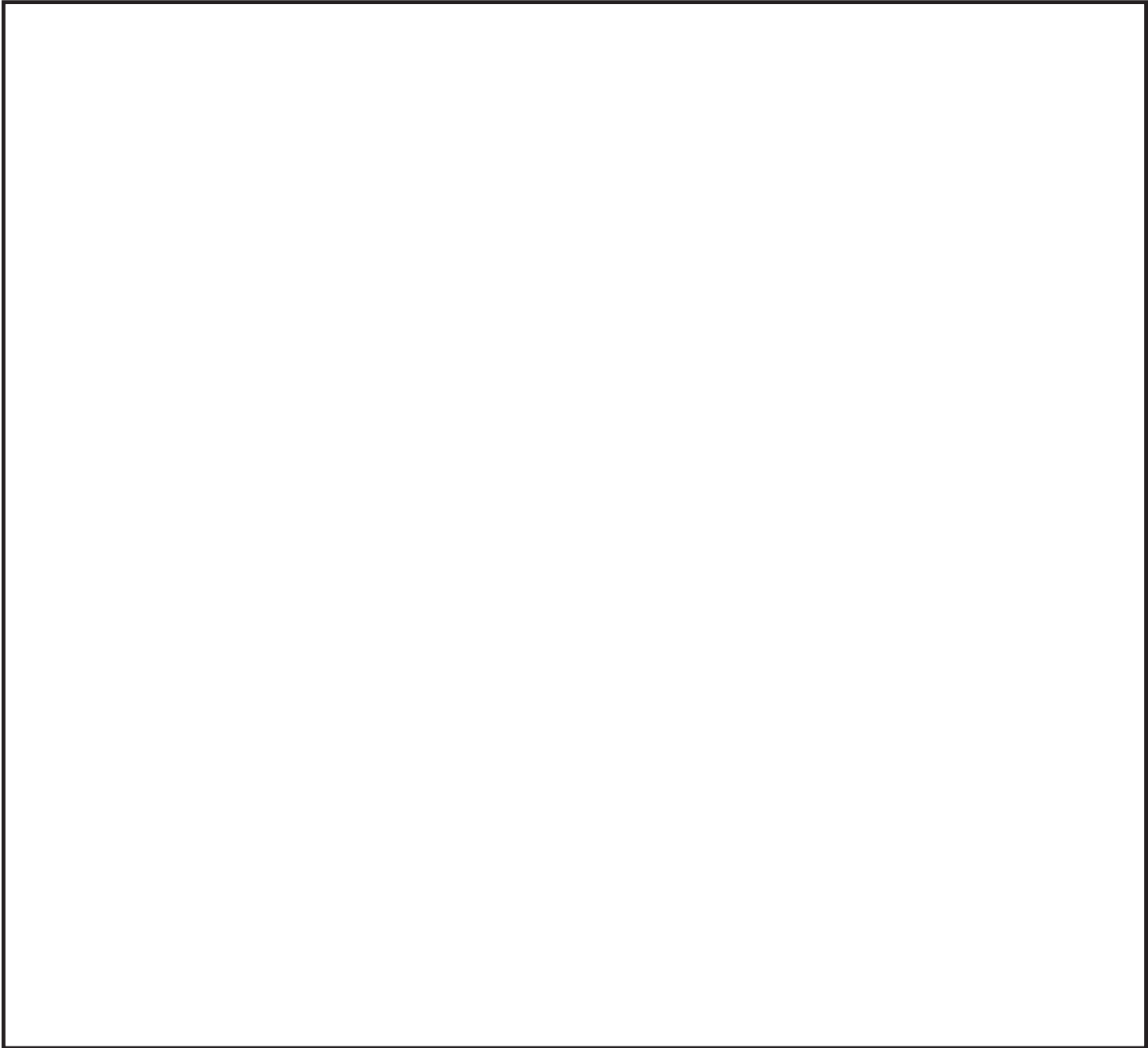


Well Construction at the Trout Lake Well Site in Polk County, Florida





Cover Photo: Permanent monitor wells at the Trout Lake well site in Polk County, Florida. In order from left to right: U Fldn Aq Monitor, Surf Aq Monitor. Photograph by Survey staff.

Well Construction at the Trout Lake Well Site in Polk County, Florida

By Julia Zydek

October 2023

Southwest Florida Water Management District

Operations, Lands and Resource Monitoring Division

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For ordering information:

World Wide Web: <http://www.watermatters.org/documents>

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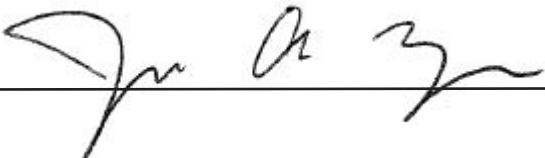
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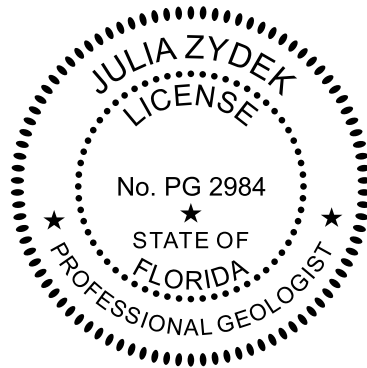
Zydek, J.A., 2023, Well Construction at the Trout Lake Well Site in Polk County, Florida: Southwest Florida Water Management District, 43 p.

The hydrogeologic evaluations and interpretations contained in *Well Construction at the Trout Lake Well Site in Polk County, Florida* have been prepared by or approved by a licensed Professional Geologist in the State of Florida, in accordance with Chapter 492, Florida Statutes.



Julia Zydek
Professional Geologist
State of Florida License No. PG 2984

Date: October 31, 2023



Foreword

The Geohydrologic Data Section (GEO) administers the Regional Observation and Monitor-well Program (ROMP) at the Southwest Florida Water Management District (District). The ROMP was started in 1974 in response to the need for hydrogeologic information by the District. The focus of the ROMP is to quantify the flow characteristics and water quality of the groundwater systems that serve as the primary source of water supply within southwest Florida. The original design of the ROMP consisted of an inland 10-mile grid network composed of 122 well sites and a coastal transect network composed of 24 coastal monitor transects of two to three well sites each. The number of wells at a well site varies with specific regional needs; usually two to five permanent monitor wells are constructed at each site. The numbering system for both networks generally increases from south to north with ROMP-labeled wells representing the inland grid network and TR-labeled wells representing the coastal transect network.

In addition to the ROMP, the GEO section oversees construction of monitor wells and performs aquifer testing activities for other District programs and projects. The broad objectives at each well site are to determine the hydrogeology, water quality, and hydraulic properties of the units present, and to install wells for long-term monitoring. Site activities include exploratory coring and testing, well construction, and aquifer performance testing. These activities provide data for the hydrogeologic and groundwater quality characterization of the well sites. These characterizations are used to ensure the monitor wells are properly designed for intended hydrologic targets. At the completion of each well site, a summary report is generated and can be found at the District's website at www.watermatters.org/data. The monitor wells form the backbone of the District's long-term aquifer monitoring networks, which supply critical data for the District's regional models, hydrologic conditions reporting, and regulatory water use permitting.

M. Ted Gates

Manager

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Conversion Factors and Datums

Multiply	By	To obtain
Length		
inch (in)	2.54	centimeter (cm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
Area		
acre	0.004047	square kilometer (km ²)
square foot (ft ²)	0.09290	square meter (m ²)
square mile (mi ²)	2.590	square kilometer (km ²)
Volume		
gallon (gal)	3.785	liter (L)
gallon (gal)	0.003785	cubic meter (m ³)
cubic foot (ft ³)	0.02832	cubic meter (m ³)
Flow Rate		
foot per day (ft/d)	0.3048	meters per day (m/d)
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)
cubic foot per day (ft ³ /d)	0.02832	cubic meter per day (m ³ /d)
gallon per day (gal/d)	0.003785	cubic meter per day (m ³ /d)

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Elevation, as used in this report, refers to distance above the vertical datum.

Abbreviations and Acronyms

aq	aquifer
bls	below land surface
CFWI	Central Florida Water Initiative
District	Southwest Florida Water Management District
fig.	figure
Fldn	Floridan
gpm	gallons per minute
gpm/ft	gallons per minute per foot
Huss	Huss Drilling, Incorporated
NAVD 88	North American Vertical Datum of 1988
NQ	2.38-inch internal diameter core drilling rod
PVC	polyvinyl chloride
SID	station identification
U	Upper
WCP	well construction permit

Well Construction at the Trout Lake Well Site in Polk County, Florida

By Julia Zydek

Introduction

Eighteen well construction sites were planned to investigate lake and groundwater interactions for the adoption of minimum lake level protocols within the boundary of the Central Florida Water Initiative (CFWI) in Polk County, Florida. The sites are part of the Data, Monitoring, and Investigations Team Work Plan that support the CFWI activities. The well sites will provide lithologic descriptions from land surface to the top of limestone and will provide long-term monitor wells. Two wells will be installed at seven sites, one to monitor the surficial aquifer and the other to monitor the Upper Floridan aquifer. The remaining 11 well sites will only have a surficial aquifer monitor well installed. Groundwater level data collected from these wells will help assess the hydraulic connection between the lakes and the surficial and Upper Floridan aquifers in the east-central part of the Southwest Florida Water Management District (District). Also, data collected from the wells will be used to assess compliance with minimum lake levels established in accordance with Section 373.042, Florida Statutes. Additionally, these sites will guide in model calibration for the East-Central Florida Transient Groundwater Model and the District-Wide Regulation Model.

The sites targeted for investigation are Crystal Lake, Diner Lake, Eagle Lake, Lake Annie, Lake Amoret, Lake Aurora, Lake Bonnie, Clinch Lake, Lake Easy, Lake Eva, Lake Lee, Lake Lowery, Lake McLeod, Lake Mabel, Lake Starr, Lake Venus, North Lake Wales, and Trout Lake (fig. 1). This report details the well construction and hydrogeology of the Trout Lake well site.

Acknowledgments

Special thanks to Huss Drilling, Incorporated (Huss) for their continued hard work and professionalism, as well as the staff at Camp Wingmann for their support during this project.

Site Location

The Trout Lake well site is in south-central Polk County adjacent to the northern border of Highlands County (fig.

2). It is in the southwest quarter of Section 34, Township 32 South, and Range 28 East at latitude 27° 38' 54.96" north and longitude 81° 30' 39.96" west (fig. 2). The land surface elevation is approximately 108 feet above the North American Vertical Datum of 1988 (NAVD 88). The Trout Lake well site is located on a perpetual easement granted to the District by Camp Wingmann, Inc., of Avon Park, Florida. Figure 3 presents the layout for the Trout Lake well site.

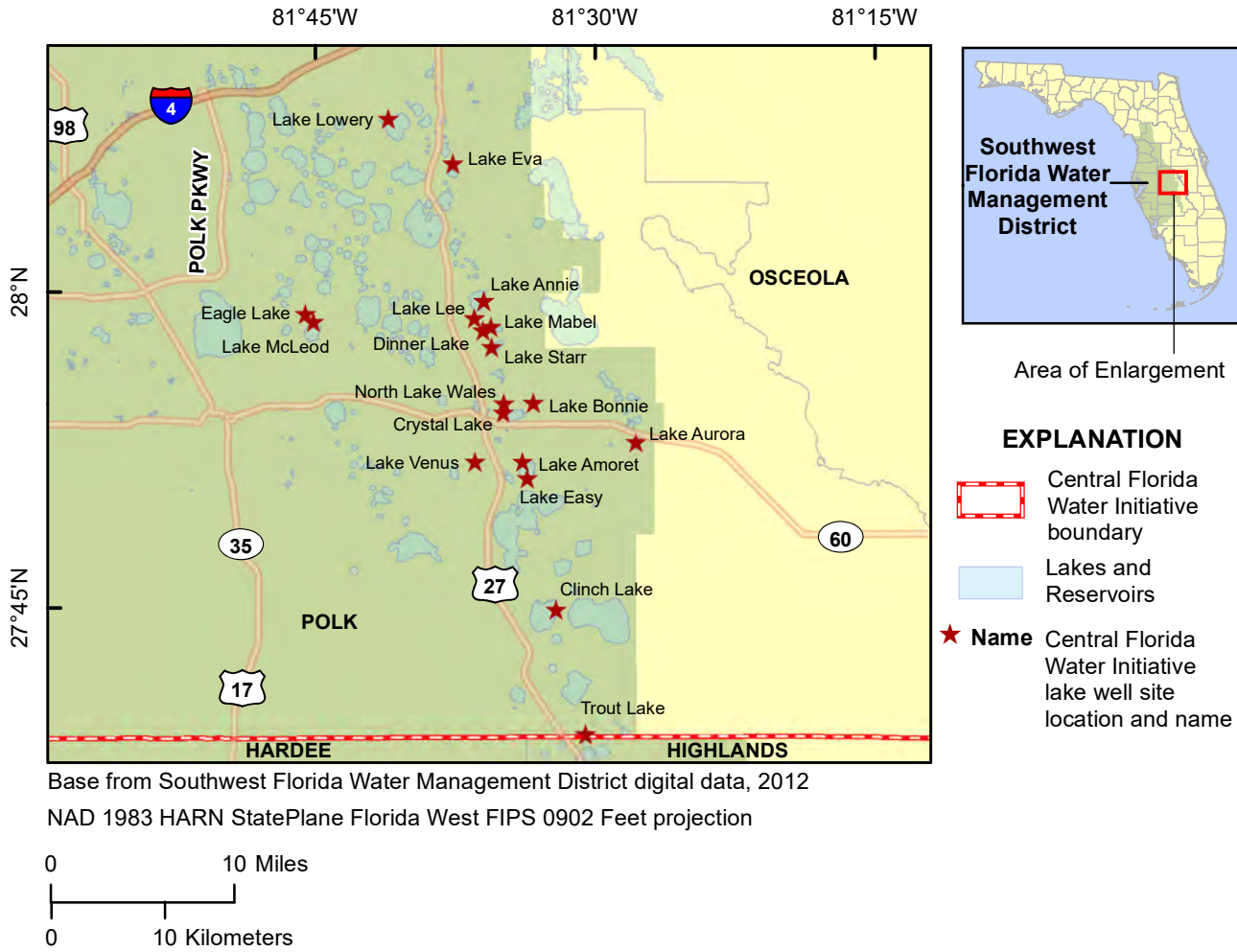
The Trout Lake well site can be found by taking US Highway 98/US Highway 27 south from Frostproof for approximately 4 miles. Turn east onto W Sun Pure Road for 0.7 miles. Turn north onto Retreat Road and continue for 0.4 miles. Turn east onto N Trout Lake Road and proceed for 0.2 miles to the well site, which is on the south side of N Trout Lake Road.

