(photo by Ted Kingston 2021)

PREPARED FOR: THE CITY OF BRIGANTINE BEACH
1417 WEST BRIGANTINE AVENUE
BRIGANTINE, NJ 08203

PORT REPUBLIC, NEW JERSEY 08241

November 5, 2021

Annual Report for 2021 to the City of Brigantine Beach on the Condition of Municipal Ocean Beaches

Introduction:

The nine survey locations established by the Stockton University Coastal Research Center along the Brigantine oceanfront beaches were surveyed twice during 2021. This report reviews the condition and status of the beaches from October 13, 2020 to October 7, 2021. Storm frequency during 2021 was low and those that did occur were of low intensity. The only tropical system to impact the Jersey shore was TS Isaias that passed on an inland track and was dominated by heavy rains inland in early September. As a stro

Annual & Seasonal Beach Changes:

Table 2 on the next page displays sand volume changes expressed in cubic yards per foot of beach ($yds^3/ft.$), while shoreline changes are given in feet. Calculating the average volume change between adjacent profiles and multiplying by the distance separating these sites yields a net volume change expressed in cubic yards (yds^3) for the distance between the two sites. Adding the cumulative volume change provides a net volume for the entire City of Brigantine beach over the entire length of surveyed cross section. Shoreline position changes are measured as the horizontal movement (toward the ocean (+) or toward the land (-)) in the zero elevation point on each profile.

Last year the annual oceanfront beach survey comparison showed a modest sand volume loss of 97,213 cubic yards of material. This year loss turned into a gain of 88,573 cubic yards of sand dominated by gains across the southern half the Brigantine oceanfront. Losses were recorded between the feeder beach and 5th Street South with two sites showing 30 plus $yds^3/ft.$ in sand volume loss. The critical 12th Street North location presented a shoreline advance of 10 feet with a smaller net loss of 17.5 $yds^3/ft.$ for the year. Large gains representing over 200,000 cubic yards of material were recorded between 27th and 43rd Streets. Finally, the loss of 52,643 cubic yards between the N profile site and the feeder beach site within the northern natural area north

Table 2
Brigantine Shoreline and Sand Volume Changes
October 2020 to October 2021

Profile	Shoreline Change (feet)	Volume Change ($yds^3/ft.$)	Avg. Volume Change ($yds^3/ft.$)	Distance Between (feet)	Net Volume Change (yds^3)
Brig-1 2 4					
Brig-4					

