

LOCATION HYDRAULICS REPORT

I-95/State Road (SR) 9 Project Development and Environment (PD&E) Study From South of SR 860/Miami Gardens Drive to North of Broward County Line Miami-Dade County, Florida

Financial Management Number: 414964-1-22-01 Federal Aid Project Number: N/A Efficient Transportation Decision Making (ETDM): 14419

DISTRICT VI





The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

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Florida Department of Transportation District Six

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1 INTRODUCTION

This roadway project entails providing additional express and general-use lanes on I-95/SR 9 from south of SR 860/Miami Gardens Drive (MGD) to north of the Broward County Line and implementing interchange improvements at SR 860/Miami Gardens Drive and CR 854/Ives Dairy Road (IDR) within Miami-Dade County. The project study area is shown on the project location map (see **Figure 1**).

The improvements proposed as part of the project stem from the Refined Build Concept that was developed as part of the Interstate 95 Corridor Planning Study, conducted by the FDOT in May 2019, that assessed enhancements along the length of the I-95/SR 9 corridor within Miami-Dade County from US 1/SR 5 (Mile Post 0.000) to the Broward County Line. As such, this project is part of a larger effort to improve the I-95/SR 9 corridor within Miami-Dade County and regionally within Broward and Palm Beach Counties.

Within the project limits, I-95/SR 9 is classified as 'Urban Principal Arterial Interstate' and consists of six to eight general use lanes and two to four express lanes; the typical section varies throughout the project segment. This particular section of the corridor is located north of the Golden Glades Interchange (GGI) in northern Miami-Dade County and traverses five U.S. Census Designated Places, including North Miami Beach, Ojus, Ives Estates, Pembroke Park, and Hallandale Beach. It connects to SR 860/Miami Gardens Drive, an important east-west facility within northern Miami-Dade County.

It should be noted that the greater I-95/SR 9 corridor is part of Florida's Strategic Intermodal System (SIS) highway network and is a designated state hurricane evacuation route. In addition, I-95/SR 9 serves a critical role in facilitating the north-south movement of traffic in southeast Florida as one of two major expressways (Florida's Turnpike being the other) that connect the major employment centers and residential areas between Miami-Dade, Broward, and Palm Beach Counties. The corridor traverses dense urban areas with predominantly commercial and residential uses, including downtown Miami.

Overall, the project will offer enhanced mobility options for motorists and transit users as it will provide additional capacity along the I-95/SR 9 corridor throughout northern Miami-Dade County. Consistent with the existing managed lanes system on I-95/SR 9, the additional express lanes are anticipated to operate using variable toll pricing based on congestion to optimize traffic flow.



Figure 1: Project Location Map

1.1 Purpose and Scope

The following supports the Purpose and Need for this study, which was screened through the FDOT projects ETDM Programming tool:

- Address the deficient operational capacity and relieve existing/future congestion along the I-95/SR 9 corridor
- Preserve the operational integrity and regional functionality of I-95/SR 9 (and, therefore, the regional transportation network) by complementing similar corridor improvements throughout Miami-Dade, Broward, and Palm Beach Counties
- Enhance emergency evacuation and response times

1.2 Drainage Basin

This bridge replacement project is located within the C-9 Basin. This drainage basin has a drainage area of approximately 98 square miles, and it can be divided into two sub-basins, which are the C-9 East Basin and the C-9 West Basin. The SFWMD Basin Map for the sub-basins is provided in Appendix A. The C-9 Canal drains into Dumbfoundling Bay approximately 3 miles downstream of the proposed I-95 Bridge over C-9 Canal project location. The land use for the C-9 Basin is mostly developed urban area. The I-95 bridge over the C-9 Canal is located between two control structures. S-29 is a gated spillway located downstream of the project just east of US 1. A headwater stage of 2.0 feet is maintained at S-29. S-30 is located upstream of the project, which is a gated spillway located west of US 27. A location map presented in Appendix A of this report shows the locations of the proposed bridge crossing as well as the locations of structures S-29 and S-30.

2 Project Alternatives

2.1 No-Build Alternative

The No-Build Alternative proposes to keep the existing corridor into the future without other improvements, except for routine maintenance. Planned and approved adjacent projects in the area (both to the south at the Golden Glades Interchange and to the north in Broward County) are considered, without any proposed changes within the limits of this project. No traffic capacity, operation, safety, mobility, or evacuation improvements would be implemented to the I-95 mainline, the Express Lanes, or the two arterials within the study area. The effect of the No-Build Alternative includes the continuation of existing delays and congested traffic conditions. Also, since travel demand and truck traffic are projected to increase over the next 20 years, given the continued growth expected in this area of Miami-Dade County, under this alternative,

congestion and delay will worsen; levels of service on the arterials will deteriorate; and no related environmental impacts, such as traffic noise levels, will be addressed. The No-Build Alternative will not require any acquisition of right-of-way and it will not impact any parks or trail access. This alternative is considered to be a viable alternative to serve as a baseline comparison against the proposed Build Alternatives.

2.2 Build Alternatives

Build Alternative #1 will provide two express lanes throughout the entire corridor; will add one additional general use lane in each direction; will reconfigure the SR 860/Miami Gardens Drive interchange; will provide a Diverging Diamond Interchange configuration at CR 854/Ives Dairy Road; will maintain at-grade access to I-95 from SR 860/Miami Gardens Drive; will add bicycle lanes and sidewalks along SR 860/Miami Gardens Drive; and will add an eastbound through lane, bicycle lanes, and one sidewalk along CR 854/Ives Dairy Road.

Build Alternative #2 will provide two express lanes throughout the entire corridor; will add one additional general use lane in each direction; will introduce braided ramp bridge access for the express lanes; will reconfigure the SR 860/Miami Gardens Drive interchange, including the addition of second level bridges; will provide a Single Point Urban Interchange configuration at CR 854/Ives Dairy Road; will provide grade-separated bridge access to I-95 from SR 860/Miami Gardens Drive; will add bicycle lanes and sidewalks along SR 860/Miami Gardens Drive; and will add an eastbound through lane, bicycle lanes, and two sidewalks along CR 854/Ives Dairy Road.

Build Alternative #3 will provide two express lanes throughout the entire corridor; will add one additional general use lane in each direction; will introduce braided ramp bridge access for the express lanes; will reconfigure the SR 860/Miami Gardens Drive interchange; will provide a Diverging Diamond Interchange configuration at CR 854/Ives Dairy Road; will provide grade-separated bridge access to I-95 from SR 860/Miami Gardens Drive; will add bicycle lanes and sidewalks along SR 860/Miami Gardens Drive; and will add an eastbound through lane, bicycle lanes, and one sidewalk along CR 854/Ives Dairy Road.

3 DRAINAGE SYSTEM IMPROVEMENTS

The project is mostly located in unincorporated Miami-Dade County with smaller portions located in the City of North Miami Beach, City of Hallandale Beach, and the Town of Pembroke Park, the latter two of which are municipalities within Broward County. The project is also within the jurisdictional boundary of the South Florida Water Management District (SFWMD), Miami-Dade County Department of Regulatory and Economic Resources (DRER), and Broward County Environmental Protection and Growth Management Department (EPGMD).

SFWMD, DRER, and EPGMD have established several criteria for water quality, depending on the proposed type of stormwater treatment facility. Existing facilities provide water quality treatment and attenuation of roadway runoff via dry and wet detention/retention ponds. All proposed stormwater management facilities will provide the necessary water quality treatment volume and limit the post-development peak discharge rate into the Biscayne Canal (C-8), Snake Creek Canal (C-9), the Oleta River, and the Intracoastal Waterway to the predevelopment peak discharge rate. Water quality treatment and discharge attenuation will be provided via existing and proposed dry and wet detention/retention ponds, French Drains, and EcoVault Structures (or approved equal). EcoVault Structures (or approved equal) are required to supplement the provided water quality treatment due to the limited right-of-way within the project limits available for retention areas, and any areas of poor soil infiltration rates for any proposed French drains.

Based on the conceptual drainage design evaluation for the proposed improvements, the stormwater management facilities [including swales, detention/retention areas and ponds, French drains, and EcoVault Structures (or approved equal)] will meet FDOT drainage criteria as well as SFWMD permit criteria. The improvements will have no negative drainage impacts to the surrounding areas and the proposed stormwater management facilities will have the capacity to adequately treat and attenuate roadway runoff within the project limits. Therefore, water quality impacts to downstream receiving waters are not anticipated to occur.

3.1 Description of Drainage Systems

System 1 – I-95/SR 9 From the Begin Project to Approx. 200' South of Miami Gardens Dr.

Stormwater runoff will be directed towards the south via a closed storm sewer network and into the Golden Glades Interchange drainage systems, which are currently being proposed for improvement and are to be constructed prior to this subject project. The Golden Glades Interchange drainage systems will consist of interconnected dry retention ponds and French drains, with an emergency overflow into the SFWMD Biscayne Canal (C-8). All water quality and pre-post attenuation criteria requirements are being designed into the Golden Glades Interchange drainage systems, and will be provided entirely within the interconnected dry retention ponds and French drains within the interchange itself. This drainage system is located within the SFWMD C-8 Drainage Basin (see Appendix C).

System 2 – I-95/SR9 From Approx. 200' South of Miami Gardens Dr. to Miami Gardens Dr.

Stormwater runoff from this drainage system will be routed into a series of proposed French drains and EcoVault Structures (or approved equal) for both water quality and pre-post attenuation. The proposed French drain and EcoVault Structures (or approved equal) will be designed to be able to handle 100% of the stormwater runoff with no emergency overflow provided. There is no physical room with the right-of-way for any wet or dry retention ponds or swales and as such, French drains are the only viable method for disposal of the stormwater

runoff. This drainage system is located within the SFWMD C-9 East Drainage Basin (see Appendix C).

System 3 – I-95/SR9 From Miami Gardens Dr. to Snake Creek Canal (C-9)

Stormwater runoff will be directed towards the infield areas within the I-95/Miami Gardens Drive Interchange, which will act as dry retention ponds and be able to provide for the required water quality and pre-post attenuation prior to discharge through an EcoVault Structure (or approved equal) and over an emergency overflow weir into the SFWMD Snake Creek Canal (C-9). In addition, the capacity of the interchange infield areas will be increased through the use of proposed French drains in spot areas in order to ensure that all of the water quality and pre-post attenuation criteria are adhered to. This drainage system is located within the SFWMD C-9 East Drainage Basin (see Appendix C).

System 4 – I-95/SR9 From Snake Creek Canal (C-9) to Ives Dairy Rd.

Stormwater runoff will be routed into roadside swales and dry retention interchange infield areas within the Ives Dairy Road Interchange for water quality and stormwater attenuation treatment. The capacity of these roadside swales and interchange infield areas will need to be supplemented by proposed French drain and EcoVault Structures (or approved equal) in order to be able to meet the applicable water quality and attenuation criteria. An emergency outfall into the existing lake located in the southeast quadrant of the I-95/Ives Dairy Road Interchange will be provided for disposition of the excess stormwater runoff. This drainage system is located within the SFWMD C-9 East Drainage Basin (see Appendix C).

System 5 – I-95/SR9 From Ives Dairy Rd. to the End Project

Stormwater runoff will be routed directly onto swales adjacent to I-95 which will act as dry retention areas for the treatment of water quality and pre-post attenuation. In addition, due to limited right-of-way, proposed French drain and EcoVault Structures (or approved equal) will be added in order to supplement the capacity of the roadside swales and be able to meet all water quality and pre-post attenuation requirements. No emergency outfall will be provided for this drainage system. This drainage system is located within the SFWMD C-9 East Drainage Basin (see Appendix C)

3.2 FEMA Floodplain Compensation

The Federal Emergency Management Agency (FEMA) has produced Flood Insurance Rate Maps (FIRM) showing the locations of floodplains throughout the United States. A copy of the FIRM for the project areas are included in Appendix A of this report. In order to ensure that proposed developments do not adversely affect the flood levels of adjacent properties, it is required to compensate for any reduction in the storage capacity of the Base Floodplain (100 year floodplain) with an equivalent amount of storage elsewhere within the same floodplain.

The project lies within FEMA 100-year floodplain, within Zones AE, AH, and X with base flood elevations. Given the significant increase in storage within the corridor for stormwater management, there is no anticipated adverse floodplain impacts associated with this project. The modifications to the drainage systems due to this project are not anticipated to result in a significant change in capacity to carry floodwater, with minimal to no increase in flood heights and flood limits. Floodplain compensation analysis is included in Appendix B of this report.

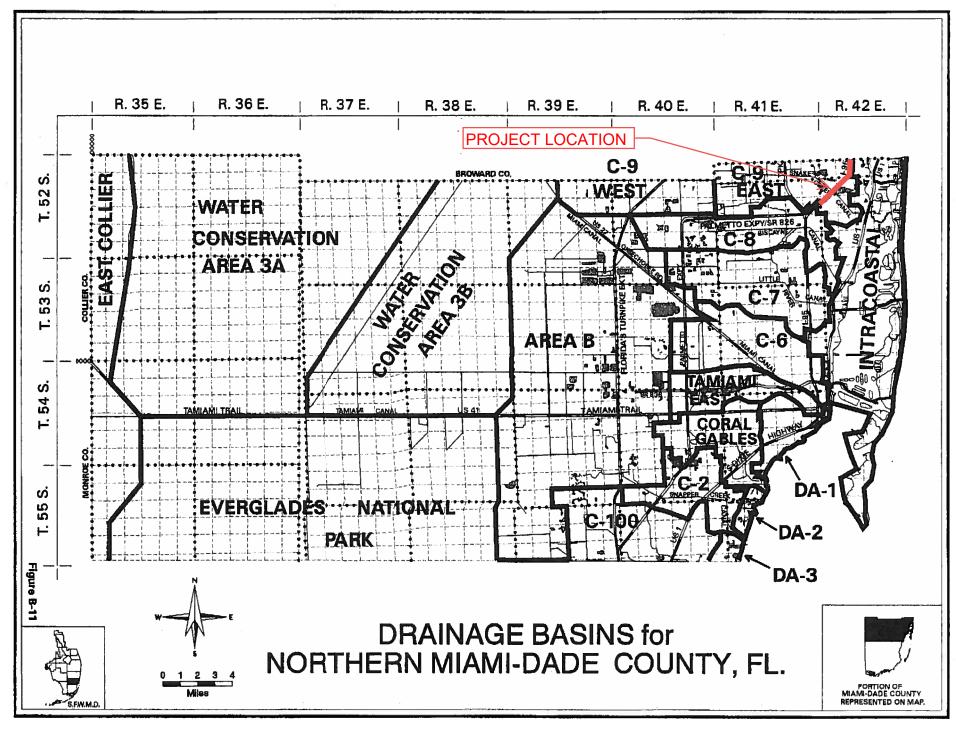
There are no regulatory floodways within the PD&E study project limits and therefore no impacts to regulatory floodways are anticipated as a result of the project.

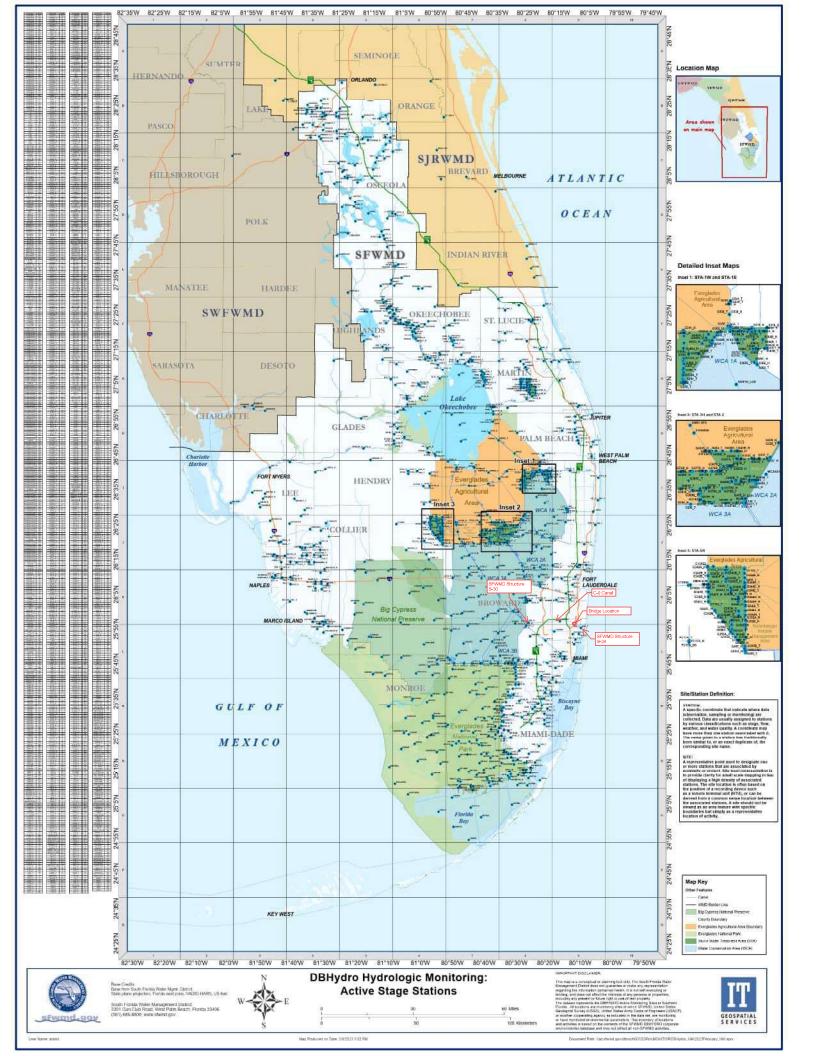
4 RISK ASSESSMENT

The project will result in only minimal encroachments to floodplains. These encroachments will be constrained to the limits described in Section 3 above. Encroachments resulting from the construction of the preferred alternative will be fully compensated within the proposed drainage systems to ensure there will be no increase or significant change to FEMA flood elevations and/or limits.

The proposed drainage systems will perform hydraulically in a manner equal to or greater than the existing systems, and floodplain surface elevations are not expected to increase. Thus, there will be no significant adverse impacts on natural and beneficial floodplain values. There will be no significant change in flood risk, and there will not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, it has been determined that the encroachment is not significant. Floodplain area limits and calculations have been provided in Appendix B of this document.

APPENDIX A SFWMD Drainage Basin Map





APPENDIX B FEMA FIRM Maps

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local darkage sources of small size. The community map repository should be coincided for possible updated or additional food hazard information.

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To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at http://www.ngs.nggs.goy.

Base map information shown on this FIPM was provided in digital format by the Mamildade County information. Technology, Department. These data were completed at seader of 1,3000 from digital orthopedopology by detect 2001. Additional base map information was provided by the Clies of Aventura, Coral Cathes, and Homestade, the Team of Cuttle Blay, and Mamildade controlled the Coral Cathes.

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Please refer to the separately printed Map todex for an overview map of the county showing the layout of map panels, community map repository addresses. and a Listing of Communities table containing National Flood Insurence Plaguem dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Center at 1-800-356-9616 for information on annihilate products associated with the FIRM. Available products may include previously associat Centers of Map Changa, a Flood Insurance Study report, and/or original versions of this resp. The FEMA Map Service Center may also be reached by Fax at 1-800-356-9502 and may exceed a https://doi.org/10.1007/service-firma-020.

If you have questions about this map or questions concerning the National Plood Insurance Program is general, please call 1-577-FEMA MAP (1-577-336-2627) or visit the FEMA website at http://www.forna.gov.







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The projection used in the preparation of this map was Florida State Place east zone (FRSZDNE 0001). The horizontal distant was NAD-83, 05630 spheroid production of FRSZDNE 0001, and the production of FRSZDNE 0

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Base map information shown on this FRM was provided in digital format by the Mani-Dade County Information Technology Department. These data were compiled at a scole of 13,000 from digital ordinaptrography deleted 2001. Additional base map information was provided by the Cities of Aventura, Costal Quibles, and Hornestead, the Form of Culter Bay, and Mani-Dade Counter Quibles, and Hornestead, the Form of Culter Bay, and Mani-Dade Counter and the Counter of Counter Bay of Counte

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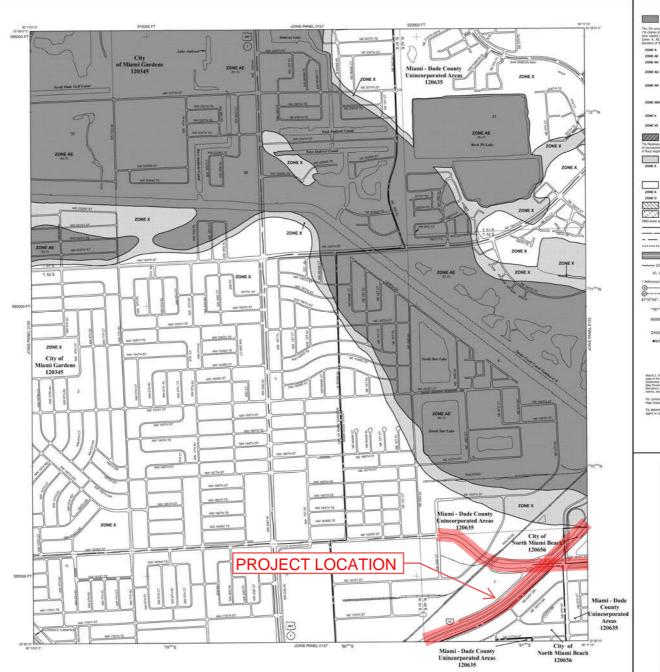
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Contact the FEMA Map Service Center at 1-000-558-9616 for information or available products associated with the FRM. Available products may include previously assets Latters of Map Chenge, a Flood humanon Study report, anchor digital versions of this read. The FEMA Map Service Center may also be reached by Fix at 3-100-505-5020 and in weekle at flamplimine Center (press per control of the cont

If you have questions about this map or questions concerning the National Floor Insurance Program in general, please call 1-877-9EMA MAP (1-877-336-2627) or visit the FEMA website at http://mmw.fema.gov.





