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TO: The Coastal Resources Commission

FROM: Christine A. Goebel, Assistant Attorney General

DATE: November 17, 2014 (for the Special November 19, 2014 CRC Meeting)

RE: **Variance Request by the Town of North Topsail Beach (14-16)**

Petitioner is the Town of North Topsail Beach ("Town"). The Town holds oceanfront easements for the area north of Topsail Reef Condos toward the New River Inlet in connection with their Inlet Management Plan. Following the Phase 1 channel realignment and nourishment project which was completed in early 2013, and in response to recent accelerated erosion in this area, the Town began to research various options to protect the 20 structures in this area from erosion during the summer of 2014. The Town intends to try and protect the structures until the next phases of the Inlet Management Plan can take place. On October 3, 2014, Petitioner completed its CAMA Major Permit seeking to develop a sandbag structure in this area larger than those allowed by the Commission's sandbag rule size limits. On October 24, 2014, DCM issued Emergency CAMA Major Permit #92-14 authorizing sandbags at this location but conditioned them to meet the Commission's rules limiting size. Petitioner now seeks a variance to allow the placement of sandbags in the configuration proposed in their CAMA permit application and the stipulated facts.

The following additional information is attached to this memorandum:

- Attachment A: Relevant Rules
- Attachment B: Stipulated Facts
- Attachment C: Petitioner's Position and Staff's Responses to Criteria
- Attachment D: Petitioner's Variance Request Materials
- Attachment E: Stipulated Exhibits including powerpoint

cc: Brian Edes, Town Attorney, electronically  
Mary Lucasse, CRC Counsel, electronically

**RELEVANT STATUTES OR RULES**

**ATTACHMENT A**

**15A NCAC 07H .0301 OCEAN HAZARD CATEGORIES**

The next broad grouping is composed of those AECs that are considered natural hazard areas along the Atlantic Ocean shoreline where, because of their special vulnerability to erosion or other adverse effects of sand, wind, and water, uncontrolled or incompatible development could unreasonably endanger life or property. Ocean hazard areas include beaches, frontal dunes, inlet lands, and other areas in which geologic, vegetative and soil conditions indicate a substantial possibility of excessive erosion or flood damage.

**15A NCAC 07H .0302 SIGNIFICANCE OF THE OCEAN HAZARD CATEGORY**

(a) The primary causes of the hazards peculiar to the Atlantic shoreline are the constant forces exerted by waves, winds, and currents upon the unstable sands that form the shore. During storms, these forces are intensified and can cause significant changes in the bordering landforms and to structures located on them. Ocean hazard area property is in the ownership of a large number of private individuals as well as several public agencies and is used by a vast number of visitors to the coast. Ocean hazard areas are critical, therefore, because of both the severity of the hazards and the intensity of interest in the areas.

(b) The location and form of the various hazard area landforms, in particular the beaches, dunes, and inlets, are in a permanent state of flux, responding to meteorologically induced changes in the wave climate. For this reason, the appropriate location of structures on and near these landforms must be reviewed carefully in order to avoid their loss or damage. As a whole, the same flexible nature of these landforms which presents hazards to development situated immediately on them offers protection to the land, water, and structures located landward of them. The value of each landform lies in the particular role it plays in affording protection to life and property. (The role of each landform is described in detail in Technical Appendix 2 in terms of the physical processes most important to each.) Overall, however, the energy dissipation and sand storage capacities of the landforms are most essential for the maintenance of the landforms' protective function.

**15A NCAC 07H .0303 MANAGEMENT OBJECTIVE OF OCEAN HAZARD AREAS**

(a) The CRC recognizes that absolute safety from the destructive forces indigenous to the Atlantic shoreline is an impossibility for development located adjacent to the coast. The loss of life and property to these forces, however, can be greatly reduced by the proper location and design of structures and by care taken in prevention of damage to natural protective features particularly primary and frontal dunes. Therefore, it is the CRC's objective to provide management policies and standards for ocean hazard areas that serve to eliminate unreasonable danger to life and property and achieve a balance between the financial, safety, and social factors that are involved in hazard area development.

(b) The purpose of these Rules shall be to further the goals set out in G.S. 113A-102(b), with particular attention to minimizing losses to life and property resulting from storms and long-term erosion, preventing encroachment of permanent structures on public beach areas, preserving the natural ecological conditions of the barrier dune and beach systems, and reducing the public costs of inappropriately sited development. Furthermore, it is the objective of the Coastal Resources Commission to protect present common-law and statutory public rights of access to and use of the lands and waters of the coastal area.

**15A NCAC 7H .0305 GENERAL IDENTIFICATION AND DESCRIPTION OF LANDFORMS**

(a) This section describes natural and man-made features that are found within the ocean hazard area of environmental concern.

(8) Erosion Escarpment. The normal vertical drop in the beach profile caused from high tide or storm tide erosion.

**15A NCAC 07H .0308 SPECIFIC USE STANDARDS FOR OCEAN HAZARD AREAS**

(a) Ocean Shoreline Erosion Control Activities:

(1) Use Standards Applicable to all Erosion Control Activities:

(A) All oceanfront erosion response activities shall be consistent with the general policy statements in 15A NCAC 07M .0200.

(B) Permanent erosion control structures may cause significant adverse impacts on the value and enjoyment of adjacent properties or public access to and use of the ocean beach, and, therefore, are prohibited. Such structures include bulkheads, seawalls, revetments, jetties, groins and breakwaters.

(C) Rules concerning the use of oceanfront erosion response measures apply to all oceanfront properties without regard to the size of the structure on the property or the date of its construction.

(D) All permitted oceanfront erosion response projects, other than beach bulldozing and temporary placement of sandbag structures, shall demonstrate sound engineering for their planned purpose.

(E) Shoreline erosion response projects shall not be constructed in beach or estuarine areas that sustain substantial habitat for fish and wildlife species, as identified by natural resource agencies during project review, unless mitigation measures are incorporated into project design, as set forth in Rule .0306(i) of this Section.

(F) Project construction shall be timed to minimize adverse effects on biological activity.

(G) Prior to completing any erosion response project, all exposed remnants of or debris from failed erosion control structures must be removed by the permittee.

(the remainder of (a)(1) is omitted in this staff recommendation)

(2) Temporary Erosion Control Structures:

(A) Permittable temporary erosion control structures shall be limited to sandbags placed landward of mean high water and parallel to the shore.

(B) Temporary erosion control structures as defined in Part (2)(A) of this Subparagraph shall be used to protect only imminently threatened roads and associated right of ways, and buildings and their associated septic systems. A structure shall be considered imminently threatened if its foundation, septic system, or right-of-way in the case of roads, is less than 20 feet away from the erosion scarp. Buildings and roads located more than 20 feet from the erosion scarp or in areas where there is no obvious erosion scarp may also be found to be imminently threatened when site conditions, such as a flat beach profile or accelerated erosion, increase the risk of imminent damage to the structure.

(C) Temporary erosion control structures shall be used to protect only the principal structure and its associated septic system, but not appurtenances such as pools, gazebos, decks or any amenity that is allowed as an exception to the erosion setback requirement.

(D) Temporary erosion control structures may be placed seaward of a septic system when there is no alternative to relocate it on the same or adjoining lot so that it is landward of or in line with the structure being protected.

(E) Temporary erosion control structures shall not extend more than 20 feet past the sides of the structure to be protected. The landward side of such temporary erosion control structures shall not be located more than 20 feet seaward of the structure to be protected or the right-of-way in the case of roads. If a building or road is found to be imminently threatened and at an increased risk of imminent damage due to site conditions such as a flat beach profile or accelerated erosion, temporary erosion control structures may be located more than 20 feet seaward of the structure being protected. In cases of increased risk of imminent damage, the location of the temporary erosion control structures shall be determined by the Director of the Division of Coastal Management or their designee.

(F) Temporary erosion control structures may remain in place for up to two years after the date of approval if they are protecting a building with a total floor area of 5000 sq. ft. or less and its associated septic system, or, for up to five years for a building with a total floor area of more than 5000 sq. ft. and its associated septic system. Temporary erosion control structures may remain in place for up to five years if they are protecting a bridge or a road. The property owner shall be responsible for removal of the temporary structure within 30 days of the end of the allowable time period.

(G) Temporary sandbag erosion control structures may remain in place for up to five years from the date of approval if they are located in a community that is actively pursuing a beach nourishment project, and for up to eight years from the date of approval if they are located in an Inlet Hazard Area adjacent to an inlet for which a community is actively pursuing an inlet relocation project. For purposes of this Rule, a community is considered to be actively pursuing a beach nourishment or inlet relocation project if it has:

- (i) an active CAMA permit, where necessary, approving such project; or
- (ii) been identified by a U.S. Army Corps of Engineers' Beach Nourishment Reconnaissance Study, General Reevaluation Report, Coastal Storm Damage Reduction Study or an ongoing feasibility study by the U.S. Army Corps of Engineers and a commitment of local or federal money, when necessary; or
- (iii) received a favorable economic evaluation report on a federal project or,
- (iv) is in the planning stages of a project that has been designed by the U.S. Army Corps of Engineers or persons meeting applicable State occupational licensing requirements and has been initiated by a local government or community with a commitment of local or state funds to construct the project and the identification of the financial resources or funding bases necessary to fund the beach nourishment or inlet relocation project.

If beach nourishment or inlet relocation is rejected by the sponsoring agency or community, or ceases to be actively planned for a section of shoreline, the time extension is void for that section of beach or community and existing sandbags are subject to all applicable time limits set forth in Part (F) of this Subparagraph.

(H) Once the temporary erosion control structure is determined to be unnecessary due to

relocation or removal of the threatened structure, a storm protection project constructed by the U.S. Army Corps of Engineers, a large-scale beach nourishment project or an inlet relocation project, it shall be removed by the property owner within 30 days of official notification from the Division of Coastal Management regardless of the time limit placed on the temporary erosion control structure.

(I) Removal of temporary erosion control structures shall not be required if they are covered by dunes with stable and natural vegetation.

(J) The property owner shall be responsible for the removal of remnants of all portions of any damaged temporary erosion control structure.

(K) Sandbags used to construct temporary erosion control structures shall be tan in color and three to five feet wide and seven to 15 feet long when measured flat. Base width of the structure shall not exceed 20 feet, and the height shall not exceed six feet.

(L) Soldier pilings and other types of devices to anchor sandbags shall not be allowed.

(M) An imminently threatened structure may be protected only once, regardless of ownership unless the threatened structure is located in an Inlet Hazard Area and in a community that is actively pursuing an inlet relocation project in accordance with (G) of this Subparagraph. Existing temporary erosion control structures located in Inlet Hazard Areas may be eligible for an additional eight year permit extension provided that the structure being protected is still imminently threatened, the temporary erosion control structure is in compliance with requirements of this Subchapter and the community in which it is located is actively pursuing an inlet relocation project in accordance with Part (G) of this Subparagraph. In the case of a building, a temporary erosion control structure may be extended, or new segments constructed, if additional areas of the building become imminently threatened. Where temporary structures are installed or extended incrementally, the time period for removal under Part (F) or (G) of this Subparagraph shall begin at the time the initial erosion control structure is installed. For the purpose of this Rule:

(i) a building and septic system shall be considered as separate structures.

(ii) a road or highway shall be allowed to be incrementally protected as sections become imminently threatened. The time period for removal of each section of sandbags shall begin at the time that section is installed in accordance with Part (F) or (G) of this Subparagraph.

(N) Existing sandbag structures may be repaired or replaced within their originally permitted dimensions during the time period allowed under Part (F) or (G) of this Subparagraph.

**15A NCAC 07M .0201 DECLARATION OF GENERAL POLICY**

It is hereby declared that the general welfare and public interest require that development along the ocean and estuarine shorelines be conducted in a manner that avoids loss of life, property and amenities. It is also declared that protection of the recreational use of the shorelines of the state is in the public interest. In order to accomplish these public purposes, the planning of future land uses, reasonable rules and public expenditures should be created or accomplished in a coordinated manner so as to minimize the likelihood of damage to private and public resources resulting from recognized coastal hazards.

**15A NCAC 07M .0202 POLICY STATEMENTS**

(a) Pursuant to Section 5, Article 14 of the North Carolina Constitution, proposals for shoreline erosion response projects shall avoid losses to North Carolina's natural heritage. All means should be taken to identify and develop response measures that will not adversely affect estuarine and marine productivity. The public right to use and enjoy the ocean beaches must be protected. The protected uses include traditional recreational uses (such as walking, swimming, surf-fishing, and sunbathing) as well as commercial fishing and emergency access for beach rescue services. Private property rights to oceanfront properties including the right to protect that property in ways that are consistent with public rights should be protected.

(b) Erosion response measures designed to minimize the loss of private and public resources to erosion should be economically, socially, and environmentally justified. Preferred response measures for shoreline erosion shall include but not be limited to AEC rules, land use planning and land classification, establishment of building setback lines, building relocation, subdivision regulations and management of vegetation.

(c) The replenishment of sand on ocean beaches can provide storm protection and a viable alternative to allowing the ocean shoreline to migrate landward threatening to degrade public beaches and cause the loss of public facilities and private property. Experience in North Carolina and other states has shown that beach restoration projects can present a feasible alternative to the loss or massive relocation of oceanfront development. In light of this experience, beach restoration and sand renourishment and disposal projects may be allowed when:

- (1) Erosion threatens to degrade public beaches and to damage public and private properties;
- (2) Beach restoration, renourishment or sand disposal projects are determined to be socially and economically feasible and cause no significant adverse environmental impacts;
- (3) The project is determined to be consistent with state policies for shoreline erosion response and state use standards for Ocean hazard and Public Trust Waters Areas of Environmental Concern and the relevant rules and guidelines of state and federal review agencies.

When the conditions set forth in this Paragraph can be met, the Coastal Resources Commission supports, within overall budgetary constraints, state financial participation in Beach Erosion Control

and Hurricane Wave Protection projects that are cost-shared with the federal government and affected local governments pursuant to the federal Water Resources Development Act of 1986 and the North Carolina Water Resources Development Program (G.S. 143-215.70-73).

(d) The following are required with state involvement (funding or sponsorship) in beach restoration and sand renourishment projects:

(1) The entire restored portion of the beach shall be in permanent public ownership;

(2) It shall be a local government responsibility to provide adequate parking, public access, and services for public recreational use of the restored beach.

(e) Temporary measures to counteract erosion, such as the use of sandbags and beach pushing, should be allowed, but only to the extent necessary to protect property for a short period of time until threatened structures may be relocated or until the effects of a short-term erosion event are reversed. In all cases, temporary stabilization measures must be compatible with public use and enjoyment of the beach.

(f) Efforts to permanently stabilize the location of the ocean shoreline with seawalls, groins, shoreline hardening, sand trapping or similar protection devices shall not be allowed except when the project meets one of the specific exceptions set out in 15A NCAC 7H .0308.

(g) The State of North Carolina will consider innovative institutional programs and scientific research that will provide for effective management of coastal shorelines. The development of innovative measures that will lessen or slow the effects of erosion while minimizing the adverse impacts on the public beach and on nearby properties is encouraged.

(h) The planning, development, and implementation of erosion control projects will be coordinated with appropriate planning agencies, affected governments and the interested public. Maximum efforts will be made by the state to accommodate the interest of each interested party consistent with the project's objectives. Local, state, and federal government activity in the coastal area should reflect an awareness of the natural dynamics of the ocean front. Government policies should not only address existing erosion problems but should aim toward minimizing future erosion problems. Actions required to deal with erosion problems are very expensive. In addition to the direct costs of erosion abatement measures, many other costs, such as maintenance of projects, disaster relief, and infrastructure repair will be borne by the public sector. Responses to the erosion should be designed to limit these public costs.

(i) The state will promote education of the public on the dynamic nature of the coastal zone and on effective measure to cope with our ever changing shorelines.



**ATTACHMENT B**

**STIPULATED FACTS**

1. The Petitioner in this case is the Town of North Topsail Beach (“Petitioner” or “Town”). The Town is represented by Town Attorney Brian Edes.
2. The site at issue in this case is located at the north end of North Topsail Beach, and includes the beach waterward of the first line of stable natural vegetation from just north of the Topsail Reef condominiums toward New River Inlet to the northernmost house on New River Inlet Road, which includes 39 parcels of land with 20 duplexes structures/40 residences on them (the “Site”). At the time these 20 structures were constructed, they were “second row” homes. The Site is depicted in the Project Narrative section of the stipulated exhibits, and in other exhibits, attached. The Town holds easements, which are attached as stipulated exhibits, on these oceanfront parcels in order to use the property for the purposes of implementing nourishment projects.
3. The Site is located within the Ocean Erodible, High-Hazard Flood and Inlet Hazard AECs.
4. The long-term average annual erosion rate at the Site is 2-feet per year. The Site is entirely within the Inlet Hazard AEC which uses the rate for the adjacent ocean hazard area per 15A NCAC 7H .0310(a)(1). Staff agrees that this Site has experienced accelerated erosion in the last 12-15 months.
5. According to the Town’s Project Engineer, Tom Jarrett, P.E. of Coastal Planning & Engineering (CP&E), one of the unique features of the area is the influence New River Inlet, or more specifically, the ebb tide delta of the inlet, has on sediment transport along the shoreline. This is demonstrated by the photo shown in Exhibit 15(an attached exhibit) in which incoming waves from the southeast are refracted around the ebb tide delta resulting in a change in sediment transport direction (as indicated by the arrows) just south of New River Inlet. The area in which the direction of sediment transport changes as a result of wave refraction is commonly referred to as a nodal zone. In general, the nodal zone is characterized by the net movement of material away from or out of the zone. While a nodal zone will generally always exist adjacent to a tidal inlet, the influence of the nodal zone on the shoreline of North Topsail Beach is enhanced due to the absence of significant shoal accumulations on the south side of the inlet. The absence of shoal material south of the inlet is one of the issues the channel relocation project was designed to address, i.e., the purpose of moving the channel was to encourage the reconfiguration of the inlet’s ebb tide delta through the redistribution of shoal material from the north side of the inlet to the south side. In support of this fact, Mr. Jarrett has provided portions of the Final Environmental Impact Statement for the North Topsail Beach Shoreline Protection Project which was prepared in December of 2009 (“FEIS”), a copy of which is attached as a stipulated exhibit.

### **History of the Site**

6. The north end of the Town has a history of erosion. More detailed information about the history of erosion and of nourishment can be found in Appendix B of the FEIS which is attached as a stipulated exhibit. A brief summary prepared by Mr. Jarrett regarding past nourishment projects between 2002 and 2011 (“Jarrett Erosion History Report”) is also attached as a stipulated exhibit.

7. According to the FEIS, the erosion of the shoreline south of New River Inlet has been a persistent problem since around 1984 when the bar channel of New River Inlet shifted its alignment toward Onslow Beach. Prior to 1984, the north end of North Topsail Beach was accreting at an average rate of 6.1 feet/year. Following the change in channel position and orientation, the north end began to erode at an average rate of 5.3 feet/year. Most of the accelerated erosion was attributed to the higher degree of exposure of the north end to wave energy. That is, prior to the channel shift, the south side of the ebb tide delta provided a breakwater effect with wave breaking relatively far offshore. With the loss of the south side delta, more wave energy was able to be transmitted directly to the shoreline. This, combined with the development of flood channels running close to and parallel to the north end, greatly increased sediment transport rates to the north.

8. Since 1993, and despite the use of sandbag structures in some places, 11 residential structures all of which were located seaward of the existing 20 structures at the Site were either removed or lost to erosion.

### **The Town’s Inlet Management Plan/FEIS**

9. Beginning in 2006, the Town hired CP&E to develop an Inlet Management Plan for the New River Inlet (“Inlet Management Plan”). This Inlet Management Plan was completed in December 2009 and memorialized in the FEIS publication. The entire Inlet Management Plan is covered by the Department of the Army permit SAW 2005-00344 dated May 16, 2001. CAMA Major Permit #79-10 was issued on July 21, 2010 authorizing Phase I of the Inlet Management Plan. A modification on October 12, 2012 authorized a change of the beach fill density, the amount of material to be removed from the ocean bar channel, and removed a previously permitted upland disposal site. This CAMA permit was further modified more recently on September 26, 2013 authorizing Phase 5 of the Inlet Management Plan to be developed during the 2014-15 dredging window, authorized an increase in beach fill densities, and allowed Phase 5 to take place before Phases 2-4 if necessary. Copies of this permit and its modifications are attached as stipulated exhibits.

10. Phase 1 of the Inlet Management Plan was completed in February 2013. It included the repositioning of the New River Inlet ocean bar channel to a more central location between the south end of Onslow Beach and the north end of North Topsail Beach. The material removed during the repositioning of the channel was used as beach fill along 7,730 feet of shoreline south of New River Inlet, as seen in the attached stipulated exhibits.

11. The Town's stated purpose for moving the ocean bar channel of New River Inlet, as stated in the FEIS, was for the purpose of inducing sand accumulation on the south side of the inlet's ebb tide delta. Based on the documented historic behavior of the inlet, the Town believed that moving the channel to a more central position with an alignment approximately perpendicular to the adjacent shorelines would result in accretion of the shoreline south of the inlet. The time required for the new channel to have a positive impact on the shoreline was estimated in the FEIS to be 3-4 years per a letter by Dr. William Cleary, a copy of which is attached.

12. According to Mr. Jarrett, the behavior of the shoreline on the north end of North Topsail Beach is tied to the position and alignment of the main bar channel of New River Inlet. Morphological studies of New River Inlet, reported in the FEIS, describe the relationship between the position and alignment of the channel and the response of the shorelines on both sides of the inlet. The FEIS also identified a position and alignment of the bar channel that would provide a beneficial impact on the north end shoreline. Based on the FEIS, the Town of North Topsail Beach elected to artificially move the channel to the preferred position and alignment indicated by the morphological studies.

13. The construction of Phase 1 moved the mean high water (MHW) shoreline an average of 272 feet seaward of the pre-project MHW shoreline in the area between Building #1 of Topsail Reef and the south shoulder of New River Inlet (baseline stations 1149+00 to 1160+00). Based on an August 2014 beach profile survey by Gahagan & Bryant, the MHW shoreline north of Topsail Reef had receded between 200 and 250 feet since completion of Phase 1, which is equivalent to rates of between 130 ft/yr. and 167 ft/yr. Visual inspections of the beach show it has continued to erode since the August 2014 survey and the MHW shoreline has returned to essentially its pre-project position. According to Mr. Jarrett, while the rate of loss of the fill placed during Phase 1 of the management plan has been higher than anticipated, the loss is comparable to losses experienced from previous fills created by the USACE through disposal of navigation maintenance material removed during maintenance of the AIWW and portions of the channel passing through Cedar Bush Cut from the AIWW to the inlet.

14. According to Mr. Jarrett in his Jarrett Erosion History Report, based on the documented history of shoreline changes along the north end of North Topsail Beach, he believes that the recent acceleration in the rate of shoreline change is not related to the channel relocation project. Instead, Mr. Jarrett believes that much of the accelerated erosion can be attributed to the unnatural shoreline configuration created by the beach fill, i.e., the conditions that were causing the north end to erode prior to relocating the channel, such as the absence of a significant shoal on the south side of the inlet and the presence of flood channels, still persist. Mr. Jarrett believes these conditions will continue to exist until such time the newly aligned channel effects the predicted changes in the ebb tide delta of New River Inlet. Until that time, waves will continue to impact the area in such a way as to cause accelerated sediment transport from the north end and into New River Inlet.

15. According to the “Year 2 Post-Construction Physical Monitoring Report” dated October 2014 and prepared by CP&E, a copy of which is attached as a stipulated exhibit (“Monitoring Report”), monitoring of the inlet has demonstrated some of the expected results are taking place with sand accumulating on the south side of the inlet. However, the rate of build-up, as predicted, has been relatively slow. As a result, the north end of North Topsail Beach has continued to experience high rates of erosion. As of August 2014, most of the fill placed north of the Topsail Reef Condominiums in February of 2013 has been lost, as shown in photographs attached as stipulated exhibits.

16. The FEIS stated the periodic maintenance of the ocean bar channel would be necessary at approximately 4-year intervals in order to keep the channel in its preferred position and alignment. Material removed to maintain the channel is to be used to provide periodic nourishment of the North Topsail Beach shoreline including the shoreline nourished during Phase 1.

17. The Corps permit allows maintenance of the channel to be accomplished once every four years providing one of two channel maintenance thresholds are met. One channel threshold is associated with shoaling of the channel and the second is based on the position and alignment of the channel. Following Phase 1’s completion in February 2013, the Town is not permitted to maintain the channel until at least the 2016/2017 environmental dredge window.

18. Based on site photographs, the final remnants of the artificial dune which was part of the Phase 1 project and was evident in August 7, 2014 photos attached, has completely eroded as shown in photos attached taken in late-September 2014.

19. In addition to the threat to the homes, flooding of the area has increased with flood waters spilling on to New River Inlet Road and side streets during times of high tide, at least four times in late-2014, as seen in photographs attached as stipulated facts.

20. As the shoreline continues to encroach closer to these residences, installation of emergency structures will likely become increasingly difficult for any work has to take place in the active surf zone. This could limit construction to times of low water along some sections of the project area.

### **CAMA Permit Process**

21. Beginning in the early summer of 2014, Town officials and their agents began to contact DCM Staff to inquire about possible options for protecting homes at the Site from erosion that was taking place following Phase 1. DCM issued a modification to permit 191-05 on August 14, 2014 authorizing sand from an upland source to be placed at the Site. This permit was originally issued on December 5, 2005 following Hurricane Ophelia and authorized for dune reconstruction at the Site. Various other options were discussed, including the use of sandbags and the use of geotubes. The work authorized by the modification of CAMA Major Permit #191-05 has not been undertaken.

22. On or about August 15, 2014, the Town, with help from its CP&E consultants Tom Jarret and Ken Wilson, submitted a CAMA Major Permit Application seeking to install approximately 1,450 linear feet of geotube (7.5' tall and 45' circumference tubes) at the Site. This permit application was deemed complete (except for the receipt of all of the easement agreements from the Town which were received later) by DCM on August 27, 2014, and was sent to the resource agencies for comment through the CAMA Major Permit process. Because the geotube proposed was inconsistent with the Commission's rules limiting the size of sandbags allowed as temporary erosion control, DCM Staff planned to deny this permit application on or soon after the public notice period ended on September 19, 2014. The Town was planning to seek a variance from this permit denial.

23. On September 18, 2014, DCM received a "modification" request to the initial geotube proposal, proposing to also place 35,000 to 50,000 cubic yards of sand in a "sand bench" to raise the elevation of the beach at the Site approximately 6' in elevation, and then place the geotube on top of the "sand bench". DCM determined that the significant changes and increased scope of this "modified" project were going to require a new CAMA permit application from the Town, including new notice of the modified project to the public and adjacent neighbors, and new review by the resource agencies.

24. Following discussions between the Town, its agents, DCM and other resource agencies, the Town submitted its "final design" sandbag proposal on September 26, 2014. This new CAMA Major Permit application was deemed complete by DCM on October 3, 2014, a copy of which is attached as a stipulated exhibit. Also, on October 2, 2014, DCM retired the Town's initial geotube project application, following receipt of this new CAMA Major Permit application for its "final design."

25. The final design proposes to install sandbags at the Site, from the existing larger sandbag revetment at Building #1 of Topsail Reef and extending north approximately 1,450 feet parallel to the existing shoreline. A 50-foot return wall would extend landward from the north end of the sand bag structure just north of the home located at 2378 New River Inlet Road. A plan view of the sand bag revetment and a typical cross-section view of proposed revetment are shown in the stipulated exhibits. The proposed borrow site for the sand needed to fill the proposed sandbags is an area approximately 5 acres on the point, just north of the Site, also called "the spit."

26. Topsail Reef was authorized by two variances of the Commission in July 2012 and October 2014, to construct a revetment similar to the larger size to that being proposed by the Town, just south of the Site.

27. The proposed sandbag revetment would follow an alignment roughly parallel to the seaward most support piles of the threatened residential structures with the landward toe of the revetment positioned as close as practical to the front support piles of the structures. In this regard, the authorized temporary erosion control structure would be located no more than 45 feet waterward of the waterward most pilings of those buildings controlling the alignment of the temporary erosion control structure from 2304 New River Inlet Rd. to the northern terminus of the temporary erosion control structure, namely those structures at: 2304 New River Inlet Rd., 2314 New River Inlet Rd., 2354 New River Inlet Rd., 2362 New River Inlet Rd., 2368 New River Inlet Rd., and 2378 New River Inlet Rd. No portion of the temporary erosion control structure between 2304 New River Road and the southern terminus of the temporary erosion control structure will be located more than 115 feet waterward of the waterward most piling of each building.

28. As part of the CAMA Major Permit Application process, adjacent neighbors and the public were given notice of the Town's final design CAMA permit application through publication in the Star News on October 8, 2014. DCM staff received only one comment—an objection from the adjacent riparian property owner Topsail Reef, which was later retracted.

29. Also as part of the CAMA Major Permit application process, the Town's application, Field Report, and other materials were sent to resource agencies for comment. Of those agencies who responded, the DCM Fisheries Specialist objected to the proposal due to concerns about surf zone habitat, though DCM did not deem this objection sufficient to support permit denial. Copies of the field report and the noted comments received by DCM are attached as stipulated exhibits.

30. On October 21, 2014 DCM staff conducted a site visit of the subject area and determined that "site conditions [had] deteriorated and emergency action is warranted". Consequently, the DENR Secretary authorized the issuance of an Emergency CAMA Major Permit, which allows DCM discretion to suspend of public notice, adjacent riparian notice, and the normal agency coordination process. In this case, once the emergency permit authority was activated for this site, earlier coordination with the federal agencies was halted.

31. On October 24, 2014, DCM issued CAMA Emergency Major Permit 92-14 to the Town, authorizing its final design, but conditioning this approval on compliance with the Commission's rules limiting the size of sandbag structures to a base width of 20' and a height of 6'.

32. The Town stipulates that its final design proposal is inconsistent with the Commission's rules limiting the size of sandbag structures.

33. On November 7, 2014, DCM received the Town's variance petition. The Town also sought to have the hearing in this matter heard in an expedited fashion, sooner than the Commission's scheduled December meeting. A copy of the petition, notice of the variance request to the adjacent riparian owners, and the documents related to the expedited hearing request are attached.

34. The tax value of the structures at the Site and their lots total about \$9 million as shown in the attached stipulated exhibits, and their loss from the tax base would reduce the annual tax revenue of the Town \$35,388 based on the proposed 2015 tax rate of \$0.3932 per \$100.

35. The proposed larger sand bag revetment is intended to protect the 20 threatened residential structures for at least the next 2.5 years or until such time the beach fill provided under Phase 1 of the North Topsail Beach shoreline/inlet management plan can be renourished. In addition, the Town of North Topsail Beach is committed to managing the north end shoreline by maintaining the preferred position and alignment of the New River Inlet ocean bar channel and using the material removed to maintain the channel to nourish the northern 7.25 miles of its ocean shoreline. Both the channel maintenance program and periodic nourishment are intended to maintain and/or preserve the dune and beach system in as near a natural state as possible.

36. On October 15, 2014, the Town's Board of Aldermen passed resolution 2014-13 which allowed for a special assessment to be imposed pursuant to NCGS 160A-238, in order to fund the larger sandbag structure proposed in this variance, with 50% of the total cost (which estimated at approximately \$2.3 million for the total project) to be paid by the 39 parcel-owners identified in the resolution based on oceanfront frontage. This assessment resolution was then the subject of a public hearing on November 6, 2014. On November 6, 2014, the Town passed resolution 2014-16 which confirmed the assessment, and Draft meeting minutes reflect the five public comments received. Copies of both resolutions and the Draft meeting minutes are attached as stipulated exhibits.

37. On November 14, 2014, the Town issued a Notice of Special Meeting scheduled for November 19, 2014 to receive recommendations on the selection of a contractor for this sandbag project.

37. The Town of North Topsail Beach is seeking a variance to conditions 1 and 2 of CAMA Major Permit #92-14. Specifically,

The Town is requesting a variance to condition 1 in that the Town proposes to construct a temporary erosion control structure with a base width of 45 feet and a height sufficient to achieve an elevation of +12.0 ft. NAVD.

The Town is requesting a variance to condition 2 in that the Town proposes that no portion of the authorized temporary erosion control structure shall be located more than 45 feet waterward of the waterward most pilings of those buildings controlling the alignment of the temporary erosion control structure from 2304 New River Inlet Rd. to the northern terminus of the temporary erosion control structure, namely those structures at: 2304 New River Inlet Rd., 2314 New River Inlet Rd., 2354 New River Inlet Rd., 2362 New River Inlet Rd., 2368 New River Inlet Rd., and 2378 New River Inlet Rd. No portion of the temporary erosion control structure between 2304 New River Road and the southern terminus of the temporary erosion control structure will be located more than 115 feet waterward of the waterward most piling of each building.

**Stipulated Exhibits:**

1. Easements from the oceanfront owners at the Site to the Town
2. Exhibit 15 photo
3. FEIS for Inlet Management Project- Table of Contents and Executive Summary only
4. Jarrett Erosion History Report, Jarrett affidavit and Jarrett Erosion Report
5. CAMA Major Permit 78-10 as amended
6. August 2014 Shoreline Survey Beach Profiles
7. Cleary Letter
8. October 2014 Monitoring Report
9. Sandbag “Final Design” CAMA Major Permit application including project narrative, updated design plan, DCM forms, riparian notice, AEC hazard notice, etc.
10. Fisheries objections
13. DCM Field Report
12. Emergency Permit email from DCM to Town dated October 21, 2014
13. CAMA Major Permit 92-14 with cover letter
14. Tax base information from town
15. Town resolution 2014-13
16. Town resolution 2014-16
17. Draft Town meeting minutes showing public comment on sandbag project
18. Notice of Town meeting on 11/19/14 to put sandbag project to bid
19. Various site photographs included in the powerpoint presentation



**Petitioner and Staff Positions**

**ATTACHMENT C**

- I. Will strict application of the applicable development rules, standards, or orders issued by the Commission cause the petitioner unnecessary hardships? If so, the petitioner must identify the hardships.**

**Petitioner's Position: Yes.**

Yes. The construction of Phase 1 of the North Topsail Beach Shoreline Management Plan in February 2013 moved the mean high water (MHW) shoreline an average of 272 feet seaward of the pre-project MHW shoreline in the area between Building #1 of Topsail Reef and the south shoulder of New River Inlet (baseline stations 1149+00 to 1160+00). Prior to 1984, the north end of North Topsail Beach was accreting at an average rate of 6.1 feet/year. Following the change in channel position and orientation, the north end began to erode at an average rate of 5.3 feet/year. Based on an August 2014 beach profile survey by Gahagan & Bryant, conducted in support of the sandbag permit application for the Topsail Reef HOA, the MHW shoreline north of Topsail Reef had receded between 200 and 250 feet which is equivalent to rates of between 130 ft/yr. and 167 ft/yr. This erosion rate is exponentially higher than the historical erosion rate for this area.

The area has continued to erode since the August 2014 survey with visual inspections of the area indicating all of the nourishment material has been lost and the MHW shoreline has returned to essentially its pre-project position.

The erosion of the Phase 1 fill north of Topsail Reef has positioned the mean high water shoreline well within 20 feet of the foundation of all of the 20 residential structures located between Topsail Reef and New River Inlet. Given the condition of the beach, the proximity of the 20 structures to the existing mean high water shoreline, and the documented rate of shoreline recession, all 20 of the residential structures satisfy the imminently threatened criteria as defined in 15 NCAC 07H.308 (a)(2)(B).

The tax value of these structures and their lots total roughly \$9 million and their loss from the tax base would reduce the annual tax revenue of North Topsail Beach based on the proposed 2015 tax rate of \$0.3932 per \$100. The loss of these 20 structures could have a secondary impact on the assessed value of other structures in the area.

In addition to the potential loss of the 20 residential structures, the deteriorated condition of the shoreline on the north end of town has resulted in frequent episodes of wave over washing the beach berm and flooding New River Inlet Road as well as side streets connecting to New River Inlet Road. Continued recession of the shoreline could eventually undermine New River Inlet Road and cutoff access to homes on the north end of town.

15A NCAC 7H.308 allows the installation of a sandbag revetment to provide temporary protection for structures that are imminently threatened. However, based on the past performance of permitted sandbag structures in this area, sandbag revetments allowed under 15A NCAC 7H.308 would not protect the 20 structures during the interim period between now and when the Town of North Topsail Beach can provide periodic nourishment in the area.

With regard to periodic nourishment, Phase 1 of the shoreline management project included a beach fill along 7,300 feet of the shoreline south of New River Inlet with the material for the beach fill obtained from the relocating of the main bar channel of the inlet to a preferred position and alignment. Material for periodic nourishment of the beach fill was to be obtained from dredging operations to maintain the preferred channel. Based on permit conditions, the Town of North Topsail Beach can only maintain the bar channel every 4 years. As a result, maintenance of the channel cannot be accomplished until the 2016-2017 dredging window.

While there may be other sources of beach fill material that could be used, none of the potential sources would provide the volume of material with the size characteristics needed to protect the area until the 2016-2017 dredging window. Also, the Town of North Topsail Beach is not in a financial position to undertake beach nourishment on the north end due to its ongoing efforts to provide erosion protection along the southern 3.85 miles of the Town's shoreline.

The intent of the channel relocation portion of the project was to induce shoreline accretion on the north end of North Topsail Beach through the reconfiguration the ebb tide delta of New River Inlet. The reconfiguration of the ebb tide delta would occur as the result of the eventual redistribution of the ebb tide delta material from the north side of the inlet to the south side. As discussed in the EIS for the project, reconfiguration of the ebb tide delta could take 5 years before the new channel began to have a positive impact on the shoreline with full recovery of the shoreline possibly taking up to 15 years.

The Town of North Topsail Beach believes the channel relocation portion of the project will eventually prove successful and does not want to abandon it without going through at least one channel maintenance cycle. Continuation of the existing shoreline/inlet management plan could be contingent on preserving the 20 threatened structures. In order to protect the threatened structures until the maintenance of the new channel is allowed, a more robust temporary structure is needed than the one allowed under 15A NCAC 7H.308. Accordingly, the Town has elected to install a super-sized sand bag structure, comparable to the one presently protecting Buildings #1 to #5 of Topsail Reef. The particulars of the proposed super-sized sand bag revetment are described in the permit application.

**Staff's Position: Yes**

Staff acknowledges that a strict application of the rules issued by the Commission will cause the Petitioner unnecessary hardships. Based on both DCM staff site observations and Petitioner's assertion, which is based on information from its engineering consultant CP&E/Tom Jarrett, there is accelerated erosion at the Site. Additionally, Petitioner asserts that while the recent nourishment project resulted in benefits immediately after the sand was placed in 2012, most of that sand has eroded away, as predicted but at a higher rate. Staff does not challenge this information, and acknowledges that based on that information, Petitioner faces unnecessary hardship due to erosion impacting the 20 structures within the Site. While Staff notes that generally 6' by 20' bags authorized by the Commission's rules are sufficient to be protective, in this area, this size may not be sufficient to protect these structures until the predicted channel alignment changes have occurred.

**II. Do such hardships result from conditions peculiar to the petitioner's property, such as location, size, or topography of the property? Explain.**

**Petitioner's Position: Yes.**

Yes. The behavior of the shoreline on the north end of North Topsail Beach is imminently tied to the position and alignment of the main bar channel of New River Inlet. Morphological studies of New River Inlet, reported in the project EIS, clearly demonstrated the relationship between the position and alignment of the channel and the response of the shorelines on both sides of the inlet. The studies also identified a position and alignment of the bar channel that would provide a beneficial impact on the north end shoreline. Based on these studies, the Town of North Topsail Beach elected to artificially move the channel to the preferred position and alignment indicated by the morphological studies. As previously stated, repositioning of the channel was completed in February 2013.

The major impacts of New River Inlet on the North Topsail Beach shoreline is limited to the first 3,000 feet of shoreline south of the inlet, which extends to approximately Building #5 of Topsail Reef. However, the influence of inlet processes on the shoreline extends almost a mile south of the inlet. When completed, the Phase 1 fill had moved the MHW shoreline in front of the eight buildings constituting Topsail Reef an average of 235 feet. As of August 2014, the increase in the width of the beach at MHW relative to the pre-Phase 1 fill varied from about 4 feet in front of Building #1 to around 75 feet at Building #8. The variable width of the shoreline fronting Topsail Reef is evident in the oblique aerial photo provided in Figure 1, which was obtained by Dr. William Cleary (UNCW, retired) on October 5, 2014.



**Figure 1. Oblique Aerial Photo provided by Dr. William Cleary.**

One of the unique features of the area is the influence New River Inlet, or more specifically, the ebb tide delta of the inlet, has on sediment transport along the shoreline. This is demonstrated by the photo shown in Figure 2 in which incoming waves from the southeast are refracted around the ebb tide delta resulting in a change in sediment transport direction (as indicated by the arrows) just south of New River Inlet. The area in which the direction of sediment transport changes as a result of wave refraction is commonly referred to as a nodal zone. In general, the nodal zone is characterized by the net movement of material away from or out of the zone. While a nodal zone will generally always exist adjacent to a tidal inlet, the influence of the nodal zone on the shoreline of North Topsail Beach is enhanced due to the absence of significant shoal accumulations on the south side of the inlet. The absence of shoal material south of the inlet is one of the issues the channel relocation project was designed to address, i.e., the purpose of moving the channel was to encourage the reconfiguration of the inlet's ebb tide delta through the redistribution of shoal material from the north side of the inlet to the south side. While monitoring of the inlet since the channel was moved seems to indicate some redistribution of material is occurring, the process will take years before it has a significant positive impact on the north end of North Topsail Beach.



**Figure 2. August 2002 Google Earth photo showing wave refraction patterns and direction of littoral sand transport just south of New River Inlet. Note: bulge in shoreline was due to disposal of navigation maintenance material removed from the AIWW by the USACE.**

At the time the project was being formulated, the State of North Carolina prohibited the use of terminal groins as a means to control shoreline behavior adjacent to tidal inlets. Even though the State has now adopted laws that allow for consideration of terminal groins, the Town of North Topsail Beach does not want to abandon the channel relocation project as a means to control erosion on the north end. Preservation of the 20 threatened residential structures is paramount to the Town's ability to maintain this approach. Should all 20 structures be destroyed and/or abandoned within the next 2.5 years, the Town will lose all of its incentives to continue to support this shoreline/inlet management strategy and may turn to alternative measures, including consideration of a terminal groin, as a means to respond to the north end erosion problem.

**Staff's Position: No.**

Staff disagrees that Petitioner's hardship is caused by conditions peculiar to the subject property. The Site is and has been located within the Inlet Hazard AEC for the New River Inlet since it was adopted, and is clearly influenced by inlet processes. The Commission's rules note that inlets are especially volatile and are known to regularly move causing both erosion and accretion. In this case, Phase 1 of the Town's channel realignment project moved the channel, and even the Town agrees that the subsequent erosion rates are typical of this inlet. While the rate of loss of the fill placed during Phase 1 of the management plan has apparently been higher than anticipated, the loss is comparable to losses experienced following previous USACE beach project involving the disposal of navigation maintenance material. It is therefore difficult for Staff to agree that merely being located near the New River Inlet and the flood channel fulfill the peculiarity criterion regarding "location, size, or topography of the property" and therefore Staff cannot agree that this constitutes a "condition peculiar to the petitioner's property" as required. Therefore, it is Staff's position that the hardships do not result from conditions that are peculiar to the Property.

**III. Do the hardships result from the actions taken by the Petitioner? Explain.**

**Petitioner's Position: No.**

No. The situation at the north end of North Topsail Beach is not related to any actions taken by the Town. Quite the contrary. The Town implemented Phase 1 of its shoreline/inlet management plan for the expressed purpose of alleviating some of the erosion stress impacting development along the entire north end of town. While there are continuing issues with the northern 2,000 feet, 5,300 feet of the beach fill provided during Phase 1 of the project continues to function as anticipated.

Since 1993 and in spite of the installation of emergency sand bag structures allowed under 15A NCAC 7H.308, eleven (11) residential structures that were located seaward of the existing 20 structures succumbed to erosion. Six of these 11 structures were lost between October 2008 and October 2009. Thus, the severe erosion on the north end pre-dated the Town's implementation of Phase 1. Had Phase 1 not been implemented, there is a strong likelihood many of the remaining 20 ocean front residential structures north of Topsail Reef would have had to be abandoned or demolished. Without the Phase 1 beach fill, there is little doubt all would have easily met the CRC's imminently threatened criteria.

The erosion of the shoreline south of New River Inlet has been a persistent problem since around 1984 when the bar channel of New River Inlet shifted its alignment toward Onslow Beach. Prior to 1984, the north end of North Topsail Beach was accreting at an average rate of 6.1 feet/year. Following the change in channel position and orientation, the north end began to erode at an average rate of 5.3 feet/year. Most of the accelerated erosion was attributed to the higher degree of

exposure of the north end to wave energy. That is, prior to the channel shift, the south side of the ebb tide delta provided a breakwater effect with wave breaking relatively far offshore. With the loss of the south side delta, more wave energy was able to be transmitted directly to the shoreline. This, combined with the development of flood channels running close to and parallel to the north end, greatly increased sediment transport rates to the north.

This change in the behavior of the shoreline ultimately resulted in the TOWN adopting channel realignment as a main feature of its overall shoreline and inlet management plan. While the rate of loss of the fill placed during Phase 1 of the management plan has been higher than anticipated, the loss is comparable to losses experienced from previous fills created by the USACE through disposal of navigation maintenance material removed during maintenance of the AIWW and portions of the channel passing through Cedar Bush Cut from the AIWW to the inlet. While the losses from the beach fill have been higher than anticipated, the condition of most of the shoreline included in the Phase 1 fill is still better, in terms of the beach width measured at MHW than it was prior to construction of Phase 1. The exception, as previously noted, lies in the area north of Topsail Reef. Much of the accelerated erosion can be attributed to the unnatural shoreline configuration created by the beach fill, i.e., the conditions that were causing the north end to erode prior to relocating the channel, such as the absence of a significant shoal on the south side of the inlet and the presence of flood channels, still persist. These conditions will continue to exist until such time the newly aligned channel effects the predicted changes in the ebb tide delta of New Rive Inlet. Until that time, waves will continue to impact the area in such a way as to cause accelerated sediment transport from the north end and into New River Inlet.

Based on the documented history of shoreline changes along the north end of North Topsail Beach, the recent acceleration in the rate of shoreline change is not related to the channel relocation project. Moreover, all structures on the project site were built in accordance with the erosion setbacks established by the CRS at the time of their construction and in fact were “second row” homes when constructed.

**Staff's Position: No.**

Staff agrees that the Petitioner has done nothing to accelerate the erosion affecting the Site and has taken significant steps to address the problem, including the development and implementation of its Inlet Management Plan, and therefore meets this statutory criterion.

**IV. Will the variance requested by the petitioner (1) be consistent with the spirit, purpose, and intent of the rules, standards or orders issued by the Commission; (2) secure the public safety and welfare; and (3) preserve substantial justice? Explain.**

**Petitioner's Position: Yes.**

**Yes.** The expressed objectives of the CRC rules are to provide management policies that eliminate unreasonable danger to life and property which achieve a balance between financial, safety, and social issues. The goals of the CRC management policies are to minimize losses to life and property due to storms and long term erosion as well as preserving the ecological conditions of the dune and beach system.

The proposed super-sized sand bag revetment is intended to protect the 20 threatened residential structures for at least the next 2.5 years or until such time the beach fill provided under Phase 1 of the North Topsail Beach shoreline/inlet management plan can be nourished. In addition, the Town of North Topsail Beach is committed to managing the north end shoreline by maintaining the preferred position and alignment of the New River Inlet ocean bar channel and using the material removed to maintain the channel to nourish the northern 7.25 miles of its ocean shoreline. Both the channel maintenance program and periodic nourishment are intended to maintain and/or preserve the dune and beach system in as near a natural state as possible.

Under existing conditions, there is a high probability all of the 20 threatened residential structures will be lost within the next 12 to 18 months either by virtue of the effects of long-term erosion or impacts of a moderate coastal storm. The loss of the 20 structures could result in the Town reconsidering its preferred shoreline/inlet management approach. Also, as the structures become more exposed, their eventual destruction could pose a serious threat to the safety of the public that uses the area for recreational purposes. This threat could come from floating debris, submerged and/or hidden piles, as well as other anthropogenic items remaining once the property is abandoned.

While the peril the 20 structures presently face is not the result of actions taken by the Town or by the individual property owners, the Town as well as the property owners should be afforded every opportunity to protect and preserve their interest as long as such actions do not prevent the public's right to access and use of the area as provided by both common-law and statutory public rights. In this



regard, the proposed super-sized sand bag structure is to be located as close to the seaward foundation of the threatened structures as practical. Once installed, the public could still pass seaward of the sand bag revetment during most tide conditions. Also, the sand bags would not pose any greater restriction on public access than the restrictions associated with abandoned structures sitting out on the beach.

**Staff's Position: Yes.**

Staff agrees that the variance would protect public safety and welfare and preserve substantial justice since it appears that despite the Town's best efforts to address the erosion issue through its nourishment and inlet relocation plan, smaller sandbags may not be sufficient to protect the 20 structures at the Site until the plan can be given sufficient time to be completed.

Staff agrees that the proposed placement of larger sandbags to protect the 20 structures at the Site is consistent with the spirit, purpose, and intent of the Commission's rules limiting the size of sandbags. The sandbag rules are, in effect, an exception to the General Assembly's and the Commission's ban on permanent erosion control structures. In its Shoreline Erosion Policies, the Commission has determined that "[T]emporary measures to counteract erosion, such as the use of sandbags . . . should be allowed, but only to the extent necessary to protect property for a short period of time until threatened structures may be relocated or until the effects of a short-term erosion event are reversed" through nourishment. "In all cases, temporary stabilization measures must be compatible with public use and enjoyment of the beach." 15A NCAC 7M .0202(e). By setting limitations on the placement, size and duration of sandbags, the Commission recognized that they are to be used in certain circumstances with well-defined criteria. In this case, Staff agrees with Petitioner's argument that at the Site, the "regular" sized bags may not be sufficient to protect those structures until the next nourishment cycle happens or the predicted results of Phase 1 have time to take place as hoped.

Staff does not disagree that the variance will secure public safety and welfare. Staff believes that due to the proximity of the structures to the ocean in combination with erosion experienced in this area, the public's access in front of these properties is already limited. Thus, increasing the waterward footprint of the sandbags proposed from what the Emergency Permit currently allows should not have significant additional impacts on the public's access to the beach.

Staff agrees with the Petitioner that the variance will preserve substantial justice because it will allow the Petitioner to protect structures at this Site while it implements its Inlet Management Plan.

# Attachment D:

Petitioner's Variance Request Materials  
(With the exception of (1) Petitioner's first draft of proposed facts and (2) any exhibits which were stipulated to and are now stipulated exhibits in Attachment E.)

**CAMA VARIANCE REQUEST FORM**

**DCM FORM 11**

**DCM FILE No.:** \_\_\_\_\_

PETITIONER'S NAME

**Town of North Topsail Beach**

COUNTY WHERE THE DEVELOPMENT IS PROPOSED **Onslow**

Pursuant to N.C.G.S. § 113A-120.1 and 15A N.C.A.C. 07J .0700 *et seq.*, the above named Petitioner hereby applies to the Coastal Resources Commission (CRC) for a variance.

**VARIANCE HEARING PROCEDURES**

A variance petition will be considered by the CRC at a regularly scheduled meeting, heard in chronological order based upon the date of receipt of a complete petition. 15A N.C.A.C. 07J .0701(e). A complete variance petition, as described below, must be *received* by the Division of Coastal Management (DCM) a minimum of six (6) weeks in advance of the first day of a regularly scheduled CRC meeting to be eligible for consideration by the CRC at that meeting. 15A N.C.A.C. 07J .0701(e). The final set of stipulated facts must be agreed to at least four (4) weeks prior to the first day of a regularly scheduled meeting. 15A N.C.A.C. 07J .0701(e). The dates of CRC meetings can be found at DCM's website: [www.nccoastalmanagement.net](http://www.nccoastalmanagement.net)

If there are controverted facts that are significant in determining the propriety of a variance, or if the Commission determines that more facts are necessary, the facts will be determined in an administrative hearing. 15A N.C.A.C. 07J .0701(b).

**VARIANCE CRITERIA**

The petitioner has the burden of convincing the CRC that it meets the following criteria:

- (a) Will strict application of the applicable development rules, standards, or orders issued by the Commission cause the petitioner unnecessary hardships? Explain the hardships.
- (b) Do such hardships result from conditions peculiar to the petitioner's property such as the location, size, or topography of the property? Explain.
- (c) Do the hardships result from actions taken by the petitioner? Explain.
- (d) Will the variance requested by the petitioner (1) be consistent with the spirit, purpose, and intent of the rules, standards or orders issued by the Commission; (2) secure the public safety and welfare; and (3) preserve substantial justice? Explain.

*Please make your written arguments that Petitioner meets these criteria on a separate piece of paper. The Commission notes that there are some opinions of the State Bar which indicate that non-attorneys may not represent others at quasi-judicial proceedings such as a variance hearing before the Commission.*

*These opinions note that the practice of professionals, such as engineers, surveyors or contractors, representing others in quasi-judicial proceedings through written or oral argument, may be considered the practice of law. Before you proceed with this variance request, you may wish to seek the advice of counsel before having a non-lawyer represent your interests through preparation of this Petition.*

**For this variance request to be complete, the petitioner must provide the information listed below. The undersigned petitioner verifies that this variance request is complete and includes:**

- \_\_\_\_\_ The name and location of the development as identified on the permit application;
- \_\_\_\_\_ A copy of the permit decision for the development in question;
- \_\_\_\_\_ A copy of the deed to the property on which the proposed development would be located;
- \_\_\_\_\_ A complete description of the proposed development including a site plan;
- \_\_\_\_\_ A stipulation that the proposed development is inconsistent with the rule at issue;
- \_\_\_\_\_ Proof that notice was sent to adjacent owners and objectors\*, as required by 15A N.C.A.C. 07J .0701(c)(7);
- \_\_\_\_\_ Proof that a variance was sought from the local government per 15A N.C.A.C. 07J .0701(a), if applicable;
- \_\_\_\_\_ Petitioner's written reasons and arguments about why the Petitioner meets the four variance criteria, listed above;
- \_\_\_\_\_ A draft set of proposed stipulated facts and stipulated exhibits. Please make these verifiable facts free from argument. Arguments or characterizations about the facts should be included in the written responses to the four variance criteria instead of being included in the facts.
- \_\_\_\_\_ This form completed, dated, and signed by the Petitioner or Petitioner's Attorney.

*\*Please contact DCM or the local permit officer for a full list of comments received on your permit application. Please note, for CAMA Major Permits, the complete permit file is kept in the DCM Morehead City Office.*

Due to the above information and pursuant to statute, the undersigned hereby requests a variance.



Signature of Petitioner or Attorney

November 7<sup>th</sup>, 2014

Date

Brian E. Edes, Town Attorney

Printed Name of Petitioner or Attorney

briane@cmclawfirm.com

Email address of Petitioner or Attorney

5002 Randall Parkway

Mailing Address

(910) 762-9711

Telephone Number of Petitioner or Attorney

Wilmington

City

NC

State

28403

Zip

(910) 256-0310

Fax Number of Petitioner or Attorney

### DELIVERY OF THIS HEARING REQUEST

This variance petition must be **received** by the Division of Coastal Management at least six (6) weeks before the first day of the regularly scheduled Commission meeting at which it is heard. A copy of this request must also be sent to the Attorney General's Office, Environmental Division, 15A N.C.A.C. 07J .0701(e).

#### Contact Information for DCM:

##### **By mail, express mail or hand delivery:**

Director  
Division of Coastal Management  
400 Commerce Avenue  
Morehead City, NC 28557

##### **By Fax:**

(252) 247-3330

##### **By Email:**

Check DCM website for the email  
address of the current DCM Director  
**[www.nccoastalmanagement.net](http://www.nccoastalmanagement.net)**

#### Contact Information for Attorney General's Office:

##### **By mail:**

Environmental Division  
9001 Mail Service Center  
Raleigh, NC 27699-9001

##### **By express mail:**

Environmental Division  
114 W. Edenton Street  
Raleigh, NC 27603

##### **By Fax:**

(919) 716-6767

## **Proof of Notice**

7012 3460 0003 6876 1144

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Return Receipt Fee (Endorsement Required)	\$2.70		Postmark Here
Restricted Delivery Fee (Endorsement Required)	\$0.00		
Total Postage & Fees	\$ 46.69		11/07/2014

Sent To Topsail Reef HOA  
 Street, Apt. No.,  
 or PO Box No. 2224 New River Inlet Rd  
 City, State, ZIP+4 North Topsail Beach, NC 28460

PS Form 3800, August 2006 See Reverse for Instructions

# Crossley McIntosh & Collier

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November 7, 2014

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Topsail Reef HOA  
2224 New River Inlet Road  
North Topsail Beach, NC 28460

Subject: Request for Variance to CAMA Major Permit #92-14  
Expansion of Sand Bag Revetment  
Town of Topsail Beach  
North Topsail Beach, Onslow County, North Carolina

Dear Topsail Reef HOA

The Town of North Topsail Beach is seeking a variance to conditions 1 and 2 of CAMA Major Permit #92-14.

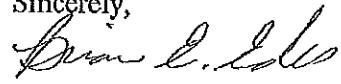
1. The Town is requesting a variance to condition 1 in that the Town proposes to construct a temporary erosion control structure with a base width of 45 feet and a height sufficient to achieve an elevation of +12.0 ft. NAVD.
2. The Town is requesting a variance to condition 2 in that the Town proposes that no portion of the authorized temporary erosion control structure shall be located more than 45 feet waterward of the waterward most pilings of those buildings controlling the alignment of the temporary erosion control structure from 2304 New River Inlet Rd. to the northern terminus of the temporary erosion control structure, namely those structures at: 2304 New River Inlet Rd., 2314 New River Inlet Rd., 2354 New River Inlet Rd., 2362 New River Inlet Rd., 2368 New River Inlet Rd., and 2378 New River Inlet Rd. No portion of the temporary erosion control structure between 2304 New River Road and the southern terminus of the temporary erosion control structure will be located more than 100 feet waterward of the waterward most piling of each building.

Please note also that pursuant to G.S. § 143-318.12(f), the Town is also requesting an expedited hearing on its variance request.

This letter is in response to 15A NCAC 07J .0701 99 (c)(7) which requires an applicant to notify adjoining property owners of the application for a variance.



Sincerely,

A handwritten signature in cursive script that reads "Brian E. Edes". The signature is written in black ink and is positioned directly below the word "Sincerely,".

Brian E. Edes  
Town Attorney, North Topsail Beach

7012 3460 0000 6878 1132  
ZETT 9899 E000 094E 2T02

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Sent To: George VAPP  
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PS Form 3800, August 2006 See Reverse for Instructions

# Crossley McIntosh & Collier

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November 7, 2014

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George & Dianne Vann  
2386 New River Inlet Road  
North Topsail Beach, NC 28460

Subject: Request for Variance to CAMA Major Permit #92-14  
Expansion of Sand Bag Revetment  
Town of Topsail Beach  
North Topsail Beach, Onslow County, North Carolina

Dear Mr. Vann

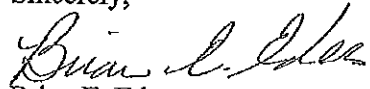
The Town of North Topsail Beach is seeking a variance to conditions 1 and 2 of CAMA Major Permit #92-14.

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Please note also that pursuant to G.S. § 143-318.12(f), the Town is also requesting an expedited hearing on its variance request.

This letter is in response to 15A NCAC 07J .0701 99 (c)(7) which requires an applicant to notify adjoining property owners of the application for a variance.

Sincerely,

A handwritten signature in cursive script, appearing to read "Brian E. Edes".

Brian E. Edes

Town Attorney, North Topsail Beach

## TOWN OF NORTH TOPSAIL BEACH VARIANCE APPLICATION

The Town of North Topsail Beach is seeking a variance to conditions 1 and 2 of CAMA Major Permit #92-14.

1. The Town is requesting a variance to condition 1 in that the Town proposes to construct a temporary erosion control structure with a base width of 45 feet and a height sufficient to achieve an elevation of +12.0 ft. NAVD.
2. The Town is requesting a variance to condition 2 in that the Town proposes that no portion of the authorized temporary erosion control structure shall be located more than 45 feet waterward of the waterward most pilings of those buildings controlling the alignment of the temporary erosion control structure from 2304 New River Inlet Rd. to the northern terminus of the temporary erosion control structure, namely those structures at: 2304 New River Inlet Rd., 2314 New River Inlet Rd., 2354 New River Inlet Rd., 2362 New River Inlet Rd., 2368 New River Inlet Rd., and 2378 New River Inlet Rd. No portion of the temporary erosion control structure between 2304 New River Road and the southern terminus of the temporary erosion control structure will be located more than 115 feet waterward of the waterward most piling of each building.

### Variance Criteria

*(a) Will strict application of the applicable development rules, standards, or orders issued by the Commission cause the petitioner unnecessary hardships? Explain the hardships.*

**Yes.** The construction of Phase 1 of the North Topsail Beach Shoreline Management Plan in February 2013 moved the mean high water (MHW) shoreline an average of 272 feet seaward of the pre-project MHW shoreline in the area between Building #1 of Topsail Reef and the south shoulder of New River Inlet (baseline stations 1149+00 to 1160+00). Prior to 1984, the north end of North Topsail Beach was accreting at an average rate of 6.1 feet/year. Following the change in channel position and orientation, the north end began to erode at an average rate of 5.3 feet/year. Based on an August 2014 beach profile survey by Gahagan & Bryant, conducted in support of the sandbag permit application for the Topsail Reef HOA, the MHW shoreline north of Topsail Reef had receded between 200 and 250 feet which is equivalent to rates of between 130 ft/yr. and 167 ft/yr. This erosion rate is exponentially higher than the historical erosion rate for this area.

The area has continued to erode since the August 2014 survey with visual inspections of the area indicating all of the nourishment material has been lost and the MHW shoreline has returned to essentially its pre-project position.

The erosion of the Phase 1 fill north of Topsail Reef has positioned the mean high water shoreline well within 20 feet of the foundation of all of the 20 residential structures located between Topsail Reef and New River Inlet. Given the condition of the beach, the proximity of the 20 structures to the existing mean high water shoreline, and the documented rate of shoreline recession, all 20 of the residential structures satisfy the imminently threatened criteria as defined in 15 NCAC 07H.308 (a)(2)(B).

The tax value of these structures and their lots total roughly \$9 million and their loss from the tax base would reduce the annual tax revenue of North Topsail Beach based on the proposed 2015 tax rate of \$0.3932 per \$100. The loss of these 20 structures could have a secondary impact on the assessed value of other structures in the area.

In addition to the potential loss of the 20 residential structures, the deteriorated condition of the shoreline on the north end of town has resulted in frequent episodes of wave over washing the beach berm and flooding New River Inlet Road as well as side streets connecting to New River Inlet Road. Continued recession of the shoreline could eventually undermine New River Inlet Road and cutoff access to homes on the north end of town.

15A NCAC 7H.308 allows the installation of a sandbag revetment to provide temporary protection for structures that are imminently threatened. However, based on the past performance of permitted sandbag structures in this area, sandbag revetments allowed under 15A NCAC 7H.308 would not protect the 20 structures during the interim period between now and when the Town of North Topsail Beach can provide periodic nourishment in the area.

With regard to periodic nourishment, Phase 1 of the shoreline management project included a beach fill along 7,300 feet of the shoreline south of New River Inlet with the material for the beach fill obtained from the relocating of the main bar channel of the inlet to a preferred position and alignment. Material for periodic nourishment of the beach fill was to be obtained from dredging operations to maintain the preferred channel. Based on permit conditions, the Town of North Topsail Beach can only maintain the bar channel every 4 years. As a result, maintenance of the channel cannot be accomplished until the 2016-2017 dredging window.

While there may be other sources of beach fill material that could be used, none of the potential sources would provide the volume of material with the size characteristics needed to protect the area until the 2016-2017 dredging window. Also, the Town of North Topsail Beach is not in a financial position to undertake beach nourishment on the north end due to its ongoing efforts to provide erosion protection along the southern 3.85 miles of the Town's shoreline.

The intent of the channel relocation portion of the project was to induce shoreline accretion on the north end of North Topsail Beach through the reconfiguration the ebb tide delta of New River Inlet. The reconfiguration of the ebb tide delta would occur as the result of the eventual redistribution of the ebb tide delta material from the north side of the inlet to the south side. As discussed in the EIS for the project, reconfiguration of the ebb tide delta could take 5 years before the new channel began to have a positive impact on the shoreline with full recovery of the shoreline possibly taking up to 15 years.

The Town of North Topsail Beach believes the channel relocation portion of the project will eventually prove successful and does not want to abandon it without going through at least one channel maintenance cycle. Continuation of the existing shoreline/inlet management plan could be contingent on preserving the 20 threatened structures. In order to protect the threatened structures until the maintenance of the new channel is allowed, a more robust temporary structure is needed than the one allowed under 15A NCAC 7H.308. Accordingly, the Town has elected to install a super-sized sand bag structure, comparable to the one presently protecting

Buildings #1 to #5 of Topsail Reef. The particulars of the proposed super-sized sand bag revetment are described in the permit application.

***(b) Do such hardships result from conditions peculiar to the petitioner's property such as the location, size, or topography of the property? Explain.***

**Yes.** The behavior of the shoreline on the north end of North Topsail Beach is imminently tied to the position and alignment of the main bar channel of New River Inlet. Morphological studies of New River Inlet, reported in the project EIS, clearly demonstrated the relationship between the position and alignment of the channel and the response of the shorelines on both sides of the inlet. The studies also identified a position and alignment of the bar channel that would provide a beneficial impact on the north end shoreline. Based on these studies, the Town of North Topsail Beach elected to artificially move the channel to the preferred position and alignment indicated by the morphological studies. As previously stated, repositioning of the channel was completed in February 2013.

The major impacts of New River Inlet on the North Topsail Beach shoreline is limited to the first 3,000 feet of shoreline south of the inlet, which extends to approximately Building #5 of Topsail Reef. However, the influence of inlet processes on the shoreline extends almost a mile south of the inlet. When completed, the Phase 1 fill had moved the MHW shoreline in front of the eight buildings constituting Topsail Reef an average of 235 feet. As of August 2014, the increase in the width of the beach at MHW relative to the pre-Phase 1 fill varied from about 4 feet in front of Building #1 to around 75 feet at Building #8. The variable width of the shoreline fronting Topsail Reef is evident in the oblique aerial photo provided in Figure 1, which was obtained by Dr. William Cleary (UNCW, retired) on October 5, 2014.



Figure 1. Oblique Aerial Photo provided by Dr. William Cleary.

One of the unique features of the area is the influence New River Inlet, or more specifically, the ebb tide delta of the inlet, has on sediment transport along the shoreline. This is demonstrated by the photo shown in Figure 2 in which incoming waves from the southeast are refracted around the ebb tide delta resulting in a change in sediment transport direction (as indicated by the arrows) just south of New River Inlet. The area in which the direction of sediment transport changes as a result of wave refraction is commonly referred to as a nodal zone. In general, the nodal zone is characterized by the net movement of material away from or out of the zone. While a nodal zone will generally always exist adjacent to a tidal inlet, the influence of the nodal zone on the shoreline of North Topsail Beach is enhanced due to the absence of significant shoal accumulations on the south side of the inlet. The absence of shoal material south of the inlet is one of the issues the channel relocation project was designed to address, i.e., the purpose of moving the channel was to encourage the reconfiguration of the inlet's ebb tide delta through the redistribution of shoal material from the north side of the inlet to the south side. While monitoring of the inlet since the channel was moved seems to indicate some redistribution of material is occurring, the process will take years before it has a significant positive impact on the north end of North Topsail Beach.



**Figure 2. August 2002 Google Earth photo showing wave refraction patterns and direction of littoral sand transport just south of New River Inlet. Note: bulge in shoreline was due to disposal of navigation maintenance material removed from the AIWW by the USACE.**



At the time the project was being formulated, the State of North Carolina prohibited the use of terminal groins as a means to control shoreline behavior adjacent to tidal inlets. Even though the State has now adopted laws that allow for consideration of terminal groins, the Town of North Topsail Beach does not want to abandon the channel relocation project as a means to control erosion on the north end. Preservation of the 20 threatened residential structures is paramount to the Town's ability to maintain this approach. Should all 20 structures be destroyed and/or abandoned within the next 2.5 years, the Town will lose all of its incentives to continue to support this shoreline/inlet management strategy and may turn to alternative measures, including consideration of a terminal groin, as a means to respond to the north end erosion problem.

*(c) Do the hardships result from actions taken by the petitioner? Explain.*

**No.** The situation at the north end of North Topsail Beach is not related to any actions taken by the Town. Quite the contrary. The Town implement Phase 1 of its shoreline/inlet management plan for the expressed purpose of alleviating some of the erosion stress impacting development along the entire north end of town. While there are continuing issues with the northern 2,000 feet, 5,300 feet of the beach fill provided during Phase 1 of the project continues to function as anticipated.

Since 1993 and in spite of the installation of emergency sand bag structures allowed under 15A NCAC 7H.308, eleven (11) residential structures that were located seaward of the existing 20 structures succumbed to erosion. Six of these 11 structures were lost between October 2008 and October 2009. Thus, the severe erosion on the north end pre-dated the Town's implementation of Phase 1. Had Phase 1 not been implement, there is a strong likelihood many of the remaining 20 ocean front residential structures north of Topsail Reef would have had to be abandoned or demolished. Without the Phase 1 beach fill, there is little doubt all would have easily met the CRC's imminently threatened criteria.

The erosion of the shoreline south of New River Inlet has been a persistent problem since around 1984 when the bar channel of New River Inlet shifted its alignment toward Onslow Beach. Prior to 1984, the north end of North Topsail Beach was accreting at an average rate of 6.1 feet/year. Following the change in channel position and orientation, the north end began to erode at an average rate of 5.3 feet/year. Most of the accelerated erosion was attributed to the higher degree of exposure of the north end to wave energy. That is, prior to the channel shift, the south side of the ebb tide delta provided a breakwater effect with wave breaking relatively far offshore. With the loss of the south side delta, more wave energy was able to be transmitted directly to the shoreline. This, combined with the development of flood channels running close to and parallel to the north end, greatly increased sediment transport rates to the north.

This change in the behavior of the shoreline ultimately resulted in the TOWN adopting channel realignment as a main feature of its overall shoreline and inlet management plan. While the rate of loss of the fill placed during Phase 1 of the management plan has been higher than anticipated, the loss is comparable to losses experienced from previous fills created by the USACE through

disposal of navigation maintenance material removed during maintenance of the AIWW and portions of the channel passing through Cedar Bush Cut from the AIWW to the inlet. While the losses from the beach fill have been higher than anticipated, the condition of most of the shoreline included in the Phase 1 fill is still better, in terms of the beach width measured at MHW than it was prior to construction of Phase 1. The exception, as previously noted, lies in the area north of Topsail Reef. Much of the accelerated erosion can be attributed to the unnatural shoreline configuration created by the beach fill, i.e., the conditions that were causing the north end to erode prior to relocating the channel, such as the absence of a significant shoal on the south side of the inlet and the presence of flood channels, still persist. These conditions will continue to exist until such time the newly aligned channel effects the predicted changes in the ebb tide delta of New Rive Inlet. Until that time, waves will continue to impact the area in such a way as to cause accelerated sediment transport from the north end and into New River Inlet.

Based on the documented history of shoreline changes along the north end of North Topsail Beach, the recent acceleration in the rate of shoreline change is not related to the channel relocation project. Moreover, all structures on the project site were built in accordance with the erosion setbacks established by the CRS at the time of their construction and in fact were “second row” homes when constructed.

***(d) Will the variance requested by the petitioner (1) be consistent with the spirit, purpose, and intent of the rules, standards or orders issued by the Commission; (2) secure the public safety and welfare; and (3) preserve substantial justice? Explain.***

**Yes.** The expressed objectives of the CRC rules are to provide management policies that eliminate unreasonable danger to life and property which achieve a balance between financial, safety, and social issues. The goals of the CRC management policies are to minimize losses to life and property due to storms and long term erosion as well as preserving the ecological conditions of the dune and beach system.

The proposed super-sized sand bag revetment is intended to protect the 20 threatened residential structures for at least the next 2.5 years or until such time the beach fill provided under Phase 1 of the North Topsail Beach shoreline/inlet management plan can be nourished. In addition, the Town of North Topsail Beach is committed to managing the north end shoreline by maintaining the preferred position and alignment of the New River Inlet ocean bar channel and using the material removed to maintain the channel to nourish the northern 7.25 miles of its ocean shoreline. Both the channel maintenance program and periodic nourishment are intended to maintain and/or preserve the dune and beach system in as near a natural state as possible.

Under existing conditions, there is a high probability all of the 20 threatened residential structures will be lost within the next 12 to 18 months either by virtue of the effects of long-term erosion or impacts of a moderate coastal storm. The loss of the 20 structures could result in the Town reconsidering its preferred shoreline/inlet management approach. Also, as the structures become more exposed, their eventual destruction could pose a serious threat to the safety of the public that uses the area for recreational purposes. This threat could come from floating debris, submerged and/or hidden piles, as well as other anthropogenic items remaining once the property is abandoned.

While the peril the 20 structures presently face is not the result of actions taken by the Town or by the individual property owners, the Town as well as the property owners should be afforded every opportunity to protect and preserve their interest as long as such actions do not prevent the public's right to access and use of the area as provided by both common-law and statutory public rights. In this regard, the proposed super-sized sand bag structure is to be located as close to the seaward foundation of the threatened structures as practical. Once installed, the public could still pass seaward of the sand bag revetment during most tide conditions. Also, the sand bags would not pose any greater restriction on public access than the restrictions associated with abandoned structures sitting out on the beach.

### **Request for Expedited Hearing**

Pursuant to G.S. § 143-318.12(f), Petitioner respectfully requests that the Coastal Resources Commission call an expedited meeting, to be held either in person or by telephone, as quickly as possible. The Petitioner believes that the unexpected and uncontrollable conditions described herein have left the structures and infrastructure dangerously exposed, and this dangerous condition cannot be left unattended awaiting the next Commission meeting. These circumstances are generally unexpected and require the immediate attention of the Commission.

**EXHIBIT 1: Pre-Nourishment – November 2012. The eight buildings in the upper left of the photo are the Topsail Reef Condominiums.**



727.520.8181  
www.aerophoto.com

**New River Inlet Realignment  
with Beach Renourishment**

Image # 121120 0010  
Date 11.20.12

**EXHIBIT 2: Post-Nourishment – February 2013**



727.520.8181  
www.aerophoto.com

**New River Inlet Realignment  
with Beach Renourishment**

Image # 130220 0009  
Date 02.20.13

**EXHIBIT 3: View looking north of Topsail Reef Building #1 – August 7, 2014. Arrow identifies house shown in Photo No. 4.**



EXHIBIT 3a: Condition as of September 14, 2014



**EXHIBIT 4: House north of Topsail Reef Building #1. View looking north toward New River Inlet. – August 7, 2014.**





**EXHIBIT 5: View looking south toward Topsail Reef Building #1 – August 7, 2014.**



**EXHIBIT 6: Flooding on north end of North Topsail Beach – August 5, 2014.**



**EXHIBIT 7: Example of failed sandbag revetment on north end of North Topsail Beach. Photo taken in September 2005. All of these sandbags and structures, which were located seaward of the present row of homes north of Topsail Reef, have been removed.**



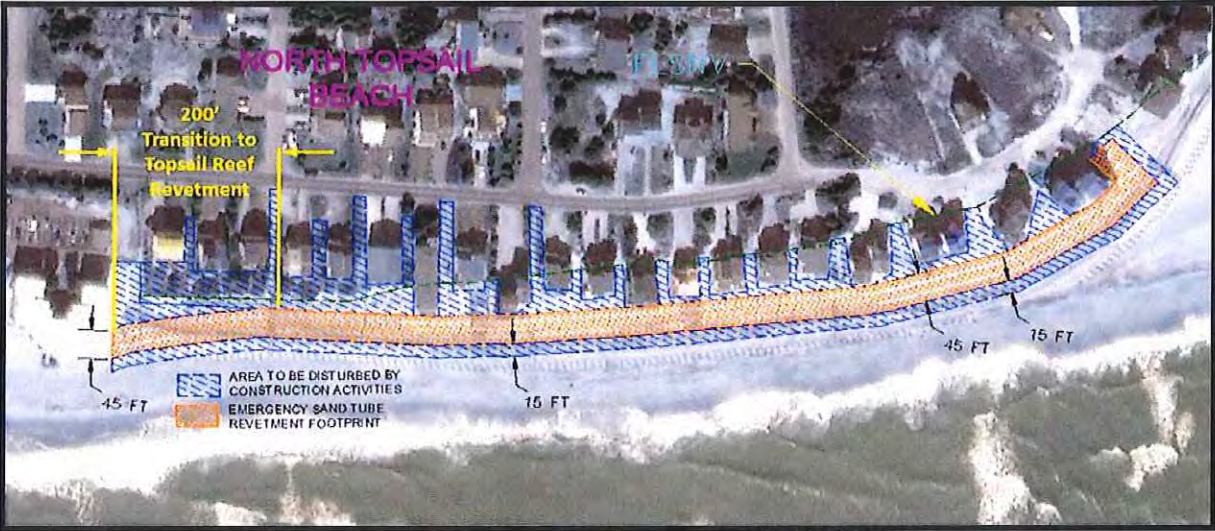
**EXHIBIT 8: Sandbags revetment at Topsail Reefs Building 1 (Sep 2014).**



**EXHIBIT 9: Plan views of proposed revetment**



**Figure A: Plan view of sand bag revetment**



**Figure B: Plan view of sand bag revetment footprint, proposed area to be disturbed, transition to topsail reef revetment and location of the first line of stable natural vegetation (flsnv).**

EXHIBIT 10: Cross-Section of Proposed Revetment

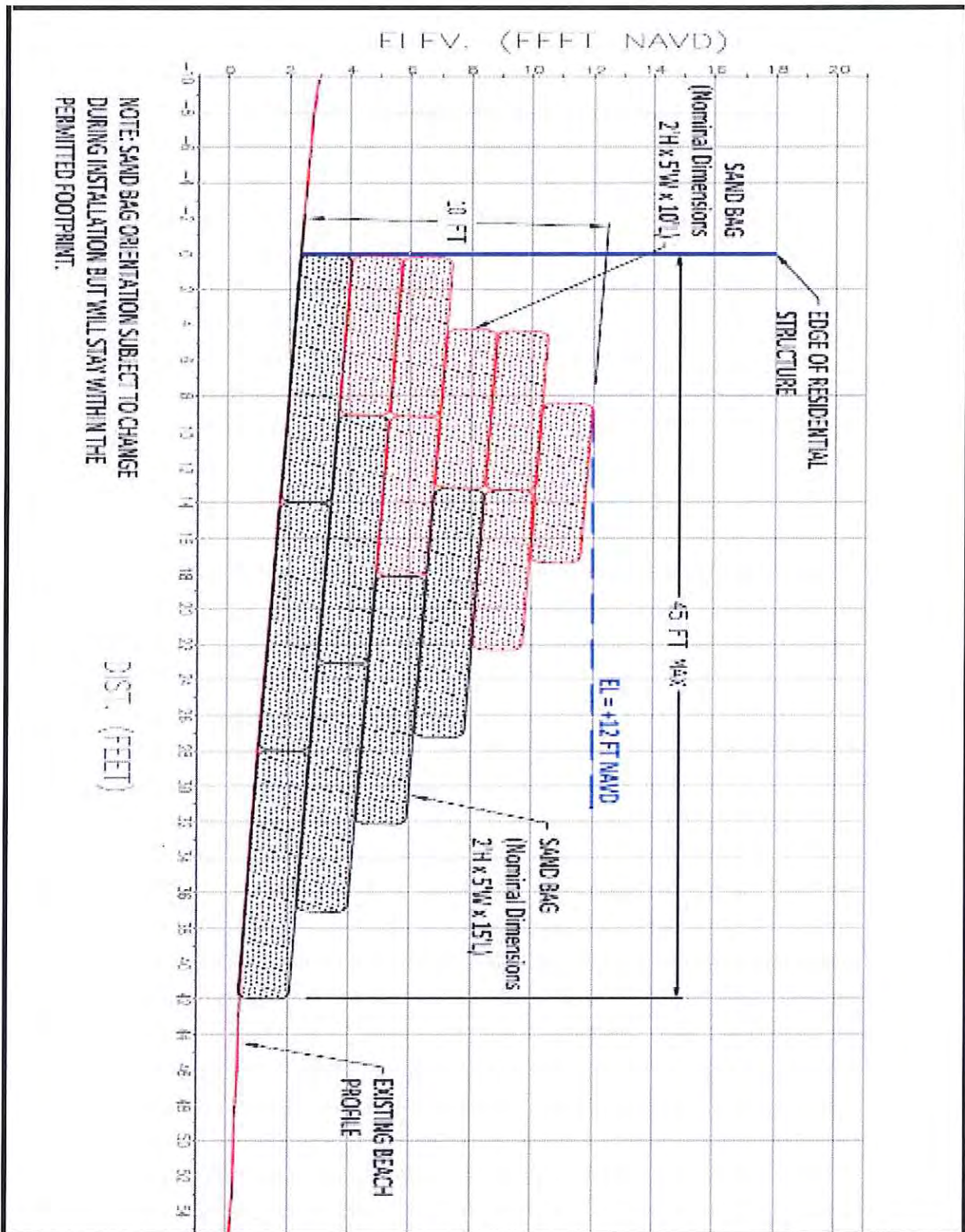


EXHIBIT 11: Schematic of tie-in to Existing Topsail Reef Revetment



EXHIBIT 14: Oblique Aerial Photo provided by Dr. William Cleary.





**EXHIBIT 15: August 2002 Google Earth photo showing wave refraction patterns and direction of littoral sand transport just south of New River Inlet. Note: bulge in shoreline was due to disposal of navigation maintenance material removed from the AIWW by the USACE.**



**EXHIBIT 16: Baseline Stations**



DATE: 04/03/13  
BY: HANSEN  
DRAWN: 146705

**COASTAL PLANNING & ENGINEERING OF NORTH CAROLINA, INC.**  
4030 MASONIC LOOP ROAD  
WILMINGTON, NC 28409  
PH: (910) 781-4434  
FAX: (910) 781-1129

**TITLE:**  
NORTH TOPSAIL BEACH, NORTH CAROLINA  
NEW RIVER INLET CHANNEL REALIGNMENT AND BEACH RESTORATION  
USACE BASELINE STATIONS

EXHIBIT 17: Station 1150+00 showing post-construction profile (May 2012) and April 2014 profile.

