

April 4, 2024

Promontory Point Conservancy
5052 South Woodlawn Avenue, Apt 1B
Chicago, Illinois 60615-2825

Attn: Debra Hammond, Treasurer

Email: dhammond4761@gmail.com

Re: Promontory Point Condition Study
5491 S DuSable Lake Shore Drive
Chicago, IL 60615

Executive Summary

At the request of the Promontory Point Conservancy (PPC), McLaren Technical Services, Inc. (McLaren) performed above-water and below-water inspections of various waterfront structures along the shoreline of Promontory Point, Chicago IL. The goal of the inspection was to assess the condition of each waterfront structure type and to provide rehabilitation recommendations.

McLaren's engineer-divers delivered the following conclusions from their inspections:

1. The limestone currently in place at Promontory Point ("the Point") provides good and/or satisfactory shoreline and storm damage protection.
2. The limestone blocks currently at the Point are generally in good condition.
3. Shifting and displacement of the current limestone blocks is almost entirely due to the loss and erosion of replaceable underlying ("subgrade") earth and material.
4. This displacement may be addressed through repair, restoration and rehabilitation; and further deterioration can be halted with proper maintenance.
5. Further accessibility options may be added while maintaining the Point's historic character, with a natural point of entry already at the east promenade.
6. Preservation and rehabilitation of the current limestone structures is likely to be more cost-effective than removal and replacement, possibly substantially so.
7. Any engineering plans for the Point must address all environmental justice mandates required by the project's federal funding.

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1. Introduction

At the request of the Promontory Point Conservancy (PPC), McLaren Technical Services, Inc. (McLaren) performed above-water and under-water condition inspections of approximately 3,150 linear feet of waterfront structures at Promontory Point, Burnham Park, Chicago, located along the shore of Lake Michigan.

McLaren has been performing investigations of bridges and waterfront structures for over 45 years, employing teams of engineer-divers with a geological and aquatic expertise focused on bridges, piers, wharfs, bulkheads, revetments, and other waterfront structures. The core of McLaren’s authority lies in the fact that the engineers performing the inspection are fully involved throughout the entire reporting process, as they are also directly responsible for making load calculations, designing and executing repairs, performing service-life analyses, estimating construction costs, and producing contract bid documents. As a result, McLaren’s engineer-divers have a nearly unparalleled knowledge of substructure conditions, repair design details, and contractor methodologies, and have experience with investigating, analyzing and designing solutions for sites comparable to Promontory Point.

Between May and July of 2023, McLaren performed inspections of Promontory Point (“the Point”) through an Unmanned Aerial System (UAS) and professional underwater engineer-divers. The inspectors identified six unique sections of the Point’s waterfront, designated Sections S1 through S6 below, by their present construction configurations and conditions. A plan view showing the layout and description of each section is presented in **Table 1.1** and **Figure 1.1** below.

Table 1.1. Legend and Description of Promontory Point Sections







Section Label	Section Construction	Begin Station	End Station
 S1	Limestone Revetment with Limestone Promenade	0+00	13+00
 S2	Limestone Revetment with Concrete “Coffins” on Promenade	13+00	19+50
 S3	Limestone Revetment with Limestone Promenade	19+50	24+80
 S4	Limestone Revetment with Limestone “Riprap”	24+80	26+80
 S5	Limestone Revetment with Concrete Promenade	26+80	29+40
 S6	Limestone “Riprap”	29+40	31+50



Figure 1.1. Overview of Promontory Point Sections, Section 1 through Section 6¹

The condition assessment was performed in accordance with the standards set forth in the ASCE (American Society of Civil Engineers) Manual of Practice No. 130 (Waterfront Facilities Inspections and Assessment). Consistent with these guidelines, each inspected waterfront facility component was assigned a *Condition Assessment Rating*. These ratings follow a standardized six-point criteria set and are intended to reflect the overall condition of the facility component being inspected. The ASCE Condition Assessment Rating Table is provided in **4. Rating Criteria (ASCE)**.

Detailed results of the inspection can be found in the remainder of this report, with full assessments of each dedicated section. A review of the construction history and previous engineering studies performed at the Point is presented in Chapter 2, **Site Description**. McLaren's methodology and the report's scope is discussed in Chapter 3, **UAS and Commercial Diving Operations**. McLaren's inspection results and condition assessments for each Section

¹ To increase accessibility, all graphics in this report utilize the Okabe-Ito color palette, developed in 2002 by researchers Masataka Okabe and Kei Ito as a tool for designing colorblind friendly presentations. (Okabe & Ito, 2002).

can be found in Chapter 4 **Rating Criteria (ASCE)** and Chapter 5 **Observed Conditions**. Finally, McLaren presents a full assessment of the Point's inspection results and sets recommendations accordingly in Chapter 6 **Inspection Results and Analysis**, and Chapter 7's **Conclusion**. Plan and section views of the site, inspection photos, and additional supporting documentation are provided in the appendices.

There are a number of topics not fully covered in this report. McLaren is currently reviewing a number of alternative designs for rehabilitating Promontory Point in a manner that fulfills multiple goals, including:

- ensuring continued shoreline protection from erosion and storm damage;
- restoring structural integrity to the limestone structures currently in use;
- maintaining the historic character required by the Point's National and Chicago Landmark designations, and complying with the Secretary of the Interior Standards for the Treatment of Historic Properties and the Guidelines for the Treatment of Cultural Landscapes;
- adding and maintaining ADA-compliant options for better community accessibility; and
- establishing a long-term service life plan compatible with maintenance requirements and capabilities.

The results of these reviews, including associated cost estimates for each design alternative, will be presented in a forthcoming **Alternative Design Study Report**. It will show that replacement of the Point's stepped revetment and promenade with a concrete substitute (similar to newer concrete shoreline construction adjacent to the Point) is not practical or required. Critically, it will also detail how the use of this concrete design will violate the legal preservation requirements to preserve the historic limestone currently in place. Finally, the **Alternative Design Study Report** will examine the cost and performance considerations in the decision between maintaining the existing limestone structure and starting over with a "new concrete steps" approach.

2. Site Description

Promontory Point is an 18-acre public park with roughly 3,150 linear feet of shoreline along Lake Michigan. The site is located in Chicago’s South Side, specifically between East 54th and East 56th Street along DuSable Lake Shore Drive. Promontory Point (“the Point”) comprises the southern portion of the larger Burnham Park, which is itself about 600 acres largely composed of sprawling green space with sports fields, bike paths, beaches, meadows, and more. An overall view of the Point is shown in **Figure 2.1** below.



Figure 2.1. Overall View of Promontory Point, Looking West (May 2023)

Built in the late 1920s, the picturesque lake-fill peninsula whose full name has long been shortened to simply “the Point” was initially designed to protect the shoreline from the aggressive waves of the lake, while also enhancing its attractiveness and adding local flair. The now-iconic limestone blocks used in its construction were quarried almost exclusively from the region around Bloomington, Indiana. The flat walkway (“promenade”) and massive, bleacher-like steps (“revetment”) were completed between 1936 and 1939. The distinctive stepped tiers of limestone, reminiscent of a classical amphitheater, originally stretched along 9.2 miles of the Chicago lakefront as part of a shoreline protection effort overseen by the Works Projects Administration. Today, the Point’s revetment is the only part of that historic project remaining intact. **Figures 2.2** through **2.7** below includes historic views of the Point and its construction.



Figure 2.2. Overall Historical View of Promontory Point



Figure 2.3. Historical View of Promontory Point



Figure 2.4. Construction of the Limestone Structures at Promontory Point



Figure 2.5. Construction of Concrete "Coffins" on the Northeast Shore of the Peninsula



Figure 2.6. Construction of the Concrete "Coffins" atop the Concrete Platform

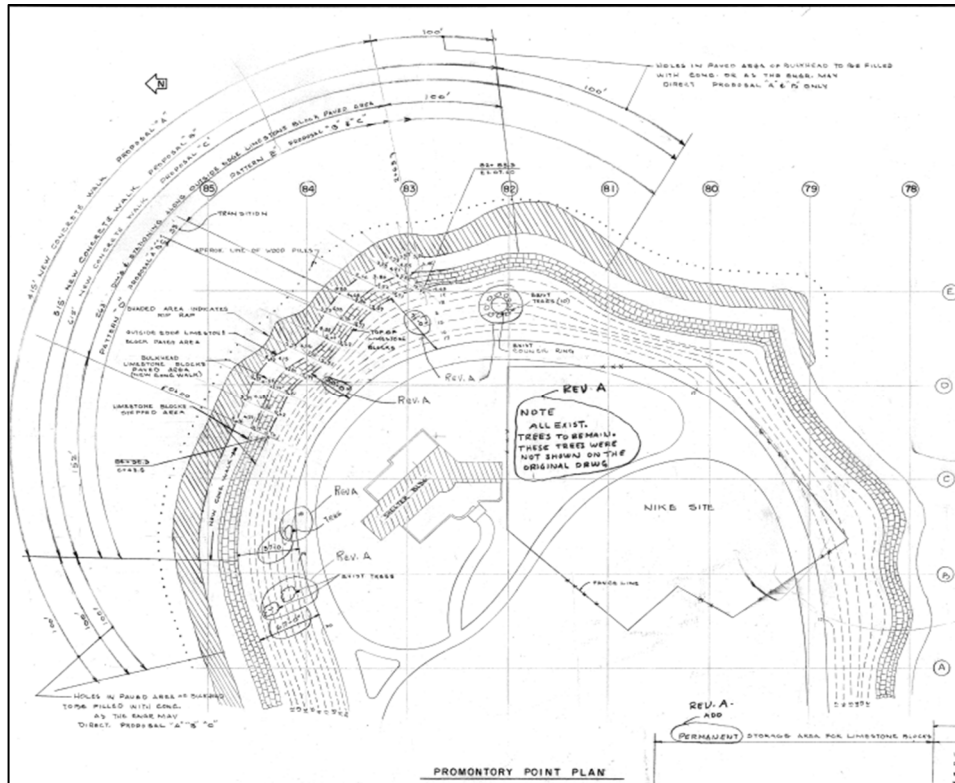


Figure 2.7. Plan View of 1964 Promontory Point Construction Drawings

This is not the first time the Point's mettle has been questioned and tested. In response to previous claims of emergency erosion and critical deterioration in the limestone blocks, coastal engineer Cyril Galvin conducted a study of the revetment and promenade in 2002. The study found, unequivocally, that the Point's limestone revetment was in serviceable condition and, having stood without maintenance for nearly 65 years, was more than capable of standing for another 100 years should repair and maintenance work be carried out.

