

# **Philco Warehouse Project**

**Edgewater, FL**

**Project Number: 1125065005.00**

## **Drainage Calculation Report**

Prepared For:

**ANDERSON-DIXON, LLC**

102 South Orange Street

New Smyrna Beach, FL 32168

Submitted to:

**City of Edgewater**

**104 North Riverside Drive**

**Edgewater, FL 32132**

Prepared By:



*200 W Welbourne Avenue*

*Winter Park, FL 32789*

May 2026

Jennifer Nunn, P.E.

Florida Registration No. 70709

# PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I am a registered professional engineer in the State of Florida practicing engineering with **The Balmoral Group** and that I have supervised the preparation of and approve the analysis, findings, opinions, conclusions and technical advice hereby reported for:

PROJECT: Philco Warehouse Project  
2611 Guava Drive  
Edgewater, FL

The engineering work represented by this document was performed through the following duly authorized engineering business:

**The Balmoral Group, LLC**  
*200 W Welbourne Avenue*  
*Winter Park, FL 32789*  
Telephone: (407) 629-2185

This report provides the results of the analysis of the existing drainage conditions and the calculations required for the design of the proposed stormwater management facility. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of hydrologic analysis and hydraulic engineering as applied through professional judgment and experience.

Any engineering analysis, documents, conclusions or recommendations relied upon from other professional sources or provided with responsibility by the client are referenced accordingly in the following report.

FLORIDA REGISTERED ENGINEER:

Jennifer Nunn, P.E., State of Florida, Professional Engineer, License No. 70709

This item has been digitally signed and sealed by

on the date indicated here.

The signature must be verified on any electronic copies.

## TABLE OF CONTENTS

|                           |   |
|---------------------------|---|
| PROJECT OVERVIEW .....    | 1 |
| EXISTING CONDITIONS ..... | 1 |
| PROPOSED CONDITIONS ..... | 1 |
| CONCLUSION .....          | 3 |

## List of Tables

|                                            |   |
|--------------------------------------------|---|
| Table 1 – SMF Design Summary .....         | 3 |
| Table 2 – Attenuation Volume Summary ..... | 3 |
| Table 3 – 90% Flow and Volume .....        | 3 |

## APPENDIX A

- Figure 1 - Project Location
- Figure 2 - FEMA Map
- Figure 3 - NRCS Soils Map
- Figure 4A - Pre-Development Drainage Map
- Figure 4B - Post Development Drainage Map
- Figure 5 - Percolation Rings
- Figure 6 - Proposed Design Sheet

## APPENDIX B

- Summary of Results
- CN Calculations
- Soil Storage
- Time of Concentration Calculations
- Storage Calculations
- Geotechnical Parameters
- ICPR Input Report
- ICPR Node Max Results
- ICPR Link Max Results
- ICPR Recovery Time Series

## APPENDIX C - EXISTING INFORMATION

## APPENDIX D – GEOTECHNICAL INFORMATION

(Universal Engineering Sciences – Report No. 2161188R)

## PROJECT OVERVIEW

This report provides the results of the stormwater management facility (SMF) design analysis based on the analysis of the existing drainage conditions and the calculations required for the stormwater management design for the Philco Warehouse Project development along 2611 Guava Drive, within Edgewater, Florida (Refer to **Figure 1** for the project location in **Appendix A**). The project is located on 3 parcels with a total area of 0.61 acres. The project is located within Section 2 of Township 18 South and Range 34 East. The project uses the North American Vertical Datum of 1988 (NAVD88). The conversion from NAVD 88 to NGVD 29 is  $0.00 \text{ NAVD88} = 1.20 \text{ feet NGVD 29}$ .

Due to the site's location, the proposed development is subject to regulations from the City of Edgewater, St Johns River Water Management District (SJRWMD), and the Florida Department of Environmental Protection (FDEP).

## EXISTING CONDITIONS

The existing site is undeveloped with no previous permits and the existing land cover consists of woods. The project is located within Unnamed Ditches (WBID 2939), which is listed as impaired for nutrients (Total Phosphorus) according to FDEP. There is no discernable existing storage on-site. Half of the project site drains to the Guava Drive right-of-way and the other half drains to an existing ditch along the eastern property line, which conveys runoff to the north. The ultimate discharge is the Mosquito Lagoon, which is approximately 1.5 miles downstream, and is considered impaired for nutrients. Due to the SJRWMD designs storms not discharging in the post condition, nutrient loading calculations were not performed.

The on-line Web Soil Survey, operated by the USDA Natural Resources Conservation Service (NRCS) was used to classify the on-site existing soil as Daytona Sand, which is listed as Type A hydrologic soil group classifications (Refer to **Figure 2** for the NRCS Soils Map in **Appendix A**). On-site geotechnical stormwater evaluation, performed by Universal Engineering Sciences on May 26, 2026, shows the site to have fine sand with an estimated normal seasonal high groundwater table (SHGWT) at elevation 9.4-feet NAVD with an average vertical permeability rate of 5.85 feet per day (includes a factor of safety of 2). The geotechnical survey report is provided in **Appendix D**.

The site is within FEMA Flood Zone X, which is outside the 100-year floodplain (Refer to **Figure 3** for the FEMA Map in **Appendix A**). There is a FEMA Flood Zone A adjacent to the eastern parcel line, which means this area is within the 100-year floodplain, but has no base flood elevation established. No impacts are proposed to this floodplain.

Refer to **Appendix B** for the pre-development calculations and pre-development nodal diagram.

## PROPOSED CONDITIONS

The proposed development consists of constructing a commercial development with 0.34-acres of impervious area and one dry retention pond to treat the impervious area. There are four proposed

inlets which collects the impervious area and discharges to the dry retention pond. The dry pond treats the building and parking impervious area. There is one discharge location: the overflow weir at the dry pond, which discharges (during the 100-yr/24-hr storm events) to the existing canal that runs north parallel to Guava Drive. The dry retention pond is designed to treat and attenuate runoff from the developed site.

## Design Criteria

The project qualifies for a 10/2 Self Certification of Qualification to use a General Permit for a Stormwater Management System since the project serves less than 10-acres of total project area and less than two acres of impervious surface. There are no wetlands or other surface waters within the project area. A dry retention pond was utilized to provide treatment for the site.

The post-development discharge peak volumetric flowrate and shall not exceed the pre-development rate for each of the following storm events: Mean Annual/24-hour/4.7-inch, 25-year/24-hour/9.4-inch, and 100 year/24-hour/13.1-inch for systems with positive outfall to a public conveyance.

Sites which discharge into public conveyances impacted by the 100-year floodplain (such as the subject site) shall have a Post-Development discharge rate & volume limited to 90% of the Pre-Development rate & volume.

## Stormwater Management Facility (SMF) Design

The SMF design used for the Philco Warehouse development is a dry retention pond. The dry retention pond has 4:1 side slopes, with a top elevation of 16.5-ft and a bottom elevation of 11.5-ft. It discharges through an overflow weir (WEIR #8) at an elevation of 16.0-ft to the TW node within the existing canal. An inlet collects runoff from the driveway at a top elevation of 16.4-ft and is connected to another inlet, which also has a top elevation of 16.4-ft. These inlets convey flow to another inlet, which collects additional runoff at a top elevation of 15.95 and ultimately discharges into the proposed dry retention pond. The tailwater elevation is 12.0-ft and no datum conversion was needed. This information was obtained from EREG\_1203127. Refer to **Appendix C** for tailwater information obtained from Guava Drive Commercial Development.

Stormwise v4.08.03 is the computer program utilized to model the pre- and post-development conditions for the SJRWMD Mean Annual, 25-yr/24-hr, and 100-yr/24-hr storm events.

Refer to **Appendix B** for the post-development calculations and post-development nodal diagram.

## CONCLUSION

The dry pond is designed to meet the treatment and attenuation criteria for the City of Edgewater. **Table 1** shows the required treatment volume and the provided treatment volume. **Table 2** shows the attenuation criteria for the mean annual and 25-year/24-hour storm events.

Table 1 – SMF Design Summary

| Parameter        | Required   | Provided   |
|------------------|------------|------------|
| Treatment Volume | 0.05 ac-ft | 0.22 ac-ft |

Table 2 – Attenuation Volume Summary

|           | Mean Annual Peak Discharge<br>(cfs) | 25-year/24-hour Peak Discharge<br>(cfs) |
|-----------|-------------------------------------|-----------------------------------------|
| TW (Pre)  | 0.10                                | 0.96                                    |
| TW (Post) | 0.00                                | 0.00                                    |

Due to the fact that the site ultimately discharges to the Mosquito Lagoon, the post-development annualized mass nutrient load discharged from the site must not increase compared to the pre-development site loading for Nitrogen and Phosphorus. Since there is no discharge in the design storm events, it is assumed this criterion is met.

The treatment volume recovery was performed using a slug load and setting the initial stage within the system at the proposed treatment volume elevation (16.10 feet). The proposed volume of 0.22 ac-ft was shown to recover in 18.50 hours which is less than the 72-hour requirement.

Lastly, because the site discharges to public conveyance system impacted by the 100-year floodplain, the Post-Development discharge rate & volume are limited to 90% of the Pre-Development rate & volume. **Table 3** shows this criterion is met for the 100-year/24-hour storm event. There is no discharge for the mean and 25-year/24-hour storm events.

Table 3 – 90% Flow and Volume

| Event      | Pre-Peak Discharge<br>(cfs) | 90% of Pre-Peak Discharge<br>(cfs) | Post-Peak Discharge<br>(cfs) | Pre-Discharge Volume (cf) | 90% of Pre-Discharge Volume (cf) | Post-Discharge Volume (cf) |
|------------|-----------------------------|------------------------------------|------------------------------|---------------------------|----------------------------------|----------------------------|
| 100Yr-24Hr | 1.94                        | 1.75                               | 1.37                         | 12189                     | 10970                            | 3149                       |

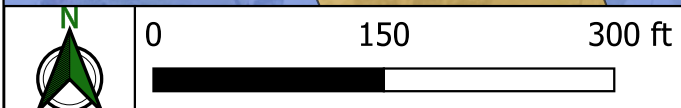
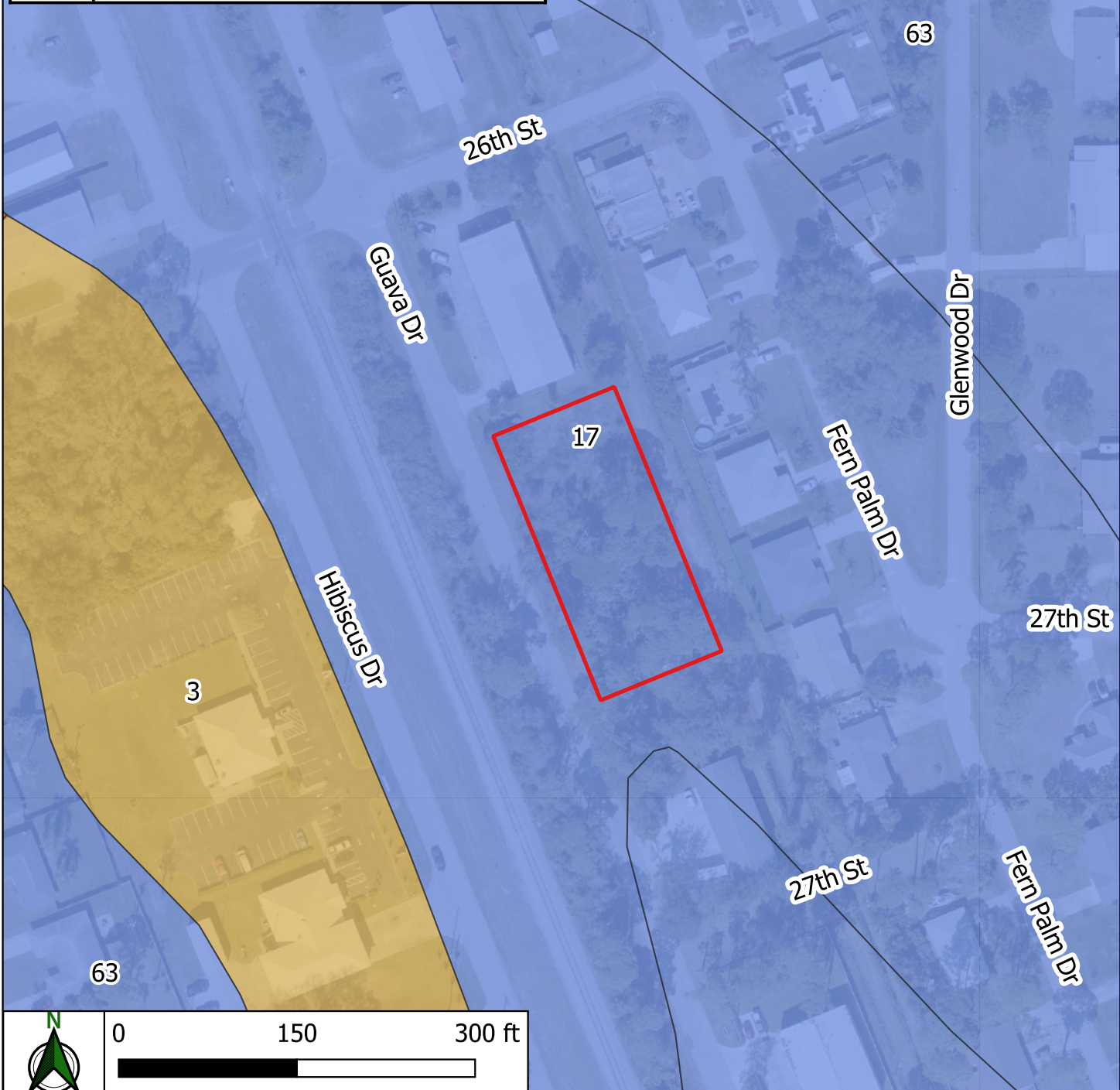
## **APPENDIX A - FIGURES**