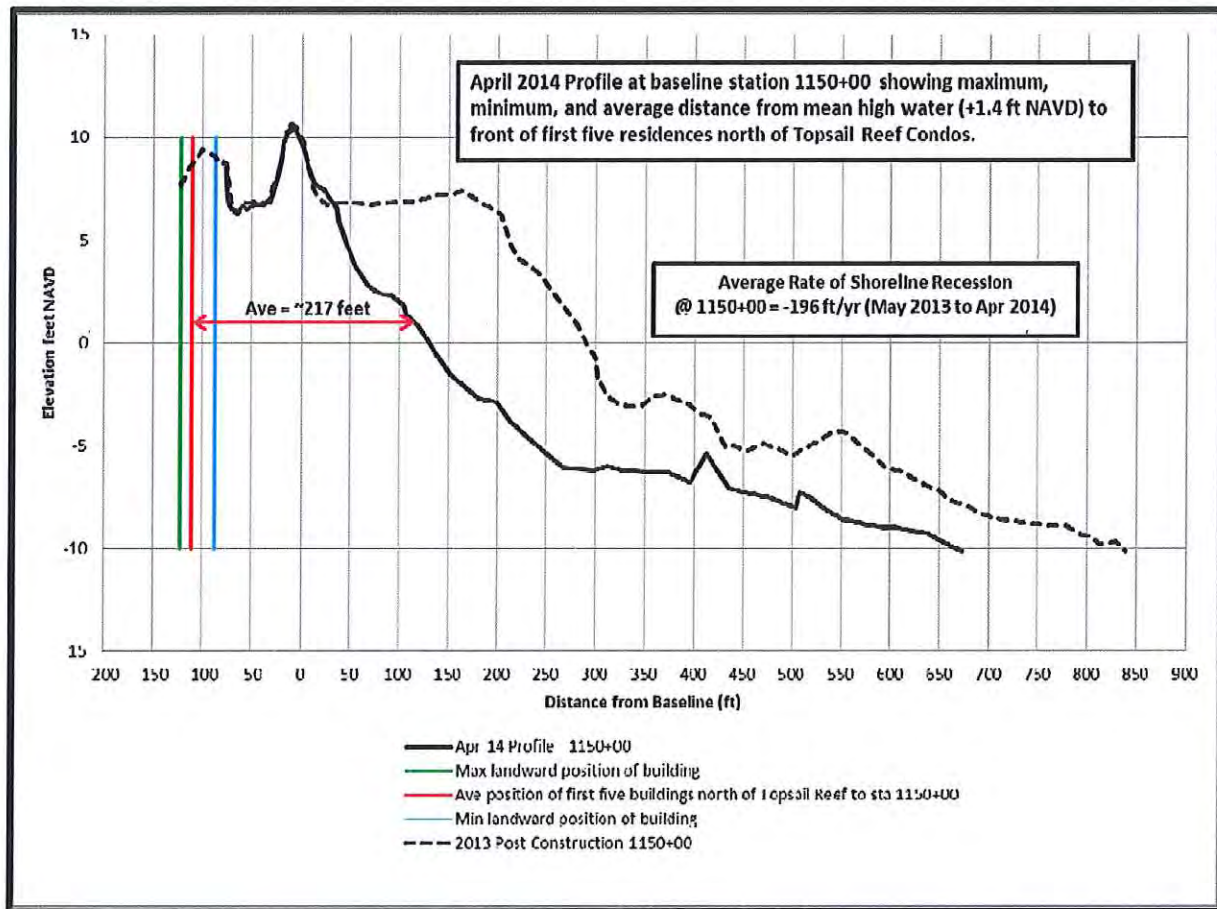
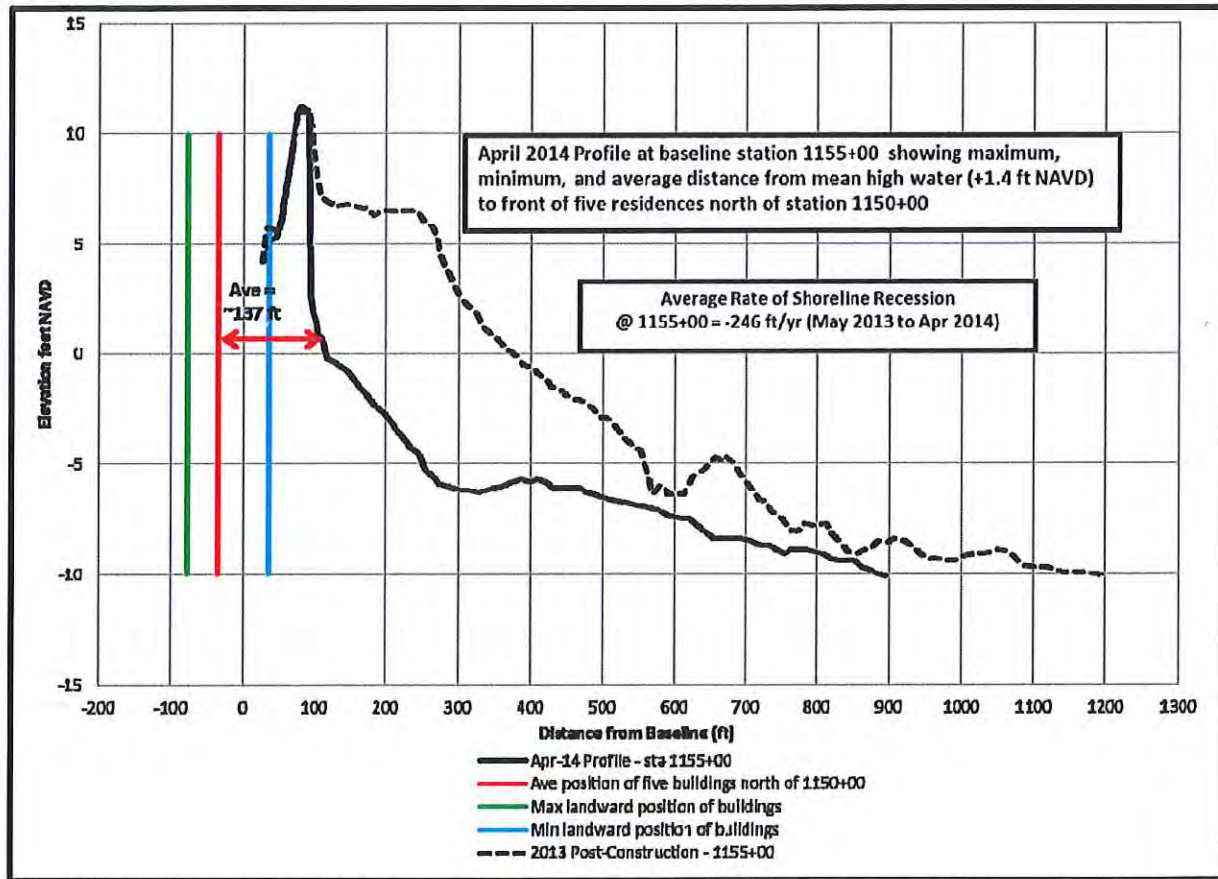


EXHIBIT 18: Station 1155+00 showing post-construction profile (May 2012) and April 2014 profile.



**EXHIBIT 19**



**EXHIBIT 20:**



**EXHIBIT 21:**



EXHIBIT 22:





EXHIBIT 24:

**Statement by Tom Jarrett, P.E., NC License No. 005545**  
**Subject: Erosion of the north end of North Topsail Beach**

The Town of North Topsail Beach completed Phase 1 of its multifaceted inlet and shoreline management plan in February 2013 with the repositioning of the New River Inlet ocean bar channel to a more central location between the south end of Onslow Beach and the north end of North Topsail Beach. The location of the new channel and the area nourished by with the material removed to relocate the channel is provided on Figure 1. The conditions of the north end of North Topsail Beach before and after the construction of Phase 1 are shown on Figures 2 and 3, respectively.



**Figure 1. Plan view of Phase 1 of the North Topsail Beach Shoreline and Inlet Management Plan.**



Figure 2. North end of North Topsail Beach prior to the construction of Phase 1.



Figure 3. North end of North Topsail Beach after completion of Phase 1.

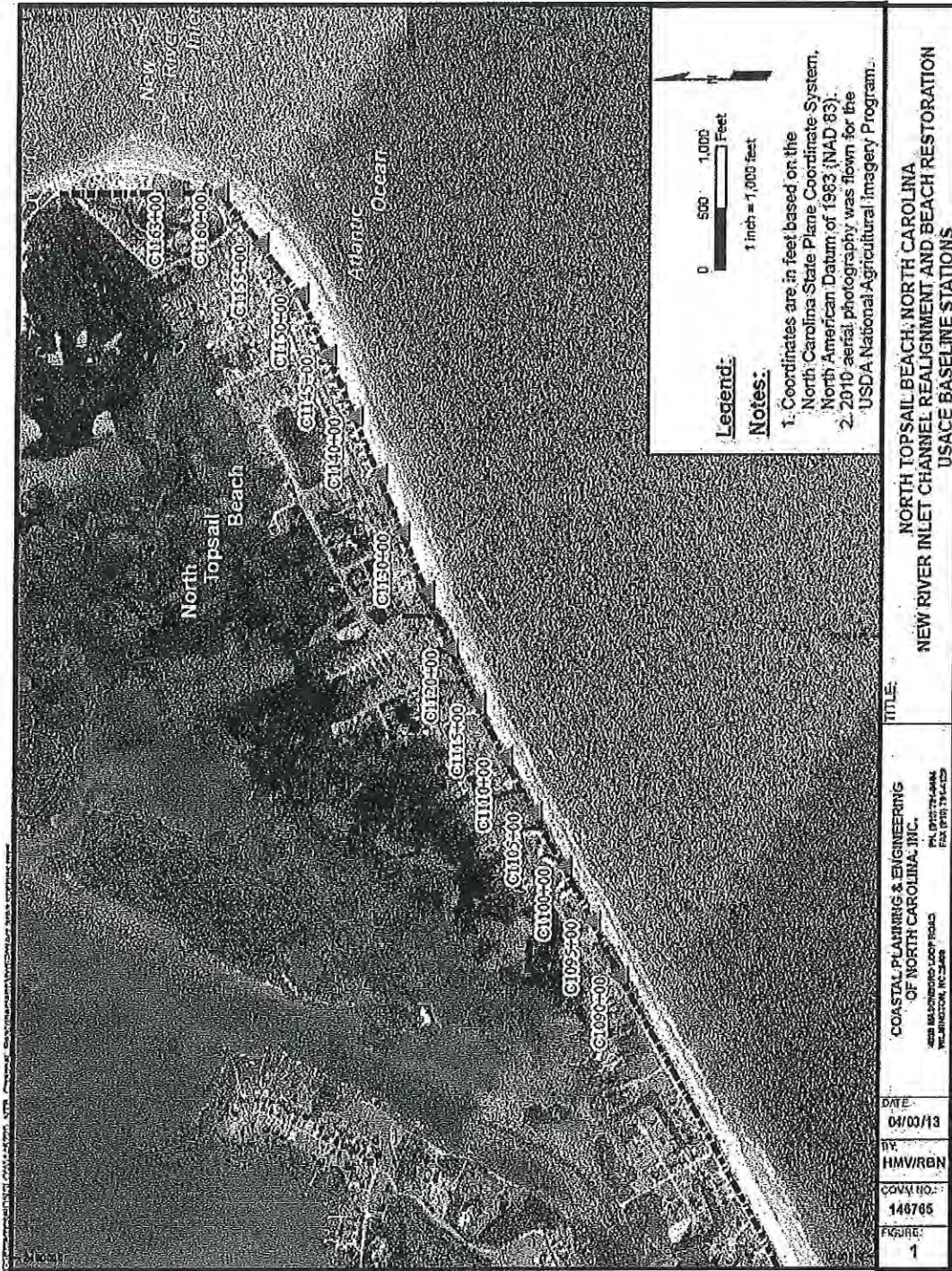


Figure 4. Baseline stationing.

The material removed during repositioning of the channel was used to construct a beach fill along 7,730 feet of shoreline south of New River Inlet. The construction of Phase 1 moved the mean high water (MHW) shoreline an average of 272 feet seaward of the pre-project MHW shoreline in the area between Building #1 of Topsail Reef (approximately baseline station 1149+00) and the south shoulder of New River Inlet (baseline station 1160+00). The locations of baseline stations along the north end of North Topsail Beach are provided on Figure 4 with plots of the beach cross-sections taken between baseline stations 1149+00 and 1155+00 before and after the construction of the beach fill provided on Figures 5 to 11. Also shown on Figures 5 to 11 are the results of a beach profile survey conducted by the engineering firm of Gahagan & Bryant in August 2014 for the Topsail Reef HOA.

Comparison of the post-construction survey taken in February 2013 and the August 2014 survey by Gahagan & Bryant, the shoreline north of Topsail Reef has receded between 200 and 250 feet which is equivalent to shoreline recession rates of between 130 ft./yr. and 167 ft./yr.

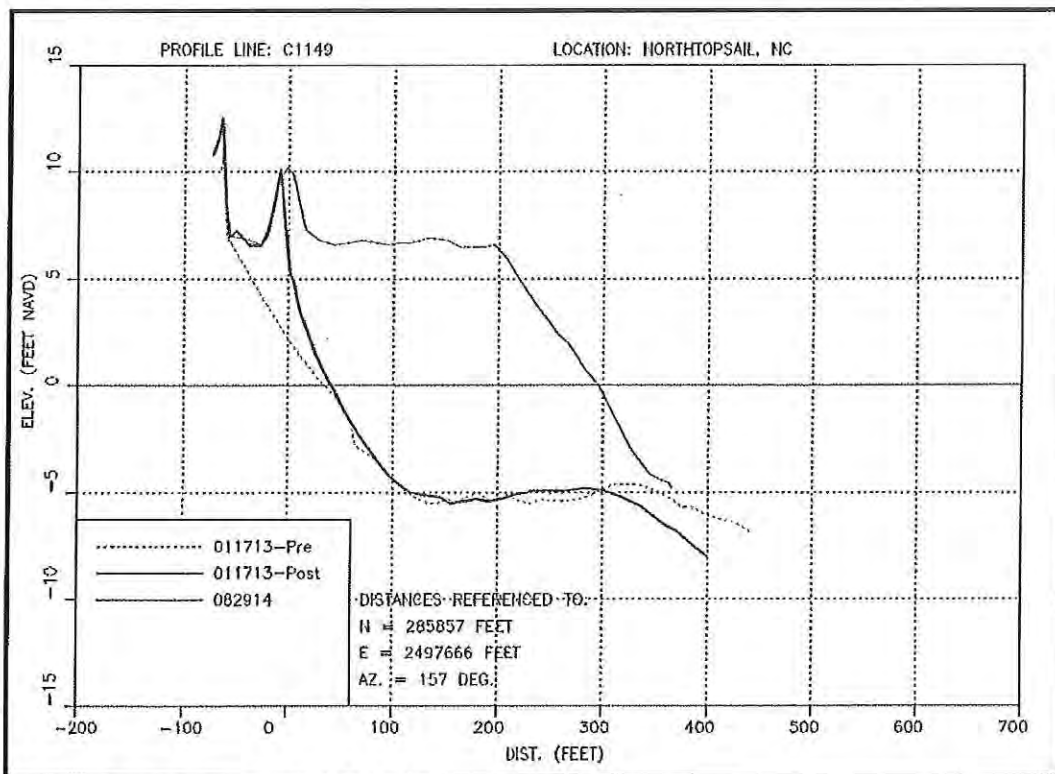


Figure 5. Cross-section plots profile 1149+00.

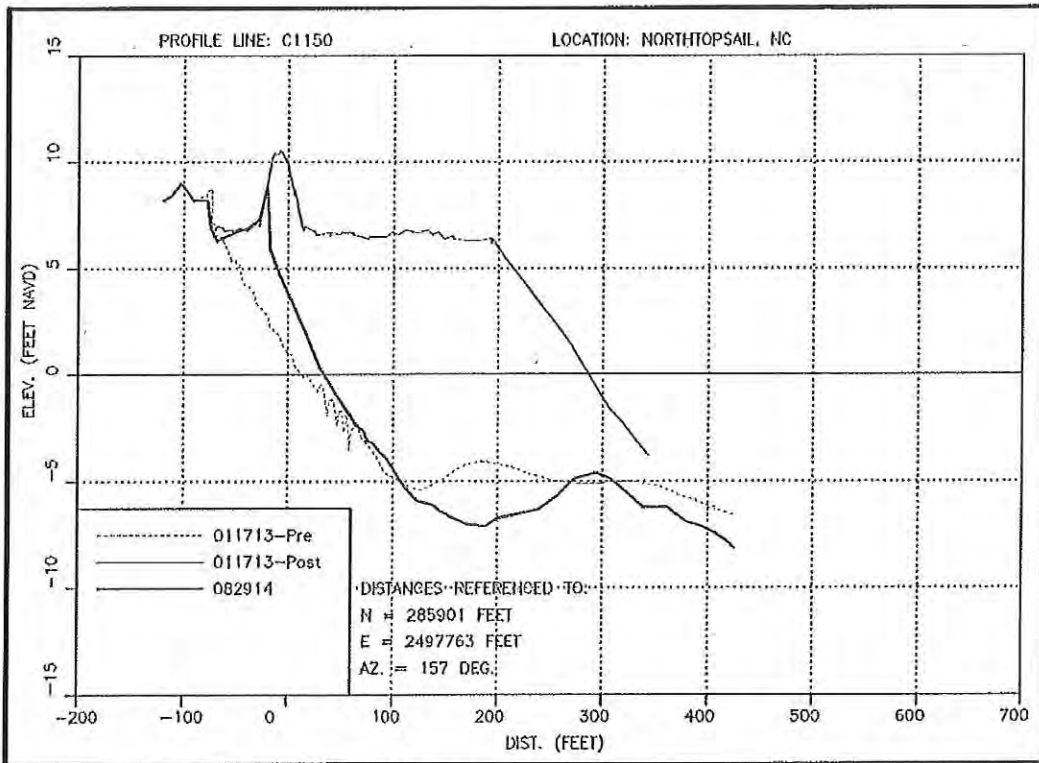


Figure 6. Cross-section plots profile 1150+00.

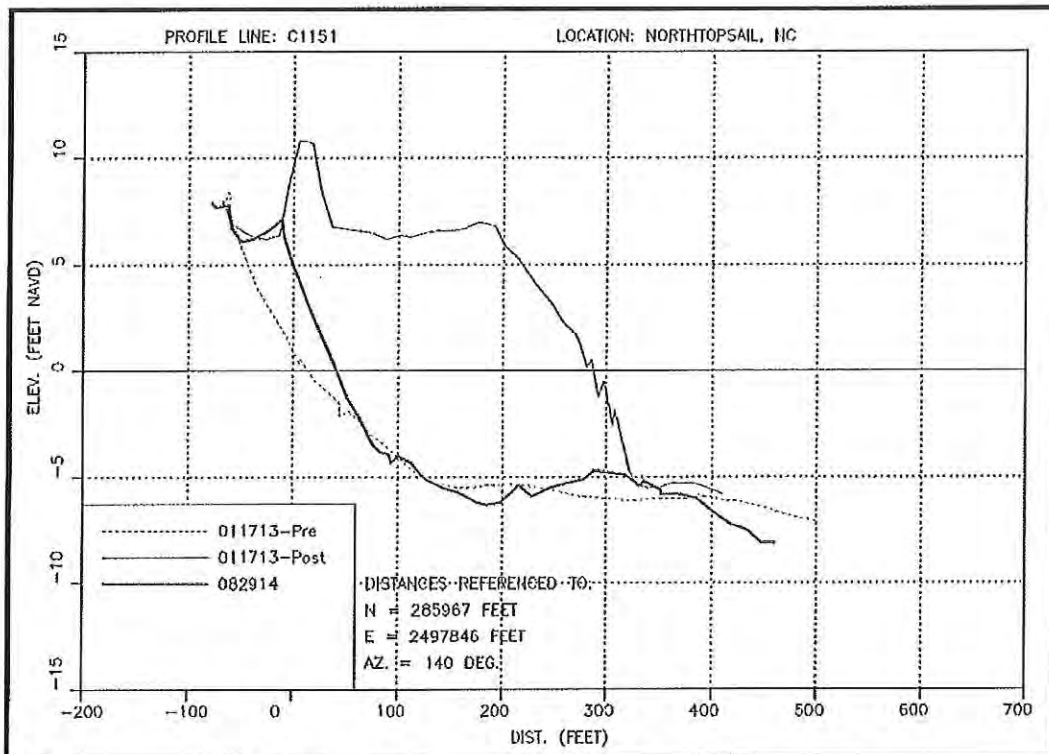


Figure 7. Cross-section plots profile 1151+00.

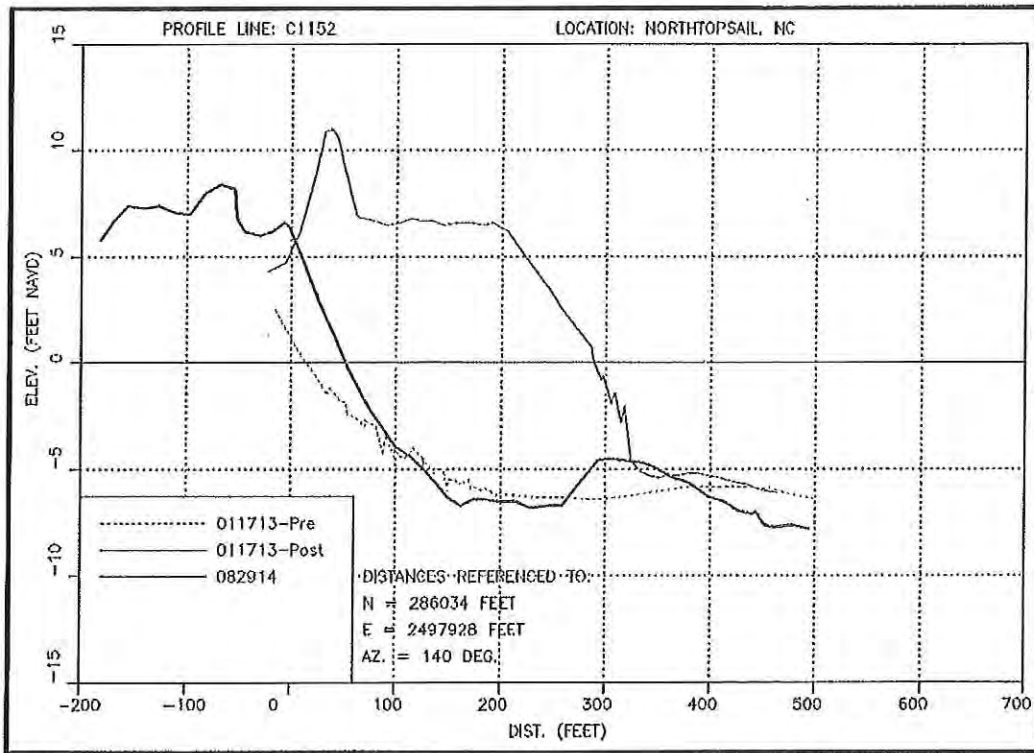


Figure 8. Cross-section plots profile 1152+00.

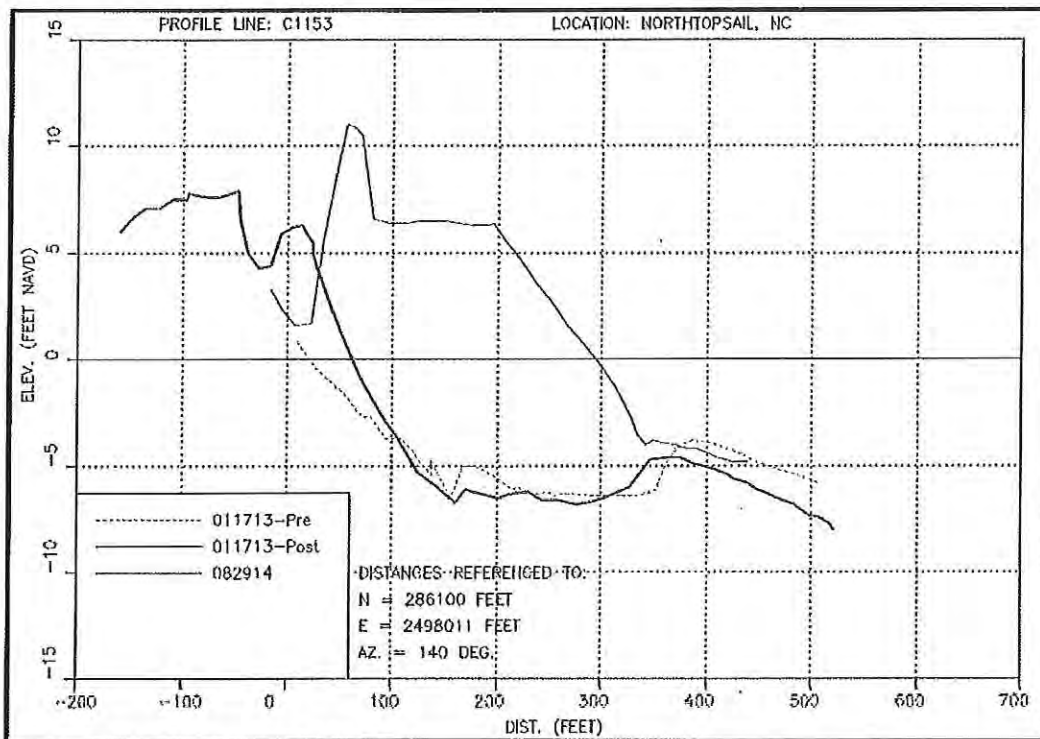


Figure 9. Cross-section plots profile 1153+00.

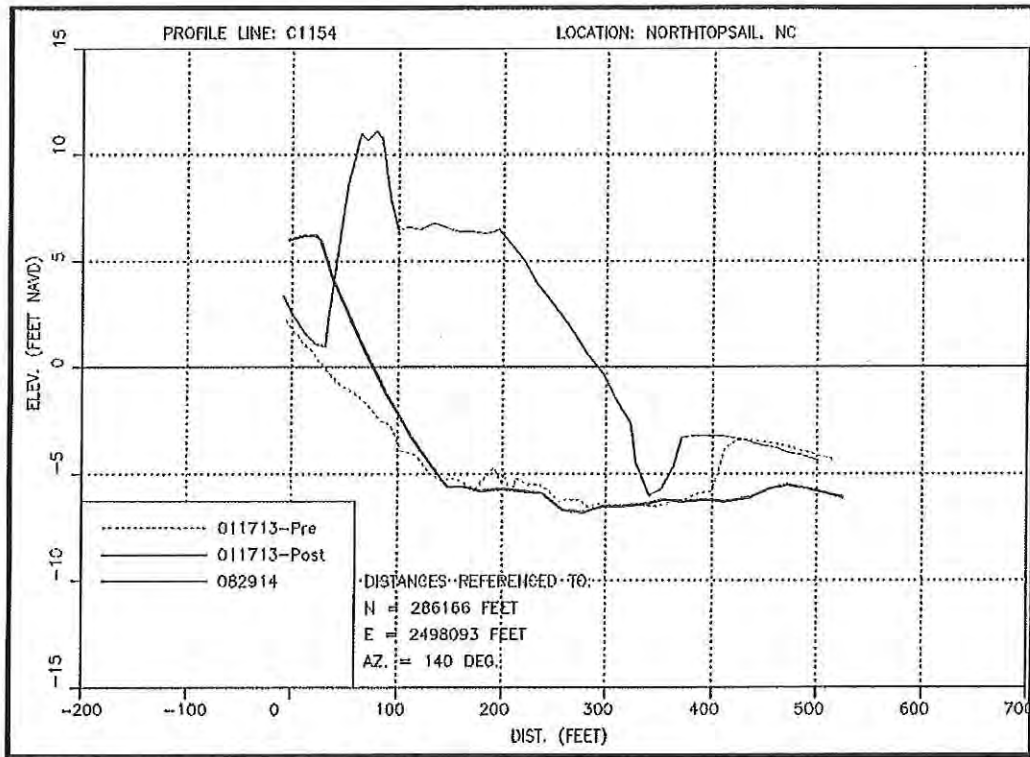


Figure 10. Cross-section plots profile 1154+00.

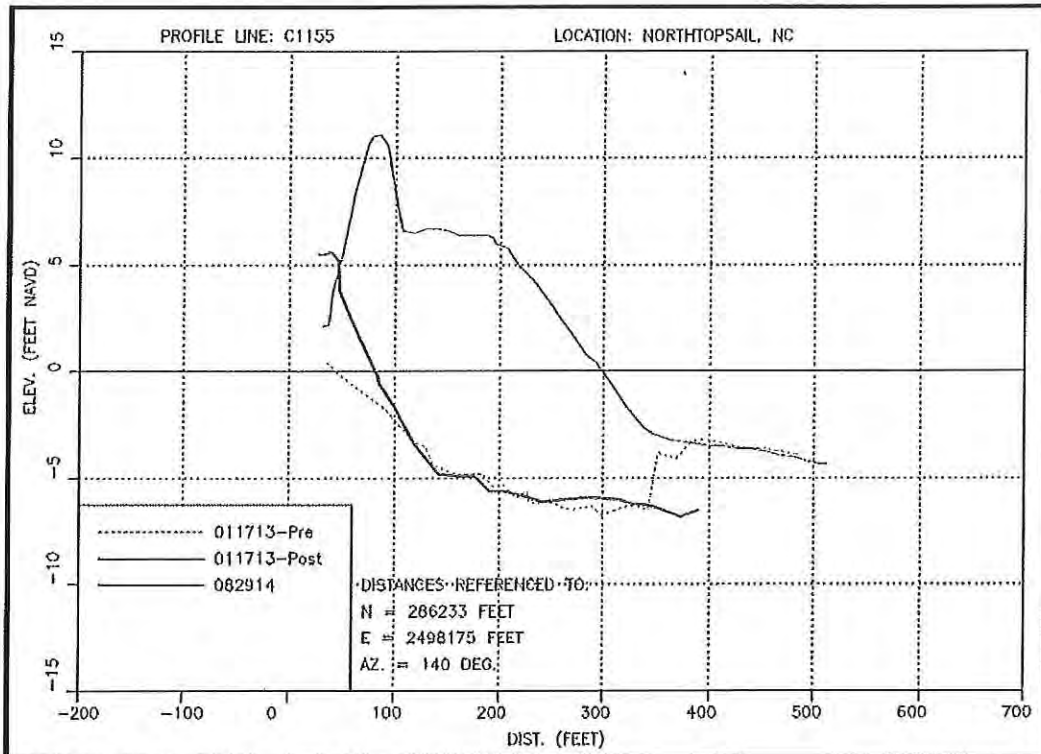


Figure 11. Cross-section plots profile 1155+00.

The ocean bar channel of New River Inlet was moved for the purpose of inducing sand accumulation on the south side of the inlet's ebb tide delta. Based on the documented historic behavior of the inlet, moving the channel to a more central position with an alignment approximately perpendicular to the adjacent shorelines would result in accretion of the shoreline south of the inlet. The time required for the new channel to begin to have a positive impact on the shoreline was estimated to be at least 5 years with the full impact of the new channel and associated reconfigured ebb tide delta on the shoreline along the north end of North Topsail Beach taking possibly 15 years.

Monitoring of the inlet has demonstrated some of the expected results are taking place with sand accumulating on the south side of the inlet, however, the rate of build-up, as predicted, has been relatively slow. As a result, the north end of North Topsail Beach has continued to experience high rates of erosion. As of October 2014, most of the fill placed north of the Topsail Reef Condominiums has been lost Figure 12.



Figure 12. October 22, 2014 photo looking north from Building #1 of Topsail Reef.

The loss of the beach fill has placed approximately 20 homes located north of Topsail Reef in imminent danger of being severely damaged or possibly destroyed. In addition to the threat to the homes, flooding of the area has been exasperated with flood waters spilling on to New River Inlet Road and side streets (Figure 13).





**Figure 13. Flooding on north end of North Topsail due to wave overwash.**

The overall management plan for New River Inlet and the shoreline of North Topsail Beach allows for the periodic maintenance of the ocean bar channel in order to keep the channel in its preferred position and alignment. Material removed to maintain the channel is to be used to provide periodic nourishment of the North Topsail Beach shoreline including the shoreline nourished during Phase 1.

The conditions of the permits issued for the project only allows maintenance of the channel to be accomplished every four years providing one of two channel maintenance thresholds are met. One channel threshold is associated with shoaling of the channel while the second is based on the position and alignment of the channel. With the initial project being completed in February 2013, under existing permit conditions, the Town of North Topsail Beach will not be allowed to maintain the channel until the 2016-17 dredging window (November 16, 2016 to March 31, 2017). Given the present condition of the shoreline, the Town of North Topsail Beach needs to take immediate emergency measures in order to prevent the loss of the 20 threatened homes between now and the time it is allow to maintain the channel.


The temporary sand bag revetment allowed under CAMA (15A NCAC 7H.1700), which is limited to a height of 6 feet above the existing ground and a maximum bottom width of 20 feet, in my opinion, is not adequate to provide the degree of protection deemed necessary to protect the 20 homes for the next 2.5 years. This is evident by the history of failure of previously permitted sandbag revetment in the area as demonstrated in Figure 14. The homes shown in Figure 14, which have since been removed, were positioned seaward of the 20 structures presently being threatened.



Figure 14. Example of failed sandbag revetment on north end of North Topsail Beach.

The proposed super-sized sand bag revetment is intended to protect the 20 threatened residential structures for at least the next 2.5 years or until such time the beach fill provided under Phase 1 of the North Topsail Beach shoreline/inlet management plan can be nourished. In addition, the Town of North Topsail Beach is committed to managing the north end shoreline by maintaining the preferred position and alignment of the New River Inlet ocean bar channel and using the material removed to maintain the channel to nourish the northern 7.25 miles of its ocean shoreline. Both the channel maintenance program and periodic nourishment are intended to maintain and/or preserve the dune and beach system in as near a natural state as possible.

Under existing conditions, there is a high probability some of the 20 threatened residential structures could be lost within the next 6 to 12 months either by virtue of the effects of long-term erosion or impacts of a moderate coastal storm. The temporary protection the super-sized sandbag revetment would provide for the 20 threatened structures north of Topsail Reef will afford the Town additional time to evaluate and possibly modify its shoreline and inlet management options.

  
Tom Jarrett, P.E. License No. 005545  
Engineering Manager  
Coastal Planning & Engineering of NC, Inc.  
A CBI Company



Notary Public: Kayn A. Welton  
My commission expires: 6-24-2015

**North Carolina  
Coastal Resources Commission**

November 10, 2014

Via Email: [briane@cmclawfirm.com](mailto:briane@cmclawfirm.com)

Brian E. Edes, Esq.  
Crossley McIntosh Collier Hanley & Edes, PLLC  
5002 Randall Parkway  
Wilmington, NC 28403

Dear Mr. Edes:

I have reviewed the materials submitted by you on November 10, 2014 on behalf of the Town of North Topsail Beach (Town) in support of its request for an expedited hearing on the variance request. Counsel for DCM has confirmed that there is no objection to the Town's request for an expedited hearing. Based on the information submitted and taking that information at face value, I note that you have alleged that based on the August 2014 beach profile survey by Gahagan & Bryant the mean high water shore north of Topsail Reef had receded between 200 and 250 feet which is equivalent to rates of between 130 feet per year and 167 feet per year. This erosion rate is exponentially higher than the historic erosion rate for the area. Since August 2014 visual inspections of the area indicate that all of the nourishment material has been lost and the mean high water shoreline is within 20 feet of the foundation of all of the 20 residential structures located between Topsail Reef and New River Inlet. All 20 structures satisfy the imminently threatened criteria as defined in 15 NCAC 07H .0308(a)(2)(B).

Section 143-318.12(f) of the North Carolina General Statutes provides that an emergency meeting may be scheduled in situations where "generally unexpected circumstances" are present requiring "immediate consideration by the public body." Given the information provided, I have decided to conditionally grant your request and call a special meeting that will be scheduled before the Commission's next regularly scheduled meeting on December 17 and 18, 2014. This decision is limited to the finding that the hearing is justified and should not be read by anyone as an indication of how the Coastal Resources Commission will ultimately decide the request for a variance.

In order for the Commission to expedite a special meeting on the variance request, there are several issues which must be addressed. First, the Town and DCM must have an agreed on set of stipulated facts. Second, we must be able to find a time that will allow a quorum of duly appointed members of the Commission to be available for a hearing. Right now we anticipate that might be scheduled for November 19, 2014. Please let me know you are available for a hearing on these dates. Once we have identified a date for the meeting when a quorum will be available, staff will provide notice of the meeting time, place and purpose to the public and interested parties at least 48 hours before the meeting. This notice will include a means by which the public can listen to the open meeting.

Division of Coastal Management  
Department of Environment and Natural Resources  
400 Commerce Ave., Morehead City, North Carolina 28557  
Phone 252-808-2808 FAX 919-733-1495



PAT MCCRORY  
GOVERNOR

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HARRY SIMMONS

JOHN SNIPES

BILL WHITE

BRAXTON C. DAVIS  
EXECUTIVE SECRETARY



**Brian E. Edes, Esq.**  
November 10, 2014  
Page 2

If the Commission is unable to gather a quorum before the next regularly scheduled meeting and the stipulated facts are agreed to four weeks prior to the first day of the regularly scheduled meeting, then the variance petition will be heard during the scheduled December 17 and 18, 2014 meeting. Commission counsel, Mary L. Lucasse, Esq. will keep you informed of the schedule and will ensure that the Town has a minimum of forty-eight (48) hour notice of a scheduled public hearing on this issue. Please do not hesitate to let Mary L. Lucasse know if you have any questions regarding this information.

Sincerely,

*Frank D. Gorham III*

Frank D. Gorham, III

cc: Christine A. Goebel, Esq. (via email)  
Braxton C. Davis, Director (via email)

## Attachment E: Stipulated Exhibits

1. Easements from the oceanfront owners at the Site to the Town
2. Exhibit 15 photo
3. FEIS for Inlet Management Project- Table of Contents and Executive Summary only
4. Jarrett Erosion History Report, Jarrett affidavit and Jarrett Erosion Report
5. CAMA Major Permit 78-10 as amended
6. August 2014 Shoreline Survey Beach Profiles
7. Cleary Letter
8. October 2014 Monitoring Report
9. Sandbag “Final Design” CAMA Major Permit application including project narrative, updated design plan, DCM forms, riparian notice, AEC hazard notice, etc.
10. Fisheries objections
13. DCM Field Report
12. Emergency Permit email from DCM to Town dated October 21, 2014
13. CAMA Major Permit 92-14 with cover letter
14. Tax base information from town
15. Town resolution 2014-13
16. Town resolution 2014-16
17. Draft Town meeting minutes showing public comment on sandbag project
18. Notice of Town meeting on 11/19/14 to put sandbag project to bid
19. Various site photographs included in the powerpoint presentation



1568

1140+00

1145+00

1150+00

1155+00

1160+00

1163+00

Marine Dr

New River Inlet Rd

Coastal Dr

Oyster Ln

Port Dr

River Dr

Image © 2014 DigitalGlobe

Google earth

843 ft



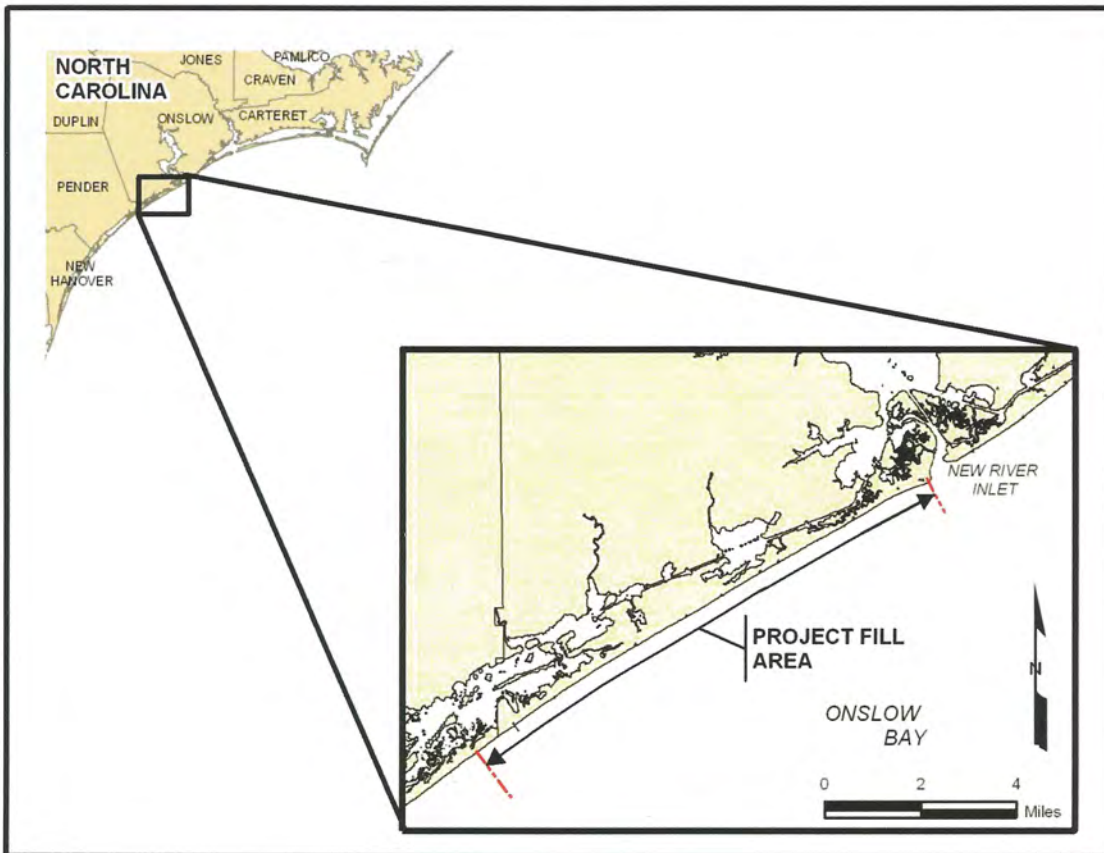
**U.S. Army Corps  
of Engineers®**  
Wilmington District

**VOLUME I OF III  
SECTIONS 1-8**

**FINAL  
ENVIRONMENTAL IMPACT STATEMENT  
DECEMBER 2009**

**NORTH TOPSAIL BEACH SHORELINE PROTECTION PROJECT**

**NORTH TOPSAIL BEACH, NORTH CAROLINA**



For more information and comments, contact Mr. Mickey T. Sugg, U.S. Army Corps of Engineers, Regulatory Division, P.O. Box 1890, Wilmington, North Carolina 28402-1890, phone (910) 251-4811, facsimile (910) 251-4025 or via e-mail: [mickey.t.sugg@saw02.usace.army.mil](mailto:mickey.t.sugg@saw02.usace.army.mil)

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**APPENDIX B**  
**Engineering Analysis**



**Final Engineering Analysis  
Shoreline Protection Project  
Town of North Topsail Beach, North Carolina**

**Prepared for:**

**North Topsail Beach, North Carolina**

**Prepared by:**

**Coastal Planning & Engineering of North Carolina, Inc.  
4038 Masonboro Loop Rd.  
Wilmington, NC 28409**

**July 2009**

## Executive Summary

North Topsail Beach has an 11.1 mile ocean shoreline that occupies the north end of Topsail Island. The Town is bordered on the south by the Town of Surf City and on the north by New River Inlet. Development and infrastructure within the corporate limits of the North Topsail Beach have been damaged during recent storm events and remain vulnerable to damage associated with coastal storms. The north end of the Town is the most vulnerable area due to erosion and shoreline fluctuations caused by uncontrolled changes in position and alignment of the New River Inlet ocean bar channel. The Town is seeking Federal and State permits to allow implementation of a non-Federally funded shoreline and inlet management project that would preserve the Town's tax base, protect its infrastructure, and maintain its tourist oriented economy.

Most of the northern 7.25 miles of the town's shoreline (shoreline north of baseline station 785+00) lies within the Coastal Barrier Resource System (CBRS) and is not eligible for federal storm damage protection. The southern 3.85 miles is presently being evaluated for a possible federal storm damage reduction project.

Seven alternatives were considered and the applicant's preferred alternative is Alternative 3: Implementation of an Inlet Management Plan for New River Inlet and construction of a beach fill along 11.1 miles of the Town's shoreline. The design template for the beach fill within the CBRS includes an artificial dune with a crest elevation of +14.0 feet above NAVD fronted by a variable width horizontal beach berm at elevation +6.0 feet NAVD. The dune feature of the template would only be constructed in areas where the existing dune is inadequate. The beach fill proposed for the southern 3.85 miles is only intended to provide interim protection until such time the federal storm damage reduction project is implemented. The design template for the beach fill along the southern 3.85 miles consists of a horizontal berm at elevation +6.0 feet NAVD.

The inlet management plan includes repositioning the of the main ocean bar channel to a more southerly alignment and periodic maintenance of the preferred position and alignment. The new channel would be constructed to a bottom width of 500 feet and a depth of -18 feet NAVD. Construction of the new channel would require the removal of 635,800 cubic yards of material based on the most recent survey of New River Inlet. Of this total volume 544,400 cubic yards is compatible with the native beach and 91,400 cubic yards incompatible. The incompatible material, which would be deposited in an upland disposal area, consists of a mixture of clay and shells. The compatible inlet material has an average mean grain size of 0.39 mm and would be used to initially construct the beach fill portion of the project along the northern 1.7 miles (9,000 feet) of the project area.

Maintenance of the new channel in the preferred position and along the preferred alignment is critical for the recovery of the extreme northern end of the town's shoreline. Therefore, the inlet management plan includes two channel thresholds which could trigger channel maintenance. The first threshold is based on shoaling of the new channel while the second is based on the position and orientation of the channel. For the shoaling threshold, channel maintenance would

be required when shoaling of the new channel reaches 85% of the initial dredge volume. The position threshold would be exceeded when the channel migrates outside the preferred channel corridor established during initial construction. The time required for the channel to migrate out of the preferred corridor is not known, however; channel shoaling is expected to reach the 85% threshold within 3 to 4 years after construction. Accordingly, formulation of the inlet management plan portion of the project assumed channel maintenance would be required at least every 4 years.

An offshore borrow area has been identified to provide beach fill for the remaining 9.4 miles of the North Topsail Beach shoreline. The borrow area is horseshoe shaped and located between 1 and 2 miles offshore, due south of the Town Hall. The borrow area contains approximately 6,551,000 cubic yards, 357,000 cubic yards of which is coarse material with a mean grain size of 0.33 mm and the balance composed of finer material with a mean grain size of 0.21 mm. The native beach has a mean grain size of 0.23mm.

Hardbottoms exist offshore of North Topsail Beach with some hardbottom areas located approximately 900 to 3,600 ft from the baseline stations. In order to avoid direct impacts on these relatively close hardbottom areas, coarse fill material from the offshore borrow area or from the construction and/or maintenance of the new channel in New River Inlet will be placed in these areas. The use of coarser fill material will require less volume to construct the design beach fill template and will move the point of intercept of the fill with the existing beach profile well landward of the nearshore hardbottom areas. The point of intercept is the seaward most point where the beach fill would ultimately tie into the existing bottom following post-construction adjustments.

The Town of North Topsail Beach proposes to construct the project in 5 phases based on its anticipated funding stream. The first phase of construction would occur between 16 November 2010 and 31 March 2011 (environmental dredging window) and would involve the relocation of the New River Inlet channel. Material from the channel relocation would be used to construct 9,000 feet of the beach fill from baseline station 1160+00, located next to New River Inlet, to 1070+00. Phase II would occur during the November 2012 to March 2013 dredging window and would cover 10,120 feet of shoreline between baseline stations 968+80 to 1070+00. Material for Phase II would come from the offshore borrow area. Coarse material from the offshore borrow area would be placed between baseline stations 1020+00 and 1070+00 (nearshore hardbottom areas) with the balance of the area constructed with material from the northeast portion of the borrow area.

Phase III would be scheduled for the November 2014 to March 2015 dredging window or 4 years after the initial channel relocation and would cover the shoreline between baseline stations 785+00 and 900+00. This is an area that includes hardbottoms approximately 900 to 2,700 ft from the baseline stations and would be constructed using coarse material from either the offshore borrow area or coarse shoal material removed to reestablish the position and alignment of the inlet bar channel. Based on shoaling predictions in the new channel, the 85% shoaling threshold would be exceeded within the first four years following channel relocation which would trigger the first channel maintenance operation. The predicted shoaling of the new

channel would be sufficient to initially construct the beach fill in Phase III and provide periodic nourishment for the beach fill constructed during Phase I.

Phase IV, which would be scheduled for the 2016 to 2017 environmental dredging window, would be constructed using material from the offshore borrow area and would cover the shoreline north of station 900+00 to 968+80. Phase IV would complete the beach fill within the North and Central Sections of North Topsail Beach. Construction of Phase IV would also correspond to the time nourishment could be required along the Phase II shoreline (968+80 to 1070+00). Since channel maintenance would not be scheduled at this time, nourishment of Phase II would be accomplished using coarse material from the offshore borrow area.

Phase V, the final initial construction phase, would occur during the 2018 to 2019 environmental dredging window and would provide an interim beach fill along the southern 20,320 feet of the town's shoreline. Phase V would also be constructed using material from the offshore borrow area.

Construction of Phase V would be scheduled 8 years after initial construction of the new bar channel in New River Inlet and, based on the theoretical shoaling predictions, could occur at the same time maintenance of the new channel is required. By this time, all or portions of the shoreline segments constructed during Phases I to IV would be in need of periodic nourishment, therefore, the inlet channel maintenance material could be deposited between the inlet and baseline station 785+00. The exact location of disposal would depend on the performance of the fill placed in the four segments.

Following initial construction of the beach fill portion of the project, material removed to maintain the preferred channel position and alignment would be used to provide periodic nourishment of the beach fill between station 785+00 and New River Inlet.

**AFFIDAVIT OF TOM JARRETT**

Tom Jarrett, having been duly sworn, says the following:

1. I am a professional engineer licensed to practice in North Carolina.
2. I earned a B.S. in Civil Engineering from N.C. State University in 1965 and an M.S. in Civil Engineering from N.C. State University in 1967. I worked for the U.S. Army Corps of Engineers for over thirty-four years, until I retired in 2000.
3. While working for the U.S. Army Corps, I served as the Wilmington District's Chief of Coastal Engineering and Hydrology from 1985 to 2000 and was involved in the engineering work for numerous projects including the Morehead City harbor deepening; the Oregon Inlet terminal groin; the Masonboro Inlet jetty and sand management plan; and shore protection projects at Fort Fisher State Historic Site, Ocean Isle Beach, Wrightsville Beach, Carolina Beach and Kure Beach.
4. Since 1996, I have served on the North Carolina Coastal Hazards Science Panel, which advises the North Carolina Coastal Resources Commission.
5. I have received numerous awards for my work including the North Carolina Order of the Long Leaf Pine, an award from the Florida Shore and Beach Preservation Association, and U.S. Army Corps Wilmington District Civilian Distinguished Employee Award.
6. Today, I work as an Engineering Manager/Director with Coastal Planning & Engineering of North Carolina, Inc., a CBI Company, and in this capacity I have been involved in the engineering work for the North Topsail Beach shoreline protection project which includes the channel realignment of the New River Inlet.
7. In prior years, the United States Army Corps of Engineers had been depositing dredge spoil from the New River Inlet Atlantic Intracoastal Waterway crossing and from the

Cedar Bush Cut along a 2,000 to 5,000 linear foot area located generally in front of the area extending from the shoulder of New River Inlet south to the Topsail Reef Condominium complex in North Topsail Beach. The last Corps disposal operation occurred in 2013. Based on my experience working on the North Topsail Beach shoreline protection project, I know that the Town of North Topsail Beach is seriously considering performing maintenance dredging of the New River Inlet channel possibly as early as the 2015-16 dredging window. Maintenance of the channel could involve the removal of 500,000 cubic yards to 600,000 cubic yards of beach quality sand with disposal of the material along the north end of the town's shoreline.

8. Also based on my experience working on the North Topsail Beach shoreline protection and the New River Inlet channel relocation projects, I know the extreme north end of North Topsail Beach is extremely vulnerable to accelerated erosion during southwesterly storm events as well as frequent reversals in the direction of littoral sand movement due to the impacts of the ebb tide delta of New River Inlet on waves as they approach the area from the southeast as well as the southwest. In addition, flood tide channels run parallel and adjacent to the beach which accelerates the rate of sediment transport away from the area immediately fronting the shoreline situated north of Topsail Reef.

9. On behalf of the Town of North Topsail Beach (TOWN) I applied for an emergency major CAMA permit on September 26, 2014 to protect 20 threatened structures located north of the Topsail Reef Condominium. As proposed, the emergency permit would have authorized the TOWN to install a sandbag revetment approximately forty feet wide with a maximum crest elevation of +12 feet NAVD88 in the area beginning at Building #1 of Topsail Reef and extending to 2378 New River Inlet Road.

10. In my professional opinion, a sandbag revetment of the size proposed in the September 26, 2014 emergency CAMA permit application is necessary to protect the area until such time the TOWN is permitted to perform maintenance of the new bar channel and deposit the dredged material along the shoreline south of New River Inlet. Under existing permit conditions for the TOWN's Shoreline and Inlet Management Plan, maintenance of the new channel cannot be performed until the 2016-17 environmental dredging window.

11. The emergency CAMA permit issued by the North Carolina Division of Coastal Management on October 24, 2014 only authorizes a sandbag revetment six feet high, twenty feet wide and twenty feet seaward of the buildings. A revetment of this height and size will be insufficient to prevent water from reaching the 20 threatened structures and will likely be overwashed during a storm. Should the sandbags be overwashed, the integrity of the revetment could be seriously comprised.

  
Tom Jarrett, P.E.

NORTH CAROLINA  
NEW HANOVER COUNTY

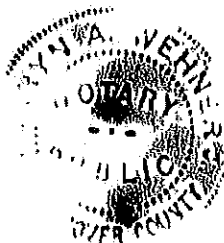
I, Kayn A. Wehner, a Notary Public for said County and State, do hereby certify that Tom Jarrett personally appeared before me this day and acknowledged that he has executed the foregoing document in his individual capacity.

Witness my hand and official seal/stamp, this 7 day of October, 2014.

(SEAL)

Kayn A. Wehner  
Notary Public

My commission expires: 10-24-2015



November 13, 2014

**History of Erosion on the North End of North Topsail Beach**

The recent high rate of erosion experience by the fill placed along the north end of North Topsail Beach was not a manifestation of the channel relocation project associated with Phase 1 of the North Topsail Beach Shoreline and Inlet Management Plan. First and foremost in this argument was the abject failure of past beach nourishment efforts to have any long-lasting effect in slowing the rate of shoreline retreat. All of these previous beach nourishment events occurred prior to the construction of Phase 1. A brief summary of past beach nourishment efforts follows.

The USACE has deposited navigation maintenance material along the north end of North Topsail Beach in the area generally between the south shoulder of New River Inlet and the south end of the Topsail Reef Condominiums. The material was obtained through maintenance of the Atlantic Intracoastal Waterway (AIWW) where it intersects with New River and the channel leading to New River Inlet known as Cedar Bust Cut. Some of the material was also removed from Cedar Bush Cut. The dates and documented amounts of the fills placed by the USACE on the north end of North Topsail Beach are provided in Table 1.

Table 1. USACE disposal of navigation maintenance material on the north end of North Topsail Beach between 2002 and 2013.

Year	Contractor	Volume (CY)
2002	Cottrell	154,196
2004	Cottrell	77,004
2006	Unknown	100,534
2010	Southwind	185,000
2011	Cottrell	54,792
<b>Total</b>		<b>571,526</b>

As shown in Table 1, the total volume of material placed on the north end of North Topsail Beach between 2002 and 2011, or prior to the construction of Phase 1 of the town's shoreline and inlet management plan was 571,526 cubic yards. The volume of material deposited along the north end of North Topsail Beach between 2002 and 2011 is comparable to the in place volume of 566,244 cubic yards deposited during construction of Phase 1 of the town's shoreline and inlet management plan.

While the performances of the fills were not documented with survey data, evidence provided by the comparison of Google Earth photos taken between July 2002 and May 2011, which are provided in Figures 1 to 7 below, clearly show that in spite of the rather substantial amounts of beach fill, the shoreline continue to erode at an inordinate rate. This rapid rate of erosion eventually resulted in the loss of the structures that were situated seaward of the present front row of structures north of Topsail Reef. The loss of this row of structures, which at the time were protected by 20-ft x 6-ft sandbag revetments, is evident by comparing Figures 4 to 6.

The failure of these previous beach nourishment efforts to have a significant impact on slowing the rate of shoreline retreat was the primary reason the Topsail Reef HOA elected to install a super-sized sandbag revetment in 2012 to protect the eight buildings making up the Topsail Reef Condominium complex. Again, all of this occurred prior to the channel relocation.



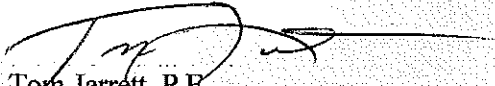
Furthermore, the existence of abnormal erosion on the north end of North Topsail Beach was the very reason the town elected to implement the channel relocation project as part of Phase 1 of its management plan. The objectives of the channel relocation portion of the project was to induce reconfiguration of the ebb tide delta of New River Inlet through the redistribution of ebb tide delta material from the north side of the inlet to the south side. This process of ebb tide delta reconfiguration was projected to take up to 5 years before significant positive impacts would occur on the north end and up to 15 years before the shoreline was restored to a condition comparable to that which existed in the early to mid 1990's.

In summary, the rapid loss of the beach fills created by USACE disposal operations mimics the behavior of the beach fill placed during construction of Phase 1 of the town's shoreline and inlet management plan. Since this rapid rate of loss of fill occurred before the bar channel was relocated, the erosion of the fills was due to pre-existing conditions. For the most part, these same conditions still exist since the channel relocation project has not had time to have an impact on the north end of North Topsail Beach.

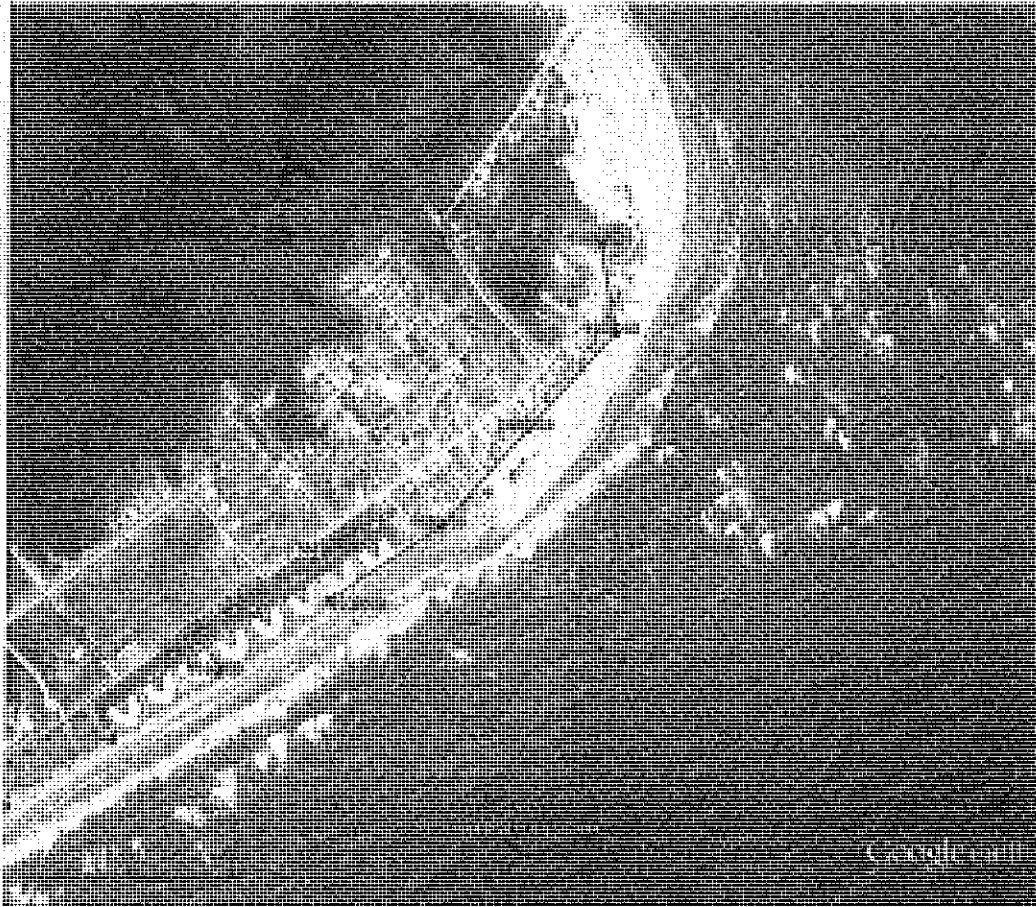
The pre-existing conditions include (1) the small size of the south side of the ebb tide delta of New River Inlet compared to the north side, (2) the presence of flood channels running parallel to and juxtaposed to the shoreline, and (3) the existing of a nodal zone just south of New River Inlet.

The relatively small size of the south side of the ebb tide delta exposes the north end of North Topsail Beach to large waves that are capable of transporting large quantities of littoral material. The combination of large waves interacting with the flood currents moving along the shoreline toward New River Inlet accelerates the rate of sediment transport north of Topsail Reef relative to the rate of sediment transport moving into the area from the south. The third pre-existing factor contributing to the high rate of sediment loss is the existence of a nodal zone created by wave refracting around the ebb tide delta. In this regard, waves moving toward North Topsail Beach from the southeast, which would normally transport sediment to the south, are refracted to such a degree that the direction of the waves impacting the shoreline are changed to the southwest just south of the inlet and in so doing move sediment north and into New River Inlet. As a result, the area north of Topsail Reef rarely receives littoral sand from the north which creates an imbalance in the sediment budget for the area.

This assessment of the conditions on the north end of North Topsail Beach are based on my almost 48 years of experience in dealing with coastal and inlet processes along the North Carolina coast and my detailed assessment of the littoral transport regime in the vicinity of New River Inlet developed during the formulation of the North Topsail Reef Shoreline and Inlet Management Plan as well as my involvement with the CRC Coastal Hazards Science Panel in the reformulation of Inlet Hazard Areas.



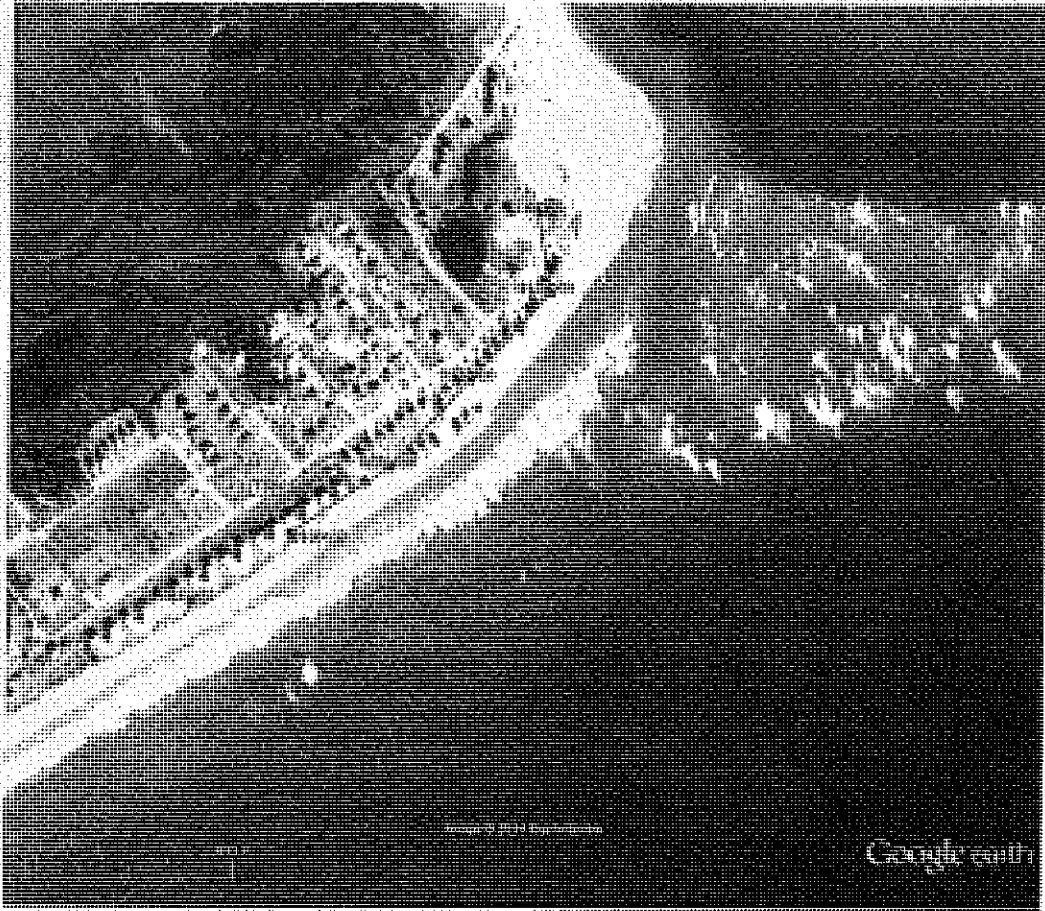
Tom Jarrett, P.E.  
NC License 005545  
Engineering Manager/Director  
Coastal Planning & Engineering of N.C., Inc.



**Figure 1. July 2003 Beach disposal operation on north end of North Tropical Beach by USACE. USACE deposited 154,000 cy in 2003.**



Figure 2. August 1981 approximately one month after disposal of 154,000 cy by USACE.



**Figure 3. March 2003 approximately 7 months after USACE disposal operation.**



**Figure 4. March 2006. USACE had deposited 100,000 cu in 2006.**



**Figure 5. October 2005 post-disposal operation by USACE.**

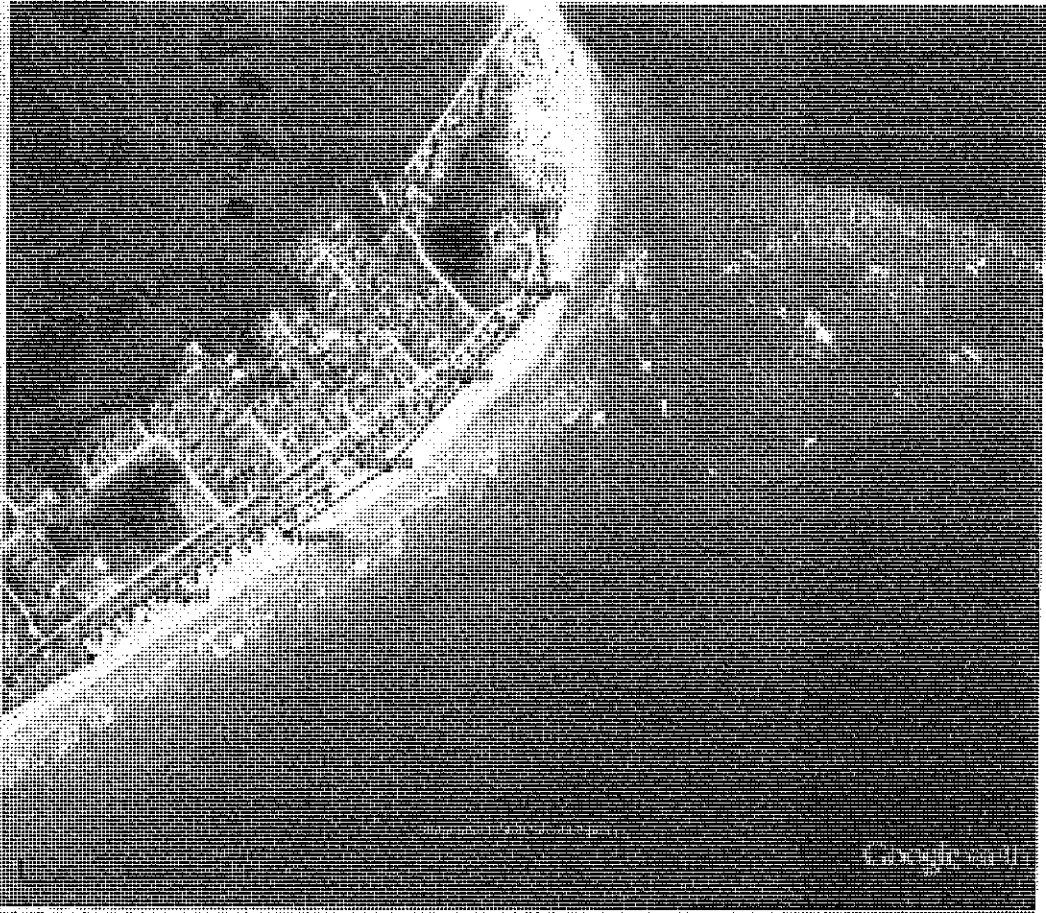
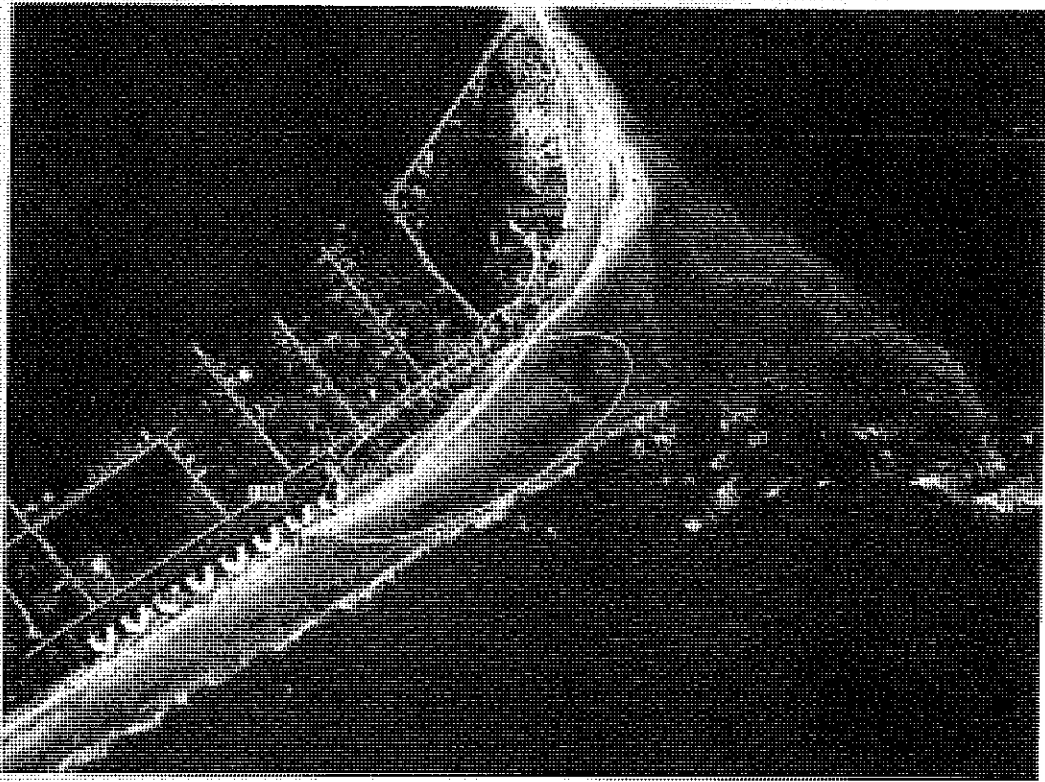


Figure 6. October 2001.





**Statement by Tom Jarrett, P.E., NC License No. 005545**  
**Subject: Erosion of the north end of North Topsail Beach**

The Town of North Topsail Beach completed Phase 1 of its multifaceted inlet and shoreline management plan in February 2013 with the repositioning of the New River Inlet ocean bar channel to a more central location between the south end of Onslow Beach and the north end of North Topsail Beach. The location of the new channel and the area nourished by with the material removed to relocate the channel is provided on Figure 1. The conditions of the north end of North Topsail Beach before and after the construction of Phase 1 are shown on Figures 2 and 3, respectively.



**Figure 1. Plan view of Phase 1 of the North Topsail Beach Shoreline and Inlet Management Plan.**



Figure 2. North end of North Topsail Beach prior to the construction of Phase 1.



Figure 3. North end of North Topsail Beach after completion of Phase 1.



Figure 4. Baseline stationing.

The material removed during repositioning of the channel was used to construct a beach fill along 7,730 feet of shoreline south of New River Inlet. The construction of Phase 1 moved the mean high water (MHW) shoreline an average of 272 feet seaward of the pre-project MHW shoreline in the area between Building #1 of Topsail Reef (approximately baseline station 1149+00) and the south shoulder of New River Inlet (baseline station 1160+00). The locations of baseline stations along the north end of North Topsail Beach are provided on Figure 4 with plots of the beach cross-sections taken between baseline stations 1149+00 and 1155+00 before and after the construction of the beach fill provided on Figures 5 to 11. Also shown on Figures 5 to 11 are the results of a beach profile survey conducted by the engineering firm of Gahagan & Bryant in August 2014 for the Topsail Reef HOA.

Comparison of the post-construction survey taken in February 2013 and the August 2014 survey by Gahagan & Bryant, the shoreline north of Topsail Reef has receded between 200 and 250 feet which is equivalent to shoreline recession rates of between 130 ft./yr. and 167 ft./yr.

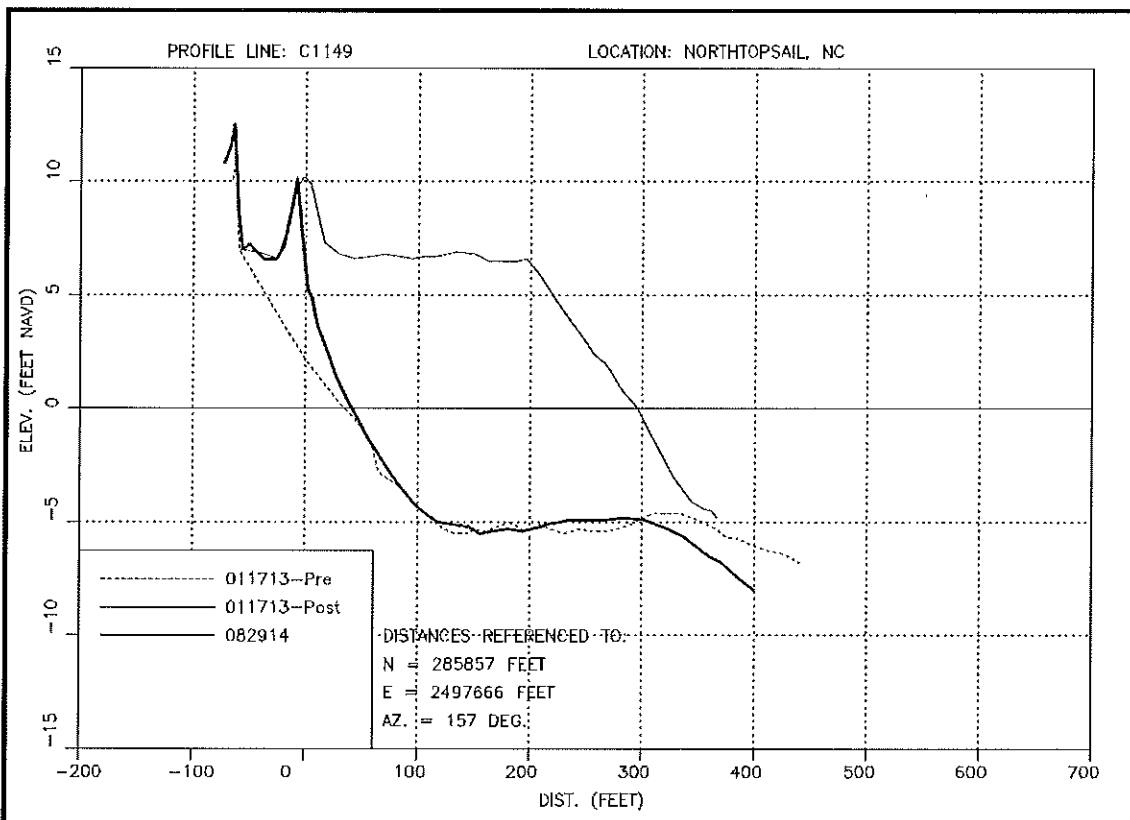


Figure 5. Cross-section plots profile 1149+00.

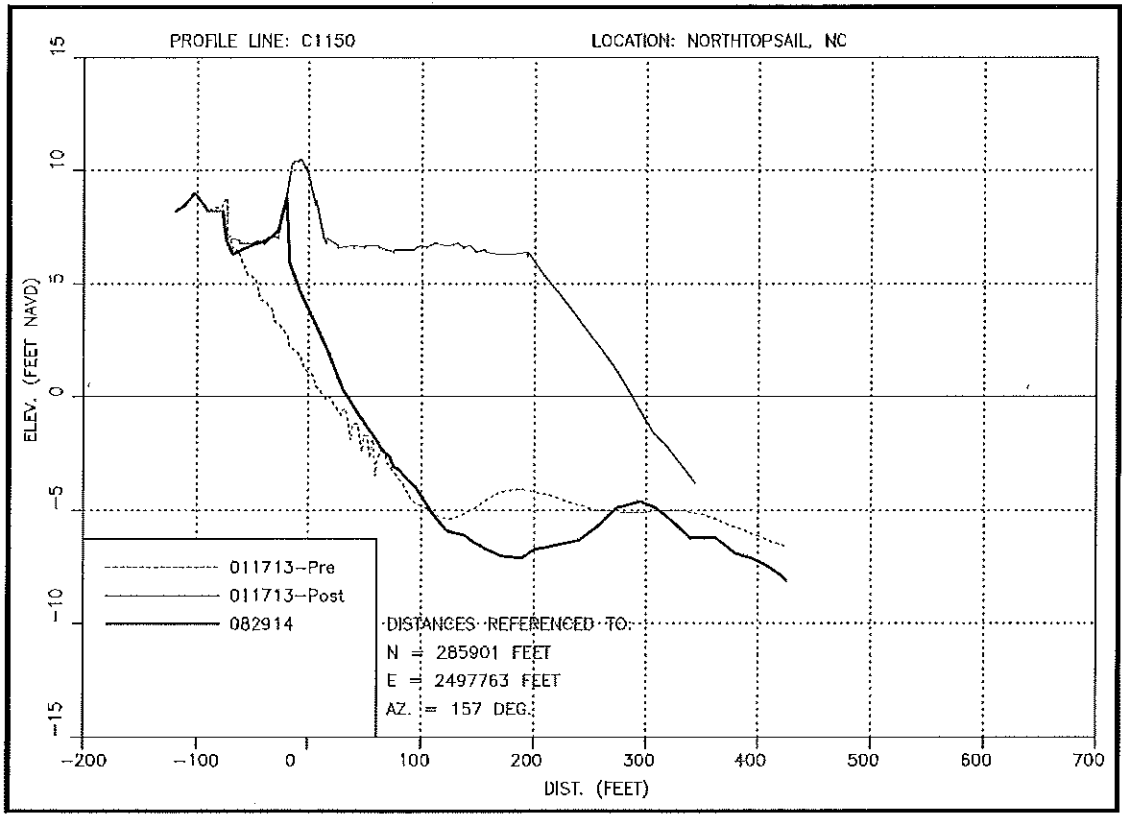


Figure 6. Cross-section plots profile 1150+00.

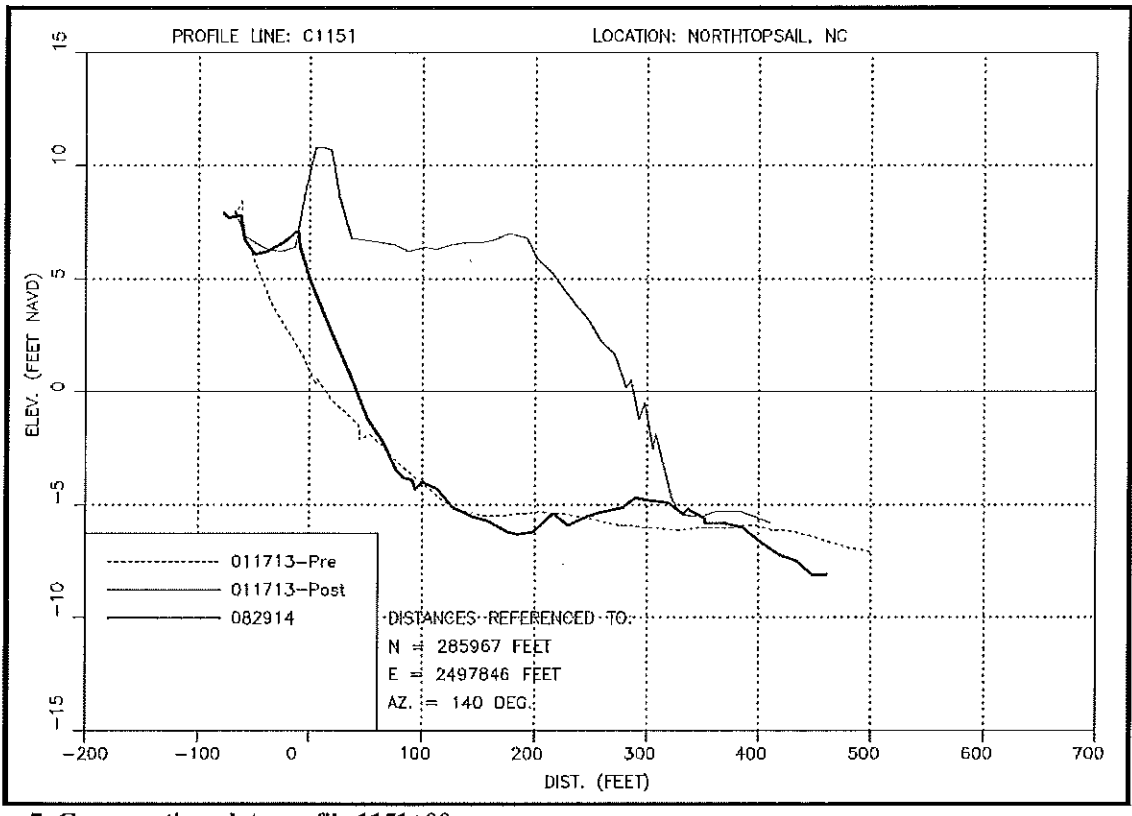


Figure 7. Cross-section plots profile 1151+00.

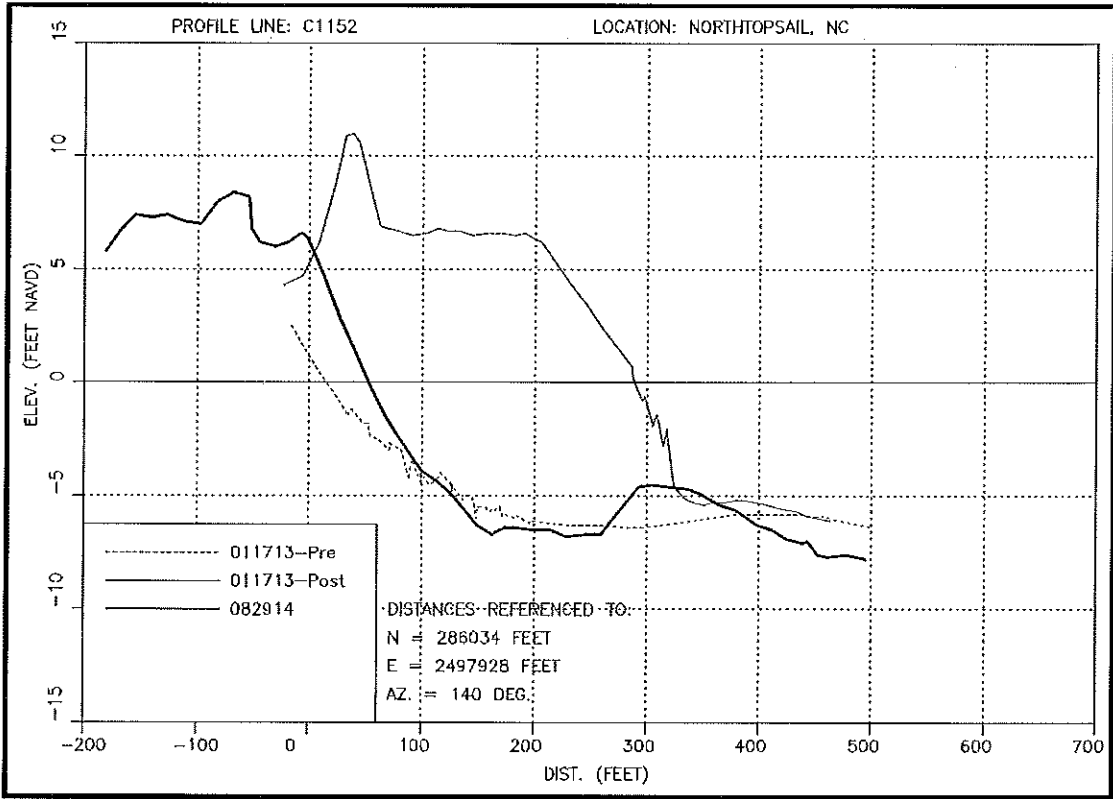


Figure 8. Cross-section plots profile 1152+00.

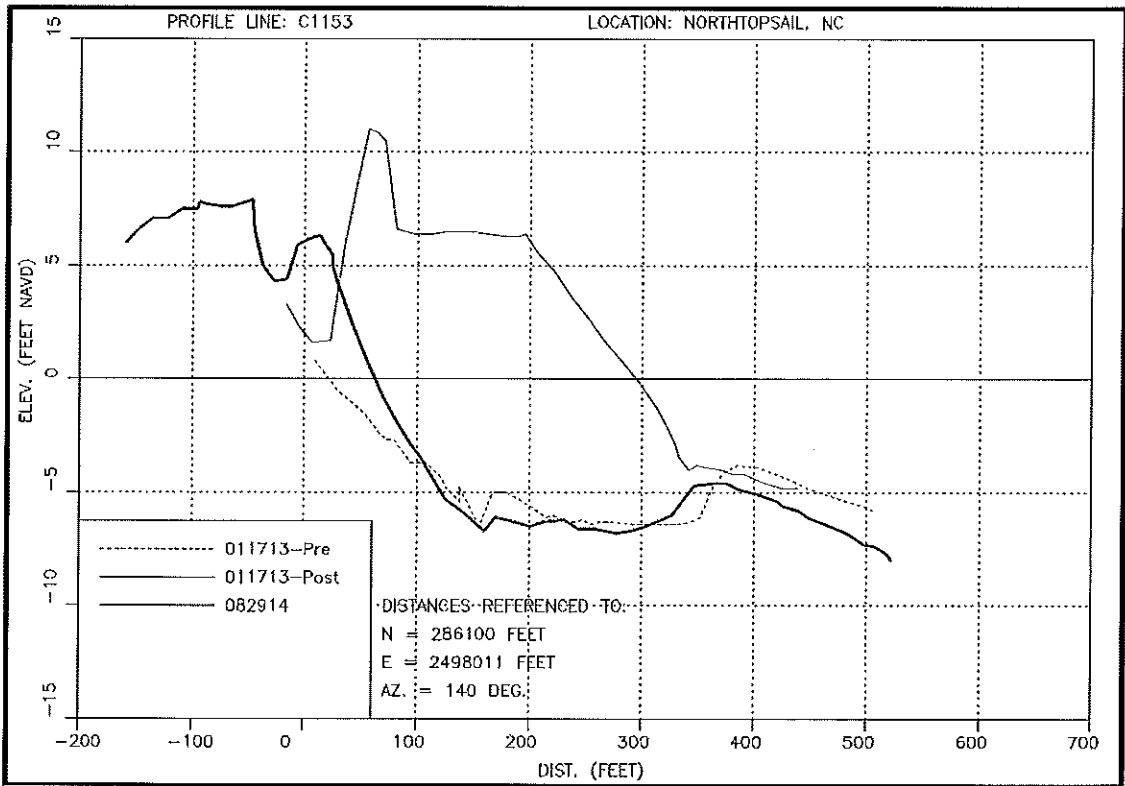


Figure 9. Cross-section plots profile 1153+00.

