

9 November, 2023

Orange County Environmental Protection Division
Lakes Management Program
Attn: Tara Urbanik
3165 McCrory Place, Suite 200
Orlando, FL 32803

Subject: Lake Butler Buoy Permitting and Installation Memorandum
Orange County, Florida
Orange County Contract Number Y20-906B

Dear Ms. Urbanik:

Geosyntec Consultants is pleased to transmit subconsultant Applied Ecology, Inc., (AEI) Lake Butler Buoy Permitting and Installation Summary Final Memorandum. This work was performed under the Continuing Water Quality Professional Services contract (Y20-906B).

Geosyntec is pleased to provide our services to the County on this project, which included a cursory review of subconsultant AEI's Lake Butler Buoy Permitting and Installation Summary Final Memorandum. All comments on the draft submittal provided by the County have been sufficiently addressed. If you have any questions regarding the attached, please contact us at 407-321-7030.

Sincerely,
GEOSYNTEC CONSULTANTS



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Enclosures: AEI's Lake Butler Buoy Permitting and Installation Summary Final Memorandum.



**ORANGE COUNTY, LAKE BUTLER BUOY PERMITTING & INSTALLATION
(SUBCONTRACT WORK ORDER 100039555, PROJECT# FW9108)**

TO: Mike Hardin Geosyntec Consultants, Inc., Principal Water Resources Engineer

FROM: Tamy Dabu and Danielle Huffner, Applied Ecology, Inc.

DATE: November 8, 2023

SUBJECT: Lake Butler Buoy Post-Installation Summary Memo

This technical summary memorandum serves to report on activities conducted during the installation of nine (9) regulatory buoys which delineate a vessel exclusion / swim area on the northwestern side of Egret Island, within Lake Butler. The Florida Fish and Wildlife Conservation Commission (FWC), Boating & Waterways Section authorization for this project is Florida Uniform Waterway Marker (FUWM) Permit Number: 23-012.

DATES OF INSTALLATION

Buoy installation took place over the course of three days starting on August 23 and ending August 25, 2023, with various Applied Ecology, Inc. team members (Table 1). Weather conditions were clear to partly cloudy for all three days of installation, with no rainfall events. Water levels were slightly lower than historical levels recorded in Orange County’s Water Atlas (10-year August average=99.13 ft, 5-year average =99.10 ft for Orange County Data Loggers Station CC4).

Table 1. Dates, staff, and general weather conditions for each day of buoy installation.

Date	Staff Present	Weather Conditions	Water Atlas Elevation - (ft NAVD88)
8/23/2023	Danielle Huffner, Cody Burns, Ashley Parks, Navanna Ramkissoon	Clear to Partly Cloudy	98.13
8/24/2023	Danielle Huffner, Cody Burns, Ashley Parks, Summer Manestar	Clear to Partly Cloudy	98.13
8/25/2023	Cody Burns, Ashley Parks, Summer Manestar, Laura Thompson	Clear to Partly Cloudy	98.08



BUOY LOCATIONS AND WATER DEPTHS

Upon arrival at each location, AEI staff utilized a Trimble R2 GNSS GPS with a submeter accuracy to navigate to the installation locations for buoy installation as identified within Orange County’s Ordinance (Ord. No. 2022-20). AEI staff once again collected GPS coordinates for the exact installation location (Table 2); the accuracy of the GPS did not deviate more than 6 inches during the installation activities. Figure 1 presents the post-installation buoy locations buoys along the northwestern shore of Egret Island.

Table 2 .Permit number, installation dates, GPS locations, and water depths for each buoy location.