The Trout Lake well site is in the Lake Wales Ridge Complex Province in the Lakes District of west-central Florida, which extends from southern Lake County to southern Highlands County (Williams et al, 2022). The Lake Wales Ridge Complex is between the Hardee Upland, and the Osceola Plain to the east. The Lake Wales Ridge Complex Province is primarily made of sand ridges separated by valleys that trend north to south. These sand ridges are underlain by a karstic terrain (Yobbi, 1996). Approximately 200 lakes, ponds, swamps, and sinkholes occur along the Lake Wales Ridge and adjacent areas (Yobbi, 1996). The carbonate materials of the ridge were dissolved, collapsing into sinkholes, and subsequently forming these lakes and ponds (Yobbi, 1996). The Lake Wales Ridge is an area of interest due to the hydrologic connection between surface water systems and groundwater systems via sinkholes and other features characterized by karstic terrain. The Trout Lake well site is in the Kissimmee River Drainage Basin.

Methods

Huss collected lithologic samples using a Failing 1500 drill rig equipped for split-spoon sampling, mud-rotary drilling, and wireline coring methods. The first 5 feet of samples were collected using a post hole digger on August 14, 2018. Split-spoon sampling occurred between August 14 and 17,

2 Well Construction at the Trout Lake Well Site in Polk County, Florida

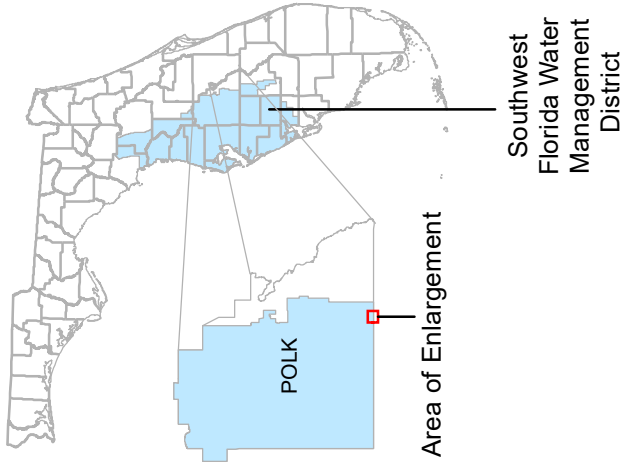
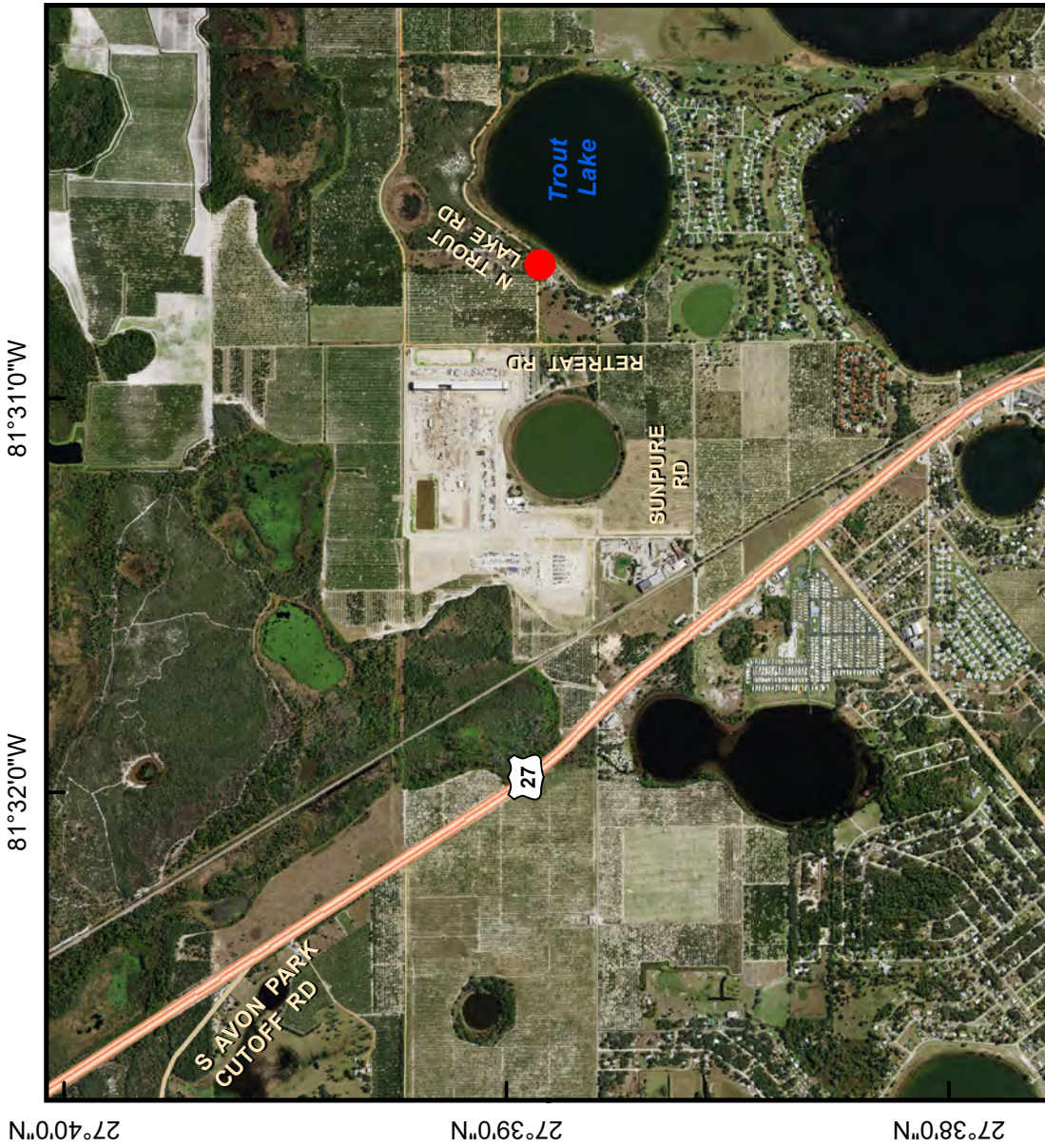


[NAD, North American Datum; HARN, High Accuracy Reference Network; FIPS, Federal Information Processing Standards; N, north; W, west]

Figure 1. Data, Monitoring, and Investigations Team Minimum Lake Level well sites.

2018. A 140-pound hammer was used to drive the 2-inch outer diameter split-spoon sampler through hollow-stem augers, which had a 4.5-inch inside diameter. The augers served as temporary casing and kept the borehole open while the split-spoon sampler advanced. Huss collected split-spoon samples in 2-foot intervals for every 5 feet drilled from 5 to 40 feet below land surface (bls). Huss moved to the Upper Floridan aquifer monitor well location and drilled a pilot hole from land surface to 40 feet bls to prepare for additional split-spoon sampling. Huss collected 2-foot split-spoon samples for every 5 feet drilled from 40 to 107 feet. Huss collected 2-foot split-spoon samples for every 10 feet drilled from 107 to 237 feet bls. Keeping the temporary augers at 235 feet bls, Huss switched to mud-rotary drilling and collected grab samples of drill cuttings at 5-to-20-foot intervals from 237 to 290 feet bls. On August 20, 2018, Huss encountered a hole collapse at 245 feet bls during drilling preparation. The exploratory borehole was filled with sand from a formation collapse above from

245 to 260 feet bls. Huss used EZ-MUD® to increase the drilling mud viscosity and drilled to 270 feet bls to clear the sand and stabilize the hole. The exploratory borehole was plugged from 270 to 235 feet bls with rock, and the 4.5-inch temporary augers were removed. From August 21 to 22, 2018, Huss reamed the exploratory borehole from land surface to 242 feet, using a 12-inch drag bit and began construction of the Upper Floridan aquifer monitor well. Huss installed 8-inch schedule 40 polyvinyl chloride (PVC) casing from land surface to 238 feet bls and pressure grouted it in place. The 8-inch schedule 40 PVC casing was installed to keep the borehole open during further exploration and well construction. On August 23, 2018, Huss drilled through the grout that had risen into the 8-inch Schedule 40 PVC casing during the grouting process using a 3 7/8-inch drill bit from 240 feet to 290 feet bls. Next, Huss switched to the split-spoon sampling method and conducted split-spoon sampling from 290 feet bls until refusal at 290.2 feet bls. Between August 23 and 24, 2018, Huss tripped in



EXPLANATION

- Trout Lake Monitor Well Site
- Section/Township/Range: S34/T32S/R28E
- Latitude: 27° 38' 54.96" N
- Longitude: 81° 30' 39.96" W

Directions

From Avon Park Cutoff Road in Frostproof, take US-98/US Highway 27 S south for approximately 4 miles. Turn east onto W Sun Pure Road for 0.7 miles. Turn north onto Retreat Road for 0.4 miles. Turn east onto N Trout Lake Road and proceed for 0.2 miles to the well site.

Base from Southwest Florida Water Management District digital orthophoto, 2020
 NAD 1983 HARN StatePlane Florida West FIPS 0902 Feet Projection



Figure 2. Location of the Trout Lake well site in Polk County, Florida.

4 Well Construction at the Trout Lake Well Site in Polk County, Florida

4-inch temporary steel casing to 250 feet bls and drilled out the bottom of the exploratory borehole to 290 feet bls using NQ (2.38-inch internal diameter) core drilling rods. Circulation loss below 290 feet bls was noted on the daily drilling log (appendix A). Next, Huss began continuous wireline core sampling using NQ core drilling rods from 292 to 360 feet bls. Between August 27 and 28, 2018, the exploratory borehole was reamed with an 8-inch drill bit from 240 to 350 feet bls. The exploratory borehole was logged by District staff using District-owned Century® geophysical logging equipment. The 9074A caliper/gamma-ray tool was run in the exploratory borehole from 351 feet bls to land surface (fig. 4). Huss set 4-inch PVC casing to 351 feet bls for construction of the Upper Floridan aquifer monitor well. On August 30, 2018, Huss resumed wireline coring using NQ core drilling rods through the 4-inch PVC casing from 360 to 400 feet bls. The samples were boxed, described, photographed, and transported to the Florida Geological Survey for further analysis and storage.

Well Construction

Monitor well construction at the Trout Lake well site was completed by Huss and supervised by District staff. Permanent monitor wells were constructed for long-term water level monitoring. Two monitor wells were constructed, including one permanent surficial aquifer monitor (Surf Aq Monitor) well and one permanent Upper Floridan aquifer monitor (U Fldn Aq Monitor) well (fig. 3). Huss constructed the two wells between August 14 and 30, 2018. The exploratory borehole was converted to the Upper Floridan aquifer monitor well after exploration was complete. Each well was developed by pumping at least three well volumes until the discharge water was free of sediment and clear, unless otherwise stated. The 4-inch PVC casing for each well was raised 3 feet above land surface. Sand was installed inside a lockable metal well cover around the casing. Concrete pads were installed around the finished wells. The groundwater level in each well was measured after well development using a Solinst electric water level meter. Each well has been surveyed, benchmarked, and equipped for daily water level monitoring.

Surficial Aquifer Monitor Well

The surficial aquifer monitor well (District station ID [SID] 909816) was installed on August 14, 2018, using well construction permit (WCP) number 870736. The final well specifications can be found in table 1 and figure 5. The well is contained within the undifferentiated sand and clay sediments and is used to monitor the groundwater level in the surficial aquifer.

