TOWN OF
LONGBOAT KEY

Incorporated November 14, 1955

Public Works Department
600 General Harris Street
Longboat Key FL 34228
(941) 316-1988
FAX (941) 316-1984
www.longboatkey.org

March 26, 2021

Derrick Hudson, Domestic Wastewater Compliance Inspector
Florida Department of Environmental Protection
Southwest District Office
3051 North Telecom Parkway, Suite 101
Temple Terrace, FL 33637-0926

Re: Town of Longboat Key Consent Order OGC 20-1261
Evaluation Summary

Dear Mr. Hudson:

As referenced in Attachment A, Section 1 of the Town's Consent Order (OGC No. 20-1261), please see the enclosed Evaluation Summary by Environmental Science Associates ("ESA").

Please feel free to contact our department if you need further assistance at (941) 316-1988.

Sincerely,

Bert Warner, Public Works Utility Manager
For

Isaac Brownman
Public Works Director

Enclosures: ESA Evaluation Summary

Cc: Tom Harmer, Town Manager
Maggie Mooney-Portale, Town Attorney
Edwin Steinmeyer, Steinmeyer Fiveash
Bert Warner, Public Works Utility Manager

4200 West Cypress Street
Suite 450
Tampa, FL 33607
813.207.7200 phone
813.207.7201 fax

esassoc.com

Technical Memorandum

Date: March 24, 2021

To: Isaac Brownman - Town of Longboat Key Public Works Director
Ricardo Borromeo – Carollo Engineers

From: Doug Robison, PWS

Subject Longboat Key Sewer Leak Consent Order – Draft Evaluation Summary

Introduction

Pursuant to the OGC File No. 20-1261 Consent Order, paragraph 15 and Attachment A, the Town of Longboat Key (Town) has been directed to conduct an *Evaluation Summary* of the mangrove impact areas associated with the access road fill/clearing and the discharge and pooling of raw sewage. On March 12, 2021, ESA conducted field investigations and sample collection to address these Consent Order requirements. The scope of work for this field effort included the following activities:

- Unmanned Aerial Vehicle (UAV) drone flyover of the entire impact area to obtain updated aerial imagery, as well as topographic and thermal signatures;
- Ground delineation of the: 1) road fill/clearing impact area; and 2) sewage leak impact area;
- Sediment core sample collection in the sewage leak impact area, and a control (adjacent un-impacted) mangrove area.

On March 23, Morgan & Eklund Surveyors conducted a special purpose ground survey of the road fill/clearing and sewage leak impact areas, as well as a pre-restoration topographic survey of the entire impact area and surrounding adjacent un-impacted areas.

As of this writing the sediment sample analyses and special purposes surveys are in process and, and these work products will be provided with the final *Evaluation Summary* report when completed. This Technical Memorandum provides a description of the activities and observations conducted on March 12, 2021 by the ESA field team, and constitutes the draft *Evaluation Summary* provided to the Department in compliance with the Consent Order.

Drone Flyover

Real-time display imagery from the UAV drone was used to generally view and bound the entire impact area from an elevation of 400 feet above ground level. Almost 9,000 true-color and thermal spectrum

photographs were collected using the UAV drone. The signatures of the fill and sewage leak impact areas were clearly observed from the UAV drone's flight elevation. As of this writing the analysis of the topographic and the real-color and thermal signatures were still in process. **Figure 1** shows true color aerial imagery of entire impact area, as recorded on the March 12, 2021 UAV drone flyover.

An anomalous visual signature was observed south and east of the previously delineated sewage leak impact area, and is depicted on **Figure 1**. This area was traversed in the field and quickly determined to be mangrove trees that had been trimmed and/or topped, and not an expansion of the sewage leak impact area. **Figure 2** shows a photograph of trimmed/topped mangroves in this area. The Long Bar Pointe Mitigation Bank Permit issued by FDEP authorizes mangrove trimming in this area, and the observed tree mangrove topping work is presumed to be consistent with this permit.

Ground Delineation of Impact Areas

The ESA field team traversed the boundaries of the road fill/clearing and sewage leak impact areas, and tied flagging ribbon to delineate the impact area for later ground surveys of each impact area. Since the sewer force main leak was repaired in July 2020, there has been no additional fill or clearing in this area. The fill road remains open and non-vegetated. Some new mangrove seedlings were observed in portions of the peripheral areas that were cleared but not filled. **Figure 3** shows the fill road, and the ESA field team with the UAV drone in operation.

