April 7, 2020 Reference No. 017358

Kevin Lund Original Sent Via Email
Michigan Department of the Environment, Great Lakes & Energy (EGLE)
Remediation Division
Jackson District Office
301 East Louis Glick Highway
Jackson, MI 49201-1556

Dear Mr. Lund:

Re: Groundwater Level Monitoring Update (through December 2019)
Willow Run Powertrain
Ypsilanti, Michigan

As part of the ongoing Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) at the Willow Run Powertrain site (Site) in Ypsilanti, Michigan, groundwater flow direction and levels are monitored on a regular basis to evaluate changes. Since RACER took over the RCRA CA responsibilities at the Site, groundwater levels have generally been gauged on a routine basis including Fall 2011, Fall 2012, April 2013, April 2014, December 2014 and quarterly between April 2015 and October 2018 (January, April, July and October). The results of these monitoring events have been presented to the ELGE (formerly MDEQ) in several submittals including:

- September 2013 - RFI Report – presented shallow, intermediate and deep groundwater contours from October 2011 through April 2013
- February 2015 – Draft Interim Measures Work Plan – described pre-demolition conditions through April 2013
- February/March 2016 – Memo included as Appendix to Supplemental RFI Report No. 1 - provided a series of groundwater contour maps from April 2012 through October 2015 and related discussion on implications to Remedial Options
- July 2016 – RCRA CA Status Update Memo (forwarded to MDEQ as attachment to EPA review- Willow Run Remedy RACER memorandum) - provided a series of groundwater contour maps from April and July 2016
- March 2019 – Groundwater Level Monitoring Update, November 2016 – October 2018 (Letter to K. Lund, MDEQ).

As proposed in the March 2019 letter to K. Lund, the groundwater level monitoring was reduced to semi-annually for 2019 (April and December).

GHD
26850 Haggerty Road Farmington Hills Michigan 48331 USA
T 248 893 3400 **F** 248 893 3454 **W** www.ghd.com

This purpose of this letter is to:

- Document redevelopment and remedial activities that may influence groundwater levels or flow.
- Document changes to the monitoring well network since the October 2018 levels event.
- Continue to evaluate whether groundwater levels and flow direction have stabilized since significant changes were made to the Site and Tyler Pond between 2013 to 2017 inclusive.
- Assess French Drain capture during the monitoring events.

Based on the collective groundwater monitoring data we have proposed continuing monitoring on a semi-annual basis (April and October) for 2020.

1. Site Redevelopment

Redevelopment of the Site is ongoing. Between October 2018 and December 2019 work occurred in the northwest (repaving of parking lot) and in/near the area formerly known as the south triangle parcel (grading and surfacing - asphalt, concrete or sod around existing buildings and start of Tech Park road bed). None of these activities would be expected to exert an influence on groundwater levels or flow.

There were also no investigative or remedial activities conducted since October 2018 which would have the potential to influence groundwater levels or flow with the exception of the on-going operation of the groundwater collection system (French drain) in the southeast portion of the site.

2. Monitoring Network Changes

Details on monitoring network changes (repairs, reference point changes, decommissioning and newly installed wells) between October 2018 and December 2019 are provided on Table 1 and summarized below.

Changes prior to the April 2019 levels event:

- November 2018: Sediment removal (5 wells).

Changes prior to the December 2019 levels event:

- May 2019: Lowering of PVC risers so that flush mount lids fit properly (6 wells).
- September 2019:
  - Confirmation that 13 wells, which could not be located by GHD for some time, had been destroyed by ACM during redevelopment in 2017 and 2018.
  - Decommissioning of 7 wells, which interfered with ACM redevelopment or were not needed.
- October/November 2019:
  - Repairs (flush mount or lid replacements, concrete pad installation) (19 wells).

- Temporary Extensions (9 wells). The PVC risers of wells located in or near the two former 2-million gallon tanks where HMA millings were placed were extended temporarily such that they are above ground. It is anticipated that these wells will be converted to flush mounts once final grade is determined by HNTB.
- Permanent Extensions (8 wells). PVC risers were extended as much as 3 feet through the new fill added during redevelopment of the test track and finished as flush mounts.
- Decommissioning (8 wells). This included wells, which could not be rehabilitated. An additional 4 wells were confirmed destroyed.
- Installation of 10 shallow and 5 intermediate zone wells, completed as replacements for destroyed/decommissioned wells and/or as part of ongoing PCE or PFAS investigations.

3. French Drain Operation

In 2019, the drain was operated with varying control settings as the sensitivity of the system was evaluated. During the April 8-12, 2019 event, sumps 1 and 2 were in manual mode with pumps running at 55% and sumps 3 and 4 were in auto mode with defined set-point elevations. The average sump elevations on the four lines during the April 2019 event ranged from 706.0 to 706.7 ft amsl[1].

During the December 2-6, 2019 event, sumps 1 and 3 were in manual mode with pumps running at 60% and sumps 2 and 4 were in auto mode with pumps running at 60%. The average sump elevations on the four lines during the December 2019 event ranged from 708.1 to 708.9 ft amsl[2] (1.4 to 2.3 ft higher than in April).

4. Results

Appendix A provides a series of hydrographs that examine the relative changes of groundwater elevation in background areas, and in areas beneath and surrounding the 85-acre former building footprint (concrete slab). Figure A.0 presents the locations of the wells featured in the hydrographs. The hydrographs also identify the timing of previous major site changes that could have affected groundwater conditions.

Appendix B provides groundwater contour plans for April and December 2019.

[1] Average sump levels April 8-12, 2019 (ft amsl) - Line 1: 706.7, Line 2: 706.7, Line 3: 706.0, Line 4: 706.0

[2] Average sump levels December 2-6, 2019 (ft amsl) – Line 1: 708.9, Line 2: 708.1, Line 3: 708.3, Line 4: 708.2

4.1 Shallow Groundwater Zone

Shallow Zone Groundwater Levels

The stability of shallow zone groundwater levels is evaluated by comparing water trends in areas where Site changes have been made with trends in background wells (those believed not to be influenced by Site changes). Stability is assumed if the trends are similar.

Background water levels in the shallow zone (west, northwest and northeast parts of Site) and monthly precipitation at the Willow Run Airport are shown on Figure A.1. In 2019, each of the locations responded differently and there is no clear correlation with monthly water levels or seasonal trends (spring typically high, fall typically low) with the exception of CRA-703M. It is noted that although April 2019 was a wet month overall, it was relatively dry prior to the April 8-12 levels event.

The influence of Site area changes on shallow zone groundwater levels is as follows:

- Former Building Footprint: Hydrographs for shallow zone wells on the west, center and east sides of the former building footprint are provided on Figure A.2. The hydrographs show that shallow zone groundwater levels beneath the west part of the former building footprint appear stable. Water levels in the central and east parts of the former building footprint appear to be approaching stabilization.
- East/Southeast Property Boundary: Hydrographs for shallow zone wells on the downgradient side of the French drain (middle of Lines 1, 2 and 4) and on the French drain (Line 3) are provided on Figure A.3. The hydrographs show that:
    - i) Shallow zone groundwater levels near the east/southeast property boundary have declined in response to operation of the drain.
    - ii) Shallow zone groundwater is captured by the drain (given that water levels on the downgradient side are lower than would be expected if the drain were off).
    - iii) Shallow zone groundwater levels are effectively stable or near stable in this area, with respect to historic site changes (based on pre-drain trend) and now fluctuate primarily in response to operation of the drain. The increase in water levels from April to December of 0.9 to 1.7’ reflects the increase of 1.4 to 2.4’ in the average sump levels.
- Southwest Property Boundary: Tyler Pond was lowered approximately 11.5 feet in March/April 2017. Groundwater levels in the two on-Site shallow zone wells closest to Tyler Pond are shown on Figure A.4. There is no obvious response to the lowering of the water level in Tyler Pond. Water levels declined after Tyler Pond was lowered but this is similar to the trend in background wells CRA-726M and CRA-703M (refer to Figure A.1).

Shallow Zone Groundwater Flow

Shallow zone groundwater contour plans for April and December 2019 are contained in Appendix B. The contours were generated using the program Surfer®. Water level elevations along the French Drain were simulated by assuming that water level elevations in the sumps and cleanouts are close to groundwater

elevations, that they change uniformly between the sump and cleanout on each line, and inserting ghost points to reflect this. Contours were removed from within FFB-C since the slurry walls used to construct the basin extend through the shallow and intermediate zones, effectively cutting-off groundwater flow.

In April 2019 (Figure B.1) there is a lack of wells on the south triangle parcel limiting the accuracy of the contours; average sump water level elevations ranged from 706.0 to 706.7 ft amsl[3]. In December 2019 (Figure B.2) many of the south parcel wells have been replaced and sump elevations ranged from 708.1 to 708.9 ft amsl[4] (1.4 to 2.3 ft higher on each line than in April).

Despite the monitoring well network and sump elevation changes, the groundwater flow pattern is similar for April and December 2019 and has been similar since January 2018. Characteristics of the flow pattern include:

- Groundwater is mounded beneath the western half of the former building footprint resulting in radial flow away from this area.
- Groundwater flows off-Site in the northeast, the northwest corner and along portions of the southwest property boundary.
- Groundwater flow toward the east and southeast parts of the former building footprint is captured by the French drain with the possible exception of the vicinity of CO-2 and CO-4 in the southeast where there is insufficient data for contouring on the downgradient (east) side of the drain.
- Some groundwater appears to infiltrate into the existing storm sewers including the western part of the perimeter storm sewer, the southern part of the 84-inch storm sewer and the historic sewers on the south parcel which are expected to tie into the 84-inch sewer.

4.2 Intermediate Groundwater Zone

Intermediate Zone Groundwater Levels

Water levels in the intermediate zone typically respond similarly to the shallow zone due to the hydraulic connection between these units.

- Background water levels in the intermediate zone (northwest and west) and monthly precipitation at the Willow Run Airport are shown on Figure A.5. In 2019 the background trends were similar with elevated water levels in the spring and lower water levels in the fall. CRA-703I is assumed to be a better representation of background levels since CRA-726I may be hydraulically connected to the Beyer Drain based on the extremely low water levels observed in 2016.

The influence of Site area changes on intermediate zone groundwater levels is as follows:

[3] Average sump levels April 8-12, 2019 (ft amsl) - Line 1: 706.7, Line 2: 706.7, Line 3: 706.0, Line 4: 706.0

[4] Average sump levels December 2-6, 2019 (ft amsl) – Line 1: 708.9, Line 2: 708.1, Line 3: 708.3, Line 4: 708.2

- Former Building Footprint: Hydrographs for intermediate zone wells on the west and east sides of the former building footprint are shown on Figure A.6. The hydrographs show that intermediate zone water levels appear to have stabilized or are close to stabilizing in this area.
- East/Southeast Property Boundary: Hydrographs for the two remaining intermediate zone wells on the immediate downgradient side of the French drain (middle of Lines 1 and 4) and the adjacent shallow zone wells are shown on Figure A.7. Review of this Figure indicates that intermediate zone water levels are influenced similarly to shallow zone water levels by operation of the French drain.
- Southwest Property Boundary: Tyler Pond was lowered approximately 11.5 feet in March/April 2017. Hydrographs for intermediate zone wells located on YCUA property near Tyler Pond are shown on Figures A.8 and A.9 (locations along the bank) and A.10 (locations along Airport Road). Consistent with previous years, some of the intermediate zone wells closest to Tyler Pond (Figures A.8 and A.9) were influenced and then restabilized at lower elevations. Intermediate wells adjacent to Airport Road (Figure A.10) do not appear to have responded to lowering of Tyler Pond and therefore, it is expected that there would be no response in intermediate wells on Site.

Intermediate Zone Groundwater Flow

Intermediate zone groundwater contour plans for April and December 2019 are contained in Appendix B (Figures B.3 and B.4, respectively). The contours were generated in the same manner as the shallow zone contours. The groundwater flow pattern is similar for April and December 2019 and has been similar since April 2018. Characteristics of the flow pattern include:

- Groundwater is mounded beneath the western half of the former building footprint resulting in radial flow away from this area.
- Groundwater flows off-Site from the south triangle area, southwest toward Tyler Pond and to the east toward the Willow Run Airport.
- At least some of the groundwater flow toward the east and southeast part of the former building footprint is captured by the French drain (based on the hydrographs). However there is insufficient data on the downgradient sides of the French drain (due to lack of wells) to prove capture with the contour plans.
- Groundwater appears to infiltrate into the western perimeter storm sewer along much of its length.
- There is also likely groundwater infiltration into the southern portion of the 84-inch sewer given its depth and shallow groundwater. However, there is no data on the east side of the French drain (no intermediate zone wells) to prove capture with the contour plans.

4.3 Deep Groundwater Zone

Deep Zone Groundwater Levels

Deep zone groundwater levels at one of the two remaining on-Site wells are shown as having increased in 2019 (Figure A.11). The reason for the increase is not known but is considered suspect given previously stable water levels. An additional water level and depth to bottom measurement taken March 12, 2020 indicated consistency with the 2019 levels. Due to the lack of deep monitoring wells remaining in the monitoring network, semi-annual monitoring of the deep zone will be discontinued. Curtailing deep zone monitoring is not considered an issue given that previous results have indicated consistent southerly flow and no analytical impacts.

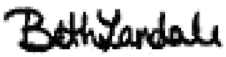
5. Summary and Next Steps

Over the past several years there have been significant changes to the Site that have affected the groundwater conditions. Review of data collected through December 2019 indicates that groundwater levels appear to be near stabilizing and that the groundwater flow direction has been consistent since at least April 2018. However, it is our understanding that continued redevelopment of south parcel in 2020 may influence groundwater levels due to more impervious surface cover being installed and abandonment of historic sewer network. Based on the above, the groundwater gauging events will continue to be completed semi-annually for the 2020 calendar year. The events are expected to be completed in May and October, which are typically the wettest and driest quarters.

Please feel free to contact Grant Trigger, RACER at 313-670-6226 or the undersigned at 248-893-3428 should you required clarification or further information.