Huss constructed the surficial aquifer monitor well using a Failing 1500 drill rig equipped for hollow-stem auguring to drill an 8-inch hole from land surface to 30 feet bls. Next,

4-inch, schedule 40, threaded, PVC screen (0.010-inch slot) was installed between 10 and 30 feet bls. Then, 4-inch, schedule 40, threaded, PVC casing was installed from land surface to 10 feet bls. A 20-30 silica sand filter pack was installed from 8 to 30 feet bls, a 30-65 fine silica sand seal was installed from 7 to 8 feet bls, and cement grout was installed from land surface to 7 feet bls. The well was developed for approximately 45 minutes at 4.35 gallons per minute (gpm), causing 7.14 feet of drawdown in water level. The specific capacity of the well was 0.6 gallons per minute per foot (gpm/ft). The surficial aquifer monitor well was subsequently used as the water supply well for the remainder of the coring and well construction operations.

Upper Floridan Aquifer Monitor Well

The Upper Floridan aquifer monitor well (District SID 909818) was installed between August 14 and 30, 2018, under WCP number 870738. The final well specifications can be found in table 1 and figure 6. The well is used to monitor the water levels in the Upper Floridan aquifer.

From August 21 to 22, 2018, Huss used the Failing 1500 drill rig to widen the exploratory borehole to 12 inches in diameter from land surface to 242 feet bls. Next, 8-inch, schedule 40, threaded, PVC casing was installed and grouted with neat Type II Portland cement from 238 feet bls to land surface. The cement was left to cure overnight. From August 27 to 30, 2018, Huss drilled a nominal 8-inch borehole using the mud-rotary method from 242 to 351 feet bls. Next, 4-inch, schedule 40, threaded, PVC casing was installed and grouted in place with neat Type II Portland cement from land surface to 351 feet bls, and #89 pea gravel from 290 to 285 feet bls. The cement was cured in 12-hour intervals during the cementing operation.

On August 30, 2018, Huss utilized the wireline coring method to drill the 4-inch nominal open hole interval of the well from 351 to 401 feet bls. The well was developed using the reverse-air pumping method for approximately 65 minutes with the drilling rods removed in 20-foot increments from the bottom of the hole to 361 feet bls. Then, the well was pumped at a rate of 10.91 gpm that caused a 0.77-foot drawdown in water level. The specific capacity of the well was 14.17 gpm/ft.

Geology

The geology of the Trout Lake well site is based on lithologic samples collected from post hole digging from land surface to 5 feet bls, split-spoon sampling from 5 to 237 feet bls, the interpretation of drill cuttings collected from 237 to 290 feet bls, split-spoon sampling from 290 to 290.2 feet bls, and samples collected from hydraulic-rotary core drilling during well construction from 292 to 400 feet bls. The geologic units encountered at the well site include, in ascending order:

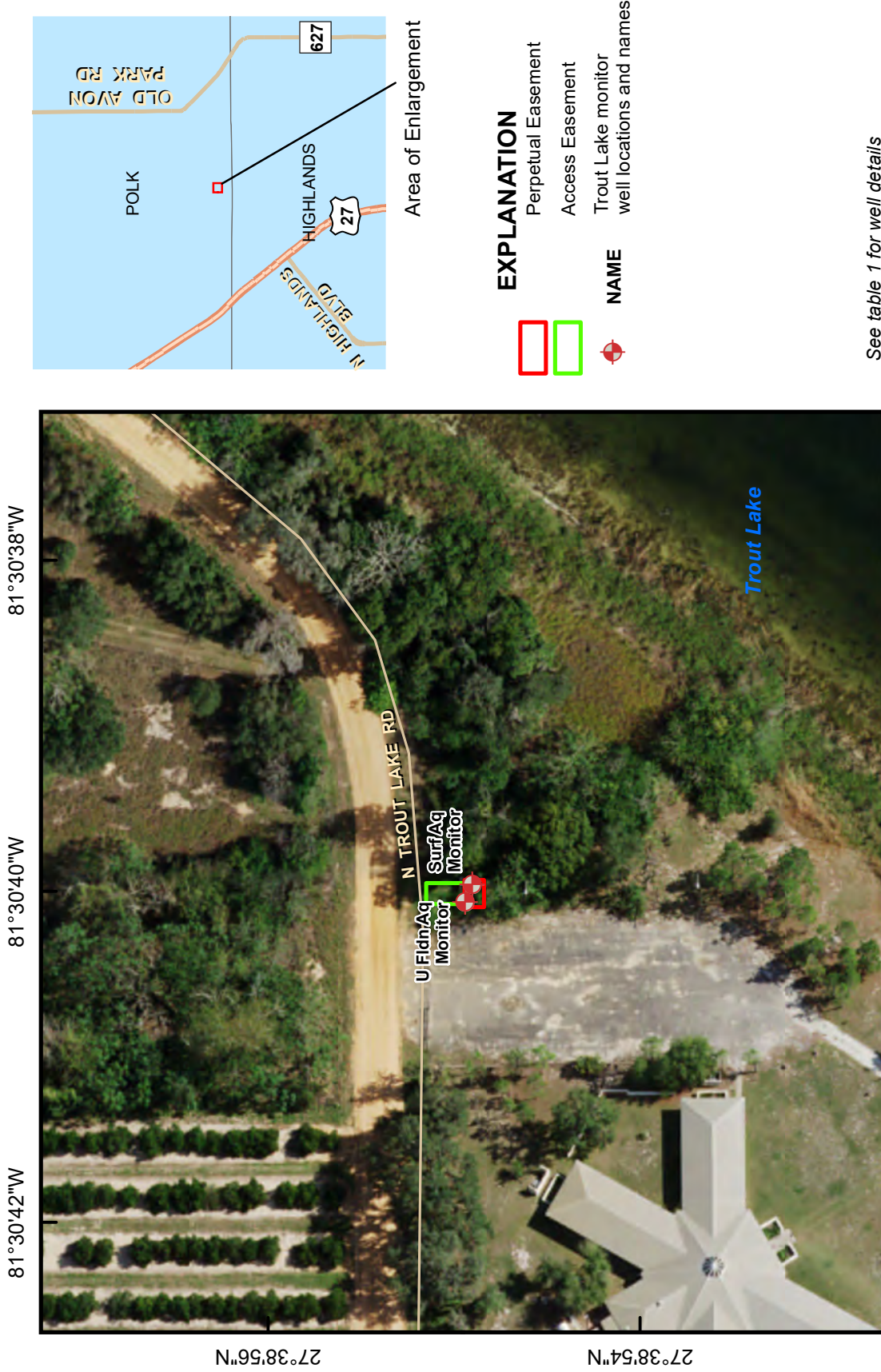


Figure 3. Layout of the Trout Lake well site in Polk County, Florida.

6 Well Construction at the Trout Lake Well Site in Polk County, Florida

Table 1. Summary of well construction details at the Trout Lake well site in Polk County, Florida

[SID, station identification; ft, feet; bls, below land surface; MM/DD/YYYY, month/day/year; WCP, well construction permit; No., number; Surf, surficial; Aq, aquifer; PVC, polyvinyl chloride; Inc., Incorporated; U, Upper; Fldn, Floridan]

SID	Station Name	Open Interval (ft bls)	Casing Type	Casing Diameter (inches)	Constructed By	Start Date (MM/DD/YYYY)	Complete Date (MM/DD/YYYY)	Status	WCP No.(s)
909816	Trout Lake Surf Aq Monitor	10-30	PVC-screen	4	Huss Drilling, Inc.	08/14/2018	08/14/2018	Active	870736
909818	Trout Lake U Fldn Aq Monitor	351-401	PVC	4	Huss Drilling, Inc.	08/14/2018	08/30/2018	Active	870738

the Ocala Limestone, the Suwannee Limestone, the undifferentiated Arcadia Formation, the Peace River Formation, and undifferentiated sand and clays deposits. A stratigraphic column detailing the lithostratigraphy encountered at the well site is presented in figure 7. The lithologic log is presented in appendix B. Digital photographs of the samples are presented in appendix C.

The Late Eocene age Ocala Limestone extends from 363 feet bls to beyond the total depth of exploration at 400 feet bls at the Trout Lake well site. The top of the Ocala Limestone was picked at the transition in the core samples from packstone, wackestone, grainstone, and minor dolostone to mudstone. The general lithology of the Ocala Limestone consists of very light orange to yellowish gray, fossiliferous, fine to medium grained mudstone with moderate induration. The diagnostic benthic foraminifera *Lepidocyclina ocalana* was identified between 380 and 382.5 feet bls. Core recovery was approximately 80 percent in the Ocala Limestone.

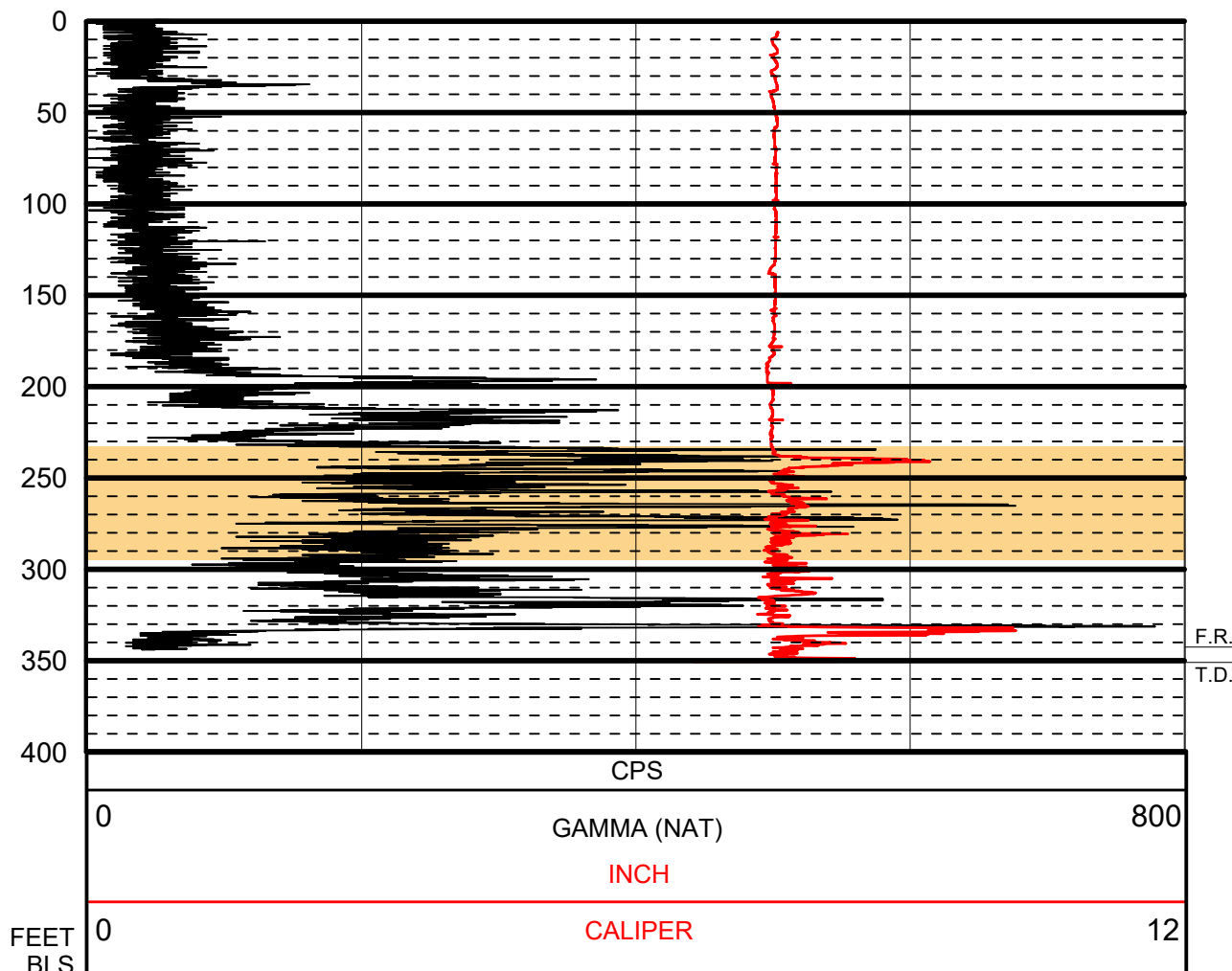
At the Trout Lake well site, the Early Oligocene Suwannee Limestone extends from 305 to 363 feet bls. The general lithology of the Suwannee Limestone consists of yellowish gray wackestone, packstone, and grainstone with beds of olive gray to yellowish gray dolostone. The lithology is fine to medium grained and has moderate induration. Phosphatic sand is present throughout the Suwannee Limestone but decreases with depth. Fossil molds and fragments increase with depth. The diagnostic benthic foraminifera *Discorinopsis gunteri* was first identified between 350 and 355 feet bls. Other fossil fragments and molds include benthic foraminifera including miliolids. Core recovery was approximately 62 percent in the Suwannee Limestone.