It has also been shown that the Point as currently constructed provides critical storm damage and shoreline protection to the park above it and, crucially, to the adjacent DuSable Lake Shore Drive, which would otherwise be subject to perilously high levels of erosion and deterioration from overtopping waves and periodic flooding. Furthermore, the Point's utility is also more than geological, providing easy lake access to pedestrian foot traffic, sun bathers, meditators and swimmers, and an aesthetic flourish unique to this part of Chicago. As many know, the Point's distinctive look and value is so significant to local history and culture that on January 19, 2018, it was listed on the National Register of Historic Places and finally, on April 19, 2023, designated a Chicago Landmark.

3. UAS and Commercial Diving Inspection Operations

McLaren recently performed an inspection of the concrete and limestone structures at the Point, which as previously stated comprises 3,150 linear feet of shoreline, protected at various points by a stepped limestone revetment, a limestone promenade, a concrete promenade bearing concrete wave deflectors (referred to colloquially as “coffins”), limestone “riprap”, and a flat concrete platform. The original structure was built between the late 1920s and 1938 and has stood largely without maintenance during its 85-plus-year service life, during which time portions of the revetment and promenade have begun to drift in place (“settle”) and exhibit localized displacement. McLaren performed an inspection of the site to determine the cause and extent of this settling, as well as to gauge the feasibility of preserving the now-historic look of the limestone revetment and promenade through repair, restoration, and rehabilitation. A historical and present-day view of the limestone revetment with limestone promenade is shown below in **Figure 3.1**.



Figure 3.1. Historic (left) and Present-Day (right) View of the Limestone Revetment with Limestone Promenade

3.1. Inspection Methodology

Between May and July 2023, McLaren performed above-water and below-water inspections supplemented by an Unmanned Aerial System (UAS), utilizing an underwater inspection team for the former and a dedicated UAS team for the latter. Both teams were led by a licensed professional engineer-diver with an FAA-Certified UAS operator. All McLaren dive team members are certified by the Association of Diving Contractors (ADCI), and all inspection team members are OSHA-certified.

The above-water inspection team walked the entirety of the waterfront and examined each Section type, identifying deficiencies and taking measurements as needed (see **Figure 3.2**). The UAS inspection team gathered aerial imagery from all angles, covering 100% of the areas of interest. See **Figure 3.3** for an example of an image captured by the UAS.



Figure 3.2. View of Engineer Measuring Limestone Block Height during the Above-Water Inspection



Figure 3.3. Typical High-Resolution Oblique UAS Image

The UAS imagery is high-resolution and provides a complete visual of all shoreline components including the upland section, revetment, promenade, and below-water area near the waterfront.

Structure-from-Motion (SfM) photogrammetry methods were utilized for the UAS imagery, producing an orthomosaic, 3D point cloud, and 3D mesh model. The UAS-generated maps and 3D models allowed engineers to determine the extents and layout of the inspection site and establish inspection stationing and visual checkpoints for the field inspection. The point cloud is geo-referenced, allowing any positional XYZ (Easting, Northing, Elevation) value or dimension to be obtained from it. The 3D models give anyone the ability to virtually re-visit the site anytime and proved to be a valuable supplement to the field inspection findings.

Engineer-divers assessed the Sections utilizing commercial surface-supplied air (SSA) diving equipment, the safest mode of diving (see **Figure 3.4**). The inspections included a 100 percent Level I visual/tactile inspection of all accessible elements, used to develop a facility layout, identify structural elements with obvious damage or deterioration, and identify structural elements with extensive biological decay.

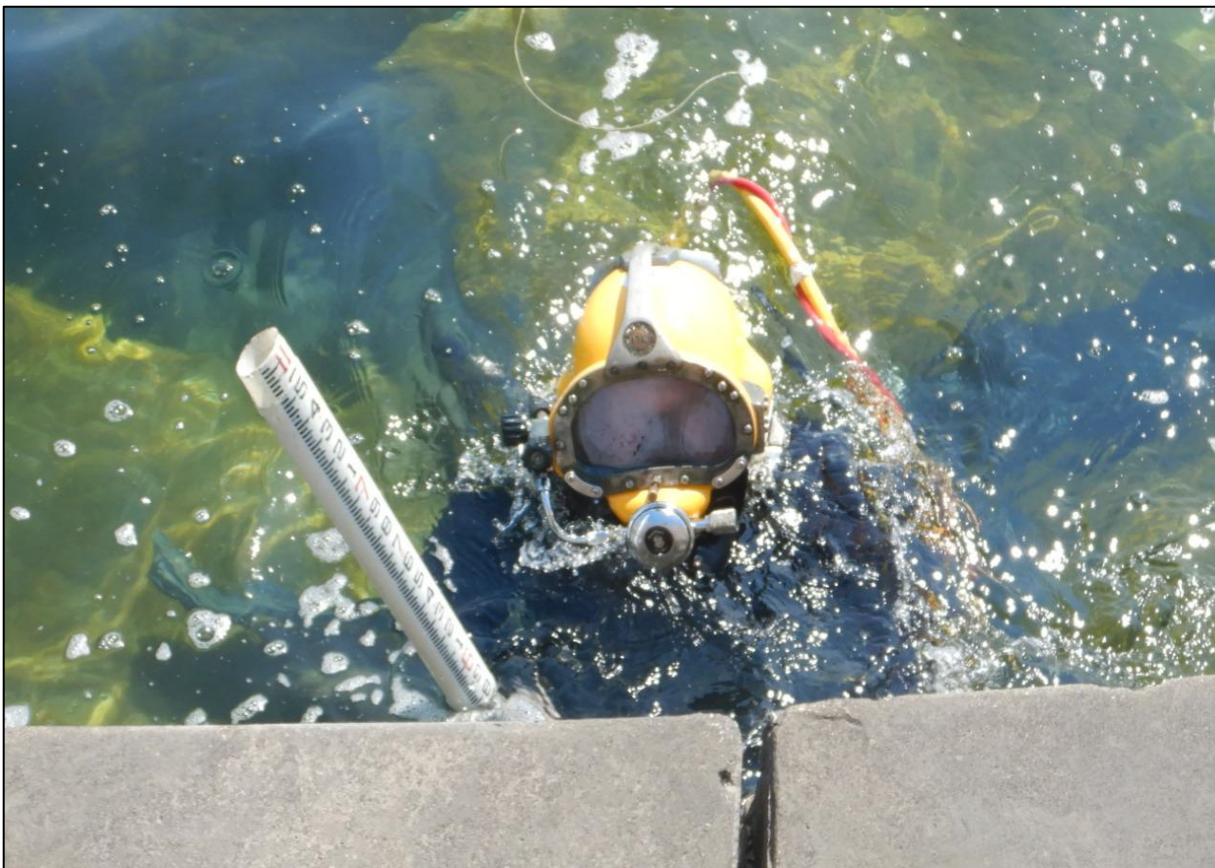


Figure 3.4. View of a McLaren Engineer-Diver inspecting the Limestone Revetment

4. Rating Criteria (ASCE)

As previously stated, McLaren performed their inspections between May and July 2023. The inspections were conducted in accordance with the guidelines and Condition Assessment Rating system provided in ASCE Manual of Practice No. 130. Each Condition Assessment Rating was determined by the findings of the inspection, with a variety of factors, including severity, quantity, and frequency of deficiencies, impacting the final rating. These ratings are required to categorize the results of the inspection and to provide a basis for comparison with deficiencies identified by future inspections.

Table 4.1 shows the Condition Ratings and associated description and shows the table reprinted directly from ASCE MOP No. 130.

Table 4.1. Summary of ASCE MOP No. 130 Condition Assessment Ratings

Condition Rating		Description
6	"Good"	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required
5	"Satisfactory"	Limited minor to moderate defects and deterioration but no overstressing observed. No repairs are required
4	"Fair"	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to major deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the repairs is low.
3	"Poor"	Major deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2	"Serious"	Major deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
1	"Critical"	Very major deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur and load restrictions should be carried out on high-priority basis with strong urgency.

For ease of use, the shoreline section labels, construction type, stationing, and plan map are once again provided below in **Table 4.2** and **Figure 4.1**.

Table 4.2. Legend and Description of Promontory Point Sections

Section Label	Section Construction	Begin Station	End Station
■ S1	Limestone Revetment with Limestone Promenade	0+00	13+00
■ S2	Limestone Revetment with Concrete “Coffins” Promenade	13+00	19+50
■ S3	Limestone Revetment with Limestone Promenade	19+50	24+80
■ S4	Limestone Revetment with Limestone “Riprap”	24+80	26+80
■ S5	Limestone Revetment with Concrete Promenade	26+80	29+40
■ S6	Limestone Riprap	29+40	31+50



Figure 4.1. Overview of Promontory Point Sections, Sections 1 through 6²

As introduced in Chapter 2, **Table 4.2** and **Figure 4.1** above present the six (6) distinct sections of the Point, designated S1 through S6. While each section has a unique construction type and/or configuration, McLaren identified the following components that are common to all or most of the sections:

Upland: The earthen fill and grass parkland inshore of the limestone structures.

Revetment: The massive, stepped limestone blocks resembling large bleacher seats. The number of steps, or courses, varies between two (2) and five (5) and is counted from the bottom to the top.

Promenade: The flat platform extending from the base of the revetment out over the water. It is constructed variously of limestone blocks and/or concrete.

² To increase accessibility, all graphics in this report utilize the Okabe-Ito color palette, developed in 2002 by researchers Masataka Okabe and Kei Ito as a tool for designing colorblind friendly presentations. (Okabe & Ito, 2002).

Promenade Subgrade: The earth and stone fill beneath the promenade, intended to provide support for the structure.

Timber Cribbing: Located immediately offshore of the promenade and running the length of the Point, the timber cribbing system comprises eight (8) inch diameter timber piles bearing a steel waler and steel tiebacks. The system was originally constructed to hold the promenade subgrade material in place.

