

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Beach Profile Measurements after Hurricane Hugo:
Sullivans Island and Isle of Palms, South Carolina

by
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91-110

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by T.E. Reiss, R.R. Wertz, and M.P. Katuna

Abstract

On September 22, 1989, Hurricane Hugo struck the U.S. mainland near Charleston, South Carolina. Landfall was at Sullivans Island, a barrier island east of Charleston. A reconnaissance flight just before landfall measured 140-knot winds at 12,000 feet, yielding an estimate of the highest one-minute wind speed of 120 knots at landfall. Storm surge measurements after the storm's passage showed an average value of 14.3 feet above mean sea level across Sullivans Island. The combination of high winds and high water created drastic changes in the beach morphology along the seaward margins of Sullivans Island and Isle of Palms. The purpose of this investigation is to document these changes. In total, twenty-five locations on the two islands were surveyed.

Introduction

Hurricane Hugo, a category four storm, struck the South Carolina coast at Sullivans Island on September 22, 1989 (see Figure 1). Packing 120 knot winds (Lawrence, 1989) and creating a storm surge averaging 14.3 feet above mean sea level across Sullivans Island and Isle of Palms (Schuk-Kolben, oral commun., 1989), it was historically one of the worst storms to strike the southeastern Atlantic coast.

Under the coordinated efforts of the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Geological Survey (USGS), the impact of Hurricane Hugo on the coastal environment was investigated. Of primary concern to the USGS are the processes responsible for barrier island erosion during severe storms. As a part of this investigation, 26 beach-profile locations on Sullivans Island and Isle of Palms were reoccupied and surveyed. The locations of the survey sites corresponded to those previously established as part of a shoreline monitoring program initiated by the South Carolina Coastal Council (SCCC). The data obtained will be used in a comparative study using profile data collected at the same locations prior to the hurricane.

A research team from the USGS arrived in South Carolina on Monday, October 2, 1989, 10 days after hurricane landfall. With the assistance of Mike Katuna (Chairman of the Geology Dept., College of Charleston), the bench-mark locations used in prior beach profiles were either located or reestablished. Shore-normal profiles were then measured.

Beach Profiles

Figures 2 and 3 indicate the original 26 profile locations on Sullivans Island and Isle of Palms (respectively). Of the 26 locations, 8 are located on Sullivans Island and 18 on Isle of Palms. Each location (or station) was identified by a SCCC bench mark. We were able to find 7 of the 26 original SCCC bench marks; 2 on Sullivans Island and 5 on Isle of Palms. The remaining nineteen were either destroyed or buried beneath overwash deposits created by Hurricane Hugo. Through post-processing of the survey data, it appears that three more bench marks on Isle of Palms (stations 3130, 3135, and 3160) may still be intact, buried beneath overwash deposits.

Of the 26 profile locations, 3 stations could not be reoccupied. Two locations on Sullivans Island (3010 and 3020) lacked reliable horizontal control descriptions and were therefore lost. At these two locations, new lines were established at the approximate pre-storm profile locations. Because of the uncertainty in horizontal placement of the control points at these two sites, no quantitative comparison can be made between the pre- and post-storm surveys. One station on Isle of Palms was not recovered. This location, station 3190, also lacked reliable horizontal control measurements and was also further complicated by erosion control measures being taken by the local residents, in the form of bulldozing the beach to create an artificial backbeach dune. Because of the uncertainty in horizontal placement of any new bench mark and the drastic changes to the beach morphology caused by the bulldozers, we decided that a profile taken at this location would yield no significant comparative information.

Determining the location of each of the SCCC bench marks was accomplished using data sheets furnished by Engineering, Surveying, & Planning Inc.¹ (Appendix A). These sheets describe each bench

¹Engineering, Surveying, & Planning Inc, Charleston, SC (803) 577-4926

mark location, giving a precise location as well as a graphic description of where the bench mark is to be found. We used these sheets to reestablish temporary bench marks at those locations that were either destroyed or buried during the storm's passage. Due to the crude measuring techniques (100-meter tape) and the condition of some of the horizontal control points (some damaged beyond usefulness), uncertainty in the horizontal repositioning of some temporary bench marks may be as much as a meter or more. For comparative purposes, however, this accuracy may be adequate.

At each reestablished SCCC bench mark location, a temporary marker consisting of a wooden stake was pounded into the beach. These stakes were used to mark horizontal position only. Due to the massive rebuilding efforts and shore-protection measures being conducted, it was felt that many of these temporary bench marks would soon be destroyed, so, later, a more permanent marker was emplaced at each location. A reference nail with a fender washer was pounded into the crown of the road. Where possible, these nails were placed on the profile itself, allowing it to be used not only as a vertical control point but also as a horizontal control point. The primary use for the nail however was for vertical control. After our departure, a survey team from South Carolina's Geodetic and Mapping Services² reestablished precise vertical control of all the survey lines. They did so by tying-in the nail elevations to the local geodetic grid system. Nail elevations were measured to third order accuracy (one-tenth of a millimeter). The reference nails marked the landward extent of our profiles.

Three locations -- 3010 and 3020 on Sullivans Island and 3165 on Isle of Palms -- could not be marked with a nail in a nearby street. For the two stations on Sullivans Island, their horizontal and vertical control points are set by the placement of two pipes pounded vertically into the back dune, in a shore-normal configuration, separated by some arbitrary and convenient distance. The profile runs through these two pipes; the horizontal control point being the landward pipe and the vertical control point being either pipe top. At station 3165 on Isle of Palms, the Coastal Science Marker "BRC-1 (front)" was determined to be on or near the original profile. It's elevation was conveniently used as the tie-in point. Table 1 gives a complete listing of stations and their corresponding horizontal and vertical

²South Carolina State Budget and Control Board, Division of Research and Statistical Services, Geodetic and Mapping Services, Columbia, SC (803) 737-9489.

reference points, as well as a listing of the profile orientation angle (relative to magnetic north).

Profile Data

Once a bench mark was either found or reestablished, an Electronic Distance Meter (EDM) was set-up over it. Profile orientation was based upon guidelines received from Mike Katuna, who was involved in pre-storm surveys. The reference nail was then placed either on the profile or nearby in a convenient location. The EDM was then moved to a convenient point where the entire profile could be observed. At each location, reference points used in establishing both the horizontal and vertical positioning of the bench mark were surveyed, followed by the survey of the shore-normal profile. Three surface sand samples; typically taken on the beach face, the backbeach (above high tide), and in the back dune area; were collected from each line, and their locations surveyed. Survey points relating to the reference point grid can be used to reestablish horizontal and vertical control of the profile in the event that a bench mark is destroyed.

The beach profile was surveyed by walking the line from its landward extent (usually at a confining man-made structure) and stopping at predetermined intervals (typically every two to three meters) or at any significant change in slope or morphology and recording a survey point. The profile was continued offshore to a point where the reflecting prism atop the stadia rod submerges when placed on the seafloor (typically around 2 1/2 meters water depth). The profile was terminated if wave conditions or currents compromised the safety of the surveyor.

Profile data is transferred electronically from the EDM to an electronic memory. Point number, azimuth (relative to the local grid set-up using two control points on the profile), elevation angle (from vertical), and range are transferred to the storage device as each point is surveyed. In addition, pertinent comments or information are also recorded via an alpha-numeric key-pad entry.

Later, the data are retrieved from the storage device via a computer link. The data is then converted to cartesian coordinates using appropriate programs (with X being the shore-normal axis, Y the shore-parallel axis, and Z the vertical axis, relative to local references). Thus, the profile falls along the X-axis. Note that this local grid system has no spatial equivalency to frequently used mapping grid

systems (eg. UTM and state-plane grids). Knowing the corresponding values of the origin (0,0) in the desired grid system and the orientation angle of the profile, survey points in the relative grid system can be converted to any cartesian system.

Appendix B includes an edited version of the survey points for each of the 25 station locations. Included in each is a listing of the reference points used in locating the station, the profile, and sample locations. In addition, for stations 3010 and 3020 on Sullivans Island, azimuths to known targets are given as measured from the seaward reference pipe, with the relative angle 000° 00' 00" being set in the direction of the landward reference pipe. Angular measurements increase in a clockwise direction. These angles should help in determining these station locations.

Post-Hugo Profiles

The following pages contain plots of the post-storm profile data for each of the stations surveyed. The data values have been adjusted as to be compatible with the data collected by Mike Katuna on previous surveys. The most noticeable difference between the plots and the data used to generate them (Appendix B) is that the X-values were multiplied by negative one. This difference merely changes the representation of the data and not the actual values. In those instances where a temporary bench mark was emplaced, the horizontal (X) value for the point was used along with a corresponding sand level at that point (since this bench mark was considered temporary and the elevation has no significance).

Acknowledgments

We would like to thank the personnel from the Geodetic and Mapping Services of the South Carolina State Budget and Control Board for their prompt and accurate work in leveling the temporary bench mark sites and for furnishing pertinent information regarding the station locations. We would also like to thank the local governments of Sullivans Island and Isle of Palms for their unlimited cooperation in permitting us to work unobstructed during this time of disaster.

References Cited

1. Lawrence, Miles, 1989, Hurricane Hugo -- 10-22 September 1989: NOAA Preliminary Report, 16 p.
2. Schuck-Kolben, Erik, U.S. Geological Survey, Water Resources Div., Columbia, South Carolina, Oral Communication, Dec. 1, 1989

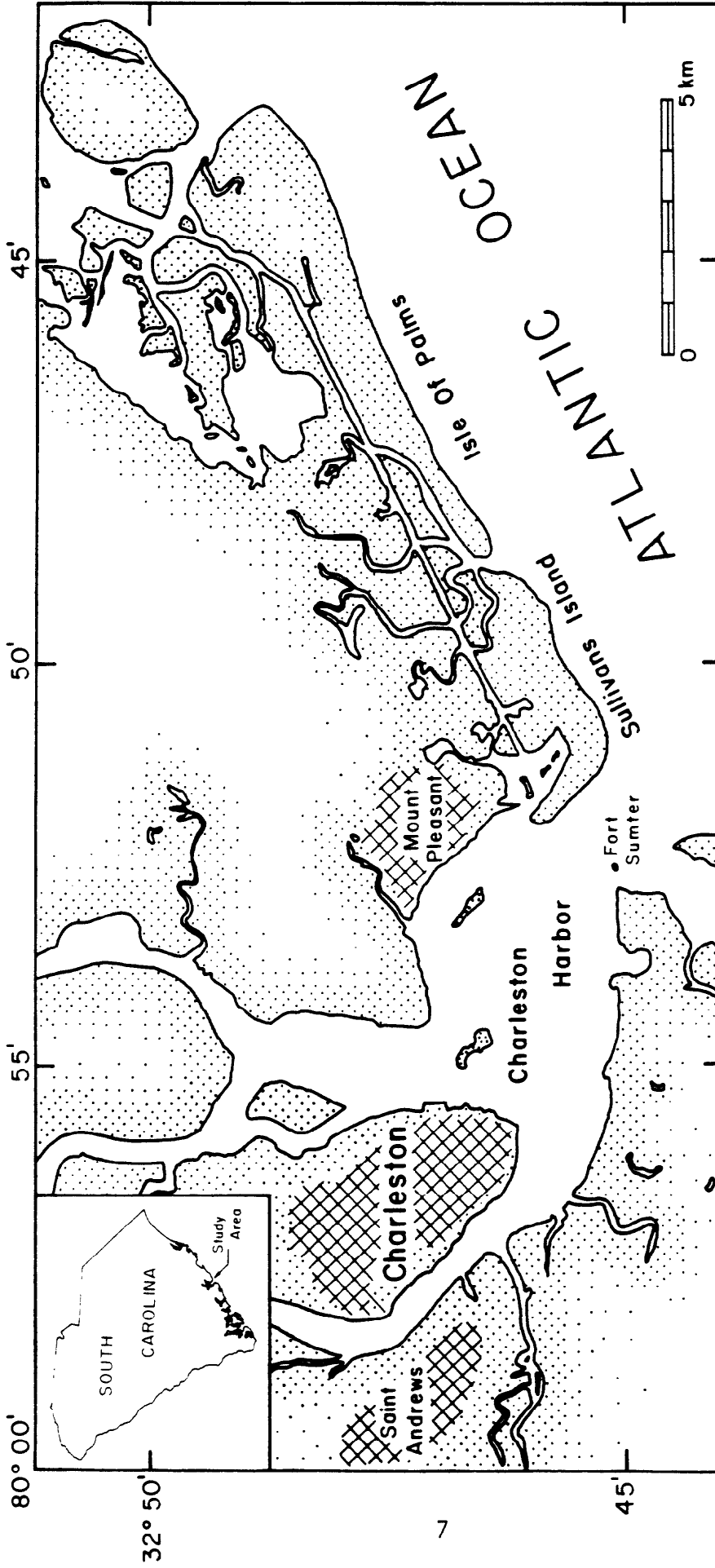


Figure 1. Location diagram showing the study area east of Charleston, South Carolina. Hurricane Hugo landfall was at Sullivan's Island.

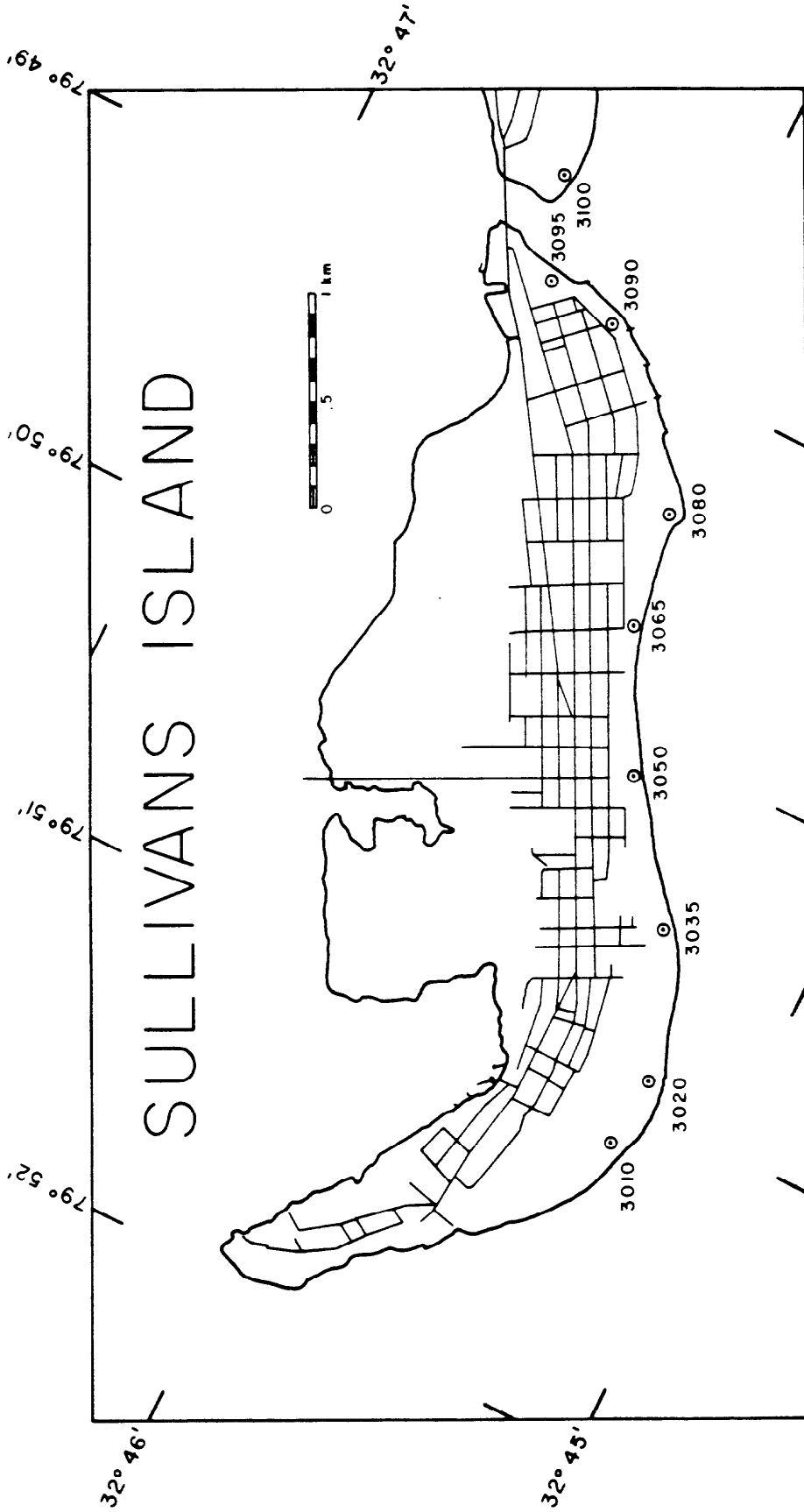


Figure 2. Station locations on Sullivans Island, South Carolina. Stations 3010 and 3020 could not be reestablished. New stations were set-up in their approximate locations.

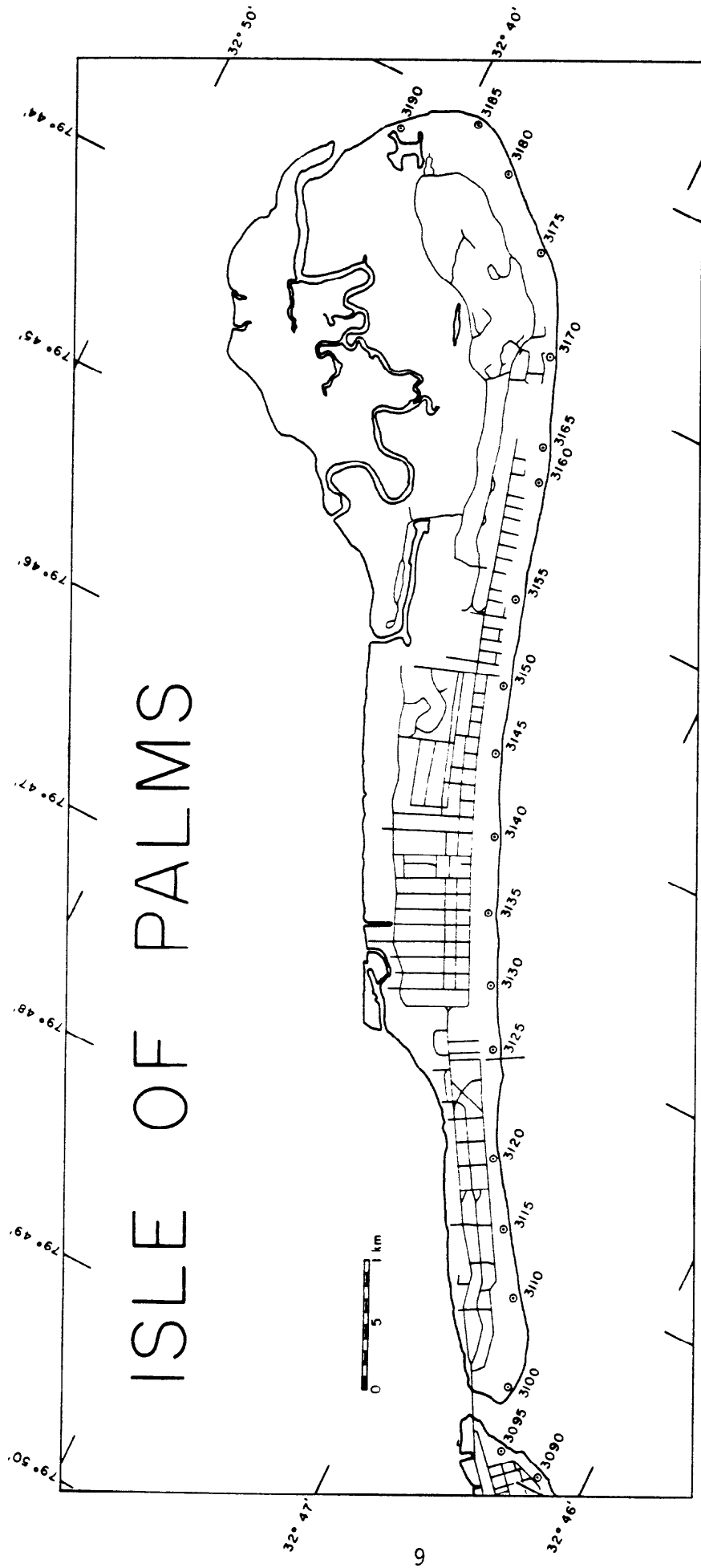


Figure 3. Station locations on Isle of Palms, South Carolina. Station 3190 was destroyed during Hurricane Hugo and subsequent shore-protection efforts in the area prevented the reestablishment of this station and profile.

Table 1

Beach Profile-Line Reference Information

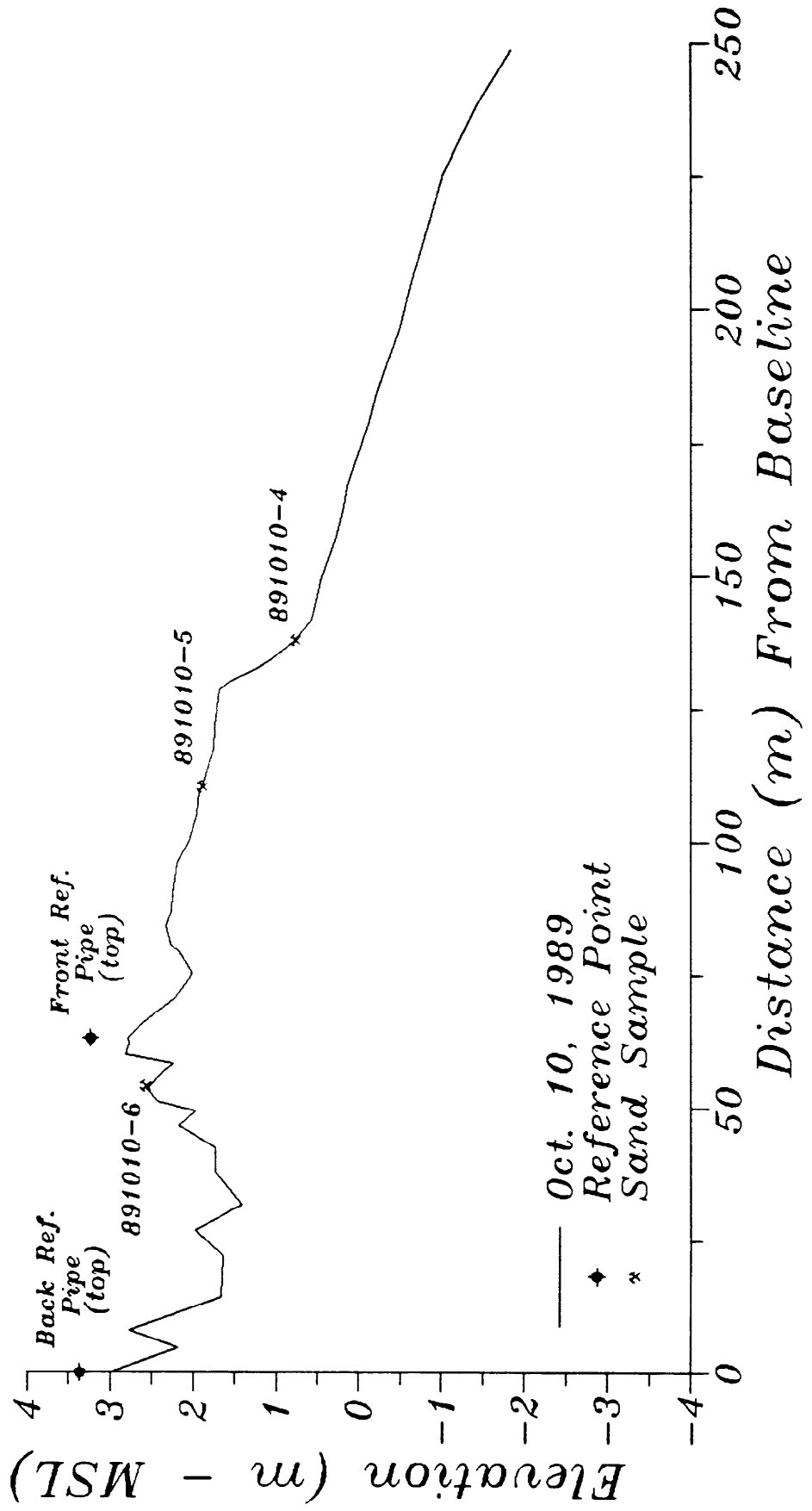
Station #	Profile-Line Orientation (° m)	Horizontal Reference Point	Vertical Reference Point
Sullivans Island			
3010 (old)	SCCC BM ¹ 3010 never found, unable to reestablish station		
3010 (new)	019-199	landward ref. pipe	seaward ref. pipe (top)
3020 (old)	SCCC BM 3020 never found, unable to reestablish station		
3020 (new)	173-353	landward ref. pipe	seaward ref. pipe (top)
3035	169-349	TBM ² 3035	ref. nail (on line)
3050	159-339	TBM 3050	ref. nail (on line)
3065	171-351	TBM 3065	ref. nail (off line)
3080	174-354	SCCC BM 3080	SCCC BM 3080 and ref. nail (on line)
3090	124-304	SCCC BM 3090	SCCC BM 3090 and ref. nail (on line)
3095	107-287	TBM 3095	ref. nail (on line)
Isle of Palms			
3100	016-196	TBM 3100	ref. nail (on line)
3110	150-330	SCCC BM 3110	SCCC BM 3110 and ref. nail (on line)
3115	161-341	SCCC BM 3115	SCCC BM 3115 and ref. nail (on line)
3120	141-321	TBM 3120	ref. nail (on line)
3125	159-339	SCCC BM 3120	SCCC BM 3125 and ref. nail (off line)
3130	163-345	TBM 3130	ref. nail (off line)
3135	157-337	TBM 3135	ref. nail (on line)
3140	168-348	SCCC BM 3140	SCCC BM 3140 and ref. nail (on line)
3145	172-352	TBM 3145	ref. nail (on line)
3150	168-348	TBM 3150	ref. nail (off line)
3155	172-352	SCCC BM 3155	SCCC BM 3155 and ref. nail (on line)
3160	174-354	TBM 3160	ref. nail (on line)
3165	175-355	TBM 3165	C.S.M. "BRC-1 (front)"
3170	173-353	TBM 3170	ref. nail (off line)
3175	133-313	TBM 3175	ref. nail (off line)
3180	143-323	TBM 3180	ref. nail (off line)
3185	057-237	TBM 3185	ref. nail (off line)
3190	bench mark destroyed, no profile-line attempted		

¹ SCCC BM: South Carolina Coastal Council Bench Mark

² TBM: Temporary Bench Mark

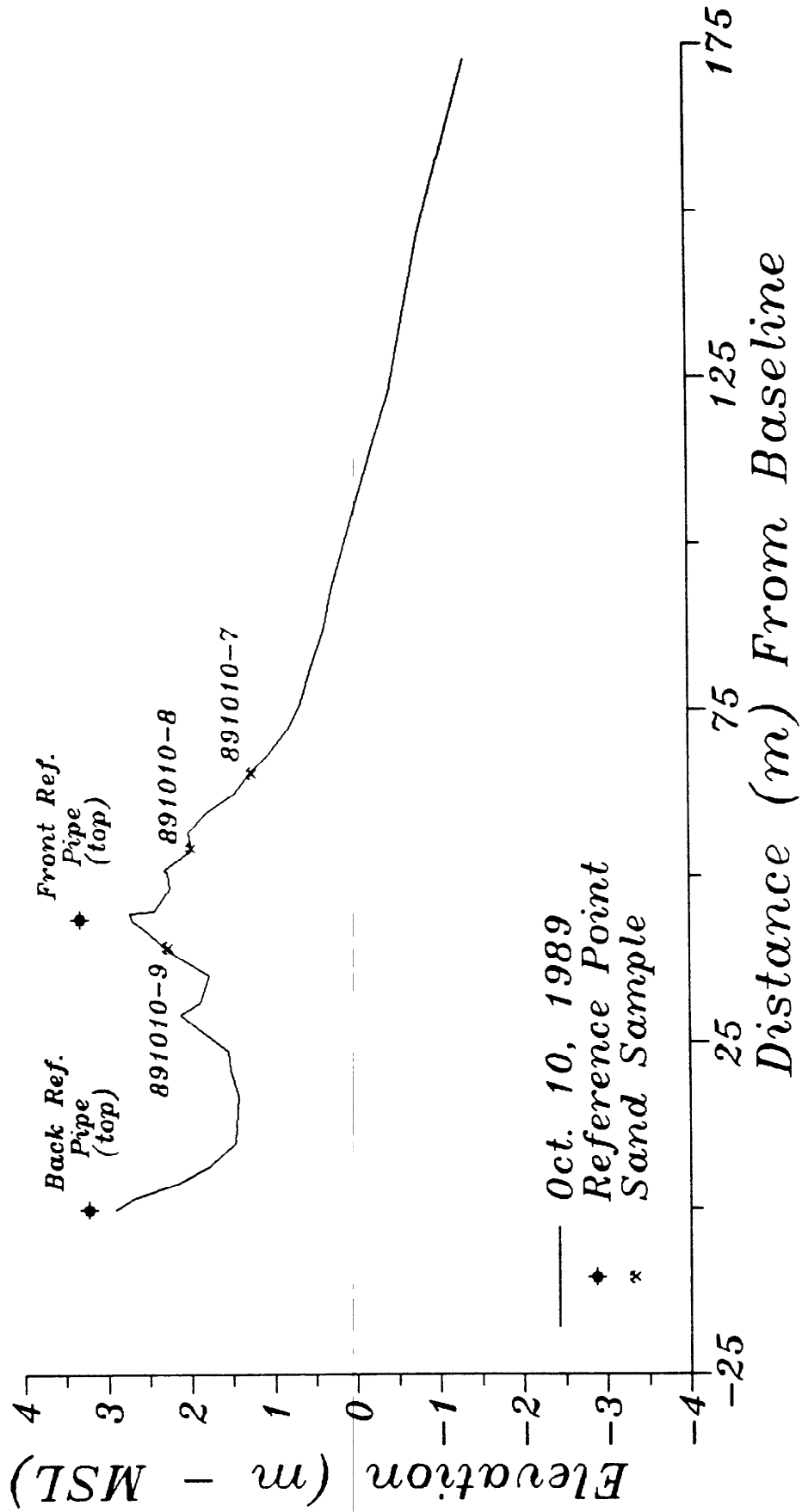
Station 3010 (new)

(Intersection of 16th St. and Atlantic Ave.)

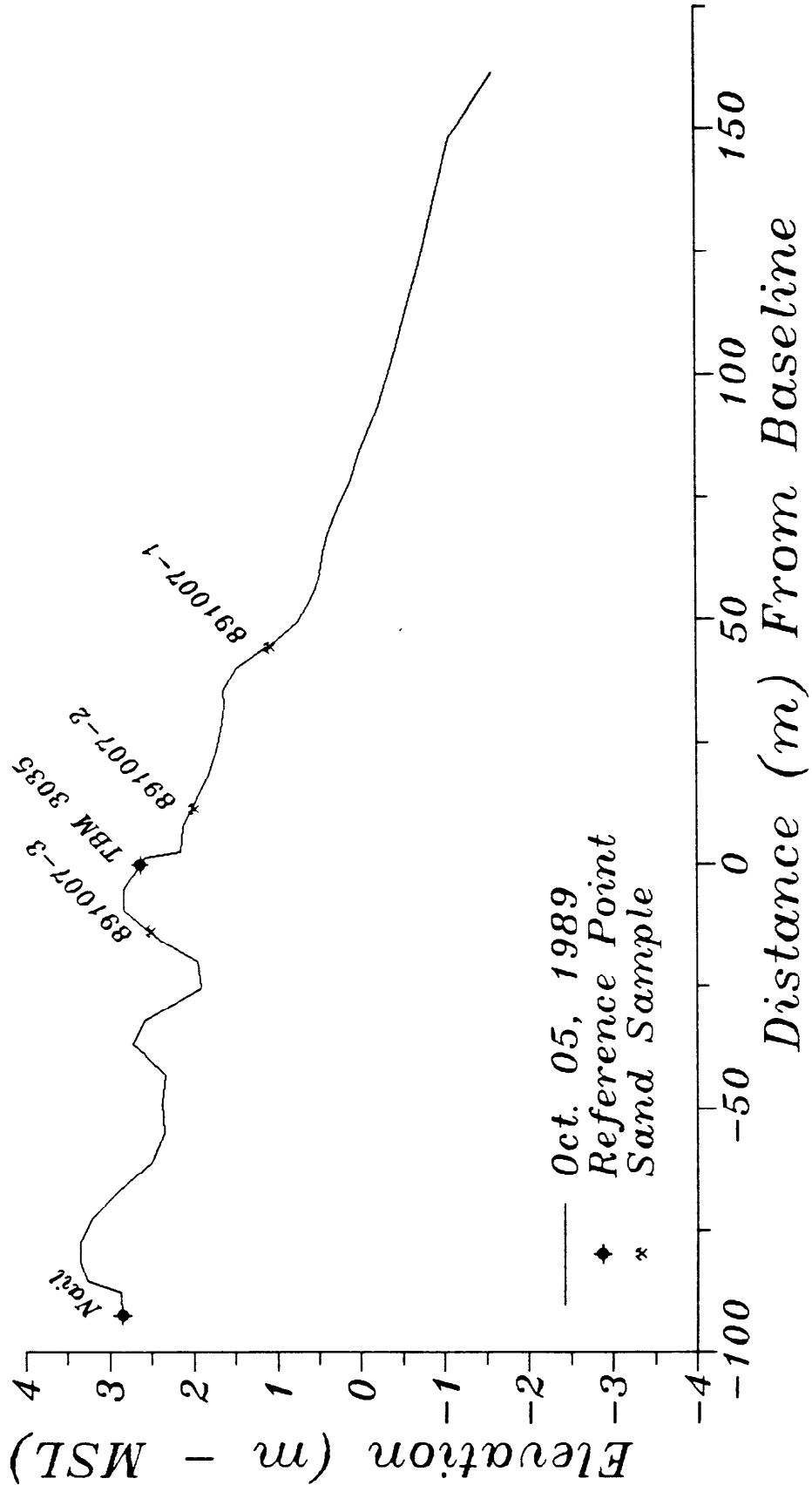


Station 3020 (new)

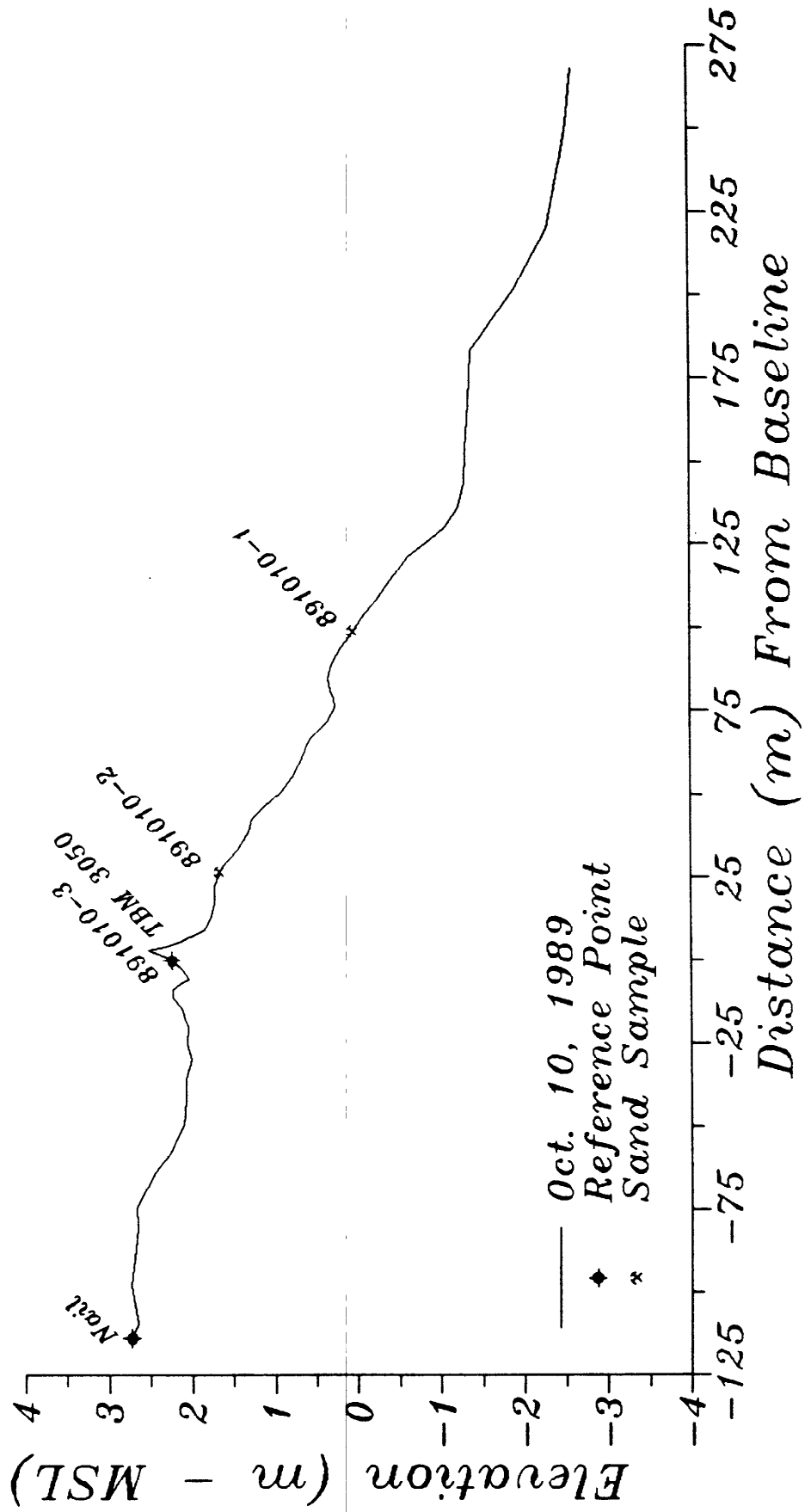
(Intersection of Atlantic Ave. and Ft Moultrie Dr.)