Sincerely,

GHD



Beth Landale
Project Manager

WB/bw/8

Encl.

cc: Grant Trigger, RACER

Table 1

Monitoring Well Network Changes (October 2018 to December 2019)
Willow Run Powertrain
Ypsilanti, Michigan

1. CHANGES BETWEEN OCTOBER 2018 AND APRIL 2019 WATER LEVEL MONITORING EVENTS

1.1) NOVEMBER 2018 (Sediment Removal)

						Measured Well Bottom Elevations (ft amsl)			Sediment	Screen	Amount of Screen
CRA/GHD ID	Easting (X) (Int. Ft.)	Northing (Y) (Int. Ft.)	Work Completed/Remarks	Contractor	Date	Original	Pre-Rehab	Post-Rehab	Remaining (ft)	Length (ft)	Still Plugged (%)
CRA-107M	13,344,997.067	270,723.261	Sediment removed by jetting/suction. (Hard bottom on completion)	CCI	11/02/2018	706.73	707.69	707.04	0.3	5.0	6%
CRA-706M	13,345,089.179	273,198.077	Sediment removed by jetting/suction. (Hard bottom on completion)	CCI	11/02/2018	705.05	711.31	705.06	0.0	5.0	0%
CRA-785I	13,345,933.446	270,452.645	Sediment removed by jetting/suction. (Hard bottom on completion. Unable to remove gravel)	CCI	11/02/2018	694.46	700.58	695.13	0.7	5.0	13%
GHD-1009M	13,346,061.166	270,445.340	Sediment removed by jetting/suction. (Hard bottom on completion)	CCI	11/02/2018	701.60	706.85	701.65	0.1	10.0	1%
MW-101	13,345,097.848	270,449.725	Attempted sediment removal by jetting/suction. (Hard bottom on completion - gravel?)	CCI	11/02/2018	706.50	713.34	708.87	2.4	5.0	47%
CRA-785D	13,345,933.162	270,444.713	Unable to remove sediment by jetting/suction. (Feels like gravel)	CCI	11/02/2018	635.53	639.77	639.77	4.2	5.0	85%
CRA-327M	13,344,987.664	270,456.800	Sediment removal not attempted. (Not accesible: top of well damaged, too narrow for jetting tool)	--	11/02/2018	707.76	711.57	NA	3.8	5.0	76%
CRA-749M	13,343,943.060	270,127.110	Sediment removal not attempted. (Could not locate, assumed destroyed)	--	11/02/2018	709.68	715.48	NA	5.8	6.5	89%

2. CHANGES BETWEEN APRIL 2019 AND DECEMBER 2019 HYDRAULIC MONITORING EVENTS

2.1) MAY 2019 (PVC Riser Adjustments)

						Post-Adjustment Elevations (ft amsl)		
CRA/GHD ID	Easting (X) (Int. Ft.)	Northing (Y) (Int. Ft.)	Work Completed	Contractor	Date	Ground	to(PVC)r	Reference Point
CRA-133M	13,345,943.136	270,443.889	Cut 2.875" off PVCr so FM lid would fit.	GHD	05/03/2019	715.765	715.392	to(PVC)r (FM)
CRA-228M	13,346,056.680	271,080.386	Cut 2.25" off PVCr so FM lid would fit.	GHD	05/03/2019	716.291	715.862	to(PVC)r (FM)
CRA-519R	13,345,703.572	271,106.437	Cut 2.0" off PVCr so FM lid would fit.	GHD	05/03/2019	716.502	715.936	to(PVC)r (FM)
CRA-785D	13,345,933.162	270,444.713	Cut 3.5" off PVCr so FM lid would fit.	GHD	05/03/2019	715.682	715.228	to(PVC)r (FM)
CRA-785I	13,345,933.446	270,452.645	Cut 2.74" off PVCr so FM lid would fit.	GHD	05/03/2019	715.789	715.349	to(PVC)r (FM)
GHD-1211M	13,345,856.810	270,430.332	Cut 1.0" off PVCr so FM lid would fit.	GHD	05/03/2019	715.590	715.237	to(PVC)r (FM)

Table 1

Monitoring Well Network Changes (October 2018 to December 2019)
Willow Run Powertrain
Ypsilanti, Michigan

2.2) SEPTEMBER, 2019

2.2a) SEPTEMBER, 2019 (Wells Confirmed Destroyed by HNTB)

						Post-Adjustment Elevations (ft amsl)		
CRA/GHD ID	**Easting (X) (Int. Ft.)**	**Northing (Y) (Int. Ft.)**	**Work Completed**	**Contractor**	**Date**	**Ground**	**to(PVC)r**	**Reference Point**
CRA-063M	13,344,654.770	270,281.070	Destroyed (Removed) during sanitary sewer and watermain construction. Excavation depth 7-8' ft bgs minimum. Area covered with asphalt millings (4/23/2019 aerial)	ACM/HNTB	10/10/2017 - 01/22/2018	NA	NA	-
CRA-532R	13,343,342.800	271,434.486	Destroyed (believed Removed) during electrical conduit installation. Excavation depth 4 ft bgs; backfilled below conduits with Class 2 engineered sand and compacted which probably filled in any void. Conduit laid, backfilled, area sealed with concrete and under HMA.	ACM/HNTB	01/23/2018 - 04/23/2018	NA	NA	-
CRA-606M	13,343,472.560	270,031.680	Destroyed (Removed) during sanitary sewer/watermain/storm sewer corridor construction. Excavation depth 7-8 ft bgs minmum. Surface covered with liner and/or concrete and HMA parking lot.	ACM/HNTB	10/10/2017 - 01/25/2018	NA	NA	-
CRA-607M	13,343,772.080	270,043.710	Destroyed (Removed) during sanitary sewer/watermain/storm sewer corridor construction. Excavation depth 7-8 ft bgs minmum. Currenly overlain by stone. May eventually be overlain by eastern extension of building.	ACM/HNTB	10/10/2017 - 01/25/2018	NA	NA	-
CRA-742D	13,343,571.898	270,039.035	Destroyed (In-Place) during construction of building footings, utility trench or First Flush Subsurface Storage Trench. Likely broke off at about 8 ft bgs and filled with bedding material. Surface is asphalt or concrete (concrete joints are sealed).	ACM/HNTB	10/10/2017 - 01/25/2018	NA	NA	-
CRA-742I	13,343,562.240	270,037.933	Destroyed (believed Removed) during construction of building footings, utility trench or First Flush Subsurface Storage Trench. Excavation depth ~8 ft bgs. Surface is paved/concrete (concrete joints are sealed).	ACM/HNTB	10/10/2017 - 01/25/2018	NA	NA	-
CRA-744M	13,343,765.910	270,229.520	Destroyed (In-Place) during utility installation. Covered by stone, then 6 inches HMA (under a parking lot).	ACM/HNTB	10/10/2017 - 01/22/2018	NA	NA	-
CRA-749M	13,343,943.060	270,127.110	Destroyed (Removed) during storm sewer installation (north stub from W-E corridor through CRA-606M/CRA-607M).	ACM/HNTB	08/31/2018 - 10/09/2018	NA	NA	-
CRA-750M	13,344,179.570	270,206.706	Destroyed (believed Removed) during installation of 6" diameter watermain and electrical loop around building. Excavation depth 5 - 6.5 ft bgs. Beneath asphalt millings now.	ACM/HNTB	10/10/2017 - 01/22/2018	NA	NA	-
CRA-751M	13,344,221.900	270,205.240	Destroyed (believed Removed) during installation of 6" diameter watermain and electrical loop around building. Excavation depth 5 - 6.5 ft bgs. Beneath asphalt millings now.	ACM/HNTB	10/10/2017 - 01/22/2018	NA	NA	-
CRA-882I	13,344,553.370	269,954.348	Destroyed (believed Removed) during sanitary sewer installation. Excavation depth 10-12 feet minimum. HNTB dug 3-4' to look for.	ACM/HNTB	07/11/2017 - 10/08/2017	NA	NA	-
CRA-882M	13,344,553.790	269,958.267	Destroyed (believed Removed) during sanitary sewer installation. Excavation depth 10-12 feet minimum. HNTB dug 3-4' to look for.	ACM/HNTB	07/11/2017 - 10/08/2017	NA	NA	-
GHD-1175TW	13,344,872.750	270,510.303	Destroyed (Removed) during watermain and swale construction. Watermain excavation depth 8 ftbgs minimum. Swale (lined with PVC) is about 4 ft deep.	ACM/HNTB	07/13/2017 - 10/10/2017	NA	NA	-

2.2b) SEPTEMBER, 2019 (Decommissioned Wells)

						Post-Adjustment Elevations (ft amsl)		
CRA/GHD ID	**Easting (X) (Int. Ft.)**	**Northing (Y) (Int. Ft.)**	**Work Completed**	**Contractor**	**Date**	**Ground**	**to(PVC)r**	**Reference Point**
CRA-880M	13,344,543.590	269,617.820	Decommissioned (Screen In-Place). Interferred with planned Tech Park Roadway.	GHD	09/19/2019	NA	NA	-
CRA-880I	13,344,543.730	269,615.616	Decommissioned (Screen In-Place). Interferred with planned Tech Park Roadway.	GHD	09/19/2019	NA	NA	-
MWLP-1	13,344,448.418	269,923.132	Decommissioned (Removed). Not Required (perched).	GHD	09/19/2019	NA	NA	-
MWLP-2	13,344,440.786	269,923.525	Decommissioned (Removed). Not Required (perched).	GHD	09/19/2019	NA	NA	-
MWLP-3	13,344,414.256	269,922.736	Decommissioned (Removed). Not Required (perched).	GHD	09/19/2019	NA	NA	-
MWLP-4	13,344,405.780	269,923.705	Decommissioned (Removed). Not Required (perched).	GHD	09/19/2019	NA	NA	-
MWLP-5	13,344,396.944	269,922.903	Decommissioned (Removed). Not Required (perched).	GHD	09/19/2019	NA	NA	-

Table 1

Monitoring Well Network Changes (October 2018 to December 2019)
Willow Run Powertrain
Ypsilanti, Michigan

2.3) OCTOBER-NOVEMBER, 2019

2.3a) OCTOBER-NOVEMBER, 2019 (Standard Repairs)

						Post-Adjustment Elevations (ft amsl)		
CRA/GHD ID	**Easting (X) (Int. Ft.)**	**Northing (Y) (Int. Ft.)**	**Work Completed**	**Contractor**	**Date**	**Ground**	**to(PVC)r**	**Reference Point**
CRA-009R	13,343,919.680	270,684.470	Replaced FM.	GHD	11/04/2019	NA	NA	-
CRA-089R	13,344,037.396	270,882.743	Replaced FM.	GHD	11/04/2019	NA	NA	-
CRA-104I	13,344,505.310	270,717.242	Replaced FM.	GHD	11/04/2019	NA	NA	-
CRA-105M	13,344,682.677	270,712.589	Replaced FM. Cut a couple of inches off PVCr.	GHD	11/04/2019	718.400	718.080	to(PVC)r (FM).
CRA-106M	13,344,972.150	270,557.808	Replaced FM. (Approx. 1 ft debris fell into well during repair).	GHD	10/28/2019	NA	NA	-
CRA-108M	13,344,824.030	270,846.503	Replaced FM.	GHD	11/04/2019	NA	NA	-
CRA-121M-A/B	13,345,715.301	271,213.712	Replaced Lid.	GHD	11/05/2019	NA	NA	-
CRA-267M	13,344,335.070	270,235.540	Installed concrete pad around FM.	GHD	11/26/2019	NA	NA	-
CRA-315I	13,345,583.610	270,848.450	Replaced FM.	GHD	10/29/2019	NA	NA	-
CRA-317M	13,345,488.960	271,372.881	Replaced FM.	GHD	11/05/2019	NA	NA	-
CRA-405M-S	13,343,381.602	271,896.293	Replaced FM.	GHD	11/26/2019	NA	NA	-
CRA-720I	13,342,590.170	271,906.555	Replaced/raised FM. PVCr left as is.	GHD	11/26/2019	NA	NA	-
CRA-725M	13,342,584.810	270,713.544	Replaced Lid.	GHD	11/26/2019	NA	NA	-
CRA-735I	13,342,969.830	272,038.197	Replaced Lid. Raised FM. New concrete form around well.	GHD	11/26/2019	NA	NA	-
CRA-756M	13,345,395.552	270,586.727	Replaced FM.	GHD	10/28/2019	NA	NA	-
CRA-757M	13,345,271.913	270,676.375	Replaced FM.	GHD	10/28/2019	NA	NA	-
CRA-806M	13,345,197.786	270,585.070	Replaced FM.	GHD	10/28/2019	NA	NA	-
GHD-1124I	13,342,294.660	271,652.000	Replaced FM.	GHD	11/26/2019	NA	NA	-
GHD-1134M	13,344,852.620	270,534.807	Replaced FM.	GHD	11/26/2019	NA	NA	-

2.3b) OCTOBER-NOVEMBER, 2019 (Temporary Extensions)

						Post-Adjustment Elevations (ft amsl)		
CRA/GHD ID	**Easting (X) (Int. Ft.)**	**Northing (Y) (Int. Ft.)**	**Work Completed**	**Contractor**	**Date**	**Ground**	**to(PVC)r**	**Reference Point**
CRA-137M	13,344,689.194	270,351.390	Extended PVCr 3' (temporary until final grade determined).	GHD	11/25/2019	718.931	721.772	to(PVC)r (SU) (temporary extension)
CRA-140M	13,344,587.590	270,147.130	Extended PVCr 3' (temporary until final grade determined).	GHD	10/30/2019	718.279	720.753	to(PVC)r (SU) (temporary extension)
CRA-609M	13,344,846.640	270,201.512	Extended PVCr 3' (temporary until final grade determined).	GHD	10/30/2019	718.228	720.485	to(PVC)r (SU) (temporary extension)
CRA-711I	13,344,941.619	270,386.611	Extended PVCr 3' (temporary until final grade determined).	GHD	10/30/2019	718.353	720.993	to(PVC)r (SU) (temporary extension)
CRA-858I	13,344,754.200	270,371.880	Extended PVCr 4' (temporary until final grade determined).	GHD	11/25/2019	718.650	721.622	to(PVC)r (SU) (temporary extension)
GHD-1145M	13,344,744.930	270,399.622	Extended PVCr 3' (temporary until final grade determined).	GHD	11/25/2019	718.584	720.702	to(PVC)r (SU) (temporary extension)
GHD-859M	13,344,756.090	270,427.619	Extended PVCr 3' (temporary until final grade determined).	GHD	10/30/2019	718.413	721.125	to(PVC)r (SU) (temporary extension)
IG-1	13,345,000.030	270,375.700	Extended PVCr 3' (temporary until final grade determined?).	GHD	11/26/2019	718.075	720.502	to(PVC)r (SU) (temporary extension?)
IG-2	13,344,999.770	270,358.120	Extended PVCr 3' (temporary until final grade determined?).	GHD	11/26/2019	718.238	721.487	to(PVC)r (SU) (temporary extension?)

