



**Groundwater and Surface Water Monitoring Plan
Central Landfill Facility
Worcester County, Maryland**

Landfill Permit No. 2021-WMF-0663

Prepared for:

Worcester County Department of Public Works
6113 Timmons Road
Snow Hill, Maryland 20863

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
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(410) 584-7000

July 2023
EA Project Number: 10609.48

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LIST OF ACRONYMS AND ABBREVIATIONS

°C	Degrees Celsius
μS/cm	Microsiemen(s) per centimeter
CFR	Code of Federal Regulations
CLF	Central Landfill Facility
cm/sec	Centimeter(s) per second
COD	Chemical oxygen demand
DO	Dissolved oxygen
EPA	U.S. Environmental Protection Agency
ft	Foot (feet)
gal	Gallon(s)
in.	Inch(es)
KM	Kaplan-Meier
L	Liter(s)
LPM	Liter(s) per minute
MCL	Maximum Contaminant Level
MDE	Maryland Department of the Environment
mg/L	Milligram(s) per liter
min.	Minute(s)
MSL	Mean sea level
mV	Millivolt(s)
NTU	Nephelometric turbidity units
ORP	Oxidation-reduction potential
PQL	Practical quantitation limit
QA/QC	Quality Assurance/Quality Control
RDP	Refuse Disposal Permit
SSI	Statistically significant increase
S.U.	Standard unit(s)
TOC	Total organic carbon
UPL	Upper Prediction Limit

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1. INTRODUCTION

The Worcester County Central Landfill Facility (CLF) is located approximately 3.5 miles northeast of Snow Hill, Maryland, and occupies an approximately 725-acre site. Two hundred and thirty acres of this site are currently permitted for landfilling (eight cells of 200 acres for municipal solid waste and one 30-acre rubble fill cell). The overall site was developed between 1986 and 1990, and the first landfill began accepting waste in April 1990.

Cells 1 through 4 are located in the northern portion of the property. There is an existing access road that serves the landfill. Cell 5 is located to the southeast of the property, within the footprint of a permitted former rubble fill. A portion of the Cell 5 area was utilized for scrap metal stockpiling activities. To the north, Cell 5 abuts the previously permitted operational area of the landfill. Construction of Cell 5 was completed and waste acceptance began on 29 January 2019.

Existing features at the Central Landfill Facility, Cells 1 through 5, include:

- The existing active landfill area
- Access roads to the existing landfill area
- Scale house facility
- Leachate facilities
- Recycling facility
- Landfill gas blower and flare station

The landfilling operations at the site are restricted to placement of municipal solid waste and cover soil material.

This monitoring plan has been developed to comply with the regulations set forth in 40 Code of Federal Regulations (CFR) 258, Subpart E, "Groundwater Monitoring and Corrective Action," and the facility's Refuse Disposal Permit (RDP), Permit No. 2021-WMF-0663 issued on 21 January 2022.

This monitoring plan addresses detection monitoring and assessment monitoring, as defined in 40 CFR 258.54 and 40 CFR 258.55, respectively. Should a statistically significant increase (SSI), as described in Chapter 6, over background conditions of the constituents tested in the detection monitoring program be detected, for which an alternate source or explanation is not able to be identified, an assessment monitoring program will be implemented.

Should an Assessment of Corrective Measures and a subsequent Remedial Plan be required, the County will prepare these documents and submit to the Maryland Department of the Environment (MDE) for review and approval. These documents will identify the proposed corrective measures, a schedule to identify notifications to MDE and certification. The plan will identify notification requirements at a minimum of 14 days both prior to the implementation of the control measures and upon completion/certification of the implementation of the control measures.

1.1 SITE GEOLOGY/HYDROLOGY

The CLF is located approximately 3.5 miles northeast of Snow Hill in Worcester County, Maryland. The regional geology of Worcester County is underlain by unconsolidated sedimentary strata of Holocene, Pleistocene, and Miocene epochs. These strata dip to the east and are generally alternating silt, sand, and clay. Geology at the site is consistent with the regional geology. According to the Geologic map of Worcester County (Owens and Denny 1978), the geologic formations underlying the site are the Omar Formation and the Beaverdam Sand. Additional information regarding site geology is provided in the 1987 Phase II Geohydrologic Investigation (EA Engineering, Science, and Technology, Inc. 1987) and Phase II Hydrogeologic Investigation and Concept Design for the Proposed Municipal Solid Waste Cell 5 (EA Engineering, Science, and Technology, Inc. 2014).

As part of the 1987 Phase II Geohydrologic Investigation (EA Engineering, Science, and Technology, Inc. 1987), a detailed plan for soil borings/well installations was developed and implemented in order to address the site-specific geology and the three underlying aquifers at the CLF. Based on the investigation, it was determined that the shallow geology at the CLF consists of relatively flat layers of a surficial silt overlying a silty-sand layer of Holocene age. The silty-sand layer contains the shallow groundwater aquifer, which overlies an impermeable clay layer approximately 12 to 21 feet (ft) below the ground surface with a permeability on the order of 2.5 to 3.80×10^{-8} centimeters per second (cm/sec). In addition, a deep clay layer was also identified approximately 90 to 100 ft below ground surface (60 to 70 ft below mean sea level [MSL]) with a permeability ranging from 1.47 to 2.4×10^{-7} cm/sec. The deep layer separates the Pleistocene (intermediate) and the Pocomoke (deep) aquifers. As described, the shallow and intermediate aquifers beneath the site are encountered within 50 ft of the bottom of the cell floors. The cells floors for Cells 1 through 4 are all approximately 33 to 35 ft above MSL.

1.2 SURFACE WATER HYDROLOGY AND TOPOGRAPHY

The landfill property is bordered to the south by Cedartown Road, to the northwest by railroad tracks, and elsewhere by wooded private property. The site lies within the Atlantic Coastal Plain Physiographic Province. With the exception of the landfill cells, the site is relatively flat with local relief approximately 5 to 7 ft over the site. The average site elevation, not including the landfill cells, is approximately 35 ft above MSL. Prior to landfilling, the land surface was mostly wooded, with several small fields used for farming in the vicinity of where the active portion of the site is located.

Standing water can be observed at the existing borrow areas on-site, which were historically used to obtain daily cover for landfill activities. Surface water also flows off-site via drainage ditches and tributaries to Five-Mile Creek and the Pocomoke River on the western side, and Waterworks Creek and Chincoteague Bay on the eastern side, as described in the 1987 Phase II Geohydrologic Investigation (EA Engineering, Science, and Technology, Inc. 1987).

Shallow groundwater flow direction in the area of Cells 1 through 4 is a result of mounding within those cells. Shallow groundwater in Cells 1 through 4 generally flows to the northwest area. Shallow groundwater in the Cell 5 area flows to the northwest and west. Groundwater

elevation data from the intermediate monitoring wells indicate groundwater flow to the southeast in the intermediate aquifer in both the Cells 1 through 4 and Cell 5 areas.

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2. LOCATION AND FREQUENCY OF MONITORING POINTS

There are 33 existing groundwater monitoring wells, 2 potable wells, 2 surface water locations, and 5 leachate sample locations sampled at the CLF (see Figure 2-1). These are divided between the northern (vicinity of Cells 1 through 4), southern (undeveloped portion of the CLF), and transitional groundwater zones (vicinity of Cell 5), based on historical groundwater flow patterns in the shallow aquifer (Figure 2-2). Twenty-two of the 33 monitoring wells are screened within the shallow aquifer, 8 monitoring wells within the intermediate aquifer, and 3 monitoring wells within the deep aquifer. The 22 shallow wells within the Cells 1 through 5 area and 3 intermediate wells within the Cell 5 area are sampled on a semi-annual basis. The 5 intermediate monitoring wells and 3 deep within the Cells 1 through 4 area are sampled on an annual basis. The off-site background monitoring well (MW-22S) is located at an active radio tower plot located less than ½ mile west of the site. Currently, landfilling activities occur over the transitional groundwater zones. This plan provides for monitoring of the northern and transitional groundwater drainage zones only.

Surface water is to be sampled from two locations, SW-1 and SW-2. SW-1 is collected from Five-Mile Branch, located west of the landfill. SW-2 is collected from the landfill borrow pond located west of Cell 1.

The following points shall be sampled:

Description	Number	Zone	Sampling Frequency
Surface water location	SW-1	Northern	Semi-Annual (Spring and Fall)
Surface water location	SW-2	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-3S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-3M	Northern	Annual (Fall)
Monitoring well	MW-3D	Northern	Annual (Fall)
Monitoring well	MW-4S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-4M	Northern	Annual (Fall)
Monitoring well	MW-4D	Northern	Annual (Fall)
Monitoring well	MW-5SR	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-7S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-7M	Northern	Annual (Fall)
Monitoring well	MW-8S	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-8M	Transitional	Annual (Fall)
Monitoring well	MW-8D	Transitional	Annual (Fall)
Monitoring well	MW-10S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-10M	Transitional	Annual (Fall)
Monitoring well	MW-11S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-13S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-14S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-15S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-16S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-17S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-18S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-19S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-20S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-21S	Northern	Semi-Annual (Spring and Fall)
Monitoring well	MW-22S	Off-site	Semi-Annual (Spring and Fall)

Description	Number	Zone	Sampling Frequency
Monitoring well	MW-501A	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-501M	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-502A	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-503A	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-504A	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-504M	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-505A	Transitional	Semi-Annual (Spring and Fall)
Monitoring well	MW-505M	Transitional	Semi-Annual (Spring and Fall)
Potable well	PW-1	Northern	Semi-Annual (Spring and Fall)
Potable well	PW-2	Transitional	Semi-Annual (Spring and Fall)
Leachate sample	LS-1	Northern	Semi-Annual (Spring and Fall)
Leachate sample	LS-2	Northern	Semi-Annual (Spring and Fall)
Leachate sample	LS-3	Northern	Semi-Annual (Spring and Fall)
Leachate sample	LS-4	Northern	Semi-Annual (Spring and Fall)

Wells which are screened in the intermediate aquifer are indicated as such with an “M” designation. Cell 5 intermediate wells (MW-501M, MW-504M, and MW-505M) shall be sampled semi-annually. All other site wells which are screened in the intermediate aquifer shall be sampled annually. All wells which are screened in the deep aquifer are indicated as such with a “D” designation and shall be sampled annually. The shallow aquifer monitoring wells (“S” and “A” designation) and remaining sample locations shall be sampled on a semi-annual basis. The groundwater elevation for all shallow monitoring wells and piezometers will be measured and recorded on a monthly basis. Historical groundwater elevations for all monitoring wells and piezometers are included in Table 2-1. Groundwater contour maps for the shallow aquifer (Figure 2-2) and intermediate aquifer (Figure 2-3) are included for reference. A groundwater contour map is not required for the deep aquifer, as it is more than 50 feet (ft) below the anticipated lowest elevation of the refuse cell floor.

In Spring 2015, elevation gauges were installed in four of the on-site borrow ponds. In addition to the shallow monitoring wells and piezometers, surface water elevations will be gauged in these four borrow ponds (see Figure 2-1).

After installation of a new well, notification of well installation certification and well completion reports will be provided within 14 days following review and receipt of well completion reports by a qualified groundwater scientist.

3. ANALYTES AND ANALYTICAL METHODS

3.1 DETECTION MONITORING

All samples collected will be analyzed for the following constituents, which comprise Appendix I of Subpart E of 40 CFR 258:

Analyte	Method
INORGANIC CONSTITUENTS	
Antimony, total	6020B
Arsenic, total	6020B
Barium, total	6020B
Beryllium, total	6020B
Cadmium, total	6020B
Chromium, total	6020B
Cobalt, total	6020B
Copper, total	6020B
Lead, total	6020B
Nickel, total	6020B
Selenium, total	6020B
Silver, total	6020B
Thallium, total	6020B
Vanadium, total	6020B
Zinc, total	6020B
ORGANIC CONSTITUENTS	
Acetone	8260B
Acrylonitrile	8260B
Benzene	8260B
Bromochloromethane	8260B
Bromodichloromethane	8260B
Bromoform	8260B
Carbon disulfide	8260B
Carbon tetrachloride	8260B
Chlorobenzene	8260B
Chloroethane; Ethyl chloride	8260B
Chloroform; Trichloromethane	8260B
Dibromochloromethane; Chlorodibromomethane	8260B
1,2-Dibromo-3-chloropropane; DBCP	8011
1,2-Dibromoethane; Ethylene dibromide; EDB	8011
o-Dichlorobenzene; 1,2-Dichlorobenzene	8260B
p-Dichlorobenzene; 1,4-Dichlorobenzene	8260B
trans-1,4-Dichloro-2-butene	8260B
1,1-Dichloroethane; Ethylidene chloride	8260B
1,2-Dichloroethane; Ethylene dichloride	8260B
1,1-Dichloroethylene; 1,1-Dichloroethene	8260B
cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene	8260B
trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene	8260B
1,2-Dichloropropane; Propylene dichloride	8260B
cis-1,3-Dichloropropene	8260B
trans-1,3-Dichloropropene	8260B
Ethylbenzene	8260B
2-Hexanone; Methyl butyl ketone	8260B
Methyl bromide; Bromomethane	8260B
Methyl chloride; Chloromethane	8260B
Methylene bromide; Dibromomethane	8260B
Methylene chloride; Dichloromethane	8260B
Methyl ethyl ketone; MEK; 2-Butanone	8260B
Methyl iodide; Iodomethane	8260B

Analyte	Method
Methyl Tertiary Butyl Ether	8260B
4-Methyl-2-pentanone; Methyl isobutyl ketone	8260B
Styrene	8260B
1,1,1,2-Tetrachloroethane	8260B
1,1,2,2-Tetrachloroethane	8260B
Tetrachloroethylene; Tetrachloroethene	8260B
Toluene	8260B
1,1,1-Trichloroethane; Methylchloroform	8260B
1,1,2-Trichloroethane	8260B
Trichloroethylene; Trichloroethene	8260B
Trichlorofluoromethane; CFC-11	8260B
1,2,3-Trichloropropane	8260B
Vinyl acetate	8260B
Vinyl chloride	8260B
Xylenes	8260B

In addition, the following constituents will be analyzed per the RDP.

Analyte	Method
pH	Field measured
Specific conductance	Field measured
Temperature	Field measured
Oxidation-Reduction Potential (ORP)	Field measured
Turbidity	Field measured
Dissolved Oxygen (DO)	Field measured
Methyl Tertiary Butyl Ether	8260B
Alkalinity	SM2320B
Ammonia	350.1
Chemical oxygen demand (COD)	410.4
Chloride	300.0
Hardness	6020B
Nitrate	300.0
Sulfate	300.0
Total dissolved solids	SM2540 C
Turbidity	180.1
Calcium, total	6020B
Iron, total	6020B
Magnesium, total	6020B
Manganese, total	6020B
Mercury, total	6020B
Potassium, total	6020B
Sodium, total	6020B

3.2 ASSESSMENT MONITORING

In the event of an SSI, as described in Chapter 6, for which an alternate source or explanation is not able to be identified, an assessment monitoring program will be established. The first assessment monitoring event will analyze the shallow groundwater monitoring wells for all the Appendix II parameters, as directed by MDE (Hynson 2015). Following the first event, three baseline sampling events will analyze only detected parameters in the shallow wells with the associated detection, as per 40 CFR 258.55. Semi-annual monitoring events following the first

baseline sampling event will include the detection monitoring constituents as well as detected Appendix II parameters.

Appendix II parameters not detected in the first assessment monitoring event will not be analyzed in subsequent events. The detected Appendix II parameters will be analyzed only in shallow wells with the associated detection, as per 40 CFR 258.55.