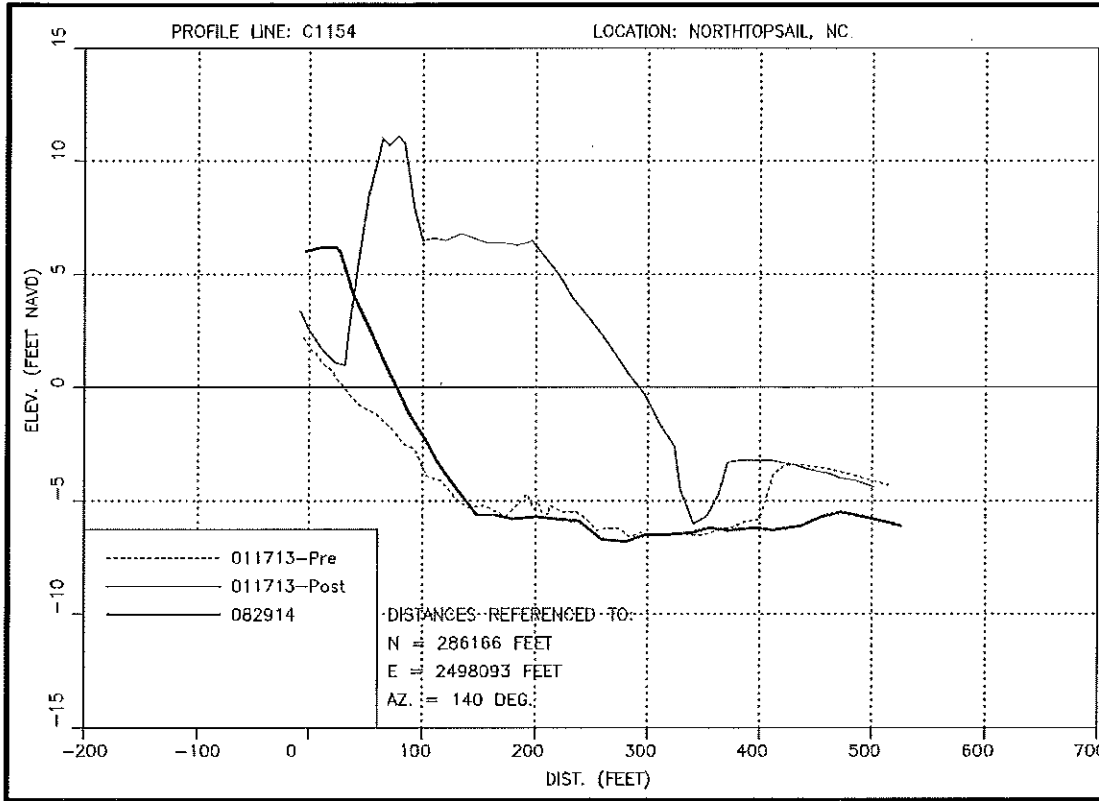


Figure 10. Cross-section plots profile 1154+00.

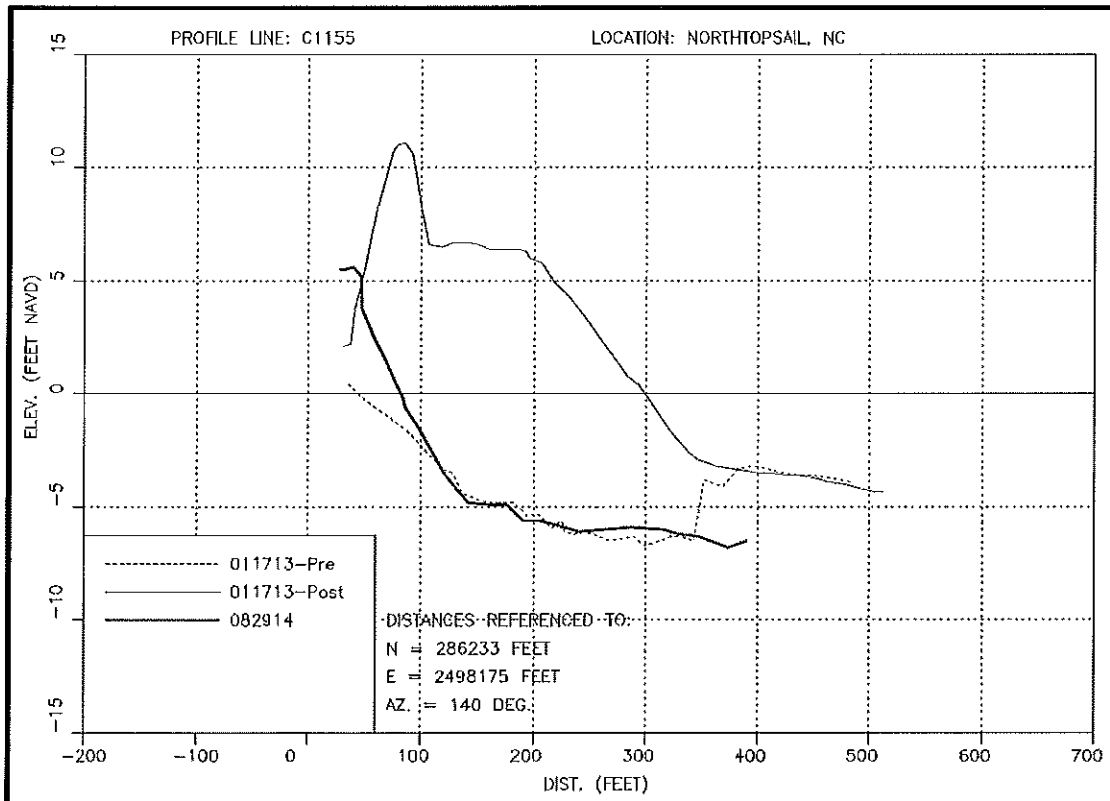


Figure 11. Cross-section plots profile 1155+00.

The ocean bar channel of New River Inlet was moved for the purpose of inducing sand accumulation on the south side of the inlet's ebb tide delta. Based on the documented historic behavior of the inlet, moving the channel to a more central position with an alignment approximately perpendicular to the adjacent shorelines would result in accretion of the shoreline south of the inlet. The time required for the new channel to begin to have a positive impact on the shoreline was estimated to be at least 5 years with the full impact of the new channel and associated reconfigured ebb tide delta on the shoreline along the north end of North Topsail Beach taking possibly 15 years.

Monitoring of the inlet has demonstrated some of the expected results are taking place with sand accumulating on the south side of the inlet, however, the rate of build-up, as predicted, has been relatively slow. As a result, the north end of North Topsail Beach has continued to experience high rates of erosion. As of October 2014, most of the fill placed north of the Topsail Reef Condominiums has been lost Figure 12.



**Figure 12. October 22, 2014 photo looking north from Building #1 of Topsail Reef.**

The loss of the beach fill has placed approximately 20 homes located north of Topsail Reef in imminent danger of being severely damaged or possibly destroyed. In addition to the threat to the homes, flooding of the area has been exasperated with flood waters spilling on to New River Inlet Road and side streets (Figure 13).





**Figure 13. Flooding on north end of North Topsail due to wave overwash.**

The overall management plan for New River Inlet and the shoreline of North Topsail Beach allows for the periodic maintenance of the ocean bar channel in order to keep the channel in its preferred position and alignment. Material removed to maintain the channel is to be used to provide periodic nourishment of the North Topsail Beach shoreline including the shoreline nourished during Phase 1.

The conditions of the permits issued for the project only allows maintenance of the channel to be accomplished every four years providing one of two channel maintenance thresholds are met. One channel threshold is associated with shoaling of the channel while the second is based on the position and alignment of the channel. With the initial project being completed in February 2013, under existing permit conditions, the Town of North Topsail Beach will not be allowed to maintain the channel until the 2016-17 dredging window (November 16, 2016 to March 31, 2017). Given the present condition of the shoreline, the Town of North Topsail Beach needs to take immediate emergency measures in order to prevent the loss of the 20 threatened homes between now and the time it is allow to maintain the channel.

The temporary sand bag revetment allowed under CAMA (15A NCAC 7H.1700), which is limited to a height of 6 feet above the existing ground and a maximum bottom width of 20 feet, in my opinion, is not adequate to provide the degree of protection deemed necessary to protect the 20 homes for the next 2.5 years. This is evident by the history of failure of previously permitted sandbag revetment in the area as demonstrated in Figure 14. The homes shown in Figure 14, which have since been removed, were positioned seaward of the 20 structures presently being threatened.



**Figure 14. Example of failed sandbag revetment on north end of North Topsail Beach.**

The proposed super-sized sand bag revetment is intended to protect the 20 threatened residential structures for at least the next 2.5 years or until such time the beach fill provided under Phase 1 of the North Topsail Beach shoreline/inlet management plan can be nourished. In addition, the Town of North Topsail Beach is committed to managing the north end shoreline by maintaining the preferred position and alignment of the New River Inlet ocean bar channel and using the material removed to maintain the channel to nourish the northern 7.25 miles of its ocean shoreline. Both the channel maintenance program and periodic nourishment are intended to maintain and/or preserve the dune and beach system in as near a natural state as possible.

Under existing conditions, there is a high probability some of the 20 threatened residential structures could be lost within the next 6 to 12 months either by virtue of the effects of long-term erosion or impacts of a moderate coastal storm. The temporary protection the super-sized sandbag revetment would provide for the 20 threatened structures north of Topsail Reef will afford the Town additional time to evaluate and possibly modify its shoreline and inlet management options.

Tom Jarrett, P.E. License No. 005545  
Engineering Manager  
Coastal Planning & Engineering of NC, Inc.  
A CBI Company

*DENR - WILM*

STATE OF NORTH CAROLINA  
Department of Environment and Natural Resources  
and  
Coastal Resources Commission

# Permit

for

Major Development in an Area of Environmental Concern  
pursuant to NCGS 113A-118

Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of North Topsail Beach, 2008 Loggerhead Court, North Topsail Beach, NC 28460

Authorizing development in Onslow Counties at New River Inlet and Ocean Beach, within

Town limits \_\_\_\_\_, as requested in the permittee's application dated 9/29/09, AEC Hazard Notice dtd.

8/27/08, mitigation/monitoring plan dtd. 9/09, & workplan drawings 1-19 dtd. rcd. 9/30/09 & PV-1, DE-1 & XS-1 all dtd. 11/24/09

This permit, issued on July 21, 2010, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

- 1) In order to protect threatened and endangered species and to minimize adverse impacts to offshore, nearshore, intertidal and beach resources no excavation or beach nourishment activities shall occur from April 1 to November 15 of any year without prior approval from the Division of Coastal Management in consultation with the Division of Marine Fisheries and the Wildlife Resources Commission.

### Excavation

- 2) Unless specifically altered herein, all excavation activities shall take place entirely within the areas indicated on attached workplan drawings.
- 3) No excavation shall take place within 400' of any identified hard bottom resource area.  
(See attached sheets for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

June 12, 2014

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

*Douglas V. Hugggett*  
for James H. Gregson, Director  
Division of Coastal Management

This permit and its conditions are hereby accepted.

RECEIVED

JUL 27 2010

DCM WILMINGTON Signature of Permittee

**ADDITIONAL CONDITIONS**

- 4) Excavation shall not exceed the following limits;
- a. Bar Channel -17' average (NGVD-29)
  - b. Offshore Borrow Area(s) -47' average (NGVD-29)

Overdredging is specifically prohibited.

- 5) In order to minimize impacts to aquatic resources, and in accordance with commitments made by the permittee, maintenance excavation of the new inlet channel shall not take place more frequently than once every four years.
- 6) Excavation shall be accomplished by cutter suction hydraulic dredge. Use of any other method of excavation shall require modification of this permit.

**Beach Nourishment**

- 7) This permit authorizes beach nourishment activities to be carried out one (1) time along the entire reach of the requested project area. Any request to carry out additional activities within an area where nourishment activities have been completed under this permit shall require a modification of this permit.
- 8) Prior to the initiation of beach nourishment activity along each section of beach, the existing mean high water line shall be surveyed and a copy provided to the Division of Coastal Management.

**NOTE:** The permittee is advised that the State of North Carolina claims title to all currently submerged lands and any future lands that are raised above the Mean High Water level as a result of this project.

- 9) Prior to the initiation of any beach nourishment activity above the normal high water contour (NHW) within the limits of the permittee's jurisdiction, easements or similar legal instruments shall be obtained from all impacted property owners.
- 10) Prior to the initiation of any beach nourishment activity, the permittee shall coordinate with the Division of Coastal Management to determine the static vegetation line that shall be used as the reference point for measuring future oceanfront setbacks. The static vegetation line, which is defined as the vegetation line that existed within one year prior to the onset of initial project construction, shall be established using on-ground observation and survey or aerial imagery. This static vegetation line shall then be marked and a survey depicting this static vegetation line shall be submitted to the Division of Coastal Management prior to any beach nourishment activities.
- 11) The seaward nourishment limit shall be conducted in accordance with the approved work plats labeled Figures 15-17 (Typical Construction Profiles) dated received 9/30/09.
- 12) Temporary dikes shall be used to retain and direct flow of material parallel to the shoreline to minimize surf zone turbidities. The temporary dikes shall be removed and the beach graded in accordance with approved profiles upon completion of pumping activities in that particular section of beach.

RECEIVED

JUL 27 2010

## ADDITIONAL CONDITIONS

- 13) Should the dredging operations encounter sand deemed non-compatible with 15A NCAC 07H .0312 (Technical Standards for Beach Fill Projects), the dredge operator shall immediately cease operation and contact the NCDCM. Dredge operations shall resume only after resolution of the issue of sand compatibility.
- 14) In order to prevent leakage, dredge pipes shall be routinely inspected. If leakage is found and repairs cannot be made immediately, pumping of material shall stop until such leaks are fixed.
- 15) Once a section is complete, piping and heavy equipment shall be removed or shifted to a new section and the area graded and dressed to final approved slopes.
- 16) Land-based equipment necessary for beach nourishment work shall be brought to the site through existing accesses. Should the work result in any damage to existing accesses, the accesses shall be restored to pre-project conditions immediately upon project completion in that specific area.

**NOTE:** The permittee is advised that any new access site would require a modification of this permit.

- 17) Where oceanfront development exists at elevations nearly equal to that of the native beach, a low protective dune shall be pushed up along the backbeach to prevent slurry from draining towards the development.
- 18) Dune disturbance shall be kept to a minimum. Any alteration of existing dunes shall be coordinated with the Division of Coastal Management as well as the appropriate property owner(s). All disturbed areas shall be restored to original contours and configuration with reference to the surveyed normal high water line and shall be revegetated immediately following project completion in that specific area.

**Upland Disposal of Non-beach Compatible Materials**

- 19) All excavated materials shall be confined above the normal high water line and landward of regularly or irregularly flooded wetlands behind adequate dikes or other retaining structures to prevent spillover of solids into any marsh or surrounding waters.
- 20) The disposal area effluent shall be contained by pipe or similar device to a point at or beyond the normal low water level, and beyond areas containing significant shellfish resources or areas of submerged aquatic vegetation.
- 21) The terminal end of the pipeline shall be positioned at or greater than 50 feet from any part of the dike and a maximum distance from spillways to allow settlement of suspended sediments.
- 22) A water control structure shall be installed at the intake end of the effluent pipe to assure compliance with water quality standards.
- 23) The diked disposal area shall be constructed a sufficient distance from the normal high water level or any marsh to eliminate the possibility of dike erosion into surrounding wetlands or waters.

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JUL 27 2010 ADDITIONAL CONDITIONS

DCM WILMINGTON, NC

- 24) The disposal area shall be properly graded and provided a ground cover sufficient to restrain erosion within 30 working days of completion of each phase of the project.
- 25) The spoil disposal area shall be inspected and approved by a representative of the Division of Coastal Management prior to the commencement of any dredging activities.

#### Mitigation and Monitoring

- 26) Unless specifically altered herein, the permittee shall fully implement the attached North Topsail Beach Shoreline Protection Project Mitigation and Monitoring Plan, including all reporting requirements. All monitoring reports referenced in this plan shall be submitted to the Division of Coastal Management and the Division of Marine Fisheries.
- 27) Immediately after completion of each phase of the beach nourishment project, and prior to the next three sea turtle nesting seasons, beach compaction shall be monitored and tilling shall be conducted as deemed necessary by the Division of Coastal Management in coordination with appropriate review agencies.
- 28) Immediately after completion of any phase of the beach nourishment project, and prior to the next three nesting seasons, monitoring shall be conducted to determine if escarpments are present that would affect nesting sea turtles or public access. If such escarpments are present, the permittee shall coordinate with the Division of Coastal Management for necessary remediation.
- 29) Unless specifically modified herein, all mitigative commitments and/or biological monitoring commitments made during the environmental review process as found in the Final Environmental Impact Statement shall be adhered to.

#### Cultural Resource Protection

- 30) There exists the possibility that the authorized activities may unearth a beached shipwreck. Should such a finding occur, the permittee shall immediately move to another area. The NCDCCR Underwater Archaeology Branch shall be contacted at (910) 458-9042 to determine appropriate response procedures.

#### General

- 31) This permit shall not be assigned, transferred, sold, or otherwise disposed of to a third party without the written approval of the Division of Coastal Management.
- 32) The permittee and/or his contractor shall schedule a pre-construction conference with the Division of Coastal Management prior to the initiation of any dredging activities.

**ADDITIONAL CONDITIONS**

- 33) The permittee shall obtain any necessary authorizations or approvals from the US Army Corps of Engineers prior to initiation of any permitted activity. All conditions of this Federal approval shall be adhered to.
- 34) The permittee and/or his contractor shall provide for proper storage and handling of all oils, chemicals, hydraulic fluids, etc., necessary to carry out the project.
- 35) The N.C. Division of Water Quality has authorized the proposed project under General Water Quality Certification No. 3642 (DWQ Project No. 081764V2), which was issued on 6/4/10. Any violation of the Water Quality Certification shall also be considered a violation of this CAMA Permit.
- 36) No sand shall be placed on any sand bags that have been determined by the Division of Coastal Management to be subject to removal under 15A NCAC 07H .0308(a)(2). In order to ensure compliance with this condition, the Division of Coastal Management shall be contacted at (910) 796-7215 prior to project initiation so that Division staff may meet on site with the permittee and/or contractor.

**NOTE:** The permittee is advised that the Division of Coastal Management shall regulate the removal of existing sandbags and the placement of new sandbags in accordance with 15A NCAC 07H .0308(a)(2)(F), or in accordance with any variances granted by the N.C. Coastal Resources Commission.

**NOTE:** This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.

**NOTE:** Future nourishment activities may require a modification of this permit. The permittee shall contact a representative of the Division at (910) 796-7215 prior to the commencement of any such activity for this determination.

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DEPT OF WILMINGTON, NC

STATE OF NORTH CAROLINA  
Department of Environment and Natural Resources **RECEIVED**  
and  
Coastal Resources Commission

OCT 26 2012 **COPY**  
DCM-MHD CITY

# Permit

for

Major Development in an Area of Environmental Concern  
pursuant to NCGS 113A-118

Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of North Topsail Beach, 2008 Loggerhead Court, North Topsail Beach, NC 28460

Authorizing development in Onslow Counties at New River Inlet and Ocean Beach, within  
Town limits, as requested in the permittee's application letter dated 9/4/12, Figures 1-3, 4a and  
4b, all dated received 9/26/12

This permit, issued on October 12, 2012, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

- 1) Unless specifically altered herein, this Minor Modification authorizes the following modifications to the active permit, all as described in the attached letter dated 9/14/12 and the attached workplan drawings dated 9/26/12:
  - a. An increase in the volume of beach quality material from within the authorized ocean bar channel borrow area. This Minor Modification does not authorize an increase in the previously authorized depth of excavation in this area.
  - b. An alteration in authorized beach fill densities.
  - c. The discontinuation of the use of the previously approved upland spoil disposal area.
  - d. Modifications of the scope of the previously approved *Donax* aquaculture and reseeding study.
  
- 2) This Minor Modification shall be attached to the original of Permit No. 79-10, which was issued on 7/21/10, and copies of both documents shall be readily available on site when a Division representative inspects the project for compliance. All conditions and stipulations of the original permit remain in force under this Minor Modification unless specifically altered herein.

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.


Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

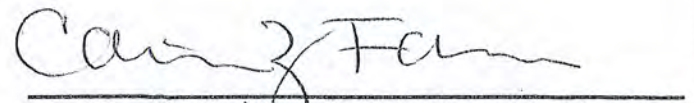
**June 12, 2014**

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

  
for Braxton C. Davis, Director  
Division of Coastal Management

This permit and its conditions are hereby accepted.

  
Interim Town Manager Signature of Permittee



STATE OF NORTH CAROLINA  
Department of Environment and Natural Resources  
and  
Coastal Resources Commission



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OCT 02 2013

DCM-MED CITY

# Permit

for

Major Development in an Area of Environmental Concern  
pursuant to NCGS 113A-118

Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of North Topsail Beach, 2008 Loggerhead Court, North Topsail Beach, NC 28460

Authorizing development in Onslow County at New River Inlet and Ocean Beach, within  
Town Limits, as requested in the permittee's letter dated 8/1/13, including the  
attached workplan drawings (3), 2 dated 8/8/13 and 1 dated received in the MHC Office on 8/21/13

This permit, issued on September 26, 2013, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

- 1) Unless specifically altered herein, this minor modification authorizes an increase in the density of fill to rates of 50 to 92 cubic yards per linear foot (cy/lf) with an average of 75 cy/lf, as well as skipping Phases 2-4 and proceeding to Phase 5 of the permitted project, all as expressly and specifically set forth in the attached work plan drawings.
- 2) This minor modification shall be attached to the original of Permit No. 79-10, which was issued on 7/21/10, the minor modification issued on 10/12/12, and copies of all documents shall be readily available on site when Division personnel inspect the project for compliance.
- 3) All conditions and stipulations of the active permit remain in force under this minor modification unless specifically altered herein.

(See attached sheet for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

June 12, 2014

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

*Douglas W. Haggitt*

for Braxton C. Davis, Director  
Division of Coastal Management

This permit and its conditions are hereby accepted.

*Stuart Turille*

*Stuart Turille*

Town Manager

Signature of Permittee



ADDITIONAL CONDITIONS

Army Corps of Engineers Conditions

- 4) All equipment must use the dedicated construction access points at Stations 900+00 (New River Inlet Road Beach Access) and/or Station 650+00 (Gray Street) as shown in the attached permit figure.
- 5) All personnel involved in the construction process along the beach will be trained in recognizing the presence of piping plovers and red knots prior to the initiation of the work on the beach. A contractor representative authorized to stop or redirect work shall be responsible for conducting a shorebird survey prior to 9:00 am each day of sand placement activities. The survey shall cover the work area and any location where equipment is expected to travel. The contractor shall note on their Quality Assurance form for each day any observance of red knots and/or piping plovers; and those forms, which verify the observance of those species, shall be submitted to the USACE Wilmington District Office the following day.
- 6) All necessary precautions and measures will be implemented so that any activity will not kill, injure, capture, pursue, harass, or otherwise harm any protected federally listed species (such as sea turtles, whales, manatees, shortnose and Atlantic sturgeon, and piping plover). While accomplishing the authorized work, if the permittee discovers or observes a damaged or hurt listed endangered or threatened species, the USACE will be immediately notified so that required coordination can be initiated with the U.S. Fish and Wildlife and/or National Marine Fisheries Service.

NOTE:

This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.

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OCT 02 2013

DCM-MED CITY

STATE OF NORTH CAROLINA  
Department of Environment and Natural Resources  
and  
Coastal Resources Commission



# Permit

- for
- Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118
  - Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of North Topsail Beach, 2008 Loggerhead Court, North Topsail Beach, NC 28460  
 Authorizing development in Onslow County at New River Inlet and Ocean Beach, within  
Town Limits, as requested in the permittee's letter dated 12/20/13

This permit, issued on June 17, 2014, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

- 1) Unless specifically altered herein, this minor modification authorizes the town to construct phases II-V of the permitted beach nourishment project in any sequence the town deems necessary, so long as the previously permitted volumes and templates are not altered.
  - 2) This minor modification authorizes a one-time extension of the moratorium until April 30, 2015. All future events shall adhere to the moratorium dates as shown on the active permit.
  - 3) This minor modification shall be attached to the original of Permit No. 79-10, which was issued on 7/21/10, as well as all subsequent modifications, refinements and renewals, and copies of all documents shall be readily available on site when Division personnel inspect the project for compliance.
- (See attached sheet for Additional Conditions)**

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

*Douglas V. Haggitt*

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

for Braxton C. Davis, Director  
Division of Coastal Management

Any maintenance work or project modification not covered hereunder requires further Division approval.

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All work must cease when the permit expires on  
June 12, 2014

JUN 23 2014

This permit and its conditions are hereby accepted.

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

DCM-MHD CITY

*Grant J. Smith*

Signature of Permittee

ADDITIONAL CONDITIONS

- 4) All conditions and stipulations of the active permit remain in force under this minor modification unless specifically altered herein.

NOTE: This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.

STATE OF NORTH CAROLINA  
Department of Environment and Natural Resources  
and  
Coastal Resources Commission

# Permit



- for
- Major Development in an Area of Environmental Concern pursuant to NCGS 113A-118
  - Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of North Topsail Beach, 2008 Loggerhead Court, North Topsail Beach, NC 28460  
 Authorizing development in Onslow County at New River Inlet and Ocean Beach, within  
Town Limits, as requested in the permittee's letter dated 12/20/13

This permit, issued on June 20, 2014, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

- 1) Unless specifically altered herein, this minor modification authorizes the town to construct phases II-V of the permitted beach nourishment project in any sequence the town deems necessary, so long as the previously permitted volumes and templates are not altered.
- 2) This minor modification authorizes a one-time extension of the moratorium until April 30, 2015. All future events shall adhere to the moratorium dates as shown on the active permit.
- 3) This minor modification shall be attached to the original of Permit No. 79-10, which was issued on 7/21/10, as well as all subsequent modifications, refinements and renewals, and copies of all documents shall be readily available on site when Division personnel inspect the project for compliance.

(See attached sheet for Additional Conditions)

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This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

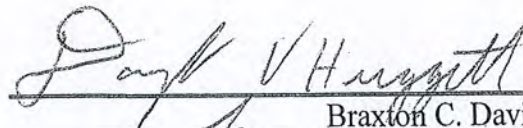
Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on


**June 12, 2015**

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

  
 Braxton C. Davis, Director  
 Division of Coastal Management

This permit and its conditions are hereby accepted.

  
 Signature of Permittee

ADDITIONAL CONDITIONS

- 4) All conditions and stipulations of the active permit remain in force under this minor modification unless specifically altered herein.

NOTE: This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.

## Dail, Jason

---

**From:** Priest, Adam T. <adam.priest@cbi.com>  
**Sent:** Friday, October 03, 2014 12:17 PM  
**To:** Dail, Jason  
**Subject:** NTB Sand Bag Revetment

Jason,

The information provided in the Town of North Topsail Beach, Application for CAMA Major Development Permit submitted on September 26<sup>th</sup> 2014 regarding the area impacted by the sand bag revetment above and below the Mean High Water (MHW) line was based on a recent shoreline survey performed August 29, 2014. The Topsail Reef condominium contracted with Bill Forman of Bearing Point Consulting to have the shoreline surveyed. Bearing Point subcontracted the survey to Gahagan and Bryant Associates and the data was provided to CPE. All calculations to determine the areal extent of the sand bag revetment seaward of the MHW line were based on this most recent survey data. As stated in the permit the maximum distance the sand bag revetment footprint extends waterward of the NHW is 7.1 ft. This maximum distance occurs at approximately Station 1155+00 based on the recent MHW survey data collected August 29<sup>th</sup>, 2014. Between stations 1152+00 and 1157+00 the footprint of the sand bag revetment extends an average of 4.6 ft waterward of the MHW line. This accounts for an area of approximately 2,300 sq. ft (0.053 ac) of the sand bag revetment footprint (also known as the disposal area) that is waterward of the most recent MHW line data. Please let me know if this information is sufficient for you evaluation, if you require any further information please let me know.

Thank you,



**Adam Priest**  
Engineer I  
Coastal, Ports and Marine  
Environmental & Infrastructure  
Tel: + 1 910 791 9494  
Cell: + 1 850 276 1265  
Fax: + 1 910 791 4129  
[adam.priest@CBI.com](mailto:adam.priest@CBI.com)

CB&I  
4038 Masonboro Loop Road  
Wilmington, NC 28409  
USA  
[www.CBI.com](http://www.CBI.com)

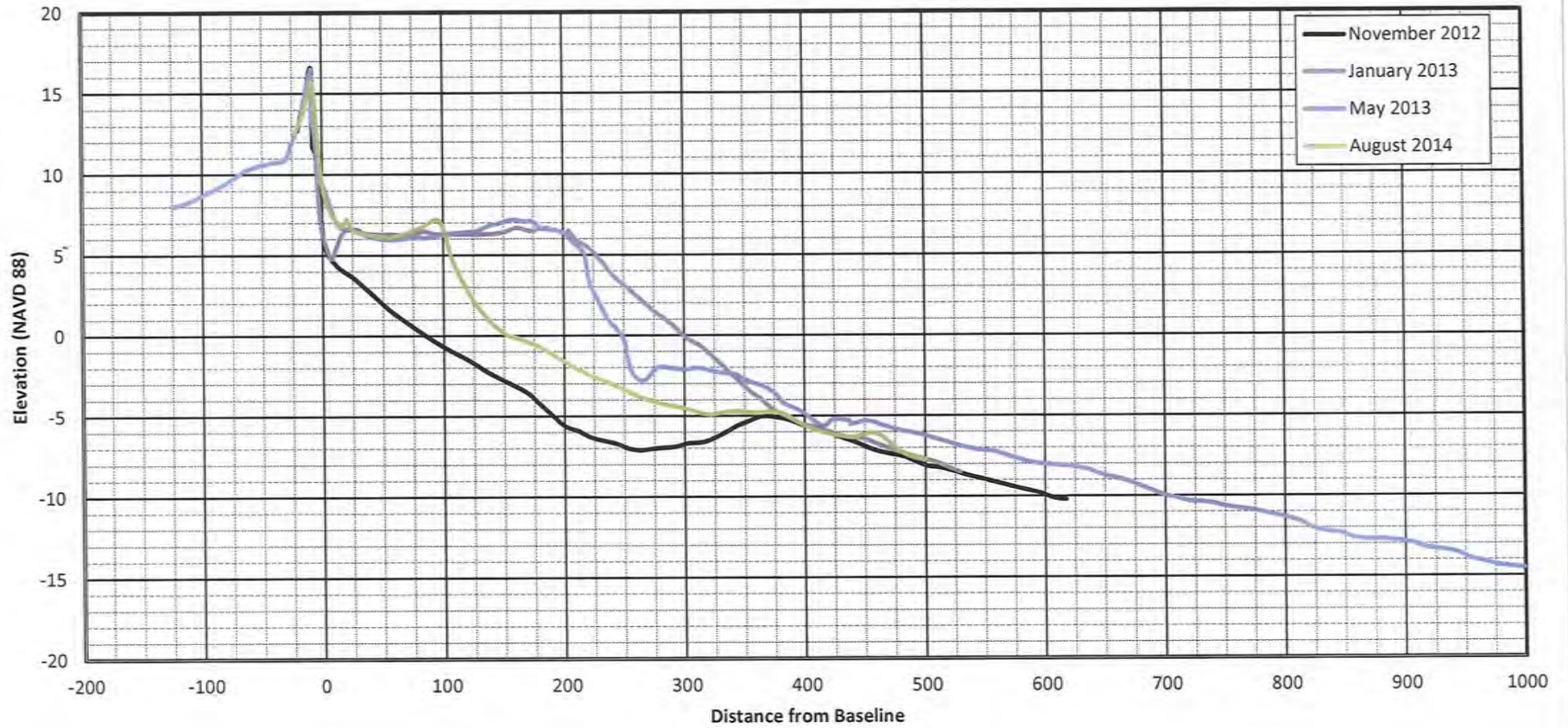
This e-mail and any attached files may contain CB&I (or its affiliates) confidential and privileged information. This information is protected by law and/or agreements between CB&I (or its affiliates) and either you, your employer or any contract provider with which you or your employer are associated. If you are not an intended recipient, please contact the sender by reply e-mail and delete all copies of this e-mail; further, you are notified that disclosing, copying, distributing or taking any action in reliance on the contents of this information is strictly prohibited.

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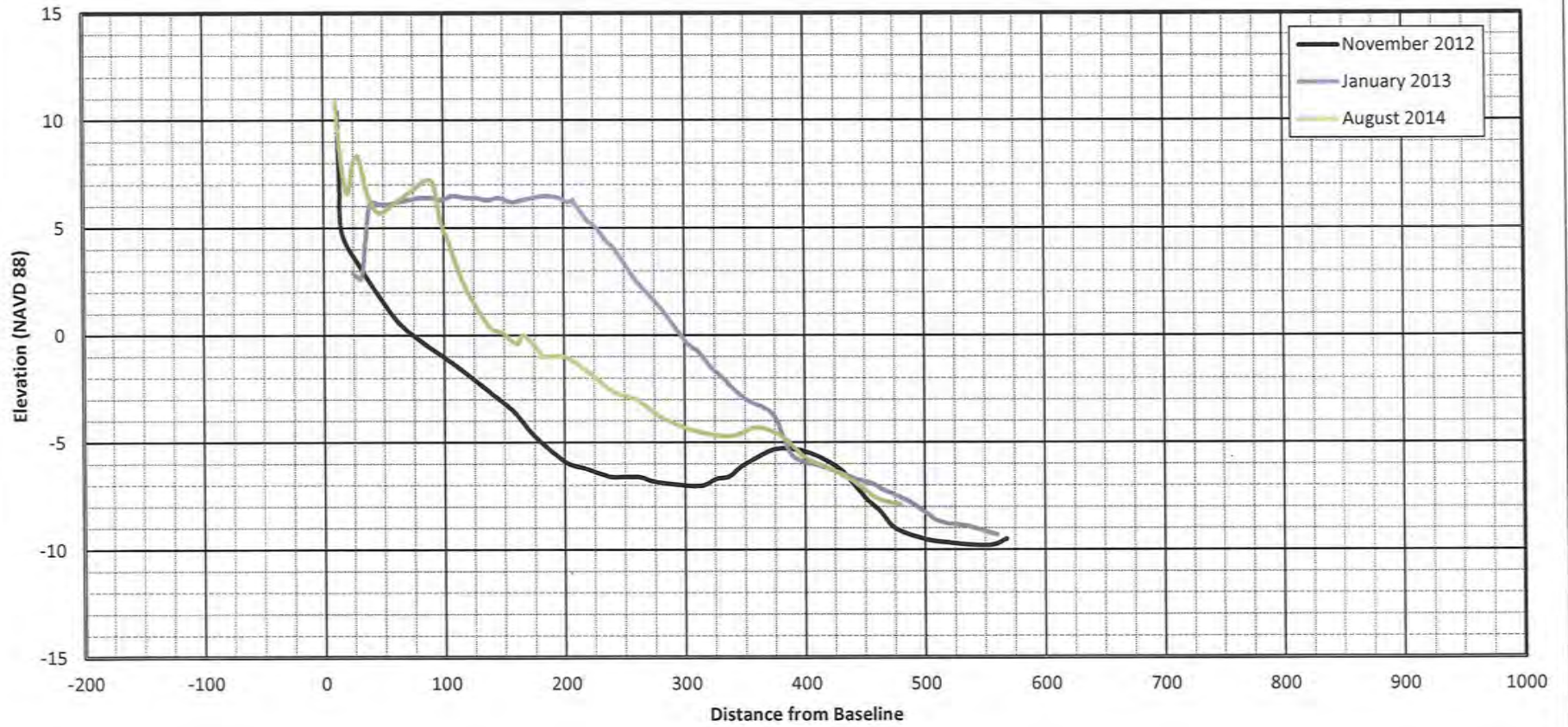
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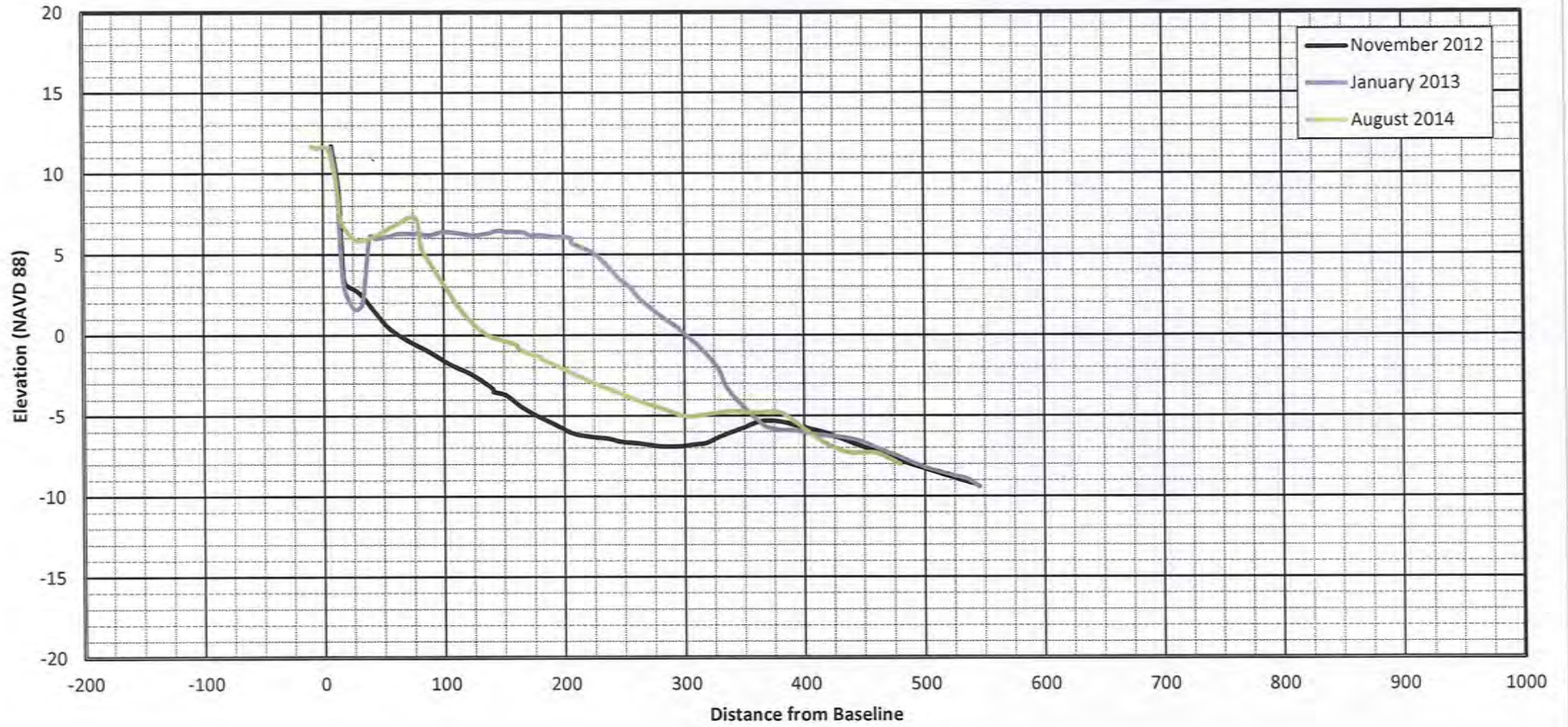




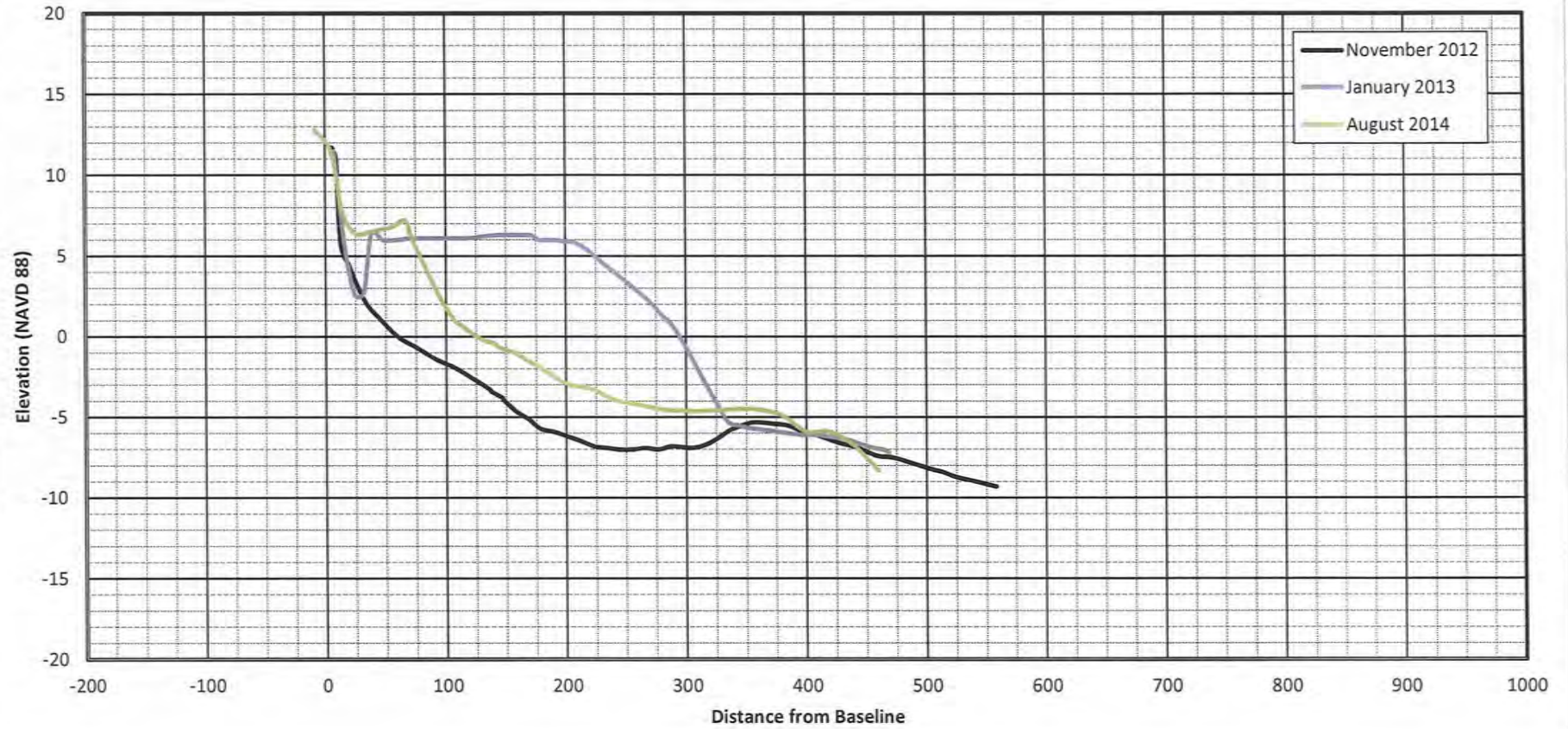
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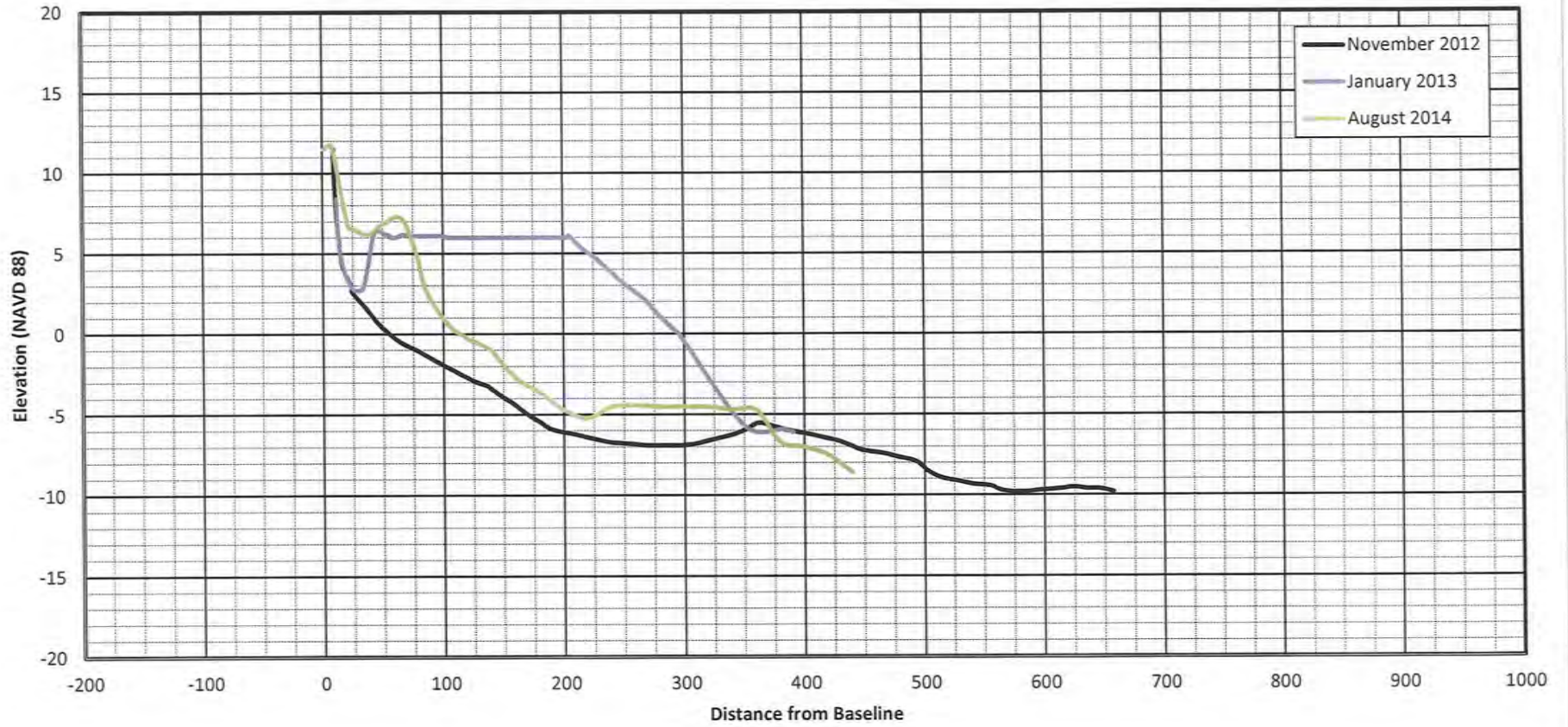
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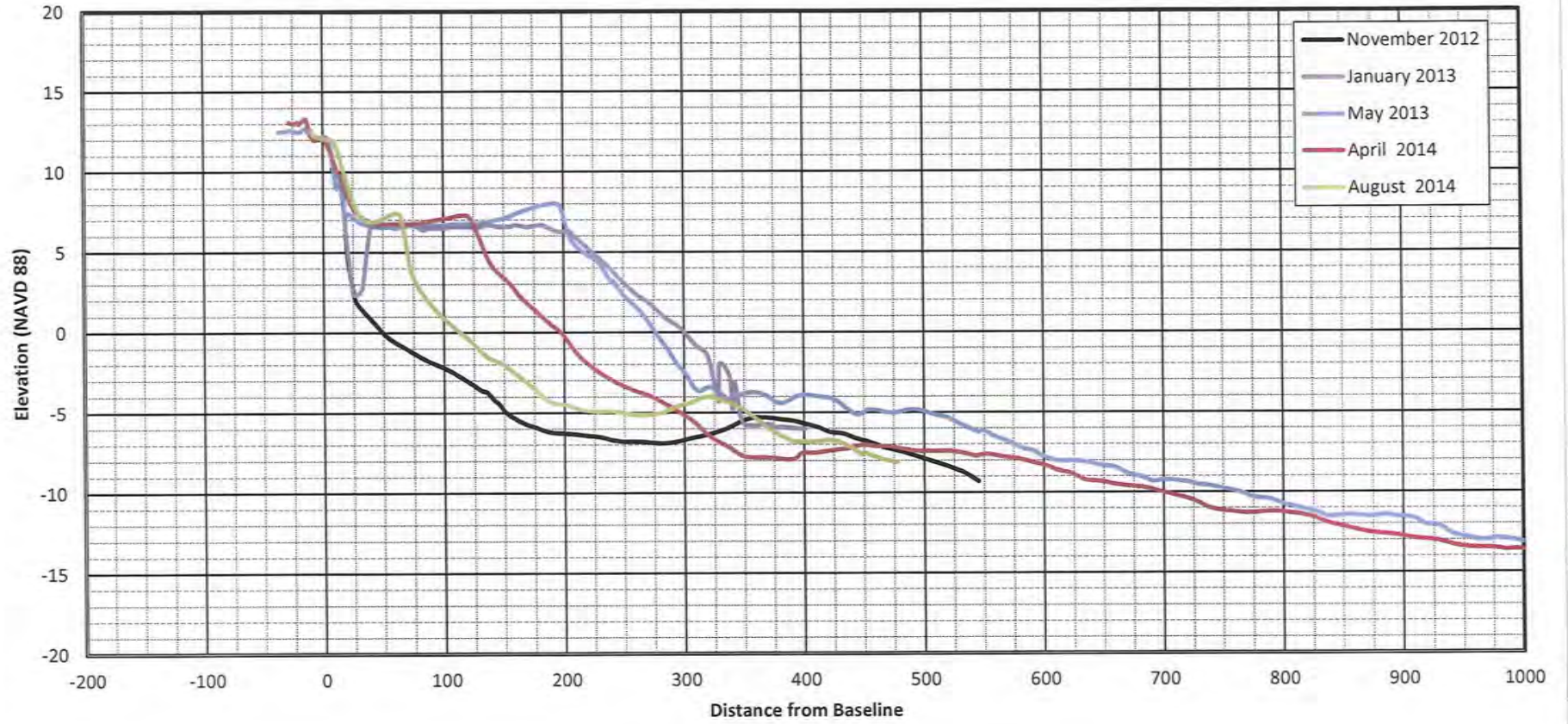
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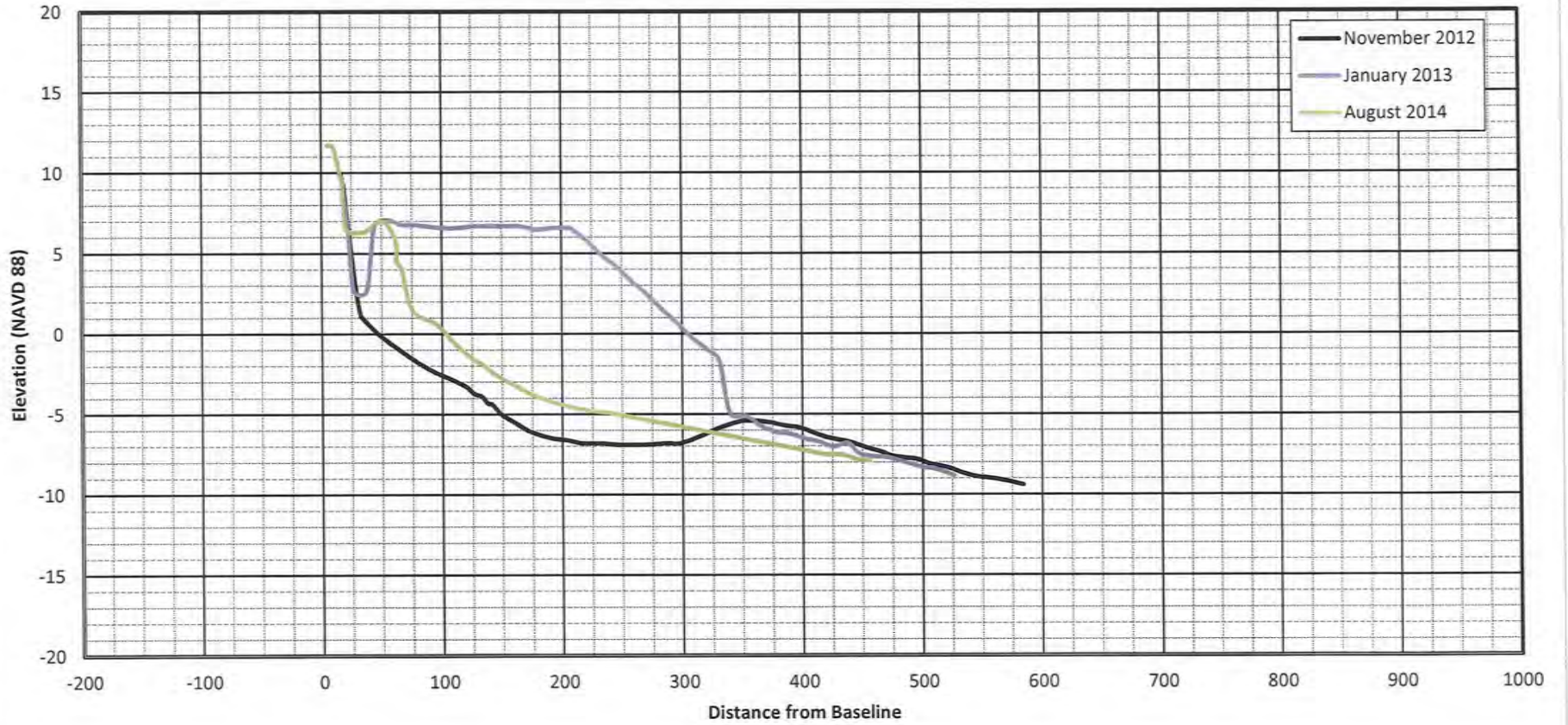
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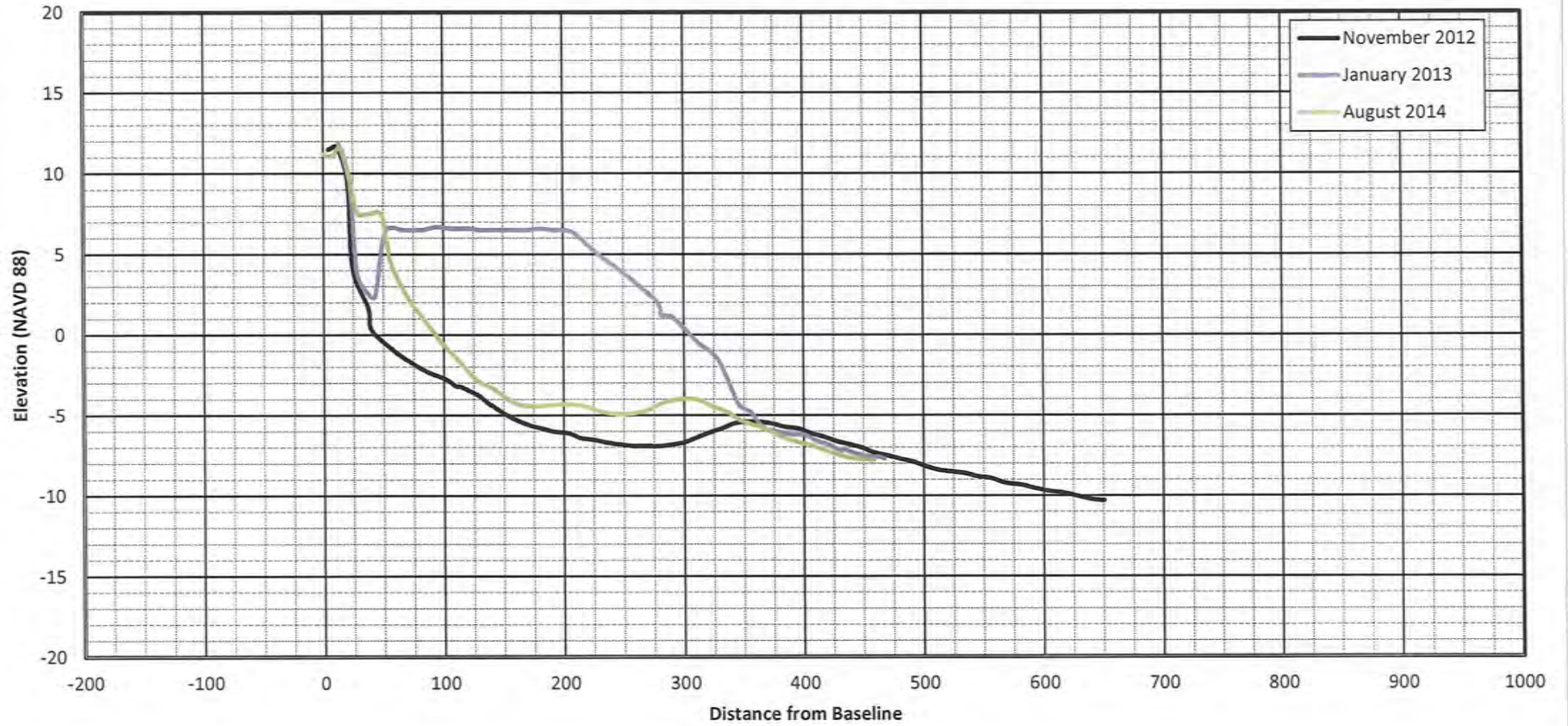
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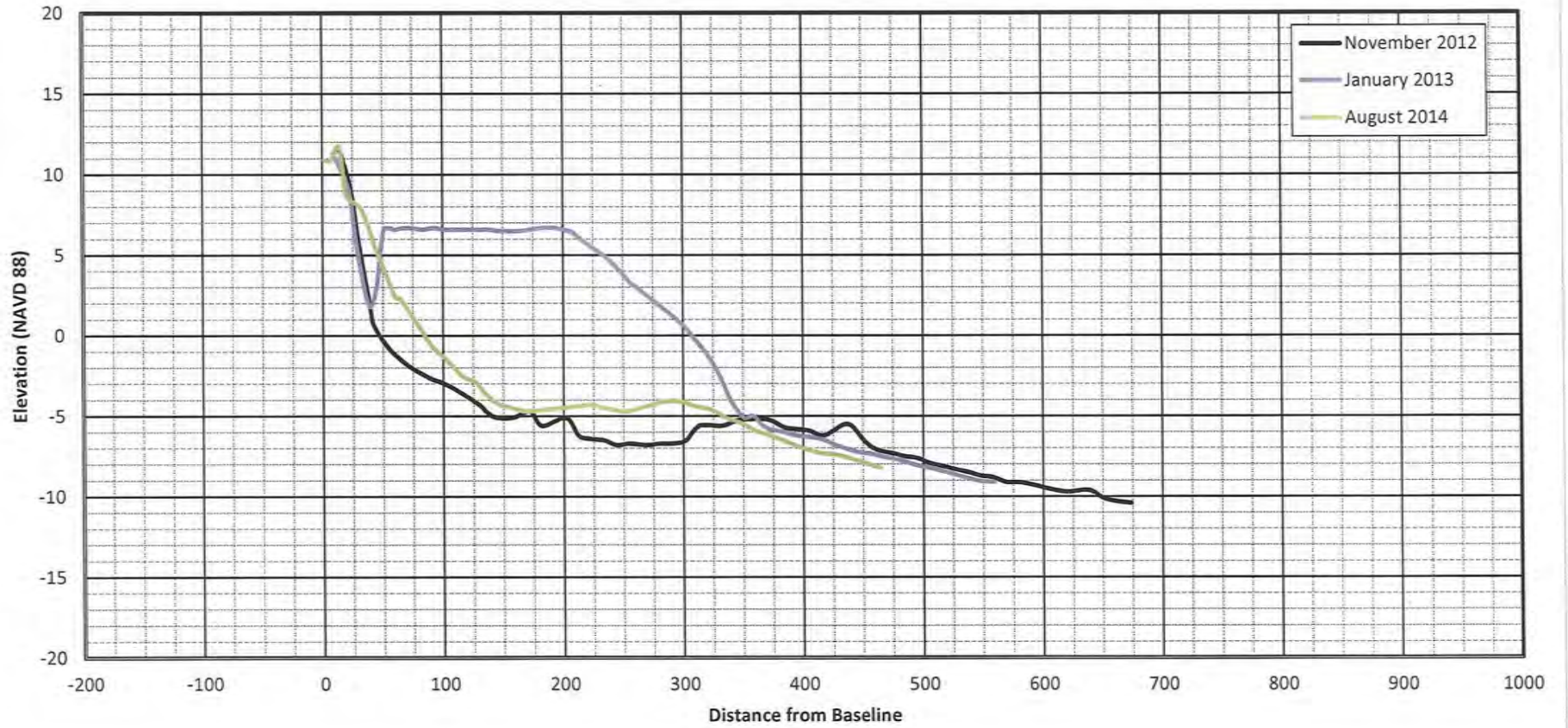
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### North Topsail Beach Station 11+42

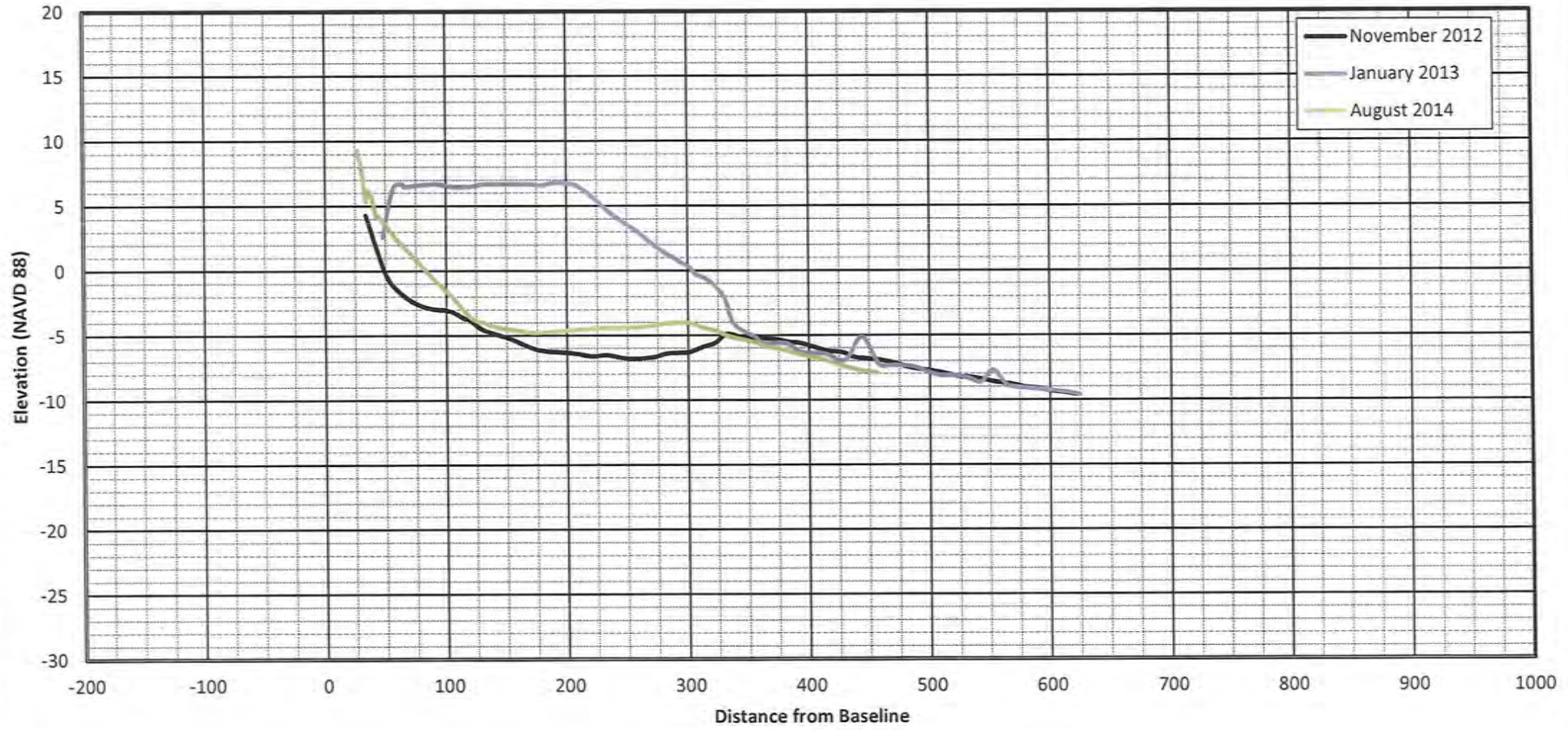


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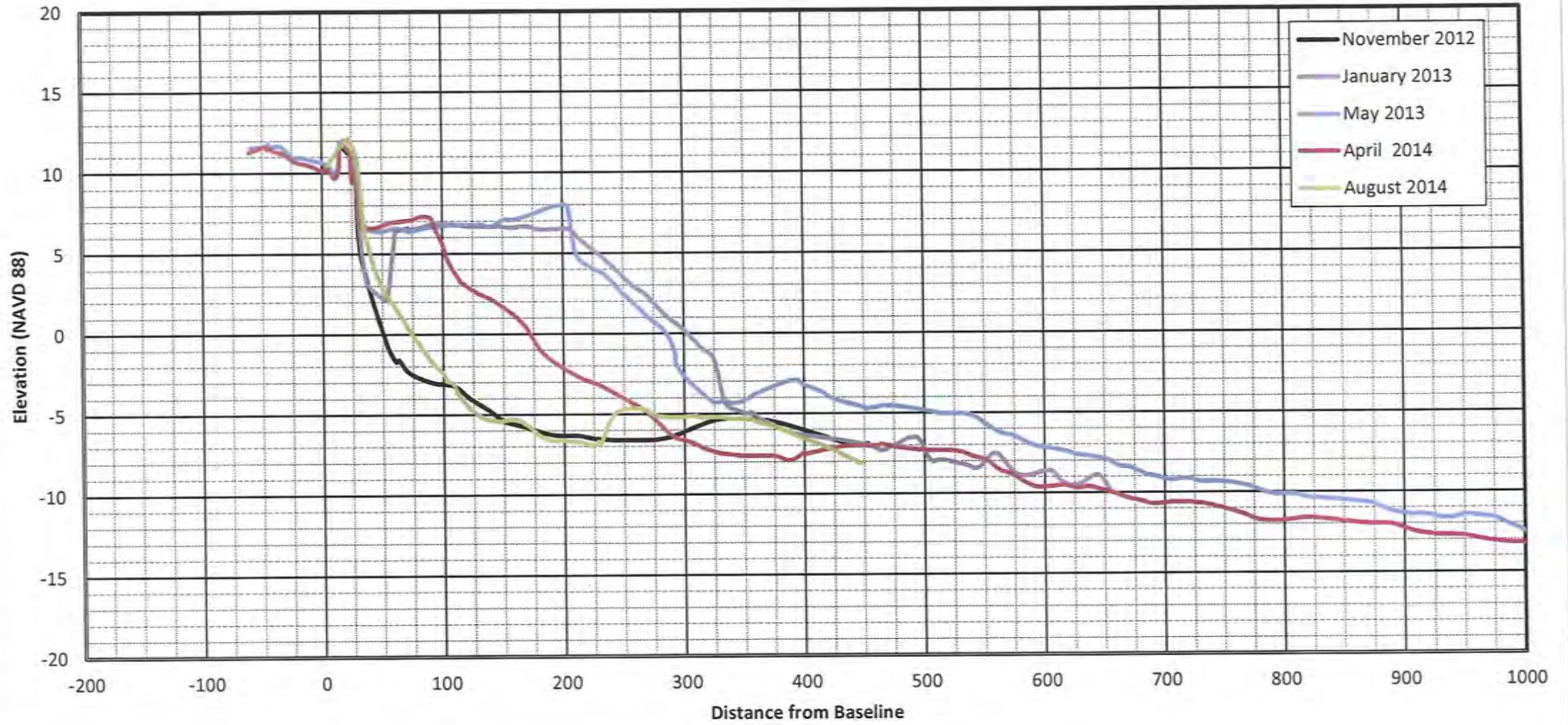




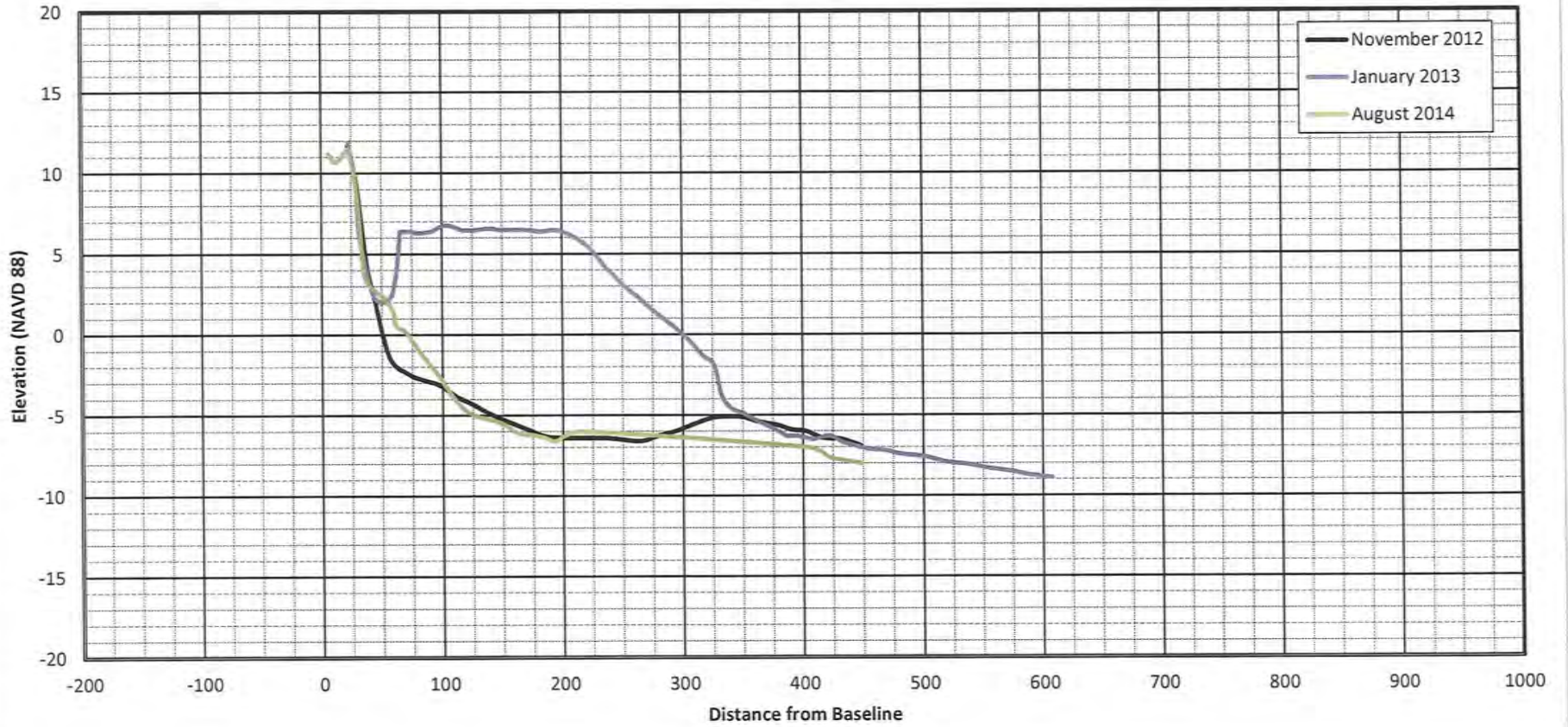
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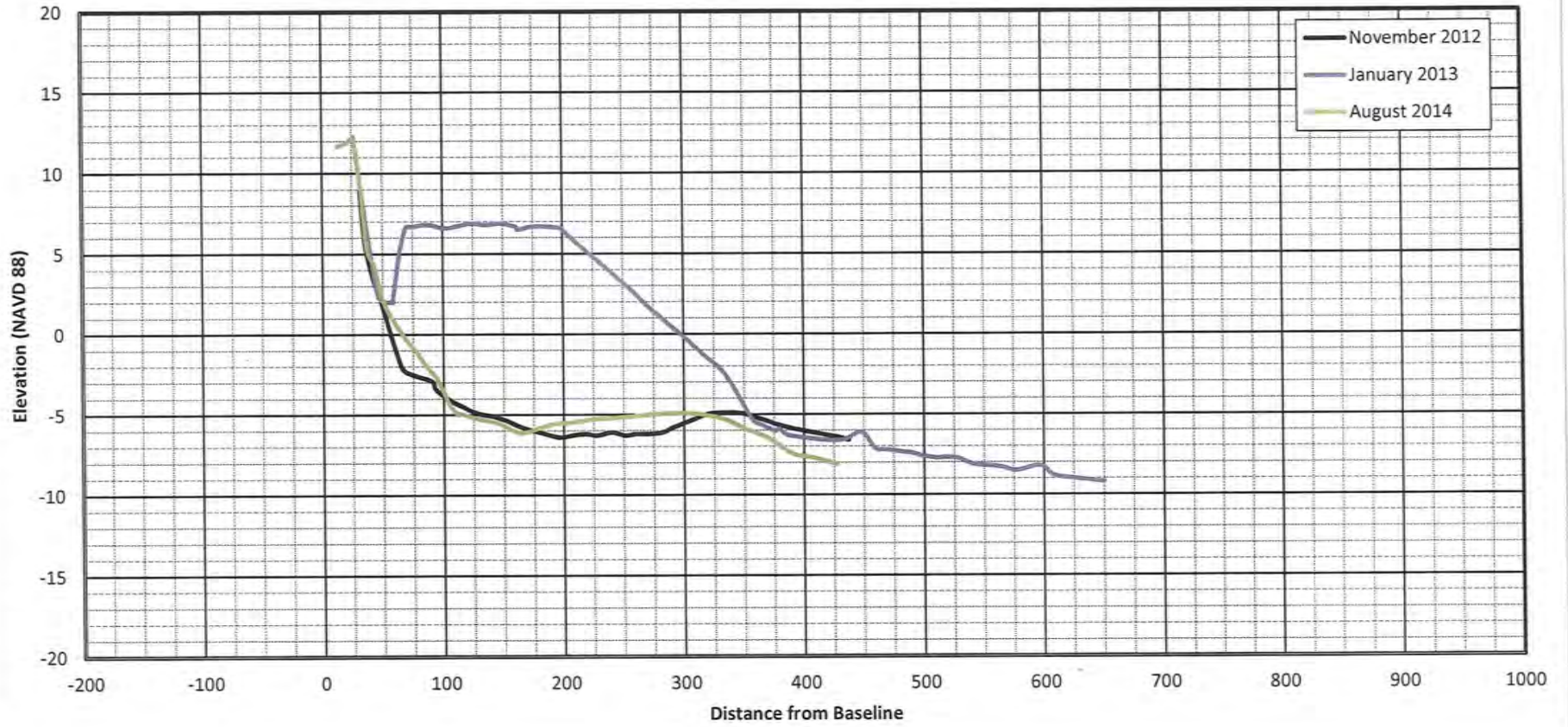
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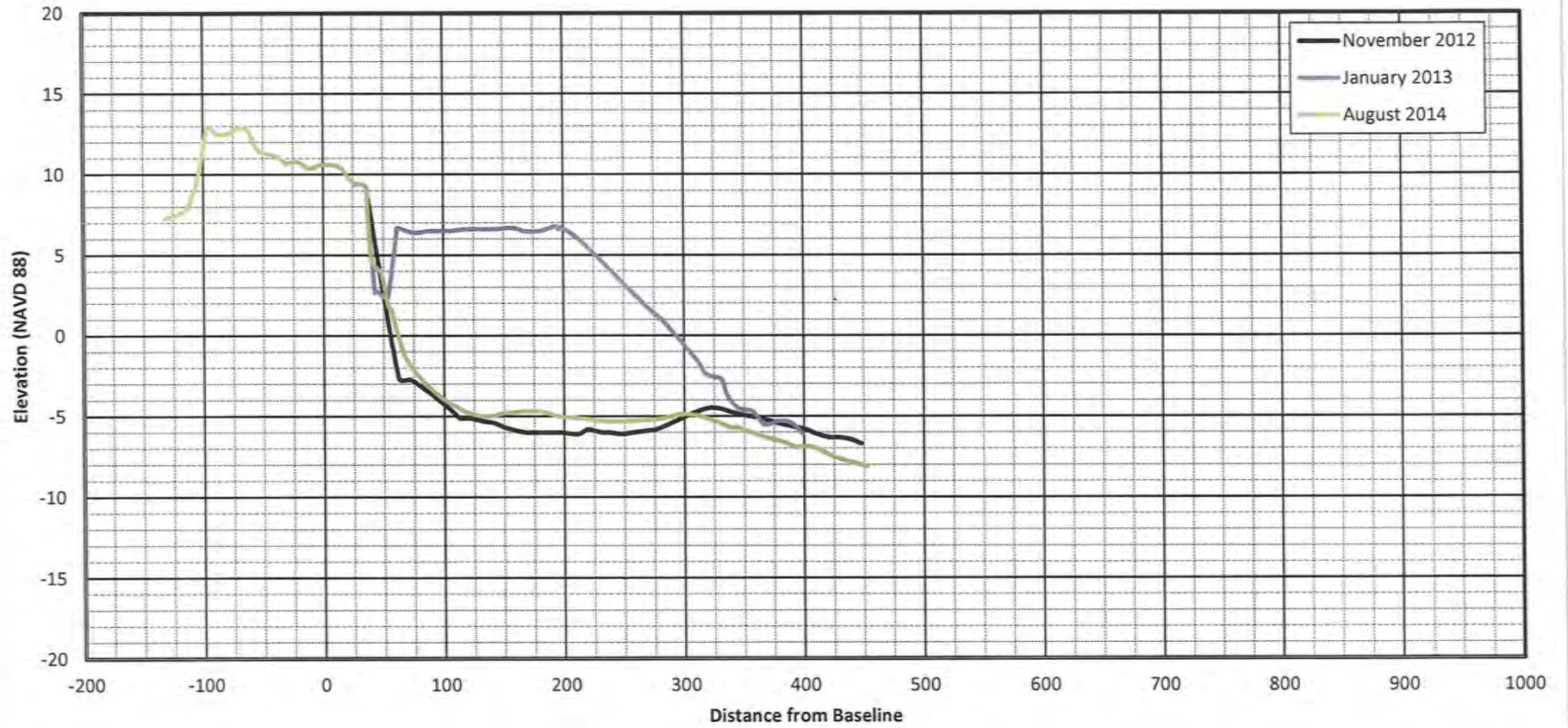
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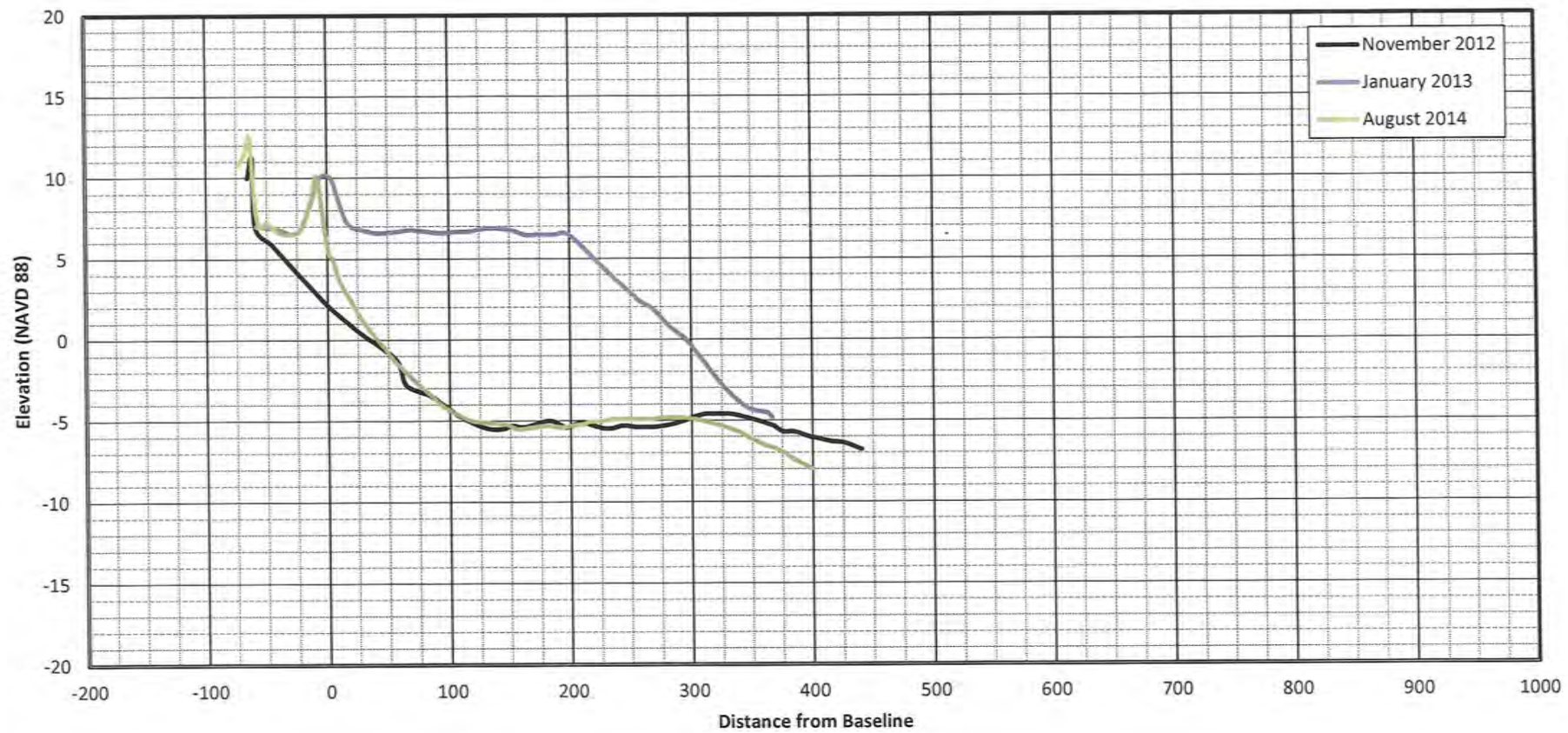
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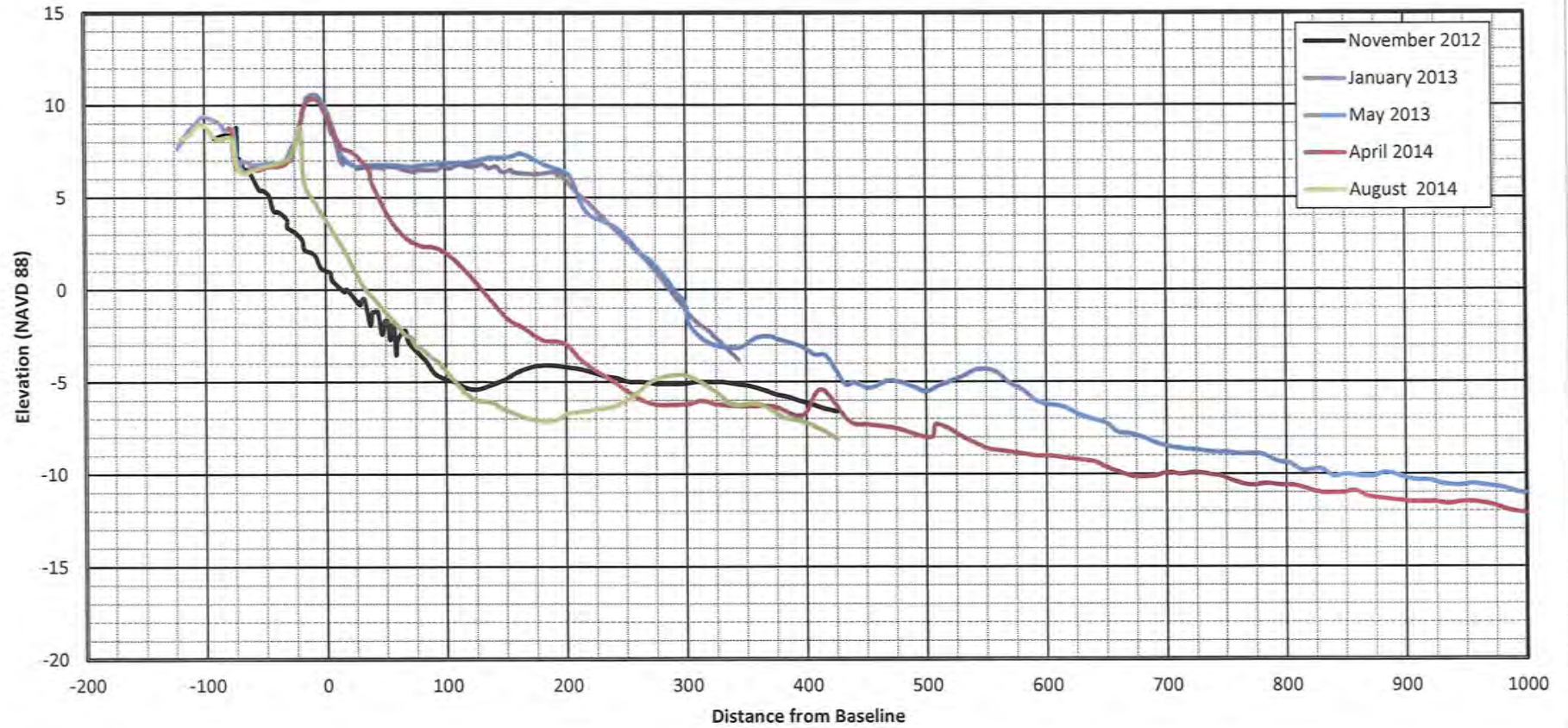
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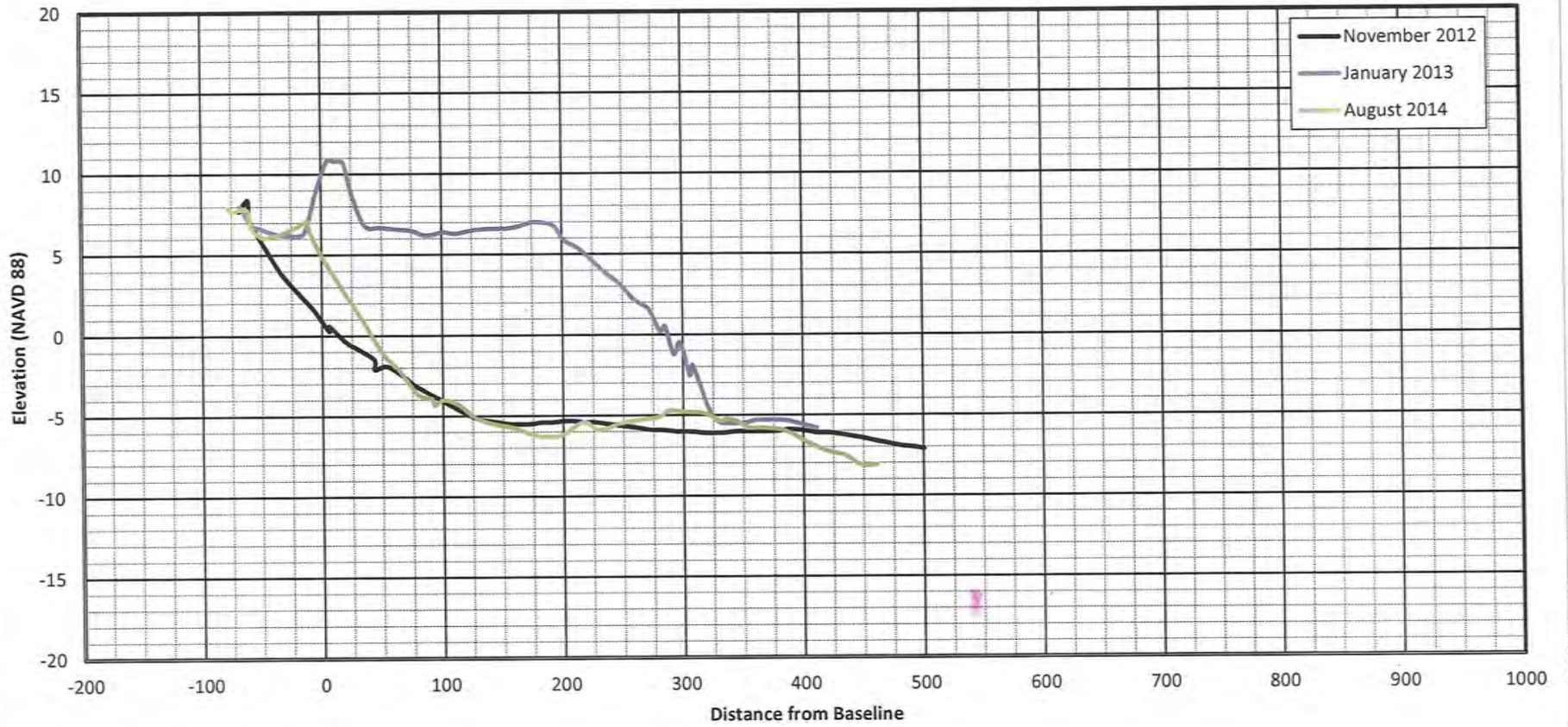
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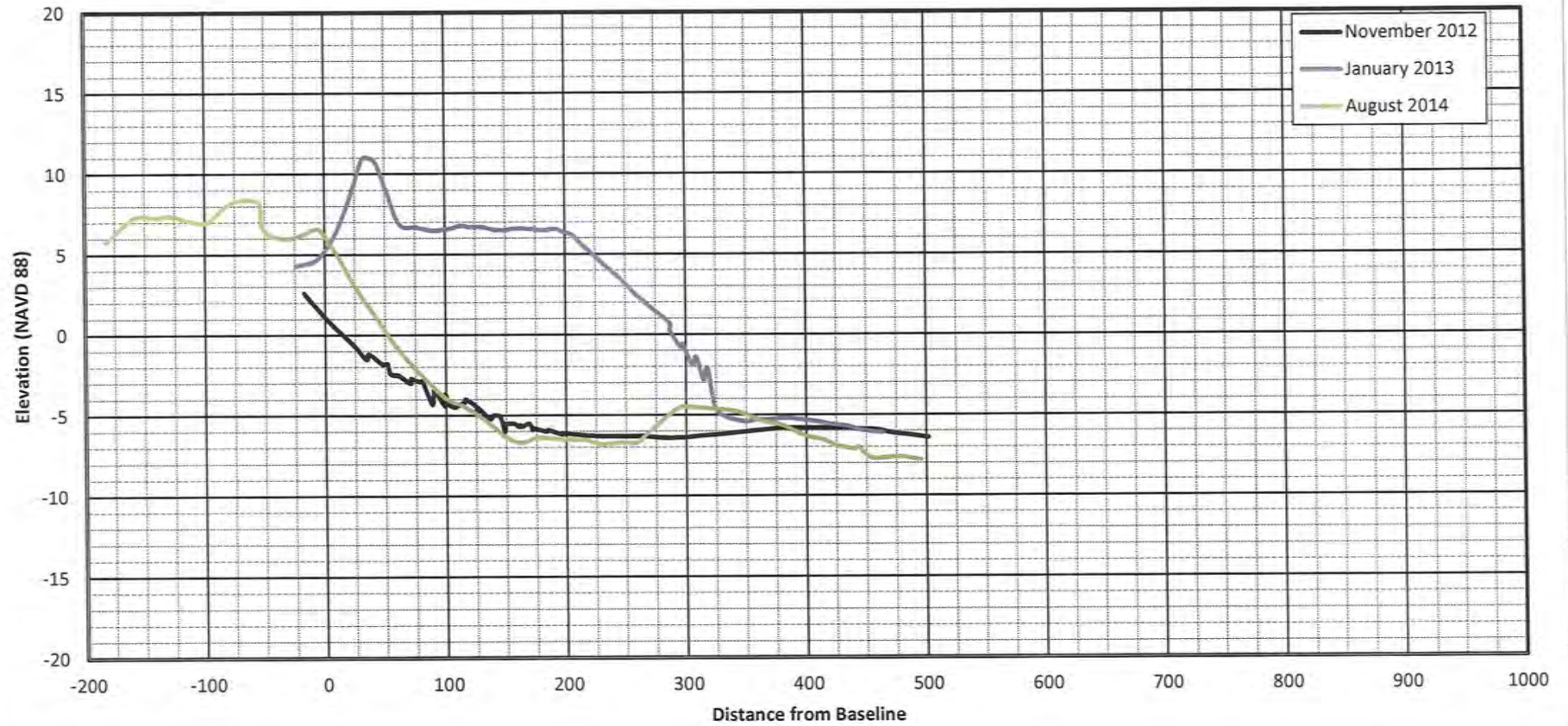


