John C. Gilbert

From: Eugenio Ochoa <eochoa@nmdceng.net>
Sent: Friday, September 27, 2013 11:22 AM
To: John C. Gilbert
Subject: RE: Village of Key Biscayne Report.
Attachments: SKMBT_C45213092710310.pdf

John, sorry it has taken us a little time to get back to you with our written review of the report. We have taken a little more time to provide a more in depth statement as it relates to the Villages situation. One item that was not discussed enough was the west bridge. Given that this bridge also is an important asset to access and egress the Village we felt it important to recognize it in our review comments since no mention of this bridge was undertaken in the study by the County. The comments come with two attachments that we find are very important because they form the basis of the Village's argument in making sure the bridge is rehabilitated to meet the 20 year bench mark being set.

Let me know if you need anything further from us.

From: John C. Gilbert [mailto:jgilbert@keybiscayne.fl.gov]
Sent: Friday, September 20, 2013 5:36 PM
To: Eugenio Ochoa
Subject: RE: Village of Key Biscayne Report.

Thank you.
Enjoy your weekend.

John C. Gilbert
Village Manager
Village of Key Biscayne
88 West McIntyre Street, Suite 210
Key Biscayne, Florida 33149
Ofc: (305) 365-5514
Fax: (305) 365-8936
Cel: (305) 970-3604
www.keybiscayne.fl.gov
jgilbert@keybiscayne.fl.gov

From: Eugenio Ochoa [mailto:eochoa@nmdceng.net]
Sent: Friday, September 20, 2013 5:36 PM
To: John C. Gilbert
Subject: RE: Village of Key Biscayne Report.

John, we plan to have it to you by next Thursday.

Thanks,

Eugene

From: John C. Gilbert [mailto:jgilbert@keybiscayne.fl.gov]
Sent: Friday, September 20, 2013 11:53 AM

To: Eugenio Ochoa
Subject: Village of Key Biscayne Report.

Good morning Mr. Ochoa.
I am inquiring as to when the Village may be in receipt of your analysis/report on the Bear Cut Bridge issue?

John C. Gilbert
Village Manager
Village of Key Biscayne
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Key Biscayne, Florida 33149
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"Under Florida's public records laws, e-mails and e-mail addresses, as well as all forms of electronic communication directed to the Village of Key Biscayne and its employees, may be considered public records subject to inspection by or disclosure to the public. If you do not wish to have your e-mail address possibly disclosed to the public, please do not communicate with the Village of Key Biscayne through e-mail. Instead, please contact the Village by telephone or other non-electronic means."
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NEW MILLENNIUM
ENGINEERING, INCORPORATED

September 27, 2013

John C. Gilbert
Village Manager
Village of Key Biscayne
88 West McIntyre Street, Suite 210
Village of Key Biscayne, Florida 33149

Subject: Bridge Repair Evaluation for Bridge 87544 (Bear Cut Bridge) and Bridge 874541 (West Bridge) on the Rickenbacker Causeway

Re: Review comments of Hardesty & Hanover Report dated 8-16-2013

Dear Mr. Gilbert:

As authorized by the Village of Key Biscayne, New Millennium Design Consultants, Inc. (NMDC) has reviewed the "Foundation Evaluation of the existing Bear Cut Bridge Pier" prepared by Hardesty & Hanover, LLC dated August 16, 2013. Foundation evaluation was requested by Miami Dade (County) in order to assess the load carrying capacity of the existing piles on the portion of the Bear Cut Bridge built in the 1940's.

As stated in the Hardesty & Hanover's report, if proper maintenance is provided the report claims that the bridge to provide an additional 20-30 years of continued life. The report further qualifies this statement with "barring an extreme event such as a coastal storm surge, extreme wind events (above 100 mph) and vessel collision." NMDC believes that the investigation and analysis of existing foundations should have addressed the effects of wave and surge forces and wind events above 100 mph since these forces can cause unexpected damage to a bridge structure during a coastal storm.