---



|                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                               |                                                                                                              |                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
|  <p>The Balmoral Group<br/>200 W Welbourne Avenue<br/>Winter Park, FL 32789<br/>Phone: (407) 629-2185<br/>www.balmoralgroup.us</p> | <p><b>Legend</b></p> <p><span style="border: 2px solid red; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Project Limits</p> <p><span style="border: 2px solid blue; display: inline-block; width: 15px; height: 10px; margin-right: 5px;"></span> Section-Township-Range</p> | <p>Philco Warehouse Project<br/>2611 Guava Drive<br/>Edgewater, FL<br/>TBG Project No.<br/>1125065005.00</p> | <p><b>FIGURE 1</b></p> <p>Project Location</p> <p>Appendix A<br/>Page 1 of 7</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|

| MUSYM | MUNAME                                   |
|-------|------------------------------------------|
| 29    | IMMOKALEE SAND                           |
| 17    | DAYTONA SAND, 0 TO 5 PERCENT SLOPES      |
| 3     | ARENTS                                   |
| 63    | TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES |



The Balmoral Group  
200 W Welbourne Avenue  
Winter Park, FL 32789  
Phone: (407) 629-2185  
www.balmoralgroup.us

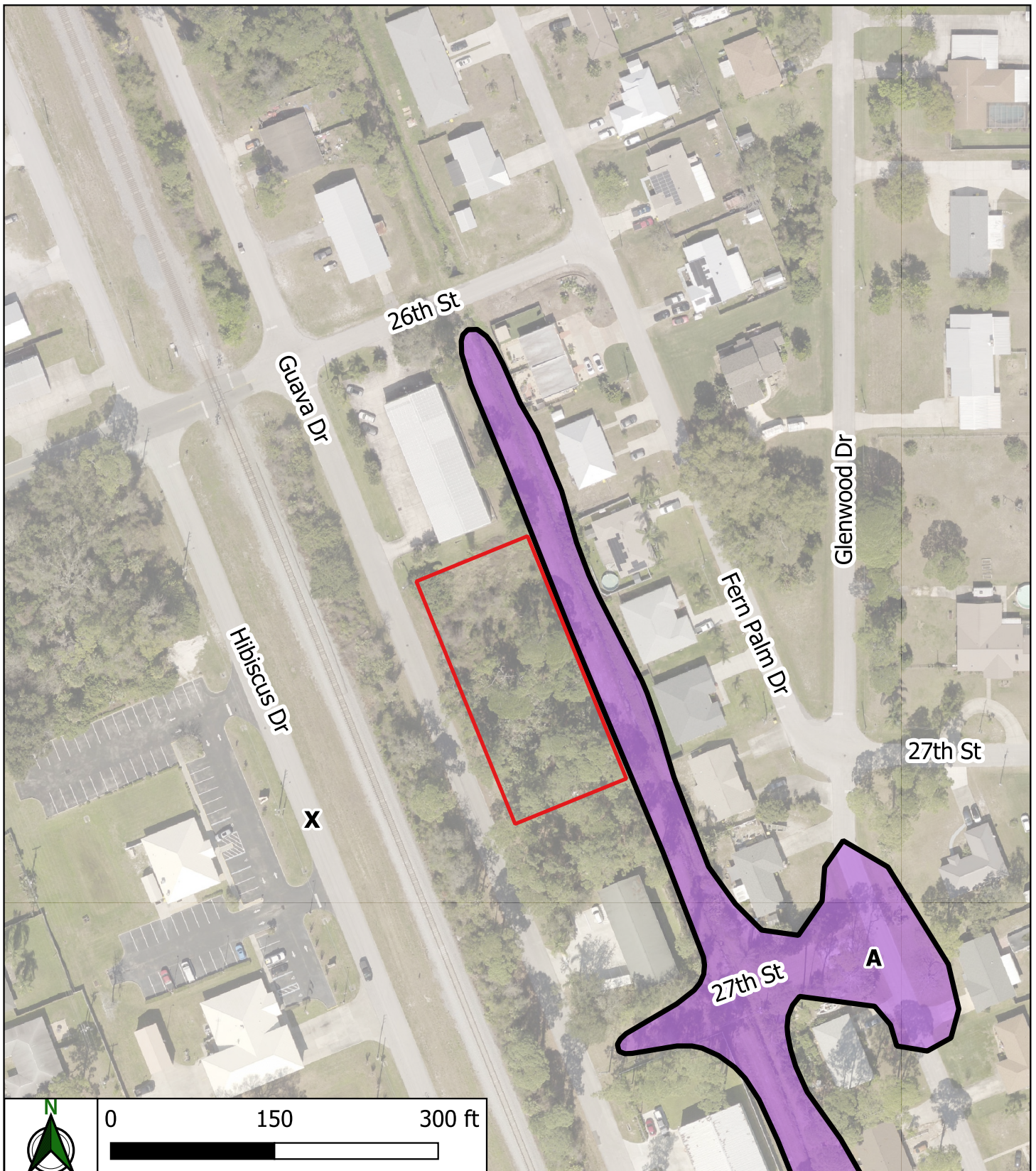
### Legend

- Project Limits
- Hydrologic Soil Group
- A
- A/D

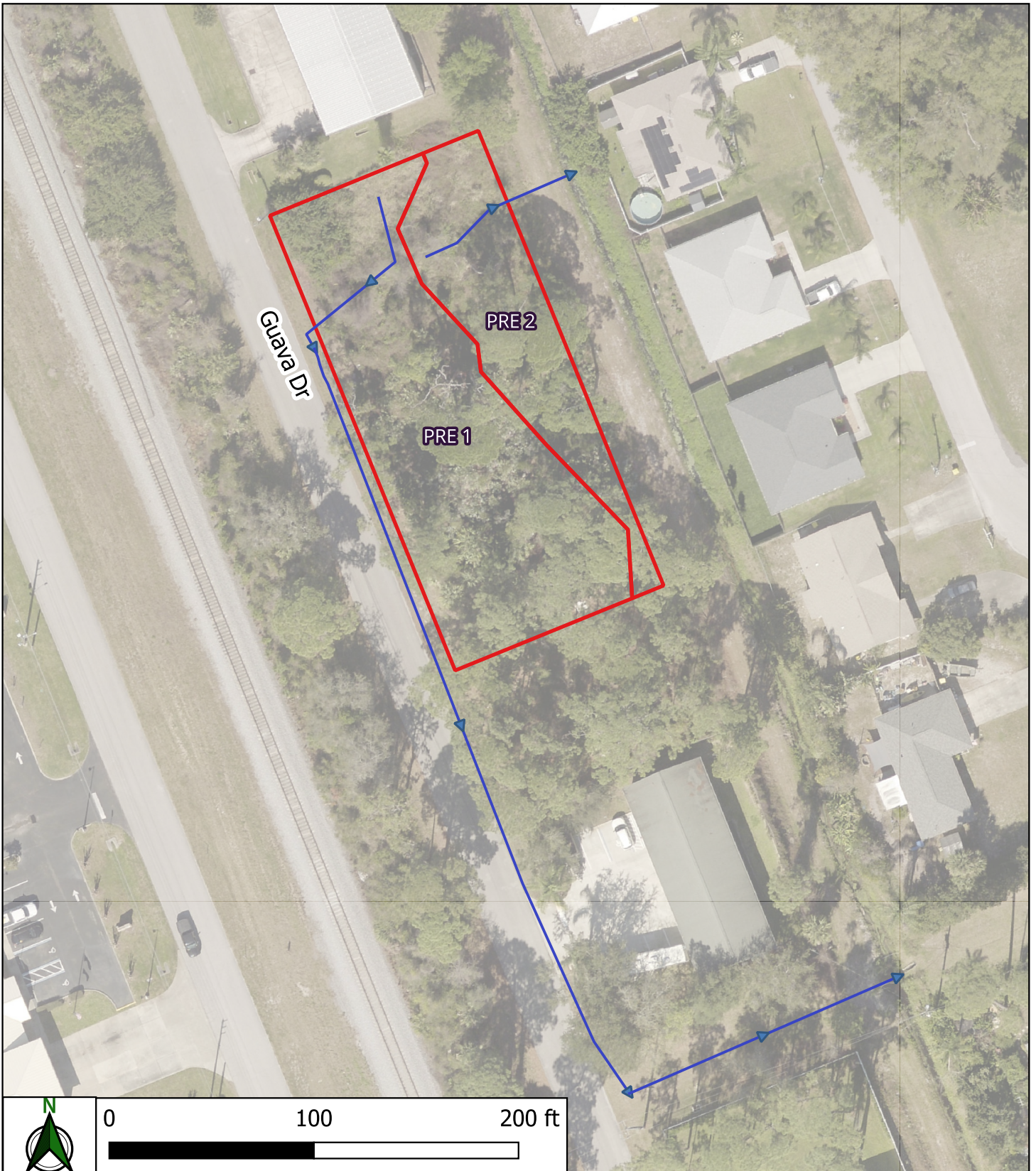
Philco Warehouse Project  
2611 Guava Drive  
Edgewater, FL  
TBG Project No.  
1125065005.00

