AGENDA
PLANNING ADVISORY BOARD
SUBCOMMITTEE
INDUSTRIAL STANDARDS FOR CONSTRUCTION WITHIN A FLOODPLAIN

TUESDAY, AUGUST 16, 2016
3:00- 5:00 P.M.

PECK CENTER - RECEPTION ROOM (FRONT LOBBY)
516 S. 10TH STREET
FERNANDINA BEACH, FL 32034

1. CALL TO ORDER / ROLL CALL / DETERMINATION OF QUORUM

1.1. **PURPOSE: THIS MEETING IS HAS BEEN SET WITH THE INTENTION TO GATHER INFORMATION AND TO DISCUSS REGULATORY REQUIREMENTS AND PROFESSIONAL STANDARDS WHICH ARE SPECIFIC CONSTRUCTION OF INDUSTRIAL FACILITIES LOCATED IN A FLOODPLAIN.**

2. NEW BUSINESS

2.1. **REVIEW OF APPLICABLE FEDERAL AND STATE STANDARDS FOR DEVELOPMENT IN A FLOODPLAIN**

Question to be addressed: What is the difference between the 500 year flood zone vs. a 100- year flood zone in terms of construction standards and elevation requirements?

Maps:

- Flood zone maps may be located using the "Map Layers --> Environmental" on the Nassau County Property Appraiser's website at www.nassauflpa.com by selection the Map search option.
- https://msc.fema.gov/portal
- https://www.floodsmart.gov/floodsmart/pages/understanding_flood_maps/map_update_schedule.jsp
- https://www.floodsmart.gov/floodsmart/pages/understanding_flood_maps/understanding_flood_maps.jsp

Additional References:

- http://www.fema.gov/new-construction
- http://www.fema.gov/media-library/assets/documents/6029

2.2. **REVIEW OF ANY PROFESSIONAL STANDARDS FOR CONSTRUCTION OF INDUSTRIAL DEVELOPMENT IN A FLOOD ZONE**

2.3. **REVIEW OF THE CITY'S FLOODPLAIN MANAGEMENT ORDINANCE**

Documents:

Ordinance 2013-26_Floodplain Mgmt_ADOPTED.pdf

2.4. **REVIEW OF THE PRELIMINARY 2016 NASSAU COUNTY FLOOD INSURANCE STUDY (FIS) DATED 01/15/2016**

Documents:

2016 prelim FIS Vol 1of2 (1) Nassuae Insurance Study.pdf
2016 prelim FIS vol 2of2 Nassua Insurance Study 2.pdf

2.5. **DISCUSSION OF THE STAFF PROPOSED LDC TEXT AMENDMENTS SPECIFIC TO LAND USES WITHIN AREAS OF SPECIAL FLOOD HAZARD**

Documents:

New LDC Section 3.02.06 Land Uses within Areas of Special Flood Hazard.doc.pdf

3. **ADJOURNMENT**

All members of the public are invited to be present. Persons with disabilities requiring accommodations in order to participate in this program or activity should contact (904) 310-3115 or through the Florida Relay Services at 711 at least 24 hours in advance to request such accommodations.For information regarding this matter, please contact the Planning Department (904) 310-3135.

ORDINANCE 2013-26

AN ORDINANCE BY THE CITY COMMISSION OF FERNANDINA BEACH AMENDING THE FERNANDINA BEACH CODE OF ORDINANCES BY REPEALING CHAPTER 22, ARTICLE V SECTIONS 22-151 THROUGH 22-166 REGARDING FLOODPLAIN MANAGEMENT; ADOPTING A NEW CHAPTER 22, ARTICLE V SECTIONS 22-151 THROUGH 22-235 REGARDING FLOODPLAIN MANAGEMENT; ADOPTING FLOOD HAZARD MAPS; DESIGNATING A FLOODPLAIN ADMINISTRATOR; ADOPTING PROCEDURES AND CRITERIA FOR DEVELOPMENT IN FLOOD HAZARD AREAS AND FOR OTHER PURPOSES; AMENDING SECTION 22-29 OF THE CODE OF ORDINANCES BY ADOPTING LOCAL ADMINISTRATIVE AND TECHNICAL AMENDMENTS TO THE FLORIDA BUILDING CODE; PROVIDING FOR FISCAL IMPACT; SEVERABILITY; AND AN EFFECTIVE DATE.

WHEREAS, the Legislature of the State of Florida has, in Chapter 166, Florida Statutes, conferred upon local governments the authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Federal Emergency Management Agency has identified special flood hazard areas within the boundaries of the City of Fernandina Beach and such areas may be subject to periodic inundation which may result in loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare; and

WHEREAS, the City of Fernandina Beach was accepted for participation in the National Flood Insurance Program on January 14, 1977 and the Fernandina Beach City Commission desires to continue to meet the requirements of Title 44 Code of Federal Regulations, Sections 59 and 60, necessary for such participation; and

WHEREAS, Chapter 553, Florida Statutes, was adopted by the Florida Legislature to provide a mechanism for the uniform adoption, updating, amendment, interpretation and enforcement of a state building code, called the *Florida Building Code*; and

WHEREAS, section 553.73(5), Florida Statutes, allows adoption of local administrative amendments to the *Florida Building Code* to implement the National Flood Insurance Program; and

WHEREAS, the Fernandina Beach City Commission has determined that it is in the public interest to adopt the proposed floodplain management regulations that are coordinated with the *Florida Building Code;* and

WHEREAS, the Fernandina Beach City Commission adopted a requirement to increase the minimum elevation requirement for buildings and structures in flood hazard areas prior to July 1, 2010 and, pursuant to section 553.73(5), F.S., is formatting that requirement to coordinate with the *Florida Building Code*; and

WHEREAS, the Fernandina Beach City Commission adopted a requirement to lower the threshold for substantial improvements of buildings and structures in flood hazard areas prior to July 1, 2010 for the purpose of participating in the National Flood Insurance Program's Community Rating System and, pursuant to section 553.73(5), F.S., is formatting that requirement to coordinate with the *Florida Building Code.*

NOW, THEREFORE, BE IT ENACTED BY THE CITY COMMISSION OF THE CITY OF FERNANDINA BEACH, FLORIDA, THAT:

SECTION 1. That Chapter 22, Article V, Sections 2-151 through 2-166, Floodplain Management, of the Code of Ordinances, City of Fernandina Beach, Florida is hereby repealed in its entirety.

SECTION 2. That the Code of Ordinances, City of Fernandina Beach, Florida is hereby amended by adding Chapter 22, Article V, Sections 2-151 through 2-235, Floodplain Management which sections shall read as specifically shown in Exhibit "A" attached hereto and incorporated fully herein by its reference.

SECTION 3. That Section 22-29 of the Code of Ordinances, City of Fernandina Beach, Florida, is hereby amended to add several administrative and technical amendments to the *Florida Building Code* as permitted by Chapter 553, Florida Statutes, and as specifically shown on Exhibit "A" attached hereto and incorporated fully herein by its reference.

SECTION 4. FISCAL IMPACT. In terms of design, plan application review, construction and inspection of buildings and structures, the cost impact as an overall average is negligible in regard to the local technical amendments because all development has been subject to the requirements of the local floodplain management Ordinance adopted for participation in the National Flood Insurance Program. In terms of lower potential for flood damage, there will be continued savings and benefits to consumers.

SECTION 5. SEVERABILITY. If any section, subsection, sentence, clause, phrase of this Ordinance, or the particular application thereof, shall be held invalid by any court, administrative agency or other body with appropriate jurisdiction, the remaining sections, subsections, sentences, clauses and phrases under application shall not be affected thereby.

SECTION 6. EFFECTIVE DATE. This Ordinance shall take effect immediately upon final adoption and passage.

ADOPTED this 17th day of September, 2013.

CITY OF FERNANDINA BEACH

Sarah L. Pelican

Sarah L. Pelican
Commissioner – Mayor

ATTEST:

Kimberly Elliott Briley

Kimberly Elliott Briley
City Clerk Pro Tem

APPROVED AS TO FORM AND LEGALITY:

Tammi E. Bach
City Attorney

ORDINANCE 2013-26
EXHIBIT "A"

CHAPTER 22, ARTICLE V FLOODPLAIN MANAGEMENT

Sec. 22-151. Definitions.

(a) Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this ordinance, have the meanings shown in this section.

(b) Terms defined in the *Florida Building Code*. Where terms are not defined in this ordinance and are defined in the *Florida Building Code*, such terms shall have the meanings ascribed to them in that code.

(c) Terms not defined. Where terms are not defined in this ordinance or the *Florida Building Code*, such terms shall have ordinarily accepted meanings such as the context implies.

Alteration of a watercourse. A dam, impoundment, channel relocation, change in channel alignment, channelization, or change in cross-sectional area of the channel or the channel capacity, or any other form of modification which may alter, impede, retard or change the direction and/or velocity of the riverine flow of water during conditions of the base flood.

Appeal. A request for a review of the Floodplain Administrator's interpretation of any provision of this ordinance or a request for a variance.

ASCE 24. A standard titled *Flood Resistant Design and Construction* that is referenced by the *Florida Building Code*. ASCE 24 is developed and published by the American Society of Civil Engineers, Reston, VA.

Base flood. A flood having a 1-percent chance of being equaled or exceeded in any given year. [Also defined in FBC, B, Section 1612.2.] The base flood is commonly referred to as the "100-year flood" or the "1-percent-annual chance flood."

Base flood elevation. The elevation of the base flood, including wave height, relative to the National Geodetic Vertical Datum (NGVD), North American Vertical Datum (NAVD) or other datum specified on the Flood Insurance Rate Map (FIRM). [Also defined in FBC, B, Section 1612.2.]

Basement. The portion of a building having its floor subgrade (below ground level) on all sides. [Also defined in FBC, B, Section 1612.2.]

Coastal construction control line. The line established by the State of Florida pursuant to section 161.053, F.S., and recorded in the official records of the community, which defines that portion of the beach-dune system subject to severe fluctuations based on a 100-year storm surge, storm waves or other predictable weather conditions.

Coastal high hazard area. A special flood hazard area extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Coastal high hazard areas are also referred to as "high hazard areas subject to

high velocity wave action" or "V Zones" and are designated on Flood Insurance Rate Maps (FIRM) as Zone V1-V30, VE, or V. [Note: The FBC,B defines and uses the term "flood hazard areas subject to high velocity wave action" and the FBC, R uses the term "coastal high hazard areas."]

Design flood. The flood associated with the greater of the following two areas: [Also defined in FBC, B, Section 1612.2.]

1. Area with a floodplain subject to a 1-percent or greater chance of flooding in any year; or
2. Area designated as a flood hazard area on the community's flood hazard map, or otherwise legally designated.

Design flood elevation. The elevation of the "design flood," including wave height, relative to the datum specified on the community's legally designated flood hazard map. In areas designated as Zone AO, the design flood elevation shall be the elevation of the highest existing grade of the building's perimeter plus the depth number (in feet) specified on the flood hazard map. In areas designated as Zone AO where the depth number is not specified on the map, the depth number shall be taken as being equal to 2 feet. [Also defined in FBC, B, Section 1612.2.]

Development. Any man-made change to improved or unimproved real estate, including but not limited to, buildings or other structures, tanks, temporary structures, temporary or permanent storage of equipment or materials, mining, dredging, filling, grading, paving, excavations, drilling operations or any other land disturbing activities.

Encroachment. The placement of fill, excavation, buildings, permanent structures or other development into a flood hazard area which may impede or alter the flow capacity of riverine flood hazard areas.

Existing building and **existing structure.** Any buildings and structures for which the "start of construction" commenced before January 13, 1977 [Also defined in FBC, B, Section 1612.2.]

Existing manufactured home park or subdivision. A manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before January 13, 1977.

Expansion to an existing manufactured home park or subdivision. The preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

Federal Emergency Management Agency (FEMA). The federal agency that, in addition to carrying out other functions, administers the National Flood Insurance Program.

Flood or flooding. A general and temporary condition of partial or complete inundation of normally dry land from: [Also defined in FBC, B, Section 1612.2.]

1. The overflow of inland or tidal waters.
2. The unusual and rapid accumulation or runoff of surface waters from any source.

Flood damage-resistant materials. Any construction material capable of withstanding direct and prolonged contact with floodwaters without sustaining any damage that requires more than cosmetic

repair. [Also defined in FBC, B, Section 1612.2.]

Flood hazard area. The greater of the following two areas: [Also defined in FBC, B, Section 1612.2.]

1. The area within a floodplain subject to a 1-percent or greater chance of flooding in any year.
2. The area designated as a flood hazard area on the community's flood hazard map, or otherwise legally designated.

Flood Insurance Rate Map (FIRM). The official map of the community on which the Federal Emergency Management Agency has delineated both special flood hazard areas and the risk premium zones applicable to the community. [Also defined in FBC, B, Section 1612.2.]

Flood Insurance Study (FIS). The official report provided by the Federal Emergency Management Agency that contains the Flood Insurance Rate Map, the Flood Boundary and Floodway Map (if applicable), the water surface elevations of the base flood, and supporting technical data. [Also defined in FBC, B, Section 1612.2.]

Floodplain Administrator. The office or position designated and charged with the administration and enforcement of this ordinance (may be referred to as the Floodplain Manager).

Floodplain development permit or approval. An official document or certificate issued by the community, or other evidence of approval or concurrence, which authorizes performance of specific development activities that are located in flood hazard areas and that are determined to be compliant with this ordinance.

Floodway. The channel of a river or other riverine watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one (1) foot. [Also defined in FBC, B, Section 1612.2.]

Floodway encroachment analysis. An engineering analysis of the impact that a proposed encroachment into a floodway is expected to have on the floodway boundaries and base flood elevations; the evaluation shall be prepared by a qualified Florida licensed engineer using standard engineering methods and models.

Florida Building Code. The family of codes adopted by the Florida Building Commission, including: *Florida Building Code, Building; Florida Building Code, Residential; Florida Building Code, Existing Building; Florida Building Code, Mechanical; Florida Building Code, Plumbing; Florida Building Code, Fuel Gas.*

Functionally dependent use. A use which cannot perform its intended purpose unless it is located or carried out in close proximity to water, including only docking facilities, port facilities that are necessary for the loading and unloading of cargo or passengers, and ship building and ship repair facilities; the term does not include long-term storage or related manufacturing facilities.

Highest adjacent grade. The highest natural elevation of the ground surface prior to construction next to the proposed walls or foundation of a structure.

Historic structure. Any structure that is determined eligible for the exception to the flood hazard area requirements of the *Florida Building Code, Existing Building*, Chapter 11 Historic Buildings.

Letter of Map Change (LOMC). An official determination issued by FEMA that amends or revises an

effective Flood Insurance Rate Map or Flood Insurance Study. Letters of Map Change include:

Letter of Map Amendment (LOMA): An amendment based on technical data showing that a property was incorrectly included in a designated special flood hazard area. A LOMA amends the current effective Flood Insurance Rate Map and establishes that a specific property, portion of a property, or structure is not located in a special flood hazard area.

Letter of Map Revision (LOMR): A revision based on technical data that may show changes to flood zones, flood elevations, special flood hazard area boundaries and floodway delineations, and other planimetric features.

Letter of Map Revision Based on Fill (LOMR-F): A determination that a structure or parcel of land has been elevated by fill above the base flood elevation and is, therefore, no longer located within the special flood hazard area. In order to qualify for this determination, the fill must have been permitted and placed in accordance with the community's floodplain management regulations.

Conditional Letter of Map Revision (CLOMR): A formal review and comment as to whether a proposed flood protection project or other project complies with the minimum NFIP requirements for such projects with respect to delineation of special flood hazard areas. A CLOMR does not revise the effective Flood Insurance Rate Map or Flood Insurance Study; upon submission and approval of certified as-built documentation, a Letter of Map Revision may be issued by FEMA to revise the effective FIRM.

Light-duty truck. As defined in 40 C.F.R. 86.082-2, any motor vehicle rated at 8,500 pounds Gross Vehicular Weight Rating or less which has a vehicular curb weight of 6,000 pounds or less and which has a basic vehicle frontal area of 45 square feet or less, which is:

1. Designed primarily for purposes of transportation of property or is a derivation of such a vehicle, or
2. Designed primarily for transportation of persons and has a capacity of more than 12 persons; or
3. Available with special features enabling off-street or off-highway operation and use.

Lowest floor. The lowest floor of the lowest enclosed area of a building or structure, including basement, but excluding any unfinished or flood-resistant enclosure, other than a basement, usable solely for vehicle parking, building access or limited storage provided that such enclosure is not built so as to render the structure in violation of the non-elevation requirements of the *Florida Building Code* or ASCE 24. [Also defined in FBC, B, Section 1612.2.]

Manufactured home. A structure, transportable in one or more sections, which is eight (8) feet or more in width and greater than four hundred (400) square feet, and which is built on a permanent, integral chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term "manufactured home" does not include a "recreational vehicle" or "park trailer." [Also defined in 15C-1.0101, F.A.C.]

Manufactured home park or subdivision. A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Market value. The price at which a property will change hands between a willing buyer and a willing seller, neither party being under compulsion to buy or sell and both having reasonable knowledge of relevant facts. As used in this ordinance, the term refers to the market value of buildings and structures, excluding the land and other improvements on the parcel. Market value may be established by a qualified independent appraiser, Actual Cash Value (replacement cost depreciated for age and quality of construction), or tax assessment value adjusted to approximate market value by a factor provided by the Property Appraiser.

New construction. For the purposes of administration of this ordinance and the flood resistant construction requirements of the *Florida Building Code*, structures for which the "start of construction" commenced on or after January 13, 1977 and includes any subsequent improvements to such structures.

New manufactured home park or subdivision. A manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after January 13, 1977

Park trailer. A transportable unit which has a body width not exceeding fourteen (14) feet and which is built on a single chassis and is designed to provide seasonal or temporary living quarters when connected to utilities necessary for operation of installed fixtures and appliances. [Defined in section 320.01, F.S.]

Recreational vehicle. A vehicle, including a park trailer, which is: [Defined in section 320.01, F.S.)

1. Built on a single chassis;
2. Four hundred (400) square feet or less when measured at the largest horizontal projection;
3. Designed to be self-propelled or permanently towable by a light-duty truck; and
4. Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

Sand dunes. Naturally occurring accumulations of sand in ridges or mounds landward of the beach.

Special flood hazard area. An area in the floodplain subject to a 1 percent or greater chance of flooding in any given year. Special flood hazard areas are shown on FIRMs as Zone A, AO, A1-A30, AE, A99, AH, V1-V30, VE or V. [Also defined in FBC, B Section 1612.2.]

Start of construction. The date of issuance for new construction and substantial improvements to existing structures, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement is within 180 days of the date of the issuance. The actual start of construction means either the first placement of permanent construction of a building (including a manufactured home) on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns.

Permanent construction does not include land preparation (such as clearing, grading, or filling), the installation of streets or walkways, excavation for a basement, footings, piers, or foundations, the erection of temporary forms or the installation of accessory buildings such as garages or sheds not occupied as dwelling units or not part of the main buildings. For a substantial improvement, the actual "start of construction" means the first alteration of any wall, ceiling, floor or other structural part of a building, whether or not that alteration affects the external dimensions of the building. [Also defined in FBC, B Section 1612.2.]

Substantial damage. Damage of any origin sustained by a building or structure whereby the cost of restoring the building or structure to its before-damaged condition would equal or exceed 30 percent of the market value of the building or structure before the damage occurred. [Also defined in FBC, B Section 1612.2.]

Substantial improvement. Any repair, reconstruction, rehabilitation, addition, or other improvement of a building or structure, the cost of which equals or exceeds 30 percent of the market value of the building or structure before the improvement or repair is started. If the structure has incurred "substantial damage," any repairs are considered substantial improvement regardless of the actual repair work performed. The

term does not, however, include either: [Also defined in FBC, B, Section 1612.2.]

1. Any project for improvement of a building required to correct existing health, sanitary, or safety code violations identified by the building official and that are the minimum necessary to assure safe living conditions.
2. Any alteration of a historic structure provided the alteration will not preclude the structure's continued designation as a historic structure.

Variance. A grant of relief from the requirements of this ordinance, or the flood resistant construction requirements of the *Florida Building Code*, which permits construction in a manner that would not otherwise be permitted by this ordinance or the *Florida Building Code*.

Watercourse. A river, creek, stream, channel or other topographic feature in, on, through, or over which water flows at least periodically.

Sec. 22-152. Title. The Legislature of the State of Florida has authorized and delegated in F.S. Ch.166, the responsibility of local government units to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. The regulations in this article shall be known as the *Floodplain Management Ordinance* of the City of Fernandina Beach hereinafter referred to as "this ordinance."

Sec. 22-153. Scope. The provisions of this ordinance shall apply to all development that is wholly within or partially within any flood hazard area, including but not limited to the subdivision of land; filling, grading, and other site improvements and utility installations; construction, alteration, remodeling, enlargement, improvement, replacement, repair, relocation or demolition of buildings, structures, and facilities that are exempt from the *Florida Building Code*; placement, installation, or replacement of manufactured homes and manufactured buildings; installation or replacement of tanks; placement of recreational vehicles; installation of swimming pools; and any other development.

Sec. 22-154. Intent. The purposes of this ordinance and the flood load and flood resistant construction requirements of the *Florida Building Code* are to establish minimum requirements to safeguard the public health, safety, and general welfare and to minimize public and private losses due to flooding through regulation of development in flood hazard areas to:

1. Minimize unnecessary disruption of commerce, access and public service during times of flooding;
2. Require the use of appropriate construction practices in order to prevent or minimize future flood damage;
3. Manage filling, grading, dredging, mining, paving, excavation, drilling operations, storage of equipment or materials, and other development which may increase flood damage or erosion potential;
4. Manage the alteration of flood hazard areas, watercourses, and shorelines to minimize the impact of development on the natural and beneficial functions of the floodplain;
5. Minimize damage to public and private facilities and utilities;
6. Help maintain a stable tax base by providing for the sound use and development of flood hazard areas;
7. Minimize the need for future expenditure of public funds for flood control projects and response

to and recovery from flood events; and

8. Meet the requirements of the National Flood Insurance Program for community participation as set forth in the Title 44 Code of Federal Regulations, Section 59.22.

Sec. 22-155. Coordination with the *Florida Building Code*. This ordinance is intended to be administered and enforced in conjunction with the *Florida Building Code*. Where cited, ASCE 24 refers to the edition of the standard that is referenced by the *Florida Building Code*.

Sec. 22-156. Warning. The degree of flood protection required by this ordinance and the *Florida Building Code*, as amended by this community, is considered the minimum reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur. Flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside of mapped special flood hazard areas, or that uses permitted within such flood hazard areas, will be free from flooding or flood damage. The flood hazard areas and base flood elevations contained in the Flood Insurance Study and shown on Flood Insurance Rate Maps and the requirements of Title 44 Code of Federal Regulations, Sections 59 and 60 may be revised by the Federal Emergency Management Agency, requiring this community to revise these regulations to remain eligible for participation in the National Flood Insurance Program. No guaranty of vested use, existing use, or future use is implied or expressed by compliance with this ordinance.

Sec. 22-157. Disclaimer of Liability. The degree of flood protection required by this article is considered reasonable for regulatory purposes and is based on scientific and engineering consideration. Larger floods can and will occur on rare occasions. Flood heights may be increased by man-made or natural causes. This article does not imply that land outside the areas of special flood hazard or uses permitted within such areas will be free from flooding or flood damages. This article shall not create liability on the part of the City Commission of the City of Fernandina Beach or by any officer or employee thereof for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder.

Sec. 22-158. General applicability. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.

Sec. 22-159. Areas to which this ordinance applies. This ordinance shall apply to all flood hazard areas within the City of Fernandina Beach, Florida as established in Section 22-160 of this ordinance.

Sec. 22-160. Basis for establishing flood hazard areas. The Flood Insurance Study for Nassau County, Florida and Incorporated Areas dated December 17, 2010, and all subsequent amendments and revisions, and the accompanying Flood Insurance Rate Maps (FIRM), and all subsequent amendments and revisions to such maps, are adopted by reference as a part of this ordinance and shall serve as the minimum basis for establishing flood hazard areas. Studies and maps that establish flood hazard areas are on file at the building department 204 Ash Street, Fernandina Beach, Florida.

Sec. 22-161. Submission of additional data to establish flood hazard areas. To establish flood hazard areas and base flood elevations, pursuant to Sections 22-183 to 22-186 of this ordinance the Floodplain Administrator may require submission of additional data. Where field surveyed topography prepared by a Florida licensed professional surveyor or digital topography accepted by the community indicates that ground elevations:

1. Are below the closest applicable base flood elevation, even in areas not delineated as a special flood hazard area on a FIRM, the area shall be considered as flood hazard area and subject to the

requirements of this ordinance and, as applicable, the requirements of the *Florida Building Code*.

2. Are above the closest applicable base flood elevation, the area shall be regulated as special flood hazard area unless the applicant obtains a Letter of Map Change that removes the area from the special flood hazard area.

Sec. 22-162. Other laws. The provisions of this ordinance shall not be deemed to nullify any provisions of local, state or federal law.

Sec. 22-163. Penalties for violation. Violation of the provisions of this article or failure to comply with any of its requirements, including violation of conditions and safeguards established in connection with grants of variances or special exceptions, shall be punishable for a non-criminal violation. Any person who violates this article or fails to comply with any of its requirements shall, upon adjudication therefore, be fined not more than $500.00, and in addition, shall pay all costs and expenses involved in the case. Each day such violation continues shall be considered a separate offense. Nothing herein contained shall prevent the floodplain administrator from taking such other lawful actions as are necessary to prevent or remedy any violation.

Sec. 22-164. Abrogation and greater restrictions. This ordinance supersedes any ordinance in effect for management of development in flood hazard areas. However, it is not intended to repeal or abrogate any existing ordinances including but not limited to land development regulations, zoning ordinances, storm-water management regulations, or the *Florida Building Code*. In the event of a conflict between this ordinance and any other ordinance, the more restrictive shall govern. This ordinance shall not impair any deed restriction, covenant or easement, but any land that is subject to such interests shall also be governed by this ordinance.

Sec. 22-165. Interpretation. In the interpretation and application of this ordinance, all provisions shall be:

1. Considered as minimum requirements;
2. Liberally construed in favor of the governing body; and
3. Deemed neither to limit nor repeal any other powers granted under state statutes.

Sec. 22-166. Designation of Floodplain Administrator. The building official is designated as the Floodplain Administrator. The Floodplain Administrator may delegate performance of certain duties to other employees.

Sec. 22-167. General Floodplain Administrator duties. The Floodplain Administrator is authorized and directed to administer and enforce the provisions of this ordinance. The Floodplain Administrator shall have the authority to render interpretations of this ordinance consistent with the intent and purpose of this ordinance and may establish policies and procedures in order to clarify the application of its provisions. Such interpretations, policies, and procedures shall not have the effect of waiving requirements specifically provided in this ordinance without the granting of a variance pursuant to Section 107 of this ordinance.

Sec. 22-168. Applications and permits. The Floodplain Administrator, in coordination with other pertinent offices of the community, shall:

1. Review applications and plans to determine whether proposed new development will be located in flood hazard areas;

2. Review applications for modification of any existing development in flood hazard areas for compliance with the requirements of this ordinance;
3. Interpret flood hazard area boundaries where such interpretation is necessary to determine the exact location of boundaries; a person contesting the determination shall have the opportunity to appeal the interpretation;
4. Provide available flood elevation and flood hazard information;
5. Determine whether additional flood hazard data shall be obtained from other sources or shall be developed by an applicant;
6. Review applications to determine whether proposed development will be reasonably safe from flooding;
7. Issue floodplain development permits or approvals for development other than buildings and structures that are subject to the *Florida Building Code*, including buildings, structures and facilities exempt from the *Florida Building Code*, when compliance with this ordinance is demonstrated, or disapprove the same in the event of noncompliance; and
8. Coordinate with and provide comments to the Building Official to assure that applications, plan reviews, and inspections for buildings and structures in flood hazard areas comply with the applicable provisions of this ordinance.

Sec. 22-169. Substantial improvement and substantial damage determinations. For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, change of occupancy, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the Floodplain Administrator, in coordination with the Building Official, shall:

1. Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work; in the case of repair, the market value of the building or structure shall be the market value before the damage occurred and before any repairs are made;
2. Compare the cost to perform the improvement, the cost to repair a damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;
3. Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; and
4. Notify the applicant if it is determined that the work constitutes substantial improvement or repair of substantial damage and that compliance with the flood resistant construction requirements of the *Florida Building Code* and this ordinance is required.

Sec. 22-170. Modifications of the strict application of the requirements of the *Florida Building Code*. The Floodplain Administrator shall review requests submitted to the Building Official that seek approval to modify the strict application of the flood load and flood resistant construction requirements of the *Florida Building Code* to determine whether such requests require the granting of a variance pursuant to Sections 22-193 to 22-200 of this ordinance.

Sec. 22-171. Notices and orders. The Floodplain Administrator shall coordinate with appropriate local agencies for the issuance of all necessary notices or orders to ensure compliance with this ordinance.

Sec. 22-172. Inspections. The Floodplain Administrator shall make the required inspections as specified in Sections 22-187 to 22-192 of this ordinance for development that is not subject to the *Florida Building Code,* including buildings, structures and facilities exempt from the *Florida Building Code*. The Floodplain Administrator shall inspect flood hazard areas to determine if development is undertaken without issuance of a permit.

Sec. 22-173. Other duties of the Floodplain Administrator. The Floodplain Administrator shall have other duties, including but not limited to:

1. Establish, in coordination with the Building Official, procedures for administering and documenting determinations of substantial improvement and substantial damage made pursuant to Section 22-169 of this ordinance;
2. Require that applicants proposing alteration of a watercourse notify adjacent communities and the Florida Division of Emergency Management, State Floodplain Management Office, and submit copies of such notifications to the Federal Emergency Management Agency (FEMA);
3. Require applicants who submit hydrologic and hydraulic engineering analyses to support permit applications to submit to FEMA the data and information necessary to maintain the Flood Insurance Rate Maps if the analyses propose to change base flood elevations, flood hazard area boundaries, or floodway designations; such submissions shall be made within 6 months of such data becoming available;
4. Review required design certifications and documentation of elevations specified by this ordinance and the *Florida Building Code* and this ordinance to determine that such certifications and documentations are complete;
5. Notify the Federal Emergency Management Agency when the corporate boundaries of the City of Fernandina Beach are modified; and
6. Advise applicants for new buildings and structures, including substantial improvements, that are located in any unit of the Coastal Barrier Resources System established by the Coastal Barrier Resources Act (Pub. L. 97-348) and the Coastal Barrier Improvement Act of 1990 (Pub. L. 101-591) that federal flood insurance is not available on such construction; areas subject to this limitation are identified on Flood Insurance Rate Maps as "Coastal Barrier Resource System Areas" and "Otherwise Protected Areas."

Sec. 22-174. Floodplain management records. Regardless of any limitation on the period required for retention of public records, the Floodplain Administrator shall maintain and permanently keep and make available for public inspection all records that are necessary for the administration of this ordinance and the flood resistant construction requirements of the *Florida Building Code*, including Flood Insurance Rate Maps; Letters of Change; records of issuance of permits and denial of permits; determinations of whether proposed work constitutes substantial improvement or repair of substantial damage; required design certifications and documentation of elevations specified by the *Florida Building Code* and this ordinance; notifications to adjacent communities, FEMA, and the state related to alterations of watercourses; assurances that the flood carrying capacity of altered watercourses will be maintained; documentation related to appeals and variances, including justification for issuance or denial; and records of enforcement actions taken pursuant to this ordinance and the flood resistant construction requirements of the *Florida Building Code*. These records shall be available for public inspection at building department 204 Ash Street, Fernandina Beach, Florida..

Sec. 22-175. Permits required. Any owner or owner's authorized agent (hereinafter "applicant") who intends to undertake any development activity within the scope of this ordinance, including buildings,

structures and facilities exempt from the *Florida Building Code*, which is wholly within or partially within any flood hazard area shall first make application to the Floodplain Administrator, and the Building Official if applicable, and shall obtain the required permit(s) and approval(s). No such permit or approval shall be issued until compliance with the requirements of this ordinance and all other applicable codes and regulations has been satisfied.

Sec. 22-176. Floodplain development permits or approvals. Floodplain development permits or approvals shall be issued pursuant to this ordinance for any development activities not subject to the requirements of the *Florida Building Code,* including buildings, structures and facilities exempt from the *Florida Building Code*. Depending on the nature and extent of proposed development that includes a building or structure, the Floodplain Administrator may determine that a floodplain development permit or approval is required in addition to a building permit.

Sec. 22-177. Buildings, structures and facilities exempt from the *Florida Building Code*. Pursuant to the requirements of federal regulation for participation in the National Flood Insurance Program (44 C.F.R. Sections 59 and 60), floodplain development permits or approvals shall be required for the following buildings, structures and facilities that are exempt from the *Florida Building Code* and any further exemptions provided by law, which are subject to the requirements of this ordinance:

1. Railroads and ancillary facilities associated with the railroad.
2. Nonresidential farm buildings on farms, as provided in section 604.50, F.S.
3. Temporary buildings or sheds used exclusively for construction purposes.
4. Mobile or modular structures used as temporary offices.
5. Those structures or facilities of electric utilities, as defined in section 366.02, F.S., which are directly involved in the generation, transmission, or distribution of electricity.
6. Chickees constructed by the Miccosukee Tribe of Indians of Florida or the Seminole Tribe of Florida. As used in this paragraph, the term "chickee" means an open-sided wooden hut that has a thatched roof of palm or palmetto or other traditional materials, and that does not incorporate any electrical, plumbing, or other non-wood features.
7. Family mausoleums not exceeding 250 square feet in area which are prefabricated and assembled on site or preassembled and delivered on site and have walls, roofs, and a floor constructed of granite, marble, or reinforced concrete.
8. Temporary housing provided by the Department of Corrections to any prisoner in the state correctional system.
9. Structures identified in section 553.73(10)(k), F.S., are not exempt from the *Florida Building Code* if such structures are located in flood hazard areas established on Flood Insurance Rate Maps

Sec. 22-178. Application for a permit or approval. To obtain a floodplain development permit or approval the applicant shall first file an application in writing on a form furnished by the community. The information provided shall:

1. Identify and describe the development to be covered by the permit or approval.
2. Describe the land on which the proposed development is to be conducted by legal description, street address or similar description that will readily identify and definitively locate the site.
3. Indicate the use and occupancy for which the proposed development is intended.
4. Be accompanied by a site plan or construction documents as specified in Section 105 of this

ordinance.

5. State the valuation of the proposed work.
6. Be signed by the applicant or the applicant's authorized agent.
7. Give such other data and information as required by the Floodplain Administrator.

Sec. 22-179. Validity of permit or approval. The issuance of a floodplain development permit or approval pursuant to this ordinance shall not be construed to be a permit for, or approval of, any violation of this ordinance, the *Florida Building Codes*, or any other ordinance of this community. The issuance of permits based on submitted applications, construction documents, and information shall not prevent the Floodplain Administrator from requiring the correction of errors and omissions.

Sec. 22-180. Expiration. A floodplain development permit or approval shall become invalid unless the work authorized by such permit is commenced within 180 days after its issuance, or if the work authorized is suspended or abandoned for a period of 180 days after the work commences. Extensions for periods of not more than 180 days each shall be requested in writing and justifiable cause shall be demonstrated.

Sec. 22-181. Suspension or revocation. The Floodplain Administrator is authorized to suspend or revoke a floodplain development permit or approval if the permit was issued in error, on the basis of incorrect, inaccurate or incomplete information, or in violation of this ordinance or any other ordinance, regulation or requirement of this community.

Sec. 22-182. Other permits required. Floodplain development permits and building permits shall include a condition that all other applicable state or federal permits be obtained before commencement of the permitted development, including but not limited to the following:

1. The St. Johns River Water Management District; section 373.036, F.S.
2. Florida Department of Health for onsite sewage treatment and disposal systems; section 381.0065, F.S. and Chapter 64E-6, F.A.C.
3. Florida Department of Environmental Protection for construction, reconstruction, changes, or physical activities for shore protection or other activities seaward of the coastal construction control line; section 161.141, F.S.
4. Florida Department of Environmental Protection for activities subject to the Joint Coastal Permit; section 161.055, F.S.
5. Florida Department of Environmental Protection for activities that affect wetlands and alter surface water flows, in conjunction with the U.S. Army Corps of Engineers; Section 404 of the Clean Water Act.
6. Federal permits and approvals.

Sec. 22-183. Site plans and construction documents: Information for development in flood hazard areas. The site plan or construction documents for any development subject to the requirements of this ordinance shall be drawn to scale and shall include, as applicable to the proposed development:

1. Delineation of flood hazard areas, floodway boundaries and flood zone(s), base flood elevation(s), and ground elevations if necessary for review of the proposed development.
2. Where base flood elevations, or floodway data are not included on the FIRM or in the Flood

Insurance Study, they shall be established in accordance with Section 22-184(2) or (3) of this ordinance.

3. Where the parcel on which the proposed development will take place will have more than 50 lots or is larger than 5 acres and the base flood elevations are not included on the FIRM or in the Flood Insurance Study, such elevations shall be established in accordance with Section 22-184(1) of this ordinance.
4. Location of the proposed activity and proposed structures, and locations of existing buildings and structures; in coastal high hazard areas, new buildings shall be located landward of the reach of mean high tide.
5. Location, extent, amount, and proposed final grades of any filling, grading, or excavation.
6. Where the placement of fill is proposed, the amount, type, and source of fill material; compaction specifications; a description of the intended purpose of the fill areas; and evidence that the proposed fill areas are the minimum necessary to achieve the intended purpose.
7. Delineation of the Coastal Construction Control Line or notation that the site is seaward of the coastal construction control line, if applicable.
8. Extent of any proposed alteration of sand dunes or mangrove stands, provided such alteration is approved by the Florida Department of Environmental Protection.
9. Existing and proposed alignment of any proposed alteration of a watercourse.

The Floodplain Administrator is authorized to waive the submission of site plans, construction documents, and other data that are required by this ordinance but that are not required to be prepared by a registered design professional if it is found that the nature of the proposed development is such that the review of such submissions is not necessary to ascertain compliance with this ordinance.

Sec. 22-184. Information in flood hazard areas without base flood elevations (approximate Zone A). Where flood hazard areas are delineated on the FIRM and base flood elevation data have not been provided, the Floodplain Administrator shall:

1. Require the applicant to include base flood elevation data prepared in accordance with currently accepted engineering practices.
2. Obtain, review, and provide to applicants base flood elevation and floodway data available from a federal or state agency or other source or require the applicant to obtain and use base flood elevation and floodway data available from a federal or state agency or other source.
3. Where base flood elevation and floodway data are not available from another source, where the available data are deemed by the Floodplain Administrator to not reasonably reflect flooding conditions, or where the available data are known to be scientifically or technically incorrect or otherwise inadequate:
    a. Require the applicant to include base flood elevation data prepared in accordance with currently accepted engineering practices; or
    b. Specify that the base flood elevation is three (3) feet above the highest adjacent grade at the location of the development, provided there is no evidence indicating flood depths have been or may be greater than three (3) feet.
4. Where the base flood elevation data are to be used to support a Letter of Map Change from FEMA, advise the applicant that the analyses shall be prepared by a Florida licensed engineer in a format required by FEMA, and that it shall be the responsibility of the applicant to satisfy the submittal requirements and pay the processing fees.

Sec. 22-185. Additional analyses and certifications. As applicable to the location and nature of the proposed development activity, and in addition to the requirements of this section, the applicant shall have the following analyses signed and sealed by a Florida licensed engineer for submission with the site plan and construction documents:

1. For development activities proposed to be located in a regulatory floodway, a floodway encroachment analysis that demonstrates that the encroachment of the proposed development will not cause any increase in base flood elevations; where the applicant proposes to undertake development activities that do increase base flood elevations, the applicant shall submit such analysis to FEMA as specified in Section 22-186 of this ordinance and shall submit the Conditional Letter of Map Revision, if issued by FEMA, with the site plan and construction documents.
2. For development activities proposed to be located in a riverine flood hazard area for which base flood elevations are included in the Flood Insurance Study or on the FIRM and floodways have not been designated, hydrologic and hydraulic analyses that demonstrate that the cumulative effect of the proposed development, when combined with all other existing and anticipated flood hazard area encroachments, will not increase the base flood elevation more than one (1) foot at any point within the community. This requirement does not apply in isolated flood hazard areas not connected to a riverine flood hazard area or in flood hazard areas identified as Zone AO or Zone AH.
3. For alteration of a watercourse, an engineering analysis prepared in accordance with standard engineering practices which demonstrates that the flood-carrying capacity of the altered or relocated portion of the watercourse will not be decreased, and certification that the altered watercourse shall be maintained in a manner which preserves the channel's flood-carrying capacity; the applicant shall submit the analysis to FEMA as specified in Section 22-186 of this ordinance.
4. For activities that propose to alter sand dunes or mangrove stands in coastal high hazard areas (Zone V), an engineering analysis that demonstrates that the proposed alteration will not increase the potential for flood damage.

Sec. 22-186. Submission of additional data. When additional hydrologic, hydraulic or other engineering data, studies, and additional analyses are submitted to support an application, the applicant has the right to seek a Letter of Map Change from FEMA to change the base flood elevations, change floodway boundaries, or change boundaries of flood hazard areas shown on FIRMs, and to submit such data to FEMA for such purposes. The analyses shall be prepared by a Florida licensed engineer in a format required by FEMA. Submittal requirements and processing fees shall be the responsibility of the applicant.

Sec. 22-187. Inspections Generally. Development for which a floodplain development permit or approval is required shall be subject to inspection.

Sec. 22-188. Development other than buildings and structures. The Floodplain Administrator shall inspect all development to determine compliance with the requirements of this ordinance and the conditions of issued floodplain development permits or approvals.

Sec. 22-189. Inspections related to Buildings, structures and facilities exempt from the *Florida Building Code*. The Floodplain Administrator shall inspect buildings, structures and facilities exempt from the *Florida Building Code* to determine compliance with the requirements of this ordinance and the

conditions of issued floodplain development permits or approvals.

Sec. 22-190. Buildings, structures and facilities exempt from the *Florida Building Code*, lowest floor inspection. Upon placement of the lowest floor, including basement, and prior to further vertical construction, the owner of a building, structure or facility exempt from the *Florida Building Code,* or the owner's authorized agent, shall submit to the Floodplain Administrator:

1. If a design flood elevation was used to determine the required elevation of the lowest floor, the certification of elevation of the lowest floor prepared and sealed by a Florida licensed professional surveyor; or
2. If the elevation used to determine the required elevation of the lowest floor was determined in accordance with Section 22-184(3)(b) of this ordinance, the documentation of height of the lowest floor above highest adjacent grade, prepared by the owner or the owner's authorized agent.

Sec. 22-191. Buildings, structures and facilities exempt from the *Florida Building Code*, final inspection. As part of the final inspection, the owner or owner's authorized agent shall submit to the Floodplain Administrator a final certification of elevation of the lowest floor or final documentation of the height of the lowest floor above the highest adjacent grade; such certifications and documentations shall be prepared as specified in Section 22-190 of this ordinance.

Sec. 22-192. Inspections related to manufactured homes. The Building Official shall inspect manufactured homes that are installed or replaced in flood hazard areas to determine compliance with the requirements of this ordinance and the conditions of the issued permit. Upon placement of a manufactured home, certification of the elevation of the lowest floor shall be submitted to the Building Official.

Sec. 22-193. Variances generally. The code enforcement and appeals board shall hear and decide on requests for appeals and requests for variances from the strict application of this ordinance. Pursuant to section 553.73(5), F.S., the code enforcement and appeals board shall hear and decide on requests for appeals and requests for variances from the strict application of the flood resistant construction requirements of the *Florida Building Code*. This section does not apply to Section 3109 of the *Florida Building Code, Building.*

Sec. 22-194. Appeals. The code enforcement and appeals board shall hear and decide appeals when it is alleged there is an error in any requirement, decision, or determination made by the Floodplain Administrator in the administration and enforcement of this ordinance. Any person aggrieved by the decision of the code enforcement and appeals board may appeal such decision to the Circuit Court, as provided by Florida Statutes.

Sec. 22-195. Limitations on authority to grant variances. The code enforcement and appeals board shall base its decisions on variances on technical justifications submitted by applicants, the considerations for issuance in Section 22-199 of this ordinance, the conditions of issuance set forth in Section 22-200 of this ordinance, and the comments and recommendations of the Floodplain Administrator and the Building Official. The code enforcement and appeals board has the right to attach such conditions as it deems necessary to further the purposes and objectives of this ordinance.

Sec. 22-196. Restrictions in floodways. A variance shall not be issued for any proposed development in a floodway if any increase in base flood elevations would result, as evidenced by the applicable analyses and certifications required in Section 22-185 of this ordinance.

Sec. 22-197. Historic buildings. A variance is authorized to be issued for the repair, improvement, or rehabilitation of a historic building that is determined eligible for the exception to the flood resistant

construction requirements of the *Florida Building Code, Existing Building*, Chapter 11 Historic Buildings, upon a determination that the proposed repair, improvement, or rehabilitation will not preclude the building's continued designation as a historic building and the variance is the minimum necessary to preserve the historic character and design of the building. If the proposed work precludes the building's continued designation as a historic building, a variance shall not be granted and the building and any repair, improvement, and rehabilitation shall be subject to the requirements of the *Florida Building Code.*

Sec. 22-198. Functionally dependent uses. A variance is authorized to be issued for the construction or substantial improvement necessary for the conduct of a functionally dependent use, as defined in this ordinance, provided the variance meets the requirements of Section 22-196, is the minimum necessary considering the flood hazard, and all due consideration has been given to use of methods and materials that minimize flood damage during occurrence of the base flood.

Sec. 22-199. Considerations for issuance of variances. In reviewing requests for variances, the code enforcement and appeals board shall consider all technical evaluations, all relevant factors, all other applicable provisions of the *Florida Building Code*, this ordinance, and the following:

1. The danger that materials and debris may be swept onto other lands resulting in further injury or damage;
2. The danger to life and property due to flooding or erosion damage;
3. The susceptibility of the proposed development, including contents, to flood damage and the effect of such damage on current and future owners;
4. The importance of the services provided by the proposed development to the community;
5. The availability of alternate locations for the proposed development that are subject to lower risk of flooding or erosion;
6. The compatibility of the proposed development with existing and anticipated development;
7. The relationship of the proposed development to the comprehensive plan and floodplain management program for the area;
8. The safety of access to the property in times of flooding for ordinary and emergency vehicles;
9. The expected heights, velocity, duration, rate of rise and debris and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; and
10. The costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, streets and bridges.

Sec. 22-200. Conditions for issuance of variances. Variances shall be issued only upon:

1. Submission by the applicant, of a showing of good and sufficient cause that the unique characteristics of the size, configuration, or topography of the site limit compliance with any provision of this ordinance or the required elevation standards;
2. Determination by the code enforcement and appeals board that:
    a. Failure to grant the variance would result in exceptional hardship due to the physical characteristics of the land that render the lot undevelopable; increased costs to satisfy the requirements or inconvenience do not constitute hardship;
    b. The granting of a variance will not result in increased flood heights, additional threats to

public safety, extraordinary public expense, nor create nuisances, cause fraud on or victimization of the public or conflict with existing local laws and ordinances; and

c. The variance is the minimum necessary, considering the flood hazard, to afford relief;

3. Receipt of a signed statement by the applicant that the variance, if granted, shall be recorded in the Office of the Clerk of the Court in such a manner that it appears in the chain of title of the affected parcel of land; and

4. If the request is for a variance to allow construction of the lowest floor of a new building, or substantial improvement of a building, below the required elevation, a copy in the record of a written notice from the Floodplain Administrator to the applicant for the variance, specifying the difference between the base flood elevation and the proposed elevation of the lowest floor, stating that the cost of federal flood insurance will be commensurate with the increased risk resulting from the reduced floor elevation (up to amounts as high as $25 for $100 of insurance coverage), and stating that construction below the base flood elevation increases risks to life and property.

Sec. 22-201. Violations. Any development that is not within the scope of the *Florida Building Code* but that is regulated by this ordinance that is performed without an issued permit, that is in conflict with an issued permit, or that does not fully comply with this ordinance, shall be deemed a violation of this ordinance. A building or structure without the documentation of elevation of the lowest floor, other required design certifications, or other evidence of compliance required by this ordinance or the *Florida Building Code* is presumed to be a violation until such time as that documentation is provided.

Sec. 22-202. Authority to post violations. For development that is not within the scope of the *Florida Building Code* but that is regulated by this ordinance and that is determined to be a violation, the Floodplain Administrator is authorized to serve notices of violation or stop work orders to owners of the property involved, to the owner's agent, or to the person or persons performing the work.

Sec. 22-203. Unlawful continuance. Any person who shall continue any work after having been served with a notice of violation or a stop work order, except such work as that person is directed to perform to remove or remedy a violation or unsafe condition, shall be subject to penalties as prescribed by law and Florida Statue 553.79 (1).

Sec. 22-204. Design and construction of buildings, structures and facilities exempt from the *Florida Building Code*. Pursuant to Section 22-177 of this ordinance, buildings, structures, and facilities that are exempt from the *Florida Building Code*, including substantial improvement or repair of substantial damage of such buildings, structures and facilities, shall be designed and constructed in accordance with the flood load and flood resistant construction requirements of ASCE 24. Structures exempt from the *Florida Building Code* that are not walled and roofed buildings shall comply with the requirements of Sections 22-228 to 22-235 of this ordinance.

Sec. 22-205. Buildings and structures seaward of the coastal construction control line. If extending, in whole or in part, seaward of the coastal construction control line and also located, in whole or in part, in a flood hazard area:

(1) Buildings and structures shall be designed and constructed to comply with the more restrictive applicable requirements of the *Florida Building Code, Building* Section 3109 and Section 1612 or *Florida Building Code, Residential* Section R322.

(2) Minor structures and non-habitable major structures as defined in section 161.54, F.S., shall be designed and constructed to comply with the intent and applicable provisions of this ordinance and ASCE 24.

Sec. 22-206. Subdivision minimum requirements. Subdivision proposals, including proposals for manufactured home parks and subdivisions, shall be reviewed to determine that:

1. Such proposals are consistent with the need to minimize flood damage and will be reasonably safe from flooding;
2. All public utilities and facilities such as sewer, gas, electric, communications, and water systems are located and constructed to minimize or eliminate flood damage; and
3. Adequate drainage is provided to reduce exposure to flood hazards; in Zones AH and AO, adequate drainage paths shall be provided to guide floodwaters around and away from proposed structures.

Sec. 22-207. Subdivision plats. Where any portion of proposed subdivisions, including manufactured home parks and subdivisions, lies within a flood hazard area, the following shall be required:

1. Delineation of flood hazard areas, floodway boundaries and flood zones, and design flood elevations, as appropriate, shall be shown on preliminary plats;
2. Where the subdivision has more than 50 lots or is larger than 5 acres and base flood elevations are not included on the FIRM, the base flood elevations determined in accordance with Section 22-184(1) of this ordinance; and
3. Compliance with the site improvement and utilities requirements of Sections 22-208 to 22-213 of this ordinance.

Sec. 22-208. Site improvements, utilities and limitations: minimum requirements. All proposed new development shall be reviewed to determine that:

1. Such proposals are consistent with the need to minimize flood damage and will be reasonably safe from flooding;
2. All public utilities and facilities such as sewer, gas, electric, communications, and water systems are located and constructed to minimize or eliminate flood damage; and
3. Adequate drainage is provided to reduce exposure to flood hazards; in Zones AH and AO, adequate drainage paths shall be provided to guide floodwaters around and away from proposed structures.

Sec. 22-209. Sanitary sewage facilities. All new and replacement sanitary sewage facilities, private sewage treatment plants (including all pumping stations and collector systems), and on-site waste disposal systems shall be designed in accordance with the standards for onsite sewage treatment and disposal systems in Chapter 64E-6, F.A.C. and ASCE 24 Chapter 7 to minimize or eliminate infiltration of floodwaters into the facilities and discharge from the facilities into flood waters, and impairment of the facilities and systems.

Sec. 22-210. Water supply facilities. All new and replacement water supply facilities shall be designed in accordance with the water well construction standards in Chapter 62-532.500, F.A.C. and ASCE 24 Chapter 7 to minimize or eliminate infiltration of floodwaters into the systems.

Sec. 22-211. Limitations on sites in regulatory floodways. No development, including but not limited to site improvements, and land disturbing activity involving fill or regrading, shall be authorized in the regulatory floodway unless the floodway encroachment analysis required in Section 22-185(1) of this ordinance demonstrates that the proposed development or land disturbing activity will not result in any

increase in the base flood elevation.

Sec. 22-212. Limitations on placement of fill. Subject to the limitations of this ordinance, fill shall be designed to be stable under conditions of flooding including rapid rise and rapid drawdown of floodwaters, prolonged inundation, and protection against flood-related erosion and scour. In addition to these requirements, if intended to support buildings and structures (Zone A only), fill shall comply with the requirements of the *Florida Building Code.*

Sec. 22-213. Limitations on sites in coastal high hazard areas (Zone V). In coastal high hazard areas, alteration of sand dunes and mangrove stands shall be permitted only if such alteration is approved by the Florida Department of Environmental Protection and only if the engineering analysis required by Section 22-185(4) of this ordinance demonstrates that the proposed alteration will not increase the potential for flood damage. Construction or restoration of dunes under or around elevated buildings and structures shall comply with Section 22-235(3) of this ordinance.

Sec. 22-214 Manufactured homes generally. All manufactured homes installed in flood hazard areas shall be installed by an installer that is licensed pursuant to section 320.8249, F.S., and shall comply with the requirements of Chapter 15C-1, F.A.C. and the requirements of this ordinance. If located seaward of the coastal construction control line, all manufactured homes shall comply with the more restrictive of the applicable requirements.

Sec. 22-215. Manufactured home foundations. All new manufactured homes and replacement manufactured homes installed in flood hazard areas shall be installed on permanent, reinforced foundations that :

(1) In flood hazard areas (Zone A) other than coastal high hazard areas, are designed in accordance with the foundation requirements of the *Florida Building Code, Residential* Section R322.2 and this ordinance.

(2) In coastal high hazard areas (Zone V), are designed in accordance with the foundation requirements of the *Florida Building Code, Residential* Section R322.3 and this ordinance.

Sec. 22-216. Manufactured home anchoring. All new manufactured homes and replacement manufactured homes shall be installed using methods and practices which minimize flood damage and shall be securely anchored to an adequately anchored foundation system to resist flotation, collapse or lateral movement. Methods of anchoring include, but are not limited to, use of over-the-top or frame ties to ground anchors. This anchoring requirement is in addition to applicable state and local anchoring requirements for wind resistance.

Sec. 22-217. Manufactured home elevation. Manufactured homes that are placed, replaced, or substantially improved shall comply with Section 22-218 or 22-219 of this ordinance, as applicable.

Sec. 22-218. General elevation requirement. Unless subject to the requirements of Section 22-219 of this ordinance, all manufactured homes that are placed, replaced, or substantially improved on sites located: (a) outside of a manufactured home park or subdivision; (b) in a new manufactured home park or subdivision; (c) in an expansion to an existing manufactured home park or subdivision; or (d) in an existing manufactured home park or subdivision upon which a manufactured home has incurred "substantial damage" as the result of a flood, shall be elevated such that the bottom of the frame is at or above the elevation required, as applicable to the flood hazard area, in the *Florida Building Code, Residential* Section R322.2 (Zone A) or Section R322.3 (Zone V).

Sec. 22-219. Elevation requirement for certain existing manufactured home parks and subdivisions. Manufactured homes that are not subject to Section 22-218 of this ordinance, including manufactured homes that are placed, replaced, or substantially improved on sites located in an existing manufactured home park or subdivision, unless on a site where substantial damage as result of flooding has occurred, shall be elevated such that either the:

1. Bottom of the frame of the manufactured home is at or above the elevation required, as applicable to the flood hazard area, in the *Florida Building Code, Residential* Section R322.2 (Zone A) or Section R322.3 (Zone V); or
2. Bottom of the frame is supported by reinforced piers or other foundation elements of at least equivalent strength that are not less than 36 inches in height above grade.

Sec. 22-220. Enclosures. Enclosed areas below elevated manufactured homes shall comply with the requirements of the *Florida Building Code, Residential* Section R322 for such enclosed areas, as applicable to the flood hazard area.

Sec. 22-221. Utility equipment. Utility equipment that serves manufactured homes, including electric, heating, ventilation, plumbing, and air conditioning equipment and other service facilities, shall comply with the requirements of the *Florida Building Code, Residential* Section R322, as applicable to the flood hazard area.

Sec. 22-222. Temporary placement of recreational vehicles and park trailers. Recreational vehicles and park trailers placed temporarily in flood hazard areas shall:

1. Be on the site for fewer than 180 consecutive days; or
2. Be fully licensed and ready for highway use, which means the recreational vehicle or park model is on wheels or jacking system, is attached to the site only by quick-disconnect type utilities and security devices, and has no permanent attachments such as additions, rooms, stairs, decks and porches.

Sec. 22-223. Permanent placement of recreational vehicles and park trailers. Recreational vehicles and park trailers that do not meet the limitations in Section 22-222 of this ordinance for temporary placement shall meet the requirements of Sections 22-214 to 22-221 of this ordinance for manufactured homes.

Sec. 22-224. Underground tanks. Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty.

Sec. 22-225. Above-ground tanks, not elevated. Above-ground tanks that do not meet the elevation requirements of Section 22-226 of this ordinance shall:

1. Be permitted in flood hazard areas (Zone A) other than coastal high hazard areas, provided the tanks are anchored or otherwise designed and constructed to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty and the effects of flood-borne debris.

2. Not be permitted in coastal high hazard areas (Zone V).

Sec. 22-226. Above-ground tanks, elevated. Above-ground tanks in flood hazard areas shall be attached to and elevated to or above the design flood elevation on a supporting structure that is designed to prevent flotation, collapse or lateral movement during conditions of the design flood. Tank-supporting structures

shall meet the foundation requirements of the applicable flood hazard area.

Sec. 22-227. Tank inlets and vents. Tank inlets, fill openings, outlets and vents shall be:

1. At or above the design flood elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood; and
2. Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy, during conditions of the design flood.

Sec. 22-228. General requirements for other development. All development, including man-made changes to improved or unimproved real estate for which specific provisions are not specified in this ordinance or the *Florida Building Code*, shall:

1. Be located and constructed to minimize flood damage;
2. Meet the limitations of Section 22-211 of this ordinance if located in a regulated floodway;
3. Be anchored to prevent flotation, collapse or lateral movement resulting from hydrostatic loads, including the effects of buoyancy, during conditions of the design flood;
4. Be constructed of flood damage-resistant materials; and
5. Have mechanical, plumbing, and electrical systems above the design flood elevation, except that minimum electric service required to address life safety and electric code requirements is permitted below the design flood elevation provided it conforms to the provisions of the electrical part of building code for wet locations.

Sec. 22-229. Fences in regulated floodways. Fences in regulated floodways that have the potential to block the passage of floodwaters, such as stockade fences and wire mesh fences, shall meet the limitations of Section 22-211 of this ordinance.

Sec. 22-230. Retaining walls, sidewalks and driveways in regulated floodways. Retaining walls and sidewalks and driveways that involve the placement of fill in regulated floodways shall meet the limitations of Section 22-211 of this ordinance.

Sec. 22-231. Roads and watercourse crossings in regulated floodways. Roads and watercourse crossings, including roads, bridges, culverts, low-water crossings and similar means for vehicles or pedestrians to travel from one side of a watercourse to the other side, that encroach into regulated floodways shall meet the limitations of Section 22-211 of this ordinance. Alteration of a watercourse that is part of a road or watercourse crossing shall meet the requirements of Section 22-185(3) of this ordinance.

Sec. 22-232. Concrete slabs used as parking pads, enclosure floors, landings, decks, walkways, patios and similar nonstructural uses in coastal high hazard areas (Zone V). In coastal high hazard areas, concrete slabs used as parking pads, enclosure floors, landings, decks, walkways, patios and similar nonstructural uses are permitted beneath or adjacent to buildings and structures provided the concrete slabs are designed and constructed to be:

(1) Structurally independent of the foundation system of the building or structure;

(2) Frangible and not reinforced, so as to minimize debris during flooding that is capable of causing significant damage to any structure; and

(3) Have a maximum slab thickness of not more than four (4) inches.

Sec. 22-233. Decks and patios in coastal high hazard areas (Zone V). In addition to the requirements of the *Florida Building Code*, in coastal high hazard areas decks and patios shall be located, designed, and constructed in compliance with the following:

(1) A deck that is structurally attached to a building or structure shall have the bottom of the lowest horizontal structural member at or above the design flood elevation and any supporting members that extend below the design flood elevation shall comply with the foundation requirements that apply to the building or structure, which shall be designed to accommodate any increased loads resulting from the attached deck.

(2) A deck or patio that is located below the design flood elevation shall be structurally independent from buildings or structures and their foundation systems, and shall be designed and constructed either to remain intact and in place during design flood conditions or to break apart into small pieces to minimize debris during flooding that is capable of causing structural damage to the building or structure or to adjacent buildings and structures.

(3) A deck or patio that has a vertical thickness of more than twelve (12) inches or that is constructed with more than the minimum amount of fill necessary for site drainage shall not be approved unless an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to the building or structure or to adjacent buildings and structures.

(4) A deck or patio that has a vertical thickness of twelve (12) inches or less and that is at natural grade or on nonstructural fill material that is similar to and compatible with local soils and is the minimum amount necessary for site drainage may be approved without requiring analysis of the impact on diversion of floodwaters or wave runup and wave reflection.

Sec. 22-234. Other development in coastal high hazard areas (Zone V). In coastal high hazard areas, development activities other than buildings and structures shall be permitted only if also authorized by the appropriate federal, state or local authority; if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent buildings and structures. Such other development activities include but are not limited to:

(1) Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures;

(2) Solid fences and privacy walls, and fences prone to trapping debris, unless designed and constructed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters; and

(3) On-site sewage treatment and disposal systems defined in 64E-6.002, F.A.C., as filled systems or mound systems.

Sec. 22-235. Nonstructural fill in coastal high hazard areas (Zone V). In coastal high hazard areas:

(1) Minor grading and the placement of minor quantities of nonstructural fill shall be permitted for landscaping and for drainage purposes under and around buildings.

(2) Nonstructural fill with finished slopes that are steeper than one unit vertical to five units horizontal shall be permitted only if an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave reflection that would increase damage to adjacent buildings and structures.

Where authorized by the Florida Department of Environmental Protection or applicable local approval, sand dune construction and restoration of sand dunes under or around elevated buildings are permitted without additional engineering analysis or certification of the diversion of floodwater or wave runup and

wave reflection if the scale and location of the dune work is consistent with local beach-dune morphology and the vertical clearance is maintained between the top of the sand dune and the lowest horizontal structural member of the building.

The following administrative amendments to the *Florida Building Code, Building* are hereby added to Section 22-29 of the Code of Ordinances, City of Fernandina Beach, Florida.

Add a new Sec. 106.6.1 as follows:

106.6.1 Building permits issued on the basis of an affidavit. Pursuant to the requirements of federal regulation for participation in the National Flood Insurance Program (44 C.F.R. Sections 59 and 60), the authority granted to the Building Official to issue permits, to rely on inspections, and to accept plans and construction documents on the basis of affidavits and plans submitted pursuant to Section 105.14 and Section 106.6, shall not extend to the flood load and flood resistance construction requirements of the *Florida Building Code.*

Add a new Sec. 117 as follows:

117 VARIANCES IN FLOOD HAZARD AREAS

117.1 Flood hazard areas. Pursuant to section 553.73(5), F.S., the variance procedures adopted in the local floodplain management ordinance shall apply to requests submitted to the Building Official for variances to the provisions of Section 1612.4 of the *Florida Building Code, Building* or, as applicable, the provisions of R322 of the *Florida Building Code, Residential.* This section shall not apply to Section 3109 of the *Florida Building Code, Building.*

The following technical amendment to the *Florida Building Code, Building* is hereby added to Section 22-29 of the Code of Ordinances, City of Fernandina Beach, Florida.

Modify a definition in Section 1612.2. as follows:

SUBSTANTIAL IMPROVEMENT. Any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds ~~50~~30 percent of the market value of the structure before the improvement or repair is started. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The term does not, however, include either:

1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to assure safe living conditions.
2. Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.

The following technical amendment to the *Florida Building Code, Existing Building* is hereby added to Section 22-29 of the Code of Ordinances, City of Fernandina Beach, Florida.

Modify a definition in Section 202 as follows:

SUBSTANTIAL IMPROVEMENT. Any repair, reconstruction, rehabilitation, addition or improvement of a building or structure, the cost of which equals or exceeds ~~50~~ 30 percent of the market value of the structure before the improvement or repair is started. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of

the actual repair work performed. The term does not, however, include either:

1. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to assure safe living conditions.
2. Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.

The following technical amendments to the *Florida Building Code, Residential* are hereby added to Section 22-29 of the Code of Ordinances, City of Fernandina Beach, Florida.

Modify Sec. R322.2.1 as follows:

R322.2.1 Elevation requirements.

1. Buildings and structures in flood hazard areas not designated as Coastal A Zones shall have the lowest floors elevated to or above the base flood elevation plus 1 foot or the design flood elevation, whichever is higher.
2. Buildings and structures in flood hazard areas designated as Coastal A Zones shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or to the design flood elevation, whichever is higher.
3. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including basement) elevated at least as high above the highest adjacent grade as the depth number specified in feet on the FIRM plus 1 foot, or at least 3 feet ~~2 feet (610 mm)~~ if a depth number is not specified.
4. Basement floors that are below grade on all sides shall be elevated to or above the base flood elevation plus 1 foot or the design flood elevation, whichever is higher.

Exception: Enclosed areas below the design flood elevation, including basements whose floors are not below grade on all sides, shall meet the requirements of Section R322.2.2.

Modify Sec. R322.3.2 as follows:

R322.3.2 Elevation requirements.

1. All buildings and structures erected within coastal high-hazard areas shall be elevated so that the lowest portion of all structural members supporting the lowest floor, with the exception of mat or raft foundations, piling, pile caps, columns, grade beams and bracing, is:
    - 1.1 Located at or above the base flood elevation plus 1 foot or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented parallel to the direction of wave approach, where parallel shall mean less than or equal to 20 degrees (0.35 rad) from the direction of approach, or
    - 1.2 Located at the base flood elevation plus 2 feet ~~1 foot (305 mm)~~, or the design flood elevation, whichever is higher, if the lowest horizontal structural member is oriented perpendicular to the direction of wave approach, where perpendicular shall mean greater than 20 degrees (0.35 rad) from the direction of approach.
2. Basement floors that are below grade on all sides are prohibited.
3. The use of fill for structural support is prohibited.
4. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

Exception: Walls and partitions enclosing areas below the design flood elevation shall meet the requirements of Sections R322.3.4 and R322.3.5.

