FINAL

Broward County's Complete Response to the March 13, 2009 FDEP Review Letter on the Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands

Prepared for:

Broward County

Port Everglades Department
1850 Eller Drive
Ft. Lauderdale, FL 33316

September 18, 2009

CH2MHILL

3001 PGA Blvd.
Suite 300
Palm Beach Gardens, FL 33410

Project #172284

FINAL

Broward County's Complete Response to the March 13, 2009 FDEP Review Letter on the Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands

Prepared for:

Broward County

Port Everglades Department
1850 Eller Drive
Ft. Lauderdale, FL 33316

September 18, 2009

CH2MHILL

3001 PGA Blvd.
Suite 300
Palm Beach Gardens, FL 33410

Project #172284

Contents

Executive Summary

This document serves as the complete RAI-1 response to the FDEP Comments provided to Port Everglades on March 13, 2009. It also serves to consolidate and supplement Broward County's Initial Response letter dated May 28, 2009 with additional items prepared by the Port's Consultants and further researched and studied since the May 28, 2009 letter. In the remaining sections of this document the complete FDEP March 13, 2009 comments (Note: Each FDEP comment is indicated in italics) to the January 29, 2009 report are presented along with Broward County's complete response. Each item is separated and responded to in the order they appear in the March 13, 2009 FDEP letter with supplemental Appendices as applicable to the response.

The following provides a chronological summary of the submittals made on this topic between the Port and FDEP.

Port Everglades has determined that a westward expansion of the SOUTHPORT Turning Notch is essential to increasing berthing capacity in the Port. The proposed SOUTHPORT Turning Notch extension will provide an additional containerized cargo berth and provide access to the berth along the west boundary and a potential aggregate bulk material berth on the north boundary. This expansion will require the excavation of approximately 8.7 acres of mangrove habitat currently included in a Conservation Easement granted to the FDEP on December 15, 1988.

In an effort to accomplish this task, the Port initiated consultation with the Florida Department of Environmental Protection (FDEP) to assess the feasibility of the project from a regulatory perspective. The Port developed a habitat enhancement proposal designed to make use of existing Port land adjacent to the existing Conservation Easement. The proposed enhancement project was presented to FDEP via a concept drawing shown in the January 29, 2009 Report.

Following initial consultation, the Port responded to an email request for additional information from the Bureau of Beaches and Coastal Systems submitted by Steve MacLeod (also presented in the January 29, 2009 Report). Original FDEP questions and Broward County responses addressed tidal flushing of the created mangrove area, an assessment of potential contamination of soils and sediments from an existing marina operation and potential manatee disturbances resulting from the construction of the bridge over the Florida Power and Light (FPL) discharge canal.

Following the initial consultation, Janet Llewellyn of FDEP sent a May 13, 2008, response letter to the Port (see Appendix ES-C of the January 29, 2009 Report) indicating that the proposal had "enough merit to warrant further investigation," and that "significant information and design details still need to be addressed in order for the FDEP to fully evaluate the merits of the proposal." The letter then listed the following 10 items that the FDEP considered critical in making a final determination:

- The type of soil and level of soil contamination of the upland areas that are proposed for conversion to mangrove wetland;

- The tidal regime and a flushing analysis of the existing and proposed conservation area adjacent to the FPL discharge canal;
- The stormwater drainage plans for contributing areas around the proposed conservation area;
- The possibility of reconfiguring, removing or limiting the use of the proposed bridge over the discharge canal;
- The possibility of reconfiguring the proposed roadway west of the proposed canal bridge and the associated parking area in order to establish a connection between the wetland creation parcels;
- A proposed site plan for areas that would be restored to wetland mangrove communities, including surface elevations and planting layout.
- Evaluation of the ecological functions of the portion of the Conservation Easement to be released (adjacent to the SOUTHPORT Turning Notch) in comparison to the functions of the proposed conservation area based on the design of the mangrove wetlands to be constructed. Use of the Uniform Mitigation Assessment Method (UMAM) is preferred by the FDEP.
- Effect of the proposed alterations on the existing portion of the Conservation Easement that would not be altered;
- The possibility of granting the State of Florida ownership of some or all of the existing and proposed Conservation Easement areas;
- Long term plans for the area around the proposed conservation site not reflected in the current draft of the Port Everglades 20-year Master Plan.

The Port subsequently contracted with CH2M HILL to perform the preliminary design and technical studies necessary to further assess the merits of the project and to answer the FDEP's questions. In terms of technical discipline, the requested data was categorized into five (5) distinct work categories:

- Drawing preparation
- UMAM Assessment
- Hydrodynamic Assessment
- Stormwater Drainage Assessment
- Environmental Investigation (to be conducted by the Port after conceptual approval)

The majority of the items above were included in sections of a report titled "Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands" dated January 29, 2009 (referenced by the FDEP as being issued on February 10, 2009).

The overall January 29, 2009 report was divided into Sections as follows.

Section 1 – Preliminary Project Drawings

Sections 2 – UMAM Comparison Technical Report

Section 3 – Hydrodynamic Modeling Analysis

Section 4 – Drainage Analysis Report

On March 13, 2009 FDEP sent the port a letter with a subject line of "Review of Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands (see

Appendix RAI-1-A). Subsequent to this letter the Port provided a preliminary response letter to the FDEP dated May 28, 2009 with a subject line of "Florida Department of Environmental Protection Comments on 'Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands'" (see Appendix RAI-1-B). This report provides information to supplement that preliminary response letter.

Due to the high cost of the Environmental Investigation, the Environmental Investigation work was delayed by the Port until after the January 29, 2009 Report and until the FDEP reviewed the report and agreed that the results of the work completed thus far continued to support the approval of an on-going Port enhancement to offset the removal of a portion of the existing Conservation Easement. The Port commenced the Environmental Investigation work in June 2009 in an effort to move the FDEP approval forward. A summary of the findings of this investigation is included in this report with the complete report provided separately

Environmental Investigation

In the FDEP letter dated May 13, 2009, the FDEP requested the Port to provide information on the type of soil and the level of soil contamination in the upland area that would be converted to mangroves. Because of the high cost of this environmental investigation necessary to provide that information, the work was delayed by the Port until after the January 29, 2009 report. This delay was designed also to allow time for FDEP review of the report and to obtain FDEP concurrence that the results of the work completed thus far continued to support the approval of the proposed upland enhancement area to offset the removal of a portion of the existing Conservation Easement. The Port commenced the Environmental Investigation work in June 2009 in an effort to move the FDEP approval forward.

A detailed report of the findings titled "Environmental Investigation Report for Proposed Mangrove Creation Area at Port Everglades" has been prepared and provided separately, however, the following is a summary of that investigation.

The environmental investigation of the scrape down area for the Conservation Easement included the collection and laboratory analysis of soil, groundwater, and sediment samples. This investigation was conducted from June 29 through July 15, 2009.

The large scrape down area was broken down into seven individual scrape down areas, designated as A through G. In addition, because of the large sizes of Areas B and D, these two areas were further broken down into quadrates. A total of 121 proposed soil boring locations were identified within the entire scrape down area. Soil sample locations in areas A, B, D, F, and G were based on a grid system with an approximate soil boring density of 8 to 10 borings per acre. A Direct Push Technology (DPT) rig was used for the collection of soil samples at each boring location.

Soil sample locations in areas C and E, however, were selected based on observation of surface staining or proximity to a possible contaminant source and were also placed with respect to accessibility of the DPT drilling rig. This sampling approach was used, as opposed to using a grid system, because areas C and E are within an active industrial area (a dry marina), and thus access for the DPT drilling rig was limited due to large physical obstructions. Six boring locations were placed in each of these scrape down areas.

In addition to the 121 soil boring locations described above, four additional locations were placed in Area C at the four corners of the former underground storage tank (UST) site.

Conclusions

The following conclusions were drawn for the results of the environmental investigation of the scrape down area at Port Everglades:

- The sampling results for overburden soil to be excavated in the scrape down area did not indicate that any of the FDEP screening criteria were exceeded.

- The soil sampling results for the below final excavation (BFE) horizon, where mangroves are proposed for cultivation, indicated that the FDEP screening criteria (Soil Cleanup Target Levels) were not exceeded, with three minor exceptions. These exceptions were that one of 18 samples exceeded the criterion for cadmium, and two samples exceeded the criterion for arsenic. Specifically, the cadmium concentration of 11,300 µg/kg in Quadrate H of Scrape Down Area B exceeded the leachability criterion for groundwater of 7,500 µg/kg, and the arsenic concentrations of 25,200 µg/kg and 25,700 µg/kg in Quadrate A of Scrape Down Area D and Scrape Down Area G, respectively, exceeded the commercial/industrial Soil Cleanup Target Level (SCTL) of 12,000 µg/kg.

- Given that the soil in the BFE horizon is proposed to be the future sediment layer where mangroves will be cultivated, the more appropriate screening criteria for the soil are the FDEP-adopted Threshold Effect Level (TEL) and Probable Effect Level (PEL) for sediment (MacDonald, D.D. 1994). These criteria were established for the protection of ecological receptors, specifically benthic invertebrates whose habitat consists of shallow sediments.

- The TEL for cadmium is 680 µg/kg and the PEL is 4,210 µg/kg. The cadmium concentration of 11,300 µg/kg detected in the composite soil sample during this sampling event exceeded both of these criteria. The hazard quotient (concentration ÷ PEL criterion) for cadmium at this composite sampling location is 2.7, which indicates a potential risk to benthic invertebrates in Quadrate H of Scrape Down Area B.

- The TEL and PEL criteria for arsenic are 7,240 µg/kg and 41,600 µg/kg, respectively. While the arsenic concentrations of 25,200 µg/kg and 25,700 µg/kg in Quadrate A of Scrape Dow Area D and Scrape Down Area G, respectively, exceeded the TEL, they were far below the PEL. The hazard quotient for arsenic for both Quadrate A of Scrape Down Area D and Scrape Down Area G relative to the PEL is 0.6. As such, no significant risks to benthic invertebrates are expected in these areas.

- The groundwater sampling results indicated that the FDEP screening criteria were not exceeded, with five minor exceptions. These exceptions were exceedances of the benzene Groundwater Cleanup Target Level (GCTL) in one groundwater sample in the former UST area (Area C) and in two groundwater samples in the area directly east of the closed landfill (Area A). In addition, there were two exceedances of the chromium GCTL in the groundwater samples collected from Area A. However, the magnitude of each of these exceedances of the benzene and chromium GCTLs was minor, and should not pose a risk to human health and environment. This is because the groundwater quality at the site is poor and not considered a viable source for potable water. In addition, it is highly unlikely that potential lateral migration of these constituents into the adjacent surface waters would occur that would result in exceedances of water quality criteria for the protection of ecological receptors.

- The sediment sampling results indicated exceedances of the TELs for benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, naphthalene, phenanthrene, and pyrene. The detected concentrations for each of these constituents, however, did not exceed their respective PEL values. As such, these concentrations are not expected to present a significant risk to benthic invertebrates.

- The total estimated volume of soil to be excavated in the proposed scrape down area is approximately 179,700 cubic yards. The evaluation of the geotechnical properties of the overburden soils indicated that approximately 62 percent of the total soil volume, or approximately 112,000 cubic yards, is reusable fill material. Of the remaining 67,800 cubic yards, approximately 65,300 cubic yards was found to potentially contain debris, as indicated by frequent refusal to the DPT soil borings. The remaining 2,500 cubic yards was not deemed as reusable fill because it consisted mainly of rock and gravel.

Recommendations

It is recommended that the 112,000 cubic yards of overburden that is reusable fill be excavated and stockpiled at an appropriate location on the Port for reuse, subject to the approval of FDEP. Additionally, approximately 65,300 cubic yards of soil was found to potentially contain buried debris in Area B adjacent to the closed landfill. At present, this material is proposed for screening to recover reusable fill material with offsite disposal of separated debris at a C&D landfill, pending FDEP approval. The remaining 2,500 cubic yards was not deemed as reusable fill because it consisted mainly of rock and gravel. This material is also proposed for offsite disposal at a C&D landfill. However, the Port may decide in the future to beneficially use this material for purposes other than construction.

Prior to bidding the excavation of Area B adjacent to the closed landfill, however, it is recommended that some test pits be excavated in this area to determine the nature of the buried material to confirm that is actually demolition debris or other inert material. If this material is determined to be something other than demolition debris, which would not be suitable for disposal at a C&D landfill, then it would be recommended to dispose of this material at a Class I landfill.

It is further recommended that once the overburden is excavated and removed from the scrape down areas, that mangroves be planted in accordance with the mangrove cultivation plan, pending approval of FDEP. However, prior to planting of mangroves in Quadrant H of Scrape Down Area B, additional soil sampling is recommended to further assess the cadmium concentrations in this area. This is because the cadmium concentration for the composite soil sample collected in this area exceeded the PEL for sediment.

This would include establishing a grid in this area to collect several discrete soil samples for cadmium analysis and evaluation of the sampling results relative to the cadmium TEL and PEL. If exceedances of the PEL are found which may indicate significant risks to ecological receptors, then appropriate remediation of the cadmium-impacted soils should be considered.

FDEP Item 1

FDEP COMMENT: The Department does not see any significant deficiencies in the sediment and pore water sampling plan. The replicate sampling at two depths is "to visually inspect the soil characteristics for the purpose of assessing the soil for beneficial use in construction." With this goal in mind, the number of samples presented seems reasonable. The different depth samples are composited and replicates per subsection are further composited to yield a single subsection sample for analyte testing. It does not seem excessive to test a total of 18 subsection samples for approximately 8.7 acres.

Listed below are a few specific questions and comments on the CH2M Hill Scope of Services (First Amendment) for the technical study.

- ***Item II. B. 1.*** *The 7th paragraph mentions that soil samples will be composited in the field. The Department's SOP for sediment sample collection, FS-3000, indicates that compositing of a sediment sample has to be done in the laboratory and not in the field.*

  Broward County May 28, 2009 Response: The soil/sediment sample aliquots to form the composite samples will not be mixed in the field. Rather, they will be placed in a single sample container with instructions to the lab to mix the sample as a composite sample prior to extraction and analysis. The exception to this will be for the VOC analysis. Regarding VOC sample collection, each individual soil sample from each boring location will be screened using an OVM. The sample with the highest OVM reading within a given sub-area will be submitted to the lab for analysis. If none of the samples within a given sub-area have a measurable OVM reading, the sample with the highest potential for contamination based on field observations (staining or other discoloration, or noticeable odor) will be selected for analysis.

  Broward County Supplemental Response: Section 2 of the report "Environmental Investigation for Proposed Mangrove Creation Area at Port Everglades" completed in August 2009 details the specific sampling methodology followed for the field investigation.

- ***Item II. B. 3.*** *Note that many of these samples (soils and sediments) may exceed the Rule 62-777, F.A.C., threshold for arsenic because it can occur naturally at these levels. The Port can use the normalized metal approach to help assess whether the soils or sediments are unnaturally elevated.*

  See the web site below for additional information on the normalization approach.
  www.dep.state.fl.us/water/monitoring/docs/seds/estuarine.pdf

  Broward County May 28, 2009 Response: We concur with the Departments suggestion.

- ***Items II. B 4. and 5.*** *What is meant by the statement "No QC samples will be collected for analysis?" Does this mean that multiple samples will not be collected in the field as verification in case spurious results are obtained? In certified laboratories, QC samples are created for every batch of samples using duplicates from a single submitted sample.*

  Broward County May 28, 2009 Response: The statement "No QC samples will be collected for analysis" means that no field duplicate samples, matrix spike/matrix spike duplicate samples, or equipment blank samples will be collected in the field for lab analysis. This is because this sampling effort is designed strictly for screening purposes. If the sample results indicate potential contamination, then additional confirmatory sampling will be performed to identify specific source areas within a given sub-area. Once source areas are identified, then additional confirmatory sampling will be performed to delineate the source area contamination which would include the collection of field QC samples.

  Broward County Supplemental Response: The hazard quotient (concentration ÷ PEL criterion) for cadmium at this composite sampling location is 2.7, which indicates a potential risk to benthic invertebrates. One area (Quadrant H of Scrape Down Area B) had Cadmium concentrations detected in the composite sample that exceeded the Probable Effort Level (PEL) for Cadnium.

  As a result, the Port plans to conduct an additional study once construction commences to further assess the nature and extent of the cadmium-impacted soils in this area. Essentially, once the overburden is excavated and removed from the scrape down areas for mangroves to be planted in accordance with the mangrove cultivation plan, but prior to planting of mangroves in Quadrant H of Scrape Down Area B, additional soil sampling is proposed to further assess the cadmium concentrations in this area.

  This additional study would include establishing a grid in this area to collect several discrete soil samples for cadmium analysis and evaluation of the sampling results relative to the cadmium TEL and PEL. If exceedances of the PEL are found which may indicate significant risks to ecological receptors, then appropriate remediation of the cadmium-impacted soils will occur.

FDEP Item 2

FDEP COMMENT: The Department offers the following comments on the Hydrodynamic Modeling Analysis:

In support of the Proposal, the applicant conducted water velocity study in the project area such as the FPL Canal and the ICW, and a numerical modeling study for the water flushing analysis. The Department has determined that the field work method for water velocity survey is adequate and the numerical model of RMA-2 and RMA-4 used for this project hydrographic character and water quality assessment is acceptable. The applicant ran the hydrodynamic model for the existing and proposed geometry cases respectively, and found that the water flushing time is less than that of four days criteria. In other words, the proposed project is not expected to alter flushing of the system to the point that it would adversely affect water quality. Note that instead of applying actual tidal data from a tidal station record, the applicant set a repeating fashion tide with approximately 2.5 feet range and 12.2 hour period for the model water flow boundary condition to run the numerical model. This is normally not adequate. Normally, one must run a numerical model through a calibration process with field data such as water flow velocity and water surface level, etc., and adjust the input parameters sufficiently to produce an accurate output. Otherwise, one could not expect to run the model with different boundary conditions and expect to get correct assessments. However, according to this numerical model validation test with field data collected over a 20 day period starting August 6, 2008, this numerical model simulation results seem to be acceptable.

As such, the Department agrees with the consultant's assessment that is based on the hydrodynamic and water quality models, and the engineering support for construction within the tidal creeks and canals.

Broward County May 28, 2009 Response: The Department's comment has been noted.

FDEP Item 3

FDEP COMMENT: The stormwater drainage study appears limited to the area north of Access Road. However, the study does not consider the paved container area labeled "Berth 34" in Figure 2.1 (see Section 4 of the report). This area borders approximately 1500 linear feet of the conservation easement, so understanding how the container yard is connected to (or isolated from) the proposed CE is critical to potential impact and overall water quality estimates. What drainage analysis is available for this area? What treatment is in place, and are any treatment improvements proposed?

Broward County May 28, 2009 Response: Drawdown analysis is required to quantitatively determine the radius of influence caused by stormwater runoff flowing or seeping from the E-W Ditch to the proposed wetlands. We believe impacts associated with the seepage is expected to be minimal, however, we will perform additional testing to confirm. We are currently working with our Consultant on the scope of work related to the drawdown analysis. An oil/grit separator (a.k.a. oil/water separator) will be installed to remove trash, debris, sediment, oil and grease from stormwater runoff discharging from upland drainage areas to the E-W Ditch. This device will be put in place at the time of project commencement in the upstream area of the project.

Broward County Supplemental Response: As requested by FDEP, the drainage study area was expanded to include the paved container area bordering the conservation easement. That area is commonly referred to as SOUTHPORT Phase VA & VB. The Drainage Supplement (Appendix RAI-1-C) includes drainage information pertaining to the SOUTHPORT Phase VA & VB, including the location of existing water quality treatment facilities affected by the proposed wetland creation area. Storm water from the Southport area is collected and conveyed to an exfiltraton system and stormwater treatment swale. The retention volume provides 50% of the required water quality treatment volume in accordance with SFWMD regulatory requirements Stormwater runoff volumes in excess of the retention volume discharge to the conservation easement and existing injection well. These drainage improvements were designed, constructed, and permitted under SFWMD permit number 06-00927-S dated February 14, 1991. The flow of stormwater runoff from the SOUTHPORT Phase VA & VB to the CE is proposed to remain as is and is not expected to adversely impact the CE.

The Department has the following comments on the drainage analysis that was presented for the 29.9 paved upland area, including the proposed bridge and parking area:

- *The design of the E-W ditch and location adjacent to the proposed wetland creation area(s) will result in seepage of poor water quality (runoff from predominantly impervious areas) into the proposed wetlands. As such, the proposed E-W ditch will secondarily impact the created wetland(s) and should be factored in the UMAM analysis.*

  Broward County Supplemental Response: As noted in our previous response, the port's consultant completed a Drawdown analysis of the E-W Ditch to estimate seepage of stormwater runoff from the E-W Ditch to the proposed wetland creation area. Based on this analysis, the Radius or zone of influence (R) calculations indicate the proposed embankment top width exceeds the maximum R for both high and low tide conditions, respectively. Thus we do not anticipate seepage from the E-W Ditch to impact the created wetlands. (See Appendix RAI-1-C).

- *Measures should be proposed to remove oil and grease from stormwater runoff to the E-W ditch.*

  Broward County Supplemental Response: An oil-grit separator (a.k.a. oil-water separator) is proposed to remove trash, debris, sediment, oil and grease from stormwater runoff discharging from upland drainage areas to the E-W Ditch. The location and details of the oil-grit separator are included in the Drainage Supplement Report (Appendix RAI-1-C).

- *The report indicates that one (1) inch of stormwater will be treated by the proposed ditch. According to the Basis of Review for Environmental Resource Permit applications within the South Florida Water Management District (Section 5.2), treatment for 2 ½ inches of stormwater should be provided for the impervious commercial/industrial upland area, with the first ½ -inch being in the form of dry pretreatment.*

  Broward County Supplemental Response: The information contained in the Drainage Supplement (Appendix RAI-1-C) supersedes the Drainage Analysis Report previously provided in Section 4 of the January 29, 2009 Report. The following statements are included in the Drainage Supplement: "The water quality volume for wet detention shall be provided for the first inch of runoff from the developed project, or the total runoff of 2.5 inches times the percentage of imperviousness, whichever is greater. The retention volume shall be provided equal to 50 percent of the above amounts computed for wet detention."

  In addition, the required and provided water quality treatment volume calculations are included in the Drainage Supplement Report (Appendix RAI-1-C).

- *Is it possible to design a better treatment train for the runoff water, perhaps sufficient to capture the first two (2) inches of run-off? The Department's stormwater engineers may have additional input, but were not able to supply comment by the given deadline.*

Broward County Supplemental Response: In Section 4 of the Drainage Analysis Report previously provided on January 29, 2009, calculations were conducted for the area North of the Access Road. In Section 4 of the January 29, 2009 Report an evaluation of four alternative stormwater treatment systems for the project was conducted. As a result of the January 29, 2009 report, the recommended alternative was to reconstruct the E-W Ditch and N-S Ditch and to construct an oil-grit separator to meet water quality treatment requirements. Subsequent to the January 29, 2009 report and after the most recent studies generated in response to FDEP Item 3 (this section), the recommended solution has been expanded to include an alteration to the proposed wetland creation area boundary line adjacent to the SOUTHPORT Phase VA & VB container yard to avoid impacts to the existing exfiltraton system and stormwater treatment swale covering that area (see Appendix RAI-1-D and RAI-1-F). The new wetland creation boundary line is also shown in more detail in the Drainage Supplement Report (see Appendix RAI-1-C). The change in the wetland boundary resulted in a relatively small change in the UMAM score with a loss of only 0.16 functional units which results in the score going from 3.76 to 3.5 functional units. However, the capacity, maintenance and operation of the existing water quality treatment system is unaffected by the construction of the proposed wetland creation area. The revised UMAM scores are reflected in Appendix RAI-1-E.

FDEP Item 4

FDEP COMMENT: No comment – the Port declines to alter their bridge plans.

Broward County May 28, 2009 Response: Item was not responded to by Broward County in the May 28, 2009 Response

Broward County Supplemental Response: The addition of the bridge over the FP&L Discharge Canal is an essential element of the Port's Master Plan to link together Midport and Southport within the port's security perimeter. It also has an existing secondary benefit of reducing truck exhaust emissions by reducing the travel distance between the two locations and eliminates the current requirement to wait in traffic to pass through the security checkpoint. The bridge construction contract was awarded and is now under construction. The north/south location of the bridge and access road will not be able to be changed. Any modifications to site work, including the parking area on the west side and etc. will be addressed at the time of design of the proposed wetland creation project.

FDEP Item 5

FDEP COMMENT: The Port is willing to adjust the new parking area to a limited degree, but wishes to maintain access to floating docks. They do not propose to improve the connectivity between the proposed northwest and southwest parcels based on their estimates of costs and benefits. The Department supports moving the proposed parking west of the design location, which is currently near the bridge, to a location along the existing north-south roadway (SE 18th Ave). This change would allow the planting of more mangrove area closer to the F P & L canal.

Broward County May 28, 2009 Response: Item was not responded to by Broward County in the May 28, 2009 Response

Broward County Supplemental Response: The addition of the bridge over the FP&L Discharge Canal is an essential element of the Port's Master Plan to link together Midport and Southport within the port's security perimeter. It also has an existing secondary benefit of reducing truck exhaust emissions by reducing the travel distance between the two locations and eliminates the current requirement to wait in traffic to pass through the security checkpoint. The bridge construction was awarded and is now under construction. The north/south location of the bridge and access road will not be able to be changed. Modifications to site work, including the parking area on the west side and etc. will be addressed at the time of design of the proposed wetland creation project.

FDEP Item 6

FDEP COMMENT: The proposed site plan has some inconsistencies:

a. *Section 1, Sheet A9 describes vegetation to be used for the planting of side-slopes. CH2M Hill confirmed that all side-slopes will be lined with rip-rap and that the side-slope planting scheme was inserted erroneously. While this should be removed, the Bureau would also like to know why planted side-slopes are not being proposed (instead of riprap revetments and steel sheet pilings) at either the interface between the proposed mangrove area and port upland or between the proposed mangrove area and the canal. It may also be advantageous to plant red mangroves between the mean high water (MHW) and mean low water (MLW) elevations.*

   Broward County May 28, 2009 Response: The attached drawings (see Appendix RAI-1-B, Sheets A6 and A7) have been revised to indicate the inclusion of the side slope planting. Please note the riprap at the FPL canal interface is for underwater erosion protection. The wetland plantings will consist of Red mangroves (Rhizophora mangle), Smooth cordgrass (Spartina alterniflora), and Black and White mangroves seeding. Please see the attached revised exhibits (see Appendix RAI-1-B, Sheets A6, A7 and A9) for design changes and planting details.

   Broward County Supplemental Response: As noted in our comments on FDEP Item 3, the size of the wetlands creation area has been modified from that previously provided (See Appendix RAI-1-D-Revised Project Drawings-September 18, 2009 sheets A1,A2, A3, and A4, Appendix RAI-1-E-Revised UMAM Assessment Forms, and Appendix RAI-1-F-Revised Concept Plan-September 18, 2009. Revisions to Appendix RAI-1-D-Revised Project Drawings-September 18, 2009 include the revised project foot print for Site A reflected on drawings A1, A2, A3 which avoided impact to existing storm water drainage features resulting in the removal of 0.43 acres of habitat from the proposed wetlands creation area. There was no net loss of habitat at sites C and D. Within Appendix RAI-1-E-Revised UMAM Assessment Forms the revised project foot print of Site A was updated on the Assessment Area "Scrape Down A" sheets and the Mitigation Determination Formulas sheet.

b. *Several of the cross-section call-outs on the plan views (e.g., A2) point the opposite direction as what is shown in the profile views (e.g., A6).*

   Broward County May 28, 2009 Response: The corrected cross section drawings are attached (see Appendix RAI-1-B, Sheets A2 and A6).

   Broward County Supplemental Response: As noted in our comments on FDEP Item 3, the size of the wetlands creation area has been modified from

that previously provided. Please see Appendix RAI-1-D-Revised Project Drawings-September 18, 2009 and Appendix RAI-1-F-Revised Concept Plan-September 18, 2009 for the most current drawings.

c. *The plan view of Site A shows (on Sheets A2 and A3) the transect lines for Cross-Sections A and B, both of which cross three (3) flushing channels on the plan view. However, Cross-Sections A and B are shown (on Sheet A6) to cross five (5) flushing channels each.*

Broward County May 28, 2009 Response: The corrected cross section drawings are attached (see Appendix RAI-1-B, Sheets A2, A3 and A6).

Broward County Supplemental Response: As noted in our comments on FDEP Item 3, the size of the wetlands creation area has been modified from that previously provided. Please see Appendix RAI-1-D-Revised Project Drawings-September 18, 2009 and Appendix RAI-1-F-Revised Concept Plan-September 18, 2009 for the most current drawings.

d. *The specific type or types of mangrove to be planted need to be identified.*

Broward County May 28, 2009 Response: The planting notes have been updated to reflect planting of Red mangroves (see Appendix RAI-1-B, Sheet A9). As mangrove communities develop, there is a succession of mangroves species that takes place throughout the sites. White mangroves serve as the primary successor with black mangroves following. Red mangroves establish and become the climax community for the site. While the planting plan calls for the planting of one gallon Red mangroves, to add in the establishment of the site and to increase the diversity, the planting plan now incorporates the scattering of white and black mangrove seeds throughout the mangrove habitat.

Broward County Supplemental Response: As noted in our comments on FDEP Item 3, the size of the wetlands creation area has been modified from that previously provided. Please see Appendix RAI-1-D-Revised Project Drawings-September 18, 2009 and Appendix RAI-1-F-Revised Concept Plan-September 18, 2009 for the most current drawings.

FDEP Item 7

FDEP COMMENT: CH2M Hill uses the UMAM that was performed by Coastal Systems International for the existing mangrove wetland that is being considered for release from the CE as the basis for the ecological value of that area. However, a different basis of evaluation seems to be used for the proposed mangrove creation locations. UMAM is designed such that it does not matter if a reviewer assigns numbers that are higher or lower than another reviewer for the same site as long as the same value system is applied to all sites under consideration. It appears that CH2M Hill assigns values that are universally higher for the proposed mangrove creation sites than CSI did for the existing mangrove wetland, which has similar characteristics.

While the Department generally recommends that the UMAM values for the proposed system be lowered, staff also suggests that the score given to the "existing conditions" for Location and Landscape (L&L) can be set to zero (0) at the proposed easement site, which effectively increases the value of the enhancement activities. This is in line with the CSI assessment that reduced L&L scores to zero (0) after the turning notch mangroves are excavated. The concept is that L&L describes the interaction between the habitat being assessed and the surrounding area. If the habitat does not exist, then there is no interaction.