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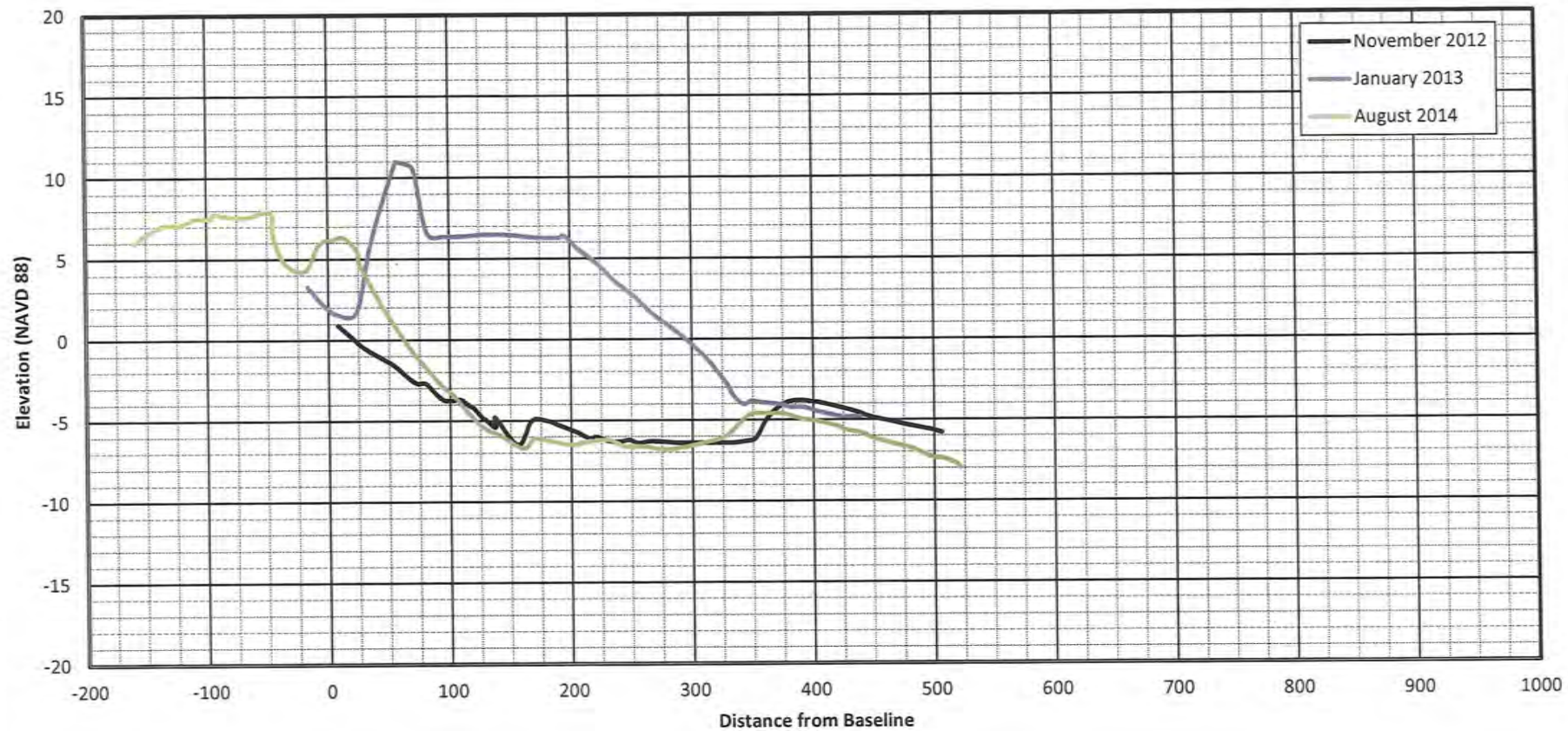




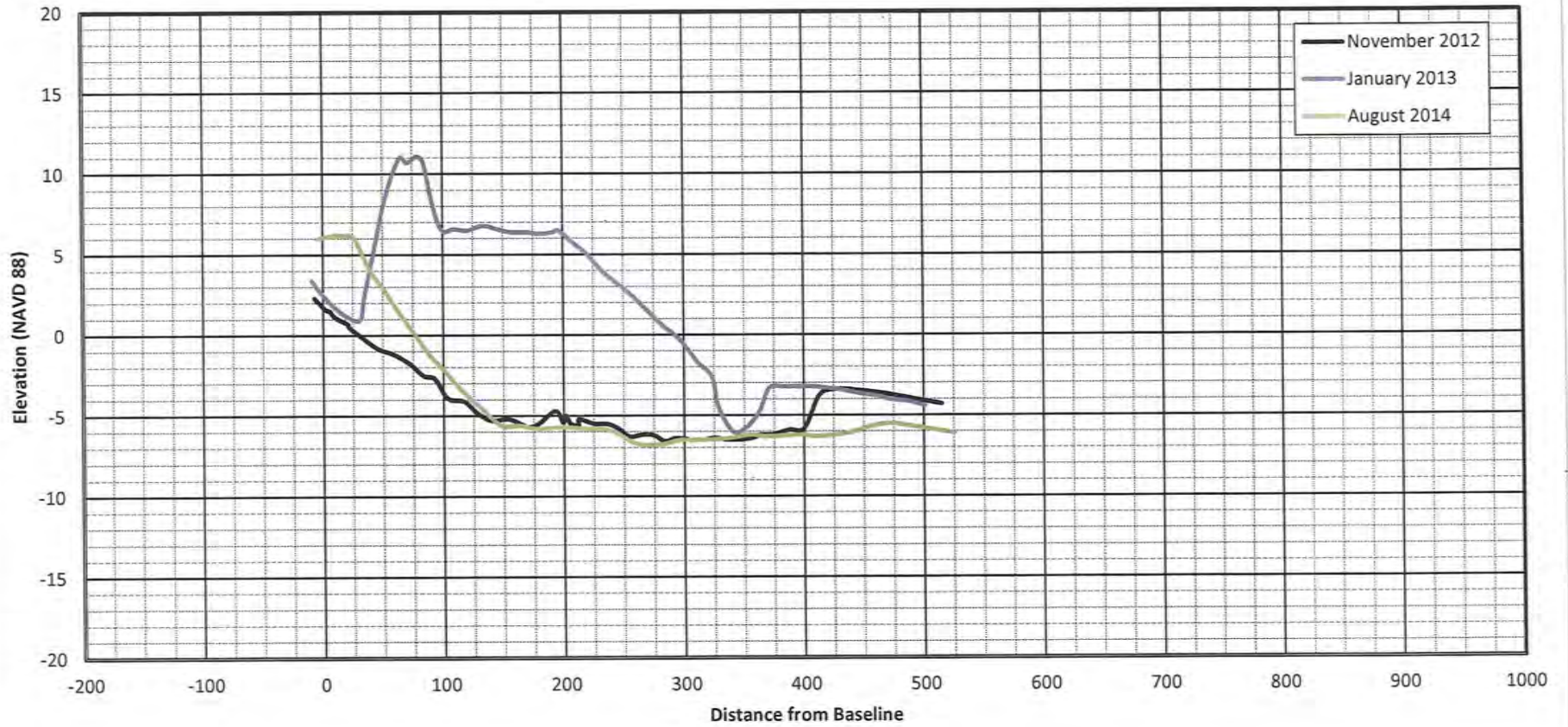
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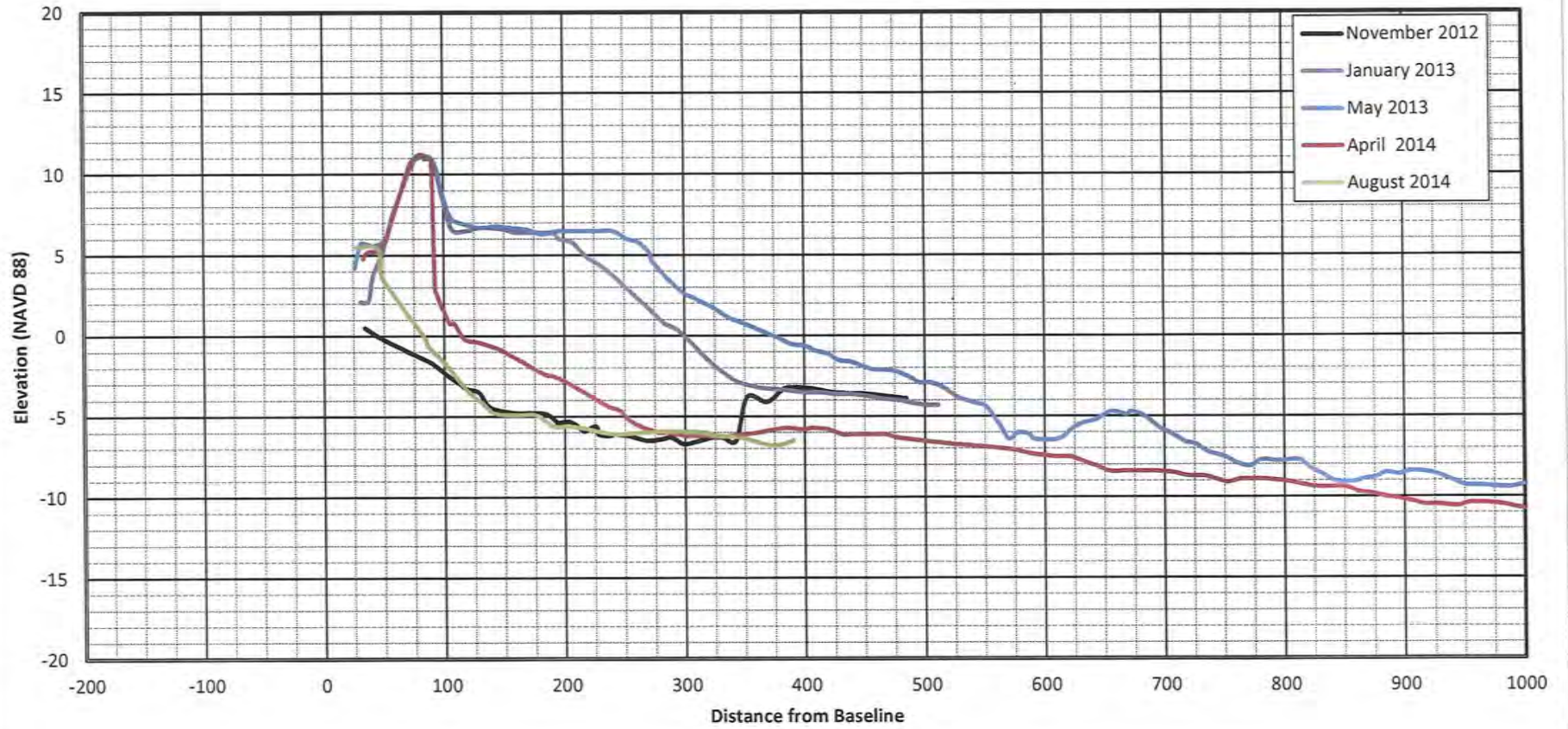
### North Topsail Beach Station 11+53



### North Topsail Beach Station 11+54



### North Topsail Beach Station 11+55



Mr. Brian E. Edes

14 November 2014

Crossley McIntosh Collier Hanley & Edes, PLLC  
Attorneys-at-Law  
5002 Randall Parkway  
Wilmington, North Carolina 28403

Dear Mr. Edes:

I have been asked to express my opinion regarding the cause of the erosion along the North Topsail Beach oceanfront shoreline immediately adjacent to New River Inlet. This 4,500 ft shoreline segment has been a chronic erosion zone for the past two decades. The shoreline retreat along this shoreline reach was/is related to the easterly movement of the outer bar channel and the attendant reconfiguration of the ebb-tidal delta. The consequence of the shape changes resulted in the removal of the wave sheltering-effect of the ebb delta along the North Topsail Beach oceanfront. This condition has existed along the above mentioned erosion hot-spot since the early 1990s.

In January 2013, the ebb channel was realigned in a near shore-normal fashion in an effort to restore the conditions that once favored accretion along the above mentioned shoreline. A realignment of the outer bar channel was predicted to result in major changes including an enlargement of the southwestern ebb shoal segment offshore the eroding shoreline. Realignment of the channel also afforded an opportunity to re-nourish the eroding shoreline with the compatible dredge material. The repositioned ebb channel was predicted to result in shoreline accretion along the erosion hot-spot when the outer bar had reconfigured to an optimum shape. The length of time necessary to achieve this configuration was estimated to range from 3 to 4 years.

When the project was completed in January 2013, the planform of the renourished oceanfront shoreline was *not* in equilibrium with the conditions that existed in early 2013. As a result, the fill material along North Topsail Beach began to erode because of the lack of a breakwater effect provided by the yet to be reconfigured southwestern portion of the ebb-tidal delta. During the past 1.8 years the ebb delta has reconfigured but not to the extent predicted for the optimum conditions at the end of 3-4 years. It is my opinion that

if the channel had not been relocated erosion would still have occurred and may likely have occurred at an earlier date.

Respectively,

*William J. Cleary*

William J. Cleary Ph. D., PG



# Town of North Topsail Beach

North Carolina

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## North Topsail Beach Shoreline Protection Project

### Phase I New River Inlet Channel Realignment & Beach Restoration

### Year 2 Post-Construction Physical Monitoring Report



*(Aerial Photo dated Oct. 2014)*

USACE Permit SAW 2005-00344

October 2014

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Prepared By:

Coastal Planning & Engineering of North Carolina, Inc.  
4038 Masonboro Loop Road  
Wilmington, NC 28409

TOWN OF NORTH TOPSAIL BEACH, NC  
NEW RIVER INLET CHANNEL REALIGNMENT AND BEACH RESTORATION  
YEAR 2 POST-CONSTRUCTION MONITORING REPORT

## **EXECUTIVE SUMMARY**

The Town of North Topsail Beach completed Phase 1 of a comprehensive shoreline protection project in February 2013. The New River Inlet ocean bar channel was realigned closer to North Topsail Beach to provide stability to the shoreline. The realignment of the channel was designed to cause the ebb tide delta of New River Inlet to reconfigure with a build-up of material on the south side and deflation of the north side. Once the south side of the ebb tide delta fully responds to the new bar channel position and alignment, a process that could take 5 years or more, the reconfigured ebb delta will provide a protective buffer between offshore wave forces and the project shoreline. The reconfigured ebb tide delta will also divert flood tide currents offshore and away from the inlet shoreline which will alleviate some of the erosion forces that plagued the area prior to construction.

Material removed from the New River Inlet was placed along 7,735 ft. of shoreline to widen the beach berm (+6.0 ft. NAVD88) approximately 135 ft. The project extended south from New River Inlet to Shipwatch Villas, or from station 1163+00, on the north end of Topsail Island, to station 1090+00.

Marinex Construction began dredging the new channel on November 26, 2012 and completed the dredging work for Phase 1 45 days later on January 9, 2013. The work was accomplished with the Dredge *Savannah*. The ocean bar channel in New River Inlet was excavated to an average depth of -18 ft. NAVD88 and a 500 ft. width. Approximately 592,000 cy of material were removed from the 3,500 ft. long channel and placed on the shoreline of North Topsail Beach. The in-place volumetric calculations reflect the beach received approximately 566,244 cy, or an average fill density of +73 cy/lf. Due to mitigation efforts for impacts sustained from Hurricane Sandy, the placed density was approximately 13 cy/lf higher than the permitted density. The average shoreline change measured as a result of the construction at the Mean High Water (MHW) contour (+1.4 ft. NAVD88) was a seaward movement of 170 ft.

A monitoring plan to document the projects performance has been established by the Town of North Topsail Beach. The plan specifies profile surveys along the project shoreline and within New River Inlet to record the current conditions. The survey results will be compared with pre-construction and post-construction monitoring data to calculate shoreline position and volume change within the project area.

The federal permit (USACE, 2011) also requires monitoring of the south end of Onslow Beach to identify impacts that may occur due to the project's construction and document sediment migration patterns along the beach strand and within the pre-construction ocean bar channel. The Onslow Beach surveys will also document changes in the northern ebb shoal of New River Inlet as it responds to the channel realignment.

### **Phase 1 Project Area**

Based on the findings of the April 2014 monitoring, the Phase 1 Project Area was divided into two regions to more accurately assess the changes occurring along the project beach. The two



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regions are the northern end of the project from just north of River Dr. to the north end of the Topsail Reef condominiums (station 1160+00 to 1145+00) and the beach strand portion of the project from station 1145+00 to station 1090+00. The northern area was evaluated separately as it experienced higher than expected erosion rates attributed to the influence of the New River Inlet.

The shoreline and volumetric analysis of the inlet influenced area (station 1160+00 to 1145+00) indicate this area experienced erosion from May 2013 to April 2014. The linear changes in the Mean High Water (MHW) contour, +1.4 ft. NAVD88, and the foreshore position measured an average retreat of -155 ft. and -233 ft. landward, respectively. The results of the volume analysis indicate that this area lost approximately -123,000 cy or -74 cy/lf. This area is being highly influenced by a nodal zone. A nodal zone is an area of localized erosion created when there is a divergence in the predominant direction of sediment transport. The change in direction is a result of wave refraction around the ebb delta. The curvature of the ebb tide delta acts as a focusing lens which causes the wave crests to change direction as they pass over the delta resulting in wave crests moving in the direction of the inlet regardless of the offshore direction. The point where the wave direction changes due to wave refraction is referred to as the nodal zone. Nodal zones are a naturally occurring phenomenon at inlets with ebb deltas.

Volumetric analysis of the beach strand portion of the project area (station 1145+00 to 1090+00) calculated that the area experienced a net volumetric loss of -98,000 cy or approximately -22 cy/lf from May 2013 to April 2014. The linear changes in the Mean High Water (MHW) contour, +1.4 ft. NAVD88, and the foreshore position measured an average retreat of -41 ft. and -48 ft. landward, respectively. These relatively high rates of change are mostly due to profile adjustments after construction and additional erosional impacts from above average intensity winter weather that affected the project area prior to the April 2014 monitoring event.

### **Adjacent Shoreline to the South**

The linear shoreline analysis of the profiles south of the project area between the May 2013 and April 2014 surveys (stations 1090+00 to 1040+00) showed average seaward changes along the MHW (+1.4 ft. NAVD88) and foreshore contours of +9 ft. and +12 ft., respectively. The volume change calculated for the same section of shoreline also shows a net of approximately +3,000 cy between May 2013 and April 2014. The results and comparisons of profiles indicated losses and gains occurred at each station but overall this area experienced relative stability since May 2013.

### **Ocean Bar Channel Shoaling**

Five (5) hydrographic survey data sets collected within the limits of the realigned channel since the project was constructed were compared to determine shoaling of the realigned channel. By January 2014 or approximately one year following construction, the new bar channel had accumulated 334,400 cy which was equal to 56% of the initial dredge volume. By April 2014 (15 months post-construction) the volume of material captured by the new channel was 448,000 cy or about 76% of the initial dredge volume. A channel shoaling analysis conducted during the engineering and design phase of the project predicted that approximately 286,000 cy (48%) of

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the material would shoal into the channel during the first year. Although the measured shoaling of the channel suggests a slightly higher shoaling rate, the rates appear to be generally in line with what was predicted.

In response to the shoaling, the thalweg, or deepest portion of the channel, has shifted to the north along the landward sections of the channel and to the southwest along the outer sections of the channel. As a result of the shifting alignment, the average depth along the thalweg of the bar channel as of April 2014 was approximately elevation -12 ft. NAVD88 with depths ranging from -10 ft. to -19.5 ft. NAVD88.

### **Ebb Shoal Reconfiguration**

The April 2014 monitoring data suggests the North Topsail Beach ebb shoal reconfiguration is continuing to develop as expected. The changes in the ebb tide delta as seen in the profile data show the shoal offshore of Onslow Beach migrating landward and to the south indicating a continuation of the ebb delta “deflation” north of the inlet. Comparison of May 2013 and April 2014 beach profile surveys also show that the pre-construction ocean bar channel and flood channels have filled in. The shoaling of the pre-construction ocean bar channel and flood channels is generally seen as a positive sign that the ebb shoal is reconfiguring as designed. Comparison of the profile surveys along the North Topsail Beach shoulder (south of inlet) shows an increase in the volume of sand accumulating within the ebb shoal area along the profile at station 1160+00. This is a further indication that the realignment of the channel is affecting the development of the ebb delta to reconfigure offshore of the north end of North Topsail Beach.

### **Onslow Beach**

The shoreline and volume change analysis for Onslow Beach (station 50+00 to 90+00) shows a continuation of the net positive shoreline trends in April 2014. The analysis indicates the shoreline continues to experience relative stability with seaward migrations of the MHW and foreshore contours between May 2013 and April 2014 of +5 ft./yr. and +2 ft./yr., respectively. The volumetric analysis also indicates relative stability along the Onslow Beach shoreline with a net annual average volume change of 0 cy/ft./yr. between May 2013 and April 2014. This result does not mean there was no change only that there was a balance between the volumes changes occurring along the profiles. Comparisons between the October 2012 and April 2014 surveys also show net positive results in the MHW and shoreline migration of +9 ft./yr. and +4 ft./yr., respectively as well as a net positive volume change rate +5 cy/ft./yr. While these results are a decrease from the May 2013 survey they still present an overall stable condition of the Onslow Beach shoreline.

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**APPENDICES**

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APPENDIX B: New River Inlet Channel Survey Profiles

APPENDIX C: Onslow Beach Inlet Shoulder - Ebb Shoal Profiles

APPENDIX D: Onslow Beach Monitoring Beach Profiles

APPENDIX E: Summary of Mean High Water (MHW) Locations

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## INTRODUCTION

The Town of North Topsail Beach completed Phase 1 of a comprehensive shoreline protection project in February 2013. The Phase 1 work entailed realigning the New River Inlet ocean bar channel closer to North Topsail Beach to provide stability to the shoreline. The new alignment was excavated to an average depth of -18 ft. NAVD88 and a 500 ft. width. A measured 592,000 cy of material were removed from the approximate 3,500 ft. long channel and placed on the North Topsail Beach shoreline. Material was placed south from New River Inlet to Shipwatch Villas, or from station 1163+00 to 1090+00, respectively.

In preparation of the New River Inlet Channel Realignment and Beach Restoration, the Town of North Topsail Beach adopted a monitoring protocol to document the performance of Phase 1 (CPE-NC, 2013b). Project performance is measured by shoreline and volumetric change along the fill area and adjacent shoreline up to 5,000 ft. The performance of the realigned channel is also documented by measuring the infilling rate and controlling depth of the channel.

Additional monitoring is also required by the federal permit (USACE, 2011) to evaluate potential impacts from construction. A main element of the additional monitoring concentrates on the performance of Onslow Beach, located to the north of New River Inlet. The monitoring is intended to evaluate any adverse impacts the channel realignment causes along the southern strand of Onslow Beach. The shoreline migration rates measured after the channel realignment will be compared to historic rates to identify what, if any, impacts occur.

The northern ebb shoal of New River Inlet and the pre-construction location of the ocean bar channel must also be monitored to evaluate the channel infilling rate. This rate will be used to estimate the timeframe and extent for the creation of intertidal and subtidal shoals within the existing channel footprint and to determine when the new bar channel is eligible for maintenance as dictated by conditions within the federal permit. In this regard, channel maintenance can only be performed every four years and only then if the shoal volume in the new channel reaches 85% of the initial dredged volume or if the channel thalweg migrates out of the preferred channel corridor.

As originally formulated, the Phase 1 fill was to include an area with nearshore hardbottoms located between station 1080+00 and 1065+00 which would have required pre- and post-construction monitoring of the hardbottom areas. Pre-construction monitoring of the hardbottom area was accomplished in October 2012, however, mitigation of the erosion impacts associated with Hurricane Sandy combined with the finite quantity of sand available from the realigned channel, did not allow the Phase 1 fill to extend into the nearshore hardbottom area. As a result, the post-construction monitoring requirement of the hardbottom area was waived by the USACE (CPE-NC, 2013a).

## MONITORING ACTIVITIES

Beach profile surveys were conducted to assess the response and measure potential impacts of the beach after completion of the Phase 1 project. The coverage area for the beach profiles extends approximately 9,000 ft. north of New River Inlet (Onslow Beach) to approximately 13,000 ft. south of the inlet (North Topsail Beach). A hydrographic survey of the ebb shoal of New River Inlet was also conducted to measure the channel performance. Below is a list of the monitoring areas and the station limits used to conduct the respective analysis.

### Beach Profiles:

- Project Shoreline and Adjacent Beach (North Topsail Beach Stations 1040+00 to 1165+00)
- New River Inlet Ebb Shoal and the Pre-Construction Ocean Bar Channel (Onslow Beach Stations 0+00 to 40+00, North Topsail Beach Stations 1150+00 to 1170+00, and Channel Stations 0+00 to 34+00)
- Onslow Beach (Onslow Beach Stations 50+00 to 90+00)

### Hydrographic Surveys

- New River Inlet Ebb Shoal

In May 2013, the first post-construction survey was conducted to capture conditions approximately 3 months after construction. In April 2014, the second post-construction survey was conducted to capture conditions approximately 15 months after construction. The monitoring profiles conducted for pre-construction in all areas were spaced at approximately 1,000 ft. intervals. However, during the 2013 post-construction monitoring, the profile spacing was reduced to 500 ft. along the North Topsail Beach shoreline. The profile density was increased to capture potential anomalies in the shoreline or ‘hot-spots’ in the sediment migration patterns after fill placement occurred. In 2014, the monitoring survey collected profile data along the beach strand section of the project area from Station 1040+00 to 1140+00 at 1,000 ft. intervals and 500 ft. intervals along the northern section of the project shoreline from station 1140+00 to station 1160+00.

Post-construction hydrographic survey data of New River Inlet was also incorporated into the monitoring analysis. The Record “or As-Built” survey conducted by the Contractor at the conclusion of construction (Jan. 2013) was compared with an April 2012 (pre-construction) and an April 2013 (post-construction) survey performed by the USACE. These surveys were used to quantify the volume of material removed from the channel during construction and the volume of material that has accumulated in the realigned channel since construction. A hydrographic survey of the New River Inlet was also conducted in April 2014 to assess the condition of the channel and calculate the shoaled volume within the dredged channel footprint. The shoaling measurements will assist in providing justification for periodic dredging. As mentioned above, maintenance of the new bar channel may not occur more than once every four (4) years and only then if the volume of shoal material is at least 85% of the volume originally removed or if the if the channel thalweg migrates outside the 500 ft. wide realigned channel corridor (USACE, 2011).

## **METHOD FOR DETERMINING SHORELINE AND FORESHORE CHANGE**

Shoreline changes along North Topsail Beach and Onslow Beach were determined at each station by comparing the position of the Mean High Water (MHW) contour (+1.4 ft. NAVD88) and changes in the position of a theoretical foreshore in which the theoretical foreshore position is an average of the position of the +4.5 ft. NAVD88, +1.4 ft. NAVD88 (MHW), -2.8 ft. NAVD88 (MLW) and -6.0 ft. NAVD88 contours. Changes in the position of the theoretical foreshore are generally less variable than shoreline changes determined based on a single contour.

Results of the shoreline change analysis are reported in terms of actual shoreline change at each station for the given monitoring period and an annual average rate of change since the time of construction.

## **METHOD FOR DETERMINING VOLUMETRIC CHANGES**

The net change in the volume was calculated for profiles along North Topsail Beach (1160+00 to 1040+00) and Onslow Beach (50+00 to 90+00) between the pre-construction, post-construction, and subsequent monitoring surveys. Volume comparisons were conducted between each consecutive monitoring event to calculate the individual changes. Total volume change across the project area was calculated using the average end area method to determine the total change in volume. The results establish a reference for comparing erosion or accretion trends in future monitoring events.

Volume changes are reported to define how the shorelines of North Topsail Beach and Onslow Beach are responding to the project. On North Topsail Beach, the volumes within the beach fill area were calculated for each profile from the landward limit of the survey to the offshore extent of the fill envelope (approximately 400 ft. offshore). The volume changes south of the beach fill area (station 1080+00 to 1040+00) were calculated for the “active profile”, i.e., the portion of the profile above the -21 NAVD88 contour. The -21 ft. NAVD88 contour is referred to as the depth of closure (DOC) (CPE-NC 2009a). The DOC is the elevation where profiles maintain a relatively constant form between monitoring events. Volumetric calculations on Onslow Beach covered the active profile for comparison with historic trends.

## PHASE 1 PROJECT AREA AND ADJACENT SHORELINES

Approximately 13,000 ft. of the North Topsail Beach shoreline beginning at New River Inlet, were included in this monitoring event. The coverage area includes profiles at stations 1170+00 south to 1040+00 and is separated into three shoreline segments (Figure 1). Beginning at the northern limits, the first shoreline segment is referenced as “North Topsail Beach Inlet Shoreline”. This area is located on the interior shoreline of the New River Inlet where a sand spit has formed since the May 2013 monitoring and is represented by profiles located at stations 1170+00 through 1163+00. The Phase 1 project fill area is the largest segment and encompasses profiles from stations 1160+00 to 1090+00. Based on the results of the April 2014 monitoring, the Phase 1 segment was subdivided into two areas; the area within the influence of the New River Inlet, which lies between stations 1160+00 and 1145+00, and the straight beach strand area from station 1145+00 south to station 1090+00 which is outside the immediate influence of the inlet. These areas are referenced as the “Inlet Influenced Area” and the “Beach Fill Performance Area”. The southernmost shoreline segment is referenced as “Adjacent Shoreline South of Project Area” and extends approximately 5,000 ft. south of the fill limits to station 1040+00.

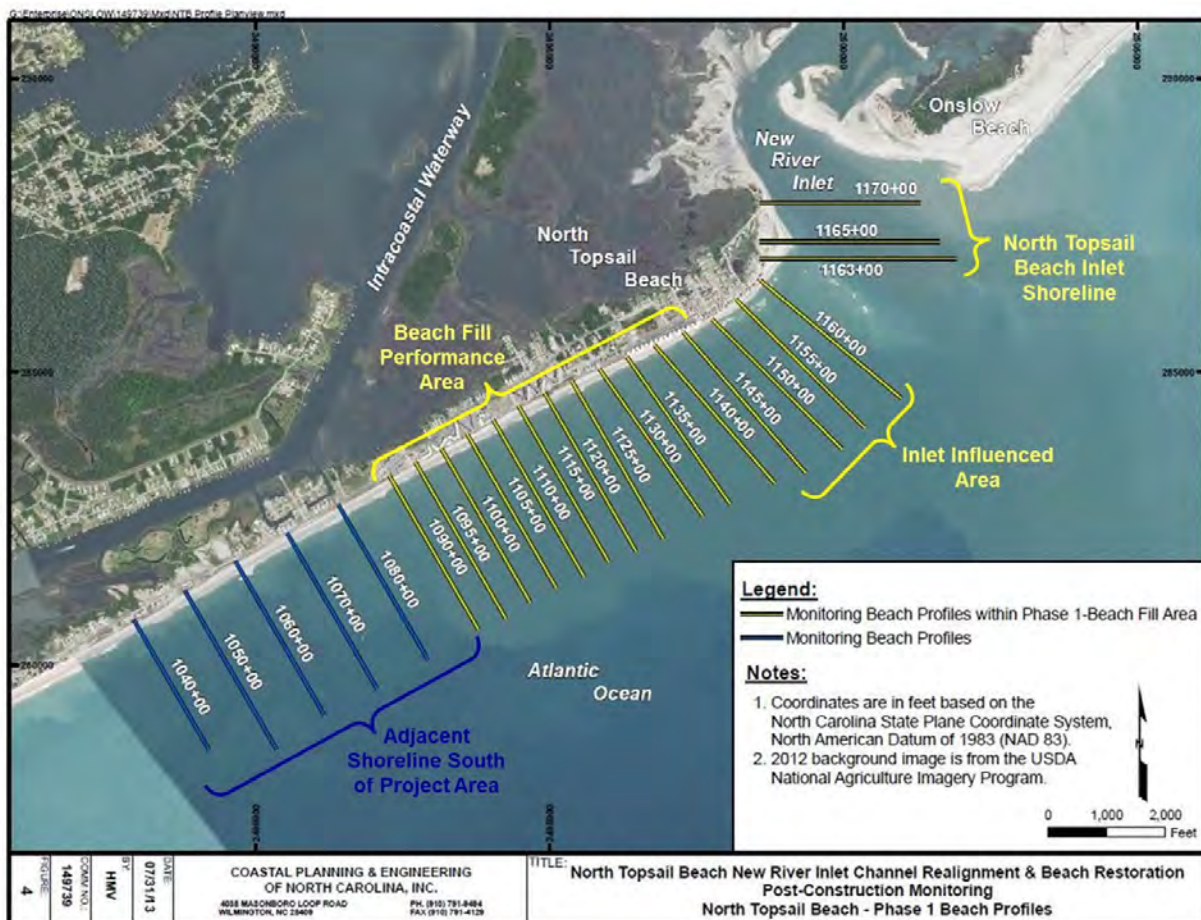


Figure 1 – Profiles Monitored for the Project Area and Adjacent Beach



The April 2014 survey collected profile data along North Topsail Beach at 1,000 ft. intervals from station 1140+00 to 1040+00 and 500 ft. intervals from station 1140+00 to 1160+00. The profile control is provided in Table 1.

**Table 1 – Monitoring Stations for North Topsail Beach**

Area Designation	Station No.	Northing	Easting	Azimuth (°)
<b>North Topsail Beach Inlet Shoreline</b>	1170+00	287,875.00	2,498,578.40	90
	1165+00	287,219.68	2,498,582.32	90
	1163+00	286,929.08	2,498,583.99	90
<b>Phase 1 - Inlet Influenced Project Area</b>	1160+00	286,564.36	2,498,586.24	130
	1155+00	286,232.66	2,498,174.95	135
	1150+00	285,901.00	2,497,763.00	135
<b>Phase 1 - Beach Fill Performance Area</b>	1145+00	285,679.04	2,497,274.34	139
	1140+00	285,457.10	2,496,785.00	139
	<b>1135+00</b>	<b>285,255.20</b>	<b>2,496,316.35</b>	<b>145</b>
	1130+00	285,053.30	2,495,847.70	145
	<b>1125+00</b>	<b>284,850.85</b>	<b>2,495,378.10</b>	<b>150</b>
	1120+00	284,648.20	2,494,908.50	150
	<b>1115+00</b>	<b>284,421.30</b>	<b>2,494,471.70</b>	<b>150</b>
	1110+00	284,194.20	2,494,034.90	150
	<b>1105+00</b>	<b>283,946.33</b>	<b>2,493,595.06</b>	<b>150</b>
	1100+00	283,698.50	2,493,155.20	150
	<b>1095+00</b>	<b>283,467.27</b>	<b>2,492,713.91</b>	<b>150</b>
1090+00	283,236.10	2,492,272.60	150	
<b>Adjacent Shoreline South of Project Area</b>	1080+00	282,735.00	2,491,406.50	150
	1070+00	282,253.20	2,490,531.60	150
	1060+00	281,776.90	2,489,653.30	150
	1050+00	281,282.40	2,488,784.60	150
	1040+00	280,782.70	2,487,919.90	150

Coordinates Reference North Carolina State Plane Zone 3200 NAD 83 ft.

## MHW Shoreline Change

The April 2014 monitoring results show the Inlet Influence Area (station 1160+00 to 1145+00) as the most heavily eroded area along the project shoreline. This area experienced an average landward movement of the MHW contour (+1.4 ft. NAVD88) of -155 ft. since May 2013. The completed project (Jan. 2013) placed fill in this area that resulted in an average seaward movement of the +263 ft. in the MHW contour. Comparisons between the June 2012 and April 2014 surveys measured an average shoreline width remaining of +47 ft. at the MHW contour.

The excessive shoreline recession in this area is highly influenced by the changes occurring at the inlet and has experienced erosion rates higher than were expected. The mechanism partly responsible for the increased rate of erosion is related to the shape of the ebb shoal acting as a focusing lens which causes incoming waves to change direction as they pass over the shoal and are redirected towards the inlet. This phenomenon is known as wave refraction. The section of shoreline experiencing the most erosion is known as a nodal zone. The nodal zone is an area where sand is being transported in opposite directions and is naturally present at all inlets with ebb tide deltas. This area is located in between where waves that are refracted by the shoal transport sand towards the inlet and waves bypassing the shoal transport sand south and away from the inlet. As the ebb shoal develops and more sand is deposited, the effective depth over the ebb shoal will decrease and shoal will provide a sheltering effect to the northern portion of the shoreline. The decrease in water depth over the ebb shoal will cause waves to break further offshore thereby reducing the erosional effect of the wave refraction and promote shoreline stability at this location. Table 2 presents the MHW shoreline results between the Pre-Construction, As-Built, Post-Construction, and subsequent Monitoring survey events for each of the project sections.

**Table 2 – North Topsail Beach MHW (+1.4 ft. NAVD88) Shoreline Change Summary**

Area Designation	Pre-Con (June 2012) to As-Built (Jan. 2013)	Post-Con (May 2013) to April 2014	Pre-Con (June 2012) to April 2014
	Average Migration (ft.)		
<b>North Topsail Beach Inlet Shoreline</b> (1165+00 – 1163+00)	-	+110	-
<b>Phase 1 – Inlet Influenced Area</b> (1160+00 – 1145+00)	+263	-155	+47
<b>Phase 1 – Beach Fill Performance Area</b> (1145+00 – 1090+00)	+145	-41	+112
<b>Adjacent Shoreline South Of Project Area</b> (1090+00 – 1040+00)	+5 <sup>(2)</sup>	+9	+14

1. (+ Number) Indicates seaward advance, (- Number) Indicates landward retreat.
2. Pre-Con to As-Built shoreline changes for the Adj. Shoreline South of Project Area (1080+00 to 1050+00) are results from June 2012 to May 2013 surveys.

As previously noted, the profile spacing used for the June 2012 pre-construction survey was 1,000 ft. Therefore, no profile information was collected at stations 1145+00 and 1155+00 during the 2012 survey. The MHW and Foreshore shoreline change results between the June 2012 and April 2014 surveys represent the changes occurring at the 1,000 ft. profile stations since the June 2012 survey did not include measurements at stations 1145+00 and 1155+00. Since, changes measured between May 2013 and April 2014 include survey data for these two stations, the results of the May 2013 to April 2014 time period are not directly comparable to the changes measured between June 2012 and May 2013.

The linear change of the MHW contour as a result of the fill placed in the Beach Fill Performance area (stations 1145+00 to 1090+00) extended the MHW contour seaward of the pre-construction shoreline by an average of +145 ft., as measured by the January 2013 As-Built survey. The April 2014 monitoring results indicate that the MHW shoreline in this area retreated by an average of -41 ft. since May 2013. Some of these changes are due to profile adjustments after construction and additional erosional impacts from above average intensity winter weather that affected the project area prior to the April 2014 monitoring event. Based on the changes measured between the June 2012 and the April 2014 surveys this area had an average of +112 ft. of shoreline remaining at the MHW contour.

The MHW contour along the adjacent shoreline south of the project area experienced minimal change from May 2013 to April 2014. The linear change measured an average seaward advance of +9 ft. from May 2013 to April 2014. The northern most stations (1080+00 to 1060+00) advanced an average of +16 ft., whereas the southern stations (1050+00 and 1040+00) receded landward an average of -14 ft. The April 2014 results show less variation in the MHW changes between profiles than were observed during the As-Built survey and show only a slight increase over the As-Built MHW change of +5 ft. seaward advance. Overall, the changes along the shoreline south of the project area since construction indicate the area is experiencing relative stability.

The shoreline and volumetric changes for the northern profiles at stations 1165+00 and 1163+00 are being identified separately because they are highly influenced by the changes occurring at the inlet; most notably the growth of the sand spit at the northern tip of North Topsail Beach. The MHW shoreline measurements in April 2014 at stations 1165+00 and 1163+00 showed average seaward changes of +154 ft. and +9 ft., respectively; however, significant variability exists along these beach profiles because of the growth of the sand spit. The linear changes of the MHW contour along the entire project shoreline measured between the June 2012 Pre-Construction survey and the January 2013 As-Built survey and the change in the position of the MHW shoreline between May 2013 and April 2014 and the overall net change between June 2012 (pre-construction) and April 2014 are provided in Table 3. Appendix A shows graphical comparisons of the North Topsail Beach monitoring profiles.

**Table 3 – North Topsail Beach MHW (+1.4 ft. NAVD88) Change**

<b>Area Designation</b>	<b>Station No.</b>	<b>Pre-Con (June 2012) to As-Built (Jan. 2013) (ft.)</b>	<b>Post-Con (May 2013) to April 2014 (ft.)</b>	<b>Pre-Con (June 2012) to April 2014 (ft.)</b>
<b>North Topsail Beach Inlet Shoreline</b>	1170+00	-	-29	-
	1165+00	-	+154	-
	1163+00	-	+9	-
<b>Phase 1 Inlet Influenced Area</b>	1160+00	+296	-116	-19
	1155+00	+262	-230	-
	1150+00	+275	-163	+112
<b>Phase 1 Beach Fill Performance Area</b>	1145+00	+236	-111	-
	1140+00	+245	-87	+130
	1130+00	+172	-39	+137
	1120+00	+105	-31	+105
	1110+00	+88	-20	+96
	1100+00	+155	-4	+102
	1090+00	+69	+9	+99
<b>Adjacent Shoreline South of Project Area<sup>(2)</sup></b>	1080+00	+70	+14	+84
	1070+00	-22	+27	+5
	1060+00	-5	+7	+2
	1050+00	-24	-12	-36
	1040+00	-	-16	-

1. (+ Number) Indicates seaward advance, (- Number) Indicates landward retreat.
2. Pre-Con to As-Built shoreline changes for the Adj. Shoreline South of Project Area (1080+00 to 1050+00) are results from June 2012 to May 2013 surveys.

## Foreshore Changes

The linear change of the shoreline was also analyzed by a method termed foreshore change. This method averages the horizontal positions of selected contours (+4.5 ft., +1.4 ft., -2.8 ft., and -6.0 ft. NAVD88) to show an average change of a representative shoreline position. The monitoring results indicate that the project shoreline as a whole experienced similar change in the foreshore contour in comparison with the change experienced in the MHW contour. The average foreshore changes between the survey events for each shoreline area are shown in Table 4.

**Table 4 – North Topsail Beach Foreshore Change Summary**

Area Designation	Pre-Con (June 2012) to Post-Con (May 2013)	Post-Con (May 2013) to April 2014	Pre-Con (June 2012) to April 2014
	Average Change (ft.)		
<b>North Topsail Beach Inlet Shoreline</b> (1165+00 – 1163+00)	-	+180	-
<b>Phase 1 – Inlet Influenced Area</b> (1160+00 – 1145+00)	+196	-233	-37
<b>Phase 1 – Beach Fill Performance Area</b> (1145+00 – 1090+00)	+97	-32	+65
<b>Adjacent Shoreline South Of Project Area</b> (1090+00 – 1040+00)	-19	+12	-7

1. (+ Number) Indicates seaward advance, (- Number) Indicates landward retreat.

The change in the foreshore contour along the Inlet Influenced Area, located in the vicinity of the nodal zone, receded by an average of -233 ft. between May 2013 and April 2014. This result is a net landward change greater than the seaward change of +196 ft. that occurred from June 2012 to May 2013. The average foreshore change from June 2012 to April 2014 measured a recession of -37 ft. landward of the pre-construction foreshore shoreline. These results indicate that the average foreshore contour receded further landward than the average seaward positions recorded for this shoreline segment in previous surveys.

The results of the foreshore analysis along the Beach Fill Performance Area (station 1145+00 to 1090+00) showed that the area experienced an average seaward advance of +97 ft. between June 2012 and May 2013. The changes along the profiles between May 2013 and April 2014 resulted in a recession of -32 ft. in the foreshore position. This change may not be representative of long-term changes due to post-fill adjustments and the advent of atypical winter storm conditions. Over time, erosion rates are expected to moderate. The net change in the foreshore position between June 2012 (Pre-Construction) and April 2014 was measured as a net positive change of +65 ft. which is an indication approximately two-thirds of the added width provided by the beach fill was still in place.

The foreshore change results in the Adjacent Shoreline South of the Project area showed a net positive average migration of +12 ft. from May 2013 to April 2014, a reversal from the landward change of -19 ft. measured between June 2012 and May 2013. The April 2014 results show that from May 2013 the profiles experienced seaward increases ranging from +23 ft. to +40 ft. These results indicate that this area is not experiencing adverse impacts as a result of the Phase 1 project.

The change in the foreshore contour along the North Topsail Beach Inlet Shoreline (stations 1165+00 and 1163+00) from May 2013 to April 2014 showed an average seaward increase of +180 ft. The profiles at stations 1165+00 and 1163+00 experienced changes of +272 ft. and +88 ft., respectively. The variations in the profiles are representative of the significant fluctuations that have occurred within the inlet and the growth of the sand spit since the May 2013 survey. The linear changes of the foreshore contour migration along the entire project shoreline measured during the pre-construction (June 2012), the post-construction (May 2013) and the April 2014 monitoring event are shown in Table 5.

**Table 5 – North Topsail Beach Foreshore Change**

<b>Area Designation</b>	<b>Station No.</b>	<b>Pre-Con (June 2012) to Post-Con (May 2013) (ft.)</b>	<b>Post-Con (May 2013) to April 2014 (ft.)</b>	<b>Pre-Con (June 2012) to April 2014 (ft.)</b>
<b>North Topsail Beach Inlet Shoreline</b>	1170+0	-	-11	-
	1165+00	-	+272	-
	1163+00	-	+88	-
<b>Phase 1 Inlet Influenced Area</b>	1160+00	+149	-269	-121
	1155+00	-	-246	-
	1150+00	+243	-196	+47
<b>Phase 1 Beach Fill Performance Area</b>	1145+00	-	-145	-
	1140+00	+174	-117	+57
	1130+00	+139	-38	+101
	1120+00	+100	-8	+91
	1110+00	+88	-5	+82
	1100+00	+61	-16	+45
<b>Adjacent Shoreline South of Project Area</b>	1090+00	+16	-4	+12
	1080+00	-17	+6	-10
	1070+00	-2	+21	+19
	1060+00	-18	+22	+4
	1050+00	-40	-2	-41
	1040+00	-	+9	-

1. (+ Number) Indicates seaward advance, (- Number) Indicates landward retreat.

## Volume Change

The calculations performed to measure the volumetric change from the May 2013 post-construction survey to the April 2014 determined a net loss in volume of approximately -222,000 cy or an average density of -39 cy/lf between stations 1160+00 and 1090+00 over the approximate 7,000 ft. fill area. As previously stated, the Phase 1 project shoreline was divided into two areas, the Inlet Influenced Area (station 1160+00 to 1145+00) and the Beach Fill Performance Area (station 1145+00 to 1090+00). The areas are assessed separately due to the increased erosion occurring along the northern 1,500 ft. of shoreline being impacted by the inlet influenced nodal zone. The remaining 5,500 ft. of shoreline south of the inlet, within the Beach Fill Performance Area, is performing as expected. A summary of the volumetric changes between the survey events are shown in Table 6 for the entire project area.

**Table 6 – North Topsail Beach Volume Change Summary**

Area Designation	As-Built (Jan 2013) to Post-Con (May 2013)		Post-Con (May 2013) to April 2014		Pre-Con (June 2012) to April 2014 <sup>(1)</sup>	
	(cy)	(cy/lf)	(cy)	(cy/lf)	(cy)	(cy/lf/yr.)
<b>North Topsail Beach Inlet Shoreline</b> (1165+00 – 1163+00)	+1,033	+1	+36,873	+110	-	-
<b>Phase 1 – Inlet Influenced Area</b> (1160+00 – 1145+00)	+176,313	+103	-123,470	-74	+19,015	+6
<b>Phase 1 – Beach Fill Performance Area</b> (1145+00 – 1090+00)	+370,889	+67	-98,003	-22	+212,933	+20
<b>Adjacent Shoreline South Of Project Area<sup>(2)</sup></b> (1090+00 – 1040+00)	+19,406 <sup>(2)</sup>	+7 <sup>(2)</sup>	+3,177	+1	+22,369	+3

<sup>(1)</sup> 1.8 years used to calculate change rate between 2012 and 2014 surveys.

<sup>(2)</sup> Pre-Con to As-Built shoreline changes for the Adj. Shoreline South of Project Area (1080+00 to 1050+00) are results from June 2012 to May 2013 surveys.

The results of the volumetric analysis show that a fill volume of approximately +176,000 cy or a fill density of +103 cy/lf was placed within the Inlet Influenced area during the construction of the Phase 1 project as measured by the January 2013 As-Built survey. Additional fill was placed in this area in anticipation of the potential for higher than expected erosion rates. An analysis of the survey data indicates that approximately -123,000 cy of fill was lost over an 11-month period, from the May 2013 post-construction survey to the April 2014 monitoring survey. This is equal to an average density of -74 cy/lf or a rate of -81 cy/lf/yr. As mentioned previously, the erosion in this area is considered to be the result of a nodal zone that has created an area of increased erosion adjacent to the inlet. As the ebb shoal continues to develop the shoal is

expected to provide increased protection from incoming waves and cause waves to break further offshore thereby reducing the erosional effect of the nodal zone.

The January 2013 As-Built survey shows that the Beach Fill Performance area (stations 1145+00 to 1090+00) received approximately +371,000 cy or +67 cy/lf of fill as a part of the Phase 1 project. The results of the volume change calculated between May 2013 and April 2014 showed that the area experienced a net loss of -98,000 cy or an average of -22cy/lf along the 5,500 ft. shoreline segment. The erosion rate calculated for this 11-month period is equivalent to -25 cy/lf/yr. Although this area is out-performing the Inlet Influenced area, the rate of erosion is not considered representative of typical conditions affecting the project shoreline and is expected to moderate over time. These changes are considered to be a result of material migrating south out of the project area as well as profile adjustments after construction. In addition, the area experienced additional erosional impacts from above average intensity winter weather that affected the project area prior to the April 2014 monitoring event. The volume change results between June 2012 and April 2014 show that approximately 213,000 cy of fill remains within the project area seaward of the pre-construction profile.

The results of the volumetric analysis for the adjacent shoreline south of the fill area showed a net gain of approximately +19,000 cy, or approximately +7 cy/lf/yr. from June 2012 to May 2013. The volumetric change occurring south of the fill area from May 2013 to April 2014 shows a minimal gain of approximately +3,200 cy, or approximately +1 cy/lf/yr. indicating stable conditions along this shoreline segment. Overall, the change from June 2012 to April 2014 is a net positive volume of approximately +22,000 cy equal to a rate of +3 cy/lf/yr. These results are reinforced by the seaward migration of the MHW contour and foreshore change suggesting that this area has remained relatively stable since the Phase 1 project was constructed.

The volume changes experienced along the North Topsail Beach inlet shoreline from May 2013 to April 2014 are associated with the growth of the sand spit that has developed in that area. The inlet profiles at stations 1165+00 and 1163+00 experienced volume increases of +133 cy/ft. and +83 cy/ft., respectively between May 2013 and April 2014 surveys. The profiles at stations 1165+00 and 1163+00 were not surveyed in June 2012 therefore no comparison can be made with subsequent surveys. The sand spit formation is a result of the fill being transported toward the inlet by the nearshore currents driven by the inlet flood channel. As the ebb shoal continues to develop and build up offshore the influence of the flood channel currents is expected to decrease. The volumetric changes at each station between each of the survey events are shown in Table 7.



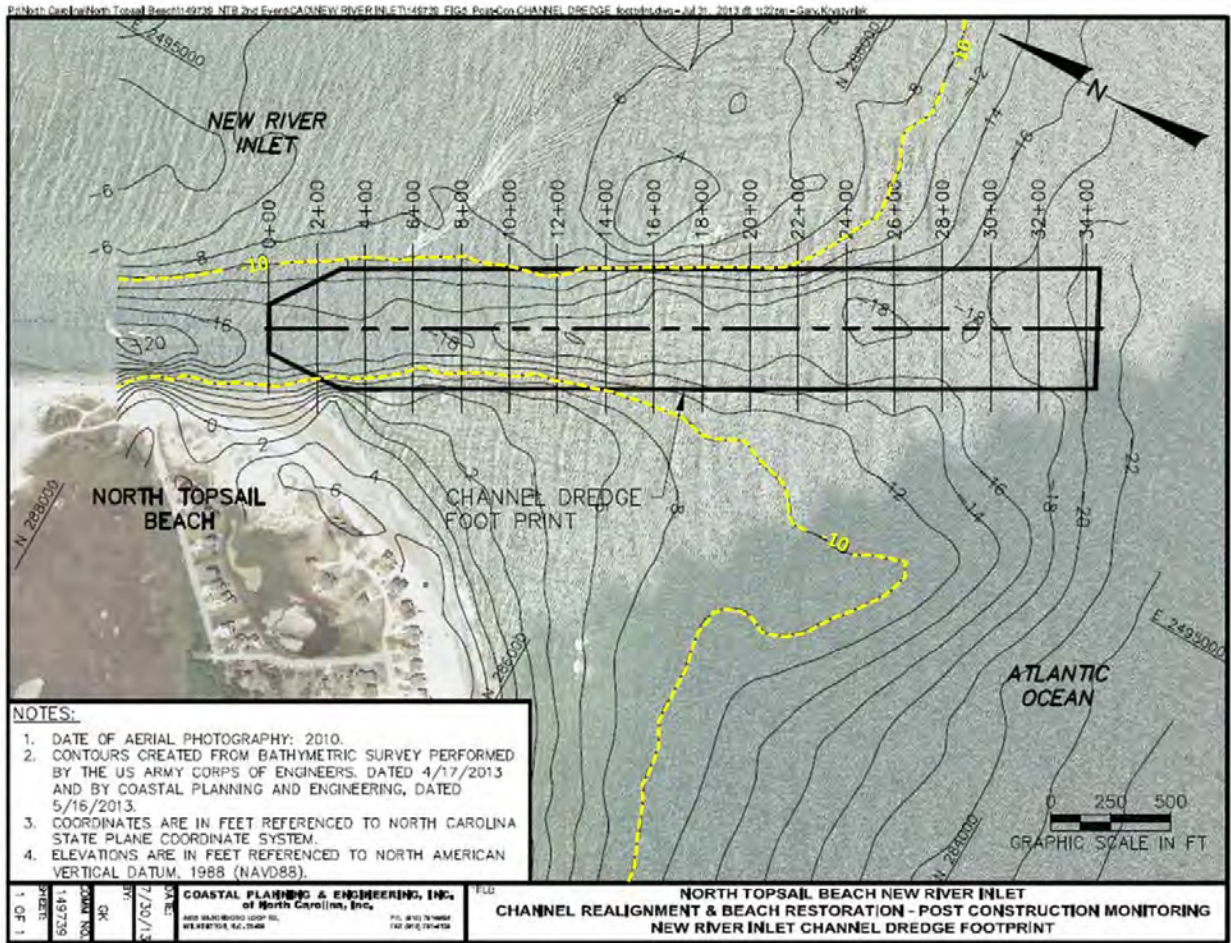
**Table 7 – North Topsail Beach Volume Changes**

<b>Station No.</b>	<b>As-Built Post-Construction (Jan. 2013) (cy/lf)<sup>(1)</sup></b>	<b>Post-Con (May 2013) to April 2014 (cy/lf)</b>	<b>Pre-Con (June 2012) to April 2014 (cy/lf)</b>
<b>1165+00</b>	-	+133	-
<b>1163+00</b>	+1	+87	-
<b>1160+00</b>	+88	-58	-18
<b>1155+00</b>	+101	-97	-4
<b>1150+00</b>	+115	-81	+27
<b>1145+00</b>	+101	-61	+30
<b>1140+00</b>	+102	-45	+34
<b>1130+00</b>	+85	-22	+56
<b>1120+00</b>	+52	-7	+41
<b>1110+00</b>	+51	-5	+42
<b>1100+00</b>	+54	-12	+29
<b>1090+00</b>	+35	-5	+22
<b>1080+00</b>	-3	+3	0
<b>1070+00</b>	+10	+3	+13
<b>1060+00</b>	-1	+6	+5
<b>1050+00</b>	0	-14	-14
<b>1040+00</b>	-	-6	-

1. Pre-Con to As-Built shoreline changes for the Adj. Shoreline South of Project Area (1080+00 to 1050+00) are results from June 2012 to May 2013 surveys.

### **Volume Change in the Realigned Channel**

Monitoring of the channel area was performed through analysis of updated survey data collected by the USACE Wilmington District and by CPE-NC. The channel survey conducted by the USACE Wilmington District was performed in January 2014, approximately one (1) year after the channel was dredged. CPE-NC performed a survey of the channel in April 2014 as part of the on-going post-construction monitoring program. Those surveys were compared with the January 2013 Record Survey performed by Marinex Construction, Inc. that documented the as-built condition of the channel. These three (3) survey events were used to complete an updated volume change analysis for the realigned channel. The channel footprint with the respective stations used in the volume analysis is shown in Figure 2. The channel profiles are shown in Appendix B. The elevation contours shown in Figure 2 illustrate the location of the realigned channel in April 2013. The -10 ft. NAVD88 contour is highlighted in yellow and serves as a reference contour to assist in delineating the changes of the ebb tide delta.



**Figure 2 – New River Inlet Realigned Channel Contour Map (April 2013)**

Analysis of the January 2013 post-dredge survey and the January 2014 survey show that approximately 334,400 cy of material (56% of the original dredged volume) has accumulated within the channel limits in 1 year since the project was constructed. This volume represents only the amount of material that has accumulated within the channel footprint. The calculated 1-year volume is approximately 15% greater than the shoaling volume predicted for the first year following construction. Volume calculations based on the January 2013 survey and the April 2014 survey show that the volume within the channel footprint increased by 25% to approximately 448,000 cy. The April 2014 volume indicates approximately 76% of the total volume dredged during construction has shoaled back into the channel limits. The increase from January to April 2014 is considered to be a result of the extreme winter weather experienced along the North Topsail Beach shoreline and not representative of a long-term infilling rate. Table 8 shows total shoaled volume and the volumetric change measured at each station between the three (3) survey events.

**Table 8 – Volumetric Changes in the Realigned Channel**

Station No.	Pre-Con to Post-Con (April 2012 to Jan. 2013)	1-Year Post-Con (Jan. 2013 to Jan. 2014)	Post-Con to Post-Mon (Jan. 2013 to April 2014)
	(cy/lf)	(cy/lf)	(cy/lf)
0+00	-82	-10	-39
2+00	-95	9	-51
4+00	-141	50	73
6+00	-166	45	171
8+00	-199	64	171
10+00	-227	75	167
12+00	-285	156	216
14+00	-294	159	179
16+00	-302	129	172
18+00	-304	133	140
20+00	-271	105	121
22+00	-266	165	189
24+00	-188	173	183
26+00	-114	147	200
28+00	-62	98	169
30+00	-21	94	123
32+00	+8	25	12
34+00 <sup>1</sup>	+11	64	34
<b>Total (cy)</b>	<b>-592,000</b>	<b>+334,400</b>	<b>+448,000</b>

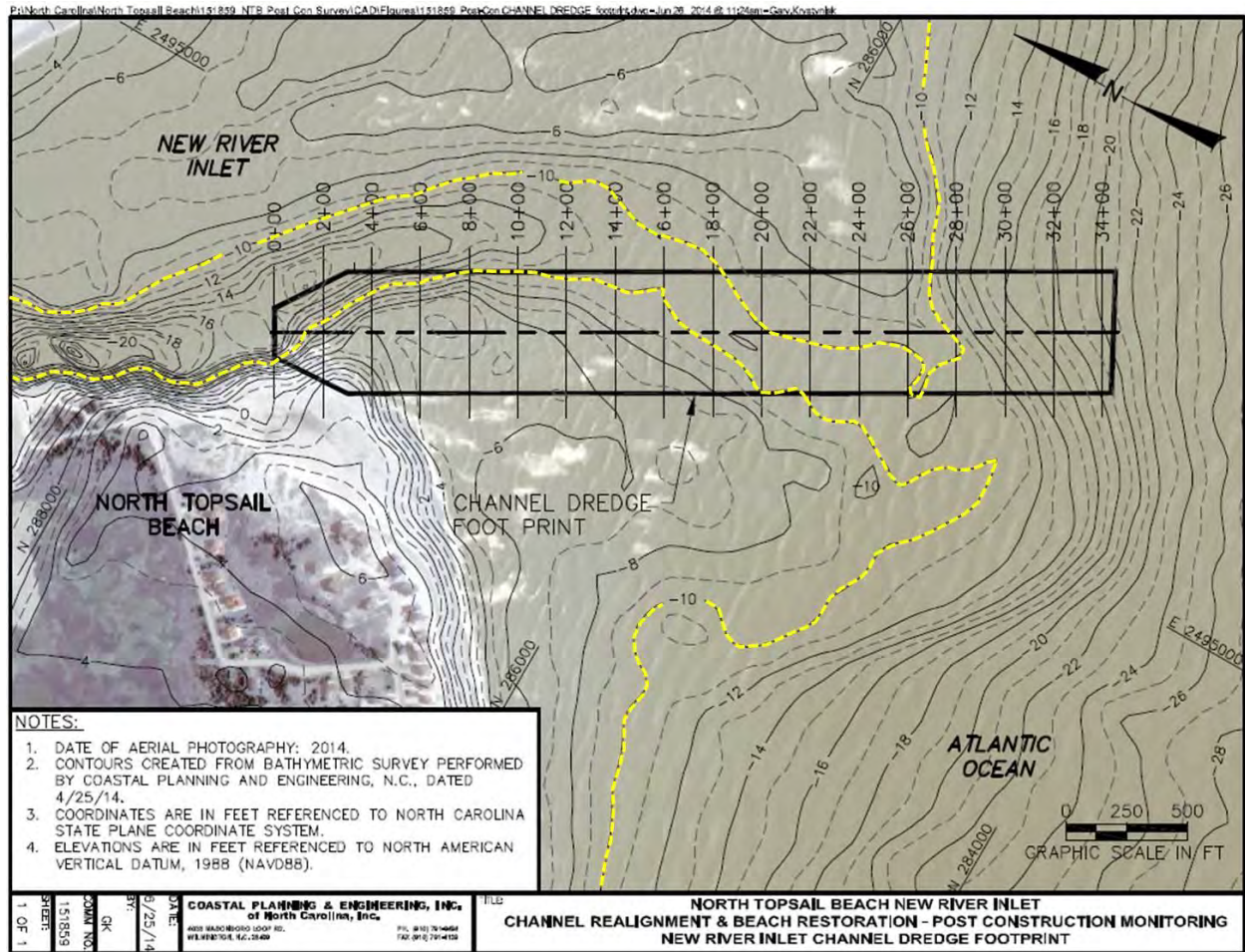
1. Effective Distance of Station 34+00 extends to the end of the channel alignment (Approx. Station 34+50).

Although the measured shoaling of the channel based on recent surveys suggests a slightly higher rate, the shoaling appears to be generally in line with what was predicted (Table 9). Future monitoring events will track changes in the shoaling rate and actual volumes shoaled into the channel.

**Table 9 – Predicted Shoaling Rates from Engineering Report (CPE-NC, 2009a)**

Years Following Construction	Predicted Shoal Volumes (cy)	Calculated Shoal Volumes (cy)
1	286,000	334,400
2	171,000	-
3	105,000	-
4	65,000	-
<b>4-Year Total</b>	<b>627,000</b>	<b>-</b>

Although the analysis indicates portions of the channel footprint have shoaled, the shoaled volumes presented do not reflect on the navigability of the channel. Figure 3 shows the elevation contours from the April 2014 survey and the original alignment of the new channel.



**Figure 3 – New River Inlet Realigned Channel Contour Map (April 2014)**

The contours show the channel has adjusted and remains navigable where the -10 ft. NAVD88 contour (highlighted in yellow) outlines the thalweg, or deepest portion of the channel. The average depth along the thalweg of the adjusted channel was determined to be at an approximate elevation of -12 ft. NAVD88. The channel depths range from -10 ft. to -19.5 ft. NAVD88 (or -7.2 ft. to -16.7 ft. MLW). The April 2014 survey shows the channel thalweg, or deepest portion of the channel, is maintaining deep water access through the inlet and remains in a favorable location for continued development of the ebb tide delta off of North Topsail Beach.

### **EBB SHOAL RECONFIGURATION**

The ebb shoal has historically experienced dynamic changes from year to year based on the position of the ocean bar channel. Design estimates forecasted that the outer limits of the ebb shoal would constrict “or deflate” towards the Onslow Beach inlet shoulder and the realigned channel and expand on the North Topsail Beach shoulder. The channel realignment is also expected to result in the infilling of the pre-construction ocean bar channel and flood channels as the main flow is redirected through the realigned channel. This process is necessary to re-configure the ebb shoal similar to the 1988 position as shown in Figure 4.



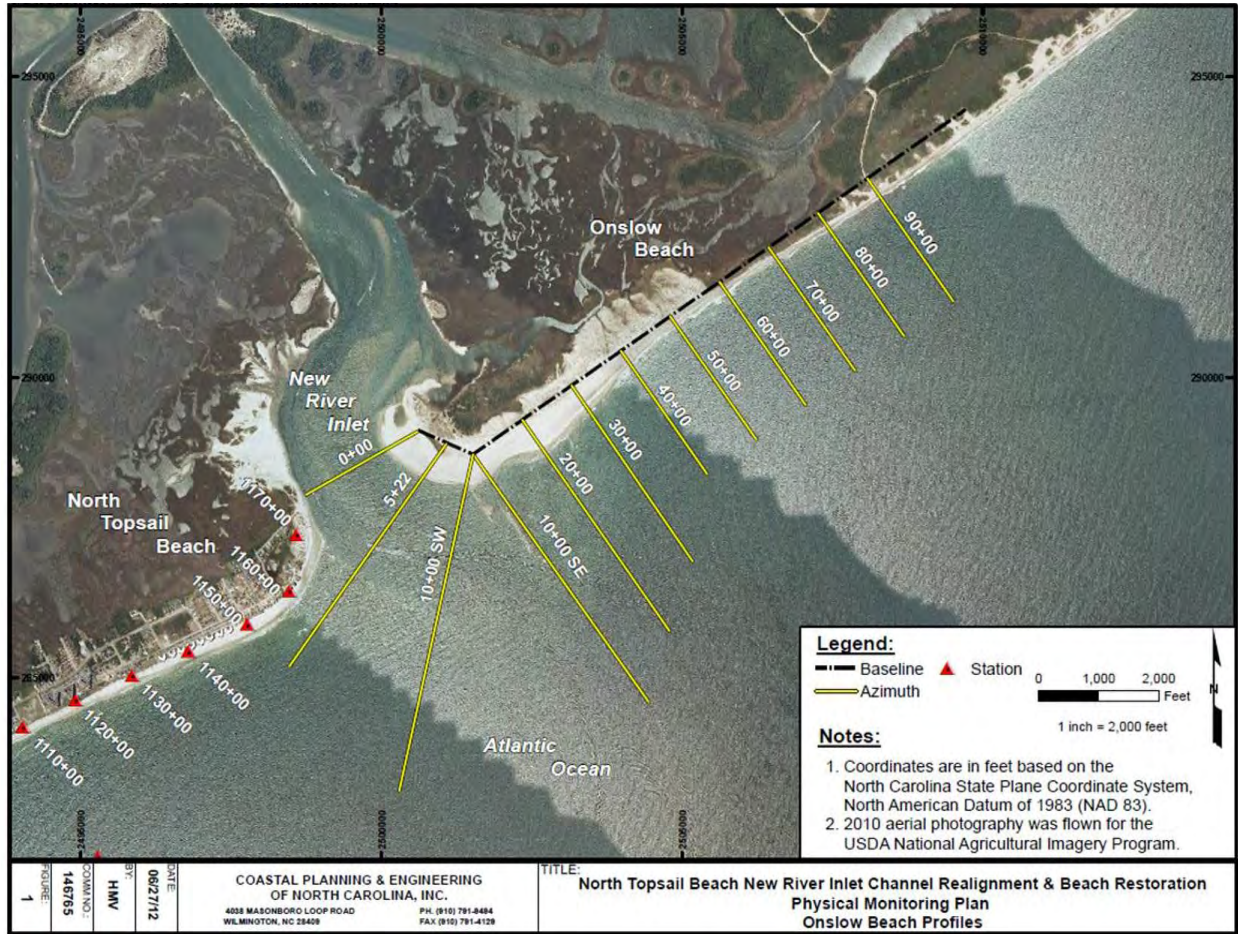
**Figure 4 – Historical New River Inlet Aerial**

A combination of survey data are being used to monitor the reconfiguration of the New River Inlet ebb shoal. These data include beach profiles along North Topsail Beach (stations 1150+00 to 1170+00 on Figure 1), beach profiles along Onslow Beach (Table 10) (stations 0+00 to 40+00 on Figure 5), and hydrographic surveys of the ebb shoal complex. The survey data collected provides information on the reconfiguration of the ebb shoal. These data also allow for the monitoring of the shoaling of the pre-construction ocean bar channel and flood channels.

**Table 10 – Inlet Shoreline Monitoring Stations for Onslow Beach**

<b>Station No.</b>	<b>Northing</b>	<b>Easting</b>	<b>Azimuth (°)</b>
<b>0+00</b>	289,104.1	2,500,601.0	240
<b>5+22</b>	288,895.7	2,501,077.5	215
<b>10+00 SW</b>	288,722.9	2,501,524.2	192
<b>10+00 SE</b>	288,722.9	2,501,524.2	145
<b>20+00</b>	289,297.5	2,502,343.6	145
<b>30+00</b>	289,871.1	2,503,162.8	145
<b>40+00</b>	290,444.6	2,503,981.9	145

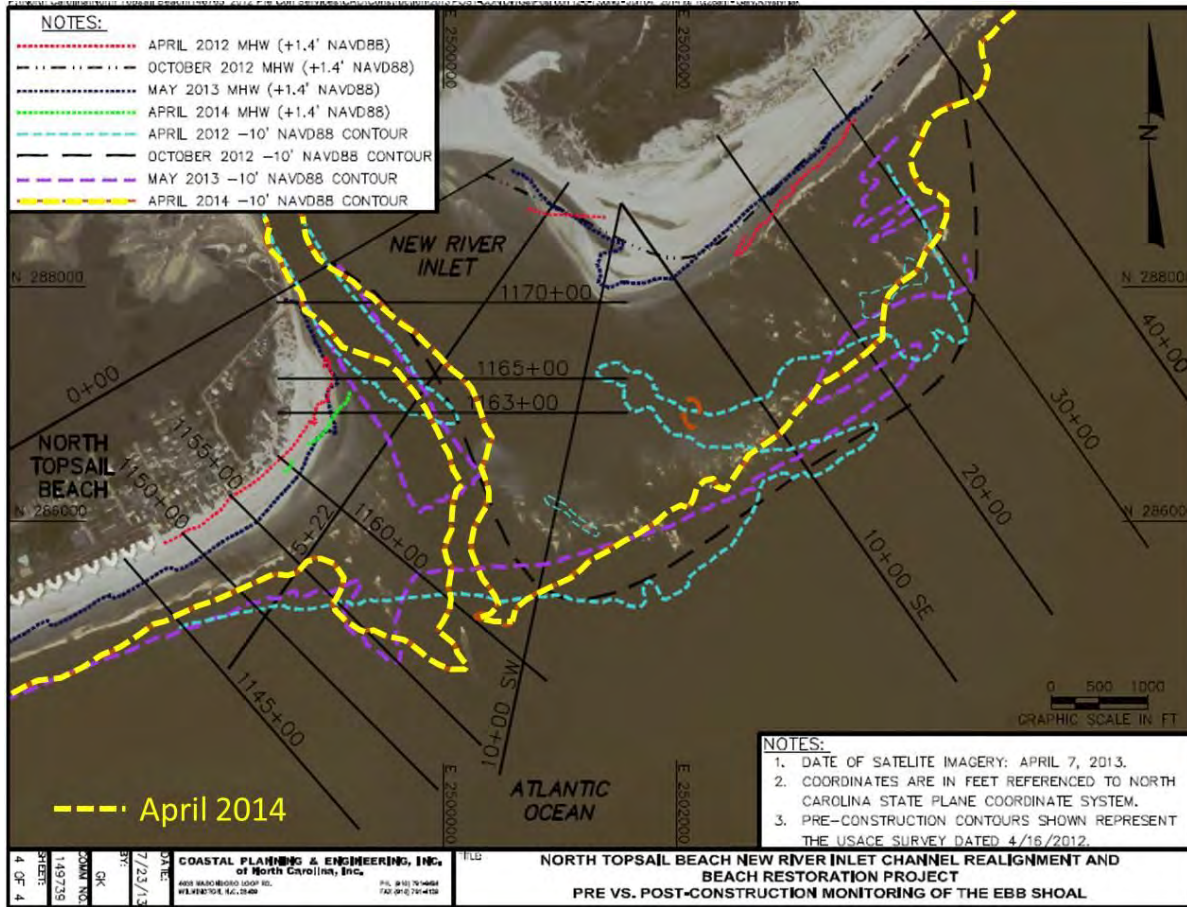
Coordinates Reference North Carolina State Plane Zone 3200 NAD 83 ft.



**Figure 5 – Monitoring Stations along Onslow Beach**

The evaluation of the reconfiguration of the ebb shoal assumed the delta is bounded by the MHW (+1.4 ft. NAVD88) contour on the landward side and the -10 ft. NAVD88 contour on the seaward side. The -10 ft. NAVD88 contour is used as the seaward reference to monitor the changes along the outer perimeter of the ebb shoal while the MHW contour provides an indication of changes along the shoreline. The changes in the position of these contours provide the basis for assessing the progress of the reconfiguration of the ebb shoal, which is the primary objective of the channel realignment.

Figure 6 shows locations of the profile lines and the associated MHW (+1.4 ft. NAVD88) and -10 ft. NAVD88 contours resulting from four surveys: April 2012, October 2012, May 2013, and April 2014. The April 2012 survey was performed by the USACE Field Research Facility and was used for the pre-construction survey of the inlet. The October 2012 survey was conducted by Gahagan & Bryant and only covers profiles originating from Onslow Beach. The May 2013 and April 2014 surveys were conducted by CPE-NC and included profiles on North Topsail Beach and Onslow Beach.



**Figure 6 – New River Inlet Ebb Shoal Extents**

The results from the April 2014 survey showed the MHW position along the Onslow Beach shoulder (stations 10+00 SW to 40+00) receded an average of -159 ft. in comparison to the May 2013 survey. This is a reversal from the shoreline advance of +130 ft. recorded between October 2012 and May 2013. The profiles on the point of the Onslow Beach shoulder (stations 10+00 SE and 10+00 SW) experienced the greatest change between the surveys. The profiles at station 10+00 SE and 10+00 SW measured an average seaward advance of +323 ft. in the MHW from October 2012 to May 2013, where the same profiles retreated landward an average of -288 ft. from May 2013 to April 2014. Conversely, the MHW contour along the interior inlet profiles (stations 5+22 and 0+00) on Onslow Beach shifted toward the channel by an average of +352 ft. from May 2013 to April 2014 where the previous surveys (October 2012 to May 2013) recorded an average landward movement of -82 ft. in the MHW contour at stations 5+22 and 0+00. The changes in the Onslow Beach profiles as of April 2014 show a loss of sediment on the inlet shoulder profiles and a buildup of sediment along the interior inlet profiles suggesting that sediment migrated from the shoulder of Onslow Beach into the interior of the inlet and south toward the channel.

