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1	Revised Tables 4, 5 and 6 and related text	10/05/09	All
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Document Review and Approval

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Floodplain Evaluation Bounding Analysis for the Levy Nuclear Plant Units 1 and 2

Prepared for

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November 2009

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Attachments

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1.0 Introduction and Summary

Progress Energy Florida, Inc. (PEF) identified a location in southwestern Levy County, Florida, for the construction of a new nuclear power plant. This proposed facility, the Levy Nuclear Plant Units 1 and 2 (LNP), will require fill within the 100-year floodplain as mapped by the Federal Emergency Management Agency (FEMA). In addition, a portion of the off-site transmission corridor/line is within the 100-year floodplain.

The analysis of potential mitigation of floodplain encroachment has been provided in accordance with the requirements set forth in Executive Order 11988, *Floodplain Management*, and Title 10 Code of Federal Regulations (CFR) Part 51. The intent of these regulations is to avoid or minimize encroachments within the 100-year floodplain, where practicable, and to avoid supporting land use development that is incompatible with floodplain values.

The U.S. Nuclear Regulatory Commission (NRC) and the U.S. Army Corps of Engineers (USACE) are preparing a Draft Environmental Impact Statement as part of the approval process for the proposed LNP plant and associated transmission facilities. To address federal, state, and local regulations, this bounding analysis was prepared based on Geographic Information System (GIS) evaluations using 1-foot contour data, wetland indicators, geotechnical, and groundwater data already available for the LNP site as well as the site plan and the transmission alignment included in the Environmental Report (PEF, 2009).

Analysis Purpose

This bounding analysis is an evaluation of the maximum potential need for compensation volume resulting from LNP construction fill and to determine the associated land area that may be required to provide the compensation. An additional assessment related to the off-site transmission corridor's effects on floodplains is also addressed generally.

The purpose of this technical memorandum is to provide the NRC and USACE with a sensitivity analysis to show that, although floodplain compensation ultimately may not be required, sufficient on-site compensation is available.

Summary of Results

Levy County requires consistency with Southwest Florida Water Management District (SWFWMD) rules with provisions for no adverse impact to off-site property owners. The SWFWMD allows for flood attenuation in isolated wetlands owned or controlled by the applicant and requires no net encroachment to the floodplain and to provide for historic basin storage. The floodplain requirements are to protect adjacent property owners from increase flood stages and the historic basin storage requirement is to maintain on-site groundwater recharge after on-site development. The Florida Department of Environmental Protection (FDEP) uses SWFWMD criteria and policies to evaluate floodplain encroachment.

At this planning level, the purpose of the bounding analysis is to demonstrate that sufficient LNP land is available to provide on-site floodplain compensation, if needed; therefore, the volume compensation storage method at a 1:1 ratio was selected as a "worst case." This bounding analysis is meant to be conservative at this point for the NRC to use for their review. A separate modeling effort will be conducted in the future to establish base flood elevations and to refine the extent of the floodplain based on the survey data. Modeling will also incorporate the site fill and stormwater improvements to determine the extent of off-site rise, if any. This document includes separate analyses for the LNP site and on-site transmission corridor and for the off-site transmission corridors/transmission lines.

LNP Site and On-site Transmission

The FEMA-adopted floodplains at the LNP site location and within the on-site transmission corridor are mapped as Zone A on the 1984 Flood Insurance Rate Maps (FIRMS) for Levy County - Community Panel Numbers 120145 0640 D, 120145 0625 D, and 120145 0650 D. FEMA defines Zone A as "areas of 100-year flood; base flood elevations and flood hazard factors not determined." The Zone A map units located within or adjacent to the proposed limits of construction for the LNP site contain both small, isolated floodplains and portions of a large, forested wetland along the western half of the property extending off-site. There are 22 map unit locations in which the proposed plant site fill intersects the large FEMA-mapped floodplain that extends off-site along with the on-site transmission corridor. There are 10 map unit locations in which the proposed plant site fill intersects an isolated FEMA-mapped floodplain.

Floodplain compensation ultimately may not be required if the off-site affects on floodplain levels is small. A conservative estimate of potential floodplain rise was conducted using only the land downstream of the LNP project fill. An estimated 2.6-inch rise in the remainder of the FEMA-designated floodplain "downstream" of the project implies that only a small affect would be realized. This rise was determined without considering the reduction in runoff and storage that the on-site stormwater ponds will provide. No detailed modeling of on-site flood storage behind the proposed facilities has been conducted to date. No official determination has been made as to whether or not this estimated rise constitutes an insignificant effect; however, this document serves as a sensitivity analysis to show that sufficient on-site, upland compensation storage is available if deemed necessary.

It was estimated that approximately 252 acre-feet of floodplain fill will be placed above the estimated seasonal high groundwater (SHGW) elevation and approximately 74 acre-feet of fill will be placed below the SHGW elevation at the plant site (22 map unit locations plus the on-site portion of the transmission corridor). For the isolated FEMA-mapped floodplains on-site (10 map unit locations, typically wetlands), approximately 14 acre-feet of historic basin storage fill was calculated. Three wet detention ponds are proposed, totaling 105 acres in size, for which the permanent pool volume serves as compensation storage for the isolated floodplain historic basin storage loss.

Potential compensation area was identified based on local knowledge of the habitat, wetlands, and soils. This review identified about 322 acres of upland area with approximately 321 acre-feet of potential compensation storage available above the SHGW, which exceeds the 252 acre-feet of estimated floodplain fill impact. Compensation for 74 acre-feet of historic basin storage below the SHGW elevation can be provided by excavation

of an average of 6 inches below the SHGW within 148 acres of the 322 acres of upland area identified.

Based on the results of site ecological surveys, areas selected as potential compensation areas are low quality upland habitat areas disturbed through conversion to silviculture. No high quality or threatened and endangered species habitat will be adversely affected by floodplain compensation, if required. Because excavation will be configured to retain runoff at or above the SHGW elevation, no effects on nearby wetlands are anticipated.

Off-Site Transmission Corridors/Transmission Lines

Potential floodplain fill is being considered in the transmission right-of-way siting process. In this process, new facilities will be collocated within existing PEF right-of-way and facilities to the greatest extent possible. This co-location allows for the use of existing access roads and reduces the amount of new fill to the floodplains. Regardless of the minimization efforts, the state Environmental Resource Permit (ERP) rules will require floodplain fill to be addressed for transmission corridors as well. New fill for access roads may require compensation storage. Typically, compensation storage immediately adjacent to the floodplain fill within the transmission right-of-way is used when required, which would mean no additional land-use change or off-site effects. The total proposed transmission line length is over 180 miles located in over approximately 148 miles of corridor within Citrus, Lake, Levy, Marion, Hernando, Sumter, Polk, Hillsborough, and Pinellas counties. Of the corridor length, approximately 34 miles are located within mapped Zone A or Zone AE, which is small compared with the overall transmission length.

2.0 Regulatory Requirements

The proposed LNP facility will require fill within the 100-year floodplain as mapped by FEMA. In addition, a portion of the off-site transmission corridor/line is within the 100-year floodplain.

FEMA Floodplain Mapping

The FEMA-adopted floodplains at the LNP site location and within the on-site transmission corridor are mapped as Zone A on the 1984 FIRMs for Levy County - Community Panel Numbers 120145 0640 D, 120145 0625 D, and 120145 0650 D. FEMA defines Zone A as "areas of 100-year flood; base flood elevations and flood hazard factors not determined." The FIRM Zone A line appears to have been set primarily by using soils data and USGS Quadrangle maps to identify approximate areas of probable flooding. The mapped Zone A areas correspond fairly well with the wetland land use mapping for the overall project site. Since the FIRMs are the adopted maps of the 100-year floodplain, even if they were not evaluated in detail previously, the mapped Zone A must be used as the basis of on-site floodplains for regulatory purposes.

The Zone A map units located within or adjacent to the proposed limits of construction for the LNP site contain both small, isolated floodplains and portions of a large, forested wetland along the western half of the property extending off-site. Figure 1 is a location map of the overall plant site with the FEMA-mapped floodplains shown.