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

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Areas determined to be automorate 0.2% annual chance floodpoor Annes in which flood hasteck are undatermined, but possible

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS. OTHERWISE PROTECTED AREAS (OPAL)

creatly located within or adjacent to Special Ploo Prophology boundary

Floodway toundary Jone D boundary

..... CBRS and OPA boundary

Boundary dividing Special Flood Huntel Area zones and boundary dividing Special Flood Head Areas of different Base Flood Develors, Rood dupts or flood velocities.

fine Pool Electron line and value; electron in fast ~ 313~ Save Flood Direction value where uniform within zonic elevation in Sect." 00, 907

Referenced to the National Geodetic Vertical Datum of 1929 Cross section Cave

●M1.5

-0 @-----@ Tramest line 87'0745', 32'22'30'

Geographic operatories reference to the North American Datum of 1963 (NAO 83), Western Homisphore 76"N 3000 meter Universal Transverse Mercator and values, some

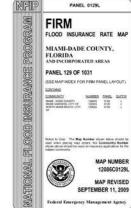
600000 FT 5000-foot grid ticks; Florida State Plane coordinate leasiem, Basis sone (FIRF520HE 0901), Transverse Marcator projection Banch mark (see explanation in Notes to Users section of this FIRM panel) DXS5550 -

MAP REPOSITORY

Plater to listing of Map Repositories on May Index

1 MAP SCALE 1" + 500"

250 8 504 1906 PANEL 0129L



This map is for use in administering the Notional Flood Indurance Program. It does not necessarily identify all areas subject to flooding, particularly from local dealwage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevation To obtain more dealed information in areas where Base Proof Elevations (EE) and/or Elevations (LEE) and/or Elevations (LEE) and the Elevation has been excluded to consult dealers and the elevation of the elevat

Coastal Base Flood: Elevations shown on this may apply only tendment of 07 National Geodetic Verlocal Datase of 1950 (1970-29). Users of the FRM should be arese that coasts flood elevations are also provided in the "Sourang of Dilleters Elevations tables in the Ripod Insurance Study report for the stratistics. Bestdom shown the Summary of Dilleters Elevations show the should be used to Desiroous shown the Summary of Dilleters Elevations show the switch the Desiroous shown the Summary of Dilleters Elevations shows should be used to construction and/or Googlain management purposes when they are higher than the elevations above on the FITOS.

Boundaries of the **Boodways** were computed at cross sections and interpolated between cross sections. The Boodways were based on hybriselic considerations with regard to requirements of the Nabotene Bood Innuariance Program. Floodway widths and other perticular throuby data are provided in the Flood Insurance Solidy regort for the jurisdiction.

Certain areas mot in Special Road Hazard Areas may be protected by flood control structures. Relat to Section 2.4 "Flood Protection Measures" of the Road Inscarring Study report for information on Sood control structures for this participation.

The projection used in the preparation of this map was Florida State Place east zone (FRSZDNE 0001). The horizontal distant was NAD-83, 05630 spheroid production of the projection of FISHS for regional immediation say meet in sittle considerable production of FISHS for regional immediation in years in sittle considerable officeroses in mee feature across jurisdiction foundations. These differences do not affect the country of the FISHS.

Flood elevations on this map are referenced to the National Geodetic Virtical Datum of 1920. These flood elevations must be compared by structure and ground elevations referenced to the same varietized attent. For information reparting conversion between the National Geodetic Vietnat Datum of 1920 and the North Americal Virtical Datum of 1920 and the North Americal Virtical Datum of 1930, set the National Geodetic Survey and the National Geodetic Datum of 1930 and 19

NGS Information Services NOAA, N/NGS12

NOAA, NINGS12 National Geodetic Survey SSMC-1, WSD02 1316 East-West Highway Silver Spring, Maryland 20919-3282 (301) 713-3242

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the information Senices Branch of the National Geodetic Survey at (391) 713-3242, or visit its website at http://www.nos.moss.gov.

Base mag information shown on this FRM was provided in digital format by the Marin-Code County Information Technology Department. These data were compiled at a scole of 13,000 from digital orchaptography idebed 2001. Additional base may information was provided by the Cities of Aventura, Costi Qubbies, and home back of Code Bay, and Memi-Code Counter.

This map referois more desiried and up-to-dain stream channel configurations than those shown on the previous FIRM for this particular. The foodpare and foodlessips that energy strainferfere for the previous FIRM they have been adjusted to confirs to these new stream channel configurations. As a result, the FEod Prolless and Foodlessy Data bolles in the Flood insurance bootly Report plactic contains administration (pd about data) may reflect stream channel defances that defirs from what is allowed to the Prolless and Foodless or the Story of the Proless and Foodless and Proless and Foodless (data) may reflect stream channel defances that defirs from what is allowed to the Proless and Foodless and Proless and Foodless and Proless and Foodless and Proless and Proles

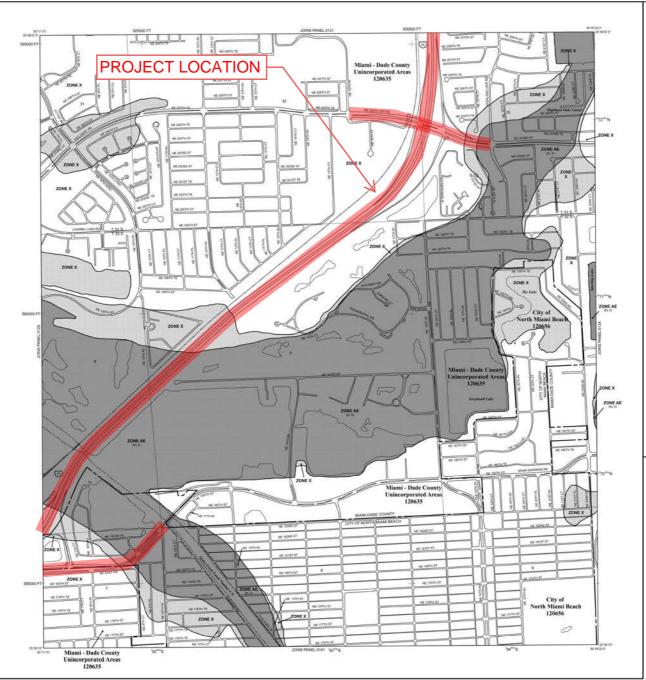
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or do-annexations may have occurred after this may was published, map users should contect appropriate community officials to verify culment corporate limit floations.

Please refer to the sequentity printed Map index for an overview map of the county showing the seyout of map panels; community map repository addresses, and a Listing of Communities statisfic containing National Flood insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the FEMA Map Service Ceeter at 1-800-358-9615 for information or available products associated with this FIRM. Available products may include previously associated Lutters of Map Cheege, a Filod Passaron Study pror, and/or organization of 16s rep. The FEMA Map Service Center may also be reached by Fix at 3-100-505-5020 and the webble at flags/inter-(fermagiv.

If you have questions about this map or questions concerning the National Floor Insurance Program in general, please call 1-877-9EMA MAP (1-877-336-2627) or visit the FEMA website at http://mmw.fema.gov.





LEGEND

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

all filod (100-year flood), visic known as the base flood, is the flood that has a temp especial or screeded in only plant year. The Special flood Head Area is the flooding by the filt annual filmen flood. Area of Special Flood Head Area is the Art, AC, AR, AR, Y, and VC. The Base flood Sheustine is this water-works: in 15 similar flates flood.

No bear flood Elevations determined

Food depths of 1 is 3 feet (usually areas of ponding); Nase Food ZONE AN Pood double of I to 3 feet (usually sheet flow on sloping terroin), delarage double interested. For arms of alluvial fair flooding, velocities she determined.

Special Flood Hazard Area formerly protected from the 1% armual choice flood by a flood control system that was submisquently described. Zone All indicates that the former flood control softem is being restored to droude projection from the 1% armual chance or grooter flood.

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MATTIONAL

Area to be protected from the annual chance flood by a Federal flood protection sestem under construction, or lines flood Directions

Costal flood zone with rescrip hazard (were action); on Name Flood Structure determined. Contail floor zone with velocity facent (were active), these floor flooring determined.

PLOCOWAY AREAS IN ZONE AS

criticated of a stream plus any adjacent floolplain areas that must be kept free other the 1th annual chance flood can be carried without substantial increases DTHER DUDON AREAS

Areas of 6.2% annual chance flood, areas of 1% annual chance flood with average deeths of less than 1 foot or with dvanage areas less than 1 square rife; and areas protected by spreec from 1% annual chance flood.

Areas determined to be automorate 0.2% annual chance floodpoor Annes in which flood hasteck are undatermined, but possible COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS.

OTHERWISE PROTECTED AREAS (OPAL) creatly located within or adjacent to Special Floor

Prophology boundary Floodway toundary Jone D boundary

..... CBRS and OPA boundary

Boundary dividing Special Flood Huntel Area zones and boundary dividing Special Flood Head Areas of different Base Flood Develors, Rood dupts or flood velocities. fine Pool Electron line and value; electron in fast

Since frood Elevation value where uniform within zonic elevation in fact." $\ensuremath{\mathsf{N}}$

Referenced to the National Geodetic Vertical Datum of 1929 -0 Cross section Cave @-----@ Tramed line

87°0745", 32°22'30" Geographic operatories reference to the North American Datum of 1963 (NAO 83), Western Homisphore 76"N 3000 meter Universal Transverse Mercator and values, some

600000 FT 5000-foot grid ticks; Florida State Plane coordinate leasiem, Basis sone (FIRF520HE 0901), Transverse Marcator projection Banch mark (see explanation in Notes to Users section of this EUO panel)

> MAP REPOSITORY
>
> Plater to listing of Map Repositories on May Index EFFECTIVE DATE OF COUNTYWIDE FLOCO WELLHANCE HATE SELF

munity map revision history prior to countywide mapping, refer to the Com any table located in the filood Insurance Sludy report for the jurisdiction.

1 MAP SCALE 1" + 500" 250 8 504 1906

PROGRAM FIRM FLOOD INSURANCE RATE MAP MIAMI-DADE COUNTY, FLORIDA AND INCORPORATED AREAS INSURANCE PANEL 133 OF 1031

(SEE MAP INDEX FOR FIRM PANEL LAYOUT) CONTANG COMMUNITY NUMBER FROM SUFFIX MARK CASE COVER COVER COVER STATE L

PANEL 0133L

Notice to Union. The Map Number alread before should be sent when placing map orders. He Community Number above should be used on improve predictions by the

MAP NUMBER 12086C0133L MAP REVISED SEPTEMBER 11, 2009

NOTES TO USERS To obtain more collected information is mass where Base Flood Elevation (EEE) and/off Robergs Anne been determined, uson are encouraged to consultation of the consult Coastad Base Flood Elevations shown on this map apply only landward of 0.0 National Geodetic Vertical Datum of 1500 (WVO 23), Users of the FRMI should be assert bell coastal food elevations are also provided in the Sommary of 20 Billitester Elevation states in the Road instance Study report for this principlot. Elevations shown in the Summary of Studiester Elevations Studies should be used to coestuction and/or Socialism management purposes when they are higher than the elevations shown on this FRMI.

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information. To obtain more detailed information in areas where Base Flood Elevations

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations after egard to requirements of the National Flood Insurance Program. Floodway widths and other perfects floodway data are provided in the Flood Insurance Study and the Flood Insurance Study report for the jumidicion.

Certain areas not in Special Flood Hazard Areas may be protected by **flood** central structures. Relat to Section 2.4 "Flood Petestion Measures" of the flood insurance Study report for information on flood control structures for the patiedistion.

The projection used in the proportion of this map was Florida State Plane east zone (FPSZONE 050), The horizontal datum was MoD St. CR650 phonois production of FPSZONE 2000, The horizontal datum was MoD St. CR650 phonois production of FPSSON for adjourn primediction may assist in sight positional differences in may feature across prediction boundaries. These differences do not effect the occupy of the FIRSA.

Flood selevations on this map are referenced to the National Geodetic Vertical Datum of 1920. These flood elevations must be compared to structure and pound selevations referenced to the name vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the Notich American Vertical Datum of 1926 and the Notich American Vertical Datum of 1926 with the National Geodetic Servey website at \$150,000 are used to 1928, with the National Geodetic Servey website at \$150,000 are used to 1920 and 1920 are used to 1920 are used to 1920 and 1920 are used to 1920 are used to 1920 and 1920 are used to 1920 are used to 1920 are used to 1920 and 1920 are used to 1920 and 1920 are used to 1920 are used to 1920 and 1920 are used to 1920 are

NGS Information Services NGAA, NNGS12 National Geodelic Survey SSMC-3, 89202 1315 East-West Highway Silver Spring, Maryland 20010-3282 (301) 713-3242

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit its website at http://www.ngs.noos.gov.

Base map information shown on this FIRM was provided in digital format by the Mami-Dade County information Technology Department. These data were compiled at a scale of 1,3000 from digital orthophologisety beloed 2001. Additional base map information was provided by the Cites of Aventura, Costil Cathea, and Hornelsted, the Toesh of Cuttle Bay, and Mami-Dade County.

This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FRM for this prindiction. The floodpasses and floodress that these transferred term for specious FRM they have been edulated to confine to these new stream channel configurations. As a result, the FROD Printies and Floodressy Data tables in the FROD insurance SULY Report (which contains authorities the years) can be in FROD insurance SULY Report (which contains authorities the years) can be in the superior of the surance of the result of the from the submit of the from the SULY contains the submit of th

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

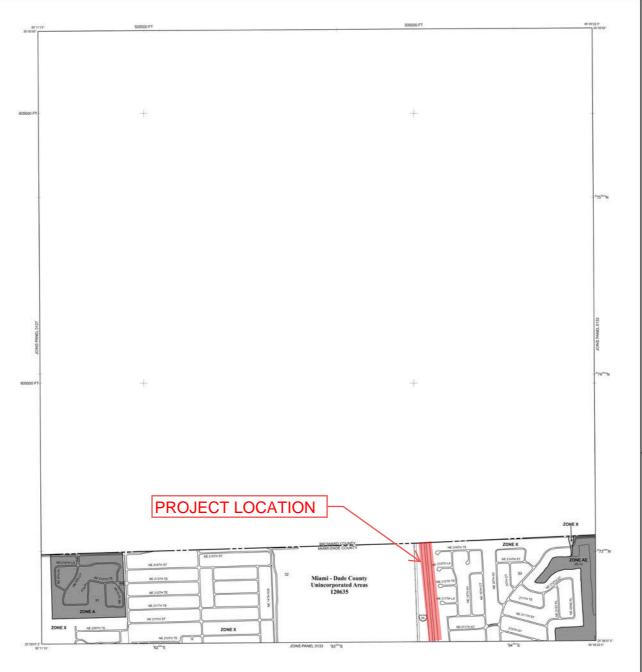
Please lefer to the sepprietely printed **Map Index** for an overview map of the country showing the layout of map panels; community more recository addresses, and a Listing of Communities bittle containing National Flood insurance Program dates for each community as well as a listing of the panels on which each community is loosted.

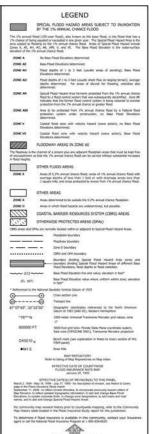
Contact the FEMA Map Service Certer at 1-800-355-0616 for information on annihilate products associated with this FEMA Availation products may include previously associated Letters of Map Change, a Flacial Insurance Study report, and/or digital versions of this near. The FEMA Map Service Center may also be reached by Fax at 1-800-356-0620 and the whole-ast tractions-ferrance.

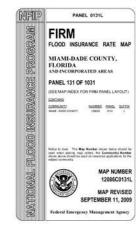
If you have questions about this map or questions concerning the National Flood insurance Program in general, please call 14977-FEMA MAP (1-977-336-2627) or visit the FEMA website as they livery forma, gov.

=PROJECT

ALTGNMENT







MAP SCALE 1" * 500" 250 8 504 1009 CECUCIO 1 1 1009

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded tenth-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

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

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The projection used in preparation of this map was Transverse Mercator State Plane Florida East FIPS 0901. The horizontal datum was NAD83 HARN, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

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

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

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by Broward County. The original orthophotographic base imagery was provided in color with a one-foot pixel resolution at a scale of 1" = 300' from photography flown in 2008.

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

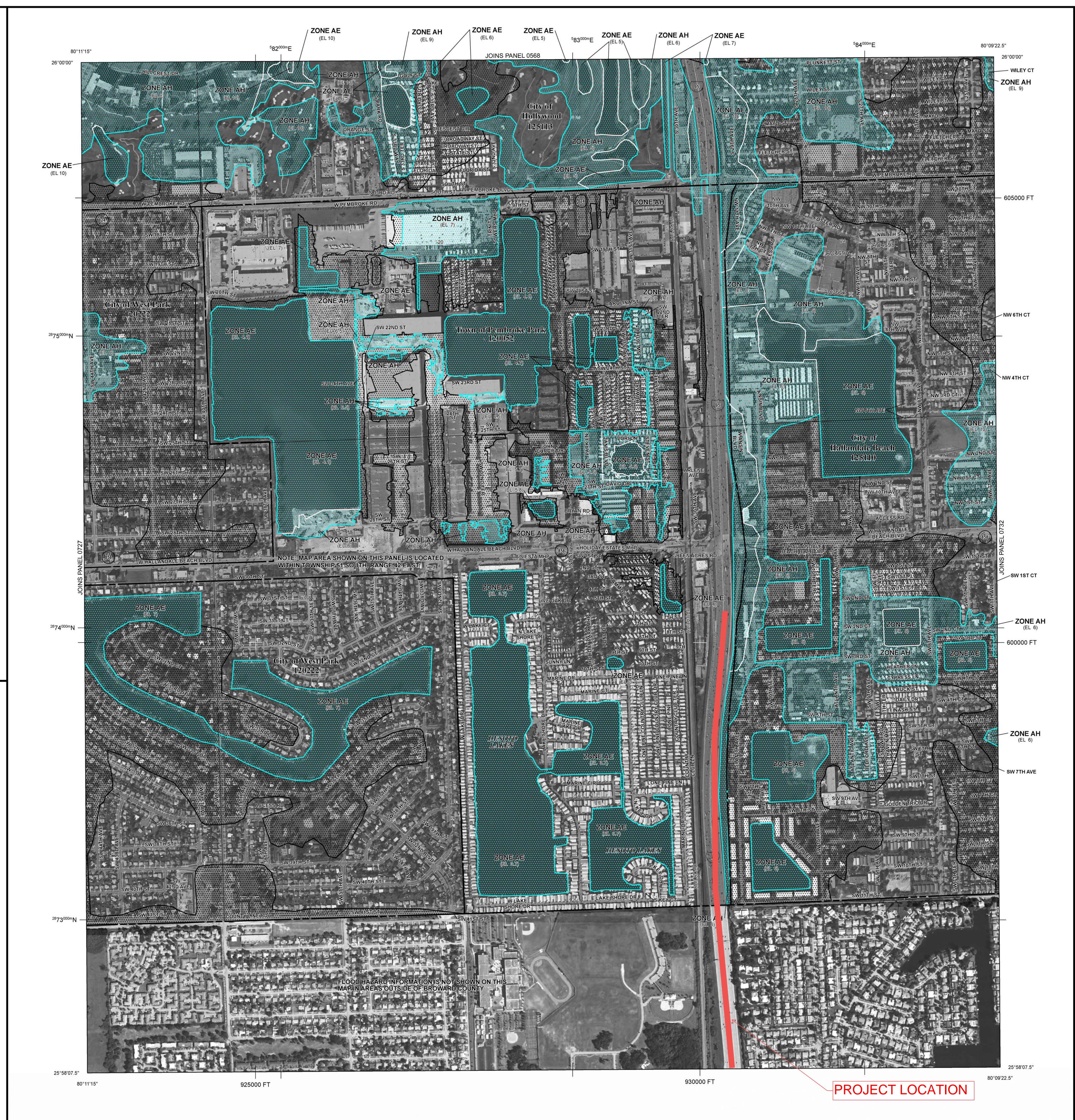
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For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange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

The "profile base lines" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the profile base line, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

= PROJECT ALIGNMENT



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE

1% ANNUAL CHANCE FLOOD The 1% annual chance 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.

No Base Flood Elevations determined.

Base Flood Elevations determined.

Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths

FLOODWAY AREAS IN ZONE AE

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.

determined. For areas of alluvial fan flooding, velocities also determined.

Areas to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.

Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations Coastal flood zone with velocity hazard (wave action); Base Flood Elevations

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

OTHER FLOOD AREAS

flood heights.

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

Areas determined to be outside the 0.2% annual chance floodplain. 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.