Pending the response to other questions and suggestions outlined in this letter, the Department recommends consideration of the following detailed adjustments to the worksheets for the proposed sites based on the UMAM scores for the existing site (i.e., the turning notch):

Broward County May 28, 2009 Response: UMAM scores have been adjusted as per FDEP recommendations (see Appendix RAI-1-B for revised UMAM forms May 28, 2009). Please note that the proposed area was scored higher since it is expected to have a much better flushing capacity than the Conservation Easement to be released and therefore an increased detrital output with increased downstream benefits. Additionally, the proposed areas will offer more acreage for fish and wildlife usage through the open tidal channels created within sites A and B.

Broward County Supplemental Response: As noted in our comments on FDEP Item 3, the size of the wetlands creation area has been modified from that previously provided. Resulting changes in UMAM scores are shown in Appendix RAI -1-E- Revised UMAM Assessment Forms September 18, 2009. For reference the CSI assessment polygons have been included in Appendix RAI-1-G UMAM Polygons.

a. *Scrape Down Area A:*

   Location and Landscape – Set the current condition to zero (0) rather than 6 and lower the "with" value from 8 to 6. The proposed area is still surrounded on three sides by paved upland industrial area and riprap. The value might be elevated if the adjacent slopes were vegetated with appropriate native plants for stability rather than riprap.

Broward County May 28, 2009 Response: Please note that the side slopes have been revised to include native plantings instead of riprap. Additionally, the mangrove habitat creation sites will be seeded with white and black mangrove seeds to increase diversity throughout the sites. As a result of this change, the UMAM value has been kept at 8.

Broward County Supplemental Response: Even with 3 sides of the site surrounded by Port facilities, Site A will have a 1000 ft interface with the 'remaining CE'. This interface between mangrove habitat and tidal channels will allow for unimpeded wildlife movement and downstream benefits between Site A and the 'remaining CE'.

Water Environment - Lower the "with" value from 9 to 7. The flushing of Area A will be improved versus the turning notch, but the condition description should recognize the compromised quality of the AIWW water and influence of runoff from the adjacent paved lots, consistent with the CSI assessment for the turning notch. The Port needs to verify whether or not any of the paved container lot south of Area A will drain into the created wetlands. Even though the first inch of run-off would be treated from the FTC/WTZ area west of the proposed easement, this still means that pollutants are still being introduced into the system via the canal for rainfall greater than one inch, and seepage through the canal walls into the wetland can occur. Increasing treatment to the first 2.5 inches for all contributing areas, as recommended in the Department's response to the Port's drainage analysis, may warrant an increase in the final value. Finally, we know nothing about the contaminant levels in the soil, though it may be assumed that the soil contaminants will have to be remediated to acceptable levels prior to approval of wetland construction.

Broward County May 28, 2009 Response: The adjacent paved lots to the south of Area A currently have treatment in place and will not discharge into the created wetlands. On the north side of Area A any seepage associated with the E-W treatment ditch is expected to be minimal. The treatment ditch is designed with a 10 foot crest and 3 to 1 slope approaching the created wetland. Seepage from the ditch would have to travel approximately 30 feet horizontally to reach the created wetlands. Also note that this water is treated and that the "seepage" through the soil medium would further treat any water prior to entering the mitigation area. Due to these reasons we feel a UMAM score of an 8 would be more appropriate than a 7. We are currently working with our Consultant on the scope of work related to the drawdown analysis.

Community Structure – Lower the 9 to a 7 or 8 pending the Port's commitment to an aggressive exotic removal and long-term maintenance plan and/or a relatively diverse mangrove planting scheme.

Broward County May 28, 2009 Response: The Port will maintain the sites as per typical permit conditions for this type of wetland creation. That is to say that a normal five year monitoring program will be established to provide for an 80% survival rate of the mangroves planted. The Port will maintain the proposed wetland creation sites with annual removal of exotics by hand. To further add to the diversity of the site, the planted side slopes will include a variety of the native plant species. The creation

area will also be supplemented with white and black mangrove seeds to increase community diversity. The UMAM score has been lowered to an 8.

b. *Scrape Down Area B:*

Location and Landscape – Set the current condition to zero (0) rather than 6 and lower "with" value from 8 to a 6 for reasons similar to comments on Area A. The surrounding landscape is not quite as industrial as for Area A, but Area B is not directly connected to a larger wetland buffer. Port Everglades Technical Study March 13, 2009 Page 7 of 9

Broward County May 28, 2009 Response: Please note that the side slopes have been revised to include native plantings instead of riprap. As a result, the Location and Landscape UMAM score has been lowered to a 7 and current conditions changed to 0.

Broward County Supplemental Response: While there is no direct connection between the mangrove habitat in Site B to the 'remaining CE', proximity of Site B to the 'remaining CE' and the direct connection to the FPL canal will allow wildlife access with minimal impediments for the expected species usage.

Water Environment – Lower 9 to a 7 for reasons similar to comments on Area A. Area B may not be subject to run-off like Area A, but the residence time is significantly longer (13 hours in Area B vs. 2 to 5 hours in Area A).

Broward County May 28, 2009 Response: The UMAM score has been lowered to a 7.

Community Structure – Lower the 9 to a 7 or 8, for reasons similar to comments on Area A

Broward County May 28, 2009 Response: The Port will maintain the sites in accordance with typical permit conditions for this type of wetland creation which require a five year period for monitoring plantings, assurance of an 80% survival ratio and the hand maintenance of the new plantings with the removal of unwanted exotic species. The Port will maintain the proposed wetland creation sites with annual removal of exotics by hand. To further add to the diversity of the site the planted side slopes will include a variety of the native plant species. The creation area will also be supplemented with white and black mangrove seeds to increase community diversity. The UMAM score has been lowered to an 8.

c. *Scrap Down Area C/D:*

Location and Landscape – Set the current condition to zero (0) rather than 6 and lower "with" value from 7 to a 6 for reasons similar to comments on Area A. Half of the surrounding landscape is industrial and half is the discharge canal. It is not directly connected to a wetland buffer or tidal creek.

Broward County May 28, 2009 **Response: UMAM scores have been adjusted to 0 for current conditions and the "with" value has been lowered 6.**

Water Environment – Lower 9 to a 6 for reasons similar to comments on Area A. In this case, though, there is NO open connection to the canal or other open water due to the riprap boundary.

Broward County May 28, 2009 Response: UMAM score has been adjusted to a 6.

Community Structure – Lower the 9 to a 7 or 8, for reasons similar to comments on Area A. Also, there simply may not be enough room in Area C/D for full development of ideal vegetative community.

Broward County May 28, 2009 Response: UMAM score has been adjusted to an 8.

d. *Risk Factor*

The estimated time to maturation of the proposed site is 10 to 15 years. However, the Port will want the Department to accept the enhancement efforts as trending towards success within one to three years of construction, and execute the easement swap at that time. That would be a full decade before maturation. For this reason mainly, a risk value of 1.25 is considered too low. The actual value will depend on the monitoring and success plan that is ultimately proposed, but can be expected to be closer to 2.0. The Port should outline their proposed monitoring plan, including success criteria and contingency plan. A risk factor of 1.5 may allow us to consider the proposal as offsetting the functions of the turning notch. However, if the plan cannot provide assurances that would lower the risk factor below 2.0, the Department would probably not support an easement swap based on the adjusted values outlined above.

Broward County May 28, 2009 Response: We believe that assigning a risk factor of 2.0 is excessively high for a tidal wetland with a documented and predictable hydrology. The hydrology has been modeled and shown to be appropriate for the type of system proposed. Once graded, the final elevation of the mangrove habitat should preclude the establishment of all but the desired plant species due to the nature of the tidal hydrology at the created site. While the side slopes to be planted might be vulnerable to colonization by invasive exotics, the Port will commit to a hand maintenance schedule for these areas for the duration of the permit. Also note that the construction of these sites will remove existing invasive exotics in the immediate vicinity. While it may be true that the site may take as much as 10-15 years to reach full maturity, the site will produce many valuable ecological functions shortly after construction. It has been observed by the Port that in areas planted within the influence of the heated effluent of the FPL discharge canal, growth rates have increased when compared to other planting areas for which the Port has been responsible. In light of this information, the Port has adjusted the Risk factor up to 1.5. The attached monitoring plan includes the success criteria and contingency plan requested by the FDEP (see plan in Appendix RAI-1-B May 28, 2009 letter as an attachment).

e. Acreages

It appears that the areas credited as mangrove creation may include the areas where riprap is to be placed. Please remove the acreage associated with riprap from the UMAM calculations.

Broward County May 28, 2009 Response: The riprap slopes have been removed between the planned mangrove areas and the uplands and acreages have also been revised. The new acreage totals are 10.18 for Scrape Down Area A, 3.33 acres for Scrape Down Area B, and 1.85 acres for Scrape Down Areas C & D.

FDEP Item 8

FDEP COMMENT: The Port has qualitatively stated that the portion of the existing conservation easement that will not be directly altered by the proposed swap will benefit from the enhancement activity. Of greater use to the Port and the Department would be a UMAM assessment that considers the ecological benefits to the remaining 48-acre parcel from the existing mangrove wetland (for which the CE release is being requested) versus the benefits to from the proposed mangrove creation/enhancement area. This would be considered in a manner similar to the UMAM scores developed under Item 7 above. The Department does not expect, and the Port does not suggest, any significant effect of the proposal on the John U. Lloyd State Park.

Broward County May 28, 2009 Response: We are currently working with our Consultant on a scope of work to complete a UMAM assessment for this parcel to account for improvements that may result from the new enhancement areas.

Broward County Supplemental Response: As recommended by FDEP, a revised UMAM Assessment was completed for the portion of the existing CE that would remain after the proposed swap (see Appendix RAI-1-E-Revised UMAM Assessment Forms-September 18, 2009). Based on a telephone conversation between Benjamin Brice (CH2M HILL) and Steven Macleod (FDEP), on July 17, 2009, the UMAM was structured with the "current condition" scores reflecting the 'remaining CE' as influenced by the 'released CE' and the "with" or proposed conditions scores reflecting the 'remaining CE' as influenced be the wetland creation at sites A through D. Because the scoring was based on the effects to 'remaining CE' and not the loss of the 'released CE' or the wetland creation specifically, only the benefits provided to the 'remaining CE' will be scored in this evaluation. Please note that the existing 48.3 acre CE is comprised of the 8.68 acre 'released CE' and 39.8 acre 'remaining CE' (Figure 1).

The Location and Landscape Support (LLS) for the "current condition" was scored as an 8. The score of 8 took into account the current proximity of the FP&L canal, the ICW, and the direct connectivity between the 'remaining CE' and the 'released CE'. The LLS score for the 'remaining CE' with the wetland creation was scored as an 8. This took in account the current proximity of the FP&L canal, the ICW, and the increased direct connection between the proposed wetland creation and the 'remaining CE'.

The Water Environment (WE) score for the "current condition" was scored as a 7. This score was based on the limited flushing provided by the dead end canal within the 'released CE'. Other factors contributing to the WE score include the current turbid state of the water within the canal and the fact that the tidal prism for the 'released CE' is limited due to the side cast berm blocking flow to the western portion of the site (approximately 3.4 acres). The "with" or proposed WE score for the 'remaining CE' with the wetland creation was scored at 8. This score was based on the increased

flushing that the tidal channels directly adjacent to the existing CE will provide to the 'remaining CE' and the additional tidal prism that the 10 acre wetland creation site (site A) will provide. Downstream benefits of the detrital output will also be increased over the 'released CE' in the future, time lag was used to account for this future benefit.

The Community Structure (CS) score for the 'remaining CE' with the 'released CE' was scored at an 8. The 'released CE' provides habitat support to the 'remaining CE' in the form of roosting, nesting, and foraging habitat. For fish and manatees, these habitat functions are limited in the dead end channel because of the side cast berm which limits connectivity. The landward edges of the site and the berm contain scattered invasive exotics. The CS score for the 'remaining CE' with the wetland creation was scored as an 8. The wetland creation areas will provide habitat support for the 'remaining CE' in the form of roosting, nesting and foraging for fish and wildlife species. With the wetland creation there will be more acres of wetland habitat available to provide support for the 'remaining CE' than with the 'released CE', both in the form of tidal channels and mangrove habitat. In addition to habitat creation, there will also be improvements in the CS score by the complete removal of exotic invasive species in the conversion of 1.65 acres to wetland habitat (sites A through D).

As with the previous UMAM analysis for the wetland creation at sites A through D, a time lag of 1.46 was used; which translates to 11-15 years. It should be noted that while the time lag is appropriate for the mangroves to reach the maturity level present in the 'released CE', it does not reflect the immediate increase in flushing from the tidal channels and increase tidal prism upon completion of the wetland creation. Additionally, while under normal growing conditions mangroves might take the estimated 11-15 years to reach maturity, the constantly maintained temperature within the FPL canal has shown anecdotally to result in accelerated growth patterns for the mangrove plantings previously planted along the FPL canal.

To maintain continuity with the other portions of the UMAM analysis a risk factor of 1.5 was used. The wetland creation will have simple and predictable hydrology, finished grades will be specified to within 0.10 foot for construction, in addition to as-built survey approval from the Port before planting to ensure proper elevations and reduced risk.

In summary, the LLS scores were 8 for current conditions and 8 for proposed conditions, the WE scores were 7 for current conditions and 8 for proposed conditions, and the CS scores were 8 and 8 for current conditions and proposed, respectively. The above scores generated a Delta of 0.03. When the Delta was divided by the product of time lag [1.46] and a risk [1.5] the Relative Functional Gain (RFG) equaled 0.01. When RFG was multiplied by the acreage of the 'remaining CE' [39.8] the Total Functional Gain (TFG) of the 'remaining CE' calculated to 0.40 units. When added to the TFG created by Site A through D this brings the TFG to 5.64 units and the Total Functional Loss for the project is 5.38 units. This represents a net gain of

0.26 units (Table 1), an increase from the net gain of .02 units shown in our May 28, 2009 submittal

FL	RFG	Acres	Total
CE to Remain	0.01	39.80	0.40
Site A	0.37	9.75	3.56
Site B	0.33	3.33	1.12
Sites C&D	0.30	1.85	0.56
Total Funtional Gain			5.64

CE to be released	FL		Total
P5	-0.21		-0.21
P6	-0.49		-0.49
P7	-1.78		-1.78
P8	-0.02		-0.02
P9	-1.99		-1.99
P10	-0.89		-0.89
Total Functional Loss			-5.38

Table 1 UMAM score summary

FDEP Item 9

FDEP COMMENT: Transfer of ownership of the existing or proposed easement area from the County to the State would clearly increase the chances of the Department's favorable response to the requested partial release of the CE, and may ultimately be critical to making the swap acceptable to the Department. On a related note, please confirm whether or not the "manatee nursery" to the north of Area B and the discharge canal adjacent to all proposed easement parcels are still offered for inclusion in the conservation easement (See Figure 1.1 in Section 3 of the Technical Study).

Broward County May 28, 2009 Response: The manatee nursery and discharge canal are not currently included in the number of acres in our response above. As I (Phil Allen, Port Director) noted in my letter dated February 3, 2009 (see Appendix RAI-1-H), any decision on transfer of ownership of any County-owned property must be made by the Broward County Board of County Commissioners. The Port is willing to discuss this matter with FDEP and bring the department's suggestion to my Board for further consideration.

Broward County Supplemental Response: The port remains open to discuss this matter with FDEP, and to bring any suggestions to the Broward County Board of County Commissioners for consideration.

FDEP Item 10

FDEP COMMENT: No comment regarding the long-term plans

Broward County May 28, 2009 Response: The Department's comment has been noted.

APPENDIX RAI-1-A

FDEP
Response Letter, March 13, 2009

Florida Department of Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

Jeff Kottkamp
Lt. Governor

Michael W. Sole
Secretary

Mr. Philip C. Allen, Port Director
Broward County
Port Everglades Department
1850 Eller Drive
Fort Lauderdale, FL 33316

RE: **Review of Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands**

Dear Mr. Allen:

On February 10, 2009, the Department of Environmental Protection received the *Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands*. This study provides many of the details about the proposal to create and restore mangrove habitat to the north and west of the existing Conservation Easement (CE) and preserve these areas through a CE in exchange for releasing 8.7 acres of the existing CE (the Proposal). The document was distributed internally for review, and was also sent to the Florida Fish and Wildlife Conservation Commission (FWC) for comment. This letter reflects observations made by the Department and the comments from FWC are provided as an attachment to this letter. Staff from the NOAA National Marine Fisheries Service also provided limited comments that are incorporated into this letter.

In summary, the Department is encouraged by the Proposal but cannot yet determine whether or not the Proposal will clearly be of greater benefit than the portion of the existing CE that would be released in order to expand the Turning Notch. Much of this depends on the risk factor assigned to the proposed enhancement, which is in turn linked to details that still need to be provided. These details include:

- A more specific planting scheme, potentially incorporating side-slopes;
- Possible improvements to the proposed stormwater treatment plan;
- Fate/treatment of the stormwater run-off from the paved container yard located west of the existing CE and south of the proposed Site A (mangrove creation site);
- Results of sediment/pore water analysis; and,
- Monitoring and success criteria.

Attached to this letter are comments from FWC. Many of their concerns are similar to the Department's, but the FWC has taken a more definitive stance that the proposed mangrove habitat creation and enhancement is NOT sufficient to warrant release of the portion of the conservation easement that currently exists for the 8.7-acre mangrove wetland directly west of the turning notch. The Department is seriously considering the FWC comments, but has the authority to execute the swap if the Department does not ultimately concur with the Commission's opinion.

On page ES-1 of the report, it states: "*In an effort to accomplish this task, the Port initiated consultation with the Florida Department of Environmental Protection (FDEP) to assess the feasibility of the project from a regulatory perspective.*" We would like to clarify that the basis of our review, and any decision to conceptually approve the Proposal would be a proprietary one, regarding only the release of a portion of the CE. The regulatory review of your plan to expand the Turning Notch by excavating a mangrove wetland, and the mitigation that would be required to do so, has not been a part of these discussions (though clearly the ultimate purpose of the requested CE release).

Listed below are the Department's responses to the Port's comments on the original ten (10) points of information outlined in the May 2008 letter from the Department (Ms. Janet Llewellyn) to the Port (Mr. Phil Allen), attached for reference.

1) The Department does not see any significant deficiencies in the sediment and pore water sampling plan. The replicate sampling at two depths is "to visually inspect the soil characteristics for the purpose of assessing the soil for beneficial use in construction." With this goal in mind, the number of samples presented seems reasonable. The different depth samples are composited and replicates per subsection are further composited to yield a single subsection sample for analyte testing. It does not seem excessive to test a total of 18 subsection samples for approximately 8.7 acres.

   Listed below are a few specific questions and comments on the CH2M Hill Scope of Services (First Amendment) for the technical study.
   - **Item II. B. 1.** The 7th paragraph mentions that soil samples will be composited in the field. The Department's SOP for sediment sample collection, FS-3000, indicates that compositing of a sediment sample has to be done in the laboratory and not in the field.
   - **Item II. B. 3.** Note that many of these samples (soils and sediments) may exceed the Rule 62-777, F.A.C., threshold for arsenic because it can occur naturally at these levels. The Port can use the normalized metal approach to help assess whether the soils or sediments are unnaturally elevated.

See the web site below for additional information on the normalization approach.
www.dep.state.fl.us/water/monitoring/docs/seds/estuarine.pdf

- **Items II. B 4. and 5.** What is meant by the statement "No QC samples will be collected for analysis?" Does this mean that multiple samples will not be collected in the field as verification in case spurious results are obtained? In certified laboratories, QC samples are created for every batch of samples using duplicates from a single submitted sample.

2) The Department offers the following comments on the Hydrodynamic Modeling Analysis:

In support of the Proposal, the applicant conducted water velocity study in the project area such as the FPL Canal and the ICW, and a numerical modeling study for the water flushing analysis. The Department has determined that the field work method for water velocity survey is adequate and the numerical model of RMA-2 and RMA-4 used for this project hydrographic character and water quality assessment is acceptable. The applicant ran the hydrodynamic model for the existing and proposed geometry cases respectively, and found that the water flushing time is less than that of four days criteria. In other words, the proposed project is not expected to alter flushing of the system to the point that it would adversely affect water quality.

Note that instead of applying actual tidal data from a tidal station record, the applicant set a repeating fashion tide with approximately 2.5 feet range and 12.2 hour period for the model water flow boundary condition to run the numerical model. This is normally not adequate. Normally, one must run a numerical model through a calibration process with field data such as water flow velocity and water surface level, etc., and adjust the input parameters sufficiently to produce an accurate output. Otherwise, one could not expect to run the model with different boundary conditions and expect to get correct assessments. However, according to this numerical model validation test with field data collected over a 20 day period starting August 6, 2008, this numerical model simulation results seem to be acceptable.

As such, the Department agrees with the consultant's assessment that is based on the hydrodynamic and water quality models, and the engineering support for construction within the tidal creeks and canals.

3) The stormwater drainage study appears limited to the area north of Access Road. However, the study does not consider the paved container area labeled "Berth 34" in Figure 2.1 (see Section 4 of the report). This area borders approximately 1500 linear feet of the conservation easement, so understanding how the container yard is connected to (or isolated from) the proposed CE is critical to potential impact and overall water quality estimates. What drainage analysis is available for this area? What treatment is in place, and are any treatment improvements proposed?

   The Department has the following comments on the drainage analysis that was presented for the 29.9 paved upland area, including the proposed bridge and parking area:

   - The design of the E-W ditch and location adjacent to the proposed wetland creation area(s) will result in seepage of poor water quality (runoff from predominantly impervious areas) into the proposed wetlands. As such, the proposed E-W ditch will secondarily impact the created wetland(s) and should be factored in the UMAM analysis.
   - Measures should be proposed to remove oil and grease from stormwater runoff to the E-W ditch.
   - The report indicates that one (1) inch of stormwater will be treated by the proposed ditch. According to the Basis of Review for Environmental Resource Permit applications within the South Florida Water Management District (Section 5.2), treatment for 2 ½ inches of stormwater should be provided for the impervious commercial/industrial upland area, with the first ½ -inch being in the form of dry pretreatment.

   Is it possible to design a better treatment train for the runoff water, perhaps sufficient to capture the first two (2) inches of run-off? The Department's stormwater engineers may have additional input, but were not able to supply comment by the given deadline.

4) No comment – the Port declines to alter their bridge plans.

5) The Port is willing to adjust the new parking area to a limited degree, but wishes to maintain access to floating docks. They do not propose to improved the connectivity between the proposed northwest and southwest parcels based on their estimates of costs and benefits. The Department supports moving the proposed parking west of the design location, which is currently near the bridge, to a location along the existing north-south roadway (SE 18th Ave). This change would allow the planting of more mangrove area closer to the FP&L canal.

6) The proposed site plan has some inconsistencies:
    a. Section 1, Sheet A9 describes vegetation to be used for the planting of side-slopes. CH2M Hill confirmed that all side-slopes will be lined with rip-rap and that the side-slope planting scheme was inserted erroneously. While this should be removed, the Bureau would also like to know why planted side-slopes are not being proposed (instead of riprap revetments and steel sheet pilings) at either the interface between the proposed mangrove area and port upland or between the proposed mangrove area and the canal. It may also be advantageous to plant red mangroves between the mean high water (MHW) and mean low water (MLW) elevations.
    b. Several of the cross-section call-outs on the plan views (e.g., A2) point the opposite direction as what is shown in the profile views (e.g., A6).
    c. The plan view of Site A shows (on Sheets A2 and A3) the transect lines for Cross-Sections A and B, both of which cross three (3) flushing channels on the plan view. However, Cross-Sections A and B are shown (on Sheet A6) to cross five (5) flushing channels each.
    d. The specific type or types of mangrove to be planted need to be identified.

7) CH2M Hill uses the UMAM that was performed by Coastal Systems International for the existing mangrove wetland that is being considered for release from the CE as the basis for the ecological value of that area. However, a different basis of evaluation seems to be used for the proposed mangrove creation locations. UMAM is designed such that it does not matter if a reviewer assigns numbers that are higher or lower than another reviewer for the same site as long as the same value system is applied to all sites under consideration. It appears that CH2M Hill assigns values that are universally higher for the proposed mangrove creation sites than CSI did for the existing mangrove wetland, which has similar characteristics.

   While the Department generally recommends that the UMAM values for the proposed system be lowered, staff also suggests that the score given to the "existing conditions" for Location and Landscape (L&L) can be set to zero (0) at the proposed easement site, which effectively increases the value of the enhancement activities. This is in line with the CSI assessment that reduced L&L scores to zero (0) after the turning notch mangroves are excavated. The concept is that L&L describes the interaction between the habitat being assessed and the surrounding area. If the habitat does not exist, then there is no interaction.

Pending the response to other questions and suggestions outlined in this letter, the Department recommends consideration of the following detailed adjustments to the worksheets for the proposed sites based on the UMAM scores for the existing site (i.e., the turning notch):

a. Scrape Down Area A:
Location and Landscape – Set the current condition to zero (0) rather than 6 and lower the "with" value from 8 to 6. The proposed area is still surrounded on three sides by paved upland industrial area and riprap. The value might be elevated if the adjacent slopes were vegetated with appropriate native plants for stability rather than rip rap.

Water Environment - Lower the "with" value from 9 to 7. The flushing of Area A will be improved versus the turning notch, but the condition description should recognize the compromised quality of the AIWW water and influence of runoff from the adjacent paved lots, consistent with the CSI assessment for the turning notch. The Port needs to verify whether or not any of the paved container lot south of Area A will drain into the created wetlands. Even though the first inch of run-off would be treated from the FTC/WTZ area west of the proposed easement, this still means that pollutants are still being introduced into the system via the canal for rainfall greater than one inch, and seepage through the canal walls into the wetland can occur. Increasing treatment to the first 2.5 inches for all contributing areas, as recommended in the Department's response to the Port's drainage analysis, may warrant an increase in the final value. Finally, we know nothing about the contaminant levels in the soil, though it may be assumed that the soil contaminants will have to be remediated to acceptable levels prior to approval of wetland construction.

Community Structure – Lower the 9 to a 7 or 8 pending the Port's commitment to an aggressive exotic removal and long-term maintenance plan and/or a relatively diverse mangrove planting scheme.

b. Scrape Down Area B:
Location and Landscape – Set the current condition to zero (0) rather than 6 and lower "with" value from 8 to a 6 for reasons similar to comments on Area A. The surrounding landscape is not quite as industrial as for Area A, but Area B is not directly connected to a larger wetland buffer.

Water Environment – Lower 9 to a 7 for reasons similar to comments on Area A. Area B may not be subject to run-off like Area A, but the residence time is significantly longer (13 hours in Area B vs. 2 to 5 hours in Area A).

Community Structure – Lower the 9 to a 7 or 8, for reasons similar to comments on Area A

c. Scrap Down Area C/D:
Location and Landscape – Set the current condition to zero (0) rather than 6 and lower "with" value from 7 to a 6 for reasons similar to comments on Area A. Half of the surrounding landscape is industrial and half is the discharge canal. It is not directly connected to a wetland buffer or tidal creek.

Water Environment – Lower 9 to a 6 for reasons similar to comments on Area A. In this case, though, there is NO open connection to the canal or other open water due to the rip rap boundary.

Community Structure – Lower the 9 to a 7 or 8, for reasons similar to comments on Area A. Also, there simply may not be enough room in Area C/D for full development of ideal vegetative community.

d. Risk Factor
The estimated time to maturation of the proposed site is 10 to 15 years. However, the Port will want the Department to accept the enhancement efforts as trending towards success within one to three years of construction, and execute the easement swap at that time. That would be a full decade before maturation. For this reason mainly, a risk value of 1.25 is considered too low. The actual value will depend on the monitoring and success plan that is ultimately proposed, but can be expected to be closer to 2.0. The Port should outline their proposed monitoring plan, including success criteria and contingency plan. A risk factor of 1.5 may allow us to consider the proposal as offsetting the functions of the turning notch. However, if the plan cannot provide assurances that would lower the risk factor below 2.0, the Department would probably not support an easement swap based on the adjusted values outlined above.

e. Acreages
It appears that the areas credited as mangrove creation may include the areas where riprap is to be placed. Please remove the acreage associated with riprap from the UMAM calculations.

8) The Port has qualitatively stated that the portion of the existing conservation easement that will not be directly altered by the proposed swap will benefit from the enhancement activity. Of greater use to the Port and the Department would be a UMAM assessment that considers the ecological benefits to the remaining 48-acre parcel from the existing mangrove wetland (for which the CE release is being requested) versus the benefits to from the proposed mangrove creation/enhancement area. This would be considered in a manner similar to the UMAM scores developed under Item 7 above. The Department does not expect, and the Port does not suggest, any significant effect of the proposal on the John U. Lloyd State Park.

9) Transfer of ownership of the existing or proposed easement area from the County to the State would clearly increase the chances of the Department's favorable response to the requested partial release of the CE, and may ultimately be critical to making the swap acceptable to the Department. On a related note, please confirm whether or not the "manatee nursery" to the north of Area B and the discharge canal adjacent to all proposed easement parcels are still offered for inclusion in the conservation easement (See Figure 1.1 in Section 3 of the Technical Study).

10) No comment regarding the long-term plans

If you have questions or comments on the items above, please feel free to contact me at the letterhead address (add Mail Station 300), by phone at 850-414-7806 or by e-mail at steven.macleod@dep.state.fl.us.