The limits of the sewage leak impact area appeared to be unchanged from that observed in September 2020 when ESA conducted the initial impact assessment. While traversing the sewage leak impact area, a Sulphur-like odor was detected, and portions of this area had a thin algal mat on the sediment surface. Virtually all mangrove trees within the center of the sewage leak impact area were dead or fully defoliated, and there was no indication of tree recovery, no recruitment of new mangrove seedlings, and no viable mangrove propagules in the majority of this area (**Figure 4**). There was also no growth or recruitment of halophytic herbaceous plant species (which often occurs in treefall or canopy loss gaps in mangrove forests) in the sewage leak impact area.

Compared to the un-impacted mangroves immediately west of the fill road (**Figure 5**), the sewage leak impact area was completely defoliated with no canopy cover and few or no healthy pneumatophores. Some smaller mangrove trees on the periphery of the sewage leak impact area, mostly on slightly elevated hummocks, did appear to be recovering with new leaves observed (**Figure 6**). The boundary between the sewage leak impact area and adjacent live mangroves could be clearly seen, both on the aerial imagery and on the ground (**Figure 7**).

Sediment Core Sample Collection

The ESA field team collected nine (9) surface sediment core samples in the sewage leak impact area; two (2) control samples in adjacent un-impacted mangroves at the same elevation; and one (1) field equipment blank. The locations of where sediments samples were collected are shown in **Figure 1**. Within the sewage leak impact area an attempt was made to collect samples along three west-to-east transects to provide for a stratified-random sample station distribution.

Sediment samples were collected using a 3-inch diameter polycarbonate suction sediment corer, as shown in **Figure 8**. The coring device was pushed into the surface sediments, between mangrove pneumatophores where feasible, until resistance was attained. Each sample typically collected the top 6-8 inches of sediments. Each sediment core sample was generally a mixture of: 1) wet black muck; 2) dense dark brown fibrous peat; 3) decomposing mangrove roots and pneumatophores; and 4) larger living and recently dead mangrove roots and pneumatophores. At each sampling location 2-3 core samples were composited and mixed in a clean metal bowl. Sample containers were then filled with the mixed sediment material. The sediment samples were immediately delivered to Benchmark Enviro-Analytical Laboratory in Palmetto, Florida, for analysis. The parameters to be analyzed include:

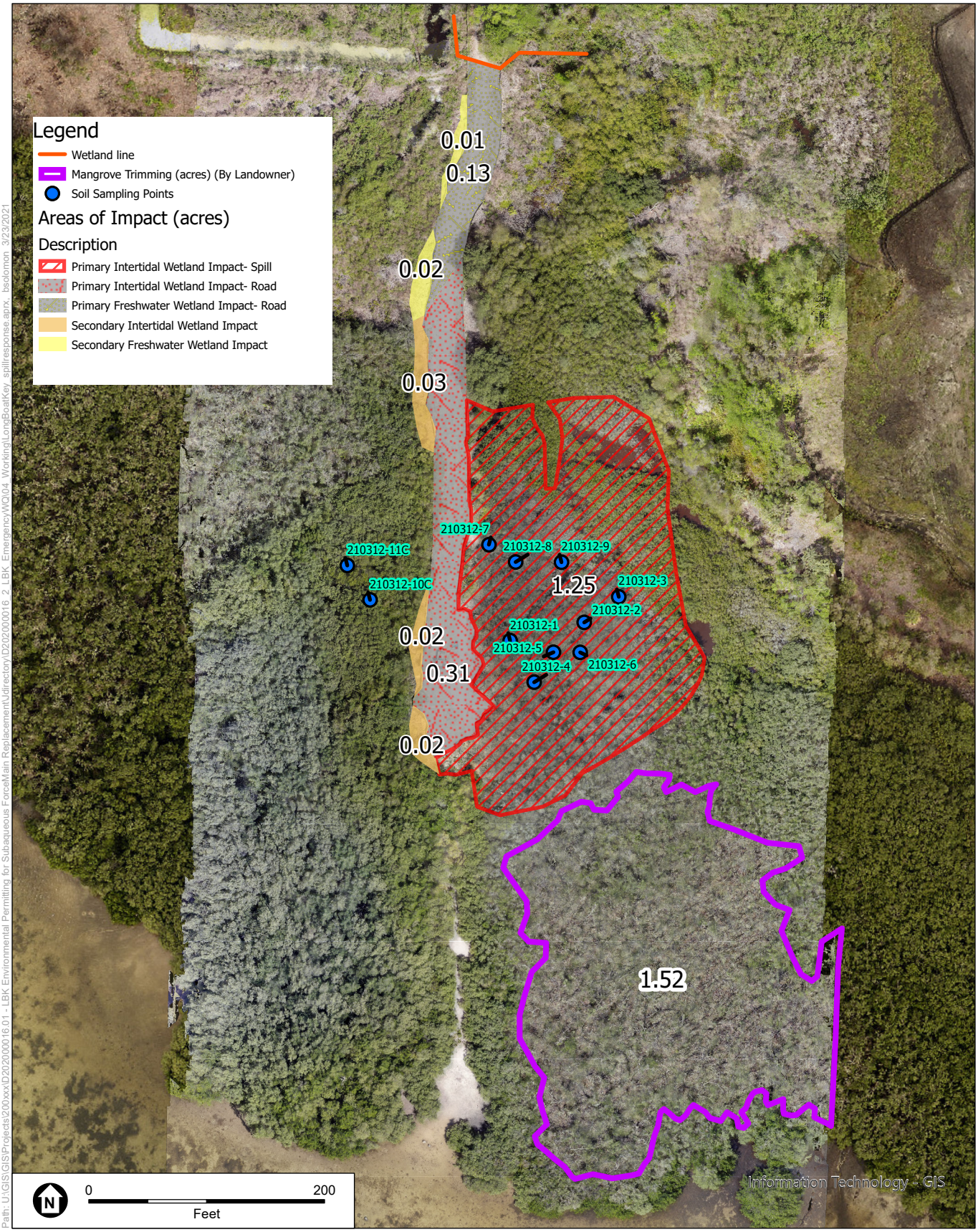
- Total Kjeldahl nitrogen;
- Ammonia;
- Organic nitrogen;
- Total nitrogen;
- Total phosphorus;
- RCRA metals;
- Total organic carbon;
- Total calcium;
- Polycyclic aromatic hydrocarbons (PAH);
- Pore water salinity/conductivity;
- Pore water redox potential;
- Pore water pH.

Initial Conclusions

Based on the activities and observations described above, ESA concludes that there has been no expansion of the sewage leak mangrove impact area since the initial assessment was conducted in September 2020. However, there has also been little or no natural recovery of this area. It is not clear if natural recovery is being stalled by poor hydrology (lack of efficient tidal circulation and flushing), contaminated sediments, or a combination of both factors.

The sewage leak impact area appears to be a slightly lower, semi-isolated depression within a larger black mangrove forest basin. A portion of the dead mangrove area was shrub black mangroves adjacent to a small open water pool. This pool and the larger sewage leak impact area does not appear to have frequent or efficient tidal circulation or flushing. Evidence for this is the filamentous algal mat on the sediment surface, and the lack of mangrove propagules in this area.

The results of the sediment sample analysis are expected to shed some light on whether this area is chemically stressed, or if the mangrove die-off was due primarily to hydrologic stress caused by pooled sewage. This determination will be used in developing an appropriate restoration plan for this area. Laboratory results are expected in early April 2021.



SOURCE: ESA, 2021.

Town of Longboat Key - Sewer Force Main Leak Area

Figure 1 - March 12, 2021 UAV Drone Imagery

ESA

Figure 2 – Mangrove tree trimming/topping area southeast of the sewage leak impact area.

Figure 3 – ESA field team mobilizing on the access fill road with the UAV drone in flight.

Figure 4 – Sewage leak mangrove impact area.

Figure 5 – Un-impacted mangrove control area.

Figure 6 – Recovering mangrove is sewage leak impact area.

Figure 7 – Boundary of sewage leak impact area and un-impacted mangroves.

Figure 8 – Sediment corer with sample from sewage leak impact area.