1% annual chance floodplain boundary 0.2% annual chance floodplain boundary Floodway boundary Zone D boundary

••••• CBRS and OPA boundary —— 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\* Base Flood Elevation value where uniform within zone; elevation \* Referenced to the North American Vertical Datum of 1988

Cross section line

M1.5

(23)----(23) Geographic coordinates referenced to the North American 97°07'30", 32°22'30" Datum of 1983 (NAD 83), Western Hemisphere

4275000mE 1000-meter Universal Transverse Mercator grid ticks, zone 17 5000-foot grid values: Florida State Plane coordinate system, 6000000 FT East Zone (FIPSZONE = 0901), Transverse Mercator projection Bench mark (see explanation in Notes to Users section of this DX5510

> River Mile MAP REPOSITORIES Refer to Map Repositories List on Map Index

> EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

> > August 18, 2014

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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.



0 250 500 750 1,000 FEET

PANEL 0731H

**FIRM** 

FLOOD INSURANCE RATE MAP BROWARD COUNTY. **FLORIDA** 

AND INCORPORATED AREAS

PANEL 731 OF 751

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

NUMBER PANEL SUFFIX HOLLYWOOD, CITY OF

PEMBROKE PARK, TOWN OF 120052 0731 H

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



NATIONA

12011C0731H **EFFECTIVE DATE AUGUST 18, 2014** 

MAP NUMBER

# APPENDIX C Floodplain Compensation Calculations

# BUILD ALTERNATIVE #1 VOLUME AVAILABLE FOR FLOODPLAIN COMPENSATION

| POND        | AREA AT POND BOTTOM (= ELEV. 1.92 NAVD) (ACRES) | *AREA AT<br>ELEV. 4.42 NAVD<br>(ACRES) | STORAGE<br>VOLUME<br>(ACFT.) |
|-------------|-------------------------------------------------|----------------------------------------|------------------------------|
| 2 (PARTIAL) | 0.161                                           | 0.279                                  | 0.550                        |
| 5           | 0.111                                           | 0.563                                  | 0.843                        |
| 6           | 0.046                                           | 0.238                                  | 0.355                        |
| 7 (PARTIAL) | 0.304                                           | 1.527                                  | 2.289                        |
| 8           | 0.068                                           | 0.347                                  | 0.519                        |
| 9 (PARTIAL) | 0.092                                           | 0.465                                  | 0.696                        |

<sup>\*</sup>Assume 1:4 Side Slopes

TOTAL: 5.251

From Approximately Station 582+30.00 to Approximately Station 622+00.00, the project is location within Zone AE with a Base Flood Elevation of 6.00 NGVD (= 4.42 NAVD)

# BUILD ALTERNATIVE #2 VOLUME AVAILABLE FOR FLOODPLAIN COMPENSATION

|             | AREA AT             |                 |         |
|-------------|---------------------|-----------------|---------|
|             | POND BOTTOM         | *AREA AT        | STORAGE |
|             | (= ELEV. 1.92 NAVD) | ELEV. 4.42 NAVD | VOLUME  |
| POND        | (ACRES)             | (ACRES)         | (ACFT.) |
|             | · ·                 |                 |         |
| 5 (PARTIAL) | 0.071               | 0.150           | 0.276   |

<sup>\*</sup>Assume 1:4 Side Slopes

**TOTAL: 2.566** 

From Approximately Station 582+30.00 to Approximately Station 622+00.00, the project is location within Zone AE with a Base Flood Elevation of 6.00 NGVD (= 4.42 NAVD)

# BUILD ALTERNATIVE #3 VOLUME AVAILABLE FOR FLOODPLAIN COMPENSATION

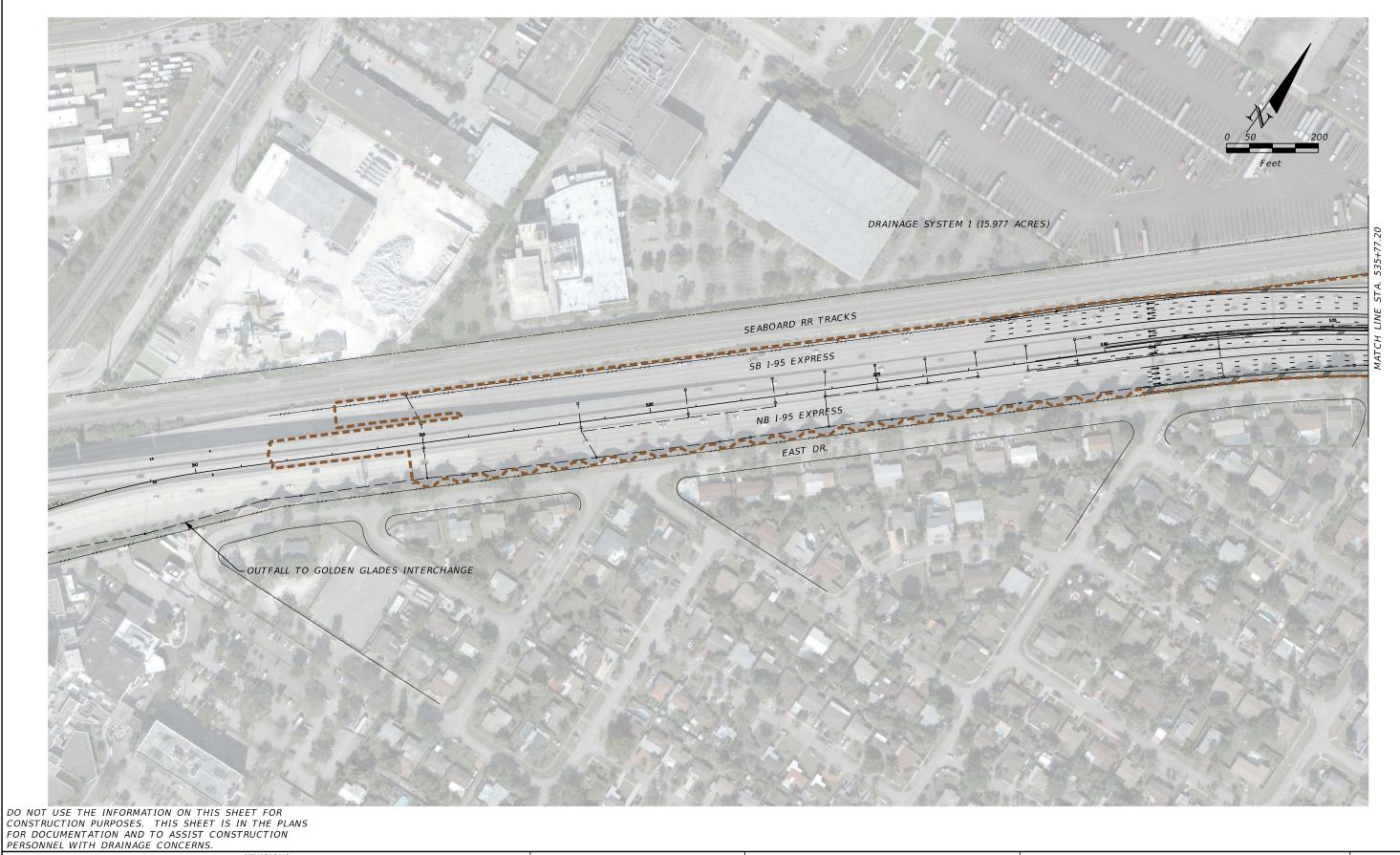
|             | AREA AT             |                 |         |
|-------------|---------------------|-----------------|---------|
| POND BOTTOM |                     | *AREA AT        | STORAGE |
|             | (= ELEV. 1.92 NAVD) | ELEV. 4.42 NAVD | VOLUME  |
|             | / A CD = C\         | (               | / \     |
| POND        | (ACRES)             | (ACRES)         | (ACFT.) |
| 7 (PARTIAL) | 0.093               | 0.210           | 0.379   |

<sup>\*</sup>Assume 1:4 Side Slopes

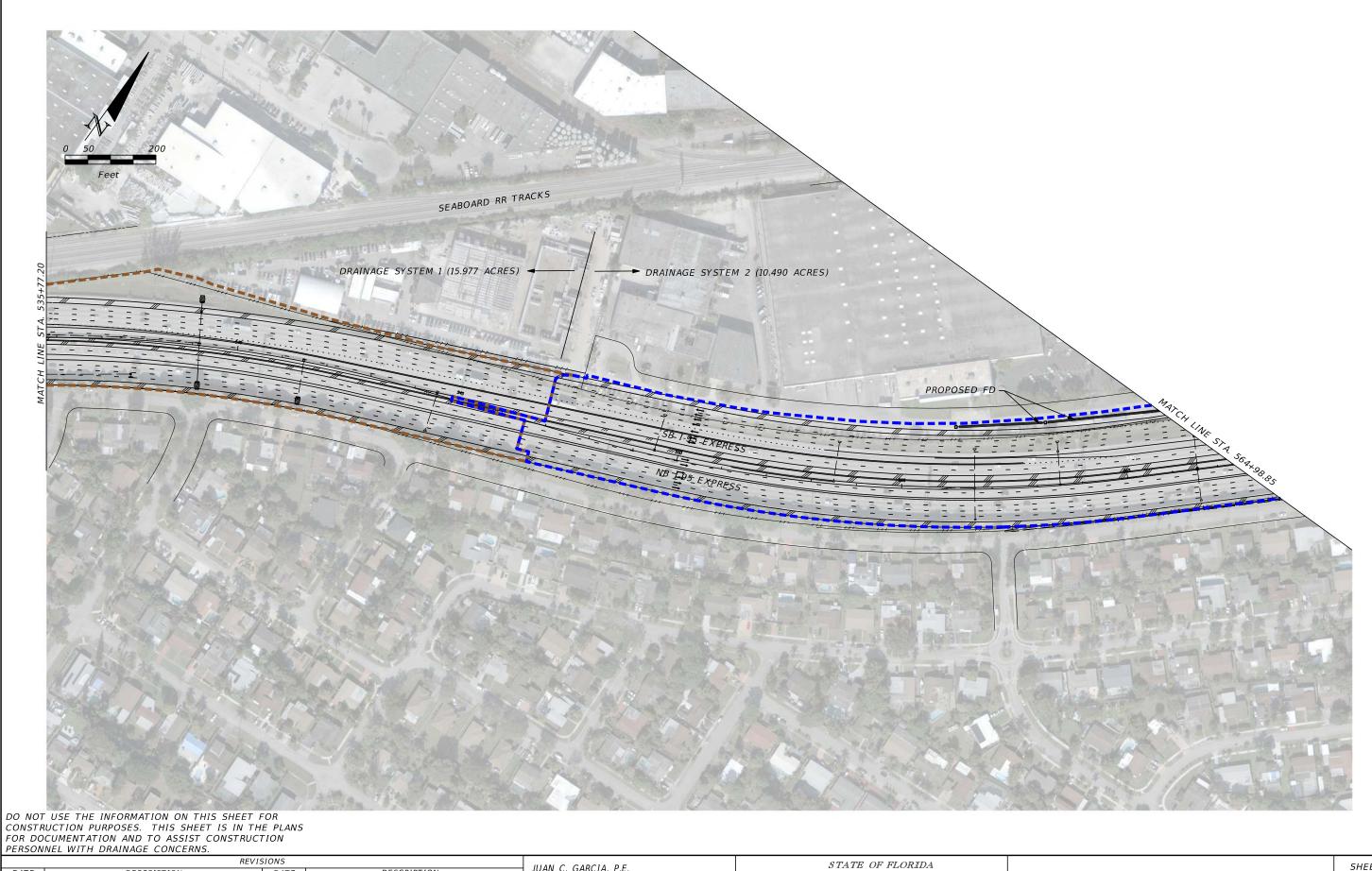
**TOTAL: 2.635** 

From Approximately Station 582+30.00 to Approximately Station 622+00.00, the project is location within Zone AE with a Base Flood Elevation of 6.00 NGVD (= 4.42 NAVD)

# APPENDIX D Build Alternative #1 – Drainage Maps



|      | REVISIONS   |      |             | JUAN C. GARCIA, P.E. STATE OF FLORIDA                                            |          |               | SHEET                |               |     |
|------|-------------|------|-------------|----------------------------------------------------------------------------------|----------|---------------|----------------------|---------------|-----|
| DATE | DESCRIPTION | DATE | DESCRIPTION | P.E. No.: 46597                                                                  | DEPAR    | TMENT OF TRAN | NSPORTATION          | DRAINAGE MAP  | NO. |
|      |             |      |             | AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134 | ROAD NO. | COUNTY        | FINANCIAL PROJECT ID | ALTERNATIVE 1 | 1   |



REVISIONS

DESCRIPTION

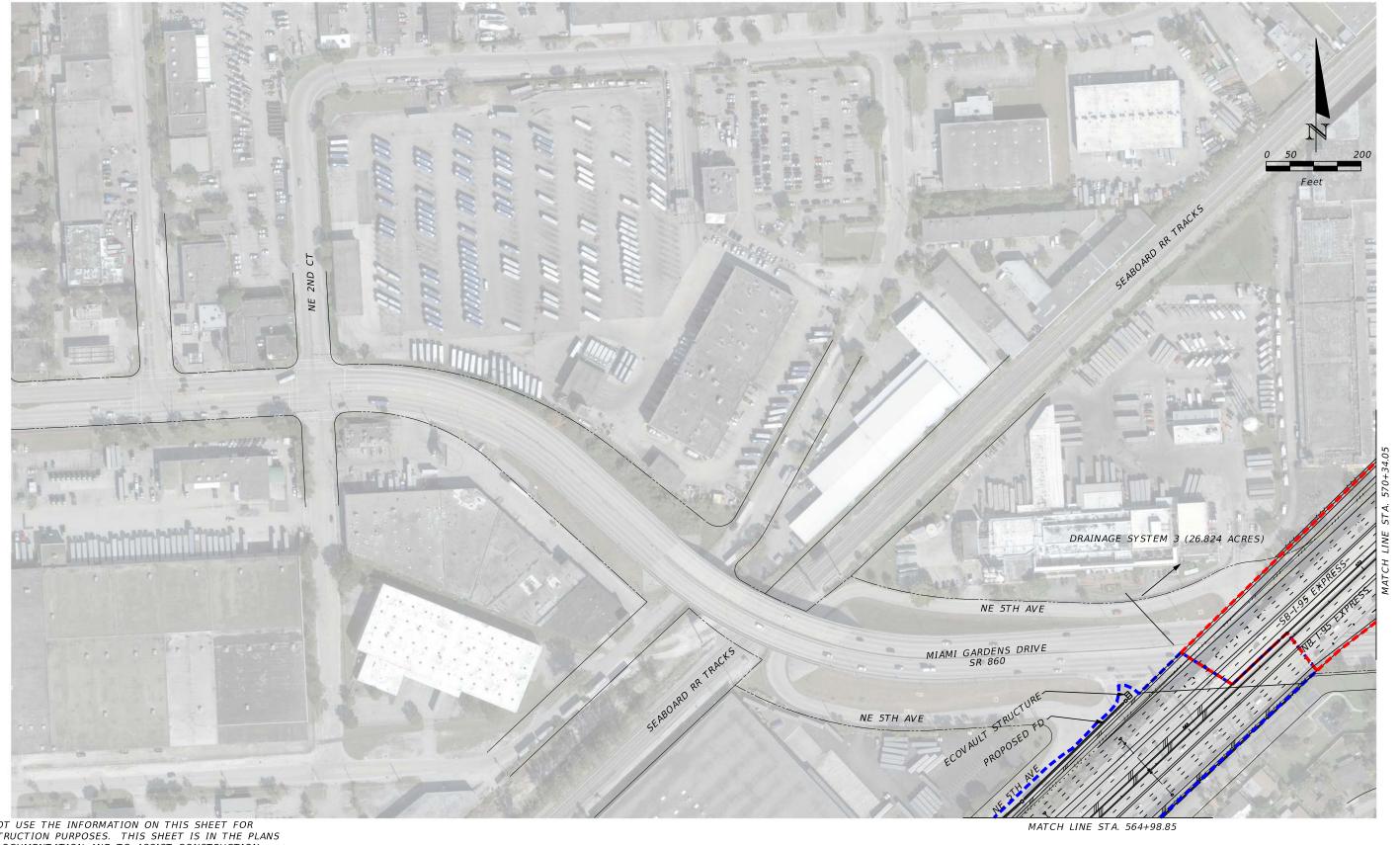
JUAN C. GARCIA, P.E. P.E. No.: 46597 AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134

DEPARTMENT OF TRANSPORTATION ROAD NO. FINANCIAL PROJECT ID

DRAINAGE MAP ALTERNATIVE 1

SHEET NO.

\$DATE\$ \$TIME\$



REVISIONS

DATE DESCRIPTION DATE DESCRIPTION

JUAN C. GARCIA, P.E.
P.E. No.: 46597
AECOM TECHNICAL SERVICES, INC
2 ALHAMBRA PLAZA, SUITE 900
CORAL GABLES, FL 33134

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO. COUNTY FINANCIAL PROJECT ID

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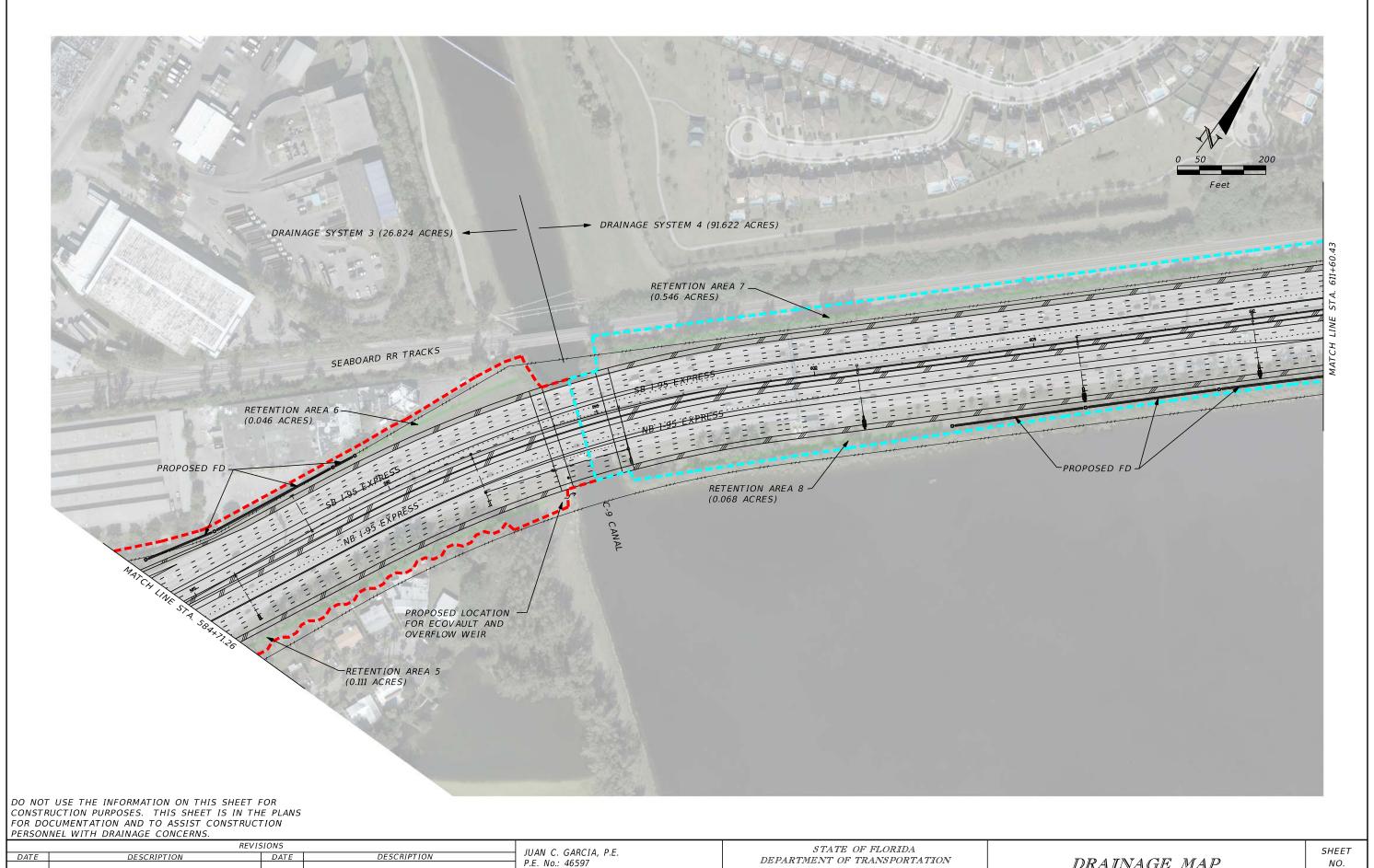
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JUAN C. GARCIA, P.E. P.E. No.: 46597 AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD NO. COUNTY FINANCIAL PROJECT ID

