



Calculation Record

Client Name: Florida Municipal Power Agency Page 1 of 7

Project Name: Cane Island Power Park Unit 4 Project No.: 147651

Calculation Title: Pre- and Post- Development Curve Numbers

Calculation No./File No.: 52.5406.1101.02

Calculation Is: (check all that apply) ☐ Preliminary ☒ Final ☐ Nuclear Safety-Related

Objective To determine the curve number for pre- and post- development.

Unverified Assumptions Requiring Subsequent Verification			
No.	Assumption	Verified By	Date

See Page _____ of this calculation for additional assumptions.

This Section Used for Computer Generated Calculations	
Program Name/Number: _____	Version: _____
Evidence of or reference to computer program verification, if applicable: _____ _____	
Bases or reference thereto supporting application of the computer program to the physical problem: _____ _____	

Review and Approval						
Rev	Prepared By	Date	Verified By	Date	Approved By	Date
0	A.L. Morgan <i>A.L. Morgan</i>	2/3/07/08	J. M. Stanek <i>J.M. Stanek</i>	2/3/12/08	<i>M. J. Stanek</i>	2/26/08



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Owner: Florida Municipal Power Authority
Plant: Cane Island
Project No. 147651
File No. 52.5406.1101.02
Title: Pre- and Post- Development Curve
Numbers

Prepared by: A. L. Morgan
Date: 03/07/08
Verified by: J. M. Stanek
Date: 03/12/08
Page No. 2 of 3
Calc Rev: 0

1.0 PURPOSE

The purpose of this calculation is to:

- 1.1) Determine the pre-development curve number and post-development curve number and compare the two values.

2.0 REFERENCES

- 2.1) Site Certification Application, Volume 2, Kissimmee Utility Authority and Florida Municipal Power Agency, Cane Island Units 1-3, August 1998 and updated July 2001.
- 2.2) South Florida Water Management District, Management and Storage of Surface Waters: Permit Information Manual, Volume IV,
- 2.3) Technical Release 55 (TR55), Urban Hydrology for Small Watersheds, USDA Soil Conservation Service, Conservation Engineering Division, June 1986.
- 2.4) Black & Veatch Drawing 147651-4STA-S1001, Site Arrangement.

3.0 ASSUMPTIONS

No assumptions.

4.0 DEFINITIONS OF UNITS AND CONSTANTS

CN _{impervious} := 98	(Reference 2.3, Appendix B)
CN _{aggregate} := 76	(Reference 2.3, Appendix B)
CN _{laydown} := 49	(Reference 2.3, Appendix B)
CN _{undisturbed} := 43	(Reference 2.1)
CN _{pond} := 98	(Reference 2.3, Appendix B)

5.0 PROCEDURE/METHODOLOGY OF DESIGN

- 5.1) Determine pre-development surfacing from existing drawings, site visit, and Reference 2.1.
- 5.2) Calculate pre-development composite curve number, Reference 2.3.
- 5.3) Determine post-development surfacing areas from existing drawings, site visit, and Reference 2.4 (Appendix A).
- 5.4) Calculate post-development composite curve number, Reference 2.3.

6.0 CONCLUSIONS

- 6.1) The pre-development CN is 45.0.
- 6.2) The post-development CN is 89.5.

7.0 ANALYSIS

- 7.1) Pre-Development Curve Number.
- 7.2) Post-Development Curve Number.

8.0 APPENDICES

- 8.1) Appendix A - Post-Development Areas.
- 8.2) Appendix B - Curve Numbers from Reference 2.3.



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 Page No. 3 of 3
 Calc Rev: 0

7.1 Pre-Development Curve Number

$A_{pre.imp} := 0.23 \text{ acre}$ (Reference 2.1 and Site Visit)

$A_{pre.agg} := 0.08 \text{ acre}$ (Reference 2.1 and Site Visit)

$A_{pre.undist} := 12.17 \text{ acre}$ (Reference 2.1 and Site Visit)

$A_{pre.lay} := 2.58 \text{ acre}$ (Reference 2.1 and Site Visit)

$A_{pre.pnd} := 0 \text{ acre}$ (Reference 2.1 and Site Visit)

$A_{pre.contributing} := A_{pre.imp} + A_{pre.agg} + A_{pre.undist} + A_{pre.lay}$ $A_{pre.contributing} = 15.06 \text{ acre}$

Pre-Development Weighted Curve Number

$$CN_{pre} := \frac{(A_{pre.imp} \cdot CN_{impervious} + A_{pre.agg} \cdot CN_{aggregate} + A_{pre.undist} \cdot CN_{undisturbed} + A_{pre.lay} \cdot CN_{laydown})}{A_{pre.contributing}}$$

$CN_{pre} = 45.0$ (Conclusion 6.1)

7.2 Post-Development Curve Number

$A_{post.imp} := 7.89 \text{ acre}$ (Appendix A)

$A_{post.agg} := 5 \text{ acre}$ (Appendix A)

$A_{post.undist} := 0 \text{ acre}$ (Appendix A)

$A_{post.lay} := 0 \text{ acre}$ (Appendix A)

