2020 FINAL REPORT - TO THE CITY OF NORTH WILDWOOD
ON THE
CONDITION OF THE CITY BEACHES

Aerial view of North Wildwood ... eastern ... jetty ... on February 6, 2021 ... the City ... about 20th Avenue ... Inlet. Sand ... Hereford ... deposited as a ... ridge in the ...

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Introduction:

The final beach survey for 2020 was delayed until January 21, 2021 when the entire oceanfront beach covered at the 200-

Figure 4. This Sept 22, 2020 view of the north end beach shows waves at the revetment and at the steel wall on a clear day with sizable surf coming in from the east, northeast.

As far back as late September, there was no shore protection offered by the oceanfront beach and at this poi the waves were reflecting off the steel wall with sufficient force to transport sand south away from this beach segment far faster than any amount of material could be trucked into place or move onto the beach naturally.

The absence of renewed beach nourishment activity either by the State of NJ or the US Army Corps of Engineers (Hereford Inlet to Cold Springs Inlet Shore Protection Project, currently authorized, but unconstructed) remains a painful reality for the City. The four still photographs are captured from drone video taken by Coastal Digital Solutions either on Sept. 22, 2020 and Feb. 6, 2021 after a moderate northeast storm The video footage source can be found at the following link. https://vimeo.com/510253223

Sand hauling from the City of Wildwood occurred during the winter of 2020 with placement in extensive stockpiles at and just north of the 15th Avenue life guard headquarters. Material was moved north and shaped into a dune and narrow dry beach. The final tally of sand moved from Wildwood to the beaches of North Wildwood was provided by the municipal engineer at 220,000 cubic yards making this season's transfer the largest thus far in this "in house" effort to restore a recreational and storm protection shoreline during this period of extensive oceanfront beach erosion manifesting itself in North Wildwood since the late 1990's.

The collection of drone snapshots (Figures 1 to 4) are in stark contrast to the beach extent as of June 13, 2020 where the dry beach extended almost to the 2nd Ave. inlet jetty (Figure 5). The past six months have made a bad situation much worse as the last of the beach width vanished either into Hereford Inlet as a new sand spit extending northwest from the jetty or back south toward Wildwood City.

North Wildwood Engineered Beach History/Performance:

Discussions remain on-going with US Army and NJ

5. Between line 54+00 and the end of surveys at line 68+00, 200 feet south of Juniper Avenue, the beachfront gained 15,443 cubic yards of sand derived from the losses to the north largely from the transferred sand volume.
6. Across the entire North Wildwood inlet and oceanfront, the dunes, beach and offshore lost 79,998 cubic yards The same calculations for the dunes and beach to elevation zero yielded a loss of 69,668 cubic yards or 87.1% of the total sand volume lost during the second half of 2020.
7. The total distance was 7,400 feet of survey that yields 10.81 cubic yards of sand per foot of beachfront.
8. Looking just at the dunes and beach to the zero elevation position on each profile, the inlet lost 8,924 cubic yards of sand split relatively evenly between the beach and the offshore region (-5,982 cy). Offshore surveys extend from zero elevation out to -12.0 plus or minus on each profile. This includes deposition in offshore bar systems that contain eroded beach sand in storage.
9. The northern 2,000 feet of the oceanfront beach and dunes lost 40,882 representing a majority of the total loss (offshore shed -12,224 cy).
10. The next 3,200 feet of oceanfront lost 30,071 cubic yards from the dunes and beach to zero elevation meaning that the offshore lost just 2,249 cubic yards of the total sand volume.
11. The southern 1,400 feet to Wildwood City beaches gained 4,427 cubic yards of sand on the beach wh means offshore accumulated the majority of the total, 10,610 cy.
12. This sand volume loss was between July 2020 and late January 2021 and represents relatively averag weather conditions with few mild northeast storms (Dec. 14 and 24, 2020) and Tropical Storm Isais in early August 2020.
13. The Feb storm loss from the oceanfront beach amounted to 70,000 cy between the jetty to 26th Avenue including the dunes, beach out to elevation -4.0 NAVD 1988. (J Verna, personal communication).

Table 1
nd Volume Comparison on the North Wildwood Oceanfront Beach & Inlet Shoreline
July 2020 to January 2021

Pr	Shoreline	Volume	Avg. Volume	Distance

In prior years the offshore regions appeared to sequester sand supplies eroded from the beach/dune system
This was continued in 2020 as the beaches and dunes contributed 87% of the sand volume lost in the entire

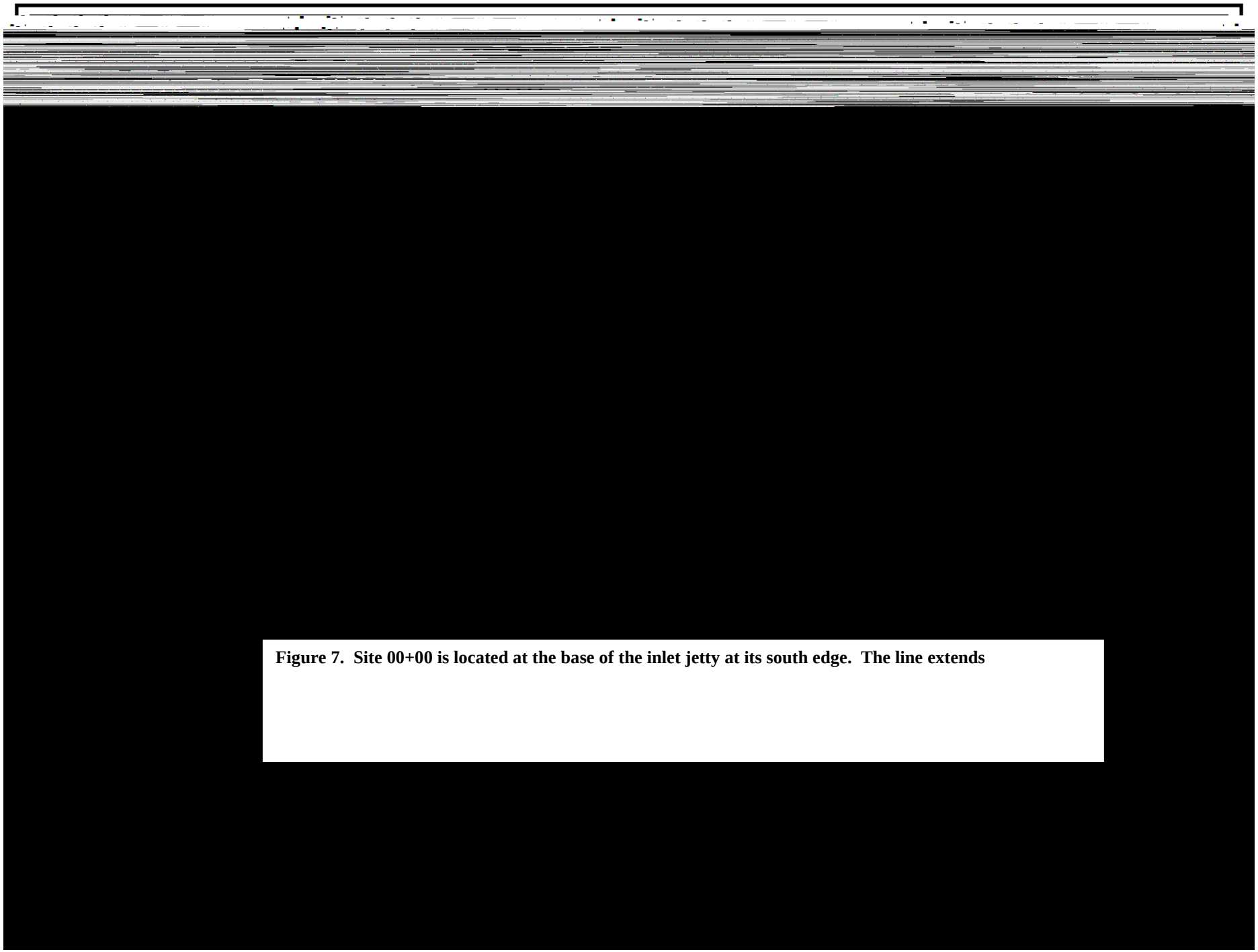

Figure 7. Site 00+00 is located at the base of the inlet jetty at its south edge. The line extends

Site 02+00 (about 100 feet south of the inlet gazebo)

Station 02+00 crosses the 2nd Avenue storm water pipeline in the ocean south of it. The backpassing operation provided sand for the summer 2020 season, but fall losses removed enough material to have water the revetment even at low tide by Jan. 2021.