2.3c) OCTOBER-NOVEMBER, 2019 (Permanent Extensions)

						Post-Adjustment Elevations (ft amsl)		
CRA/GHD ID	**Easting (X) (Int. Ft.)**	**Northing (Y) (Int. Ft.)**	**Work Completed**	**Contractor**	**Date**	**Ground**	**to(PVC)r**	**Reference Point**
CRA-015M	13,344,260.780	271,206.440	Extended PVCr through new fill (permanent).	GHD	11/04/2019	722.090	721.733	to(PVC)r (FM)
CRA-017R	13,344,463.080	271,213.490	Extended PVCr through new fill (permanent).	GHD	11/04/2019	721.427	720.970	to(PVC)r (FM)
CRA-082I	13,344,604.290	271,331.759	Extended PVCr through new fill (permanent).	GHD	10/29/2019	720.129	719.977	to(PVC)r (FM)
CRA-082M	13,344,603.040	271,334.980	Extended PVCr through new fill (permanent).	GHD	10/29/2019	720.129	720.018	to(PVC)r (FM)
CRA-276M	13,344,362.888	271,305.872	Extended PVCr through new fill (permanent).	GHD	10/29/2019	720.937	720.718	to(PVC)r (FM)
CRA-304M	13,343,791.080	271,128.378	Extended PVCr through new fill (permanent).	GHD	10/29/2019	722.556	722.361	to(PVC)r (FM)
GHD-1016M	13,344,413.480	271,936.436	Extended PVCr through new fill (permanent).	GHD	10/29/2019	721.359	721.106	to(PVC)r (FM)
GHD-1029I	13,344,023.870	271,825.700	Extended PVCr through new fill (permanent).	GHD	10/29/2019	723.600	723.430	to(PVC)r (FM)

Table 1

Monitoring Well Network Changes (October 2018 to December 2019)
Willow Run Powertrain
Ypsilanti, Michigan

2.3d) OCTOBER-NOVEMBER, 2019 (Destroyed and Decommissioned Wells)

						Post-Adjustment Elevations (ft amsl)		
CRA/GHD ID	**Easting (X) (Int. Ft.)**	**Northing (Y) (Int. Ft.)**	**Work Completed**	**Contractor**	**Date**	**Ground**	**to(PVC)r**	**Reference Point**
CRA-016R	13,344,348.720	271,207.850	Decommissioned (in-place with pump).	GHD	10/29/2019	NA	NA	-
CRA-139M	13,344,559.050	270,359.540	Decommissioned (in-place).	GHD	10/29/2019	NA	NA	-
CRA-301M	13,344,320.023	271,334.028	Decommissioned (well removed).	GHD	11/26/2019	NA	NA	-
CRA-308M	13,344,305.926	270,699.522	Decommissioned (well removed).	GHD	11/25/2019	NA	NA	-
CRA-753I	13,344,359.010	270,263.410	Decommissioned (well removed).	GHD	11/25/2019	NA	NA	-
CRA-753M	13,344,360.270	270,259.170	Decommissioned (well removed).	GHD	11/25/2019	NA	NA	-
GHD-1173TW	13,344,872.310	270,553.530	Decommissioned (well removed).	GHD	11/25/2019	NA	NA	-
GHD-1174TW	13,344,892.340	270,531.410	Decommissioned (well removed).	GHD	11/25/2019	NA	NA	-
CRA-141M	13,344,655.235	270,184.490	Assumed Destroyed (could not locate).	GHD	10/29/2019	NA	NA	-
CRA-601M	13,342,677.830	270,925.282	Assumed Destroyed (could not locate; new storm line installed).	HNTB/GHD	10/29/2019	NA	NA	-
CRA-743M	13,343,719.290	270,435.640	Destroyed (redevelopment construction; area dug out).	HNTB	11/14/2019	NA	NA	-
CRA-960M	13,343,751.355	269,861.875	Destroyed (well removed) during construction.	HNTB	11/25/2019	NA	NA	-

2.3e) OCTOBER-NOVEMBER, 2019 (New Monitoring Wells)

						Post-Adjustment Elevations (ft amsl)		
CRA/GHD ID	**Easting (X) (Int. Ft.)**	**Northing (Y) (Int. Ft.)**	**Work Completed**	**Contractor**	**Date**	**Ground**	**to(PVC)r**	**Reference Point**
GHD-1196M	13,343,407.180	269,871.818	Replacement for CRA-606M	GHD	11/05/2019	717.890	717.436	to(PVC)r (FM)
GHD-1196I	13,343,405.270	269,872.873	Replacement for CRA-742I	GHD	11/05/2019	717.864	717.651	to(PVC)r (FM)
GHD-1197M	13,343,723.850	269,730.371	Replacement for CRA-960M	GHD	11/06/2019	716.514	716.138	to(PVC)r (FM)
GHD-1198M	13,343,771.820	270,214.352	Replacement for CRA-744M and CRA-749M	GHD	11/06/2019	719.605	719.316	to(PVC)r (FM)
GHD-1199I	13,344,204.850	270,220.746	Replacement for CRA-753I	GHD	11/06/2019	719.287	723.440	to(PVC)r (SU) (temporary extension)
GHD-1220M	13,344,913.680	270,458.590	PCE Area Investigation.	GHD	11/01/2019	718.110	719.900	to(PVC)r (SU) (temporary extension)
GHD-1223M	13,344,848.530	270,390.330	PCE Area Investigation.	GHD	11/01/2019	718.500	720.050	to(PVC)r (SU) (temporary extension)
GHD-1226M	13,344,886.150	270,311.310	PCE Area Investigation.	GHD	11/01/2019	718.920	720.370	to(PVC)r (SU) (temporary extension)
GHD-1229M	13,344,984.020	270,460.960	PCE Area Investigation. Replacement for CRA-327M	GHD	10/30/2019	717.580	717.390	to(PVC)r (FM)
GHD-1232I	13,344,599.370	269,955.925	Replacement for CRA-882I. PFAS Investigation.	GHD	11/08/2019	716.834	720.650	to(PVC)r (SU) (temporary extension)
GHD-1232M	13,344,599.680	269,952.556	Replacement for CRA-882M. PFAS Investigation.	GHD	11/08/2019	716.874	720.531	to(PVC)r (SU) (temporary extension)
GHD-1233I	13,344,536.080	269,695.585	Replacement for CRA-880I. PFAS Investigation.	GHD	11/08/2019	716.540	720.367	to(PVC)r (SU) (temporary extension)
GHD-1233M	13,344,535.770	269,699.598	Replacement for CRA-880M. PFAS Investigation.	GHD	11/08/2019	716.874	719.537	to(PVC)r (SU) (temporary extension)
GHD-1234I	13,344,767.260	269,707.730	PFAS Investigation.	GHD	11/07/2019	717.430	720.770	to(PVC)r (SU) (temporary extension)
GHD-1234M	13,344,766.140	269,711.460	PFAS Investigation.	GHD	11/07/2019	717.400	720.540	to(PVC)r (SU) (temporary extension)

Notes:

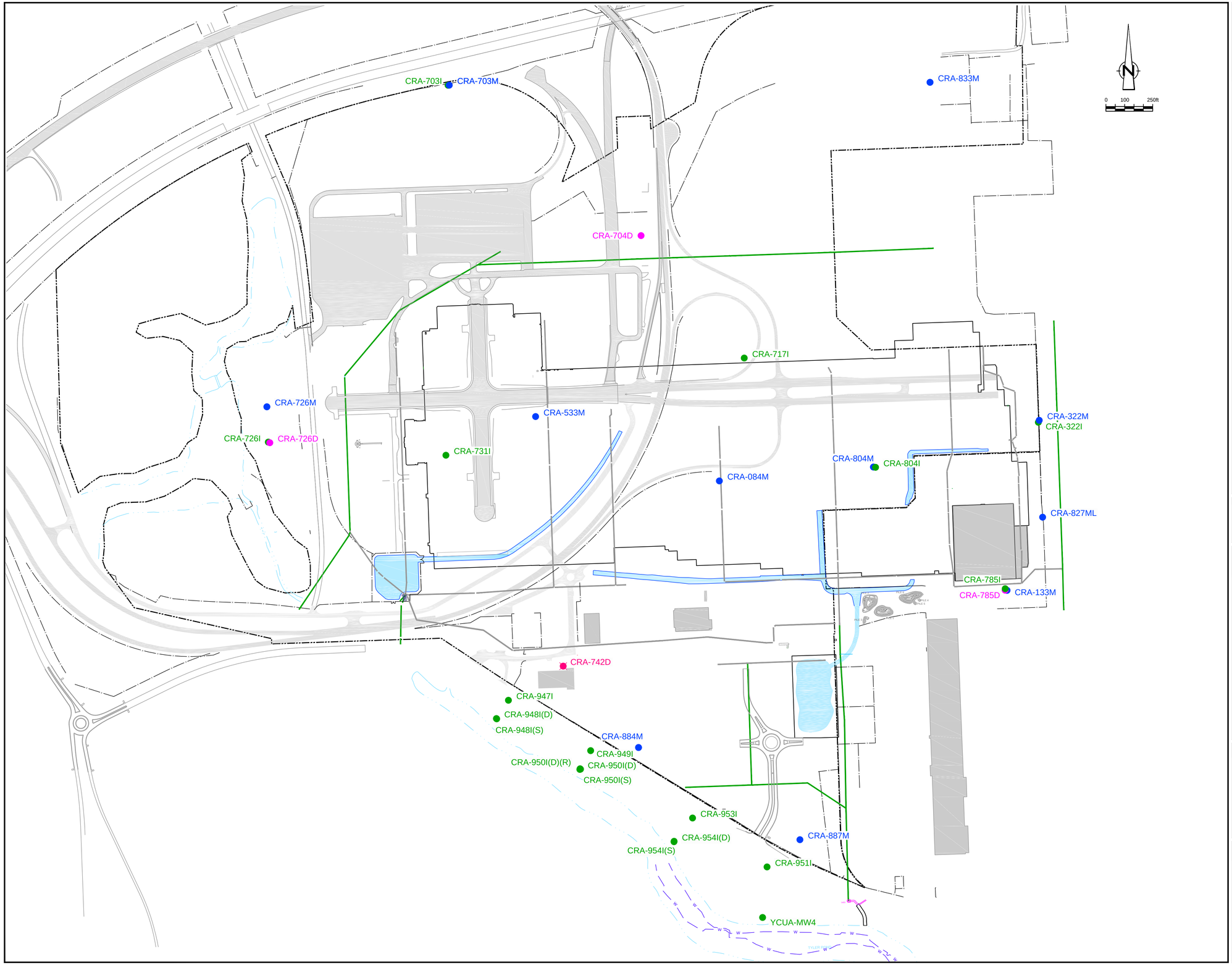
CCI	Cleaning Contractors Inc. (Taylor Michigan)
FM	flush mount
SU	stick up
to(PVC)r	top of (poly vinyl chloride) riser
IG-1/IG-2	Infiltration Gallery Wells

Attachment A
Hydrographs

Table A.1

Chronology of Events Potential Affecting Groundwater Flow
Willow Run Powertrain
Ypsilanti, Michigan

From	To	Description
October 2013	Dec-15	Plant Decommissioning and Demolition
Mar. 08, 2017	Apr. 24, 2017	Tyler Pond Lowered · Water level declined from 697.55 to 686.2 ft amsl (YCUA monitoring)
Late May 2017	July 2018	French Drain Construction · May 22 – Jun. 22, 2017: concrete removed, utilities capped. · Jun. 2 - Jun. 6, 2017: Lines 1 and 2 installed (east side). · Jun. 8 – Jun. 30, 2017: Lines 3 and 4 installed (south side). · July 2017 – May 2018 Construction of YAM Utilities in French drain area · June and July 2018 - Final impervious cover placed over trench area.
August 2017	October 2018	ACM/YAM Swales and FFB-B Construction · August – November 2017: FFB-B Excavated and lined. · August to November 2017: Western swales leading to FFB-C excavated and lined. · October – December 2017: Eastern swales leading to FFB-C excavated and partially lined. Area connecting to channel, not lined. · Spring 2018: Eastern swales north of YAM leading to box culvert excavated. · October 2018: All swales lined.
July 2017	Present	French Drain Operation (Pumping) · July 2017 – Dec. 18, 2017: Trench Dewatering. Pumping rates unknown, pumps were temporary and not variable speed. Pumped harder than normal operation in order to dewater trench for installation of other utilities. · Jan. 26 – February 22, 2018 – Variable frequency drive pumps installed and operated in manual mode. Controls for remote operation installed Feb 5-22, 2018. · March 2018 – July 2018 – French drain system operation in automatic, based on level control. Initially pumped to achieve 710 ft amsl along drain (elevation predicted by modelling to result in capture). Still impacted by infiltration storm water due to lack of impervious cover. · August 2018 through October 2018 - French drain system operation in automatic, level controlled. Groundwater potentially influenced by ACM/YAM swales still under construction. · November 2018 – Present: all swales lined and impervious cover over drain. Area south of French drain segments 3 and 4 has some infiltration due to lack of deed restriction for infiltration restrictions on the airport property. Redevelopment of this area is expected to include impervious cover over the next few years.
Mid June 2017	November 2017	First Flush Basin C (FFB-C) Construction · Jun. 15 - 22, 2017: Installation for construction of French drain on east and slurry wall on north, west and south sides of FFB-C. Extends into clay below intermediate zone. · July 26, 2017: Installed two sumps to improve dewatering within FFB-C footprint · July – September 2017: Dewatering of FFB-C using French drain and sumps for construction and install of liner and ballast. · Mid July 2017: Excavation of overburden in basin. · September 14 – October 5, 2017: Liner and ballast installed · November 1, 2017 - FFB-C: operational to accept water from channel and discharge to 84-inch sewer.
October 2017	October 2017	Storm water System Closure Part 1 – installation of bulkheads and temporary sealing of surface drains (catch basins and manholes) to permit screw pumps and storm water discharge to YCUA to be stopped Nov. 1, 2017. · Oct. 2 – Oct. 31, 2017: Seal YAM manholes, interim closure of manholes and catch basins · Oct. 13 – Oct. 31, 2017: Installed bulkheads on main lines to prevent movement of groundwater water in sewers.
November 2017	November 2017	Storm water System Closure Part 2 – permeant closure of surface inputs (manholes and catch basins) to the bulk headed storm sewers. Sealed other surface slab penetrations.
January 2018	March 2018	Dewatering in Northwest – Nexus was pumping water northwest of the slab in the parking lots for installation of gas main. Low rate pumping.