The post-monitoring results for the changes in the -10 ft. NAVD88 contour (indicated by the yellow dashed line in Figure 6) on the north side of the inlet show that between stations 30+00 and 10+00 SE (Onslow Beach) the contour receded an average distance of -364 ft. from May 2013 to April 2014. This is a continuation of the ebb shoal landward migration that measured an

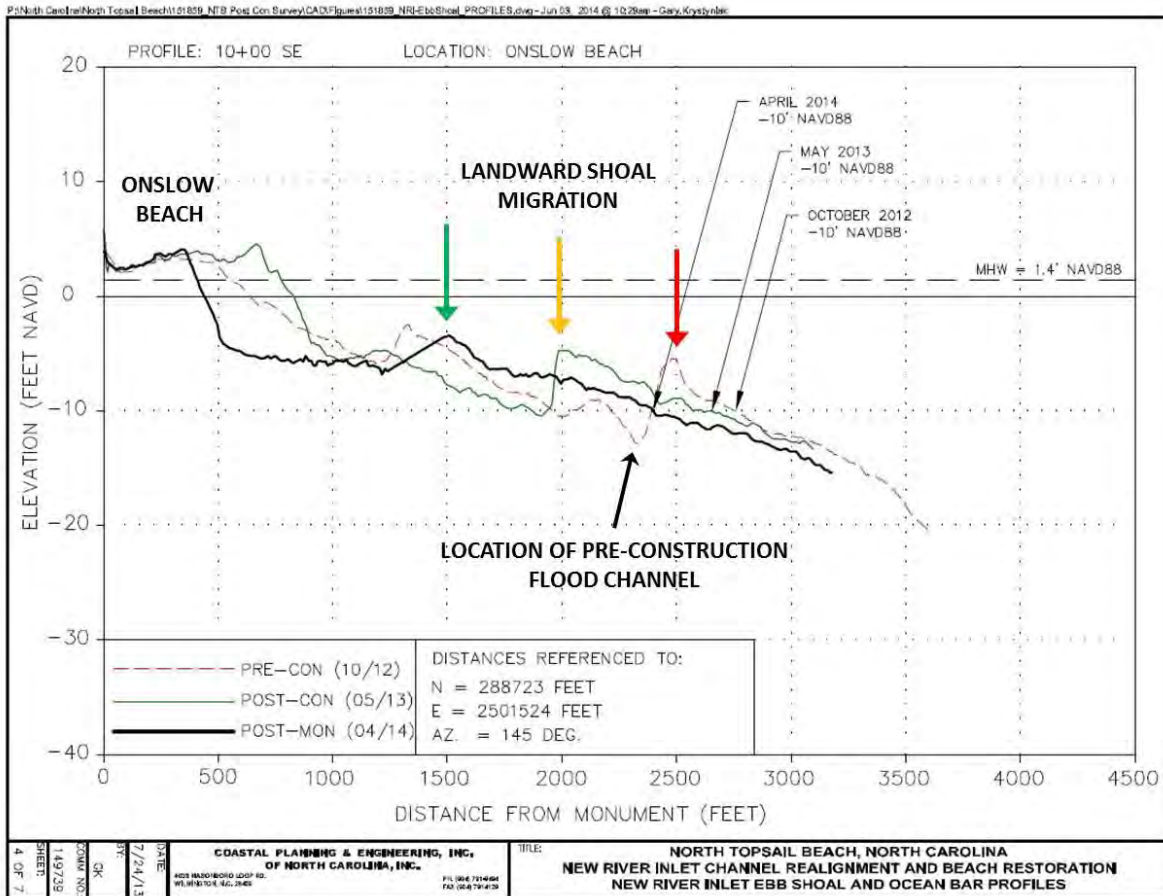
average retreat of -128 ft. between stations 30+00 and 10+00 SE from October 2012 and May 2013. A comparison of profiles on the south side of the inlet, at station 1160+00 (refer to Figure 6 and Figure 8), shows that the -10 ft. NAVD88 contour advanced seaward by approximately 400 ft. between May 2013 and April 2014. The changes in the -10 ft. NAVD88 contour location over the course of the surveys suggests a landward migration of the contour on the north side of the channel and a seaward shift of the contour on the south side of the channel. The shoreward movement of the contour on the north side suggests the shoal is deflating because the realigned channel has redirected the distribution of sand away from the north (Onslow Beach) side of the inlet.

Over time, it is expected that as the ebb shoal reconfigures, in response to the channel realignment, a landward progression of the -10 ft. NAVD88 contour along the northern lobe of the ebb shoal will continue to occur in addition to infilling of the flood channels. Conversely, the southern lobe of the ebb shoal offshore of North Topsail Beach would be expected to show an increased areal extent and shallower offshore depths as a result of the channel realignment. The ebb shoal growth is attributed to sediment deposited by the realigned channel offshore of the North Topsail Beach shoreline.

Comparison of the beach profiles on the Onslow Beach side of the inlet clearly shows the landward movement of the MHW contour and the landward movement of the -10 ft. NAVD88 contour from October 2012 to May 2013. Similar trends can be seen for the profile plots for stations 5+22, 10+00 SE, 20+00, and 30+00, suggesting the ebb shoal is deflating in size north of the channel in response to the realigned channel. The profile comparison for each station located along Onslow Beach is shown in Appendix C for reference.

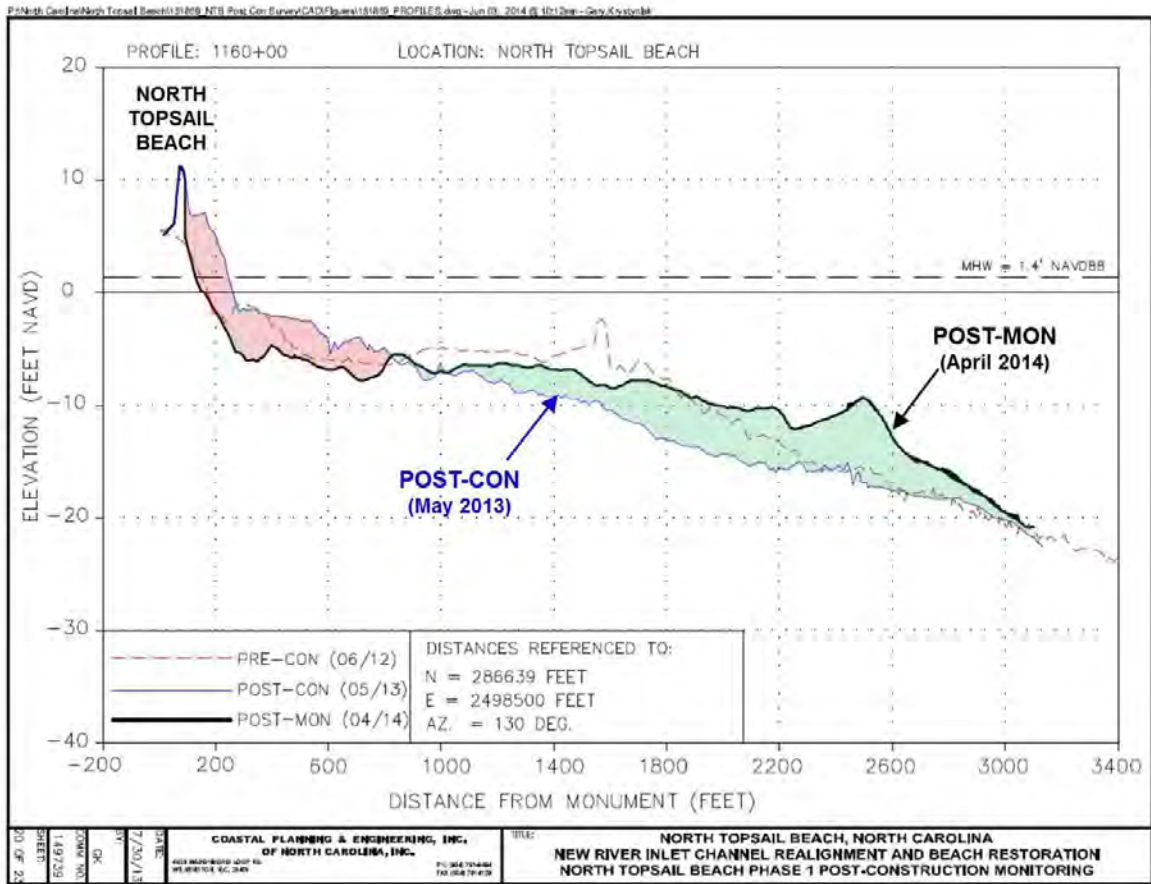
Examination of profile plots taken along both the Onslow Beach and North Topsail Beach shoulders provide insight into the landward progression and shoaling occurring on the northern lobe of the ebb delta and growth of the ebb delta's southern lobe offshore of North Topsail Beach. Comparison of the profiles at station 10+00 SE on the shoulder of Onslow Beach (Figure 7) shows the infilling of the pre-construction ocean bar channel that occurred between October 2012 and May 2013 and the continued recession of the -10 ft. NAVD88 contour through April 2014. The -10 ft. NAVD88 contour moved landward a distance of 103 ft. from October 2012 to May 2013 and by April 2014 the contour was 256 ft. further landward than in May 2013. The plot also shows the landward migration of an anomalous "high point" shoal feature that was evident in the October 2012 survey (identified by the red arrow). The shoal feature in the May 2013 profile (identified by the yellow arrow) is approximately 500 ft. further landward than the high point feature in October 2012. The April 2014 profile shows the high point shoal feature, identified by the green arrow, approximately 500 ft. further landward than in May 2013. The plot also shows a flood channel on the May 2013 profile that does not appear on the April 2014 profile. The changes of the profiles on the plot in Figure 7 illustrate the landward migration of the northern lobe of the ebb tide delta. Similar trends are seen on all profiles between 10+00 SW and 30+00 (Onslow Beach) (Appendix C) and suggest that the ebb tide delta is reconfiguring as expected.





**Figure 7 – Onslow Beach Inlet Shoulder – Ebb Shoal Profile**

Changes to the ebb shoal south of the inlet are shown on the comparison plot of the beach profiles at station 1160+00 in Figure 8. Station 1160+00 is located at the northern end of the project, southeast of the realigned channel, extending from the beach across the southern lobe of the ebb tide delta (refer to Figure 6). In general, the comparison plot shows the erosion that occurred along the beach (red shaded area) from May 2013 to April 2014 and the increase in the amount of sediment on the offshore portion of the profile (green shaded area) between May 2013 and April 2014. The erosion at this location is attributed to the effects of a nodal zone or localized area of erosion caused by waves refracting around the ebb shoal. The increase in sediment on the offshore profile extends 2,000 ft. with increases of 5 ft. to 7 ft. of sand in some areas and indicates that sediment carried seaward by the ebb tidal currents through the realigned channel is being deposited on the south side of the New River Inlet.



**Figure 8 – North Topsail Beach Inlet Shoulder – Ebb Shoal Profile**

The increased deposition of sediment is contributing to the development and reformation of the preferred ebb shoal configuration off of North Topsail Beach. As more sediment is deposited on the ebb shoal, the effective depth will decrease and cause waves to break further offshore thereby reducing the erosional effect at the nodal zone and promoting shoreline stability at this location. The Engineering Report developed during the design of the project (CPE-NC, 2009a) estimated that the time needed for the south side of the ebb tide delta to assume a size necessary to have a significant impact on slowing erosion rates on the extreme north end of North Topsail Beach would be around 5 years. The increased deposition observed on the offshore profile at Station 1160+00 and the seaward increases of the -10 ft. NAVD88 contour on the south side the inlet are positive indications that the ebb shoal is reconfiguring in response to the realignment of the channel as expected. Future monitoring will assist in assessing the changes to the ebb shoal complex as it continues to reconfigure and migrate toward the position maintained in 1988.

## ONslow BEACH

The northern 5,000 ft. of the Onslow Beach monitoring area is represented by stations 50+00 to 90+00 (Figure 5). Shoreline and volumetric changes were analyzed along this beach strand to determine whether the channel realignment produced increased recession rates for Onslow Beach. The calculated shoreline migration and erosion rates were compared to historic rates measured between 2005 and October 2012 (pre-construction). The profiles selected for this monitoring are listed in Table 11.

**Table 11 – Onslow Beach Monitoring Stations**

Station No.	Northing	Easting	Azimuth (°)
<b>50+00</b>	291,018.2	2,504,801.1	145
<b>60+00</b>	291,591.8	2,505,620.2	145
<b>70+00</b>	292,165.4	2,506,439.4	145
<b>80+00</b>	292,738.9	2,507,258.5	145
<b>90+00</b>	293,312.5	2,508,077.7	145

Coordinates Reference North Carolina State Plane Zone 3200 NAD 83 ft.

### MHW Shoreline Change

The post-construction shoreline position was analyzed to show the migration of the MHW contour (+1.4 ft. NAVD88) and the foreshore change for Onslow Beach. The results show that the migration of the MHW contour through the post-monitoring has continued to experience relative stability from May 2013 to April 2014 with an average seaward migration of +5 ft. Over the course of the monitoring, the Onslow Beach MHW shoreline has increased by a net average of +15 ft. or an annual average rate of +9 ft./yr. since October 2012. The results show that the Onslow Beach shoreline continues to experiencing a net positive trend along the MHW contour, opposite to the historic rate of -12 ft./yr. calculated between 2005 and 2012. The MHW shoreline change rates as well as the annualized average rate of change for Onslow Beach are shown for each profile location in Table 12.

**Table 12 – Onslow Beach MHW Migration**

Station No.	Historic Trend (Aug. 2005 - Oct. 2012) (ft./yr.)	Pre- to Post-Con (Oct. 2012 - May 2013) (ft./yr.)	May 2013 - April 2014 (ft./yr.)	Oct. 2012 - April 2014 (ft./yr.)
<b>50+00</b>	+4.5	-16	+3	-5
<b>60+00</b>	-9	+43	+10	+23
<b>70+00</b>	-14	+46	0	+19
<b>80+00</b>	-19	+5	+2	+3
<b>90+00</b>	-23	N/A	+11	+6
<b>Annual Avg. (ft./yr.)</b>	-12	+20	+5	+9

1. (+ Number) Indicates seaward advance, (- Number) Indicates landward retreat.

## Foreshore Shoreline Change

The post-construction data was also used to analyze the foreshore change along Onslow Beach. Consistent with the MHW shoreline change analysis, the foreshore shoreline change analysis also showed a continuation of positive trends in the migration of the foreshore. The analysis of results between the May 2013 and April 2014 surveys show that the foreshore shoreline experienced an average seaward migration of +2 ft. Since October 2012, before the project was constructed, the foreshore average has maintained a net positive migration of +7 ft. for an average annual rate of +4 ft./yr. in April 2014. The average annual foreshore change rate experienced between August 2005 and October 2012 was -10 ft./yr. Similar to the MHW measurements above, the post-construction monitoring results show a continued net positive trend contrary to the historic trend prior to the construction of the project. The foreshore change rates and the annualized rates of change since construction are shown for each station in Table 13.

**Table 13 – Onslow Beach Foreshore Change**

Station No.	Historic Trend (Aug. 2005 - Oct. 2012) (ft./yr.)	Pre- to Post-Con (Oct. 2012 - May 2013) (ft./yr.)	May 2013 - April 2014 (ft./yr.)	Oct. 2012 - April 2014 (ft./yr.)
<b>50+00</b>	+7	-2	-25	-16
<b>60+00</b>	-5.5	+19	+5	+11
<b>70+00</b>	-13	+37	+3	+17
<b>80+00</b>	-18	+6	+14	+11
<b>90+00</b>	-19	N/A	+12	-2
<b>Annual Avg. (ft./yr.)</b>	-10	+15	+2	+4

1. (+ Number) Indicates seaward advance, (- Number) Indicates landward retreat.

## Volume Change

The profile data collected during the April 2014 post-monitoring survey was used to update the volumetric changes that have occurred along Onslow Beach since the Phase 1 Project was completed. The post-monitoring results show that the area experienced a net volume change of approximately 0 cy/lf from May 2013 to April 2014, where the losses on the southern profiles were balanced by gains on the northern profiles. This indicates that the Onslow Beach shoreline is experiencing relative stability and has not been adversely impacted by the changes occurring at the New River Inlet. The annualized volumetric change rates for each profile along the Onslow Beach shoreline between August 2005 and April 2014 are shown in Table 14.

**Table 14 – Onslow Beach Volumetric Changes**

Station No.	Historic Annual Trend Aug. 2005 to Oct. 2012	Oct. 2012 to Post-Con (May 2013)	Post-Con (May 2013) to April 2014	Oct. 2012 to Post-Mon (April 2014)
	(cy/lf/yr)			
<b>50+00</b>	+13	-2	-21	-13
<b>60+00</b>	-1	+31	-1	+12
<b>70+00</b>	-9	+50	-9	+15
<b>80+00</b>	-12	+6	+14	+11
<b>90+00</b>	-13	N/A	+15	0
<b>Annual Average (cy/lf/yr)</b>	-4	+22	0	+5

The volumetric analysis compared the changes between the Oct. 2012 and April 2014 surveys and calculated an average change of +8 cy/lf or an annual average change rate of +5 cy/lf/yr. The 2014 post-monitoring show a decrease in the long-term change rate from the +22 cy/lf/yr between Oct. 2012 and May 2013, however, the most recent results continue to indicate a net positive trend in the volume change along Onslow Beach.

**CONCLUSION**

The second post-construction physical monitoring event for the North Topsail Beach Phase 1 project was performed in April 2014. The monitoring consisted of profile surveys to evaluate shoreline and volumetric changes within the project vicinity and hydrographic surveys to evaluate the realigned channel performance. The results were used to document the project performance and to identify potential adverse impacts that may have been created.

The coverage area extended north from New River Inlet to include approximately 9,000 ft. of shoreline on Onslow Beach and south from the inlet to include approximately 13,000 ft. of North Topsail Beach. The shoreline on Onslow Beach was separated into two (2) segments. The northern segment is referenced as Onslow Beach and contains stations 50+00 to 90+00. Monitoring activities within this area concentrated on the performance of the Onslow Beach shoreline. The southern segment, from stations 0+00 to 40+00, contains the northern inlet shoulder of New River Inlet along the Onslow Beach shoreline. Beach profile surveys conducted along this region of Onslow Beach as well as those conducted along stations 1140+00 through 1170+00 on North Topsail Beach were used to evaluate the performance of the ebb shoal of New River Inlet as well as the pre-construction ocean bar channel and flood channels.

Based on the findings of the April 2014 monitoring, the Phase 1 Project Area was divided into two regions to more accurately assess the changes occurring along the project beach. The two regions are the northern end of the project from just north of River Dr. to the north end of the Topsail Reef between stations 1160+00 and 1145+00, referred to as the “Inlet Influenced Area” and the beach strand portion of the project from station 1145+00 to 1090+00, referenced as the “Beach Fill Performance Area”. The Inlet Influenced area was evaluated separately as it

experienced higher than expected erosion rates attributed to the influence of the New River Inlet and the effects of a nodal zone within the area.

The Inlet Influenced area, along the northern end of North Topsail Beach, experienced higher than expected rates of erosion which is attributed to the effects of a nodal zone (or localized area of erosion) adjacent to the New River Inlet. The Phase 1 project moved the shoreline an average of +263 ft. seaward of the pre-construction profile and placed approximately +176,000 cy or +103 cy/lf of fill in this area. The physical monitoring results for the area show an average landward retreat of the MHW shoreline by approximately -155 ft. occurred from May 2013 to April 2014. The volume analysis calculated that the area lost approximately -123,000 cy or -74 cy/lf between stations 1160+00 and 1145+00. Although this area experienced significant erosion, the continued development of the ebb shoal offshore of North Topsail Beach will provide increased protection from incoming waves as the effective depth over the shoal decreases causing waves to break further offshore reducing the erosional effect of the nodal zone and promoting shoreline stability at this location.

The physical monitoring results show that the Beach Fill Performance area of the Phase 1 project (stations 1145+00 to 1090+00) lost an average of -22 cy/lf of fill or approximately -98,000 cy from May 2013 to April 2014. The MHW shoreline within the area measured an average retreat of -41 ft from May 2013 to April 2014. The completed Phase 1 project placed approximately +371,000 cy or +67 cy/lf of fill along the 5,500 ft. length of shoreline. The degree of change within the Beach Fill Performance area is not unexpected considering the above average intensity winter weather that affected the project area prior to the April 2014 monitoring event and migration of material south out of the project area. However, the erosion rates are not regarded as representative of typical conditions affecting the project shoreline.

The MHW and foreshore shoreline changes south of the project area between stations 1090+00 and 1050+00 showed a seaward increase of +9 ft. and +12 ft., respectively from May 2013 and April 2014. The volume change calculated for the same section of shoreline shows a gain of approximately +3,000 cy, or approximately +1 cy/lf/yr. These results are a continuation of the positive net shoreline and volume changes recorded from June 2012 to May 2013.

Five (5) hydrographic survey data sets collected within the limits of the realigned channel since the project was constructed were compared to determine shoaling of the realigned channel. The April 2014 survey conducted by CPE-NC showed that approximately 76% (or 448,000 cy) of the dredged volume has shoaled back into the channel footprint. The January 2013 (1-Year post dredging) survey conducted by the USACE showed that approximately 56% (or 334,400 cy) of the dredged volume has shoaled back into the channel footprint. Shoaling analysis conducted during the engineering and design phase of the project predicted that by Year 1 approximately 286,000 cy (48%) of material would shoal into the channel during Year 1. Although the measured shoaling of the channel based on recent surveys suggests a slightly higher shoaling rate, the rates appear to be generally in line with what was predicted. The average depth along the thalweg, or deepest portion of the channel, as of April 2014 was measured at approximate elevation -12 ft. NAVD88, ranging from -10 ft. to -19.5 ft. NAVD88. The April 2014 survey shows the channel thalweg is maintaining deep water access through the inlet and remains in a favorable location for continued development of the ebb tide delta off of North Topsail Beach.

Monitoring of the ebb shoal suggests that the reconfiguration is taking place as expected. The MHW contour along the Onslow Beach shoulder (north of the inlet) has moved southward; toward the channel while the -10 ft. NAVD88 contour has continued to move landward. This trend suggests that the ebb shoal offshore of Onslow Beach is migrating landward and to the south indicating a continuation of the ebb shoals deflation north of the inlet. Profile comparisons of the May 2013 and April 2014 profile surveys along the North Topsail Beach shoulder (south of inlet) show an increase in the volume of sand between the -7 ft. NAVD88 and -20 ft. NAVD88 contour. The results suggest that this material is being deposited in this area due to the realignment of the channel and is contributing to the reconfiguration of the ebb shoal as expected. Comparison of the May 2013 and April 2014 beach profile surveys also show that the pre-construction ocean bar channel and flood channels that appeared in the May 2013 survey have filled in and is generally seen as a positive sign that the ebb shoal is reconfiguring as designed.

Shoreline and volume change analysis of the Onslow Beach shoreline (stations 50+00 to 90+00) shows a continuation of the net positive trends in April 2014. Shoreline change and volume change analysis between May 2013 and April 2014 show a seaward migration of both the MHW and foreshore contours and minimal change in the volume of sand. The average volume change rate between August 2005 and October 2012 was -4 cy/ft./yr; whereas the rate between October 2012 and April 2014 was +5 cy/ft./yr. This is equivalent to a net positive volume increase of 53,000 cy along Onslow Beach from October 2012 to April 2014. While the seaward migration of the MHW and Foreshore contours and accretion is not believed to be a direct result of the Phase 1 project construction, it is clear that as of April 2014, the Onslow Beach shoreline between stations 50+00 and 90+00 has not experienced any adverse impacts with regards to loss of beach.

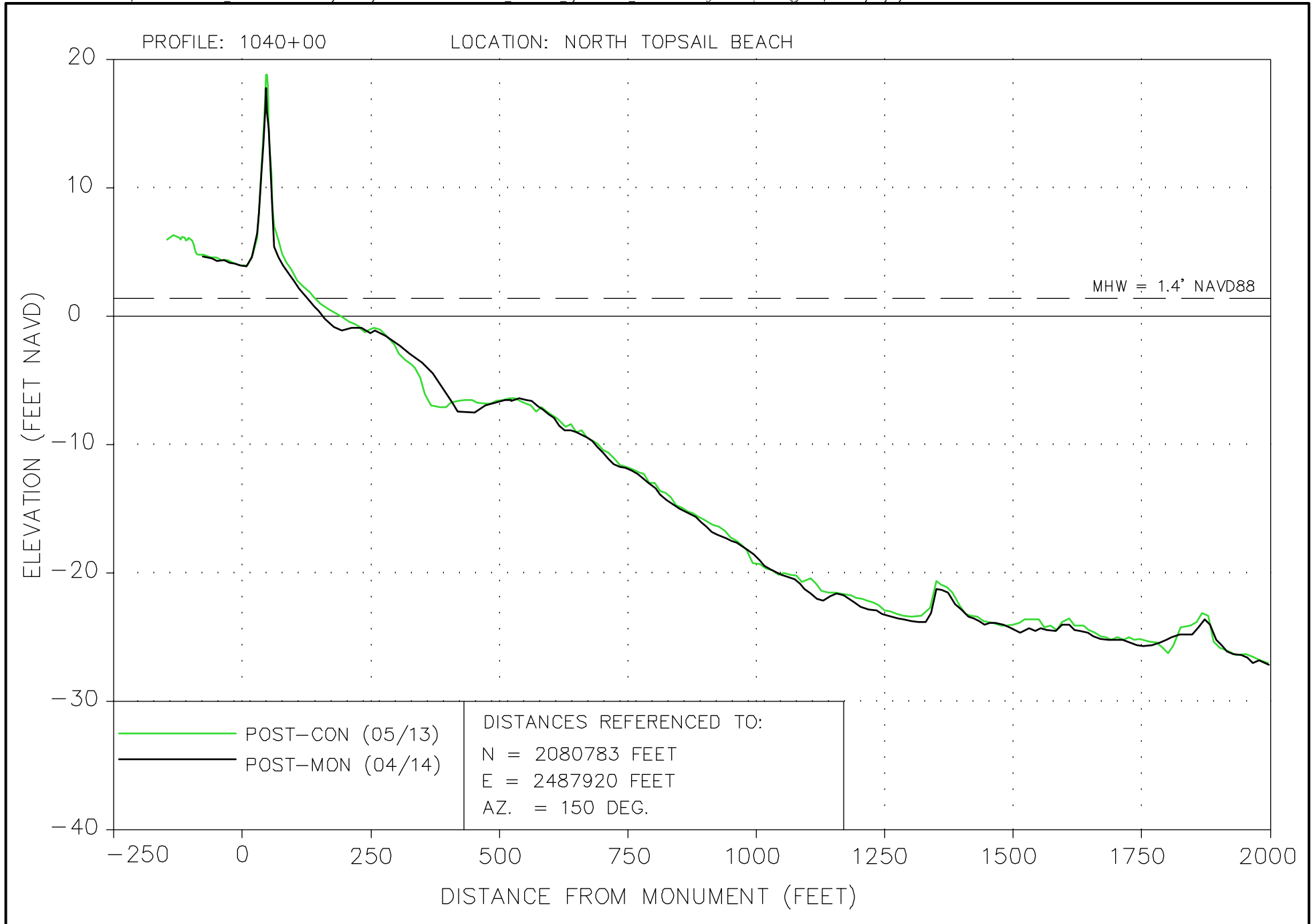
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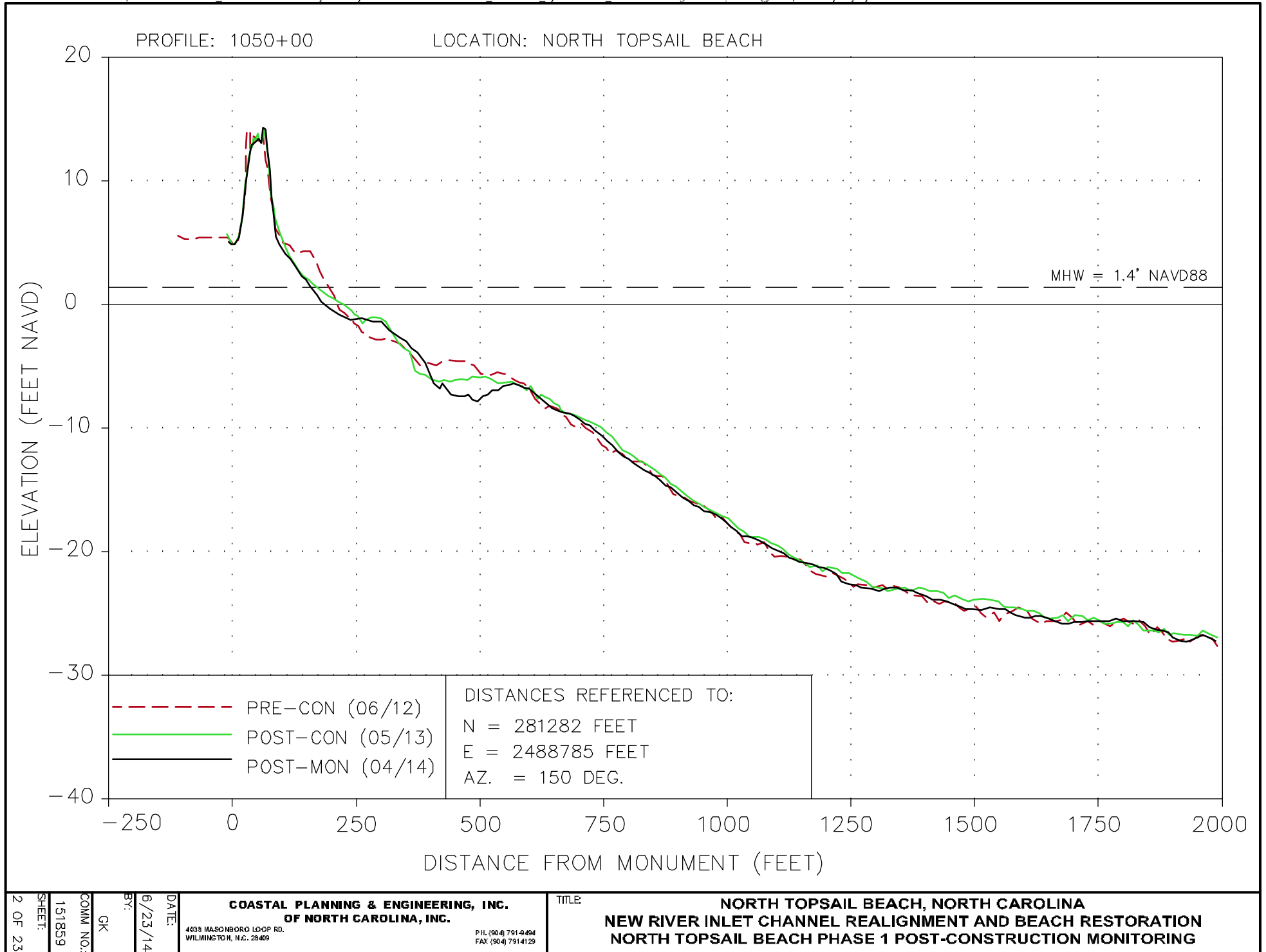


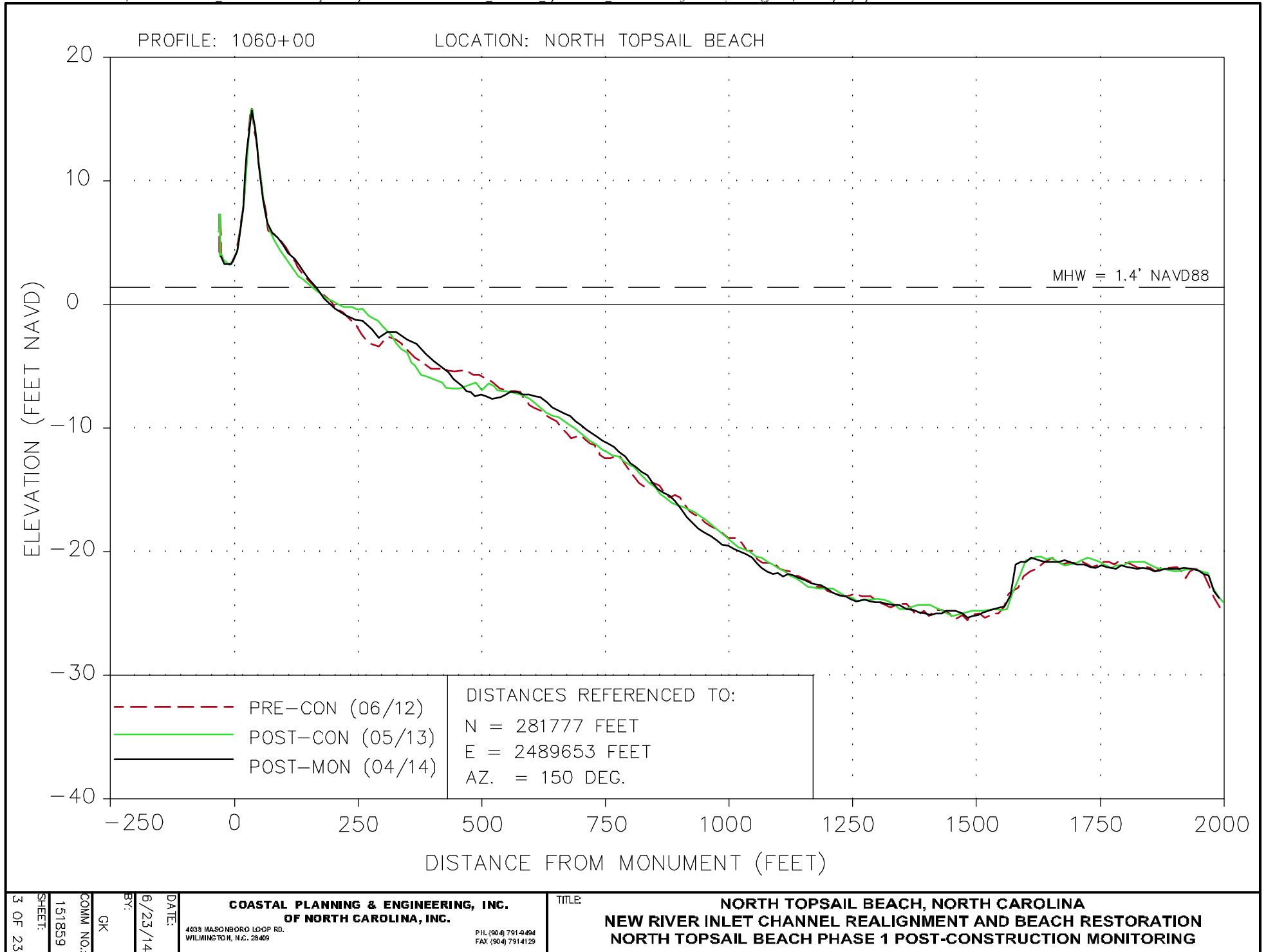
APPENDIX A

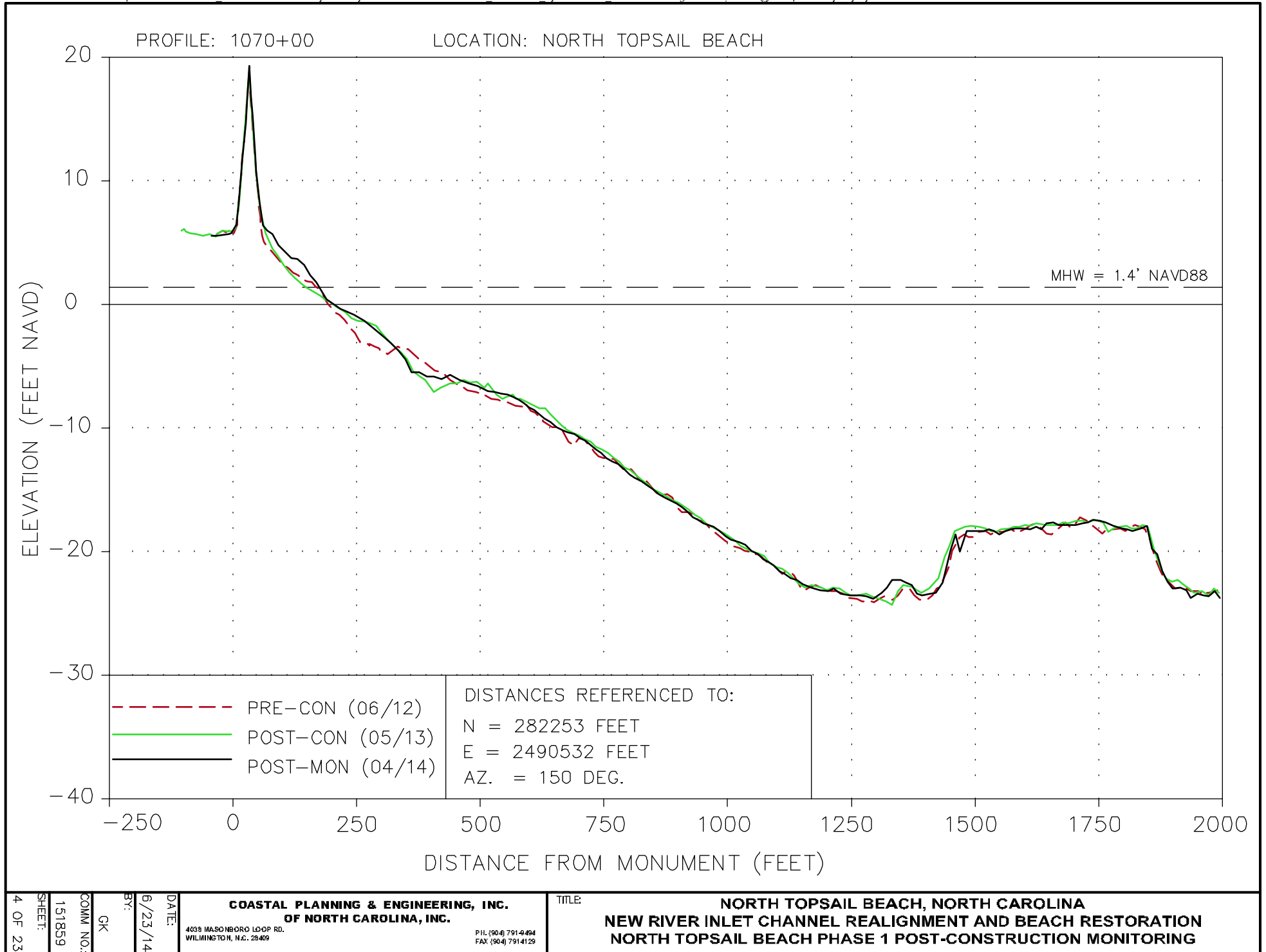
NORTH TOPSAIL BEACH - PHASE 1 MONITORING  
BEACH PROFILES

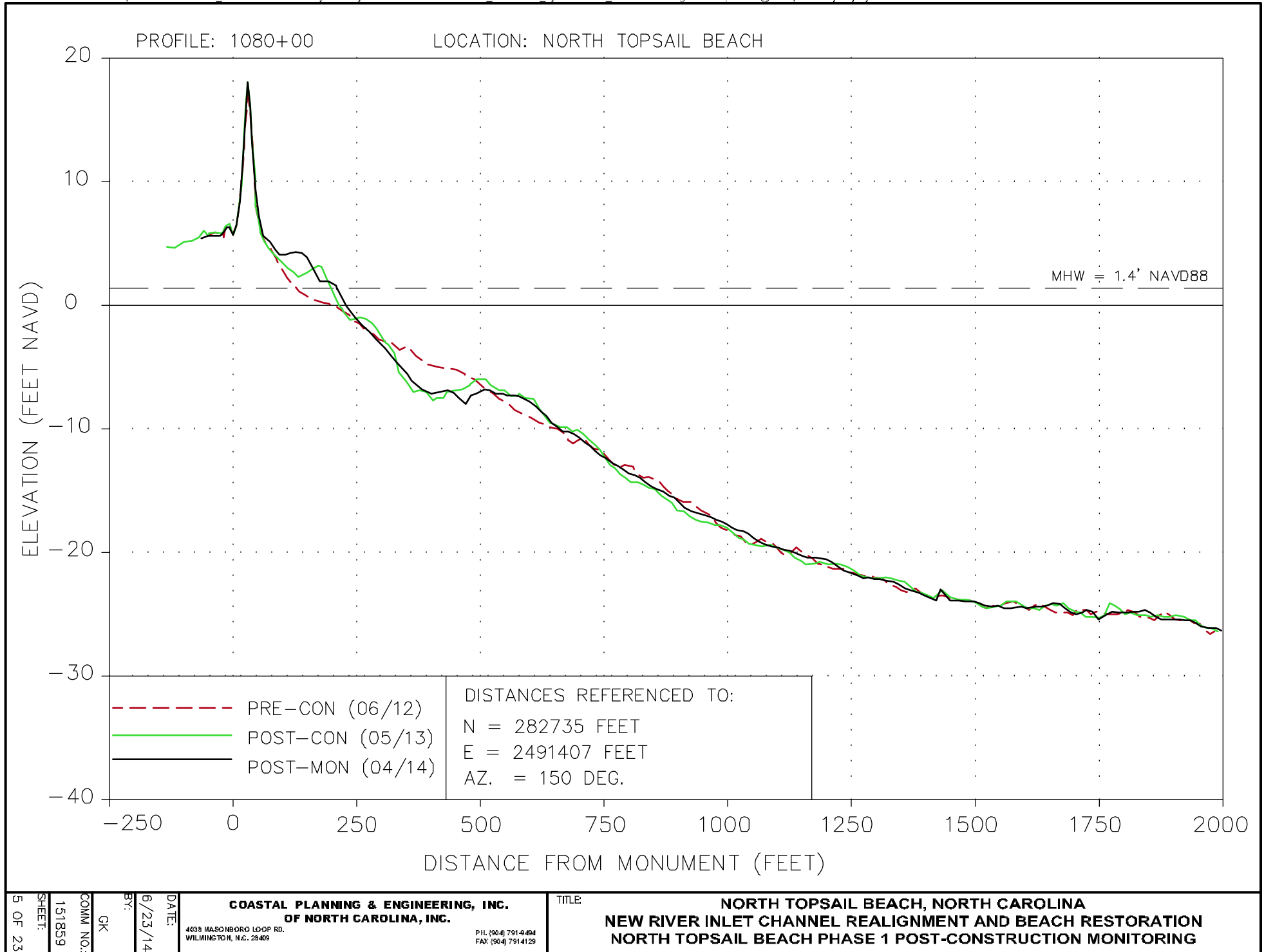


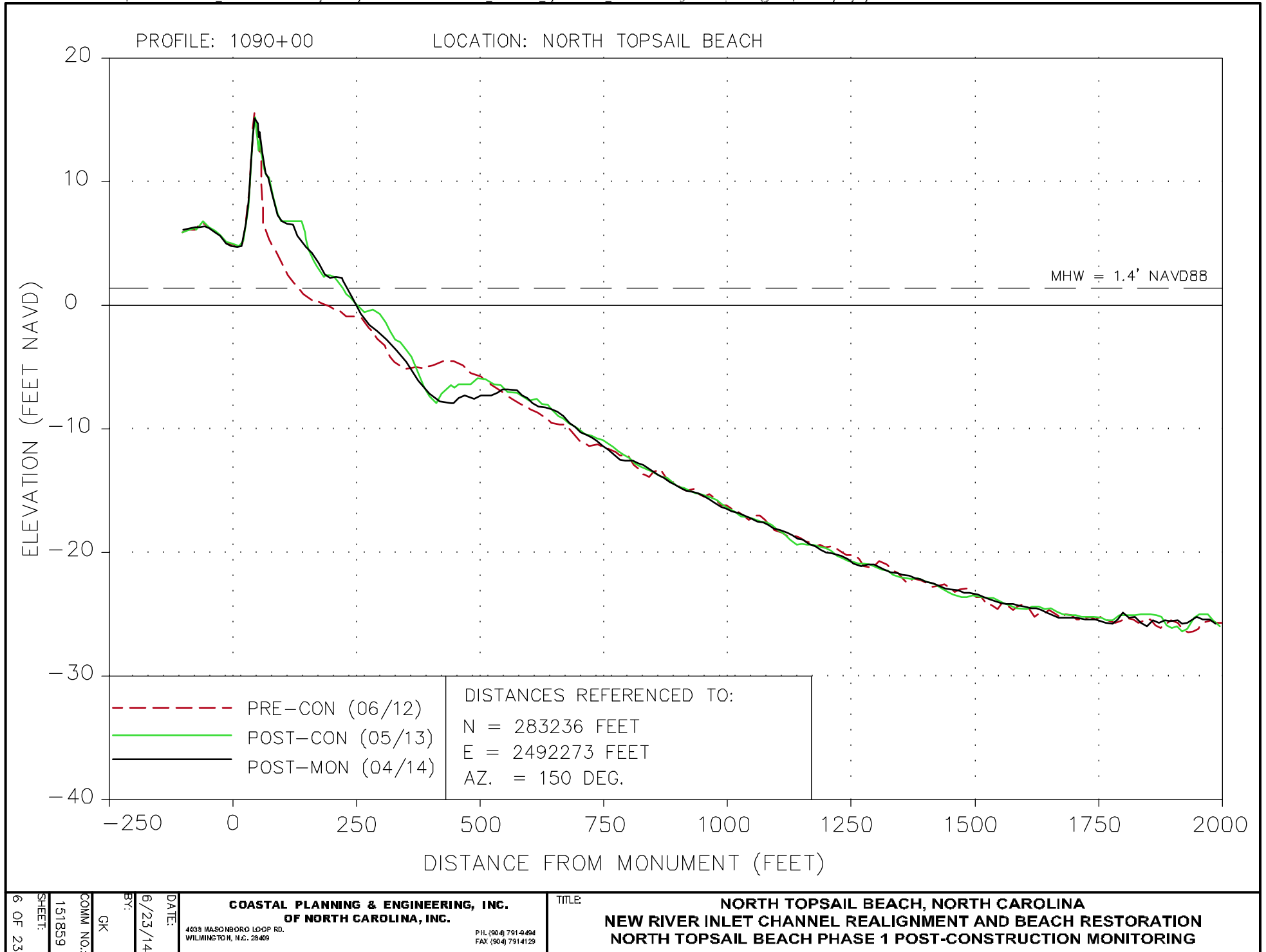
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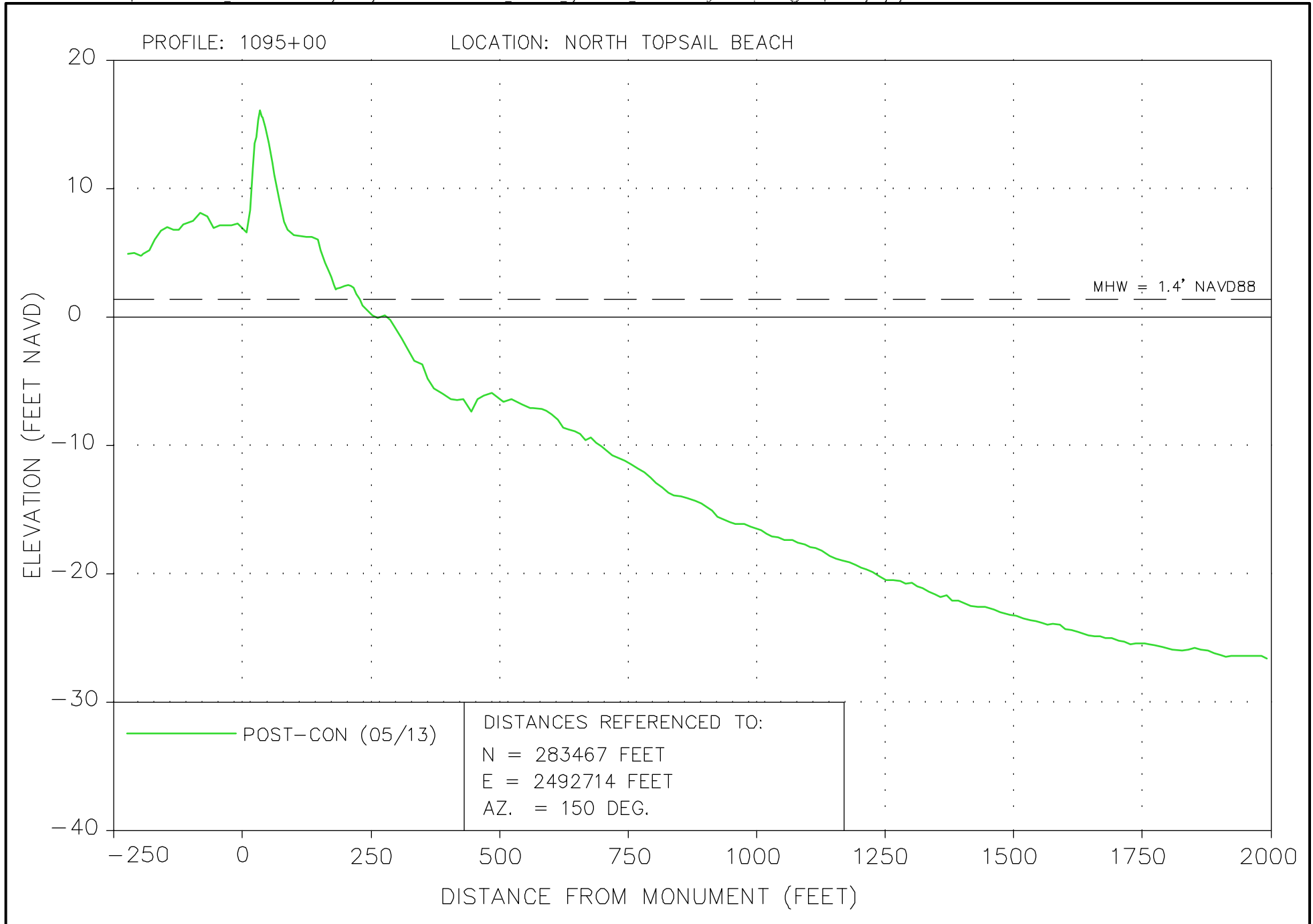






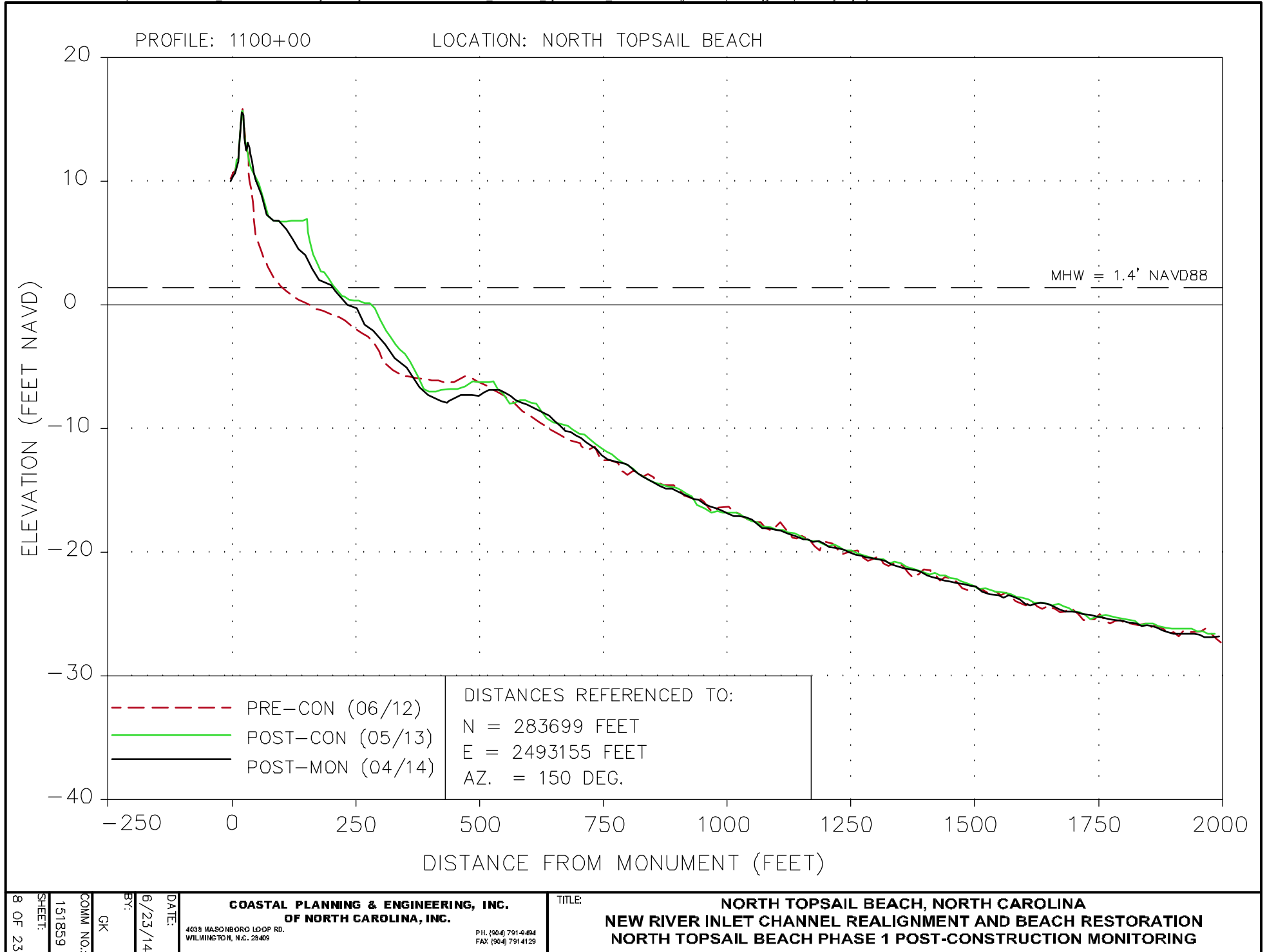


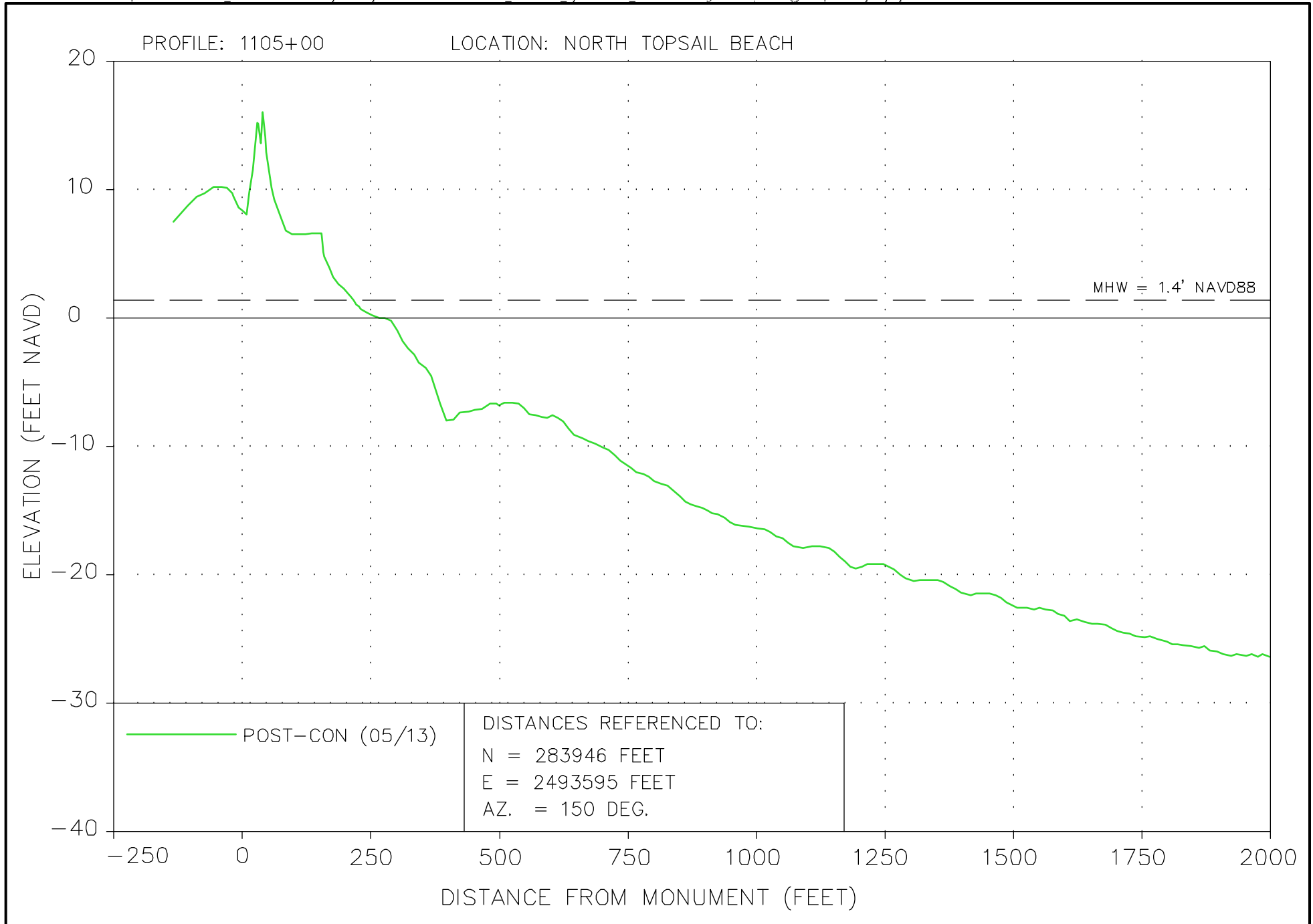




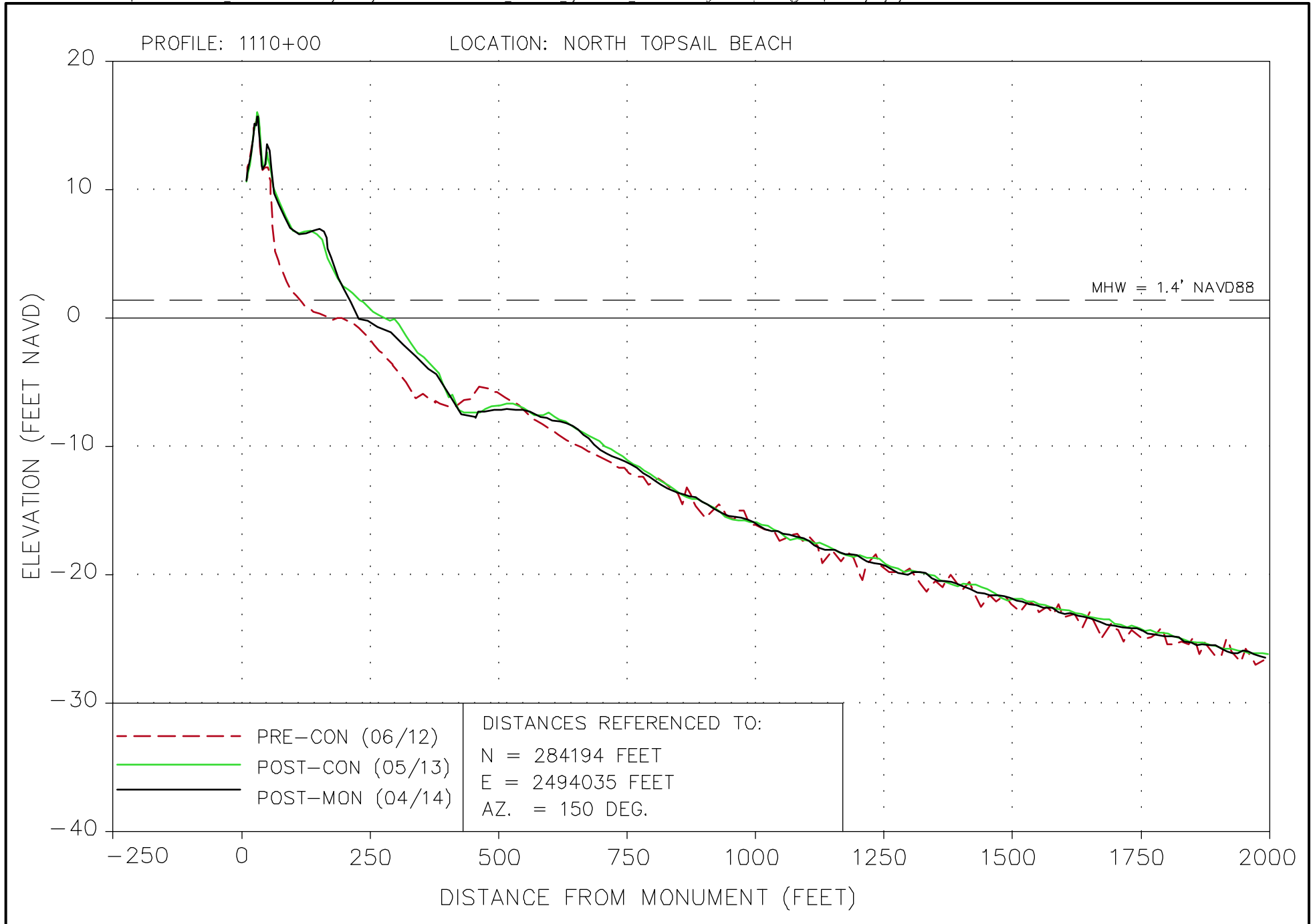
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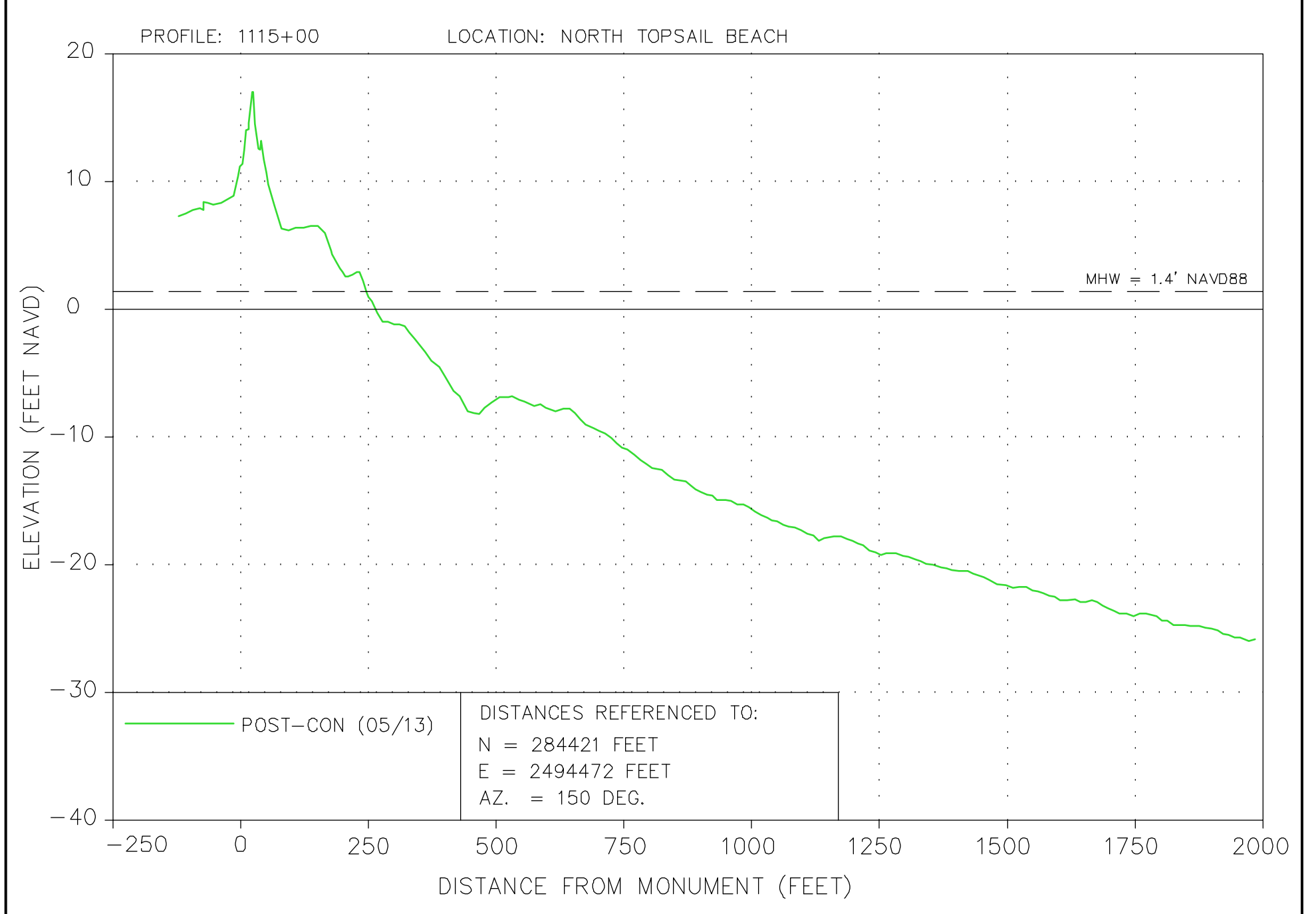




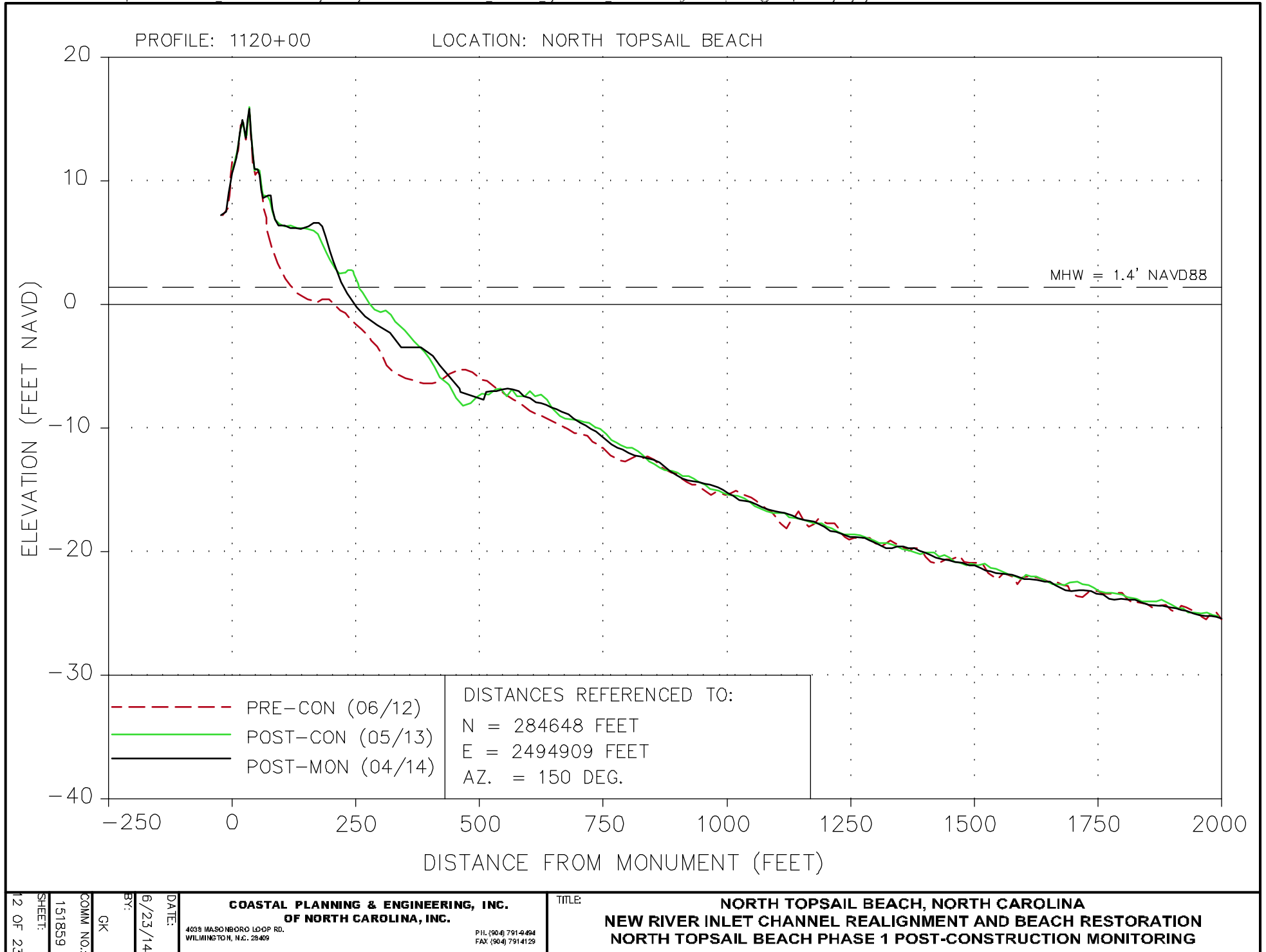


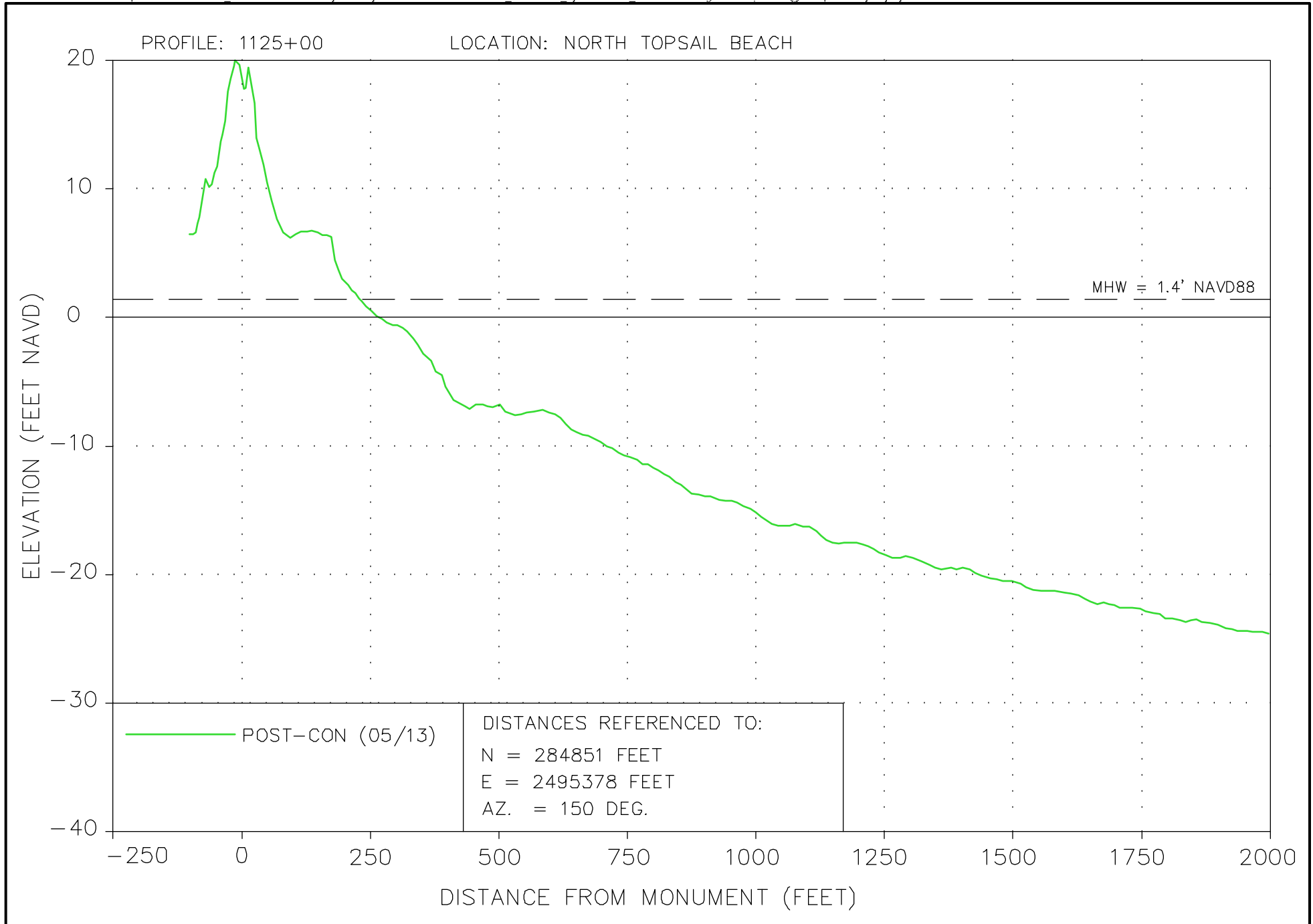
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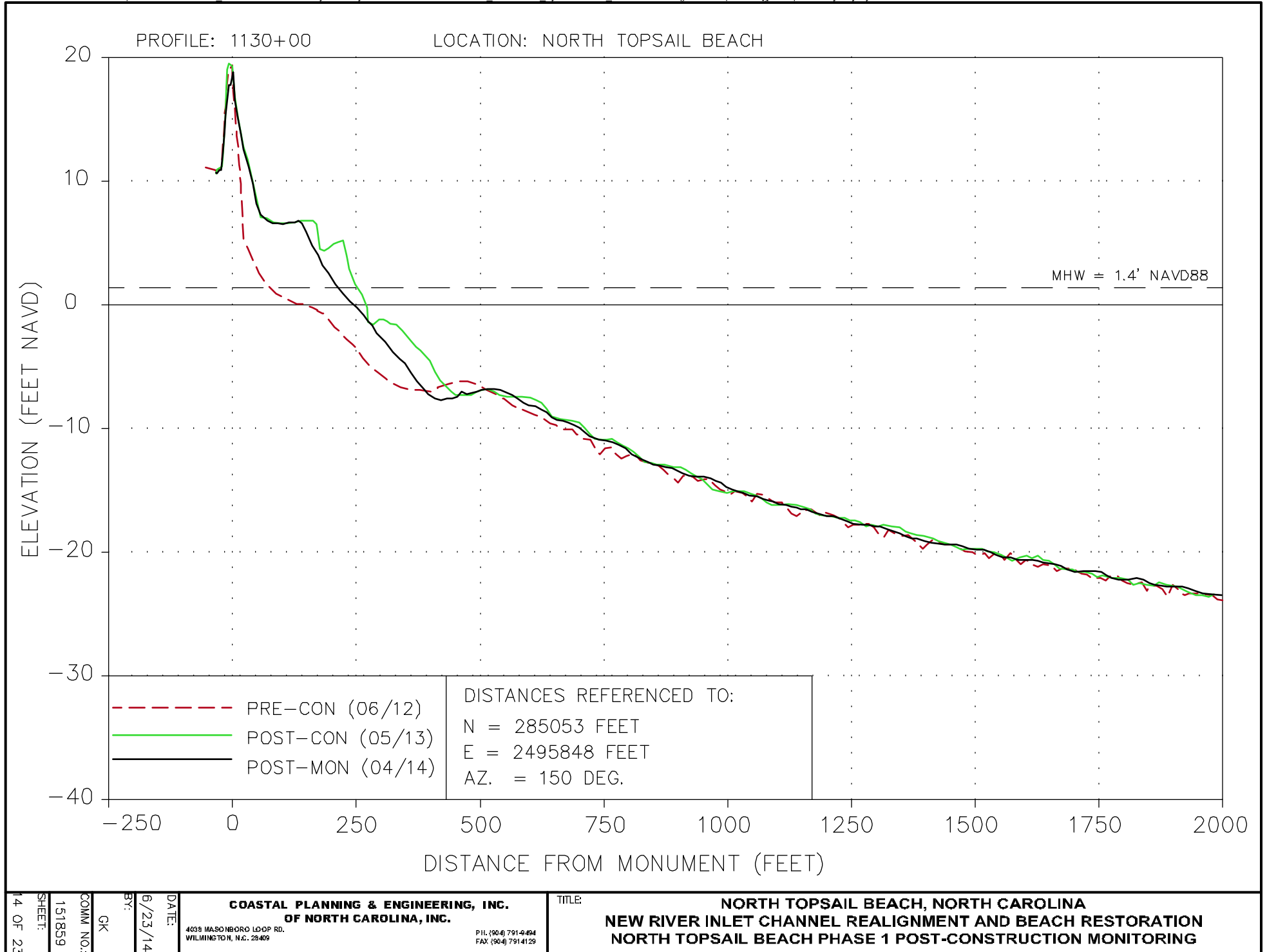


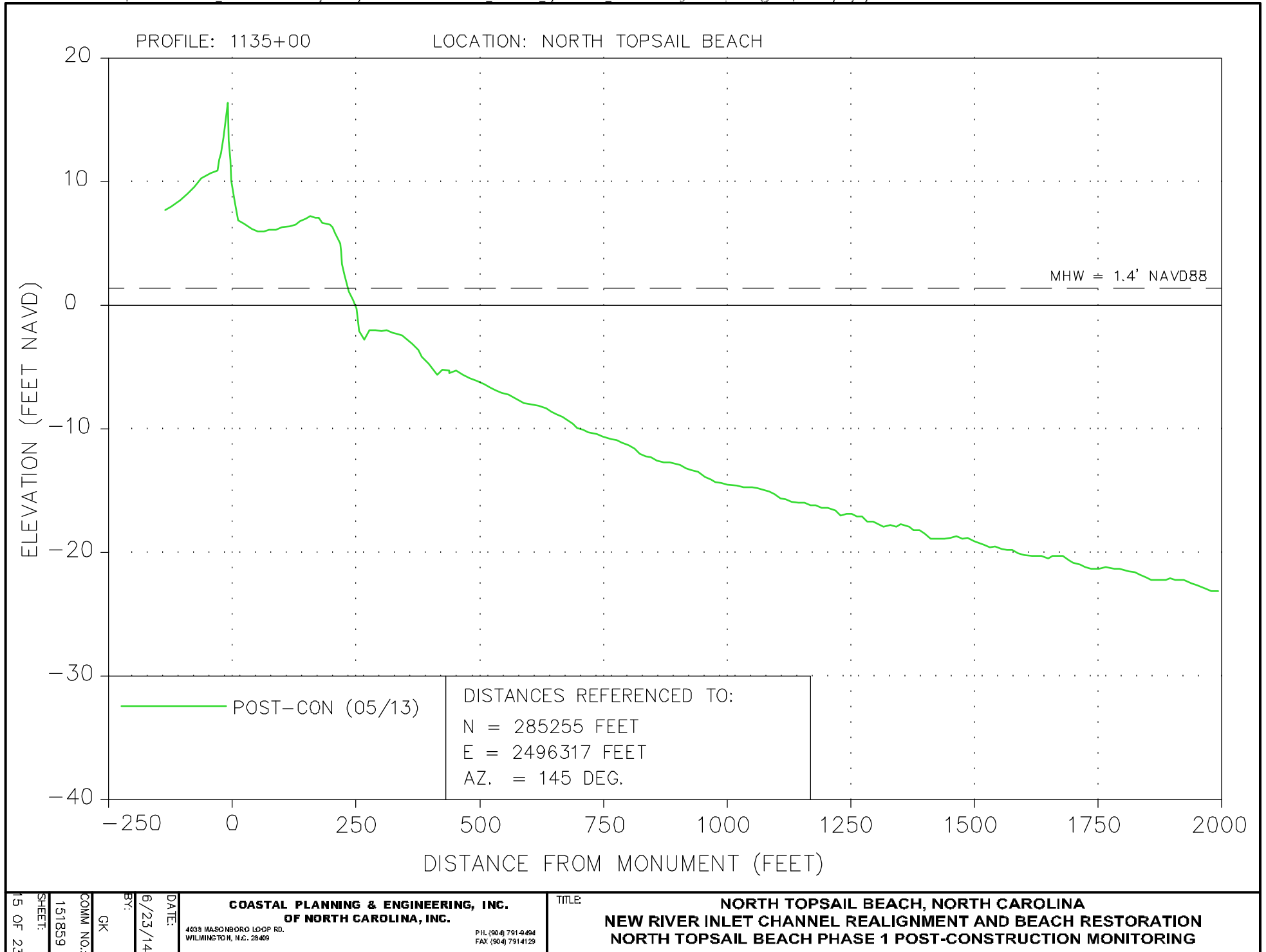
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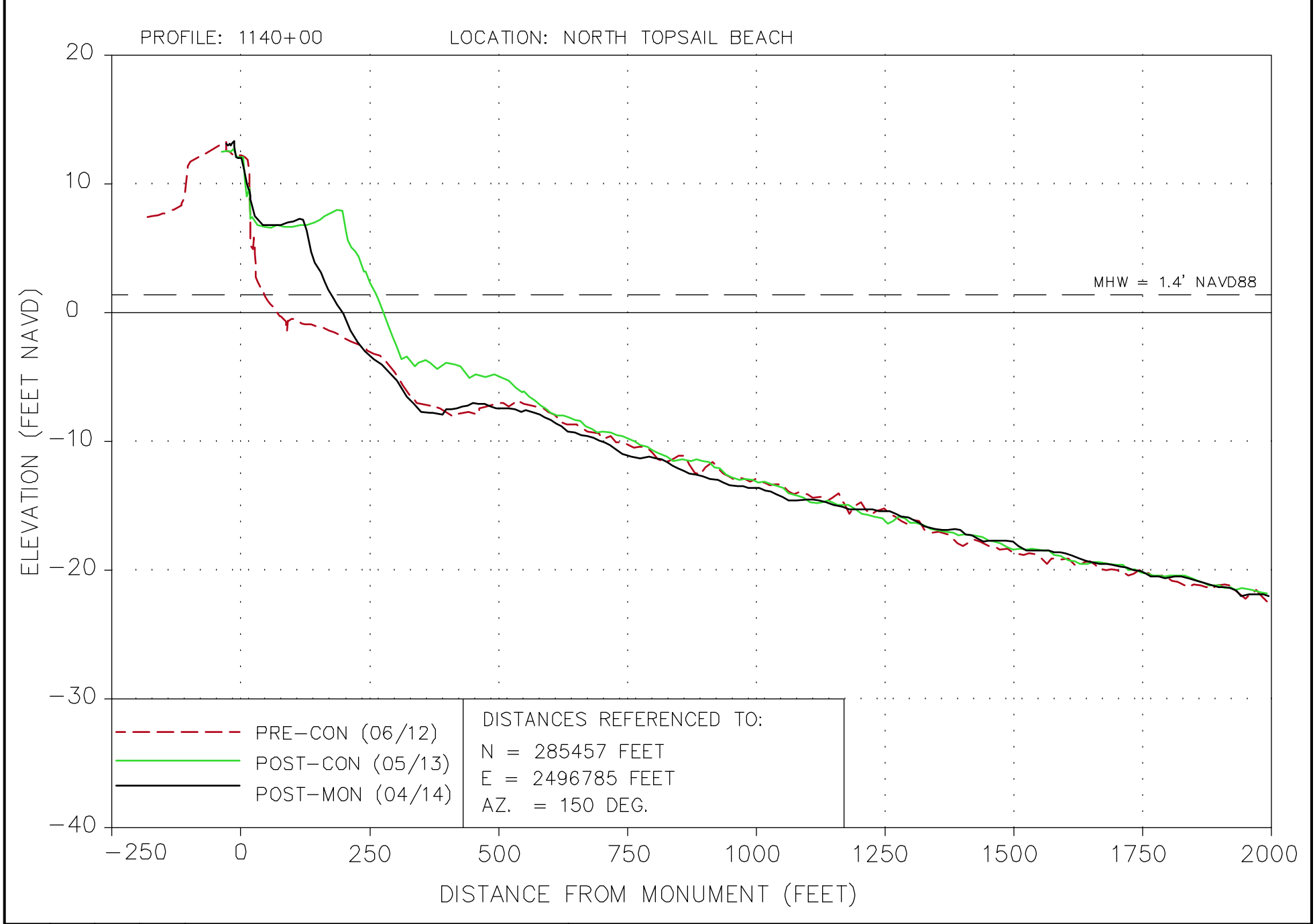


