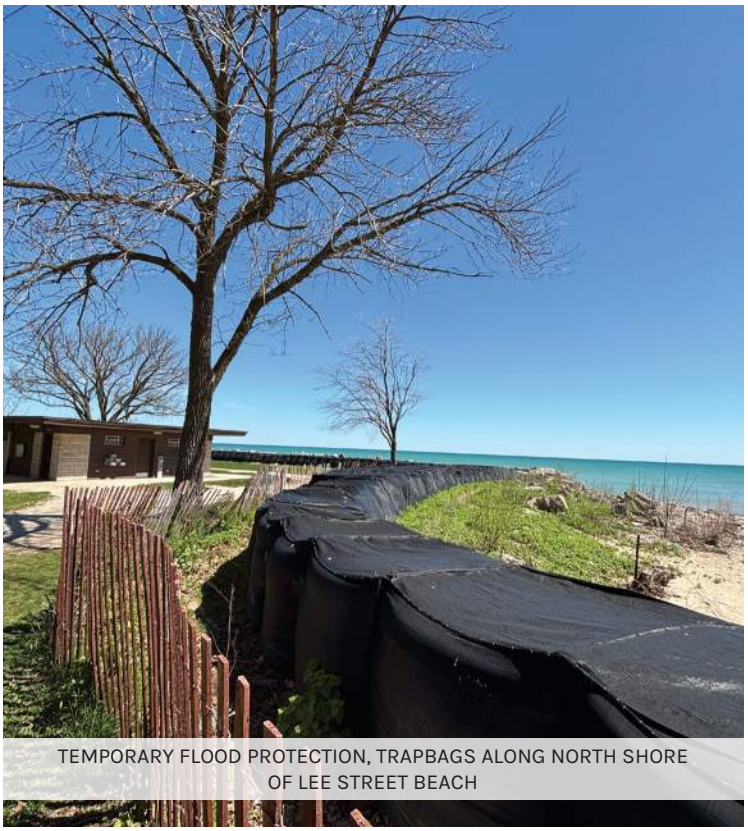
The area is used for a mixture of passive and active recreation, with a landscape of trees, shrubs, and lawn. There is a bathroom building at the south end of Elliot Park, which serves the park and beach areas. The pedestrian path along the park's east perimeter is often unusable due to flooding and drainage issues.



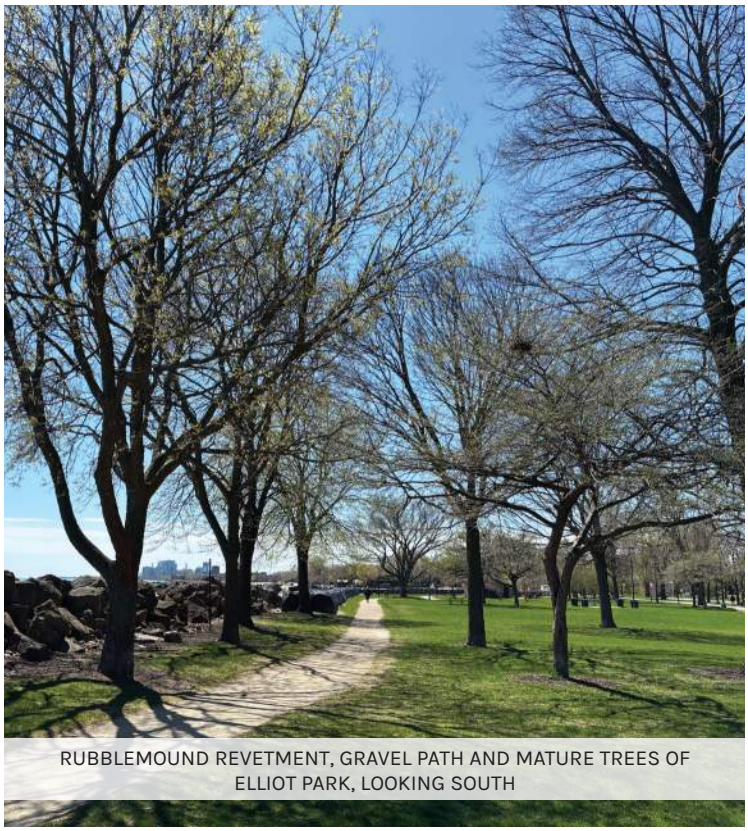
EXISTING CONDITIONS

EXISTING PATH TO BEACH HOUSE AND RESTROOM BUILDING AT THE NORTH END OF LEE STREET BEACH/SOUTH END OF ELLIOT LOOKING EAST

FLOODING OF THE BEACH HOUSE AND RESTROOM BUILDING DUE TO OVERTOPPING OF THE RUBBLEMOUND REVETMENT



TEMPORARY FLOOD PROTECTION, TRAPBAGS ALONG NORTH SHORE OF LEE STREET BEACH



RUBBLEMOUND REVETMENT, GRAVEL PATH AND MATURE TREES OF ELLIOT PARK, LOOKING SOUTH

PROPOSED IMPROVEMENTS

BASIS OF DESIGN

Conceptual design was guided by an assumed level of design life, risk tolerance (aka Encounter probability) and allowable overtopping rate. Based on the design life and encounter probability a design event was selected. This design event includes combined water levels of high lake levels and storm surge and wave conditions of wave height and period. The design event and other considerations such as allowable overtopping rate for, limiting damage to vegetation, vehicles or structures as well as pedestrian safety were used as the basis of design for the shoreline stabilization and flood protection elements.

RISK FACTORS	DESIGN EVENT	OTHER CONSIDERATIONS
DESIGN LIFE: 50 YEARS	WATER LEVEL: 100-YEAR STILL WATER LEVEL + 10-YEAR STORM SURGE	LEE STREET: DAMAGE POTENTIAL TO UTILITY INFRASTRUCTURE DUE TO EROSION; RECREATIONAL VALUE AND ECOLOGICAL BENEFITS
ENCOUNTER PROBABILITY: 10%	WAVE CONDITIONS: 10-YEAR	ELLIOT PARK: PEDESTRIAN SAFETY; ECOLOGICAL ENHANCEMENT

REGULATORY

Potential permits required: Individual Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA), Watershed Management Permit (MWRD) and City of Evanston Building Permit.

Key project components and coordination: This project has the potential to have a complex permitting process. It is anticipated that additional analysis needed to complete regulatory applications will include:

- An alternatives analysis including a shoreline evolution analysis, support/reasoning behind use of headlands over other stabilization approaches, discussion of the feasibility of long-term stability and maintenance of beaches and headlands, discussion of how the project minimizes environmental impacts to the Lake and the ecological and fisheries benefits and habitat created,
- Estimation of Prefill requirement of 120% of the volume of sediment impounded by the headland structure
- Littoral transport analysis to identify potential impacts to downcoast shorelines.

The alternatives analysis will be critical for identifying any required mitigation for open water impacts. Coordination with USACE, IDNR-OWR, IEPA and MWRD prior to completing the respective applications is recommended to discuss any changes to the project and the details included in the alternatives analysis and may require multiple meetings to make the permit review process smooth.