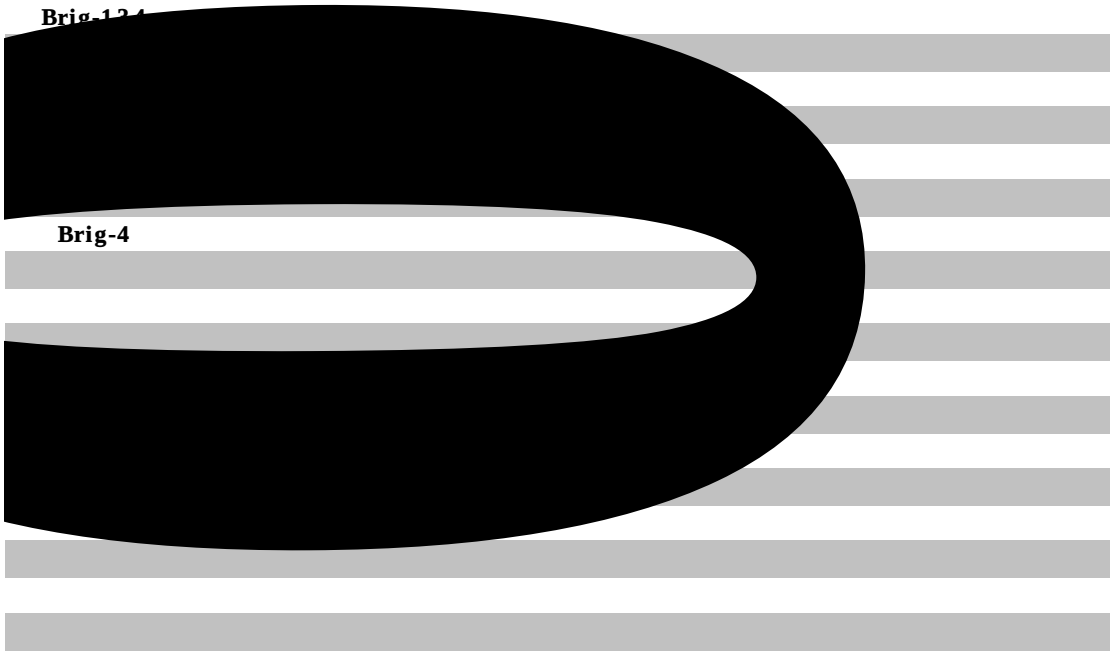

Table 3 shows the summer into the fall 2021 seasonal trend. Last year two unusual sand volume losses at 15th and 27th Streets South generated a net loss of 49,577 cubic yards for the six months. This summer season accretion was the rule with loss seen at the feeder beach (-19,551 yds^3/ft.) and declining losses at both 12th Street North and 14th Street North (-2.93 yds^3/ft. and -5.90 yds^3/ft.). Reversal to a sand volume gain was both rapid and convincing with a gross value of over 370,000 cubic yards deposited between 5th Street South and 43rd Street South. A small loss was observed between 43rd Street and the Jetty (-3,247 cubic yards across 600 feet of oceanfront). The net gain for the season was 339,104 creating a very positive alternative to that of last year's summer season.

Individual Profile Descriptions

This section describes the changes documented at each of the beach profile locations starting with the March 2020 survey, the October 2020 survey, the February or April 2021 survey and the October 2021 survey and includes annual photographs and cross-sections that show the semi-annual and annual comparisons (Figures 1 – 9).

x Profile Brig-134: Green Acres -North end (Figures 1a, 1b & 1c)

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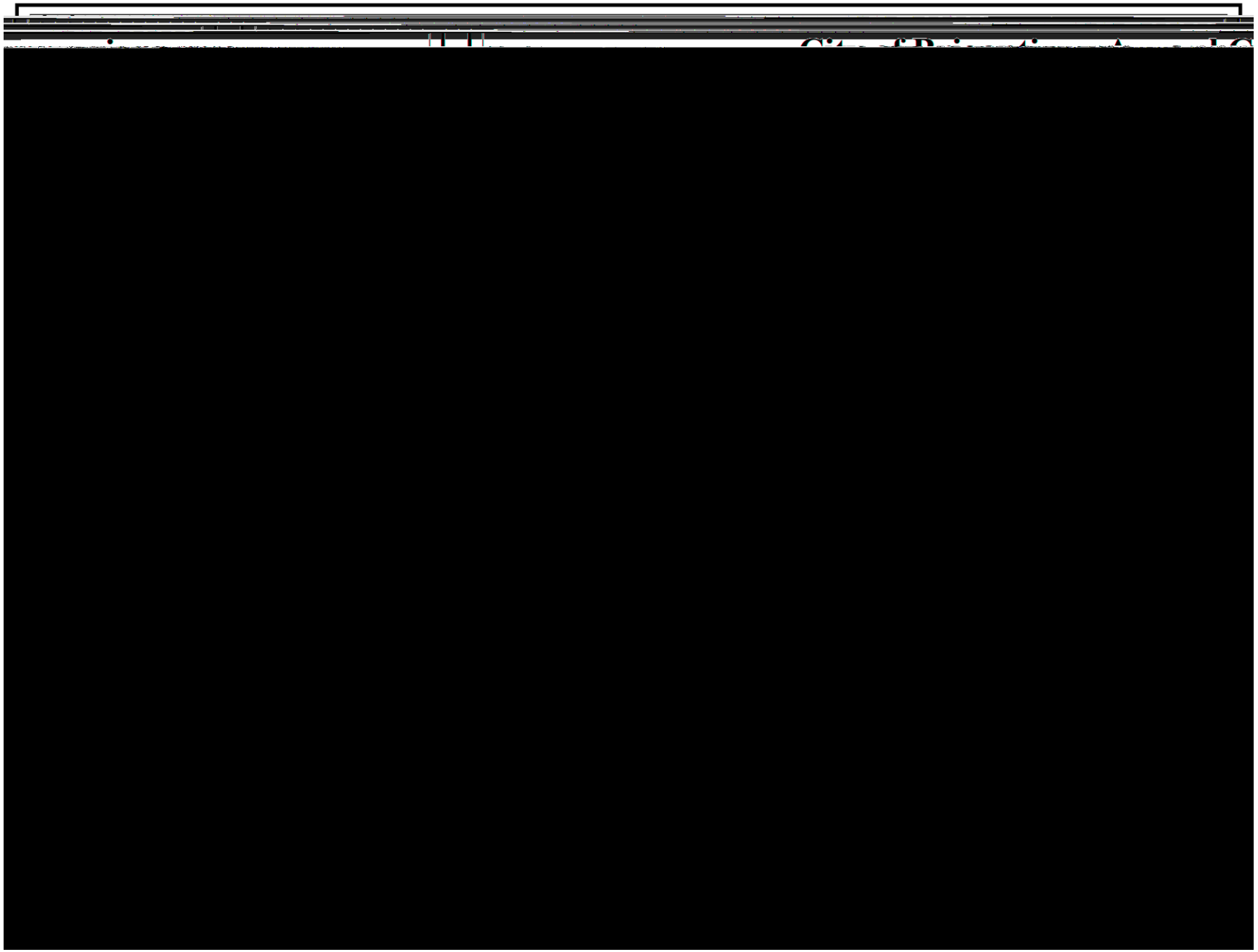