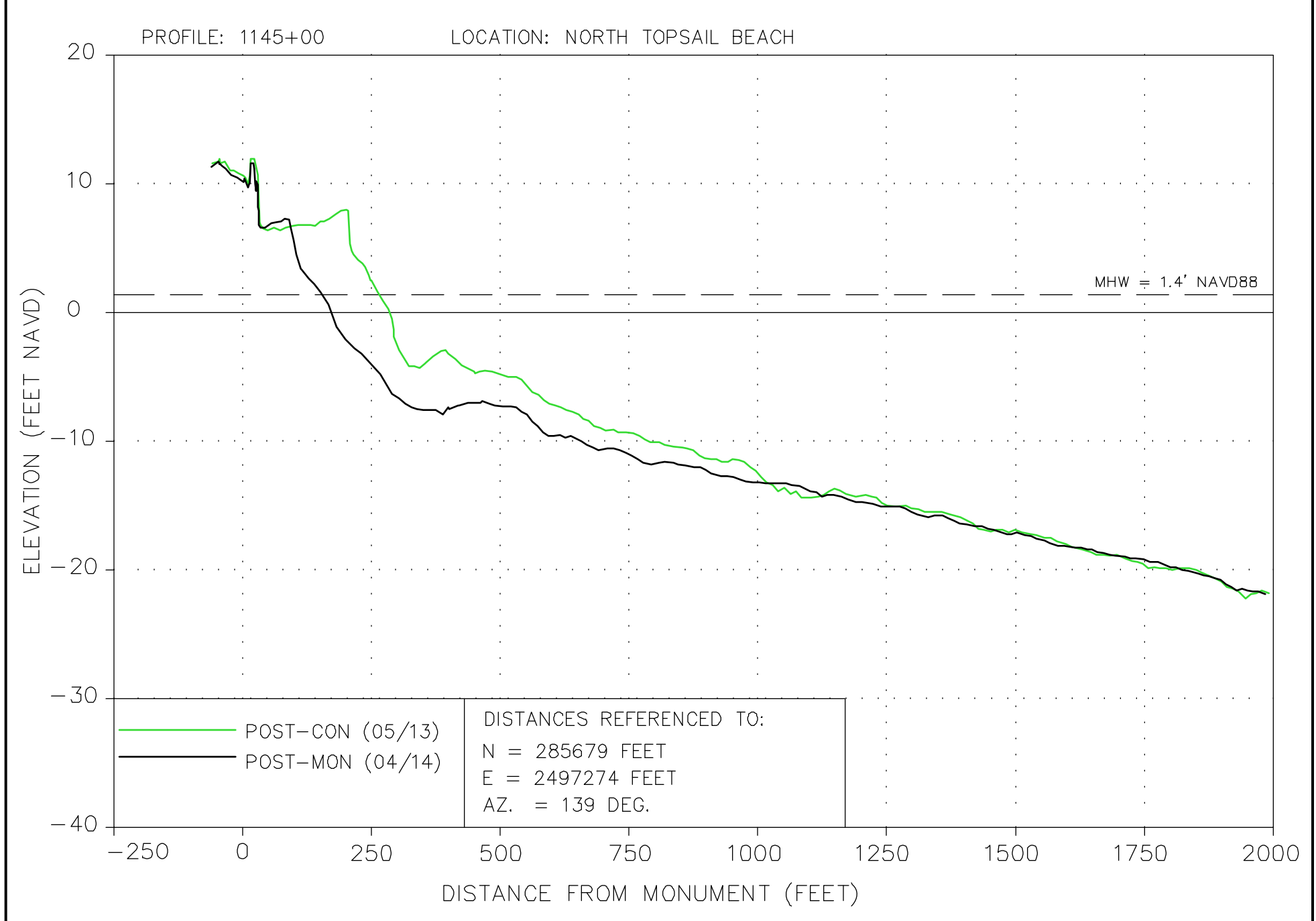
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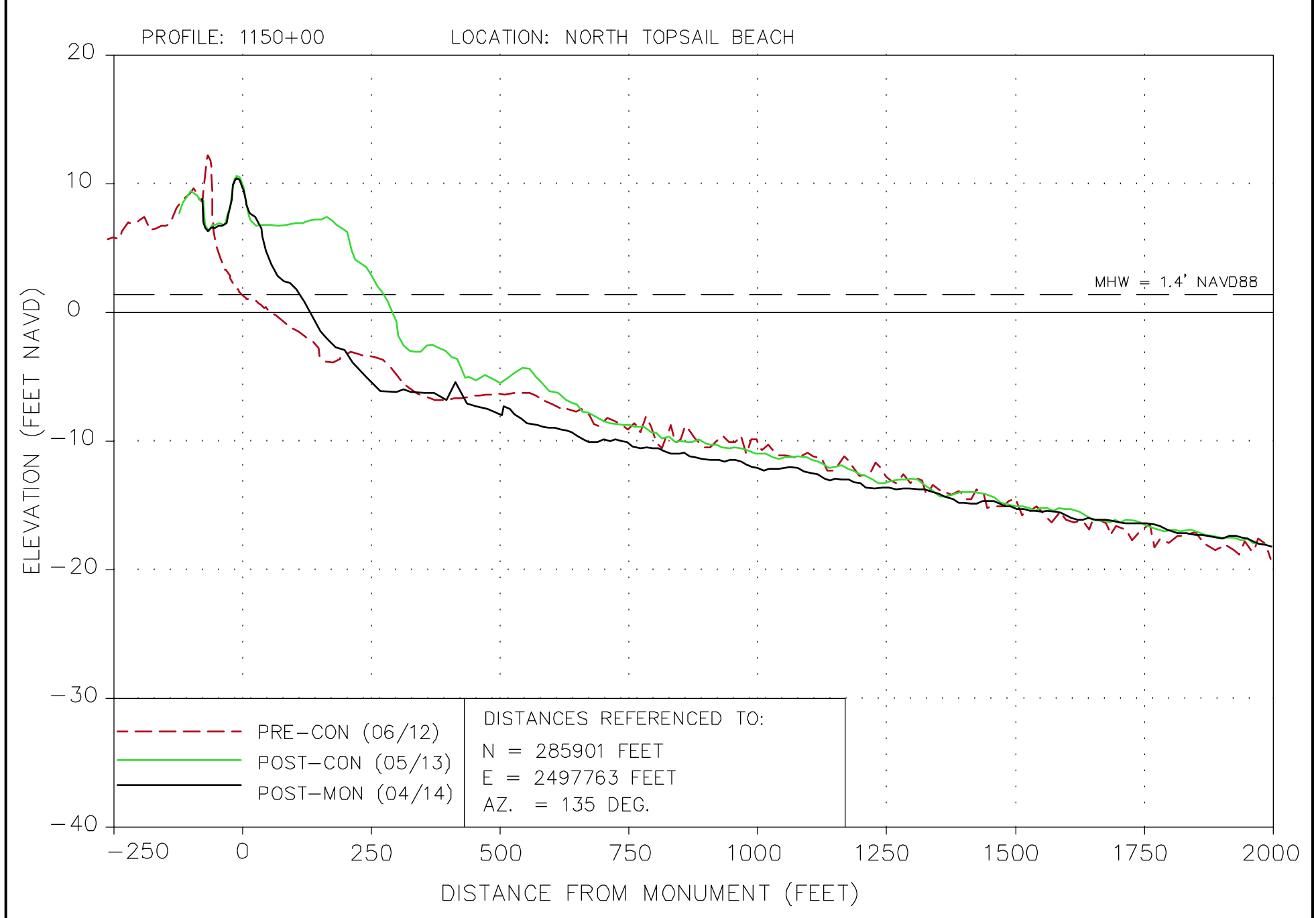


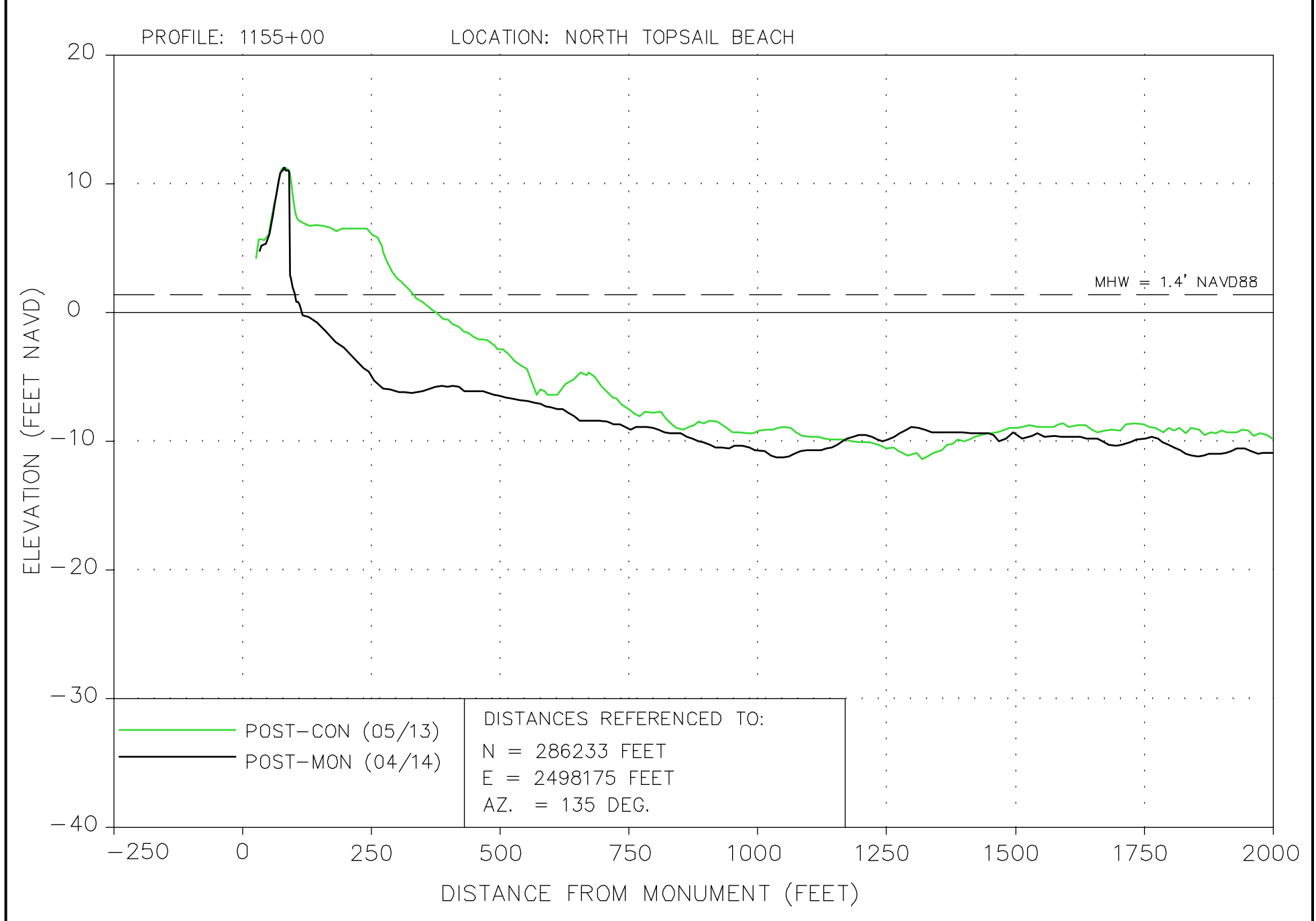




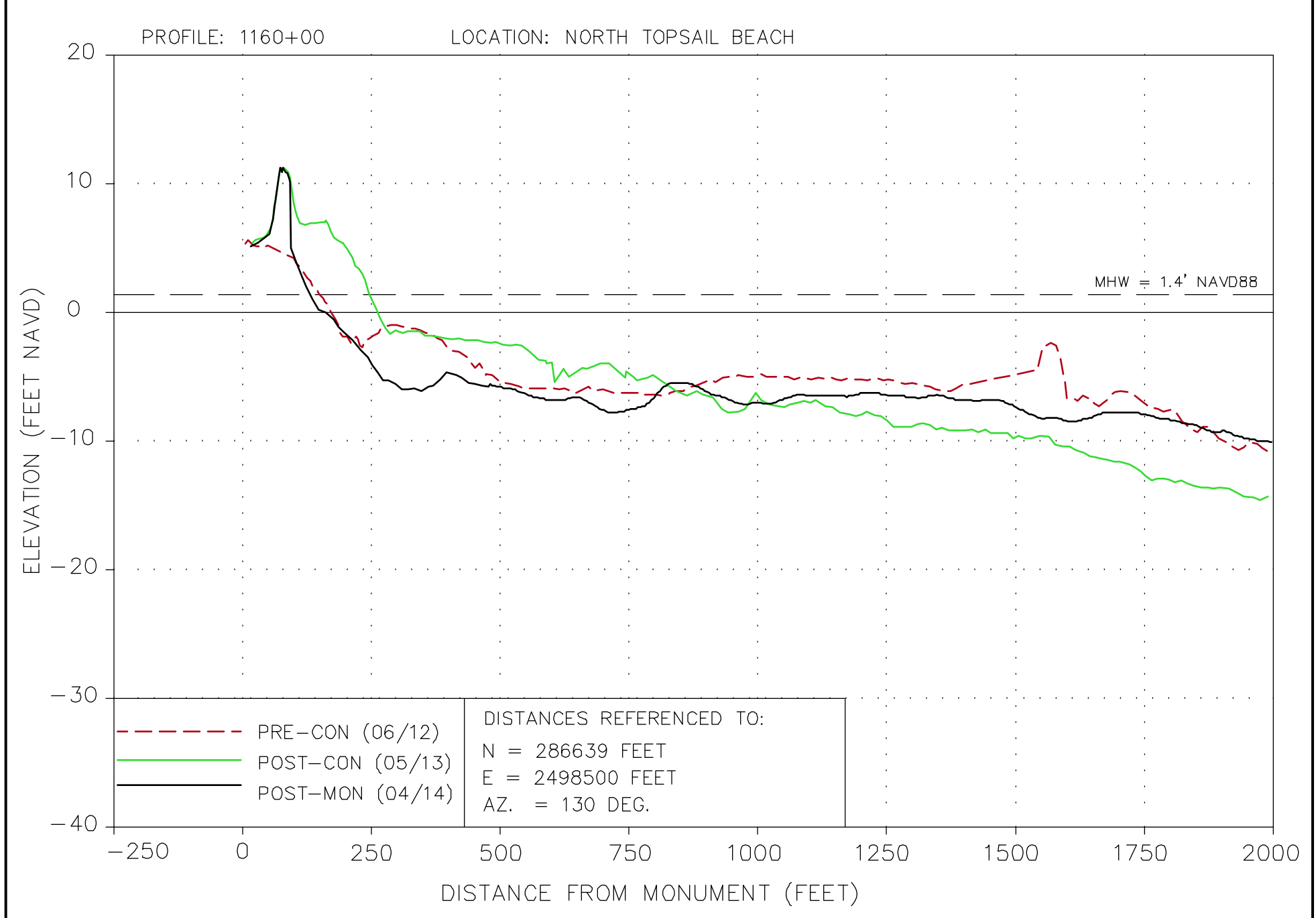


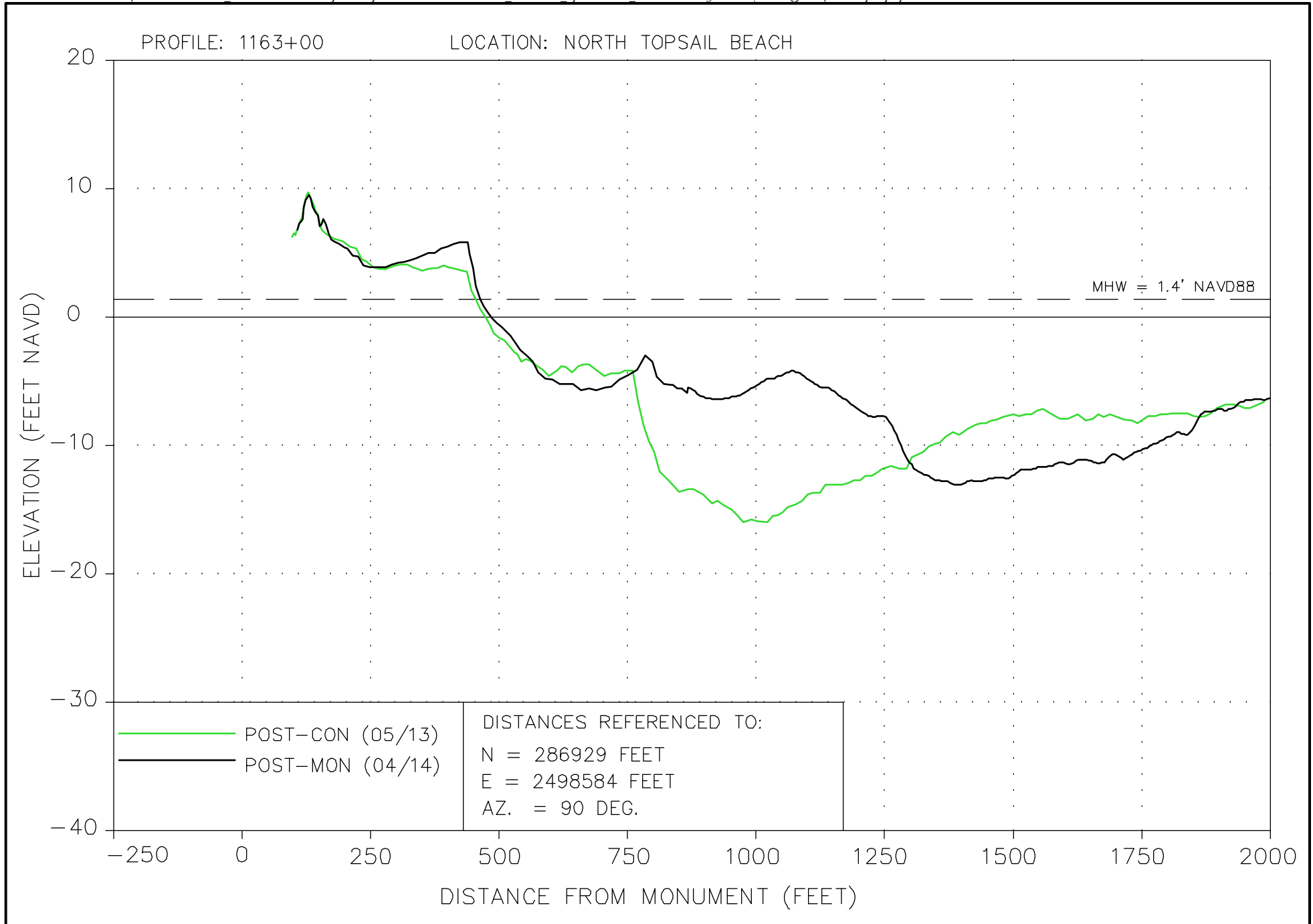
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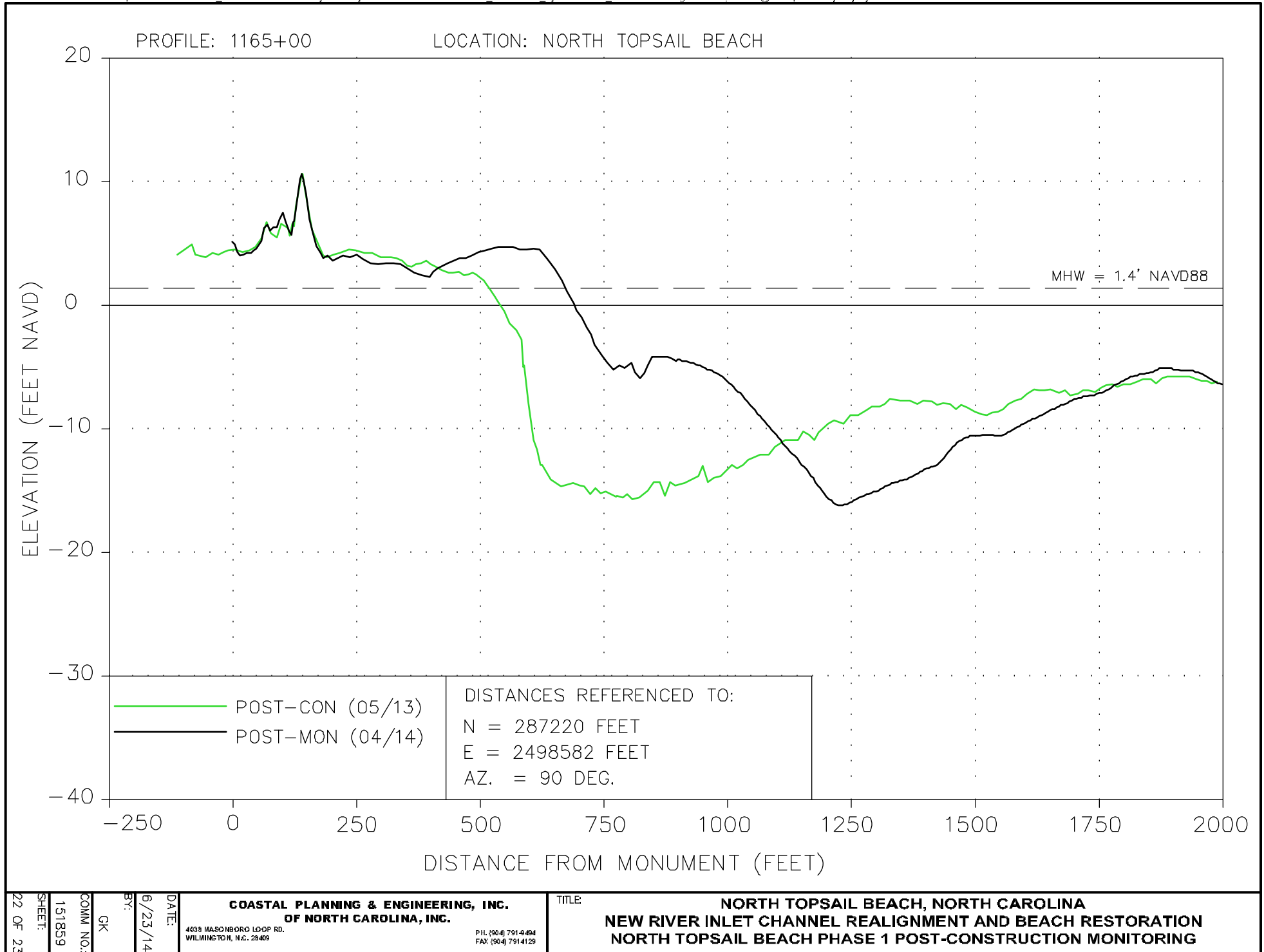


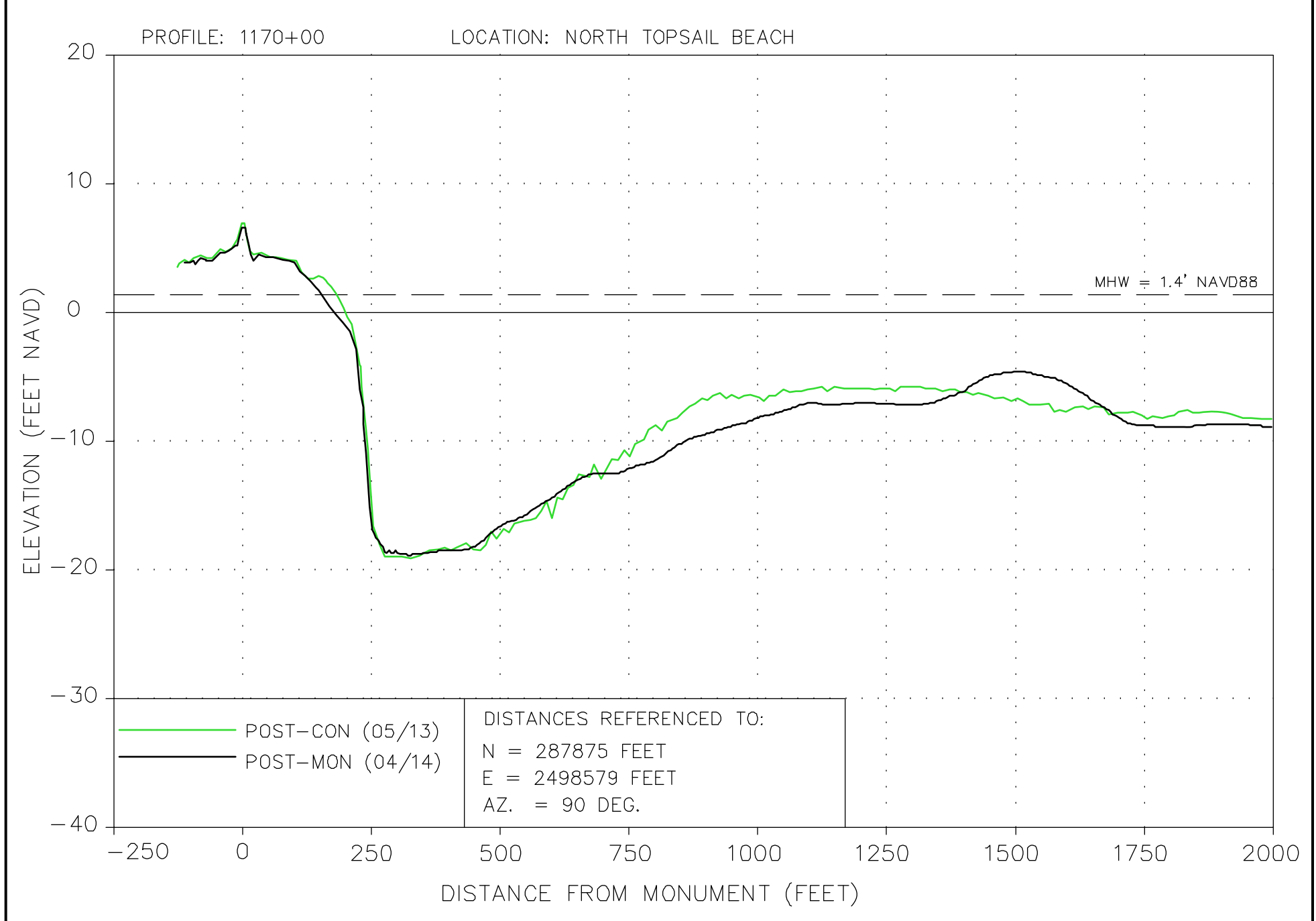
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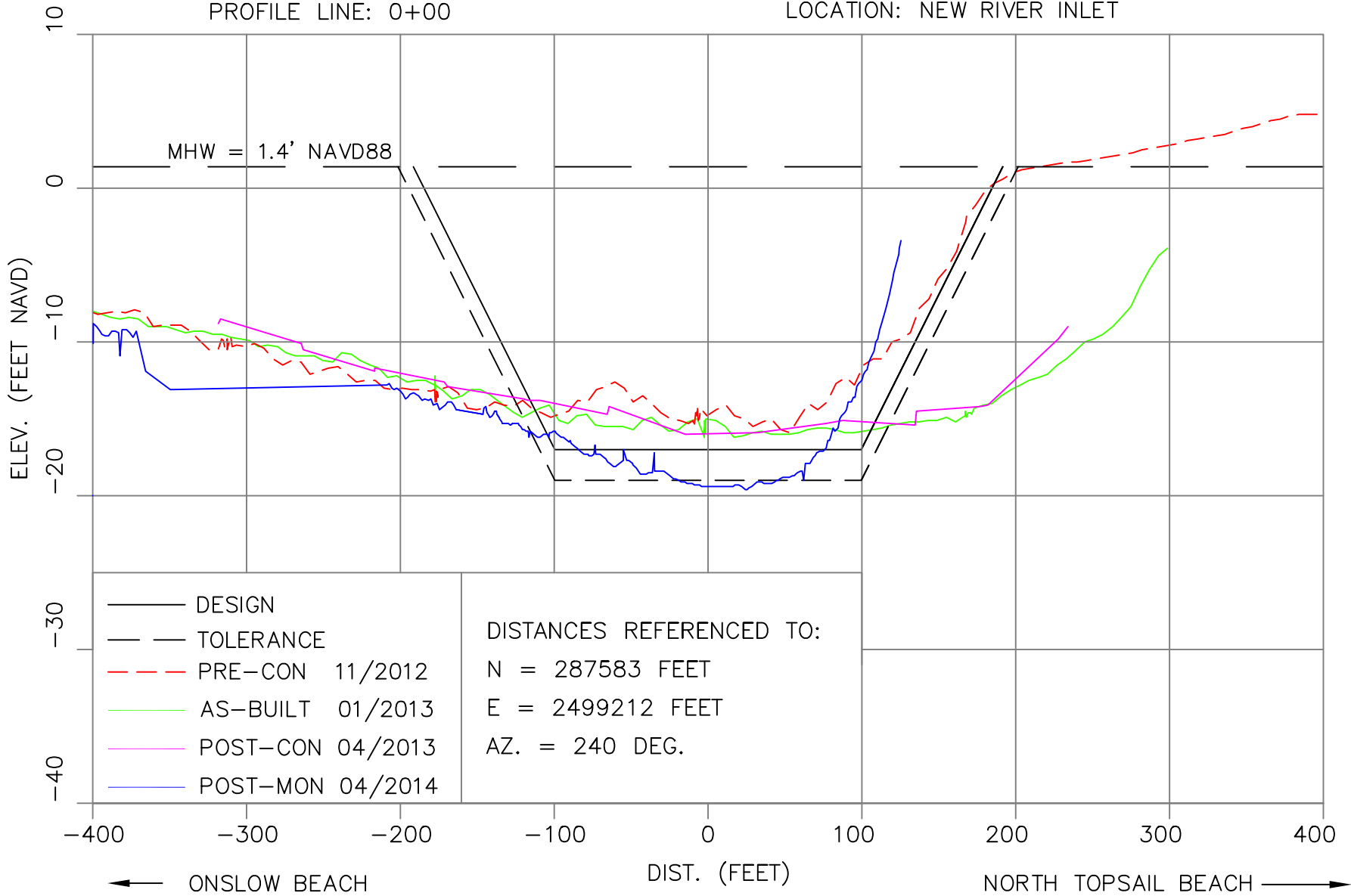


APPENDIX B

NEW RIVER INLET CHANNEL SURVEY PROFILES

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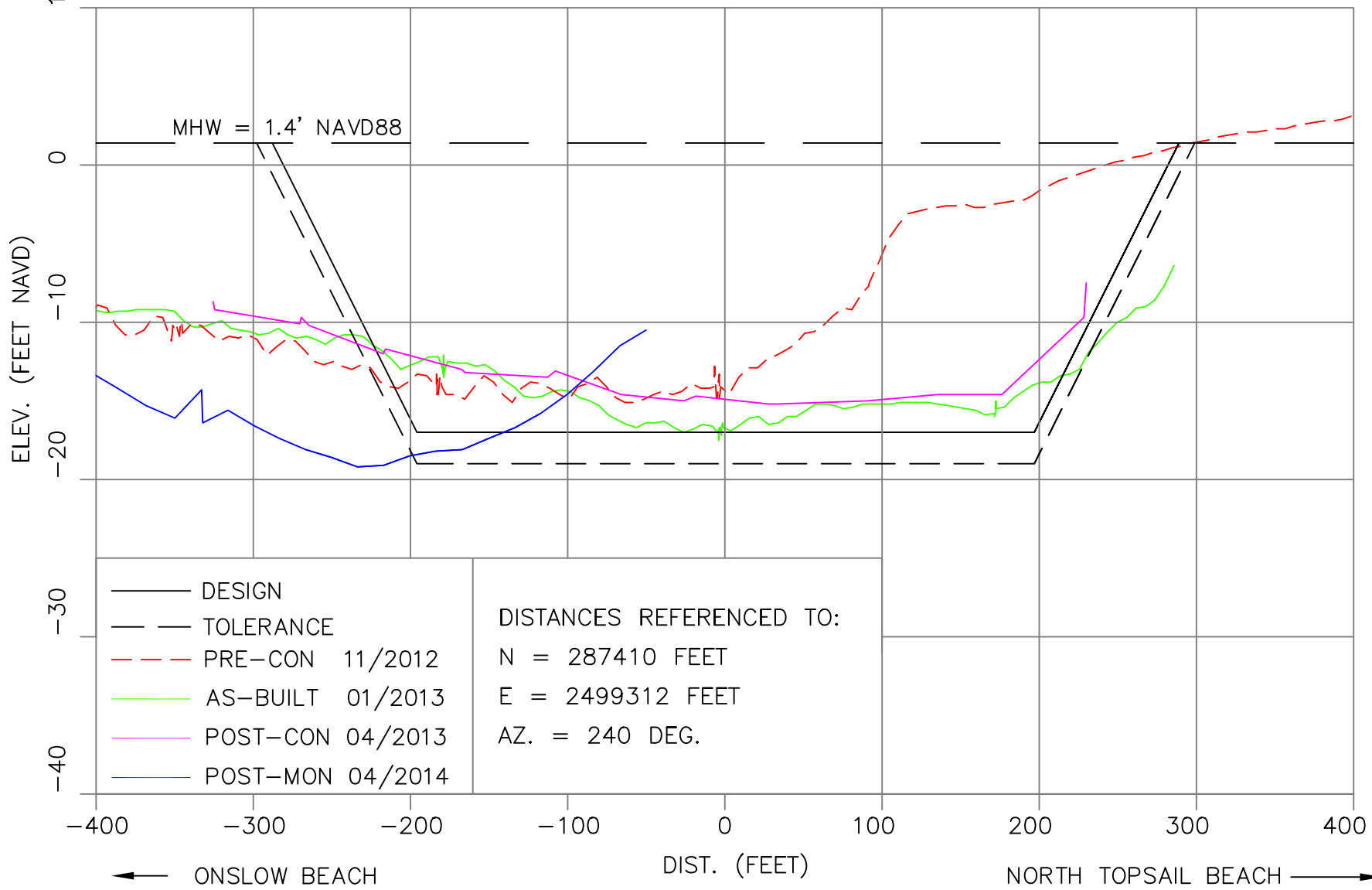


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- - - PRE-CON 11/2012
- AS-BUILT 01/2013
- POST-CON 04/2013
- POST-MON 04/2014

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 E = 2499212 FEET  
 AZ. = 240 DEG.

PROFILE LINE: 2+00

LOCATION: NEW RIVER INLET

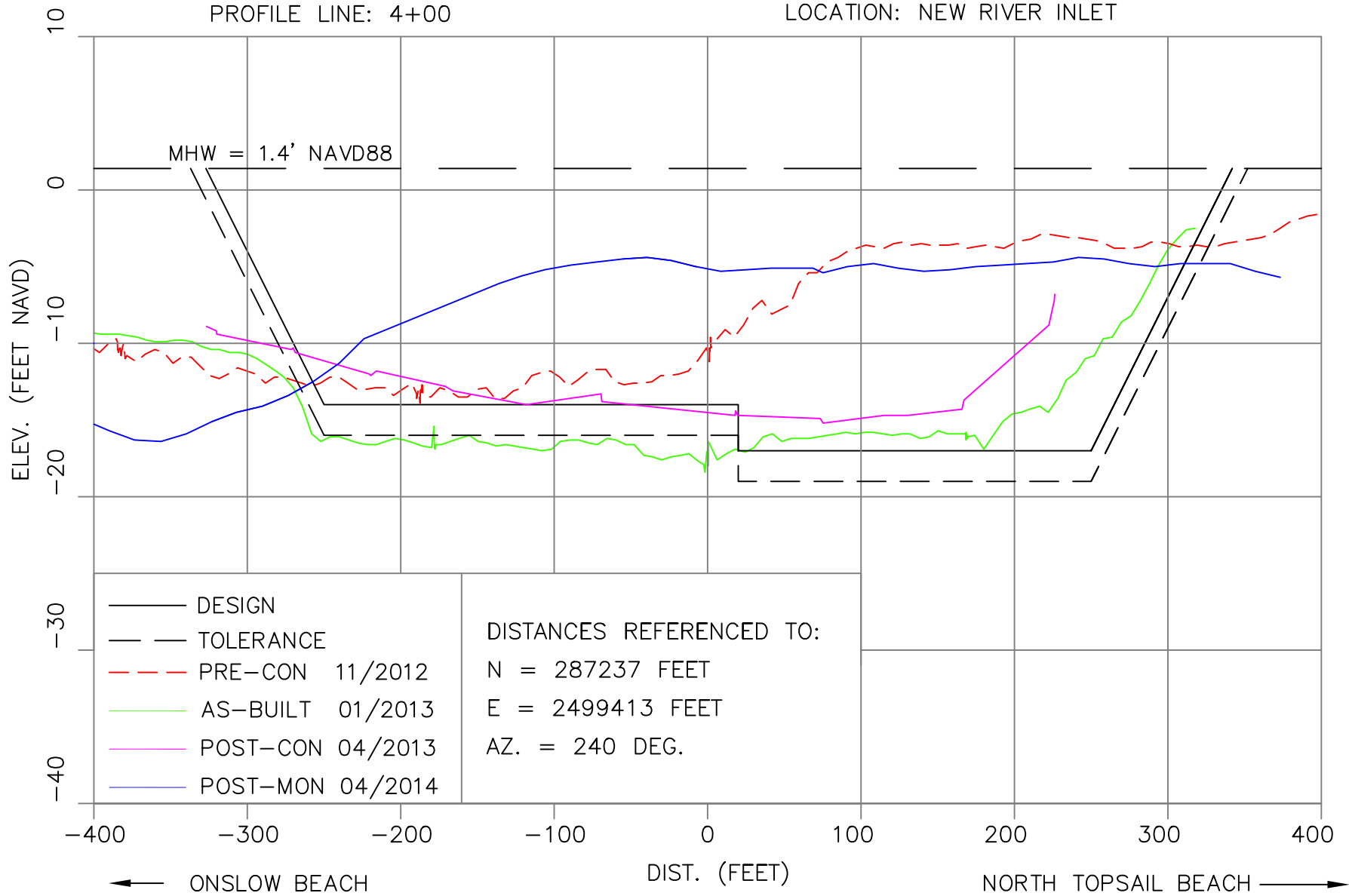


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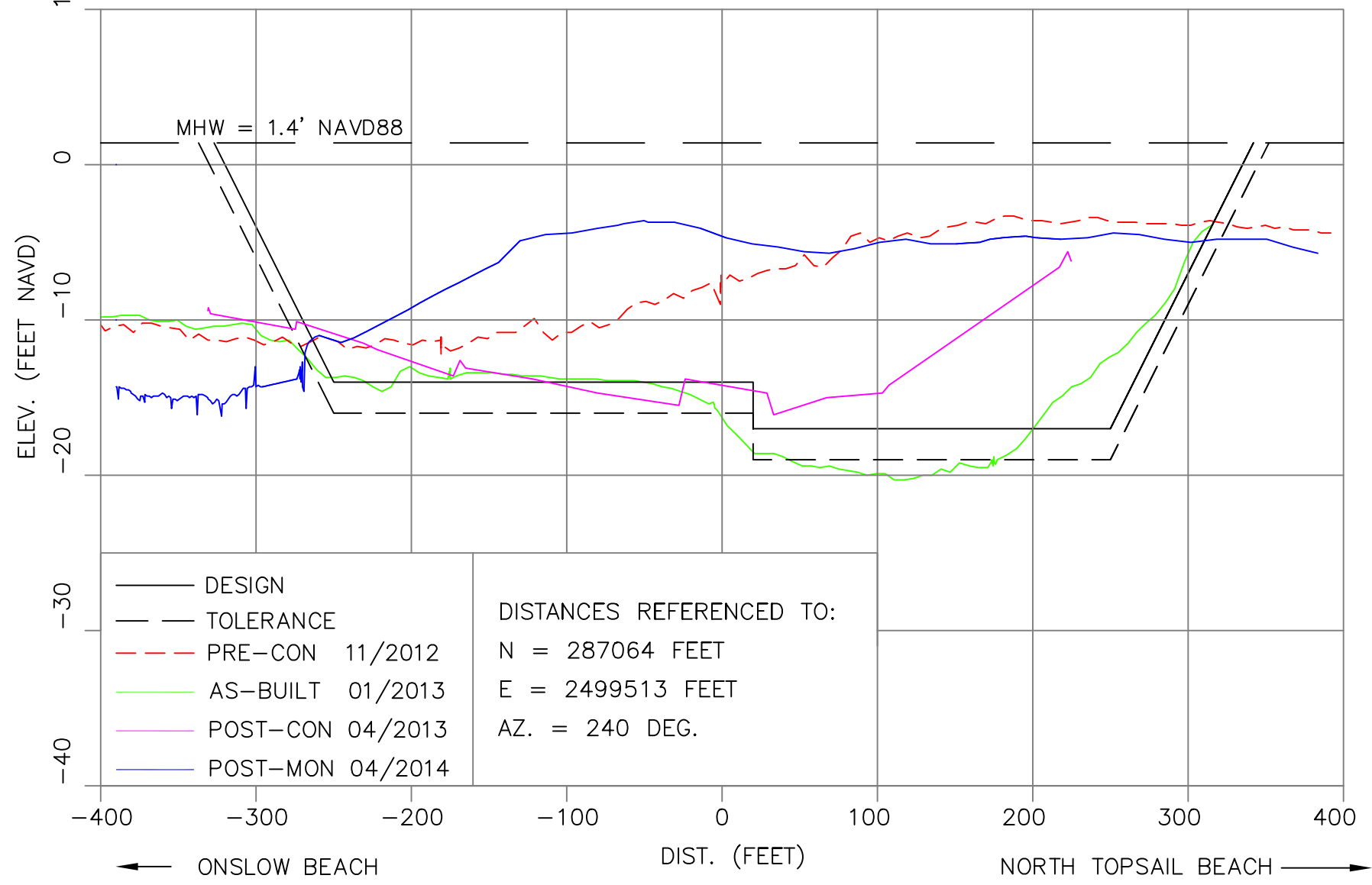
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LOCATION: NEW RIVER INLET



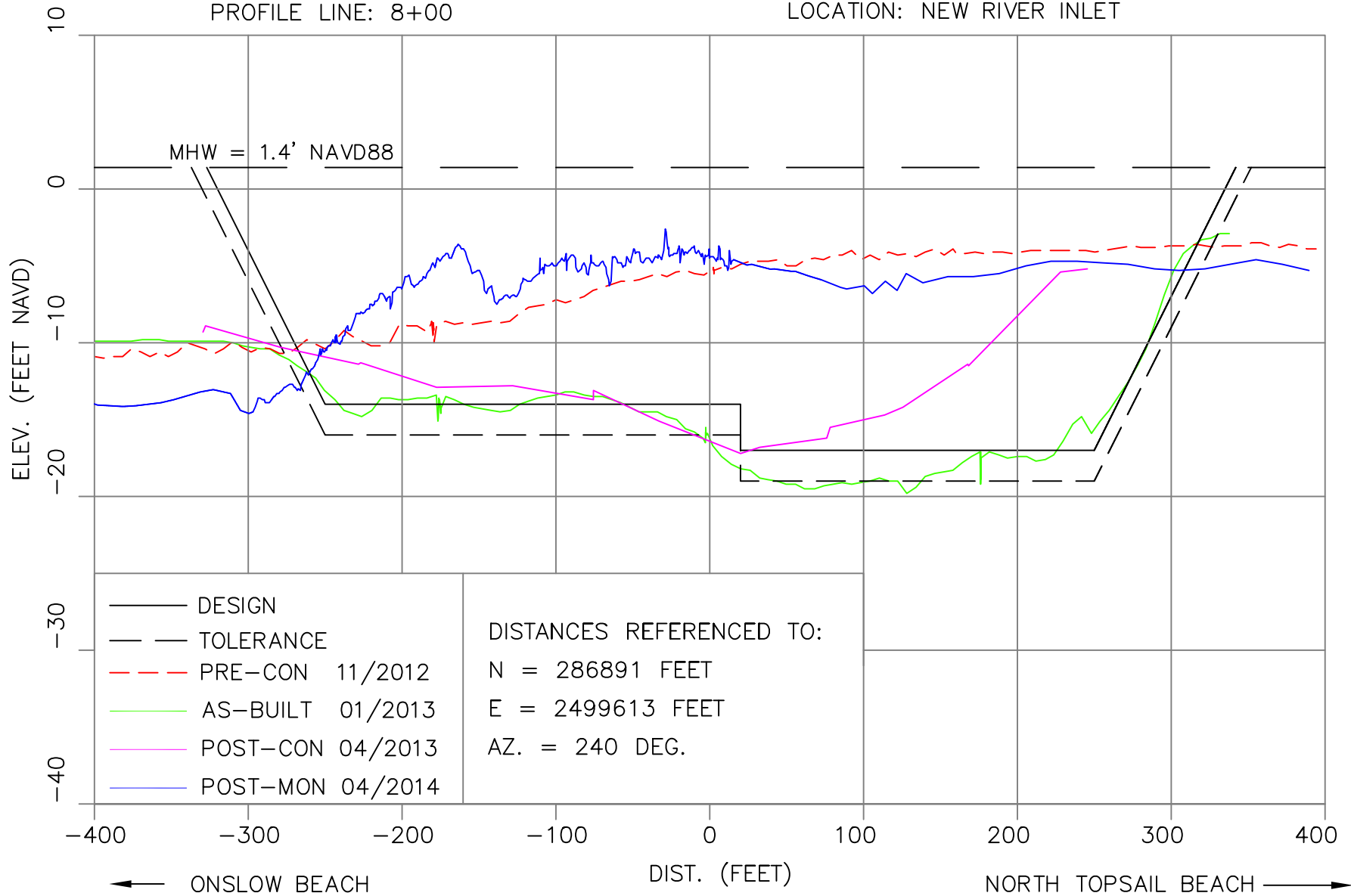
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LOCATION: NEW RIVER INLET



PROFILE LINE: 8+00

LOCATION: NEW RIVER INLET

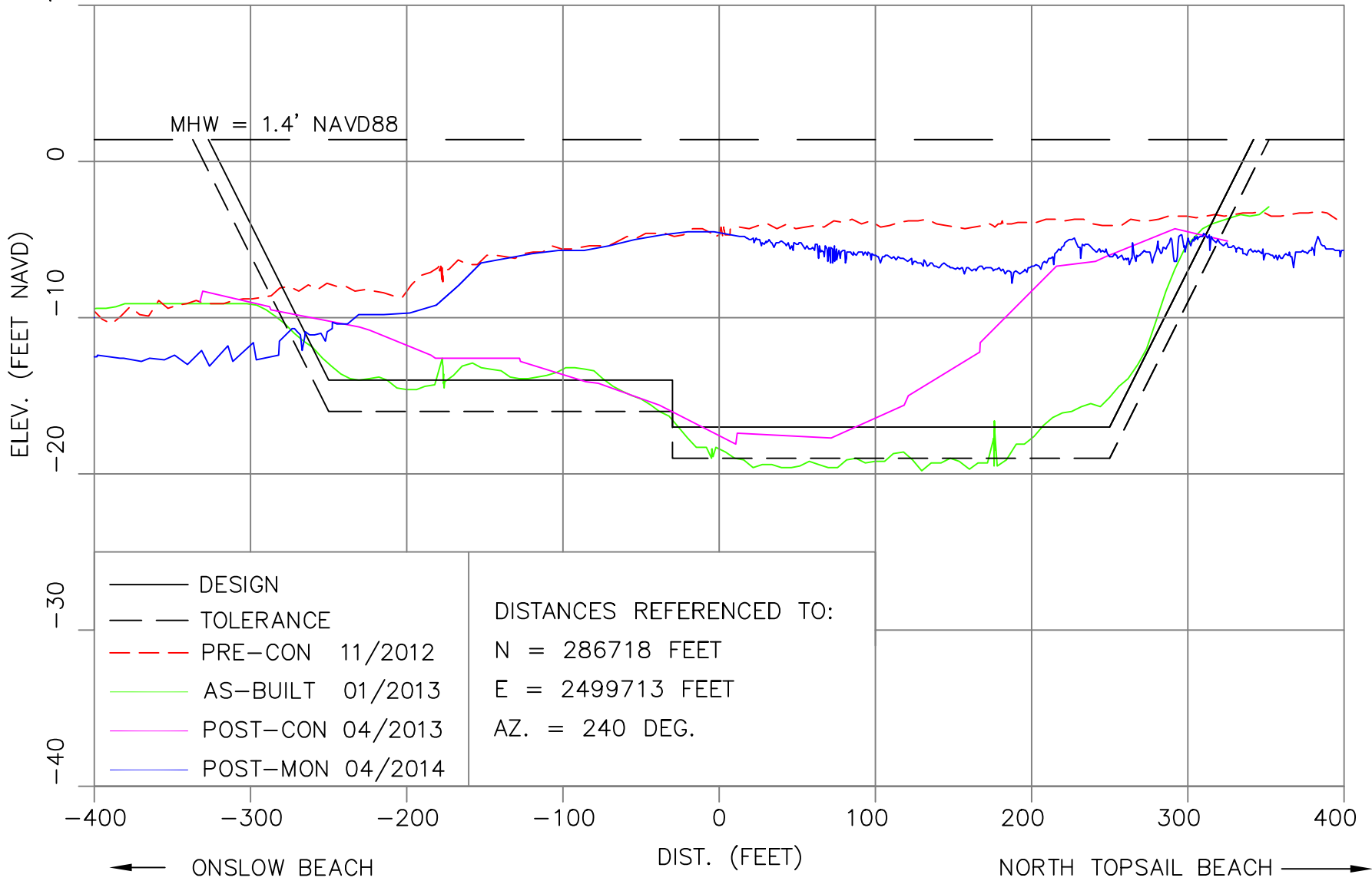


- DESIGN
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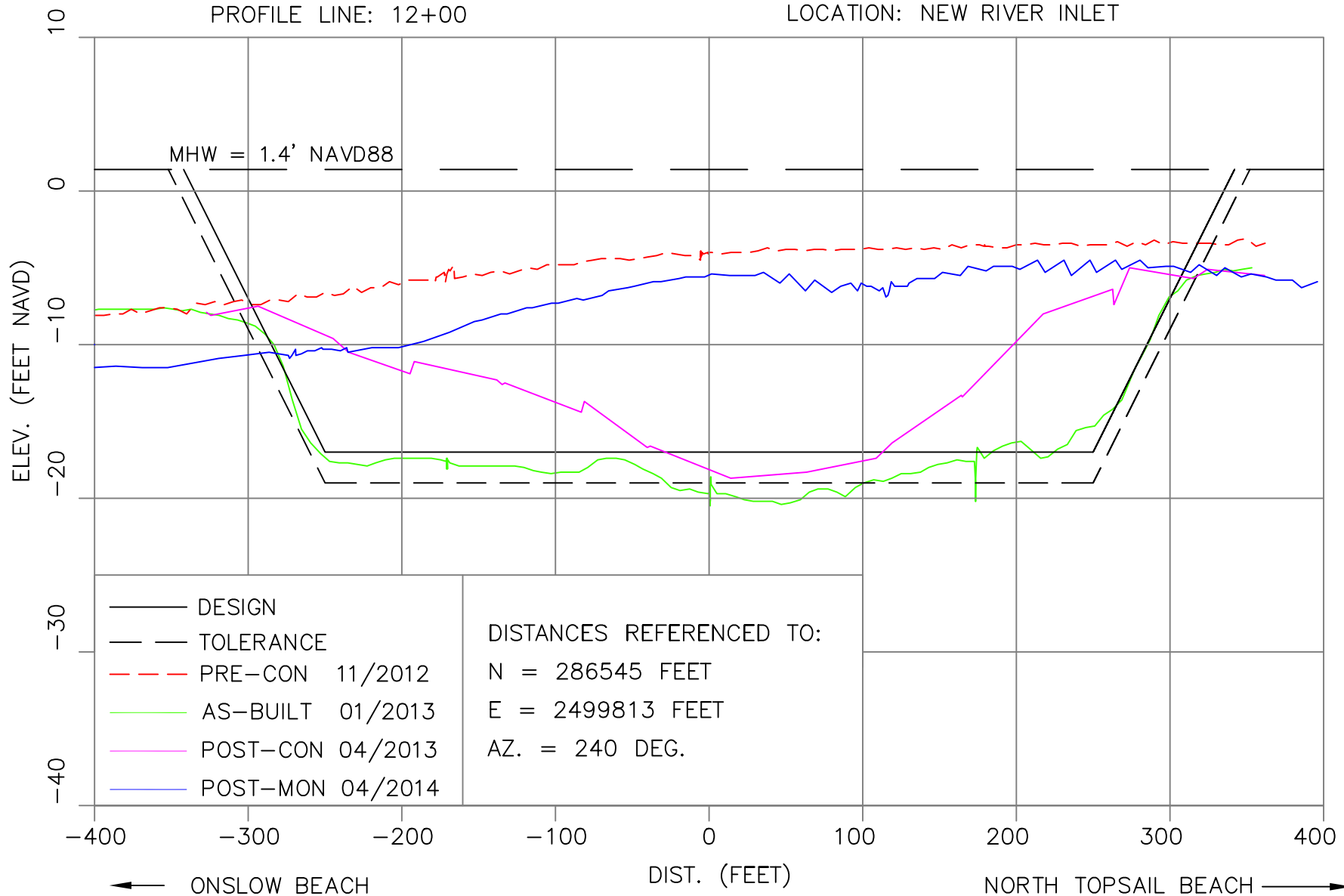
PROFILE LINE: 10+00

LOCATION: NEW RIVER INLET



PROFILE LINE: 12+00

LOCATION: NEW RIVER INLET



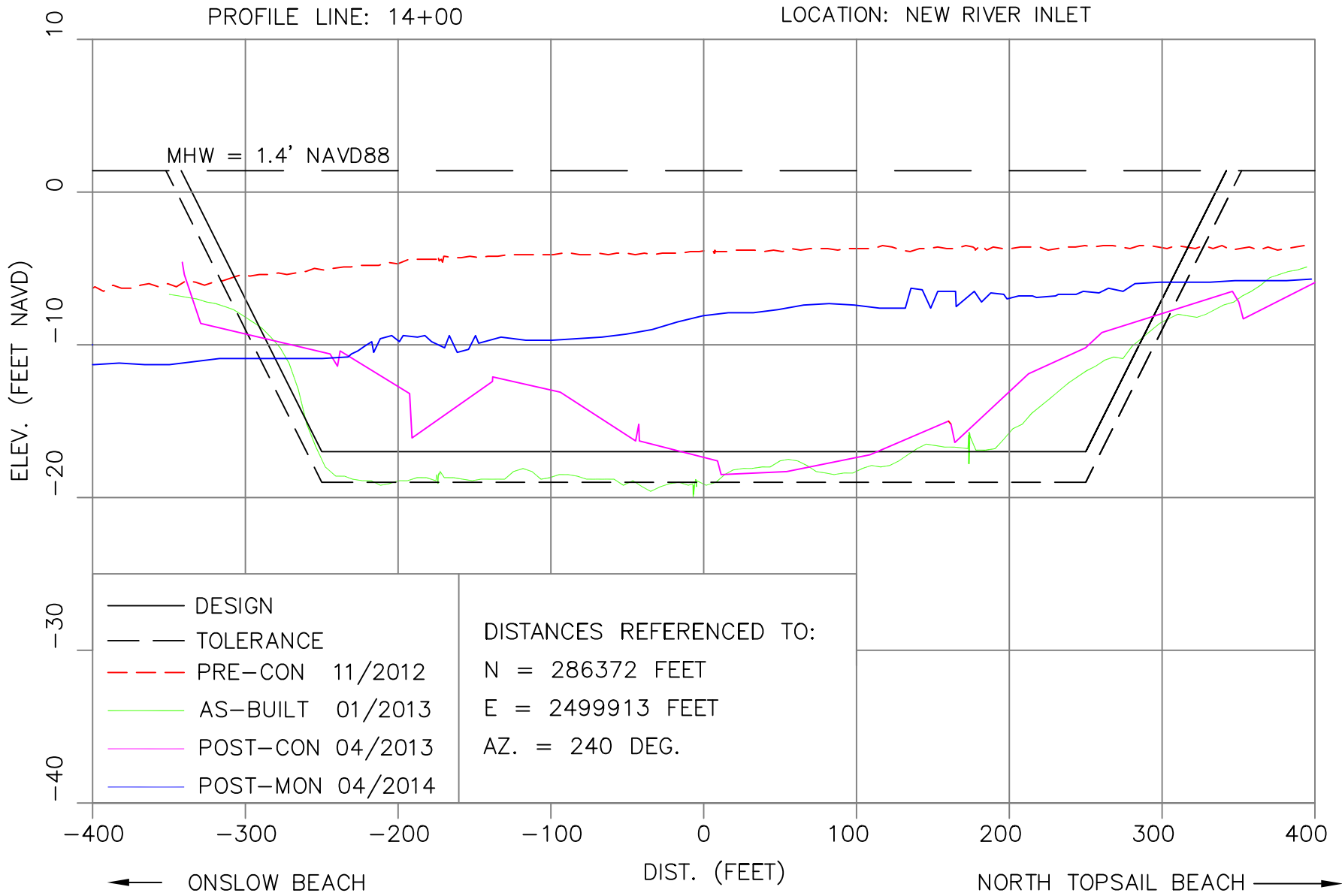
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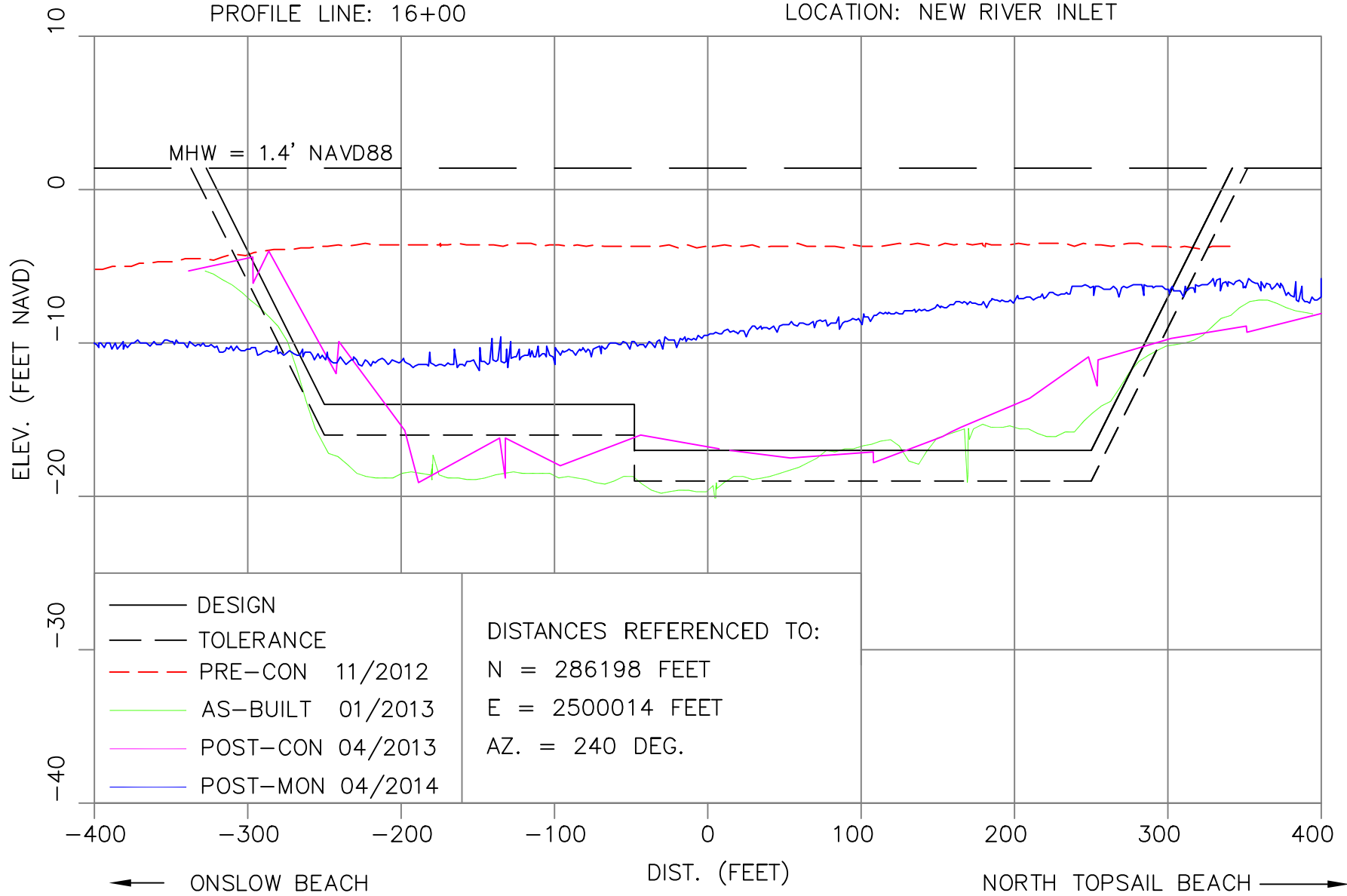


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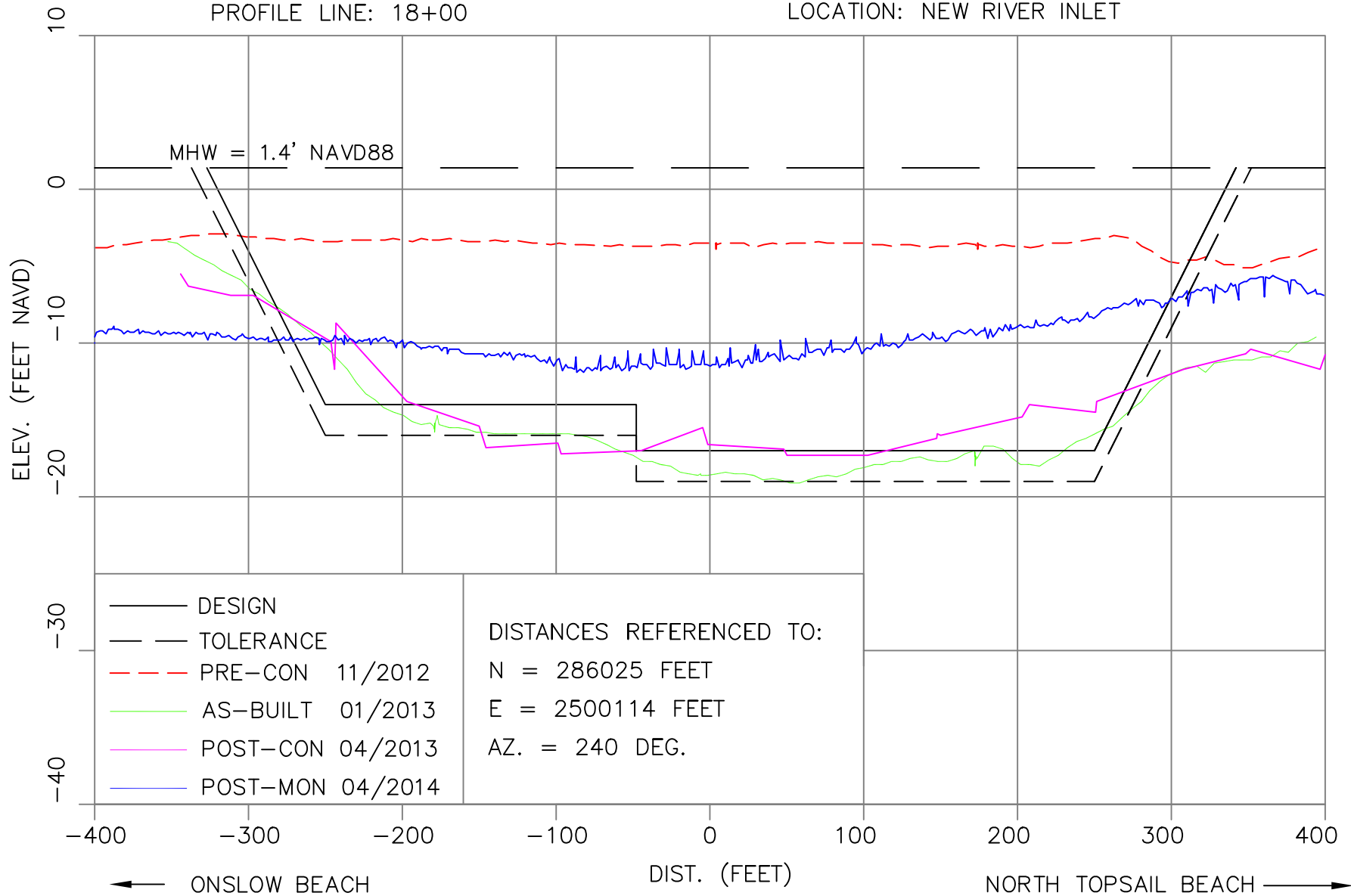


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 E = 2500014 FEET  
 AZ. = 240 DEG.

PROFILE LINE: 18+00

LOCATION: NEW RIVER INLET

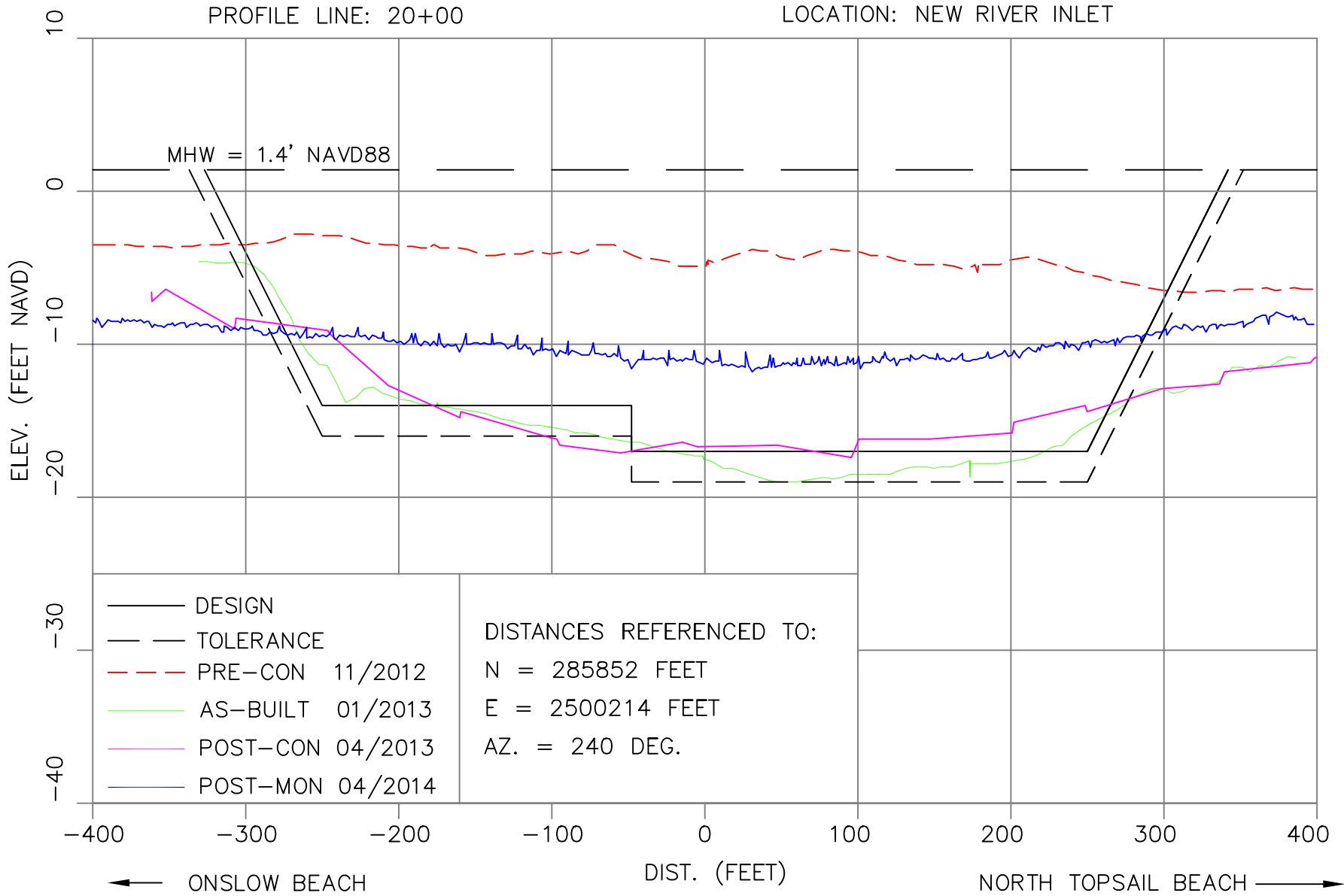


- DESIGN
- - - TOLERANCE
- - - PRE-CON 11/2012
- AS-BUILT 01/2013
- POST-CON 04/2013
- POST-MON 04/2014

DISTANCES REFERENCED TO:  
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 E = 2500114 FEET  
 AZ. = 240 DEG.

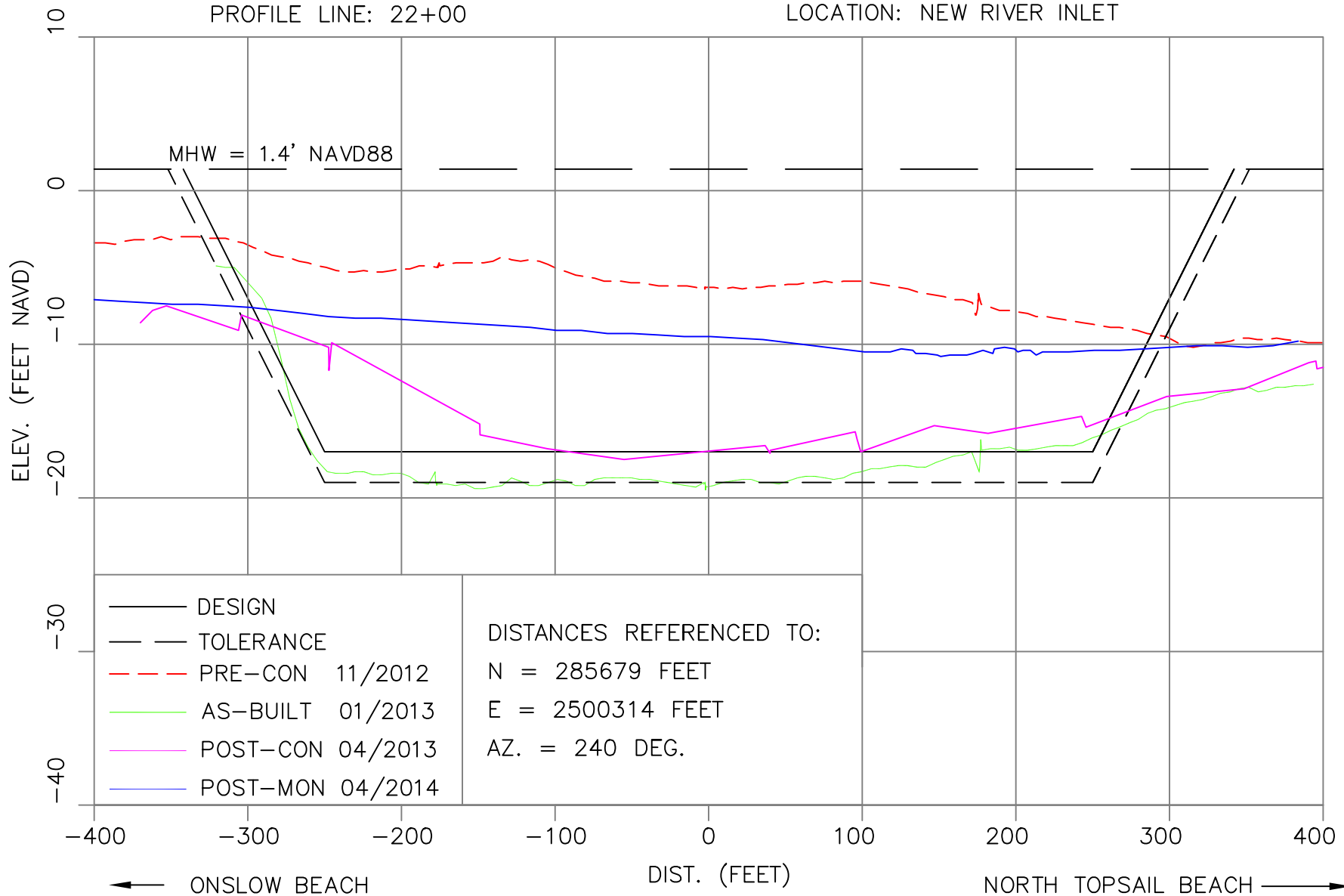
PROFILE LINE: 20+00

LOCATION: NEW RIVER INLET



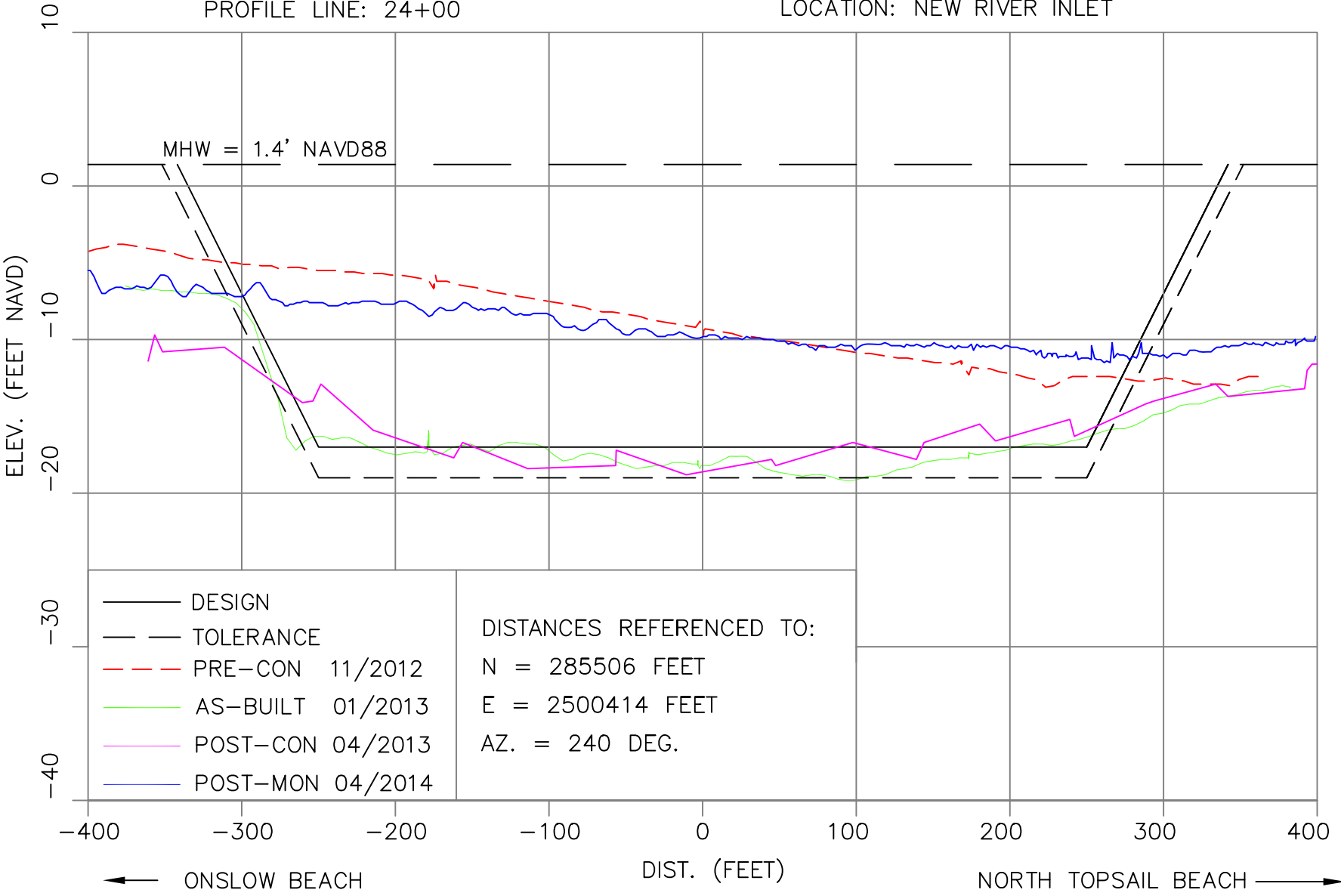
PROFILE LINE: 22+00

LOCATION: NEW RIVER INLET



PROFILE LINE: 24+00

LOCATION: NEW RIVER INLET

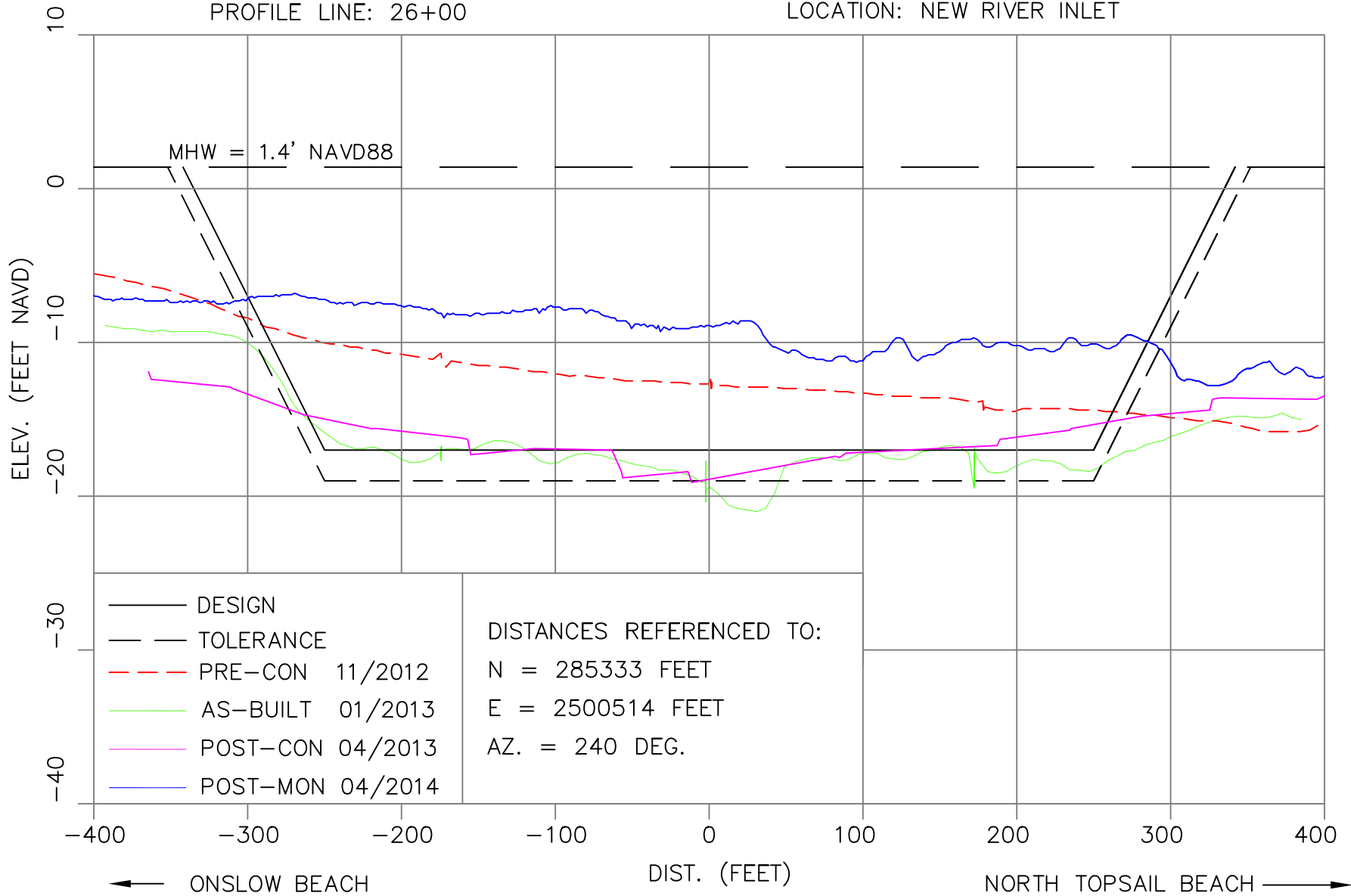


- DESIGN
- - - TOLERANCE
- - - PRE-CON 11/2012
- AS-BUILT 01/2013
- POST-CON 04/2013
- POST-MON 04/2014

DISTANCES REFERENCED TO:  
 N = 285506 FEET  
 E = 2500414 FEET  
 AZ. = 240 DEG.

PROFILE LINE: 26+00

LOCATION: NEW RIVER INLET



- DESIGN
- - - TOLERANCE
- - - PRE-CON 11/2012
- AS-BUILT 01/2013
- POST-CON 04/2013
- POST-MON 04/2014

DISTANCES REFERENCED TO:  
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 E = 2500514 FEET  
 AZ. = 240 DEG.

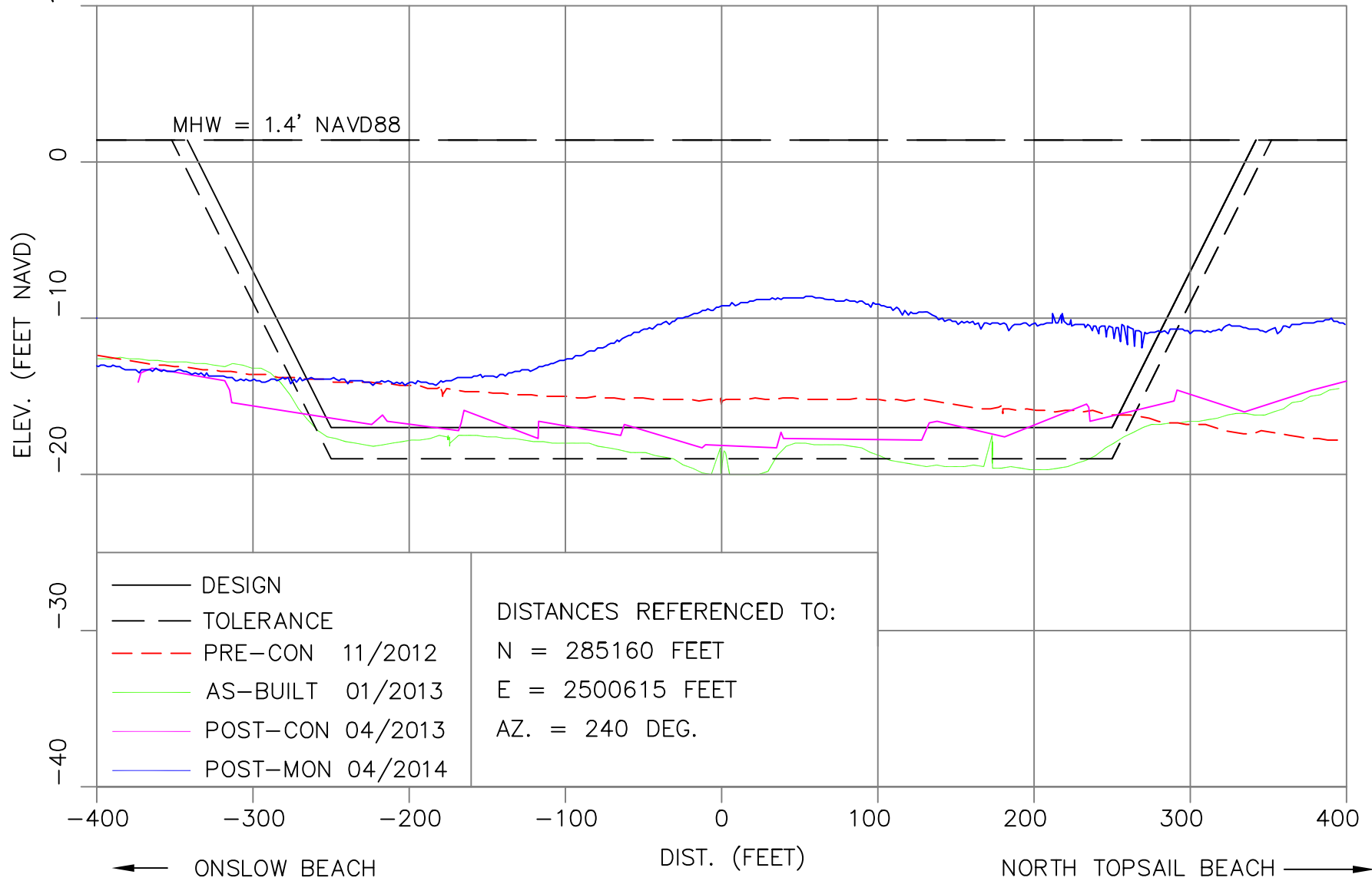
← ONSLOW BEACH

DIST. (FEET)

NORTH TOPSAIL BEACH →

PROFILE LINE: 28+00

LOCATION: NEW RIVER INLET



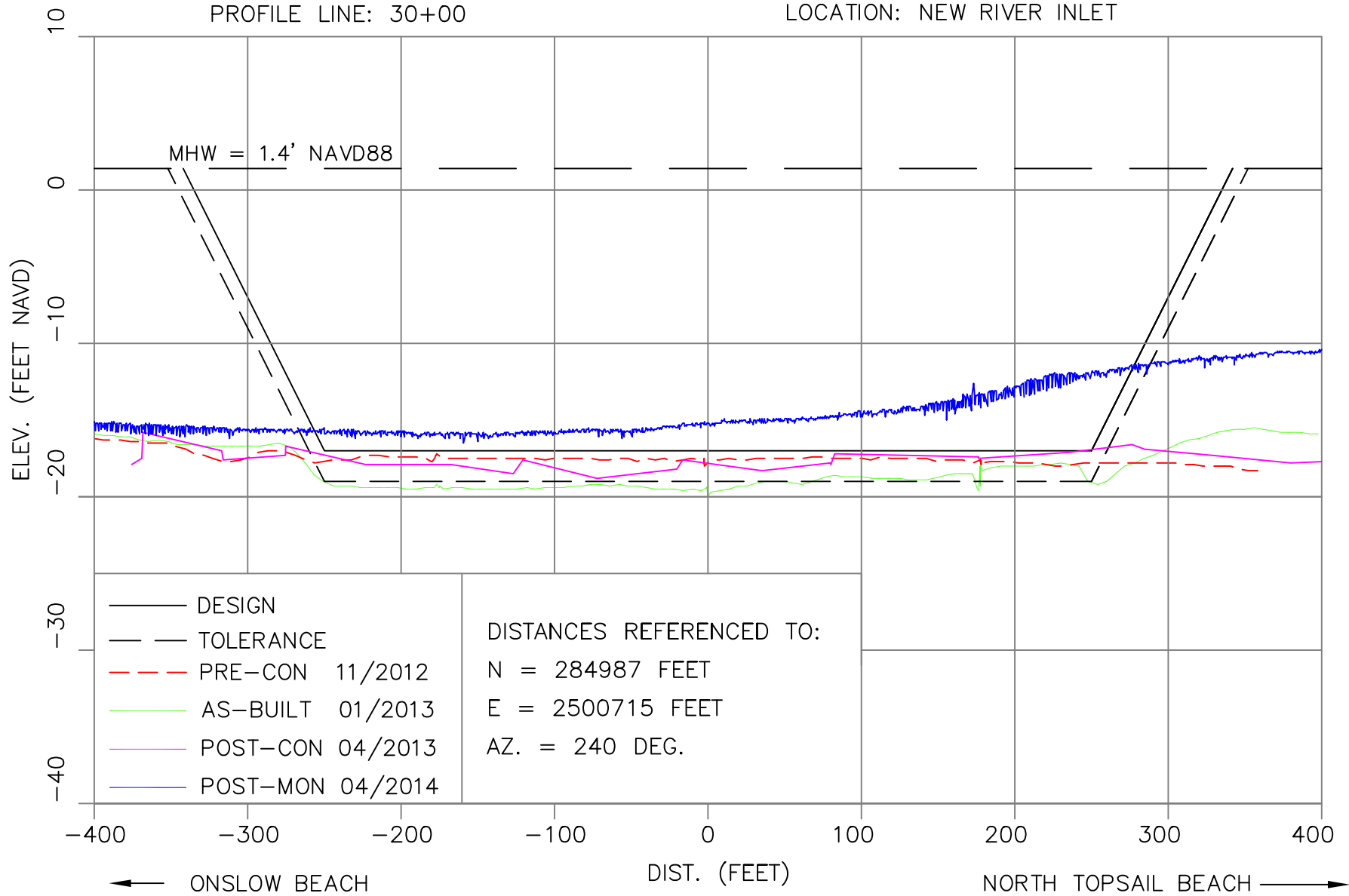
- DESIGN
- - - TOLERANCE
- - - PRE-CON 11/2012
- AS-BUILT 01/2013
- POST-CON 04/2013
- POST-MON 04/2014

DISTANCES REFERENCED TO:  
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 E = 2500615 FEET  
 AZ. = 240 DEG.