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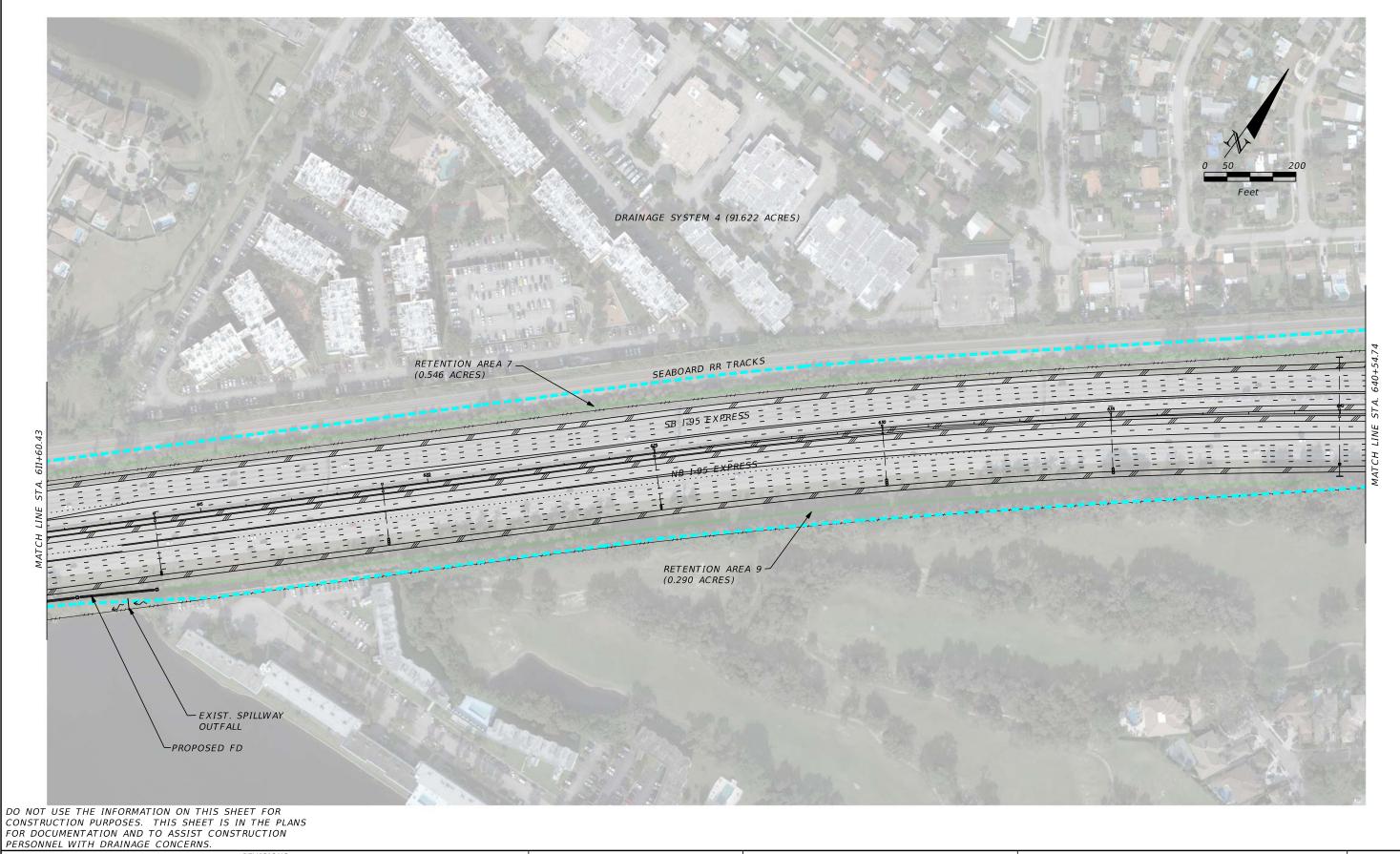
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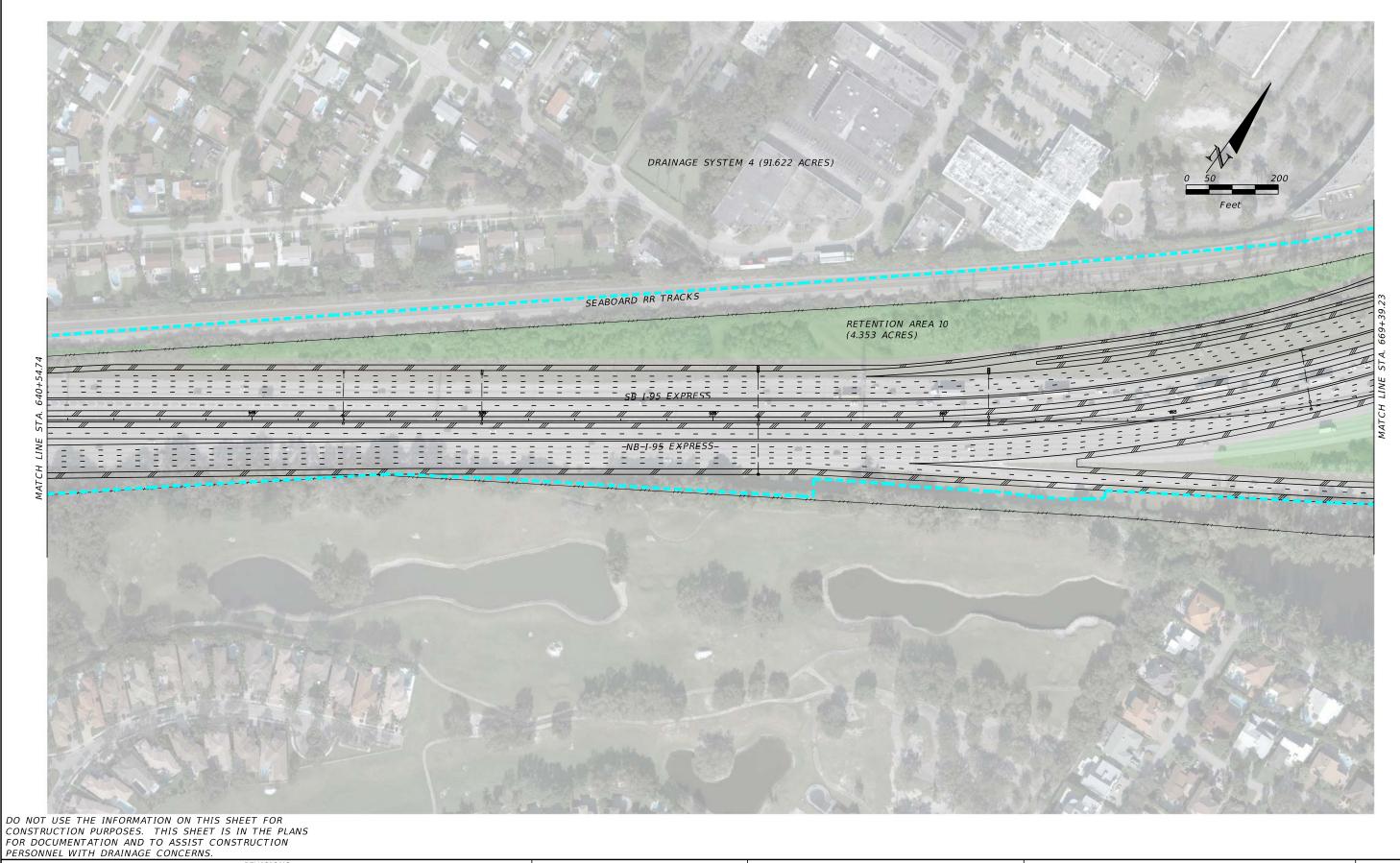
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD NO. COUNTY FINANCIAL PROJECT ID

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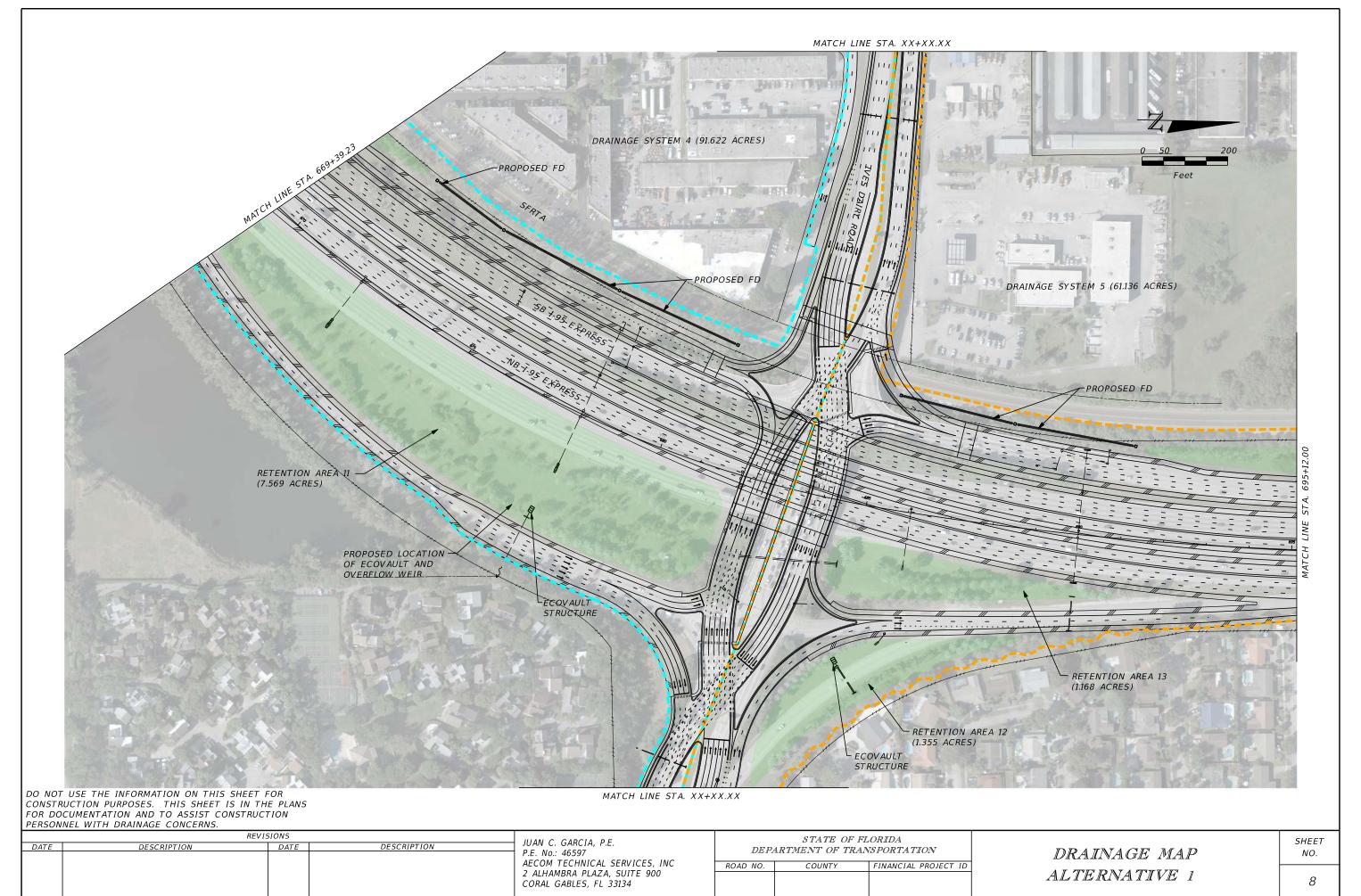
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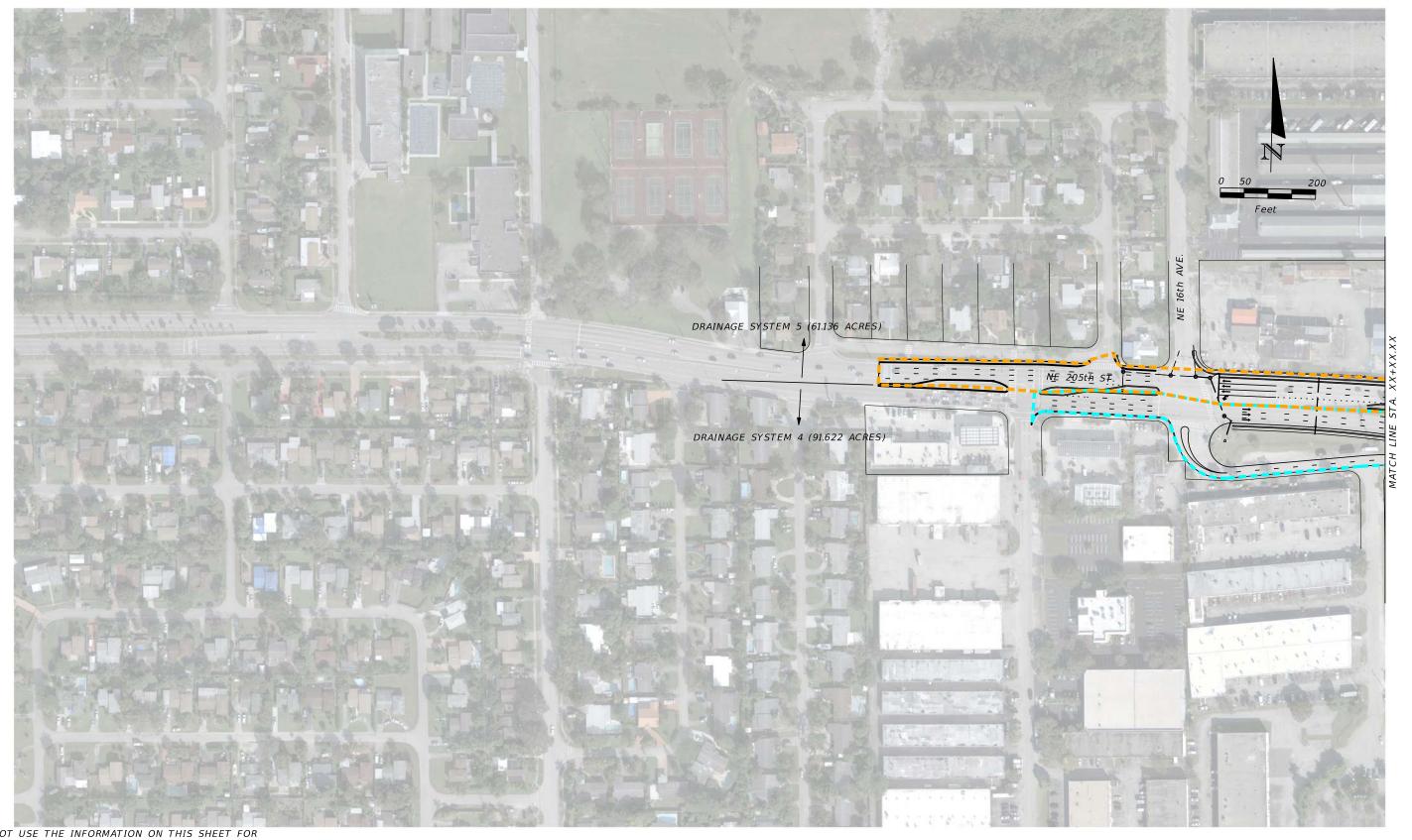
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JUAN C. GARCIA, P.E.
P.E. No.: 46597
AECOM TECHNICAL SERVICES, INC
2 ALHAMBRA PLAZA, SUITE 900
CORAL GABLES, FL 33134

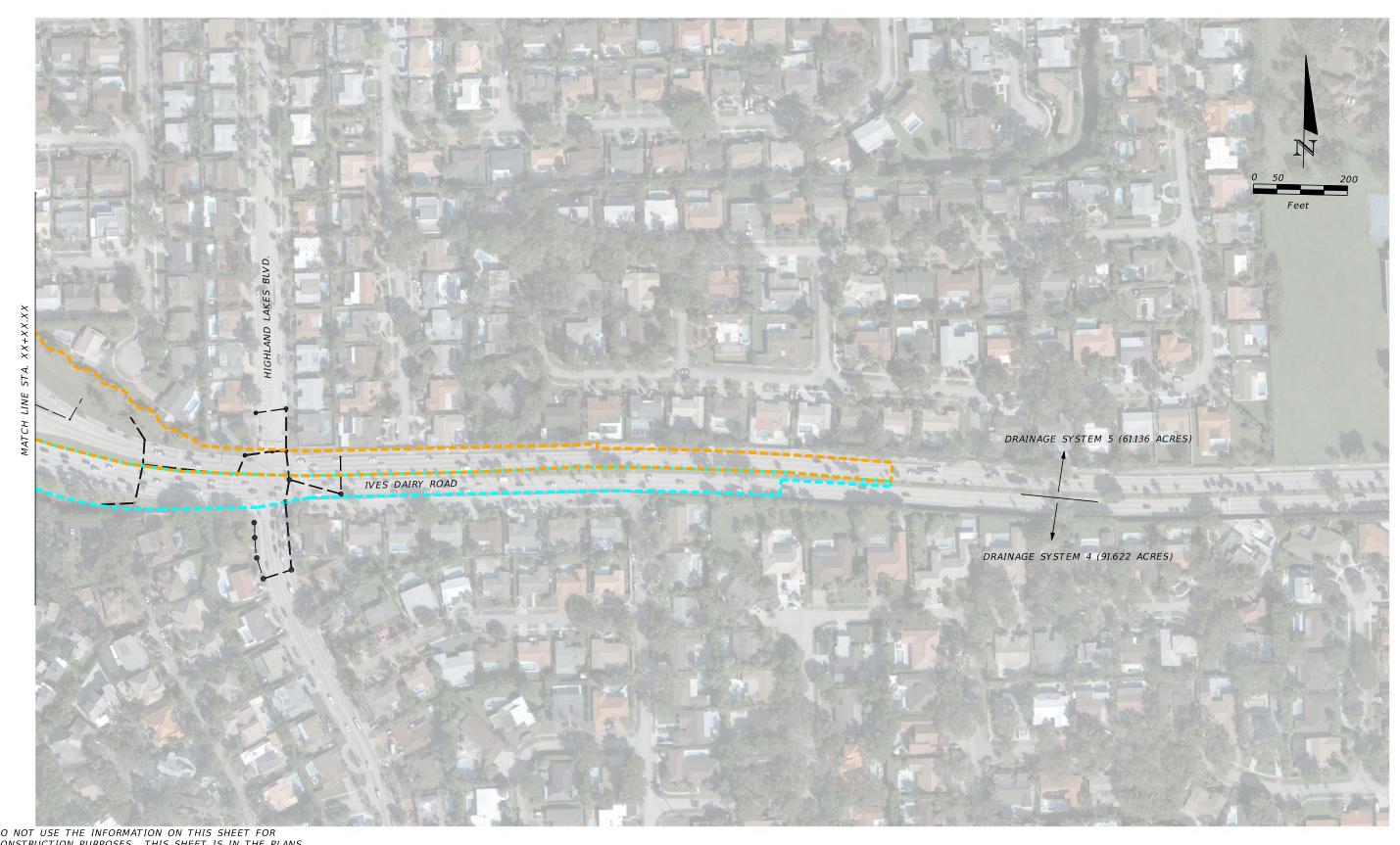
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JUAN C. GARCIA, P.E.
P.E. No.: 46597
AECOM TECHNICAL SERVICES, INC
2 ALHAMBRA PLAZA, SUITE 900
CORAL GABLES, FL 33134