All samples collected as part of the first assessment monitoring event will be analyzed for the following constituents, which comprise Appendix II of Subpart E of 40 CFR 258:

Analyte	Analyte
Acenaphthene	Endosulfan II
Acenaphthylene	Endosulfan sulfate
Acetone	Endrin
Acetonitrile; Methyl cyanide	Endrin aldehyde
Acetophenone	Ethylbenzene
2-Acetylaminofluorene; 2-AAF	Ethyl methacrylate
Acrolein	Ethyl methanesulfonate
Acrylonitrile	Famphur
Aldrin	Fluoranthene
Allyl chloride	Fluorene
4-Aminobiphenyl	Heptachlor
Anthracene	Heptachlor epoxide
Antimony	Hexachlorobenzene
Arsenic	Hexachlorobutadiene
Barium	Hexachlorocyclopentadiene
Benzene	Hexachloroethane
Benzo[a]anthracene; Benzanthracene	Hexachloropropene
Benzo[b]fluoranthene	2-Hexanone; Methyl butyl ketone
Benzo[k]fluoranthene	Indeno(1,2,3-cd)pyrene
Benzo[ghi]perylene	Isobutyl alcohol
Benzo[a]pyrene	Isodrin
Benzyl alcohol	Isophorone
Beryllium	Isosafrole
alpha-BHC	Kepone
beta-BHC	Lead
delta-BHC	Mercury
gamma-BHC; Lindane	Methacrylonitrile
Bis(2-chloroethoxy)methane	Methapyrilene
Bis(2-chloroethyl)ether; Dichloroethyl ether	Methoxychlor
Bis(2-chloro-1-methylethyl) ether;	Methyl bromide; Bromomethane
2,2'-Dichlorodiiisopropyl ether; DCIP	
Bis(2-ethylhexyl) phthalate	Methyl chloride; Chloromethane
Bromochloromethane; Chlorobromomethane	3-Methylcholanthrene
Bromodichloromethane; Dibromochloromethane	Methyl ethyl ketone; MEK; 2-Butanone
Bromoform; Tribromomethane	Methyl iodide; Iodomethane
4-Bromophenyl phenyl ether	Methyl methacrylate
Butyl benzyl phthalate; Benzyl butyl phthalate	Methyl methanesulfonate
Cadmium	2-Methylnaphthalene
Carbon disulfide	Methyl parathion; Parathion methyl
Carbon tetrachloride	4-Methyl-2-pentanone; Methyl isobutyl ketone
Chlordane	Methylene bromide; Dibromomethane
p-Chloroaniline	Methylene chloride; Dichloromethane
Chlorobenzene	Naphthalene
Chlorobenzilate	1,4-Naphthoquinone
p-Chloro-m-cresol; 4-Chloro-3-methylphenol	1-Naphthylamine
Chloroethane; Ethyl chloride	2-Naphthylamine

Analyte	Analyte
Chloroform; Trichloromethane 2-Chloronaphthalene 2-Chlorophenol 4-Chlorophenyl phenyl ether Chloroprene Chromium Chrysene Cobalt Copper m-Cresol; 3-Methylphenol o-Cresol; 2-Methylphenol p-Cresol; 4-Methylphenol	Nickel o-Nitroaniline; 2-Nitroaniline m-Nitroaniline; 3-Nitroaniline p-Nitroaniline; 4-Nitroaniline Nitrobenzene o-Nitrophenol; 2-Nitrophenol p-Nitrophenol; 4-Nitrophenol N-Nitrosodi-n-butylamine N-Nitrosodiethylamine N-Nitrosodimethylamine N-Nitrosodiphenylamine N-Nitrosodipropylamine; N-Nitroso-N-dipropylamine; Di-n-propylnitrosamine N-Nitrosomethylethylamine N-Nitrosopiperidine N-Nitrosopyrrolidine 5-Nitro-o-toluidine Parathion Pentachlorobenzene Pentachloronitrobenzene Pentachlorophenol Phenacetin Phenanthrene Phenol p-Phenylenediamine Phorate Polychlorinated biphenyls; PCBs Pronamide Propionitrile; Ethyl cyanide Pyrene Safrole Selenium Silver Silvex; 2,4,5-TP Styrene
Cyanide 2,4-D; 2,4-Dichlorophenoxyacetic acid 4,4'-DDD 4,4'-DDE 4,4'-DDT Diallate Dibenz[a,h]anthracene Dibenzofuran Dibromochloromethane; Chlorodibromomethane 1,2-Dibromo-3-chloropropane; DBCP 1,2-Dibromoethane; Ethylene dibromide; EDB Di-n-butyl phthalate o-Dichlorobenzene; 1,2-Dichlorobenzene m-Dichlorobenzene; 1,3-Dichlorobenzene p-Dichlorobenzene; 1,4-Dichlorobenzene 3,3'-Dichlorobenzidine trans-1,4-Dichloro-2-butene Dichlorodifluoromethane; CFC 12 1,1-Dichloroethane; Ethylidene chloride 1,2-Dichloroethane; Ethylene dichloride 1,1-Dichloroethylene; 1,1-Dichloroethene; Vinylidene chloride cis-1,2-Dichloroethylene; cis-1,2-Dichloroethene trans-1,2-Dichloroethylene; trans-1,2-Dichloroethene 2,4-Dichlorophenol 2,6-Dichlorophenol 1,2-Dichloropropane 1,3-Dichloropropane; Trimethylene dichloride 2,2-Dichloropropane; Isopropylidene chloride 1,1-Dichloropropene	Sulfide 2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid 2,3,7,8-TCDD; 2,3,7,8-Tetrachlorodibenzo-p-dioxin 1,2,4,5-Tetrachlorobenzene 1,1,1,2-Tetrachloroethane 1,1,1,2-Tetrachloroethane Tetrachloroethylene; Tetrachloroethene; Perchloroethylene 2,3,4,6-Tetrachlorophenol Thallium Tin Toluene o-Toluidine
cis-1,3-Dichloropropene trans-1,3-Dichloropropene Dieldrin Diethyl phthalate O,O-Diethyl O-2-pyrazinyl phosphorothioate; Thionazin Dimethoate p-(Dimethylamino)azobenzene 7,12-Dimethylbenz[a]anthracene 3,3'-Dimethylbenzidine alpha, alpha-Dimethylphenethylamine 2,4-Dimethylphenol; m-Xylenol Dimethyl phthalate m-Dinitrobenzene 4,6-Dinitro-o-cresol; 4,6-Dinitro-2-methylphenol	Toxaphene 1,2,4-Trichlorobenzene 1,1,1-Trichloroethane; Methylchloroform 1,1,2-Trichloroethane Trichloroethylene; Trichloroethene Trichlorofluoromethane; CFC-11 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 1,2,3-Trichloropropane

Analyte

2,4-Dinitrophenol
 2,4-Dinitrotoluene
 2,6-Dinitrotoluene
 Dinoseb; DNBP; 2-sec-Butyl-4,6-dinitrophenol
 Di-n-octyl phthalate
 Diphenylamine
 Disulfoton
 Endosulfan I

Analyte

O,O,O-Triethyl phosphorothioate
 sym-Trinitrobenzene
 Vanadium
 Vinyl acetate
 Vinyl chloride; Chloroethene
 Xylene (total)
 Zinc

Due to statistically significant increases over background concentrations observed as part of semi-annual detection monitoring, an assessment monitoring program was established at the Central Landfill Facility beginning in April 2015. Four semivolatile organic compounds, tin, and sulfide were retained for four rounds of sampling as part of assessment monitoring. Results showed these parameters did not exceed background concentrations or groundwater protection standards in a downgradient well at the property boundary. As a result, the County requested the assessment monitoring parameters be reduced to those included on Tables I and II of the County's refuse disposal permit, which was approved by MDE in a letter dated 3 November 2017.

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4. FIELD COLLECTION AND SAMPLE MANAGEMENT TECHNIQUES

A qualified groundwater scientist will oversee experienced environmental technicians who will sample monitoring wells identified within this plan on a semi-annual or annual basis. The following procedures will be employed for well gauging and sampling, sample preservation and handling, and documentation.

4.1 PHYSICAL INSPECTION AND OBSERVATION

Upon arrival at each well, the condition of the well and surrounding area will be noted, using Form 4-1. This will include but should not be limited to security, evidence of tampering, evidence of physical damage, well integrity, evidence of breakage or heaving of the concrete pad, if present, and evidence of surface infiltration. If damage or impairment is observed, the condition of the well will be reported to Worcester County.

4.2 WATER LEVEL DETERMINATION

After the physical inspection has been completed, the static water levels will be determined for all wells to be sampled prior to initiation of any purging and sampling activities. The depth to water and the elevation at the top of well casing reference point will be used to calculate the groundwater elevation at the well. Because these data will be used to construct water table maps, it is essential that they be as accurate as possible. All water level determinations will be made to the nearest 0.01 ft and recorded on Form 4-1.

A water level indicator will be used and the depth to water measured by lowering the precleaned probe of the electronic sounder into the well slowly until the indicator (buzzer or meter) is activated. After an indication of water penetration has been achieved, the probe will be slowly raised and lowered until the indicator accurately registers the water surface. The water level will be referenced to the source point on the casing marked when the casing stick-up was measured. The water level will be determined to the nearest 0.01 ft. To be sure that cross-contamination via water-level sounding equipment does not occur, it is necessary to decontaminate equipment between each well. This will be done by wiping the sounding device with a paper towel saturated with a non-phosphate detergent as retrieved. Probes are rinsed with a non-phosphate detergent and spray-rinsed with deionized water between samplings.

4.3 WELL LOW FLOW PURGING AND SAMPLING

Low flow purging and sampling methods (less than 0.5 liter per minute) were performed beginning in Spring 2014 and have continued for each event thereafter. Sampling will be accomplished using a clean, stainless steel submersible pump and discharge hose that is lowered to the screened interval midpoint. Care shall be taken as to not disturb the well while lowering the non-dedicated pump and tubing into the well. The portable generator should be placed on level ground approximately 15 ft away from and downwind from the well. All generator maintenance (oil and fueling) is to be performed off-site.

A flow-through cell or a clean container containing the instrumentation header will be connected to the pump discharge and well purging will begin at a pumping rate of less than 0.5 liter per

minute, unless a different purge rate is established for the well. The flow cell will be filled completely, taking care not to cause entrapment of air in the system. The pumping rate will then be adjusted in order to stabilize the water level within the well, if necessary.

During the purging of the well, water quality parameters will be monitored and recorded every 3 to 5 minutes, as well as purge rate, volume purged, and depth to water. Water quality parameters monitored during purging are listed in Section 4.5. Purging of the standing water will be considered complete when three consecutive readings of the water quality indicator parameters agree within approximately 10 percent. No treatment or special disposal is required for purged well water at non-contaminated wells. Purged water from contaminated wells will be containerized and disposed of properly or run through a portable carbon vessel prior to discharge.

Information regarding low flow well purging is recorded on a Low Flow Sampling Record form, (Form 4-1).

4.4 EQUIPMENT DECONTAMINATION

All equipment used to collect samples and any equipment that might contact the sample will be cleaned to avoid cross-contamination and/or the introduction of outside contaminants into the sample. All non-dedicated equipment shall be decontaminated utilizing a non-phosphate detergent and grade deionized water prior to use in monitoring wells and between sampling at each of the wells. This will be done by wiping the pump device with a paper towel saturated with a non-phosphate detergent as retrieved. Non-phosphate detergent and deionized water must then be pumped through the pump. Equipment that is decontaminated using the liquids mentioned above will be containerized and disposed of properly. Materials used to clean and dry the equipment and containers will be collected in a trash bag and then disposed as municipal waste.

4.5 GROUNDWATER SAMPLE COLLECTION/DOCUMENTATION

Temperature, pH, oxidation-reduction potential (ORP), dissolved oxygen (DO), turbidity, and specific conductance will be determined in the field. These determinations will be made using individual meters or a single unit utilizing multiple probes. All instrumentation will be calibrated prior to transport to the field and, where provided for, recalibrated during usage. Field meters will be calibrated on a daily basis. All equipment shall be properly decontaminated prior to each use. Information shall be recorded on Form 4-1.

After sampling parameters have stabilized to within 10 percent of each other, sample containers will be filled by allowing the pump discharge to flow gently down the inside of the containers with as little agitation or aeration as possible. Samples for volatile organics will be collected in a manner that will minimize aeration and so that containers will be free of bubbles and headspace. The first sample aliquot will be used to fill the volatile organics parameter vials. Containers that contained preservative will not be filled to overflowing and will be thoroughly mixed after filling by upending. Each pre-labeled container will be placed in a cooler containing ice and a sample entry will be made on the chain-of-custody form.

Additionally, if needed as a result of mechanical equipment failure, groundwater sample collection will be accomplished with certified, pre-cleaned bottom-filling bailers. A new, clean section of line will be attached to the bailer and the bailer lowered into the well. Care will be exercised to ensure that the bailer and line do not contact the ground or other sources of contamination. The bailer will be lowered into the well to the depth of the screened interval avoiding stagnant water at the top of the well. The water from the first three bailers will be discarded. The first sample aliquot will be used to fill the volatile organics parameter vials. Samples for volatile organics will be collected in a manner that will minimize aeration and the containers will be free of bubbles and headspace. The bailer will then be filled and the other sample transferred to the sample containers. Containers that contain preservative will not be filled to overflowing and will be mixed after filling by upending. Each pre-labeled container will be placed in a cooler containing ice and a sample entry made on the chain-of-custody form.

The sampling locations and frequency of sampling are discussed in Chapter 2 of this monitoring plan.

4.6 SURFACE WATER SAMPLE COLLECTION/DOCUMENTATION

Two surface water samples will be collected per semi-annual event. The locations of the surface water samples are shown on Figure 2-1. Temperature, pH, and specific conductivity will be measured in the field and recorded. Each sample will be obtained using a clean, non-preserved bottle, which will be rinsed several times with the surface water from the sampling location and then transferred into the proper sample container.

4.7 POTABLE WELL SAMPLE COLLECTION

Samples should be collected from interior locations. It is most desirable to sample from an interior high-use tap such as a bathroom. If a sample is to be collected from an exterior tap, it should never be collected from a hose. Whenever possible, the tap should be sterilized with a sodium hypochlorite swab prior to sampling. The cold tap should be run 2–3 minutes prior to sampling. If the tap is a temperature mixing faucet, the hot water should be run for 2–3 minutes, followed by 2–3 minutes on cold, and then the sample should be collected. Water samples should not be collected from the bathtub/shower or kitchen faucet because of the high potential for bacteria. If samples are required from these locations, the outside of the tap should be sterilized prior to sample collection.

4.8 FIELD QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality assurance (QA)/quality control (QC) protocols will be employed during all monitoring events to check the uniformity of the data and to ensure field QC criteria and laboratory QA criteria. Trip blanks will be prepared during each sampling event by the laboratory and will be delivered to the laboratory accompanying the field samples with the purpose of evaluating if volatile organic compound contamination from ambient air is introduced into the samples during sample handling or transportation. Each trip blank will be analyzed for volatile organics and will be prepared prior to field sampling. As an additional QC measure, analytical results of the deionized water utilized by the laboratory to prepare trip blanks will also be requested prior to

both the spring and fall sampling events. Trip blanks will be sealed and labeled and will never be opened during any sampling activities. In addition to the trip blanks, field blanks and a rinsate (equipment) blank will be collected and analyzed for the same groundwater parameters as the monitoring wells and surface water. The rinsate (equipment) blank will be prepared by running deionized water through and/or over decontaminated equipment and into the sample containers. The rinsate (equipment) blank will accompany the groundwater samples to the laboratory for analytical testing and will be used to determine the effectiveness of the decontamination process and procedures. The field blanks will be prepared by pouring deionized water directly into the sample containers while on-site and will be used to determine if there was ambient contamination in the field or in the laboratory. As an additional QC measure, the deionized water used for the field blanks and rinsate blank was analyzed for the same parameters as groundwater samples.

A trip blank and a field blank will be prepared for every day of sampling. One rinsate blank will be prepared for each sampling event. Duplicate samples will also be collected at a rate of approximately 1 per 10 samples.

4.9 FIELD FILTRATION

In accordance with 40 CFR 258, no samples will be field filtered.

4.10 SAMPLE HANDLING

When sampling has been completed, the sampling agent will maintain strict custody control over the samples and will deliver the samples to the analytical laboratory for proper analysis. Samples contained in glass bottles or vials will be bubble wrapped to protect them during shipping and receiving at the laboratory. All samples will be placed on ice to 4 degrees Celsius or less in an appropriate sample and shipping cooler. Each sampling effort will be done under strict chain-of-custody protocol, initiated by the sample technician, and updated each time a sample is collected and passed from one person to another. The completed chain-of-custody form will accompany the samples to the laboratory, where they will be relinquished from sampling personnel and given to appropriate lab personnel. Other documentation such as field data logs, etc., will be retained by responsible project personnel throughout the course of the monitoring event.

Chain-of-Custody Procedure:

- Give the site name and project number.
- Enter the sample identification number.
- Indicate the sampling date for all samples.
- List the sampling times in military format.
- Indicate “grab” or “composite” with an “X.”

- Specify the sample location.
- Enter the total number of containers per cooler.
- List the analyses and container volume.
- Obtain the signature of the sample team leader.
- State the carrier service and number, analytical laboratory, and custody seal numbers.
- Sign, time, and date the “relinquish by” section.
- Upon completion of the chain-of-custody form, retain the shipper copy, and affix the other copies to the inside of the cooler, in a zip-seal bag to protect from moisture, to be sent to the designated laboratory.
- Sample cooler shall be packaged with ice, for maintaining temperature and packed with bubble wrap, to prevent breakage of the sample containers.

4.11 MONITORING FREQUENCY

Per RDP No. 2021-WMF-0663 and 40 CFR 258.55.(d) (2), sampling is to be performed on at least a semi-annual basis, unless approved otherwise by MDE. Part III, General Conditions, Section F Written Reports on Water Quality Analysis (2) (c) directs that sampling events will occur during the periods of January through March, and July through September of each year, unless an alternate schedule is approved by MDE. Monitoring will typically be performed during the months of March and August and will include all the monitoring locations identified within Chapter 2 of this monitoring plan, with the exception of the intermediate and deep aquifer monitoring wells. The Cell 5 intermediate wells (MW-501M, MW-504M, and MW-505M) shall be sampled semi-annually. All other site intermediate aquifer monitoring wells (indicated as such with an “M” designation) shall be sampled on an annual basis, as approved by MDE in a letter dated 3 November 2017. Deep aquifer monitoring wells (indicated as such with a “D” designation) shall be sampled annually during the Fall sampling event. The surface water elevations at the borrow ponds and groundwater elevation for all shallow monitoring wells and piezometers will continue to be measured and recorded on a monthly basis per the RDP.