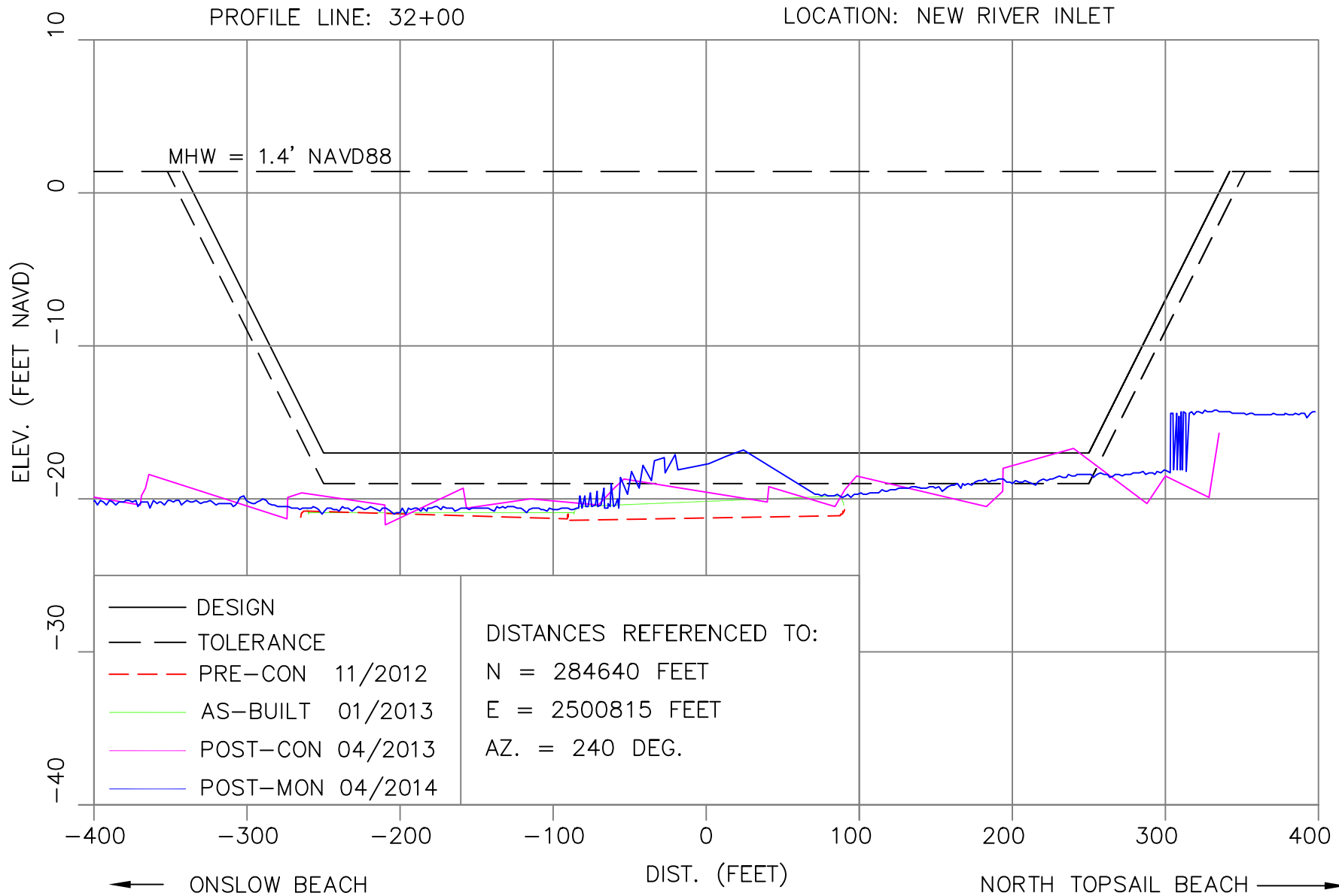
PROFILE LINE: 30+00

LOCATION: NEW RIVER INLET



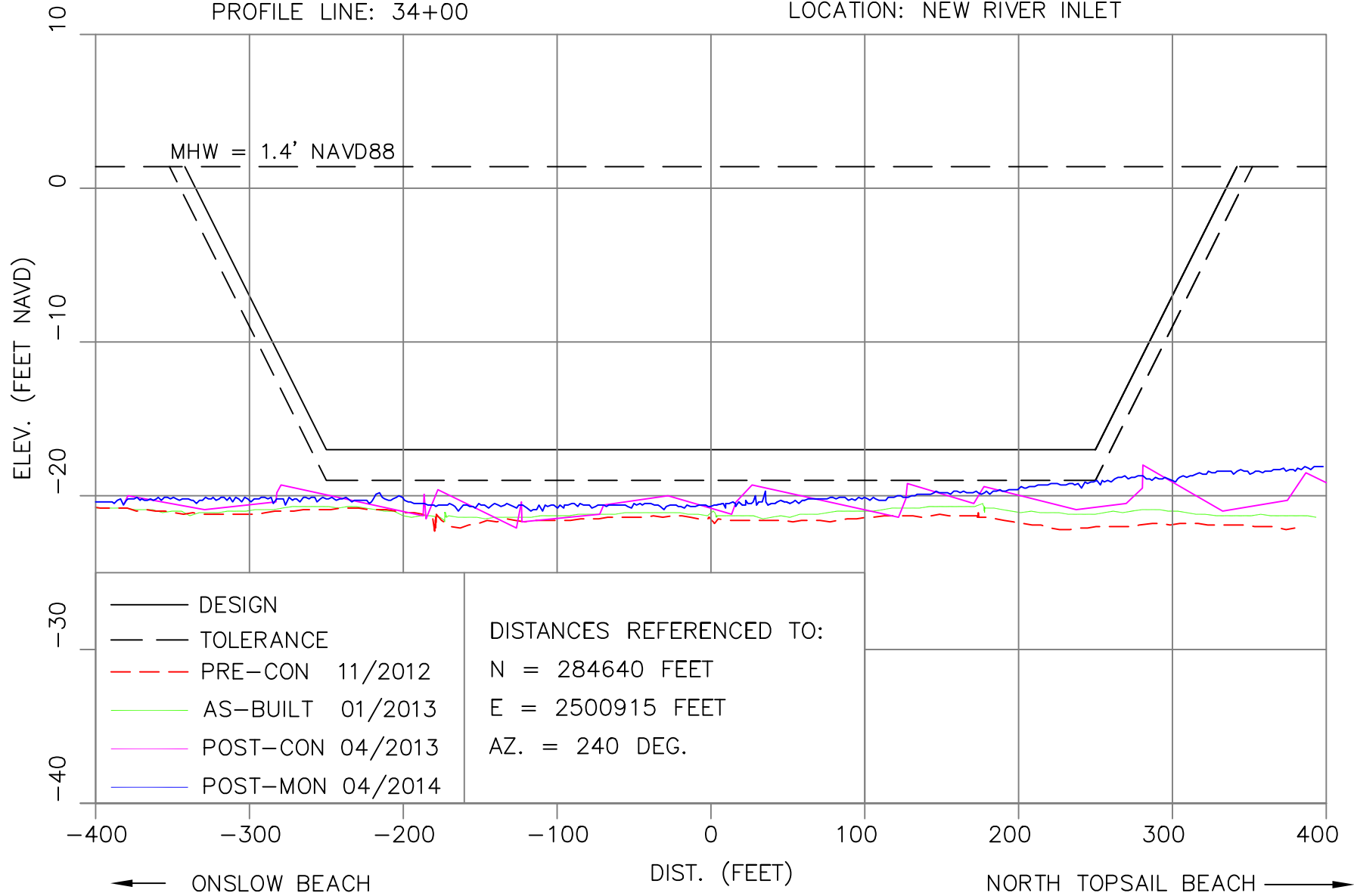
PROFILE LINE: 32+00

LOCATION: NEW RIVER INLET



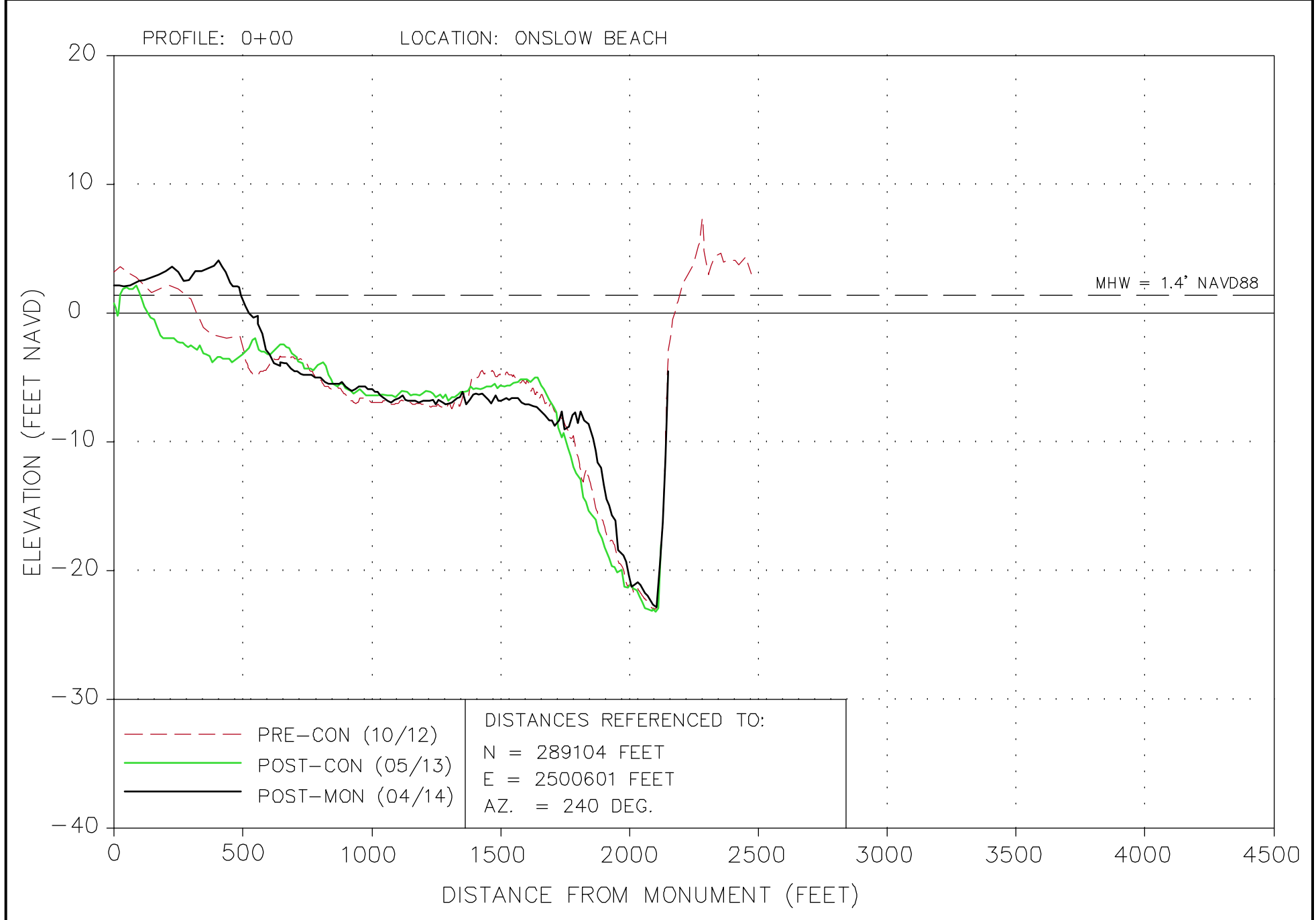
PROFILE LINE: 34+00

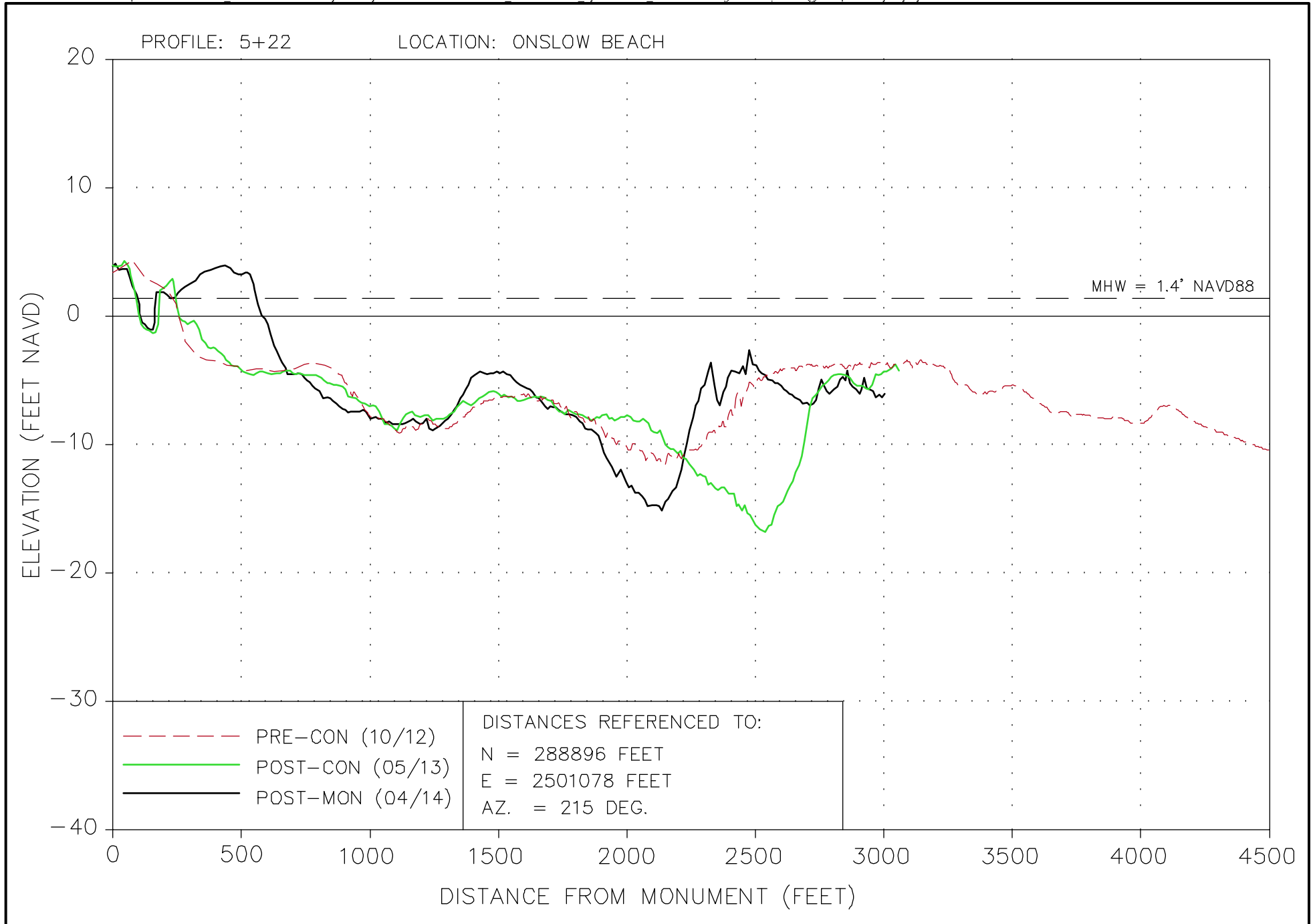
LOCATION: NEW RIVER INLET

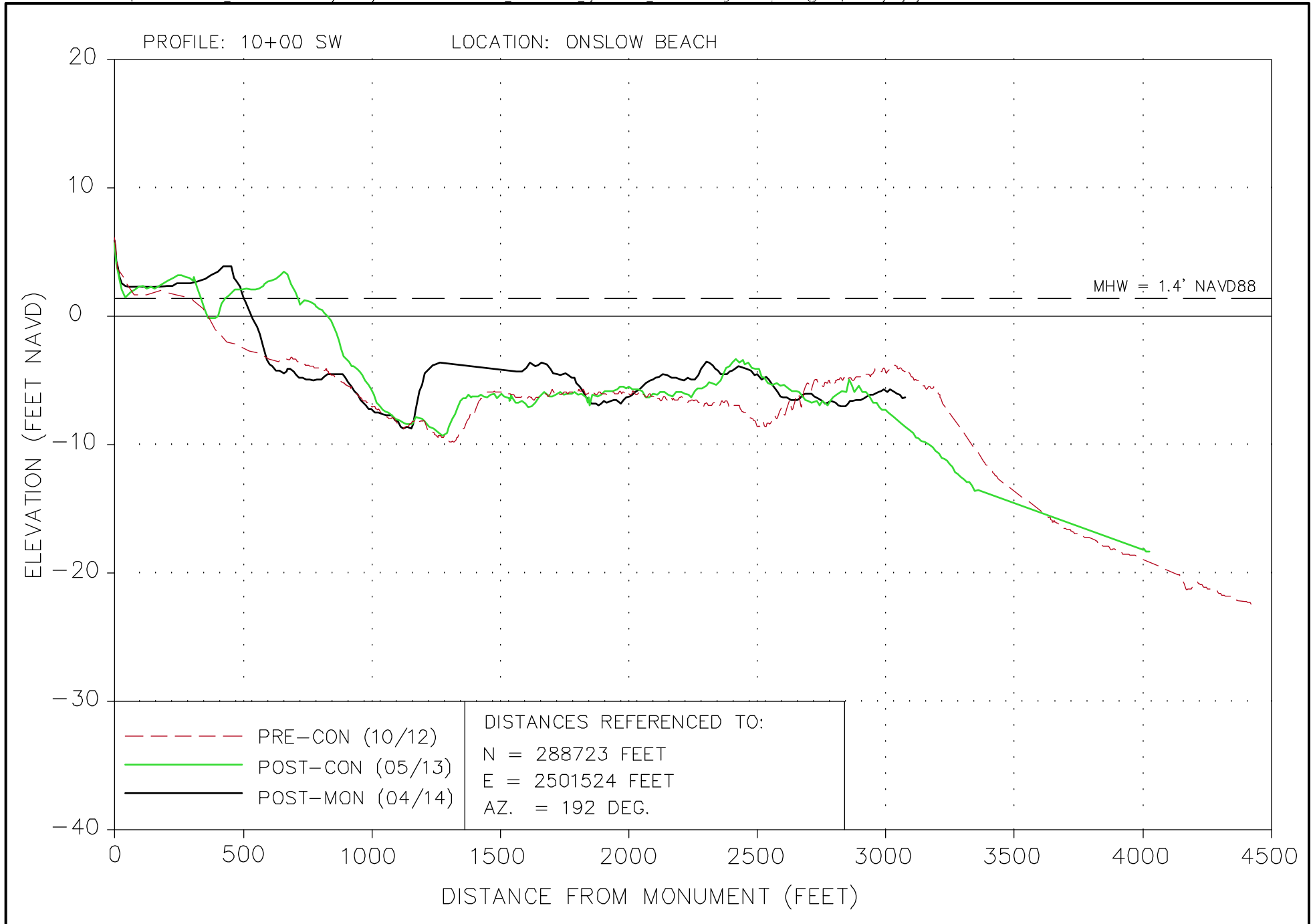


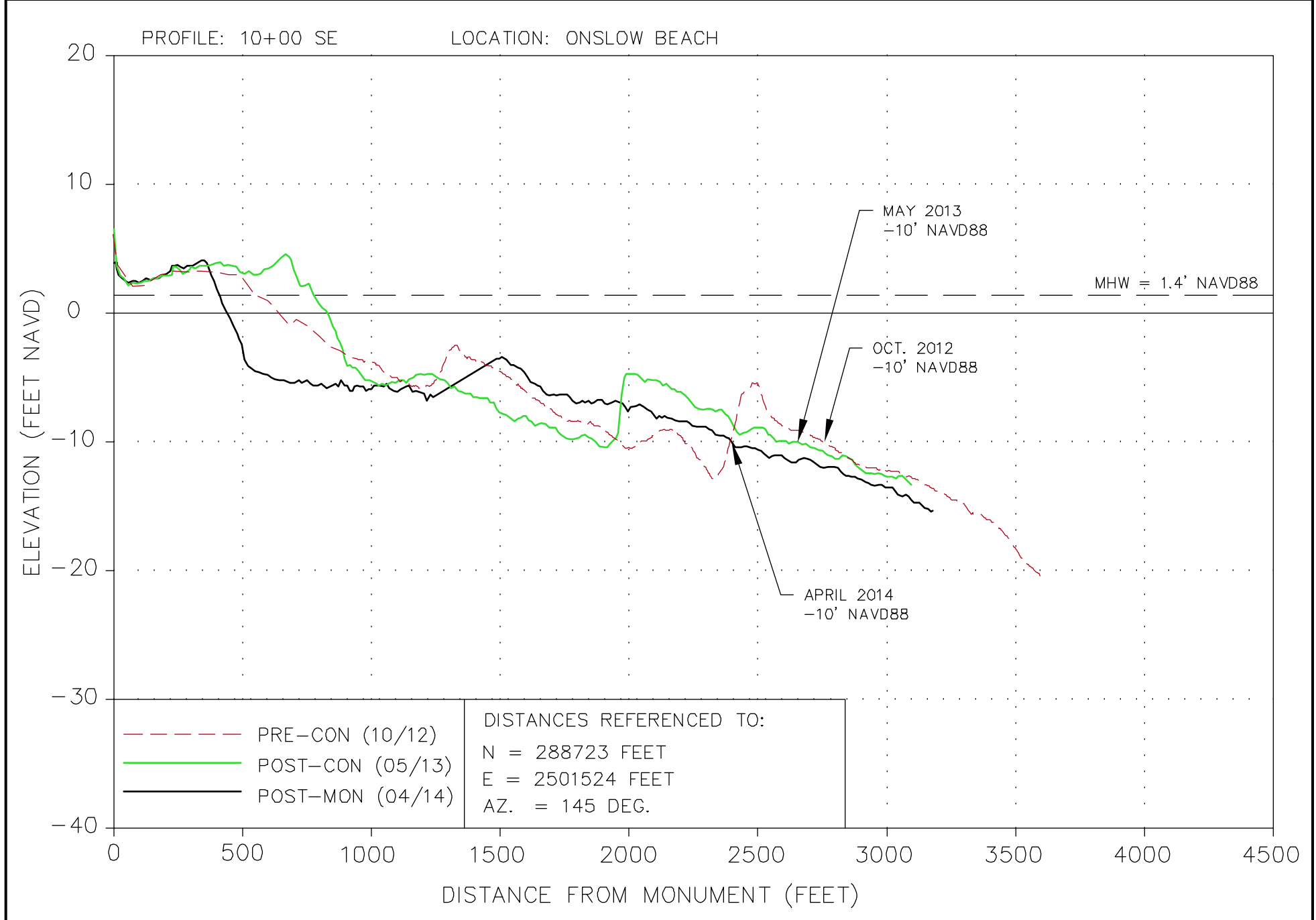
APPENDIX C

ONSLOW BEACH INLET SHOULDER - EBB SHOAL  
PROFILES

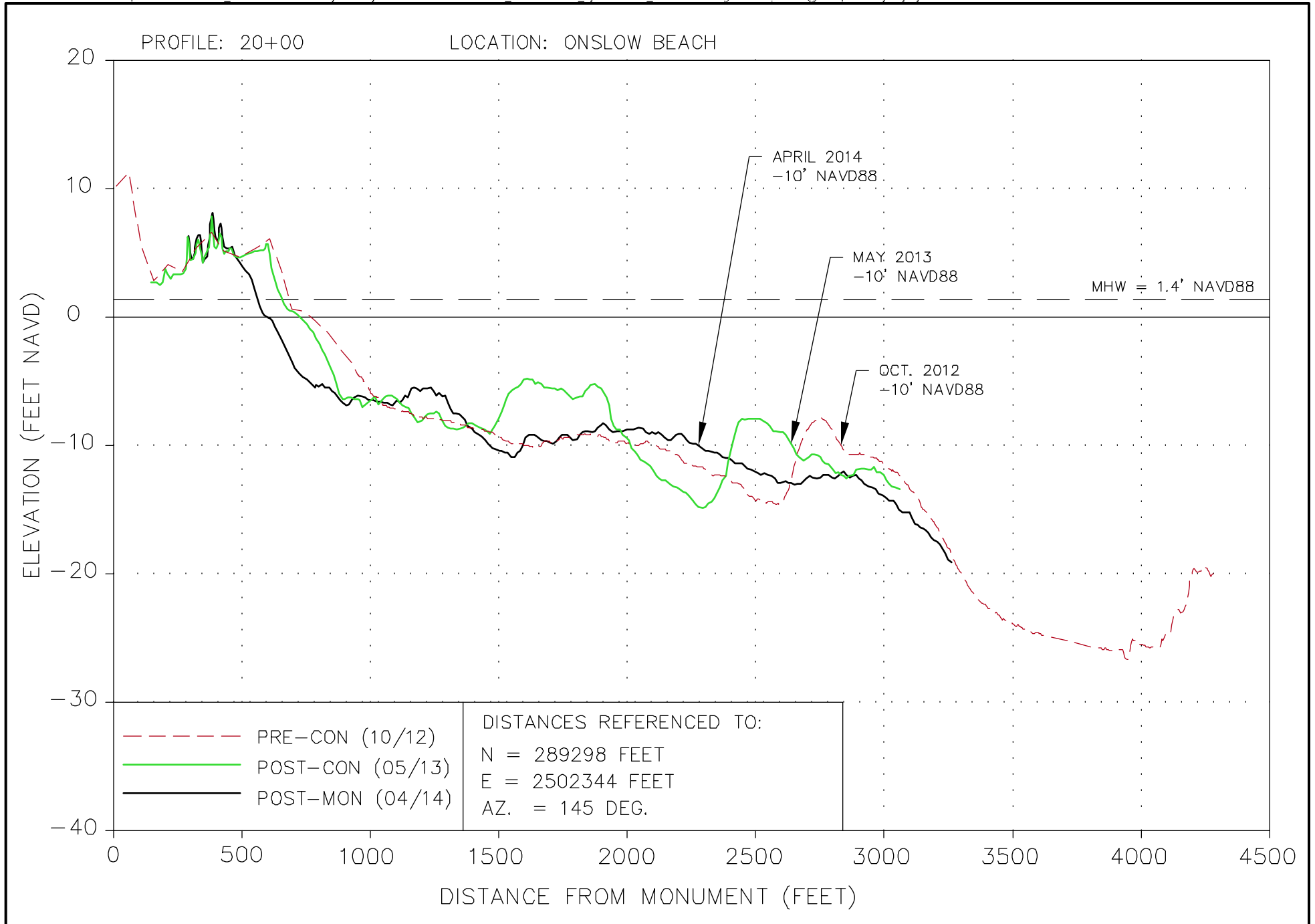




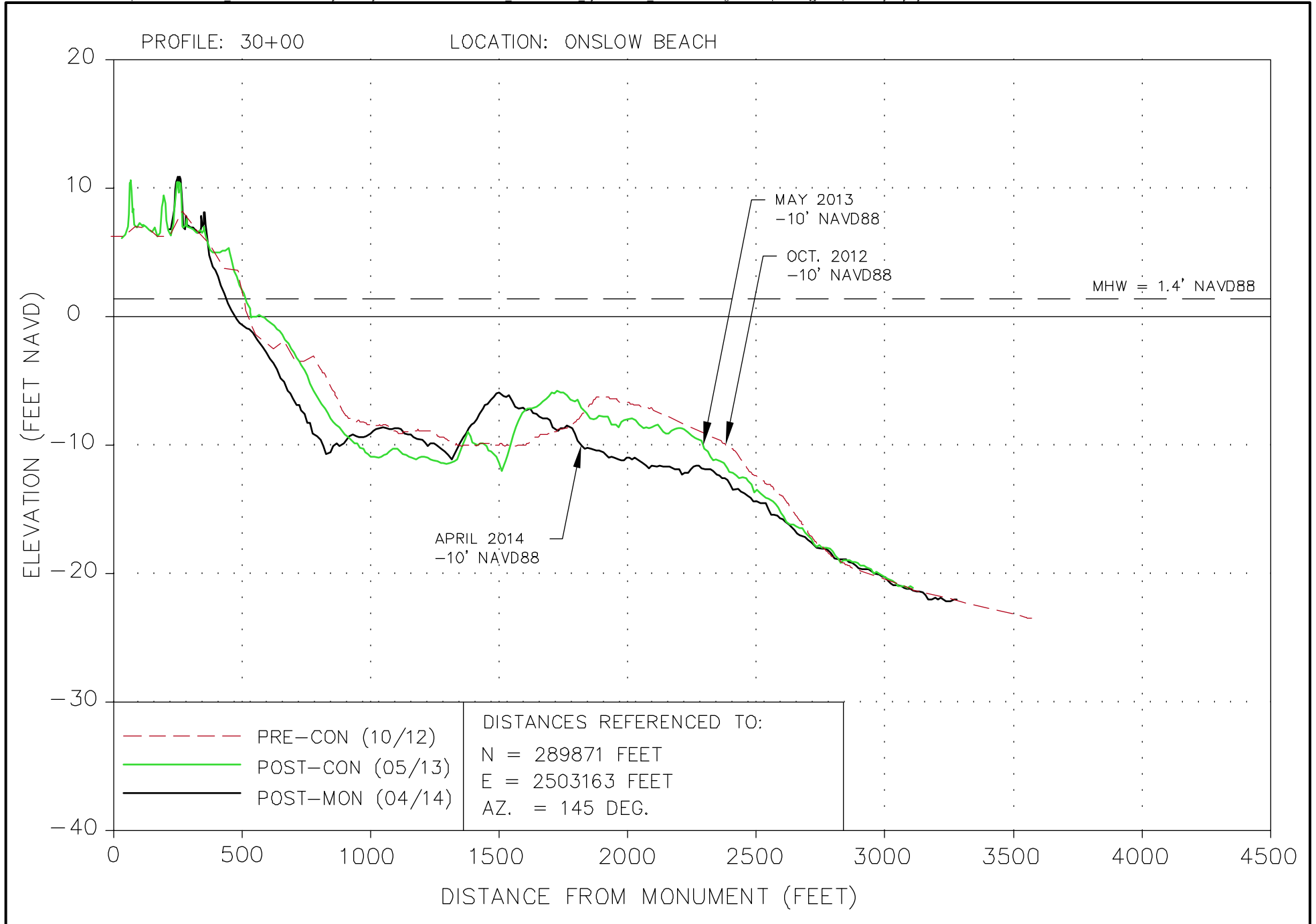




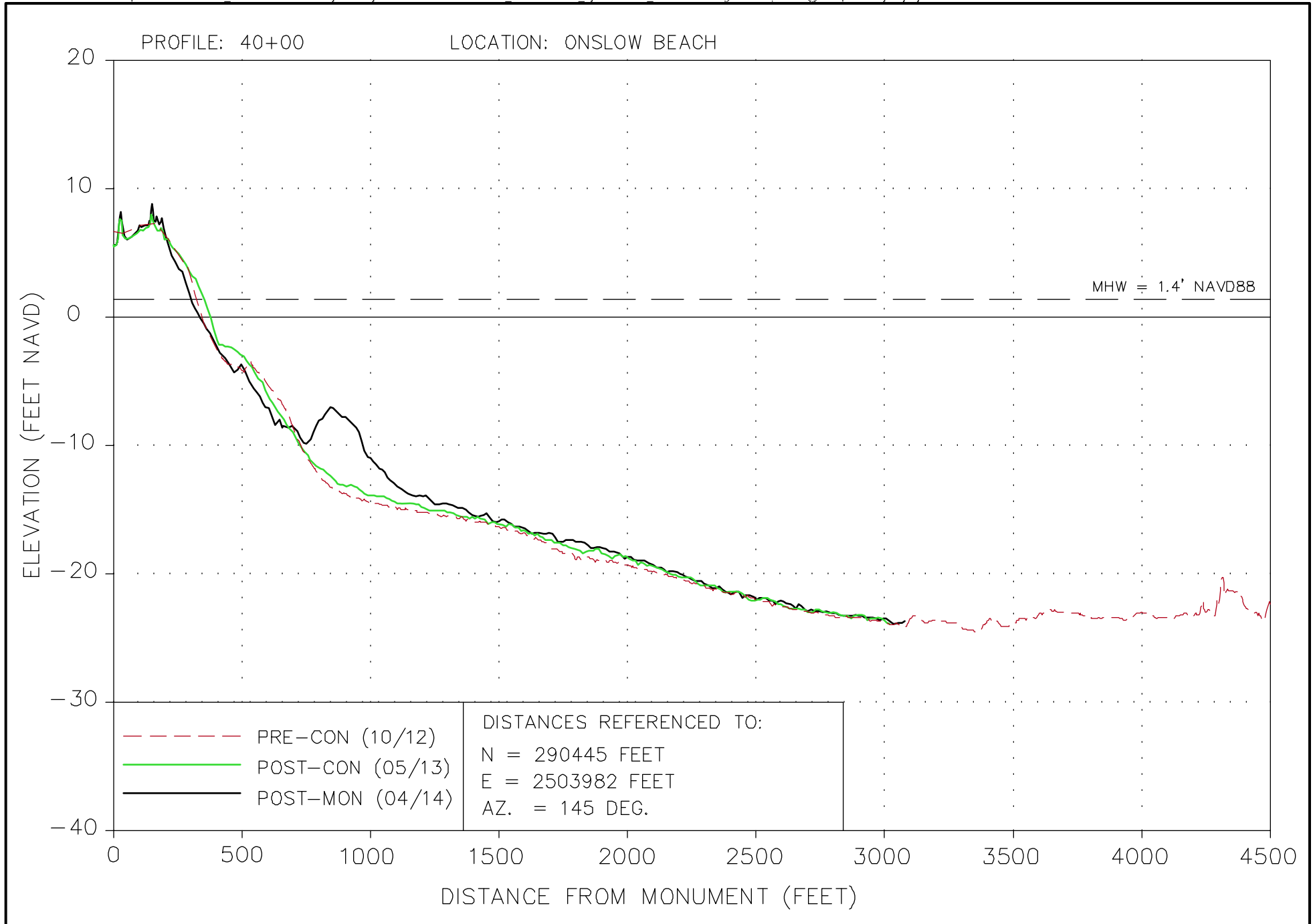




SHEET: 5 OF 7	COMM. NO. 151859	BY: GK	DATE: 6/23/14	<b>COASTAL PLANNING &amp; ENGINEERING, INC.</b> <b>OF NORTH CAROLINA, INC.</b> 4028 MASONBORO LOOP RD. WILMINGTON, N.C. 28409 PHL (904) 791-6494 FAX (904) 791-4129	TITLE: <b>NORTH TOPSAIL BEACH, NORTH CAROLINA</b> <b>NEW RIVER INLET CHANNEL REALIGNMENT AND BEACH RESTORATION</b> <b>NEW RIVER INLET EBB SHOAL AND OCEAN BAR PROFILES</b>

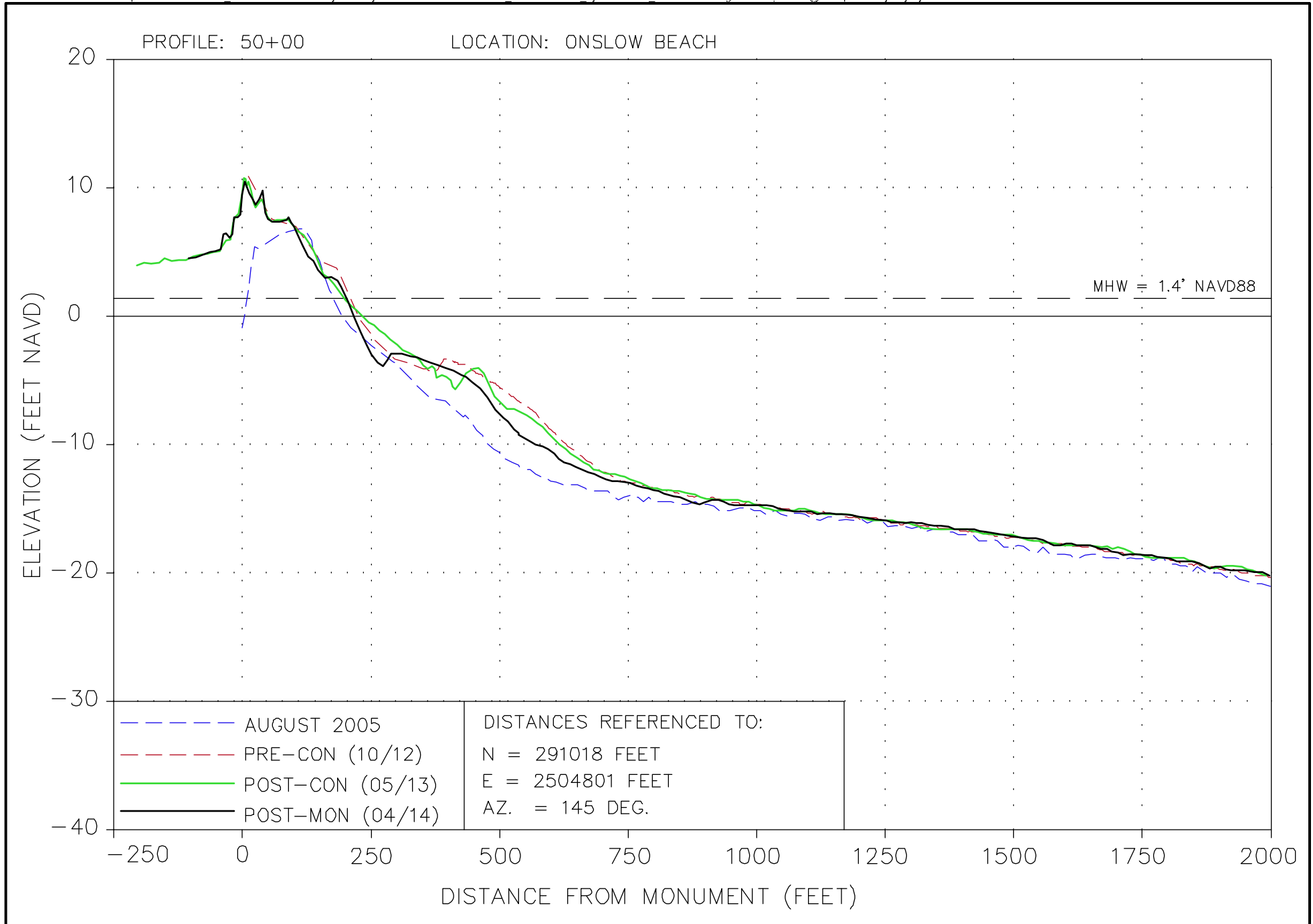


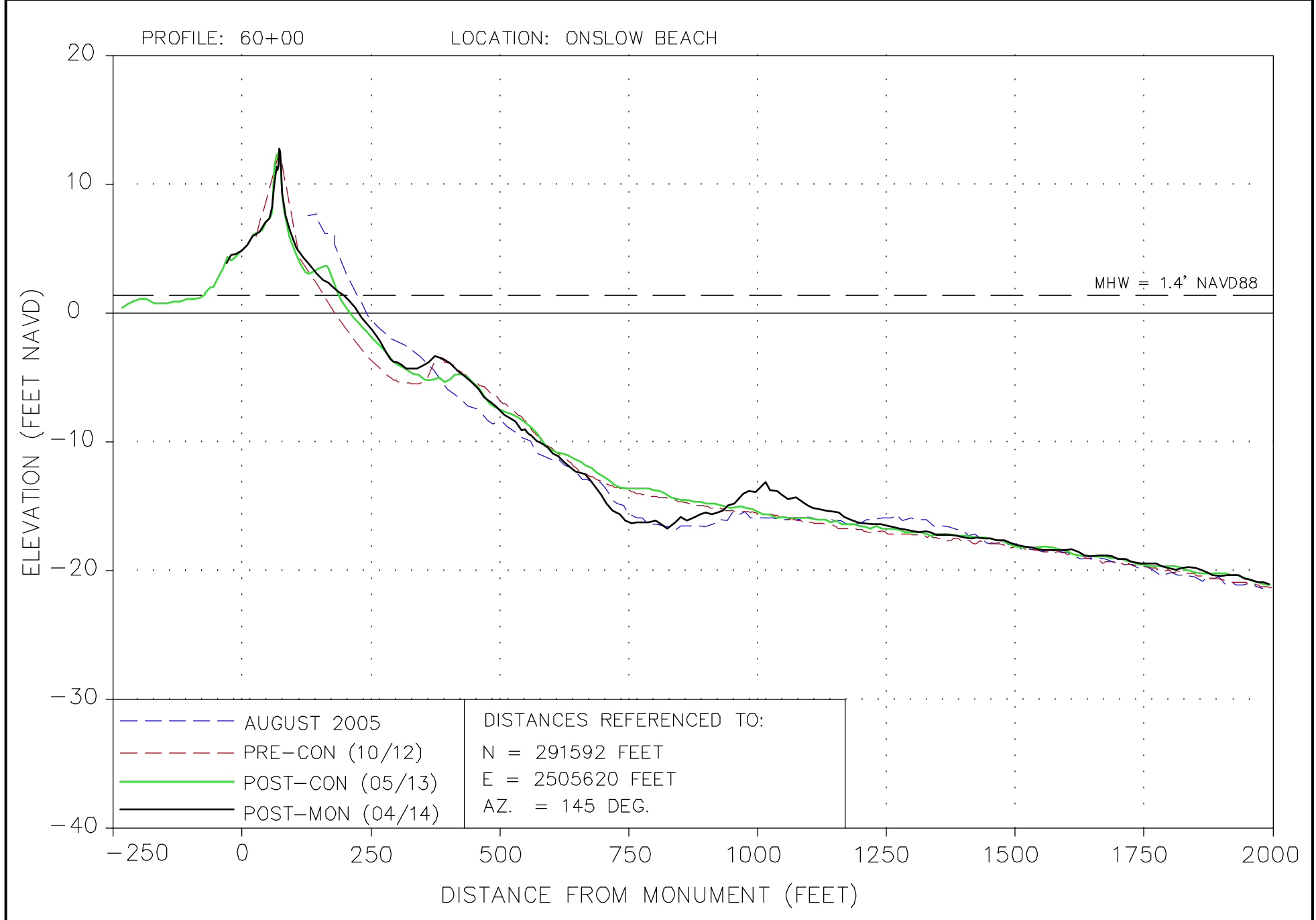
SHEET: 6 OF 7	COMM. NO. 151859	BY: GK	DATE: 6/23/14	<b>COASTAL PLANNING &amp; ENGINEERING, INC.</b> <b>OF NORTH CAROLINA, INC.</b> 4028 MASONBORO LOOP RD. WILMINGTON, N.C. 28409 PHL (904) 791-6494 FAX (904) 791-4129	TITLE: <b>NORTH TOPSAIL BEACH, NORTH CAROLINA</b> <b>NEW RIVER INLET CHANNEL REALIGNMENT AND BEACH RESTORATION</b> <b>NEW RIVER INLET EBB SHOAL AND OCEAN BAR PROFILES</b>

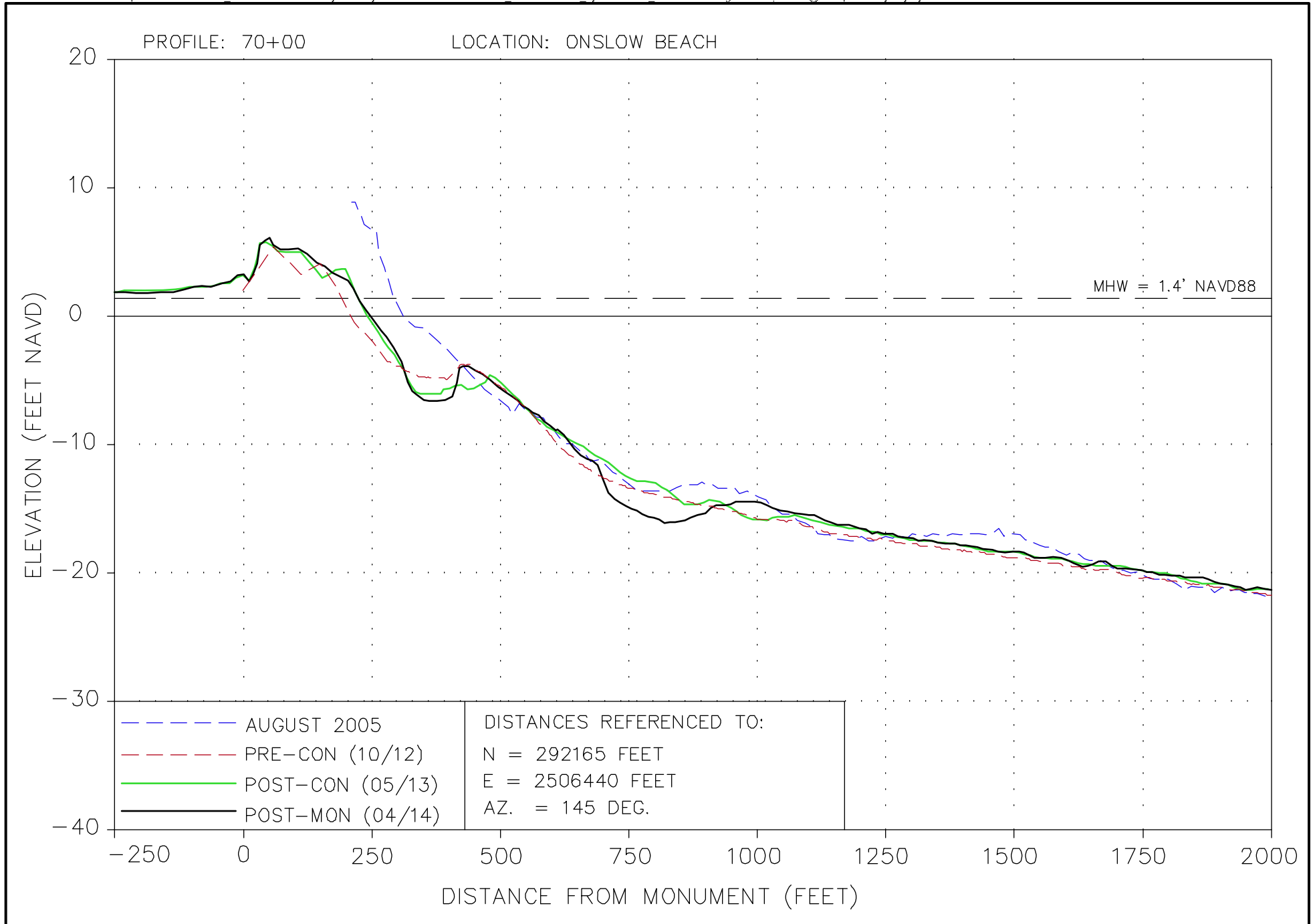


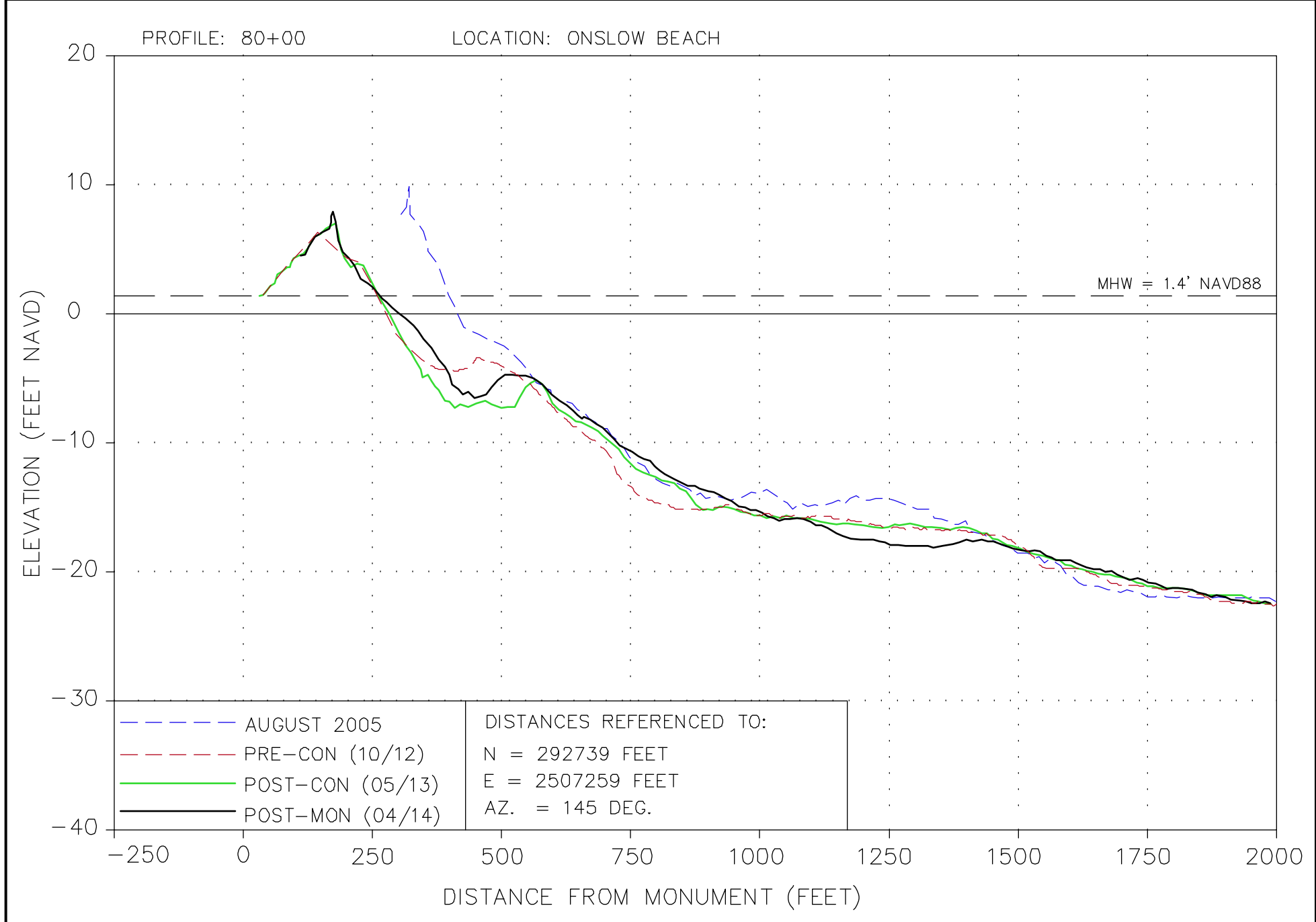
APPENDIX D

ONSLOW BEACH MONITORING BEACH PROFILES

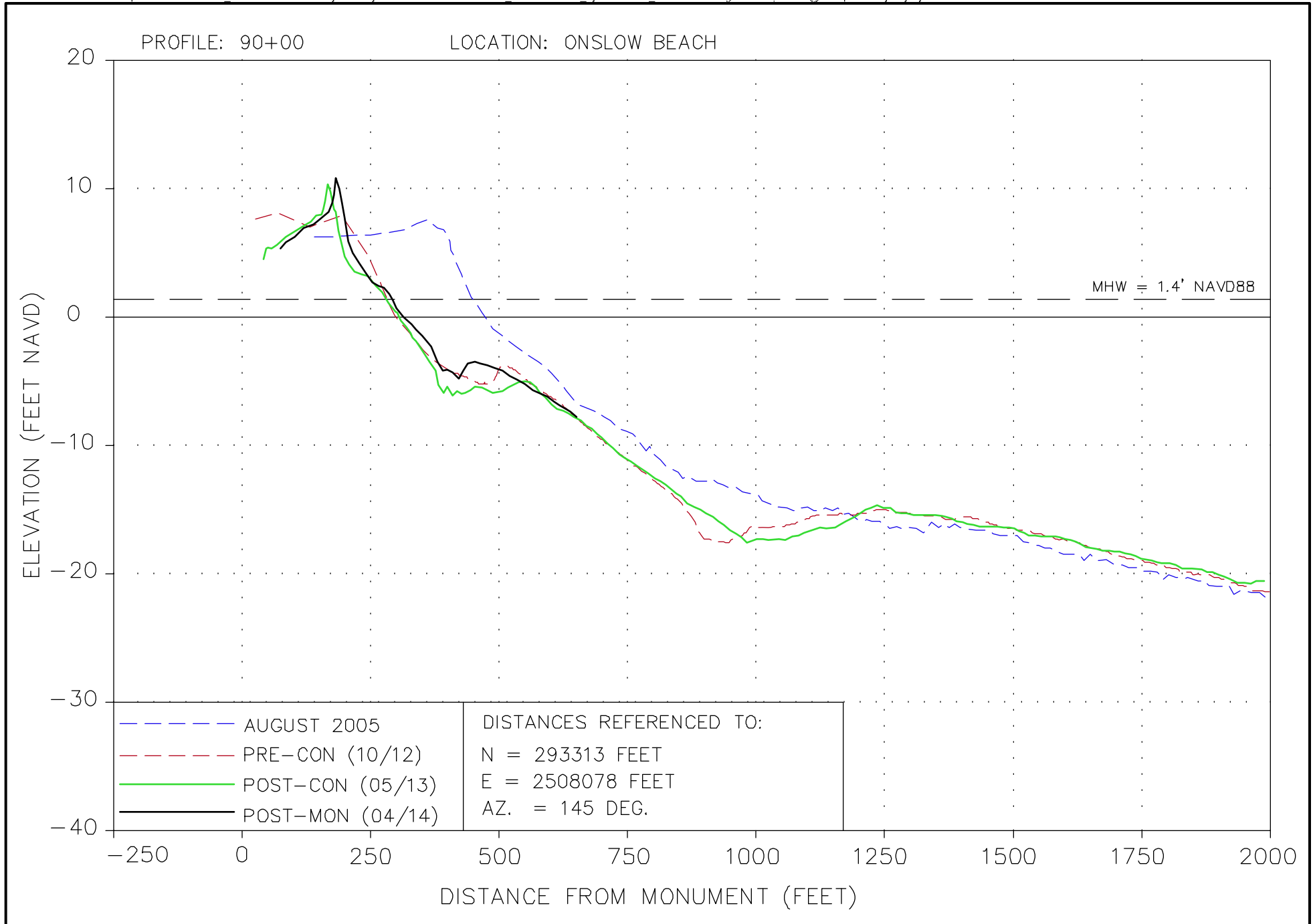












APPENDIX E

SUMMARY OF MEAN HIGH WATER (MHW) LOCATIONS

**Table 1 – Survey Control for Onslow Beach**

<b>Profile</b>	<b>Easting</b>	<b>Northing</b>	<b>Azimuth</b>	<b>April 2014 Range to MHW EL +1.4 ft. (NAVD88)</b>
0+00	2,500,601.00	289,104.10	240°	491.0
5+22	2,501,077.50	288,895.70	215°	558.7
10+00 SW	2,501,524.20	288,722.90	192°	501.8
10+00 SE	2,501,524.20	288,722.90	145°	410.4
20+00	2,502,343.57	289,297.45	145°	560.9
30+00	2,503,162.80	289,871.10	145°	438.7
40+00	2,503,981.91	290,444.63	145°	303.0
50+00	2,504,801.06	291,018.21	145°	202.1
60+00	2,505,620.21	291,591.79	145°	197.3
70+00	2,506,439.36	292,165.36	145°	223.6
80+00	2,507,258.52	292,738.94	145°	265.2
90+00	2,508,077.67	293,312.51	145°	292.2

1. Coordinates Reference NC State Plane NAD83 ft.

**Table 2 – Survey Control for North Topsail Beach**

<b>Profile</b>	<b>Easting</b>	<b>Northing</b>	<b>Azimuth</b>	<b>April 2014 Range to MHW EL +1.4 ft. (NAVD88)</b>
1170+00	2,498,578.40	287,875.00	90°	153.5
1165+00	2,498,582.32	287,219.68	90°	672.3
1163+00	2,498,583.99	286,929.08	90°	463.7
1160+00	2,498,586.24	286,564.36	130°	130.6
1155+00	2,498,174.95	286,232.66	135°	100.9
1150+00	2,497,763.00	285,901.00	135°	110.7
1145+00	2,497,274.34	285,679.04	139°	154.8
1140+00	2,496,785.00	285,457.10	139°	175.8
1135+00	2,496,316.35	285,255.20	145°	-
1130+00	2,495,847.70	285,053.30	145°	212.7
1125+00	2,495,378.10	284,850.85	150°	-
1120+00	2,494,908.50	284,648.20	150°	226.1
1115+00	2,494,471.70	284,421.30	150°	-
1110+00	2,494,034.90	284,194.20	150°	209.1
1105+00	2,493,595.06	283,946.33	150°	-
1100+00	2,493,155.20	283,698.50	150°	203.4
1095+00	2,492,713.91	283,467.27	150°	-
1090+00	2,492,272.60	283,236.10	150°	230.6
1080+00	2,491,406.50	282,735.00	150°	211.0
1070+00	2,490,531.60	282,253.20	150°	174.8
1060+00	2,489,653.30	281,776.90	150°	165.0
1050+00	2,488,784.60	281,282.40	150°	159.5
1040+00	2,487,919.90	280,782.70	150°	126.8

1. Coordinates Reference NC State Plane NAD 83 ft.

# Town of North Topsail Beach

Daniel Tuman, Mayor  
Tom Leonard, Mayor Pro Tem  
Aldermen:  
Suzanne Gray  
Don Harte  
Richard Macartney  
Richard Peters



Stuart Turille  
Town Manager

Carin Z. Faulkner, MPA  
Town Clerk

Winner of 2014 Best Restored Beaches Award

September 26, 2014

Mr. Jason Dail  
Division of Coastal Management  
North Carolina Department of Environment  
and Natural Resources  
127 Cardinal Drive Extension  
Wilmington, North Carolina 28405

**Re: Town of North Topsail Beach, Application for CAMA Major Development Permit including Excavation and Fill (Forms DCM-MP-1 and DCM-MP-2)**

Dear Mr. Dail:

On behalf of the Town of North Topsail Beach, I am submitting an application for a Major Permit under the Coastal Area Management Act (see attachments).

The Town of North Topsail Beach completed Phase 1 of its beach and inlet management plan in February 2013. Phase 1 included relocating the main bar channel of New River Inlet to a preferred position and alignment and deposition of the dredged material along approximately 7,730 feet of the town's shoreline south of New River Inlet. The intent of the bar channel relocation was to induce a build-up of material on the south side of New River Inlet which would eventually result in accretion along the northern portion of the town's shoreline.

The response of New River Inlet to the new channel will take some time. Since completion of Phase 1, the area north of the Topsail Reef Condominium has experienced inordinate erosion with most of the fill material placed in this area being eroded. The loss of the fill material has placed the homes north of Topsail Reef in imminent danger requiring interim erosion response measures to protect threatened homes until such time the inlet channel can be maintained and the relocated channel begins to have a positive impact on the condition of the shoreline along the extreme north end of Town.

As you are aware, we submitted an application for a sand tube revetment on August 22<sup>nd</sup>; however, due to continued erosions in the project area a single stacked sand tube would not achieve the preferred elevation of 12.0 ft. NAVD88. Given the change in conditions, we are re-submitting our application for a geotextile revetment to be constructed out of stacked sand bags as opposed to a single stack sand tube.

Our beach management plan calls for re-nourishment of Phase 1 in the winter of 2016/2017. Our existing permits would not allow for dredging of the channel or placement of sand in Phase 1 prior to this time. Without the ability to dredge the inlet channel, there is no other economical source of beach nourishment material that could provide the volume of material that has characteristics needed to protect the area for at least the next 2 years.

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Given the severity of the erosion, the use of conventional 20-foot wide by 6-foot high sandbag revetments as presently allowed by the CAMA (15A NCAC 7H.1700) would not be able to protect the threatened homes for the required 2 year period. As evidence of this, prior to the placement of the Phase 1 beach fill, most of the affected property owners had attempted to protect their property using the conventional sandbag design but all of the installations failed primarily due to undermining of the seaward edge of the bags (Figure 1). The structures and sandbags shown in Figure 1, which were located seaward of the present line of structures north of the Topsail Reef Condominiums, no longer exist.

The Topsail Reefs HOA located just south of the proposed project area constructed a revetment similar to that being proposed in our application (Figure 2). This structure has performed well thus far, which lends itself to the construction of a similar structure along the northernmost section of Phase 1 where erosion has been the most severe.



Figure 1. Sandbags at north end of North Topsail Beach (Sep 2005). (Note these sandbags no longer exist as they fronted buildings that were located seaward of the present structures north of Topsail Reef that were subsequently demolished.)

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Figure 2. Sandbags revetment at Topsail Reefs Building 1 (Sep 2014).

Based on information obtained from the DCM website, three structures north of Topsail Reef are listed as having existing sandbags. However, as shown in Photo 1 in the attached Project Narrative, none of the bags were visible prior to the construction of Phase 1 of the North Topsail Beach project. The existing sandbags are reportedly located at 2332, 2334, and 2368 New River Inlet Road (State Rd. 1568).

As an alternative to the conventional sandbag revetment (3 – 2 – 1 stacked configuration), the Town of North Topsail Beach proposes to install a sand bag revetment structure consisting of a stacked configuration of sand filled geotextile bags with a crest elevation of approximately +12 feet NAVD. Sand to construct the revetment would be obtained from the sand spit north of the project area and adjacent to New River Inlet and supplemented by sand from a borrow site located off the island. The bags proposed for use will have a filled height of approximately 1.67 ft., a width of approximately 4.0 ft. and lengths ranging from 9.0 ft. to 14.0 ft. The total bottom width of the sand bag installation would be about 42 feet. Details of the proposed sand bag structure are provided in the attached permit application forms.

Documents attached to this letter include:

- Completed application forms DCM-MP-1 and DCM-MP-2;
- Project and contact information;
- Application fee of \$475;
- List of names and addresses of adjacent property owners; and
- Vicinity map, plan view, and cross section plats

A copy of the application and letter of notification has been submitted to the adjacent property owners (shown on the attached list) by certified mail. The letter of notification and postal receipts are attached as proof of notification. Signed return receipts will be submitted as they become available.

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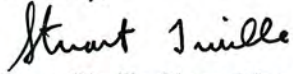
SEP 26 2014

Title

Date

Please contact me at 910.328.1349 Ext. 26 (office) or 910.367.3961 (cell), or Mr. Tom Jarrett and or Mr. Ken Willson with Coastal Planning & Engineering of North Carolina at 910.791.9494 (office) or 910.264.2166 (cell - Tom)/910.443.4471 (cell - Ken) should you have any questions or need additional information.

Sincerely,



Stuart Turille, Town Manager  
North Topsail Beach

Cc: Dan Tuman, Mayor of North Topsail Beach  
Tom Jarrett, CPE-NC  
Ken Willson, CPE-NC  
Mickey Sugg, USACE  
Doug Huggett, NCDCM  
Jonathan Howell, NCDCM

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**Attachment 4.**  
**List of Adjacent Property Owners:**

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#### 4. LIST OF ADJACENT PROPERTY OWNERS

SOCHIN JONATHAN L & NANCY K FR  
52 FEATHER BED LN  
SOUTH HERO VT 05486

CHALMIN JEAN P & EILEEN  
33 GOLDEN EYE LN  
PORT MONMOUTH NJ 07758

MARTIN EDWARD B & GAIL H  
703 OLD AMWELL RD  
HILLSBOROUGH NJ 08844

HORNBECK JAMES R & ELIZABETH M  
PO BOX 249  
WAWARSING NY 12489

COZY HOMES OF NORTH CAROLINA INC  
9450 WEHRLE DR  
CLARENCE NY 14031 1826

MCCARTHY EDWARD F & MARY TRUST  
2022 WATERLOO RD  
BERWYN PA 19312

NIELSEN WAYNE F & MARGARET S  
19471 YOUNGS CLIFF RD  
STERLING VA 20165

VANN GEORGE C & DIANN L  
12926 COUPLES PL  
WALDORF MD 20601

QUINN PATRICK & THOMAS  
8287 CHOPTANK RD  
PASADENA MD 21122

CONEY ROGER TRUSTEE  
7874 PROMONTORY CT  
VIENNA VA 22027

WEINSTEIN SYDNEY T & OTHERS  
11936 HOLLY BRANCH CT  
GREAT FALLS VA 22066

JOHNSON DENICE V & DAVID W  
3521 BLITHEWOOD DR  
RICHMOND VA 23225

KRUSHELNISKY KENNETH & FRANCES  
1506 MONMOUTH DR  
HENRICO VA 23238 4828

KREIGHBAUM WILLIAM M  
100 BUCKTAIL RUN  
YORKTOWN VA 23692

MILLER HUGH O & TERRY M BROWN  
108 WALNUT RD  
DANVILLE VA 24541

MAURAKIS TIMOTHY A & ANDREW P &  
318 OAK CREEK DR  
DANVILLE VA 24541

PAOLINI ALEX & PAUL HAZINSKI &  
PO BOX 8848  
CHARLESTON WV 25303

MILLER VICTOR D TRUSTEE  
2904 FRENCH OAK AVE  
THE VILLAGES FL 32163 2322

HALDEMAN DEAN W & PATRICIA S  
648 EAST AVE  
SHINNSTON WV 26431

GIOVINAZZO JORGE L & VALERIE L  
2249 MORLOW DR  
BURLINGTON NC 27215

WIFORD CYNTHIA M  
55 HAMLET GROVE DR  
PITTSBORO NC 27312

NEAL GEORGE III  
3203 HENDERSON RD  
GREENSBORO NC 27410 6032

MATHEWS JOHN J & LYNN K  
3 CAUSEWAY CT  
GREENSBORO NC 27455

HEID GERARD J & MARYANN  
7878 QUAIL HOLLOW CT  
WEST CHESTER OH 45069

TYSON STREET PARTNERS INC  
120 LIVINGSTONE DR  
CARY NC 27513

WILLCOX WESTMORE C & SMARANDA S  
824 CHURCHILL DR  
CHAPEL HILL NC 27517 3003

DOUGHERTY JAMES PATRICK & SARA  
MARIE  
54 IDLEWOOD LN  
CLAYTON NC 27527

TEEN PATRICK A & EILEEN F  
10320 GRAFTON RD  
RALEIGH NC 27615

MALONE KAREN B  
4727 COUNTRY LN  
ROCKY MOUNT NC 27803

PROCTOR RUSSELL L III & NANCY W &  
2148 JOELENE DR  
ROCKY MOUNT NC 27803

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TOPSAIL REEF HOMEOWNERS ASSO  
2224 NEW RIVER INLET RD  
N TOPSAIL BEACH NC 28460

BOYLE EDWARD F  
PO BOX 1202  
SNEADS FERRY NC 28460

KOSKO JOSEPH M  
2280 1 NEW RIVER INLET RD  
N TOPSAIL BEACH NC 28460

BARRKATT LLC  
15145 BEECH DR  
LOWELL AR 72745

SULLIVAN MARK & CINDA  
PO BOX 1141  
SNEADS FERRY NC 28460

LEWIS SALLY K  
4705 RIVER RD  
MUNCIE IN 47304

POLANCO FAUSTO A JR & AMIE E  
2276 1 NEW RIVER INLET RD  
SNEADS FERRY NC 28460

BURNS FRED J & SYLVIA TRUSTEES  
1669 NEW RIVER INLET RD  
NORTH TOPSAIL BEACH NC 28460

FARLEY RICHARD J & MARGUERITE A  
2300 NEW RIVER INLET RD # 1  
NORTH TOPSAIL BEACH NC 28460

GRAZIOSI GENE & MICHELLE  
1075 DAVENPORT PL  
WINTERVILLE NC 28590

MILLER MICAH M & SIDDHARTHA M  
VELANDY  
4014 PENHURST DR  
MARIETTA GA 30062 6161

SPERR EDWIN V & SHELBY J  
3056 WALTON WAY  
AUGUSTA GA 30909

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# Attachment 5.

## Example letter notifying adjacent property owners

---

DATE

(Adjacent Property Owner)  
xxxx New River Inlet Road  
North Topsail Beach, NC 28460

Subject: Proposed Sand Bag Installation North of Topsail Reef

Dear (Property Owner):

The Town of North Topsail Beach has plans to install a geotextile sand bag revetment along approximately 1,450 feet of shoreline north of the Topsail Reef Condominiums. The north end of the structure will curve back about 50 feet making the total 1,500 ft. This proposed action is taken in response to inordinate erosion occurring north of Topsail Reef.

The sand bag would begin at the existing sandbag revetment at Building #1 of Topsail reef and would extend approximately 1,450 feet north in front of 20 residential structures north of Topsail Reef Condominiums. The top of the sand bag revetment would be at elevation 12.0 ft., which is approximately the height of the dune constructed during the Phase 1 in 2012/2013. The revetment will have a total base width of approximately 45 feet when completed.

This letter is in response to CAMA permit application requirements to notify adjacent property owners of the intended action. Adjacent property owners have the right to protest the application.

Sincerely,

Stuart Turille  
Town Manager North Topsail Beach

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## **Attachments**

- 1. Project Narrative**
- 2. Exhibit 1 – Sand Source**
- 3. Sheet 1 of 3 to Sheet 3 of 3 - Vicinity Map, Plan View, and Typical Cross-Section**
- 4. List of Adjacent Property Owners**
- 5. Example letter notifying adjacent property owners**

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SEP 26 2014

# APPLICATION for Major Development Permit

(last revised 12/27/06)



North Carolina DIVISION OF COASTAL MANAGEMENT

1. Primary Applicant/ Landowner Information				
Business Name Town of North Topsail Beach			Project Name (if applicable) Phase 1 Emergency Sandbag Revetment	
Applicant 1: First Name Stuart		MI	Last Name Turille	
Applicant 2: First Name N/A		MI N/A	Last Name N/A	
<i>If additional applicants, please attach an additional page(s) with names listed.</i>				
Mailing Address 2008 Loggerhead Court		PO Box N/A	City North Topsail Beach	State NC
ZIP 28460	Country Onslow	Phone No. 910 - 328 - 1349 ext. NA		FAX No. N/A
Street Address (if different from above) N/A		City N/A	State N/A	ZIP N/A-
Email townmanager@north-topsail-beach.org				

2. Agent/Contractor Information				
Business Name Coastal Planning & Engineering of NC, PC				
Agent/ Contractor 1: First Name James		MI T.	Last Name Jarrett	
Agent/ Contractor 2: First Name N/A		MI N/A	Last Name N/A	
Mailing Address 4038 Masonboro Loop Rd		PO Box N/A	City Wilmington	State NC
ZIP 28409		Phone No. 1 910-791-9494 ext. N/A		Phone No. 2 910-264-2166 ext. N/A
FAX No. 910-791-4129		North Carolina Professional Engineering License 005545		
Street Address (if different from above) N/A		City N/A	State N/A	ZIP N/A -
Email James.Jarrett@cbi.com				

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3. Project Location				
County (can be multiple) Onslow		Street Address New River Inlet Rd		State Rd. # N/A
Subdivision Name N/A		City Town of North Topsail Beach	State NC	Zip 28460
Phone No. 910-328-1349 ext. N/A		Lot No.(s) (if many, attach additional page with list) N/A, , , ,		
a. In which NC river basin is the project located? White Oak River Basin		b. Name of body of water nearest to proposed project New River Inlet and Atlantic Ocean		
c. Is the water body identified in (b) above, natural or manmade? <input checked="" type="checkbox"/> Natural <input type="checkbox"/> Manmade <input type="checkbox"/> Unknown		d. Name the closest major water body to the proposed project site. New River Inlet and Atlantic Ocean		
e. Is proposed work within city limits or planning jurisdiction? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		f. If applicable, list the planning jurisdiction or city limit the proposed work falls within. Town of North Topsail Beach		

4. Site Description	
a. Total length of shoreline on the tract (ft.) Approximately 1,450 feet.	b. Size of entire tract (sq.ft.) 198,200 sq ft (4.55 ac)
c. Size of individual lot(s) N/A, (If many lot sizes, please attach additional page with a list)	d. Approximate elevation of tract above NHW (normal high water) or NWL (normal water level) approximately +2 to +6 ft above NHW or roughly +4 to +8 ft NAVD88
e. Vegetation on tract No native dune grasses are present seaward of the erosion scarp line due to continuing erosion issues and past efforts associated with Phase 1 of the beach management project. Sand fencing and dune vegetation were installed on the artificial dune included in the beach fill design but the continuing erosion has destroyed almost all of the fencing and grass. (Photo Nos. 3 to 5 in the attached Project Narrative).	
f. Man-made features and uses now on tract There are currently 20 residential structures located along the ocean shoreline north of the Topsail Reef Condominiums. New River Inlet Road is located immediately landward of the homes. The residential structures serve as both permanent residences and rental properties.	
g. Identify and describe the existing land uses <u>adjacent</u> to the proposed project site. The property immediately south of the proposed sand tube installation is occupied by the Topsail Reef Condominiums. To the north, the area is undeveloped and bounded by New River Inlet. The Topsail Reef Condominiums are protected by a sandbag revetment installed in 2012.	
h. How does local government zone the tract? R-1 Residential	i. Is the proposed project consistent with the applicable zoning? (Attach zoning compliance certificate, if applicable) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA
j. Is the proposed activity part of an urban waterfront redevelopment proposal? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
k. Has a professional archaeological assessment been done for the tract? If yes, attach a copy. NA	

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l. Is the proposed project located in a National Registered Historic District or does it involve a National Register listed or eligible property?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA
m. (i) Are there wetlands on the site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
(ii) Are there coastal wetlands on the site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
(iii) If yes to either (i) or (ii) above, has a delineation been conducted? (Attach documentation, if available)	<input type="checkbox"/> Yes <input type="checkbox"/> No
n. Describe existing wastewater treatment facilities.	N/A
o. Describe existing drinking water supply source.	N/A
p. Describe existing storm water management or treatment systems.	N/A

### 5. Activities and Impacts

a. Will the project be for commercial, public, or private use?	<input type="checkbox"/> Commercial <input type="checkbox"/> Public/Government <input checked="" type="checkbox"/> Private/Community
b. Give a brief description of purpose, use, and daily operations of the project when complete.  The sand bag revetment will provide temporary erosion protection for 20 residential structures north of the Topsail Reef Condominiums and some flood protection to a portion of New River Inlet Road north of Port Drive. Flooding in this area is occurring during normal spring high tides due to wave over washing the beach (Photo No. 6 in the Attached Project Narrative). A vicinity map, general layout of the proposed sand bag structure, and a typical cross-section of the revetment is provided on Sheets 1 of 3 to 3 of 3 in the Attachments.	
c. Describe the proposed construction methodology, types of construction equipment to be used during construction, the number of each type of equipment and where it is to be stored.  In order to achieve a design elevation of approximately +12 feet NAVD, the revetment will be built on top of the existing grade at the time of construction in a stacked configuration of sand bags. The material needed to fill the sand bags will be removed from the sand "spit" shown in Exhibit 1 in the Attachments and transported via dump trucks to designated locations where a hopper, or large container, will be stationed. This sand will be supplemented with material from an off-island borrow area as needed. The hopper and associated pumps and filling equipment will be stationed within the area to be disturbed as identified in Figure B on Sheet 2 of 3 in the Attachments. As the sand bags are filled the hopper and associated pumps used to create the slurry within the hopper will be moved. Multiple sand bags can be filled from one hopper location; however, it is anticipated that the hopper and pumps will need to be moved as the work progresses. The sand from the borrow site will be placed into the hopper. A pump will be used to draw water from the ocean and discharge it into the hopper. The sand/water "slurry" in the hopper will then be pumped into the sand bags. No open "pit" will be created as all of the pumping will be contained within the hopper and discharged into the sand bags. Prior to filling the bags, bulldozers and frontend loaders will be used to grade the area prior to placement of the sand bags and will maneuver the sand bags into position. All work will be performed above the NHW line. A temporary berm will be formed on the seaward side of the work area and will provide a buffer from wave action. The existing material within the footprint of where the sand bags will be placed will be used to create the berm. The temporary berm will also inhibit any direct discharge of water from the work area back into the ocean. The bulldozer will be on standby during sand bag placement and once the bags have been filled will be used to flatten out the temporary berm and final dress the area.	
d. List all development activities you propose.  The single purpose of the project is to install the temporary sand bag revetment in the area fronting the 20 residential structures north of the Topsail Reef Condominiums.	

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<p>e. Are the proposed activities maintenance of an existing project, new work, or both?</p> <p>A total of 15 sandbag structures have been installed along the north end of North Topsail Beach north of Topsail Reef. Due to the erosion this area has experienced in recent years, only three of the 15 sandbag structures that have been installed are currently in place in front of existing residences. The remainder of the standard size sandbag structures permitted in this area (3-2-1 stacked structure) have either been removed or were installed at residential structures that were seaward of the current row of oceanfront homes and no longer exist. Although there have been sandbag structures installed in this area in the past, 17 of the 20 residences proposed to be protected by the emergency sand bag revetment do not have sandbag structures installed in front of them. The three remaining sandbag revetments, located at 2332, 2334, and 2368 New River Inlet Rd. (State Rd. 1568) have been buried and are not presently visible as discussed in the attached Project Narrative.</p>	<p>New Work</p>
<p>f. What is the approximate total disturbed land area resulting from the proposed project?</p> <p>The sand bag revetment would cover approximately 1,450 linear feet of ocean shoreline with a 50-foot wingwall or tieback on the north end (Sheet 2 of 3 in the Attachments). Installation will disturb an area about 60 feet wide resulting in a total disturbed area of approximately 2.2 acres. Construction activities landward of the sand bags, i.e. placement and filling of hopper between the existing residences and areas between residences and sand bags will disturb approximately 1.4 acres. Excavation of material from the sand spit on the north end of the island will disturb approximately 5.0 acres. The total disturbed area will be approximately 8.6 acres.</p>	<p>Approximately 8.6  <input type="checkbox"/>Sq.Ft or <input checked="" type="checkbox"/>Acres</p>
<p>g. Will the proposed project encroach on any public easement, public access way or other area that the public has established use of?</p> <p>The sand bag structure will cover the area from the front of the 20 residential structures and extend approximately 45 ft. seaward. This area is changing dramatically day to day but based on the most recent survey data, the landward portion of the structure would be constructed at an elevation ranging from 5.5 – 6.9 ft. NAVD; whereas the seaward edge would extend out to elevations ranging from 0.7 – 5.2 ft. NAVD. The mean high water elevation is +1.4 ft. NAVD. With the sand bag revetment installed (See Figure B on Sheet 2 of 3 in the Attachments) the sand bags may extend seaward of the mean high water elevation of beach. Some of the residences north of Topsail Reef presently impose some restrictions on public access during times of high tide. As a result, installation of the sand bag structure would not have a significant incremental impact on public access in the project area at the time of high tide.</p>	<p><input checked="" type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>NA</p>
<p>h. Describe location and type of existing and proposed discharges to waters of the state.  N/A - No discharges will be made into state waters (see description of construction methodology in item c).</p>	
<p>i. Will wastewater or stormwater be discharged into a wetland?</p> <p>If yes, will this discharged water be of the same salinity as the receiving water?</p>	<p><input type="checkbox"/>Yes <input checked="" type="checkbox"/>No <input type="checkbox"/>NA  <input type="checkbox"/>Yes <input type="checkbox"/>No <input checked="" type="checkbox"/>NA</p>
<p>j. Is there any mitigation proposed? If yes, attach a mitigation proposal.</p> <p>While there is no formal mitigation proposed for the sand bag revetment installation, the Town of North Topsail Beach will continue to monitor the area with beach profile surveys associated with its ongoing inlet/beach management plan. The Town expects to perform maintenance of the new channel through New River Inlet in the next 2 to 2.5 years. At that time, some of the dredged material could be used to provide beach nourishment in the sand bag project area. Maintenance of the inlet channel will be predicated on satisfying conditions contained in DOA permit SAW 2005-00344 and CAMA permit 79-10.</p>	<p><input type="checkbox"/>Yes <input checked="" type="checkbox"/>No <input type="checkbox"/>NA</p>

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**6. Additional Information**

In addition to this completed application form, (MP-1) the following items below, if applicable, must be submitted in order for the application package to be complete. Items (a) – (f) are always applicable to any major development application. Please consult the application instruction booklet on how to properly prepare the required items below.

- a. A project narrative. (See attached)
- b. An accurate, dated work plat (including plan view and cross-sectional drawings) drawn to scale. Please give the present status of the proposed project. Is any portion already complete? If previously authorized work, clearly indicate on maps, plats, drawings to distinguish between work completed and proposed.  
 No work has been done at the site for this project. See Sheets 2 of 3 and 3 of 3 in the Attachments for the plan view of the proposal and a typical cross-section, respectively. Sheet 2 of 3 shows both the site plan (Figure A) and the areas that would likely be disturbed during construction (Figure B).
- c. A site or location map that is sufficiently detailed to guide agency personnel unfamiliar with the area to the site. (See Sheet 1 of 3 in the Attachments)
- d. A copy of the deed (with state application only) or other instrument under which the applicant claims title to the affected properties. N/A
- e. The appropriate application fee. Check or money order made payable to DENR.
- f. A list of the names and complete addresses of the adjacent waterfront (riparian) landowners and signed return receipts as proof that such owners have received a copy of the application and plats by certified mail. Such landowners must be advised that they have 30 days in which to submit comments on the proposed project to the Division of Coastal Management.
 

Name See Attached	Phone No.
Address	
Name	Phone No.
Address	
Name	Phone No.
Address	
- g. A list of previous state or federal permits issued for work on the project tract. Include permit numbers, permittee, and issuing dates.
 

Permittee: Town of North Topsail Beach (management plan)	DOA Permit SAW-2005-00344
Permittee: Town of North Topsail Beach (management plan)	CAMA Permit 79-10
Permittee: town of North Topsail Beach (Off-Island Truck Haul Operation)	CAMA Permit 191-05 (As modified)
- h. Signed consultant or agent authorization form, if applicable.
- i. Wetland delineation, if necessary.
- j. A signed AEC hazard notice for projects in oceanfront and inlet areas. (Must be signed by property owner)
- k. A statement of compliance with the N.C. Environmental Policy Act (N.C.G.S. 113A 1-10), if necessary. If the project involves expenditure of public funds or use of public lands, attach a statement documenting compliance with the North Carolina Environmental Policy Act.

**7. Certification and Permission to Enter on Land**

I understand that any permit issued in response to this application will allow only the development described in the application. The project will be subject to the conditions and restrictions contained in the permit.

I certify that I am authorized to grant, and do in fact grant permission to representatives of state and federal review agencies to enter on the aforementioned lands in connection with evaluating information related to this permit application and follow-up monitoring of the project.

I further certify that the information provided in this application is truthful to the best of my knowledge.

Date Sept. 26, 2014

Print Name Stuart Turille

Signature Stuart Turille

Please indicate application attachments pertaining to your proposed project.

- DCM MP-2 Excavation and Fill Information
- DCM MP-3 Upland Development
- DCM MP-5 Bridges and Culverts

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DCM MP-4 Structures Information

Form DCM MP-2

# EXCAVATION and FILL

(Except for bridges and culverts)

Attach this form to Joint Application for CAMA Major Permit, Form DCM MP-1. Be sure to complete all other sections of the Joint Application that relate to this proposed project. Please include all supplemental information.

Describe below the purpose of proposed excavation and/or fill activities. All values should be given in feet.

	Access Channel (NLW or NWL)	Canal	Boat Basin	Boat Ramp	Rock Groin	Rock Breakwater	Other (excluding shoreline stabilization)
Length							
Width							
Avg. Existing Depth					NA	NA	
Final Project Depth					NA	NA	

## 1. EXCAVATION

- a. Amount of material to be excavated from below NHW or NWL in cubic yards.  
None
- b. Type of material to be excavated.  
Beach sand and shell.
- c. (i) Does the area to be excavated include coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.  
 CW \_\_\_\_  SAV \_\_\_\_  SB \_\_\_\_  
 WL \_\_\_\_  None
- (ii) Describe the purpose of the excavation in these areas:  
N/A.
- d. High-ground excavation in cubic yards.  
Between 14,000 and 17,000 cubic yards to fill the sand bags. Material will be obtained from a combination of the sand spit (approximately 10,000 cy) and material trucked in from an off island source (up to 7,000 cy).

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**2. DISPOSAL OF EXCAVATED MATERIAL**

This section not applicable

- a. Location of disposal area.  
Material excavated from a combination of the spit and the off-island borrow source will be used to fill sand bags to construct the revetment.
- b. Dimensions of disposal area.  
The approximate area to be covered by the sandbags will be 67,500 sq. ft. (1.55 acres).  
Area covered = 1,500 ft long x 45 feet wide.
- c. (i) Do you claim title to disposal area?  
 Yes  No  NA  
(ii) If no, attach a letter granting permission from the owner.
- d. (i) Will a disposal area be available for future maintenance?  
 Yes  No  NA  
(ii) If yes, where?
- e. (i) Does the disposal area include any coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.  
 CW  SAV  SB  WL  None  
(ii) Describe the purpose of disposal in these areas:  
N/A
- f. (i) Does the disposal include any area in the water?  
 Yes  No  NA  
(ii) If yes, how much water area is affected?