September 4, 2013
News Leader Edition

NOTICE OF PUBLIC HEARING
CITY COMMISSION
CITY OF FERNANDINA BEACH

NOTICE IS HEREBY GIVEN that a Public Hearing is scheduled for Tuesday, September 17, 2013 at 6:00 PM in the City Commission Chambers, 204 Ash Street Fernandina Beach, Florida to consider the following Ordinances:

ORDINANCE 2013-26

AN ORDINANCE BY THE CITY COMMISSION OF FERNANDINA BEACH AMENDING THE FERNANDINA BEACH CODE OF ORDINANCES BY REPEALING CHAPTER 22, ARTICLE V SECTIONS 22-151 THROUGH 22-166 REGARDING FLOODPLAIN MANAGEMENT; ADOPTING A NEW CHAPTER 22, ARTICLE V SECTIONS 22-151 THROUGH 22-235 REGARDING FLOODPLAIN MANAGEMENT; ADOPTING FLOOD HAZARD MAPS; DESIGNATING A FLOODPLAIN ADMINISTRATOR; ADOPTING PROCEDURES AND CRITERIA FOR DEVELOPMENT IN FLOOD HAZARD AREAS AND FOR OTHER PURPOSES; AMENDING SECTION 22-29 OF THE CODE OF ORDINANCES BY ADOPTING LOCAL ADMINISTRATIVE AND TECHNICAL AMENDMENTS TO THE FLORIDA BUILDING CODE; PROVIDING FOR FISCAL IMPACT, SEVERABILITY, AND AN EFFECTIVE DATE.

Interested parties may appear at said hearing and be heard as to the advisability of any action, which may be considered. Any persons with disabilities requiring accommodations in order to participate in this program or activity should contact 277-7305, or TTY/TDD 711 (for the hearing or speech impaired) at least 24 hours in advance to request such accommodation.

IF ANY PERSON DECIDES TO APPEAL ANY DECISION MADE BY THE BOARD/COMMISSION WITH RESPECT TO ANY MATTER CONSIDERED AT SUCH HEARING, S/HE WILL NEED TO ENSURE THAT A VERBATIM RECORD OF THE PROCEEDINGS IS MADE, WHICH RECORD INCLUDES THE TESTIMONY AND EVIDENCE UPON WHICH THE APPEAL IS TO BE BASED.

Copies of the application may be inspected in the office of the City Clerk, City Hall, 204 Ash Street, between the hours of 8:00 AM – 5:00 PM, Monday through Friday. For information on the application, please contact the Staff of the City Clerk's Office at 277-7305.

1t 9-4-2013
1726

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 2

NASSAU COUNTY, FLORIDA

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
CALLAHAN, TOWN OF	120171
FERNANDINA BEACH, CITY OF	120172
HILLIARD, TOWN OF	120573
NASSAU COUNTY UNINCORPORATED AREAS	120170

FEMA

PRELIMINARY
01/15/2016

REVISED:

FLOOD INSURANCE STUDY NUMBER
12089CV001B

Version Number 2.3.3.2

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Published Separately

Flood Insurance Rate Map (FIRM)

FLOOD INSURANCE STUDY REPORT
NASSAU COUNTY, FLORIDA

SECTION 1.0 – INTRODUCTION

1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60.3, *Criteria for land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is

later. These buildings are generally referred to as “Post-FIRM” buildings.

1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) Report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community’s regulations.

1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Nassau County, Florida.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the 8-digit Hydrologic Unit Codes (HUC-8) sub-basins affecting each, are shown in Table 1. The Flood Insurance Rate Map (FIRM) panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

The location of flood hazard data for participating communities in multiple jurisdictions is also indicated in the table.

Table 1: Listing of NFIP Jurisdictions

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Callahan, Town of	120171	03070205	12089C0304F 12089C0312F	
Fernandina Beach, City of	120172	03070203 03070204 03070205	12089C0229G 12089C0233G 12089C0236G 12089C0237G 12089C0238G 12089C0239G 12089C0241G 12089C0243G 12089C0376G 12089C0377G	
Hilliard, Town of	120573	03070204 03070205	12089C0130F 12089C0135F 12089C0140F 12089C0145F	

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Nassau County, Unincorporated Areas	120170	03070203 03070204 03070205	12089C0020F 12089C0030F 12089C0035F 12089C0040F 12089C0045F 12089C0065F 12089C0069G 12089C0070F 12089C0088G 12089C0093G 12089C0110F 12089C0120F 12089C0130F 12089C0135F 12089C0139F 12089C0140F 12089C0145F 12089C0155G 12089C0160G 12089C0165F 12089C0170F 12089C0176G 12089C0177G 12089C0178G 12089C0179F 12089C0181G 12089C0182G 12089C0183G 12089C0184G 12089C0190F 12089C0195F 12089C0201G 12089C0202G 12089C0203G 12089C0204G 12089C0206G 12089C0207G 12089C0208G 12089C0209G 12089C0214G 12089C0215G	

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Nassau County, Unincorporated Areas (continued)	120170	03070203 03070204 03070205	12089C0216G 12089C0217G 12089C0218G 12089C0219G 12089C0226G 12089C0228G 12089C0229G 12089C0233G 12089C0236G 12089C0237G 12089C0238G 12089C0239G 12089C0260F 12089C0270F 12089C0277F 12089C0280F 12089C0281F 12089C0282F 12089C0283F 12089C0284F 12089C0290F 12089C0291F 12089C0292F 12089C0295F 12089C0301F 12089C0302F 12089C0303F 12089C0304F 12089C0306F 12089C0307F 12089C0308F 12089C0309F 12089C0311F 12089C0312F 12089C0315F 12089C0316F 12089C0320F 12089C0330F 12089C0335F 12089C0340F 12089C0345F	

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Nassau County, Unincorporated Areas (continued)	120170	03070203 03070204 03070205	12089C0351G 12089C0352G 12089C0353G 12089C0354G 12089C0356G 12089C0357G 12089C0358G 12089C0359G 12089C0361G 12089C0362G 12089C0366G 12089C0367G 12089C0368G 12089C0369G 12089C0376G 12089C0377G 12089C0378G 12089C0379G 12089C0381G[1] 12089C0386G 12089C0387G 12089C0388G 12089C0389G 12089C0391G 12089C0393G 12089C0410F 12089C0420F 12089C0430F 12089C0435F 12089C0440F 12089C0445F 12089C0455F 12089C0460F 12089C0465F[1] 12089C0485F 12089C0495F 12089C0505F 12089C0510F	

[1] Panel Not Printed

1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

  It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 31, "Map Repositories," within this FIS Report.

- New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

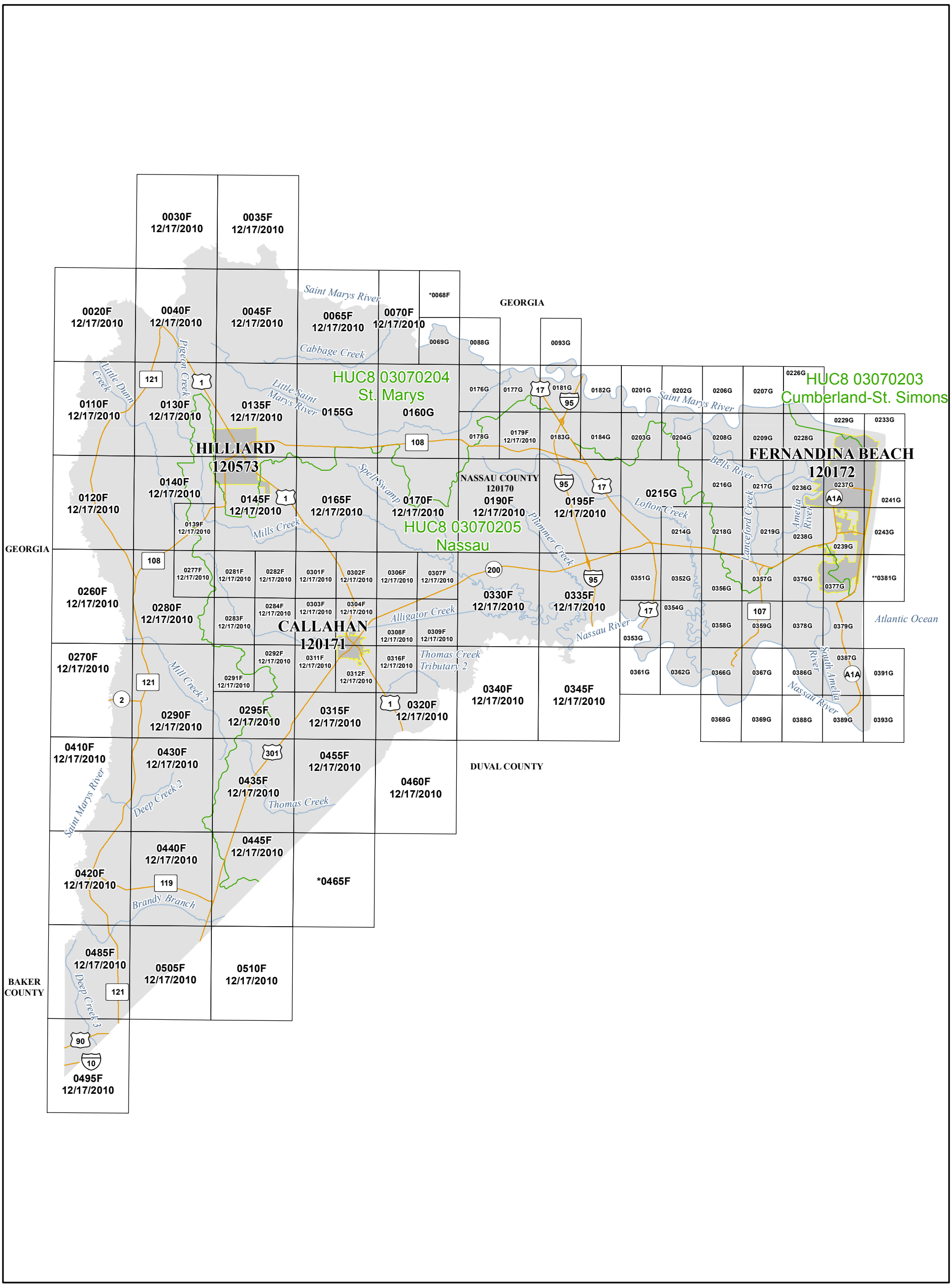
  The initial Countywide FIS Report for Nassau County became effective on December 17, 2010. Refer to Table 28 for information about subsequent revisions to the FIRMs.

- FEMA does not impose floodplain management requirements or special insurance ratings based on Limit of Moderate Wave Action (LiMWA) delineations at this time. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. If the LiMWA is shown on the FIRM, it is being provided by FEMA as information only. For communities that do adopt Zone VE building standards in the area defined by the LiMWA, additional Community Rating System (CRS) credits are available. Refer to Section 2.5.4 for additional information about the LiMWA.

  The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at www.fema.gov/national-flood-insurance-program-community-rating-system or contact your appropriate FEMA Regional Office for more information about this program.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at www.fema.gov/online-tutorials.

The FIRM Index in Figure 1 shows the overall FIRM panel layout within Nassau County, and also displays the panel number and effective date for each FIRM panel in the county. Other information shown on the FIRM Index includes community boundaries, flooding sources, and United States Geological Survey (USGS) Hydrologic Unit Code – 8 (HUC-8) codes.



1 inch = 22,917 feet 1:275,000

0 6,500 13,000 26,000 39,000 52,000 feet

Map Projection:
State Plane Transverse Mercator, Florida East;
North American Datum 1983

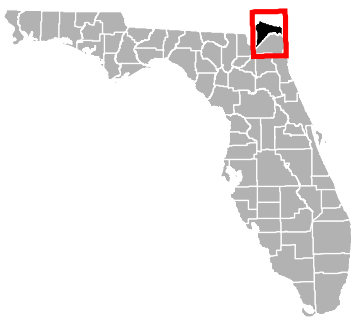
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
** PANEL NOT PRINTED - AREA ALL WITHIN ZONE VE (EL 14)

COUNTY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

NASSAU COUNTY, FLORIDA and Incorporated Areas

PANELS PRINTED:

0020, 0030, 0035, 0040, 0045, 0065, 0069, 0070, 0088, 0093, 0110, 0120, 0130, 0135, 0139, 0140, 0145, 0155, 0160, 0165, 0170, 0176, 0177, 0178, 0179, 0181, 0182, 0183, 0184, 0190, 0195, 0201, 0202, 0203, 0204, 0206, 0207, 0208, 0209, 0214, 0215, 0216, 0217, 0218, 0219, 0226, 0228, 0229, 0233, 0236, 0237, 0238, 0239, 0241, 0243, 0260, 0270, 0277, 0280, 0281, 0282, 0283, 0284, 0290, 0291, 0292, 0295, 0301, 0302, 0303, 0304, 0306, 0307, 0308, 0309, 0311, 0312, 0315, 0316, 0320, 0330, 0335, 0340, 0345, 0351, 0352, 0353, 0354, 0356, 0357, 0358, 0359, 0361, 0362, 0366, 0367, 0368, 0369, 0376, 0377, 0378, 0379, 0386, 0387, 0388, 0389, 0391, 0393, 0410, 0420, 0430, 0435, 0440, 0445, 0455, 0460, 0485, 0495, 0505, 0510

FEMA

PRELIMINARY
MAP NUMBER
12089CIND0B

MAP REVISED

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

Figure 2: FIRM Notes to Users

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 28 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

Coastal Base Flood Elevations shown on the map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Coastal flood elevations are also provided in the Coastal Transect Parameters table in the FIS Report for this jurisdiction. Elevations shown in the Coastal Transect Parameters table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on the FIRM.

Figure 2. FIRM Notes to Users

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

PROJECTION INFORMATION: The projection used in the preparation of the map was State Plane Transverse Mercator, Florida East Zone**.** The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988**.** These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988**,** visit the National Geodetic Survey website at www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 31 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by the U.S. Department of Agriculture Farm Service Agency. This imagery was flown in 2013 and was produced with a 1-meter ground sample distance. For information about base maps, refer to Section 6.2 “Base Map” in this FIS Report.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Figure 2. FIRM Notes to Users

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Nassau County, Florida, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 28 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Nassau County, Florida**,** effective **<date>.**

COASTAL BARRIER RESOURCES SYSTEM (CBRS): This map includes approximate boundaries of the CBRS for informational purposes only. Flood insurance is not available within CBRS areas for structures that are newly built or substantially improved on or after the date(s) indicated on the map. For more information see www.fws.gov/cbra/, the FIS Report, or call the U.S. Fish and Wildlife Service Customer Service Center at 1-800-344-WILD.

LIMIT OF MODERATE WAVE ACTION: Zone AE has been divided by a Limit of Moderate Wave Action (LiMWA). The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between Zone VE and the LiMWA (or between the shoreline and the LiMWA for areas where Zone VE is not identified) will be similar to, but less severe than, those in Zone VE.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identiy the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigartion opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legen for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legen for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Nassau County.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*

	Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)
Zone A	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
Zone AE	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone.
Zone AH	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
Zone AO	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
Zone AR	The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
Zone A99	The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
Zone V	The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.

Figure 3: Map Legend for FIRM

	Regulatory Floodway determined in Zone AE.
OTHER AREAS OF FLOOD HAZARD	
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood.
OTHER AREAS	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.
NO SCREEN	Unshaded Zone X: Areas of minimal flood hazard.
FLOOD HAZARD AND OTHER BOUNDARY LINES	
(ortho) (vector)	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
GENERAL STRUCTURES	
Aqueduct *Channel* *Culvert* *Storm Sewer*	Channel, Culvert, Aqueduct, or Storm Sewer
Dam *Jetty* *Weir*	Dam, Jetty, Weir
	Levee, Dike, or Floodwall
Bridge	Bridge

Figure 3: Map Legend for FIRM

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas. See Notes to Users for important information.*	
CBRS AREA 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
OTHERWISE PROTECTED AREA 09/30/2009	Otherwise Protected Area
REFERENCE MARKERS	
22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8	Coastal Transect
	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.
	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
513	Base Flood Elevation Line
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity

Figure 3: Map Legend for FIRM

BASE MAP FEATURES	
Missouri Creek	River, Stream or Other Hydrographic Feature
234	Interstate Highway
234	U.S. Highway
234	State Highway
234	County Highway
MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad
	Horizontal Reference Grid Line
	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
$^{42}76^{000m}$E	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16’ 52.5”	Corner Coordinates (Latitude, Longitude)

SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

2.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1% annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2% annual chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and Nassau County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1% annual chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 23), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1% and 0.2% annual chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1% annual chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary is shown on the FIRM. Figure 3, "Map Legend for FIRM", describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within Nassau County, Florida, respectively.

Table 2, "Flooding Sources Included in this FIS Report," lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 13. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1% annual chance floodplain corresponds to the SFHAs. The 0.2% annual chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

Table 2: Flooding Sources Included in this FIS Report

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi^2) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Alligator Creek	Callahan, Town of; Nassau County, Unicorporated Areas	Approximately 983' downstream of U.S. Highway 1 and U.S. Highway 23	Approximately 0.4 miles upstream of Railroad	03070205	0.85		Y	A, AE	
Atlantic Ocean	Fernandina Beach, City of; Nassau County, Unincorporated Areas	Entire coastline of Nassau County	Entire coastline of Nassau County	N/A	13.18		N	VE	5/6/2015

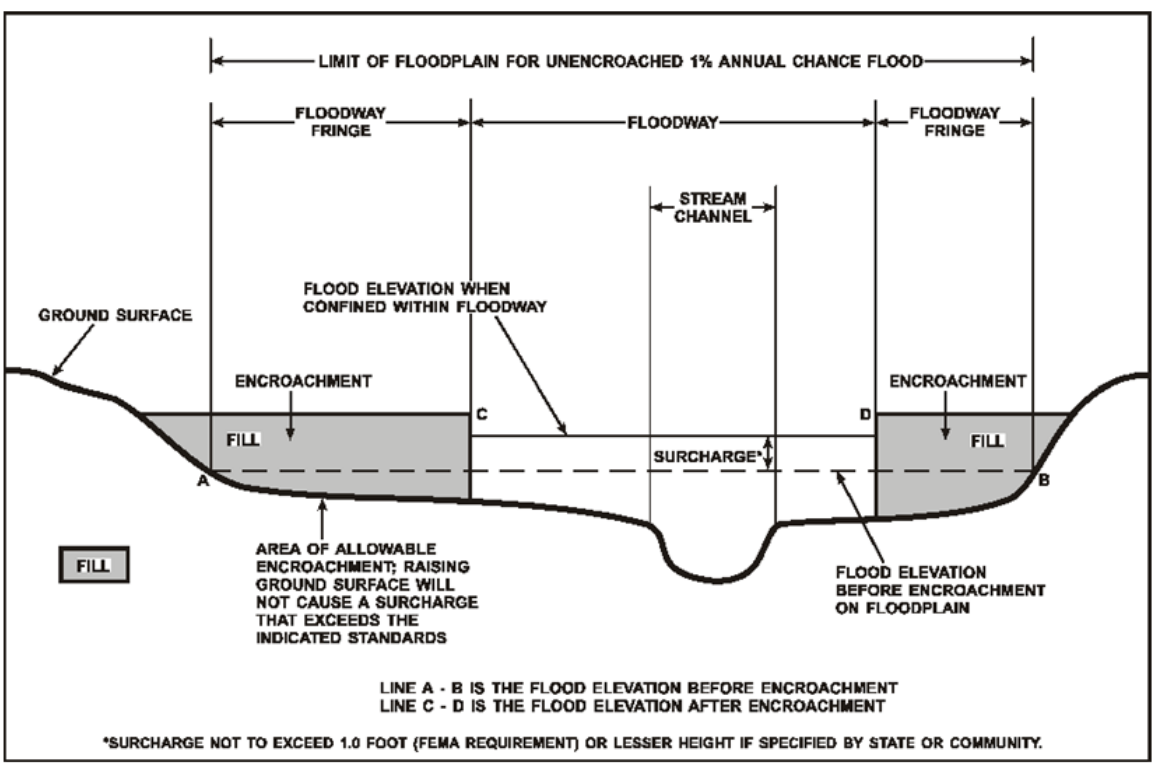
2.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard.

For purposes of the NFIP, a floodway is used as a tool to assist local communities in balancing floodplain development against increasing flood hazard. With this approach, the area of the 1% annual chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1% annual chance flood. The floodway fringe is the area between the floodway and the 1% annual chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1% annual chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4: Floodway Schematic



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

All floodways that were developed for this Flood Risk Project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and l% annual chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM.

2.4 Non-Encroachment Zones

Some States and communities use non-encroachment zones to manage floodplain development. For flooding sources with medium flood risk, field surveys are often not collected and surveyed bridge and culvert geometry is not developed. Standard hydrologic and hydraulic analyses are still performed to determine BFEs in these areas. However, floodways are not typically determined, since specific channel profiles are not developed. To assist communities with managing floodplain development in these areas, a "non-encroachment zone" may be provided. While not a FEMA designated floodway, the non-encroachment zone represents that area around the stream that should be reserved to convey the 1% annual chance flood event. As with a floodway, all surcharges must fall within the acceptable range in the non-encroachment zone.

General setbacks can be used in areas of lower risk (e.g. unnumbered Zone A), but these are not considered sufficient where unnumbered Zone A is replaced by Zone AE. The NFIP requires communities to ensure that any development in a non-encroachment area causes no increase in BFEs. Communities must generally prohibit development within the area defined by the non-encroachment width to meet the NFIP requirement.

Non-encroachment determinations may be delineated where it is not possible to delineate floodways because specific channel profiles with bridge and culvert geometry were not developed. Any non-encroachment determinations for this Flood Risk Project have been tabulated

for selected cross sections and are shown in Table 25, "Flood Hazard and Non-Encroachment Data for Selected Streams." Areas for which non-encroachment zones are provided show BFEs and the 1% annual chance floodplain boundaries mapped as zone AE on the FIRM but no floodways.

2.5 Coastal Flood Hazard Areas

For most areas along rivers, streams, and small lakes, BFEs and floodplain boundaries are based on the amount of water expected to enter the area during a 1% annual chance flood and the geometry of the floodplain. Floods in these areas are typically caused by storm events. However, for areas on or near ocean coasts, large rivers, or large bodies of water, BFE and floodplain boundaries may need to be based on additional components, including storm surges and waves. Communities on or near ocean coasts face flood hazards caused by offshore seismic events as well as storm events.

Coastal flooding sources that are included in this Flood Risk Project are shown in Table 2.

2.5.1 Water Elevations and the Effects of Waves

Specific terminology is used in coastal analyses to indicate which components have been included in evaluating flood hazards.

The stillwater elevation (SWEL or still water level) is the surface of the water resulting from astronomical tides, storm surge, and freshwater inputs, but excluding wave setup contribution or the effects of waves.

- *Astronomical tides* are periodic rises and falls in large bodies of water caused by the rotation of the earth and by the gravitational forces exerted by the earth, moon and sun.
- *Storm surge* is the additional water depth that occurs during large storm events. These events can bring air pressure changes and strong winds that force water up against the shore.
- *Freshwater inputs* include rainfall that falls directly on the body of water, runoff from surfaces and overland flow, and inputs from rivers.

The 1% annual chance stillwater elevation is the stillwater elevation that has been calculated for a storm surge from a 1% annual chance storm. The 1% annual chance storm surge can be determined from analyses of tidal gage records, statistical study of regional historical storms, or other modeling approaches. Stillwater elevations for storms of other frequencies can be developed using similar approaches.

The total stillwater elevation (also referred to as the mean water level) is the stillwater elevation plus wave setup contribution but excluding the effects of waves.

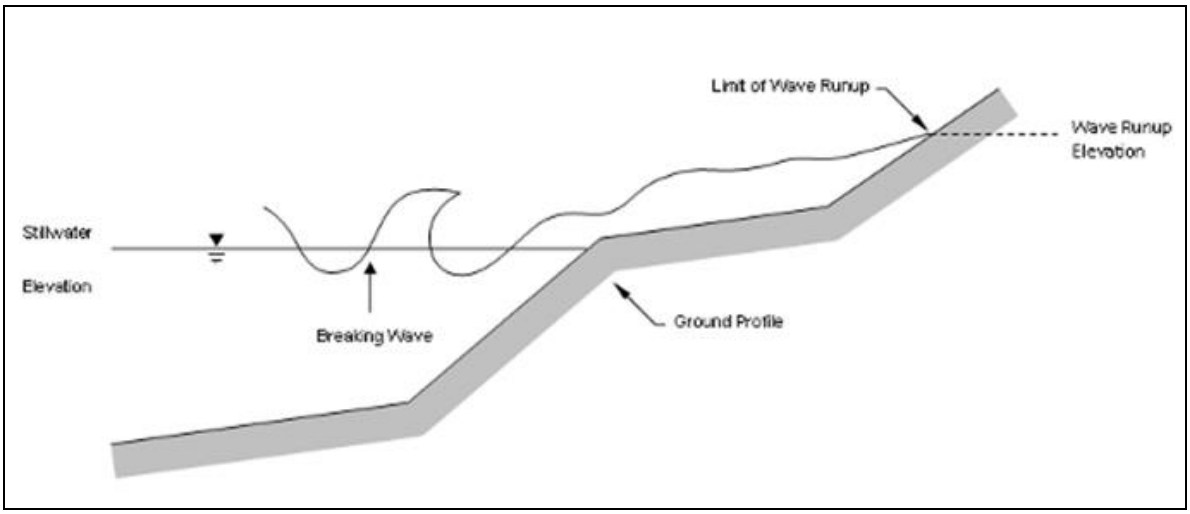
- *Wave setup* is the increase in stillwater elevation at the shoreline caused by the reduction of waves in shallow water. It occurs as breaking wave momentum is transferred to the water column.

Like the stillwater elevation, the total stillwater elevation is based on a storm of a particular frequency, such as the 1% annual chance storm. Wave setup is typically estimated using standard engineering practices or calculated using models, since tidal gages are often sited in areas sheltered from wave action and do not capture this information.

Coastal analyses may examine the effects of overland waves by analyzing storm-induced erosion, overland wave propagation, wave runup, and/or wave overtopping.

- *Storm-induced erosion* is the modification of existing topography by erosion caused by a specific storm event, as opposed to general erosion that occurs at a more constant rate.
- *Overland wave propagation* describes the combined effects of variation in ground elevation, vegetation, and physical features on wave characteristics as waves move onshore.
- *Wave runup* is the uprush of water from wave action on a shore barrier. It is a function of the roughness and geometry of the shoreline at the point where the stillwater elevation intersects the land.
- *Wave overtopping* refers to wave runup that occurs when waves pass over the crest of a barrier.

Figure 5: Wave Runup Transect Schematic



2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

For coastal communities along the Atlantic and Pacific Oceans, the Gulf of Mexico, the Great Lakes, and the Caribbean Sea, flood hazards must take into account how storm surges, waves, and extreme tides interact with factors such as topography and vegetation. Storm surge and waves must also be considered in assessing flood risk for certain communities on rivers or large inland bodies of water.

Beyond areas that are affected by waves and tides, coastal communities can also have riverine floodplains with designated floodways, as described in previous sections.

Floodplain Boundaries

In many coastal areas, storm surge is the principle component of flooding. The extent of the 1% annual chance floodplain in these areas is derived from the total stillwater elevation (stillwater elevation including storm surge plus wave setup) for the 1% annual chance storm. The methods that were used for calculation of total stillwater elevations for coastal areas are described in Section 5.3 of this FIS Report. Location of total stillwater elevations for coastal areas are shown in Figure 8, “1% Annual Chance Total Stillwater Levels for Coastal Areas.”

In some areas, the 1% annual chance floodplain is determined based on the limit of wave runup or wave overtopping for the 1% annual chance storm surge. The methods that were used for calculation of wave hazards are described in Section 5.3 of this FIS Report.

Table 26 presents the types of coastal analyses that were used in mapping the 1% annual chance floodplain in coastal areas.

Coastal BFEs

Coastal BFEs are calculated as the total stillwater elevation (stillwater elevation including storm surge plus wave setup) for the 1% annual chance storm plus the additional flood hazard from overland wave effects (storm-induced erosion, overland wave propagation, wave runup and wave overtopping).

Where they apply, coastal BFEs are calculated along transects extending from offshore to the limit of coastal flooding onshore. Results of these analyses are accurate until local topography, vegetation, or development type and density within the community undergoes major changes.

Parameters that were included in calculating coastal BFEs for each transect included in this FIS Report are presented in Table 17, "Coastal Transect Parameters." The locations of transects are shown in Figure 9, "Transect Location Map." More detailed information about the methods used in coastal analyses and the results of intermediate steps in the coastal analyses are presented in Section 5.3 of this FIS Report. Additional information on specific mapping methods is provided in Section 6.4 of this FIS Report.

2.5.3 Coastal High Hazard Areas

Certain areas along the open coast and other areas may have higher risk of experiencing structural damage caused by wave action and/or high-velocity water during the 1% annual chance flood. These areas will be identified on the FIRM as Coastal High Hazard Areas.

- *Coastal High Hazard Area (CHHA)* is a SFHA extending from offshore to the inland limit of the primary frontal dune (PFD) or any other area subject to damages caused by wave action and/or high-velocity water during the 1% annual chance flood.
- *Primary Frontal Dune (PFD)* is a continuous or nearly continuous mound or ridge of sand with relatively steep slopes immediately landward and adjacent to the beach. The PFD is subject to erosion and overtopping from high tides and waves during major coastal storms.

CHHAs are designated as "V" zones (for "velocity wave zones") and are subject to more stringent regulatory requirements and a different flood insurance rate structure. The areas of greatest risk are shown as VE on the FIRM. Zone VE is further subdivided into elevation zones and shown with BFEs on the FIRM.

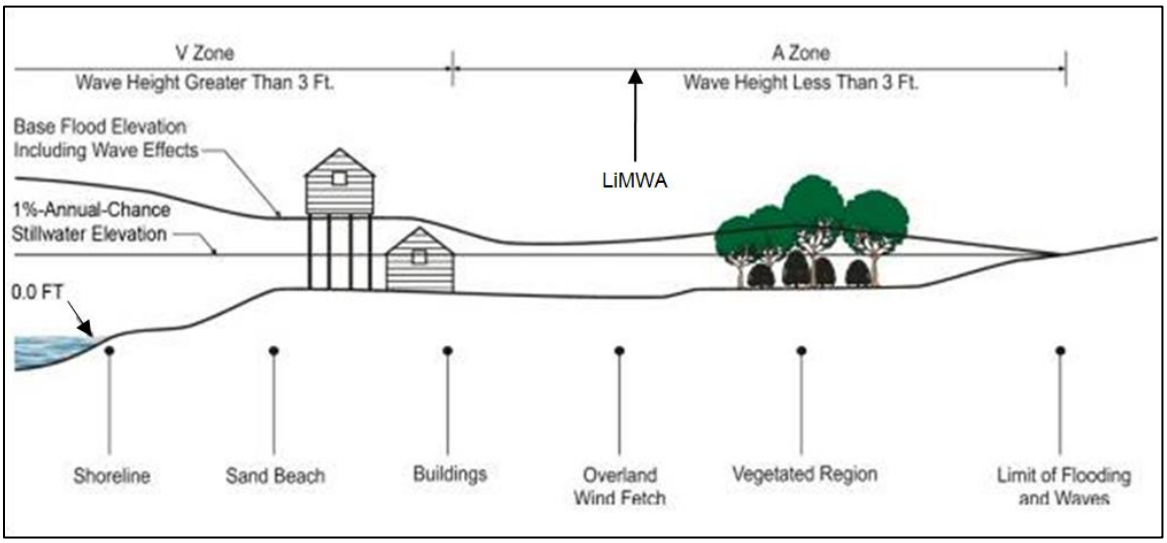
The landward limit of the PFD occurs at a point where there is a distinct change from a relatively steep slope to a relatively mild slope; this point represents the landward extension of Zone VE. Areas of lower risk in the CHHA are designated with Zone V on the FIRM. More detailed information about the identification and designation of Zone VE is presented in Section 6.4 of this FIS Report.

Areas that are not within the CHHA but are SFHAs may still be impacted by coastal flooding and

damaging waves; these areas are shown as “A” zones on the FIRM.

Figure 6, “Coastal Transect Schematic,” illustrates the relationship between the base flood elevation, the 1% annual chance stillwater elevation, and the ground profile as well as the location of the Zone VE and Zone AE areas in an area without a PFD subject to overland wave propagation. This figure also illustrates energy dissipation and regeneration of a wave as it moves inland.

Figure 6: Coastal Transect Schematic



Methods used in coastal analyses in this Flood Risk Project are presented in Section 5.3 and mapping methods are provided in Section 6.4 of this FIS Report.

Coastal floodplains are shown on the FIRM using the symbology described in Figure 3, “Map Legend for FIRM.” In many cases, the BFE on the FIRM is higher than the stillwater elevations shown in Table 17 due to the presence of wave effects. The higher elevation should be used for construction and/or floodplain management purposes.

2.5.4 Limit of Moderate Wave Action

Laboratory tests and field investigations have shown that wave heights as little as 1.5 feet can cause damage to and failure of typical Zone AE building construction. Wood-frame, light gage steel, or masonry walls on shallow footings or slabs are subject to damage when exposed to waves less than 3 feet in height. Other flood hazards associated with coastal waves (floating debris, high velocity flow, erosion, and scour) can also damage Zone AE construction.

Therefore, a LiMWA boundary may be shown on the FIRM as an informational layer to assist coastal communities in safe rebuilding practices. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The location of the LiMWA relative to Zone VE and Zone AE is shown in Figure 6.

The effects of wave hazards in Zone AE between Zone VE (or the shoreline where Zone VE is not identified) and the limit of the LiMWA boundary are similar to, but less severe than, those in Zone VE where 3-foot or greater breaking waves are projected to occur during the 1% annual

chance flooding event. Communities are therefore encouraged to adopt and enforce more stringent floodplain management requirements than the minimum NFIP requirements in the LiMWA. The NFIP Community Rating System provides credits for these actions.

Where wave runup elevations dominate over wave heights, there is no evidence to date of significant damage to residential structures by runup depths less than 3 feet. Examples of these areas include areas with steeply sloped beaches, bluffs, or flood protection structures that lie parallel to the shore. In these areas, the FIRM shows the LiMWA immediately landward of the VE/AE boundary. Similarly, in areas where the zone VE designation is based on the presence of a primary frontal dune or wave overtopping, the LiMWA is delineated immediately landward of the Zone VE/AE boundary.

SECTION 3.0 – INSURANCE APPLICATIONS

3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, "Map Legend for FIRM." Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in Nassau County.

Table 3: Flood Zone Designations by Community

Community	Flood Zone(s)
Callahan, Town of	A, AE, X
Fernandina Beach, City of	AE, AO, VE, X
Hilliard, Town of	A, X
Nassau County, Unicorporated Areas	A, AE, VE, X

3.2 Coastal Barrier Resources System

The Coastal Barrier Resources Act (CBRA) of 1982 was established by Congress to create areas along the Atlantic and Gulf coasts and the Great Lakes, where restrictions for Federal financial assistance including flood insurance are prohibited. In 1990, Congress passed the Coastal Barrier Improvement Act (CBIA), which increased the extent of areas established by the CBRA and added "Otherwise Protected Areas" (OPA) to the system. These areas are collectively referred to as the John. H Chafee Coastal Barrier Resources System (CBRS). The CBRS boundaries that have been identified in the project area are in Table 4, "Coastal Barrier Resource System Information."

Table 4: Coastal Barrier Resources System Information

Primary Flooding Source	CBRS/OPA Type	Date CBRS Area Established	FIRM Panel Number(s)
Atlantic Ocean	OPA	11/16/1991	12089C0389G 12089C0393G
Atlantic Ocean	OPA	11/16/1991	12089C0229G 12089C0233G 12089C0237G 12089C0241G

SECTION 4.0 – AREA STUDIED

4.1 Basin Description

Table 5 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

Table 5: Basin Characteristics

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Cumberland-St. Simons	03070203	*	*	2.4
Nassau	03070205	Nassau River	Located along the southern boundary of the county and discharges into the Atlantic Ocean.	312
St. Marys	03070204	St. Marys River	Located along the northern boundary of the county and discharges into the Atlantic Ocean.	352

*Data not available

4.2 Principal Flood Problems

Table 6 contains a description of the principal flood problems that have been noted for Nassau County by flooding source.

Table 6: Principal Flood Problems

Flooding Source	Description of Flood Problems
Atlantic Ocean	The principal flooding threat to Nassau County is the open coast surge, whose elevation is augmented by wind-induced waves. Nassau County was flooded during Hurricane Dora in 1964, when large portions of Amelia Island were

Flooding Source	Description of Flood Problems
	washed away and tides of 10 feet above mean sea level (MSL) were recorded at Fernandina Beach. Federally Declared Disasters occurred in Nassau County in 2008 for Tropical Storm Fay, 2004 for Hurricane Jeanne, 2004 for Hurricane Frances, 2004 for Hurricane Charley and Tropical Storm Bonnie, 1999 for Hurricane Irene, and 1999 for Hurricane Floyd (FEMA).
Alligator Creek	Alligator Creek flows into the Town of Callahan through a wooded wetland area which readily absorbs excess water following heavy rains. The capacity of this area is such that there are no reported occasions on which Alligator Creek rose to the low chord of U.S. Highway 1 bridge, including times of heavy rainfall accompanying hurricanes. One known high water mark of 16.2 feet NGVD 29, recorded in 1951, fell more than a foot below the low chord on the U.S. Highway 1 Bridge. Based upon step-backwater computations, the findings of the study indicate that neither the 100-year nor the 500-year flood in Alligator Creek may be expected to reach residential and commercial areas of the Town of Callahan, although flooding due to ponding may be expected at several areas within the corporate limits. In the Town of Callahan the principal flood problems may be attributed to poor drainage. This occurrence is aggravated by roadways and railroad lines that interfere with drainage. Damage due to ponding is most likely to occur near the State Route 200 overpass in the southwestern quadrant.

Table 7 contains information about historic flood elevations in the communities within Nassau County.

Table 7: Historic Flooding Elevations

Flooding Source	Location	Historic Peak (Feet NGVD29)	Event Date	Approximate Recurrence Interval (years)	Source of Data
Alligator Creek	U.S. Highway 1 bridge	16.2	1951	*	*

*Data not available

4.3 Non-Levee Flood Protection Measures

Table 8 contains information about non-levee flood protection measures within Nassau County such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

Table 8: Non-Levee Flood Protection Measures

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Atlantic Ocean	N/A	Groins and riprap	Amelia Island	USACE effort to control beach erosion

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Alligator Creek	N/A	Brushing and snagging	Downstream of U.S. Highway 1 Bridge	Began in the 1940's by USACE to improve flow in Alligator Creek
Alligator Creek	N/A	Channel	Between the U.S. Highway 1 and State Route 200 bridges	Stream channelizing to improve drainage
Cushing Creek	N/A	Channel	From Seaboard Coast Line Railroad Bridge to Alligator Creek	Stream channelizing to improve drainage

4.4 Levees

This section is not applicable to this Flood Risk Project.

Table 9: Levees

[Not Applicable to this Flood Risk Project]

SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or

methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 13. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 10. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources in provided in Table 11. (Coastal stillwater elevations are discussed in Section 5.3 and shown in Table 17.) Stream gage information is provided in Table 12.

Table 10: Summary of Discharges

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Alligator Creek	N/A	13.8	1,222	*	1,548	1,629	2,089

*Not calculated for this Flood Risk Project

Figure 7: Frequency Discharge-Drainage Area Curves

[Not Applicable to this Flood Risk Project]

Table 11: Summary of Non-Coastal Stillwater Elevations

[Not Applicable to this Flood Risk Project]

Table 12: Stream Gage Information used to Determine Discharges

[Not Applicable to this Flood Risk Project]

5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed on Table 24, “Floodway Data.”

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 13. Roughness coefficients are provided in Table 14. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

Table 13: Summary of Hydrologic and Hydraulic Analyses

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Atlantic Ocean	Entire coastline of Nassau County	Entire coastline of Nassau County	ADCIRC+ SWAN	GANEFL	2013	VE	The low-frequency stillwater analysis portion of the GANEFL storm surge study produced 2-, 1-, and 0.2-percent-annual-chance SWELs. These SWELs include wave setup contributions produced from the coupled two-dimensional (2-D) hydrodynamic and wave models (ADCIRC+SWAN) used in the GANEFL study. The 1- and 0.2-percent-annual-chance SWEL surfaces were modified in select locations during the overland wave hazard analysis and floodplain mapping. Modifications to the 1- and 0.2-percent-annual-chance SWELs within Nassau County were made to areas where dune erosion, not accounted for in the ADCIRC+SWAN modeling, allows open coast SWELs to propogate inland. In addition, inland areas were modified to capture small areas hydraulically connected to a flooding source that weren't fully resolved in the original surfaces and areas where the surface did not extend fully to the location where ground elevations equal SWEL elevations. In these area, SWELs were assigned or added to properly reflect hydraulic connectivity and to expand the coverage beyond flooding extents to facilitate mapping.

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Alligator Creek	Confluence with Nassau River	Approximately 1 mile upstream of confluence of Alligator Creek Tributary 17	N/A	HEC-2		AE, A	Water-surface elevations tabulated in this report were computed with the Hydrologic Engineering Center (HEC)-2 step-backwater computer program developed by USACE (USACE, 1973.) Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of selected recurrence intervals. There is no known flow-to-water-surface-elevation relationship for the Town of Callahan that might be used as an initial condition from which to being step-backwater computeations. Therefore, HEC-2 computations were started by the slope-area method at the corss-section farthest downstream using channel slope for the channelized portion. There are no stream gages on Alligator Creek, nor are there any rainfall gages in or near the Town of Callahan. Since no historical data was available from which to determine a discharge-frequency relationship for Alligator Creek, this information was derived using a procedure for the estimation of stream flow which is presented in Chapter 21, Section 4, of the SCS National Engineering Handbook (USDA, 1973). Estimates of rainfall amounts were taken from Technical Paper 40, Rainfall Frequency Atlas of the United States (USDC, 1961).

Table 14: Roughness Coefficients

Flooding Source	Channel "n"	Overbank "n"
Alligator Creek	0.035	0.070-0.125

5.3 Coastal Analyses

For the areas of Nassau County that are impacted by coastal flooding processes, coastal flood hazard analyses were performed to provide estimates of coastal BFEs. Coastal BFEs reflect the increase in water levels during a flood event due to extreme tides and storm surge as well as overland wave effects.

The following subsections provide summaries of how each coastal process was considered for this FIS Report. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation. Table 15 summarizes the methods and/or models used for the coastal analyses. Refer to Section 2.5.1 for descriptions of the terms used in this section.

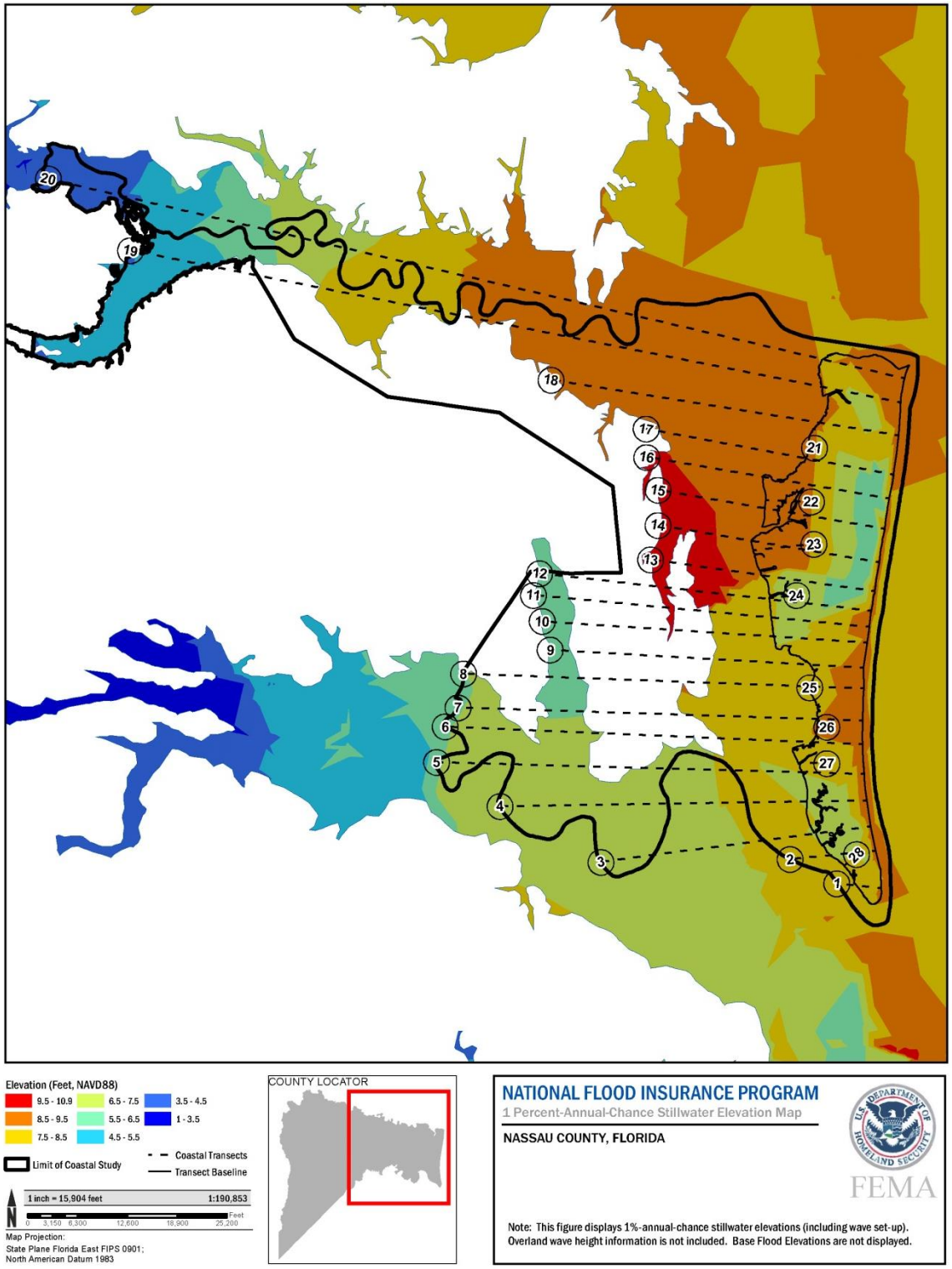
Table 15: Summary of Coastal Analyses

Flooding Source	Study Limits From	Study Limits To	Hazard Evaluated	Model or Method Used	Date Analysis was Completed
Atlantic Ocean	Entire Coastline of Nassau County	Entire Coastline of Nassau County	Storm Climatology Statistical Analysis	JPM-OS	11/1/2013
Atlantic Ocean	Entire Coastline of Nassau County	Entire Coastline of Nassau County	Storm Surge including Regional Wave Setup	SWAN+ADCIRC (fully coupled model)	10/7/2013
Atlantic Ocean	Entire Coastline of Nassau County	Entire Coastline of Nassau County	Stillwater Frequency Analysis	SURGESTAT (low frequency); Tidal Frequency Analysis (high frequency)	11/21/2013
Atlantic Ocean	Entire Coastline of Nassau County	Entire Coastline of Nassau County	Overland Wave Propagation	WHAFIS 4.0	2/23/2015
Atlantic Ocean	Entire Coastline of Nassau County	Entire Coastline of Nassau County	Wave Runup	Runup 2.0	2/23/2015
Atlantic Ocean	Entire Coastline of Nassau County	Entire Coastline of Nassau County	Erosion	FEMA 540 SF Rule	2/23/2015

5.3.1 Total Stillwater Elevations

The total stillwater elevations (stillwater including storm surge plus wave setup) for the 1% annual chance flood were determined for areas subject to coastal flooding. The models and methods that were used to determine storm surge and wave setup are listed in Table 15. The stillwater elevation that was used for each transect in coastal analyses is shown in Table 17, "Coastal Transect Parameters." Figure 8 shows the total stillwater elevations for the 1% annual chance flood that was determined for this coastal analysis.

Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas



Astronomical Tide

Astronomical tidal statistics were generated directly from local tidal constituents by sampling the predicted tide at random times throughout the tidal epoch.

Storm Surge Statistics

Storm surge is modeled based on characteristics of actual storms responsible for significant coastal flooding. The characteristics of these storms are typically determined by statistical study of the regional historical record of storms or by statistical study of tidal gages.

When historic records are used to calculate storm surge, characteristics such as the strength, size, track, etc., of storms are identified by site. Storm data was used with hydrodynamic models to determine storm surge levels.

Statistical analyses were performed to determine the annual chance flood elevations for the GANEFL study. The study considered both high frequency (i.e., 50-, 25-, 10-, and 4-percent-annual-chance) events as well as low frequency (i.e., 2-, 1-, and 0.2-percent-annual-chance) events.

Flood estimates for the low frequency events were derived by simulating a large number of storm events using a coupling of hydrodynamic and wave models (i.e., the ADCIRC-ADvanced CIRCulation model and the SWAN-Simulating Waves Nearshore model). Key storm parameters (central pressure deficit, radius to maximum winds, forward speed, track heading, and the Holland's B parameter) were used to represent a population of historic and synthetic storm events. The Joint Probability Method with Optimal Sampling (JPM-OS), developed by Resio (2007) and Toro et. al. (2010), was applied to compute Stillwater Elevations (SWELs), which include the storm surge component and the wave setup component.

High frequency events were computed based on the approach described in the report "Tide Gage Analysis for the Atlantic and Gulf Open Coast" dated December 2, 2008 (Federal Emergency Management Agency, 2008). The methods from this previous study were applied to updated tide records, through the end of 2012, which added six years of additional data to the analysis. In addition, the regionalization of the tide gages from the previous study was re-evaluated and revised using the additional data and observations of revised statistical parameters.

Tidal gages can be used instead of historic records of storms when the available tidal gage record for the area represents both the astronomical tide component and the storm surge component. Table 16 provides the gage name, managing agency, gage type, gage identifier, start date, end date, and statistical methodology applied to each gage used to determine the stillwater elevations.

Table 16: Tide Gage Analysis Specifics

Gage Name	Managing Agency of Tide Gage Record	Gage Type	Start Date	End Date	Statistical Methodology
Charleston – 8665530	NOAA	Tide	1899	Present	L-moments, GEV

Gage Name	Managing Agency of Tide Gage Record	Gage Type	Start Date	End Date	Statistical Methodology
Fort Pulaski - 8670870	NOAA	Tide	1935	Present	L-moments, GEV
Fernandina Beach - 8720030	NOAA	Tide	1898	Present	L-moments, GEV
Mayport Ferry Depot - 8720220	NOAA	Tide	1928	2008	L-moments, GEV
St Augustine - 8720587	NOAA	Tide	1992	2004	L-moments, GEV
Daytona Beach Shores - 8721120	NOAA	Tide	1966	1984	L-moments, GEV
Trident Pier - 8721604	NOAA	Tide	1994	Present	L-moments, GEV
Lake Worth Pier - 8722670	NOAA	Tide	1970	Present	L-moments, GEV
Miami Beach - 8723170	NOAA	Tide	1931	1981	L-moments, GEV
Virginaia Key - 8713214	NOAA	Tide	1994	Present	L-moments, GEV

Wave Setup Analysis

Wave setup was computed during the storm surge modeling through the methods and models listed in Table 15 and included in the frequency analysis for the determination of the total stillwater elevations.

5.3.2 Waves

Offshore wave conditions were modeled as part of the regional hydrodynamic and wave modeling (ADCIRC + SWAN). The regional model results provided valuable information on the wave conditions that could be expected to occur during the types of extreme storm events that would produce storm surge elevations with 1- and 0.2-percent-annual-chance probabilities of occurrence. Wave heights and periods derived from the SWAN model results were used as inputs to the wave hazard analyses described in Section 5.4.3.

5.3.3 Coastal Erosion

A single storm episode can cause extensive erosion in coastal areas. Storm-induced erosion was

evaluated to determine the modification to existing topography that is expected to be associated with flooding events. Erosion was evaluated using the methods listed in Table 15. The post-event eroded profile was used for the subsequent wave hazard analyses.

5.3.4 Wave Hazard Analyses

Overland wave hazards were evaluated to determine the combined effects of ground elevation, vegetation, and physical features on overland wave propagation and wave runup. These analyses were performed at representative transects along all shorelines for which waves were expected to be present during the floods of the selected recurrence intervals. The results of these analyses were used to determine elevations for the 1% annual chance flood.

Transect locations were chosen with consideration given to the physical land characteristics as well as development type and density so that they would closely represent conditions in their locality. Additional consideration was given to changes in the total stillwater elevation. Transects were spaced close together in areas of complex topography and dense development or where total stillwater elevations varied. In areas having more uniform characteristics, transects were spaced at larger intervals. Transects shown in Figure 9, “Transect Location Map,” are also depicted on the FIRM. Table 17 provides the location, stillwater elevations, and starting wave conditions for each transect evaluated for overland wave hazards. In this table, “starting” indicates the parameter value at the beginning of the transect.

Wave Height Analysis

Wave height analyses were performed to determine wave heights and corresponding wave crest elevations for the areas inundated by coastal flooding and subject to overland wave propagation hazards. Refer to Figure 6 for a schematic of a coastal transect evaluated for overland wave propagation hazards.

Wave heights and wave crest elevations were modeled using the methods and models listed in Table 15, “Summary of Coastal Analyses”.

Wave Runup Analysis

Wave runup analyses were performed to determine the height and extent of runup beyond the limit of stillwater inundation for the 1% annual chance flood. Wave runup elevations were modeled using the methods and models listed in Table 15.

Table 17: Coastal Transect Parameters

Flood Source	Coastal Transect	Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)				
		Significant Wave Height H_s (ft)	Peak Wave Period T_p (sec)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	1	18.4	12.5	5.6 5.0 - 5.6	6.0 5.4 - 6.0	7.4 6.7 - 7.4	8.8 7.8 - 9.0	11.3 10.0 - 11.6
Atlantic Ocean	2	17.5	12.7	5.6 4.9 - 5.6	6.1 5.3 - 6.1	7.5 5.5 - 7.5	8.9 7.2 - 8.9	11.5 9.4 - 11.5
Atlantic Ocean	3	17.7	12.8	5.6 4.6 – 5.6	6.1 4.9 - 6.1	7.5 5.6 - 7.5	8.9 7.1 - 8.9	11.5 9.1 - 11.5
Atlantic Ocean	4	17.7	13.0	5.7 3.8 - 5.7	6.1 4.1 - 6.1	7.6 5.0 - 7.6	8.8 6.8 - 9.1	11.5 9.1 - 11.7

Flood Source	Coastal Transect	Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)				
		Significant Wave Height H_s (ft)	Peak Wave Period T_p (sec)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	5	17.7	12.9	5.5 4.0 - 5.5	5.9 4.3 – 5.9	7.3 5.3 - 7.3	8.9 6.6 - 9.1	11.5 7.0 - 11.7
Atlantic Ocean	6	17.8	12.8	5.8 3.8 - 5.8	6.2 4.1 - 6.2	7.7 5.1 - 7.7	9.0 6.6 - 9.1	11.5 6.9 - 11.7
Atlantic Ocean	7	17.9	12.7	5.7 3.7 - 5.7	6.1 4.0 - 6.1	7.6 4.9 - 7.6	9.0 6.2 - 9.0	11.5 7.1 - 11.5
Atlantic Ocean	8	17.8	13.0	5.7 3.5 - 5.7	6.1 3.7 - 6.1	7.6 4.6 - 7.6	8.9 5.4 - 9.0	11.4 7.5 - 13.4

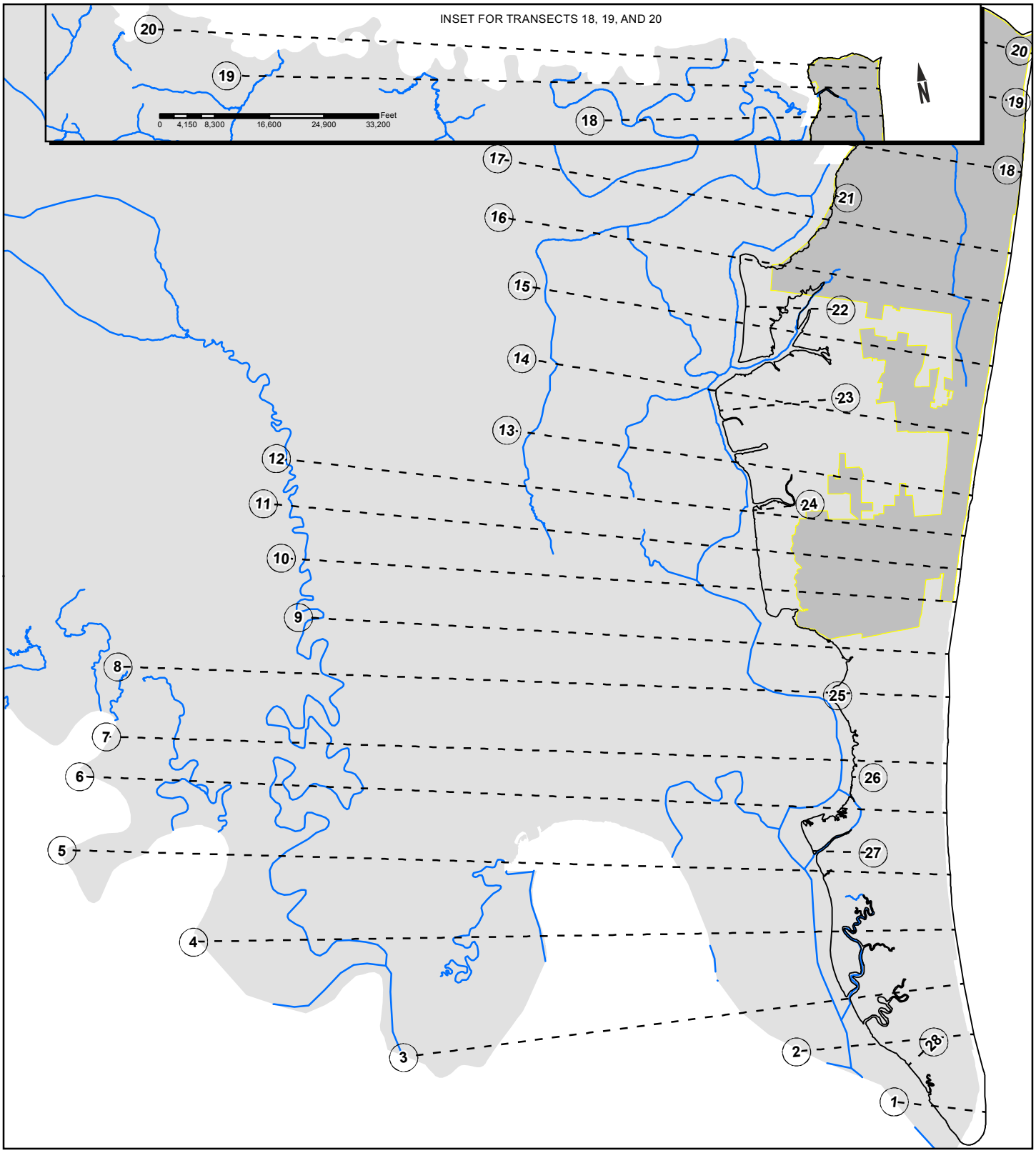
Flood Source	Coastal Transect	Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)				
		Significant Wave Height H_s (ft)	Peak Wave Period T_p (sec)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	9	17.8	12.7	5.6 4.0 - 5.6	6.1 4.3 - 6.1	7.5 4.9 - 7.5	8.9 6.2 - 9.1	11.4 8.7 - 13.8
Atlantic Ocean	10	17.9	12.6	5.7 2.9 - 5.7	6.1 3.2 - 6.1	7.6 3.9 - 7.6	8.8 5.7 - 10.4	11.3 8.5 - 13.8
Atlantic Ocean	11	18.0	12.6	5.6 2.8 - 5.6	6.1 3.0 - 6.1	7.5 3.7 - 8.1	8.8 5.7 - 10.4	11.4 8.5 - 13.8
Atlantic Ocean	12	18.0	12.5	5.6 2.8 – 6.3	6.1 2.9 - 6.8	7.5 3.7 - 8.4	8.8 5.7 - 10.4	11.3 8.4 - 13.8

Flood Source	Coastal Transect	Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)				
		Significant Wave Height H_s (ft)	Peak Wave Period T_p (sec)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	13	17.8	12.4	5.6 4.7-6.2	6.1 5.1-6.6	7.5 2.3-8.2	8.7 5.7-10.2	11.2 9.1-13.5
Atlantic Ocean	14	17.6	12.1	5.6 5.7-6.0	6.1 6.1-6.5	7.5 2.3-8.0	8.6 5.7-10.0	11.1 9.1-13.1
Atlantic Ocean	15	17.3	12.3	5.6 1.7-5.9	6.0 1.9-6.4	7.4 2.3-7.9	8.7 5.7-9.8	11.3 9.1-12.8
Atlantic Ocean	16	17.3	12.4	5.6 1.2-5.8	6.0 1.3-6.3	7.4 2.3-7.8	8.6 5.8-9.7	11.2 9.0-12.7

Flood Source	Coastal Transect	Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)				
		Significant Wave Height H_s (ft)	Peak Wave Period T_p (sec)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Atlantic Ocean	17	17.3	12.4	5.6 1.8-5.8	6.1 1.9-6.2	7.5 2.4-7.7	8.7 5.9-9.5	11.2 9.0-12.4
Atlantic Ocean	18	17.1	12.1	5.6 4.9-5.7	6.1 5.3-6.1	7.5 6.5-7.6	8.8 7.5-9.3	11.3 9.5-12.3
Atlantic Ocean	19	17.3	12.1	5.6 2.7-5.6	6.1 2.9-6.1	7.5 3.6-7.5	8.8 4.8-9.1	11.4 6.5-12.1
Atlantic Ocean	20	17.4	12.2	5.6 1.9-5.6	6.0 2.0-6.0	7.4 2.5-7.4	8.7 3.5-9.0	11.4 5.0-11.7

Flood Source	Coastal Transect	Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)				
		Significant Wave Height H_s (ft)	Peak Wave Period T_p (sec)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Amelia River	21	3.2	3.0	5.6 5.4 – 5.6	6.0 5.8 - 6.0	7.4 7.2 - 7.4	8.8 8.8 - 8.8	11.5 11.5 - 11.5
Amelia River	22	3.2	3.0	5.6 5.6 – 5.7	6.1 5.7 - 6.1	7.6 7.1 - 7.6	9.1 8.8 - 9.1	11.9 11.7 - 11.9
Amelia River	23	3.0	3.0	5.8 5.6 – 5.8	6.2 6.0 - 6.2	7.7 7.4 - 7.7	9.3 9.1 - 9.3	12.1 11.9 - 12.1
Amelia River	24	2.5	2.5	4.9 4.8 – 4.9	5.3 5.2 – 5.3	6.5 6.4 - 6.5	7.6 7.3 - 7.6	9.9 9.7 - 9.9

Flood Source	Coastal Transect	Starting Wave Conditions for the 1% Annual Chance		Starting Stillwater Elevations (ft NAVD88) Range of Stillwater Elevations (ft NAVD88)				
		Significant Wave Height H_s (ft)	Peak Wave Period T_p (sec)	10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Amelia River	25	3.0	2.8	4.8 4.8-4.8	5.2 5.2-5.2	6.4 6.4-6.4	7.4 7.3-7.4	9.4 9.4-9.4
Amelia River	26	3.0	2.8	4.8 4.5-4.8	5.2 4.8-5.2	6.4 6.0-6.4	7.4 7.2-7.4	9.4 9.3-9.4
Amelia River	27	3.1	2.8	4.8 4.8-4.8	5.2 5.2-5.2	6.4 6.0-6.4	7.4 7.2-7.4	9.5 9.3-9.5
Amelia River	28	3.0	2.7	5.0 5.0-5.0	5.4 5.4-5.4	6.7 6.3-6.7	7.8 7.2-7.8	10.0 9.5-10.0

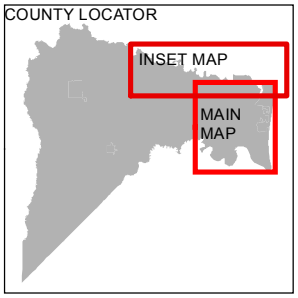


1 inch = 8,350 feet 1:100,200

0 1,650 3,300 6,600 9,900 13,200 Feet

Map Projection:
State Plane Florida East FIPS 0901;
North American Datum 1983

COUNTY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

Transect Locator Map **NASSAU COUNTY, FLORIDA**

PANELS WITH TRANSECTS:

0069G, 0088G, 0176G, 0177G, 0181G, 0182G, 0201G, 0202G, 0203G, 0204G, 0206G, 0208G, 0209G, 0214G, 0217G, 0218G, 0219G, 0228G, 0229G, 0233G, 0236G, 0237G, 0238G, 0239G, 0241G, 0243G, 0351G, 0352G, 0353G, 0354G, 0356G, 0357G, 0358G, 0359G, 0362G, 0366G, 0367G, 0368G, 0369G, 0376G, 0377G, 0378G, 0379G, 0386G, 0387G, 0388G, 0389G, 0391G, 0393G

FEMA

5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

Table 18: Summary of Alluvial Fan Analyses

[Not Applicable to this Flood Risk Project]

Table 19: Results of Alluvial Fan Analyses

[Not Applicable to this Flood Risk Project]

SECTION 6.0 – MAPPING METHODS

6.1 Vertical and Horizontal Control

All FIS Reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS Reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the archived project documentation associated with the FIS Report and the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please contact information services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

The datum conversion locations and values that were calculated for Nassau County are provided in Table 20.

Table 20: Countywide Vertical Datum Conversion

[Not Applicable to this Flood Risk Project]

A countywide conversion factor from NGVD 29 to NAVDD 88 is -1.052 feet in Nassau County for all streams and stillwater elevations.

Calculations for the vertical offsets on a stream by stream basis are depicted in Table 21.

Table 21: Stream-Based Vertical Datum Conversion

[Not Applicable to this Flood Risk Project]

6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA's *Guidelines and Standards for Flood Risk Analysis and Mapping*, www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping.

Base map information shown on the FIRM was derived from the sources described in Table 22.

