CITY OF EDINBURG SOLID WASTE MANAGEMENT

PERMIT AMENDMENT APPLICATION

Part III, Attachment 5

GROUNDWATER CHARACTERIZATION AND MONITORING REPORT

Edinburg Regional Disposal Facility

Edinburg, Hidalgo County, Texas

TCEQ Permit MSW-956C

GOLDER ASSOCIATES INC.
Professional Engineering Firm
Registration Number F-2578

INTENDED FOR PERMITTING PURPOSES ONLY

Submitted To: City of Edinburg
Department of Solid Waste Management
8601 North Jasman Road
Edinburg, Texas 78542 USA

Submitted By: Golder Associates Inc.
500 Century Plaza Drive, Suite 190
Houston, TX 77073 USA

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Project No. 1401491

Golder Associates

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GOLDER ASSOCIATES INC.
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EXECUTIVE SUMMARY

This Groundwater Characterization and Monitoring Report is prepared in accordance with 30 TAC §§330.63(f) and 330.403. This report summarizes available data related to the occurrence and distribution of groundwater, establishes a groundwater monitoring system, and provides a Groundwater Sampling and Analysis Plan (GWSAP).

EXECUTIVE SUMMARY

This Groundwater Characterization and Monitoring Report is prepared in accordance with 30 TAC §§330.63(f) and 330.403. This report summarizes available data related to the occurrence and distribution of groundwater, establishes a groundwater monitoring system, and provides a Groundwater Sampling and Analysis Plan (GWSAP).

1.0 GROUNDWATER CHARACTERIZATION

Part III4, Geology Report summarizes available data related to regional and local geology and aquifers in the vicinity of the facility where its appendixes and figures contained within are used to support the following groundwater characterization discussion.

1.1 Regional Hydrogeology

1.1.1 Generalized Stratigraphic Column

The generalized stratigraphic column of the area beneath the facility is presented to a depth of approximately 1,600 ft-bgs, which is the base of the Evangeline Aquifer. The Goliad Formation outcrops in the vicinity and is overlain by a veneer of Holocene eolian deposits.

1.1.2 Evangeline Aquifer

Underlying the facility is the Evangeline Aquifer which overlies the Burkeville Confining Unit. The Evangeline Aquifer is composed primarily of the Goliad Sand, but may also contain sections of sand and clay from the Upper Lagarto Formation. It is approximately 1,600 feet thick under the facility and dips towards the coast approaching thicknesses greater than 2,300 ft.

The Evangeline Aquifer generally exhibits under water table conditions, however successions of clay may cause portions to behave as a semi-confined aquifer. Transmissivity values are observed to range from 3,000 to 15,000 ft^2/day (Chowdhury and Mace, 2007). Average horizontal and vertical hydraulic conductivities are 80 feet/day and 1 x 10^{-3} feet/day, for horizontal and vertical, respectively (Ryder, 1988).

1.2 Local Hydrogeology

1.2.1 Subsurface Stratigraphy

The results of a subsurface investigation demonstrate the facility is underlain by three distinct strata, identified below in order from ground surface down:

- Stratum I: sandy clays or clayey sands, with layers of silty clay, silty sand, or clayey silt.
- Stratum II: sands/silty sands, fine, poorly graded, and is the uppermost water-bearing unit (uppermost aquifer).
- Stratum III: predominantly clay, with some amounts of sandy clay or silty clay, high plasticity, hard, brown, and dry, and is the confining unit underlying the uppermost water-bearing unit (lower confining unit).

1.2.2 Uppermost Aquifer

The second stratigraphic layer, Stratum II, which is composed of sands/silty sands, is the upper water bearing unit at the site (uppermost aquifer). The thickness of the unit varies from 5 to 30 feet, except in portions of the northwest corner of the proposed expansion area where it was not encountered. The extent of this stratum can be seen in Figures III4-12, Interpretive Geology Cross-Sections which depicts the monitoring wells, borings and sub-surface profiles obtained from the soil investigations at the site.

Groundwater occurs primarily within Stratum II, separated from lower aquifers by underlying Stratum III, which acts as an aquiclude. The groundwater within Stratum II is also locally, partially confined by the clayey soils encountered in Stratum I. In other areas, recharge could occur through vertical flows through overlying sandy soils.

1.3 Hydraulic Characteristics

1.3.1 Groundwater Flow Direction

Figures III4-13A through III4-13N, Potentiometric Surfaces demonstrate groundwater flow direction across the facility. Groundwater within the currently permitted area of TCEQ Permit MSW-956B has a very low hydraulic gradient with variable flow directions. Within the expansion area to be included in TCEQ Permit MSW-956C, groundwater flow is predominantly towards the east, northeast, or southeast in subdued conformance to topography.

1.3.2 Groundwater Flow Rate

Groundwater flow rates were estimated for the uppermost aquifer, using estimated average hydraulic gradients, estimated hydraulic conductivities, and effective porosity for silty sand. The estimated groundwater flow rate is 7.4 feet per year within the currently permitted area of TCEQ Permit MSW-956B and 2.0 feet per year within the expansion area to be included in TCEQ Permit MSW-956C.

1.4 Groundwater Quality

1.4.1 Regional Groundwater Quality

Typical range of values for total dissolved solids content of groundwater, mineral constituents dissolved from rocks and soils within the Evangeline Aquifer is 632 – 8,774 mg/L (Young, 2010). A general classification of water based on dissolved solids content is as follows; waters containing less than 1,000 mg/L of dissolved solids are considered fresh; 1,000 to 3,000 mg/L, slightly saline; 3,000 to 10,000 mg/L, moderately saline; 10,000 to 35,000 mg/L, very saline, and more than 35,000 mg/L, brine (Winslow and Kister, 1956, p.5).

1.4.2 Local Groundwater Quality

Groundwater quality data from the facility's monitoring wells and piezometers indicate that total dissolved solids content ranges 690-25,500 mg/L. Therefore the facility's groundwater quality is considered fresh to saline.

1.4.3 Groundwater Monitoring Data

A tabulation of all relevant groundwater monitoring data from wells on site is presented in Part III4F, Historic Groundwater Quality Testing Data. The groundwater monitoring data includes results of all semi-annual and applicable quarterly groundwater monitoring events since 2005.

2.0 GROUNDWATER MONITORING

30 TAC §330.401(d)-(f)

To ensure both a conservative approach to groundwater monitoring at the facility and ensure the detection of any contaminants that may potentially be released to the uppermost aquifer, the facility currently monitors the groundwater present in Stratum II at the point of compliance with a well spacing of approximately 600 feet. Once established at a solid waste management unit, groundwater monitoring must be conducted throughout the active life and any required post-closure care period of that solid waste management unit as specified in 30 TAC §330.463.

Groundwater monitoring requirements under 30 TAC §§330.403, 330.405, 330.407, and 330.409 may be suspended by the TCEQ for a solid waste management unit if the City can demonstrate that there is no potential for migration of hazardous constituents from that solid waste management unit to the uppermost aquifer during the active life and the closure and post-closure care period of the unit. This demonstration shall be certified by a qualified groundwater scientist and approved by the TCEQ, and must be based upon:

- site-specific field-collected measurements, sampling, and analysis of physical, chemical, and biological processes affecting contaminant fate and transport; and
- contaminant fate and transport predictions that maximize contaminant migration and consider impacts on human health and the environment.

2.1 Groundwater Monitoring Compliance Certification

30 TAC §§330.401(e) & 330.403(e)

For new solid waste management units, the City must submit to the TCEQ a documented certification signed by a qualified groundwater scientist that the facility is in compliance with the groundwater monitoring requirements specified in 30 TAC §§330.403, 330.405, 330.407, and 330.409 prior to waste placement in the unit. The qualified groundwater scientist must also certify the groundwater monitoring system design, including the number, spacing, and depths of monitoring wells and submit the plan for the monitoring system and all supporting data to the TCEQ for review and approval prior to construction of the unit. Within 14 days of the certification, the City shall submit the certification to the TCEQ and place a copy of the certification

QUALIFIED GROUNDWATER SCIENTIST STATEMENT

I, Chad E. Ireland, am a licensed professional geological engineer in the State of Texas (PE 99293) and a qualified groundwater scientist as defined in 30 TAC §330.3(120); and have reviewed the groundwater monitoring system design (including the number, spacing, and depths of monitoring wells), groundwater sampling and analysis requirements, detection monitoring program, and assessment monitoring program including supporting data contained herein. In my professional opinion, the Edinburg Regional Disposal Facility TCEQ Permit MSW-956C located in Hidalgo County, Texas is in compliance with the groundwater monitoring requirements specified in 30 TAC §§330.403, 330.405, 330.407, and 330.409. The only warranty made by me in connection with this document is that I have used that degree of care and skill ordinarily exercised under similar conditions by reputable members of my profession, practicing in the same or similar locality. No other warranty expressed or implied, is intended.

Signature: _____Date: _____
Chad E. Ireland, Texas PE 99293

Firm: Golder Associates Inc., Texas Registration F-2578
500 Century Plaza Drive, Suite 190
Houston, TX 77073

2.2 Groundwater Monitoring System

30 TAC §§330.63(f)(4), 330.63(f)(5)(A), 330.63(f)(6)(D), 330.403(a), 330.403(a)(1)-(2), and 330.403(d)

The proposed groundwater monitoring system is designed with of a sufficient number of groundwater monitoring wells located at the point of compliance in accordance to 40 CFR §258.51(a)(2), spaced less than 600 ft apart, and installed at a depth to yield representative groundwater samples from the uppermost aquifer identified as the saturated zone within Stratum II. The point of compliance monitoring system is designed to allow determination of the quality of groundwater passing the point of compliance as defined by 30 TAC §330.3(106) and to ensure the detection of groundwater contamination. As a result of the varying groundwater flow conditions, all of the groundwater monitoring wells are considered to be point of compliance wells and the quality of background groundwater will be determined at each groundwater monitoring well that has not been affected by leakage from a unit. All parts of a groundwater monitoring system shall be operated and maintained so that they perform at least to design specifications through the life of the groundwater monitoring program.

2.2.1 Design Considerations

30 TAC §330.403(e)(1)

2.2.1.1 Bottom of Waste Disposal Units Relative to Uppermost Aquifer

The subgrade elevation of the waste disposal units are designed primarily within Stratum I, though it may penetrate into Stratum II, the uppermost aquifer, in portions of Unit 7. Groundwater is encountered at approximately 5 to 35 ft-bgs (elevation of 74 ft-msl to 54 ft-msl), depending on topography and season. Although unlikely, if a release from the Subtitle D waste disposal unit were to occur, the most probable location would be the leachate collection sumps, the lowest excavation point.

2.2.1.2 Groundwater Flow

30 TAC §330.403(e)(3)

Landfill construction and site development activities have modified groundwater flow as an inward gradient towards cell construction activities may modify the groundwater flow direction which is discussion in § 1.3.1 and 1.3.2. The City shall promptly notify the TCEQ, and any local pollution agency with jurisdiction that has requested to be notified, in writing of changes in facility construction or operation or changes in adjacent property that affect or are likely to affect the direction and rate of groundwater flow and the potential for detecting groundwater contamination from a solid waste management unit and that may require the installation of additional monitoring wells or sampling points and that such additional wells or sampling points require a modification of the site development plan.

2.2.1.3 Potential Contaminant Pathways

30 TAC §330.63(f)(3)

Although unlikely, if a release from the Subtitle D waste disposal unit were to occur, the most probable contaminant pathway would be either along the interface of the waste disposal unit lining system and the soil interface or downward into Stratum II. In the event that any contaminants were to reach the groundwater, the miscible contaminants would be diluted by the groundwater and would move laterally because of the underlying aquiclude. The direction of lateral movement may fluctuate because of the varying groundwater flow conditions resulting from ongoing construction activities; however any contaminants will be detected by the point of compliance monitoring wells prior to reaching any potential receptors. No critical receptors were identified based on review of the adjacent properties surrounding the facility.

2.2.2 Groundwater Monitoring Well Locations

30 TAC §§330.63(f)(1) & 330.403(b)(1)-(5)

As a result of the bottom of the waste disposal units relative to the uppermost aquifer, groundwater monitoring wells will be screened to include the saturated zone within Stratum II interface allowing for monitoring of groundwater elevations and contaminant levels in the groundwater in the uppermost water-bearing unit. Groundwater monitoring in the low-permeability Stratum III clay is not necessary because migration rates of potential contamination will be very slow and water will preferentially flow within the higher permeability Stratum II. Because of the varying groundwater flow conditions and potential contaminant pathways, all of the groundwater monitoring wells are considered to be point of compliance wells and the quality of background groundwater will be determined at each groundwater monitoring well that has not been affected by leakage from a unit. All monitoring wells have a spacing along the point of compliance of 600 ft. or less.

The layout of the groundwater monitoring system is presented on Figure III5-1, Proposed Groundwater Monitoring System and includes topographic contours of existing conditions, a delineation of the waste management area, the property boundary, the point of compliance, and location of groundwater monitoring wells. The plan depicts groundwater monitoring wells, spaced less than 600 ft apart, along the point of compliance located not greater than 500 ft from the joined solid waste management units within the overall waste management area to effectively monitor groundwater from large portions of the facility.

2.2.2.1 Previously Permitted Groundwater Monitoring Well Network

The monitoring well network of TCEQ Permit MSW-956B included 14 wells (MW-1 through MW-14) screened in the upper water-bearing unit. MW-1 through MW-4 were installed in 1993 and MW-5 through MW-8 in 1996. MW-9 through MW-12 and MW-14 were installed in 2000. In 2003, replacement wells MW-1R through MW-4R were installed, followed by further reinstallation of well MW-3RA. In 2005, MW-15 and MW-18 were added to the existing monitoring well system. In 2009, the following wells were replaced/relocated – MW-3A, MW-4A, MW-7R, MW-8R, MW-9R, MW-10R, MW-15R, and MW-18R. In addition, MW-16 and MW-22 through MW-24 were installed in 2009. The Edinburg Sanitary Landfill TCEQ Permit MSW-956B and Type IV Landfill TCEQ Permit MSW-2302 share a common permit boundary along the southwestern portion of the facility. In 2013, wells MWD-6 and MWD-7 were installed along this southern boundary to monitor the same groundwater unit as the Type IV Landfill. These wells are located 30 feet of the southern permit boundary of the Type I landfill. Apart from the wells which were relocated or replaced, wells MW-5, MW-6, and MW-14 were plugged in 2004, 2008, and 2000 respectively. MW-13, MW-14R, MW-17, MW-19, MW-20, and MW-21 are part of the current monitoring well network that are permitted for future installation.

Table III5-1 lists the monitoring wells that are part of the monitoring well network of TCEQ Permit MSW-956B. Appendix III5A, Existing Monitoring Well Information presents the available well installation records for the current and historic monitoring wells.

Table III5-1: Previously Permitted Groundwater Monitoring Well Network

Well ID	Northing (ft)	Easting (ft)	Ground Elevation	Top of Casing	Depth of Screened Interval		Elevation of Screened Interval	
			ft-msl	ft-msl	ft-bgs		ft-msl	
					Top	Bottom	Top	Bottom
MW-1R	16,670,451.01	1,104,162.79	84.7	87.5	20	25	64.7	59.7
MW-2R	16,668,465.10	1,103,816.69	86.5	89.4	25	30	61.5	56.5
MW-3A	16,668,167.98	1,105,587.63	95.7	98.4	31	41	64.7	54.7
MW-4A	16,670,162.92	1,105,941.09	87.3	90.0	27	37	60.3	50.3
MWD-6	16,667,949.81	1,106,763.82	90.6	93.5	35	45	55.6	45.6
MWD-7	16,670,250.28	1,105,347.96	85.0	87.7	21	31	65.0	55.0
MW-7R	16,667,810.34	1,107,955.19	86.4	89.2	26	36	60.4	50.4
MW-8R	16,670,347.68	1,104,753.77	85.1	88.3	26	36	59.1	49.1
MW-9R	16,669,023.33	1,103,878.53	86.8	89.8	27	37	59.8	49.8
MW-10R	16,669,618.10	1,103,965.73	88.2	91.0	26	36	62.2	52.2
MW-11	16,670,058.17	1,106,488.44	88.4	91.1	27	37	61.4	51.4
MW-12	16,668,084.93	1,106,178.78	89.8	92.3	30.1	40.1	59.8	49.8
MW-13*	16,667,722.74	1,108,566.75	90.4	-	-	-	-	-

Well ID	Northing (ft)	Easting (ft)	Ground Elevation	Top of Casing	Depth of Screened Interval		Elevation of Screened Interval	
			ft-msl	ft-msl	ft-bgs		ft-msl	
					Top	Bottom	Top	Bottom
MW-14R*	16,669,889.35	1,108,856.78	96.9	-	-	-	-	-
MW-15R	16,670,041.53	1,107,087.42	88.3	91.3	26.5	36.5	61.8	51.8
MW-16	16,669,923.37	1,107,650.60	85.8	88.4	22	32	63.8	53.8
MW-17*	16,668,909.26	1,108,747.81	83.1	-	-	-	-	-
MW-18R	16,667,902.08	1,107,362.25	85.3	88.1	22	32	63.3	53.3
MW-19*	16,669,975.70	1,108,263.02	102.6	-	-	-	-	-
MW-20*	16,669,502.20	1,108,839.55	84.1	-	-	-	-	-
MW-21*	16,668,316.32	1,108,656.07	94.0	-	-	-	-	-
MW-22	16,668,253.10	1,104,999.75	93.0	95.2	28	38	65.0	55.0
MW-23	16,668,353.05	1,104,406.40	87.9	90.7	17	27	70.9	60.9
MW-24	16,670,208.81	1,104,062.92	87.2	90.4	25	35	62.2	52.2

Note: *These wells are part of the groundwater monitoring well network approved under TCEQ Permit MSW-956B, but haven't been installed as of the date of this report.

2.2.2.2 Groundwater Monitoring Well Network

The groundwater monitoring system will consist of a total of 38 groundwater monitoring wells requiring modifications to the approved network of monitoring well of TCEQ Permit MSW-956B; retain 12 wells, plug and abandon 12 wells, and install 26 additional wells as depicted on Figure III5-1, Proposed Groundwater Monitoring System. The twelve existing monitoring wells to be properly plugged and abandoned are MW-1R, MW-4A, MW-7R, MW-8R, MW-11, MW-14R, MW-15R, MW-16, MW-17, MW-19, MW-20, and MW-21. The additional 26 monitoring wells to be installed are MW-101 through MW-115 along the northern permit boundary, MW-116 through MW-122 along the eastern permit boundary; and MW-123 through MW-126 along the southern permit boundary. The removal of existing monitoring wells and installation of the additional wells will be sequenced to coincide with the schedule of site development outlined in Part II, Facility Layout. Wells will be installed prior to waste placement in the adjacent disposal unit.

Table III5-2: Groundwater Monitoring Well Network

Well ID	Northing (ft)	Easting (ft)	Ground Elevation	Top of Casing	Depth of Screened Interval		Elevation of Screened Interval	
			ft-msl	ft-msl	ft-bgs		ft-msl	
					Top	Bottom	Top	Bottom
Monitoring Wells to Remain								
MW-2R	16,668,465.10	1,103,816.69	86.5	89.4	25	30	61.5	56.5
MW-3A	16,668,167.98	1,105,587.63	95.7	98.4	31	41	64.7	54.7

Well ID	Northing (ft)	Easting (ft)	Ground Elevation	Top of Casing	Depth of Screened Interval		Elevation of Screened Interval	
			ft-msl	ft-msl	ft-bgs		ft-msl	
					Top	Bottom	Top	Bottom
MWD-6	16,667,949.81	1,106,763.82	90.6	93.5	35	45	55.6	45.6
MWD-7	16,670,250.28	1,105,347.96	85.0	87.7	21	31	65.0	55.0
MW-9R	16,669,023.33	1,103,878.53	86.8	89.8	27	37	59.8	49.8
MW-10R	16,669,618.10	1,103,965.73	88.2	91.0	26	36	62.2	52.2
MW-12	16,668,084.93	1,106,178.78	89.8	92.3	30.1	40.1	59.8	49.8
MW-13*	16,667,722.74	1,108,566.75	90.4	-	-	-	-	-
MW-18R	16,667,902.08	1,107,362.25	85.3	88.1	22	32	63.3	53.3
MW-22	16,668,253.10	1,104,999.75	93.0	95.2	28	38	65.0	55.0
MW-23	16,668,353.05	1,104,406.40	87.9	90.7	17	27	70.9	60.9
MW-24	16,670,208.81	1,104,062.92	87.2	90.4	25	35	62.2	52.2
Additional Monitoring Wells to be Installed								
MW-101	16,670,791.71	1,104,169.10	83.4	-	20	30	63.4	53.4
MW-102	16,670,787.29	1,104,623.01	83.6	-	20	30	63.6	53.6
MW-103	16,670,705.22	1,105,156.73	84.0	-	20	30	64.0	54.0
MW-104	16,670,622.82	1,105,690.41	85.3	-	18	28	67.3	57.3
MW-105	16,670,540.42	1,106,224.08	86.9	-	18	28	68.9	58.9
MW-106	16,670,458.17	1,106,757.78	87.5	-	18	28	69.5	59.5
MW-107	16,670,385.39	1,107,290.48	92.2	-	20	30	72.2	62.2
MW-108	16,670,836.34	1,107,371.57	98.7	-	25	35	73.7	63.7
MW-109	16,671,423.26	1,107,462.38	93.5	-	30	40	63.5	53.5
MW-110	16,671,972.46	1,107,598.57	95.9	-	25	35	70.9	60.9
MW-111	16,671,885.23	1,108,177.04	92.1	-	25	35	67.1	57.1
MW-112	16,671,798.19	1,108,752.57	90.6	-	34	44	56.6	46.6
MW-113	16,671,708.81	1,109,334.62	95.3	-	33	43	62.3	52.3
MW-114	16,671,620.14	1,109,912.86	85.8	-	28	38	57.8	47.8
MW-115	16,671,531.11	1,110,492.95	82.2	-	25	35	57.2	47.2
MW-116	16,670,961.59	1,110,572.09	88.4	-	25	35	63.4	53.4
MW-117	16,670,387.13	1,110,597.01	87.6	-	30	40	57.6	47.6
MW-118	16,669,812.67	1,110,621.93	88.7	-	20	30	68.7	58.7
MW-119	16,669,402.58	1,110,842.39	92.6	-	35	45	57.6	47.6
MW-120	16,668,987.79	1,111,045.55	93.8	-	40	50	53.8	43.8
MW-121	16,668,413.22	1,111,067.56	96.3	-	40	50	56.3	46.3
MW-122	16,667,838.65	1,111,089.58	99.4	-	40	50	59.4	49.4
MW-123	16,667,379.28	1,110,767.39	98.7	-	43	53	55.7	45.7
MW-124	16,667,461.31	1,110,228.55	97.6	-	43	53	54.6	44.6
MW-125	16,667,549.21	1,109,660.31	93.7	-	43	53	50.7	40.7

Well ID	Northing (ft)	Easting (ft)	Ground Elevation	Top of Casing	Depth of Screened Interval		Elevation of Screened Interval	
			ft-msl	ft-msl	ft-bgs		ft-msl	
					Top	Bottom	Top	Bottom
MW-126	16,667,637.14	1,109,092.08	96.8	-	45	55	51.8	41.8

Note:
*These wells are part of the groundwater monitoring well network approved under TCEQ Permit MSW-956B, but haven't been installed as of the date of this report.
- Anticipated construction details are provided for additional monitoring wells to be installed and are estimates inferred from cross-sections presented in Part III4, Geology Report. Actual screen depths need to be determined based on field observations during borehole drilling.

2.2.3 Monitoring Well Construction

30 TAC §330.421(a)

Monitoring well construction shall provide for maintenance of the integrity of the bore hole, collection of representative groundwater samples from the water-bearing zone of concern, and prevention of migration of groundwater and surface water within the bore hole. The following specifications must be used for the installation of groundwater monitoring wells at municipal solid waste landfills. Equivalent alternatives to these specifications may be used if prior written approval is obtained in advance from the TCEQ. Figure III5-2, Proposed Monitoring Well Construction Details present the required specifications for installation of a monitoring well.

Damaged monitoring wells that are no longer usable will be reported to the TCEQ Executive Director for a determination whether to replace or repair the well. In accordance with 30 TAC §305.70(j), if a compromised well requires replacement, a permit modification request will be submitted within 45 days of the discovery. Plugging and abandoning of monitoring wells will be performed in accordance with 16 TAC §76.104. No abandonment will be performed without prior written authorization from the TCEQ.

2.2.3.1 Drilling

30 TAC §330.421(a)(1)(A)-(D)

Monitoring wells must be drilled by a Texas-licensed driller who is qualified to drill and install monitoring wells. The installation and development shall be supervised by a licensed professional geoscientist or engineer who is familiar with the geology of the area and a log of the boring shall be completed, sealed, signed, and dated by the licensed professional.

The well shall be drilled by a method that will allow installation of the casing, screen, etc., and that will not introduce contaminants into the borehole or casing. Drilling techniques used for boring shall take into account the materials to be drilled, depth to groundwater, total depth of the hole, adequate soil

sampling, and other such factors that affect the selection of the drilling method. The diameter of the boring shall be at least four inches larger than the diameter of the casing. In the event that a boring is advanced through hard rock, a smaller annulus may be approved by the TCEQ.

If any fluids are necessary in drilling or installation, then clean, treated city water shall be used; other fluids must be approved in writing by the TCEQ before use. If city water is used, a current chemical analysis of the city water shall be provided with the monitor-well report.

2.2.3.2 Casing, Screen, Filter Pack, and Seals

30 TAC §330.421(a)(2)

2.2.3.2.1 Casing

30 TAC §330.421(a)(2)(A)

The well casing shall be: two to four inches in diameter; National Science Foundation-certified polyvinyl chloride (PVC) Schedule 40 or 80 pipe, flush-thread, screw joint (no glue or solvents); polytetrafluorethylene (PTFE, such as Teflon) tape or O-rings in the joints; no collar couplings. The top of the casing shall be at least two feet above ground level. Where high levels of volatile organic compounds or corrosive compounds are anticipated, stainless steel or PTFE casing and screen may be used, subject to approval by the TCEQ. A two- inch to four-inch diameter casing is recommended. The casing shall be cleaned and packaged at the place of manufacture; the packaging shall include a PVC wrapping on each section of casing to keep it from being contaminated prior to installation. The casing shall be free of ink, labels, or other markings. The casing (and screen) shall be centered in the hole to allow installation of a good filter pack and annular seal. Centralizers are recommended on wells over six meters (20 feet) in length, but may not be needed if the wells are installed through hollow-stem augers. The top of the casing shall be protected by a threaded or slip-on top cap or by a sealing cap or screw-plug seal inserted into the top of the casing. The cap shall be vented to prevent buildup of methane or other gases and shall be designed to prevent moisture from entering the well.

2.2.3.2.2 Screen

30 TAC §330.421(a)(2)(B)

The well screen shall be compatible with the casing and should generally be of the same material. The screen shall not involve the use of any glues or solvents for construction. A wire-wound screen is recommended to provide maximum inflow area. Field-cut slots are not permitted for well screen. Filter cloth shall not be used. A blank-pipe sediment trap, typically one to two feet, should be installed below the screen. A bottom cap will be placed on the bottom of the sediment trap. The sediment trap shall not

extend through the lower confining layer of the water-bearing zone being monitored. Screen sterilization methods are the same as those for casing. Selection of the size of the screen opening should be done by a person experienced with such work and shall include consideration of the distribution of particle sizes both in the water-bearing zone and in the filter pack surrounding the screen. The screen opening shall not be larger than the smallest fraction of the filter pack.

2.2.3.2.3 Filter Pack

30 TAC §330.421(a)(2)(C)

The filter pack, placed between the screen and the well bore, shall consist of prepackaged, inert, clean silica sand or glass beads; it shall extend from one to four feet above the top of the screen. Open stockpile sources of sand or gravel are not permitted. The filter pack usually has a 30% finer grain size that is about four to ten times larger than the 30% finer grain size of the water-bearing zone; the filter pack should have a uniformity coefficient less than 2.5.

2.2.3.2.4 Annular Seal

30 TAC §330.421(a)(2)(D)

The annular seal shall be placed on top of the filter pack and shall be at least two feet thick. It should be placed in the zone of saturation to maintain hydration. The seal should be composed of coarse-grain sodium bentonite, coarse-grit sodium bentonite, or bentonite grout. Special care should be taken to ensure that fine material or grout does not plug the underlying filter pack. Placement of a few inches of prepackaged clean fine sand on top of the filter pack will help to prevent migration of the annular seal material into the filter pack. The bentonite shall be hydrated with clean water prior to any further activities on the well and left to stand until hydration is complete (eight to 12 hours, depending on the grain size of the bentonite). If a bentonite-grout (without cement) casing seal is used in the well bore, then it may replace the annular seal described in this paragraph.

2.2.3.2.5 Casing Seal

30 TAC §330.421(a)(2)(E)

A casing seal shall be placed on top of the annular seal to prevent fluids and contaminants from entering the borehole from the surface. The casing seal shall consist of a commercial bentonite grout or a cement-bentonite mixture. Drilling spoil, cuttings, or other native materials are not permitted for use as a casing seal. Quick-setting cements are not permitted for use because contaminants may leach from them into the groundwater. The top of the casing seal shall be between five and two feet from the surface.

2.2.3.3 Concrete Pad

30 TAC §330.421(a)(3)

High-quality structural-type concrete shall be placed from the top of the casing seal (two to five feet below the surface) continuously to the top of the ground to form a pad at the surface. This formed surface pad shall be at least six inches thick and not less than four (preferably six) feet square or five (preferably six) feet in diameter. The pad shall contain sufficient reinforcing steel to ensure its structural integrity in the event that soil support is lost. The top of the pad shall slope away from the well bore to the edges to prevent ponding of water around the casing or collar.

2.2.3.4 Protective Collar

30 TAC §330.421(a)(4)

A steel or aluminum protective pipe collar shall be placed around the casing "stickup" to protect it from damage and unwanted entry. The collar shall be set at least one foot into the surface pad during its construction and should extend at least three inches above the top of the well casing (and top cap, if present). The top of the collar shall have a lockable hinged top flap or cover. A sturdy lock shall be installed, maintained in working order, and kept locked when the well is not being bailed/purged or sampled. The well number or other designation shall be marked permanently on the protective steel collar; it is useful to mark the total depth of the well and its elevation on the collar.

2.2.3.5 Protective Barrier

30 TAC §330.421(a)(5)

Where monitoring wells are likely to be damaged by moving equipment or are located in heavily traveled areas, a protective barrier shall be installed. A typical barrier is three or four six- to 12-inch diameter pipes set in concrete just off the protective pad. The pipes can be joined by pipes welded between them, but consideration must be given to well access for sampling and other activities. Separation of such a pipe barrier from the pad means that the barrier can be damaged without risk to the pad and well. Other types of barriers may be approved by the TCEQ.

2.2.3.6 Unusual Conditions

30 TAC §330.421(b)

Where monitoring wells are installed in unusual conditions, all aspects of the installation shall be approved in writing in advance by the TCEQ. Such aspects include, for example, the use of cellar-type enclosures for the top-well equipment or multiple completions in a single hole.

2.2.3.7 Development

30 TAC §330.421(c)

After a monitoring well is installed, it shall be developed to remove artifacts of drilling (clay films, bentonite pellets in the casing, etc.) and to open the water-bearing zone for maximum flow into the well. Development should continue until all of the water used or affected during drilling activities has been removed and field measurements of pH, specific conductance, and temperature have stabilized. Failure to develop a well properly may result in improper monitoring of the water-bearing zone or in adequate water for sampling even though the water-bearing zone is prolific.

2.2.3.8 Location and Elevation

30 TAC §330.421(d)

Upon completion of installation of a monitoring well, the location of the well and all appropriate elevations associated with the top-well equipment shall be surveyed by a registered professional surveyor. The elevation shall be surveyed to the nearest 0.01 foot above mean sea level (with year of the sea-level datum shown). The point on the well casing for which the elevation was determined shall be permanently marked on the casing. The location shall be given in terms of the latitude and longitude at least to the nearest tenth of a second or shall be accurately located with respect to the landfill grid system described in Part IV, Site Operating Plan, §4.11, Landfill Markers and Benchmark.

2.2.3.9 Reporting

30 TAC §330.421(e)

Monitoring well installation and construction details must be submitted on forms available from the TCEQ and must be completed and submitted within 60 days of well completion. A copy of the detailed geologic log of the boring, a description of development procedures, any particle size or other sample data from the well, and a site map drawn to scale showing the location of all monitoring wells and the point of compliance must be submitted to the TCEQ at the same time. The licensed driller should be familiar with the forms required by other agencies; a copy of those forms must also be submitted to the TCEQ.

2.3 Groundwater Sampling and Analysis Requirements

Groundwater sampling and analytical testing will be performed in accordance with the Appendix III5B, Groundwater Sampling and Analysis Plan (GWSAP). The GWSAP includes procedures for the sampling of groundwater at each monitoring well within the groundwater monitoring system and for

laboratory analysis. The plan establishes a detection monitoring program and an assessment monitoring program as well as methods to be used to evaluate groundwater monitoring data.

2.4 Evaluation of Historical Groundwater Monitoring Data

The facility began detection monitoring with the first quarterly sampling event in 1999. Part III4F, Historic Groundwater Quality Testing Data is a tabulation of available groundwater analytical test results from quarterly background and semi-annual detection monitoring events since 2005.

2.4.1 Historical Statistically Significant Increases

To provide a relevant historical account of the statistically significant increases (SSIs) at the facility within the last 10 years, detections for inorganic metal constituents above current background concentrations for each individual groundwater monitoring well and detections for volatile organic compounds (VOCs) above the TCEQ recommended Municipal Solid Waste Practical Quantitation Limits (MSW-PQL) are presented in Appendix III5C, Historical Statistically Significant Increases (SSI).

Every detection for inorganic metal constituents above background was followed by either verification resampling and / or an alternate source demonstration (ASD). If the verification resampling demonstrated constituent levels lower than background value, then the measurements were excluded from Appendix III5C. Therefore, all historical SSIs for inorganic metal constituents have a demonstration of an alternative source other than the landfill that has been accepted by the TCEQ.

Every detection for VOCs was followed by verification resampling, have been recorded and accepted by the TCEQ as anomalous measurements, or the approved assessment monitoring program was initiated for the groundwater monitoring well of concern. If VOCs detections were determined to be anomalous, then the measurements were excluded from Appendix III5C. Therefore, all historical SSIs for VOCs have been evaluated under the assessment monitoring program.

2.4.2 Assessment Monitoring

30 TAC §330.63(f)(6)(B)

The assessment monitoring program has been initiated for groundwater monitoring wells MW-4A and MW-22 because VOCs above the MSW-PQL were detected and verified. As shown in Appendix III5C, monitoring well MW-4A contained VOC detections above the MSW-PQL for benzene, 1,4-Dichlorobenzene, 1,1-Dichloroethane, cis-1,2-Dichloroethene, Tetrachloroethene, Trichloroethylene, and Vinyl Chloride. MW-4A and two adjacent monitoring wells, MW-7R and MW-11, were sampled and tested for 40 CFR Part 258, Appendix II Constituents in March 2014 and resulted in no detections in the additional constituents. MW-22 had VOC detections above the MSW-PQL for cis-1,2-

Dichloroethene. MW-22 and two adjacent monitoring wells MW-3A and MW-23 were sampled and tested for 40 CFR Part 258, Appendix II Constituents in December 2015 and resulted in no detections in the additional constituents.

2.4.3 Source of Contamination

30 TAC §§330.63(f)(2), 330.63(f)(2)(A), & 330.63(f)(2)(B)

A contamination plume is body of ground water containing contaminants, emanating and migrating from a point source within a hydrogeologic unit. Although VOCs have been detected in MW-4A and MW-22, the point source of VOC contamination has not been conclusively identified nor determined to be from the facility's waste management unit. In addition, adjacent monitoring wells to those of concern have been sampled and tested with analytical results showing no detections of VOCs. Because the point source, extent, migration direction, and maximum concentration of VOCs cannot be adequately assessed from the available data, a contamination plume cannot be delineated other than to the extent of the adjacent wells that show no detections.

In a proactive effort to address the potential source of the VOCs detected in MW-4A and MW-22, the City installed passive gas vent trenches between both monitoring wells and the existing waste footprint in March 2016. These passive gas vent trenches extended both 50 feet east and west, on either side of the monitoring well, to collect and passively vent any migrating landfill gas that could be contributing to the detection of VOCs. Since their installation, MW-4A analytical results have demonstrated no VOC detections for two consecutive semi-annual monitoring events and therefore the well is no longer in assessment monitoring.

Conversely, the analytical results for MW-22 show an increase in concentration for cis-1,2-Dichloroethene. The effectiveness of the passive gas vent trench installed for the monitoring well was evaluated. A review of its as-built construction revealed the trench was not installed at an adequate depth to intercept migrating landfill gas that may exist directly above the groundwater surface. Consequently, the City reinstalled the passive gas vent trench to a depth below the existing groundwater surface in March 2017. MW-22 to date is in assessment monitoring and analytical results of further groundwater monitoring will determine if the reinstallation of the passive gas vent trench adequately mitigates the VOCs detected.

3.0 REFERENCES

Chowdhury, Ali and Robert E. Mace. 2007. Groundwater Resource Evaluation and Availability Model of the Gulf Coast Aquifer in the Lower Rio Grande Valley of Texas. (Report 368). Austin, TX. Texas Water Development Board, 129 pp. Available online at the following address:

http://www.twdb.state.tx.us/publications/reports/numbered_reports/doc/R368/R368_GulfCoastGAM.pdf (accessed October 2014)

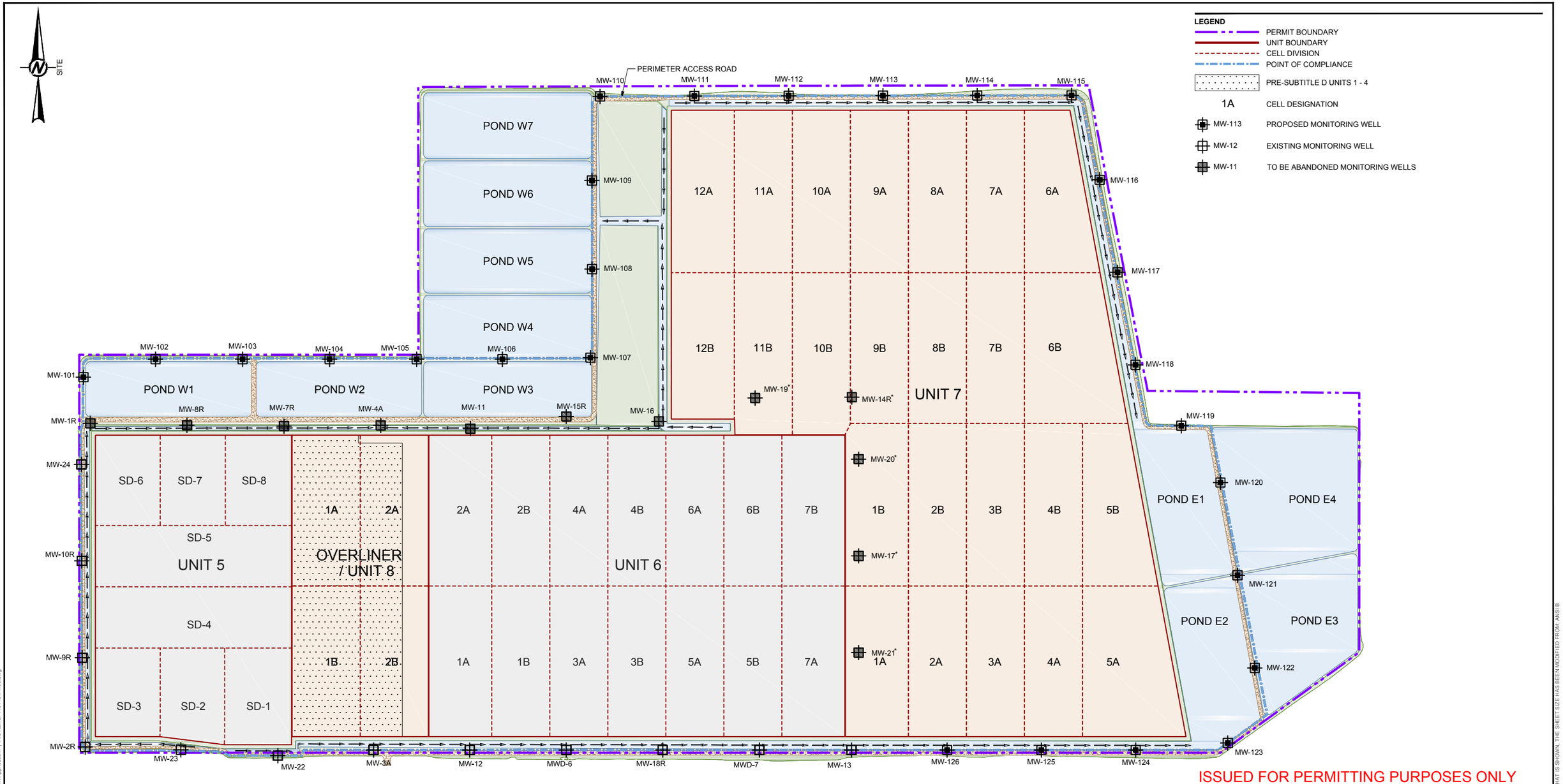
Ryder, Paul D. 1988. Hydrogeology and Predevelopment Flow in the Texas Gulf Coast Aquifer Systems. (USGS Water Resources Investigations Report 87-4248). Austin, TX: US Geological Survey, 116 pp. Available on the Web at: http://pubs.er.usgs.gov/publication/wri874248 (accessed October 2014)

Southern Ecology Management. 2008, Groundwater Characterization Report, Permit Amendment Application No. 956-B, Edinburg Sanitary Landfill, Hidalgo County, Texas.