Figure 1c – The natural area beach has seen general sand accumulation on the dune and beach, restoring the slope present in March 2020. Offshore sand moved landward from the bar crest seen in March 2021 toward the shallower water closer to the beach. Loss far offshore was compensated by gains closer to the shoreline (+29.56 yds^3/ft. near the beach and 33.05 yds^3/ft. offshore).

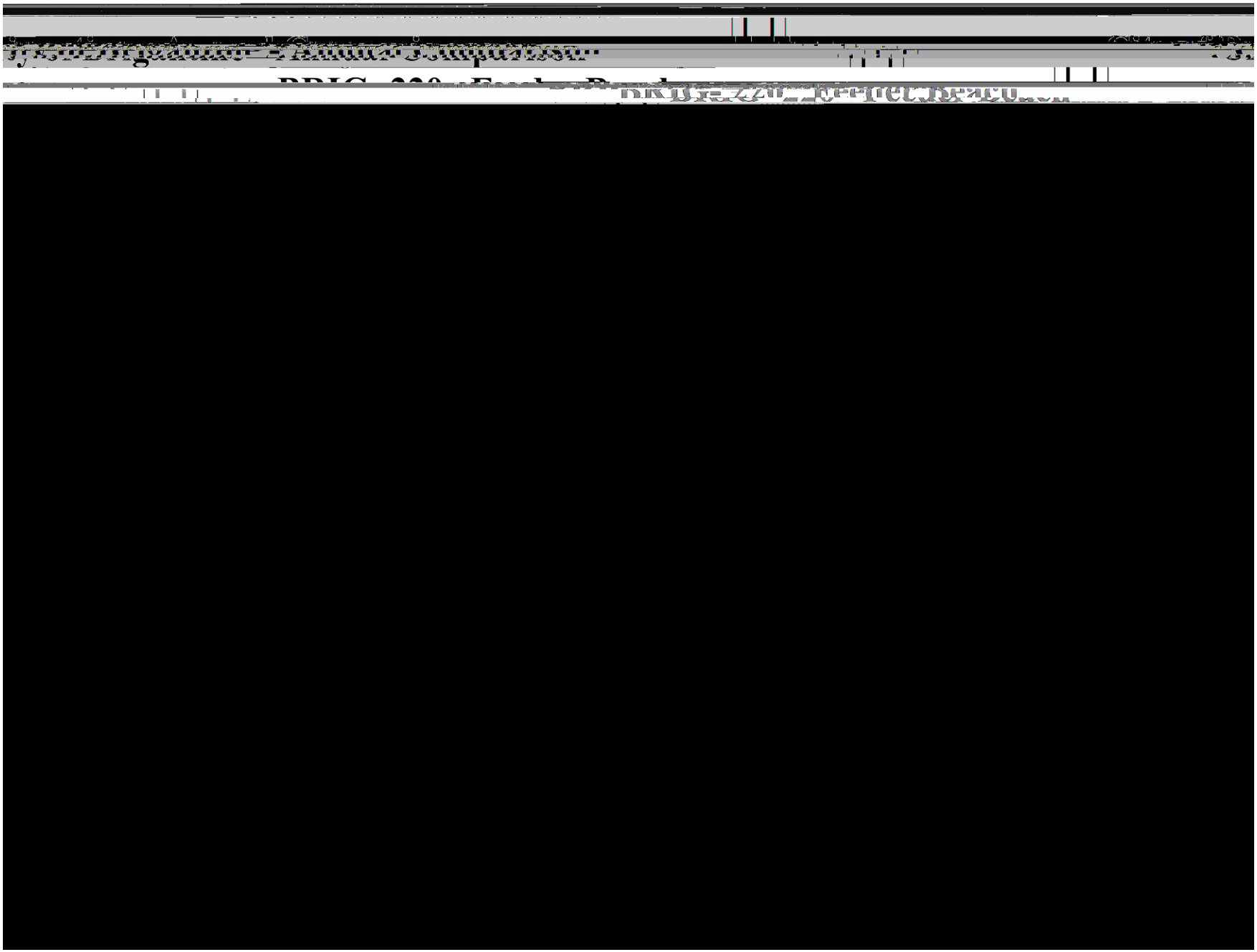

Figure 2c – The 2020 beach profile pair retreated by February 2021 taking about 15 feet of beach width. The high crested offshore bar in February moved landward filling in the existing trough moving sand toward the shoreline. The summer profile was quite uniform in slope all the way to the outermost survey point.

