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**TECHNICAL MEMORANDUM**

**To:** **Gustavo Vergara, CPRE**
**Parks, Recreation & Conservation**
**Operations and Programs Assistant Director**
**1590 9th St SW**
**Vero Beach, FL 32962**

**From:** **Jon Friedrichs, P.G.**
**JLA Geosciences, Inc.**

**Re:** **Indian River County, Parks, Recreation & Conservation Department, North County Pool Heat Exchange System UFA Supply Well Sand Investigation, Exploratory Video, Testing, & Recommendations**

**Date:** **November 27, 2024**

**SUMMARY**

This report documents the scope of work and services provided by JLA Geosciences Inc. (JLA) during the Investigation and testing of one (1) Upper Floridan Aquifer (UFA) supply well for Indian River County, Parks, Recreation & Conservation Department (IRC). Preliminary pre-rehabilitation investigation work was performed by Centerline Drilling Inc, (Centerline) between 11/20/24 and 11/22/24 and included disconnecting the existing well pump and discharge line, modifying the wellhead to facilitate testing and performing a downhole investigative well video under dynamic flowing conditions. JLA provided onsite hydrogeologic support and direction to the Contractor (Centerline Drilling, Inc.) during the well video which included field observations of the well head conditions, well performance testing and field water quality testing.

Based on the well video investigation JLA is providing the following recommendations: observations and recommendations from the well video investigation include:

- Existing supply well is damaged beyond repair and needs to be abandoned by a Florida certified water well driller.
- Based on observations made during the supply well video it is recommended IRC perform a similar downhole well video investigation on the existing UFA return well to determine condition of casing.

- Siting, permitting, design and construction of a replacement UFA supply well and return well if necessary should begin immediately.

Several key observations from the 11/22/24 well video and well performance testing are summarized below (All depths are in feet below land surface (BLS)):

- **6" Steel casing from 0 to 150 feet.**
  - Visible sediment buildup and scale on the well casing throughout including whole shells visible in places.
  - Sand seen entering the well through visible holes in the casing at 21.85' and 44.21'.
  - Casing joints appear to be threaded when visible indicating a driven casing with no cement grout seal behind the casing.

- **173.24' - Transition from a 6-inch steel casing to 4-inch Steel casing.**
  - 194.28' & 216.31' – Complete separation of the well casing with formation visible at all points between the two section of steel casing.
  - 195.50' - Large hole in the side of the casing.
  - 176.17' to 178.00 , 234.94' to 254.06, & 276.63' to 280.07' – Well casing is cracked. Formation visible through cracks.
  - 251.91' to 253.11' – Well casing is cracked. Visible flow and sand seen entering the well from behind the casing and through the crack.
  - 275.16' - Major hole in the well casing visible increase in flow and sand entering the well.
  - 283.91' to 289.82' - Major hole in the well casing in this interval with approximately 1/4 of the casing missing.
  - 322.82' – Base of 4-inch steel casing.

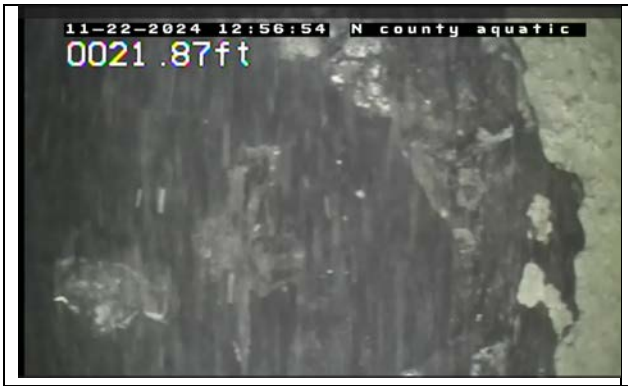
- **Open hole section of the well from 322.82 to a total accessible depth of 346.69 feet.**
  - 324.00' - Start of the observed drill pipe that was left behind in the well extending down to total accessible depth of 346.69'.
  - 332.61' - There is a large washout in the open hole.
  - 337.80' – Visible second column of drill pipe or smaller diameter casing is also present.
  - 340.85' - Large quantities of sand are coming out of a fracture in the open hole.
  - 346.69' - Drill pipe in the well preventing the camera from reaching any deeper.

- **Well Site and Equipment Observations.**
  - UFA Supply well location was not adjacent to the well pump pedestal.
  - UFA well location was approximately 100-feet south of the well pump.
  - Supply well was continuously flowing to the ground and flooding the well site due to damaged well casing.
  - Well pump impeller was obstructed with large pieces of formation material.

