



Hillsborough County

Dept. Of Environmental Protection

JUN 01 2015

April 28, 2015

Southwest District

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Mr. John Morris, P.G.
Florida Department of Environmental Protection
Waste Permitting Section
13051 Telecom Parkway
Temple Terrace, FL 33637

RE: Southeast County Landfill
Laboratory Analytical Results
Initial Assessment Monitoring Plan
Report No. 55 – March 2015

Dear Mr. Morris:

The Hillsborough County Public Utilities Department (County) is pleased to provide the analytical results from the March 2015 sampling event conducted as part of the continuation of the Initial Assessment Monitoring Plan (IAMP). The IAMP was developed to address the potential impacts to groundwater from the sinkhole on the edge of Phase 6 at the Southeast County Landfill (SCLF), which was discovered on December 14, 2010.

As part of the agreement between the County and Florida Department of Environmental Protection (Department) Southwest District Office, four (4) upper Floridan/Limestone aquifer monitoring wells, designated as TH-72, TH-76, TH-77, and TH-78 are sampled on a monthly schedule. Representative samples were collected from each of these four (4) monitoring wells on March 4-5, 2015 and analyzed for total dissolved solids (TDS), chloride, total ammonia, arsenic, iron, sodium, and five (5) field parameters. The samples collected were analyzed by our contracted laboratory, Advanced Environmental Laboratories, Inc. The following paragraphs summarize the parameter specific results pertinent to the evaluation of potential water quality impacts from the sinkhole at the SCLF.

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pH

pH was observed within the Secondary Drinking Water Standard (SDWS) acceptable range of 6.5-8.5 pH units in each of the four (4) upper Floridan/Limestone aquifer monitoring wells. The pH values in monitoring wells, TH-72, TH-76, TH-77, and TH-78 were recorded at 6.87, 7.58, 7.56, and 8.23 pH units, respectively, and the values are consistent with the historical data set.

Turbidity

Turbidity values in the upper Floridan/Limestone aquifer monitoring wells TH-72, TH-76, TH-77, and TH-78 were recorded at 0.66, 0.68, 0.63, and 0.62 Nephelometric Turbidity Units (NTUs), respectively, and these values are consistent with the historical data set.

Conductivity

The conductivity values in TH-72, TH-76, TH-77, and TH-78 were recorded at 2,486, 500, 490, and 605 umhos/cm, respectively. Monitoring well TH-72 is the closest upper Floridan/Limestone aquifer monitoring well to the sinkhole, and it continues to exhibit groundwater impacts similar to those observed over the past year. Conductivity values in TH-76, TH-77, and TH-78 are relatively low and consistent with the other unaffected deep wells across the site.

Total Dissolved Solids (TDS)

The TDS in monitoring well TH-72 was observed at 1,300 mg/l, which continues to be above the SDWS of 500 mg/l. The remaining three (3) down gradient upper Floridan/Limestone aquifer monitoring wells, TH-76, TH-77, and TH-78 exhibited TDS values of 270, 250, and 300 mg/l, respectively. These values are consistent with the water quality of the unaffected deep wells across the site.

Chloride

Chloride was observed at 450 mg/l in monitoring well TH-72, which is above the SDWS of 250 mg/l. Chloride values in the down gradient upper Floridan/Limestone aquifer monitoring wells TH-76, TH-77, and TH-78 were observed at 13, 7.6, and 28 mg/l. These values are consistent with the unaffected deep wells across the site.

Iron

The total iron concentration in the upper Floridan/Limestone aquifer monitoring well TH-72 was 0.65 mg/l, which is above the SDWS of 0.3 mg/l. The remaining three monitoring wells, TH-76, TH-77, and TH-78 exhibited iron below the SDWS at 0.095, 0.11, and 0.24 mg/l, respectively. The concentrations of iron observed are consistent with the historical data sets for these wells.

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Sodium

Sodium was observed at a concentration of 190 mg/l in monitoring well TH-72, which is above the Primary Drinking Water Standard (PDWS) of 160 mg/l. Sodium values in down gradient monitoring wells TH-76, TH-77, and TH-78 were observed at 21, 18, and 36 mg/l, which is consistent with the unaffected deep wells across the site.

