

Alex L. DeYoung

From: Erwin, Mark D <Mark.Erwin@atkinsglobal.com>
Sent: Tuesday, December 19, 2017 1:29 PM
To: Alex L. DeYoung
Subject: North Park Isles
Attachments: North Park Isles_DRAFT.PDF

Hi Alex

It says DRAFT because, we would actually finalize the document once they (Advantage/Morris) have responded to our comments and we are in agreement on their responses. Please feel free to call me if you have any questions. Thanks for your time.

Best Regards,
Mark Erwin, PE, CFM
Project Manager, Water East

ATKINS

4030 West Boy Scout Blvd, Suite 700, Tampa, FL, 33607 | Tel: +1 (813) 281 7369 |
Email: mark.erwin@atkinsglobal.com | Web: www.atkinsglobal.com/northamerica www.atkinsglobal.com

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North Park Isles - Peer Review

For the City of Plant City



November 10 2017

DRAFT

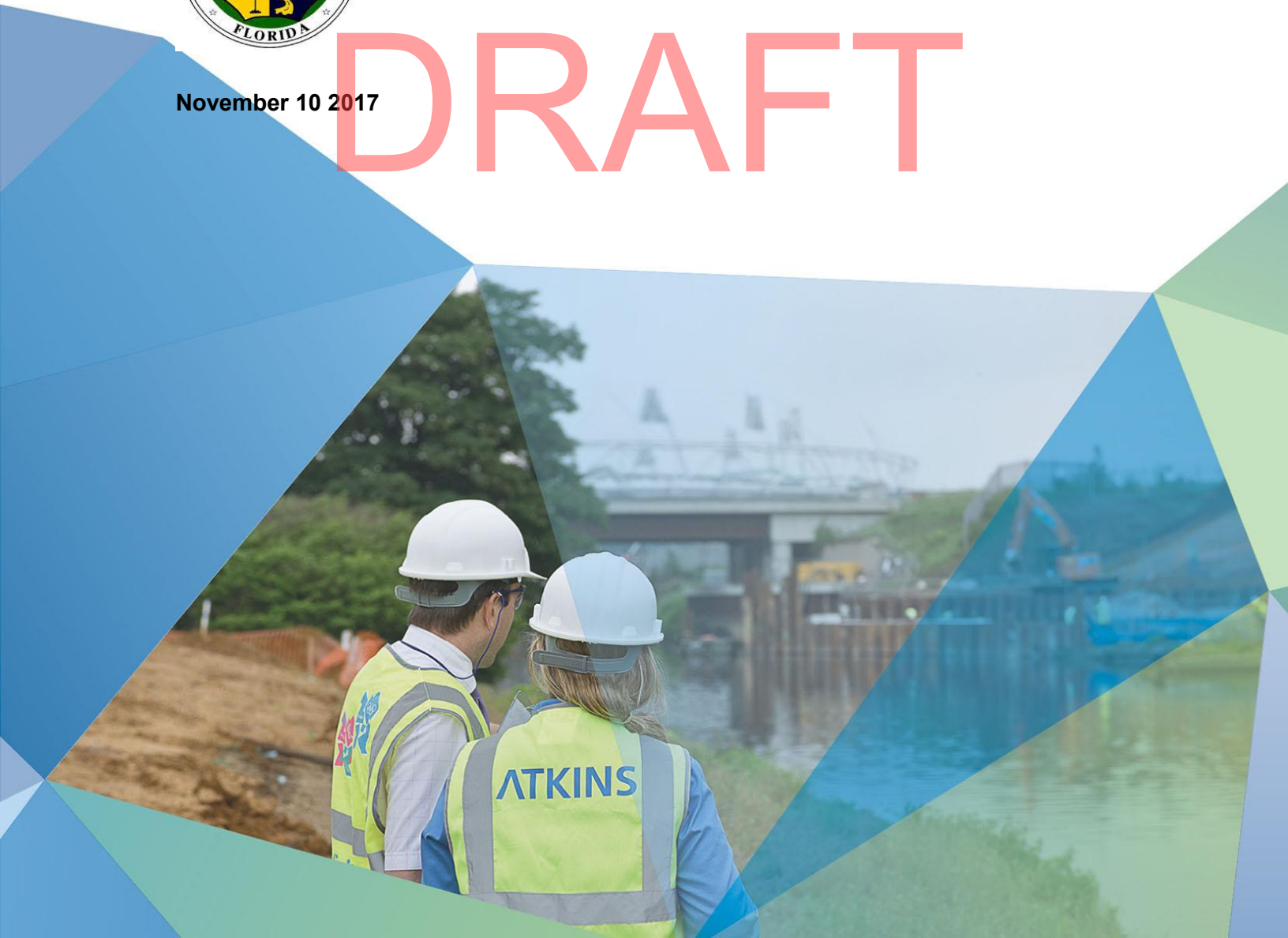


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1. Introduction

North Park Isles Development, LLC (NPI) is developing the parcels for residential units identified as Folio ID Nos. 089903-0000, 089902-0000, 089625-0000, and 089612-0000 (per the Hillsborough County Property Appraiser's Office) which are in Plant City, Florida. The intent is to construct approximately 517 residential units on the 397.2 acres. The project site is in Township 28 South, Range 22 East, and Sections 9, 10, 15, and 16 in Plant City, Florida, and bordered by Sam Allen Road to the south, Williams Road to the north (not an exact border), Country Wood Mobile Home Park to the west, and North Wilder Road to the east. NPI desires to submit a FEMA no-rise certification and Conditional Letter of Map Revision (CLOMR) to FEMA for the development. **Figure 1-1** below shows the location of the proposed project.

The development is being constructed within a significant area of the Hillsborough County and Southwest Florida Water Management District regulatory floodplain. The City of Plant City (CITY) has also previously received flooding complaints from residents within the general area which includes The Lakes at Country Wood Mobile Home Park. Because of this, the CITY has contracted Atkins North America to perform a peer review of the modeling analysis performed by Advantage Engineering Inc. (AEI). The following sections provide comments and explanations of the comments on the modeling analysis for the No-Rise certification and the CLOMR for the CITY's use in determining the suitability of the modeling analysis.