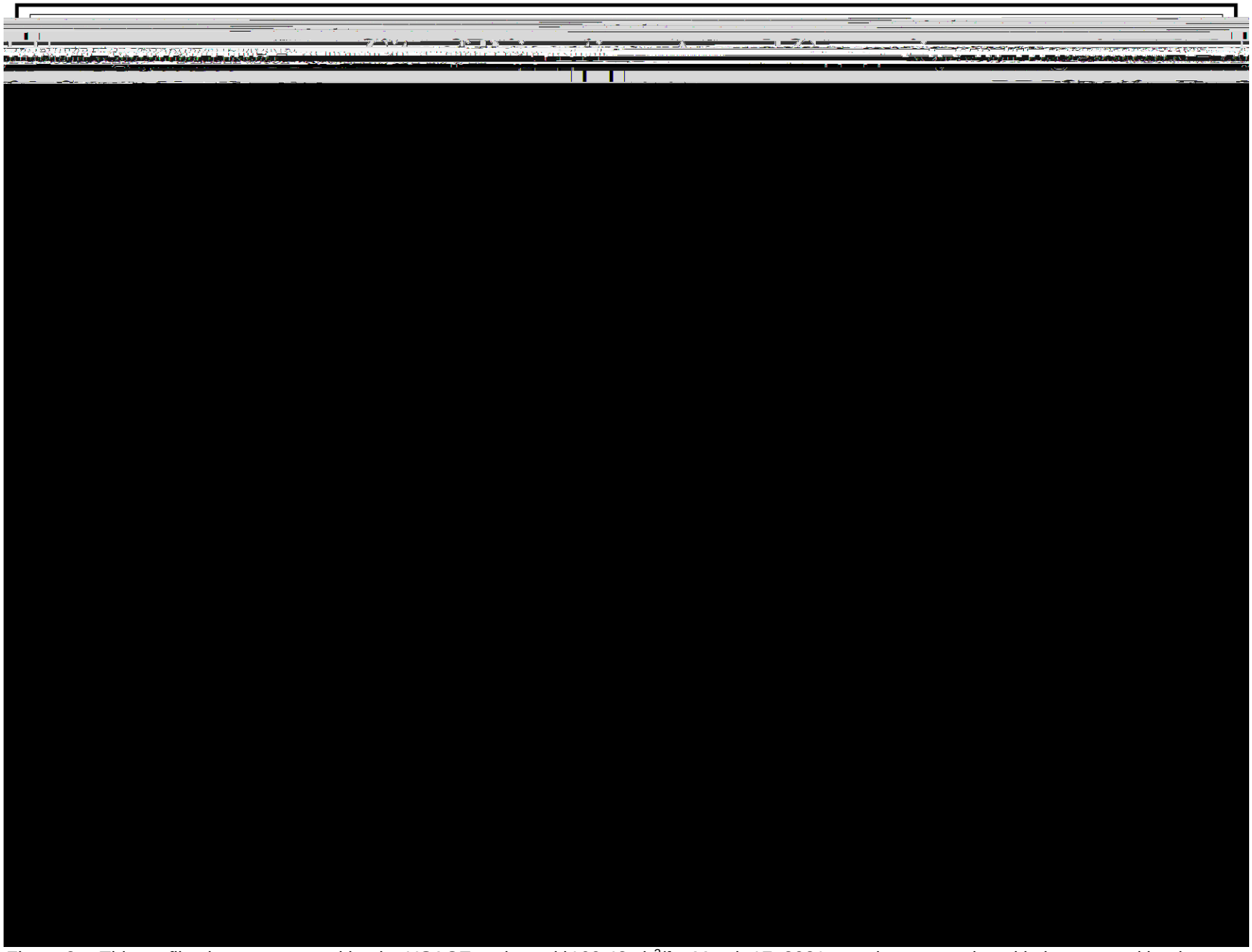

Figure 3c - This profile site was restored by the USACE project with 160.43 yds^3/ft. March 17, 2021 saw the most reduced beach present with a bar present on the beachface. During the summer of 2021 the large offshore bar moved dramatically landward filling in the trough and generating a smoother gradient from the bulkhead out to sea.