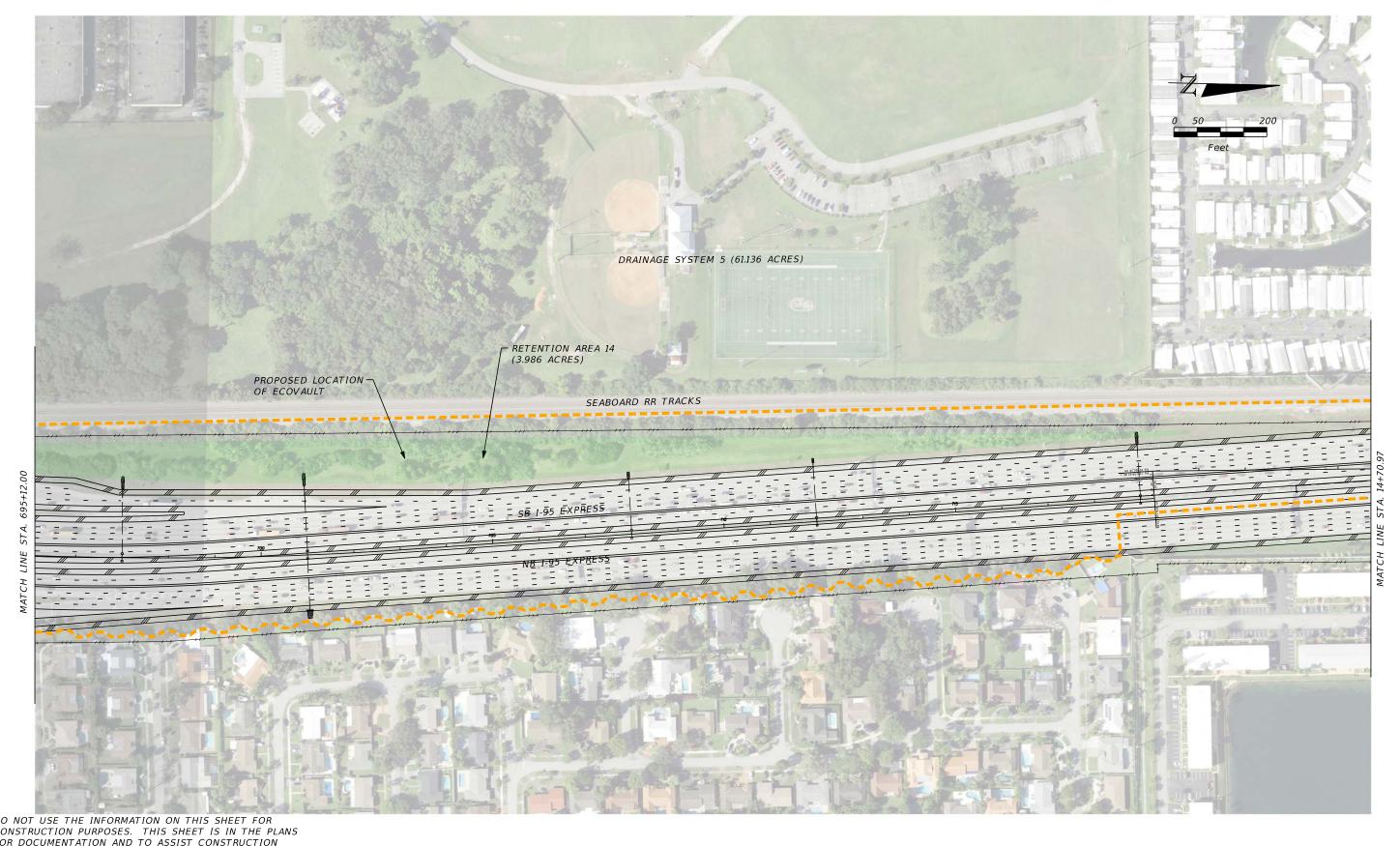
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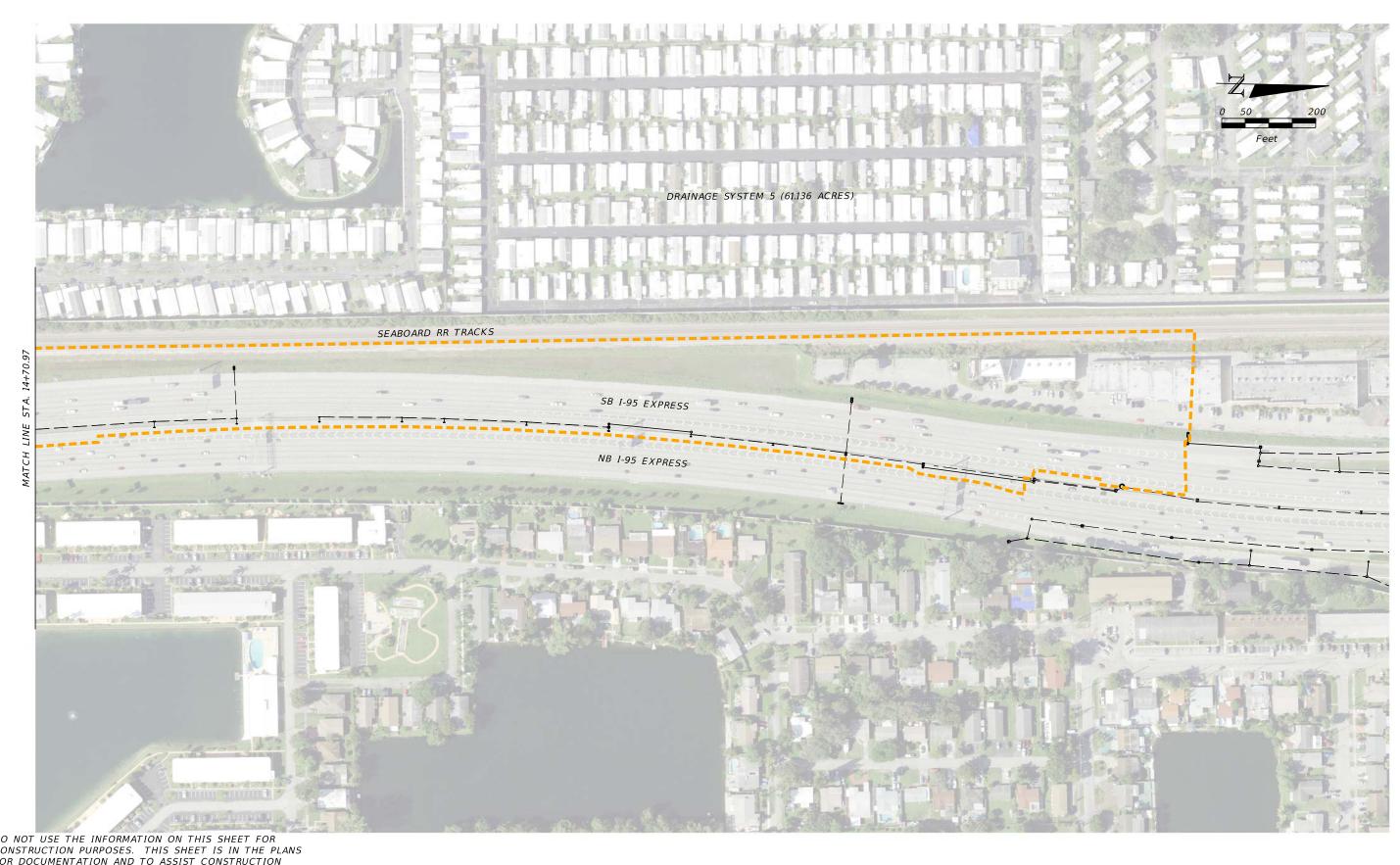
JUAN C. GARCIA, P.E. P.E. No.: 46597 AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134

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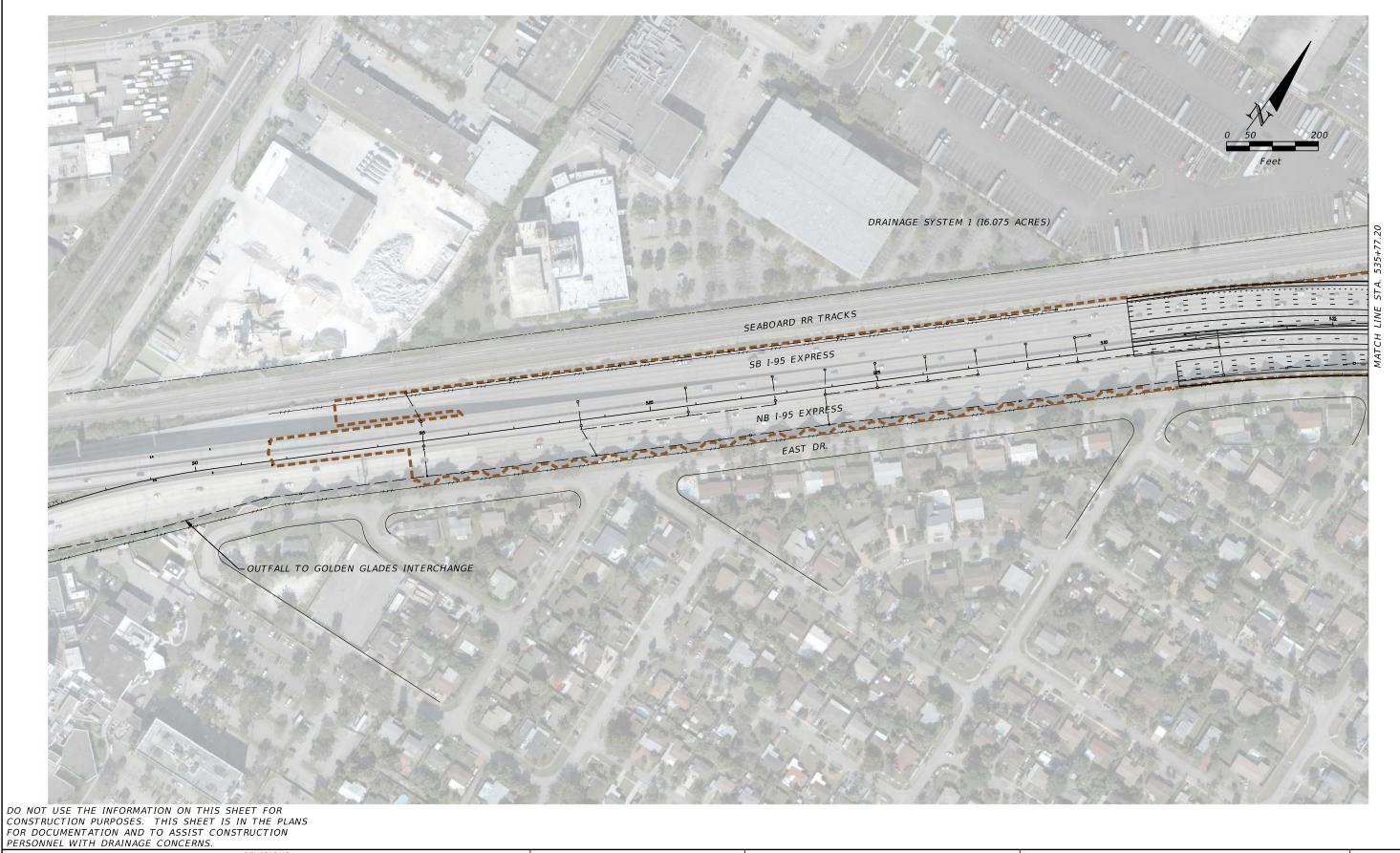
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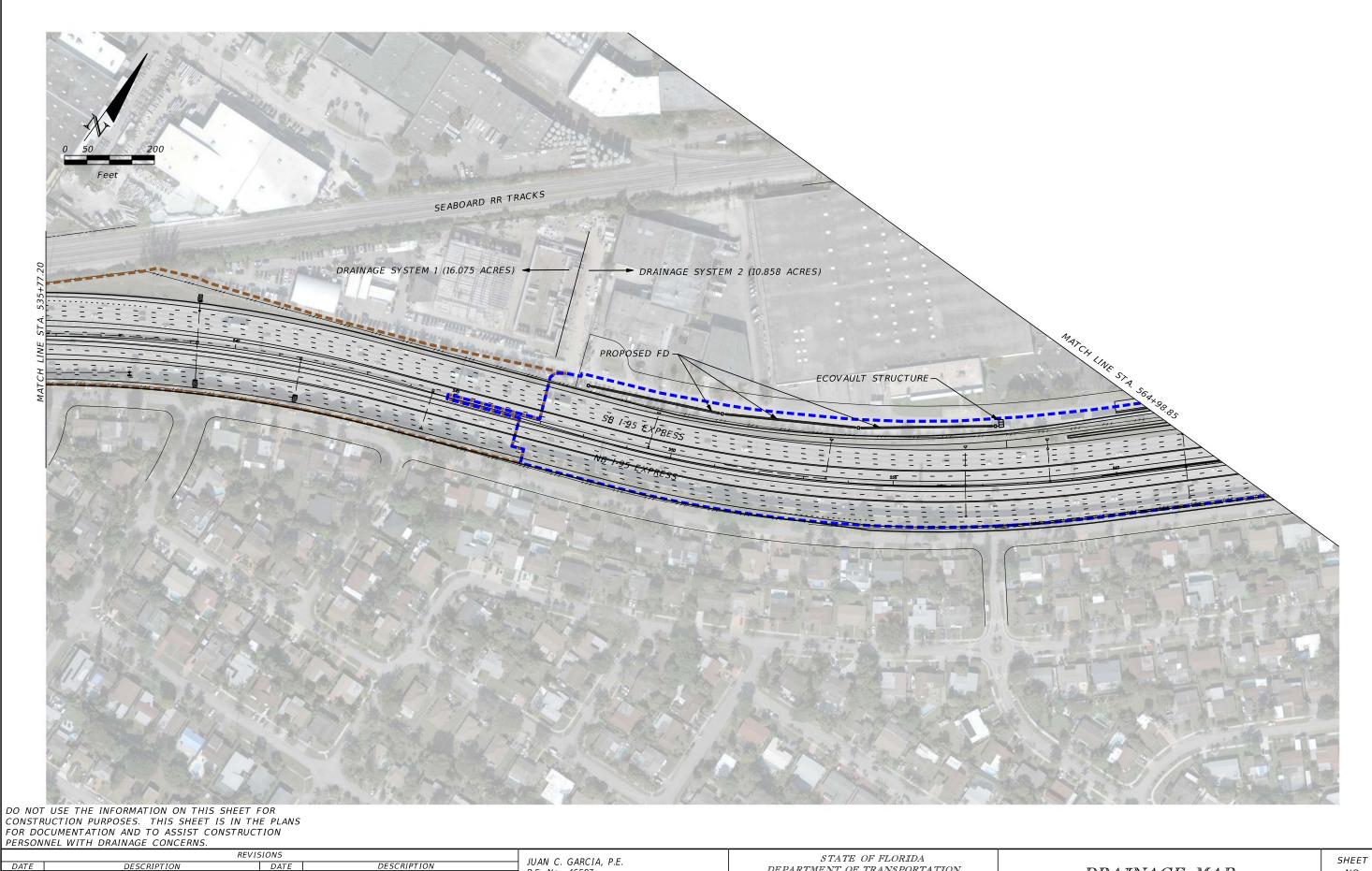
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## APPENDIX E Build Alternative #2 – Drainage Maps



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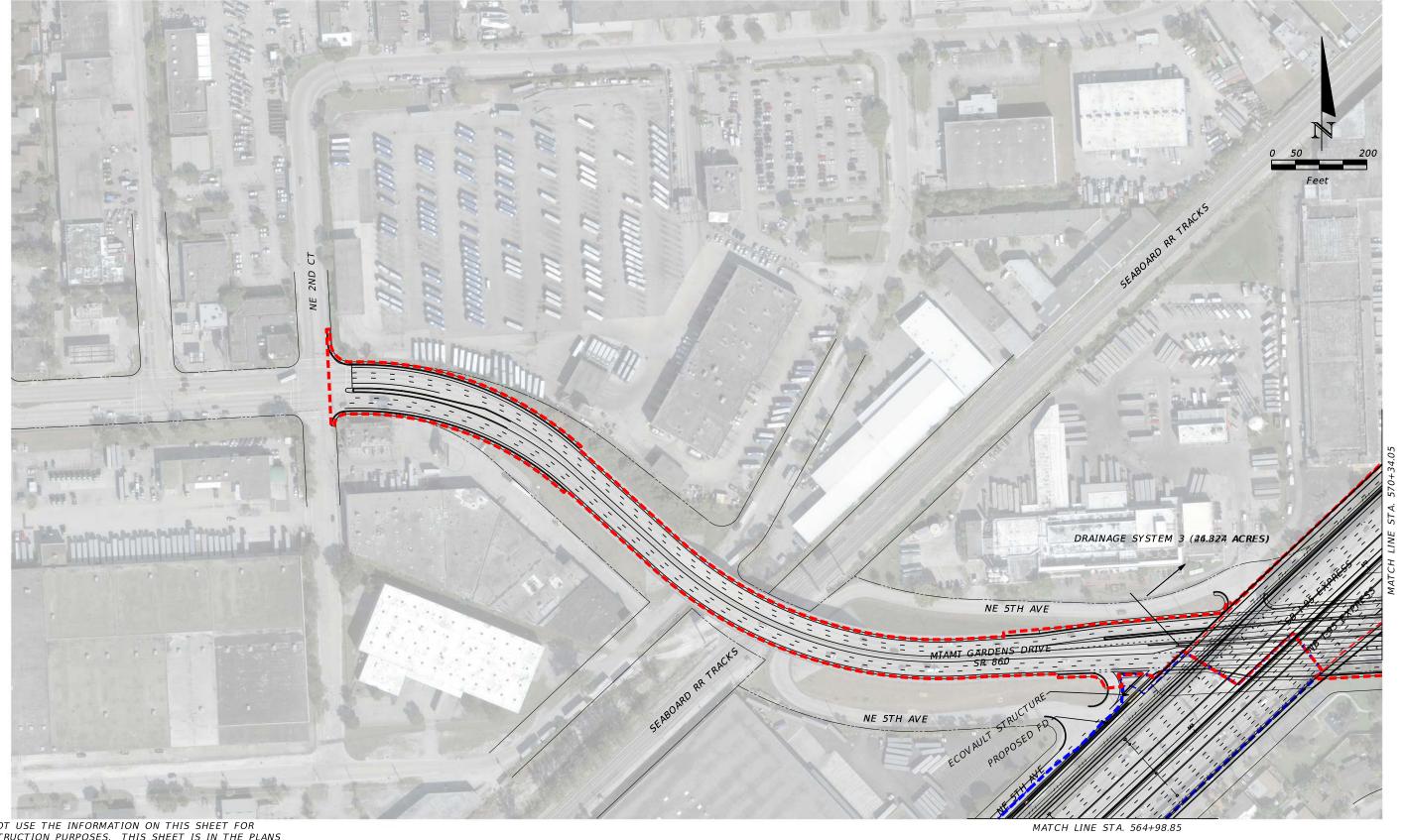
JUAN C. GARCIA, P.E.
P.E. No.: 46597
AECOM TECHNICAL SERVICES, INC
2 ALHAMBRA PLAZA, SUITE 900
CORAL GABLES, FL 33134

DEPARTMENT OF TRANSPORTATION

ROAD NO. COUNTY FINANCIAL PROJECT ID

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JUAN C. GARCIA, P.E.
P.E. No.: 46597
AECOM TECHNICAL SERVICES, INC
2 ALHAMBRA PLAZA, SUITE 900
CORAL GABLES, FL 33134

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

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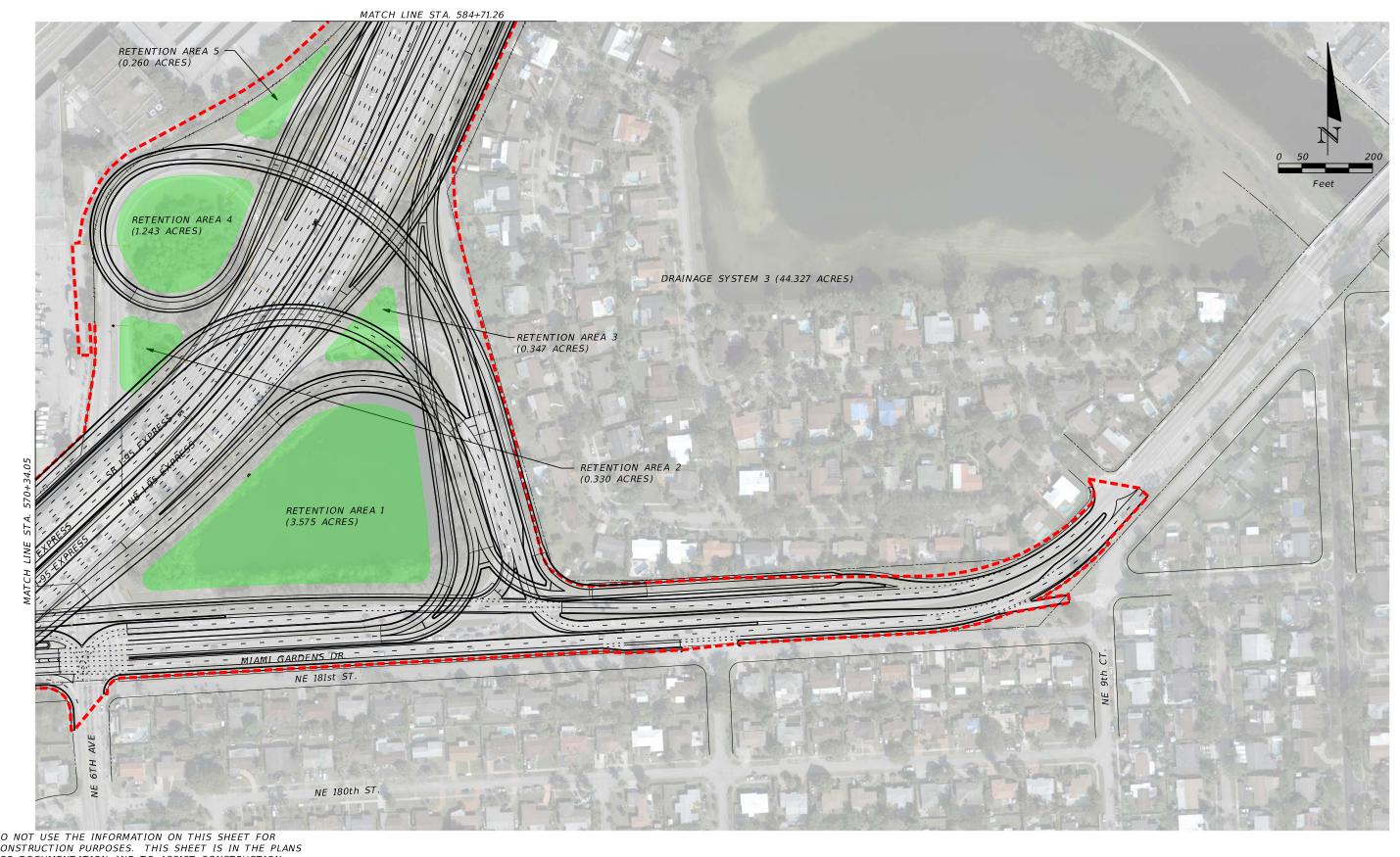
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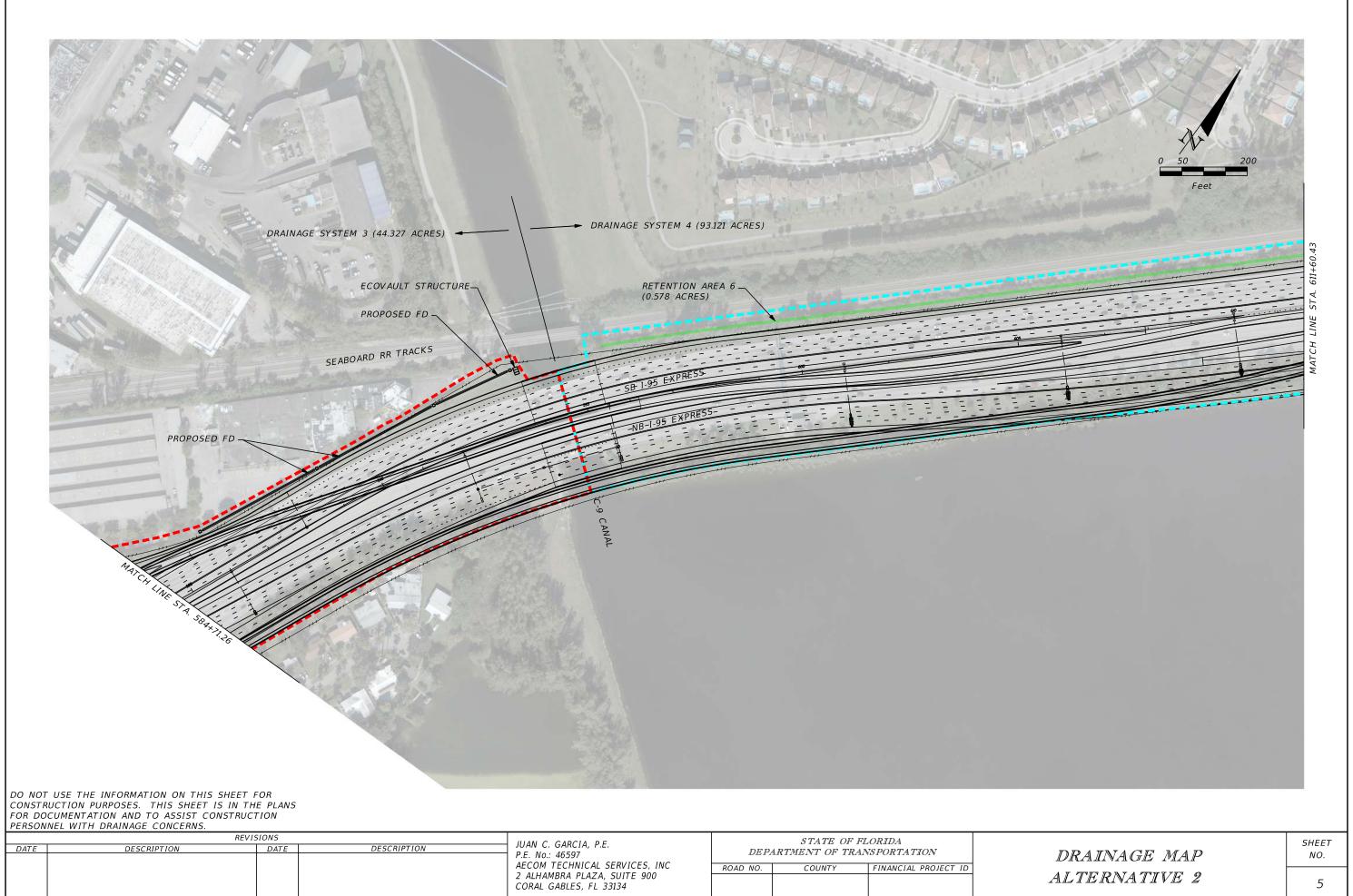
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JUAN C. GARCIA, P.E. P.E. No.: 46597 AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD NO. COUNTY FINANCIAL PROJECT ID