Upon the completion of the inspection, each section and component of the Point’s shoreline was assigned a Condition Assessment Ratings as defined in **Table 4.1** with the results summarized below in **Table 4.3**.

Table 4.3. Summary of All Condition Assessment Ratings

Section	Overall Rating	Upland	Revetment	Promenade	Promenade Subgrade	Timber Cribbing
S1	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Poor	Serious
S2	Satisfactory	Poor	Satisfactory	Satisfactory	Poor	Fair
S3	Poor	Poor	Fair	Serious	Poor	Serious
S4	Satisfactory	Fair	Satisfactory	Satisfactory	Satisfactory	N/A - Abandoned
S5	Fair	Poor	Satisfactory	Fair	Poor	Serious
S6	Fair	Poor	N/A	Satisfactory	Satisfactory	N/A - Abandoned

Detailed observations for each section of the Point will be presented in the following chapters, followed by McLaren’s engineering analysis and findings. Supporting documentation is included in the report’s appendices. **Appendix A** presents cross-sectional drawing depictions for each section of the Point. Plan views of each section with notable deficiency locations are presented in **Appendix B**. Inspection photos are presented in **Appendix C**.

5. Observed Conditions

5.1. Section S1 – Limestone Revetment with Limestone Promenade

Section S1 designates the 1,300-foot segment of Promontory Point beginning at STA 0+00 (the site's southern inspection terminus) and ending at STA 13+00. Typical terrestrial and aerial views of the section are provided below in **Figure 5.1** and **Figure 5.2**, respectively.



Figure 5.1. Terrestrial View of S1

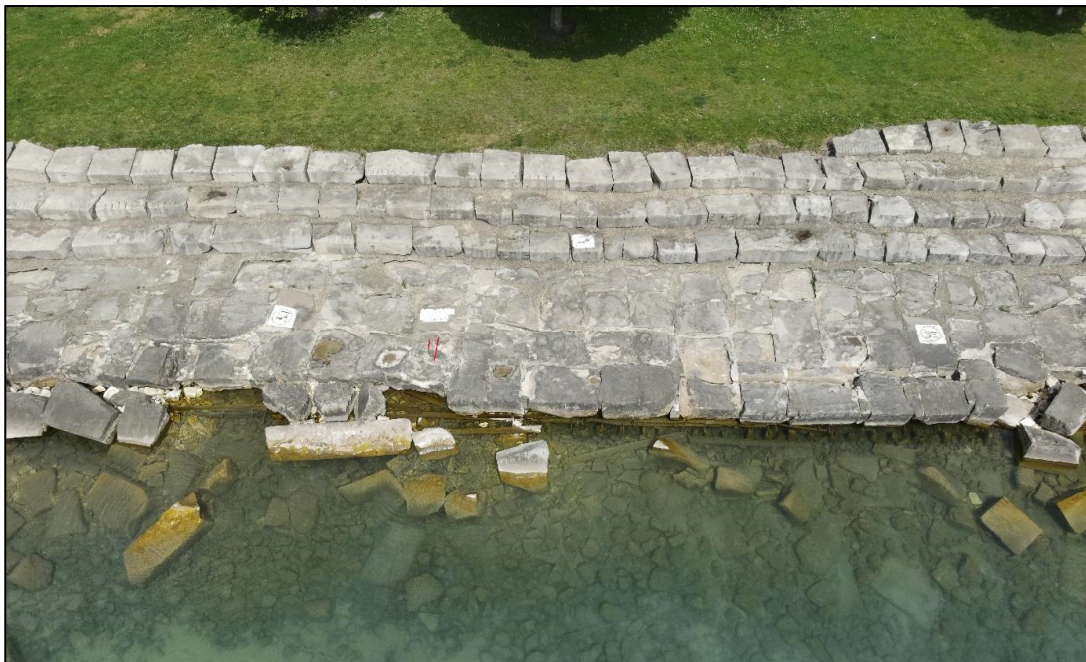


Figure 5.2. Aerial View of S1

S1 comprises a stepped, limestone block revetment inshore of a limestone block promenade. There are three (3) courses of stone in the stepped revetment between STA 0+00 and STA 1+30, and four (4) courses between STA 1+30 and STA 13+00.

The dimensions of the limestone blocks in both the revetment and the promenade vary significantly. In the revetment, the blocks are approximately two (2) feet tall and between four (4) and five (5) feet wide (with the width running perpendicular to the shoreline). Along the shoreline, their lengths vary anywhere between four (4) and eight (8) feet. The stones in the promenade are approximately four (4) feet by five (5) feet by two and a half (2.5) feet, with significant variation. The width of the promenade from the base of the revetment to the shoreline varies but is typically about twenty (20) feet wide.

Immediately offshore of the promenade, a row of timber piles supports the remains of a derelict cribbing system, including a failed steel waler and failed steel tieback rods. The offshore edge of Section S1 generally faces east to southeast and is sheltered against most wave action. This is reflected by the generally intact condition of the promenade. A typical view of the cross-section is provided below in **Figure 5.3**.

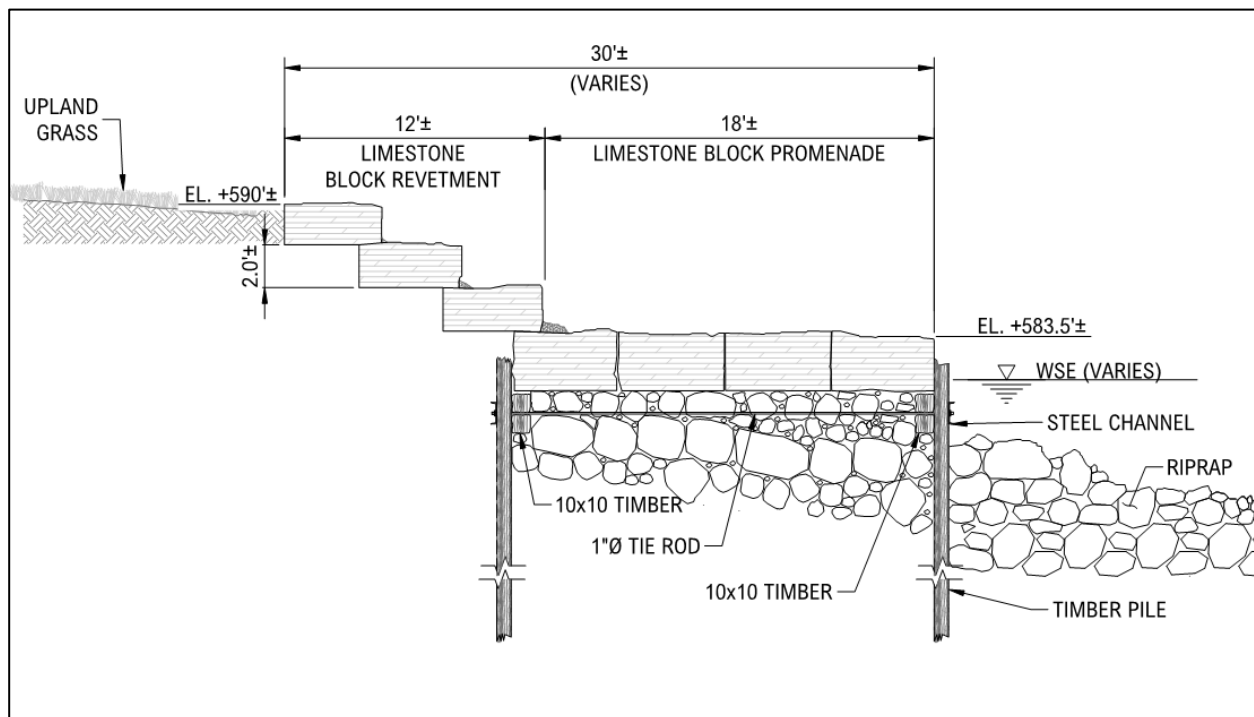


Figure 5.3. Typical Cross-Section of Section 1

The overall Condition Assessment Rating of Section S1 is **Satisfactory**. Ratings by component are shown below in **Table 5.1**, and described in further detail below. Inspection photos of each component in this section are provided in Appendix C.

Table 5.1. Section 1 (S1) Component Level Condition Assessment Rating

Component	Condition Assessment Rating
Upland	Satisfactory
Revetment	Satisfactory
Promenade	Satisfactory
Promenade Subgrade	Poor
Timber Cribbing	Serious

Upland

The upland fill is in overall satisfactory condition. The shoreline of S1 is generally sheltered from the aggressive wave action from the northeast and does not experience the frequent overtopping waves seen by the Point's north and northeastern sections. McLaren did not observe evidence of significant widespread erosion upland of S1.

Revetment

The revetment is in overall satisfactory condition. As a result of its sheltered position, the stepped courses of S1's revetment typically exhibit good alignment and overall condition compared to other sections of the structure. There are isolated voids between limestone blocks that McLaren recommends filling with cementitious grout. Additionally, at several locations along the revetment, there are voids between the first (lowest) course and the promenade that exhibit complete penetration through the limestone structure into the water below.

The earthen fill behind and beneath the revetment is typically intact. In several locations, however, McLaren was able to probe voids in the revetment, discovering isolated areas that exhibited complete loss of subgrade material. This condition can be addressed through maintenance. Installation of drainage systems and pressure injected grout will provide stabilization of the blocks and arresting of fill loss.

Promenade

The promenade is in overall satisfactory condition. It exhibits signs of undermining at the outermost course, with an associated settling of the limestone blocks that comprise its construction. Typically, the limestone blocks of the promenade are intact and show little signs of wear, though some have separated from the grout and settled, resulting in gaps of up to several inches between

limestone, and an uneven surface throughout much of the promenade. The outermost row of stones is the most affected by this settlement, separating almost entirely from the rest of the promenade in some places, fully drifting into Lake Michigan in the worst-affected areas.

Promenade Subgrade

The promenade subgrade is in overall poor condition. Due to loss of soil and stone through the timber cribbing system, the fill material beneath the promenade has been eroded out from beneath the Point by wave action, resulting in widespread voiding. This has resulted in the uneven condition of the limestone promenade stones, which have begun to settle without the support of the fill material.

Rehabilitative actions will require the restoration of this fill material, resetting the limestone stones of the promenade, and erecting a new fill-retaining system to prevent further undermining.