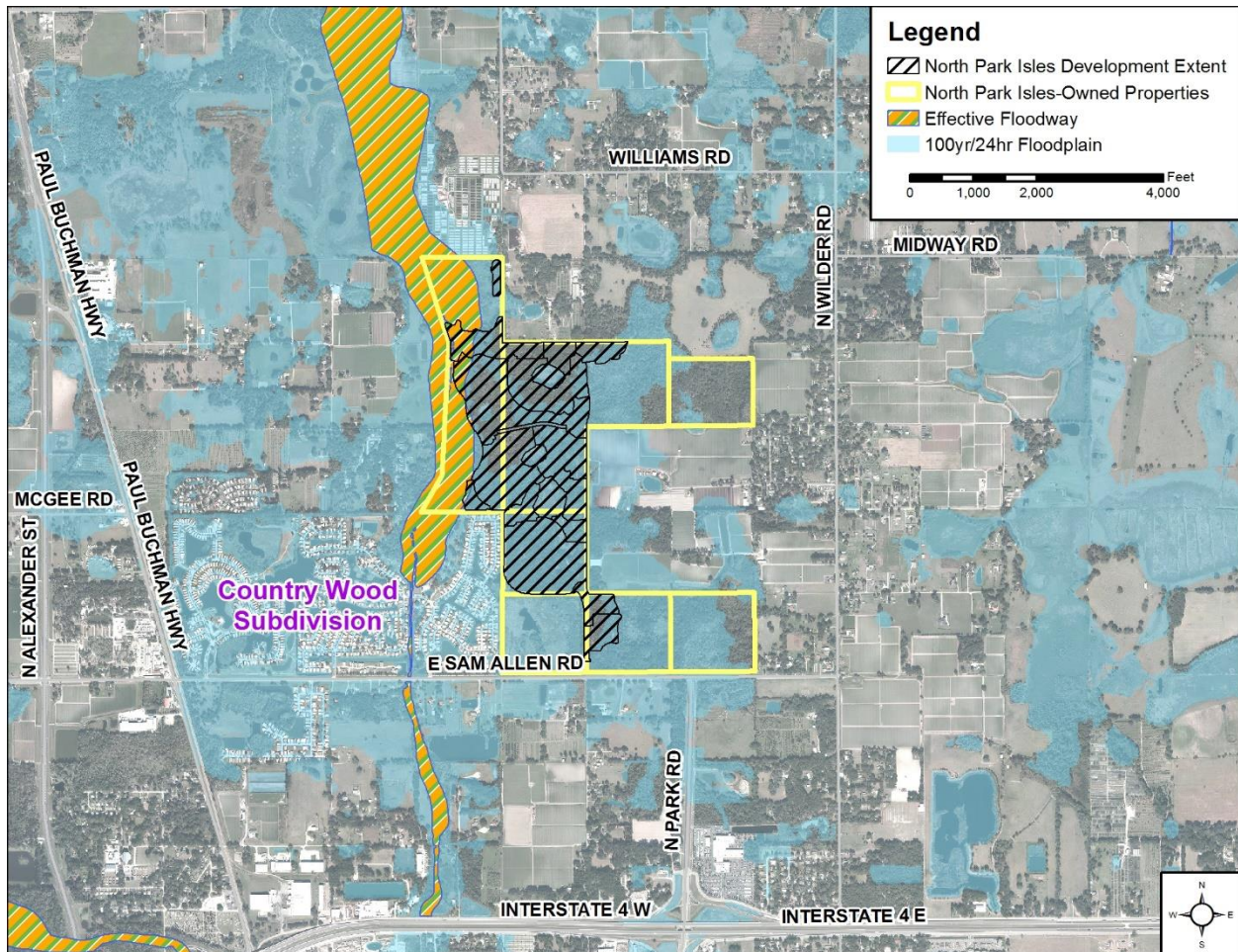


Figure 1-1 Project Location Map

2. Review of FEMA Floodway No-rise

This review is based on the document obtained from the CITY entitled *North Park Isles No-Rise Certification Report Folio ID Nos. 089909-0000, 089902-0000, 089625-000 & 089612-000 Plant City, Hillsborough County Florida*.

The following is the definition/description from the FEMA's No-Rise Certification for Floodways (<https://www.fema.gov/no-rise-certification-floodways>);

Any project in a floodway must be reviewed to determine if the project will increase flood heights. An engineering analysis must be conducted before a permit can be issued. The community's permit file must have a record of the results of this analysis, which can be in the form of a No-rise Certification. This No-rise Certification must be supported by technical data and signed by a registered professional engineer. The supporting technical data should be based on the standard step-backwater computer model used to develop the 100-year floodway shown on the Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM).

Based on the layout for this project, a portion of the project lies within the FEMA effective floodway, more specifically, cross section 9686450. As such, AEI obtained the current effective floodway model from Hillsborough County. The model is based on the original Hillsborough County Hillsborough River Masterplan Model developed in 2001. The model was subsequently used to develop the County's floodways for the FEMA Digital FEMA Insurance Rate Map (DFIRM) updates in 2008. Although the model is based on existing conditions from back in 2001, it is the effective model. The procedure for demonstrating a given project will not impact flood stage within the floodway is included in the FEMA document *GUIDANCE FOR "NO-RISE / NO-IMPACT" CERTIFICATION FOR PROPOSED DEVELOPMENTS IN REGULATORY FLOODWAYS*. The following is the general procedure for the analysis.

1. Current Effective Model – Obtain the current effective model from FEMA of the local FEMA Cooperating Technical Partner
2. Duplicate Effective Model – Upon receiving the effective model, the engineer should run the effective model to duplicate the data in the effective Flood Insurance Study (FIS)
3. Existing Conditions Model – Revise the duplicate model to reflect site specific conditions by adding cross sections in the area of the proposed development as needed without the proposed development in place.
4. Proposed Conditions Model - Modify the existing conditions model to reflect the proposed development. These results must indicate NO impact on the base flood elevations, regulatory floodway elevations, or regulatory floodway widths shown in the duplicate Effective Model or in the Existing Conditions Model

According to the AEI report, only steps 1 and 2 were completed. The no-rise certification analysis is based on the assumption that flow is contained within the primary or main channel of the effective model cross section. **Figures 2-1 and 2-2** below show the cross section in question and there are graphs in Appendix C from the AEI report. The flaw in this justification is that, in SWMM, flow is conveyed anywhere in the cross section below elevation 103.3 NAVD88 (104.15 NGVD29), which includes stations 849 – 1000 and stations 1708 – 1718 within the cross section. **Figure 2-3** presents this in a graphical format. This was tested by Atkins staff by eliminating the portion of the cross section beyond station 808 (which is the portion in which the development is encroaching in on the cross section). The results of this modeling analysis are presented in **Table 2-1**. As can be seen in the table, there are rises in peak stages for over fifteen (15) nodes along the floodway, for which no rise is allowed (meaning 0.00 feet of rise).