*Station 3035
(19th St.; The Island House Restaurant)*

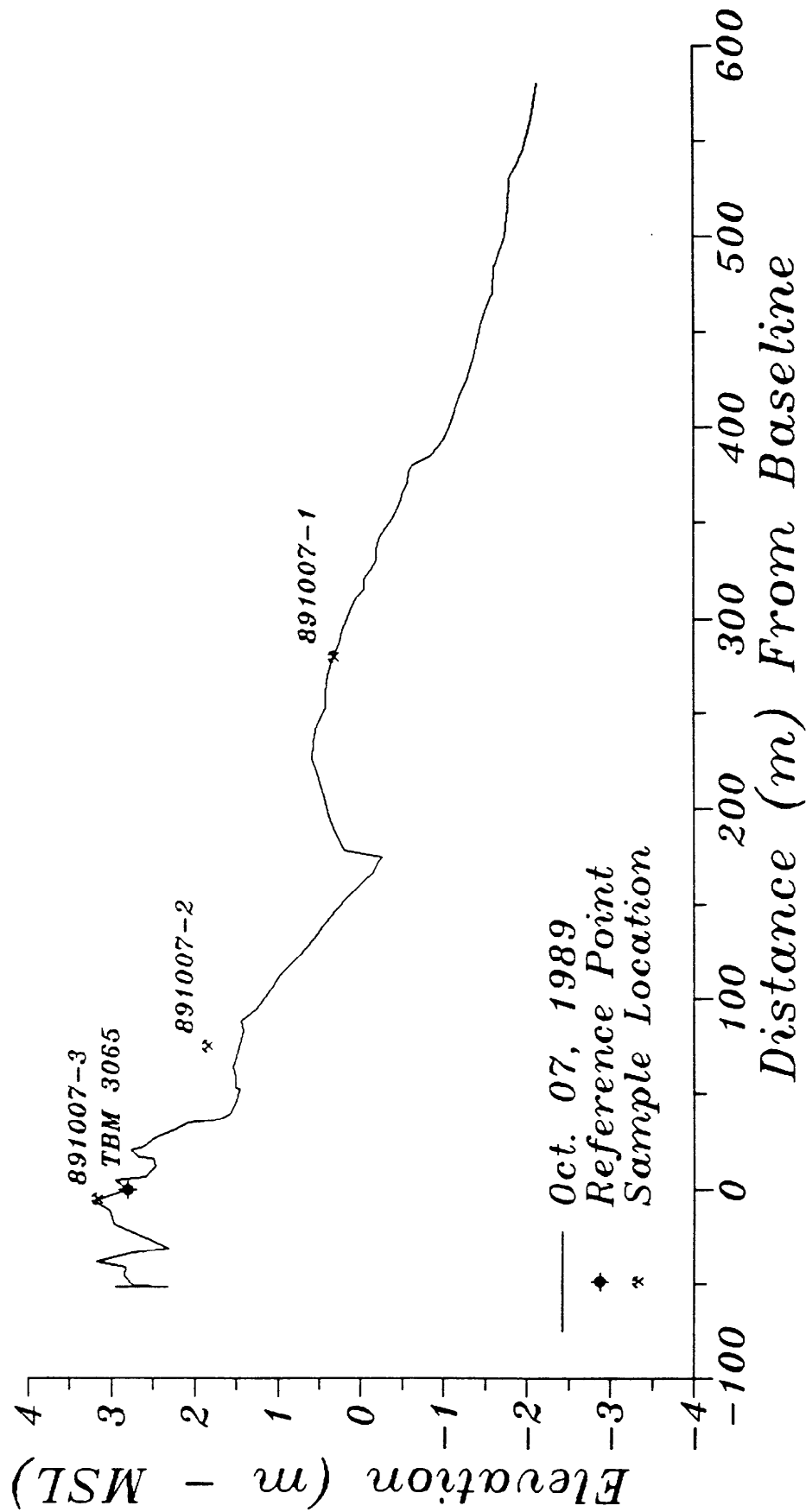


Station 3050
(Intersection of 22 1/2 St. and Atlantic Ave.)

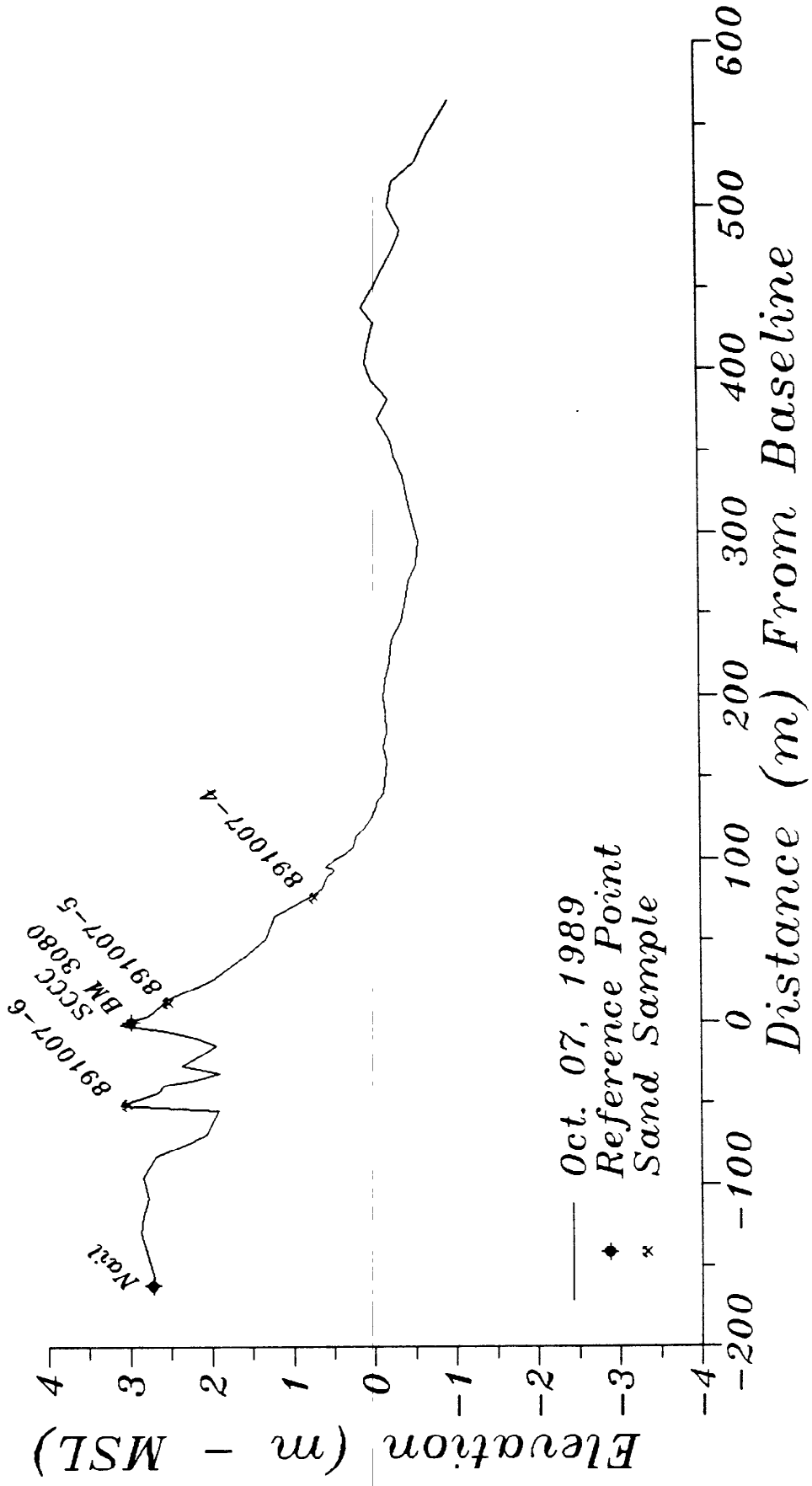


Station 3065

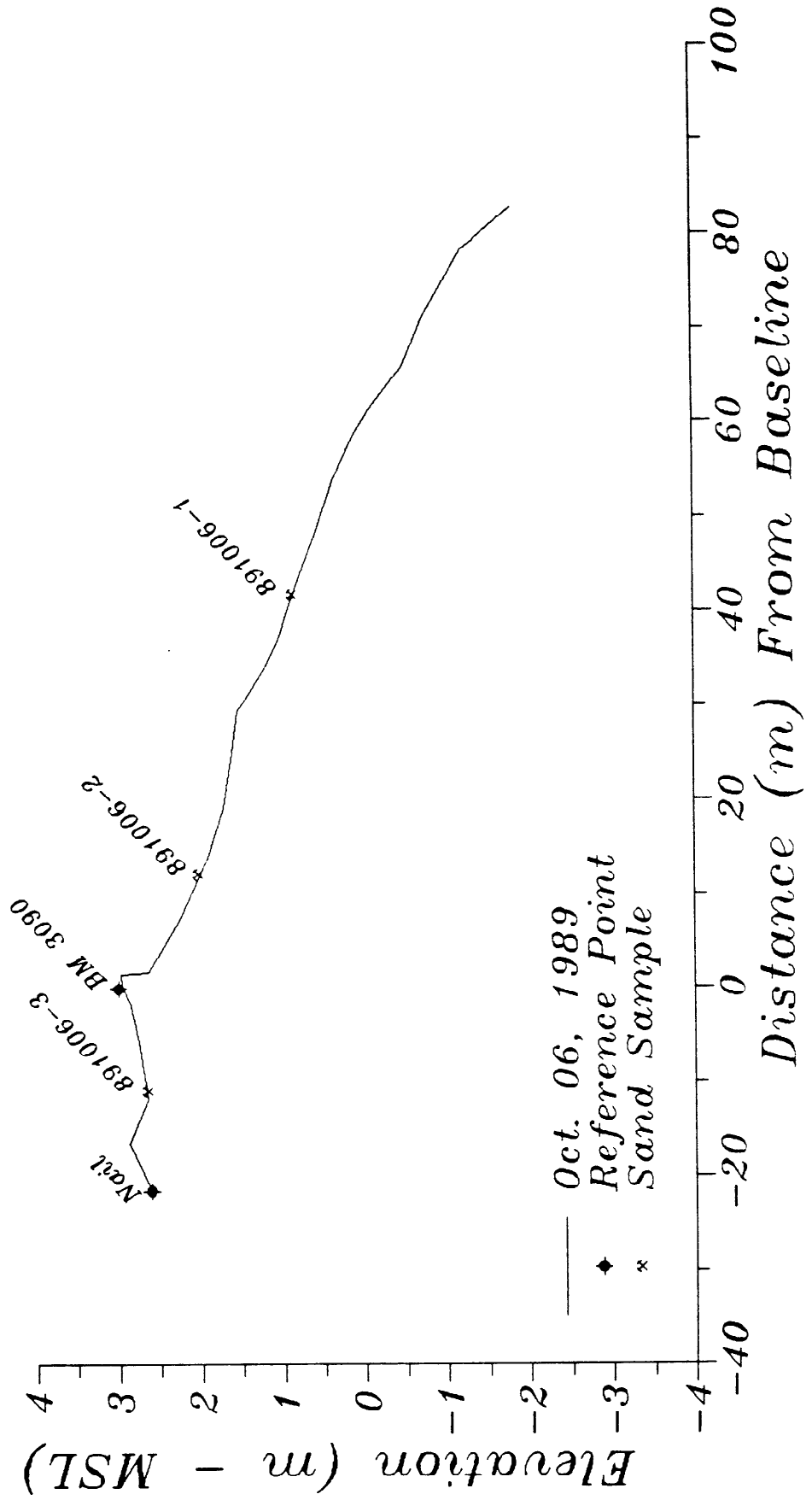
(Intersection of 26th St. and Bayonne St.)



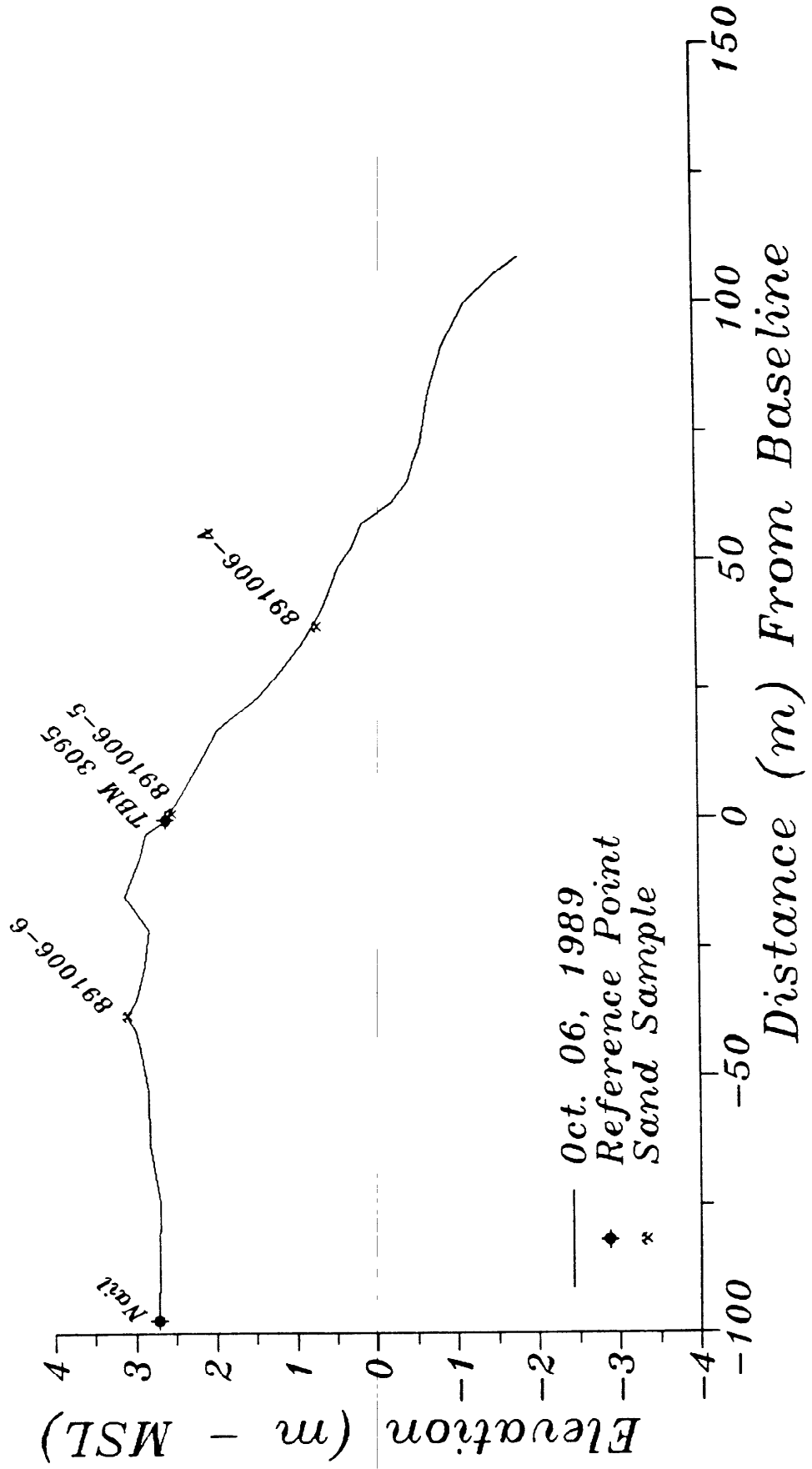
*Station 3080
 (Intersection of 28th St. and Marshall Blvd.)*



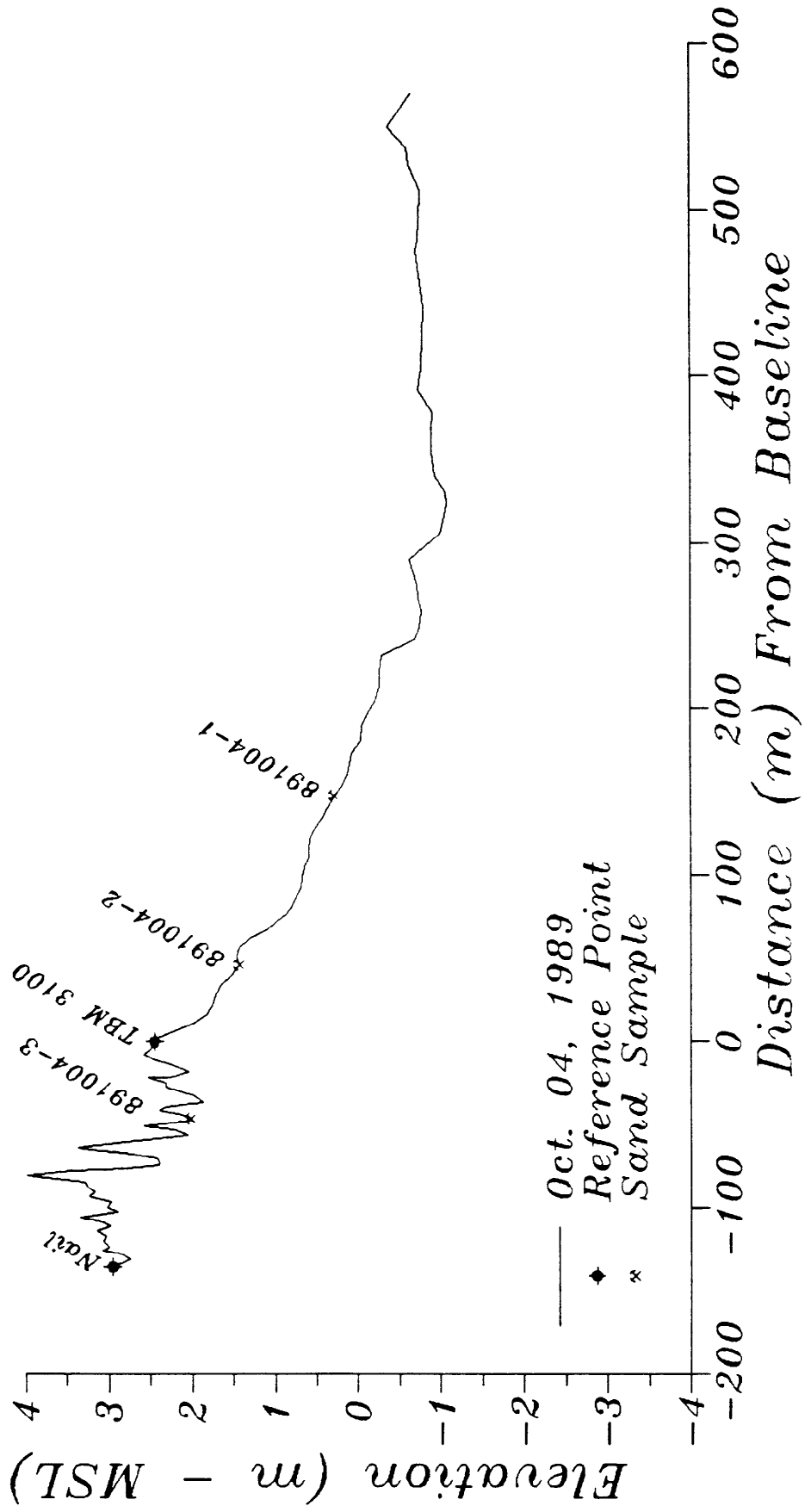
*Station 3090
(Intersection of 31st St. and Marshall Blvd.)*



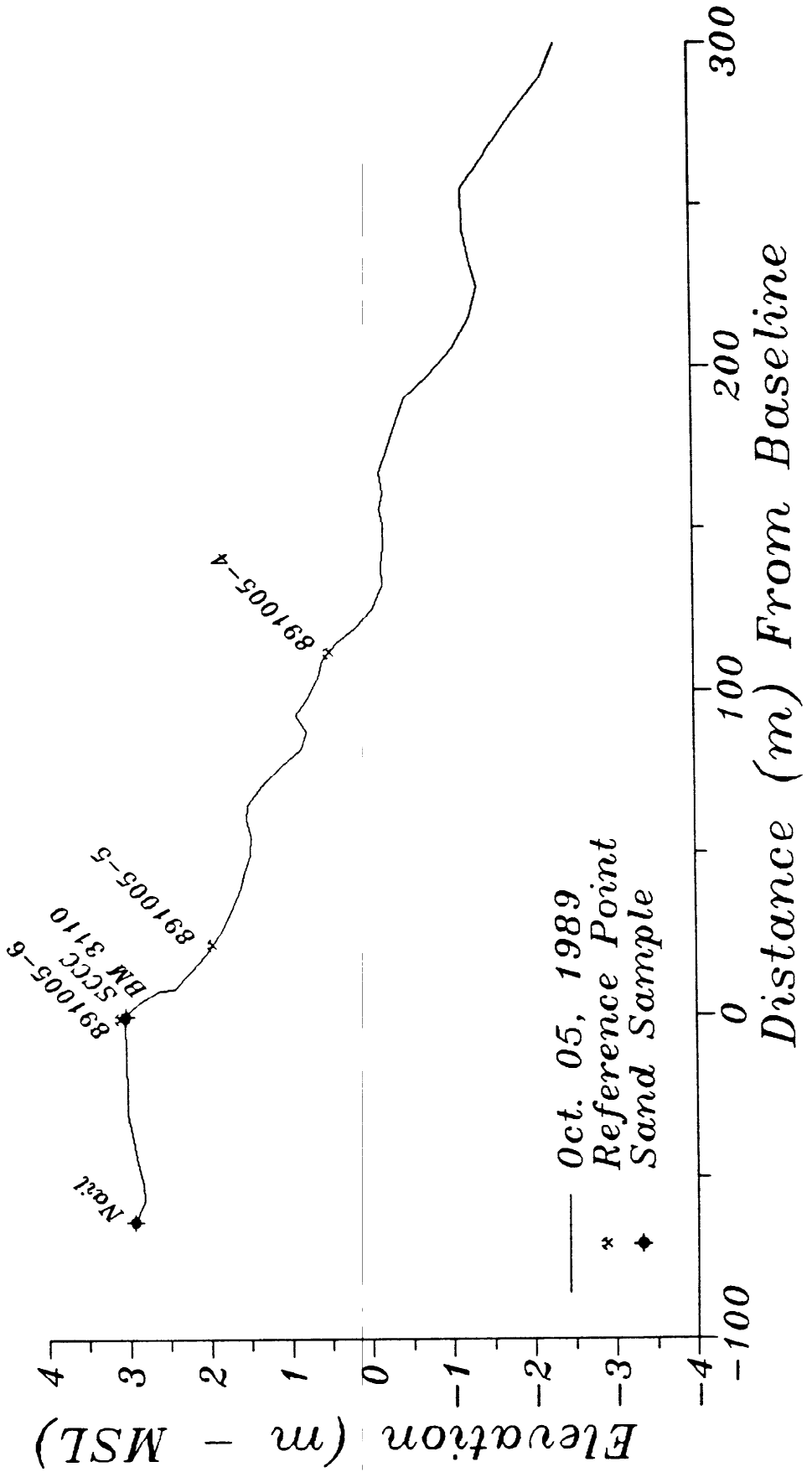
Station 3095 (32nd Street and Ion Avenue)



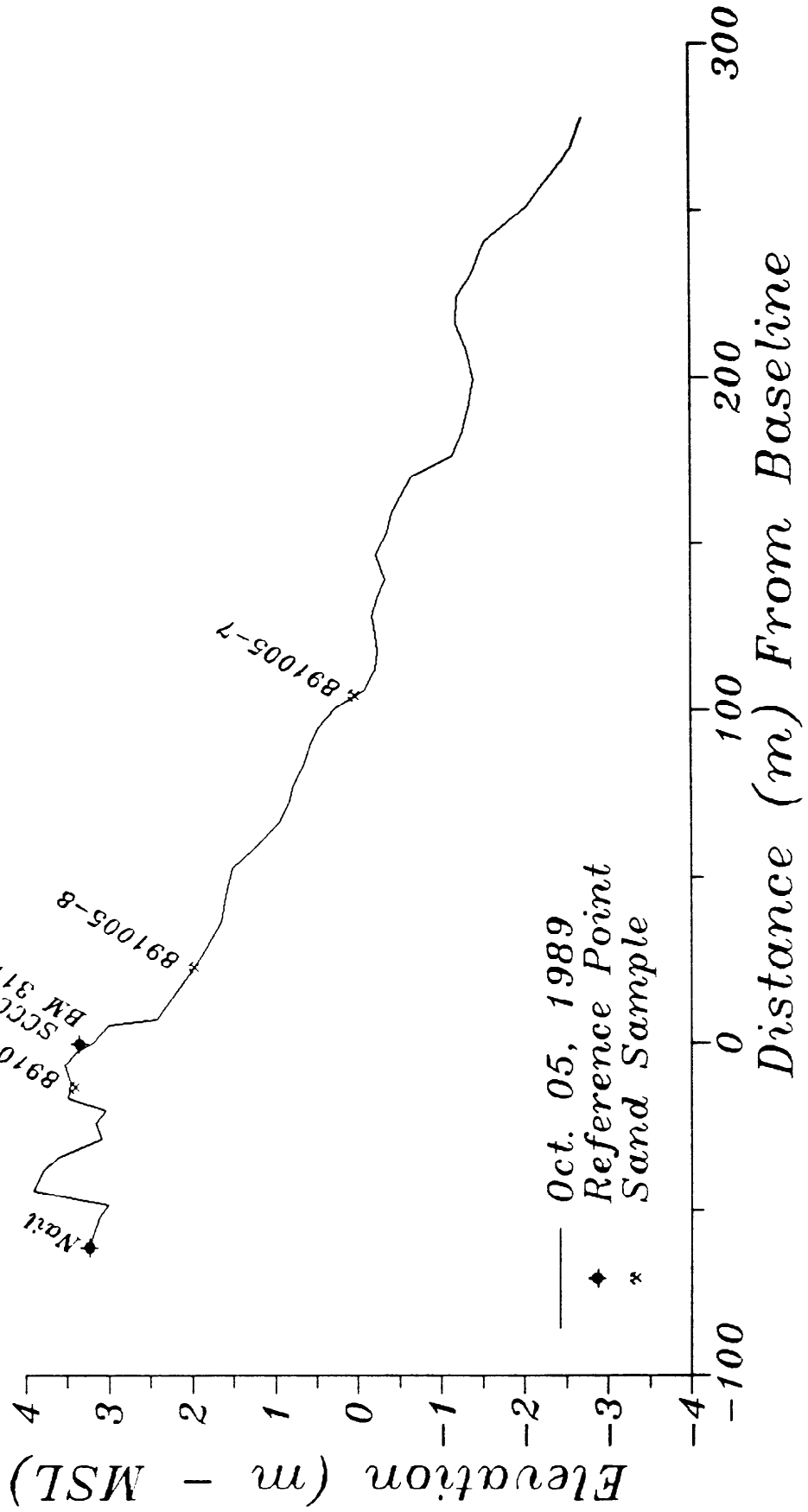
Station 3100 (Breach Inlet)



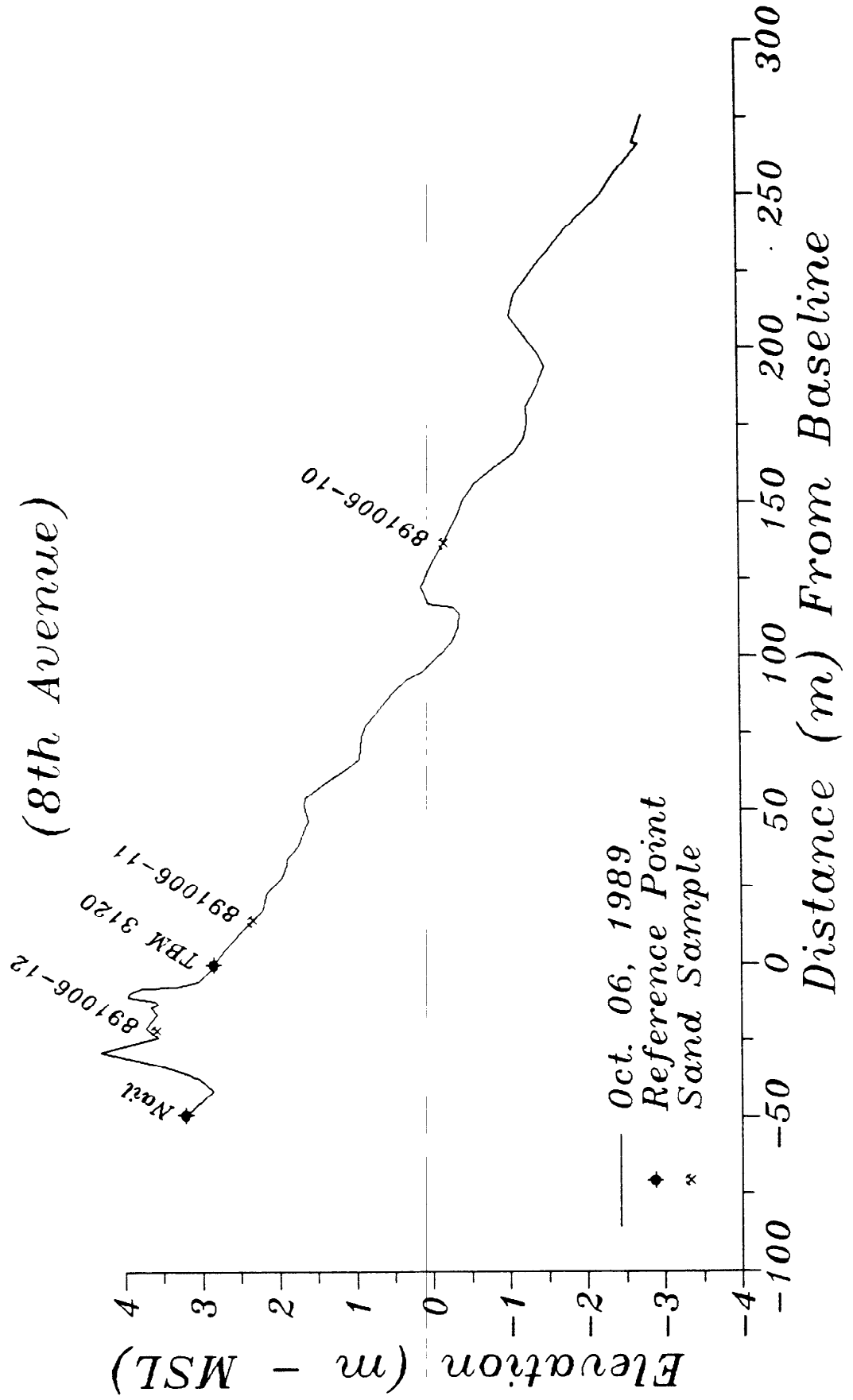
Station 3110 (3rd Avenue)



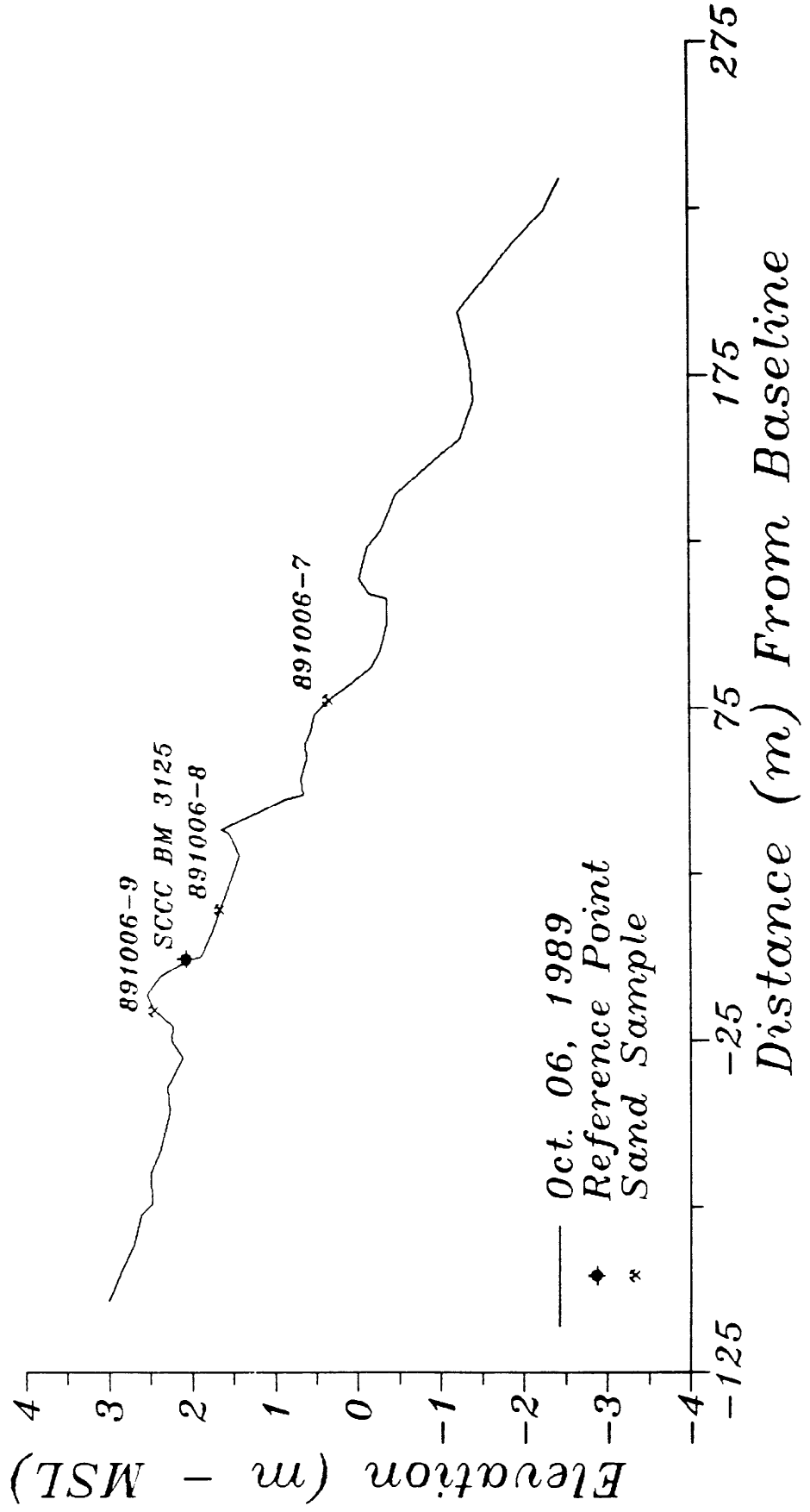
Station 3115 (6th Avenue)



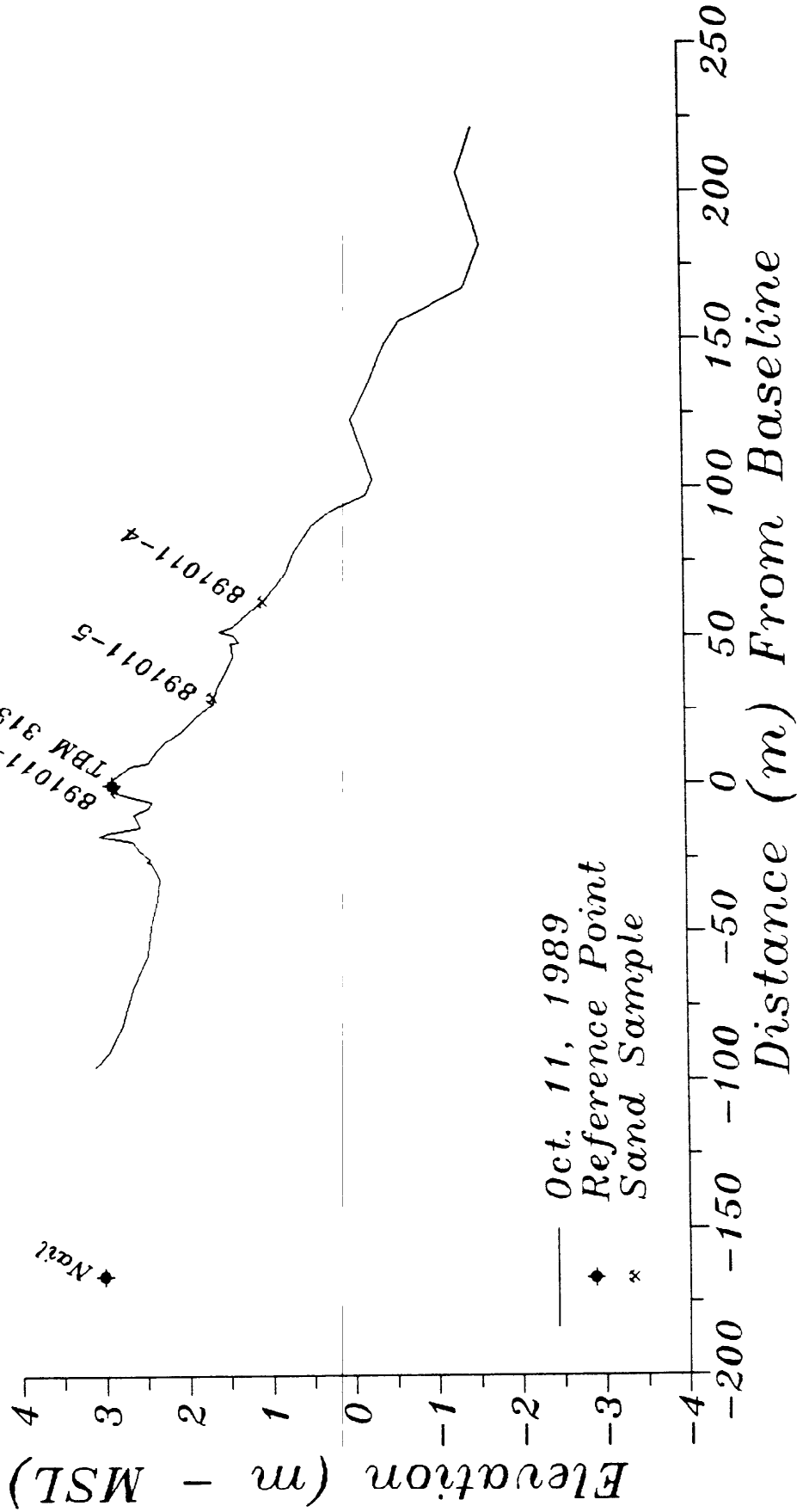
Station 3120 (8th Avenue)