Note the Inglis Lock Bypass Channel, Lake Rousseau/Withlacoochee River, and Cross Florida Barge Canal have floodplains with Zone A1 and Zone A12 designations. FEMA defines Zone A1-A30 as "areas of 100-year flood; base flood elevations and flood hazard factors determined"; therefore, these off-site areas are shown on Figure 1 as Zone AE.

The proposed transmission lines extend more than 180 miles within over 148 miles of corridor (multiple lines in some corridors). Most of the transmission lines are collocated with existing facilities. The existing and proposed transmission corridors/transmission lines cross Zone A and Zone AE floodplains.

State and Local Regulatory Framework

The Florida Governor and Cabinet, sitting as the State of Florida Siting Board, approved the *Final Order on Certification for the Progress Energy Levy Nuclear Power Plant Units 1 & 2* on August 26, 2009. The Final Order included Conditions of Certification (COCs; FDEP, 2009). The FDEP is identified as the lead review agency for submittals, and the requirements of the Levy County Code of Ordinances, *Chapter 50 Article VI Flood Damage Protection*, and the SWFWMD, which is a regional state agency, are incorporated into the COCs.


19
40
Lake Rousseau
Inglis Lock Bypass Channel
Cross Florida Barge Canal
LEGEND
Property Boundary
Limits of Construction
FEMA Zone A
FEMA Zone AE
N
W
E
S
0 300 600
Meters
0 1,000 2,000
1" = 2000'
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Floodplain Evaluation Bounding
Analysis Technical Memorandum
Site and Floodplain Location
Figure 1

In addition to requirements for finished floor elevations and/or floodproofing of buildings, Levy County rules requires consistency with SWFWMD rules, with provisions for no adverse impact to off-site property owners. The SWFWMD ERP Basis of Review as adopted by the FDEP (SWFWMD, 1995) contains definitions and requirements for on-site fill as follows:

- Isolated wetlands "owned or controlled by the applicant may be used for flood attenuation purposes."
- "No net encroachment into the flood plain, up to that encompassed by the 100-year event, which will adversely effect either conveyance, storage, water quality or adjacent lands will be allowed. Any required compensation storage shall be equivalently provided between the seasonal high water level and the 100 year flood level to allow storage function during all lesser flood events."
- "Provision must be made to replace or otherwise mitigate the loss of historic basin storage provided by the project site", which is defined as the "depression storage available on the site in the predevelopment condition." Historic basin storage maintains groundwater recharge opportunities with site development.

The separation between floodplain storage (that is, peak flood ponding) and historic basin storage depends on the landscape. In general, floodplain storage is the detention volume above the elevation where stormwater runoff occurs by sheet flow from natural low areas; historic basin storage is the detention and/or retention volume below this discharge elevation. The historic basin storage volume remains on-site and percolates to recharge the surficial aquifer system. Since normal (that is, non-flooding) surface water levels are most often no higher than the SHGW elevation, which is the typical starting elevation used for flooding estimates to begin, there can be overlap in historic basin storage and flooding volumes and they are not mutually exclusive (that is, not additive).

FDEP uses SWFWMD criteria and policies for evaluation of submittals; therefore, the standard permitting practices and policies for SWFMWD are relevant. The SWFWMD procedures to address potential floodplain and historic basin storage impacts, in order of SWFWMD preference, are as follows:

- Provide volume compensation storage on-site for fill.
- Purchase the land or flooding rights to the property affected by the fill.
- Use dynamic modeling to demonstrate no adverse off-site impact.
- Apply for a variance (Section 120.542, Florida Statutes and Rule 28-104, Florida Administrative Code).

Generally, the procedures above are in order of decreasing land requirements. The "worst case" from a land requirement standpoint would be the volume compensation, which is at a 1:1 ratio and locally referred to as cup-for-cup compensation. For this method, floodplain compensation volume must be above the SHGW level. Historic basin storage compensation may occur above or below the SHGW level or within the permanent pool of on-site wet detention ponds.

Analysis Approach

At this planning level, the purpose of this bounding analysis is to demonstrate that there is sufficient land area on-site to provide on-site floodplain compensation, if needed; therefore, the volume compensation storage method was selected as a "worst case." This document includes separate analyses for the LNP site and on-site transmission corridor and for the off-site transmission corridors/transmission lines.

For the LNP site and on-site transmission corridors, the following simplifying assumptions and definitions are used in this analysis:

- The FEMA-mapped floodplains are assumed to represent both the regulated floodplain and historic basin storage areas on-site.
- The fill above the SHGW within each map unit, whether technically floodplain storage or historic basin storage, is used to determine the land area required for compensation storage for the large, connected floodplain system on-site. This generates the largest estimate of required compensation volume and translates into the largest potential land area required. The area required for compensation for the historic basin storage fill below the SHGW is a subset of the floodplain compensation area because more historic storage volume can be created by excavating deeper than the SHGW levels.
- For the purpose of this document, the volume of fill above the SHGW is referred to as floodplain fill and the volume below the SHGW is referred to as historic basin storage.
- As isolated wetlands may be used for flood attenuation/storage, no floodplain compensation for fill above the SHGW within isolated floodplains on-site is proposed. The increased flood stages resulting from filling these isolated areas are assumed to be wholly contained on-site, which will be verified with more detailed modeling in the future. The isolated wetland floodplains do provide historic basin storage that contributes to recharge in the area. The permanent pool volume of the proposed on-site wet detention stormwater ponds is assumed to be sufficient as compensation for historic basin storage loss within the on-site isolated floodplain mappings.

3.0 Fill and Compensation Analysis

The planning-level process used to estimate the filled area and flood volume for each Zone A mapping unit associated with the proposed site development, including the on-site portion of the transmission corridor, is described in the following steps. A separate generalized assessment associated with the off-site transmission corridors/lines is also included in this section (Zone A and AE).

LNP Plant Site and On-Site Transmission Corridor

The following process was used to assess the plant site (that is, the construction area grouped around the power plant).

1. **Determine the area of floodplain affected using the intersection of the limits of LNP construction and the floodplain as mapped by FEMA.**

   The average 100-year floodplain elevation was determined by using Light Detection and Ranging (LiDAR) mapping accurate to the 1-foot contour and the FIRM boundaries, which were converted to digital format in 1996. The LiDAR digital terrain model data was produced to meet FEMA floodplain mapping specifications. A copy of the accuracy statement prepared for Sargent & Lundy is included as Attachment A. The affected area within each intersection polygon was calculated using GIS. These areas are identified in Table 1 and shown on Figure 2. Attachment B presents a detailed map book of the potential floodplain fill areas.

2. **Estimate the normal pool and SHGW elevation by using on-site wetland, soil, and hydrology data and observations for the connected floodplain map units.**

   The normal pool elevation or SHGW elevation constitutes the base elevation of floodplain storage used for this document. Determining this value allows for the separation of floodplain fill volume and historic basin storage fill volume at each intersection polygon. Wetland indicators of normal pool, Natural Resource Conservation Commission (NRCS) soils data, and recent quarterly groundwater monitoring were used to determine the base elevation, as summarized in Tables 2 through 4.

   The term "normal pool" is used here to describe the elevation of standing water in wetlands for a period of several weeks during the wet season. This elevation is often estimated by using a combination of ecological indicators such as the inflection point of buttresses in cypress and the elevation of moss collars on cypress. For the purposes of this analysis, based on site knowledge and using elevations from LiDAR mapping, the normal pool elevation was assumed to be 1-foot above the average base (bottom of basin) of cypress wetlands. This flooding depth is consistent with site observations by field ecologists. Site wetlands are depicted in Figure 3.