Winslow, A.G. and L.R. Kister. 1956. Saline-water Resources of Texas. (USGS Water Supply Paper 1365). Washington, DC: US Geological Survey, 114 pp. Available on the web at: http://pubs.usgs.gov/wsp/1365/report.pdf (Accessed October 2014)

Young, Steven C., Trevor Budge, Paul R. Knox, Robert Kalbouss, Ernie Baker, Scott Hamlin, Bill Galloway, and Neil Deeds. 2010. Hydrostratigraphy of the Gulf Coast Aquifer from the Brazos River to the Rio Grande. (Contracted Report 0804830795). Austin, TX: Texas Water Development Board, 213 pp. Available online at: http://www.twdb.state.tx.us/publications/reports/contracted_reports/doc/0804830795_Gulf_coast_hydrostratigraphy_wcover.pdf (accessed October 2014)

FIGURES



ISSUED FOR PERMITTING PURPOSES ONLY

REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED
0	2017-07-21	PERMIT AMENDMENT APPLICATION SUBMITTAL	CEI	AA	JAW	CEI

SEAL

STATE OF TEXAS
CHAD E. IRELAND
99293
LICENSED
PROFESSIONAL ENGINEER
9/1/17

GOLDER ASSOCIATES INC.
TEXAS REGISTRATION F-2578

CLIENT

CITY OF EDINBURG SOLID WASTE MANAGEMENT

CONSULTANT

Golder Associates

HOUSTON OFFICE
500 CENTURY PLAZA DRIVE, SUITE 190
HOUSTON, TEXAS
USA
[+1] (281) 821-6868
www.golder.com

PROJECT
EDINBURG REGIONAL DISPOSAL FACILITY
PERMIT AMENDMENT APPLICATION TCEQ PERMIT MSW-956C
EDINBURG, HIDALGO COUNTY, TEXAS

TITLE
GROUNDWATER MONITORING SYSTEM PLAN

PROJECT NO.	APPLICATION SECTION	REV.		FIGURE
1401491	III5	0	1 of 2	III5-1

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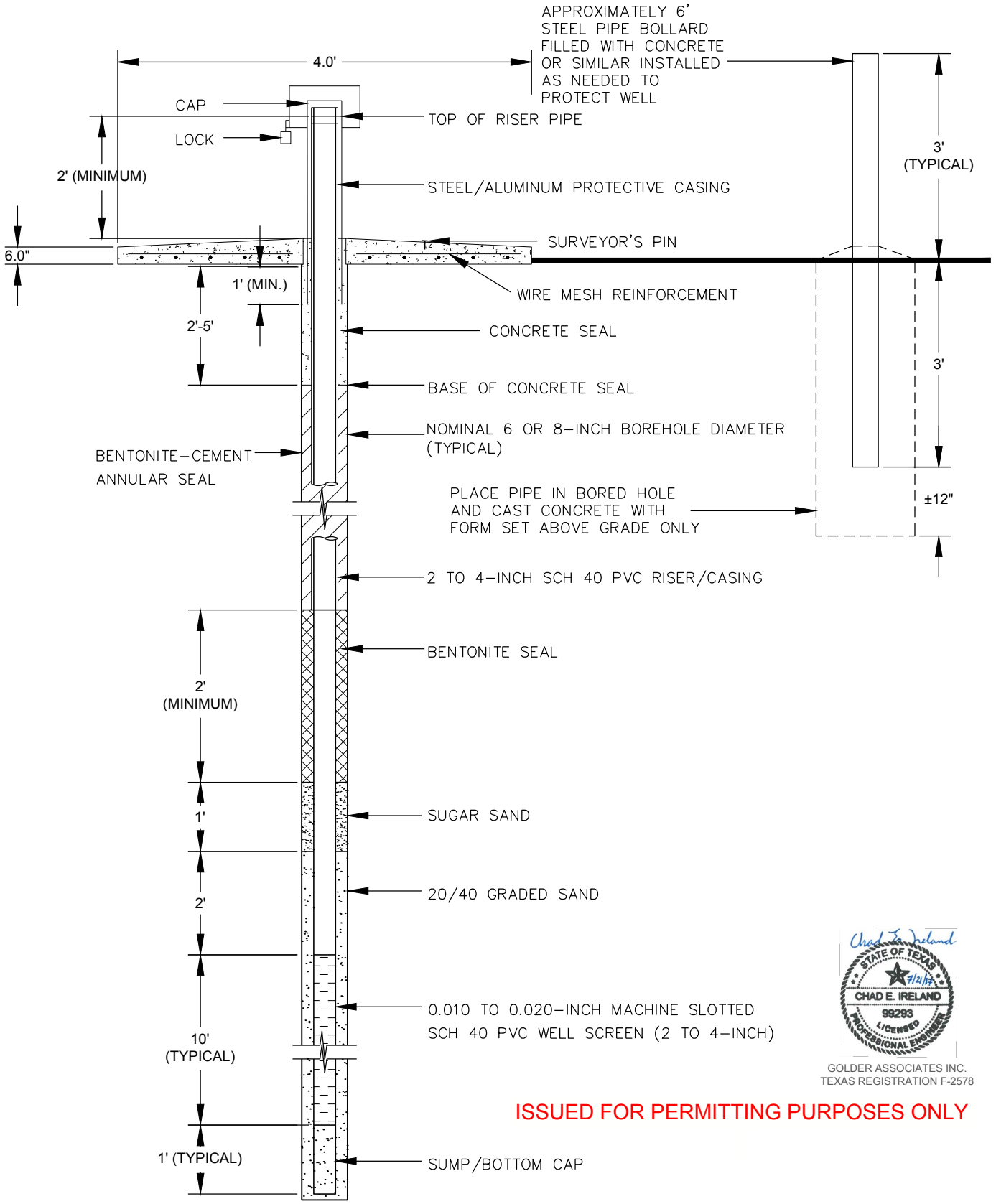

Chad E. Ireland
STATE OF TEXAS
7/2/17
CHAD E. IRELAND
99283
LICENSED
PROFESSIONAL ENGINEER

GOLDER ASSOCIATES INC.
TEXAS REGISTRATION F-2578

ISSUED FOR PERMITTING PURPOSES ONLY

CLIENT
CITY OF EDINBURG SOLID WASTE MANAGEMENT

CONSULTANT
Golder Associates

YYYY-MM-DD	
DESIGNED	CEI
PREPARED	AA
REVIEWED	JAW
APPROVED	CEI

PROJECT
EDINBURG REGIONAL DISPOSAL FACILITY
PERMIT AMENDMENT APPLICATION TCEQ PERMIT MSW-956C
EDINBURG, HIDALGO COUNTY, TEXAS

TITLE
PROPOSED MONITORING WELL COSTRUCTION DETAILS

PROJECT NO.	APPLICATION SECTION	REV.	2 of 2	FIGURE
1401491	III5	0		III5-2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

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APPENDIX III5A

EXISTING MONITORING WELL INFORMATION

A. Monitor Well Data Sheet

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MSWD-SE67

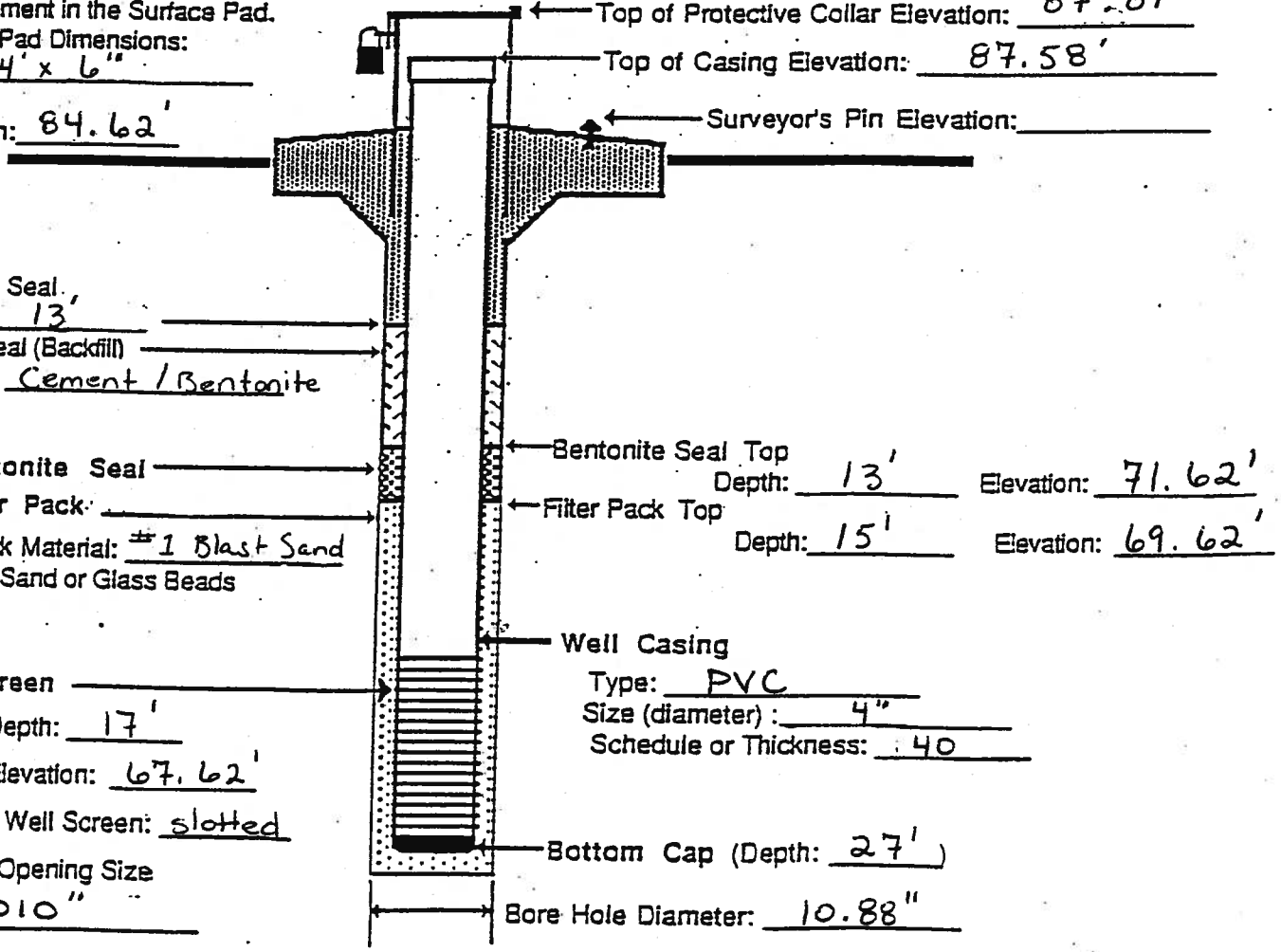
Permittee or Site Name: Edinburg Sanitary Landfill
MSW PERMIT NO: 956-A
County: Hidalgo
Monitor Well I.D. No.: MW-1
Date of Monitor Well Installation: 03-17-93
Date of Monitor Well Development: UNKNOWN
Monitor Well: Latitude: 2024.43 Longitude: 14.05
Monitor Well Groundwater Gradient: Upgradient ___ Downgradient X
Monitor Well Driller Name: Mark Monroe
License No.: 2814-M

NOTE:

(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: COOK-JOYCE INC.
Static Water Level Elevation (with respect to MSL) after Well Developement: 64.9 +/-
Name of Geologic Formation(s) in which Well is completed: Holocene Formation

Type of Locking Device: Pad Lock
Type of Casing Protection: 6"x 6" METAL WELL STICKUP
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4'x4'x 6"
Surface Elevation: 84.62'



* Developed from best available information.

1/14 NOV. 2001

A. Monitor Well Data Sheet

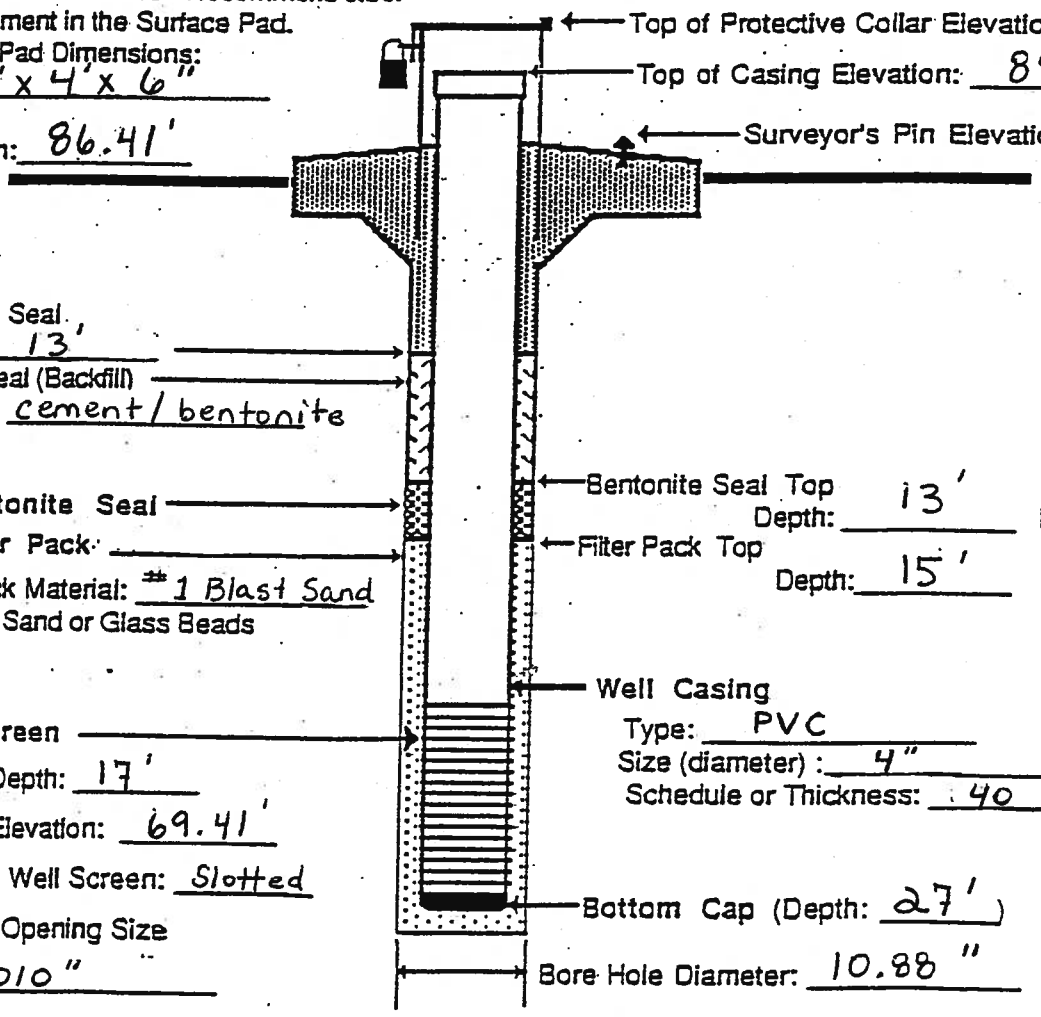
TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MSWD-SE67

Permittee or Site Name: Edinburg Sanitary Landfill
MSW PERMIT NO: 956-A
County: Hidalgo
Monitor Well I.D. No.: MW-2
Date of Monitor Well Installation: 03-17-93
Date of Monitor Well Development: unknown
Monitor Well: Latitude: 44.47 Longitude: 14.50
Monitor Well Groundwater Gradient: Upgradient X Downgradient ____
Monitor Well Driller Name: MARK MONROE
License No.: 2814-M

NOTE:

(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: COOK-JOYCE INC.
Static Water Level Elevation (with respect to MSL) after Well Developement: 65.6 +/-
Name of Geologic Formation(s) in which Well is completed: Holocene Formation
Type of Locking Device: Pad Lock
Type of Casing Protection: 6" x 6" METAL WELL STICKUP
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4' x 4' x 6"
Surface Elevation: 86.41'



* Developed from best available information.

2/14 NOV. 2001

A. Monitor Well Data Sheet

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MSWD-SE67

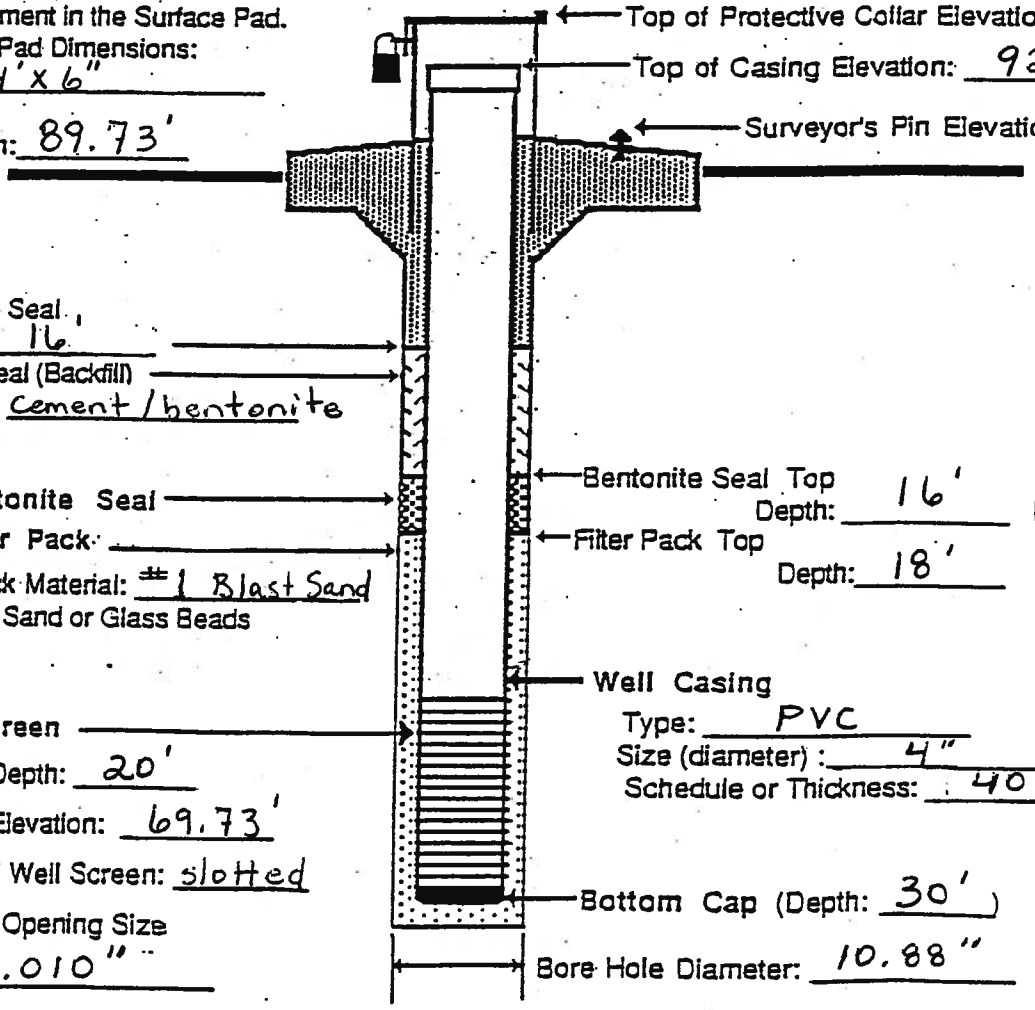
Permittee or Site Name: Edinburg Sanitary Landfill
MSW PERMIT NO: 956-A
County: Hidalgo
Monitor Well I.D. No.: MW-3
Date of Monitor Well Installation: 03-18-93
Date of Monitor Well Development: UNKNOWN
Monitor Well: Latitude: 42.25 Longitude: 2095.07
Monitor Well Groundwater Gradient: Upgradient X Downgradient ____
Monitor Well Driller Name: Mark Monroe
License No.: 2814-M

NOTE:

(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: COOK-JOYCE INC.
Static Water Level Elevation (with respect to MSL) after Well Developement: 65.4 +/-
Name of Geologic Formation(s) in which Well is completed: Holocene Formation

Type of Locking Device: Pad Lock
Type of Casing Protection: 6" x 6" METAL WELL STICKUP
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4'x4'x6"
Surface Elevation: 89.73'



Top of Protective Collar Elevation: 92.95'
Top of Casing Elevation: 92.73'
Surveyor's Pin Elevation: ____
Concrete Seal Depth: 16'
Casing Seal (Backfill) Material: Cement/bentonite
Bentonite Seal
Filter Pack
Filter Pack Material: #1 Blast Sand
Sterilized Sand or Glass Beads
Bentonite Seal Top Depth: 16' Elevation: 73.73'
Filter Pack Top Depth: 18' Elevation: 71.73'
Well Casing Type: PVC
Size (diameter): 4"
Schedule or Thickness: 40
Well Screen
Top Depth: 20'
Top Elevation: 69.73'
Type of Well Screen: slotted
Screen Opening Size 0.010"
Bottom Cap (Depth: 30')
Bore Hole Diameter: 10.88"

* Developed from best available information.

3/14 NOV. 2001

A. Monitor Well Data Sheet

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MSWD-SE67

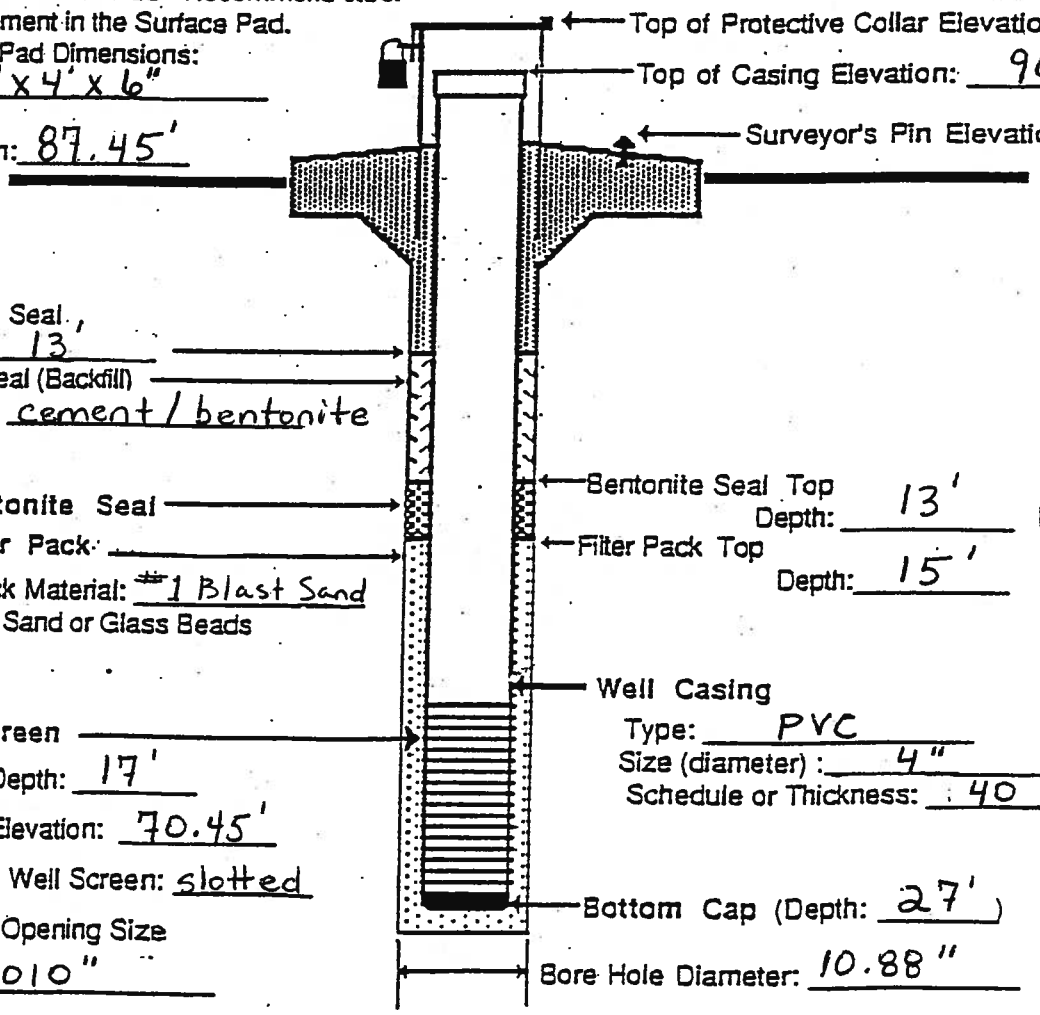
Permittee or Site Name: Edinburg Sanitary Landfill
MSW PERMIT NO: 956-A
County: Hidalgo
Monitor Well I.D. No.: MW-4
Date of Monitor Well Installation: 03-18-93
Date of Monitor Well Development: unknown
Monitor Well: Latitude: 2021.83 Longitude: 2096.72
Monitor Well Groundwater Gradient: Upgradient ___ Downgradient X
Monitor Well Driller Name: Mark Monroe
License No.: 2814-M

NOTE:

(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: COOK-JOYCE INC.
Static Water Level Elevation (with respect to MSL) after Well Developement: 65.5 +/-
Name of Geologic Formation(s) in which Well is completed: Holocene Formation

Type of Locking Device: Pad Lock
Type of Casing Protection: 6" x 6" METAL WELL STICKUP
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4' x 4' x 6"
Surface Elevation: 87.45'



* Developed from best available information.

4/14 NOV. 2001

WELL No. MW-3

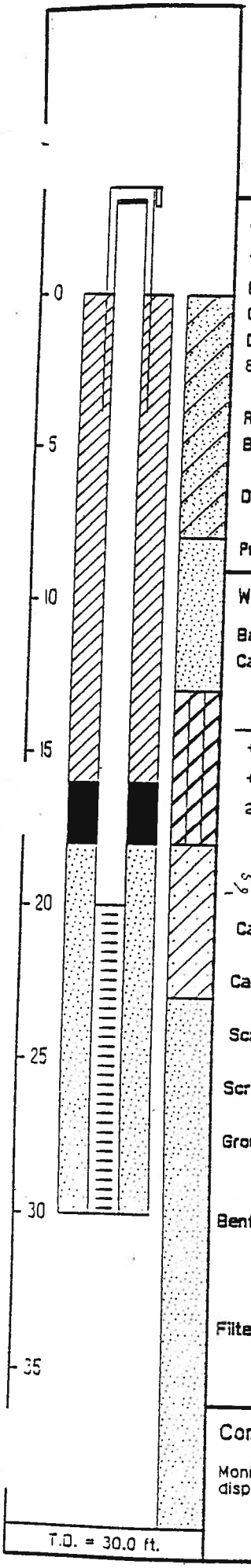
Boring No X-Ref. B-3

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords .

Elevation Ground Level 89.73.

Top of Casing 92.73



Drilling Summary

Total Depth (ft): 30.0
Borehole Diameter (in): 10 7/8 "
Casing Stickup Height (ft): 3.0 ft.
Driller: Professional Service Industries Inc.
810 South Padre Island Drive, Corpus Cristi

Rig:
Bit (s):

Drilling Fluid:

Protective Casing:

Well Design & Specifications

Basis: Geologic Log ☒ Geophysical Log ☐
Casing String (s): C = Casing S = Screen

Depth (ft)	String (s)	Elevation (MSL)
+3.5 - 2.0	C_1	-
+3.0 - 20.0	C_2	92.73 - 69.73
20.0 - 30.0	S_1	69.73 - 59.73
-		-
-		-

Casing: C1 6" diameter Metal

Casing: C2 4" diameter PVC, Sch.40

Screen: S1 4" diameter PVC, Scn.40, 0.010-inch

Screen: S2

Grout Seal: 0 - 16 ft.
Cement w/ 5% Bentonite per bag of cement.

Bentonite Seal: 16.0 - 18.0 ft.
1/2-inch Pellets

Filter Pack: 18 - 30 ft.
#1 Blast Sand

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling HSA:	3/18/93		3/18/93	
Ream to Rock:				
Air Coring:				
Air Reaming:				
Geophys.Logging:				
Casing:				
C_1 Temp.:	3/18/93		3/18/93	
C_2 2" PVC:	3/18/93		3/18/93	
Filter Placement:	3/18/93		3/18/93	
Cementing:	3/18/93		3/18/93	
Development:				
Bentonite Seal:	3/18/93		3/18/93	

Well Development

No data available

Stabilization Test Data

Time	pH	Spec. Cond.	Temp (C)

Recovery Data

Q = S_o =

Comments

Monitoring well installed adjacent to boring B-3 (drilled on 3/11/93). Lithology from boring B-3 is displayed. **This well diagram was compiled from a State of Texas Well Report.**

SITE NAME *City of Edinburg Sanitary Landfill*

SUPERVISED BY *Mark monroe*

WELL No. MW-4

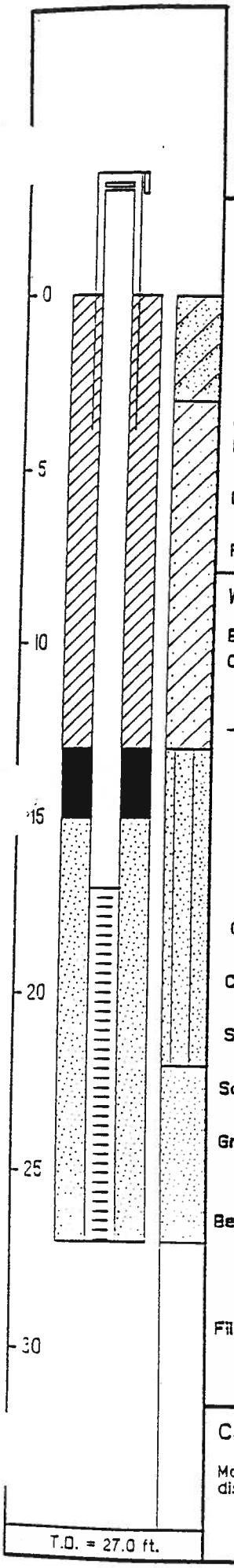
Boring No X-Ref. B-4

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords .

Elevation Ground Level 87.45

Top of Casing 90.45



Drilling Summary

Total Depth (ft): 27.0
Borehole Diameter (in): 10 7/8 "
Casing Stickup Height (ft): 3.0 ft.
Driller: Professional Service Industries Inc.
810 South Padre Island Drive, Corpus Cristi

Rig:
Bit (s):

Drilling Fluid:

Protective Casing:

Construction Time Log

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling HSA:	3/18/93		3/18/93	
Ream to Rock:				
Air Coring:				
Air Reaming:				
Geophys.Logging:				
Casing:				
C_1 Temp.:	3/18/93		3/18/93	
C_2 2" PVC:	3/18/93		3/18/93	
Filter Placement:	3/18/93		3/18/93	
Cementing:	3/18/93		3/18/93	
Development:				
Bentonite Seal:	3/18/93		3/18/93	

Well Design & Specifications

Basis: Geologic Log ☒ Geophysical Log ☐
Casing String (s): C = Casing S = Screen

Depth (ft)	String (s)	Elevation (MSL)
+3.5 - 2.0	C_1	-
+3.0 - 17.0	C_2	90.45 - 70.45
17.0 - 27.0	S_1	70.45 - 60.45
-		-
-		-

Casing: C1 8" diameter Metal

Casing: C2 4" diameter PVC, Sch.40

Screen: S1 4" diameter PVC, Sch.40, 0.010-inch

Screen: S2

Grout Seal: 0 - 13 ft.
Cement w/ 5% Bentonite per bag of cement.

Bentonite Seal: 15.0 - 13.0 ft.
1/2-inch Pellets

Filter Pack: 15 - 27 ft.
#1 Blast Sand

Well Development

No data available

Stabilization Test Data

Time	pH	Spec. Cond.	Temp (C)

Recovery Data

Q =

S_0 =

Comments

Monitoring well installed adjacent to boring B-4 (drilled on 3/11/93). Lithology from boring B-4 is displayed. **This well diagram was compiled from a State of Texas Well Report.**

SITE NAME City of Edinburg Sanitary Landfill

LOCATION Edinburg, Texas

WELL NO. MW-1

SUPERVISED BY Mark Monroe

CHECKED BY

DATE 3/18/93

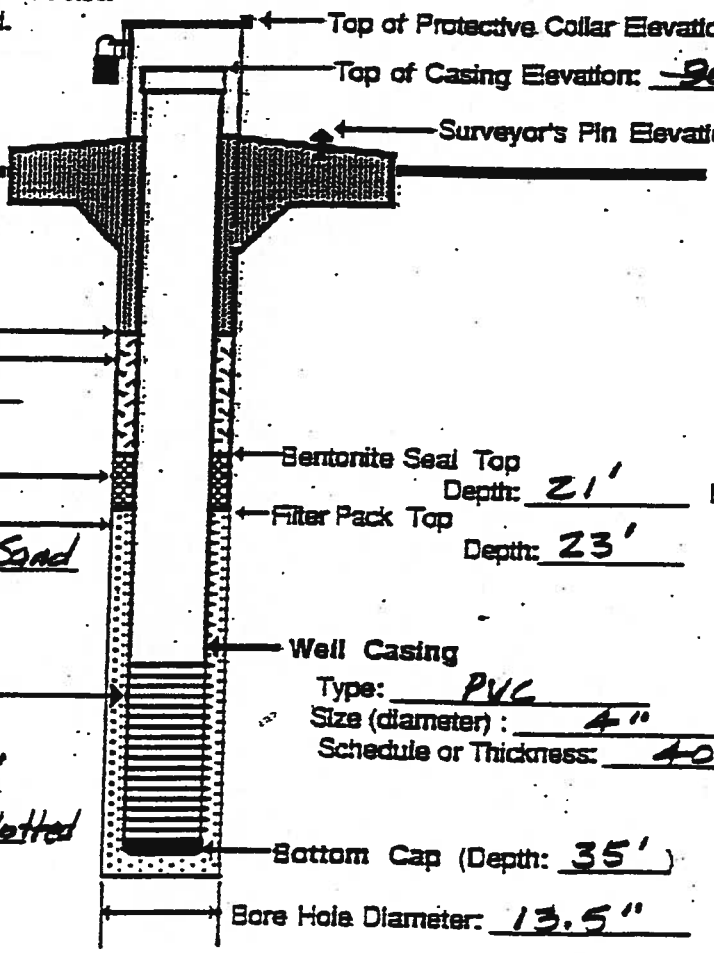
Monitor Well Data Sheet

Texas Natural Resource Conservation Commission
SEGT

Permittee or Site Name: Edinburg Sanitary Landfill
MSW Permit No.: 956-A
County: Hidalgo
Monitor Well I.D. No.: MW5
Date of Monitor Well Installation: 11-12-96
Date of Monitor Well Development: 12-13-96
Monitor Well: Latitude: ~~2093.68~~ Longitude: ~~715.59~~
Monitor Well Groundwater ~~715.59~~ 2093.68
Gradient: Upgradient X Downgradient ___
Monitor Well Driller Name: JEDI
License No.: 2799-M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 2".
(D) Use Flush Screw Joint Casing only; 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Alvaro Garnalo
Static Water Level Elevation (with respect to MSL) after Well Development: 65.21'
Name of Geologic Formation(s) in which Well is completed: Holocene Formation
Type of Locking Device: Dolphin Pad Lock
Type of Casing Protection: 6"x6" Metal Well Stick up



Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4'x 4'x 6"
Surface Elevation: 86.93'
Top of Protective Collar Elevation: 90.46'
Top of Casing Elevation: ~~90.85'~~ 90.04'
Surveyor's Pin Elevation: 87.43'
Concrete Seal Depth: 21'
Casing Seal (Backfill) Material: Concrete
Bentonite Seal
Filter Pack
Filter Pack Material: Silica Sand
Sterilized Sand or Glass Beads
Bentonite Seal Top Depth: 21' Elevation: 65.93'
Filter Pack Top Depth: 23' Elevation: 63.93'
Well Casing Type: PVC
Size (diameter): 4"
Schedule or Thickness: 40
Well Screen
Top Depth: 25'
Top Elevation: 61.93'
Type of Well Screen: PVC Slotted
Screen Opening Size: 0.010"
Bottom Cap (Depth: 35')
Bore Hole Diameter: 13.5"

REVISD 11/98

5/14 NOV. 2001

Monitor Well Data Sheet

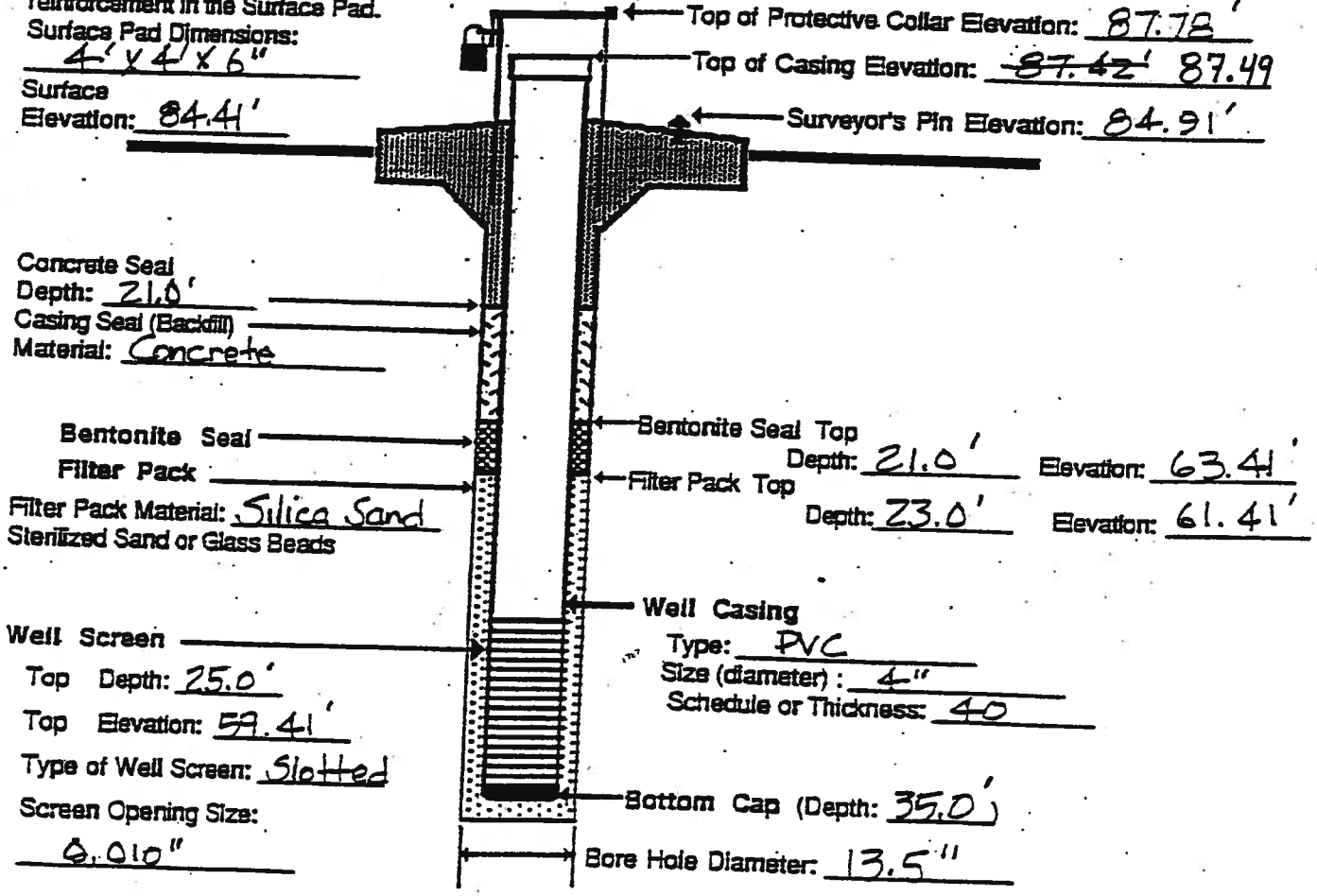
Texas Natural Resource Conservation Commission
SE67