At the Trout Lake well site, the Miocene to Oligocene age undifferentiated Arcadia Formation is present from 265 to 305 feet bls. The undifferentiated Arcadia Formation primarily consists of very light orange, fine to medium grained mudstone with poor induration from 265 feet to 290.2 feet bls. Between 290.2 and 305 feet bls, very light orange to yellowish gray, fossiliferous, fine to medium grained wackestone and

packstone with good induration are present. The index fossil *Sorites sp.* was observed between 292 and 301.2 feet bls. Phosphatic sand and gravel are present throughout the undifferentiated Arcadia Formation. As mentioned in the Methods section, drill cuttings were collected from 230 to 290 feet bls during well construction. As a result, the lithologic description of the undifferentiated Arcadia Formation is not as detailed from 265 to 290 feet bls. The natural gamma signature from approximately 265 to 330 feet bls is a response to the increase in phosphate and is indicative of this formation in south-central Polk County (fig. 4).

The Miocene age Peace River Formation is present from 220 to 265 feet bls at the Trout Lake well site. The top of the Formation was picked at a transition from sand to clay. The general lithology of the Peace River Formation at this location consists of yellowish gray to very light orange, sub-angular to sub-rounded, unconsolidated sand, and very light orange to grayish orange, unconsolidated clay with accessory phosphatic sand and gravel, quartz sand, and organics. Shark teeth were observed between 235 and 237 feet bls. Lithologic sampling consisted of drill cuttings from 230 to 290 feet bls; therefore, the lithologic description of the Peace River Formation is not as detailed from 230 to 265 feet bls. The gamma-ray peak at approximately 265 feet bls is likely due to a phosphate lag that is typically seen near the boundary of the Peace River Formation and the Arcadia Formation (fig. 4).

At the Trout Lake well site, the Pliocene to Holocene age undifferentiated sand and clay unit is present from land surface to 220 feet bls. The interval from land surface to 40 feet bls consists of mainly fine to medium grained, rounded to subrounded, unconsolidated quartz sand with accessory plant remnants, organics, and phosphatic sand. A clay lamination is present between 30 and 32 feet bls. From 40 to 220 feet bls, the sediments are primarily very light orange to white, very fine to medium grained, subangular to subrounded, unconsolidated quartz sand with accessory phosphatic sand, gravel, and organics. Mica first appears at 145 feet bls and continues to 232 feet bls, ranging from 5 to less than 1 percent.



[CPS, counts per second; NAT, natural; F.R., first read; T.D., total depth]

Figure 4. Gamma-ray and caliper log for the U Fldn Aq Monitor from land surface to 350.8 feet below land surface collected at the Trout Lake well site in Polk County, Florida. The log was performed on August 28, 2018, using the 9074A (caliper/gamma-ray) tool. The tool was run inside the borehole after it was reamed to 8-inches in diameter. The log scale is 1-inch per 100 feet and is linearly scaled. The first reading is 342.1 feet below land surface. Shaded intervals indicate confining units.

Hydrogeology

The characterization presented below is based on the lithology encountered during split-spoon sampling, grab samples, and core samples collected during well construction, drilling records, and static groundwater levels in the wells. Two aquifers were identified at the Trout Lake well site: the surficial aquifer and the Upper Floridan aquifer. A confining unit separates the two aquifers (fig. 7).

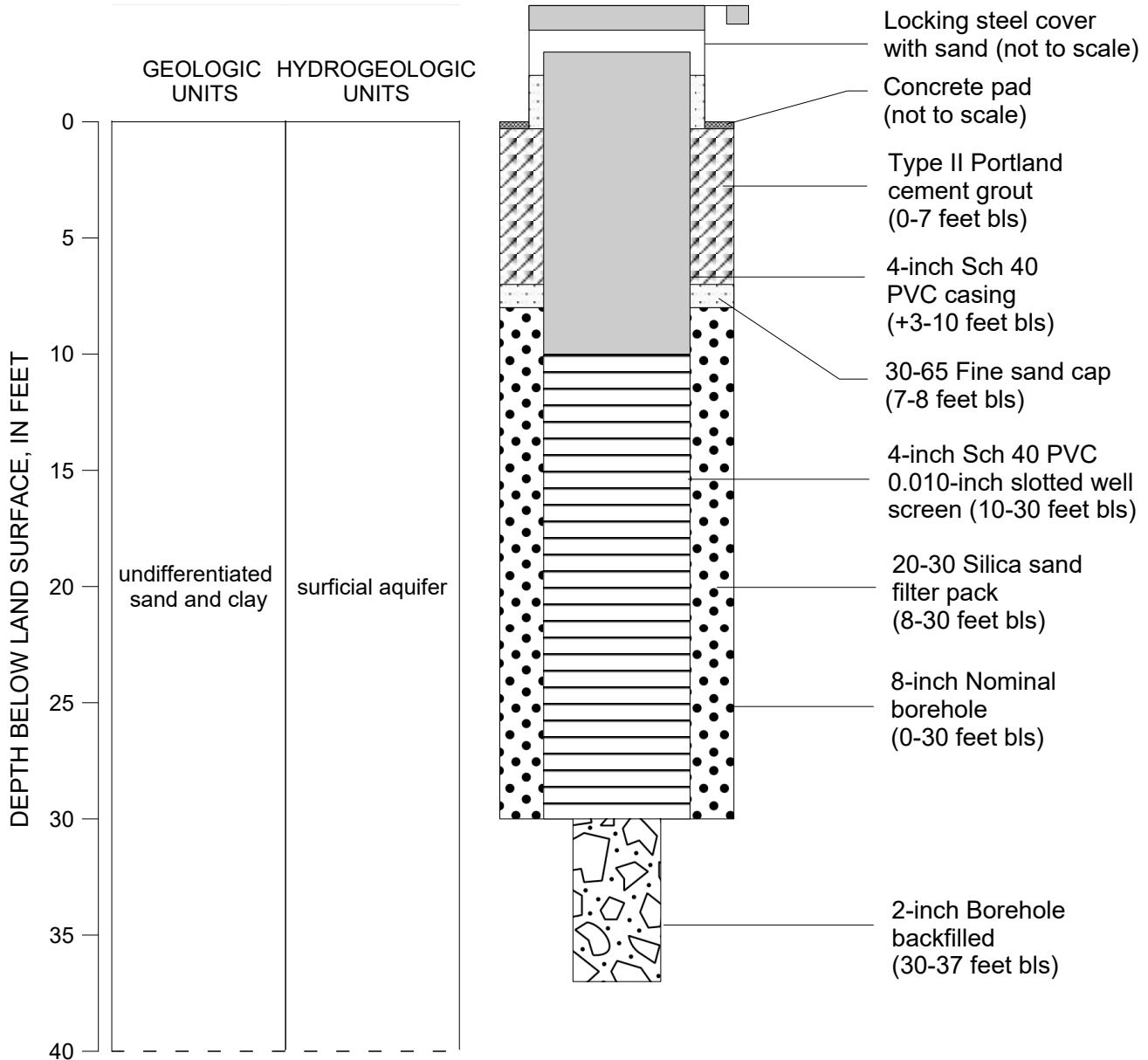
The surficial aquifer is the shallowest hydrologic unit present at the Trout Lake well site. It extends from the water table to approximately 232 feet bls and is unconfined. The aquifer is contained within the undifferentiated sand and clay

unit. On May 24, 2022, the groundwater level in the surficial aquifer monitor well was measured at 93.23 feet NAVD 88 (15.07 feet bls).

A confining unit between 232 and 296 feet bls is present in the clay and mudstone of the Peace River Formation and undifferentiated Arcadia Formation. The confining unit separates the surficial aquifer from the underlying Upper Floridan aquifer.

The portion of the Upper Floridan aquifer encountered during well construction extends from 296 feet to beyond the depth of exploration and is contained within the bottom nine feet of the undifferentiated Arcadia Formation, the Suwannee Limestone, and Ocala Limestone. The top of the unit is

8 Well Construction at the Trout Lake Well Site in Polk County, Florida

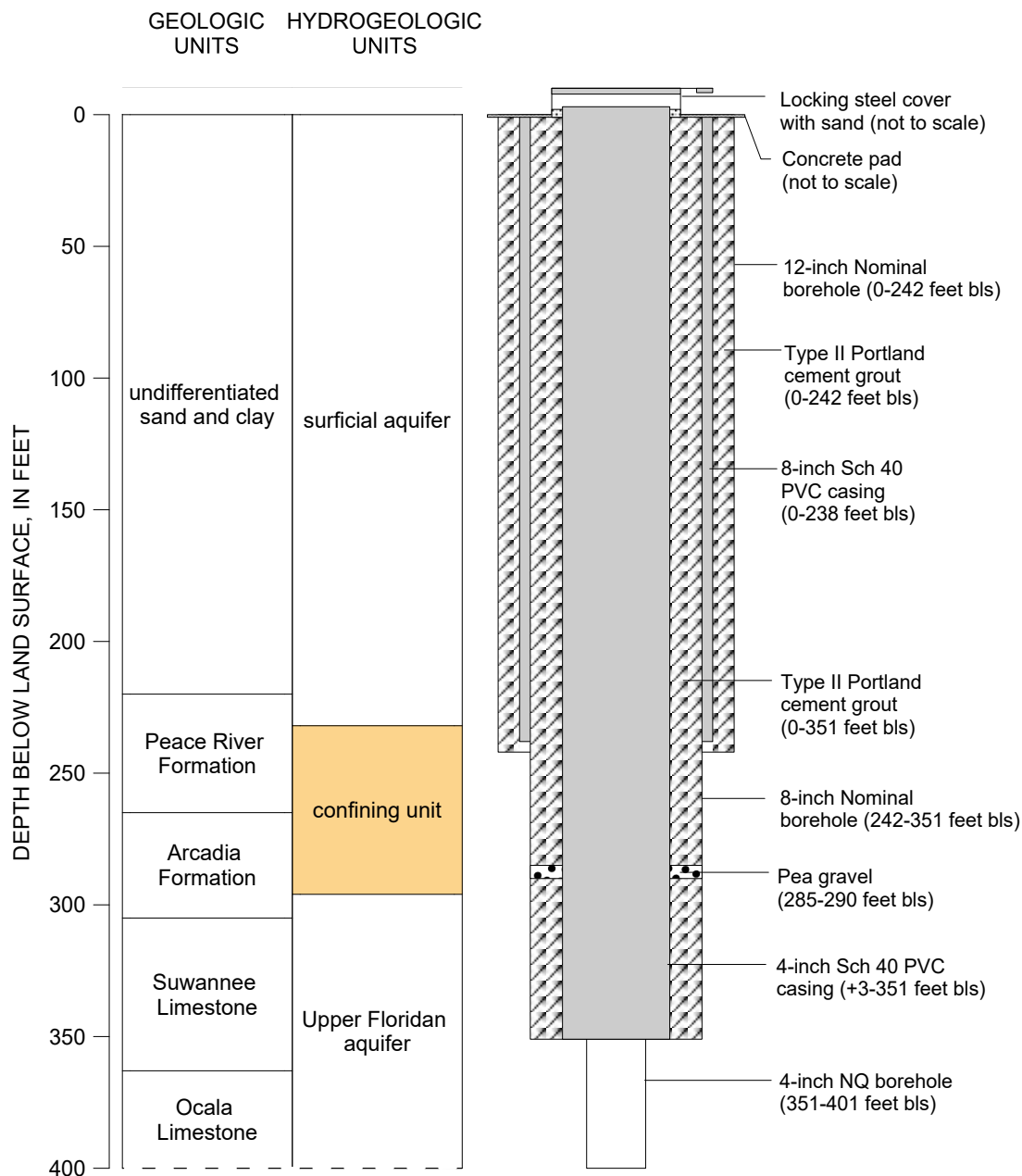


Well Name:	Trout Lake Surf Aq Monitor
SID:	909816
WCP:	870736
S/T/R:	34/32S/28E
Latitude:	27° 38' 54.89"
Longitude:	81° 30' 40.02"
Reporting Category:	TROU
Const. Began:	08/14/2018
Const. Complete:	08/14/2018

EXPLANATION	
	20-30 Sand
	Cement grout
	PVC casing
	Screen
	Locking steel cover
	30-65 Fine sand
	Concrete
	Backfill

[bls, below land surface; Sch, schedule; PVC, polyvinyl chloride; Surf, surficial, Aq, aquifer; SID, station identification; WCP, well construction permit; S/T/R, Section/Township/Range; S, south; E, east; Const., construction]

Figure 5. Well as-built diagram for the Surf Aq Monitor at the Trout Lake well site in Polk County, Florida.