### FIGURE 2

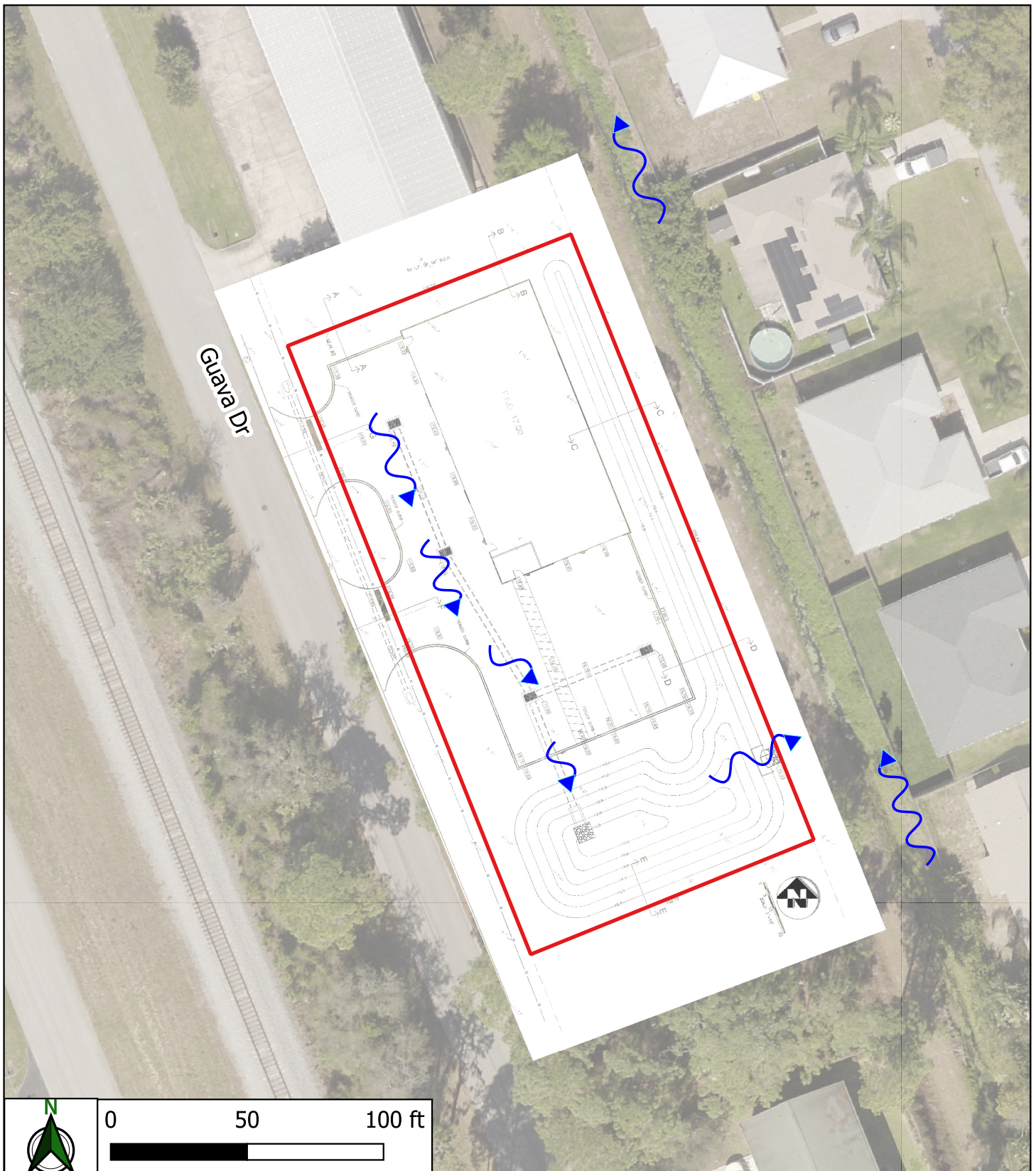
NRCS Soil Map



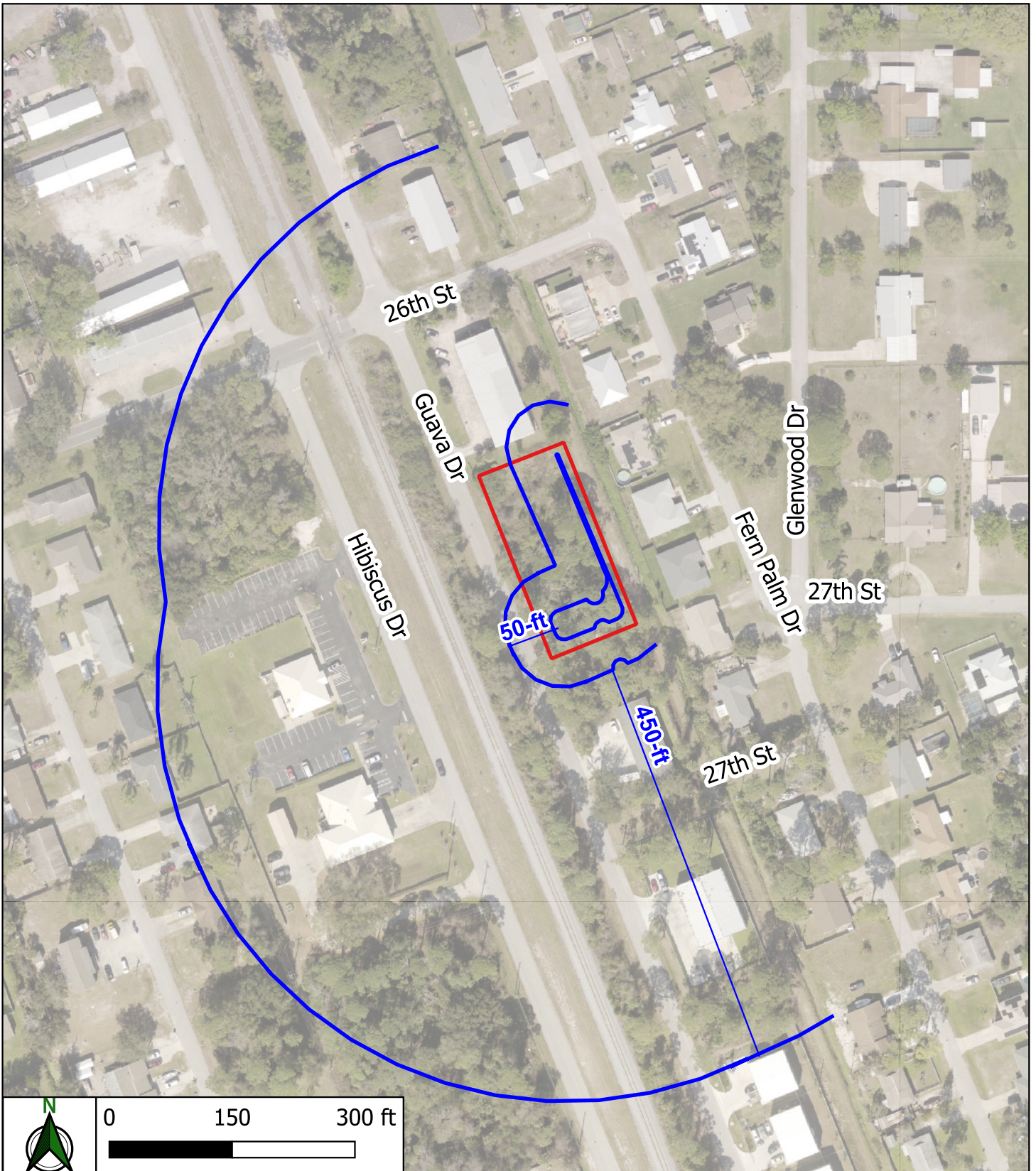
|                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                              |                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
|  <p>The Balmoral Group<br/>200 W Welbourne Avenue<br/>Winter Park, FL 32789<br/>Phone: (407) 629-2185<br/>www.balmoralgroup.us</p> | <p><b>Legend</b></p> <p><span style="border: 2px solid red; display: inline-block; width: 20px; height: 10px;"></span> Project Limits</p> <p>FEMA Flood Zone</p> <p><span style="border: 2px solid black; display: inline-block; width: 20px; height: 10px;"></span> X</p> <p><span style="background-color: purple; display: inline-block; width: 20px; height: 10px;"></span> A</p> | <p>Philco Warehouse Project<br/>2611 Guava Drive<br/>Edgewater, FL<br/>TBG Project No.<br/>1125065005.00</p> | <p><b>FIGURE 3</b></p> <p>FEMA Flood Map<br/>Sources:<br/>FEMA FIS Volusia County<br/>12127C0685J<br/>Effective: 9/29/2017</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|



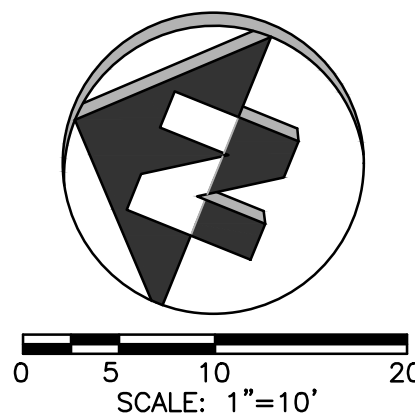
|                                                                                                                                                                                                                       |                                                                                                                                                      |                                                                                                              |                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
|  <p>The Balmoral Group<br/>200 W Welbourne Avenue<br/>Winter Park, FL 32789<br/>Phone: (407) 629-2185<br/>www.balmoralgroup.us</p> | <p><b>Legend</b></p> <p><span style="color: red;">▭</span> Project Limits</p> <p><span style="color: blue;">➡</span> Pre-Development Flow Arrows</p> | <p>Philco Warehouse Project<br/>2611 Guava Drive<br/>Edgewater, FL<br/>TBG Project No.<br/>1125065005.00</p> | <p>FIGURE 4A</p> <p>Pre-Development Map</p> <p>Appendix A<br/>Page 4 of 7</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|



|                                                                                                                                                                                                                       |                                                                                                                                                           |                                                                                                              |                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
|  <p>The Balmoral Group<br/>200 W Welbourne Avenue<br/>Winter Park, FL 32789<br/>Phone: (407) 629-2185<br/>www.balmoralgroup.us</p> | <p><b>Legend</b></p> <p><span style="color: red;">▭</span> Project Limits</p> <p><span style="color: blue;">~&gt;</span> Post-Development Flow Arrows</p> | <p>Philco Warehouse Project<br/>2611 Guava Drive<br/>Edgewater, FL<br/>TBG Project No.<br/>1125065005.00</p> | <p><b>FIGURE 4B</b></p> <p>Post-Development Map</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|



|                                                                                                                                                                                                                       |                                                                                                                                            |                                                                                                              |                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
|  <p>The Balmoral Group<br/>200 W Welbourne Avenue<br/>Winter Park, FL 32789<br/>Phone: (407) 629-2185<br/>www.balmoralgroup.us</p> | <p><b>Legend</b></p> <p><span style="color: red;">▭</span> Project Limits</p> <p><span style="color: blue;">—</span> Percolation Rings</p> | <p>Philco Warehouse Project<br/>2611 Guava Drive<br/>Edgewater, FL<br/>TBG Project No.<br/>1125065005.00</p> | <p><b>FIGURE 5</b></p> <p>Percolation Rings<br/>Map</p> <p>Appendix A<br/>Page 6 of 7</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|



## **APPENDIX B – PRE- & POST-DEVELOPMENT CALCULATIONS AND ICPR MODEL**

---

Summary of Results

PROJECT: Philco Warehouse PREPARED: ANN DATE: 5/27/2026

LOCATION: Edgewater, Florida CHECKED: OB DATE: 5/27/2026

SJRWMD Routing Results

| Node | Discharge to TW node, Mean Annual (cfs) |      | Difference | Discharge to TW node, 25 YR 24 HR (cfs) |      | Difference |
|------|-----------------------------------------|------|------------|-----------------------------------------|------|------------|
|      | Pre                                     | Post |            | Pre                                     | Post |            |
| TW   | 0.10                                    | 0.00 | -0.10      | 0.96                                    | 0.00 | -0.96      |

Treatment Volume Summary

| Required    | Provided    |
|-------------|-------------|
| 0.05 ac-ft. | 0.22 ac-ft. |

Provided Treatment Volume Recovery

Recovery = 18.50

Stormwater Management Facility Design

| Node | SMF  | Berm Elev. | 25yr-24hr Peak Stage | Design Freeboard | Mean Peak Stage | 100yr-24hr Peak Stage |
|------|------|------------|----------------------|------------------|-----------------|-----------------------|
| POND | Pond | 16.50      | 15.67                | 0.83             | 13.84           | 16.20                 |

Post must not excede of Pre Flow and Volume

| Event      | Pre Rate (cfs) | Pre Rate x 0.9 (cfs) | Post Rate (cfs) | Pre Volume (cf) | Pre Vol x 0.9 (cf) | Post Vol (cf) |
|------------|----------------|----------------------|-----------------|-----------------|--------------------|---------------|
| Mean       | 0.10           | 0.09                 | 0.00            | 1066            | 0.00               | 0.00          |
| 25Yr-24hr  | 0.96           | 0.86                 | 0.00            | 6428            | 5785               | 0.00          |
| 100Yr-24hr | 1.94           | 1.75                 | 1.37            | 12189           | 10970              | 3149          |

POST-DEVELOPMENT TIME OF CONCENTRATION

Time of Concentration was less than 10 minutes, so 10 minutes was used.

**CURVE NUMBER CALCULATIONS**PROJECT: Philco Warehouse PREPARED: ANNDATE: 5/27/2026LOCATION: Edgewater, Florida CHECKED: OBDATE: 5/27/2026Basin: PRE1**Runoff Curve Number Calculations**

| Cover description      | Soil name                           | Hydrologic group | CN <sup>(1)</sup> | Area (Acre) | CN x Area |
|------------------------|-------------------------------------|------------------|-------------------|-------------|-----------|
| Woods - Good Condition | Daytona Sand, 0 to 5 Percent Slopes | A                | 48                | 0.43        | 21        |
|                        |                                     |                  | <b>Totals =</b>   | <b>0.43</b> | <b>21</b> |

$$\text{CN (weighted)} = \frac{(\text{total product})}{(\text{total area})} = \frac{21}{0.43} = 48$$

Basin: PRE2**Runoff Curve Number Calculations**

| Cover description      | Soil name                           | Hydrologic group | CN <sup>(1)</sup> | Area (Acre) | CN x Area |
|------------------------|-------------------------------------|------------------|-------------------|-------------|-----------|
| Woods - Good Condition | Daytona Sand, 0 to 5 Percent Slopes | A                | 48                | 0.18        | 9         |
|                        |                                     |                  | <b>Totals =</b>   | <b>0.18</b> | <b>9</b>  |

$$\text{CN (weighted)} = \frac{(\text{total product})}{(\text{total area})} = \frac{9}{0.18} = 48$$

Basin: POST**Runoff Curve Number Calculations**

| Cover description           | Soil name                           | Hydrologic group | CN <sup>(1)</sup> | Area (Acre) | CN x Area |
|-----------------------------|-------------------------------------|------------------|-------------------|-------------|-----------|
| Impervious Area             | --                                  | --               | 98                | 0.34        | 34        |
| Open Space - Good Condition | Daytona Sand, 0 to 5 Percent Slopes | A                | 48                | 0.27        | 13        |
|                             |                                     |                  | <b>Totals =</b>   | <b>0.61</b> | <b>47</b> |

$$\text{CN (weighted)} = \frac{(\text{total product})}{(\text{total area})} = \frac{47}{0.61} = 76$$