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo
Date of Monitor Well Installation: 11/12/96
Monitor Well: Latitude: ~~2095.60~~ 1371.80 Longitude: ~~1371.80~~ 2095.60
Monitor Well Groundwater Gradient: Upgradient ___ Downgradient X

MSW Permit No.: 956-A
Monitor Well I.D. No.: MW6
Date of Monitor Well Development: 12/13/96
Monitor Well Driller Name: JEDI
License No.: 2799-M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 2".
(D) Use Flush Screw Joint Casing only; 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Alvaro Gurrola
Static Water Level Elevation (with respect to MSL) after Well Development: 64.92'
Name of Geologic Formation(s) in which Well is completed: Holocene Formation
Type of Locking Device: Dolphin Lock
Type of Casing Protection: 6"x6" Metal Well Stickup



Revised 11/98

6/15 NOV. 2001

A. Monitor Well Data Sheet

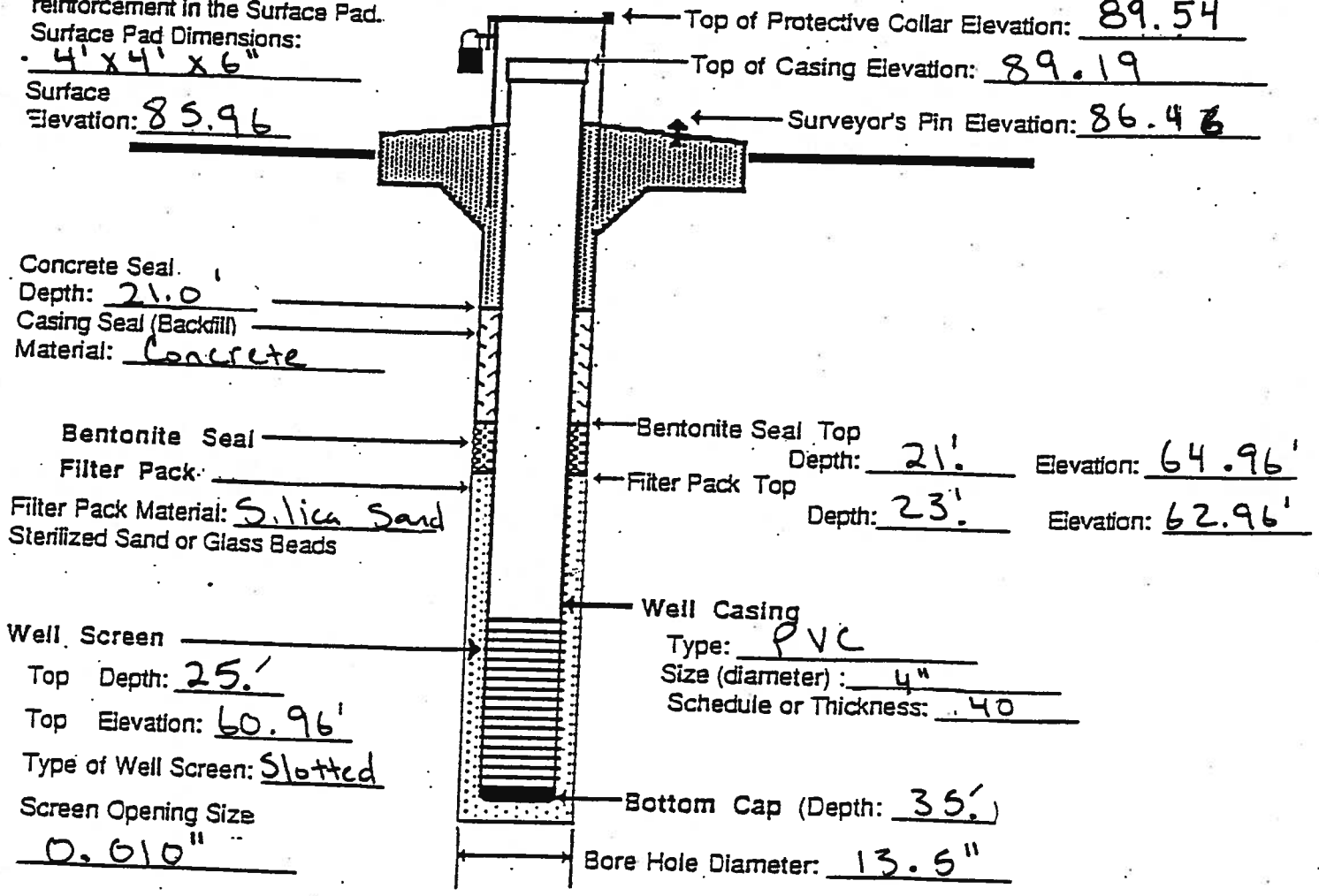
TEXAS NATURAL RESOURCE CONSERVATION COMMISSIC
MSWD-SE67

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo
Date of Monitor Well Installation: 11/10/96
Monitor Well: Latitude: ~~1377.45~~ 2029.53 Longitude: ~~2029.53~~ 1377.45
Monitor Well Groundwater Gradient: Upgradient ___ Downgradient ___

MSW PERMIT NO: 956-A
Monitor Well I.D. No.: MW7
Date of Monitor Well Development: 12/13/96
Monitor Well Driller Name: SEDI
License No.: 2799-M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor we
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Alvaro Gurrola
Static Water Level Elevation (with respect to MSL) after Well Developement: 65.39'
Name of Geologic Formation(s) in which Well is completed: Holocene Formation
Type of Locking Device: Dolphin Lock
Type of Casing Protection: 6"x6" metal well Stick
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4'x4'x6"
Surface Elevation: 85.96



Revised 02/01

7/14 NOV. 2001

Monitor Well Data Sheet

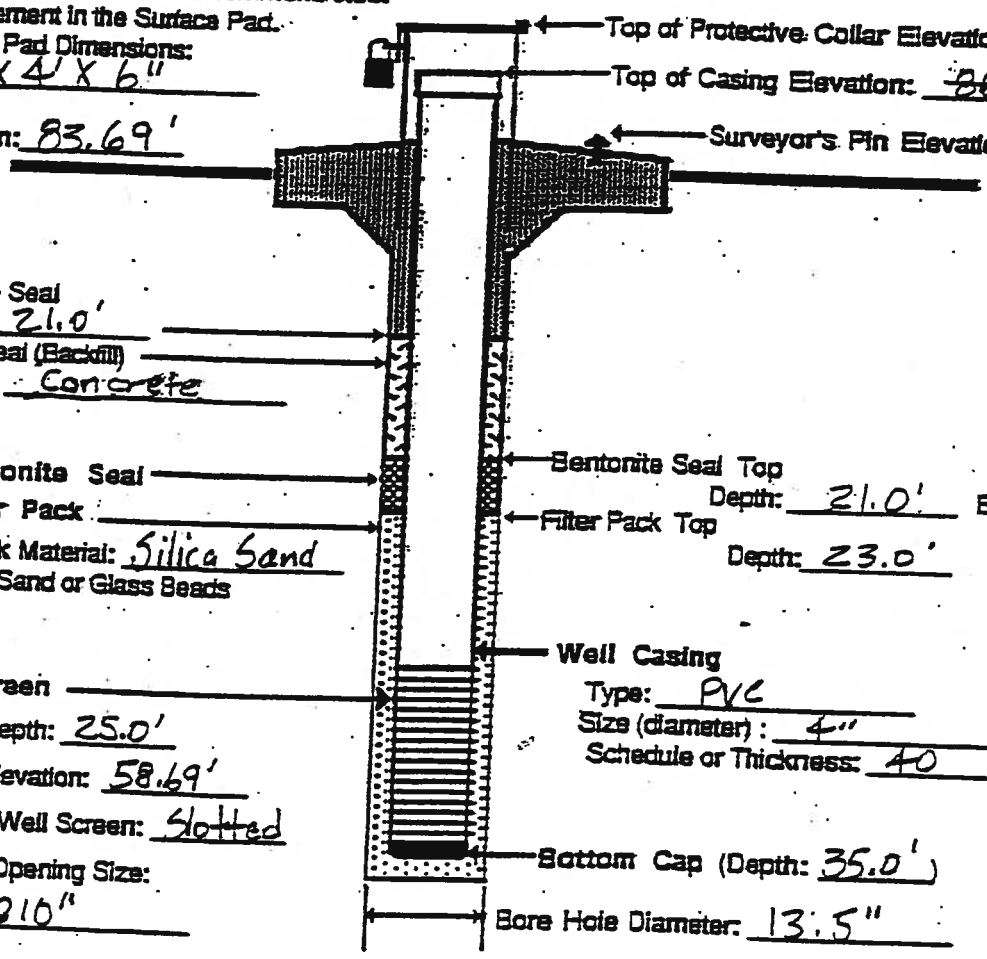
Texas Natural Resource Conservation Commission
SR67

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo
Date of Monitor Well Installation: 11/9/96
Monitor Well: Latitude: ~~711.68~~ 2024.60 Longitude: ~~2024.60~~ 711.68
Monitor Well Groundwater Gradient: Upgradient X Downgradient ___

MSW Permit No.: 956-A
Monitor Well I.D. No.: MW8
Date of Monitor Well Development: 12/13/96
Monitor Well Driller Name: JFDI
License No.: 2799-M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 2".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: Alavro Gurrola
Static Water Level Elevation (with respect to MSL) after Well Development: 64.00'
Name of Geologic Formation(s) in which Well is completed: Holocene Formation
Type of Locking Device: Dolphin Lock
Type of Casing Protection: 6"X6" Metal Well Stickup
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4'X4'X6"
Surface Elevation: 83.69'



Revised 11/98

8/14 NOV. 2001

Monitor Well Data Sheet

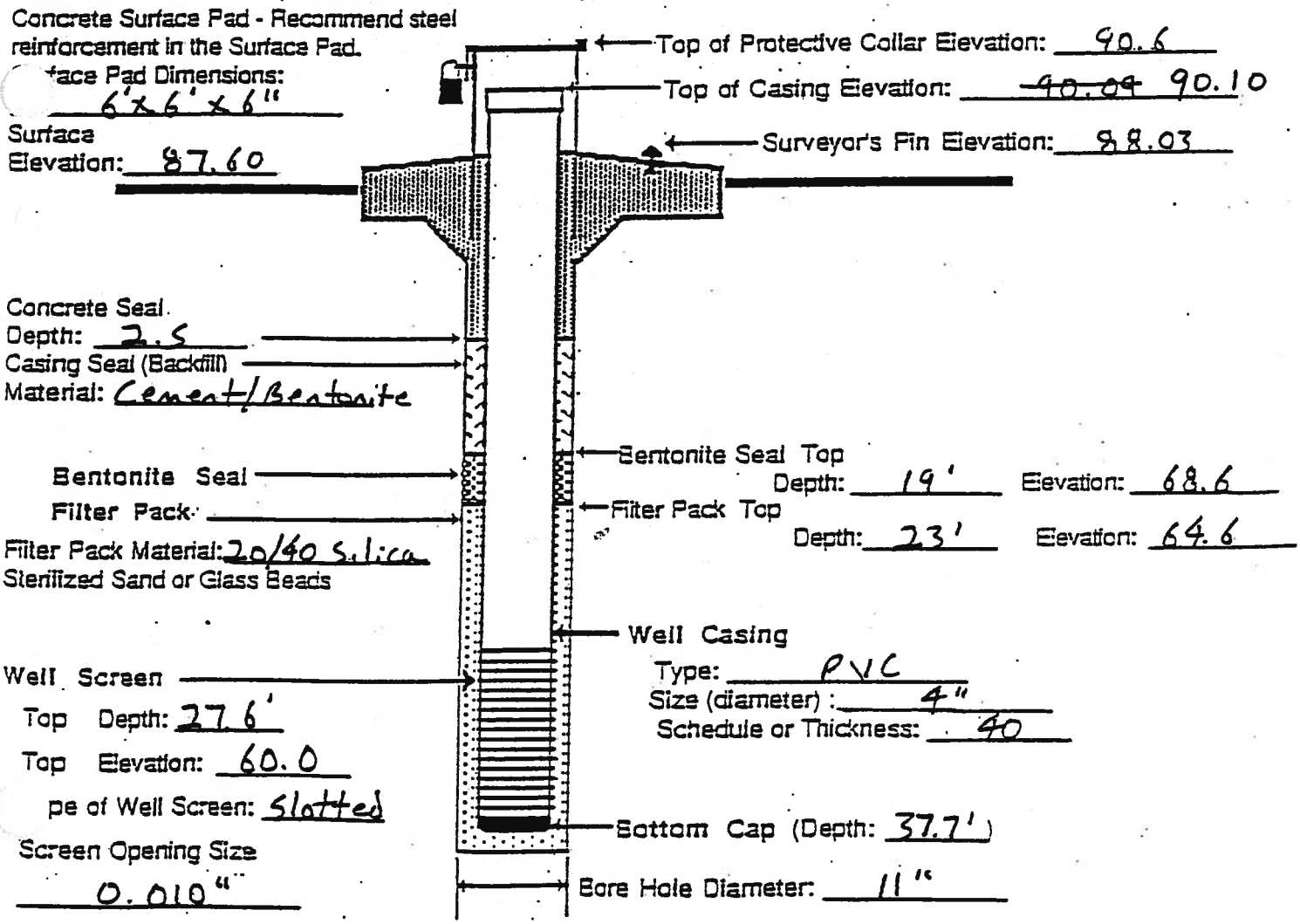
TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MSWD-SE67

Permittee or Site Name: Edinburg Sanitary Landfill
MSW PERMIT NO: 956-A
County: Hidalgo
Monitor Well I.D. No.: MW-9
Date of Monitor Well Installation: 4/9/00
Date of Monitor Well Development: 4/28/00
Monitor Well: Latitude: 26°23'41" Longitude: 98°8'3"
Monitor Well Groundwater Gradient: Upgradient ___ Downgradient ✓
Monitor Well Driller Name: Jaime Flores
License No.: 50270M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: M Hudgins
Static Water Level Elevation (with respect to MSL) after Well Development: 63.69
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Pad Lock
Type of Casing Protection: 6x6 steel



9/14 Nov. 2001

A. Monitor Well Data Sheet

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
MSWD-SE67

nittee or Site Name: Edinburg Sanitary Landfill
MSW PERMIT NO: 956-A

County: Hidalgo
Monitor Well I.D. No.: MW-10

Date of Monitor Well Installation: 4/9/00
Date of Monitor Well Development: 4/28/00

Monitor Well: Latitude: 26°23'47" Longitude: 98°8'2"

Monitor Well Groundwater Gradient: Upgradient ___ Downgradient ✓

Monitor Well Driller Name: Jaime Flores
License No.: 50270

NOTE:

(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor well.
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: M. Hudgins

Static Water Level Elevation (with respect to MSL) after Well Developement: 63.89

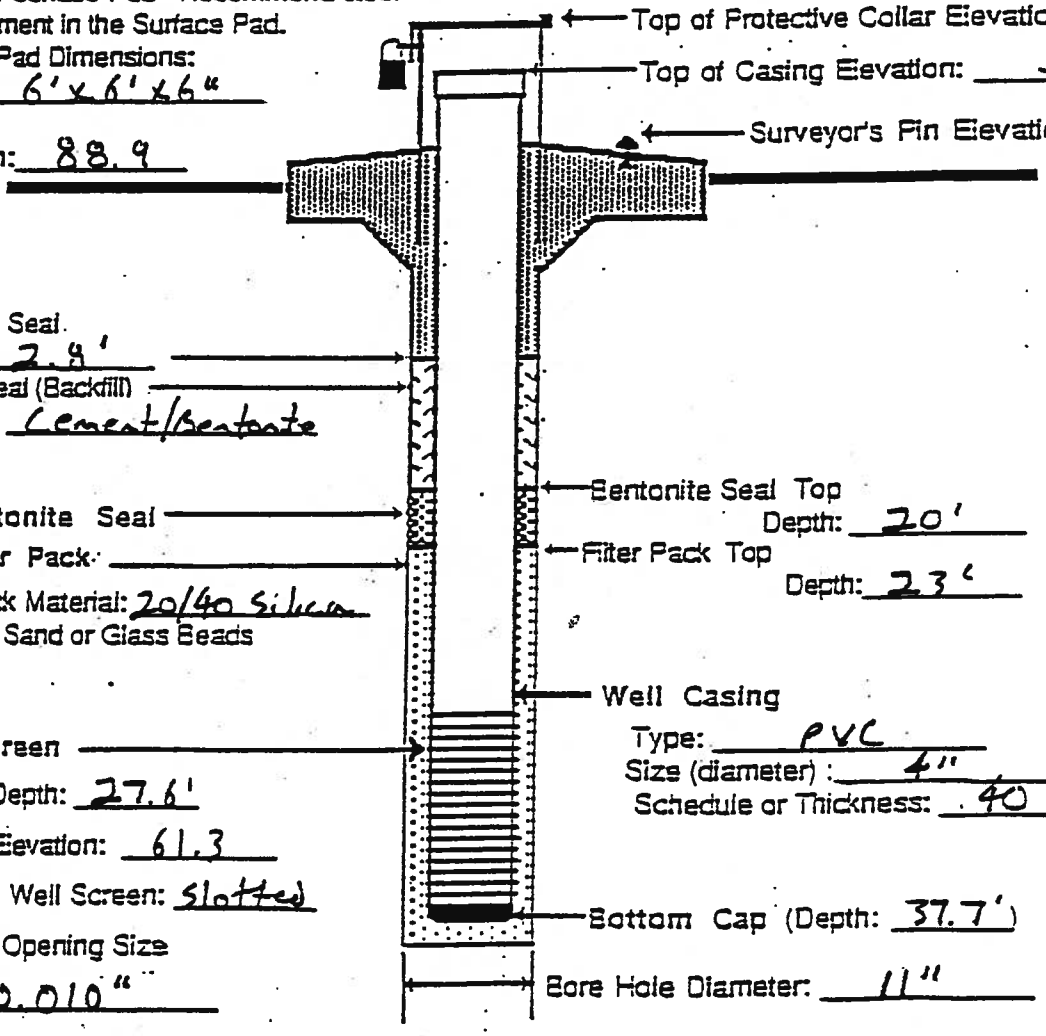
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Pad Lock
Type of Casing Protection: 6x6 steel

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 6'x6'x6"

Top of Protective Collar Elevation: 92.0
Top of Casing Elevation: 91.49 91.48
Surveyor's Pin Elevation: 89.44

ice Elevation: 88.9



Concrete Seal Depth: 2.9'
Casing Seal (Backfill) Material: Cement/Bentonite

Bentonite Seal
Filter Pack
Filter Pack Material: 20/40 Silica Sterilized Sand or Glass Beads

Bentonite Seal Top Depth: 20' Elevation: 68.9
Filter Pack Top Depth: 23' Elevation: 65.9

Well Screen
Top Depth: 27.6'
Top Elevation: 61.3
Type of Well Screen: Slotted
Screen Opening Size: 0.010"

Well Casing
Type: PVC
Size (diameter): 4"
Schedule or Thickness: 40

Bottom Cap (Depth: 37.7')

Bore Hole Diameter: 11"

10/14 NOV. 2001

A. Monitor Well Data Sheet

TEXAS NATURAL RESOURCE CONSERVATION COMMISSIO
MSWD-SE67

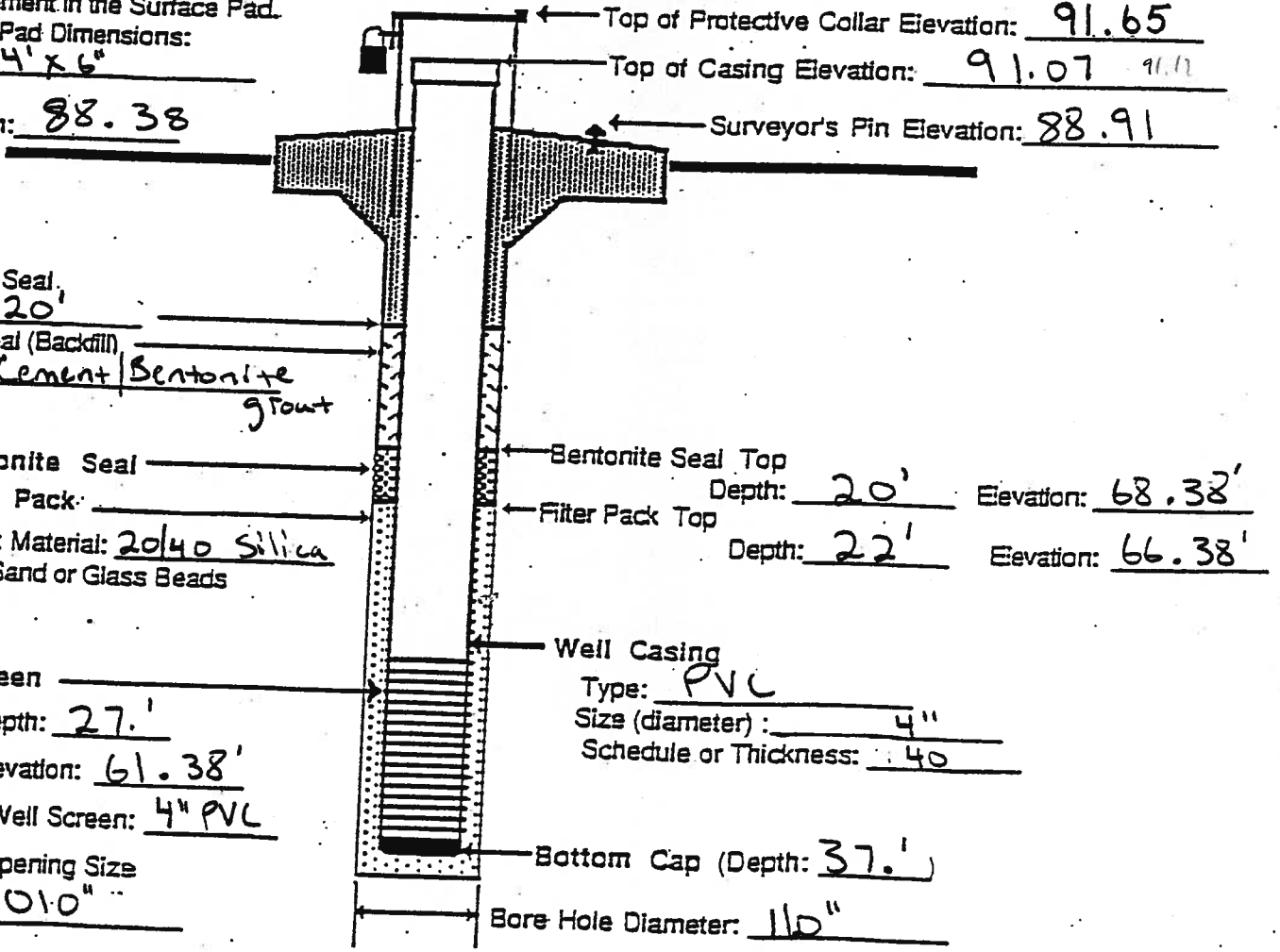
Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo
Date of Monitor Well Installation: 4/7/00
Monitor Well: Latitude: 26°24'01.07" Longitude: 98°07'13.93"
Monitor Well Groundwater Gradient: Upgradient ___ Downgradient ___

MSW PERMIT NO: 956-A
Monitor Well I.D. No.: MW-11
Date of Monitor Well Development: 4-28-00
Monitor Well Driller Name: Jaime Flores
License No.: 50270 M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor we
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints.
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: M. Hudgins
Static Water Level Elevation (with respect to MSL) after Well Developement: 64.42
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: pad lock
Type of Casing Protection: 6"x6" Steel
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4'x4'x6"
Surface Elevation: 88.38



Top of Protective Collar Elevation: 91.65
Top of Casing Elevation: 91.07 91.12
Surveyor's Pin Elevation: 88.91

Concrete Seal Depth: 20'
Casing Seal (Backfill) Material: Cement/Bentonite grout
Bentonite Seal
Filter Pack
Filter Pack Material: 20/40 Silica Sterilized Sand or Glass Beads
Well Screen
Top Depth: 27.'
Top Elevation: 61.38'
Type of Well Screen: 4" PVC
Screen Opening Size 0.010"

Bentonite Seal Top Depth: 20' Elevation: 68.38'
Filter Pack Top Depth: 22' Elevation: 66.38'
Well Casing Type: PVC
Size (diameter): 4"
Schedule or Thickness: 40
Bottom Cap (Depth: 37.')
Bore Hole Diameter: 10"

11/14 NOV. 2001

A. Monitor Well Data Sheet

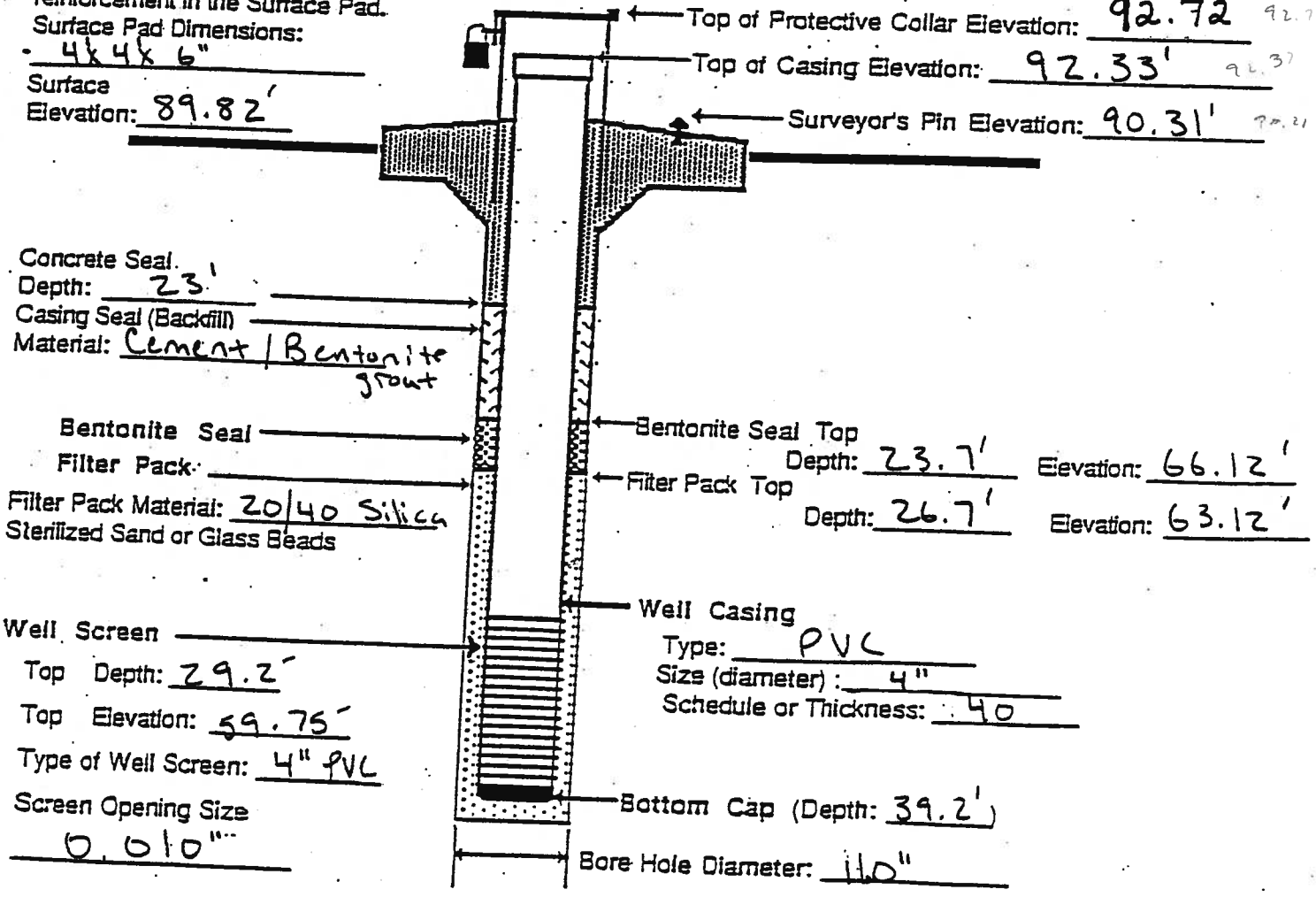
TEXAS NATURAL RESOURC
CONSERVATION COMMISSI
MSWD-SE67

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo
Date of Monitor Well Installation: 3/30/00
Monitor Well: Latitude: 26 23 41.28 Longitude: 98 07 13.99
Monitor Well Groundwater
Gradient: Upgradient ___ Downgradient ___

MSW PERMIT NO: 956-A
Monitor Well I.D. No.: MW-12
Date of Monitor Well Development: 4-28-00
Monitor Well Driller
Name: Jaime Flores
License No.: 50270 M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor w
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: M. Hudgins
Static Water Level Elevation (with respect to MSL) after Well Developement: 65.73'
Name of Geologic Formation(s) in which Well is completed: Holocene
Type of Locking Device: pad lock
Type of Casing Protection: 6"x6" Steel
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4'x4'x 6"
Surface Elevation: 89.82'



12/14 NOV. 2001

A. Monitor Well Data Sheet

TEXAS NATURAL RESOURC
CONSERVATION COMMISSI
MSWD-SE67

Permittee or Site Name: Edinburg Sanitary Landfill

MSW PERMIT NO: 956-A

County: Hidalgo

Monitor Well I.D. No.: MW-13

Date of Monitor Well Installation: 3-30-00

Date of Monitor Well Development: 4-28-00

Monitor Well: Latitude: 26°23'41".29 Longitude: 98°06'47".48

Monitor Well Groundwater Gradient: Upgradient ___ Downgradient ___

Monitor Well Driller Name: Jaime Flores

License No.: 50270 M

NOTE:

(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor w
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimum distance between the inside wall of the Bore Hole and the outside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: M. Hudgins

Static Water Level Elevation (with respect to MSL) after Well Developement: 65.74

Name of Geologic Formation(s) in which Well is completed: Holocene

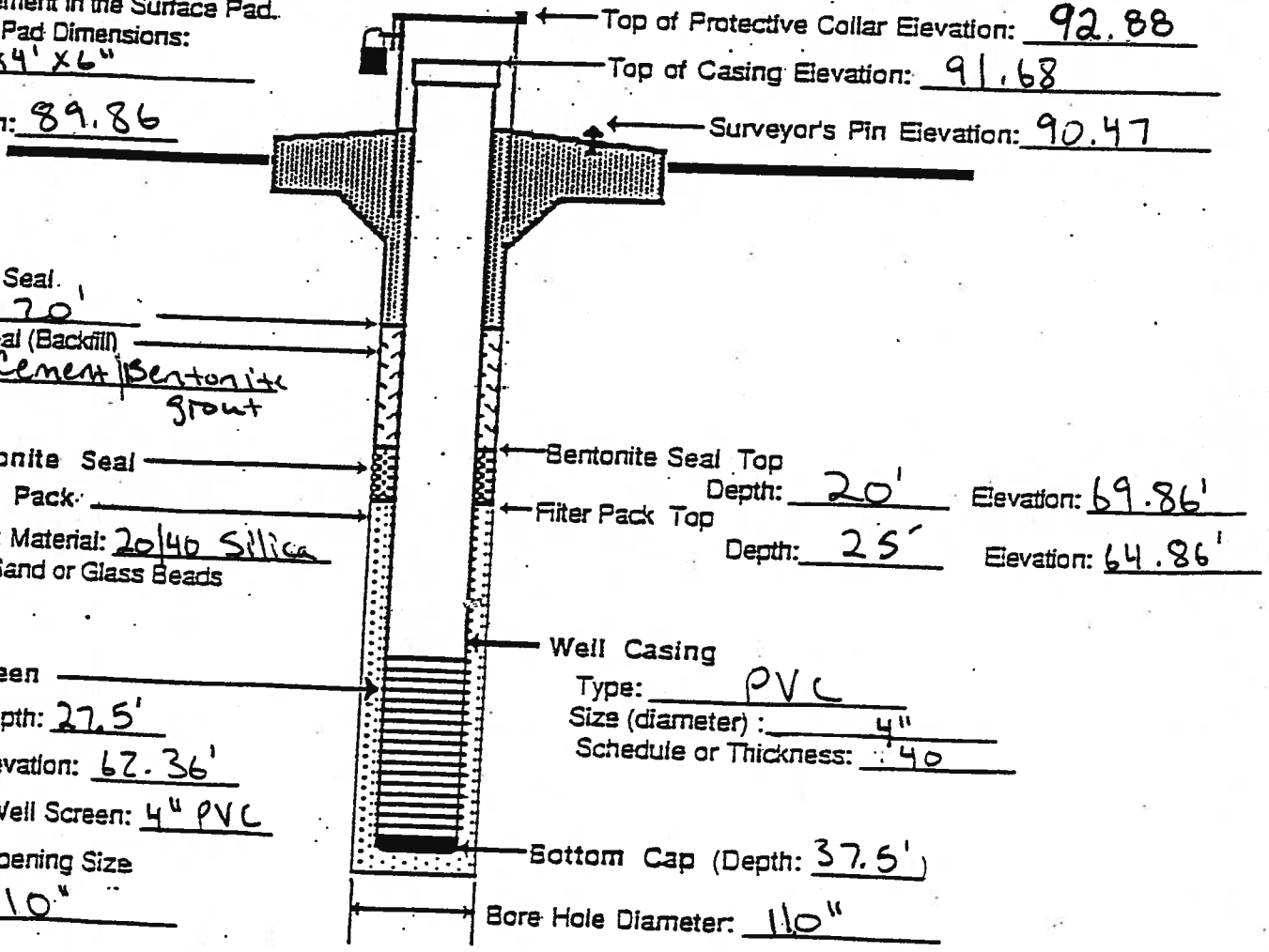
Type of Locking Device: Pad lock

Type of Casing Protection: 6"x6" steel

Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.

Surface Pad Dimensions: 4' x 4' x 6"

Surface Elevation: 89.86



13/14 NOV. 2001

A. Monitor Well Data Sheet

TEXAS NATURAL RESOUR(
CONSERVATION COMMISS:
MSWD-SE67

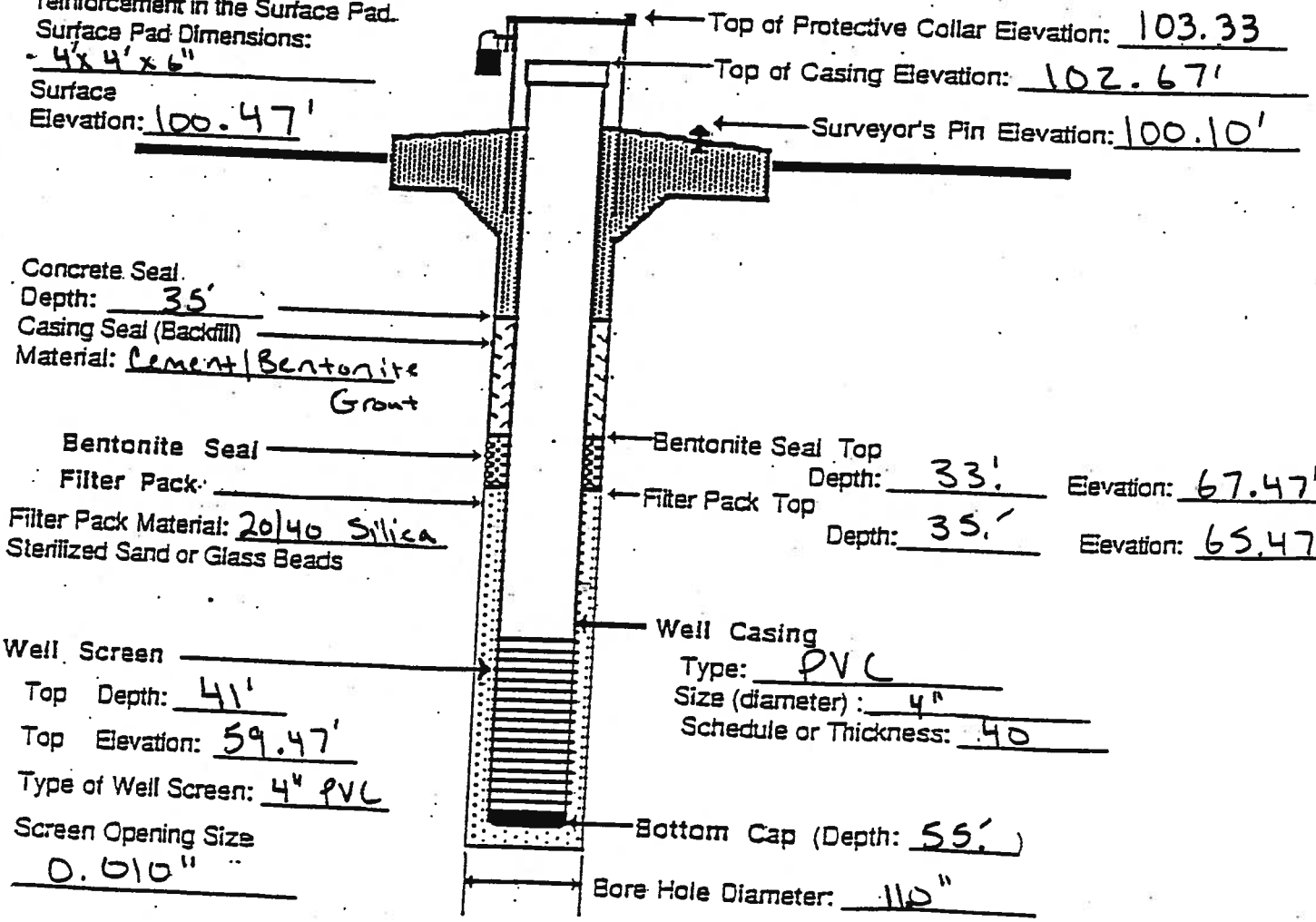
Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo
Date of Monitor Well Installation: 3-30-00
Monitor Well: Latitude: 26 24 01.51 Longitude: 98 06 47.50
Monitor Well Groundwater
Gradient: Upgradient ___ Downgradient ___

MSW PERMIT NO: 956-A
Monitor Well I.D. No.: MW 14
Date of Monitor Well
Development: 4-28-00
Monitor Well Driller
Name: Jaime Flores
License No.: 50270 M

NOTE:
(A) The information shown in the sketch below should be considered the minimum required for an installed ground-water monitor v
(B) Report All Depths from Surface Elevation and all Elevations relative to Mean Sea Level.
(C) The minimun distance between the inside wall of the Bore Hole and the ouiside of the Well Casing shall be 3".
(D) Use Flush Screw Joint Casing only, 2" diameter or larger. Recommend 4" diameter minimum & Teflon Taping Casing Joints
(E) Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: M. Hudgins
Static Water Level Elevation (with respect to MSL) after Well Developement: 63.57'
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: pad lock
Type of Casing Protection: 6"x6" steel
Concrete Surface Pad - Recommend steel reinforcement in the Surface Pad.
Surface Pad Dimensions: 4'x4'x6"
Surface Elevation: 100.47'



14/14 NOV. 2001

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Regional Landfill
County: Hidalgo
Date of Monitor Well Installation 10-21-03
Monitor Well Latitude: 26° 23' 54.185" Longitude: 98°08' 00.705"
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