**Well Performance and Water Quality at approximately 195 gallons per minute (gpm):**

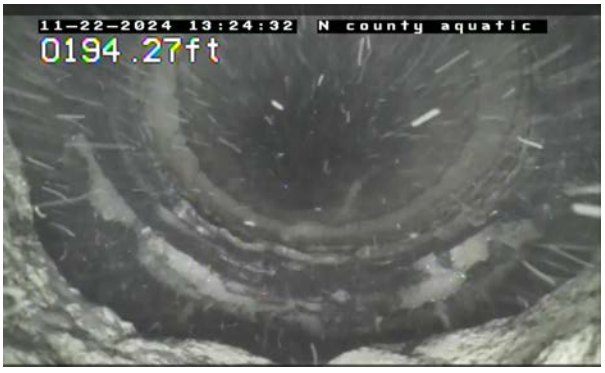
| North County Pool Heat Exchange System UFA Supply Well | | | |
|---|---|---|---|
| | **Date of Data Collection** | | **11/22/24** |
| **WATER QUALITY** | **Specific Conductance (JLA)** | (uS/cm) | 3,765 |
| | **Field Temperature (JLA)** | (°C) | 26.5 |
| | **TDS (JLA)** | (mg/L) | 2,447 |
| | **Salinity (JLA)** | (ppt) | 2.0 |
| | **Field DO (JLA)** | (mg/L) | 2.0 |
| | **Field pH (JLA)** | (S.U.) | 7.2 |
| | **Turbidity (JLA)** | (NTU) | 5.0 |
| | **Field Dissolved Iron (JLA)** | (mg/L) | 0.2 |
| | **Field Total Iron (JLA)** | (mg/L) | 0.2 |
| | **Field Hydrogen Sulfide (JLA)** | (mg/L) | 2.0 |

**Photos during Well Video Survey:**




21.87’ - Hole in the well casing.


172.37’ - Casing Diameter decreasing from 6-inch to 4-inch casing.




194.27’ - Separation in the well casing.


274.54’ - Large hole in the casing.

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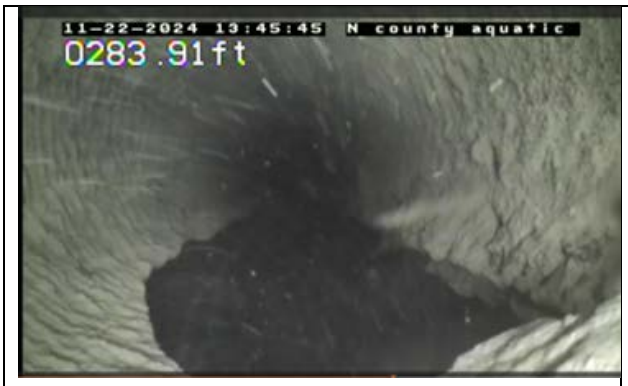
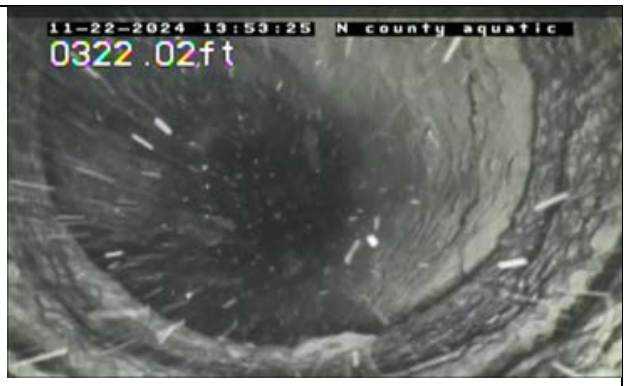
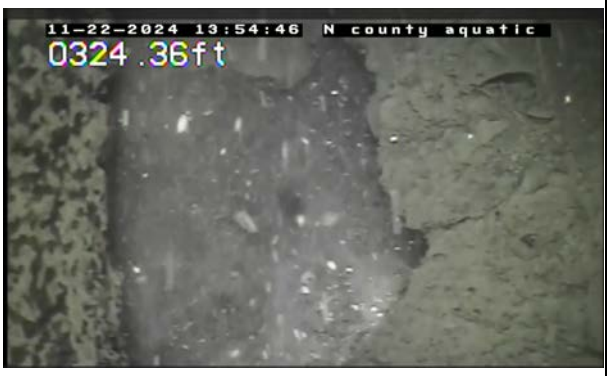
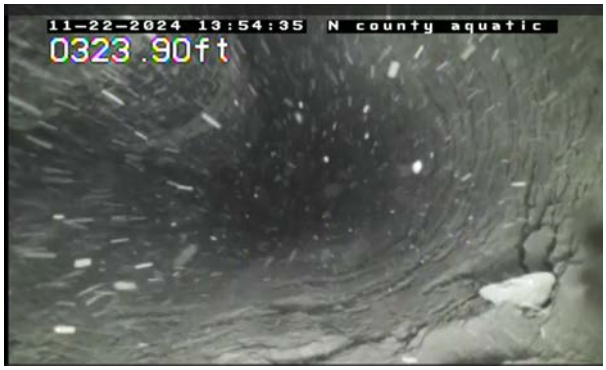
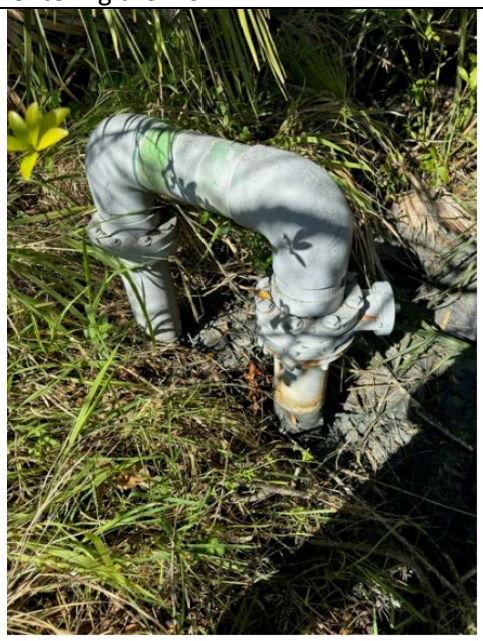
|  |  |
| 283.91’ – Major hole in the casing approximately ¼ of the well casing missing. | 322.02’ - Base of well casing. |
|  |  |
| 324.36’ Hole in casing with large quantities of sand entering the well. | 323.90’ - Drill pipe left in the well. |
|  |  |
| Well Head and discharge piping. | Well site flooded due to damaged casing. |