Site Name	Date	Permit Number	Latitudinal Coordinates (Degrees Decimal Minutes) ¹	Longitudinal Coordinates (Degrees Decimal Minutes) ¹	Water Depth (ft)
*EI 1	8/23/2023	FUWM-23-012	28° 29.543'	-81° 32.420'	4.75
*EI 2	8/23/2023	FUWM-23-012	28° 29.546'	-81° 32.427'	2.50
*EI 3	8/23/2023	FUWM-23-012	28° 29.543'	-81° 32.442'	1.67
*EI 4	8/24/2023	FUWM-23-012	28° 29.537'	-81° 32.458'	2.75
*EI 5	8/24/2023	FUWM-23-012	28° 29.529'	-81° 32.464'	2.50
*EI 6	8/24/2023	FUWM-23-012	28° 29.519'	-81° 32.470'	3.08
*EI 7	8/24/2023	FUWM-23-012	28° 29.509'	-81° 32.476'	3.17
*EI 8	8/25/2023	FUWM-23-012	28° 29.498'	-81° 32.482'	3.00
*EI 9	8/25/2023	FUWM-23-012	28° 29.483'	-81° 32.490'	3.00

*EI=Egret Island

¹ = Degrees Decimal Minutes have been rounded to the thousands

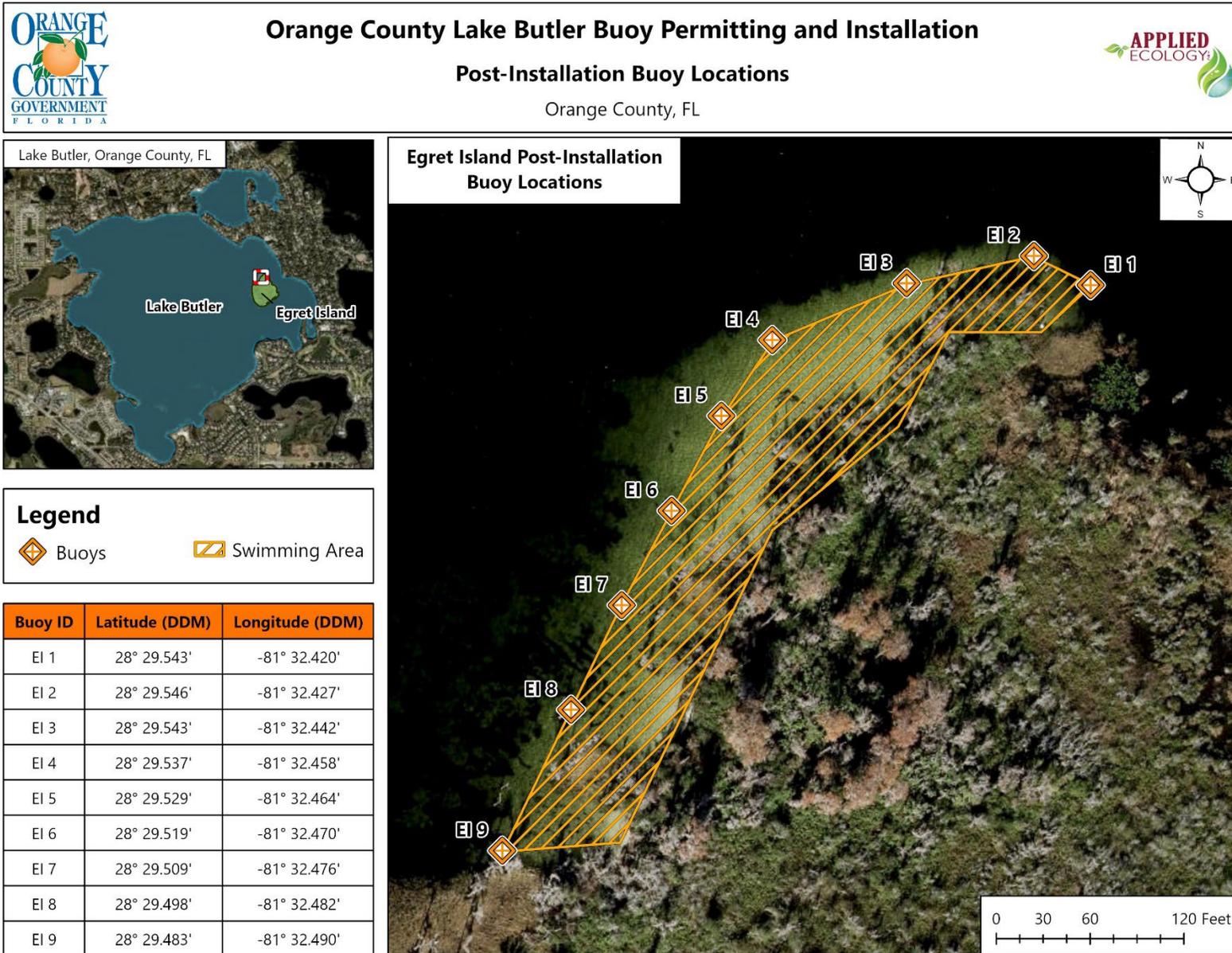


Figure 1. Post-installation buoy locations on Lake Butler's Egret Island.

TURBIDITY MONITORING

Turbidity was monitored via a HACH 2100Q Portable Turbidimeter throughout the field activities to ensure compliance with 62-4.242, F.A.C. A turbidity measurement of the initial background conditions was recorded prior to the installation of any components associated with the buoys. Additional readings were taken immediately after complete installation of each buoy configuration to ensure background conditions were restored in accordance with 62-4.242 F.A.C. Table 3 below presents all pre- and post-installation turbidity readings for each regulatory buoy. The installation of the anchors and associated buoys resulted negligible to no turbidity changes between pre- and post-installation values. In addition, the installation of the anchored buoys did not result in any long-term or permanent increase in turbidity.

Table 3. Pre- and Post-Installation turbidity readings for each regulatory buoy.

Buoy Number	Date	Pre-Installation Turbidity Time	Pre-Installation Turbidity Value (NTU)	Post-Installation Turbidity Time	Post-Installation Turbidity Value (NTU)
*EI 1	8/23/2023	9:48	3.20	11:43	2.61