WELL PURGING AND SAMPLING RECORD (FORM 4-1)

WELL ID _____ SAMPLE NO. _____

WELL/SITE DESCRIPTION _____

DATE ____/____/____ TIME _____ AIR TEMP. _____

WELL DEPTH _____ ft WELL DIAMETER _____ in.

WATER DEPTH _____ ft WATER COL. HEIGHT _____ ft

EQUIVALENT VOL. OF STANDING WATER __ L

PUMP RATE _____ LPM PUMP TIME _____ min.

WELL WENT DRY? () Yes () No

VOL. REMOVED _____ L

Date	Time	Volume Removed	pH	Cond.	Temp.	ORP	Turb.	DO	Depth to Water from TOC	Pump Rate
		Unit: Gal	--	µS/cm	°C	mV	NTU	mg/L		LPM

COMMENTS _____

SIGNATURE _____

5. ANALYTICAL LABORATORY PROCEDURES

All analytical work shall be completed in accordance with standard U.S. Environmental Protection Agency (EPA) protocols where such exist, per 40 CFR 258. When necessary, procedures for performing a cation/anion balance equation shall be in accordance with “Standard Methods for the Examination of Water and Wastewater,” latest edition.

A qualified independent laboratory certified for water quality analysis by the Maryland Department of Health and Mental Hygiene or which is otherwise acceptable to MDE will perform all analyses. Quality assurance and quality control shall be assured through the accredited laboratory’s quality assurance manual.

The laboratory will report analytical results based on the practical quantitation limits (PQLs) as defined within the RDP and shown in Tables 5-1 and 5-2. All analytical results below the PQL that can be estimated by the laboratory will be reported with a J qualifier. Alternate PQLs are presented for total iron, total magnesium, alkalinity, and chloride due to elevated reporting limits. The reason for the elevated reporting limits relative to the MDE standard is due to the relatively high amount of these analytes naturally present in the environment. Historical data shows that most of the groundwater samples contain these analytes well above the proposed PQL adjustments. Achieving the very low concentrations required by the MDE standard is challenging as it would necessitate diluting almost every sample significantly, leading to higher reporting limits and longer analysis times. To meet the necessary limits for most other analytes, the samples must be run undiluted, and the high concentration of the specific analytes would raise concerns about data quality when attempting to meet those lower limits. The laboratory will continue to review options of performing these tests to assess the lab’s ability to meet the MDE specified PQLs.

Table 5-1. Monitoring Parameters for Volatile Organic Compounds

Volatile Organic Compounds	PQL (parts per billion)
Acetone	5.0
Acrylonitrile	5.0
Benzene	1.0
Bromochloromethane	1.0
Bromodichloromethane	1.0
Bromoform	1.0
Bromomethane	1.0
2-Butanone	5.0
Carbon disulfide	1.0
Carbon tetrachloride	1.0
Chlorobenzene	1.0
Chloroethane	1.0
Chloroform	1.0
Chloromethane	1.0
Dibromochloromethane	1.0
1,2-Dibromo-3-chloropropane ¹	0.04
1,2-Dibromoethane (EDB) ¹	0.04
Dibromomethane	1.0
1,2 – Dichlorobenzene	1.0
1,4 – Dichlorobenzene	1.0
Trans-1,4-dichloro-2-butene	5.0
1,1-Dichloroethane	1.0
1,2-Dichloroethane	1.0
1,1-Dichloroethene	1.0
Cis-1,2-Dichloroethene	1.0
Trans-1,2-Dichloroethene	1.0
Methylene chloride	1.0
1,2-Dichloropropane	1.0
Trans-1,3-Dichloropropene	1.0
Cis-1,3-Dichloropropene	1.0
Ethylbenzene	1.0
2-Hexanone	5.0
Iodomethane	1.0
4-Methyl-2-pentanone	5.0
Methyl Tertiary Butyl Ether	2.0
Styrene	1.0
1,1,1,2-Tetrachloroethane	1.0
1,1,2,2-Tetrachloroethane	1.0
Tetrachloroethene	1.0
Toluene	1.0
1,1,1-Trichloroethane	1.0
1,1,2-Trichloroethane	1.0
Trichloroethene	1.0
Trichlorofluoromethane	1.0
1,2,3-Trichloropropane	1.0
Vinyl acetate	1.0
Vinyl chloride	1.0
Xylene	1.0

Note:

1. 1,2-Dibromo-3-chloropropane and 1,2-Dibromoethane have been analyzed by EPA method 8011 since Fall 2020.

Table 5-2. Monitoring Parameters for Elements and Indicator Parameters

Elements and Indicator Parameters	PQL (parts per million)
Total Antimony	0.0020
Total Arsenic	0.0020
Total Barium	0.0100
Total Beryllium	0.0020
Total Cadmium	0.0040
Total Chromium	0.0100
Total Calcium	0.08
Total Cobalt	0.0100
Total Copper	0.0100
Total Iron ¹	0.1
Total Lead	0.0020
Total Nickel	0.0110
Total Magnesium ¹	0.1
Total Manganese	0.0100
Total Mercury	0.0002
Total Potassium	0.39
Total Selenium	0.035
Total Silver	0.0100
Total Sodium	0.2
Total Thallium	0.0020
Total Vanadium	0.0100
Total Zinc	0.0100
pH	0.1 (S.U.)
Alkalinity ¹	5.0
Hardness	0.5
Chloride ¹	0.5
Specific conductance	1
Nitrate	0.06
Chemical oxygen demand	10
Turbidity	0.11 (NTU)
Ammonia	1
Sulfate	0.38
Total dissolved solids	10

Notes:

1. PQLs were revised for total iron, total magnesium, alkalinity, chloride, nitrate, sulfate, and turbidity.

NTU = Nephelometric turbidity unit(s)

S.U. = Standard units

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6. STATISTICAL ANALYSIS

Statistical analysis of the results from the groundwater monitoring will be performed using both interwell and intrawell statistical analysis, as directed by MDE (Hynson 2015). Interwell analysis will be used for the Cell 1 through Cell 4 groundwater monitoring wells and intrawell analysis will be used for the Cell 1 through Cell 5 groundwater monitoring wells. As directed by MDE (Grenzer 2022), a trend analysis will be performed for any parameter found to be a SSI over the GWPS.

6.1 TREATMENT OF SAMPLE RESULTS WITH LABORATORY QUALIFIERS

For the purposes of statistical analyses, “U” and “J” qualified data reported below the PQL will be treated as less than PQL values. Sample results with a “U” qualifier with a laboratory reporting limit that exceeds the PQL will not be included in statistical analyses.

6.2 INTERWELL MANN-WHITNEY U TEST

Interwell analysis will be used for the Cell 1 through Cell 4 shallow groundwater monitoring wells. The concentrations observed in the downgradient wells are compared to the concentrations observed in the background well (MW-22). If the downgradient samples show statistically significant higher concentrations than the background samples, then it will be concluded that an SSI has occurred. Identified SSIs will be investigated to determine if the likely cause of the SSI is a release from the landfill.

The groundwater data will be analyzed using the Mann-Whitney U test (also known as, Wilcoxon rank sum test) to determine whether the distribution of downgradient sample data tends to exceed the background well sample data. The Mann-Whitney test is nonparametric, i.e., assumes no underlying distribution (e.g., normal distribution), and compares two groups of data to test the null hypothesis that the distributions of both groups of data are identical.

Hypothesis tests, such as the Mann-Whitney U, are evaluated at a specified Type I error rate that represents the probability of incorrectly rejecting the null hypothesis when it is in fact true (i.e., a false positive error). When multiple tests are conducted (from different wells and different constituents), the probability of Type I error rate is compounded. A maximum network-wide Type I error rate of 5 percent is required by 40 CFR 258.53(h) (2); however, a Type I error rate no less than 1 percent shall be applied to any single test.

Statistical analyses shall be performed for over 60 parameters at each downgradient well. Using the Bonferroni adjustment to account for multiple statistical comparisons, a Type I error rate of much less than 1 percent per analysis would result, so the minimum allowable Type I error rate under 40 CFR 258.52(h) (2) of 1 percent was used to evaluate the null hypothesis.

The sum of the data ranks, the number of upgradient observations, and the number of downgradient observations will be used to calculate the Mann-Whitney test statistic U. The Gehan procedure (Gehan 1965) will be used to rank the data. When there are non-detects in a dataset, the Gehan rank assigns the average of the positions a value could take in the ordered dataset if the non-detect value are known. Thus, the Gehan procedure treats non-detects as less

than values as opposed to using a simple substitution such as one-half the detection limit. Sample concentrations below the PQL will be treated as <PQL in the ranking procedure. The calculated U for each well/analyte pair will be compared to a critical value (U_{crit}) at the 99 percent confidence level (i.e., 1 percent Type I error rate) obtained from Conover (1999). The null hypothesis will be rejected for tests with $U < U_{crit}$ indicating that downgradient sample concentrations tend to exceed the background sample concentrations.

6.3 INTRAWELL STATISTICAL ANALYSIS WITH RETESTING

An intrawell analysis compares data from a given compliance well against a background data set composed of its own historical data. The intrawell analysis does not require that the hydrogeologic conditions are homogeneous throughout the site and that all wells are sampled with equal intervals. This is because the intrawell analysis identifies changes over time at a given well instead of changes among different wells. Once a baseline data set has been established, future compliance monitoring samples are compared to the baseline data.

Intrawell analysis will be performed semi-annually for all the Cell 5 monitoring wells (MW-501A through MW-505A, MW-501M, MW-504M, and MW-505M) as well as all intermediate depth wells in Cells 1 through 4 on an annual basis. Statistical analysis will compare results from these wells to an intrawell upper prediction limit (UPL) specific to each well-analyte pair. If an analyte exceeds the UPL, it will be flagged for confirmatory retesting with the following round of sampling. In order to reduce the site-wide false positive error rate, two consecutive exceedances of the UPL are required to conclude the exceedance is an SSI.

The procedure for establishing intrawell UPLs is discussed in Section 6.3.1. Periodic reviews of intrawell background values every 5 years will evaluate the potential for revising the intrawell UPLs.

6.3.1 Establishing Intrawell Upper Prediction Limits

A UPL will be established for each well-analyte pair. In order to compute UPLs that are representative of baseline conditions, the data set must be free of outliers. Potential outliers will be identified as any result exceeding 3.0 times the standard deviation. The standard deviation will be estimated from the sample data for each well-analyte pair using the median absolute deviation, which is a robust statistic insensitive to extreme values. Potential outliers will be further evaluated but were only excluded from the baseline data set if there is a scientific rationale (e.g., method blank contamination) justifying their removal.

The methods used to compute the UPL statistics will account for the distributions of the data, the number of samples, and the existence of non-detect samples. A decision tree (Figure 6-1) summarizes the process that will be used to identify the best method for each data set. For data sets with no non-detect observations, goodness of fit tests conducted at the 95 percent significance level will be used to characterize the data distributed as normal, gamma, or nonparametric. UPLs for data sets with non-detect results will be computed using Kaplan-Meier estimates (at least eight detected results), or higher order statistics (less than eight detected results). All statistical computations will be performed using the ProUCL software version 5.1 (U.S. EPA 2014) using the methodology described below.

6.3.1.1 Computation of the Normal Upper Prediction Limit

The 95 percent UPL for a single future or independent observation of sample data that is normally distributed will be computed as

$$\text{UPL}_t = \bar{x} + t_{(1-0.05),(n-1)} s_x \sqrt{\frac{1}{n} + 1}$$

where:

\bar{x}	=	Sample arithmetic mean
n	=	Number of background data
$t_{(1-0.05),(n-1)}$	=	One-tailed Student's t critical value evaluated at $\alpha = 0.05$ with $(n-1)$ degrees of freedom
s_x	=	Sample standard deviation

6.3.1.2 Computation of a Gamma Upper Prediction Limit

For gamma distributed data, the 95 percent UPL will be computed using the Hawkins-Wixley normal approximation to the gamma distribution as

$$\text{UPL}_{\text{gamma},t} = \left(\bar{y} + t_{(1-0.05),(n-1)} s_y \sqrt{\frac{1}{n} + 1} \right)^4$$

where:

\bar{y}	=	Sample arithmetic mean of fourth-root transformed data
n	=	Number of background data
$t_{(1-0.05),(n-1)}$	=	One-tailed Student's t critical value evaluated at $\alpha = 0.05$ with $(n-1)$ degrees of freedom
s_y	=	Sample standard deviation of fourth-root transformed data

6.3.1.3 Computation of a Kaplan-Meier Upper Prediction Limit for Data Sets with Non-detect Results

For data sets containing non-detect observations and at least 8 detected results, the Kaplan-Meier (KM) estimate assuming a Student's t -distribution will be used to compute the UPL. The KM approach can accommodate non-detect samples with multiple detection limits. KM estimates of the population mean and variance will be used to compute a Student's t -statistic-based UPL as follows:

$$\text{UPL} = \hat{\mu}_{KM} + t_{(1-0.05),(n-1)} \sqrt{\hat{\sigma}_{KM}^2 \left(1 + \frac{1}{n}\right)}$$

where:

$\hat{\mu}_{KM}$	=	Estimate of the population mean
------------------	---	---------------------------------

- n = Number of background data
- $t_{(1-0.05),(n-1)}$ = One-tailed Student's t critical value evaluated at $\alpha = 0.05$ with (n-1) degrees of freedom
- $\hat{\sigma}_{KM}^2$ = Estimate of the variance of the mean

6.3.1.4 Computation of a Nonparametric Upper Prediction Limit

For nonparametric data sets as defined in Figure 6-1 with at least one detected sample result above the PQL, a nonparametric 95 percent UPL will be computed as the m^{th} higher order statistic given by

$$m = (n + 1) \times (1 - 0.05)$$

where:

$$n = \text{Sample size}$$

For data sets containing non-detect observations and one to seven detected results, a nonparametric approach based on rank-ordered statistics will be used to compute the UPL. Finally, the PQL will be used as a nonparametric UPL for data sets with no detected sample results above the PQL.

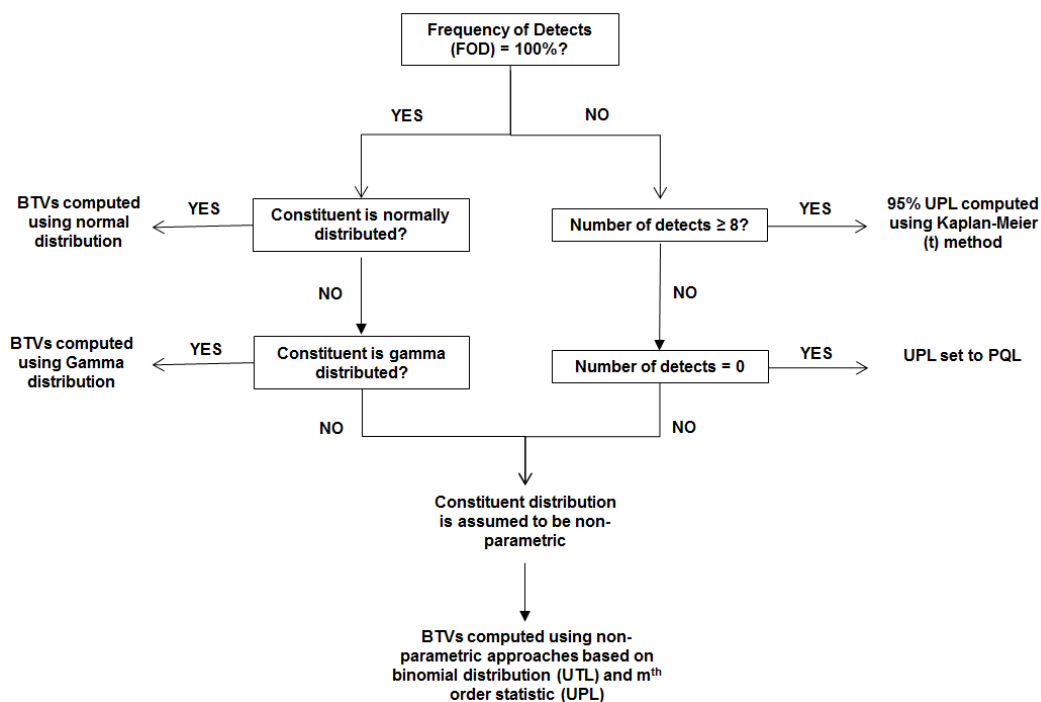


Figure 6-1. Decision Tree for Determining the Intrawell UPLs from Baseline Monitoring Data

6.4 GROUNDWATER PROTECTION STANDARDS

Statistically significant increases over background levels were observed as part of the semi-annual detection monitoring event conducted in Spring 2015. As a result, in accordance with this Groundwater Monitoring Program, assessment monitoring was initiated from 2015 to 2017 as described in the *Worcester County Central Landfill Facility Assessment Monitoring Results and Groundwater Protection Standards* (EA Engineering, Science, and Technology, Inc., PBC 2017). At the conclusion of the assessment monitoring event, groundwater protection standards were established for all constituents detected in the initial April 2015 baseline sampling event (Table 6-1). During the Fall 2017 semi-annual sampling event, all Appendix II constituents tested at the CLF were compared with the groundwater protection standards established during this assessment monitoring period for each semi-annual sampling event. Results showed that the parameters tested did not exceed background concentrations or groundwater protection standards in a downgradient well at the property boundary. As a result, the assessment monitoring parameters were reduced to those included on Tables I and II of the County's refuse disposal permit, per MDE's letter dated 3 November 2017.

