From: Davies, Wyn <Wyn.Davies@arcadis.com>
Sent: Wednesday, February 05, 2020 2:30 PM
To: Spellman, John (DEC)
Cc: Jackson, Darrel; O'Connor, Maryanne (DEC); Banach, Katie; Earp, Steve
Subject: AVNET - Former Channel Master Site, Ellenville, NY CEMR for Second Half 2019
Attachments: 020520.Avnet Channel Master Ellenville NY CEMR Second Half 2019.pdf

John:

Per the requirements of Avnet/Channel Master's RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018, attached is the Chemical Effectiveness Monitoring Report (CEMR) for the second half of 2019 reporting period. We appreciate your willingness and desire to only provide electronic reporting of these regulatory reports.

Please let me know of any questions or concerns you may have regarding the report. As always, just call me on my mobile 610.360.4895

Wyn
Wyn V. Davies, CIH | Associate Vice President | Remediation Technical Expert wyn.davies@arcadis.com
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ARCADIS Design & Consultancy for natural and built assets

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Environment

Subject:
Avnet Inc. / Former Channel Master Site, Ellenville, NY
RCRA Corrective Action & Post Closure Consent Order
Index Number: CO 3-20170802-152
Site Number: 356025

Chemical Effectiveness Monitoring Report
Semi-Annual Report for Period July 1, 2019 to December 31, 2019

Date:
February 05, 2020

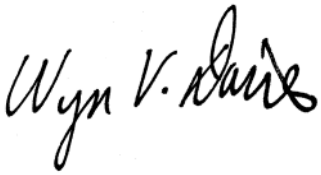
Dear Mr. Spellman:

Enclosed is the semi-annual Chemical Effectiveness Monitoring Report (CEMR) for the former Channel Master site located in Ellenville, NY submitted on behalf of Avnet, Inc. This report covers the July 1, 2019 to December 31, 2019 reporting period and presents a summary of the ongoing 2019 corrective action activity results at the facility through the second half of 2019. The overall summary of the activities for 2019, as well as a statistical evaluation, of all wells will be performed and this annual report will be issued to the NYSDEC in 2Q2020.

If you have any comments or questions regarding the report, please call me at 610.360.4895.

Sincerely,

Arcadis of NY, Inc.



Wyn V. Davies, CIH
Associate Vice President

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Darrel Jackson, Avnet Inc., (w/encl.)

ARCADIS Design & Consultancy for natural and built assets

AVNET Inc. – Former Channel Master Facility

CHEMICAL EFFECTIVENESS MONITORING REPORT

Second Half 2019

Report Period – July 1 to December 31, 2019

February 2020

CHEMICAL EFFECTIVENESS MONITORING REPORT AVNET/FORMER CHANNEL MASTER SITE, ELLENVILLE NY

Second Half 2019

(July 01 to December 31, 2019)

Wyn V. Davies, CIH
Associate Vice President

Prepared for:

AVNET Inc.

Prepared by:

Arcadis of NY, Inc.
17-17 Route 208 North
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Our Ref.:

30001478 - 00395052.0000

Date:

February 5, 2020

CONTENTS

TABLES

FIGURES

1 SITE BACKGROUND

Channel Master owned and operated a manufacturing facility in Ellenville, New York until the facility was sold to Imperial Schrade in 1984. Channel Master, which was owned by Avnet Inc. at that time, relocated its operations out of state and agreed to retain responsibility for identified environmental conditions associated with its Channel Master Division at the Ellenville, NY site. In October 1997, Avnet sold its Channel Master Division and again retained its responsibilities associated with its former operations at the Ellenville site, including assuming the role of responsible party in the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018.

During its period of operation, Channel Master treated its wastewater in a chemical treatment system within the plant building and in an outdoor surface impoundment (Lagoon) on Channel Master's property. The plant and the surface impoundment were decommissioned under the Resource Conservation and Recovery Act (RCRA) in accordance with Channel Master's approved Closure Plan. Groundwater beneath the building was found to be contaminated with several volatile organic compounds (VOCs), the primary of which was 1,1,1-trichloroethane (TCA), a solvent used in degreasing. A groundwater recovery and treatment system was installed and has been operating since January 1987 to remedy the groundwater contamination beneath the building pad.

In March 1991, the New York State Department of Environmental Conservation (NYSDEC) issued a 6NYCRR Part 373 Post-Closure Permit for the facility (NYSDEC # 3-5156-91/4-0) which was replaced by a RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018. The post-closure monitoring requirements for the former surface impoundment (lagoon area) and the monitoring and evaluation requirements for the groundwater treatment and recovery system (plant area) are addressed in the Consent Order. The corrective action was also covered by a HSWA permit (#NYDO42457788, issued by the United States Environmental Protection Agency [USEPA] in May 1991 which has been managed by NYSDEC and continues to be covered by the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018.

2 CHEMICAL EFFECTIVENESS MONITORING PLAN - PROGRESS SUMMARY

Channel Master developed a Chemical Effectiveness Monitoring Plan (CEMR) to assess the effectiveness of the corrective action program and has been incorporated into the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018. The purpose of the plan, as described in the permit, is to determine the rate of groundwater cleanup and verify that groundwater elevation gradients are being maintained toward the recovery well. To satisfy these objectives, the plan proposed use of water quality and water level data collected from the

recovery well and eight monitoring wells (BH-1, BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-18, and BH-19) located formerly inside[1] the plant building (see Figure 3-1A).

Earlier evaluations of the effectiveness of the corrective action concluded that pumping the recovery well is effectively removing contaminants from the groundwater. However, during the period of time from 1989 to early 1992, monitoring well BH-19 had shown an increase in the concentration of TCA, which is used as the indicator parameter in this assessment. From 1993 to 1999, TCA concentrations in BH-19 generally followed a cyclical pattern before beginning a steady decrease in 1999. This monitoring well is located approximately ten feet from the recovery well and is screened deeper (41 to 51 feet below grade) than the others in the network, including the recovery well. To investigate the possibility of induced downward migration of contaminants, Channel Master proposed collecting analytical data from well BH-17 for at least one year. BH-17 is screened deeper than most wells at the site (from 22 to 32 feet below grade) and is located in the area of greatest groundwater contamination. As proposed in the evaluation report, groundwater from BH-17 is being analyzed instead of BH-1 (which was originally part of the monitoring network) for comparison to groundwater data obtained from the other deep wells and to determine the significance of the earlier increase detected at BH-19. Although deep well BH-13 was also sampled during both semiannual sampling rounds in 2000 and 2001 to provide additional data on the deeper groundwater under the plant (as requested by the NYSDEC in its letter to Avnet dated January 18, 2000), the NYSDEC discontinued the requirement to sample BH-13 in 2002, since no significant concentrations of TCA were detected there in the four sampling rounds.

In September 1991, Channel Master began pumping an additional recovery well (BH-20) inside the plant building. Screened to a depth of 24.5 feet, BH-20 was installed in July 1990 approximately 70 feet west (upgradient) of the existing recovery well. At the time, this was near the area of greatest groundwater contamination. Pumping of BH-20 ceased in April 2001 because of mechanical difficulties with the well screen and pump. Because of the historically low recovery obtained at this well (less than 5 pounds of TCA had been removed from BH-20 since December 1996) and the fact that the area of greatest contamination is now much closer to the main recovery well, this did not have a significantly adverse impact on the effectiveness of the groundwater treatment system. Nonetheless, BH-20 was rehabilitated during the annual maintenance of the recovery well and associated piping in July 2002, at which time the pumping of BH-20 recommenced. BH-20 was not included in the Chemical Effectiveness Monitoring Plan because it was not being operated at the time the plan was developed; however, the results of pumping this well are evaluated in this report.

In a letter dated January 18, 2000, Gary Casper of the NYSDEC directed Avnet to sample deep well BH-13 in April and October 2000 to further evaluate the conditions in the deep groundwater in the plant area. Neither sample contained contaminants exceeding NYSDEC groundwater quality standards. At the request of the NYSDEC, Avnet sampled BH-13 again in May and October 2001. As indicated in the semiannual groundwater monitoring report for the May 2001

[1] In April 2016, the former manufacturing building demolition was completed while maintaining the integrity of the building slab (the well structures are no longer “inside” the building). No substantial changes to the corrective action area or groundwater flow is anticipated.

sampling round, the groundwater elevation measured at BH-13 was more than 5 feet lower than the elevations measured at deep wells BH-11A, BH-17, and BH-19, indicating that BH-13 is to some degree hydraulically downgradient of the other deep wells. Therefore, because the groundwater sample from deep well BH-13 contained only 0.39 micrograms per liter (µg/l) of TCA (significantly less than the concentrations found in the other deep wells), it appears that TCA is not migrating laterally to a significant degree in the deep groundwater. Because TCA was not detected above its groundwater quality standard (GWQS) in BH-13 during any of the four sampling events in 2000 and 2001, the NYSDEC agreed to discontinue sampling BH-13 starting in 2002.

In the third and fourth quarters of 2015 and first quarter of 2016, the current site owner (AmTrust Realty) performed a demolition of the former Channel Master manufacturing buildings. The demolition activities removed all above ground structures and maintained the integrity of the building floor/pad to avoid potential issues of disrupting the groundwater flow patterns as well as the effectiveness of the groundwater recovery and treatment system. Arcadis monitored the progress of the demolition work to assure no disturbance of the well structures or the creation of infiltration pathways within the building pad occurred during the performance of the work. The relocation of the groundwater treatment system and the establishment of a new operational center on the building pad between the recovery well and BH-20 were performed in a manner that averted operational shutdowns beyond Post Closure requirements for the former Channel Master Site.

3 EVALUATION

3.1 Influence of Pumping on Groundwater Flow

Groundwater elevations were measured in the monitoring wells associated with the former plant building on November 25, 2019. These measurements were used to generate a groundwater contour map (see Figure 3-1) and to evaluate the current efficacy of the hydraulic control. Before pumping of the recovery well began in 1986, groundwater contours indicated flow generally toward the east. These contours were relatively parallel and straight. The current significant bending of the contour lines around the Recovery Well indicates that groundwater beneath the former plant building concrete slab is drawn toward the pumping well. The groundwater contours also support the impact of BH-20 on the groundwater flow to this intermittent groundwater recovery operation. Groundwater from the area surrounding the most highly contaminated groundwater shallow monitoring wells BH-11B and BH-16 also indicate flows toward the recovery well and BH-20 respectively. Therefore, the results of the current semi-annual groundwater elevation event support the goals of the CEMR in maintaining the efficacy of hydraulic control with the recovery wells. Additionally, there continues to be no groundwater flow disturbances/impacts related to the demolition of the building structure for the well structures installed beneath the former building floor slab through this semi-annual monitoring period.

3.2 Quantities of TCA Recovered and Associated Removal Rates

As discussed in the Chemical Effectiveness Monitoring Plan, 1,1,1-trichloroethane (TCA) has been detected in the monitored wells during every sampling event and consistently occurs at higher concentrations than other parameters. Therefore, TCA has been used in the semi-annual assessments (and found historically acceptable to the NYSDEC) as the indicator of contamination beneath the former plant building and the site. TCA concentrations in the recovery well have been monitored since 1986, prior to implementation of the corrective action program. TCA concentrations in BH 20 have been monitored since installation of that well in July 1990.

TCA concentration data on the recovery well are presented in Table 2-1, and the TCA concentration data for recovery well BH 20 are presented in Table 2-2.

To estimate the mass of TCA recovered from the recovery well and from BH 20, the concentration of TCA in the groundwater was multiplied by the volume of water pumped during the period between that sampling date and the preceding sampling date. The volume of groundwater pumped from the wells is recorded weekly. The following equation was used:

Mass of TCA pumped (lb.) = C•V•K

Where C = Concentration of TCA, in µg/l;

V = Volume of groundwater pumped, in gallons; and

K = Conversion factor: 8.34x10 9 (liters H_2O)(lb. TCA)/(gallons H_2O)(µg TCA)

Estimates of the mass of TCA recovered from each well since the start of pumping are presented in Table 2-1 and Table 2-2. The total amount of TCA removed by the Recovery Well and BH-20 through December 31, 2019 is approximately 866 pounds.

The removal rates are variable because of variability in both the concentrations and pumped volumes. The estimated average TCA removal rate from pumping the recovery well during the period covering July 1 to December 31, 2019 was approximately 0.0019 pounds per day (0.34 pounds total for the Second Half of year 2019). The estimated average TCA removal rate from BH 20 during the same period was approximately 0.00003 pounds per day (0.005 pounds total for the Second Half of year 2019).

4 DETERMINATION OF WATER QUALITY TREND

4.1 Historical

Avnet has evaluated groundwater data from the sampled monitoring wells as part of the corrective action program to assess the impact of TCA removal on groundwater quality beneath the plant's former building slab. Although the permit originally required the sampling of eight monitoring wells (BH-1, BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-18, and BH-19), concentrations of TCA have been monitored in ten wells since 1986. Of the eight wells initially required to be sampled, six wells (BH-1, BH-2, BH-9, BH-11B, BH-16 and BH-18) are approximately 20 feet deep and monitor the shallow water table, while the other two wells (BH-

11A and BH-19) monitor deeper zones of the water bearing formation and are 38 and 51 feet deep, respectively. A third deep well, BH-17, is 32 feet deep and is also used to monitor the deeper zone. Prior to October 1991, this well was only sampled twice, in September 1985 and August 1986. The well is now being sampled instead of BH-1 to investigate the possibility of downward migration of contaminants as discussed in the previous section. In addition, the NYSDEC directed Avnet to sample deep well BH-13 in April and October 2000 and in May and October 2001 to provide additional information on the deeper groundwater under the site. The sampling of BH-13 was discontinued in 2002, as agreed to by the NYSDEC. The locations of these wells are shown on Figure 3-1A.

Water quality data collected before the start of the corrective action program were used to determine the average background concentration of TCA in the monitoring wells. Generally, two or three values are available from each well, as shown on Table 2-3. The concentrations measured at each well vary considerably, sometimes by as much as two orders of magnitude. Therefore, the estimates of background concentrations have a high degree of error associated with them.

In the case of several monitoring wells, samples collected shortly after installation (1985-1986, before the pumping and treating system began operating) contained the highest TCA concentrations recorded in those wells. This is particularly evident in the samples collected from BH 11A, BH-11B, BH-16, BH-18, and BH-17 (although one sample from BH-17 collected in 1998 contained the highest TCA concentration ever recorded for that well). The contaminants may have mobilized from the unsaturated soil during well installation; therefore, the concentrations detected may not represent what was present in the groundwater, and the calculated background concentrations may be overestimated.

Trends in water quality can be determined from historic data collected since the start of the corrective action program as presented in Table 2-4. Table 2-4 reveals a significant groundwater quality reduction trend of TCA in shallow wells decreasing in three orders of magnitude since pumping began [Especially evident in wells BH11B and BH-16].

Annual average TCA concentrations in deep well BH-19 have been generally decreasing since 1992, with the annual averages for the years 2002-2019 being the lowest ever. No sample from BH-19 has exceeded the NYSDEC GWQS for TCA (5.0 µg/l) since October 2000, and TCA has been detected in BH-19 above its laboratory reporting limit (generally 1.0 µg/l) only three times since April 2003. The annual average TCA concentration in deep well BH-17 peaked in 1998, and although the TCA concentration has tended to fluctuate somewhat since sampling of BH-17 began in 1991, TCA has been detected in BH-17 above its GWQS on only two occasions since October 2003. TCA concentrations in the other wells have been generally decreasing since 1987 as shown in Table 2-4.

The addition of one data point to the existing set of data is generally not sufficient to create a significant change in the linear regression analyses. Accordingly, the NYSDEC agreed that these analyses may now be performed on an annual basis and submitted with the Annual Report.

4.2 Current Monitoring Data Results

The results of the TCA monitoring for the Second Half of 2019 are presented in Table 2-4.

An iso-concentration map was constructed using the TCA concentrations in the five shallow groundwater samples collected in November 2019, as shown on Figure 3-2. Although the isopleths themselves should not be considered exact, the patterns on this map indicate that the area of highest contamination is near BH-11B (36 µg/l) and BH-16 (580 µg/l).

These results confirm that the recovery well is positioned near the area of greatest groundwater contamination and requires no modification to the goals of the Chemical Effectiveness Monitoring Plan.

5 CONCLUSIONS AND RECOMMENDATIONS

Water quality and water level data collected from the shallow wells located beneath the pad of the former plant building indicate that pumping the recovery well continues to remove contaminants from the groundwater. Groundwater quality in monitoring wells BH-11B, BH-16, and BH-18, historically three of the most contaminated shallow wells, has improved significantly as a result of the pumping. The concentration of 1,1,1-trichloroethane (TCA) in all three wells has decreased by several orders of magnitude since pumping began, although it appears that the reduction of the TCA concentration in groundwater has slowed in recent years. All samples collected from BH-11B and BH-16 (the two most contaminated wells) from October 2006 through December 2019 contained TCA at concentrations less than one part per million (ppm or mg/l), and in 24 of the 30 sampling rounds since April 2002, samples from these two wells have both contained TCA below one ppm. The TCA concentration in BH-18 has only slightly exceeded GWQS on two occasions since April 1999 – most recently in 2011.

A qualitative review of the most recent shallow groundwater contour map (Figure 3-1) and iso-concentration map (Figure 3-2) indicate that the contaminant plume appears to be effectively contained by the recovery well and BH-20 capture zones. This is supported by the fact that TCA has not been detected above its NYSDEC GWQS of 5.0 µg/l in the downgradient shallow well BH-9 since 1994, except for five samples, one in October 2005, one in November 2011, one in May 2013, one in November 2018, one in May 2019 and the current round in November 2019.

Avnet will continue to sample BH-17 (in lieu of shallow well BH-1) as well as BH-11A and BH-19 to monitor concentrations of volatile organic compounds (VOCs) in the deep groundwater, thereby addressing the concern with downward and/or deep lateral migration.

Therefore, the historical weight of evidence of facts continues to support the conclusion that the current corrective action program is effectively controlling the contaminant plume in the shallow groundwater and therefore should continue.

TABLES

TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
3/18/1986	19	0		
12/3/1986	7500	0		
12/8/1986	3100	81000	2.1	0.419
1/14/1987	2300	180910	3.5	0.094
2/20/1987	920	941560	7.2	0.195
3/20/1987	630	873500	4.6	0.164
4/29/1987	860	1120240	8.0	0.201
5/27/1987	150	608350	0.76	0.027
6/11/1987	1100	295070	2.7	0.180
7/28/1987	710	966190	5.7	0.122
8/18/1987	520	569900	2.5	0.118
9/15/1987	670	732400	4.1	0.146
10/12/1987	1100	751920	6.9	0.255
11/19/1987	860	944670	6.8	0.178
1/20/1988	1900	1611970	26	0.412
2/17/1988	1300	227410	2.5	0.088
3/18/1988	2200	620380	11	0.379
4/7/1988	840	556180	3.9	0.195
5/18/1988	450	571190	2.1	0.052
6/7/1988	660	0	0.0	0.000
7/12/1988	620	0	0.0	0.000
8/30/1988	730	569960	3.5	0.071
9/30/1988	640	164950	0.88	0.028
10/27/1988	460	439310	1.7	0.062
11/30/1988	360	1225510	3.7	0.108
12/22/1988	750	462160	2.9	0.131
1/17/1989	470	446290	1.7	0.067
2/8/1989	670	475070	2.7	0.121
3/29/1989	330	1199950	3.3	0.067
5/2/1989	170	319080	0.45	0.013
5/22/1989	5.1	262740	0.011	0.001
6/30/1989	470	464420	1.8	0.047
7/6/1989	320	0	0.0	0.000
8/2/1989	370	363790	1.1	0.042
9/12/1989	260	1680180	3.6	0.089
10/4/1989	320	985570	2.6	0.120
10/25/1989	380	975570	3.1	0.147
12/13/1989	290	1739400	4.2	0.086
1/9/1990	480	431730	1.7	0.064
2/6/1990	1000	528180	4.4	0.157
3/3/1990	1100	426570	3.9	0.157
4/2/1990	640	923500	4.9	0.164
5/10/1990	460	1152430	4.4	0.116
6/4/1990	380	1419860	4.5	0.180
7/1/1990	290	0	0.0	0.000
8/7/1990	250	3049880	6.4	0.172

TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
9/4/1990	220	1703420	3.1	0.112
10/8/1990	320	2054910	5.5	0.161
11/6/1990	250	1261917	2.6	0.091
12/10/1990	280	1791263	4.2	0.123
1/9/1991	640	503440	2.7	0.090
2/9/1991	330	1093430	3.0	0.097
3/6/1991	310	862420	2.2	0.089
4/20/1991	290	2432100	5.9	0.131
7/24/1991	270	2639010	5.9	0.063
10/15/1991	5000	3464990	144	1.741
12/21/1991	430	3211800	12	0.172
6/19/1992	890	7858630	58	0.322
12/7/1992	310	5733730	15	0.087
7/9/1993	195	4164728	6.8	0.032
12/6/1993	300	3789014	9.5	0.063
10/25/1994	970	8423700	68	0.211
3/28/1995	2000	4139800	69	0.448
7/12/1995	970	3354600	27	0.256
12/5/1995	200	4766100	7.9	0.054
6/11/1996	780	4398500	29	0.151
12/17/1996	1800	4297700	65	0.341
6/10/1997	160	3151400	4.2	0.024
12/16/1997	120	4643400	4.6	0.025
4/28/1998	360	4258800	13	0.096
12/10/1998	160	5930800	7.9	0.035
6/24/1999	66	3907100	2.2	0.011
12/28/1999	170	5397900	7.7	0.041
6/13/2000	340	4098800	11.6	0.069
12/29/2000	270	5491500	12.4	0.062
6/12/2001	170	5710200	8.1	0.049
12/26/2001	36	6573900	2.0	0.010
6/25/2002	36	4680800	1.4	0.0078
12/31/2002	26	5184000	1.1	0.0059
6/24/2003	40	5627400	1.9	0.011
12/30/2003	140	5525800	6.5	0.034
6/29/2004	130	6198100	6.7	0.037
12/28/2004	0	5540600	0.0	0.000
6/28/2005	32	5317700	1.4	0.0078
12/27/2005	0	4438700	0.0	0.000
6/28/2006	23	4667300	0.90	0.0049
12/27/2006	41	5061500	1.7	0.010
6/26/2007	16	5288400	0.71	0.0039
12/24/2007	15	5007800	0.63	0.0035
6/24/2008	19	4378500	0.69	0.0038
12/30/2008	39	3677500	1.20	0.0063
6/30/2009	13	3752500	0.41	0.0022

TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
12/30/2009	16	4403800	0.59	0.0032
6/29/2010	12	3898500	0.39	0.0022
12/28/2010	19	4132300	0.65	0.0036
6/15/2011	11	4750000	0.44	0.0026
12/28/2011	9.4	4941900	0.39	0.0020
6/30/2012	14	4951000	0.58	0.0031
12/26/2012	22	5283500	0.97	0.0054
6/28/2013	16	5503000	0.73	0.0040
12/31/2013	66	5214300	2.87	0.0154
6/25/2014	22	4860400	0.89	0.0051
12/30/2014	18	4812400	0.72	0.0038
6/5/2015	14	4427300	0.52	0.0033
12/29/2015	18	5227600	0.78	0.0038
6/30/2016	19	3794107	0.60	0.0033
12/30/2016	26	4926193	1.07	0.0058
6/30/2017	23	4090300	0.78	0.0043
12/27/2017	14	3594000	0.42	0.0023
6/30/2018	13	4158500	0.45	0.0024
12/31/2018	14	5078800	0.59	0.0032
6/3/2019	14	4241800	0.50	0.0032
12/1/2019	15	2691900	0.34	0.0019
TOTALS		321,796,142	826.94	

Notes:
* Gallons pumped is measured from previous sampling date.
Updated 1/2020

TABLE 2-2

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN BH-20
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
7/13/1990	4300	12,487	0.45	0.090
7/25/1990	270	0	0.00	0.000
10/17/1990	860	0	0.00	0.000
1/9/1991	2100	0	0.00	0.000
10/15/1991	2700	16,410	0.37	0.018
12/21/1991	4800	88,290	3.5	0.053
1/15/1992	2800	32,880	0.77	0.031
6/19/1992	4100	201,990	6.9	0.044
12/7/1992	1800	182,170	2.7	0.016
7/7/1993	740	330,450	2.0	0.010
12/6/1993	790	118,620	0.78	0.0051
10/25/1994	3000	324,410	8.1	0.025
3/28/1995	1700	124,490	1.8	0.011
7/12/1995	930	85,160	0.66	0.0062
12/5/1995	850	124,840	0.88	0.0061
6/11/1996	630	217,360	1.1	0.0060
12/17/1996	1400	192,540	2.2	0.012
6/10/1997	560	190,070	0.89	0.0051
12/16/1997	600	153,750	0.77	0.0041
4/28/1998	370	156,550	0.48	0.0036
12/10/1998	350	226,630	0.66	0.0029
6/24/1999	190	194,730	0.31	0.0016
12/28/1999	130	146,970	0.16	0.0009
6/13/2000	410	250,780	0.86	0.0051
12/29/2000	240	266,290	0.53	0.0027
12/31/2002	0	209,410	0.00	0.0000
6/24/2003	34	226,960	0.064	0.00037
12/30/2003	170	296,080	0.42	0.0022
6/29/2004	75	239,060	0.15	0.00082
12/28/2004	21	108,140	0.019	0.00010
6/28/2005	48	254,480	0.10	0.00056
12/27/2005	130	189,520	0.21	0.00113
6/28/2006	110	192,330	0.18	0.00096
12/27/2006	160	200,010	0.27	0.00147
6/26/2007	41	234,690	0.080	0.00044
12/24/2007	59	104,060	0.051	0.00028
6/24/2008	84	196,380	0.14	0.00075
12/30/2008	350	68,170	0.20	0.00105
6/30/2009	65	84,360	0.05	0.00025
12/30/2009	71	84,380	0.05	0.00027
6/29/2010	45	137,270	0.05	0.00028
12/28/2010	83	70,630	-1.80	-0.00991
6/15/2011	45	138,690	1.06	0.00626
12/28/2011	50	206,800	0.08	0.00043
6/30/2012	52	66,660	0.03	0.00015
12/26/2012	65	61,170	0.03	0.00019
6/28/2013	55	89,650	0.04	0.00022
12/31/2013	63	96,070	0.05	0.00027
6/25/2014	17	88,060	0.01	0.00007
12/30/2014	133	63,340	0.07	0.00037
6/5/2015	41	67,840	0.02	0.00013
12/29/2015	32	19,020	0.005	0.00003
6/30/2016	13	31,590	0.003	0.00002
12/30/2016	160	19,400	0.026	0.00014
6/30/2017	92	54,880	0.042	0.00023
12/27/2017	26	47,610	0.010	0.00006
6/30/2018	14	71,340	0.008	0.00005
12/31/2018	15	61,310	0.008	0.00004
6/3/2019	46	62,980	0.024	0.00016
12/1/2019	20	28,440	0.005	0.00003
TOTALS		7,808,647	38.80	

Notes:
* Gallons pumped is measured from previous sampling date.
Pumping of BH-20 ceased in April 2001 and was continued in July 2002.

Updated 1/2020

TABLE 2-3
INITIAL 1,1,1-TCA CONCENTRATIONS
Former Channel Master Site
Chemical Effectiveness Monitoring

Well No.	BH-1	BH-2	BH-9	BH-11A	BH-11B	BH-16	BH-17	BH-18	BH-19
Well Screen Interval (ft bgl)	10-20	10-20	10-20	28-38	10-20	10-20	22-32	10-20	41-51
1985									
13-Jun	0.5 *	19.5	17.0						
17-Jul	2.0	17.0	4.0						
17-Sep				0.5 *	37,800	276,000	226	19,930	
17-Dec					13,300				
1986									
18-Mar				30.0					18.0
20-Jun		0.5 *	0.5 *						
16-Sep	9.3		38.0		140,000	900,000	0.8 *	9,200	0.8 *
03-Dec						170,000			
Sample average (1985-86)	3.9	12.3	14.9	15.3	63,700	448,667	113	14,565	9.4

NOTES: Blank space indicates well was not sampled

* indicates a value of one-half the detection limit for samples in which TCA was not detected

ft bgl = feet below grade level

All concentrations presented in units of ug/l.

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. / Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
Average Initial Concentration (data collected 1985-1986)		3.9	12.3	14.9	15.3	63,700	448,667	113	14,565	9.4
1987	20-Feb						304,000			
	29-Apr					24,000	90,000			9.4
	27-May					100,000	470,000			14.0
	18-Aug		94	30	0.15 *	41,000	170,000		1,600	93.0
average			94	30	0.15 *	55,000	258,500		1,600	39
1988	20-Jan		57	65	0.15 *	46,000	69,000		560	1.1
	07-Apr		260	23	2.5	39,000	150,000		950	4.8
	21-Jul		380	8.3	1.2	3,500	66,000		990	0.55
	27-Oct		31	17	2.7	11,000	210,000		410	0.95
average			182	28	1.6	24,875	123,750		728	1.9
1989	17-Jan		38	7.4	1.9	17,000	370,000		1,300	2.5
	01-May	1.5	17		1.2	12,000	48,000		120	0.4
	05-Jul	2.1	200	180	0.33	22,000	26,000		660	130.0
	25-Oct	8.8	79	16	11.0	20,000	110,000		330	92.0
average		4.1	84	68	3.6	17,750	138,500		603	56
1990	23-Jan	100	50	6.2	0.15 *	36,000	78,000		450	46
	10-May	100	160	19	1.6	18,000	63,000		150	54
	25-Jul	8.3	43	11	1.1	18,000	28,000		3,600	47
	17-Oct	3.2	16	7.4	1.0	25,000	59,000		490	190
average		53	67	11	0.96	24,250	57,000		1,173	84
1991	09-Jan	10	58	7.0	1.4	13,000	12,000		700	130
	24-Apr	3.2	54	11	3.4	6,100	16,000		310	170
	24-Jul	4.4	32	9.7	0.48	28,000	12,000		160	70
	15-Oct		41	4.8	4.8	19,000	19,000	11	12	190
average		5.9	46	8	2.5	16,525	14,750	11	296	140
1992	16-Jan		32	10	0.2 *	31,000	2,400	1.6	1,100	250
	07-Apr		14	7.8	5.4	17,000	6,100	1.5	1,700	250
	22-Jul		12	7.3	6.8	18,000	11,000	89	1,900	140
	20-Oct		8.0	5.3	0.7	6,700	13,000	2.8	160	160
average			17	7.6	3.3	18,175	8,125	24	1,215	200
1993	26-Jan				5.7	14,000	4,200	0.75	2,300	68
	07-Apr		9.0	300.0	2.0	180	5,500	0.80	4.1	14
	06-Jul		14	6.8	0.25 *	11,800	3,270	18.4	13	21
	02-Nov		0.25 *	0.25 *	0.25 *	13,000	12,000	160	150	93
average			7.8	102	2.1	9,745	6,243	45	617	49
1994	01-Feb		6.3	17	7.2	9,000	4,900	62	450	41
	13-Apr		4.5	21	6.0	9,000	5,000	0.25 *	120	23
	06-Jul		32	1.2	2.9	10,000	4,000	190	180	18
	12-Oct		21	3.2	2.1	5,300	8,400	110	300	90
average			16	11	4.6	8,325	5,575	91	263	43
1995	10-Jan		7.7	3.6	0.25 *	5,800	2,300	2.7	620	37
	11-Apr		25	1.9	2.5	5,600	1,500	6.4	120	13
	12-Jul		12	3.8	0.25 *	5,400	7,900	120	3.5	35
	25-Oct		17	2.6	4.6	2,900	13,000	39	19	140
average			15	3.0	1.9	4,925	6,175	42	191	56
1996	25-Jan		17	1.2	2.3	1,900	4,300	0.25 *	4.5	26
	03-Apr		16	1.3	3.2	3,100	1,700	14	9.5	18
	10-Jul		28	1.1	0.80	6,800	4,800	32	9.0	42
	08-Oct		46	0.90	2.4	6,500	4,000	28	10	67
average			27	1.1	2.2	4,575	3,700	19	8.3	38
1997	14-Jan		12	1.8	0.25 *	7,500	1,200	75.0	110	49
	29-May		12	2.5	0.32	6,800	1,100	3.4	10	5.1
	22-Oct		19	1.4	1.7	690	4,910	260	2.9	76
average			14	1.9	0.76	4,997	2,403	113	41	43
1998	28-Apr		22	1.0	1.7	3,900	1,700	135.0	260	37
	27-Oct		30	1.0	4.3	1,800	2,200	360.0	0.24	110
average			26	1.0	3.0	2,850	1,950	248	130	74
1999	08-Apr		3.7	2.0	1.4	3,000	360	22	130	64
	20-Oct		26	1.7	4.9	6,300	2,300	180	2.5	38
average			15	1.9	3.2	4,650	1,330	101	66	51

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. / Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
2000	19-Apr		16	0.99	1.1	4,300	380	5.9	6.9	20
	17-Oct		9.9	0.59	2.9	5,900	1,600	67	2.0	21
average			13	0.79	2.0	5,100	990	36	4.5	21
2001	31-May		8.1	1.3	12	4,200	840	62	1.6	4.1
	29-Oct		2.3	0.79	9.6	1,600	960	79	1.4	0.17
average			5.2	1.0	11	2,900	900	71	1.5	2.1
2002	18-Apr		6.6	0.73	4.7	2,900	420	110	1.4	0.24
	09-Oct		3.0	1.1	3.7	730	700	140	1.4	0.11 *
average			4.8	0.92	4.2	1,815	560	125	1.4	0.18
2003	29-May		9.8	1.3	4.3	3,000	210	120	1.3	0.37
	23-Oct		23	0.7	3.3	900	120	75	1.3	0.13 *
average			16	1.0	3.8	1,950	165	98	1.3	0.25
2004	07-Apr		11	0.71 J	3.0	1,200	75	0.5 *	3.1	0.5 *
	22-Oct		27	1.8	3.0	2,800	120	0.5 *	5.6	0.5 *
average			19	1.3	3.0	2,000	98	0.5	4.4	0.5
2005	29-Apr		3.1	0.94	3.4	300	170	0.5 *	2.6	0.5 *
	21-Oct		4.0	18	3.6	240	390	0.5 *	2.0	0.5 *
average			3.6	9.5	3.5	270	280	0.5	2.3	0.5
2006	20-Apr		12	0.76 J	2.3	1,500	110	0.84 J	1.3	0.55 J
	10-Oct		17	0.55	2.3	33	120	0.5 *	0.95 J	0.5 *
average			14.5	0.66	2.3	767	115	0.7	1.1	0.5
2007	21-Apr		4.4	0.94 J	2.0	140	160	0.5 *	4.2	0.5 *
	30-Oct		9.5	1.7	0.5 *	530	120	77	0.78 J	0.5 *
average			7.0	1.32	1.3	335	140	38.8	2.5	0.5
2008	03-Apr		3.9	1.3	0.5 *	77	490	2.1	3.0	0.5 *
	22-Oct		6.8	0.28 J	0.5 *	240	210	0.36 J	0.80 J	0.5 *
average			5.4	0.79	0.5	159	350	1.2	1.9	0.5
2009	10-Apr		6.0	2.3	0.5 *	160	430	5.2	3.2	0.53
	23-Nov		9.0	1.1	0.12 *	240	220	1.8	0.93	
average			7.5	1.7	0.31	200	325	3.5	2.1	0.53
2010	15-Jun			0.98	0.12 *	220	430	0.12 *	0.95	
	10-Nov		16	0.78	0.12 *	170	210	0.12 *	0.98	0.12
average			16.0	0.9	0.12	195	320	0.12	1.0	0.12
2011	02-May		6.2	1.6	0.12 *	22	300 E	4.7	12	0.39
	22-Nov		2.6	5.9	0.12 *	94 E	180 E	0.12 *	0.87	0.12 *
average			4.4	3.8	0.12	58	240	2.41	6.4	0.26
2012	01-May		3.5	4.3	0.12 *	110 E	250 E	4.7	3.5	0.12 *
	25-Oct		8.3	5.2	0.12 *	61	280 E	0.12 *	1.6	0.12 *
average			5.9	4.8	0.12 *	86	265	2.41	2.6	0.12 *
2013	03-May		3.1	6.1	0.12 *	26	220 E	2.5	3.4	0.12 *
	24-Oct		5.5	0.46	0.12 *	150 E	520 E	0.12 *	0.72	0.12 *
average			4.3	3.3	0.12 *	88	370	1.31	2.1	0.12 *
2014	07-May		1.2	0.2	0.12 *	38	320 E	2.9	4.80	0.12 *
	28-Oct		5.1	0.26	0.12 *	160	59	0.35	0.55	0.12 *
average			3.2	0.23	0.12 *	99	190 E	1.63	2.68	0.12 *
2015	15-Apr		**5.5**	0.81	0.12 *	36	340	3.3	3.00	0.12 *
	13-Nov		8.6	1.60	0.12	26	410	0.12 *	1.2	0.12 *
average			7.1	1.2	0.1 *	31.0	375.0	1.7 *	2.1	0.12 *

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
2016	20-May		2.7	1.70	0.12 *	71	410	0.36	0.47	0.12 *
	04-Nov		12	0.39	0.12 *	180	450	0.12 *	0.44	0.29
average			7.4	1.05	0.12 *	126	430	0.24	0.46	0.21 *
2017	07-May		5.2	15.00	0.12 *	75	330	0.12 *	1.00	0.12 *
	22-Nov		7.14	0.12 *	0.12 *	120	990	0.12 *	0.56 J	0.12 *
average			6.2	7.56	0.12 *	98	660	0.12	0.78	0.12 *
2018	19-May		2.9	0.80 J	0.12 *	80	130	0.12 *	0.68 J	0.12 *
	20-Nov		3.4	9.60	0.12 *	18	640	0.12 *	0.72 J	0.12 *
average			3.2	5.20	0.12 *	49	385	0.12	0.70	0.12 *
2019	17-May		2.7	7.20	0.12 *	20	180	0.12 *	0.54 J	0.12 *
	25-Nov		3.6	6.20	0.61 J	36	580	0.12 *	0.64 J	0.28 J
average			3.2	6.70	0.37 *	28	380	0.12 *	0.59	0.20 *
(Feb 1987- November 2019)		24	29	12	2	8,857	29,615	41	275	39

NOTES:

Blank spaces indicate well was not sampled

J - estimated value; detected below quantitation limit

* - indicates a value of one-half the detection limit for samples in which TCA was not detected

E- Result exceeded calibration range, secondary dilution required

ft bgl = feet below grade level

All concentrations presented in units of ug/l.

FIGURES

Legend

1,1,1-TCA - Trichloroethane

ug/l - Micrograms per liter

N

BH10

BH3

BH2
1,1,1-TCA 3.6 ug/l

BH15

BH14

BH19
1,1,1-TCA 0.28 ug/l

BH12

BH9
1,1,1-TCA 6.20 ug/l

PZ2

BH16
1,1,1-TCA 580.0 ug/l

BH17
1,1,1-TCA 0.24 ug/l

BH20

PZ3

PZ1

BH11B
1,1,1-TCA 36.00 ug/l
BH11A
1,1,1-TCA 0.61 ug/l

BH18
1,1,1-TCA 0.64 ug/l

Recovery

BH13

BH1

BH4

BH7

0 25 50 100
Feet

Elevations: feet MSL

Document Path: G:\Project\0395052 Channel Master AVNET\GIS\ChannelMaster.mxd

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
SEMI-ANNUAL GROUNDWATER ANALYTICAL RESULTS
NOVEMBER 25, 2020

0395-052-108
FIGURE 3-1

Legend

Former Plant Area Water Table Contours (11/25/2019)

N

BH10 (298.63)

BH3 (299.56)

299

BH15 (299.62)

BH2 (298.94)

BH14 (299.00)

BH12 (298.92)

BH19 (302.09)

BH9 (298.93)

PZ2 (298.79)

BH16 (300.49)

BH17 (302.06)

301

PZ3 (298.72)

BH20 (298.77)

PZ1 (298.93)

BH11B (298.99)
BH11A (302.08)

300

Recovery (294.35)

296

297

BH18 (299.79)

299

298

BH13 (298.64)

BH1 (299.02)

BH4 (301.31)

301

300

BH7 (300.02)

0 25 50 100 Feet

Elevations: feet MSL.

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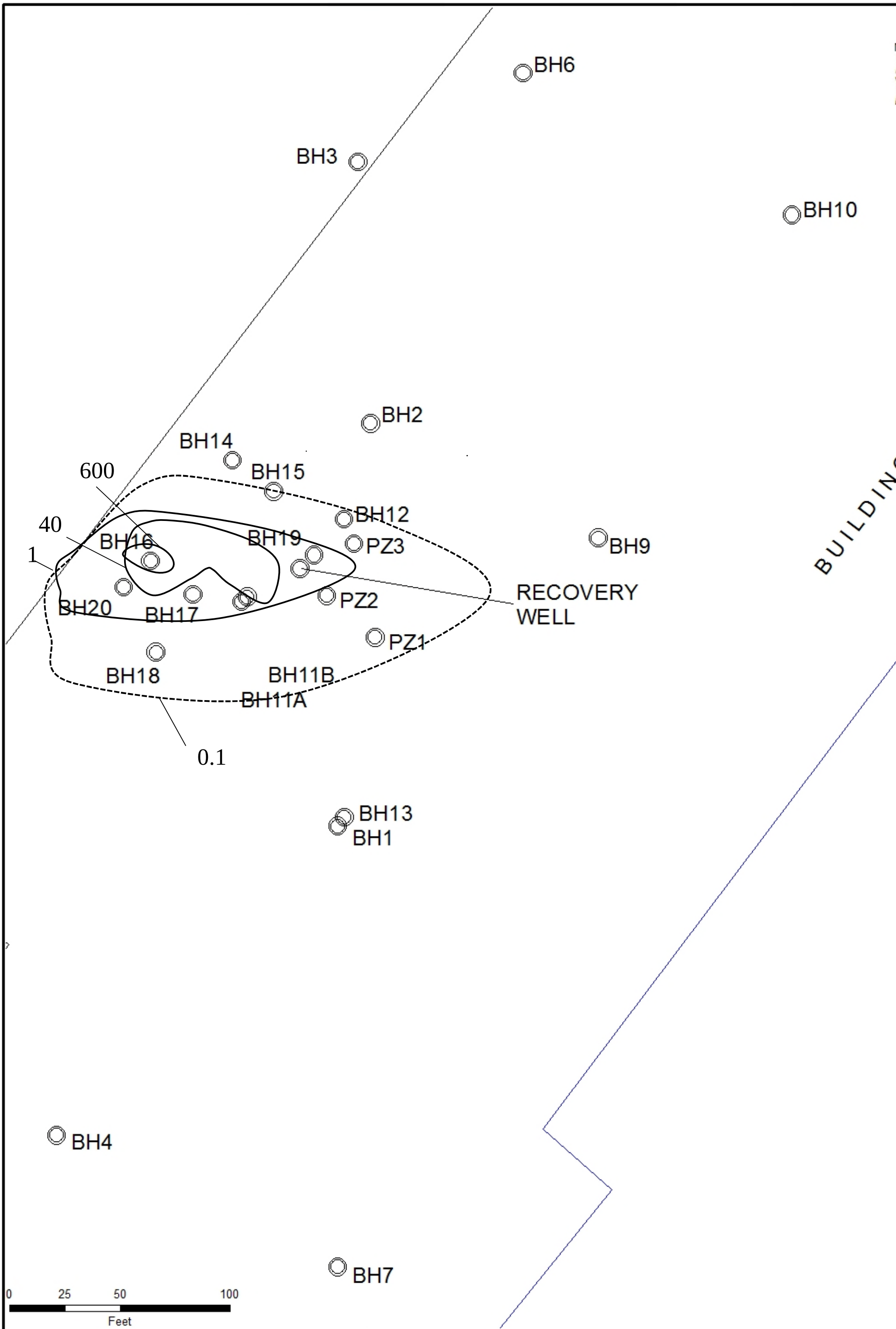
ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
WATER TABLE ELEVATION CONTOUR MAP
FORMER PLANT AREA WELLS - NOVEMBER 25, 2019

0395-052-108

FIGURE 3-1A

Path: G:\Model\ChannelMaster_0395052\Channel_Master.mxd



ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE NEW YORK
ISOCONCENTRATION MAP - 1,1,1-TRICHLOROETHANE (µg/l)
SHALLOW PLANT AREA WELLS – November 25, 2019

0395-052-108

FIGURE 3-2

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