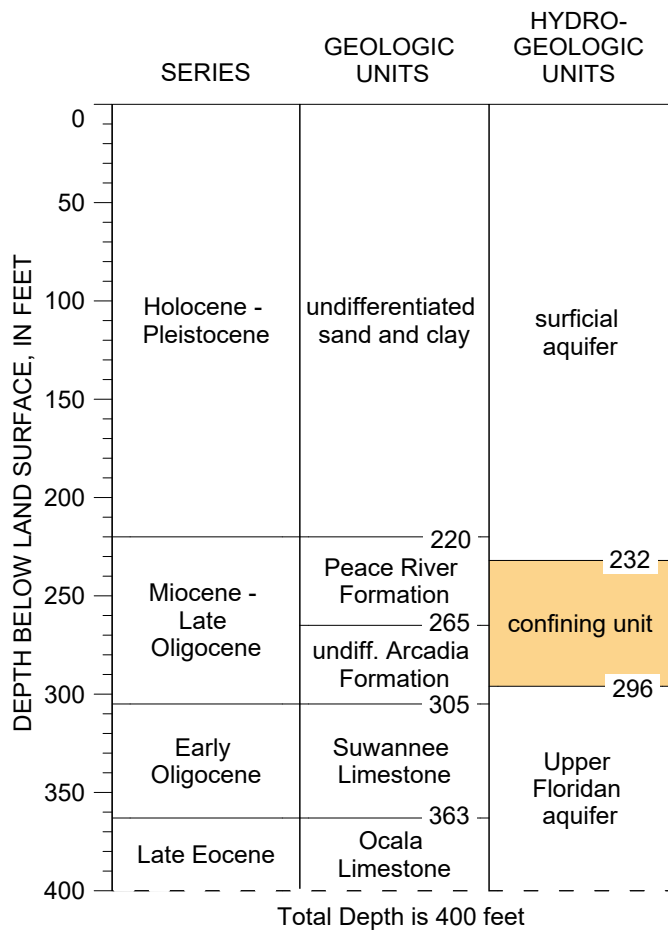


Well Name:	Trout Lake U Fldn Aq Monitor
SID:	909818
WCP:	870738
S/T/R:	34/32S/28E
Latitude:	27° 38' 54.93"
Longitude:	81° 30' 40.13"
Reporting Category:	TROU
Const. Began:	08/14/2018
Const. Complete:	08/30/2018

EXPLANATION			
	Concrete		PVC casing
	Pea gravel		Locking steel cover
	Open hole		Fine sand
	Cement grout		

[bls, below land surface; PVC, polyvinyl chloride; Sch, schedule, U, Upper; Fldn, Floridan; Aq, aquifer; SID, station identification; WCP, well construction permit; S/T/R, Section/Township/Range; S, south; E, east; Const., construction]

Figure 6. Well as-built diagram for the U Fldn Aq Monitor at the Trout Lake well site in Polk County, Florida.



[undiff., undifferentiated; Land surface elevation is approximately 108 feet above the North American vertical datum of 1988 at the U Fldn Aq Monitor well]

Figure 7. Stratigraphic column detailing the hydrogeologic setting at the Trout Lake well site in Polk County, Florida.

in permeable limestone and is nearly coincident with the top of the Suwannee Limestone where circulation was lost while reaming the exploratory core hole. The bottom of the unit was not reached during well construction. On May 24, 2022, the groundwater level in the Upper Floridan aquifer monitor well was measured at 83.64 feet NAVD 88 (24.96 feet bls).

Summary

Two monitor wells were constructed at the Trout Lake well site in Polk County, Florida in August 2018. The wells were constructed as part of the CFWI to monitor groundwater levels in the surficial and Upper Floridan aquifers near Trout Lake. The casing and total depth of the surficial aquifer monitor well are 10 and 30 feet bls, respectively. The casing and total depth of the Upper Floridan aquifer monitor well are 351 and 400 feet bls, respectively. The groundwater levels in the

two wells differed by 9.59 feet on May 24, 2022. Both wells are secured with lockable metal well covers and equipped for long-term groundwater level monitoring.

The hydrogeology of the well site was determined from split-spoon samples, cuttings, and core samples that were collected prior to well construction and core samples that were recovered during the construction of the open hole interval of the Upper Floridan aquifer monitor well. The geologic units encountered at the well site are: Ocala Limestone from 363 feet bls to beyond the total depth of exploration at 400 feet bls, Suwannee Limestone from 305 to 363 feet bls, the undifferentiated Arcadia Formation from 265 to 305 feet bls, the Peace River Formation from 220 to 265 feet bls, and the undifferentiated sand and clay deposits from land surface to 220 feet bls. The hydrogeologic units encountered at the site are: the surficial aquifer from the water table to 232 feet bls, a confining unit from 232 to 296 feet bls, and the Upper Floridan aquifer from 296 feet bls to beyond the total depth of exploration of 400 feet bls.

References

- Williams, Christopher P., Scott, Thomas M., and Upchurch, Sam B., 2022, Florida Geomorphology Atlas: Florida Geological Survey Special Publication No. 59, 238 p.
- Yobbi, D.K., 1996, Analysis and Simulation of Ground-Water Flow in Lake Wales Ridge and Adjacent Areas of Central Florida: U.S. Geological Survey Water-Resources Investigations Report 94-4254, 82 p.

**Appendix A. Scanned Daily Drilling Logs Taken
During Well Construction at the Trout Lake Well
site in Polk County, Florida**

**SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG**

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
2	TJ Fallon	8/14/14	8/13/14	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Driller) Roy, Tray			

WELL SITE	Lake Trout UFA	WELL NAME	SPT
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TIME LOG		DEPTH	DETAILS OF OPERATIONS																								
FROM	TO																										
07:30			Fallon on-site																								
08:30			Huss on-site																								
08:47		5-7	SPT - (Blows 3, 3, 5, 7 = 18)																								
08:55		70-12	SPT - (Blows 6, 9, 10, 10 = 35)																								
09:01		15-17	SPT - (Blows 5, 10, 7, 10 = 32)																								
09:09		20-27	SPT - (Blows 6, 6, 9, 8 = 29)																								
09:17		25-27	SPT - (Blows 6, 9, 10, 12 = 37)																								
09:25		30-32	SPT - (Blows 10, 2, 16, 18 = 65)																								
09:38		35-37	SPT - (Blows 7, 9, 17, 16 = 49) - 25% of clay																								
09:40	10:15		La Roche on-site; Rig time → discuss casing, logs; Decide to set well @ 30' b/s																								
10:15			Trap, set; Prep to set surface well																								
10:33		0-20	Drill out to 30-52 8-inch Bore																								
10:45	10:49	20-30'	Add Rod + Drill																								
10:49	11:00		Circulate Drilling Fluid																								
11:00			TRIP out Rods; Empty Mud Tub ^{205%}																								
11:09	11:15		205% Screen & 105% blank (0.010-inch 5/6" + blank)																								
11:15	11:32		Sand up annulus																								
11:33	11:39		Pump out Mud																								
			↳ Site Clean-up																								
			*Note: Well set at 30-52 b/s as Clay likely between 32-35-52 interval.																								
12:00	12:43		Develop Well																								
12:43			Specific Capacity Test @ 4.35 gpm Measured from Tub																								
			<table style="font-size: small; border-collapse: collapse;"> <tr> <td style="text-align: right;">WL</td> <td style="text-align: left;">Time</td> <td></td> </tr> <tr> <td style="text-align: right;">20.24'</td> <td style="text-align: left;">0.0 min</td> <td style="text-align: right;">4.35 gpm</td> </tr> <tr> <td style="text-align: right;">16.16'</td> <td style="text-align: left;">1.0 min</td> <td style="text-align: right;">7.14 gpm = 0.609 gpm/ft</td> </tr> <tr> <td style="text-align: right;">15.09'</td> <td style="text-align: left;">2.6 min</td> <td></td> </tr> <tr> <td style="text-align: right;">14.45'</td> <td style="text-align: left;">3.0 min</td> <td></td> </tr> <tr> <td style="text-align: right;">13.19'</td> <td style="text-align: left;">5.0 min</td> <td></td> </tr> <tr> <td style="text-align: right;">12.70'</td> <td style="text-align: left;">10.0 min</td> <td></td> </tr> <tr> <td style="text-align: right;">12.70'</td> <td style="text-align: left;">11.0 min</td> <td></td> </tr> </table>	WL	Time		20.24'	0.0 min	4.35 gpm	16.16'	1.0 min	7.14 gpm = 0.609 gpm/ft	15.09'	2.6 min		14.45'	3.0 min		13.19'	5.0 min		12.70'	10.0 min		12.70'	11.0 min	
WL	Time																										
20.24'	0.0 min	4.35 gpm																									
16.16'	1.0 min	7.14 gpm = 0.609 gpm/ft																									
15.09'	2.6 min																										
14.45'	3.0 min																										
13.19'	5.0 min																										
12.70'	10.0 min																										
12.70'	11.0 min																										
12:45	1:15		Move Rig to UFA SPT site Bags Fine Sand = 1 Bags 20/30 50lb Sand = 1 Bags of Quick Gel = 0																								

District Representative	Contractor Representative
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14 Well Construction at the Trout Lake Well Site in Polk County, Florida

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
3	TJ Fallon	14 Aug '18	13 August 18	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Driller) Roy, Tray			

WELL SITE	Lake Trout UFA	WELL NAME	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
13:20			- Set-up Failing 1500 over SPT/UFA Borehole ↳ Mast-up; Mix Drilling Fluid
13:50	14:04	0-40'	- Rds in - Drill to 40' for SPT; Change bit to spoon ↳ Start SPT Interval
14:10		40-42	- SPT (Blows 4, 12, 12, 14 = 42)
14:26		45-47	- SPT (Blows 12, 12, 10, 13 = 47)
14:42		50-52	- SPT (Blows 25, 26, 21, - = Refusal @ 52)
14:58		55-57	- SPT (Blows 13, 20, 25, 16 = 72)
15:16		60-62	- SPT (Blows 13, 16, 20, 5 = 54)
15:38		65-67	- SPT (Blows 1, 4, 6, 14 = 25); Circulate Mud
15:50		70-72	- SPT (Blows 6, 10, 13, 14 = 43); Circulate Mud
16:07		75-77	- SPT (Blows 10, 13, 16, 15 = 54)
			End of Day - Site Clean up
16:25			- Huss Departs
19:00			- Fallon Departs
			Bags of Quirk Gel: 11

District Representative		Contractor Representative	
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**SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG**

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
4	TJ Fallon	15 Aug '18	13 Aug '19	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Driller) Ray, Tray		100%	182

WELL SITE	Lake Trout UFA	WELL NAME	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
			SPT @ UFA Well
07:45			Fallon on-site; Site Prep
08:25			Huss On-Site; Site Prep
08:40			Reg-on Prep for SPT, Plan it to split-spacer to significant clay layer and set + grout 12-inch casing
09:10		80-82	SPT (Blows 18, 20, 25, 22 = 85)
09:31		85-87	SPT (Blows 10, 14, 15, 16 = 55)
09:50		90-92	SPT (Blows 10, 15, 20, 17 = 62)
			La Roche on-site; Circulate Mud
10:20		95-97	SPT (Blows 10, 15, 20, 30 = 75); Circulate Mud
10:44		100-102	SPT (Blows 19, 28, 28, 24 = 99); Circulate Mud
11:13		105-107	SPT (Blows 18, 28, 29, 26 = 101); Circulate Mud
			Switch to 105ft Spacing Intervals
11:50		115-117	SPT (Blows 10, 10, 28, 30 = 84); circulate mud
12:20		125-127	SPT (Blows 10, 11, 17, 14 = 48); Circulate Mud
13:00		135-137	SPT (Blows 5, 10, 11, 17 = 39); Circulate Mud
13:29	13:52		Drillers Break - Lunch
		145-147	SPT (Blows 2, 4, 4, 7 = 17); Circulate Mud
14:40		150-152	SPT (Blows 1, 2, 4, 7 = 14); Circulate Mud
15:16		155-157	SPT (Blows 1, 3, 4, 7 = 15); Circulate Mud
15:59		160-162	SPT (Blows 1, 1, 10, 16 = 28); Circulate Mud
16:41		170-172	SPT (Blows 5, 8, 14, 14 = 41); Circulate Mud
17:25		180-182	SPT (Blows 7, 12, 18, 20 = 57)
17:50			Read in hole
17:55			Huss Off-Site
18:00			Fallon Off-site
			Bags of Quick-Crete = 11

District Representative	Contractor Representative
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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
 GEOHYDROLOGIC DATA SECTION
 DAILY CORING/DRILLING LOG

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
5	TJ Fallon	16 Aug '18	13 Aug '18	
CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Driller), Roy, Tray		42	232
WELL SITE	Lake Trout UFA	WELL NAME	Monitor Well	

TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
08:00			FALLON on-site; Drillers already on-site ↳ Site Prep. Rig on @ 08:15. Mix Drilling Fluid, Trip in
09:45		190-192	SPT (Blows 14, 20, 25, 24 = 83)
11:00		200-203	SPT (Blows 15, 17, 15, 16 = 63)
12:35		0-200'	Set 4 1/4" ID Casing to 200
12:50			La Roche 055 size Drive in last 3-5 ft casing w/ Cathead
14:00	14:30		Lunch Break - Huss 055 size
14:35		202-210	Trip in bit, Drill to 210; Trip Out; Switch out to Spoon; Trip in
		210-213	SPT (Blows 4, 10, 20, 22 = 56); Add Rock to Rock
16:08		220-222	SPT (Blows 18, 21, 21, 25 = 85)
17:02		230-232	SPT (Blows 8, 12, 13, 16 = 49)
17:20			Recover Spoon; Rig 055; Polise Site
17:48			Huss 055 size
18:00			Fallon 055 size
			Bags of Quick-Ceils III