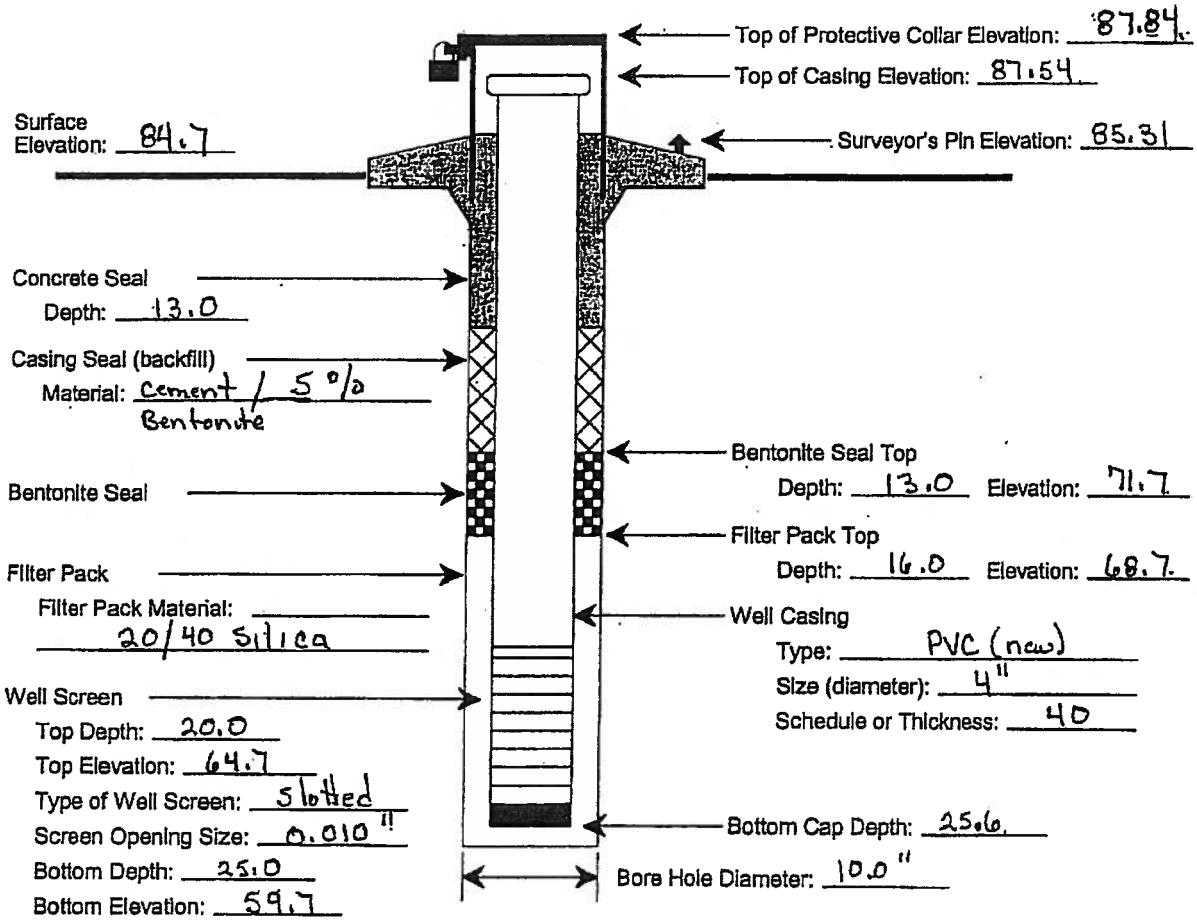
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-1R
Date of Monitor Well Development: 10-23-03
Monitor Well Driller Name: John Loken
License No.: 3213 MDN

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Mark E. Roth.
Static Water Level Elevation (with respect to MSL) after Well Development: 14.20
Name of Geologic Formation(s) in which Well is completed: Beaumont FM (Holocene - Upper)

Type of Locking Device: Pad Lock Type of Casing Protection: 6"x6" Aluminum.
Concrete Surface Pad (with steel reinforcement) Dimensions: 6'x6'x6"



TNRCC-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Regional Landfill
County: Hidalgo
Date of Monitor Well Installation: 10-20-03
Monitor Well Latitude: 26° 23' 34.635" Longitude: 98° 08' 04.037"
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient

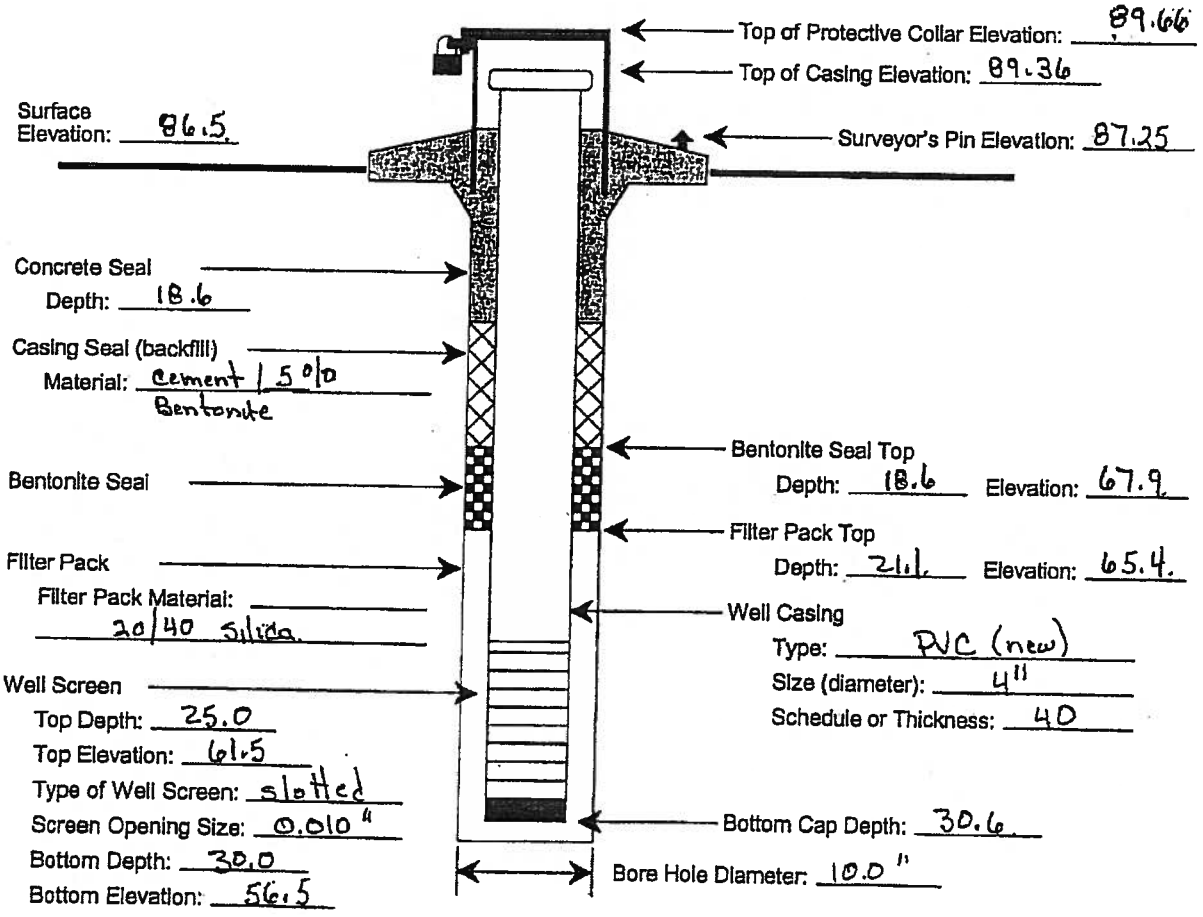
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-2R
Date of Monitor Well Development: 10-23-03
Monitor Well Driller Name: John Loden
License No.: 3213 MDN

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Mark E. Roth.
Static Water Level Elevation (with respect to MSL) after Well Development: 23.20
Name of Geologic Formation(s) in which Well is completed: Beaumont FM (Holocene-Upper)

Type of Locking Device: Pad Lock Type of Casing Protection: 6"x6" Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 6' x 6' x 6"



TNRCC-10308

Monitor Well Data Sheet

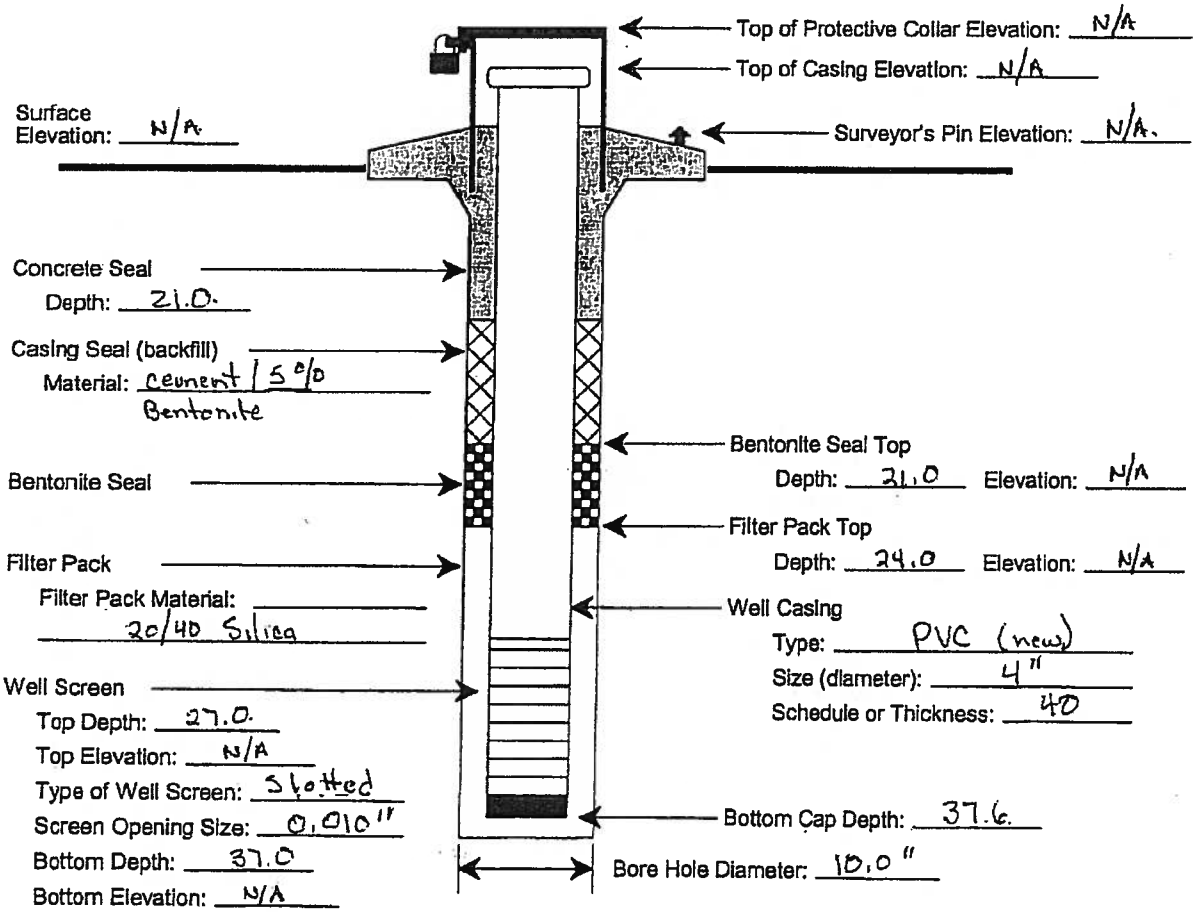
Permittee or Site Name: Edinburg Sanitary Landfill
MSW Permit No.: 956-B
County: Hidalgo
Monitor Well I.D. No.: MW-3R
Date of Monitor Well Installation: 10-21-03
Date of Monitor Well Development: 10-23-03
Monitor Well Latitude: N/A Longitude: N/A
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient
Monitor Well Driller Name: John Loden
License No.: 3213 MDN

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Mark E Roth.
Static Water Level Elevation (with respect to MSL) after Well Development: 28.22
Name of Geologic Formation(s) in which Well is completed: Beaumont FM (Holocene - Upper)

Type of Locking Device: Pad Lock. Type of Casing Protection: 6"x6" Aluminum.
Concrete Surface Pad (with steel reinforcement) Dimensions: 6'x6'x6"



TNRCC-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo
Date of Monitor Well Installation: 1-13-04
Monitor Well Latitude: 26 23 31.09050 Longitude: 98 07 41.66326
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient _____

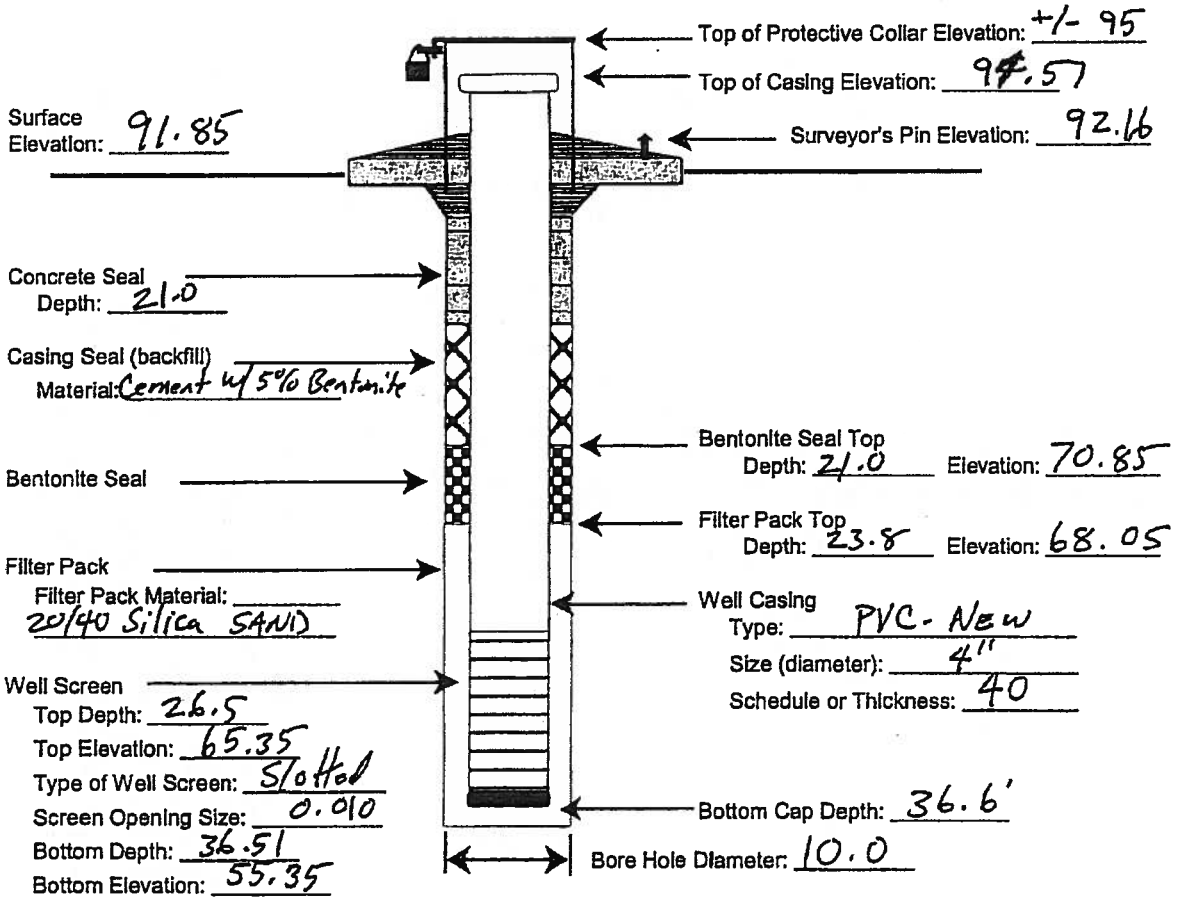
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-3RA
Date of Monitor Well Development: 1-14-04
Monitor Well Driller Name: Craig Schena
License No.: 4694

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jack E. Plitt
Static Water Level Elevation (with respect to MSL) after Well Development: 68.20
Name of Geologic Formation(s) in which Well is completed: Beaumont Fm (Holocene - Upper)

Type of Locking Device: Pad Lock Type of Casing Protection: 6"x6" Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 4'x4'x6"



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: EDINBURG SANITARY LANDFILL
County: HIDALGO
Date of Monitor Well Installation: 3-17-03
Monitor Well Latitude: 2019.75 Longitude: 2001.39
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient ✓

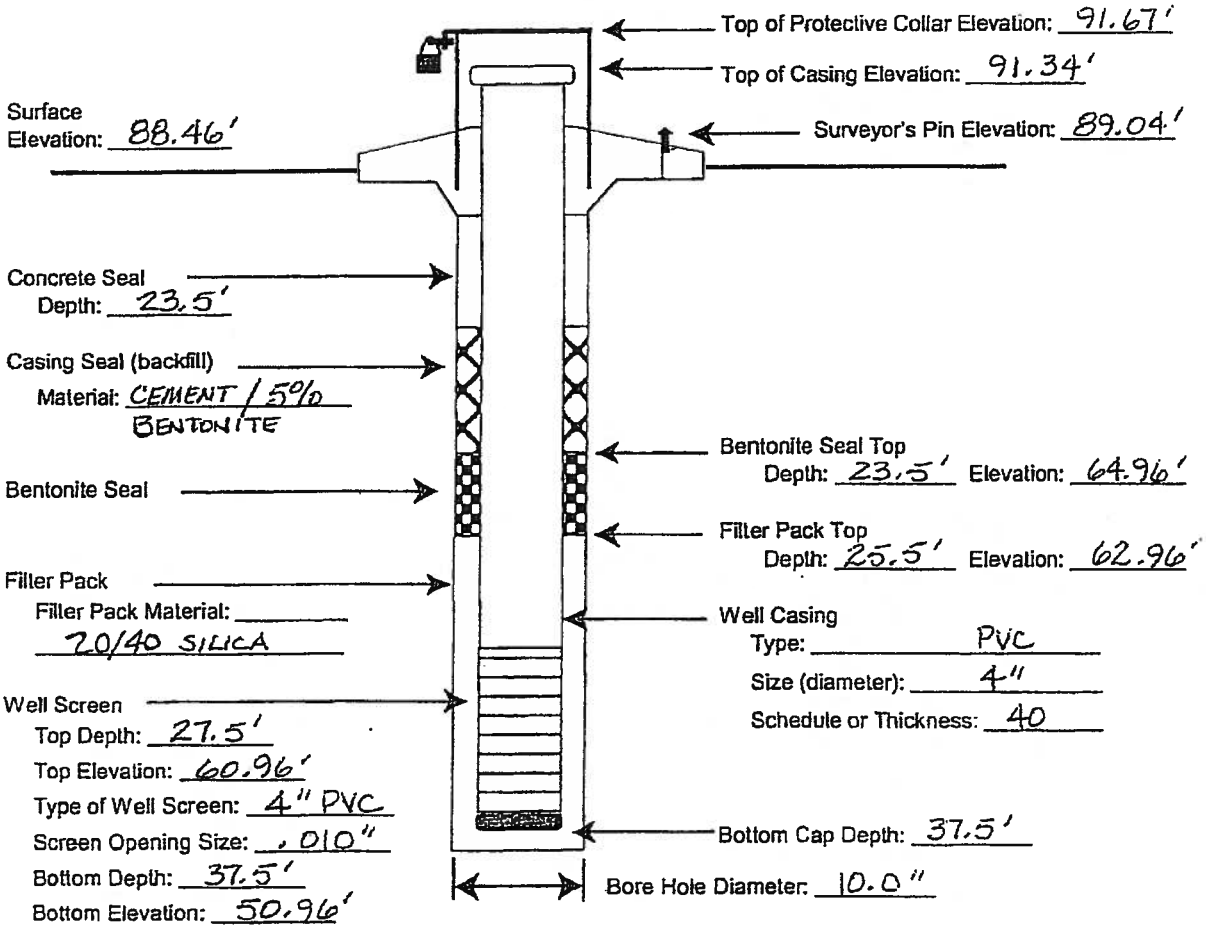
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-4R
Date of Monitor Well Development: 3-19-03
Monitor Well Driller Name: MARK MUNROE
License No.: 2814-M

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: TOM FREUND
Static Water Level Elevation (with respect to MSL) after Well Development: 68.34'
Name of Geologic Formation(s) in which Well is completed: BEAUMONT FM (HOLOCENE-UPPER)

Type of Locking Device: PAD LOCK Type of Casing Protection: 6" x 6" ALUMINUM
Concrete Surface Pad (with steel reinforcement) Dimensions: 6' x 6' x 6"



TNRCC-10308

Monitor Well Data Sheet

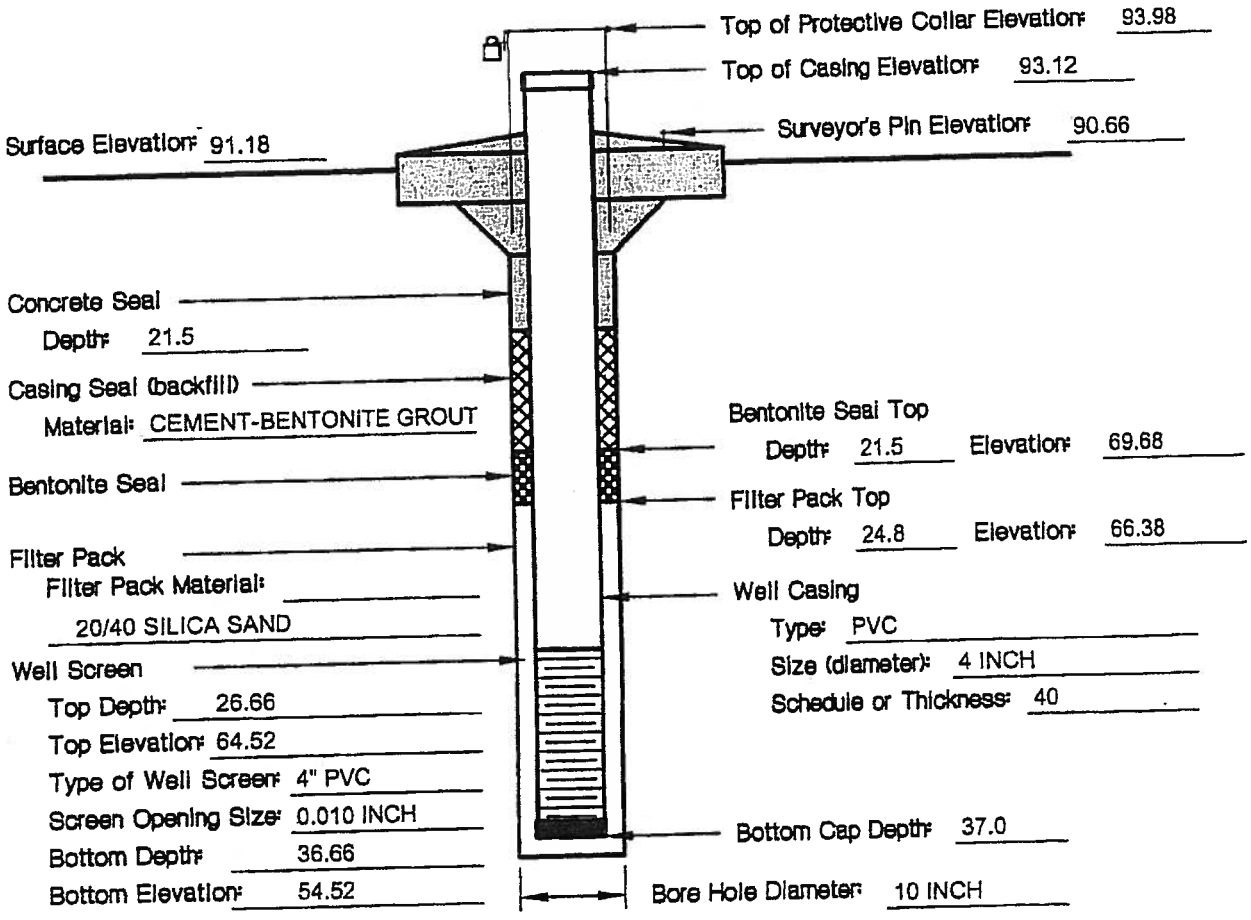
Permittee or Site Name: EDINBURG SANITARY LANDFILL
MSW Permit No.: 956-B
County: HIDALGO
Monitoring Well I.D. No.: MW-15
Date of Monitoring Well Installation: 9-15-05
Date of Monitoring Well Development: 11-29-05
Monitor Well Latitude: 26° 23' 50.85074"N Longitude: 98°07'26.90360"W
Monitoring Well Groundwater Gradient Position:
Upgradient ____ Downgradient X
Monitor Well Driller
Name: CRAIG SCHENA
License No.: 4694

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings of PTFE tape in joints (4-inch diameter recommend)
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: JACK PLITT
Static Water Level Elevation (with respect to MSL) after well Development: 24.36 (TOC)
Name of Geologic Formation(s) in which Well is completed: HOLOCENE

Type of Locking Device: PAD LOCK
Type of Casing Protection: 6"X6" STEEL
Concrete Surface Pad (with steel reinforcement) Dimensions: 4'x4'x4" Concrete



TCEQ-10308

Monitor Well Data Sheet

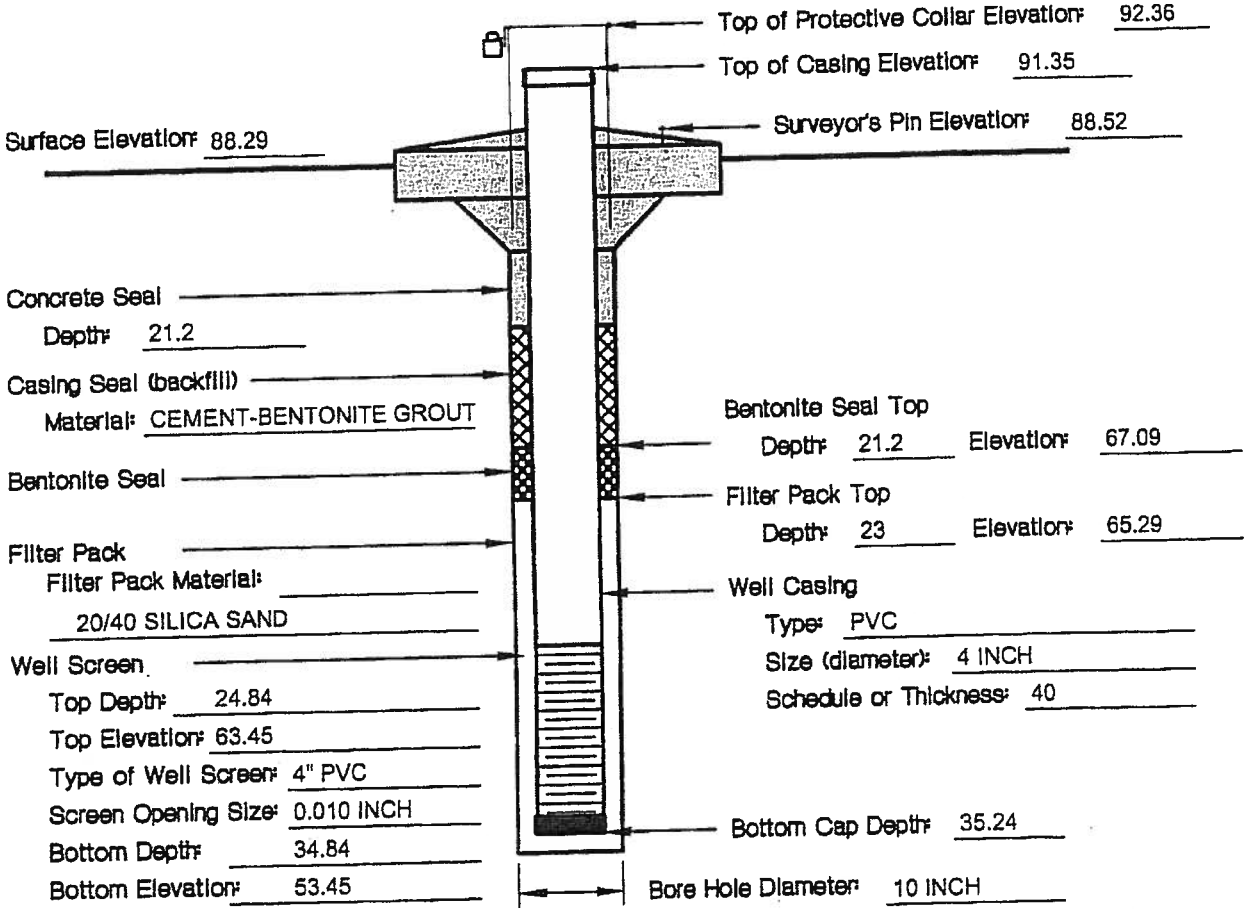
Permittee or Site Name: EDINBURG SANITARY LANDFILL
MSW Permit No.: 956-B
County: HIDALGO
Monitoring Well I.D. No.: MW-18
Date of Monitoring Well Installation: 9-15-05
Date of Monitoring Well Development: 11-29-05
Monitor Well Latitude: 26° 23' 30.3707"N Longitude: 98°07'27.79697"W
Monitor Well Driller Name: CRAIG SCHENA
Monitoring Well Groundwater Gradient Position:
Upgradient ____ Downgradient X
License No.: 4694

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings of PTFE tape in joints (4-inch diameter recommend)
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist or Engineer Supervising Well Installation: JACK PLITT
Static Water Level Elevation (with respect to MSL) after well Development: 22.33 (TOC)
Name of Geologic Formation(s) in which Well is completed: HOLOCENE

Type of Locking Device: PAD LOCK
Type of Casing Protection: 6"X6" STEEL
Concrete Surface Pad (with steel reinforcement) Dimensions: 4'x4'x4" Concrete



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo
Date of Monitor Well Installation: 1-13-04
Monitor Well Latitude: 26 23 31.09050 Longitude: 98 07 41.66326
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient _____

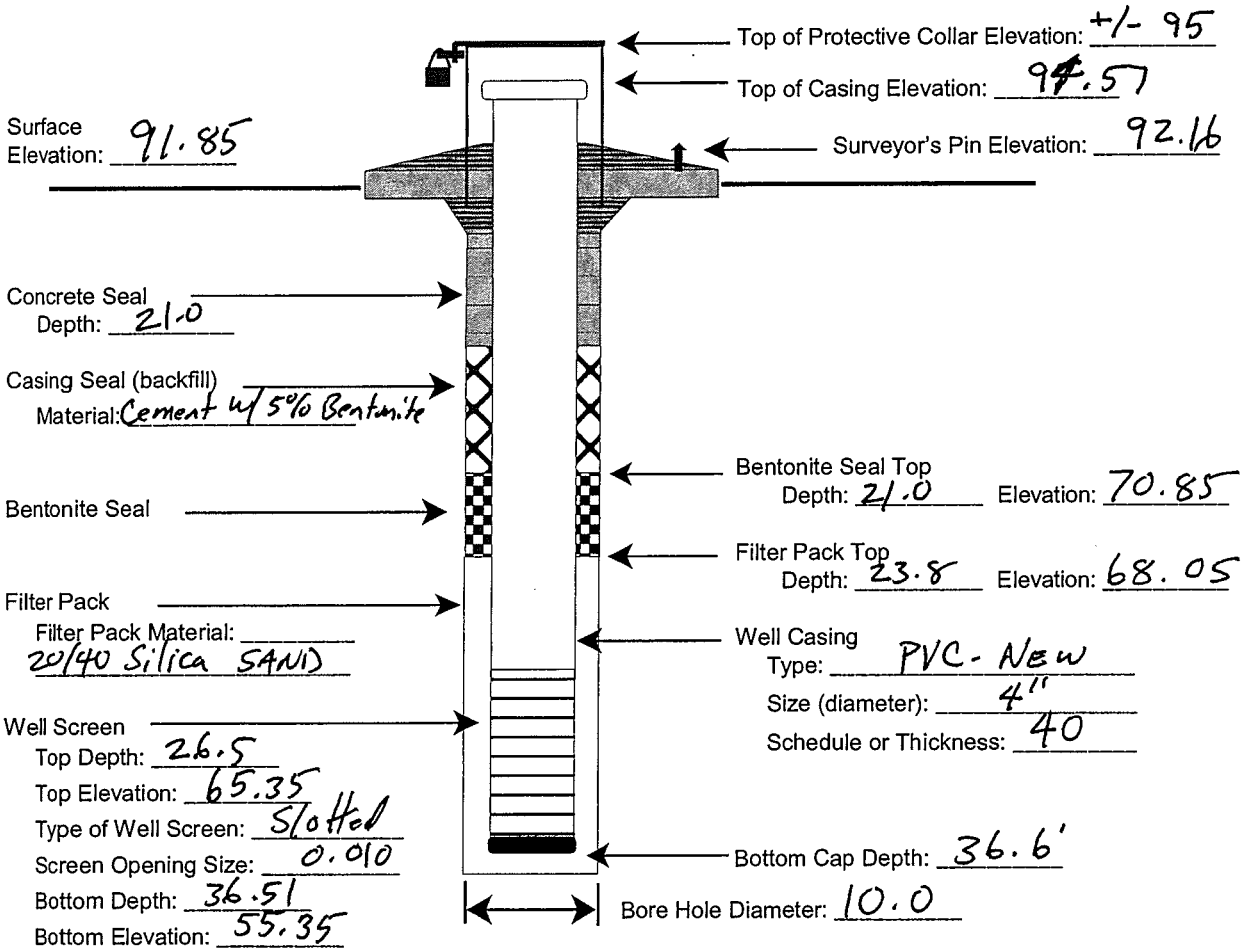
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-3RA
Date of Monitor Well Development: 1-14-04
Monitor Well Driller Name: Craig Schena
License No.: 4694

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jack E. Plitt
Static Water Level Elevation (with respect to MSL) after Well Development: 68.20
Name of Geologic Formation(s) in which Well is completed: Beaumont Fm (Holocene - Upper)

Type of Locking Device: Pad Lock Type of Casing Protection: 6"x6" Aluminum
Concrete Surface Pad (with steel reinforcement) Dimensions: 4'x4'x6"



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/29/2009
Monitor Well Latitude: 26 23' 32.54382" N Longitude: 98 07' 45.63712" W
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient

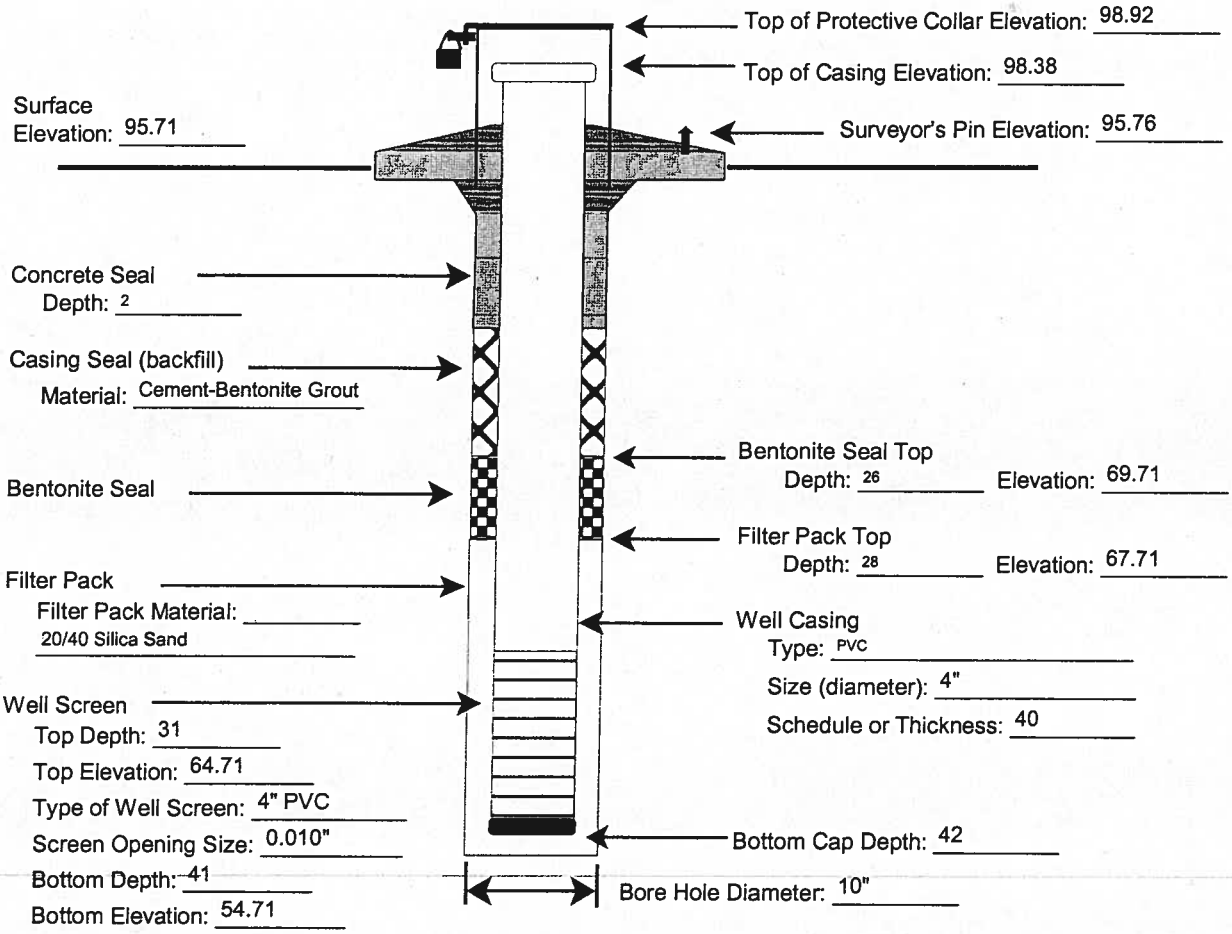
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-3A
Date of Monitor Well Development: 05/07/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 73.84
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock
Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/23/2009
Monitor Well Latitude: 26 23' 52.29163" N Longitude: 98 07' 41.69065" W
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

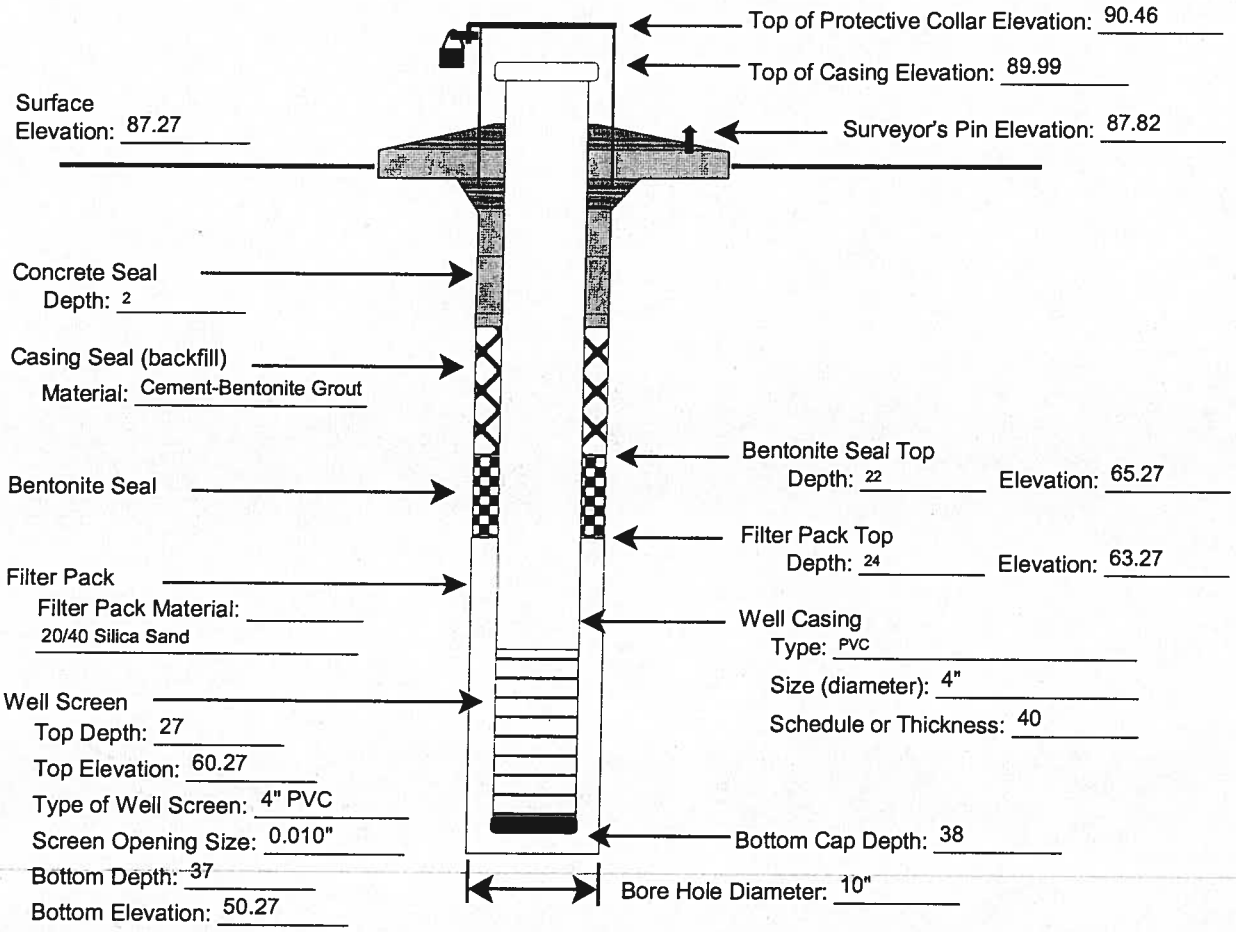
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-4A
Date of Monitor Well Development: 05/08/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 73.86
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock
Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/23/2009
Monitor Well Latitude: 26 23' 53.17291" N Longitude: 98 07' 48.21069" W
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