**Notes:**

(1) Urban Hydrology for Small Watersheds TR-55

## SOIL STORAGE - CURVE NUMBER CALCULATIONS

PROJECT: Philco Warehouse

PREPARED: AN DATE: 5/27/2026

LOCATION: Edgewater, Florida

CHECKED: OB DATE: 5/27/2026

| Depth to Water Table (ft) | Cumulative Water Storage (in.) | CN           | CN for Open Space Calcs |
|---------------------------|--------------------------------|--------------|-------------------------|
| 1                         | 0.6                            | 94.34        | 94.00                   |
| 2                         | 2.5                            | 80.00        | 80.00                   |
| 3                         | 6.6                            | 60.24        | 60.00                   |
| <b>4</b>                  | <b>10.9</b>                    | <b>47.85</b> | <b>48.00</b>            |

$$CN = \frac{1000}{(10 + S)}$$

From SFWMD ERP Applicant's Handbook Volume II, dated May. 2016, Section 5.7.4

Water Table = 5 ft NAVD  
 Avg. Exist. Ground Ele. = 10 ft NAVD  
 Depth to WT = 5 ft  
 Depth to WT used = 4 ft

| Revised Calculation for Land Uses | Average percent impervious area (CN = 98) | CN (Assume HSG = A/D) |
|-----------------------------------|-------------------------------------------|-----------------------|
| Residential (1/8 ac or less)      | 65                                        | 80.5                  |
| Residential (1/4 ac)              | 38                                        | 67                    |
| Residential (1/3 ac)              | 30                                        | 63                    |
| Residential (1/2 ac)              | 25                                        | 60.5                  |
| Commercial                        | 85                                        | 90.5                  |
| Woods                             | 0                                         | 48                    |

## Time of Concentration

PROJECT: Philco Warehouse

PREPARED: ANN

DATE: 05/27/26

LOCATION: Edgewater, Florida

CHECKED: OB

DATE: 05/27/26

**EXISTING**

or

DEVELOPED / UNDEVELOPED

Basin

**PRE1**

**Tc**

or

Tt (through subarea)

L = 622 ft

### Sheet flow (Applicable to Tc only)

Segment ID

1. Surface description<sup>†</sup>
2. Mannings roughness coeff., n<sup>†</sup>
3. Flow length, L (total L ≤ 100 ft.)
4. 2-year, 24-hour rainfall (in.)<sup>††</sup>
5. Land slope, s (ft./ft.)
6. Compute Tt in hr,  $T_t = [0.007(nL)^{0.8}] / [P_{24hr}^{0.5} s^{0.4}]$  <sup>†††</sup>
- Subtotal

|             |
|-------------|
| AB          |
| WoodsLight  |
| 0.4         |
| 100         |
| 4.7         |
| 0.021       |
| 0.292       |
| <b>0.29</b> |

### Shallow Concentrated Flow

Segment ID

7. Surface description (Paved or Unpaved)<sup>††††</sup>
8. Flow length, L (ft)
9. Watercourse slope, s (ft/ft)
10. Average velocity<sup>†††</sup>,  $V = kS^{0.5}$  (fps)
11. Compute Tt in hr,  $T_t = L/3600V$
- Subtotal

| BC          | CD          |
|-------------|-------------|
| Unpaved     | Unpaved     |
| 387         | 135         |
| 0.011       | 0.066       |
| 1.70        | 4.16        |
| 0.06        | 0.01        |
| <b>0.06</b> | <b>0.01</b> |

### Time of Concentration, hr. (summation of subtotals)

Hours  
Minutes  
Total

|             |
|-------------|
| 0.36        |
| 21.8        |
| <b>21.8</b> |

### Notes:

- † Values from Table 3-1 of Urban Hydrology for Small Watersheds, Technical Release of TR-55
- †† The 2-year, 24-hour rainfall used from NOAA Depth Duration Frequency Curves.
- ††† This equation is derived from TR-55
- †††† Assume minimum physical slope that produces a velocity of 2.5 ft/sec

Time of Concentration

PROJECT: Philco Warehouse  
LOCATION: Edgewater, Florida

PREPARED: ANN  
CHECKED: OB  
DATE: 05/27/26

EXISTING

or

DEVELOPED / UNDEVELOPED

Tc

or

Tt (through subarea)

Basin

PRE2

L = 100 ft

Sheet flow (Applicable to Tc only)

- Segment ID
- 1. Surface description†
  - 2. Mannings roughness coeff., n†
  - 3. Flow length, L (total L ≤ 100 ft.)
  - 4. 2-year, 24-hour rainfall (in.) ††
  - 5. Land slope, s (ft./ft.)
  - 6. Compute Tt in hr,  $Tt = [0.007(nL)^{0.8}] / [P_{24hr}^{0.5} s^{0.4}]$  †††
- Subtotal

|            |
|------------|
| AB         |
| WoodsLight |
| 0.4        |
| 100        |
| 4.7        |
| 0.038      |
| 0.229      |
| 0.23       |

Time of Concentration, hr. (summation of subtotals)

|         |      |
|---------|------|
| Hours   | 0.23 |
| Minutes | 13.8 |
| Total   | 13.8 |

Notes:

† Values from Table 3-1 of Urban Hydrology for Small Watersheds, Technical Release of TR-55

†† The 2-year, 24-hour rainfall used from NOAA Depth Duration Frequency Curves.

††† This equation is derived from TR-55

†††† Assume minimum physical slope that produces a velocity of 2.5 ft/sec

## **STORAGE CALCULATIONS**

PROJECT: Philco Warehouse PREPARED: ANN DATE: 5/27/2026

LOCATION: Edgewater, Florida CHECKED: OB DATE: 5/27/2026

### **Proposed Pond Storage**

| Elev. | h   | Area     | Area  | Inc. Volume | Cum. Volume |
|-------|-----|----------|-------|-------------|-------------|
| NAVD  | ft. | sf       | ac    | Ac-ft.      | Ac-ft.      |
| 16.5  | 1.0 | 6,306.29 | 0.145 | 0.117       | 0.276       |
| 15.5  | 1.0 | 3,858.07 | 0.089 | 0.072       | 0.159       |
| 14.5  | 1.0 | 2,454.67 | 0.056 | 0.046       | 0.087       |
| 13.5  | 1.0 | 1,582.79 | 0.036 | 0.028       | 0.041       |
| 12.5  | 1.0 | 860.21   | 0.020 | 0.013       | 0.013       |
| 11.5  | 0.0 | 282.15   | 0.006 | 0.000       | 0.000       |

Weir Elev. = 16.00 ft.  
Volume below Weir = 9474 ft<sup>3</sup> **0.218** ac-ft.

### **City of Edgewater Pollution Abatement Criteria**

#### **Greater of the Following:**

Project Area = 0.61 acres  
Since project area is greater than 1/4  
acres, multiply by 1" 0.61 ac-in 0.051 ac-ft.  
OR  
1.5" over Impervious Area 0.52 ac-in 0.043 ac-ft.  
**Required Treatment Volume = 0.61 ac-in 0.051 ac-ft.**

### **Geotechnical Parameters for the Site**

PROJECT: Philco Warehouse

PREPARED: ANN

DATE: 5/27/2026

LOCATION: Edgewater, Florida

CHECKED: OB

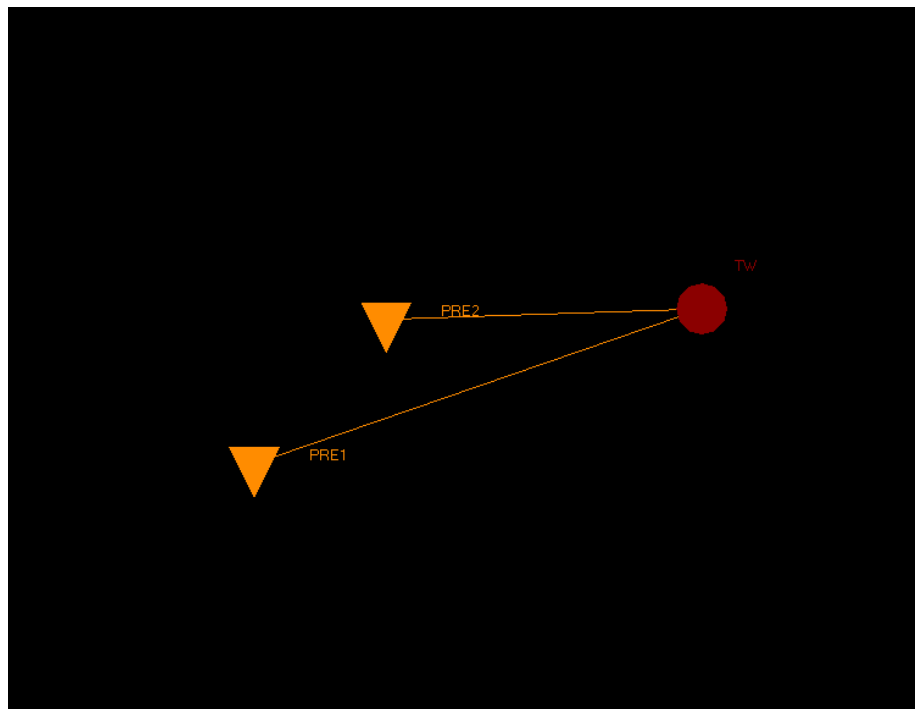
DATE: 5/27/2026

| <b>Boring</b>                      | <b>Estimated Existing<br/>Ground Elev. (ft.<br/>NAVD)</b> | <b>Encountered<br/>GW Elev. (ft.<br/>NAVD)</b> | <b>Estimated SHGWT<br/>Elev. (ft. NAVD)<sup>1</sup></b> | <b>Base of Aquifer<br/>Elev. (ft. NAVD)<sup>2</sup></b> | <b>Saturate Vertical<br/>Permeability (ft./day)</b> | <b>Saturated<br/>Horizontal<br/>Permeability<br/>(ft./day)<sup>4</sup></b> |
|------------------------------------|-----------------------------------------------------------|------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------|
| P-1                                | 17.4                                                      | 7.4                                            | <b>9.4</b>                                              | <b>-2.6</b>                                             | 11.7                                                | 23.4                                                                       |
| Values Used In ICPR <sup>3</sup> : |                                                           |                                                |                                                         |                                                         | <b>5.85</b>                                         | <b>11.70</b>                                                               |

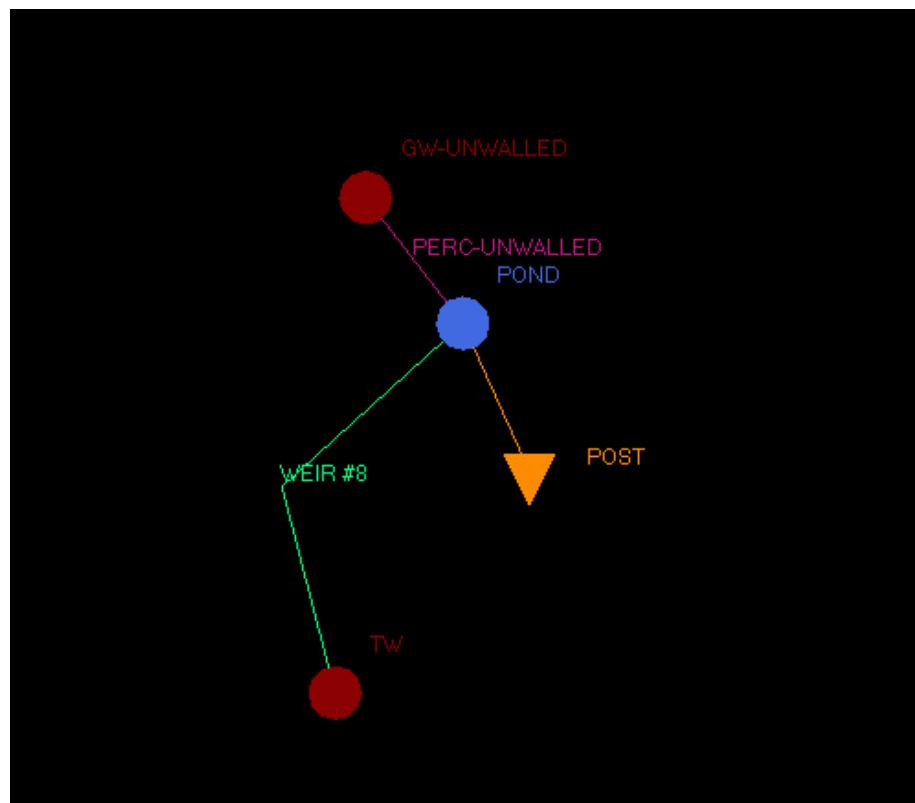
Notes:

1. SHGWT is estimated to be two feet above the encountered.
2. Base of aquifer assumed at boring termination (20' below ground).
3. The average vertical permeability parameters from P-1 was applied with a safety factor of 2.
4. The horizontal vertical permeability is 2 times greater than the vertical permeability, as recommended in the geotechnical report.
5. Geotechnical information is provided by Universal Engineering Sciences (May 26, 2026 Report No. 2161188R)

Nodal Diagram: Existing



Nodal Diagram: Proposed



## Simple Basin: PRE1

Scenario: Existing  
 Node: TW  
 Hydrograph Method: NRCS Unit Hydrograph  
 Infiltration Method: Curve Number  
 Time of Concentration: 21.800 min  
 Max Allowable Q: 9999.00 cfs  
 Time Shift: 0.000 hr  
 Unit Hydrograph: UH323  
 Peaking Factor: 323.0  
 Area: 0.4300 ac  
 Curve Number: 48.0  
 Ia/S: 0.00  
 % Impervious: 0.00  
 % DCIA: 0.00  
 % Direct: 0.00  
 Rainfall Name:

Comment:

## Simple Basin: PRE2

Scenario: Existing  
 Node: TW  
 Hydrograph Method: NRCS Unit Hydrograph  
 Infiltration Method: Curve Number  
 Time of Concentration: 13.800 min  
 Max Allowable Q: 9999.00 cfs  
 Time Shift: 0.000 hr  
 Unit Hydrograph: UH323  
 Peaking Factor: 323.0  
 Area: 0.1800 ac  
 Curve Number: 48.0  
 Ia/S: 0.00  
 % Impervious: 0.00  
 % DCIA: 0.00  
 % Direct: 0.00  
 Rainfall Name:

Comment:

## Simple Basin: POST

Scenario: Proposed  
 Node: POND  
 Hydrograph Method: NRCS Unit Hydrograph  
 Infiltration Method: Curve Number  
 Time of Concentration: 10.000 min  
 Max Allowable Q: 9999.00 cfs

Time Shift: 0.000 hr  
 Unit Hydrograph: UH323  
 Peaking Factor: 323.0  
 Area: 0.6100 ac  
 Curve Number: 76.0  
 Ia/S: 0.00  
 % Impervious: 0.00  
 % DCIA: 0.00  
 % Direct: 0.00  
 Rainfall Name:

Comment:

Node: TW

Scenario: Existing  
 Type: Time/Stage  
 Base Flow: 0.00 cfs  
 Initial Stage: 12.00 ft  
 Warning Stage: 12.50 ft  
 Alert Stage: 0.00 ft  
 Boundary Stage:

| Year | Month | Day | Hour     | Stage [ft] |
|------|-------|-----|----------|------------|
| 0    | 0     | 0   | 0.000    | 12.00      |
| 0    | 0     | 0   | 9999.000 | 12.00      |

Comment: I.E = (INFORMATION PULLED FROM EREG\_1203127. Refer to Appendix B for more information)

Node: GW-UNWALLED

Scenario: Proposed  
 Type: Time/Stage  
 Base Flow: 0.00 cfs  
 Initial Stage: 9.40 ft  
 Warning Stage: 11.00 ft  
 Alert Stage: 0.00 ft  
 Boundary Stage:

| Year | Month | Day | Hour     | Stage [ft] |
|------|-------|-----|----------|------------|
| 0    | 0     | 0   | 0.000    | 9.40       |
| 0    | 0     | 0   | 9999.000 | 9.40       |

Comment:

Node: POND

Scenario: Proposed  
 Type: Stage/Area  
 Base Flow: 0.00 cfs  
 Initial Stage: 11.50 ft  
 Warning Stage: 16.50 ft  
 Alert Stage: 0.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|------------|-----------|------------|
| 16.50      | 0.1450    | 6316       |
| 15.50      | 0.0890    | 3877       |
| 14.50      | 0.0560    | 2439       |
| 13.50      | 0.0360    | 1568       |
| 12.50      | 0.0200    | 871        |
| 11.50      | 0.0060    | 261        |

Comment: W.S = Top of Berm  
 I.S = Bottom of Pond

Node: TW

Scenario: Proposed  
 Type: Time/Stage  
 Base Flow: 0.00 cfs  
 Initial Stage: 12.00 ft  
 Warning Stage: 12.50 ft  
 Alert Stage: 0.00 ft  
 Boundary Stage:

| Year | Month | Day | Hour     | Stage [ft] |
|------|-------|-----|----------|------------|
| 0    | 0     | 0   | 0.000    | 12.00      |
| 0    | 0     | 0   | 9999.000 | 12.00      |

Comment: I.E = (INFORMATION PULLED FROM EREG\_1203127. Refer to Appendix B for more information)

Node: GW-UNWALLED

Scenario: Recovery  
 Type: Time/Stage  
 Base Flow: 0.00 cfs  
 Initial Stage: 9.40 ft  
 Warning Stage: 11.00 ft  
 Alert Stage: 0.00 ft  
 Boundary Stage:

| Year | Month | Day | Hour     | Stage [ft] |
|------|-------|-----|----------|------------|
| 0    | 0     | 0   | 0.000    | 9.40       |
| 0    | 0     | 0   | 9999.000 | 9.40       |

Comment:

## Node: POND

Scenario: Recovery  
 Type: Stage/Area  
 Base Flow: 0.00 cfs  
 Initial Stage: 16.00 ft  
 Warning Stage: 16.50 ft  
 Alert Stage: 0.00 ft

| Stage [ft] | Area [ac] | Area [ft2] |
|------------|-----------|------------|
| 16.50      | 0.1450    | 6316       |
| 15.50      | 0.0890    | 3877       |
| 14.50      | 0.0560    | 2439       |
| 13.50      | 0.0360    | 1568       |
| 12.50      | 0.0200    | 871        |
| 11.50      | 0.0060    | 261        |

Comment: W.S = Top of Berm  
 I.S = Treatment Vol. El

## Percolation Link: PERC-UNWALLED

|                                     |                                                      |
|-------------------------------------|------------------------------------------------------|
| Scenario: Proposed                  | Surface Area Option: Vary Based on Stage/Area Table  |
| From Node: POND                     |                                                      |
| To Node: GW-UNWALLED                | Vertical Flow Termination: Horizontal Flow Algorithm |
| Link Count: 1                       | Perimeter 1: 597.70 ft                               |
| Flow Direction: Both                | Perimeter 2: 691.44 ft                               |
| Aquifer Base Elevation: -2.60 ft    | Perimeter 3: 2087.22 ft                              |
| Water Table Elevation: 9.40 ft      | Distance P1 to P2: 50.00 ft                          |
| Annual Recharge Rate: 0 ipy         | Distance P2 to P3: 450.00 ft                         |
| Horizontal Conductivity: 11.700 fpd | # of Cells P1 to P2: 10                              |
| Vertical Conductivity: 5.850 fpd    | # of Cells P2 to P3: 45                              |
| Fillable Porosity: 0.300            |                                                      |
| Layer Thickness: 2.10 ft            |                                                      |

Comment:

## Weir Link: WEIR #8

|                                         |                        |
|-----------------------------------------|------------------------|
| Scenario: Proposed                      | Bottom Clip            |
| From Node: POND                         | Default: 0.00 ft       |
| To Node: TW                             | Op Table:              |
| Link Count: 1                           | Ref Node:              |
| Flow Direction: Both                    | Top Clip               |
| Damping: 0.0000 ft                      | Default: 0.00 ft       |
| Weir Type: Broad Crested Vertical       | Op Table:              |
| Geometry Type: Trapezoidal              | Ref Node:              |
| Invert: 16.00 ft                        | Discharge Coefficients |
| Control Elevation: 16.00 ft             | Weir Default: 2.800    |
| Max Depth: 0.50 ft                      | Weir Table:            |
| Extrapolation Method: Normal Projection | Orifice Default: 0.600 |

Bottom Width: 5.00 ft  
 Left Slope: 4.000 (h:v)  
 Right Slope: 4.000 (h:v)

Orifice Table:

Comment:

#### Percolation Link: PERC-UNWALLED

|                          |             |                            |                                |
|--------------------------|-------------|----------------------------|--------------------------------|
| Scenario:                | Recovery    | Surface Area Option:       | Vary Based on Stage/Area Table |
| From Node:               | POND        | Vertical Flow Termination: | Horizontal Flow Algorithm      |
| To Node:                 | GW-UNWALLED | Perimeter 1:               | 597.70 ft                      |
| Link Count:              | 1           | Perimeter 2:               | 691.44 ft                      |
| Flow Direction:          | Both        | Perimeter 3:               | 2087.22 ft                     |
| Aquifer Base Elevation:  | -2.60 ft    | Distance P1 to P2:         | 50.00 ft                       |
| Water Table Elevation:   | 9.40 ft     | Distance P2 to P3:         | 450.00 ft                      |
| Annual Recharge Rate:    | 0 ipy       | # of Cells P1 to P2:       | 10                             |
| Horizontal Conductivity: | 11.700 fpd  | # of Cells P2 to P3:       | 45                             |
| Vertical Conductivity:   | 5.850 fpd   |                            |                                |
| Fillable Porosity:       | 0.300       |                            |                                |
| Layer Thickness:         | 0.00 ft     |                            |                                |

Comment:

#### Simulation: 100yr24hr

Scenario: Existing  
 Run Date/Time: 1/22/2026 11:35:42 AM  
 Program Version: StormWise 4.08.03

#### General

Run Mode: Normal

|             | Year | Month | Day | Hour [hr] |
|-------------|------|-------|-----|-----------|
| Start Time: | 0    | 0     | 0   | 0.000     |
| End Time:   | 0    | 0     | 0   | 30.000    |

|                       | Hydrology [sec] | Surface Hydraulics [sec] |
|-----------------------|-----------------|--------------------------|
| Min Calculation Time: | 60.000          | 0.100                    |
| Max Calculation Time: |                 | 30.000                   |

#### Output Time Increments

##### Hydrology

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

##### Surface Hydraulics

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
|------|-------|-----|-----------|----------------------|

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder:

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain Global  
 Opt:

Rainfall Name: ~FLMOD  
 Rainfall Amount: 13.10 in  
 Storm Duration: 24.000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment: Per City of Edgewater Site Design Criteria

## Simulation: 25yr24hr

Scenario: Existing  
 Run Date/Time: 1/22/2026 11:35:57 AM  
 Program Version: StormWise 4.08.03

## General

Run Mode: Normal

|             | Year            | Month                       | Day | Hour [hr] |
|-------------|-----------------|-----------------------------|-----|-----------|
| Start Time: | 0               | 0                           | 0   | 0.000     |
| End Time:   | 0               | 0                           | 0   | 30.000    |
|             | Hydrology [sec] | Surface Hydraulics<br>[sec] |     |           |

Min Calculation Time: 60.000 0.100  
 Max Calculation Time: 30.000

#### Output Time Increments

##### Hydrology

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

##### Surface Hydraulics

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder:

Unit Hydrograph  
Folder:

##### Lookup Tables

Boundary Stage Set:  
Extern Hydrograph Set:  
Curve Number Set:

Green-Ampt Set:  
Vertical Layers Set:  
Impervious Set:

#### Tolerances & Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.000 hr  
 Ia/S: 0.20 dec  
 Smp/Man Basin Rain Global  
 Opt:  
 Rainfall Name: ~FLMOD  
 Rainfall Amount: 9.40 in  
 Storm Duration: 24.000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment: Per City of Edgewater Site Design Criteria

Simulation: Mean

Scenario: Existing

Run Date/Time: 1/22/2026 11:36:25 AM  
 Program Version: StormWise 4.08.03

### General

Run Mode: Normal

|             | Year | Month | Day | Hour [hr] |
|-------------|------|-------|-----|-----------|
| Start Time: | 0    | 0     | 0   | 0.000     |
| End Time:   | 0    | 0     | 0   | 30.000    |

|                       | Hydrology [sec] | Surface Hydraulics<br>[sec] |
|-----------------------|-----------------|-----------------------------|
| Min Calculation Time: | 60.000          | 0.100                       |
| Max Calculation Time: |                 | 30.000                      |

### Output Time Increments

#### Hydrology

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

#### Surface Hydraulics

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

#### Restart File

Save Restart: False

### Resources & Lookup Tables

#### Resources

Rainfall Folder:

Unit Hydrograph  
Folder:

#### Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
 Vertical Layers Set:  
 Impervious Set:

### Tolerances & Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.000 hr  
 Ia/S: 0.20 dec  
 Smp/Man Basin Rain Opt: Global  
 Rainfall Name: ~FLMOD  
 Rainfall Amount: 4.70 in  
 Storm Duration: 24.000 hr

Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment: Per City of Edgewater Site Design Criteria

Simulation: 100yr24hr

Scenario: Proposed  
 Run Date/Time: 5/27/2026 2:43:56 PM  
 Program Version: StormWise 4.08.03

#### General

Run Mode: Normal

|             | Year | Month | Day | Hour [hr] |
|-------------|------|-------|-----|-----------|
| Start Time: | 0    | 0     | 0   | 0.000     |
| End Time:   | 0    | 0     | 0   | 30.000    |

|                       | Hydrology [sec] | Surface Hydraulics [sec] |
|-----------------------|-----------------|--------------------------|
| Min Calculation Time: | 60.000          | 0.100                    |
| Max Calculation Time: |                 | 30.000                   |

#### Output Time Increments

##### Hydrology

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

##### Surface Hydraulics

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

##### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder:

Unit Hydrograph  
Folder:

##### Lookup Tables

Boundary Stage Set:  
 Extern Hydrograph Set:  
 Curve Number Set:

Green-Ampt Set:  
 Vertical Layers Set:  
 Impervious Set:

#### Tolerances & Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.000 hr  
 Ia/S: 0.20 dec  
 Smp/Man Basin Rain Opt: Global  
 Rainfall Name: ~FLMOD  
 Rainfall Amount: 13.10 in  
 Storm Duration: 24.000 hr  
 Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area (1D): 100 ft2  
 Energy Switch (1D): Energy

Comment: Per City of Edgewater Site Design Criteria

Simulation: 25yr24hr

Scenario: Proposed  
 Run Date/Time: 5/27/2026 2:45:07 PM  
 Program Version: StormWise 4.08.03