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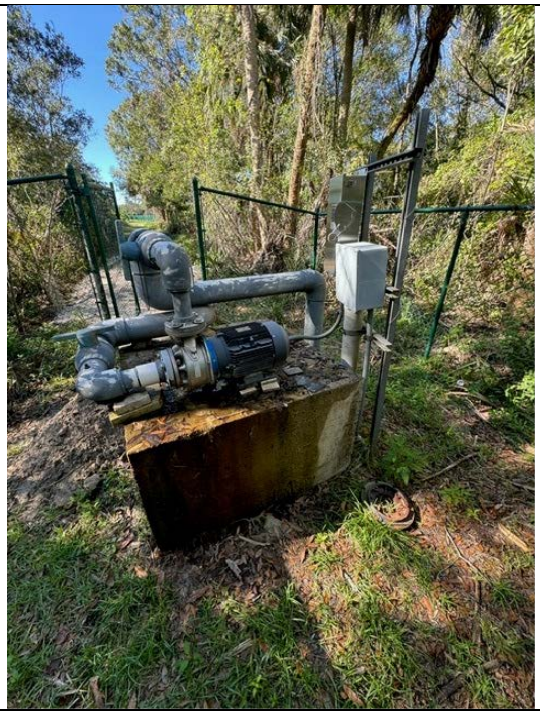
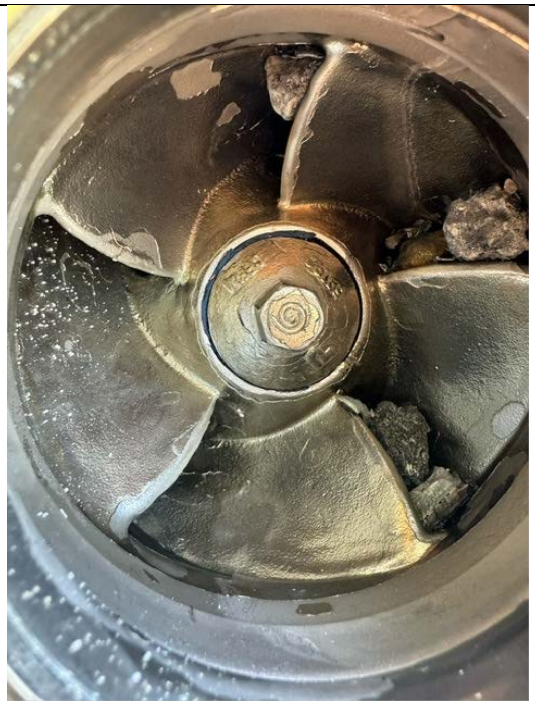
|  |  |
| Well Pump - Site location. | Pump impeller obstructed with large pieces well formation material. |