Timber Cribbing

The timber cribbing system is in serious condition and exhibiting localized failures. The steel waler and steel tieback rods are largely derelict. However, this steel tieback system was required only for construction and is not necessary for future maintenance. Typically, the eight-inch diameter timber piles immediately offshore of the promenade are in good condition, exhibiting no signs of widespread fungal or mechanical damage. Although the waler and tieback system is no longer functional, the remaining timber piles act to retain larger stone fill and could be a useful component for restoration, acting as an edge-bearing point and a modified retaining structure.

Erosion Protection

The original promenade and revetment structure continues to provide adequate storm damage and shoreline protection for the Point, even at high water levels. The observed deficiencies do not indicate structural instability at this site, nor do they represent a significant threat to public safety, the traveling public nearby or on DuSable Lake Shore Drive.

5.2. Section S2 – Limestone Revetment with Concrete “Coffins”

Section S2 designates the 650-foot segment of Promontory Point beginning at STA 13+00 and terminating at STA 19+50. Typical terrestrial and aerial views of the section are provided below in **Figure 5.4** and **Figure 5.5**, respectively.



Figure 5.4. Terrestrial View of S2



Figure 5.5. Aerial View of S2

This section has been historically nicknamed “the coffins” due to the presence of the person-sized, rectangular, concrete blocks staggered along the promenade to serve as wave deflectors. S2 comprises a stepped limestone block revetment inshore of a concrete platform promenade bearing two (2) feet by two (2) feet by eight (8) feet concrete “coffins”. There are four (4) courses of stone in the stepped revetment between STA 13+00 and STA 14+30, and five (5) courses between STA 14+30 and STA 19+50. The fifth (top) course terminates at STA 19+50.

The dimensions of the limestone blocks in the revetment vary significantly. Typical dimensions are two (2) feet tall and between four (4) and five (5) feet wide (with the width running perpendicular to the shoreline). The width of the promenade from the base of the revetment to the shoreline varies but is typically at or near twenty (20) feet.

Unique to section S2, the timber piles of the cribbing system are not offshore of the promenade. Instead, the outer edge of the concrete platform itself sits on the piles. A typical view of the cross-section is provided below in **Figure 5.6**.

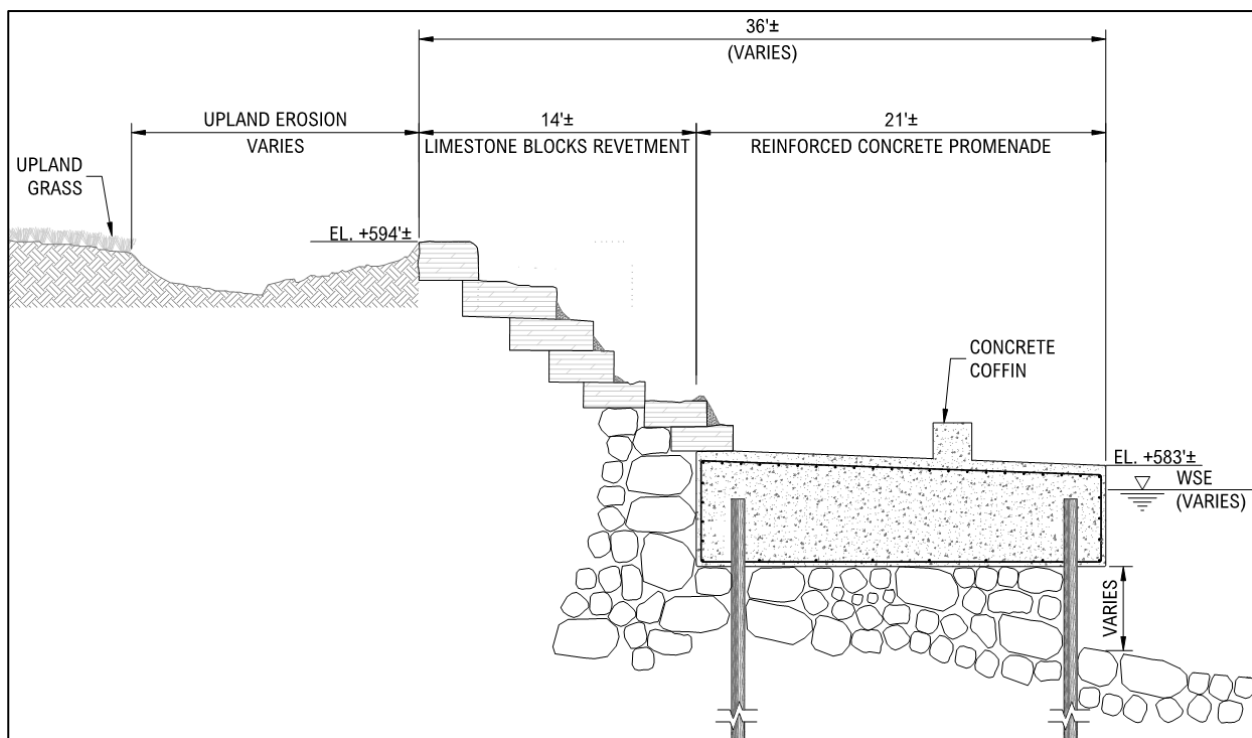


Figure 5.6. Typical Cross-Section View of S2

The overall Condition Assessment Rating of S2 is **Satisfactory**. Ratings by component are shown below in **Table 5.2** and further described below. Inspection photos of each component in this section are provided in Appendix C.

Table 5.2. Section 2 (S2) Component Level Condition Assessment Rating

Component	Condition Assessment Rating
Upland	Poor
Revetment	Satisfactory
Promenade	Satisfactory
Promenade Subgrade	Poor
Timber Cribbing	Fair

Upland

The upland fill is in overall poor condition. Significant erosion damage is present due to overtopping waves and poor drainage, which results in a loss of fill behind the revetment on the park-side. Notably, this poor condition is not the result of the failure of the revetment to provide adequate storm damage and shoreline protection. Rather, it stems from lack of maintenance and failure to provide adequate protection of and draining from the upland during overtopping events. The loss of grass and earthen fill extends as far as twenty (20) feet inshore of the revetment in the worst-affected regions, including a large region of erosion present between STA 16+10 and STA 16+50. Notably, this deterioration appears to be associated with the settling of a portion of the revetment in the same location. Evidence of overtopping waves was also observed in the concrete step revetment north of the Point, so this appears to be a common problem along the entire lakefront and not unique to the Point.

McLaren is currently evaluating options for providing proper drainage for overtopping waves at the site, which will protect the Point from further damage of this nature. These design options will be presented in our forthcoming **Alternative Design Study**.

Revetment

The revetment is in overall satisfactory condition. Section S2 underwent renovations in the 1960s during the construction of the concrete platform and coffins. The grouting is of a different vintage than that of the rest of the structure and is typically in better condition. The limestone blocks are in good condition and do not exhibit significant wear, and the grouting is intact throughout the section with no significant voids or gaps.

Specific areas of concern include areas of settlement within the revetment observed at stations 15+00, 17+10, and 17+60. The most significant of these deficiencies is the portion of S2 between STA 16+10 and STA 16+50, where the revetment has partially collapsed. The upland area above the affected area exhibits significant erosion, with areas of voiding, suggesting the loss of subgrade material may be due to inadequate drainage in the upland area.

Promenade

The promenade is in overall satisfactory condition. Typically, the promenade exhibits intact concrete with no widespread areas of spalling, corrosion staining, cracking, or deformation. The coffins are in overall satisfactory condition with only isolated areas of wear.

Promenade Subgrade

The promenade subgrade is in overall poor condition. Due to wave action, the fill material below the promenade has eroded out from beneath it, resulting in widespread voiding. However, the promenade exhibits no sign of imminent failure due to the structural support provided by the timber cribbing system. Restorative efforts should reestablish the promenade subgrade for redundant support and protection of the fill below the revetment.

Rehabilitative actions in this section will require the restoration of the fill material, resetting the limestone revetment stones, and erecting a new fill-retaining system to prevent further undermining of the Promenade. This section could provide new ADA-compliant access to the coffin promenade and the water.

Timber Cribbing

The offshore edge of the concrete promenade sits upon the piles of the timber cribbing system. Section S2 is the only section of the Point where the timber piles act in-bearing to support the promenade.

The typically eight-inch diameter piles are in overall good condition, exhibiting no signs of widespread fungal or mechanical damage. The steel waler and steel tieback rods were abandoned in 1960 and are no longer required. Long term maintenance in this segment should consider the protection and strengthening of the timber piles while restoring the fill beneath the promenade and areas of the revetment which have been undermined.

Erosion Protection

The original limestone revetment structure and concrete coffins promenade continue to provide adequate storm damage and shoreline protection, even at high water levels, for Promontory Point. The observed deficiencies do not indicate structural instability at this Section, nor do they represent a significant threat to public safety, the traveling public nearby or DuSable Lake Shore Drive.

5.3. Section S3 – Limestone Revetment with Limestone Promenade

Section S3 designates the 530-foot segment of Promontory Point beginning at STA 19+50 and terminating at STA 24+80. Typical terrestrial and aerial views of the section are provided below in **Figure 5.7** and **Figure 5.8**, respectively.



Figure 5.7. Terrestrial View of S3



Figure 5.8. Aerial View of S3

Section S3 comprises a stepped limestone block revetment inshore of a limestone block promenade. There are four (4) courses of stone in the stepped revetment between STA 19+50 and STA 24+60, and three courses between STA 24+60 and STA 24+80. The fourth (top) course terminates at STA 24+60, and the first (bottom) course terminates at the end of the section, STA 24+80.

The dimensions of the limestone blocks in both the revetment and the promenade vary significantly. In the revetment, the blocks are approximately two feet tall and between four and five feet wide (with the width running perpendicular to the shoreline). Along the shoreline, their lengths vary, anywhere between four and eight feet. The width of the promenade from the base of the revetment was originally at or near twenty (20) feet. However, due to widespread collapse of the promenade throughout the length of the section, it now varies between zero and twenty feet.

Immediately offshore of the promenade, a row of timber piles supports the remains of a derelict cribbing system, including a failed steel waler and failed steel tieback rods.

Section S3 is exposed to aggressive wave action from the northeast, resulting in significant undermining beneath the promenade and further upland erosion due to overtopping waves. This loss of fill material has led to widespread, intermittent collapse in both the revetment and the promenade. S3 exhibits the most widespread and significant damage observed at the entire site. A typical cross section of Section 3 is provided below as **Figure 5.9**.