Sincerely,

Steven MacLeod, Environmental Manager
Bureau of Beaches and Coastal Systems

Attachments: FWC Technical Study Review (March 4, 2009)
DEP Letter on Study Proposal (May 13, 2008)
CH2M Hill Scope of Services – First Amendment

CC (via e-mail):

Allan D. Sosnow, Broward County
Linda Shelley, Fowler White Boggs
Michael Sole, DEP, Secretary
Mary Ann Poole, FWC, OPSC
Lisa Gregg, FWC, MFMS
Steve Ross, USACE, Jacksonville
Bob Ballard, DEP, Deputy Secretary
Janet G. Llewellyn, DEP, WRM Director
Chantal Collier, DEP, CAMA
Mark Latch, DEP, DRP
Jennifer Smith, DEP, SE District
Chris Stahl, DEP, OIP
Michael Barnett, DEP, BBCS
Martin Seeling, DEP, BBCS

APPENDIX RAI-1-B

Broward County Port Everglades Department Response Letter, May 28, 2009

PORT EVERGLADES DEPARTMENT - Port Director's Office
1850 Eller Drive - Fort Lauderdale, Florida 33316
954-523-3404 FAX 954-523-8713

May 28, 2009

Mr. Steven MacLeod
Environmental Manager
Florida Department of Environmental Protection
Bureau of Beaches and Coastal Systems
3900 Commonwealth Boulevard, Mail Station 300
Tallahassee, Florida 32399-300

RE: FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMENTS ON "PORT EVERGLADES FEASIBILITY AND TECHNICAL STUDY FOR THE CREATION OF MANGROVE WETLANDS"

Dear Mr. MacLeod:

Thank you for your letter dated March 13, 2009 and we appreciate the Department's thorough review of the above referenced study. Working with our Consultant, we have prepared responses to the most of the Department's comments which we believe satisfactorily addresses them **(see ATTACHMENT I)**. For those comments that require field work, we have engaged our Consultant with additional work tasks. It is anticipated that it will take up to 3 months from the issuance of a notice to proceed to complete these tasks which were not part of the original scope of work (SOW). Once these tasks are complete we will respond via separate correspondence. We are also proceeding with the soil sampling and analysis that was part of the original SOW with our Consultant. Once this effort is complete, we will provide you with results of this analysis.

As always, Port Everglades remains committed to resolve any outstanding issues or concerns the Department may have in order to facilitate the release of the existing 8.7 acres of the conservation easement that would be affected by the westward expansion of the Southport Turning Notch.

I look forward to receiving any additional feedback that you may have. Please feel free to contact me if you have any questions or need any additional information.

Sincerely,

Phillip C. Allen
Port Director

Attachments (4)

cc: Mike Sole, FDEP, Secretary
Bob Ballard, FDEP, Deputy Secretary
Janet Llewellyn, FDEP, DWRM
Michael Barnett, FDEP, BBCS
Martin Seeling, FDEP, BBCS
Allan D. Sosnow, Broward County
Linda Shelley, Fowler White Boggs
Mary Poole, OPSC

ATTACHMENT I

RESPONSES TO FDEP COMMENTS ON THE PORT EVERGLADES FEASIBILITY AND TECHNICAL STUDY FOR THE CREATION OF MANGROVE WETLANDS

FDEP Comment No. 1) Item II. B. 1.

Our response to the Department's SOP for the compositing of sediment samples is as follows:

The soil/sediment sample aliquots to form the composite samples will not be mixed in the field. Rather, they will be placed in a single sample container with instructions to the lab to mix the sample as a composite sample prior to extraction and analysis. The exception to this will be for the VOC analysis. Regarding VOC sample collection, each individual soil sample from each boring location will be screened using an OVM. The sample with the highest OVM reading within a given sub-area will be submitted to the lab for analysis. If none of the samples within a given sub-area have a measurable OVM reading, the sample with the highest potential for contamination based on field observations (staining or other discoloration, or noticeable odor) will be selected for analysis.

FDEP Comment No. 1) Item II. B. 3.

Our response to the Department's suggestion that the Port utilize the normalized metal approach to help assess whether the soils or sediments are unnaturally elevated is as follows:

We concur with the Department's suggestion.

FDEP Comment No. 1) Items II. B4. and 5.

Our response to the Department's comments as to what is meant by the statement "No QC samples will be collected for analysis?" is as follows:

The statement "No QC samples will be collected for analysis" means that no field duplicate samples, matrix spike/matrix spike duplicate samples, or equipment blank samples will be collected in the field for lab analysis. This is because this sampling effort is designed strictly for screening purposes. If the sample results indicate potential contamination, then additional confirmatory sampling will be performed to identify specific source areas within a given sub-area. Once source areas are identified, then additional confirmatory sampling will be performed to delineate the source area contamination which would include the collection of field QC samples.

FDEP Comment No. 2)

Our response to the Department's comment on the Hydrodynamic modeling is as follows:

The Department's comment has been noted.

ATTACHMENT I

RESPONSES TO FDEP COMMENTS ON THE PORT EVERGLADES FEASIBILITY AND TECHNICAL STUDY FOR THE CREATION OF MANGROVE WETLANDS

FDEP Comment No. 3)

Our response to the Departments comments regarding the proposed drainage analysis for the 29.9 paved upland areas, including the bridge and parking area specific to the design of the E-W ditch and location adjacent to the proposed wetland creation area resulting in seepage of poor water quality, and measures proposed to remove oil and grease from stormwater runoff to the E-W ditch are as follows:

Drawdown analysis is required to quantitatively determine the radius of influence caused by stormwater runoff flowing or seeping from the E-W Ditch to the proposed wetlands. We believe impacts associated with the seepage is expected to be minimal, however, we will perform additional testing to confirm. We are currently working with our Consultant on the scope of work related to the drawdown analysis.

An oil/grit separator (a.k.a. oil/water separator) will be installed to remove trash, debris, sediment, oil and grease from stormwater runoff discharging from upland drainage areas to the E-W Ditch. This device will be put in place at the time of project commencement in the upstream area of the project.

FDEP Comment No. 6) a.

Our response to the Department's comments on the proposed site plan related to the side slopes is as follows:

The attached drawings (see Sheets A6 and A7) have been revised to indicate the inclusion of the side slope planting. Please note the riprap at the FPL canal interface is for underwater erosion protection. The wetland plantings will consist of Red mangroves (*Rhizophora mangle*), Smooth cordgrass (*Spartina alterniflora*), and Black and White mangroves seeding. Please see the attached revised exhibits (Sheets A6, A7 and A9) for design changes and planting details.

FDEP Comment No. 6) b.

Our response to the Department's comments on the proposed site plan related to the cross-section call-outs is as follows:

The corrected cross section drawings are attached (see Sheets A2 and A6).

FDEP Comment No. 6) c.

Our response to the Department's comments on the proposed site plan related to the transect lines cross-section A and B is as follows:

The corrected cross section drawings are attached (see Sheets A2, A3 and A6).

ATTACHMENT I

RESPONSES TO FDEP COMMENTS ON THE PORT EVERGLADES FEASIBILITY AND TECHNICAL STUDY FOR THE CREATION OF MANGROVE WETLANDS

FDEP Comment No. 6) d.

Our response to the Department's comments on the specific types of mangroves to be planted is as follows:

The planting notes have been updated to reflect planting of Red mangroves (see Sheet A9). As mangrove communities develop, there is a succession of mangroves species that takes place throughout the sites. White mangroves serve as the primary successor with black mangroves following. Red mangroves establish and become the climax community for the site. While the planting plan calls for the planting of one gallon Red mangroves, to add in the establishment of the site and to increase the diversity, the planting plan now incorporates the scattering of white and black mangrove seeds throughout the mangrove habitat.

Scrape Down Area A

FDEP Comment No. 7)

Our response to the Department's comments on the UMAM evaluation values for the existing mangrove wetland and the proposed mangrove wetland is as follows:

UMAM scores have been adjusted as per FDEP recommendations (see attached revised UMAM).

Please note that the proposed area was scored higher since it is expected to have a much better flushing capacity than the Conservation Easement to be released and therefore an increased detrital output with increased downstream benefits. Additionally, the proposed areas will offer more acreage for fish and wildlife usage through the open tidal channels created within sites A and B.

Scrape Down Area A

FDEP Comment No. 7) a. Location and Landscape

Our response to the Department's comments on Location and Landscape for Scrape Down Area A is as follows:

Please note that the side slopes have been revised to include native plantings instead of riprap. Additionally, the mangrove habitat creation sites will be seeded with white and black mangrove seeds to increase diversity throughout the sites. As a result of this change, the UMAM value has been kept at 8.

Scrape Down Area A

FDEP Comment No. 7) a. Water Environment

Our response to the Department's comments on Water Environment for Scrape Down Area A is as follows:

The adjacent paved lots to the south of Area A currently have treatment in place and will not discharge into the created wetlands. On the north side of Area A any seepage associated with

ATTACHMENT I

RESPONSES TO FDEP COMMENTS ON THE PORT EVERGLADES FEASIBILITY AND TECHNICAL STUDY FOR THE CREATION OF MANGROVE WETLANDS

the E-W treatment ditch is expected to be minimal. The treatment ditch is designed with a 10 foot crest and 3 to 1 slope approaching the created wetland. Seepage from the ditch would have to travel approximately 30 feet horizontally to reach the created wetlands. Also note that this water is treated and that the "seepage" through the soil medium would further treat any water prior to entering the mitigation area. Due to these reasons we feel a UMAM score of an 8 would be more appropriate than a 7. We are currently working with our Consultant on the scope of work related to the drawdown analysis.

Scrape Down Area A

FDEP Comment No. 7) a. Community Structure

Our response to the Department's comments on Community Structure for Scrape Down Area A is as follows:

The Port will maintain the sites in accordance with typical permit conditions for this type of wetland creation which require a five year monitoring program be established to provide for an 80% survival rate of the mangroves planted. The Port will maintain the proposed wetland creation sites with annual removal of exotics by hand. To further add to the diversity of the site, the planted side slopes will include a variety of the native plant species. The creation area will also be supplemented with white and black mangrove seeds to increase community diversity. The UMAM score has been lowered to an 8.

Scrape Down Area B

FDEP Comment No. 7) b. Location and Landscape

Our response to the Department's comments on Location and Landscape for Scrape Down Area B is as follows:

Please note that the side slopes have been revised to include native plantings instead of riprap. As a result, the Location and Landscape UMAM score has been lowered to a 7 and current conditions changed to 0.

Scrape Down Area B

FDEP Comment No. 7) b. Water Environment

Our response to the Department's comments on Water Environment for Scrape Down Area B is as follows:

The UMAM score has been lowered to a 7.

Scrape Down Area B

FDEP Comment No. 7) b. Community Structure

Our response to the Department's comments on Community Structure for Scrape Down Area B is as follows:

The Port will maintain the sites in accordance with typical permit conditions for this type of wetland creation which require a five year period for monitoring plantings, assurance of an 80% survival ratio and the hand maintenance of the new plantings with the removal of unwanted

ATTACHMENT I

RESPONSES TO FDEP COMMENTS ON THE PORT EVERGLADES FEASIBILITY AND TECHNICAL STUDY FOR THE CREATION OF MANGROVE WETLANDS

exotic species. The Port will maintain the proposed wetland creation sites with annual removal of exotics by hand. To further add to the diversity of the site the planted side slopes will include a variety of the native plant species. The creation area will also be supplemented with white and black mangrove seeds to increase community diversity. The UMAM score has been lowered to an 8.

Scrape Down Area C/D

FDEP Comment No. 7) c. Location and Landscape

Our response to the Department's comments on Location and Landscape for Scrape Down Area C/D is as follows:

UMAM scores have been adjusted to 0 for current conditions and the "with" value has been lowered to 6.

Scrape Down Area C/D

FDEP Comment No. 7) c. Water Environment

Our response to the Department's comments on Water Environment for Scrape Down Area C/D is as follows:

UMAM score has been lowered to a 6.

Scrape Down Area C/D

FDEP Comment No. 7) c. Community Structure

Our response to the Department's comments on Community Structure for Scrape Down Area C/D is as follows:

UMAM score has been lowered to an 8.

FDEP Comment No. 7) d.

Our response to the Department's comments on risk factor as well as our proposed monitoring plan is as follows:

We believe that assigning a risk factor of 2.0 is excessively high for a tidal wetland with a documented and predictable hydrology. The hydrology has been modeled and shown to be appropriate for the type of system proposed. Once graded, the final elevation of the mangrove habitat should preclude the establishment of all but the desired plant species due to the nature of the tidal hydrology at the created site. While the side slopes to be planted might be vulnerable to colonization by invasive exotics, the Port will commit to a hand maintenance schedule for these areas for the duration of the permit. Also note that the construction of these sites will remove existing invasive exotics in the immediate vicinity.

ATTACHMENT I

RESPONSES TO FDEP COMMENTS ON THE PORT EVERGLADES FEASIBILITY AND TECHNICAL STUDY FOR THE CREATION OF MANGROVE WETLANDS

While it may be true that the site may take as much as 10-15 years to reach full maturity, the site will produce many valuable ecological functions shortly after construction. It has been observed by the Port that in areas planted within the influence of the heated effluent of the FPL discharge canal, growth rates have increased when compared to other planting areas for which the Port has been responsible for. In light of this information, the Port has adjusted the Risk factor up to 1.5. The attached monitoring plan includes the success criteria and contingency plan the Department requested **(see ATTACHMENT II)**.

FDEP Comment No. 7) e.

Our response to the Department's comments on acreages is as follows:

The riprap slopes have been removed between the planned mangrove areas and the uplands and acreages have also been revised. The new acreage totals are 10.18 for Scrape Down Area A, 3.33 acres for Scrape Down Area B, and 1.85 acres for Scrape Down Areas C & D.

FDEP Comment No. 8)

Our response to the Department's comments regarding a UMAM assessment that considers the ecological benefits of the remaining 48 acre parcel from the existing wetland (for which the CE release is being requested) versus the benefits to the proposed mangrove creation/enhancement is as follows:

We are currently working with our Consultant on a scope of work to complete a UMAM assessment for this parcel to account for improvements that may result from the new enhancement areas.

FDEP Comment No. 9)

Our response to the Department's comments regarding the inclusion of the manatee nursing and discharge canal and potential transfer of ownership of the existing or proposed easement area from the County to the State is as follows:

The manatee nursery and discharge canal are not currently included in the number of acres in our response above. As I noted in my letter dated February 3, 2009, any decision on transfer of ownership of any County-owned property must be made by the Broward County Board of County Commissioners. The Port is willing to discuss this matter with FDEP and bring the Department's suggestion to my Board for further consideration.

ATTACHMENT II

PORT EVERGLADES CONSTRUCTED WETLANDS MONITORING PLAN

Project Description:

Port Everglades is proposing an expansion of the existing turning notch into 8.7 acres of the conservation easement (CE). As a result of this expansion Port Everglades would like this encroached portion of the CE to be released. In exchange for this expansion the Port is proposing approximately 15.4 acres of mangrove wetland creation within uplands adjacent to the turning notch. The project will consist of the construction of 4 sites of tidal mangrove habitat. Work to be conducted will include demolishing and removing existing structures, the removal of invasive exotics and re-grading to appropriate wetland elevations. All sites will be planted with red mangroves and seeded with both white and black mangroves.

Monitoring to be conducted:

Mitigation monitoring will be conducted and reports prepared semi-annually for the first year and annually thereafter for a total of five years. The monitoring reports will include: permanent photo stations; percent cover by planted species; plant species composition with estimates of the contribution of each species to percent cover; observations of hydrologic regime; descriptions of pertinent climatological conditions; description of soil moisture; description of the maintenance that was required in support of the exotic vegetation eradication effort; descriptions of any problems encountered and solutions undertaken; and any other information or observations that pertain to negative environmental effects.

Transect and sample plots:

To establish the percent cover per species and species composition, a series of five 300 foot transects will be established. The transects will be established across the created/restored wetlands and will be permanently marked with pvc pipes to identify the monitoring areas of the study areas. The transects will be monitored using the line intercept methodology. At 3-foot intervals along the transect, the species present or bare ground will be recorded. This data will then used to calculate the percent cover in the wetlands. In addition to the transects, the overall mitigation area will be evaluated for health, exotic species occurrence and survivability of planted vegetation.

Fixed Photo Stations:

At commencement of the planting, fixed photo stations will be established and marked along each transect with PVC pipes. Panoramic photo stations will be located at the beginning of each transect in the created wetlands, and at fixed representative locations throughout the enhanced upland and wetland habitats.

Wildlife Observation:

Wildlife utilization will be recorded during the monitoring event. During the vegetative monitoring, signs of wildlife usage including direct observation, tracks, nests, trails, rooting areas, scat, and vocalizations will be documented.

ATTACHMENT II

PORT EVERGLADES CONSTRUCTED WETLANDS MONITORING PLAN

Success Criteria:

The mitigation shall be deemed successful when the following criteria have been continuously met for a period of at least one (1) year, without intervention in the form of irrigation, removal of undesirable vegetation, or replanting of desirable vegetation:

a. Planted species have achieved a minimum 80% coverage within the designated planting areas.

b. Total contribution to percent cover in wetlands by non-native wetland species and species not listed in 62-340.450, FAC shall be maintained below 10%. Total contribution to percent cover in uplands by non-native species shall be maintained below 10%.

Contingency Plan:

If all success criteria are not met by the end of the third year after completion of planting, or during the established monitoring period thereafter, the Port shall submit a formal remediation plan within 60 days to the DEP Bureau of Beaches and Coastal Systems, for review and approval. The plan shall discuss any additional mitigation proposed to offset the additional time lag anticipated prior to success (i.e., beyond 3 years), and an extension to the monitoring period.

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down A**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
191 (undeveloped land)	**N/A**	**mitigation**	**10.18**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Site is adjacent to the existing FPL hot water discharge, ICW is located to the east, 48 ac Conservation Easement is located to the east. No hydrological connection

Assessment area description

Site is currently undeveloped upland. Site contains Australian pines and Brazilian pepper. Site borders the 48 ac. conservation easement.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
FPL discharge canal abuts a portion of the site. The ICW is located to east and a 48 ac conservation easement is located directly east of the site.	**Not Unique**

Functions	Mitigation for previous permit/other historic use
None	**Not mitigation**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

Site is currently undeveloped upland with 10-20 coverage in exotic species.

Assessment conducted by:	Assessment date(s):
CH2M HILL	8/4/2008

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down A**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Mitigation	CH2M HILL	8/4/2008

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 0.00 — with: 8.00	**Current Conditions:** Site is located within Port Everglades. Site is adjacent to 48 ac conservation easement and FPL hot water discharge canal. **Proposed Conditions:** Site will be directly connected to the conservation easement. Surrounding areas will have exotic vegetation will be removed. The side slopes at the site will be planted with native vegeation. In addition to the red mangrove planting, the site will be seeded with both black and white mangrove seeds.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 0.00 — with: 8.00	**Current Conditions**: Site is currently upland with no hydrological connection **Proposed conditions:** The site will receive hydrological impute through a series of canals and tidal pools which will be hydrological connected through the FPL discharge canal and the site will connect through one of the existing canals within the conservation easement.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 0.00 — with: 8.00	**Current Conditions**: Site is partially vegetated by Brazilian Pepper and Australian Pines. **Proposed conditions:** Site will be mangrove habitat with tidal pools and tidal creeks that allow for fish and wildlife usage. The side slopes will be planted with native species. Expected usage will include foraging, roosting, nesting, nursery habitat for juvenile fish species .

Score = sum of above scores/30 (if uplands, divide by 20)
current or w/o pres: 0.00 — with: 0.80

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres =

CH2M HILL
0.80

If mitigation	
Time lag (t-factor) =	1.46
Risk factor =	1.5

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.37

May 28, 2009 Submittal

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down B**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
191 (undeveloped land)	**N/A**	**Mitigation**	**3.33**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Site is adjacent to the existing FPL discharge canal, ICW is located to the east, 48 ac Conservation Easement is located to the south. To the north in the manatee nursery. No hydrological connection

Assessment area description

Site is currently dry marina and open yard storage.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to east, 48 ac conservation easement is located directly east of the site.	**Not Unique**

Functions	Mitigation for previous permit/other historic use
None	**Not mitigation**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
None	**None**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

Site is currently a functioning dry dock marina, and open storage yards. The site is just south of the existing manatee nursery. Site will be hydrologicaly connected to the FPL discharge canal by a tidal channel. The tidal channel will provide habitat for fish and wildlife.

Assessment conducted by:	Assessment date(s):
CH2M HILL	8/4/2008

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down B**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Mitigation	**CH2M HILL**	**8/4/2008**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 0.00 with: 7.00	**Current conditions:** Site is located within Port Everglades. Site is adjacent to 48 ac conservation easement and FPL discharge canal. **Proposed conditions:** 3.54 ac of surrounding areas will have exotic vegetation removed and will be excavated and planted with mangroves and native species on the side slopes.	
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 0.00 with: 7.00	**Current Conditions:** Site is currently upland with no hydrological connection **Proposed conditions:** The site will receive hydrological impute through a tidal channel which will be hydrologicaly connected through the FPL discharge canal.	
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 0.00 with: 8.00	**Current Conditions:** Site is currently a dry dock marina and open storage yard with scattered exotic vegetation. **Proposed conditions:** Site will be mangrove habitat with a tidal creek that allow for fish and wildlife usage. Expected usage will include foraging, roosting, nesting, nursery habitat for juvenile fish species .	

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: 0.00 with: 0.73	Preservation adjustment factor =	FL = delta x acres =
	Adjusted mitigation delta =	

CH2M HILL	If mitigation	For mitigation assessment areas
0.73	Time lag (t-factor) = 1.46 Risk factor = 1.5	RFG = delta/(t-factor x risk) = 0.33

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down C & D**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
191 (undeveloped land)	**N/A**	**Mitigation**	**1.85**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Site is adjacent to the existing FPL hotwater discharge, ICW is located to the east, 48 ac Conservation Easement is located to the South

Assessment area description

Site is currently undeveloped upland slope adjoining Port to the FPL Discharge canal. Site contains Australian pines and Brazilian pepper.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, 48 ac conservation easement is located directly south of the site. FPL discharge canal is adjacent to the site.	**Not Unique**

Functions	Mitigation for previous permit/other historic use
Current functions of the site are limited due to dense exotic growth with limited shoreline interface. Possible usage includes roosting.	**Not mitigation**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

roosting evident.

Additional relevant factors:

Currently the site is densely vegetated with Brazilian Pepper and Australian Pines.

Assessment conducted by:	Assessment date(s):
CH2M HILL	8/4/2008

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		Scrape Down C & D
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	CH2M HILL	8/4/2008

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 0.00	with: 6.00

Current Conditions: Site is located within Port Everglades. Site is adjacent to 48 ac CE and FPL hotwater discharge canal. **Proposed Conditions:** Site will be continuous with adjacent CE and will have no exotic species present in the vicinity.

.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 0.00	with: 6.00

Current Conditions: Site is currently upland with no hydrological connection **Proposed conditions:** The site will receive hydrological impute through rip rap which will line the edge of the created planting shelves.

.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 0.00	with: 8.00

Current Conditions: Site is vegetated by Brazilian Pepper and Australian Pines. **Proposed conditions:** Site will be mangrove habitat with rip rap along the FPL canal edge. Expected usage will include foraging, roosting, nesting, nursery habitat for juvenile fish species .

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres: 0.00	with: 0.67

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres =

CH2M HILL
0.67

If mitigation	
Time lag (t-factor) =	1.46
Risk factor =	1.5

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.30

Form 62-345.900(2), F.A.C. [effective date 02-04-2004]

May 28, 2009 Submittal

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:

(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:

(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable)/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

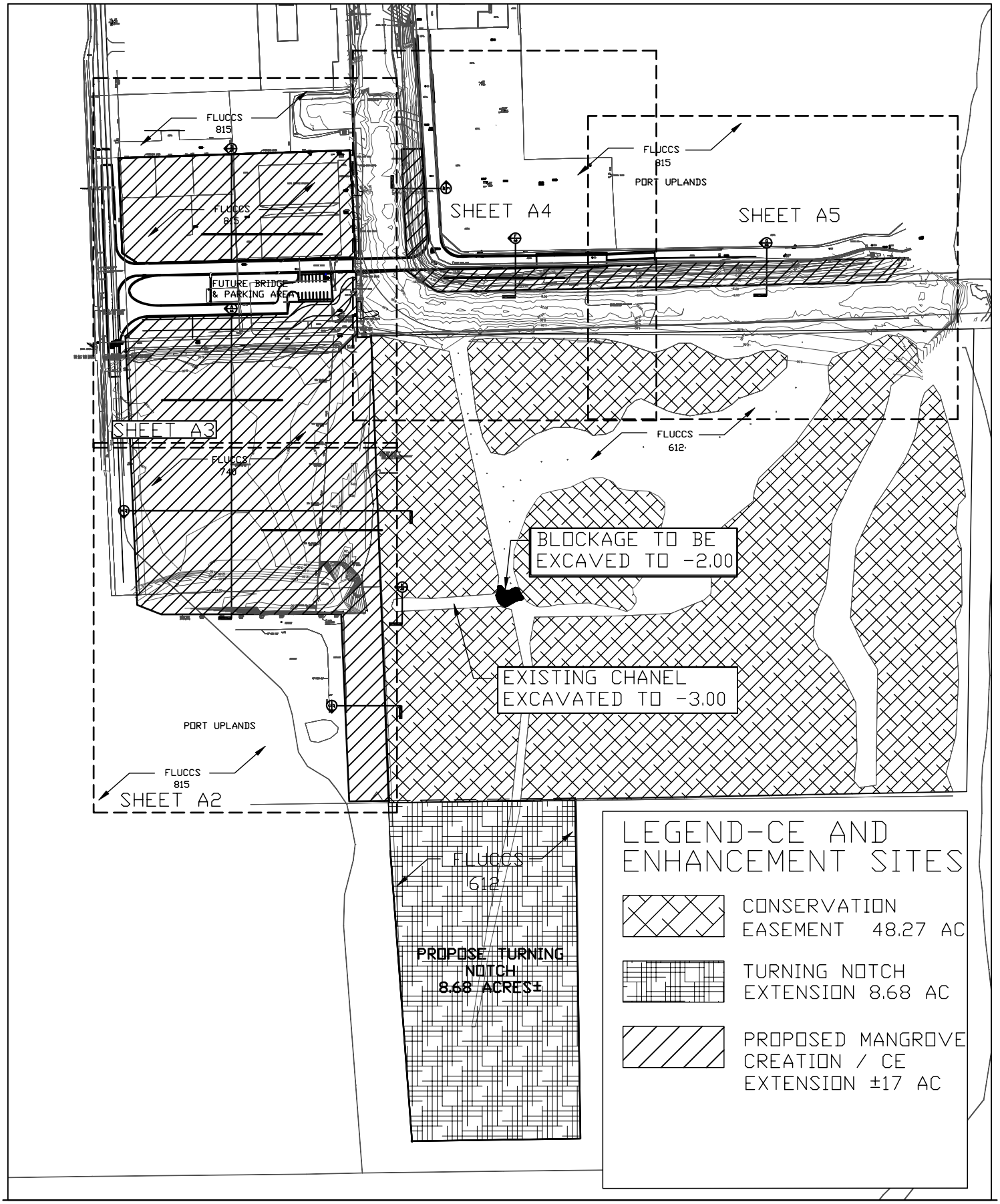
The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assessed in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	RFG	Acres	Total
example				
A		0.37	10.18	3.72
B		0.33	3.33	1.12
C&D		0.30	1.85	0.56
Total Funtional Gain				**5.40**
CE				
P5	-0.21			-0.21
P6	-0.49			-0.49
P7	-1.78			-1.78
P8	-0.02			-0.02
P9	-1.99			-1.99
P10	-0.89			-0.89
Total Functional Loss				**-5.38**



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE:	May 28, 2009

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

SITE PLAN-OVERVIEW

CH2MHILL

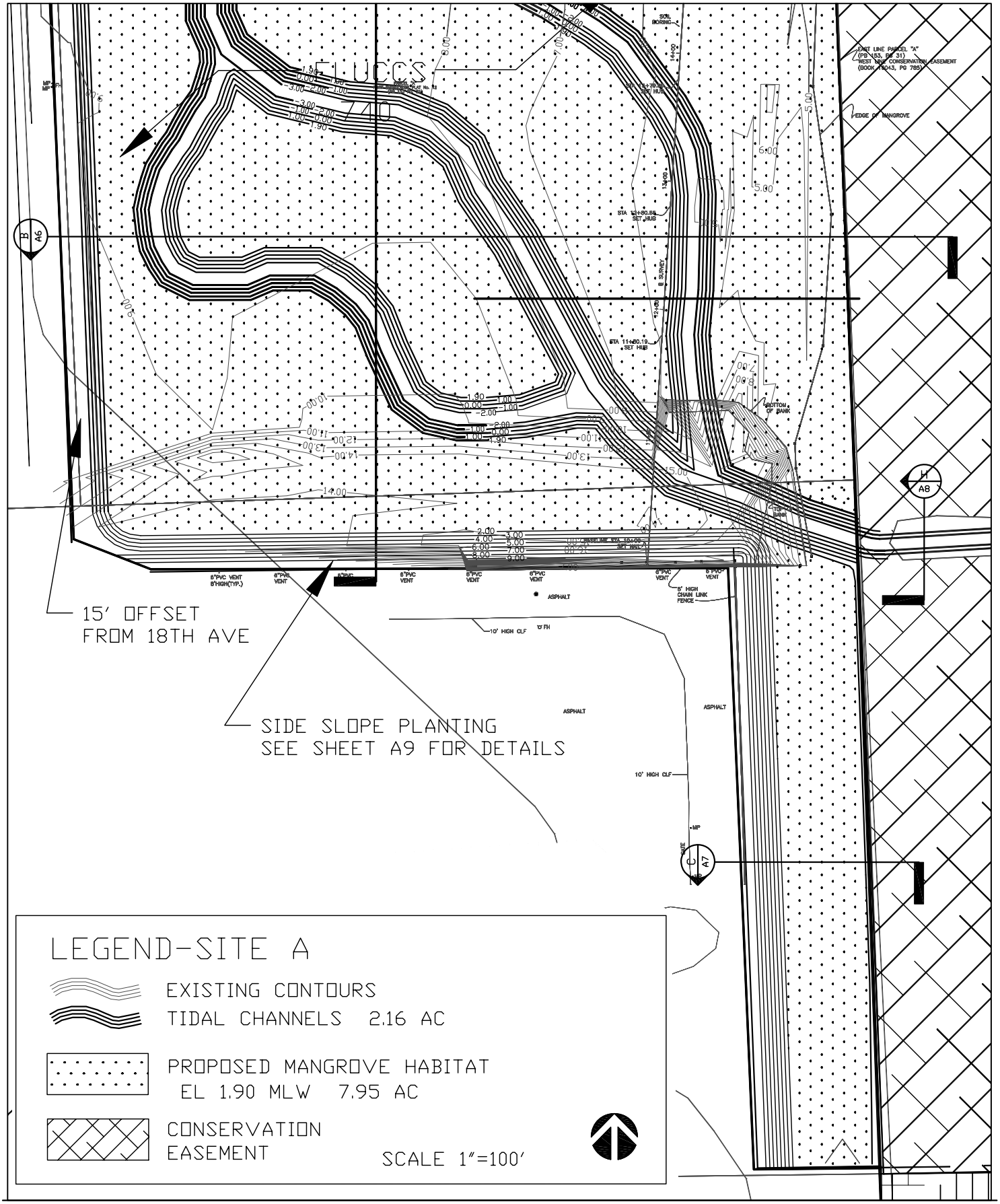
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