Table 22: Base Map Sources

Data Type	Data Provider	Data Date	Data Scale	Data Description
Digital Orthophoto	U.S. Department of Agriculture Farm Service Agency	2013	1:12,000	2013 NAIP Imagery used for Nassau County, FL Study 11-04-1944
Political boundaries	Nassau County	2006	N/P	Municipal and county boundaries
Transportation Features	Nassau County	2006	N/P	All transportation features within the study area
Surface Water Features	US Geological Survey	2009	N/P	Stream flowlines within the study area
Public Land Survey System (PLSS)	Bureau of Land Management	2006	N/P	PLSS areas that are associated with the study area
Coastal Barrier Resources	US Fish and Wildlife Service	1991	N/P	Digital coastal barrier

6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 23. For each coastal flooding source studied as part of this FIS Report, the mapped floodplain boundaries on the FIRM have been delineated using the flood and wave elevations determined at each transect; between transects, boundaries were delineated using land use and land cover data, the topographic elevation data described in Table 23, and knowledge of coastal flood processes. In ponding areas, flood elevations were determined at each junction of the model; between junctions, boundaries were interpolated using the topographic elevation data described in Table 23.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

Certain flooding sources may have been studied that do not have published BFEs on the FIRMs, or for which there is a need to report the 1% annual chance flood elevations at selected cross sections because a published Flood Profile does not exist in this FIS Report. These streams may have also been studied using methods to determine non-encroachment zones rather than floodways. For these flooding sources, the 1% annual chance floodplain boundaries have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 23. All topographic data used for modeling or mapping has been converted as necessary to NAVD 88. The 1% annual chance elevations for selected cross sections along these flooding sources, along with their non-encroachment widths, if calculated, are shown in Table 25, "Flood Hazard and Non-Encroachment Data for Selected Streams."

Table 23: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data					
		Description	Scale	Contour Interval	RMSEz	Accuracyz	Citation
Entire Coastline of Nassau County	Atlantic Ocean	LiDAR	N/A	N/A	4.7 cm	9.25 cm	FDEM 2007

BFEs shown at cross sections on the FIRM represent the 1% annual chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations.

Table 24: Floodway Data

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/ SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	320	96	620	2.6	14.6	14.6	15.6	1.0
B	1,035	156	1,015	1.6	14.8	14.8	15.8	1.0
C	1,185	226	1,240	1.3	14.9	14.9	15.9	1.0
D	2,605	200	854	1.9	16.9	16.9	17.9	1.0
E	2,680	416	1,863	0.9	17.1	17.1	18.0	0.9

[1]Feet above Limit of Detailed Study

Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams

[Not Applicable to this Flood Risk Project]

6.4 Coastal Flood Hazard Mapping

Flood insurance zones and BFEs including the wave effects were identified on each transect based on the results from the onshore wave hazard analyses. Between transects, elevations were interpolated using topographic maps, land-use and land-cover data, and knowledge of coastal flood processes to determine the aerial extent of flooding. Sources for topographic data are shown in Table 23.

Zone VE is subdivided into elevation zones and BFEs are provided on the FIRM.

The limit of Zone VE shown on the FIRM is defined as the farthest inland extent of any of these criteria (determined for the 1% annual chance flood condition):

- The *primary frontal dune zone* is defined in 44 CFR Section 59.1 of the NFIP regulations. The primary frontal dune represents a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes that occur immediately landward and adjacent to the beach. The primary frontal dune zone is subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune zone occurs at the point where there is a distinct change from a relatively steep slope to a relatively mild slope.

- The *wave runup zone* occurs where the (eroded) ground profile is 3.0 feet or more below the 2-percent wave runup elevation.

- The *wave overtopping splash zone* is the area landward of the crest of an overtopped barrier, in cases where the potential 2-percent wave runup exceeds the barrier crest elevation by 3.0 feet or more.

- The *breaking wave height zone* occurs where 3-foot or greater wave heights could occur (this is the area where the wave crest profile is 2.1 feet or more above the total stillwater elevation).

- The *high-velocity flow zone* is landward of the overtopping splash zone (or area on a sloping beach or other shore type), where the product of depth of flow times the flow velocity squared (hv^2) is greater than or equal to 200 ft^3/sec^2. This zone may only be used on the Pacific Coast.

The SFHA boundary indicates the limit of SFHAs shown on the FIRM as either “V” zones or “A” zones.

Table 26 indicates the coastal analyses used for floodplain mapping and the criteria used to determine the inland limit of the open-coast Zone VE and the SFHA boundary at each transect.

Table 26: Summary of Coastal Transect Mapping Considerations

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD 88)	Zone Designation and BFE (ft NAVD 88)		
1	✓	VE[1] 10	VE 11, 12, 14 AE 8-9	PFD	SWEL
2	✓	VE 12	VE 10-12, 14 AE 7-9	Erosion/ Runup	Erosion/ Runup
3	✓	VE 12	VE 10, 11, 13, 14 AE 7, 9	Erosion/ Runup	Erosion/ Runup
4	✓	VE 13	VE 9-11, 14 AE 7-9	Erosion/ Runup	Erosion/ Runup
5	✓	VE 13	VE 10, 11, 14 AE 7-9	PFD	PFD
6	✓	VE 13	VE 10, 14 AE 7-9	Erosion/ Runup	PFD
7	✓	VE 12	VE 10, 13-14 AE 6-9	PFD	SWEL
8	✓	VE 13	VE 10, 14 AE 6-9	PFD	SWEL
9	✓	VE 13	VE 10, 14 AE 6-10	PFD	SWEL
10	✓	VE 13	VE 10, 14 AE 6-10	PFD	PFD
11	✓	VE 13	VE 10, 14 AE 6-10	PFD	PFD
12	✓	VE 13	VE 10, 14 AE 6-10	PFD	PFD
13	✓	VE 13	VE 12, 14 AE 6, 8-12	PFD	PFD
14	✓	VE 14	VE 11, 12, 14 AE 6, 9-12	PFD	PFD
15	✓	VE 12	VE 11-14 AE 6, 10-12	Erosion/ Runup	Erosion/ Runup
16	✓	VE 12[2]	VE 11-14 AE 6, 9-11	Overtopping Splash Zone	SWEL

Coastal Transect	Primary Frontal Dune (PFD) Identified	Wave Runup Analysis	Wave Height Analysis	Zone VE Limit	SFHA Boundary
		Zone Designation and BFE (ft NAVD 88)	Zone Designation and BFE (ft NAVD 88)		
17	✓	VE 14	VE 12 AE 6, 7, 9-11	Erosion/ Runup	Erosion/ Runup
18	✓	VE 13 AO (Depth 1')	VE 11, 12, 14 AE 8-11	Overtopping Splash Zone	SWEL
19	✓	VE 12	VE 11-13 AE 5-10	Overtopping Splash Zone	SWEL
20	✓	--	VE 10-13 AE 4-6, 8, 9, 11	PFD	PFD
21[3]	--	--	VE 12 AE 9, 10	Wave Height	SWEL
22[3]	--	--	VE 11, 12 AE 9, 10	Wave Height	SWEL
23[3]	--	--	VE 11, 12 AE 10, 11	Wave Height	SWEL
24[3]	--	--	VE 10 AE 8-10	Wave Height	SWEL
25[3]	--	--	VE 10 AE 8	Wave Height	SWEL
26[3]	--	--	VE 10 AE 9	Wave Height	SWEL
27[3]	--	--	VE 10 AE 8, 9	Wave Height	SWEL
28[3]	--	--	VE 10, 11 AE 7-9	Wave Height	SWEL

[1]Mapped as VE due to PFD designation
[2]Runup capped at 3 feet above crest elevation
[3]Transect originates inland, not on open coast

A LiMWA boundary has also been added in coastal areas subject to wave action for use by local communities in safe rebuilding practices. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. To simplify representation, the LiMWA was continued immediately landward of the VE/AE boundary in areas where wave runup elevations dominate. Similarly, in areas where the Zone VE designation is based on the presence of a primary frontal dune or wave overtopping, the LiMWA was delineated immediately landward of the Zone VE/AE boundary.

6.5 FIRM Revisions

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 31, "Map Repositories").

6.5.1 Letters of Map Amendment

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA. A LOMA cannot be issued for properties located on the PFD (primary frontal dune).

To obtain an application for a LOMA, www.fema.gov/floodplain-management/letter-map-amendment-loma and download the form "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill". Visit the "Flood Map-Related Fees" section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at www.fema.gov/online-tutorials.

For more information about how to apply for a LOMA, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

6.5.2 Letters of Map Revision Based on Fill

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA's determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting www.fema.gov/floodplain-management/letter-map-amendment-loma for the "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill" or by calling the FEMA Map Information eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the "Flood Map-Related Fees" section.

A tutorial for LOMR-F is available at www.fema.gov/online-tutorials.

6.5.3 Letters of Map Revision

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood

zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instructions and download the form "MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision". Visit the "Flood Map-Related Fees" section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Nassau County FIRM are listed in Table 27.

Table 27: Incorporated Letters of Map Change

[Not Applicable to this Flood Risk Project]

6.5.4 Physical Map Revisions

PMRs are an official republication of a community's NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community's chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit www.fema.gov and visit the "Flood Map Revision Processes" section.

6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community. FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit www.fema.gov to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

6.5.6 Community Map History

The current FIRM presents flooding information for the entire geographic area of Nassau County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBMs) and/or Flood Boundary and Floodway Maps (FBFMs) may have been prepared for the incorporated communities and the

unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 28, "Community Map History." A description of each of the column headings and the source of the date is also listed below.

- *Community Name* includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.

- *Initial Identification Date (First NFIP Map Published)* is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or "pending" (for Preliminary FIS Reports) is shown. If the community is listed in Table 28 but not identified on the map, the community is treated as if it were unmapped.

- *Initial FHBM Effective Date* is the effective date of the first Flood Hazard Boundary Map (FHBM). This date may be the same date as the Initial NFIP Map Date.

- *FHBM Revision Date(s)* is the date(s) that the FHBM was revised, if applicable.

- *Initial FIRM Effective Date* is the date of the first effective FIRM for the community. This is the first effective date that is shown on the FIRM panel.

- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are completed or revised, each community listed should have its FIRM dates updated accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as Physical Map Revisions (PMR) of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

The initial effective date for the Nassau County FIRMs in countywide format was 12/17/2010.

Table 28: Community Map History

Community Name	Initial Identification Date (First NFIP Map Published)	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Callahan, City of	07/19/1974	07/19/1974	01/09/1976	04/04/1983	12/17/2010
Fernandina Beach, City of	08/16/1974	08/16/1974	02/27/1976	01/14/1977	12/17/2010 05/18/1992 09/30/1988 04/04/1983

Community Name	Initial Identification Date (First NFIP Map Published)	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Hilliard, Town of	12/23/1977	12/23/1977	N/A	10/01/2003	12/17/2010
Nassau County, Unincoporated Areas	11/29/1974	11/29/1974	02/04/1977	08/15/1984	12/17/2010 05/18/1992 05/04/1988

SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

7.1 Contracted Studies

Table 29 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

Table 29: Summary of Contracted Studies Included in this FIS Report

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Atlantic Ocean		BakerAECOM	HSFEHQ-09-D-0368	May 2015	Nassau County, Unincorporated Areas
Sources within Town of Callahan	10/4/1982	Water Resources Engineers/ Camp Dresser and McKee (CDM), Inc.	H-4052	February 1980	Callahan, Town of
Sources within City of Fernandina Beach	10/28/1987	FEMA	N/A	May 1987	Fernandina Beach, City of
Sources within Nassau County, Unincorporated Areas	5/4/1988	CDM	H-4052	August 1981	Nassau County, Unincorporated Areas

7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and any previous Flood Risk Projects are shown in Table 30. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

Table 30: Community Meetings

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Callahan, Town of	04/04/1983	July 1976	Initial CCO	FEMA, this community and the study contractor
		May 9, 1982	Final CCO	FEMA, this community and the study contractor
Fernandina Beach, City of	01/14/1977	*	Initial CCO	FEMA, this community and the study contractor
		*	Final CCO	FEMA, this community and the study contractor
Hilliard, Town of	10/01/2003	*	Initial CCO	FEMA, this community and the study contractor
		*	Final CCO	FEMA, this community and the study contractor
Nassau County, Unincorporated Areas	08/15/1984	July 1976	Initial CCO	FEMA, Town of Callahan, City of Fernandina Beach, Town of Hilliard, State Department of Land and Development, and the study contractor
		September 23, 1983	Final CCO	FEMA, Town of Callahan, City of Fernandina Beach, Town of Hilliard, and the study contractor
	12/17/2010	August 24, 2007	Initial CCO	FEMA, Town of Callahan, City of Fernandina Beach, Town of Hilliard, Watershed IV Alliance, and the study contractor
		November 24, 2009	Final CCO	Town of Callahan, City of Fernandina Beach, Town of Hilliard, Watershed IV Alliance, and the study contractor

SECTION 8.0 – ADDITIONAL INFORMATION

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see http://www.fema.gov.

Table 31 is a list of the locations where FIRMs for Nassau County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

Table 31: Map Repositories

Community	Address	City	State	Zip Code
Callahan, Town of	Town Hall 542300 US Highway 1	Callahan	FL	32011
Fernandina Beach, City of	City Hall 204 Ash Street	Fernandina Beach	FL	32034
Hilliard, Town of	Town Hall 15859 West County Road 108	Hilliard	FL	32046
Nassau County, Unincorporated Areas	Nassau County Building Department 96161 Nassau Place	Yulee	FL	32097

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 32.

Table 32 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the State NFIP Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of State and local GIS data in their state.

Table 32: Additional Information

FEMA and the NFIP	
FEMA and FEMA Engineering Library website	www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/engineering-library
NFIP website	www.fema.gov/national-flood-insurance-program
NFHL Dataset	msc.fema.gov

FEMA Region IV	FEMA-R4 (Hollins Building), 3003 Chamblee-Tucker Road, Atlanta, GA 30341 (770) 220-3174
Other Federal Agencies	
USGS website	www.usgs.gov
Hydraulic Engineering Center website	www.hec.usace.army.mil
State Agencies and Organizations	
State NFIP Coordinator	Steve Martin, CFM, State Floodplain Manager Florida Division of Emergency Management 2555 Shumard Oak Boulevard Tallahassee, FL 32399-2100 (850) 922-5269 steve.martin@em.myflorida.com
State GIS Coordinator	Richard Butgereit, GIS Administrator Florida Division of Emergency Management 2555 Shumard Oak Boulevard Tallahassee, FL 32399-2100 (850) 413-9907 richard.butgereit@em.myflorida.com

SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES

Table 33 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.

Table 33: Bibliography and References

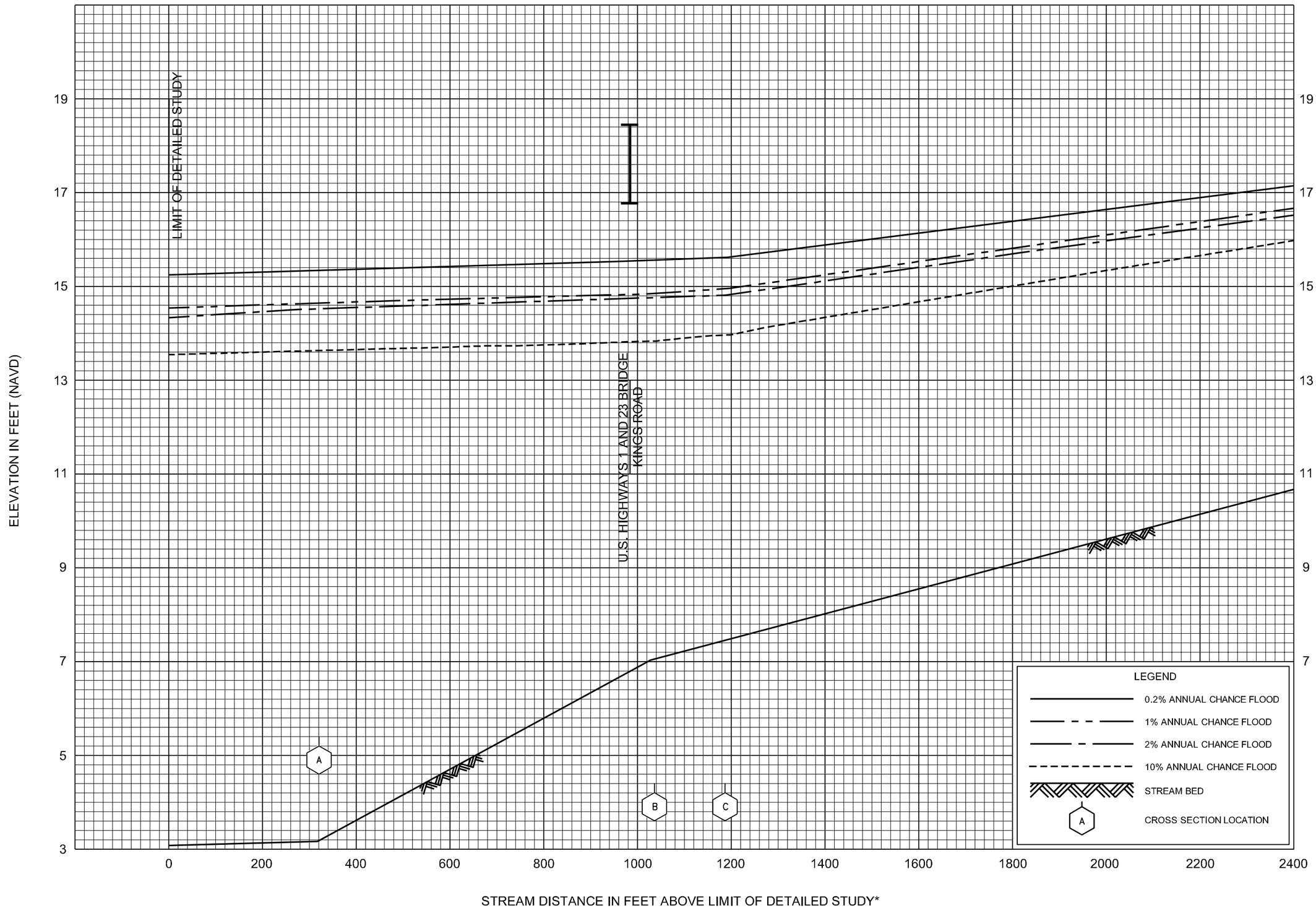
Citation in this FIS	Publisher/ Issuer	*Publication Title,* "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
US Census Bureau	U.S. Census Bureau	*"State and County QuickFacts"*		Nassau County, FL		http://quickfacts.census.gov/qfd/states/12/12089.html
US Census Bureau, Callahan	U.S. Census Bureau	*"Profile of General Demographic Characteristics: 2000; Geographic Area: Callahan town, Florida"*				http://censtats.census.gov/data/FL/1601209700.pdf
US Census Bureau, Hilliard	U.S. Census Bureau	*"Profile of General Demographic Characteristics: 2000; Geographic Area: Hilliard town, Florida"*				http://censtats.census.gov/data/FL/1601230750.pdf
US Census Bureau, Fernandina Beach	U.S. Census Bureau	*"Profile of General Demographic Characteristics: 2000; Geographic Area: Fernandina Beach City, Florida"*				http://censtats.census.gov/data/FL/1601222175.pdf
FEMA	Federal Emergency Management Agency	*"Florida Disaster History: Major Disaster Declarations."*				http://www.fema.gov/news/disasters_state.fema?id=12
USDC, November 1967	U.S. Department of Commerce	*Florida Hurricanes*	Weather Bureau Technical Memorandum SR-38		November 1967	

Citation in this FIS	Publisher/ Issuer	*Publication Title,* "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
American Meteorolog-ical Society	American Meteorological Society	*Monthly Weather Review*		Boston, MA		
Heldref Publications	Heldref Publications	*Weatherwise*		Washington, DC		
G.W. Cry, 1957	U.S. Department of Commerce	*Tropical Cyclones of the North Atlantic Ocean Tracks and Frequencies of Hurricanes and Tropical Storms, 187I1963, Technical Paper No. 55*	G.W. Cry	Washington, DC	1957	
USDC, 1957	U.S. Department of Commerce	*National Hurrican Research Project, Report No. 5, Survey of Meteorological Factors Pertinent to Reduction of Loss of Life and Property in Hurricane Situations*		Washington, DC	1957	
USDC, November 1975	U.S. Department of Commerce	*"Joint Probability Method of Tide Frequency Analysis Applied to Apalachicola Bay and St. George Sound, Florida", NOAA Technical Report NWS-I8*	F.P. Ho and V.A. Myers	Washington, DC	November 1975	

Citation in this FIS	Publisher/ Issuer	*Publication Title,* "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USDC, June 1975	U.S. Department of Commerce	*"Storm Tide Frequencies on the South Carolina Coast", NOAA Technical Report NWS-16*	V.A. Myers	Washington, DC	June 1975	
USDA, 1973	U.S. Department of Agriculture, Soil Conservation Service	*National Engineering Handbook, Section 4, Hydrology*			August 1973	
USDC, 1961	U.S. Department of Commerce	Rainfall Frequency Atlas of the United States, Technical Paper 40			1961	
Soil Conservation Service, 1964	Soil Conservation Serivce	*"Work Plan for Mills Creek Watershed, Nassau County, Florida"*			November 1964	
USACE, 1973	U.S. Army Corps of Engineers, Hydrologic Engineering Center	*"Computer program 723-X6-L202A, HEC-2 Water-Surface Profiles"*		Davis, CA	June 1973	
FEMA, 1981	Federal Emergency Management Agency	*Coastal Flooding Storm Surge Model, "Part I, Methodology"*		Washington, DC	February 1981	
FEMA, 1980	Federal Emergency Management Agency	*"Coastal Flooding Storm Surge Model"*		Washington, D.C.	1980	

Citation in this FIS	Publisher/ Issuer	*Publication Title,* "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
National Academy of Sciences, 1977	National Academy of Sciences	*Methodology for Calculating Wave Action Effects Associated With Storm Surges*			1977	
FEMA, 1981	Federal Emergency Management Agency	*Users Manual for Wave Height Analysis*			Revised February 1981	
USGS, Various	U.S. Department of Interior, Geological Survey	*7.5-Minute Series Topographic Maps; scale 1:24,000, contour interval 5 feet: Amelia City, Florida 1958, Photorevised 1970; Hedges, Florida 1958, Photorevised 1970; Italia, Florida 1958; Photorevised 1970; Gross, Florida-Georgia 1958, Photorevised 1970; St. Marys, Georgia-Florida 1970; Fernandina Beach, Florida-Georgia 1958, Photorevised 1970; Kingsland, Georgia-Florida 1958*			Various	
Florida DEM, 2009	Florida Division of Emergency Management	*"Florida DEM"*		Tallahassee, FL	February 2009	

Citation in this FIS	Publisher/ Issuer	*Publication Title,* "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USGS, 1999	U.S. Geological Survey	*"National Elevation Dataset, Nassau County, Florida, 7.5-Minute Series, 10 meter Digital Elevation Model"*		Sioux Falls, SD	1999	
Federal Emergency Management Agency, 2008	Federal Emergency Management Agency	*"Tide Gage Analysis for the Atlantic and Gulf Open Coast"*			December 2008	



FLOOD PROFILES

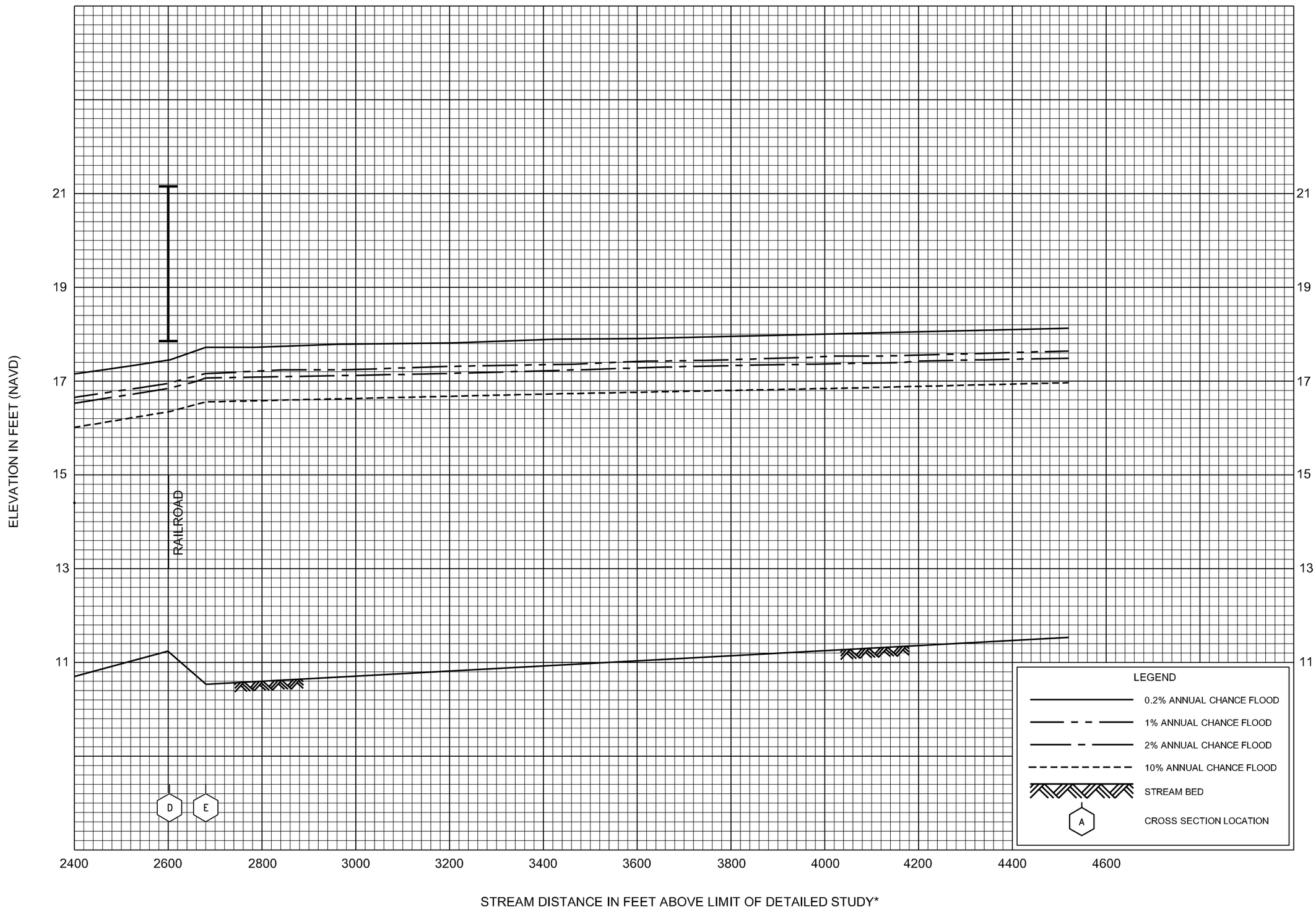
ALLIGATOR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL
AND INCORPORATED AREAS

01P

*LIMIT OF DETAILED STUDY IS LOCATED APPROXIMATELY 980 FEET DOWNSTREAM OF U.S. HIGHWAY 1



FLOOD PROFILES

ALLIGATOR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL
AND INCORPORATED AREAS

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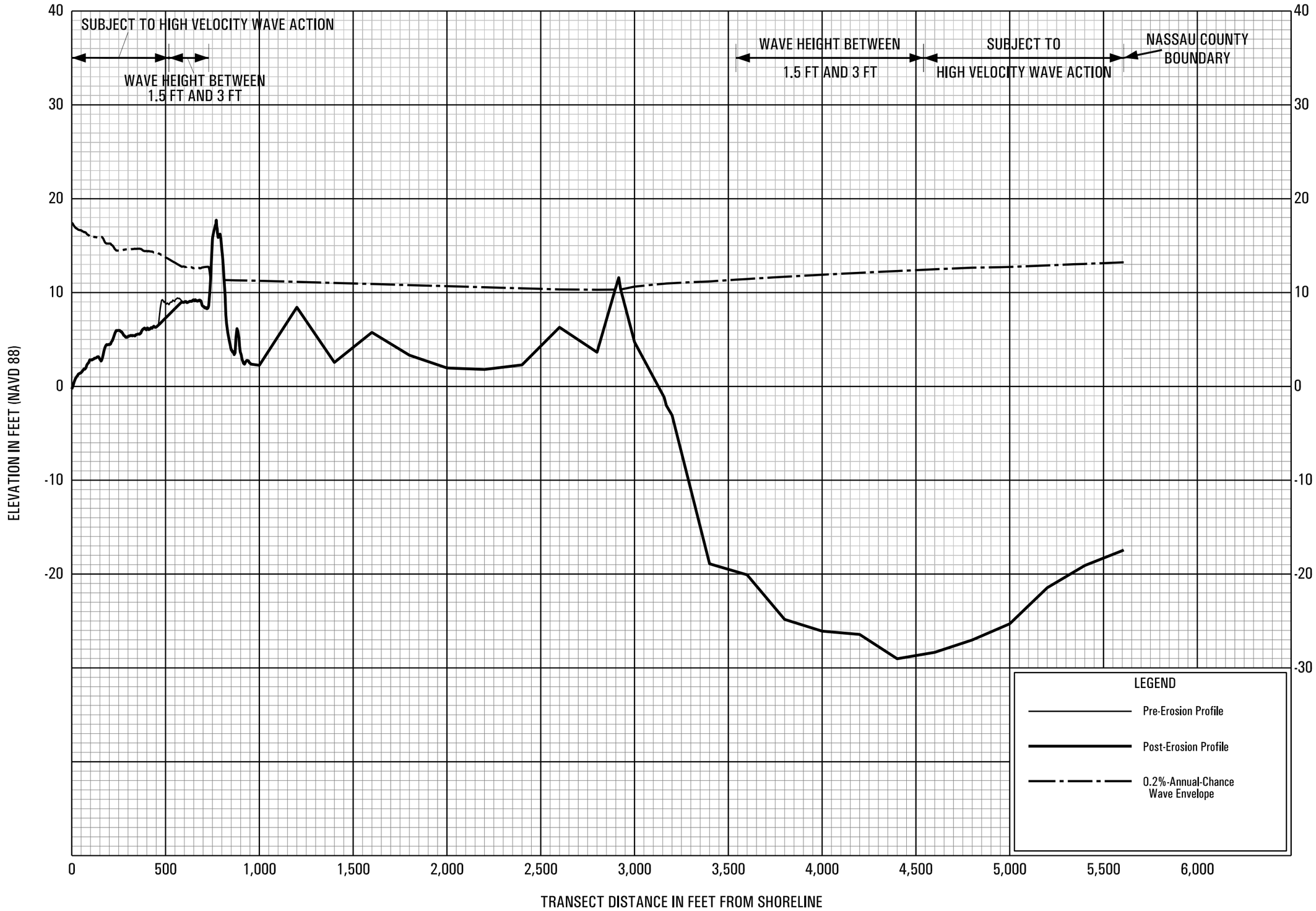

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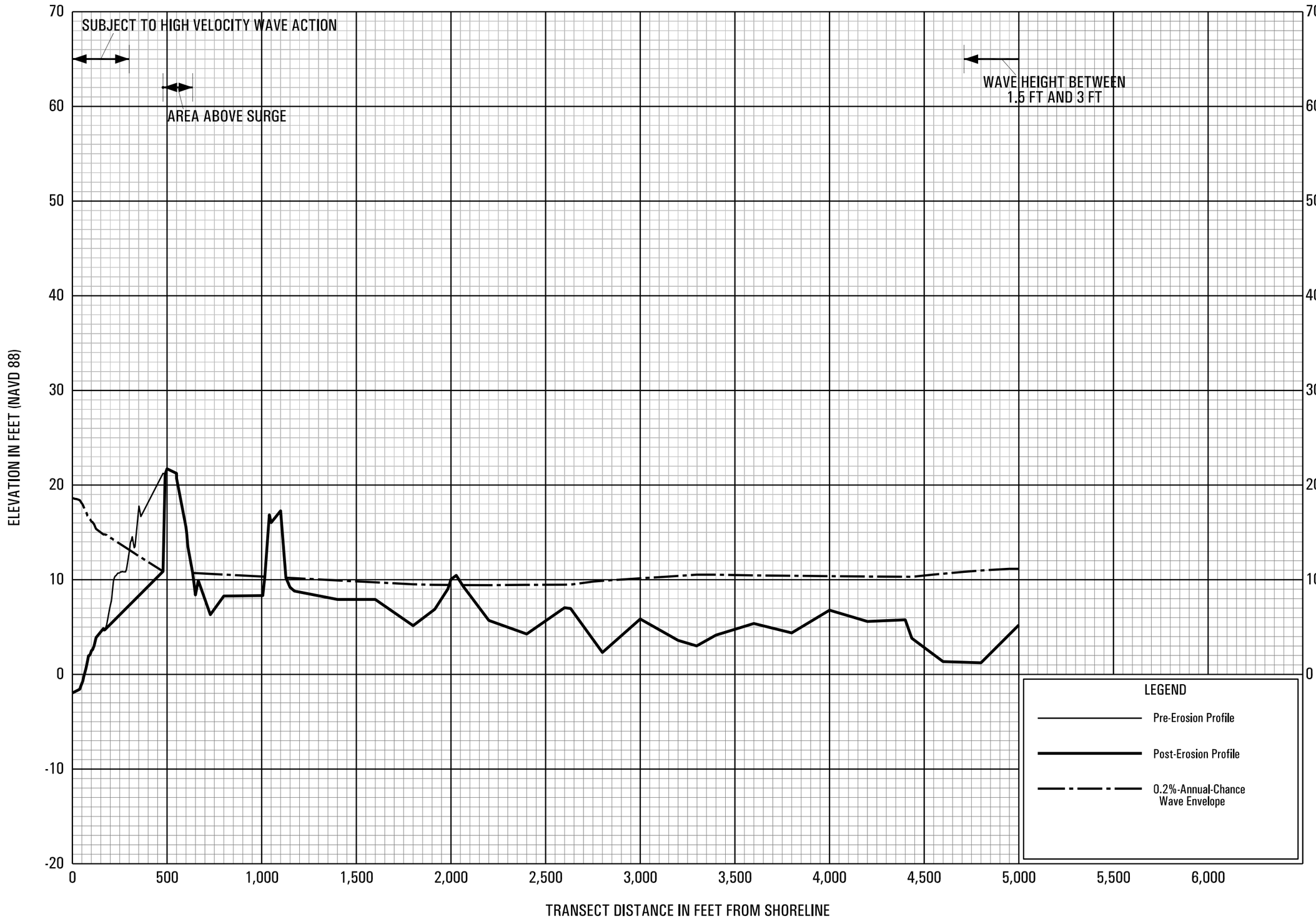

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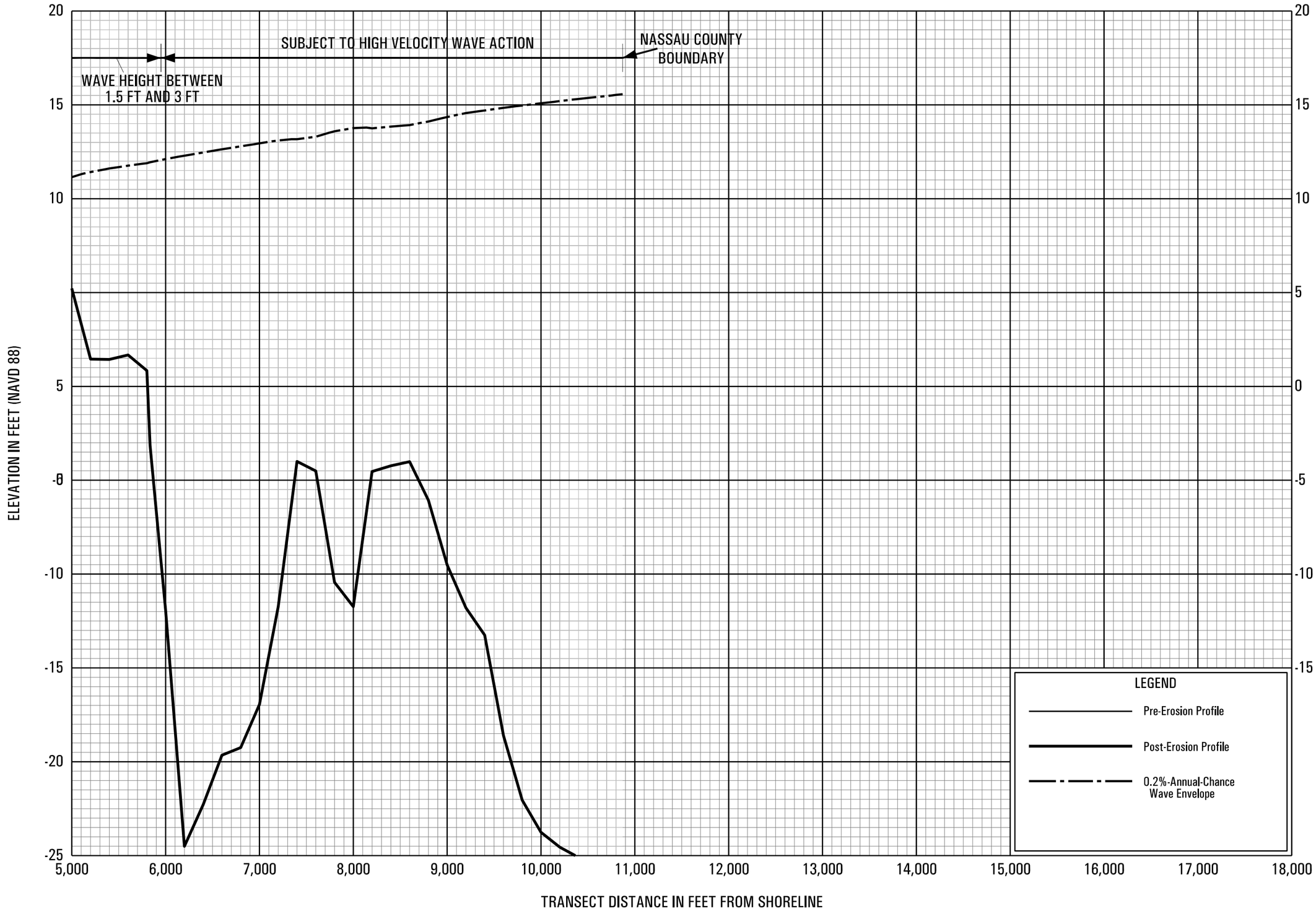

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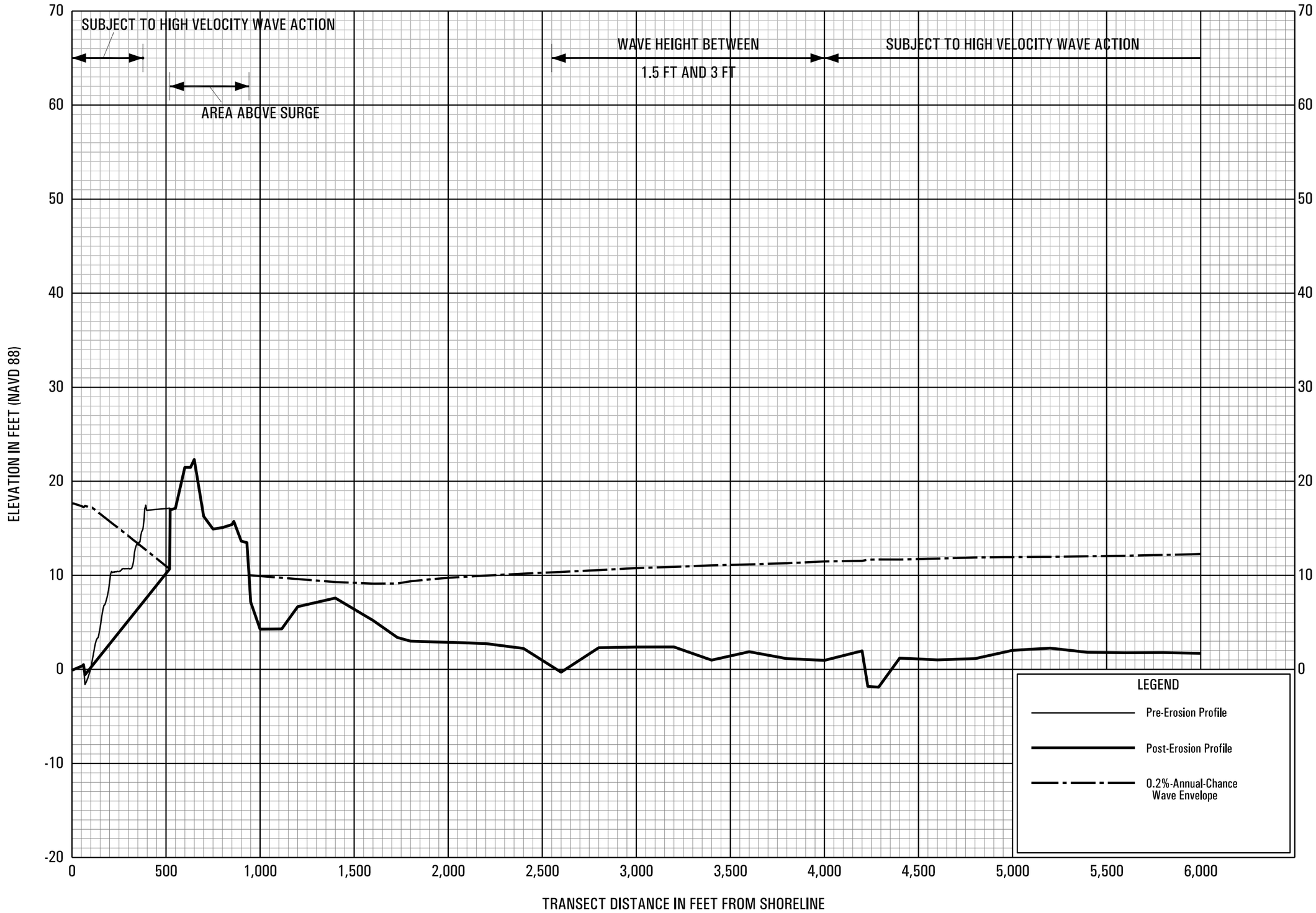

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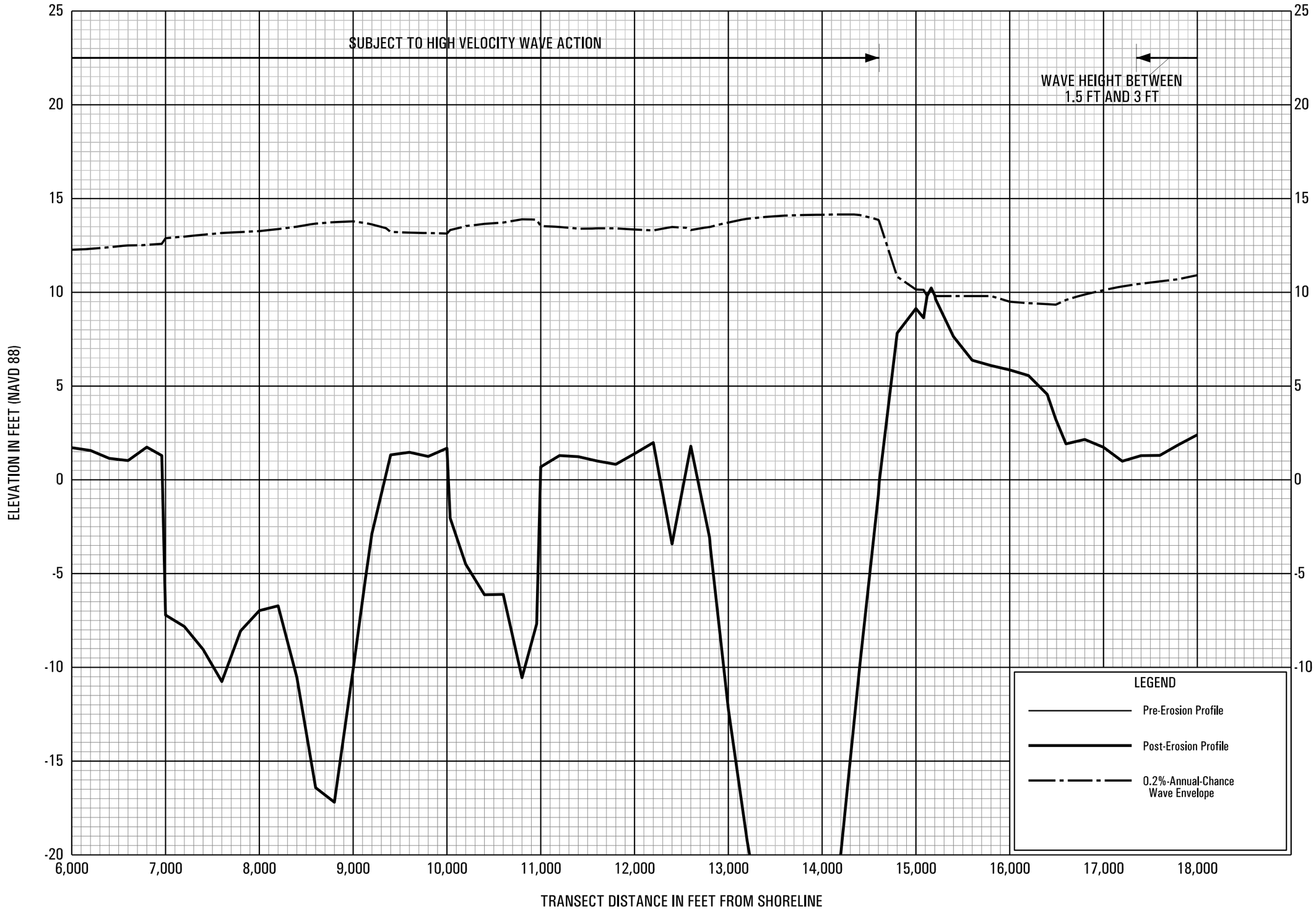

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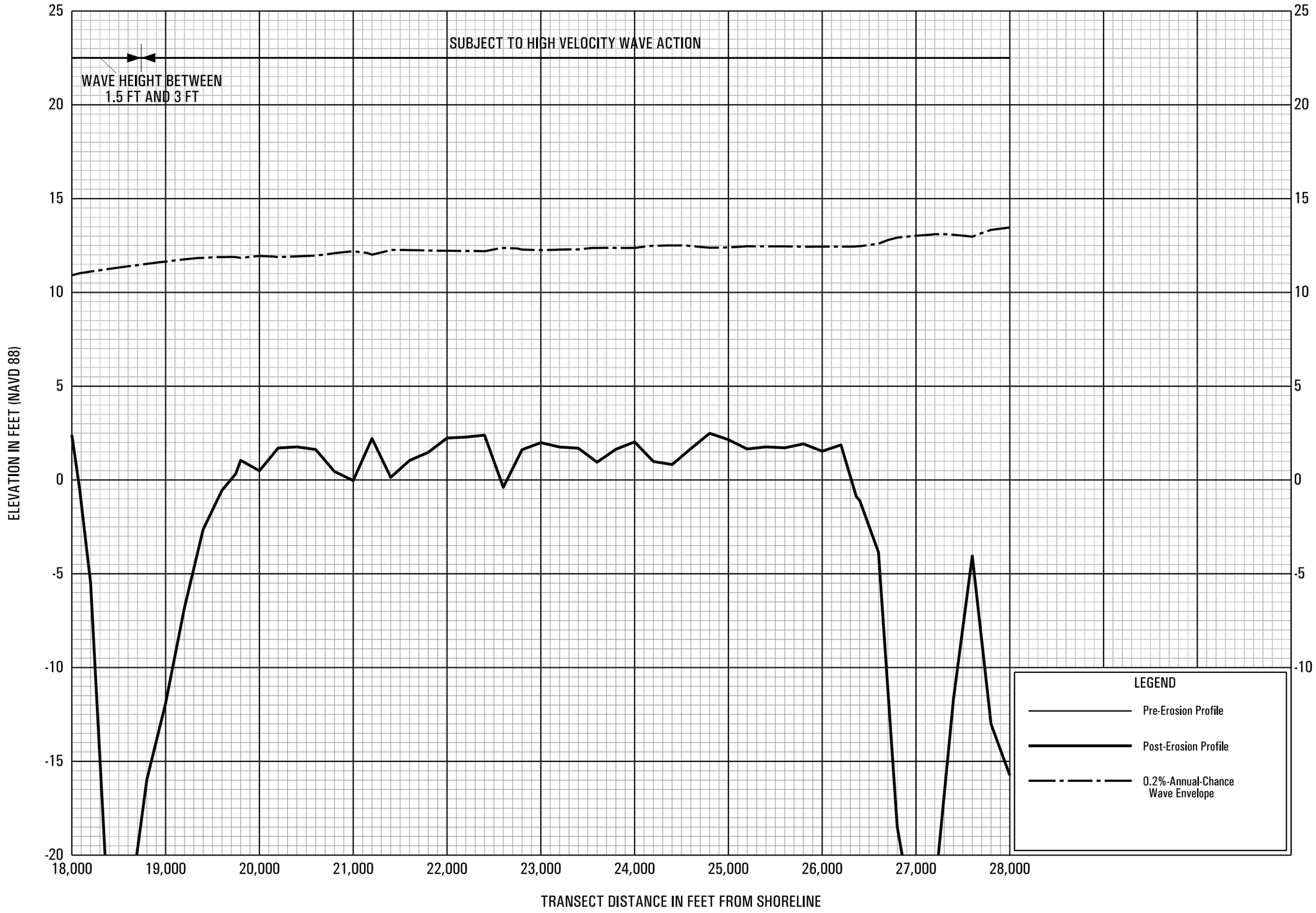

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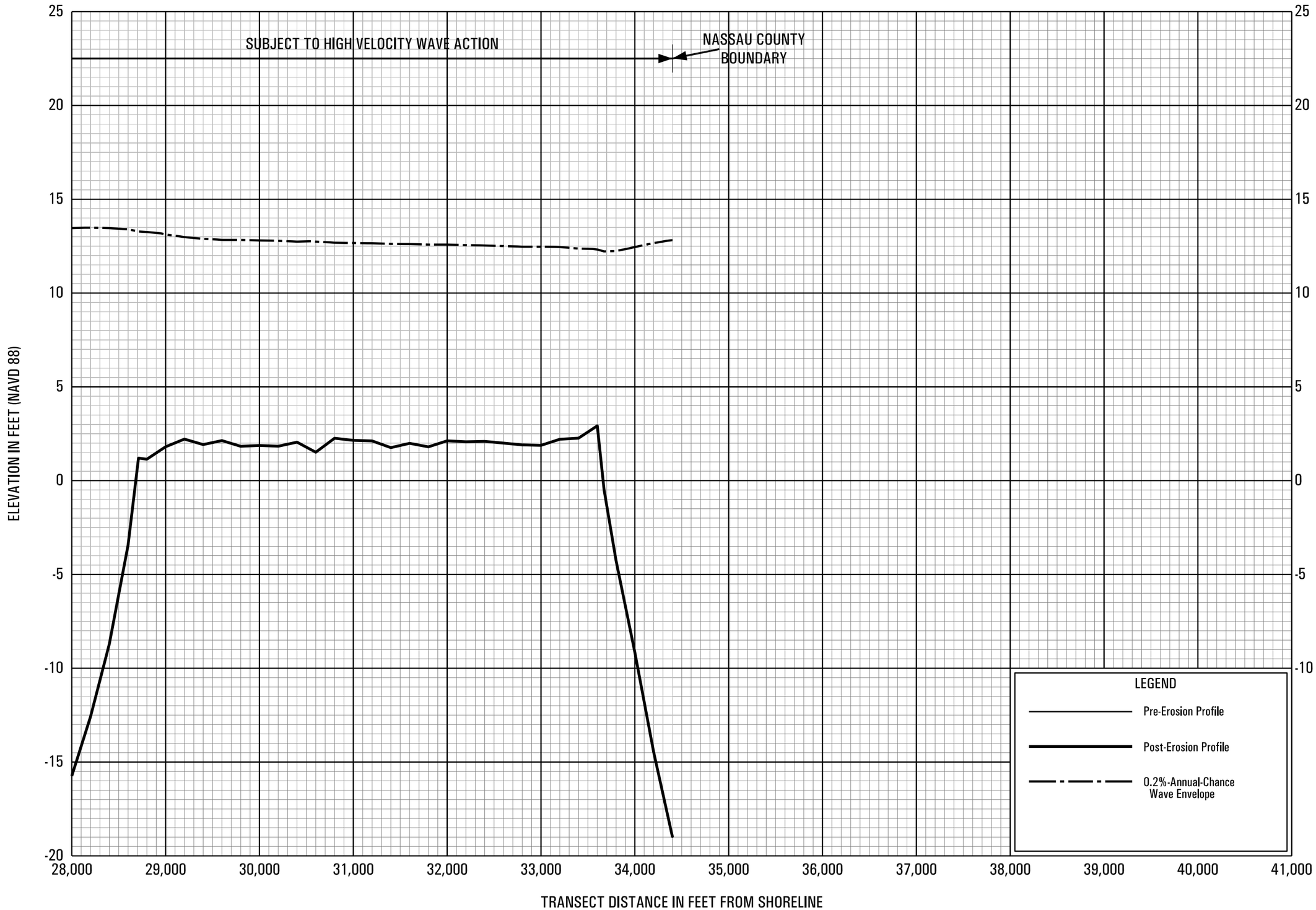

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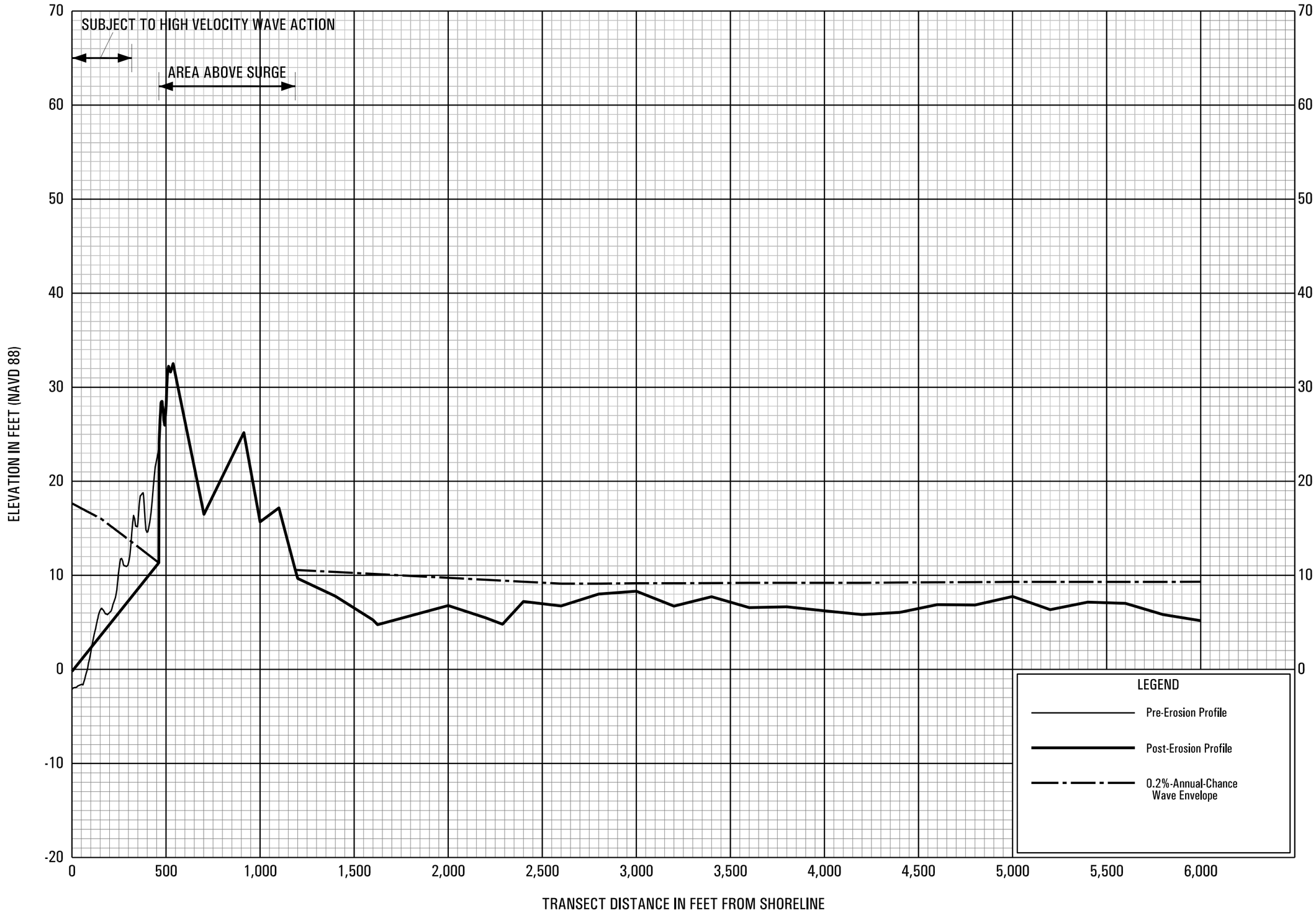

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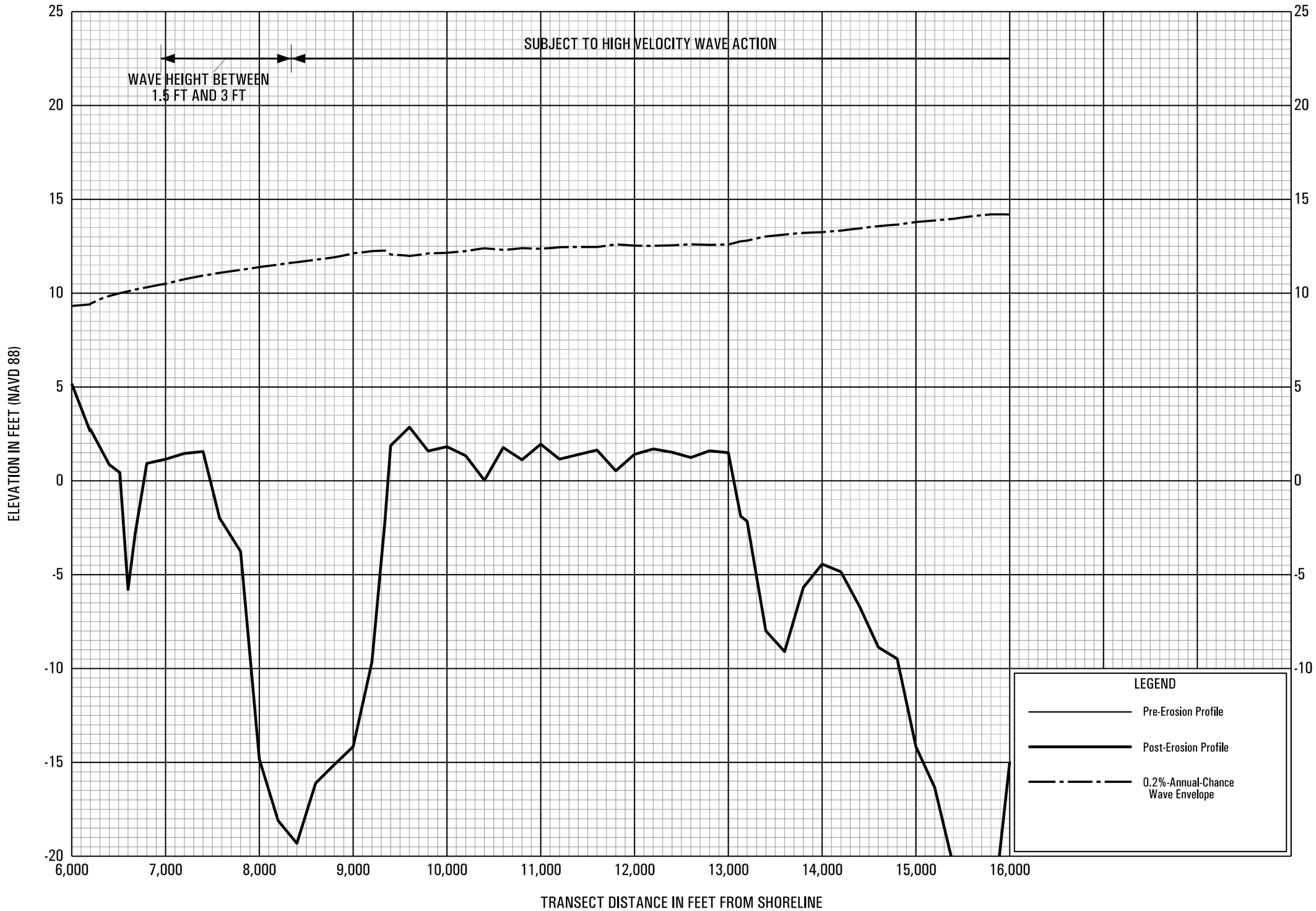

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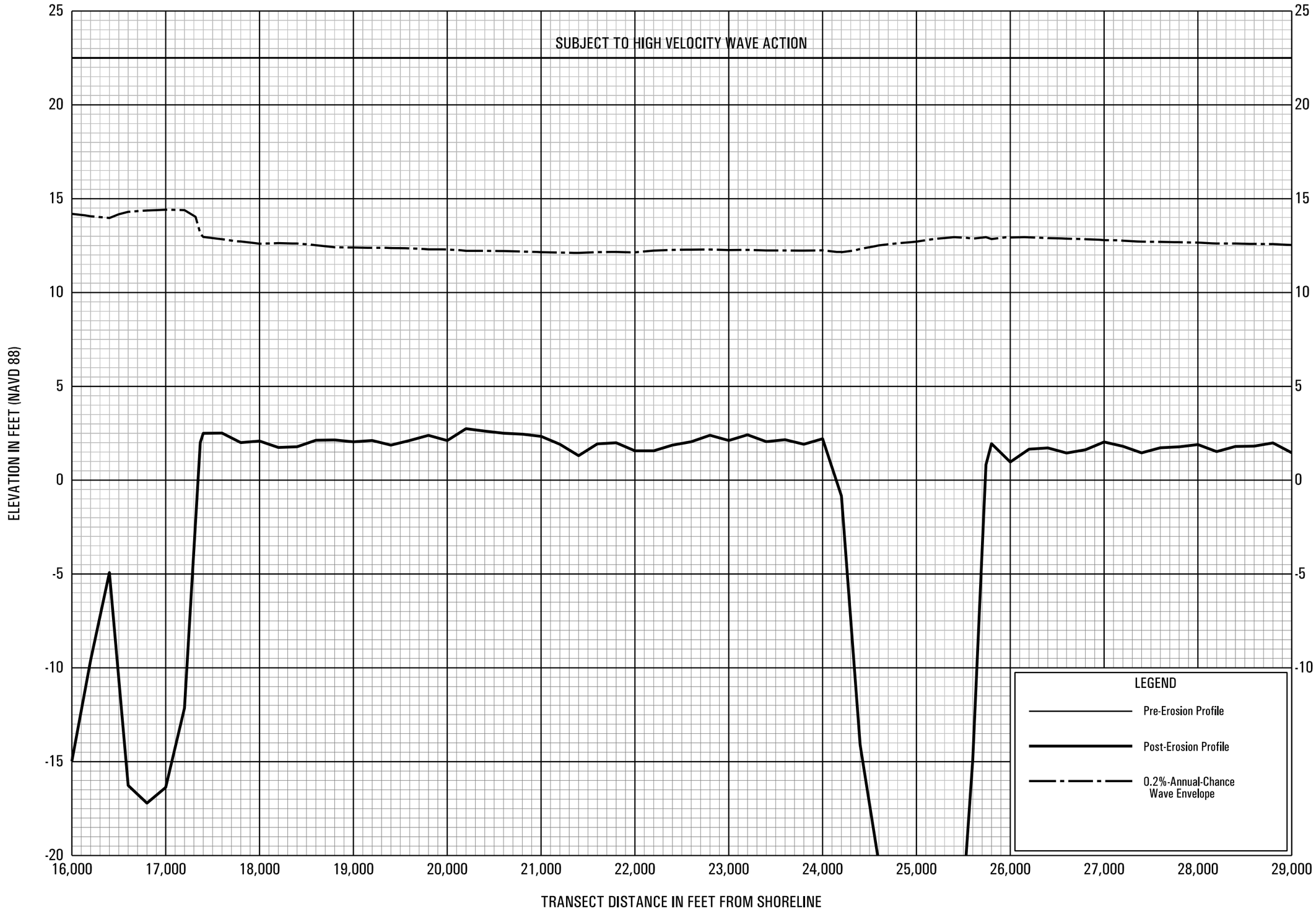

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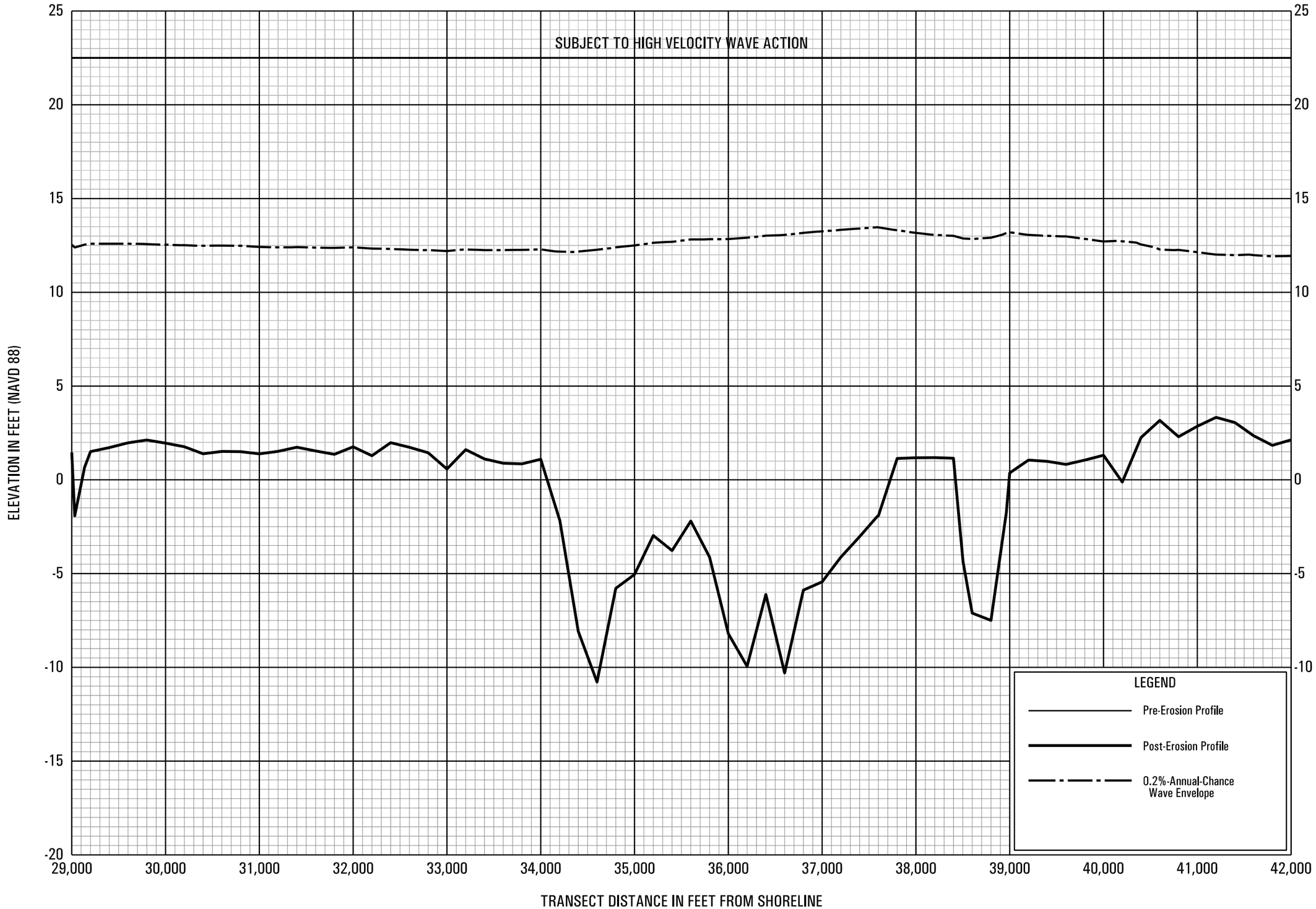