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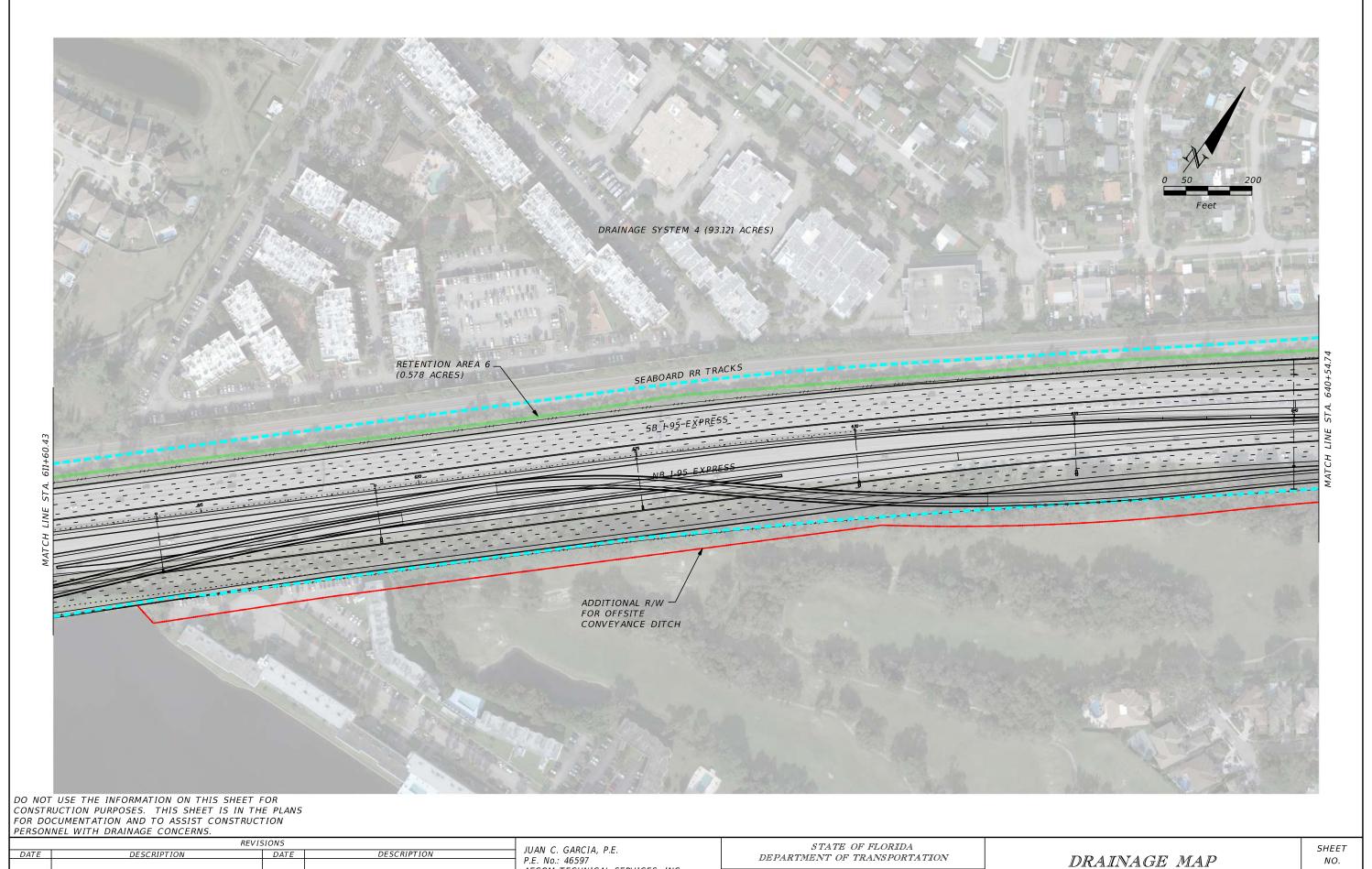


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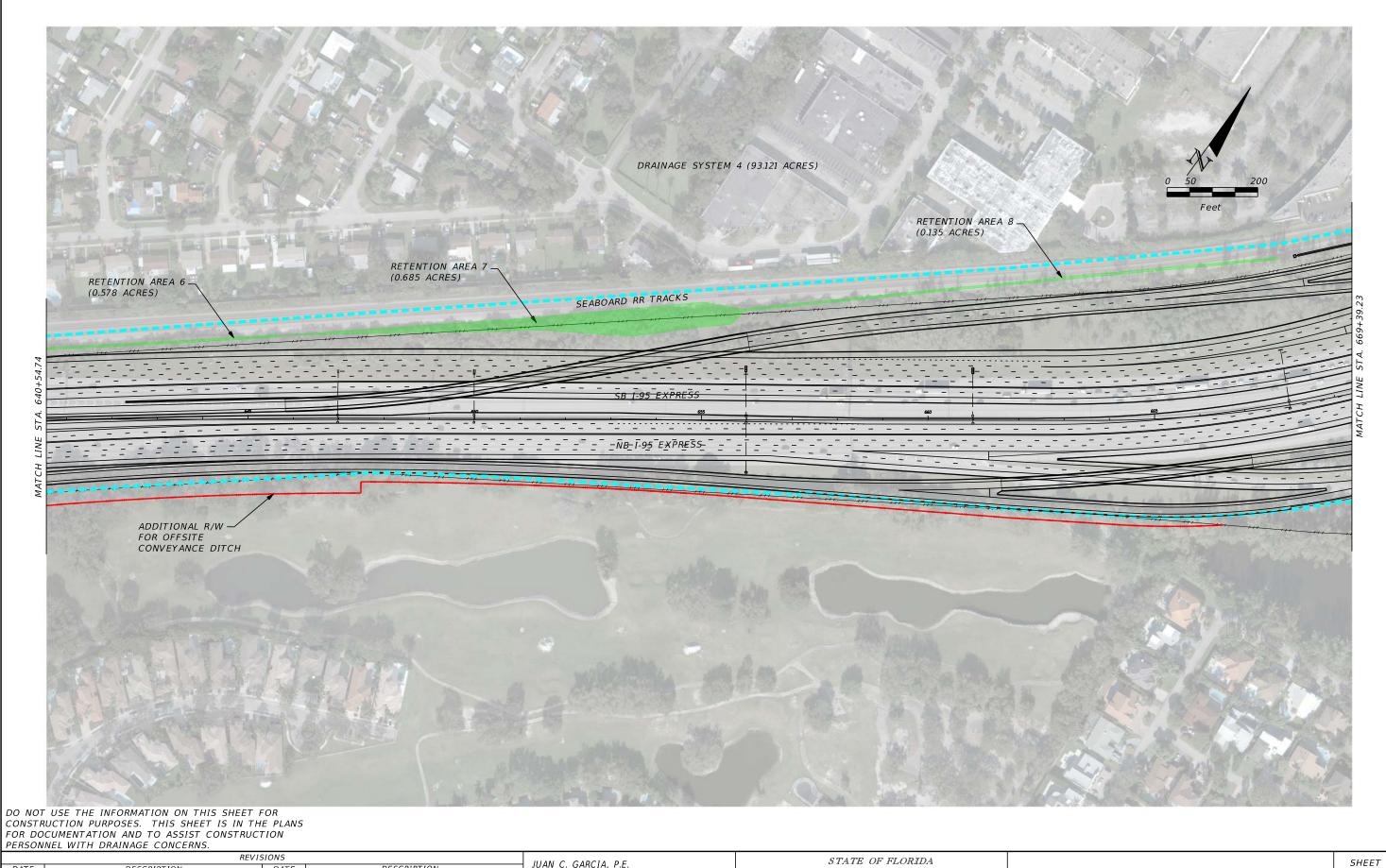
AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134

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JUAN C. GARCIA, P.E.
P.E. No.: 46597
AECOM TECHNICAL SERVICES, INC
2 ALHAMBRA PLAZA, SUITE 900
CORAL GABLES, FL 33134

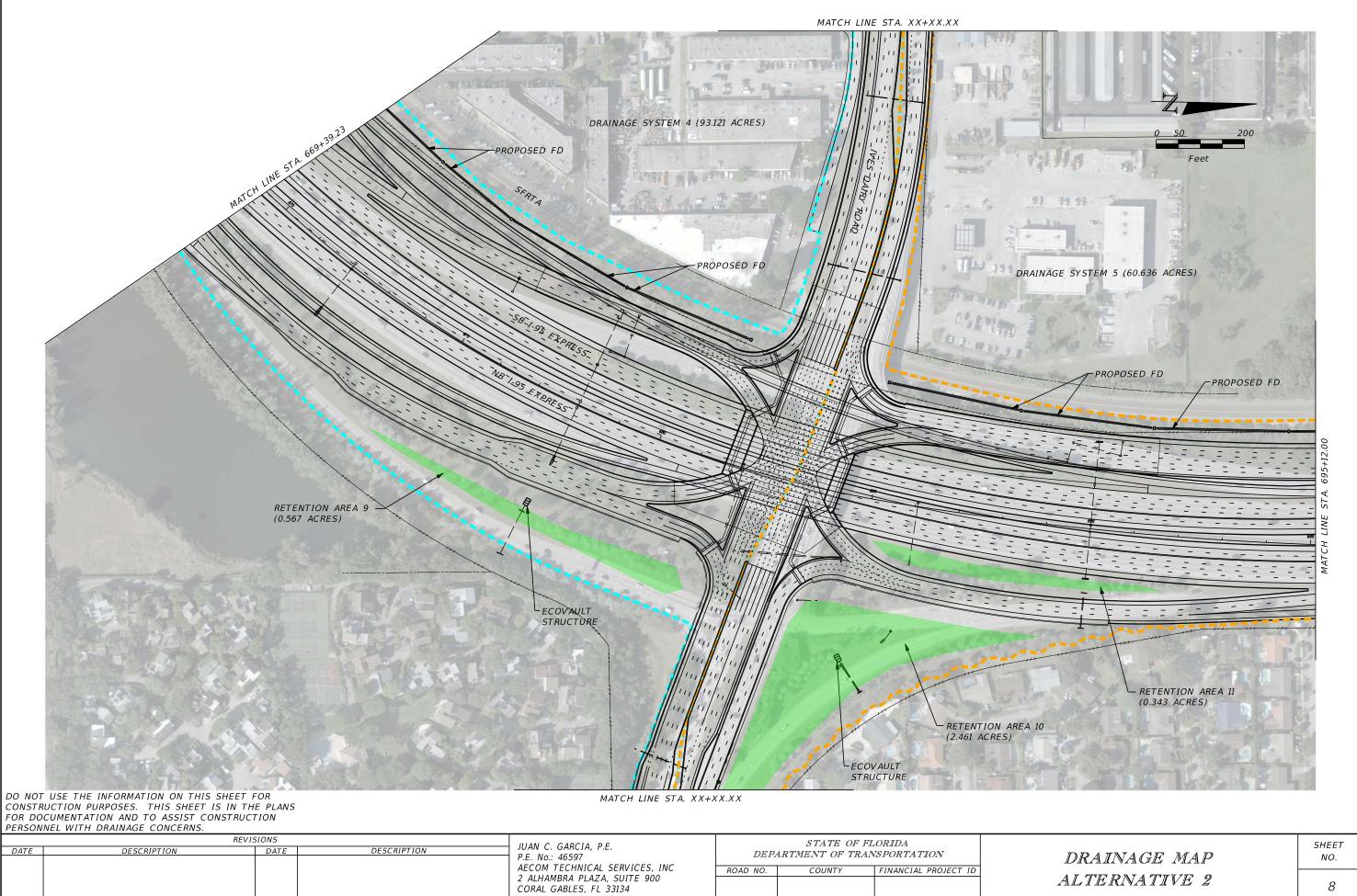
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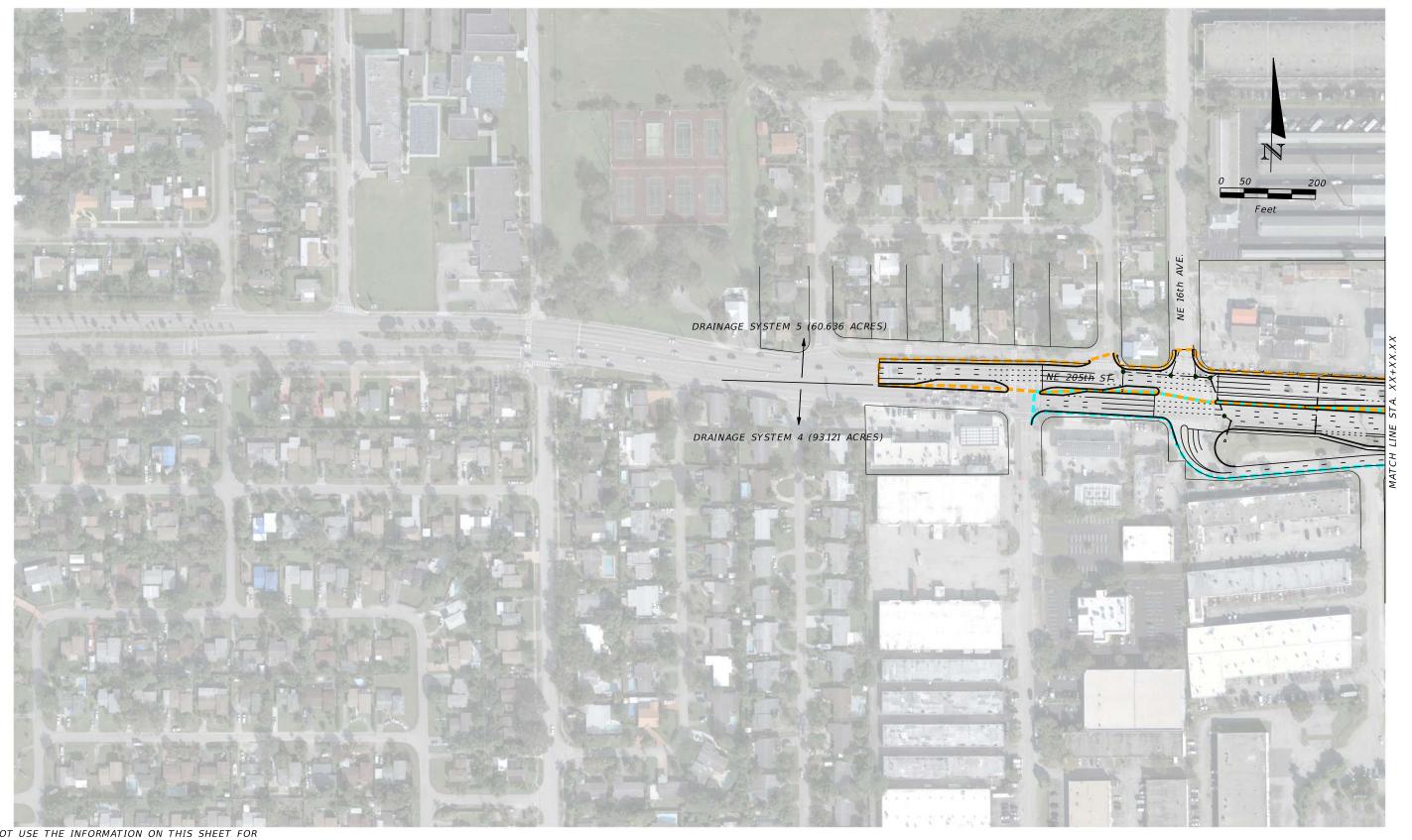
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JUAN C. GARCIA, P.E.
P.E. No.: 46597
AECOM TECHNICAL SERVICES, INC
2 ALHAMBRA PLAZA, SUITE 900
CORAL GABLES, FL 33134