TABLE 1
FEMA-Mapped Floodplain Polygons Affected by Construction

Column [C1]	[C2]	[C3]	[C4]	[C5]
Map Unit Identification	**Location Description**	**Area[1] (acre)**	**Estimated Floodplain Elevation[2] (ft NAVD)**	**Connectivity of Location**
A1	North US 19 Access Road	3.23	41	Connected
B1	North US 19 Access Road	7.46	42	Connected
C1	Building 118, 136	0.96	43	Connected
D1	North US 19 Access Road	0.04	42	Connected
E1	Building 186	13.62	43	Connected
F1	Access Road	0.08	42	Connected
G1	Building 122	3.12	42	Connected
H1	North US 19 Access Road	2.61	44	Connected
I1	Building 102, 103, 105, 106, 111, 117, 119 & 132	47.80	43	Connected
J1	Building 180	1.37	48	Isolated
K1	Building 180	2.04	45	Isolated
L1	Building 180	4.75	45	Isolated
M1	Stormwater Pond A, Building 196A, 197A	67.04	43	Connected
N1	South US 19 Access Road	9.28	42	Connected
O1	Units 1 & 2, Stormwater Pond B	128.82	43	Connected
P1	Stormwater Pond C	0.85	47	Isolated
Q1	Building 131	7.41	43	Isolated
R1	South US 19 Access Road	0.53	40	Isolated
S1	Stormwater Pond B	3.46	43	Isolated
T1	Access Road	10.53	42	Connected
U1	Heavy Haul Road	3.36	41	Connected
V1	Building 137	0.56	43	Isolated
W1	Heavy Haul Road	3.37	43	Connected
X1	Heavy Haul Road	1.69	44	Connected
Y1	Heavy Haul Road	1.36	43	Connected
Z1	Heavy Haul Road	8.23	43	Connected
A2	Heavy Haul Road	10.08	42	Connected
B2	Heavy Haul Road	0.79	36	Isolated
C2	Heavy Haul Road	0.25	37	Isolated
D2	Heavy Haul Road	1.25	36	Connected
E2	Heavy Haul Road	0.77	37	Connected
F2	Heavy Haul Road	6.68	34	Connected

Notes:
1. From GIS
2. Overlay with 1-foot LiDAR contours. FEMA mapping is based on 1996 digital representation of FIRMs available through GIS.

NAVD = North American Vertical Datum of 1988


19
A1
B1
C1
D1
E1
F1
G1
H1
I1
J1
K1
L1
M1
N1
O1
P1
Q1
R1
S1
T1
U1
V1
W1
X1
Y1
Z1
A2
B2
C2
D2
E2
F2
40
Lake Rousseau
Inglis Lock Bypass Channel
Cross Florida Barge Canal
LEGEND
Property Boundary
Limits of Construction
Floodplain Fill Areas
FEMA Zone A
FEMA Zone AE
Reference:
Attachment B Map Book - Potential Fill Areas within FEMA-Mapped Fill Areas within FEMA-Mapped Floodplain
N
W
E
S
0 300 600
Meters
0 1,000 2,000
1" = 2000'
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Floodplain Evaluation Bounding Analysis Technical Memorandum
Potential Fill Areas within FEMA-Mapped Floodplain
Figure 2

TABLE 2
Summary of Wetland Indicators / Normal Pool Elevations

Column [C1]	[C2]	[C3]	[C4]
Map Unit Identification [1]	**Associated Wetland**	**Wetland Type**	**Estimate of Wetland "Normal Pool" Information [2] (ft NAVD)**
A1	LNP – 019	621 Cypress	40.0
B1	LNP - 020, Primarily Upland	621 Cypress	41.0
C1	LNP – 019	621 Cypress	42.5
D1	LNP – 019	621 Cypress	43.0
E1	LNP – 016	617 Mixed Wetland Hardwoods	43.0
F1	LNP – 019	621 Cypress	42.0
G1	LNP – 016	617 Mixed Wetland Hardwoods	42.0
H1	LNP – 019	621 Cypress	43.0
I1	LNP – 016	617 Mixed Wetland Hardwoods	43.0
M1	LNP - 015 & 019	621 Cypress	42.0
N1	LNP - 015 & 019	621 Cypress	42.0
O1	LNP - 015 & 019	621 Cypress	42.0
T1	LNP – 011	621 Cypress	41.0
U1	LNP - 015 & 019	621 Cypress	41.0
W1	LNP – 013	621 Cypress	41.0
X1	LNP - 013 and Upland	621 Cypress	43.0
Y1	LNP - 011 and Upland	621 Cypress	42.0
Z1	LNP - 011 and Upland	621 Cypress	41.0
A2	LNP - 011 & 012 and Upland	621 Cypress	41.0
D2	LNP – 010	621 Cypress	35.0
E2	Upland	None	N/A
F2	Minor LNP - 005, Upland	None	N/A

Notes:
1. From Table 1. Isolated floodplain units (J1, K1, L1, P1, Q1, R1, S1, V1, B2, and C2) are evaluated separately (Table 8).
2. Normal pool estimate is 1-ft above average bottom of wetland.
N/A = Not applicable
NAVD = North American Vertical Datum of 1988

TABLE 3
Estimated SHGW Elevation for Each Location

Column [C1]	[C2]	[C3]	[C4]	[C5]	[C6]	[C7] Table 2 [C4]	[C8]
Map Unit Identification [1]	NRCS Soil Unit Type	Average Ground Elevation [2] (ft NAVD)	NRCS Depth to Water Table (feet)	Estimate of NRCS Water Table Elevation (ft NAVD)	Groundwater Monitoring Elevation (ft NAVD)	Estimate of "Normal Pool" (ft NAVD)	Estimated SHGW Elevation [3] (ft NAVD)
A1	17 - Adamsville	40.1	2.8	37.3	<41.5	40.0	40.0
B1	17 - Adamsville	41.8	2.8	39.0	<41.5	41.0	41.0
C1	18 - Wauchula	43.3	1.0	42.3	41.8	42.5	42.5
D1	17 - Adamsville	42.3	2.8	39.6	41.5	43.0	43.0
E1	18 - Wauchula	43.4	1.0	42.4	42.0	43.0	43.0
F1	17 - Adamsville	41.6	2.8	38.8	<41.5	42.0	42.0
G1	17 - Adamsville	42.2	2.8	39.5	44.0	42.0	44.0
H1	18 - Wauchula	43.5	1.0	42.5	41.8	43.0	43.0
I1	16 - Chobee	42.7	0.3	42.5	43.0	43.0	43.0
M1	9 - Pomona	42.0	1.0	41.0	41.5	42.0	42.0
N1	9 - Pomona	42.1	1.0	41.1	<42.0	42.0	42.0
O1	17 - Adamsville	42.0	2.8	39.2	42.0	42.0	42.0
T1	17 - Adamsville	41.7	2.8	38.9	41.0	41.0	41.0
U1	17 - Adamsville	41.1	2.8	38.4	42.5	41.0	42.5
W1	17 - Adamsville	41.4	2.8	38.7	43.0	41.0	43.0
X1	17 - Adamsville	43.1	2.8	40.3	N.A.	43.0	43.0
Y1	11 - Placid	42.2	0.3	42.0	N.A.	42.0	42.0
Z1	17 - Adamsville	40.9	2.8	38.1	N.A.	41.0	41.0
A2	17 - Adamsville	38.8	2.8	36.0	N.A.	41.0	41.0
D2	17 - Adamsville	35.6	2.8	32.9	N.A.	35.0	35.0
E2	23 - Zolfo	36.5	2.8	33.7	N.A.	N/A	33.7
F2	34 - Cassia	31.4	2.5	28.9	N.A.	N/A	28.9

Notes
1. Isolated floodplain units (J1, K1, L1, P1, Q1, R1, S1, V1, B2, & C2) evaluated separately (Table 8).
2. Average ground elevation within each area based on GIS analysis.
3. SHGW estimated from normal pool [C7] unless groundwater monitoring data [C6] shown as a higher value. NRCS data used when no wetlands or locations beyond the extent of groundwater monitoring.