Floodway Comment 1 – Conduct floodway analysis that shows no rise in peak stage in the floodway (0.01 foot is considered a rise).²

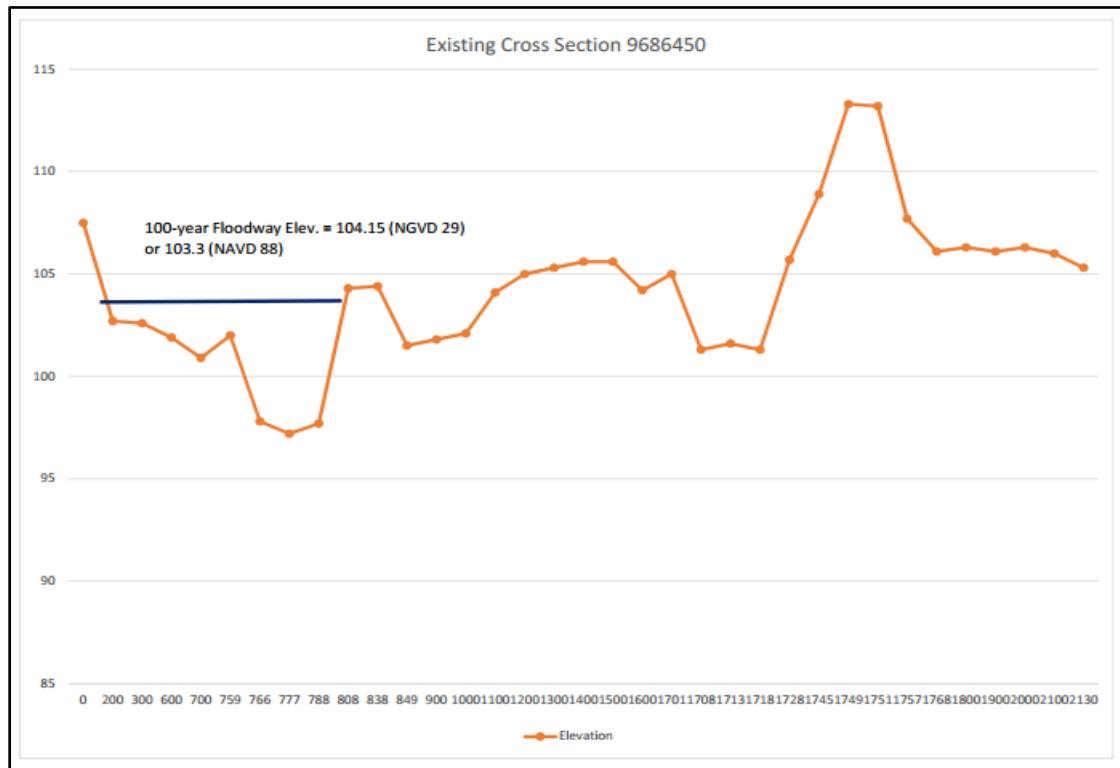


Figure 2-1 Graph 1 from Appendix C in AEI Report

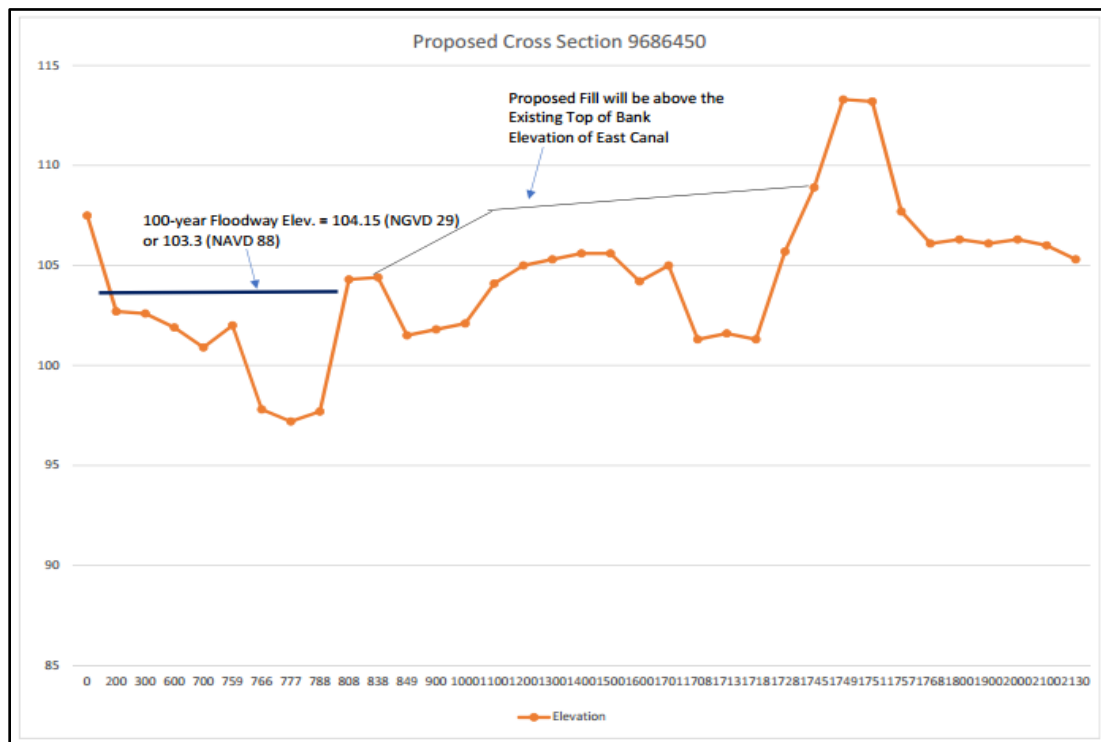


Figure 2-2 Graph 2 from Appendix C in AEI Report

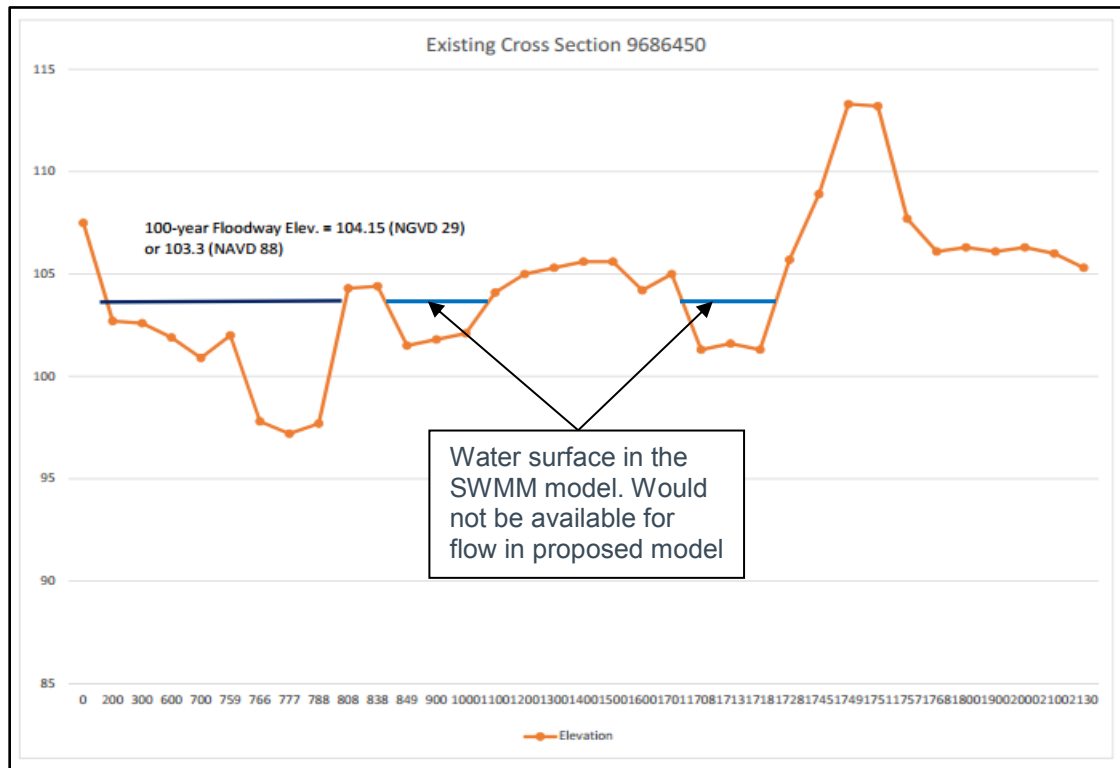


Figure 2-3 Modified Graph 2 from Appendix C in AEI Report Extending Water Surface

Table 2-1 Floodway Model Test Results of the Effective Model vs. Modified (9686450) Model

Model Junction	Location Description	Effective Floodway Model Peak Stages (ft. NGVD29)	Modified Floodway Model Peak Stages (ft. NGVD29)	Peak Stage Increases (ft.)
686150	Channel N of E. Knights Griffin Rd	102.18	102.19	0.01
686175	Channel N of E. Knights Griffin Rd	102.19	102.2	0.01
686200	Channel N of E. Knights Griffin Rd	102.2	102.21	0.01
686250		102.62	102.62	0.00
686300	Channel N of E. Knights Griffin Rd	102.75	102.76	0.01
686390	N. of E. Knights Griffin Rd	102.93	102.94	0.01
686400	S. of E. Knights Griffin Rd	103.19	103.2	0.01
686410		103.2	103.21	0.01
686420		103.27	103.28	0.01
686425		103.34	103.35	0.01
686430		103.39	103.4	0.01
686440	Channel W. of Proposed North Park Isles Development	103.43	103.44	0.01
686450	Channel W. of Proposed North Park Isles Development	104.18	104.34	0.16
686460	Channel W. of Proposed North Park Isles Development	104.32	104.46	0.14
686470	Channel N. of Country Meadows Blvd	104.47	104.6	0.13
686480	Channel N. of Country Meadows Blvd	104.47	104.6	0.13
686490	Channel N. of Country Meadows Blvd	104.66	104.7	0.04
686500	Channel N. of Country Meadows Blvd	104.68	104.73	0.05
686510	Channel N. of Country Meadows Blvd	104.72	104.77	0.05
686520	N. of Country Meadows Blvd	104.84	104.88	0.04
686530	S. of Country Meadows Blvd	104.84	104.88	0.04

3. Review of FEMA Conditional Letter of Map Revision (CLOMR)

3.1. AEI Report

Atkins was provided a drainage report to support the CLOMR request by NPI entitled *North Park Isles Drainage Report Folio ID Nos. 089909-0000, 089902-0000, 089625-000 & 089612-000 Plant City, Hillsborough County Florida*. The report was reviewed to determine the nature of the modeling analysis that was conducted, how the data was developed and the general results of the modeling analysis. The following is a general description of the modeling analysis that was conducted.