Groundwater Elevations and Direction of Flow

On March, 2015, the County collected groundwater elevation data at eleven (11) locations along the western portion of Phases 1-6 at the landfill site, including seven (7) surficial aquifer wells and four (4) upper Floridan (limestone) aquifer wells. No significant changes to the patterns of flow in the surficial aquifer were noted in the data set, and the flow diagram for the surficial aquifer is provided. The elevations observed within the wells closest to the sinkhole indicate that the flow pattern continues to be affected by the feature, which has not been unexpected. However, the overall direction of flow within the surficial aquifer remains toward the west/northwest.

A contour diagram of the upper Floridan / Limestone aquifer has been prepared for the west side of the landfill around the sinkhole, and it is provided with this submittal. This diagram was generated manually in AutoCad™ utilizing the four data points closest to the sinkhole. During this sampling event, the changes in elevations between TH-72 and TH-76 is - 0.04 ft., and TH-72 and TH-77 is + 0.14 ft. Elevation of newly installed monitor well TH-78 indicated an elevation of approximately 8 feet higher than those elevations recorded at TH-72, TH-76, and TH-77. This anomaly in the groundwater elevation indicates that TH-78 may be influenced by the surface water body in this area, or some other geologic formation anomaly may be creating this potentiometric high. Based on the significant difference in elevations, the data from TH-78 was not utilized to prepare the contour diagram. However, the County maintains the position that the configuration of the three down gradient deep monitoring wells adequately addresses the potential for migration of the contamination observed in TH-72, and the three wells have not exhibited any impact to date.

Conclusions

The water quality observed in the March 2015 IAMP sampling event indicates that the monitoring well TH-72 continues to exhibit impacts to water quality in the upper Floridan / Limestone aquifer. The impacts observed include elevated conductivity, TDS, chloride, iron, and sodium. The values have remained relatively stable, and do not appear to be migrating to any of the down gradient deep monitoring wells. Down gradient wells, TH-76 and TH-77, and TH-78 exhibit good water quality consistent with the unaffected deep wells at the site.

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Recommendations

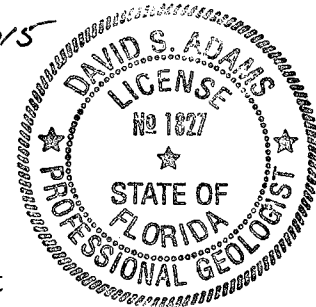
The County has submitted information to the FDEP Southwest District office that supports the discontinuation of the IAMP. Two select IAMP wells, TH-72 and TH-78, shall be included in the semi-annual sampling events conducted in accordance with the Landfill Operations Permit No. 35435-022-SO/01. The application for modification of that permit will be submitted to the FDEP in Tallahassee.

Enclosed for your review please find a site location map depicting the location of the monitoring wells sampled, the water quality data summary table for this sampling event, a groundwater elevation data table, groundwater contour and flow diagrams for the surficial and upper Floridan / Limestone aquifers, the historical data summary tables for the wells sampled this month, and the complete analytical data report from our contracted laboratory, Advanced Environmental Laboratories, Inc. Should you have any questions or require any additional information please feel free to call me at (813) 663-3221.