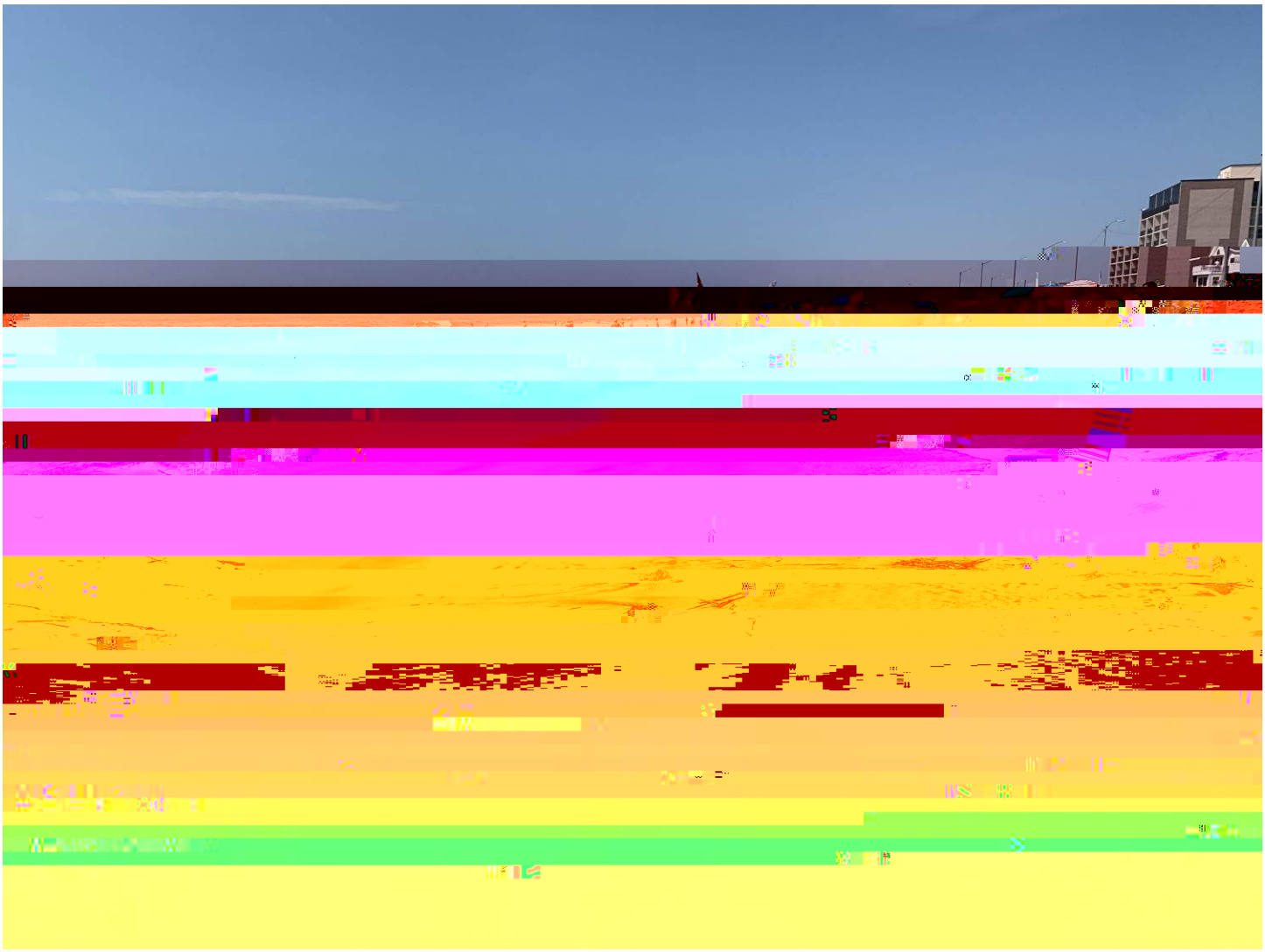

Figure 8. View to the south across site 02+00 and toward the stormwater pipeline showing the scarp cut into the back-passed sand volume on the beach as of July 8, 2020. There is sand offshore, but not in sufficient elevation or quantity to assist in providing any measure of adequate shore protection.

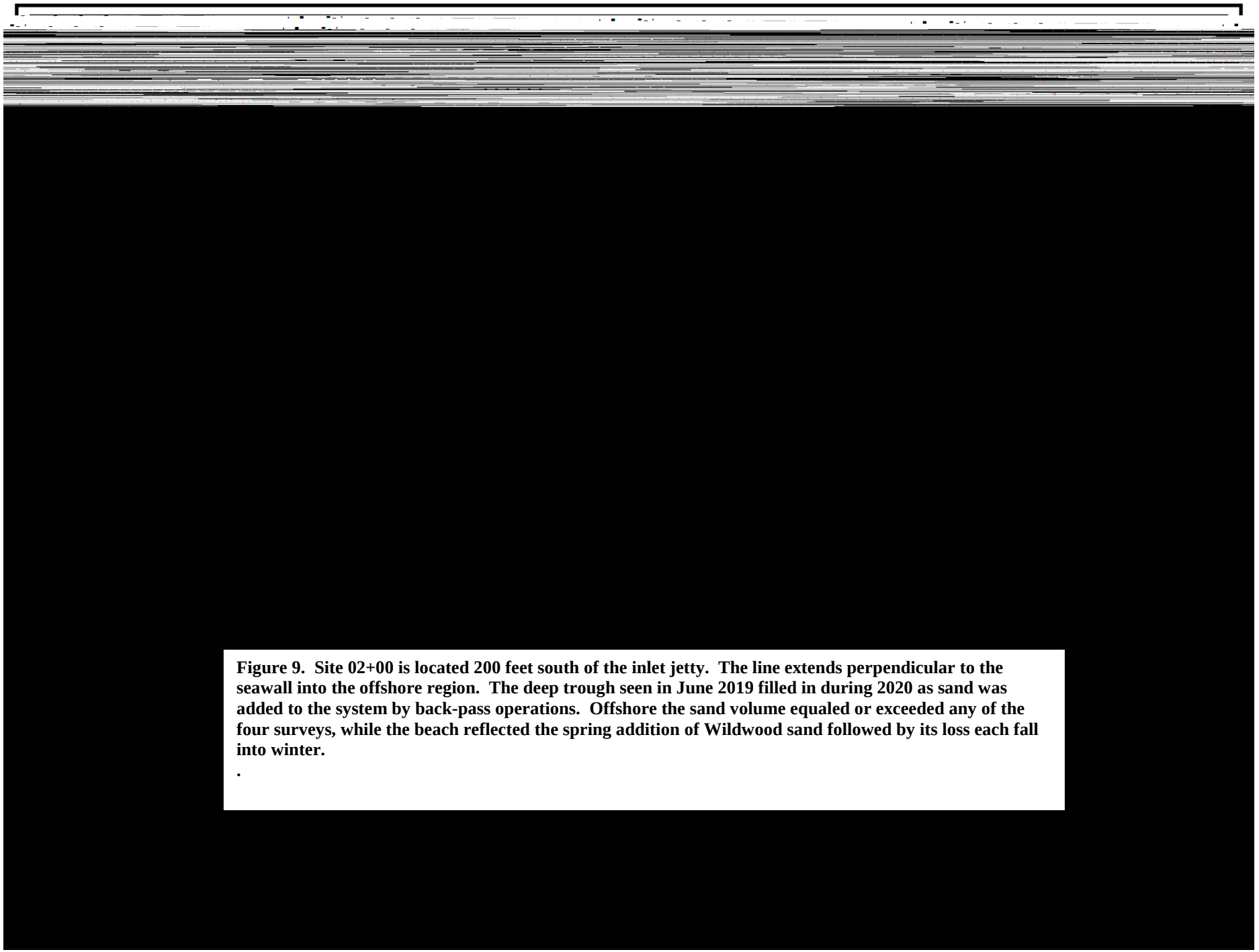

Figure 9. Site 02+00 is located 200 feet south of the inlet jetty. The line extends perpendicular to the seawall into the offshore region. The deep trough seen in June 2019 filled in during 2020 as sand was added to the system by back-pass operations. Offshore the sand volume equaled or exceeded any of the four surveys, while the beach reflected the spring addition of Wildwood sand followed by its loss each fall into winter.