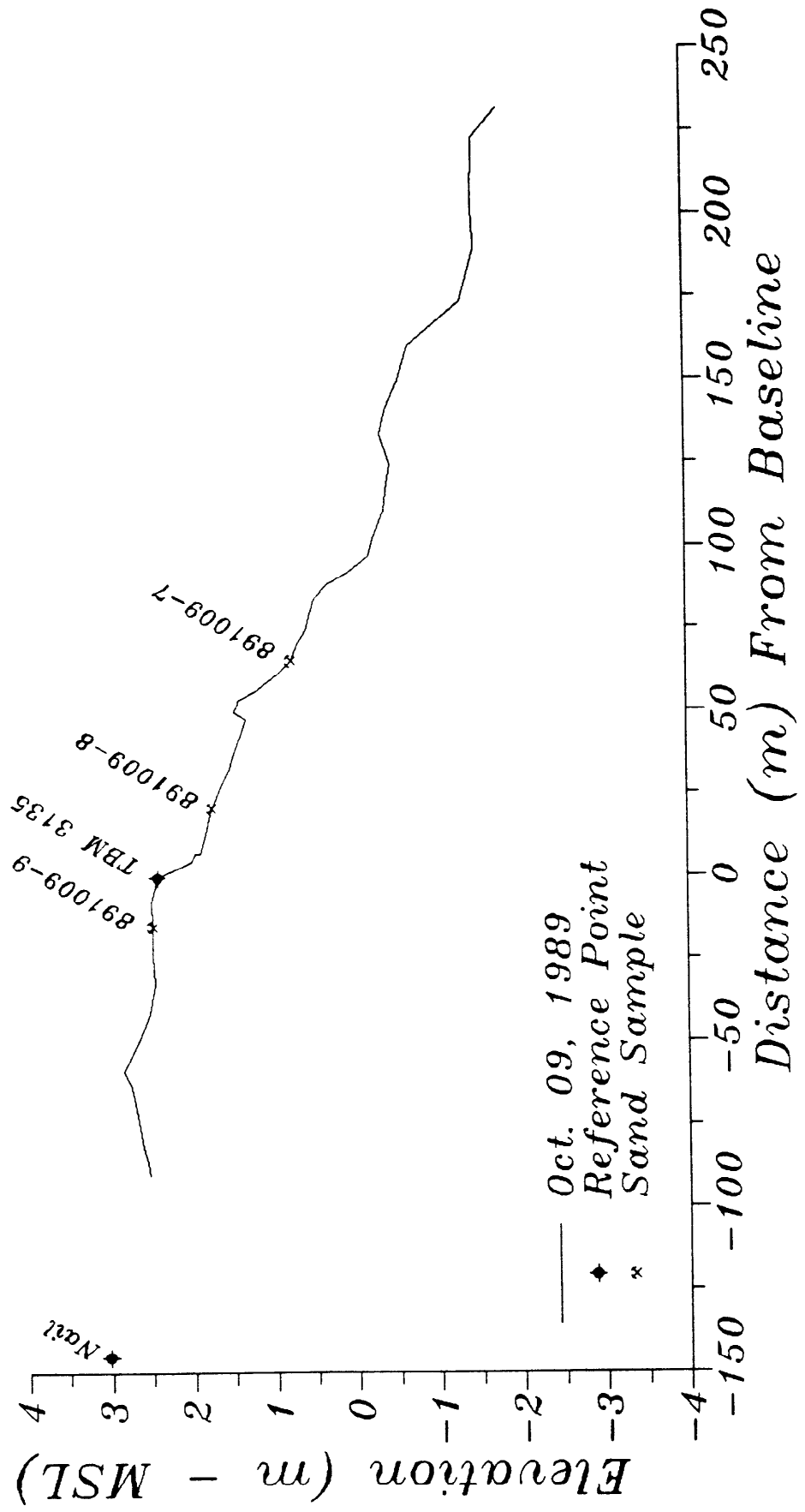
Station 3125 (14th Avenue - Pier)



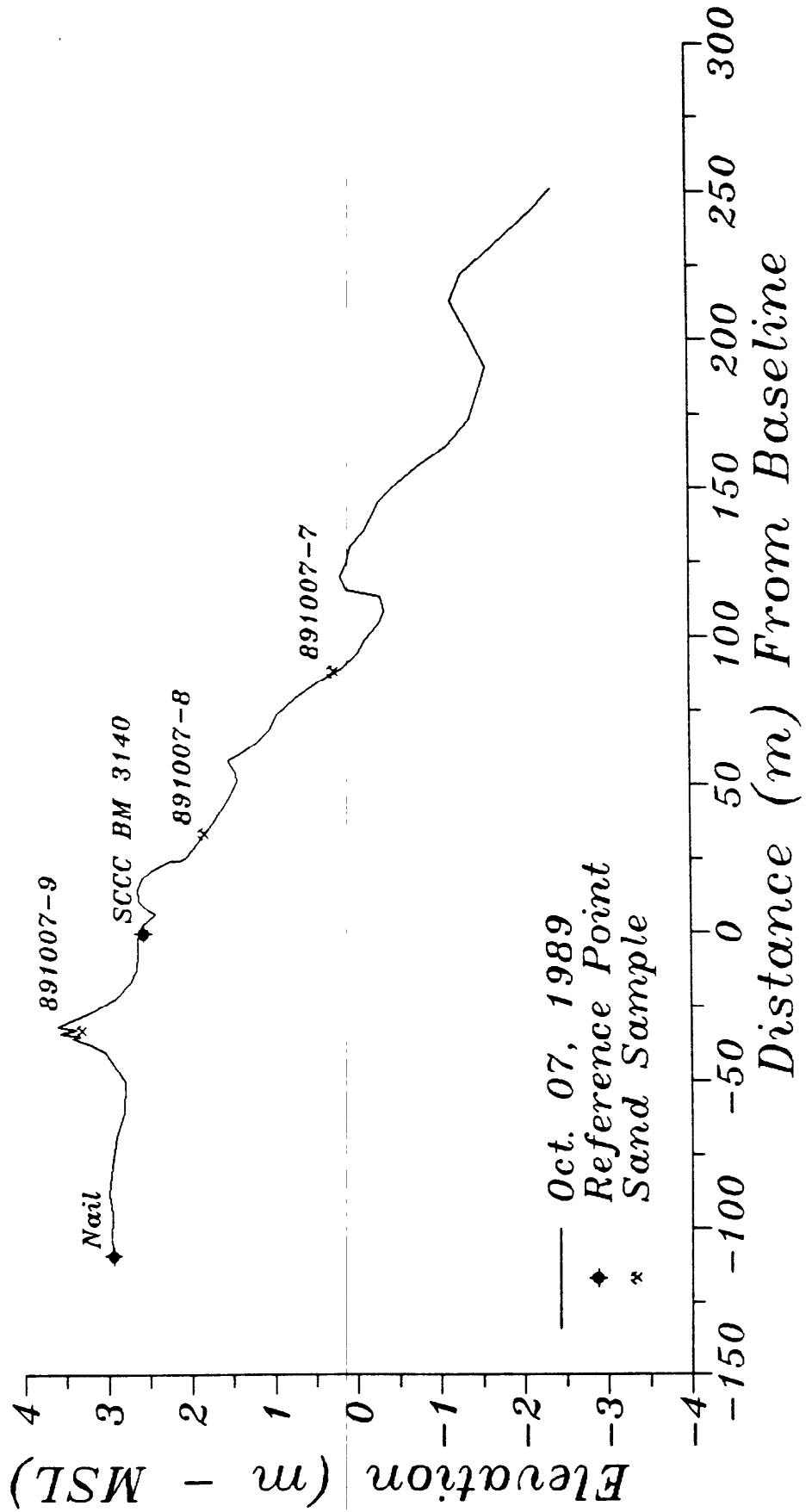
Station 3130 (22nd Avenue)



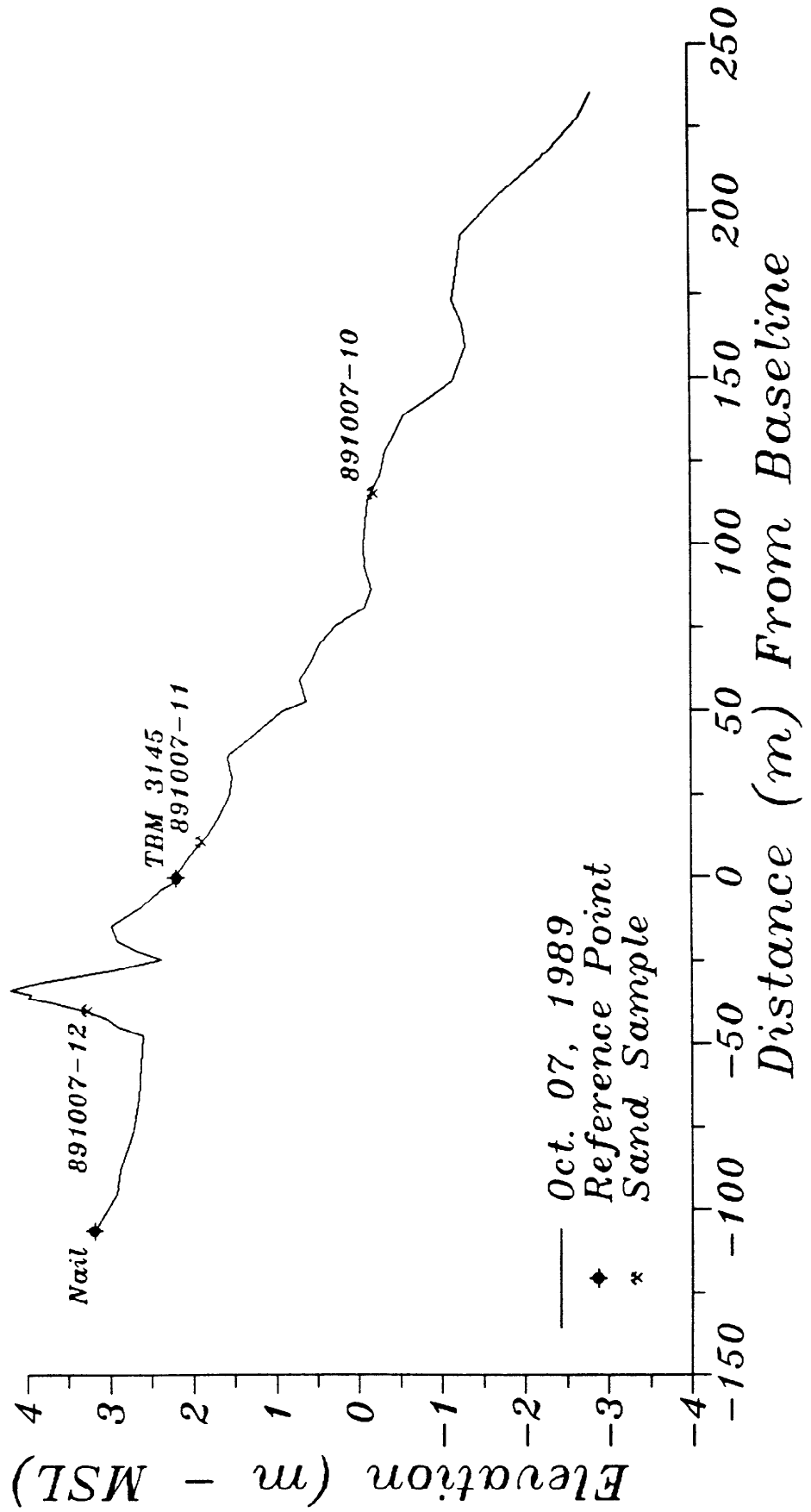
Station 3135 (27th Avenue)



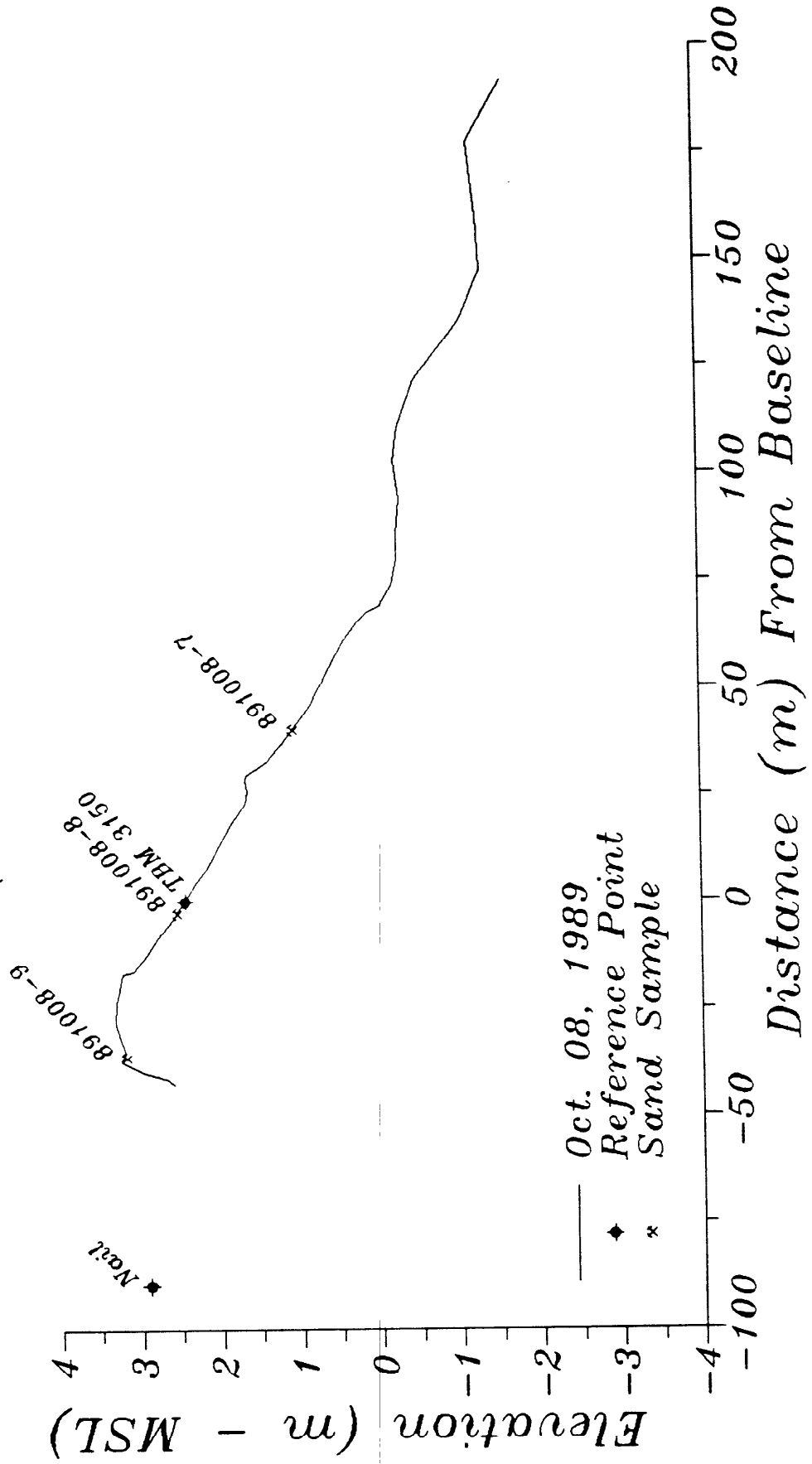
Station 3140 (31st Avenue)



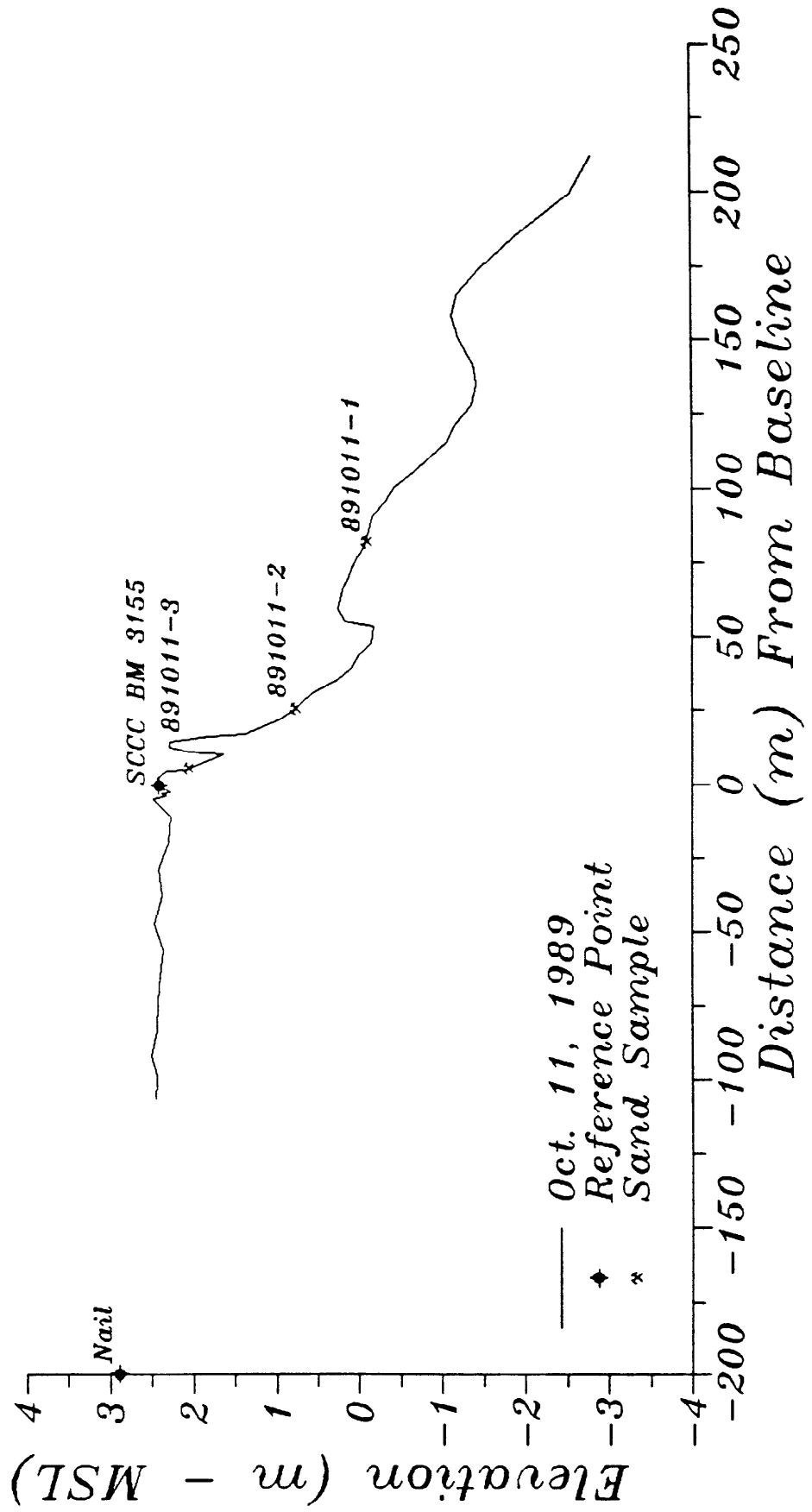
Station 3145 (36th Avenue)



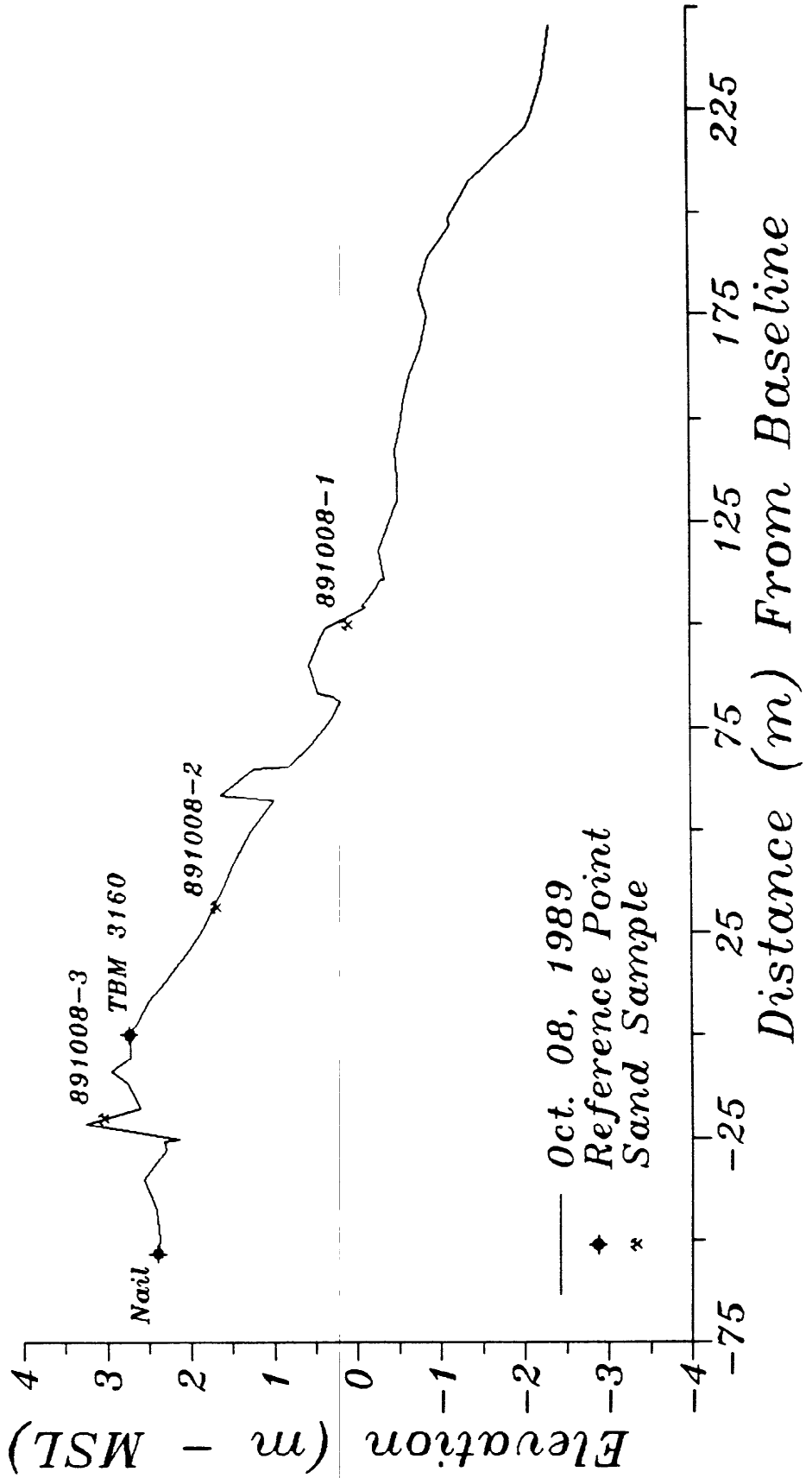
Station 3150 (41st Avenue)



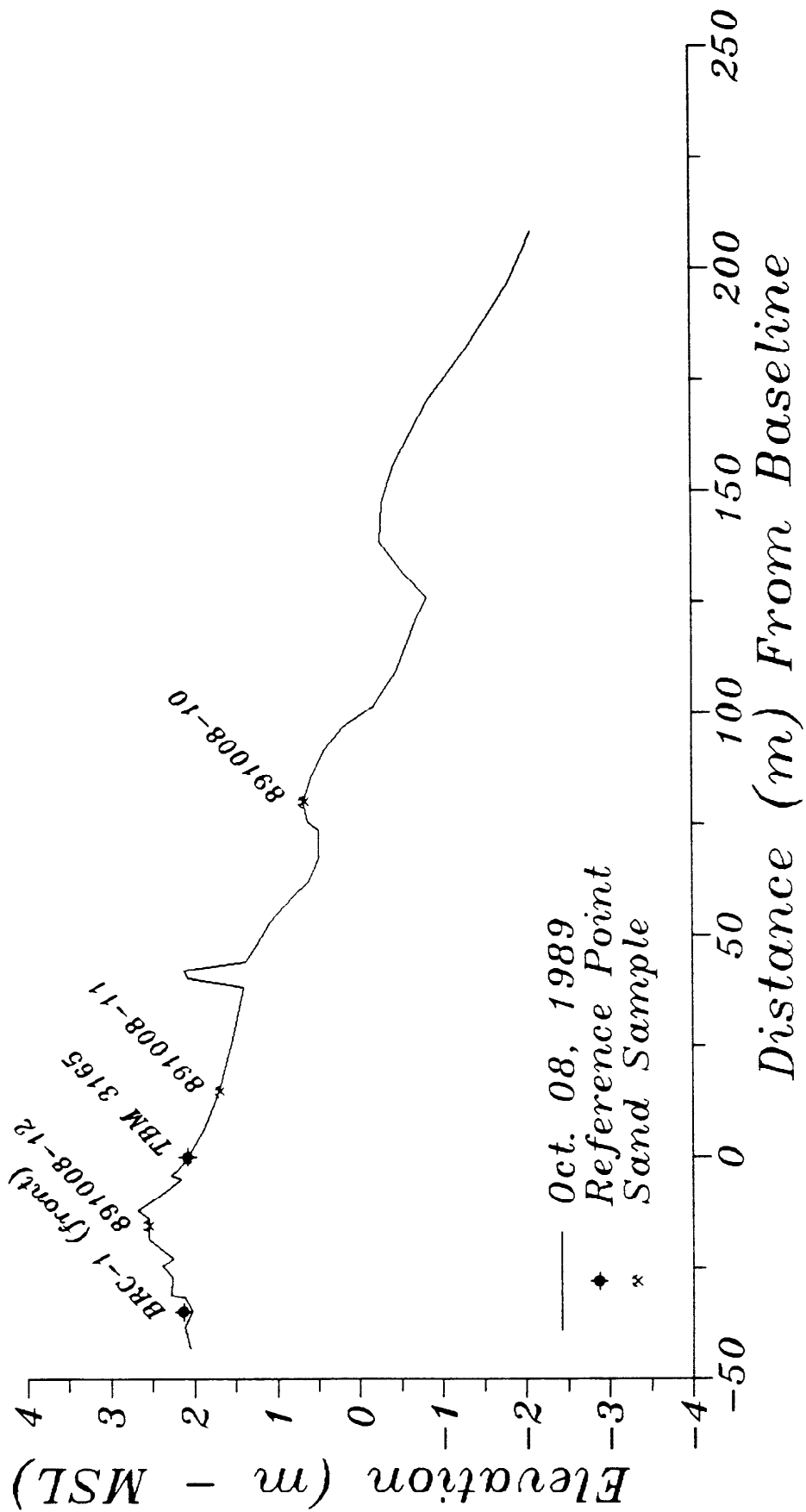
Station 3155 (Citadel Beach House)



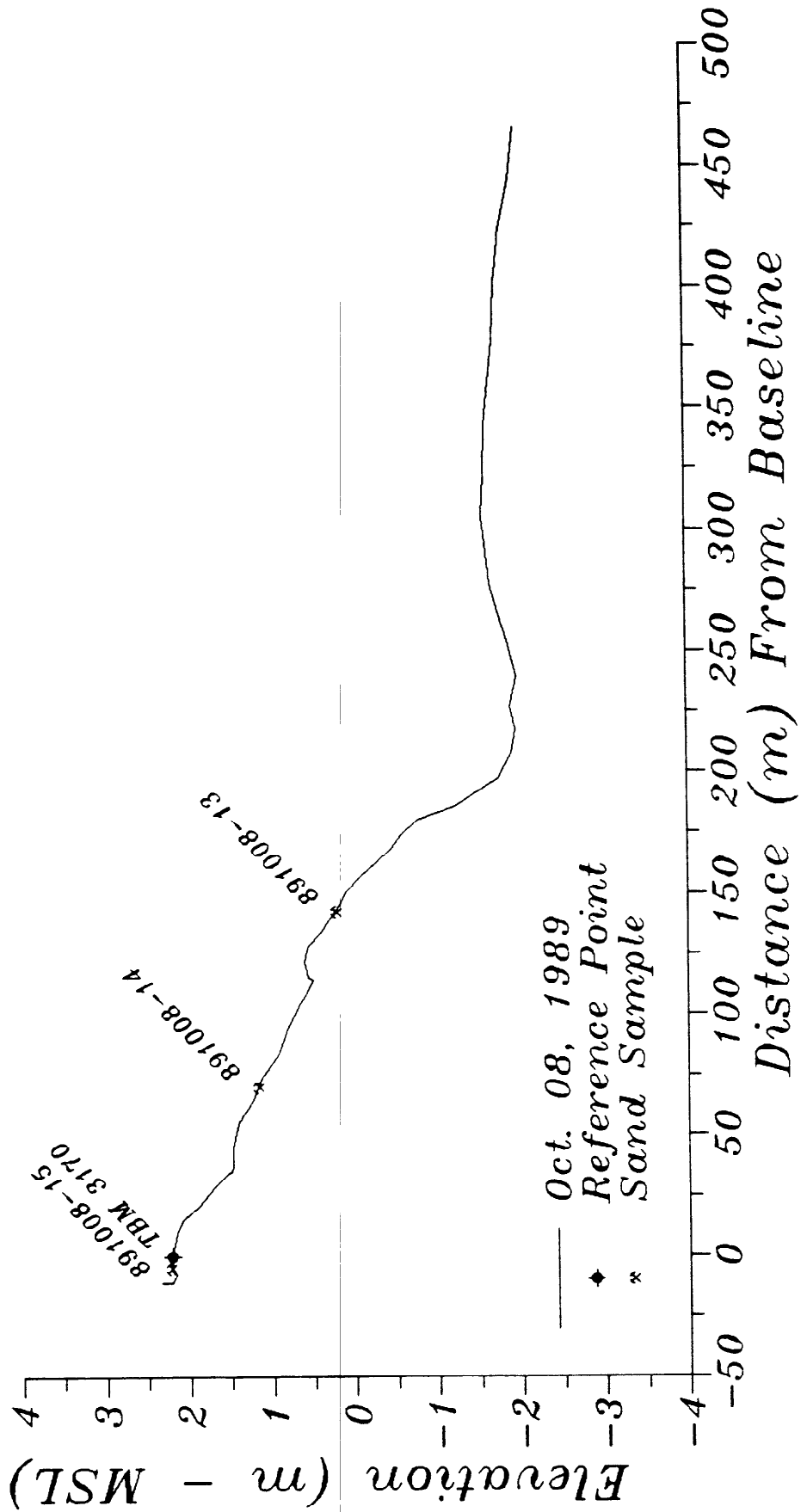
Station 3160 (56th Avenue)



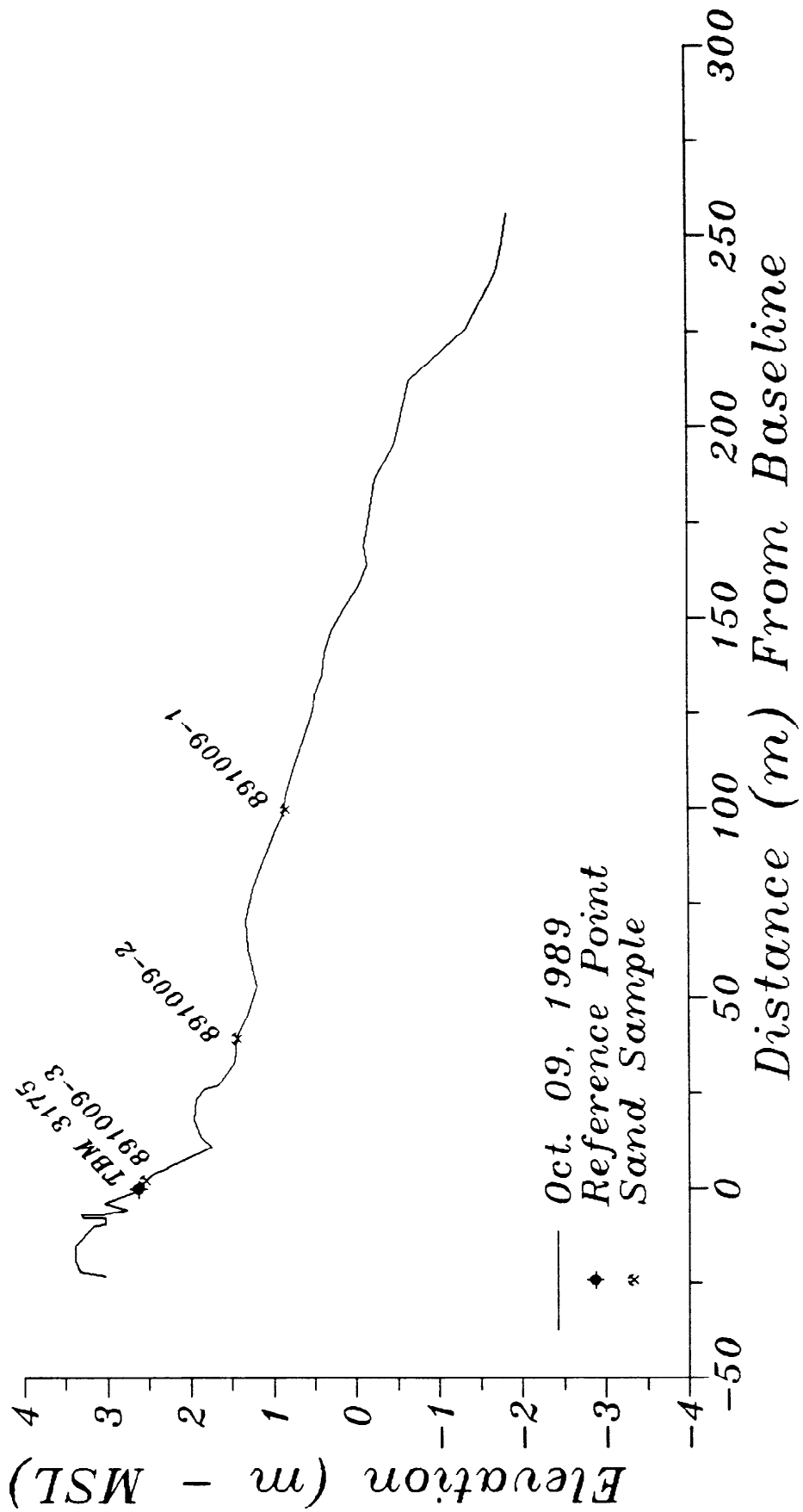
Station 3165 (57th Avenue)



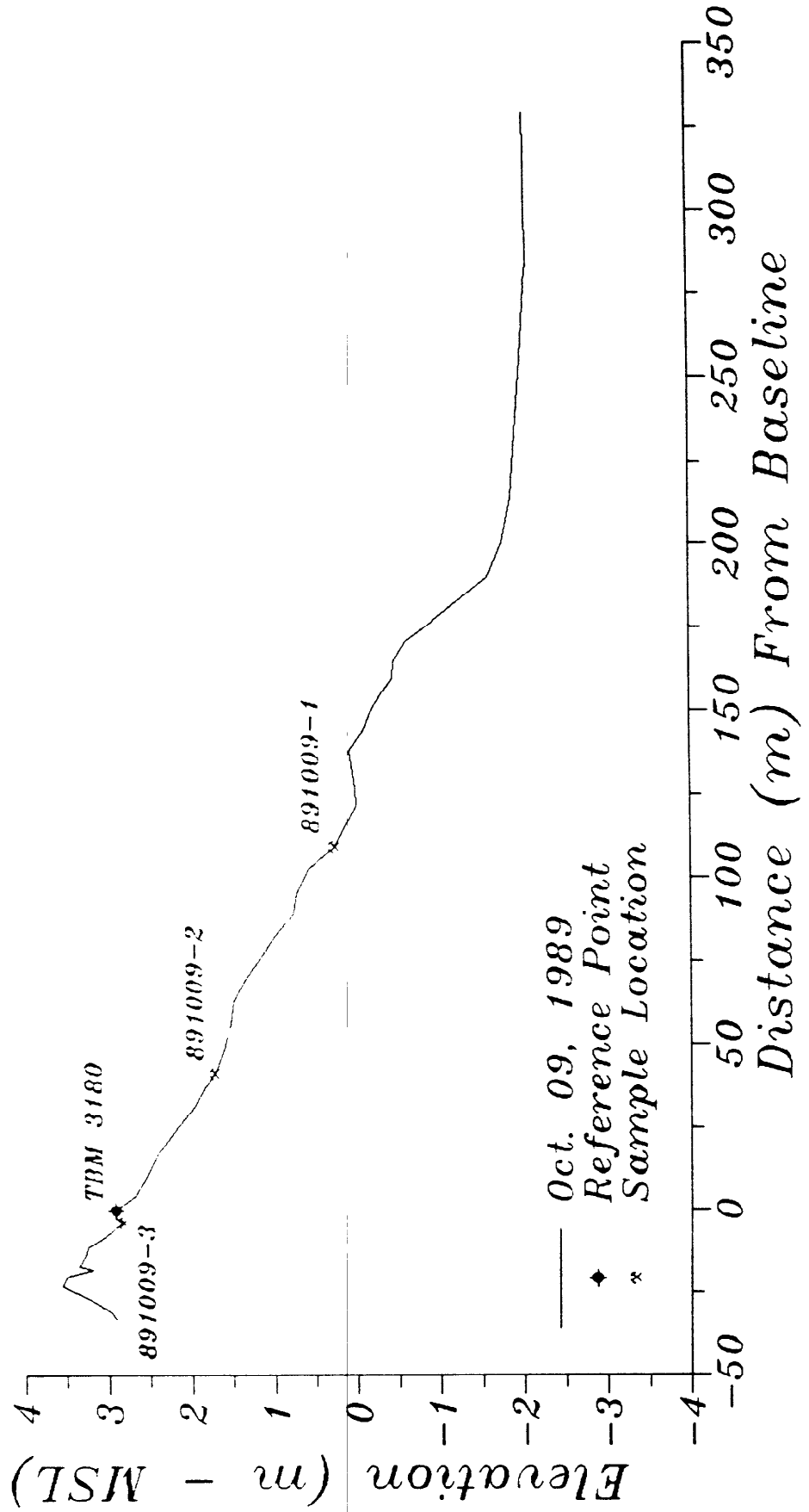
Station 3170 (Beachwood East)