**3. SHORELINE STABILIZATION**

This section not applicable

(If development is a wood groin, use MP-4 – Structures)

- a. Type of shoreline stabilization:  
 Bulkhead  Riprap  Breakwater/Sill   
Other: Geotextile Sand Bag revetment
- b. Length: 1450 ft plus a 50-ft wingwall  
Width: Total approximately 45 feet.
- c. Average distance waterward of NHW or NWL: 0 feet (
- d. Maximum distance waterward of NHW or NWL: 7.1 ft.
- e. Type of stabilization material:  
Two primary bag dimensions are proposed. Per the manufacturer's specifications, both bags, when filled, will have widths of approximately 4 ft. and a filled height of between 1.5 ft. and 2.0 ft. The difference in the two types of bags proposed are their lengths, which are proposed to be 9 ft. and 14 ft., respectively. The revetment will be constructed out of a combination of these bags to achieve a base width not to exceed 45 ft. and an elevation of approximately 12.0 ft. NAVD.
- f. (i) Has there been shoreline erosion during preceding 12 months?  
 Yes  No  NA  
(ii) If yes, state amount of erosion and source of erosion amount information.  
Beach profile surveys taken in the area as part of the Town of North Topsail Beach's shoreline management program have documented shoreline recession rates of between 196 feet/year to 246 feet/year in the area north of Topsail Reef since completion of the Phase 1 beach nourishment project in February 2013. Examples of the profile surveys are provided in Figures 2 and 3 in the Project Narrative.
- g. Number of square feet of fill to be placed below water level. NONE  
Bulkhead backfill \_\_\_\_\_ Riprap \_\_\_\_\_  
Breakwater/Sill \_\_\_\_\_ Other geotextile sand filled bags
- h. Type of fill material.  
Geotextile bags filled with sand.
- i. Source of fill material.  
Sand bags will be filled with a combination of sand obtained from the surface of the sand spit located

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adjacent to New River Inlet (see Exhibit 1 in the Attachments) and an off-island borrow source. All excavation of the material will be above the NHW line.

**4. OTHER FILL ACTIVITIES**  This section not applicable  
(Excluding Shoreline Stabilization)

- a. (i) Will fill material be brought to the site?  Yes  No  NA  
If yes,  
(ii) Amount of material to be placed in the water  
None  
(iii) Dimensions of fill area  
N/A  
(iv) Purpose of fill  
To fill geotextile sand bags
- b. (i) Will fill material be placed in coastal wetlands/marsh (CW), submerged aquatic vegetation (SAV), shell bottom (SB), or other wetlands (WL)? If any boxes are checked, provide the number of square feet affected.  
 CW \_\_\_\_\_  SAV \_\_\_\_\_  SB \_\_\_\_\_  
 WL \_\_\_\_\_  None  
(ii) Describe the purpose of the fill in these areas: To fill geotextile sand bags

**5. GENERAL**

- a. How will excavated or fill material be kept on site and erosion controlled?  
All fill brought to the site will be used to fill geotextile sand bags. See explanation of construction methodology in item c of DCM MP-1)
- b. What type of construction equipment will be used (e.g., dragline, backhoe, or hydraulic dredge)?  
Bulldozer, dump trucks, frontend loader, water pump.
- c. (i) Will navigational aids be required as a result of the project?  
 Yes  No  NA  
(ii) If yes, explain what type and how they will be implemented.
- d. (i) Will wetlands be crossed in transporting equipment to project site?  Yes  No  NA  
(ii) If yes, explain steps that will be taken to avoid or minimize environmental impacts.

Date Sept. 26, 2014

Project Name  
Phase 1 Emergency Sand Bag Revetment – North end North Topsail Beach

Applicant Name  
Town of North Topsail Beach

Applicant Signature Strat Juville Town Manager

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# Attachment 1. Project Narrative

The Town of North Topsail Beach completed Phase 1 of its multifaceted inlet and shoreline management plan in February 2013 with the repositioning of the New River Inlet ocean bar channel to a more central location between the south end of Onslow Beach and the north end of North Topsail Beach. The material removed during repositioning of the channel was used to construct a beach fill along 7,730 feet of shoreline south of New River Inlet.

The condition of the north end of North Topsail Beach prior to construction of the Phase 1 beach fill project is shown in Photo 1 with the condition immediately after construction provided in Photo 2.

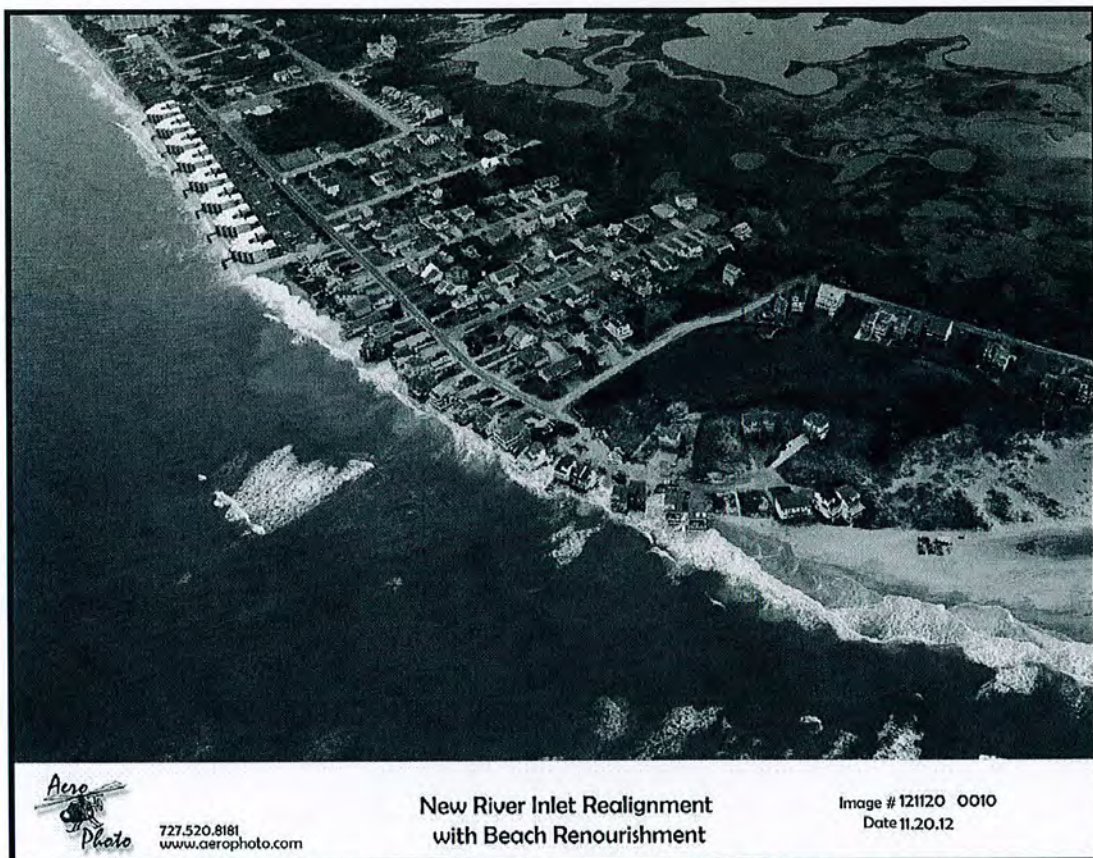


Photo 1. Pre-Nourishment – November 2012. The eight buildings in the upper left of the photo are the Topsail Reef Condominiums.

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**Photo 2. Post-Nourishment – February 2013.**

The ocean bar channel of New River Inlet was moved for the purpose of inducing sand accumulation on the south side of the inlet's ebb tide delta. Based on the documented historic behavior of the inlet, moving the channel to a more central position with an alignment approximately perpendicular to the adjacent shorelines would result in accretion of the shoreline south of the inlet. The time required for the new channel to have a positive impact on the shoreline was estimated to be at least 5 years.

Monitoring of the inlet has demonstrated some of the expected results are taking place with sand accumulating on the south side of the inlet, however, the rate of build-up, as predicted, has been relatively slow. As a result, the north end of North Topsail Beach has continued to experience high rates of erosion. As of August 2014, most of the fill placed north of the Topsail Reef Condominiums has been lost as shown in Photo 3 to Photo 5.

The beach profiles taken at baseline stations 1150+00 and 1155+00, located north of the Topsail Reef Condominium (Figure 1), in April 2012 immediately after completion of the Phase 1 beach fill and approximately one year later in May 2014 are provided in Figures 2 and 3, respectively. The minimum distance between the front of the residences north of Topsail Reef and mean high water (+1.4 feet NAVD) is approximately 65 feet. The average distance between mean high water (+1.4 feet NAVD) and the front of the five residences located north of Topsail Reef was about 217 feet while the distance from mean high water to the front of the next five residences north of baseline station 1155+00 averaged 137 feet. Obviously, these distances do not conform to the imminently threatened

definition used by DCM to determine when structures are eligible for temporary protection. However, when the rate of shoreline recession over the approximate one-year post-construction period is taken into account, the continuation of these measured recession rates will ultimately result in all 10 of these homes becoming imminently threatened, as defined by DCM, in less than a year. The same holds true for the northern 10 residences. As the shoreline continues to encroach closer to the residences, installation of emergency structures will become increasingly difficult due to having to work in the active surf zone. This could limit construction to times of low water along some sections of the project area.

The condition on the north end of the island has continued to deteriorate as demonstrated by Photo 3a which was taken on September 14, 2014. As is evident in Photo 3a, the final remnants of the artificial dune included with the Phase 1 project, which were evident in the August 7, 2014 photo of the area provided in Photo No. 3, has been completely removed.

In addition to the threat to the homes, flooding of the area has been exasperated (Photo 6) with flood waters spilling on to New River Inlet Road and side streets during times of high tide.



Photo No. 3. View looking north of Topsail Reef Building #1 – August 7, 2014. Arrow identifies house shown in Photo No. 4.

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Photo No. 3a. Condition as of September 14, 2014.



Photo No. 4. House north of Topsail Reef Building #1. View looking north toward New River Inlet. – August 7, 2014.

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Photo No. 5. View looking south toward Topsail Reef Building #1 – August 7, 2014.



Photo No. 6. Flooding on north end of North Topsail Beach – August 5, 2014.

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Figure 1. Baseline stations.

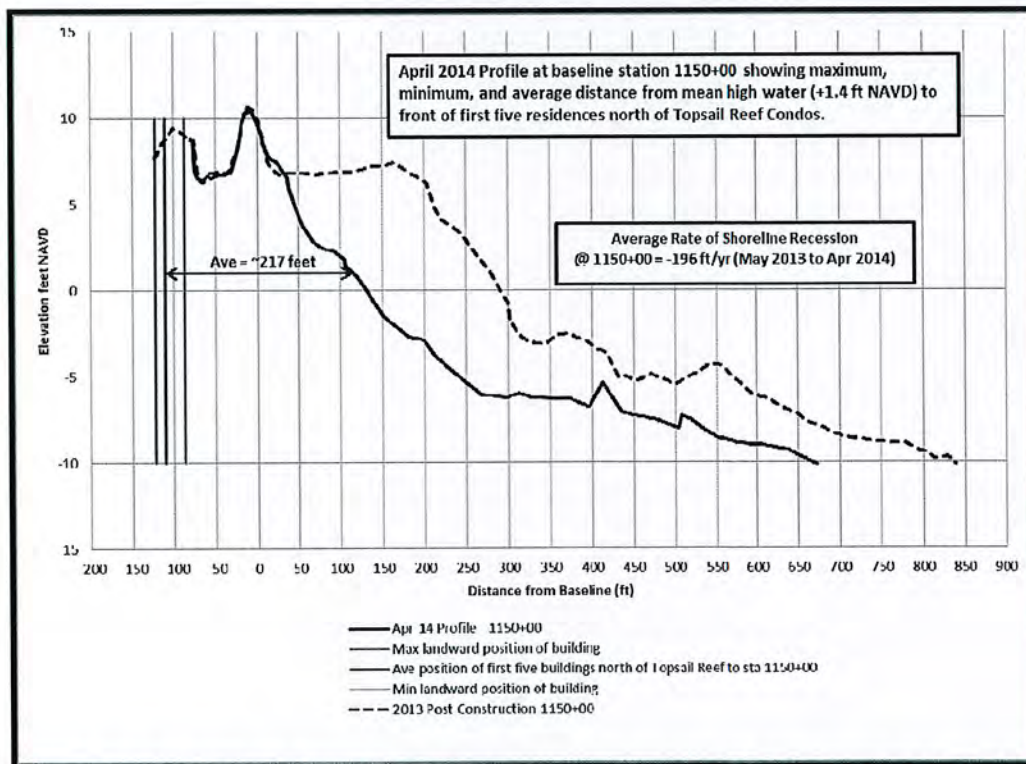


Figure 2. Station 1150+00 showing post-construction profile (May 2012) and April 2014 profile.

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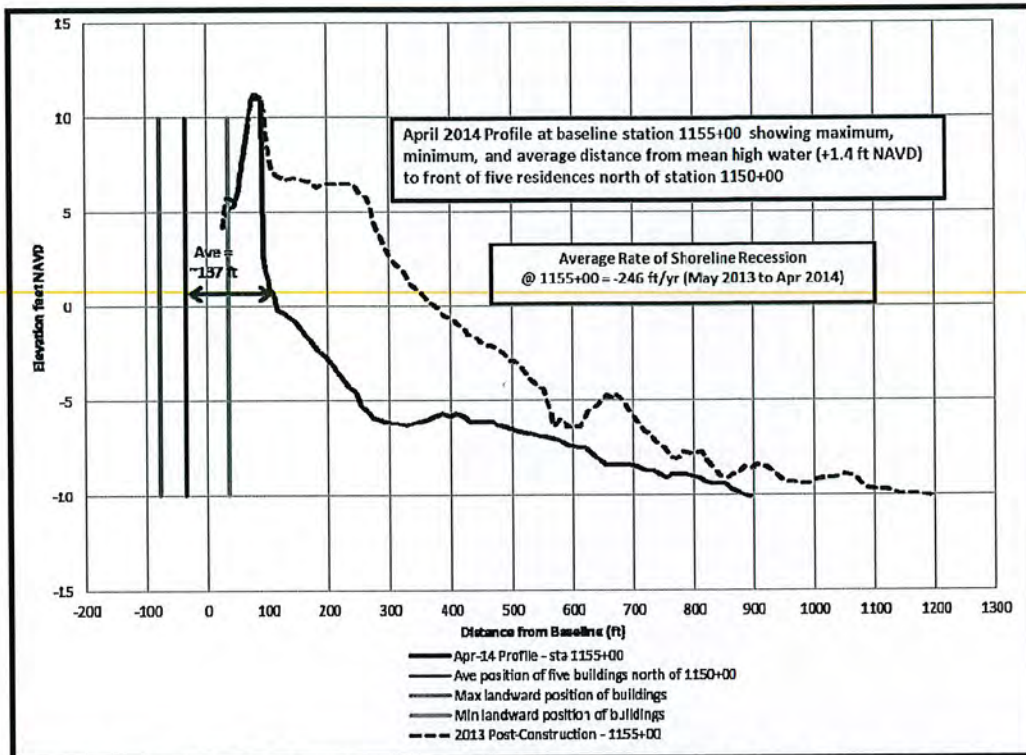


Figure 3. Station 1155+00 showing post-construction profile (May 2012) and April 2014 profile.

The overall management plan for New River Inlet and the shoreline of North Topsail Beach allows for the periodic maintenance of the ocean bar channel in order to keep the channel in its preferred position and alignment. Material removed to maintain the channel is to be used to provide periodic nourishment of the North Topsail Beach shoreline including the shoreline nourished during Phase 1.

The conditions of the permits issued for the project only allows maintenance of the channel to be accomplished every four years providing one of two channel maintenance thresholds are met. One channel threshold is associated with shoaling of the channel while the second is based on the position and alignment of the channel. With the initial project being completed in February 2013, the Town of North Topsail Beach is not permitted to maintain the channel until at least the 2016/2017 environmental dredge window. Given the present condition of the shoreline, the Town of North Topsail Beach needs to take immediate emergency measures in order to prevent the loss of the 20 threatened residential structures between now and the time it is permitted to maintain the channel.

The temporary sand bag revetment allowed under CAMA (15A NCAC 7H.1700), which is limited to a height of 6 feet above the existing ground and a maximum bottom width of 20 feet, is not adequate to provide the degree of protection deemed necessary to protect the 20 residential structures for a minimum of 2 years. This is evident by the history of failure of previously permitted sandbag revetment in the area as demonstrated in Photo 7. Furthermore, the Topsail Reefs HOA located just south of the proposed project area constructed a revetment similar to that being proposed in this application (Photo 8). This

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structure has performed well thus far, which lends itself to the construction of a similar structure along the northernmost section of Phase 1 where erosion has been the most severe. Therefore, the Town of North Topsail Beach has elected to install a sand bag structure to achieve an elevation of 12.0 ft. NAVD.

A plan view of the sand bag revetment is provided on Sheet 2 of 3 (Figures A and B) and a typical cross-section view of proposed revetment is shown on Sheet 3 of 3 in the Attachments.

The proposed sand bag would begin at the existing “super-sized” sandbag revetment at Building #1 of the Topsail Reef Condominium and extend 1,450 feet parallel to the existing shoreline. A 50-foot return wall would extend landward from the north end of the sand bag structure just north of the home located at 2378 New River Inlet Road.

A schematic of the tie-in of the proposed sandbag revetment with the existing Topsail Reef revetment is shown in Figure 4. As indicated in Figure 4 shown in the plan view on Sheet 2 of 3 in the Attachments, outer toe of the proposed sandbag revetment would correspond approximately to the position of the seaward toe of the existing Topsail Reef revetment with the alignment of the proposed sandbag revetment gradually transitioning landward for a distance of about 200 feet. From the end of the transition north to the northern most residential structure, the proposed sandbag revetment would follow an alignment roughly parallel to the seaward most support piles of the threatened residential structures with the landward toe of the revetment positioned as close as practical to the front support piles of the structures. The gradual transition between the Topsail Reef revetment and the proposed sandbag revetment should reduce the concentration of wave energy associated with an approximate 90° change in the alignment of the sandbags and thus reduce the potential for scour at the seaward toe of the bags at that point.



Figure 4. Schematic of tie-in of proposed sandbag revetment to the existing Topsail Reef sandbag revetment.

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**Photo 7. Example of failed sandbag revetment on north end of North Topsail Beach. Photo taken in September 2005. All of these sandbags and structures, which were located seaward of the present row of homes north of Topsail Reef, have been removed.**



**Photo 8. Sandbags revetment at Topsail Reefs Building 1 (Sep 2014).**

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**Attachment 2.**  
**EXHIBIT 1 – Sand Source**

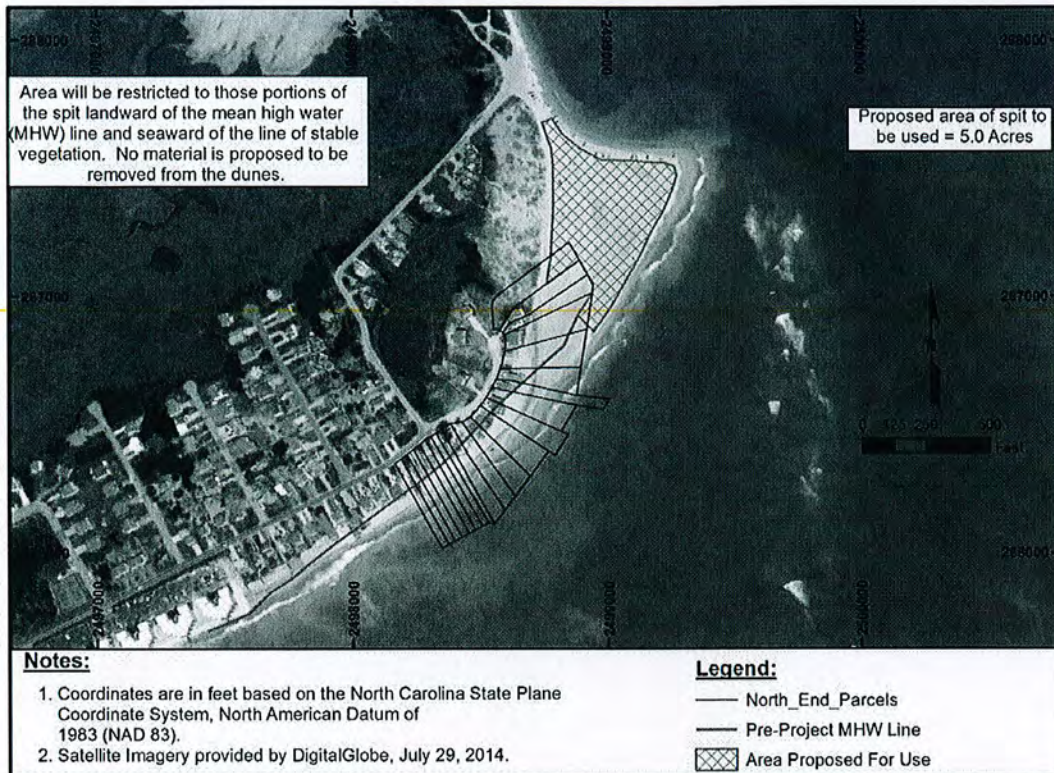
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Sand source for sand bags

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# Attachment 3. VICINITY MAP, PLAN VIEW, & TYPICAL CROSS-SECTION

(Sheets 1 of 3 to 3 of 3)

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Attachment 3: Sheet 1 of 3



Vicinity Map – Emergency Sand Bag Revetment – North End North Topsail Beach

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Attachment 3: Sheet 2 of 3



Figure A. Plan view of sand bag revetment



Figure B. Plan view of sand bag revetment footprint, proposed area to be disturbed, transition to Topsail Reef revetment and location of the First Line of Stable Natural Vegetation (FLSNV).

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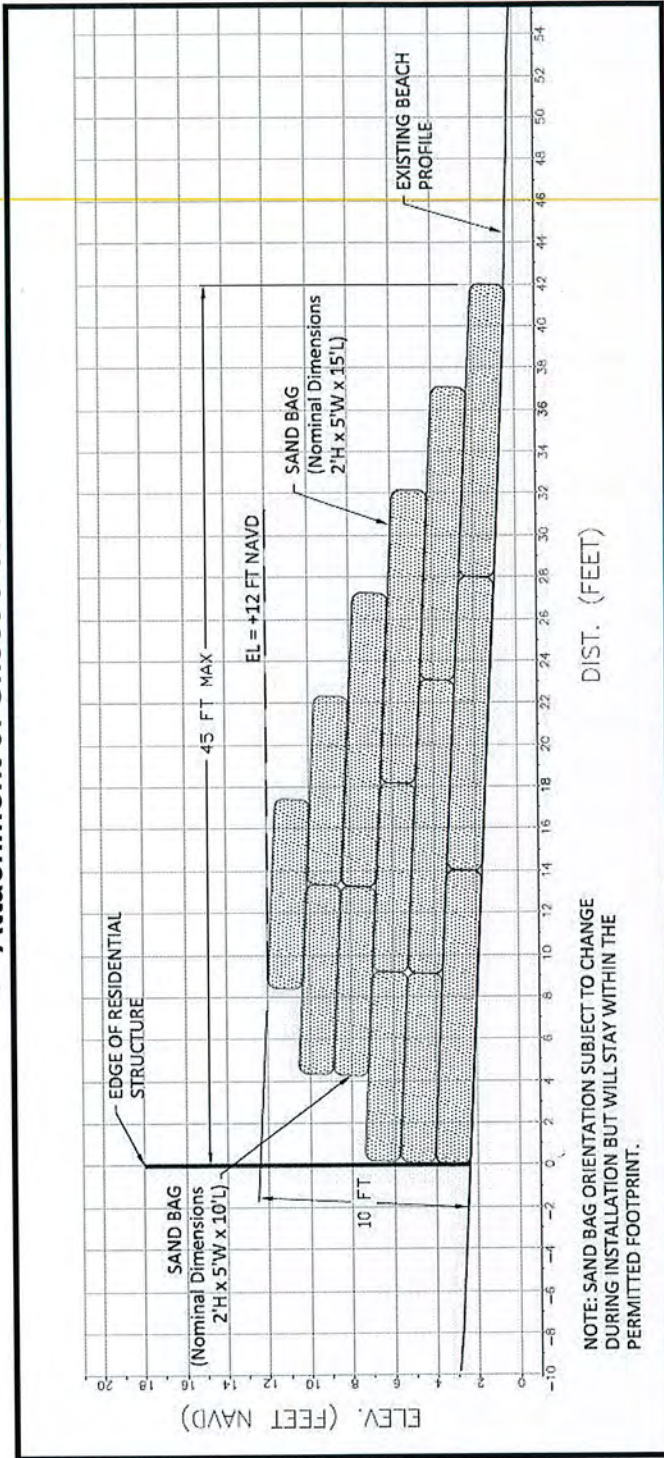
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Attachment 3: Sheet 3 of 3



Typical Cross-Section – Sand bag revetment

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# OCEAN HAZARD AEC NOTICE

Project is in an:  Ocean Erodible Area  High Hazard Flood Area  Inlet Hazard Area

Property Owner: Town of North Topsail Beach

Property Address: N. River Inlet Road (far north end)

Date Lot Was Platted: N/A

This notice is intended to make you, the applicant, aware of the special risks and conditions associated with development in this area, which is subject to natural hazards such as storms, erosion and currents. The rules of the Coastal Resources Commission require that you receive an AEC Hazard Notice and acknowledge that notice in writing before a permit for development can be issued.

The Commission's rules on building standards, oceanfront setbacks and dune alterations are designed to minimize, but not eliminate, property loss from hazards. By granting permits, the Coastal Resources Commission does not guarantee the safety of the development and assumes no liability for future damage to the development. Permits issued in the Ocean Hazard Area of Environmental Concern include the condition that structures be relocated or dismantled if they become imminently threatened by changes in shoreline configuration. The structure(s) must be relocated or dismantled within two (2) years of becoming imminently threatened, and in any case upon its collapse or subsidence.

The best available information, as accepted by the Coastal Resources Commission, indicates that the annual long-term average ocean erosion rate for the area where your property is located is 2 feet per year.

The rate was established by careful analysis of aerial photographs of the coastline taken over the past 50 years.

Studies also indicate that the shoreline could move as much as 450 feet landward in a major storm.

The flood waters in a major storm are predicted to be about 14-16' feet deep in this area.

Preferred oceanfront protection measures are beach nourishment and relocation of threatened structures. Hard erosion control structures such as bulkheads, seawalls, groins, jetties and breakwaters are prohibited. Temporary sand bags may be authorized under certain conditions.

The applicant must acknowledge this information and requirements by signing this notice in the space below. Without the proper signature, the application will not be complete.

Grant Juville Oct. 2, 2014  
Property Owner Signature Date  
(Town Manager)

**SPECIAL NOTE:** This hazard notice is required for development in areas subject to sudden and massive storms and erosion. Permits issued for development in this area expire on December 31 of the third year following the year in which the permit was issued. Shortly before work begins on the project site, the Local Permit Officer must be contacted to determine the vegetation line and setback distance at your site. If the property has seen little change since the time of permit issuance, and the proposed development can still meet the setback requirement, the LPO will inform you that you may begin work. Substantial progress on the project must be made within 60 days of this setback determination, or the setback must be re-measured. Also, the occurrence of a major shoreline change as the result of a storm within the 60-day period will necessitate re-measurement of the setback. It is important that you check with the LPO before the permit expires for official approval to continue the work after the permit has expired. Generally, if foundation pilings have been placed and substantial progress is continuing, permit renewal can be authorized. It is unlawful to continue work after permit expiration.

For more information, contact:

JASON DAIL

Local Permit Officer

127 Cardinal Drive

Address

Wilmington NC 28405

Locality

910-796-7221

Phone Number

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# SANDBAG REMOVAL NOTICE

TO WHOM IT MAY CONCERN:

I, Stuart Turille, Town Manager, give permission to CP&E-NC to act as my agent in my behalf in obtaining a CAMA <sup>MAJOR</sup> ~~General~~ Permit to place sandbags as a temporary erosion control structure in front of my property at at point just north of Topsail Reef condominiums to 2382 New river Inlet Rd.

I, Stuart Turille, Town Manager, have read the specifications in 15A NCAC 7H-0308(a)(2) and understand that the sand bags may remain in place for up to 5 years after the date of permit approval. I understand that I will be responsible for removing the sandbags within 30 days after that date or at any time that they are determined by DCM staff or its agent to be unnecessary due to relocation or removal of the structure. I will also be responsible for removing any damaged sandbags during the period they are authorized to be in place.

I also understand that the removal of the sandbags shall not be required if at the specified date for removal they are determined by DCM staff to be covered by dunes with vegetation sufficient to be considered stable and natural.

AUTHORIZED SIGNATURE:

*Stuart Turille*

DATE: October 3, 2014

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OCT 03 2014

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OCT 07 2014  
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SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY
<ul style="list-style-type: none"> <li>Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.</li> <li>Print your name and address on the reverse so that we can return the card to you.</li> <li>Attach this card to the back of the mailpiece, or on the front if space permits.</li> </ul>	<p>A. Signature <input type="checkbox"/> Agent  <input checked="" type="checkbox"/> Addressee</p> <p>B. Received by (Printed Name) C. Date of Delivery</p>
<p>1. Article Addressed to:</p> <p>George VAND  12926 Couples Pl  WALDORF, MD 20601</p>	<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes  <input checked="" type="checkbox"/> No  If YES, enter delivery address below:</p> <p>OCT 15 2014</p> <p>3. Service Type  <input checked="" type="checkbox"/> Certified Mail® <input type="checkbox"/> Priority Mail Express™  <input checked="" type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise  <input type="checkbox"/> Insured Mail <input type="checkbox"/> Collect on Delivery</p>
<p>2. Article Number  (Transfer from service lab)</p>	<p>4. Restricted Delivery? (Extra Fee) <input type="checkbox"/> Yes</p> <p>7012 3460 0003 6878 1125</p>

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OCT 20 2014  
DCM-WMD

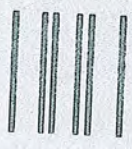
SENDER: COMPLETE THIS SECTION	COMPLETE THIS SECTION ON DELIVERY
<ul style="list-style-type: none"> <li>Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.</li> <li>Print your name and address on the reverse so that we can return the card to you.</li> <li>Attach this card to the back of the mailpiece, or on the front if space permits.</li> </ul>	<p>A. Signature <input type="checkbox"/> Agent  <input checked="" type="checkbox"/> Addressee</p> <p>B. Received by (Printed Name) C. Date of Delivery</p>
<p>1. Article Addressed to:</p> <p>TopSAIL Reef HOA  2224 New River Inlet Rd  N. TOPSAIL BEACH, NC  28460</p>	<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes  <input checked="" type="checkbox"/> No  If YES, enter delivery address below:</p> <p>OCT 15 2014</p> <p>3. Service Type  <input checked="" type="checkbox"/> Certified Mail® <input type="checkbox"/> Priority Mail Express™  <input checked="" type="checkbox"/> Registered <input type="checkbox"/> Return Receipt for Merchandise  <input type="checkbox"/> Insured Mail <input type="checkbox"/> Collect on Delivery</p>
<p>2. Article Number  (Transfer from service lab)</p>	<p>4. Restricted Delivery? (Extra Fee) <input type="checkbox"/> Yes</p> <p>7012 3460 0003 6878 1118</p>

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Sender: Please print your name, address, and ZIP+4® in this box®

TOWN OF NORTH TOPSAIL BEACH  
2008 LOGGERSHEAD COURT  
NORTH TOPSAIL BEACH, NC 28460

First-Class Mail  
Postage & Fees Paid  
USPS  
Permit No. G-10



UNITED STATES POSTAL SERVICE  
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Sender: Please print your name, address, and ZIP+4® in this box®

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2008 LOGGERSHEAD COURT  
NORTH TOPSAIL BEACH, NC 28460

First-Class Mail  
Postage & Fees Paid  
USPS  
Permit No. G-10



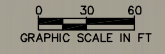
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07 OCT 2014 PM

045286



**NOTES:**

1. DATE OF AERIAL PHOTOGRAPHY: OCTOBER 5, 2014.
2. COORDINATES ARE IN FEET BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM OF 1983 (NAD83).
3. ELEVATIONS ARE IN FEET REFERENCED TO NORTH AMERICAN VERTICAL DATUM, 1988 (NAVD88).
4. FIRST LINE OF STABLE NATIVE VEGETATION (FLSNV) WAS STAKED BY A FIELD REPRESENTATIVE OF THE (NCDCM) NORTH CAROLINA DIVISION OF COASTAL MANAGEMENT.
5. PRE DREDGE MEAN HIGH WATER LINE SURVEYED BY MARINEX NOV. 16, 2012 MULTIPLE SURVEYS USED TO CAPTURE MHW POSITIONS.



**LEGEND:**

	FIRST LINE OF STABILIZED NATIVE VEGETATION (FLSNV) OCTOBER 3, 2012
	PRE CONSTRUCTION (MHW) MEAN HIGH WATER NOVEMBER 2012
	AREA TO BE DISTURBED BY CONSTRUCTION ACTIVITIES
	EMERGENCY SAND TUBE REVETMENT FOOTPRINT

**COASTAL PLANNING & ENGINEERING**  
of North Carolina, INC.

4038 MASONBORO LOOP RD.  
WILMINGTON, NC 28409  
PH (910) 791-9494  
FAX (910) 791-4129

No.	Date	Description

Reference Files:	Checked by: AMB	Reviewed by: AP	Submitted by: JTJ
Designed by: AP	Drawn by: --	Date: 10/27/14	Comm. No.: 148108
Plot Scale: PAS NOTED			

**NORTH TOPSAIL BEACH, NC**  
**NORTH END SAND BAG REVETMENT PROJECT**  
**TEMPORARY SAND BAG REVETMENT**  
**LOCATION PLAN**

DRAWING NO.  
**PV-1**

SHEET 3 OF 5

C:\North Carolina\North Topsail Beach\150841\_Sand Tube Revetment\04\14\10\10-28\_PV.dwg - Oct 28, 2014 @ 9:35am - Gary Kristofsky





North Carolina Department of Environment and Natural Resources  
Division of Coastal Management

Pat McCrory  
Governor

John E. Skvarla, III  
Secretary

MEMORANDUM:

TO: Jonathan Howell, DCM Assistant Major Permits Coordinator

FROM: Jessi Baker, DCM Fisheries Resource Specialist *JOB*

SUBJECT: Town of North Topsail Beach MODIFIED Sandbag Revetment, Onslow County, NC

DATE: October 23, 2014

A North Carolina Division of Coastal Management (DCM) Fisheries Resource Specialist has reviewed the subject permit application for proposed actions that impact fish and fish habitats. The applicant proposes to install a large sandbag revetment on the beach in front of structures on the Northern end of the island. The total revetment will be approximately 1,500 feet long, up to 10 feet tall, and 45 feet wide.

The intertidal beach zone supports an important prey source for various fishes (ex. red drum and flounder) as well as providing forage, nursery, and refuge areas for species such as kingfish and pompano. Oceanfront shoreline armoring is well documented to degrade beach surf zones by effecting erosion rates and sediment grain size which can result in a much narrower surf zone, increased turbidity, and a reduced abundance and diversity of benthic macroinvertebrates (Deaton et al. 2010, Defeo et al. 2009, and Pilkey and Wright 1988).

The placement of a shore-parallel, hardened structure like a large sandbag revetment on an eroding oceanfront beach has a high likelihood of resulting in significant losses of swash zone fish habitat. Ultimately, erosive processes could undermine the structure itself, resulting in compromised infrastructure, including sewer systems which would further degrade the surf zone habitat. For these reasons, use of shore-parallel, hardened structures are likely to result in significant adverse impacts to surf zone fish habitat.

Please feel free to contact Jessi Baker at (252) 808-2808 ext. 213 or [jessi.baker@ncdenr.gov](mailto:jessi.baker@ncdenr.gov) if you have any further questions or concerns.

References

- Deaton, A.S., W.S. Chappell, K. Hart, J. O'Neal, B. Boutin. 2010. North Carolina Coastal Habitat Protection Plan. North Carolina Department of Environment and Natural Resources. Division of Marine Fisheries, NC. 639 pp.
- Pilkey, O. H. and H.L. Wright. 1988. Seawalls versus beaches. *Journal of Coastal Research* SI(4): 41-64.
- Defeo, P. K., D.S. Schoeman, J. D. T.A. Schlacher, A. Jones, M. Lastra, and F. Scapini. 2009. Threats to sand beach ecosystem: A review. *Estuarine, Coastal and Shelf Science* 89(1-2): 1-12.



North Carolina Department of Environment and Natural Resources

Pat McCrory  
Governor

John E. Skvarla, III  
Secretary

October 3, 2014

**Division of Coastal Management**

**MEMORANDUM:**

**TO:** Jessi Baker  
Fisheries Resource Specialist  
Division of Coastal Management

**FROM:** Jonathan Howell, NC DENR-DCM Assistant Major Permits Coordinator  
400 Commerce Avenue, Morehead City, NC 28557 **(Courier 11-12-09)**

**SUBJECT:** CAMA / Dredge & Fill Application Review

**Applicant:** ***Town of North Topsail Beach***  
***Modified Phase 1 Emergency Sandbag Revetment***

**Project Location:** *along the oceanfront beach from 2276 to 2382 New River Inlet Drive, adjacent to the Atlantic Ocean, in North Topsail Beach, Onslow County*

**Proposed Project:** *to install a large sandbag revetment (+/-1500 linear ft.) to protect the residential structures located along the north end of Topsail Island*

Please indicate below your agency's position or viewpoint on the proposed project and **return this form to Jonathan Howell** at the address above by **October 29, 2014**. If you have any questions regarding the proposed project, contact Jason Dail at (910)796-7221 when appropriate, in depth comments with supporting data is requested.

- REPLY:** \_\_\_\_\_ This agency has no objection to the project as proposed.
- \_\_\_\_\_ This agency has no comment on the proposed project.
- \_\_\_\_\_ This agency approves of the project only if the recommended changes are incorporated. See attached.
- X \_\_\_\_\_ This agency objects to the project for reasons described in the attached comments.

**SIGNED** Jessi Baker **DATE** 10/23/14

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**DIVISION OF COASTAL MANAGEMENT  
FIELD INVESTIGATION REPORT**

1. **APPLICANT'S NAME:** Town of North Topsail Beach – “Phase I Emergency Sandbag Revetment” - **Modified**
2. **LOCATION OF PROJECT SITE:** The project site is located along the oceanfront beach from 2276 to 2382 New River Inlet Drive, adjacent to the Atlantic Ocean, in North Topsail Beach, Onslow County.

**Photo Index – 2006:** 28-(6497): Oceanfront & Inlet

**2000:** 28-(391): Oceanfront & Inlet

**1995:** 28-(379): Oceanfront & Inlet

**State Plane Coordinates – GPS File:** P111811B X: 2449610 Y: 256997

**Lat.:** 34°31'29.15"N **Long:** 77°20'47.98"W

3. **INVESTIGATION TYPE:** CAMA / D&F
4. **INVESTIGATIVE PROCEDURE: Dates of Site Visit –** Multiple visits between Jan. 2013 and September 2014  
**Was Applicant Present –** Yes
5. **PROCESSING PROCEDURE: Application Received –** Complete 10/3/14 (with exceptions)  
**Office –** Wilmington

6. **SITE DESCRIPTION:**

- (A) **Local Land Use Plan –** Town of North Topsail Beach  
**Classification From LUP –** No Classification / Developed
- (B) **AEC(s) Involved:** OH, IH
- (C) **Water Dependent:** Yes
- (D) **Intended Use:** Private/Government
- (E) **Wastewater Treatment: Existing –** Municipal Sewer  
**Planned –** N/A
- (F) **Type of Structures: Existing –** Commercial and Residential structures and access-ways  
**Planned –** Sand bag revetment
- (G) **Estimated Annual Rate of Erosion:** 2'/year **Source –** LTAASCR 2011 Update

7. **HABITAT DESCRIPTION:**

	[AREA]		
	DREDGED	FILLED	OTHER
(A) Vegetated Wetlands (coastal)	N/A	N/A	N/A
(B) Non-Vegetated Wetlands - open water	N/A	~2,300 sq. ft. (sand bags placed on beach)	N/A
(C) Other (Highground)	N/A	~65,200 sq. ft. (sand bags placed on beach)	~5.0 acres (217,800 sq. ft., sand removed from spit)
*N/A – Not applicable			

(D) **Total Area Disturbed:** 6.54 acres (285,300 sq. ft.)

(E) **Primary Nursery Area:** No

(F) **Water Classification:** SA **Open:** NO

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8. **PROJECT SUMMARY:** The applicant is proposing to install a large sandbag revetment from 2276 to 2382 New River Inlet Road (+/- 1,500 linear feet), to protect the residential structures located along the north end of Topsail Island.

## 9. PROJECT DESCRIPTION:

**This CAMA major permit application is a modified version of the CAMA major permit application that was submitted in August 2014 and circulated on, or around August 28, 2014, for the installation of a revetment structure (i.e. “Geo-tube”) along the northern end of North Topsail Beach. The information presented in this application package still includes the installation of a sand bag revetment in the same general area as the “Geo-tube” project; however, this proposal includes the installation of traditional sand bags, in lieu of the large Geo-tube(s). The relative information of the new project is described below.**

The project site is located in North Topsail Beach, specifically between 2276 and 2382 New River Inlet Road, adjacent to the Atlantic Ocean, in Onslow County. To get to the site from Wilmington take US HWY 17 N to NC Hwy 210, which is located at the Lowe’s Home Improvement on US HWY 17. Turn right onto NC Hwy 210 and continue across the Surf City Swing Bridge. Take a left at the first street N. New River Drive (NC Hwy 210). Continue on NC Hwy 210 until you reach the New River Inlet Road (approximately 8.15miles). Turn right onto New River Inlet Road and continue to the far end. Turn left at the stop sign and the project area will be located on the right hand side of the road, just north of the Topsail Reef Condominium complex. The project area would span from the north side of the Topsail Reef Condos, north to the property identified by the Onslow County Tax office as 2382 New River Inlet Road. The current elevation of the project area ranges from approximately 6’ NAVD to approximately 8’ NAVD. The project site is adjacent to commercial (condos) and residential properties. The project site is bordered by New River Inlet to the north, the Atlantic Ocean to the East and commercial and residential properties to the south and west. The high ground portion of the property is primarily un-vegetated with the exception of lawn grasses and ornamental landscaping around the existing homes.

The Annual erosion rate in the project area is 2’/year per the Division of Coastal Management’s 2011 Annual Erosion Rate maps. Currently, the Town’s proposal is to install a large sandbag revetment to protect the 20 or so homes located north of the Topsail Reef Condominium complex. This particular area of North Topsail Beach has experienced “accelerated erosion” within the past 12-15 months and the shoreline is progressively receding. Of the 20 or so properties included in this permit request, roughly 15 are considered “imminently threatened”, or have an erosion escarpment within twenty (20) feet of the foundation of the structure(s).

The Town of North Topsail Beach currently has an active CAMA Permit (No.79-10) that authorizes sand deposition along the entire ocean front area of North Topsail Beach. The material used for this project includes excavated material from the New River Inlet Channel Re-alignment project, as well as excavation from a near-shore borrow site. To date, the Town has completed Phase I of the shoreline stabilization/channel re-alignment project, which happens to include the area for which the applicant is requesting the sandbag revetment. Permit No. 79-10 was originally issued on July 21, 2010, and later amended on June 20, 2014. The permit is scheduled to expire on June 12, 2015. Plans are underway to begin completion of Phases V of the shoreline stabilization project once the moratoriums are lifted for turtle nesting (i.e. November 15<sup>th</sup>).

The Town of North Topsail Beach Land Use Plan does not have a “dry sand beach” classification: However; the upland areas of this project are classified as Developed. The waters of the project site are classified as SA by the NC Division of Water Quality. The NC Division of Marine Fisheries has NOT designated this area of New River / Atlantic Ocean as a Primary Nursery Area, and the waters adjacent to the proposed project are CLOSED to the harvesting of shellfish.

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**PROPOSED PROJECT:**

The applicant is proposing to install approximately 1,500 linear feet of oversized sand bags from roughly 2276 New River Inlet Road to 2382 New River Inlet Road. As proposed, the sand bag revetment would adjoin, or abut, the existing temporary erosion control structure(s) located along the eastern side of Topsail Reef Condominiums and would span north, terminating at 2382 New River Inlet Road (owned by the Town of North Topsail Beach). As designed, the sand bag revetment would consist of multiple bag layers, with a base width of 45' and a crest height of 12' NAVD. The proposed sand bag structure would be similar to the existing oversized sand bag revetment located adjacent to the project site, at Topsail Reef, Buildings 1-5.

As described, traditional sandbags (i.e. each tan in color, 3'-5' in width and 7'-15' in length) would be installed along 1,500 linear feet of beach. The sand bags would abut a majority of existing homes in the area; however there are several properties just north of Topsail Reef where the bags would extend oceanward/seaward of the structures approximately 20'-30'. Along these 5-6 homes, the landward side of the proposed sandbags would be located a distance of 20'-30' away from the foundation of these structures. It is believed the intent of this orientation is to create a uniform alignment (i.e. straight line) so that the proposed bags would connect directly to the existing sand bags located at Topsail Reef. As proposed, the sand bags would be installed parallel to the shoreline, along the seaward side of the existing homes/dwellings. The sand bags would be placed atop a scour apron that would span the entire length of the project. As stated by the applicant, the sand bag revetment would be for protection of the aforementioned structures, and not for the creation of any new dune, or dune core.

Information provided by the applicant's agent (Coastal Planning and Engineering, a.k.a. CP&E) indicates that a mean high water boundary survey was performed in the vicinity of the proposed project under a contract with Bearing Point Consulting, on August 29, 2014. Based on data collected from the August 29, 2014 survey, it appears the proposed sand bag revetment (seaward toe of eastern most bags) would be placed along an alignment that would extend no more than approximately 7.1' below the mean high water line. However, it appears that additional erosion has taken place in the project area since the August 29, 2014 survey, thereby creating a larger footprint for sand bag placement below the mean high water level. Nevertheless, the applicant has accounted for approximately 2,300 sq. ft. of impacts below the mean high water line and approximately 65,200 sq. ft. of impacts above the mean high water line as a result of the installation of the proposed sand bag revetment. These numbers will likely change again prior to initiation of the project due to the tidal fluctuations and wind/wave energy in the immediate vicinity of the project.

According to the application package, site drawings and project narrative, the applicant intends to fill the sand bags with sand currently held in storage from an area north of the project site, labeled and referred to as the "spit". The spit is a broad, relatively flat, dry sand beach area that is located along the far northeast section of the island. The area is generally undisturbed, with the exception of foot traffic, and vegetation is beginning to propagate throughout. The elevation of the spit is roughly 2'-4' above the normal high water level, with a slight depression in the center. In total, the spit consists of approximately 5.0 acres of what the Town considers premium sand for shoreline protection immediately adjacent to the referenced properties. As designed, the applicant would remove approximately 12"-15" (top layer) from the spit, or approximately 10,000 cubic yards, which is what the applicant's engineer estimate is needed for the sand bags. In addition, the applicant proposes to haul in, or truck in the remaining 7,000 cubic yards of sand bag fill material from an off-site source. Any fill material trucked in and placed in the bags should be clean, compatible material of similar size, color and shape.

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**North Topsail Beach – “Phase I Emergency Sandbag Revetment” Project - MODIFIED**  
**Page Four**

As planned, the construction methodology would proceed as follows: The Town, or its contractor, would use an excavator and/or front end loader to remove the required amount of material from the spit. Once loaded, the dry sand would be placed in a “hopper” where it would be mixed with seawater (pumped from the surf zone into the hopper) to create a “slurry”. From there, the slurry would be pumped into the bags. As I understand the process, the hopper would move up and down the beach, in conjunction with the filling of the bags. In addition, the sand trucked in from the off-site borrow source would be added to the hopper and mixed together, just as the material collected from the spit.

Based on historical documentation (i.e. DCM files), it appears the applicant’s proposal would result in a sand bag revetment over/atop existing temporary erosion control structures. Our records indicate that several homes in the vicinity of the project site received sand bag permits and actually installed sandbags at these properties back in the 1990’s. Some of the sand bags still remain intact and were visible prior to the deposition of sand associated with the shoreline stabilization/channel re-alignment project.

**10. ANTICIPATED IMPACTS**

The applicant’s proposal to remove sand from the “spit” would result in the disturbance of approximately 5.0 acres of dry sand beach, from which approximately 10,000 cubic yards of material would be removed. The excavated material would be pumped into a 1,500 linear foot section of sand bags measuring approximately 45’ in base width and up to a height of 12’ NAVD. Approximately 2,300 sq. ft. (7’ x 1,500’) of material would be placed at or below the normal high water level, while approximately 65,200 sq. ft. would be placed above the elevation of normal high water. The applicant has provided a copy of the oceanside easement agreement for this project (as it corresponds to the shoreline protection project) and it appears the scope of the work is consistent with the intent of the easement agreement. Impacts to the “spit” area, as a result of project completion, are uncertain and unknown at this time. Increases in turbidity should be expected during the project; however, they should dissipate once the project is complete.

**Submitted by:** Jason Dail

**Date:** October 3, 2014

**Office:** Wilmington

RECEIVED  
OCT 07 2014  
DCM-MHD CITY

EXHIBIT 23:

**From:** Brian Edes  
**To:** Andrea O'Dell  
**Subject:** FW: Questions on North End of North Topsail Beach Permitting  
**Date:** Friday, November 07, 2014 5:03:57 PM

---

**From:** Davis, Braxton C [<mailto:Braxton.Davis@NCDENR.Gov>]  
**Sent:** Tuesday, October 21, 2014 6:17 PM  
**To:** Stuart Turille  
**Cc:** Mayor Tuman; 'Tom Leonard'  
**Subject:** RE: Questions on North End of North Topsail Beach Permltting

Mr. Turille,

Based on another site visit by staff today, we agree that site conditions have deteriorated and emergency action is warranted. The Secretary has authorized our issuance of an Emergency CAMA Major Permit for your project in accordance with NCGS 113A-118, which will terminate the public notice and adjacent property owner notification periods. The emergency permit will be conditioned upon your ability to satisfy all other state and federal permits and authorizations, and will be conditioned to only authorize a structure that conforms with the size limitations and other standards established by the Coastal Resources Commission's rules on temporary erosion control structures.

You may begin requesting an expedited CRC variance proceeding as soon as your emergency permit is issued; however, prior to your request for an expedited hearing by the CRC, I would advise you to: 1) secure all other permits and authorizations, and 2) be able to provide, if requested, a financial assurance that guarantees the Town's ability to commence with the project immediately following the issuance of a variance by the Commission.

Due to the Commission's meeting tomorrow and Thursday in Wilmington, staff may not be able to issue the emergency CAMA major permit until Friday of this week. I hope this will not cause you any delays given that you will still need to coordinate with the Corps of Engineers and any other relevant regulatory or resource agencies.

I hope that this helps. I will give you a call to discuss later – my cell phone battery just died and I am getting ready to drive to Wilmington, so I may not be able to call you until tomorrow.

Talk to you soon,  
Braxton

-----  
Braxton Davis  
Director, NC Division of Coastal Management  
400 Commerce Avenue  
Morehead City, NC 28557  
(252) 808-2808 ext. 202

Please visit [www.nccoastalmanagement.net](http://www.nccoastalmanagement.net) to subscribe to Coastal Management's quarterly newsletter, the CAMAgram.



North Carolina Department of Environment and Natural Resources

Pat McCrory  
Governor

John E. Skvarla, III  
Secretary

October 27, 2014

Town of North Topsail Beach  
2008 Loggerhead Court  
North Topsail Beach, N.C. 28460

Dear Sir or Madam:

The enclosed permit constitutes authorization under the Coastal Area Management Act, and where applicable, the State Dredge and Fill Law, for you to proceed with your project proposal. The original (buff-colored form) is retained by you and it must be available on site when the project is inspected for compliance. Please sign both the original and the copy and return the copy to this office in the enclosed envelope. Signing the permit and proceeding means you have waived your right of appeal described below.

If you object to the permit or any of the conditions, you may request a hearing pursuant to NCGS 113A-121.1 or 113-229. Your petition for a hearing must be filed in accordance with NCGS Chapter 150B with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27611-6714, (919) 733-2698 within twenty (20) days of this decision on your permit. You should also be aware that another qualified party may submit an objection to the issuance of this permit within twenty (20) days.

The project plan is subject to those conditions appearing on the permit form. Otherwise, all work must be carried out in accordance with your application. Modifications, time extensions, and future maintenance requires additional approval. Please read your permit carefully prior to starting work and review all project plans, as approved. If you are having the work done by a contractor, it would be to your benefit to be sure that he fully understands all permit requirements.

From time to time, Department personnel will visit the project site. To facilitate this review, we request that you complete and mail the enclosed Notice Card just prior to work initiation. However, if questions arise concerning permit conditions, environmental safeguards, or problem areas, you may contact Department personnel at any time for assistance. By working in accordance with the permit, you will be helping to protect our vitally important coastal resources.

Sincerely,

Douglas V. Huggett  
Major Permits and Consistency Manager

Enclosure



Permit Class  
**EMERGENCY**

Permit Number  
**92-14**

STATE OF NORTH CAROLINA  
Department of Environment and Natural Resources  
and  
Coastal Resources Commission

# Permit

for

- Major Development in an Area of Environmental Concern  
pursuant to NCGS 113A-118
- Excavation and/or filling pursuant to NCGS 113-229

Issued to Town of North Topsail Beach, 2008 Loggerhead Court, North Topsail Beach, NC 28460

Authorizing development in Onslow County at Atlantic Ocean from 2276 to 2382 New River  
Inlet Road, as requested in the permittee's application dated 9/26/14, including the attached workplan  
drawings (3), Figures 1-3 of 3 all dated received in the MHC office on 10/7/14 and AEC Hazard Notice dated 10/2/14.

This permit, issued on October 24, 2014, is subject to compliance with the application (where consistent  
with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may  
be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

- 1) In keeping with 15A NCAC 07H.0308(a)(2)(K) of the rules of the Coastal Resources Commission, the base width of the authorized temporary erosion control structure shall not exceed 20 feet, and the height shall not exceed six feet.
- 2) No portion of the authorized temporary erosion control structure shall be located more than 20 feet waterward of the imminently threatened structure.

(See attached sheet for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

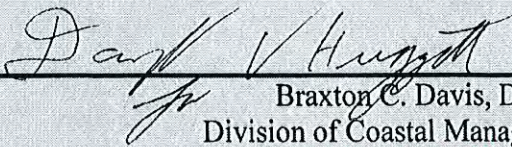
Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

December 31, 2017

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.

  
\_\_\_\_\_  
Braxton C. Davis, Director  
Division of Coastal Management

This permit and its conditions are hereby accepted.

RECEIVED  
DOM WILMINGTON, NC

OCT 27 2014

\_\_\_\_\_  
Signature of Permittee

**ADDITIONAL CONDITIONS**

- 3) Sandbags used to construct the temporary erosion control structures shall be tan in color and three to five feet wide and seven to 15 feet long when measured flat.

**NOTE:** The configuration of the individual sandbags may vary from that shown on the attached workplan drawings, so long as the dimensions, alignment, and size requirements of Conditions 2, 3, and 4 of this permit are not exceeded.

- 4) Soldier pilings and other types of devices to anchor the sandbags shall not be allowed.
- 5) Sand used to backfill the sandbags shall be of the same general characteristics as the sand in the area in which the material is to be placed. In order to ensure compliance with this requirement, the permittee shall coordinate the location of the backfill borrow source with a representative of the Division of Coastal Management prior to initiation of any backfilling activities.
- 6) The temporary erosion control structures may remain in place for up to eight years from October 24, 2014.
- 7) Once the temporary erosion control structure is determined to be unnecessary due to relocation or removal of the threatened structure, a storm protection project, a beach nourishment project or an inlet relocation project, it shall be removed by the permittee within 30 days of official notification by the Division of Coastal Management regardless of the time limit placed on the temporary erosion control structure. However, removal of the authorized temporary erosion control structures shall not be required if they are covered by dunes with stable and natural vegetation.
- 8) If the temporary erosion control structure becomes damaged, the permittee shall be responsible for the removal of remnants of all portions of the structure(s).
- 9) There is the potential that work may occur during the sea turtle nesting window which runs from 01 May to 15 November, or until the last known nest has hatched. To reduce the potential for any unintended impacts to nesting sea turtles and their nests, should any work take place during the sea turtle nesting window, the NC Wildlife Resources Commission requests that the work be expedited to the greatest extent possible. All work should be conducted during the daytime only and only begin after qualified sea turtle monitors have evaluated the project area for any potential sea turtle nesting activities.
- 10) The permittee and/or his or her contractor shall meet with a representative of the Division prior to project initiation.

**NOTE:** This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required, including but not limited a permit from the US Army Corps of Engineers.

**NOTE:** Future development of the permittee's property may require a modification of this permit. Contact a representative of the Division at (910) 796-7215 prior to the commencement of any such activity for this determination.

RECEIVED  
DWM/VLM/MSB/NC

OCT 27 2014

STATE OF NORTH CAROLINA  
 Department of Environmental and Natural Resources  
 127 Cardinal Drive Extension  
 Wilmington, North Carolina 28405  
 (910) 796-7215

FILE ACCESS RECORD

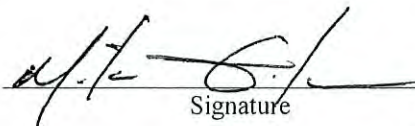
**DIVISION OF COASTAL MANAGEMENT**

DATE / TIME \_\_\_\_\_ 10/29/14 1:30-2:30 pm \_\_\_\_\_  
 NAME \_\_\_\_\_ Mike Giles \_\_\_\_\_  
 REPRESENTING \_\_\_\_\_ Coastal Federation \_\_\_\_\_  
 PHONE \_\_\_\_\_ 910-231-6687 \_\_\_\_\_

Guidelines for Access: The staff of Wilmington Regional Office is dedicated to making public records in our custody readily available to the public for review and copying. We also have the responsibility to the public to safeguard these records and to carry out our day-to-day program obligations. Please read carefully the following guidelines signing the form:

1. CAMA Major Permits are issued out of the Morehead City District Office. The COMPLETE file is in the Morehead Office and may contain additional information and/or comments which may not be in the WIRO file.
2. Due to the large public demand for file access, we request that you call at least a day in advance to schedule an appointment to review the files. **Appointments will be scheduled between 9:00am and 3:00pm.** Viewing time ends at 4:45pm. **Anyone arriving without an appointment may view the files to the extent that time and staff supervision is available.**
3. You must specify files you want to review by facility name. The number of files that you may review at one time will be limited to five.
4. You may make copies of a file when the copier is not in use by the staff and if time permits. Cost per copy is \$.05 cents. **Payment may be made by check, money order, or cash at the reception desk. Copies totaling \$5.00 or more can be invoiced for your convenience.**
5. **FILES MUST BE KEPT IN ORDER YOU FOUND THEM.** Files may not be taken from the office. To remove, alter, deface, mutilate, or destroy material in one of these files is a misdemeanor for which you can be fined up to \$500.00. **No briefcases, large totes, etc. are permitted in the file review area.**
6. In accordance with General Statue 25-3-512, a \$25.00 processing fee will be charged and collected for checks on which payment has been refused.

	<u>FACILITY NAME</u>	<u>COUNTY</u>
1.	_____ North Topsail Beach, emer. Sandbags MP 92-14 _____	_____ Onslow Co _____
2.	_____	_____
3.	_____	_____
4.	_____	_____


 \_\_\_\_\_ 10/29/14 \_\_\_\_\_ 1:30 \_\_\_\_\_  
 Signature Date Time In Time Out  
 COPIES MADE 19 PAID 95¢ INVOICE \_\_\_\_\_

*Town of North Topsail Beach*

Daniel Tuman, Mayor  
Tom Leonard, Mayor Pro Tem  
Aldermen:  
Suzanne Gray  
Don Harte  
Richard Macartney  
Richard Peters



Stuart Turille  
Town Manager

Carin Z. Faulkner, MPA  
Town Clerk

*Winner of 2014 Best Restored Beaches Award*

STATE OF NORTH CAROLINA  
ONSLOW COUNTY

CLERK'S CERTIFICATION

I, CARIN Z. FAULKNER, Town Clerk of the Town of North Topsail Beach, North Carolina, do hereby certify that the attached is a true and correct copy of the following:

**TOWN OF NORTH TOPSAIL BEACH  
BUDGET ORDINANCE  
FISCAL YEAR 2014-2015**

The original of which is now on file in the office of the Town Clerk of North Topsail Beach, North Carolina.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official Seal of the Town of North Topsail Beach, North Carolina, this the 14<sup>th</sup> day of November 2014.

Carin Z. Faulkner  
Town Clerk



(SEAL)

<p><b>TOWN OF NORTH TOPSAIL BEACH</b>  <b>BUDGET ORDINANCE</b>  <b>FISCAL YEAR 2014-2015</b></p>
--

**BE IT ORDAINED** by the Governing Board of the Town of North Topsail Beach, North Carolina:

**GENERAL FUND**

**SECTION 1:** The following amounts are hereby appropriated in the General Fund for the operation of the Town government and its activities for the fiscal year beginning July 1, 2014, and ending June 30, 2015, in accordance with the chart of accounts heretofore established for this Town:

**Appropriations**

GOVERNING BODY	\$107,152
ADMINISTRATION	430,422
POLICE DEPARTMENT	976,230
PLANNING & ZONING	101,324
BUILDING INSPECTIONS	130,844
PUBLIC WORKS	241,377
STREETS	127,500
PUBLIC BUILDINGS & GROUNDS	125,300
SANITATION COLLECTIONS	384,988
RECREATION	55,000
ELECTIONS, SALES TAX PAYOUT & COMMITTEES	4,500
TRANSFER	0
CONTINGENCY	0
INSURANCE	151,474
FIRE DEPARTMENT	<u>710,180</u>
	<b>\$3,546,291</b>

**SECTION 2:** It is estimated that the following revenues will be available in the General Fund for the fiscal year July 1, 2014, and ending June 30, 2015:

**Revenues**

STATE	\$ 982,000
TOWN	130,209
PROPERTY TAX	1,927,651
REFUSE	345,488
INTEREST	16,000
TRANSFER IN	141,943
GRANTS	<u>3,000</u>
FUND	<b>\$3,546,291</b>

*CJA*

**SECTION 3:**

There is hereby levied a tax at the rate of \$.3932 (\$.2361 General Fund and \$.1571 Beach Nourishment Fund) per one hundred dollars (\$100) valuation of property as listed for taxes as of January 1, 2011, for the purpose of raising the revenue listed as "Ad Valorem Taxes" in the General Fund in Section 2 of this ordinance. This rate is based on a total estimated valuation of property for the purposes of taxation of \$818,453,300 and an estimated rate of collection of 97.57 percent.

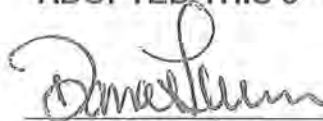
**SECTION 4:** The Town Manager is hereby authorized to transfer appropriations as contained herein under the following conditions:

- (A) Town Manager may transfer amounts between line-item expenditures within a department without limitation and without a report being required.
- (B) Town Manager may transfer amounts up to \$500 between functional areas, within the same fund. He/she must make an official report on such transfers at the next regular meeting of the Governing Board.
- (C) Town Manager may not transfer any amounts between funds, except as approved by the Governing Board in the budget ordinance as amended.
- (D) Contracts in excess of \$40,000 shall first be approved by Board of Aldermen. The Town Manager has authority for execution under that amount, and must be a budgeted item.


**SECTION 5:** The attached Schedule of Fees is hereby adopted for the fiscal year beginning July 1, 2014, and ending June 30, 2015. These fees may be amended during the fiscal year by Board action.

**SECTION 6:** Copies of the budget ordinance shall be furnished to the Clerk to the Governing Board and to the Town Manager and Finance Officer to be kept on file by them to be used in the execution of their duties regarding the disbursement of funds.

ADOPTED THIS 5<sup>th</sup> DAY OF JUNE, 2014.



Daniel Tuman, Mayor



Carin Z. Faulkner, Town Clerk

**EXHIBIT 12: Total Assessed Taxable Value-North End Properties**

Parcel ID	Total Taxable Assessed Value - Onslow County Tax Office
027899	\$ 367,650.00
044407	\$ 266,540.00
028000	\$ 291,590.00
044408	\$ 266,980.00
033556	\$ 256,580.00
035832	\$ 317,110.00
044410	\$ 276,670.00
002201	\$ 258,620.00
002202	\$ 234,590.00
002200	\$ 288,320.00
002199	\$ 205,440.00
002198	\$ 231,480.00
002197	\$ 230,980.00
002196	\$ 245,060.00
002195	\$ 233,710.00
042613	\$ 206,740.00
002194	\$ 215,670.00
015866	\$ 279,760.00
042612	\$ 269,870.00
015864	\$ 207,310.00
042746	\$ 215,330.00
008559	\$ 239,220.00
033884	\$ 250,290.00
010292	\$ 217,260.00
042745	\$ 210,600.00
034795	\$ 198,050.00
018022	\$ 232,190.00
041856	\$ 228,090.00
030654	\$ 207,270.00
034334	\$ 192,640.00
005654	\$ 211,520.00
042744	\$ 211,810.00
001574	\$ 217,760.00
034336	\$ 211,940.00
034337	\$ 201,090.00
001572	\$ 208,580.00
001571	\$ 206,210.00
034338	\$ 221,750.00
<b>TOTAL</b>	<b>\$ 9,032,270.00</b>

*Town of North Topsail Beach*

Daniel Tuman, Mayor  
Tom Leonard, Mayor Pro Tem  
Aldermen:  
Suzanne Gray  
Don Harte  
Richard Macartney  
Richard Peters



Stuart Turille  
Town Manager  
Carin Z. Faulkner, MPA  
Town Clerk

STATE OF NORTH CAROLINA  
ONSLOW COUNTY

CLERK'S CERTIFICATION

I, CARIN Z. FAULKNER, Town Clerk of the Town of North Topsail Beach, North Carolina, do hereby certify that the attached is a true and correct copy of the following:


**RESOLUTION 2014-13** - Preliminary Assessment Resolution  
Beach Erosion Control and Flood and Hurricane Protection Works  
North End Sand Bag Revetment

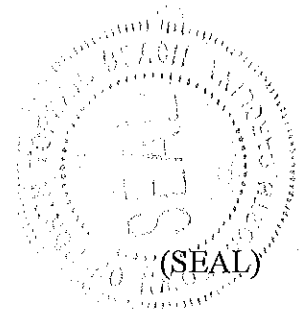
**RESOLUTION 2014-16** - Assessment Resolution  
Beach Erosion Control and Flood and Hurricane Protection Works  
North End Sand Bag Revetment

**EXCERPT FROM BOARD OF ALDERMEN REGULAR MEETING MINTUES**  
November 6, 2014 (Draft – not approved yet)  
Public Hearing – Preliminary Assessment Resolution for Beach  
Erosion and Flood and Hurricane Protection Works, North End  
Sand Bag Revetment

The original of which is now on file in the office of the Town Clerk of North Topsail Beach, North Carolina.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official Seal of the Town of North Topsail Beach, North Carolina, this the 12<sup>th</sup> day of November 2014.

  
\_\_\_\_\_  
Carin Z. Faulkner  
Town Clerk





*Town of North Topsail Beach*

Daniel Tuman, Mayor  
Tom Leonard, Mayor Pro Tem  
Aldermen:  
Suzanne Gray  
Don Harte  
Richard Macartney  
Richard Peters



Stuart Turille  
Town Manager  
Carin Z. Faulkner, MPA  
Town Clerk

**RESOLUTION 2014-13**

**PRELIMINARY ASSESSMENT RESOLUTION**

**BEACH EROSION CONTROL AND FLOOD AND HURRICANE PROTECTION WORKS  
NORTH END SAND BAG REVETMENT PROJECT**

**WHEREAS**, the area north of the Topsail Reef Condominiums in North Topsail Beach has experienced inordinate erosion and has placed homes and public infrastructure north of Topsail Reef in imminent danger requiring interim erosion response measures until such time the New River Inlet can be maintained and the relocated channel begins to have a positive impact on the condition of the shoreline; and

**WHEREAS**, the Town of North Topsail Beach intends to undertake a sand bag revetment project on the north end of Topsail Island to provide temporary erosion protection for the residential ocean front structures north of the Topsail Reef Condominiums and to provide some flood protection to a portion of New River Inlet Road north of Port Drive; and

**WHEREAS**, the proposed sand bag revetment would begin at the existing "super-sized" sand bag revetment at Building #1 of the Topsail Reef Condominiums and extend 1,450 feet parallel to the existing shoreline and a 50-foot return wall would extend landward from the north end of the sand bag structure just north of the home located at 2378 New River Inlet Road; and

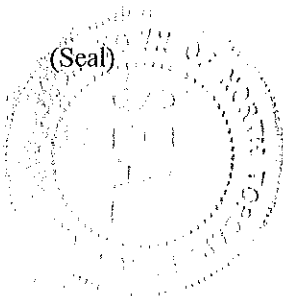
**WHEREAS**, North Carolina General Statute 160A-238 gives municipalities the authority to make special assessments against benefited property for all or part of the costs of acquiring, constructing, reconstructing, extending, or otherwise building or improving beach erosion control and flood and hurricane protection works.

**NOW, THEREFORE, BE IT RESOLVED** by the Board of Aldermen of the Town of North Topsail Beach, North Carolina:

- 1) That, in light of the threatened state of the property and infrastructure, the above mentioned Project is found to be sufficient and desirable in all respects.
- 2) As provided in North Carolina General Statute 160A-238, special assessments for beach erosion control and flood and hurricane protection works will be imposed as follows, by way of:
  - a. An assessment shall be made on the basis of frontage abutting on a beach or shoreline protected or benefited by the project, at an equal rate per foot of frontage.
  - b. The properties with frontage abutting the project that will be benefitted by the Project have been identified as properties having the Onslow County Parcel identification numbers (PARID): 027899, 044407, 028000, 044408, 044409, 033556, 035832, 044410, 002201, 002202, 002200, 002199, 002198, 002197, 002196, 002195, 042613, 002194, 015866, 042612, 015864, 042746, 008559, 033884, 010292, 042745, 034795, 018022, 041856, 030654, 034334, 005654, 042744, 001574, 034336, 034337, 001572, 001571, 034338.
  - c. The estimated high-end cost of the project is \$2.3 million.

- 3) That fifty percent (50%) of the cost of said Project will be hereafter assessed upon the properties receiving the improvements as follows:
  - a. The total cost shall be levied based upon the frontage abutting on the beach protected or benefited by the project, at an equal rate per foot of frontage per N.C.G.S. 160A-238.
  - b. The Town will assess fifty percent (50%) of the cost of the project. This assessment will be assessed to the property owners in five (5) annual installments.
  - c. The "Assessment Roll" will be prepared identifying owners of those properties with frontage abutting the Project in compliance with N.C.G.S. 160A-227, briefly describing their lot, parcel or tract of land assessed, the basis for the assessment, the amount of each assessment, the terms of payment, and any discounts.
  - d. Interest shall be set at three and one-half percent (3.5%) per annum.
  - e. The assessed property owner has the option to pay all of their total assessment in one (1) payment without incurring interest. This payment must be paid within 30 days after the publication of the notice that the Assessment Roll has been confirmed.
- 4) That because of the emergency nature of the project, *none* of the assessments for the properties with frontage abutting on the Project described herein shall be held in abeyance.
- 5) That the assessments for the properties with frontage abutting on the Project provided herein shall be payable based upon one of the following methods;
  - a. In cash; or
  - b. If any property owner shall so elect and give notice of the fact to the Board of Aldermen in accordance with Chapter 160A, Sections 232 and 233 of the General Statutes of North Carolina, he shall have the option and privilege of paying the assessment in five (5) equal annual installments, said installments to bear interest at the rate of three and one-half percent (3.5%) per annum, upon confirmation and publication of the assessment roll.
- 6) That a Public Hearing on the matters covered in this preliminary resolution shall be held at the next regular meeting of the Board of Aldermen on **November 6, 2014 at 6:30 p.m.** in the Town Hall Meeting Room located at 2008 Loggerhead Court North Topsail Beach, N.C. 28460, which is three weeks from the date of the adoption of this resolution.

Adopted this the 15<sup>th</sup> day of October 2014.



Handwritten signature of Daniel Tuman in black ink.

Daniel Tuman, Mayor

ATTEST:

Handwritten signature of Carin Z. Faulkner in black ink.

Carin Z. Faulkner, Town Clerk

Handwritten initials "CF" in the bottom right corner.

*Town of North Topsail Beach*

Daniel Tuman, Mayor  
Tom Leonard, Mayor Pro Tem  
Aldermen:  
Suzanne Gray  
Don Harte  
Richard Macartney  
Richard Peters



Stuart Turille  
Town Manager

Carin Z. Faulkner, MPA  
Town Clerk

**RESOLUTION 2014-16**

**ASSESSMENT RESOLUTION**

**BEACH EROSION CONTROL AND FLOOD AND HURRICANE PROTECTION WORKS  
NORTH END SAND BAG REVETMENT PROJECT**

**WHEREAS**, the area north of the Topsail Reef Condominiums in North Topsail Beach has experienced inordinate erosion and has placed homes and public infrastructure north of Topsail Reef in imminent danger requiring interim erosion response measures until such time the New River Inlet can be maintained and the relocated channel begins to have a positive impact on the condition of the shoreline; and

**WHEREAS**, the Town of North Topsail Beach intends to undertake a sand bag revetment project on the north end of Topsail Island to provide temporary erosion protection for the residential ocean front structures north of the Topsail Reef Condominiums and to provide some flood protection to a portion of New River Inlet Road north of Port Drive; and

**WHEREAS**, the proposed sand bag revetment would begin at the existing "super-sized" sand bag revetment at Building #1 of the Topsail Reef Condominiums and extend 1,450 feet parallel to the existing shoreline and a 50-foot return wall would extend landward from the north end of the sand bag structure just north of the home located at 2378 New River Inlet Road; and

**WHEREAS**, North Carolina General Statute 160A-238 gives municipalities the authority to make special assessments against benefited property for all or part of the costs of acquiring, constructing, reconstructing, extending, or otherwise building or improving beach erosion control and flood and hurricane protection works.

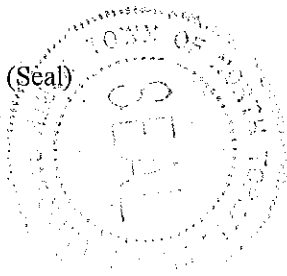
**NOW, THEREFORE, BE IT RESOLVED** by the Board of Aldermen of the Town of North Topsail Beach, North Carolina:

- 1) That, in light of the threatened state of the property and infrastructure, the above mentioned Project is found to be sufficient and desirable in all respects.
- 2) As provided in North Carolina General Statute 160A-238, special assessments for beach erosion control and flood and hurricane protection works will be imposed as follows, by way of:
  - a. An assessment shall be made on the basis of frontage abutting on a beach or shoreline protected or benefited by the project, at an equal rate per foot of frontage.
  - b. The properties with frontage abutting the project that will be benefitted by the Project have been identified as properties having the Onslow County Parcel identification numbers (PARID): 027899, 044407, 028000, 044408, 044409, 033556, 035832, 044410, 002201, 002202, 002200, 002199, 002198, 002197, 002196, 002195, 042613, 002194, 015866, 042612, 015864, 042746, 008559, 033884, 010292, 042745, 034795, 018022, 041856, 030654, 034334, 005654, 042744, 001574, 034336, 034337, 001572, 001571, 034338.
  - c. The estimated high-end cost of the project is \$2.3 million.

C/F

- 3) That fifty percent (50%) of the cost of said Project will be hereafter assessed upon the properties receiving the improvements as follows:
  - a. The total cost shall be levied based upon the frontage abutting on the beach protected or benefited by the project, at an equal rate per foot of frontage per N.C.G.S. 160A-238.
  - b. The Town will assess fifty percent (50%) of the cost of the project. This assessment will be assessed to the property owners in five (5) annual installments.
  - c. The "Assessment Roll" will be prepared identifying owners of those properties with frontage abutting the Project in compliance with N.C.G.S. 160A-227, briefly describing their lot, parcel or tract of land assessed, the basis for the assessment, the amount of each assessment, the terms of payment, and any discounts.
  - d. Interest shall be set at three and one-half percent (3.5%) per annum.
  - e. The assessed property owner has the option to pay all of their total assessment in one (1) payment without incurring interest. This payment must be paid within 30 days after the publication of the notice that the Assessment Roll has been confirmed.
- 4) That because of the emergency nature of the project, *none* of the assessments for the properties with frontage abutting on the Project described herein shall be held in abeyance.
- 5) That the assessments for the properties with frontage abutting on the Project provided herein shall be payable based upon one of the following methods;
  - a. In cash; or
  - b. If any property owner shall so elect and give notice of the fact to the Board of Aldermen in accordance with Chapter 160A, Sections 232 and 233 of the General Statutes of North Carolina, he shall have the option and privilege of paying the assessment in five (5) equal annual installments, said installments to bear interest at the rate of three and one-half percent (3.5%) per annum, upon confirmation and publication of the assessment roll.
- 6) That a Public Hearing on the matters covered in the preliminary resolution was held on **November 6, 2014 at 6:30 p.m.** in the Town Hall Meeting Room located at 2008 Loggerhead Court North Topsail Beach, N.C. 28460, which is three weeks after the date of the adoption of the preliminary resolution.

Adopted this the 6<sup>th</sup> day of November 2014.



A handwritten signature in black ink that reads "Daniel Tuman".

Daniel Tuman, Mayor

ATTEST:

A handwritten signature in black ink that reads "Carin Z. Faulkner".

Carin Z. Faulkner, Town Clerk

CZF

*Town of North Topsail Beach*

Daniel Tuman, Mayor  
Tom Leonard, Mayor Pro Tem  
Aldermen:  
Suzanne Gray  
Don Harte  
Richard Macartney  
Richard Peters



Stuart Turille  
Town Manager  
Carin Z. Faulkner, MPA  
Town Clerk

*Winner of 2014 Best Restored Beaches Award*

**Board of Aldermen  
Regular Meeting  
Minutes  
Thursday, November 6, 2014  
6:30 P.M.\***

**PRESENT:** Mayor Daniel Tuman, Mayor Pro Tem Tom Leonard, Aldermen Suzanne Gray, Don Harte, Richard Macartney and Richard Peters, Town Attorney Brian Edes, Town Manager Stuart Turille and Town Clerk Carin Faulkner.

- I. **CALL TO ORDER:** Mayor Tuman called the meeting to order at 6:30 p.m.
- II. **INVOCATION:** Mayor Tuman gave the invocation.
- III. **PLEDGE OF ALLEGIANCE:** Mayor Tuman led those present in the Pledge of Allegiance.
- IV. **APPROVAL OF AGENDA:**
  - Mayor Pro Tem Leonard made a motion to approve the agenda with the addition of a Closed Session per NCGS 143-318.11 (3) to consult with the Town Attorney.
  - Alderman Peters seconded the motion to approve the amended agenda.
  - The motion passed unanimously.
- V. **PUBLIC HEARINGS & PRESENTATIONS:**
  - A. **Public Hearing – Preliminary Assessment Resolution for Beach Erosion Control and Flood and Hurricane Protection Works, North End Sand Bag Revetment Project:**
    - Mr. Turille introduced this item and made a presentation (Attachment A).
    - Mayor Pro Tem Leonard made a motion to open the public hearing. Alderman Gray seconded the motion. The motion passed unanimously.

\*There are attachments to these minutes.

Citizens made the following comments:

**Cinda Sullivan of 2344 New River Inlet Road** - Ms. Sullivan made comments in favor of the sand bag project. She said she is willing to pay the assessment to save her home. She loves her house and wants to keep her house. She said it is fortunate that the Town is pitching in. She said that individually, the homeowners cannot save one house, not one.

**John Matthews of 2376 New River Inlet Road** - Mr. Matthews said he has lived here for 17 years and has seen a lot of erosion. He commented that there is not much time left for the houses. He described the amount of sand lost under his house. He said that there are alternatives to waiting on the variance, such as the Town declaring a State of Emergency. He said that the Town should consider this, that the state will pay up to 75% of the cost. He said he thinks that this situation falls in the category of an emergency. He said that he appreciates what the Town has done and that the property owners there have spent a lot of money reconstructing. He said there is just not any time left.

**Fred Burns of 2378 New River Inlet Road** - Mr. Burns said he agreed with Mr. Matthews. He expressed concern about the design of the sand bag revetment and thinks that the water is going to go around the revetment and affect the road and houses nearby. He thinks that the revetment might speed up the water movement toward the north end. He quoted some previous comments made by Mr. Robert Neal, an engineer with CP&E, which were favorable to the design of the channel realignment and its effectiveness. He said he thinks the Town needs to think about what it is doing before it spends millions again. He thinks the engineers of the inlet realignment should be held liable as an engineer who designs a building that falls down should be held liable.

**Cynthia Wiford of 2368 New River Inlet Road** - Ms. Wiford thanked the Board, she said that the Board has been supportive of the property owners and have worked hard to help them save their houses. She said that this is an emergency; there is no doubt about it. She supports the idea of declaring a state of emergency. She described what she has gone through to protect her home and said that she is lucky that she knows people that can help her with it. She said the houses are sinking and that it's just a matter of a storm or two. She said we are all here because of the beach, every property owner is here because of the beach. She asked the Board to consider a graduated assessment that includes not just the oceanfront property owners. She said she does not know how much more the oceanfront owners can stand. She said if the road goes the Town will lose money. She asked the Board to reconsider who pays and how much to make it fair. She also expressed that the new beach in front of their houses is now State land and they don't own it anymore, she said the Town should repair it since they have lost the rights to it.

**Frances Krusheluisky of 2276 New River Inlet Road** - Ms. Krushelnisky said that she lives further south of some of the other homes but described the cables and wires that are now becoming exposed near her home and it is now a safety issue. She said that she has owned the home since 2001 so she used to have a row of houses in front of her. She said she agrees with the state of emergency. She said that the timeline that the Town Manager presented is not fast enough. She said when people come to the north end and see what it looks like they are shocked.

- Alderman Gray made a motion to close the public hearing. Mayor Pro Tem Leonard seconded the motion. The motion passed unanimously.
- There was discussion about the resolution, the uniqueness and urgency of the situation, and about whether the Mayor should declare a State of Emergency.
- Mr. Edes said given the legal hurdles for the variance, he advises that if the Town decides to declare a State of Emergency that it is not in lieu of the sand bag project. He said if the resolution passes tonight the Town can still declare a State of Emergency.
- Mayor Tuman said he did not think the State of Emergency is going to speed up the construction of the sand bag revetment. He said that it still requires the actions of engineers, contractors, and willing bidders to start the construction and that it is still 2-3 weeks away.
- Mayor Pro Tem Leonard said that the Town needs to act on this resolution first and task Town Staff to research the State of Emergency and see what we can find out.
- Mayor Pro Tem Leonard made a motion that the North Topsail Beach Board of Aldermen adopt Resolution 2014-16, Resolution for Beach Erosion Control and Flood and Hurricane Protection Works, North End Sand Bag Revetment Project as presented (Attachment B). Alderman Harte seconded.
- There was discussion.
- The motion passed unanimously.

**B. Public Hearing – Proposed Amendment to Sec. 8.04.02 Signs that do not require a permit:**

- Mr. Edes introduced this item and read the staff report.
- Alderman Macartney made a motion to open the public hearing. Alderman Gray seconded the motion. The motion passed unanimously.
- No one came forward to speak.
- Alderman Gray made a motion to close the public hearing. Alderman Macartney seconded the motion. The motion passed unanimously.
- Alderman Macartney made a motion to adopt Ordinance 2014-11 as presented and recommended by the Planning Board. Alderman Harte seconded the motion.
- There was discussion.
- The motion failed 3 to 2 Aldermen Gray and Macartney voting in favor.
- There was discussion.
- Mayor Pro Tem Leonard made a motion to recommend that the Planning Board re-examine the sign ordinance (Sec. 8.04.02) and consider reducing the size of signs allowed from 32 square feet to 18 square feet. Alderman Harte seconded the motion.

# *Town of North Topsail Beach*

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Suzanne Gray  
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Richard Peters



Stuart Turille  
Town Manager

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Town Clerk

*Winner of 2014 Best Restored Beaches Award*

## NOTICE OF SPECIAL MEETING North Topsail Beach Board of Aldermen

Wednesday  
November 19, 2014  
5:00 P.M.

The Town of North Topsail Beach Board of Aldermen will hold a Special Meeting on Wednesday, November 19<sup>th</sup> 2014 at 5:00 P.M. This meeting will be held in the Meeting Room of the North Topsail Beach Town Hall, located at 2008 Loggerhead Court, North Topsail Beach, North Carolina.

The purpose of this meeting is for the Board of Aldermen to receive recommendations on the selection of a contractor for the North End Sand Bag Revetment Project. Action may be taken at this meeting.

Contact North Topsail Beach Administration at 910.328.1349 for additional information.

Carin Z. Faulkner, Town Clerk

Posted 11/14/2014