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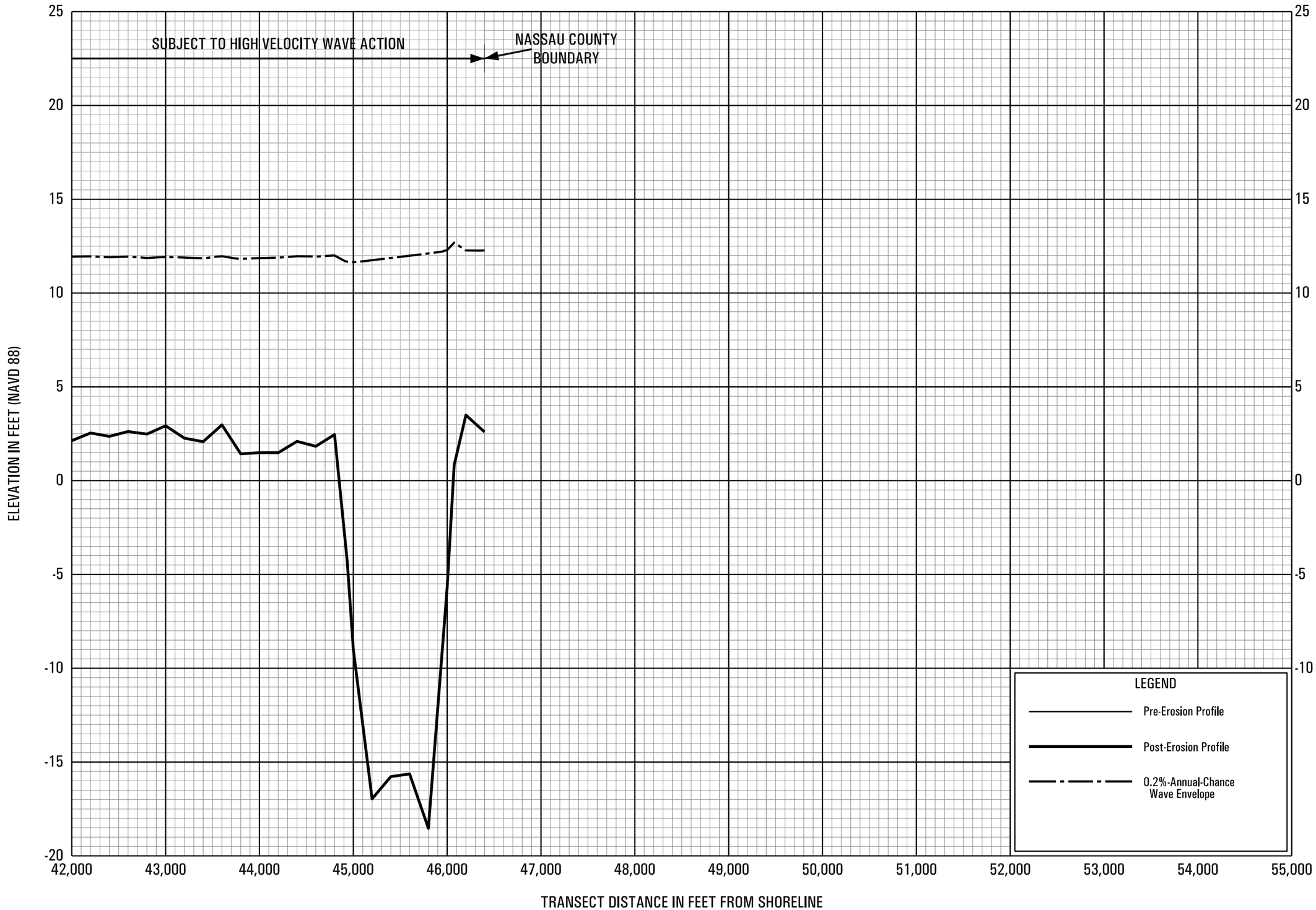

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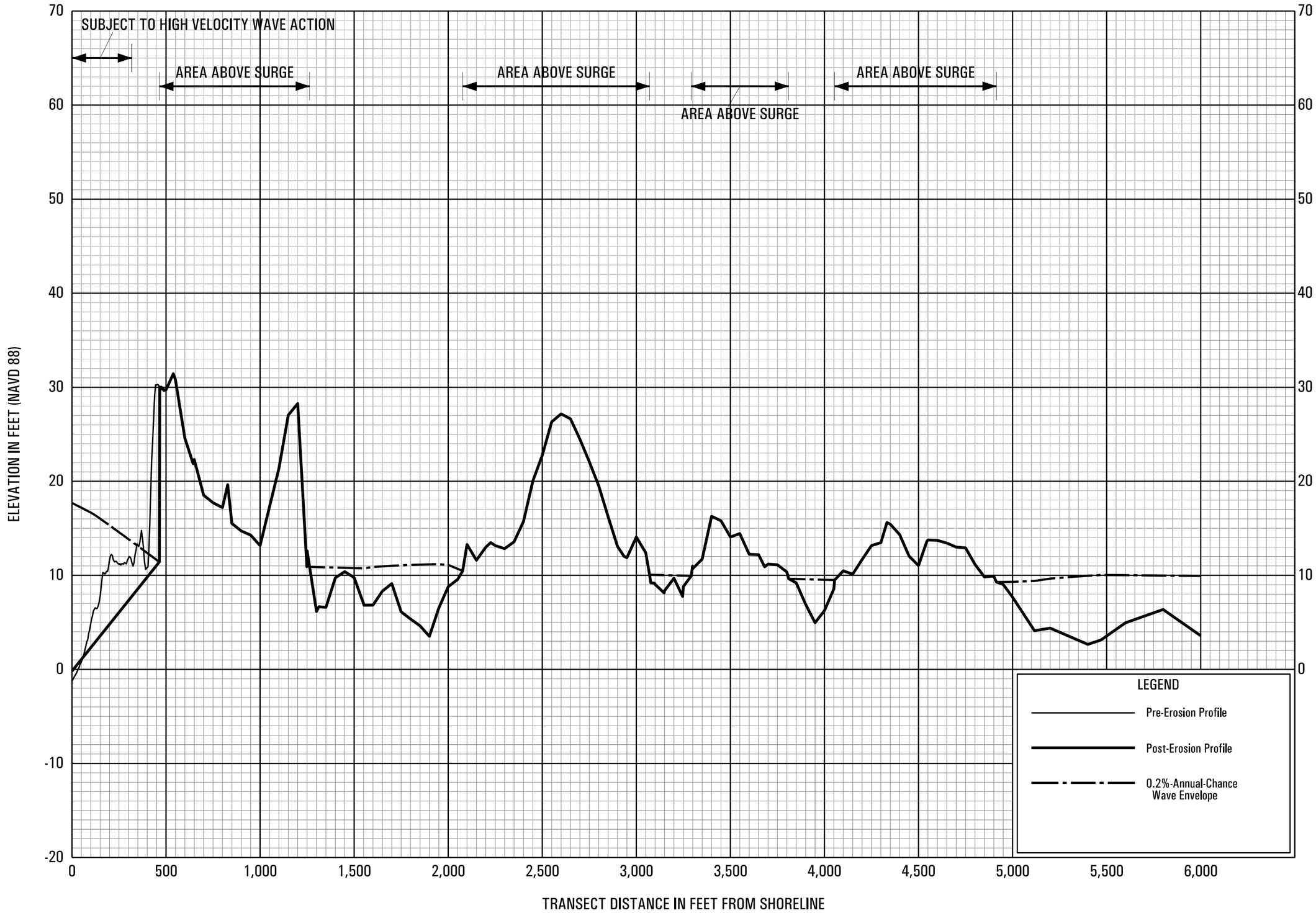

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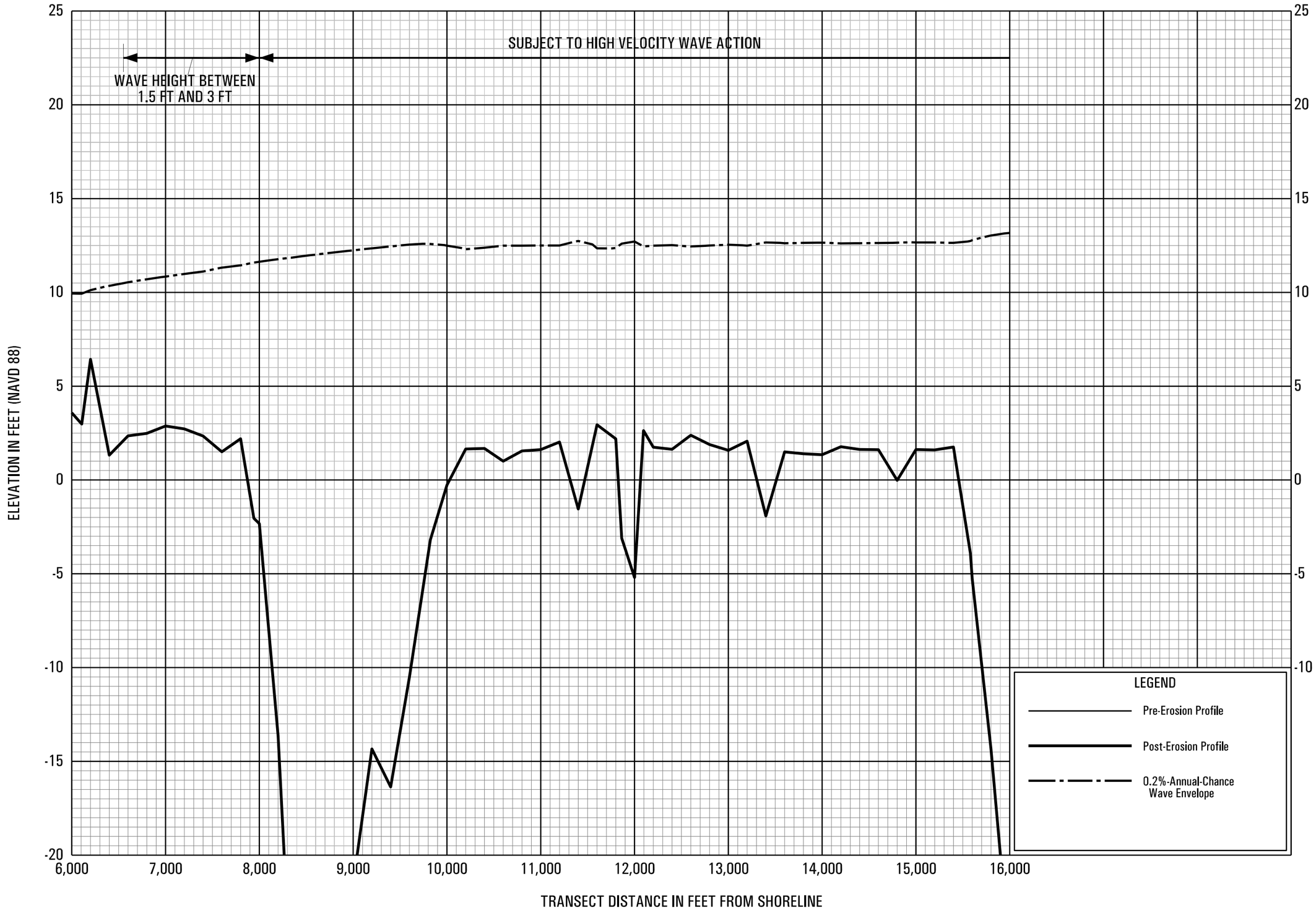

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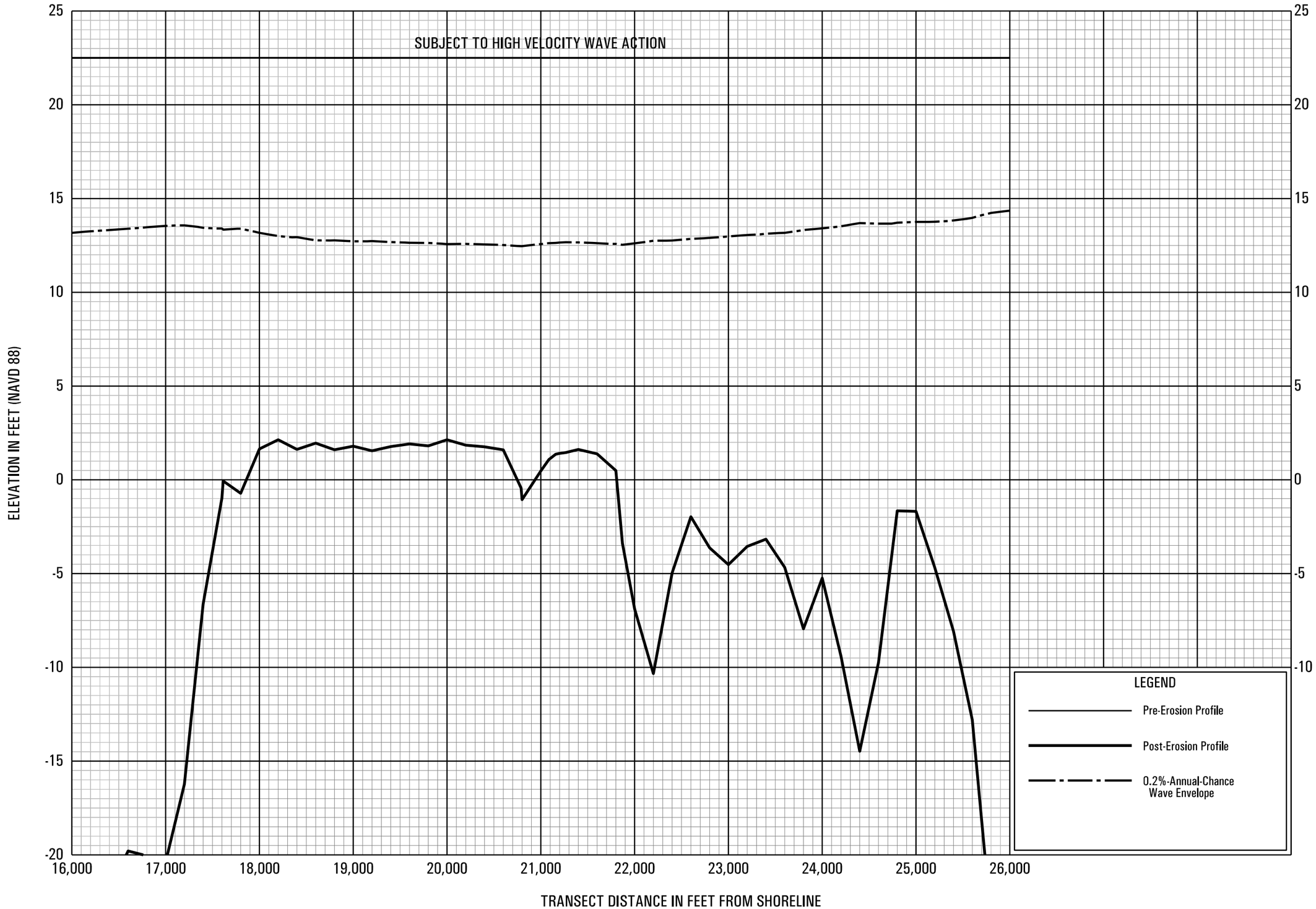

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AND INCORPORATED AREAS

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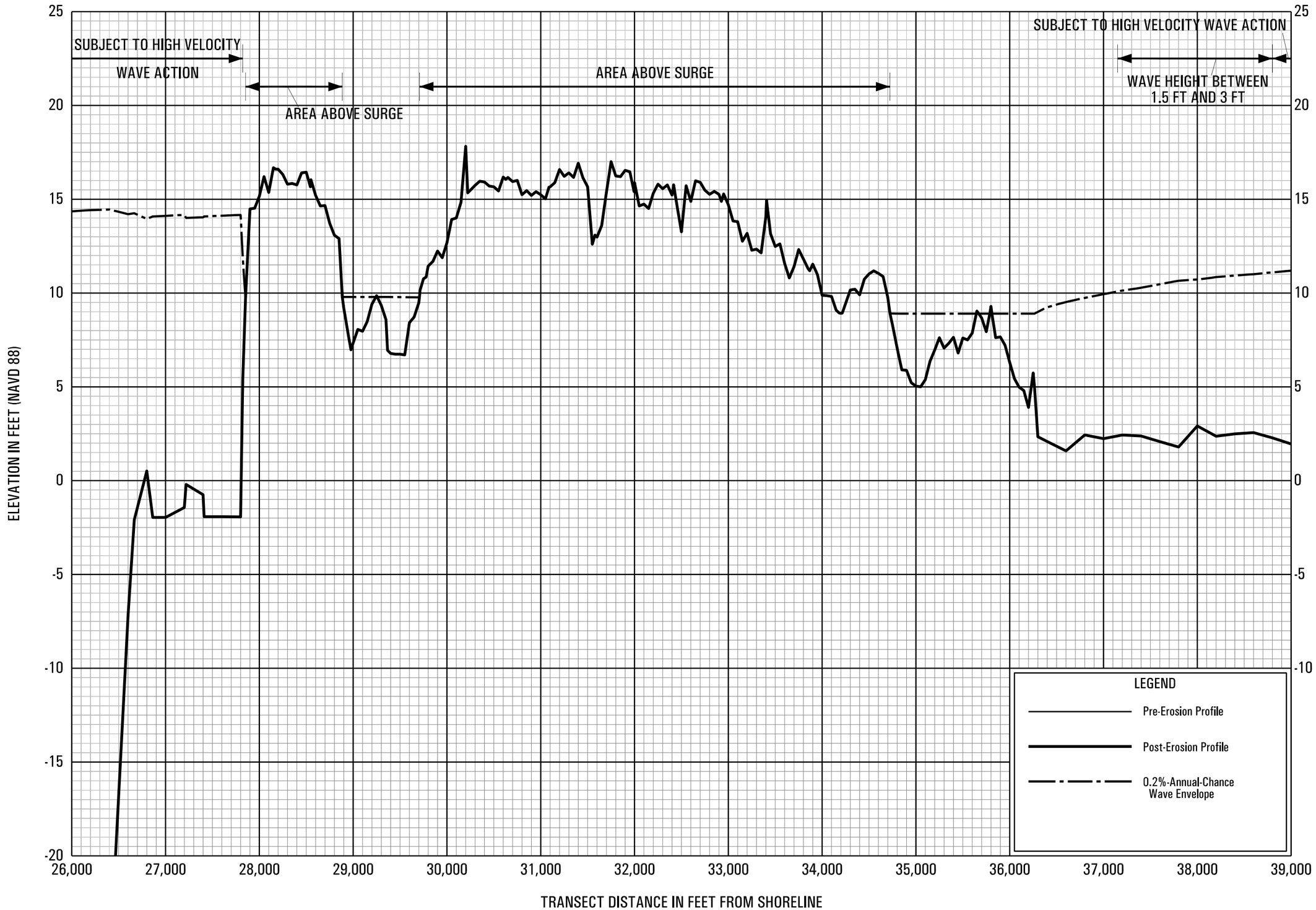

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NASSAU COUNTY, FL

AND INCORPORATED AREAS

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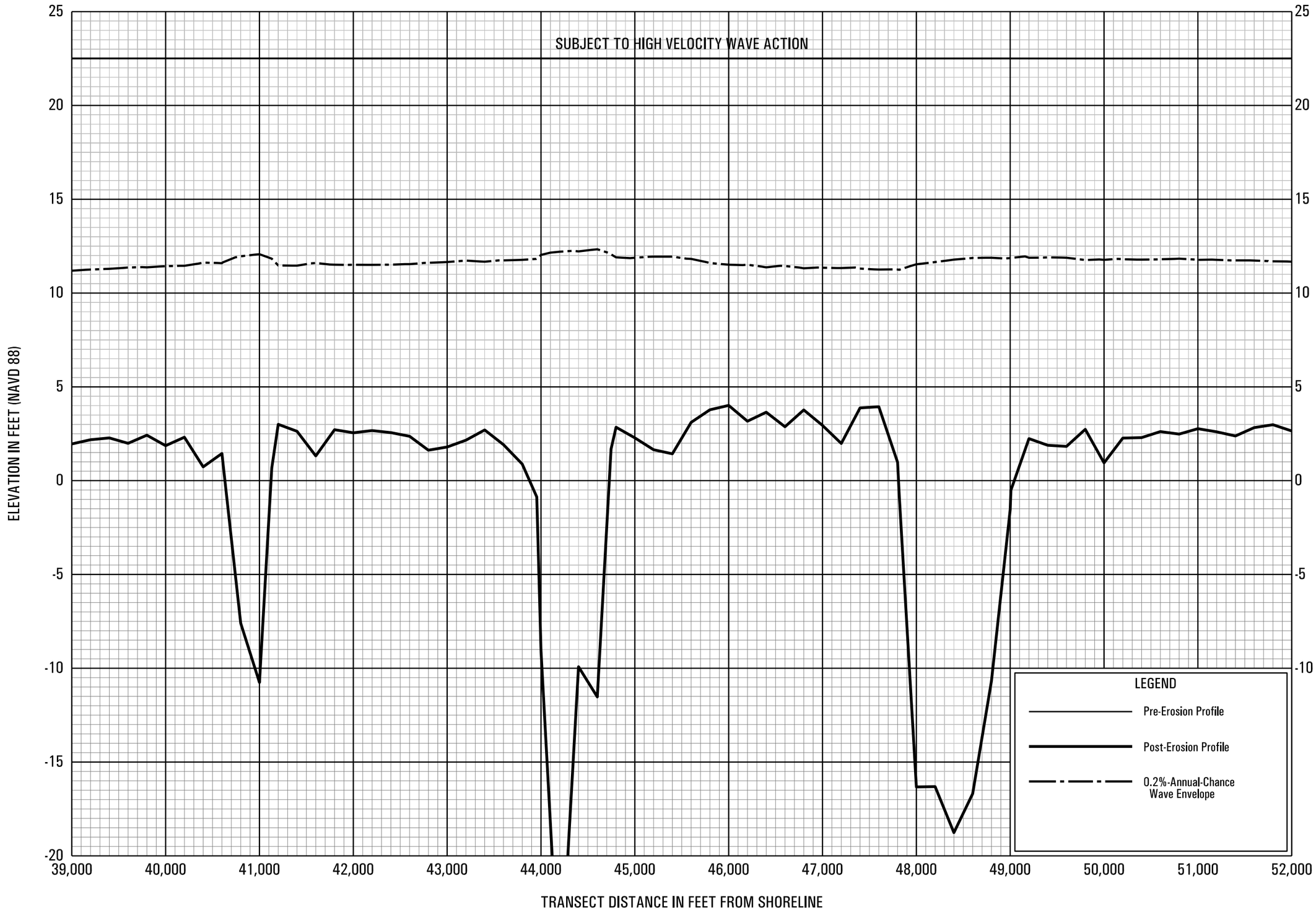

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FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

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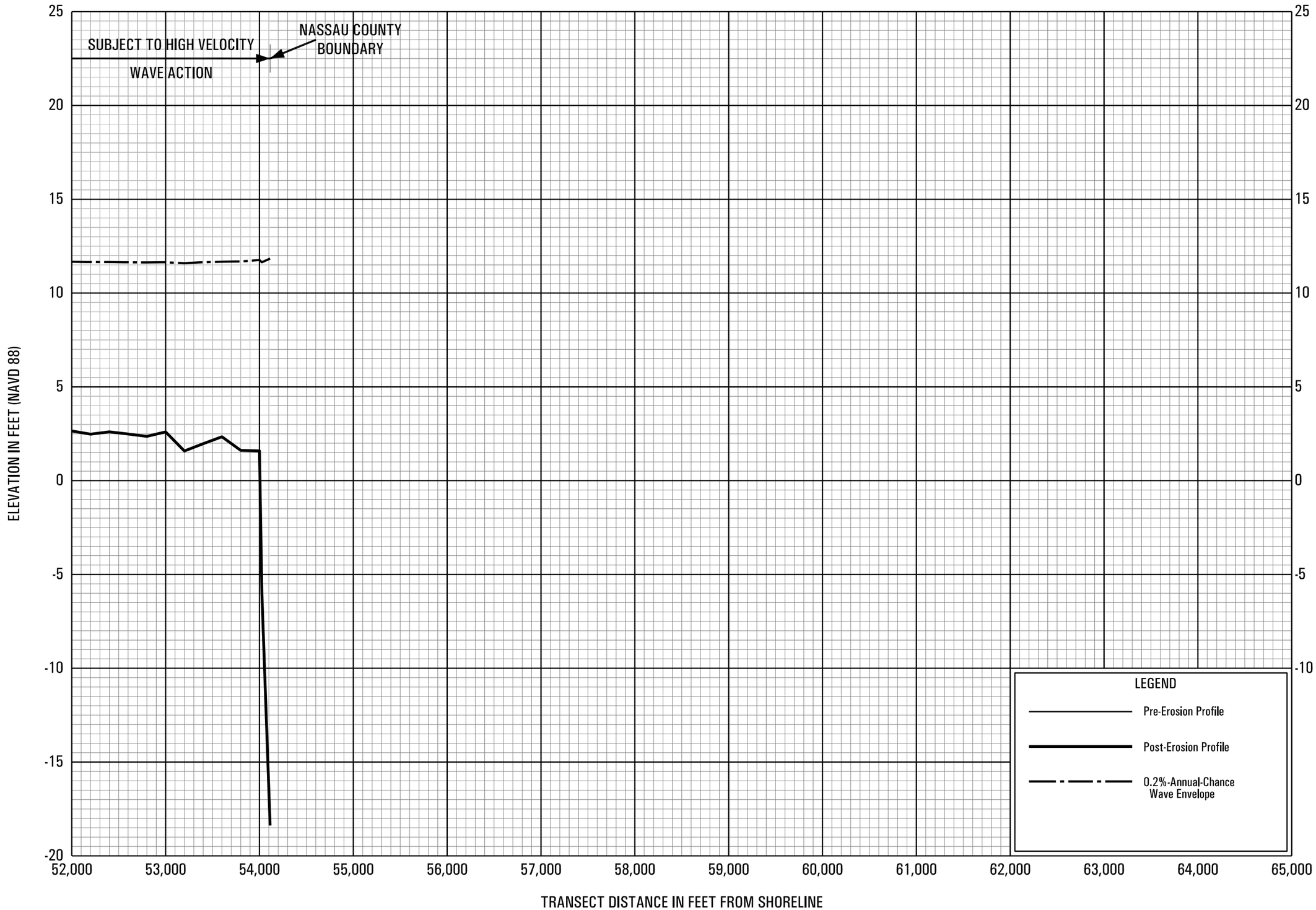

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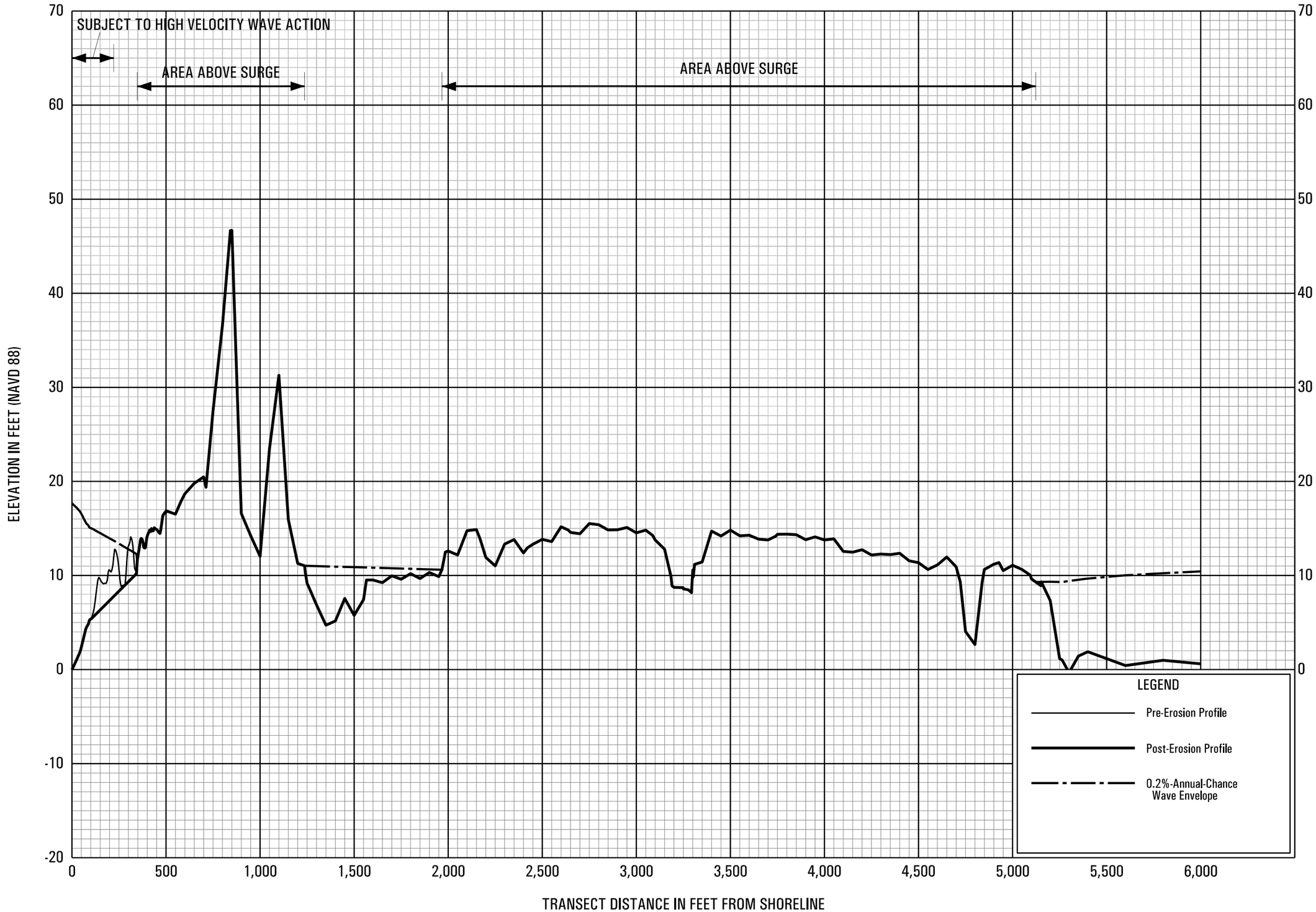

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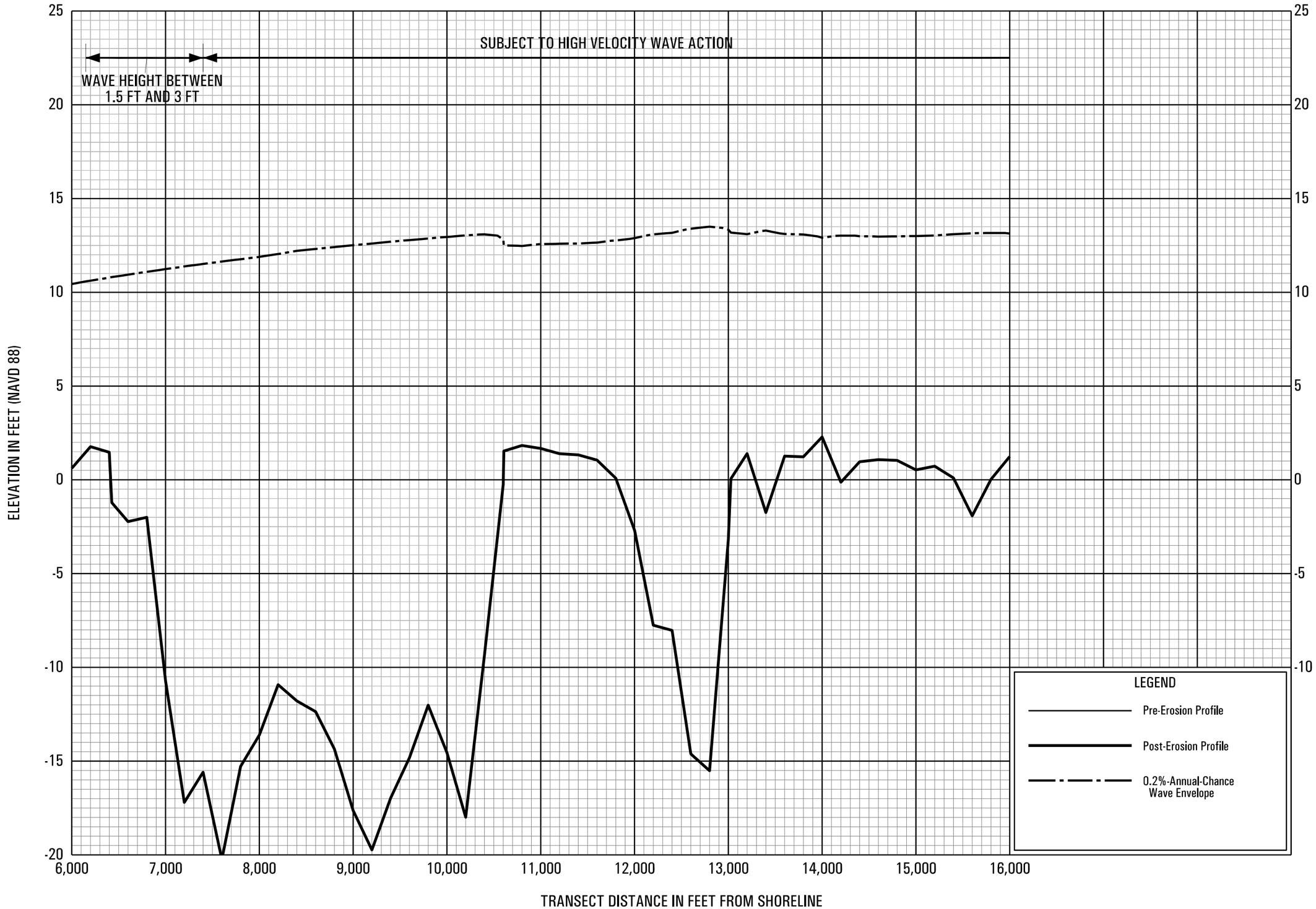
FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



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FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

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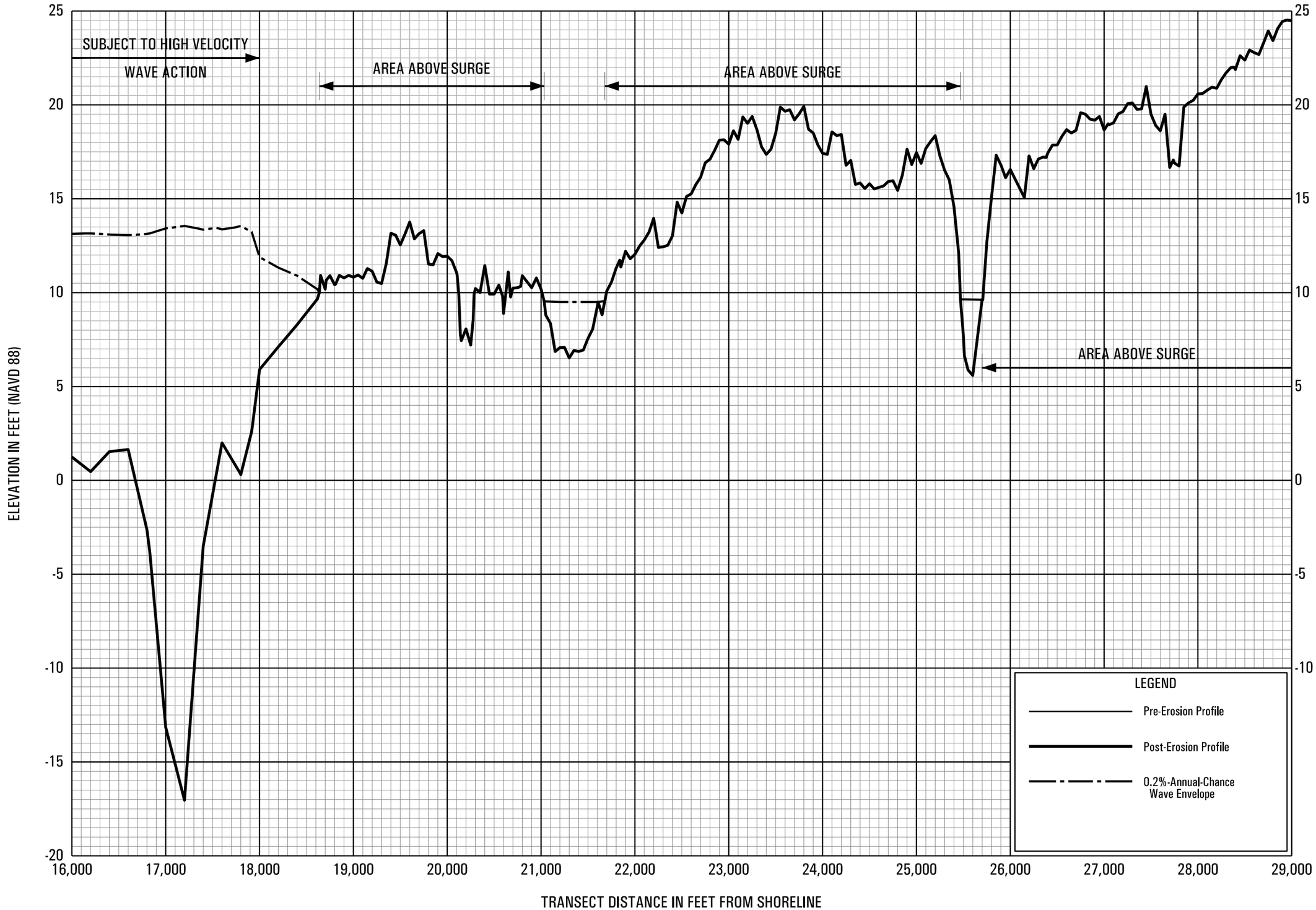

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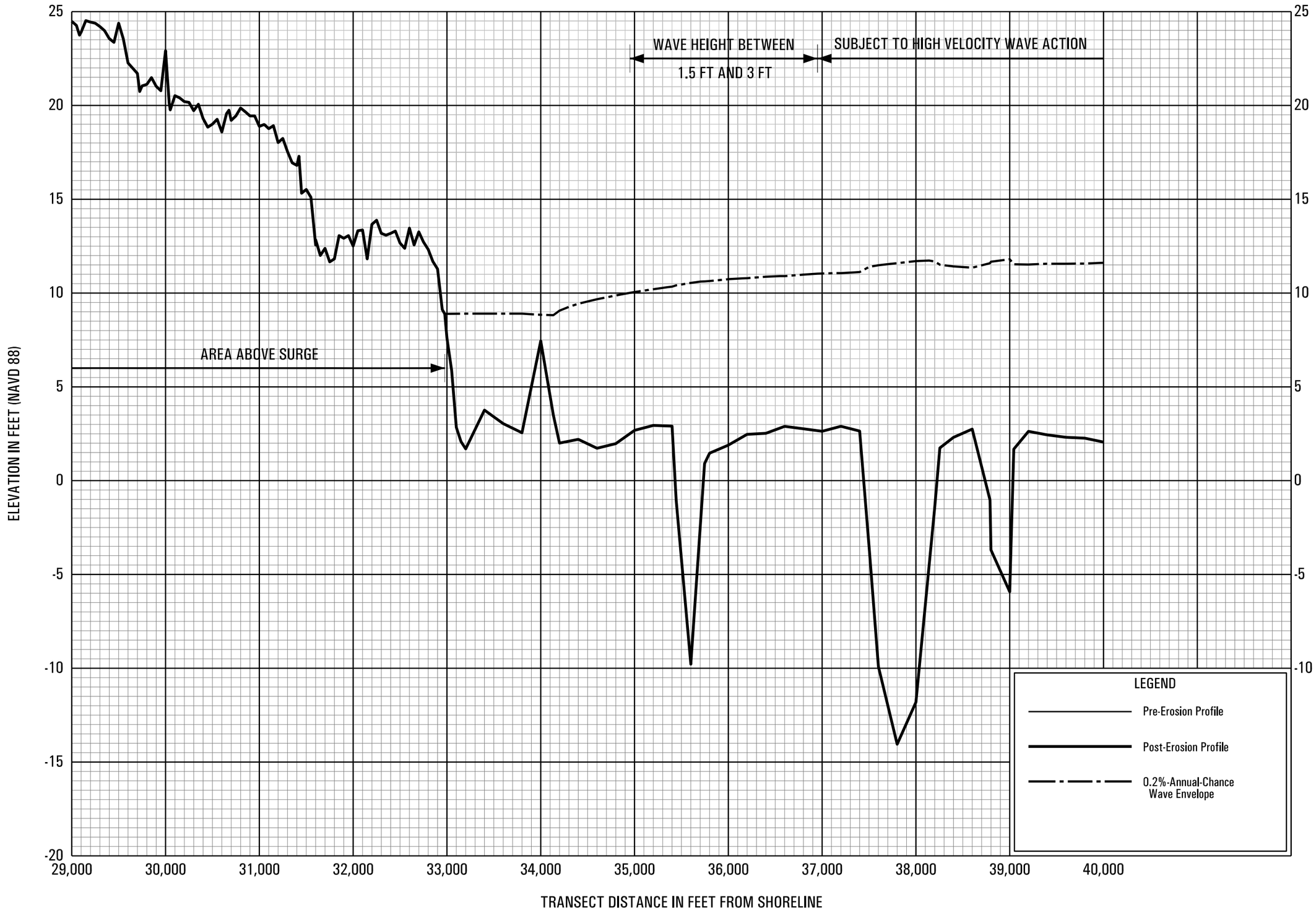
FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



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NASSAU COUNTY, FL

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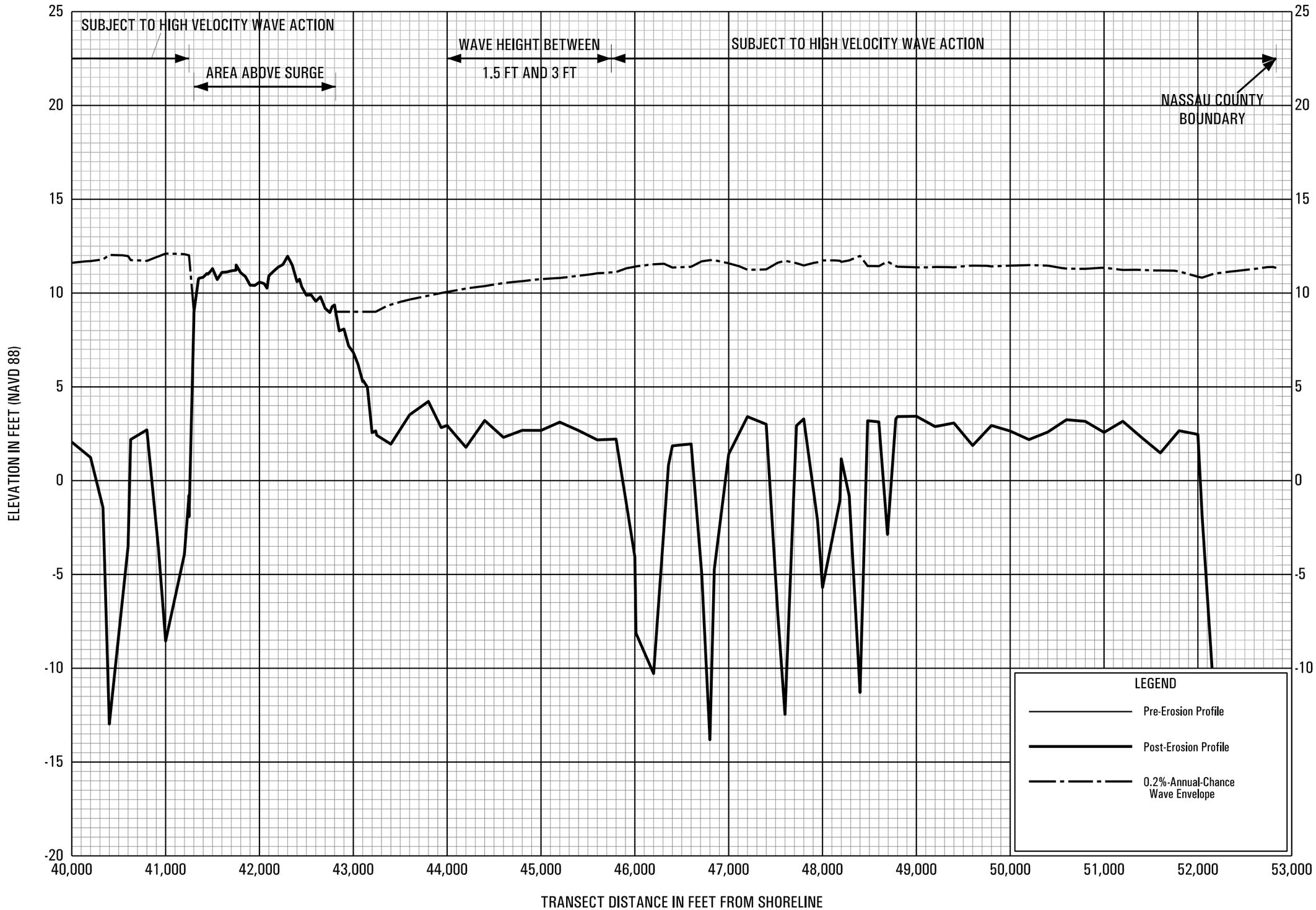

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TRANSECT 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

23P

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 2 OF 2

NASSAU COUNTY, FLORIDA

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
CALLAHAN, TOWN OF	120171
FERNANDINA BEACH, CITY OF	120172
HILLIARD, TOWN OF	120573
NASSAU COUNTY UNINCORPORATED AREAS	120170

FEMA

PRELIMINARY
01/15/2016

REVISED:

FLOOD INSURANCE STUDY NUMBER
12089CV002B

Version Number 2.3.3.2

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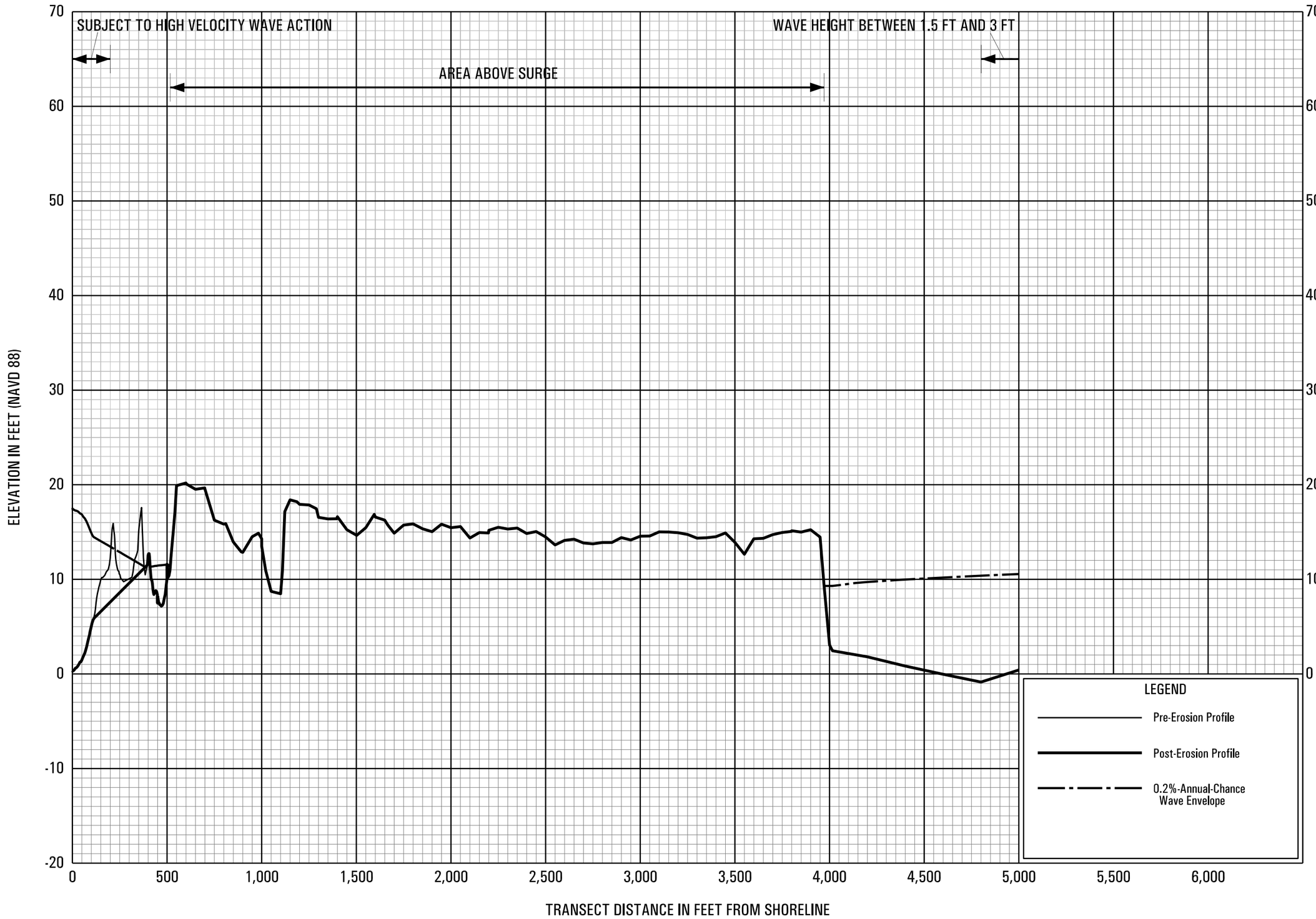
Flood Insurance Rate Map (FIRM)



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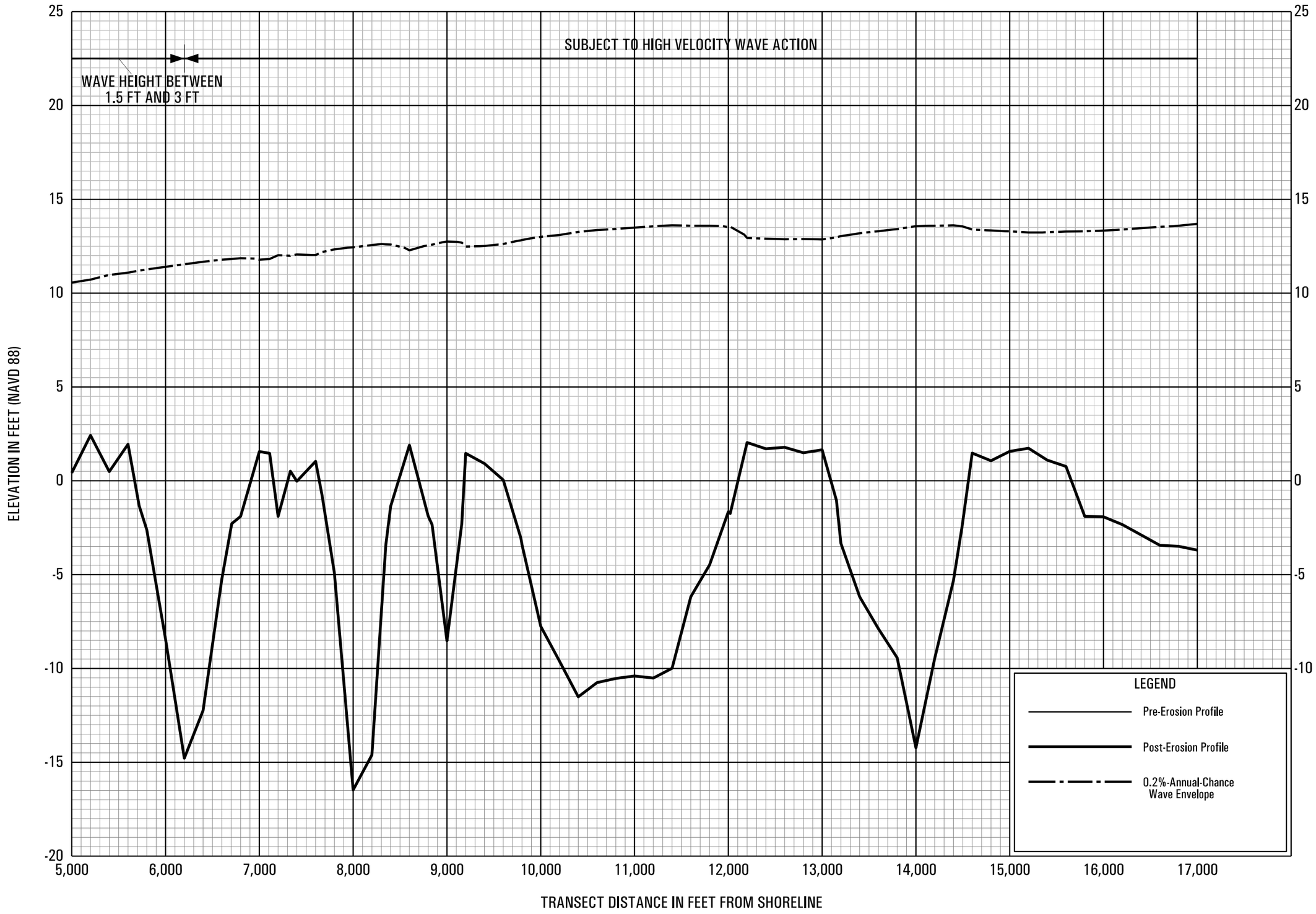

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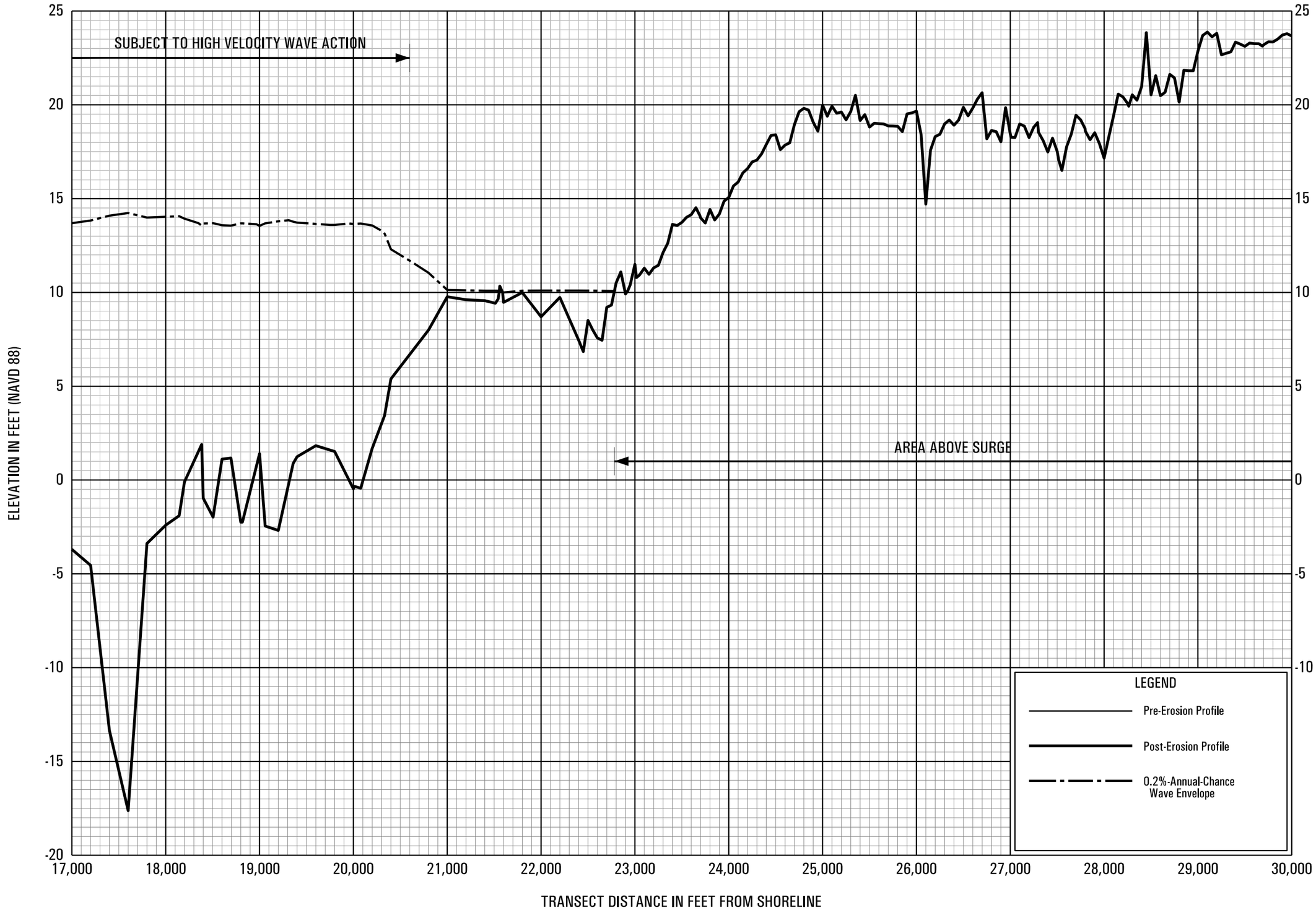

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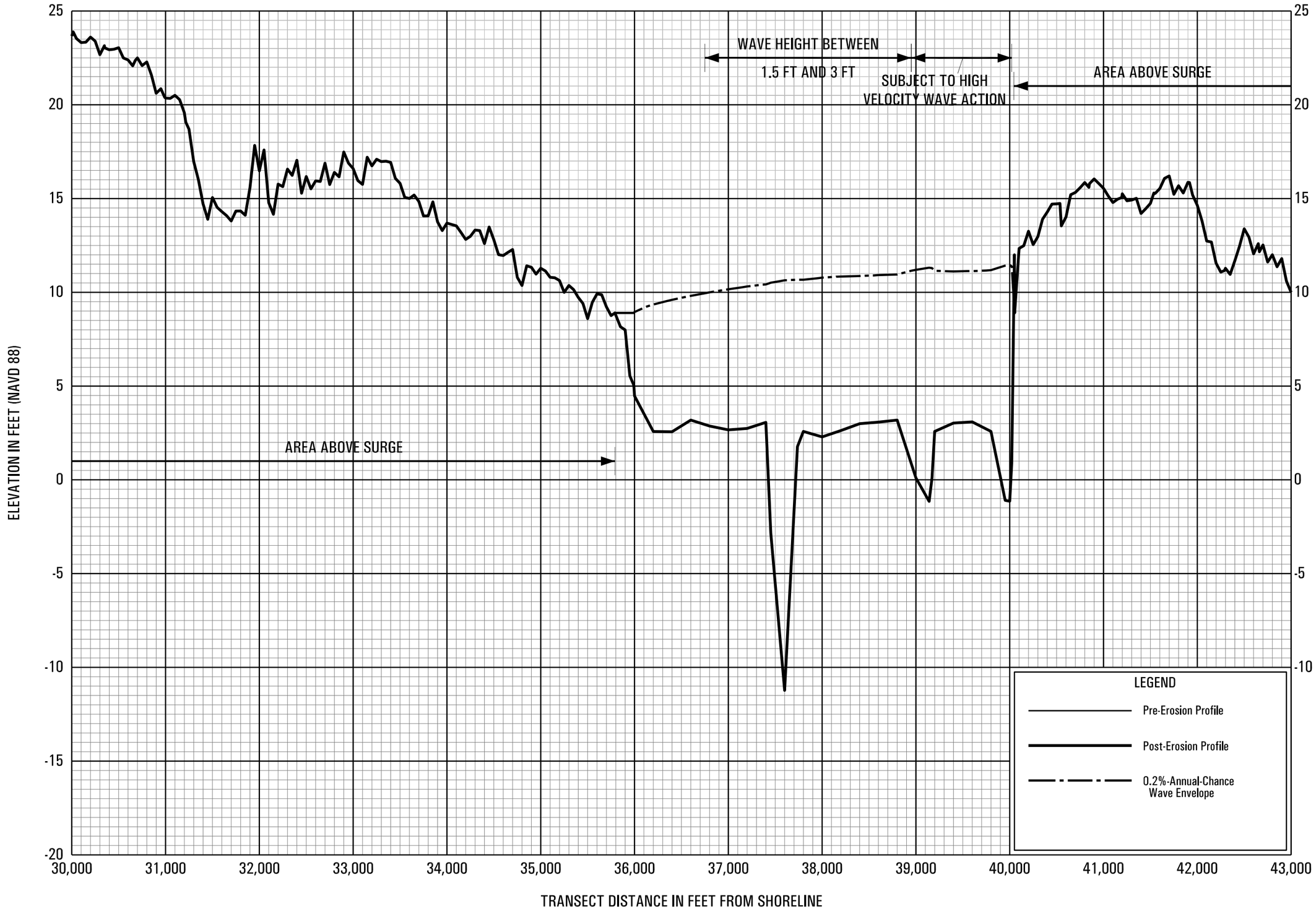

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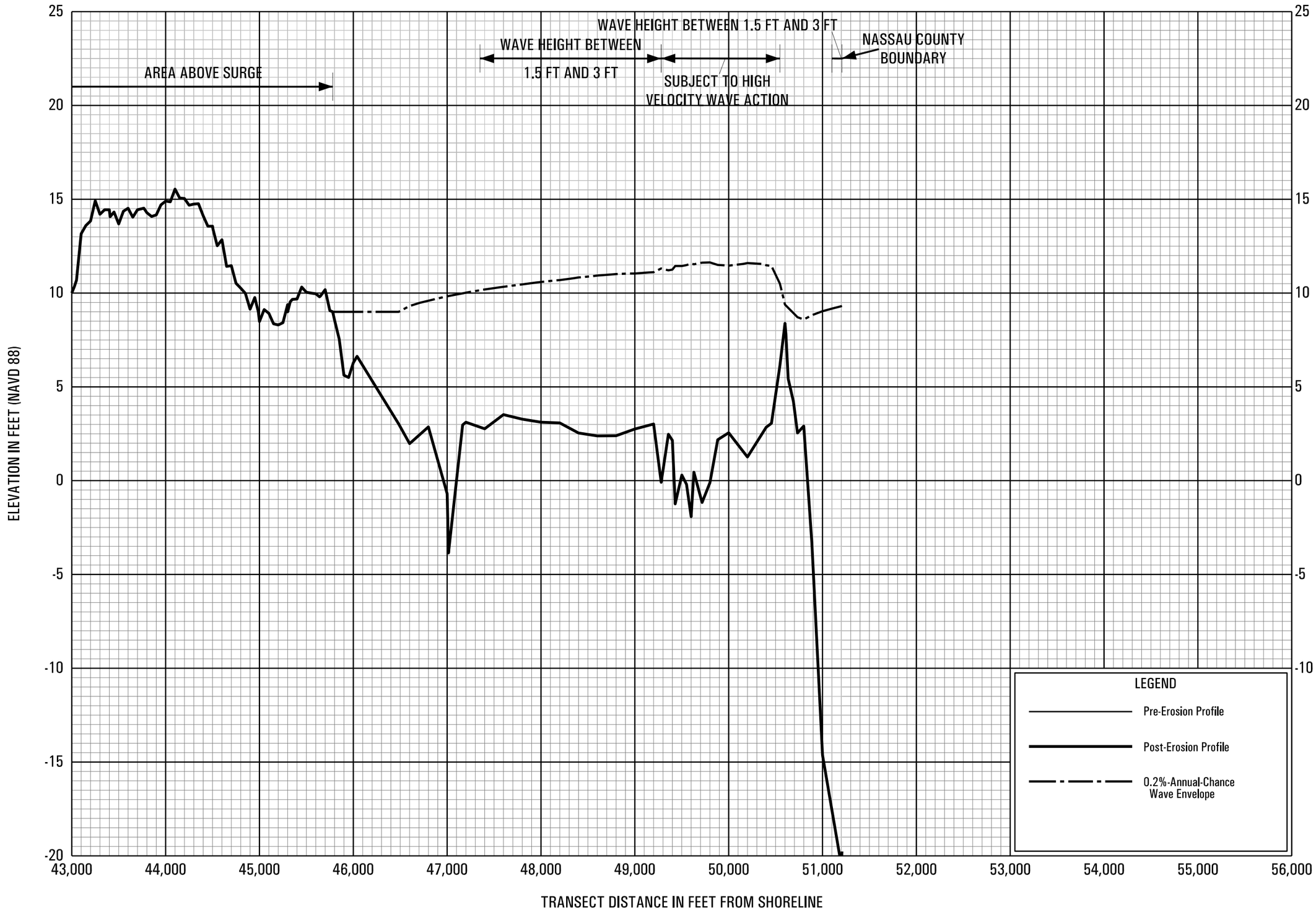