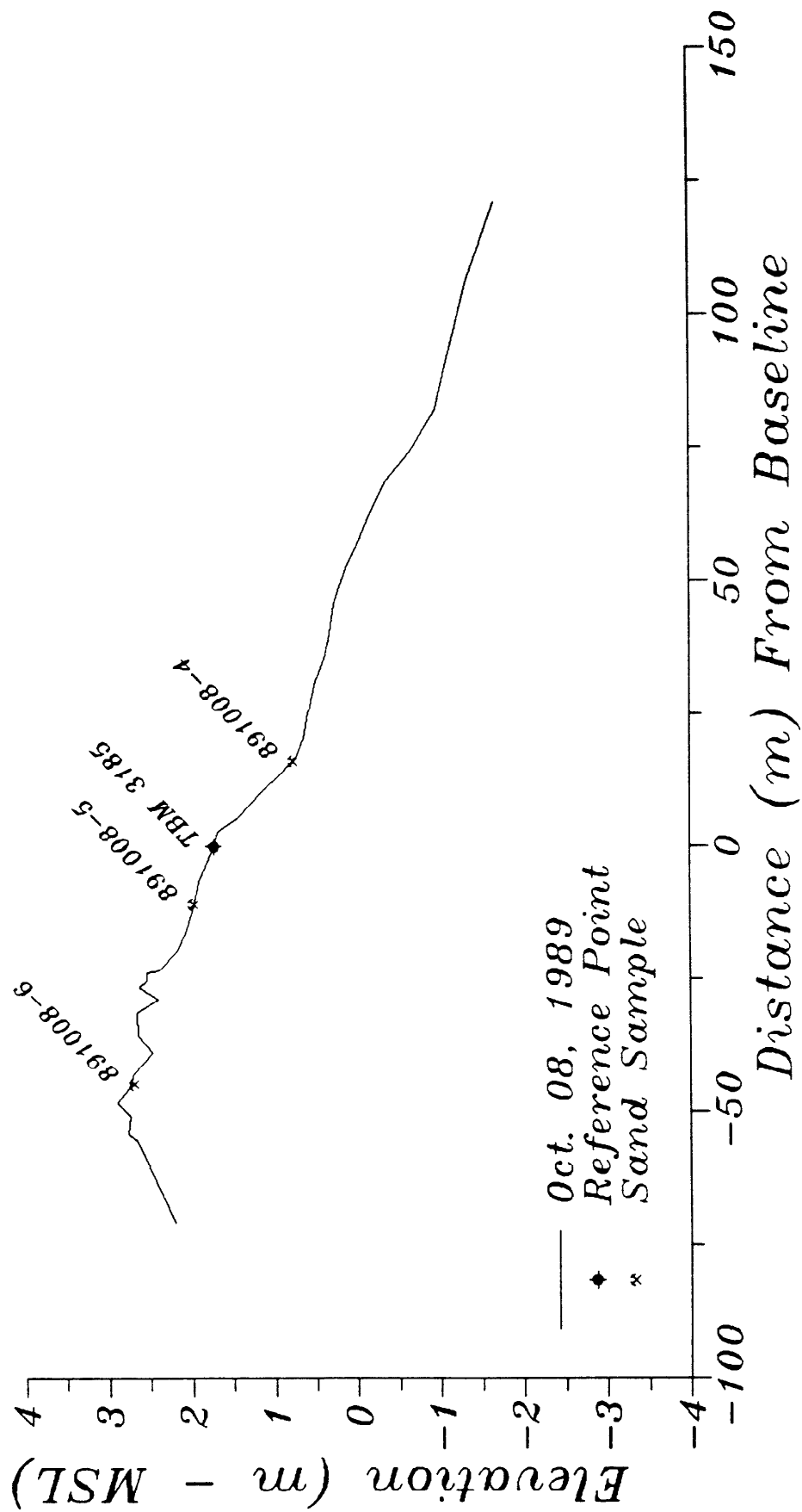
Station 3175 (Mariners Walk)



Station 3180 (Port 0' Call)



Station 3185 (18th Fairway)



Appendix A

Horizontal Control Sheets for Sullivans Island and Isle of Palms

SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3010
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°38'09.48" SCALE FACTOR: 0.99992005
 HORIZONTAL ORIGIN: IOP 1963 TO MOULTRIE 2 VERTICAL ORIGIN: BREACH 1963 TO V-70
 NORTHING: 102,765.903 m EASTING: 717,087.786 m
 LATITUDE: N 32°45'16.53183" LONGITUDE: W 79°51'10.33945"
 ELEVATION (NAVD 29) 10.332 FT. DATE: (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

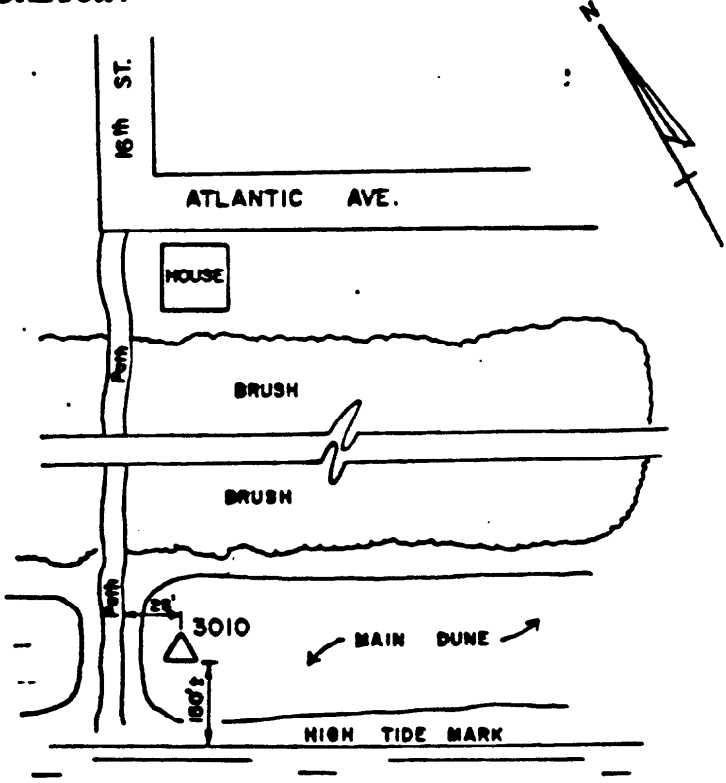
OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3020	271°25'48.13"	SE 89°12'21.35"	583.220 m
MOULTRIE 2	126°25'07.52"	NW 54°13'01.96"	703.929 m

PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE
 MONUMENT SURROUNDED BY CONC. WITH 6"
 PVC COLLAR PROJECTING 6" ABOVE THE GROUND.
DESCRIPTION:

STATION IS LOCATED ON SULLIVANS ISLAND S
 OF ATLANTIC AVE. AT STATION 16' ST., 28'
 E OF A BEACH ACCESS FOOT PATH, ABOUT 150'
 LANDWARD FROM THE MEAN HIGH WATER MARK.

SKETCH:



MADE FROM BEST
 AVAILABLE COPY

SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3020
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°38'21.90" SCALE FACTOR: 0.99992008
 HORIZONTAL ORIGIN: IOP 1963 TO MOUTRIE 2 VERTICAL ORIGIN: BREACH 1963 TO V-70
 NORTHING: 102,757.821 m EASTING: 717,670.903 m
 LATITUDE: N 32°45'16.05878" LONGITUDE: W 79°50'47.94152"
 ELEVATION (NGVD 29) 8.363 FT. DATE: (M)JAN. (YR)1988 - (M)JULY (YR)1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3035	240°58'23.44"	NE 60°20'01.54"	599.080 m
3010	91°26'00.55"	NW 89°12'21.35"	583.220 m

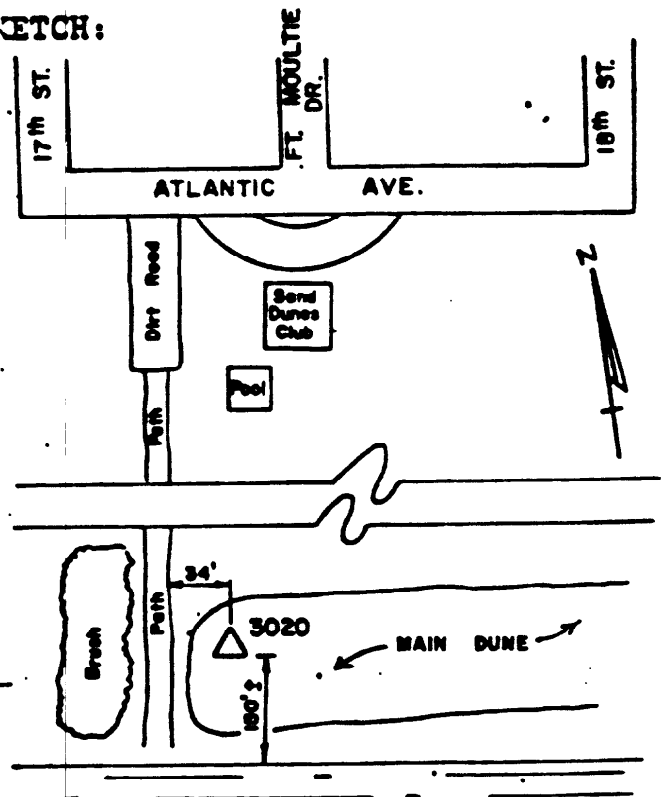
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE
 MONUMENT SURROUNDED BY CONC. WITH 6"
 PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON SULLIVANS ISLAND S
 OF ATLANTIC AVE. AT STATION 17 ST., ON
 THE PRIMARY DUNE, 34' E OF A BEACH ACCESS
 FOOTPATH JUST W OF THE SAND DUNES CLUB,
 ABOUT 150' LANDWARD FROM THE MEAN HIGH
 MARK.

SKETCH:



MADE FROM BEST
 AVAILABLE COPY

SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3035

STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.

NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°38'33.06" SCALE FACTOR: 0.99991936

HORIZONTAL ORIGIN: IOF1963 TO MOUTRIE 2 VERTICAL ORIGIN: BREACH 1963

NORTHING: 103,054.310 m EASTING: 718,191.416 m

LATITUDE: N 32°45'25.49444" LONGITUDE: W 79°50'27.81748"

ELEVATION (NGVD 29) 14,948 FT. DATE: (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3050	238°10'43.41"	NE 57°32'10.35"	711.404 m
3020	60°58'34.60"	SW 60°20'01.54"	599.080 m

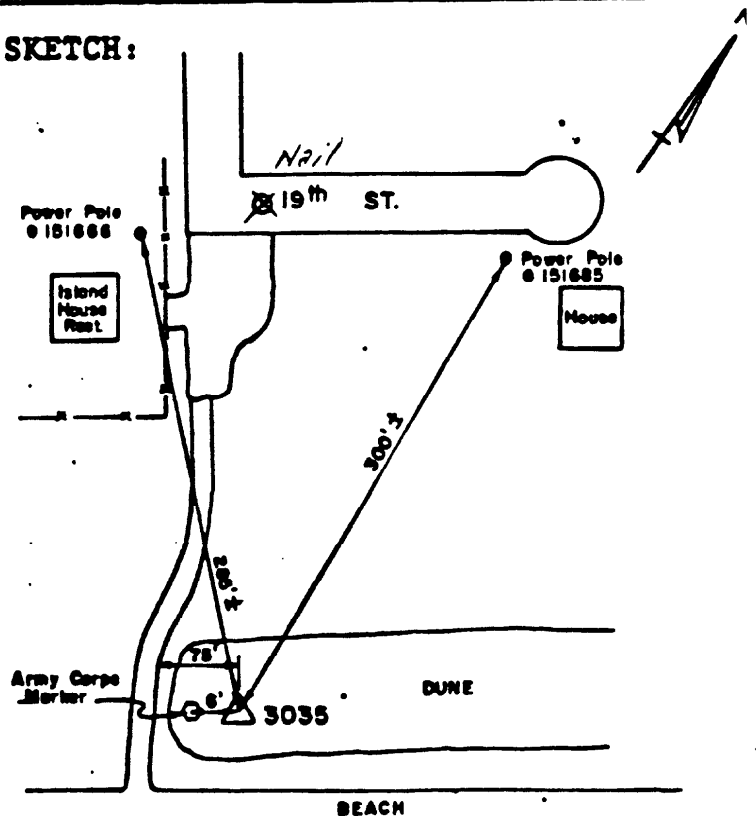
PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONC. WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON SULLIVANS ISLAND AT STATION 19 ST., ON THE PRIMARY DUNE 75' E OF A BEACH ACCESS FOOTPATH, ABOUT 285' SE OF A POWER POLE #151686 AT THE ISLAND HOUSE.

SKETCH:



MADE FROM BEST AVAILABLE COPY

SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOC. BEACH MONITORING STATIONS STATION: 3050
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°38'45.93" SCALE FACTOR: 0.99991843
 HORIZONTAL ORIGIN: TOP 1963 TO MOUTRIE 2 VERTICAL ORIGIN: BREACH 1963 TO V-70
 NORTHING: 103,436.137 m EASTING: 718,791.601 m
 LATITUDE: N 32°45'37.67028" LONGITUDE: W 79°50'04.59434"
 ELEVATION (NGVD 29) 8.334 FT. DATE: (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3065	243°20'24.40"	NE 62°41'38.47"	679.420 m
3035	58°10'56.28"	SW 57°32'10.35"	711.404 m

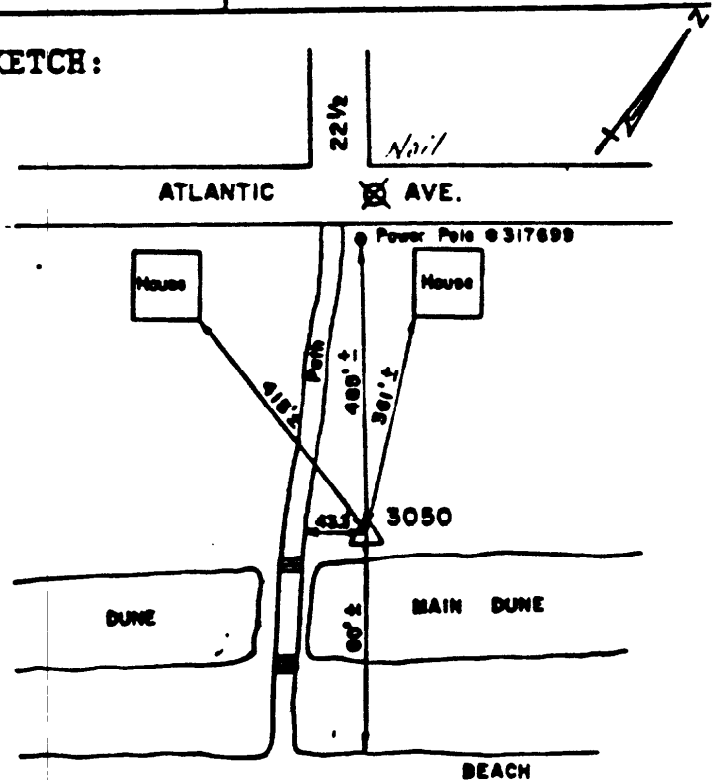
PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONC. WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON SULLIVANS ISLAND SE OF ATLANTIC AVE. AT STATION 22-1/2 ST, JUST LANDWARD OF THE PRIMARY DUNE 43.3' NE OF A BEACH ACCESS FOOTPATH, ABOUT 361' SE OF THE SW CORNER OF A RESIDENCE AT #2251 ATLANTIC AVE.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3065
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°38'58.86" SCALE FACTOR: 0.99991768
 HORIZONTAL ORIGIN: IOP 1963 TO MOLUTRIE 2 VERTICAL ORIGIN: BREACH 1963 TO V-70
 NORTHING: 103,747.790 m EASTING: 719,395.263 m
 LATITUDE: N 32°45'47.56562" LONGITUDE: W 79°49'41.26640"
 ELEVATION (NGVD 29) 11.193 FT. DATE: (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3080	253°04'17.31"	NE 72°25'18.45"	594.167 m
3050	63°20'37.33"	SW 62°41'38.47"	679.420 m

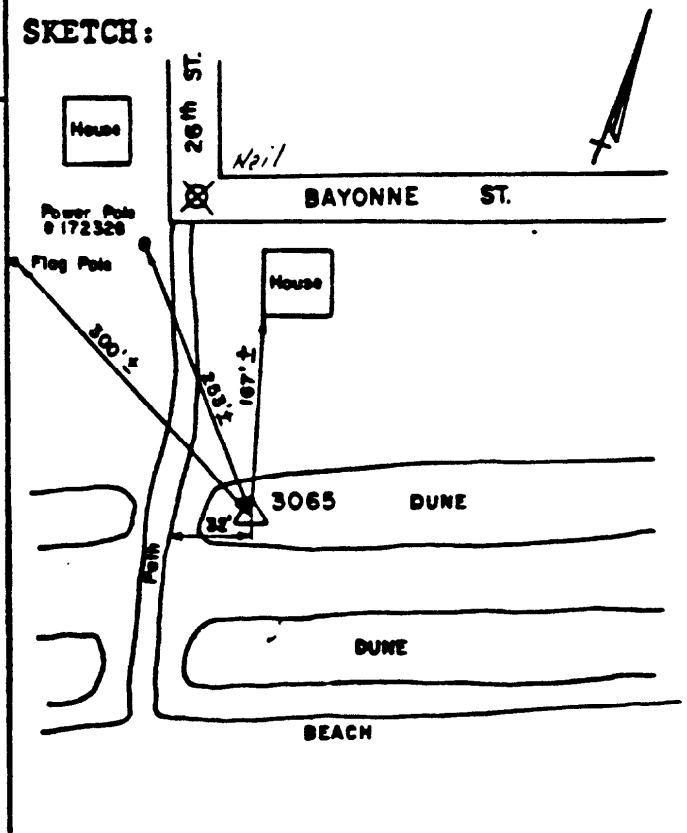
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONC. WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON SULLIVANS ISLAND SE OF BAYONNE ST. AT STATION 26 ST., 32' NE OF A BEACH ACCESS FOOTPATH, ABOUT 167' S OF THE S CORNER OF A RESIDENCE AT #2603 BAYONNE ST.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCOC BEACH MONITORING STATIONS STATION: 3080
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°39'10.97" SCALE FACTOR: 0.99991725
 HORIZONTAL ORIGIN: IOP 1963 TO MOUTRIE 2 VERTICAL ORIGIN: BREACH 1963 TO V-70
 NORTHING: 103,927.218 m EASTING: 719,916.639 m
 LATITUDE: N 32°45'53.18122" LONGITUDE: W 79°49'19.42747"
 ELEVATION (NGVD 29) 9.744 FT. DATE: (M)JAN. (YR)1988 - (M)JULY (YR)1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3090	225°52'02.28"	NE 45°12'51.31"	872.747 m
3065	73°04'29.42"	SW 72°25'18.45"	594.167 m

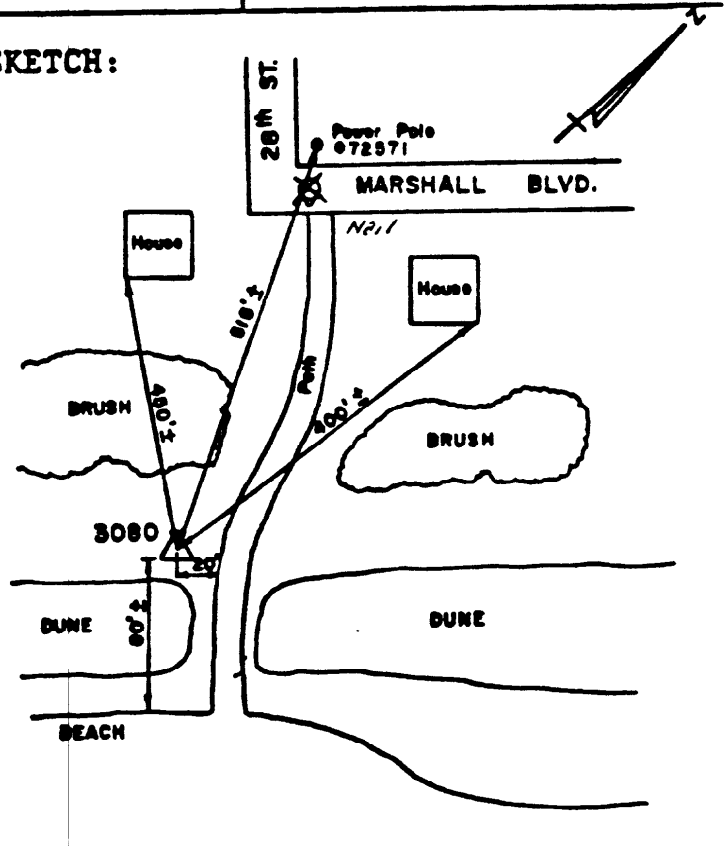
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONC. WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON SULLIVANS ISLAND SE OF MARSHALL BLVD. AT STATION 28 ST., 20' SW OF A BEACH ACCESS FOOTPATH, ABOUT 515' S OF A POWER POLE #72571 AT MARSHALL BLVD. AND STATION 28 ST., ABOUT 80' LANDWARD FROM THE MEAN HIGH WATER MARK.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

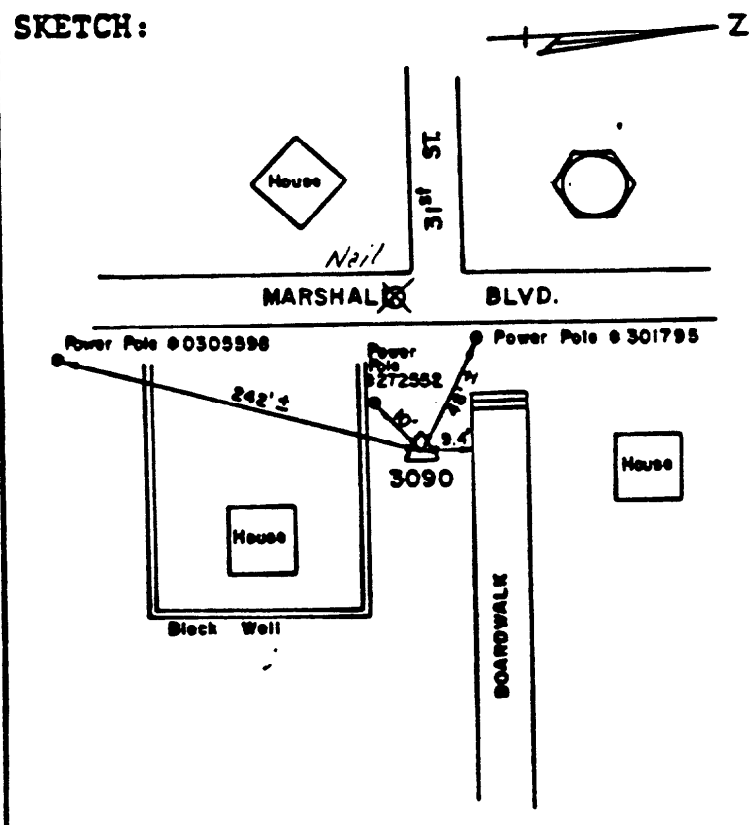
THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SCCC BEACH MONITORING STATIONS **STATION:** 3090
STATE: SOUTH CAROLINA **COUNTY:** CHARLESTON **EST. BY:** ENGINEERING, SURVEYING, & PLANNING, INC.
NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°39'24.31" **SCALE FACTOR:** 0.99991576
HORIZONTAL ORIGIN: IOP 1963/MOULTRIE 2 1963 **VERTICAL ORIGIN:** BREACH 1963/V-70
NORTHRING: 104,541.980 m **EASTING:** 720,581.016 m
LATITUDE: N 32°46'12.90790" **LONGITUDE:** W 79°48'55.35965"
ELEVATION (NGVD 29) 9.842 FT. **DATE:** (M)JAN. (YR)1988 - (M)JULY (YR)1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3095	191°44'41.66"	NE 11°05'17.35"	280.610 m
3080	45°52'15.62"	S 5°12'53.31"	872.747 m

PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE
 MONUMENT SURROUNDED BY CONC. WITH 6" PVC
 COLLAR PROJECTING 6" ABOVE THE GROUND.
DESCRIPTION:
 STATION IS LOCATED ON SULLIVANS ISLAND SE
 OF MARSHALL BLVD. AT STATION 31 ST., 9.4'
 SW OF A WOODEN BOARDWALK, 10' E OF A POWER
 POLE #272552, 48' SE OF POWER POLE #301795
 AT MARSHALL BLVD.



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCB BEACH MONITORING STATIONS **STATION:** 3095
STATE: SOUTH CAROLINA **COUNTY:** CHARLESTON **EST. BY:** ENGINEERING, SURVEYING, & PLANNING, INC.
NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°39'25.53" **SCALE FACTOR:** 0.99991509
HORIZONTAL ORIGIN: ICP 1963 TO MOUTRIE 2 **VERTICAL ORIGIN:** BREACH 1963 TO V-70
NORTHING: 104,817.328 m **EASTING:** 720,634.978 m
LATITUDE: N 32°46'21.82621" **LONGITUDE:** W 79°48'53.16491"
ELEVATION (NGVD 29) 10.821 FT. **DATE:** (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
BREACH	200°08'17.90"	NE 19°28'52.37"	349.358 m
3090	11°44'42.88"	SW 11°05'17.35"	280.610 m

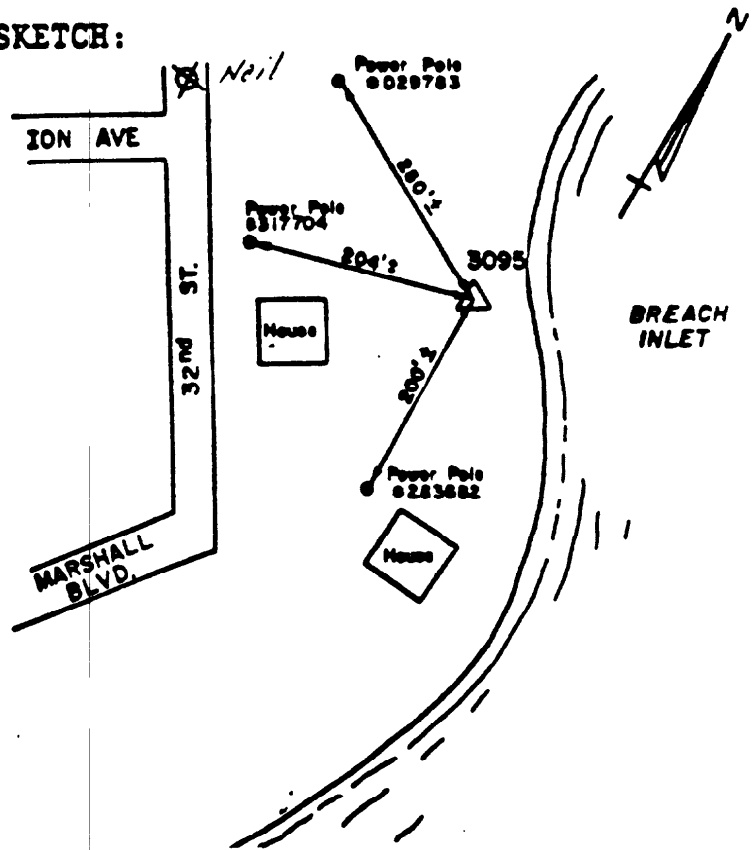
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE
 MONUMENT SURROUNDED BY CONC. WITH 6" PVC
 COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON SULLIVANS ISLAND NE
 OF STATION 32 ST. AT ION AVE. AT BREACH
 INLET, NE OF A RESIDENCE AT #3204 STATION
 32 ST., ABOUT 209' E OF A POWER POLE
 #317704 NW OF THE RESIDENCE.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS **STATION:** 3100
STATE: SOUTH CAROLINA **COUNTY:** CHARLESTON **EST. BY:** ENGINEERING, SURVEYING & PLANNING, INC.
NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°39'34.71" **SCALE FACTOR:** 0.99991437
HORIZONTAL ORIGIN: IOP 1963 TO MOUTRIE 2 **VERTICAL ORIGIN:** 866-5494 TO 866-5552
NORTHING: 105119.855m **EASTING:** 721062.31m
LATITUDE: N 32°46' 31.48749" **LONGITUDE:** W 79°48' 36.61103"
ELEVATION (NGVD 29) 8.787 FT. **DATE:** (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3110	253°17'42.17"	NE 72°38'07.46"	605.977 m
BREACH	95°35'16.29"	NW 85°04'18.42"	312.013 m

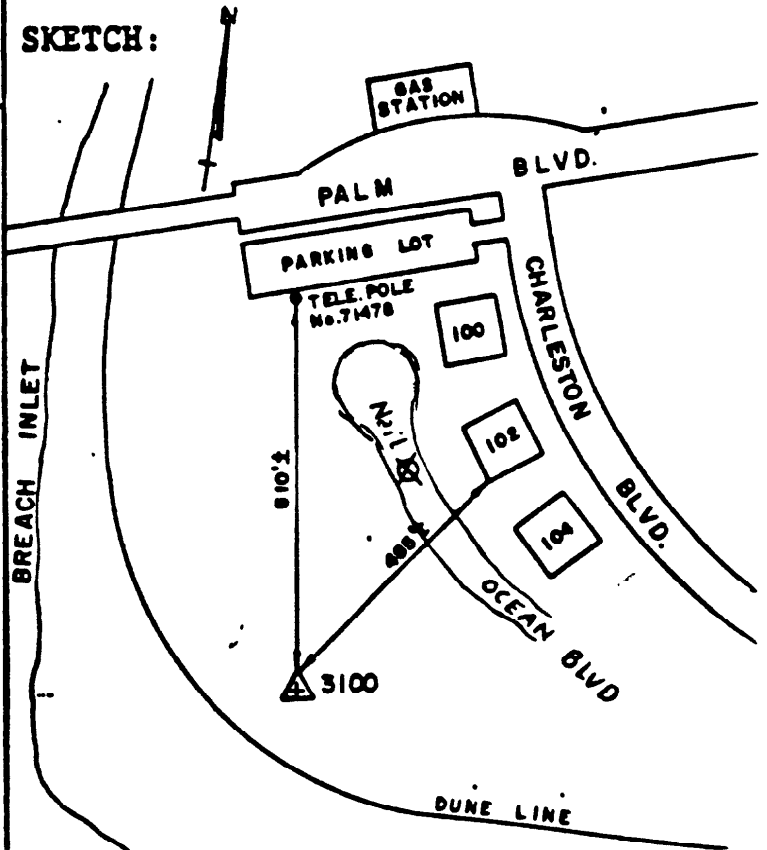
PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE
 MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC
 COLLAR PROJECTING 6" ABOVE THE GROUND

DESCRIPTION:

STATION IS LOCATED AT THE SW END OF ISLE OF
 PALMS AT DEWEES INLET, ON A DUNE ABOUT 510'
 S OF A POWER POLE #71478 AT A PARKING LOT
 AT PALM BLVD., ABOUT 485' SW OF A RESIDENCE
 AT #102 CHARLESTON BLVD.

SKETCH:



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CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SCCC BEACH MONITORING STATIONS STATION: 3110
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°39' 47.07" SCALE FACTOR: 0.99991395
 HORIZONTAL ORIGIN: IOP 1963 TO MOUTRIE 2 VERTICAL ORIGIN: 866-5494 TO 866-5552
 NORTHING: 105,300.694 m EASTING: 721,640.621 m
 LATITUDE: N 32°46' 37.14120" LONGITUDE: W 79°48' 14.30869"
 ELEVATION (NGVD 29) 9.921 FT. DATE: (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3115	236°42'31.57"	NE 56°02'44.50"	647.455 m
3100	73°17'54.53"	SW 72°38'07.46"	605.977 m

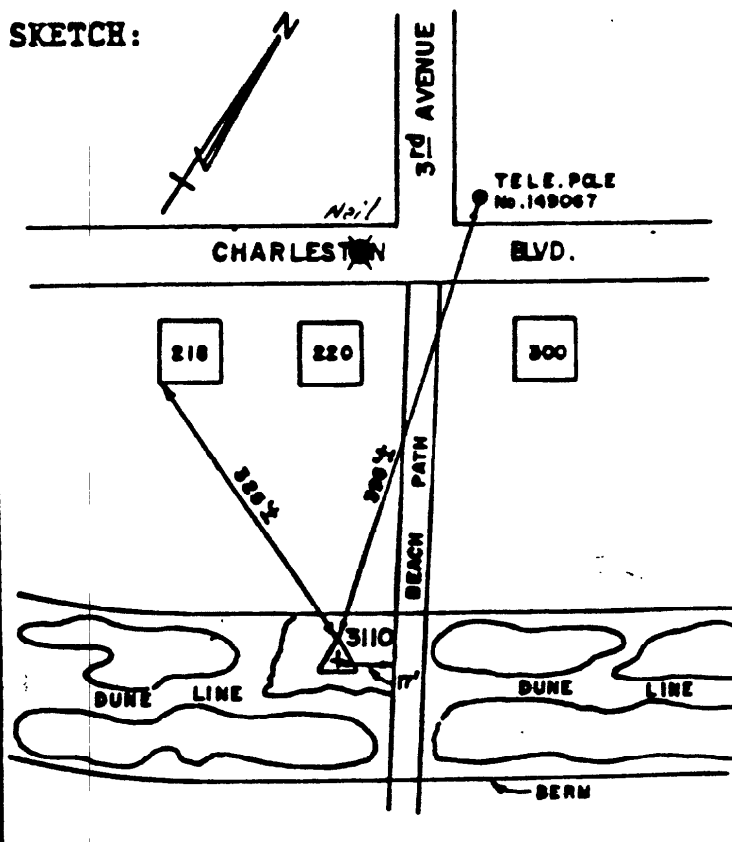
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON THE ISLE OF PALMS SE OF CHARLESTON BLVD. AT 3rd AVE., 17' SW OF A BEACH ACCESS FOOT PATH, ABOUT 395' S OF A POWER POLE #149067 AT 3rd AVE. AND CHARLESTON BLVD.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3115
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°39' 58.60" SCALE FACTOR: 0.99991308
 HORIZONTAL ORIGIN: ICP 1963 TO MOUTRIE 2 VERTICAL ORIGIN: 866-5494 TO 866-5552
 NORTHING: 105,662.287 m EASTING: 722,177.628 m
 LATITUDE: N 32°46' 48.67705" LONGITUDE: W 79°47' 53.51193"
 ELEVATION (NGVD 29) 10.943 FT. DATE: (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3120	238°23'16.31"	NE 57°43'17.71"	486.326 m
3110	56°42'43.10"	SW 56°02'44.50"	647.455 m

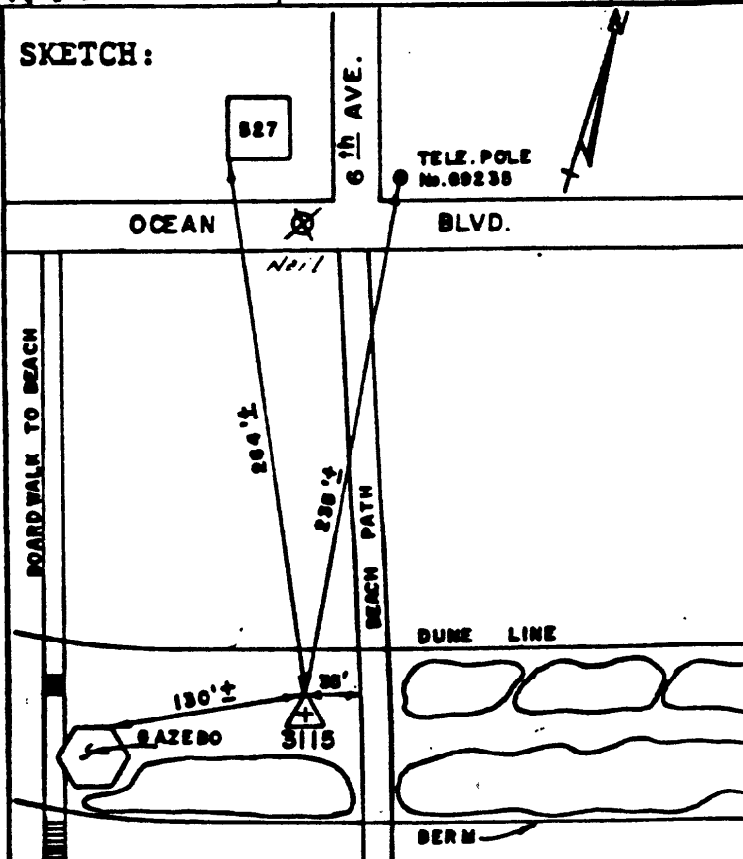
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON ISLE OF PALMS SE OF OCEAN BLVD. AT 6th AVE., 35' SW OF A BEACH ACCESS FOOT PATH, ABOUT 130' NE OF A GAZEBO, ABOUT 235' S OF A POWER POLE #69235 AT 6th AVE. AND OCEAN BLVD.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3120
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°40' 07.43" SCALE FACTOR: 0.99991247
 HORIZONTAL ORIGIN: IOP 1963 TO MOULTRIE 2 VERTICAL ORIGIN: 866-5494 TO 866-5552
 NORTHING: 105,921.979 m EASTING: 722,588.763 m
 LATITUDE: N 32°46' 56.95171" LONGITUDE: W 79°47' 37.59649"
 ELEVATION (NGVD 29) 12.838 FT. DATE: (M)JAN. (YR)1988 - (M)JULY (YR)1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
IOP 1963	226°56'39.09"	NE 46°16'31.66"	784.365 m
3115	58°23'25.14"	SW 57°43'17.71"	486.326 m