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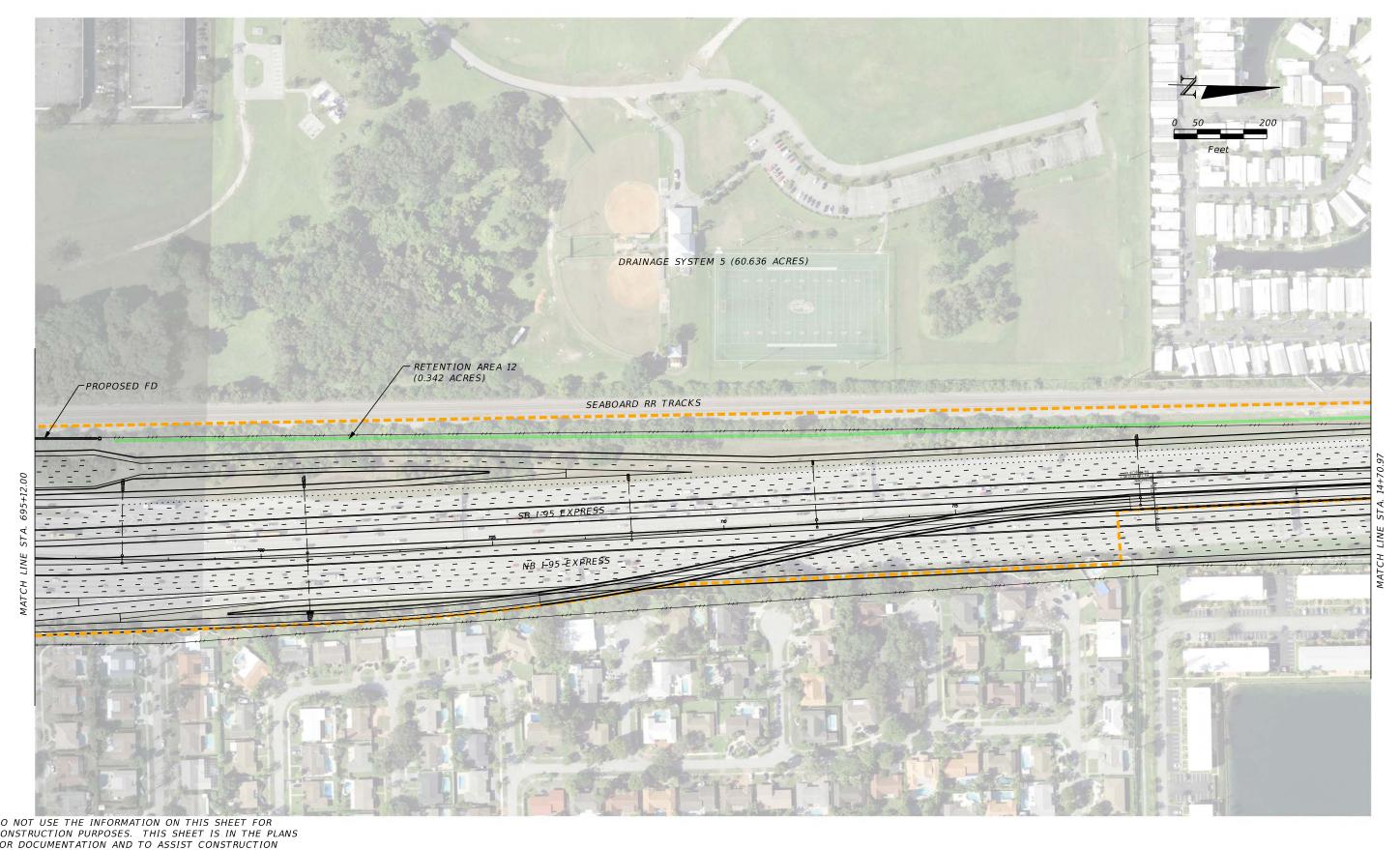
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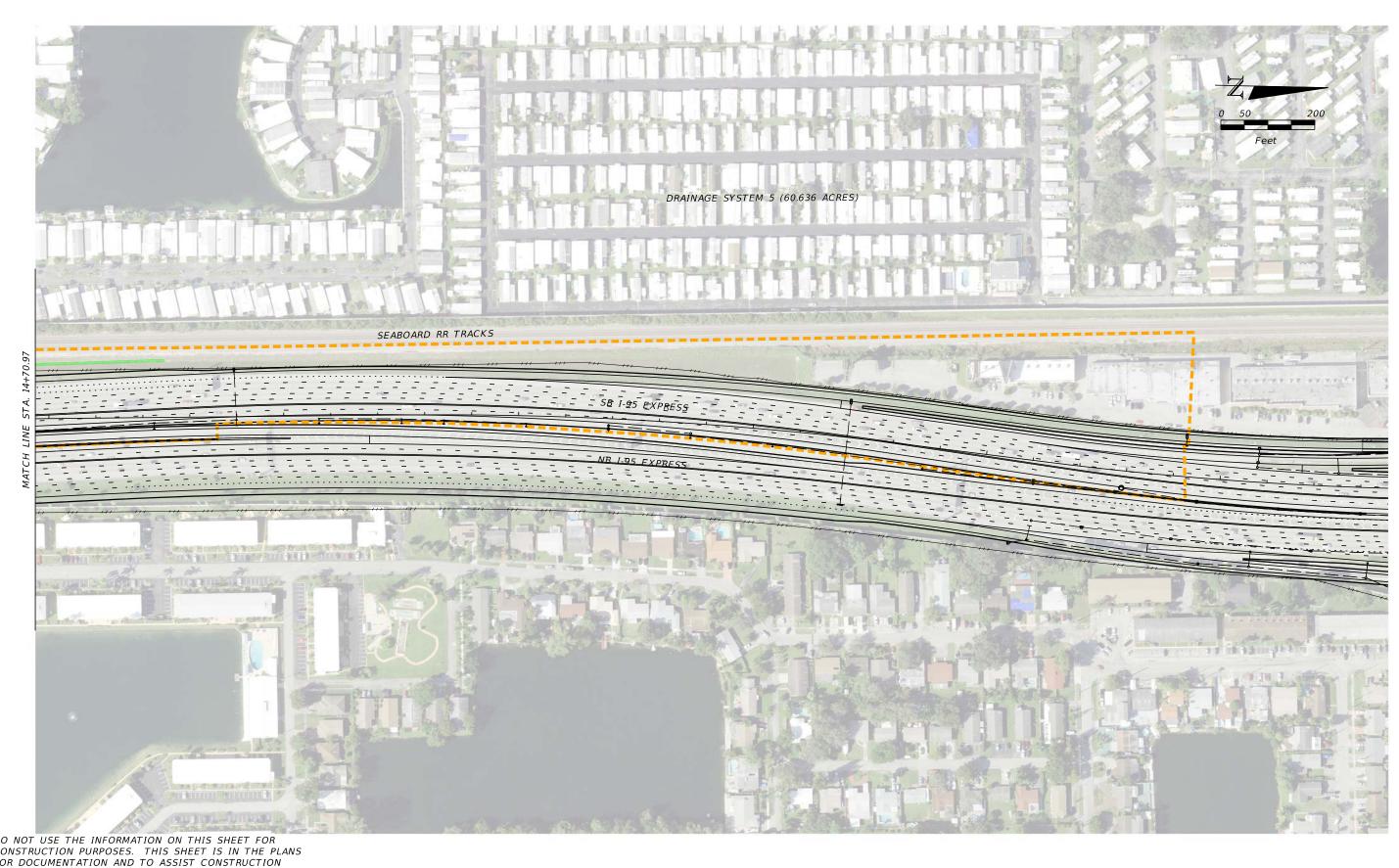
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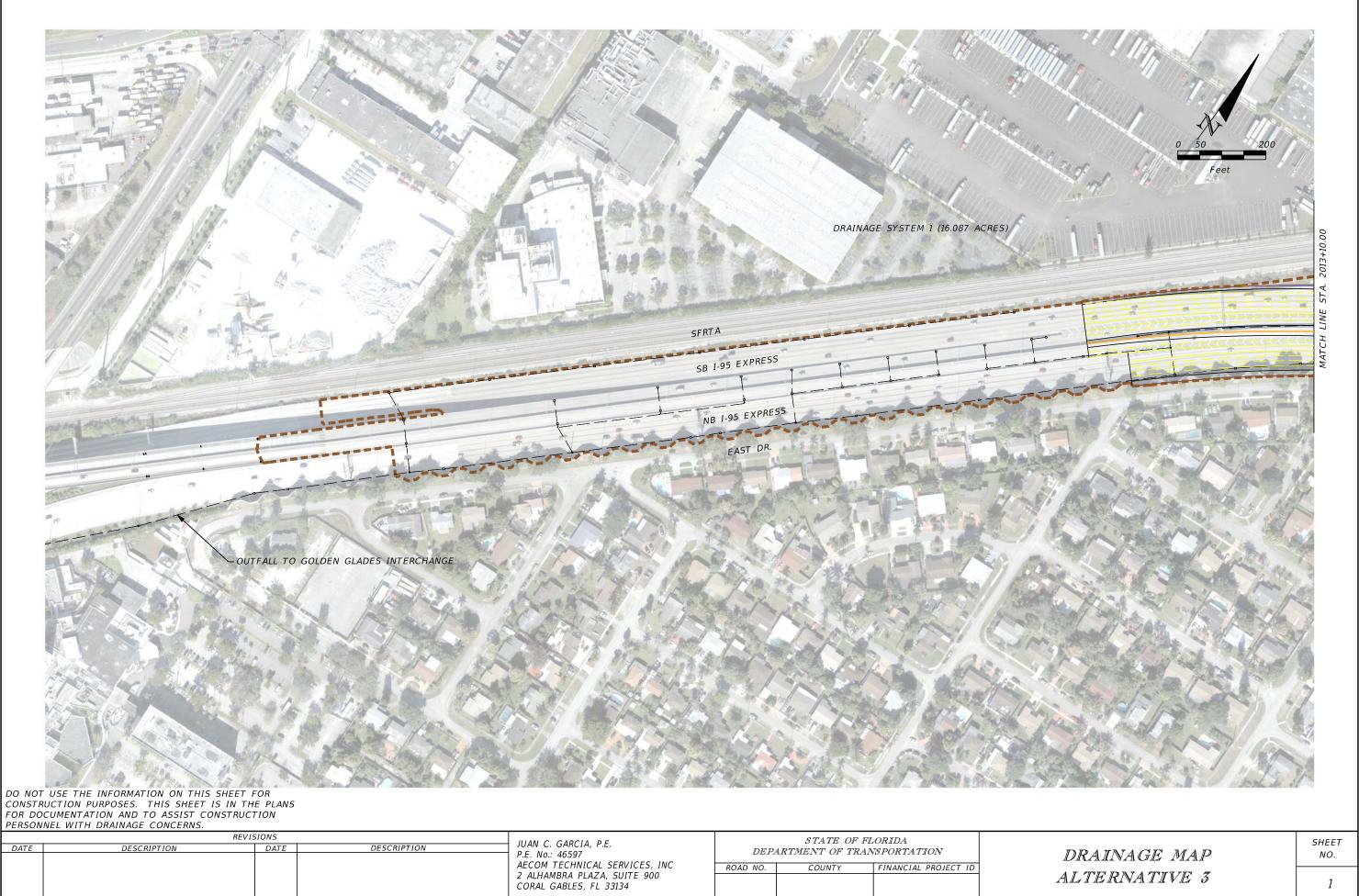
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## APPENDIX F Build Alternative #3 – Drainage Maps

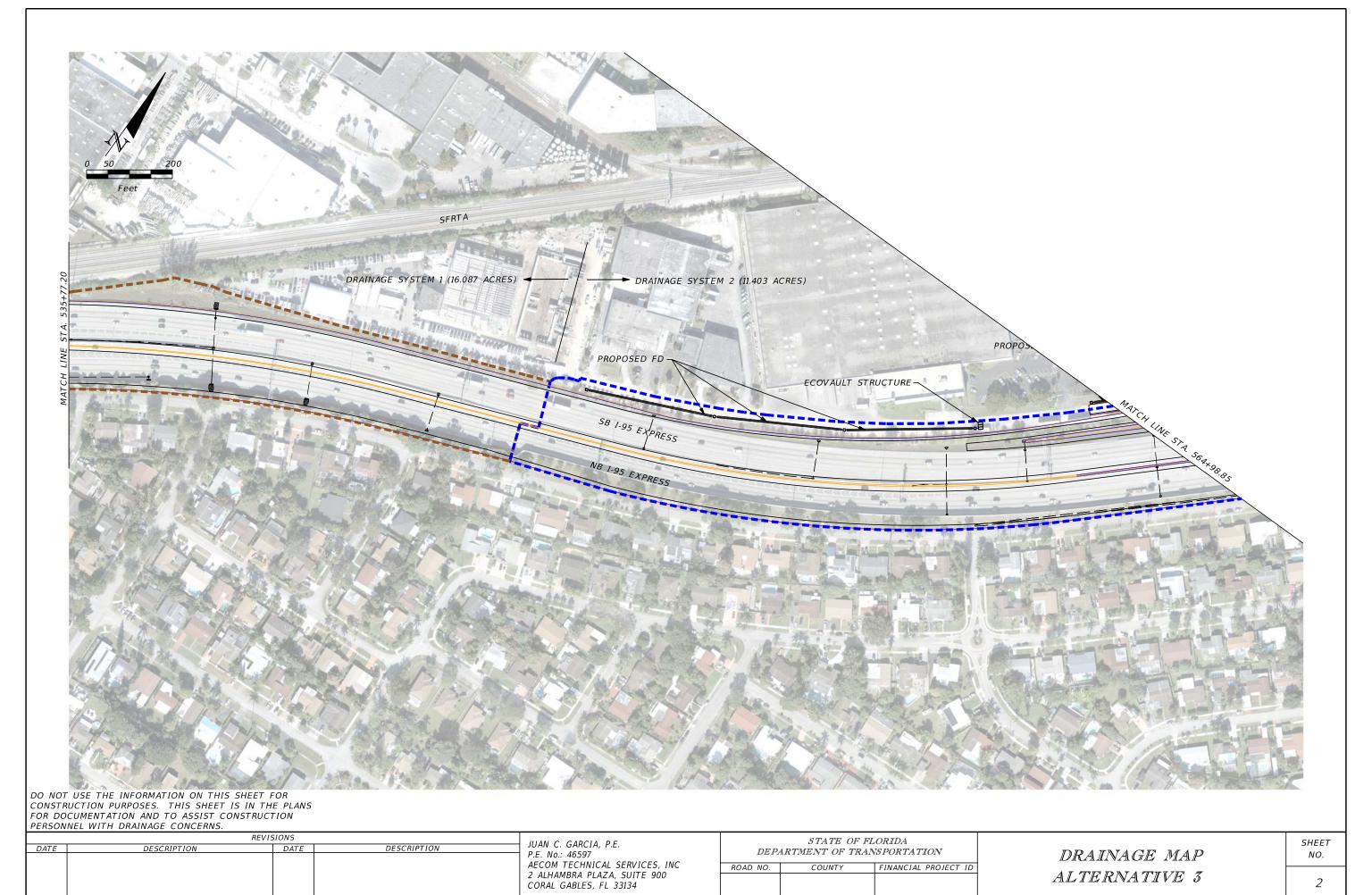


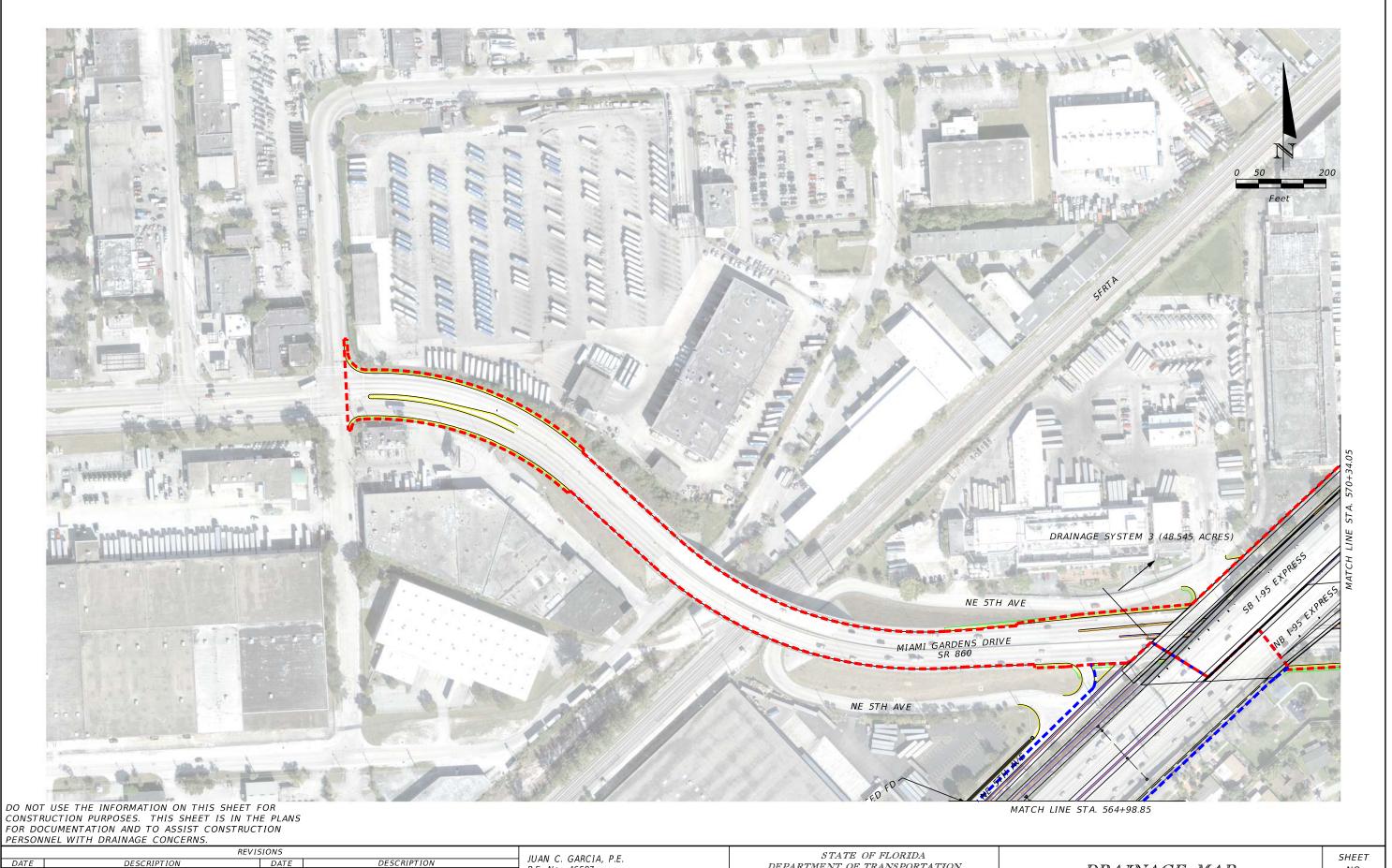
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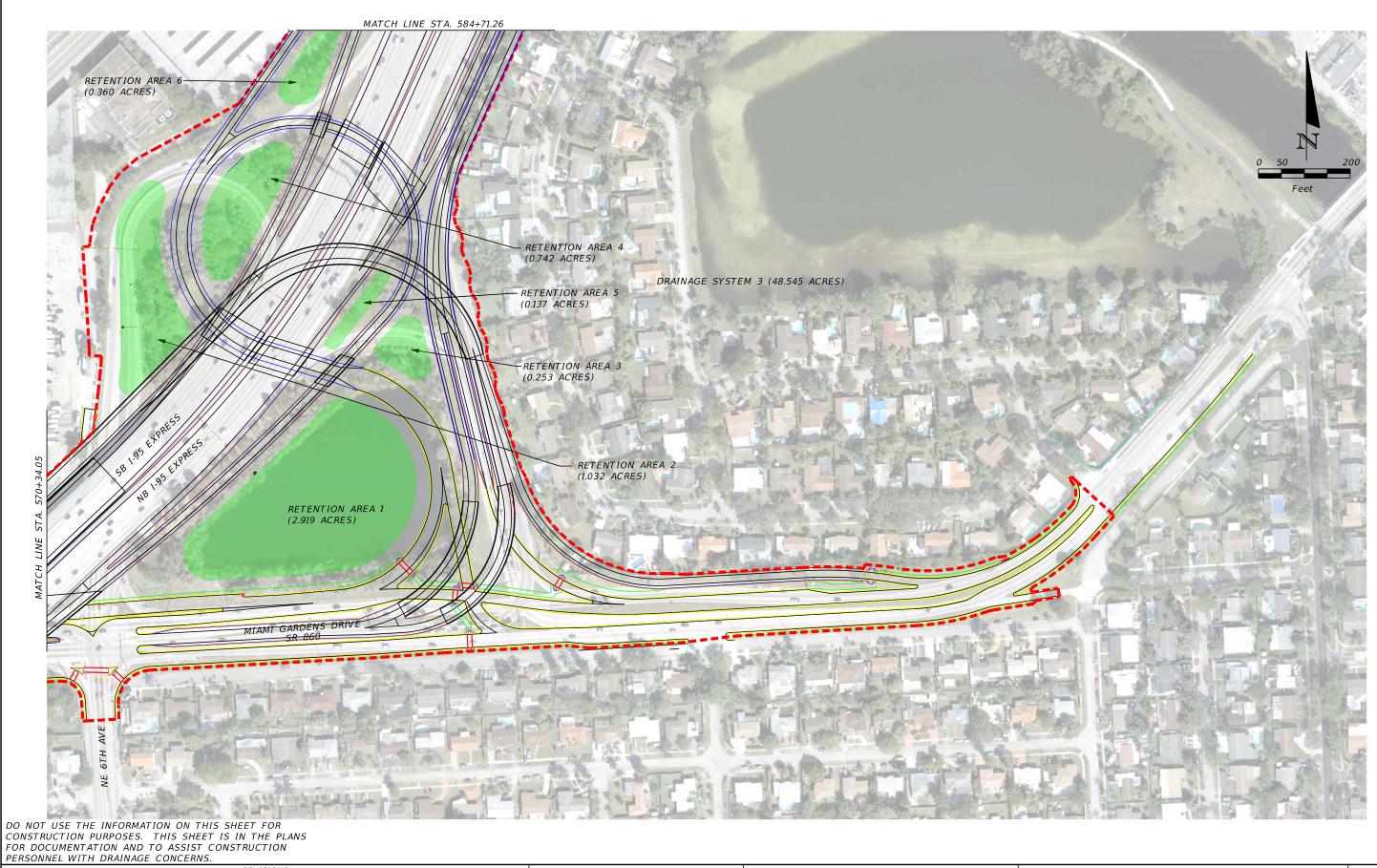




JUAN C. GARCIA, P.E. P.E. No.: 46597 AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134