- The Hillsborough River (East Canal) watershed SWMM model was obtained from Hillsborough County which included the Sam Allen Road widening project. This model is based on the Hillsborough River Masterplan update completed in 2011 (a different and more current model than the model the effective floodway is based on)
- The model was adjusted based on project survey and elevations of two overflow weirs were modified, weirs 6686442 and 6686825, based on that survey.
- A “sub-model” was then created from the larger Hillsborough River SWMM watershed model and was converted to the ICPR software. When the “sub-model” was created, inflow headwater and time-stage tailwater boundary conditions were developed based on the SWMM model in the second bullet above. This modified model and results were used as the revised existing conditions model.
- The project design conditions were then incorporated into the revised existing conditions to develop the proposed conditions model

As part of the review of the report Atkins further examined two specific items, Tables 4.1 – 4.4 and the modification of the overflow weirs to the SWMM model obtained from the County.

Tables 4-1 – 4-4 of the AEI report present the peak stage and peak flow model results from the from the “sub-model” revised existing conditions, “sub-model” proposed conditions and the peak stage/flow differences for the 2.33-yr/, 10-yr/, 25-yr/ and 100-yr/24-hr storm events. The one junction that stands out in each table is node 686442. This node shows a substantial increase for each storm event. The report indicates that the increases are “on-site”. But according to the property appraiser, the property is not currently owned by the North Park Isles, LLC. **Figure 3-1** shows the areas of floodplain impacts on adjacent properties.

Report Comment 1 - Please verify/show property ownership or reduce flood stage to existing conditions on adjacent property.