Furthermore, the report states that the 1947 bridge substructure was not designed for extreme lateral load events such as coastal storm surges, extreme wind events (above 100 mph) and vessel collision. The presence of tapered steel corrugated pipe piles may indicate that the 1947 bridge substructure was designed for lateral loads. NMDC believes that wind events above 100 mph are not extreme but standard events in the south and should have been accounted for in the evaluation of existing foundations.

In accordance with the National Flood Insurance Program Maps (refer to Exhibit A), Bear Cut Bridge is located in a VE Zone with the base flood elevation of 12 feet and the West Bridge is located in a VE Zone with a base flood elevation of 16 feet. The base blood elevation is the water surface elevation during a coastal storm and Zone VE designates a coastal flood zone with velocity hazard (wave action).

4868 SW 72nd Avenue, Miami, Florida 33155 ~ Phone 305.667.4772 ~ Fax 305.667.1790 ~ www.nmdceng.net

In our opinion, Zone VE designation is significant for the Bear Cut Bridge and the West Bridge due to combined effects of wave and surge forces. These combined forces have a potential damaging the bridge superstructure and the substructure therefore hindering the emergency response and causing significant impact on recovery and reconstruction.

Design of retrofits to Bear Cut and West Bridges need to consider and account for hurricane wave and storm surge forces. Based on data obtained from recent hurricanes, hydrostatic uplift, hydrodynamic uplift and lateral loading restraint failure has been a primary factor causing damage to both bridge decks and substructures.

"Guide Specifications for Bridges Vulnerable to Coastal Storms" 2008 Edition published by AASHTO (refer to Exhibit B for cover page) provides technical guidance and contains specifications. NMDC recommends a Level III Analysis and Design be performed.

NMDC is also concerned that only the load carrying capacity of the piles supporting the Bear Cut Bridge were evaluated as opposed to a similar study undertaken for the West Bridge. Foundations supporting both bridges would have similar concerns regarding load carrying capacity.

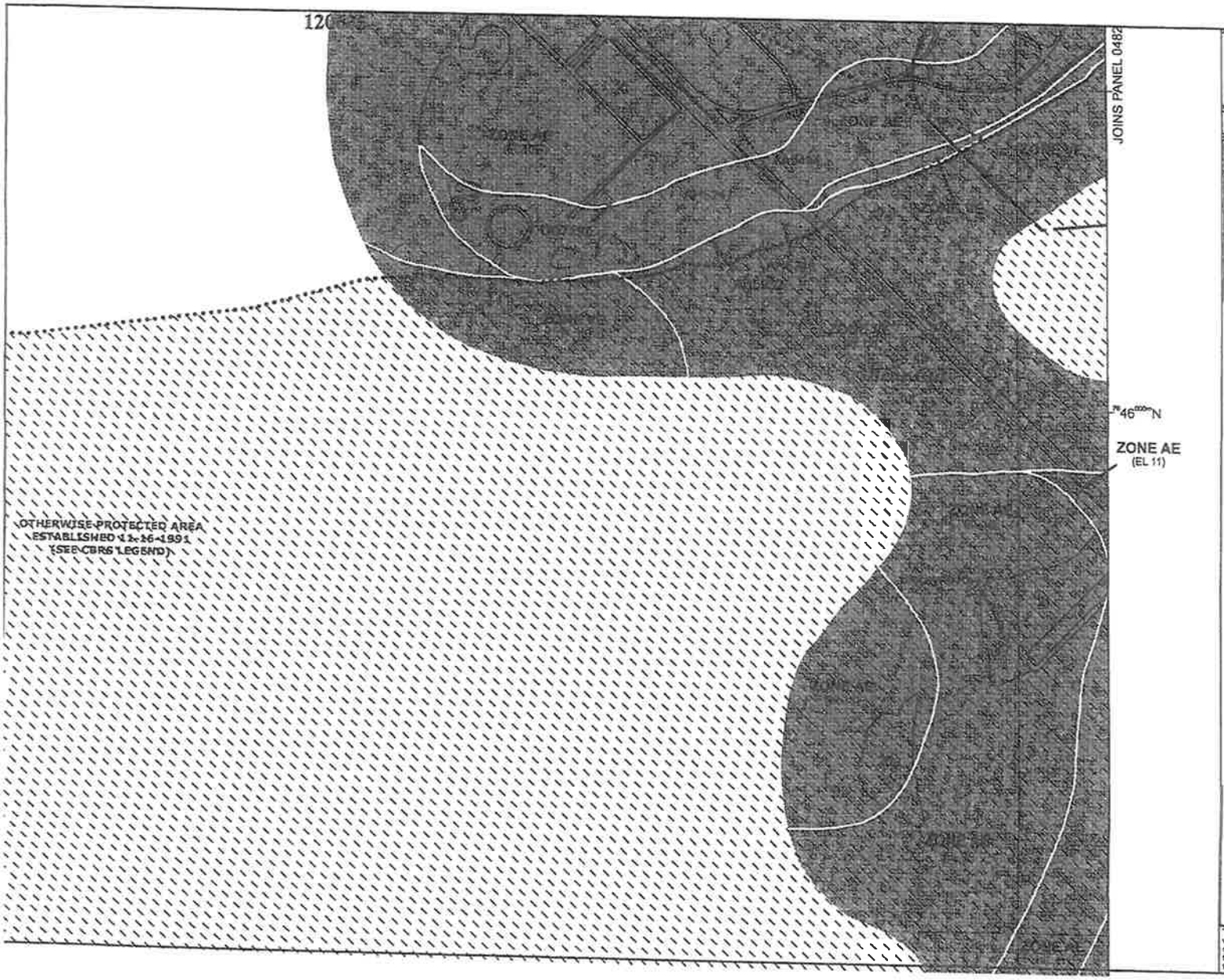
Hardesty & Hanover report is based on the analysis of (8) piles on the Bear Cut Bridge out of 440 piles resulting in a very low reliability factor. However, since each tapered pile was most likely to have been driven until refusal and the bridge has safely supported the loads imposed on it for the past 67 years, NMDC would find the results obtained from the analysis reliable.