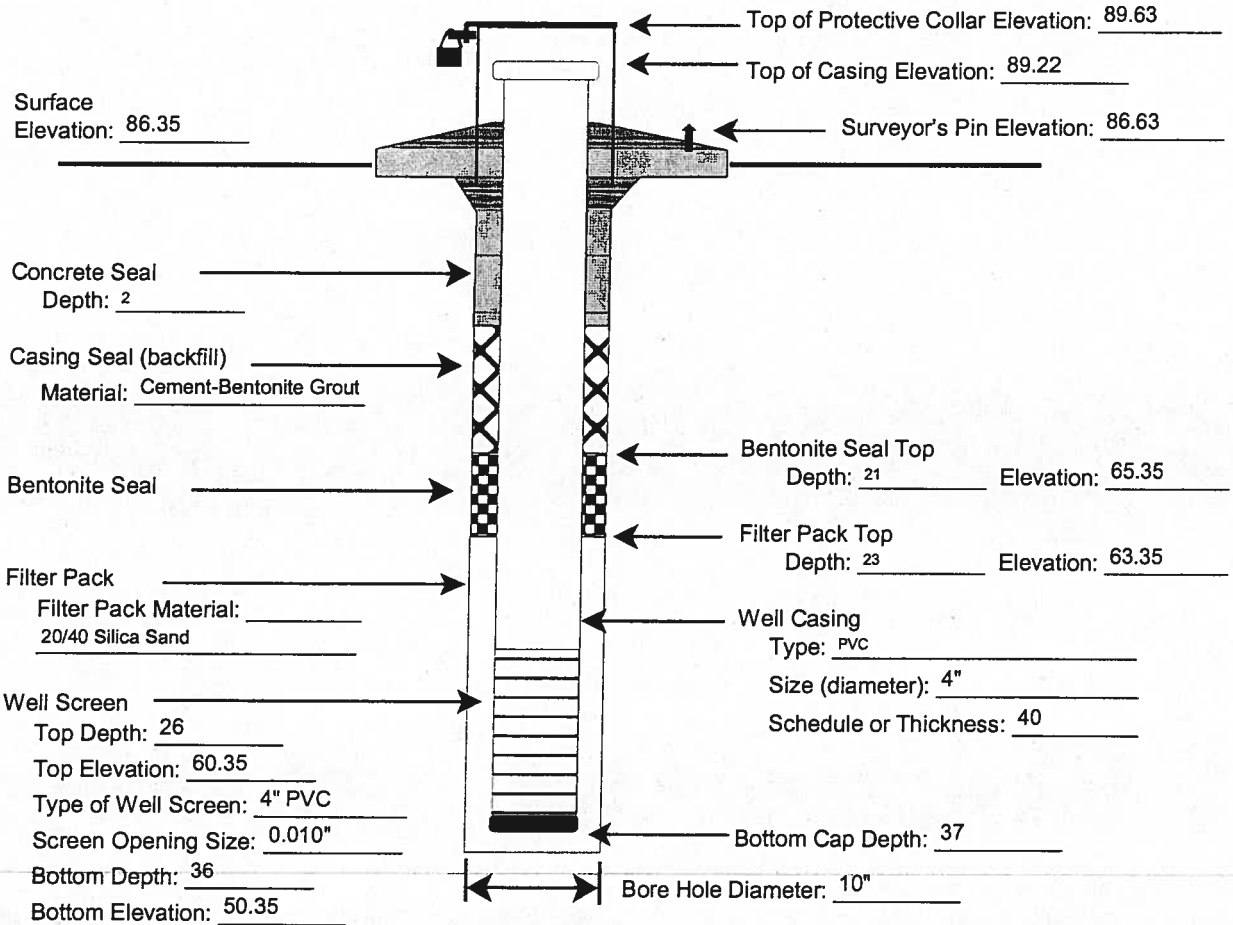
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-7R
Date of Monitor Well Development: 05/08/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 67.84
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock
Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/24/2009
Monitor Well Latitude: 26 23' 54.15324" N Longitude: 98 07' 54.74235" W
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

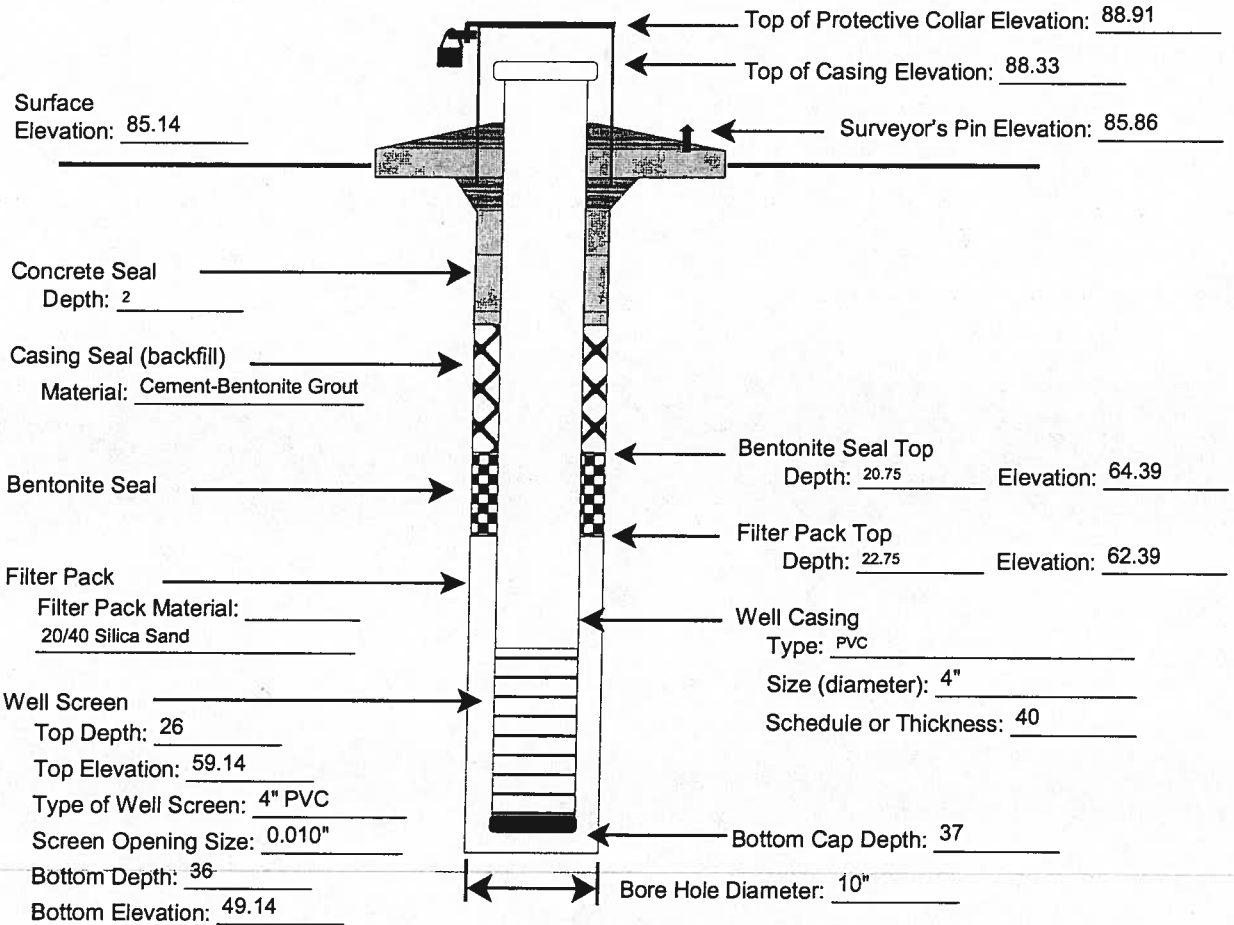
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-8R
Date of Monitor Well Development: 05/08/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 68.71
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock
Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/26/2009
Monitor Well Latitude: 26 23' 41.06052"N Longitude: 98 08' 4.40612" W
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient _____

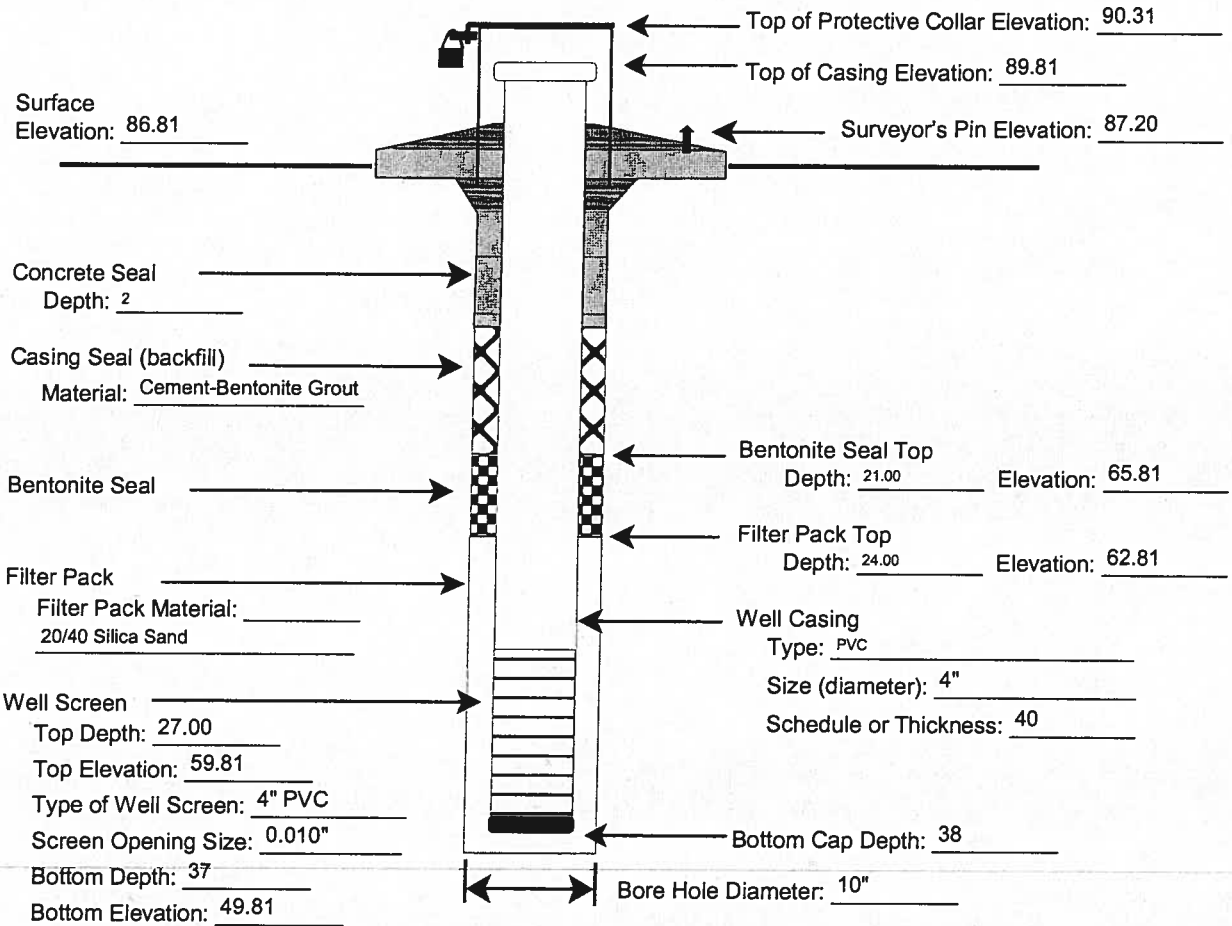
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-9R
Date of Monitor Well Development: 05/05/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 67.83
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock
Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/25/2009
Monitor Well Latitude: 26 23' 46.94857"N Longitude: 98 08' 3.42995" W
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient

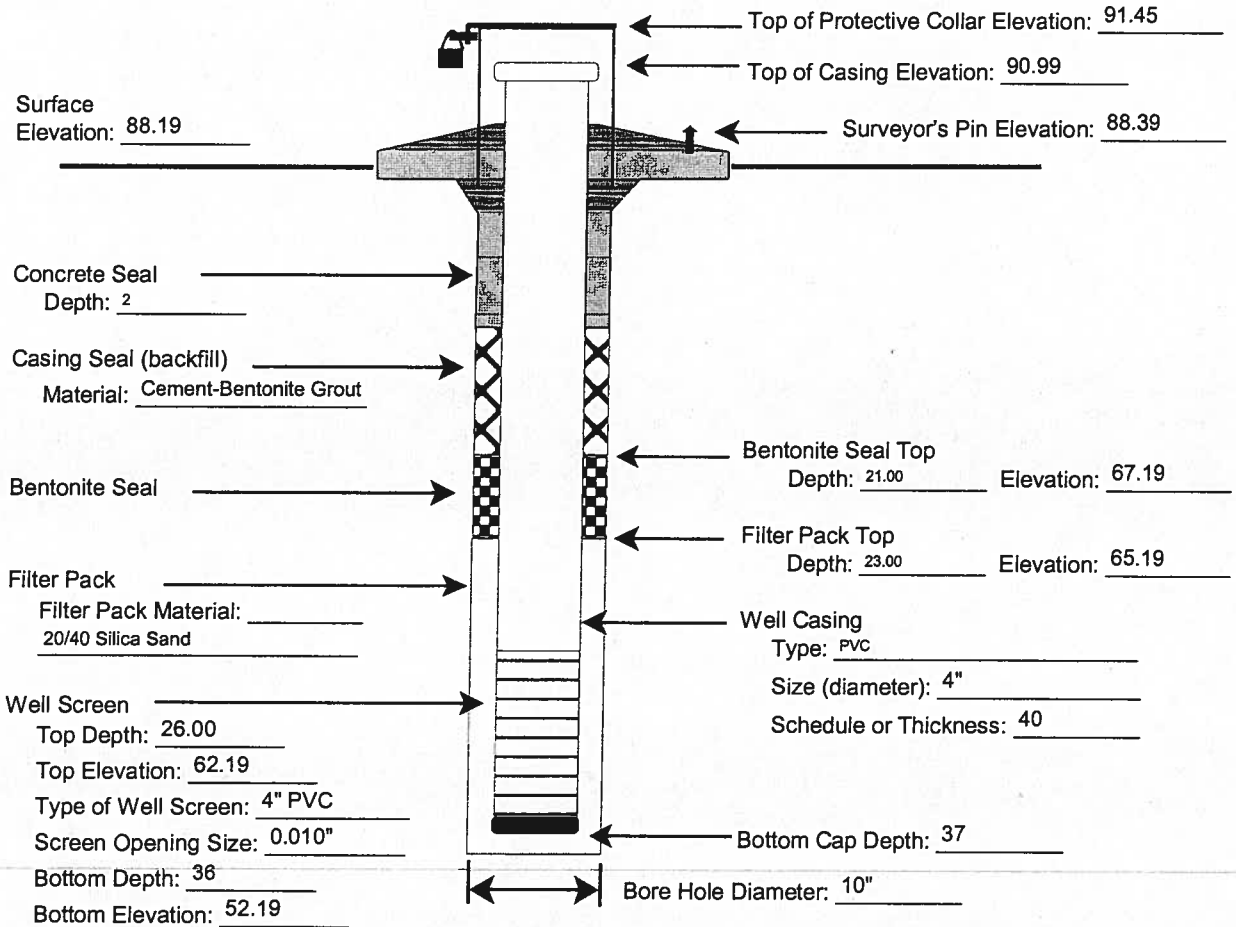
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-10R
Date of Monitor Well Development: 05/05/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 72.68
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/27/2009
Monitor Well Latitude: 26 23' 51.05866" N Longitude: 98 7' 29.08801" W
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

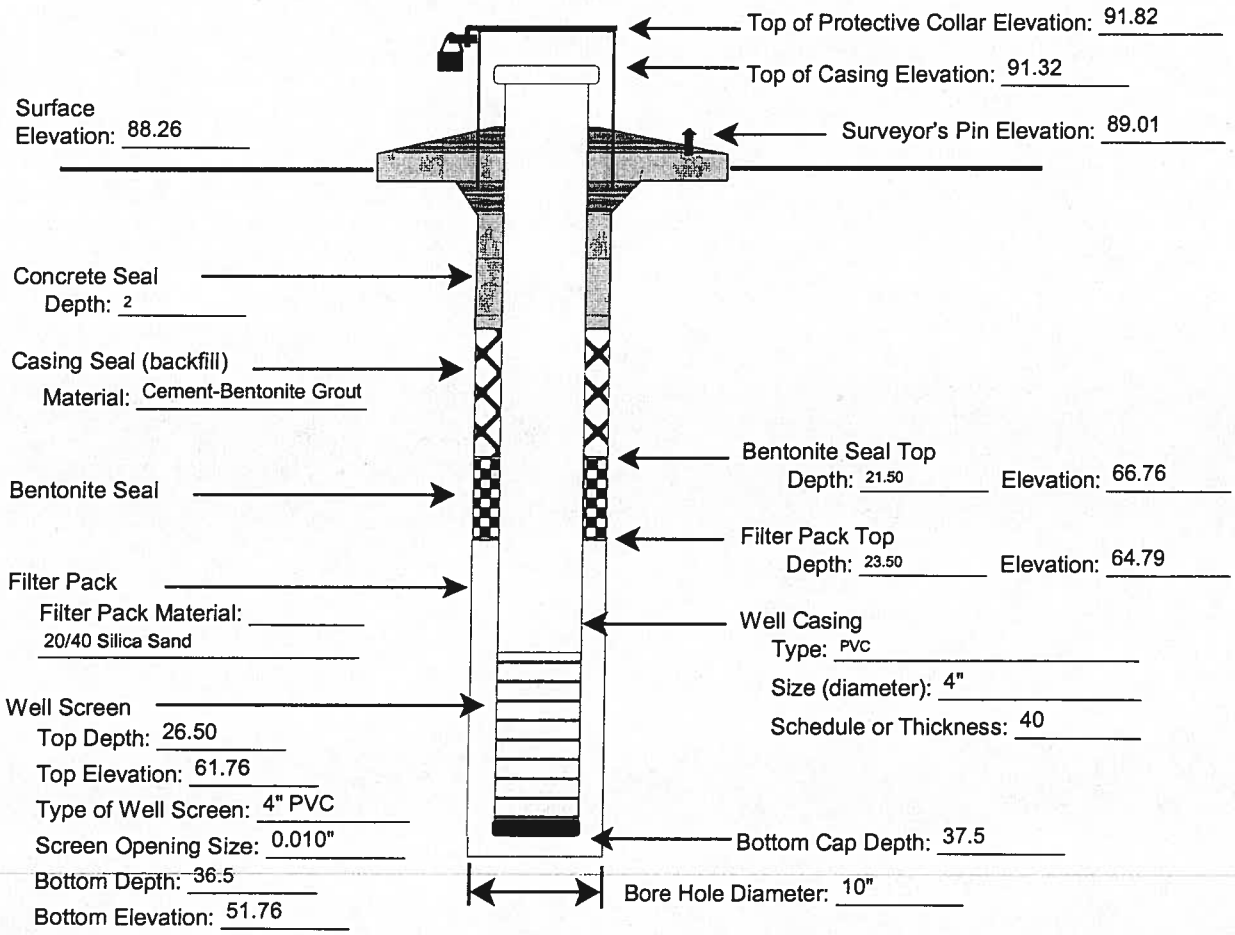
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-15R
Date of Monitor Well Development: 05/08/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 72.34
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock
Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/22/2009
Monitor Well Latitude: 26 23' 49.87290" N Longitude: 98 7' 22.89848" W
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

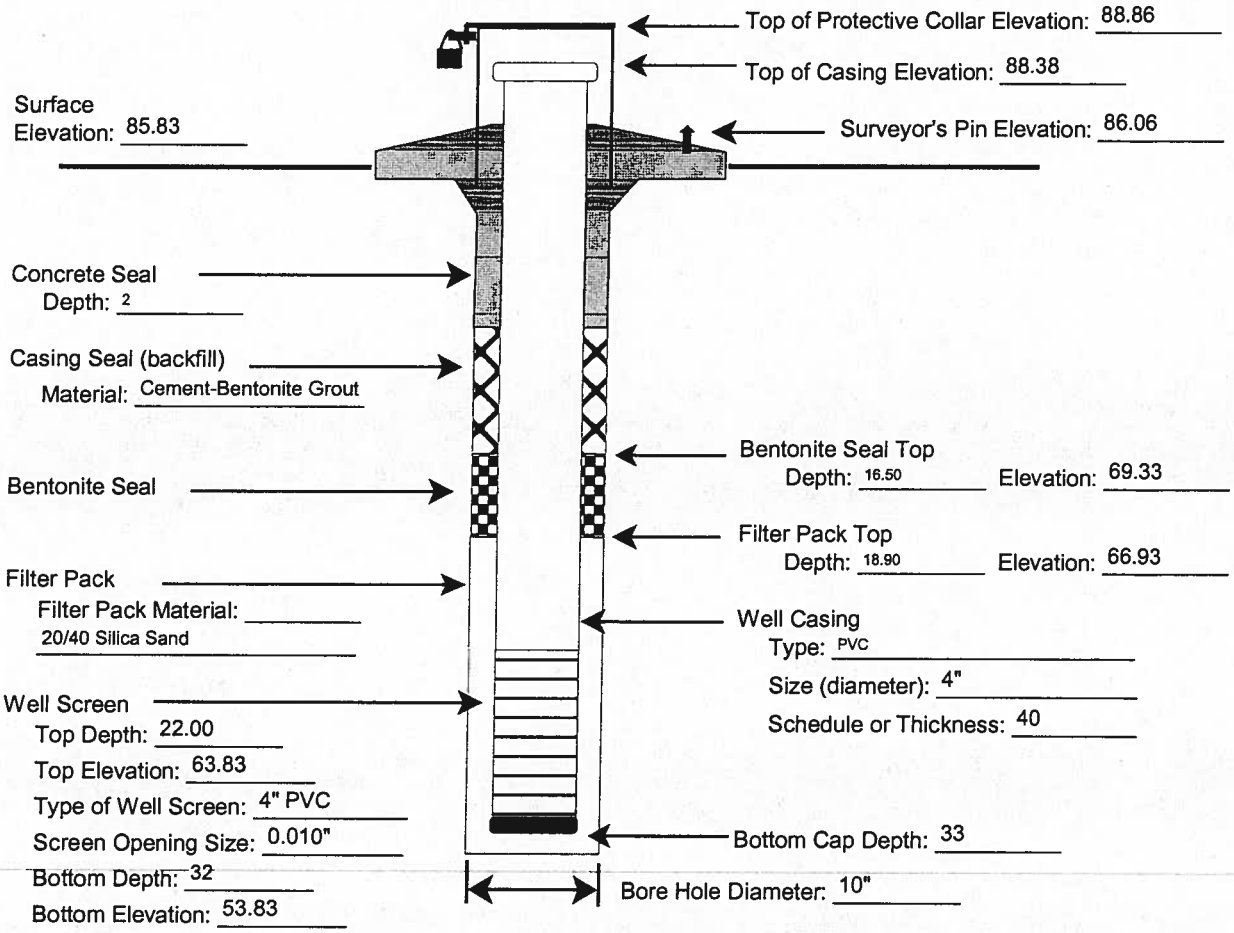
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-16
Date of Monitor Well Development: 05/07/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 67.84
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock
Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/28/2009
Monitor Well Latitude: 26 23' 29.86272" N Longitude: 98 7' 26.13051" W
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient _____

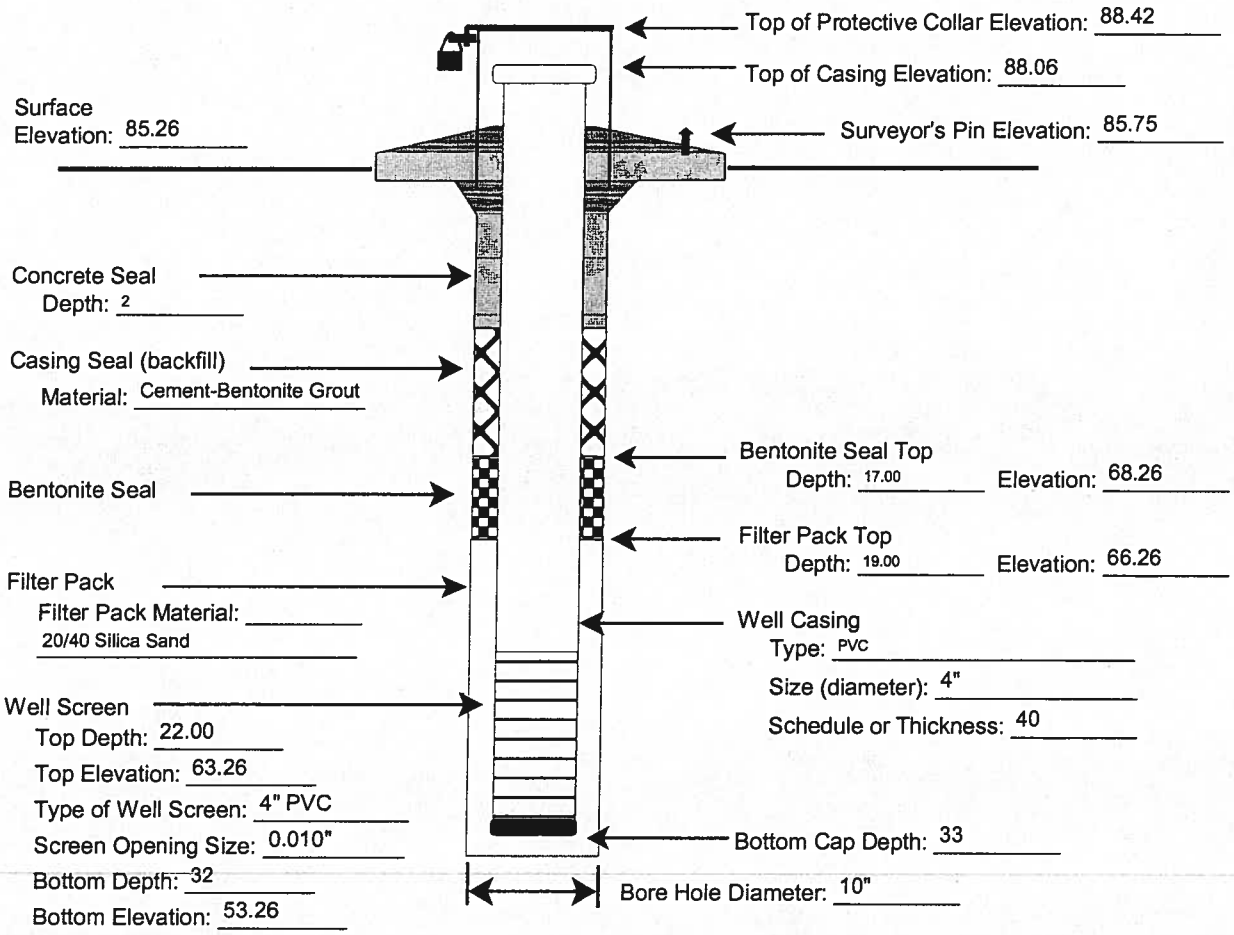
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-18R
Date of Monitor Well Development: 05/07/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 66.60
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/28/2009
Monitor Well Latitude: 26 23' 33.40248" N Longitude: 98 7' 52.09920" W
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient _____

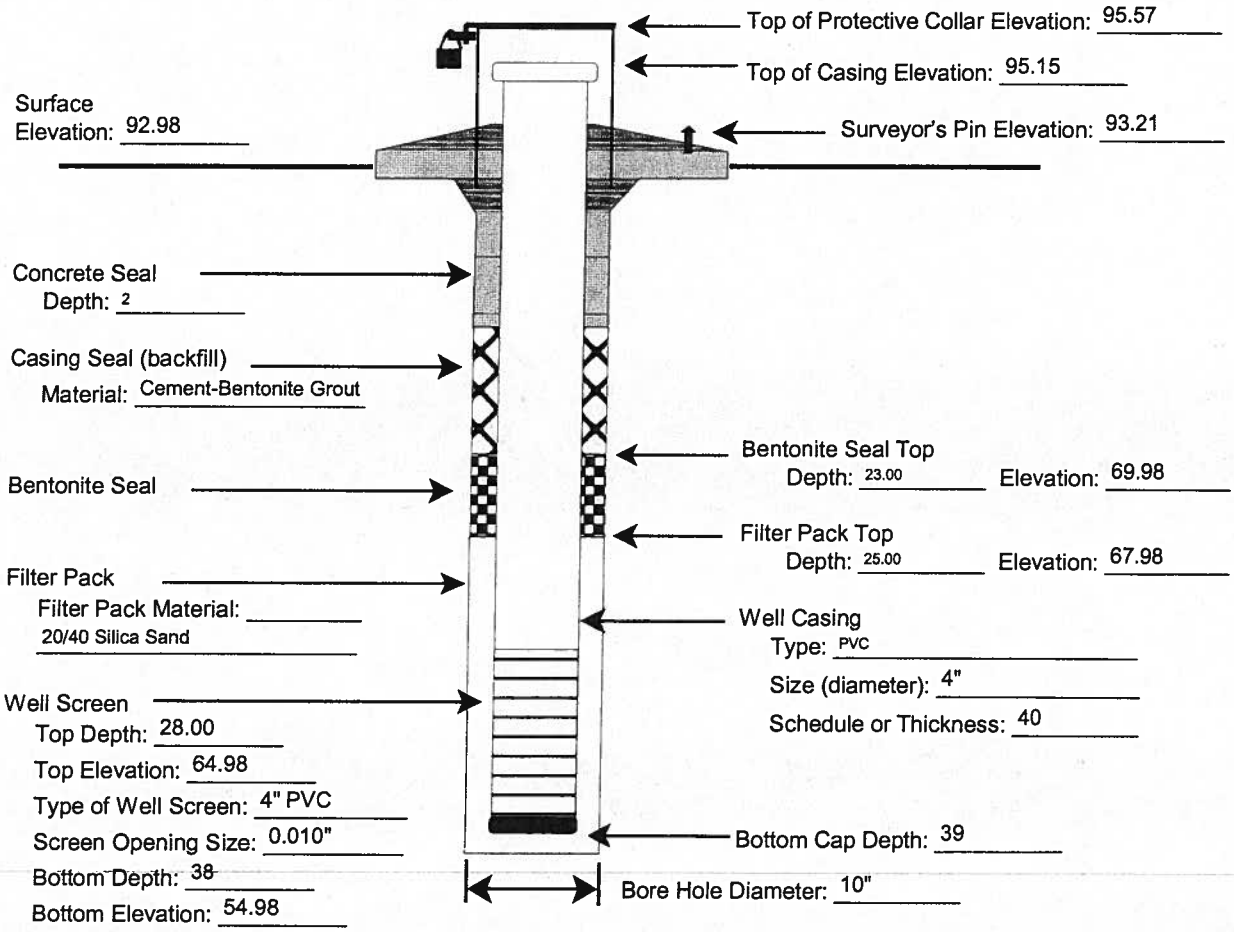
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-22
Date of Monitor Well Development: 05/06/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 73.79
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock
Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/28/2009
Monitor Well Latitude: 26 23' 34.40808" N Longitude: 98 7' 58.62109" W
Monitor Well Groundwater Gradient Position:
Upgradient X Downgradient _____

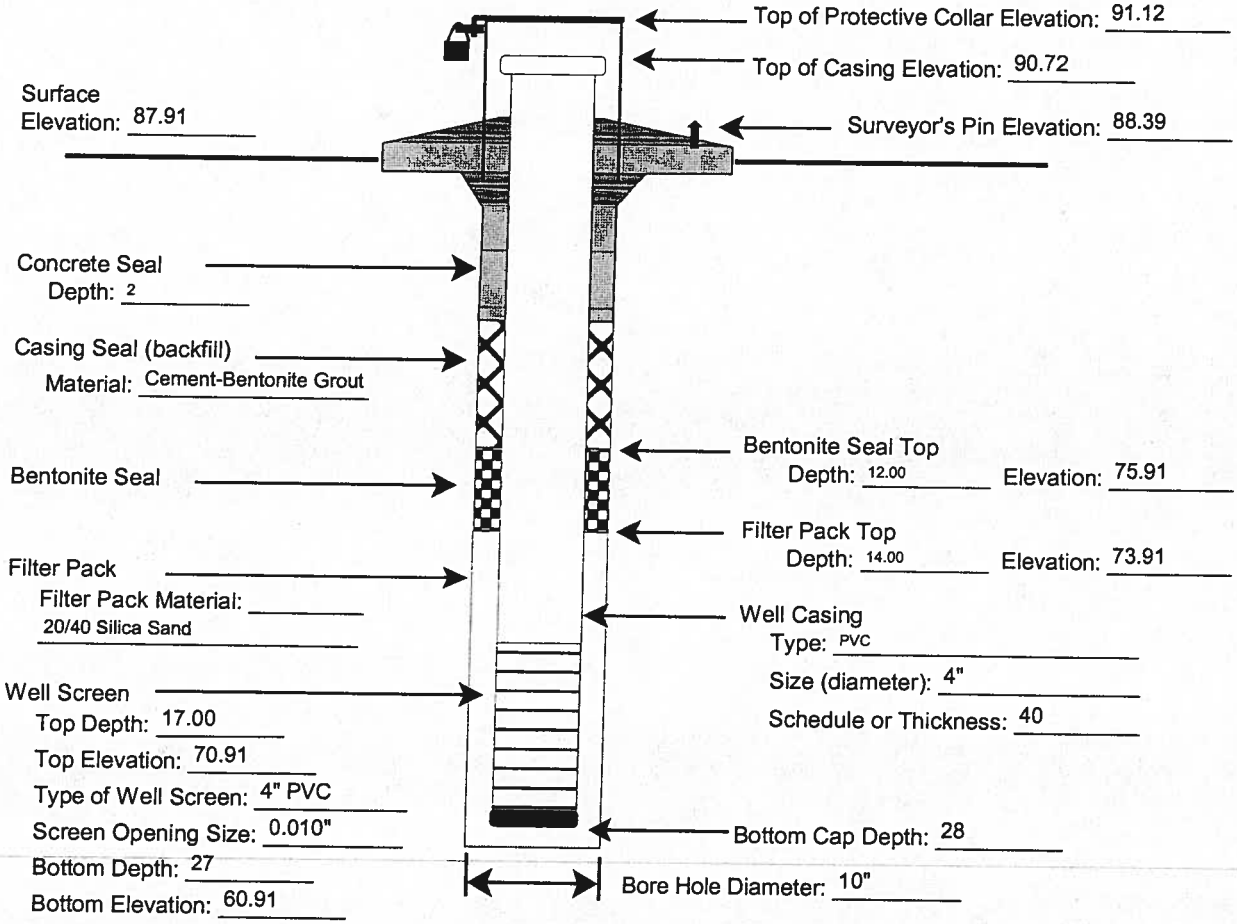
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-23
Date of Monitor Well Development: 05/06/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 72.60
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Permittee or Site Name: Edinburg Sanitary Landfill
County: Hidalgo County
Date of Monitor Well Installation: 04/25/2009
Monitor Well Latitude: 26 23' 52.79769" N Longitude: 98 8' 02.35464" W
Monitor Well Groundwater Gradient Position:
Upgradient _____ Downgradient X

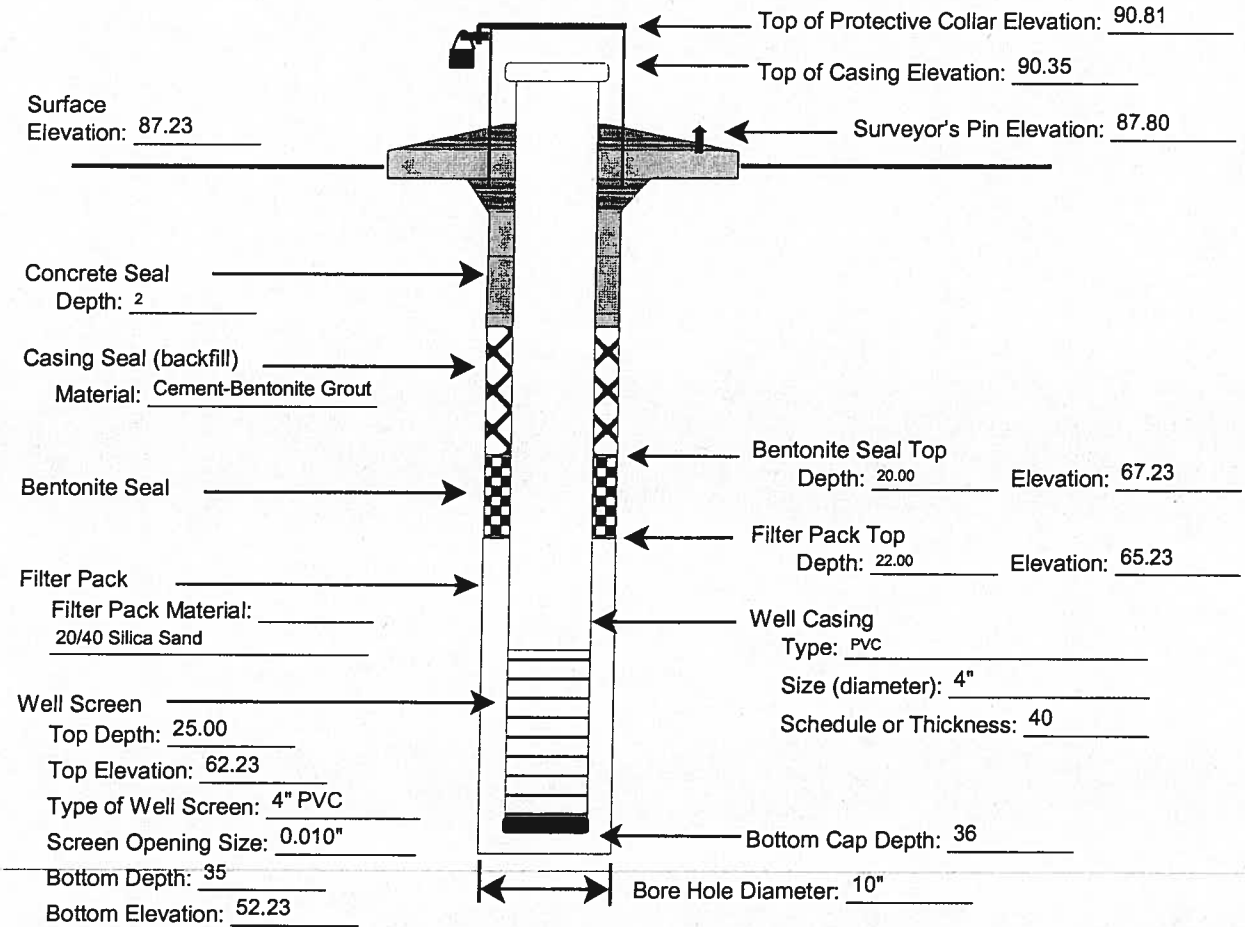
MSW Permit No.: 956-B
Monitor Well I.D. No.: MW-24
Date of Monitor Well Development: 05/05/2009
Monitor Well Driller Name: Danny Gonzales
License No.: 54672

NOTES:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jeffrey B. Fassett, P.E.
Static Water Level Elevation (with respect to MSL) after Well Development: 70.84
Name of Geologic Formation(s) in which Well is completed: Holocene

Type of Locking Device: Padlock Type of Casing Protection: 6" x 6" Steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 4' x 4' x 0.5'



TCEQ-10308

Monitor Well Data Sheet

Texas Commission on Environmental Quality
Waste Permits Division

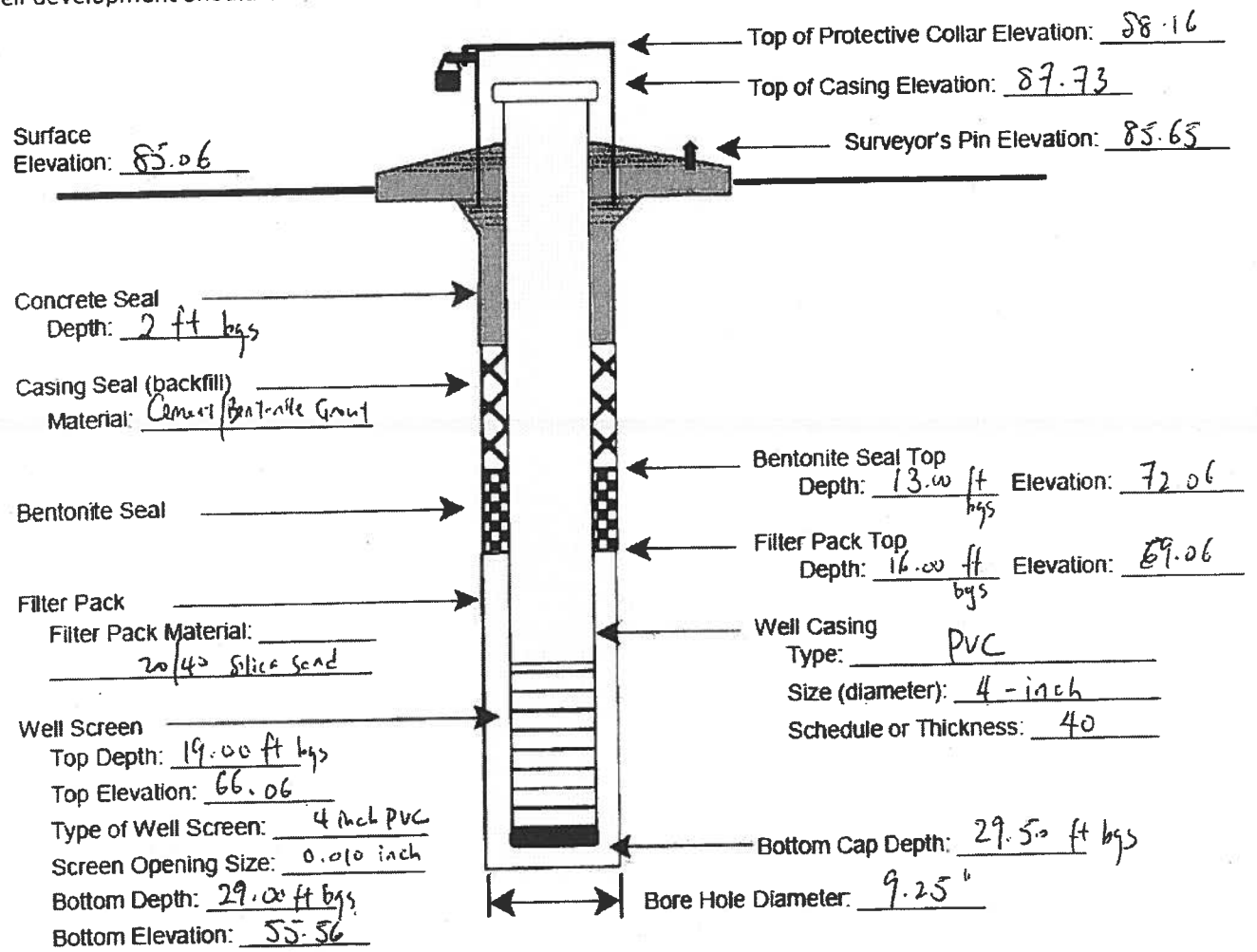
Permittee or Site Name: Edinburg Landfill
County: Hidalgo
Date of Monitor Well Installation: March 25, 2013
Monitor Well Latitude: 26° 17' 14" N Longitude: 98° 9' 58" W
Monitor Well Hydraulic Position:
Upgradient X Downgradient _____

MSW Permit No.: 956B/2302
Monitor Well I.D. No.: MWD-7
Date of Well Development: March 27, 2013
Monitor Well Driller
Name: Craig Schena
License No.: 4694

Geologist, Hydrologist, or Engineer Supervising Well Installation: Jing Song Xi
Static Water Level Elevation (with respect to MSL) after Well Development: 68.22 ft
Name of Geologic Formation(s) in which Well is completed: Holocene
Type of Locking Device: Padlock Type of Casing Protection: 6 in x 6 in steel
Concrete Surface Pad (with steel reinforcement) Dimensions: 6 ft x 6 ft x 6 in

Notes:

- Report all depths from Surface Elevation and all Elevations relative to Mean Sea Level (MSL), to nearest hundredth of a foot.
- Diameter of boring should be at least 4 inches larger than diameter of well casing.
- Use flush screw joint casing only, 2-inch diameter or larger, with o-rings or PTFE tape in joints (4-inch diameter recommend).
- Well development should continue until water is clear, and pH and conductivity are stable.