SHGW = Seasonal High Groundwater
N.A. = Not Available, beyond extent of groundwater monitoring wells.
NAVD = North American Vertical Datum of 1988

TABLE 4
Estimated Depth of Floodplain Fill and Depth of Historic Basin Storage for Volume Computations

Column [C1]	[C2] Table 1 [C4]	[C3] Table 3 [C3]	[C4] Table 3 [C8]	[C5] Largest of [C3] & [C4]	[C6] [C2] – [C5]	[C7]
Map Unit Identification[1]	**Floodplain Elevation (ft NAVD)**	**Average Ground Elevation (ft NAVD)**	**Estimated SHGW Elevation (ft NAVD)**	**Bottom of Floodplain Storage Value Used (ft NAVD)**	**Depth of Floodplain Fill (feet)**	**Depth of Fill in Historic Basin Storage** [5] **(feet)**
A1	41.0	40.1	40.0	40.1 [2]	41.0 – 40.1 = 0.9	N/A
B1	42.0	41.8	41.0	41.8 [2]	42.0 – 41.8 = 0.2	N/A
C1	43.0	43.3	42.5	43.3 [2]	N/A	0.5
D1	42.0	42.3	43.0	43.0 [3]	N/A	0.5
E1	43.0	43.4	43.0	43.4 [2]	N/A	0.5
F1	42.0	41.6	42.0	42.0 [3]	N/A	0.5
G1	42.0	42.3	44.0	44.0 [3]	N/A	0.5
H1	44.0	43.5	43.0	43.5 [2]	44.0 – 43.5 = 0.5	N/A
I1	43.0	42.7	43.0	43.0 [3]	N/A	0.5
M1	43.0	42.0	42.0	42.0 [4]	43.0 - 42.0 = 1.0	N/A
N1	42.0	42.1	42.0	42.1 [2]	N/A	0.5
O1	43.0	42.0	42.0	42.0 [4]	43.0 – 42.0 = 1.0	N/A
T1	42.0	41.7	41.0	41.7 [2]	42.0 – 41.7 = 0.3	N/A
U1	41.0	41.1	42.5	42.5 [3]	N/A	42.5 - 41.1 = 1.4
W1	43.0	41.4	43.0	43.0 [3]	N/A	43.0 - 41.4 = 1.6
X1	44.0	43.1	43.0	43.1	44.0 - 43.1 = 0.9	N/A
Y1	43.0	42.2	42.0	42.2 [2]	43.0 – 42.2 = 0.8	N/A
Z1	43.0	40.9	41.0	41.0 [3]	43.0 – 41.0 = 2.0	0.5
A2	42.0	38.8	41.0	41.0 [3]	42.0 – 41.0 = 1.0	41.0 - 38.8 = 2.2
D2	36.0	35.6	35.0	35.6 [2]	36.0 – 35.6 = 0.4	N/A
E2	37.0	36.5	33.7	36.5 [2]	37.0 – 36.5 = 0.5	N/A
F2	34.0	31.4	28.9	31.4 [2]	34.0 – 31.4 = 2.6	N/A

Notes: 1. Isolated floodplain units (J1, K1, L1, P1, Q1, R1, S1, V1, B2, and C2) are evaluated separately (Table 8).
2 Source for Bottom of Floodplain Storage is Average Ground Elevation
3. Source for Bottom of Floodplain Storage is SHGW
4 Source for Bottom of Floodplain Storage is Average Ground and SHGW
5. Historic basin storage assumed when the bottom of floodplain storage (column 5) is above the average ground elevation (column 3) or when the average ground elevation (column 3) is at or above the estimated floodplain elevation (column 2). A value of 6-inches is used as a minimum.

NAVD = North American Vertical Datum of 1988:
N/A = Not applicable
SHGW = Seasonal High Groundwater


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Lake Rousseau
Inglis Lock Bypass Channel
Cross Florida Barge Canal
LEGEND
Property Boundary
Field Survey Wetlands
Limits of Construction
Floodplain Fill Areas
FEMA Zone A
FEMA Zone AE
Reference:
Attachment B Map Book - Potential Fill Areas within FEMA-Mapped Floodplain
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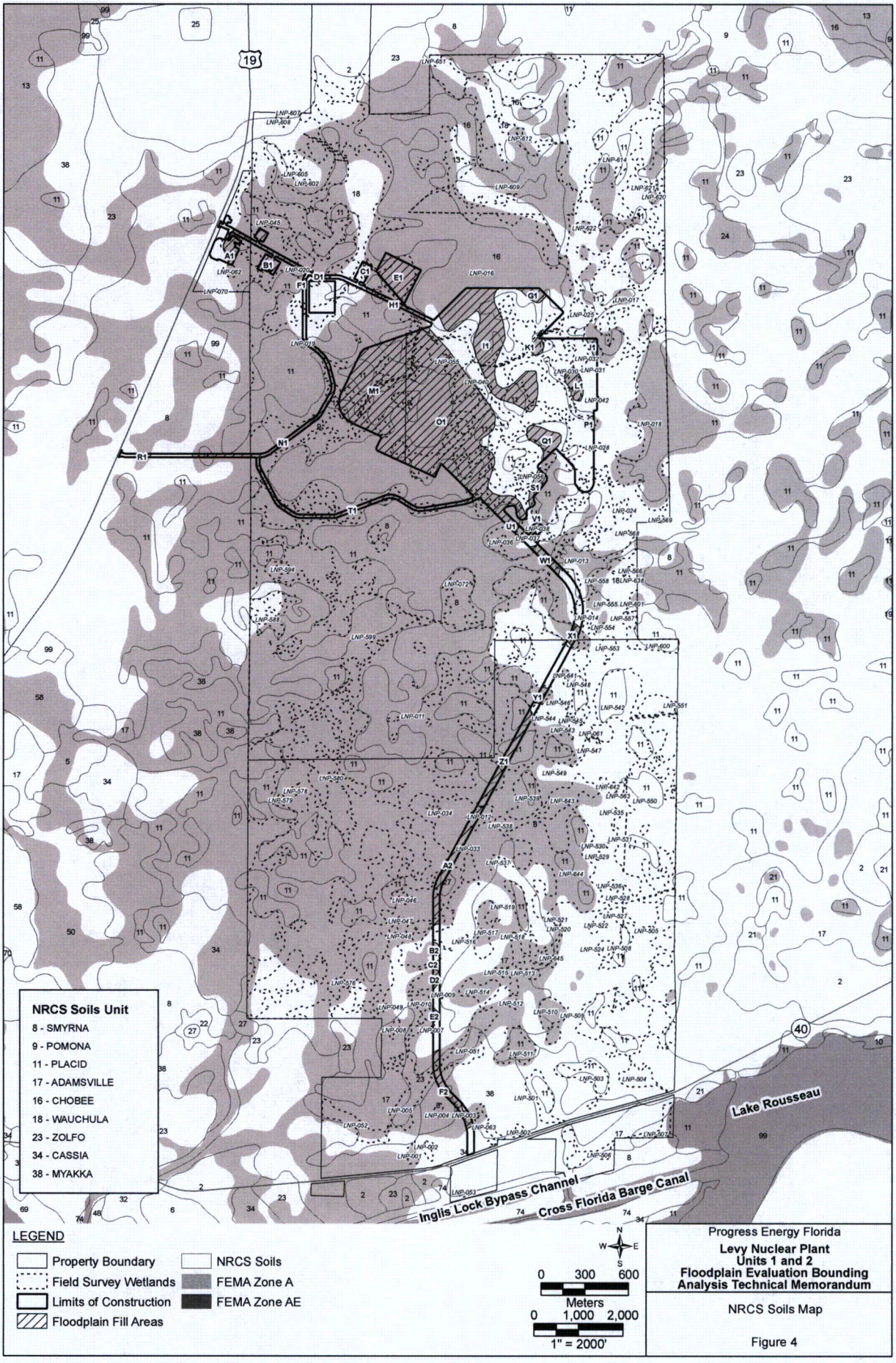
1" = 2000'
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Floodplain Evaluation Bounding Analysis Technical Memorandum
Potential Fill Areas within FEMA-Mapped Floodplain
Figure 3