If one or more Appendix II constituents are detected at statistically significant levels above the groundwater protections standards developed, the landfill must notify MDE and follow the protocol detailed in 40 CFR Part 258.55(g).

Table 6-1. Groundwater Protection Standards for Detected Appendix II Parameters

Parameter	GWPS	Source
General, (mg/L)		
Sulfide	4	4
Total Metals, (mg/L)		
Arsenic, total	0.010	1
Barium, total	2	1
Beryllium, total	0.004	1
Cadmium, total	0.005	1
Calcium, total	32.7	4
Chromium, total	0.1	1
Cobalt, total	0.006	3
Copper, total	1.3	1
Lead, total	0.015	1
Mercury, total	0.002	1
Nickel, total	0.073	2
Selenium, total	0.05	1
Silver, total	0.1	2
Tin, total	2.2	2
Vanadium, total	0.0037	2
Zinc, total	5	2
Semivolatile Organic Compounds, (µg/L)		
Bis(2-ethylhexyl) Phthalate	6	2
Dimethyl Phthalate	10	4
Hexachlorocyclopentadiene	0.05	1
2-Methyl-4,6-dinitrophenol	1.5	3
Volatile Organic Compounds, (µg/L)		
Acetone	550	2
Benzene	5	1

Carbon Disulfide	100	2
Chloroform	80	2
Methyl Tertiary Butyl Ether	20	2

Notes:

Groundwater Protection Standards (GWPS) sources:

- 1) U.S. EPA Maximum Contaminant Level or Action Level for Copper and Lead.
- 2) Maryland Department of the Environment Cleanup Standards for Soil and Groundwater.
- 3) U.S. EPA Region III Tapwater Risk Based Concentration.
- 4) 95 Percent upper confidence level of the mean statistical analysis.

$\mu\text{g/L}$ = Microgram(s) per liter

mg/L = Milligram(s) per liter

The 95% lower confidence limits (LCLs) of the median concentrations for each analyte above the GWPS will be used to determine if the results are detected at statistically significant levels above the GWPS per 40 CFR 258.55(g), based on historical data since Spring 2014, when the low flow sampling techniques were implemented.

6.4.1 Mann-Kendall Trend Analysis on the SSIs Exceeding GWPSs

An evaluation for a monotonic (i.e., increasing or decreasing) trend will be conducted for parameters found to be an SSI over the GWPS using the Mann-Kendall (MK) test (Gilbert 1987) using all data collected after low-flow sampling was implemented. In the event that the trend analysis does not further support the identification of the source of the SSIs, the County may request the discontinuation of the trend analysis.

The MK test is a nonparametric trend test that looks for all possible differences between the relative magnitude of one sample result to another successive sample result in a time series. As a nonparametric test, the MK test does not require that the residuals be normally distributed as required by parametric regression analysis. The MK test will accommodate non-detect results by treating non-detects as an interval between 0 and the laboratory reporting limit (RL) as described in (Helsel 2012).

The test statistic S is the sum of these differences given by

$$S = \sum_{k=1}^{n-1} \sum_{j=k+1}^n \text{sgn}(x_j - x_k)$$

where x_1, x_2, \dots, x_n is the list of data in ascending order of the time they were collected, and $\text{sgn}(x_j - x_k)$ is the sign function of $x_j - x_k$ modified to handle non-detects with multiple RLs:

$$\begin{aligned} &+1 && \text{if } (x_j - x_k) > 0, x_k \text{ can be a non-detect } [0, \text{RL}] \\ \text{sgn}(x_j - x_k) = &-1 && \text{if } (x_j - x_k) < 1, x_j \text{ can be a non-detect } (\text{RL}, 0] \\ &0 && \text{if } (x_j - x_k) = 0, \text{ or values of } x_j \text{ and } x_k \text{ overlap due to non-detects} \end{aligned}$$

Large positive values of S indicate that samples collected later in time tend to have higher concentrations than samples taken earlier (i.e., increasing trend), whereas large negative values

of S indicate that samples collected later in time tend to have lower concentrations than samples taken earlier (i.e., decreasing trend).

The statistical significance of S will be determined by comparing the computed value of S to its distribution under the null hypothesis H_0 of no trend versus the alternative hypothesis H_a of either trend. Tabled one-sided probabilities for the null distribution of S will be obtained from Hollander and Wolfe (1973). The test will be conducted with a false positive error rate of $\alpha = 5\%$ corresponding to a confidence level of $1 - \alpha = 95\%$. To maximize the statistical power of the trend evaluation, tests for increasing and decreasing trends will be conducted independently at the 95% confidence level.

Although the monitoring program collects data semi-annually, the month of year that data have been collected varies from year to year. Therefore, the semi-annual data will be aggregated into an annual time series for purposes of the MK trend analysis.

7. REPORTING PROCEDURES

A semi-annual report on water quality will be submitted to MDE containing a summary and interpretation of the analytical results of the monitoring locations sampled and analyzed as defined in this plan. The report will be submitted to MDE within 90 days of the close of every first and third calendar quarters. In the report, a qualified groundwater scientist or professional will evaluate the results and advise of any changes in water quality or any exceedance of the state and federal Maximum Contaminant Level (MCL), Action Level, or other health standard. The report shall also include the following:

- A complete copy of the laboratory data, and the qualified groundwater scientist or professional's interpretive findings.
- The report will include a discussion of the data, including the identification of those monitoring locations that show influences attributable to the presence of landfill leachate and any results which exceed MCLs.
- The report will discuss the quality assessment and quality control procedures and data used to ensure that the data collected are reliable, if those procedures vary from those included in this monitoring plan.
- Historical data presented in a time series format and analysis of the data. Historical data from each well will be presented in a tabular format. The report discussion will include historical data trends.
- As described in Chapter 6 of this plan, statistical analysis of the groundwater monitoring network data will be performed and evaluated.
- The semi-annual report will include a site plan with the most current topographic map depicting the location of all monitoring wells and piezometers in existence at the time of survey. Water level readings from the semi-annual event will be used to generate an updated groundwater contour map for the site. Additionally, monthly water level data will be collected and will be provided as required by the facility's RDP.

7.1 FIRST TIME EXCEEDANCES

Worcester County will notify MDE of a first time MCL, Action Level, or other health standard exceedance in writing within 24 hours of receipt of the analytical data. Upon detection of the exceedance for the first time, the location will be re-sampled within 30 days and analyzed for the exceedance by the same analytical laboratory.

7.2 STATISTICALLY SIGNIFICANT INCREASE IN CONSTITUENT LEVELS

If Worcester County determines, pursuant to Chapter 6, "Statistical Analysis," that there is an SSI over background or an exceedance of the upper prediction limit for one or more of the constituents listed in the Appendix I list included in Section 3.1, "Analytes," at any monitoring

well, Worcester County will place notice to this effect in the operating record of the landfill and notify MDE within 14 days.

Worcester County would then establish an assessment monitoring program meeting the requirements of 40 CFR 258.55 and Section 3.2 within 90 days, unless the County demonstrates that a source other than the landfill caused the contamination, or that the SSI resulted from an error in sampling, analysis, statistical evaluation, or variation in groundwater quality. A report documenting this demonstration will be certified by a qualified groundwater scientist, or approved by MDE, and be placed in the operating record. If a successful demonstration is made and documented, Worcester County will continue detection monitoring in accordance with this plan, and not institute the assessment monitoring program.

The results of all monitoring and statistical analysis will be reported after each sampling event. This report will include a discussion of the data, including the identification of those monitoring locations that show influences attributable to the presence of landfill leachate and any results which exceed MCLs. The report will also discuss the quality assessment and quality control procedures and data used to ensure that the data collected are reliable, if those procedures vary from those included in this monitoring plan.

8. REFERENCES

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Tables and Figures

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TABLE 2-1 GROUNDWATER ELEVATION (FT)

Event	MW-03S	MW-3M	MW-04S	MW-4M	MW-05S	MW-05SR	MW-07S	MW-7M	MW-08S	MW-8M	MW-10S	MW-10M	MW-11S	MW-13S	MW-14S	MW-15S	MW-16S	MW-17S	MW-18S	MW-19S	MW-20S	MW-21S	MW-22S
01/91	--	--	31.92	--	18.27	--	25.97	--	33.64	--	33.57	--	36.60	27.54	--	--	--	--	--	--	--	--	--
04/91	32.07	--	32.32	--	20.51	--	29.39	--	33.95	--	34.32	--	36.20	30.94	--	--	--	--	--	--	--	--	--
07/91	30.12	--	30.77	--	18.42	--	24.04	--	33.27	--	30.56	--	36.03	29.51	--	--	--	--	--	--	--	--	--
10/91	30.67	--	29.75	--	15.72	--	23.28	--	31.25	--	29.36	--	35.21	29.73	--	--	--	--	--	--	--	--	--
07/92	30.43	--	30.60	--	19.34	--	26.74	--	33.21	--	30.79	--	35.92	31.03	--	--	--	--	--	--	--	--	--
01/93	31.81	--	33.34	--	22.77	--	29.24	--	34.42	--	34.53	--	36.30	31.73	--	--	--	--	--	--	--	--	--
07/93	27.79	--	29.30	--	19.52	--	25.07	--	30.13	--	29.10	--	34.23	30.31	--	--	--	--	--	--	--	--	--
01/94	31.41	--	33.98	--	21.34	--	26.86	--	34.59	--	34.15	--	36.48	27.65	--	--	--	--	--	--	--	--	--
07/94	28.31	--	29.37	--	19.08	--	24.10	--	30.27	--	28.44	--	35.12	27.06	--	--	--	--	--	--	--	--	--
01/95	30.15	--	32.92	--	20.82	--	25.20	--	34.47	--	33.65	--	36.20	26.85	--	--	--	--	--	--	--	--	--
08/95	26.34	--	28.27	--	22.50	--	22.94	--	29.21	--	28.43	--	32.88	25.12	--	--	--	--	--	--	--	--	--
03/96	30.84	--	32.42	--	24.32	--	26.69	--	34.65	--	34.57	--	36.52	25.63	--	--	--	--	--	--	--	--	--
07/96	--	--	30.02	--	21.92	--	26.89	--	33.89	--	30.21	--	36.11	27.28	--	--	--	--	--	--	--	--	--
01/97	30.14	--	30.51	--	23.82	--	27.50	--	34.41	--	33.37	--	36.26	27.77	--	--	--	--	--	--	--	--	--
07/97	--	--	29.12	--	17.79	--	28.69	--	30.02	--	29.36	--	35.60	29.09	--	--	--	--	--	--	--	--	--
01/98	--	--	29.92	--	22.67	--	26.79	--	34.57	--	33.17	--	36.37	27.50	--	--	--	--	--	--	--	--	--
10/99	--	--	29.48	--	20.10	--	26.39	--	--	--	30.77	--	--	24.43	--	--	--	--	--	--	--	--	--
06/00	27.26	--	27.50	--	16.22	--	26.28	--	30.45	--	28.81	--	33.86	24.78	--	--	--	--	--	--	--	--	--
01/01	28.64	--	28.72	--	23.62	--	25.44	--	32.27	--	29.67	--	33.40	24.53	--	--	--	--	--	--	--	--	--
08/01	27.49	--	27.10	--	20.55	--	25.92	--	30.65	--	28.47	--	34.60	25.38	--	--	--	--	--	--	--	--	--
03/02	29.07	--	27.40	--	19.97	--	26.30	--	33.35	--	29.71	--	33.32	24.48	--	--	--	--	--	--	--	--	--
08/02	26.15	--	26.31	--	19.91	--	24.66	--	29.15	--	27.78	--	33.54	23.55	--	--	--	--	--	--	--	--	--
02/03	30.27	--	29.26	--	24.72	--	26.12	--	33.67	--	32.88	--	36.19	25.47	--	--	--	--	--	--	--	--	--
08/03	27.55	--	27.33	--	23.40	--	25.10	--	33.25	--	29.46	--	35.15	25.01	--	--	--	--	--	--	--	--	--
01/04	29.27	--	29.71	--	25.41	--	27.99	--	34.01	--	32.75	--	35.44	27.50	--	--	--	--	--	--	--	--	--
08/04	27.83	--	28.22	--	23.54	--	25.87	--	33.81	--	30.43	--	35.78	25.89	--	--	--	--	--	--	--	--	--
03/05	29.47	--	29.36	--	24.75	--	28.39	--	33.96	--	32.53	--	34.78	28.34	--	--	--	--	--	--	--	--	--
10/05	25.79	15.42	27.68	15.97	21.11	--	27.66	10.65	32.41	15.36	28.21	--	34.88	28.22	--	--	--	--	--	--	--	--	--
04/06	27.91	--	29.09	--	22.57	--	28.36	--	32.75	--	29.79	--	35.13	29.11	--	--	--	--	--	--	--	--	--
10/06	28.40	18.25	29.02	18.15	21.71	--	28.40	18.31	34.33	17.64	31.66	--	32.10	28.38	--	--	--	--	--	--	--	--	--
04/07	30.16	--	32.12	--	--	--	30.04	--	33.97	--	33.24	--	32.70	30.03	--	--	--	--	--	--	--	--	--
11/07	25.11	14.40	28.27	14.10	20.27	--	28.34	14.41	30.77	13.92	28.12	--	30.62	28.93	--	--	--	--	--	--	--	--	--
04/08	27.44	--	30.92	--	22.42	--	29.99	--	34.07	--	32.52	--	32.60	30.53	--	--	--	--	--	--	--	--	--
10/08	25.48	14.32	28.64	15.30	23.77	--	29.09	15.33	30.86	14.71	28.50	--	31.52	29.83	--	--	--	--	--	--	--	--	--
05/09	--	--	27.44	--	22.47	--	26.47	--	30.29	--	27.44	--	31.38	28.88	--	--	--	--	--	--	--	--	--
10/09	27.59	16.95	29.38	16.44	15.77	--	28.39	17.74	31.19	16.77	29.13	--	31.31	27.51	--	--	--	--	--	--	--	--	--
04/10	28.86	--	30.59	--	23.72	--	30.10	--	32.97	--	31.13	--	33.60	29.44	--	--	--	--	--	--	--	--	--
05/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
06/10	24.20	18.07	29.22	18.02	20.22	--	28.99	18.13	31.37	17.67	28.90	--	32.83	29.78	--	--	--	--	--	--	--	--	--
07/10	23.30	16.31	27.90	16.29	19.62	--	28.34	16.34	29.92	15.86	27.97	--	32.10	29.23	--	--	--	--	--	--	--	--	--
07/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
08/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/10	22.89	14.10	28.37	14.11	18.68	--	28.04	14.16	30.04	13.67	28.02	--	31.10	29.03	--	--	--	--	--	--	--	--	--
12/10	23.40	13.90	28.54	13.94	18.60	--	28.31	13.96	30.17	13.52	28.17	--	30.95	28.93	--	--	--	--	--	--	--	--	--
01/11	24.38	14.50	30.67	14.59	18.69	--	29.60	14.55	34.11	14.20	30.67	--	32.80	29.51	--	--	--	--	--	--	--	--	--
02/11	24.54	14.82	30.00	14.94	18.55	--	29.27	14.94	32.97	14.49	29.70	--	31.98	29.71	--	--	--	--	--	--	--	--	--
03/11	25.44	15.61	30.82	15.79	18.53	--	29.53	15.75	34.07	15.32	32.65	--	32.77	29.90	--	--	--	--	--	--	--	--	--
04/11	25.05	15.70	29.82	15.82	18.60	--	29.14	15.78	33.12	15.37	30.44	--	32.66	29.71	--	--	--	--	--	--	--	--	--
05/11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
06/11	23.77	14.26	27.85	14.35	18.07	--	28.09	14.35	29.76	13.89	28.10	--	31.52	28.90	--	--	--	--	--	--	--	--	--
07/11	23.40	13.89	27.24	13.97	18.58	--	27.77	13.93	29.91	12.40	27.87	--	31.37	28.74	--	--	--	--	--	--	--	--	--
08/11	23.91	13.85	29.02	13.92	A	--	28.72	13.90	32.93	13.45	28.76	--	32.20	29.63	--	--	--	--	--	--	--	--	--
09/11	24.07	14.45	29.34	14.49	A	--	28.56	14.60	32.83	14.22	28.89	--	31.80	29.71	--	--	--	--	--	--	--	--	--
10/11	24.78	13.97	29.30	14.00	A	30.59	28.40	14.10	32.45	13.60	28.82	13.87	31.56	29.40	33.17	27.62	28.95	--	--	--	--	--	--
11/11	24.80	14.01	29.43	14.04	A	30.58	28.46	14.11	32.89	13.65	29.22	13.87	31.91	29.64	33.14	28.05	29.20	--	--	--	--	--	--
12/11	24.83	14.20	29.57	14.19	A	30.46	28.49	14.29	32.77	13.82	29.37	13.99	32.10	29.85	32.81	28.23	29.32	--	--	--	--	--	--
01/12	24.69	14.31	30.25	14.37	A	30.34	29.12	14.39	33.87	13.98	32.03	14.14	32.58	30.03	33.88	29.18	30.16	--	--	--	--	--	--
02/12	24.69	14.68	30.82	14.79	A	30.48	29.31	14.77	34.12	14.39	32.89	14.58	32.91	30.14	34.04	30.01	30.83	--	--	--	--	--	--
03/12	25.34	15.51	30.72	15.69	A	18.67	29.43	15.65	33.97	15.22	32.55	15.08	32.67	29.80	33.84	30.93	31.08	--	--	--	--	--	--
04/12	25.39	15.25	30.28	15.36	A	30.30	29.14	15.39	33.91	14.95	32.47	15.18	32.55	29.82	33.94	30.06	31.18	--	--	--	--	--	--