x Profile Brig -4: 4th Street North

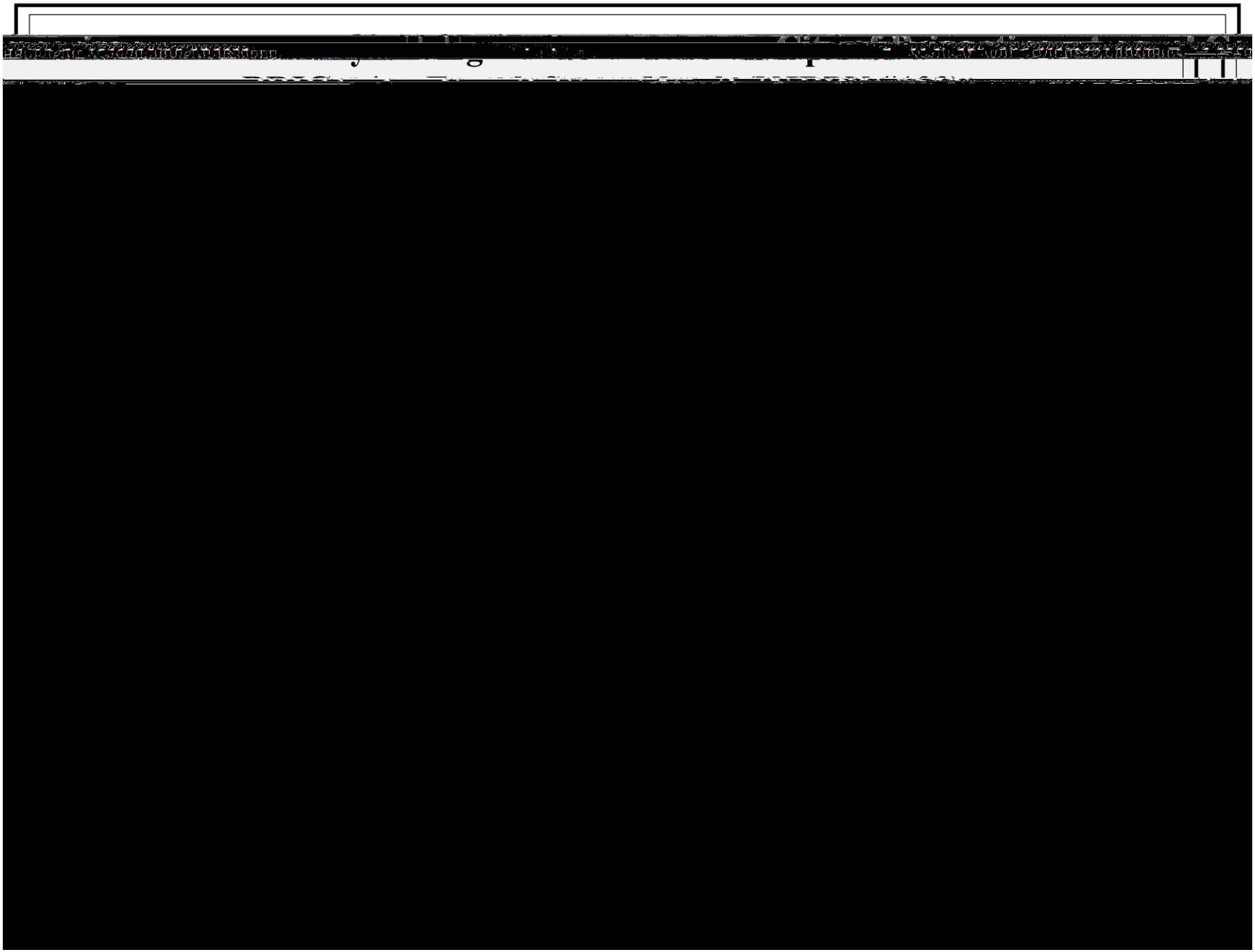

Figure 4c - Located south of the promenade, this site received sand in 2018. Loss in the dunes removed a small dune in 2020. The April 2021 survey found the most erosional beach. Berm recovery occurred during the summer of 2021 including the movement of offshore sand landward.