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Site 04+00 (between 3th and 4th Avenues)

The site

Site 06+00 (approximately at 4th Avenue)

This location is at the end of 4th Avenue where the new bulkhead was constructed in early 2018.

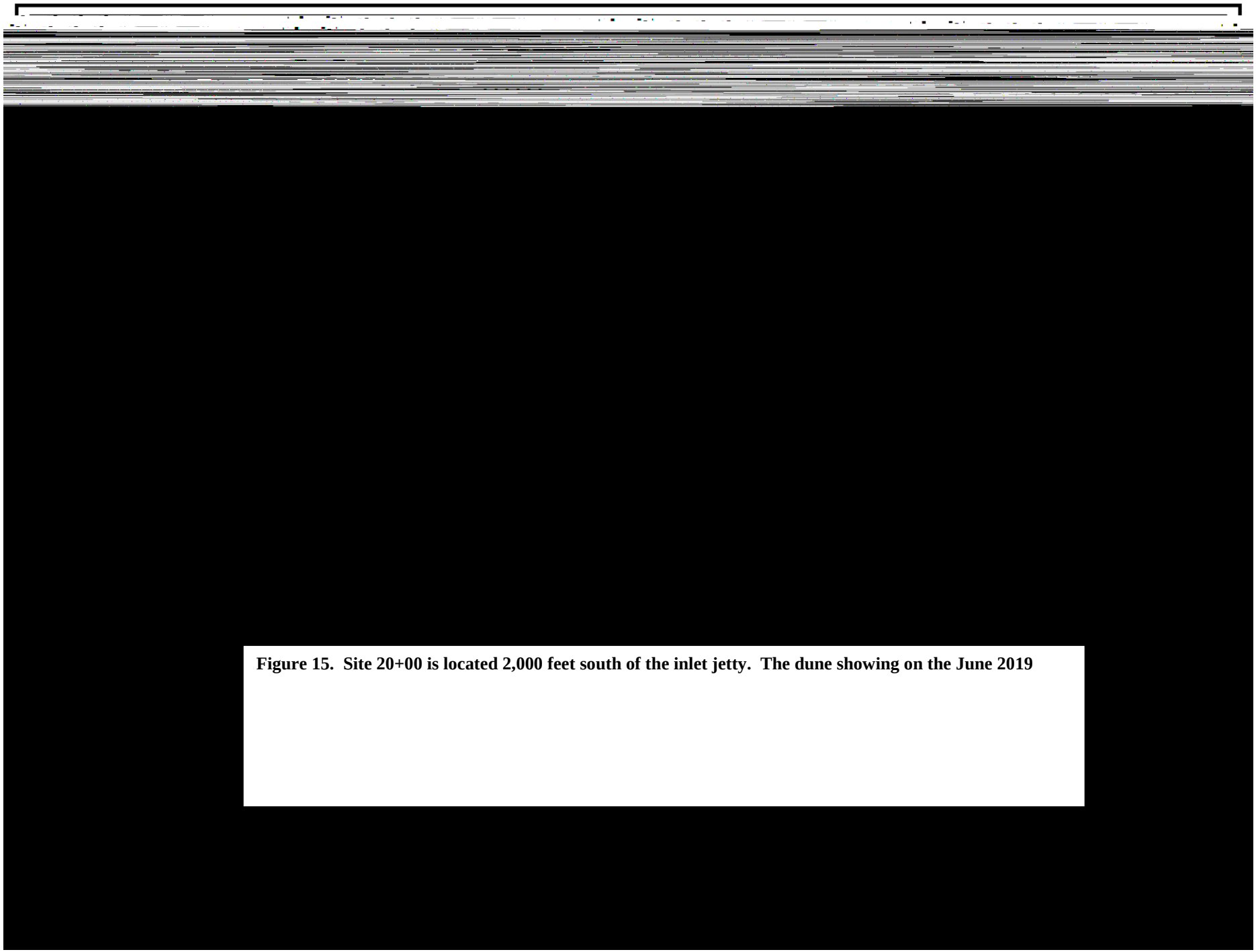

Figure 15. Site 20+00 is located 2,000 feet south of the inlet jetty. The dune showing on the June 2019

Site 40+00 (17th Avenue)

Positioned 4,000 feet south of the 2nd Avenue jetty, this site is located two blocks south of the lifeguard station in the mid-section of the City's oceanfront beaches. Following initial construction in 2009 this region has remained relatively stable. The dry sand expanse has diminished over the past decade, leaving the visitor ar dependent on wave run-up conditions. The bar offshore was in the process of adding material to the beachface in modest amounts. Backpassed sand was not directly placed here, but a quantity did migrate onto the beach during the summer.