The project will likely require a 30-60 day public notice period once permit applications have been submitted. Following completion of the project, regulatory permits will require a 5-year monitoring plan with surveys pre-project, post-project, 1-year post-construction and 5-years post-construction.

SITE ELEMENT DESCRIPTIONS

COASTAL PROTECTION

Improvements to the shoreline include, new revetment, headland and beach restoration and a stepped revetment to provide a shoreline more resilient to flooding and erosion. For the majority of the shoreline the existing revetment is replaced with new angular 1.5-3 Ton armor stone with underlayer and geotextile. The revetment consists of a 2-3 stone wide crest and toe scour protection. Existing Crest elevations are maintained to limit impacts to views with the properly designed revetment reducing existing overtopping issues associated with the porous nature of the existing protection.

At the North end of Lee Street beach extending into the southern end of Elliot Park the headland and beach restoration work together to create a more resilient shoreline. The headland consists of 120 feet wide by 100 feet long extension from shore with a revetment edge. The promontory created by the headland is vegetated with native plantings and elevated to reduce potential overtopping by storm waves, creating new views and ecological and habitat benefits. The beach restoration consists of 75 feet of new dry beach width and 1.5 acres of new sand beach extending along 350 feet of the shoreline.

At the mid point of Elliot Park, a stepped concrete revetment is included to allow for improved views and seating and closer access to and passive engagement with the Lake. This shoreline hardening extends for 175 linear feet and maintains the existing crest elevation.

ACCESS/CIRCULATION

Pedestrian access improvements include a new 6 feet wide concrete path that provides ADA access to the existing beach house and restroom building, shoreline, stepped revetment and playground. The path undulates along the shoreline to reduce potential impacts to the existing mature trees. An expanded plaza area around the Restroom and beach house provides new gathering space with stone stepped seating and views from the headland.

HABITAT/VEGETATION

Some existing mature trees that are growing through the existing deteriorated revetment will be removed in order to rehabilitate the shoreline protection. Several new trees will be planted at the new headland at the southern end of Elliot Park, and in the vicinity of the stepped revetment section. Tall- and short-grass prairie plantings are proposed between the new pedestrian path and the revetment, with native bioswale plantings in strategic areas as part of the stormwater management approach.

RECREATION

No new programming is anticipated. However, the new entrance to the beach from the south end of Elliot Park will also allow visitors to more easily utilize the washroom building and provide a staging area for the lifeguards. The plaza area could also support future year-round pop-up gatherings.

IMPLEMENTATION

COST ESTIMATE SUMMARY

Estimated Project Total (2023 $, without escalation) (including Construction, Engineering, Permitting, Contingency)

= $8.3 Million

Estimated Construction Cost Breakdown by Elements:

A. General Requirements, Mobilization	**$ 180,000**
B. Lakeside / Revetment Work	**$ 4,330,000**
C. Site Improvements	**$ 930,000**
D. Other	**$ 110,000**
Estimated Construction Subtotal	**= $ 5,550,000**

APPLICABLE GRANT OPPORTUNITIES

Comparatively fewer infrastructure grant opportunities exist for the Lee Street Beach & Elliot Park site, since there is no record of damage to critical infrastructure or significant transportation / life safety impacts. The primary benefits are recreational, as the new headland / revetment will protect the park from flooding, and along with the proposed beach nourishment, will expand the footprint and longevity of the recreational beach.

Potential grant opportunities include:

- Land and Water Conservation Fund, NPS
- National Coastal Resilience Fund, NOAA/NFWF
- Lake Michigan Coastal Program, NOAA

BENEFIT COST ANALYSIS

The preliminary BCA resulted in a Benefit Cost Ratio of 0.65 which is below minimum threshold of 1.0 for Federally-funded programs such as the Building Resilient Infrastructure and Communities (BRIC) program. Refining the project scope may bring the BCA up to the required threshold of 1.0 with a focus on the shoreline protection elements (i.e. the beach restoration and revetment/ headland). Further data collection and analysis to support and finalize the BCA include:

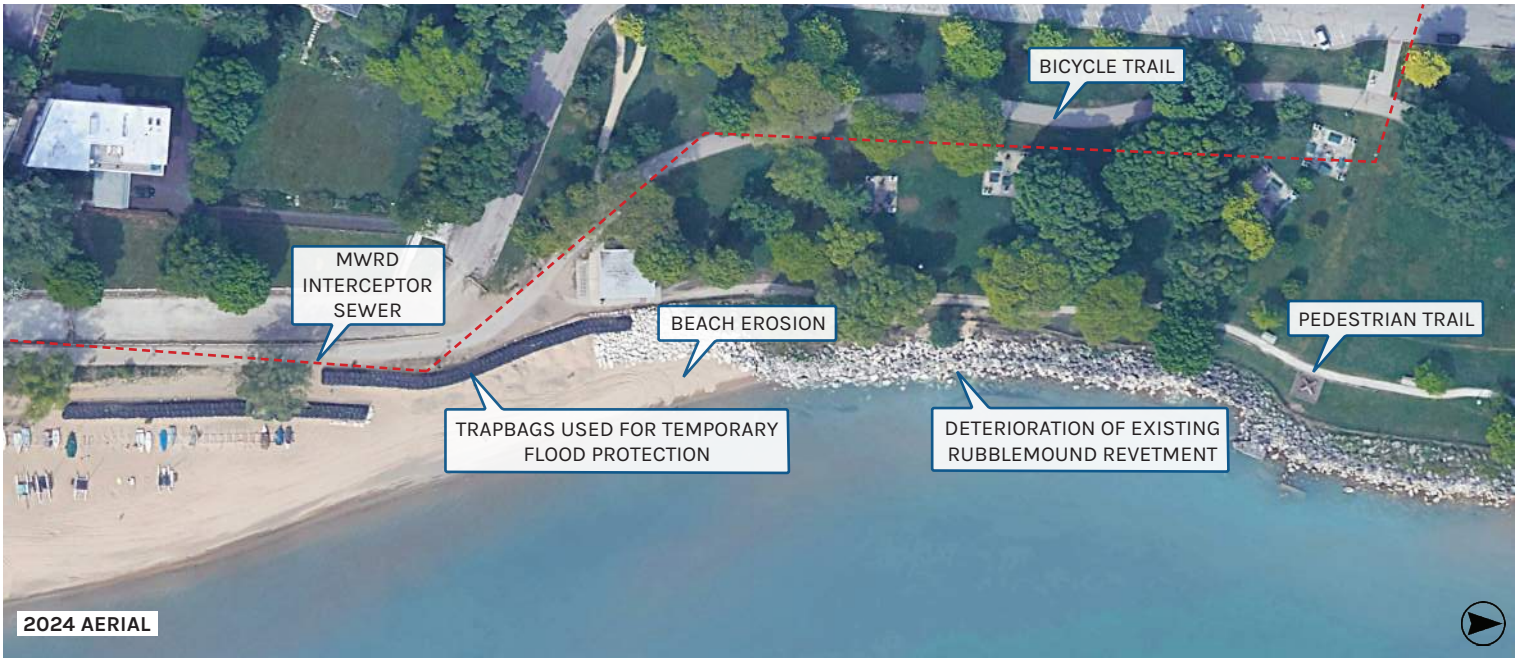
- Refinement of the project to focus on the shoreline protection and resilience and the benefits that apply to optimize project costs, benefits and avoided costs.
- A detailed failure analysis of the shoreline protection, roads, and sewer infrastructure due to storm events of a defined recurrence interval.
- Map of the location of the MWRD sewer main and confirmation of customers served.
- Refined estimation of acreage of new green space and beach restoration proposed.
- Cost of existing annual maintenance efforts to keep the park and beach open and cleanup following flood events.
- Estimated site maintenance costs after project completion (focus on maintenance of structural components not typical park maintenance).