District Representative		Contractor Representative	
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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
7	TJ Fallon	20 Aug '18	13 Aug '18	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Driller) Roy, Tray Bryson			

WELL SITE	Lake Trout UFA	WELL NAME	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
09:05			- FALLON On-site - Set up Trailer
09:20			- Huss On-site Site Prep
09:50			- Water levels UFA - 24.09' b2oc (1.2' stick-up) - Sans 10.81' b2oc
10:00	12:20		- Rig On; Coring Prep.; Trip in 'Core' Rods - to 290 (295' Kelly) ↳ Plan to core 105' intervals to Total Depth, Switch to Reaming
11:50			- Tim Lohner on-site
12:28	12:33	240-250	- Drill Out/Ream - to Remove Sand From Hole Collapse 245-260" ↳ Add Ez-Mud; Clean Hole & Circulate Mud to Stabilize Hole
13:15	13:33	250-260	- Drill Out/Ream Hole
		260-270	- Drill On - Ream Hole; Trip out Rods;
14:05	15:40		- Driller off-site to Purchase Rock Saw back-plug
16:10			↳ Tag Cave-in @ w/ PVC Tremie
	17:30		↳ Pour rock into Borehole to bottom of Casing
17:35	17:59		- Circulate Mud Site Clean-Up
18:15			- Huss + District Rys off Site
			Bags of Quick Gel = 111

District Representative	Contractor Representative

**SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG**

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
8	TJ Fallon	21 Aug '18	17 Aug '18	
CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Driller) Roy, Tray, Rayson			
WELL SITE	Lake Trout UFA	WELL NAME	Monitor Well	

TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
07:30			- All Parties on site
07:40			- Rig on; Prep to Remove Temp 4-inch Casing
07:53	9:03	235-2.8	- Pull 4-inch Casing from 235' bls
09:15	11:30	6.5-6054	- Drill/Ream w/ 12-inch drag bit ↳ 6054 @ 11:30 ; Circulate Mud
11:55	12:07	60-80	- Drill/Ream w/ 12-inch Drag Bit ; Circulate Mud
12:22	12:33	80-100	- Drill/Ream w/ 12-inch Drag Bit ; Circulate Mud
12:54	13:02	100-120	- Drill/Ream w/ 12-inch Drag Bit ; Circulate Mud
13:55	14:27	120-140	- Drill/Ream w/ 12-inch Drag Bit ; then Circulate Mud
14:49	15:05	140-160	- Drill-Ream with 12-Inch Drag Bit, Post-Drill Circulation
15:15	16:05		- Severe Weather - Thunderstorm - Safety Halt
16:05	16:30	160-180	- Circulate Mud ; Clean-up Site
16:47			- Huss off-site
17:01			- Fallon / Bohren off-site
			Bags of Quik (well) =

District Representative		Contractor Representative	
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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
9	TJ Fallon	22 Aug 2018	23 Aug 2018	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Drilled), Roy, Tray, Bryson			

WELL SITE	Lake Trout UFA	WELL NAME	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
07:17	07:32	L.S-160	- All Parties On-Site; Trip in - Hole Open to 160' ↳ Mix Drilling Fluid; Add 205ft Rod
08:00	08:20	160-180	- Drill-Ream ↳ Circulate Mud
08:37	09:55	180-200	- Drill-Ream ↳ Circulate Mud
09:15	09:36	200-220	- Drill-Ream ↳ Circulate Mud
10:55	11:06	220-240	- Drill-Ream (240') ↳ Circulate Mud
	12:20		↳ Trip out as Hole; Prep for Casing Set
12:25			- Set 8-inch Casing, Note: PVC Casing is screwed to Connect
12:58			↳ Use Cat-Head/Hammer to Emplace PVC 1005ft in string
12:57			- Add 20-ft PVC Casing Section w/ 4 screws after Hammering Casing into Bell - 4 screws around Bell (1205ft in string)
12:59			- Add 20-ft PVC Casing Section w/ 4 Screws after Hammering Casing into Bell - 4 screws around Bell (1405ft in string)
13:01			- Add 20-ft PVC Casing Section w/ 4 Screws around Bell after Cat-Head Hammer together in following configuration (1605ft in string) ↳ Hammer Casing Down from 140 ft bls to ~159
13:11			- Add 20-ft PVC Casing w/ 4-Screws in configuration after Hammering into Bell. (1805ft in string) ↳ Hammer casing into Hole from ~159 bls to ~179 bls
13:17			- Add 20-ft PVC Casing w/ 4 Screws in configuration after Hammering into Bell (2005ft in string) ↳ Hammer casing into Hole from ~179 bls to ~198 bls
13:31			- Add 20-ft PVC Length of Casing w/ 4 Screws in configuration after Hammering bell together. (2205ft in string) (Bags Quick-Gel- III)

District Representative	Contractor Representative
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**SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG**

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
10	TJ Fallon	22 Aug 2018	13 Aug 2018	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Nailler) Roy, Tray, Bryson			240

WELL SITE	Lake Trout UFA	WELL NAME	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
13:37			- Hammer into Hole with Cathead Hammer - 1985 ft bls - ~ 2185 ft bls
13:45			- Add 20-5t PVC length; Hammer into Bell; 290-5t in 8-inch PVC String; Screen in place - 4 screens in (C) configuration;
	14:00		↳ Hammer into place 218-238 ft bls
			- Tim Lohner measures drag bit to 11 inches w/ wings (Nailler says it is 11 1/2")
			↳ T.L. also asks Tony to clean up sand; ↳ 12-inch Nominal
14:10			- 220-5t as 1-inch PVC Tremie in hole -
			↳ 2-5t stick-up on PVC (8-inch) als
			↳ Emplace Pressure head with Screens onto 8-inch Casing
			↳ Measure on Pressure Head.
14:22			- Extend Fluid Pump ass hoses to beyond big tree on east side of Drill site to get Drill and ass site
14:23			- Pump Water into 8-inch to displace Drill Mud - Circulation present.
1			- Set-up to Mix + Pump Cement
14:45			- Mix Cement
15:10	15:20		- Pump Cement - Collect Sample From ~250 gallon tank (Pressure Ground)
15:20	15:46		- Mix Cement
15:47	15:53		- Pump Cement - Collect Sample From ~250 gallon tank (Pressure Ground)
15:52			- Severe Weather - Thunderstorm - Close Lightning
16:07			- Tony (Nailler) on-site assist picking up cement
16:09			- Mix Cement
16:25	16:36		- Pump Cement - Collect Sample From 250 gallon Tank (Pressure Ground)
16:36	16:40		- Mix Cement - Partial Batch
16:40	17:05	385t	- Pump Same (Pressure Ground) - Adjust Pumps - Pump Independently
			↳ Clean Up Pumps/ Site Tag Cement @ 385t in Annulus
17:14			- Mix 1/2 Batch
17:30	17:36		- Pump Cement From Top into Annulus → 405t Tremie in Annulus
			- Clean-up Site; Organize Equipment
18:13			- All Parties Depart

District Representative	Contractor Representative

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
11	TJ Fallon	23 August '13	13 August '17	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Driller), Roy, Tray, Ryan			

WELL SITE	Lake Trout UFA	WELL NAME	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
07:25			Fallon Arrives on-site - Huss Already On-site Note: All 3 Groat Samples from 22 August have cured sufficiently; Groat Top in annulus between 8-inch casing & Bore is 10-12 H ₂ O per Driller ↳ Prep to Drill 3 7/8 bit to 290 SL
8:35			Trip in Rod + Bit
08:55	09:24	LS-240	Drill out Cement to 240' - Driller's Note: 105# Cement in Bottom of 8-inch
09:27		240-290	Drill - Beam to 290 - Driller - Soft Drilling ↳ Driller Makes it to 290 - Trips out to get spoon at 300-305
10:26	10:30	290-290.2	SPT - (Blow Count 164 (Re-Susal)) - Approx 2 inches Penetration ↳ Trip out - Remove Spoon
10:40		LS-230	Trip in 4-inch Temp Casing to Set to Top of Cement in 8-inch Casing (~230) (Note: Tray drops rod on his foot when tripping in) @ 11:10
11:50	12:11	230-250	Drill/Set 4-inch Casing to 250 w/ mud circulation
12:30	12:50		Lunch Break
13:00	13:55	LS-240	Trip in Core Rod w/ bit; Pump out mud from Core Rod; Drop barrel + chase w/ water;
14:37	15:19	240-260	Drill out - Core out
15:22	15:46	260-280	Drill out - Core out
16:15	16:35	280-290	Drill out - Core out
16:40	16:55	290-LS	Trip out + Recover 8-inches of Core (Core stuck in Bit)
17:24	17:45	294-300	Core Run; Retrieve Barrel
17:52	18:15	300-305	Core Run; Retrieve Barrel ↳ Trip out - Bit into Casing
18:47			Huss off-site
18:55			Fallon off-site Note: No Circulation below 290
			Bags - Quick-Crete = 111 / EZ Mud - Partial Container

District Representative	Contractor Representative
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**SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG**

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
12	TJ Fallon	24 August	13-Aug-2018	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss Drilling	Tony (Driller) Roy, Tracy Bryan			

WELL SITE	WELL NAME
Lake Trout UFA	Monitor Well

TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
07:14			FALLON on-site
07:25			Huss on-site; W.L.; Rig-on → prep to core
		240-305'	↳ Ream; Trip in to 305'
	08:45	305-310	Core Run - Driller comments on 505ft Drilling
09:20	10:12	310-320	Core Run
10:47	11:18	320-330	Core Run 3-45t bit drop - Driller - at end of Run
	12:30		Rig Repairs - Barrel Malfunction
12:30	13:00		Severe Weather Delay/Lunch
13:30	13:45	330-340	Core Run
14:05	14:20	340-350	Core Run
14:25	14:45	350-360	Core Run;
14:45			Driller Policing site; Prepping for Departure
			↳ Trip out Rod, Set up new rod rock
13:54			Huss off-site
13:54			FALLON off-site

District Representative		Contractor Representative	
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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
 GEOHYDROLOGIC DATA SECTION
 DAILY CORING/DRILLING LOG

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
13	TJ Fallon	27 Aug 2018	12 Aug 2018	
CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss	Tony (Miller)			
ROMP SITE NUM-NAME	Trout Lake UFA	WELL NAME/ID	Monitor Well	

TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
09:41			Fallon on-site; Huss already on-site
			↳ HQ Rod Tripped on L.S. (240-L.S)
09:55		L.S.-240	↳ Trip in 8-inch bit drill string; Mix Drilling Fluid
11:05	11:25	240-260	Drill-Beam
11:31	11:53	260-280	Drill-Beam; Circulate Mud; Sweep Hole
12:09	12:53	280-300	Drill-Beam; Add brine to P 290; Severe Choking 290-300; Lose Circulation 290-300
			↳ Circulate Mud
12:59		300-320	Drill-Beam - Intermittent Choking; Add Gum Gel (T.L. on site at 13:10)
			Drill-Beam (Stop 13:20-13:50 - Spills)
14:00	15:20		Severe Weather T-Storms; Replace Swiss Parking on Filling
	16:30	320	End Drill Run - Lightning; Huss Departs at 16:48
17:30			Fallon off site.