APPENDIX III5B

GROUNDWATER SAMPLING AND ANALYSIS PLAN

CITY OF EDINBURG SOLID WASTE MANAGEMENT

PERMIT AMENDMENT APPLICATION

Part III, Attachment 5, Appendix B

GROUNDWATER SAMPLING AND ANALYSIS PLAN (GWSAP)

Edinburg Regional Disposal Facility

Edinburg, Hidalgo County, Texas

TCEQ Permit MSW-956C

GOLDER ASSOCIATES INC.
Professional Engineering Firm
Registration Number F-2578

INTENDED FOR PERMITTING PURPOSES ONLY

Submitted To: City of Edinburg
Department of Solid Waste Management
8601 North Jasman Road
Edinburg, Texas 78542 USA

Submitted By: Golder Associates Inc.
500 Century Plaza Drive, Suite 190
Houston, TX 77073 USA

July 2017

Project No. 1401491

Golder Associates

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GOLDER ASSOCIATES INC.
Professional Engineering Firm
Registration Number F-2578

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GOLDER ASSOCIATES INC.
Professional Engineering Firm
Registration Number F-2578

INTENDED FOR PERMITTING PURPOSES ONLY

EXECUTIVE SUMMARY

30 TAC §§330.63(f), 330.405(a), and 330.405(b)

This Groundwater Sampling and Analysis Plan (GWSAP) is prepared in accordance with 30 TAC §330 Subchapter J relating to Groundwater Monitoring and Corrective Action and includes consistent sampling and analysis procedures that are designed to ensure monitoring results that provide an accurate representation of groundwater quality at the background and groundwater monitoring wells installed in compliance with 30 TAC §330.403(a) – (c). The City of Edinburg (City) shall submit this plan to the TCEQ for review and approval prior to commencement of sampling and shall maintain a current copy in the Site Operation Record (SOR).

1.0 GROUNDWATER SAMPLING AND ANALYSIS PROCEDURES

30 TAC §§330.63(f)(6)(E), 330.405(a), 330.405(b)(1), 330.405(b)(3), and 330.405(b)(3)(A)

Consistent analysis procedures are designed to ensure monitoring results that provide an accurate representation of groundwater quality at the groundwater monitor wells. These sampling and analytical methods are appropriate for groundwater sampling and that accurately measure hazardous constituents and other monitoring parameters in groundwater samples. Provided within this section of the GWSAP are procedures and techniques for sample collection, sample preservation and shipment, analytical procedures, chain of custody controls, and quality assurance and quality control. The City shall collect an appropriate number of samples necessary to establish groundwater quality data consistent with the appropriate statistical procedures for detection, assessment, and corrective measures.

1.1 Groundwater Sampling Procedures

1.1.1 Well Inspection

Prior to performing any purging or sampling, each monitoring well will be inspected to assess its integrity. The visual inspection will include the well lock, static water level measuring mark, protective steel casing, concrete pad, and monitor well casing for signs of damage by vandalism, animals, heavy equipment, or other causes. The objective of the visual inspection is to confirm that no outside constituents or other conditions exist that may affect the quality of the sampling. All necessary repairs or maintenance that can be accomplished without a TCEQ modification request will be conducted immediately by the City and documented on the Field Sampling Data Sheet for that well. If it is determined that the integrity of the well has been, or may have been, compromised the necessary information will be documented and the Executive Director of the TCEQ notified. No additional actions will be taken without the approval of the TCEQ.

1.1.2 Sample Collection

1.1.2.1 Equipment Decontamination

All equipment used for water-level measurement, purging, and/or the collection of groundwater samples will be decontaminated prior to use at each well location, unless the equipment is dedicated to a specific well. Appropriate decontamination procedures consists of scrubbing all equipment with a solution of Alconox® or equivalent laboratory grade detergent and deionized, tap, or distilled water, then triple rinsing with deionized or distilled water. Separate containers for each rinsate will be individually set up at each monitor well. At the conclusion of the sampling all the rinsate will be properly disposed with the water generated during purging.

1.1.2.2 Calibration of Field Measurement Devices

Prior to use, all portable field measurement instrumentation, including the turbidimeter and the temperature, conductivity, and pH probes will be accurately calibrated on-site according to manufacturer's specifications. The probes will first be decontaminated to remove foreign material that may have accumulated on their components since their previous use. As recommended by the manufacturer, the probe's accuracy should first be verified and adjusted accordingly. Typically, conductivity probes are factory calibrated, but the accuracy should be confirmed in the field with a solution of known conductance, preferably in the range anticipated in the samples. The pH meter will first be standardized in the field by placing its probe in a neutral reference buffer solution (pH=7), adjusting as necessary, and then rinsed with deionized water. The probe will then be placed in a pH reference buffer solution of either 4 or 10, depending on the pH range anticipated in the samples to be collected, and adjusted accordingly.

Prior to each sampling event, the water depth indicator probe shall be inspected for any damage and for proper operation. In addition, it should be periodically verified for accuracy by a comparison to a calibrated tape.

1.1.2.3 Water Level Measurements

30 TAC §330.405(b)(2)

Groundwater elevations shall be measured at each sampling point prior to bailing or purging; measurement at an event shall be accomplished within a 48 hour period to avoid temporal variations in water levels; sampling at each event shall proceed from the point with the highest water-level elevation to those with successively lower elevations unless contamination is known to be present, in which case wells not likely to be contaminated shall be sampled prior to those that are known to be contaminated.

The static water level below the top of well casing and the total depth of the well will be measured and recorded in the field logbook. Depth measurements will be to the nearest 0.01 foot (ft). Depth measurements will be taken from the north side, top of the well casing at the "permanent measurement mark" each time a measurement is taken. The depth measurement probe will be decontaminated prior to use in each well. A functionality check will consist of dipping the probe into deionized water to see if the alarm sounds at the appropriate time. A visual check of the probe's condition and the condition of the tape and handle will be made when the measurements are being taken. Notation will be made of any minor damage or irregularities on the water level measurement device. If the tape appears to be elongated, kinked, or twisted, then the tape will be checked against a functional tape to determine if there are any discrepancies in the measurements. If the tape is determined to be non-functional due to elongation and/or damage, it will be replaced.

Using the surveyed elevation of the Top of Casing (referenced to mean sea level (msl)), depth to water measurements can be converted to water-level elevations (hydraulic head) by subtracting the depth to static water from Top of Casing (TOC) elevation.

Water-Level Elevation (ft msl) = TOC (ft msl) - Depth to Static Water (ft)

1.1.2.4 Field Sampling Data Sheets and Groundwater Sampling Field Report

A summary of all field activities including date, project name, weather conditions, sampling personnel, purpose of sampling, and site observations will be recorded on the Appendix III5B-1, Groundwater Field Sampling Data Sheet.

1.1.2.5 Purging or Bailing

Personnel performing water level measurements, well purging, or sampling will wear latex or nitrile gloves. The gloves will be changed when they become damaged and when activities begin at a different well location.

The following procedures will be followed for purging or bailing each monitor well prior to sampling:

- Prior to purging the wells, the volume of water in the well casing will be calculated based on the static water level, well casing diameter, and total depth measurements.
- The area around the well will be set-up to minimize potential contamination from the surroundings. If sampling equipment is to be set down, it should be placed on polyethylene sheeting to prevent contamination.
- The monitor well will be purged until a minimum of three well casing volumes of water has been purged, the well has been pumped dry, or until an appropriate amount of water has been purged to achieve the collection of a representative sample.
- A representative sample is considered when the field parameters of temperature, pH, and specific conductivity of the water have stabilized. The field parameters will be considered stable when three consecutive field measurements, taken at least 3- 5 minutes apart, are within 10% of each reading.
- When using a non-dedicated pump to purge the well, the pump intake should be located below, but near the static groundwater depth to allow for the collection of all potential types of contaminates that may exist in the groundwater. Non-dedicated pumps (if used) will be completely decontaminated before using in another well.
- A low flow purging method will be used and the water drawn from the well will be pumped at a rate no more than 500 mL/min.
- Purged effluent will be stored, transported, and disposed of appropriately. The purged water removed from each well will be containerized until the results of the analysis are known. If analytical results indicate contaminants are below the Maximum Contaminant Level (MCL) for constituents that have an MCL and below detection limits for constituents without MCL's, then the water may be discharged into the site's storm water management system. If levels of contamination are above the MCL's or detection limits, the water will be managed as leachate and handled in accordance with the facility's leachate management plan. If required, due to a hazardous classification, the water will be transported and disposed of at a hazardous waste permitted facility.

- Extremely slow recharging wells will be purged dry. The total amount of purged water will be measured and recorded.

The following purging information for each well will be noted and recorded on the sampling field sheet:

- Well number
- Well casing diameter
- Current outside temperature and weather conditions
- Well inspection information
- Date and time
- Static water level and total depth of well
- Height of water column and well casing volume
- Purging discharge rate, well purging time, volume of water purged
- In situ water quality measurements (temperature, pH, specific conductivity and turbidity)

1.1.2.6 Well Sampling

30 TAC §330.405(c)

Sampling personnel will wear nitrile, latex, or other equivalent non-powdered gloves during sampling to avoid contamination to the samples. Generally wells should be sampled within 24 hours of purging the well to obtain a representative groundwater sample. Sampling procedures will follow the low-flow sampling method demonstrated in the Low-Flow Purging and Sampling Demonstration Report dated July 1, 2009. The pump flow rate for the dedicated bladder pump is to be no more than 500 ml per minute. For the collection of the VOCs, the pump flow rate will be adjusted to less than 100 ml per minute. For wells with non-dedicated pumps, the wells will be sampled using a single-use, disposable bailer. Groundwater samples shall not be field-filtered prior to laboratory analysis.

- **Metals** are to be collected in a high density polyethylene (HDPE) or glass container that is preserved with nitric acid ($HN0_3$) to a pH < 2, and immediately chilled to four degrees Celsius (4°C).
- **Other Parameters** are to be collected in polyethylene or glass containers, and immediately chilled to four degrees Celsius (4°C).
- **Volatile Organic Compounds (VOCs)** are to be collected in 40-mL VOA vials that are preserved with hydrochloric acid (HCl) and immediately chilled to four degrees Celsius (4°C). There is to be no headspace or air bubbles when the sample is collected.

As each sample container is filled, the sampling time will be recorded on the sampling field sheet and the container will be labeled with the following information:

- Facility name and/or owner (i.e. City of Edinburg Landfill)
- Monitoring well number (i.e., MW-1)
- Sample date and time
- Preservatives utilized

- Sampler's signature or initials

1.1.3 Sample Preservation

The proper container, preservation technique, and maximum holding times shall be in accordance with the requirements identified in the U.S. EPA Publication No., SW-846 (Test Methods for Evaluating Solid Waste, Physical/Chemical Methods). Preservation of samples may be conducted in the field immediately after the container is filled or the sample container can be pre-preserved by the laboratory in advance of the sampling event based on the specific testing required. The only exception will be for the analyses of volatile organic compounds, in which case the sample containers will always be pre-preserved by the laboratory.

1.1.4 Quality Assurance / Quality Control Samples

To document that sample collection and handling procedures have not affected the quality of the groundwater samples, QA/QC samples shall be prepared and analyzed as detailed below:

- **Equipment Blank:** Following decontamination of all non-dedicated or disposable sampling equipment, and prior to sample collection, reagent-grade water will be run over the sampling equipment and the rinsate will be collected in a clean container labeled as an Equipment Blank. A minimum of one equipment blank will be collected each day. This sample will be analyzed for all detection monitoring constituents, to measure the effectiveness of the decontamination procedure in removing contaminants from one sample collection point to another.
- **Field Blank**: A field blank will be prepared in the field by pouring reagent-grade water into empty sample containers. This procedure shall be conducted on the downwind side of the facility or in another appropriate location that is the most representative of site sampling conditions. A minimum of one field blank will be collected per day. The sample will be analyzed for VOCs only and will verify field sampling procedures and check for the presence of airborne contaminants that may be present at the well site.
- **Trip Blank:** A minimum of one Trip Blank per sampling event and/or number of coolers containing VOC samples (whichever is greater) will be prepared by the laboratory with reagent-grade water, and shall accompany the VOC sample container coolers during site activities, but never opened. This blank will be analyzed for VOCs only to determine if any of the samples and/or containers have become contaminated before, during, or subsequent to the sampling event prior to laboratory analysis.
- **Field Duplicates:** One (1) Field Duplicate will be collected per day. The duplicate samples are prepared by collecting two samples from the same monitor well during the same sample collection period. One of the samples will be labeled as duplicate (i.e. DUP-01) so the laboratory is unaware of the relationship between the two samples. The field personnel will note which well was duplicated on their field forms. The duplicate will be analyzed for all detection monitoring constituents. The purpose of this sample is to check the reliability (precision and accuracy) of the laboratory's techniques.

1.1.5 Sample Shipment

Subsequent to field activities, all samples collected shall be preserved as appropriate, and immediately transported to the laboratory within the required holding times, dictated by the specific analytical methods. To maintain sample integrity, the samples shall be kept in appropriate portable coolers that have a constant interior temperature of 4°C, protect samples from sunlight, and minimize the risk of sample container

breakage. Under no circumstances shall dry ice be used as the chilling agent for sample preservation; dry ice has the potential to freeze samples, which can result in container breakage (i.e., glass containers may shatter). Custody seals will be placed on the coolers and will not be broken until the samples arrive in the analytical laboratory and are checked in by the laboratory personnel.

If samples are shipped by common carrier, the COC form will be completed with the signature of the relinquisher and the date and time relinquished. The COC is then placed in a sealable plastic storage bag and placed in the sample cooler. At the time and place of receipt of the samples, the receiving party will attach a copy of the bill of lading to the COC document.

1.1.5.1 Chain of Custody

The primary objective of the chain-of-custody is to create an accurately written and verified record that can be used to trace the possession and handling of the samples from the moment of collection until receipt by the laboratory. Adequate sample custody will be achieved by proper completion of an approved Chain-of-Custody (COC) Form. Each party handling the samples will sign the COC and provide the date and time when the samples were relinquished or received.

The COC Form includes:

- The unique sample number as obtained from the sample label
- Date and time of sample collection
- Number of total containers per unique sample number
- Number of containers per preservative used
- Source of the sample
- Analysis name and analytical method requested (i.e., OM Metals)
- Name of person taking samples
- Signature of persons involved in the chain-of-custody
- Inclusive dates of possession

1.2 Groundwater Analysis Procedures

1.2.1 Laboratory Procedures

Paramount to the receipt of representative data is that the analytical laboratory closely follows an established QA/QC program. To eliminate the laboratory's interpretation of the items required in a QA/QC program, a detailed QA/QC Plan needs to be requested from the laboratory and submitted to the TCEQ Municipal Solid Waste Permits for review and approval prior to the receipt and analysis of the samples. The QA/QC Plan should include as a minimum, the following criteria:

- Technical expertise, and instrumentation capable of performing the desired analyses.

- Method Detection Limits (MDLs) and practical quantitation limits (PQLs), as appropriate.
- Possession of the required current state and/or health department certifications of competence.
- Frequency of third party chemist validation of analytical data.
- Detailed listing of typical sample holding times, sequence of sample analyses, container certifications of quality and cleanliness, frequency of laboratory and blanks, duplicates, spikes, and instrumentation calibrations.

If at any time the site changes analytical laboratories, the Laboratory Standard Operating Procedures (LSOP) should be submitted to the TCEQ for review and approval of the laboratory's QA/QC procedures. In the event that the laboratory changes over time, updated LSOPs will be submitted by the laboratory to the City. The City will then submit the LSOP to TCEQ for review and approval. All laboratory testing, laboratory QA/QC, and laboratory reporting will be conducted in accordance with 30 TAC §330, Subchapter F.

1.2.2 Practical Quantitation Limit

The practical quantitation limit (PQL) is defined as the lowest concentration reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions and is analogous to the limit of quantitation (LOQ) definition in the most recent available National Environmental Laboratory Accreditation Conference (NELAC) Standard. The PQL is method, instruments, and analyte specific and may be updated as more data becomes available. The PQL must be below the groundwater protection standard established for that analyte as defined by 30 TAC §330.409(h) unless approved otherwise by the TCEQ. The precision and accuracy of the PQL shall be initially determined from the PQLs reported over the course of a minimum of eight groundwater monitoring events. The results obtained from these events shall be used to demonstrate that the PQLs meet the specified precision and accuracy as shown in the table below. The PQL will be supported by analysis of a PQL check sample, which is a laboratory reagent grade sample matrix spiked with chemicals of concern at concentrations equal to or less than the PQL. At minimum, a PQL continues to meet the specified limits for precision and accuracy as defined in the table below.

Table III5B-1: PQL Performance Objectives

Chemical Compound	Precision (%RSD)	Accuracy (% Recovery)	EPA SW-846 Analytical Method
Metals	10	70-130	6010 (6020)
Volatiles	20	50-150	8260
Semi-Volatiles	30	50-150	8270

% RSD – is a measure of precision, calculated as the standard deviation of the set of values divided by the average and multiplied by 100.
% Recovery – is defined as a measure of agreement between analytical measurements and accepted reference values (recover % of a true value)

1.2.3 TCEQ Established PQLs

The MSW Permits Section of the TCEQ has performed an Inter-Laboratory MSW Practical Quantitation Limit (PQL) Study and revised the groundwater monitoring performance objectives to better meet both 40 CFR §258.53(h)(5) and 30 TAC §330.405(f)(5) for the requirements to specify limits for precision and accuracy at the PQL. As a result of the study, MSW-PQL "benchmark" concentrations for the 40 CFR Part 258 Appendix I constituents have been established. If the City does not wish to use the MSW-PQL benchmarks, then the City will be required to demonstrate how the preferred reporting limits chosen are representative of the lower limit of quantitation that can meet the PQL performance objectives.

Appendix III5B-2A, Detection Monitoring Constituents contains the 40 CFR Part 258 Appendix I constituents, EPA SW-846 Analytical Method, and associated MSW-PQL benchmark concentrations. EPA Method 6020 may be used for metals analysis because instrumentation is capable of attaining reporting limits for all metal constituents, which are low enough to capture concentrations at or below regulatory groundwater protections standards.

The most current MSW-PQL benchmark concentrations must be used in lieu of Method Detection Limits (MDLs) as reporting limits. Only concentrations at or above the MSW-PQL shall be reported and those less than the MSW-PQL will be reported as non-detected.

2.0 DETECTION MONITORING PROGRAM

30 TAC §§330.63(f)(5), 330.407(a), & 330.407(d)

The detection monitoring program provides for the sampling and analysis of groundwater at each of the groundwater monitor wells in the groundwater monitoring system to determine if there is a Statistical Significant Increase (SSI) in any hazardous constituents listed in the table located in 40 Code of Federal Regulations Part 258, Appendix I. After establishment of the background groundwater quality, the detection monitoring frequency shall be at least semiannual during the active life of the facility and the closure and post-closure care period. If the City determines that the detection monitoring program no longer satisfies the requirements of 30 TAC §330.407, the City must, within 90 days of this determination, submit an application for a permit amendment or modification to make any appropriate changes to the program.

2.1 Detection Monitoring Constituents

30 TAC §330.419

The City shall sample and analyze groundwater at each of the groundwater monitor wells in the groundwater monitoring system for any hazardous constituents listed in the table located in 40 Code of Federal Regulations Part 258, Appendix I. Appendix III5B-2A, Detection Monitoring Constituents lists the 40 CFR

Part 258 Appendix I constituents. In addition, the monitoring wells may also be sampled for water quality parameters listed in Appendix III5B-2B, Water Quality Parameters.

2.2 Background Quality Establishment

30 TAC §§330.63(f)(5)(B), 330.405(d), & 330.407(a)(1)

Background sampling for a groundwater monitoring well within the groundwater monitoring system shall be completed on a quarterly basis until eight non-filtered statistically independent samples is collected and analyzed. Testing results will be analyzed and using a statistical method described in Section 4.0, Groundwater Monitoring Data Evaluation to establish background values, or upper prediction limits (UPLs), for each Detection Monitoring Constituent for each groundwater monitoring well within the groundwater monitoring system. Background data sets may be updated once every two years with semiannual detection monitoring results that are demonstrated to be representative of background groundwater quality. At least one sample from each groundwater monitor well shall be collected and analyzed during each subsequent semiannual sampling event.

Upon completion of background monitoring and during background updates, the background data to will be evaluated ensure that the data are representative of background groundwater constituent concentrations unaffected by waste management activities, leakage from a solid waste management unit, or other sources of contamination. The evaluation shall be documented in a report and submitted to the TCEQ before the next subsequent groundwater monitoring event following the updated background period.

2.3 Detections Above Established Background Quality

30 TAC §330.407(b)

Not later than 60 days after each sampling event, the City shall determine whether there has been an exceedance over background of any tested Detection Monitoring Constituents at any groundwater monitor well. An exceedance is determined to be a detection above the upper prediction limit (UPL) of the established background value for inorganic constituents; for volatile organic constituents an exceedance is determined to be a detection above the TCEQ established MSW-PQL benchmark concentrations listed in Appendix III5B-2A, Detection Monitoring Constituents.

If an exceedance is determined, the City shall notify the TCEQ of the initial exceedance, and any local pollution agency with jurisdiction that has requested to be notified, in writing within 14 days. The Notice of Initial Exceedance will include a statement explain how the City intends to proceed regarding any initial exceedances. Possible actions include:

- treating the initial exceedance as an statistically significant increase (SSI) and establishing an assessment monitoring program,

- conducting verification resampling, or
- preparing and submitting an alternate source demonstration (ASD)

2.3.1 Statistically Significant Increase

30 TAC §330.407(b)(1)

If the City determines a statistically significant increase (SSI) over background of any tested constituent at any monitoring well, the City shall immediately place a notice in the site operating record (SOR) describing the increase and shall establish an assessment monitoring program meeting the requirements of 30 TAC §330.409 within 90 days of the date of the required notice to the TCEQ.

2.3.2 Verification Resampling

30 TAC §330.407(b)(2)

If an exceedance is determined over background of any tested Detection Monitoring Constituents at any monitoring wells, the City may submit the results of verification resampling as appropriate for the statistical method being used within 60 days of determining the initial exceedance. The resample data may be used to statistically confirm or disprove an SSI.

2.3.3 Alternative Source Demonstration e.d.17, e.d.18, e.d.19, e.d.20, & e.d.21

30 TAC §§330.407(b)(3), & 330.407(b)(4)

If a SSI increase over background of any tested Detection Monitoring Constituents at any groundwater monitoring well has occurred and the City has reasonable cause to believe that a source other than a landfill unit caused the contamination or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality, then the City may submit a report providing documentation to this effect. In making an alternative source demonstration, the City must:

- notify the TCEQ, and any local pollution agency with jurisdiction that has requested to be notified, in writing within 14 days of determining a SSI over background at the compliance point that the City intends to make a demonstration;
- within 90 days of determining a SSI, submit a report to the TCEQ, and any local pollution agency with jurisdiction that has requested to be notified, that demonstrates that a source other than a monitored landfill unit caused the contamination or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The report must be prepared and certified by a qualified groundwater scientist;
- not filter the groundwater sample for constituents addressed by the demonstration prior to laboratory analysis. The TCEQ may also require City to provide analyses of the landfill leachate to support the demonstration; and
- continue to monitor in accordance with the Detection Monitoring Program.

If the City does not make a demonstration satisfactory to the TCEQ within 90 days after the date of the required notice to the TCEQ, the City shall initiate an assessment monitoring program that meets the requirements of 30 TAC §330.409. The TCEQ may require the City to install additional wells at the point of compliance to further characterize the release.

2.4 Annual Detection Monitoring Report

30 TAC §330.407(c)

The City shall submit an annual detection monitoring report within 90 days after the facility's last groundwater monitoring event in a calendar year that must include the following information determined since the previously submitted annual report:

- a statement regarding whether a statistically significant increase has occurred over background values in any well during the previous calendar year period and the status of any statistically significant increase events;
- the results of all groundwater monitoring, testing, and analytical work obtained or prepared under the requirements of this GWSAP, including a summary of background groundwater quality values, groundwater monitoring analyses, statistical calculations, graphs, and drawings;
- the groundwater flow rate and direction in the uppermost aquifer. The groundwater flow rate and direction of groundwater flow shall be established using the data collected during the preceding calendar year's sampling events from the monitoring wells of the detection monitoring program. The City shall also include in the report all documentation used to determine the groundwater flow rate and direction of groundwater flow;
- a contour map of piezometric water levels in the uppermost aquifer based at a minimum upon concurrent measurement in all monitoring wells. All data or documentation used to establish the contour map should be included in the report;
- recommendation for any changes; and
- any other items requested by the TCEQ.

In addition, the City will submit the entire laboratory report which includes laboratory QA/QC data and laboratory analytical data, a laboratory case narrative, and a laboratory checklist. The facility may explain any problems encountered in the laboratory analysis, either by adding additional explanations to the checklist or by extending the laboratory case narrative. Any information required in the laboratory case narrative that cannot be completed by the laboratory will be completed by the City.

3.0 ASSESSMENT MONITORING PROGRAM

30 TAC §§330.63(f)(6), 330.409(a), & 330.409 (g)(4)

An assessment monitoring program will be initiated within 90 days whenever the City determines there has been a SSI over background for one or more of the Detection Monitoring Constituents or the TCEQ does not accept an alternate source demonstration (ASD) for the SSI. The assessment monitoring program

provides for the sampling and analysis of groundwater at each of the groundwater monitor wells in the groundwater monitoring system to determine if there is a Statistical Significant Level (SSL) above the groundwater protection standard (GWPS) of any hazardous constituents listed in the table located in 40 Code of Federal Regulations Part 258, Appendix II.

If the presence of hazardous constituents listed in 30 TAC §330.419 has been detected in the groundwater at the time of the permit application, the City shall submit sufficient information, supporting data, and analyses to establish an assessment monitoring program that meets the requirements of 30 TAC §330.409. If the City determines that the assessment monitoring program no longer satisfies the requirements of 30 TAC §330.409 relating to Assessment Monitoring Program, the City must, within 90 days, submit an application for a permit amendment or modification to make any appropriate changes to the program.

3.1 Assessment Monitoring Constituents

30 TAC §§330.63(f)(6)(C) & 330.409(b)

At the initiation of the assessment monitoring program, the City shall sample and analyze the groundwater monitoring system for the full set of constituents listed in in the table located in 40 Code of Federal Regulations Part 258, Appendix II. The Appendix II constituents are inclusive of the Detection Monitoring Constituents. Appendix III5B-2C, Assessment Monitoring Constituents lists the 40 CFR Part 258 Appendix II constituents.

3.2 Assessment Sampling

30 TAC §§330.409(b), 330.409 (c)(1)-(5), 330.409 (d), & 330.409 (d)(1)

A minimum of one sample shall be collected from each groundwater monitor well and analyzed for the Assessment Monitoring Constituents. Not later than 60 days after the initial assessment sampling event, the City shall submit to the TCEQ the Assessment Monitoring Constituents results from the initial sampling event and place them in the site operating record.

After sampling all groundwater monitor wells for Assessment Monitoring Constituents, the TCEQ may specify an appropriate subset of wells to be sampled and analyzed for the Assessment Monitoring Constituents during assessment monitoring and may delete any of the Assessment Monitoring Constituents for a municipal solid waste management unit if the City can document that the removed constituents are not reasonably expected to be in or derived from the waste contained in the unit.

The TCEQ may specify an alternative monitoring frequency for repeated sampling and analysis during the active life and the closure and post-closure care period for the Assessment Monitoring Constituents. The alternative frequency during the active life and the closure and post-closure care period shall be not less than annual. The alternative frequency shall be based on consideration of the following factors:

- lithology and hydraulic conductivity of the aquifer and unsaturated zone;
- groundwater flow rates;
- minimum distance of travel from the waste nearest to any groundwater monitoring well;
- resource value of the uppermost aquifer; and
- nature (fate and transport) of any constituents detected.

Within 90 days of submittal of the results from the initial assessment sampling event and on at least a semiannual basis thereafter, resample all groundwater monitor wells in the groundwater monitoring system or TCEQ approved subset of wells and conduct analyses for all Detection Monitoring Constituents and for those additional Assessment Monitoring Constituents that are detected. Not later than 60 days after each sampling event, the City shall submit to the TCEQ the Assessment Monitoring Constituents results from the initial and subsequent sampling events and place them in the site operating record.

3.3 Background Quality Establishment

30 TAC §§330.409(b) & 330.409(d)(2)

For any new constituent(s) detected in the groundwater monitor wells as a result of the complete Assessment Monitoring Constituents analysis, a minimum of four statistically independent samples from each groundwater monitor well shall be collected and analyzed to establish background levels for the additional constituent(s).

3.4 Duration of Assessment Monitoring

30 TAC §§330.409(e) & 330.409(f)

If the concentrations of the Assessment Monitoring Constituents are shown to be at or below background values, using the statistical procedures in 30 TAC §330.405(f) for two consecutive sampling events, the City must notify the TCEQ in writing and return to detection monitoring if approved. If the concentrations of the Assessment Monitoring Constituents are above background values, but below the established groundwater protection standard City shall continue assessment monitoring.

3.5 Groundwater Protection Standards

30 TAC §§330.409(d)(3), 330.409(h), & 330.409(i)

The City shall establish a GWPS for Assessment Monitoring Constituents detected in the groundwater monitor wells. The groundwater protection standard must be:

- for constituents for which a maximum contaminant level (MCL) has been promulgated under 40 CFR Part 141, Safe Drinking Water Act (codified), §1412, the MCL for that constituent;

- for constituents for which MCLs have not been promulgated, the background concentration for the constituent established from wells; or
- for constituents for which the background level is higher than the MCL, the background concentration.

The TCEQ may establish an alternative GWPS for Assessment Monitoring Constituents for which MCLs have not been established. These GWPS shall be appropriate health-based levels that satisfy either the criteria of the following:

- the level is derived in a manner consistent with United States Environmental Protection Agency guidelines for assessing the health risks of environmental pollutants (51 FR 33992, 34006, 34014, 34028, September 24, 1986);
- the level is based on scientifically valid studies conducted in accordance with the Toxic Substances Control Act Good Laboratory Practice Standards (40 CFR Part 792) or equivalent;
- for carcinogens, the level represents a concentration associated with an excess lifetime cancer risk level (due to continuous lifetime exposure) with the 1 x 10-4 to 1 x 10 -6 range; and
- for systemic toxicants, the level represents a concentration to which the human population (including sensitive subgroups) could be exposed to on a daily basis that is likely to be without appreciable risk of deleterious effects during a lifetime. For purposes of this subchapter, systemic toxicants include toxic chemicals that cause effects other than cancer or mutation; or

inclusive or comply with the level is developed in accordance with 30 TAC §350, Texas Risk Reduction Program.

3.6 Detections above Groundwater Protection Standards

30 TAC §330.409(g)

Not later than 60 days after each sampling event, the City shall determine whether any Assessment Monitoring Constituents were detected at statistically significant levels (SSLs) above the established groundwater protection standard (GWPS) in any sampling event. A SSL is when the calculated 95% lower confidence limit (LCL) from the eight previous sampling events exceeds the GWPS. If a SSL has been determined, the City shall notify the TCEQ and appropriate local government officials in writing within seven days.

3.6.1 Requirements e.d.96, e.d.97, e.d.98, & e.d.99

30 TAC §330.409(g)(1)

If the groundwater protection standard has been exceeded, the City shall also:

- characterize the nature and extent of the release by installing additional monitoring wells as necessary;

- install at least one additional monitoring well between the monitoring well with the statistically significant level and the next adjacent wells along the point of compliance before the next sampling event and sample these wells;
- notify in writing all persons that own or occupy the land that directly overlies any part of the plume of contamination if contaminants have migrated off-site as indicated by sampling of wells; and
- initiate Assessment of Corrective Measures Program all within 90 days of the notice to the TCEQ.

3.6.2 Alternate Source Demonstration e.d.100, e.d.101, e.d.102, & e.d.103

30 TAC §330.409(g)(2)-(3)

The City may demonstrate that a source other than the monitored solid waste management unit caused the contamination or that the SSL resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. In making an alternative source demonstration (ASD), the City must:

- notify the TCEQ in writing within 14 days of determining a SSL above the GWPS at the point of compliance that the City intends to make an ASD;
- within 90 days of determining a SSL above the GWPS, submit a report to the TCEQ that demonstrates that a source other than the monitored solid waste management unit caused the contamination or that the SSL resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The report shall be prepared and certified by a qualified groundwater scientist;
- not filter the groundwater samples for constituents addressed by the demonstration prior to laboratory analysis. The TCEQ may also require the City to provide analysis of landfill leachate to support the demonstration; and
- continue to monitor in accordance with the Assessment Monitoring Program.

If a successful ASD is made, the City shall continue monitoring in accordance with the Assessment Monitoring Program and may return to detection monitoring if the Assessment Monitoring Constituents are at or below established background concentrations. Until a successful demonstration is made, the City shall comply with the requirements of this section including initiating an assessment of corrective measures.

3.7 Assessment of Corrective Measures

30 TAC §330.63(f)(7)

If hazardous constituents have been measured in the groundwater that exceed the concentration limits of the established GWPS, the City shall submit sufficient information, supporting data, and analyses to establish a corrective action program that meets the requirements of 30 TAC §330.411 and §330.413 relating to Assessment of Corrective Measures and Selection of Remedy, respectively. To demonstrate compliance with of 30 TAC §330.411, the City shall address, at a minimum, the following:

- a characterization of the contaminated groundwater, including concentrations of assessment constituents as defined in §330.409 of this title;
- the concentration limit for each constituent found in the groundwater;
- detailed plans and an engineering report describing the corrective action to be taken;
- a description of how the groundwater monitoring program will demonstrate the adequacy of the corrective action; and
- a schedule for submittal of the aforementioned information required provided the City obtains written authorization from the TCEQ prior to submittal of the complete permit application.

Implementation of the Corrective Action Program will be conducted in accordance with 30 TAC § 330.415.

3.8 Annual Assessment Monitoring Report

30 TAC §§330.63(f)(6)(A), 330.409(k), & 330.409(k)(1)-(6)

The City shall submit an annual assessment monitoring report within 60 days after the facility's second semiannual groundwater monitoring event that includes the following information determined since the previously submitted report:

- a statement whether an statistically significant level above the established groundwater protection standard groundwater monitor well during the previous calendar year period and the status of any statistically significant level events;
- the results of all groundwater monitoring, testing, and analytical work obtained or prepared in accordance with the requirements of this GWSAP, including a summary of background groundwater quality values, groundwater monitoring analyses, statistical calculations, graphs, and drawings;
- the groundwater flow rate and direction in the uppermost aquifer. The groundwater flow rate and direction of groundwater flow shall be established using the data collected during the preceding calendar year's sampling events from the monitoring wells of the Assessment Monitoring Program. The City shall also include in the report all documentation used to determine the groundwater flow rate and direction of groundwater flow;
- a contour map of piezometric water levels in the uppermost aquifer based, at a minimum, upon concurrent measurement in all groundwater monitor wells. All data or documentation used to establish the contour map should be included in the report;
- recommendation for any changes; and
- any other items requested by the TCEQ such as a description of any special wastes previously handled at the facility.

In addition, the City will submit a laboratory case narrative and a laboratory checklist with all analysis submitted to the TCEQ. An example laboratory review checklist and exception report is included in Appendix D. In place of the laboratory checklist, the facility may submit a copy of the laboratory QA/QC and analytical data. The facility may explain any problems encountered in the laboratory analysis, either by adding additional explanations to the checklist or by extending the laboratory case narrative. Any

information required in the laboratory case narrative that cannot be completed by the laboratory will be completed by the City.

4.0 GROUNDWATER MONITORING DATA EVALUATION

30 TAC §§330.63(f)(5)(C) & 330.63(f)(6)(E)

Provided in the following sections are a description of statistical comparison procedures that may be utilized in evaluating groundwater monitoring data in accordance with 30 TAC §330.405 (e) – (f).