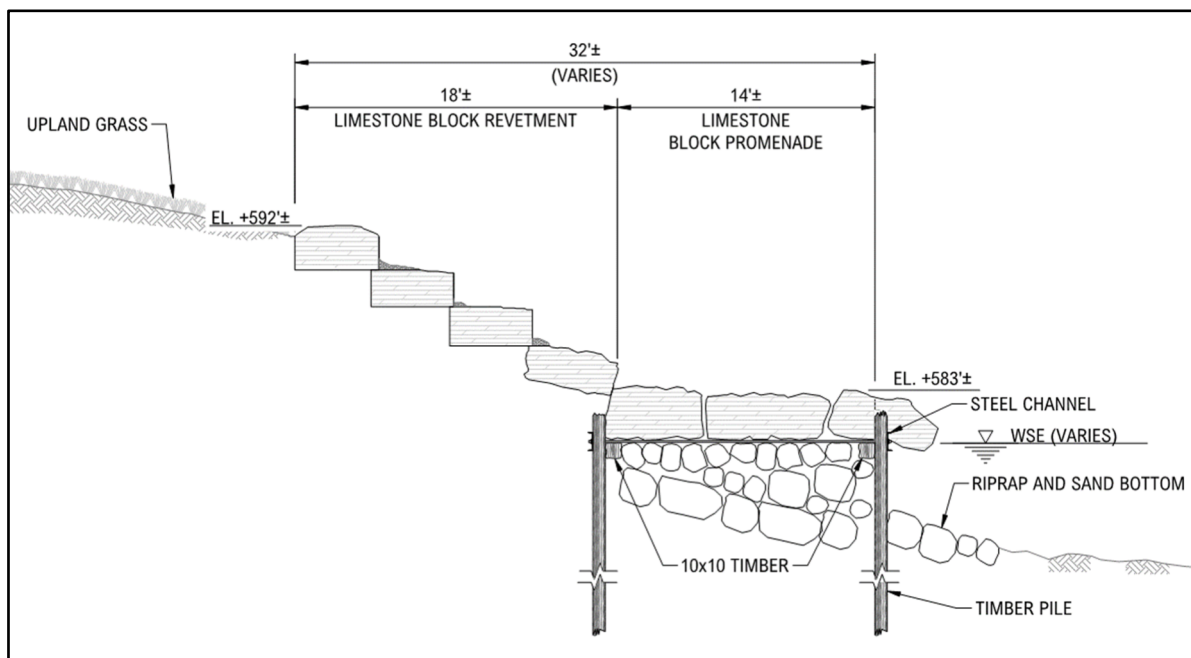


Figure 5.9. Typical Cross-Section of Section 3

The overall Condition Assessment Rating of S3 is **Poor**. Ratings by component are shown below in **Table 5.3** and further described below. Inspection photos of each component in this section are provided in Appendix C.

Table 5.3. Section 3 (S3) Component Level Condition Assessment Rating

Component	Condition Assessment Rating
Upland	Poor
Revetment	Fair
Promenade	Poor
Promenade Subgrade	Poor
Timber Cribbing	Severe

Upland

The upland fill is in overall poor condition. Throughout the length of S3, generally between one (1) and ten (10) feet of the revetment’s inshore earthen fill exhibits erosion damage. The deterioration is due to overtopping waves and subsequent poor drainage, and a large area of erosion present at STA 21+60 appears to be associated with a collapse in the revetment at the same location.

As in Section S2, the Upland’s condition is a result of a lack of maintenance, rather than lack of adequate shoreline protection inherent in the revetment’s structure. Additional care and maintenance, with details to be presented in the forthcoming **Alternative Design Study**, can mitigate future damage of this nature.

Revetment

The revetment is in overall fair condition. Typically, the revetment limestones are in good condition, exhibiting good alignment and intact grouting in the upper courses, though with intermittent voids observed between the first (bottom) course and the promenade. Several stones have been displaced and appear to have settled into voids beneath the revetment.

Specific areas of concern include a region of collapsed revetment between STA 21+60 and STA 22+10. A localized region of erosion upland of the collapse likely resulted in a loss of revetment subgrade material, contributing to the collapse. Less severe deficiencies include missing or displaced revetment stones at STA 21+30 and STA 23+60.

Promenade

The promenade is in overall serious condition. Section S3 experiences some of the most aggressive wave action at the Point, and accordingly has experienced the most extreme loss of subgrade material from inside its timber cribbing system. The loss of structural support from the subgrade has resulted in widespread settling of the promenade stones. The stones themselves are typically intact and show little signs of wear, however, the structure itself exhibits widespread settling and intermittent collapse throughout the entire length of the section.

Promenade Subgrade

The promenade subgrade is in overall poor condition, primarily due to wave action eroding the fill material out from beneath the promenade. Settling of the limestone promenade stones and intermittent collapse of the promenade is observed throughout the full length of the section.

Rehabilitative actions will be most extensive in this section, requiring the restoration of the fill material, resetting the limestone promenade stones, and erecting a new fill-retaining system to prevent further erosion and undermining.

Timber Cribbing

The timber cribbing is in overall serious condition. The eight-inch diameter timber piles immediately offshore of the promenade are in good condition, exhibiting no signs of widespread fungal or mechanical damage. However, the steel waler and steel tieback rods that comprise the rest of the cribbing system are largely derelict and provide no bracing for retaining promenade subgrade. Although the waler and tieback system is no longer functional, the remaining timber piles could be a useful component for restoration, potentially serving as an edge-bearing point and as a modified retaining structure.

Erosion Protection

Despite settling of the limestone blocks, the original promenade and revetment structure in this section continues to provide adequate storm damage and shoreline protection, even at high water levels, for the Point and the broader lakefront. The observed deficiencies do not indicate structural instability at this site, nor do they represent a significant threat to public safety, the traveling public nearby or on DuSable Lake Shore Drive.

5.4. Section S4 – Limestone Revetment with Riprap

Section S4 designates the 200-foot segment of Promontory Point beginning at STA 24+80 and terminating at STA 26+80. Typical terrestrial and aerial views of the section are provided below in **Figure 5.10** and **Figure 5.11**, respectively.



Figure 5.10. Terrestrial View of S4



Figure 5.11. Aerial View of S4

Section 4 comprises a stepped limestone block revetment inshore of limestone “riprap.” There are two (2) courses of stone in the stepped revetment throughout the length of the section. The dimensions of the limestone blocks in the revetment vary significantly. The blocks are approximately two feet tall and between four and five feet wide (with the width running perpendicular to the shoreline). Along the shoreline, their lengths vary, anywhere between four and eight feet. The riprap is made up of limestone blocks, typically between two (2) and four (4) feet in diameter, many of which appear to be salvaged or repurposed promenade and revetment stones. The riprap appears to have been placed on top of a limestone block promenade of the same construction as sections S1 and S3. The timber cribbing system has been partially covered by the riprap and has been abandoned.

In standard shoreline terminology, the piled limestone structure described here as a “riprap” would typically be described as a revetment. To maintain consistency with the rest of this report, the term “revetment” will be used throughout this section to refer exclusively to the stepped limestone block structure, while the piled limestone riprap will be referred to as the “promenade” or “riprap promenade”.

S4 is generally in satisfactory condition and exhibits no significant deterioration. There is minor erosion present in the upland fill that may require additional drainage. The riprap promenade found here does not conform to the original, historic design of a stepped, limestone revetment down to a limestone promenade, having at some point replaced the initial structure after construction. This riprap promenade does not provide a universally accessible walkway to pedestrian visitors, an issue that should be re-visited, however, from a purely structural perspective, there are no indications that restorative efforts are required at S4.

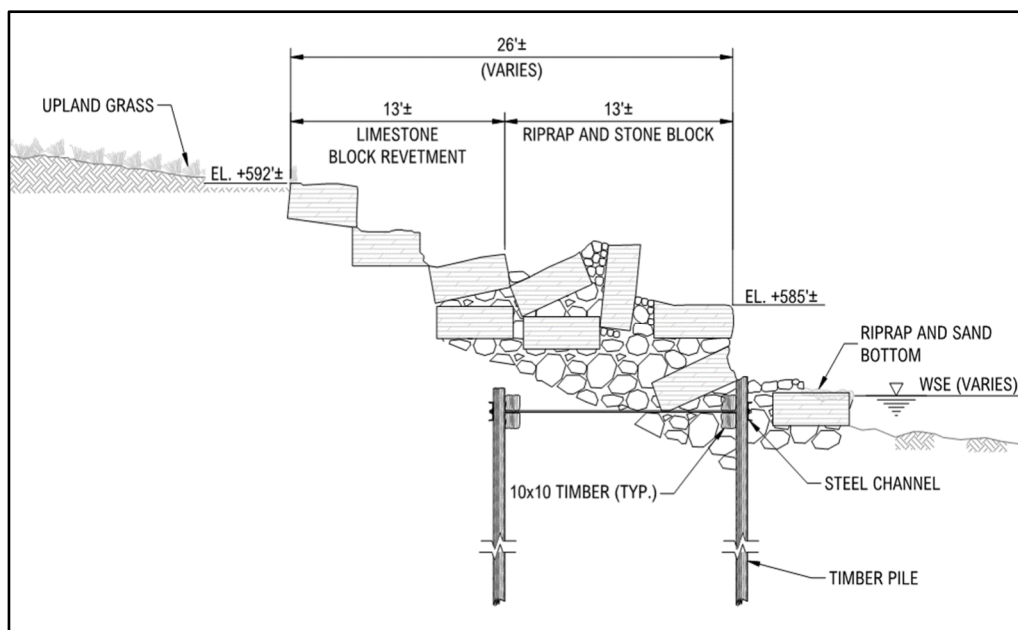


Figure 5.12. Typical Cross-Section of Section 4

The overall Condition Assessment Rating of S4 is **Satisfactory**. Ratings by component are shown below in **Table 5.4** and further described below. Inspection photos of each component in this section are provided in Appendix C.