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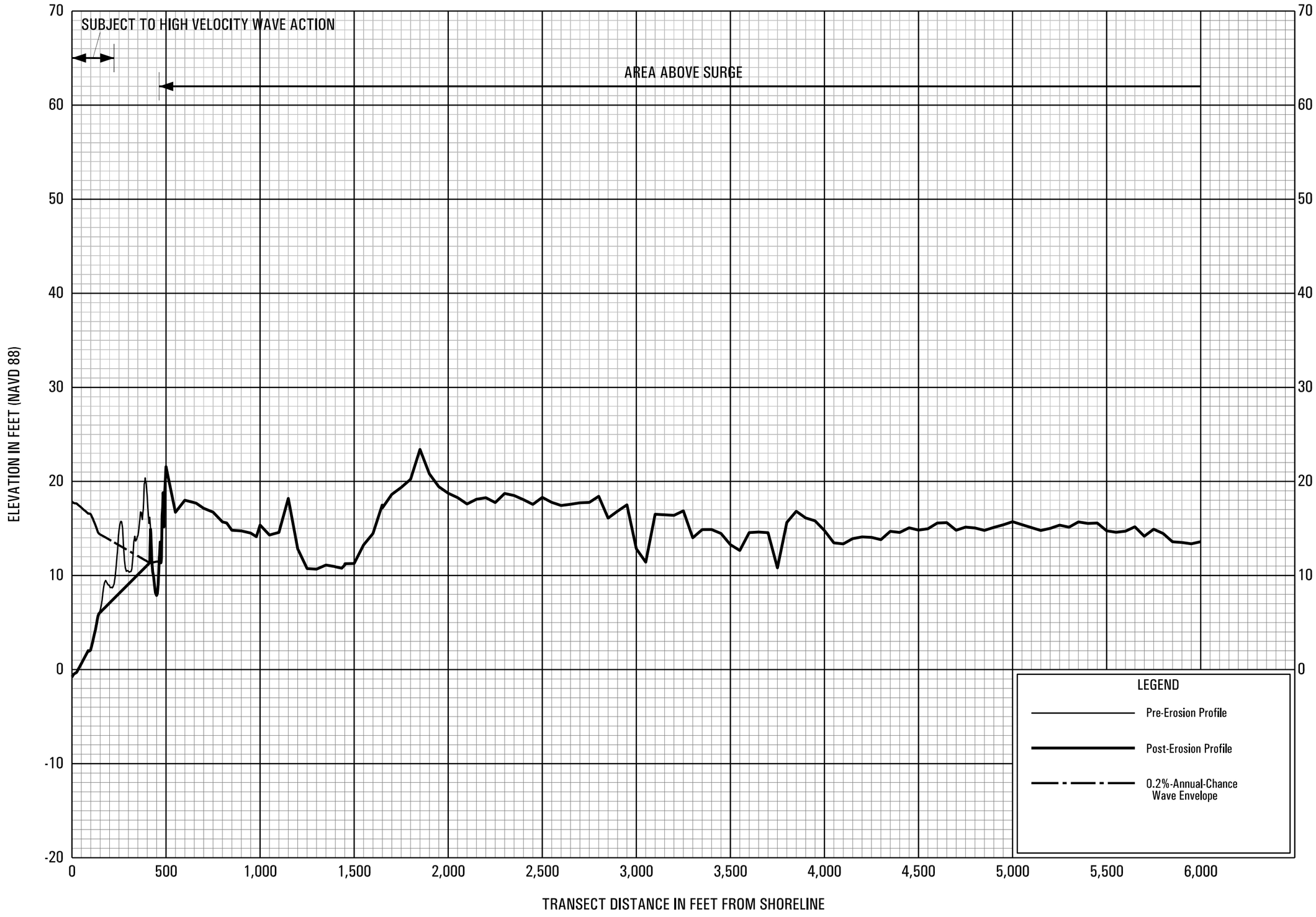

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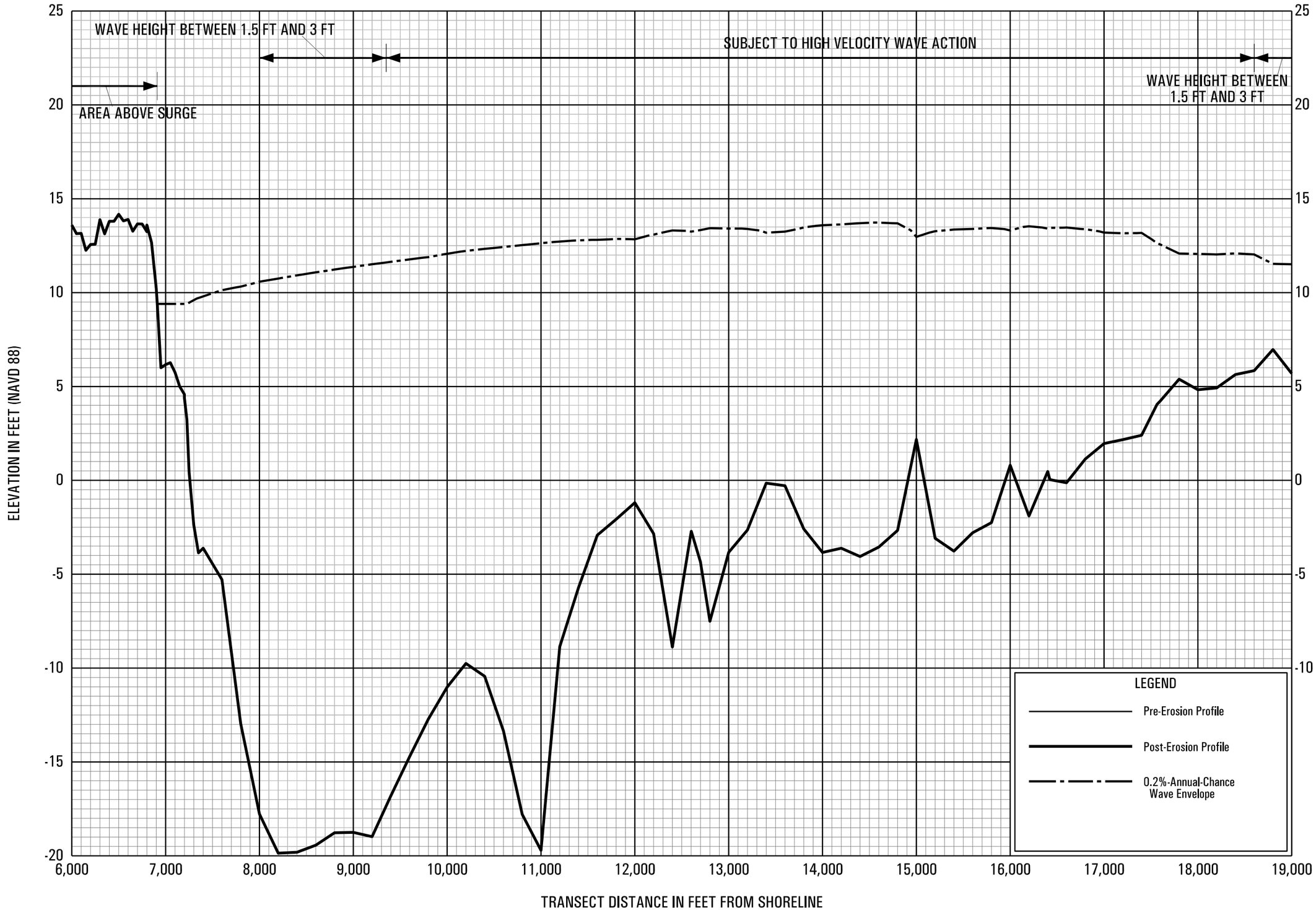

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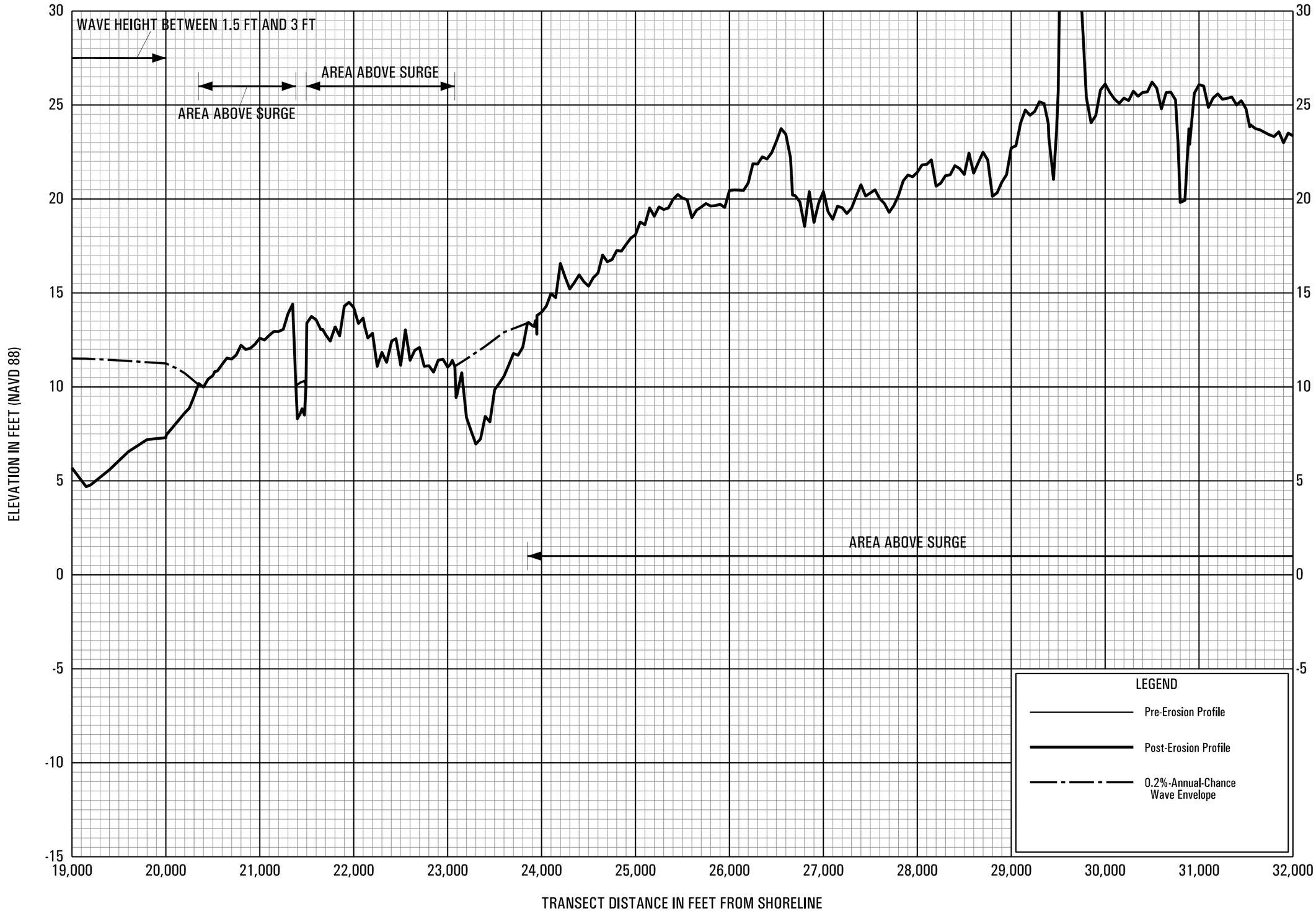

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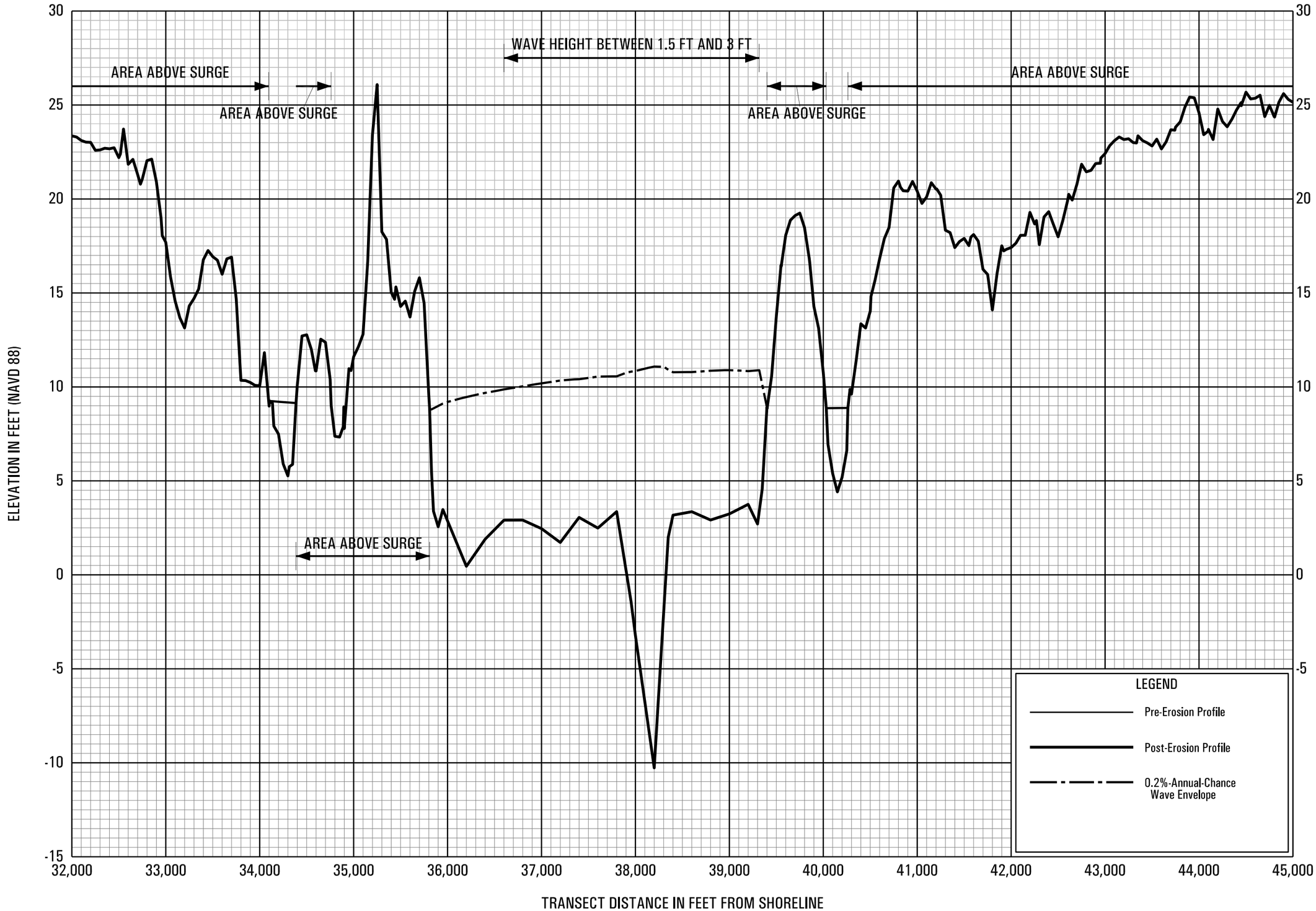

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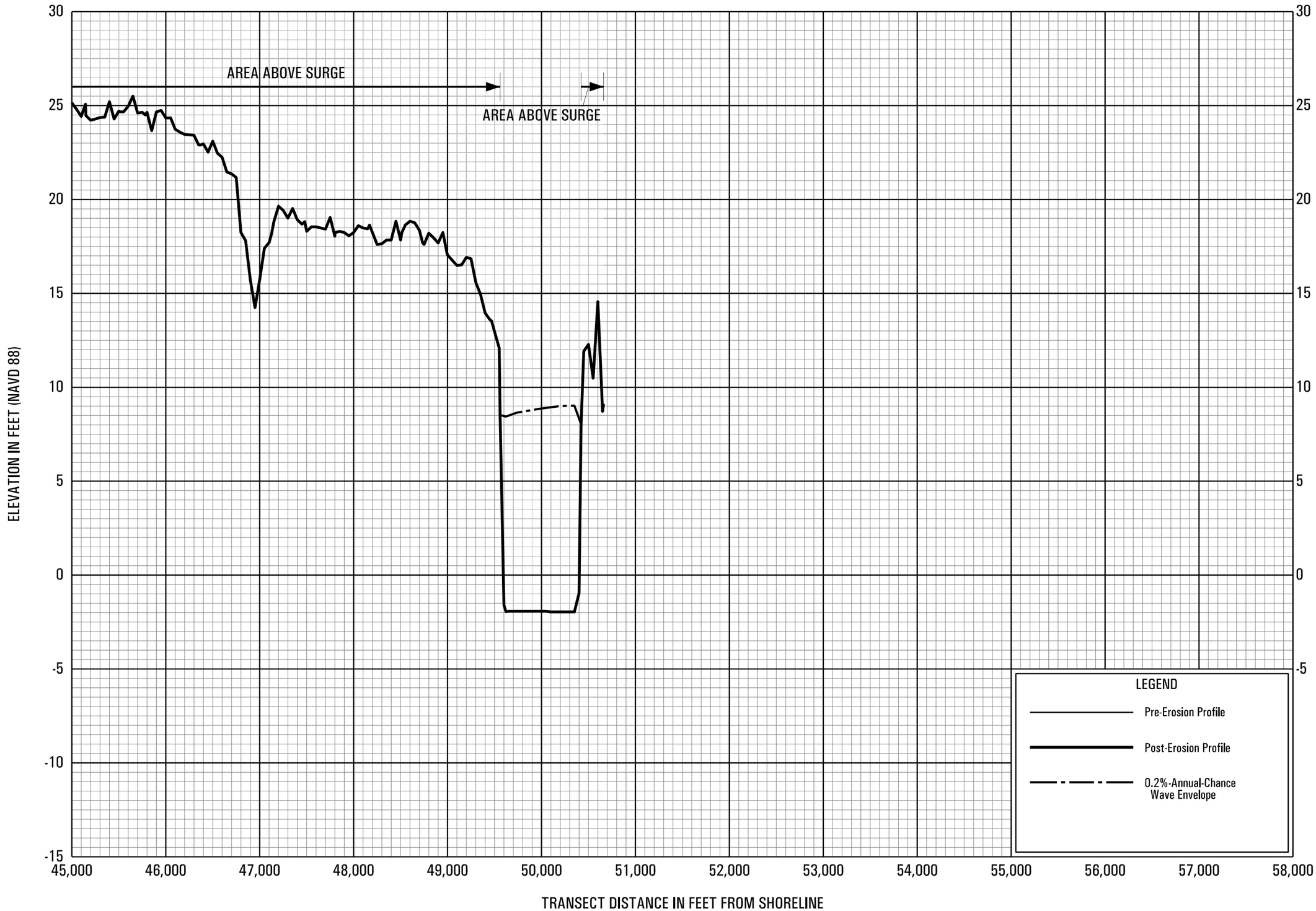

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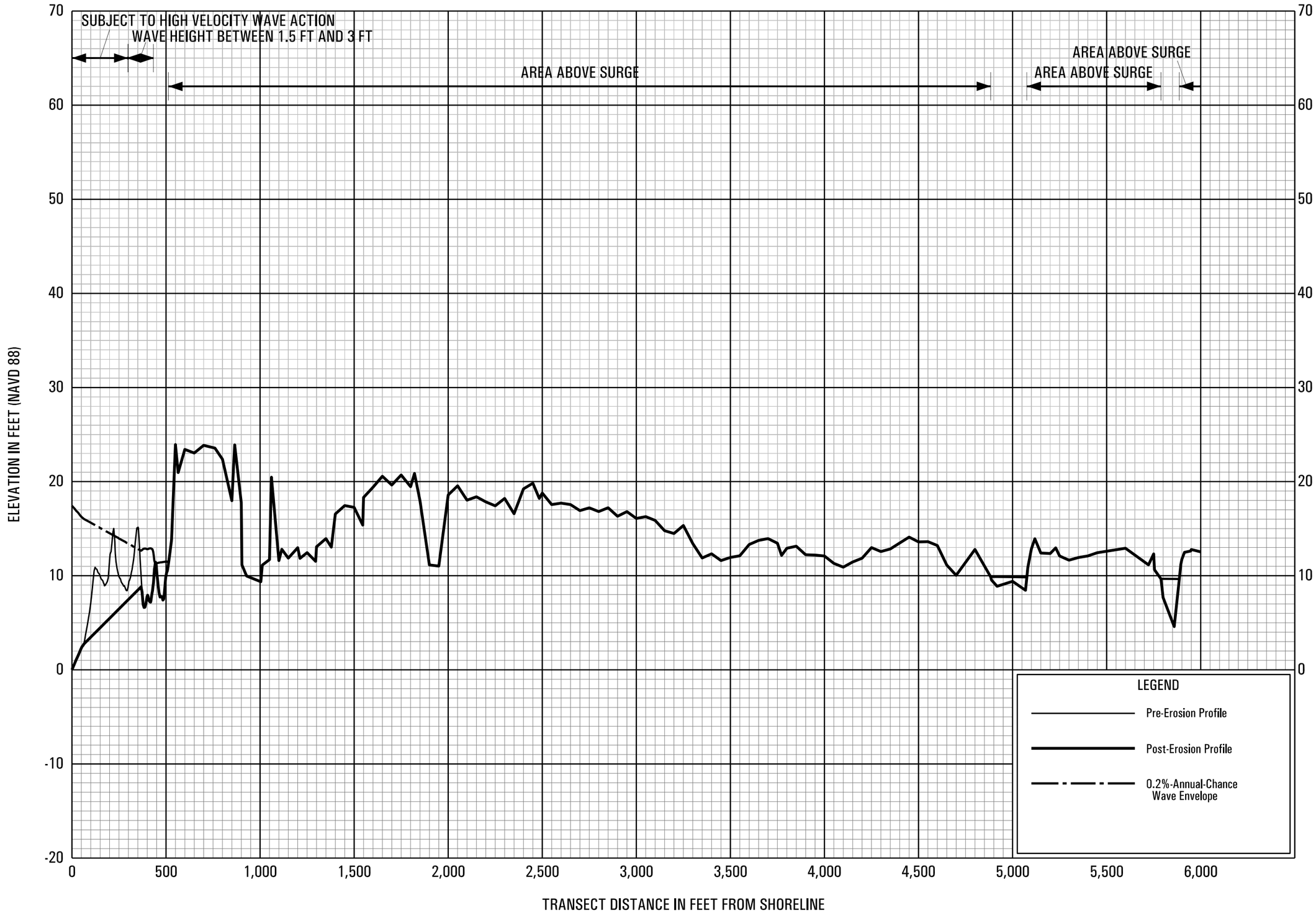

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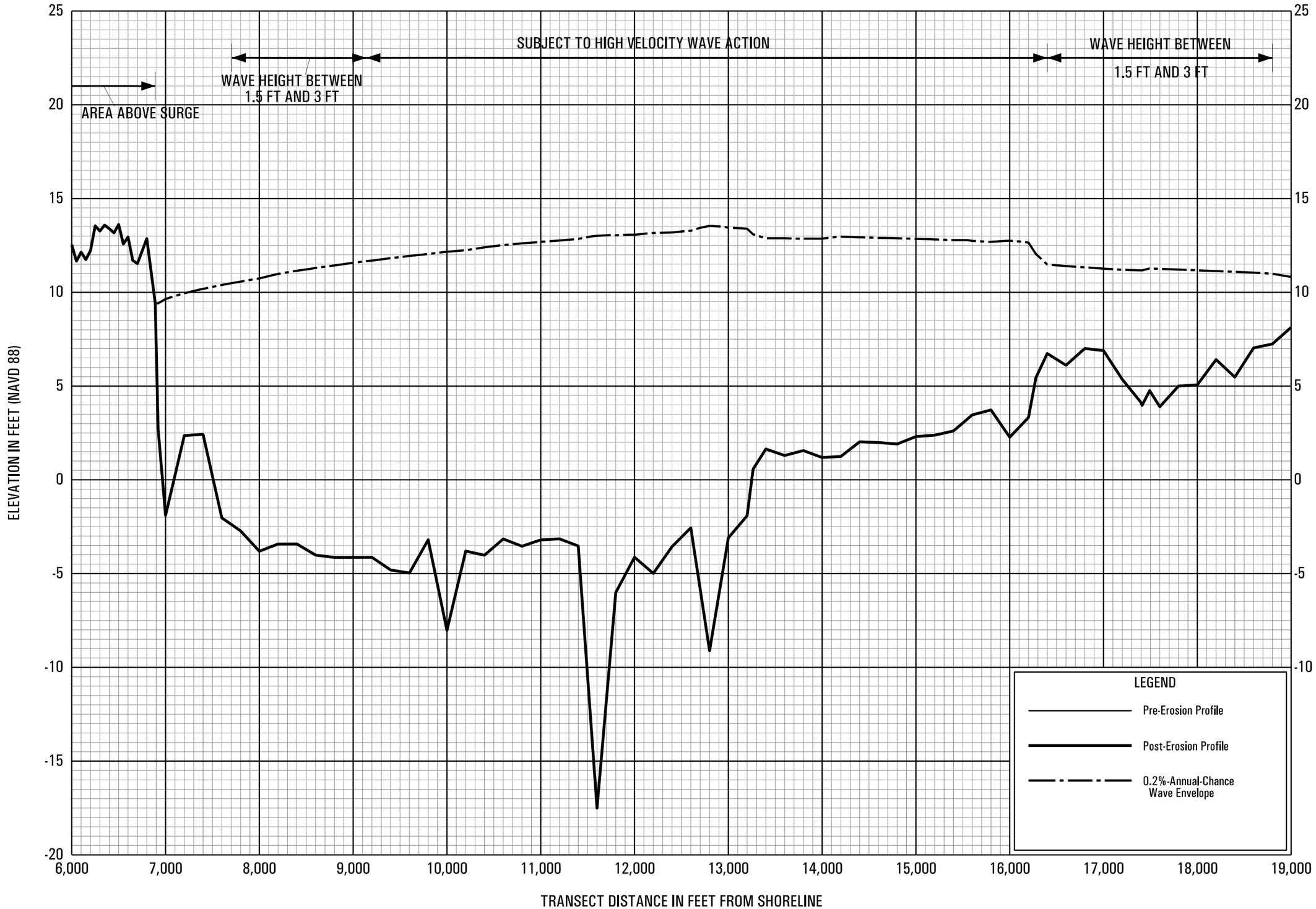

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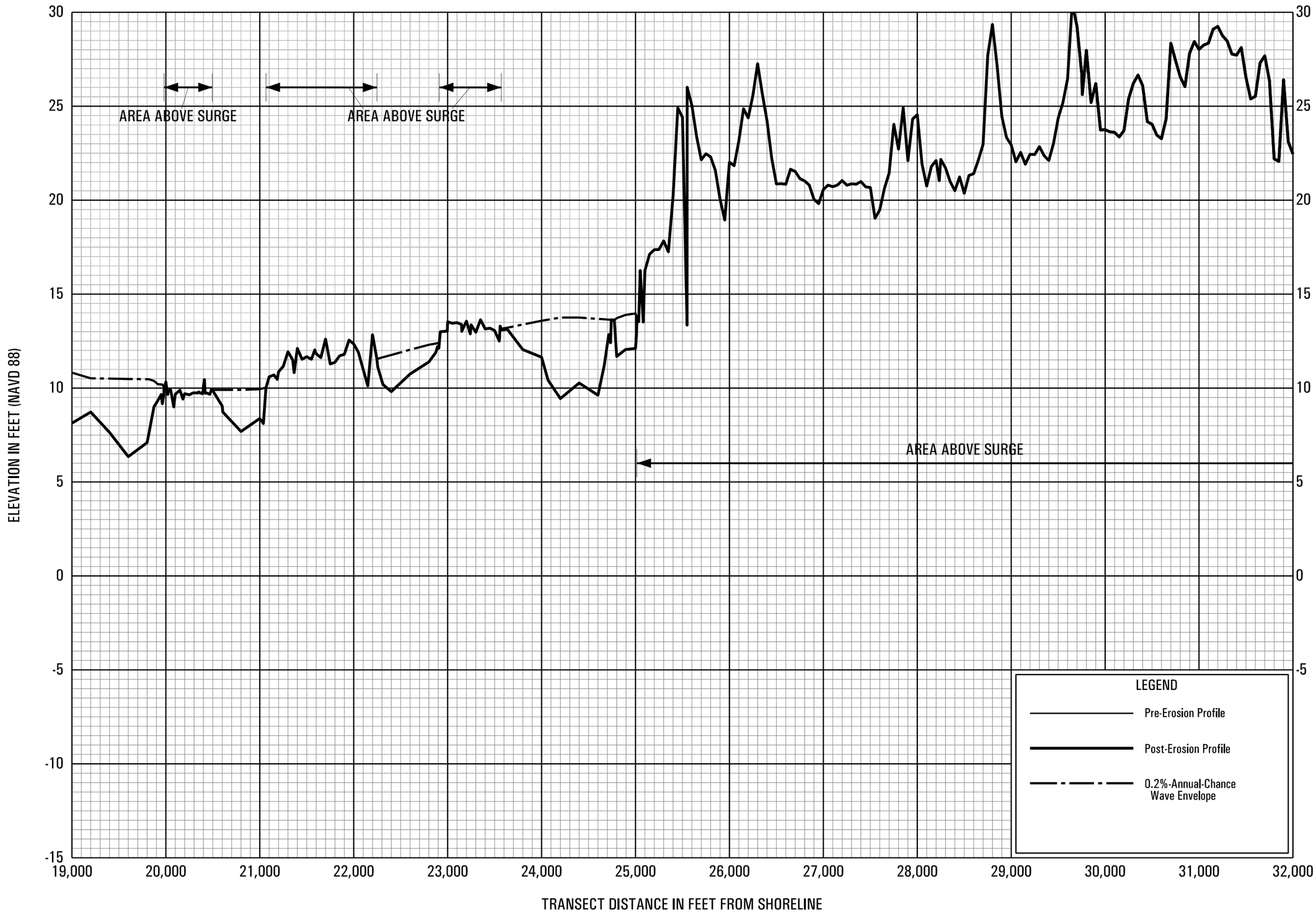

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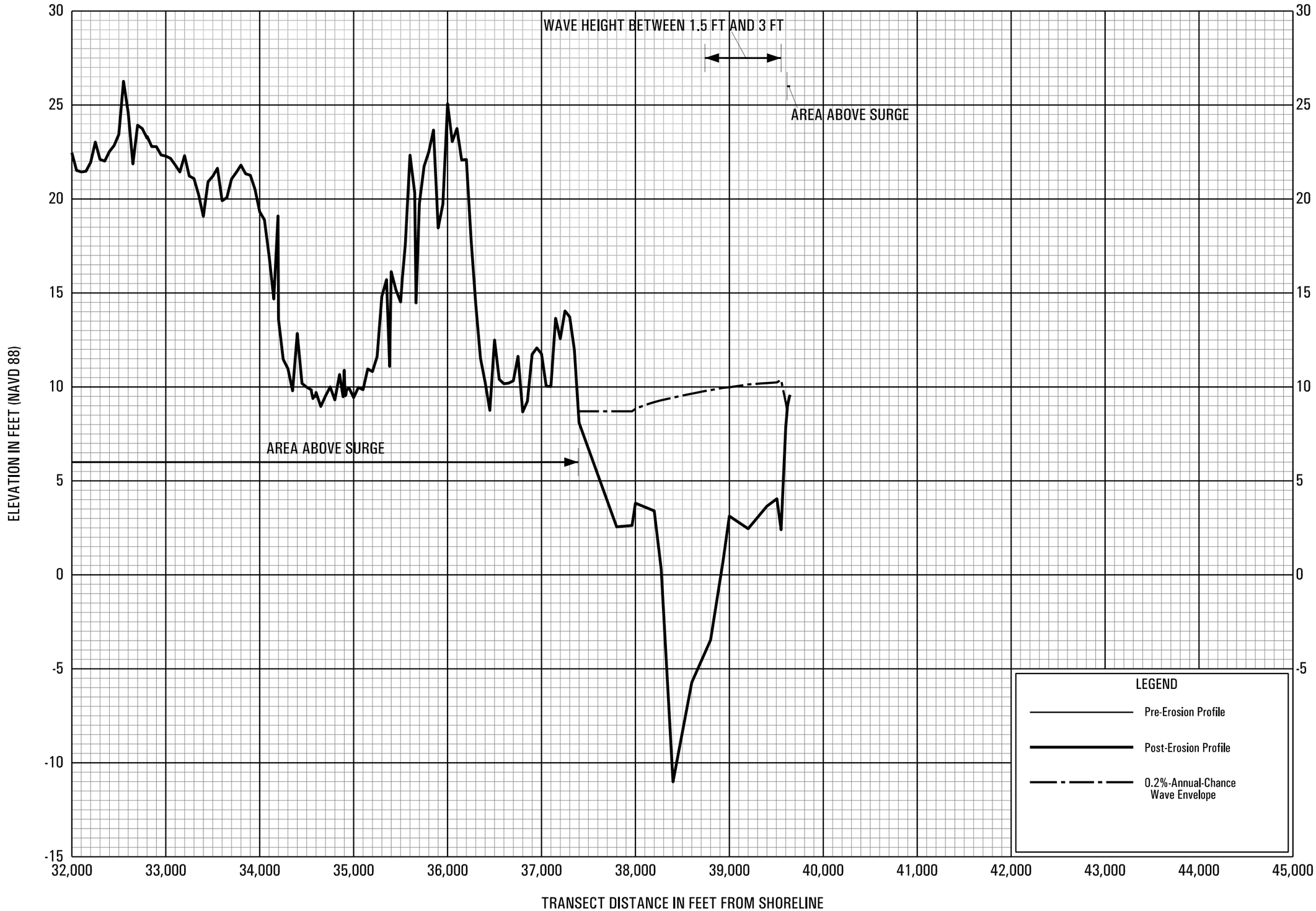

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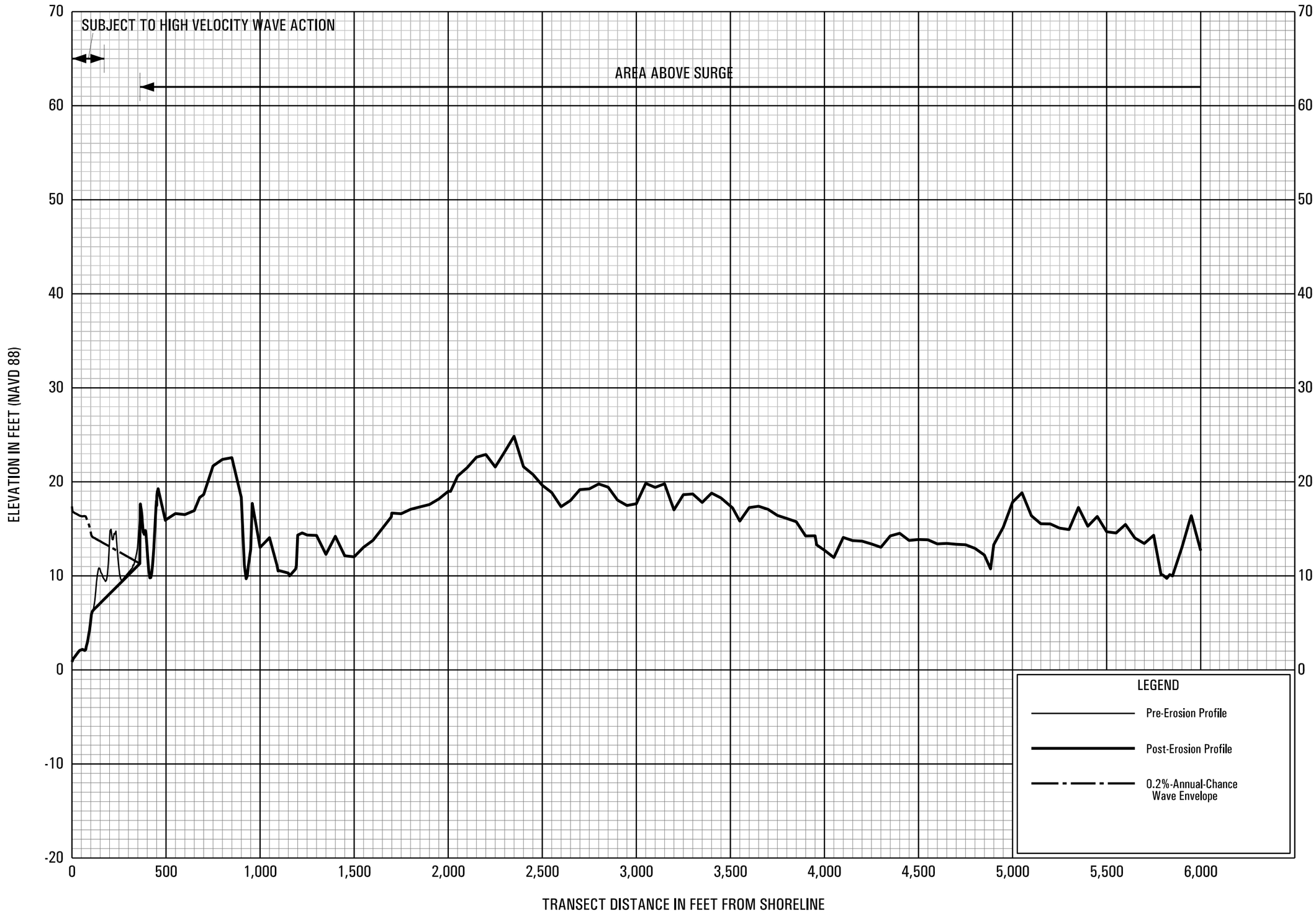

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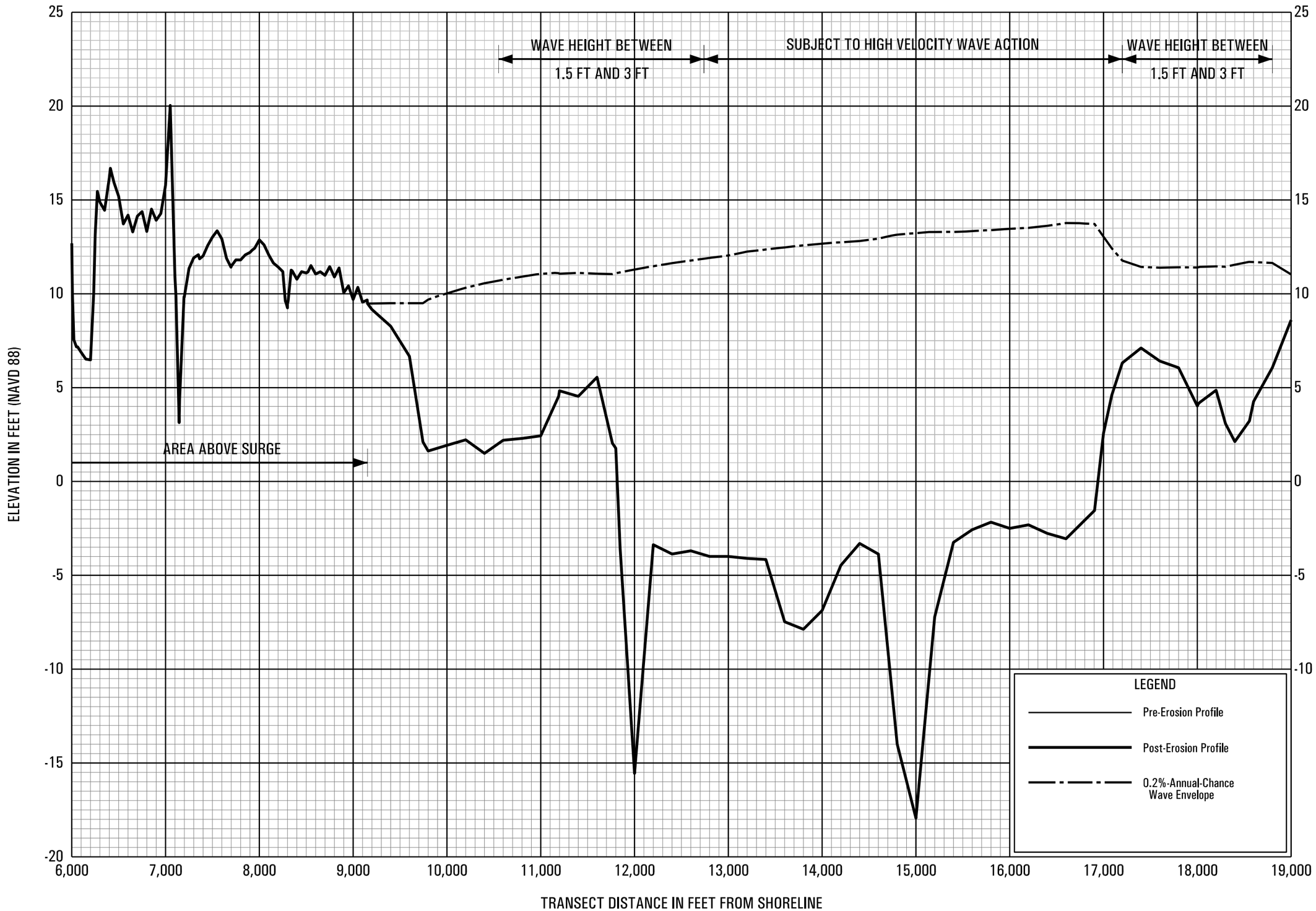

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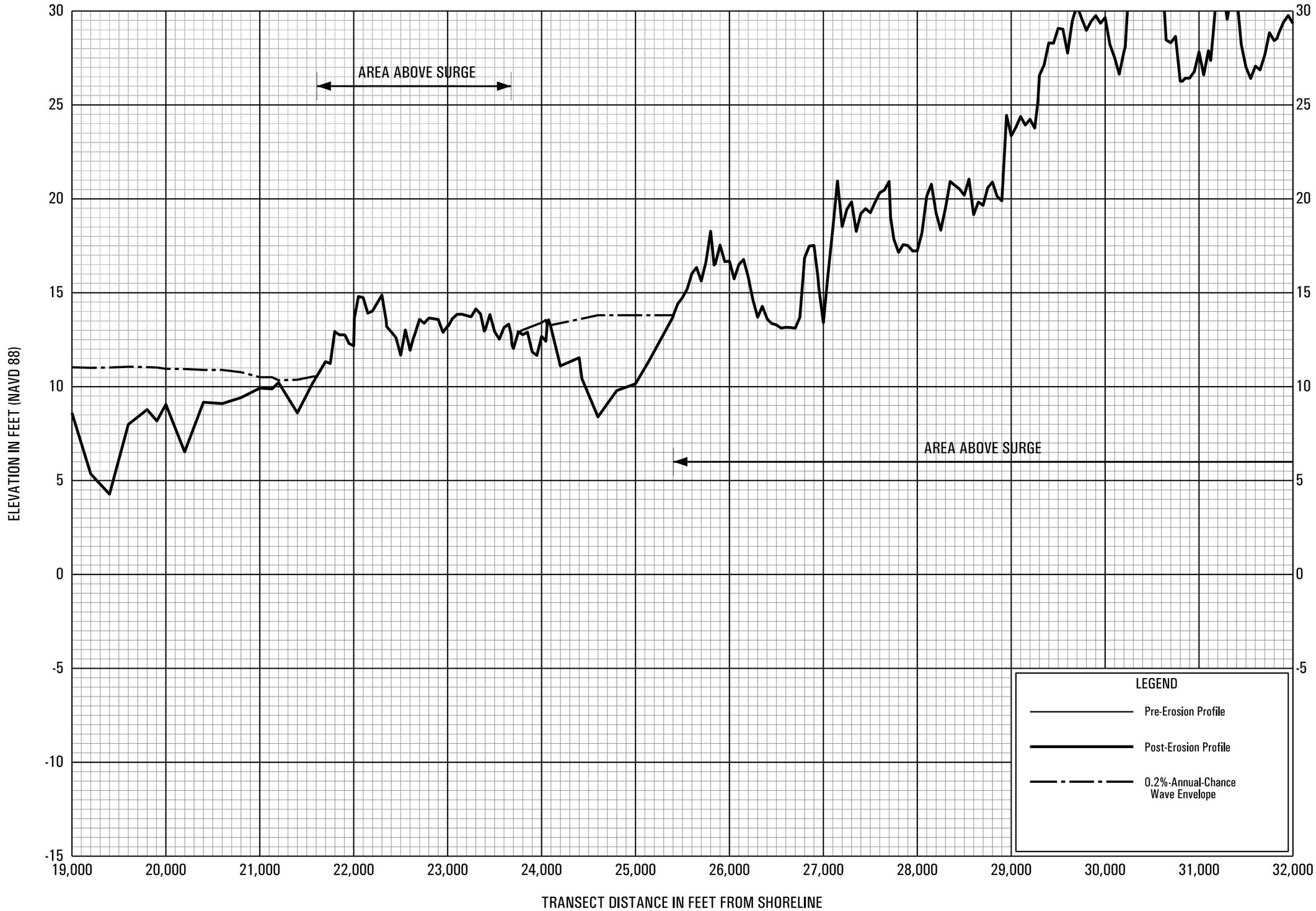

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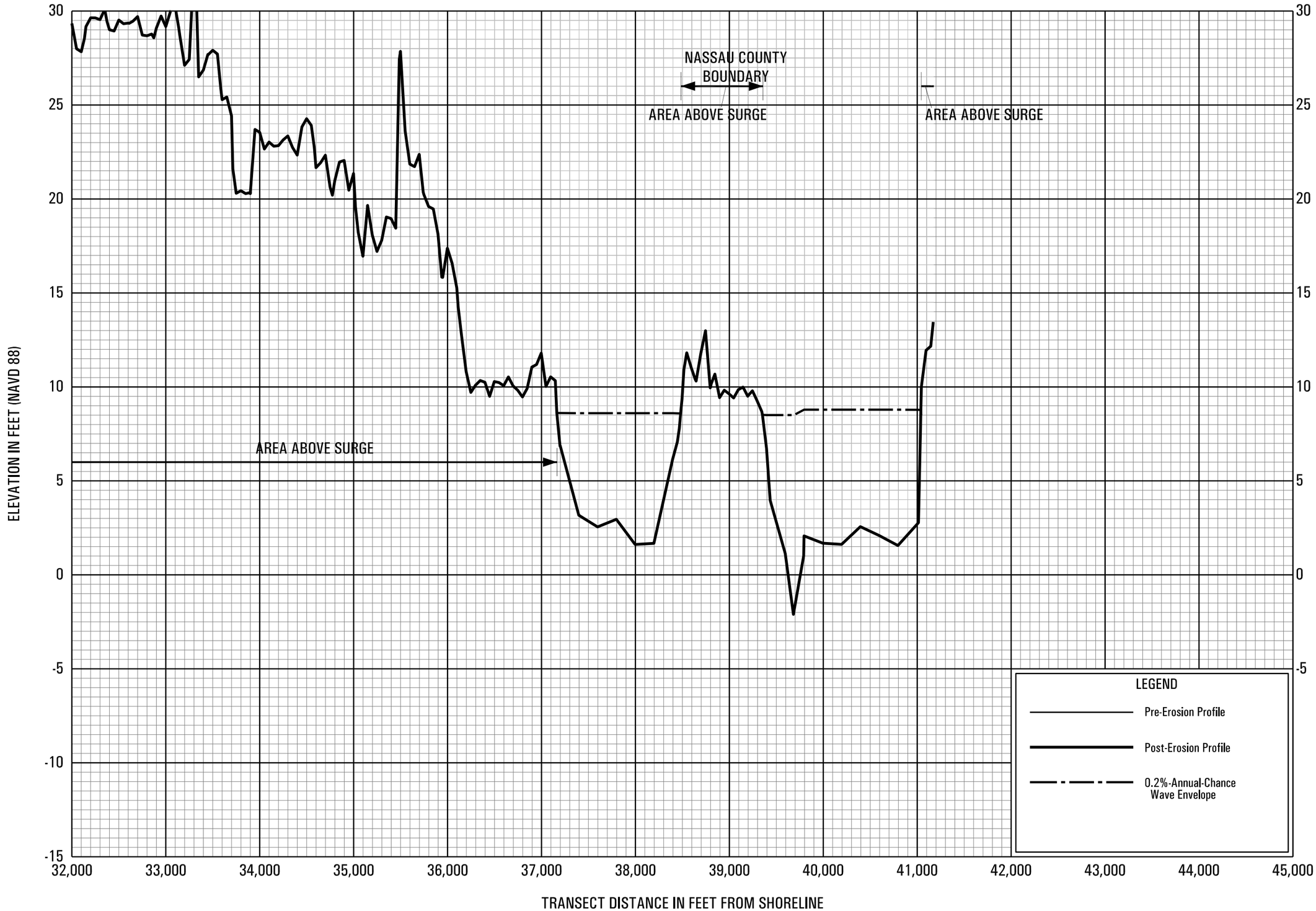

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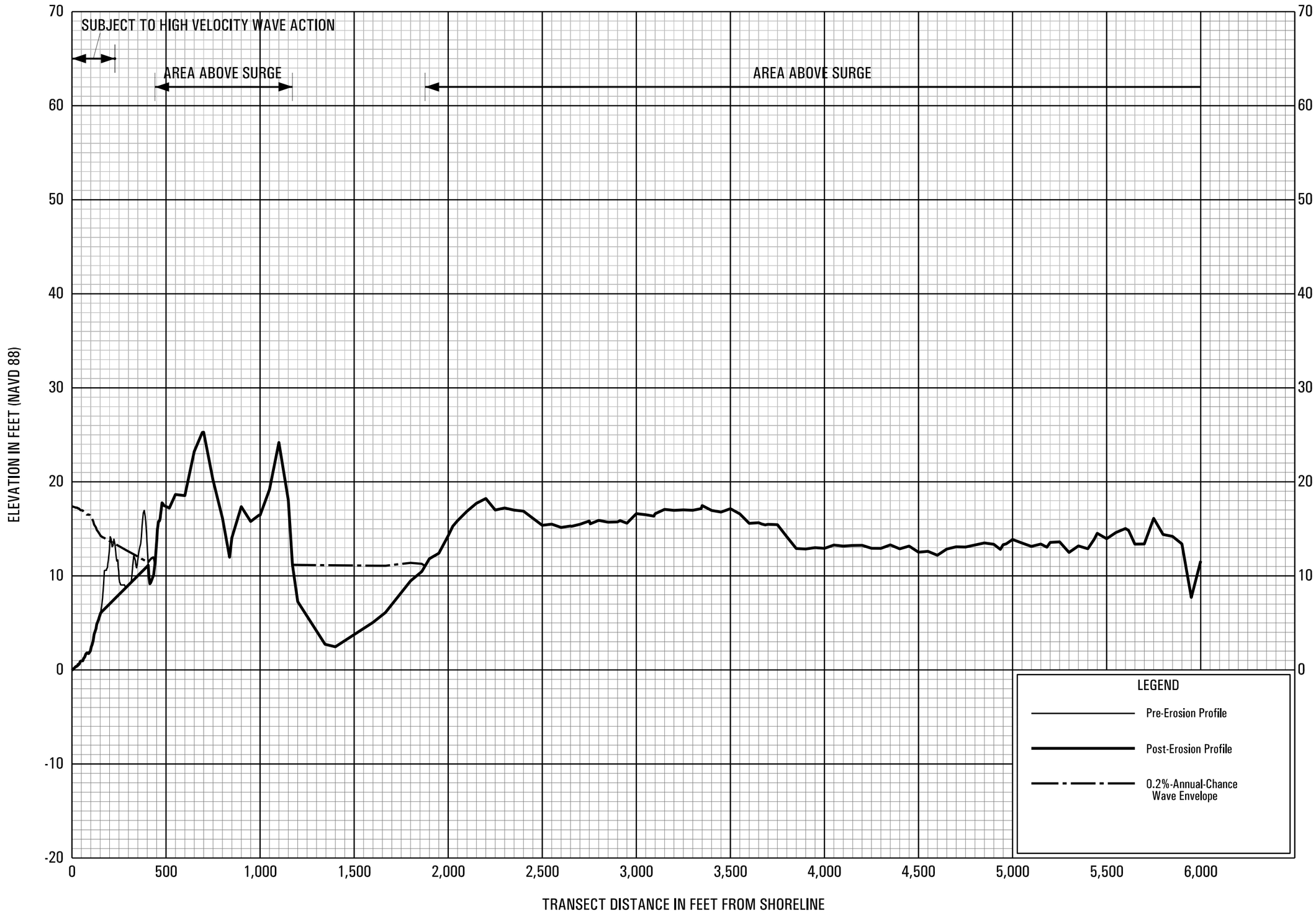

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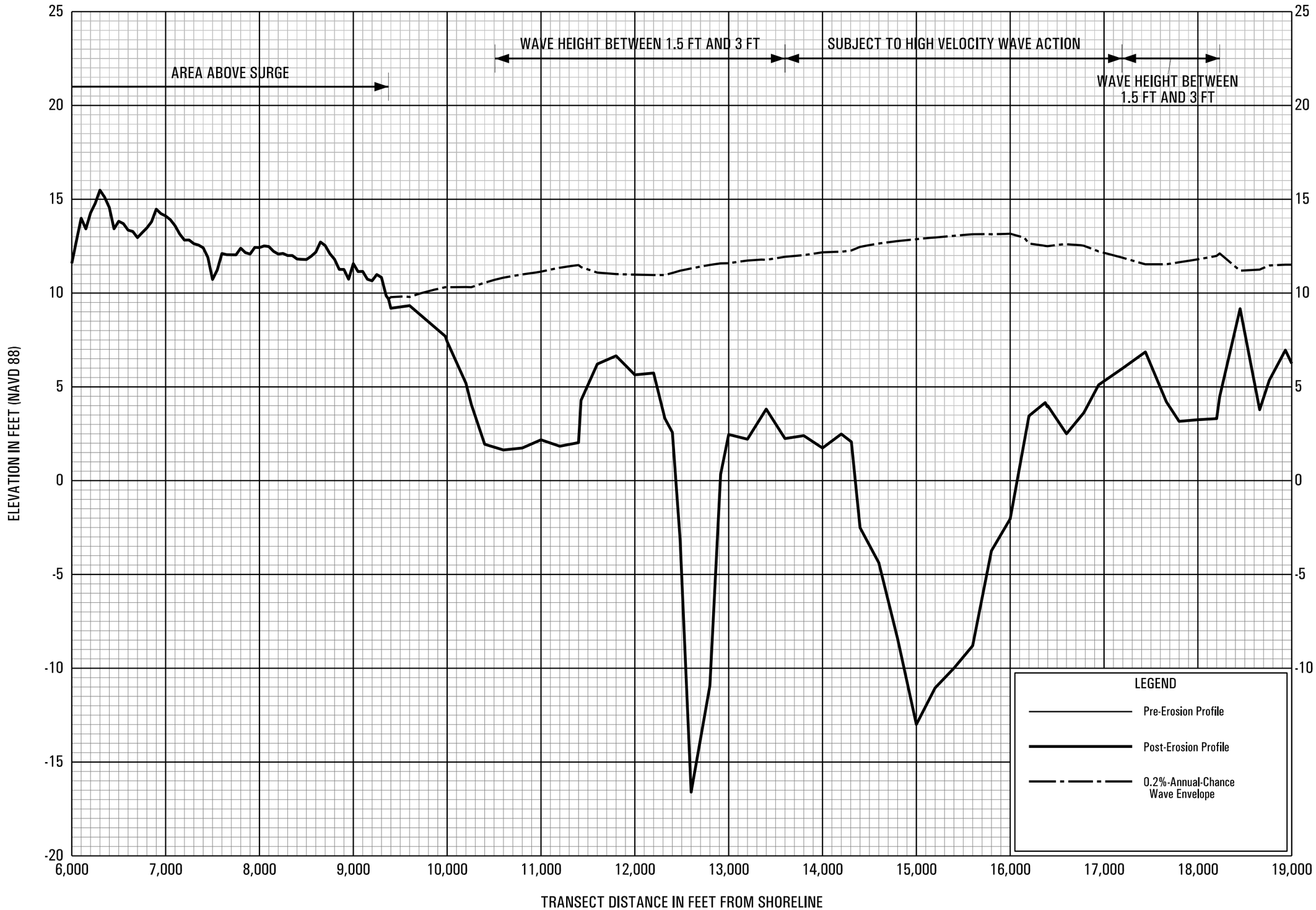

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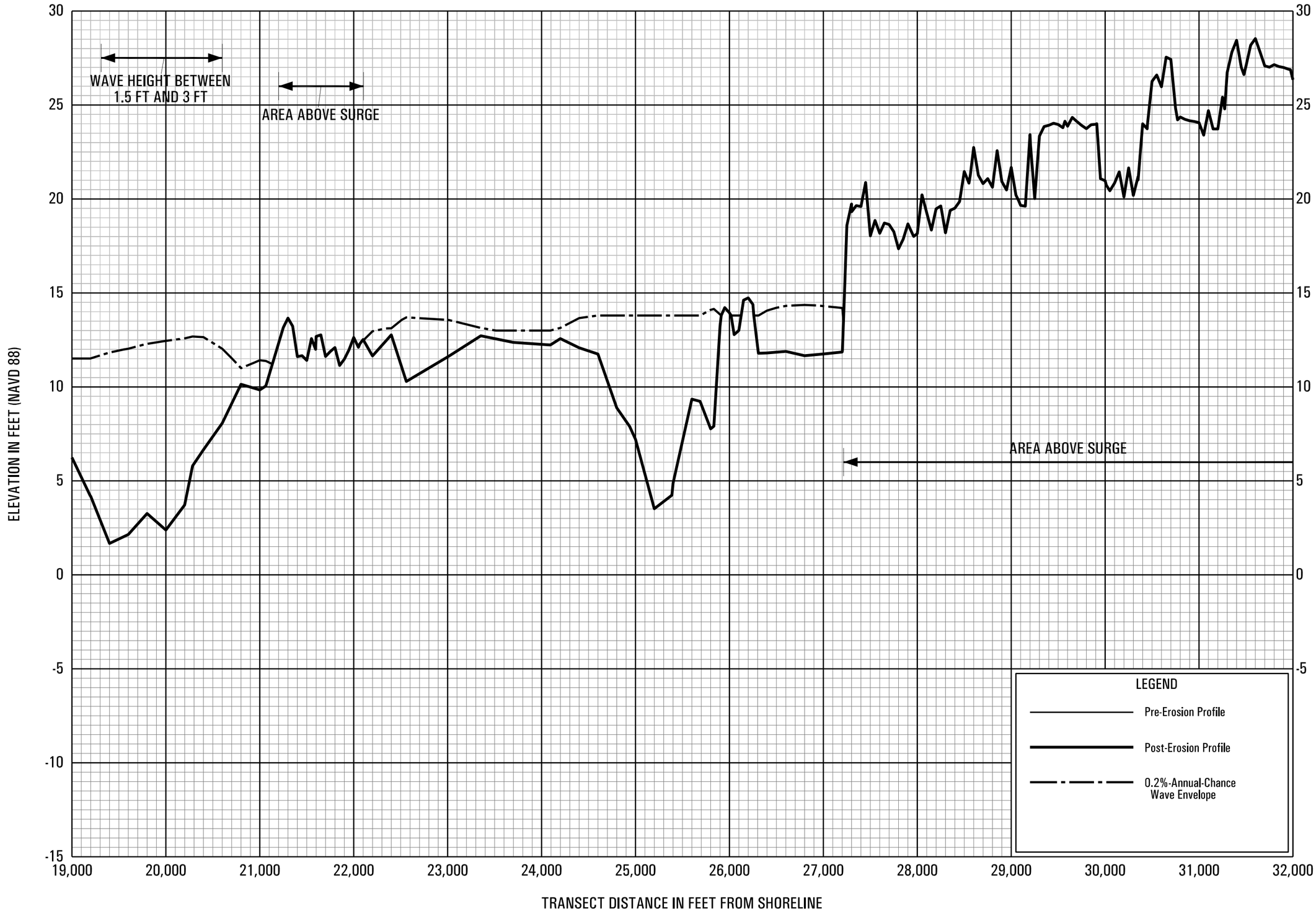

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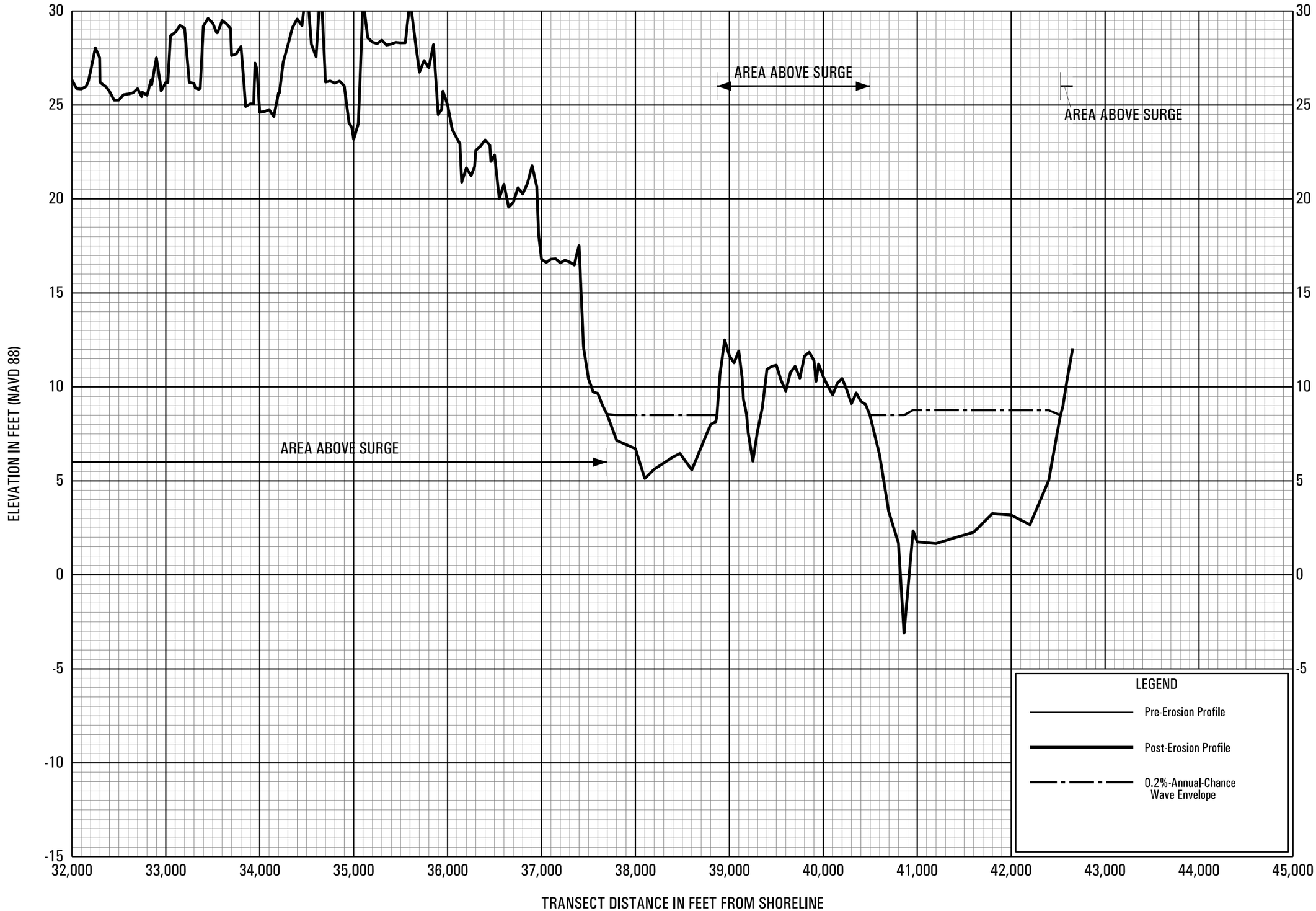

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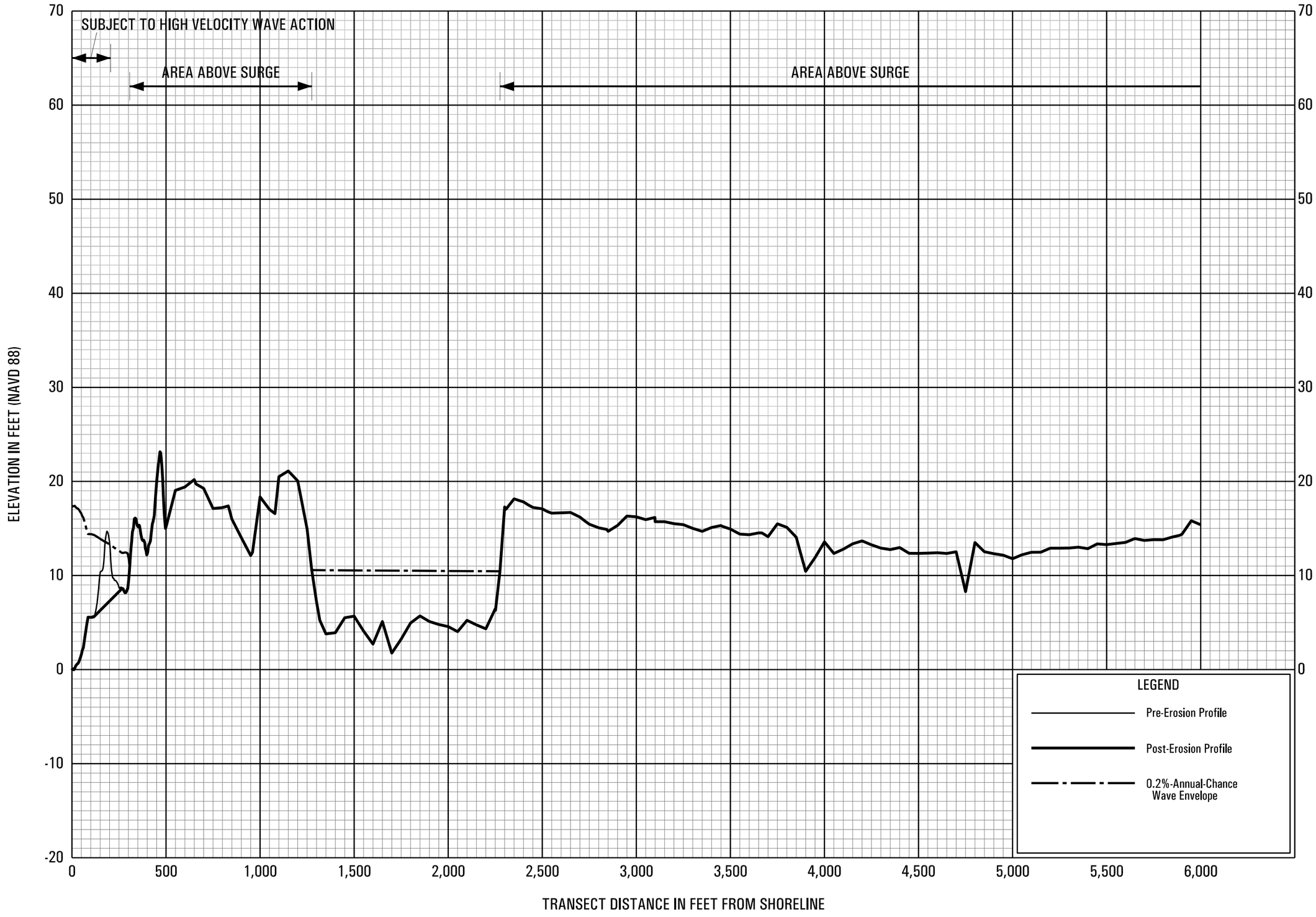