The second item that was examined, was the modification of the weir overflows to the SWMM model obtained from the Hillsborough County. The survey data for the project was reviewed to verify these modifications. Using the survey data and the location of the weir overflows, Atkins compared the overflow elevations to the survey data. **Figures 3-2 and 3-3** below present these results.

Based on the comparisons, the modification to weir 6686442 appears to represent actual conditions well, based on the project survey data (grey line versus thick black line in **Figure 3-2**). However, weir 6686825 does not. When examining the survey data grade line (black line in **Figure 3-3**), it can be seen that the model overflow elevation (grey line in **Figure 3-3**) is well above the survey data.

Report Comment 2 – Modify weir invert elevation to 105.4 ft. NAVD88 to more accurately represent ground existing ground conditions (yellow line in **Figure 3-3**)

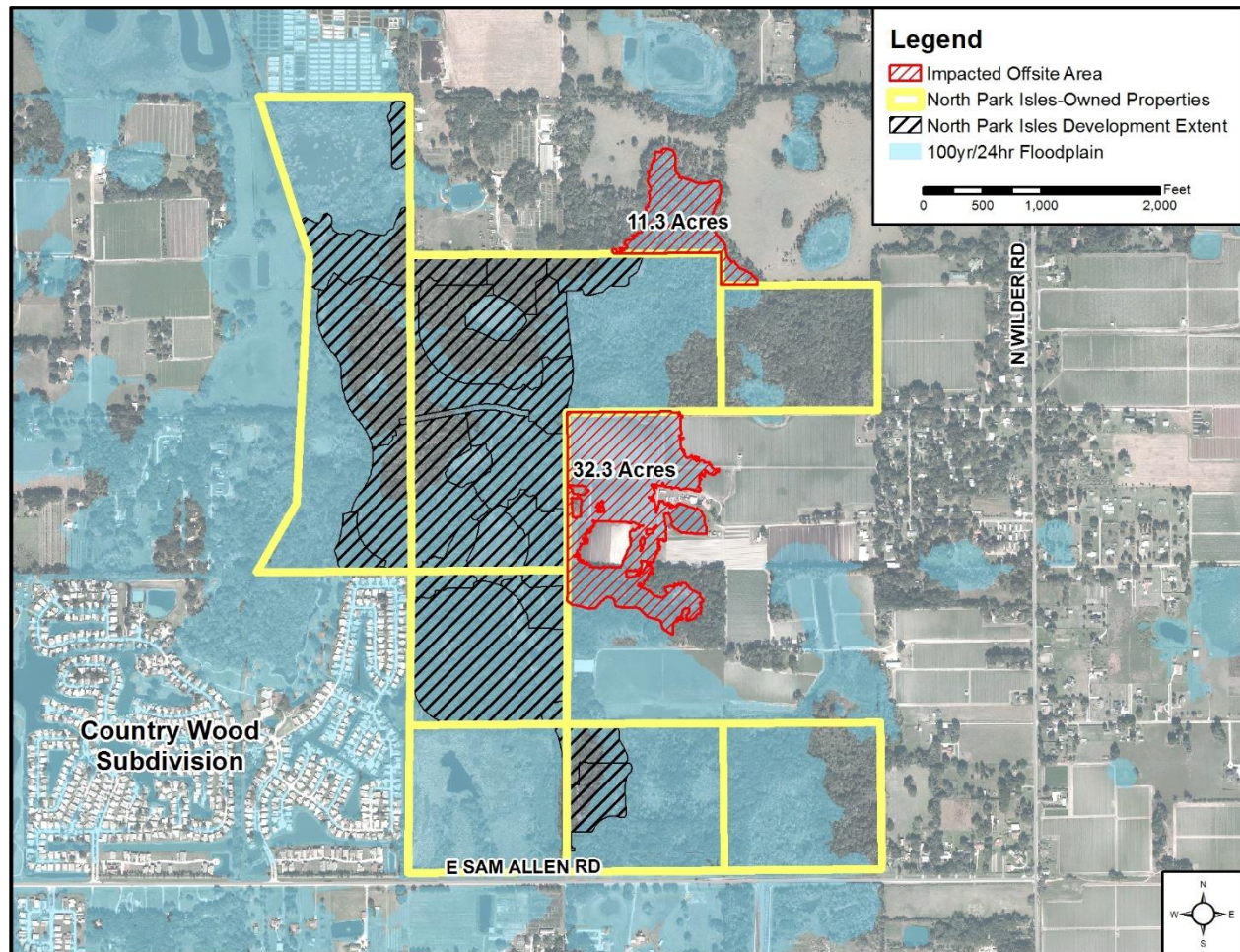


Figure 3-1 Area of Impacted Floodplain on Adjacent Properties

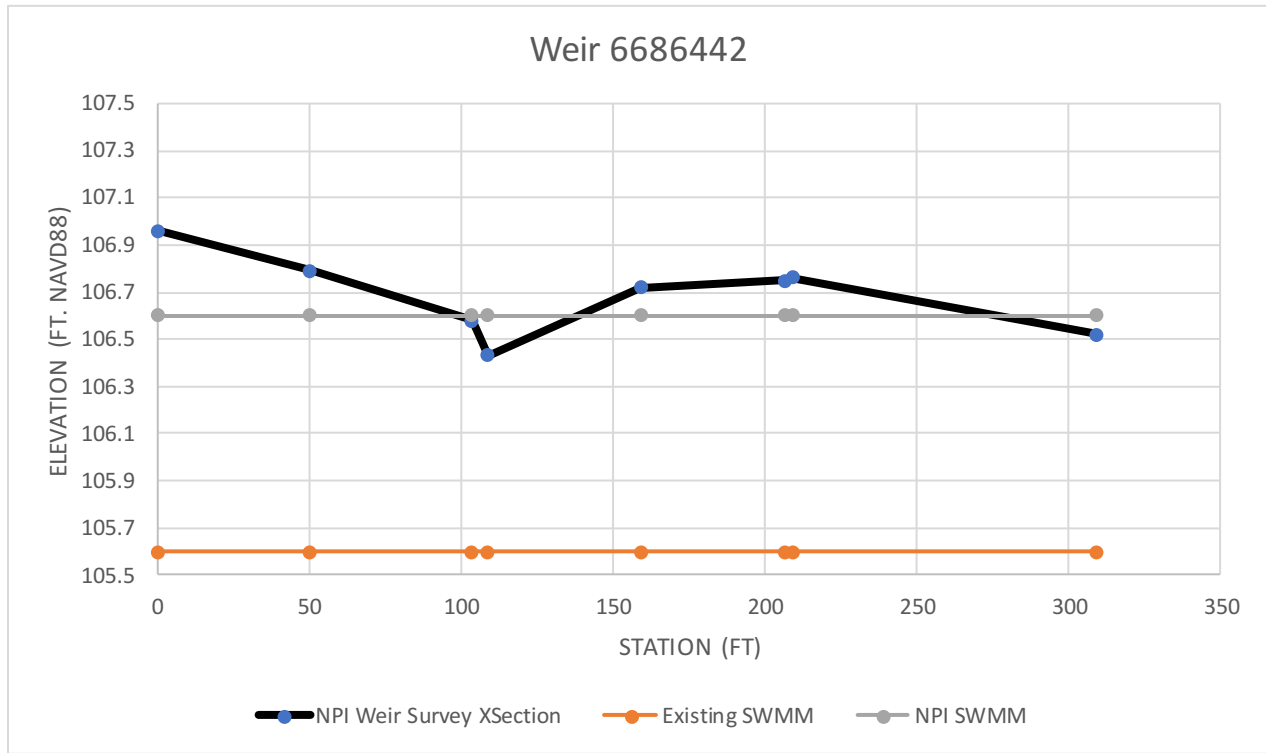


Figure 3-2 Weir overflow 6686442 model input versus survey data

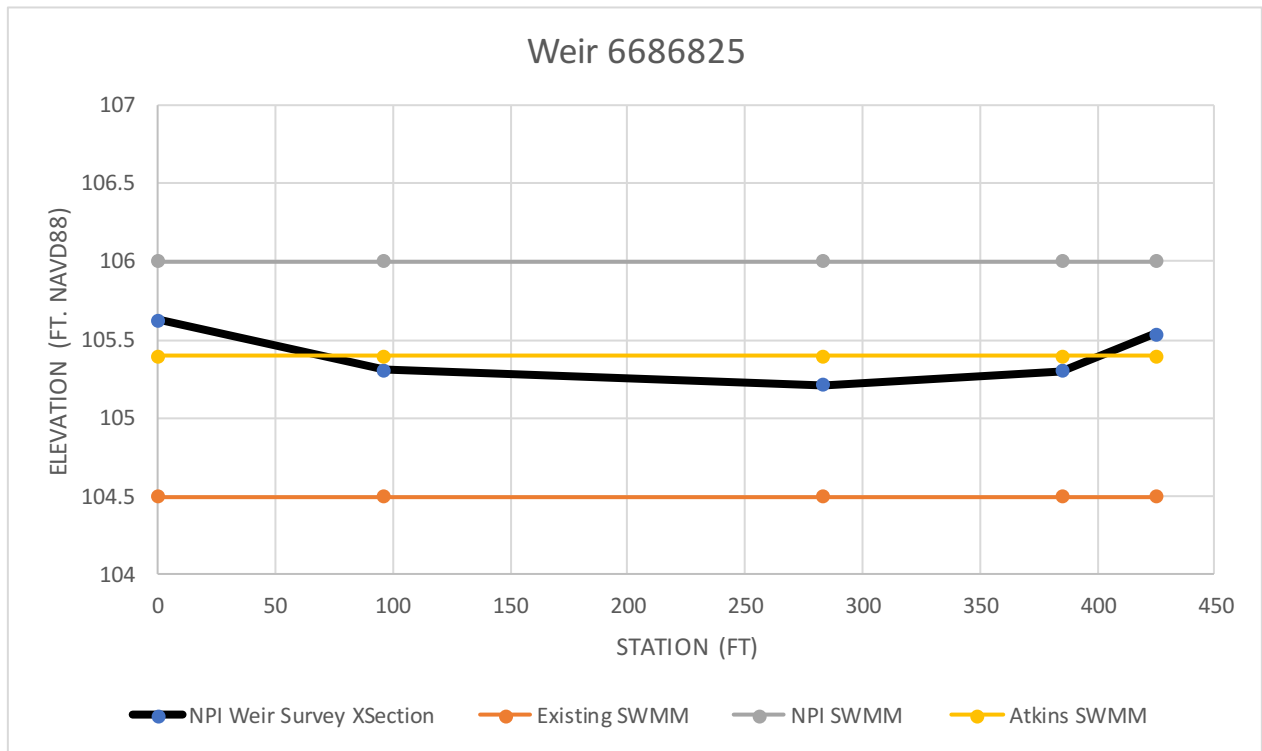


Figure 3-3 Weir overflow 6686825 model input versus survey data

3.2. Existing Conditions SWMM Model

The existing conditions SWMM model used for this project was obtained from Hillsborough County and includes the proposed improvements to Sam Allen Road. The County in cooperation with the Florida Department of Transportation (FDOT) is widening Sam Allen Road between SR 39 and N Park Road. Although this model has been reviewed and approved for analysis, the Sam Allen Road project is not constructed at the date of this review.

Existing SWMM Comment 1 – Consider making the Sam Allen widening project a proposed condition instead of an existing condition. FEMA does not recognize projects that are not constructed as an existing condition.