OTHER IMPLEMENTATION CONSIDERATIONS

From the standpoint of land area and length of shoreline, the Lee Street / Elliot park is one of the longest, and as such, implementation should probably be phased into a North and South component to reduce disruption and impacts to park users.

The "TrapBag" emergency temporary flood protection measures installed in 2020 have successfully reduced the risk of infrastructure failure at this location, however, they should not be considered as a permanent solution.

SITE OVERVIEW



Greenwood Beach lies between the Arrington Lagoon in Dawes Park and the Church Street Boat Launch to the north and the Dempster Street Launch Facility and Sailing Beach to the south. The beach is held with a shore-perpendicular sheet pile groin at Dempster Street, and the park is protected by rubblemound revetment.

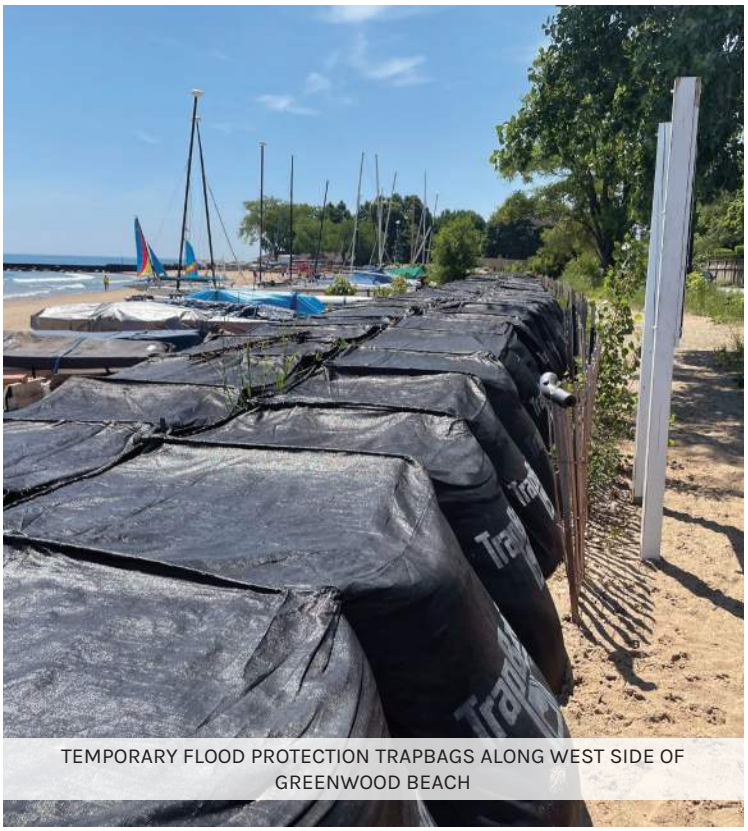
The beach eroded during the high lake levels of 2019-2021, and at the northern end, the dry beach width was temporarily reduced to zero, with the lakefront path close to being undermined. As lake levels have receded, the beach profile has naturally restored itself. The armor stones comprising the revetment are deteriorated, and the crest is narrow and irregular. After flooding in 2020, the City rebuilt part of the revetment, and added TrapBags as temporary flood protection.

In addition to the surface infrastructure, an MWRD interceptor sewer runs very close to Lake Michigan through this site, which is also threatened with being undermined by erosion from future storms / high lake levels. This is the City's most active recreation beach, with significant summer youth camp activity. The area has some of the highest lakefront pedestrian and bicycle traffic, which is funneled through a narrow pinch point at the Greenwood Street end.

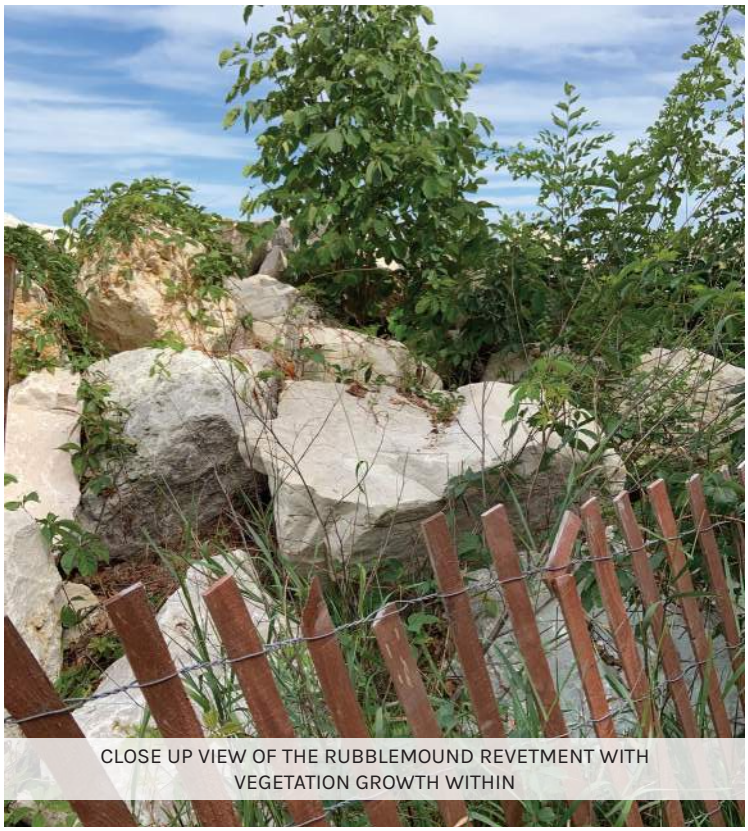
EXISTING CONDITIONS

UNEVEN PATH MATERIAL CREATES LOW AREAS WITH STANDING WATER. DESIRED PATH CREATED WHILE AVOIDING THESE WET AREAS.

DETERIORATION OF REVETMENT AND SAND BEACH



TEMPORARY FLOOD PROTECTION TRAPBAGS ALONG WEST SIDE OF GREENWOOD BEACH



CLOSE UP VIEW OF THE RUBBLEMOUND REVETMENT WITH VEGETATION GROWTH WITHIN

PROPOSED IMPROVEMENTS

BASIS OF DESIGN

Conceptual design was guided by an assumed level of design life, risk tolerance (aka Encounter probability) and allowable overtopping rate. Based on the design life and encounter probability a design event was selected. This design event includes combined water levels of high lake levels and storm surge and wave conditions of wave height and period. The design event and other considerations such as allowable overtopping rate for, limiting damage to vegetation, vehicles or structures as well as pedestrian safety were used as the basis of design for the shoreline stabilization and flood protection elements.