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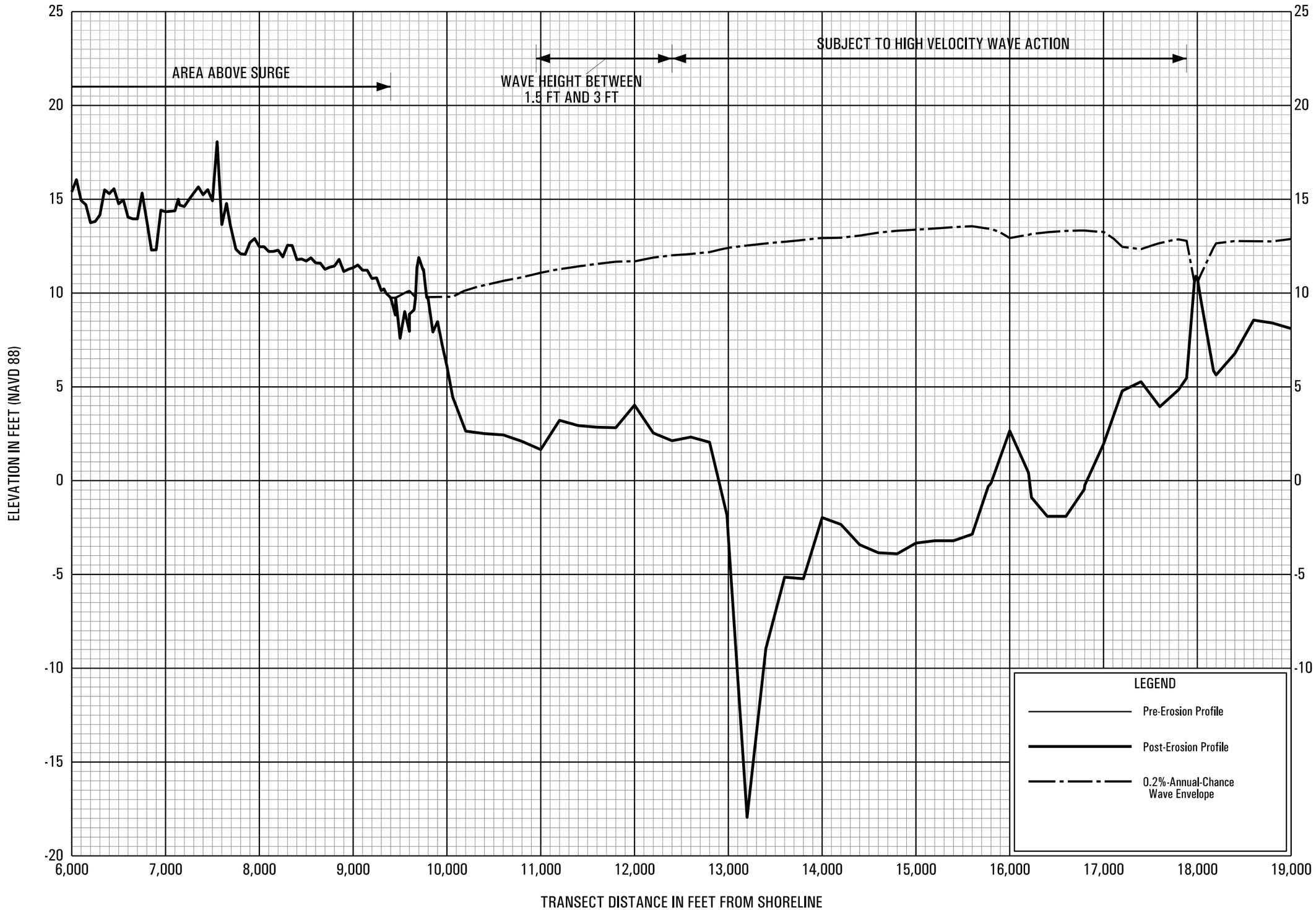

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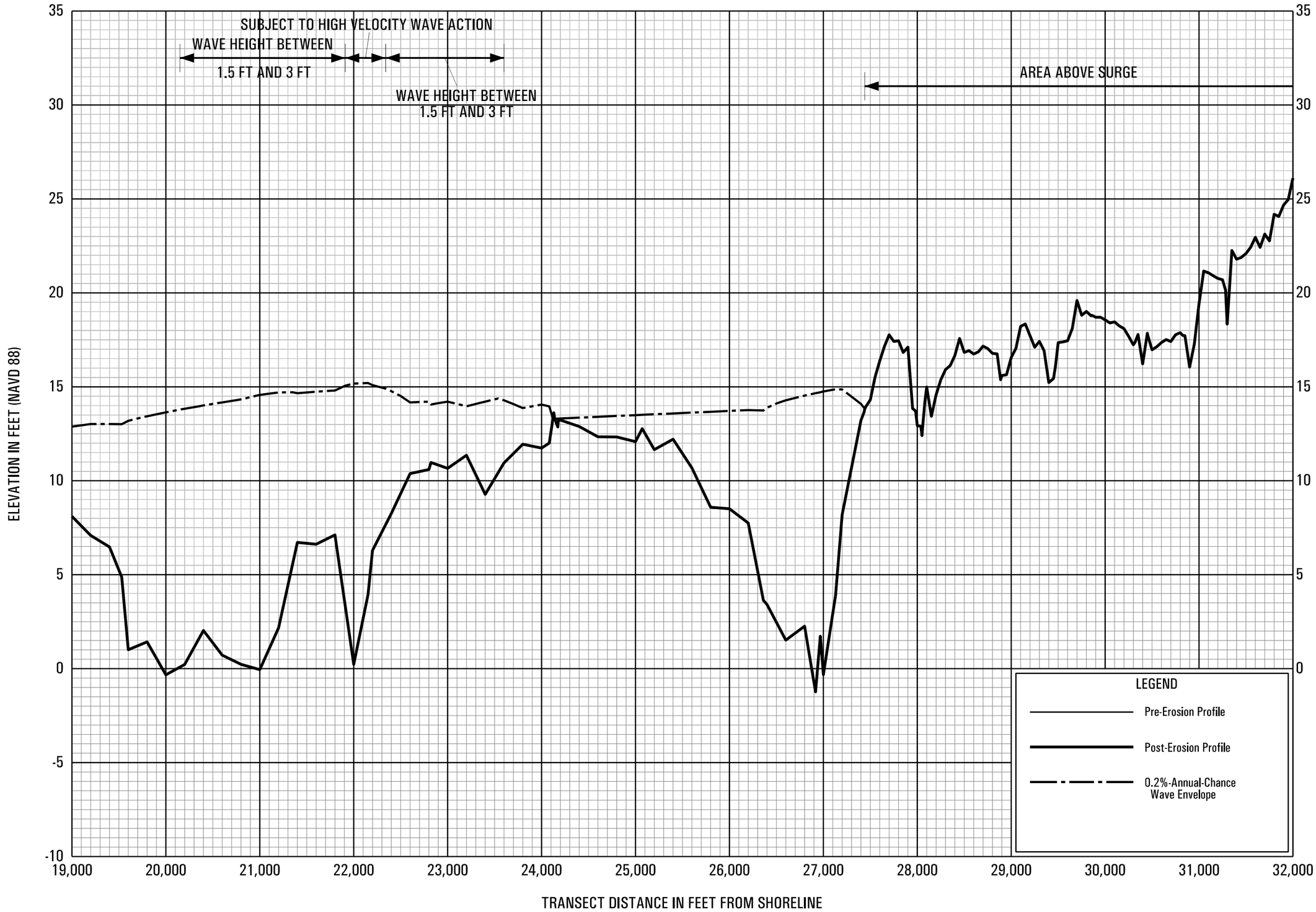

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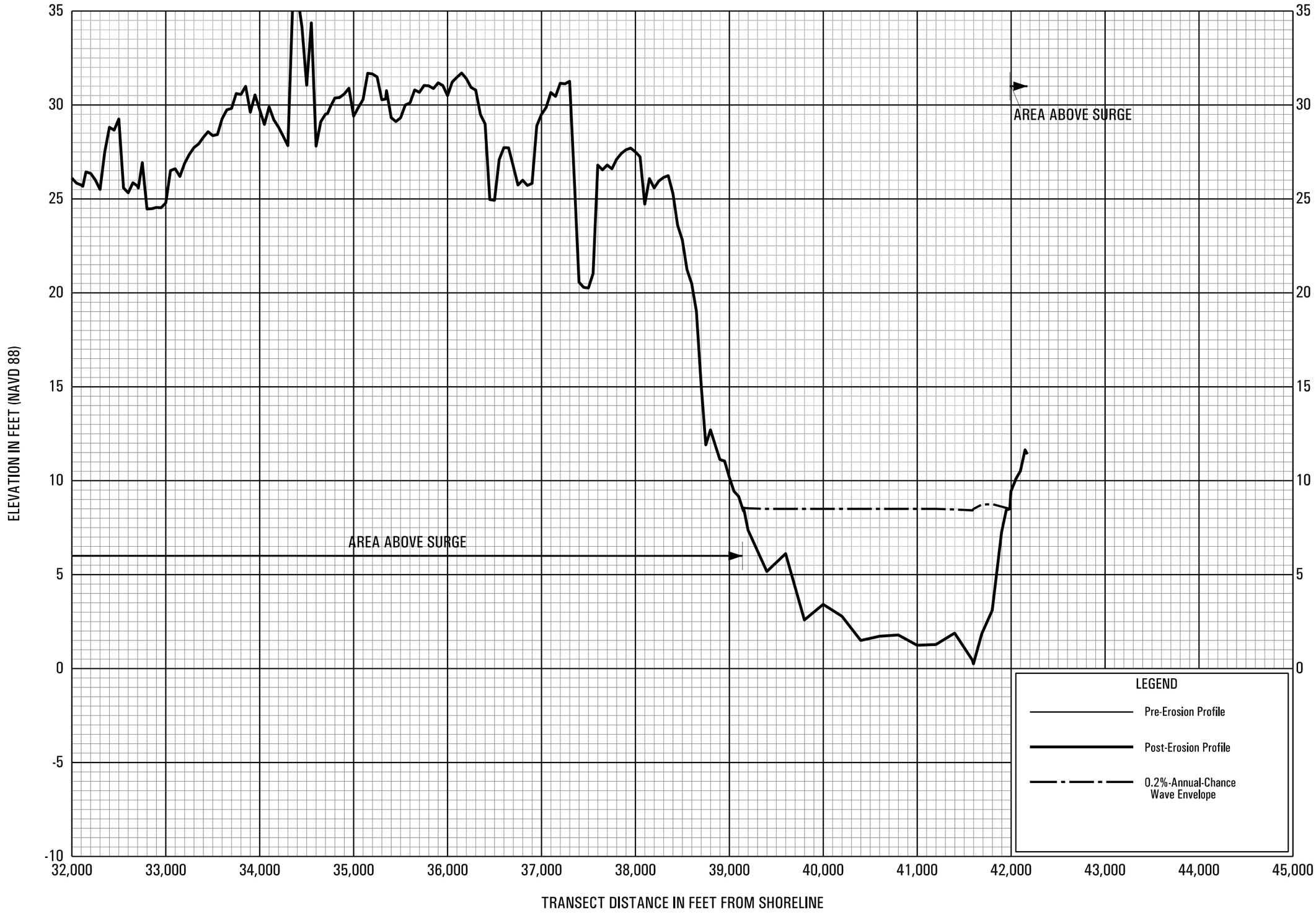

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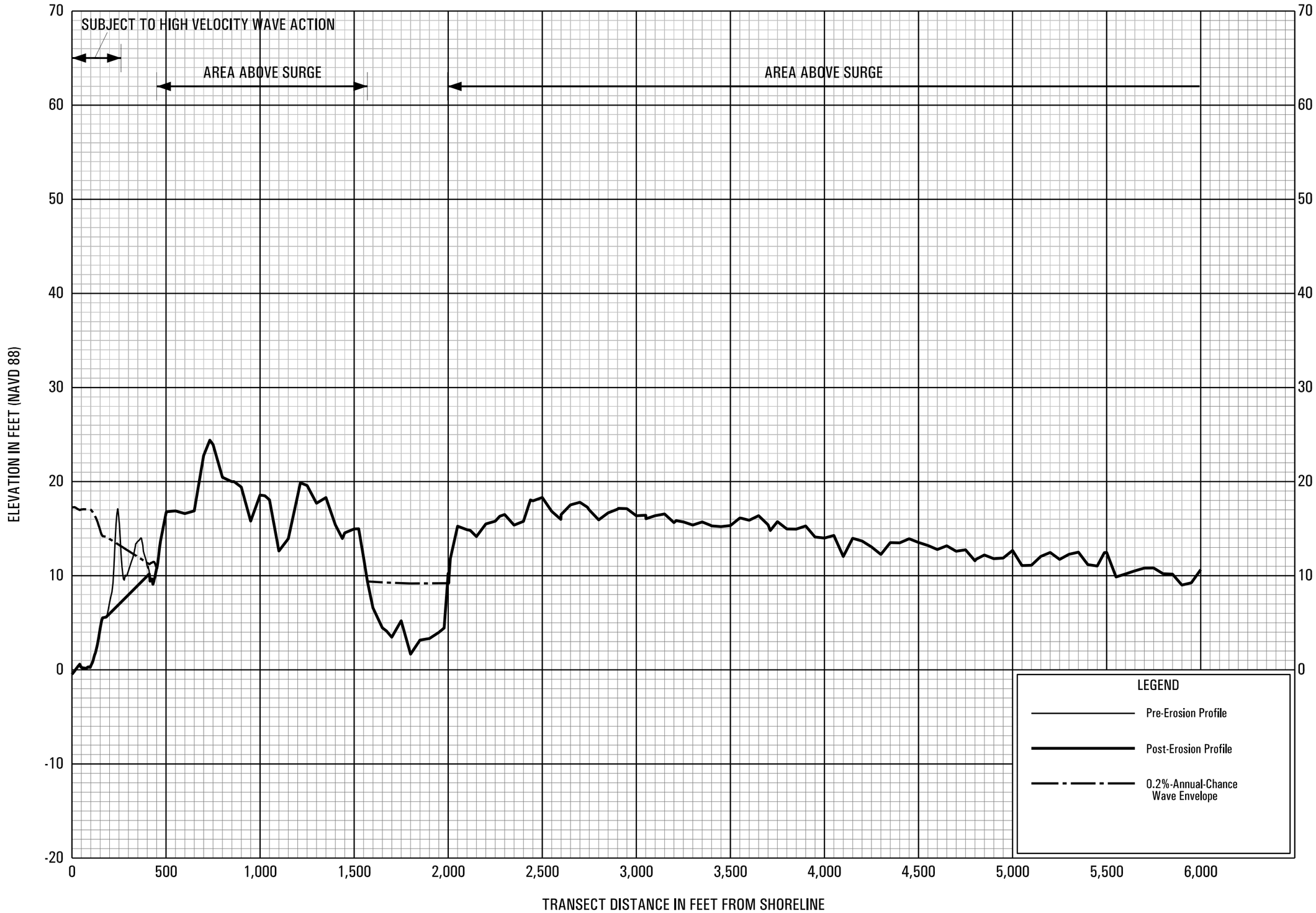

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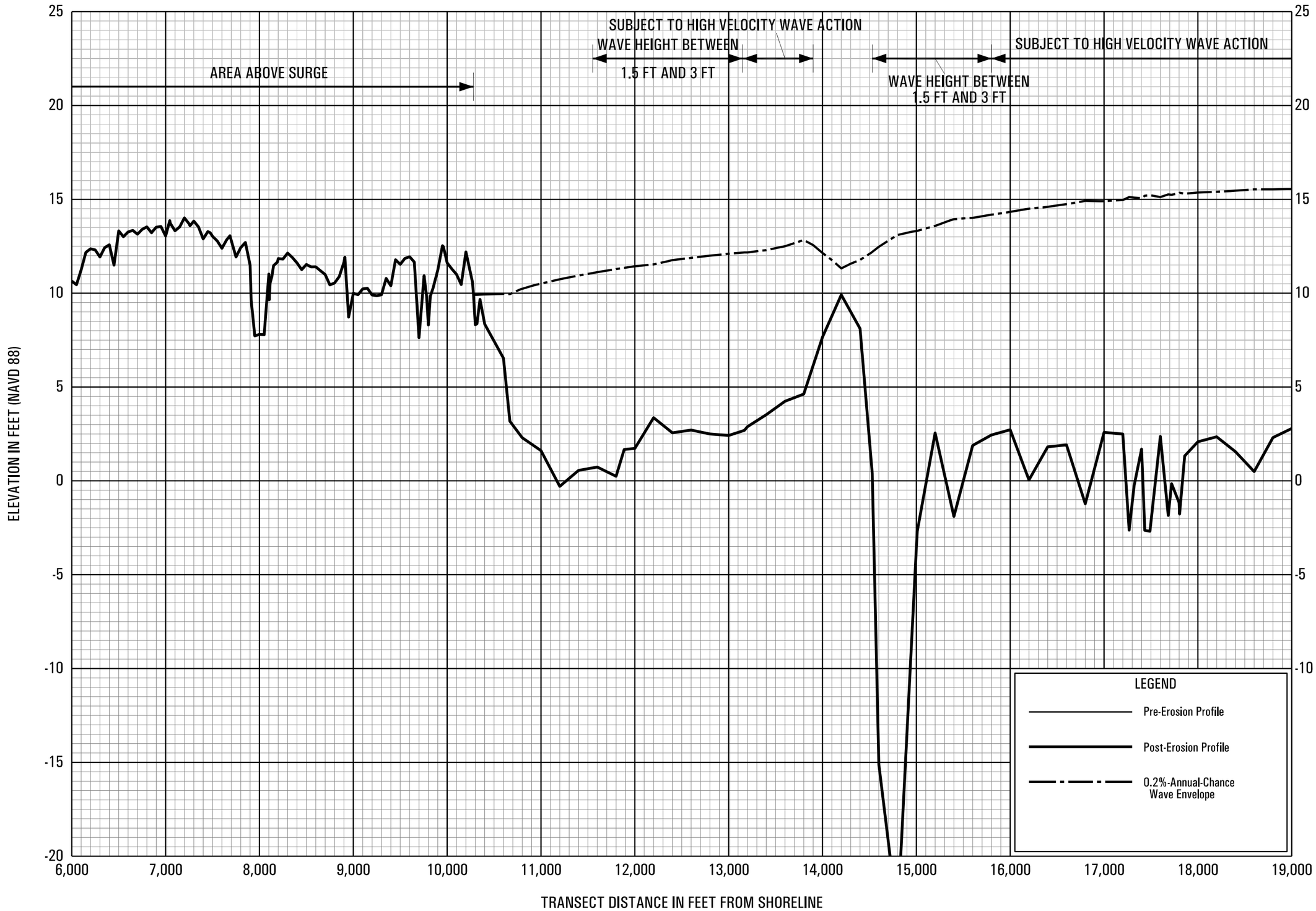

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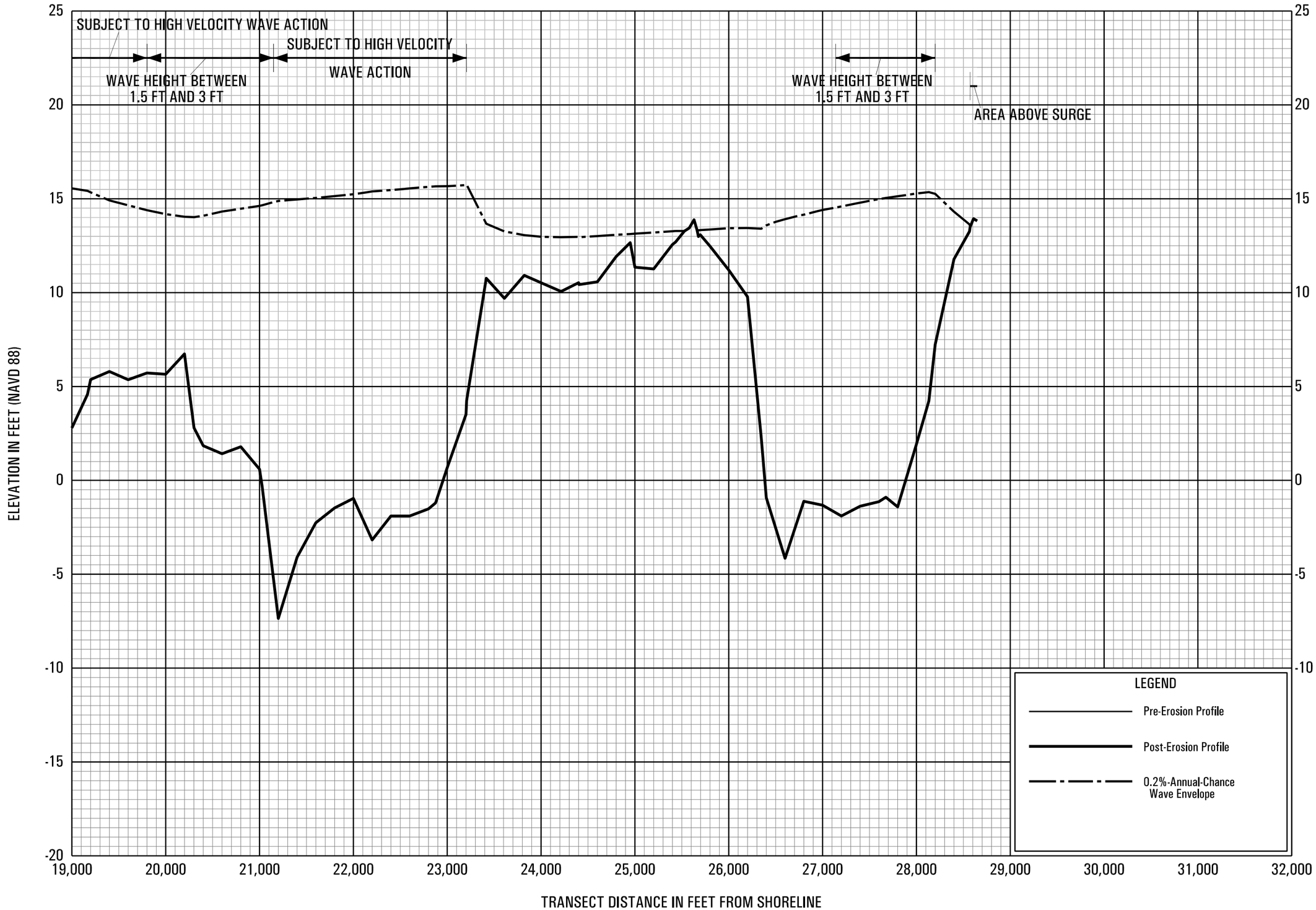

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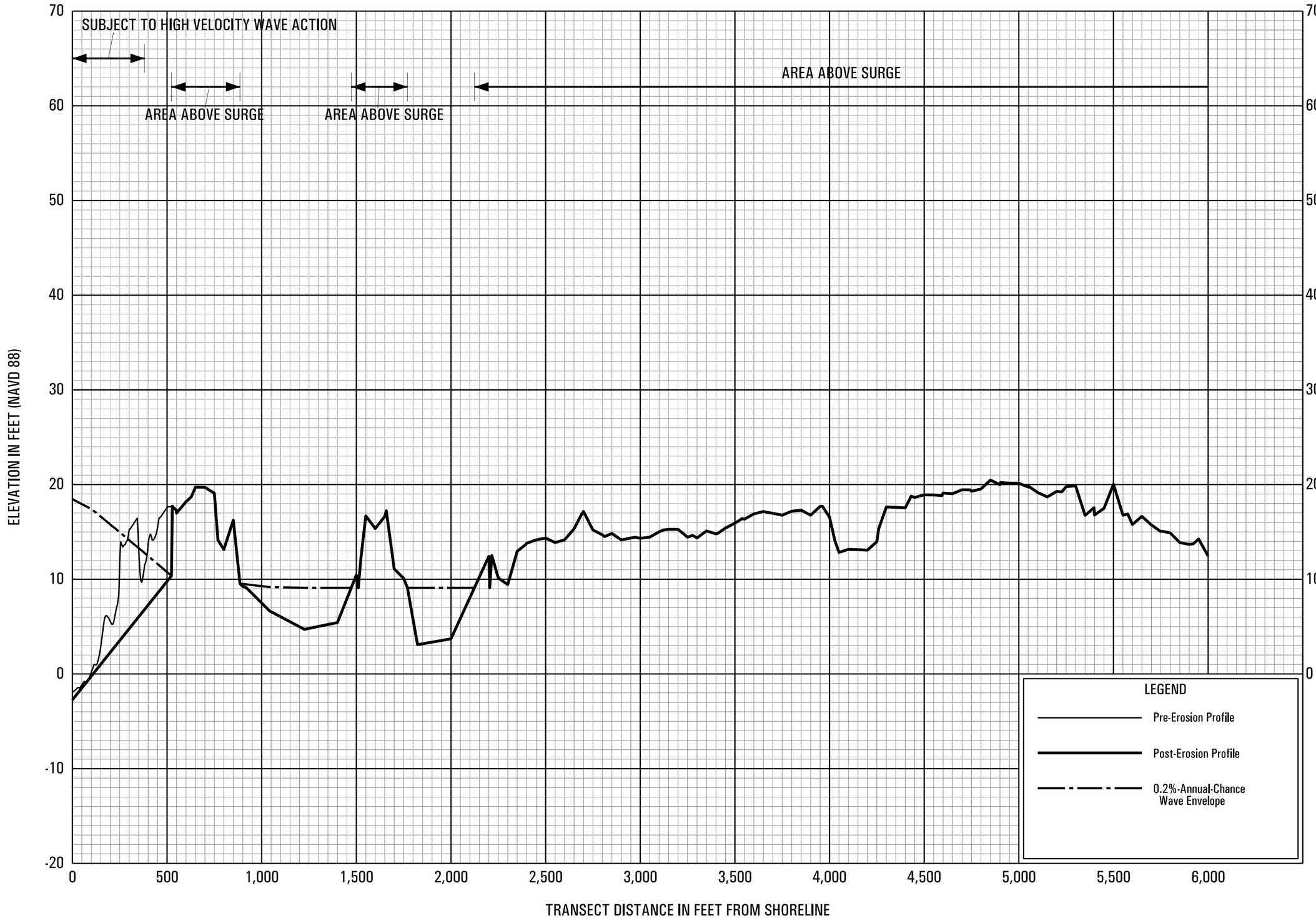

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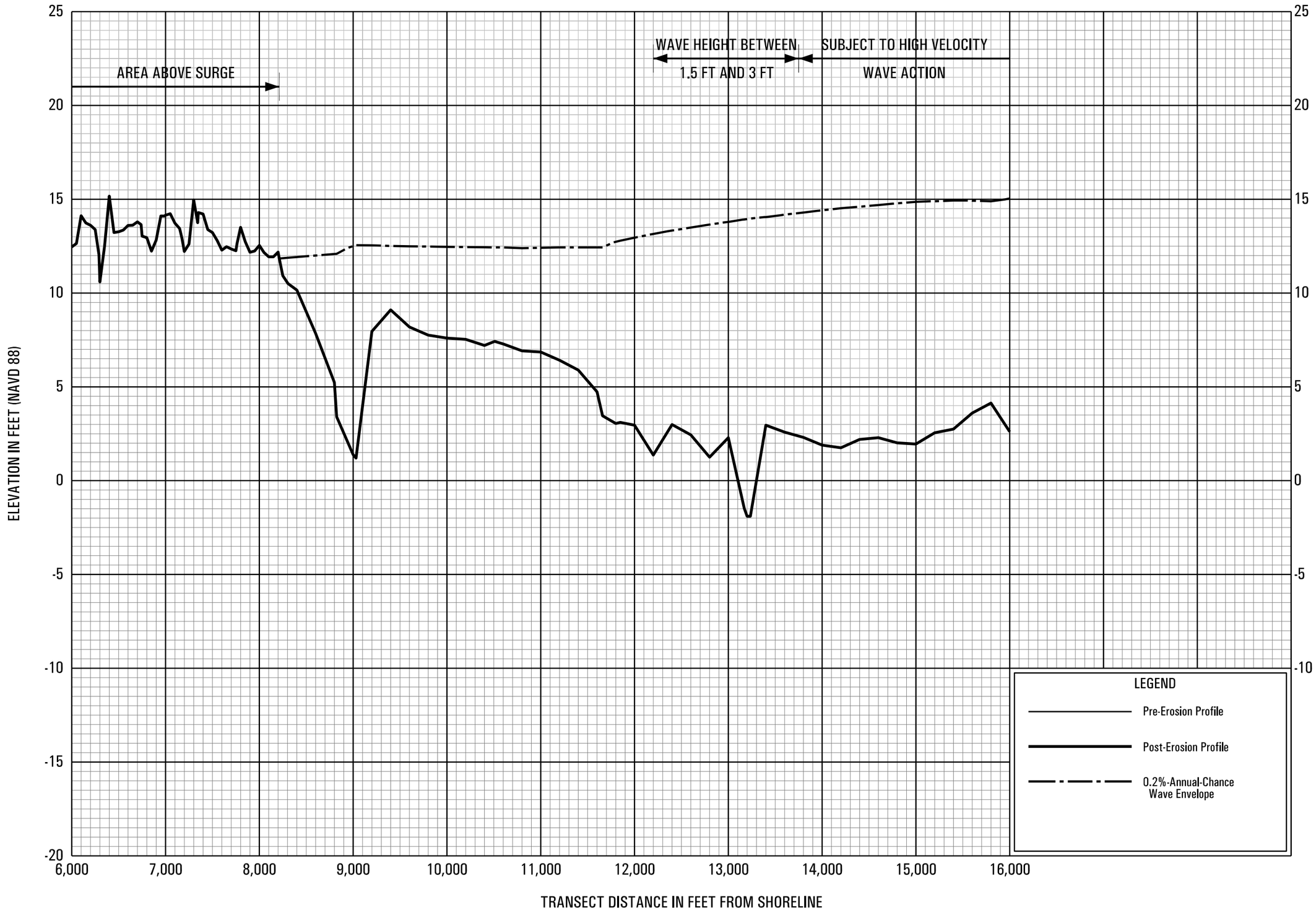

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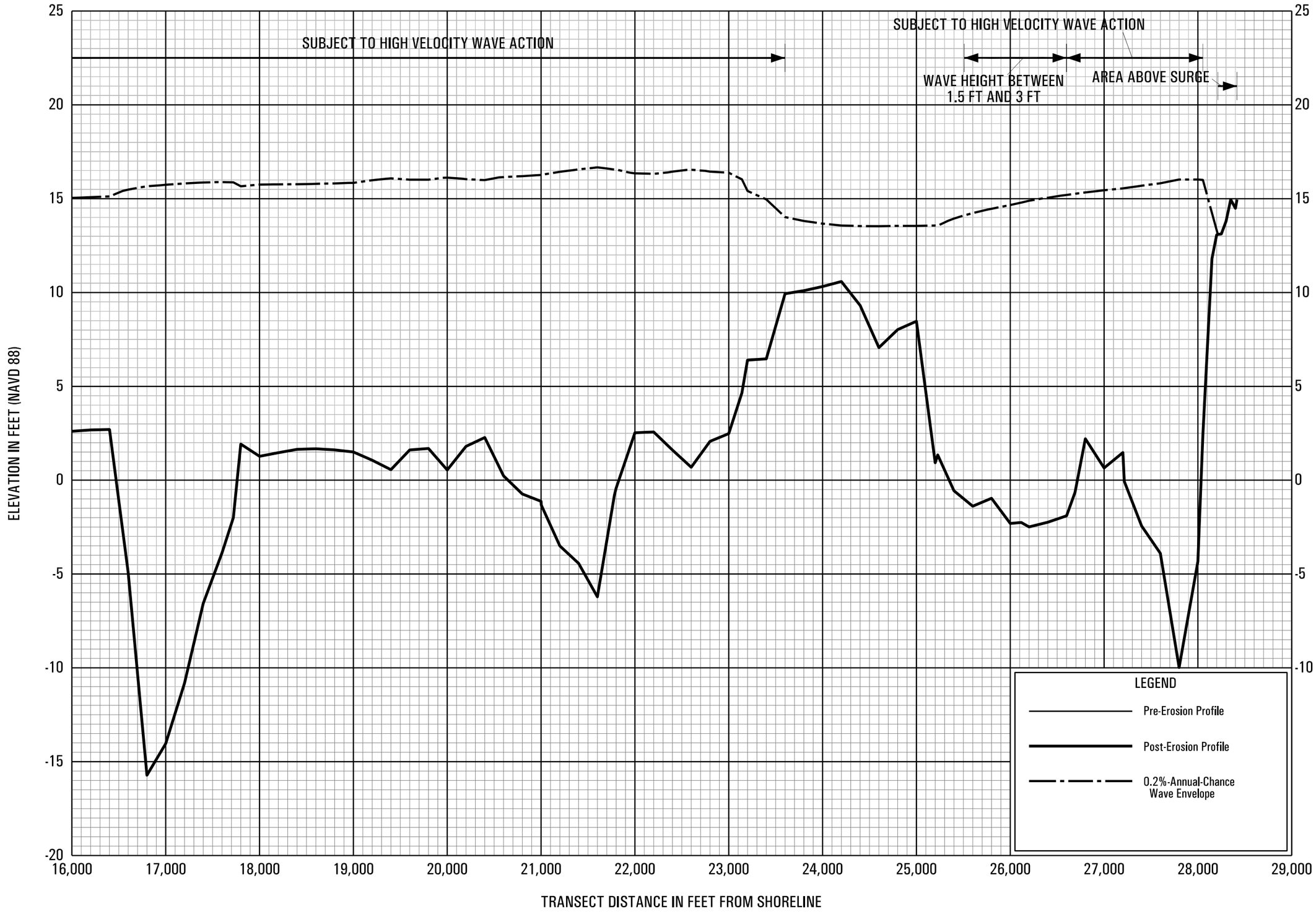

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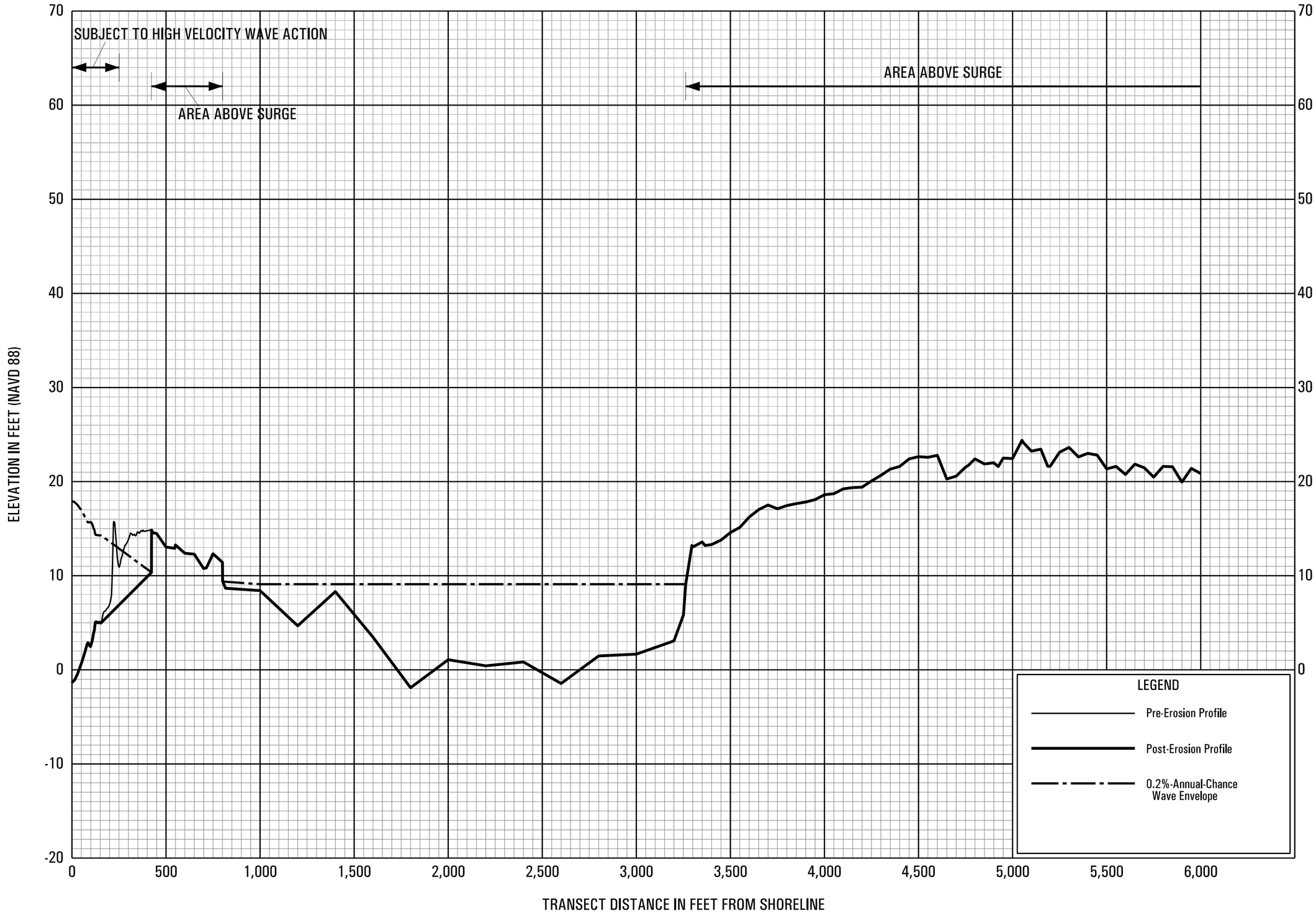

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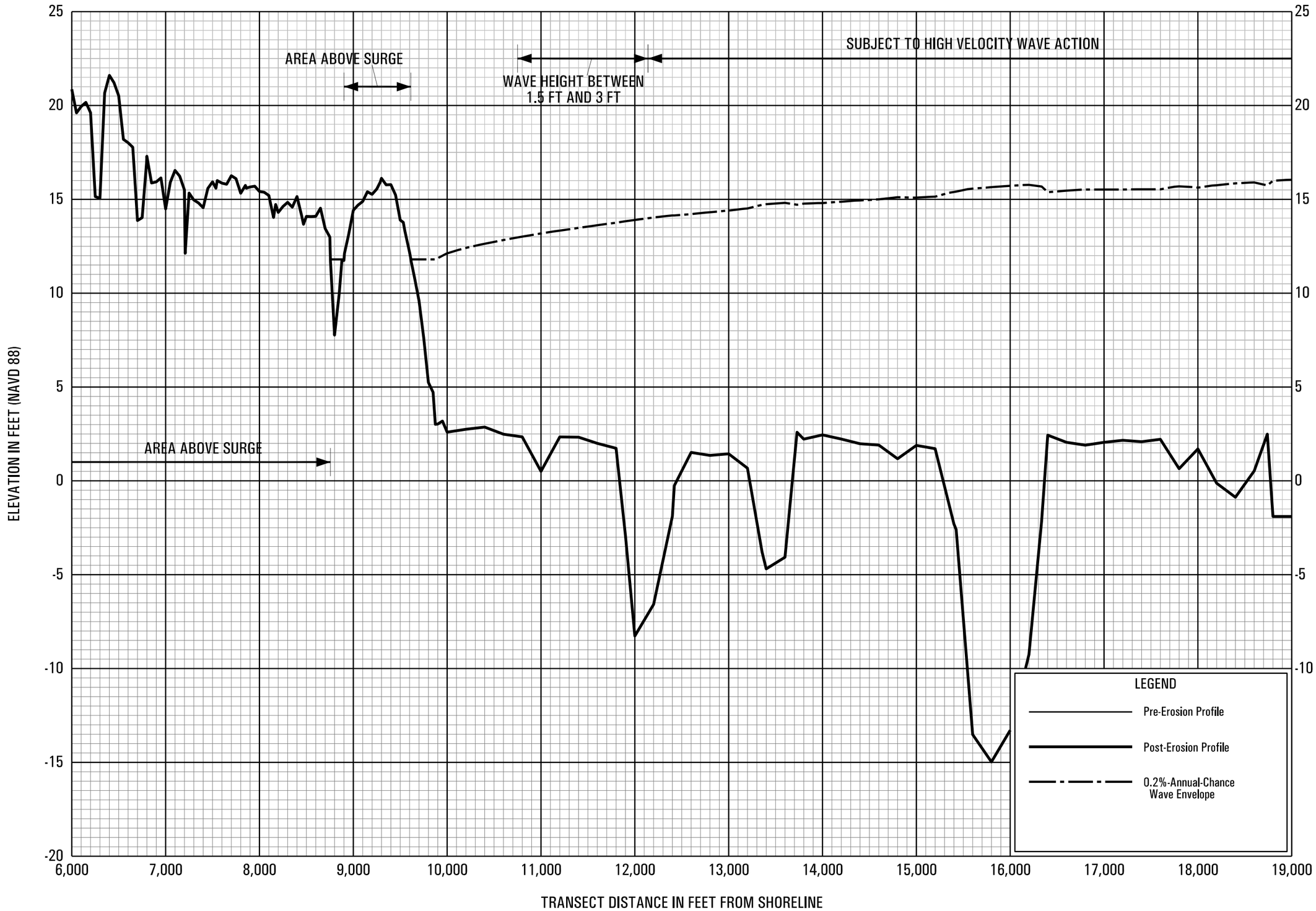

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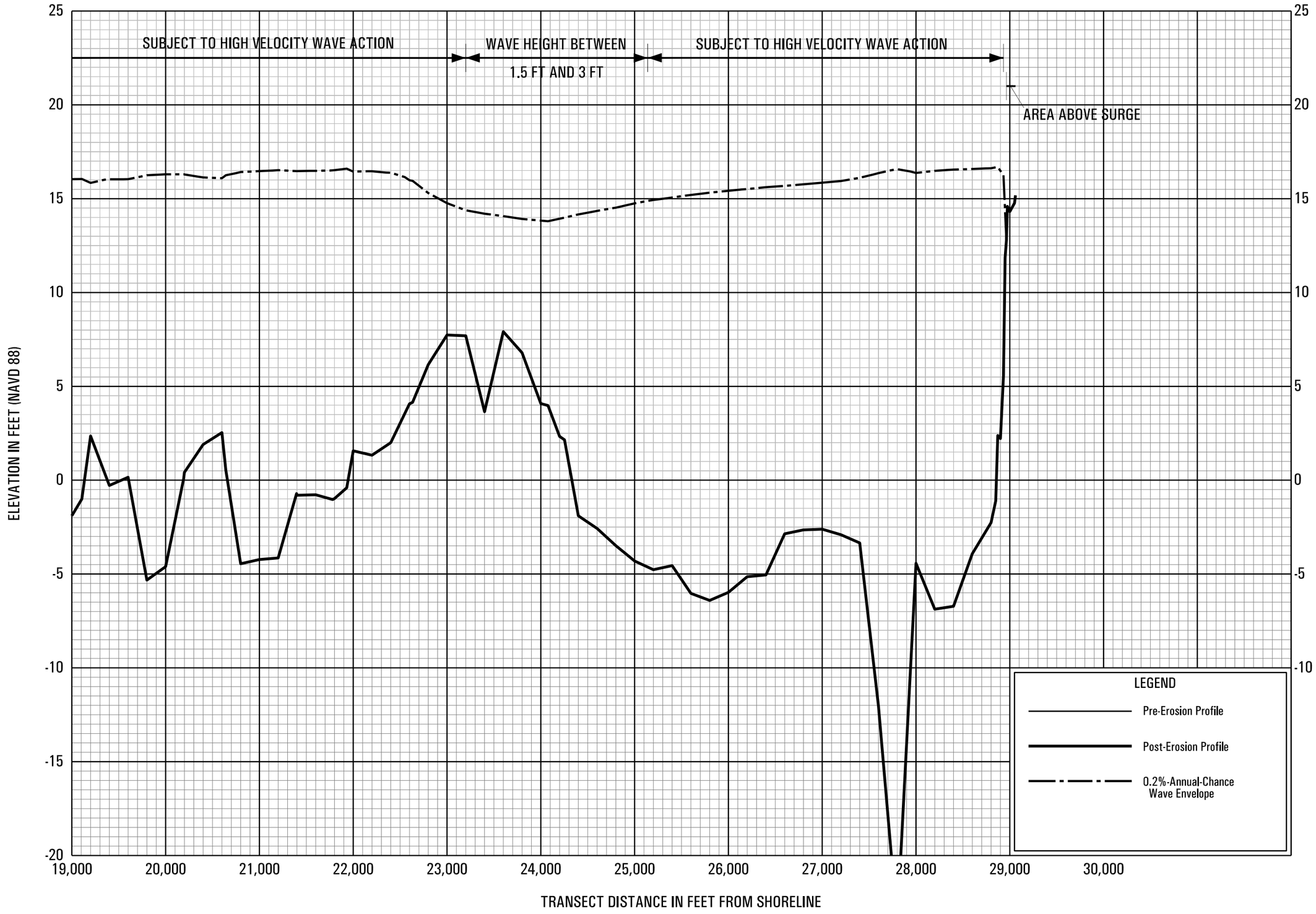


0.2% ANNUAL CHANCE WAVE ENVELOPE

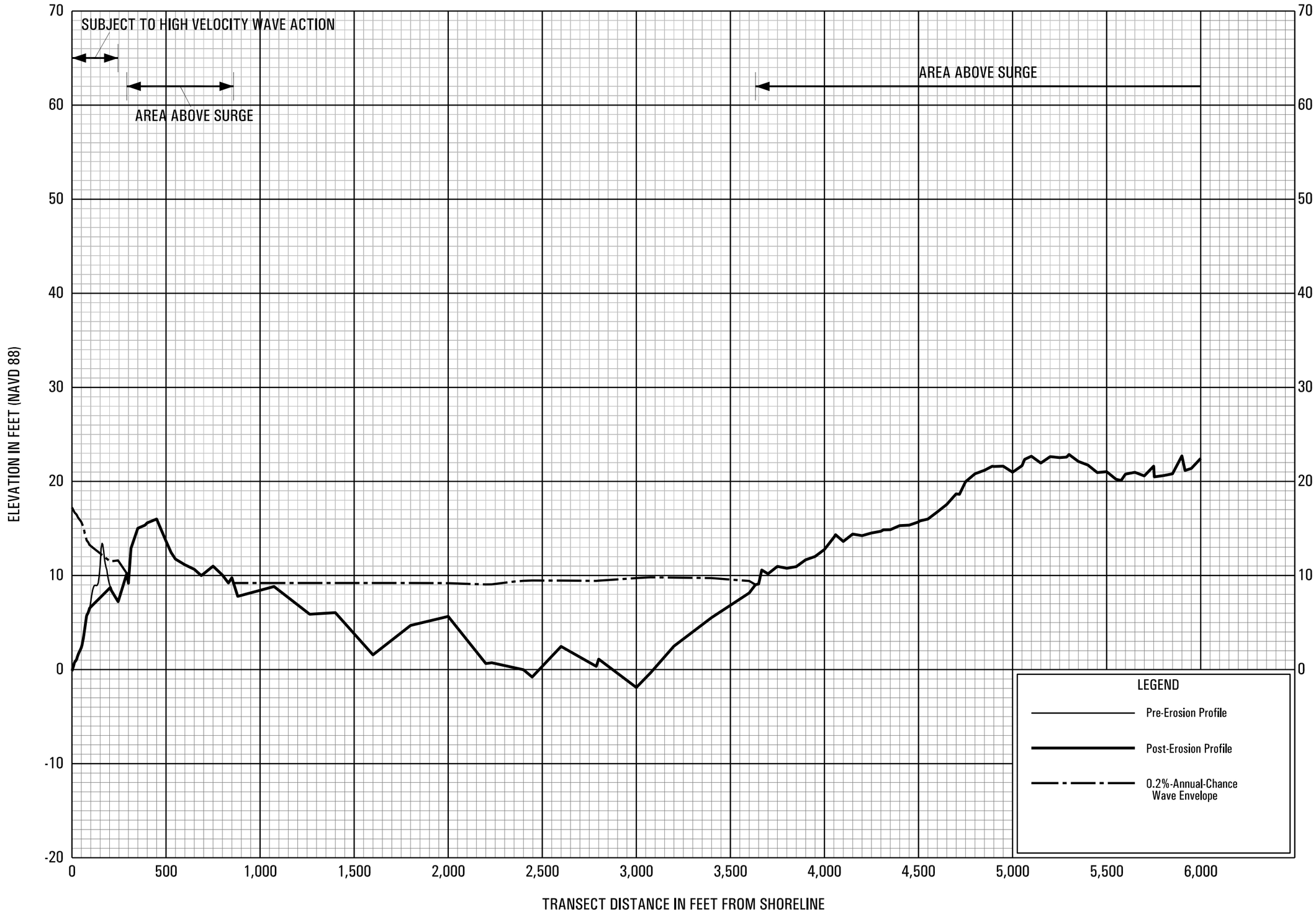
TRANSECT 15

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

58P



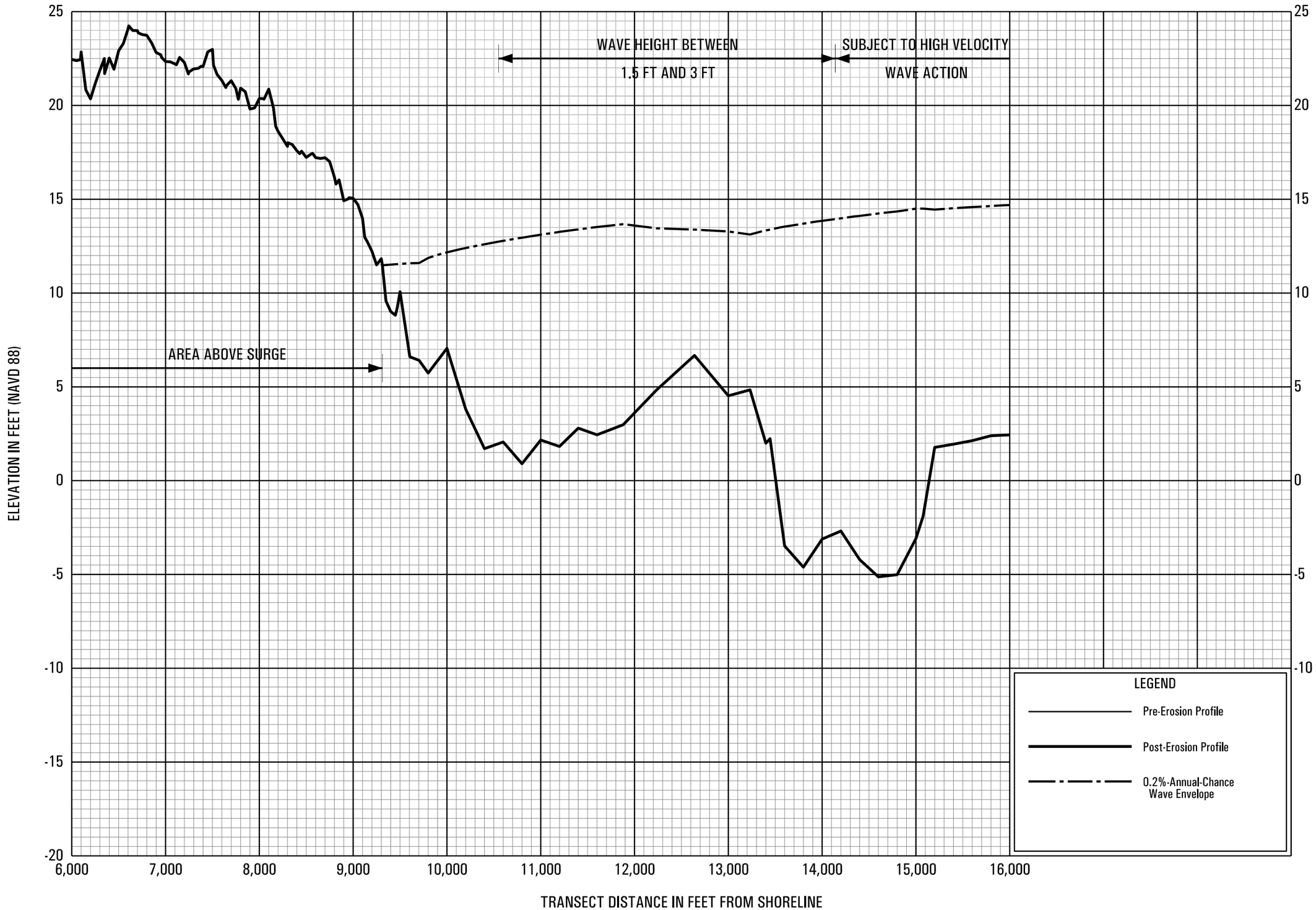
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

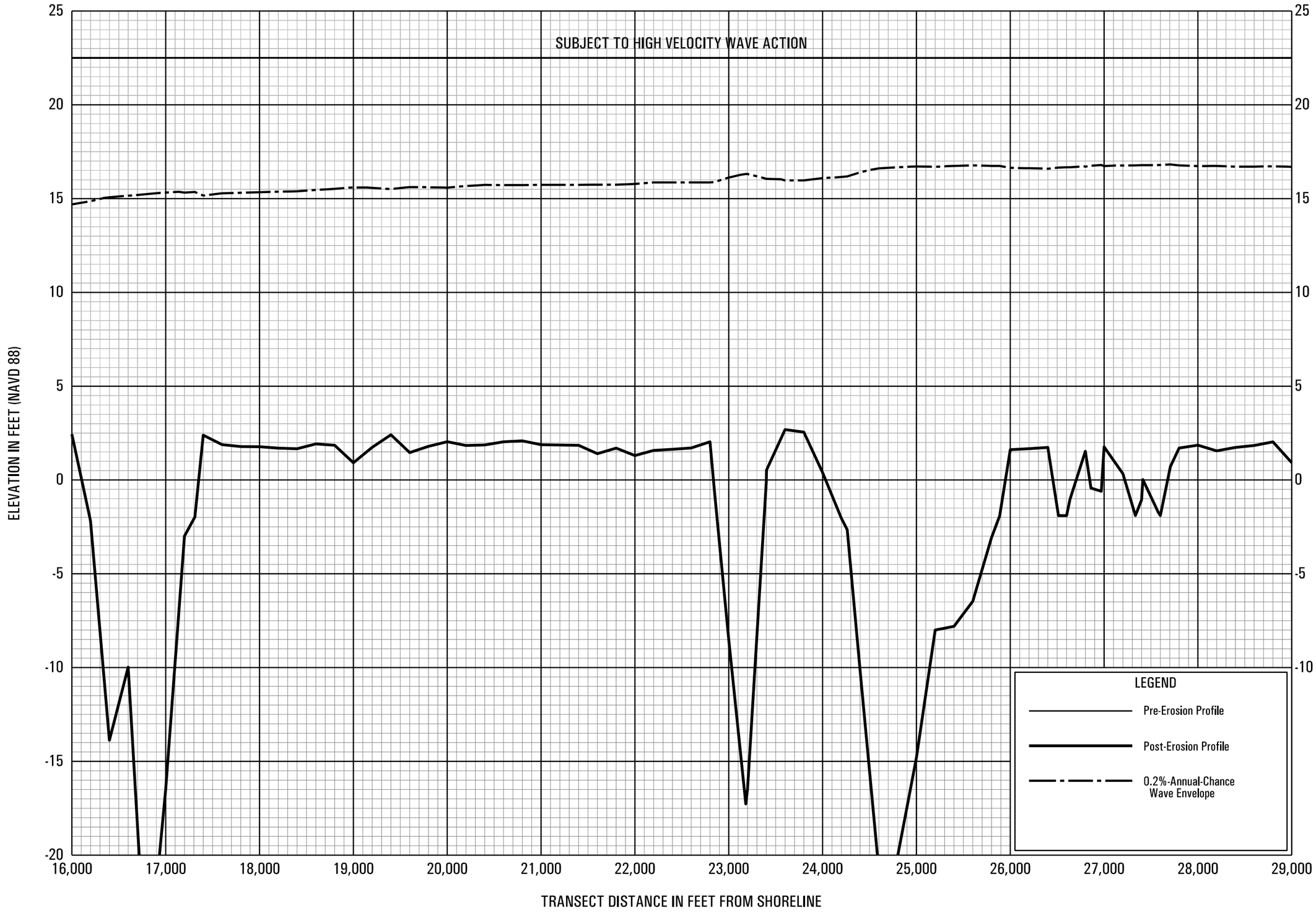
TRANSECT 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

60P



0.2% ANNUAL CHANCE WAVE ENVELOPE

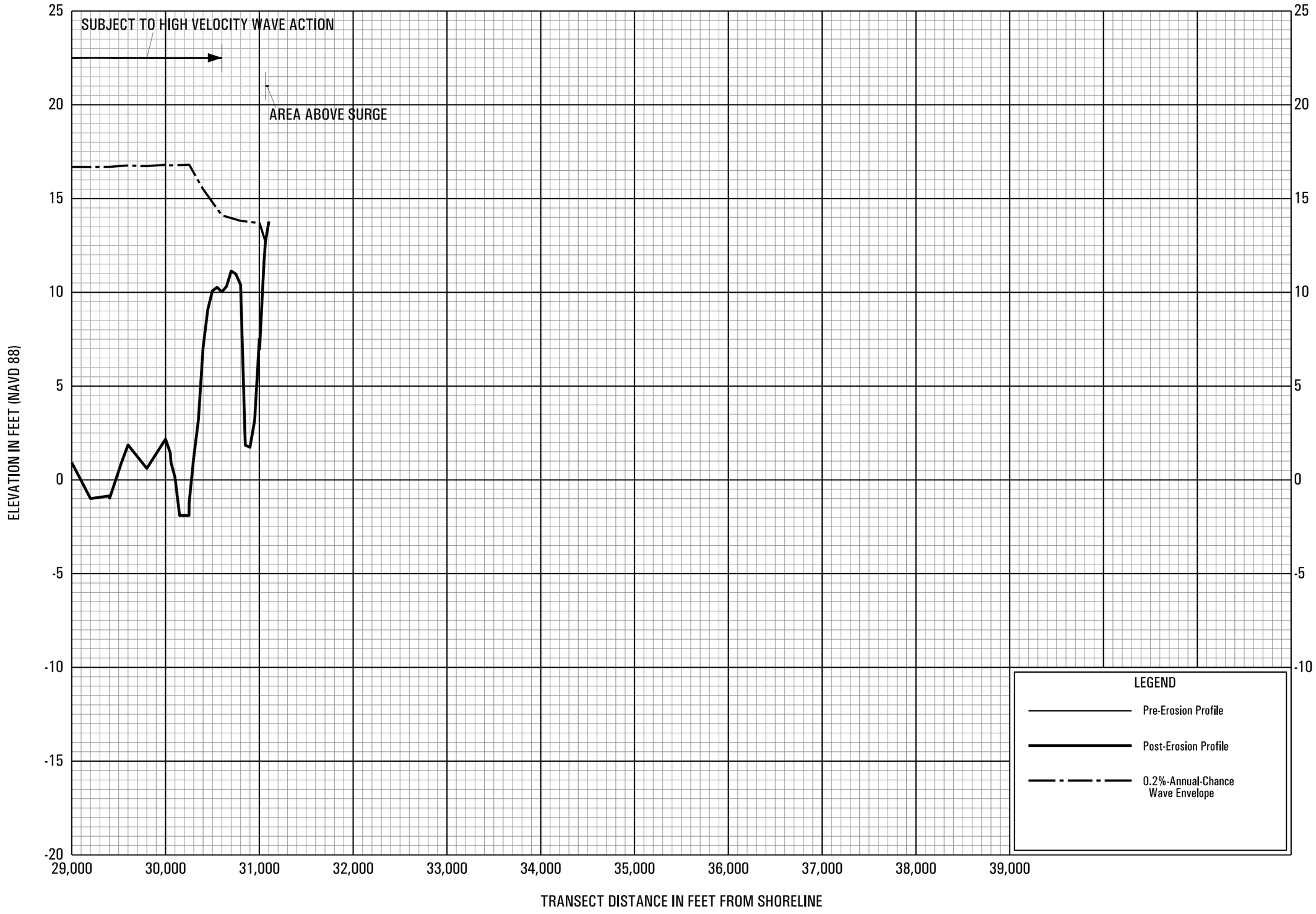
TRANSECT 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

61P



0.2% ANNUAL CHANCE WAVE ENVELOPE

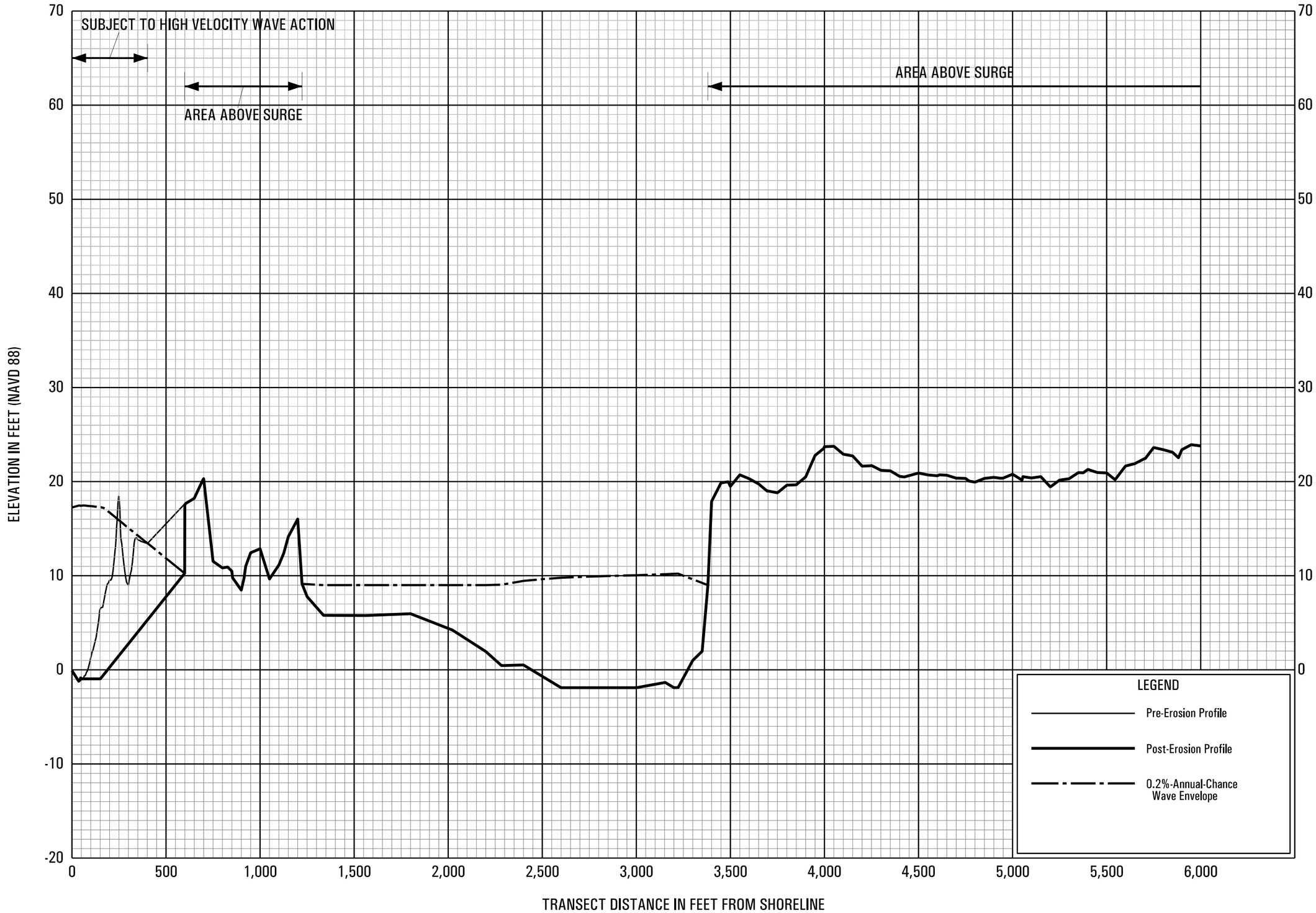
TRANSECT 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