*EI 2	8/23/2023	11:51	1.63	12:47	1.32
*EI 3	8/23/2023	14:29	1.59	15:53	1.31
*EI 4	8/24/2023	9:21	1.23	10:10	0.82
*EI 5	8/24/2023	10:12	0.84	10:50	1.06
*EI 6	8/24/2023	11:38	0.97	12:34	1.08
*EI 7	8/24/2023	13:50	1.28	14:24	1.41
*EI 8	8/25/2023	9:06	0.93	11:01	0.90
*EI 9	8/25/2023	11:05	0.90	11:49	1.51

*EI=Egret Island

POST-INSTALLATION PHOTOS

Post installation photos of all nine buoys with retro-reflective tape were collected and are included below.

EI 1



EI 2



EI 3



EI 4



EI 5



EI 6



EI 7



EI 8



EI 9



INSTALLATION SUMMARY

The buoy vendor, CURD Enterprises, initially provided the buoys without the regulated orange tape in a reflective material. Thus, the project completion was delayed until the retro-reflective tape was received. AEI installed the orange retro-reflective tape in accordance with the FWC requirements on September 22, 2023.

Overall, the installation of the nine buoys in Lake Butler on the northwest side of Egret Island went smoothly. AEI immensely appreciates all the assistance provided from the following entities:

- Town of Windermere, Public Works
- Town of Windermere, Police Department
- Orange County Sheriff's Office, Marine Patrol Unit
- Florida Fish & Wildlife Conservation Commission (FWC), Boating & Waterways Section
- Orange County, Environmental Protection Division and
- Florida Audubon Society, Inc.

After the buoys were installed, Orange County requested that an anti-theft mechanism be placed on the nuts/bolts to the nine buoys. In a separate document, AEI will provide Orange County a couple of examples for tamper proofing the buoys and also seek an example of the mechanisms that they have utilized in the past. AEI will subsequently request that Orange County select which method they would like to see installed on the nine buoys. Once the anti-theft mechanism is approved by Orange County, AEI will secure the equipment (utilizing the remaining approved budget) and install the anti-theft mechanism on the nine buoys.