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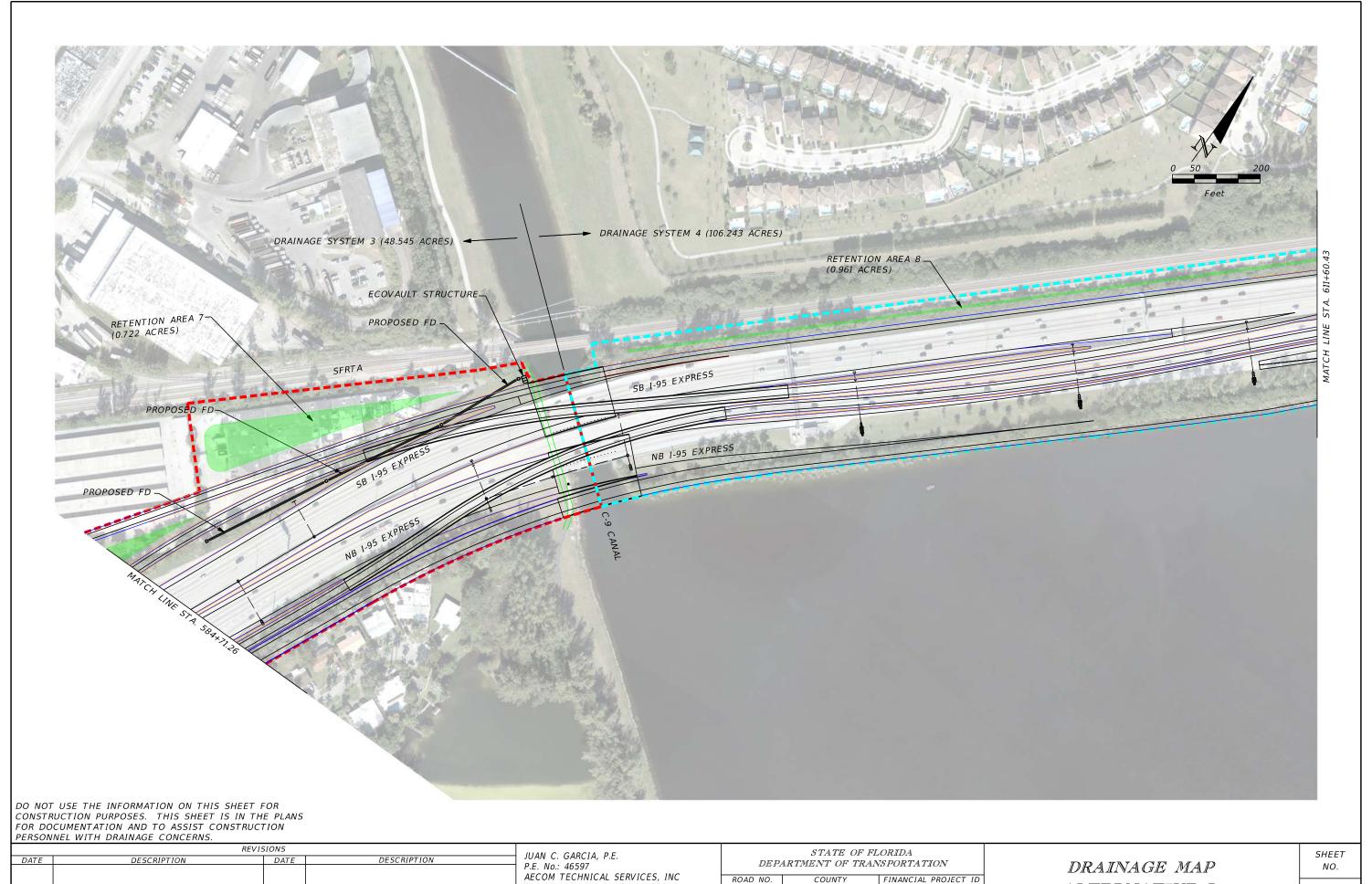
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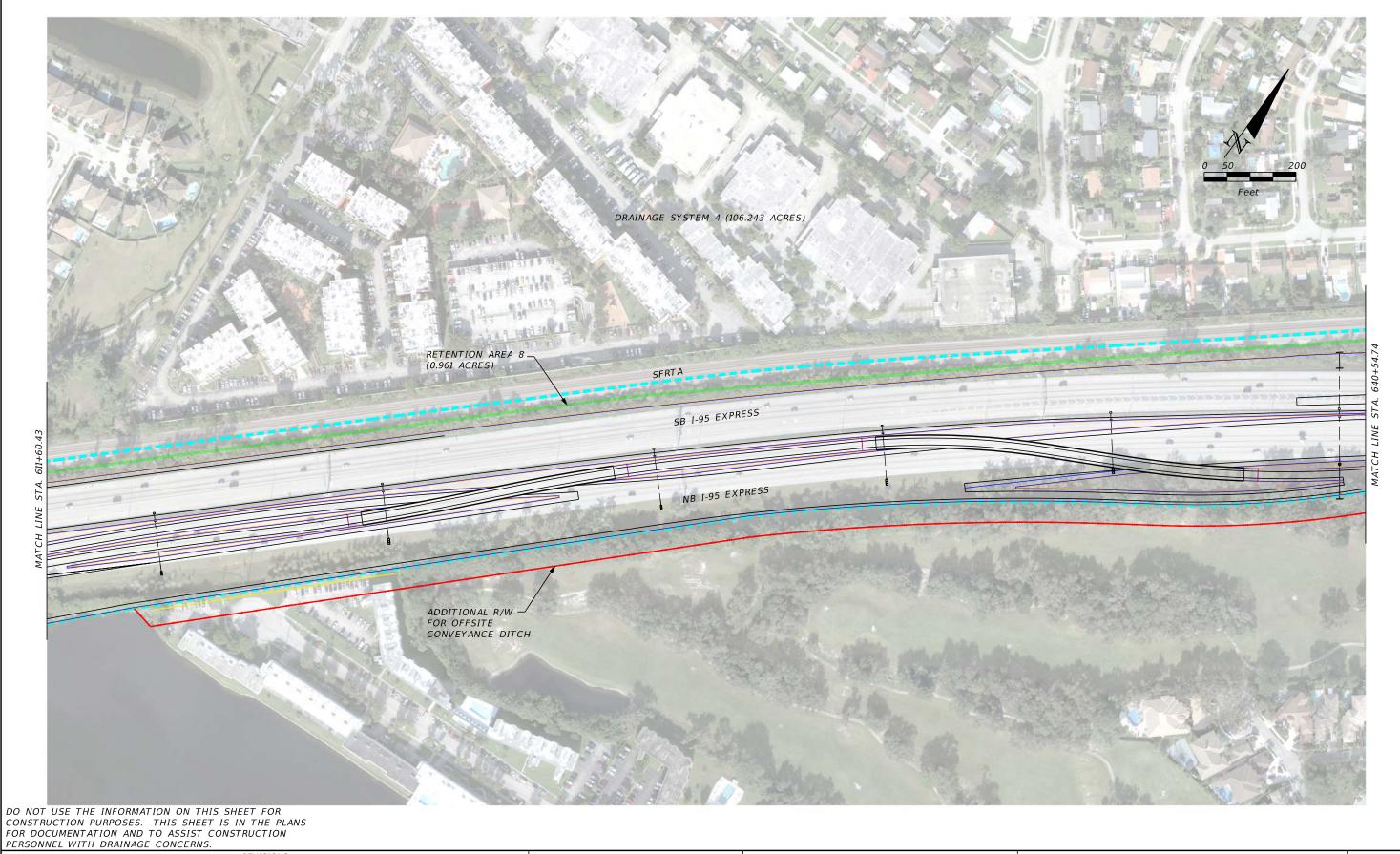


AECOM TESCHNICAL SERVICES, INC
2 ALHAMBRA PLAZA, SUITE 900
CORAL GABLES, FL 33134

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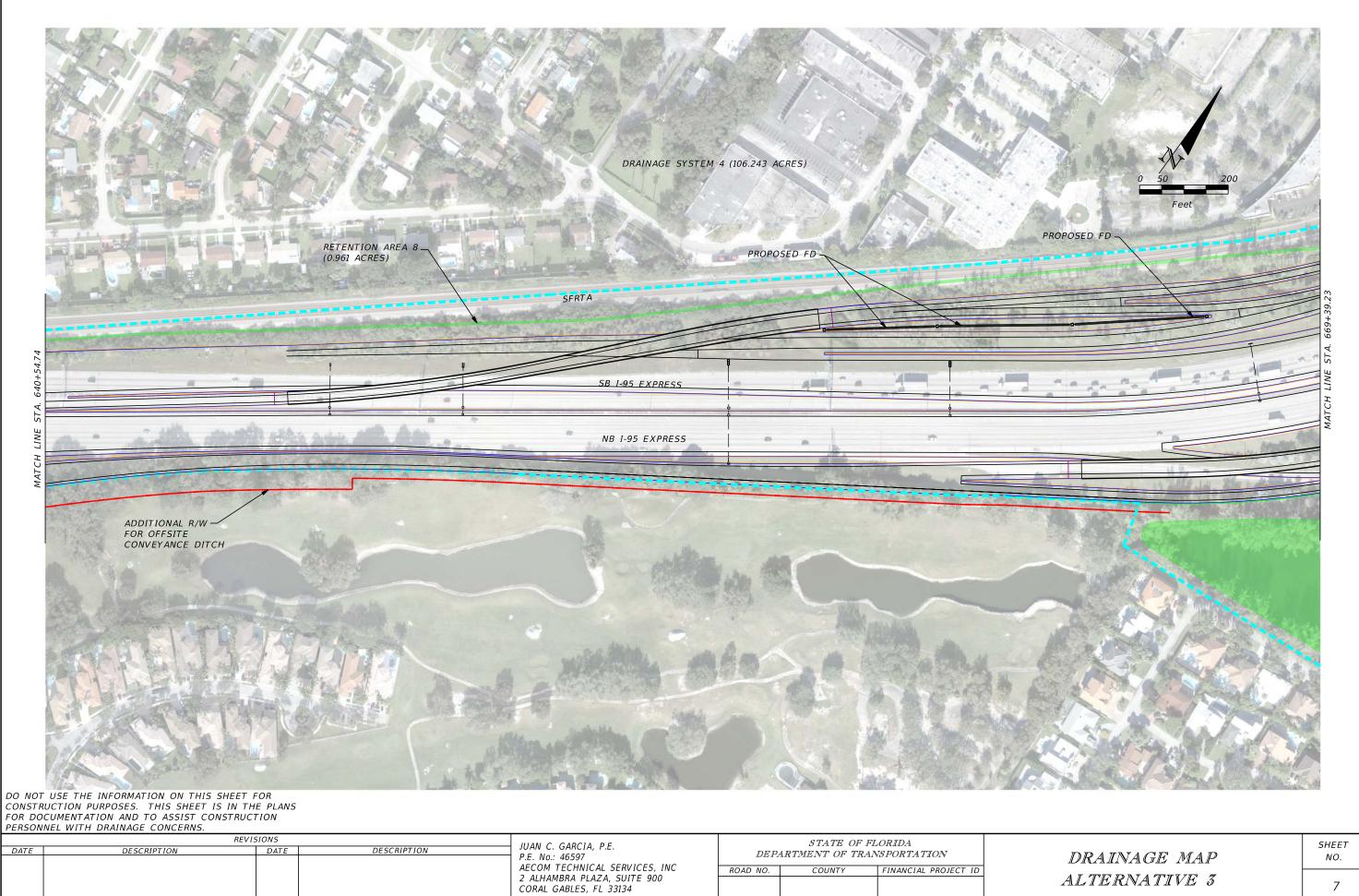
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JUAN C. GARCIA, P.E. P.E. No.: 46597 AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD NO. COUNTY FINANCIAL PROJECT ID

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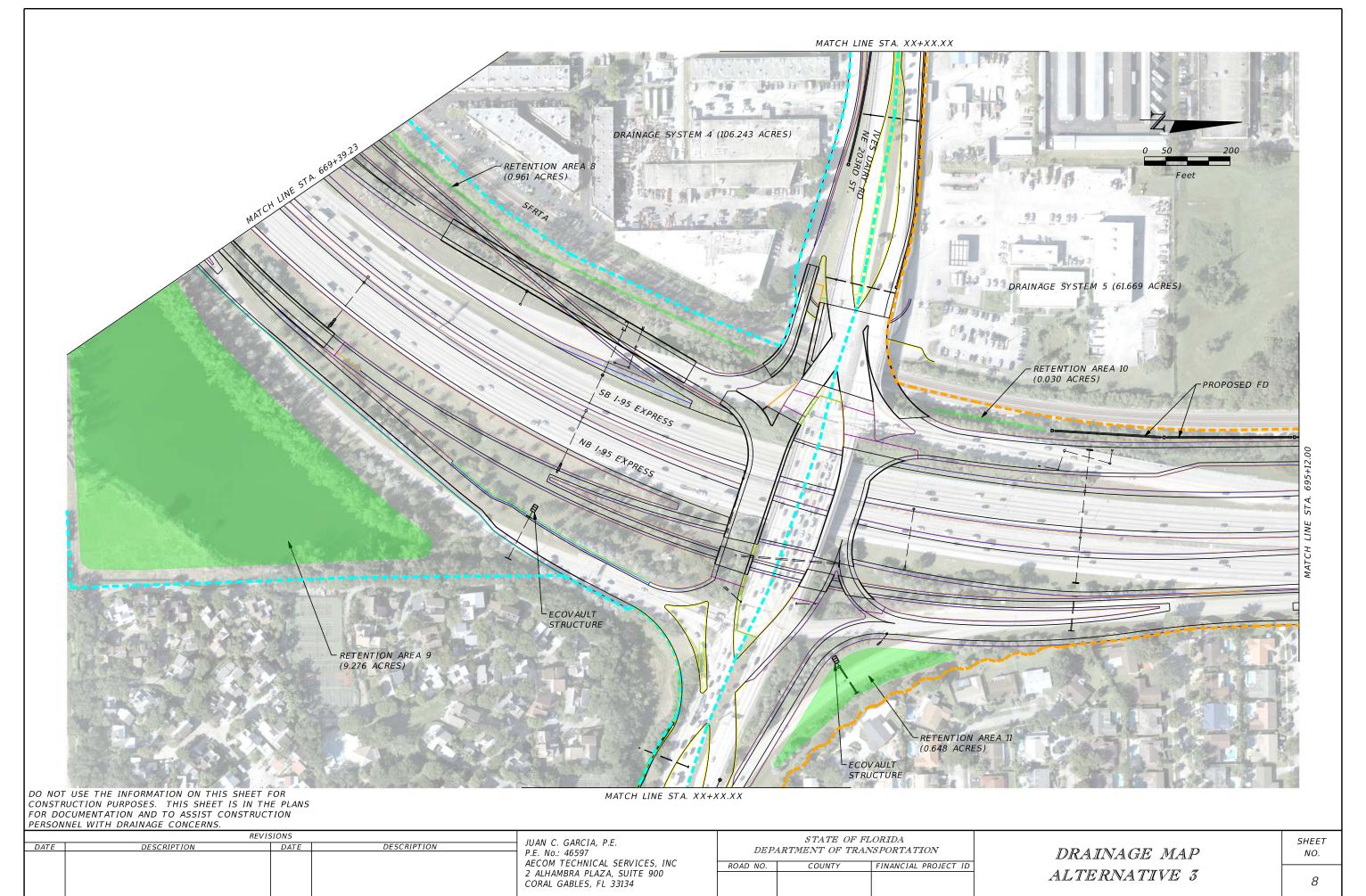


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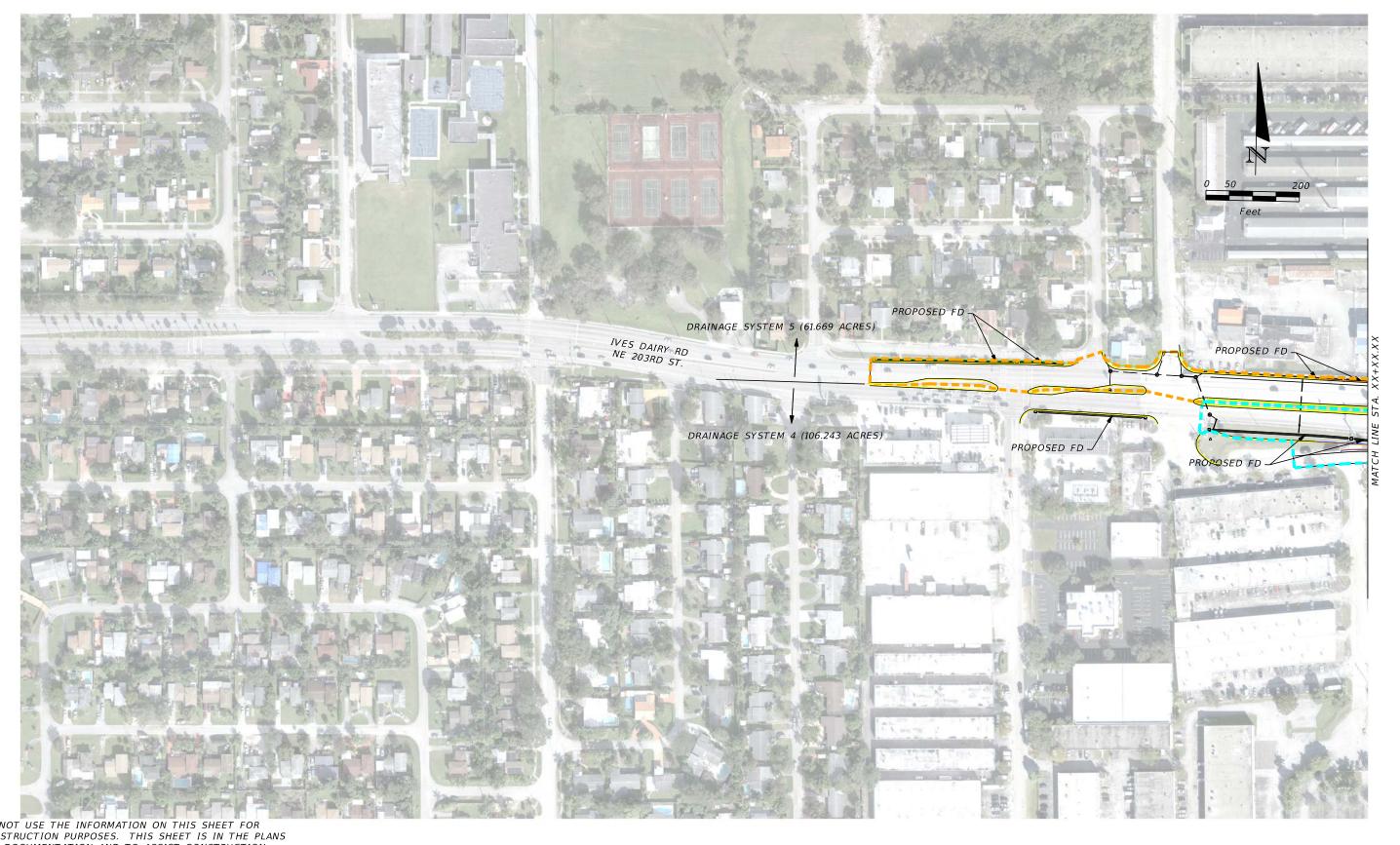
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P.E. No.: 46597
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2 ALHAMBRA PLAZA, SUITE 900
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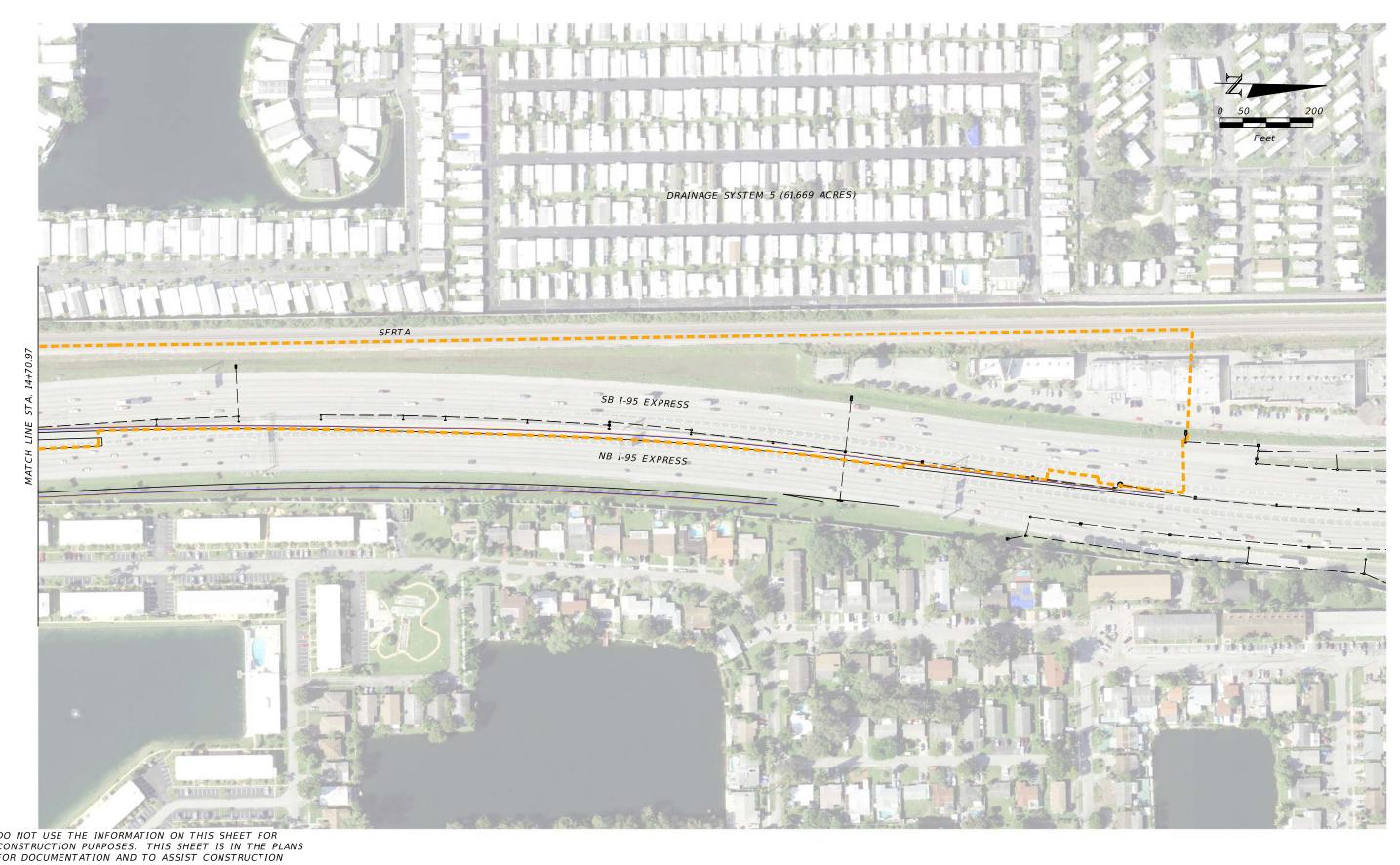
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JUAN C. GARCIA, P.E. P.E. No.: 46597 AECOM TECHNICAL SERVICES, INC 2 ALHAMBRA PLAZA, SUITE 900 CORAL GABLES, FL 33134

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD NO. COUNTY FINANCIAL PROJECT ID

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