3.3. Existing Conditions ICPR Sub-Model

As part of this section, Atkins primarily reviewed the model conversion from SWMM to ICPR and the model boundary conditions established as part of the creation of the sub-model. The Hillsborough County SWMM model for the Hillsborough River (East Canal) watershed is a very large model and the node array is already at capacity (5,000 nodes). Because of this, the engineers for NPI created a sub-model. The sub-model that was created was also converted from SWMM to ICPR, which is a more user-friendly model software. When developing a sub-model from a larger model, boundary conditions must be created to account for model stages and flows in the surrounding area. When boundary conditions are introduced to a model, the dynamic nature of the modeling analysis is removed at those locations. As such, model boundary conditions should be established a sufficient distance away from the area to be analyzed, such that the boundary conditions do not influence the modified proposed conditions model results and impacts to the surrounding areas and communities can be accurately determined.

Atkins determined that the existing model data converted from SWMM to ICPR was sufficient (no comments). However, upon reviewing the boundary conditions, it appears some corrections should be made, in addition to a recommendation to the CITY on the location(s) of the proposed model boundary conditions.

Existing ICPR Comment 1 – Based on the discussion above, Atkins would recommend extending the sub-model further south and to the west. **Figure 3-4** shows the recommended extent of the sub-model versus the existing extent of the sub-model. This would provide a means of assuring that no adverse impacts are caused by the proposed development for the, already flooding sensitive, communities of Country Wood Mobile Home Park and The Oaks at Country Wood.