RISK FACTORS	DESIGN EVENT	OTHER CONSIDERATIONS
DESIGN LIFE: 50 YEARS	WATER LEVEL: 100-YEAR STILL WATER LEVEL + 10-YEAR STORM SURGE	DAMAGE POTENTIAL TO UTILITY INFRASTRUCTURE DUE TO EROSION; RECREATIONAL VALUE AND ECOLOGICAL BENEFITS
ENCOUNTER PROBABILITY: 10%	WAVE CONDITIONS: 10-YEAR	

REGULATORY

Potential permits required: Individual Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA), Watershed Management Permit (MWRD) and City of Evanston Building Permit.

Key project components and coordination: This project has the potential to have a complex permitting process. It is anticipated that additional analysis needed to complete regulatory applications will include:

- An alternatives analysis including a shoreline evolution analysis, support/reasoning behind use of headlands over other stabilization approaches, discussion of the feasibility of long-term stability and maintenance of beaches and headlands, discussion of how the project minimizes environmental impacts to the Lake and the ecological and fisheries benefits and habitat created
- Estimation of Prefill requirement of 120% of the volume of sediment impounded by the headland structure
- Littoral transport analysis to identify potential impacts to downcoast shorelines.

The alternatives analysis will be critical for identifying any required mitigation for open water impacts. Coordination with USACE, IDNR-OWR, IEPA and MWRD prior to completing the respective applications is recommended to discuss any changes to the project and the details included in the alternatives analysis and may require multiple meetings to make the permit review process smooth.

The project will likely require a 30-60 day public notice period once permit applications have been submitted. Following completion of the project, regulatory permits will require a 5-year monitoring plan with surveys pre-project, post-project, 1-year post-construction and 5-years post-construction.

SITE ELEMENT DESCRIPTIONS

COASTAL PROTECTION

Improvements to the shoreline include, headland and beach restoration and Dune Restoration with buried protection structure to provide a shoreline more resilient to erosion. At the north end of Greenwood Beach the headland and beach restoration work together to create a more resilient shoreline. The headland consists of 250 feet wide by 150 feet long extension from shore with a revetment edge. The promontory created by the headland is vegetated with native plantings and elevated to reduce potential overtopping by storm waves, creating new views and ecological and habitat benefits. The beach restoration consists of 20 feet of new dry beach width and 0.7 acres of new sand beach extending along 280 feet of the shoreline.

This headland will protect the adjacent parkland and the proposed sand nourishment of the north end of the beach from erosion providing for a more resilient beach. The additional protection from the headland will allow for removal of some of the existing revetment immediately to the east of the washroom building and creation of new dune habitat. Recognizing the uncertainty that future climate conditions create, a seawall is buried in the core of the dune to provide a level of protection for unforeseeable future conditions which could put the critical infrastructure at risk. The existing TrapBags will be removed as part of the permanent project.

ACCESS/CIRCULATION

Pedestrian access improvements include access to the existing beach house and restroom building, shoreline, and headland. The path ties into the existing multi-use trail at the south and to the existing gravel path to the north. Removal of some of the existing revetment immediately to the east of the washroom building, will allow for more seamless access between the beach and the washroom. The plaza space around the building will be expanded, to relieve some of the pedestrian / bicycle conflicts which currently occur south and east of the building and additional bike racks will be added on the west side.

HABITAT/VEGETATION

Ecological and habitat benefits are created through revetment removal, dune creation and the use of native planting and prairie grasses. Dune creation is proposed via the planting of dunes grasses to the north and south of the restroom building. Naturalizing the existing turf grass area along the shoreline to fit with the passive recreational use of the park includes deciduous trees, native grasses and plantings along the pedestrian path and around the headland.

RECREATION

The expanded beach with protective headland will allow for more reliably available recreational space. The improved washroom plaza will allow for better sight lines for beachgoers and trail users. The headland will be available for active and passive recreation year-round, with exceptional views of Lake Michigan.

IMPLEMENTATION

COST ESTIMATE SUMMARY

Estimated Project Total (2023 $, without escalation) (including Construction, Engineering, Permitting, Contingency)

= $7.4 Million

Estimated Construction Cost Breakdown by Elements:

A. General Requirements, Mobilization	**$ 180,000**
B. Lakeside / Revetment Work	**$ 3,940,000**
C. Site Improvements	**$ 710,000**
D. Other	**$ 100,000**
Estimated Construction Subtotal	**= $ 4,930,000**

BENEFIT COST ANALYSIS

The preliminary BCA resulted in a Benefit Cost Ratio of 0.41 which is below minimum threshold of 1.0 for Federally-funded programs such as the Building Resilient Infrastructure and Communities (BRIC) program. Refining the project scope may bring the BCA up to the required threshold of 1.0 with a focus on the shoreline protection elements (i.e. the beach restoration and revetment/ headland). Further data collection and analysis to support and finalize the BCA include:

- Refinement of the project to focus on the shoreline protection and resilience and the benefits that apply to optimize project costs, benefits and avoided costs.
- A detailed failure analysis of the shoreline protection, roads, and sewer infrastructure due to storm events of a defined recurrence interval.
- Map of the location of the MWRD sewer main and confirmation of customers served.
- Refined estimation of acreage of new green space and beach restoration proposed.
- Cost of existing annual maintenance efforts to keep the park and beach open.
- Data on the effectiveness of the Trap Bags to confirm the estimated useful life.
- Information on the loss of beach use without the trap bags, both residents and City income.
- Estimated site maintenance costs after project completion (focus on maintenance of structural components not typical park maintenance).

APPLICABLE GRANT OPPORTUNITIES

The Greenwood Beach project site offers the greatest variety of benefits: recreation, habitat and environment, mobility improvement, water quality (from the sewer protection), and erosion prevention, which makes this it attractive to different funding sources.

Potential grant opportunities include:

- **Surface Transportation Block Grant Program, DOT**
- **Land and Water Conservation Fund, NPS**
- **Open Space Land Acquisition and Development (OSLAD), State of Illinois**
- **National Coastal Resilience Fund, NOAA/NFWF**
- **Lake Michigan Coastal Program, NOAA**
- **Chi-Cal Rivers Fund**

OTHER IMPLEMENTATION CONSIDERATIONS

The "TrapBag" emergency temporary flood protection measures installed in 2020 have successfully reduced the ridk of infrastructure failure at this location, however, they should not be considered as a permanent solution.The City of Evanston can collaborate with MWRD to explore the potential for a regional partnership, since this location is known to be vulnerable and critical infrastructure risk will increase with time if no action is taken.