No	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (OCTOBER 2016)
- FENCE (UPDATED 2-21-2019)
- ESTIMATED STORM SEWER (MAIN LINES - ACTIVE)
- ESTIMATED STORM SEWER (MAIN LINES - INACTIVE)
- SURFACE WATER
- TYLER POND AFTER LOWERED (OCT 2017 SURVEY)
- CRA-704M — EXISTING MONITORING WELL LOCATION (SHALLOW)
- CRA-704I — EXISTING MONITORING WELL LOCATION (INTERMEDIATE)
- CRA-704D — EXISTING MONITORING WELL LOCATION (DEEP)
- CRA-742D — DESTROYED MONITORING WELL LOCATION (DEEP)
- TEST ROADS, ACCESS ROADS, OTHER ROADS AND CURRENT BUILDINGS (NOT SURVEYED) - ACM SITE PLAN (07-27-2018)
- SURFACE STORM WATER FEATURES (02-21-2019)

NOTE: ALL COORDINATES ARE IN INTERNATIONAL FEET

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

FORMER POWERTRAIN PLANT
YPSILANTI, MICHIGAN

GROUNDWATER UPDATE (TO DECEMBER 2019)

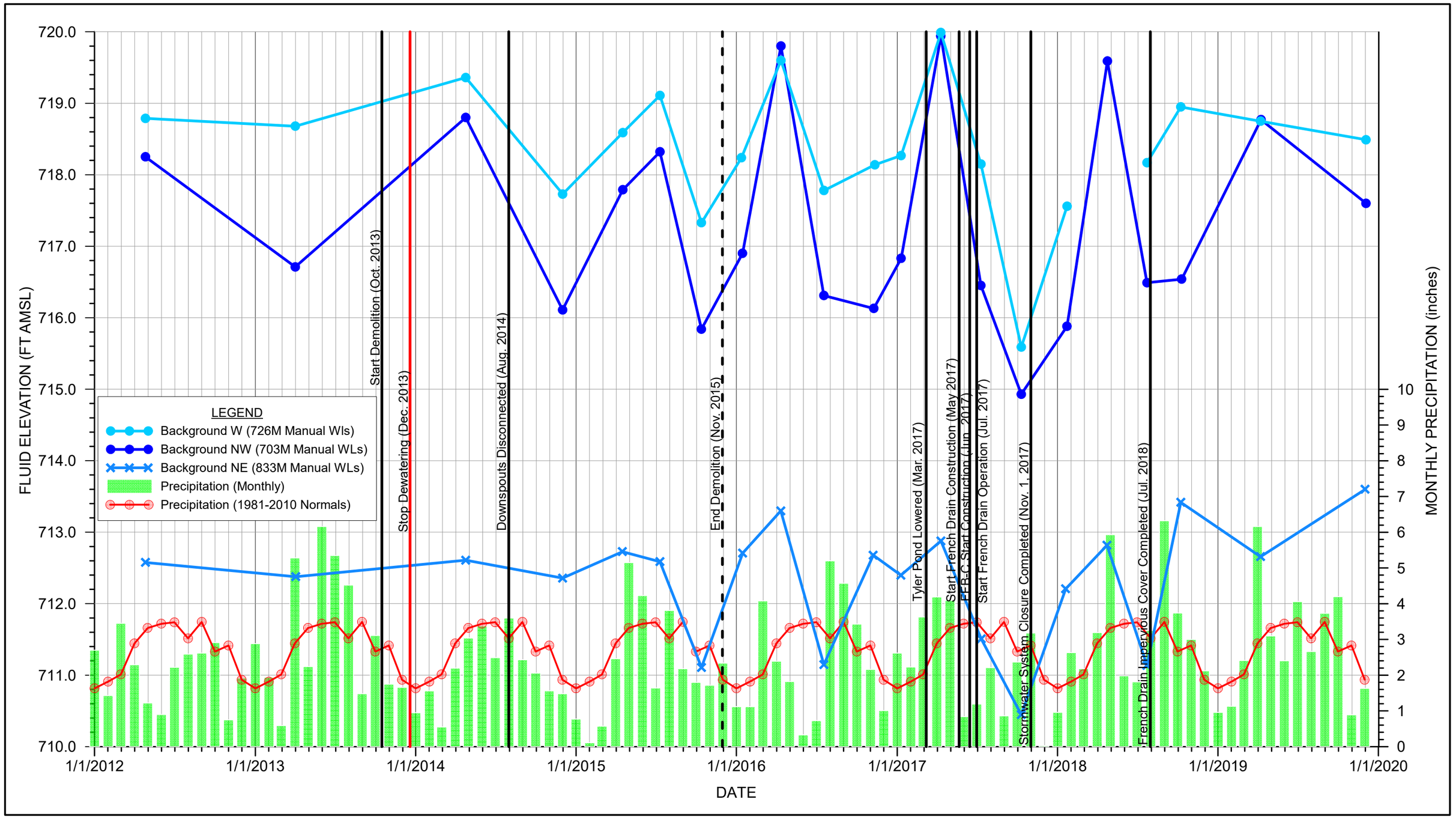
HYDROGRAPH LOCATIONS

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
BL	WB	FEBRUARY 2020	
Scale: AS SHOWN	Project No: 017358-2019	Report No: LUND008	Drawing No: figure A.0

I:\drawings\17000s\17358\17358-CORR\017358-2019\LUND008\017358-2019\LUND008\GN017358-2019\LUND008\GN-DE001.dwg Plot Date: MAR 06, 2020



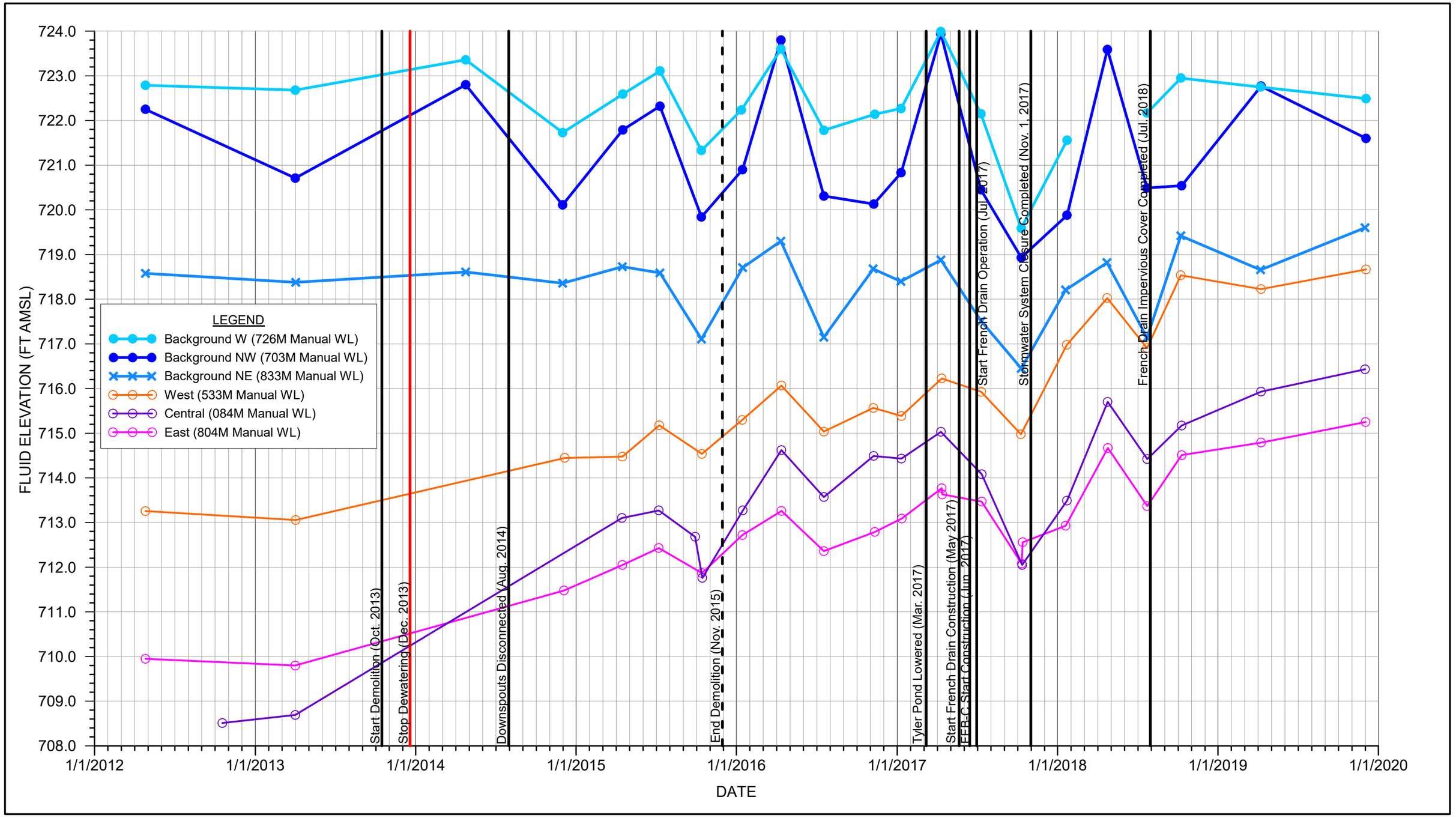
Precipitation data is from Willow Run Airport
Source: NOAA Website (www.ncdc.noaa.gov)

FORMER POWERTRAIN PLANT
YPSILANTI, MICHIGAN

017358
March, 2020

WATER LEVELS VS. TIME - SHALLOW ZONE (BACKGROUND)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2020) FIGURE A.1

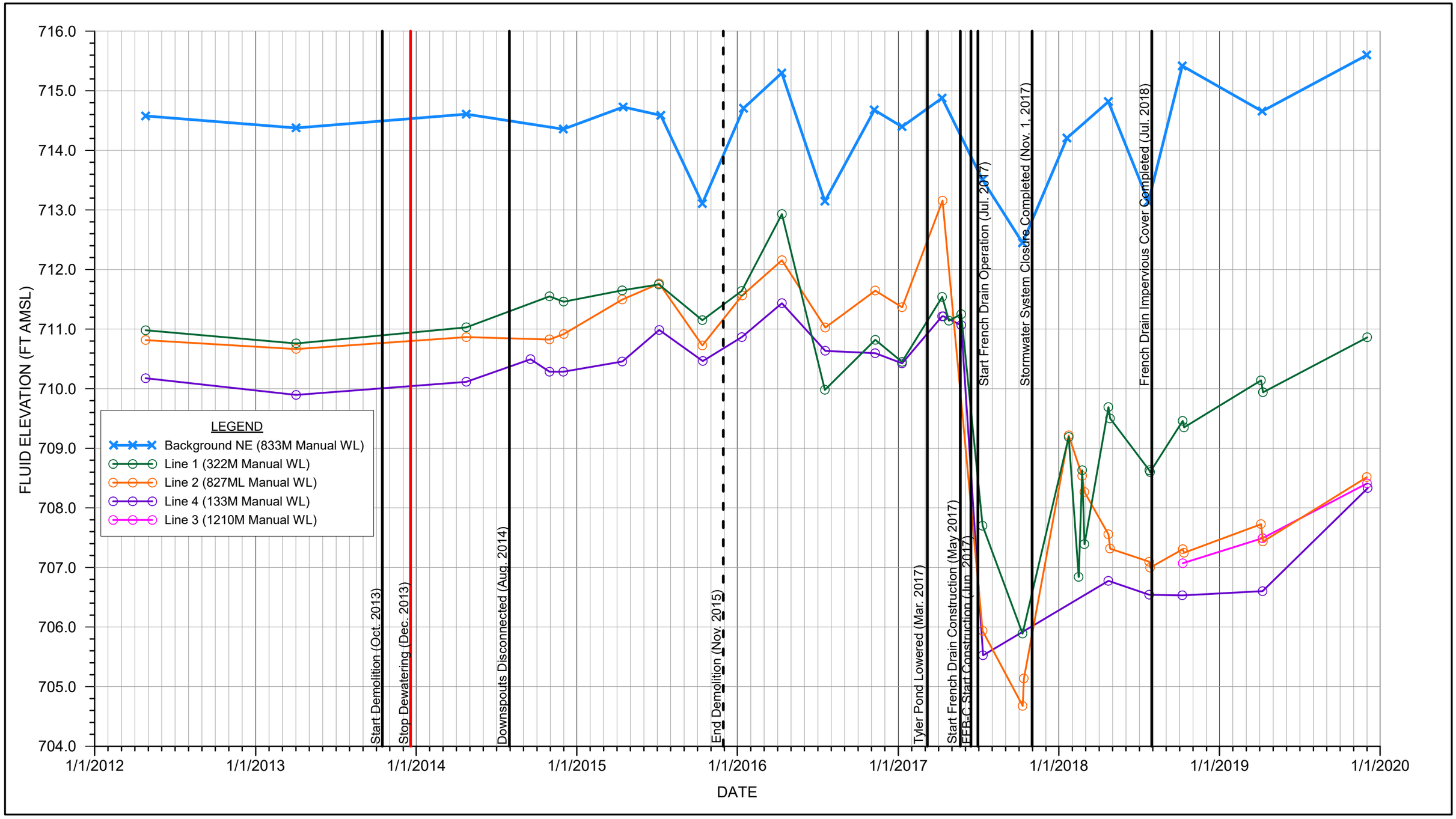
017358-Hydrograph-S Wells-Background



FORMER POWERTRAIN PLANT, YPSILANTI, MICHIGAN

017358
March, 2020

WATER LEVELS VS. TIME - SHALLOW ZONE
(FORMER BUILDING FOOTPRINT)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.2



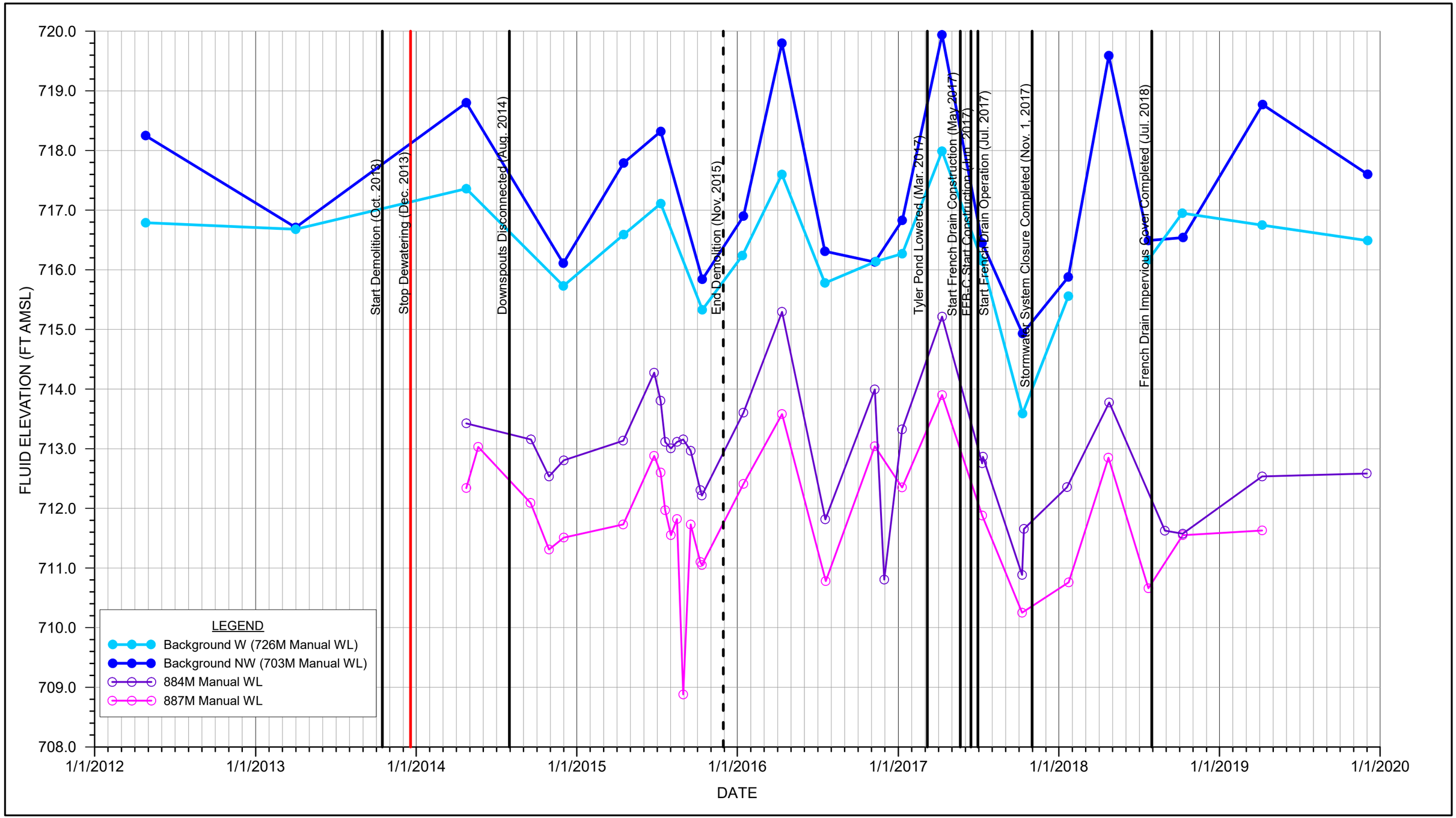
FORMER POWERTRAIN PLANT, YPSILANTI, MICHIGAN

017358

March, 2020

WATER LEVELS VS. TIME - SHALLOW ZONE
(EAST/SOUTHEAST - DOWNGRADIENT SIDE FRENCH DRAIN)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.3

017358-Hydrograph-S Wells-FigA.3-French Drain

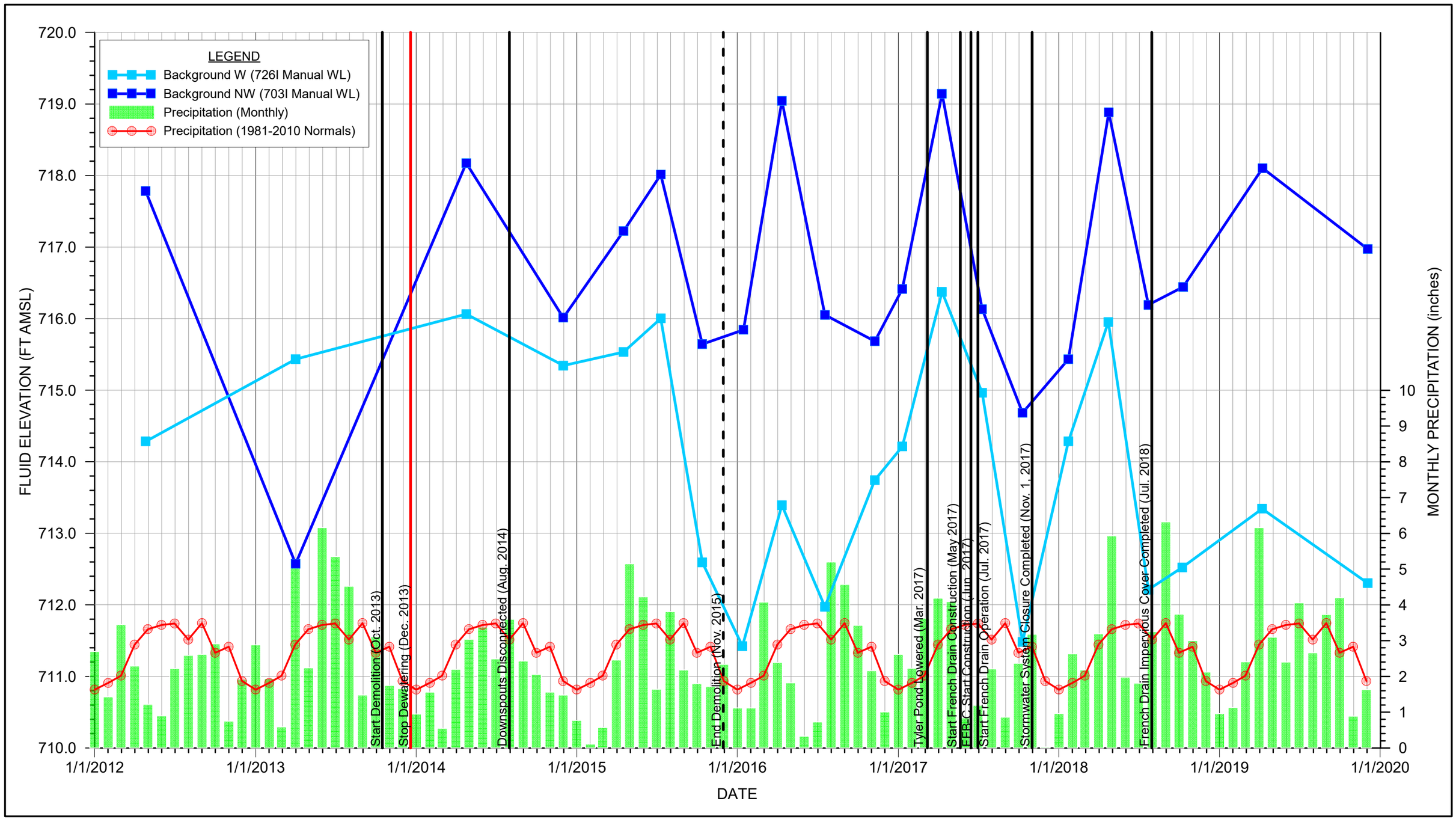


FORMER POWERTRAIN PLANT, YPSILANTI, MICHIGAN

017358
March, 2020

WATER LEVELS VS. TIME - SHALLOW ZONE (SW)
(WELLS IN SOUTHWEST NEAR TYLER POND)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.4

017358-Hydrograph-S Wells-FigA.4-TPond



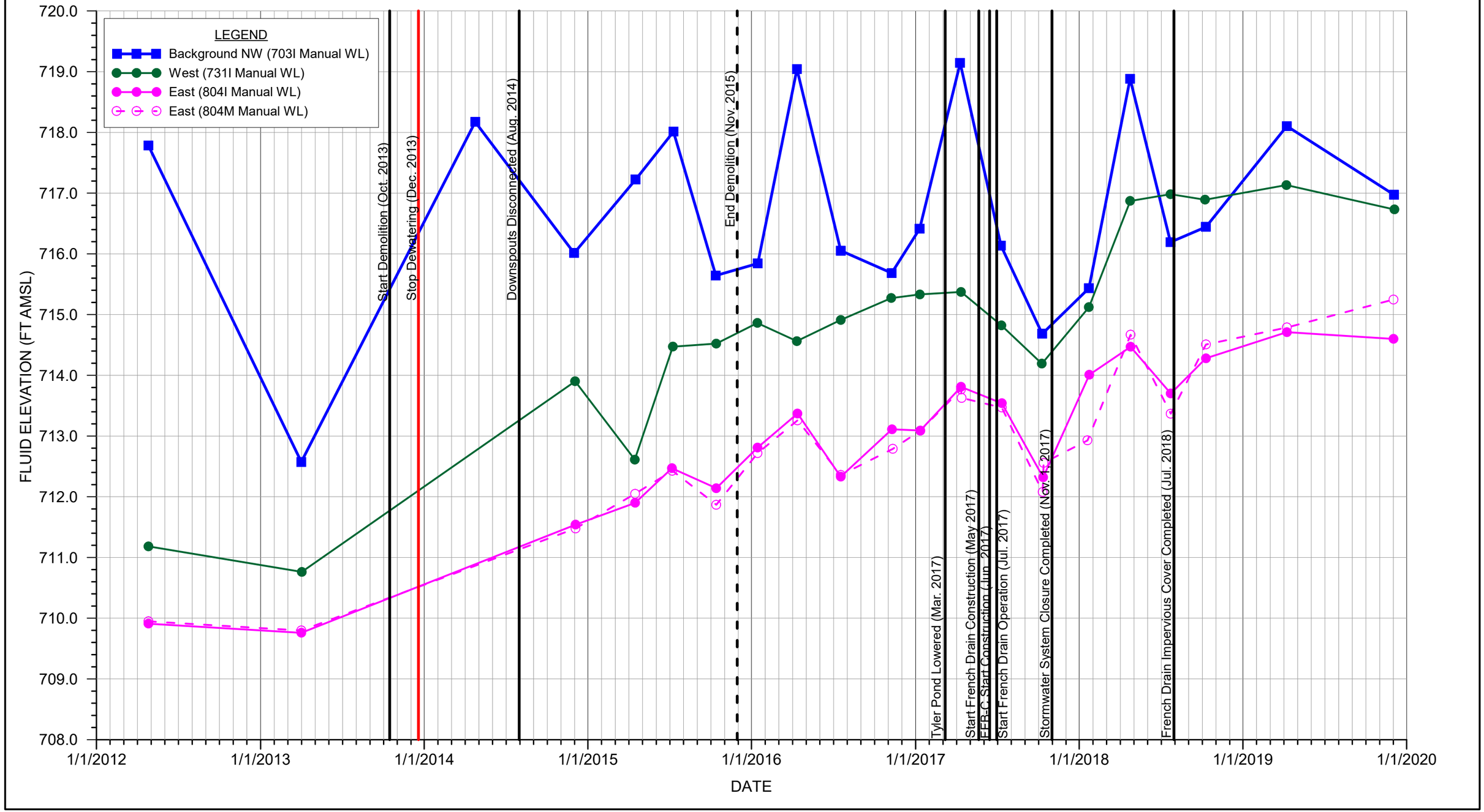
Precipitation data is from Willow Run Airport
Source: NOAA Website (www.ncdc.noaa.gov)

FORMER POWERTRAIN PLANT
YPSILANTI, MICHIGAN

017358
March, 2020

WATER LEVELS VS. TIME - INTERMEDIATE ZONE (BACKGROUND)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.5

017358-Hydrograph-I Wells-FigA.6-Background

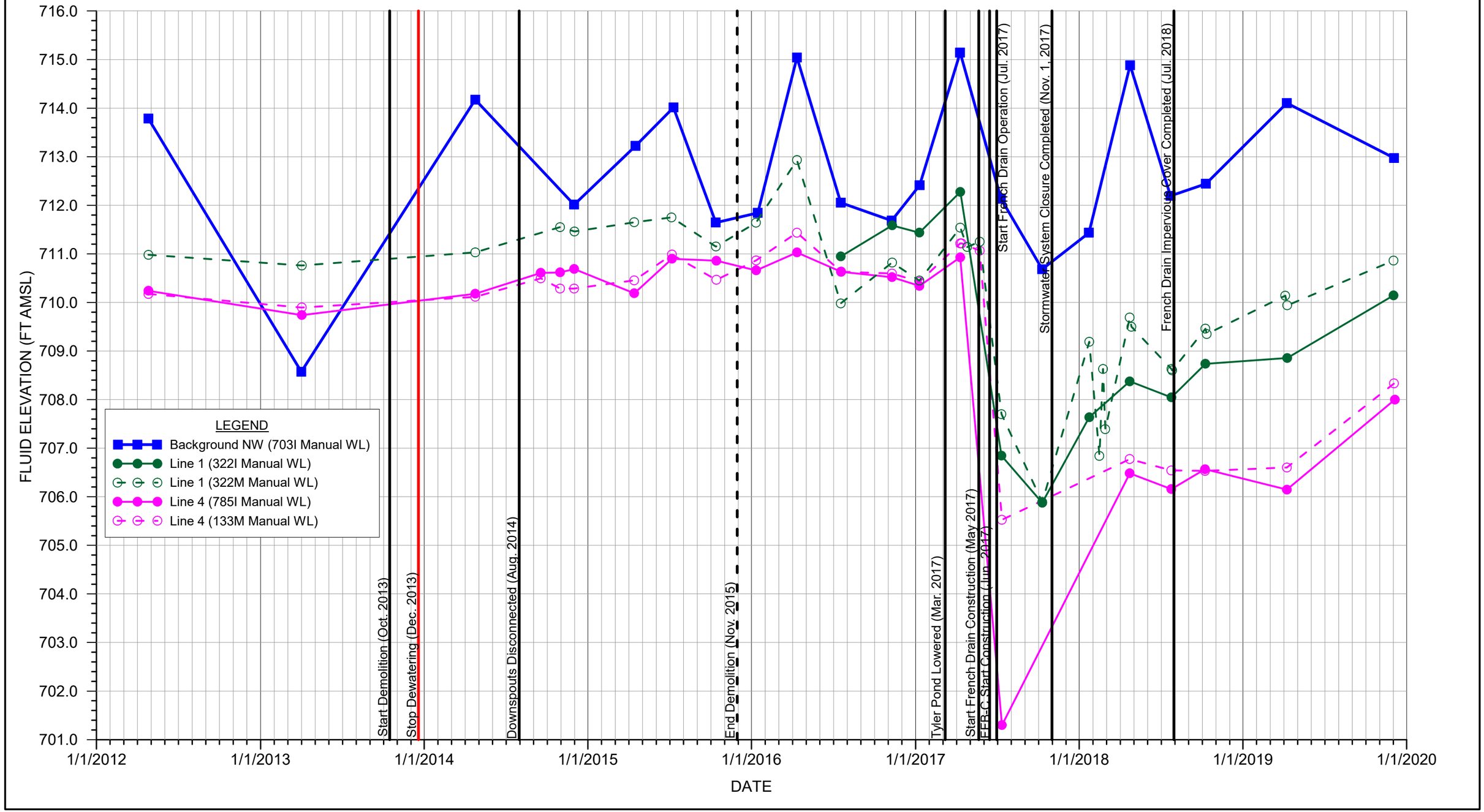


FORMER POWERTRAIN PLANT, YPSILANTI, MICHIGAN

017358
March, 2020

WATER LEVELS VS. TIME - INTERMEDIATE ZONE
(FORMER BUILDING FOOTPRINT)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.6

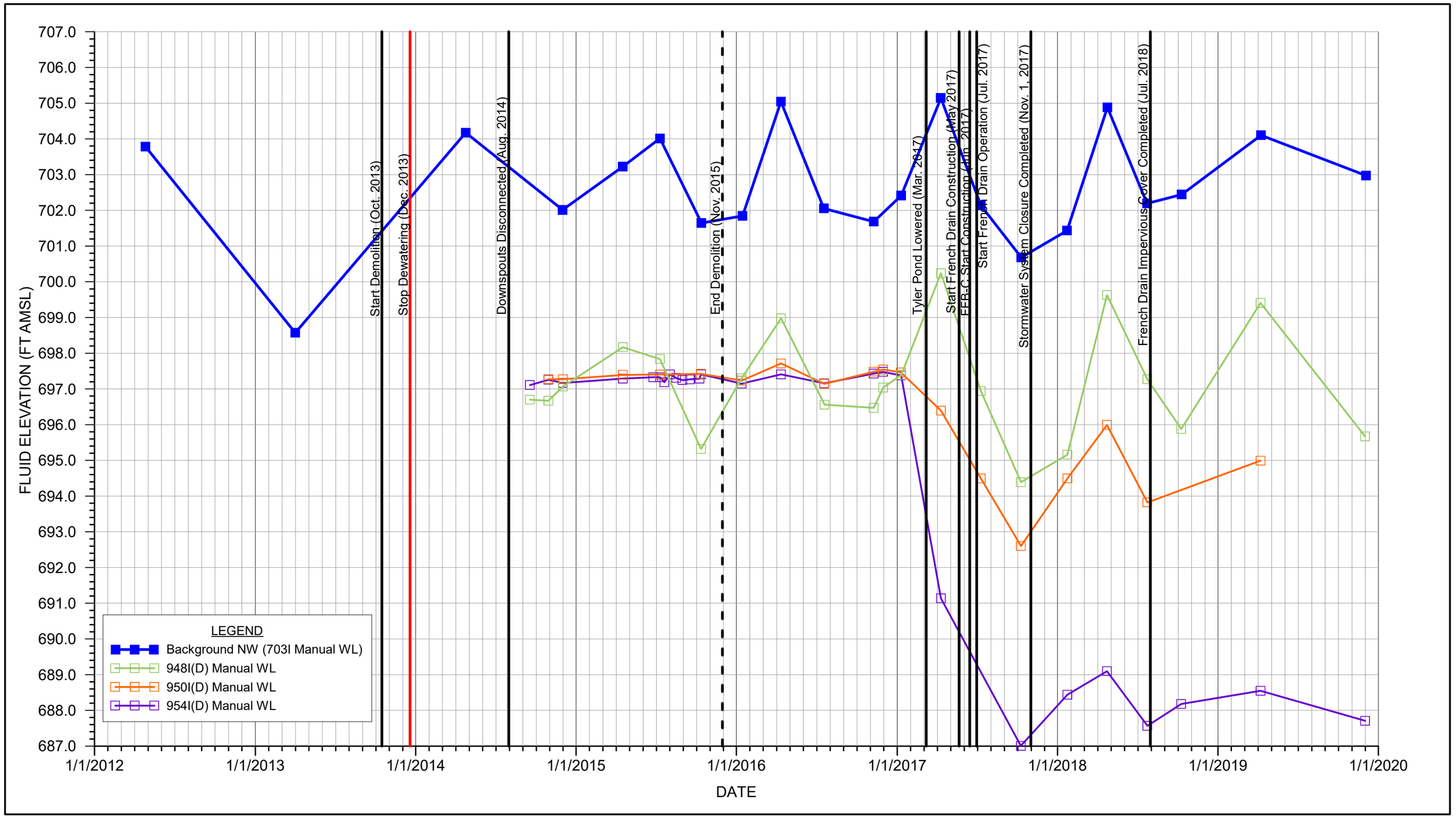
017358-Hydrograph-I Wells-FigA.7-Slab



FORMER POWERTRAIN PLANT, YPSILANTI, MICHIGAN

017358
March, 2020

WATER LEVELS VS. TIME - SHALLOW ZONE
(EAST/SOUTHEAST - DOWNGRADIENT SIDE FRENCH DRAIN)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.7



FORMER POWERTRAIN PLANT, YPSILANTI, MICHIGAN

017358

March, 2020

WATER LEVELS VS. TIME - INTERMEDIATE (DEEP) ZONE (SW)
(WELLS ADJACENT TO TYLER POND)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.8

017358-Hydrograph-I Wells-FigA.9-T Pond-1

FLUID ELEVATION (FT AMSL)

712.0
711.0
710.0
709.0
708.0
707.0
706.0
705.0
704.0
703.0
702.0
701.0
700.0
699.0
698.0
697.0
696.0
695.0
694.0
693.0
692.0

Start Demolition (Oct. 2013)
Stop Dewatering (Dec. 2013)
Downspouts Disconnected (Aug. 2014)
End Demolition (Nov. 2015)
Tyler Pond Lowered (Mar. 2017)
Start French Drain Construction (May 2017)
EER-C Start Construction (Jun. 2017)
Start French Drain Operation (Jul. 2017)
Stormwater System Closure Completed (Nov. 1, 2017)
French Drain Impervious Cover Completed (Jul. 2018)

LEGEND
Background NW (703I Manual WL)
948I(S) Manual WL
950I(S) Manual WL
954I(S) Manual WL
YCUA-MW4 Manual WL

1/1/2012
1/1/2013
1/1/2014
1/1/2015
1/1/2016
1/1/2017
1/1/2018
1/1/2019
1/1/2020

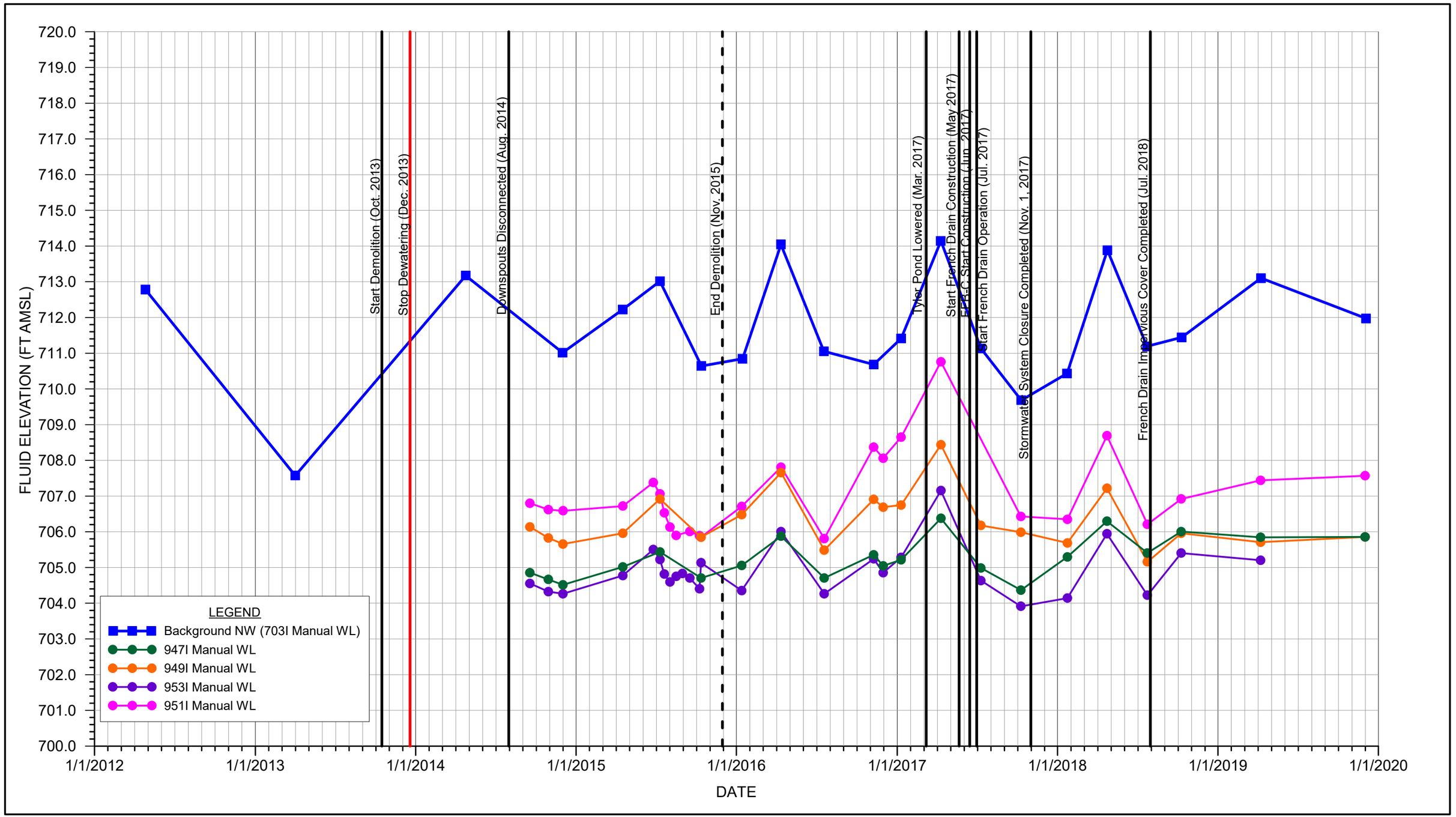
DATE

FORMER POWERTRAIN PLANT, YPSILANTI, MICHIGAN

017358
March, 2020

WATER LEVELS VS. TIME - INTERMEDIATE ZONE (SW)
(WELLS ADJACENT TO TYLER POND)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.9

017358-Hydrograph-I Wells-FigA.10-T Pond-2



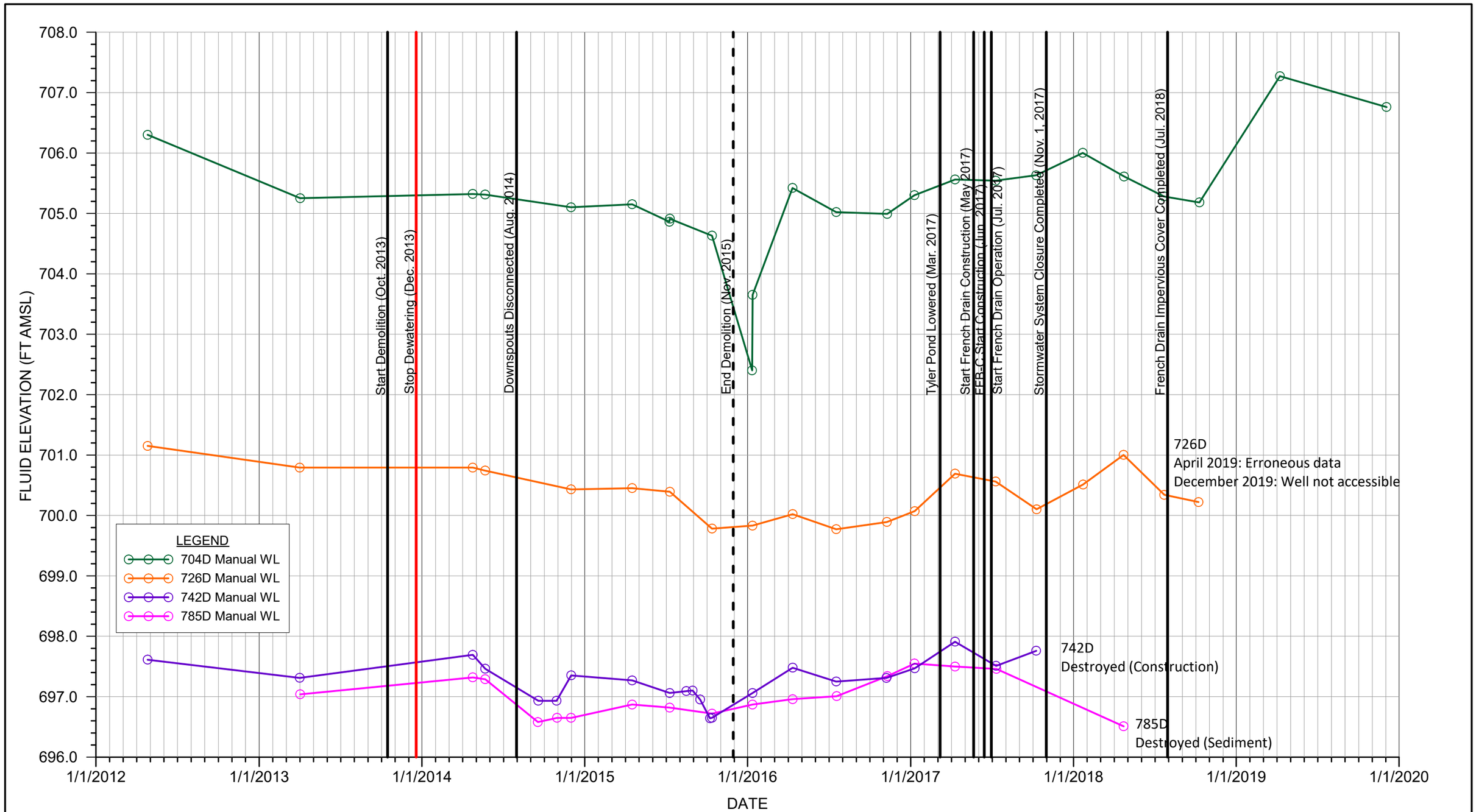
FORMER POWERTRAIN PLANT, YPSILANTI, MICHIGAN

017358

March, 2020

WATER LEVELS VS. TIME - INTERMEDIATE ZONE (SW)
(WELLS ADJACENT TO SOUTH SIDE AIRPORT ROAD)
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.10

017358-Hydrograph-I Wells-FigA.10-T Pond-2



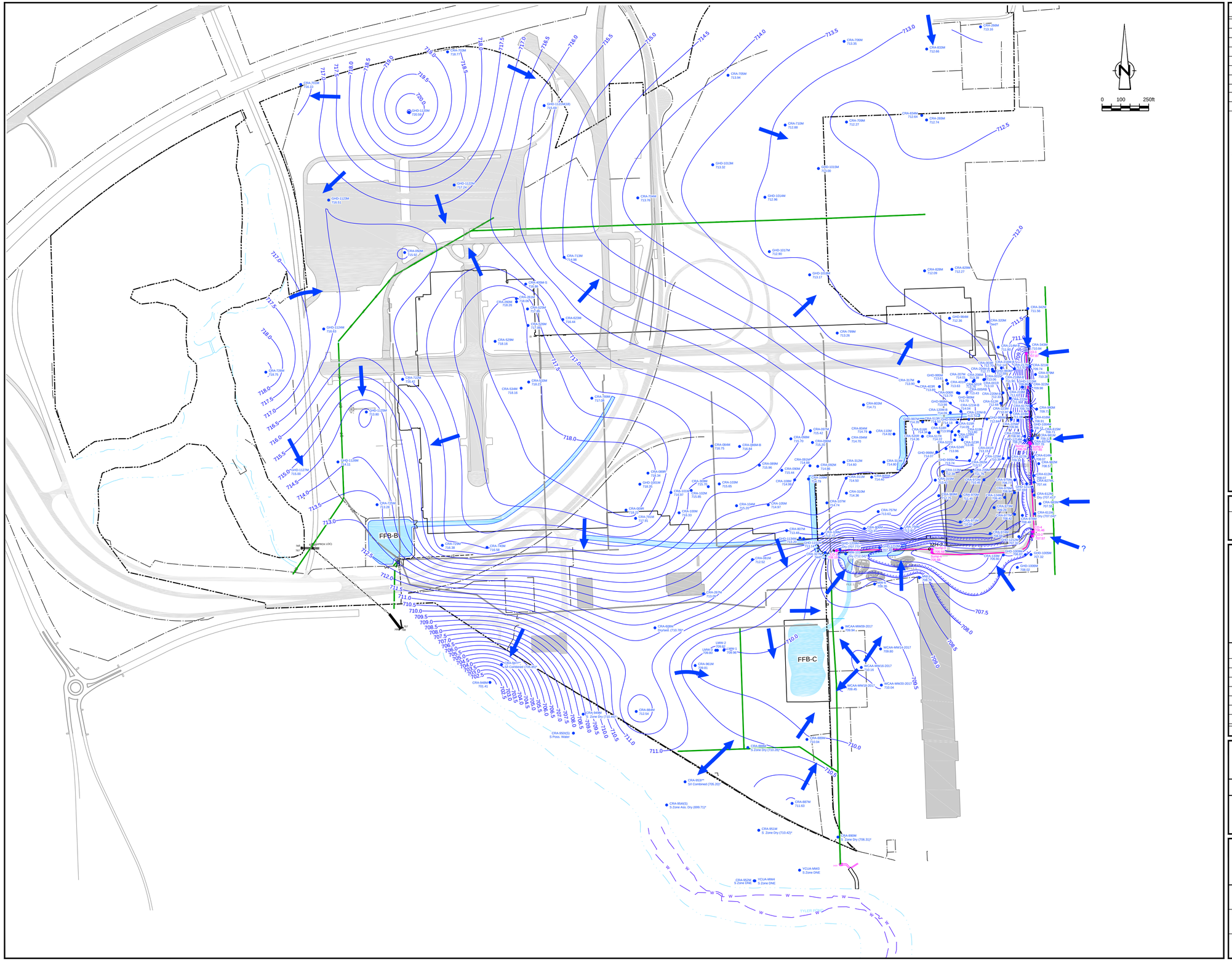
FORMER POWERTRAIN PLANT
YPSILANTI, MICHIGAN

017358
March, 2020

WATER LEVELS VS. TIME - DEEP ZONE
GROUNDWATER LEVEL MONITORING UPDATE (TO DEC. 2019) FIGURE A.11

017358-Hydrograph-D Wells-FigA.13

Attachment B
Contour Plans



No	Revision	Date	Initial

LEGEND

- CRA-265M — EXISTING MONITORING WELL LOCATION
- PROPERTY BOUNDARY (OCTOBER 2016)
- 714.0 — GROUNDWATER CONTOUR (FT. AMSL)
- INTERPRETED GROUNDWATER FLOW DIRECTION
- ESTIMATED STORM SEWER (MAIN LINES - ACTIVE)
- ESTIMATED STORM SEWER (MAIN LINES - INACTIVE)
- SURFACE WATER
- TYLER POND AFTER LOWERED (OCT 2017 SURVEY)
- 712.74 — GROUNDWATER ELEVATION (FT AMSL) (APRIL 2019)
- FRENCH DRAIN AND TRENCH EXCAVATION (AS BUILT, NOT SURVEYED)
- CO-1, SUMP-1 — CLEANOUTS AND SUMPS ALONG FRENCH DRAIN
- TEST ROADS, ACCESS ROADS, OTHER ROADS AND CURRENT BUILDINGS (NOT SURVEYED) - ACM SITE PLAN (07-27-2018)
- SURFACE STORM WATER FEATURES (02-21-2019)
- * NOT USED FOR CONTOURING
- ** SHALLOW AND INTERMEDIATE ZONES NOT SEPARATED BY CLAY

SITE CONDITIONS:

1. TYLER POND LOWERED. WATER LEVEL = 681.49 FT AMSL (APRIL 2019).
2. FRENCH DRAIN: SUMP 1/2 IN MANUAL AT 55%. SUMP 3/4 IN AUTO. AVERAGE SUMP ELEVATIONS (FT AMSL) APR. 8-12, 2019: 1 - 706.7, 2 - 706.7, 3 - 706.0, 4 - 706.0. IMPERVIOUS SURFACE.
3. FFB-C: OPERATIONAL SINCE NOVEMBER 1, 2017. DISCHARGE TO 84" SEWER. ALL SWALES LINED.
4. FFB-B: COMPLETED NOVEMBER 2017 (LINED).
5. STORM WATER SYSTEM CLOSURE: COMPLETED NOVEMBER 2017 (CLOSURE OF MANHOLES, CATCH BASINS AND OTHER SLAB PENETRATIONS; INSTALLATION OF BULKHEADS ON MAIN LINES).

NOTES:

1. ALL COORDINATES ARE IN INTERNATIONAL FEET.
2. WATER LEVELS MEASURED APRIL 8-12, 2019.
3. WATER LEVELS IN WELLS CONTAINING LNAPL WERE CORRECTED USING LNAPL DENSITY = 0.9.
4. FIRST FLUSH BASINS B & C AND CHANNEL OUTLINES REPRESENT SURVEYED LIMITS, SOURCE ACM AND GHD, DATED 2-21-19 AND 4-8-19.
5. FRENCH DRAIN SOURCE: 017358-T02(036)GN-DE027 (OCTOBER 6, 2018) WITH MODIFICATIONS TO CONSTRUCT FOUR (4) SEPARATE LINES (NOVEMBER 16, 2018).
6. REFERENCE ELEVATIONS USED ARE APRIL 2015 OR LATER IF AVAILABLE. AT CRA-888, CRA-889 AND CRA-890 NESTS, 0.3' ADDED TO 2014 ELEVATIONS FOR CONSISTENCY WITH OTHER AREA WELLS.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

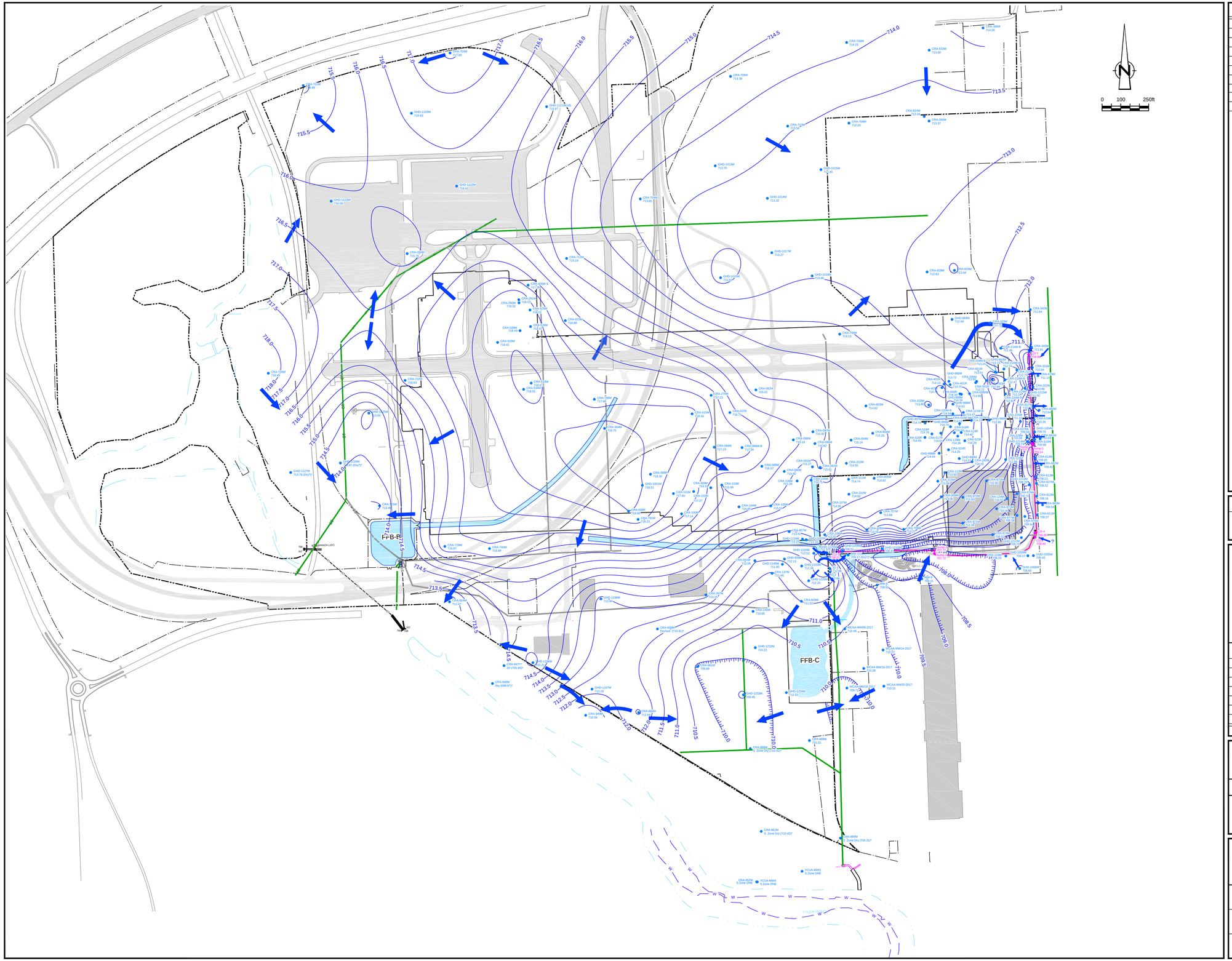
FORMER POWERTRAIN PLANT YPSILANTI, MICHIGAN

APRIL 2019 CONTOUR PLANS

SHALLOW GROUNDWATER CONTOURS - APRIL 2019

GHD

Source Reference:			
Project Manager: B. L.	Reviewed By: W.B.	Date: FEBRUARY 2020	
Scale: AS SHOWN	Project No: 017358-2019	Report No: PRES001	Drawing No: figure B.1



No	Revision	Date	Initial

LEGEND

- CRA-828M — EXISTING MONITORING WELL LOCATION
- PROPERTY BOUNDARY (OCTOBER 2016)
- 714.0 — GROUNDWATER CONTOUR (FT. AMSL)
- INTERPRETED GROUNDWATER FLOW DIRECTION
- ESTIMATED STORM SEWER (MAIN LINES - ACTIVE)
- ESTIMATED STORM SEWER (MAIN LINES - INACTIVE)
- SURFACE WATER
- TYLER POND AFTER LOWERED (OCT 2017 SURVEY)
- 712.83 — GROUNDWATER ELEVATION (FT AMSL) (DECEMBER 2019)
- FRENCH DRAIN AND TRENCH EXCAVATION (AS BUILT, NOT SURVEYED)
- CO-1, SUMP-1 — CLEANOUTS AND SUMPS ALONG FRENCH DRAIN
- * — NOT USED FOR CONTOURING
- ** — SHALLOW AND INTERMEDIATE ZONES NOT SEPARATED BY CLAY
- TEST ROADS, ACCESS ROADS, OTHER ROADS AND CURRENT BUILDINGS (NOT SURVEYED) - ACM SITE PLAN (07-27-2018)
- SURFACE STORM WATER FEATURES (02-21-2019)

SITE CONDITIONS:

1. TYLER POND LOWERED. WATER LEVEL = 681.49 FT AMSL (APRIL 2019).
2. FRENCH DRAIN: SUMP 1/3 IN MANUAL AT 60%, SUMPS 2/4 IN AUTO AT 60%. AVERAGE SUMP ELEVATIONS (FT AMSL) DEC 2-6, 2019: 1-708.9, 2-708.1, 3-708.3, 4-708.2.
3. FFB-C: OPERATIONAL SINCE NOVEMBER 1, 2017. DISCHARGE TO 84" SEWER. ALL SWALES LINED.
4. FFB-B: COMPLETED NOVEMBER 2017 (LINED).
5. STORM WATER SYSTEM CLOSURE: COMPLETED NOVEMBER 2017 (CLOSURE OF MANHOLES, CATCH BASINS AND OTHER SLAB PENETRATIONS; INSTALLATION OF BULKHEADS ON MAIN LINES).

NOTES:

1. ALL COORDINATES ARE IN INTERNATIONAL FEET.
2. WATER LEVELS MEASURED DECEMBER 2-6, 2019.
3. WATER LEVELS IN WELLS CONTAINING LNAPL WERE CORRECTED USING LNAPL DENSITY = 0.9.
4. FIRST FLUSH BASINS B & C AND CHANNEL OUTLINES REPRESENT SURVEYED LIMITS, SOURCE ACM AND GHD, DATED 02-21-2019 AND 04-08-2019.
5. FRENCH DRAIN SOURCE: 017358-T02(036)GN-DE027 (OCTOBER 6, 2018) WITH MODIFICATIONS TO CONSTRUCT FOUR (4) SEPARATE LINES (NOVEMBER 16, 2018).
6. REFERENCE ELEVATIONS USED ARE APRIL 2015 OR LATER IF AVAILABLE. AT CRA-888, CRA-889 AND CRA-890 NESTS, 0.3' ADDED TO 2014 ELEVATIONS FOR CONSISTENCY WITH OTHER AREA WELLS.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

FORMER POWERTRAIN PLANT
YPSILANTI, MICHIGAN

DECEMBER 2019 CONTOUR PLANS

SHALLOW GROUNDWATER CONTOURS - DECEMBER 2019

Source Reference:

Project Manager:	Reviewed By:	Date:	
B. L.	W.B.	FEBRUARY 2020	
Scale: AS SHOWN	Project No: 017358-2019	Report No: PRES004	Drawing No: figure B.2

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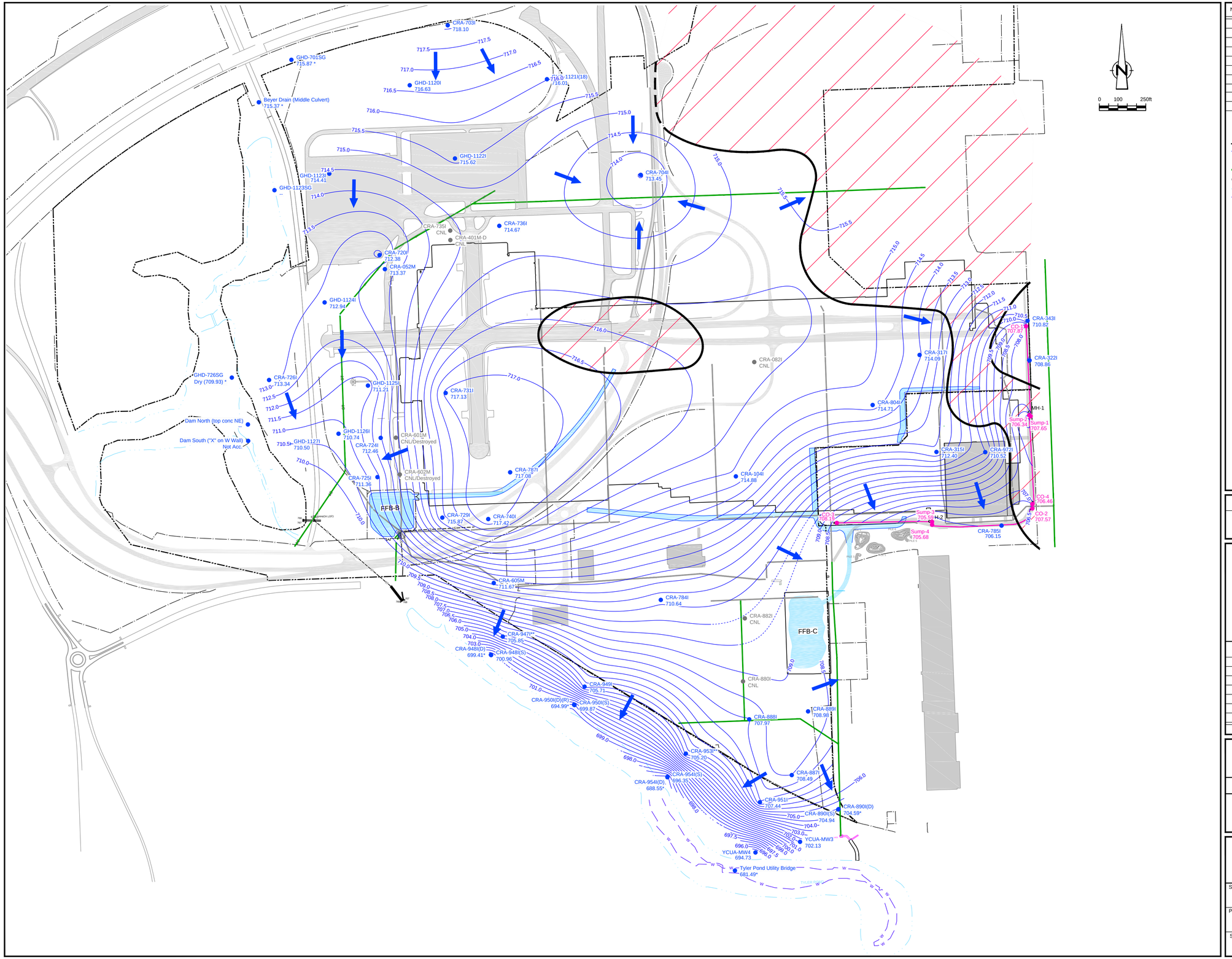

NO	Revision	Date	Initial

LEGEND

- CRA-322I — EXISTING MONITORING WELL LOCATION
- CRA-082I — LOCATION NOT USED
- PROPERTY BOUNDARY (OCTOBER 2016)
- 714.0 — GROUNDWATER CONTOUR (FT. AMSL)
- INTERPRETED GROUNDWATER FLOW DIRECTION
- ESTIMATED STORM SEWER (MAIN LINES - ACTIVE)
- ESTIMATED STORM SEWER (MAIN LINES - INACTIVE)
- SURFACE WATER
- TYLER POND AFTER LOWERED (OCT 2017 SURVEY)
- 708.74 — GROUNDWATER ELEVATION (FT AMSL) (APRIL 2019)
- FRENCH DRAIN AND TRENCH EXCAVATION (AS BUILT, NOT SURVEYED)
- CO-1, SUMP-1 — CLEANOUTS AND SUMPS ALONG FRENCH DRAIN
- TEST ROADS, ACCESS ROADS, OTHER ROADS AND CURRENT BUILDINGS (NOT SURVEYED) - ACM SITE PLAN (07-27-2018)
- SURFACE STORM WATER FEATURES (02-21-2019)
- INTERMEDIATE ZONE MAY NOT EXIST
- * — NOT USED FOR CONTOURING
- ** — SHALLOW AND INTERMEDIATE ZONES NOT SEPARATED BY CLAY
- CNL — COULD NOT LOCATE
- SED — SEDIMENT IN WELL (>50% OF SCREEN)

SITE CONDITIONS:

1. TYLER POND LOWERED. WATER LEVEL = 681.49 FT AMSL (APRIL 2019).
2. FRENCH DRAIN: SUMP 1/2 IN MANUAL AT 55%. SUMP 3/4 IN AUTO. AVERAGE SUMP ELEVATIONS (FT AMSL) APR. 8-12, 2019: 1 - 706.7, 2 - 706.7, 3 - 706.0, 4 - 706.0. IMPERVIOUS SURFACE.
3. FFB-C: OPERATIONAL SINCE NOVEMBER 1, 2017. DISCHARGE TO 84" SEWER. ALL SWALES LINED.
4. FFB-B: COMPLETED NOVEMBER 2017 (LINED).
5. STORM WATER SYSTEM CLOSURE: COMPLETED NOVEMBER 2017 (CLOSURE OF MANHOLES, CATCH BASINS AND OTHER SLAB PENETRATIONS; INSTALLATION OF BULKHEADS ON MAIN LINES).

NOTES:

1. ALL COORDINATES ARE IN INTERNATIONAL FEET.
2. WATER LEVELS MEASURED APRIL 8-11, 2019.
3. LNAPL NOT OBSERVED IN ANY INTERMEDIATE WELLS.
4. FIRST FLUSH BASINS B & C AND CHANNEL OUTLINES REPRESENT SURVEYED LIMITS, SOURCE ACM AND GHD, DATED 2-21-19 AND 4-8-19.
5. FRENCH DRAIN SOURCE: 017358-T02(036)GN-DE027 (OCTOBER 6, 2018) WITH MODIFICATIONS TO CONSTRUCT FOUR (4) SEPARATE LINES (NOVEMBER 16, 2018).
6. REFERENCE ELEVATIONS USED ARE APRIL 2015 OR LATER IF AVAILABLE. AT CRA-888, CRA-889 AND CRA-890 NESTS, 0.3' ADDED TO 2014 ELEVATIONS FOR CONSISTENCY WITH OTHER AREA WELLS.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

FORMER POWERTRAIN PLANT YPSILANTI, MICHIGAN

APRIL 2019 CONTOUR PLANS

INTERMEDIATE GROUNDWATER CONTOURS - APRIL 2019

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
B. L.	W.B.	FEBRUARY 2020	
Scale: AS SHOWN	Project NO: 017358-2019	Report NO: PRES001	Drawing NO: figure B.3

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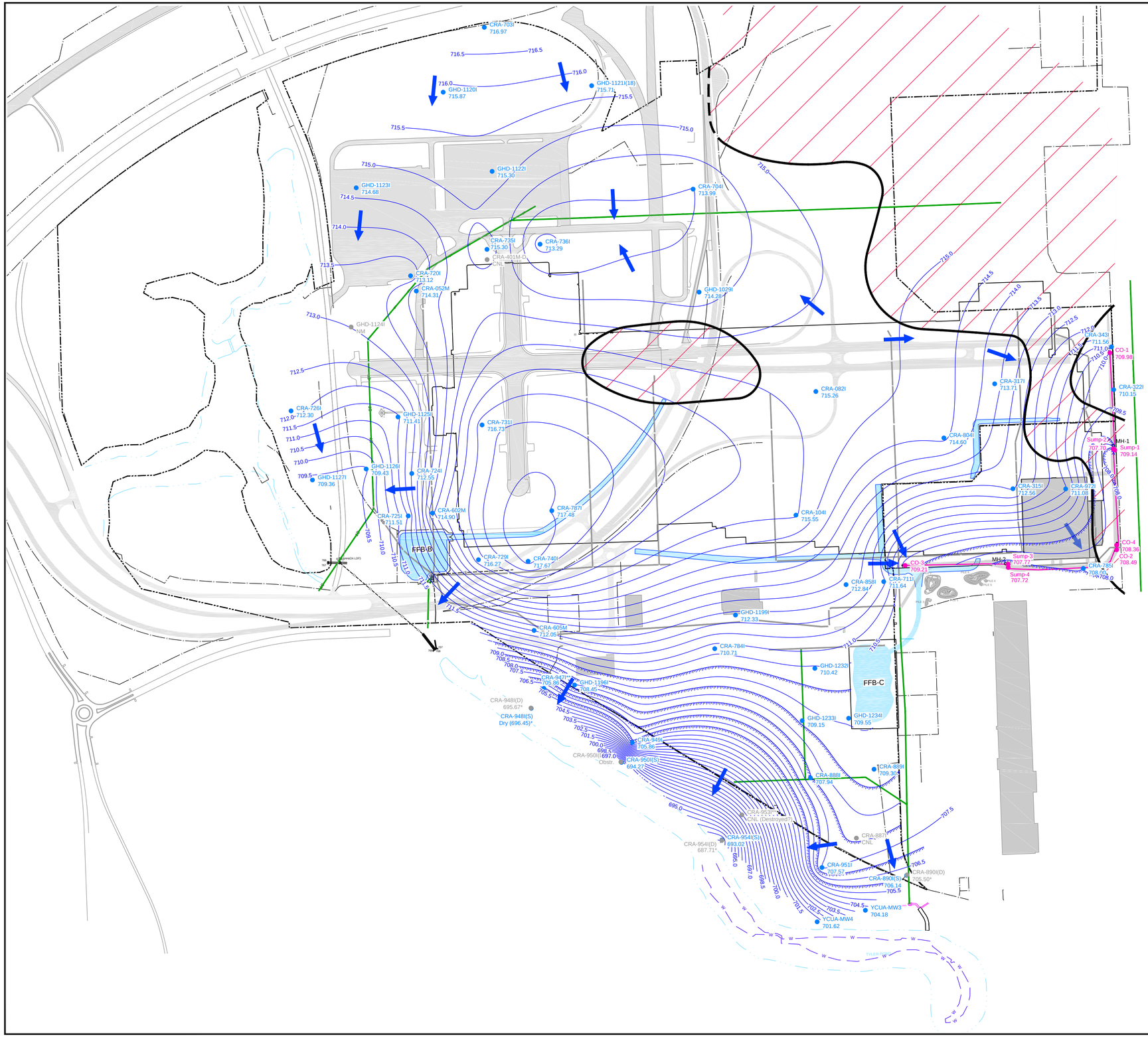

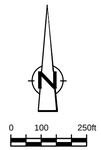

No	Revision	Date	Initial

LEGEND

- CRA-343I — EXISTING MONITORING WELL LOCATION
- CRA-082I — LOCATION NOT USED
- PROPERTY BOUNDARY (OCTOBER 2016)
- ESTIMATED STORM SEWER (MAIN LINES)
- ESTIMATED STORM SEWER (MAIN LINES - INACTIVE)
- 714.0 — GROUNDWATER CONTOUR (FT. AMSL)
- INTERPRETED GROUNDWATER FLOW DIRECTION
- SURFACE WATER
- TYLER POND AFTER LOWERED (OCT 2017 SURVEY)
- 711.56 — GROUNDWATER ELEVATION (FT AMSL) (DECEMBER 2019)
- FRENCH DRAIN AND TRENCH EXCAVATION (AS BUILT, NOT SURVEYED)
- CO-1, SUMP-1 — CLEANOUTS AND SUMPS ALONG FRENCH DRAIN
- * — NOT USED FOR CONTOURING
- ** — SHALLOW AND INTERMEDIATE ZONES NOT SEPARATED BY CLAY
- CNL — COULD NOT LOCATE
- SED — SEDIMENT IN WELL (>50% OF SCREEN)
- TEST ROADS, ACCESS ROADS, OTHER ROADS AND CURRENT BUILDINGS (NOT SURVEYED) - ACM SITE PLAN (07-27-2018)
- SURFACE STORM WATER FEATURES (2-21-19)
- INTERMEDIATE ZONE MAY NOT EXIST

SITE CONDITIONS:

1. TYLER POND LOWERED. WATER LEVEL = 681.49 FT AMSL (APRIL 2019).
2. FRENCH DRAIN: SUMP 1/3 IN MANUAL AT 60%, SUMPS 2/4 IN AUTO AT 60%. AVERAGE SUMP ELEVATIONS (FT AMSL) DEC 2-6, 2019: 1-708.9, 2-708.1, 3-708.3, 4-708.2.
3. FFB-C: OPERATIONAL SINCE NOVEMBER 1, 2017. DISCHARGE TO 84" SEWER. ALL SWALES LINED.
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NOTES:

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6. REFERENCE ELEVATIONS USED ARE APRIL 2015 OR LATER IF AVAILABLE. AT CRA-888, CRA-889 AND CRA-890 NESTS, 0.3' ADDED TO 2014 ELEVATIONS FOR CONSISTENCY WITH OTHER AREA WELLS.

SCALE VERIFICATION

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Approved

DRAWING STATUS

Status	Date	Initial

FORMER POWERTRAIN PLANT YPSILANTI, MICHIGAN

DECEMBER 2019 CONTOUR PLANS

INTERMEDIATE GROUNDWATER CONTOURS - DECEMBER 2019

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
B. L.	W.B.	FEBRUARY 2020	
Scale: AS SHOWN	Project No: 017358-2019	Report No: PRES004	Drawing No: figure B.4

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