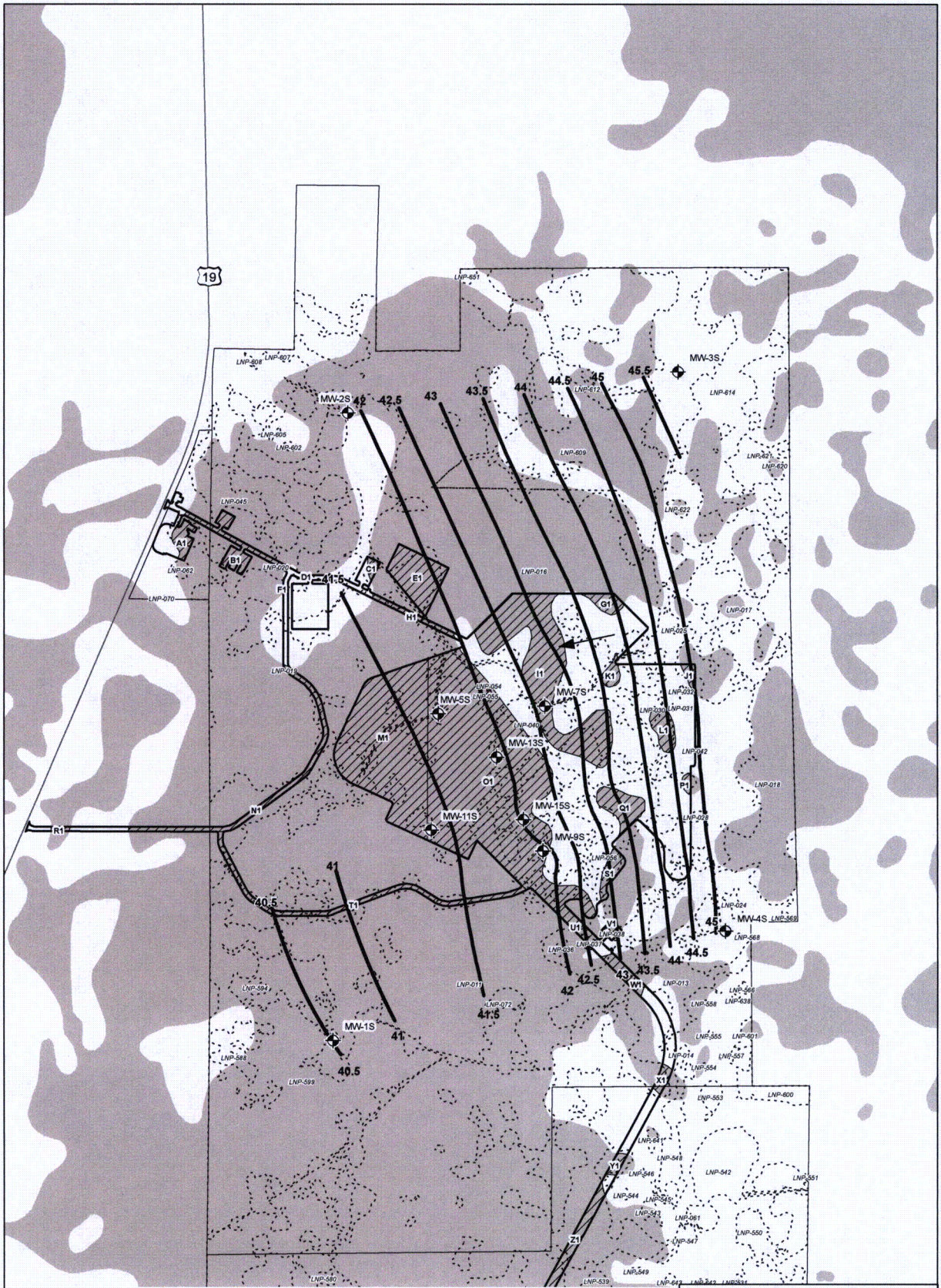


Progress Energy Florida

Levy Nuclear Plant
Units 1 and 2
Floodplain Evaluation Bounding Analysis Technical Memorandum

NRCS Soils Map

Figure 4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LNP-580
LEGEND
Monitoring Well
Potentiometric Contours
Property Boundary
Field Survey Wetlands
Limits of Construction
Floodplain Fill Areas
FEMA Zone A
Reference:
Levy Nuclear Plant Units 1 and 2 – Part 3, Environmental Report Rev 0, Chapter 2, Figure 2.3-20 (June 2008)
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Meters
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1" = 1500'
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Floodplain Evaluation Bounding Analysis Technical Memorandum
Groundwater Monitoring Results
(Highest Quarter)
Figure 5

Refer to Figures 4 and 5 for the NRCS soils information and the groundwater contours, respectively. Groundwater levels were determined from the highest quarterly monitoring results (March 2007) and were previously documented in Chapter 2 of the Environmental Report (PEF, 2009).

3. **Use the data from steps 1 and 2 to determine the volume of floodplain fill and volume of historic basin storage fill within the connected floodplain map units.**

   Table 5 presents the estimated volume of floodplain fill and historic basin storage fill within the large, connected FEMA-mapped floodplain on the LNP site.

   The depth of floodplain fill is determined by taking the difference between the average floodplain elevation (Table 1) and the estimated bottom of floodplain storage (Table 4). The depth of floodplain fill for each map unit is then multiplied by the total affected area (Table 1) to determine the floodplain fill volume.

   The depth of historic basin storage occurs when the bottom of floodplain storage elevation (SHGW) is above the average ground elevation. The difference is the depth of historic basin storage fill. The depth of historic basin storage fill for each map unit is then multiplied by the total affected area (Table 1) to determine the historic basin storage fill volume.

4. **Add a conservative estimate for the on-site transmission corridor volume of fill within the floodplain map units for the connected floodplain map units.**

   The on-site transmission corridor also includes portions of the Zone A mapping; therefore, it is assumed that a portion of the transmission poles/foundations may be located within the existing FEMA-mapped floodplain.

   A conservative estimate of the potential fill volume was evaluated assuming that all poles/foundations are located within the floodplain. Assuming a 750-foot pole spacing along the 16,900-foot transmission corridor and a 20-foot by 20-foot maximum size pole foundation, the estimated area of on-site impact would total 0.2 acres. Assuming a conservative 1-foot depth of floodplain for the poles/foundations, the resulting volume of fill is estimated at 0.2 acre-feet (see Table 5). This was added to the potential fill volume for purposes of this analysis.

   No historic basin storage was considered for the on-site transmission corridor since its affect is small.

5. **Determine the rise provided within the large floodplain system that extends off-site for the connected floodplain map units floodplain fill.**

   This step was conducted for the single large wetland along the western half of the site. Surface drainage is generally by overland flow, crossing the site from the higher topography to the north and east of the proposed LNP plant site toward the southwest.

   The wetlands on the property will temporarily store water for a longer duration than the rest of the site. Isolated on-site wetlands are not included in this analysis as fill in these map units will not affect off-site lands. The "Downstream Remainder Floodplain" is the portion of the connected FEMA-mapped floodplain located down-gradient of the LNP plant site, Heavy Haul Road and south of the US 19 Access Road and extends on both

TABLE 5
Summary of Floodplain and Historic Basin Storage Fill Evaluation for the Connected FEMA-Mapped Floodplain at the LNP Site

Column [C1]	[C2] Table 1 [C3]	[C3] Table 1 [C4]	[C4] Table 4 [C6]	[C5] [C2] x [C4]	[C6] Table 4 [C7]	[C7] [C2] x [C6]
Map Unit Identification [1]	**Floodplain Area (acre)**	**Floodplain Elevation (ft NAVD)**	**Depth of Floodplain Fill (feet)**	**Estimated Floodplain Fill Volume (acre-feet)**	**Depth of Fill in Historic Basin Storage [2] (feet)**	**Estimated Historic Basin Storage Fill Volume (acre-feet)**
A1	3.23	41	0.9	2.9	N/A	N/A
B1	7.46	42	0.2	1.5	N/A	N/A
C1	0.96	43	N/A	N/A	0.5	0.5
D1	0.04	42	N/A	N/A	0.5	< 0.1
E1	13.62	43	N/A	N/A	0.5	6.8
F1	0.08	42	N/A	N/A	0.5	< 0.1
G1	3.12	42	N/A	N/A	0.5	1.6
H1	2.61	44	0.5	1.3	N/A	N/A
I1	47.80	43	N/A	N/A	0.5	23.9
M1	67.04	43	1.0	67.0	N/A	N/A
N1	9.28	42	N/A	N/A	0.5	4.6
O1	128.82	43	1.0	128.8	N/A	N/A
T1	10.53	42	0.3	3.2	N/A	N/A
U1	3.36	41	N/A	N/A	1.4	4.7
W1	3.37	43	N/A	N/A	1.6	5.4
X1	1.69	44	0.9	1.5	N/A	N/A
Y1	1.36	43	0.8	1.1	N/A	N/A
Z1	8.23	43	2.0	16.5	0.5	4.1
A2	10.08	42	1.0	10.1	2.2	22.2
D2	1.25	36	0.4	0.5	N/A	N/A
E2	0.77	37	0.5	0.4	N/A	N/A
F2	6.68	34	2.6	17.4	N/A	N/A
On-Site Transmission [2]	0.20	--	1.0	0.2	N/A	N/A
Total Area (ac)	**331.58**	**Total Estimated Fill Volume (ac-ft)**		**252.4**		**73.9**