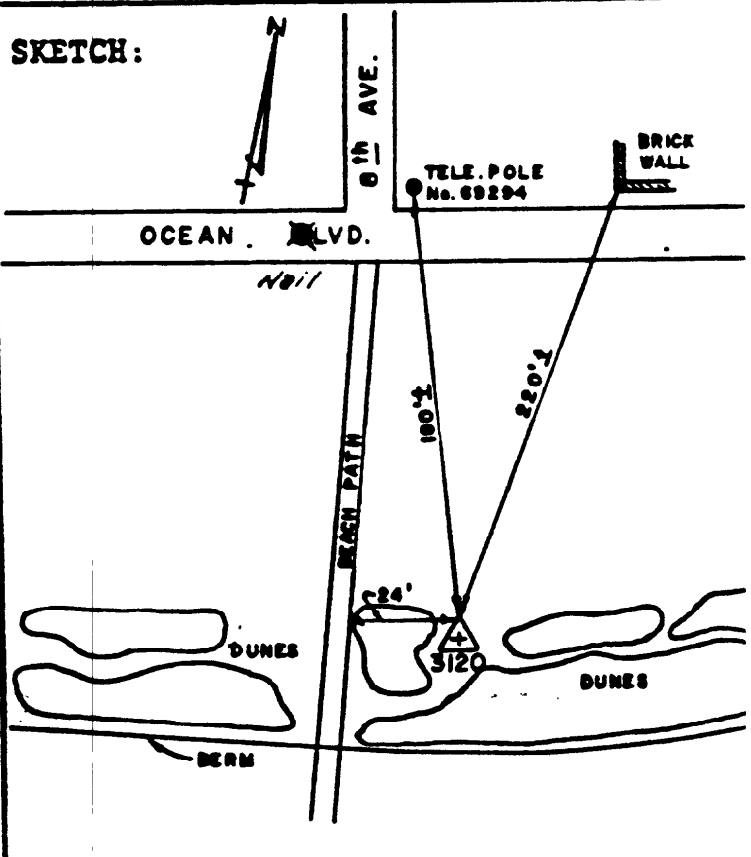
PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON THE ISLE OF PALMS SE OF OCEAN BLVD. AT 8th AVE., 24' NE OF A BEACH ACCESS FOOT PATH, ABOUT 180' SE OF A POWER POLE #69294 AT 8th AVE. AND OCEAN BLVD.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3125
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°40' 24.10" SCALE FACTOR: 0.99991153
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: E5 BCD TO 866-5494
 NORTHING: 106,320.097 m EASTING: 723,366.943 m
 LATITUDE: N 32°47' 09.57960" LONGITUDE: W 79°47' 07.51228"
 ELEVATION (NGVD 29) 6.754 FT DATE: (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3130	243°19'54.54"	NE 62°39'30.44"	491.050 m
IOP 1963	124°55'56.97"	NW 55°44'27.13"	255.790 m

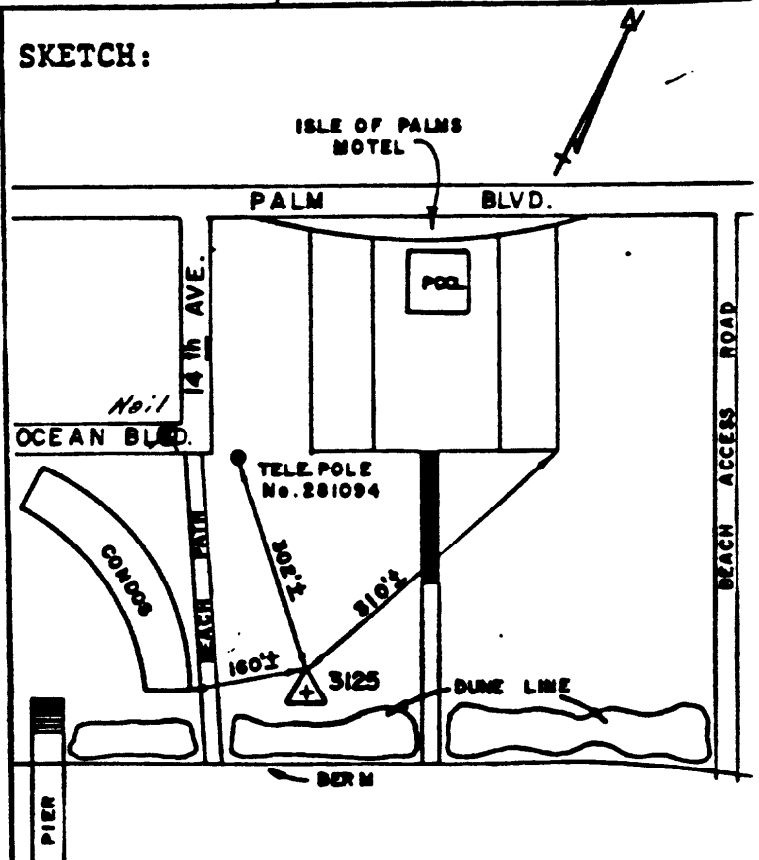
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON THE ISLE OF PALMS SE OF OCEAN BLVD. AT 14th AVE., E OF A BEACH ACCESS FOOTPATH, ABOUT 160' E OF THE SE CORNER OF A CONDOMINIUM BUILDING, ABOUT 302' SE OF A POWER POLE #281094 AT OCEAN BLVD. AND 14th AVE.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SCCC BEACH MONITORING STATIONS STATION: 3130
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°40' 33.45" SCALE FACTOR: 0.99991100
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: E5 BCD TO 866-5494
 NORTHING: 106,545.613 m EASTING: 723,803.096 m
 LATITUDE: N 32°47' 16.73360" LONGITUDE: W 79°46' 50.64859"
 ELEVATION (NGVD 29) 8.954 FT. DATE: (M)JAN. (YR)1988 - (M)JULY (YR)1988

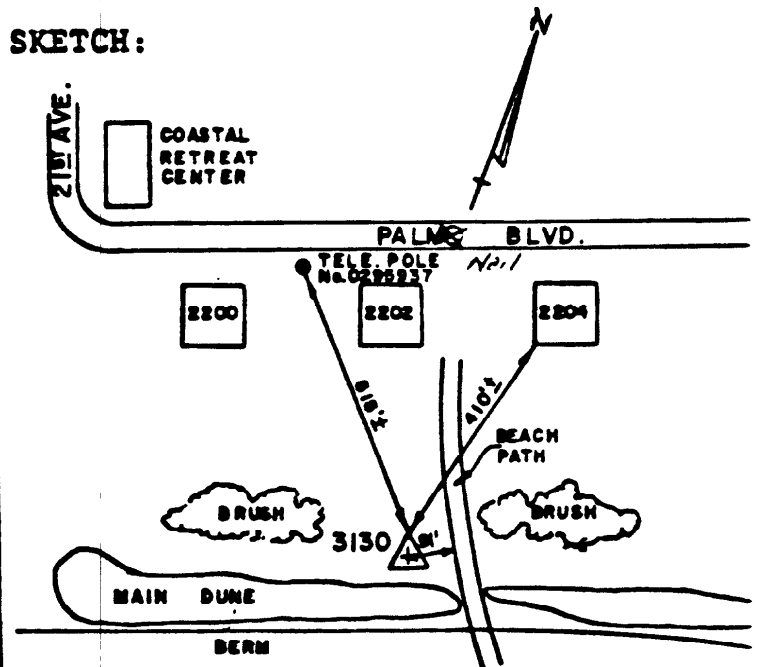
OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3135	240°48'48.51"	NE 60°08'15.06"	551.718 m
3125	63°20'03.89"	SW 62°39'30.44"	491.050 m

PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.
 DESCRIPTION:

STATION IS LOCATED ON THE ISLE OF PALMS SE OF PALM BLVD. AT THE 22nd BLOCK, ABOUT 515' SE OF A POWER POLE #0295937 AT PALM BLVD., 91' SW OF A BEACH ACCESS FOOT PATH.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3135
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°40'43.72" SCALE FACTOR: 0.99991036
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: E5 BOD TO 866-5494
 NORTHING: 106,820.300 m EASTING: 724,281.516 m
 LATITUDE: N 32°47'25.46689" LONGITUDE: W 79°46'32.13735"
 ELEVATION (NGVD 29) 7.147 FT. DATE: (M)JAN. (YR) 1988 - (M)JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3140	241°09'11.89"	NE 60°28'28.17"	616.539 m
3130	60°48'58.78"	SW 60°08'15.06"	551.718 m

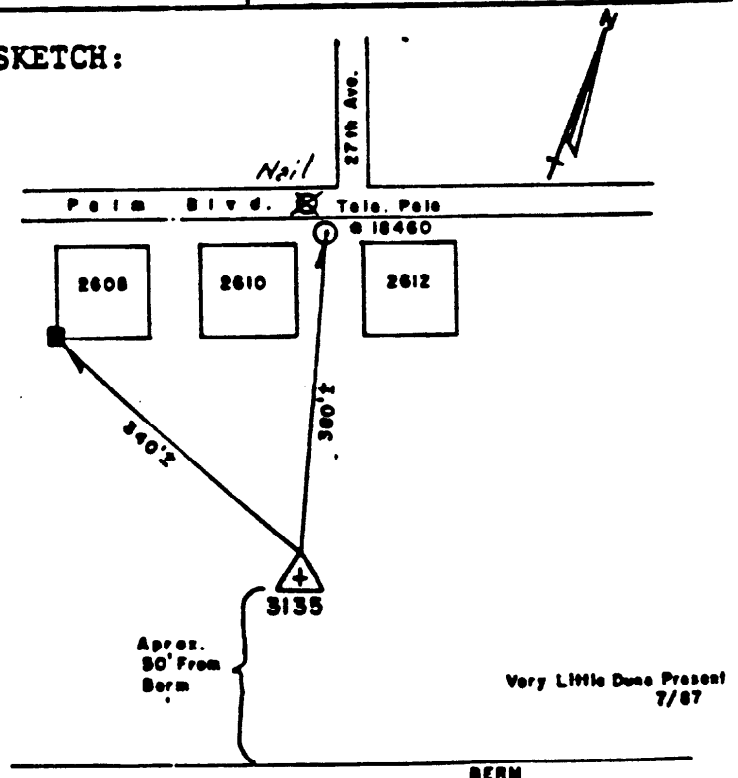
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE
 MONUMENT SURROUNDED BY CONC. WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON THE ISLE OF PALMS, S OF PALM BLVD. AT 27th AVE., ABOUT 340' SE OF THE SW CORNER OF A RESIDENCE AT #2608 PALM BLVD., ABOUT 380' S OF A POWER POLE #18460 ON THE S SIDE OF PALM BLVD.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3140
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°40'55.22" SCALE FACTOR: 0.99990965
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: ES BCD TO 866-5494
 NORTHING: 107,124.110 m EASTING: 724,817.941 m
 LATITUDE: N 32°47'35.12240" LONGITUDE: W 79°46'11.38244"
 ELEVATION (NGVD 29) 8.379 FT. DATE: (M) JAN. (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3145	247°42'39.06"	NE 67°01'43.84"	609.004 m
3135	61°09'23.39"	SW 60°28'28.17"	616.539 m

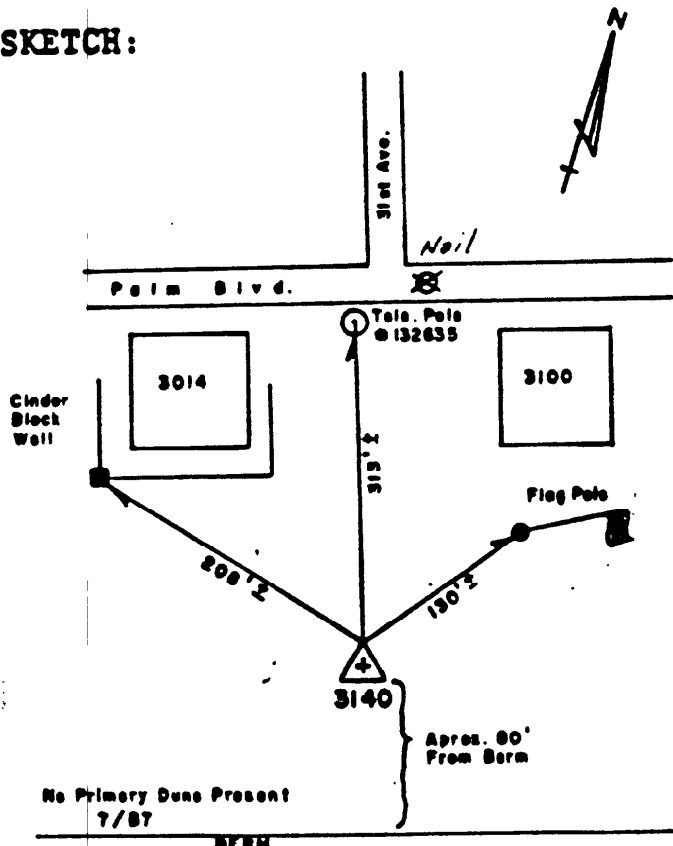
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONC. WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED ON THE ISLE OF PALMS, S OF PALM BLVD. AT 31st AVE., ABOUT 208' SE OF THE SW CORNER OF A BLOCK WALL OF #3014 PALM BLVD., ABOUT 313' SE OF A POWER POLE #132635 ON THE S SIDE OF PALM BLVD.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SODC BEACH MONITORING STATIONS STATION: 3145
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°41'07.23" SCALE FACTOR: 0.99990910
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: E5 BCD TO 866-5494
 NORTHING: 107,361.763 m EASTING: 725,378.601 m
 LATITUDE: N 32°47'42.61993" LONGITUDE: W 79°45'49.72521"
 ELEVATION (NGVD 29) 8.672 FT. DATE: (M) JAN (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3150	248°43'36.64"	NE 68°02'29.41"	559.980 m
3140	67°42'51.07"	SW 67°01'43.84"	609.004 m

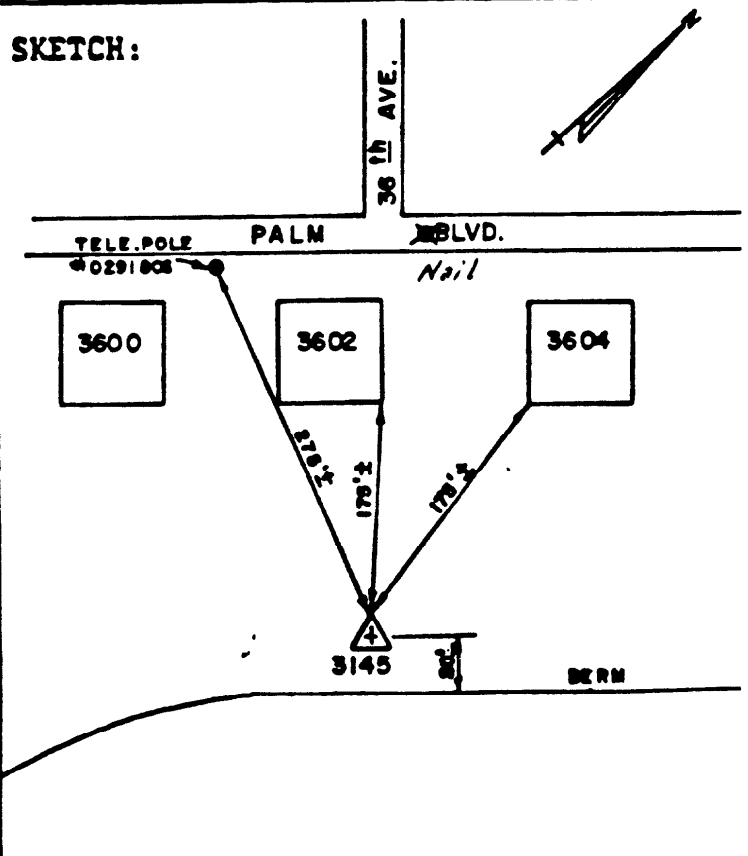
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND

DESCRIPTION:

STATION IS LOCATED ON ISLE OF PALMS, S OF PALM BLVD. AT 36th AVE., ABOUT 275' SE OF A POWER POLE #0291806 ON THE SOUTH SIDE OF PALM BLVD., ABOUT 175' S OF THE SW CORNER OF A RESIDENCE AT #3604 PALM BLVD.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3150
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°41'18.35" SCALE FACTOR: 0.99990862
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: E5 BCD TO 866-5494
 NORTHING: 107,571.140 m EASTING: 725,897.910 m
 LATITUDE: N 32°47'49.21463" LONGITUDE: W 79°45'29.66934"
 ELEVATION (NGVD 29) 10.992 FT. DATE: (M) JAN (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3155	253°53'26.59"	NE 73°12'08.24"	586.039 m
3145	68°43'47.76"	SW 68°02'29.41"	559.980 m

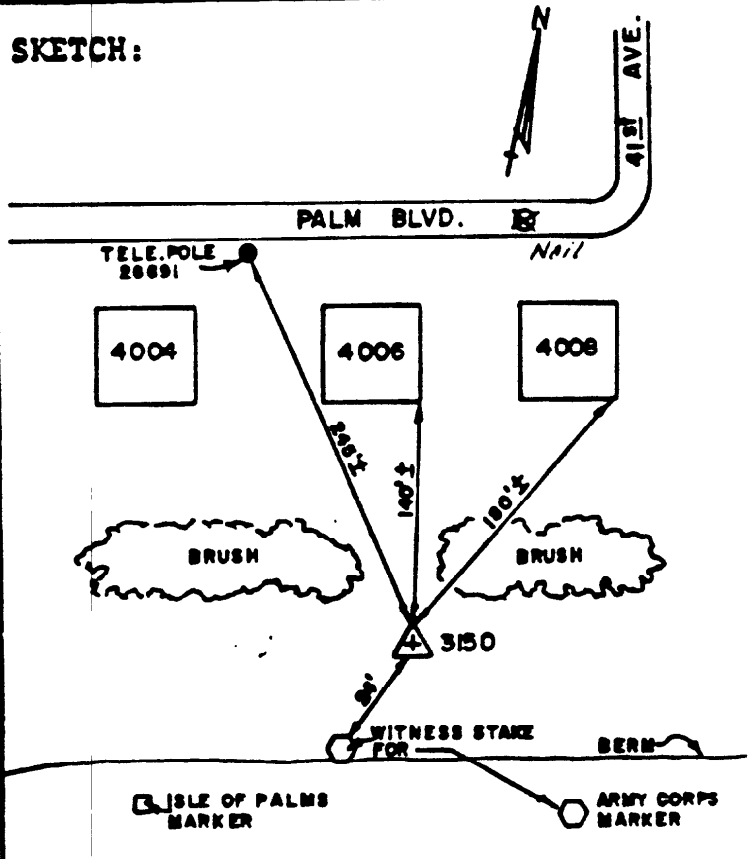
PRELIMINARY

TYPE OF MARK: **BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND**

DESCRIPTION:

STATION IS LOCATED ON ISLE OF PALMS, S OF PALM BLVD. AT 41st AVE., ABOUT 245' SE OF A POWER POLE #26691 ON THE SOUTH SIDE OF PALM BLVD., ABOUT 180' SW OF THE SE CORNER OF THE RESIDENCE AT #4008 PALM BLVD.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3155
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°41' 30.35" SCALE FACTOR: 0.99990823
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: 10-332 TO 10-331
 NORTHING: 107,740.486 m EASTING: 726,458.892 m
 LATITUDE: N 32°47'54.49260" LONGITUDE: W 79°45'08.02947"
 ELEVATION (NGVD 29) 7.882 FT. DATE: (M) JAN (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3160	253°34'35.11"	NE 72°53'04.76"	1,030.271 m
3150	73°53'38.59"	SW 73°12'08.24"	586.039 m

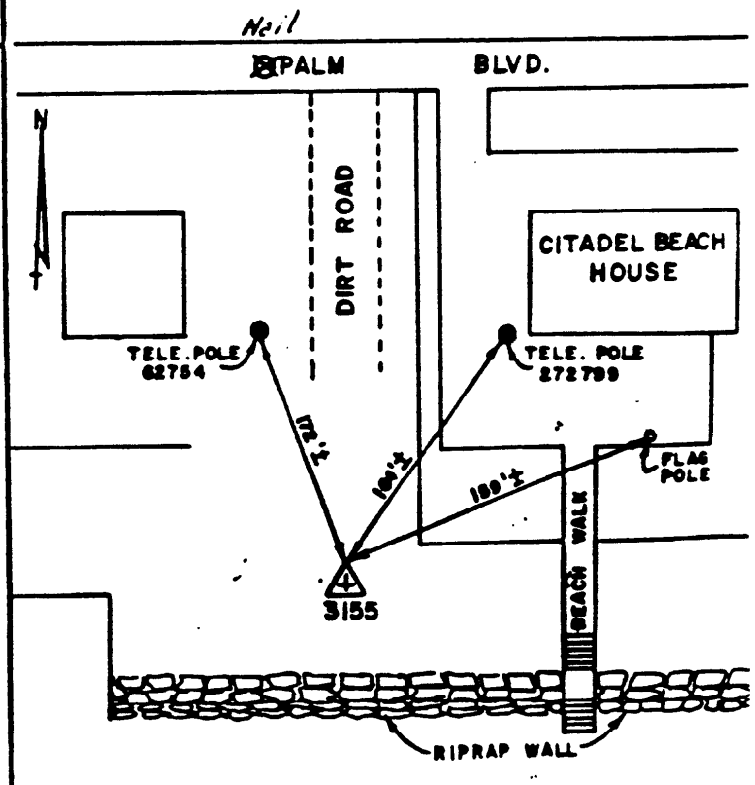
PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND

DESCRIPTION:

STATION IS LOCATED ON THE ISLE OF PALMS, S OF PALM BLVD. BETWEEN 47th AND 48th AVE. NEAR THE CITADEL BEACH HOUSE, ABOUT 172' S OF A POWER POLE #62754, ABOUT 159' SW OF A FLAG POLE AT THE CITADEL BEACH HOUSE.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SCCC BEACH MONITORING STATIONS STATION: 3160
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°41'51.40" SCALE FACTOR: 0.99990754
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: RUSH 1963 TO 10-332
 NORTHING: 108,043.663 m EASTING: 727,443.446 m
 LATITUDE: N. 32°48'03.94681" LONGITUDE: W 79°44'30.04577"
 ELEVATION (NGVD 29) 8.411 FT. DATE: (M)JAN. (YR)1988 - (M)JULY (YR)1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3165	259°34'43.08"	NE 78°52'51.68"	231.340 m
3155	73°34'56.16"	SW 72°53'04.76"	1,030.271 m

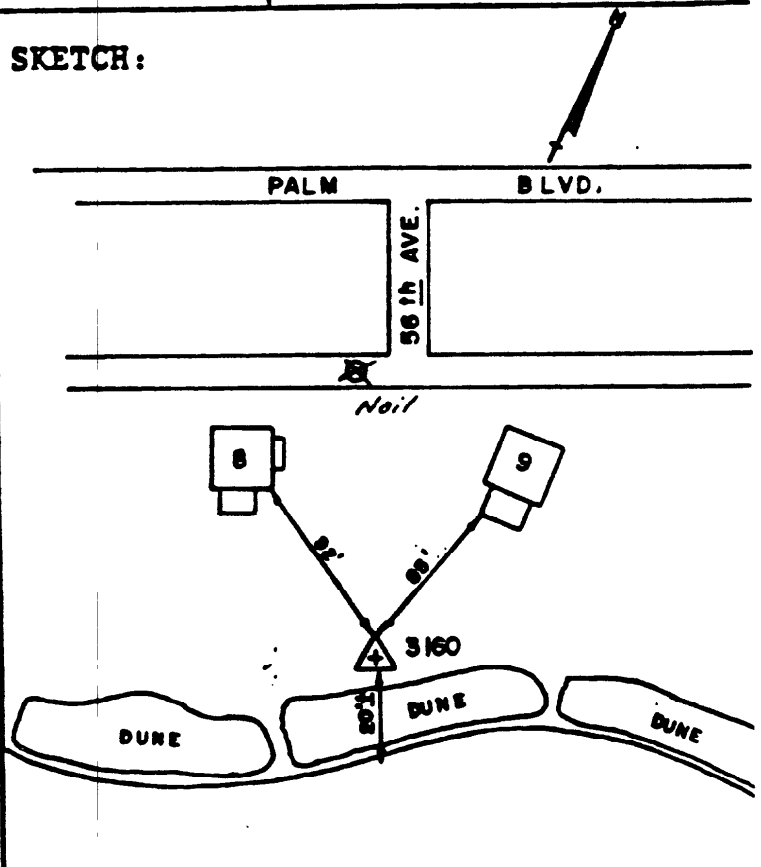
PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONC. WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED IN THE WILD DUNES SECTION OF THE ISLE OF PALMS, S OF PALM BLVD. AT 56th AVE., 92' SE OF THE SE CORNER OF A RESIDENCE AT #8 56th AVE., 85' S OF THE SW CORNER OF A RESIDENCE AT #9 56th AVE.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3165
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°41'56.25" SCALE FACTOR: 0.99990744
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: RUSH 1963 TO 10-332
 NORTHING: 108,088.272 m EASTING: 727,670.422 m
 LATITUDE: N 32°48'05.30510" LONGITUDE: W 79°44'21.30066"
 ELEVATION (NGVD 29) 9.765 FT. DATE: (M) JAN (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3170	250°39'32.25"	NE 69°57'36.00"	761.542 m
3160	79°34'47.93"	SW 78°52'51.68"	231.340 m

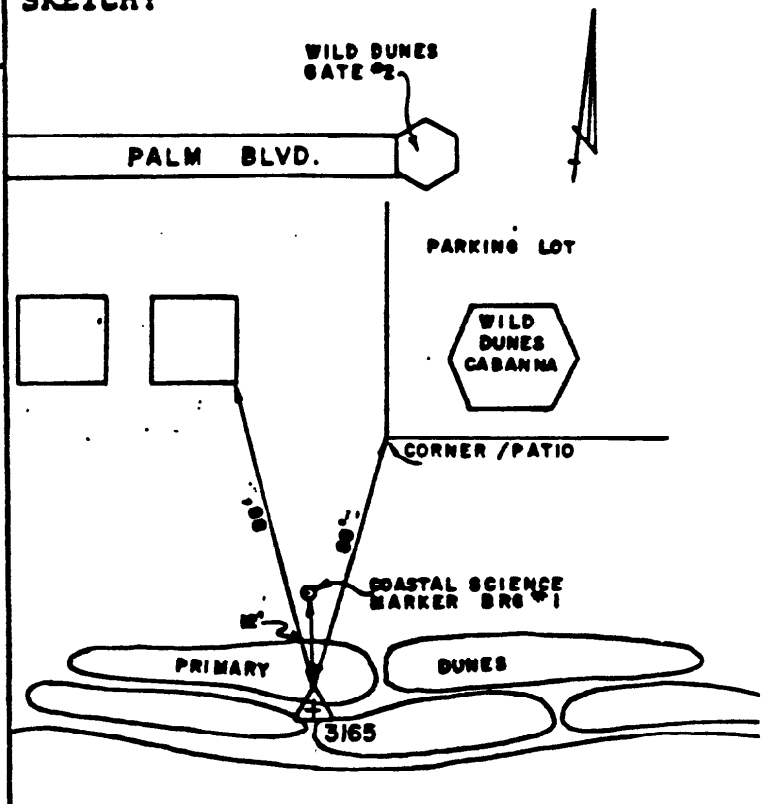
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONCRETE WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND

DESCRIPTION:

STATION IS LOCATED IN THE WILD DUNES SECTION OF THE ISLE OF PALMS S OF PALM BLVD. AT ITS TERMINUS AT WILD DUNES GATE #2, 88' SE OF THE SE CORNER OF A RESIDENCE AT #11 57th ST., 88' S OF THE SW CORNER OF A PATIO OF THE WILD DUNES CABANNA.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3170
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°42'11.56" SCALE FACTOR: 0.99990685
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: RUSH 1963 TO 10-332
 NORTHING: 108,349.210 m EASTING: 728,385.789 m
 LATITUDE: N 32°48'13.49150" LONGITUDE: W 79°43'53.68177"
 ELEVATION (NGVD 29) 11.981 FT. DATE: (M) JAN (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3175	234°51'12.75"	NE 54°09'01.19"	694.102 m
3165	70°39'47.56"	SW 69°57'36.00"	761.542 m

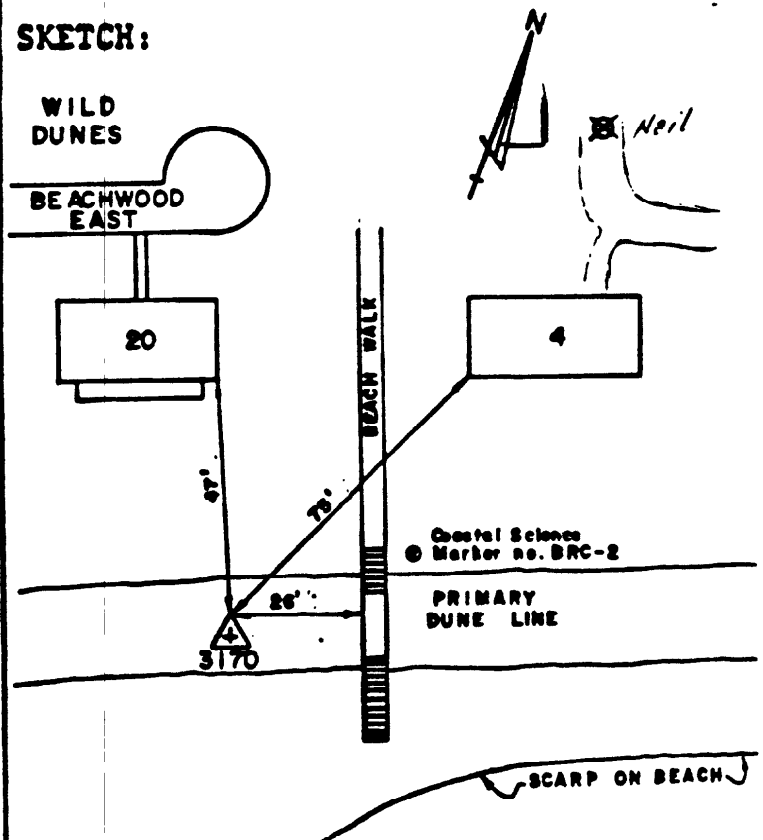
PRELIMINARY

TYPE OF MARK: BERNSTEN BREAKAWAY PIPE
 MONUMENT SURROUNDED BY CONCRETE WITH 6"
 PVC COLLAR PROJECTING 6" ABOVE THE GROUND

DESCRIPTION:

STATION IS LOCATED IN THE WILD DUNES
 SECTION OF THE ISLE OF PALMS S OF THE CUL-
 DE-SAC AT THE EASTERLY TERMINUS OF BEACHWOOD
 EAST, ON THE PRIMARY DUNE 46.5' S OF THE SE
 CORNER OF A RESIDENCE AT #20 BEACHWOOD
 EAST, 26.2' W OF A WOODEN BOARDWALK.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3175
 STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING, & PLANNING, INC.
 NAD 83 - SINGLE ZONE SPC - MAPPING ANGLE: 0°42'23.66" SCALE FACTOR: 0.99990591
 HORIZONTAL ORIGIN: RUSH 1963 TO IOP 1963 VERTICAL ORIGIN: RUSH 1963 TO 10-332
 NORTHING: 108,755.680 m EASTING: 728,948.345 m
 LATITUDE: N 32°48'26.46164" LONGITUDE: W 79°43'31.86510"
 ELEVATION (NGVD 29) 12.611 FT. DATE: (M) JAN (YR) 1988 - (M) JULY (YR) 1988

OBJECT	GEODETIC AZIMUTH	GRID BEARING	HORIZONTAL DISTANCE
3180	221°36'51.14"	NE 40°54'27.48"	532.011 m
3170	54°51'24.85"	SW 54°09'01.19"	694.102 m

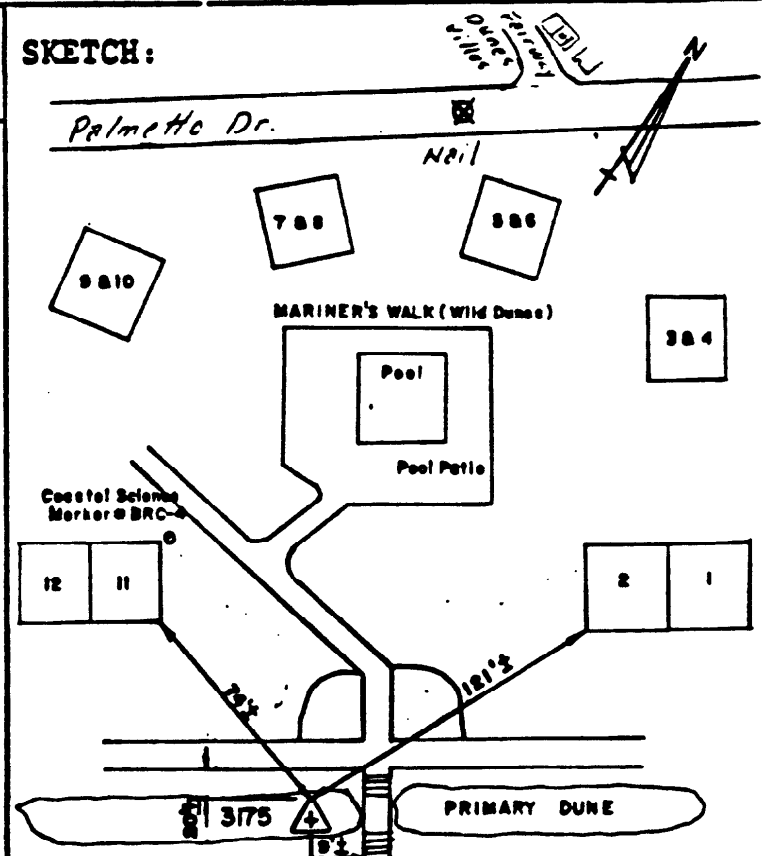
PRELIMINARY

TYPE OF MARK: BERNSTEIN BREAKAWAY PIPE MONUMENT SURROUNDED BY CONC. WITH 6" PVC COLLAR PROJECTING 6" ABOVE THE GROUND.

DESCRIPTION:

STATION IS LOCATED IN THE WILD DUNES SECTION OF THE ISLE OF PALMS AT MARINERS WALK, ON THE PRIMARY DUNE ABOUT 74' E OF THE MOST EASTERLY CORNER OF BUILDING 11, 8.5' SW OF A WOODEN BOARDWALK.

SKETCH:



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SOUTH CAROLINA COASTAL COUNCIL

CONTROL SURVEYS

THIRD-ORDER, CLASS I HORIZONTAL - THIRD-ORDER VERTICAL

PROJECT: SOCC BEACH MONITORING STATIONS STATION: 3180

STATE: SOUTH CAROLINA COUNTY: CHARLESTON EST. BY: ENGINEERING, SURVEYING
& PLANNING, INC.