#### General

Run Mode: Normal

|             | Year | Month | Day | Hour [hr] |
|-------------|------|-------|-----|-----------|
| Start Time: | 0    | 0     | 0   | 0.000     |
| End Time:   | 0    | 0     | 0   | 30.000    |

|                       | Hydrology [sec] | Surface Hydraulics [sec] |
|-----------------------|-----------------|--------------------------|
| Min Calculation Time: | 60.000          | 0.100                    |
| Max Calculation Time: |                 | 30.000                   |

#### Output Time Increments

##### Hydrology

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

##### Surface Hydraulics

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

##### Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder:

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft

Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain: Global  
Opt:

Rainfall Name: ~FLMOD

Rainfall Amount: 9.40 in

Storm Duration: 24.000 hr

Dflt Damping (1D): 0.0050 ft

Min Node Srf Area: 100 ft2

(1D):

Energy Switch (1D): Energy

Comment: Per City of Edgewater Site Design Criteria

## Simulation: Mean

Scenario: Proposed

Run Date/Time: 5/27/2026 2:45:32 PM

Program Version: StormWise 4.08.03

## General

Run Mode: Normal

|             | Year | Month | Day | Hour [hr] |
|-------------|------|-------|-----|-----------|
| Start Time: | 0    | 0     | 0   | 0.000     |
| End Time:   | 0    | 0     | 0   | 30.000    |

|                       | Hydrology [sec] | Surface Hydraulics<br>[sec] |
|-----------------------|-----------------|-----------------------------|
| Min Calculation Time: | 60.000          | 0.100                       |
| Max Calculation Time: |                 | 30.000                      |

## Output Time Increments

## Hydrology

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

#### Surface Hydraulics

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

#### Restart File

Save Restart: False

#### Resources & Lookup Tables

##### Resources

Rainfall Folder:

Unit Hydrograph  
Folder:

##### Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

#### Tolerances & Options

Time Marching: SAOR  
Max Iterations: 6  
Over-Relax Weight: 0.5 dec  
Fact:  
dZ Tolerance: 0.0010 ft  
Max dZ: 1.0000 ft  
Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain: Global  
Opt:

Rainfall Name: ~FLMOD  
Rainfall Amount: 4.70 in  
Storm Duration: 24.000 hr  
Dflt Damping (1D): 0.0050 ft  
Min Node Srf Area: 100 ft2  
(1D):  
Energy Switch (1D): Energy

Comment: Per City of Edgewater Site Design Criteria

#### Simulation: NoRain

Scenario: Recovery  
Run Date/Time: 5/27/2026 2:45:54 PM  
Program Version: StormWise 4.08.03

#### General

Run Mode: Normal

|             | Year | Month | Day | Hour [hr] |
|-------------|------|-------|-----|-----------|
| Start Time: | 0    | 0     | 0   | 0.000     |
| End Time:   | 0    | 0     | 0   | 72.000    |

|                       | Hydrology [sec] | Surface Hydraulics<br>[sec] |
|-----------------------|-----------------|-----------------------------|
| Min Calculation Time: | 60.000          | 0.100                       |
| Max Calculation Time: |                 | 30.000                      |

## Output Time Increments

## Hydrology

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

## Surface Hydraulics

| Year | Month | Day | Hour [hr] | Time Increment [min] |
|------|-------|-----|-----------|----------------------|
| 0    | 0     | 0   | 0.000     | 15.000               |

## Restart File

Save Restart: False

## Resources &amp; Lookup Tables

## Resources

Rainfall Folder:

Unit Hydrograph  
Folder:

## Lookup Tables

Boundary Stage Set:

Extern Hydrograph Set:

Curve Number Set:

Green-Ampt Set:

Vertical Layers Set:

Impervious Set:

## Tolerances &amp; Options

Time Marching: SAOR  
 Max Iterations: 6  
 Over-Relax Weight: 0.5 dec  
 Fact:  
 dZ Tolerance: 0.0010 ft  
 Max dZ: 1.0000 ft  
 Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.000 hr

Ia/S: 0.20 dec

Smp/Man Basin Rain: No Rainfall  
 Opt:

Dflt Damping (1D): 0.0050 ft  
 Min Node Srf Area: 100 ft2  
 (1D):  
 Energy Switch (1D): Energy

Comment:

## Node Max Conditions w/ Times [Existing]

| Node Name | Sim Name  | Warning Stage [ft] | Alert Stage [ft] | Max Stage [ft] | Min/Max Delta Stage [ft] | Max Total Inflow [cfs] | Max Total Outflow [cfs] | Max Surface Area [ft <sup>2</sup> ] | Time to Max Stage [hr] | Time to Min/Max Delta Stage [hr] | Time to Max Total Inflow [hr] | Time to Max Total Outflow [hr] |
|-----------|-----------|--------------------|------------------|----------------|--------------------------|------------------------|-------------------------|-------------------------------------|------------------------|----------------------------------|-------------------------------|--------------------------------|
| TW        | 100yr24hr | 12.50              | 0.00             | 12.00          | 0.0000                   | 1.94                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 12.144                        | 0.000                          |
| TW        | 25yr24hr  | 12.50              | 0.00             | 12.00          | 0.0000                   | 0.96                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 12.169                        | 0.000                          |
| TW        | Mean      | 12.50              | 0.00             | 12.00          | 0.0000                   | 0.10                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 12.369                        | 0.000                          |

## Node Max Conditions w/ Times [Proposed]

| Node Name    | Sim Name  | Warning Stage [ft] | Alert Stage [ft] | Max Stage [ft] | Min/Max Delta Stage [ft] | Max Total Inflow [cfs] | Max Total Outflow [cfs] | Max Surface Area [ft <sup>2</sup> ] | Time to Max Stage [hr] | Time to Min/Max Delta Stage [hr] | Time to Max Total Inflow [hr] | Time to Max Total Outflow [hr] |
|--------------|-----------|--------------------|------------------|----------------|--------------------------|------------------------|-------------------------|-------------------------------------|------------------------|----------------------------------|-------------------------------|--------------------------------|
| GW-U NWALLED | 100yr24hr | 11.00              | 0.00             | 9.40           | 0.0000                   | 0.38                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 12.463                        | 0.000                          |
| GW-U NWALLED | 25yr24hr  | 11.00              | 0.00             | 9.40           | 0.0000                   | 0.29                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 13.558                        | 0.000                          |
| GW-U NWALLED | Mean      | 11.00              | 0.00             | 9.40           | 0.0000                   | 0.13                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 13.306                        | 0.000                          |

## Node Max Conditions w/ Times [Proposed]

| Node Name | Sim Name  | Warning Stage [ft] | Alert Stage [ft] | Max Stage [ft] | Min/Max Delta Stage [ft] | Max Total Inflow [cfs] | Max Total Outflow [cfs] | Max Surface Area [ft <sup>2</sup> ] | Time to Max Stage [hr] | Time to Min/Max Delta Stage [hr] | Time to Max Total Inflow [hr] | Time to Max Total Outflow [hr] |
|-----------|-----------|--------------------|------------------|----------------|--------------------------|------------------------|-------------------------|-------------------------------------|------------------------|----------------------------------|-------------------------------|--------------------------------|
| POND      | 100yr24hr | 16.50              | 0.00             | 16.20          | 0.0010                   | 4.59                   | 1.74                    | 5575                                | 12.463                 | 11.058                           | 12.033                        | 12.463                         |
| POND      | 25yr24hr  | 16.50              | 0.00             | 15.67          | 0.0010                   | 3.03                   | 0.29                    | 4285                                | 13.550                 | 10.567                           | 12.033                        | 13.558                         |
| POND      | Mean      | 16.50              | 0.00             | 13.84          | 0.0010                   | 1.09                   | 0.13                    | 1862                                | 13.297                 | 11.480                           | 12.050                        | 13.306                         |

## Node Max Conditions w/ Times [Proposed]

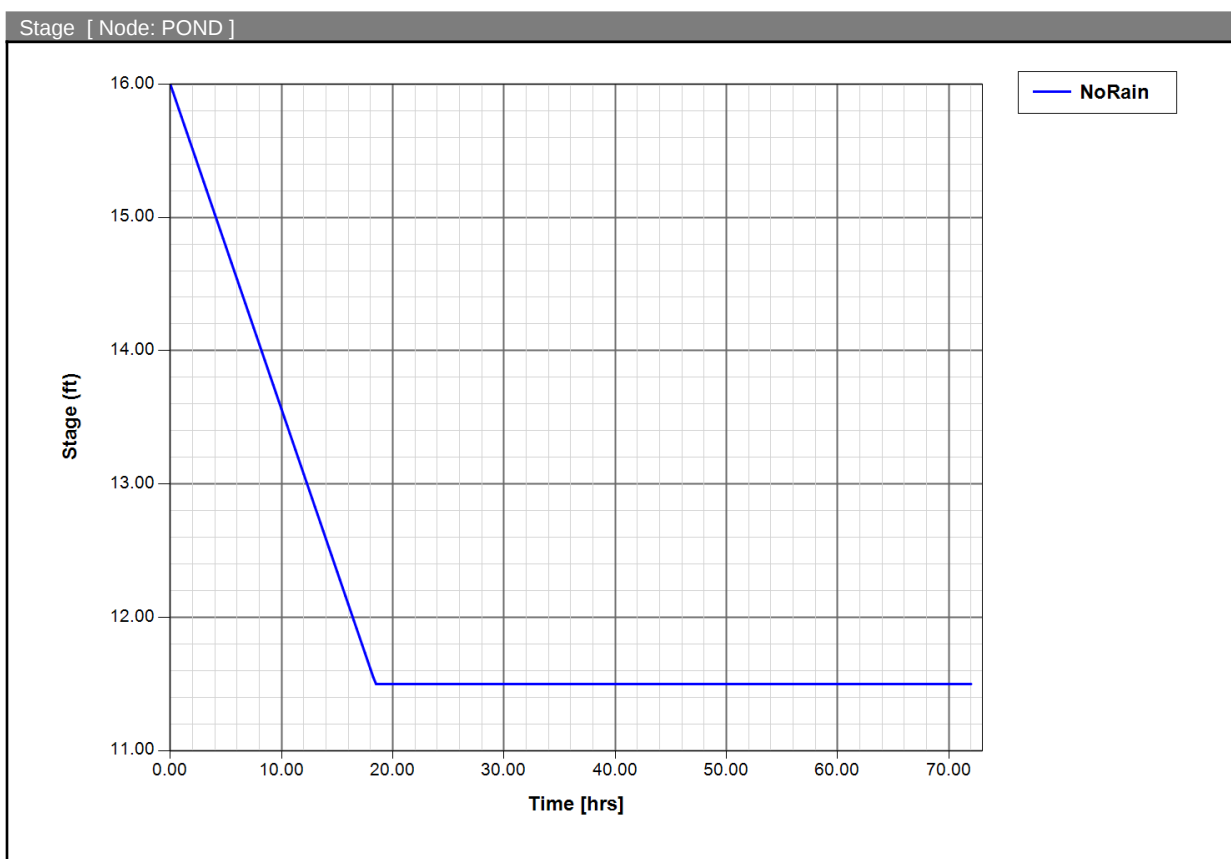
| Node Name | Sim Name  | Warning Stage [ft] | Alert Stage [ft] | Max Stage [ft] | Min/Max Delta Stage [ft] | Max Total Inflow [cfs] | Max Total Outflow [cfs] | Max Surface Area [ft <sup>2</sup> ] | Time to Max Stage [hr] | Time to Min/Max Delta Stage [hr] | Time to Max Total Inflow [hr] | Time to Max Total Outflow [hr] |
|-----------|-----------|--------------------|------------------|----------------|--------------------------|------------------------|-------------------------|-------------------------------------|------------------------|----------------------------------|-------------------------------|--------------------------------|
| TW        | 100yr24hr | 12.50              | 0.00             | 12.00          | 0.0000                   | 1.37                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 12.463                        | 0.000                          |
| TW        | 25yr24hr  | 12.50              | 0.00             | 12.00          | 0.0000                   | 0.00                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 0.000                         | 0.000                          |
| TW        | Mean      | 12.50              | 0.00             | 12.00          | 0.0000                   | 0.00                   | 0.00                    | 0                                   | 0.000                  | 0.000                            | 0.000                         | 0.000                          |

Link Min/Max Conditions with Times [Proposed]

| Link Name      | Sim Name  | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Time to Max Flow [hrs] | Time to Min Flow [hrs] | Time to Min/Max Delta Flow [hrs] | Time to Max Us Velocity [hrs] | Time to Max Ds Velocity [hrs] |
|----------------|-----------|----------------|----------------|--------------------------|-----------------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------------------|-------------------------------|
| PERC-UNWAL LED | 100yr24hr | 0.38           | 0.00           | 0.00                     | 0.00                  | 0.00                  | 12.463                 | 0.000                  | 17.691                           | 0.000                         | 0.000                         |
| PERC-UNWAL LED | 25yr24hr  | 0.29           | 0.00           | 0.00                     | 0.00                  | 0.00                  | 13.558                 | 0.000                  | 12.573                           | 0.000                         | 0.000                         |
| PERC-UNWAL LED | Mean      | 0.13           | 0.00           | -0.01                    | 0.00                  | 0.00                  | 13.306                 | 0.000                  | 28.303                           | 0.000                         | 0.000                         |