Notes: 1. Isolated floodplain units (J1, K1, L1, P1, Q1, R1, S1, V1, B2, & C2) are evaluated separately (Table 8).
2. Assuming a 750-ft pole spacing along the 16,900-ft transmission corridor, & a 20-ft by 20-ft maximum size pole foundation, results in 0.2 ac estimated potential affected area. Assuming a conservative 1-foot depth of floodplain & counting the entire number of poles/foundations, estimated volume of fill is 0.2 ac-ft.

N/A = Not applicable
NAVD = North American Vertical Datum of 1988

on-site and off-site property. This downstream remainder of floodplain is 1,453 acres as shown in Figure 6.

The total potential rise computation shown below used the downstream wetland area constrained to the PEF-owned property only. The computed potential on-site rise in the downstream "remainder floodplain" is shown as follows:

Total Fill Volume = 252.4 + 73.9 = 326.3 ac-ft

Downstream Remainder FEMA- Mapped Floodplain = 1,452.9 ac

$$\text{Estimated Rise} = \frac{\text{Total Fill Volume}}{\text{Downstream Remainder FEMA-Mapped Floodplain}}$$

$$= \frac{323.3 \text{ ac-ft}}{1{,}452.9 \text{ ac}}$$

$$= 0.22 \text{ ft} = 2.6 \text{ in}$$

As shown above, the connected floodplain rise is 2.6-inches when considering just the on-site portion of the downstream FEMA-mapped floodplain. As this rise calculation is based on the volume of fill and area of undisturbed downstream floodplain, it does not account for the benefit of the on-site stormwater ponds or ponding behind the new facilities. At this point, no determination has been made as to the "significance" relative to the need for compensation storage. If off-site effects are determined to be insignificant, no compensation is required.

6. **Identify potential upland compensation areas adjacent to the existing floodplain.**

This step was completed by estimating the SHGW at each location, then determining an area and excavation depth to provide one-to-one storage volume compensation, if required. This additional step was conducted to determine the potential floodplain compensation areas that may be available on-site for this bounding analysis. This step describes the process used to identify these areas, while the next step analyzes the results.

A GIS spatial analysis was used to identify the location and area of land outside the estimated wetlands that is at least 100 feet from the outside property line (Attachment C) for review as potential compensation storage. Upland areas isolated from the FEMA-mapped floodplain or that, when used as compensation, would potentially result in additional wetland impacts (through proximity or a need for access), were eliminated from consideration.

Habitat assessments were conducted on the north and south properties. Assessments were based on desktop analyses using the Florida Land Use and Cover Classification System (FLUCCS), Florida Natural Area Inventory (FNAI), aerial photo-interpretation, and other available resources for the entire north and south properties, with more detailed field evaluations in the potential project impact areas. The more detailed


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Remainder Floodplain =
1452.93 Ac.
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Lake Rousseau
Inglis Lock Bypass Channel
Cross Florida Barge Canal
LEGEND
Downstream Remainder Floodplain
Property Boundary
Limits of Construction
FEMA Zone A
FEMA Zone AE
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Meters
0 1,000 2,000
1" = 2000'
Progress Energy Florida
Levy Nuclear Plant
Units 1 and 2
Floodplain Evaluation Bounding
Analysis Technical Memorandum
Downstream Remainder Floodplain
Figure 6

analyses included wetland delineations, functional analyses, and protected species surveys. Field surveys have been ongoing to some degree since the fall of 2006 and throughout the year to capture seasonal variations.

Areas identified as habitat for protected species will be avoided if floodplain compensation is required and no adverse effects on protected species or their habitat are expected. If protected species are identified in the potential compensation area at the time of excavation, either the area will be avoided or the species will be relocated or mitigated for in consultation with appropriate regulatory agencies.

7. **Summarize upland compensation areas adjacent to the existing floodplain proposed.**

There are five potential on-site compensation locations, as presented in Table 6 and shown in Figure 7, that could yield up to 320.9 acre-feet of compensation storage above the SHGW. Attachment D presents a detailed map book of these potential on-site compensation storage locations.

As presented in Table 5, an estimated 252.4 acre-feet of compensation storage is required above the SHGW, which is less than the 320.9 acre-feet available. Compensation for 73.9 acre-feet of historic basin storage fill will be provided by excavation below the SHGW for a portion of the potential compensation areas. For an average depth of 6 inches below the SHGW, approximately 148 acres is required as compensation for the historic basin storage volume, which is only a portion of the total area required as compensation for the volume above the SHGW.

Table 7 provides a summary of land uses based for the candidate upland compensation areas according to the FLUCCS. Based on the results of LNP ecological surveys, areas selected as potential compensation areas are low quality upland habitat areas previously disturbed by silviculture activity. No high quality or threatened and endangered species habitat will be adversely affected by floodplain compensation, if required. Each candidate compensation area will be re-evaluated prior to construction to ensure that only low-quality uplands are used for compensation.

Because excavation for floodplain compensation is to the SHGW level and historic basin storage will require a depression to retain runoff, no effects on nearby wetlands are anticipated. Hydrological assessments will be conducted to ensure that there is no resulting change in the hydroperiods of adjacent ecosystems. Where appropriate, some compensation areas may be incorporated into the wetland mitigation plan as wetland creation areas.

Most of the on-site wetlands have been defined through field delineation, with boundaries field-verified by the USACE and the FDEP. Wetland boundaries in the potential compensation areas will be confirmed through field delineation if not already field-delineated. Should the final wetland configuration reduce the area available for floodplain compensation, more than a sufficient amount of upland area is available to provide on-site floodplain compensation.

TABLE 6
Estimated Area and Volume of Potential Floodplain Compensation Locations

Column [C1]	[C2]	[C3]	[C4]	[C5]	[C6]	[C7]	[C8]	[C9]	[C10]
Compensation Identification	**Area [2] (acre)**	**Average Ground Elevation [2] (ft NAVD)**	**Soil Type**	**NRCS Depth to Water Table (feet)**	**Water Table Estimated from NRCS (ft NAVD)**	**Comparison with Map Unit Information**	**Estimated SHGW Elevation (ft NAVD)**	**Compensation Depth (feet)**	**Estimated Volume Available (acre-feet)**
C-74	20.11	42.75	17 – Adamsville	2.8	39.9	Downgradient of W1 (41)	40	2.6	52.3
C-76A [1]	84.88	43.59	17 – Adamsville	2.8	40.7	Upgradient of X1 (43)	42	1.5	127.3
C-76B [1]	78.48	40.6	17 – Adamsville	2.8	37.96	Z1 & A2 (41)	40	0.6	47.1
C-76C [1]	102.94	37.6	17 – Adamsville	2.8	34.8	Upgradient A2, B2, C2, D2	37	0.6	61.8
C-96A	9.34	42.00	17 – Adamsville	2.8	39.2	T1 (41)	40	2.0	18.7
C-100	10.74	42.7	9 – Pomona	1.0	41.6	N1 (42)	42	0.7	7.5
C-101	15.57	42.4	9 – Pomona	1.0	41.3	N1 (42)	42	0.4	6.2
Total Area (ac)	*322.06*				**Total Estimated Volume Available Above SHGW (ac-ft)**				**320.9**

Notes:
1. Area C-76 was split into three viable areas due to its large size.
2. Areas and average ground elevations were computed using GIS.
3. Volume of fill below SHGW will be a subset of the identified floodplain compensation areas in which excavation extends below SHGW.