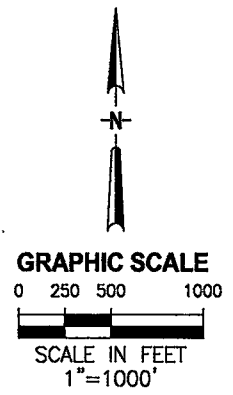
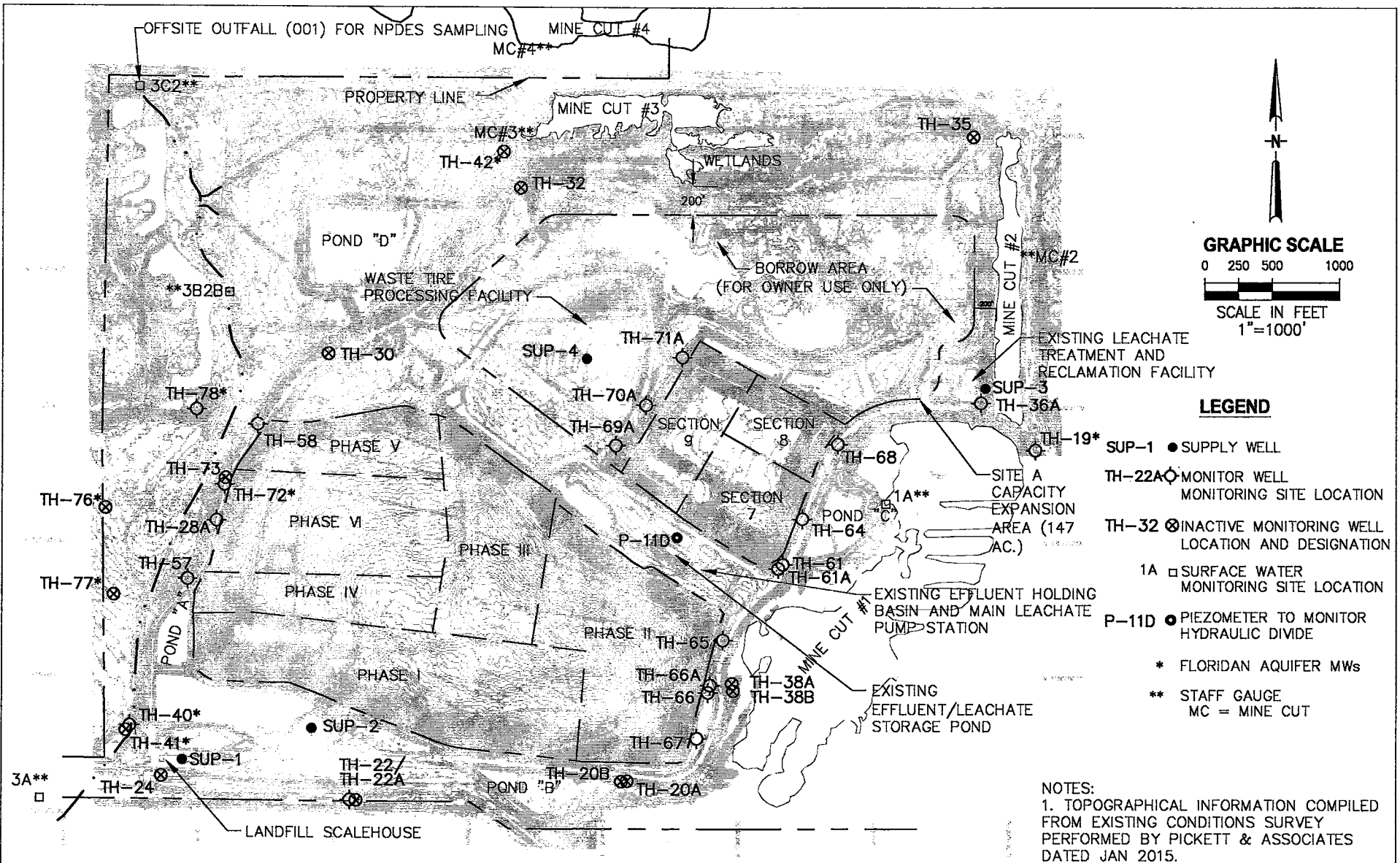
Respectfully submitted,



David S. Adams, P.G
Environmental Manager
Public Utilities Department

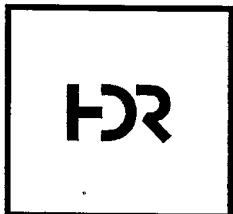


- xc: John Lyons, Director, Public Works Department
- Kim Byer, Director, Solid Waste Division, Public Works
- Larry Ruiz, Landfill Manager, Solid Waste Division, Public Works
- Jeff Greenwell, GMIII, Environmental Services, Public Utilities
- Richard Tedder, FDEP Tallahassee
- Clark Moore, FDEP Tallahassee
- Steve Morgan, FDEP, Southwest District
- Andy Schipfer, EPC
- Ernest Ely, WMI
- Brian Miller, DOH
- Rich Siemering, HDR
- Bob Curtis, HDR
- Joe O'Neill, CDS



- LEGEND**
- SUP-1 ● SUPPLY WELL
 - TH-22A ◯ MONITOR WELL MONITORING SITE LOCATION
 - TH-32 ⊗ INACTIVE MONITORING WELL LOCATION AND DESIGNATION
 - 1A ◻ SURFACE WATER MONITORING SITE LOCATION
 - P-11D ● PIEZOMETER TO MONITOR HYDRAULIC DIVIDE
 - * FLORIDAN AQUIFER MWs
 - ** STAFF GAUGE
 - MC = MINE CUT

NOTES:
 1. TOPOGRAPHICAL INFORMATION COMPILED FROM EXISTING CONDITIONS SURVEY PERFORMED BY PICKETT & ASSOCIATES DATED JAN 2015.



**LOCATION OF MONITORING WELLS, PIEZOMETERS, AND SURFACE WATER SAMPLING SITES
 SOUTHEAST COUNTY LANDFILL
 HILLSBOROUGH COUNTY, FLORIDA**

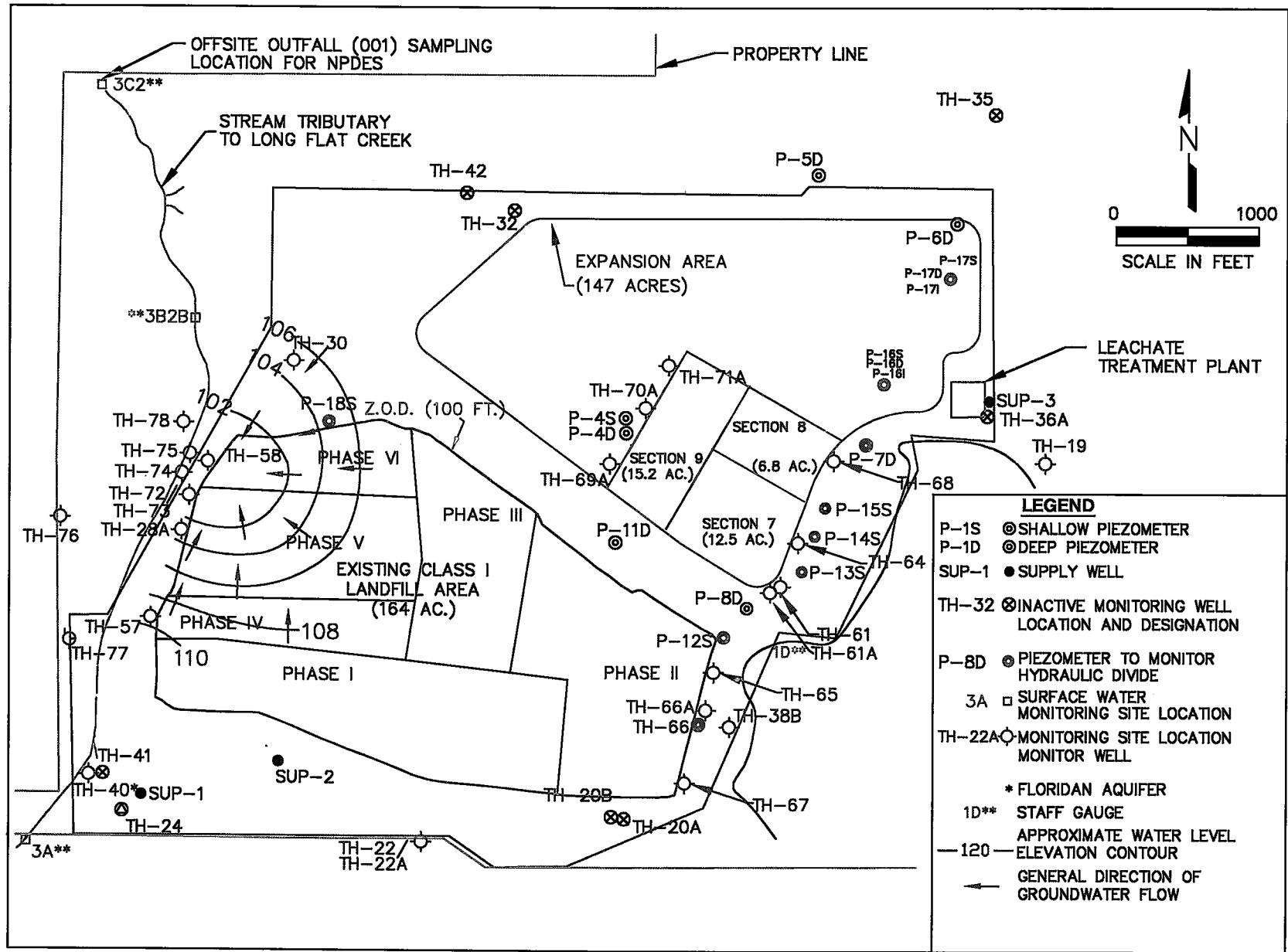
DATE	APRIL 2015
FIGURE	FIGURE L-1

**Southeast County Landfill
Laboratory Analytical Data
Upper Floridan Aquifer Groundwater Monitoring Wells
March 4-5, 2015**

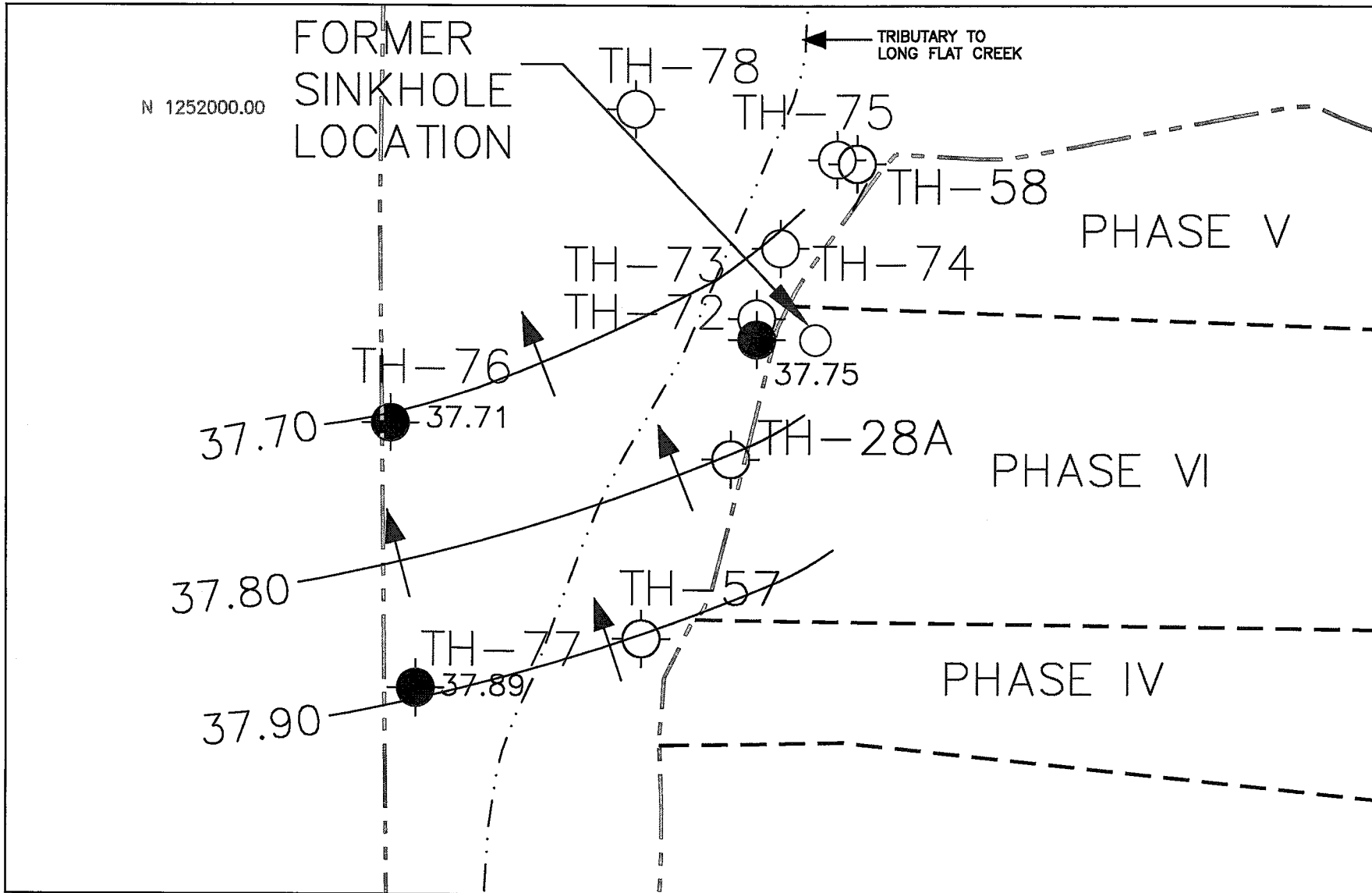
GENERAL PARAMETERS	Upper Floridan Wells				MCL STANDARD
	TH-72	TH-76	TH-77	TH-78	
conductivity (umhos/cm) (field)	2,486	500	490	605	NS
dissolved oxygen (mg/l) (field)	0.57	0.39	0.49	0.46	NS
pH (field)	6.87	7.58	7.56	8.23	(6.5 - 8.5)**
temperature (°C) (field)	23.50	22.99	23.52	23.50	NS
turbidity (NTU) (field)	0.66	0.68	0.63	0.62	NS
total dissolved solids (mg/l)	1,300	320	330	410	500**
chloride (mg/l)	450	13	7.6	28	250**
ammonia nitrogen (mg/l as N)	21	0.33	0.37	0.33	NS
METALS (mg/l)					MCL STANDARD
arsenic	0.0021 u	0.0021 u	0.0021 u	0.0021 u	0.01*
iron	0.65	0.095 i	0.11 i	0.24	0.3**
sodium	190	21	18	36	160*
Note: Ref. Groundwater Guidance Concentrations, FDEP 2012					
MCL = Maximum Contaminant Level					
NTU = Nephelometric Turbidity Units					
NS = No Standard					
u = parameter was analyzed but not detected.					
i = value was detected between the laboratory method detection limit and practical quantitation limit.					
* = Primary Drinking Water Standard					
** = Secondary Drinking Water Standard					
1,300					
ug/l = micrograms per liter					
mg/l = milligrams per liter					

**Southeast County Landfill
Groundwater Elevations
March 4, 2015**

Measuring Point I.D.	T.O.C. Elevations (NGVD)	W.L. B.T.O.C.	W.L. (NGVD)	Time
TH-28A	131.10	27.64	103.46	10:03 AM
TH-30	128.88	23.63	105.25	9:55 AM
TH-57	128.36	18.59	109.77	10:06 AM
TH-58	127.88	27.44	100.44	9:58 AM
TH-72*	130.96	93.21	37.75	10:01 AM
TH-73	131.07	30.15	100.92	10:00 AM
TH-74	109.08	8.82	100.26	9:48 AM
TH-75	106.92	7.41	99.51	9:50 AM
TH-76*	111.21	73.50	37.71	10:14 AM
TH-77*	119.88	81.99	37.89	10:11 AM
TH-78*	120.75	75.16	45.59	10:20 AM
NGVD = National Geodetic Vertical Datum T.O.C. = Top of Casing B.T.O.C. = Below Top of Casing * = Floridan Well W.L. = Water Level				



Southeast County Landfill
 Groundwater Elevation Contour Diagram – March 4, 2015



MARCH 2015
 UPPER FLORIDAN / LIMESTONE AQUIFER CONTOUR DIAGRAM
 IN THE VICINITY OF THE FORMER SINKHOLE
 SOUTHEAST COUNTY LANDFILL
 HILLSBOROUGH COUNTY, FLORIDA