In summary, NMDC believes that combined effects of wave and surge forces need to be addressed for both the Bear Cut and West Bridges in order to insure that the rehabilitation of the structures are done in the most complete and sound manner possible to ensure that the integrity of the bridges remain intact during coastal storms that frequent the South Florida area.

Respectfully submitted
New Millennium Design Consultants, Inc.

Eugenio L. Ochoa, P.E.

ATTACHMENT "A"



MAP SCALE 1" = 500'

50 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0481L

FIRM

FLOOD INSURANCE RATE MAP

MIAMI-DADE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 481 OF 1031

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MIAMI - DADE COUNTY	120688	0481	L
MIAMI, CITY OF	120650	0481	L

- NOTE -

THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

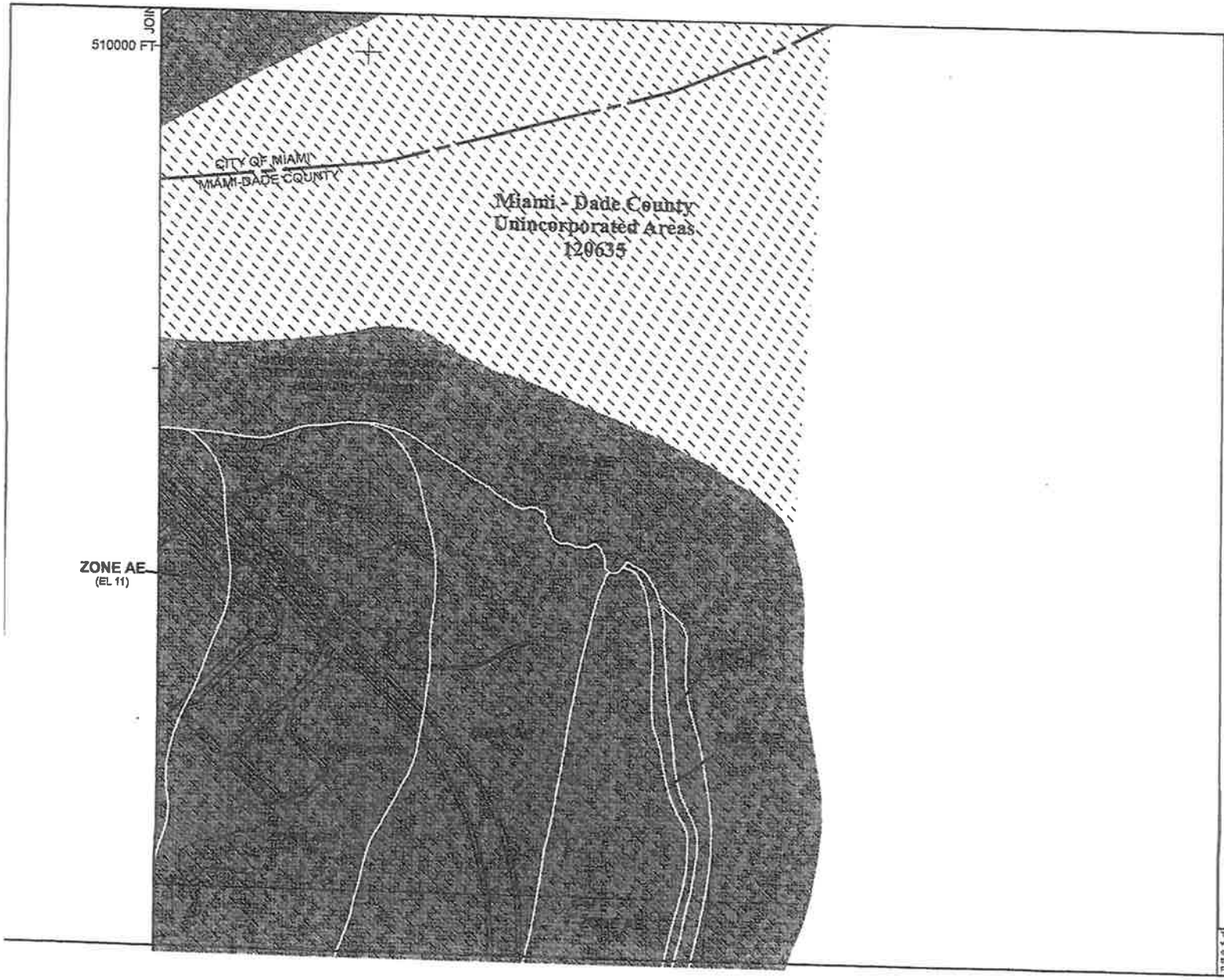
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12086C0481L

MAP REVISED
SEPTEMBER 11, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0482L

FIRM

FLOOD INSURANCE RATE MAP

MIAMI-DADE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 482 OF 1031

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MIAMI - DADE COUNTY	120635	0482	L
MIAMI, CITY OF	120680	0482	L

- NOTE -

THIS MAP INCLUDES ROUNDWORK OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

Notice to User: The Map Number shown below should be used when placing map orders; the Community number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12086C0482L