Table 5.4. Section 4 (S4) Component Level Condition Assessment Rating

Component	Condition Assessment Rating
Upland	Fair
Revetment	Satisfactory
Promenade	Satisfactory
Promenade Subgrade	Satisfactory
Timber Cribbing	N/A - Abandoned

Upland

The upland fill is in overall fair condition. Approximately one foot of the upland immediately inshore of the stepped limestone block revetment exhibits signs of erosion due to insufficient drainage. However, the extent of the deficiency is significantly less than that of the adjacent sections.

McLaren is currently evaluating options for providing drainage at the site, which will protect the Point from further damage of this nature. Since this riprap section is not the original design, McLaren is determining a different set of options for preservation and rehabilitation. These design options will be presented in our **Alternative Design Study Report**.

Revetment

The revetment is in overall satisfactory condition. Only the top two (2) courses of the Revetment are accessible, while the lower courses are covered by the riprap promenade. Throughout the accessible portions, the revetment exhibits good alignment and intact grouting, and there are no instances of missing or displaced stones. There were no instances of significant damage or deterioration observed during the inspection.

Promenade

The promenade is in overall satisfactory condition. The limestone riprap appears to be piled on top of a limestone block promenade of the same construction as Sections S1 and S3. The underlying promenade may have previously collapsed, as where visible, the limestone blocks have settled into the subgrade.

The riprap exhibits constant slope throughout the length of S4 with no areas of missing stone. There were no instances of significant damage or deterioration observed during the inspection.

Promenade Subgrade

The promenade subgrade is inaccessible in this section. There were no instances of undermining observed at the outer edge of the promenade, and the riprap promenade does not exhibit signs of settling, suggesting the subgrade is intact and in satisfactory condition.

Timber Cribbing

The timber cribbing has been partially covered by riprap and is considered derelict. Where visible, the timber piles are in good condition. These timber pile remnants provided supplemental support to the riprap base. As in all sections, the steel waler and tie rods are intermittently present but serve no structural function and should be considered derelict.

Erosion Protection

As in all other sections observed, the original promenade and revetment structure continues to provide adequate storm damage and shoreline protection, even at high water levels and without a contiguous flat promenade. The observed deficiencies do not indicate structural instability at this site, nor do they represent a significant threat to public safety, the traveling public nearby or on DuSable Lake Shore Drive.

5.5. Section S5 – Limestone Revetment with Concrete Promenade

Section S5 designates the 260-foot segment of Promontory Point beginning at STA 26+80 and terminating at STA 29+40. Typical terrestrial and aerial views of the section are provided below in **Figure 5.13** and **Figure 5.14**, respectively.



Figure 5.13. Terrestrial View of S5



Figure 5.14. Aerial View of S5

Section 5 comprises a stepped limestone block revetment inshore of concrete promenade. There are three (3) courses of stone in the stepped revetment between STA 26+80 and STA 27+90. At STA 27+90, the stepped stone revetment transitions to riprap, resulting in no subsequent courses north of STA 28+20.

The dimensions of the limestone blocks in the revetment vary significantly. Typically, they are approximately two (2) feet tall and between four (4) and five (5) feet wide (with the width running perpendicular to the shoreline). Along the shoreline, their lengths vary anywhere between four (4) and eight (8) feet.

The concrete promenade in Section S5 consists of an approximately three (3) foot thick, cast-in-place concrete platform that bears upon the original limestone block promenade. The width of the promenade varies, but the distance between the bottom of the revetment and the edge of the promenade is typically at or near eighteen (18) feet.

Immediately offshore of the promenade, a row of timber piles supports the remains of a derelict cribbing system, including a failed steel waler and failed steel tieback rods. A typical cross section of S5 is provided below as **Figure 5.15**.

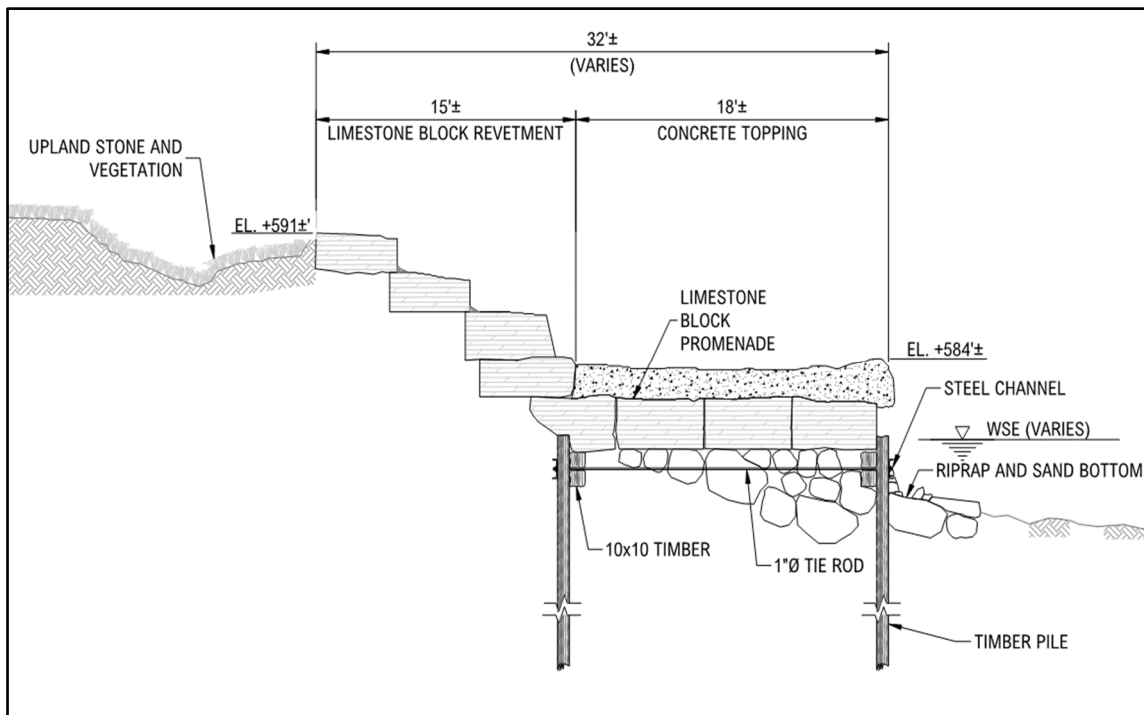


Figure 5.15. Typical Cross-Section of Section 5

The overall Condition Assessment Rating of S5 is **Fair**. Ratings by component are shown below in **Table 5.5** and further described below. Inspection photos of each component in this section are provided in Appendix C.

Table 5.5. Section 5 (S5) Component Level Condition Assessment Rating

Component	Condition Assessment Rating
Upland	Poor
Revetment	Satisfactory
Promenade	Fair
Promenade Subgrade	Poor
Timber Cribbing	Serious

Upland

The upland fill is in overall poor condition. Between ten (10) and fifteen (15) feet of the upland fill exhibits erosion damage due to overtopping waves and poor drainage, which also leads to loss of fill beneath the revetment and promenade.

McLaren is currently evaluating options for providing drainage at this part of the site, which will protect the Point from further damage of this nature. These design options will be presented in our **Alternative Design Study Report**.

Revetment

The revetment is in overall satisfactory condition. The Point’s revetment construction terminates at STA 27+90, prior to which there are three (3) courses of stepped stone typically exhibiting good alignment, intact grouting, and no significant voiding. No instances of significant damage or deterioration in the revetment were observed during the inspection.

Promenade

The promenade is in overall fair condition. Typically, the concrete promenade exhibits minor scale, with the offshore edge exhibiting moderate scale. Areas of concern include the separated and collapsed portions at STA 27+90 and STA 28+70.

Promenade Subgrade

The promenade subgrade is in overall poor condition. Due to wave action eroding out the fill material beneath the promenade, voiding has occurred beneath the original promenade upon which the concrete platform is molded. The loss of structural support from the subgrade is likely to have contributed to the collapse of the concrete at STA 27+90 and STA 28+70. The underlying

promenade may have previously collapsed, as where visible, the limestone blocks have settled into the subgrade.

Rehabilitative actions will require the restoration of fill material, rehabilitating the collapsed portions of underlying limestone, and erecting a new fill-retaining system to prevent further undermining.

Timber Cribbing

The timber cribbing is in overall serious condition. Typically, the eight-inch diameter timber piles immediately offshore of the promenade are in good condition, exhibiting no signs of widespread fungal or mechanical damage. Once again, however, the steel waler and steel tieback rods that comprise the rest of the cribbing system are largely derelict and provide no bracing against which the promenade subgrade may be retained.

McLaren is currently evaluating options for retaining fill beneath the promenade and will present alternatives that make practical use of the existing structures, as commented on previously, while improving performance and reducing upland erosion. These design solutions will be presented in our **Alternative Design Study Report**.

Erosion Protection

Again, despite fill loss, the original promenade and revetment structure continues to provide adequate storm damage and shoreline protection, even at high water levels, for the Point and the lakefront. The observed deficiencies do not indicate structural instability at this site, nor do they represent a significant threat to public safety, the traveling public nearby or on DuSable Lake Shore Drive.

5.6. Section S6 – Limestone Riprap

Section S6 designates the 210-foot segment of Promontory Point beginning at STA 29+40 and terminating at STA 31+50. Typical terrestrial and aerial views of the section are provided below in **Figure 5.16** and **Figure 5.17**, respectively.



Figure 5.16. Terrestrial View of S6



Figure 5.17. Aerial View of S6

S6 comprises limestone riprap with typical stone diameters between two (2) and four (4) feet. The stepped limestone revetment that is present throughout the Point does not extend to Section S6. The timber cribbing system has been partially covered by riprap. The timber pile remnants continue to support the toe of the riprap slope, resisting lateral movement.

Section S6 is generally in fair condition and exhibits no significant deterioration. The upland exhibits erosion and rehabilitative efforts should be undertaken to provide additional drainage at this part of the site, however, there are no indications that S6 has suffered significant structural deterioration as a result of this erosion. From a purely structural perspective, there are no indications that restorative efforts are required for the promenade at S6. A typical cross section of S6 is provided as **Figure 5.18**.