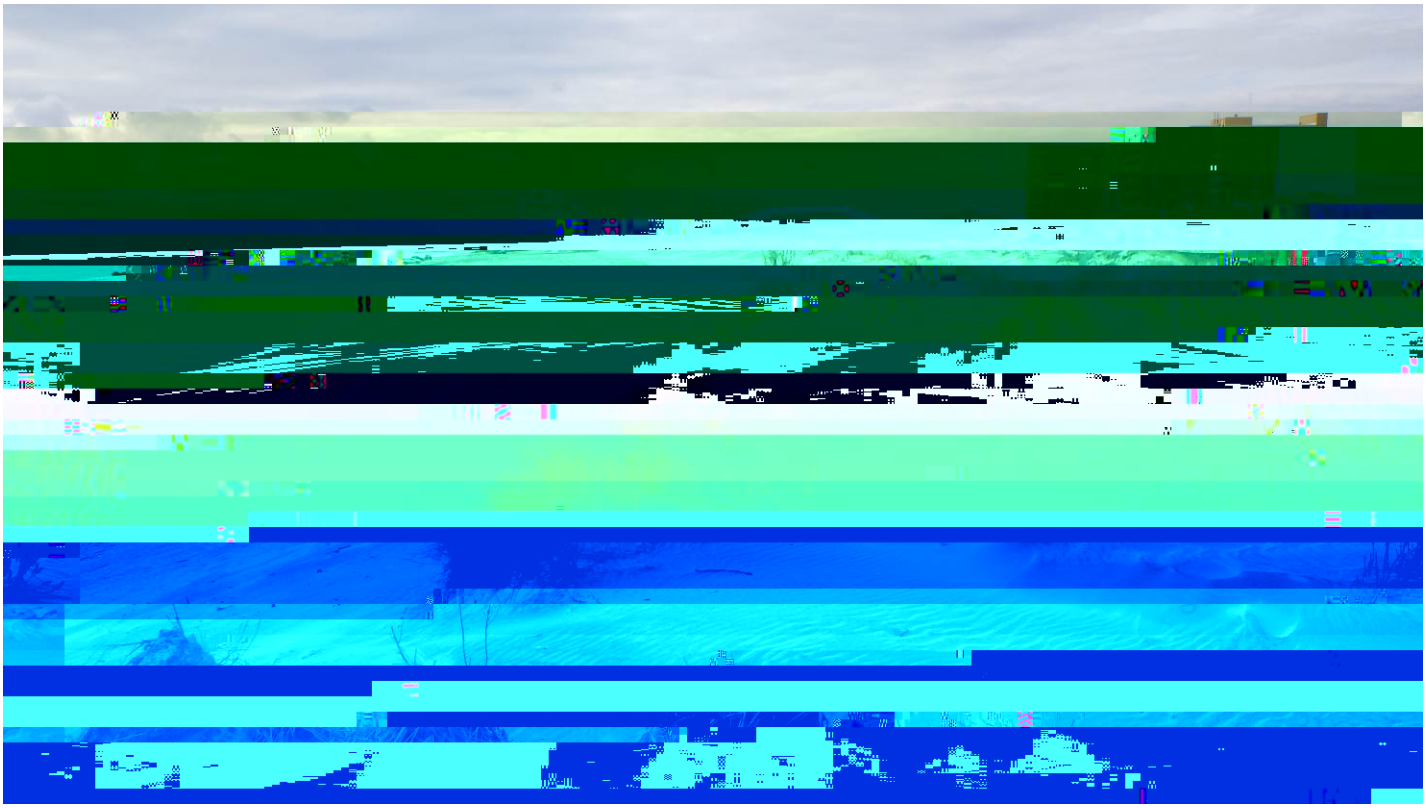

Figure 16. View to the south along the seaward dune slope and upper beach on January 27, 2021. The 2020 sand stockpile shows in the middle ground with the tracks on it. The dunes and beach lost 6.99 yds^3/ft. with sand deposited offshore as a bar.

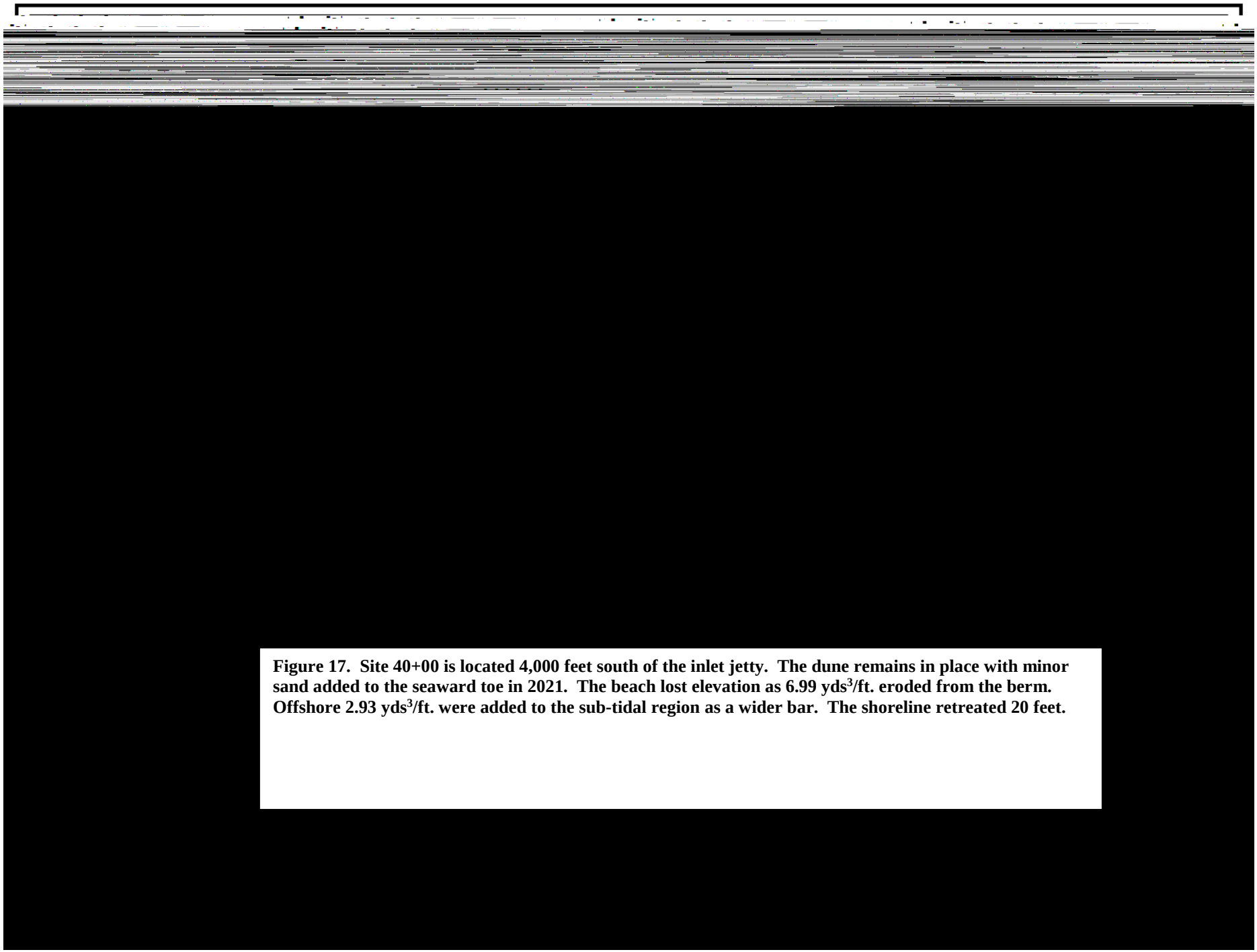

Figure 17. Site 40+00 is located 4,000 feet south of the inlet jetty. The dune remains in place with minor sand added to the seaward toe in 2021. The beach lost elevation as 6.99 yds^3/ft. eroded from the berm. Offshore 2.93 yds^3/ft. were added to the sub-tidal region as a wider bar. The shoreline retreated 20 feet.

Site 52+00 (21st Avenue)

This view was taken at 56th Avenue looking north toward the survey site 400 feet to the north. The 2009 dune was still present at the site,