District Representative		Contractor Representative	
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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
 GEOHYDROLOGIC DATA SECTION
 DAILY CORING/DRILLING LOG

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
14	TJ Fallon	28 Aug 2018	13 Aug 2018	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
HUSS	Tony (Driller) Tray, Bryson Weston			

ROMP SITE NUM-NAME	Trout Lake UFA	WELL NAME/ID	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
06:45			- Fallon on-site - Logger Prep
07:05			- Huss on site - Repair/shim-up Swivel packing; Site Prep
09:50	09:35	300-320	- Drill - Ream
09:35	10:36	320-340	- Drill - Ream
10:42	10:54	340-350	- Drill - Ream; drill string = 340 ft of drill rod + Kelly w/ 8 inch bit.
			↳ mud tub empty, all mud in hole
10:55	11:23		- tripping all Rod lost 1 lost THH THH THH 1
11:24	12:30		- Log hole - Caliper/Gamma Log - (351' W- 8" mud)
13:10			- Rig on - Set 4-inch PVC 538 - casing / to 351
	14:05		↳ Set in Tremie to 351 w/ pressure grout
14:15	14:47		- Huss off-site - Lunch driving down Weston - T. Storm
14:55	15:15		- Mix Grout 300 gallons pumped into 4"-8" annulus
16:15			- Huss off-site
16:25			Fallon off site

District Representative		Contractor Representative	
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SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
 GEOHYDROLOGIC DATA SECTION
 DAILY CORING/DRILLING LOG

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
15	TJ Fallon	29 Aug 2018	13 Aug 2018	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Huss	Tony (Driller), Weston, Tray, Bryson			

ROMP SITE NUM-NAME	Trout Lake UFA	WELL NAME/ID	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
07:00			Fallon on-site; Huss on-site at 09:05 Annular L 74.42 lbs 1.1354 in thick cap 8.05m
08:00			Tag 4-mil. 8-inch Annular at 330' (bottom of void) ↳ Mix 15 bags grout/streem into Annular
08:25	08:45		↳ Pump Tremie Grout into Annular (Porthead was added) ↳ Wait for cement to cure; Driller sets pipe at 10:20 to Bay 60th Deck ↳ Rotate at 11:40
11:50		290	Soft Tag @ 290 - Sample is H&S. Log Set up.
	12:15	285	↳ #89 Rock 55% to 285
12:20	12:45		↳ Mix 300 gal Porthead + Pump into Annular
12:55	12:45		↳ Prep for Surface Well Area Protective Cover + Emplate
15:00		270	Tag Grout @ 270 - Plan to Rock 4-5 ft w/ #89 Rock
15:25			Falla on-site ↳ Huss Tremie 1 batch of 5 bags
18:15			Huss on-site

District Representative		Contractor Representative	
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**SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
GEOHYDROLOGIC DATA SECTION
DAILY CORING/DRILLING LOG**

REPORT #	SITE GEOLOGIST	DATE	DATE ON-SITE	SID
16	TJ Fallon / Reed Potnall	30 Aug 2019	13 Aug 2019	

CONTRACTOR	CREW	PROPOSED T.D.	PROGRESS	DEPTH
Hoss	Tony (Driller) / Troy, Ransom, Weston			

ROMP SITE NUM-NAME	Trout Lake UFA	WELL NAME/ID	Monitor Well
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TIME LOG		DEPTH	DETAILS OF OPERATIONS
FROM	TO		
08:45			- Fallon + Potnall on-site; Hoss already on-site ↳ 4'x8' Annular grouted to surface ↳ Prep to Core, Trip in, Circulate EZ-Mud
09:45			- Angus Bannell / Circulate EZ-Mud
09:55	10:00	345-	- Core Run (Partial Run) Rig Stalls; Complete Run
	10:15	350	- Core Run Completed - Cored out Portland 5mm 4" PVC
10:31	10:43	350-360	- Core Run; Add EZ-Mud - Sust. Drilling - Driller
10:51	11:10	360-370	- Core Run
11:20	11:40	370-380	- Core Run
11:55	12:09	380-390	- Core Run } Intermittent Vents (bit chng/corstrng) & Driller
12:15	12:31	390-400	- Core Run
12:32	12:05		- Severe Weather T-Storms
12:15	12:45	400-4.5	- Air 1.5t in increments
12:45	14:00		- Trip out core Rod
14:00	14:15	"	- Air 1.5t
14:15	14:25		- Trip Out Rod
14:26	14:40		- Air 1.5t
14:50	15:11		- Trip Out
			- Clean up site; Rig off Hole
			- Pump Test $10.909 \text{ gpm} / 0.715 \text{ ft} = 14.17 \text{ gpm} / \text{ft}$
16:45			- Fallon + Potnall off site
			Hoss on site to finish cleanup ↳ Will Emphasize on 8/21

District Representative	Contractor Representative
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**Appendix B. Lithologic Logs for the Samples
Collected at the Trout Lake Well Site in Polk
County, Florida**

30 Well Construction at the Trout Lake Well Site in Polk County, Florida

Well Number: W-19745 (Trout Lake)

Total Depth 400 feet Elevation: 105 feet

120 Samples from 0 to 400 feet

Drill Completion Date: 8/30/2018

Other Logs:

Owner/Driller: SWFWMD

Described by: B. Davis in 2019

Comments: Multi-sample type well. SPT from 0'-230' and 290'-290.2', cuttings from 230'-290', and core from 290.2' to 400'.

County: Polk

Location: T.32S R.28E S.34

Lat/Long: 27° 38' 54.93" N; 81° 30' 37.96" W

XSr:

TOR:

SFrm:

Geological Formation Picks

0 - 220 ft	UDSC	Undifferentiated Sand and Clay
220 - 265 ft	PCRV	Peace River Formation
265 - 305 ft	ARCA	Arcadia Formation
305 - 363 ft	SWNN	Suwannee Limestone
363 - ? ft	OCAL	Ocala Limestone

0 - 1 ft Sand; Light Gray (N7) to Very Light Gray (N8); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Subrounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Plant Remains-8%, Organics-6%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing fair amounts of plant remains and organic material.

1 - 5 ft No Sample;

5 - 7 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-3%, Organics-1%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing the first appearance of black (N1) phosphate sands.

7 - 10 ft No Sample;

10 - 12 ft Sand; White (N9) to Grayish Orange (10YR 7/4); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Subrounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-3%, Organics-1%; General Fossils: No Fossils;

12 - 15 ft No Sample;

15 - 17 ft Sand; Light Grayish Brown (5YR 5/2) to Grayish Brown (10YR 6/2); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Organics-2%, Phosphatic Sand-<1%; General Fossils: No Fossils;

17 - 20 ft No Sample;

20 - 22 ft Sand; Light Grayish Brown (5YR 5/2) to Grayish Brown (10YR 6/2); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Organics-2%, Phosphatic Sand-<1%; General Fossils: No Fossils;

22 - 25 ft No Sample;

25 - 27 ft Sand; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Organics-<1%, Phosphatic Sand-<1%; General Fossils: No Fossils;

27 - 30 ft No Sample;

- 30 - 32 ft Sand; Light Gray (N7) to White (N9); Grain Size: Very Fine; Range: Very Fine to Fine; Roundness: Rounded to Sub-rounded; Low Sphericity; Unconsolidated; Accessory Minerals: Clay-8%, Organics-<1%; General Fossils: No Fossils; Interval consists of quartz-rich sand with medium-hard clay component.
- 32 - 35 ft No Sample;
- 35 - 37 ft Sand; Very Light Orange (10YR 8/2) to Moderate Orange Pink (5YR 8/4); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-1%, Organics-<1%; General Fossils: No Fossils;
- 37 - 41.6 ft No Sample;
- 40 - 42 ft Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-2%, Organics-<1%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing white (N9) and black (N1) phosphate sands.
- 41.6 - 40 ft Sand; Very Light Orange (10YR 8/2) to Moderate Orange Pink (5YR 8/4); Grain Size: Medium; Range: Medium to Fine; Roundness: Rounded to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-1%, Organics-<1%; General Fossils: No Fossils;
- 42 - 45 ft No Sample;
- 45 - 47 ft Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Medium; Roundness: Sub-angular to Subrounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-2%, Organics-<1%; General Fossils: No Fossils;
- 47 - 50 ft No Sample;
- 50 - 52 ft Sand; Very Light Orange (10YR 8/2) to Grayish Brown (10YR 6/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Subangular to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-3%, Organics-1%; General Fossils: No Fossils;
- 52 - 55 ft No Sample;
- 55 - 57 ft Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Medium; Roundness: Sub-angular to Subrounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-3%, Organics-1%; General Fossils: No Fossils;
- 57 - 60 ft No Sample;
- 60 - 62 ft Sand; Very Light Orange (10YR 8/2) to Grayish Brown (10YR 6/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Subangular to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-4%, Phosphatic Gravel-2%, Organics-1%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing both white (N9) and black (N1) phosphatic sands and gravels. Noticeable increase in phosphate content.
- 62 - 65 ft No Sample;
- 65 - 67 ft Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Medium; Roundness: Sub-angular to Subrounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-2%, Organics-1%; General Fossils: No Fossils;
- 67 - 70 ft No Sample;
- 70 - 72 ft Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Medium; Range: Medium to Fine; Roundness: Sub-angular to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-3%, Organics-1%; General Fossils: No Fossils;

32 Well Construction at the Trout Lake Well Site in Polk County, Florida

72 - 75 ft	No Sample;
75 - 77 ft	Sand; Very Light Orange (10YR 8/2) to Grayish Brown (10YR 6/2); Grain Size: Medium; Range: Medium to Fine; Roundness: Sub-angular to Sub-rounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-2%, Organics-1%; General Fossils: No Fossils;
77 - 80 ft	No Sample;
80 - 82 ft	Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Medium; Roundness: Sub-angular to Subrounded; Medium Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-2%, Organics-1%; General Fossils: No Fossils;
82 - 85 ft	No Sample;
85 - 87 ft	Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-1%, Organics-1%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing both white (N9) and gray (N6) phosphatic sands.
87 - 90 ft	No Sample;
90 - 92 ft	Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-1%, Organics-1%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing both white (N9) and gray (N6) phosphatic sands.
92 - 95 ft	No Sample;
95 - 97 ft	Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-2%, Organics-1%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing both white (N9) and gray (N6) phosphatic sands.
97 - 100 ft	No Sample;
100 - 102 ft	Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-2%, Organics-1%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing both white (N9) and gray (N6) phosphatic sands.
102 - 115 ft	No Sample;
115 - 117 ft	Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-1%, Organics-1%; General Fossils: No Fossils;
117 - 125 ft	No Sample;
125 - 127 ft	Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-1%, Organics-1%; General Fossils: No Fossils;
127 - 135 ft	No Sample;
135 - 137 ft	Sand; Very Light Orange (10YR 8/2) to White (N9); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Sand-1%, Organics-1%; General Fossils: No Fossils;
137 - 145 ft	No Sample;

- 145 - 147 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-2%, Organics-1%, Phosphatic Sand-<1%; General Fossils: No Fossils; Interval consists of quartz-rich sand containing trace amounts of black (N1) phosphate with an increase in muscovite mica content.
- 147 - 150 ft No Sample;
- 150 - 152 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-2%, Organics-1%, Phosphatic Sand-<1%; General Fossils: No Fossils;
- 152 - 155 ft No Sample;
- 155 - 157 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Very Fine; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-3%, Organics-1%, Phosphatic Sand-<1%; General Fossils: No Fossils; Noticeable increase in muscovite mica content.
- 157 - 160 ft No Sample;
- 160 - 162 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-2%, Organics-1%, Phosphatic Sand-<1%; General Fossils: No Fossils;
- 162 - 170 ft No Sample;
- 170 - 172 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-3%, Organics-1%, Phosphatic Sand-<1%; General Fossils: No Fossils;
- 172 - 180 ft No Sample;
- 180 - 182 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-2%, Organics-1%, Phosphatic Sand-<1%; General Fossils: No Fossils;
- 182 - 190 ft No Sample;
- 190 - 192 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Sub-angular to Subrounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-3%, Organics-1%, Phosphatic Sand-1%; General Fossils: No Fossils;
- 192 - 200 ft No Sample;
- 200 - 202 ft Sand; Yellowish Gray (5Y 8/1) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Subangular to Sub-rounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-2%, Phosphatic Sand-2%, Organics-<1%; General Fossils: No Fossils;
- 202 - 210 ft No Sample;
- 210 - 212 ft Sand; White (N9) to Very Light Orange (10YR 8/2); Grain Size: Very Fine; Range: Very Fine to Fine; Roundness: Sub-angular to Sub-rounded; Low Sphericity; Unconsolidated; Accessory Minerals: Mica-5%, Phosphatic Sand-1%; General Fossils: No Fossils; Noticeable increase in muscovite mica content.
- 212 - 220 ft No Sample;