CAD FILE CAD FILE

SHEET NUMBER A1

SHEET OF



LEGEND-SITE A

EXISTING CONTOURS

TIDAL CHANNELS 2.16 AC

PROPOSED MANGROVE HABITAT
EL 1.90 MLW 7.95 AC

CONSERVATION EASEMENT

SCALE 1"=100'

PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE:	May 28, 2009

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

SITE A PROPOSED MANGROVE CREATION

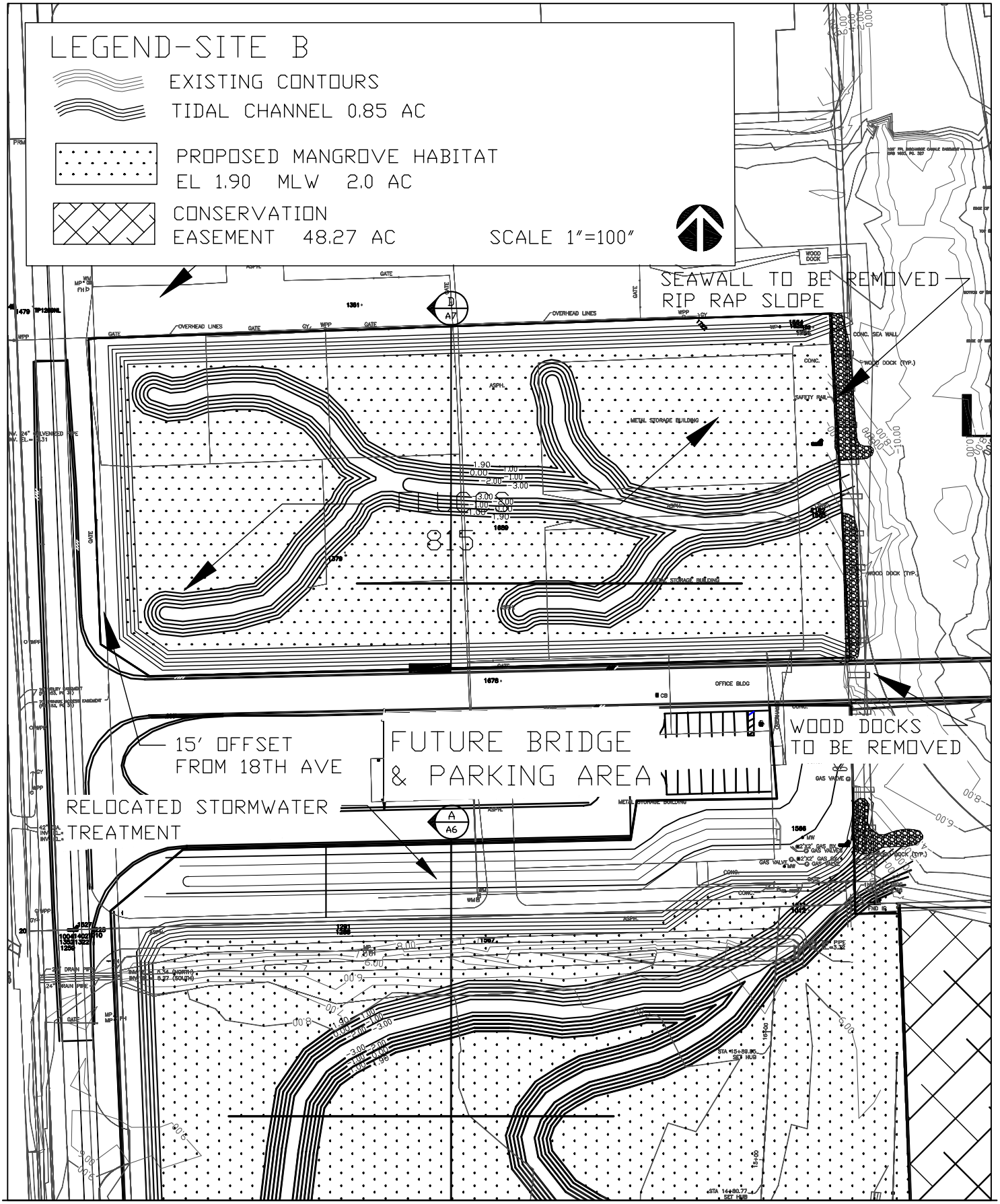
CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

CAD FILE CAD FILE

SHEET NUMBER A2

SHEET OF



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE:	May 28, 2009

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

SITE B PROPOSED MANGROVE CREATION

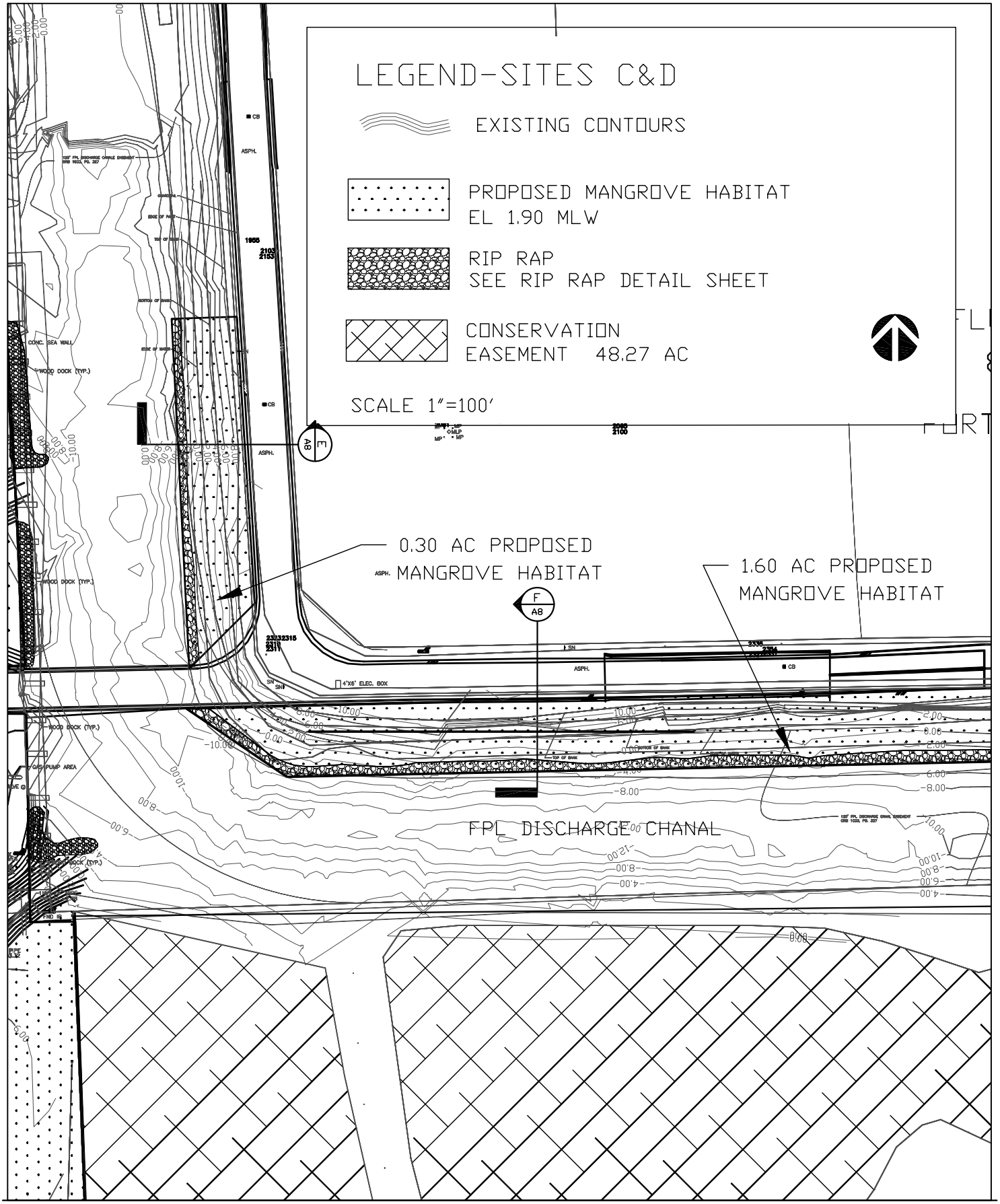
CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

CAD FILE CAD FILE

SHEET NUMBER A3

SHEET OF



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE:	May 28, 2009

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

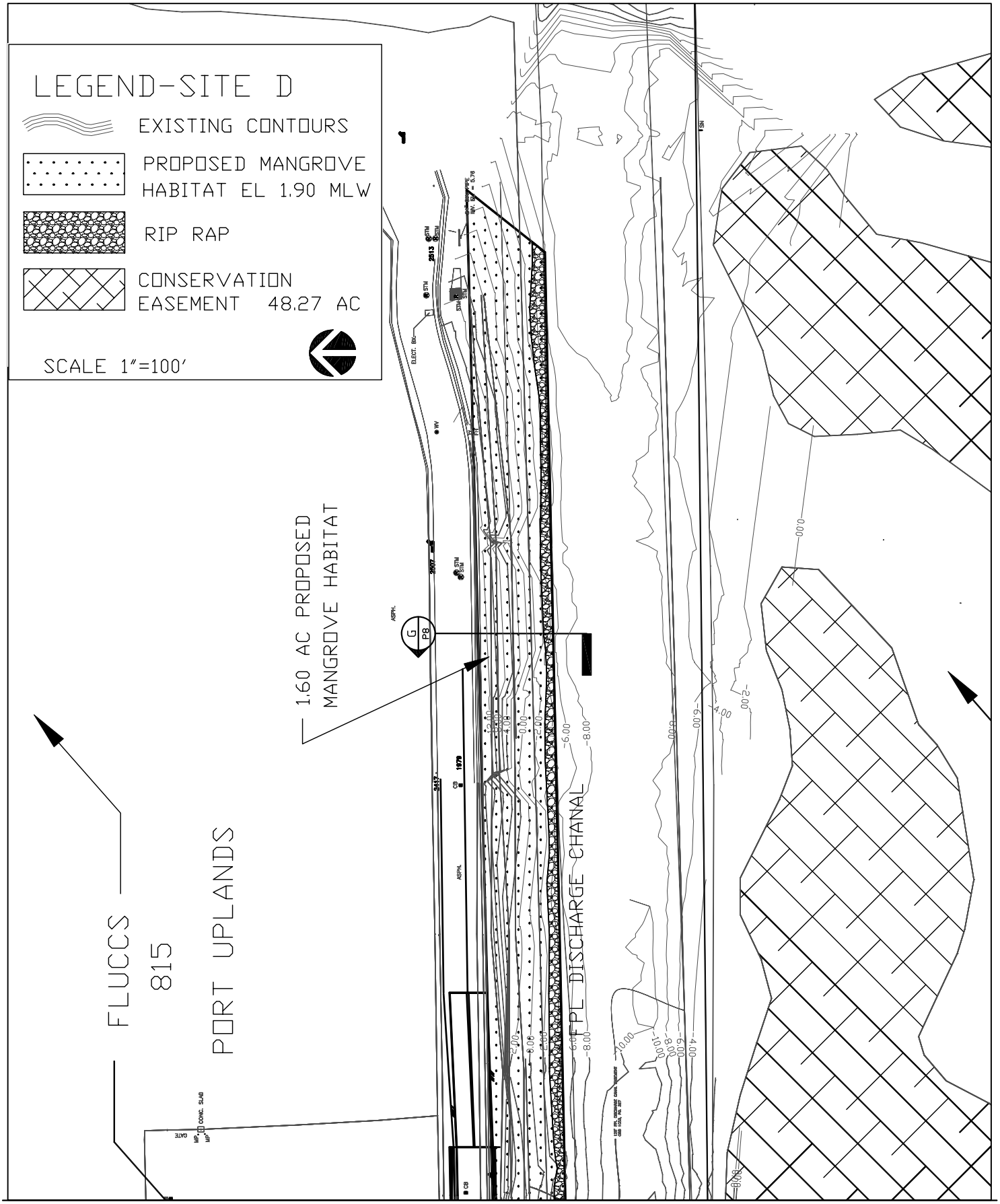
BROWARD COUNTY, FL

SITE C+D PROPOSED MANGROVE CREATION

CH2MHILL

4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No.	172285
CAD FILE	CAD FILE
SHEET NUMBER	A4
SHEET	OF



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE:	May 28, 2009

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

SITE D- PROPOSED MANGROVE CREATION

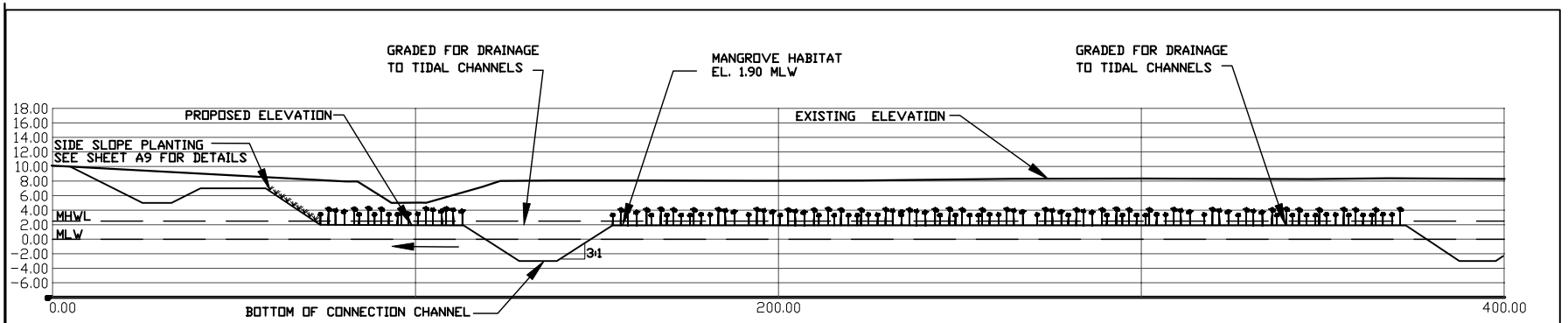
CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

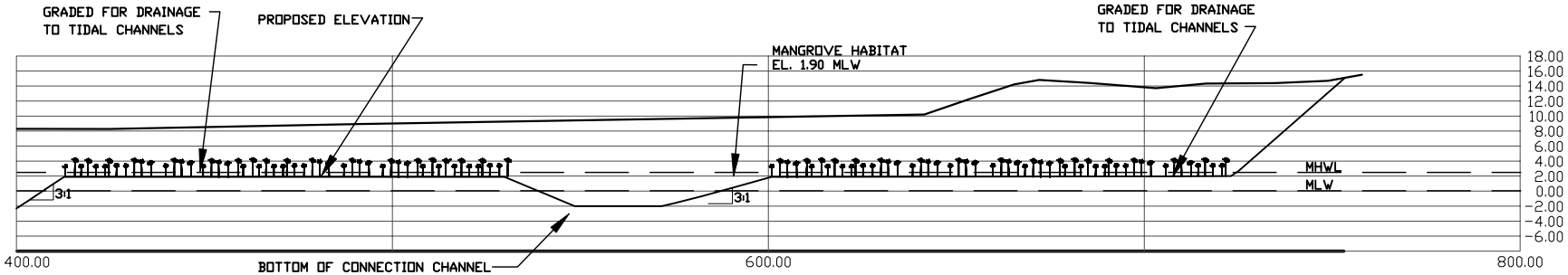
CAD FILE CAD FILE

SHEET NUMBER A5

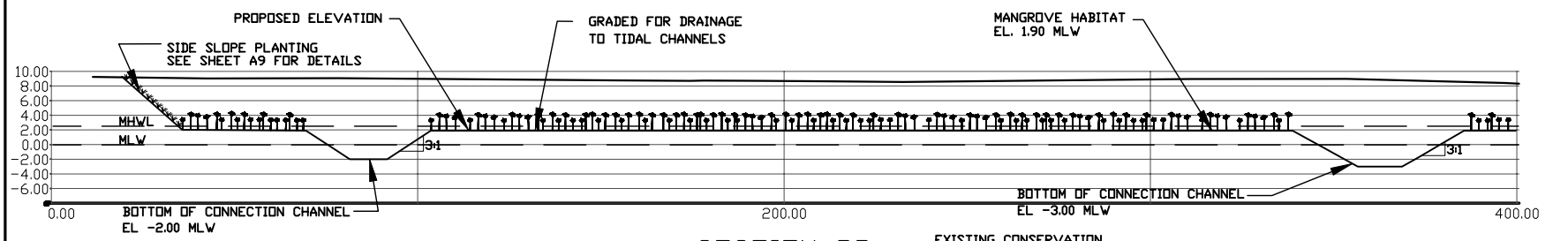
SHEET OF



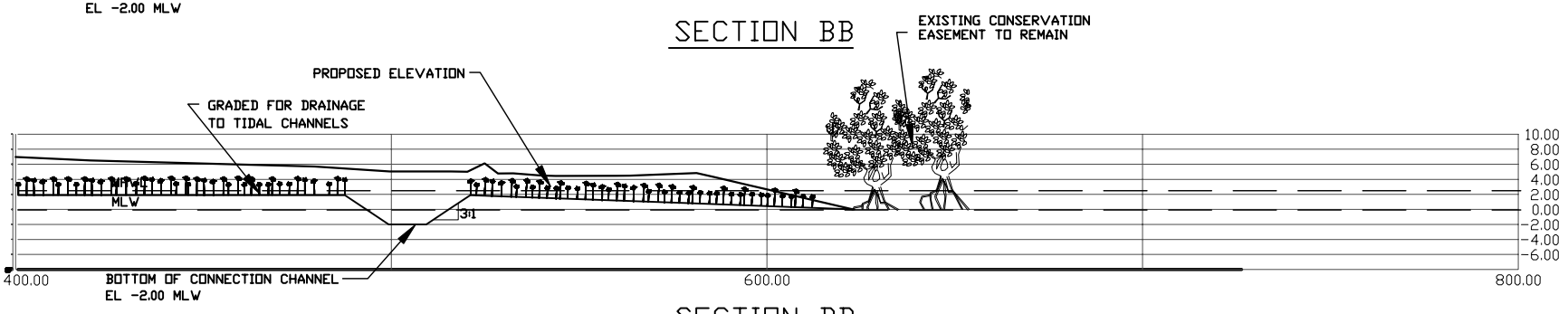
SECTION AA



SECTION AA



SECTION BB



SECTION BB

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

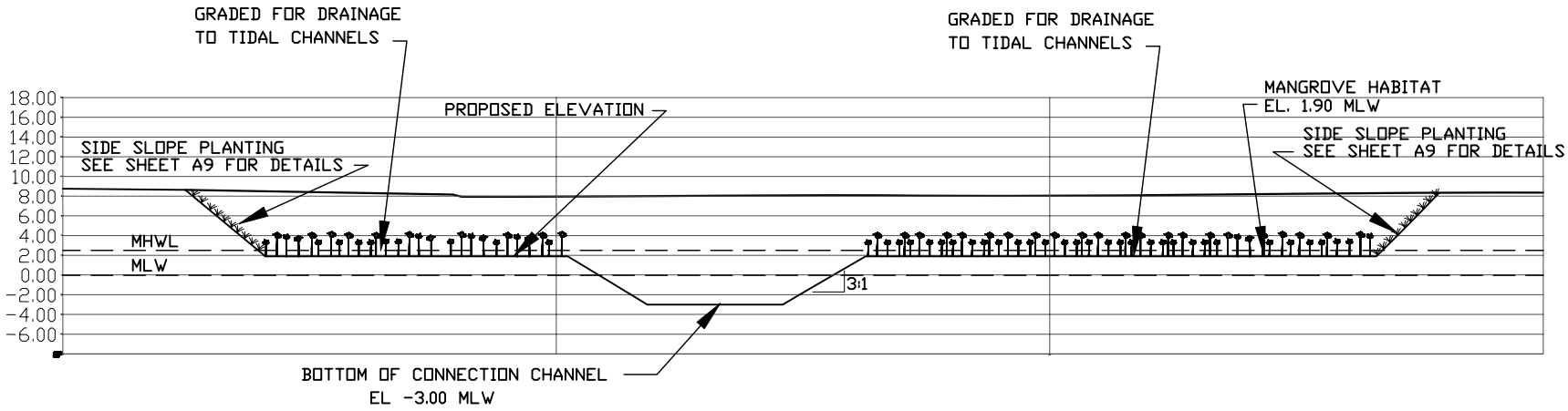
BROWARD COUNTY, FL

SITE A CROSS SECTIONS

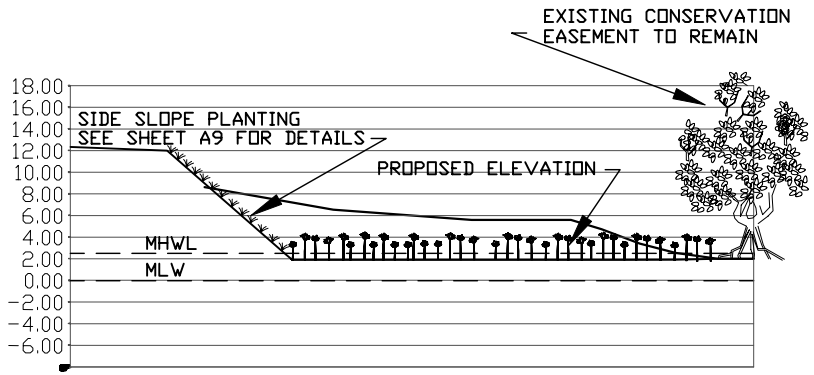
CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

PLOTTED: –
TIME: –
PLOT SCALE: –
DESIGNED: –
DRAWN: –
CHECKED: –
APPROVED: –
DATE: May 28, 2009

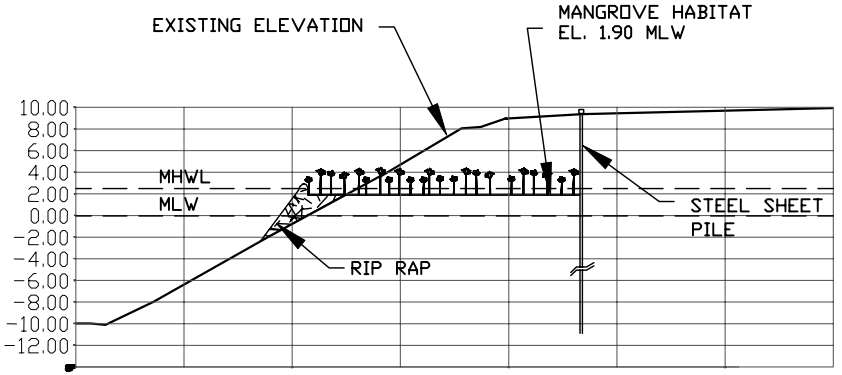
JOB No. 172285
CAD FILE
CAD FILE
SHEET NUMBER A6
SHEET OF



SECTION D



SECTION C



SECTION E

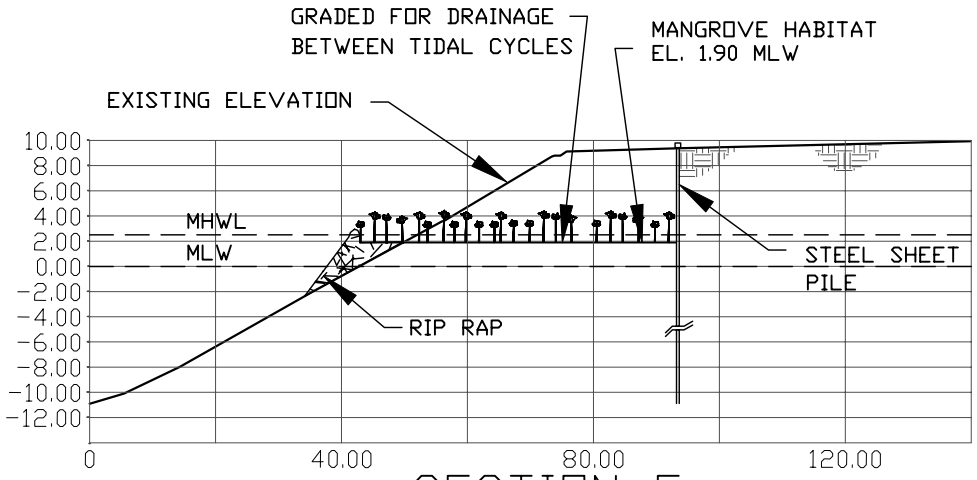
PLOTTED: –
TIME: –
PLOT SCALE: –
DESIGNED: –
DRAWN: –
CHECKED: –
APPROVED: –
DATE: May 28, 2009

PORT EVERGLADES CONSERVATION EASEMENT
PORT EVERGLADES
BROWARD COUNTY, FL

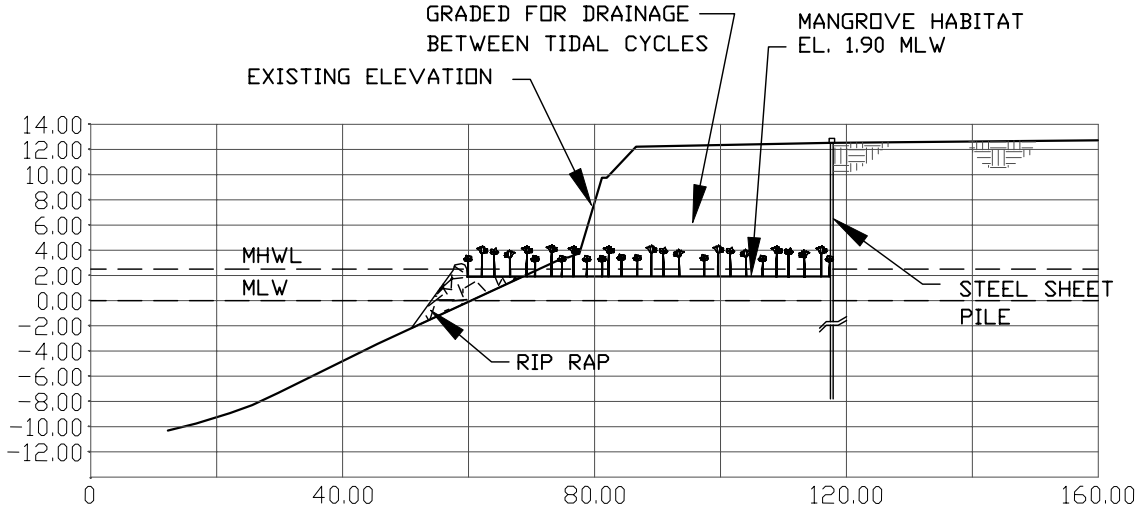
SITE B + C CROSS SECTIONS

CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

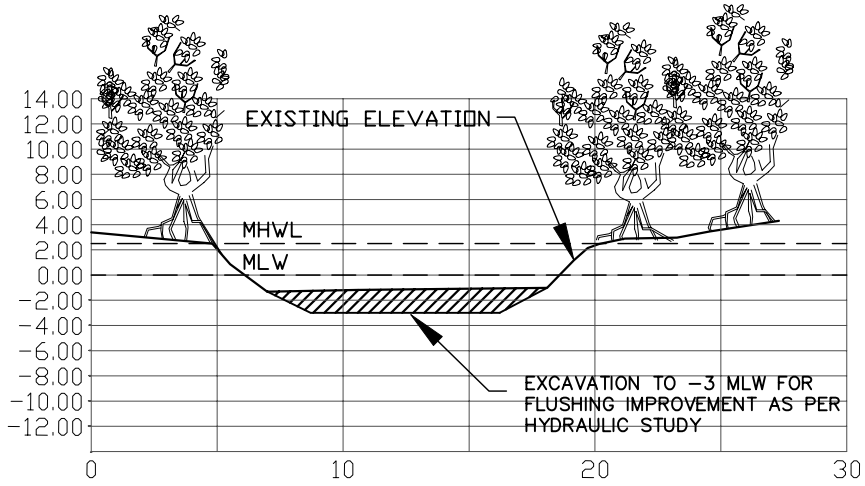
JOB No. 172285
CAD FILE CAD FILE
SHEET NUMBER A7
SHEET OF



SECTION F



SECTION G



SECTION H

PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE:	May 28, 2009

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

SITE D CROSS SECTIONS

CH2MHILL

4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

CAD FILE CAD FILE

SHEET NUMBER A8

SHEET OF

PLANTING NOTES:

RED MANGROVE HABITAT EL 1.90 MLW: THE MANGROVE HABITAT WILL BE GRADED TO WITHIN 0.10 FT OF THE SPECIFIED ELEVATION. RED MANGROVE PLANTINGS WILL BE 1 GALLON TREES, ON 3 FOOT STAGGERED CENTERS. TO HELP STABILIZE THE SUB-STRAIGHT AT TIME OF PLANTING, SPARTINA ALTERNIFLORA PLUGS WILL BE INTERSPERSED (5 FOOT CENTERS) WITH THE MANGROVE SEEDLINGS AND BOTH BLACK AND WHITE MANROVE SEEDS WILL BE SCATTERED THROUGHOUT THE PLANTING AREA.