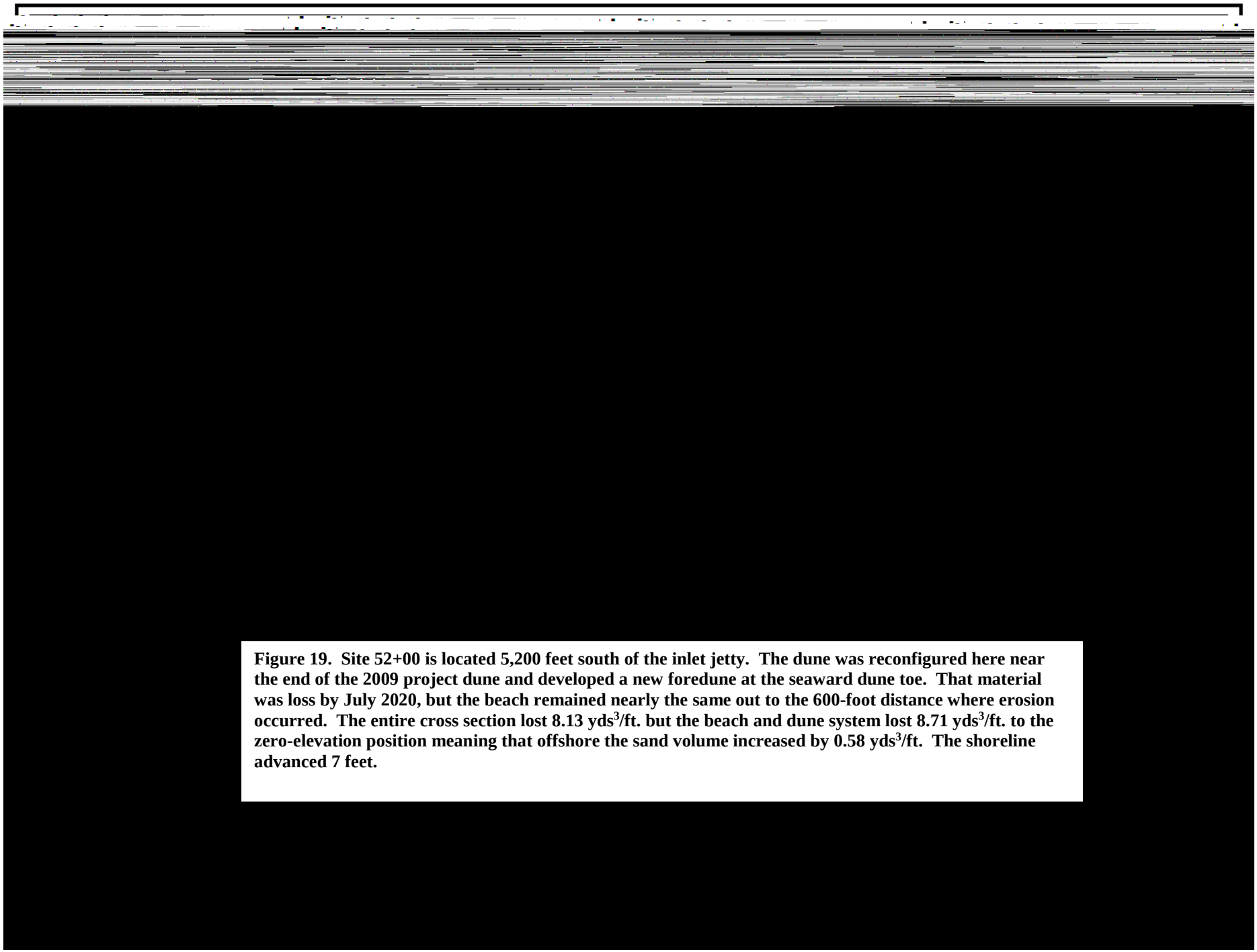

Figure 19. Site 52+00 is located 5,200 feet south of the inlet jetty. The dune was reconfigured here near the end of the 2009 project dune and developed a new foredune at the seaward dune toe. That material was loss by July 2020, but the beach remained nearly the same out to the 600-foot distance where erosion occurred. The entire cross section lost 8.13 yds^3/ft. but the beach and dune system lost 8.71 yds^3/ft. to the zero-elevation position meaning that offshore the sand volume increased by 0.58 yds^3/ft. The shoreline advanced 7 feet.

Site 58+00 (Between 23rd & 24th Avenues)

This site is located in the southern section of the City's oceanfront where the engineered dune system was originally constructed seaward of the piers. An effort was made in 2013 to restore the dune, but events in 2014 forced repositioning the dune system landward between the piers and including a large vegetated island dune that had existed between Morey's Surfside Pier and the adjacent timber pier.

As of January 27, 2021, a temporary haul road had been built seaward of the piers so trucks could move sand north from Wildwood at high tide. This feature was broken up by the February 2021 storm, but work had ceased on hauling sand.

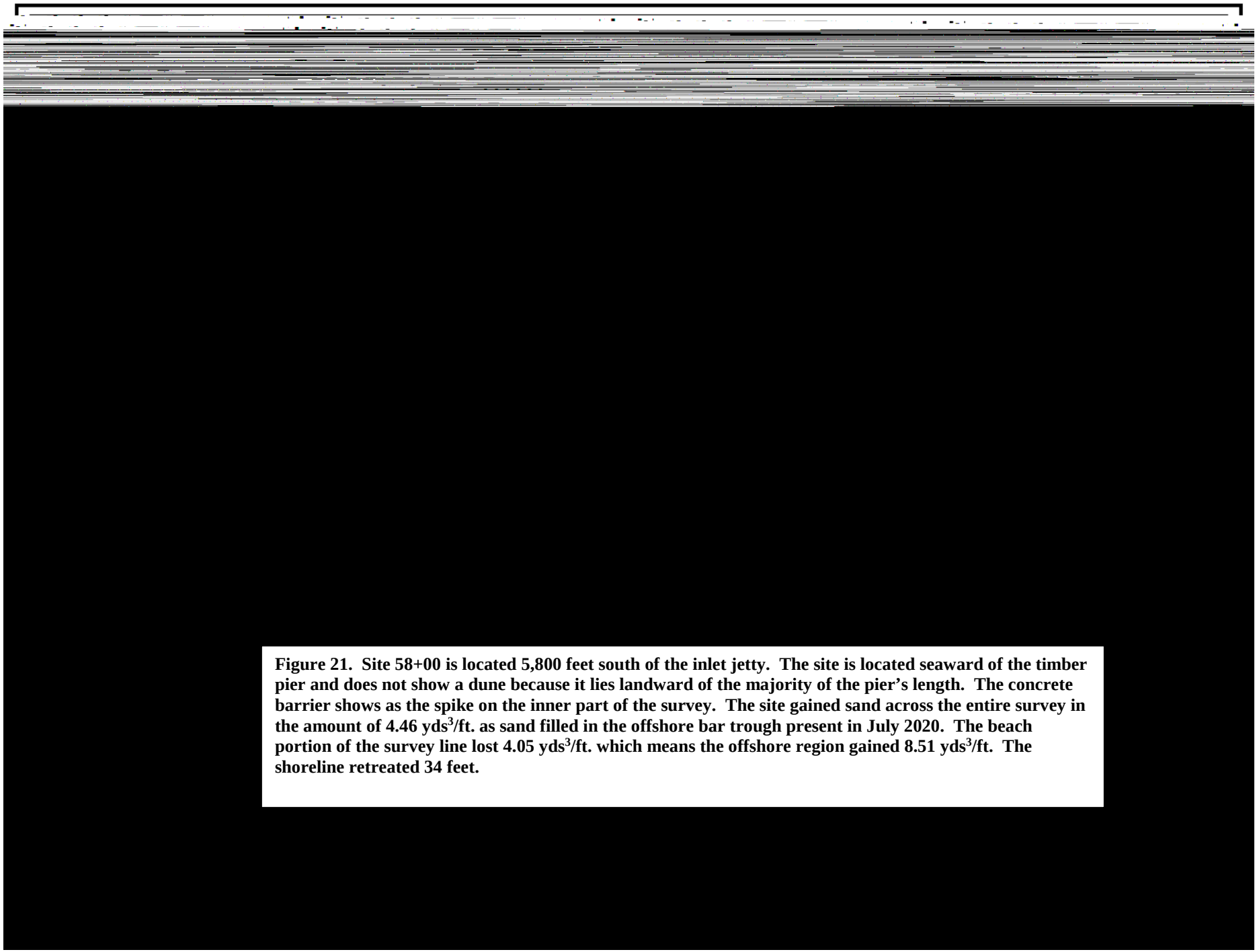

Figure 21. Site 58+00 is located 5,800 feet south of the inlet jetty. The site is located seaward of the timber pier and does not show a dune because it lies landward of the majority of the pier's length. The concrete barrier shows as the spike on the inner part of the survey. The site gained sand across the entire survey in the amount of 4.46 yds^3/ft. as sand filled in the offshore bar trough present in July 2020. The beach portion of the survey line lost 4.05 yds^3/ft. which means the offshore region gained 8.51 yds^3/ft. The shoreline retreated 34 feet.

Site 60+00 (24th Avenue)

In an effort to better define the beach zone where piers dominate in North Wildwood, this site was selected to show the changes to enhance dune protection since Hurricane Sandy. The main feature is an old dune island likely developed around beach raking debris left in a variety of places when the North Wildwood beach was much wider. The piers originally had the 2009 dune built seaward of the pier ends on the outer beach, but storm erosion starting November 2009 and climaxing with Hurricane Sandy in October 2012 saw complete loss of the dune seaward of the three piers. The existing situation was completed in 2014 and has established quite well. However shoreline retreat has forced the high tide line under the two timber piers producing the need for the haul road. This beach in Jan. 2021 was extremely flat following two storms in December 2020.