62P



0.2% ANNUAL CHANCE WAVE ENVELOPE

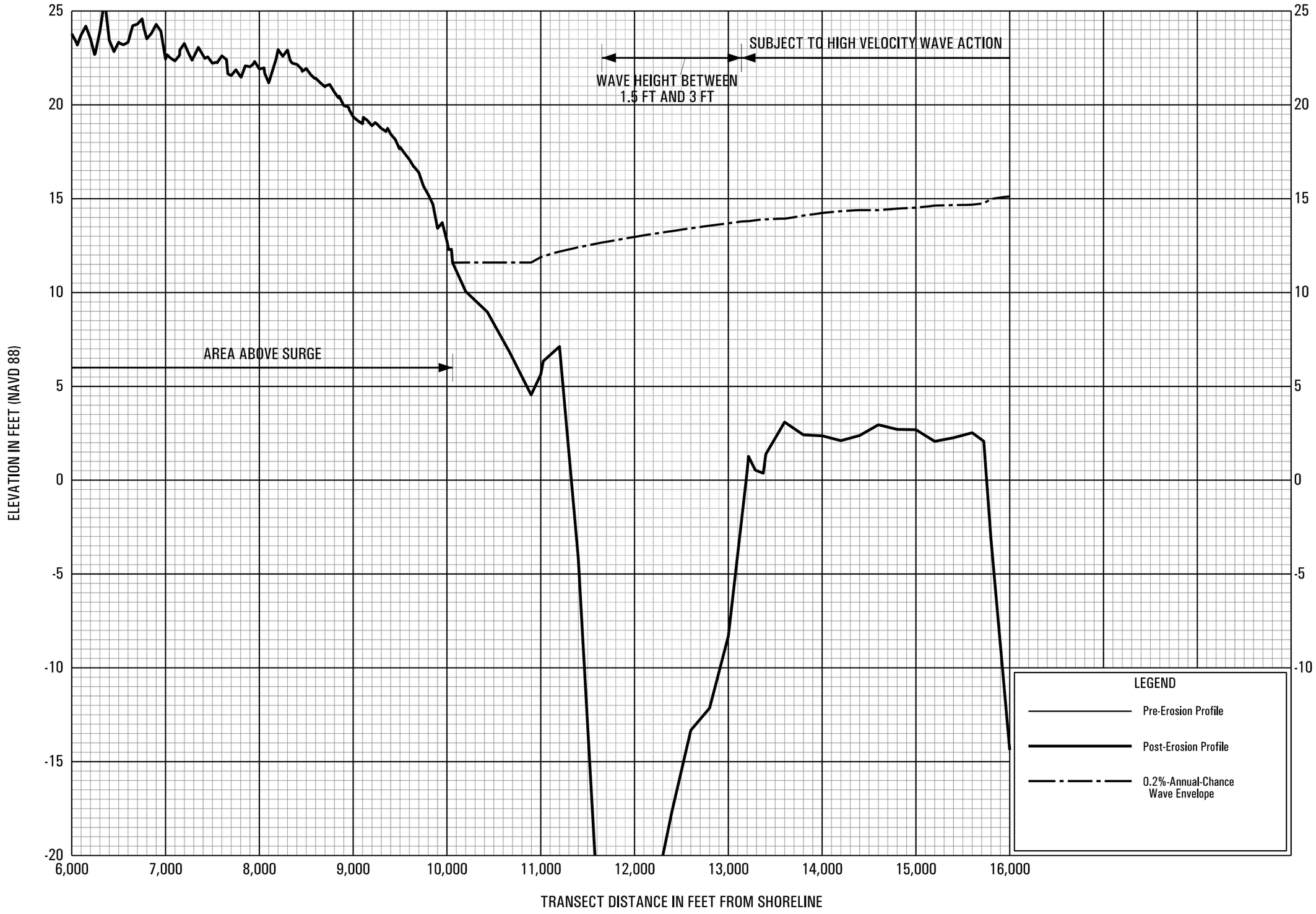
TRANSECT 17

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

63P



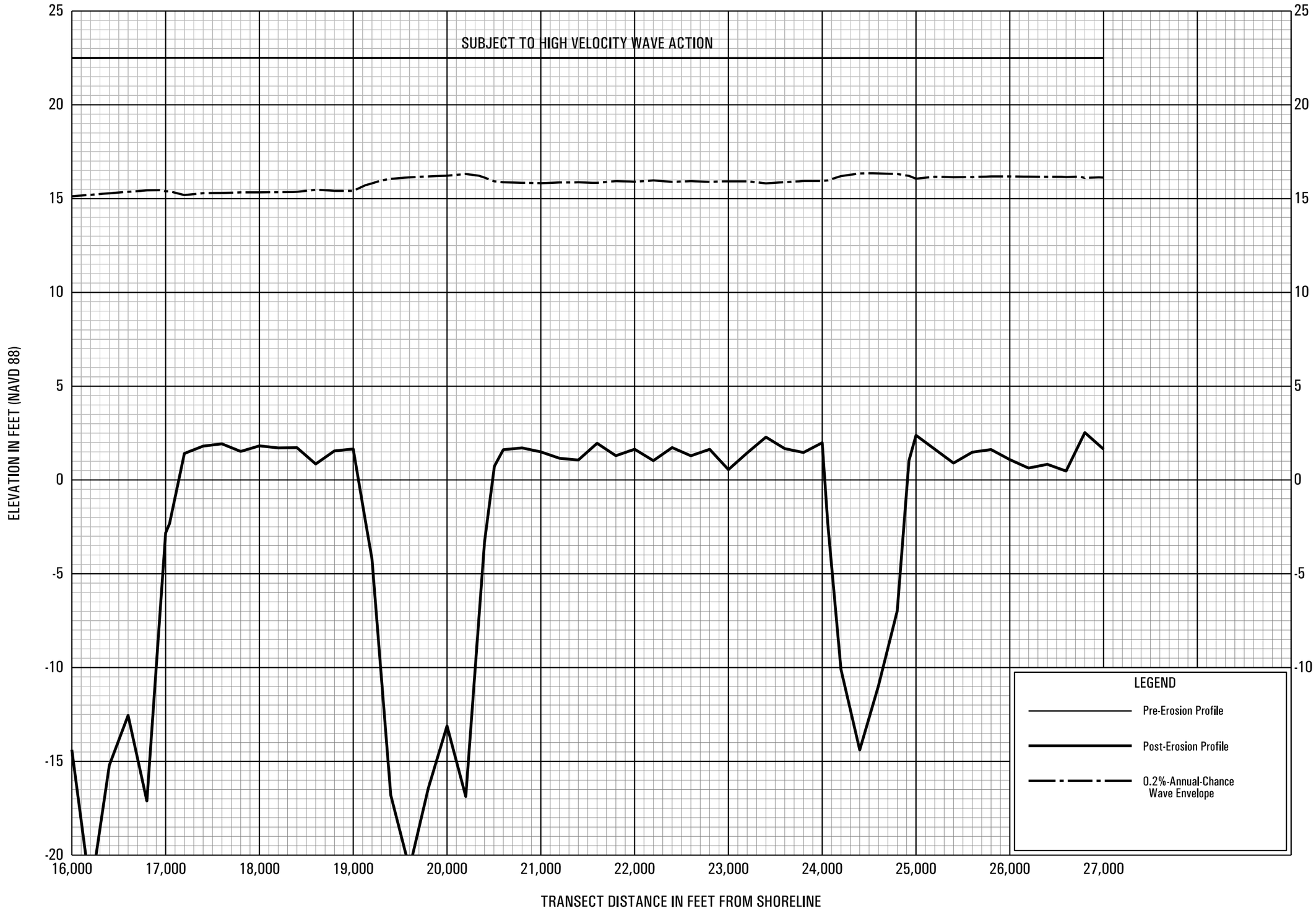
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 17

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



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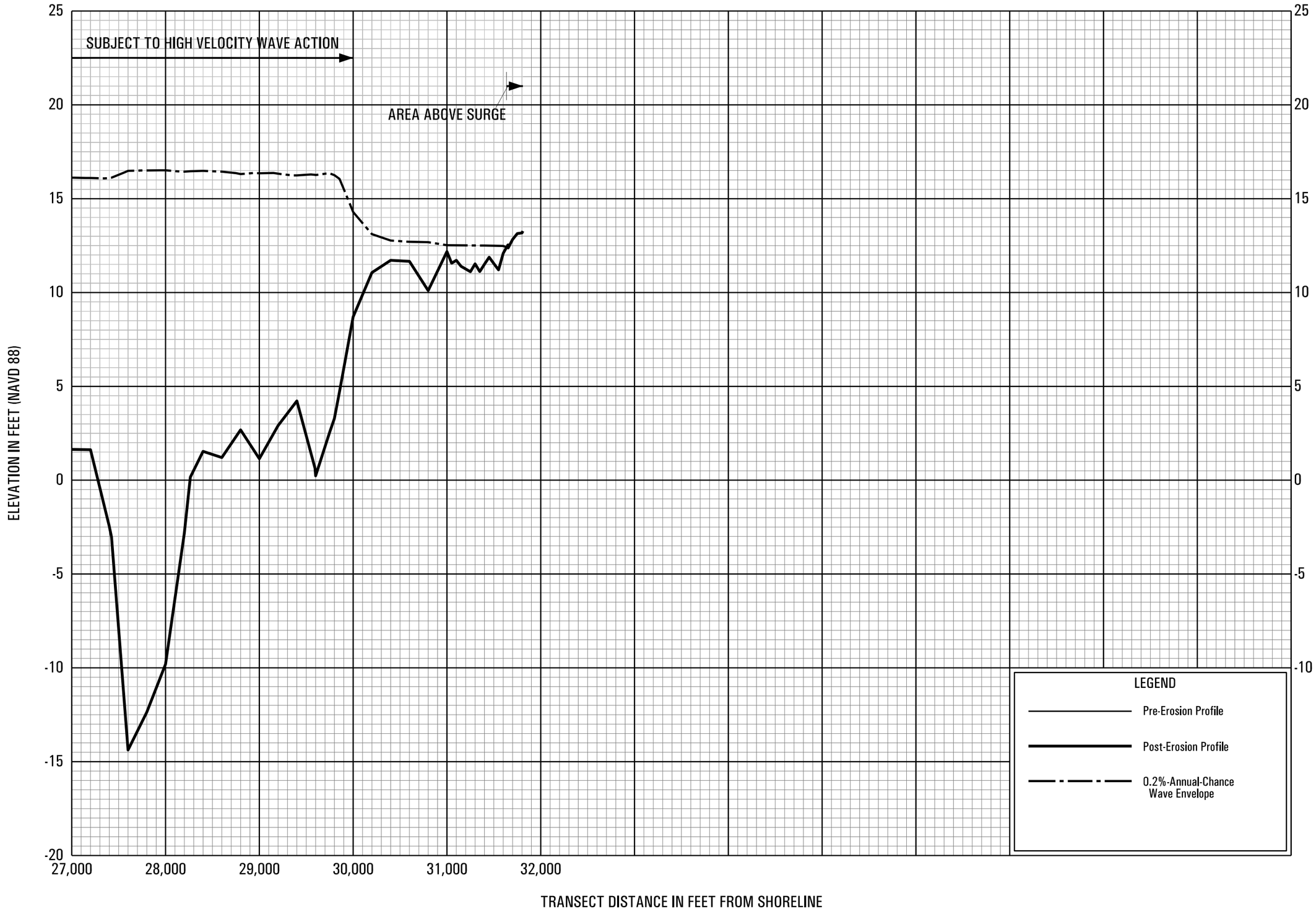
TRANSECT 17

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

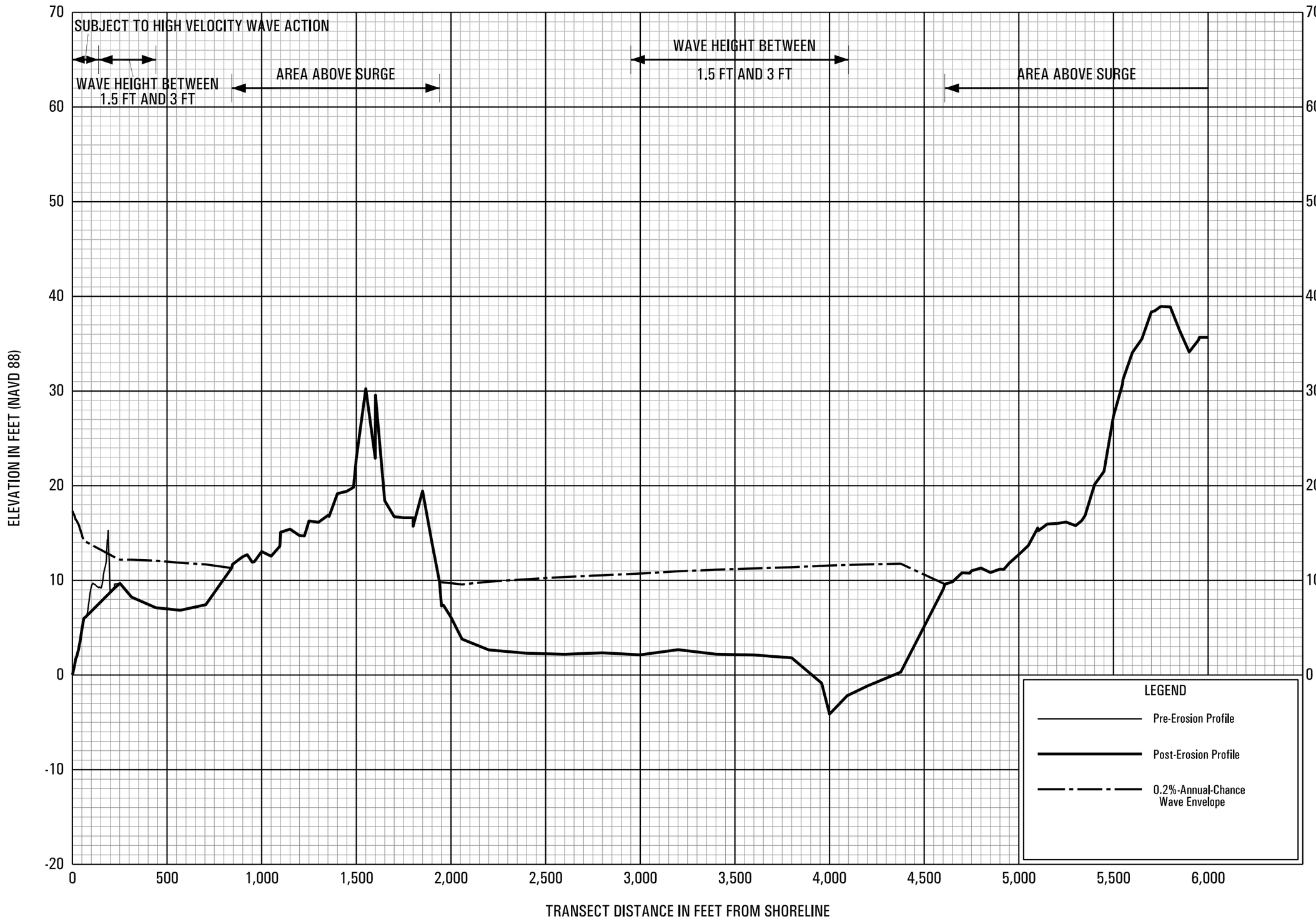
TRANSECT 17

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

66P



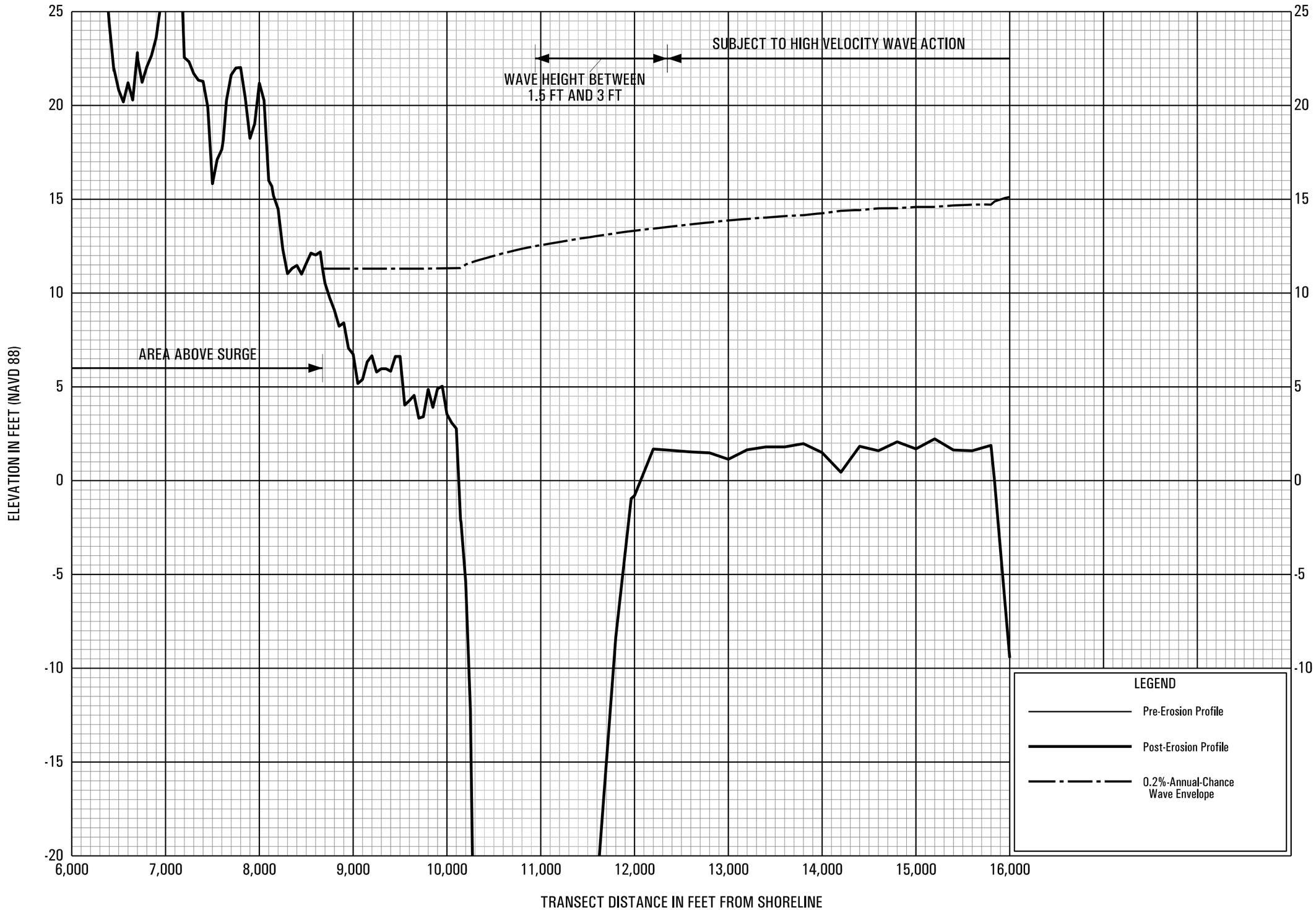
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 18

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

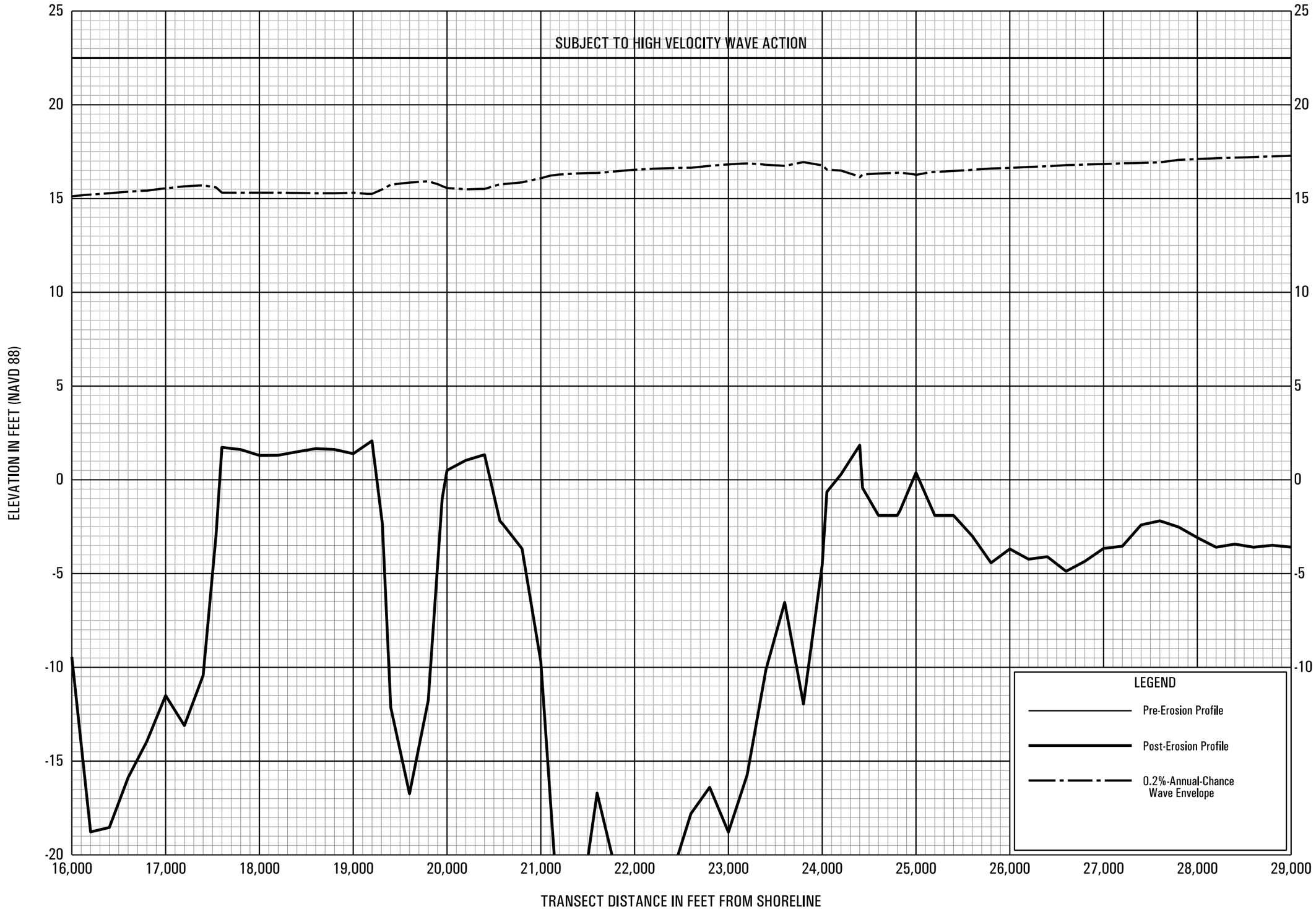
TRANSECT 18

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

68P



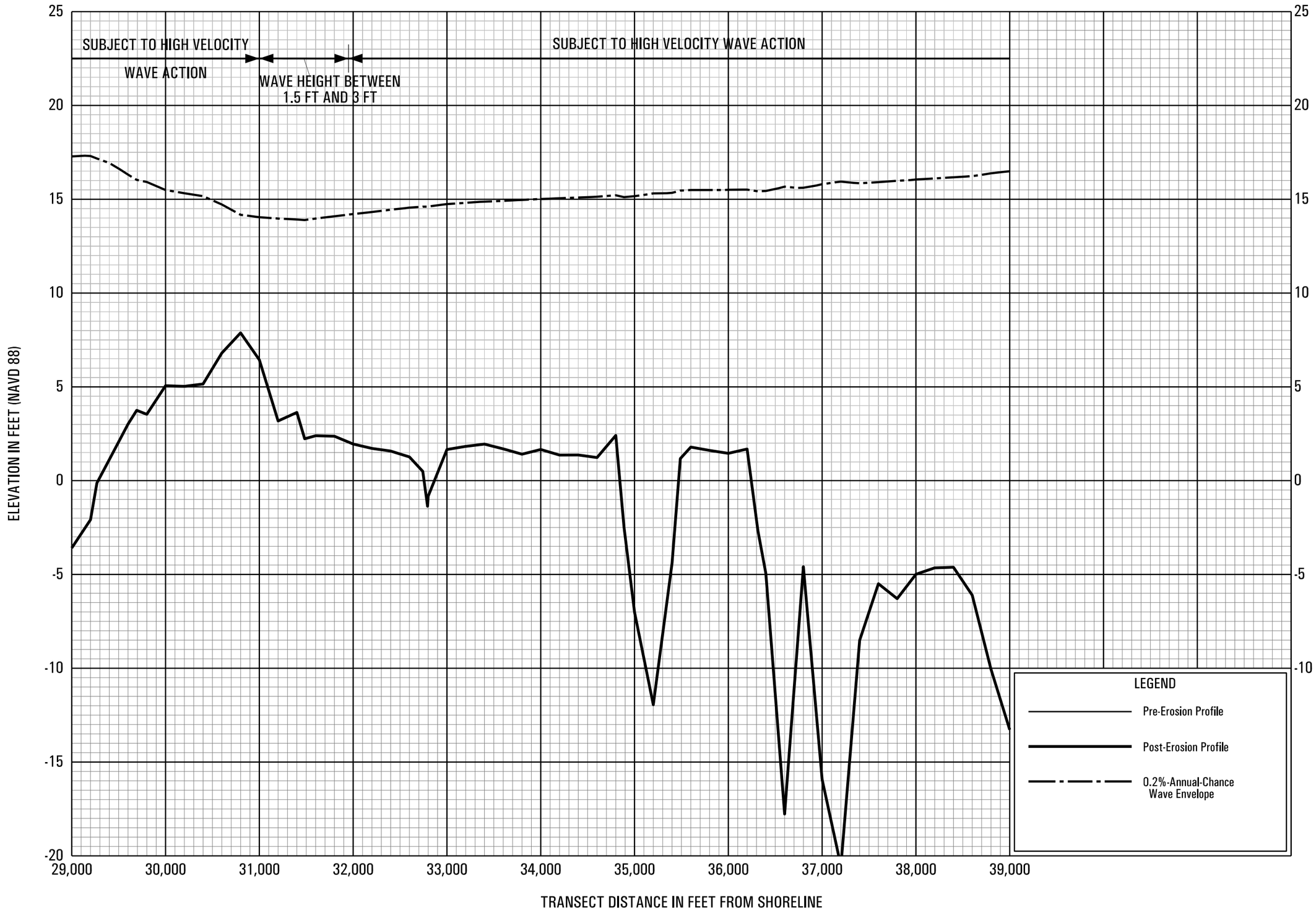
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 18

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

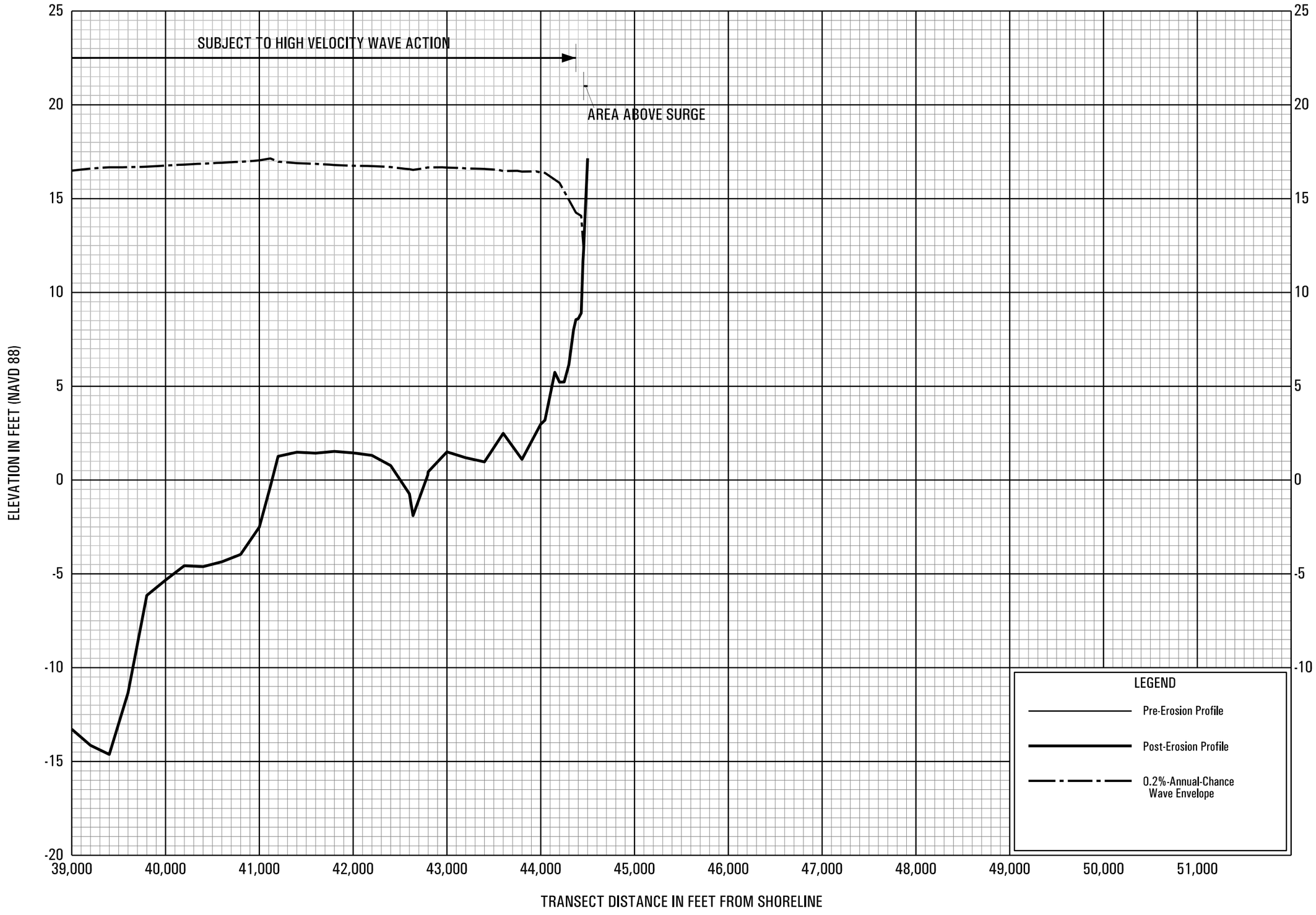
TRANSECT 18

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

70P



0.2% ANNUAL CHANCE WAVE ENVELOPE

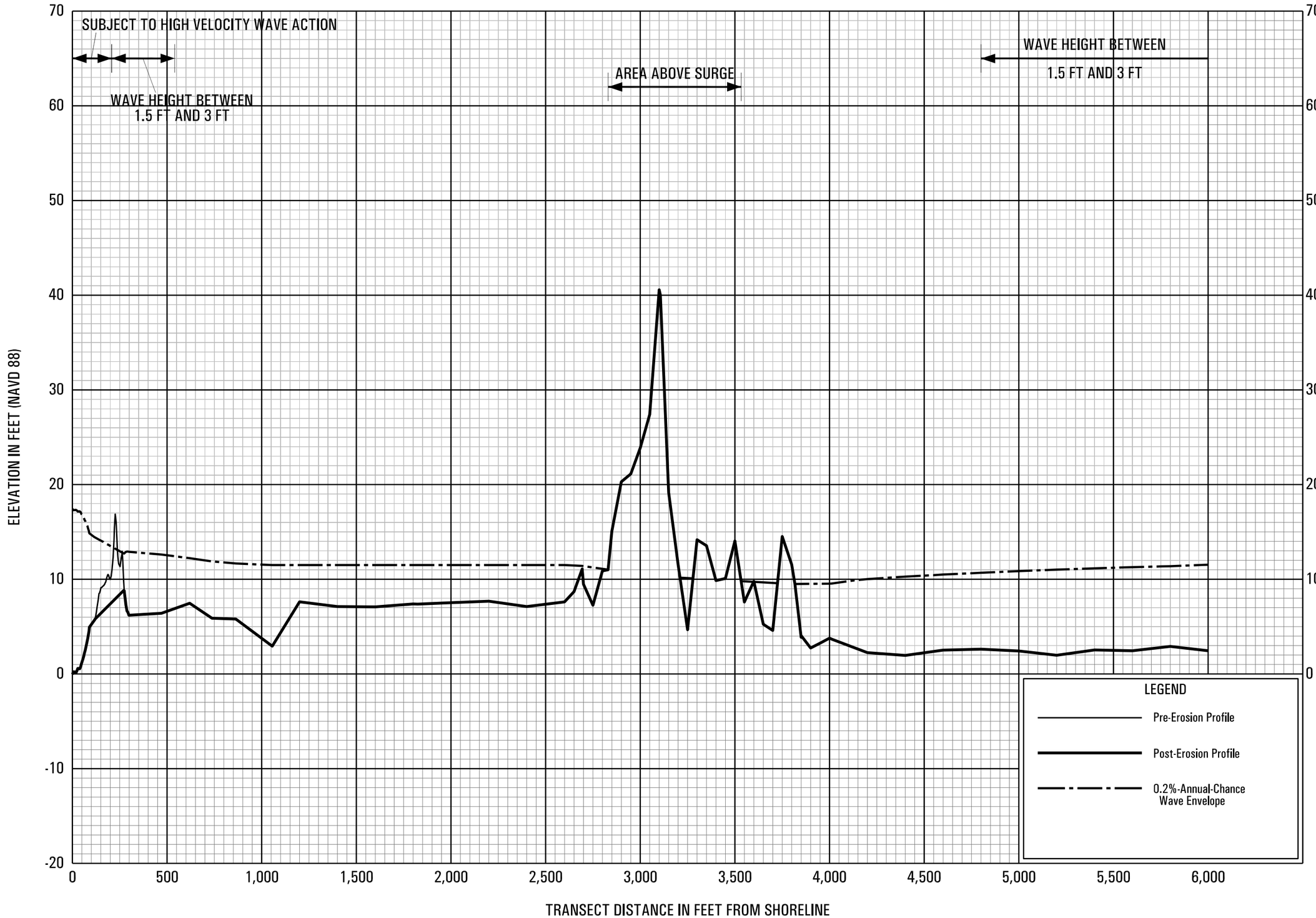
TRANSECT 18

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

71P



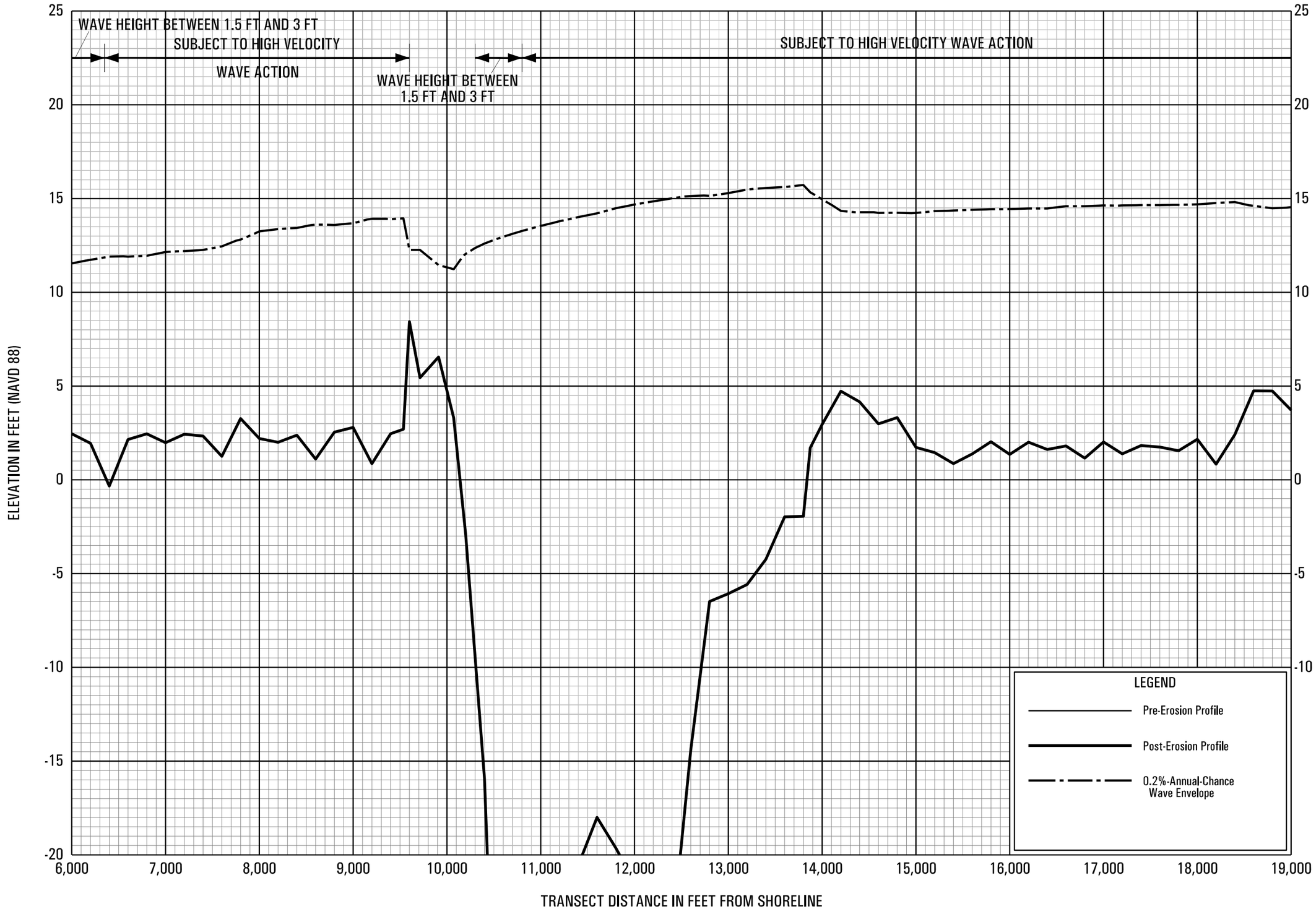
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



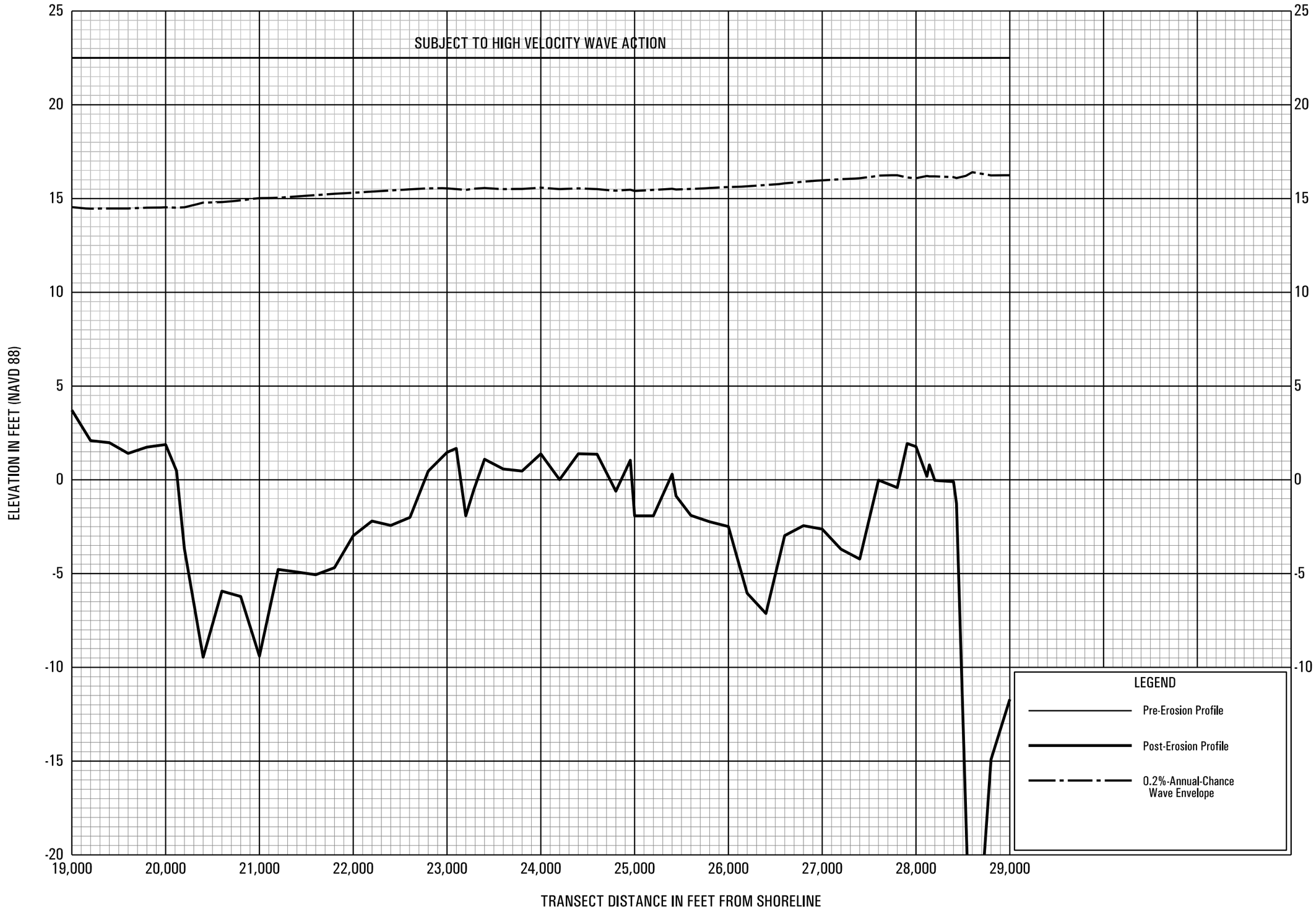
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



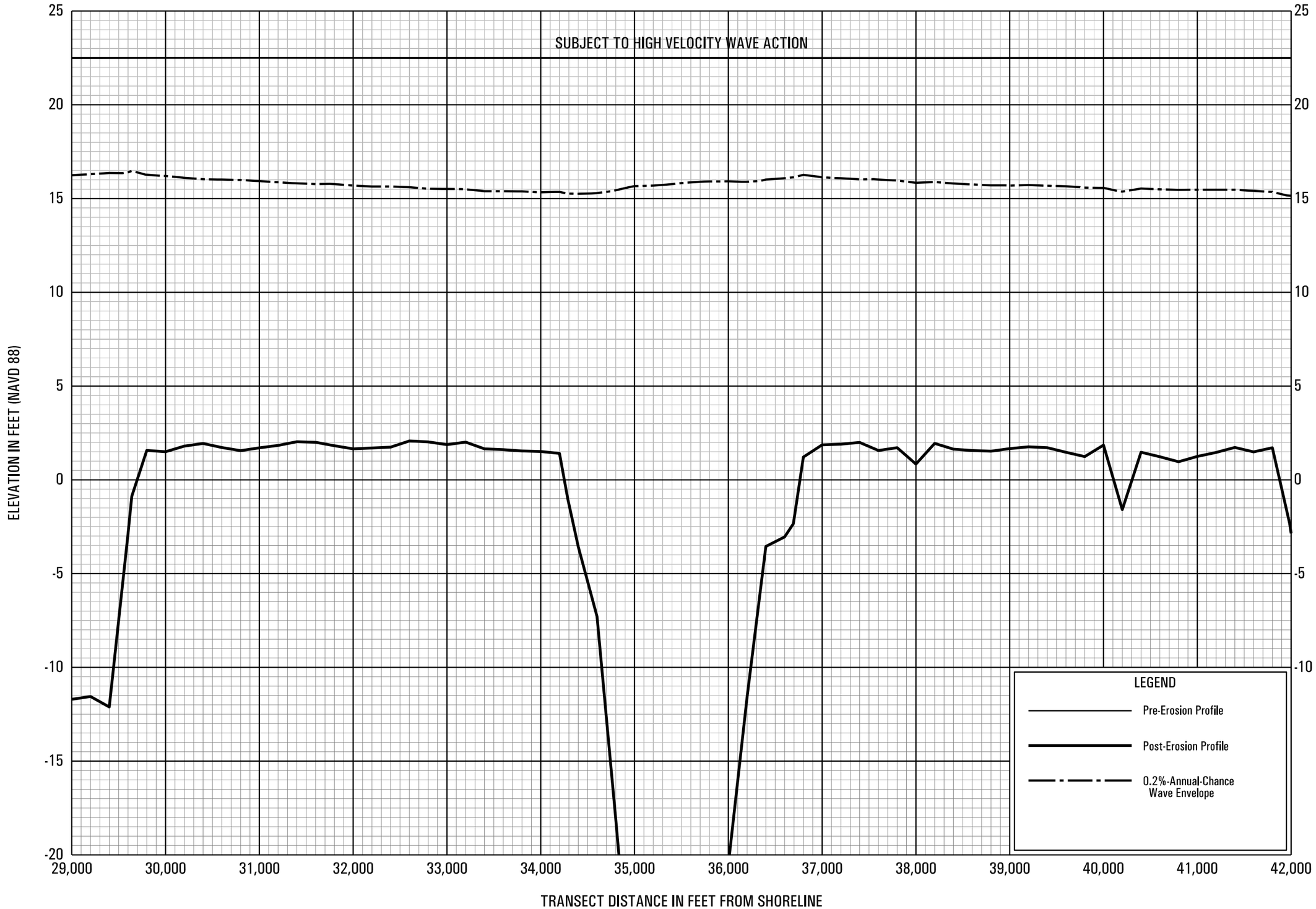
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



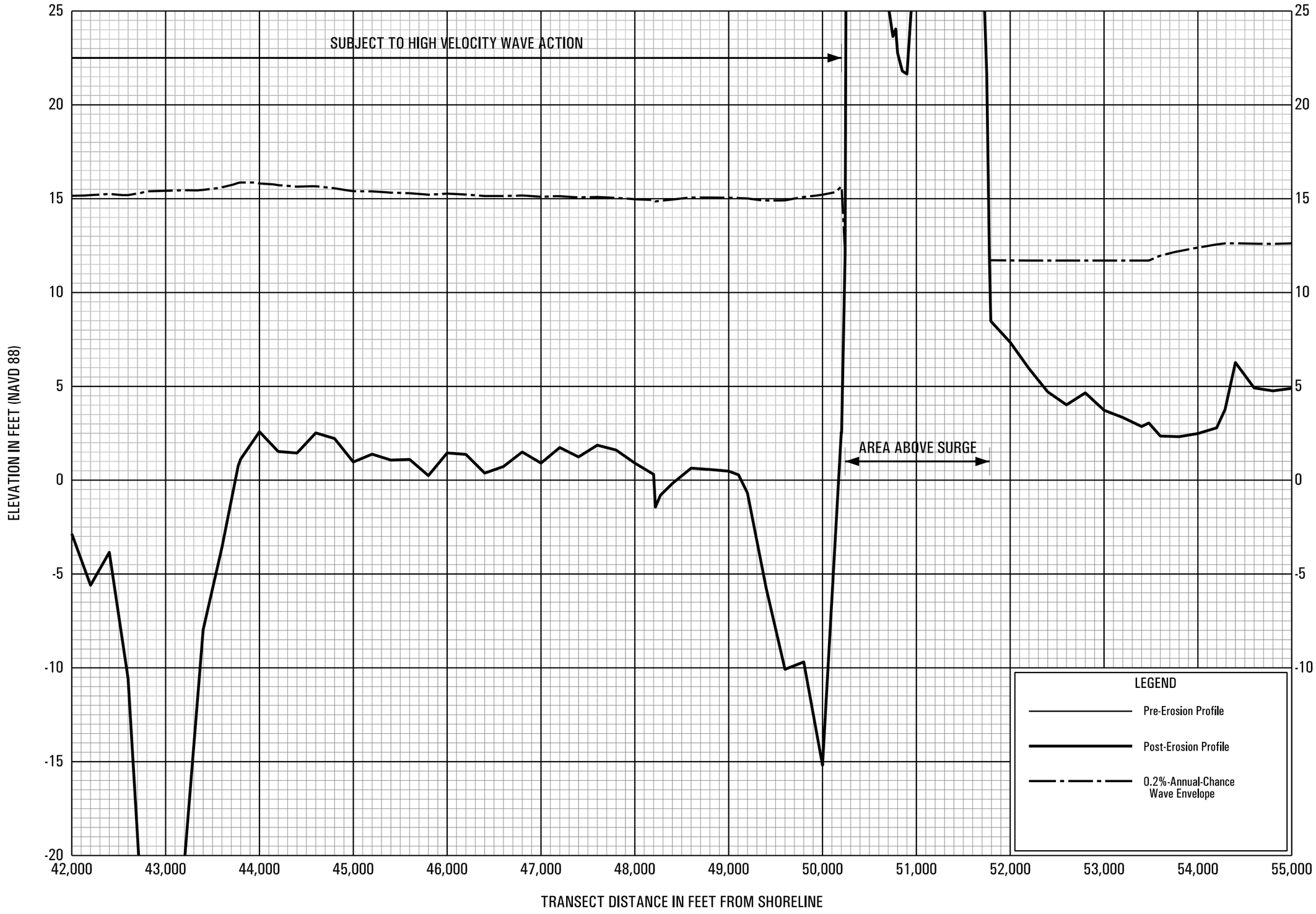
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



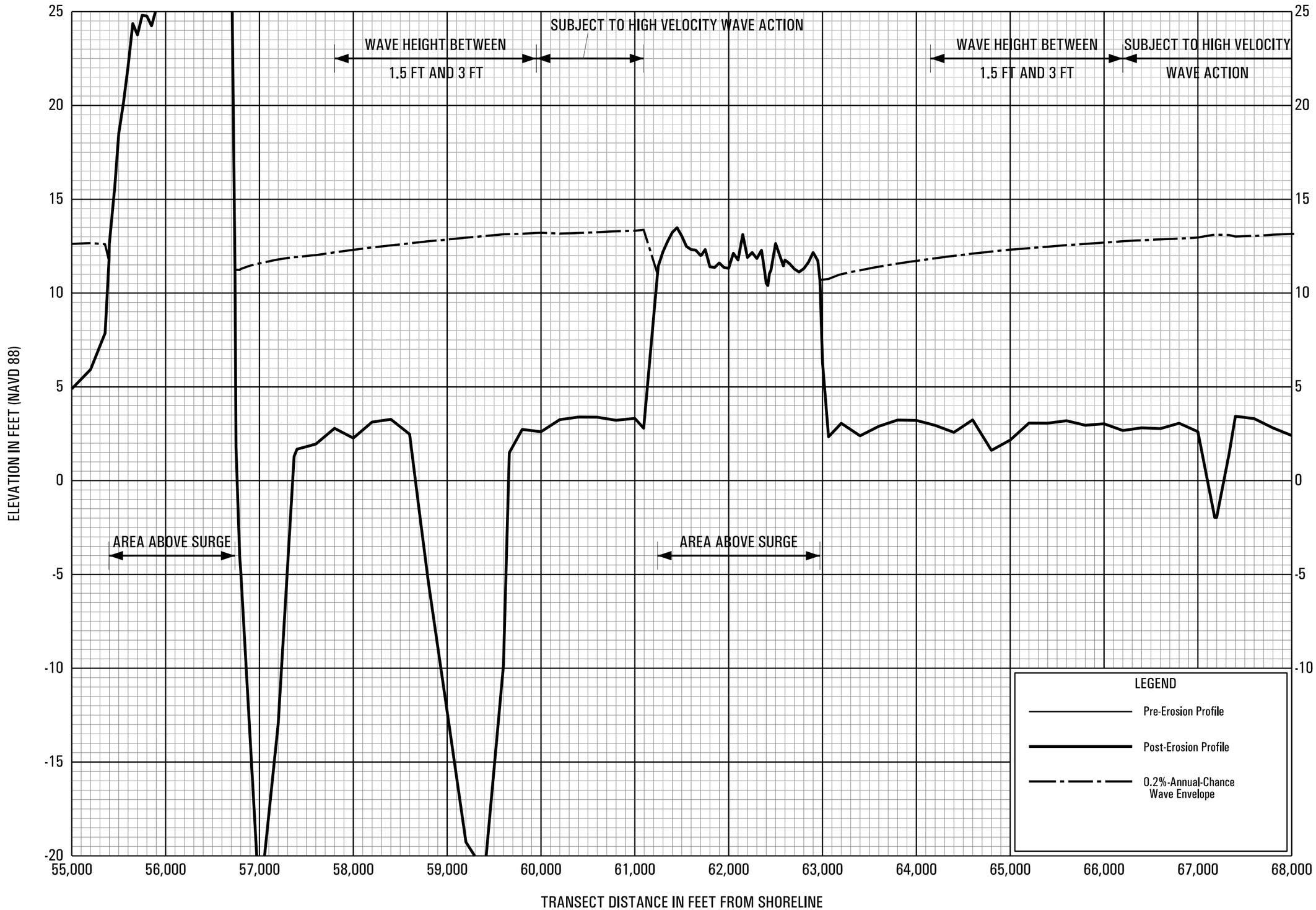
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

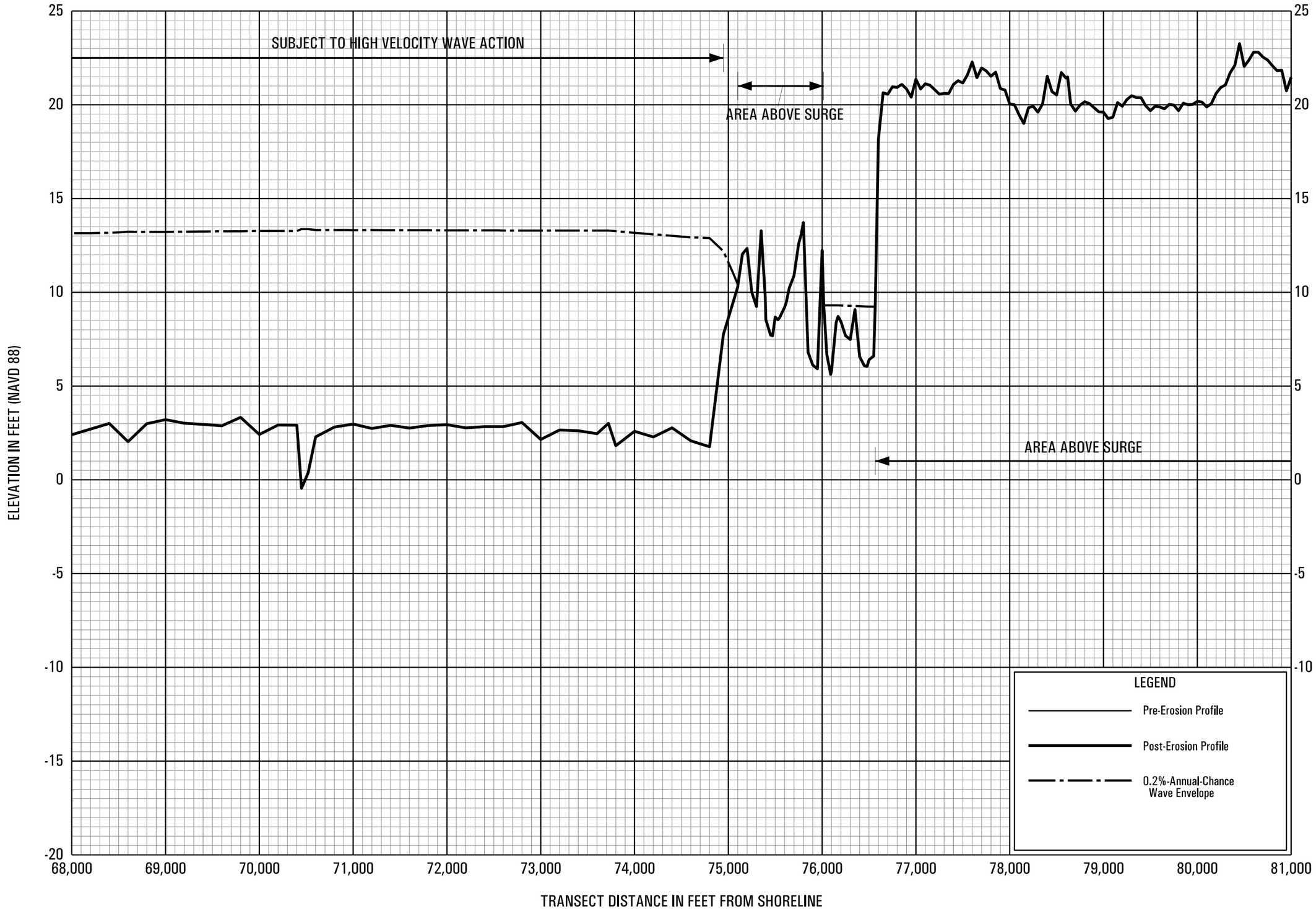
TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

77P



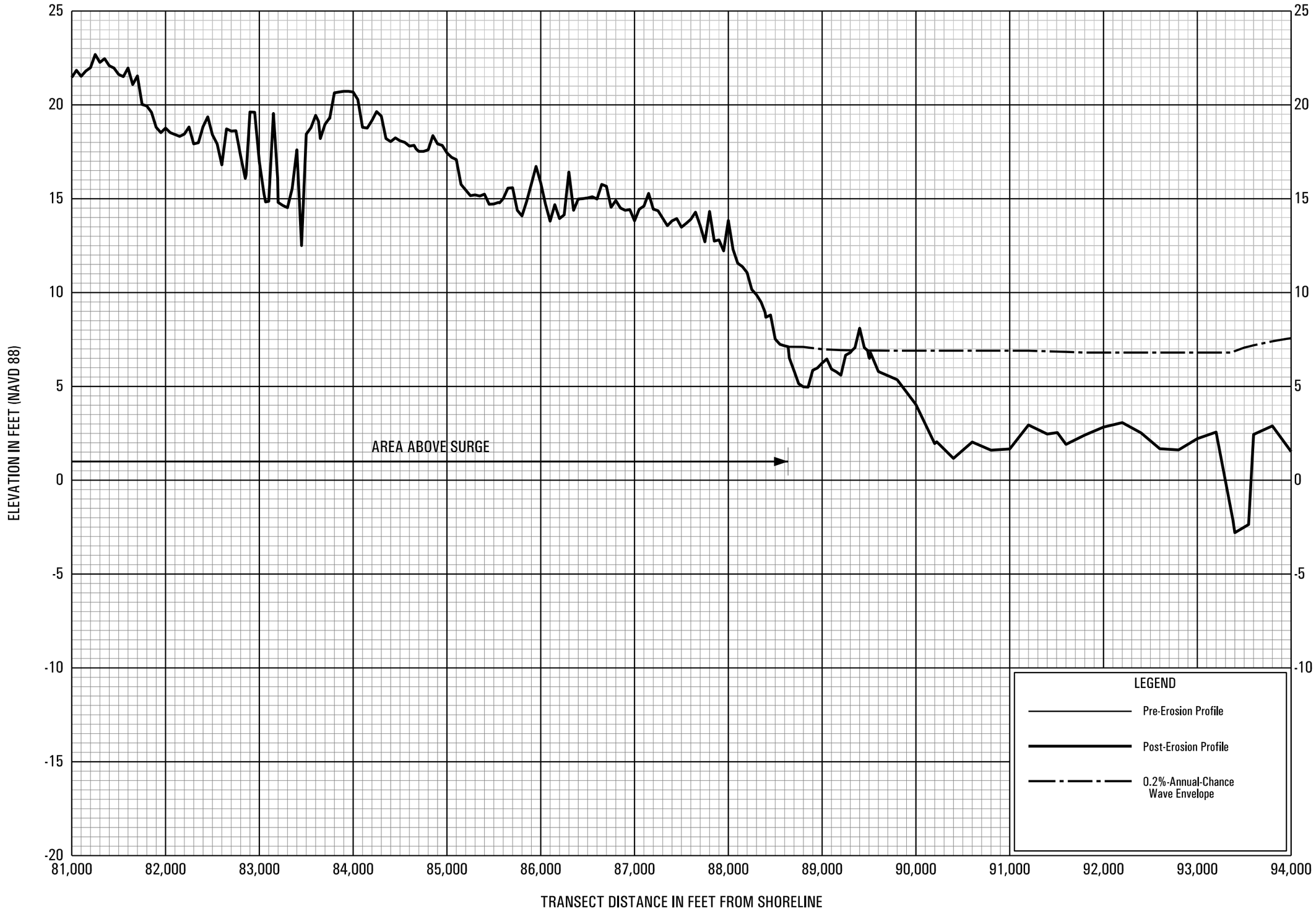
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



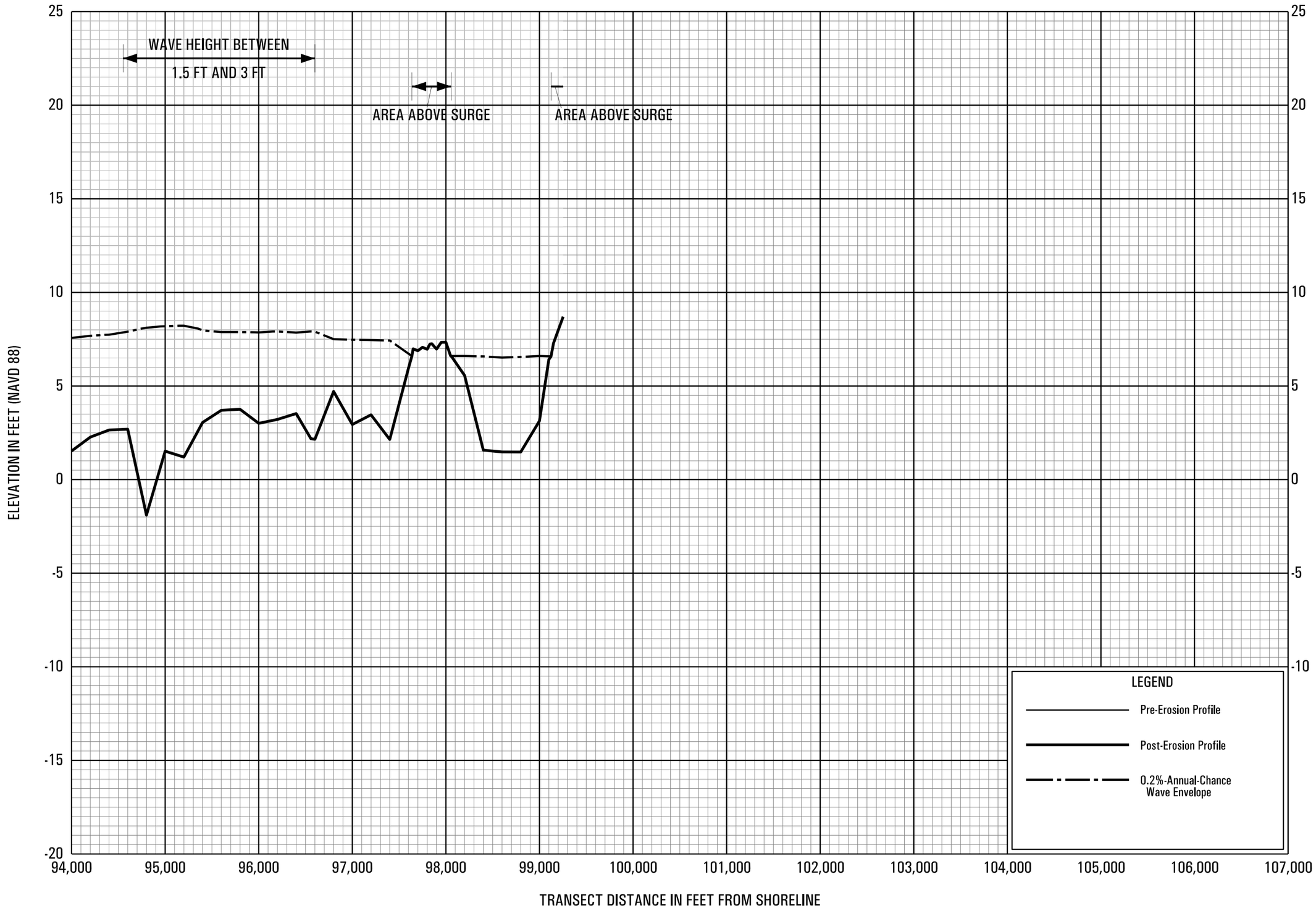
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

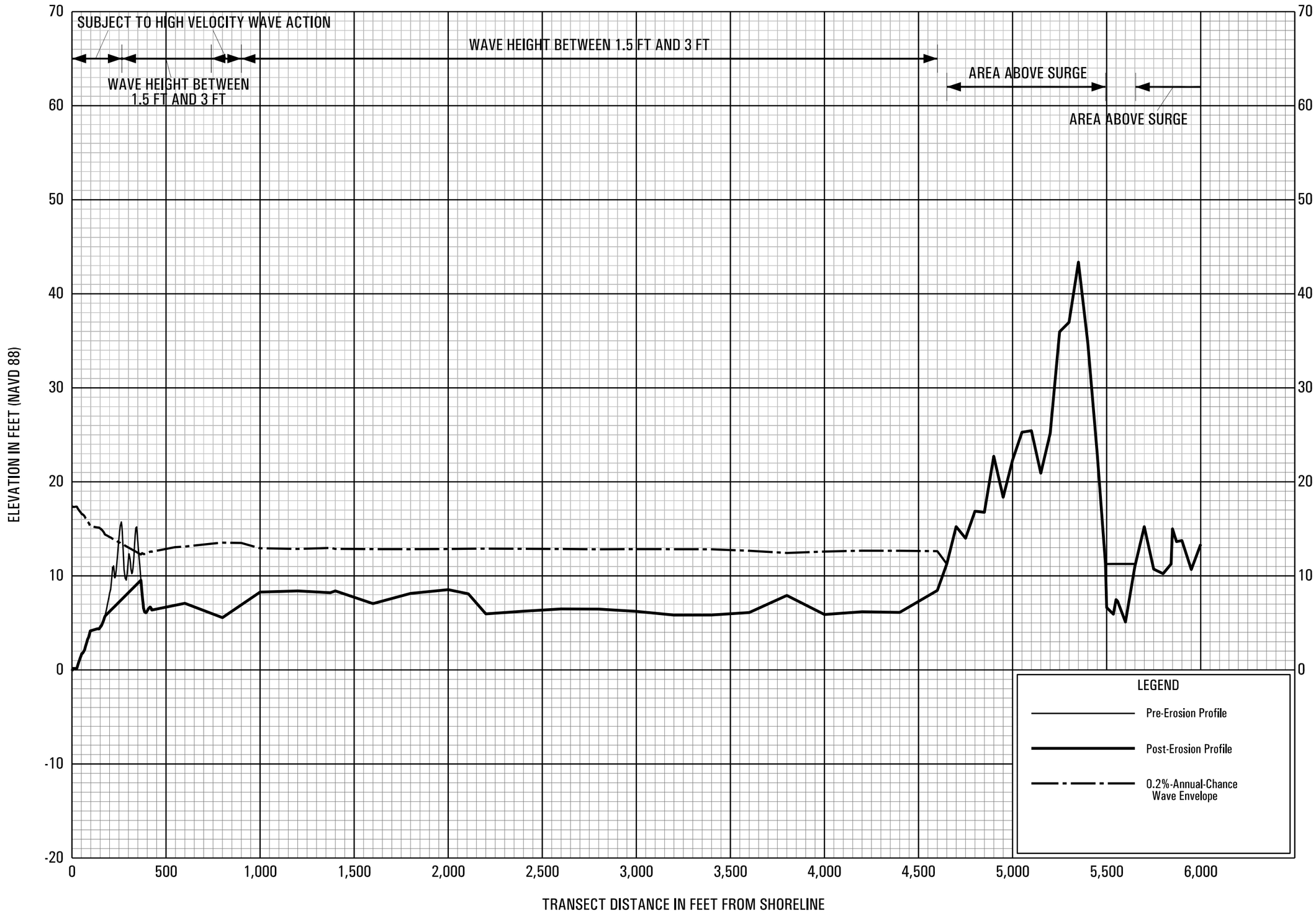
TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

80P



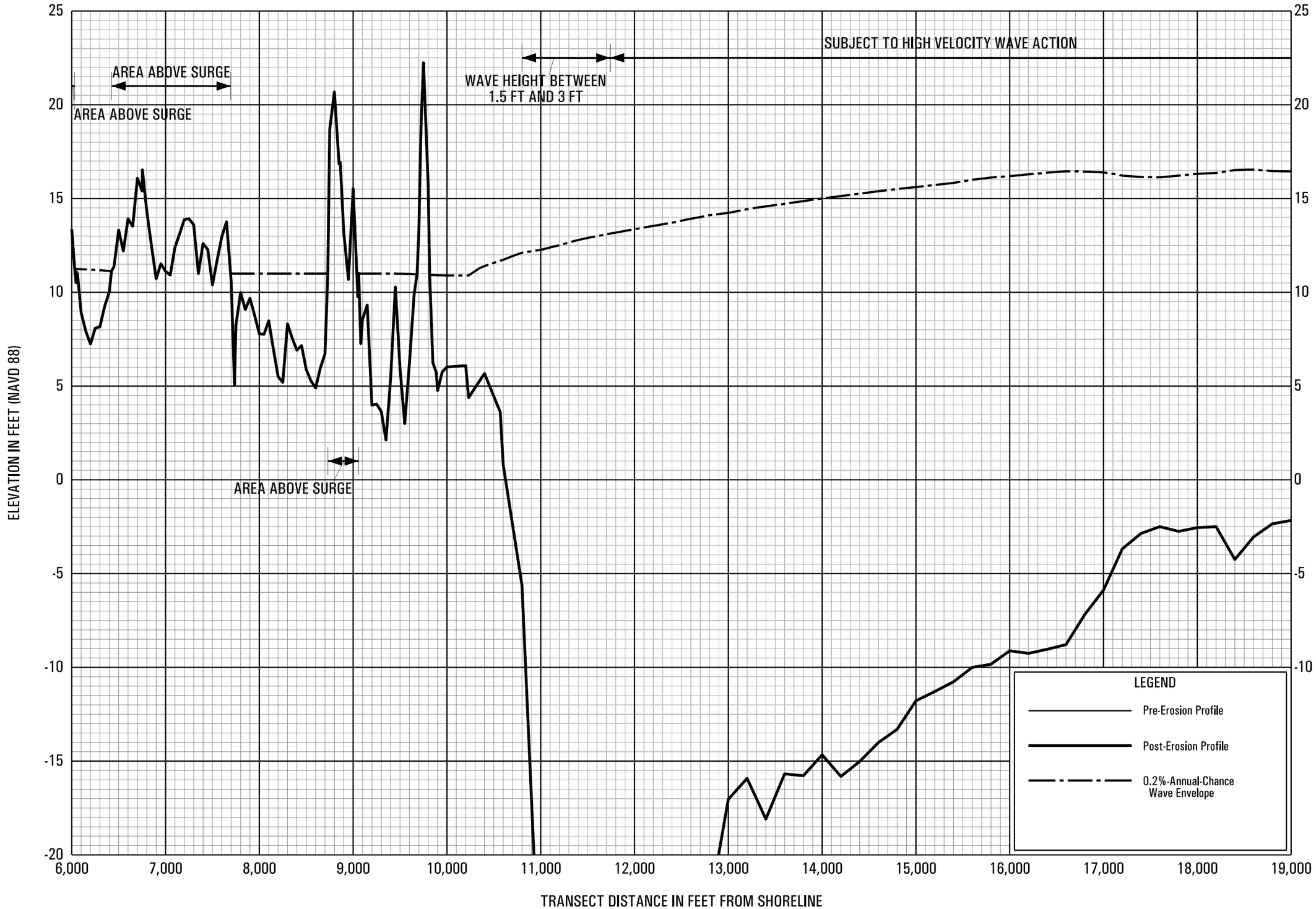
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