SIDE SLOPE PLANTINGS WILL CONSIST OF A MIXTURE THE FOLLOWING SPECIES

Baccharis halimifolia- saltbrush	1 Gallon
Borrichia arborescens- sea ox-eye daisy	1 Gallon
Borrichia frutescens- Sea ox-eye daisy	1 Gallon
Canavalia rosea- beach bean	1 Gallon
Distichlis spicata - seashore saltgrass	4" Liner
Ernodea litoralis- golden creeper	1 Gallon
Helianthus debilis- beach sunflower	1 Gallon
Iva imbricata- beach elder	1 Gallon
Paspalum vaginatum-salt jointgrass	4" Liner
Spartina patens- marsh hay cordgrass	4" Liner
Sporobolis virginicus- virginia dropseed	4" Liner
Batis martima- saltwort	4" Liner
Lycium carolinianum- christmas berry	1 Gallon
Scaerola plumieri- inkberry	1 Gallon
Pithecellobium keyensis- black bead	1 Gallon
Spartina spartina- gulf cord grass	4" Liner
Argusia gnaphalodes- sea lavender	1 Gallon
Coccoloba unifora- sea grape	3 Gallon

*1 GALLON ON 5 FT CENTERS
** 4" LINER ON 3FT CENTERS

PLOTTED: –
TIME: –
PLOT SCALE: –
DESIGNED: –
DRAWN: –
CHECKED: –
APPROVED: –
DATE: May 28, 2009

PORT EVERGLADES CONSERVATION EASEMENT
PORT EVERGLADES
BROWARD COUNTY, FL

PLANTING PLAN

CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285
CAD FILE CAD FILE
SHEET NUMBER A9
SHEET OF

APPENDIX RAI-1-C

Supplemental Drainage Report – September 18, 2009

FINAL

Supplemental Drainage Report

Conservation Easement Assessment
Port Everglades
Broward County, FL

Prepared for:

Broward County

Public Works Department
Seaport Engineering & Construction Division
1850 Eller Drive
Ft. Lauderdale, FL 33316-4201

September 18, 2009

CH2MHILL
4350 W. Cypress Street
Suite 600
Tampa, FL 33607

Contents

List of Figures

List of Tables

Attachment

Executive Summary

This document supercedes the FTZ and 18th Street portions of the the Drainage Analysis Report, dated January 2009, and supplements the Drainage Analysis Report, dated January 2009 with information on the SOUTHPORT area. This document includes information requested by the FDEP on March 13, 2009. Specifically, the supplement addresses the following FDEP concerns as follows:

1. Evaluates the stormwater runoff from the Foreign Trade Zone and SOUTHPORT Phase VA & VB, and also assesses the impact to the existing water quality treatment facilities adjacent to the proposed wetland creation area.
2. Water quality treatment volume calculations for the proposed E-W Ditch and N-S Ditch.
3. Drawdown analysis to estimate the radius or zone of influence of E-W Ditch in the vicinity of the proposed wetland creation area at Site A.
4. Provides construction details showing the location of the proposed oil-grit separator.
5. Provides the location of recommended stormwater facilities to meet water quality treatment volume requirements.

The purpose of the project is to swap 8.7 acres of an existing conservation easement for the new 17-acre wetland creation area. The existing conservation easement is proposed to support and facilitate port operations and better navigation at Berth 30.

The existing drainage system is comprised of three (3) separate drainage areas. The areas include Foreign Trade Zone, SE 18th Avenue, and SOUTHPORT.

Stormwater runoff from Foreign Trade Zone and SE 18th Avenue combine to flow via the N-S Ditch to the E-W Ditch. The existing E-W Ditch flows east from SE 18th Avenue to an existing discharge structure and discharges to the FPL Discharge Canal. The existing discharge structure consists of a 24" RCP with a concrete weir at elevation 5.72 feet.

Stormwater runoff from the SOUTHPORT Phase VA & VB flows via closed storm drain system to exfiltration systems and stormwater treatment swale. Excess stormwater runoff from the stormwater treatment swale overflows to the Conservation Easement.

The following drainage improvements are recommended and identified on the Drainage Concept Plan:

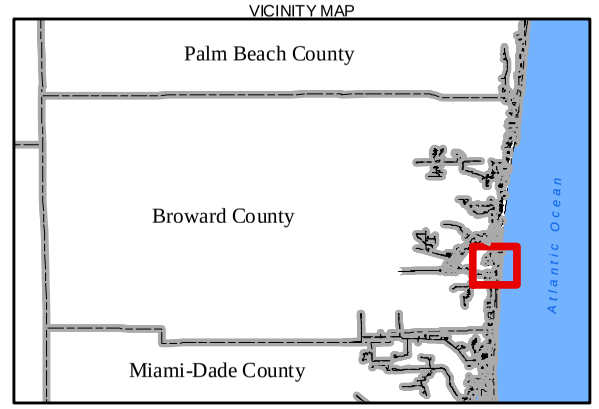
- Relocate and reconstruct E-W Ditch
- Reconstruct the N-S Ditch
- Remove existing discharge structure
- Construct a new discharge structure
- Construct a new oil-grit separator

Reconstruction of the E-W and N-S ditches is recommended to mitigate impacts due to construction of the proposed wetland creation area at Site A.

A drawdown analysis of the E-W Ditch was completed to estimate the radius or zone of influence for the worst-case scenario between the E-W Ditch and Site A Wetland Creation Area.

The worst-case scenario as described is a situation in which the maximum elevation in the E-W Ditch occurs simultaneously with a low and high tide event in the wetland creation area. Results indicate the zone of influence is less than the embankment top width between the E-W Ditch and the Site A Wetland Creation Area.

VICINITY MAP



LEGEND

- Street
- Ditch
- 24" Stormwater Pipe
- Existing Stormwater Treatment Swale
- Direction of Flow
- Proposed Mangove Creation
- Parcel Boundary

N

0 100 200 Feet

FIGURE ES-1
Drainage Concept Plan
Conservation Easement Assessment
Port Everglades
Broward County, Florida

1.0 Introduction

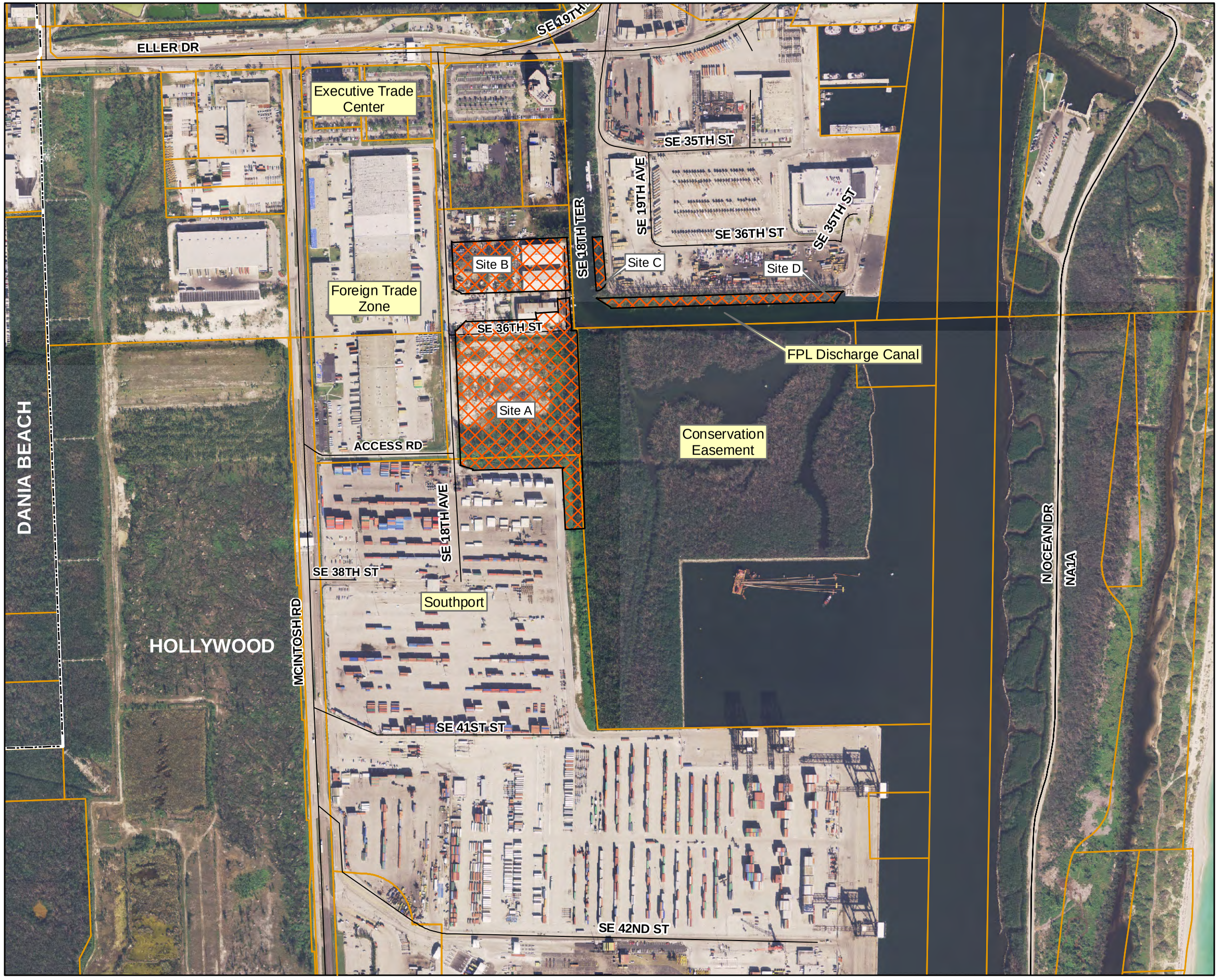
This document supercedes the FTZ and 18th Street portions of the the Drainage Analysis Report, dated January 2009, and supplements the Drainage Analysis Report, dated January 2009 with information on the SOUTHPORT area. This document includes information requested by the FDEP on March 13, 2009. Specifically, the supplement addresses the following FDEP concerns as follows:

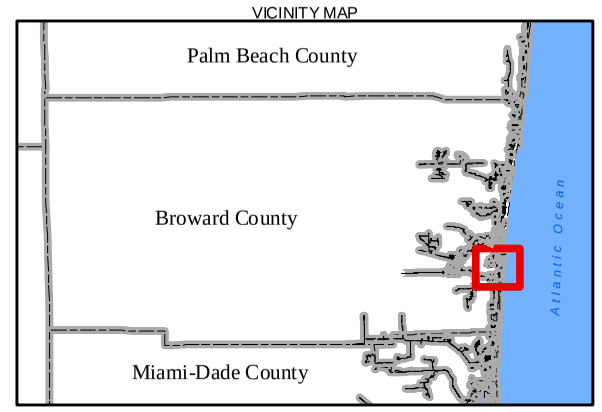
1. Evaluates the stormwater runoff from the Foreign Trade Zone and SOUTHPORT Phase VA & VB, and also assesses the impact to the existing water quality treatment facilities adjacent to the proposed wetland creation area.
2. Water quality treatment volume calculations for the proposed E-W Ditch and N-S Ditch.
3. Drawdown analysis to estimate the radius or zone of influence of E-W Ditch in the vicinity of the proposed wetland creation area at Site A.
4. Provides construction details showing the location of the proposed oil-grit separator.
5. Provides the location of recommended stormwater facilities to meet water quality treatment volume requirements.

The purpose of the project is to swap 8.7 acres of an existing conservation easement for the new 17-acre wetland creation area. The existing conservation easement is proposed to support and facilitate port operations and better navigation at Berth 30.

The proposed wetland creation area is situated on four (4) separate sites encompassing 17 acres of developed and undeveloped land east of SE 18th Avenue. The sites are labeled A, B, C, and D (see Figure 1.1 - Location Map).

The document includes information pertaining to existing and proposed drainage conditions and provides a drainage concept plan for new stormwater management facilities associated with the proposed wetland creation area.





LEGEND

- Street
- Parcel Boundary
- Proposed Mangove Creation

N

0 250 500 Feet

Figure 1.1
Location Map
Conservation Easement Assessment
Port Everglades
Broward County, Florida

2.0 Existing Drainage

The existing drainage system is comprised of three (3) separate drainage areas. The existing drainage areas are summarized in Table 2.1.

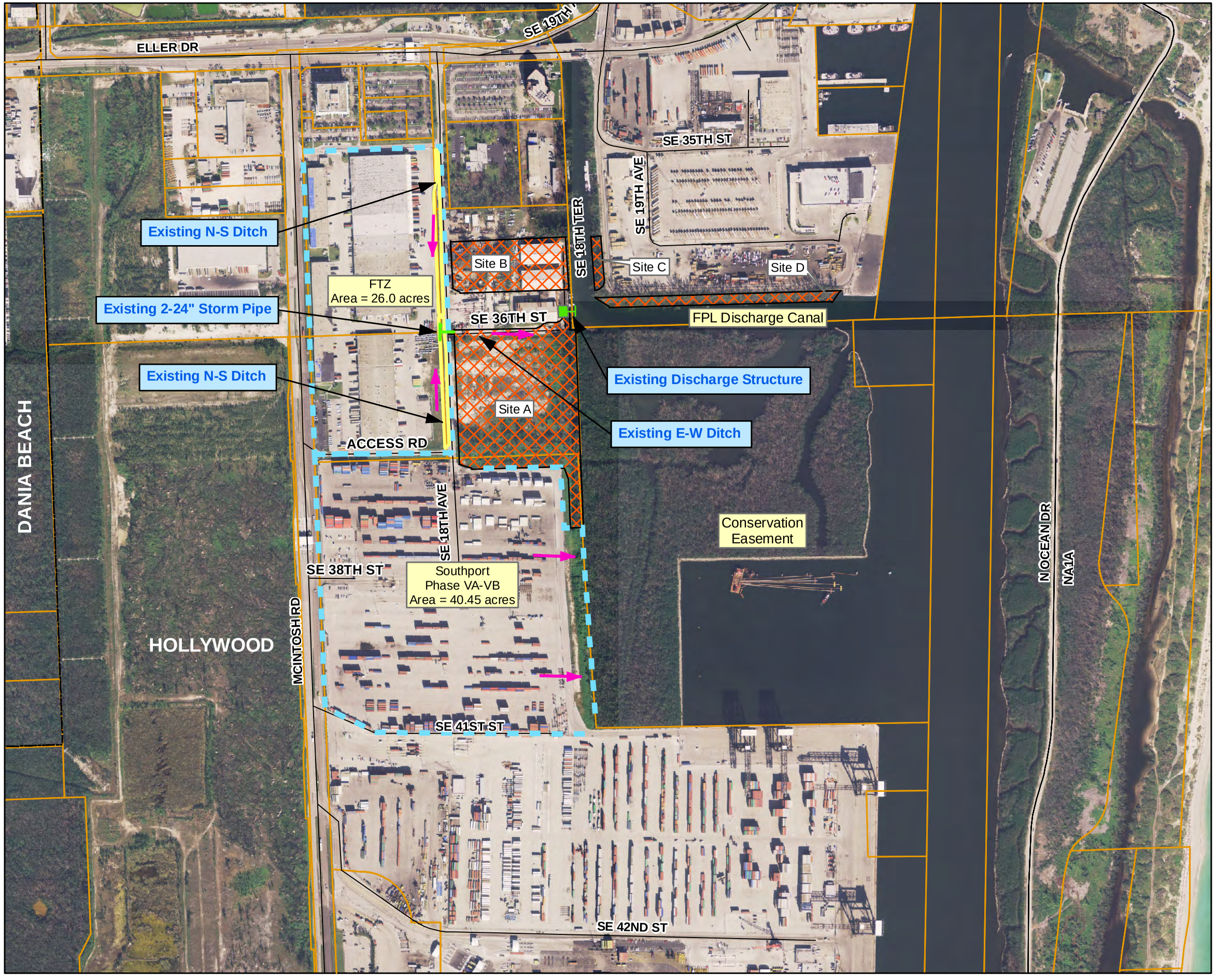
TABLE 2.1
Port Everglades
Conservation Easement Assessment
Existing Drainage Areas

Basin Name	Description	Area (Ac)
FTZ	Foreign Trade Zone	24.40
18th Ave	SE 18th Ave (ROW)	1.62
Subtotal		26.02
SP	SOUTHPORT	40.45
Total		66.47

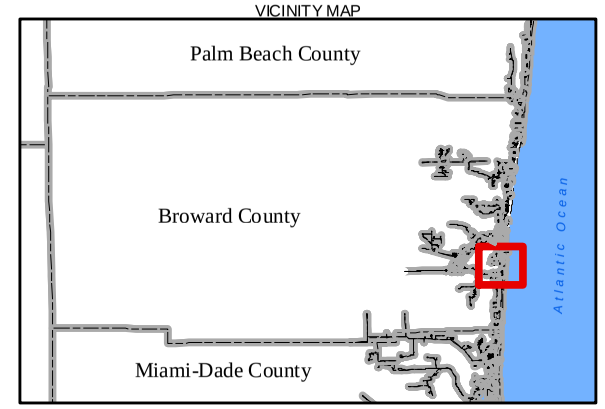
Stormwater runoff from Foreign Trade Zone and SE 18th Avenue combine to flow via the N-S Ditch to the E-W Ditch. The existing E-W Ditch flows east from SE 18th Avenue to an existing discharge structure and discharges to the FPL Discharge Canal. The existing discharge structure consists of a 24" RCP with a concrete weir at elevation 5.72 feet.

Stormwater runoff from the SOUTHPORT Phase VA & VB flows via closed storm drain system to exfiltration systems and stormwater treatment swale. Excess stormwater runoff from the stormwater treatment swale overflows to the Conservation Easement.

The existing drainage boundaries are shown on Figure 2.1.



VICINITY MAP



LEGEND

- Ditch
- 24" Stormwater Pipe
- Drainage Flow
- Drainage Boundary
- Proposed Mangove Creation
- Street
- Parcel Boundary

N

0 250 500 Feet

Figure 2.1
Existing Drainage Map
Conservation Easement Assessment
Port Everglades
Broward County, Florida

3.0 Proposed Drainage

Stormwater runoff from the Foreign Trade Zone and SE 18th Avenue should continue to flow east to the E-W Ditch; however, the location and geometry of the E-W Ditch should be modified due to the construction of the proposed wetland creation area at Site A. Stormwater runoff from the SOUTHPORT Phase VA & VB should continue to flow east to the exfiltration system and stormwater treatment swale. The proposed drainage boundaries are shown in Figure 3.1. The proposed wetland line adjacent to SOUTHPORT Phase VA was modified to avoid impacts to the existing drainage system. Consequently, existing drainage facilities at the SOUTHPORT Phase VA & VB should not be affected by the construction of the proposed wetland creation area at Site A.

3.1 Water Quality Treatment Volumes

Reconstruction of the E-W and N-S ditches is recommended to mitigate impacts due to construction of the proposed wetland creation area at Site A. The recommended drainage improvements are listed in Table 3.1 and shown on Figure 3.2.

TABLE 3.1
Port Everglades
Conservation Easement Assessment
Recommended Drainage Improvements

Item	Recommended Drainage Improvement
1.	Reconstruct and relocate E-W Ditch
2.	Reconstruct N-S Ditch
3.	Remove existing discharge structure
4.	Construct new discharge structure
5.	Construct new oil-grit separator

E-W Ditch

Relocating and reconstructing the E-W Ditch is proposed due to the construction of the Site A Wetland Creation Area and to increase hydraulic capacity. The minimum top width is 37 feet based on a 28-ft bottom width with 1:1 side slopes. Slope protection is required to stabilize the channel side slopes.

N-S Ditch

Reconstruction of the N-S Ditch is proposed to increase the hydraulic capacity. The maximum top width is 34 feet based on a 27-ft bottom width with 1:1 side slopes. Slope protection is required to stabilize the channel side slopes.

Existing Discharge Structure

The existing discharge structure should be removed to accommodate construction of the connection channel between the Site A Wetland Creation Area and the FPL Discharge Canal.

New Discharge Structure

A new discharge structure is required at the downstream end of the E-W Ditch. The recommended water quality treatment elevation at the new discharge structure should remain the same as the permitted water quality treatment elevation.

Oil-Grit Separator

A new oil-grit separator is recommended to remove oil and grit from stormwater runoff in the E-W Ditch prior to discharging to the FPL Discharge Canal. The oil-grit separator will function as an offline structure. A splitter structure is recommended upstream of the oil-grit separator to bypass flood flows away from the oil-grit separator directly to the E-W ditch. A concept drawing of the oil-grit separator is included in Attachment B.

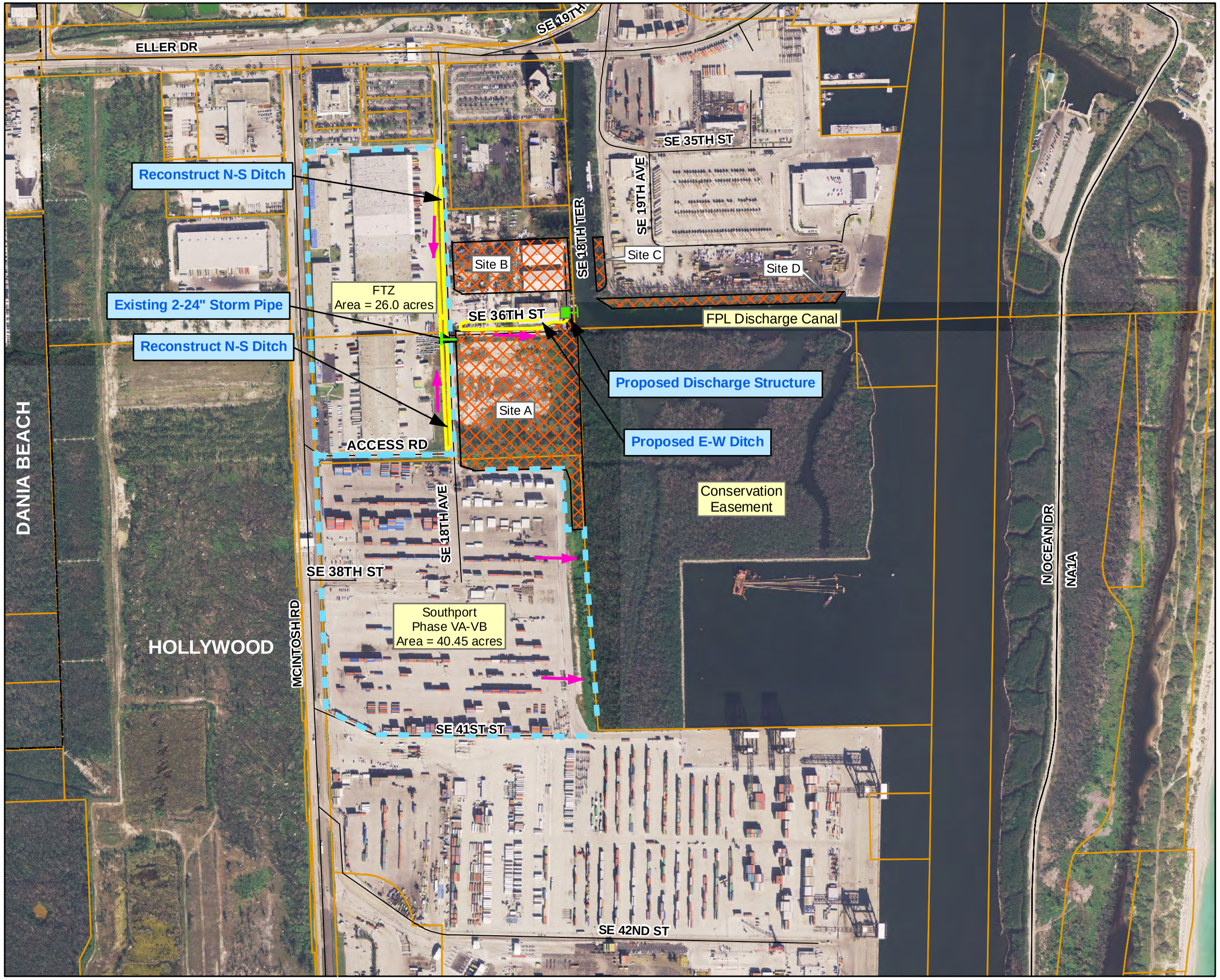
3.2 Drawdown Analysis

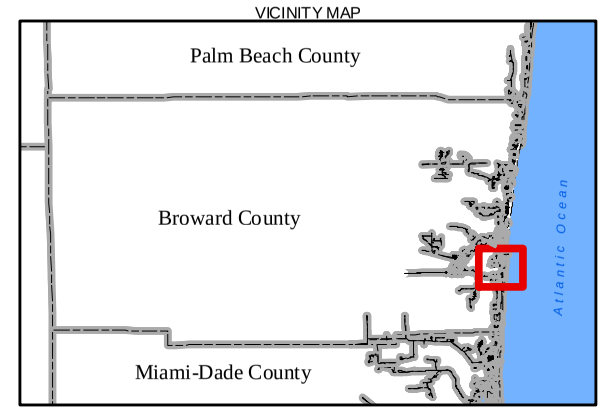
A drawdown analysis of the E-W Ditch was completed to estimate the radius or zone of influence for the worst-case scenario between the E-W Ditch and Site A Wetland Creation Area.

The worst-case scenario is described as a situation in which the maximum elevation in the E-W Ditch occurs simultaneously with a low and high tide event in the wetland creation area. Results indicate the zone of influence is less than the embankment top width between the E-W Ditch and the Site A Wetland Creation Area. The proposed embankment top width is 10 feet. The results are summarized in Table 3.2 and are included in Attachment C.

TABLE 3.2
Port Everglades
Conservation Easement Assessment
Drawdown Analysis between E-W Ditch and Site A Wetland Creation Area

Condition	Description	Radius of Influence	
		Minimum (ft)	Maximum (ft)
1	Control Elevation and MLW	1.6	3.4
2	Control Elevation and MHW	0.9	1.9





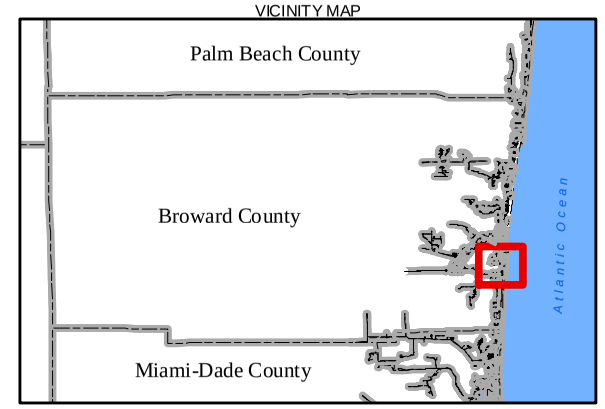
LEGEND

- Ditch
- Street
- 24" Stormwater Pipe
- Drainage Flow
- Drainage Boundary
- Proposed Mangove Creation
- Parcel Boundary

N

0 250 500 Feet

Figure 3.1
Proposed Drainage Map
Conservation Easement Assessment
Port Everglades
Broward County, Florida



LEGEND

- Street
- Ditch
- 24" Stormwater Pipe
- Existing Stormwater Treatment Swale
- Direction of Flow
- Proposed Mangove Creation
- Parcel Boundary

N

0 100 200 Feet

FIGURE 3.2
Drainage Concept Plan
Conservation Easement Assessment
Port Everglades
Broward County, Florida

4.0 Summary and Recommendations

The existing E-W Ditch and N-S Ditch convey stormwater runoff from the FTZ to the FPL Discharge Canal. The existing E-W ditch is affected by the construction of the proposed wetland creation area at Site A. Existing drainage facilities at the SOUTHPORT Phase VA & VB should not be affected by the construction of the proposed wetland creation area at Site A. The following drainage improvements are recommended to mitigate the impacts of constructing the proposed wetland creation area at Site A:

- Reconstruct and relocate E-W Ditch
- Reconstruct N-S Ditch
- Remove existing discharge structure
- Construct new discharge structure
- Construct new oil-grit separator

Figure 3.2 shows the Proposed Drainage Concept Plan.