MAP REVISED
SEPTEMBER 11, 2009

Federal Emergency Management Agency

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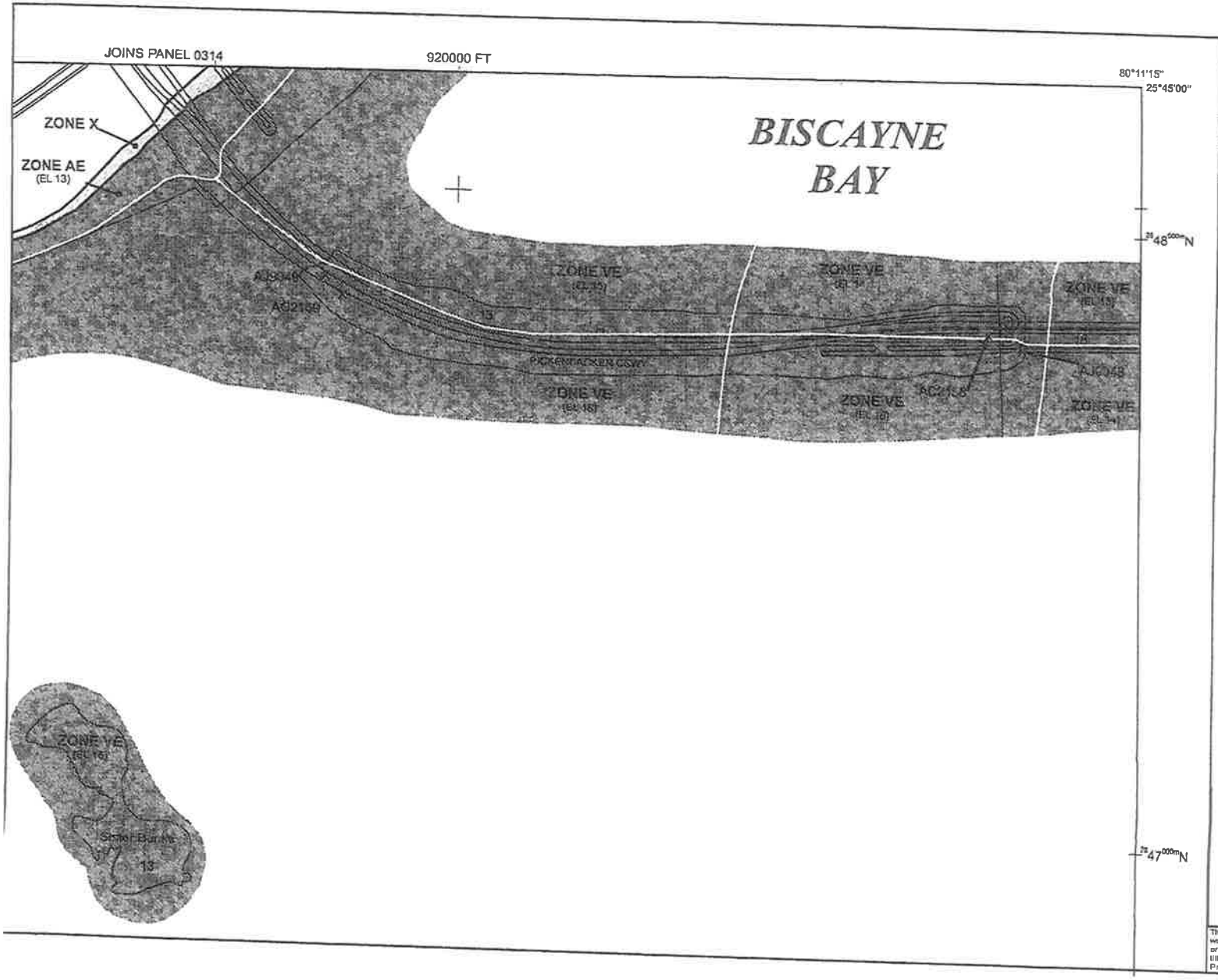

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0477L

FIRM

FLOOD INSURANCE RATE MAP

MIAMI-DADE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 477 OF 1031

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MIAMI, CITY OF	120650	0477	L