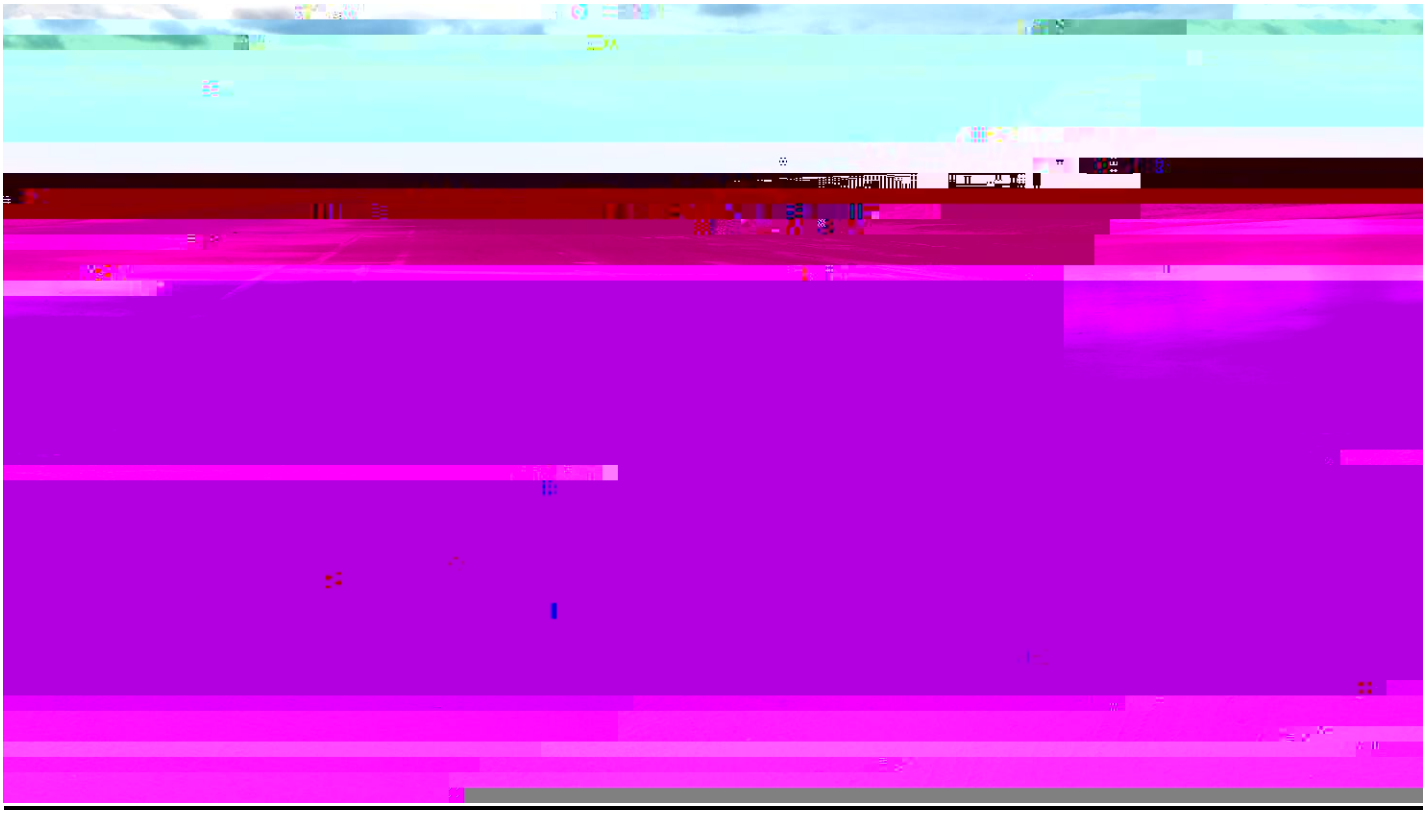

Figure 22. Site 60+00 lies between Morey's Surfside Pier and the next timber pier to the north. The bulldozer is maintaining the haul road entrance past the two timber piers.

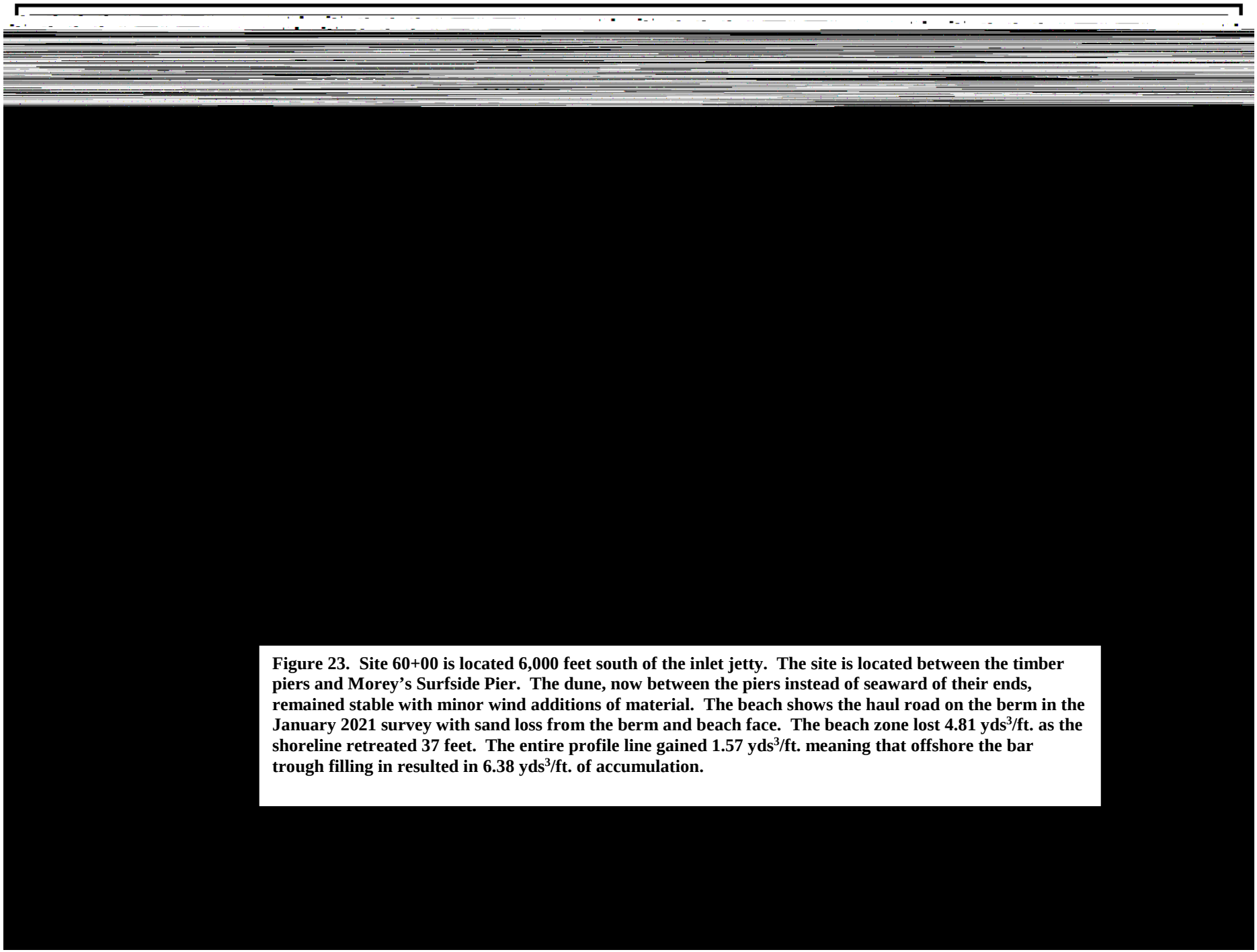

Figure 23. Site 60+00 is located 6,000 feet south of the inlet jetty. The site is located between the timber piers and Morey's Surfside Pier. The dune, now between the piers instead of seaward of their ends, remained stable with minor wind additions of material. The beach shows the haul road on the berm in the January 2021 survey with sand loss from the berm and beach face. The beach zone lost 4.81 yds^3/ft. as the shoreline retreated 37 feet. The entire profile line gained 1.57 yds^3/ft. meaning that offshore the bar trough filling in resulted in 6.38 yds^3/ft. of accumulation.