ATTACHMENT A

Water Quality Treatment Volume Calculations

Port Everglades - FTZ

Drainage Area: **E-W and N-S Ditches**

Proposed Drainage Area and Pond Capacity Calculations - Recommended

Cover Description	Curve Number and Associated Areas								Product of
	A	Area	B	Area	C	Area	D	Area	CN x Area
Open Space, Poor Condition (Grass cover <50%)	68		79		86		89		**0.00**
Open Space, Fair Condition (Grass cover 50% to 75%)	49		69		79		84	**0.03**	**2.52**
Open Space, Good Condition (Grass cover >75%)	39		61		74		80		**0.0**
Impervious Area, Paved (Excluding right-of-way)	98		98		98		98		**0.0**
Urban Districts: Commercial and Business	89		92		94		95	**24.40**	**2318.00**
Urban Districts: Industrial	81		88		91		93		**0.00**
Residential: 65% Impervious (1/8 Acre)	77		85		90		92		**0.00**
Residential: 38% Impervious (1/4 Acre)	61		75		83		87		**0.00**
Residential: 30% Impervious (1/3 Acre)	57		72		81		86		**0.00**
Residential: 25% Impervious (1/2 Acre)	54		70		80		85		**0.00**
Residential: 20% Impervious (1 Acre)	51		68		79		84		**0.00**
Residential: 12% Impervious (2 Acre)	46		65		77		82		**0.00**
Pasture, Grassland, or Range, Poor Condition	68		79		86		89		**0.00**
Pasture, Grassland, or Range, Fair Condition	49		69		79		84		**0.00**
Pasture, Grassland, or Range, Good Condition	39		61		74		80		**0.00**
Meadow, protected from grazing	30		58		71		78		**0.00**
Brush - Brush, weed grass combination, Poor Condition	48		67		77		83		**0.00**
Brush - Brush, weed grass combination, Fair Condition	35		56		70		77		**0.00**
Brush - Brush, weed grass combination, Good Condition	30		48		65		73		**0.00**
Wood - Grass combination, Poor Condition	57		73		82		86		**0.00**
Wood - Grass combination, Fair Condition	43		65		76		82		**0.00**
Wood - Grass combination, Good Condition	32		58		72		79		**0.00**
Woods, Poor Condition	45		66		77		83		**0.00**
Woods, Fair Condition	36		60		73		79		**0.00**
Woods, Good Condition	30		55		70		77		**0.00**
Pond Area (Top of Bank)	100							**1.6**	**0.00**
Riprap (Top of Bank)									**0.00**
R/W Totals =>		**0.00**		**0**		**0**		**26.02**	**2320.52**

CN (Weighted) = $\frac{\text{Total Product}}{\text{Total Area}} = \frac{2320.52}{26.02} =$ 89.182 **Use CN = 89**

Required Water Quality Treatment Volume

A. Wet Detention Volume

1. Compute 1st one inch of runoff from the developed project:
   - Project Area = **26.02** acres
   - 1st One Inch of Runoff = **2.17** ac-ft
2. Compute 2.5 inches times impervous area:
   - Impervious area = **20.74** ac-ft
   - 2.5 inches x Impervious Area = **4.32** ac-ft
3. Wet Detention Volume = **4.32** ac-ft
4. Wet Detention Area = **1.9** ac (2.22-ft vertical depth)

B. Dry Detention Volume

1. Dry detention volume shall be provided equal to 75 percent of the amounts computed for wet detention:
   - Dry Detention Volume = 0.75 x **4.32** = **3.24** ac-ft
2. Dry Detention Area = **1.5** ac (2.22-ft vertical depth)

C. Retention Volume

1. Retention volume shall be provided equal to 50 percent of the amounts computed for wet detention:
   - Retention Volume = 0.50 x **4.32** = **2.16** ac-ft
2. Exfiltration Trench Volume = **0.0** ac-ft
3. Required Retention Volume minus Exfiltration Trench Volume = **2.2** ac-ft

Provided Water Quality Treatment Volume

A. Provided Treatment Volume (%) at Water Quality Treatment Depth **2.2** ac-ft

B. If Required Retention Volume > Existing Pond & Trench Area

1. Then pond does not meet SFWMD criteria for water quality treatment volume: **Meets SFWMD criteria**

C. % Water Quality Treatment Volume Provided **103** %

Port Everglades - FTZ

Recommended N-S Ditch - Area Calculations

Computed by: AAJ Date: 07-23-09
Checked by: JAA Date: 07-23-09

SMF Data Sta. LT

Stage	Elevation (Ft)	Area (Ac)	Volume (Ac-Ft)
Berm (Back of Berm)	9.00	1.04	3.22
Berm (Front)	9.00	1.04	3.22
Weir (Design Low Water)	6.82	0.89	**1.12**
Pond Bottom	5.50	0.80	0.00

Required Treatment Volume

0.75 x (Total Project Area x 1" and/or Impervious Area x 2.5") = (whichever is greater) **3.24** ac-ft

Provided Treatment Volume

Volume between Normal Water and Weir = 1.12 ac-ft

Provided Detention Volume

Volume between Normal Water and DHW = 4.34 ac-ft

Port Everglades - FTZ

Recommended E-W Ditch - Area Calculations

Computed by: AAJ Date: 07-23-09
Checked by: JAA Date: 07-23-09

SMF Data Sta. LT

Stage	Elevation (Ft)	Area (Ac)	Volume (Ac-Ft)
Berm (Back of Berm)	8.00	0.59	2.36
Berm (Front)	8.00	0.59	2.36
Weir (Design Low Water)	5.72	0.52	**1.09**
Pond Bottom	3.50	0.46	0.00

Required Treatment Volume

0.75 x (Total Project Area x 1" and/or Impervious Area x 2.5") = (whichever is greater) **3.24** ac-ft

Provided Treatment Volume

Volume between Normal Water and Weir = 1.09 ac-ft

Provided Detention Volume

Volume between Normal Water and DHW = 3.46 ac-ft

ATTACHMENT B

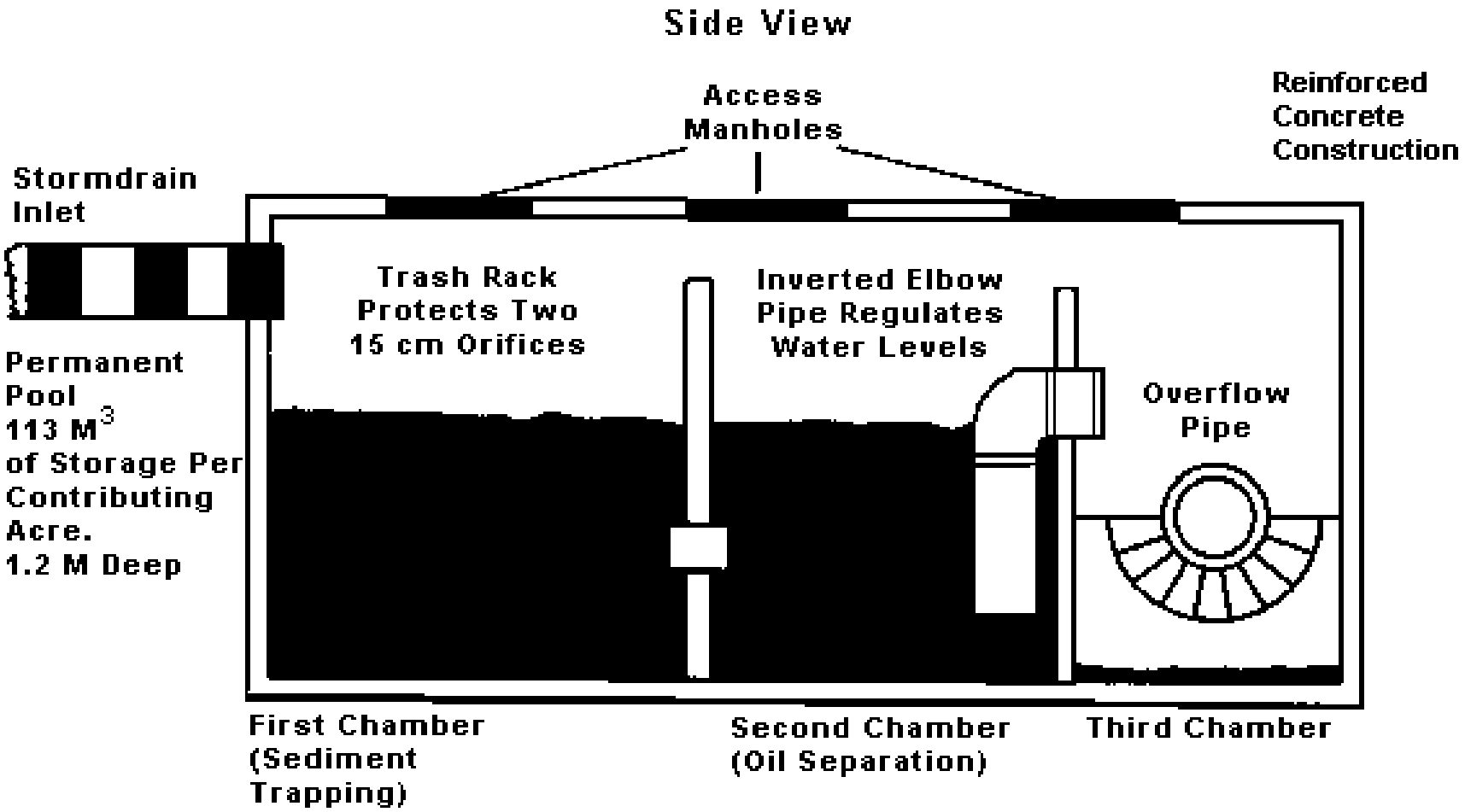
Oil-Grit Separator

:

Port Everglades
Conservation Easement Assessment
East-West Ditch
Oil-Grit Separator Calculation
Alternate 3

Drainage Area =	26.02	acres
Storage per Contributing Acre =	400*	ft^3/acre
Total OGS Storage =	10,408	ft^3
Width =	24	ft
Top-of-Bank Elevation =	9	ft MLW
Channel Bottom Elevation =	3.5	ft MLW
Depth =	10.0	ft
Oil-Grit Separator Bottom Elevation =	-6.5	ft MLW
Surface Area =	1,545	ft^2
Sediment Chamber Length =	43	ft
Oil Chamber Length =	8	ft
Outlet Chamber Length =	8	ft
Baffle Wall Thickness =	1	ft
Total Baffle Wall Thickness =	3	ft
Exterior Wall Thickness =	1	ft
Total Exterior Wall Thickness =	2	ft
Total OGS Length =	64	ft

*Best Management Practices for South Florida Urban Stormwater Management Systems, Figure 3 - Pollutant Removal Effectiveness of Different BMPs, SFWMD, April 2002.



Schematic of an oil/grit separator (OGS)
(adapted from Schueler, 1987)

ATTACHMENT C

Drawdown Analysis
Radius of Influence Calculations

:

Port Everglades
Conservation Easement Assessment
East-West Ditch
Radius of Influence Calculation

1. Evaluation per SFWMD BOR 6.12 - Lake-Wetland Separation

(1.a) Condition 2: Control Elev-MLW Elev

h_1 = Elevation of ground surface at wetland boundary (MLW) =	0	ft MLW
h_2 = Control Elevation of Proposed E-W Ditch =	5.72	ft MLW
L = Horizontal Distance between Nearest Edge of Proposed Ditch at Control Elevation & Wetland Boundary at MLW =	91.9	ft
Δh (MLW) = difference in hydraulic head = $h_1 - h_2$ =	-5.72	ft
Gradient (MLW) = $\Delta h/L$ =	-0.062	ft/ft

(1.b) Condition 1: Contol Elev-MHW-Elev

h_1 = Elevation of ground surface at wetland boundary (MHW) =	2.5	ft MLW
h_2 = Control Elevation of Proposed E-W Ditch =	5.72	ft MLW
L = Horizontal Distance between Nearest Edge of Proposed Ditch at Control Elevation & Wetland Boundary at MHW =	24.2	ft
Δh (MHW) = difference in hydraulic head = $h_1 - h_2$ =	-3.22	ft
Gradient (MHW) = $\Delta h/L$ =	-0.133	ft/ft

0.133> 0.015 and 0.062 > 0.015, therefore, evaluate permeability (k) of insitu soils

2. Solution: Estimate the Permeability (k) of In-Situ Material and Calculate the Radius of Influence using the SCS and USACE K-Values for the Soil

$R = C (h_2 - h_1) \sqrt{k}$

Fine sand (k varies from 0.008 to 0.040 ft/min)

Given: C = 3,

Fine sand (k varies from 0.008 to 0.040 ft/min)

			R (ft)			
			Condition 1		Condition 2	
Method	k (ft/min)		Min.	Max.	Min.	Max.
SCS	0.008	0.028	0.88	1.61	1.57	2.86
USACE	0.010	0.040	0.97	1.93	1.72	3.43

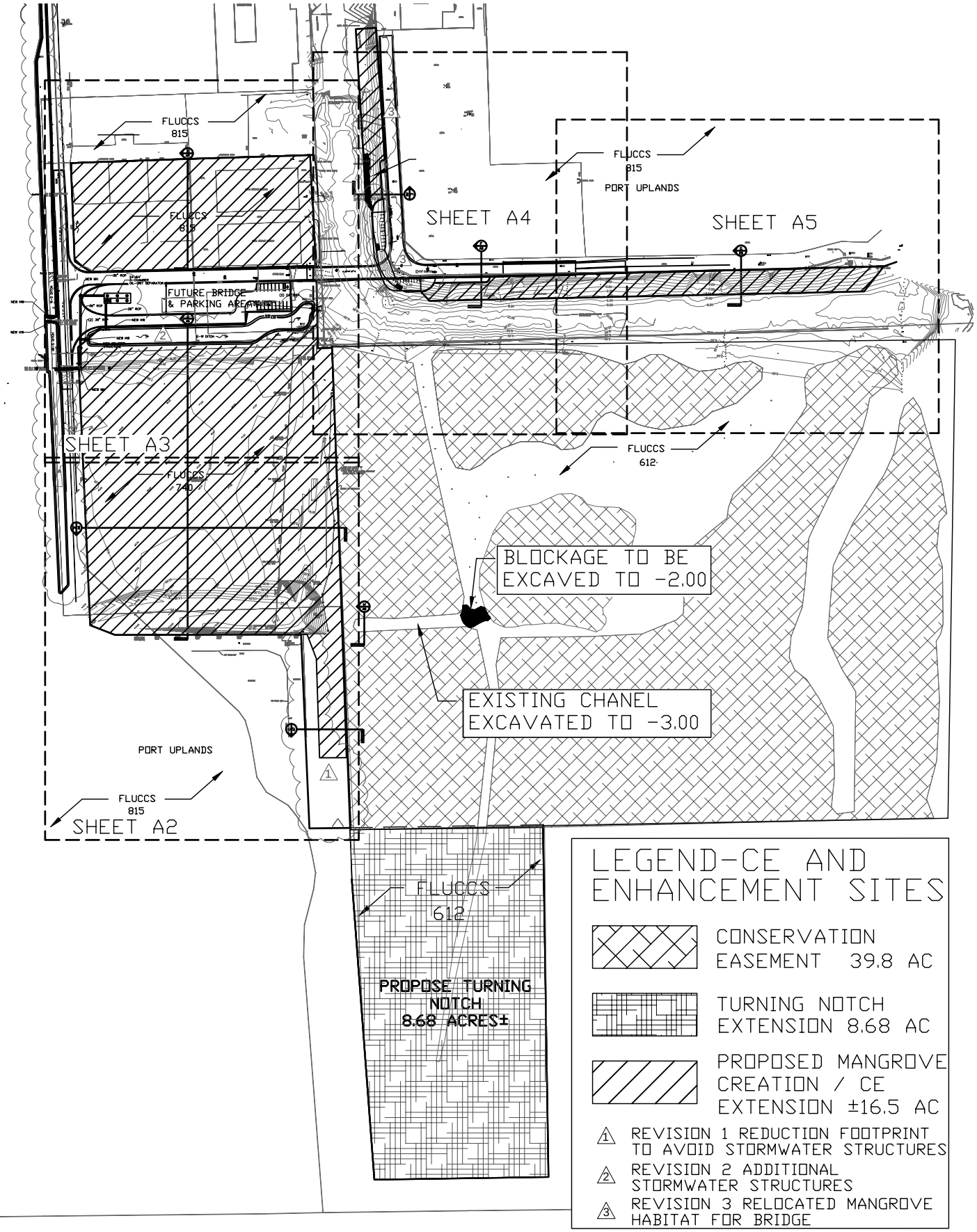
3. Results

Condition 1: The maximum R for high tide (MHW = 2.5) is 1.93 ft
The length from the East-West ditch to TOS at Site A = 24.2 ft.
The minimum embankment top width exceeds the calculated R.

Condition 2: The maximum R for low tide (MLW = 0.00) is 3.43 ft
The length from the East-West ditch to TOS at Site A = 91.9 ft.
The minimum embankment top width exceeds the calculated R.

APPENDIX RAI-1-D

Revised Project Drawings – September 18, 2009



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE:	September 18, 2009

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

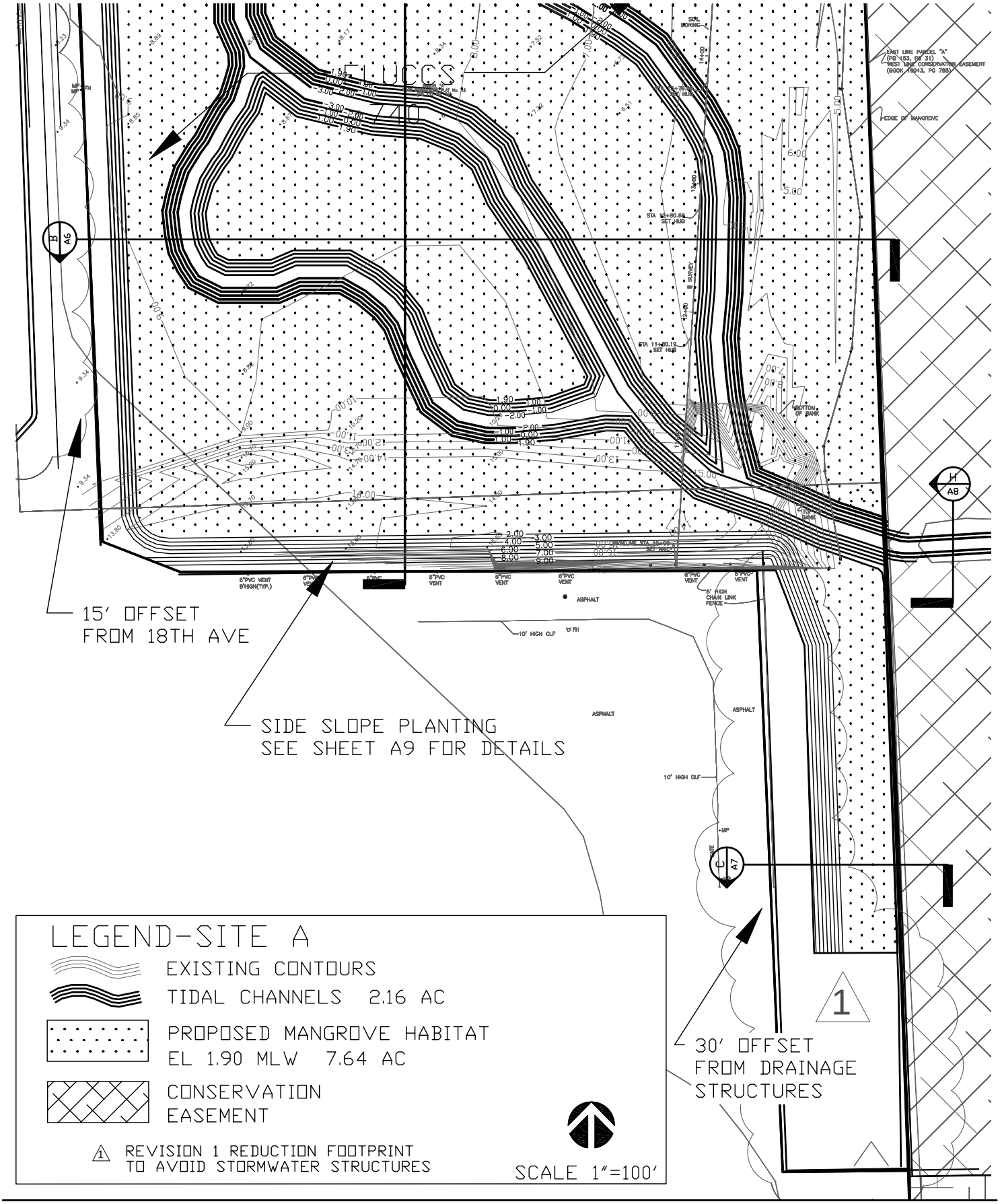
BROWARD COUNTY, FL

SITE PLAN-OVERVIEW

CH2MHILL

4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No.	172285
CAD FILE	CAD FILE
SHEET NUMBER	A1
SHEET	OF



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE: September 18, 2009	

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

SITE A PROPOSED MANGROVE CREATION

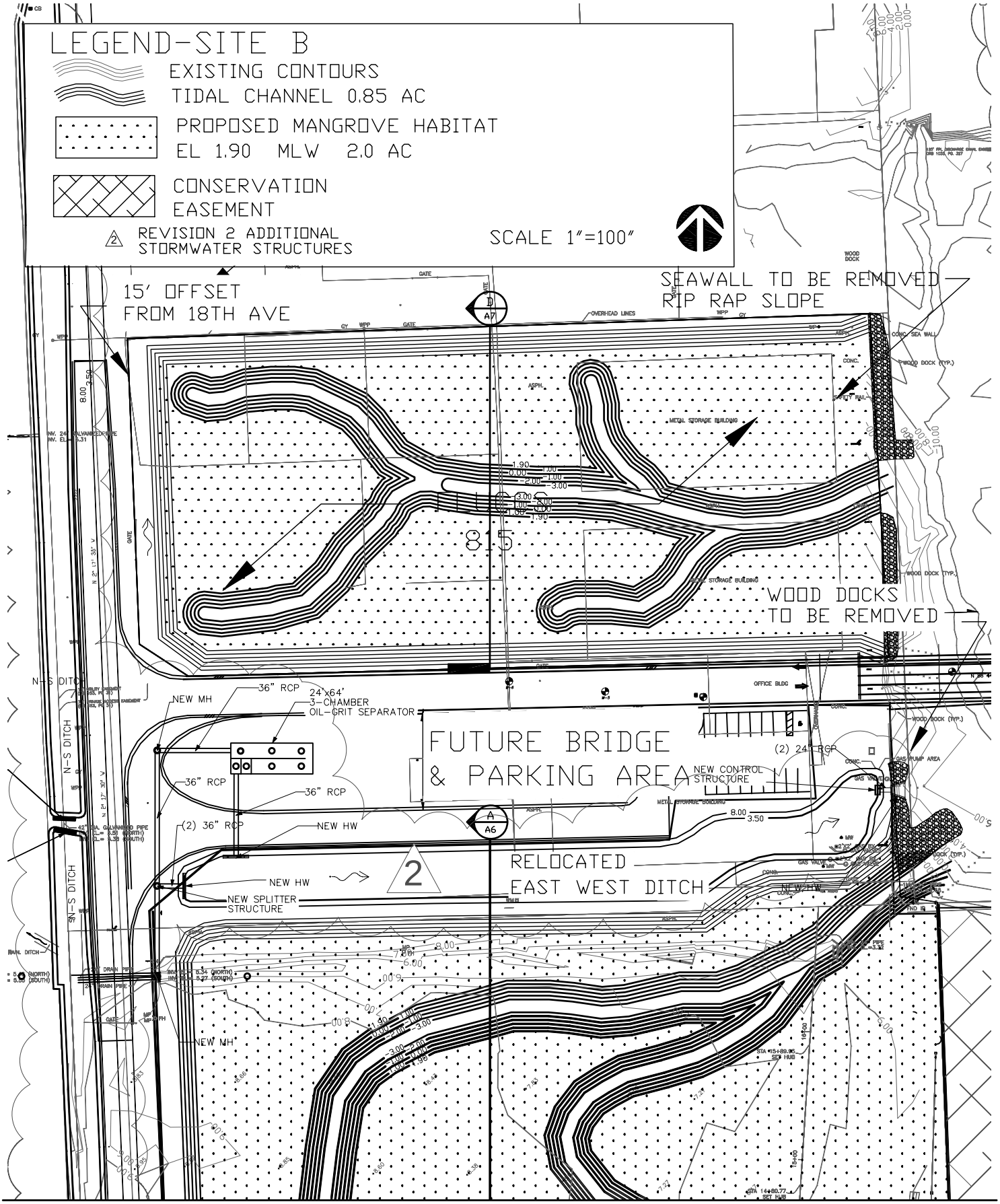
CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

CAD FILE CAD FILE

SHEET NUMBER A2

SHEET OF



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE: September 18, 2009	

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

SITE B PROPOSED MANGROVE CREATION

CH2MHILL

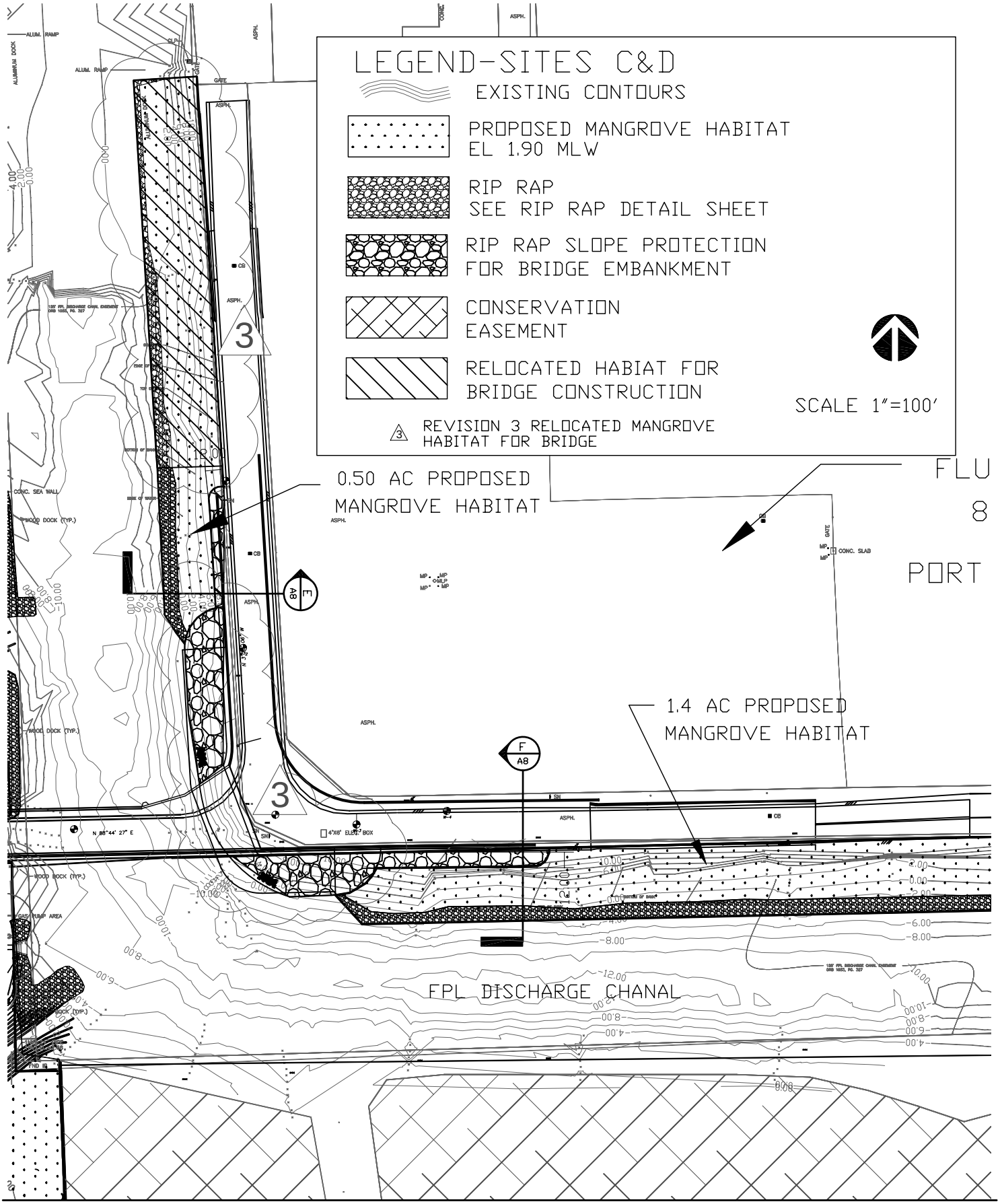
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

CAD FILE CAD FILE

SHEET NUMBER A3

SHEET OF



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE: September 18, 2009	

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

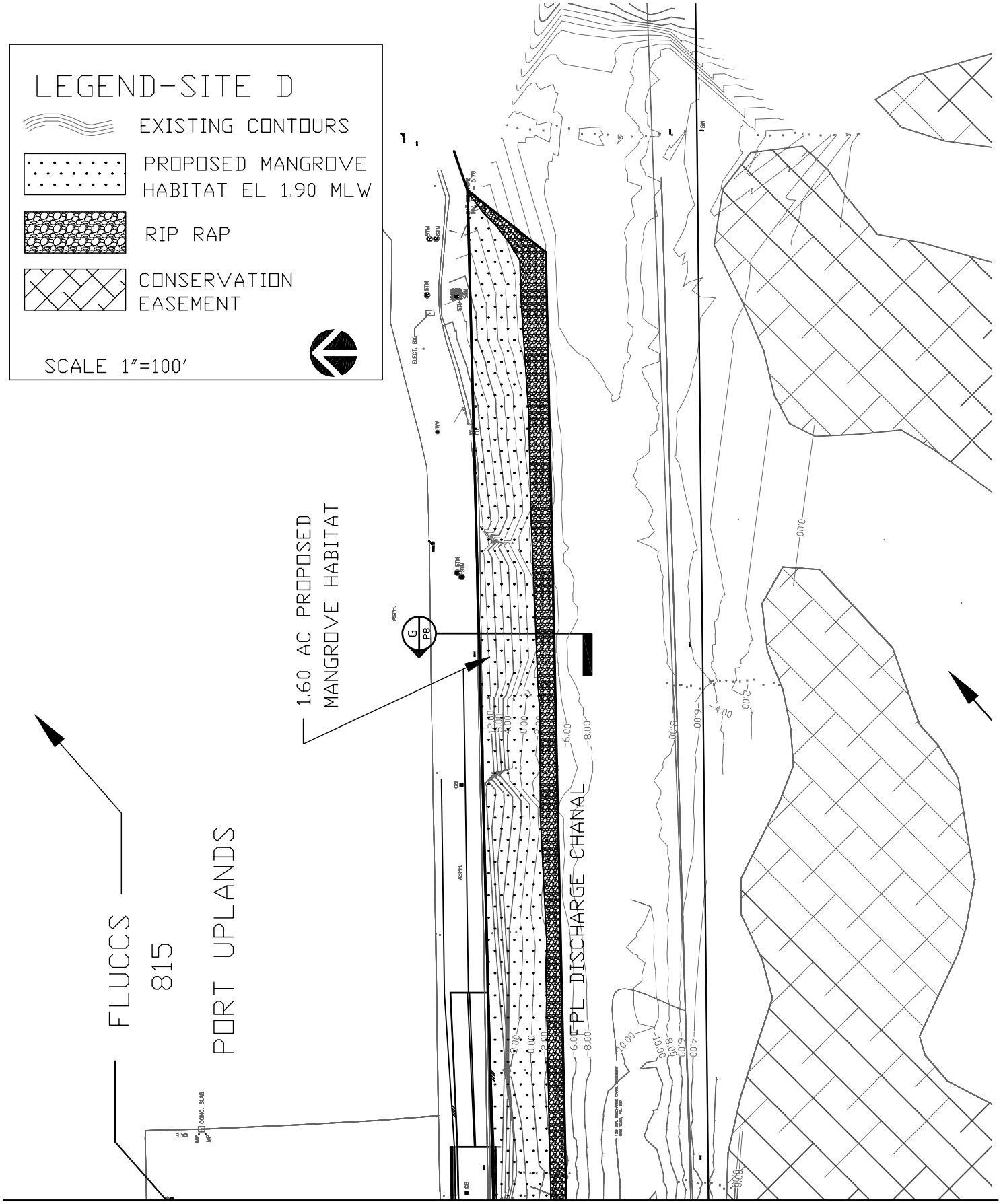
BROWARD COUNTY, FL

SITE C+D PROPOSED MANGROVE CREATION

CH2MHILL

4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No.	172285
CAD FILE	CAD FILE
SHEET NUMBER	A4
SHEET	OF



PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE: September 18, 2009	

PORT EVERGLADES CONSERVATION EASEMENT

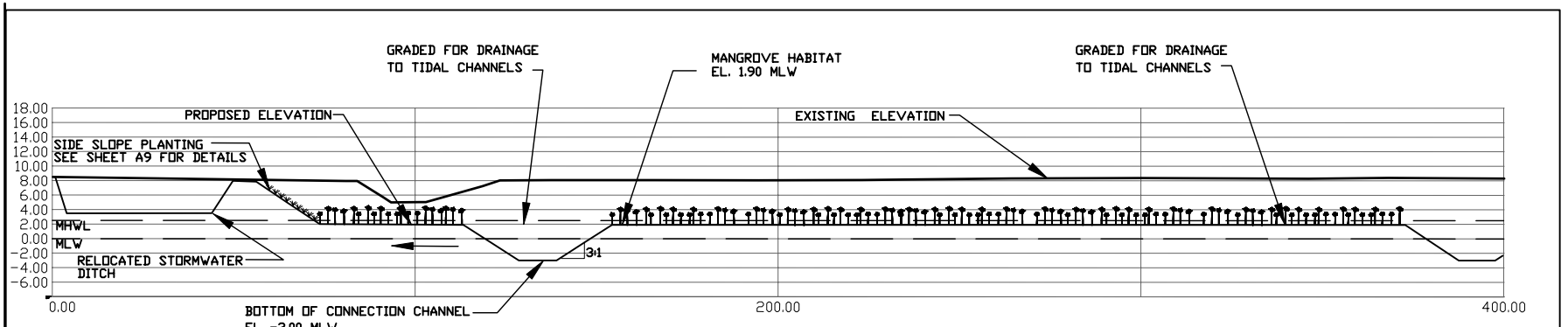
PORT EVERGLADES

BROWARD COUNTY, FL

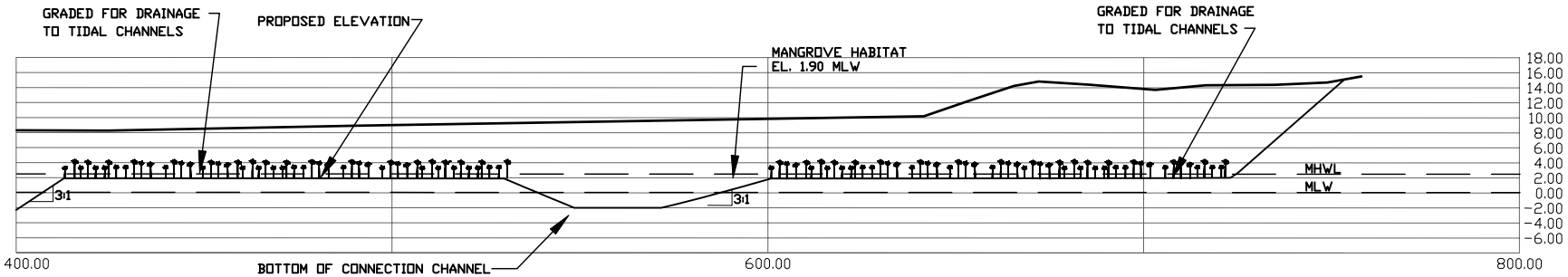
SITE D- PROPOSED MANGROVE CREATION

CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

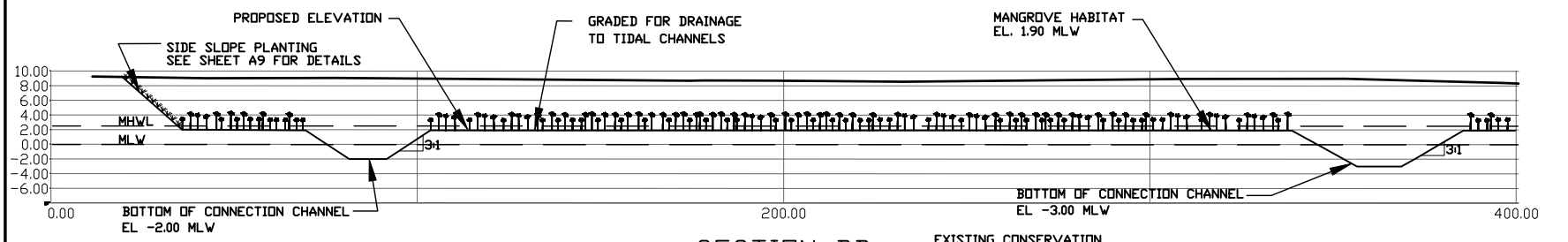
JOB No.	172285
CAD FILE	CAD FILE
SHEET NUMBER	A5
SHEET	OF



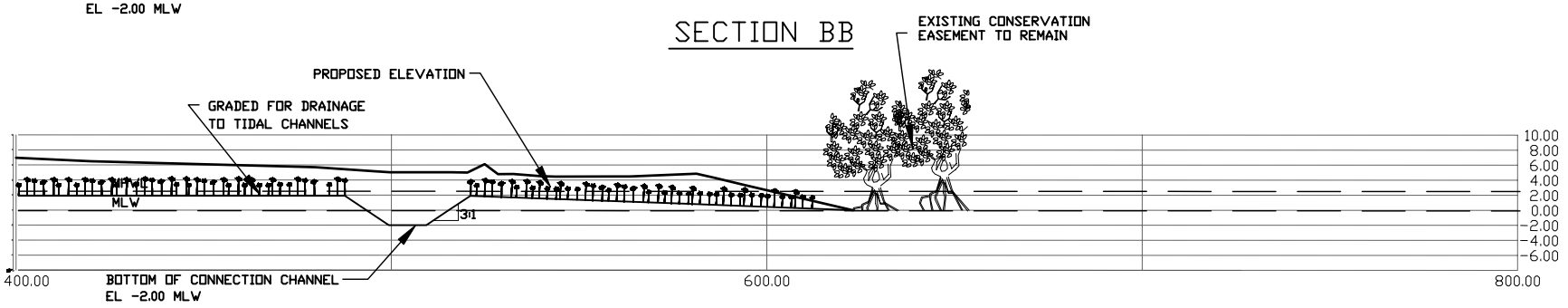
SECTION AA



SECTION AA



SECTION BB



SECTION BB

PLOTTED: –
TIME: –
PLOT SCALE: –
DESIGNED: –
DRAWN: –
CHECKED: –
APPROVED: –
DATE: September 18, 2009

PORT EVERGLADES CONSERVATION EASEMENT

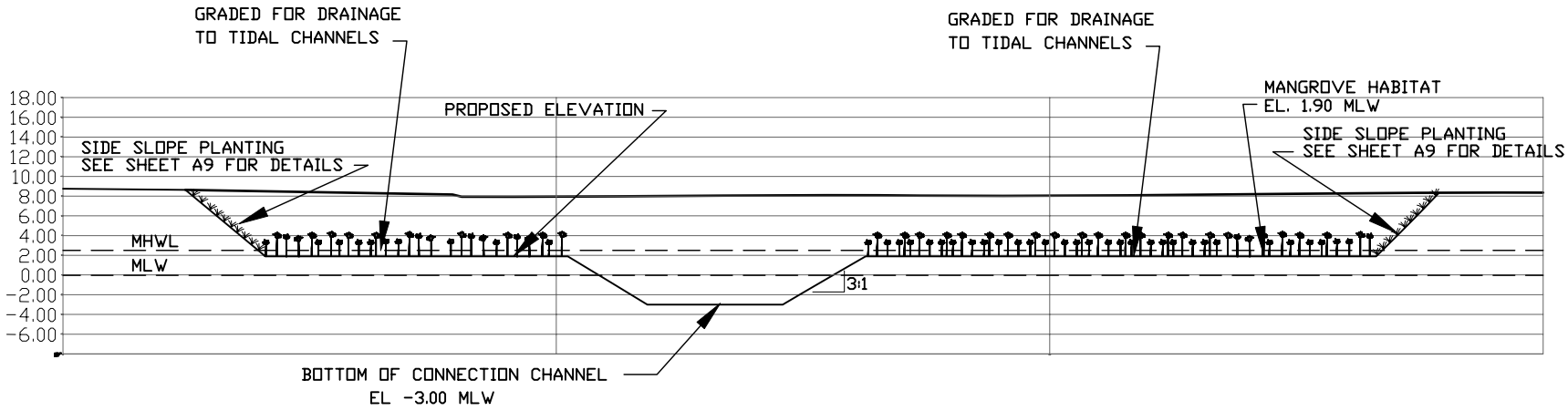
PORT EVERGLADES

BROWARD COUNTY, FL

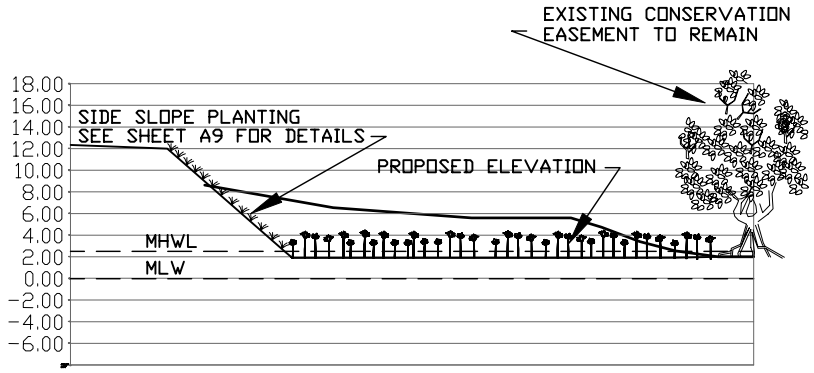
SITE A CROSS SECTIONS

CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

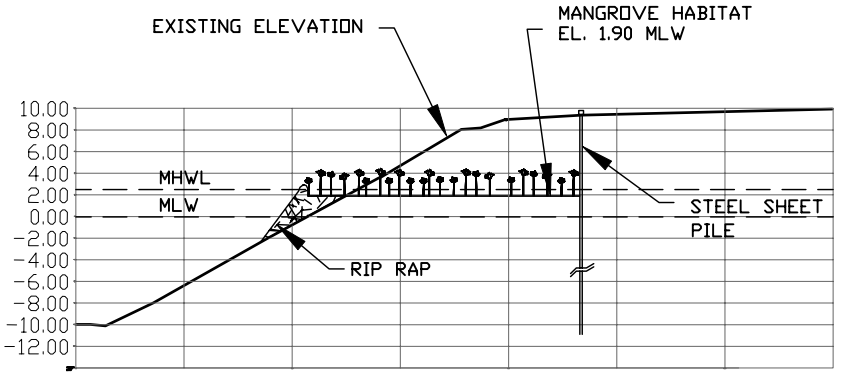
JOB No. 172285
CAD FILE
CAD FILE
SHEET NUMBER A6
SHEET OF



SECTION D



SECTION C



SECTION E

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

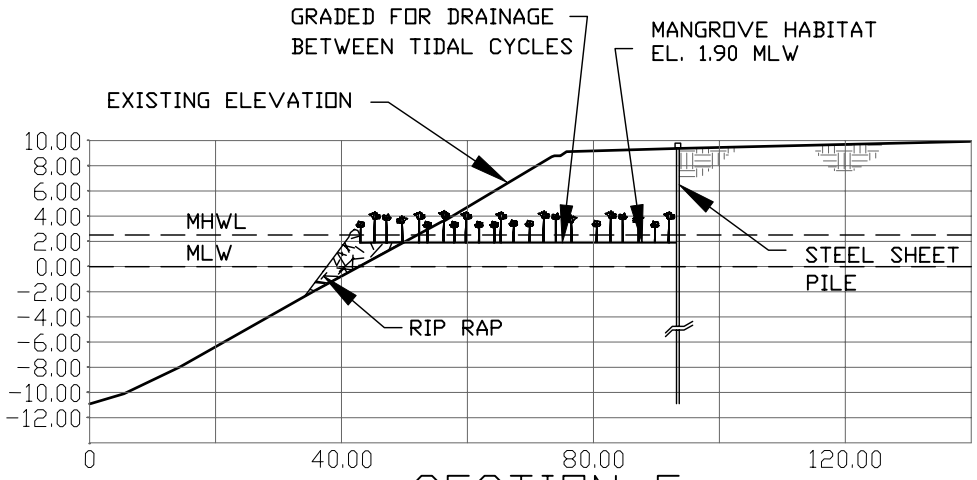
SITE B + C CROSS SECTIONS

CH2MHILL

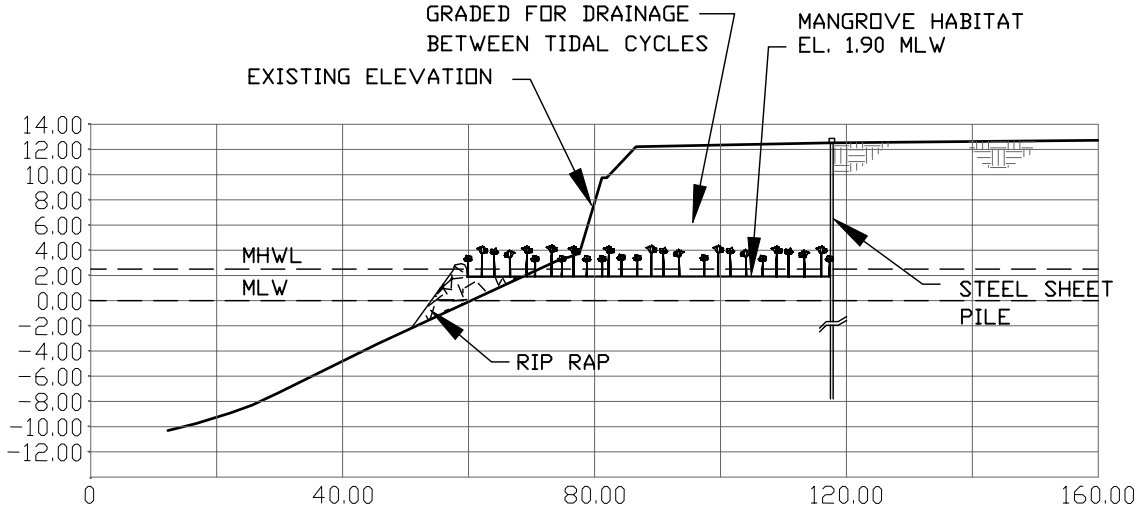
4350 W Cypress
Suite # 600
Tampa, Florida
33607

PLOTTED: –
TIME: –
PLOT SCALE: –
DESIGNED: –
DRAWN: –
CHECKED: –
APPROVED: –
DATE: September 18, 2009

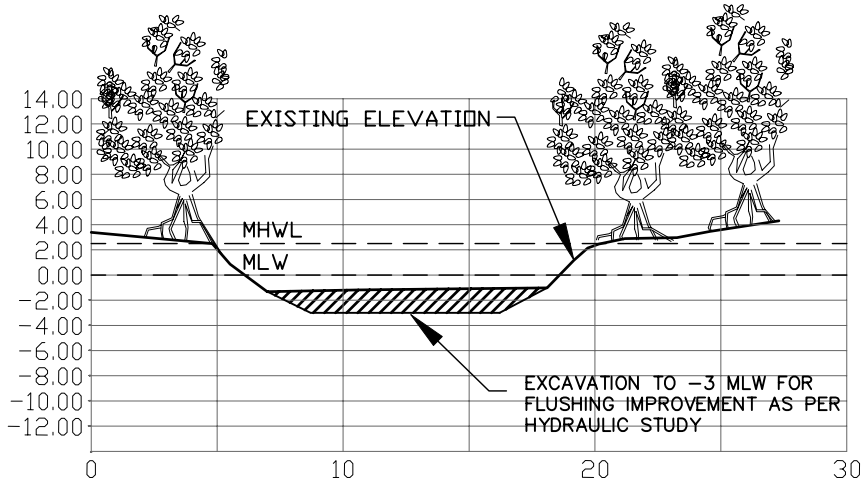
JOB No. 172285
CAD FILE CAD FILE
SHEET NUMBER A7
SHEET OF



SECTION F



SECTION G



SECTION H

PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE: September 18, 2009	

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

SITE D CROSS SECTIONS

CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

CAD FILE CAD FILE

SHEET NUMBER A8

SHEET OF

PLANTING NOTES:

RED MANGROVE HABITAT EL 1.90 MLW: THE MANGROVE HABITAT WILL BE GRADED TO WITHIN 0.10 FT OF THE SPECIFIED ELEVATION. RED MANGROVE PLANTINGS WILL BE 1 GALLON TREES, ON 3 FOOT STAGGERED CENTERS. TO HELP STABILIZE THE SUB-STRAIGHT AT TIME OF PLANTING, SPARTINA ALTERNIFLORA PLUGS WILL BE INTERSPERSED (5 FOOT CENTERS) WITH THE MANGROVE SEEDLINGS AND BOTH BLACK AND WHITE MANGROVE SEEDS WILL BE SCATTERED THROUGHOUT THE PLANTING AREA.

SIDE SLOPE PLANTINGS WILL CONSIST OF A MIXTURE THE FOLLOWING SPECIES

Baccharis halimifolia- saltbush	1 Gallon
Borrichia arborescens- sea ox-eye daisy	1 Gallon
Borrichia frutescens- Sea ox-eye daisy	1 Gallon
Canavalia rosea- beach bean	1 Gallon
Distichlis spicata - seashore saltgrass	4" Liner
Ernodea litoralis- golden creeper	1 Gallon
Helianthus debilis- beach sunflower	1 Gallon
Iva imbricata- beach elder	1 Gallon
Paspalum vaginatum-salt jointgrass	4" Liner
Spartina patens- marsh hay cordgrass	4" Liner
Sporobolis virginicus- virginia dropseed	4" Liner
Batis martima- saltwort	4" Liner
Lycium carolinianum- christmas berry	1 Gallon
Scaerola plumieri- inkberry	1 Gallon
Pithecellobium keyensis- black bead	1 Gallon
Spartina spartina- gulf cord grass	4" Liner
Argusia gnaphalodes- sea lavender	1 Gallon
Coccoloba unifora- sea grape	3 Gallon

*1 GALLON ON 5 FT CENTERS
** 4" LINER ON 3FT CENTERS

PLOTTED: –
TIME: –
PLOT SCALE: –
DESIGNED: –
DRAWN: –
CHECKED: –
APPROVED: –
DATE: September 18, 2009

PORT EVERGLADES CONSERVATION EASEMENT
PORT EVERGLADES
BROWARD COUNTY, FL

PLANTING PLAN

CH2MHILL
4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285
CAD FILE CAD FILE
SHEET NUMBER A9
SHEET OF

APPENDIX RAI-1-E

Revised UMAM Assessment Forms – September 18, 2009

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 5**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6120 (mangrove swamp)	**N/A**	**Impact**	**0.36 acres**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63)/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Tidally connected mangrove wetlands located adjacent to the ICW, Port located immediately to the south, mangrove wetlands located to the north. Area is bordered to the east by a riprap revetment.

Assessment area description

Predominately red mangrove wetland with black and white mangroves also present. Area is characterized by a large amount of garbage and debris.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, 36.2 acres of mangrove wetlands to the west and south, Port Everglades in surrounding area, John U. Lloyd State Park, West Lake Park	**Mangrove swamps are rare in Broward County**

Functions	Mitigation for previous permit/other historic use
Mangroves provide nursery habitat for juvenile inshore and pelagic reef species, provide basis of food web in the form of detrital matter, provide roosting and foraging habitat for migratory and wading birds, stabilize sediment and provide protection of surrounding area from storm surge.	**This area is part of a conservation easement that was granted to the then FDER by Port Everglades on 12/15/88 in accordance with dredge and fill permit # 060924019 for the development of the Southport Turning Notch.**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Mangrove crabs, migratory and wading birds, juvenile fish, commercial fish, barnacles, oysters, sponges and other invertebrates	**Little Blue heron (SSC), Snowy Egret (SSC), Tricolored Heron (SSC), Bald Eagle (E), Snook (SSC), Smalltooth Sawfish (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Crab holes present

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
Coastal Systems International, Inc.	**1/15/2008 - 1/17/2008**

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 5**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Impact	**Coastal Systems Int.**	**1/15/2008 - 1/17/2008**

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: **6** with: **0**	**Concrete wall separating area from Port is located immediately to the south and west of the this area, riprap revetment to the east which separates area from ICW and mangrove wetlands are located to the north. Connection to surrounding area is limited by barriers (i.e. concrete wall to south, riprap revetment to the east) and there is a significant distance to the ICW. No exotics were present, however, pine needles were observed on the ground throughout the area as were large amounts of garbage and debris.** **With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: **4** with: **0**	**Urban runoff from Port and surrounding developed area; ICW receives stormwater runoff from all areas throughout the County, water levels lower than expected, decreased hydrological connection due to distance to ICW, barriers and limited tidal exchange.** **With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: **7** with: **0**	**Red, black, and white mangroves were present in this area, however, red was dominant overall. Black mangroves were dominant in trees under 5 feet tall and seedlings were common. Area was characterized by a large amount of garbage and debris, particularly plastic bottles. Pine needles were also observed throughout the area on the ground. The mean DBH was 2.4 inches. The mean tree height was 16 feet and the mean number of trees under 5 feet tall was 2.0.** **With impact (dredging), mangrove swamp will no longer be present.**

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.57	**0.00**

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas	
FL = delta x acres =	-0.21

Delta = [with-current]
-0.57

If mitigation	
Time lag (t-factor) =	1.46
Risk factor =	

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 6**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6120 (mangrove swamp)	**N/A**	**Impact**	**1.33 acres**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63)/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Tidally connected mangroves with uplands immediately adjacent to the west and south and berm located to the east.

Assessment area description

Tidally connected moangrove wetland with encroaching exotic species ranging from 30 to 100% at various data collection points.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, 36.2 acres of mangrove wetlands to the west and south. Port Everglades in surrounding area, John U. Lloyd State Park, West Lake Park	**Mangrove swamps are rare in Broward County**
Functions	Mitigation for previous permit/other historic use
Mangroves provide nursery habitat for juvenile inshore, pelagic and reef species, provide basis of food web in the form of dtrital matter, provide roosting and foraging habitat for migratory birds, stabilize sediment and provide protection.	**This area is part of a conservation easement that was granted to the then FDER by Port Everglades on 12/15/88 in accordance with dredge and fill permit # 060924019 for the development of the Southport**
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Mangrove crabs, migratory and wading birds, juvenile fish, commercial fish, barnacles, oysters, sponges, and other invertebrates	**Little Blue Heron (SSC), Snowy Egret (SSC), Tricolored Heron (SSC), Bald Eagle (E), Snook (SSC), Smalltooth Sawfish (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

various spiders, crab holes

Additional relevant factors:

N/A

Assessment conducted by:	Assessment date(s):
Coastal Systems International, Inc.	**1/15/2008 - 1/17/2008**

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 6**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Impact	**Coastal Systems Int.**	**1/15/2008 - 1/17/2008**

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: **4**	with: **0**
Mangrove wetlands are tidally connected however there is a significant distance to the ICW. The Port is located directly to the west and south of this area and exotics are encroaching. connection to surrounding area is limited by berm located to the east of the assessment area. With impact (dredging), mangrove swamp will no longer be present.		
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: **4**	with: **0**
Urban runoff from Port and surrounding developed area; ICW receives stormwater runoff from all areas throughout the County, water levels lower than expected, drecreased hydrological connection due to distance to ICW, barriers (i.e. berm) and limited tidal exchange. With impact (dredging), mangrove swamp will no longer be present.		
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: **3**	with: **0**
Exotics in this area included Australian Pine, Wedelia, and Brazillian Pepper. The mean percent cover of exotics was 82%. Mangrove seedlings were rare. Black mangroves were the dominant species in trees below and above 5 feet in height. Red and white mangroves were also present at some of the points. The mean DBH of the trees was 1.9 inches. The mean tree height was 17 feet and the mean number of trees less than 5 feet tall was 0.7.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.37	**0.00**

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = **-0.49**

Delta = [with-current]
-0.37

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 7**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6120 (mangrove swamp)	**N/A**	**Impact**	**2.44 acres**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63)/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Tidally connected mature mangrove wetlands, including a portion of the north south tidal channel, separated from the ICW to the east by a riprap boulder revetment. This area includes a portion of a tidal channel that runs north-south.

Assessment area description

Mature red mangrove wetland with black and white mangroves also present.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, 36.2 acres of mangrove wetlands to the west and south. Port Everglades in surrounding area, John U. Lloyd State Park, West Lake Park	**Mangrove swamps are rare in Broward County**

Functions	Mitigation for previous permit/other historic use
Mangroves provide nursery habitat for juvenile inshore and pelagic reef species, provide basis of food web in the form of detrital matter, provide manatee habitat, provide roosting and foraging habitat for migratory and wading birds, stabilize sedimen and provide protection of surrounding area from storm surge.	**This area is part of a conservation easement that was granted to the then FDER by Port Everglades on 12/15/88 in accordance with dredge and fill permit # 060924019 for the development of the Southport Turning Notch.**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Mangrove crabs, migratory and wading birds, juvenile fish, commercial fish, barnacles, oysters, sponges and other invertebrates	**Manatee (E), Little Blue Heron (SSC), Snowy Egret (SSC), Tricolored Heron (SSC), Bald Eagle (E), Snook (SSC), Smalltooth Sawfish (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Mangrove crabs, fiddler crabs, various spiders

Additional relevant factors:

N/A

Assessment conducted by:	Assessment date(s):
Coastal Systems International, Inc.	**1/15/2008 - 1/17/2008**

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 7**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Impact	**Coastal Systems Int.**	**1/15/2008 - 1/17/2008**

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: **7** with: **0**	**Mangrove wetlands immediately surrond this area to the west and north and the Port is located in the near vicinity. A riprap revetment separates this area from the ICW. A tidal channel that runs north-south through this area provides a connection to the surrounding habitats. there is a long distance to open tidal waters of the ICW through the tidal channel, and the riprap wall slows tidal exchange. With impact (dredging), mangrove swamps will no longer be present.**
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: **7** with:	**Data collection points in this area were either adjacent to the tidal channel or were in standing water between 0.5 and 1.5 feet deep. Urban runoff from the Port and surrounding developed area; ICW receives stormwater runoff from all areas throughout the County and there is decreased hydrological connection due to distance to ICW. However, existing tidal channel provides good flushing. With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: **8** with: **0**	**Red, black and white mangroves were present in this area, however, red was dominant overall. Red mangroves were the dominant species under 5 feet tall and seedlings were rare. All stages of mangroves were present but there were many large trees present. (1) Australian pine was observed in this area. The mean DBH of trees was 3.4 inches, mean tree height of 19 feet, while the mean number of trees less than 5 feet tall was 1.2. Extensive prop root systems were found throughout the area and some areas had open areas with less canopy.**

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.73	**0.00**

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = -1.78

Delta = [with-current]
-0.73

If mitigation
Time lag (t-factor) = 1.46
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 8**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6120 (mangrove swamp)	**N/A**	**Impact**	**0.12 acres**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63)/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Within tidal mangroves at higher elevation than surrounding areas

Assessment area description

Mangrove area impacted by fill area approximately 16 feet wide

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, 36.2 acres of mangrove wetlands to the west and south, Port Everglades in surrounding area, John U. Lloyd State Park, West Lake Park	**Mangrove swamps are rare in Broward County**

Functions	Mitigation for previous permit/other historic use
Mangroves provie nursery habitat for juvenile pelagic reef species, provide basis of food web in the form of detrital matter, provide roosting and foraging habitat for migratory and wading birds, stabilize sediment and provide protection of surrounding area from storm surge.	**This area is part of a conservation easement that was granted to the then FDER by Port Everglades on 12/15/88 in accordance with dredge and fill permit # 060924019 for the development of the Southport Turning Notch.**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Mangrove crabs, migratory and wading birds, juvenile fish, commercial fish, barnacles, oysters, sponges and other invertebrates	**Little Blue Heron (SSC), Snowy Egret (SSC), Tricolored Heron (SSC), Bald Eagle (E), Snook (SSC), Smalltooth Sawfish (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

N/A

Assessment conducted by:	Assessment date(s):
Coastal Systems International, Inc.	**1/15/2008 - 1/17/2008**

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 8**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Impact	**Coastal Systems Int.**	**1/15/2008 - 1/17/2008**

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: **3**	with: **0**	**Connection to surrounding area is limited by berm at higher elevation, significant distance from ICW and riprap revetment separating the ICW to the east. With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: **2**	with: **0**	**Urban runoff from Port and surrounding developed area; ICW receives stormwater runoff from all areas throughout the County, water levels lower than expected, decreased hydrological connection due to distance to ICW, barriers, higher elevation and limited tidal exchange. With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: **1**	with: **0**	**Only seedling present at lower elevation next to berm. With impact (dredging), mangrove swamp will no longer be present.**

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.20	0.00

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = -0.02

Delta = [with-current]
-0.20

If mitigation
Time lag (t-factor) = 1.46
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 9**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6120 (wetland swamp)	**N/A**	**Impact**	**3.15 acres**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63)/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Tidally connected mature mangrove wetlands located west of existing berm and surrounded by mangrove wetlands.

Assessment area description

Predominately red magnrove wetland with black and white mangrove also present along with a large number of trees under 5 feet tall and abundant seedlings.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, 36.2 acres of mangrove wetlands to the west and south, Port Everglades in surrounding area, John U. Lloyd State Park, West Lake Park	**Mangrove swamps are rare in Broward County**

Functions	Mitigation for previous permit/other historic use
Mangroves provie nursery habitat for juvenile pelagic reef species, provide basis of food web in the form of detrital matter, provide roosting and foraging habitat for migratory and wading birds, stabilize sediment and provide protection of surrounding area from storm surge.	**This area is part of a conservation easement that was granted to the then FDER by Port Everglades on 12/15/88 in accordance with dredge and fill permit # 060924019 for the development of the Southport Turning Notch.**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Mangrove crabs, migratory and wading birds, juvenile fish, commercial fish, barnacles, oysters, sponges and other invertebrates	**Little Blue Heron (SSC), Snowy Egret (SSC), Tricolored Heron (SSC), Bald Eagle (E), Snook (SSC), Smalltooth Sawfish (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Mangrove crabs, fiddler crabs, spiders

Additional relevant factors:

N/A

Assessment conducted by:	Assessment date(s):
Coastal Systems International, Inc.	**1/15/2008 - 1/17/2008**

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 9**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Impact	**Coastal Systems Int.**	**1/15/2008 - 1/17/2008**

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 6 with: 0	**mangrove wetlands immediately surrond this area to the north, south, and west. Area is tidally connected; however separated from tidal channel by berm resulting in reduced tidal exchange and connection to surrounding areas. No exotics were present. The Port is located in the vicinity of this area. With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 6 with: 0	**Urban runoff from Port and surrounding developed area; ICW receives stormwater runoff from all areas throughout the County, slightly decreased hydrological connection and tidal exchange due to distance to ICW and separation from tidal channel. Sufficient water environment to support diverse community structure. With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 7 with:	**Red, black and white mangroves were present in this area; however, red was dominant overall. No exotics were present. Red mangroves were the dominant species under 5 feet tall and seedlings were abundant throughout. There were a large number of smaller trees present and the average number of trees under 5 feet tall per point was 7.9. DBH of trees was 2.2 inches and the mean tree height was 17 feet. With impact (dredging), mangrove swamp will no longer be present.**

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres	with
0.63	0.00

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres = -1.99

Delta = [with-current]
-0.63

If mitigation
Time lag (t-factor) = 1.46
Risk factor =

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 9**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6120 (wetland swamp)	**N/A**	**Impact**	**1.27 acres**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63)/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Tidally connected mature mangrove wetlands, including a portion of the north south tidal channel, separated from the ICW to the east by a riprap bould revetment. Mangrove wetlands border area to the west, north, and south.