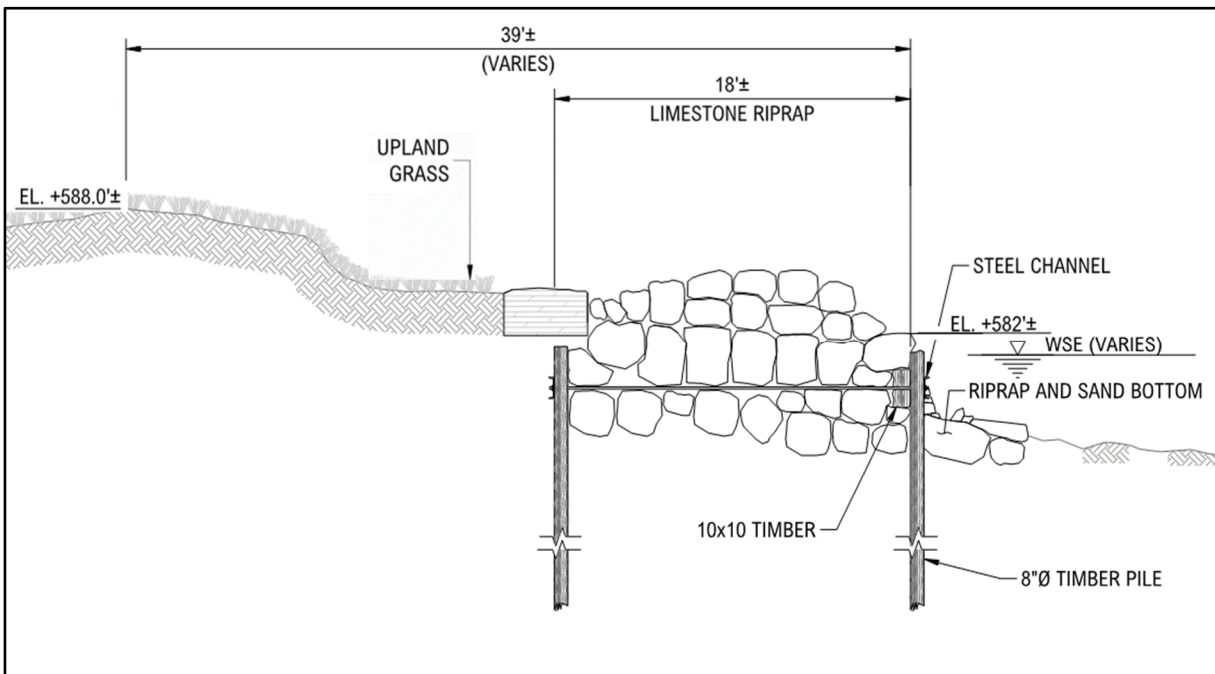


Figure 5.18. Typical Cross-Section of Section 6

The overall Condition Assessment Rating of S6 is **Fair**. Ratings by component are shown below in **Table 5.6** and further described below. Inspection photos of each component in this section are provided in Appendix C.

Table 5.6. Section 6 (S6) Component Level Condition Assessment Rating

Component	Condition Assessment Rating
Upland	Poor
Revetment	N/A
Promenade	Satisfactory
Promenade Subgrade	Satisfactory
Timber Cribbing	N/A - abandoned

Upland

The upland fill is in overall poor condition. Between ten (10) and fifteen (15) feet of the upland fill exhibits erosion damage stemming from overtopping waves and poor drainage. Typically, erosion damage upland of the revetment is indicative of associated loss of fill beneath the promenade and revetment, as water trapped inshore returns to Lake Michigan by tunneling through subgrade material. During the inspection, however, McLaren did not observe a significant loss of subgrade material beneath Section S6.

Promenade

The riprap promenade is in overall satisfactory condition. The riprap exhibits constant slope throughout the length of the section, with no evident areas of deterioration. Like the one in S4, the limestone riprap here appears to be piled on top of a limestone block promenade of the same construction as Sections S1 and S3, which may have previously collapsed, as where visible, the limestone blocks have settled into the subgrade. However, McLaren’s inspection identified no deficiencies in the promenade requiring restorative action.

Promenade Subgrade

The promenade subgrade in Section S6 is inaccessible. There were no instances of undermining observed at the outer edge of the promenade, and the riprap promenade does not exhibit signs of settling, suggesting the subgrade is intact and in satisfactory condition.

Timber Cribbing

The timber cribbing has been partially covered by riprap. Where visible, the timber piles are in good condition. These timber pile remnants provided supplemental support to the riprap base.

As in other sections, the steel waler and tie rods are intermittently present but serve no structural function and should be considered derelict.

Erosion Protection

The original promenade and revetment structure continues to provide adequate storm damage and shoreline protection, even at high water levels, for the Point and the broader lakefront. The observed deficiencies do not indicate structural instability at this site, nor do they represent a significant threat to public safety, the traveling public nearby or on DuSable Lake Shore Drive.

6. Inspection Results and Analysis

An analysis of the aforementioned inspection efforts and condition ratings is provided below. The most significant findings and results are presented as leading statements outlined in **bold**, followed by supporting text underneath.

1. ***The current revetment and promenade structure provides adequate storm damage and shoreline protection despite needed repair and maintenance.***

The Point's promenade and revetment were initially constructed for the purpose of creating a large earthen peninsula and a waterfront park while allowing the public to experience the waterfront. Although the structure requires deferred maintenance, the quantity of massive stone material present at the site offers an ideal mechanism to provide protection from waves and storm activity. If the criteria were only storm damage and shoreline protection, even at abandoned sections the structure could still act as effective protection by simply adding an additional mass in the form of stone riprap. However, modern restoration and improvement technology combined with the quality and mass of the original natural limestone block structure provides an opportunity for a strengthened and cost-effective shoreline treatment solution, providing a measurable upgrade in storm and erosion protection while preserving the historic, landmarked limestone structure as required by the standards set by the US Department of the Interior. Structures like the Point are not common today, not because they are ineffective, but because few municipalities have the initiative and funding to build structures from this sort of material. The current condition of this structure and the condition of the upland park are testaments to the quality of design, the workmanship, and the use of resilient materials that, unfortunately, are no longer in common use. Aged does *not* necessarily mean outdated or derelict, and repair, restoration and rehabilitation of the originally designed structure meets storm damage and shoreline protection requirements for this location as robustly as any feasible novel solution.

2. ***The limestone blocks have not failed.***

In 2002, a geological study was conducted on Promontory Point's limestone blocks, as referenced in Section 3. In addition to an on-site survey conducted by a coastal engineer, representative samples were collected from the limestone revetment for analysis by an expert in carbonate petrology. The study emphatically rejected suggestions made at the time that the limestone blocks had failed and were in need of replacement. The engineer behind the study, Cyril Galvin, determined that after 65 years without maintenance, there was almost no widespread evidence of structural deterioration in the Point's limestone. According to Galvin, no more than 25 percent of the blocks would need any sort of in-kind replacement. There is little to no evidence that a concrete replacement would provide close to an equal level of effectiveness and durability against the yearly storm surges battering the lakefront.

Twenty-one (21) years later, McLaren concurs with Galvin's finding and has determined that the limestone at the Point remains in overall good condition. In the worst-affected areas (namely the north and northeast-facing shorelines), only up to 25 percent of the blocks exhibit any notable deterioration such as displacement, severely worn or missing corners, voids, splits, or significant reduction in volume due to erosion. The percentage is significantly lower in the lesser-affected sections.

Perhaps most critically, much of this "deterioration" is purely aesthetic, and not necessarily deleterious to the protective structure or function of the Point. The blocks at the Point are not just visually pleasing and distinct; they also serve to isolate the earthen embankment of the peninsula (and the park lying on top of it) from the rough waves of Lake Michigan. Characteristics of deterioration like worn corners, voids, splits, and even loss of volume do *not* hinder this function. Furthermore, the natural wear on the material from decades in service protecting the Point's parkland is itself a fundamental part of the blocks' aesthetic value.

Keeping all this in mind, ***the number of blocks actually requiring replacement is in the dozens, rather than hundreds.*** Importantly, much of this replacement may not even require the importation of new material, as sufficient replacement blocks may already be present in the water just offshore of the promenade.

The results of the survey also provide a means to estimate the total tonnage of limestone present at the Point. McLaren's estimates the density of the limestone at 150 lbs/ft³ and 13.3 ft³/ton, with promenade stones typically around three (3) feet in height. Revetment stones are roughly two (2) feet in height and five (5) feet in width. See **Table 6.1** for a summary of the total limestone tonnage based on the quantity of promenade and revetment stones.

Table 6.1. Summary of Total Limestone Tonnage

Begin Station	End Station	Linear Feet	Number of Revetment Courses	Limestone Promenade	Cubic Feet (ft ³)	Tons
0+00	1+30	130	3	Yes	10,010	753
1+30	13+00	1170	4	No	42,120	3,167
13+00	14+30	130	4	No	4,680	352
14+30	19+50	520	5	No	23,400	1,759
19+50	24+60	510	4	Yes	43,860	3,298
24+60	24+80	20	3	Yes	1,540	116
24+80	26+80	200	2	Yes	13,600	1,023
26+80	27+90	110	3	Yes	8,470	637
27+90	31+50	360	0	Yes	18,000	1,353
					Total Tonnage (Nearest 100):	12,500

Note that several simplifying assumptions were made. In actuality, the dimensions of the limestone blocks and promenade vary widely, and this estimate assumes the promenade exists contiguously beneath the piled riprap in Sections S4 and S6 as well as beneath the concrete cover in Section S5. Additionally, this estimate takes into account neither the piled limestone blocks in the revetments at S4 and S6 nor the excess promenade blocks that are positioned in the offshore mudline along nearly the entire length of the Point. Without performing a thorough survey of both the revetments and the offshore limestone, both of which are outside of the scope of this investigation, the calculated 12,500 tons may only be appropriately used as an order of magnitude estimate of the total tonnage. The existing and unmeasured limestone material is useful for restoration efforts consistent with the historic preservation requirements. This is worth noting because an attempt to replace the Point with an alternate material would result not just in significant cost for new materials, but extraordinary costs for disposal of the limestone.

3. The settling of the promenade blocks is due to the loss of subgrade material.

The Point's position in Lake Michigan exposes its north and northeastern faces to particularly aggressive wave action, which accounts for the two most significant forms of deterioration observed during the inspection: overtopping and undermining.

Overtopping waves on the north and northeast faces of the Point have resulted in deterioration of the upland embankment just inshore of the limestone revetment. The upland area suffers from inadequate drainage, and when a large wave or series of waves clears the revetment during a storm or heavy winds, the deposited water has no unobstructed route to return to Lake Michigan.