~~MAP NO. CENTER POINT 220 MARKING ANGLE 30.110000 SCALE FACTOR 1.000000~~

Appendix B

Profile Data Sheets

Sullivans Island: Station 3010

Ref. Point Elev. = 3.229 m (top of front reference pipe)

Surveying Crew: Thomas E. Reiss, Rob R. Wertz, and Mike P. Katuna

Azimuth Angle Measurements For Horizontal Control

10 October 1989 1318 to 1330

Number of points = 11

PT.#	DEG	MIN	SEC	TIME	COMMENTS
1	328	033	42	1318	center-line of blue water tower
2	328	33	42		radio antenna #1
3	350	04	00		radio antenna #2
4	359	59	34		radio antenna #3
5	029	44	30		radio antenna #4
6	049	09	28		Sullivans Island Lighthouse (apex)
7	052	34	48		radio antenna #5
8	192	41	42		Morris Lighthouse
9	252	08	18		flagpole at Fort Sumter
10	282	01	00		prominent church steeple in Charleston
11	192	41	42	1330	Morris Lighthouse

Reference Point Survey

10 October 1989 1335 to 1345 (EDT)

Number of points = 13

min (x, y, z):		-70.608	-88.002	2.238	
max (x, y, z):		0.004	0.010	3.362	
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	0.001	0.000	3.359	1340	back ref. pipe; top
1	-0.006	-0.001	3.361		back ref. pipe; top
2	0.004	0.000	3.362		back ref. pipe; top
2a	0.000	0.000	3.361		back ref. pipe; top (average)
3	-63.140	-0.009	3.229	1342	front ref. pipe; top
4	-63.126	0.010	3.230		front ref. pipe; top
5	-63.134	-0.001	3.229		front ref. pipe; top
5a	-63.133	0.000	3.229		front ref. pipe; top (average)
6	-51.016	-87.968	2.940	1343	ACOE 4"X4" wood witness post
7	-51.008	-88.002	2.944		ACOE 4"X4" wood witness post
8	-51.011	-87.993	2.943		ACOE 4"X4" wood witness post
8a	-51.012	-87.988	2.942		ACOE post (average value)
999	-70.608	-10.574	2.238		geodimeter location

Main-Line Profile

10 October 1989 1346 to 1419 (EDT)

Number of points = 56

min (x, y, z):		-248.725	-0.859	-1.842	
max (x, y, z):		-0.046	1.050	2.989	
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
9	-0.046	0.000	2.989	1346	onshore to offshore
10	-4.742	0.211	2.181		
11	-8.170	0.429	2.769		
12	-14.468	0.535	1.658		
13	-22.175	0.567	1.630		
14	-26.933	0.473	1.963		
15	-31.648	-0.760	1.401		
16	-37.893	-0.774	1.731		
17	-42.600	-0.072	1.729		
18	-46.804	0.125	2.162		
19	-49.335	-0.050	1.970		
20	-51.341	0.020	2.424		
21	-53.532	0.085	2.553		
22	-56.940	-0.026	2.358		
23	-58.354	0.116	2.238		
24	-60.059	0.155	2.802		

25	-62.047	0.017	2.772
26	-63.138	-0.103	2.779
27	-65.902	-0.058	2.603
28	-70.582	0.043	2.223
29	-73.413	-0.095	2.081
30	-75.549	-0.055	2.009
31	-79.357	0.046	2.168
32	-80.898	0.244	2.272
33	-84.174	0.245	2.329
34	-87.062	0.421	2.257
35	-90.339	0.355	2.242
36	-96.017	1.050	2.195
37	-100.316	0.835	2.047
38	-105.469	0.419	1.959
39	-109.621	0.214	1.934
40	-111.455	0.019	1.878
41	-114.292	0.233	1.826
42	-117.871	0.509	1.755
43	-121.747	0.197	1.743
44	-125.311	0.266	1.709
45	-128.635	0.175	1.688
46	-130.320	0.259	1.551
47	-132.399	0.219	1.255
48	-134.474	0.224	1.053
49	-137.602	0.037	0.788
50	-141.258	0.111	0.589
51	-145.266	0.292	0.508
52	-149.355	0.226	0.459
53	-153.836	0.299	0.348
54	-158.087	0.313	0.265
55	-163.039	0.429	0.174
56	-166.971	0.225	0.134
57	-172.075	0.154	0.033
58	-178.404	0.163	-0.118
59	-185.217	-0.001	-0.235
60	-196.001	-0.154	-0.490
61	-205.721	-0.123	-0.654
62	-225.663	-0.425	-1.022
63	-239.309	-0.248	-1.464
64	-248.725	-0.859	-1.842

1419

Sample Locations

10 October 1989 1422 to 1432 (EDT)

Number of points = 3

min (x, y, z): -137.907 0.122 0.769

max (x, y, z): -54.146 1.598 2.572

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
65	-137.907	0.159	0.769	1422	891010-4 (beach face)
66	-110.656	0.122	1.893		891010-5 (backbeach)
67	-54.146	1.598	2.572	1432	891010-6 (back dune)

Sullivans Island: Station 3020

Ref. Point Elev. = 3.314 m (top of front reference pipe)

Surveying Crew: Thomas E. Reiss, Rob R. Wertz, and Mike P. Katuna

Azimuth Angle Measurements For Horizontal Control

10 October 1989 1525 to 1530

Number of points = 7

PT.#	DEG	MIN	SEC	TIME	COMMENTS
1	326	12	32	1525	blue water tower
2	009	59	18		radio antenna #2
3	013	56	04		radio antenna #4
4	021	32	12		radio antenna #3
5	055	54	00		Sullivan's Island Lighthouse (apex)
6	061	57	00		radio antenna #5
7	222	30	46	1530	Morris Lighthouse

Reference Point Survey

10 October 1989 1445 to 1500 (EDT)

Number of points = 14

min (x, y, z): -49.723 -7.657 2.140

max (x, y, z): 0.005 365.090 3.320

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	-0.002	-0.002	3.221	1549	back reference pipe; top
1	0.005	0.004	3.222		back reference pipe; top
2	-0.004	-0.002	3.222		back reference pipe; top
2a	0.000	0.000	3.221		back ref. pipe; top (average)
17	-43.897	-0.017	3.302	1559	front reference pipe; top
18	-43.861	0.000	3.320		front reference pipe; top
19	-43.860	-0.000	3.319	1602	front reference pipe; top
19a	-43.872	-0.006	3.314		front ref. pipe; top (average)
49	-18.115	365.074	2.914	1630	ACOE 4"X4" wood witness post
50	-18.115	365.072	2.918		ACOE 4"X4" wood witness post
51	-18.121	365.090	2.929		ACOE 4"X4" wood witness post
52	-18.115	365.078	2.925	1640	ACOE 4"X4" wood witness post
52a	-18.116	365.078	2.922		ACOE post (average value)
999	-49.723	-7.657	2.140		geodimeter location

Main-Line Profile

10 October 1989 1554 to 1615 (EDT)

Number of points = 40

min (x, y, z): -172.788 -0.201 -1.362

max (x, y, z): 0.007 0.659 2.900

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
3	0.007	0.010	2.900	1554	onshore to offshore
4	-1.646	0.006	2.691		
5	-4.089	0.077	2.144		
6	-6.493	0.228	1.768		
7	-10.000	0.070	1.465		
8	-16.980	0.020	1.421		
9	-20.922	0.338	1.515		
10	-23.841	0.287	1.537		
11	-27.293	0.233	1.910		
12	-29.354	0.024	2.107		
13	-31.160	-0.103	1.871		
14	-35.327	0.355	1.764		
15	-39.084	-0.166	2.244		
16	-41.812	0.117	2.485		
20	-43.707	0.037	2.683		
21	-44.644	-0.088	2.720		
22	-44.997	-0.146	2.419		
23	-48.378	-0.095	2.237		
24	-50.647	-0.027	2.257		

25	-50.978	-0.152	2.302	
26	-54.230	-0.028	1.964	
27	-56.969	-0.064	2.004	
28	-59.921	0.065	1.781	
29	-62.637	0.006	1.463	
30	-65.730	0.038	1.258	
31	-68.390	-0.002	1.052	
32	-72.220	0.042	0.801	
33	-75.736	0.037	0.658	
34	-81.426	-0.001	0.531	
35	-86.666	-0.153	0.383	
36	-93.127	0.011	0.276	
37	-96.509	0.013	0.194	
38	-102.435	-0.008	0.059	
39	-109.216	-0.201	-0.097	
40	-116.119	-0.058	-0.259	
41	-122.727	0.080	-0.430	
42	-131.698	0.659	-0.575	
43	-146.619	0.617	-0.793	
44	-158.015	0.336	-1.030	
45	-172.788	0.140	-1.362	1615

Sample Locations

10 October 1989 1617 to 1622 (EDT)

Number of points = 3

min (x, y, z): -65.655 -0.131 1.245

max (x, y, z): -39.653 0.145 2.271

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
46	-65.655	-0.131	1.245	1617	891010-7 (beach face)
47	-54.510	0.145	1.982		891010-8 (backbeach)
48	-39.653	0.061	2.271	1622	891010-9 (back dune)

Sullivans Island: Station 3035
 Ref. Point Elev. = 2.844 m (nail on Thee St.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

5 October 1989 1153 to 1213 (EDT)

Number of points = 23

min (x, y, z):	-0.006	-29.767	2.312		
max (x, y, z):	92.356	143.145	5.982		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	92.356	-0.014	2.843	1153	reference nail
1	92.345	-0.018	2.843		reference nail
2	92.340	-0.020	2.845		reference nail
2a	92.347	-0.017	2.844		reference nail (average)
3	90.241	-29.758	2.313	1158	tel. pole #151685
4	90.245	-29.760	2.312		tel. pole #151685
5	90.252	-29.767	2.312		tel. pole #151685
5a	90.247	-29.762	2.312		tel. pole #151685 (average)
6	84.708	14.886	3.052	1200	tel. pole #341197
7	84.707	14.884	3.052		tel. pole #341197
8	84.708	14.886	3.052		tel. pole #341197
8a	84.708	14.885	3.052		tel. pole #341197 (average)
9	89.969	143.145	4.426	1207	radio ant. (cement base)
10	89.995	143.125	4.426		radio ant. (cement base)
11	89.993	143.111	4.427		radio ant. (cement base)
11a	89.985	143.127	4.427		radio ant. (average)
12	0.003	-0.001	2.977	1210	temporary bench mark "3035"
13	0.003	-0.000	2.979		temporary bench mark "3035"
14	-0.006	0.000	2.978		temporary bench mark "3035"
14a	0.000	0.000	2.978		TBM 3035 (average)
15	4.333	-0.936	2.726	1212	ACOE bench mark (disturbed)
16	10.184	0.092	2.717	1213	SCCC BM 3035 (disturbed)
999	68.856	-8.787	5.982		geodimeter location

Main-Line Profile

5 October 1989 1215 to 1241 (EDT)

Number of points = 46

min (x, y, z):	-161.738	-0.752	-1.597		
max (x, y, z):	92.355	1.457	3.342		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
17	92.355	-0.032	2.842	1215	onshore to offshore
18	87.587	0.042	2.867		
19	85.262	0.147	3.268		
20	81.411	0.589	3.340		
21	77.558	0.703	3.342		
22	72.453	1.010	3.193		
23	67.018	0.950	2.882		
24	60.973	1.038	2.489		
25	54.748	1.169	2.347		
26	48.760	1.457	2.361		
27	43.188	1.131	2.325		
28	36.873	0.691	2.711		
29	32.143	0.418	2.576		
30	25.466	0.716	1.903		
31	19.899	-0.363	1.942		
32	15.476	-0.015	2.387		
33	11.930	-0.060	2.645		
34	9.444	0.049	2.822		
35	5.025	0.022	2.822		
36	0.086	-0.002	2.629		
37	-1.355	-0.074	2.567		
38	-2.431	0.239	2.143		

39	-7.580	0.158	2.116	
40	-13.216	0.094	1.948	
41	-18.598	0.053	1.811	
42	-23.429	0.106	1.711	
43	-28.782	0.200	1.644	
44	-32.459	0.022	1.625	
45	-35.488	-0.061	1.637	
46	-40.209	0.038	1.476	
47	-44.854	0.112	1.054	
48	-49.501	0.375	0.736	
49	-54.328	0.060	0.579	
50	-58.502	0.250	0.489	
51	-63.631	0.214	0.429	
52	-67.391	0.265	0.376	
53	-72.555	0.014	0.256	
54	-77.355	0.108	0.122	
55	-84.397	0.183	-0.010	
56	-93.754	0.156	-0.229	
57	-104.372	0.136	-0.427	
58	-113.717	-0.235	-0.574	
59	-123.392	-0.585	-0.728	
60	-134.010	-0.752	-0.871	
61	-148.068	0.470	-1.074	
62	-161.738	0.420	-1.597	1241

Sample Locations

5 October 1989 1245 to 1250 (EDT)

Number of points = 3

min (x, y, z): -44.328 0.000 1.077

max (x, y, z): 13.646 0.233 2.501

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
63	-44.328	0.000	1.077	1245	891005-1 (beach face)
64	-11.341	0.100	1.986		891005-2 (backbeach)
65	13.646	0.233	2.501	1250	891005-3 (back dune)

Sullivans Island: Station 3050
 Ref. Point Elev. = 2.724 m (nail on Atlantic Ave.)
 Surveying Crew: Thomas E. Reiss, Rob R. Wertz, and Mike P. Katuna

Reference Point Survey

10 October 1989 1013 to 1026 (EDT)

Number of points = 15

min (x, y, z):	-17.494	-46.336	2.056		
max (x, y, z):	113.761	56.394	2.725		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	113.760	0.208	2.724	1013	reference nail
1	113.752	0.208	2.723		reference nail
2	113.761	0.208	2.725		reference nail
2a	113.758	0.208	2.724		reference nail (average)
3	65.610	-40.740	2.444	1015	corner of house (porch), pt. #1
4	108.618	-46.336	2.623	1016	tel. pole #317690
5	109.290	0.202	2.664	1017	tel. pole #317699
6	109.506	49.241	2.531	1019	tel. pole #317698
7	64.930	56.394	2.494	1021	corner of house (not porch)
8	-0.005	-0.006	2.681	1023	temporary bench mark "3050"
9	0.001	0.002	2.682		temporary bench mark "3050"
10	0.003	0.004	2.681		temporary bench mark "3050"
10a	0.000	0.000	2.681		TBM 3050 (average)
11	-17.494	8.402	2.056	1025	SCCC BM 3050 (disturbed)
999	-7.003	-8.776	2.464		geodimeter location

Main-Line Profile

10 October 1989 1028 to 1107 (EDT)

Number of points = 65

min (x, y, z):	-268.062	-0.320	-2.612		
max (x, y, z):	113.755	0.871	2.727		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
12	113.755	0.178	2.727	1028	onshore to offshore
13	109.229	0.339	2.647		
14	97.824	0.089	2.725		
15	87.459	0.170	2.677		
16	80.237	0.296	2.648		
17	74.172	0.346	2.661		
18	63.648	0.155	2.431		
19	58.231	0.229	2.256		
20	49.566	0.364	2.089		
21	41.998	-0.055	2.059		
22	35.533	-0.003	2.066		
23	30.003	-0.009	2.000		
24	25.238	-0.025	2.050		
25	20.305	0.023	2.029		
26	17.692	0.005	2.080		
27	14.311	0.073	2.107		
28	11.126	0.080	2.226		
29	8.699	0.036	2.221		
30	6.651	0.115	2.108		
31	5.564	0.111	2.020		
32	2.539	0.097	2.111		
33	0.057	0.023	2.231		
34	-0.947	0.021	2.305		
35	-3.185	0.025	2.521		
36	-3.981	0.045	2.309		
37	-5.472	0.131	2.148		
38	-9.147	0.077	1.834		
39	-13.310	0.163	1.754		
40	-17.225	-0.007	1.709		
41	-22.350	0.051	1.711		

42	-27.988	0.025	1.624	
43	-33.494	-0.025	1.440	
44	-38.929	-0.033	1.303	
45	-42.937	-0.038	1.253	
46	-46.469	0.060	1.115	
47	-51.221	0.117	0.898	
48	-56.160	0.085	0.749	
49	-61.036	0.110	0.655	
50	-66.493	0.082	0.562	
51	-71.810	0.094	0.357	
52	-75.915	0.111	0.265	
53	-78.932	0.089	0.278	
54	-81.128	-0.032	0.311	
55	-84.335	0.023	0.337	
56	-88.932	0.112	0.300	
57	-93.992	-0.145	0.184	
58	-96.306	-0.053	0.114	
59	-98.684	-0.238	0.052	
60	-102.949	-0.253	-0.059	
61	-108.621	-0.200	-0.250	
62	-112.937	-0.179	-0.362	
63	-117.491	-0.320	-0.510	
64	-121.482	-0.187	-0.636	
65	-125.220	0.110	-0.834	
66	-130.137	0.399	-1.074	
67	-135.434	0.452	-1.225	
68	-143.208	0.124	-1.300	
69	-153.040	0.294	-1.315	
70	-167.528	0.383	-1.351	
71	-182.939	0.185	-1.377	
72	-201.098	0.498	-1.906	
73	-219.678	0.559	-2.298	
74	-236.795	0.768	-2.432	
75	-251.510	0.871	-2.539	
76	-268.062	0.515	-2.612	1107

Sample Locations

10 October 1989 1110 to 1119 (EDT)

Number of points = 3

min (x, y, z): -99.012 -0.279 0.043

max (x, y, z): 0.848 0.116 2.208

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
77	-99.012	0.000	0.043	1110	891010-1 (beach face)
78	-26.501	-0.279	1.663		891010-2 (backbeach)
79	0.848	0.116	2.208	1119	891010-3 (back dune)

Sullivans Island: Station 3065

Ref. Point Elev. = 2.289 m (nail at intersection of Bayonne St. and 26th St.)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

7 October 1989 0921 to 0943 (EDT)

Number of points = 30

min (x, y, z):	-52.696	-29.976	1.109		
max (x, y, z):	84.583	84.096	3.484		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	84.581	21.314	2.290	0921	reference nail
1	84.553	21.308	2.289		reference nail
2	84.583	21.310	2.290		reference nail
2a	84.573	21.311	2.289		reference nail (average)
3	73.005	26.599	2.465	0923	tel. pole #364087
4	73.036	26.557	2.470		tel. pole #364087
5	73.058	26.523	2.466		tel. pole #364087
5a	73.033	26.560	2.467		tel. pole #364087 (average)
6	71.851	26.333	2.542	0927	tel. pole stump (#172328 ?)
7	71.853	26.331	2.543		tel. pole stump (#172328 ?)
8	71.847	26.328	2.543		tel. pole stump (#172328 ?)
8a	71.850	26.330	2.542		tel. pole stump (average)
9	57.430	6.465	1.134	0929	house corner (ref. pt.)
10	57.426	6.465	1.113		house corner (ref. pt.)
11	57.431	6.466	1.109		house corner (ref. pt.)
11a	57.429	6.466	1.119		house corner (average)
12	50.217	4.765	2.579	0933	corner of wood deck (ref. pt. ?)
13	50.212	4.765	2.582		corner of wood deck (ref. pt. ?)
14	50.212	4.765	2.582		corner of wood deck (ref. pt. ?)
14a	50.214	4.765	2.581		corner of wood deck (average)
15	36.695	84.096	2.579	0937	assumed flag pole location
16	36.709	84.066	2.579		assumed flag pole location
17	36.720	84.059	2.579		assumed flag pole location
17a	36.708	84.073	2.579		flag pole location (average)
18	-0.011	-0.006	3.480	0941	temporary bench mark "3065"
19	-0.004	-0.002	3.483		temporary bench mark "3065"
20	0.015	0.008	3.484		temporary bench mark "3065"
20a	0.000	0.000	3.482		TBM 3065 (average)
21	-0.020	0.498	2.686	0942	SCCC BM 3065 (disturbed)
999	-52.696	-29.976	2.051		geodimeter location

Main-Line Profile

7 October 1989 0958 to 1032 (EDT)

Number of points = 93

min (x, y, z):	-580.606	-0.647	-2.125		
max (x, y, z):	51.419	0.393	3.196		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
22	51.419	0.082	2.949	0958	onshore to offshore
23	51.334	-0.090	2.315		
24	50.742	-0.294	2.735		
25	45.940	0.267	2.831		
26	41.279	-0.033	2.824		
27	38.139	0.056	3.169		
28	33.656	0.282	2.737		
29	31.332	0.283	2.305		
30	25.757	0.046	2.572		
31	18.522	0.381	2.954		
32	11.070	-0.028	3.009		
33	6.229	-0.065	3.196		
34	2.102	-0.036	2.911		
35	-0.003	-0.111	2.792		
36	-4.848	0.131	2.937		

37	-7.111	0.102	2.578
38	-12.368	0.036	2.466
39	-16.065	-0.047	2.491
40	-16.835	0.070	2.669
41	-21.007	-0.019	2.751
42	-22.792	-0.046	2.612
43	-27.561	-0.160	2.456
44	-31.973	-0.218	2.196
45	-34.977	-0.028	2.073
46	-36.657	-0.137	1.692
47	-39.802	0.110	1.566
48	-44.530	0.088	1.504
49	-52.430	-0.306	1.450
50	-52.921	-0.262	1.493
51	-58.994	-0.647	1.497
52	-64.029	-0.031	1.533
53	-69.431	-0.060	1.488
54	-76.024	-0.020	1.453
55	-82.728	-0.453	1.410
56	-88.414	-0.180	1.430
57	-95.234	-0.076	1.252
58	-103.316	0.057	1.119
59	-112.882	-0.155	0.967
60	-122.427	0.061	0.758
61	-132.207	-0.119	0.556
62	-143.063	-0.206	0.383
63	-153.191	-0.216	0.169
64	-158.062	0.088	0.061
65	-162.750	0.262	-0.042
66	-166.895	0.043	-0.157
67	-170.769	0.152	-0.192
68	-174.749	0.067	-0.266
69	-178.696	0.046	0.189
70	-188.172	0.352	0.314
71	-198.174	0.006	0.399
72	-207.398	0.027	0.444
73	-217.386	0.044	0.512
74	-225.888	-0.108	0.577
75	-234.747	-0.236	0.559
76	-243.789	-0.182	0.523
77	-252.517	-0.062	0.427
78	-261.328	-0.084	0.426
79	-270.121	-0.119	0.393
80	-279.396	-0.007	0.328
81	-288.074	-0.138	0.248
82	-296.093	0.018	0.205
83	-304.045	0.093	0.120
84	-312.015	0.174	0.028
85	-315.894	-0.021	-0.045
86	-320.601	-0.119	-0.052
87	-325.532	0.294	-0.122
88	-330.673	-0.061	-0.193
89	-335.832	0.245	-0.195
90	-341.401	0.013	-0.223
91	-347.367	0.124	-0.302
92	-352.567	-0.017	-0.388
93	-359.591	0.312	-0.468
94	-364.745	0.121	-0.497
95	-370.220	0.071	-0.563
96	-376.130	0.257	-0.582
97	-380.961	0.006	-0.640
98	-385.421	0.140	-0.846

99	-393.590	-0.054	-1.009	
100	-403.586	-0.088	-1.108	
101	-416.306	0.101	-1.200	
102	-425.643	0.072	-1.291	
103	-439.628	-0.013	-1.383	
104	-453.248	0.073	-1.453	
105	-468.584	-0.512	-1.573	
106	-469.971	-0.023	-1.594	
107	-484.690	-0.288	-1.604	
108	-485.107	-0.213	-1.615	
109	-500.043	-0.305	-1.747	
110	-515.343	-0.313	-1.780	
111	-531.192	-0.149	-1.795	
112	-544.469	-0.169	-1.962	
113	-561.833	0.393	-2.055	
114	-580.606	-0.557	-2.125	1032

Sample Locations

7 October 1989 1040 to 1047 (EDT)

Number of points = 3

min (x, y, z):	-279.972	-36.993	0.321		
max (x, y, z):	4.934	0.000	3.162		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
115	-279.972	0.000	0.321	1040	891007-1 (beach face)
116	-75.387	-36.993	1.840		891007-2 (backbeach)
117	4.934	-0.022	3.162	1047	891007-3 (back dune)

Sullivans Island: Station 3080

Bench Mark Elev. = 2.970 m Ref. Nail Elev. = 2.702 m (nail on Marshall Blvd.)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

7 October 1989 1219 to 1225 (EDT)

Number of points = 23

min (x, y, z): -0.008 -36.555 2.100

max (x, y, z): 162.246 29.937 4.240

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	162.246	-0.415	2.720	1219	reference nail
1	162.238	-0.424	2.718		reference nail
2	162.246	-0.415	2.720	1220	reference nail
2a	162.243	-0.418	2.719		reference nail (average)
3	-0.000	-0.003	2.972	1224	SCCC bench mark "3080"
4	-0.008	0.009	2.968		SCCC bench mark "3080"
5	0.008	-0.005	2.970	1225	SCCC bench mark "3080"
5a	0.000	0.000	2.970		SCCC BM 3080 (average)
89	128.191	29.935	4.240	1341	house ref. point (main house)
90	128.200	29.936	4.231		house ref. point (main house)
91	128.202	29.937	4.232	1343	house ref. point (main house)
91a	128.198	29.936	4.234		house ref. pt. (average)
92	119.563	28.001	2.788	1344	house ref. point (porch loc.)
93	154.649	-0.301	2.951	1351	tel. pole #72571
94	154.684	-0.342	2.954		tel. pole #72571
95	154.668	-0.347	2.954	1352	tel. pole #72571
95a	154.667	-0.330	2.953		tel. pole #72571 (average)
96	122.099	-24.190	2.107	1353	house ref. point (north)
97	122.090	-24.093	2.108		house ref. point (north)
98	122.085	-24.114	2.100	1355	house ref. point (north)
98a	122.091	-24.132	2.105		house ref. pt. (average)
99	-2.142	-18.410	2.531	1356	ACOE bench mark (disturbed)
999	41.346	-36.555	2.966		geodimeter location

Main-Line Survey

7 October 1989 1235 to 1306 (EDT)

Number of points = 80

min (x, y, z): -564.820 -8.636 -0.983

max (x, y, z): 162.144 0.862 3.109

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
70	162.144	-0.448	2.742	1327	reference nail location
71	157.492	-0.445	2.706		
72	128.904	0.862	2.855		
73	119.432	-0.356	2.834		
74	107.593	-1.542	2.762		
75	95.202	-2.329	2.837		
76	82.308	-2.926	2.676		
77	69.362	-2.418	2.051		
78	54.518	-2.252	1.903		
79	50.864	-1.126	3.109		
80	43.865	-0.024	2.649		
81	39.105	0.473	2.573		
82	36.308	0.581	2.233		
83	31.741	0.660	1.890		
84	27.185	-0.130	2.348		
85	19.544	0.079	2.099		
86	14.225	-0.119	1.928		
87	9.904	0.226	2.184		
6	8.734	-0.645	2.290	1235	landward of bench mark
88	6.255	0.109	2.471	1338	bench mark location
7	5.447	-0.041	2.605		
8	1.709	-0.082	3.098		

9	0.097	0.023	3.019		
10	-3.925	0.016	2.759		
11	-14.490	-0.275	2.509		
12	-25.558	0.014	1.980		
13	-39.189	0.006	1.604		
14	-50.735	-0.734	1.314		
15	-64.829	0.156	1.210		
16	-76.785	-0.164	0.761		
17	-82.540	0.419	0.627		
18	-88.704	0.169	0.565		
19	-92.761	0.160	0.471		
20	-94.364	0.266	0.499		
21	-95.185	0.258	0.577		
22	-99.656	0.248	0.474		
23	-103.740	0.036	0.321		
24	-107.862	0.250	0.229		
25	-113.265	0.362	0.209		
26	-118.919	0.204	0.104		
27	-124.422	0.277	0.022		
28	-129.567	0.390	-0.030		
29	-134.627	0.459	-0.066		
30	-140.223	0.396	-0.136		
31	-146.927	0.331	-0.152		
32	-152.795	0.284	-0.164		
33	-159.610	0.150	-0.179		
34	-168.061	0.329	-0.136		
35	-177.774	0.644	-0.185		
36	-189.074	0.214	-0.169		
37	-199.894	0.292	-0.139		
38	-209.413	0.444	-0.169		
39	-221.103	0.109	-0.223		
40	-234.154	0.234	-0.249		
41	-244.770	0.748	-0.363		
42	-258.309	0.273	-0.421		
43	-269.445	0.305	-0.465		
44	-280.578	-0.294	-0.550		
45	-295.236	-0.127	-0.576		
46	-309.925	0.041	-0.506		
47	-321.334	-0.142	-0.448		
48	-334.212	0.720	-0.390		
49	-346.317	-0.700	-0.287		
50	-355.938	0.280	-0.251		
51	-368.854	-0.187	-0.083		
52	-381.317	0.257	-0.224		
53	-392.250	0.248	-0.024		
54	-403.302	-0.203	0.054		
55	-412.734	0.005	0.033		
56	-427.525	0.171	-0.053		
57	-436.881	0.204	0.100		
58	-448.561	-0.093	-0.033		
59	-461.028	-0.208	-0.169		
60	-473.973	-0.773	-0.300		
61	-484.447	-3.712	-0.379		
62	-498.939	-0.497	-0.236		
63	-514.918	-0.644	-0.282		
64	-527.047	0.095	-0.571		
65	-541.792	-3.307	-0.707		
66	-564.820	-8.636	-0.983	1306	offshore

Sample Locations

7 October 1989 1316 to 1321 (EDT)

Number of points = 3

min (x, y, z):	-76.546	-0.235	0.724		
max (x, y, z):	51.036	0.185	3.027		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
67	-76.546	0.000	0.724	1316	891007-4 (beach face)
68	-12.095	0.185	2.524		891007-5 (backbeach)
69	51.036	-0.235	3.027	1321	891007-6 (back dune)

Sullivans Island: Station 3090

Bench Mark Elev. = 3.000 m Ref. Nail Elev. = 2.603 m (nail on Marshall Blvd.)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

6 October 1989 1115 to 1128 (EDT)

Number of points = 21

min (x, y, z): -9.291 -4.302 2.068
max (x, y, z): 21.621 73.593 3.001

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	21.621	0.018	2.611	1115	reference nail
1	21.613	0.016	2.610		reference nail
2	21.606	0.016	2.610	1117	reference nail
2a	21.613	0.017	2.610		reference nail (average value)
3	0.001	0.000	3.001	1121	SCCC bench mark "3090"
4	-0.004	-0.002	2.998		SCCC bench mark "3090"
5	0.004	0.002	3.000	1123	SCCC bench mark "3090"
5a	0.000	0.000	3.000		SCCC BM 3090 (average)
6	14.517	-2.625	2.629	1124	tel. pole #301795
7	14.522	-2.625	2.629		tel. pole #301795
8	14.524	-2.625	2.631	1125	tel. pole #301795
8a	14.521	-2.625	2.630		tel. pole #301795 (average)
9	1.951	2.444	2.641	1126	tel. pole #272552
10	1.963	2.451	2.642		tel. pole #272552
11	1.966	2.452	2.642		tel. pole #272552
11a	1.960	2.449	2.642		tel. pole #272552 (average)
12	4.531	73.578	2.612	1127	tel. pole #305598
13	4.533	73.592	2.602		tel. pole #305598
14	4.534	73.593	2.603	1128	tel. pole #305598
14a	4.533	73.588	2.606		tel. pole #305598 (average)
999	-9.291	-4.302	2.068		geodimeter location

Main-Line Survey

6 October 1989 1129 to 1149 (EDT)

Number of points = 25

min (x, y, z): -82.757 -0.472 -1.827
max (x, y, z): 21.586 0.455 2.975

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
15	21.586	0.006	2.609	1129	reference nail location
16	16.650	0.037	2.871		
17	11.836	0.189	2.651		
18	6.275	0.048	2.742		
19	1.858	-0.092	2.851		
20	-0.257	0.051	2.956		
21	-1.452	0.145	2.975		
22	-1.726	0.172	2.630		
23	-7.044	-0.038	2.258		
24	-13.902	-0.472	1.901		
25	-19.030	-0.361	1.718		
26	-25.071	-0.344	1.606		
27	-29.490	-0.167	1.537		
28	-33.880	0.076	1.208		boulders: shore protection
29	-37.055	-0.057	1.040		boulders: shore protection
30	-40.302	0.017	0.914		
31	-43.653	-0.001	0.779		
32	-48.241	0.025	0.584		
33	-53.808	-0.023	0.362		
34	-58.491	0.197	0.109		
35	-61.741	0.183	-0.131		
36	-65.816	0.455	-0.486		
37	-71.346	0.130	-0.756		
38	-78.341	0.384	-1.226		

39 -82.757 -0.211 -1.827 1149 offshore

Sample Locations

6 October 1989 1151 to 1154 (EDT)

Number of points = 3

min (x, y, z): -41.761 -0.259 0.876

max (x, y, z): 10.959 0.000 2.657

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
40	-41.761	0.000	0.876	1151	891006-1 (beach face)
41	-12.091	-0.259	2.031		891006-2 (backbeach)
42	10.959	-0.008	2.657	1154	891006-3 (back dune)

Sullivans Island: Station 3095
 Ref. Nail Elev. = 2.715 m (nail on Station 32nd St.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

6 October 1989 1315 to 1346 (EDT)

Number of points = 34

min (x, y, z):	-401.558	-514.749	2.594		
max (x, y, z):	97.480	62.222	3.825		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	97.480	-0.688	2.711	1315	reference nail
1	97.468	-0.692	2.717		reference nail
2	97.444	-0.689	2.716		reference nail
2a	97.464	-0.690	2.715		reference nail (average)
3	-0.013	-0.003	3.003	1320	temporary bench mark "3095"
4	0.015	0.004	3.002		temporary bench mark "3095"
5	-0.001	0.000	3.004		temporary bench mark "3095"
5a	0.000	0.000	3.003		TBM 3095 (average)
6	19.925	-1.574	2.727	1321	SCCC BM 3095 (disturbed)
7	76.028	5.988	2.736	1323	telephone pole #029783
8	76.028	6.000	2.738		telephone pole #029783
9	76.031	6.007	2.738		telephone pole #029783
9a	76.029	5.998	2.737		tel. pole #029783 (average)
10	58.308	22.548	2.768	1324	telephone pole #317704
11	58.335	22.544	2.767		telephone pole #317704
12	58.329	22.538	2.770		telephone pole #317704
12a	58.324	22.543	2.768		tel. pole #317704 (average)
13	-14.924	62.202	2.595	1326	telephone pole #283682
14	-14.924	62.209	2.594		telephone pole #283682
15	-14.929	62.222	2.594		telephone pole #283682
15a	-14.926	62.211	2.594		tel. pole #283682
16	-317.891	-514.747	3.813	1332	NOS BM "B.I. NO 4 1975"
17	-317.892	-514.749	3.819		NOS BM "B.I. NO 4 1975"
18	-317.922	-514.718	3.825		NOS BM "B.I. NO 4 1975"
18a	-317.902	-514.738	3.819		NOS bench mark (average)
19	-391.920	-339.719	2.715	1339	temporary bench mark "3100"
20	-391.862	-339.677	2.720		temporary bench mark "3100"
21	-391.931	-339.701	2.720		temporary bench mark "3100"
21a	-391.904	-339.699	2.718		TBM 3100 (average)
22	-401.558	-475.155	2.892	1345	ref. nail at Station 3100
23	-401.503	-475.215	2.880		ref. nail at Station 3100
24	-401.475	-475.221	2.898		ref. nail at Station 3100
24a	-401.512	-475.197	2.890		ref. nail at 3100 (average)
999	21.554	5.227	2.841		geodimeter location

Main-Line Survey

6 October 1989 1352 to 1413 (EDT)

Number of points = 34

min (x, y, z):	-108.685	-1.268	-1.849		
max (x, y, z):	97.456	1.556	3.083		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
25	97.456	-0.663	2.712	1352	reference nail location
26	74.418	-0.386	2.687		
27	63.181	-0.609	2.802		
28	52.403	-0.986	2.818		
29	41.109	-1.268	2.962		
30	35.001	-0.251	2.960		
31	28.085	-0.232	2.851		
32	21.180	-0.085	2.799		
33	14.671	-0.165	3.083		
34	7.445	0.002	2.909		
35	2.668	-0.075	2.817		

36	0.067	0.006	2.579		
37	-5.987	0.022	2.346		
38	-12.352	-0.133	2.105		
39	-17.353	0.037	1.931		
40	-19.310	0.112	1.781		
41	-23.910	0.128	1.411		
42	-28.775	0.061	1.125		
43	-33.563	0.114	0.884		
44	-38.602	0.102	0.692		
45	-43.657	0.170	0.542		
46	-48.623	0.344	0.419		
47	-52.832	0.137	0.232		
48	-57.173	0.317	0.116		
49	-61.224	0.307	-0.261		
50	-65.255	0.429	-0.456		
51	-68.946	0.462	-0.526		
52	-72.781	0.547	-0.618		
53	-76.762	0.469	-0.662		
54	-82.702	0.553	-0.731		
55	-91.622	0.695	-0.907		
56	-99.771	0.922	-1.181		
57	-105.412	1.311	-1.557		
58	-108.685	1.556	-1.849	1413	offshore

Sample Locations

6 October 1989 1415 to 1419 (EDT)

Number of points = 3

min (x, y, z): -37.368 0.000 0.688

max (x, y, z): 38.020 0.079 3.074

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
59	-37.368	0.000	0.688	1415	891006-4 (beach face)
60	-1.196	0.026	2.507		891006-5 (backbeach)
61	38.020	0.079	3.074	1419	891006-6 (back dune)

Isle of Palms: Station 3100
 Ref. Nail Elev. = 2.949 m (nail on Ocean Blvd.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

4 October 1989 1500 to 1510 (EDT)

Number of points = 18

min (x, y, z):	-135.941	-16.248	2.447		
max (x, y, z):	33.565	86.180	4.240		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	169.466	86.180	3.869	1442	NOS BM "B.I. NO 4 1975"
1	169.475	86.178	3.871		NOS BM "B.I. NO 4 1975"
2	169.506	86.161	3.860		NOS BM "B.I. NO 4 1975"
2a	169.482	86.173	3.867		NOS bench mark (average)
3	150.362	67.691	4.235	1445	telephone pole #71478
4	150.354	67.701	4.235		telephone pole #71478
5	150.364	67.697	4.240		telephone pole #71478
5a	150.360	67.696	4.237		tel. pole #71478 (average)
6	156.745	-16.238	2.688	1449	corner of house #102 Charleston
7	156.747	-16.226	2.687		corner of house #102 Charleston
8	156.750	-16.248	2.681		corner of house #102 Charleston
8a	156.747	-16.237	2.685		corner of house (average)
9	135.941	0.000	2.947	1454	reference nail
10	135.949	0.021	2.951		reference nail
11	135.937	-0.003	2.948		reference nail
11a	135.942	0.006	2.949		reference nail (average)
126	20.495	21.002	2.947	1627	Isle of Palms Beach Mon. Marker
999	0.000	0.000	2.447		geodimeter location

Main-Line Survey

4 October 1989 1513 to 1600 (EDT)

Number of points = 111

min (x, y, z):	-706.493	-0.368	-1.074		
max (x, y, z):	-0.008	2.132	3.977		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
12	135.933	-0.003	2.953	1513	reference nail location
13	130.908	0.018	2.739		
14	128.154	-0.012	2.844		
15	126.188	-0.010	3.069		
16	123.651	-0.011	2.996		
17	120.703	0.082	3.056		
18	117.113	0.017	3.037		
19	114.153	0.008	3.136		
20	111.437	-0.054	2.982		
21	108.367	-0.019	3.074		
22	105.901	-0.025	3.344		
23	102.816	-0.014	2.890		
24	99.751	-0.013	3.018		
25	96.475	0.007	2.972		
26	93.260	-0.007	3.226		
27	90.478	0.004	3.167		
28	87.776	0.000	3.246		
29	84.732	0.020	3.285		
30	80.810	0.020	3.977		
31	77.693	0.018	3.433		
32	76.660	0.018	2.781		
33	74.215	-0.145	2.386		
34	70.685	-0.088	2.418		
35	67.237	0.102	2.799		
36	64.922	0.283	3.219		
37	63.592	0.195	3.360		
38	60.698	0.124	2.789		