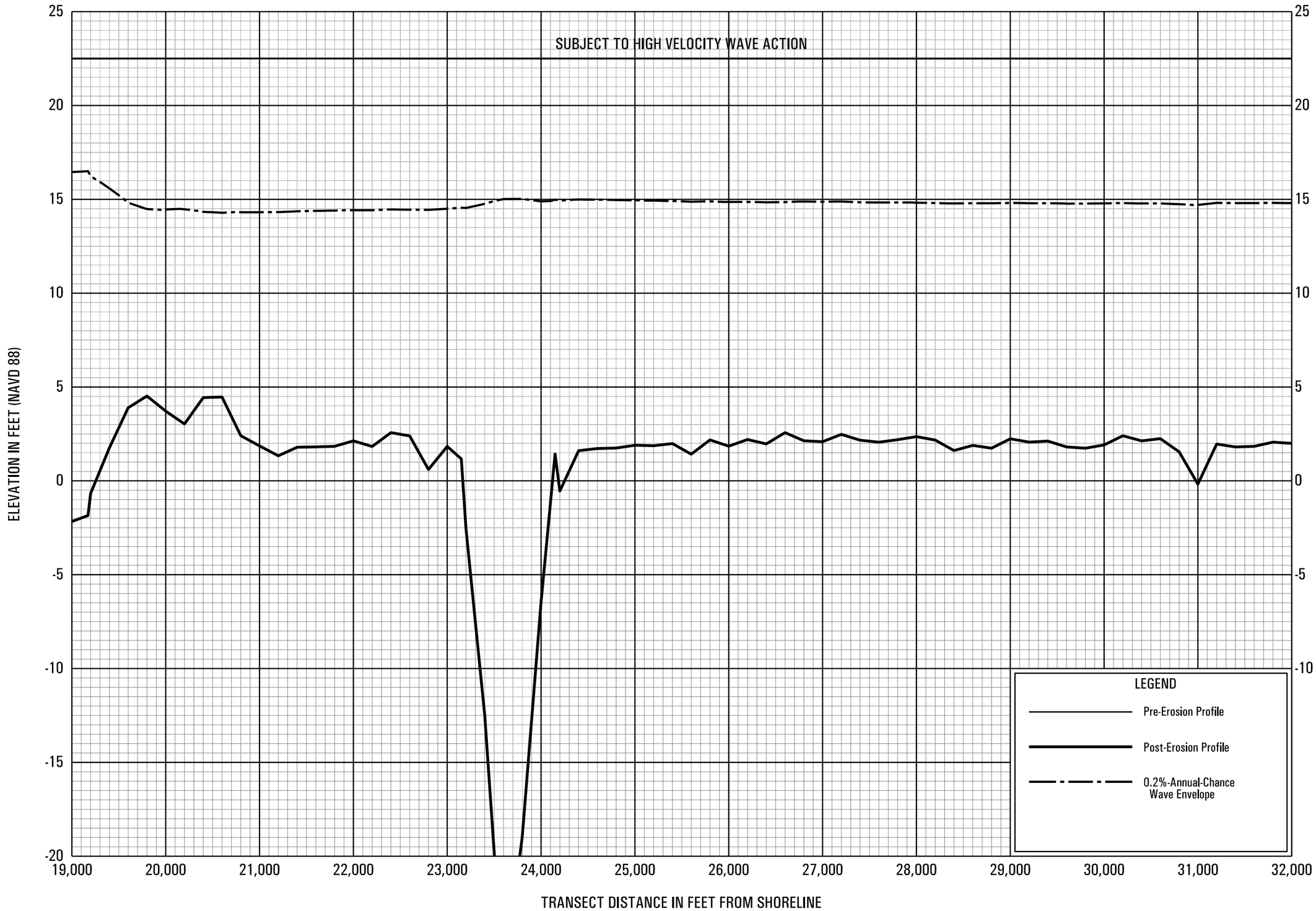
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

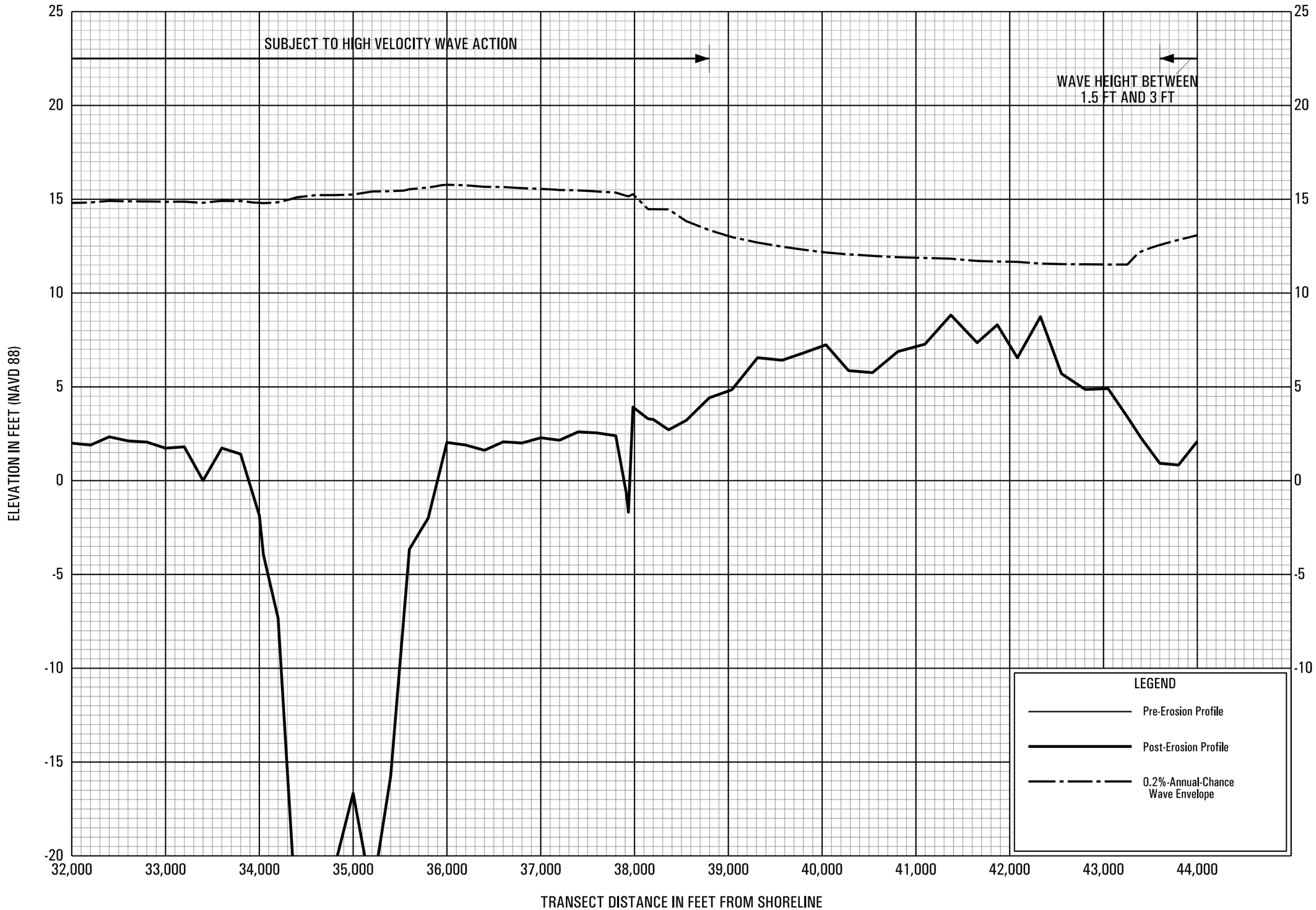
TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

83P



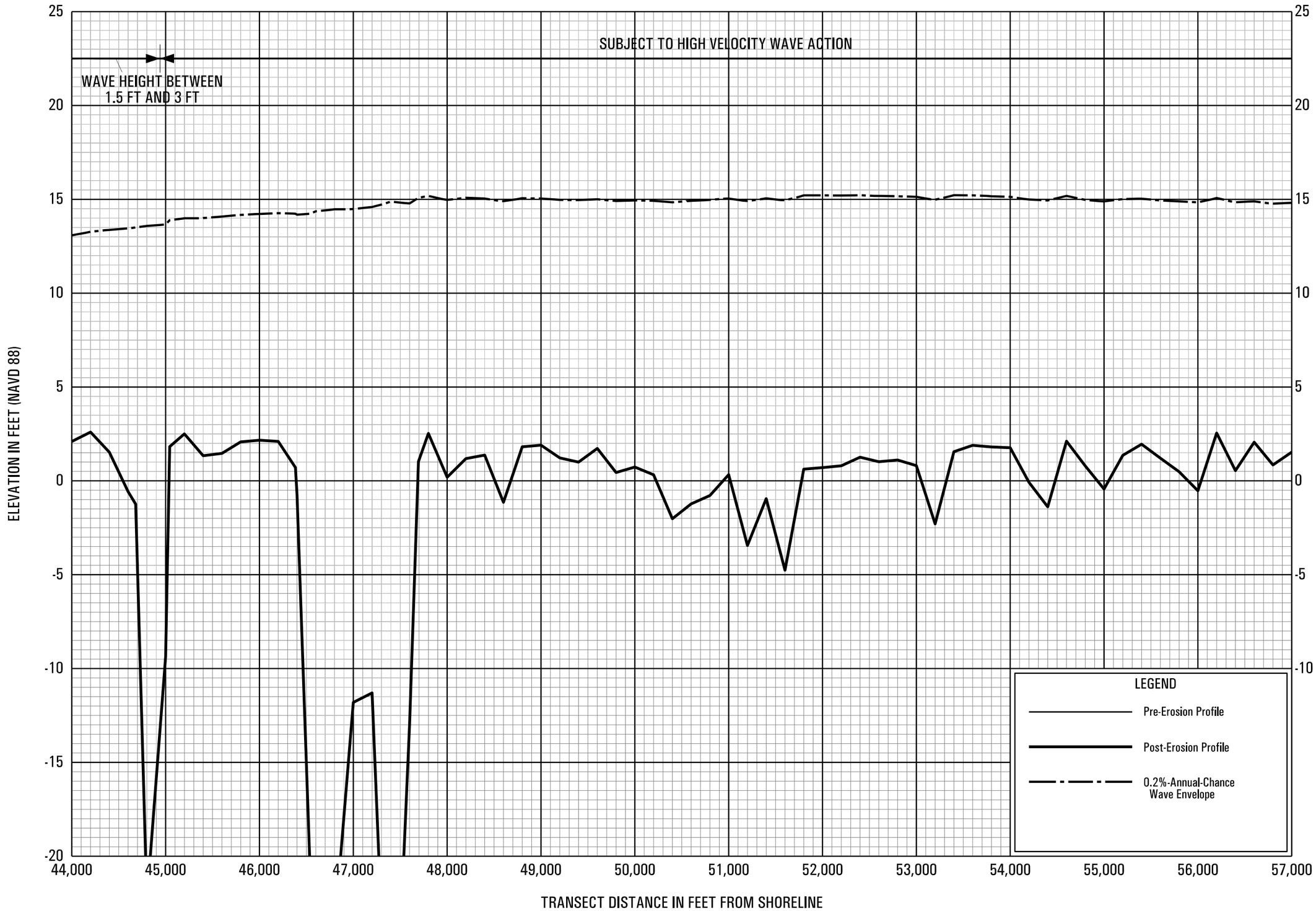
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

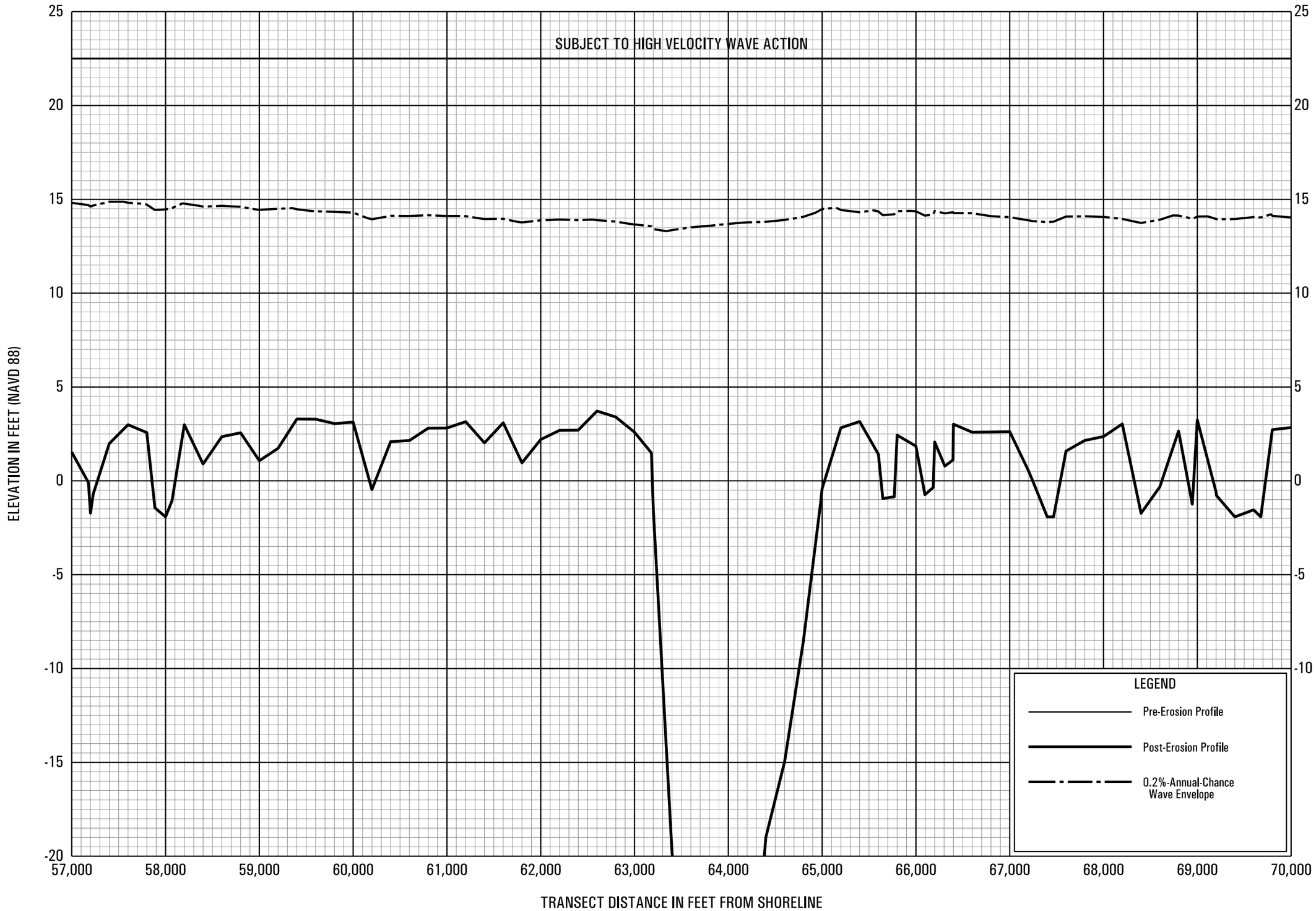
TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

85P



0.2% ANNUAL CHANCE WAVE ENVELOPE

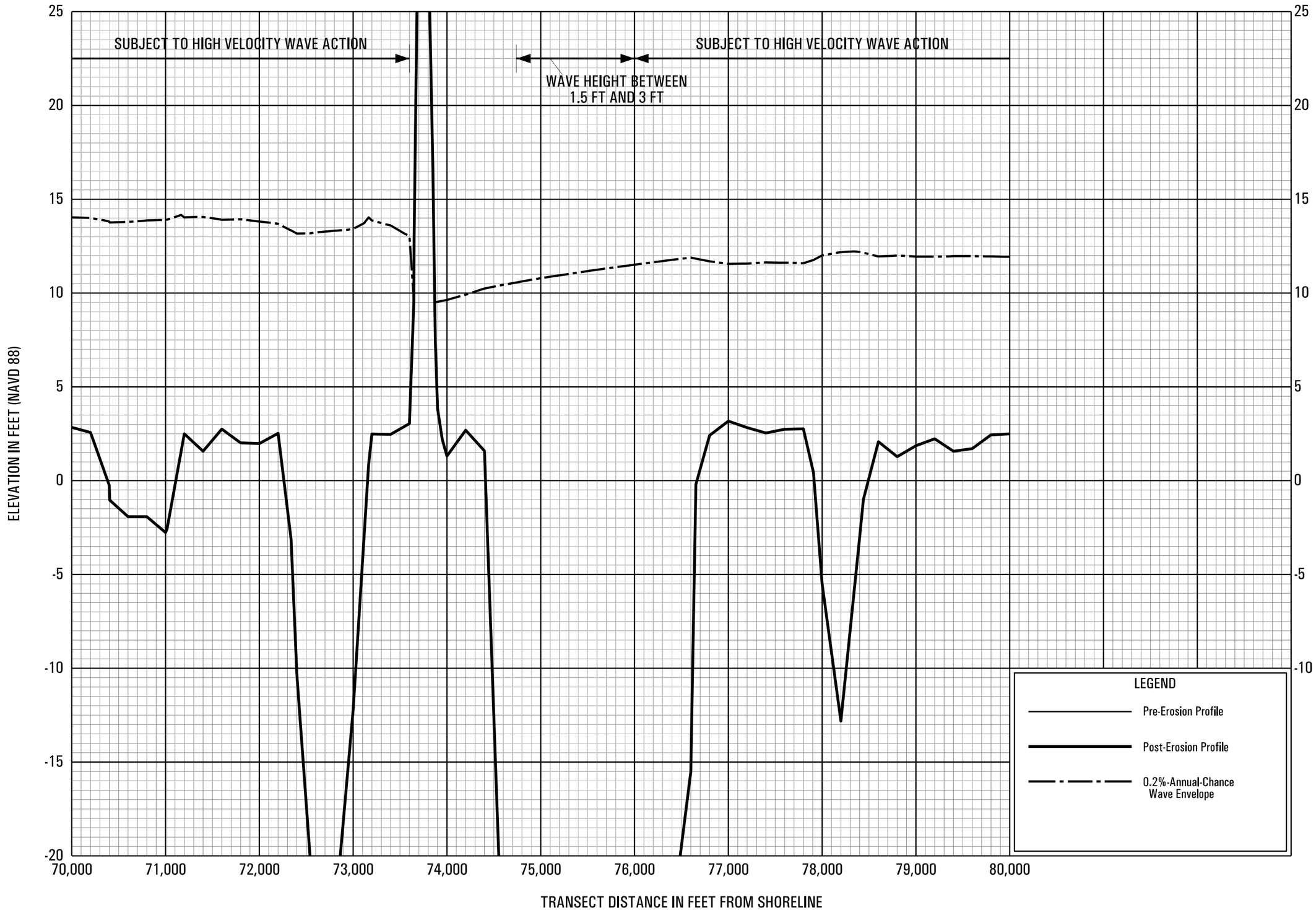
TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

86P



0.2% ANNUAL CHANCE WAVE ENVELOPE

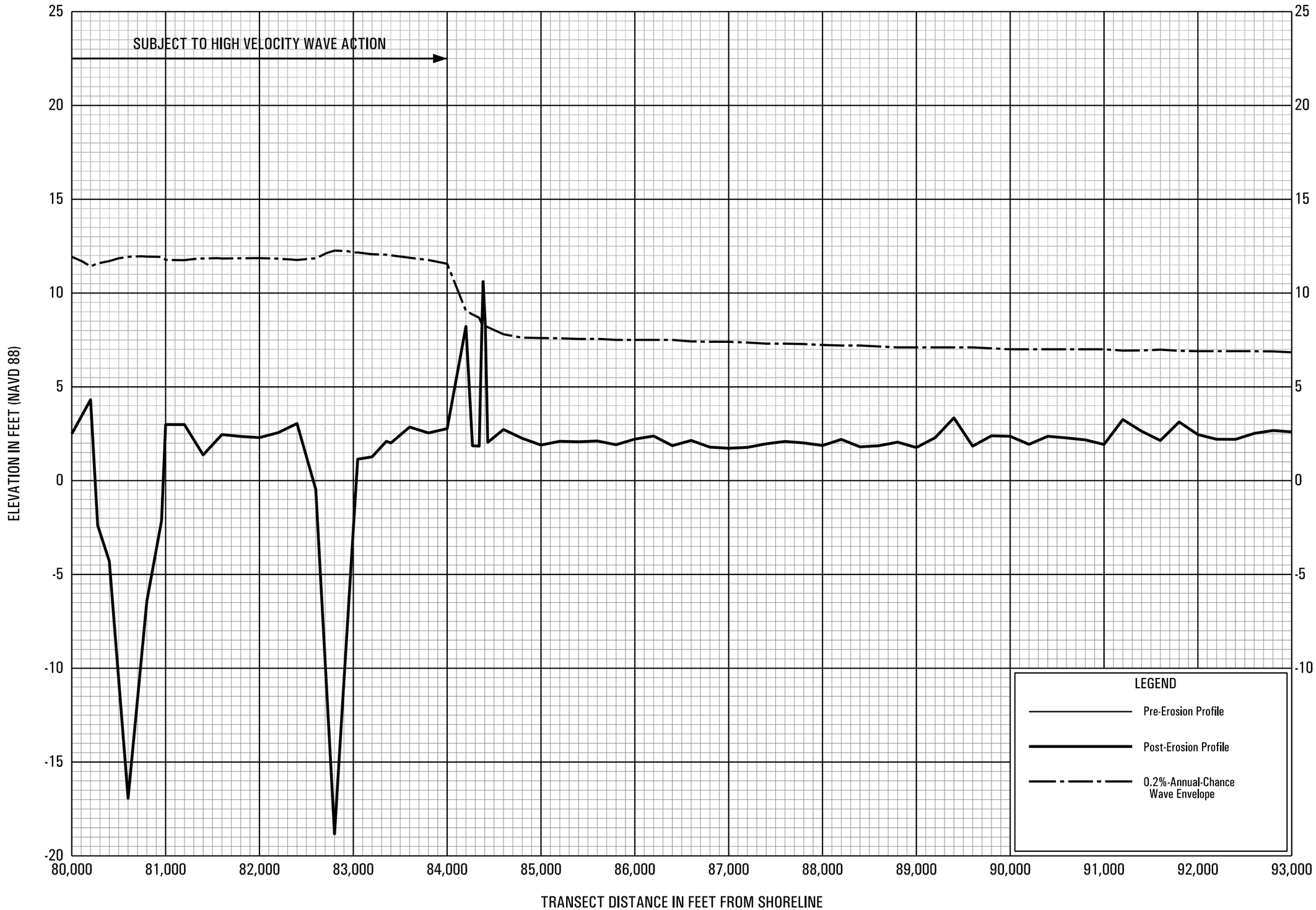
TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

87P



0.2% ANNUAL CHANCE WAVE ENVELOPE

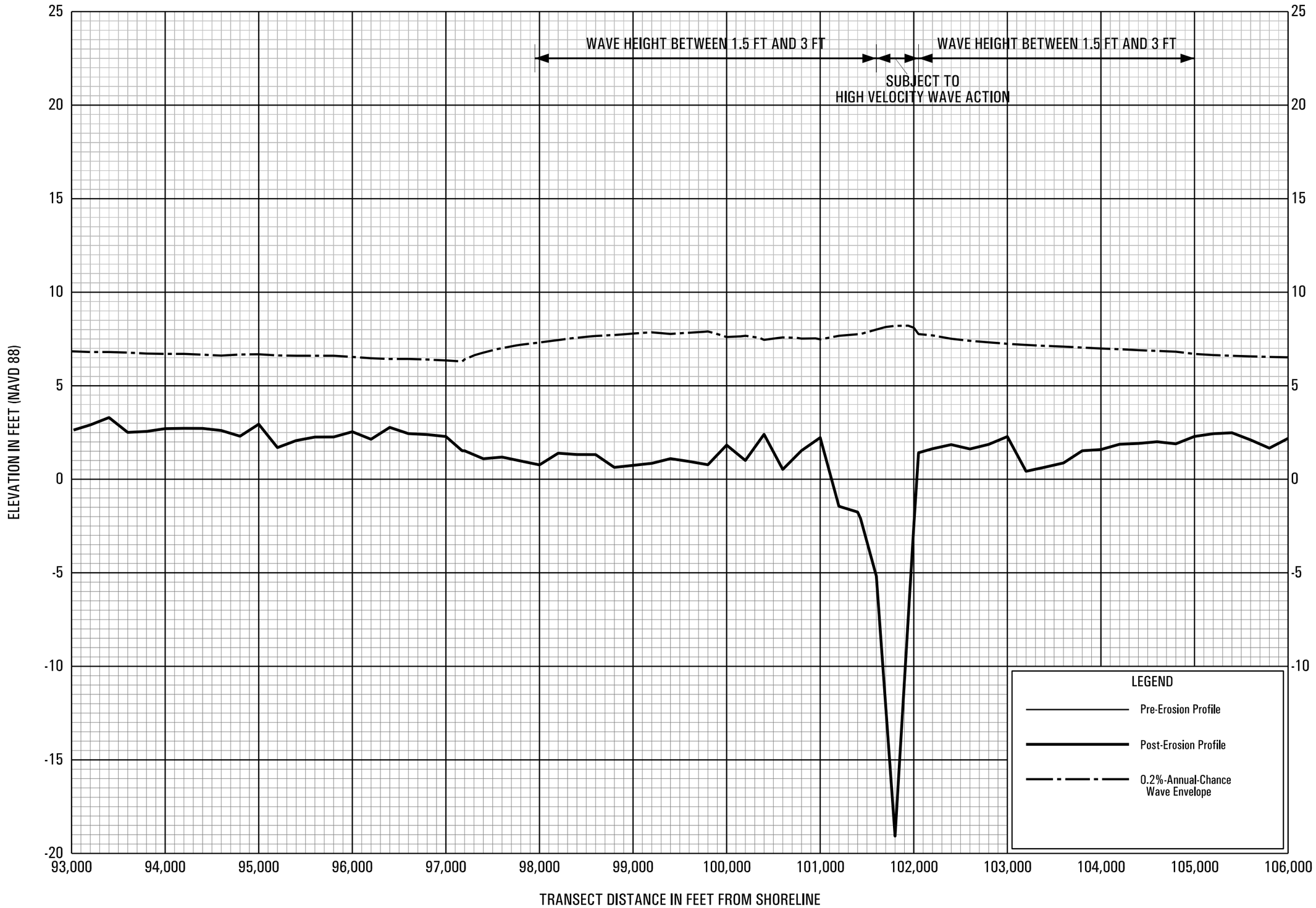
TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

88P



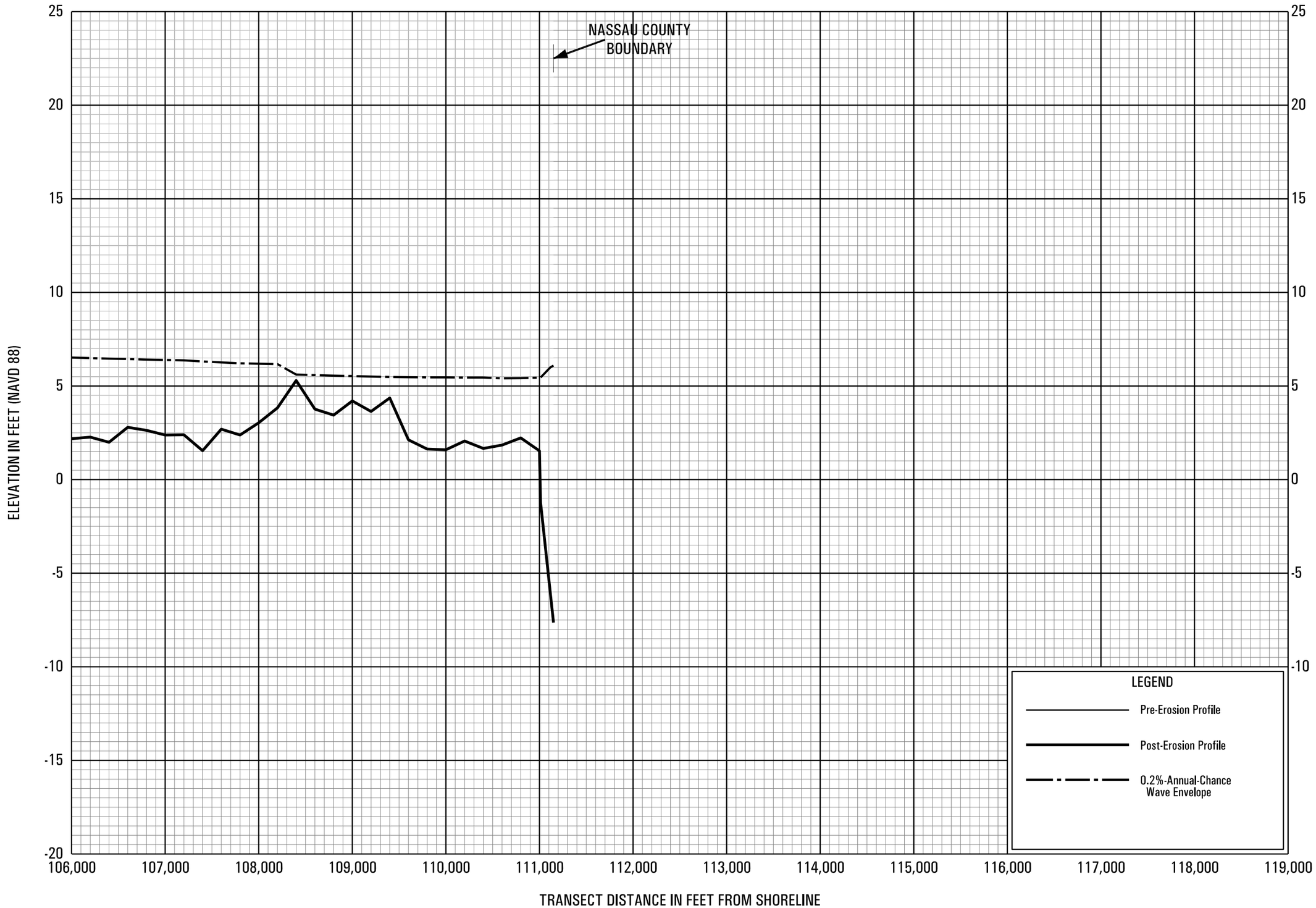
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

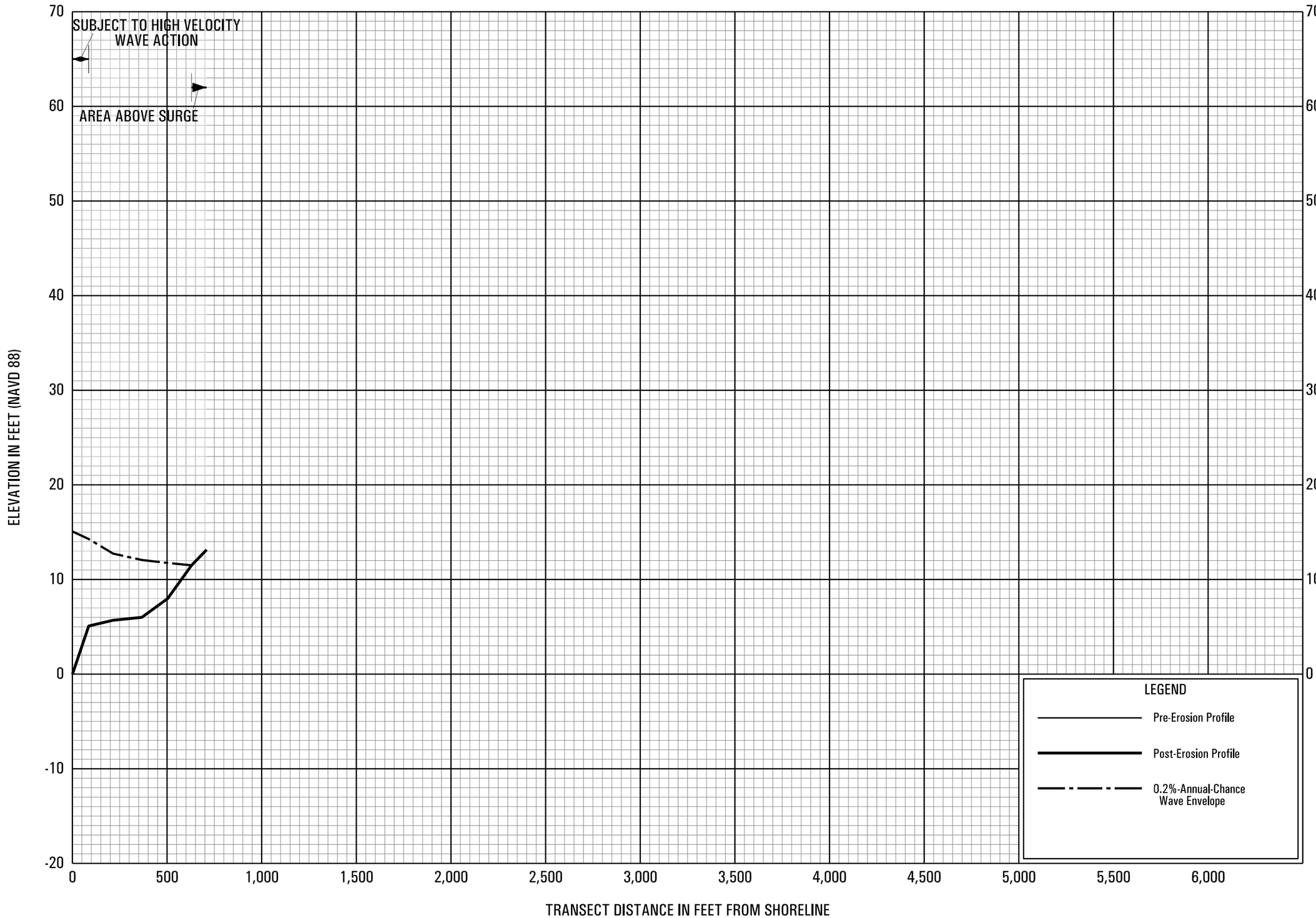
TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

90P



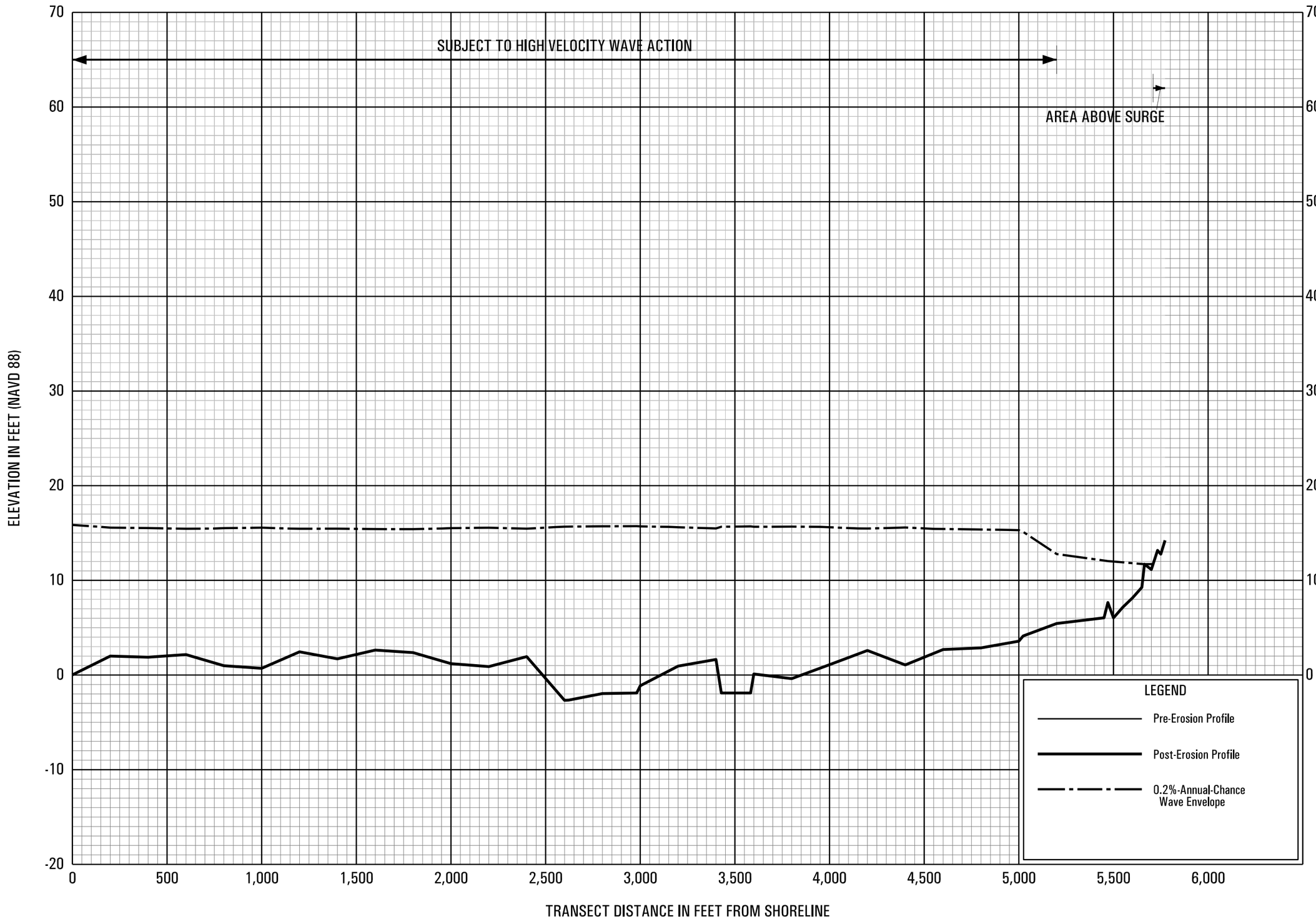
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 21

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



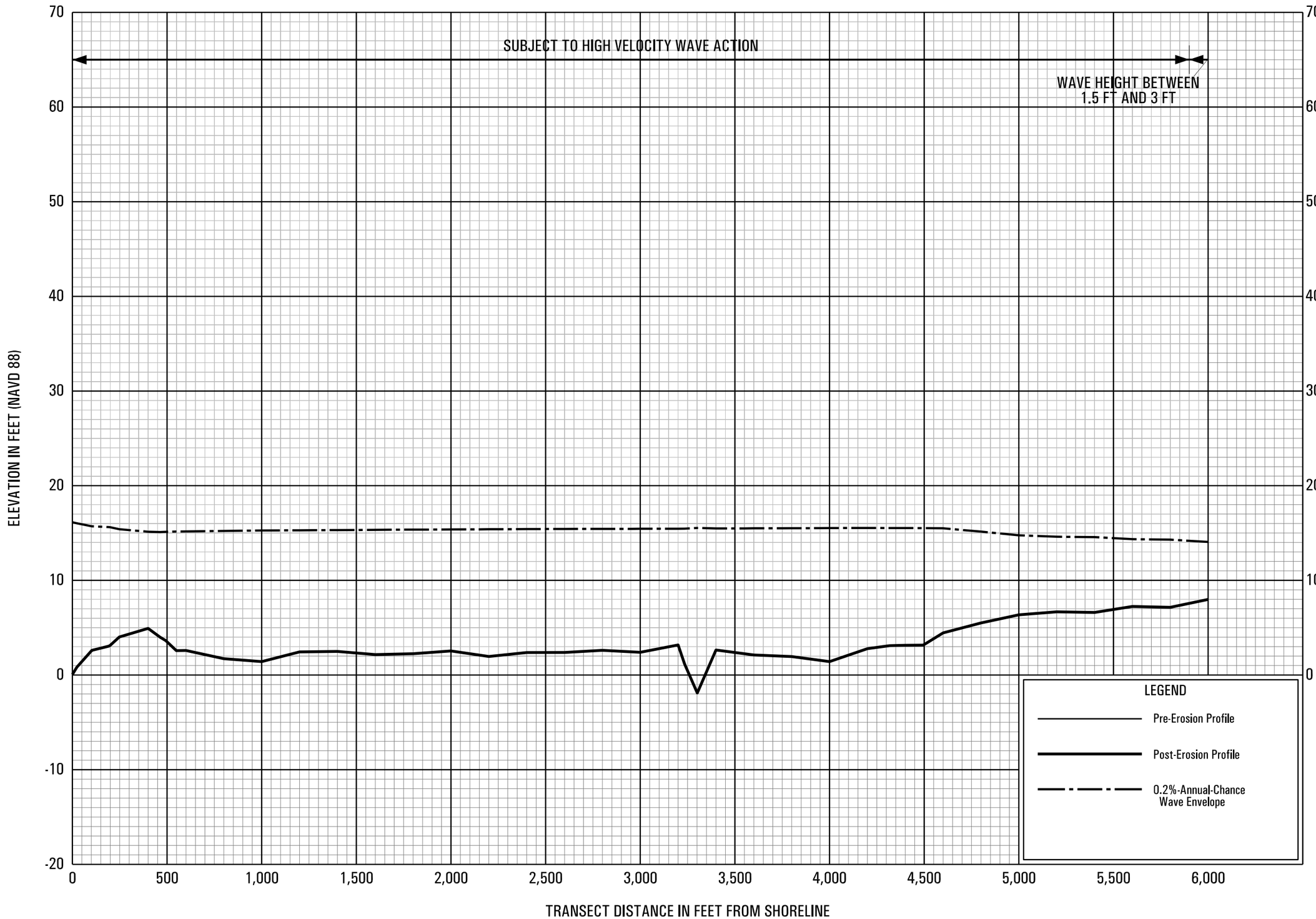
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 22

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

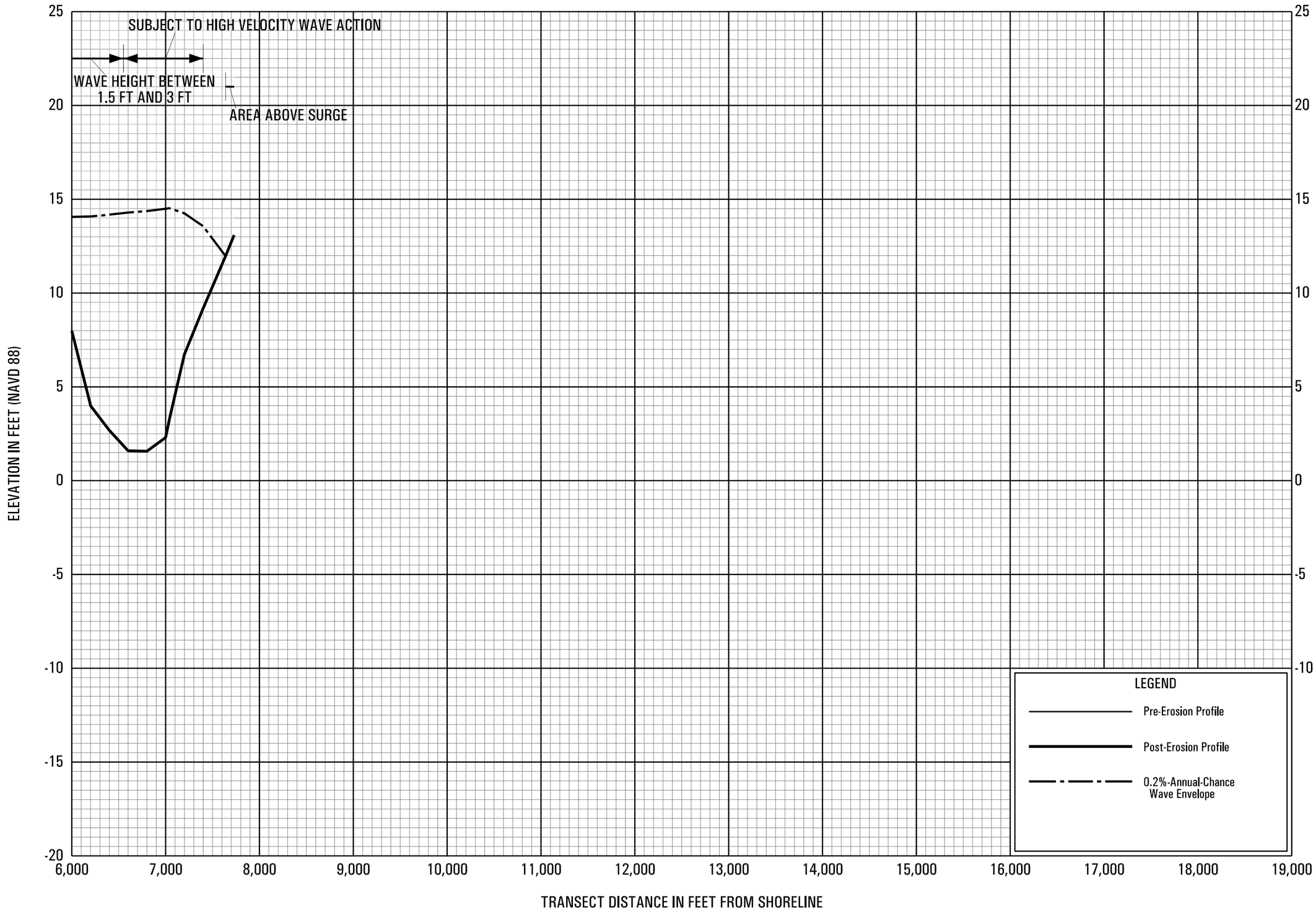
TRANSECT 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

93P



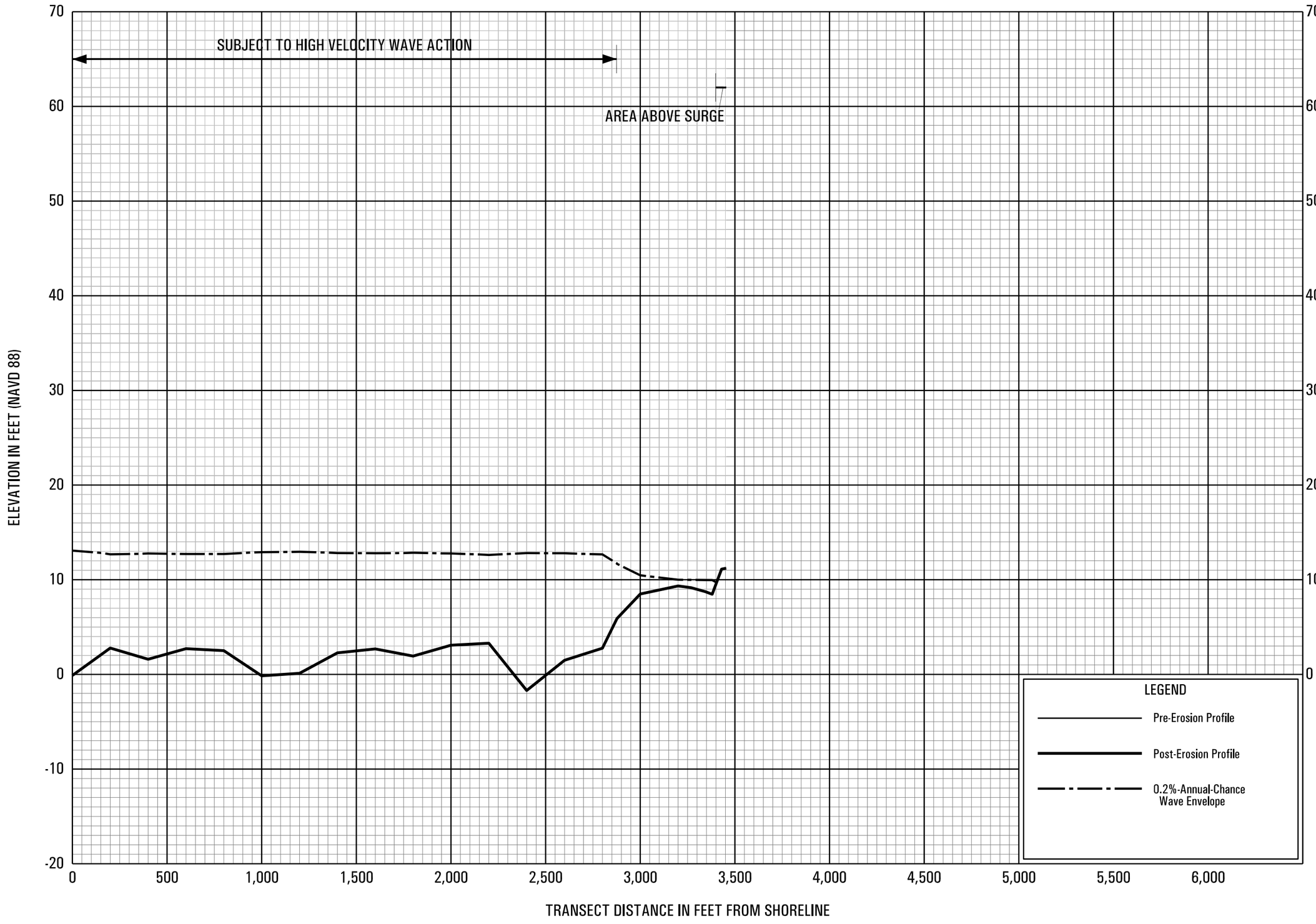
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



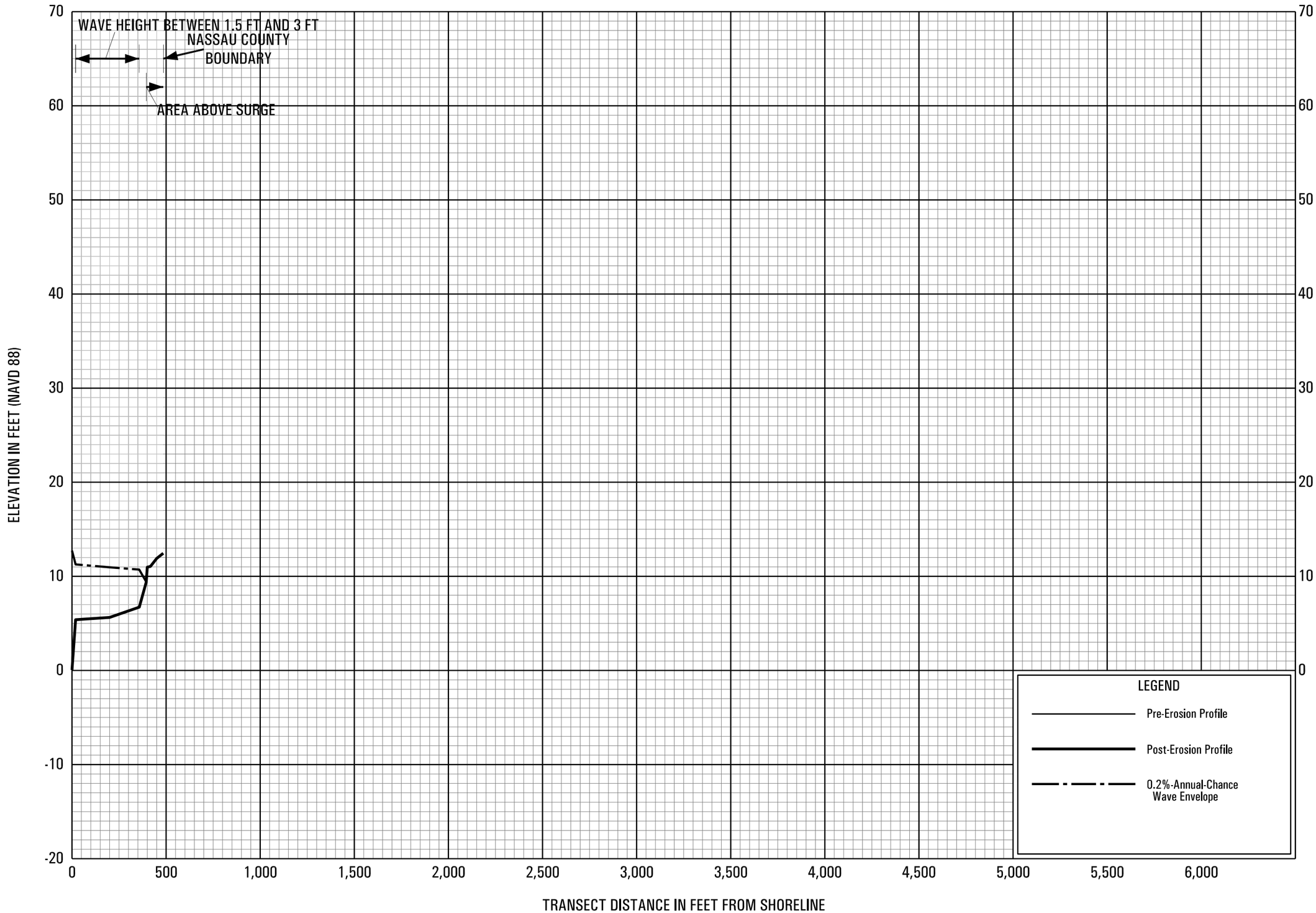
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



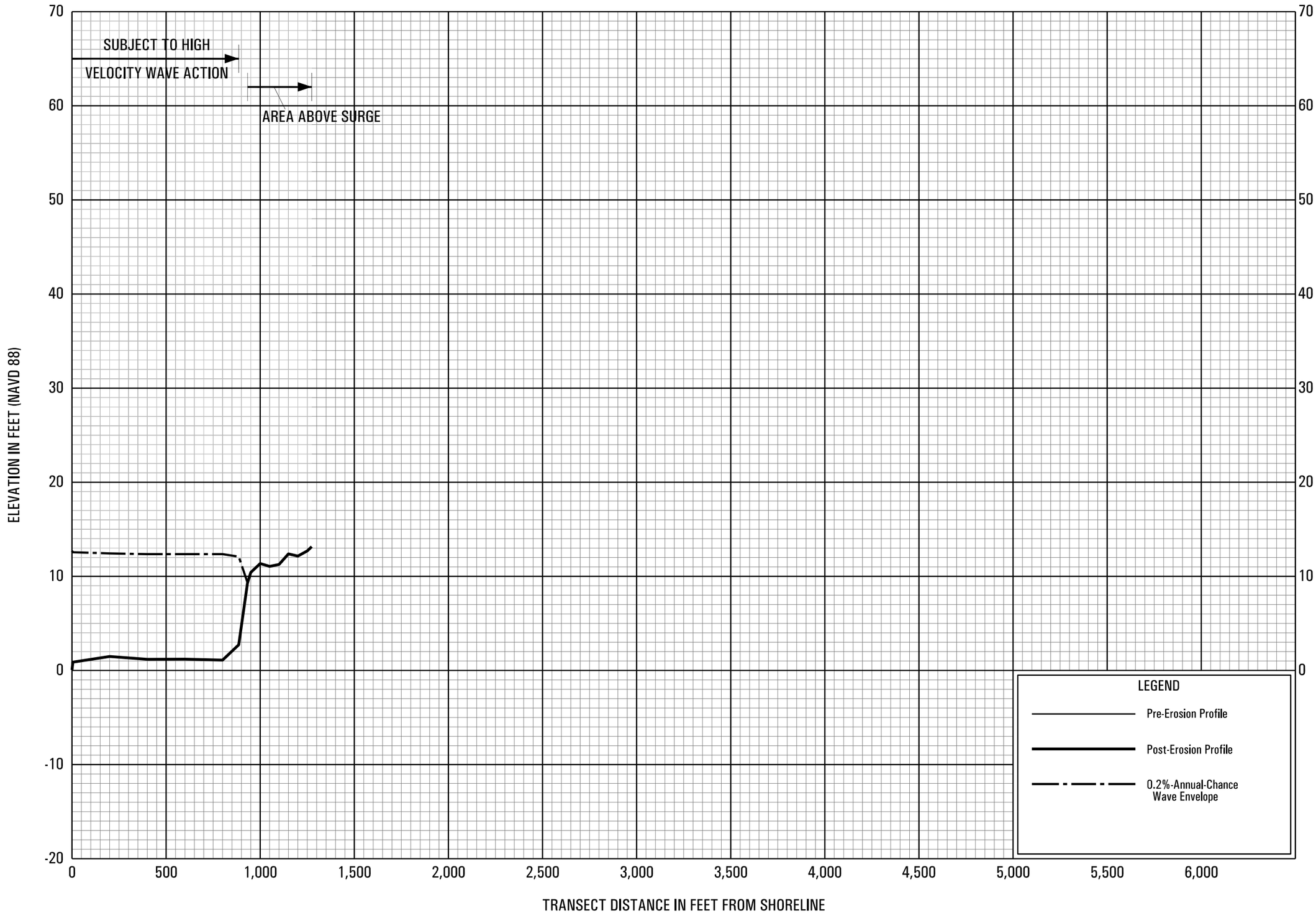
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 25

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



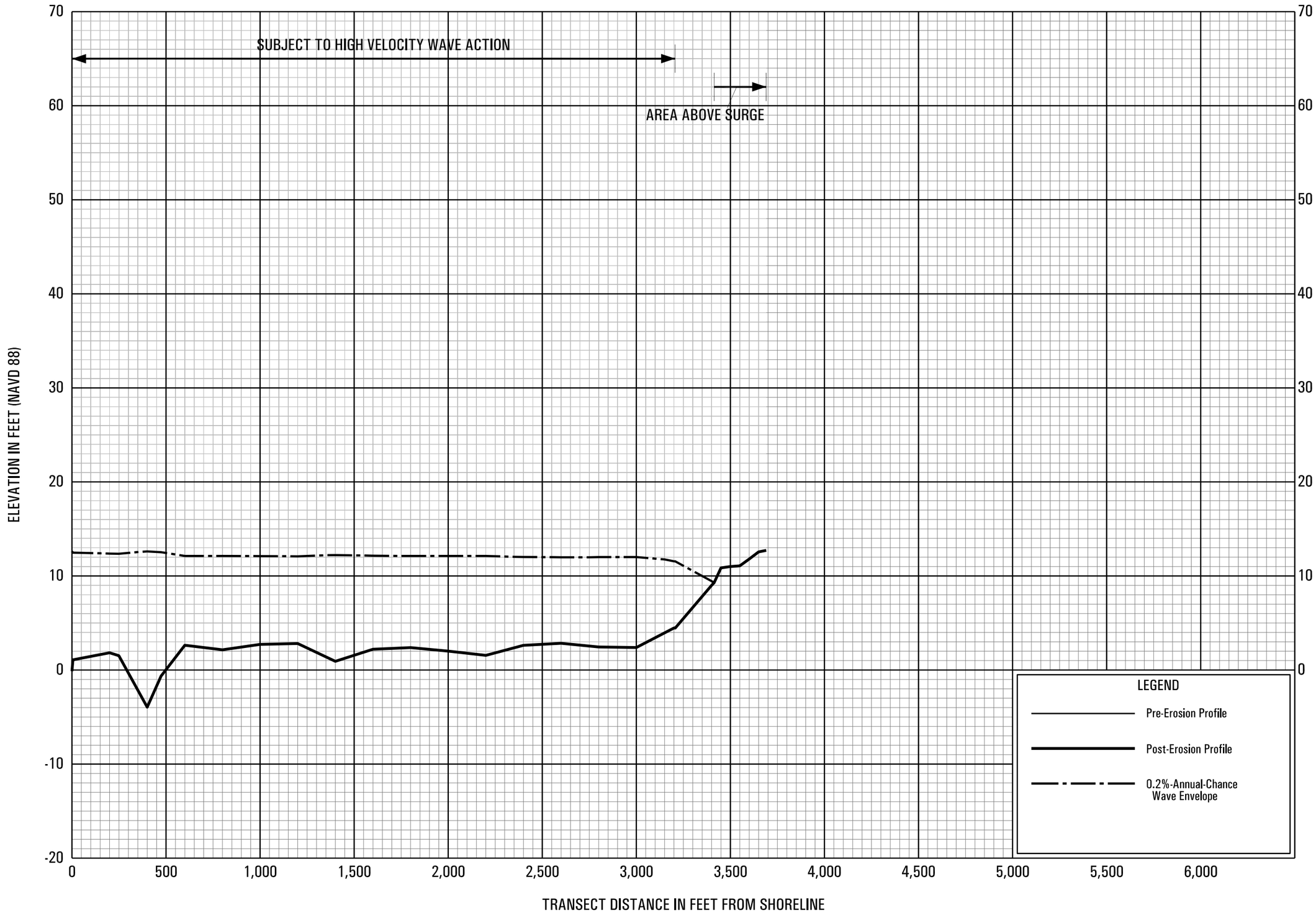
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 26

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



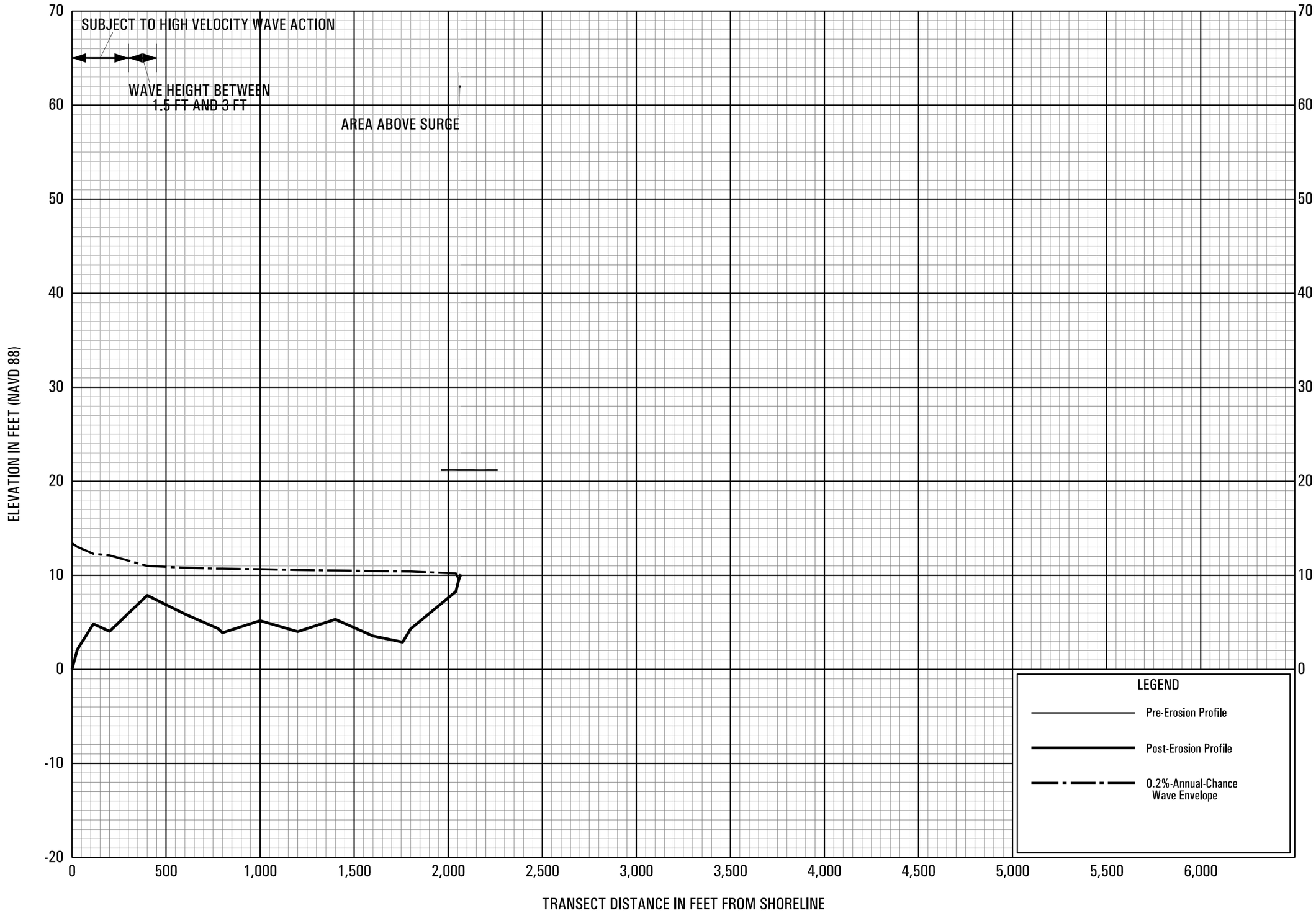
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 27

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 28

FEDERAL EMERGENCY MANAGEMENT AGENCY

NASSAU COUNTY, FL

AND INCORPORATED AREAS

99P

3.02.02 Land Uses within Areas of Special Flood Hazard

A. Exempted Uses within Areas of Special Flood Harard

1. The following uses and activities are permitted consistent with existing Local, Regional, State and Federal regulations for floodplain management:

   a. Land uses as allowed in Chapter 2 of the City's Land Development Code for applicable zoning.

B. Prohibited Uses within Areas of Special Flood Hazard

1. Commercial and Industrial land uses that store, handle or generate hazardous material or waste, unless the following standards are met:
   a. All building and structures shall be subject to compliance with the City's Floodplain Management Ordinance, including the requirement to secure local permitting.
   b. Hazardous materials or waste shall be stored within tanks or vessels, the lowest extremity of which is located at least two (2) feet above the applicable 100-year base flood elevation, inclusive of tank inlets and vents.
   c. Tanks/Vessels shall be elevated on pilings or columns, the foundation of which shall be designed in accordance with requirements of the City's Floodplain Management Ordinance.
2. Hospitals, nursing homes and housing likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood.
3. Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for flood response activities before, during and after a flood.
4. Wastewater treatment facilities, unless adequately mitigated through engineered solutions which meet the construction standards associated with the 100-year base flood as well as elevation of facilities and the storage of any hazardous materials or waste to two (2) feet above the 100-year base flood elevation.
5. Injection wells, irrigation wells, and domestic and commercial wells more than six (6) inches in diameter;
6. Human or animal cemeteries;
7. Storage or transfer of bulk coal; and,
8. Bulk storage of liquefied natural gas.