DOG BEACH

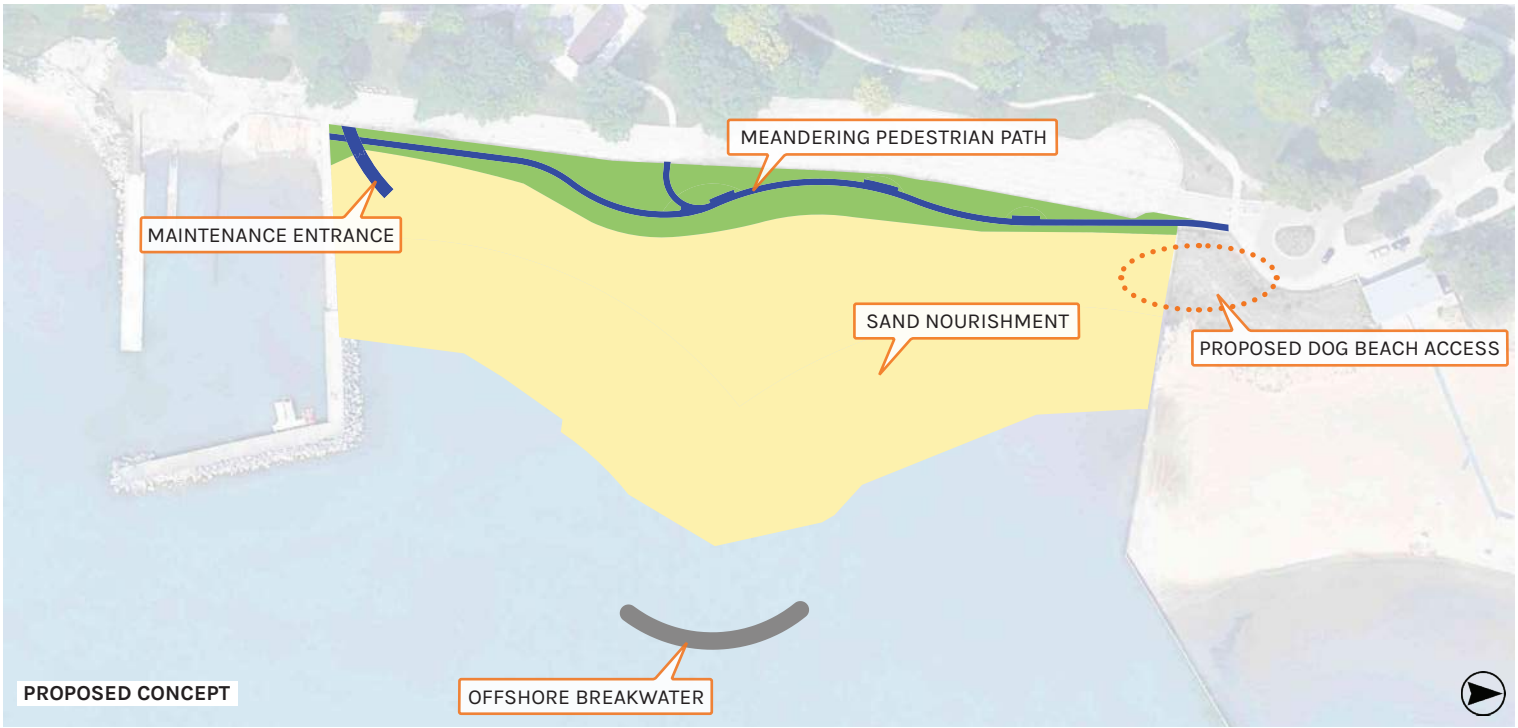
SITE OVERVIEW

Dog Beach is located between the Clark Street Beach to the north and the Church Street Boat Launch to the south. The beach is bound by two shore perpendicular groin structures, a sheet pile structure at Clark Street Beach and a composite rubble mound and crib wall structure at Church Street Boat Launch. The backshore consists of a rock revetment stabilizing the bluff and protecting the access road and parking for the Church Street Boat Launch.

The beach eroded during the high lake levels of 2019-2021, reducing the dry beach width to zero over the full length of shoreline, with storm waves breaking directly on the backshore rock revetment. As lake levels have receded, the beach profile has naturally recovered exhibiting the beaches' natural adaptive capacity. The armor stones comprising the revetment are deteriorated, and the crest is narrow and irregular.

During high lake levels the beach saw significant downcutting as the waves were acting directly on the backshore rock revetment. There is a risk that future periods of high lake levels will result in similar loss of beach use and function and that downcutting of the beach would lead to revetment and roadway failure.

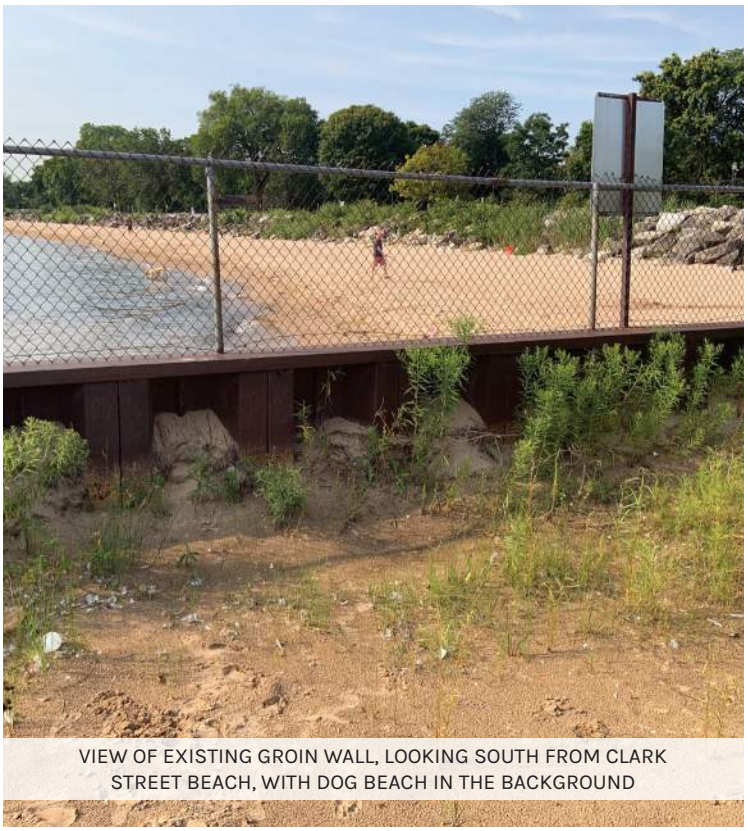
The area is heavily used by the community as a dog friendly beach with a new ADA access pathway being developed through Clark Street Beach. The backshore lacks a safe pedestrian path along the shoreline and has little amenities for passive enjoyment of the shoreline.