Assessment area description

Predominately red mangrove wetland with black and white mangroves also present. Seedlings were rare and there were a large number of trees less than 5 feet tall.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, 36.2 acres of mangrove wetlands to the west and south, Port Everglades in surrounding area, John U. Lloyd State Park, West Lake Park	**Mangrove swamps are rare in Broward County**

Functions	Mitigation for previous permit/other historic use
Mangroves provie nursery habitat for juvenile pelagic reef species, provide basis of food web in the form of detrital matter, provide roosting and foraging habitat for migratory and wading birds, stabilize sediment and provide protection of surrounding area from storm surge.	**This area is part of a conservation easement that was granted to the then FDER by Port Everglades on 12/15/88 in accordance with dredge and fill permit # 060924019 for the development of the Southport Turning Notch.**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Mangrove crabs, migratory and wading birds, juvenile fish, commercial fish, barnacles, oysters, sponges and other invertebrates	**Little Blue Heron (SSC), Snowy Egret (SSC), Tricolored Heron (SSC), Bald Eagle (E), Snook (SSC), Smalltooth Sawfish (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Mangrove crabs, fiddler crabs, spiders, raccoon

Additional relevant factors:

N/A

Assessment conducted by:	Assessment date(s):
Coastal Systems International, Inc.	**1/15/2008 - 1/17/2008**

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades Wetland Assessment	**N/A**	**Polygon 10**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Impact	**Coastal Systems Int.**	**1/15/2008 - 1/17/2008**

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	**7**	**0**	**Tidally connected mangrove wetlands immediately surround this area to the north, south and west. Area is tidally connected; however reduced tidal exchange and connection to surrounding area as a result of a riprap revetment and distance to the ICW. No exotics were present. Port is located in the vicinity of this area. With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(b)Water Environment (n/a for uplands)	**7**	**0**	**Urban runoff from Port and surrounding developed area; ICW receives stormwater runoff from all areas throughout the County; slighly decreased hyrological connection and tidal exchange due to distance along tidal channel to ICW and riprap revetment located to the east. With impact (dredging), mangrove swamp will no longer be present.**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	**7**	**0**	**Red, black and white mangroves were present in this area; however, red was dominant overall. no exotics were present. Red mangroves were the dominant species under 5 feet tall and seedlings were rare. The mean number of trees under 5 feet was 2.9 while the mean DBH was 2.5 inches, mean tree height was 17 feet. With impact (dredging), mangrove swamp will no longer be present.**

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.70	0.00

Delta = [with-current]
-0.70

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation	
Time lag (t-factor) =	1.46
Risk factor =	

For impact assessment areas
FL = delta x acres = -0.89

For mitigation assessment areas
RFG = delta/(t-factor x risk) =

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down A**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
191 (undeveloped land)	**N/A**	**mitigation**	**9.75**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Site is adjacent to the existing FPL hot water discharge, ICW is located to the east, 48 ac Conservation Easement is located to the east. No hydrological connection

Assessment area description

Site is currently undeveloped upland. Site contains Australian pines and Brazilian pepper. Site borders the 48 ac. conservation easement.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
FPL discharge canal abuts a portion of the site. The ICW is located to east and a 48 ac conservation easement is located directly east of the site.	**Not Unique**

Functions	Mitigation for previous permit/other historic use
None	**Not mitigation**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

Site is currently undeveloped upland with 10-20 coverage in exotic species.

Assessment conducted by:	Assessment date(s):
CH2M HILL	8/4/2008

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down A**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Mitigation	CH2M HILL	8/4/2008

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 0.00 with: 8.00	**Current Conditions:** Site is located within Port Everglades. Site is adjacent to 48 ac conservation easement and FPL hot water discharge canal. **Proposed Conditions:** Site will be directly connected to the conservation easement. Surrounding areas will have exotic vegetation will be removed. The side slopes at the site will be planted with native vegeation. In addition to the red mangrove planting, the site will be seeded with both black and white mangrove seeds.
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 0.00 with: 8.00	**Current Conditions:** Site is currently upland with no hydrological connection **Proposed conditions:** The site will receive hydrological input through a series of canals and tidal pools which will be hydrological connected through the FPL discharge canal and the site will connect through one of the existing canals within the conservation easement.
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 0.00 with: 8.00	**Current Conditions**: Site is partially vegetated by Brazilian Pepper and Australian Pines. **Proposed conditions:** Site will be mangrove habitat with tidal pools and tidal creeks that allow for fish and wildlife usage. The side slopes will be planted with native species. Expected usage will include foraging, roosting, nesting, nursery habitat for juvenile fish species .

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres: 0.00	with: 0.80

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres =

CH2M HILL
0.80

If mitigation	
Time lag (t-factor) =	1.46
Risk factor =	1.5

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.37

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down B**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
191 (undeveloped land)	**N/A**	**Mitigation**	**3.33**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Site is adjacent to the existing FPL discharge canal, ICW is located to the east, 48 ac Conservation Easement is located to the south. To the north in the manatee nursery. No hydrological connection

Assessment area description

Site is currently dry marina and open yard storage.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to east, 48 ac conservation easement is located directly east of the site.	**Not Unique**

Functions	Mitigation for previous permit/other historic use
None	**Not mitigation**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
None	**None**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

None

Additional relevant factors:

Site is currently a functioning dry dock marina, and open storage yards. The site is just south of the existing manatee nursery. Site will be hydrologicaly connected to the FPL discharge canal by a tidal channel. The tidal channel will provide habitat for fish and wildlife.

Assessment conducted by:	Assessment date(s):
CH2M HILL	8/4/2008

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down B**
Impact or Mitigation	Assessment conducted by:	Assessment date:
Mitigation	**CH2M HILL**	**8/4/2008**

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		w/o pres or current	with
.500(6)(a) Location and Landscape Support	**Current conditions:** Site is located within Port Everglades. Site is adjacent to 48 ac conservation easement and FPL discharge canal. **Proposed conditions:** 3.54 ac of surrounding areas will have exotic vegetation removed and will be excavated and planted with mangroves and native species on the side slopes.	0.00	7.00
.500(6)(b)Water Environment (n/a for uplands)	**Current Conditions:** Site is currently upland with no hydrological connection **Proposed conditions:** The site will receive hydrological impute through a tidal channel which will be hydrologicaly connected through the FPL discharge canal.	0.00	7.00
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	**Current Conditions:** Site is currently a dry dock marina and open storage yard with scattered exotic vegetation. **Proposed conditions:** Site will be mangrove habitat with a tidal creek that allow for fish and wildlife usage. Expected usage will include foraging, roosting, nesting, nursery habitat for juvenile fish species .	0.00	8.00

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.00	0.73

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres =

CH2M HILL
0.73

If mitigation	
Time lag (t-factor) =	1.46
Risk factor =	1.5

For mitigation assessment areas
RFG = delta/(t-factor x risk) = 0.33

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Scrape Down C & D**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
191 (undeveloped land)	**N/A**	**Mitigation**	**1.85**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Site is adjacent to the existing FPL hotwater discharge, ICW is located to the east, 48 ac Conservation Easement is located to the South.

Assessment area description

Site is currently undeveloped upland slope adjoining Port to the FPL Discharge canal. Site contains Australian pines and Brazilian pepper.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, 48 ac conservation easement is located directly south of the site. FPL discharge canal is adjacent to the site.	**Not Unique**

Functions	Mitigation for previous permit/other historic use
Current functions of the site are limited due to dense exotic growth with limited shoreline interface. Possible usage includes roosting.	**Not mitigation**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

roosting evident.

Additional relevant factors:

Currently the site is densely vegetated with Brazilian Pepper and Australian Pines.

Assessment conducted by:	Assessment date(s):
CH2M HILL	8/4/2008

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		Scrape Down C & D
Impact or Mitigation	Assessment conducted by:	Assessment date:
Mitigation	CH2M HILL	8/4/2008

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 0.00 with: 6.00	**Current Conditions:** Site is located within Port Everglades. Site is adjacent to 48 ac CE and FPL hotwater discharge canal. **Proposed Conditions:** Site will be continuous with adjacent CE and will have no exotic species present in the vicinity.	
.500(6)(b)Water Environment (n/a for uplands) w/o pres or current: 0.00 with: 6.00	**Current Conditions:** Site is currently upland with no hydrological connection **Proposed conditions:** The site will receive hydrological impute through rip rap which will line the edge of the created planting shelves.	
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 0.00 with: 8.00	**Current Conditions:** Site is vegetated by Brazilian Pepper and Australian Pines. **Proposed conditions:** Site will be mangrove habitat with rip rap along the FPL canal edge. Expected usage will include foraging, roosting, nesting, nursery habitat for juvenile fish species .	

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: 0.00 with: 0.67	Preservation adjustment factor =	FL = delta x acres =
	Adjusted mitigation delta =	

CH2M HILL	If mitigation	For mitigation assessment areas
0.67	Time lag (t-factor) = 1.46	RFG = delta/(t-factor x risk) = 0.30
	Risk factor = 1.5	

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Conservation Easement to remain**

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6120 (mangrove swamp)	**N/A**		**39.8 Ac**

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e.OFW, AP, other local/state/federal designation of importance)
Southeast Coast(FL63)/29/030902	**Class III**	**N/A**

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

ICW is located to the East, FP&L canal is located to the north. There is a network of tidal channels through out he 39.8 Ac. Conservation Easement (CE).

Assessment area description

Site is a mangrove swamp consisting mostly mature red mangroves scattered juveniles and sparse seedlings. Site is bounded to the west by upland with Brazilian Pepper and Australian Pine. At the upland wetland interface there are intermixed black and white mangroves. To the south of the site is the existing turning notch and the CE to be released of 8.7 ac.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
ICW is located to the east, Port Everglades in the surrounding areas and the FP&L discharge canal to the north.	**Site is considered to be Unique as mangrove swamps are rare in Broward County.**

Functions	Mitigation for previous permit/other historic use
Mangroves provide nursery habitat for juvenile inshore and pelagic reef species, provide basis of food web in the form of detrital matter, provide roosting and foraging habitat for migratory and wading birds, stabilize sediment and provide protection of surrounding area from storm surge.	**This area is part of a conservation easement that was granted to the then FDER by Port Everglades on 12/15/88 in accordance with dredge and fill permit # 060924019 for the development of the Southport Turning Notch.**

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Manatees, mangrove crabs, migratory and wading birds, juvenile fish, commercial fish, barnacles, oysters, sponges, tunicates and other invertebrates	**Manatee (E) Little Blue Heron (SSC), Snowy Egret (SSC), Tricolored Heron (SSC), Bald Eagle (E), Smalltooth Sawfish (T)**

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Snook (observed), mangrove snapper (observed), Great Blue Heron (observed), Tricolor Heron (observed), Raccoon (tracks)

Additional relevant factors:

Assessment conducted by:	Assessment date(s):
CH2M HILL	6/29/2009

PART II – Quantification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Port Everglades		**Conservation Easement to remain**
Impact or Mitigation	Assessment conducted by: CH2M HILL	Assessment date: 6/29/2009

Scoring Guidance	Optimal (10)	Moderate(7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 8	with: 8	**Current Condition:** **Mangrove swamp bordered by the ICW to the East, FP&L discharge canal to north, undeveloped Port properties to the west and the existing turning notch and 8.7 ac CE to be released to the south. The CE to remain has an approximately a 470 ft interface with the 8.7 ac CE to be released. Within the 470 ft interface the main hydrological connection is a 30-40 ft wide dead end ditch with a side cast berm.** **Proposed Conditions:** **The 8.7 Ac CE to be released will be dredged as a portion of the turning notch expansion and 16.5 Ac of uplands adjacent to the CE to remain will be converted into mangrove habitat. Directly connect to the 39.8 Ac CE to remain will be 10. Ac. of the wetlands creation that will have a 1000 ft interface and a series of 30 ft channels that will increase the hydraulic connectivity between the two sites.**
.500(6)(b)Water Environment (n/a for uplands)	w/o pres or current: 7	with: 8	**Current Condition:** **Currently the CE to remain receives flushing from connections to the ICW and the FP&L discharge canal. The 8.7 Ac. CE to be released is connected via a single 30-40 ft wide dead end canal. Additional flushing is provided by sheet flow through the Rip Rap that lines the eastern edge along the turning notch. To the west of the dead end ditch, a side cast berm limits flow and detrital out put for this portion of the site. Currently the side cast berm elevation is above the MHWL with a few small depressions below the MHWL that limit flushing into the western portion of the site to high tide events. Water within the dead end ditch is turbid with significantly reduced clarity as compared to the water within the CE to remain.** **Proposed Condition:** **The CE to remain will continue to receive tidal flushing from the ICW and the FP&L canal. The flushing within the CE to remain will be augmented by the construction of the tidal channels within site A wetland creation area and the removal of an 0.06 Ac. spoil deposit the will be scraped down within the CE to remain. Because the 10 Ac area will not have the restriction present the 8.7 Ac. CE to be released (i.e. the side cast berm), the tidal prism for the wetland creation will be greater and contribute to the flushing of the CE to remain. Additionally the 10 Ac. wetland creation area will provide down stream benefits of detrital output to the CE to remain**
.500(6)(c)Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 8	with: 8	**Current Condition:** **The CE to remain consists of mature stand of red mangroves with some juveniles and minimal seedlings recruitment through out the interior portions of the site. Currently the western interface with the uplands contains a fringe of Brazilian pepper and Australian pines. The interior portion of the site contains tidal channels and a open embayment which are utilized by fish and wildlife. Manatee surveys have shown utilization of the interior channels of the CE to remain and the FP&L canal. Although, the 8.7 Ac CE to be released does provide habitat for fish and wildlife usage, it is limited to the approximate 0.65 Ac. of the dead end ditch for fish and Manatees.** **Proposed Conditions:** **The CE to remain will have the fringe of Brazilian pepper and Australian pines to the west removed during the construction of the wetland creation. The CE to remain will gain an additional 2.15 Ac. of directly connected tidal creeks which will be utilized by fish and wildlife. In addition to the 10 Ac. directly connected to the CE to remain, 7 Ac. of adjacent upland will have all exotic invasive plants will be removed from the area with the other wetland creation sites.**

Score = sum of above scores/30 (if uplands, divide by 20)	
current or w/o pres: 0.77	with: 0.80

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL = delta x acres =

Delta = [with-current]
0.03

If mitigation
Time lag (t-factor) = 1.46
Risk factor = 1.5

For mitigation assessment areas	
RFG = delta/(t-factor x risk) =	0.01

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:

(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:

(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable)/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assessed in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	RFG	Acres	Total
CE to Remain		0.01	39.8	0.40
A		0.37	9.75	3.56
B		0.33	3.33	1.12
C&D		0.30	1.85	0.56
Total Funtional Gain				**5.64**
CE				
P5	-0.21			-0.21
P6	-0.49			-0.49
P7	-1.78			-1.78
P8	-0.02			-0.02
P9	-1.99			-1.99
P10	-0.89			-0.89
Total Functional Loss				**-5.38**

APPENDIX RAI-1-F

Revised Concept Plan – September 18, 2009

PLOTTED:	–
TIME:	–
PLOT SCALE:	–
DESIGNED:	–
DRAWN:	–
CHECKED:	–
APPROVED:	–
DATE: September 18, 2009	

PORT EVERGLADES CONSERVATION EASEMENT

PORT EVERGLADES

BROWARD COUNTY, FL

APPENDIX F

CH2MHILL

4350 W Cypress
Suite # 600
Tampa, Florida
33607

JOB No. 172285

CAD FILE CAD FILE

SHEET NUMBER F

SHEET OF

APPENDIX RAI-1-G

UMAM Polygons

:

FIGURE 4

MANGROVE RESOURCES DOCUMENTED WITHIN

8.7 ACRE AND 3.2 ACRE PARCELS

PORT EVERGLADES, BROWARD COUNTY, FLORIDA

COASTAL SYSTEMS INTERNATIONAL, INC.
464 South Dixie Highway, Coral Gables, Florida 33146
Tel: 305-661-3655 Fax: 305-661-1914 www.CoastalSystemsInt.com
STATE OF FLORIDA EB #7687
Coastal, Environmental, Civil Engineering and Management

Appendix RAI-1-H

Broward County Port Everglades Department Letter, February 3, 2009

BROWARD COUNTY
FLORIDA

Port Everglades Department
PORT DIRECTOR
1850 Eller Drive, Fort Lauderdale, Florida 33316-4201 • 954-523-3404 • FAX 954-523-8713

2008 FEB 4 AM 11 03

February 3, 2009

Ms. Janet G. Llewellyn
Director
Division of Water Resource Management
Florida Department of Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, FL 32399-3000

Re: **Delivery of the "Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands"**

Dear Ms. Llewellyn:

We are pleased to forward you six copies of the "Port Everglades Feasibility and Technical Study for the Creation of Mangrove Wetlands". This study was completed by the Port's environmental consultant, CH2M Hill, to provide much of the detailed information requested in the Department's May 13, 2008 letter concerning the proposed use of Port land to create an enhancement area as an offset for the release of 8.68 acres of the existing Conservation Easement within Port Everglades.

The attached study addresses most of the ten critical detail areas identified in the Department's letter. We have also attached a summary response to each of the critical detail areas to facilitate review of the study. You will note, however, that we have deferred work on one of the detail areas requested, the analysis of soil type and potential contamination within the upland area proposed for conversion. While the scope of the Port's contract with CH2M Hill includes performing that work, given the significant costs involved, we chose not to proceed with that portion of the study until we receive feedback from the Department on the information being forwarded with this letter. Having the FDEP's input on the information developed thus far, as well as your concurrence that the proposed upland site remains viable, will help provide focus for this additional work as well as any other work that may be needed.

The Port remains committed to providing the information necessary to allow the Department to approve this alternate site as an offset to the existing mangrove area that would be affected by the westward extension of the Turning Notch. The proposed enhancement area will provide a significant enhancement to the current environment within Southport.

We look forward to receiving the Department's feedback and to the opportunity to meet and discuss this in more detail. Please feel free to contact me if you have any questions or need additional information.

Sincerely,

Phillip C. Allen
Port Director

PCA:GAW:KEB:rm

Attachments

cc: Allan D. Sosnow, Broward County, w/o attachment
Linda Shelley, Fowler White Boggs, w/o attachment
Mary Poole, OPSC, w/o attachment
Mike Sole, FDEP, Secretary, w/o attachment
Bob Ballard, FDEP, Deputy Secretary, w/o attachment
Michael Barnett, FDEP, BBCS, w/o attachment
Martin Seeling, FDEP, BBCS, w/o attachment
Steve MacLeod, FDEP, BBCS, w/o attachment

Port Everglades' Comments on Critical Detail Areas
Per FDEP Letter Dated May 14, 2008

FDEP COMMENT No. 1: **The type of soil and level of soil contamination of the upland areas that are proposed for conversion to mangrove wetland.**

As indicated in the cover letter, the Port has elected to defer completion of this element of the study until we receive the FDEP's input on the CH2M Hill report due to the cost associated with this aspect of the FDEP's request. After the FDEP reviews the work completed thus far and accepts the conceptual design and data related to bringing water to the proposed enhancement area, the Port is prepared to direct its consultant to proceed with the soil investigation and will share these findings with the FDEP.

FDEP COMMENT No. 2: **The tidal regime and a flushing analysis of the existing and proposed conservation area adjacent to the FPL discharge canal.**

Section 3 of the CH2M Hill report includes the results and comments on the hydrological modeling. The results of the modeling of the proposed mangrove creation areas indicate that the tidal regime and flushing of the new mangrove areas will be more than sufficient for the establishment of a healthy, functioning ecosystem. Furthermore, results indicate that the flushing in the existing conservation easement will also be improved as a result of the project, as well as removing a blockage located at the intersection of an east/west and north/south canal within the southern area of the Conservation Easement. Please see Drawing A-1 in Section 2 of the report for the location of the blockage to be removed.

FDEP COMMENT No. 3: **The stormwater drainage plans for contributing areas around the proposed conservation area.**

Section 4 of the CH2M Hill report addresses the results of the drainage study. The potentially affected drainage basins were reviewed as part of the drainage investigation. The only system with the potential to be impacted includes the existing east/west ditch located south of S.E. 36th Street. This system conveys stormwater runoff from a 29.9 acre off-site drainage area to the FPL Discharge Canal. The off-site drainage area includes the Foreign Trade Zone and the 1800 Eller Drive Building. This section recommends utilization of an existing drainage ditch instead of culverts so there can be more space for the construction of the enhancement area. The recommended solutions as detailed in the Drainage Analysis have been incorporated into the proposed project drawings.

FDEP COMMENT No. 4: **The possibility of reconfiguring, removing or limiting the use of the proposed bridge over the discharge canal.**

The Port plans to use the bridge primarily for limited access between Midport and Southport within the restricted area of the Port. The bridge will be used for general cargo and vehicular traffic as may be needed for access to the areas directly connected to the bridge. It is not the Port's intention to use the bridge as a general use bridge for all Port traffic. By providing an internal roadway, there will be less traffic on the Port's main entrance roadway, Eller Drive, thus reducing queuing, congestion and air pollution associated with the idling of vehicles waiting to enter the Port. This new connection will provide for more efficient operations, especially during our very busy cruise season (November through May).

FDEP COMMENT No. 5: **The possibility of reconfiguring the proposed roadway west of the proposed canal bridge and the associated parking area in order to establish a connection between the wetland creation parcels.**

The east/west road on the west side of the FPL Discharge Canal connecting the new bridge to S.E. 18th Avenue will need to maintain its current configuration to align with the road on the east side of the Canal. The parking can be relocated as necessary; however, access will need to be provided to the proposed floating docks on the west side of the Canal south of the proposed bridge.

Since the proposed road and bridge will need to remain as currently sited, the Port considered the possibility of connecting the two mangrove areas through use of a culvert or series of culverts beneath the proposed roadway. This concept was not developed further due to the following factors:

- The hydrodynamic modeling indicates that the design of the separated systems will allow for efficient flushing of each area.
- Culverts would be limited in diameter due to the required depth below the roadbed and would effect little, if any, improvement in system flushing.
- The proposed flushing channels will provide fish and wildlife access to the full extent of each created mangrove area.
- Culvert construction and long-term maintenance costs are not justified based upon the above factors that indicate a lack of beneficial need.

FDEP COMMENT No. 6: **A proposed site plan for areas that would be restored to wetland mangrove communities, including surface elevations and planting layout.**

The proposed enhancement areas are broken into four distinct areas as depicted in Section 2, Figure F-1. Sites A and B comprise the largest contiguous areas to the existing Conservation Easement and are adjacent to the existing Manatee Lagoon. Sites C and D will be developed to support mangrove planters on the south side of Berth No. 29 and on the east side of the FPL Canal north or south of the proposed bridge. Approximately 17 upland acres will be developed into mangrove wetlands as an offset for the approximate 8.7 acres sought to be released from the existing Conservation Easement.

FDEP COMMENT No. 7: **Evaluation of the ecological functions of the portion of the conservation easement to be released (adjacent to the turning notch) in comparison to the functions of the proposed conservation area based on the design of the mangrove wetlands to be constructed. Use of the Uniform Mitigation Assessment Method (UMAM) is preferred by the Department.**

The Conservation Easement proposed to be released for the extension of the Turning Notch consists of 8.7 acres. The mangrove wetlands to be constructed total 17 acres. The functional loss for the portion of the Conservation Easement to be released is 5.38 units, and the total functional gain generated by the proposed mangrove wetlands is 6.20 units, an improvement of 15%. Please see Section 3, UMAM Comparison Technical Memorandum, for more detail on the functional assessment of the Conservation Easement to be released and the mangrove wetlands to be constructed. Please see Section 2 for the results of the UMAM for the area within the proposed release for the Turning Notch and the UMAM assessment conducted by CH2M Hill for the balance of the Conservation Easement.

Port Everglades' Comments on Critical Detail Areas
Per FDEP Letter Dated May 14, 2008

FDEP COMMENT No. 1: **The type of soil and level of soil contamination of the upland areas that are proposed for conversion to mangrove wetland.**

As indicated in the cover letter, the Port has elected to defer completion of this element of the study until we receive the FDEP's input on the CH2M Hill report due to the cost associated with this aspect of the FDEP's request. After the FDEP reviews the work completed thus far and accepts the conceptual design and data related to bringing water to the proposed enhancement area, the Port is prepared to direct its consultant to proceed with the soil investigation and will share these findings with the FDEP.

FDEP COMMENT No. 2: **The tidal regime and a flushing analysis of the existing and proposed conservation area adjacent to the FPL discharge canal.**

Section 3 of the CH2M Hill report includes the results and comments on the hydrological modeling. The results of the modeling of the proposed mangrove creation areas indicate that the tidal regime and flushing of the new mangrove areas will be more than sufficient for the establishment of a healthy, functioning ecosystem. Furthermore, results indicate that the flushing in the existing conservation easement will also be improved as a result of the project, as well as removing a blockage located at the intersection of an east/west and north/south canal within the southern area of the Conservation Easement. Please see Drawing A-1 in Section 2 of the report for the location of the blockage to be removed.

FDEP COMMENT No. 3: **The stormwater drainage plans for contributing areas around the proposed conservation area.**

Section 4 of the CH2M Hill report addresses the results of the drainage study. The potentially affected drainage basins were reviewed as part of the drainage investigation. The only system with the potential to be impacted includes the existing east/west ditch located south of S.E. 36th Street. This system conveys stormwater runoff from a 29.9 acre off-site drainage area to the FPL Discharge Canal. The off-site drainage area includes the Foreign Trade Zone and the 1800 Eller Drive Building. This section recommends utilization of an existing drainage ditch instead of culverts so there can be more space for the construction of the enhancement area. The recommended solutions as detailed in the Drainage Analysis have been incorporated into the proposed project drawings.

FDEP COMMENT No. 4: **The possibility of reconfiguring, removing or limiting the use of the proposed bridge over the discharge canal.**

The Port plans to use the bridge primarily for limited access between Midport and Southport within the restricted area of the Port. The bridge will be used for general cargo and vehicular traffic as may be needed for access to the areas directly connected to the bridge. It is not the Port's intention to use the bridge as a general use bridge for all Port traffic. By providing an internal roadway, there will be less traffic on the Port's main entrance roadway, Eller Drive, thus reducing queuing, congestion and air pollution associated with the idling of vehicles waiting to enter the Port. This new connection will provide for more efficient operations, especially during our very busy cruise season (November through May).

FDEP COMMENT No. 5: **The possibility of reconfiguring the proposed roadway west of the proposed canal bridge and the associated parking area in order to establish a connection between the wetland creation parcels.**

The east/west road on the west side of the FPL Discharge Canal connecting the new bridge to S.E. 18th Avenue will need to maintain its current configuration to align with the road on the east side of the Canal. The parking can be relocated as necessary; however, access will need to be provided to the proposed floating docks on the west side of the Canal south of the proposed bridge.

Since the proposed road and bridge will need to remain as currently sited, the Port considered the possibility of connecting the two mangrove areas through use of a culvert or series of culverts beneath the proposed roadway. This concept was not developed further due to the following factors:

- The hydrodynamic modeling indicates that the design of the separated systems will allow for efficient flushing of each area.
- Culverts would be limited in diameter due to the required depth below the roadbed and would effect little, if any, improvement in system flushing.
- The proposed flushing channels will provide fish and wildlife access to the full extent of each created mangrove area.
- Culvert construction and long-term maintenance costs are not justified based upon the above factors that indicate a lack of beneficial need.

FDEP COMMENT No. 6: **A proposed site plan for areas that would be restored to wetland mangrove communities, including surface elevations and planting layout.**

The proposed enhancement areas are broken into four distinct areas as depicted in Section 2, Figure F-1. Sites A and B comprise the largest contiguous areas to the existing Conservation Easement and are adjacent to the existing Manatee Lagoon. Sites C and D will be developed to support mangrove planters on the south side of Berth No. 29 and on the east side of the FPL Canal north or south of the proposed bridge. Approximately 17 upland acres will be developed into mangrove wetlands as an offset for the approximate 8.7 acres sought to be released from the existing Conservation Easement.

FDEP COMMENT No. 7: **Evaluation of the ecological functions of the portion of the conservation easement to be released (adjacent to the turning notch) in comparison to the functions of the proposed conservation area based on the design of the mangrove wetlands to be constructed. Use of the Uniform Mitigation Assessment Method (UMAM) is preferred by the Department.**

The Conservation Easement proposed to be released for the extension of the Turning Notch consists of 8.7 acres. The mangrove wetlands to be constructed total 17 acres. The functional loss for the portion of the Conservation Easement to be released is 5.38 units, and the total functional gain generated by the proposed mangrove wetlands is 6.20 units, an improvement of 15%. Please see Section 3, UMAM Comparison Technical Memorandum, for more detail on the functional assessment of the Conservation Easement to be released and the mangrove wetlands to be constructed. Please see Section 2 for the results of the UMAM for the area within the proposed release for the Turning Notch and the UMAM assessment conducted by CH2M Hill for the balance of the Conservation Easement.

FDEP COMMENT No. 8: **Effect of the proposed alterations on the existing portion of the conservation easement that would not be altered.**

There are no anticipated negative effects to the existing Conservation Easement that would remain. The proposed mangrove creation project would result in a net 8.3 acre gain in mangrove habitat acreage. The mangrove wetlands to be constructed will enhance the existing Conservation Easement area by increasing wildlife usage of the area. This enhancement will result from the integrated open water features in the designed wetlands which are severely limited or non-existent in the area of the existing Conservation Easement to be released. It should also be noted that man-made topography (riprap berms) surrounding the existing Conservation Easement to be released, along with other internal impediments to flushing, provides little to no detritus or mangrove seed export to the surrounding mangrove areas and waterways. Additionally, the hydrologic modeling conducted by CH2M Hill has shown an improvement in flushing within the portion of the Conservation Easement to remain. Please see Sections 2 and 3 for the results of the biological evaluation and hydrographic study.

FDEP COMMENT No. 9: **The possibility of granting the State of Florida ownership of some or all of the existing and proposed conservation easement areas.**

At this time, Port management is not in a position to grant the state ownership of the mangroves within the balance of the existing Conservation Easement. However, the Port is willing to discuss this matter with the FDEP and bring the Department's suggestions to the Broward County Board of County Commissioners for further consideration.

FDEP COMMENT No. 10: **Long term plans for the area around the proposed conservation site not reflected in the current draft of the Port Everglades 20-year Master Plan.**

The Port is in the process of updating the Port's 20-year Master/Vision Plan. While we do not anticipate any changes of land use in the area surrounding the Conservation Easement, it is too early to say with certainty. However, if the FDEP approves the development of the upland enhancement area, it will be taken into account if any land use changes in contiguous areas are considered as well as being reflected in the Plan revisions.