39	56.654	0.143	2.040
40	53.436	0.211	2.217
41	51.315	0.248	2.580
42	47.665	0.492	2.011
43	44.460	0.066	2.106
44	41.909	0.053	2.393
45	39.648	-0.008	2.324
46	37.537	0.032	1.987
47	36.899	0.019	1.857
48	33.089	-0.103	1.969
49	30.361	-0.110	2.135
50	27.864	-0.122	2.313
51	25.380	-0.060	2.316
52	22.036	-0.193	2.521
53	21.485	-0.152	2.256
54	18.496	-0.151	2.034
55	16.299	-0.077	2.128
56	13.896	-0.010	2.261
57	10.903	0.033	2.438
58	7.858	0.027	2.573
59	4.531	-0.045	2.498
60	-1.836	0.119	2.446
61	-10.651	-0.368	1.981
62	-16.016	-0.233	1.820
63	-21.604	-0.206	1.745
64	-27.614	-0.158	1.706
65	-33.861	-0.216	1.638
66	-39.774	-0.257	1.526
67	-45.723	-0.168	1.424
68	-51.510	-0.343	1.453
69	-56.543	0.041	1.436
70	-62.084	-0.006	1.302
71	-67.614	-0.050	1.089
72	-72.141	0.055	0.977
73	-76.933	0.015	0.858
74	-81.910	0.065	0.789
75	-87.305	-0.007	0.736
76	-93.220	0.116	0.686
77	-99.122	0.235	0.665
78	-105.006	0.082	0.637
79	-110.624	0.122	0.596
80	-115.783	0.240	0.593
81	-121.727	0.419	0.579
82	-127.684	0.353	0.517
83	-134.257	0.492	0.431
84	-140.230	0.506	0.368
85	-146.761	0.783	0.279
86	-152.962	0.604	0.205
87	-160.134	0.660	0.124
88	-166.950	0.703	0.100
89	-173.681	0.660	0.070
90	-180.237	0.594	-0.032
91	-189.849	0.098	-0.057
92	-197.042	0.653	-0.116
93	-205.073	1.106	-0.206
94	-213.727	0.661	-0.267
95	-222.549	0.591	-0.261
96	-232.313	0.608	-0.298
97	-241.642	0.679	-0.692
98	-249.245	0.706	-0.741
99	-258.263	0.879	-0.769
100	-266.692	0.634	-0.733

101	-274.337	0.476	-0.722		
102	-289.694	-0.104	-0.625		
103	-305.386	-0.234	-0.999		
104	-312.799	0.746	-1.036		
105	-323.320	0.288	-1.074		
106	-330.523	1.118	-1.060		
107	-339.723	0.955	-0.934		
108	-354.112	0.841	-0.898		
109	-366.107	0.206	-0.898		
110	-377.893	0.044	-0.910		
111	-391.170	0.250	-0.730		
112	-404.306	-0.106	-0.778		
113	-423.076	1.579	-0.785		
114	-441.393	1.228	-0.794		
115	-455.799	1.971	-0.756		
116	-474.933	2.132	-0.699		
117	-493.709	1.991	-0.740		
118	-511.555	1.632	-0.754		
119	-528.125	1.884	-0.626		
120	-537.600	0.615	-0.603		
121	-550.694	0.566	-0.367		
122	-570.552	-0.221	-0.654	1600	offshore

Sample Locations

4 October 1989 1613 to 1625 (EDT)

Number of points = 3

min (x, y, z): -283.845 -0.247 0.298

max (x, y, z): -89.120 0.427 2.019

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
123	-147.904	0.427	0.298	1613	891004-1 (beach face)
124	-45.992	0.165	1.436		891004-2 (backbeach)
125	46.821	-0.247	2.019	1625	891004-3 (back dune)

Isle of Palms: Station 3110

bench Mark Elev. = 3.024 m Ref. Nail Elev. = 2.931 m (nail on Ocean Blvd.)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

5 October 1989 1438 to 1449 (EDT)

Number of points = 17

min (x, y, z):	-0.001	-34.995	2.031		
max (x, y, z):	130.612	39.347	3.033		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	63.506	-0.069	2.928	1438	reference nail
1	63.508	-0.069	2.925		reference nail
2	63.498	-0.063	2.925	1439	reference nail
2a	63.504	-0.067	2.926		reference nail (average)
3	130.604	-34.990	2.031	1440	tel. pole #149067
4	130.611	-34.994	2.037		tel. pole #149067
5	130.612	-34.995	2.036	1443	tel. pole #149067
5a	130.609	-34.993	2.035		tel. pole #149067 (ave. value)
6	102.136	22.023	2.459	1444	house corner at #218
7	102.133	22.022	2.460		house corner at #218
8	102.133	22.022	2.458	1445	house corner at #218
8a	102.134	22.022	2.459		house corner (average value)
9	0.001	0.023	3.023	1448	SCCC bench mark "3110"
10	-0.001	-0.011	3.025		SCCC bench mark "3110"
11	-0.001	-0.011	3.024	1449	SCCC bench mark "3110"
11a	0.000	0.000	3.024		SCCC BM 3110 (average)
999	2.573	39.347	3.033		geodimeter location

Main-Line Survey

5 October 1989 1451 to 1515 (EDT)

Number of points = 54

min (x, y, z):	-299.868	-1.347	-2.352		
max (x, y, z):	63.481	1.092	3.046		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
12	63.481	-0.078	2.925	1451	near reference nail locat.
13	57.111	0.474	2.801		
14	51.938	0.275	2.815		
15	45.296	-0.034	2.893		
16	38.018	-0.084	2.949		
17	30.086	-0.037	3.004		
18	25.546	-0.001	3.012		
19	1.808	0.208	3.038		
20	-0.123	-0.014	3.046		
21	-4.120	0.250	2.866		
22	-8.017	-0.221	2.603		
23	-8.558	-0.142	2.419		
24	-13.629	-0.112	2.221		
25	-19.530	-0.109	2.022		
26	-25.940	-0.019	1.840		
27	-32.228	0.133	1.710		
28	-39.545	0.130	1.591		
29	-44.528	0.013	1.540		
30	-49.569	0.035	1.480		
31	-55.535	0.178	1.457		
32	-60.504	0.017	1.518		
33	-65.463	0.160	1.496		
34	-71.381	0.222	1.316		
35	-77.410	-0.073	1.078		
36	-82.457	0.076	0.838		
37	-87.721	0.013	0.760		
38	-92.814	0.161	0.895		
39	-99.162	0.100	0.725		

40	-104.459	0.156	0.614		
41	-109.834	-0.018	0.569		
42	-115.013	0.053	0.388		
43	-119.925	0.257	0.151		
44	-125.652	0.140	-0.047		
45	-132.815	0.315	-0.177		
46	-138.920	0.027	-0.171		
47	-144.941	0.281	-0.189		
48	-151.375	0.367	-0.200		
49	-156.271	0.436	-0.158		
50	-160.722	0.265	-0.195		
51	-167.674	0.284	-0.154		
52	-175.235	0.023	-0.258		
53	-183.111	-0.034	-0.371		
54	-190.512	-0.229	-0.470		
55	-197.338	0.318	-0.769		
56	-205.677	1.062	-1.076		
57	-215.069	0.771	-1.288		
58	-224.452	1.092	-1.378		
59	-231.425	0.297	-1.305		
60	-242.178	0.923	-1.210		
61	-255.068	1.070	-1.195		
62	-266.265	0.134	-1.505		
63	-279.071	0.614	-1.854		
64	-289.086	0.061	-2.180		
65	-299.868	-1.347	-2.352	1515	offshore

Sample Locations

5 October 1989 1519 to 1526 (EDT)

Number of points = 3

min (x, y, z): -112.214 -0.073 0.494

max (x, y, z): 0.671 0.005 3.104

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
66	-112.214	0.000	0.494	1519	891005-4 (beach face)
67	-22.210	-0.073	1.953		891005-5 (backbeach)
68	0.671	0.005	3.104	1526	891005-6 (back dune)

Isle of Palms: Station 3115

bench mark Elev. = 3.335 m Ref. Nail Elev. = 3.209 m (nail on Ocean Blvd.)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

5 October 1989 1635 to 1646 (EDT)

Number of points = 17

min (x, y, z): -0.002 -16.084 3.218

max (x, y, z): 76.413 24.595 3.409

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	61.260	0.076	3.219	1635	reference nail
1	61.249	0.072	3.218		reference nail
2	61.235	0.068	3.219	1636	reference nail
2a	61.248	0.072	3.219		reference nail (average)
3	69.510	-16.083	3.243	1639	tel. pole #69235
4	69.515	-16.083	3.231		tel. pole #69235
5	69.517	-16.084	3.231	1640	tel. pole #69235
5a	69.514	-16.083	3.235		tel. pole #69235 (average)
6	76.413	24.595	3.271	1641	corner of house #527
7	76.406	24.583	3.266		corner of house #527
8	76.403	24.593	3.264	1643	corner of house #527
8a	76.407	24.590	3.267		corner of house (average)
9	0.002	-0.002	3.335	1645	SCCC bench mark "3115"
10	-0.001	0.001	3.335		SCCC bench mark "3115"
11	-0.002	0.002	3.335	1646	SCCC bench mark "3115"
11a	0.000	0.000	3.335		SCCC BM 3115 (average)
999	15.782	-14.430	3.409		geodimeter location

Main-Line Survey

5 October 1989 1647 to 1714 (EDT)

Number of points = 56

min (x, y, z): -277.899 -0.849 -2.722

max (x, y, z): 61.256 0.795 3.893

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
12	61.256	0.083	3.218	1647	start at reference nail
13	56.066	0.057	3.150		
14	51.988	0.317	3.106		
15	48.400	0.472	2.996		
16	44.035	0.273	3.893		
17	38.365	-0.085	3.786		
18	33.849	-0.014	3.598		
19	28.574	-0.071	3.069		
20	23.540	-0.059	3.136		
21	20.035	-0.020	3.018		
22	16.085	0.048	3.472		
23	11.306	0.160	3.444		
24	6.348	0.213	3.520		
25	2.287	0.196	3.370		
26	-0.279	-0.008	3.172		
27	-5.905	0.028	2.987		
28	-7.352	0.043	2.409		
29	-14.887	0.509	2.203		
30	-22.245	0.789	1.995		
31	-29.323	0.678	1.812		
32	-36.994	0.543	1.638		
33	-44.711	0.703	1.586		
34	-52.995	0.424	1.507		
35	-59.146	0.354	1.234		
36	-66.698	-0.030	0.933		
37	-72.417	-0.162	0.819		
38	-77.857	-0.037	0.762		
39	-83.583	0.002	0.646		

40	-89.347	0.025	0.568		
41	-94.791	-0.077	0.475		
42	-100.902	-0.035	0.266		
43	-106.267	-0.024	-0.090		
44	-112.601	-0.053	-0.222		
45	-117.818	0.041	-0.247		
46	-122.983	0.098	-0.216		
47	-128.668	-0.023	-0.178		
48	-134.071	-0.000	-0.250		
49	-139.358	0.081	-0.336		
50	-146.892	0.221	-0.237		
51	-153.479	0.217	-0.367		
52	-158.930	0.232	-0.422		
53	-164.054	0.533	-0.534		
54	-170.069	0.118	-0.657		
55	-176.500	-0.041	-1.149		
56	-183.960	0.081	-1.273		
57	-190.483	-0.186	-1.339		
58	-199.105	0.122	-1.412		
59	-208.466	0.195	-1.312		
60	-215.944	-0.001	-1.196		
61	-223.732	-0.849	-1.206		
62	-231.280	0.444	-1.390		
63	-240.469	0.426	-1.548		
64	-250.884	0.423	-2.046		
65	-260.460	0.795	-2.340		
66	-268.447	0.108	-2.580		
67	-277.899	-0.659	-2.722	1714	offshore

Sample Locations

5 October 1989 1718 to 1724 (EDT)

Number of points = 3

min (x, y, z): -104.750 -0.431 0.040

max (x, y, z): 12.925 0.028 3.397

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
68	-104.750	0.000	0.040	1718	891005-7 (beach face)
69	-23.409	0.028	1.965		891005-8 (backbeach)
70	12.925	-0.431	3.397	1724	891005-9 (back dune)

Isle of Palms: Station 3120
 Ref. Nail Elev. = 3.196 m (nail on Ocean Blvd.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey
 6 October 1989 1750 to 1757 (EDT)
 Number of points = 21

min (x, y, z):	18.958	-51.860	3.196		
max (x, y, z):	76.308	5.060	3.626		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	49.064	-0.039	3.196	1750	reference nail
1	49.076	-0.041	3.196		reference nail
2	49.077	-0.041	3.196		reference nail
2a	49.072	-0.040	3.196		reference nail (average)
3	76.284	5.059	3.443		house corner
4	76.287	5.058	3.440		house corner
5	76.308	5.060	3.441		house corner
5a	76.293	5.059	3.441		house corner (average)
6	54.212	-9.461	3.373		telephone pole #69294
7	54.208	-9.460	3.373		telephone pole #69294
8	54.210	-9.461	3.372		telephone pole #69294
8a	54.210	-9.461	3.373		tel. pole #69294 (ave. value)
9	46.218	-51.831	3.235		concrete wall corner
10	46.228	-51.851	3.232		concrete wall corner
11	46.232	-51.860	3.234	1757	concrete wall corner
11a	46.226	-51.847	3.234		wall corner (average)
88	0.020	-0.013	3.335	1842	temporary bench mark "3120"
89	-0.023	0.001	3.336	1844	temporary bench mark "3120"
90	0.005	0.006	3.336		temporary bench mark "3120"
90a	0.001	-0.002	3.336		TBM 3120 (average)
999	18.958	3.360	3.626		geodimeter location

Main-Line Survey
 6 October 1989 1758 to 1828 (EDT)
 Number of points = 73

min (x, y, z):	-275.465	-2.083	-2.792		
max (x, y, z):	49.104	0.637	4.289		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
12	49.104	-0.047	3.197	1758	reference nail location
13	41.160	-0.149	2.839		
14	37.351	-0.427	3.017		
15	33.150	-0.930	3.481		
16	28.558	0.011	4.289		
17	26.519	0.029	3.985		
18	23.806	-0.129	3.544		
19	20.531	-0.235	3.708		
20	16.213	0.023	3.552		
21	13.759	0.130	3.634		
22	13.061	0.020	3.542		
23	12.004	-0.015	3.580		
24	10.497	0.061	3.926		
25	9.079	-0.016	3.920		
26	7.603	-0.047	3.741		
27	7.136	-0.065	3.307		
28	5.438	-0.047	3.022		
29	1.892	0.072	2.873		
30	-0.046	-0.040	2.823		
31	-4.734	0.159	2.681		
32	-10.856	0.206	2.455		
33	-17.875	0.301	2.187		
34	-23.166	0.437	2.129		
35	-28.158	0.415	1.922		

36	-32.436	0.370	1.863		
37	-33.985	0.433	1.865		
38	-38.378	0.571	1.710		
39	-42.802	0.637	1.641		
40	-46.753	0.624	1.573		
41	-51.498	-0.002	1.637		
42	-54.053	-0.044	1.620		
43	-58.754	0.051	1.363		
44	-63.691	-0.109	1.067		
45	-66.715	-0.249	0.907		
46	-70.209	-0.142	0.901		
47	-73.937	-0.226	0.891		
48	-77.341	0.027	0.826		
49	-81.305	0.045	0.699		
50	-85.595	0.097	0.559		
51	-88.842	0.229	0.447		
52	-92.209	0.140	0.294		
53	-95.143	0.266	0.080		
54	-99.821	-0.046	-0.095		
55	-105.082	0.065	-0.297		
56	-109.699	-0.007	-0.378		
57	-114.293	0.041	-0.398		
58	-116.184	0.249	-0.320		
59	-117.136	0.267	-0.001		
60	-122.617	0.012	0.100		
61	-128.378	-0.125	-0.006		
62	-134.426	-0.192	-0.139		
63	-140.375	-0.190	-0.270		
64	-145.774	-0.033	-0.382		
65	-150.567	-0.095	-0.445		
66	-155.785	-0.178	-0.590		
67	-160.904	0.474	-0.847		
68	-166.204	-0.060	-1.125		
69	-170.458	0.401	-1.251		
70	-175.494	-0.318	-1.290		
71	-180.814	0.027	-1.282		
72	-186.929	-0.489	-1.412		
73	-193.912	-0.343	-1.516		
74	-197.953	0.226	-1.436		
75	-203.020	-0.195	-1.293		
76	-210.586	0.200	-1.062		
77	-217.470	-0.120	-1.127		
78	-227.205	-0.430	-1.423		
79	-238.523	-0.649	-1.797		
80	-248.609	-0.542	-2.226		
81	-257.153	-2.083	-2.444		
83	-266.115	-0.811	-2.758		
82	-266.681	-0.617	-2.682		
84	-275.465	-1.550	-2.792	1828	offshore

Sample Locations

6 October 1989 1833 to 1840 (EDT)

Number of points = 3

min (x, y, z): -136.641 -0.008 -0.196

max (x, y, z): 21.546 0.263 3.573

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
87	21.546	0.263	3.573	1833	891006-10 (beach face)
86	-14.174	-0.008	2.320		891006-11 (backbeach)
85	-136.641	0.000	-0.196	1840	891006-12 (back dune)

Isle of Palms: Station 3125

Bench Mark Elev. = 2.059 m Ref. Nail Elev. = 2.733 m (nail on Ocean Blvd.)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

6 October 1989 1515 to 1527 (EDT)

Number of points = 33

min (x, y, z):	2.388	-53.235	1.103		
max (x, y, z):	114.927	63.742	3.492		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	114.911	63.742	2.733	1515	reference nail
1	114.927	63.737	2.731		reference nail
2	114.925	63.738	2.730	1517	reference nail
2a	114.921	63.739	2.731		ref. nail (average)
3	87.841	53.279	2.642	1519	tel. pole (#281093)
4	87.806	53.341	2.642		tel. pole (#281093)
5	87.825	53.327	2.641	1519	tel. pole (#281093)
5a	87.824	53.316	2.642		tel. pole #281093 (average)
6	89.081	22.207	2.628	1520	tel. pole (#281094)
7	89.080	22.214	2.625		tel. pole (#281094)
8	89.084	22.218	2.622	1521	tel. pole (#281094)
8a	89.082	22.213	2.625		tel. pole #281094 (average)
9	40.633	48.205	2.392	1523	cement slab (vertical face)
10	40.630	48.206	2.393		cement slab (vertical face)
11	40.630	48.205	2.393	1524	cement slab (vertical face)
11a	40.631	48.205	2.393		cement slab (average)
12	105.628	-53.235	3.015	1525	hotel ref. pt. (corner)
13	105.630	-53.229	3.013		hotel ref. pt. (corner)
14	105.631	-53.227	3.014	1526	hotel ref. pt. (corner)
14a	105.629	-53.230	3.014		hotel ref. pt. (average)
15	73.244	-41.757	3.491	1527	yellow standpipe ("11 ft")
16	73.202	-41.740	3.492		yellow standpipe ("11 ft")
17	73.190	-41.735	3.490	1528	yellow standpipe ("11 ft")
17a	73.212	-41.744	3.491		yellow standpipe "11 ft" (ave.)
78	73.812	0.399	2.903	1611	yellow standpipe #2 , top
79	73.819	0.400	2.904		yellow standpipe #2 , top
80	73.826	0.385	2.902	1613	yellow standpipe #2 , top
80a	73.819	0.395	2.903		yellow standpipe #2 (average)
81	-0.001	0.006	2.059	1614	SCCC bench mark "3125"
82	0.002	-0.009	2.059		SCCC bench mark "3125"
83	-0.001	0.004	2.060	1616	SCCC bench mark "3125"
83a	0.000	0.000	2.059		SCCC BM 3125 (average)
999	2.388	-12.028	2.311		geodimeter location

Main-Line Survey

6 October 1989 1529 to 1600 (EDT)

Number of points = 57

min (x, y, z):	-233.948	-2.741	-2.457		
max (x, y, z):	103.140	1.069	2.998		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
18	103.140	0.170	2.998	1529	near hotel foundation
19	95.219	0.676	2.866		
20	85.871	0.678	2.689		
21	77.283	0.585	2.610		
22	73.907	0.495	2.479		
24	64.465	0.701	2.494		
23	64.461	0.658	2.494		
25	57.405	0.623	2.373		
26	46.177	0.867	2.258		
27	38.492	1.069	2.288		
28	30.066	0.713	2.096		
29	24.818	0.639	2.230		

30	20.150	0.600	2.227		
31	14.984	0.117	2.463		
32	10.664	-0.014	2.528		
33	5.305	-0.130	2.374		
34	0.157	-0.055	2.040		
35	-0.847	0.094	1.873		
36	-8.537	0.200	1.736		
37	-15.811	0.229	1.635		
38	-23.768	0.114	1.520		
39	-30.696	0.260	1.417		
40	-37.740	0.020	1.534		
41	-38.683	0.002	1.637		
42	-43.289	-0.120	1.216		
43	-47.764	-0.019	0.871		
44	-49.188	-0.039	0.644		
45	-53.933	-0.087	0.676		
46	-57.902	-0.058	0.636		
47	-59.946	-0.256	0.601		
48	-64.452	0.056	0.621		
49	-68.319	-0.074	0.552		
50	-73.128	-0.039	0.507		
51	-77.603	-0.043	0.357		
52	-82.844	-0.017	0.039		
53	-87.798	-0.046	-0.177		
54	-92.342	-0.063	-0.284		
55	-96.648	-0.246	-0.323		
56	-100.489	-0.138	-0.361		
57	-104.935	-0.130	-0.374		
58	-108.515	-0.091	-0.365		
59	-109.827	-0.094	-0.156		
60	-114.270	0.201	-0.039		
61	-119.213	-0.129	-0.088		
62	-123.771	-0.065	-0.135		
63	-128.466	-0.100	-0.304		
64	-133.306	-0.009	-0.375		
65	-139.303	-0.301	-0.472		
66	-146.255	-0.211	-0.784		
67	-156.188	-0.693	-1.259		
68	-167.630	-1.225	-1.420		
69	-179.213	-0.216	-1.384		
70	-194.065	-1.787	-1.234		
71	-204.835	-1.989	-1.589		
72	-214.783	-2.450	-1.899		
73	-224.379	-2.122	-2.271		
74	-233.948	-2.741	-2.457	1600	offshore

Sample Locations

6 October 1989 1604 to 1610 (EDT)

Number of points = 3

min (x, y, z):	-77.708	-0.084	0.346		
max (x, y, z):	15.540	0.054	2.454		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
75	-77.708	0.000	0.346	1604	891006-7 (beach face)
76	-14.570	0.054	1.659		891006-8 (backbeach)
77	15.540	-0.084	2.454	1610	891006-9 (back dune)

Isle of Palms: Station 3130
 Ref. Nail Elev. = 3.048 m (nail on Palm Blvd.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

11 October 1989 1445 to 1507 (EDT)

Number of points = 13

min (x, y, z):	-7.325	-113.793	2.281		
max (x, y, z):	166.059	45.311	3.235		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	166.051	-7.352	3.049	1445	reference nail
1	166.058	-7.351	3.047		reference nail
2	166.059	-7.351	3.047		reference nail
2a	166.056	-7.351	3.048		reference nail (average)
3	147.000	45.311	2.281		telephone pole #0295937
4	111.195	25.267	2.948	1500	right front support, house #2200
5	116.333	-8.091	2.706	1501	left front corner, house #2204
6	124.828	-113.793	3.126	1503	left front corner, house #?
7	0.005	-0.003	3.235	1505	temporary bench mark "3130"
8	-0.005	0.002	3.234		temporary bench mark "3130"
9	-0.001	0.000	3.234	1508	temporary bench mark "3130"
9a	0.000	0.000	3.234		TBM 3130 (top of pipe, average)
999	-7.325	3.644	2.768		geodimeter location

Main-Line Survey

11 October 1989 1508 to 1540 (EDT)

Number of points = 61

min (x, y, z):	-221.934	-1.532	-1.564		
max (x, y, z):	95.102	1.893	3.135		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
10	95.102	0.227	3.135	1508	onshore to offshore
11	90.204	0.464	2.970		
12	80.482	0.663	2.807		
13	68.925	-0.030	2.681		
14	57.507	-0.101	2.499		
15	47.879	-0.141	2.460		
16	38.608	0.030	2.377		
17	32.042	-0.015	2.358		
18	26.319	-0.076	2.444		
19	25.676	-0.103	2.504		
20	24.949	-0.091	2.456		
21	22.163	-0.045	2.597		
22	18.978	-0.006	2.673		
23	17.261	0.011	3.073		
24	15.929	0.037	2.966		
25	14.190	0.135	2.585		
26	11.501	0.157	2.614		
27	10.037	0.145	2.656		
28	7.741	0.116	2.467		
29	5.530	0.115	2.429		
30	3.598	0.008	2.713		
31	2.284	-0.065	2.881		
32	0.120	0.004	2.913		
33	-1.878	0.130	2.907		
34	-3.251	-0.006	2.833		
35	-6.492	-0.021	2.691		
36	-7.403	-0.045	2.478		
37	-11.351	0.004	2.382		
38	-14.406	0.458	2.271		
39	-18.190	0.074	2.079		
40	-22.930	0.112	1.900		
41	-27.557	0.191	1.701		

42	-32.575	0.275	1.650	
43	-37.906	-0.006	1.537	
44	-42.992	0.000	1.449	
45	-47.487	0.297	1.476	
46	-48.161	-0.133	1.365	
47	-50.719	-0.104	1.448	
48	-51.871	0.074	1.600	
49	-53.467	-0.030	1.451	
50	-58.124	0.081	1.246	
51	-62.504	0.034	1.055	
52	-67.251	-0.053	0.913	
53	-72.235	0.034	0.788	
54	-77.344	0.062	0.726	
55	-82.201	0.154	0.616	
56	-87.267	0.188	0.481	
57	-92.561	0.022	0.235	
58	-97.743	0.021	-0.169	
59	-103.037	-0.444	-0.256	
60	-122.518	-0.174	0.000	
61	-135.952	-0.728	-0.224	
62	-141.413	-1.247	-0.300	
63	-147.958	-0.203	-0.397	
64	-155.891	1.893	-0.589	
65	-167.011	-1.254	-1.357	
66	-181.600	-1.532	-1.564	
69	-206.258	-0.246	-1.284	
68	-206.719	-0.734	-1.295	
67	-207.202	-0.220	-1.300	
70	-221.934	1.356	-1.479	1540

Sample Locations

11 October 1989 1524 to 1550 (EDT)

Number of points = 3

min (x, y, z): -61.814 -0.007 1.082

max (x, y, z): 1.758 0.102 2.871

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
71	-61.814	0.000	1.082	1544	891011-4 (beach face)
72	-29.690	-0.007	1.702		891011-5 (backbeach)
73	1.758	0.102	2.871	1550	891011-6 (back dune)

Isle of Palms: Station 3135
 Ref. Nail Elev. = 3.053 m (nail on Palm Blvd.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

9 October 1989 1724 to 1730 (EDT)

Number of points = 13

min (x, y, z):	-0.011	-164.641	2.699		
max (x, y, z):	145.284	0.207	3.371		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	145.251	0.207	3.050	1724	reference nail
1	145.281	0.206	3.054	1725	reference nail
2	145.284	0.206	3.054	1726	reference nail
2a	145.272	0.206	3.053		reference nail (average)
3	101.644	-5.166	2.992		left corner of house (back side)
4	92.242	-61.380	2.766		left corner of house (pillar)
5	71.410	-164.641	2.699		telephone pole #18462
6	0.008	0.002	2.904	1728	temporary bench mark "3135"
7	0.003	0.001	2.903		temporary bench mark "3135"
8	-0.011	-0.004	2.905	1730	temporary bench mark "3135"
8a	0.000	0.000	2.904		TBM 3135 (average)
59	117.102	-3.497	3.371	1816	pt. 13m seaward of TP #18460
999	8.692	2.672	2.507		geodimeter location

Main-Line Survey

9 October 1989 1731 to 1758 (EDT)

Number of points = 47

min (x, y, z):	-231.792	-0.933	-1.761		
max (x, y, z):	90.348	1.026	2.866		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
9	90.348	0.063	2.549	1731	reference nail location
10	81.487	-0.176	2.637		
11	72.049	-0.066	2.699		
12	63.504	0.197	2.774		
13	58.647	0.149	2.866		
14	49.714	-0.003	2.674		
15	41.147	0.101	2.547		
16	32.451	0.059	2.477		
17	23.606	0.109	2.500		
18	15.059	0.107	2.504		
19	7.122	0.219	2.519		
20	-0.105	0.009	2.439		
21	-4.828	0.276	2.021		
22	-7.143	-0.005	1.983		
23	-7.165	-0.064	1.915		
24	-13.050	0.000	1.844		
25	-19.276	-0.043	1.796		
26	-25.741	-0.118	1.689		
27	-31.757	-0.081	1.570		
28	-37.263	-0.116	1.498		
29	-42.465	0.089	1.420		
30	-47.485	-0.230	1.354		
31	-49.863	-0.180	1.500		
32	-53.065	-0.064	1.440		
33	-56.506	0.020	1.202		
34	-61.478	-0.009	0.949		
35	-65.604	-0.054	0.796		
36	-70.060	-0.041	0.729		
37	-74.444	-0.087	0.625		
38	-79.341	0.172	0.566		
39	-84.017	-0.067	0.508		
40	-88.190	0.082	0.357		

41	-91.825	0.048	0.094		
42	-96.961	0.055	-0.158		
43	-102.313	-0.028	-0.211		
44	-110.411	-0.170	-0.345		
45	-118.493	-0.434	-0.379		
46	-124.219	-0.116	-0.422		
47	-133.244	-0.077	-0.308		
48	-140.501	0.189	-0.373		
49	-149.925	0.016	-0.522		
50	-160.129	-0.039	-0.644		
51	-173.515	-0.933	-1.283		
52	-189.213	-0.546	-1.461		
53	-201.760	-0.867	-1.443		
54	-222.909	0.536	-1.453		
55	-231.792	1.026	-1.761	1758	offshore

Sample Locations

9 October 1989 1802 to 1808 (EDT)

Number of points = 3

min (x, y, z):	-65.260	0.000	0.812		
max (x, y, z):	15.013	0.155	2.507		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
58	15.013	0.155	2.507	1802	891009-7 (beach face)
57	-20.604	0.096	1.779		891009-8 (backbeach)
56	-65.260	0.000	0.812	1808	891009-9 (back dune)

Isle of Palms: Station 3140

Bench Mark Elev. = 2.554 m Ref. Nail Elev. = 2.942 m (nail on Palm Blvd.)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

7 October 1989 1544 to 1553 (EDT)

Number of points = 25

min (x, y, z):	-0.004	-7.847	2.553		
max (x, y, z):	122.316	36.862	4.292		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	109.225	0.281	2.935	1544	reference nail
1	109.240	0.279	2.936		reference nail
2	109.270	0.276	2.935	1545	reference nail
2a	109.245	0.279	2.935		ref. nail (average)
3	94.190	14.083	3.006	1546	tel. ref. pole (#132635)
4	94.189	14.084	2.995		tel. ref. pole (#132635)
5	94.200	13.983	2.995	1547	tel. ref. pole (#132635)
5a	94.193	14.050	2.999		tel. ref. pole (average)
6	122.313	0.124	4.291	1548	tel. pole (#330598)
7	122.316	0.123	4.291		tel. pole (#330598)
8	122.314	0.124	4.292	1549	tel. pole (#330598)
8a	122.314	0.124	4.291		tel pole #330598 (average)
9	51.464	36.855	2.693	1549	cinder block wall ref. point
10	51.494	36.848	2.694		cinder block wall ref. point
11	51.477	36.862	2.692	1550	cinder block wall ref. point
11a	51.478	36.855	2.693		c.b. wall ref. pt. (average)
12	38.607	-7.839	3.074	1551	flag pole ref. point
13	38.611	-7.841	3.074		flag pole ref. point
14	38.623	-7.847	3.073	1552	flag pole ref. point
14a	38.614	-7.842	3.074		flag pole ref. pt. (average)
15	0.001	-0.002	2.554	1552	SCCC bench mark "3140"
16	-0.004	0.009	2.553		SCCC bench mark "3140"
17	0.003	-0.007	2.555	1553	SCCC bench mark "3140"
17a	0.000	0.000	2.554		SCCC BM 3140 (average)
999	-5.180	13.512	2.794		geodimeter location

Main-Line Survey

7 October 1989 1555 to 1635 (EDT)

Number of points = 73

min (x, y, z):	-251.256	-1.827	-2.384		
max (x, y, z):	109.217	0.912	3.577		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
18	109.217	0.272	2.935	1555	at reference nail location
19	103.842	0.477	2.960		
20	95.239	0.351	2.944		
21	88.457	0.425	2.981		
22	78.804	0.480	2.936		
23	68.579	0.594	2.892		
24	60.490	0.912	2.796		
25	50.991	-0.887	2.777		
26	39.978	-0.707	3.024		
27	37.407	-0.728	3.221		
28	35.568	-0.782	3.409		
29	35.534	-0.793	3.408		
30	34.793	-0.713	3.323		
31	33.742	-0.675	3.553		
32	32.580	-0.664	3.355		
33	31.329	-0.662	3.577		
34	26.978	-0.622	3.193		
35	21.895	-0.609	2.881		
36	16.589	-0.120	2.707		
37	12.013	0.074	2.639		

38	7.312	0.222	2.629		
39	2.473	0.268	2.618		
40	-0.147	0.017	2.605		
41	-2.906	-0.171	2.561		
42	-6.675	-0.252	2.411		
43	-8.193	-0.550	2.499		
44	-10.932	-0.726	2.613		
45	-14.601	-0.636	2.619		
46	-18.333	-0.341	2.568		
47	-21.272	-0.352	2.457		
48	-24.365	-0.298	2.232		
49	-24.588	-0.244	2.098		
50	-25.785	-0.163	2.034		
51	-28.502	-0.263	1.938		
52	-33.196	-0.113	1.828		
53	-37.249	-0.011	1.718		
54	-42.383	0.079	1.597		
55	-47.340	0.103	1.490		
56	-51.227	0.070	1.414		
57	-54.416	-0.129	1.430		
58	-56.798	-0.151	1.489		
59	-58.503	-0.253	1.525		
60	-60.939	0.009	1.374		
61	-64.802	0.122	1.175		
62	-69.238	0.152	1.026		
63	-74.242	0.013	0.928		
64	-79.604	0.064	0.707		
65	-84.995	-0.050	0.432		
66	-89.553	0.161	0.152		
67	-94.171	0.008	-0.028		
68	-99.191	-0.087	-0.128		
69	-104.022	0.089	-0.272		
70	-108.825	0.058	-0.347		
71	-113.761	0.128	-0.310		
72	-115.877	0.094	0.105		
73	-120.479	-0.197	0.163		
74	-125.313	-0.039	0.086		
75	-130.562	-0.144	0.039		
76	-135.793	-0.022	-0.126		
77	-139.756	-0.313	-0.187		
78	-145.483	-0.378	-0.294		
79	-151.665	-0.376	-0.508		
80	-157.554	-0.238	-0.772		
81	-164.596	-0.182	-1.119		
82	-173.256	-0.831	-1.385		
83	-181.142	-0.492	-1.482		
84	-190.574	-1.435	-1.577		
85	-199.367	-1.331	-1.442		
86	-212.915	-1.090	-1.170		
87	-222.168	-1.307	-1.297		
88	-235.343	-1.402	-1.824		
89	-244.843	-1.827	-2.186		
90	-251.256	-1.042	-2.384	1635	offshore

Sample Locations

7 October 1989 1639 to 1644 (EDT)

Number of points = 3

min (x, y, z): -88.448 0.000 0.266

max (x, y, z): 32.706 0.967 3.301

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
91	-88.448	0.000	0.266	1639	891007-7 (beach face)
92	-33.746	0.072	1.824		891007-8 (backbeach)

93 2.706 0.967 3.301 1644 891007-9 (back dune)

Isle of Palms: Station 3145
 Ref. Nail Elev. = 3.189 m (nail on Palm Blvd.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

7 October 1989 1757 to 1836 (EDT)

Number of points = 34

min (x, y, z):	-79.554	-45.775	2.053		
max (x, y, z):	160.444	603.704	4.289		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	106.301	-0.085	3.190	1757	reference nail
1	106.294	-0.085	3.188		reference nail
2	106.283	-0.086	3.189		reference nail
2a	106.293	-0.085	3.189		reference nail (average)
3	122.765	-45.770	2.959	1758	telephone pole #S-857-35
4	122.781	-45.775	2.964		telephone pole #S-857-35
5	122.778	-45.773	2.963		telephone pole #S-857-35
5a	122.775	-45.773	2.962		tel. pole #S-857-35 (average)
6	160.443	10.402	4.289	1802	telephone pole #0297851
7	160.438	10.402	4.289		telephone pole #0297851
8	160.444	10.402	4.278		telephone pole #0297851
8a	160.442	10.402	4.285		tel. pole #0297851 (average)
9	63.538	10.651	2.590	1808	corner of house #3602
10	63.539	10.645	2.591		corner of house #3602
11	63.537	10.644	2.590		corner of house #3602
11a	63.538	10.647	2.590		corner of house (average)
12	60.468	10.522	2.678	1809	corner of porch on house #3602
13	60.467	10.521	2.677		corner of porch on house #3602
14	60.468	10.522	2.677		corner of porch on house #3602
14a	60.468	10.522	2.677		corner of porch (average)
15	60.854	-3.324	2.553	1810	corner of house #3604
16	60.853	-3.324	2.553		corner of house #3604
17	60.857	-3.324	2.551		corner of house #3604
17a	60.855	-3.324	2.552		corner of house #3604 (average)
18	-79.518	603.572	2.556	1826	SCCC bench mark "3140"
19	-79.545	603.704	2.562		SCCC bench mark "3140"
20	-79.554	603.680	2.556		SCCC bench mark "3140"
20a	-79.539	603.652	2.558		SCCC BM 3140 (average)
21	0.024	-0.005	2.590	1834	temporary bench mark "3145"
22	-0.004	0.001	2.590		temporary bench mark "3145"
23	-0.019	0.004	2.590		temporary bench mark "3145"
23a	0.000	0.000	2.590		TBM 3145 (average)
24	-0.395	0.016	2.053	1835	SCCC BM 3145 (disturbed)
999	18.920	-3.759	3.533		geodimeter location