Notes:

1. MSL: Mean Sea Level
2. TOC: Top of Casing
3. TOC elev determined from a survey in August 2010
4. Pond Gauge TOC elev updated March 2018.
5. "--": Measurement Not Taken
6. "A": Well Abandoned

TABLE 2-1 GROUNDWATER ELEVATION (FT)

Event	MW-03S	MW-3M	MW-04S	MW-4M	MW-05S	MW-05SR	MW-07S	MW-7M	MW-08S	MW-8M	MW-10S	MW-10M	MW-11S	MW-13S	MW-14S	MW-15S	MW-16S	MW-17S	MW-18S	MW-19S	MW-20S	MW-21S	MW-22S
05/12	25.19	16.25	30.57	16.37	A	30.56	29.31	16.44	32.94	15.95	31.42	--	33.20	30.11	34.00	29.85	31.18	--	--	--	--	--	--
06/12	24.19	15.83	29.40	15.79	A	29.56	28.81	15.86	31.44	15.45	29.42	--	32.95	30.03	30.92	28.60	29.43	--	--	--	--	--	--
07/12	23.61	14.92	28.24	14.87	A	27.81	28.31	14.94	30.10	14.45	28.25	14.62	32.20	29.45	29.42	27.43	28.18	--	--	--	--	--	--
08/12	24.77	14.08	29.40	15.21	A	30.89	29.14	15.19	33.77	14.79	28.92	15.04	32.95	30.11	33.92	29.93	31.43	--	--	--	--	--	--
09/12	25.11	16.50	29.82	16.37	A	31.39	28.97	17.53	32.35	16.04	29.92	15.04	31.53	29.95	32.17	29.35	30.18	--	--	--	--	--	--
10/12	26.61	17.67	32.82	7.62	A	32.56	29.89	17.69	34.60	17.12	33.25	17.12	33.45	30.70	34.67	32.18	29.51	--	--	--	--	--	--
11/12	26.69	18.17	30.07	17.96	A	31.73	29.14	18.11	33.10	17.54	31.34	17.79	32.20	29.95	33.50	30.10	30.51	--	--	--	--	--	--
12/12	26.69	18.92	31.74	18.79	A	32.14	29.89	18.94	34.27	18.29	33.00	18.54	32.70	30.45	34.34	31.51	30.51	--	--	--	--	--	--
01/13	27.11	19.58	30.90	19.46	A	32.31	29.97	19.61	34.35	19.04	33.34	18.20	33.12	30.28	34.17	31.35	31.35	--	--	--	--	--	--
02/13	27.94	19.17	32.32	20.37	A	32.56	30.31	20.78	34.60	19.04	33.75	20.04	34.03	30.53	34.50	32.01	32.10	--	--	--	--	--	--
03/13	27.44	20.50	31.15	20.37	A	32.23	29.97	20.53	34.35	19.95	33.50	18.54	33.62	30.20	34.34	31.51	31.76	--	--	--	--	--	--
04/13	27.09	19.75	30.65	19.71	A	31.46	29.87	19.78	34.06	19.20	32.73	19.66	34.54	30.13	34.07	30.82	31.54	--	--	--	--	--	--
05/13	25.94	19.00	29.90	18.79	A	30.64	29.47	19.11	33.02	17.62	30.50	18.79	33.28	30.03	32.84	29.68	30.26	--	--	--	--	--	--
07/13	25.19	18.25	29.57	18.29	A	30.23	29.22	18.28	32.10	18.45	29.75	18.04	33.12	29.95	31.75	29.43	29.68	--	--	--	--	--	--
07/13	24.77	18.17	29.40	18.04	A	30.06	28.22	18.19	31.85	17.62	29.50	17.87	32.95	29.86	31.34	29.18	29.60	--	--	--	--	--	--
08/13	24.44	17.25	28.99	17.21	A	29.56	28.81	17.28	31.10	16.79	29.00	16.95	32.53	29.78	30.42	28.93	29.01	--	--	--	--	--	--
09/13	23.27	16.17	28.15	16.12	A	28.98	28.56	16.11	29.85	15.62	28.25	15.87	30.70	29.45	29.34	28.10	28.18	--	--	--	--	--	--
10/13	23.13	15.98	28.74	16.02	A	30.09	28.84	16.07	31.74	15.55	28.63	15.77	32.76	29.69	30.19	28.48	27.94	--	--	--	--	--	--
11/13	23.94	15.50	28.74	15.54	A	29.39	28.56	15.53	30.60	15.04	27.25	15.29	31.53	29.36	29.84	28.26	27.43	--	--	--	--	--	--
12/13	24.86	15.67	29.07	15.71	A	29.81	28.81	15.69	31.85	15.29	28.67	15.37	32.20	28.61	30.34	28.68	28.93	--	--	--	--	--	--
01/14	26.36	16.75	30.57	17.79	A	31.14	29.72	17.78	34.19	17.20	32.84	17.54	32.70	30.20	34.50	30.76	31.35	--	--	--	--	--	--
02/14	27.11	19.17	31.15	19.21	A	31.73	30.06	18.44	34.52	18.62	33.34	18.87	33.70	30.36	34.25	31.51	31.43	--	--	--	--	--	--
03/14	27.52	19.25	32.65	19.37	A	32.31	30.14	20.36	34.85	18.70	33.75	19.04	34.12	30.45	34.42	32.18	31.93	--	--	--	--	--	--
04/14	27.61	19.83	32.07	19.87	A	32.56	30.06	20.03	34.94	18.29	33.75	19.62	34.12	30.36	34.50	31.51	32.01	--	--	--	--	--	--
06/14	25.77	18.92	29.74	18.54	A	31.23	29.39	18.61	33.02	18.20	30.25	18.37	33.45	29.95	32.59	19.60	30.18	30.99	29.66	29.49	31.42	32.78	24.17
06/14	24.61	17.17	28.57	17.21	A	30.14	28.89	30.28	30.77	16.79	28.75	17.04	33.03	29.53	30.17	28.51	28.68	30.66	28.49	28.07	29.67	32.03	21.17
07/14	25.27	16.42	28.99	16.46	A	31.81	29.06	16.44	33.52	16.04	28.75	16.54	33.12	29.70	31.92	29.60	29.01	30.82	28.74	28.82	30.17	34.28	21.26
08/14	23.77	16.00	16.07	15.87	A	30.81	28.72	15.94	28.60	14.45	28.42	15.62	32.28	28.70	29.67	27.93	28.68	31.91	27.99	26.57	28.25	31.94	20.67
08/14	23.72	15.81	28.90	15.79	A	30.76	28.74	15.92	30.39	15.50	28.42	15.53	32.18	29.73	29.90	28.38	29.08	31.24	28.06	28.54	29.25	31.96	20.69
09/14	24.27	15.58	29.07	15.54	A	31.39	28.89	15.61	31.19	15.12	28.59	15.37	32.62	29.78	30.84	28.43	29.43	30.91	28.41	28.99	29.75	32.53	20.26
10/14	24.27	13.25	28.90	15.12	A	30.98	30.89	15.11	30.10	14.70	28.42	14.87	32.03	29.78	29.25	28.26	28.76	30.91	28.16	28.82	29.25	31.86	19.67
12/14	24.77	14.67	29.24	14.71	A	31.56	28.72	14.78	28.85	15.29	28.50	14.54	31.78	29.86	29.34	29.01	28.93	30.82	28.49	29.07	29.42	31.94	19.09
01/15	27.69	16.42	30.90	16.54	A	32.48	29.39	18.11	33.10	16.95	33.00	16.37	33.12	30.11	34.17	31.43	31.26	30.99	31.33	30.91	32.75	32.86	20.09
03/15	28.19	17.50	32.40	17.71	A	32.89	29.81	17.61	33.44	17.32	33.34	17.95	33.37	30.36	34.34	32.18	33.10	31.16	32.24	31.74	32.59	32.94	22.17
03/15	28.69	19.08	31.15	19.12	A	32.39	29.72	19.11	34.44	19.54	33.50	18.87	34.03	30.03	34.34	31.51	31.26	31.24	31.08	32.07	33.50	33.69	25.67
04/15	27.81	19.81	32.60	19.88	A	32.41	29.89	19.89	34.39	19.37	33.14	19.57	34.70	30.21	34.32	32.20	31.27	31.24	32.65	31.44	33.56	33.79	27.83
06/15	26.02	17.83	29.49	17.79	A	32.39	29.22	17.86	31.52	18.04	29.34	17.62	33.37	29.78	32.75	28.51	30.82	29.49	29.24	30.34	32.69	32.01	23.01
07/15	24.36	17.17	26.74	17.62	A	31.73	28.89	17.86	25.60	17.45	27.67	16.12	32.12	26.36	28.00	26.85	27.68	31.82	28.49	27.07	26.50	32.78	27.01
07/15	18.77	16.42	26.65	16.62	A	31.73	30.56	--	28.85	15.54	27.09	15.79	32.95	27.70	30.34	27.35	26.76	30.74	29.33	26.41	26.25	32.61	21.34
08/15	24.04	15.55	27.94	15.63	A	30.54	28.52	15.55	30.47	15.21	28.22	15.22	32.35	29.63	29.71	27.96	28.46	30.56	27.63	27.93	29.19	31.73	20.61
10/15	25.36	15.67	29.57	15.79	A	32.56	29.47	15.78	29.60	16.04	29.25	15.54	33.53	27.45	33.84	29.68	32.66	28.99	29.74	31.67	32.69	32.04	20.34
10/15	25.02	16.00	27.15	15.12	A	31.48	26.64	17.78	28.10	15.79	28.84	15.79	32.03	26.78	29.42	26.51	27.43	30.74	28.74	27.24	28.00	31.78	20.34
11/15	27.27	17.00	28.99	17.21	A	32.81	29.47	17.19	34.52	16.70	31.84	16.95	32.70	30.20	34.17	29.85	30.76	32.07	29.08	30.57	33.25	32.78	21.09
12/15	34.86	15.83	32.57	16.71	A	33.06	34.39	17.61	33.02	18.04	33.17	18.20	33.53	32.20	34.50	32.51	31.26	33.24	32.99	31.16	32.17	33.28	23.67
01/16	28.19	19.67	32.32	19.62	A	32.98	30.14	19.69	34.52	18.95	33.42	19.29	35.45	28.11	34.25	28.10	31.68	31.41	32.33	31.91	33.84	33.19	26.84
02/16	33.52	18.33	33.49	19.54	A	32.64	34.72	19.78	33.60	20.62	33.09	20.20	35.37	32.70	35.00	32.68	31.26	33.24	34.66	31.24	33.42	33.28	27.17
03/16	28.49	19.57	30.40	20.01	A	32.26	29.53	19.81	33.63	19.35	31.82	19.47	32.80	29.41	33.63	29.51	31.53	30.70	28.74	31.31	32.78	32.83	26.19
04/16	28.02	19.08	29.82	19.04	A	32.14	29.72	19.11	33.94	18.62	29.50	19.37	32.70	29.86	33.75	29.76	30.51	31.74	30.16	30.66	29.59	32.78	25.92
04/16	27.27	17.58	29.24	18.46	A	32.23	29.47	18.44	29.85	18.87	29.67	18.54	32.70	29.70	30.75	29.51	29.85	30.82	28.16	29.66	29.34	32.44	24.26
06/16	33.44	17.33	33.40	17.54	A	32.73	34.97	19.28	33.77	18.20	33.67	17.79	36.78	32.86	34.67	32.93	33.68	33.24	34.74	33.49	33.25	33.36	26.26
07/16	26.52	19.67	30.15	19.71	A	32.64	30.06	19.78	33.85	19.04	31.75	19.37	33.37	30.20	33.67	29.68	31.10	31.07	28.91	30.82	32.84	32.94	25.17
07/16	29.94	16.67	29.57	17.12	A	32.64	30.47	18.28	30.27	17.37	29.09	17.20	32.78	28.70	30.67	28.85	29.93	32.41	30.66	29.24	29.34	32.69	22.76
08/16	24.61	16.75	27.82	16.54	A	31.14	28.72	16.78	27.10	17.04	28.42	16.54	31.95	29.36	29.17	27.10	28.18	31.57	27.49	25.99	25.92	31.86	21.51
09/16	24.19	15.68	27.02																				

TABLE 2-1 GROUNDWATER ELEVATION (FT)