Link Min/Max Conditions with Times [Proposed]

| Link Name | Sim Name  | Max Flow [cfs] | Min Flow [cfs] | Min/Max Delta Flow [cfs] | Max Us Velocity [fps] | Max Ds Velocity [fps] | Time to Max Flow [hrs] | Time to Min Flow [hrs] | Time to Min/Max Delta Flow [hrs] | Time to Max Us Velocity [hrs] | Time to Max Ds Velocity [hrs] |
|-----------|-----------|----------------|----------------|--------------------------|-----------------------|-----------------------|------------------------|------------------------|----------------------------------|-------------------------------|-------------------------------|
| WEIR #8   | 100yr24hr | 1.37           | 0.00           | -0.01                    | 1.20                  | 1.20                  | 12.463                 | 0.000                  | 12.616                           | 12.465                        | 12.465                        |
| WEIR #8   | 25yr24hr  | 0.00           | 0.00           | 0.00                     | 0.00                  | 0.00                  | 0.000                  | 0.000                  | 0.000                            | 0.000                         | 0.000                         |
| WEIR #8   | Mean      | 0.00           | 0.00           | 0.00                     | 0.00                  | 0.00                  | 0.000                  | 0.000                  | 0.000                            | 0.000                         | 0.000                         |



## **APPENDIX C – EXISTING INFORMATION**

---

# Office

## Project

13 June 2024

### INPUT

Geographic, NAD83  
Vertical - NGVD29 (Vertcon94), U.S. Feet

### OUTPUT

Geographic, NAD83  
Vertical - NAVD88, U.S. Feet

---

## Philco

1/1

**Latitude:** 28.955123  
**Longitude:** 80.895214  
**Elevation/Z:** 0.00

**Latitude:** 28.955123000  
**Longitude:** 80.895214000  
**Elevation/Z:** -1.201

---

Remark:

**STORMWATER MANAGEMENT SYSTEM  
DESIGN REPORT**

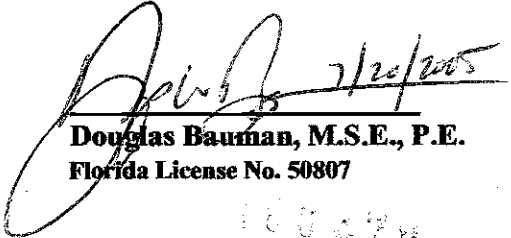
**for**

**GUAVA DRIVE COMMERCIAL DEVELOPMENT  
EDGEWATER, FLORIDA**

**Prepared by:**

**General Environmental Engineering, Inc.  
5305 Pineview way  
Apopka, Florida 32703  
Tel: (407) 822-7655**

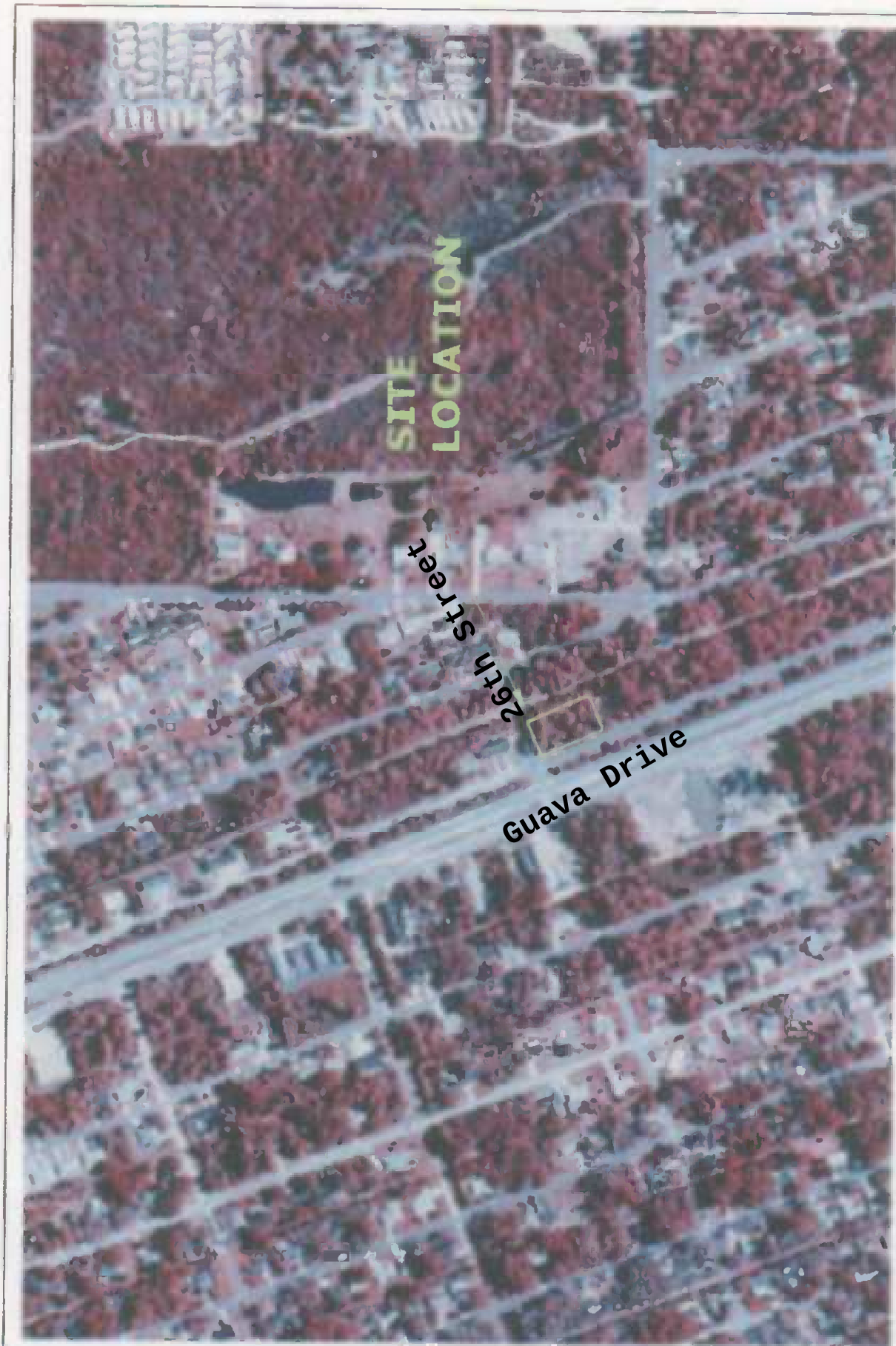
**July 2005**

  
**Douglas Bauman, M.S.E., P.E.  
Florida License No. 50807**

**RECEIVED**

**JUL 28 2005**

**PDS  
ALTAMONTE SVC. CTR.**



|                                                                                       |                                                                                                            |  |                                       |  |                                 |  |                  |                    |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--|---------------------------------------|--|---------------------------------|--|------------------|--------------------|
|  | GENERAL ENVIRONMENTAL<br>ENGINEERING, INC.<br>5305 PINEVIEW WAY<br>APOLKA, FLORIDA 32703<br>(407) 822-7655 |  | GUAVA DRIVE COMMERCIAL<br>DEVELOPMENT |  | 2004 ORTHOGRAPHIC<br>PHOTOGRAPH |  | DRAWN: MRN       | FIGURE<br><b>1</b> |
|                                                                                       |                                                                                                            |  |                                       |  |                                 |  | APPROVED: DWB    |                    |
|                                                                                       |                                                                                                            |  |                                       |  |                                 |  | DATE: JULY 2005  |                    |
|                                                                                       |                                                                                                            |  |                                       |  |                                 |  | SCALE: 1" = 400' |                    |

Basins

Name: SITE  
Group: BASE

Node: Exfiltration  
Type: SCS Unit Hydrograph

Status: Onsite

Unit Hydrograph: Uh323  
Rainfall File: Flmod  
Rainfall Amount(in): 9.800  
Area(ac): 0.510  
Curve Number: 82.00  
DCIA(%): 0.00

Peaking Factor: 323.0  
Storm Duration(hrs): 24.00  
Time of Conc(min): 6.00  
Time Shift(hrs): 0.00  
Max Allowable Q(cfs): 999999.000

Nodes

Name: Exfiltration  
Group: BASE  
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 11.000  
Warn Stage(ft): 16.950

| Stage(ft) | Area(ac) |
|-----------|----------|
| 11.000    | 0.0320   |
| 16.000    | 0.0320   |

Name: OUTFALL  
Group: BASE  
Type: Time/Stage

Base Flow(cfs): 0.000

Init Stage(ft): 12.000  
Warn Stage(ft): 16.950

| Time(hrs) | Stage(ft) |
|-----------|-----------|
| 0.00      | 12.000    |
| 36.00     | 12.000    |

Name: POND  
Group: BASE  
Type: Stage/Area

Base Flow(cfs): 0.000

Init Stage(ft): 15.000  
Warn Stage(ft): 17.000

| Stage(ft) | Area(ac) |
|-----------|----------|
| 15.000    | 0.0081   |
| 16.000    | 0.0265   |
| 16.500    | 0.0500   |
| 17.000    | 0.0735   |

Cross Sections

Operating Tables

Pipes

Channels

Drop Structures

## **APPENDIX D – GEOTECHNICAL INFORMATION**

---

May 22, 2026  
Revised: May 26, 2026

Mr. Brian Borman  
Philco Construction, Inc.  
114 North Park Avenue  
Sanford, Florida 32771

Reference: **GEOTECHNICAL STORMWATER EVALUATION**  
**2611 Guava Drive – Additional Stormwater Boring**  
**Edgewater, Volusia County, Florida**  
**UES Project No. A26147.00643.000 and UES Report No. 2161188R**

Dear Mr. Borman;

UES Professional Solutions, LLC (UES) has completed the Geotechnical Stormwater Evaluation for the project located in Edgewater, Florida. We understand the subsurface conditions at the requested location needs to be evaluated for groundwater and subsurface evaluation purposes. UES previously performed a Geotechnical Evaluation for this site, UES Report No. 2083833, dated May 29, 2024.

### **FIELD EXPLORATION**

As requested, we performed one (1) Standard Penetration Test (SPT) Boring, P-1, advanced to a depth of approximately 20.0 feet below existing grade. The SPT boring was performed in accordance with the procedures of ASTM D-1586. The soil samples recovered from the soil test boring were returned to our laboratory and a UES Engineer visually examined and reviewed the field descriptions. The samples were visually classified in accordance with the Unified Soil Classification System (USCS).

### **FINDINGS**

#### **SUBSURFACE CONDITIONS**

The results of our boring generally indicated fine sand with trace silt (SP) to the boring termination depth of approximately 20.0 feet below existing grade.

Groundwater was encountered at a depth of approximately 10.0 feet below existing grade. Based on available published literature, existing site features, and the results of the boring we estimate the normal seasonal high groundwater level to be approximately two feet above the measured levels. It should be noted the estimated seasonal high water level does not provide any assurance that the groundwater level will not exceed the estimated level during any given year in the future. Should impediments to surface water drainage be present, or should rainfall intensity and duration, or total rainfall quantities, exceed the normally anticipated rainfall quantities, groundwater levels might once again exceed our seasonal high estimate.

### **STORMWATER DESIGNS RECOMMENDATIONS**

#### **GENERAL**

For a dry bottom retention facility, performance will be significantly influenced by the soil permeability and the vertical separation between the bottom and the seasonal high groundwater level. A wet retention

facility should be excavated to a depth necessary to obtain a sufficient water depth to limit growth of aquatic vegetation.

If requested, UES can assist in evaluating the facility design exfiltration rates, underdrains and/or groundwater baseflow as pond geometry and stormwater volume requirements become available.

#### PERMABILITY

Five (5) Laboratory Falling-head Saturated Vertical Permeability Tests were performed on relatively undisturbed soil samples. The samples were obtained using thin-walled tube sampling techniques (Shelby Tube). The results of the tests, in feet per day, describe the coefficient of hydraulic conductivity (Permeability) of the soils and are presented on the attached Subsurface Profiles. The measured permeability rates should not be construed to represent the actual pond exfiltration rates.

Upon evaluation of regional and local geology, we have evaluated that the characteristics of the soils within the vicinity of this project are comprised of sedimentary soils which often exhibit thin, alternating layers. Generally, in relatively homogeneous natural deposits where stratification may result from particle orientation, the Permeability in the Horizontal direction can be somewhat greater than that in the Vertical direction. Based on our experience, the estimated coefficient of Horizontal Permeability is typically on the order of 2.0 times greater than the Vertical Permeability for SP soil types. All pond backfill material should be clean sandy soils having 5 percent or less fines passing the No. 200 sieve.

#### CLOSURE

We appreciate the opportunity to have worked with you on this project and look forward to a continued association. Please do not hesitate to contact us if you should have any questions, or if we may further assist you as your plans proceed.