34 Well Construction at the Trout Lake Well Site in Polk County, Florida

- 220 - 222 ft Sand; Yellowish Gray (5Y 8/1) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Subangular to Sub-rounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Gravel-12%, Phosphatic Sand-6%, Mica-2%; General Fossils: No Fossils; This interval consists of quartz-rich sand with an abundance of white (N9) and gray (N7) phosphatic gravels and sands. Interval probably denotes the top of the Peace River Formation of the Hawthorn Group.
- 222 - 230 ft No Sample;
- 230 - 232 ft Sand; Yellowish Gray (5Y 8/1) to Very Light Orange (10YR 8/2); Grain Size: Fine; Range: Fine to Medium; Roundness: Subangular to Sub-rounded; Low Sphericity; Unconsolidated; Accessory Minerals: Phosphatic Gravel-14%, Phosphatic Sand-8%, Mica-<1%; General Fossils: No Fossils; This interval consists of quartz-rich sand with more of an abundance of white (N9) and gray (N7) phosphatic gravels and sands than the previous interval. Interval is Peace River Formation of the Hawthorn Group.
- 232 - 235 ft No Sample;
- 235 - 237 ft Clay; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Poor Induration; Cement Type: Clay Matrix; Accessory Minerals: Phosphatic Sand-12%, Phosphatic Gravel-4%, Organics-2%; General Fossils: Sharks Teeth; This interval is clay-rich and contains a high, black (N1) phosphatic sand content with very few fragmented sharks teeth.
- 237 - 240 ft Clay; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Unconsolidated; Cement Type: Clay Matrix; Accessory Minerals: Phosphatic Sand-10%, Phosphatic Gravel-2%, Organics-2%, Quartz Sand-2%; General Fossils: No Fossils; This interval is clay-rich and contains a high, black (N1) phosphatic sand content.
- 240 - 245 ft Clay; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Unconsolidated; Cement Type: Clay Matrix; Accessory Minerals: Phosphatic Sand-12%, Phosphatic Gravel-3%, Organics-2%, Quartz Sand-2%; General Fossils: No Fossils; This interval is clay-rich and contains a high, black (N1) phosphatic sand content.
- 245 - 250 ft Clay; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Unconsolidated; Cement Type: Clay Matrix; Accessory Minerals: Phosphatic Sand-12%, Phosphatic Gravel-2%, Organics-2%, Quartz Sand-2%; General Fossils: No Fossils; This interval is clay-rich and contains a high, black (N1) phosphatic sand content.
- 250 - 255 ft Clay; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Unconsolidated; Cement Type: Clay Matrix; Accessory Minerals: Phosphatic Sand-10%, Phosphatic Gravel-2%, Organics-2%, Quartz Sand-2%; General Fossils: No Fossils; This interval is clay-rich and contains a high, black (N1) phosphatic sand content.
- 255 - 260 ft Clay; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Unconsolidated; Cement Type: Clay Matrix; Accessory Minerals: Phosphatic Sand-10%, Phosphatic Gravel-2%, Organics-2%, Quartz Sand-2%; General Fossils: No Fossils; This interval is clay-rich and contains a high, black (N1) phosphatic sand content.
- 260 - 265 ft Clay; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Unconsolidated; Cement Type: Clay Matrix; Accessory Minerals: Phosphatic Sand-8%, Phosphatic Gravel-2%, Organics-2%, Quartz Sand-2%; General Fossils: No Fossils; This interval is clay-rich and contains a high, black (N1) phosphatic sand content.
- 265 - 270 ft Mudstone; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Grain Type: Biogenic, Calcilutite; 2% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Poor Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-10%, Phosphatic Gravel-3%, Organics-2%, Quartz Sand-2%; General Fossils: No Fossils; This interval consists of limestone and contains a high, black (N1) phosphatic sand content.
- 270 - 275 ft Mudstone; Very Light Orange (10YR 8/2) to Grayish Orange (10YR 7/4); Grain Type: Biogenic, Calcilutite; 3% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Poor Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-7%, Phosphatic Gravel-3%, Organics-2%, Quartz Sand-2%; General Fossils: No Fossils;
- 275 - 280 ft Mudstone; Very Light Orange (10YR 8/2); Grain Type: Biogenic, Calcilutite; 3% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Poor Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-8%, Phosphatic Gravel-5%, Organics-3%, Quartz Sand-3%; General Fossils: No Fossils;

- 280 - 285 ft Mudstone; Very Light Orange (10YR 8/2); Grain Type: Biogenic, Calcilutite; 2% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Poor Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-8%, Phosphatic Gravel-5%, Organics-2%, Quartz Sand-4%; General Fossils: No Fossils;
- 285 - 290 ft Mudstone; Very Light Orange (10YR 8/2); Grain Type: Biogenic, Calcilutite; 3% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Poor Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-8%, Phosphatic Gravel-5%, Quartz Sand-3%; General Fossils: No Fossils;
- 290 - 290.2 ft Mudstone; Very Light Orange (10YR 8/2); Grain Type: Biogenic, Calcilutite; 2% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Poor Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-8%, Phosphatic Gravel-3%, Quartz Sand-3%; General Fossils: No Fossils;
- 290.2 - 292 ft No Sample; General Fossils: No Fossils;
- 292 - 294 ft Wackestone; Very Light Orange (10YR 8/2); Grain Type: Biogenic, Calcilutite, Pellet; 30% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-5%, Quartz Sand-2%; Other Features: Fossiliferous; General Fossils: Fossil Fragments, Fossil Molds, Benthic Foraminifera; This interval contains Miocene index fossils and is representative of the Hawthorn Group. Poor recovery consisting of only 1.6' of core. Index Fossils: Sorites sp.
- 294 - 296 ft Wackestone; Very Light Orange (10YR 8/2); Grain Type: Biogenic, Calcilutite, Pellet; 45% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-8%, Quartz Sand-1%; Other Features: Fossiliferous; General Fossils: Fossil Fragments, Fossil Molds, Benthic Foraminifera; As Above. Index Fossils: Sorites sp.
- 296 - 300 ft Packstone; Very Light Orange (10YR 8/2); Grain Type: Biogenic, Calcilutite, Pellet; 60% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-10%, Quartz Sand-1%; Other Features: Fossiliferous; General Fossils: Fossil Fragments, Fossil Molds, Benthic Foraminifera; As Above. Poor recovery consisting of only 1.0' of core. Index Fossils: Sorites sp.
- 300 - 301.2 ft Packstone; Very Light Orange (10YR 8/2); Grain Type: Biogenic, Calcilutite, Pellet; 65% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-12%, Quartz Sand-1%; Other Features: Fossiliferous; General Fossils: Fossil Fragments, Fossil Molds, Benthic Foraminifera; As Above. Index Fossils: Sorites sp.
- 301.2 - 303 ft Wackestone; Yellowish Gray (5Y 8/1) to Light Gray (N7); Grain Type: Biogenic, Calcilutite, Pellet; 40% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-12%, Quartz Sand-2%; Other Features: Fossiliferous; General Fossils: Fossil Fragments;
- 303 - 305 ft Wackestone; Yellowish Gray (5Y 8/1) to Light Gray (N7); Grain Type: Biogenic, Calcilutite, Pellet; 65% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-12%, Quartz Sand-2%; General Fossils: Fossil Fragments;
- 305 - 310 ft Packstone; Yellowish Gray (5Y 8/1) to Light Brownish Gray (5YR 6/1); Grain Type: Biogenic, Calcilutite, Pellet; 70% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-10%, Quartz Sand-2%; General Fossils: No Fossils; Interval consists of dolostone with abundant black (N1) phosphatic sands. Poor recovery consisting of only 1.7' of core.
- 310 - 312 ft Dolostone; Olive Gray (5Y 4/1) to Yellowish Gray (5Y 8/1); Highly (50-90%) Altered; Anhedral Crystals; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Dolomite; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-10%, Quartz Sand-2%; General Fossils: No Fossils; Same as above. Poor recovery consisting of only 8.0" of core.

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312 - 314 ft Dolostone; Olive Gray (5Y 4/1) to Yellowish Gray (5Y 8/1); Highly (50-90%) Altered; Anhedral Crystals; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Dolomite; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-12%, Quartz Sand-2%; General Fossils: No Fossils;

314 - 318.2 ft Dolostone; Olive Gray (5Y 4/1) to Yellowish Gray (5Y 8/1); Highly (50-90%) Altered; Anhedral Crystals; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Dolomite; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-15%, Quartz Sand-3%; General Fossils: No Fossils; Noticeable increase in phosphatic sand content. Poor recovery consisting of only 1.6' of core.

318.2 - 320 ft Dolostone; Olive Gray (5Y 4/1) to Yellowish Gray (5Y 8/1); Highly (50-90%) Altered; Anhedral Crystals; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Dolomite; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-8%, Quartz Sand-3%; General Fossils: No Fossils; Same As above. Poor recovery consisting of only 1.0' of core.

320 - 320.8 ft Wackestone; Very Light Gray (N8) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 40% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-5%, Quartz Sand-2%; General Fossils: No Fossils;

320.8 - 327 ft Dolostone; Olive Gray (5Y 4/1) to Yellowish Gray (5Y 8/1); Highly (50-90%) Altered; Anhedral Crystals; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Dolomite; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-10%, Organics-4%, Heavy Minerals-<1%; General Fossils: No Fossils; Poor recovery consisting of only 1.8' of core.

327 - 330 ft Dolostone; Olive Gray (5Y 4/1) to Yellowish Gray (5Y 8/1); Highly (50-90%) Altered; Anhedral Crystals; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Dolomite; Sedimentary Structures: Mottled; Accessory Minerals: Phosphatic Sand-5%, Organics-2%, Heavy Minerals-<1%; General Fossils: No Fossils; Poor recovery consisting of only 1.0' of core.

330 - 340 ft Packstone; White (N9) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 40% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-2%, Organics-<1%; Other Features: Fossiliferous, Chalky; General Fossils: Fossil Fragments, Fossil Molds, Benthic Foraminifera, Miliolids; Interval consists of white (N9) packstone. Poor recovery consisting of only 2.0' of core.

340 - 350 ft Packstone; White (N9) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 70% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-2%, Organics-<1%; Other Features: Fossiliferous, Chalky; General Fossils: Fossil Fragments, Fossil Molds, Benthic Foraminifera, Miliolids; Same as above. Poor recovery consisting of only 2.0' of core.

350 - 355 ft Grainstone; White (N9) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 90% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-4%, Organics-<1%, Iron Stain-<1%; Other Features: Fossiliferous, Chalky; General Fossils: Fossil Fragments, Fossil Molds, Benthic Foraminifera, Miliolids; Interval consists of white (N9) packstone with minor phosphatic sand content throughout. Suwannee Limestone index fossils were found throughout this interval. Poor recovery consisting of only 2.0' of core. Index Fossils: *Discorinopsis gunteri*

355 - 360 ft Packstone; White (N9) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 60% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Good Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Phosphatic Sand-3%, Organics-<1%, Iron Stain-<1%; Other Features: Fossiliferous, Chalky; General Fossils: Fossil Fragments, Fossil Molds, Benthic Foraminifera, Miliolids; Same as above. Poor recovery consisting of only 1.5' of core.

360 - 363 ft Wackestone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 35% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments, Fossil Molds; Poor recovery consisting of only 2.0' of core.

363 - 365 ft Wackestone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 30% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments, Fossil Molds;

365 - 370 ft Wackestone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 30% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments; Poor recovery consisting of only 2.0' of core.

370 - 371.1 ft Wackestone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 30% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

371.1 - 373 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 10% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

373 - 375 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 8% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

375 - 377 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 8% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

377 - 380 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 4% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments; Same as above with poor recovery consisting of only 2.0' of core

380 - 382.5 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 4% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments, Benthic Foraminifera; Interval contains fragments of Ocala Limestone index fossils. Poor recovery consisting of 1.7' of core. Index Fossils: *Lepidocyclus ocalana*

382.5 - 384.5 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 5% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

384.5 - 386.5 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 5% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

386.5 - 390 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 5% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments; Same as above. Poor recovery consisting of 1.2' of core.

390 - 392 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 5% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

392 - 394 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 5% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

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394 - 395 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 5% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments; Same as above. Poor recovery consisting of only 0.8' of core.

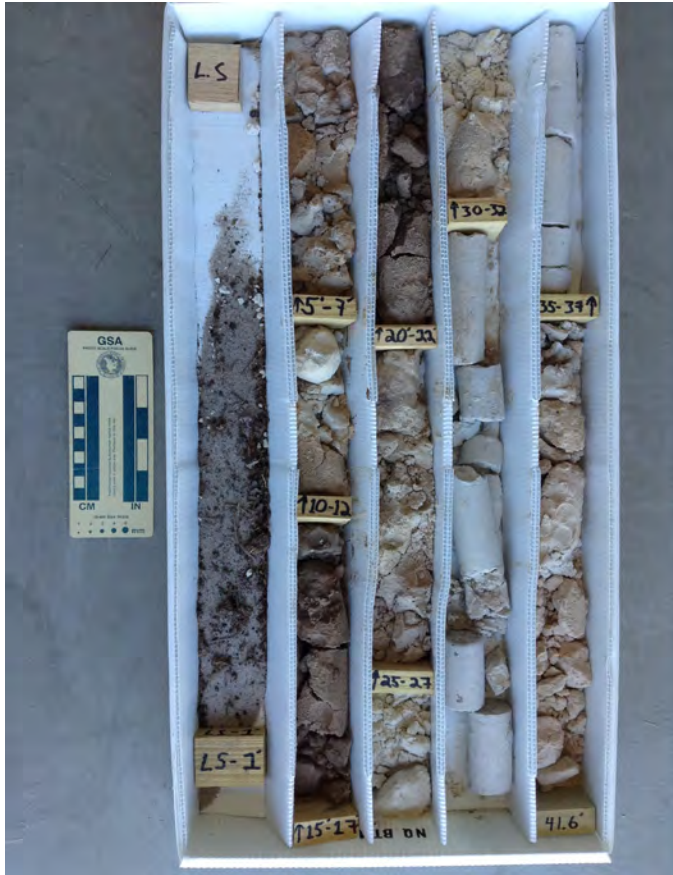
395 - 397 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 6% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

397 - 399 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 7% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments;

399 - 400 ft Mudstone; Very Light Orange (10YR 8/2) to Yellowish Gray (5Y 8/1); Grain Type: Biogenic, Calcilutite, Pellet; 8% Allochemical Constituents; Grain Size: Fine; Range: Fine to Medium; Moderate Induration; Cement Type: Calcilutite Matrix; Accessory Minerals: Organics-<1%; Other Features: Chalky; General Fossils: Fossil Fragments

**Appendix C. Digital Photographs of Samples
Retrieved at the Trout Lake Well Site in Polk
County, Florida**

40 Well Construction at the Trout Lake Well Site in Polk County, Florida





42 Well Construction at the Trout Lake Well Site in Polk County, Florida



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