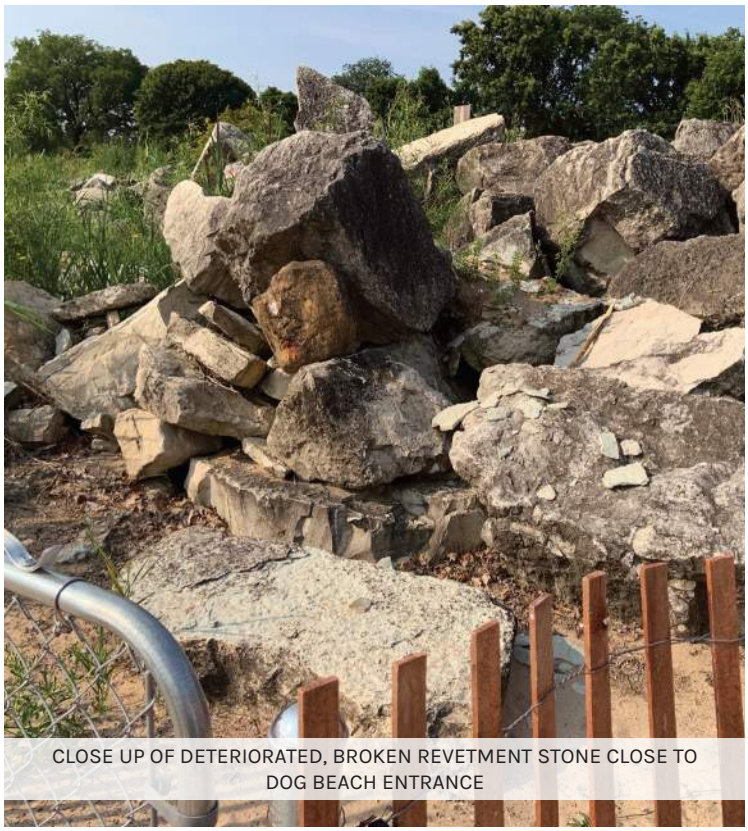
EXISTING CONDITIONS

VIEW OF DOG BEACH, LOOKING SOUTH NEAR THE EXISTING GROIN STRUCTURE

EXISTING LOWER GATE AT THE ENTRANCE TO DOG BEACH



VIEW OF EXISTING GROIN WALL, LOOKING SOUTH FROM CLARK STREET BEACH, WITH DOG BEACH IN THE BACKGROUND



CLOSE UP OF DETERIORATED, BROKEN REVETMENT STONE CLOSE TO DOG BEACH ENTRANCE

PROPOSED IMPROVEMENTS

BASIS OF DESIGN

Conceptual design was guided by an assumed level of design life, risk tolerance (aka Encounter probability) and allowable overtopping rate. Based on the design life and encounter probability a design event was selected. This design event includes combined water levels of high lake levels and storm surge and wave conditions of wave height and period. The design event and other considerations such as allowable overtopping rate for, limiting damage to vegetation, vehicles or structures as well as pedestrian safety were used as the basis of design for the shoreline stabilization and flood protection elements.

RISK FACTORS	DESIGN EVENT	OTHER CONSIDERATIONS
DESIGN LIFE: 25 YEARS	WATER LEVEL: 100-YEAR STILL WATER LEVEL + 3-YEAR STORM SURGE	DAMAGE POTENTIAL TO ROADWAY INFRASTRUCTURE DUE TO EROSION; RECREATIONAL VALUE
ENCOUNTER PROBABILITY: 10%	WAVE CONDITIONS: 3-YEAR	

REGULATORY

Potential permits required: Individual Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA), Watershed Management Permit (MWRD) and City of Evanston Building Permit.

Key project components and coordination: Additional analysis needed to complete regulatory applications will include an alternatives analysis, estimation of Prefill requirement of 120% of the volume of sediment impounded by the offshore breakwater structure and littoral transport analysis to identify potential impacts to downcoast shorelines. Coordination with USACE, IDNR-OWR, IEPA and MWRD prior to completing the respective applications is recommended to discuss any changes to the project and the details included in the alternatives analysis.

The project will likely require a 30-60 day public notice period once permit applications have been submitted. Following completion of the project, regulatory permits will require a 5-year monitoring plan with surveys pre-project, post-project, 1-year post construction and 5-years post construction.

SITE ELEMENT DESCRIPTIONS

COASTAL PROTECTION
Improvements to the shoreline include, an offshore breakwater and beach restoration and Dune Restoration with buried protection structure to provide a shoreline more resilient to erosion. The offshore breakwater and beach restoration work together to create a more resilient shoreline. The offshore breakwater is partially emergent balancing the need for wave protection with environmental and visual impacts at varying water levels. The breakwater is made up of 2-layers of stone varying in size from coarse aggregate in the core to 1.5-3 tons on the exterior armor layer. The 200 feet long alignment is intentionally curved to create opportunities for habitat benefits. The beach restoration consists of 95 to 245 feet of new dry beach width and 3.7 acres of new sand beach extending along 780 feet of the shoreline.

The additional protection from the offshore breakwater will allow for removal of the existing revetment along the full length of shoreline and creation of new dune habitat. Recognizing the uncertainty that future climate conditions create, a revetment is buried in the core of the dune to provide a level of protection for unforeseeable future conditions which could put the critical infrastructure at risk.

ACCESS/CIRCULATION
Pedestrian access improvements include a new 6 feet wide concrete path that provides ADA access along the area between the beach and the roadway, with connections to the existing sidewalk at Clark Street Beach and the path through Centennial Park. Additional access improvements include a 12 feet wide equipment access point for City maintenance staff at the southern end of the beach.

HABITAT/VEGETATION
Ecological and habitat benefits are created through revetment removal, offshore breakwater alignment and dune creation. Dune creation is proposed via the removal of the existing revetment and the planting of dunes grasses at the back of the beach along the full length of shoreline. In the protected side of the offshore breakwater, wave conditions will be conducive to incorporating habitat enhancements for fisheries benefits.

RECREATION
No new programming is anticipated. The expanded beach with protective breakwater will allow for more reliably available recreational space.

IMPLEMENTATION

COST ESTIMATE SUMMARY

Estimated Project Total (2023 $, without escalation) (including Construction, Engineering, Permitting, Contingency)

= $4.9 Million

Estimated Construction Cost Breakdown by Elements:

A. General Requirements, Mobilization	**$ 260,000**
B. Lakeside / Revetment Work	**$ 2,790,000**
C. Site Improvements	**$ 140,000**
D. Other	**$ 60,000**
Estimated Construction Subtotal	**= $ 3,250,000**

APPLICABLE GRANT OPPORTUNITIES

Despite the positive BCA, this site may not be as well suited for infrastructure grants due to the fact that the use is limited, and not available to the broader public, which may impact community-based resilience programs. Close examination of future Notices of Funding Opportunities (NOFOs) is recommended before proceeding with applications.

Offshore breakwaters can be designed to incorporate substantial aquatic habitat benefits, which have at times been the focus of some of the natural infrastructure grant programs.