4.1 Statistical Methods

30 TAC §330.405(e)

One or more of the following statistical methods may be used in evaluating groundwater monitoring data for each parameter or constituent analyzed as required for the Detection Monitoring Program and Assessment Monitoring Program under 30 TAC §330.407 and §330.409 respectively. These statistical analysis methods are necessary to determine whether a statistically significant increase (SSI) over background has occurred. The statistical analysis of monitoring data occurs after receiving validated results from each sampling and analysis event. The statistical test(s) chosen shall be conducted separately for each tested constituent in each groundwater monitoring well or sampling point.

Different methods may be selected for each groundwater quality constituent. The appropriateness of a method must be substantiated by demonstrating that the distribution of the data for that constituent is appropriate for the method. Selection of a specific method is described in the USEPA "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Interim Final Guidance" (USEPA, 1989) and is also discussed in "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Addendum to Interim Final Guidance" (USEPA, 1992). The methods include the following:

- a parametric analysis of variance followed by multiple-comparisons procedures to identify statistically significant evidence of contamination. The method shall include estimation and testing of the contrasts between each point of compliance well's mean and the background mean levels for each constituent;
- an analysis of variance based on ranks followed by multiple-comparisons procedures to identify statistically significant evidence of contamination. The method shall include estimation and testing of the contrasts between each point of compliance well's median and the background median levels for each constituent;
- a tolerance or prediction interval procedure in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each point of compliance well is compared to the upper tolerance or prediction limit;
- a control-chart approach that gives control limits for each constituent; and
- another statistical test method that meets the performance standards. The City shall submit to the TCEQ satisfactory justification for this alternative test. Sanitas™ statistical software may be used to determine intrawell statistical "upper prediction limits".

4.2 Performance Standards

30 TAC §330.405(f)

The statistical performance standards provide a means to limit the possibility of making false conclusions from the monitoring data. Any statistical method chosen shall comply with the following performance standards, as appropriate. The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of tested constituents. If the distribution of a tested constituent is shown by the City to be inappropriate for a normal theory test, then the data should be transformed or a distribution-free theory test should be used. If the distributions for the constituents differ, more than one statistical method may be needed. Any statistical method chosen shall comply with the following performance standards, as appropriate:

- The statistical method used to evaluate groundwater monitoring data shall be appropriate for the distribution of tested constituents. If the distribution of a tested constituent is shown by the owner or operator to be inappropriate for a normal theory test, then the data should be transformed or a distribution-free theory test should be used. If the distributions for the constituents differ, more than one statistical method may be needed.
- If an individual well (or sampling point) comparison procedure is used to compare an individual compliance well constituent concentration with background constituent concentrations or a groundwater protection standard, the test shall be done at a Type I error level no less than 0.01 for each testing period. If a multiple-comparisons procedure is used, each testing period shall be no less than 0.05, but the Type I error of no less than 0.01 for individual well comparisons shall be maintained. This performance standard does not apply to tolerance intervals, prediction interval, or control charts.
- If a control-chart approach is used to evaluate groundwater monitoring data, the specific type of control chart and its associated parameter values shall be protective of human health and the environment. These parameters shall be determined after considering the number of samples in the background database, the data distribution, and the range of the concentration values for each constituent of concern.
- If a tolerance interval or a prediction interval is used to evaluate groundwater monitoring data, the levels of confidence, and for tolerance intervals the percentage of the population that the interval must contain, shall be protective of human health and the environment. These parameters shall be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.
- The statistical method shall account for data below the limit of detection with one or more statistical procedures that are protective of human health and the environment. Any practical quantitation limit that is used in the statistical method shall be the lowest concentration level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.
- If necessary, the statistical method shall include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

4.3 Data Presentation

Upon receiving the groundwater sampling data from the laboratory, it shall be organized in a format that it can be clearly understood and analyzed. For each sampling event, the City will make a selection of at least one or more of the following data presentation formats:

- **Tables:** provide an overall summary of the data in a neat, clearly understood format that allows straightforward analysis and comparison to other data points and standards;
- **Contour Maps:** placement of contaminant concentrations in contours on a map assist in conveying a clearer picture of contamination distribution. Contaminant distribution and associated concentrations will dictate whether this format can be easily utilized;
- **Time Series Displays (X and Y Line Graphs)**: assist in the display of single or multiple contaminant concentration variations over time for a single data point or for multiple point comparison; and/or
- **Histograms (X and Y Bar Graphs)**: allows comparisons of the magnitudes of single or multiple data point contaminant concentrations.

The groundwater sampling and laboratory analytical results will be submitted to the TCEQ on forms and electronic formats specified by the TCEQ.

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Africa	+ 27 11 254 4800
Asia	+ 852 2562 3658
Australasia	+ 61 3 8862 3500
Europe	+ 356 21 42 30 20
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

Golder Associates Inc.
500 Century Plaza Drive, Suite 190
Houston, TX 77073 USA
Tel: (281) 821-6868
Fax: (281) 821-6870

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APPENDIX III5B-1

GROUNDWATER FIELD SAMPLING DATA SHEET

FIELD SAMPLING DATA SHEET

FACILITY NAME:_____

LOCATION:_____

OWNER:_____

Date: _____Temperature: _____Weather:_____Time:_____

Sampling Team:_____

Purpose of Sampling:_____Background _____Semi-annual _____Annual Quarterly

Phase:_____Detection Monitoring _____ Assessment Monitoring _____ Other

Purge Method: = _____ Bail _____ Pump _____ Low Flow

Sample Method: = _____ Bailer _____ Low Flow

Site Observations: _____

_____

Total Depth: = _____ Static Water Level= _____ WC = _____ Purge vol. = _____

Field Testing Results:

Time	pH	Temp (Co)	Conductivity ms/cm	Q ml/minute	ORP mv	DO (mg/L)	TDS (ppm)

TDS – Total Dissolved Solids

(Sampled: Date _____ Time:_____)

Reported By:_____

APPENDIX III5B-2

MONITORING CONSTITUENTS

APPENDIX III5B-2A

DETECTION MONITORING CONSTITUENTS

40 CFR Part 258, Appendix I, Constituents for Detection Monitoring		EPA Method	MSW-PQL µg/L
Inorganic Constituents			
(1)	Antimony	SW 846 6020	5
(2)	Arsenic	SW 846 6020	5
(3)	Barium	SW 846 6010	10
(4)	Beryllium	SW 846 6010	4
(5)	Cadmium	SW 846 6010	2
(6)	Chromium	SW 846 6010	20
(7)	Cobalt	SW 846 6010	5
(8)	Copper	SW 846 6010	10
(9)	Lead	SW 846 6010	15
(10)	Nickel	SW 846 6010	20
(11)	Selenium	SW 846 6010	50
(12)	Silver	SW 846 6010	10
(13)	Thallium	SW 846 6020	1
(14)	Vanadium	SW 846 6010	10
(15)	Zinc	SW 846 6010	100
Volatile Organics			
(16)	Acetone	SW 846 8260	20
(17)	Acrylonitrile	SW 846 8260	50
(18)	Benzene	SW 846 8260	1
(19)	Bromochloromethane	SW 846 8260	1
(20)	Bromodichloromethane	SW 846 8260	1
(21)	Bromoform; Tribromomethane	SW 846 8260	5
(22)	Carbon disulfide	SW 846 8260	5
(23)	Carbon tetrachloride	SW 846 8260	5
(24)	Chlorobenzene	SW 846 8260	1
(25)	Chloroethane; Ethyl chloride	SW 846 8260	5
(26)	Chloroform; Trichloromethane	SW 846 8260	1
(27)	Dibromochloromethane; Chlorodibromomethane	SW 846 8260	2
(28)	1,2-Dibromo-3-chloropropane; DBCP	SW 846 8260	5
(29)	1,2-Dibromoethane; Ethylene dibromide; EDB	SW 846 8260	1
(30)	o-Dichlorobenzene; 1,2-Dichlorobenzene	SW 846 8260	2
(31)	p-Dichlorobenzene; 1,4-Dichlorobenzene	SW 846 8260	2
(32)	trans-1, 4-Dichloro-2-butene	SW 846 8260	100
(33)	1,1-Dichlorethane; Ethylidene chloride	SW 846 8260	1
(34)	1,2-Dichlorethane; Ethylene dichloride	SW 846 8260	1
(35)	1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride	SW 846 8260	1
(36)	cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	SW 846 8260	1
(37)	trans-1, 2-Dichloroethylene; trans-1,2-Dichloroethene	SW 846 8260	1
(38)	1,2-Dichloropropane; Propylene dichloride	SW 846 8260	1

40 CFR Part 258, Appendix I, Constituents for Detection Monitoring		EPA Method	MSW-PQL µg/L
(39)	cis-1,3-Dichloropropene	SW 846 8260	2
(40)	trans-1,3-Dichloropropene	SW 846 8260	5
(41)	Ethylbenzene	SW 846 8260	2
(42)	2-Hexanone; Methyl butyl ketone	SW 846 8260	5
(43)	Methyl bromide; Bromomethane	SW 846 8260	10
(44)	Methyl chloride; Chloromethane	SW 846 8260	5
(45)	Methylene bromide; Dibromomethane	SW 846 8260	1
(46)	Methylene chloride; Dichloromethane	SW 846 8260	5
(47)	Methyl ethyl ketone; MEK; 2-Butanone	SW 846 8260	5
(48)	Methyl iodide; Idomethane	SW 846 8260	5
(49)	4-Methyl-2-pentanone; Methyl isobutyl ketone	SW 846 8260	5
(50)	Styrene	SW 846 8260	2
(51)	1,1,1,2-Tetrachloroethane	SW 846 8260	2
(52)	1,1,2,2-Tetrachloroethane	SW 846 8260	1
(53)	Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	SW 846 8260	5
(54)	Toluene	SW 846 8260	1
(55)	1,1,1-Trichloroethane; Methylchloroform	SW 846 8260	1
(56)	1,1,2-Trichloroethane	SW 846 8260	1
(57)	Trichloroethylene; Trichloroethene	SW 846 8260	5
(58)	Trichlorofluoromethane; CFC-11	SW 846 8260	10
(59)	1,2,3-Trichloropropane	SW 846 8260	1
(60)	Vinyl acetate	SW 846 8260	100
(61)	Vinyl chloride	SW 846 8260	2
(62)	m,p-Xylene	SW 846 8260	5
	o-Xylene		2
	Total Xylenes		10

* MSW-PQL benchmark concentrations from TCEQ MSW-PQL Study Update dated May 25, 2010.

APPENDIX III5B-2B

WATER QUALITY PARAMETERS

Water Quality Parameters	CAS RN	EPA Method[1]	MRV[2] mg/L
Total Dissolved Solids		160.1	10
Alkalinity, Total		310.0	5
Ammonia-N	7664-41-7	350.1	0.05
Calcium	7440-70-2	200.7	1
Chloride	16887-00-6	325.2	2
Iron	7439-89-6	200.7	0.05
Magnesium	7439-95-4	200.7	1
Potassium	7440-09-7	258.1	1
Sodium	7440-23-5	200.7	1
Sulfate	14808-79-8	375.4	20

1. All analysis should be performed using standard methods capable of achieving the MRV. EPA Method listed is an option.

2. MRV = Minimum Reporting Value. Values from EPA Landfill Manuals, Landfill Monitoring 2nd Edition

APPENDIX III5B-2C

ASSESSMENT MONITORING CONSTITUENTS

40 CFR Part 258, Appendix II, List of Hazardous Inorganic and Organic Constituents	CAS RN
Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Acetone	67-64-1
Acetonitrile; Methyl cyanide	75-05-8
Acetophenone	98-86-2
2-Acetylaminofluorene; 2-AAF	53-96-3
Acrolein	107-02-8
Acrylonitrile	107-13-1
Aldrin	309-00-2
Allyl chloride	107-05-1
4-Aminobiphenyl	92-67-1
Anthracene	120-12-7
Antimony	(Total)
Arsenic	(Total)
Barium	(Total)
Benzene	71-43-2
Benzo[a]anthracene; Benzanthracene	56-55-3
Benzo[b]fluoranthene	205-99-2
Benzo[k]fluoranthene	207-08-9
Benzo[ghi]perylene	191-24-2
Benzo[a]pyrene	50-32-8
Benzyl alcohol	100-51-6
Beryllium	(Total)
alpha-BHC	319-84-6
beta-BHC	319-85-7
delta-BHC	319-86-8
gamma-BHC; Lindane	58-89-9
Bis(2-chloroethoxy)methane	111-91-1
Bis(2-chloroethyl)ether; Dichloroethyl ether	111-44-4
Bis(2-chloro-1-methylethyl) ether; 2,2′-Dichlorodiisopropyl ether; DCIP, See footnote 4	108-60-1
Bis(2-ethylhexyl) phthalate	117-81-7
Bromochloromethane; Chlorobromethane	74-97-5
Bromodichloromethane; Dibromochloromethane	75-27-4
Bromoform; Tribromomethane	75-25-2
4-Bromophenyl phenyl ether	101-55-3
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7
Cadmium	(Total)
Carbon disulfide	75-15-0
Carbon tetrachloride	56-23-5
Chlordane	
alpha-chlordane	5103-71-9
beta-chlordane	5103-74-2
gamma-chlordane	5566-34-7

40 CFR Part 258, Appendix II, List of Hazardous Inorganic and Organic Constituents	**CAS RN**
constituents	57-74-9
constituents	12789-03-6
p-Chloroaniline	106-47-8
Chlorobenzene	108-90-7
Chlorobenzilate	510-15-6
p-Chloro-m-cresol; 4-Chloro-3-methylphenol	59-50-7
Chloroethane; Ethyl chloride	75-00-3
Chloroform; Trichloromethane	67-66-3
2-Chloronaphthalene	91-58-7
2-Chlorophenol	95-57-8
4-Chlorophenyl phenyl ether	7005-72-3
Chloroprene	126-99-8
Chromium	(Total)
Chrysene	218-01-9
Cobalt	(Total)
Copper	(Total)
m-Cresol; 3-Methylphenol	108-39-4
o-Cresol; 2-Methylphenol	95-48-7
p-Cresol; 4-Methylphenol	106-44-5
Cyanide	57-12-5
2,4-D; 2,4-Dichlorophenoxyacetic acid	94-75-7
4,4′-DDD	72-54-8
4,4′-DDE	72-55-9
4,4′-DDT	50-29-3
Diallate	2303-16-4
Dibenz[a,h]anthracene	53-70-3
Dibenzofuran	132-64-9
Dibromochloromethane; Chlorodibromomethane	124-48-1
1,2-Dibromo-3-chloropropane; DBCP	96-12-8
1,2-Dibromoethane; Ethylene dibromide; EDB	106-93-4
Di-n-butyl phthalate	84-74-2
o-Dichlorobenzene; 1,2-Dichlorobenzene	95-50-1
m-Dichlorobenzene; 1,3-Dichlorobenzene	541-73-1
p-Dichlorobenzene; 1,4-Dichlorobenzene	106-46-7
3,3′-Dichlorobenzidine	91-94-1
trans-1,4-Dichloro-2-butene	110-57-6
Dichlorodifluoromethane; CFC 12	75-71-8
1,1-Dichloroethane; Ethyldidene chloride	75-34-3
1,2-Dichloroethane; Ethylene dichloride	107-06-2
1,1-Dichloroethylene; 1,1-Dichloroethene;	75-35-4
Vinylidene chloride cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	156-59-2
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	156-60-5
2,4-Dichlorophenol	120-83-2

40 CFR Part 258, Appendix II, List of Hazardous Inorganic and Organic Constituents	CAS RN
2,6-Dichlorophenol	87-65-0
1,2-Dichloropropane	78-87-5
1,3-Dichloropropane; Trimethylene dichloride	142-28-9
2,2-Dichloropropane; Isopropylidene chloride	594-20-7
1,1-Dichloropropene	563-58-6
cis-1,3-Dichloropropene	10061-01-5
trans-1,3-Dichloropropene	10061-02-6
Dieldrin	60-57-1
Diethyl phthalate	84-66-2
O,O-Diethyl O-2-pyrazinyl phosphorothioate; Thionazin	297-97-2
Dimethoate	60-51-5
p-(Dimethylamino)azobenzene	60-11-7
7,12-Dimethylbenz[a]anthracene	57-97-6
3,3′-Dimethylbenzidine	119-93-7
alpha, alpha-Dimethylphenethylamine	122-09-8
2,4-Dimethylphenol; m-Xylenol	105-67-9
Dimethyl phthalate	131-11-3
m-Dinitrobenzene	99-65-0
4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol	534-52-1
2,4-Dinitrophenol	51-28-5
2,4-Dinitrotoluene	121-14-2
2,6-Dinitrotoluene	606-20-2
Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol	88-85-7
Di-n-octyl phthalate	117-84-0
Diphenylamine	122-39-4
Disulfoton	298-04-4
Endosulfan I	959-98-8
Endosulfan II	33213-65-9
Endosulfan sulfate	1031-07-8
Endrin	72-20-8
Endrin aldehyde	7421-93-4
Ethylbenzene	100-41-4
Ethyl methacrylate	97-63-2
Ethyl methanesulfonate	62-50-0
Famphur	52-85-7
Fluoranthene	206-44-0
Fluorene	86-73-7
Heptachlor	76-44-8
Heptachlor epoxide	1024-57-3
Hexachlorobenzene	118-74-1
Hexachlorobutadiene	87-68-3
Hexachlorocyclopentadiene	77-47-4
Hexachloroethane	67-72-1

40 CFR Part 258, Appendix II, List of Hazardous Inorganic and Organic Constituents	CAS RN
Hexachloropropene	1888-71-7
2-Hexanone; Methyl butyl ketone	591-78-6
Indeno(1,2,3-cd)pyrene	193-39-5
Isobutyl alcohol	78-83-1
Isodrin	465-73-6
Isophorone	78-59-1
Isosafrole	120-58-1
Kepone	143-50-0
Lead	(Total)
Mercury	(Total)
Methacrylonitrile	126-98-7
Methapyrilene	91-80-5
Methoxychlor	72-43-5
Methyl bromide; Bromomethane	74-83-9
Methyl chloride; Chloromethane	74-87-3
3-Methylcholanthrene	56-49-5
Methyl ethyl ketone; MEK; 2-Butanone	78-93-3
Methyl iodide; Iodomethane	74-88-4
Methyl methacrylate	80-62-6
Methyl methanesulfonate	66-27-3
2-Methylnaphthalene	91-57-6
Methyl parathion; Parathion methyl	298-00-0
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1
Methylene bromide; Dibromomethane	74-95-3
Methylene chloride; Dichloromethane	75-09-2
Naphthalene	91-20-3
1,4-Naphthoquinone	130-15-4
1-Naphthylamine	134-32-7
2-Naphthylamine	91-59-8
Nickel	(Total)
o-Nitroaniline; 2-Nitroaniline	88-74-4
m-Nitroaniline; 3-Nitroaniline	99-09-2
p-Nitroaniline; 4-Nitroaniline	100-01-6
Nitrobenzene	98-95-3
o-Nitrophenol; 2-Nitrophenol	88-75-5
p-Nitrophenol; 4-Nitrophenol	100-02-7
N-Nitrosodi-n-butylamine	924-16-3
N-Nitrosodiethylamine	55-18-5
N-Nitrosodimethylamine	62-75-9
N-Nitrosodiphenylamine	86-30-6
N-Nitrosodipropylamine; N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine	621-64-7
N-Nitrosomethylethalamine	10595-95-6
N-Nitrosopiperidine	100-75-4

40 CFR Part 258, Appendix II, List of Hazardous Inorganic and Organic Constituents	CAS RN
N-Nitrosopyrrolidine	930-55-2
5-Nitro-o-toluidine	99-55-8
Parathion	56-38-2
Pentachlorobenzene	608-93-5
Pentachloronitrobenzene	82-68-8
Pentachlorophenol	87-86-5
Phenacetin	62-44-2
Phenanthrene	85-01-8
Phenol	108-95-2
p-Phenylenediamine	106-50-3
Phorate	298-02-2
Polychlorinated biphenyls; PCBs	1336-36-3
Aroclor-1016	12674-11-2
Aroclor-1221	11104-28-2
Aroclor-1232	11141-16-5
Aroclor-1242	53469-21-9
Aroclor-1248	12672-29-6
Aroclor-1254	11097-69-1
Aroclor-1260	11096-82-5
Pronamide	23950-58-5
Propionitrile; Ethyl cyanide	107-12-0
Pyrene	129-00-0
Safrole	94-59-7
Selenium	(Total)
Silver	(Total)
Silvex; 2,4,5-TP	93-72-1
Styrene	100-42-5
Sulfide	18496-25-8
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	93-76-5
2,3,7,8-TCDD; 2,3,7,8-Tetrachlorodibenzo- p-dioxin	1746-01-6
1,2,4,5-Tetrachlorobenzene	95-94-3
1,1,1,2-Tetrachloroethane	630-20-6
1,1,2,2-Tetrachloroethane	79-34-5
Tetrachloroethylene; Tetrachloroethene; Perchloroethylene	127-18-4
2,3,4,6-Tetrachlorophenol	58-90-2
Thallium	(Total)
Tin	(Total)
Toluene	108-88-3
o-Toluidine	95-53-4
Toxaphene	8001-35-2
1,2,4-Trichlorobenzene	120-82-1
1,1,1-Trichloroethane; Methylchloroform	71-55-6
1,1,2-Trichloroethane	79-00-5

APPENDIX III5B-3

TCEQ GUIDANCE DOCUMENTS AND FORMS

APPENDIX III5B-3A

MSW-PRACTICAL QUANTITATION LIMIT (PQL) STUDY DATED 5-25-10

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

May 25, 2010

To: Owners and/or Operators for Type I and Type IV Municipal Solid Waste (MSW) Landfills

Re: Progression of the Inter-Laboratory MSW-Practical Quantitation Limit (PQL) Study

Dear MSW Owner and/or Operator:

The MSW Permits Section of the Texas Commission on Environmental Quality (TCEQ) has been conducting a PQL Study of performance objectives at the PQL. We have revised the groundwater monitoring (GWM) performance objectives to better meet both the federal (40 Code of Federal Regulation (CFR) Section (§)258.53(h)(5)) and state (30 Texas Administrative Code (TAC) §330.405(f)(5)) solid waste rule requirements for the requirements to specify limits for precision and accuracy at the PQL.

The MSW Permits Section of the TCEQ is requesting that all owners/operators encourage and/or assist their analytical laboratories to participate in the MSW-PQL Study. The performance objectives (specified limits) for precision and accuracy have been incorporated into MSW facility permits, as listed below.

Chemical Compound	Precision (% RSD)	Accuracy (% Recovery)	EPA SW-846 Analytical Method
Metals	10	70-130	6010 (6020)
Volatiles	20	50-150	8260
Semi-Volatiles	30	50-150	8270

% RSD – is a measure of precision, calculated as the standard deviation of a set of values divided by the average and multiplied by 100.
% Recovery - is defined as a measure of agreement between analytical measurements and accepted reference values (recovery % of a true value).

Analytical data has been collected from independent laboratories across the nation and processed/modeled through the American Society for Testing and Materials (ASTM) Inter-Laboratory Quantitation Estimation (IQE) Standard D6512. The IQE based MSW-PQL "benchmark" concentrations for the 40 CFR Part 258 Appendix I constituents have been established.

If analytical laboratories are unable to meet the precision and accuracy performance objectives at an MSW-PQL benchmark concentration, then a subsequent adjustment will be made and neither the owner/operator nor the analytical laboratories will be considered out of compliance.
If a facility does not wish to use the MSW-PQL benchmarks, then the facility will be required to demonstrate how the preferred reporting limits chosen are representative of the lower limit of quantitation that can meet the MSW Permits Section's interlaboratory precision and accuracy performance objectives, as listed in the table above.

We acknowledge that data collection of the background population pools may have already been initiated and/or completed. In such cases, we are suggesting that the newly acquired GWM data be assimilated directly into the existing background population pools until there are a rolling sum of eight (n=8) data points based on the MSW-PQL benchmark concentrations. Background population pools should be updated as soon as there are a total of eight data points.

Completion of the Inter-Laboratory MSW-PQL Study
In order to complete the MSW-PQL concentration verification process and develop the additional MSW-PQLs for the 40 CFR §258 Appendix II compounds, additional data based on specific multi-concentration spiking levels is required. With additional data, the MSW Permits Section will re-evaluate whether the benchmark concentrations need to be adjusted (increased or decreased) and complete the development of the MSW-PQLs for the Appendix I and II metallic, volatile and semi-volatile compounds.

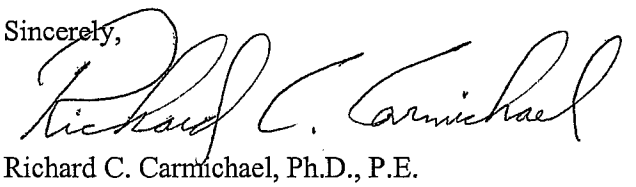
It is requested that analytical laboratories perform quarterly analyses (for one year) of the specified multi-concentration spiking levels under the same procedure as that which was initially collaborated through the MSW-PQL Listserv.

The additional laboratory spiking data will result in an initial/short-term increased level of effort by the participating analytical laboratories. Prior to collecting additional data, your analytical laboratory's input is requested for a collaborative determination of the appropriate multiple concentration ranges for the Appendix II semi-volatile compounds.

MSW-PQL ListServ
We will continue to use the MSW-PQL ListServ to convey information concerning the MSW-PQL Study and other MSW topics. If you have any questions concerning this letter or the Inter-Laboratory MSW-PQL Study, please contact Mr. Arthur Denny by phone at (512) 239-6610 or through correspondence using mail code MC 124.

If you and/or your analytical laboratory have not already joined the MSW-PQL ListServ and would like to do so, please send an e-mail to adenny@tceq.state.tx.us so that we may add you to the e-mail list. Your cooperation is deeply appreciated.

Sincerely,



Richard C. Carmichael, Ph.D., P.E.
Manager, Municipal Solid Waste Permits Section
Waste Permits Division
Texas Commission on Environmental Quality

RCC/ALD/dd

Enclosure

ANALYTE	Method	DW MCL (ug/l)	DW TPCL (ug/l)	Rounded IQE (ug/l)	Rounded IQE PQL Met P&A Criteria (Y/N)	Rounded IQE PQL Met Both Reg Criteria (Y/N)	Initial MSW-PQL (ug/l)
Acetone	SW 846 8260	NA	22000	20	Y	Y	20
Acrylonitrile	SW 846 8260	NA	1.7	50	Y	N	50
Benzene	SW 846 8260	5	5	1	Y	Y	1
Bromochloromethane	SW 846 8260	NA	980	1	Y	Y	1
Bromodichloromethane	SW 846 8260	NA	15	1	Y	Y	1
Bromoform; Tribromomethane	SW 846 8260	NA	120	5	Y	Y	5
Carbon disulfide	SW 846 8260	NA	2400	5	Y	Y	5
Carbon tetrachloride	SW 846 8260	5	5	5	Y	Y	5
Chlorobenzene	SW 846 8260	100	100	1	Y	Y	1
Chloroethane; Ethyl chloride	SW 846 8260	NA	9800	5	Y	Y	5
Chloroform; Trichloromethane	SW 846 8260	NA	240	1	Y	Y	1
Dibromochloromethane; Chlorodibromomethane	SW 846 8260	NA	11	2	Y	Y	2
1,2-Dibromo-3-chloropropane; DBCP	SW 846 8260	0.2	0.2	5	Y	N	5
1,2-Dibromoethane; Ethylene dibromide; EDB	SW 846 8260	0.05	0.05	1	Y	N	1
o-Dichlorobenzene; 1,2-Dichlorobenzene	SW 846 8260	600	600	2	Y	Y	2
p-Dichlorobenzene; 1,4-Dichlorobenzene	SW 846 8260	75	75	2	Y	Y	2
trans-1,4-Dichloro-2-butene	SW 846 8260	NA	140	100	Y	Y	100
1,1-Dichloroethane; Ethylidene chloride	SW 846 8260	NA	4900	1	Y	Y	1
1,2-Dichloroethane; Ethlyene dichloride	SW 846 8260	5	5	1	Y	Y	1
1,1-Dichloroethylene; 1-1-Dichloroethene	SW 846 8260	7	7	1	Y	Y	1
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	SW 846 8260	70	70	1	Y	Y	1
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	SW 846 8260	100	100	1	Y	Y	1
1,2-Dichloropropane; Propylene dichloride	SW 846 8260	5	5	1	Y	Y	1
cis-1,3-Dichloropropene	SW 846 8260	NA	1.7	2	Y	N	2
trans-1,3-Dichloropropene	SW 846 8260	NA	9.1	5	Y	Y	5
Ethylbenzene	SW 846 8260	700	700	2	Y	Y	2
2-hexanone; Methyl butyl ketone	SW 846 8260	NA	1500	5	Y	Y	5
Methyl bromide; Bromomethane	SW 846 8260	NA	34	10	Y	Y	10
Methyl chloride; Chloromethane	SW 846 8260	NA	70	5	Y	Y	5
Methylene bromide Dibromomethane	SW 846 8260	NA	120	1	Y	Y	1
Methylene chloride; Dichloromethane	SW 846 8260	NA	5	5	Y	Y	5
Methyl ethyl ketone; MEK; 2-Butanone	SW 846 8260	NA	15000	5	Y	Y	5
Methyl iodide; Iodomethane	SW 846 8260	NA	34	5	Y	Y	5
4-Methyl-2-pentanone; Methyl isobutyl isobutyl ketone	SW 846 8260	NA	2000	5	Y	Y	5
Styrene	SW 846 8260	100	100	2	Y	Y	2
1,1,1,2-Tetrachloroethane	SW 846 8260	NA	35	2	Y	Y	2

ANALYTE	Method	DW MCL (ug/l)	DW TPCL (ug/l)	Rounded IQE (ug/l)	Rounded IQE PQL Met P&A Criteria (Y/N)	Rounded IQE PQL Met Both Reg Criteria (Y/N)	Initial MSW-PQL (ug/l)
1,1,2,2-Tetrachloroethane	SW 846 8260	NA	4.6	1	Y	Y	1
Tetrachloroethylene; Tetracholorethene; Perchloroethylene	SW 846 8260	5	5	5	Y	Y	5
Toluene	SW 846 8260	1000	1000	1	Y	Y	1
1,1,1-Trichloroethane; Methylchloroform	SW 846 8260	200	200	1	Y	Y	1
1,1,2-Trichloroethane	SW 846 8260	5	5	1	Y	Y	1
Trichloroethylene; Trichlorethene	SW 846 8260	5	5	5	Y	Y	5
Trichlorofluoromethane; CFC-11	SW 846 8260	NA	7300	10	Y	Y	10
1,2,3-Trichloropropane	SW 846 8260	NA	0.13	1	Y	N	1
Vinyl acetate	SW 846 8260	NA	24000	NONE	N	N	100*
Vinyl chloride	SW 846 8260	2	2	2	Y	Y	2
m, p-Xylenes	SW 846 8260	NA	NA	5	Y	Y	5
o-Xylene	SW 846 8260	NA	NA	2	Y	Y	2
Total Xylenes	SW 846 8260	10000	10000	10	Y	Y	10
Antimony	SW 846 6020	6	6	5	Y	Y	5
Arsenic	SW 846 6020	10	10	5	Y	Y	5
Barium	SW 846 6010	2000	2000	10	Y	Y	10
Beryllium	SW 846 6010	4	4	5	Y	N	4
Cadmium	SW 846 6010	5	5	2	Y	Y	2
Chromium	SW 846 6010	100	100	20	Y	Y	20
Cobalt	SW 846 6010	200	200	5	Y	Y	5
Copper	SW 846 6010	1300	1300	10	Y	Y	10
Lead	SW 846 6010	15	15	20	Y	N	15
Nickel	SW 846 6010	N/A	490	20	Y	Y	20
Selenium	SW 846 6010	50	50	50	Y	Y	50
Silver	SW 846 6010	120	120	10	Y	Y	10
Thallium	SW 846 6020	2	2	1	Y	Y	1
Vanadium	SW 846 6010	N/A	170	10	Y	Y	10
Zinc	SW 846 6010	N/A	730	100	Y	Y	100
Benchmark MSW-PQL concentration to be evaluated.							
* Highest study concentration spiked							

APPENDIX III5B-3B

BACKGROUND EVALUATION REPORT DATED 8-30-10

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

August 30, 2010

To: Owners and/or Operators for Type I Municipal Solid Waste (MSW) Landfills

Re: Background Evaluation Report for Groundwater Constituent Concentrations

Dear MSW Owner and/or Operator:

To ensure consistency in the reporting of background data for groundwater constituent concentrations in accordance to Title 30 Texas Administrative Code (TAC), Chapter 330, Section (§)330.405 and §330.407 and to facilitate the agency's review, the MSW Permits Section of the Texas Commission on Environmental Quality (TCEQ) requires that future background evaluation/monitoring report submittals include the following:

- A narrative explanation of the statistical process used to select and evaluate data to be incorporated into the facility's background population pool, including methods for evaluating data distribution and for identifying outliers.

- Documentation of the values of the intermediate statistics, and the values of the statistical limits before and after the update and a comparison of the newly developed background limit to the historical background limit.

- A summary table that is labeled Table 1-Background Data for the 40 Code of Federal Regulation §258.53(h)(5)Appendix I Metals (see enclosed example). This table should include the groundwater monitoring results identifying which of these data is included in background and which were removed as outliers in **bold** print.

- A summary table that is labeled Table 2-Summary Statistics/Intermediate Computations and Appropriate Statistical Limits (see enclosed example). This table should include the intermediate statistics (mean, standard deviation, and appropriate/calculated limit) for each well and constituent, in every well.

- Graphical time series plots of the data for each well and constituent to help visualize the data.

For facilities collecting new background monitoring data for total metals, based on the initial benchmark MSW Practical Quantitation Limits (PQLs)[1], the collection period for the existing monitoring program should be performed until background updates have been completed.

[1] Please note that PQL is equivalent to the National Environmental Laboratory Accreditation (NELAC) standards terminology for Limit of Quantitation (LOQ)

If the data collection of the background population pools has already been initiated and/or completed, the MSW Permits Section is suggesting that the newly acquired groundwater monitoring data be assimilated directly into the existing population of background data pools until there are a rolling sum of eight (n=8) data points based on the MSW-PQL benchmark concentrations. Background pools should be updated as soon as there are a total of eight data points.

In addition, the background evaluation report must be submitted to the TCEQ before the next subsequent groundwater monitoring event following the updated background period. Please submit an original and one copy of the report to the TCEQ Central office and a copy to the applicable Region office.

If you have any questions, please contact Diane Barnes at (512) 239-2626 or through correspondence using mail code MC 124.

Sincerely,

Richard C. Carmichael, Ph.D., P.E.
Manager, Municipal Solid Waste Permits Section
Waste Permits Division
Texas Commission on Environmental Quality

RCC/DMB/dd

Enclosure

EXAMPLE TABLES

TABLE 1 - BACKGROUND DATA FOR APPENDIX I TOTAL METALS

Date	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
MW-01 (point of compliance well/background well)															
1/15/08	<5	20	180	<4	<2	30	16	<10	<15	<20	<50	<10	<1	**45**	<100
4/15/08	<5	24	200	<4	<2	37	11	<10	<15	<20	<50	<10	<1	<10	<100
7/15/08	<5	32	210	<4	<2	23	<5	<10	<15	<20	<50	<10	<1	<10	<100
10/15/08	<5	<5	220	<4	<2	25	6	<10	<15	<20	<50	<10	<1	11	<100
1/15/09	<5	**120**	190	<4	<2	35	<5	<10	<15	<20	<50	<10	<1	<10	<100
4/15/09	<5	15	150	<4	<2	31	9	<10	<15	<20	<50	<10	<1	<10	<100
7/15/09	<5	19	250	<4	<2	29	<5	<10	<15	<20	<50	<10	<1	15	<100
10/15/09	<5	10	200	<4	<2	30	<5	<10	<15	<20	<50	<10	<1	<10	<100

120 *outlier*

TABLE 2 - SUMMARY STATISTICS/INTERMEDIATE COMPUTATIONS AND APPROPRIATE STATISTICAL LIMITS

Constituent	Units	Well	N	Mean	SD	Upper Control Limit
Antimony	µg/L	MW-01	8	5	0	5
Arsenic	µg/L	MW-01	7	18	9	20
Barium	µg/L	MW-01	8	200	29	250
Beryllium	µg/L	MW-01	8	4	0	4
Cadmium	µg/L	MW-01	8	2	0	2
Chromium	µg/L	MW-01	8	30	5	36
Cobalt	µg/L	MW-01	8	8	4	12
Copper	µg/L	MW-01	8	10	0	10
Lead	µg/L	MW-01	8	15	0	15
Nickel	µg/L	MW-01	8	20	0	20
Selenium	µg/L	MW-01	8	50	0	50
Silver	µg/L	MW-01	8	10	0	10
Thallium	µg/L	MW-01	8	1	0	1
Vanadium	µg/L	MW-01	7	11	2	12
Zinc	µg/L	MW-01	8	100	0	100

APPENDIX III5B-3C

GUIDELINES FOR GROUNDWATER MONITORING REPORT SUBMITTALS DATED 12-22-14

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

December 22, 2014

To: Owners and Operators of Type I Municipal Solid Waste (MSW) Landfills

Re: Guidelines for Groundwater Monitoring Report Submittals

Dear MSW Owner or Operator:

The Texas Commission on Environmental Quality (TCEQ), MSW Permits Section offers the following guidelines to assist owners and operators with meeting the reporting requirements for groundwater monitoring in Title 30 Texas Administrative Code (30 TAC), Chapter 330, §§330.405 through 330.409.

Topics covered in these guidelines:

- Background Monitoring
  - Background Sampling Reports
  - Background Evaluation Report
  - Background Update Report
- Detection Monitoring
  - Semiannual Detection Monitoring Report (first semiannual event)
  - Notice of Initial Exceedance
  - Verification Resampling Report
  - Alternate Source Demonstration (ASD)
  - Annual Detection Monitoring Report (second semiannual event)
- Assessment Monitoring
  - Semiannual Assessment Monitoring Report (first semiannual event)
  - Report of Assessment Monitoring Results
  - Notice of Statistically Significant Level (SSL)
  - Annual Assessment Monitoring Report (second semiannual event)

The reports described here and the timing of their submission is summarized in Table 1.

Table 1. Groundwater monitoring reports and timeframes for submission.

Report Type	Recommended Submission Time (days after sampling)	Report Content and Nominal Rule Based Submission Time (days after sampling)
Semiannual Detection and Assessment Monitoring	60	Assessment Monitoring Results (60 days) Notice of SSL (67 days) Notice of initial exceedance (74 days) Notice of Intent to Submit an ASD (74 days) Background Sampling Results
Semiannual Detection Monitoring only	74	Notice of initial exceedance (74 days) Notice of Intent to Submit an ASD (74 days) Background Sampling Results
Verification Resampling	120	Verification Resampling (120 days)
ASD	150	ASD (150 days)
Annual Detection and Assessment Monitoring	60	Annual Assessment Report (60 days) Assessment Monitoring Results (60 days) Notice of SSL (67 days) Notice of initial exceedance (74 days) Notice of Intent to Submit an ASD (74 days) Background Sampling Results Annual Detection Report (90 days)
Annual Detection Monitoring Only	74	Notice of initial exceedance (74 days) Notice of Intent to Submit an ASD (74 days) Background Sampling Results Annual Detection Report (90 days)
Background Evaluation	After completion of background monitoring	Background Evaluation Report (after completion of background monitoring)
Background Update	n/a	Background Update Report (may be updated once every two years)

Background Monitoring

Background Sampling Report

Quarterly background monitoring is required for new wells to determine the quality of groundwater. According to 30 TAC §330.407(c), the results of all groundwater monitoring, testing, and analytical work performed during a calendar year may be included in an annual detection monitoring report. However, to maintain currency and timeliness, the MSW Permits Section encourages the facility owner or operator to submit background sampling results semiannually. These reports can be combined with other semiannual reports.

It is also advised that during background data collection periods, sampling results be evaluated after each event for evidence of releases from the facility, to enable a prompt and early response to a potential adverse situation.

The report should include the following information:

1. Sampling results on Form TCEQ-00312.

2. The laboratory case narrative and laboratory checklist.

3. The chain of custody record.

Background Evaluation Report

The evaluation must be submitted in accordance with §330.405(d) and §330.407(a)(1) after collecting background samples. Details about the information that should be included in a report were provided in the TCEQ MSW Permits Section letter dated August 30, 2010, available on the TCEQ website at <www.tceq.texas.gov/permitting/assets/public/permitting/waste/msw/msw-gw-background.pdf>.

Background Data Update Report

Background data sets may be updated with semiannual monitoring results that are demonstrated to be representative of background groundwater quality in accordance with §330.407(a)(1). Updating of background should occur when enough new measurements (at least 4 measurements, representing approximately 2 years of semiannual monitoring) have been collected.