NAVD = North American Vertical Datum of 1988
SHGW = Seasonal High Groundwater

TABLE 7
Existing Land Use for Potential Floodplain Compensation Locations based on FLUCCS

Column [C1]	[C2]	[C3]	[C4]	[C5]	[C6]
Compensation Identification	**Area (acre)**	**FLUCCS Code (feet)**	**FLUCCS Description**	**Area by FLUCCS Type (acre)**	**Percentage of Total**
C-74	20.11	440	Tree Plantations	20.11	100.00%
C-76A	84.88	2600	Other Open Lands <Rural>	14.38	16.95%
		4100	Upland Coniferous Forest	3.50	4.12%
		4400	Tree Plantations	67.00	78.93%
C-76B	78.48	2600	Other Open Lands <Rural>	50.82	64.76%
		4340	Hardwood Conifer Mixed	3.82	4.87%
		4400	Tree Plantations	23.83	30.37%
C-76C	102.94	2600	Other Open Lands <Rural>	20.40	19.82%
		4400	Tree Plantations	82.54	80.18%
C-96A	9.34	2600	Other Open Lands <Rural>	1.90	20.33%
		4400	Tree Plantations	7.44	79.67%
C-100	10.74	4400	Tree Plantations	10.74	100.00%
C-101	15.57	4400	Tree Plantations	15.57	100.00%
Total Area (ac)	*322.06*				

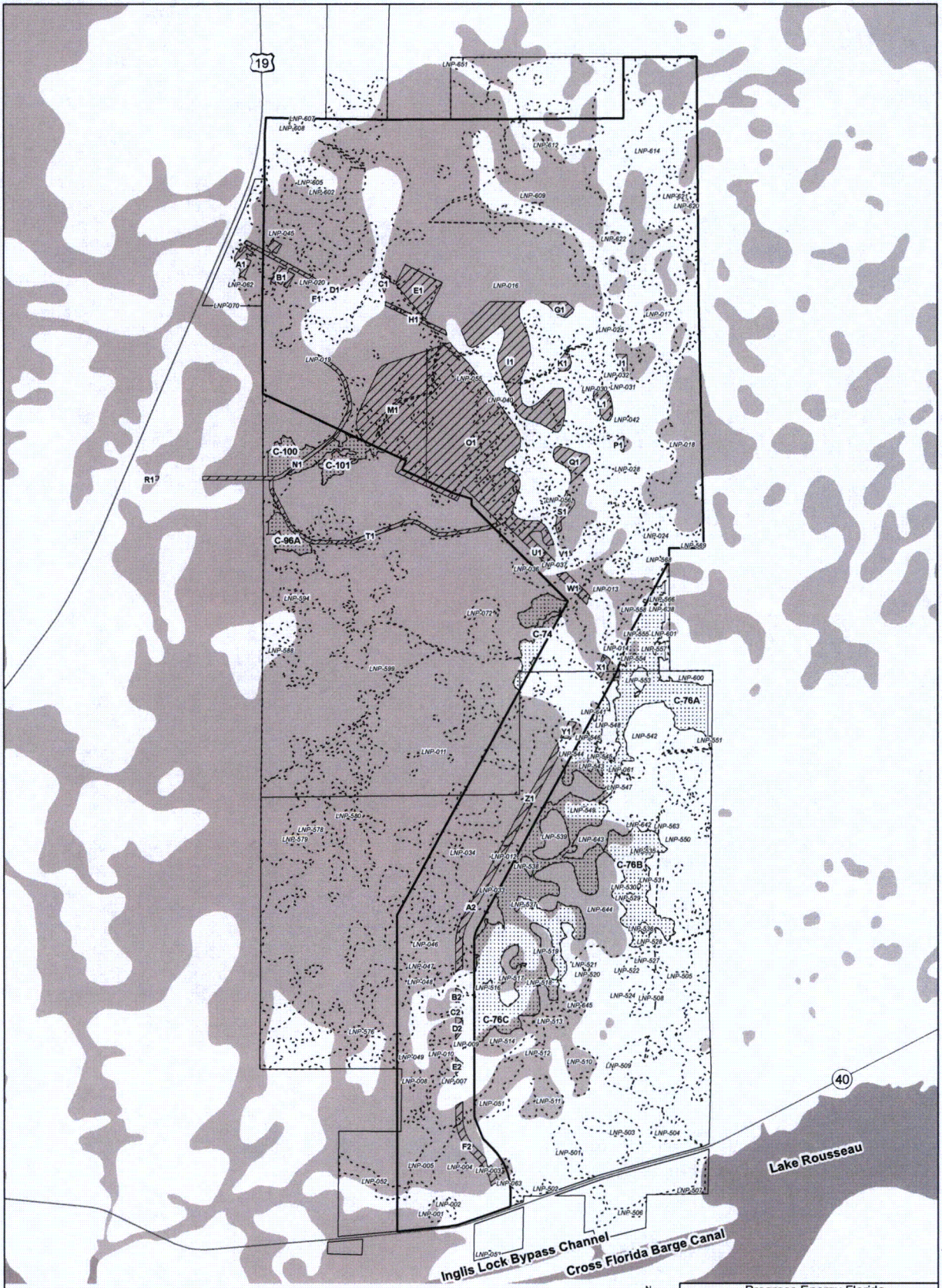
8. **Evaluate historic basin storage fill for the isolated floodplain map units and compensation within the permanent pool volume of the proposed wet detention ponds.**

While it is acceptable to increase the stage in isolated floodplains to offset the floodplain fill, the historic basin storage volume will need to be replaced. Table 8 provides an estimate of historic basin storage volume within the isolated floodplain systems on-site.

TABLE 8
Estimated Isolated Floodplain Historic Basin Storage Fill

Column [C1]	[C2] Table 1 [C3]	[C3] Table 1 [C4]	[C4]	[C5] [C3] – [C4]	[C6] [C2] x [C5]
Map Unit Identification	**Area (acre)**	**Estimated Floodplain Elevation (ft NAVD)**	**Average Ground Elevation (ft NAVD)**	**Depth of Fill in Historic Basin Storage [1] (feet)**	**Volume of Isolated Historic Basin Storage Area (acre-feet)**
J1	1.37	48	47.2	0.8	1.1
K1	2.04	45	44.2	0.8	1.6
L1	4.75	45	45.4	0.5	2.4
P1	0.85	47	45.7	1.3	1.1
Q1	7.41	43	43.3	0.5	3.7
R1	0.53	40	39.0	1.0	0.5
S1	3.46	43	43.4	0.5	1.7
V1	0.56	43	42.9	0.5	0.3
B2	0.79	36	34.7	1.3	1.0
C2	0.25	37	34.8	2.2	0.5
Total Area	*22.01*	**Total Estimated Isolated Fill Volume (ac-ft)**			**13.9**

Notes:
1. A value of 6 inches is used as a minimum.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LEGEND
Potential On-Site Compensation Storage Locations
Floodplain Fill Areas
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1" = 2000'
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Potential On-Site Compensation
Storage Locations
Figure 7

Per SWFWMD policy, the permanent pool volume of the proposed wet detention ponds on-site can serve as compensation storage for the isolated floodplain historic basin storage loss. Based on the site plan developed for the Environmental Report (PEF, 2009), three wet detention ponds are proposed, which total 105 acres in size. Typically a 6-foot average depth is desirable in wet detention ponds to avoid the establishment of nuisance species, such as cattails. A 1-foot depth of permanent pool yields 105 acre-feet, well in excess of the 13.9 acre-feet of isolated historic basin storage fill.

Off-Site Transmission Corridors/Transmission Lines

New off-site transmission lines will be required to integrate the electrical power generated at LNP site to the Florida electrical grid system. Potential floodplain fill is being considered in the transmission right-of-way siting process. In this process, new facilities are to be collocated within existing PEF right-of-way and facilities to the greatest extent possible.