BENEFIT COST ANALYSIS

The preliminary BCA resulted in a benefit Cost Ratio of 2.56, which is greater than the minimum threshold of 1.0 for Federally-funded programs such as the Building Resilient Infrastructure and Communities (BRIC) program. This BCA is heavily influenced by the potential for impacts to the operations of rescue boat operations at the adjacent launch ramp basin. Support and documentation of the relationship of the proposed project and use of the rescue boat operation are critical to the BCA. Further data collection and analysis to support and finalize the BCA include:

- **Map showing the location of the next nearest harbor for rescue boat operations in relation to the existing.**
- **Data on number of people served by the rescue boat operations.**
- **A detailed failure analysis of the shoreline protection and roads due to storm events of a defined recurrence interval.**
- **Data on if the storms capable of doing damage to the critical emergency facility occur during the time period that emergency services are offered from this location (i.e., if emergency services are only offered a portion of the year, then confirm that potential storm damage may happen during that time of year).**
- **Confirmation that the current estimated project capital cost and that the proposed Project elements provide protection to the critical emergency facility.**
- **Estimated site maintenance costs before and after project completion (focus on maintenance of structural components not typical park maintenance).**

OTHER IMPLEMENTATION CONSIDERATIONS

In the recent past, the Illinois Department of Natural Resources has been looking to promote beneficial re-use of dredged sediment (either from elsewhere within Lake Michigan) or from Illinois River locations. Given the relatively large quantities of sand that would be required to implement the proposed preliminary design, engaging in further discussions with IDNR and the relevant regulatory agencies is advised. Beach nourishment using material from clean upland sources is typically a less complex permitting proposition but needs to be coordinated with the offshore breakwater.

SITE OVERVIEW

The Lincoln Street End Site is located between Northwestern University to the south and The City of Evanston Water Treatment plant to the north. The shoreline is characterized by a small beach which becomes evident during average to low lake levels, a low sheet pile toe wall with rock and construction debris laid on the bluff slope. The top of bluff is a mix of trees and turf grass providing some passive recreation use.

The beach eroded during the high lake levels of 2019-2021, reducing the dry beach width to near zero over the full length of shoreline, with storm waves breaking directly on the backshore toe wall. As lake levels have receded, the beach profile has naturally recovered exhibiting the beaches' natural adaptive capacity. The protection at the backshore is generally degraded materials that offer little in the way for resilient protection to erosion from high lake levels and storm waves or storm water runoff. With recent construction activities at the Water Treatment plant, the site has been used as a staging area and has generally been cleared and gated off.

EXISTING CONDITIONS

ALL EXISTING PHOTOS WERE TAKEN PRIOR TO THE CURRENT INTAKE CONSTRUCTION PROJECT

VIEW OF BURIED SHEET PILE (LOOKING NORTH WEST) AT LINCOLN STREET END

EXISTING REVETMENT STONE WITH HEAVY VEGETATION GROWTH AT LINCOLN STREET END

VIEW OF OPEN SPACE (PRIOR TO WATER TREATMENT PLANT CONSTRUCTION ACTIVITY) AT LINCOLN STREET END (LOOKING EAST)

HEAVY VEGETATION GROWTH ON REVETMENT AT LINCOLN STREET END

PROPOSED IMPROVEMENTS

BASIS OF DESIGN

Conceptual design was guided by an assumed level of design life, risk tolerance (aka Encounter probability) and allowable overtopping rate. Based on the design life and encounter probability a design event was selected. This design event includes combined water levels of high lake levels and storm surge and wave conditions of wave height and period. The design event and other considerations such as allowable overtopping rate for, limiting damage to vegetation, vehicles or structures as well as pedestrian safety were used as the basis of design for the shoreline stabilization and flood protection elements.

RISK FACTORS	DESIGN EVENT	OTHER CONSIDERATIONS
DESIGN LIFE: 50 YEARS	WATER LEVEL: 100-YEAR STILL WATER LEVEL + 10-YEAR STORM SURGE	SECURITY CONCERNS OF ADJACENT WATER TREATMENT PLANT; ECOLOGICAL VALUE
ENCOUNTER PROBABILITY: 10%	WAVE CONDITIONS: 10-YEAR	

REGULATORY

Potential permits required: Lake Michigan Regional General Permit (USACE); Individual Permit (IDNR-OWR); 401 Water Quality Certification and Pre-filing notice (IEPA), Watershed Management Permit (MWRD) and City of Evanston Building Permit.

Key project components and coordination: Additional analysis needed to complete regulatory applications will include a project narrative identifying what's at risk, the project goals and site constraints, how the project minimizes environmental impacts to the Lake and the ecological benefits provided. Coordination with USACE, IDNR-OWR, IEPA and MWRD prior to completing the respective applications is recommended to discuss any changes to the project and the details included in the project narrative. The project will likely require a 30 day public notice period once permit applications have been submitted.

City coordination with the Water Treatment Plant is recommended to confirm that security concerns are addressed.

SITE ELEMENT DESCRIPTIONS

COASTAL PROTECTION
Improvements to the shoreline include a new revetment to provide a shoreline more resilient to erosion. Replacement of the existing rock and construction debris with approximately 80 linear feet of new angular 300 lb armor stone with underlayer. Revetment consists of a wide crest and toe scour protection. Existing Crest elevations are maintained and a wider than standard crest width is used to address overtopping potential, supporting the upland ecological restoration.

ACCESS/CIRCULATION
No access improvements have been included, focusing on naturalizing the area.

HABITAT/VEGETATION
The project proposes to convert the existing turf grass area into a new ecological restoration area. The full 0.28 acres of upland area will be planted with native grasses and plantings and deciduous and ornamental trees.

RECREATION
Creation of a new ecological restoration area will provide some potential birding and nature viewing, though no formal trails have been included.

IMPLEMENTATION

COST ESTIMATE SUMMARY

Estimated Project Total (2023 $, without escalation) (including Construction, Engineering, Permitting, Contingency)

= $0.8 Million

Estimated Construction Cost Breakdown by Elements:

A. General Requirements, Mobilization	**$ 40,000**
B. Lakeside / Revetment Work	**$ 380,000**
C. Site Improvements	**$ 130,000**
D. Other	**$ 10,000**
Estimated Construction Subtotal	**= $ 560,000**

APPLICABLE GRANT OPPORTUNITIES

This site is not particularly well suited for infrastructure grants. However, since the proposed plan calls for establishment of native plants to replace existing turf, there may be an opportunity for habitat-related grants, depending on the timing of any proposed work.

In the future, ongoing maintenance for the site - if developed as planned into a natural area - could possibly be supported through work-force development programs for natural infrastrucure.

BENEFIT COST ANALYSIS

This site was not considered in the Benefit /Cost Analysis, since there are no opportunities to generate widespread benefits to attract large shoreline grants.

OTHER IMPLEMENTATION CONSIDERATIONS

The City of Evanston has several projects slated for the adjacent Water Treatment Facility, and at the time of writing, the project area is serving as contractor access and laydown area for the new intake project. Incorporating the proposed revetment improvements and landscaping / grading restoration into the Water Plant's capital projects is likely the most cost-effective and least disruptive approach to implementation of the Lincoln Street End projects. Given the relatively lower construction estimate for this work, seeking additional design and/or construction funds may not be required.