Main-Line Survey

7 October 1989 1837 to 1900 (EDT)

Number of points = 62

min (x, y, z):	-235.275	-1.199	-2.834		
max (x, y, z):	106.256	1.706	4.185		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
25	106.256	-0.074	3.188	1837	reference nail location
26	95.299	0.993	2.916		
27	87.977	1.706	2.879		
28	76.201	1.127	2.719		
29	66.296	0.692	2.642		
30	55.973	0.413	2.619		
31	47.264	0.413	2.597		
32	44.540	0.006	2.897		
33	42.145	0.106	3.019		
34	39.790	0.053	3.269		
35	37.667	0.035	3.649		

36	35.967	0.049	3.975		
37	35.039	0.128	3.935		
38	33.535	0.119	4.185		
39	32.166	0.134	3.997		
40	31.248	0.147	3.811		
41	27.448	0.289	2.964		
42	24.308	0.298	2.369		
43	21.823	-0.089	2.655		
44	18.758	0.022	2.905		
45	14.220	-0.009	2.962		
46	8.673	0.080	2.601		
47	3.597	0.015	2.380		
48	1.500	0.121	2.231		
49	-0.707	0.072	2.191		
50	-6.559	0.052	2.041		
51	-11.964	0.229	1.830		
52	-18.540	0.236	1.668		
53	-24.368	0.217	1.550		
54	-30.213	0.463	1.520		
55	-36.129	0.585	1.565		
56	-37.186	-0.039	1.560		
57	-40.509	0.243	1.386		
58	-46.914	-0.063	1.081		
59	-50.312	-0.029	0.909		
60	-53.255	0.033	0.626		
61	-59.444	0.009	0.694		
62	-65.012	-0.108	0.555		
63	-70.579	0.045	0.442		
64	-75.975	0.128	0.243		
65	-81.134	0.097	-0.086		
66	-86.939	0.105	-0.175		
67	-93.470	0.041	-0.089		
68	-99.938	0.062	-0.078		
69	-106.442	0.191	-0.106		
70	-113.664	0.011	-0.129		
71	-120.516	-0.140	-0.275		
72	-128.179	0.020	-0.335		
73	-134.067	0.060	-0.472		
74	-138.700	0.061	-0.564		
75	-143.637	0.034	-0.853		
76	-149.010	-0.108	-1.157		
77	-154.688	-0.353	-1.242		
78	-159.331	0.023	-1.311		
79	-165.791	-0.256	-1.275		
80	-173.370	-0.173	-1.157		
81	-181.879	-0.258	-1.202		
82	-192.859	-0.063	-1.256		
83	-204.382	-0.247	-1.722		
84	-217.675	-1.199	-2.313		
85	-228.071	-0.610	-2.689		
86	-235.275	-0.658	-2.834	1900	offshore

Sample Locations

7 October 1989 1904 to 1909 (EDT)

Number of points = 3

min (x, y, z): -115.384 0.000 -0.188

max (x, y, z): 39.661 0.183 3.272

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
87	-115.384	0.000	-0.188	1904	891007-10 (beach face)
88	-10.944	0.084	1.897		891007-11 (backbeach)
89	39.661	0.183	3.272	1909	891007-12 (back dune)

Isle of Palms: Station 3150
 Ref. Nail Elev. = 2.899 m (nail on Palm Blvd.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

8 October 1989 1431 to 1443 (EDT)

Number of points = 19

min (x, y, z):	-19.520	-27.591	1.832		
max (x, y, z):	89.761	33.213	2.900		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	89.749	-15.042	2.900	1431	reference nail
1	89.761	-15.048	2.900		reference nail
2	89.740	-15.042	2.896		reference nail
2a	89.750	-15.044	2.899		reference nail (average)
3	72.338	19.826	2.768	1437	telephone pole #26691
4	72.333	19.825	2.769		telephone pole #26691
5	72.336	19.826	2.770		telephone pole #26691
5a	72.336	19.826	2.769		tel. pole #26691 (average)
6	0.002	0.003	2.754	1438	temporary bench mark "3150"
7	-0.004	-0.006	2.754		temporary bench mark "3150"
8	0.001	0.002	2.754		temporary bench mark "3150"
8a	0.000	0.000	2.754		TBM 3150 (average)
9	-19.487	-4.106	1.878	1440	ACOE bench mark
10	-19.520	-4.123	1.878		ACOE bench mark
11	-19.486	-4.106	1.878		ACOE bench mark
11a	-19.498	-4.112	1.878		ACOE bench mark (average)
12	-11.832	33.213	1.832		Isle of Palm Beach Mon. Marker
13	47.891	-27.591	2.374		house #408 Palm Blvd. ref. pt.
999	5.695	9.155	2.593		geodimeter location

Main-Line Survey

8 October 1989 1444 to 1610 (EDT)

Number of points = 47

min (x, y, z):	-191.646	-1.214	-1.636		
max (x, y, z):	42.611	0.373	3.301		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
14	42.611	0.102	2.585	1444	at house #406 Palm Blvd.
15	41.353	0.015	2.657		
16	40.017	0.012	2.949		
17	37.083	0.041	3.229		
18	35.246	0.124	3.180		
19	31.664	0.373	3.246		
20	28.061	0.112	3.301		
21	23.531	0.089	3.287		
22	20.176	-0.011	3.246		
23	16.726	-0.012	3.206		
24	16.111	0.012	3.074		
25	12.079	0.310	2.905		
26	8.315	0.128	2.764		
27	4.259	0.103	2.585		
28	1.465	0.130	2.485		
29	-0.026	-0.004	2.426		
30	-1.623	0.061	2.378		
31	-4.129	-0.225	2.307		
32	-7.812	-0.484	2.157		
33	-13.002	-0.554	1.994		
34	-18.168	-0.333	1.845		
35	-23.136	-0.065	1.662		
36	-25.869	0.018	1.634		
37	-28.421	-0.133	1.657		
38	-29.639	-0.082	1.647		
39	-32.991	-0.051	1.378		

40	-37.168	-0.069	1.188		
41	-41.488	-0.154	1.006		
42	-45.918	-0.017	0.839		
43	-49.463	-0.036	0.750		
44	-54.926	-0.189	0.588		
45	-60.369	-0.215	0.434		
46	-65.055	-0.119	0.248		
47	-67.538	-0.147	0.115		
48	-68.947	0.095	-0.033		
49	-74.008	0.174	-0.192		
50	-79.847	0.268	-0.261		
51	-85.888	-0.113	-0.257		
52	-93.771	-0.098	-0.296		
53	-102.679	-0.217	-0.230		
54	-110.462	-0.237	-0.294		
55	-121.402	-0.398	-0.502		
56	-135.341	-0.315	-1.077		
57	-147.128	-0.793	-1.343		
58	-159.628	0.194	-1.299		
59	-177.194	-0.444	-1.190		
60	-191.646	-1.214	-1.636	1510	offshore

Sample Locations

8 October 1989 1514 to 1519 (EDT)

Number of points = 3

min (x, y, z):	-40.064	0.000	1.069		
max (x, y, z):	36.310	0.232	3.177		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
61	-40.064	0.000	1.069	1514	891008-7 (beach face)
62	2.765	0.008	2.525		891008-8 (backbeach)
63	36.310	0.232	3.177	1519	891008-9 (back dune)

Isle of Palms: Station 3155
 Bench Mark Elev. = 2.402 m Ref. Nail Elev. = 2.881 m (nail on Palm Blvd.)
 Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

11 October 1989 1130 to 1141 (EDT)

Number of points = 16

min (x, y, z):	-0.006	-46.137	2.340	
max (x, y, z):	199.740	4.135	3.996	
PT.#	X (m)	Y (m)	Z (m)	TIME
0	199.740	-0.333	2.888	1123
1	199.730	-0.333	2.891	
2	199.723	-0.338	2.887	
2a	199.731	-0.335	2.889	
3	180.853	-10.006	2.834	1127
4	140.987	-9.891	2.608	1130
5	120.316	-0.293	3.996	1133
6	82.102	-10.786	3.961	1135
7	52.023	4.135	2.340	1136
8	43.076	-25.264	2.966	1138
9	14.465	-46.137	2.901	1139
10	0.004	-0.010	2.402	1140
11	0.002	0.019	2.403	
12	-0.006	-0.008	2.402	
12a	0.000	0.000	2.402	
999	5.530	-30.720	2.493	

COMMENTS
 reference nail
 reference nail
 reference nail
 ref. nail (average)
 tel. pole #255948
 tel. pole #331838
 reference tel. pole #341196
 tel. pole #90440
 tel. pole #62754
 tel. pole #272799
 flagpole at Citadel Bch. House
 SCCC bench mark "3155"
 SCCC bench mark "3155"
 SCCC bench mark "3155"
 SCCC BM 3155 (average)
 geodimeter location

Main-Line Survey

11 October 1989 1142 to 1219 (EDT)

Number of points = 60

min (x, y, z):	-211.728	-0.918	-2.800	
max (x, y, z):	106.012	1.267	2.498	
PT.#	X (m)	Y (m)	Z (m)	TIME
13	106.012	0.218	2.450	1142
14	98.254	0.305	2.427	
15	92.013	0.470	2.498	
16	83.153	0.647	2.428	
17	73.120	0.480	2.417	
18	64.663	0.520	2.394	
19	55.952	0.959	2.357	
20	47.002	1.264	2.457	
21	37.521	0.813	2.370	
22	28.428	-0.388	2.410	
23	19.516	-0.046	2.289	
24	10.363	-0.171	2.255	
25	4.389	-0.113	2.470	
26	3.454	0.006	2.311	
27	2.477	-0.073	2.370	
28	2.069	-0.015	2.257	
29	0.316	-0.112	2.382	
30	-2.776	-0.311	2.418	
31	-4.939	-0.234	2.310	
32	-5.393	-0.241	2.078	
33	-10.539	-0.028	1.620	
34	-10.759	-0.061	1.826	
35	-11.428	0.028	2.022	
36	-12.653	-0.201	2.270	
37	-14.637	0.033	2.278	
38	-16.525	0.232	1.792	
39	-17.299	-0.192	1.362	
40	-22.269	-0.318	0.950	
41	-25.300	-0.153	0.792	

COMMENTS
 landward side of driveway

42	-30.644	-0.738	0.565	
43	-35.738	-0.657	0.241	
44	-39.406	-0.112	0.083	
45	-43.714	0.010	-0.010	
46	-47.954	0.006	-0.150	
47	-53.707	-0.918	-0.183	
48	-55.396	-0.189	0.161	
49	-59.755	-0.007	0.247	
50	-65.870	-0.144	0.197	
51	-70.823	-0.034	0.115	
52	-75.358	0.020	0.044	
53	-80.286	-0.003	-0.058	
54	-85.944	0.026	-0.131	
55	-90.757	-0.116	-0.169	
56	-95.743	0.041	-0.322	
57	-100.619	0.005	-0.432	
58	-105.735	0.183	-0.672	
59	-110.679	-0.037	-0.864	
60	-115.607	0.111	-1.063	
61	-121.958	-0.078	-1.185	
63	-127.767	-0.229	-1.351	
62	-127.909	-0.200	-1.372	
64	-134.899	-0.202	-1.418	
65	-141.946	-0.226	-1.378	
66	-150.582	-0.163	-1.203	
67	-158.106	-0.573	-1.128	
68	-165.629	-0.051	-1.193	
69	-174.287	0.135	-1.455	
70	-184.826	0.480	-1.883	
71	-199.242	1.267	-2.538	
72	-211.728	0.187	-2.800	1219

Sample Locations

11 October 1989 1222 to 1228 (EDT)

Number of points = 3

min (x, y, z): -82.265 -0.146 -0.092

max (x, y, z): -5.763 0.019 2.046

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
73	-82.265	0.000	-0.092	1222	891011-1 (beach face)
74	-25.907	0.019	0.762		891011-2 (backbeach)
75	-5.763	-0.146	2.046	1228	891011-3 (back dune)

Isle Of Palms: Station 3160

Ref. Nail Elev. = 2.393 m (nail on the frontage road near 56th Ave.)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

8 October 1989 0914 to 0922 (EDT)

Number of points = 22

min (x, y, z):	-13.375	-58.990	1.921		
max (x, y, z):	53.281	5.994	3.284		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	53.278	-0.114	2.394	0914	reference nail
1	53.279	-0.114	2.393		reference nail
2	53.281	-0.113	2.393		reference nail
2a	53.279	-0.114	2.393		reference nail (average)
3	-0.013	-0.014	3.278	0916	temporary bench mark "3160"
4	0.004	0.004	3.284		temporary bench mark "3160"
5	0.009	0.010	3.283		temporary bench mark "3160"
5a	0.000	0.000	3.282		TBM 3160 (average)
6	27.145	5.992	1.922		house #8 reference point
7	27.149	5.994	1.922		house #8 reference point
8	27.150	5.994	1.921		house #8 reference point
8a	27.148	5.994	1.922		house #8 ref. point (average)
9	25.171	-4.952	2.314		house #9 reference point
10	25.156	-4.954	2.314		house #9 reference point
11	25.145	-4.976	2.317		house #9 reference point
11a	25.157	-4.961	2.315		house #9 ref. point (average)
72	-13.374	-58.977	2.991	0957	ACOE bench mark
73	-13.373	-58.973	2.995		ACOE bench mark
74	-13.372	-58.959	2.992		ACOE bench mark
75	-13.375	-58.990	2.992		ACOE bench mark
75a	-13.373	-58.975	2.992	0959	ACOE bench mark (average)
999	-7.934	-8.765	2.651		geodimeter location

Main-Line Survey

8 October 1989 0925 to 0949 (EDT)

Number of points = 57

min (x, y, z):	-245.250	-2.154	-2.351		
max (x, y, z):	53.213	1.550	3.247		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
12	53.213	-0.076	2.397	0925	onshore to offshore
13	49.681	-0.356	2.374		
14	42.589	-0.454	2.409		
15	35.008	-0.622	2.550		
16	27.913	-0.313	2.288		
17	26.035	-0.335	2.319		
18	25.300	-0.076	2.127		
19	21.599	0.018	3.247		
20	17.829	0.186	2.593		
21	11.623	0.073	2.755		
22	8.807	-0.092	2.940		
23	5.510	0.052	2.716		
24	-0.072	0.018	2.725		
25	-2.853	-0.259	2.636		
26	-8.276	-0.384	2.495		
27	-14.562	-0.613	2.230		
28	-19.978	-0.937	2.035		
29	-24.507	-0.636	1.876		
30	-30.699	-0.753	1.710		
31	-35.544	-0.994	1.589		
32	-41.957	-0.943	1.456		
33	-49.839	-1.233	1.248		
34	-57.237	-1.569	0.976		

35	-58.711	-1.526	1.623	
36	-64.840	-1.388	1.218	
37	-65.358	-1.349	0.803	
38	-70.839	-1.517	0.533	
39	-76.977	-1.232	0.289	
40	-81.050	-2.053	0.180	
41	-82.337	-2.154	0.259	
42	-83.162	-1.816	0.449	
43	-90.085	-1.764	0.558	
45	-95.623	-0.147	0.438	
44	-95.638	-0.261	0.438	
46	-99.112	0.012	0.347	
47	-104.167	0.040	-0.125	
48	-104.303	-0.134	-0.094	
50	-110.987	0.093	-0.312	
49	-111.018	0.075	-0.347	
51	-117.888	0.177	-0.286	
52	-123.866	-0.042	-0.395	
53	-130.179	0.121	-0.508	
54	-135.456	0.126	-0.516	
55	-142.300	0.225	-0.487	
56	-148.469	0.180	-0.549	
57	-154.755	-0.027	-0.593	
58	-160.980	0.254	-0.673	
59	-166.740	-0.020	-0.797	
60	-174.567	0.215	-0.880	
61	-180.971	0.806	-0.787	
62	-188.893	-0.209	-0.888	
63	-196.716	1.550	-1.157	
64	-198.671	-0.484	-1.147	
65	-207.685	0.917	-1.393	
66	-220.730	0.786	-2.076	
67	-231.991	0.210	-2.261	
68	-245.250	0.162	-2.351	0949

Sample Locations

8 October 1989 0952 to 0955 (EDT)

Number of points = 3

min (x, y, z): -100.053 -0.029 0.092

max (x, y, z): 20.202 0.198 3.041

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
69	-100.053	0.000	0.092	0952	100889-1 (beach face)
70	-31.158	0.198	1.682		100889-2 (backbeach)
71	20.202	-0.029	3.041	0955	100889-3 (back dune)

Isle of Palms: Station 3165

Ref. Point Elev. = 2.114 m (top of Coastal Science Marker "BRC #1, Front")

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

8 October 1989 1640 to 1646 (EDT)

Number of points = 15

min (x, y, z):	-3.329	-18.812	2.082		
max (x, y, z):	34.895	67.722	2.486		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	34.895	-0.138	2.115	1640	C.S.M. "BRC #1 - Front"
1	34.890	-0.141	2.113		C.S.M. "BRC #1 - Front"
2	34.889	-0.141	2.115		C.S.M. "BRC #1 - Front"
2a	34.891	-0.140	2.114		"BRC #1 - Front" (average)
3	0.001	0.009	2.431	1642	temporary bench mark "3165"
4	-0.001	-0.003	2.431		temporary bench mark "3165"
5	-0.001	-0.005	2.431		temporary bench mark "3165"
5a	0.000	0.000	2.431		TBM 3165 (average)
6	1.117	32.705	2.124	1644	Isle of Palms Beach Mon. Marker
7	1.117	32.712	2.123		Isle of Palms Beach Mon. Marker
8	1.118	32.711	2.124		Isle of Palms Beach Mon. Marker
8a	1.117	32.709	2.124		IOP Beach Mon. Marker (average)
9	24.871	67.722	2.082	1645	flag pole
10	13.493	1.140	2.406	1646	SCCC BM 3165 (disturbed)
999	-3.329	-18.812	2.486		geodimeter location

Main-Line Survey

8 October 1989 1647 to 1710 (EDT)

Number of points = 47

min (x, y, z):	-208.083	-0.785	-2.108		
max (x, y, z):	43.250	0.830	2.655		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
11	43.250	-0.143	2.033	1647	near coastal science marker
12	38.478	-0.071	2.098		
13	34.780	-0.150	2.008		
14	31.707	-0.093	2.091		
15	31.087	-0.055	2.251		
16	26.945	0.201	2.249		
17	24.538	0.122	2.365		
18	22.788	0.432	2.234		
19	18.535	0.184	2.525		
20	13.700	0.417	2.519		
21	11.860	0.094	2.655		
22	8.455	0.020	2.380		
23	4.929	-0.103	2.138		
24	4.300	-0.091	2.252		
25	0.077	-0.078	2.060		
26	-5.794	-0.318	1.870		
27	-11.727	-0.071	1.737		
28	-16.994	0.138	1.640		
29	-23.098	0.000	1.566		
30	-26.615	-0.785	1.514		
31	-38.359	0.083	1.380		
32	-40.311	0.077	2.044		
33	-42.021	0.058	2.095		
34	-44.178	0.042	1.354		
35	-47.786	0.023	1.220		
36	-53.169	0.039	1.063		
37	-58.830	0.012	0.790		
38	-62.472	-0.023	0.592		
39	-67.588	-0.083	0.471		
40	-73.839	0.064	0.469		

41	-75.670	0.179	0.605		
42	-80.212	0.235	0.659		
43	-85.352	-0.078	0.564		
44	-91.776	-0.149	0.384		
45	-96.918	0.320	0.179		
46	-101.535	0.119	-0.186		
47	-109.387	-0.011	-0.463		
48	-120.757	-0.040	-0.704		
49	-126.123	-0.124	-0.834		
50	-131.626	-0.258	-0.561		
51	-138.728	0.150	-0.282		
52	-147.426	0.143	-0.308		
53	-155.886	-0.091	-0.454		
54	-170.015	0.830	-0.854		
55	-182.068	0.686	-1.336		
56	-196.354	-0.103	-1.824		
57	-208.083	0.232	-2.108	1710	offshore

Sample Locations

8 October 1989 1714 to 1719 (EDT)

Number of points = 3

min (x, y, z):	-80.117	-0.200	0.653		
max (x, y, z):	15.313	0.056	2.530		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
58	-80.117	0.000	0.653	1714	891008-10 (beach face)
59	-14.852	-0.200	1.670		891008-11 (backbeach)
60	15.313	0.056	2.530	1719	891008-12 (back dune)

Isle of Palms: Station 3170

Ref. Nail Elev. = 2.592 m (nail on road fronting house #4)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

8 October 1989 1820 to 1829 (EDT)

Number of points = 17

min (x, y, z): -22.456 -45.385 0.740

max (x, y, z): 66.152 70.959 2.593

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	66.100	-45.349	2.593	1820	reference nail
1	66.114	-45.357	2.591		reference nail
2	66.152	-45.385	2.593		reference nail
2a	66.122	-45.364	2.592		reference nail (average)
3	-0.007	0.007	2.464	1824	temporary bench mark "3170"
4	0.002	-0.001	2.464		temporary bench mark "3170"
5	0.007	-0.006	2.467		temporary bench mark "3170"
5a	0.001	0.000	2.465		TBM 3170 (average)
6	9.184	13.298	0.740	1825	house #20, support #1
7	9.276	9.574	0.927		house #20, support #2
8	9.327	5.815	0.944		house #20, support #3
9	9.411	1.752	0.891		house #20, support #4
10	12.194	-0.917	0.942		house #20, support #5
11	-0.003	0.118	2.361	1828	SCCC BM 3170 (disturbed)
68	9.511	-16.981	2.334	1910	house #4 reference point
69	-22.456	70.959	2.158	1911	Coastal Science Marker "WD 8R"
999	-6.725	5.957	2.252		geodimeter location

Main-Line Survey

8 October 1989 1830 to 1854 (EDT)

Number of points = 53

min (x, y, z): -465.737 -0.628 -2.014

max (x, y, z): 11.028 2.278 2.320

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
12	11.028	-0.002	2.320	1830	concrete pad at house #20
13	10.990	0.034	2.195		
14	7.513	0.011	2.133		
15	6.705	0.000	2.176		
16	2.930	-0.005	2.220		
17	-0.086	-0.033	2.194		
18	-4.978	0.148	2.159		
19	-9.516	0.001	2.138		
20	-14.981	0.057	2.061		
21	-20.637	0.041	1.876		
22	-28.618	0.106	1.685		
23	-34.279	0.099	1.507		
24	-34.744	0.178	1.468		
25	-44.564	0.145	1.450		
26	-54.667	-0.061	1.391		
27	-64.590	-0.380	1.205		
28	-73.405	-0.116	1.110		
29	-83.477	-0.165	0.896		
30	-94.078	-0.074	0.791		
31	-104.437	0.004	0.622		
32	-108.604	0.010	0.553		
33	-114.145	0.042	0.463		
34	-115.239	0.094	0.530		
35	-121.525	0.093	0.581		
36	-128.076	0.127	0.535		
37	-134.068	-0.036	0.374		
38	-140.389	0.160	0.250		
39	-146.117	-0.029	0.130		

40	-150.437	0.077	0.082		
41	-157.391	0.164	-0.100		
42	-162.911	0.160	-0.295		
43	-168.381	-0.219	-0.463		
44	-174.108	0.050	-0.600		
45	-180.420	0.652	-0.792		
46	-185.837	0.556	-1.246		
47	-197.168	0.613	-1.764		
48	-207.132	0.915	-1.914		
49	-217.450	0.551	-1.972		
50	-227.700	-0.166	-1.912		
51	-239.297	-0.605	-1.983		
52	-254.168	-0.628	-1.880		
53	-266.204	-0.163	-1.771		
54	-277.499	0.224	-1.684		
55	-290.522	-0.390	-1.637		
56	-305.224	1.259	-1.590		
57	-322.631	0.433	-1.613		
58	-342.310	1.785	-1.623		
59	-360.318	2.278	-1.677		
60	-377.261	1.279	-1.732		
61	-401.889	1.087	-1.764		
62	-421.657	0.131	-1.815		
63	-444.316	1.947	-1.949		
64	-465.737	-0.065	-2.014	1854	offshore

Sample Locations

8 October 1989 1902 to 1908 (EDT)

Number of points = 3

min (x, y, z): -142.583 0.000 0.199

max (x, y, z): 4.944 0.105 2.208

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
65	-142.583	0.000	0.199	1902	891008-13 (beach face)
66	-69.928	0.105	1.141		891008-14 (backbeach)
67	4.944	0.015	2.208	1908	891008-15 (back dune)

Isle of Palms: Station 3175

Ref. Nail Elev. = 2.502 m (nail on Palmetto Drive near Fairway Dunes Villas)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

9 October 1989 1232 to 1245 (EDT)

Number of points = 17

min (x, y, z):	-3.396	-123.761	1.831		
max (x, y, z):	151.744	112.534	3.415		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	151.728	-29.326	2.503	1232	reference nail
1	151.736	-29.327	2.501		reference nail
2	151.744	-29.328	2.501		reference nail
2a	151.736	-29.327	2.502		reference nail (average)
3	1.046	-123.761	1.831	1235	IOP Beach Mon. Marker #31
4	11.565	-35.013	3.415	1237	House #2 Reference Point
5	-0.002	-0.008	3.182	1238	temporary bench mark "3175"
6	-0.007	-0.022	3.178		temporary bench mark "3175"
7	0.009	0.030	3.182		temporary bench mark "3175"
7a	0.009	0.030	3.182		TBM 3175 (average)
8	10.925	19.587	3.126	1240	house #11 reference point
9	0.123	112.534	2.265	1241	IOP Beach Mon. Marker #30
10	29.079	17.378	3.180	1244	Coastal Science Marker: "BRC-4F"
11	29.083	17.367	3.180		Coastal Science Marker: "BRC-4F"
12	29.075	17.364	3.178		Coastal Science Marker: "BRC-4F"
12a	29.079	17.370	3.179		C.S.M. "BRC-4F" (average)
999	-3.396	-11.334	2.385		geodimeter location

Main-Line Survey

9 October 1989 1246 to 1315 (EDT)

Number of points = 53

min (x, y, z):	-255.776	-1.049	-1.847		
max (x, y, z):	22.989	1.667	3.390		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
13	22.989	-0.366	3.028	1246	near palmetto tree
14	22.986	-0.367	3.028		
15	22.053	-0.072	3.327		
16	18.939	-0.045	3.383		
17	14.928	-0.088	3.390		
18	9.727	-0.090	3.158		
19	9.327	0.081	3.019		
20	7.733	0.073	3.024		
21	7.541	0.087	3.293		
22	6.843	0.105	3.313		
23	6.794	0.140	3.067		
24	5.736	0.042	2.756		
25	3.945	0.343	3.043		
26	0.676	-0.034	2.649		
27	-0.219	0.027	2.629		
28	-3.889	0.011	2.446		
29	-7.396	-0.064	2.087		
30	-11.002	0.162	1.739		
31	-13.741	0.337	1.882		
32	-17.992	0.481	1.958		
33	-23.481	0.224	1.925		
34	-26.113	0.193	1.819		
35	-27.128	0.432	1.658		
36	-33.288	0.913	1.465		
37	-39.844	0.856	1.430		
38	-46.040	1.115	1.304		
39	-52.933	1.218	1.190		
40	-63.026	1.435	1.304		

41	-70.674	1.667	1.332		
42	-79.542	0.721	1.239		
43	-87.646	0.092	1.093		
44	-93.547	0.187	0.977		
45	-98.988	0.098	0.874		
46	-104.048	0.316	0.841		
47	-109.199	0.241	0.768		
48	-114.250	0.275	0.690		
49	-119.234	0.034	0.613		
50	-124.644	0.337	0.534		
51	-129.903	0.265	0.482		
52	-134.984	0.369	0.401		
53	-140.804	0.189	0.365		
54	-147.007	0.347	0.273		
55	-152.475	0.204	0.134		
56	-158.367	0.464	-0.045		
57	-163.991	-0.146	-0.157		
58	-168.942	0.386	-0.114		
59	-175.457	0.296	-0.163		
60	-186.363	0.579	-0.247		
61	-195.676	-0.061	-0.485		
62	-212.086	1.453	-0.664		
63	-225.870	0.564	-1.349		
64	-240.473	-1.049	-1.710		
65	-255.776	0.275	-1.847	1315	offshore

Sample Locations

9 October 1989 1320 to 1327 (EDT)

Number of points = 3

min (x, y, z):	-99.843	0.000	0.849		
max (x, y, z):	-2.270	0.830	2.549		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
66	-99.843	0.000	0.849	1320	891009-1 (beach face)
67	-39.515	0.830	1.442		891009-2 (backbeach)
68	-2.270	0.446	2.549	1327	891009-3 (back dune)

Isle Of Palms: Station 3180

Ref. Nail Elev. = 2.481 m (reference nail on Palmetto Drive)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

9 October 1989 0948 to 1006 (EDT)

Number of points = 21

min (x, y, z):	-12.786	-19.156	2.480		
max (x, y, z):	138.751	67.863	3.400		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	-0.007	0.007	3.187	0948	temporary bench mark "3180"
1	0.006	-0.005	3.185		temporary bench mark "3180"
2	0.001	-0.001	3.187		temporary bench mark "3180"
2a	0.000	0.000	3.186		TBM 3180 (average)
3	-12.765	-4.262	2.665	0950	Coastal Science Marker "WD 18F"
4	-12.786	-4.257	2.665		Coastal Science Marker "WD 18F"
5	-12.759	-4.263	2.665		Coastal Science Marker "WD 18F"
5a	-12.770	-4.261	2.665		C.S.M. "WD 18F" (average)
6	15.617	32.724	2.799		corner of building "B"
7	17.310	13.865	2.880		corner of concrete wall
8	86.918	31.563	3.397	0953	corner of building "D"
9	86.921	31.564	3.397		corner of building "D"
10	86.925	31.566	3.400		corner of building "D"
10a	86.921	31.564	3.398		corner of building "D" (average)
11	19.731	-19.156	3.063		corner of building "F"
12	138.748	67.861	2.482	1003	reference nail
13	138.751	67.862	2.480		reference nail
14	138.751	67.863	2.482		reference nail
14a	138.750	67.862	2.481		reference nail (average)
70	-3.169	11.265	2.184	1044	SCCC BM 3180 (disturbed)
999	11.321	-10.181	3.078		geodimeter location

Main-Line Survey

9 October 1989 1010 to 1032 (EDT)

Number of points = 52

min (x, y, z):	-329.151	-1.983	-2.080		
max (x, y, z):	32.821	2.365	3.557		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
15	32.821	-0.024	2.904	1010	onshore to offshore
16	30.533	0.008	2.984		
17	26.674	0.057	3.238		
18	22.914	0.101	3.557		
19	20.069	0.097	3.495		
20	17.784	0.023	3.188		
21	17.005	-0.002	3.350		
22	13.367	-0.161	3.258		
23	11.140	-0.122	3.245		
24	7.821	-0.204	3.037		
25	5.782	-0.215	2.949		
26	3.700	-0.010	2.840		
27	2.439	0.127	2.907		
28	0.060	-0.276	2.910		
29	-4.565	-0.228	2.677		
30	-10.842	-0.529	2.533		
31	-17.349	-0.708	2.389		
32	-24.077	-1.131	2.195		
33	-31.242	-1.446	1.956		
34	-37.252	-1.983	1.822		
35	-43.191	-1.572	1.677		
36	-48.610	-1.107	1.596		
37	-55.987	-0.556	1.511		
38	-63.313	-0.067	1.469		

39	-70.150	-0.002	1.330	
40	-76.201	0.031	1.157	
41	-82.608	-0.006	0.976	
42	-89.364	-0.012	0.752	
43	-95.711	-0.025	0.717	
44	-102.874	0.056	0.567	
45	-109.696	-0.022	0.245	
46	-116.058	0.124	0.119	
47	-121.686	0.042	-0.002	
48	-127.267	0.058	0.007	
49	-131.971	0.119	0.036	
50	-138.320	0.021	0.066	
51	-144.571	-0.063	-0.100	
52	-150.411	0.118	-0.189	
53	-154.727	0.236	-0.304	
54	-159.674	0.073	-0.449	
55	-164.925	0.131	-0.466	
56	-170.670	0.150	-0.606	
57	-178.233	0.215	-0.979	
58	-190.272	0.340	-1.592	
59	-200.532	0.354	-1.768	
60	-213.782	0.429	-1.875	
61	-233.593	1.001	-1.931	
62	-255.533	1.513	-1.996	
63	-282.704	2.198	-2.067	
64	-282.870	2.365	-2.080	
65	-305.106	1.543	-2.056	
66	-329.151	1.175	-2.049	1032

Sample Locations

9 October 1989 1035 to 1043 (EDT)

Number of points = 3

min (x, y, z): -109.580 -0.006 0.264

max (x, y, z): 3.859 0.172 2.822

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
67	-109.580	0.000	0.264	1035	891009-1 (beach face)
68	-41.416	-0.006	1.712		891009-2 (backbeach)
69	3.859	0.172	2.822	1043	891009-3 (back dune)

Isle of Palms: Station 3185

Ref. Nail Elev. = 2.455 m (nail on 18th fairway cart path)

Surveying Crew: Thomas E. Reiss and Rob R. Wertz

Reference Point Survey

8 October 1989 1207 to 1215 (EDT)

Number of points = 25

min (x, y, z):	-4.981	-44.356	1.577		
max (x, y, z):	105.247	15.446	5.017		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
0	105.247	-44.356	2.456	1207	reference nail
1	105.238	-44.349	2.455		reference nail
2	105.227	-44.340	2.454		reference nail
2a	105.237	-44.348	2.455		reference nail (average)
3	104.159	-40.743	2.888	1209	Coastal Science Marker: "BRC-8R"
4	104.155	-40.742	2.879		Coastal Science Marker: "BRC-8R"
5	104.158	-40.743	2.885		Coastal Science Marker: "BRC-8R"
5a	104.157	-40.743	2.884		C.S.M. "BRC-8R" (average)
6	54.317	5.291	3.006	1210	Coastal Science Marker: "BRC-8F"
7	54.317	5.291	3.006		Coastal Science Marker: "BRC-8F"
8	54.309	5.294	3.007		Coastal Science Marker: "BRC-8F"
8a	54.314	5.292	3.006		C.S.M. "BRC-8F" (average)
9	0.007	0.005	2.308	1212	temporary bench mark "3185"
10	-0.004	-0.003	2.309		temporary bench mark "3185"
11	-0.004	-0.003	2.307		temporary bench mark "3185"
11a	0.000	0.000	2.308		TBM 3185 (average)
12	-4.981	-6.011	1.577	1214	IOP Beach Mon. Marker #35
13	-4.980	-6.010	1.578		IOP Beach Mon. Marker #35
14	-4.973	-6.005	1.577		IOP Beach Mon. Marker #35
14a	-4.978	-6.009	1.577		IOP BM Marker #35 (average)
60	109.770	-91.113	5.011	1242	poolhouse reference point
61	109.776	-91.115	5.017		poolhouse reference point
62	109.782	-91.120	5.012		poolhouse reference point
62a	109.776	-91.116	5.013		poolhouse point (average)
999	22.071	15.446	1.994		geodimeter location

Main-Line Survey

8 October 1989 1238 to 1242 (EDT)

Number of points = 45

min (x, y, z):	-16.088	-0.179	0.775		
max (x, y, z):	44.674	0.464	2.700		
PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
15	70.752	0.655	2.206	1238	edge of fairway
16	55.401	0.396	2.656		
17	54.030	0.307	2.769		
18	50.692	0.344	2.740		
19	48.282	0.419	2.891		
20	45.439	0.375	2.751		
21	42.551	0.441	2.691		
22	38.722	0.418	2.471		
23	35.488	0.339	2.640		
24	31.177	0.415	2.653		
25	28.795	0.384	2.400		
26	26.381	0.315	2.626		
27	25.222	0.185	2.534		
28	23.583	0.027	2.537		
29	23.191	0.067	2.383		
30	19.589	0.144	2.156		
31	16.265	0.051	2.068		
32	12.268	-0.178	1.991		
33	7.620	-0.065	1.930		
34	6.691	-0.048	1.904		

35	0.641	-0.034	1.755		
36	0.014	-0.112	1.727		
37	-2.855	-0.127	1.683		
38	-5.372	-0.229	1.448		
39	-10.527	-0.111	1.139		
40	-13.831	-0.111	0.912		
41	-17.259	-0.119	0.719		
42	-20.545	-0.167	0.642		
43	-25.383	-0.091	0.583		
44	-30.462	0.011	0.511		
45	-36.062	-0.102	0.376		
46	-40.016	-0.343	0.321		
47	-45.666	-0.193	0.272		
48	-52.474	0.110	0.121		
49	-56.828	-0.160	-0.017		
50	-62.671	0.064	-0.172		
51	-68.554	-0.081	-0.365		
52	-74.035	-0.071	-0.654		
53	-82.042	-0.283	-0.957		
54	-91.088	-0.081	-1.096		
55	-106.433	-0.383	-1.347		
56	-121.068	-0.532	-1.679	1236	offshore

Sample Locations

8 October 1989 1238 to 1242 (EDT)

Number of points = 3

min (x, y, z): -16.088 -0.179 0.775

max (x, y, z): 44.674 0.464 2.700

PT.#	X (m)	Y (m)	Z (m)	TIME	COMMENTS
57	-16.088	0.000	0.775	1238	891008-4 (beach face)
58	10.825	-0.179	1.981		891008-5 (backbeach)
59	44.674	0.464	2.700	1242	891008-6 (back dune)