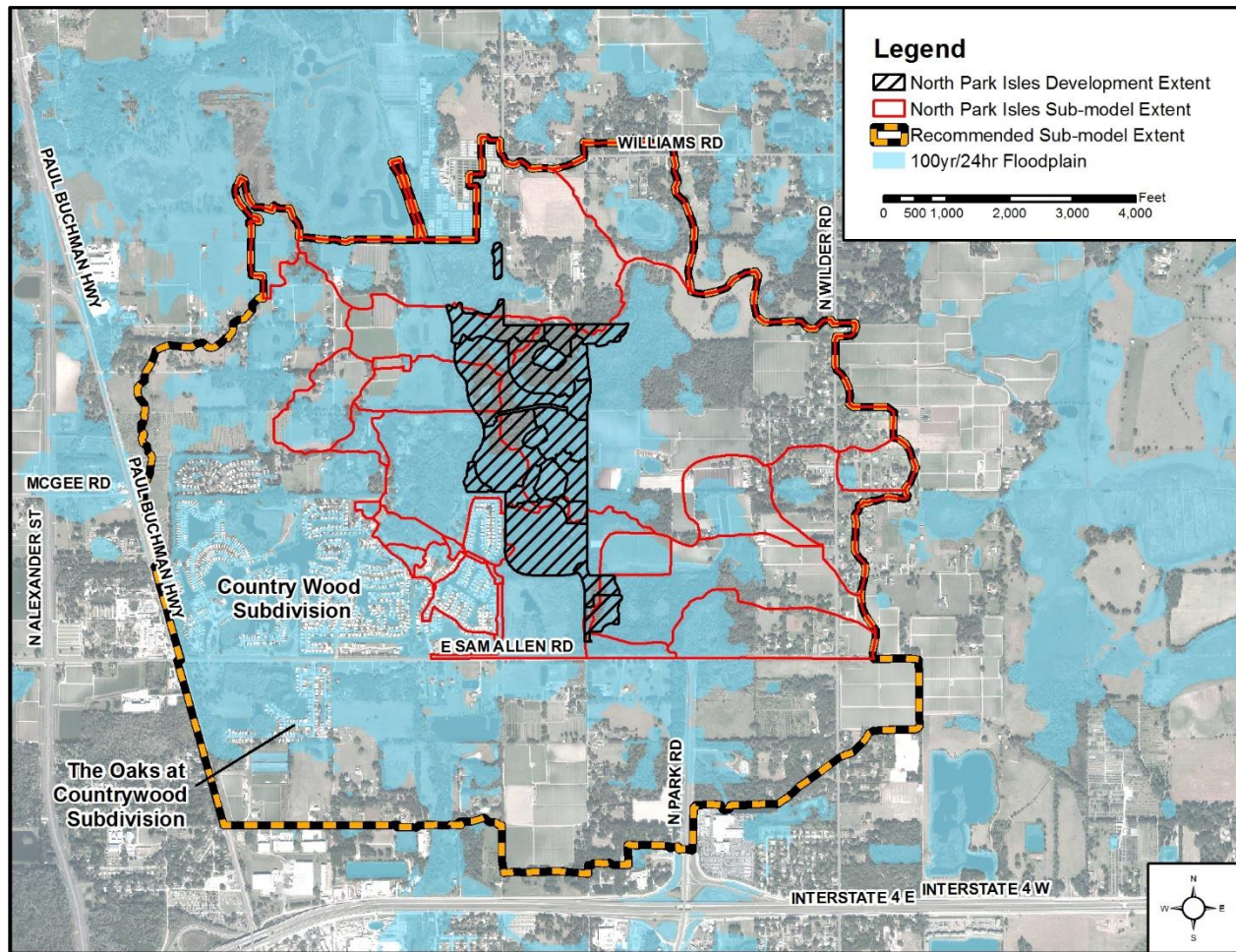


Figure 3-4 Current Extent and Recommended Extent of Sub-model

Existing ICPR Comment 2 – Channel inflow boundary 6686646 is missing

Existing ICPR Comment 3 – Pipe 2686835 inflow boundary flow to node 686830 is negative and should be positive.

Existing ICPR Comment 4 – All boundary conditions (time/stage and time/flow) for the 100yr/24hr storm event are using the 25yr/24hr boundary data.

3.4. Proposed Conditions ICPR Sub-Model

Below is a list of model input data and the comments associated with Atkins review of the model. For input that was reviewed and determined to be reasonable are noted as “**No Comments**”

3.4.1. Hydrology

- Curve numbers
 - Inside the North Park Isles Development
 - Appear reasonable – **No Comments**
 - Outside the North Park Isles Development
 - Curve numbers need to be updated based the updated areas – **General Comment**

- Times of Concentration (TC)
 - Basins within proposed residential development
 - Appear reasonable – **No Comments**
 - Surrounding offsite existing basins
 - Majority appear reasonable, except for a few basins that were significantly impacted by the proposed North Park Isles Development - May need to re-calculate/verify TCs for basins 686440, 686450, 686455 and 686825.
- Subbasins
 - Existing offsite subbasins in contribution area
 - Areas appear reasonable – **No Comments**
 - Proposed subbasins within North Park Isles development
 - Total area of proposed subbasins closely matches the area for the entire development– **No Comments**
 - Basin areas within the proposed ICPR model do not match the plans
 - Basin missing in proposed model – sliver subbasin (approximately 1.27 ac.) for bypass channel from Wetland R to the west

3.4.2. Hydraulics

- Nodes/Channels
 - Storage
 - Stage area relationship within proposed North Park Isles Development
 - Appears reasonable – **No Comments**
 - Surrounding existing offsite subbasins
 - Subbasins that do not overlap North Park Isles development
 - Appear reasonable – **No Comments**
 - Subbasins that overlap North Park Isles development (Shown in **Figure 3-5**)
 - Storage volumes were not reduced to reflect the proposed fill from future development, storage has been duplicated in nodes 686440, 686450, 686455, 686442, 686825, 686830, 686475 and 686840.
 - Channel cross sections along East Canal were not modified to reflect development encroachment into channel cross section bank areas (channel cross sections 9686470, 9686455 and 9686450)