This results in water pooling above the revetment, causing damage to the landscaping and erosion of the subgrade as the pooled water filters through the earth and creates micro-tunnels that carry fill material out of the revetment along with it.

Undermining, meanwhile, has occurred throughout the Point as a result of the deterioration and loss of fill through the now eighty-five (85) year old timber cribbing structure. This structure previously retained fill material that supported the promenade, but due to a lack of maintenance over time, much of the fill material beneath the revetment and promenade has slowly filtered out into the water. Without the support of the subgrade, the multi-ton limestone blocks that form the structure have begun to settle, resulting in the displacement of stones seen at various sections of the Point.

4. *The settling of the revetment and promenade may be repaired, and further deterioration arrested.*

McLaren is in the process of designing repair and rehabilitation plans for the Point. While a comprehensive route is still in formulation, rehabilitative efforts will require three key actions:

- Restoring subgrade material to return underlying support to the structure;
- Reinforcing the timber cribbing system to better retain the fill beneath the promenade and revetment;
- Providing adequate upland drainage to prevent further subgrade erosion.

McLaren has extensive experience with designing comparable repair efforts and is confident that a feasible and cost-effective design solution will be developed for the Point.

5. *Accessibility options may be added to the revetment while maintaining the Point's historic character.*

McLaren continues to work with Promontory Point Conservancy, its professional accessibility partners, and community constituents to review design options for expanding pedestrian access to the Point, the promenade and the water. These include designs that have met with community approval and whose engineering has already been found sound and broad, such as the design presented in **Figure 6.1**.

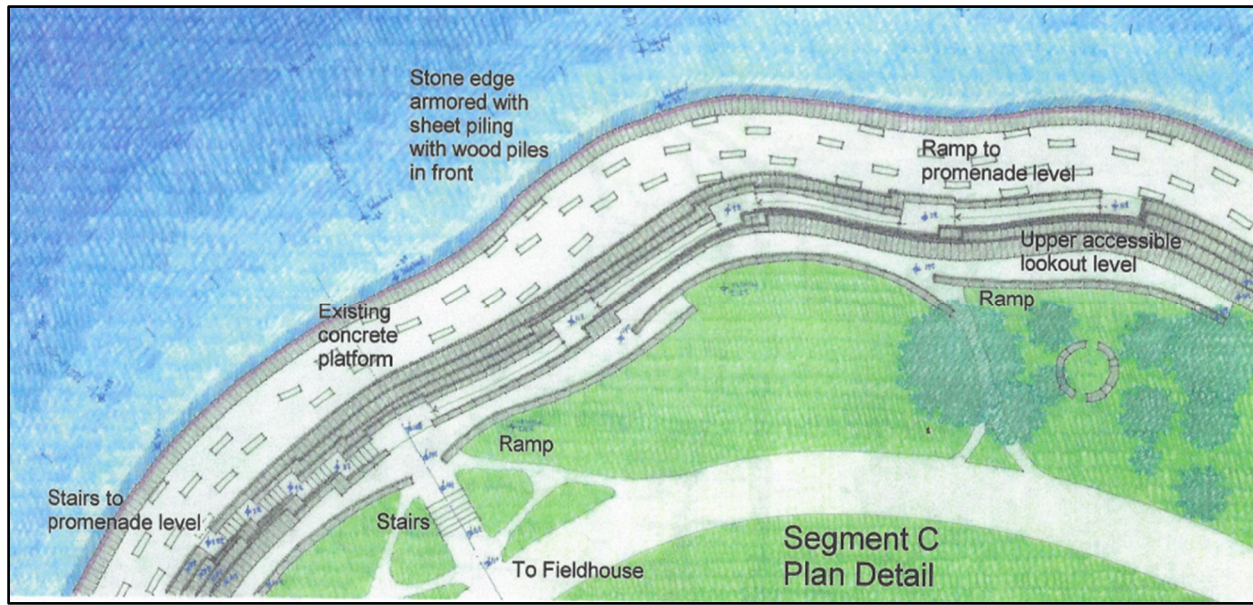


Figure 6.1. Accessibility features near the concrete coffins, proposed in the Hyde Park Community's Proposal for the Preservation, Restoration, and Enhancement of the Historic Stepped Limestone Revetment System at Promontory Park (2003).

McLaren's review of these design options – including an engineering appraisal and detailed cost estimates – will be presented in the forthcoming **Alternative Design Study Report**. In advance of that report, McLaren can state that the feasibility of many of these options has already been demonstrated, and McLaren's own assessment of the site has found no evidence suggesting there will be any issues encountered in the construction of additional access ramps.

6. *Rehabilitation of the historic limestone structures is not likely to incur greater costs than new construction.*

McLaren's team of in-house marine and coastal engineers have developed cost estimates for many projects and sites similar to Promontory Point. In advance of the **Alternative Design Study Report** that draws upon this experience in prescribing recommendations for the Point, McLaren presents the following observations based on nearly a half-century of experience in the field of marine construction, as well as their pertinence to this undertaking:

i. The cost of a project is highly dependent on the materials used

As previously stated, the Promontory Point site comprises approximately 3,150 linear feet, and the current structure was constructed originally using 28,000 tons of material. A new structure would require the same order of magnitude of new material to be both purchased and delivered to the site. The limestone blocks observed by McLaren are in good condition overall, meaning *the majority of reconstruction and rehabilitation can be completed using material already at the site*. It is apparent that this would *significantly* reduce restoration costs compared to those incurred by the volume of *any* new material otherwise required.

ii. Material disposal can produce significant (and often unanticipated) costs

If alternative, non-preservation-compliant plans are developed, there still remains the matter of the limestone currently at the site. A plan that does not intend to re-use limestone will also assume the responsibility of extracting and disposing of it. The removal and disposal of 12,500 tons of limestone in good condition would represent a significant cost — possibly even the majority of the cost — for any replacement project.

iii. The historic structure is a design proven to be effective

Promontory Point has stood effectively without maintenance since at least 1938, during which time the site has suffered remarkably little damage. Although the shifting and settling of stones in the revetment and promenade appear to indicate the need for action, the effect is almost purely aesthetic. McLaren's inspection identified no indications of imminent or widespread collapse, and no threat to either pedestrian visitors or the traveling public on DuSable Lake Shore Drive. The original design has proven itself most effective for storm damage and shoreline protection over the decades and, if repaired and maintained, has another near-century of service.

7. *Federal funding requires adherence to new mandates for environmental justice must be addressed in any engineering plans for Promontory Point.*

Federal agencies have developed strategic plans to address ongoing environmental justice issues, as mandated by President Biden's Executive Order 14096 in April 2023. Environmental justice seeks to address the disproportionately high health and environmental risks found among low-income and minority communities across the United States. Since federal funds contribute and will continue to contribute to the Point, environmental justice must be properly addressed in any engineering, maintenance, and improvement project. Pursuant to proposals to the Point obtained from the City of Chicago, it is worth noting that concrete production is the world's third highest producer of man-made carbon dioxide and, once employed in the built environment, significantly intensifies the urban heat island effect. The limestone currently in use, conversely, meets the environmental justice criteria of sustainability, durability, and cost-effectiveness.

In summary, the engineering and building of a new structure at Promontory Point would entail the significant cost of procuring new materials and the even more significant cost of disposing of the old materials, all for the purpose of replacing a structure that has already demonstrated that it can stand for 85 years without maintenance.

7. Conclusion

The historic limestone revetment at Promontory Point exhibits no indications of imminent failure, in spite of what has now become several decades of fruitless hand-wringing. The structure currently functions as effective storm damage and shoreline protection critical for the preservation of inshore parkland that also serves as a stable gathering place for City-wide residents. With maintenance and repairs to localized areas of deterioration, the limestone revetment can continue to serve Chicago's South Side and surrounding communities with minimal interruption and cost outlay.

Based on our preliminary assessments, the overall condition of the limestone revetment is fair, with localized areas rated as poor. McLaren did not identify conditions requiring immediate action, and the structures remain functional both for critical erosion protection and for recreational use. Examination of the parkland erosion areas shows minimal damage, limited to the effects of overtopping waves, a frankly remarkable finding after more than 80 years of uninterrupted use. Restoration of these areas could be simply and immediately affected with marine mattress absorption fabric and topsoil. Several segments have been modified since the original construction in the 1930s and, in some areas, stone riprap has been added to supplement the limestone revetment slope protection. Considering the site geometry and topography, McLaren did not observe conditions that pose a danger to infrastructure or the traveling public during high storm events, including DuSable Lake Shore Drive.

McLaren anticipates the need to make improvements to some areas, particularly the lack of drainage mechanisms and addressing overtopping waves during storm events and high-water levels. Portions of the promenade do require resetting and limited replacement of individual stones, while other areas (primarily at the heavily weathered north shore) may require in-kind replacement. **In McLaren's opinion, in-kind repair and restoration would be the most cost-effective means of repair and will maintain the character of the historic landscape architecture.**

It is McLaren's professional assessment that the limestone revetment currently functions as the original design intended, is not in danger of collapse, and provides adequate storm damage and shore protection. Further, it is our opinion that with maintenance and repairs, the service life of the structure can be significantly extended, obviating the need for major demolition and replacement.

Attachments: Appendix A – Section Drawings
Appendix B – Deficiency Plans and Tables
Appendix C – Inspection Photos
Appendix D – Previous Engineering Studies
Appendix E – ASCE 130 Inspection Manual (available by request)

If we may be of any further assistance in this matter, please contact our office.

Very truly yours,

The Office of
McLaren Technical Services, Inc.

A handwritten signature in black ink, appearing to read "Brian Moody". The signature is fluid and cursive, with a large initial "B" and "M".

Brian Moody, P.E., S.E.
Senior Associate – Diver

8. References

- Galvin, C. (2002). *Preservation Plans for Limestone Revetment, Promontory Point, 54th to 57th Streets (Extended) and Lake Michigan Shore, Chicago, IL.*
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- Okabe, M., & Ito, K. (2002, November 20). *Color Universal Design (CUD) - How to make figures and presentations that are friendly to Colorblind people.* Color universal design (CUD) / colorblind barrier free. <https://jfly.uni-koeln.de/color/>