$A_{post.pnd} := 1.41 \text{ acre}$ (Appendix A)

$A_{post.contributing} := A_{post.imp} + A_{post.agg} + A_{post.undist} + A_{post.lay}$ $A_{post.contributing} = 12.89 \text{ acre}$

Pre-Development Weighted Curve Number

$$CN_{post} := \frac{(A_{post.imp} \cdot CN_{impervious} + A_{post.agg} \cdot CN_{aggregate} + A_{post.undist} \cdot CN_{undisturbed} + A_{post.lay} \cdot CN_{laydown})}{A_{post.contributing}}$$

$CN_{post} = 89.5$ (Conclusion 6.2)



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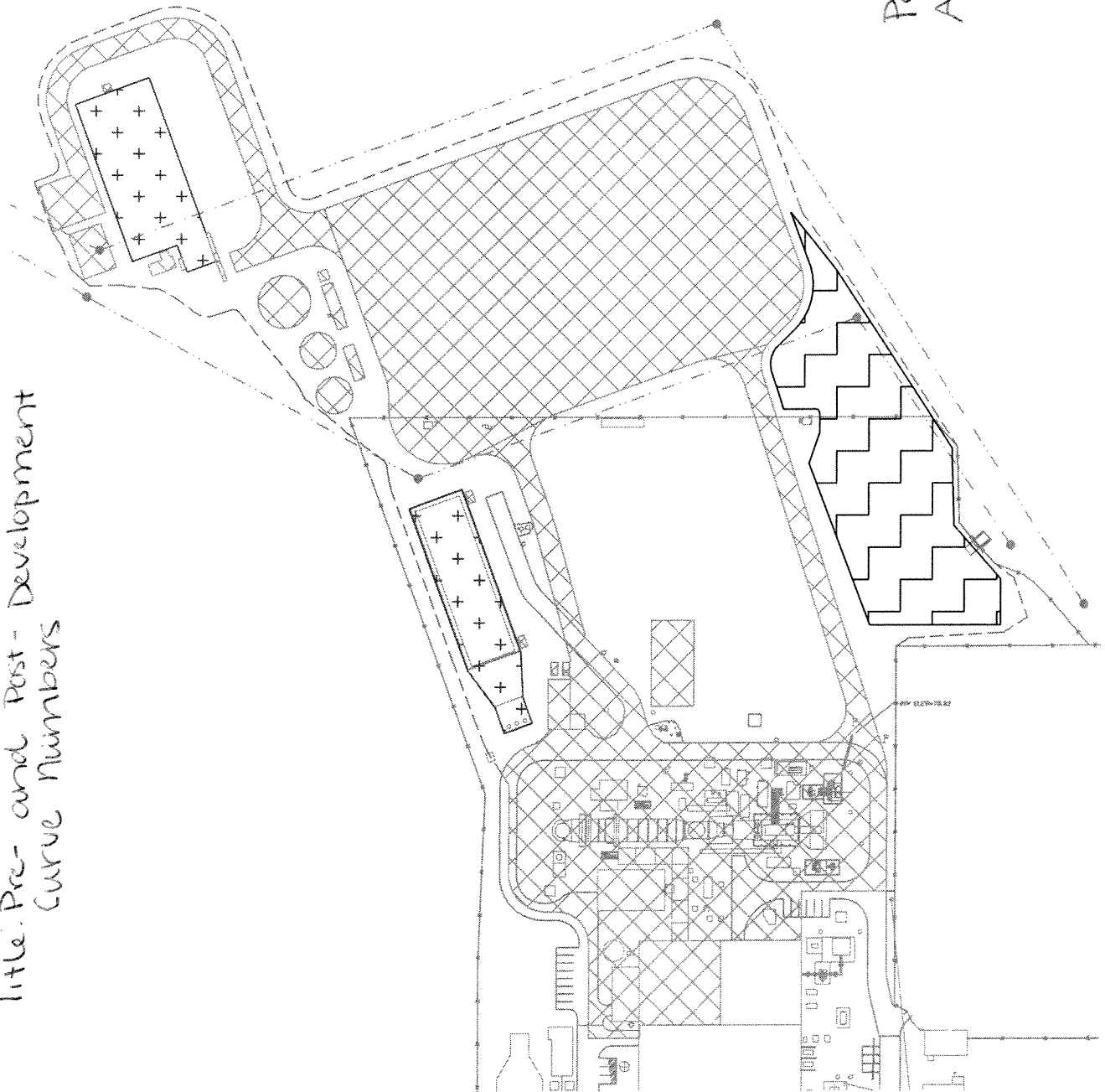
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Page No. A1 of A2
Calc Rev: 0

APPENDIX A

Post-Development Areas

Project No: 147651
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Page No. B1 of B2
Calc Rev: 0

APPENDIX B

TR-55 Curve Numbers

Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type and hydrologic condition	Average percent impervious area ^{2/}	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82

Developing urban areas

Newly graded areas (pervious areas only, no vegetation) ^{5/}	77	86	91	94
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Idle lands (CN's are determined using cover types
similar to those in table 2-2c).

¹ Average runoff condition, and $I_a = 0.2S$.

² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.