A report must be prepared and submitted for each background update. The report should include the following information:

1. A narrative explaining the statistical process used to select and evaluate data to be incorporated into the facility's updated background data set, including methods for evaluating data distribution, and for identifying trends and outliers.

2. A discussion of the differences between the existing background data sets and updated data sets.

3. A summary table of updated background data sets for the Title 40 Code of Federal Regulations, Part 258, Appendix I metals, identifying which results were included in background and which were removed as outliers.

4. A summary table of the intermediate statistics (for example, mean and standard deviation) and computations, and calculated statistical limits for each well and constituent.

5. Charts that include the updated background data sets and updated statistical limits.

Detection Monitoring

Semiannual Detection Monitoring Report (first semiannual event)

Although the MSW rules do not require a semiannual detection monitoring report, we encourage the facility owner or operator to submit a semiannual report within 74 days after the first semiannual event. Having this information at mid-year allows for a better understanding of the groundwater conditions at a facility.

The report should include the following information:

1. A summary table of the groundwater monitoring event that lists event date and type, and monitoring status of each well (background or detection).

2. A table indicating which initial exceedances were determined along with their reported constituent concentrations and background limits (see example in Table 2, below).

Table 2. Example summary of initial exceedances determined during a detection monitoring event (constituent concentrations in µg/L).

Well	Constituent	Detected Concentration	Statistical Limit	Type of Comparison	Proposed Action
MW-2	Arsenic	25	20	Interwell	Resampling
MW-3	Barium	900	250	Intrawell	ASD

3. A statement explaining how the facility intends to proceed regarding any statistical exceedances. Possible actions include treating the initial exceedance as a statistically significant increase (SSI) without verification and establishing an assessment monitoring program, conducting verification resampling, or preparing and submitting an alternate source demonstration (ASD).

4. Results of all groundwater monitoring, resampling, and analytical work produced during the first semiannual sampling event, including:

    - groundwater sampling results on the TCEQ-00312 forms,
    - a table of background statistical limits (see example in Table 3, below) or statistical analysis summary table that includes limits,
    - a laboratory case narrative and laboratory checklist,
    - the chain of custody record, and
    - charts of the detected concentrations, including statistical limits.

Table 3. Summary of background statistical limits (constituent concentrations in µg/L).

Monitor Well	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
MW-1	5	5	35	4	2	20	5	10	15	20	50	10	1	10	100
MW-2	5	5	47	4	2	20	6	10	15	20	50	10	1	10	100

5. A contour map of piezometric groundwater levels and groundwater flow direction. Also, the map should include the background wells, point of compliance wells and active cells. Pre-Subtitle D cells should be clearly identified on the map, if applicable.

6. Recommendations for any changes or updates to the background data set.

7. Any other items requested by the executive director.

The entire laboratory report which includes laboratory quality assurance and quality control (QA/QC) data and laboratory analytical data should be provided on a compact disc (CD) in PDF file.

Notice of Initial Exceedance

The term "initial exceedance" refers to a monitoring result that exceeds a statistical limit but has not yet been verified. If an initial exceedance was identified during a detection monitoring event, notify the TCEQ in writing within 14 days of the determination as required in §330.407(b).

A notice of initial exceedance should include the following information:

1. A table indicating which exceedances were determined along with their reported concentrations and background limits (see earlier example in Table 2).

2. A statement explaining how the facility intends to proceed regarding any exceedances. Possible actions include treating the initial exceedance as a statistically significant increase (SSI) without verification and establishing an assessment monitoring program, conducting verification resampling, or preparing and submitting an alternate source demonstration.

The MSW Permits Section encourages you to include the notice of initial exceedances in the semiannual report.

Verification Resampling Report

If an initial exceedance occurs, results of resampling (if conducted) must be submitted within 60 days of determining the exceedance in accordance with §330.407(b)(2). The report should include the following information:

1. A discussion of the statistical evaluations and conclusions.

2. A summary table indicating verification resampling results (see example in Table 4, below).

3. Verification resampling results on Form TCEQ-00312.

4. The laboratory case narrative and laboratory checklist.

5. The chain of custody record.

Table 4. Verification resampling results (constituent concentrations in µg/L).

Well	Constituent	Initial Result	Statistical Limit	Resampling Result	Confirmed SSI?	Proposed Action
MW-1	Selenium	65	50	<50	No	Detection
MW-2	Arsenic	25	20	23	Yes	Assessment

Alternate Source Demonstration (ASD)

If an SSI is confirmed, an ASD may be submitted if there is reasonable cause to think that the SSI is a result of contamination from a source other than the landfill unit; *or* resulted from an error in sampling, analysis, statistical evaluation; *or* is due to natural variation in groundwater quality. The ASD should be submitted to the TCEQ within 90 days of determining the SSI. The ASD may be submitted together with the verification resampling report.

An ASD should include the following information:

1. A discussion of the statistical evaluation and any resampling.

2. Identification of a source; errors in sampling, analysis, or statistical evaluation; or the natural variation; or the source other than the landfill unit.

3. Data, which may include:

   - information explaining the error along with corrected data, new calculations, and the results of a revised statistical evaluation,
   - information describing the natural variation,
   - analysis of the landfill leachate, and
   - samples collected from offsite sources or comparisons with background data sets from facility monitoring wells.

Acceptance of ASDs are well-specific, constituent-specific, and concentration-specific. If the concentration of a constituent that was covered by an ASD increases, the previously accepted demonstration may no longer be satisfactory and assessment monitoring may be triggered unless a new demonstration is accepted.

Annual Detection Monitoring Report (second semiannual event)

The rule in §330.407(c) requires that an annual detection monitoring report be submitted within 90 days after the last groundwater monitoring event in a calendar year at a facility. The last groundwater monitoring event refers to a second semiannual event.

An annual detection monitoring report should include the following information:

1. A discussion regarding SSIs during the calendar year and results of the statistical calculations summarized (see examples in Table 1 and Table 3).

2. A summary table of the groundwater monitoring events with the monitoring status of each well (see example in Table 5, below).

Table 5. Groundwater monitoring events.

Event Date	Event Type	Monitoring Wells
February 15, 2013	First Semiannual	Detection: MW-1, 2, 3[1], 5 Assessment: MW-4
February 15, 2013	First Background Monitoring	MW-6, 7 and 8
April 15, 2013	Second Background Monitoring	MW-6, 7 and 8
April 15, 2013	Verification Resampling	MW-1
August 15, 2013	Second Semiannual	Detection: MW-1, 2, 3[1] Assessment: MW-4, 5
August 15, 2013	Third Background Monitoring	MW-6, 7 and 8

1 Dry well.

3. Results of all groundwater monitoring, resampling, and analytical work produced during the sampling events for the year, including:

   - groundwater sampling results on the TCEQ-0312 forms,
   - a table of background statistical limits (see example in Table 2) or statistical analysis summary table that includes limits,
   - a laboratory case narrative and laboratory checklist,
   - the chain of custody record, and
   - charts of the detected concentrations, including statistical limits.

4. A contour map of piezometric groundwater levels and groundwater flow direction for each sampling event. The map should include the background wells, point of compliance wells and active cells. Pre-Subtitle D cells should be clearly identified on the map, if applicable.

5. Recommendations for any changes or updates to the background data set.

6. Any other items requested by the executive director.

The entire laboratory report which includes laboratory QA/QC data and laboratory analytical data should be provided on CD in PDF file.

If a Semiannual Detection Monitoring Report covering the first half of the calendar year was submitted, the annual report should not duplicate information (such as TCEQ-0312 forms, statistical analysis, laboratory checklist...) in the semiannual report, but should include a summary of the semiannual report.

Assessment Monitoring

Semiannual Assessment Monitoring Report (first semiannual event)

Although the MSW rules do not specify a semiannual assessment monitoring report requirement, the MSW Permits Section encourages facility owner or operator to submit a semiannual report within 60 days after the first semiannual event. Having this information at mid-year allows for a better understanding of the groundwater conditions at a facility.

A report should include the following information:

1. A statement whether a statistically significant level (SSL) above a groundwater protection standard (GWPS) occurred during the first semiannual event (see example in Table 6), including:

    - all historical data, statistical limits, GWPS and calculations of 95% lower confidence limits (LCL),
    - groundwater sampling results on the TCEQ-00312 forms,
    - a laboratory case narrative and laboratory checklist,
    - the chain of custody record, and
    - statistical calculations, graphs and drawings.

Table 6. Summary of SSLs determined during the assessment monitoring sampling event (constituent concentrations in µg/L).

Monitoring Well	Constituent	Detected Concentration	95% LCL	GWPS	Recommended Action
MW-1	Arsenic	12	11	10	ASD
MW-1	Benzene	7	7.5	5	Corrective Action

2. A contour map of piezometric water levels and groundwater flow direction. The map should include the background wells, point of compliance wells and active cells. Pre-Subtitle D cells should be clearly identified on the map, if applicable.

3. Recommendations for any changes.

The entire laboratory report which includes QA/QC data and laboratory analytical data should be provided on CD in PDF file.

Report of Assessment Monitoring Results

According to §330.409(d), the results from the initial and subsequent assessment monitoring events must be submitted not later than 60 days after each assessment sampling event. At a minimum, the report of assessment monitoring results must include the following information:

1. Sampling results from assessment monitoring wells on Form TCEQ-00312.

2. The laboratory case narrative and laboratory checklist.

3. The chain of custody record.

The MSW Permits Section encourages you to include assessment monitoring results in the semiannual report.

Notice of Statistically Significant Level (SSL)

If an SSL is determined after a semiannual assessment monitoring event, notify the TCEQ in writing within 7 days of the determination, in accordance with §330.409(g). The notice of an SSL should include the following information:

1. A summary table indicating constituents for which SSLs were determined, along with their reported concentrations, calculated 95% LCL and GWPS (see earlier example in Table 6).

2. A statement explaining how the facility intends to proceed.

The MSW Permits Section encourages you to include the notice of SSL in the semiannual report.

Annual Assessment Monitoring Report (second semiannual event)

In accordance with §330.409(k), an annual assessment monitoring report must be submitted within 60 days after the facility's second semiannual groundwater monitoring event.

A report should include the following information:

1. A statement whether an SSL above a groundwater protection standard occurred during the calendar year, along with:

    - a summary table of the groundwater monitoring events with the monitoring status of each well (see earlier example in Table 5),
    - all historical data, statistical limits and calculations of 95% LCLs,
    - groundwater sampling results on the TCEQ-00312 forms,
    - a laboratory case narrative and laboratory checklist,
    - the chain of custody record, and

- statistical calculations, graphs and drawings.

2. A contour map of piezometric groundwater levels and groundwater flow direction for each sampling event. The map should include the background wells, point of compliance wells, active cells and future cells. Pre-Subtitle D cells should be clearly identified on the map, if applicable.

3. Recommendations for any changes.

The entire laboratory report which includes QA/QC data and laboratory analytical data should be provided on CD, in PDF file.

If a Semiannual Detection Monitoring Report covering the first half of the calendar year was submitted, the annual report should not duplicate information (such as TCEQ-0312 forms, statistical analysis, laboratory checklist...) in the semiannual report, but should include a summary of the semiannual report.

Additional Information

The MSW Permits Section suggests submitting semiannual reports after the first semiannual groundwater monitoring events and annual reports after the second semiannual groundwater monitoring events. Detection Reports can be combined with Assessment Reports if submitted **within 60 days** after the last day of the facility's semiannual events.

Text files are no longer required to be submitted. Please do not send text files. Electronic data files for analytical results are no longer required to be submitted via email. Please do not send electronic data files via email. The MSW Permits Section requests groundwater reports be submitted according to the following instructions:

1. Please submit the following number of copies:

   - One hard copy of the report to the MSW Permits Section in central office.
   - One PDF copy of the report on CD to the MSW Permits Section in central office (the entire laboratory report with analytical data and laboratory QA/QC should be added to the PDF copy of the report).
   - One hard copy of the report to the appropriate TCEQ regional office.

2. All PDF files on CD should be properly named. A PDF file name should consist of:

   - Record series (MSW PA), Permit number, Folder code (RP for reports and PA for permits), date of document (Year Month Day) and Document name.

     Example:

     MSW PA_1222_RP_20131215_GW-Annual-2013-Report.pdf

3. Small reports such as ASDs, Verification Resampling Reports or others may be submitted in hard copy only (original and one copy to the MSW Permits Section in central office, and one copy to region office).

If you have any questions about these reporting guidelines, please contact Ms. Iryna Kushnirsky at (512) 239-1471, or in writing at the address on our letterhead. When addressing written correspondence, please use mail code MC 124.

Sincerely,

Earl Lott

Earl Lott, Director
Waste Permits Division
Texas Commission on Environmental Quality

EL/IMK

APPENDIX III5B-3D

TCEQ GROUNDWATER SAMPLING REPORT TCEQ-0312

Texas Commission on Environmental Quality
Waste Permits Division, Municipal Solid Waste Permits Section
Groundwater Sampling Report

Facility name_____

Permittee_____

County_____

Name of sampler_____

Affiliation of sampler_____

If split-sampled, with whom?_____

Integrity of well_____

Installation date_____

5. Purging/Sampling method_____
(enter Bailer or Pump)

Were low-flow methods used? [ ] yes [ ] no
(check one)

If yes, what volume was purged?_____

6. Well volumes purged_____
(enter 1, 2, 2.5, 3, etc)

7. Was the well dry before purging? [ ] yes [ ] no
(check one)

8. Was the well dry after purging? [ ] yes [ ] no
(check one)

9. How long before sampling?_____
(enter time)

10. Unit of measure?_____
(days, hours, or mins)

1. MSW permit no. _____
(Essential Field)

2. Monitor well no. _____
(Essential Field)

3. Date of sampling _____
(Essential Field)

Most recent previous sampling_____

Date of water level measurements_____

Datum reference point_____

Datum elevation*_____

Depth to water (below datum)*_____

4. Water level elevation*_____

11. Sample Event_____
(enter one of the selections below)

- Background
- Detection Monitoring
- Assessment
- Corrective Action
- Other

12. Sample Schedule_____
(enter one of the selections below)

- Quarterly
- Semi-Annual
- Annual
- Fourth Year
- Other

13. Sample Type_____
(enter one of the selections below)

- Regular
- Duplicate
- Resample
- Split
- Other

Field Measurements: 14. pH _____

15. Spec. cond._____ 16. [ ] umho/cm or [ ] mmho/cm *(check one)*

17. Temp. _____ 18. [ ] °F or [ ] °C *(check one)*

Laboratory: 19. Name _____ Phone _____

Address _____

Representative _____
(name) *(signature)* *(date)*

Site operator or representative_____
(name) *(signature)* *(date)*

***Report depth to water and elevations to nearest 0.01 foot relative to mean sea level (MSL).**

Texas Commission on Environmental Quality
Waste Permits Division, Municipal Solid Waste Permits Section
Groundwater Sampling Report

Heavy Metals

Constituent		Concentration	Reporting Limits[-3]	Method
Antimony	T[1] D[2]	µg/l	µg/l	
Arsenic	T D	µg/l	µg/l	
Barium	T D	µg/l	µg/l	
Beryllium	T D	µg/l	µg/l	
Cadmium	T D	µg/l	µg/l	
Chromium	T D	µg/l	µg/l	
Cobalt	T D	µg/l	µg/l	
Copper	T D	µg/l	µg/l	
Lead	T D	µg/l	µg/l	
Mercury	T D	µg/l	µg/l	
Nickel	T D	µg/l	µg/l	
Selenium	T D	µg/l	µg/l	
Silver	T D	µg/l	µg/l	
Thallium	T D	µg/l	µg/l	
Vanadium	T D	µg/l	µg/l	
Zinc	T D	µg/l	µg/l	
Iron	T D	µg/l	µg/l	
Manganese	T D	µg/l	µg/l	

[1, 2] Indicate whether analyses for Total (T) or Dissolved (D); use two pages if both are run. If analyses for dissolved concentrations, indicate filter pore size [ ] 0.45, [ ] 1, [ ] 10, [ ] ____ micron, and whether filtered [ ] in field or [ ] in laboratory.

[3] Indicate if reporting limits are _____ PQLs or _____ MDLs.

Texas Commission on Environmental Quality
Waste Permits Division, Municipal Solid Waste Permits Section
Groundwater Sampling Report

Volatile Organic Compounds (VOCs) [1]

Constituent	Concentration (µg/L)	Reporting Limit (µg/L) [2]	Method	CAS No.
Acetone				67-64-1
Acrylonitrile				107-13-1
Benzene				71-43-2
Bromochloromethane				74-97-5
Bromodichloromethane				75-27-4
Bromoform				75-25-2
Carbon disulfide				75-15-0
Carbon tetrachloride				56-23-5
Chlorobenzene				108-90-7
Chloroethane				75-00-3
Chloroform				67-66-3
Dibromochloromethane				124-48-1
1,2-Dibromo-3-chloropropane				96-12-8
1,2-Dibromoethane				106-93-4
o-Dichlorobenzene (1,2)				95-50-1
p-Dichlorobenzene (1,4)				106-46-7
trans-1,4-Dichloro-2-butene				110-57-6
1,1-Dichloroethane				75-34-3
1,2-Dichloroethane				107-06-2
1,1-Dichloroethylene				75-35-4
cis-1,2-Dichloroethylene				156-59-2
trans-1,2-Dichloroethylene				156-60-5
1,2-Dichloropropane				78-87-5
cis-1,3-Dichloropropene				10061-01-5
trans-1,3-Dichloropropene				10061-02-6
Ethylbenzene				100-41-4
2-Hexanone				591-78-6
Methyl bromide				74-83-9
Methyl chloride				74-87-3
Methylene bromide				74-95-3
Methylene chloride				75-09-2
Methyl ethyl ketone				78-93-3
Methyl iodide				74-88-4
4-Methyl-2-pentanone				108-10-1
Styrene				100-42-5
1,1,1,2-Tetrachloroethane				630-20-6
1,1,2,2-Tetrachloroethane				79-34-5
Tetrachloroethylene				127-18-4
Toluene				108-88-3
1,1,1-Trichloroethane				71-55-6
1,1,2-Trichloroethane				79-00-5
Trichloroethylene				79-01-6
Trichlorofluoromethane				75-69-4
1,2,3-trichloropropane				96-18-4
Vinyl acetate				108-05-4
Vinyl chloride				75-01-4
Xylenes (total)				1330-20-7

[1] Samples for VOCs must not be filtered.

[2] Indicate if reporting limits are _____ PQLs or _____ MDLs.

Texas Commission on Environmental Quality
Waste Permits Division, Municipal Solid Waste Permits Section
Groundwater Sampling Report

Other Constituents

Constituent [1]	Concentration [2]	Reporting Limit [2, 3]	Method

1 Indicate whether analyses for Total (T) or Dissolved (D) concentrations. If analyses for dissolved concentrations, indicate filter pore size [ ] 0.45, [ ] 1, [ ] 10, [ ] __ micron, and whether filtered [ ] in field or [ ] in laboratory.

2 Indicate if reporting limits are ________ PQLs or ________ MDLs.

3 Show units of concentration and reporting limit.

APPENDIX III5B-3E

MSW LAB CHECKLIST

Municipal Solid Waste Laboratory Review Checklist

This data package consists of:

- ☐ This signature page, and the laboratory review checklist consisting of Table 1, Reportable Data (which includes the reportable data identified on this page), Table 2, Supporting Data, and Table 3, Exception Reports.
- ☐ R1 Field chain-of-custody documentation
- ☐ R2 Sample identification cross-reference
- ☐ R3 Test reports (analytical data sheets) for each environmental sample that includes:
  - (a) Items specified in NELAC Chapter 5 for reporting results, e.g., Section 5.5.10 in 2003 NELAC Standard
  - (b) Dilution factors
  - (c) Preparation methods
  - (d) Cleanup methods
  - (e) If required for the project, tentatively identified compounds (TICs)
- ☐ R4 Surrogate recovery data including:
  - (a) Calculated recovery (%R)
  - (b) The laboratory's surrogate QC limits
- ☐ R5 Test reports/summary forms for blank samples
- ☐ R6 Test reports/summary forms for laboratory control samples (LCSs) including:
  - (a) LCS spiking amounts
  - (b) Calculated %R for each analyte
  - (c) The laboratory's LCS QC limits
- ☐ R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
  - (a) Samples associated with the MS/MSD clearly identified
  - (b) MS/MSD spiking amounts
  - (c) Concentration of each MS/MSD analyte measured in the parent and spiked samples
  - (d) Calculated %Rs and relative percent differences (RPDs)
  - (e) The laboratory's MS/MSD QC limits
- ☐ R8 Laboratory analytical duplicate (if applicable) recovery and precision:
  - (a) The amount of analyte measured in the duplicate
  - (b) The calculated RPD
  - (c) The laboratory's QC limits for analytical duplicates
- ☐ R9 List of method quantitation limits (MQLs) for each analyte for each method and matrix
- ☐ R10 Other problems or anomalies
- ☐ The Exception Report for every item for which the result is "No" or "NR" (Not Reviewed)

Release Statement: I am responsible for the release of this laboratory data package. This data package as been reviewed by the laboratory and is complete and technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory as having the potential to affect the quality of the data, have been identified by the laboratory in the Laboratory Review Checklist, and no information or data have been knowingly withheld that would affect the quality of the data.

Check, if applicable: [ ] This laboratory is an in-house laboratory controlled by the person responding to rule. The official signing the cover page of the rule-required report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

_____	_____	_____	_____
Name (printed)	Signature	Official Title	Date

Table 1. Reportable Data.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
R1	O, I	**Chain-of-custody (COC)**		
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?		
		Were all departures from standard conditions described in an exception report?		
R2	O, I	**Sample and quality control (QC) identification**		
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?		
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?		
R3	O, I	**Test reports**		
		Were all samples prepared and analyzed within holding times?		
		Other than those results < MQL, were all other raw values bracketed by calibration standards?		
		Were calculations checked by a peer or supervisor?		
		Were all analyte identifications checked by a peer or supervisor?		
		Were sample quantitation limits reported for all analytes not detected?		
		Were all results for soil and sediment samples reported on a dry weight basis?		
		Was % moisture (or solids) reported for all soil and sediment samples?		
		If required for the project, TICs reported?		
R4	O	**Surrogate recovery data**		
		Were surrogates added prior to extraction?		
		Were surrogate percent recoveries in all samples within the laboratory QC limits?		
R5	O, I	**Test reports/summary forms for blank samples**		
		Were appropriate type(s) of blanks analyzed?		
		Were blanks analyzed at the appropriate frequency?		

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?		
		Were blank concentrations < MQL?		
R6	O, I	**Laboratory control samples (LCS):**		
		Were all COCs included in the LCS?		
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?		
		Were LCSs analyzed at the required frequency?		
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?		
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SQLs?		
		Was the LCSD RPD within QC limits?		
R7	O, I	**Matrix spike (MS) and matrix spike duplicate (MSD) data**		
		Were the project/method specified analytes included in the MS and MSD?		
		Were MS/MSD analyzed at the appropriate frequency?		
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		
		Were MS/MSD RPDs within laboratory QC limits?		
R8	O, I	**Analytical duplicate data**		
		Were appropriate analytical duplicates analyzed for each matrix?		
		Were analytical duplicates analyzed at the appropriate frequency?		
		Were RPDs or relative standard deviations within the laboratory QC limits?		
R9	O, I	**Method quantitation limits (MQLs):**		
		Are the MQLs for each method analyte included in the laboratory data package?		
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?		
		Are unadjusted MQLs included in the laboratory data package?		
R10	O, I	**Other problems/anomalies**		
		Are all known problems/anomalies/special conditions noted in this LRC and ER?		
		Were all necessary corrective actions performed for the reported data?		
		Was applicable and available technology used to lower the SQL minimize the matrix interference affects on the sample results?		

Table 2. Supporting Data.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S1	O, I	**Initial calibration (ICAL)**		
		Were response factors and/or relative response factors for each analyte within QC limits?		
		Were percent RSDs or correlation coefficient criteria met?		
		Was the number of standards recommended in the method used for all analytes?		
		Were all points generated between the lowest and highest standard used to calculate the curve?		
		Are ICAL data available for all instruments used?		
		Has the initial calibration curve been verified using an appropriate second source standard?		
S2	O, I	**Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):**		
		Was the CCV analyzed at the method-required frequency?		
		Were percent differences for each analyte within the method-required QC limits?		
		Was the ICAL curve verified for each analyte?		
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?		
S3	O	**Mass spectral tuning:**		
		Was the appropriate compound for the method used for tuning?		
		Were ion abundance data within the method-required QC limits?		
S4	O	**Internal standards (IS):**		
		Were IS area counts and retention times within the method-required QC limits?		
S5	O, I	**Raw data (NELAC section 1 appendix A glossary, and section 5.)**		
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?		
		Were data associated with manual integrations flagged on the raw data?		

Item[1]	Analytes[2]	Description	Result (Yes, No, NA, NR)[3]	Exception Report No.[4]
S6	O	**Dual column confirmation**		
		Did dual column confirmation results meet the method-required QC?		
S7	O	**Tentatively identified compounds (TICs):**		
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?		
S8	I	**Interference Check Sample (ICS) results:**		
		Were percent recoveries within method QC limits?		
S9	I	**Serial dilutions, post digestion spikes, and method of standard additions**		
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		
S10	O, I	**Method detection limit (MDL) studies**		
		Was a MDL study performed for each reported analyte?		
		Is the MDL either adjusted or supported by the analysis of DCSs?		
S11	O, I	**Proficiency test reports:**		
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?		
S12	O, I	**Standards documentation**		
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?		
S13	O, I	**Compound/analyte identification procedures**		
		Are the procedures for compound/analyte identification documented?		
S14	O, I	**Demonstration of analyst competency (DOC)**		
		Was DOC conducted consistent with NELAC Chapter 5C?		
		Is documentation of the analyst's competency up-to-date and on file?		
S15	O, I	**Verification/validation documentation for methods (NELAC Chap 5n 5)**		
		Are all the methods used to generate the data documented, verified, and validated, where applicable?		
S16	O, I	**Laboratory standard operating procedures (SOPs):**		
		Are laboratory SOPs current and on file for each method performed?		

Table 3. Exception Reports.

Laboratory Name: _____

Project Name: _____

Reviewer Name: _____

LRC Date: _____

Laboratory Job Number: _____

Prep Batch Number(s): _____

Exception Report No.	Description

[1] Items identified by the letter "R" must be available as a hard copy or as a .pdf file. Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period.
[2] O - organic analyses; I - inorganic analyses (including general chemistry constituents, when applicable).
[3] NA - Not applicable; NR - Not reviewed.
[4] Exception Report identification number; an Exception Report should be completed for an item if the result is "No" or "NR."

APPENDIX III5C

HISTORICAL STATISTICALLY SIGNIFICANT INCREASES

Well ID	Date	Constituent	Analytical Result (ug/L)	MSW-PQL (ug /L)	Back-ground (ug /L)	Verified (V) or Verification Sample (VS)	Alternate Source Demonstration
Inorganic Constituents							
MW-12	9/13/05	Arsenic	15	5	12.3	-	YES
MW-10	11/30/05	Selenium	51.6	50	28.7	-	YES
MW-15	3/15/06	Arsenic	20	5	11.4	-	YES
MW-15	3/15/06	Selenium	62.6	50	27.8	-	YES
MW-18	3/15/06	Selenium	57.8	50	27.6	-	YES
MW-3RA	10/31/06	Barium	53.3	10	49.2	-	YES
MW-9	10/31/06	Barium	94.9	10	44.5	-	YES
MW-10	10/31/06	Selenium	109	50	28.7	-	YES
MW-10	12/19/06	Selenium	59.5	50	28.7	-	YES
MW-18	12/18/06	Selenium	84.5	50	27.6	-	YES
MW-6	3/22/07	Barium	114	10	64.7	-	YES
MW-6	3/22/07	Chromium	273	5	25	-	YES
MW-6	3/22/07	Nickel	66.9	20	12.6	-	YES
MWD-6	3/22/07	Barium	114	10	82	-	YES
MWD-6	3/22/07	Chromium	273	20	5	-	YES
MWD-6	3/22/07	Nickel	66.9	20	24	-	YES
MW-15	3/21/07	Barium	131	10	85.2	-	YES
MW-18	3/21/07	Selenium	55.5	50	27.6	-	YES
MW-4R	5/22/07	Arsenic	11.2	5	10.6	-	YES
MW-9	5/22/07	Barium	118	10	100.6	-	YES
MW-10	5/22/07	Selenium	54.3	50	28.7	-	YES
MW-15	5/22/07	Arsenic	11.4	5	11.4	-	YES
MW-15	9/5/07	Arsenic	12.2	5	11.4	-	YES
MW-4R	12/19/07	Selenium	66.1	50	62.3	-	YES
MW-10	12/18/07	Selenium	75.4	50	28.7	-	YES
MW-11	12/19/07	Arsenic	12.7	5	10.4	-	YES
MW-12	12/19/07	Arsenic	13.2	5	12.3	-	YES
MW-12	12/19/07	Selenium	57.9	50	55.5	-	YES
MW-9	6/19/08	Barium	121	10	100.6	-	YES
MW-10	6/19/08	Selenium	76.3	50	28.7	-	YES
MW-4R	5/13/09	Silver	499	10	25	-	YES
MW-4R	5/13/09	Vanadium	76	10	74.8	-	YES
MW-7	5/13/09	Silver	12	10	5	-	YES
MW-10	5/12/09	Selenium	72.7	50	28.7	-	YES
MW-11	5/13/09	Silver	729	10	5	-	YES
MW-12	5/12/09	Silver	40.2	10	5	-	YES
MW-15	5/13/09	Silver	23.3	10	5	-	YES
MW-18	5/13/09	Barium	88.5	10	80.2	-	YES
MW-18	5/12/09	Silver	148	10	5	-	YES
MW-3A	6/5/09	Barium	75.1	10	49.2	-	YES
MW-9R	6/5/09	Barium	113	10	100.6	-	YES
MW-10R	6/5/09	Barium	127	10	106.1	-	YES
MW-18R	6/5/09	Barium	112	10	80.2	-	YES
MW-22	6/5/09	Barium	65.3	10	43.5	-	YES
MW-23	6/5/09	Barium	54.8	10	44.6	-	YES
MWD-6	6/5/09	Chromium	31.8	20	5	-	YES
MWD-6	6/5/09	Copper	10.8	10	5	-	YES
MWD-6	6/5/09	Nickel	114	20	24	-	YES

Well ID	Date	Constituent	Analytical Result (ug/L)	MSW-PQL (ug /L)	Back-ground (ug /L)	Verified (V) or Verification Sample (VS)	Alternate Source Demonstration
MW-12	12/17/09	Zinc	295	100	10	-	YES
MW-12	4/6/10	Copper	98	2	5	-	YES
MW-24	6/27/12	Vanadium	112	10	111.3	V	-
MW-24	7/25/12	Vanadium	110	10	111.3	VS	YES
MW-24	6/27/12	Arsenic	13.6	5	13.4	V	-
MW-24	7/25/12	Arsenic	13.7	5	13.4	VS	YES
MW-3A	12/11/12	Vanadium	209	10	186	V	-
MW-3A	1/7/13	Vanadium	215	10	186	VS	YES
MW-24	12/11/12	Arsenic	16	5	13.4	V	-
MW-24	1/7/13	Arsenic	17	5	13.4	VS	YES
MW-24	12/11/12	Vanadium	121	10	111.3	V	-
MW-24	1/7/13	Vanadium	124	10	111.3	VS	YES
MW-24	6/13/13	Arsenic	16	5	13.4	V	-
MW-24	7/19/13	Arsenic	16	5	13.4	VS	YES
MW-24	6/13/13	Vanadium	128	10	111.3	V	-
MW-24	7/19/13	Vanadium	131	10	111.3	VS	YES
MW-3A	12/14/13	Vanadium	196	10	186	V	-
MW-3A	2/4/14	Vanadium	214	10	186	VS	YES
MW-12	12/13/13	Chromium	36.3	5	7.9	V	-
MW-12	2/4/14	Chromium	<1.0	5	7.9	VS	YES
MW-16	12/14/13	Arsenic	22	5	21.2	V	-
MW-16	2/4/14	Arsenic	25.5	5	21.2	VS	YES
MW-9R	12/14/13	Barium	103	10	100.6	V	-
MW-9R	2/4/14	Barium	105	10	100.6	VS	YES
MW-24	12/13/13	Arsenic	22.1	5	13.4	V	-
MW-24	2/4/14	Arsenic	21.8	5	13.4	VS	YES
MW-24	12/13/13	Vanadium	163	10	111.3	V	-
MW-24	2/4/14	Vanadium	177	10	111.3	VS	YES
MW-16	6/21/14	Arsenic	39.3	5	21.2	V	-
MW-16	7/25/14	Arsenic	37	5	21.2	VS	YES
MW-16	6/21/14	Vanadium	216	10	143.2	V	-
MW-16	7/25/14	Vanadium	206	10	143.2	VS	YES
MW-24	6/21/14	Arsenic	21.3	5	13.4	V	-
MW-24	7/25/14	Arsenic	18	5	13.4	VS	YES
MW-24	6/21/14	Vanadium	160	10	111.3	V	-
MW-24	7/25/14	Vanadium	161	10	111.3	VS	YES
MW-16	12/9/14	Arsenic	105	5	21.2	V	-
MW-16	1/14/15	Arsenic	117	5	21.2	VS	YES
MW-16	12/9/14	Vanadium	458	10	143.2	V	-
MW-16	1/14/15	Vanadium	468	10	143.2	VS	YES
MW-24	12/10/14	Arsenic	24	5	13.4	V	-
MW-24	1/13/15	Arsenic	28	5	13.4	VS	YES
MW-24	12/10/14	Vanadium	183	10	111.3	V	-
MW-24	1/13/15	Vanadium	207	10	111.3	VS	YES
MWD-6	6/22/15	Copper	12.7	10	5	V	-
MWD-6	7/29/15	Copper	15.5	10	5	VS	YES
MWD-6	6/22/15	Zinc	32.3	100	17.5	V	
MWD-6	7/29/15	Zinc	120	100	17.5	VS	YES
MWD-7	6/22/15	Barium	145	10	99.6	V	-
MWD-7	7/30/15	Barium	103	10	99.6	VS	YES

Well ID	Date	Constituent	Analytical Result (ug/L)	MSW-PQL (ug /L)	Back-ground (ug /L)	Verified (V) or Verification Sample (VS)	Alternate Source Demonstration
MW-16	6/25/15	Arsenic	148	5	21.2	V	-
MW-16	7/28/15	Arsenic	116	5	21.2	VS	YES
MW-16	6/25/15	Vanadium	559	10	143.2	V	-
MW-16	7/28/15	Vanadium	458	10	143.2	VS	YES
MW-23	6/24/15	Arsenic	23.1	5	12.2	V	-
MW-23	7/29/15	Arsenic	29	5	12.2	VS	YES
MW-23	6/24/15	Barium	48.9	10	44.6	V	-
MW-23	7/29/15	Barium	134	10	44.6	VS	YES
MW-23	6/24/15	Vanadium	260	10	95.2	V	-
MW-23	7/29/15	Vanadium	228	10	95.2	VS	YES
MW-24	6/23/15	Arsenic	32.3	5	13.4	V	-
MW-24	7/29/15	Arsenic	36	5	13.4	VS	YES
MW-24	6/23/15	Vanadium	233	10	111.3	V	-
MW-24	7/29/15	Vanadium	227	10	111.3	VS	YES
MW-2R	6/24/15	Zinc	36	100	9	V	-
MW-2R	7/29/15	Zinc	102	100	9	VS	YES
MW-16	12/8/15	Arsenic	141	5	21.2	V	-
MW-16	1/27/16	Arsenic	133	5	21.2	VS	YES
MW-16	12/8/15	Vanadium	523	10	143.2	V	-
MW-16	1/27/16	Vanadium	515	10	143.2	VS	YES
MW-24	12/8/15	Arsenic	41.2	5	13.4	V	-
MW-24	1/27/16	Arsenic	41.3	5	13.4	VS	YES
MW-24	12/8/15	Vanadium	247	10	111.3	V	-
MW-24	1/27/16	Vanadium	236	10	111.3	VS	YES
MW-9R	12/8/15	Barium	109	10	100.6	V	-
MW-9R	1/27/16	Barium	105	10	100.6	VS	YES
MWD-6	12/8/15	Copper	34.7	10	5	V	-
MWD-6	1/27/16	Copper	14.8	10	5	VS	YES
MWD-7	12/9/15	Barium	103	10	99.6	V	-
MWD-7	1/27/16	Barium	117	10	99.6	VS	YES
MWD-7	12/9/15	Zinc	179	100	6	V	-
MWD-7	1/27/16	Zinc	9.09	100	6	VS	YES
MW-16	6/29/16	Arsenic	98.8	5	21.2	V	-
MW-16	9/7/16	Arsenic	123	5	21.2	VS	YES
MW-16	6/29/16	Vanadium	392	10	143.2	V	-
MW-16	9/7/16	Vanadium	470	10	143.2	VS	YES
MW-24	6/28/16	Arsenic	40.7	5	13.4	V	-
MW-24	9/8/16	Arsenic	42	5	13.4	VS	YES
MW-24	6/28/16	Vanadium	226	10	111.3	V	-
MW-24	9/8/16	Vanadium	229	10	111.3	VS	YES
MWD-7	6/27/16	Barium	127	10	99.6	V	-
MWD-7	9/7/16	Barium	168	10	99.6	VS	YES

Well ID	Date	Constituent	Analytical Result (ug/L)	MSW-PQL (ug /L)	Back-ground (ug /L)	Verified (V) or Verification Sample (VS)	Alternate Source Demonstration
Volatile Organics							
MW-22	6/23/15	cis-1,2-Dichloroethene	3.5	1	--	-	-
MW-22	12/10/15	cis-1,2-Dichloroethene	4.4	1	--	-	-
MW-22	6/30/16	cis-1,2-Dichloroethene	17.0	1	--	-	-
MW-22	12/1/16	cis-1,2-Dichloroethene	62.0	1	--	-	-
MW-22	6/30/16	1,1-Dichlorethane	0.5	1	--	-	-
MW-22	12/1/16	1,1-Dichlorethane	1.1	1	--	-	-
MW-22	6/30/16	Trichloroethylene	1.0	5	--	-	-
MW-4A	12/10/15	Benzene	1.1	1	--	-	-
MW-4A	6/21/14	1,4-Dichlorobenzene	2.4	2	--	-	-
MW-4A	6/24/15	1,4-Dichlorobenzene	3.9	2	--	-	-
MW-4A	12/10/15	1,4-Dichlorobenzene	3.3	2	--	-	-
MW-4A	6/21/14	1,1-Dichloroethane	1.1	1	--	-	-
MW-4A	6/24/15	1,1-Dichloroethane	1.2	1	--	-	-
MW-4A	12/10/12	cis-1,2-Dichloroethene	5.9	1	--	-	-
MW-4A	3/21/14	cis-1,2-Dichloroethene	8.8	1	--	-	-
MW-4A	6/21/14	cis-1,2-Dichloroethene	5.4	1	--	-	-
MW-4A	6/24/15	cis-1,2-Dichloroethene	9.5	1	--	-	-
MW-4A	12/10/15	cis-1,2-Dichloroethene	4.0	1	--	-	-
MW-4A	6/21/14	Tetrachloroethene	2.4	5	--	-	-
MW-4A	6/24/15	Tetrachloroethene	4.0	5	--	-	-
MW-4A	12/10/15	Tetrachloroethene	2.5	5	--	-	-
MW-4A	6/27/12	Trichloroethylene	6.0	5	--	-	-
MW-4A	12/10/12	Trichloroethylene	11.0	5	--	-	-
MW-4A	12/14/13	Trichloroethylene	5.2	5	--	-	-
MW-4A	3/21/14	Trichloroethylene	12.0	5	--	-	-
MW-4A	6/21/14	Trichloroethylene	9.5	5	--	-	-
MW-4A	12/9/14	Trichloroethylene	1.8	5	--	-	-
MW-4A	6/24/15	Trichloroethylene	15.2	5	--	-	-
MW-4A	12/10/15	Trichloroethylene	7.1	5	--	-	-
MW-4A	3/21/14	Vinyl Chloride	2.7	2	--	-	-
MW-4A	6/21/14	Vinyl Chloride	1.5	2	--	-	-
MW-4A	6/24/15	Vinyl Chloride	2.7	2	--	-	-
MW-4A	12/10/15	Vinyl Chloride	1.9	2	--	-	-

Notes:
All metal levels are compared to current background values, and VOCs are compared to current MSW PQLs
Table last updated with December 2016 Analytical Results