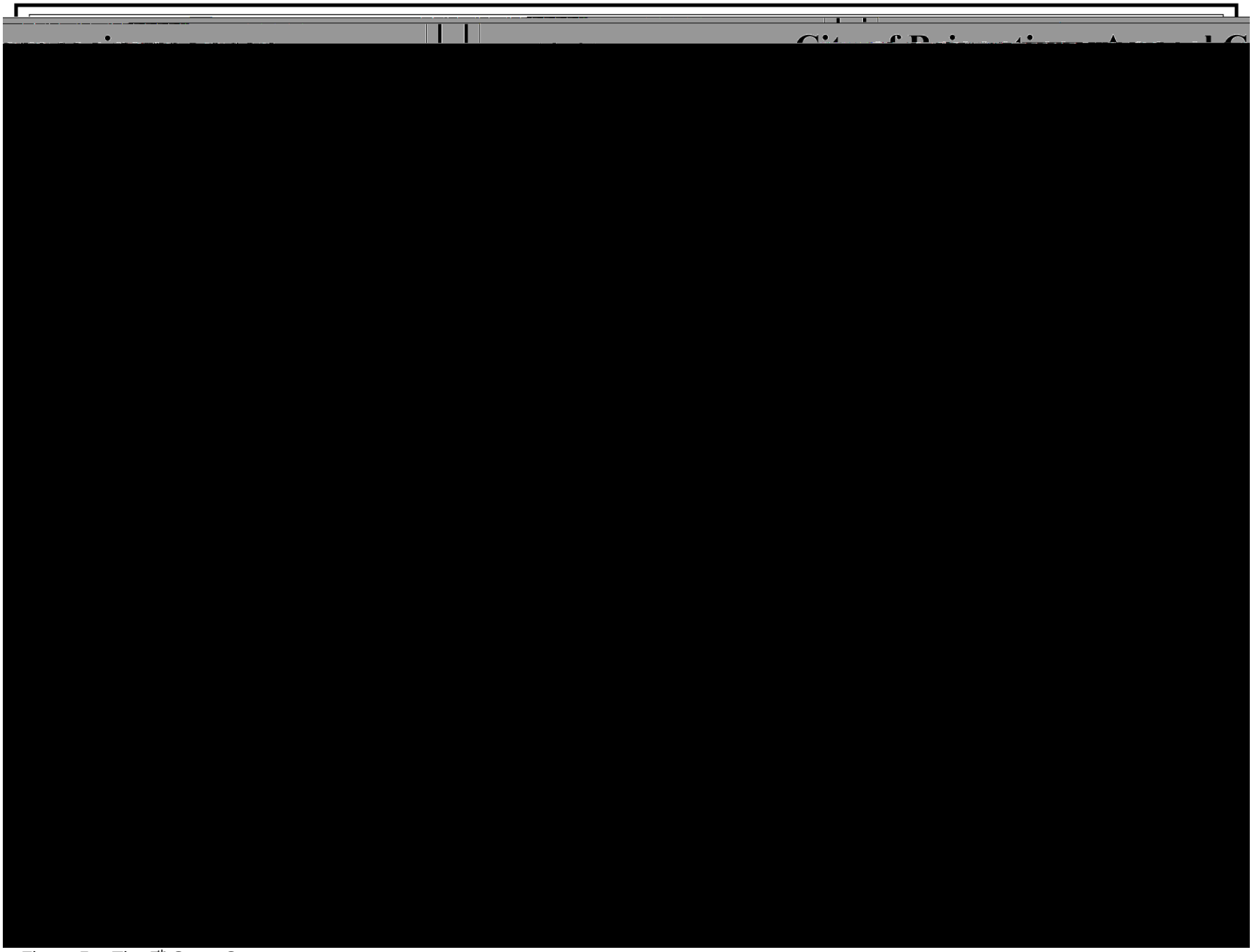

Figure 5c - The 5th Street S-

x Profile Brig -15: 15th Street South (Figures 6a, 6b

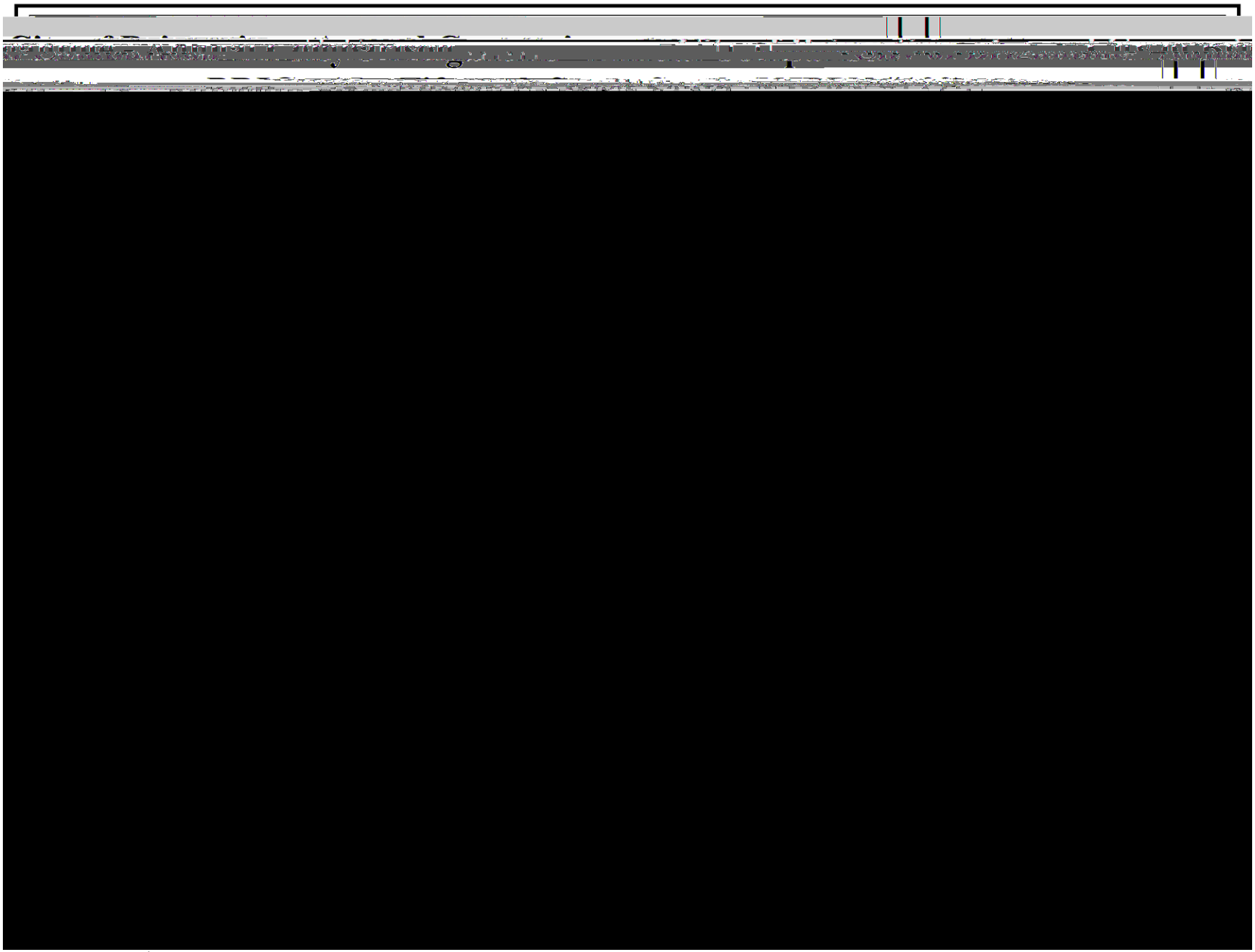

Figure 6c- At 15th Street South sand has been transported south to this location derived from the beach to the north (i)]TJ 0.002 Tc -0.002 tton

x Profile Brig-27: 27th Street South (Figures 7a, 7b & 7c)

This site was established in 1992 for the city's beach monitoring program. The location was selected to f: (s)1 (ite

Figure 7c - 27th Street South survey saw beach retreat and sand volume losses in 2020 that were completely recovered in 2021. The berm and summer beachface slope match that present in April 2020 for a shoreline position with a much wider berm. The large offshore bar trough filled in with sand derived from offshore positions of the earlier bars surveyed.

x Profile Brig-43: 43rd Street South (Figures 8a, 8b & 8c)

This site was established in 1986 as part of the New Jersey Beach Profile Network and was incorporated in the City's monitoring project in June 1992. The profile is in a area dominated by the sand retention characteristic produced by the Absecon Inlet jetty. Sand retention benefits extend from the Absecon Inlet jetty to about 5th Street South. In 1986 the end of 43rd Street was the start of the dry beach with little dune growth. The present shoreline here is almost a half mile seaward of the shoreline position before the inlet jetty was built in 1944. The dune system occupies over 200 feet of width between the development and the seaward toe of the dune. The current recreation beach berm extends over 600 feet seaward of the dune toe.

The annual beach sand volume and shoreline position continued to increase and advance seaward in 2021. The annual gain was 28.62 yds^3/ft. dominated by a 49.69 yds^3/ft. gain between April and October 2021. The shoreline retreated 20 feet over the year but had advanced 33 feet seaward between April and October 2021. The berm shown on the cross sections for this site is a dramatic indication of sand accumulation this past summer. Dune growth at the toe was substantial (+4.73 yds^3/ft. de

Figure 8c – This site continued to add sand to the beach, dunes and offshore areas. The tiny foredune became a reasonable small feature by Oct. 2021. Berm accumulation was extensive and distal offshore bar sand filled in the deep trough landward (+57.37 yds^3/ft. added as 12.96 yds^3/ft. moved from the crest into the trough).