Respectfully submitted,

UES PROFESSIONAL SOLUTIONS, LLC



Michael Mohny, M.S.  
Project Manager



Cc: Mr. Richard J. Dixon, P.E. – Anderson-Dixon, LLC

Attachments

MM/BCP/cme

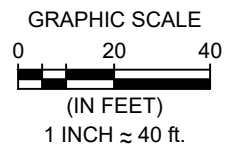
# APPENDIX A



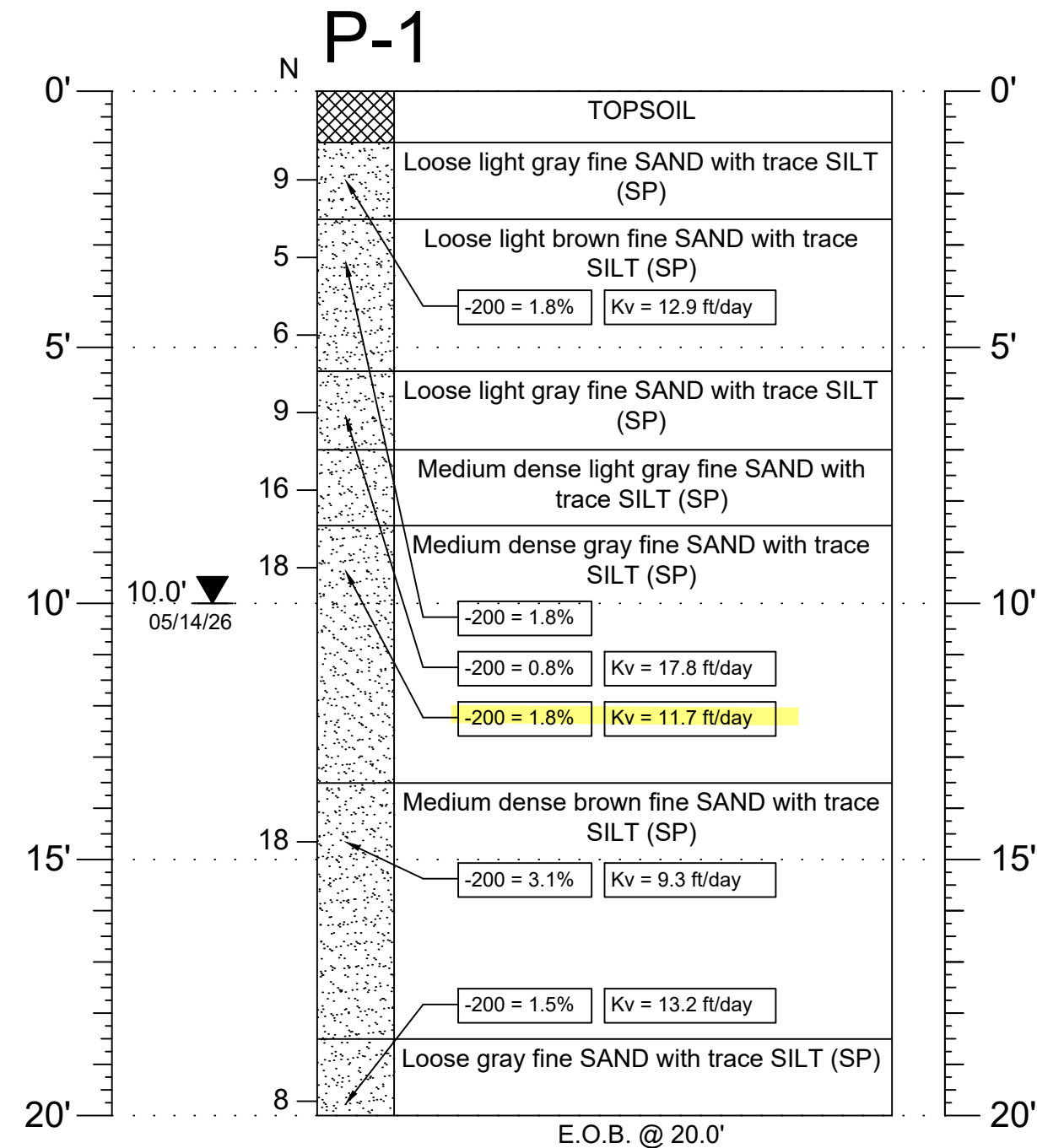


# LEGEND


 APPROXIMATE LOCATION OF STANDARD PENETRATION TEST (SPT) BORING



|                |                                                                   |                               |                            |
|----------------|-------------------------------------------------------------------|-------------------------------|----------------------------|
| TITLE:         | BORING LOCATION PLAN                                              |                               | SCALE:<br>1" ≈ 40'         |
| PROJECT:       | GEOTECHNICAL EVALUATION<br>2611 GUAVA DRIVE<br>EDGEWATER, FLORIDA |                               | PAGE/FIG. NO.:<br><br>A-1  |
| DRAWN BY: MKL  | DATE: 05/15/26                                                    | PROJECT NO.: A26147.00643.000 | Appendix D<br>Page 4 of 10 |
| CHECKED BY: CW | DATE: 05/15/26                                                    | REPORT NO.: 2161188           |                            |



Fine SAND (SP)

Topsoil (PT) ... some to many ORGANICS (PT), sometimes DEBRIS

NOTES:

▼  
(SP)  
EOB  
N  
NE  
HA  
WOH  
Kv  
-200

Measured Groundwater Level 24 (+)  
Hours Subsequent to Time of Drilling  
Unified Soil Classification System  
End of Boring  
Penetr. Resistance, Blows/ft.  
Groundwater Not Encountered  
Hand Auger Method  
Weight of Hammer  
Coefficient of Permeability, (ft/day)  
% Passing No. 200 Sieve



PROJECT:

GEOTECHNICAL EVALUATION  
2611 GUAVA DRIVE  
EDGEWATER, FLORIDA

TITLE:

SUBSURFACE PROFILE

DRAWN BY:

MKL

DATE:

05/20/26

PROJECT NO.:

A26147.00643.000

SCALE:

NA (in feet)

PAGE/FIG. NO.:

A-2

CHECKED BY:

CW

DATE:

05/20/26

REPORT NO.:

216118

## SYMBOLS AND ABBREVIATIONS

| SYMBOL                                                                            | DESCRIPTION                                                                                  |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| N-Value                                                                           | No. of Blows of a 140-lb. Weight Falling 30 Inches Required to Drive a Standard Spoon 1 Foot |
| WOR                                                                               | Weight of Drill Rods                                                                         |
| WOH                                                                               | Weight of Drill Rods and Hammer                                                              |
|  | Sample from Auger Cuttings                                                                   |
|  | Standard Penetration Test Sample                                                             |
|  | Thin-wall Shelby Tube Sample (Undisturbed Sampler Used)                                      |
| RQD                                                                               | Rock Quality Designation                                                                     |
|  | Stabilized Groundwater Level                                                                 |
|  | Seasonal High Groundwater Level (also referred to as the W.S.W.T.)                           |
| NE                                                                                | Not Encountered                                                                              |
| GNE                                                                               | Groundwater Not Encountered                                                                  |
| BT                                                                                | Boring Terminated                                                                            |
| -200 (%)                                                                          | Fines Content or % Passing No. 200 Sieve                                                     |
| MC (%)                                                                            | Moisture Content                                                                             |
| LL                                                                                | Liquid Limit (Atterberg Limits Test)                                                         |
| PI                                                                                | Plasticity Index (Atterberg Limits Test)                                                     |
| NP                                                                                | Non-Plastic (Atterberg Limits Test)                                                          |
| K                                                                                 | Coefficient of Permeability                                                                  |
| Org. Cont.                                                                        | Organic Content                                                                              |
| G.S. Elevation                                                                    | Ground Surface Elevation                                                                     |

## UNIFIED SOIL CLASSIFICATION SYSTEM

| MAJOR DIVISIONS                                                      |                                                                   |                                                 | GROUP SYMBOLS                                                                        | TYPICAL NAMES                                                      |
|----------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| COARSE GRAINED SOILS<br>More than 50% retained on the No. 200 sieve* | GRAVELS<br>50% or more of coarse fraction retained on No. 4 sieve | CLEAN GRAVELS                                   | GW                                                                                   | Well-graded gravels and gravel-sand mixtures, little or no fines   |
|                                                                      |                                                                   |                                                 | GP                                                                                   | Poorly graded gravels and gravel-sand mixtures, little or no fines |
|                                                                      |                                                                   | GRAVELS WITH FINES                              | GM                                                                                   | Silty gravels and gravel-sand-silt mixtures                        |
|                                                                      |                                                                   |                                                 | GC                                                                                   | Clayey gravels and gravel-sand-clay mixtures                       |
|                                                                      | SANDS<br>More than 50% of coarse fraction passes No. 4 sieve      | CLEAN SANDS<br>5% or less passing No. 200 sieve | SW**                                                                                 | Well-graded sands and gravelly sands, little or no fines           |
|                                                                      |                                                                   |                                                 | SP**                                                                                 | Poorly graded sands and gravelly sands, little or no fines         |
|                                                                      |                                                                   | SANDS with 12% or more passing No. 200 sieve    | SM**                                                                                 | Silty sands, sand-silt mixtures                                    |
|                                                                      |                                                                   |                                                 | SC**                                                                                 | Clayey sands, sand-clay mixtures                                   |
| FINE-GRAINED SOILS<br>50% or more passes the No. 200 sieve*          | SILTS AND CLAYS<br>Liquid limit 50% or less                       | ML                                              | Inorganic silts, very fine sands, rock flour, silty or clayey fine sands             |                                                                    |
|                                                                      |                                                                   | CL                                              | Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays |                                                                    |
|                                                                      |                                                                   | OL                                              | Organic silts and organic silty clays of low plasticity                              |                                                                    |
|                                                                      | SILTS AND CLAYS<br>Liquid limit greater than 50%                  | MH                                              | Inorganic silts, micaceous or diamicaceous fine sands or silts, elastic silts        |                                                                    |
|                                                                      |                                                                   | CH                                              | Inorganic clays or clays of high plasticity, fat clays                               |                                                                    |
|                                                                      |                                                                   | OH                                              | Organic clays of medium to high plasticity                                           |                                                                    |
|                                                                      |                                                                   | PT                                              | Peat, muck and other highly organic soils                                            |                                                                    |

\*Based on the material passing the 3-inch (75 mm) sieve

\*\* Use dual symbol (such as SP-SM and SP-SC) for soils with more than 5% but less than 12% passing the No. 200 sieve

## RELATIVE DENSITY

(Sands and Gravels)

Very loose – Less than 4 Blow/Foot  
Loose – 4 to 10 Blows/Foot  
Medium Dense – 11 to 30 Blows/Foot  
Dense – 31 to 50 Blows/Foot  
Very Dense – More than 50 Blows/Foot

## CONSISTENCY

(Silts and Clays)

Very Soft – Less than 2 Blows/Foot  
Soft – 2 to 4 Blows/Foot  
Firm – 5 to 8 Blows/Foot  
Stiff – 9 to 15 Blows/Foot  
Very Stiff – 16 to 30 Blows/Foot  
Hard – More than 30 Blows/Foot

## RELATIVE HARDNESS

(Limestone)

Soft – 100 Blows for more than 2 Inches  
Hard – 100 Blows for less than 2 Inches

## MODIFIERS

**These modifiers Provide Our Estimate of the Amount of Minor Constituents (Silt or Clay Size Particles) in the Soil Sample**

Trace – 5% or less  
With Silt or With Clay – 6% to 11%  
Silty or Clayey – 12% to 30%  
Very Silty or Very Clayey – 31% to 50%

**These Modifiers Provide Our Estimate of the Amount of Organic Components in the Soil Sample**

Trace – Less than 3%  
Few – 3% to 4%  
Some – 5% to 8%  
Many – Greater than 8%

**These Modifiers Provide Our Estimate of the Amount of Other Components (Shell, Gravel, Etc.) in the Soil Sample**

Trace – 5% or less  
Few – 6% to 12%  
Some – 13% to 30%  
Many – 31% to 50%

# APPENDIX B



# Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

## Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

## Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

## Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

## A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

### Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

### Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.*

### Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

### Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

### Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

### Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910

Telephone: 301/565-2733 Facsimile: 301/589-2017

e-mail: [info@geoprofessional.org](mailto:info@geoprofessional.org) [www.geoprofessional.org](http://www.geoprofessional.org)

Copyright 2015 by Geoprofessional Business Association (GBA). Duplication, reproduction, or copying of this document, or its contents, in whole or in part, by any means whatsoever, is strictly prohibited, except with GBA's specific written permission. Excerpting, quoting, or otherwise extracting wording from this document is permitted only with the express written permission of GBA, and only for purposes of scholarly research or book review. Only members of GBA may use this document as a complement to or as an element of a geotechnical-engineering report. Any other firm, individual, or other entity that so uses this document without being a GBA member could be committing negligent or intentional (fraudulent) misrepresentation.

# CONSTRAINTS & RESTRICTIONS

The intent of this document is to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

## WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

## UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

## CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

## MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

## CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

## USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

## STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

## OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

## WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

## LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

## TIME

This report reflects the soil conditions at the time of exploration. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.