Event	MW-03S	MW-3M	MW-04S	MW-4M	MW-05S	MW-05SR	MW-07S	MW-7M	MW-08S	MW-8M	MW-10S	MW-10M	MW-11S	MW-13S	MW-14S	MW-15S	MW-16S	MW-17S	MW-18S	MW-19S	MW-20S	MW-21S	MW-22S
05/17	26.86	16.92	27.15	17.46	A	32.48	29.22	18.03	31.10	17.79	30.34	17.79	32.37	29.53	33.00	29.35	29.68	30.82	28.91	29.49	31.42	32.36	23.67
06/17	25.19	16.92	25.40	17.29	A	31.39	28.72	17.03	25.35	17.45	27.75	15.70	31.95	29.28	30.34	28.68	29.10	30.57	28.58	28.57	29.75	31.78	22.01
07/17	24.86	16.75	25.24	17.04	A	31.89	28.97	16.78	32.69	16.29	28.92	16.54	32.03	26.86	31.50	27.76	29.18	30.91	27.58	28.91	30.17	32.03	21.51
08/17	29.77	16.17	32.99	16.62	A	32.81	30.14	18.19	32.85	18.45	30.09	17.04	32.95	32.70	33.84	32.10	30.35	32.57	33.99	29.99	32.84	32.61	22.51
09/17	26.23	19.35	29.26	19.00	A	32.63	29.24	19.29	33.47	18.77	31.37	18.82	32.60	29.62	32.47	29.20	30.66	31.26	28.86	30.49	32.52	32.52	24.42
10/17	26.94	17.17	27.24	18.04	A	32.89	29.22	18.11	30.44	18.04	30.59	17.79	32.45	27.20	33.84	29.60	30.68	31.16	29.49	30.32	32.50	32.11	22.59
12/17	27.27	18.17	28.82	18.04	A	32.31	28.89	18.19	32.19	17.62	30.09	17.87	31.70	29.11	32.50	28.01	29.68	30.82	27.83	29.41	31.34	31.86	16.59
12/18	27.19	17.83	29.15	17.79	A	32.31	29.06	35.86	16.44	17.37	30.50	17.54	31.78	29.45	32.92	29.18	29.76	30.99	28.91	29.49	31.59	31.86	22.59
01/17	28.44	19.00	31.74	18.96	A	33.14	29.64	19.03	34.10	18.45	33.42	18.70	32.95	29.78	34.25	31.10	31.26	31.16	30.83	31.49	33.84	32.69	25.01
02/18	28.69	19.58	30.86	19.29	A	32.89	29.64	19.36	34.30	19.24	33.09	19.23	33.00	29.63	34.02	31.25	31.09	31.44	30.46	31.21	33.58	33.40	25.44
04/18	33.52	18.00	29.82	19.87	A	33.06	34.06	20.11	19.69	19.54	31.50	19.70	32.37	32.70	34.50	31.85	31.10	31.32	29.16	30.57	33.17	33.19	27.01
05/18	28.45	20.75	31.15	20.62	A	33.06	29.64	20.78	32.52	21.37	30.50	20.12	33.53	30.61	34.50	30.26	30.68	32.99	29.74	30.99	33.25	33.19	27.84
07/18	27.11	19.42	29.32	19.71	A	32.81	30.47	20.28	33.19	20.04	30.84	20.20	32.87	28.36	32.42	30.51	33.43	31.41	30.16	28.66	28.59	32.78	25.84
08/18	25.81	17.88	28.27	17.84	A	31.56	28.73	18.05	30.89	17.58	28.93	17.28	32.00	28.50	30.92	27.27	28.88	30.74	27.58	28.62	29.71	31.78	22.46
09/18	25.86	18.42	28.57	18.71	A	32.23	27.39	20.03	29.44	19.04	30.00	17.95	32.62	27.95	32.50	28.51	29.60	30.99	28.33	29.32	31.09	32.53	22.84
11/18	29.19	20.67	29.65	20.29	A	32.98	29.64	20.61	32.94	19.12	31.00	19.54	33.03	28.03	33.92	31.18	32.10	31.41	30.83	31.07	33.34	32.78	25.84
12/18	32.52	18.33	29.07	19.54	A	33.06	29.81	20.69	33.60	19.54	30.34	19.54	33.20	28.20	33.50	29.93	30.85	32.91	31.49	29.99	29.84	32.94	26.34
01/19	34.02	21.08	33.15	19.04	A	32.89	33.97	20.78	33.77	20.54	32.92	20.62	33.12	31.86	33.84	31.85	33.10	34.07	33.49	32.32	33.42	32.94	29.67
02/19	29.61	21.50	31.65	21.29	A	33.31	29.22	21.53	33.69	21.20	33.25	21.04	33.62	29.45	34.92	31.26	30.93	31.41	31.49	31.16	33.50	33.36	27.92
03/19	29.38	20.93	30.73	21.26	A	32.81	28.51	21.09	33.22	20.55	32.90	20.67	33.17	28.48	33.73	30.50	30.73	30.75	30.18	30.89	33.19	33.02	27.54
03/19	29.11	20.83	29.74	19.62	A	32.48	30.72	22.61	30.02	20.45	33.25	20.37	33.12	29.03	31.50	29.10	30.51	32.24	30.74	30.24	28.92	32.86	26.09
04/19	28.52	19.33	29.74	19.79	A	32.39	30.06	21.86	30.02	20.45	32.17	19.87	33.03	28.78	33.00	28.68	30.51	32.41	29.91	30.16	30.09	32.69	25.92
05/19	28.61	18.00	29.15	15.96	A	31.89	30.06	19.53	28.69	18.45	28.67	19.29	32.70	27.70	30.17	28.35	29.18	29.91	30.08	28.41	28.34	32.44	23.34
06/19	29.52	16.00	28.74	16.29	A	31.31	30.14	17.61	28.60	16.62	29.09	16.70	33.12	28.20	30.00	28.10	29.26	30.74	29.99	28.57	28.59	31.94	22.09
07/19	25.36	16.83	27.57	16.79	A	31.39	27.81	16.86	28.69	16.95	28.25	16.54	31.87	28.20	29.92	27.51	28.51	30.74	27.41	27.82	29.34	31.78	21.01
08/19	25.69	16.90	27.97	16.29	A	31.76	28.09	16.95	30.82	16.42	28.32	13.87	32.00	30.13	30.37	27.78	28.68	32.64	27.56	28.04	29.62	31.66	20.90
09/19	29.94	15.75	28.65	15.96	A	31.14	27.97	15.44	27.94	17.37	26.42	16.12	31.28	26.20	29.42	26.10	27.35	31.24	29.66	28.24	28.00	31.36	19.76
10/19	25.69	16.00	28.40	15.96	A	32.39	27.22	17.69	29.77	17.29	29.00	16.12	31.70	26.61	31.09	27.76	29.10	31.07	29.91	28.57	29.25	31.78	19.51
11/19	28.02	15.92	28.24	15.79	A	32.56	29.47	17.19	29.02	16.37	28.50	15.95	31.95	26.95	30.25	28.18	29.10	31.91	30.08	28.24	28.59	31.94	28.51
12/19	32.61	14.17	29.07	14.04	A	32.81	32.89	15.86	33.27	16.12	29.42	16.29	32.53	28.36	31.09	30.35	29.93	32.49	30.99	29.49	29.34	32.53	20.17
01/20	29.61	15.33	29.07	15.12	A	32.81	30.47	16.94	33.52	17.27	32.25	16.95	33.37	28.03	32.09	30.01	30.93	32.49	29.24	27.91	28.00	32.53	21.17
02/20	29.36	18.50	29.57	18.46	A	32.89	28.47	18.61	33.60	16.95	30.50	18.79	32.95	27.70	28.75	29.85	30.51	31.32	29.33	29.99	33.25	32.78	23.51
03/20	28.95	18.70	30.31	18.34	A	33.11	28.49	18.76	34.22	18.10	33.20	18.31	33.40	28.61	34.07	30.50	30.96	34.04	29.64	30.67	33.68	33.25	23.98
04/20	33.19	16.42	30.65	15.46	A	32.89	28.89	18.36	33.69	17.95	30.09	17.20	33.20	30.45	35.00	30.51	31.43	33.74	31.33	29.82	33.42	32.86	25.17
05/20	28.61	15.75	28.49	14.87	A	31.64	27.89	17.86	27.94	16.87	27.84	16.54	32.20	27.78	30.42	28.35	29.10	31.91	30.08	27.66	28.75	32.03	22.59
06/20	25.69	16.58	27.57	16.62	A	31.06	27.56	16.69	27.44	14.62	28.42	16.37	31.78	27.86	29.84	27.35	28.51	30.66	27.41	27.91	29.25	31.53	21.34
07/20	25.61	16.33	27.49	16.37	A	31.81	27.97	16.36	27.10	17.04	28.17	16.12	31.87	28.03	29.84	27.51	28.43	30.91	27.16	27.74	29.34	31.69	34.84
08/20	25.59	15.80	27.42	16.39	A	31.46	27.69	16.01	29.87	15.57	27.82	15.67	31.55	27.53	30.17	27.38	28.38	30.59	27.01	28.19	29.07	31.46	20.24
09/20	24.86	16.17	27.99	15.96	A	32.06	28.06	16.11	28.10	16.29	28.00	15.87	31.78	28.20	30.17	27.68	28.60	30.91	27.41	25.99	29.42	31.78	20.09
10/20	27.77	17.33	27.99	17.54	A	32.39	29.97	19.28	29.69	18.20	28.84	18.37	32.03	26.95	30.34	28.85	29.18	32.07	27.91	29.07	28.84	32.11	23.09
11/20	33.52	16.83	32.74	17.37	A	32.89	33.31	18.78	33.60	18.45	31.75	18.54	32.87	30.95	32.84	31.10	30.60	32.57	31.08	30.07	31.00	32.69	23.09
01/21	30.02	19.58	30.32	20.54	A	32.81	31.97	21.86	33.52	20.45	31.75	20.04	32.87	32.70	32.84	29.60	30.76	34.66	32.74	31.32	32.50	34.69	25.84
02/21	30.44	21.42	30.57	21.71	A	32.98	28.81	21.36	33.35	20.45	31.67	20.20	33.37	27.53	34.75	30.76	31.76	34.32	31.41	29.32	29.25	33.11	27.76
03/21	29.64	20.86	30.47	20.87	A	33.08	28.66	20.89	33.97	20.36	33.27	20.57	33.83	29.01	34.17	30.48	30.84	31.32	29.41	30.79	33.90	33.66	27.19
04/21	28.94	20.25	29.15	20.21	A	31.31	30.69	21.78	29.02	20.70	31.59	19.79	33.20	28.70	33.34	29.43	30.51	33.07	28.91	29.66	32.67	33.11	25.84
05/21	26.69	18.17	26.82	18.54	A	31.39	27.81	18.19	26.94	18.45	27.34	18.54	32.28	28.03	28.92	26.85	27.76	30.66	27.24	25.82	27.59	32.11	22.59
06/21	25.69	17.35	25.99	16.96	A	31.39	27.22	18.86	25.94	17.97	28.25	17.79	32.12	27.95	29.59	27.60	28.35	31.82	30.24	27.74	28.17	31.78	21.34
07/21	25.55	17.01	27.87	16.71	A	31.10	28.03	16.99	30.54	16.47	28.83	16.47	32.21	28.07	30.71	27.70	28.92	30.71	27.56	28.29	29.30	31.99	21.29
08/21	25.69	16.75	27.99	16.71	A	31.23	28.06	16.78	30.69	16.37	28.92	16.54	32.03	28.11	31.09	27.76	29.18	30.74	27.41	28.49	29.67	31.86	20.59
09/21	27.02	16.08	27.32	16.37	A	31.23	28.81	17.69	28.85	16.62	27.75	16.45	31.28	27.95	30.34	27.35	28.35	31.24	29.66	28.24	28.92	31.28	20.01
10/21	25.02	15																					

TABLE 2-1 GROUNDWATER ELEVATION (FT)

Event	MW-501A	MW-501M	MW-502A	MW-503A	MW-504A	MW-504M	MW-505A	MW-505M	PZ-1A	PZ-2A	PZ-3A	PZ-4A	PZ-5A	PZ-6A	PG-1	PG-2	PG-3	PG-4
01/91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
04/91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
07/91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/91	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
07/92	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
01/93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
07/93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
01/94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
07/94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
01/95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
08/95	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
03/96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
07/96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
01/97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
07/97	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
01/98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
06/00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
01/01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
08/01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
03/02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
08/02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
02/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
08/03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
01/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
08/04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
03/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
04/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
04/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
04/08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
05/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
10/09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
04/10	32.23	--	31.24	32.08	33.12	--	32.38	--	--	--	--	--	--	--	--	--	--	--
05/10	31.14	--	32.74	30.58	32.47	--	31.63	--	32.73	31.46	32.40	31.33	31.65	31.57	--	--	--	--
06/10	30.83	--	31.09	31.88	32.37	--	31.13	--	32.93	31.60	32.55	31.40	31.80	31.50	--	--	--	--
07/10	29.34	--	30.04	31.68	31.19	--	29.41	--	31.51	29.91	31.10	29.63	30.06	29.94	--	--	--	--
07/10	29.29	--	28.74	29.92	30.51	--	29.26	--	31.51	29.82	30.80	29.64	30.03	30.02	--	--	--	--
08/10	29.44	--	31.14	31.89	32.02	--	28.78	--	31.38	31.41	32.80	31.13	31.95	30.52	--	--	--	--
10/10	30.13	--	32.04	32.46	33.21	--	28.35	--	31.69	32.22	33.12	32.52	33.05	32.10	--	--	--	--
11/10	30.24	--	31.39	31.53	32.47	--	28.33	--	30.88	31.17	32.27	31.03	31.78	31.22	--	--	--	--
12/10	30.49	--	31.88	32.53	33.05	--	28.28	--	30.83	32.01	32.60	32.18	32.65	32.12	--	--	--	--
01/11	33.49	--	34.22	33.51	33.24	--	29.54	--	33.61	33.79	33.77	34.11	34.10	34.98	--	--	--	--
02/11	32.11	--	32.59	32.66	33.34	--	30.29	--	33.43	32.56	33.00	32.66	33.20	32.87	--	--	--	--
03/11	33.96	--	33.45	33.31	33.82	--	32.38	--	34.04	33.45	33.40	33.76	33.72	34.42	--	--	--	--
04/11	32.03	--	32.19	32.21	33.08	--	31.63	--	33.88	32.65	33.11	32.63	32.95	31.89	--	--	--	--
05/11	30.52	--	30.88	31.37	31.63	--	30.56	--	32.55	31.11	32.03	30.94	31.25	31.17	--	--	--	--
06/11	29.15	--	29.73	30.84	30.56	--	29.09	--	31.23	29.74	30.58	29.70	29.99	30.00	--	--	--	--
07/11	29.15	--	30.70	30.87	30.77	--	28.59	--	31.70	30.63	31.77	30.30	30.91	30.25	--	--	--	--
08/11	30.55	--	32.28	32.67	33.13	--	29.87	--	36.04	31.51	33.06	32.92	33.37	32.63	--	--	--	--
09/11	30.93	--	32.82	32.96	33.32	--	29.63	--	32.97	33.09	33.50	33.48	33.71	32.94	--	--	--	--
10/11	30.44	13.29	32.35	32.91	33.15	13.42	29.12	13.26	32.11	32.58	32.90	26.93	33.20	32.87	--	--	--	--
11/11	31.24	13.45	33.04	33.03	32.91	13.52	29.18	13.44	32.73	32.92	33.25	33.38	33.51	33.55	--	--	--	--
12/11	31.35	13.62	32.89	32.74	32.79	13.68	29.34	13.60	33.13	33.01	33.34	33.21	33.53	33.18	--	--	--	--
01/12	32.40	13.76	33.44	33.15	32.99	13.86	30.08	13.69	33.98	33.36	33.42	33.64	33.76	34.16	--	--	--	--
02/12	33.34	14.08	33.50	33.15	33.09	14.17	31.23	14.04	34.08	33.48	33.40	33.86	33.90	34.35	--	--	--	--
03/12	33.79	14.57	33.35	33.21	33.72	14.63	34.88	14.52	33.94	33.35	33.30	33.66	33.62	34.32	--	--	--	--
04/12	33.04	14.67	33.32	33.23	33.82	14.73	34.78	14.62	33.18	33.41	33.39	33.79	33.72	34.27	--	--	--	--

- Notes:
1. MSL: Mean Sea Level
 2. TOC: Top of Casing
 3. TOC elev determined from a survey in August 2010
 4. Pond Gauge TOC elev updated March 2018.
 5. "--": Measurement Not Taken
 6. "A": Well Abandoned

TABLE 2-1 GROUNDWATER ELEVATION (FT)

Event	MW-501A	MW-501M	MW-502A	MW-503A	MW-504A	MW-504M	MW-505A	MW-505M	PZ-1A	PZ-2A	PZ-3A	PZ-4A	PZ-5A	PZ-6A	PG-1	PG-2	PG-3	PG-4
05/12	32.87	--	32.79	33.45	33.65	15.78	34.53	15.63	32.16	33.31	33.34	33.63	33.20	33.70	--	--	--	--
06/12	30.62	--	31.04	31.45	32.24	15.53	31.28	15.13	33.00	31.23	32.25	31.13	31.53	31.29	--	--	--	--
07/12	29.29	--	32.96	33.11	30.99	14.28	29.61	14.21	31.58	29.73	30.50	29.63	29.87	30.12	--	--	--	--
08/12	32.79	14.57	32.62	33.20	34.15	14.53	33.11	14.46	33.08	33.14	33.00	33.80	33.87	33.79	--	--	--	--
09/12	15.12	14.91	33.12	32.70	32.82	15.86	32.28	15.29	33.08	31.98	32.67	32.13	32.37	32.12	--	--	--	--
10/12	34.96	16.74	33.96	34.03	34.65	16.78	35.70	16.63	34.08	34.39	35.00	34.63	34.87	35.20	--	--	--	--
11/12	33.62	17.40	32.54	33.03	33.57	17.44	34.53	17.29	33.08	33.06	33.17	33.13	33.37	33.37	--	--	--	--
12/12	34.54	18.07	33.71	33.70	33.90	17.28	35.53	17.96	33.25	33.98	34.00	33.96	34.20	34.70	--	--	--	--
01/13	35.29	18.90	33.62	33.61	33.82	18.86	35.45	19.54	34.41	33.98	34.00	34.13	34.20	34.45	--	--	--	--
02/13	34.62	19.65	34.29	34.20	34.24	19.86	35.70	19.63	35.50	34.48	34.25	34.46	34.37	35.04	--	--	--	--
03/13	34.21	19.74	33.87	33.86	33.90	19.86	35.45	19.71	35.08	33.98	33.92	34.05	34.03	34.70	--	--	--	--
04/13	33.98	19.31	33.29	33.48	33.64	19.37	35.06	19.31	34.96	33.90	33.95	34.30	34.37	35.00	--	--	--	--
05/13	32.37	18.40	32.29	32.36	32.57	18.44	32.78	18.29	34.50	32.64	33.17	32.63	32.70	32.79	--	--	--	--
07/13	31.46	17.57	32.04	32.78	32.15	17.61	31.70	17.46	33.66	32.48	32.75	31.71	31.95	31.87	--	--	--	--
07/13	30.12	17.40	31.54	31.78	31.65	17.44	31.11	17.79	33.66	31.48	32.33	31.38	31.45	31.62	--	--	--	--
08/13	30.62	16.57	31.29	31.78	31.24	16.61	30.70	16.46	32.91	31.14	32.00	31.96	31.03	31.12	--	--	--	--
09/13	29.71	15.40	30.12	30.95	29.49	15.53	29.61	15.38	31.33	29.98	30.92	29.71	29.45	30.12	--	--	--	--
10/13	29.64	15.30	31.52	33.50	33.05	15.43	29.18	15.34	31.27	29.67	30.59	29.77	29.66	30.10	--	--	--	--
11/13	30.37	14.74	31.29	31.70	31.49	14.86	29.28	14.79	31.91	31.14	32.25	31.05	31.12	31.04	--	--	--	--
12/13	31.04	15.07	32.54	33.20	33.07	15.11	29.20	14.96	33.16	32.81	33.42	33.21	33.53	33.45	--	--	--	--
01/14	33.87	16.99	33.46	33.53	33.65	16.94	35.20	16.79	34.91	33.81	33.67	34.05	33.95	34.62	--	--	--	--
02/14	34.29	18.24	33.79	33.70	33.82	18.36	35.45	18.21	36.00	33.89	33.83	34.63	34.12	35.20	--	--	--	--
03/14	34.96	18.49	33.87	34.03	34.24	18.53	35.70	18.38	36.00	34.56	34.75	34.71	34.53	35.04	--	--	--	--
04/14	34.54	19.15	34.29	33.20	34.15	19.19	35.61	19.04	35.83	34.06	34.08	34.80	34.87	34.95	--	--	--	--
06/14	32.46	17.99	32.12	32.78	32.82	18.03	32.78	17.88	34.50	32.89	33.33	33.30	32.62	33.95	--	--	--	--
06/14	30.29	16.57	35.62	31.36	30.65	16.61	30.61	16.54	32.66	30.14	30.75	30.13	30.20	30.62	--	--	--	--
07/14	31.04	15.82	32.04	33.61	33.15	15.86	30.11	15.79	33.16	33.31	33.25	33.71	33.78	34.70	--	--	--	--
08/14	29.79	16.32	30.46	31.20	28.65	13.69	29.45	15.29	32.08	30.39	30.33	31.46	30.95	32.04	--	--	--	--
08/14	30.02	15.36	30.95	31.22	30.85	15.59	29.58	15.46	32.08	30.31	30.33	31.46	30.95	32.04	--	--	--	--
09/14	30.37	15.90	31.54	32.61	30.15	15.86	30.53	16.13	32.83	32.48	33.33	33.71	33.03	33.87	--	--	--	--
10/14	30.04	14.07	30.54	31.45	29.07	13.53	29.95	15.04	32.08	31.14	31.42	31.80	31.70	33.04	--	--	--	--
12/14	29.54	15.74	31.46	32.86	28.99	15.03	29.86	15.46	31.75	32.64	32.75	33.55	33.28	33.95	--	--	--	--
01/15	34.12	15.74	34.04	33.61	33.74	34.86	32.45	15.71	35.41	33.81	34.17	34.46	34.12	35.20	--	--	--	--
03/15	33.71	16.82	34.21	34.03	33.32	15.94	34.11	17.46	35.66	34.14	34.50	34.96	30.37	35.37	--	--	--	--
03/15	34.54	17.99	33.46	33.78	33.82	18.19	35.45	18.21	36.25	33.98	34.42	34.80	34.28	34.79	--	--	--	--
04/15	34.45	18.05	33.19	33.71	33.88	19.14	35.48	19.01	36.41	33.99	33.97	34.12	34.24	34.67	32.16	33.02	30.53	29.62
06/15	31.54	16.15	31.96	33.70	31.90	15.36	32.45	16.71	32.25	32.56	33.08	33.46	33.12	34.29	32.26	33.04	30.38	29.50
07/15	30.71	16.49	30.96	32.03	29.65	15.94	30.53	16.71	32.66	31.73	32.00	32.46	31.95	32.79	32.43	33.04	30.46	29.67
07/15	30.12	16.90	34.37	33.45	29.49	16.53	30.28	17.63	33.00	32.23	32.50	33.71	32.87	33.45	32.34	32.95	30.38	29.50
08/15	29.61	14.85	29.82	31.44	29.95	14.99	29.13	14.81	32.08	30.23	30.34	30.88	30.62	31.46	32.34	32.85	30.38	29.50
10/15	31.21	14.99	33.62	33.95	30.40	14.53	31.28	15.46	14.41	33.48	33.92	34.38	34.03	34.95	32.59	33.12	30.96	30.25
10/15	29.21	15.07	33.21	32.86	28.65	14.53	28.86	15.29	31.58	31.64	32.08	32.80	32.37	33.37	32.26	31.87	30.38	29.67
11/15	33.46	16.40	33.96	34.03	30.40	15.11	31.53	16.38	35.16	--	--	--	--	32.43	33.37	30.71	30.17	
12/15	34.54	17.57	34.04	34.45	33.32	16.78	34.45	18.04	36.00	33.98	34.33	34.88	34.53	35.29	32.68	33.27	30.96	30.34
01/16	34.71	18.65	33.79	33.86	34.15	18.78	35.20	18.63	35.91	34.23	34.50	34.80	34.45	35.37	32.76	33.27	31.05	30.34
02/16	34.21	19.65	33.12	33.61	33.15	19.03	34.36	20.13	35.25	33.81	34.17	34.63	34.28	35.20	32.43	33.19	30.88	30.25
03/16	33.25	19.17	32.17	32.13	33.54	18.96	34.83	19.83	34.96	33.65	33.51	33.91	33.61	34.23	32.26	33.19	30.80	30.00
04/16	34.29	18.40	32.96	33.11	32.82	17.36	35.45	18.29	34.50	33.81	34.08	34.63	34.20	35.29	32.26	33.02	30.55	29.92
04/16	33.04	17.82	32.12	33.70	31.99	17.19	33.11	18.21	34.08	32.89	33.25	33.80	33.37	34.37	32.76	33.27	30.96	30.34
06/16	34.37	18.49	32.96	33.70	33.40	17.86	34.36	19.04	35.58	33.89	34.33	34.96	34.45	35.45	32.43	33.19	30.80	30.25
07/16	32.96	18.74	32.54	33.45	33.57	18.86	34.95	18.71	35.58	33.64	33.75	33.96	34.03	34.37	32.43	33.10	30.71	29.67
07/16	31.04	17.90	31.12	34.11	30.65	17.36	30.70	18.29	33.75	32.56	33.08	33.55	33.12	33.95	32.01	32.77	30.30	29.34
08/16	27.12	17.49	30.12	30.53	26.24	15.86	27.20	17.63	32.33	30.48	31.00	30.55	30.62	30.79	32.68	33.27	31.13	30.25
09/16	29.79	15.42	28.22	30.75	30.10	15.11	29.71	15.61	34.91	33.98	34.33	34.63	34.12	35.04	--	--	--	--
10/16	34.46	17.49	33.29	33.95	33.74	16.78	34.70	17.96	--	--	--	--	--	32.01	33.10	30.71	29.42	
10/16	32.21	18.40	31.54	32.45	31.07	17.86	32.11	18.88	33.41	32.14	32.50	32.21	32.20	33.29	32.01	33.02	30.38	29.42
11/16	31.12	17.40	31.04	33.95	30.24	16.53	31.03	17.71	32.41	31.31	32.33	31.21	21.20	31.54	32.01	33.02	29.58	31.12
12/16	34.62	17.82	34.12	34.20	34.07	17.86	35.70	17.71	34.91	34.06	34.00	34.21	34.12	35.04	32.51	33.19	29.08	30.95
01/17	34.12	18.65	32.96	33.61	33.57	18.78	35.36	18.63	34.66	33.56	33.50	33.71	33.70	34.29	--	--	--	--
02/17	33.54	17.99	32.37	33.45	33.32	18.11	34.95	17.96	34.08	33.14	33.17	33.30	33.37	34.04	32.43	33.19	29.25	31.04
03/17	33.00	18.22	31.16	30.84	32.86	17.85	34.34	17.92	35.88	33.28	33.23	33.51	33.51	33.93	32.79	33.19	30.71	29.50
04/17	33.54	17.49	32.29	33.45	33.07	17.53	34.95	17.46	33.58	33.14	33.08	33.46	33.28	34.04	--	--	--	--

Notes:

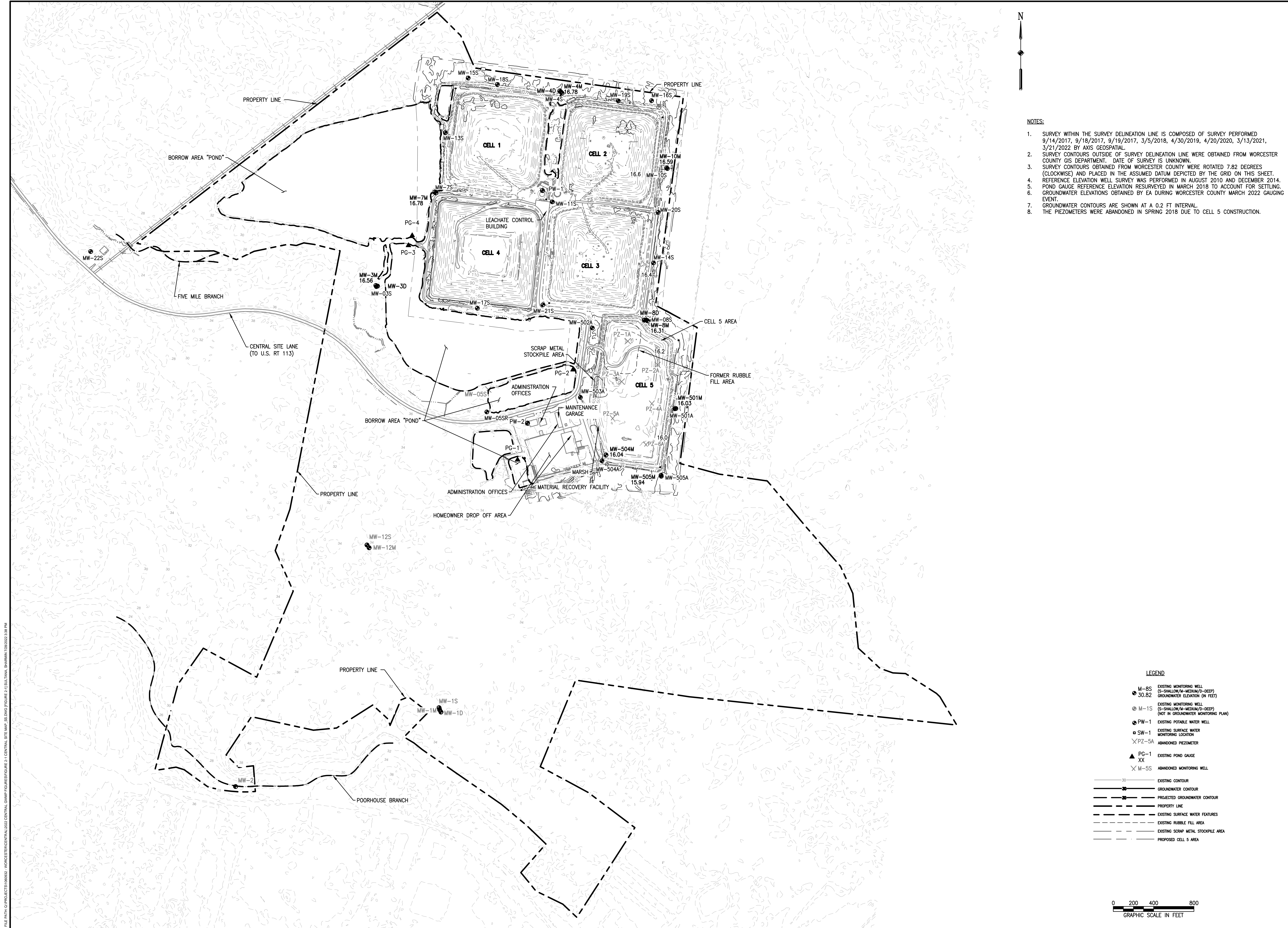
1. MSL: Mean Sea Level
2. TOC: Top of Casing
3. TOC elev determined from a survey in August 2010
4. Pond Gauge TOC elev updated March 2018.
5. "--": Measurement Not Taken
6. "A": Well Abandoned

TABLE 2-1 GROUNDWATER ELEVATION (FT)

Event	MW-501A	MW-501M	MW-502A	MW-503A	MW-504A	MW-504M	MW-505A	MW-505M	PZ-1A	PZ-2A	PZ-3A	PZ-4A	PZ-5A	PZ-6A	PG-1	PG-2	PG-3	PG-4
05/17	33.54	17.24	31.96	33.61	32.49	16.44	33.45	17.71	33.91	33.39	33.42	33.55	33.28	34.29	--	--	--	--
06/17	30.54	16.32	30.62	31.45	29.57	15.61	30.61	16.79	32.50	30.73	31.17	30.71	30.62	31.45	--	--	--	--
07/17	30.54	16.15	31.12	32.03	31.32	16.19	31.28	16.13	32.75	31.39	32.08	31.88	31.78	32.37	--	--	--	--
08/17	34.12	17.40	34.46	33.61	33.49	16.61	34.28	17.79	A	33.39	33.17	33.71	33.37	34.29	32.59	33.27	30.96	29.59
09/17	33.25	18.49	31.26	32.96	32.70	18.62	33.23	18.47	A	31.52	31.83	32.63	31.49	31.83	32.68	33.10	30.88	29.34
10/17	33.96	17.49	32.54	33.95	32.99	16.94	34.03	34.21	A	33.31	32.92	33.63	33.37	34.04	32.34	26.97	28.91	30.95
12/17	32.71	17.57	31.62	32.61	32.40	17.61	34.03	17.54	A	32.23	32.50	32.55	32.53	33.12	--	--	--	--
12/18	32.62	17.24	31.62	32.74	25.49	17.28	34.70	17.21	A	31.14	31.58	32.55	31.70	32.12	--	--	--	--
01/17	33.54	18.24	33.87	34.03	33.99	18.28	33.70	18.63	A	34.64	34.67	35.30	34.87	35.87	32.76	33.37	30.88	29.50
02/18	33.89	18.87	33.49	34.04	33.55	18.81	35.53	18.66	A	--	--	34.01	33.66	34.48	32.76	33.27	31.05	29.42
04/18	33.87	19.32	32.87	33.53	33.32	19.36	33.95	19.88	A	--	--	--	--	--	33.01	33.19	30.80	29.17
05/18	34.54	19.99	33.04	33.78	33.40	19.36	34.61	20.46	A	--	--	--	--	--	32.43	33.27	31.05	29.34
07/18	33.71	20.90	34.66	33.95	33.15	19.78	34.03	20.79	A	34.64	34.67	35.30	34.87	35.87	31.93	33.02	30.71	29.09
08/18	31.08	18.43	29.83	31.78	31.67	17.19	--	--	A	--	--	--	--	--	32.43	33.19	30.88	29.17
09/18	32.04	18.49	31.96	33.20	33.32	17.69	31.95	19.04	A	--	--	--	--	--	--	--	--	--
11/18	34.62	19.74	33.21	34.11	33.74	19.19	34.53	10.96	A	--	--	--	--	--	--	--	--	--
12/18	34.46	20.90	34.62	33.95	33.65	20.28	34.45	21.46	A	--	--	--	--	--	--	--	--	--
01/19	34.46	20.32	33.79	33.70	33.57	19.78	34.53	20.88	A	--	--	--	--	--	--	--	--	--
02/19	34.46	20.65	33.37	32.70	32.40	20.86	34.53	21.13	A	--	--	--	--	--	--	--	--	--
03/19	33.04	20.47	32.34	32.90	33.51	20.26	34.78	20.20	A	--	--	--	--	--	32.18	33.19	30.71	28.00
03/19	34.79	20.07	32.46	33.36	32.90	19.44	33.95	20.38	A	--	--	--	--	--	--	--	--	--
04/19	32.62	19.49	32.54	33.36	31.57	18.86	32.61	19.88	A	--	--	--	--	--	--	--	--	--
05/19	32.12	20.32	31.62	32.53	30.74	19.61	32.03	20.79	A	--	--	--	--	--	--	--	--	--
06/19	32.12	17.90	32.37	31.70	31.40	16.19	32.03	17.29	A	--	--	--	--	--	--	--	--	--
07/19	30.21	16.15	30.62	32.95	31.49	16.28	32.36	17.29	A	--	--	--	--	--	--	--	--	--
08/19	30.30	16.25	31.29	32.53	31.32	16.77	30.37	16.21	A	--	--	--	--	--	32.01	32.94	30.88	31.00
09/19	32.29	18.07	32.12	31.45	31.07	17.28	32.03	18.29	A	--	--	--	--	--	32.18	33.19	30.80	28.00
10/19	29.96	16.07	31.79	31.03	31.90	15.69	31.70	16.46	A	--	--	--	--	--	32.26	33.10	30.88	28.09
11/19	30.12	15.57	32.21	33.70	29.07	15.03	30.03	16.04	A	--	--	--	--	--	32.34	33.19	30.96	28.09
12/19	33.04	15.82	35.71	34.03	32.07	15.19	33.11	35.21	A	--	--	--	--	--	32.43	33.27	31.13	28.42
01/20	33.54	17.40	33.04	33.61	32.57	16.78	33.45	17.88	A	--	--	--	--	--	32.59	33.27	31.13	28.25
02/20	35.37	17.49	33.21	33.70	34.40	16.61	35.28	17.79	A	--	--	--	--	--	32.34	33.27	31.05	28.17
03/20	33.85	18.15	33.89	34.63	33.91	14.53	34.83	18.00	A	--	--	--	--	--	32.34	33.19	30.96	28.00
04/20	34.54	18.24	34.62	33.78	33.49	17.53	34.53	18.71	A	--	--	--	--	--	32.68	33.19	31.05	28.25
05/20	31.62	17.24	32.71	32.03	30.65	17.36	31.53	17.71	A	--	--	--	--	--	32.18	33.02	30.71	27.92
06/20	30.12	15.99	29.96	31.95	30.40	16.11	32.53	15.96	A	--	--	--	--	--	33.46	27.22	29.41	27.62
07/20	29.79	15.74	30.21	34.36	31.65	15.86	29.95	15.71	A	--	--	--	--	--	33.63	27.30	29.16	25.62
08/20	28.99	15.57	29.59	31.53	32.32	15.31	29.23	15.26	A	--	--	--	--	--	32.43	33.19	30.96	28.09
09/20	29.46	15.65	31.12	33.61	31.82	15.61	29.70	15.46	A	--	--	--	--	--	32.26	33.19	30.88	28.00
10/20	30.12	16.57	34.04	33.20	29.32	16.11	30.20	17.04	A	--	--	--	--	--	32.43	33.27	30.96	28.00
11/20	34.71	19.24	33.46	34.20	33.99	18.36	34.78	19.38	A	--	--	--	--	--	32.59	33.27	31.05	28.17
01/21	34.29	20.49	34.54	33.70	33.49	19.69	32.20	20.88	A	--	--	--	--	--	33.01	33.27	30.96	28.17
02/21	33.87	20.57	33.12	33.78	33.82	20.69	33.95	20.88	A	--	--	--	--	--	30.59	33.27	30.88	28.42
03/21	34.25	20.52	33.24	33.88	34.02	20.46	35.62	20.31	A	--	--	--	--	--	32.51	33.19	30.96	28.09
04/21	33.04	19.49	34.12	33.45	33.15	19.69	33.03	20.04	A	--	--	--	--	--	32.51	33.19	30.96	28.09
05/21	31.04	17.57	30.62	32.11	31.24	17.69	31.86	18.54	A	--	--	--	--	--	31.93	32.85	30.30	27.59
06/21	31.29	17.49	32.46	31.61	30.82	16.86	31.61	17.79	A	--	--	--	--	--	32.26	32.94	30.63	27.59
07/21	30.33	16.20	30.59	32.19	31.37	16.36	30.78	16.23	A	--	--	--	--	--	31.93	32.77	30.30	27.59
08/21	29.96	16.15	30.37	31.78	30.99	16.19	31.11	16.13	A	--	--	--	--	--	32.26	32.94	30.71	31.84
09/21	29.46	15.57	32.21	31.36	28.57	15.03	29.36	16.04	A	--	--	--	--	--	32.26	33.10	30.55	27.84
10/21	29.21	14.90	29.96	32.78	27.82	13.71	28.78	14.88	A	--	--	--	--	--	32.41	33.02	30.38	27.59
11/21	32.29	15.82	32.62	31.70	30.32	14.53	32.28	16.04	A	--	--	--	--	--	32.43	33.10	30.38	27.50
12/21	29.71	14.74	32.12	33.61	32.99	14.86	29.45	15.79	A	--	--	--	--	--	32.59	33.10	30.38	27.50
01/22	29.79	14.90	32.29	33.78	33.15	15.03	29.61	15.88	A	--	--	--	--	--	32.43	33.10	30.88	28.00
02/22	30.71	15.74	32.54	33.45	32.82	15.69	34.03	15.63	A	--	--	--	--	--	32.43	33.02	30.80	27.92
03/22	31.99	16.03	32.59	33.28	32.80	16.04	35.06	15.94	A	--	--	--	--	--	32.51	33.02	30.71	27.84
04/22	33.29	17.24	33.87	33.20	32.49	16.44	33.53	17.88	A	--	--	--	--	--	32.34	32.94	30.80	27.84
05/22	33.29	17.24	33.87	33.11	32.57	16.28	33.36	17.71	A	--	--	--	--	--	32.34	32.94	30.80	27.75
06/22	29.87	15.40	30.12	33.28	30.74	15.53	31.78	15.38	A	--	--	--	--	--	32.26	32.85	30.63	27.50
07/22	29.46	15.07	29.37	31.20	29.99	15.11	30.11	15.04	A	--	--	--	--	--	--	--	--	--
08/22	28.52	14.02	28.67	30.12	29.10	14.17	28.94	14.03	A	--	--	--	--	--	32.34	32.85	30.55	27.50
09/22	28.62	14.40	29.37	33.61	27.65	13.78	28.53	15.04	A	--	--	--	--	--	32.59	32.44	29.88	27.00
10/22	27.46	13.14	28.79	32.53	30.90	12.86	27.70	12.71	A	--	--	--	--	--	32.51	32.77	30.05	27.09
11/22	28.71	13.24	30.12	32.45	31.90	13.03	27.61	12.96	A	--	--	--	--	--	32.43	32.94	30.13	27.17
12/22	29.62	13.82	31.46	32.28	32.49	12.11	28.45	13.29	A	--	--	--	--	--	32.01	32.44	30.88	28.59
01/23	31.21	14.57	31.79	32.36	32.90	12.11	30.78	14.29	A	--	--	--	--	--	32.26	32.44	29.63	30.92
02/23	31.62	14.57	31.62	33.11	32.99	14.69	33.45	14.88	A	--	--	--	--	--	32.43	32.44	30.88	28.00
03/23	30.79	14.82	30.54	31.95	31.90	14.44	32.61	14.38	A	--	--	--	--	--	32.34	32.44	30.71	27.67
04/23	31.89	15.34	32.16	33.01	32.30	15.37	33.26	15.46	A	--	--	--	--	--	31.26	--	30.71	27.92
05/23	30.54	14.99	30.21	32.70	32.40	14.69	32.70	14.63	A	--	--	--	--	--	32.51	--	30.63	28.84

Notes:

1. MSL: Mean Sea Level
2. TOC: Top of Casing
3. TOC elev determined from a survey in August 2010
4. Pond Gauge TOC elev updated March 2018.
5. "--": Measurement Not Taken
6. "A": Well Abandoned



- NOTES:**
1. SURVEY WITHIN THE SURVEY DELINEATION LINE IS COMPOSED OF SURVEY PERFORMED 9/14/2017, 9/18/2017, 9/19/2017, 3/5/2018, 4/30/2019, 4/20/2020, 3/13/2021, 3/21/2022 BY AXIS GEOSPATIAL.
 2. SURVEY CONTOURS OUTSIDE OF SURVEY DELINEATION LINE WERE OBTAINED FROM WORCESTER COUNTY GIS DEPARTMENT. DATE OF SURVEY IS UNKNOWN.
 3. SURVEY CONTOURS OBTAINED FROM WORCESTER COUNTY WERE ROTATED 7.82 DEGREES (CLOCKWISE) AND PLACED IN THE ASSUMED DATUM DEPICTED BY THE GRID ON THIS SHEET.
 4. REFERENCE ELEVATION WELL SURVEY WAS PERFORMED IN AUGUST 2010 AND DECEMBER 2014.
 5. POND GAUGE REFERENCE ELEVATION RESURVEYED IN MARCH 2018 TO ACCOUNT FOR SETTLING.
 6. GROUNDWATER ELEVATIONS OBTAINED BY EA DURING WORCESTER COUNTY MARCH 2022 GAUGING EVENT.
 7. GROUNDWATER CONTOURS ARE SHOWN AT A 0.2 FT INTERVAL.
 8. THE PIEZOMETERS WERE ABANDONED IN SPRING 2018 DUE TO CELL 5 CONSTRUCTION.

REVISIONS		DESCRIPTION
NO.	DATE	
DESIGNED BY:	AJB	
DRAWN BY:	CY/HSS	
CHECKED BY:	PL	
PROJECT MANAGER:	GAT	

PROFESSIONAL CERTIFICATION I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. [blank] EXPIRATION DATE: [blank]

**SEMI-ANNUAL SAMPLING EVENT
CENTRAL LANDFILL FACILITY**
WORCESTER COUNTY, MARYLAND

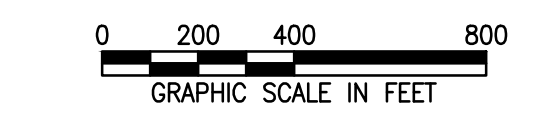
GROUNDWATER AND SURFACE WATER MONITORING LOCATIONS

EA Engineering, Science, and Technology, Inc., PBC
Hunt Valley Center
225 Schilling Circle
Hunt Valley, Maryland 21031
(410) 584-7000

DATE: JUNE 2022
PROJECT NUMBER: 10609.48
Figure 2-1
SHEET: 2 OF 2

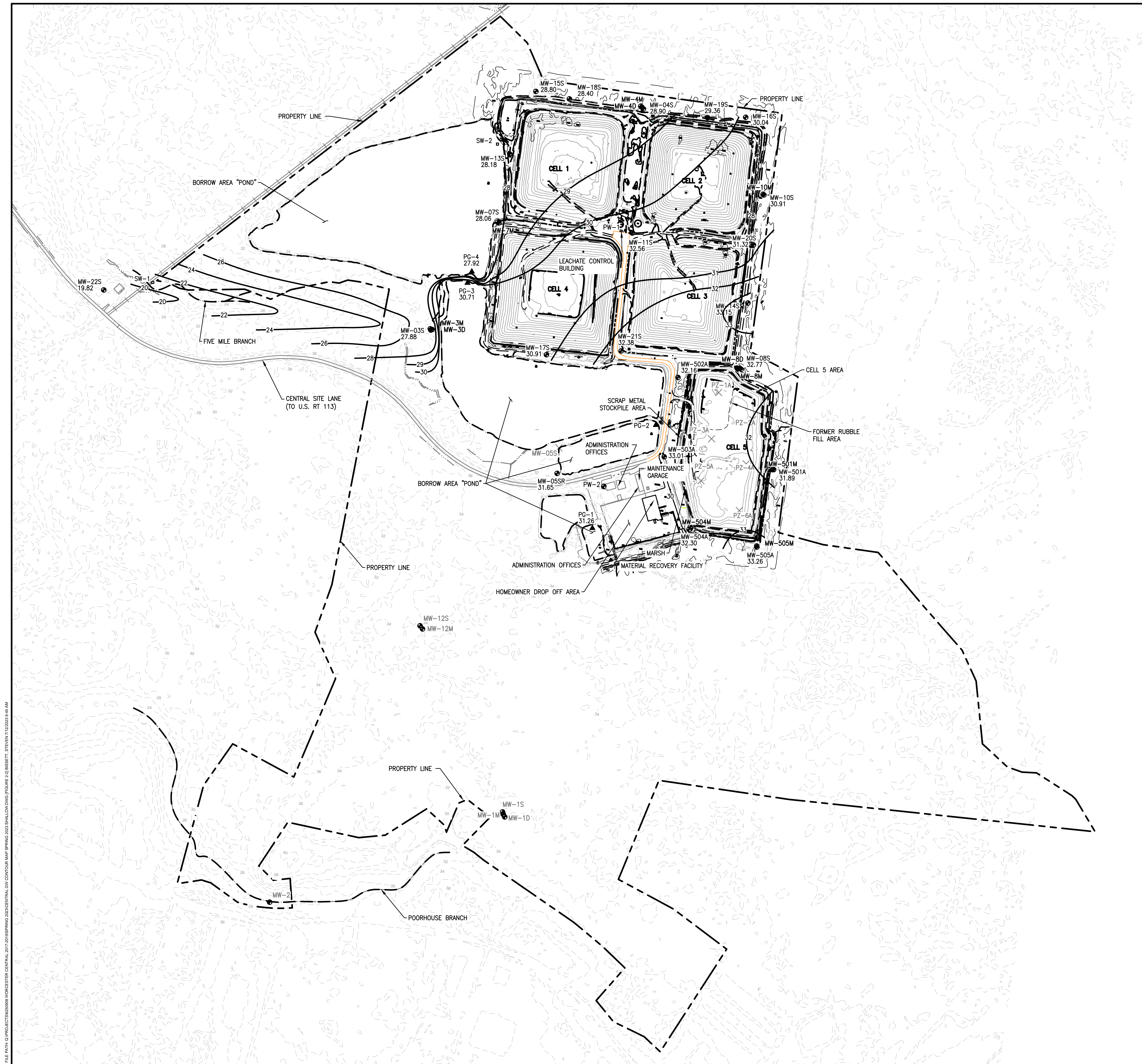
LEGEND

● M-BS 30.82	EXISTING MONITORING WELL (S-SHALLOW/M-MEDIUM/D-DEEP) GROUNDWATER ELEVATION (IN FEET)
⊙ M-1S	EXISTING MONITORING WELL (S-SHALLOW/M-MEDIUM/D-DEEP) (NOT IN GROUNDWATER MONITORING PLAN)
⊙ PW-1	EXISTING POTABLE WATER WELL
⊙ SW-1	EXISTING SURFACE WATER MONITORING LOCATION
✕ PZ-5A	ABANDONED PIEZOMETER
▲ PG-1	EXISTING POND GAUGE
✕ M-5S	ABANDONED MONITORING WELL
— 30	EXISTING CONTOUR
— 30	GROUNDWATER CONTOUR
— 30	PROJECTED GROUNDWATER CONTOUR
---	PROPERTY LINE
---	EXISTING SURFACE WATER FEATURES
---	EXISTING RUBBLE FILL AREA
---	EXISTING SCRAP METAL STOCKPILE AREA
---	PROPOSED CELL 5 AREA



FILE PATH: G:\PROJECTS\10609.48 - WORCESTER\CENTRAL\3025 - CENTRAL - GROUP FIGURES\FIGURE 2-1 - CENTRAL SITE MAP - 20220623.DWG, DATE: 2022.06.23 3:58 PM

NOT FOR CONSTRUCTION



- NOTES:**
1. SURVEY WITHIN THE SURVEY DELINEATION LINE IS COMPOSED OF SURVEY PERFORMED 9/14/2017, 9/18/2017, 9/19/2017, 3/5/2018, 4/30/2019, 4/20/2020, 3/13/2021, 3/21/2022, AND 12/2022 BY AXIS GEOSPATIAL.
 2. SURVEY CONTOURS OUTSIDE OF SURVEY DELINEATION LINE WERE OBTAINED FROM WORCESTER COUNTY GIS DEPARTMENT. DATE OF SURVEY IS UNKNOWN.
 3. SURVEY CONTOURS OBTAINED FROM WORCESTER COUNTY WERE ROTATED 7.82 DEGREES (CLOCKWISE) AND PLACED IN THE ASSUMED DATUM DEPICTED BY THE GRID ON THIS SHEET.
 4. REFERENCE ELEVATION WELL SURVEY WAS PERFORMED IN AUGUST 2010 AND DECEMBER 2014.
 5. POND GAUGE REFERENCE ELEVATION RESURVEYED IN MARCH 2018 TO ACCOUNT FOR SETTLING.
 6. GROUNDWATER ELEVATIONS OBTAINED BY EA DURING WORCESTER COUNTY APRIL 2023 GAUGING EVENT.
 7. GROUNDWATER CONTOURS ARE SHOWN AT A 1 FT INTERVAL IN THE EASTERN PORTION OF THE SITE AND AT A 2 FT INTERVAL IN THE WESTERN PORTION OF THE SITE.
 8. THE PIEZOMETERS WERE ABANDONED IN SPRING 2018 DUE TO CELL 5 CONSTRUCTION.
 9. THE ELEVATION FOR PG-2 IS NOT AVAILABLE SO THERE ARE NOT ANY CONTOURS IN THE AREA

LEGEND

● M-8S 30.82	EXISTING MONITORING WELL (S=SHALLOW/M=MEDIUM/D=DEEP) GROUNDWATER ELEVATION (IN FEET)
○ M-1S	EXISTING MONITORING WELL (S=SHALLOW/M=MEDIUM/D=DEEP) (NOT IN GROUNDWATER MONITORING PLAN)
○ PW-1	EXISTING POTABLE WATER WELL
○ SW-1	EXISTING SURFACE WATER MONITORING LOCATION
× PZ-5A	ABANDONED PIEZOMETER
▲ PG-1 XX	EXISTING POND GAUGE
× M-5S	ABANDONED MONITORING WELL
— 30	EXISTING CONTOUR
—	GROUNDWATER CONTOUR
—	PROJECTED GROUNDWATER CONTOUR
—	PROPERTY LINE
—	EXISTING SURFACE WATER FEATURES
—	EXISTING RUBBLE FILL AREA
—	EXISTING SCRAP METAL STOCKPILE AREA
—	PROPOSED CELL 5 AREA



REVISIONS	DESCRIPTION								
NO.	DATE	BY							
DESIGN INFORMATION									
DESIGNED BY:	A.J.B.	DRAWN BY:	J.N.S.	CHECKED BY:	P.L.	PROJECT MANAGER:	G.A.T.		
PROFESSIONAL CERTIFICATION I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. [blank] EXPIRATION DATE: [blank]									
SEMI-ANNUAL SAMPLING EVENT CENTRAL LANDFILL FACILITY WORCESTER COUNTY, MARYLAND									
GROUNDWATER CONTOUR MAP APRIL 2023 GAUGING EVENT SHALLOW AQUIFER									
 EA Engineering, Science, and Technology, Inc., PBC Hunt Valley Center 225 Schilling Circle Hunt Valley, Maryland 21031 (410) 584-7000									
DATE: JUNE 2023 PROJECT NUMBER: 10609.48 Figure 2-2 SHEET: 1 OF 2									

FILE PATH: G:\PROJECTS\2023\WORCESTER CENTRAL 2017 GAUGING\2023\CENTRAL_OG_CONTOUR_MAP_01.MXD; PROJECT: 10609.48; DRAWN: J.N.S.; CHECKED: P.L.; PROJECT MANAGER: G.A.T.

NOT FOR CONSTRUCTION