The total proposed transmission line length is over 180 miles located in over approximately 148 miles of corridor. Of the corridor length, almost 34 miles is located within mapped Zone A or Zone AE (A1 through A30) floodplains (see Attachment E). As shown in the following breakdown by county, the length of floodplain is small compared with the overall transmission length.

- Citrus County – 7.7 miles, approximately 5.2 percent
- Lake County – Not applicable, does not cross floodplain
- Levy County - 2.0 miles, approximately 1.4 percent
- Marion County – 3.2 miles, approximately 2.2 percent
- Hernando County – Not applicable, does not cross floodplain
- Sumter County – 4.2 miles, approximately 2.8 percent
- Polk County – 2.0 miles, approximately 1.4 percent
- Hillsborough County – 14.8 miles, approximately 9.9 percent
- Pinellas County – substation only, does not cross floodplain

Transmission lines will be placed in parallel and adjacent to existing facilities to the greatest extent possible. This co-location allows for the use of existing access roads and reduces the amount of new fill to the floodplains. Fill for potential new access roads may require compensation storage. Typically, compensation storage immediately adjacent to the floodplain fill within the transmission right-of-way is used when required, which would mean no additional land-use change or off-site effects.

4.0 Conclusion

This *Bounding Analysis* provides a planning-level analysis of the potential floodplain impacts resulting from placing LNP construction fill in regulated floodplains, and a general assessment related to the off-site transmission corridor's effects on floodplains.

LNP Site and On-site Transmission

Floodplain compensation ultimately may not be required as suggested from the small rise estimated. If runoff could be contained on-site in the remainder of the on-site FEMA-designated floodplain "downstream" of the project impacts, only a 2.6-inches rise was estimated. This rise was determined without considering the reduction in runoff and storage that the on-site stormwater ponds will provide. Furthermore, no upstream ponding behind filled materials were estimated, so this small rise constitutes a conservatively high potential effect. No official determination has been made as to whether or not an estimated rise constitutes an insignificant effect; however this document serves as a sensitivity analysis to show that sufficient on-site, upland compensation storage is available if deemed necessary.

The maximum potential need for additional compensation area has been estimated based on 1-foot contour data, wetland indicators, and geotechnical data already available for the LNP site. A GIS evaluation was performed for the transmission alignment to identify potential floodplain fill locations and potential compensation areas, as deemed necessary.

More than 300 acres of candidate on-site uplands were identified as potential compensation areas for floodplain and historic basin storage fill on-site. Compensation storage, also referred to as cup-for-cup storage locally, was reviewed for floodplain fill affecting the single, large, contiguous floodplain. Approximately 320.9 acre-feet is available above the SHGW table, which exceeds the 252.4 acre-feet of floodplain fill estimated above the SHGW. An average excavation of less than 6 inches over 148 acres of the compensation area identified will provide replacement storage for the 73.9 acre-feet of historic basin storage fill determined below the SHGW. Additionally, approximately 13.9 acre-feet of historic basin storage fill was estimated in isolated floodplain map units that will be filled. Compensation for the historic basin storage loss in these isolated wetlands is easily accommodated in the permanent pool volumes of the proposed wet detention ponds, which total 105 acres in area.

Off-Site Transmission Corridors/Transmission Lines

Potential floodplain fill is being considered in the transmission right-of-way siting process. In this process, new facilities will be co-located within existing PEF right-of-way and facilities to the greatest extent possible. This co-location allows for the use of existing access roads and reduces the amount of new fill to the floodplains. Regardless of the minimization efforts, the state ERP rules will require floodplain fill to be addressed for transmission corridors as well. Typically, compensation storage immediately adjacent to the floodplain fill within the transmission right-of-way is used when required, which would mean no additional land-use change or off-site effects.

Path Forward

A separate modeling effort will be conducted in the future to establish base flood elevations and to refine the extent of the floodplain based on the survey data. Modeling will also incorporate the site fill and stormwater improvements to determine the extent of off-site rise, if any, and to develop a compensation plan. Any compensation plan, if required, will be closely coordinated with the wetland mitigation plan to develop compatible on-site locations. In addition, the compensation areas will be collocated with wetland mitigation to the greatest extent possible as the compensation areas are all uplands that have been drained and highly impacted by silviculture activities over the years.

Coordination with FDEP will be necessary to review and approve the model results and need for compensation, if any. If compensation is required, ecologists will evaluate all candidate upland areas for habitat quality and function to ensure that only lower-quality upland areas are considered. Most of the upland areas on-site have been degraded through silvicultural activities. No high quality or threatened and endangered species habitat will be adversely affected by floodplain compensation. Each candidate compensation area will be re-evaluated prior to construction to ensure that only low-quality uplands are used for compensation.

5.0 References

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ATTACHMENT A

LIDAR ACCURACY STATEMENT

AERO-METRIC
PHOTOGRAMMETRY & GEOSPATIAL DATA SOLUTIONS

AERO-METRIC, INCORPORATED
4020 TECHNOLOGY PARKWAY - SHEBOYGAN, WI 53083
P.O. BOX 449 - SHEBOYGAN, WI 53082-0449
TEL: (920) 457-3631 FAX: (920) 457-0410

Office Locations
Anchorage, Alaska
Fort Collins, Colorado
Minneapolis, Minnesota
Kansas City, Missouri
Dallas, Texas
Dulles, Virginia
Virginia Beach, Virginia
Seattle, Washington
Chilton, Wisconsin
Sheboygan, Wisconsin

SARGENT & LUNDY, L.L.C.
Photogrammetric Mapping
(Florida Site)
Accuracy Statement

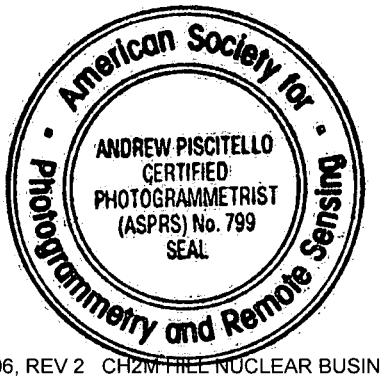
Sargent & Lundy Specification Number:	P-2800
Project Number:	11945-013
Contractor:	AERO-METRIC, Inc. 4020 Technology Parkway Sheboygan, Wisconsin 53083
Project Number:	1-061008
Photo Scale:	1"=660'
LiDAR Altitude:	3,609'
Planimetric Mapping:	1"=100'
Contour Interval:	1'
Digital Ortho Photo Pixel Resolution:	0.5' GSD
Units:	United States Survey Foot
Coordinate System:	Florida State Plane Coordinate System, West Zone
Horizontal Datum:	North American Datum 1983/1999 (NAD 83/99)
Vertical Datum:	North American Vertical Datum 1988 (NAVD 88)

Photogrammetric Mapping Accuracy Statement:

The final project photogrammetric mapping deliverables included a combination of planimetric, LiDAR DTM, contours and digital orthophoto mapping. The mapping was produced according to procedures that have been demonstrated to comply with the United States National Map Accuracy Standards (NMAS) for a target horizontal scale of 1"=100' and a specified contour interval of one foot. The Lidar DTM data was produced to meet the Federal Emergency Management Agency (FEMA) floodplain mapping specifications.

Signed: _____ Date: 7 Mar '07

Andrew Piscitello, Vice President Production
ASPRS, Certified Photogrammetrist, #R799




TOPOGRAPHIC MAPPING LIMITS BUFFERED 50 FEET
DIGITAL ORTHO AND PLANIMETRIC LIMITS
001 002 003 004
005 006 007 008
009 010 011 012 013
014 015 016 017 018
019 020 021 022 023 024 025 026 027 028
029 030 031 032 033 034 035 036 037 038 039 040 041 042 043 044 045
046 047 048 049 050 051 052 053 054 055 056 057 058 059 060 061 062 063 064 065 066
067 068 069 070 071 072 073 074 075 076 077 078 079 080 081 082 083 084
085 086 087 088 089 090 091 092 093 094 095 096 097 098 099 100
101 102 103 104 105 106 107 108 109 110 111 112 113
114 115 116 117 118 119 120 121 122 123 124 125
126 127 128 129 130 131 132 133 134 135 136 137 138