Gavin Residual Waste Landfill

Gavin Power, LLC

2020 Annual Groundwater Monitoring and Corrective Action Report

Gavin Power Plant
Cheshire, Ohio

31 January 2021

Project No.: 0545239

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31 January 2021

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2020 Annual Groundwater Monitoring and Corrective Action Report

Gavin Power Plant
Cheshire, Ohio

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CONTENTS

List of Tables

List of Figures

Acronyms and Abbreviations

Name	Description
ASD	Alternate Source Demonstration
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
ERM	ERM Consulting and Engineering, Inc.
Gavin	Gavin Power, LLC
Plant	General James M. Gavin Power Plant
RWL	Residual Waste Landfill
SSI	Statistically significant increase

EXECUTIVE SUMMARY

On behalf of Gavin Power, LLC (Gavin), ERM Consulting and Engineering, Inc. (ERM) has prepared this *2020 Annual Groundwater Monitoring and Corrective Action Report* summarizing groundwater sampling activities at the Residual Waste Landfill (RWL) at the General James M. Gavin Power Plant (Plant) located in Cheshire, Ohio. The RWL is one of three regulated coal combustion residual (CCR) management units at the Plant that are subject to regulation under Title 40, Code of Federal Regulations, Part 257, Subpart D (40 CFR § 257.50 *et seq.*), also known as the CCR Rule. A review of the CCR monitoring well network is documented in the *Groundwater Monitoring Network Evaluation* for the RWL (Geosyntec 2016).

This report documents the status of the groundwater monitoring program for the RWL, which includes the following as required by 40 CFR § 257.90(e):

- A summary of key actions completed;
- A description of problems encountered and actions taken to resolve the problems; and
- Identification of key activities for the coming year.

The RWL CCR unit groundwater monitoring program began calendar year 2020 in “detection monitoring” program status as defined by 40 CFR § 257.94 and remains in detection monitoring at the end of the 2020 reporting period. Groundwater monitoring in 2020 consisted of two semi-annual monitoring events completed in March and September 2020, which included groundwater level measurements and subsequent groundwater sampling. Groundwater level measurements were used to construct updated groundwater potentiometric surface maps for each of the geologic units monitored.

Groundwater samples were collected for laboratory analysis of CCR Rule Appendix III constituents and the results were compared to previously calculated upgradient well prediction limits to identify statistically significant increases (SSIs) for downgradient wells. The following locations and analytes had observed SSIs in 2020:

Well	Date Sampled	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids (TDS)
2016-20	Mar-2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	X
2016-21	Mar-2020	*	*	*	*	*	*	*
	Sep-2020	*	*	*	*	*	*	*
93108	Mar-2020	*	*	*	*	*	*	*
	Sep-2020	*	*	*	*	*	*	*
94136	Mar-2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2020	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ

Notes: ϕ = No SSI; X = SSI; SSI = statistically significant increase

** Insufficient sample volume to perform analysis.*

The identified SSI for TDS was addressed in the attached *Gavin Residual Waste Landfill Second Semiannual Sampling Event of 2020 Alternate Source Demonstration (ASD) Report* (Appendix A). The ASD report identifies impact from regional brine as the source of the SSI for TDS; therefore, the RWL remains in detection monitoring at the conclusion of 2020. Accordingly, no remedial actions were selected, initiated, or performed in 2020.

1. INTRODUCTION

The General James M. Gavin Power Plant (Plant) is a coal-fired generating station located in Gallia County in Cheshire, Ohio, along the Ohio River. The Plant consists of three regulated coal combustion residual management units that are subject to regulation under Title 40, Code of Federal Regulations, Part 257, Subpart D (40 CFR § 257.50 *et seq.*), also known as the CCR Rule: the Residual Waste Landfill, the Fly Ash Reservoir, and the Bottom Ash Pond. The RWL is located approximately 1.25 miles northwest of the Plant (Figure 1-1). The RWL is permitted by the Ohio Environmental Protection Agency to accept and dispose of CCR material as a Class 3 Landfill. Gavin received approval from the Ohio Environmental Protection Agency in January 2019 to construct the Phase I expansion of the RWL. This project includes a lateral expansion to the west of the existing RWL.

This report was produced by ERM Consulting and Engineering, Inc. (ERM) on behalf of Gavin Power, LLC and documents the status of the groundwater monitoring program for the RWL, including the following as required by 40 CFR § 257.90(e):

- A summary of key actions completed;
- A description of problems encountered and actions taken to resolve the problems; and
- Identification of key activities for the coming year.

Consistent with the notification requirements of the CCR Rule, this annual groundwater monitoring report will be posted to the Plant operating record no later than 31 January 2021 (40 CFR § 257.105(h)(1)). Within 30 days of placing the report in the operating record, notification will be made to the Ohio Environmental Protection Agency and the report will be placed on the Plant publicly accessible internet site (40 CFR §§ 257.106(h)(1), 257.107(h)(1)). Table 1-1 cross-references the reporting requirements under the CCR Rule with the contents of this report.

Table 1-1: Regulatory Requirement Cross-Reference Table

Regulatory Citation in 40 CFR Part 257, Subpart D	Requirement (paraphrased)	Where Addressed in this Report
§ 257.90(e)	Status of the groundwater monitoring program.	Section 2
§ 257.90(e)	Summarize key actions completed.	Section 2.3, 2.4, and 3.1
§ 257.90(e)	Describe any problems encountered and actions taken to resolve problems.	Section 2.3
§ 257.90(e)	Key activities for upcoming year.	Section 4.0
§ 257.90(e)(1)	Map, aerial image, or diagram of coal combustion residual (CCR) Unit and monitoring wells.	Figure 2-1
§ 257.90(e)(2)	Identification of new monitoring wells installed or abandoned during the preceding year and narrative description.	Section 2.4
§ 257.90(e)(3)	Summary of groundwater data, wells sampled, date sampled, and whether sampling was required under detection or assessment monitoring.	Section 2.3, 3.2, Appendix B
§ 257.90(e)(4)	Narrative discussion of any transition between monitoring programs.	Section 4.0
§ 257.93(c) (via § 257.90(e)(5))	Rate and direction of groundwater flow each time groundwater is sampled	Section 3.1
§ 257.94(e)(2) (via § 257.90(e)(5))	Any alternate source demonstration reports and related certifications.	Appendix A

2. PROGRAM STATUS § 257.90(E)

2.1 Monitoring Well Network

Hydrogeology within the RWL is characterized by a shallow zone of saturation that overlies an upper aquifer system that consists of sandstone and interbedded clay and shale units. The uppermost aquifer system, which includes the Morgantown sandstone and the Cow Run sandstone, is overlain by the Clarksburg Red Beds, which act as a confining layer.

Figure 2-1 provides the Morgantown and Cow Run monitoring well locations on the site location map. Three monitoring wells previously in the federal sampling program (94125, 94126, and 94128) were decommissioned in November 2019, after the fall sampling event, due to permitted RWL expansion activities. Installation of replacement wells 2019-02, 2019-03, and 2019-06 for 94128, 94126, and 94125, respectively, along the western boundary of the RWL occurred in January and February 2020. New monitoring wells 2019-9 and 2019-10 were also installed in November and December 2019 along the western boundary of the landfill.

2.2 Previous Groundwater Monitoring Activities

The RWL monitoring wells were sampled eight times between August 2016 and July 2017 to establish upgradient well baseline data. Prediction limits were developed using the baseline data and compared to the July 2017 downgradient well results, consistent with the CCR Rule and the *Statistical Analysis Plan* developed for Gavin (ERM 2017). This comparison resulted in the identification of statistically significant increases (SSI) for Appendix III analytes in downgradient RWL wells, which were reported in the *2017 Annual Groundwater Monitoring and Corrective Action Report* (ERM 2018a). As a result, ERM prepared an Alternate Source Demonstration (ASD) Report (ERM 2018b) to address the identified SSIs. Downgradient results from the spring and fall sampling events in 2018 and 2019 were reported in the *2018* and *2019 Annual Groundwater Monitoring and Corrective Action Reports* (ERM 2019a, ERM 2020a) and SSIs associated with the 2018 and 2019 results were addressed in additional ASD reports (ERM 2018c, ERM 2019b, ERM 2019c, and ERM 2020b). Each ASD report concluded that SSIs resulted from alternate sources, and thus the CCR unit remained in detection monitoring. Table 2-1 and Table 2-2 below summarize identified SSIs to date in 2017, 2018, and 2019.

Table 2-1: Previous SSIs for Morgantown Downgradient Wells

Well	Date sampled	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	Total Dissolved Solids
2016-21	May-2017	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ
	Apr-2018	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ
	Sep-2018	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ
	Sep-2019	ϕ	ϕ	ϕ	ϕ	X	ϕ	ϕ
93108	May-2017	ϕ	ϕ	ϕ	X	ϕ	ϕ	ϕ
	Mar-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ

Notes: ϕ = No SSI, X = SSI.

Table 2-2: Previous SSIs for Cow Run Downgradient Wells

Well	Date sampled	Boron	Calcium	Chloride	Fluoride	pH	Sulfate	TDS
2016-20	May-2017	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	May-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2018	*	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
94136	May-2017	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	May-2018	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2018	**	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Mar-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ
	Sep-2019	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ	ϕ

Notes: ϕ = No SSI, X = SSI
** Insufficient sample volume to perform analysis.*
*** Not reported by laboratory due to analytical quality control not meeting acceptance criteria.*

2.3 2020 Sampling Summary

Groundwater samples were collected in 2020 as part of the detection monitoring program under 40 CFR § 257.94 and analyzed for the constituents listed in Appendix III to 40 CFR Part 257, Subpart D. Tables 2-3 and 2-4 provide a summary of the 2020 sample dates and the well gradient designation (upgradient or downgradient of the CCR unit) for the RWL monitoring network.

Some monitoring wells could not be sampled due to insufficient water, significant depths to groundwater and/or pump malfunctions in 2020. In an effort to resolve these and other sampling challenges that resulted in the inability to collect samples in 2020, pump inspection and modification in selected wells is planned for 2021.

Table 2-3: Sampling Dates for RWL Morgantown Well Network

Sample Date	Upgradient Wells				Downgradient Wells		Alluvium
	2000	2003	9806	94139	93108	2016-21	94137
13 Mar 2020						Dry	
19 Mar 2020				X	Dry		
24 Mar 2020	X	X					
25 Mar 2020			X				X
11 Sept 2020						Dry	
17 Sept 2020			X				
21 Sept 2020		X					
22 Sept 2020	X			X	Dry	Dry	
25 Sept 2020							X

Notes: Notes: Notes: RWL = Residual Waste Landfill; NS = not sampled
Sampling of certain Morgantown wells was limited in 2020 by the following factors:
(1) Wells with sampling events marked with "dry" had an insufficient volume of water to allow collection of samples.
(2) Wells 93107 and 94122 consistently contained an insufficient volume of water for the past several years and thus were not sampled.
(3) Well 94137 is part of the certified monitoring well network (Geosyntec 2016) and was sampled in 2020, but is not discussed further in this report because it is not screened in the relevant aquifer.

Table 2-4: Sampling Dates for RWL Cow Run Well Network

Sample Date	Upgradient Wells				Downgradient Wells	Alluvium
	2002	9801	93100	94136	2016-20	9802
13 Mar 2020	NS				X	
19 Mar 2020			X			
24 Mar 2020		X				X
25 Mar 2020				X		
21 Sept 2020	NS					
22 Sept 2020		NS	X			X
23 Sept 2020					X	
25 Sept 2020				X		

Notes: Notes: RWL = Residual Waste Landfill; NS = not sampled
Sampling of certain Cow Run wells was limited in 2020 by the following factors:
(1) Well 2002 was not sampled in March or September due to limitations of the dedicated pumps.
(2) Well 9801 was not sampled in September 2020 due to a pump malfunction.
(3) Well 9802 is part of the certified monitoring well network (Geosyntec 2016) and was sampled in 2020, but is not discussed further in this report because it is not screened in the relevant aquifer.

2.4 Monitoring Well Installation

Three monitoring wells (94125, 94126, and 94128) were decommissioned as part of the permitted expansion of the RWL. Six new monitoring wells (2019-02, 2019-03, 2019-06, 2019-07, 2019-09, and 2019-10) were installed between November 2019 and February 2020 as part of the State Permit to Install (PTI) along the western border of the RWL. Gavin is evaluating the use of some or all of the wells installed west of the RWL to replace the recently decommissioned federal wells. Gavin is also evaluating the removal and addition of wells to the south and east to improve the well network (i.e. increase the ability to sample downgradient Morgantown and Cow Run wells) along the downgradient boundary of the RWL. Changes to the groundwater monitoring network will be incorporated into a revised *Monitoring Well Network Certification* in 2021.

2.5 Data Quality

ERM reviewed field and laboratory documentation to assess the validity, reliability, and usability of the analytical results. Samples collected in 2019 were analyzed by TestAmerica of North Canton, Ohio. Data quality information reviewed for these results included field sampling forms, chain-of-custody documentation, holding times, laboratory methods, cooler temperatures, laboratory method blanks, laboratory control sample recoveries, field duplicate samples, matrix spikes/matrix spike duplicates, quantitation limits, and equipment blanks. Data qualifiers were appended to results in the project database, as appropriate, based on laboratory quality measurements (e.g., control sample recoveries) and field quality measurements (e.g., agreement between normal and field duplicate samples). ERM's data quality review found the laboratory analytical results to be valid, reliable, and usable for decision-making purposes with the listed qualifiers. No analytical results were rejected.

3. 2020 RESULTS

3.1 2020 Groundwater Flow Direction and Velocity

Depth to groundwater measurements were collected in March and September 2020 at each monitoring well prior to each sampling event. Groundwater elevations, calculated by subtracting the depth to groundwater from the surveyed reference elevation for each well, were reviewed for each sampling event. Groundwater elevations, interpreted potentiometric surface maps, and interpreted groundwater flow directions for wells screened in the Morgantown Sandstone and Cow Run Sandstone are presented on Figures 3-1 through 3-4.

The principal direction of groundwater flow in the uppermost aquifer system under the RWL (both in the Morgantown Sandstone and in Cow Run Sandstone) is from the north and northwest to the south and southeast, towards the Ohio River. Groundwater velocity estimates are presented in the next sections.

3.1.1 Morgantown Sandstone Groundwater Velocity

Horizontal hydraulic gradients were calculated for the Morgantown Sandstone using groundwater elevations calculated at wells 96154R and 2016-21 for both the spring and fall sampling events. The velocity of groundwater through the Morgantown sandstone is estimated based on the measured horizontal hydraulic gradient, a hydraulic conductivity of 7.18×10^{-5} centimeters per second (Geosyntec 2012), and an estimated effective porosity value of 0.01 for fractured bedrock. For the spring sampling event, a horizontal hydraulic gradient of 0.010 was calculated, resulting in an estimated groundwater velocity of 77 feet/year. For the fall sampling event, a horizontal hydraulic gradient of 0.010 was calculated, resulting in an estimated groundwater velocity of 75 feet/year.

3.1.2 Cow Run Sandstone Groundwater Velocity

Horizontal hydraulic gradients were calculated for the Cow Run Sandstone using groundwater elevations calculated at wells 2016-09 and 9631 for both the fall and spring sampling events. The velocity of groundwater through the Cow Run sandstone is estimated based on the measured horizontal hydraulic gradient, a hydraulic conductivity of 2.92×10^{-5} centimeters per second (Geosyntec 2012), and an effective porosity value of 0.01 for fractured bedrock. For the spring sampling event, a horizontal hydraulic gradient of 0.009 was calculated, resulting in an estimated groundwater velocity of 26 feet/year. For the fall sampling event, a horizontal hydraulic gradient of 0.011 was calculated, resulting in an estimated groundwater velocity of 32 feet/year.

3.2 Comparison of Results to Prediction Limits

Consistent with the CCR Rule and with Gavin's *Statistical Analysis Plan* (ERM 2017), a prediction limit approach was used to identify potential impacts to groundwater. Upper prediction limits were developed for the Appendix III parameters; in the case of pH, a lower prediction limit was also developed. Documentation of the development of the upper prediction limits and lower prediction limit for the RWL is provided in the *2018 Alternate Source Demonstration* (ERM 2018b).

3.2.1 March 2020 Sampling Event Results

Tables 3-1 and 3-2 summarize SSIs observed in the Morgantown and Cow Run downgradient wells for the first semiannual sampling event of 2020. The field sampling event was conducted between 13 March and 25 March 2020.

Table 3-1: SSIs from March 2020 Sampling Event—Morgantown

Analyte	Monitoring Well	
	2016-21	93108
Boron	*	*
Calcium	*	*
Chloride	*	*
Fluoride	*	*
pH	*	*
Sulfate	*	*
Total Dissolved Solids	*	*

Notes: ϕ = No SSI, X = SSI
Results are for the downgradient wells sampled in March 2020.
** Insufficient sample volume due to low recharge.*

Table 3-2: SSIs from March 2020 Sampling Event—Cow Run

Analyte	Monitoring Well	
	2016-20	94136
Boron	ϕ	ϕ
Calcium	ϕ	ϕ
Chloride	ϕ	ϕ
Fluoride	ϕ	ϕ
pH	ϕ	ϕ
Sulfate	ϕ	ϕ
Total Dissolved Solids	ϕ	ϕ

Notes: ϕ = No SSI, X = SSI
Results are for the downgradient wells sampled in March 2020.

No SSIs were detected for the RWL for March 2020.

3.2.2 September 2020 Sampling Event Results

A comparison of the September 2020 sampling event results to the prediction limits identified SSIs for the following analytes in the downgradient wells, summarized in Tables 3-3 and 3-4. The field sampling event was conducted between 21 September and 25 September 2020.

Table 3-3: SSIs from September 2020 Sampling Event—Morgantown

Analyte	2016-21	93108
Boron	*	*
Calcium	*	*
Chloride	*	*
Fluoride	*	*
pH	*	*
Sulfate	*	*
Total Dissolved Solids	*	*

Notes: ϕ = No SSI, X = SSI
Results are for the downgradient wells sampled in September 2020.
** Insufficient sample volume due to low recharge.*

Table 3-4: SSIs from September 2020 Sampling Event—Cow Run

Analyte	2016-20	94136
Boron	ϕ	ϕ
Calcium	ϕ	ϕ
Chloride	ϕ	ϕ
Fluoride	ϕ	ϕ
pH	ϕ	ϕ
Sulfate	ϕ	ϕ
Total Dissolved Solids	X	ϕ

Notes: ϕ = No SSI, X = SSI
Results are for the downgradient wells sampled in September 2020.

The only SSI detected for the RWL for September 2020 was total dissolved solids (TDS) for Well 2016-20. An alternate source was identified for this SSI and is documented in the *Gavin RWL Second Semiannual Sampling Event of 2020 ASD Report*, included as Appendix A. This ASD Report identified regional brine as the source of the TDS SSI detected at Well 2016-20.

A summary of all analytical results obtained from the RWL groundwater monitoring is provided in Appendix B.

4. KEY FUTURE ACTIVITIES

The six ASD Reports prepared to date concluded that sources other than the RWL were responsible for the identified SSIs. As required by 40 CFR § 257.94(e)(2), the demonstrations were completed within 90 days of detecting the SSIs and were certified by a qualified Professional Engineer. Because it met these requirements, the RWL remains in detection monitoring at the end of the 2020 reporting period. As described in Section 2.3, pump inspection and possible pump replacement in selected wells is planned for 2021 to resolve challenges which resulted in the inability to collect samples in 2020. Gavin will reevaluate the monitoring well network for the RWL in 2021 and may add additional wells and/or modify sampling procedures in order to optimize the monitoring program. Two series of groundwater sampling events will be performed in 2021 at the RWL and the results will be compared to the prediction limits.

5. REFERENCES

ERM. 2017. *Groundwater Monitoring Plan. Bottom Ash Complex, Fly Ash Reservoir, and Residual Waste Landfill*, *Gavin Plant, Cheshire Ohio*.

ERM. 2018a. *2017 Annual Groundwater Monitoring and Corrective Action Report. Residual Waste Landfill, Gavin Plant, Cheshire Ohio,* dated 1-31-2018.

ERM. 2018b. *Gavin Residual Waste Landfill Alternate Source Demonstration Report,* dated 7-3-2018.

ERM. 2018c. *Gavin Residual Waste Landfill First Semi-Annual Sampling Event of 2018 Alternate Source Demonstration Report,* dated 10-12-2018.

ERM. 2019a. *2018 Annual Groundwater Monitoring and Corrective Action Report. Residual Waste Landfill, Gavin Plant, Cheshire Ohio,* dated 1-31-2019.

ERM. 2019b. *Gavin Residual Waste Landfill Second Semiannual Sampling Event of 2018 Alternate Source Demonstration Report,* dated 1-31-2019.

ERM. 2019c. *Gavin Residual Waste Landfill First Semiannual Sampling Event of 2019 Alternate Source Demonstration Report,* dated 1-31-2019.

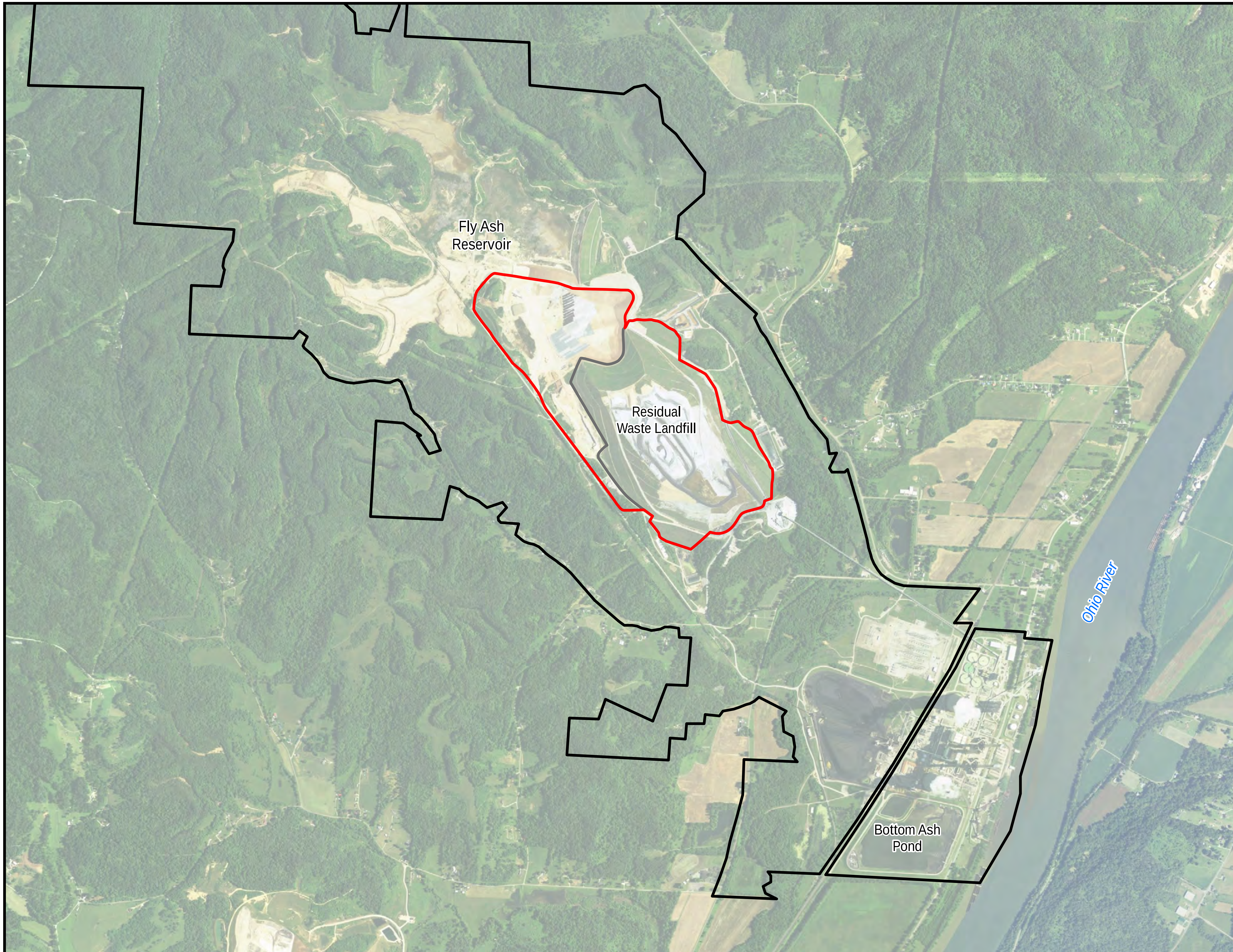
ERM. 2020a. *2019 Annual Groundwater Monitoring and Corrective Action Report. Residual Waste Landfill, Gavin Plant, Cheshire Ohio,* dated 1-31-2020.

ERM. 2020b. *Gavin Residual Waste Landfill Second Semiannual Sampling Event of 2019 Alternate Source Demonstration Report,* dated 1-31-2020.

Geosyntec. 2012. "Final Permit-To-Install Application. Expansion of the Gavin Plant Residual Waste Landfill*." Hydrogeologic Study Report. OAC 3745-30-05(C)(4).*

Geosyntec. 2016. *Groundwater Monitoring Network Evaluation, Gavin Site—Residual Waste Landfill, Cheshire, Ohio*.

FIGURES



Legend

- Permitted Limit of Waste
- Previous Limit of Waste
- Gavin Property Boundary

NOTE:
1. Limits of Waste from Revised Gavin RWL Permit-To-Install Application Drawing No. 12-30429-B (Geosyntec 2014)

N

0 550 1,100 2,200 3,300
Feet

Figure 1-1: Residual Waste Landfill Location
Gavin Generating Station
Cheshire, Ohio

ERM

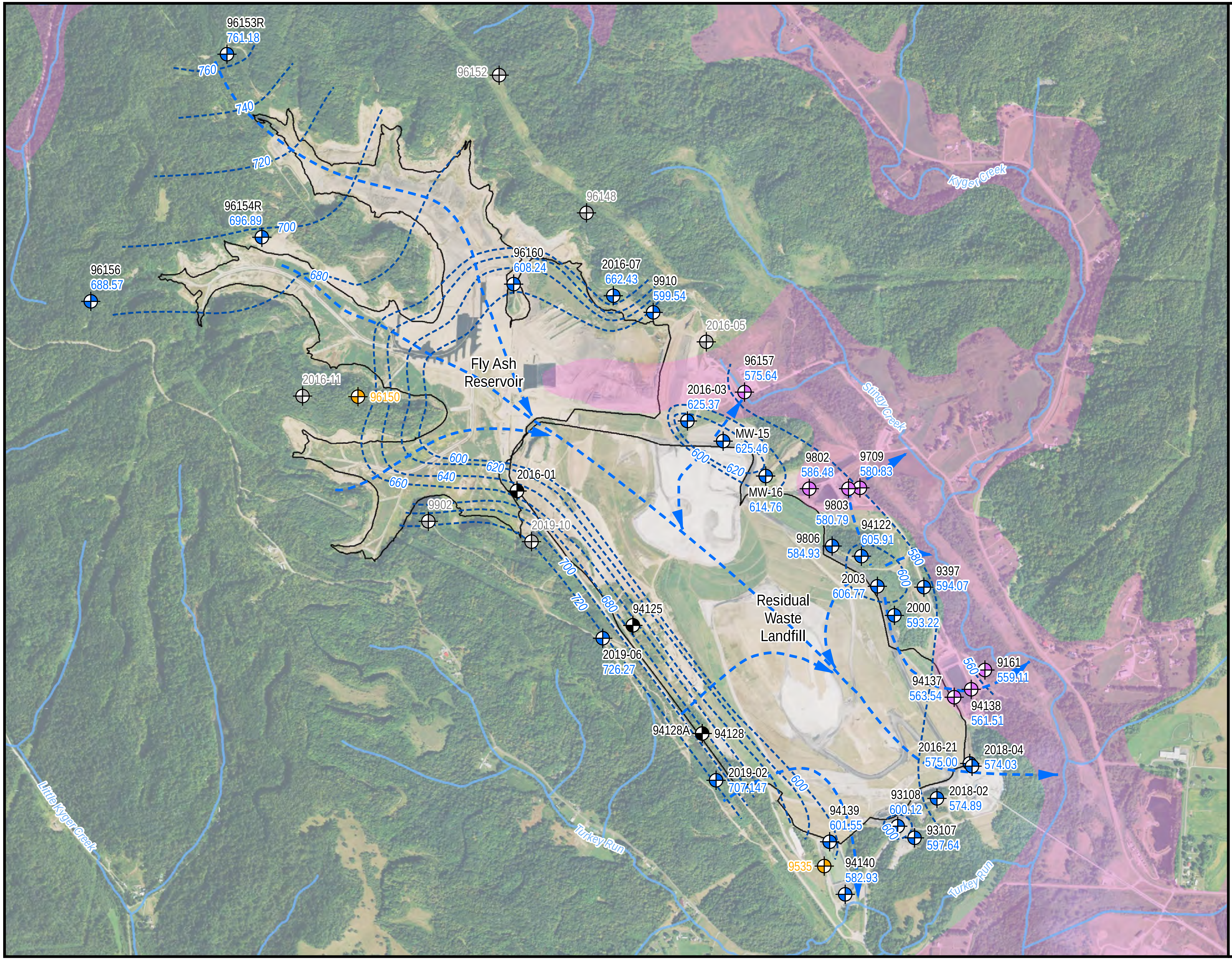
Legend

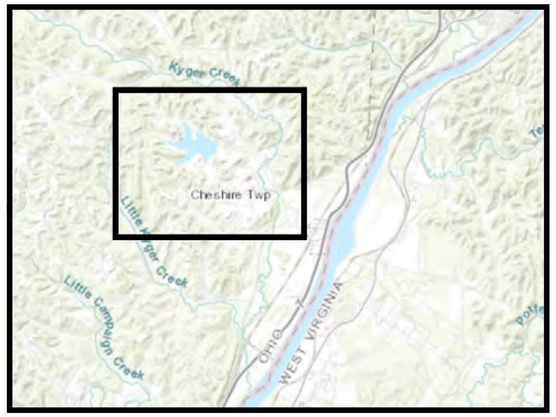
- Monitoring Well - Morgantown Sandstone (Not in Federal Program)
- Monitoring Well - Cow Run Sandstone (Not in Federal Program)
- Federal Sampling Program Monitoring Well (Morgantown Sandstone)
- Federal Sampling Program Monitoring Well (Cow Run sandstone)
- Monitoring Well (Alluvium)
- Monitoring Well Abandoned in Fall 2019
- Permitted Limit of Waste
- Previous Limit of Waste

NOTES:
1. Locations are approximate
2. Aerial Imagery: USA NAIP 2019
3. Limits of Waste from Revised Gavin RWL Permit-To-Install Application Drawing No. 12-30429-B (Geosyntec 2014)

Figure 2-1: Monitoring Well Network Map
Residual Waste Landfill
Gavin Power Plant
Cheshire, Ohio

ERM





Legend

- Morgantown Sandstone Monitoring
- Morgantown Sandstone Monitoring Well - Low Recharge or Dry
- Morgantown Sandstone Monitoring Well - Not Gauged
- Morgantown Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- Alluvium Monitoring Well
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual Unit
- Interpreted area where the Morgantown Sandstone has been eroded and is not present (based on borehole logs and topographic analysis)

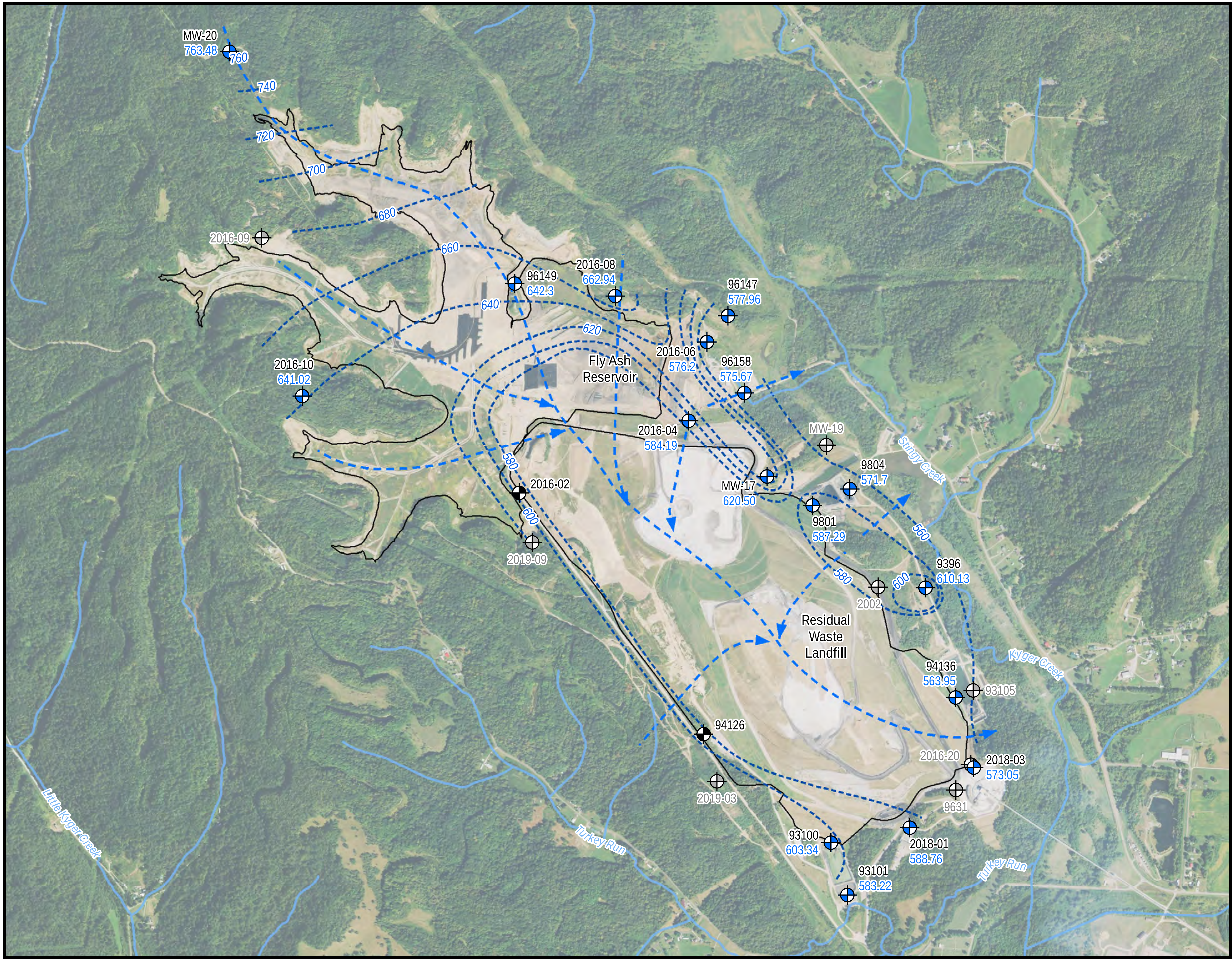
NOTES:
- Interpreted contours based on groundwater gauging conducted on 3/5/2020, 4/3/2020, and 4/28/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in March and April 2020 (historical data not shown on figure).
- Where the Morgantown SS is absent, the contours represent the potentiometric surface in the alluvial aquifer because these aquifers are hydraulically connected.
- Interpreted groundwater flow directions include potential influence from GWIs.

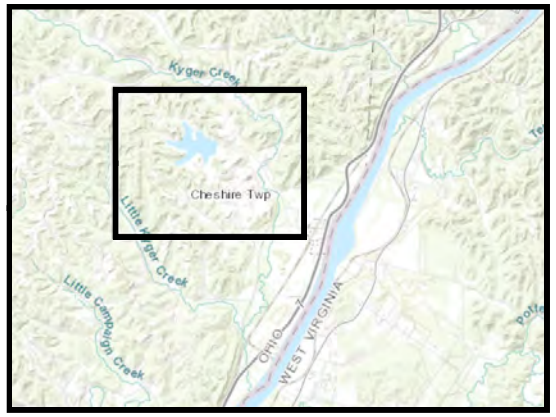
0 500 1,000 2,000
Feet

N

Figure 3-1: Morgantown Sandstone Potentiometric Surface Map
March and April 2020
Gavin Power, LLC
Cheshire, Ohio

ERM





Legend

- Cow Run Sandstone Monitoring Well
- Cow Run Sandstone Well - Dry or Low Recharge
- Cow Run Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual Unit

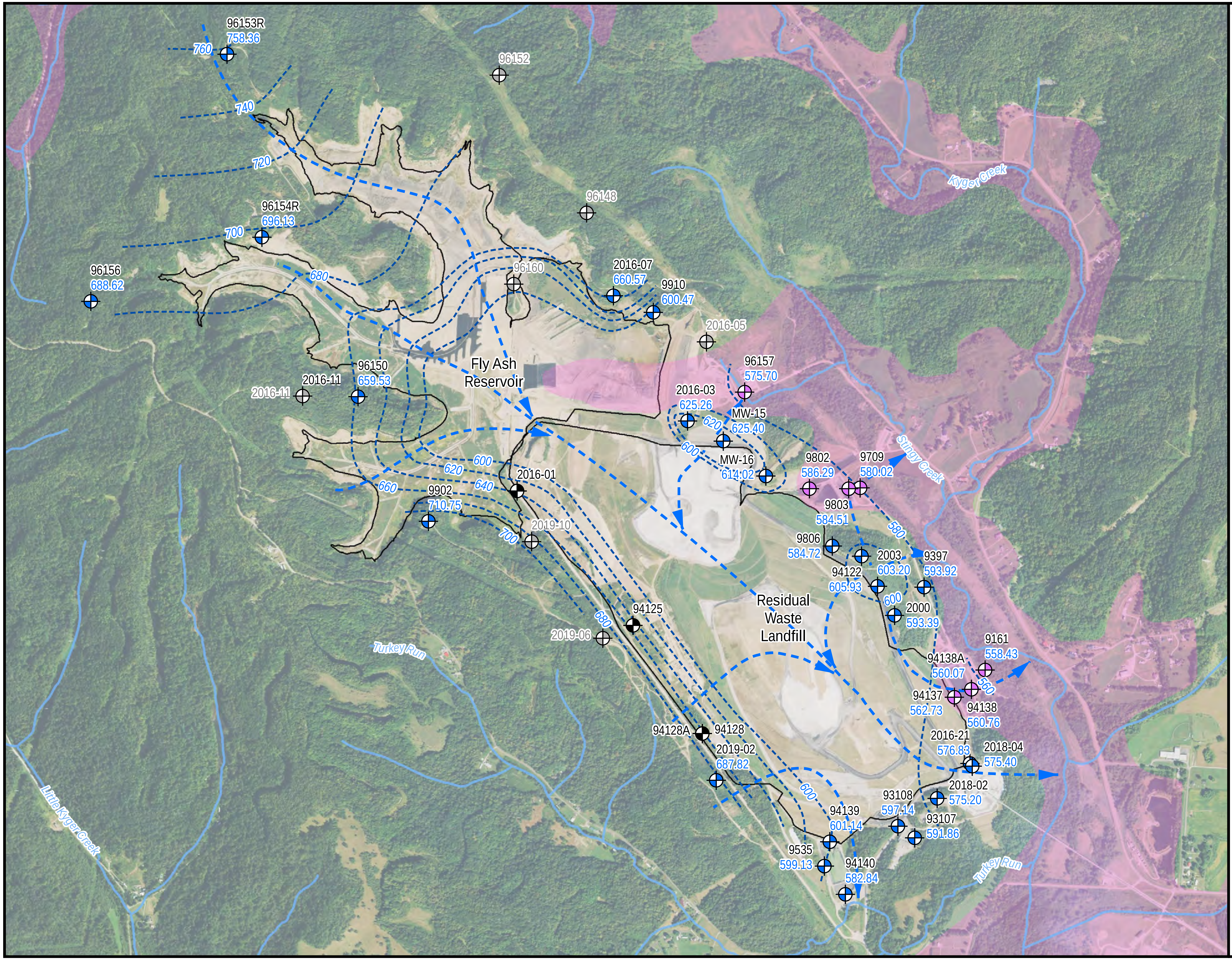
NOTES:
- Cow Run Sandstone is present through entire site.
- Interpreted contours based on groundwater gauging conducted on 3/5/2020, 4/3/2020, and 4/28/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in March and April 2020 (historical data not shown on figure).

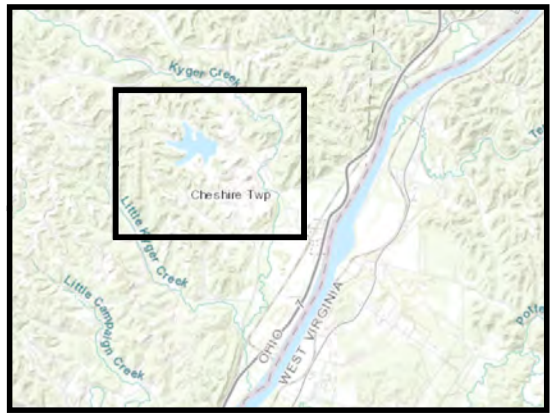
N

0 500 1,000 2,000
Feet

Figure 3-2: Cow Run Sandstone Potentiometric Surface Map March and April 2020
Gavin Power, LLC
Cheshire, Ohio

ERM





Legend

- Morgantown Sandstone Monitoring
- Morgantown Sandstone Monitoring Well - Low Recharge, Dry, or Data Anomaly
- Morgantown Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- Alluvium Monitoring Well
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual
- Interpreted area where the Morgantown Sandstone has been eroded and is not present (based on borehole logs and topographic analysis)

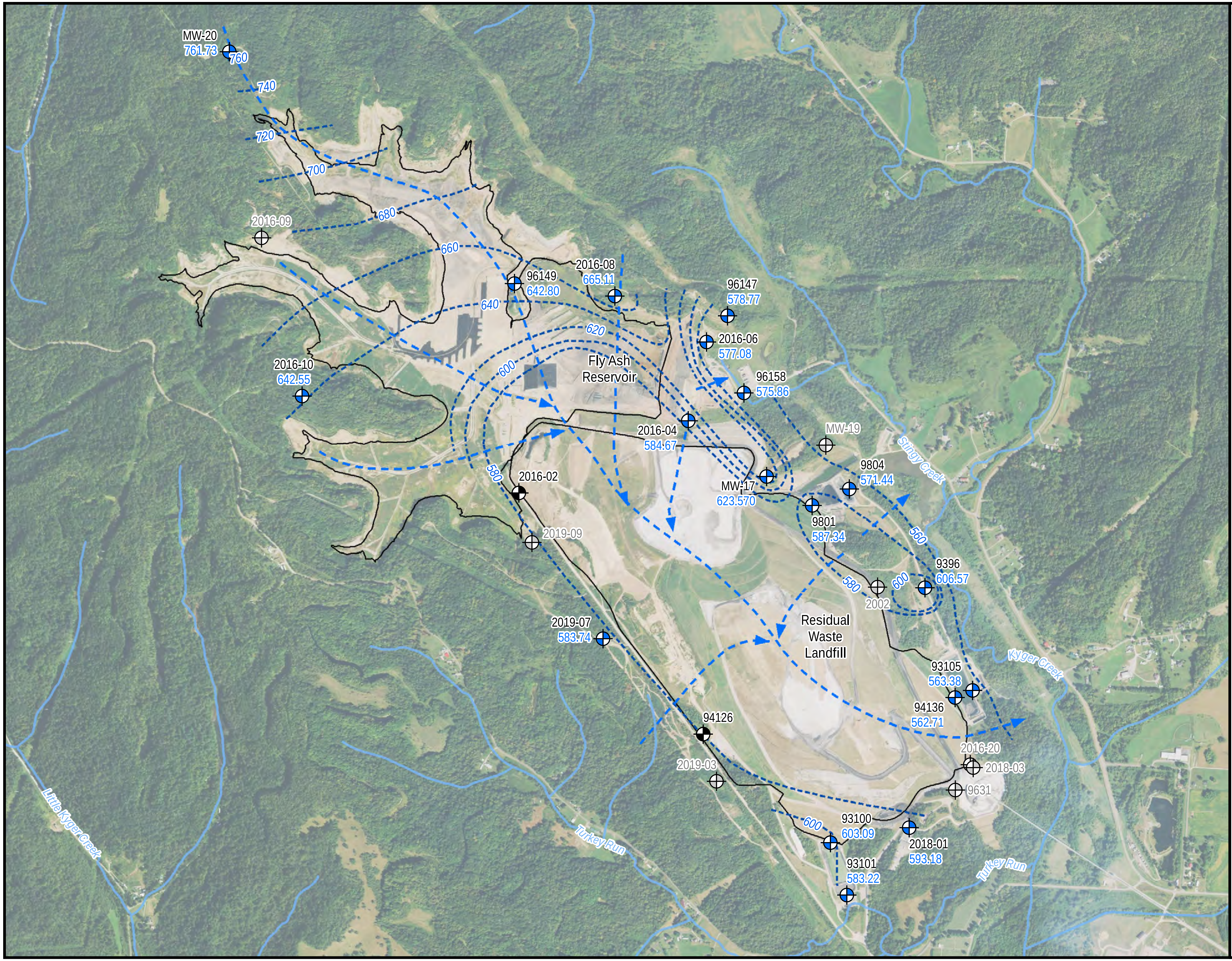
NOTES:
- Interpreted contours based on groundwater gauging conducted on 9/1/2020 and 9/2/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in September 2020 (historical data not shown on figure).
- Where the Morgantown SS is absent, the contours represent the potentiometric surface in the alluvial aquifer because these aquifers are hydraulically connected.
- Interpreted groundwater flow directions include potential influence from GWIs.

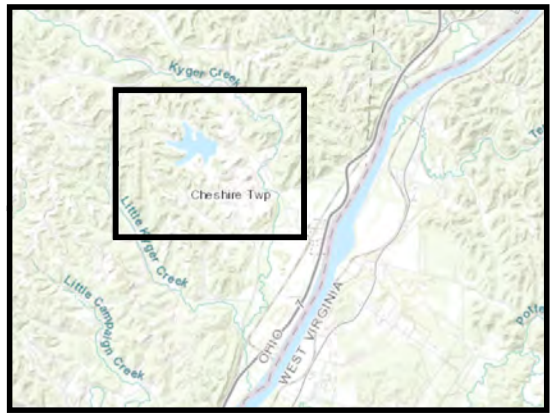
N

0 500 1,000 2,000
Feet

Figure 3-3: Morgantown Sandstone Potentiometric Surface Map
September 2020
Gavin Power, LLC
Cheshire, Ohio

ERM





Legend

- Cow Run Sandstone Monitoring Well
- Cow Run Sandstone Well - Low Recharge, Dry, or Data Anomaly
- Cow Run Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual Unit

NOTES:
- Cow Run Sandstone is present through entire site.
- Interpreted contours based on groundwater gauging conducted on 9/1/2020 and 9/2/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in September 2020 (historical data not shown on figure).

N

0 500 1,000 2,000
Feet

Figure 3-4: Cow Run Sandstone Potentiometric Surface Map
September 2020
Gavin Power, LLC
Cheshire, Ohio

ERM

APPENDIX A GAVIN RESIDUAL WASTE LANDFILL SECOND SEMIANNUAL SAMPLING EVENT OF 2020 ALTERNATE SOURCE DEMONSTRATION REPORT

Gavin Power, LLC

Gavin Residual Waste Landfill

Second Semiannual Sampling Event of 2020 Alternate Source Demonstration Report

Gavin Power Plant
Cheshire, Ohio

31 January 2021

Project No.: 0545239

The business of sustainability

ERM

Signature Page

31 January 2021

Gavin Residual Waste Landfill

Second Semiannual Sampling Event of 2020 Alternate Source Demonstration Report

Gavin Power Plant
Cheshire, Ohio

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CONTENTS

List of Tables

List of Figures

Acronyms and Abbreviations

Name	Description
ASD	Alternate Source Demonstration
CCR	Coal Combustion Residuals
CCR Unit	Coal Combustion Residual unit
CFR	Code of Federal Regulations
FAR	Fly Ash Reservoir
Gavin	Gavin Power, LLC
Plant	General James M. Gavin Power Plant
RWL	Residual Waste Landfill
SSI	Statistically significant increase

1. INTRODUCTION

1.1 Regulatory and Legal Framework

In accordance with Title 40 Code of Federal Regulations (CFR) Part 257 Subpart D—Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments (CCR Rule), Gavin Power, LLC (Gavin) has been implementing the groundwater monitoring requirements for its Residual Waste Landfill (RWL) at the General James M. Gavin Power Plant (Plant). Gavin conducted statistical analyses and calculated background levels for Appendix III constituents in accordance with 40 CFR § 257.93(h) and is performing detection monitoring in accordance with 40 CFR § 257.94. A statistically significant increase (SSI) over the background concentration was detected in a downgradient monitoring well for an Appendix III constituent for the second semiannual groundwater sampling event of 2020 and is explained in this report.

An SSI for one or more Appendix III constituents is a potential indication of a release of constituents from the CCR unit to groundwater. In the event of an SSI, the CCR Rule provides that "the owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality" (40 CFR § 257.94(e)(2)). If it can be demonstrated that the SSI is due to a source other than the CCR unit, then the CCR unit may remain in the Detection Monitoring Program instead of transitioning to an Assessment Monitoring Program. An Alternate Source Demonstration (ASD) must be made in writing and the accuracy of the information must be verified through certification by a qualified Professional Engineer (40 CFR § 257.94(e)(2)).

The United States Environmental Protection Agency guidance document, "Solid Waste Disposal Facility Criteria Technical Manual, USEPA 530-R-93-017, Subpart E" (USEPA 1993), lays out the six lines of evidence that should be addressed to determine whether an SSI resulted from a source other than the regulated disposal unit:

1. An alternative source exists.
2. Hydraulic connection exists between the alternative source and the well with the significant increase.
3. Constituent(s) (or precursor constituents) are present at the alternative source or along the flow path from the alternative source prior to possible release from the unit.
4. The relative concentration and distribution of constituents in the zone of contamination are more strongly linked to the alternative source than to the unit when the fate and transport characteristics of the constituents are considered.
5. The concentration observed in groundwater could not have resulted from the unit given the waste constituents and concentrations in the unit leachate and wastes, and site hydrogeologic conditions.
6. The data supporting conclusions regarding the alternative source are historically consistent with the hydrogeologic conditions and findings of the monitoring program.

This ASD Report addresses each of these lines of evidence for the SSI detected in groundwater beneath the RWL.

1.2 Background

The Plant is a coal-fired generating station located along the Ohio River in Gallia County in Cheshire, Ohio (Figure 1-1). The RWL is one of three CCR units at the Plant that are subject to regulation under the

CCR Rule. The RWL is located about 1.25 miles northwest of the Plant (Figure 1-2) and is permitted by the Ohio Environmental Protection Agency to accept and dispose of CCR material as a Class 3 Landfill. Approximately 98 percent of this material is Flue Gas Desulfurization by-product (consisting of scrubber cake, fly ash, and lime) and 2 percent is other approved materials (bottom ash, lime ball mill rejects, coal pulverizer rejects, and Bottom Ash Pond sediments).

A Groundwater Monitoring Network Evaluation was performed to provide an assessment of the compliance of the groundwater monitoring network with 40 CFR § 257.91. This evaluation identified an uppermost aquifer composed of sandstone and interbedded clay shale units – specifically the Morgantown Sandstone and Cow Run Sandstone – and indicated groundwater flows to the south and east (Geosyntec 2016). Consistent with the CCR Rule and the Groundwater Monitoring Plan developed for Gavin (ERM 2017), a prediction limit approach was used to identify potential impacts to groundwater. Upper prediction limits and lower prediction limits were established based on the upgradient groundwater data. The 2017 Annual Groundwater Monitoring and Corrective Action Report (ERM 2018a) identified SSIs in the downgradient monitoring wells for the period from August 2016 to August 2017. Additionally, the following reports were previously prepared and posted to identify an alternate source for the following:

- SSIs associated with the August 2016 to August 2017 period were addressed in the *Gavin RWL ASD Report* (ERM 2018b).
- SSIs associated with the May 2018 sampling event were addressed in the *Gavin RWL First Semiannual Sampling Event of 2018 ASD Report* (ERM 2018c).
- SSIs associated with the September 2018 sampling event were addressed in the *Gavin RWL Second Semiannual Sampling Event of 2018 ASD Report* (ERM 2019a).
- SSIs associated with the March 2019 sampling event were addressed in the *Gavin RWL First Semiannual Sampling Event of 2019 Report* (ERM 2019b).
- SSIs associated with the September 2019 sampling event were addressed in the *Gavin RWL Second Semiannual Sampling Event of 2019 ASD Report* (ERM 2020).
- There were no SSIs associated with the March 2020 sampling event.

Tables 1-1 and 1-2 summarize the groundwater statistical results from the downgradient Morgantown and Cow Run monitoring wells, respectively, that were sampled or attempted to be sampled in September 2020 (Figure 1-2).

Table 1-1: SSIs in Morgantown Downgradient Monitoring Wells

Analyte	2016-21	93108
Boron	*	*
Calcium	*	*
Chloride	*	*
Fluoride	*	*
pH	*	*
Sulfate	*	*
Total Dissolved Solids	*	*

Notes: ϕ = No SSI, X = SSI
** Insufficient sample volume due to low recharge.*

Table 1-2: SSIs in Cow Run Downgradient Monitoring Wells

Analyte	2016-20	94136
Boron	ϕ	ϕ
Calcium	ϕ	ϕ
Chloride	ϕ	ϕ
Fluoride	ϕ	ϕ
pH	ϕ	ϕ
Sulfate	ϕ	ϕ
Total Dissolved Solids	X	ϕ

Notes: ϕ = No SSI, X = SSI
** Insufficient sample volume due to low recharge.*

Based on the comparisons shown in Tables 1-1 and 1-2, the only SSI detected for the RWL in the fall of 2020 was at well 2016-20 for Total Dissolved Solids (TDS). This ASD Report identifies regional brine as the source of the TDS SSI detected at Well 2016-20. Supporting information and discussion of each of the lines of evidence discussed in Section 1.1 are presented in subsequent sections of this report.

2. HYDROGEOLOGIC INTERPRETATION

A detailed interpretation of hydrogeologic conditions is presented in the Gavin RWL ASD Report (ERM 2018b). Key conclusions from this analysis include the following:

- A region of lower hydraulic head (i.e. pressure) compared to the surrounding areas exists within the portion of the aquifer under the southeastern portion of the Fly Ash Reservoir (FAR) and extends southeastward under the RWL, as depicted on Figure 2-1 for the Morgantown Sandstone and Figure 2-2 for the Cow Run Sandstone. This area of lower hydraulic pressure is located under portions of the FAR and RWL that have received CCR materials that act to reduce infiltration due to their lower permeability, and where an engineered geosynthetic liner system has been installed beneath the RWL and a geosynthetic capping system has been installed at the FAR. The forested and pastured areas surrounding the FAR and RWL are more permeable and exhibit higher infiltration than the FAR and RWL. Groundwater flows from areas of higher pressure surrounding the FAR and RWL to areas of lower pressure below the FAR and RWL.
- On the western side of the RWL, groundwater flows from west to east toward the groundwater trough and then turns to the southeast and flows toward the Ohio River.
- Along the northeastern boundary of the RWL is a potentiometric ridge that divides groundwater flow. Water northeast of this ridge flows to the northeast and water southwest of this ridge flows to the southwest to the area of lower hydraulic pressure, and then turns to the southeast and flows toward the Ohio River.

3. DESCRIPTION OF THE ALTERNATE SOURCE

The regional bedrock geology near the Plant includes Pennsylvanian-age sedimentary rocks from the Monongahela and Conemaugh Groups. These sedimentary rocks consist primarily of shale and siltstone, with minor amounts of mudstone, sandstone, and incidental amounts of limestone and coal (USGS 2005). Overlying the Pennsylvanian-age rocks are Quaternary-age alluvium that consists primarily of sand, silt, clay, and gravel (OEPA 2018). These sedimentary rocks form the ridges and valleys west of the Ohio River and the unconsolidated sands, silts, clays, and gravels are located along the Ohio River. The consolidated sedimentary rocks and the unconsolidated alluvium (sand, silt, clay, and gravel) form the two major aquifers near the Plant (Figure 3-1). The interaction of groundwater with rocks and minerals within these aquifers can influence the concentration of Appendix III constituents (ORSANCO 1984).

Naturally-occurring brine, which is known to be rich in various metals, anions, and other trace elements, has naturally elevated total dissolved solids (TDS), and exists in the subsurface and at the land surface in the Ohio River Valley (ORSANCO 1984; ODNR 1995). The Cow Run Sandstone, where well 2016-20 is screened, is the shallowest sedimentary rock formation that contains a brine of marine origin (Stout et al. 1932). The presence of brine in the region indicates the potential for brine to be the alternate source for TDS observed in the Cow Run Sandstone.

4. HYDRAULIC CONNECTIONS TO THE ALTERNATE SOURCE

As depicted on Figure 3-1, regional groundwater flow near and surrounding the RWL occurs primarily within fractured sedimentary rocks of the Conemaugh Group, which contain the Morgantown and the Cow Run Sandstones (Wyrick and Borchers 1981; USGS 2016). These sedimentary rock groups extend west of the RWL where naturally occurring brine could contribute TDS to groundwater. Figure 4-1 illustrates the pathway for regional groundwater flows through the fractured bedrock from the northern and western regions under the RWL, to the southern and eastern regions toward the Ohio River. While migrating through the fractured bedrock, groundwater has the potential to interact with naturally occurring brine containing elevated TDS concentrations. Based on these considerations, the fractured rock of the Conemaugh Group, which includes the Cow Run Sandstone, is hydraulically connected to the potential alternate source of TDS.

5. PRESENCE OF CONSTITUENTS FROM THE ALTERNATE SOURCE

To account for natural sources of TDS on a regional scale, brine data were obtained from the National Energy Technology Laboratory's (NETL) NATCARB database (NETL 2015). Figure 5-1 presents the concentration of TDS in brine and illustrates how elevated TDS concentrations are present throughout the region surrounding the Plant. As discussed in Section 3.1, brine is commonly found at relatively shallow depths or at the land surface in the Ohio River Valley. The fractured bedrock aquifers of the Monongahela and Conemaugh Group could act as the flow pathways where brine could mix with groundwater (Figure 4-1).

The Cow Run is the shallowest sedimentary member that carries naturally occurring brine in the region of the Plant (Stout et. al. 1932). The brines consist of high concentrations of dissolved salts, which consequently result in elevated concentrations of TDS. Figure 5-2 presents the difference between the Morgantown and Cow Run Sandstone TDS for well couplets in the FAR and RWL where data from both intervals was available. At the majority of the locations, the TDS concentrations are greater in the deeper brine-impacted Cow Run formation (green circles) compared to the shallower Morgantown formation.

These combined lines of evidence demonstrate that elevated concentrations of TDS are present at the alternate source (brine) and along the flow path underneath the RWL.

6. RELATIONSHIP OF THE ALTERNATE SOURCE TO DOWNGRADIENT WELLS

As described in Sections 4 and 5, regional concentrations of TDS in brine within the Conemaugh Group (which contains the Cow Run Sandstone) are higher than in well 2016-20. This demonstrates that naturally occurring brine could be an alternate source. The brine consists of high concentrations of dissolved salts, which consequently results in elevated TDS concentrations. The Cow Run Sandstone is laterally extensive throughout southeast Ohio where regional brine is known to exist. Figure 4-1 demonstrates the mechanism for groundwater in the Cow Run Sandstone to contact brine, then flow under the RWL, and eventually discharge to the Ohio River.

In Figure 6-1, the relative concentrations of calcium, chloride, and sulfate are presented for regional brine collected within 50 miles of the Plant (NETL 2015). Brine has a signature defined by a very low relative concentration of sulfate and is generally dominated by chloride, with relative sulfate concentrations not exceeding 5% and relative chloride concentrations no lower than 75%. The initial samples from well 2016-20 were obtained in August 2016, and a relative sulfate concentration of 39% was detected. The relative concentration of sulfate has dropped with each subsequent sampling event and samples collected in 2020 plot in the same area as brine. Thus, these observations are consistent with groundwater at monitoring well 2016-20 being increasingly influenced by brine over the period from 2016 to 2020.

The geochemical fingerprints of RWL leachate, groundwater from the RWL, and regional brine were evaluated using a piper diagram. The piper diagram is a graphical procedure commonly used to interpret and differentiate between sources of dissolved constituents in water and evaluate the potential for mixing of waters from different sources (Piper 1944). The primary observations and conclusions based on the RWL piper diagram (Figure 6-2) are the following:

- Landfill leachate plots in the upper portion of the upper diamond of the piper diagram and is characterized by elevated concentrations of calcium, chloride and sulfate, and low alkalinity.
- Regional brine is characterized by elevated sodium/potassium and chloride and plots on the right side of the upper diamond. The anion signature is dominated by chloride and regional brine consistently plots in the bottom-right corner of the lower-right anion triangle.
- RWL groundwater at Cow Run monitoring wells 2002, 93100, 94136, and 9801 plots on the right side of the upper diamond. It is distinct from leachate due to higher concentrations of alkalinity and sodium, and very low concentrations of sulfate.
- Well 2016-20 was only sampled for the complete suite of piper constituents once, in March 2020, and plots at the far right side of the upper diamond, similar to regional brine and other RWL groundwater locations. Its cation and anion signatures are dominated by sodium and chloride, respectively. Well 2016-20 has a similar signature to regional brine and is distinct from leachate. Thus, impact from regional brine is supported as the source of the SSI for TDS.

7. RWL RELEASE POTENTIAL

If the RWL experienced a release and leachate mixed with groundwater, the concentrations in the resulting mixture would depend on the volume and initial concentration of the release. In order for a release of leachate to result in the TDS concentration found at well 2016-20, the TDS concentration in leachate would need to be higher than the value observed in groundwater from well 2016-20. At the RWL, the opposite conditions exist; the detected concentration of TDS at well 2016-20 is higher than the concentrations typical of leachate. In contrast, the TDS concentrations observed in regional brine are higher than the concentration detected at well 2016-20 (Table 7-1).

Table 7-1: Comparison of Leachate, Brine, and Groundwater for TDS

Analyte	Pond 1 Leachate (2016-2020)	Pond 2 Leachate (2016-2020)	Pond 3 Leachate (2016-2020)	Regional Brine*	Well 2016-20 (2016-March 2020)	Well 2016-20 (September 2020)
TDS (mean)	9,200	16,000	7,600	178,000	6,900	110,000**

Notes: units are mg/L = milligrams per liter
**Locations within 50 miles of plant considered*
***September 2020 value is from one sample, not an average*

Additionally, the fact that the RWL is located above the Morgantown Sandstone, where TDS concentrations are consistently lower than in the underlying Cow Run (Figure 5-1), further demonstrates that RWL leachate is unlikely to be the source of the TDS observed at well 2016-20.

Historical measurements of boron and TDS for well 2016-20 and leachate from ponds 2 and 3, which are upgradient of well 2016-20, are shown in Figure 7-1. TDS concentrations at well 2016-20 have increased since sampling began in 2016. In the same time period, TDS in the leachate has remained stable with the exception of an anomalous measurement in the Pond 2 Leachate in November 2019.

Boron is a constituent in CCR and is a known indicator for leachate impacted groundwater. If the RWL leachate was the source for the increase in TDS, a corresponding increase in boron in groundwater would be expected. This trend is not observed in the data – while TDS increased sharply in the September 2020 sampling event, boron concentrations at well 2016-20 have remained stable. Concentrations of boron of 6-12 mg/L have been observed in leachate since 2016; well 2016-20 has consistently had a boron concentration below the UPL of 0.653 mg/L.

The relative concentrations of TDS and boron further indicate that a release from RWL leachate is not supported as the source of increased TDS. Historically, the TDS:boron ratio in leachate has been approximately 1000, has remained stable, and is an order of magnitude lower than at well 2016-20. The ratio of TDS:boron at well 2016-20 has been above 10,000 and has been increasing, consistent with the increasing influence of impacts from regional brine over time, as shown on Figure 6-1 and described in Section 6.

8. ALTERNATE SOURCE CONSISTENCY WITH HYDROGEOLOGIC CONDITIONS

This ASD report provides background groundwater quality for the fractured sedimentary bedrock aquifers found within and beyond the boundary of the RWL. The patterns of regional groundwater flow through fractured rock near the RWL were established after the last deglaciation, which occurred approximately 14,000 years ago (Hansen 2017). A conservatively high effective porosity of 1 percent results in an estimated groundwater velocity for the Morgantown Sandstone and Cow Run Sandstone of 75 feet per year and 32 feet per year based on groundwater gauging in the fall of 2020 (ERM, 2021), respectively, which would allow ample time for groundwater to migrate from upgradient regional sources onto Plant property since the end of the last glaciation. The data supporting these conclusions are historically consistent with hydrogeologic conditions and findings of the monitoring program.

9. CONCLUSIONS

The Total Dissolved Solids concentration associated with the sample collected from monitoring well 2016-20 in September 2020 was determined to be an SSI over the background concentration. The data were reviewed for quality assurance, statistically analyzed, and reported to Gavin on 25 November 2020. In response to the SSI, this ASD report was prepared within the required 90-day period in accordance with 40 CFR § 257.94(e)(2). The SSI was determined to result from an alternate source: regional brine. Table 9-1 summarizes the six lines of evidence of this ASD for this SSI.

Table 9-1: RWL ASD Summary

Line of Evidence	TDS
Alternate source	TDS is present in regional sources such as naturally occurring brine.
Hydraulic connection	Regional groundwater flows under the RWL
Constituent present at source or along flow path	Elevated TDS is present along the flow path
Constituent distribution more strongly linked to alternate source	TDS in Cow Run groundwater below the RWL is within the range of regional brine concentrations, and relative concentrations of individual constituents are similar in brine and well 2016-20.
Constituent could not have resulted from the RWL	The concentrations of TDS in leachate are lower than in Cow Run groundwater where the SSI was observed
Data are historically consistent with hydrogeologic conditions	Regional groundwater flows under the RWL.

In conclusion, the RWL was not the source of the TDS SSI identified in the second semiannual groundwater sampling event of 2020. The Plant will continue detection monitoring at the RWL in accordance with 40 CFR § 257.94(e)(2). The first RWL semiannual sampling event for 2021 is planned to be performed before 30 June 2021.

PROFESSIONAL ENGINEER CERTIFICATION

I hereby certify that I, or an agent under my review, have prepared this Alternate Source Demonstration Report for the Residual Waste Landfill and it meets the requirements of 40 CFR § 257.94(e)(2). To the best of my knowledge, the information contained in this report is true, complete, and accurate.

____

James A. Hemme, P.E.
State of Ohio License No.: 72851

Date: _______29 January 2021________

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FIGURES

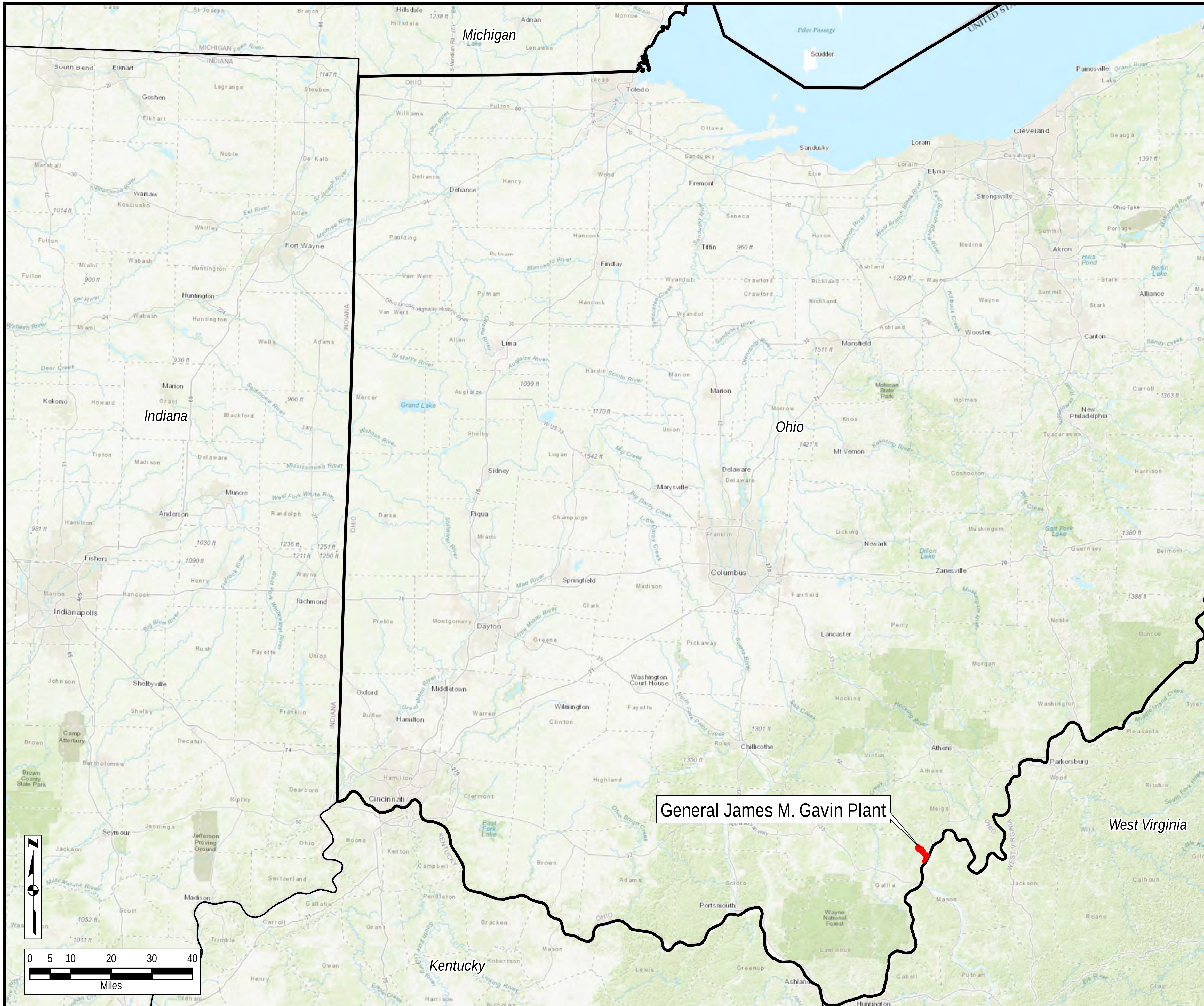

Figure 1-1: Gavin Plant Location
Gavin Generating Station
Cheshire, Ohio

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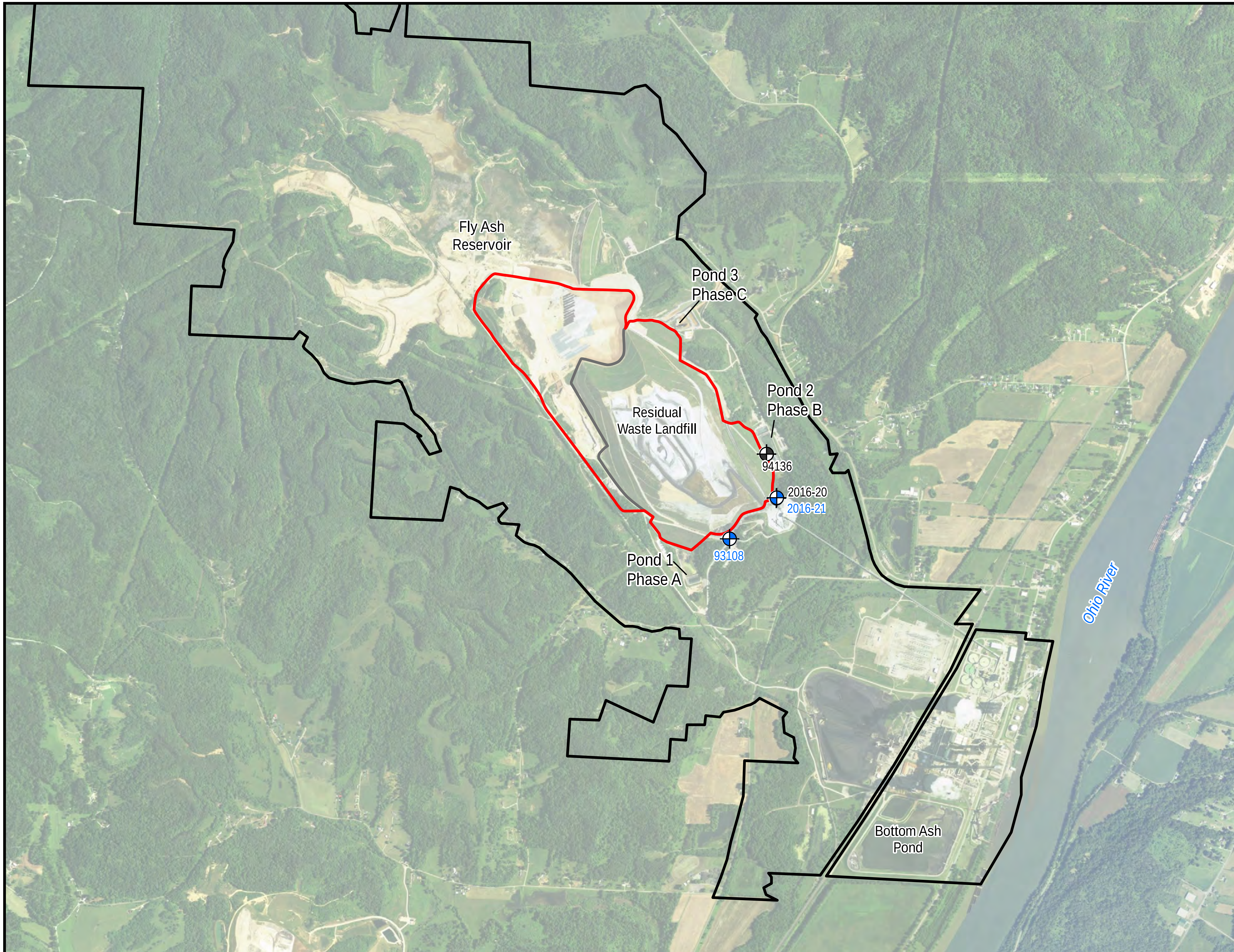
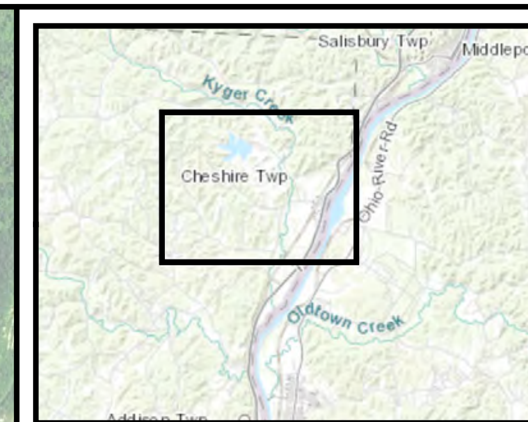




Legend

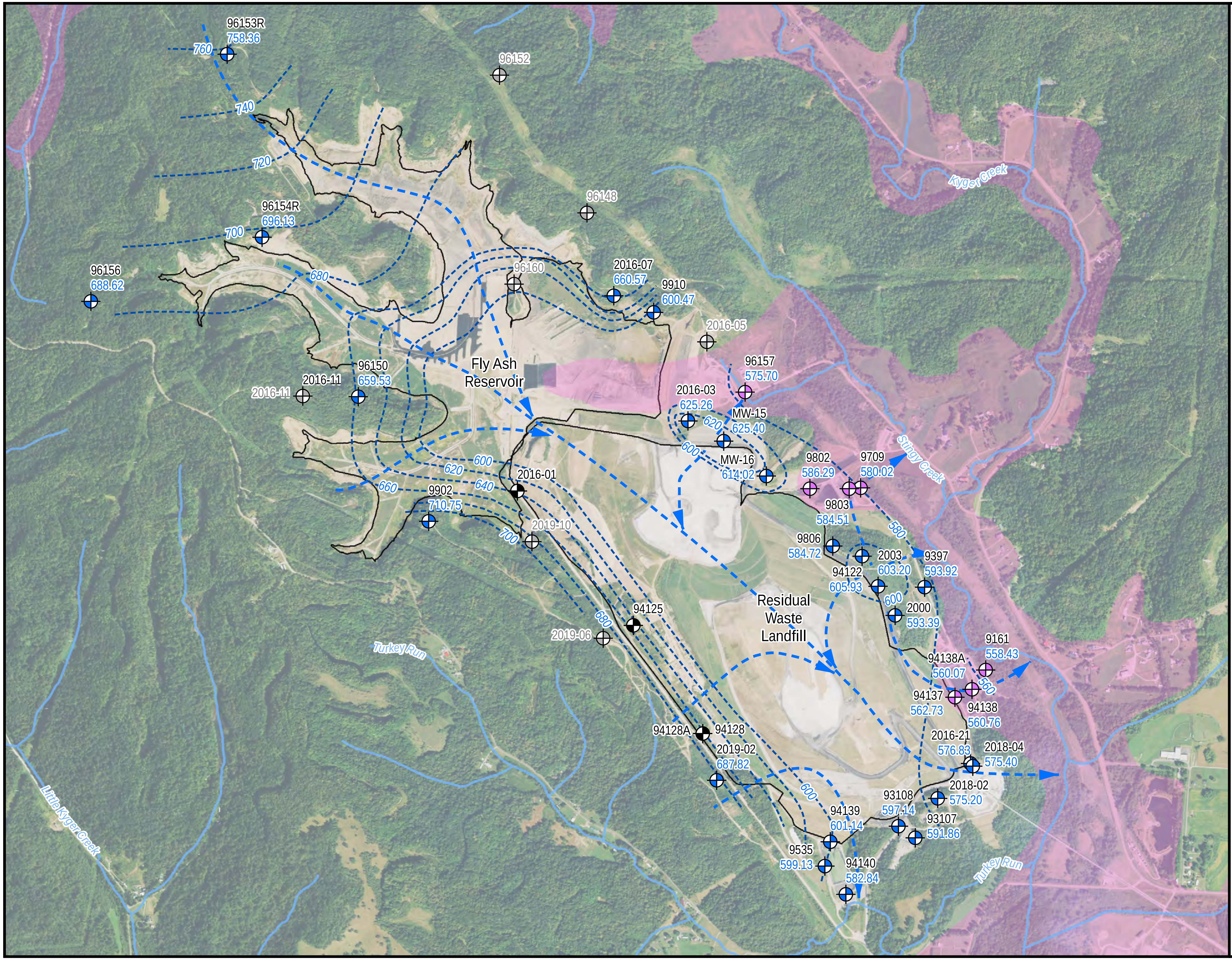
- Morgantown Downgradient Monitoring Well
- Cow Run Downgradient Monitoring Well
- Permitted Limit of Waste
- Previous Limit of Waste
- Gavin Property Boundary

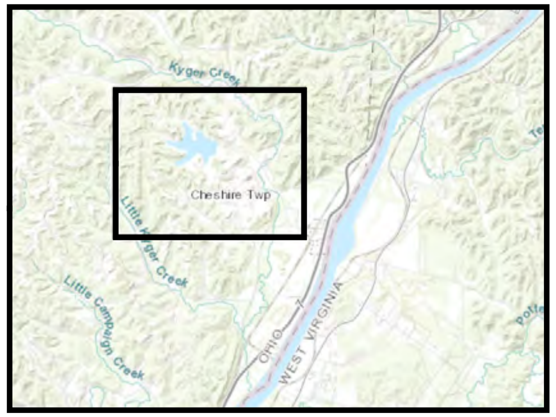
NOTE:
1. Limits of Waste from Revised Gavin RWL Permit-To-Install Application Drawing No. 12-30429-B (Geosyntec 2014)

0 500 1,000 2,000 3,000 4,000
Feet

Figure 1-2: Residual Waste Landfill
Gavin Generating Station
Cheshire, Ohio

ERM





Legend

- Morgantown Sandstone Monitoring
- Morgantown Sandstone Monitoring Well - Low Recharge, Dry, or Data Anomaly
- Morgantown Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- Alluvium Monitoring Well
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual
- Interpreted area where the Morgantown Sandstone has been eroded and is not present (based on borehole logs and topographic analysis)

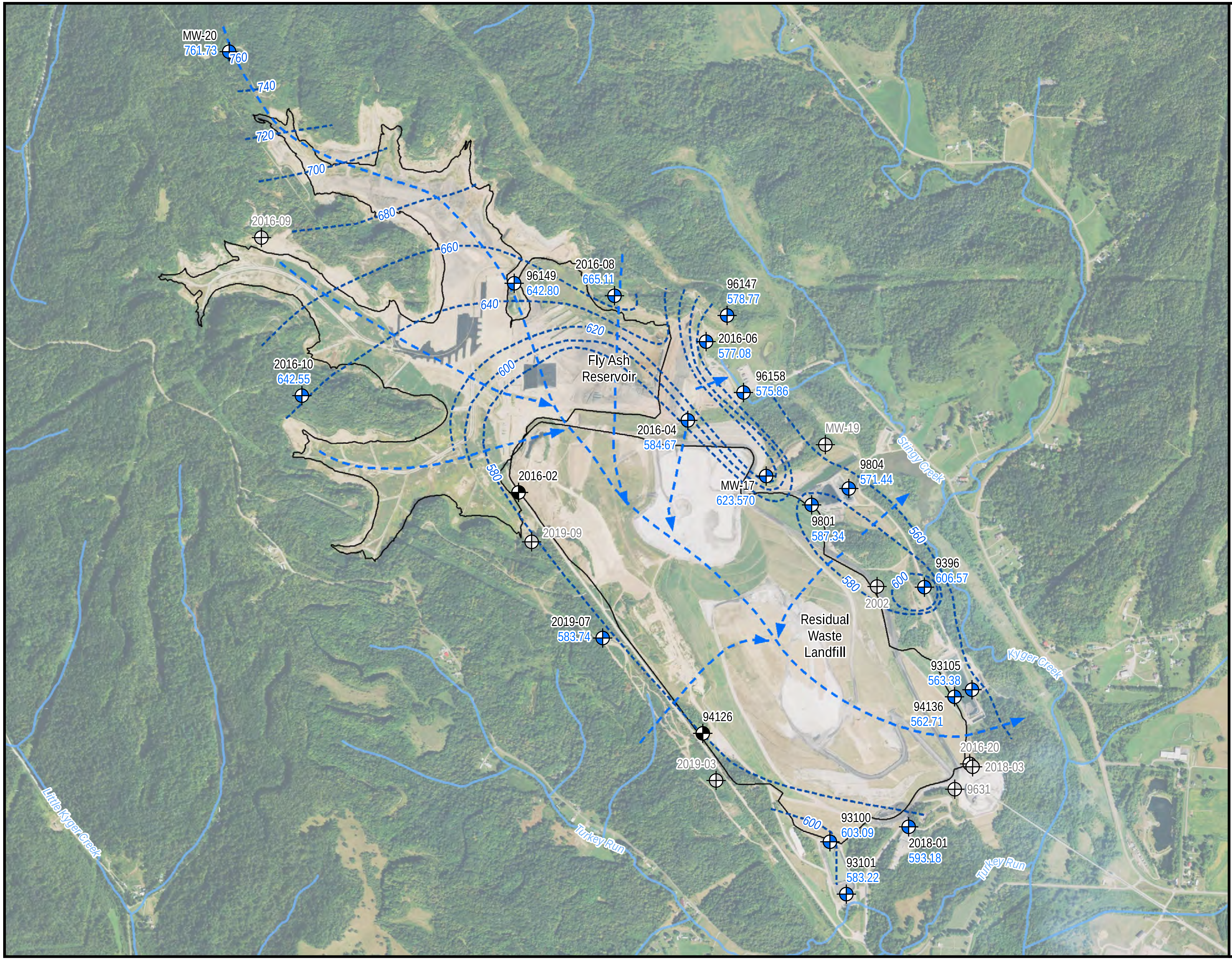
NOTES:
- Interpreted contours based on groundwater gauging conducted on 9/1/2020 and 9/2/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in September 2020 (historical data not shown on figure).
- Where the Morgantown SS is absent, the contours represent the potentiometric surface in the alluvial aquifer because these aquifers are hydraulically connected.
- Interpreted groundwater flow directions include potential influence from GWIs.

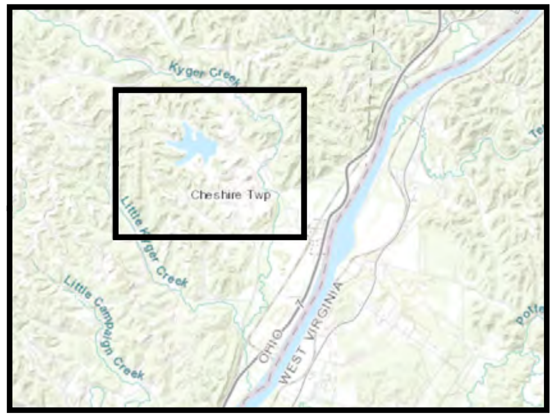
N

0 500 1,000 2,000
Feet

Figure 2-1: Morgantown Sandstone Potentiometric Surface Map September 2020
Gavin Power, LLC
Cheshire, Ohio

ERM





Legend

- Cow Run Sandstone Monitoring Well
- Cow Run Sandstone Well - Low Recharge, Dry, or Data Anomaly
- Cow Run Sandstone Monitoring Well - Abandoned Fall 2019/Spring 2020
- 605.82 Groundwater Elevation (ft)
- Interpreted Groundwater Potentiometric Contour
- Interpreted Generalized Groundwater Flow Direction
- Stream/Creek
- Coal Combustion Residual Unit

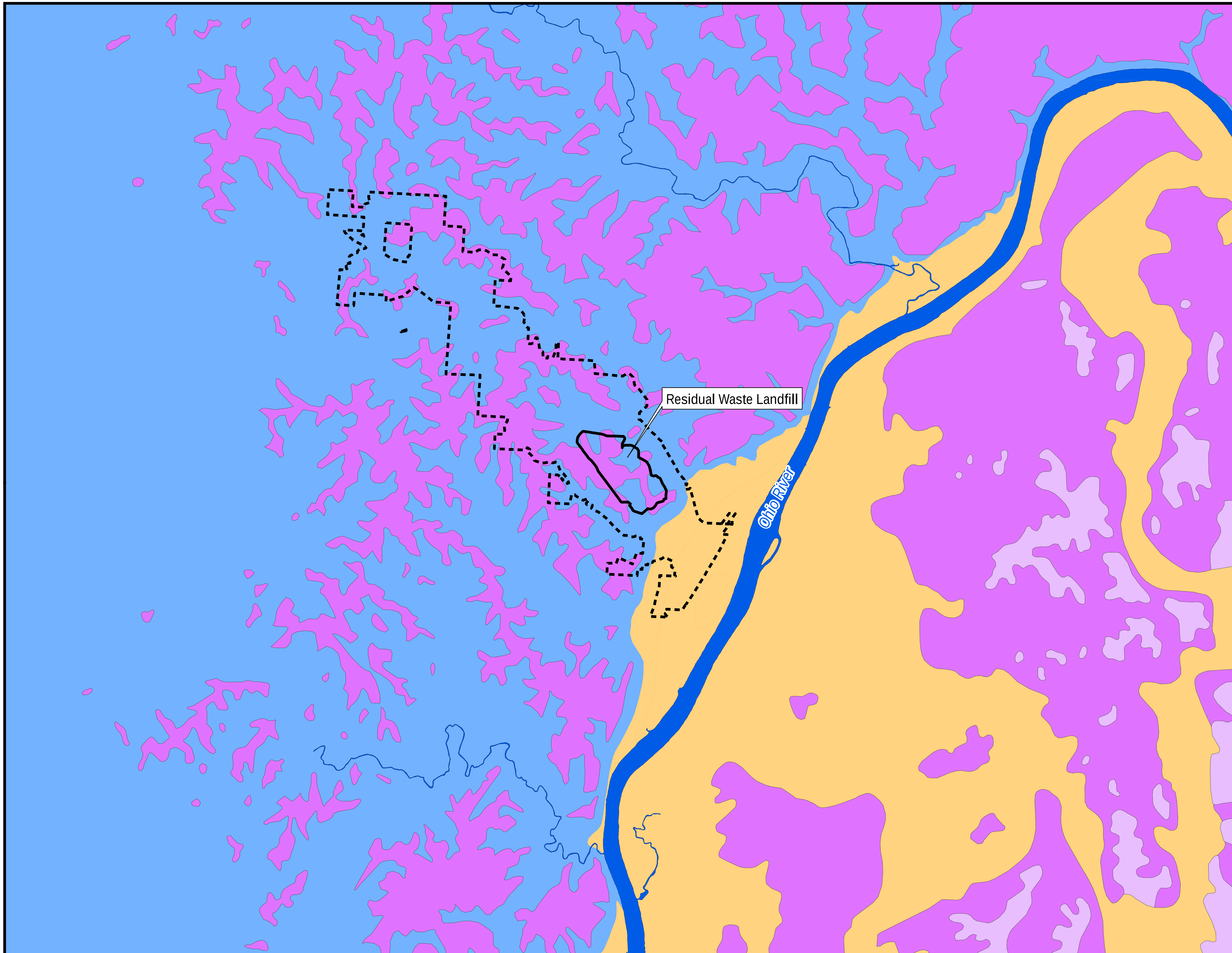
NOTES:
- Cow Run Sandstone is present through entire site.
- Interpreted contours based on groundwater gauging conducted on 9/1/2020 and 9/2/2020.
- Some groundwater elevation contours were interpreted using historical groundwater elevation trends in monitoring wells that were not gauged in September 2020 (historical data not shown on figure).

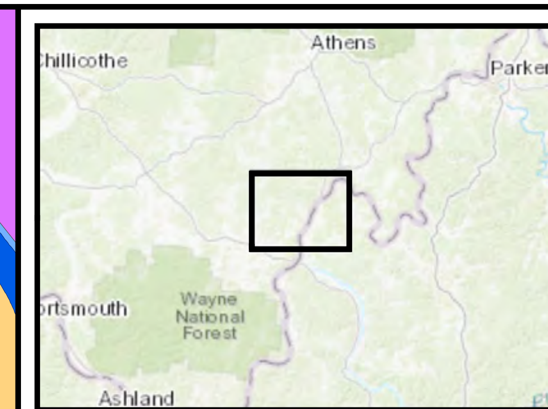
N

0 500 1,000 2,000
Feet

Figure 2-2: Cow Run Sandstone Potentiometric Surface Map
September 2020
Gavin Power, LLC
Cheshire, Ohio

ERM





Legend

- Gavin Property Boundary
- Alluvial Aquifer

Sedimentary Aquifers

- Conemaugh Group
- Monongahela Group
- Dunkard Group

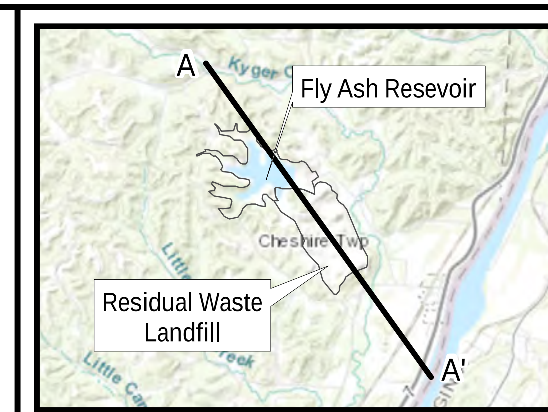
NOTES:
1. Alluvial aquifer data from Ohio EPA and Sedimentary aquifer data from USGS

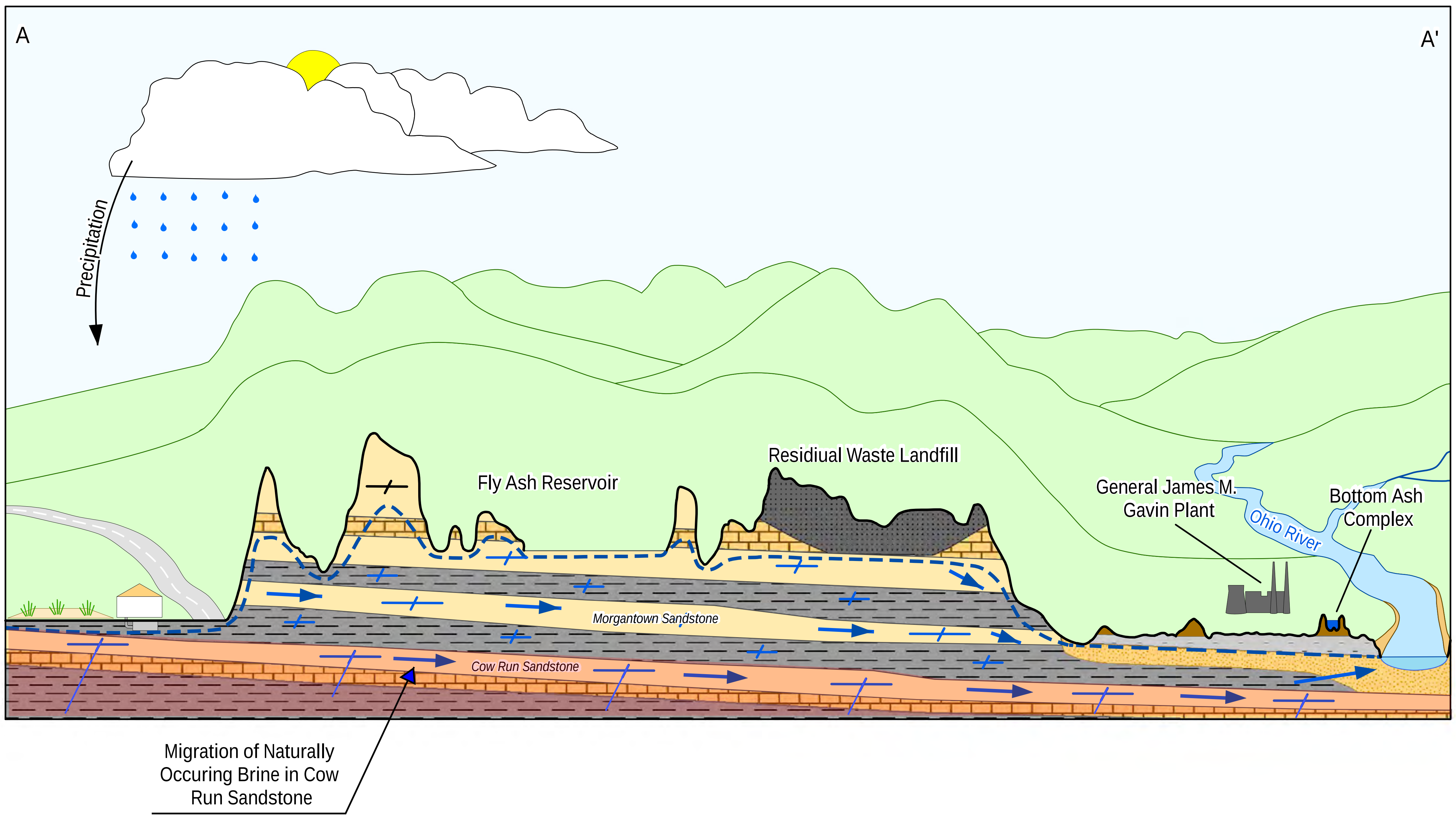
N

0 0.25 0.5 1 1.5 2
Miles

Figure 3-1: Sedimentary and Alluvial Aquifers
Gavin Generating Station
Cheshire, Ohio

ERM





Legend

- Groundwater Flow Direction
- Water Table
- Saturated Fractures
- Unsaturated Fractures
- Naturally Occuring Brine
- FGD Material
- Fill
- Interbedded Silt/Clay
- Sand
- Sandstone
- Fractured Limestone
- Fractured Shale

NOTES:
1. Sandstone bedrock units represent the Conemaugh Group and Monongahela Group Sedimentary Aquifers

0 500 1,000 2,000 3,000 4,000 5,000
Feet

Figure 4-1: Regional Groundwater Flow Patterns

Gavin Generating Station
Cheshire, Ohio

ERM

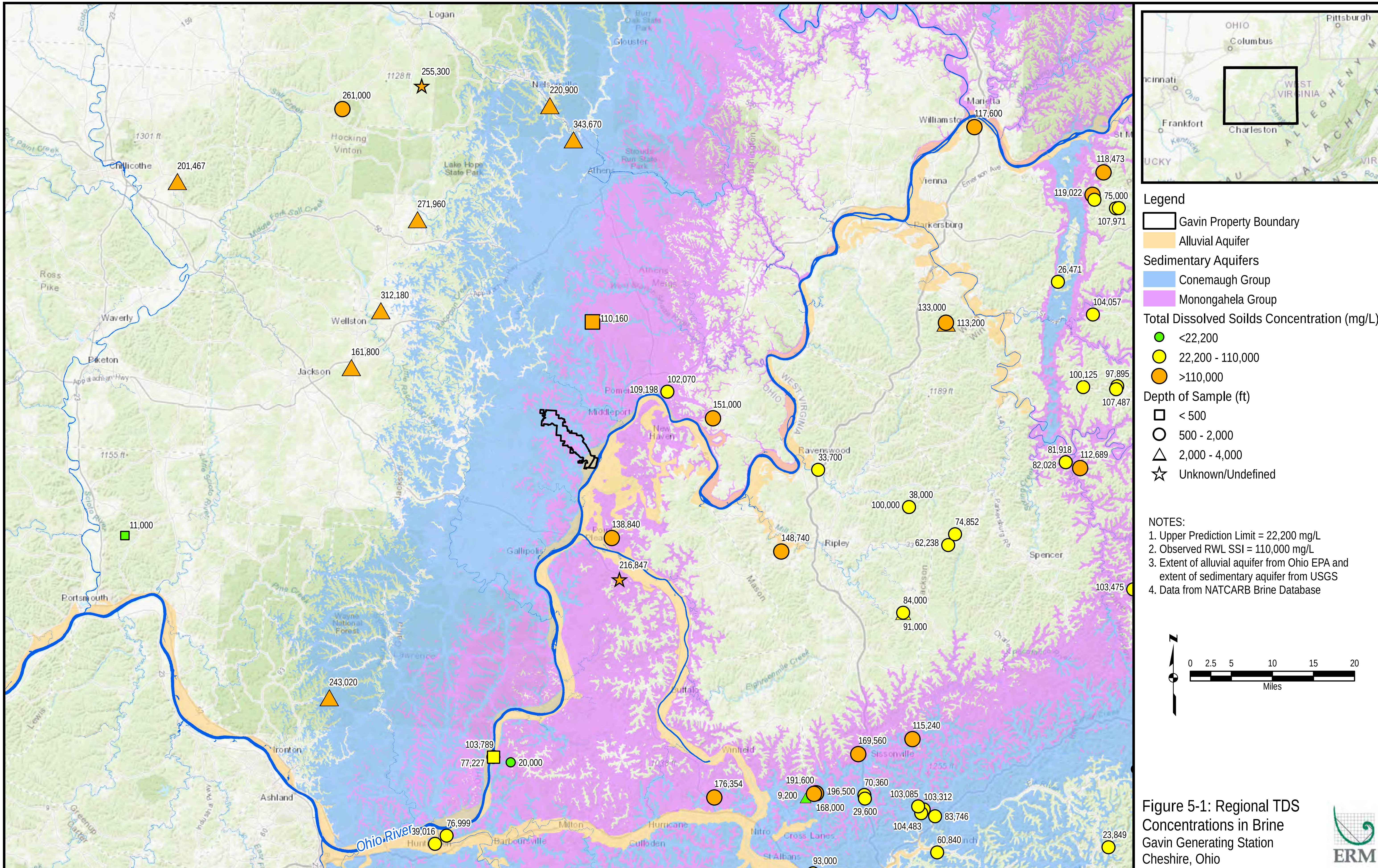
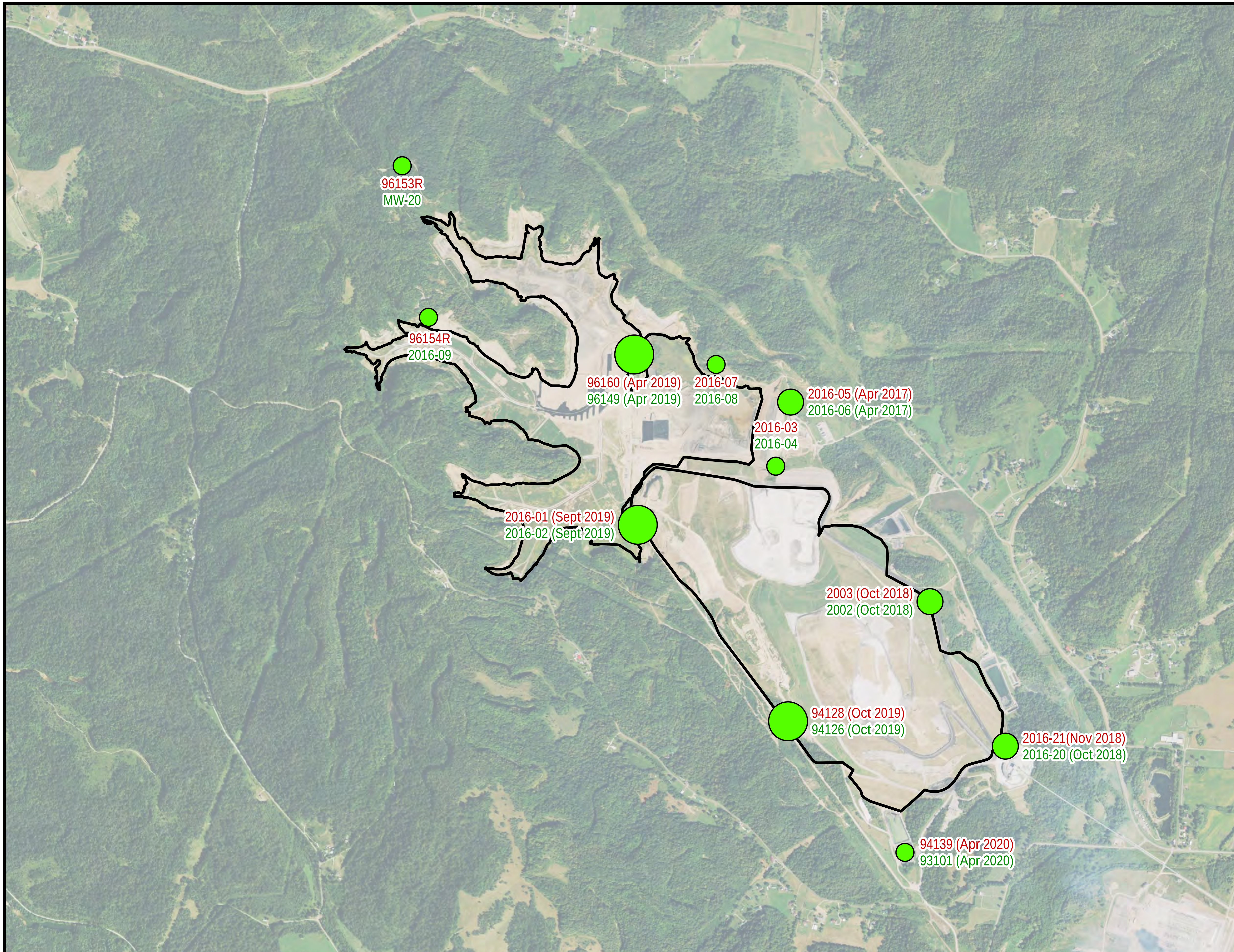
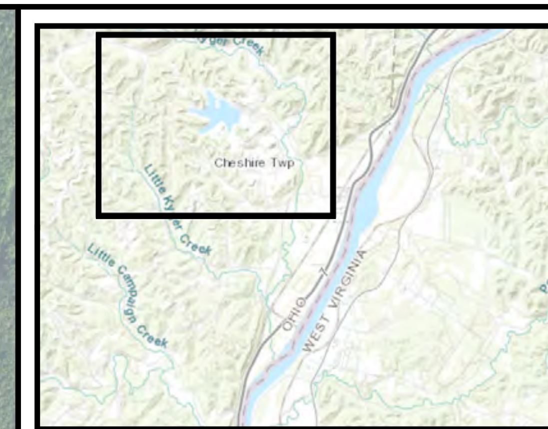


Figure 5-1: Regional TDS Concentrations in Brine
Gavin Generating Station
Cheshire, Ohio

ERM





Legend

TDS Concentration Difference between Morgantown and Cow Run Sandstone (mg/L)

- <500
- 500 - 1,000
- 1,001 - 10,000
- >10,000

= Morgantown has greater TDS

= Cow Run has greater TDS

CCR Unit

Morgantown Sandstone Monitoring Well

Cow Run Sandstone Monitoring Well

NOTES:
1. All data collected in H2 unless otherwise noted
2. TDS concentration diferences calculated for the most recent event that both wells were sampled
3. Wells 2016-01 and 2016-2 were abandoned in 2019.
4. Wells 94126 and 94128 were removed in 2019.

0 500 1,000 2,000 3,000

Feet

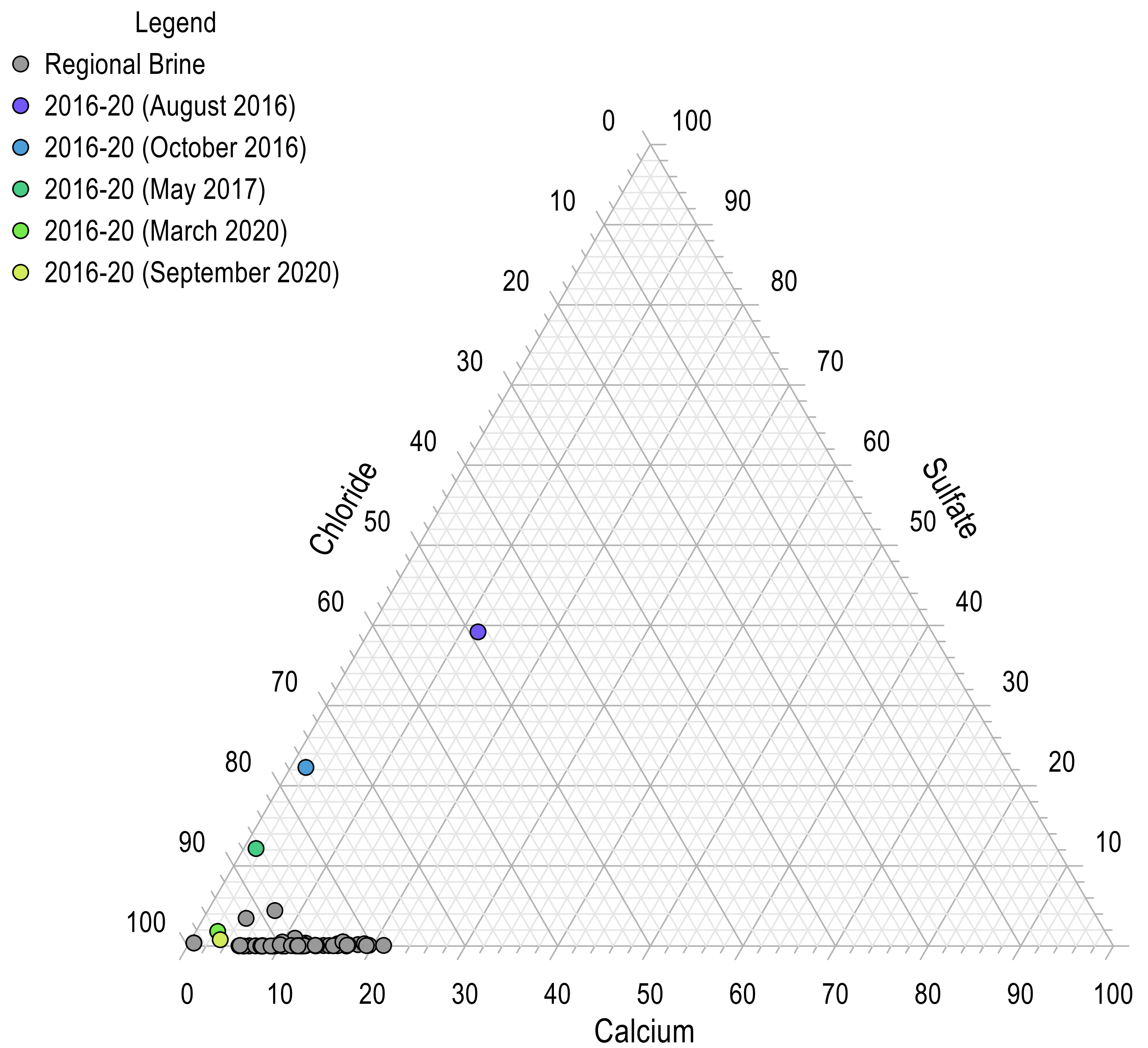
N

Figure 5-2: Difference in TDS Concentrations in the Morgantown and Cow Run Sandstone

Gavin Generating Station

Cheshire, Ohio

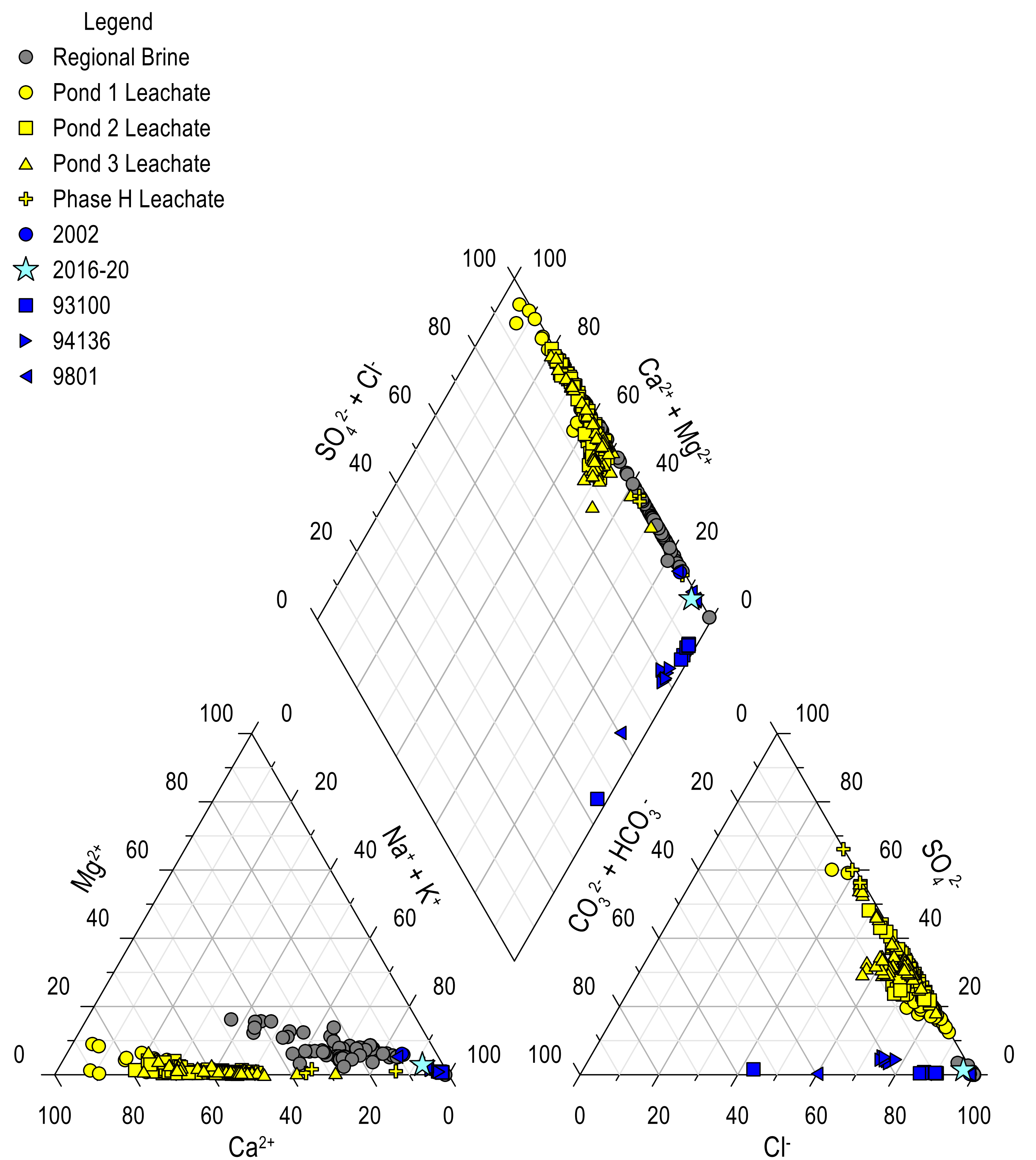
ERM



NOTES:
1. Brine results from NATCARB Database.
2. Only includes wells within 50 miles of the site.
3. Values represent the relative mass percentage of calcium, sulfate, and chloride.

Figure 6-1: RWL Cow Run Ternary Diagram
Gavin Generating Station
Cheshire, Ohio

ERM



NOTES:
1. Brine results from NATCARB Database.
2. Only includes wells within 50 miles of the site.
3. Only locations analyzed for all parameters are included.
4. Well 2016-20 was only analyzed for all parameters in March 2020.

Figure 6-2: RWL Cow Run Piper Diagram
Gavin Generating Station
Cheshire, Ohio

ERM

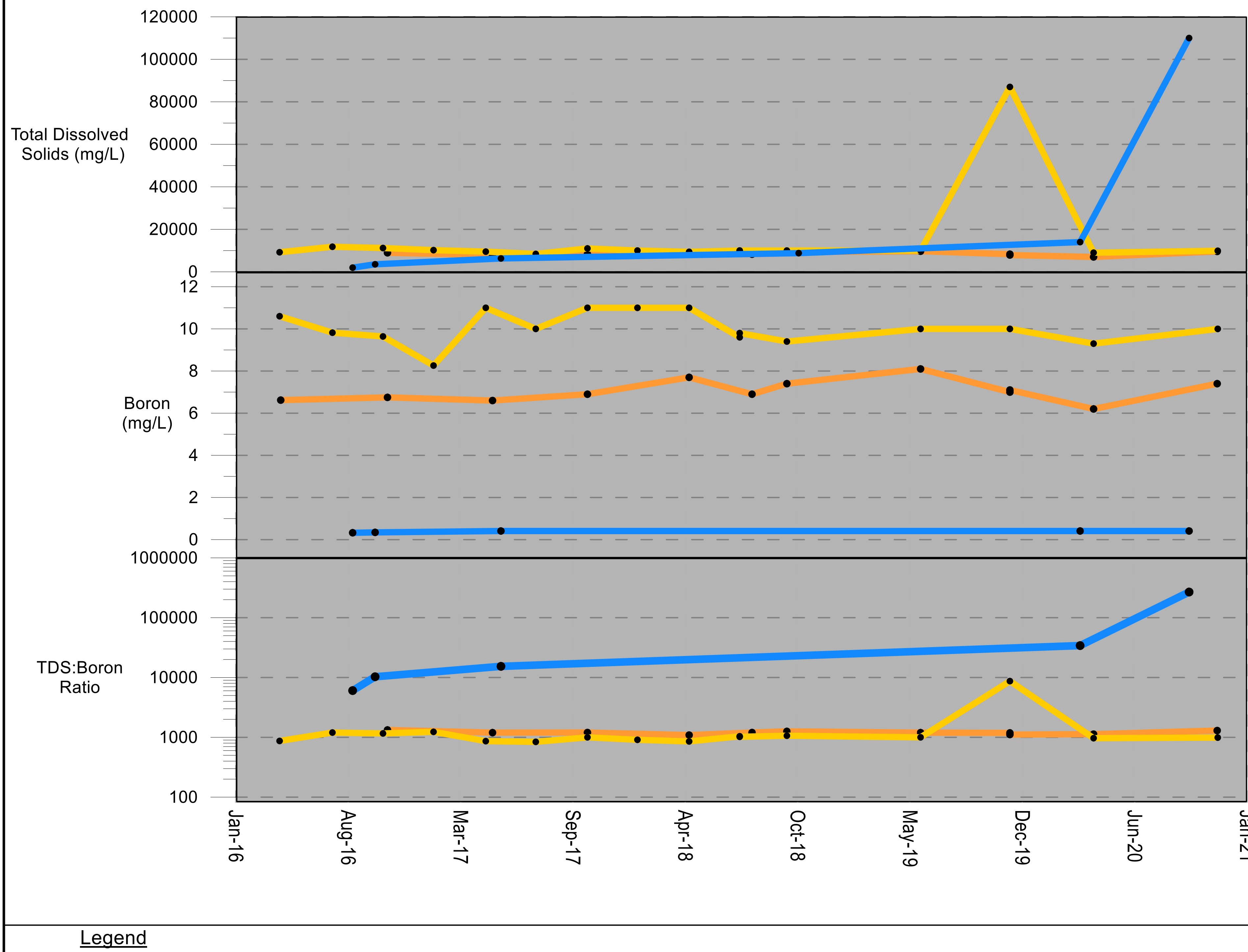


Figure 7-1: TDS and Boron in 2016-20 and RWL Leachate
Gavin Generating Station
Cheshire, Ohio

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APPENDIX B ANALYTICAL DATA SUMMARY

Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
	Date	2016-08-24	2016-10-06	2016-12-01	2017-02-02	2017-03-23	2017-05-01	2017-06-12	2017-07-17	2018-03-15	2018-09-13	2019-03-12	2019-09-24	2020-03-24
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L			417	424					380	370	380	380	390
Aluminum	mg/L					7.8 J	0.18	1.4 B	0.32					
Antimony	mg/L	2E-05 J	1E-05 J	3E-05	0.0001	0.002 U	0.002 U	0.002 U	0.002 U					
Arsenic	mg/L	0.0018	0.00177	0.00153	0.00192	0.0042 J	0.0017 J	0.0024 J	0.0017 J					
Barium	mg/L	0.0244	0.0233	0.019	0.0245	0.078 B	0.022	0.036	0.024					
Beryllium	mg/L	2E-05 U	5E-06 J	5E-06	2E-05 U	0.00042 J	0.001 U	0.001 U	0.001 U					
Bicarbonate Alkalinity as CaCO3	mg/L									350	330		340	350
Bicarbonate Alkalinity as HCO3	mg/L											350		
Boron	mg/L	0.289	0.278	0.296	0.283	0.33	0.33	0.34	0.35 JB	0.32		0.34	0.31	0.29
Bromide	mg/L			0.412	0.334	0.41 J	5 U	2.5 U	2.5 U					
Cadmium	mg/L	2E-05 U	5E-06 J	1E-05	5E-05	0.001 U	0.001 U	0.001 U	0.001 U					
Calcium	mg/L	2.7	2.78	2.64	2.57	3.9 B	2.5	3.2	2.6	2.6	2.8	2.6	2.6	2.5
Carbonate Alkalinity as CaCO3	mg/L									34	34	34	38	41
Chloride	mg/L	83.9	92	96.9	96.3	96	60	79	62	86	96	93	100	110
Chromium	mg/L	0.0018	0.0033	0.0007	0.00263	0.06	0.0019 J	0.0081	0.0019 J					
Cobalt	mg/L	0.00011	0.000202	4.6E-05	0.000151	0.0052	0.00026 J	0.0011	0.00042 J					
Conductivity, Field	uS/cm	2068	2149	2094	2158					2079				2014
Copper	mg/L					0.01 B	0.002 U	0.0048 B	0.002 U					
Dissolved Oxygen, Field	mg/L	0.88	3.16	1.59	1.86					0.2				
Dissolved Solids, Total	mg/L	1220	1300	1290	1290	1300 J	1200 J	1300	1300 J	1300		1300	1300	1300
Fluoride	mg/L	1.86	2	2.26	2.13	2.6	2.2	2.4	2.2	2.2	2.3	2.2	2.5	2.4
Iron	mg/L					8.3 JB	0.19	1.5	0.39					
Lead	mg/L	3.9E-05	9.6E-05	4.9E-05	0.000237	0.0052 J	0.00056 J	0.0011	0.00058 J					
Lithium	mg/L	0.02	0.023	0.017	0.014	0.021	0.016	0.018	0.016					
Magnesium	mg/L			0.724	0.723	2.4 B	0.75 J	1.1	0.8 J	0.66 J	0.69 J	0.76 J	0.74 J	0.73 J
Manganese	mg/L					0.084	0.01	0.026	0.014					
Mercury	mg/L	5E-06 U	5E-06 U	2E-06	5E-06 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U					
Molybdenum	mg/L	0.0389	0.0349	0.0331	0.0345	0.037	0.033	0.033	0.032					
Nickel	mg/L					0.039	0.002 U	0.0056	0.0018 J					
pH, Field	pH units	7.28	8.89	8.6	8.59	8.69	8.58	8.55	8.61	8.71	8.6	8.85	8.83	8.85
Potassium	mg/L			1.05	1.49	2.6 B	0.92 J	1.2	0.91 J	0.84 J	1	0.93 J	0.9 J	0.98 J
Radium-226	pCi/L	0.356	0.547	0.32	0.257	0.303	0.116	0.147	0.171					
Radium-226/228	pCi/L	1.348	1.827	0.595	0.701	0.497	0.339	0.539	0.53					
Radium-228	pCi/L	0.992	1.28	0.275	0.444	0.194 U	0.224 U	0.393	0.359					
Redox Potential, Field	mV	167.6	70.5	-68	88.2									
Selenium	mg/L	7E-05 J	4E-05 J	5E-05	0.0001 U	0.00073 J	0.005 U	0.005 U	0.005 U					
Silver	mg/L					0.0005 J	0.001 U	0.001 U	0.001 U					
Sodium	mg/L			414	405	440 JB	480 B	460 B	440 JB	440	460	470	490	430
Strontium	mg/L			0.199	0.19	0.22 B	0.19 B	0.2 B	0.19					
Sulfate	mg/L	493	516	567	521	560 J	570	560	560	560	570	570	540	540
Temperature, Field	deg C	15.16	18.6	15.2	12.4					13.1				13
Thallium	mg/L	2E-05 J	4E-05 J	1E-05	5.2E-05	0.001 U	0.001 U	0.001 U	0.001 U					
Turbidity, Field	NTU	3.3	5.1	6.7	1.9	61.2	28.9	31.1	5.7	1.2	1.96		3	16.5
Vanadium	mg/L					0.013			0.005 U					
Zinc	mg/L					0.026	0.02 U	0.02 U	0.02 U					

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
J: Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
U: Indicates the analyte was analyzed for but not detected.
Empty cells = Not analyzed

Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

	Program Location ID Date	FEDERAL 2000 2020-09-22 N	FEDERAL 2002 2018-10-22 N	FEDERAL 2003 2016-12-01 N	FEDERAL 2003 2017-02-08 N	FEDERAL 2003 2017-03-27 N	FEDERAL 2003 2017-05-01 N	FEDERAL 2003 2017-06-12 N	FEDERAL 2003 2018-10-29 N	FEDERAL 2003 2019-09-21 N	FEDERAL 2003 2020-03-24 N	FEDERAL 2003 2020-09-21 N	FEDERAL 2016-20 2016-08-26 N	FEDERAL 2016-20 2016-10-05 N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	380	240	709	680				730	740	750	760		
Aluminum	mg/L					61 J	34	27	28					
Antimony	mg/L			0.00029	0.0002	0.0014 JB	0.00087 J	0.00074 J	0.00058 J				0.00039	0.00039
Arsenic	mg/L			0.00826	0.0074	0.03	0.019	0.02	0.021				0.0264	0.008
Barium	mg/L			0.175	0.145	0.41 B	0.39	0.29	0.2				0.12	0.213
Beryllium	mg/L			0.000166	0.000162	0.0031	0.0022	0.0016	0.0011				0.00281	0.000343
Bicarbonate Alkalinity as CaCO3	mg/L	350	240						710	710	710	730		
Bicarbonate Alkalinity as HCO3	mg/L													
Boron	mg/L	0.32	0.48	0.461	0.462	0.46	0.48	0.51	0.48	0.44	0.41	0.45	0.326	0.344
Bromide	mg/L			2.7	2.25	2.6 J	2.4 J	2 J						
Cadmium	mg/L			8E-05	6E-05	0.001 U	0.001 U	0.001 U	0.001 U				0.00201	0.00027
Calcium	mg/L	2.7	760	8.98	8.37	12 B	15	12	7.5	5.8	5	5.7	138	34.1
Carbonate Alkalinity as CaCO3	mg/L	29	5 U						27	21	34	28		
Chloride	mg/L	87	17000	643	700	650	690	560	430	390	500	440	574	1570
Chromium	mg/L			0.0011	0.0839	0.11 B	0.058	0.055	0.037				0.0287	0.0079
Cobalt	mg/L			0.00251	0.00382	0.023	0.014	0.013	0.0075				0.0398	0.00486
Conductivity, Field	uS/cm	1990		3638	3676						2692	2760	3670	4990
Copper	mg/L					0.023 B	0.018 B	0.019 B	0.0076					
Dissolved Oxygen, Field	mg/L			1.03	1.28								11.98	10.16
Dissolved Solids, Total	mg/L	1200	4700	1950	1960	2100 J	2400 J	2100	1800	1600	1400	1600	1970	3540
Fluoride	mg/L	2.1	2.5 U	2.7	2.36	2.9	2.8	2.7	3.2	3.6	3.4	3.2	1.29	0.95
Iron	mg/L					67 JB	38	36	19					
Lead	mg/L			0.00144	0.00165	0.031 J	0.019	0.018	0.0097				0.0678	0.00995
Lithium	mg/L			0.024	0.019	0.084	0.05	0.051	0.051				0.088	0.051
Magnesium	mg/L	0.64 J	320	2.26	2.65	9.6 B	7.3	5.9	4	1.5	1.3	1.6		
Manganese	mg/L					0.21 B	0.17	0.13	0.062					
Mercury	mg/L			1.7E-05	5E-06 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U				0.000423	2.4E-05
Molybdenum	mg/L			0.105	0.125	0.12	0.1	0.12 J	0.16				0.00943	0.11
Nickel	mg/L					0.074 B	0.039	0.04	0.025					
pH, Field	pH units	8.79	6.82	8.02	7.84	7.94	7.87	7.83	8.06	8.19	8.26	8.21	9.29	9.02
Potassium	mg/L	0.87 J	29	2.61	3.22	11 B	7.2	6	5.9	1.8	1.5	2		
Radium-226	pCi/L			0.555	0.193	0.937	0.45	1.48	0.909				4.03	0.0323
Radium-226/228	pCi/L			0.975	1.483	2.93	0.95	2.05	1.71				4.656	1.7223
Radium-228	pCi/L			0.42	1.29	2 G	0.5 U	0.57 U	0.797				0.626	1.69
Redox Potential, Field	mV			4	-122.2								172.2	139.2
Selenium	mg/L			0.0013	0.0011	0.0068	0.0034 J	0.0046 J	0.0017 J				0.0104	0.002
Silver	mg/L					0.00074 J	0.00023 J	0.00061 J	0.0005 J					
Sodium	mg/L	450	8400	605	628	730 JB	740 B	730	630	620	590	610		
Strontium	mg/L			0.593	0.567	0.84 B	0.94 B	0.69 B	0.52					
Sulfate	mg/L	530	50 U	77.8	65.3	84 J	84	86	73	74	72	84	459	460
Temperature, Field	deg C	16		12.5	13.1						14	16	24.8	18.4
Thallium	mg/L			4E-05	3E-05 J	0.00031 J	0.001 U	0.001 U	0.0002 J				0.000318	0.000115
Turbidity, Field	NTU	0.3	882	123.9	265.2	530.1	336.7	236.9	1000	60	24.3	43.1	1270	668.2
Vanadium	mg/L													
Zinc	mg/L					0.11	0.07	0.059	0.041					

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
J: Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
U: Indicates the analyte was analyzed for but not detected.
Empty cells = Not analyzed

Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

Program		FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
Location ID		2016-20	2016-20	2016-20	2016-20	2016-20	2016-21	2016-21	2016-21	2016-21	2016-21	2016-21	2016-21	93100
Date		2017-05-17	2018-10-29	2019-03-15	2020-03-13	2020-09-23	2016-08-25	2016-10-06	2017-08-10	2018-04-13	2018-09-24	2019-03-14	2019-09-21	2016-08-23
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L				330					340	300	240 B	170	
Aluminum	mg/L	1.6 B							0.46					
Antimony	mg/L	0.00099 J					0.00047	0.001	0.0036 B					4E-05 J
Arsenic	mg/L	0.0055					0.0245	0.0373	0.037					0.00164
Barium	mg/L	0.48					0.0618	0.113	0.035					0.602
Beryllium	mg/L	0.001 U					0.000591	0.000923	0.001 U					1E-05 J
Bicarbonate Alkalinity as CaCO3	mg/L				330					5 U	5 U	5 U	5 U	
Bicarbonate Alkalinity as HCO3	mg/L													
Boron	mg/L	0.41			0.41	0.41	0.504	0.429	0.34	0.24	0.24	0.22	0.2	0.432
Bromide	mg/L	15							0.71					
Cadmium	mg/L	0.001 U					0.00011	0.00016	0.001 U					4E-05 U
Calcium	mg/L	49			270	360	22.8	24.4	24	54	26	41	17	20.3
Carbonate Alkalinity as CaCO3	mg/L				5 U					90	90	58	73	
Chloride	mg/L	3200	5400		11000	11000	62.2	65.2	110	54	48	40	88	2180
Chromium	mg/L	0.004					0.0075	0.0112	0.0035					0.0022
Cobalt	mg/L	0.0014					0.00396	0.00519	0.00088 J					0.00062
Conductivity, Field	uS/cm				26558	29597	2714	2184		2425				6544
Copper	mg/L	0.0067 B							0.02 B					
Dissolved Oxygen, Field	mg/L						2.91	4.78		3.34				1.22
Dissolved Solids, Total	mg/L	6300 J	8800		14000	110000	1310	1510	1000	1100	1100	1100	1100	3630
Fluoride	mg/L	1.2	0.88 J		1 U	0.54	2.7	2.72	2.1	1.4	1.5	1.1	1.6	2.17
Iron	mg/L	1.2							0.12					
Lead	mg/L	0.001					0.00238	0.00351	0.001 U					0.000244
Lithium	mg/L	0.06					0.044	0.048	0.076					0.048
Magnesium	mg/L	15			89				1 U	1	0.37 J	1.8	0.42 J	
Manganese	mg/L	0.18							0.005 U					
Mercury	mg/L	0.0002 U					3.2E-05	5.2E-05	0.0002 U					5E-06 U
Molybdenum	mg/L	0.14					0.0545	0.057	0.1 B					0.087
Nickel	mg/L	0.025							0.016					
pH, Field	pH units	8.16	7.44	7.31	7.35	7.26	11.76	11.42		11.99	11.71	11.85	11.4	7.97
Potassium	mg/L	7.9			16				44	42	16	15	12	
Radium-226	pCi/L						0.733	1.19	1.87					0.637
Radium-226/228	pCi/L						1.356	1.362	6.04					2.587
Radium-228	pCi/L						0.623	0.172	4.16 G					1.95
Redox Potential, Field	mV						-312.7	31.1						-98.5
Selenium	mg/L	0.0023 J					0.0018	0.0033	0.0027 J					0.0001 J
Silver	mg/L	0.0014							0.001 U					
Sodium	mg/L	2000			5400				330	280	320	320	330	
Strontium	mg/L	4 B							0.48 B					
Sulfate	mg/L	450	330		210	91	415	373	360	520	530	600	540	11.4
Temperature, Field	deg C				14	16	17.8	15.7		14.9				19.02
Thallium	mg/L	0.001 U					0.000143	0.00011	0.001 U					0.0001 U
Turbidity, Field	NTU	6382	1000		1029	27.7	195.1	847.3		208	37.7		60	7
Vanadium	mg/L													
Zinc	mg/L	0.02 U							0.02 U					

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
J: Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
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Empty cells = Not analyzed

Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

Program		FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
Location ID		93100	93100	93100	93100	93100	93100	93100	93100	93100	93100	93100	93100	93100
Date		2016-10-05	2016-12-02	2017-02-02	2017-03-29	2017-04-28	2017-06-12	2017-07-18	2017-07-18	2018-03-15	2018-09-24	2019-03-11	2019-03-11	2019-09-23
		N	N	N	N	N	N	FD	N	N	N	FD	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L		393	359						360	320	320	320	330
Aluminum	mg/L				1.8 J	0.044 J	3.8 B	1.8	1.7					
Antimony	mg/L	6E-05 J	5E-05 J	5E-05 J	0.0012 J	0.002 U	0.002 U	0.002 U	0.002 U					
Arsenic	mg/L	0.00207	0.00174	0.00156	0.002 J	0.0016 J	0.002 J	0.0019 J	0.002 J					
Barium	mg/L	0.69	0.468	0.521	0.64 B	0.65	0.65	0.66	0.66					
Beryllium	mg/L	5.3E-05	1E-05 J	1E-05 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U					
Bicarbonate Alkalinity as CaCO3	mg/L									360	320			330
Bicarbonate Alkalinity as HCO3	mg/L											320	320	
Boron	mg/L	0.429	0.39	0.415	0.45	0.47 B	0.48	0.49 JB	0.5 JB	0.45	0.45	0.48	0.49	0.46
Bromide	mg/L		7.81	8.8	8.9 J	8.9 J	10	8.7 J	8.8 J					
Cadmium	mg/L	1E-05 J	4E-05 U	4E-05 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U					
Calcium	mg/L	22.2	14.1	16.8	17 B	16	20	17	17	14	18	17	17	18
Carbonate Alkalinity as CaCO3	mg/L									5 U	5 U	5 U	5 U	5 U
Chloride	mg/L	2310	1770	199	2200	2200	2100	2200	2200	1800	2200	2100	2100	2000
Chromium	mg/L	0.0049	0.00586	0.00582	0.0098	0.002 U	0.04	0.011	0.011					
Cobalt	mg/L	0.00129	0.00235	0.00195	0.0012	0.00027 J	0.0099	0.0033	0.0031					
Conductivity, Field	uS/cm	7642	5904	7014						6107				
Copper	mg/L				0.0028 B	0.002 U	0.0051 B	0.002 U	0.002 U					
Dissolved Oxygen, Field	mg/L	0.51	0.91	1.18						0.2				
Dissolved Solids, Total	mg/L	3980	3420	3600	3900 J	3700 J	3600	3400 J	3600 J	3300	3100	3100	3100	2900
Fluoride	mg/L	2.05	1.97	2.18	2.4	2.2	2.3	2.3	2.3	2.6	2.7	2.2	2.2	2.7
Iron	mg/L				1.7 JB	0.082 J	1	0.42	0.41					
Lead	mg/L	0.00093	0.000135	0.000189	0.001 J	0.001 U	0.00046 J	0.001 U	0.001 U					
Lithium	mg/L	0.058	0.046	0.04	0.044	0.047	0.043	0.048	0.048					
Magnesium	mg/L		4.4	5.37	6.2 B	5.6	6.1	6.2	6.2	4.1	5.4	5.9	6.1	6.3
Manganese	mg/L				0.046	0.032	0.055	0.045	0.044					
Mercury	mg/L	3E-06 J	5E-06 U	5E-06 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U					
Molybdenum	mg/L	0.0889	0.125	0.106	0.11	0.11	0.11 J	0.097	0.098					
Nickel	mg/L				0.0065	0.002 U	0.038	0.0096	0.0087					
pH, Field	pH units	7.85	7.78	7.87	7.82	7.86	7.77		7.71	7.93	7.89		8.06	8.04
Potassium	mg/L		3.87	4.57	3.1 B	2.6	2.7	2.7	2.7	2.1	2.6	2.6	2.6	2.9
Radium-226	pCi/L	0.909	0.863	0.544	0.538	0.565	0.736	0.691 J	0.758 J					
Radium-226/228	pCi/L	1.969	1.538	1.252	0.869	1.14	1.19	1.32	1.41					
Radium-228	pCi/L	1.06	0.675	0.708	0.332 U	0.58	0.458	0.63	0.648					
Redox Potential, Field	mV	788	35.3	-138.6										
Selenium	mg/L	0.0002 J	0.0003	0.0002 J	0.0007 J	0.005 U	0.005 U	0.005 U	0.005 U					
Silver	mg/L				0.001 U	0.001 U	0.00036 J	6.9E-05 J	6.3E-05 J					
Sodium	mg/L		1270	1050	1400 JB	1500	1500	1500 JB	1500 JB	1200	1400	1500	1500	1400
Strontium	mg/L		1.18	1.4	1.7 B	1.9	1.7 B	1.7	1.7					
Sulfate	mg/L	8.4	12.2	9.9	15 J	13 J	15	14 J	14 J	22	16	17 J	18 J	16
Temperature, Field	deg C	18.6	14.9	14.1						15.2				
Thallium	mg/L	3E-05 J	2E-05 J	4E-05 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U					
Turbidity, Field	NTU	42.7	7.4	15.3	31.1	6.4	2.8		6	4.6	1.18			7
Vanadium	mg/L							0.005 U	0.005 U					
Zinc	mg/L				0.02 U	0.02 U	0.02 U	0.02 U	0.02 U					

Notes:
FD = Field duplicate sample
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mg/L = Milligrams per liter
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NTU = Nephelometric Turbidity Unit
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Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	93100	93100	93100	93108	93108	93108	93108	93108	93108	93108	93108	93108	93108
	Date	2020-03-19	2020-03-19	2020-09-22	2016-08-24	2016-10-06	2016-12-02	2017-02-02	2017-03-23	2017-05-02	2017-06-12	2017-07-18	2018-03-15	2018-09-14
		FD	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	330	330	320			720	672					640	640
Aluminum	mg/L								2.5 J	0.13	0.041 JB	7.1		
Antimony	mg/L				0.0001	3E-05 J	0.00023	0.00016	0.002 U	0.002 U	0.002 U	0.002 U		
Arsenic	mg/L				0.00196	0.00153	0.0025	0.00166	0.0018 J	0.0013 J	0.0016 J	0.0029 J		
Barium	mg/L				0.174	0.164	0.199	0.157	0.19 B	0.18	0.18	0.22		
Beryllium	mg/L				4.1E-05	1E-05 J	0.000162	0.000107	0.001 U	0.001 U	0.001 U	0.00047 J		
Bicarbonate Alkalinity as CaCO3	mg/L	330	330	320									640	640
Bicarbonate Alkalinity as HCO3	mg/L													
Boron	mg/L	0.47	0.47	0.48	0.429	0.404	0.391	0.411	0.5	0.48	0.46	0.48 JB	0.45	0.47
Bromide	mg/L						2.42	2.16	2.4 J	2.7 J	2.8	2.6 J		
Cadmium	mg/L				7E-05	3E-05	0.0003	0.00019	0.001 U	0.001 U	0.0014	0.00024 J		
Calcium	mg/L	17	18	19	6.09	5.87	6.55	5.85	6 B	5.9	5.8	6.4	5.6	6.4
Carbonate Alkalinity as CaCO3	mg/L	4.6 J	5 U	5 U									5 U	5 U
Chloride	mg/L	2200	2200	2200	745	731	681	688	700	820	790	750	770	720
Chromium	mg/L				0.0086	0.0062	0.0263	0.025	0.02	0.004	0.002 U	0.067		
Cobalt	mg/L				0.00113	0.00039	0.00393	0.00262	0.002	0.00037 J	0.00025 J	0.0059		
Conductivity, Field	uS/cm	6772	6772	6702	3490	3589	3580	3545					3606	
Copper	mg/L								0.008 B	0.002 U	0.002 U	0.021		
Dissolved Oxygen, Field	mg/L				1.67	0.81	1.01	1.42					0.64	
Dissolved Solids, Total	mg/L	3200	3900	3100	1940	1900	1950	1900	1800 J	1900 J	2000	1800 J	2100	1700
Fluoride	mg/L	2.6	2.6	2.3	4.59	4.46	4.15	4.57	5.4	5.1	5.3	5.5	4.6	4.9
Iron	mg/L								2.7 JB	0.25	0.12	8.3		
Lead	mg/L				0.00206	0.000516	0.00639	0.00385	0.0026 J	0.0007 J	0.001 U	0.0074		
Lithium	mg/L				0.027	0.028	0.033	0.024	0.025	0.025	0.029	0.033		
Magnesium	mg/L	5.3	5.6	5.8			2.33	2.18	2.2 B	2	1.8	2.9	1.7	1.9 J
Manganese	mg/L								0.051	0.027	0.031	0.092		
Mercury	mg/L				5E-06	1.5E-05	1E-05	9E-06	0.0002 U	0.0002 U	0.0002 U	0.0002 U		
Molybdenum	mg/L				0.254	0.267	0.237	0.23	0.25	0.24	0.23 J	0.24		
Nickel	mg/L								0.014	0.0033	0.0015 J	0.05		
pH, Field	pH units	8.02	8.02	7.94	7.59	7.87	7.96	7.9	8.07	7.99	7.87	7.84	7.97	7.7
Potassium	mg/L	2.5	2.5	2.6			2.59	2.53	1.8 B	1.4	1.3	2.7	1.3	1.4 J
Radium-226	pCi/L				0.74	0.639	1.02	0.322	0.355	0.289	0.351	0.527		
Radium-226/228	pCi/L				2.68	2.059	1.229	0.502	0.471	0.919	0.704	2.09		
Radium-228	pCi/L				1.94	1.42	0.209	0.18	0.116 U	0.63	0.353	1.56		
Redox Potential, Field	mV				-29.9	-145.3	-112.7	-121.3						
Selenium	mg/L				0.0002 J	6E-05 J	0.0004	0.0002	0.005 U	0.005 U	0.005 U	0.005 U		
Silver	mg/L								0.001 U	0.001 U	0.001 U	6.2E-05 J		
Sodium	mg/L	1400	1400	1400			827	595	790 JB	790 B	790	760 JB	810	820
Strontium	mg/L						0.434	0.41	0.46 B	0.5 B	0.45 B	0.46		
Sulfate	mg/L	17	17	13	73.1	66.1	68.1	72.3	83 J	82	84	90	85	85
Temperature, Field	deg C	16	16	17	18.33	15	12.9	12.9					14.8	
Thallium	mg/L				0.000125	4E-05 J	0.000159	0.000126	0.001 U	0.001 U	0.001 U	0.00021 J		
Turbidity, Field	NTU	4	4	1.4	28.9	9.7	18.3	15.9	50.1	16.4	8.6	287.1	4.8	10.1
Vanadium	mg/L								0.0045 J			0.013		
Zinc	mg/L								0.019 J	0.02 U	0.02 U	0.036		

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
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Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	94125	94125	2019-06	94126	94126	94126	94126	94126	94126	94126	94126	94126	94126
	Date	2016-12-02	2017-02-06	2020-09-15	2016-08-23	2016-10-05	2016-12-01	2017-02-02	2017-03-23	2017-03-23	2017-05-17	2017-06-08	2017-07-18	2018-03-15
		N	N	N	N	N	N	N	FD	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	279	274	220			135	123						130
Aluminum	mg/L								0.024 J	0.016 J	0.52 B	0.79	0.46	
Antimony	mg/L	0.0003 J	0.0003 J		0.0005 U	0.0005 U	0.0001	0.0005 U	0.002 U	0.002 U	0.002 U	0.002 U	0.004 U	
Arsenic	mg/L	0.00689	0.00276		0.00422	0.00524	0.0043	0.00442	0.0058	0.0058	0.0025 J	0.0021 J	0.0017 J	
Barium	mg/L	1.41	1.22		13	12.5	13	10.8	11 B	11 B	11	11	11	
Beryllium	mg/L	0.000598	0.0002 J		0.0002 U	0.0002 U	5E-05	0.0002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	
Bicarbonate Alkalinity as CaCO3	mg/L			220										130
Bicarbonate Alkalinity as HCO3	mg/L													
Boron	mg/L	0.408	0.494	0.23	0.372	0.371	0.372	0.333	0.46	0.44	0.41	0.41	0.43 JB	0.39
Bromide	mg/L	51.7	49.6				50.9	52.2	49	50	52	49 J	53	
Cadmium	mg/L	0.00116	0.00109		4E-05 J	0.0002 U	4E-05	0.0002 U	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	
Calcium	mg/L	410	448	27	325	356	336	323	370 B	370 B	320	320	310	350
Carbonate Alkalinity as CaCO3	mg/L			5.6										5 U
Chloride	mg/L	11600	12500	1900	11100	11000	10600	11400	12000	12000	12000	11000	12000	11000
Chromium	mg/L	0.126	0.195		0.0023	0.0027	0.0045	0.00257	0.0046	0.0028	0.022	0.011	0.0066	
Cobalt	mg/L	0.0138	0.0112		0.00363	0.00485	0.00369	0.00371	0.0041	0.0038	0.0023	0.0022	0.0028	
Conductivity, Field	uS/cm	33959	33696	7203	27600	30317	29486	30460						3703
Copper	mg/L								0.0013 JB	0.0015 JB	0.002 U	0.0028	0.004 U	
Dissolved Oxygen, Field	mg/L	152	1.89		2.99	0.71	2	1.19						0.2
Dissolved Solids, Total	mg/L	20000	19500	2900	17900	18200	17300	16900	18000 J	19000 J	18000 J	18000	16000 J	18000
Fluoride	mg/L	2 U	1 J	1.5	0.43	0.5 J	0.6	0.7 J	0.82 J	0.69 J	5 U	5 U	5 U	5 U
Iron	mg/L								2.8 JB	2.6 JB	1.1	1.1	0.99	
Lead	mg/L	0.0105	0.0044		0.0002 J	0.0002 J	0.0001	9E-05 J	0.001 U	0.001 U	0.001 U	0.00053 J	0.002 U	
Lithium	mg/L	0.263	0.237		0.2	0.237	0.249	0.228	0.17	0.16	0.19	0.19	0.2	
Magnesium	mg/L	113	112	7.7			93.4	97.4	120 B	120 B	100	110	110	100
Manganese	mg/L								1.4	1.3	0.63	0.64	0.78	
Mercury	mg/L	2E-05	7E-06		5E-06 U	5E-06 U	1.2E-05	5E-06 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	
Molybdenum	mg/L	0.0642	0.0534		0.00601	0.0338	0.0099	0.0626	0.0059 J	0.0042 J	0.008 J	0.004 J	0.0062 J	
Nickel	mg/L								0.0067	0.0061	0.027	0.05 U	0.034	
pH, Field	pH units	6.74	6.81	8.46	7.36	7.21	7.2	7.2		7.35	7.21	7.12	7.11	7.99
Potassium	mg/L	21.4	24.7	3.8			16.9	22	11 B	10 B	11	10	11	9.1
Radium-226	pCi/L	3.28	10.9		20.1	20.2	22.7	25.2	36.8	37.6	36.8	31.6	32 J	
Radium-226/228	pCi/L	12.69	20.73		50.95	60.9	52.3	55.57	91.8	83.5	84.7	77.2	82.8 J	
Radium-228	pCi/L	9.41	9.83		30.85	40.7	29.6	30.37	55	45.9	47.9	45.7	50.8 J	
Redox Potential, Field	mV	149.5	21.7		-77.2	-107.5	-88.5	-113.7						
Selenium	mg/L	0.0022	0.0009 J		0.001 U	0.001 U	0.0005	0.001 U	0.00087 J	0.00087 J	0.001 J	0.00095 J	0.01 U	
Silver	mg/L								4E-05 J	4E-05 J	9E-05 J	8.7E-05 J	0.002 U	
Sodium	mg/L	5630	3100	1500			1370	626	6400 JB	6200 JB	5900	5800 B	5900 JB	6000
Strontium	mg/L	34.1	32.5				32.2	29.9	31 B	31 B	30 B	30 B	33	
Sulfate	mg/L	83.5	80.8	750	2.1	10.9	0.5	1 J	8.3 J	28 J	100 U	100 U	100 U	100 U
Temperature, Field	deg C	11.8	11.8	14	17.4	15.4	13	12.9						12.7
Thallium	mg/L	0.0002 J	0.0003 J		0.0001 J	0.00098	0.0001	0.0001 J	0.001 U	0.001 U	0.001 U	0.001 U	0.002 U	
Turbidity, Field	NTU	2190.4	158.7	13.4	1.9	8	4.2	4.7		11.8	5.9	38.2	37.1	1.9
Vanadium	mg/L								0.005 U	0.005 U			0.01 U	
Zinc	mg/L								0.0068 J	0.007 J	0.02 U	0.02 U	0.04 U	

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Residual Water Landfill
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	94126	94126	94126	94126	94128	94128	94128	94128	94128	94128	94128	94128	94128
	Date	2018-09-14	2018-09-14	2019-03-07	2019-09-17	2016-06-08	2016-08-23	2016-10-05	2016-12-01	2017-02-02	2017-03-23	2017-05-02	2017-05-02	2017-06-08
		FD	N	N	N	N	N	N	N	N	N	FD	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	120	120	130	120				730	712				
Aluminum	mg/L										0.05 UJ	0.05 U	0.05 U	0.18
Antimony	mg/L						7E-05	7E-05	6E-05	6E-05	0.002 UJ	0.002 U	0.002 U	0.002 U
Arsenic	mg/L						0.0226	0.0236	0.0193	0.0195	0.018 J	0.017	0.017	0.017
Barium	mg/L						0.141	0.141	0.134	0.131	0.15 JB	0.15	0.15	0.15
Beryllium	mg/L						2E-05 U	2E-05 U	5E-06	2E-05 U	0.001 UJ	0.001 U	0.001 U	0.001 U
Bicarbonate Alkalinity as CaCO3	mg/L	120	120		120									
Bicarbonate Alkalinity as HCO3	mg/L			130										
Boron	mg/L	0.35	0.36	0.38	0.36		0.439	0.421	0.431	0.411	0.49	0.45	0.45	0.46
Bromide	mg/L								3.34	2.62	2.9 J	3 J	3 J	2.9 J
Cadmium	mg/L						2E-05 U	2E-05 U	4E-06	2E-05 U	0.001 UJ	0.001 U	0.001 U	0.00035 J
Calcium	mg/L	400	380	330	320		6.72	7.16	6.85	6.38	6.6 JB	6.3	6.4	6.7
Carbonate Alkalinity as CaCO3	mg/L	5 U	5 U	5 U	5 U									
Chloride	mg/L	14000	13000	11000	11000		765	788	805	770	780	840	850	790
Chromium	mg/L						0.0003	0.0004	0.0022	0.000409	0.002 UJ	0.002 U	0.002 U	0.0028
Cobalt	mg/L						0.000105	0.000124	0.000142	0.000101	0.001 UJ	0.001 U	0.001 U	0.0002 J
Conductivity, Field	uS/cm						3384	3649	3719	3788				
Copper	mg/L										0.002 UJ	0.002 U	0.002 U	0.002 U
Dissolved Oxygen, Field	mg/L						1.6	0.82	1	1.4				
Dissolved Solids, Total	mg/L	13000	14000	4800	20000		1990	1980	1460	1990	1500 J	1900 J	1800 J	2100
Fluoride	mg/L	5 U	5 U	2.5 U	2.5 U		2.17	2.11	2.29	2.06	2.6	2.8	2.8	2.6
Iron	mg/L										0.011 JB	0.1 U	0.1 U	0.23
Lead	mg/L						3.5E-05	4.9E-05	7.1E-05	2E-05 J	0.001 UJ	0.001 U	0.001 U	0.001 U
Lithium	mg/L						0.029	0.035	0.031	0.023	0.026 J	0.03	0.029	0.032
Magnesium	mg/L	130	120	110	110				2.13	2.04	2.1 JB	2.1	2.1	2.1
Manganese	mg/L										0.034 J	0.032	0.032	0.036
Mercury	mg/L						5E-06 U	5E-06 U	9E-06	5E-06 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L						0.45	0.441	0.444	0.371	0.39 J	0.39	0.39	0.38 J
Nickel	mg/L										0.002 UJ	0.002 U	0.002 U	0.0018 J
pH, Field	pH units		7.3	7.36	7.38	7.99	7.92	7.98	7.99	7.96	8		7.97	
Potassium	mg/L	11	11	9.8	9.9				2.53	2.4	1.6 JB	1.6	1.7	1.7
Radium-226	pCi/L						0.719	0.525	0.321	0.364	0.357	0.368	0.361	0.223
Radium-226/228	pCi/L						1.626	1.735	1.046	0.92	0.367 U	0.74	0.804	0.639
Radium-228	pCi/L						0.907	1.21	0.725	0.556	0.00985 U	0.373	0.443	0.417
Redox Potential, Field	mV						-39.2	-96.7	-96.1	-60.6				
Selenium	mg/L						0.0001 U	3E-05 J	3E-05	0.0001 U	0.005 UJ	0.005 U	0.005 U	0.005 U
Silver	mg/L										0.001 UJ	0.001 U	0.001 U	0.001 U
Sodium	mg/L	6600	6500	6000	6400				551	618	840 JB	790 B	780 B	760 B
Strontium	mg/L								0.5	0.459	0.48 JB	0.5 B	0.49 B	0.52 B
Sulfate	mg/L	100 U	100 U	50 U	50 U		51.4	40.7	52.4	43.4	49 J	51	52	53
Temperature, Field	deg C						17.95	16.1	13.1	12.7				
Thallium	mg/L						2E-05 J	5E-05 J	1E-05	2E-05 J	0.001 UJ	0.001 U	0.001 U	0.001 U
Turbidity, Field	NTU		8.41		12	4.3	6.4	3.5	3.9	2	2.6		4.5	
Vanadium	mg/L										0.005 UJ			
Zinc	mg/L										0.02 UJ	0.02 U	0.02 U	0.02 U

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Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

Program		FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
Location ID		94128	94128	94128	94128	94128	2019-02	94136	94136	94136	94136	94136	94136	94136
Date		2017-07-18	2018-03-15	2018-09-14	2019-03-07	2019-09-17	2020-09-15	2016-08-24	2016-10-06	2016-12-01	2017-02-01	2017-03-23	2017-04-28	2017-06-09
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L		650	630	640	620	1800			331	323			
Aluminum	mg/L	0.046 J										0.057	0.037 J	0.69
Antimony	mg/L	0.002 U						2E-05 J	3E-05 J	2E-05	1E-05 J	0.0017 J	0.002 U	0.01 U
Arsenic	mg/L	0.019						0.00037	0.00048	0.00042	0.00039	0.0012 J	0.005 U	0.025 U
Barium	mg/L	0.15						0.0865	0.0894	0.102	0.0877	0.11 B	0.1	0.099 B
Beryllium	mg/L	0.001 U						2E-05 U	1E-05 J	1E-05	5E-06 J	0.001 U	0.001 U	0.001 U
Bicarbonate Alkalinity as CaCO3	mg/L		650	620		610	5 U							
Bicarbonate Alkalinity as HCO3	mg/L				640									
Boron	mg/L	0.47 JB	0.43	0.43	0.43	0.43	0.1 U	0.405	0.395	0.349	0.362	0.46	0.43 B	0.54
Bromide	mg/L	3.3 J								4.07	3.25	3.7 J	3.7 J	3.8 J
Cadmium	mg/L	0.001 U						6E-06 J	6E-06 J	6E-06	5E-06 J	0.001 U	0.001 U	0.005 U
Calcium	mg/L	6	7.5	6.9	6.5	6.2	220	23.2	22	19.2	17.7	19 B	17	16
Carbonate Alkalinity as CaCO3	mg/L		5 U	4.1 J	2.7 J	17	120							
Chloride	mg/L	830	830	790	780	800	190	888	927	887	882	910	900	940
Chromium	mg/L	0.002 U						0.0012	0.002	0.0013	0.00124	0.0019 J	0.002 U	0.005 J
Cobalt	mg/L	0.001 U						0.000107	0.00029	0.00015	0.000122	0.0004 J	0.00079 J	0.0014 J
Conductivity, Field	uS/cm		30253				8754	3541	3581	3578	3558			
Copper	mg/L	0.002 U										0.00085 JB	0.002 U	0.01 U
Dissolved Oxygen, Field	mg/L		0.61					1.08	0.58	0.77	1.7			
Dissolved Solids, Total	mg/L	1900 J	1900	1400	1900	2200	1900	1850	1820	1840	1750	1800 J	2000 J	2000
Fluoride	mg/L	2.8	2.4	2.5	2.5	2.6	0.86	0.96	0.94	1.03	0.9	1.2	1.2	1.4
Iron	mg/L	0.058 J										0.067 JB	0.1 U	0.6
Lead	mg/L	0.001 U						5.3E-05	0.000164	0.000142	7.9E-05	0.00031 J	0.001 U	0.001 U
Lithium	mg/L	0.032						0.028	0.033	0.035	0.029	0.026	0.028	0.025
Magnesium	mg/L	2	2.1	2.2	2	1.9	1 U			4.46	4.13	4.5 B	3.9	4.1 J
Manganese	mg/L	0.033										0.058	0.03	0.079
Mercury	mg/L	0.0002 U						5E-06 U	5E-06 U	2E-06	5E-06 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.39						0.0135	0.015	0.0137	0.0133	0.02	0.015	0.017 J
Nickel	mg/L	0.002 U										0.0015 J	0.004	0.01 U
pH, Field	pH units	7.8	7.22	8.02	8.2	8.2	12.62	7.54	7.69	7.72	7.74	7.81	7.76	7.8
Potassium	mg/L	1.6	1.7	1.7 J	1.6	1.6	33			2.38	4.27	2.1 B	2	2.1 J
Radium-226	pCi/L	0.351						0.312	0.984	0.122	0.304	0.211	0.338	0.191
Radium-226/228	pCi/L	1.09						2.592	2.264	1.642	0.665	0.398	0.584	0.528
Radium-228	pCi/L	0.738						2.28	1.28	1.52	0.361	0.188 U	0.246 U	0.337 U
Redox Potential, Field	mV							170.7	11.5	-50.1	26.4			
Selenium	mg/L	0.005 U						4E-05 J	8E-05 J	7E-05	5E-05 J	0.0012 J	0.005 U	0.025 U
Silver	mg/L	0.001 U										0.001 U	0.001 U	0.005 U
Sodium	mg/L	840 JB	840	840	770	870	560			557	496	750 JB	690	750
Strontium	mg/L	0.49								0.686	0.616	0.74 B	0.69	0.65 B
Sulfate	mg/L	57	55	58	51	50	3.1 J	91.6	75.1	63.8	52.7	78 J	83	99
Temperature, Field	deg C		12.9				13	17.44	15.8	15.3	14			
Thallium	mg/L	0.001 U						1E-05 J	9.9E-05	1E-05	5E-05 U	0.001 U	0.001 U	0.001 U
Turbidity, Field	NTU	4.3	58	1.74		1	19.8	4	8.4	9.2	21.1	6.4	195.4	8.5
Vanadium	mg/L	0.005 U										0.00054 J		
Zinc	mg/L	0.02 U										0.02 U	0.02 U	0.1 U

Notes:
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Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

Program		FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
Location ID		94136	94136	94136	94136	94136	94136	94136	94136	94136	94136	94137	94137	94137
Date		2017-07-17	2017-07-17	2018-03-08	2018-03-08	2018-09-12	2019-03-07	2019-09-17	2019-09-17	2020-03-25	2020-09-25	2016-08-24	2016-10-06	2016-12-01
		FD	N	FD	N	N	N	FD	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L					310	310	330	340	370	340			341
Aluminum	mg/L	0.05 U	0.05 U											
Antimony	mg/L	0.002 U	0.002 U									5E-05	3E-05 J	3E-05
Arsenic	mg/L	0.005 U	0.005 U									0.00179	0.00244	0.00211
Barium	mg/L	0.11	0.1									0.0524	0.0578	0.0553
Beryllium	mg/L	0.001 U	0.001 U									2E-05 U	2E-05 U	5E-06
Bicarbonate Alkalinity as CaCO3	mg/L					310		330	330	360	340			
Bicarbonate Alkalinity as HCO3	mg/L						310							
Boron	mg/L	0.42 JB	0.44 JB	0.49	0.54		0.33	0.41	0.44	0.48	0.41	0.021	0.017	0.022
Bromide	mg/L	4.2 J	4.2 J											0.106
Cadmium	mg/L	0.001 U	0.001 U									6E-05	2E-05	7E-05
Calcium	mg/L	17	17	29	34	17	15	14	14	13	14	147	163	154
Carbonate Alkalinity as CaCO3	mg/L					5 U	5 U	5.9	6	6.1	5.1			
Chloride	mg/L	950	960	940	950	970	900	870	870	960	830	27.5	27.7	27.8
Chromium	mg/L	0.0032	0.001 J									0.0035	0.0055	0.0014
Cobalt	mg/L	0.0007 J	0.00065 J									0.0922	0.495	0.0503
Conductivity, Field	uS/cm				3896					3409	3397	1252	1305	1283
Copper	mg/L	0.002 U	0.002 U											
Dissolved Oxygen, Field	mg/L				4.05							1.08	0.73	0.83
Dissolved Solids, Total	mg/L	1800 J	1900 J	1900	1900		1700	2000	1900	1700	1400	958	856	867
Fluoride	mg/L	1.1	1.1	1.1	1.1	1.2	1.1	1.3	1.4	1.4	1.4	0.11	0.1 J	0.12
Iron	mg/L	0.1 U	0.1 U											
Lead	mg/L	0.001 U	0.001 U									0.0002	0.000152	0.000156
Lithium	mg/L	0.03	0.029									0.011	0.017	0.015
Magnesium	mg/L	4.3	4.3	6.5	7.4	3.9	3.8	3.5	3.5	3.5	3.6			47.9
Manganese	mg/L	0.098	0.089											
Mercury	mg/L	0.0002 U	0.0002 U									8E-06	3E-06 J	5E-06
Molybdenum	mg/L	0.015	0.015									0.00275	0.00353	0.00287
Nickel	mg/L	0.002 U	0.002 U											
pH, Field	pH units		7.89		7.74	7.87	8		8.02	8.06	8.07	7.11	6.93	6.98
Potassium	mg/L	2	2	2.4	2.6	2.1	1.8	1.9	1.9	1.9	1.9			1.82
Radium-226	pCi/L	0.123	0.22									0.171	1.71	0.29
Radium-226/228	pCi/L	0.521	0.765									2.681	2.373	1.268
Radium-228	pCi/L	0.398	0.545									2.51	0.663	0.978
Redox Potential, Field	mV											-32.2	-21.4	-55.4
Selenium	mg/L	0.005 U	0.005 U									5E-05 J	9E-05 J	5E-05
Silver	mg/L	0.001 U	0.001 U											
Sodium	mg/L	720 JB	720 JB	790	800	760	710	750	760	690	690			70.7
Strontium	mg/L	0.73	0.73											0.298
Sulfate	mg/L	60	61	150	180	75	60	81	85	73	67	348	330	349
Temperature, Field	deg C				14.7					15	16	19.28	17	15.7
Thallium	mg/L	0.001 U	0.001 U									4E-05 J	4E-05 J	4E-05
Turbidity, Field	NTU		5.9		1.1	2.94			12	7	2.9	5.9	9.7	7.8
Vanadium	mg/L	0.005 U	0.005 U											
Zinc	mg/L	0.02 U	0.02 U											

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Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	94137	94137	94137	94137	94137	94137	94137	94137	94137	94137	94137	94139	94139
	Date	2017-02-01	2017-03-23	2017-04-28	2017-06-09	2017-07-17	2018-03-08	2018-09-12	2019-03-11	2019-09-17	2020-03-25	2020-09-25	2016-08-23	2016-10-05
		N	N	N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	360						330	330	340	350	330		
Aluminum	mg/L		0.039 J	0.05 U	0.27	0.05 U								
Antimony	mg/L	4E-05 J	0.00038 J	0.002 U	0.002 U	0.002 U							4E-05 J	3E-05 J
Arsenic	mg/L	0.00138	0.0026 J	0.0012 J	0.0036 J	0.0028 J							0.00328	0.00322
Barium	mg/L	0.049	0.068 B	0.056	0.065 B	0.059							0.0893	0.0852
Beryllium	mg/L	2E-05 U	0.001 U	0.001 U	0.001 U	0.001 U							6.5E-05	2.7E-05
Bicarbonate Alkalinity as CaCO3	mg/L							330		340	350	330		
Bicarbonate Alkalinity as HCO3	mg/L								330					
Boron	mg/L	0.037	0.04 J	0.028 JB	0.039 J	0.072 JB	0.035 J^		0.037 J	0.1 U	0.1 U	0.024 J	0.498	0.507
Bromide	mg/L	0.085	0.11 J	2.5 U	0.11 J	0.09 J								
Cadmium	mg/L	5E-05	0.001 U	0.001 U	0.001 U	0.001 U							1E-05 J	1E-05 J
Calcium	mg/L	148	160 B	160	160	160	150	160	150	150	150	150	6.7	5.6
Carbonate Alkalinity as CaCO3	mg/L							5 U	5 U	5 U	5 U	5 U		
Chloride	mg/L	27.5	29	29	29	28	28	28	28	26	27	28	487	503
Chromium	mg/L	0.00169	0.0031	0.002 U	0.0049	0.0038							0.0008	0.0017
Cobalt	mg/L	0.056	0.12	0.031	0.097	0.17							0.000397	0.00031
Conductivity, Field	uS/cm	1302					1281				1221	1213	2454	2630
Copper	mg/L		0.00065 JB	0.002 U	0.0045	0.002 U								
Dissolved Oxygen, Field	mg/L	1.29					1.61						1.05	0.41
Dissolved Solids, Total	mg/L	883	890 J	920 J	880	920 J	890		870	890	870	830	1420	1460
Fluoride	mg/L	0.11	0.14	0.12 J	0.13 J	0.12	0.12 J	0.11	0.25 U	0.11	0.12	0.12	4.22	4.08
Iron	mg/L		0.67 JB	0.19	1.6	0.83								
Lead	mg/L	7E-05	0.00019 J	0.001 U	0.00053 J	0.001 U							0.000963	0.00125
Lithium	mg/L	0.007	0.0078 J	0.0096	0.0088	0.0088							0.02	0.026
Magnesium	mg/L	47.4	51 B	47	50	48	51	49	51	48	47	49		
Manganese	mg/L		0.088	0.06	0.13	0.14								
Mercury	mg/L	2E-06 J	0.0002 U	0.0002 U	0.0002 U	0.0002 U							5E-06 U	5E-06 U
Molybdenum	mg/L	0.00633	0.0034 J	0.0027 J	0.0031 J	0.0026 J							0.2	0.231
Nickel	mg/L		0.0028	0.0019 J	0.0039	0.003								
pH, Field	pH units	7.02	7.03	6.96	7.05	6.96	6.98	7.01	7.13	7.13	7.14	7.2	8.19	8.18
Potassium	mg/L	2.18	1.7 B	1.7	1.8	1.7	1.7	1.9	2	1.8	1.6	1.7		
Radium-226	pCi/L	0.257	0.239	0.111	0.0957	0.0922							1.34	0.464
Radium-226/228	pCi/L	3.127	0.261 U	0.201 U	0.331 U	0.3 U							16.81	1.634
Radium-228	pCi/L	2.87	0.0221 U	0.0903 U	0.235 U	0.208 U							15.47	1.17
Redox Potential, Field	mV	-74.7											-51.8	-191.2
Selenium	mg/L	0.0001 U	0.00056 J	0.005 U	0.005 U	0.005 U							0.0002	0.0001
Silver	mg/L		6E-05 J	0.001 U	6.8E-05 J	0.001 U								
Sodium	mg/L	65	68 JB	64 B	68	68 JB	67	64	67	65	61	64		
Strontium	mg/L	0.276	0.32 B	0.29	0.28 B	0.29								
Sulfate	mg/L	332	360 J	360	360	370	360	370	370	350	390	330	56.1	49
Temperature, Field	deg C	14					14.7				14	17	20.42	17.9
Thallium	mg/L	0.000166	0.001 U	0.001 U	0.001 U	0.001 U							5E-05 U	5E-05 U
Turbidity, Field	NTU	7.1	8	13.9	4.5	6.7	2.3	4.31		3	2.5	1.3	69.7	8.8
Vanadium	mg/L		0.00076 J			0.005 U								
Zinc	mg/L		0.02 U	0.02 U	0.02 U	0.02 U								

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	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	94139	94139	94139	94139	94139	94139	94139	94139	94139	94139	94139	94139	94139
	Date	2016-12-02	2017-02-02	2017-03-29	2017-04-28	2017-06-12	2017-06-12	2017-07-18	2018-03-15	2018-09-24	2019-03-11	2019-09-23	2020-03-19	2020-09-22
		N	N	N	N	FD	N	N	N	N	N	N	N	N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L	563	555						510	500	500	490	520	500
Aluminum	mg/L			1.1 J	0.092	3.8 B	5.1 B	32						
Antimony	mg/L	6E-05	3E-05 J	0.0017 J	0.002 U	0.002 U	0.002 U	0.002 U						
Arsenic	mg/L	0.00438	0.00317	0.0031 J	0.0033 J	0.0047 J	0.0051	0.008						
Barium	mg/L	0.0969	0.081	0.097 B	0.092	0.11	0.12	0.29						
Beryllium	mg/L	7.1E-05	2E-05 J	0.001 U	0.001 U	0.001 U	0.00038 J	0.0015						
Bicarbonate Alkalinity as CaCO3	mg/L								490	490		470	490	470
Bicarbonate Alkalinity as HCO3	mg/L										480			
Boron	mg/L	0.458	0.456	0.52	0.54 B	0.53	0.54	0.54 JB	0.51	0.5	0.54	0.51	0.51	0.51
Bromide	mg/L	1.75	1.57	1.9 J	1.8 J	1.8 J	1.8 J	1.8 J						
Cadmium	mg/L	2E-05 U	6E-06 J	0.001 U	0.001 U	0.001 U	0.001 U	0.00034 J						
Calcium	mg/L	7.99	6.66	5.5 B	7.1	9.6	10	13	7.1	6.8	6.7	7.5	7.4	8.1
Carbonate Alkalinity as CaCO3	mg/L								15	13	17	19	27	24
Chloride	mg/L	450	500	510	510	480	480	520	500	560	500	480	560	560
Chromium	mg/L	0.00236	0.000647	0.0017 J	0.002 U	0.0029	0.0052	0.014						
Cobalt	mg/L	0.000507	0.000159	0.00037 J	0.001 U	0.00062 J	0.00082 J	0.0035						
Conductivity, Field	uS/cm	2608	2726						2550				2467	2493
Copper	mg/L			0.0014 JB	0.002 U	0.007 B	0.0063 B	0.019						
Dissolved Oxygen, Field	mg/L	0.79	1.27						1.29					
Dissolved Solids, Total	mg/L	1390	1360	1500 J	1500 J	1400	1400	1400 J	1400	1400	1300	1300	1300	1400
Fluoride	mg/L	4.05	4.11	4.6	4.7	5	5	5.1	4.4	4.6	4.4	4.7	4.6	4.6
Iron	mg/L			0.62 JB	0.048 J	1.7	2.4	16						
Lead	mg/L	0.000921	0.000319	0.001 J	0.001 U	0.0025	0.004	0.029						
Lithium	mg/L	0.026	0.014	0.019	0.019	0.018	0.019	0.024						
Magnesium	mg/L	2.44	2	1.9 B	2.1	3.2	3.4	7.5	2.3	2.1	2.3	2.9	2.3	2.9
Manganese	mg/L			0.026	0.017	0.023	0.033	0.28						
Mercury	mg/L	1E-05	3E-06 J	0.0002 U	0.0002 U	0.0002 U	0.0002 UJ	0.0002 U						
Molybdenum	mg/L	0.214	0.195	0.22	0.21	0.19 J	0.2 J	0.19						
Nickel	mg/L			0.00089 J	0.002 U	0.0025	0.0027	0.013						
pH, Field	pH units	8.17	8.13	8.12	8.14		8.01	7.92	8.19	8.17	8.37	8.36	8.35	8.22
Potassium	mg/L	2.6	1.97	1.4 B	1.4	1.5	1.6	2.4	1.4	1.4	1.4	1.6	1.3	1.5
Radium-226	pCi/L	0.936	0.454	0.387	0.547	0.559	0.61	0.886 J						
Radium-226/228	pCi/L	1.606	1.196	0.797	0.907	1.12	0.971	2.21						
Radium-228	pCi/L	0.67	0.742	0.41 U	0.36 U	0.565	0.361 U	1.32						
Redox Potential, Field	mV	-43.3	-102.6											
Selenium	mg/L	0.0002	3E-05 J	0.00089 J	0.005 U	0.005 U	0.00091 J	0.0029 J						
Silver	mg/L			0.001 U	0.001 U	0.001 U	0.001 U	0.00019 J						
Sodium	mg/L	425	451	580 JB	570	530	550	560 JB	550	590	560	510	550	520
Strontium	mg/L	0.453	0.395	0.4 B	0.46	0.48 B	0.51 B	0.75						
Sulfate	mg/L	52.8	51	62 J	62	70	69	66	65	74	66	60	62	59
Temperature, Field	deg C	14.8	14.3						15.7				16	17
Thallium	mg/L	2E-05 J	2E-05 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U						
Turbidity, Field	NTU	169.8	8.7	5	5.9		90.8	69.3	22	10.8		34	7.4	309
Vanadium	mg/L							0.0079						
Zinc	mg/L			0.02 U	0.02 U	0.02 U	0.02 U	0.081						

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
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Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

Program Location ID Date		FEDERAL 9801 2016-08-24 N	FEDERAL 9801 2016-10-06 N	FEDERAL 9801 2016-12-02 N	FEDERAL 9801 2017-02-01 N	FEDERAL 9801 2017-03-29 N	FEDERAL 9801 2017-06-09 FD	FEDERAL 9801 2017-06-09 N	FEDERAL 9801 2017-07-17 N	FEDERAL 9801 2018-03-16 N	FEDERAL 9801 2018-09-12 N	FEDERAL 9801 2019-03-12 N	FEDERAL 9801 2019-09-24 N	FEDERAL 9801 2020-03-24 N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L			141	160					130	130	140	130	140
Aluminum	mg/L					0.25 U	1.3 U	1.3 U	0.1 U					
Antimony	mg/L	0.0005 U	0.0005 U	5E-05 U	0.0005 U	0.01 U	0.05 U	0.05 U	0.004 U		0.002 U			
Arsenic	mg/L	0.00075	0.00109	0.00072	0.00056	0.025 U	0.13 U	0.13 U	0.01 U		0.005 U			
Barium	mg/L	5.16	4.84	4.63	4.33	5 B	4.7 B	5 B	5.3		4.8			
Beryllium	mg/L	0.0002 U	0.0002 U	2E-05 U	0.0002 U	0.005 U	0.001 U	0.001 U	0.002 U		0.001 U			
Bicarbonate Alkalinity as CaCO3	mg/L									130	130		130	140
Bicarbonate Alkalinity as HCO3	mg/L											140		
Boron	mg/L	0.378	0.329	0.353	0.404	0.42	0.45	0.45	0.52 JB	0.44	0.44	0.44	0.42	0.38
Bromide	mg/L			34.3	36.2	41	36 J	35 J	39 J					
Cadmium	mg/L	0.0002 U	0.0002 U	2E-05 U	0.0002 U	0.005 U	0.025 U	0.025 U	0.002 U		0.001 U			
Calcium	mg/L	202	198	184	180	180 B	170	190	200	220	200	180	250	180
Carbonate Alkalinity as CaCO3	mg/L									5 U	5 U	5 U	5 U	5 U
Chloride	mg/L	7930	7950	7210	7330	8800	8300	8100	9000	8300	8400	150	9300	8900
Chromium	mg/L	0.0045	0.0024	0.00216	0.000768	0.0017 J	0.05 U	0.05 U	0.0025 J		0.0018 J			
Cobalt	mg/L	0.00173	0.00172	0.000975	0.000957	0.0014 J	0.025 U	0.025 U	0.0011 J		0.0015			
Conductivity, Field	uS/cm	2129	23618	23470	22980					22901				21314
Copper	mg/L					0.01 U	0.05 U	0.05 U	0.004 U					
Dissolved Oxygen, Field	mg/L	3.03	0.71	2.8	1.53					0.22				
Dissolved Solids, Total	mg/L	12600	13000	12300	11300	13000 J	14000	14000	14000 J	13000	14000	11000 HT	14000	11000
Fluoride	mg/L	0.87	0.61	0.6 J	0.91	1 J	5 U	5 U	5 U	2.5 U	1	0.05 U	1.1	1.1
Iron	mg/L					0.51 JB	2.5 U	2.5 U	0.43					
Lead	mg/L	0.0001 J	0.0001 J	0.000354	9E-05 J	0.005 U	0.005 U	0.005 U	0.002 U		0.001 U			
Lithium	mg/L	0.141	0.142	0.16	0.159	0.12	0.13	0.12	0.15		0.13			
Magnesium	mg/L			54.6	55.2	63 B	58	63	63	61		69	83 J	54
Manganese	mg/L					0.57	0.44	0.47	0.51					
Mercury	mg/L	5E-06 U	1.6E-05	1.6E-05	1E-05	0.0002 U	0.0002 U	0.0002 U	0.0002 U		0.0002 U			
Molybdenum	mg/L	0.00533	0.00723	0.00651	0.0068	0.0042 J	0.05 U	0.05 U	0.004 J		0.0039 J			
Nickel	mg/L					0.01 U	0.05 U	0.05 U	0.0035 J					
pH, Field	pH units	6.95	7.16	6.92	7.03	7.2		7.21	7.16	7.32	7.34	7.51	7.49	7.4
Potassium	mg/L			14.4	18.6	9.6 B	8.3 J	9.3 J	9.5	9.2		9.1	12 J	8.7
Radium-226	pCi/L	3.39	6.84	3.47	4.19	4.48	4.49	3.83	4.35 J		5.31			
Radium-226/228	pCi/L	8.15	13.99	7.83	9.95	10.5	10.3	11.3	11 J		11.5			
Radium-228	pCi/L	4.76	7.15	4.36	5.76	5.98	5.8	7.43	6.64 J		6.16			
Redox Potential, Field	mV	124.2	-91.8	85.3	-87.4									
Selenium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.025 U	0.13 U	0.13 U	0.01 U		0.005 U			
Silver	mg/L					0.005 U	0.005 U	0.005 U	0.002 U					
Sodium	mg/L			4310	1650	4400 JB	4200	4700	4600 JB	4700		4800	4400	4200
Strontium	mg/L			16.4	15.6	19 B	13 B	13 B	20					
Sulfate	mg/L	3.4	7.2	6.7	3.4	8.6 J	100 U	100 U	100 U	50 U	6.3 J	1 U	5.2 J	8.9 J
Temperature, Field	deg C	19.72	16.5	14.2	13.5					14.9				14
Thallium	mg/L	0.0002 J	0.0001 J	0.000528	0.0005 U	0.005 U	0.005 U	0.005 U	0.002 U		0.001 U			
Turbidity, Field	NTU	4.7	9.7	3	3.9	7.7		3.2	3.5	1.5	4.22		6	1.4
Vanadium	mg/L								0.01 U					
Zinc	mg/L					0.1 U	0.5 U	0.5 U	0.04 U					

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
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Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

Program / Location ID / Date		FEDERAL 9802 2016-08-24 N	FEDERAL 9802 2016-10-06 N	FEDERAL 9802 2016-12-02 N	FEDERAL 9802 2017-02-01 N	FEDERAL 9802 2017-03-29 N	FEDERAL 9802 2017-06-09 N	FEDERAL 9802 2017-07-17 N	FEDERAL 9802 2018-03-16 N	FEDERAL 9802 2018-09-12 N	FEDERAL 9802 2019-03-12 N	FEDERAL 9802 2019-09-24 N	FEDERAL 9802 2020-03-24 N	FEDERAL 9802 2020-09-22 N
Analyte	Unit													
Alkalinity, Total as CaCO3	mg/L			796	645				610	570	590	590	610	590
Aluminum	mg/L					0.071 J	0.22	0.05 U						
Antimony	mg/L	3E-05 J	4E-05 J	2E-05 J	3E-05 J	0.00034 J	0.002 U	0.002 U						
Arsenic	mg/L	0.00091	0.00072	0.0012	0.00103	0.00094 J	0.00083 J	0.00089 J						
Barium	mg/L	0.0781	0.0711	0.0664	0.069	0.08 B	0.086 B	0.082						
Beryllium	mg/L	5E-06 J	2E-05 U	7E-06 J	6E-06 J	0.001 U	0.00035 J	0.001 U						
Bicarbonate Alkalinity as CaCO3	mg/L								610	570		590	610	590
Bicarbonate Alkalinity as HCO3	mg/L										590			
Boron	mg/L	0.172	0.157	0.178	0.242	0.18	0.19	0.27 JB	0.2		0.2	0.21	0.22	0.24
Bromide	mg/L			0.499	0.157	2.5 U	2.5 U	2.5 U						
Cadmium	mg/L	2E-05	1E-05 J	0.0001	5E-05	0.001 U	0.001 U	0.001 U						
Calcium	mg/L	29.3	28.7	24.5	28	29 B	31 J	30	30	36	31	26	26	26
Carbonate Alkalinity as CaCO3	mg/L								5 U	5 U	5 U	5 U	5 U	5 U
Chloride	mg/L	36.1	35.2	39.1	38	39	38	40	39	35	39	38	41	47
Chromium	mg/L	0.0013	0.0028	0.00206	0.000823	0.00081 J	0.0025	0.0011 J						
Cobalt	mg/L	0.000954	0.00112	0.000847	0.00108	0.0011	0.00048 J	0.00041 J						
Conductivity, Field	uS/cm	1311	1361	1354	1366				13.31				1265	1284
Copper	mg/L					0.00056 JB	0.0017 JB	0.002 U						
Dissolved Oxygen, Field	mg/L	1.81	0.73	2.01	1.68				1.46					
Dissolved Solids, Total	mg/L	766	784	796	810	820 J	830	810 J	810		780	740	780	790
Fluoride	mg/L	0.88	0.8	0.8	0.84	0.96	0.99	0.95	1	0.94	0.91	1	1	0.9
Iron	mg/L					0.18 JB	0.27	0.058 J						
Lead	mg/L	4.4E-05	3.1E-05	4.3E-05	6E-05	0.00026 J	0.001 U	0.001 U						
Lithium	mg/L	0.015	0.018	0.022	0.012	0.014	0.012	0.014						
Magnesium	mg/L			6.8	7.8	8.2 B	9	8.6	8.1	9.3	8.8	7.8	7.1	7
Manganese	mg/L					0.48	0.1	0.28						
Mercury	mg/L	5E-06 U	5E-06 U	1.1E-05	5E-06 U	0.0002 U	0.0002 U	0.0002 U						
Molybdenum	mg/L	0.0064	0.00563	0.00543	0.00525	0.0051 J	0.0046 J	0.0048 J						
Nickel	mg/L					0.00079 J	0.0018 J	0.0022						
pH, Field	pH units	6.94	7.25	7.3	7.19	7.24	7.2	7.11	7.31	7.59	7.51	7.43	7.4	7.32
Potassium	mg/L			1.66	2.05	1.5 B	1.5	1.6	1.5	1.9	1.7	1.6	1.6	1.5
Radium-226	pCi/L	0.443	0.327	0.603	0.245	0.173	0.181	0.188						
Radium-226/228	pCi/L	2.763	0.638	0.832	0.506	0.31 U	0.276 U	0.786						
Radium-228	pCi/L	2.32	0.311	0.229	0.261	0.136 U	0.0949 U	0.597						
Redox Potential, Field	mV	14.6	-32.9	9	-49.4									
Selenium	mg/L	5E-05 J	4E-05 J	3E-05 J	5E-05 J	0.005 U	0.005 U	0.0012 J						
Silver	mg/L					0.001 U	0.001 U	0.001 U						
Sodium	mg/L			253	270	260 JB	270	290 JB	290	260	290	300	280	290
Strontium	mg/L			0.58	0.601	0.62 B	0.55 B	0.65						
Sulfate	mg/L	65.8	57.5	60.2	58.9	70 J	72	71	68	68	73	69	70	73
Temperature, Field	deg C	20.37	18.2	14.3	13.6				16.8				16	17
Thallium	mg/L	5.8E-05	8.4E-05	5.8E-05	5E-05 J	0.001 U	0.001 U	0.001 U						
Turbidity, Field	NTU	0.4	2.5	14.4	6.5	6.9	1.6	7.5	2.1	35.3		5	0.8	1
Vanadium	mg/L							0.005 U						
Zinc	mg/L					0.02 U	0.02 U	0.02 U						

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NTU = Nephelometric Turbidity Unit
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Appendix B
Analytical Data Summary
Residual Water Landfill
Gavin Power Plant

	Program	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL	FEDERAL
	Location ID	9806	9806	9806	9806	9806	9806	9806	9806	9806	9806	9806
	Date	2016-12-02	2017-02-08	2017-03-27	2017-05-01	2017-06-27	2018-03-20	2018-09-11	2019-03-14	2019-09-26	2020-03-25	2020-09-17
		N	N	N	N	N	N	N	N	N	N	N
Analyte	Unit											
Alkalinity, Total as CaCO3	mg/L	350	346				330	330	390 B	320	370	350
Aluminum	mg/L			2.4 J	2.8	0.057						
Antimony	mg/L	0.00011	6E-05	0.0003 JB	0.00068 J	0.002 U		0.002 U	0.002 U			
Arsenic	mg/L	0.00207	0.00113	0.0011 J	0.0015 J	0.001 J		0.005 U	0.005 U			
Barium	mg/L	0.0676	0.05	0.057 B	0.058	0.041		0.031	0.033			
Beryllium	mg/L	0.000269	0.000122	0.001 U	0.00038 J	0.001 U		0.00061 JF2F1	0.001 U			
Bicarbonate Alkalinity as CaCO3	mg/L						300	310	390 B	300	370	340
Bicarbonate Alkalinity as HCO3	mg/L											
Boron	mg/L	0.256	25	0.31	0.32	0.35	0.29	0.27	0.23	0.3	0.22	0.21
Bromide	mg/L	0.82	0.65	0.94 J	0.77 J	0.96			0.23 J			
Cadmium	mg/L	0.00037	0.0001	0.001 U	0.001 U	0.001 U		0.001 U	0.001 U			
Calcium	mg/L	5.35	159	4 B	4.2	3.7	3.6	9.6	37	4.1	31	37
Carbonate Alkalinity as CaCO3	mg/L						22	19	5 U	26	5 U	7.3
Chloride	mg/L	187	191	200	200	200	210	94	38	190	53	51
Chromium	mg/L	0.00653	0.00291	0.004 B	0.0054	0.002 U		0.002 U	0.0015 J			
Cobalt	mg/L	0.00516	0.00231	0.0016	0.0017	0.001 U		0.001 U	0.00046 J			
Conductivity, Field	uS/cm	1500	1574				1533				1666	1691
Copper	mg/L			0.0031 B	0.0066 B	0.002 U						
Dissolved Oxygen, Field	mg/L	1.44	1.25				1.78					
Dissolved Solids, Total	mg/L	860	874	890 J	860 J	870	880	850	1000	1900	930	1100
Fluoride	mg/L	1.14	1.08	1.4	1.3	1.3	1.3	0.87	0.34	1.4	0.44	0.39
Iron	mg/L			2 JB	2.2	0.058 J						
Lead	mg/L	0.00481	0.00227	0.0018 J	0.0028	0.001 U		0.001 U	0.001 U			
Lithium	mg/L	0.022	0.249	0.013	0.012	0.012		0.036 F2F1	0.045			
Magnesium	mg/L	2.21	171	1.4 B	1.5	0.92 J	0.85 J			1.5	13	16
Manganese	mg/L			0.034 B	0.03	0.02 B						
Mercury	mg/L	0.000131	6E-06	0.0002 U	0.0002 U	0.0002 U		0.0002 U	0.0002 U			
Molybdenum	mg/L	0.011	0.0107	0.012	0.011	0.023		0.0061	0.0023 J			
Nickel	mg/L			0.0037 B	0.0036	0.002 U						
pH, Field	pH units	8.61	8.49	8.59	8.4	8.4	8.64	8.5	7.74	8.73	7.86	8.2
Potassium	mg/L	2.09	18.4	1.6 B	1.7	0.84 J	0.96 J			1.1	2.9	3.2
Radium-226	pCi/L	0.658	0.221	0.154	0.149	0.199		0.151	0.0571 U			
Radium-226/228	pCi/L	0.7334	0.711	0.378	0.235 U	0.353		0.257 U	0.0148 U			
Radium-228	pCi/L	0.0754	0.49	0.224 U	0.0855 U	0.154 U		0.106 U	-0.0422 U			
Redox Potential, Field	mV	-14.2	69.1									
Selenium	mg/L	0.0007	0.0003	0.005 U	0.0011 J	0.005 U		0.0015 J	0.00098 J			
Silver	mg/L			0.00084 J	0.0012	0.001 U						
Sodium	mg/L	277	213	320 JB	350 B	350	320			320	310	350
Strontium	mg/L	0.166	1.28	0.15 B	0.16 B	0.13						
Sulfate	mg/L	116	113	130 J	130	130	130	240	450	130	510	490
Temperature, Field	deg C	11	12.4				11.8				13	14
Thallium	mg/L	7E-05	4E-05 J	0.001 U	0.001 U	0.001 U		0.001 U	0.001 U			
Turbidity, Field	NTU	301.9	74.3	110.6	40.6	53.8	13	4.33		32	2.3	0.8
Vanadium	mg/L											
Zinc	mg/L			0.0093 J	0.02 U	0.02 U						

Notes:
FD = Field duplicate sample
N = Normal environmental sample
deg C = Degree Celcius
mg/L = Milligrams per liter
mV = Milivolts
NTU = Nephelometric Turbidity Unit
uS/cm = Microsiemens per centimeter
pCi/L = Picocuries per liter
B: Compound was found in the blank and sample.
J: Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
U: Indicates the analyte was analyzed for but not detected.
Empty cells = Not analyzed

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