Site 64+00 (between 25th and 26th Avenues)

This is the southernmost cross section of the selected profiles within the larger database

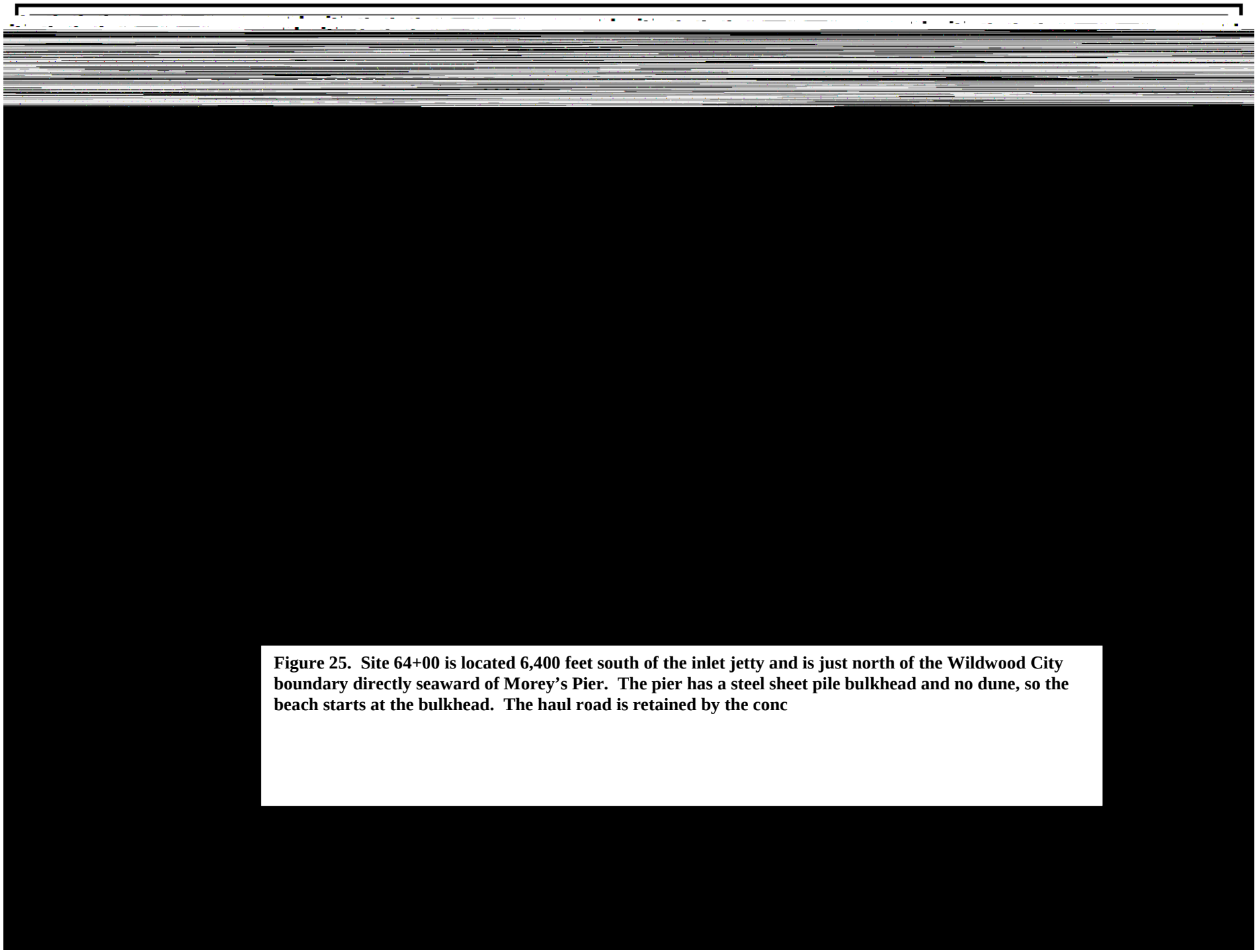

Figure 25. Site 64+00 is located 6,400 feet south of the inlet jetty and is just north of the Wildwood City boundary directly seaward of Morey's Pier. The pier has a steel sheet pile bulkhead and no dune, so the beach starts at the bulkhead. The haul road is retained by the conc

Site -00+00 (at the toe of the jetty, but into Hereford Inlet from the oceanfront shoreline)

Site -02+00 (200 feet to the northwest along the Hereford Inlet shoreline)

Site -04+00 (400 feet to the northwest along the Hereford Inlet shoreline)

Site -06+00 (near the end of Surf Avenue on the Hereford Inlet shoreline)

This is the northwestern most cross section on beaches open to public bathing. Further up the inlet the beac is dosed for endangered species bird nesting every summer starting March 15th until August 30th. Sand was deposited here in quantity starting in about 2000 creating a large spit growing along the inlet revetment towar the end of New Jersey Avenue in North Wildwood. Surveys were initiated here during the 2009 NJ State/North Wildwood beach restoration project. In the past several years the southeastern portion of this beach has been erosional as inlet currents alter sand deposition and the oceanfront beach to the point where material was unable to move past the jetty into the inlet shore.

Figure 26. This view on January 22, 2021 shows a view to the southeast along the toe of the dunes. The bathing beach is substantial in width with a taper to zero width at the 2nd Ave. and Kennedy Blvd. gazebo. The site stability is tied to loss from the oceanfront sand deposited each year derived from Wildwood City beaches. Flood tides act in concert with wave activity to move sand past the jetty into Hereford Inlet and it deposits along the inlet shoreline as an extended sand spit oriented into the inlet, along the City shoreline. Material initially deposits in the nearby offshore allowing ocean waves to move it landward adding to the beach eventually.