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12086C0477L

MAP REVISED
SEPTEMBER 11, 2009

Federal Emergency Management Agency

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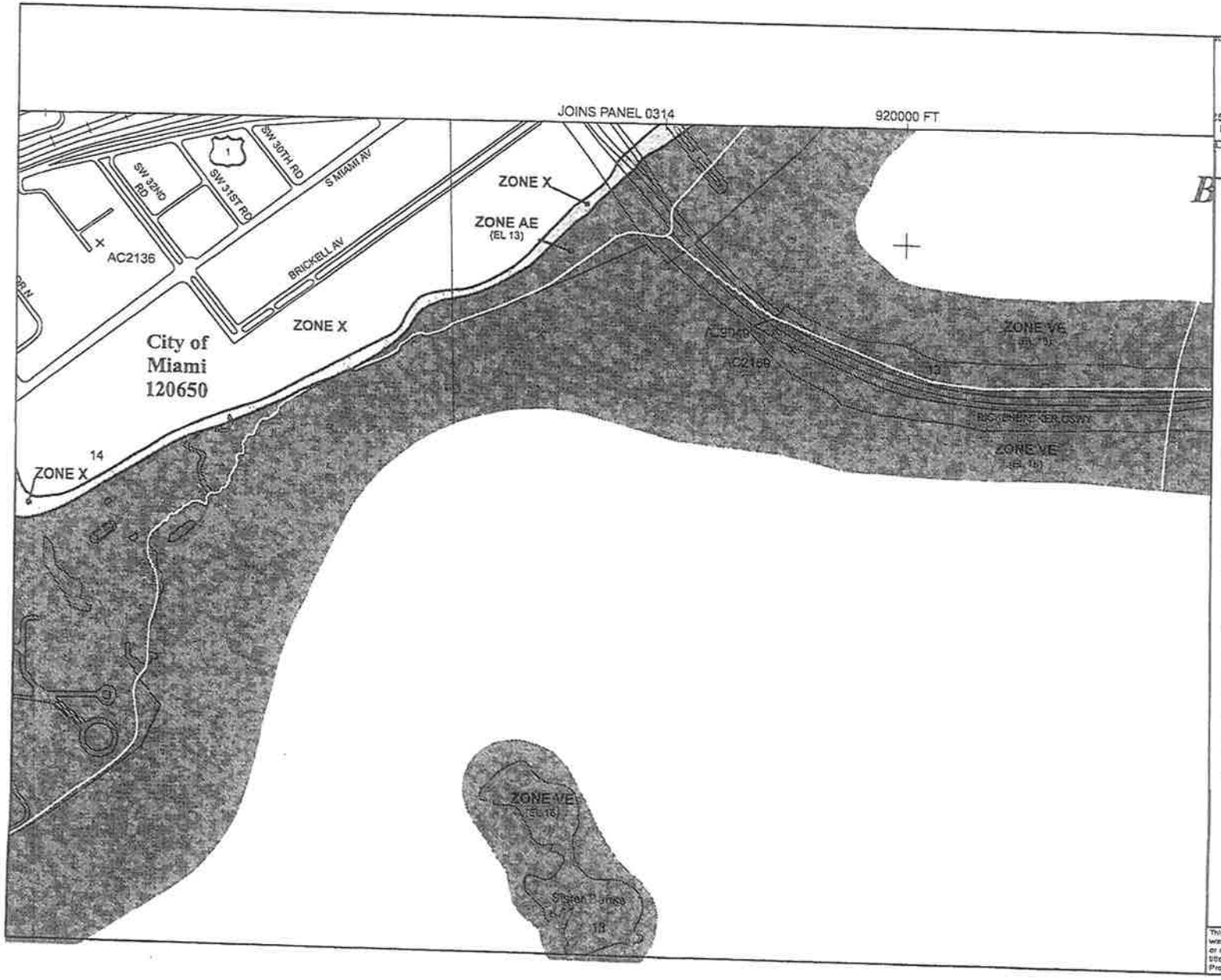

MAP SCALE 1" = 500'

250 0 500 1000 FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0477L

FIRM

FLOOD INSURANCE RATE MAP

MIAMI-DADE COUNTY, FLORIDA
AND INCORPORATED AREAS

PANEL 477 OF 1031

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MIAMI, CITY OF	120650	0477	L

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
12086C0477L

MAP REVISED
SEPTEMBER 11, 2009

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LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

~~~ 513 ~~~ Base Flood Elevation line and value; elevation in feet*

~~~ 513 ~~~ Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the National Geodetic Vertical Datum of 1929

(A)———(A) Cross section Line

(23)- - - - - -(23) Transect line

87°07'45", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

*76***N 1000-meter Universal Transverse Mercator grid values, zone 17

600000 FT 5000-foot grid ticks: Florida State Plane coordinate system, East zone (FIPSZONE 0901), Transverse Mercator projection

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

⊕M1.5 River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 20, 1993

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
March 2, 1994 - May 15, 1994 - July 17, 1995 - for description of revision, see Notice to Users page in the Flood Insurance Study report.
September 11, 2009 - to reflect revised shoreline, to incorporate previously issued Letters of Map Revision, to reflect updated topographic information, to add and change Base Flood Elevations, to update corporate limits, to change zone designations, to add roads and road nerves, and to add and change Special Flood Hazard Areas.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

PANEL 0116L

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

ATTACHMENT "B"

2008

Guide Specifications for Bridges Vulnerable to Coastal Storms

1 EDITION

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS