ATTACHMENT D

GROUNDWATER QUALITY MONITORING REQUIREMENTS

Pasco County Resource Recovery Facility
14230 Hays Road
Spring Hill, FL 34610
Pasco County

Latitude: 28°22'12" North Longitude: 82°33'36" West

INTRODUCTION

These Groundwater Quality Monitoring Requirements (GWQMR) were developed by the Licensee, Pasco County, in conjunction with the Florida Department of Environmental Protection Solid Waste (SW) Section – Tallahassee. The GWQMR incorporates groundwater monitoring for the Class I landfill (Solid Waste Cells SW-1 & SW-2 and Ash Monofill Cells A-1 through A-4). The Department's SW Section is responsible for reviewing and approving all revisions to this document that are: a) submitted concurrently with a SCA; b) submitted as part of an amendment request or a petition for modification; or c) in accordance with Section A, Condition XX. Procedures for Post-Certification Submittals.

1. General

A. The field testing, sample collection and preservation and laboratory testing, including quality control procedures, shall be in accordance with Chapter 62-160, F.A.C. Approved methods as published by the Department or as published in Standard Methods, ASTM, or EPA Methods shall be used. [62-701.510(2)(b), F.A.C.]

B. The organization collecting samples at this site must use the Field and Laboratory Standard Operating Procedures (DEP-SOP-001/01) referenced in Chapter 62-160, F.A.C. The laboratory designated to conduct the chemical analyses must be certified by the Florida Department of Health Environmental Laboratory Certification Program (DOH ELCP). This Certification must be for the test method and analyte(s) that are reported. [62-160.210(1), 62-160.300(1), 62-701.510(2)(b), F.A.C. and DEP SOP FS 1008.]

NOTE: DEP-SOP-001/01 can be accessed at:
http://www.dep.state.fl.us/water/sas/sop/sops.htm

C. The licensee must ensure that the analytical laboratory conducting the analyses uses analytical methods capable of achieving detection limits at or below the Groundwater Cleanup Target Levels (GCTLs) or the Freshwater Surface Water Cleanup Target Levels (SWCTLs) in Table I, Chapter 62-777, F.A.C. except those listed in Table C of the "FDEP Guidance for the Selection of Analytical Methods and for the Evaluation of Practical Quantitation Limits dated 10/12/2004". GCTLs and SWCTLs that are not water quality standards are used as screening tools and interim guidelines for ground water minimum criteria until standards are promulgated. [DEP SOP FM 1000]

D. If, at any time, analyses detect parameters which are significantly above background water quality, or which are at levels above the Department's water quality standards or criteria specified in Chapter 62-520, F.A.C., in the detection wells or at the edge of the Zone

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of Discharge, the Licensee may confirm the data by resampling the affected wells within thirty (30) days of receipt of the sampling data. Should the licensee choose not to resample, the Department will consider the water quality analysis as representative of current ground water conditions at the facility. If the data is confirmed, or if the licensee chooses not to resample, the licensee shall notify the Department within 14 days of this finding. [62-701.510(6)(a), F.A.C.]

If the resampling event detects parameters which are significantly above background water quality, or which are at levels above the Department's water quality standards or criteria specified in Chapter 62-520, F.A.C., the Licensee shall notify the Department in writing within 14 days of receipt of the sampling data. Confirmed data must be submitted to the Department within 60 days from completion of lab analyses, unless a different due date is approved. Use "CONF" (for confirmation data) in the report type column. [62-701.510(8)(a), F.A.C.]

Upon notification by the Department, the licensee shall initiate evaluation monitoring in accordance with Rule 62-701.510(6)(a), F.A.C.

2. Specific

A. The twenty-nine ground water monitoring wells/piezometers included in this monitoring plan and designated for water quality testing and water level measurements are listed on Table 1 and shown on Figure 1. [62-701.510(3)(d)2 & 3, F.A.C.]

B. Any initial sample collected from a new ground water monitoring well, unless the new monitoring well is installed to replace an existing well within the monitoring network, shall be analyzed for the following Initial Ground Water Monitoring Parameters. [62-701.510(5)(b), F.A.C.]

Field Parameters	Laboratory Parameters
1. Static water level in wells before purging	1. Ammonia – N, Total
2. Dissolved oxygen	2. Chlorides
3. pH	3. Iron
4. Specific conductivity	4. Nitrate
5. Temperature	5. Sodium
6. Turbidity	6. Total dissolved solids (TDS)
7. Colors and sheens (by observation)	7. Those parameters listed in 40 CFR Part 258, Appendix II.*

* Mercury not listed because it is included in Appendix II.

* Appendix I is not listed because it is a subset of Appendix II

C. The twenty-nine active monitoring wells for the landfill shall be routinely sampled and analyzed semi-annually (during the periods January 1-June 30, and July 1-December 31 of each year) for the following Ground Water Monitoring Parameters. [62-701.510(5)(c) & (7)(a), F.A.C.]

Field Parameters	Laboratory Parameters
1. Static water level in wells before purging	1. Ammonia – N, Total
2. Dissolved oxygen	2. Chlorides
3. pH	3. Iron
4. Specific conductivity	4. Mercury
5. Temperature	5. Nitrate
6. Turbidity	6. Sodium
7. Colors and sheens (by observation)	7. Total dissolved solids (TDS)
	8. Those parameters listed in 40 CFR Part 258 Appendix I

D. All water quality analyses will be performed on unfiltered samples unless approved by the Department.

3. Surface Water Monitoring

A. It is not anticipated that the existing stormwater management system will discharge from the property. However, in the event that discharges from the stormwater management system leave the property, representative samples of each discharge event shall be collected. [62-701.510(4)(c), F.A.C.]

B. The samples shall be analyzed for the following Surface Water Monitoring Parameters. [62-701.510(5)(d) & (7)(b), F.A.C.]

Field Parameters	Laboratory Parameters
1. Surface Water Elevation	1. Unionized ammonia as N
2. Specific Conductivity	2. Total hardness as CaCO3
3. pH	3. Biochemical oxygen demand (BOD_5)
4. Dissolved oxygen	4. Iron
5. Turbidity	5. Mercury
6. Temperature	6. Nitrate
7. Colors and sheens (by observation)	7. Total Dissolved Solids (TDS)
	8. Total Organic Carbon (TOC)
	9. Fecal Coliform
	10. Total Phosphorus as P
	11. Chlorophyll A
	12. Total nitrogen
	13. Chemical Oxygen Demand (COD)
	14. Total Suspended Solids (TSS)
	15. Those parameters listed in 40 CFR Part 258 Appendix I

4. Monitoring Requirements

A. If a monitoring well or piezometer becomes damaged or inoperable, the Licensee shall notify the Department within two (2) days of discovery with a written report within ten (10) days of notice. The written report shall describe what problem has occurred and the remedial measures that have been taken to prevent a recurrence. The Department can require the replacement of inoperable monitoring wells or piezometers. [62-520.600(6)(l), F.A.C.]

B. New or replacement monitoring well design or placement must be approved by the Department. The design and construction of these wells must be based on site-specific borings with appropriate supporting data such as grain size distribution analyses, in-situ hydraulic conductivity testing, and depth to water. Wells shall be installed using standard, accepted practices for well construction. [62-701.510(3), F.A.C. and 62-520.600(3) and (6), F.A.C.]

C. All wells and piezometers shall be clearly and permanently labeled and the well site maintained so that the well is visible at all times. Unless otherwise authorized in a Department permit, new monitoring wells, and existing monitoring wells at the time of permit renewal, shall have protective bollards or other devices installed around them if they are located in areas of high traffic flow to prevent damage from passing vehicles. [62-701.510(3)(d)5, F.A.C.]

D. The Department shall be notified in writing before any monitoring wells are abandoned or plugged. Wells shall be abandoned using standard, accepted practices for well abandonment. [62-701.510(3)(d)6, F.A.C.]

5. Reporting Requirements

A. Field Activities

The Department must be notified in writing, hard copy or e-mail, at least fourteen (14) days prior to the installation and/or sampling of any monitoring well(s) so that the Department may collect split samples. [62-701.510(8)(a), F.A.C.]

B. Monitoring Well Completion Report

One (1) paper copy and one (1) electronic copy (Adobe pdf format) of the Monitoring Well Completion Report, Form 62-701.900(30), F.A.C., must be submitted to the Department within thirty (30) days after installation of any new or replacement monitoring well(s). In addition, as-built well construction diagrams and soil boring logs that cover the entire depth of the monitoring well(s) must be submitted to the Department. [62-520.600(6)(j), F.A.C.]

NOTE: The top of casing elevation of each well, to the nearest 0.01 feet, and the latitude and longitude of each well in degrees, minutes and seconds, to two (2) decimal places, must be determined and certified by a Florida Licensed Surveyor and Mapper and provided on the form. [62-701.510(3)(d)1 & 62-520.600(6)(i), F.A.C.]

C. Surveying

1. One (1) paper copy and one (1) electronic copy (Adobe pdf format) of a drawing must be submitted within sixty (60) days following monitoring well installation showing the location of all monitoring sites (active, abandoned, and Evaluation Monitoring), piezometers, water bodies and waste filled areas. The location of features on the drawing must be horizontally and vertically located by standard surveying techniques. The drawing shall include all monitoring well locations, each monitoring well name and identification (WACS) number, the top of casing, pad elevation, permanent benchmark(s) and/or corner monument marker(s) referenced to a nationally recognized datum (such as NGVD 1929 or NAVD 1988) to the nearest 0.01 feet. The latitude and longitude of each well in degrees, minutes and seconds, to two (2) decimal places, must be determined and provided on the drawing. The survey shall be conducted and certified by a Florida Licensed Surveyor and Mapper. [62-701.510(1)(c) and (3)(d)1, and 62-520.600(6)(i), F.A.C.]

2. If a monitoring well is being replaced or new wells are being added to an existing ground water monitoring plan, only the new wells need to be surveyed as long as all other monitoring wells in the monitoring plan have been surveyed and certified by a Florida Licensed Surveyor and Mapper and there is no reason to believe that the elevations have changed. The location and elevation determinations and the certification must be provided with the Monitoring Well Completion Report upon completion of each new well. [62-701.510(3)(d)1, F.A.C.]

D. Depth Measurements

A total depth measurement must be made on each well at time of the Technical Report or every five years. This measurement is to be reported as total apparent depth below ground surface and should be compared to the original total depth of the well.

E. Initial and Semi-Annual Sampling and Submitting Electronic Data

1. Required monitoring reports must be submitted to the Department within sixty (60) days from completion of laboratory analyses and no later than January 15th and July 15th of each year for the time periods July 1-December 1 and January 1-June 30, respectively and shall follow the Department's electronic reporting requirements using the ADaPT software. [Rule 62-701.510(8)(a), F.A.C.]

2. Required water quality monitoring reports and analytical results shall be submitted electronically. Water quality monitoring reports shall be submitted in Adobe pdf format. The water quality data Electronic Data Deliverable (EDD) shall be provided to the Department in a comma separated text file electronic format consistent with requirements for importing the data into the Department's databases as summarized at: http://www.dep.state.fl.us/waste/ADaPT/.

3. Water quality monitoring reports shall be signed and sealed by a Florida registered professional geologist or professional engineer with experience in hydrogeological investigations and shall include the following:

(1) Cover letter;
(2) Summary of exceedances and recommendations;
(3) Ground water contour maps;
(4) Laboratory report of results including chain of custody forms;
(5) Water levels, water elevation table;
(6) Water Quality Monitoring Certification using Form Rule 62-701.900(31), F.A.C.;
(7) Appropriate information using the Groundwater Sampling Log, Form FD 9000-24 (DEP-SOP-001/01); and,
(8) Laboratory and Field EDDs and error logs, as applicable.

All submittals in response to this specific condition shall be sent both to:

Florida Department of Environmental Protection Southwest District Office Air/Solid Waste Section 13051 N. Telecom Parkway Tampa, Florida 33637-0926 Email to: SWD_Waste@dep.state.fl.us	Florida Department of Environmental Protection Solid Waste Section 2600 Blair Stone Road, MS 4565 Tallahassee, Florida, 32399-2400 Email to: ADaPT.EDDs.and.Reports@dep.state.fl.us

F. Water Elevations

Water levels in all monitoring wells, whether sampled or not, all piezometers and all surface water sites must be measured to the nearest 0.01 foot and reported semi-annually. Surface water elevations at sampling locations must be measured to the nearest 0.01 foot on the same day as ground water levels in the wells and piezometers and reported semiannually. All water level measurements must be made within a one-day period. These measurements should be reported in a table that includes well or surface water point name, date water level measured, measuring point elevation referenced to a nationally recognized datum (such as NGVD 1929 or NAVD 1988), depth to water and calculated water level elevation referenced to the same nationally recognized datum. The ground water elevations shall be reported in the ADaPT data for the upload into WACS. [62-701.510(8)(a)8, F.A.C.]

G. Ground Water Contour Maps

Ground water elevation contour maps for each monitored aquifer zone must be submitted semi-annually to the Department, with contours at no greater than one foot intervals unless site specific conditions dictate otherwise. Ground water elevation contour map(s) should include monitoring well and piezometer locations, ground water elevation at each monitoring well or piezometer location referenced to a nationally recognized datum (such as NGVD 1929 or NAVD 1988), a bar scale, north arrow, ground water contour interval, date of measurement and ground water flow direction. The map(s) must incorporate adjacent and on-site surface water elevations where appropriate. These maps shall be signed and sealed pursuant to Florida Statutes (F.S.) Chapters 471 and 492 which require that documents requiring the practice of professional engineering or professional geology, as described in Chapter 471 or 492, F.S., be signed and sealed by the professional(s) who prepared or approved them. This certification must be made by a licensed professional who is able to demonstrate competence in this subject area. [62-701.510(8)(a)9, F.A.C.]

H. Technical Report

1. A technical report, signed and sealed by a professional geologist or professional engineer with experience in hydrogeologic investigations, shall be submitted to the Department approximately every two and one-half years during the active life of the facility, and every five years during the long-term care period. The report shall summarize and interpret the water quality monitoring results and water level measurements collected since the last Technical Report. The report shall contain, at a minimum, the following [62-701.510(8)(b), F.A.C.]:

a) Tabular displays of any data which shows that a monitoring parameter has been detected, and graphical displays of any leachate key indicator parameters detected (such as pH, specific conductance, TDS, TOC, sulfate, chloride, sodium and iron), including hydrographs for all monitor wells;

b) Trend analyses of any monitoring parameters consistently detected;

c) Comparisons among shallow, middle, and deep zone wells;

d) Comparisons between background water quality and the water quality in detection and compliance wells;

e) Correlations between related parameters such as total dissolved solids and specific conductance;

f) Discussion of erratic and/or poorly correlated data;

g) An interpretation of the ground water contour maps, including an evaluation of ground water flow rates; and

h) An evaluation of the adequacy of the water quality monitoring frequency and sampling locations based upon site conditions.

2. One (1) paper and one (1) electronic copy (Adobe pdf format) of the Technical Report shall be submitted to the Department on the following schedule: [62-701.510(8)(b), F.A.C.]

Sampling Periods Covered	Number of Semi-annual Sampling	Date Technical Report Due
Second semi-annual event 2015 through Second semi-annual event 2017	5	March 31, 2018
First semi-annual event 2018 through first semi-annual event 2020	5	August 30, 2020
Second semi-annual event 2020 through Second semi-annual event 2022	5	March 31, 2023
First semi-annual event 2023 through First semi-annual event 2025	5	August 30, 2025
Second semi-annual event 2025 through Second semi-annual event 2027	5	March 31, 2028
First semi-annual event 2028 through First semi-annual event 2030	5	September 30, 2030

3.. Required water quality monitoring reports and water quality data for the Technical Report shall be submitted in electronic format as described in Specific Conditions E.5-8 of this Attachment. [62-160.240, and 62-701.510(8)(a), F.A.C.]

List of Attachments

Table 1 Water Quality Sampling Testsite Information
Figure 1 Groundwater Monitoring Locations Map

Table 1 – Water Quality Sampling Testsite Information

Testsite Name	Testsite WACS No.	Designation	Aquifer
2MW-1	2381	Surficial	Background
4MW-1	2386	Floridan	Background
2MW-2	2382	Surficial	Background
4MW-2	2387	Floridan	Background
2MW-6	2385	Surficial	Background
4MW-6	2390	Floridan	Background
2MW-15DA	19766	Floridan	Background
2MW-27S	23449	Surficial	Background
2MW-27D	23450	Floridan	Background
4MW-27	23451	Floridan	Background
4MW-27D	23452	Floridan	Background
4MW-11D	2510	Floridan	Detection
4MW-12D	2511	Floridan	Detection
2MW-13D	2515	Surficial	Detection
4MW-13D	19214	Floridan	Detection
4MW-14D	2512	Floridan	Detection
2MW-17S	19758	Surficial	Detection
2MW-18D	19759	Floridan	Detection
2MW-19D	19764	Floridan	Detection
2MW-24S	23443	Surficial	Detection
2MW-24D	23444	Floridan	Detection
2MW-25S	23445	Surficial	Detection
2MW-25D	23446	Floridan	Detection
2MW-26S	23447	Surficial	Detection
2MW-26D	23448	Floridan	Detection
2MW-4	2383	Surficial	Compliance
4MW-4	2388	Floridan	Compliance
2MW-5	2384	Surficial	Compliance
4MW-5	2389	Floridan	Compliance
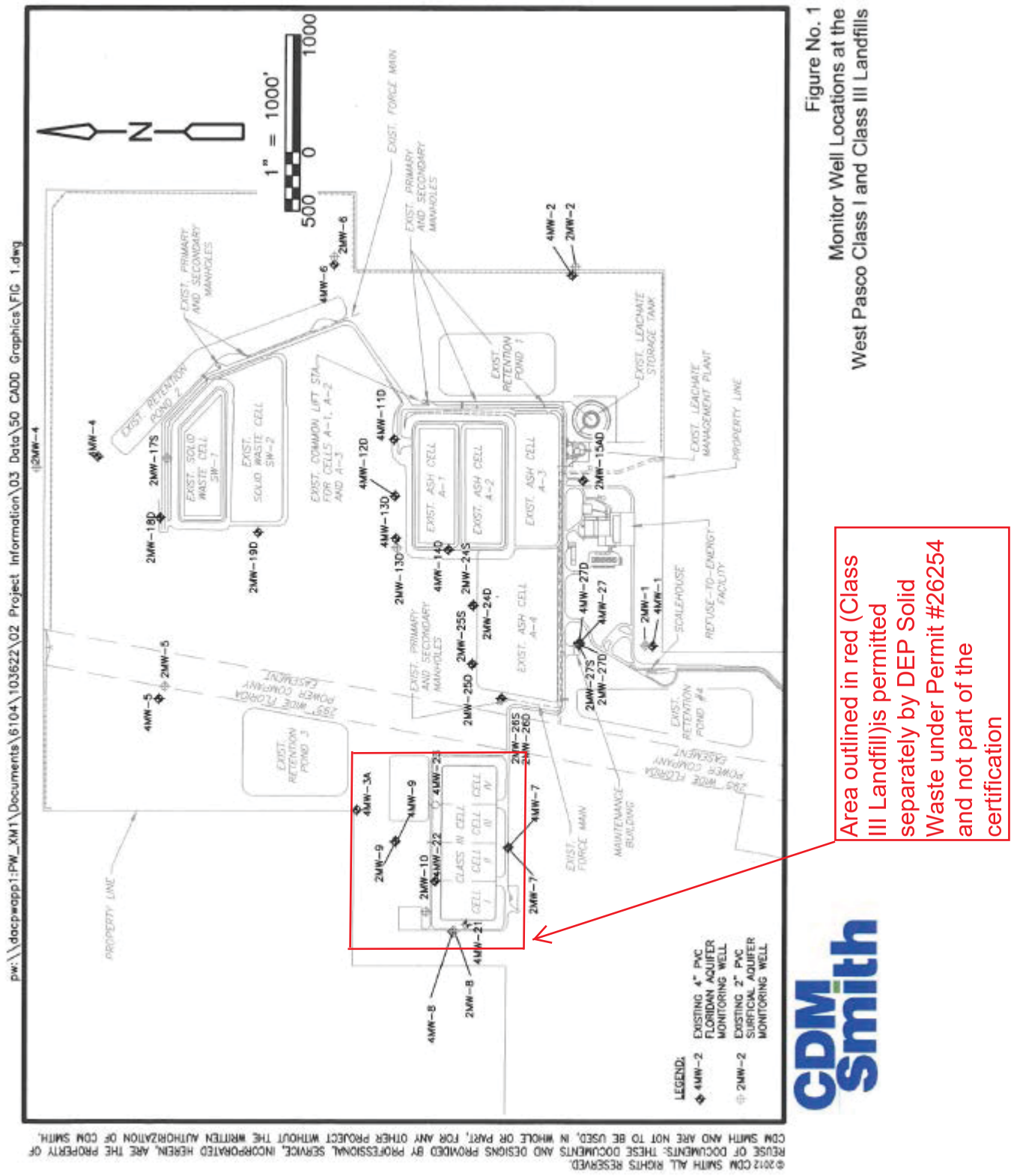
Figure 1: Monitor Well Location Map