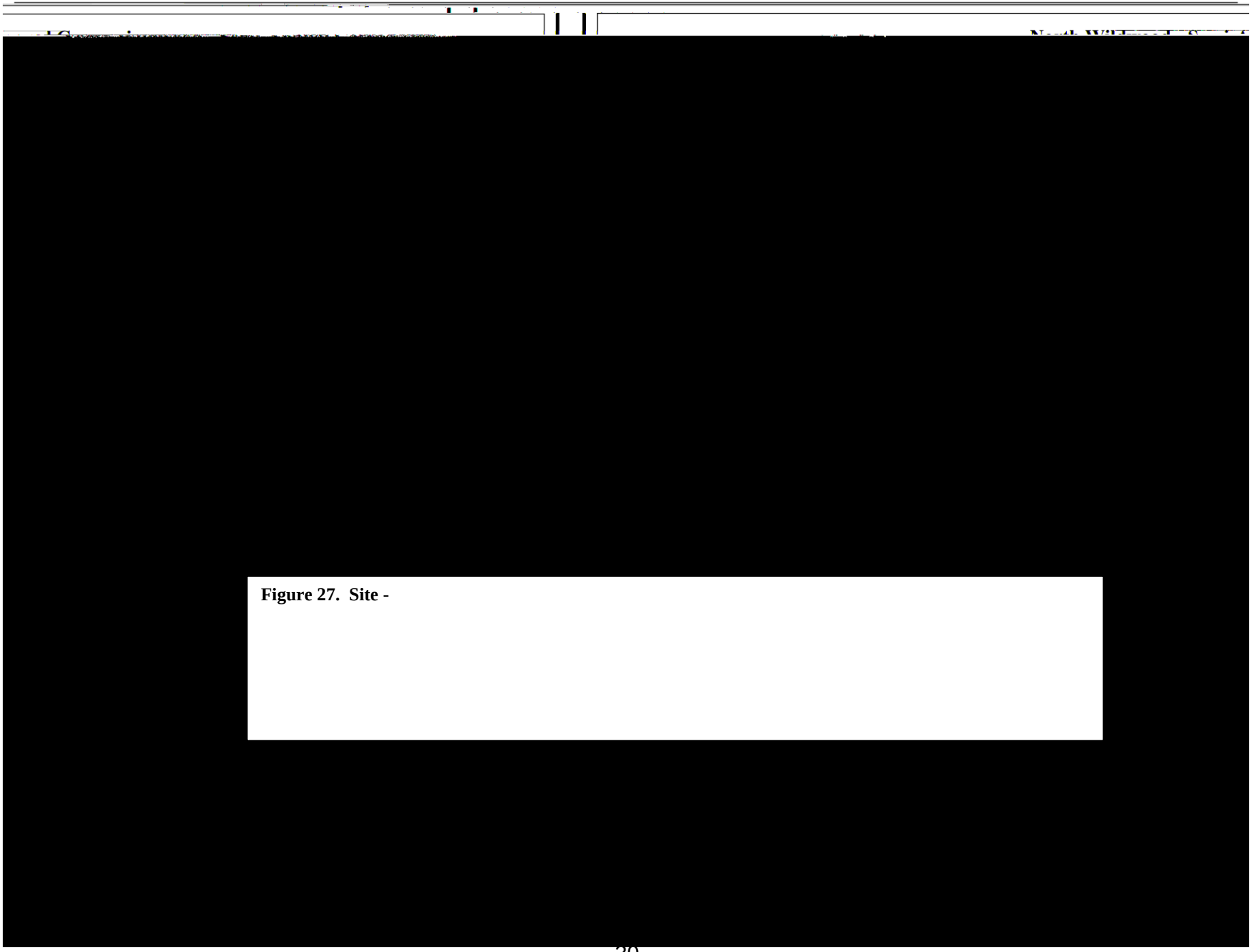

Figure 27. Site -

Hereford Inlet Borrow Zone Survey Fall 2020:

The City requested a survey of the State and Federally authorized Hereford Inlet sand borrow zone located in the ebb-tidal shoals of the inlet approximately 1,500 feet northeast of the inlet jetty and 2nd Kennedy Boulevard. This was completed November 24, 2020 under ideal surf and wind wave conditions. The digital elevation model of the bathymetry shows extensive sand deposition in the southern section of the borrow zone where any potential supply for North Wildwood would be extracted. A significant shift in the inlet's medial ebb channel produced a deeper trough through the entire zone area since 2018 data was obtained, some parts of the site for sand supplies. Most of the sediment has accumulated between this new ebb channel and the North Wildwood shoreline on the inlet. In fact, at the high tide during the day of the survey, the 24-foot vessel was unable to continue out to sea along what had previously been a channel along the inlet beach and past the jetty tip. The water was less than 2 feet deep at high tide over 800 feet from the water's edge.

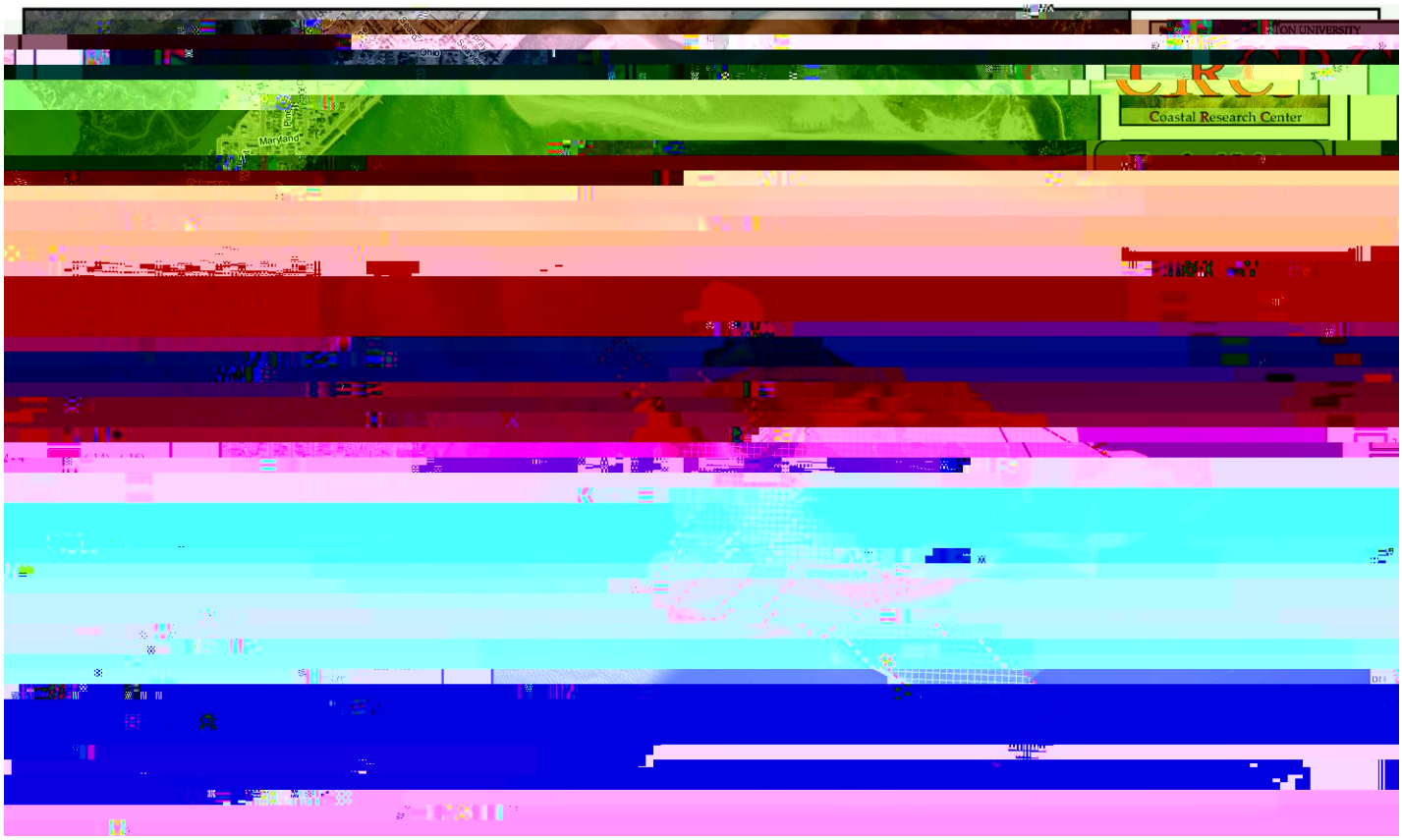

Figure 29. The fall 2020 borrow zone survey data was compared to the last NJDEP funded Hereford Inlet survey covering a wider area to determine change in sand supplies and locations since fall 2018. The multi-assigned authorized borrow zones are outlined for both federal and NJDEP source areas with the NJDEP sites A, B and C on the south end of the entire site. The best accumulation has occurred in DEP sites B and C where the net gain was 137,120 yards of sand since 2018. NJDEP zone A has done better than the data indicates because the color-blanked hatched area could not be surveyed in 2020 because of extremely shallow water within the hatched area. The deep red zone cutting through the DEP A and USACE A1 zones is the new ebb-tidal channel generated by the closure of the one shown in the 2019 air photograph as background that existed close to the North Wildwood inlet shoreline. The NJDEP C zone blank hatched area was not surveyed in 2018 as it was too far from shore and in deep water beyond the allowed dredging depths. That segment remains deep as of 2020 (Figure 28).