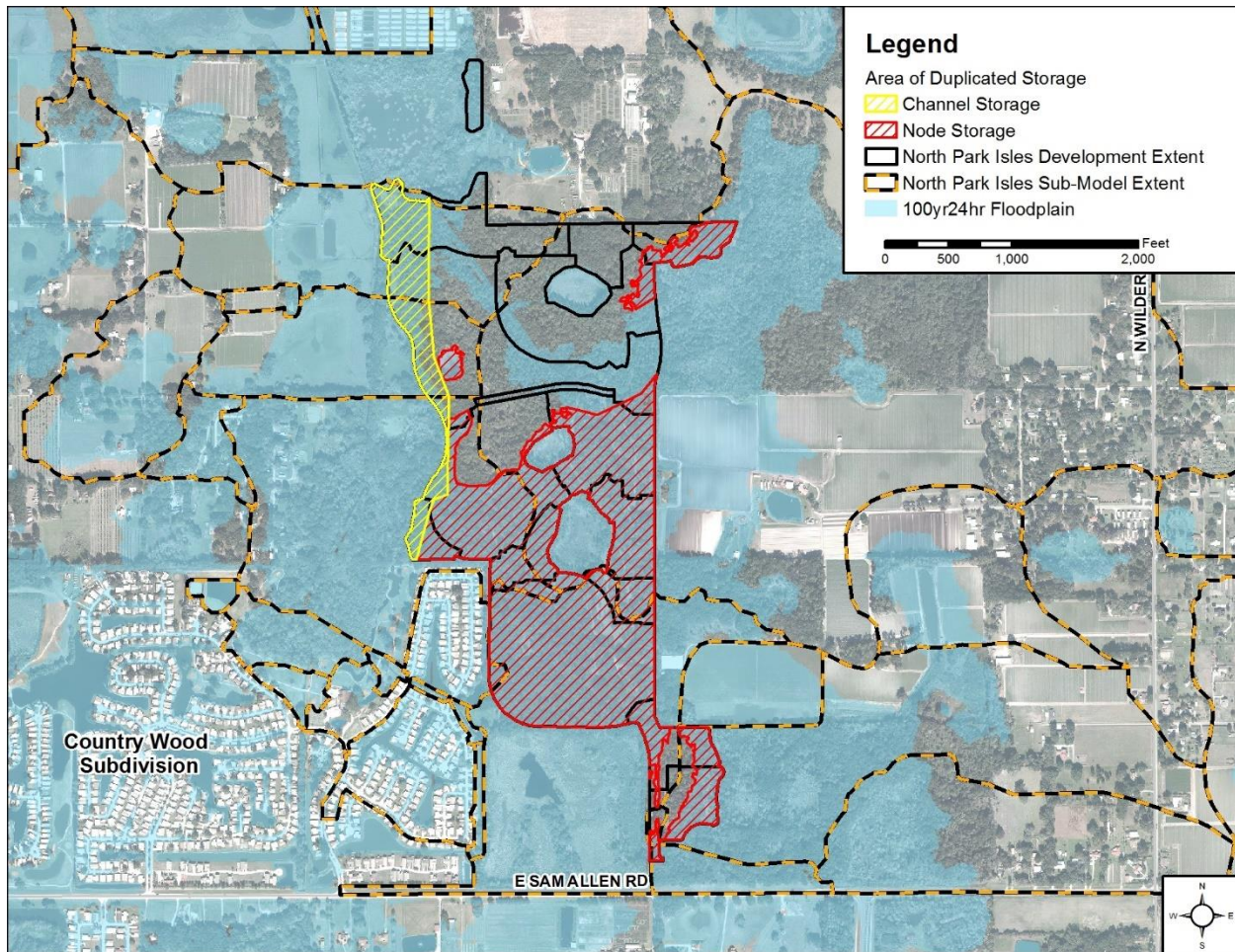


Figure 3-5 Areas of Duplicated Storage within the Model

- Initial Stages
 - Initial stages for proposed North Park Isles appear reasonable, except for two locations;
 - Pond L-03
 - Outfall to Wetland M – North Park Isles survey indicated SHWL at 104.4' (NAVD88) within Wetland M, but Pond L-03 initial water at 102.2' (NAVD88), significantly lower than downstream Wetland M SHWL
 - Pond L-FDOT01 – Joint Use Pond
 - Existing ICPR North Park Isles mini model included Sam Allen widening project which discharges to SMF A/B (Node 686843)
 - Sam Allen Road model - initial stage set at 104.7' (NAVD88), but the North Park Isles mini model lowered initial water elevation from 104.7' to 103.1' (NAVD88)
 - Pond L-FDOT01 discharges to Wetland H, Survey from North Park Isles indicate SHWL = 103.1' (NAVD88), this appears reasonable, but Pond L-FDOT01 is located directly adjacent to Wetland D, Survey from North Park Isles indicate SHWL = 103.91' (NAVD88) – potential for wetland drawdown.

- Node 686442
 - Initial stage was changed from 103.2' (NAVD88) to 104.2' (NAVD88) in the proposed ICPR model
 - Wetland-R SHWL = 103.2' (NAVD88), previous initial water seems reasonable and could be maintained.
- Model Connectivity
 - Overall proposed North Park Isles link/node schematics
 - Verify links are connected to the appropriate downstream node – **General Comments**
- Model Boundary Conditions
 - Boundary Stages – Nodes 686393, 686428, 686420 and 686402
 - All 100-yr model time/stage boundary conditions have incorrect data
 - 25-yr SWMM time/stage data was used for ICPR 100-yr simulations
 - Boundary Flows – Inflow to nodes 686842, 686830, 686807, 686490, 686644, 686471, 686470, 686430 and 686825
 - Appears all 100-yr model inflow boundary conditions have incorrect time/flow data
 - 25-yr SWMM time/flow data used within the ICPR 100-yr simulations
- Other
 - Proposed Joint Use Pond L-FDOT01 (SWMM model node 686843)
 - FPC A/B (from Sam Allen Road plans) top of bank elevation is at 106.20' (NAVD88), located north of SMF A/B, but in the North Park Isle plans (now Pond L-FDOT01) the TOB is 108.1. (NAVD88)
 - Adjacent wetland 100-yr flood elevation is at 106.83', so it was hydraulically connected, but it appears now that the Joint Use pond (L-FDOT01) encompasses both the SMF A/B and FPC A/B location, now is not hydraulically connected to the adjacent floodplain elevation of 106.63 (NAVD88)

3.4.3. Results

Results were not reviewed based on the amount model input discrepancies and will be reviewed after model adjustments are made.