- Profile Brig-1: South Beach (Figure 9a, 9b & 9c)

This site is located 600 feet from the Absecon Inlet jetty, established to determine if sand is retained, eroded and or bypasses the structure into the inlet channel. After years of observation at this structure

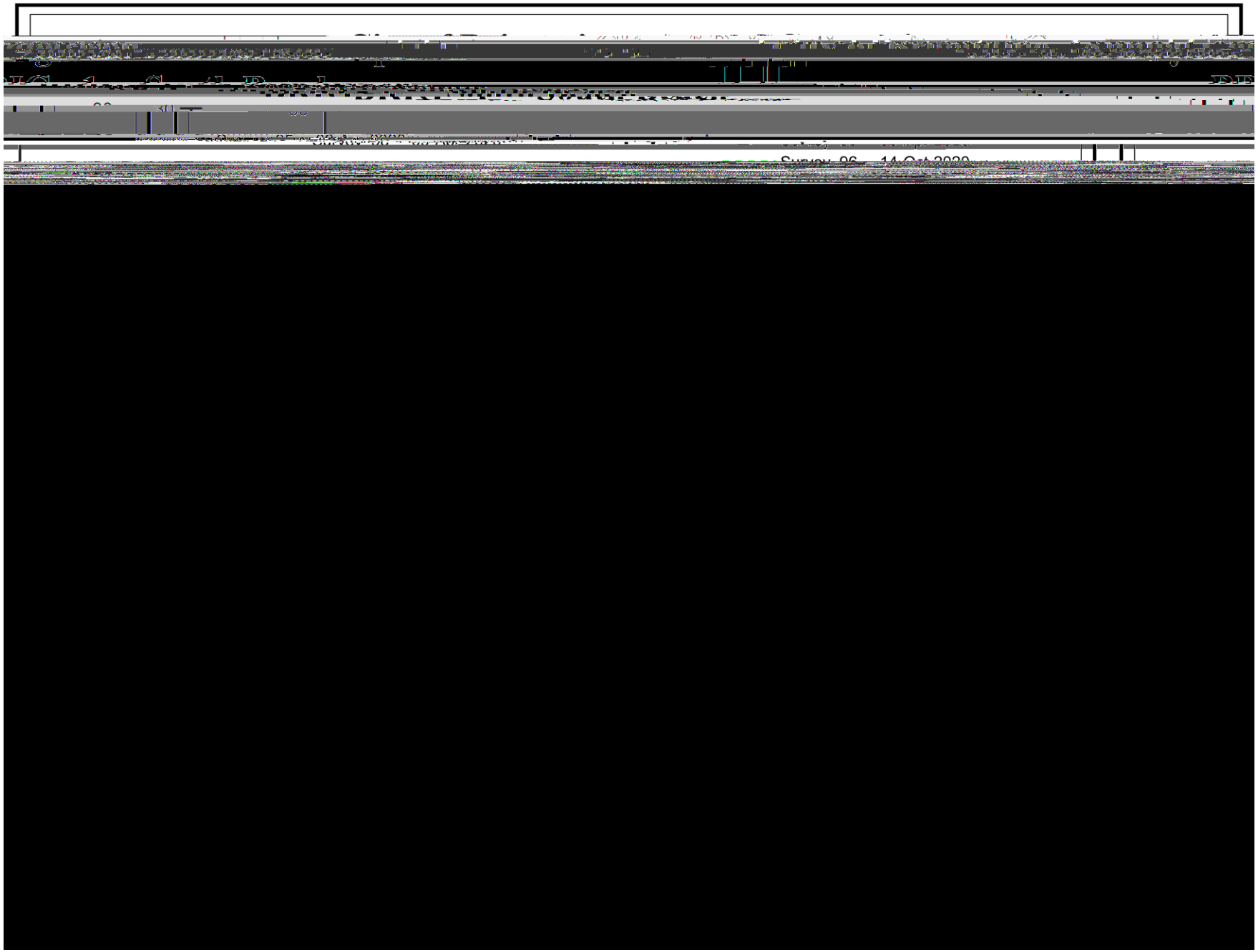

Figure 9c – Positioned 600 feet north of the inlet jetty, this site has seen sand accumulate between most surveys, perhaps because the
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