IMPLEMENTATION RECOMMENDATIONS

IMPLEMENTATION

The prior chapters discuss the issues and the public engagement around the shoreline repairs, as well as design development for each site and project-specific considerations such as cost and regulatory environment. The City of Evanston must now decide how to proceed. A No-Action alternative is not recommended. Postponing lakefront capital improvements has a number of significant drawbacks, including:

- Critical infrastructure such as regionally important sewers, life-safety access, and roadways are currently at risk. This risk fluctuates with Lake Michigan water levels, but ongoing shoreline degradation may lead to catastrophic failures in the future;
- The construction cost associated with the identified projects will very likely increase over time, due to both construction inflation, and also as a result of ongoing degradation requiring more intensive interventions;
- Increasing occurrence and duration of facility closures and/or service unavailability at locations that are highly valued by the community; and
- Increasing maintenance and operation costs to keep the existing facilities at business as usual status.

Broadly, the City may choose to move forward following one of two paths:

- Opportunistically with individual project implementation as funding (both internal and external grant funding) becomes available; or
- Programmatically with implementation of the improvements fully incorporated into the City's Capital Improvement Plan (CIP).

SmithGroup recommends the second of these approaches, since the opportunistic approach will most likely result in significantly slower implementation, which will materially increase the risks identified under the No Action scenario. Incorporating the identified shoreline repair projects systematically into the City's CIP will have financial, administrative, and community benefits for the city. As well as lowering the overall coastal vulnerability to coastal and future climate threats, these benefits include:

- Reducing future ad-hoc decision-making;
- Improving the allocation of resources;
- Connecting to long-range planning; and
- Increasing transparency for the community.

PROJECT PRIORITIZATION

SmithGroup understands that the total expenditure for the projects described in this report, which totals almost $30M, is a very large undertaking, and that the City has many other concurrent capital needs. Therefore, a key next step for the City will be to determine the implementation priority for the individual projects, since simultaneously implementing all the projects is undesirable from the standpoint of financial and staffing capacity, as well as being overly disruptive to the lakefront park system.

Broadly, there are four primary categories of prioritization criteria for capital improvement projects:

- Mandated criteria (e.g. consent decrees, statutory compliance, or other policy commitments)
- Financial criteria (e.g. cost, cost-efficiency, impact on maintenance and operations budgets, availability of grant funds)
- Technical criteria (e.g. complexity, hazard elimination, public safety, and risk-reduction)
- Other criteria (e.g. co-benefits, advancement of other plans/community goals, community impact, contribution towards cultural, aesthetic or other social values, institutional capacity). These criteria tend to be more subjective, and less easily quantified.

For the Shoreline Repair projects discussed in this report, the first category is not applicable. Within the second and third categories, SmithGroup has compiled information related to estimated capital cost and coastal vulnerability that can easily be compared across all projects, as well as qualitative information related to potential funding sources, and regulatory / permitting complexity. This information is summarized in the table on page 38.

IMPLEMENTATION RECOMMENDATIONS

PROJECT PRIORITIZATION CHART

EVALUATION CRITERIA	EVALUATION WEIGHTING	SHERIDAN ROAD $4.3 M	CLARK SQUARE PARK $3.2 M	LEE STREET BEACH AND ELLIOT PARK $8.3 M	GREENWOOD BEACH $7.4 M	DOG BEACH $4.9 M	LINCOLN STREET END $0.9 M
COASTAL RISK	HIGH	HIGH	MEDIUM	HIGH	HIGH	LOW	MEDIUM
LIKELIHOOD OF FUNDING	HIGH	MEDIUM	HIGH	MEDIUM	HIGH	LOW	LOW
COST	MEDIUM	$$$	$$	$$$$$	$$$$$	$$$$	$
OTHER BENEFITS	MEDIUM	HIGH	LOW	MEDIUM	HIGH	LOW	LOW
PERMIT COMPLEXITY	LOW	MEDIUM	MEDIUM	COMPLEX	COMPLEX	MEDIUM	SIMPLE
EFFECTS ON O&M	LOW	LOW	HIGH	MEDIUM	LOW	MEDIUM	LOW
WEIGHTED PRIORITY SCORE		**36**	**28**	**26**	**35**	**15**	**27**

* Weighted Priority Score represents an assessment of each project on a 5-point scale for each criteria, using a multiplier of 2.0 for highly weighted criteria, 1.5 for medium weighted criteria, and 1.0 for lower weighted criteria, with a maximum score of 45.

LEGEND:

HIGH SCORING ATTRIBUTES | MEDIUM SCORING ATTRIBUTES | LOW SCORING ATTRIBUTES

From this exercise, the highest priority projects are determined to be Sheridan Road and Greenwood Beach, with Clark Square, Lee Street Beach / Elliot Park, and Lincoln Street all scoring lower, and Dog Beach being the lowest scoring project. While useful, this ranking may not be sufficient for the City to complete a prioritization, for two primary reasons:

- It assigns weight to each criterion, while decision makers may view other criteria such as project cost as being materially more important than other criteria; and
- It does not include all criteria that decision makers may wish to consider.

Prior to finalizing an implementation program, SmithGroup recommends that a select group of City staff and officials use the modified table on page 39 to conduct its own prioritization to identify the one or two highest priority projects to be moved forward in the next available CIP cycle, and to rank the remaining projects in order of priority to be inserted in subsequent CIP cycles.

SmithGroup also recommends that for the highest priority project(s) the City begin exploratory discussions with relevant partner agencies and organizations (for example MWRD, which owns the large diameter sewer line in the vicinity of Greenwood Beach) to determine where there may be alignment with external sources of funding or other types of project support.

PROJECT PRIORITIZATION CHART

HIGH SCORING ATTRIBUTES | MEDIUM SCORING ATTRIBUTES | LOW SCORING ATTRIBUTES

EVALUATION CRITERIA	EVALUATION WEIGHTING	SHERIDAN ROAD $4.3 M	CLARK SQUARE PARK $3.2 M	LEE STREET BEACH AND ELLIOT PARK $8.3 M	GREENWOOD BEACH $7.4 M	DOG BEACH $4.9 M	LINCOLN STREET END $0.9 M
COASTAL RISK	HIGH	HIGH	MEDIUM	HIGH	HIGH	LOW	MEDIUM
LIKELIHOOD OF FUNDING	HIGH	MEDIUM	HIGH	MEDIUM	HIGH	LOW	LOW
COST	MEDIUM	$$$	$$	$$$$$	$$$$$	$$$$	$
OTHER BENEFITS	MEDIUM	HIGH	LOW	MEDIUM	HIGH	LOW	LOW
PERMIT COMPLEXITY	LOW	MEDIUM	MEDIUM	COMPLEX	COMPLEX	MEDIUM	SIMPLE
EFFECTS ON O&M	LOW	LOW	HIGH	MEDIUM	LOW	MEDIUM	LOW
COMMUNITY IMPACT							
ADVANCES OTHER CITY PLANS/ GOALS							
ADDITIONAL CRITERIA _____							
ADDITIONAL CRITERIA _____							
PRIORITY SCORE							