COMPOSITE HYDROGEOLOGIC ASSESSMENT AND EXECUTIVE SUMMARY

PROPOSED EAGLE HARBOR AGGREGATE MINE EAGLE HARBOR SAND & GRAVEL

Prepared for

Eagle Harbor Sand & Gravel
4780 Eagle Harbor Road
Albion, New York 14411

Prepared by

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

January 2023

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Geology
Hydrology
Remediation
Water Supply

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1.0 INTRODUCTION

This composite report and executive summary was prepared on behalf of Eagle Harbor Sand & Gravel, Inc. (Eagle Harbor), by Alpha Geological Services, DPC (Alpha), in order to provide a comprehensive, updated document that ties together the relevant results of the various hydrogeologic investigations and analyses completed for the proposed vertical expansion of the Eagle Harbor Sand and Gravel Pit (NYSDEC Mine ID #80171) into bedrock. This report was requested by the New York State Department of Environmental Conservation (NYSDEC) in a letter to Mr. Thomas Biamonte of Eagle Harbor on October 17, 2022.

The mine currently extracts sand and gravel from the site and is proposing to expand vertically into the underlying bedrock at the site. The expansion is entirely within the existing life of mine (LOM). The quarry will need to be dewatered in order to maintain a dry working floor. It is the potential impact of this dewatering that has been the focus of the hydrogeologic evaluations and the comments received from the NYSDEC.

Alpha has produced several reports since 2018 and provided responses to the hydrogeologic comments contained in two Notices of Incomplete Application issued by the NYSDEC in 2019 and 2020. These reports and responses have discussed potential drawdown impacts on neighboring water supply wells; potential impacts to wetlands north, south and east of the mine; and potential downstream impacts of mine pumping discharge to surface waters. Additionally, a revised SWPPP and a Water Withdrawal Permit Application have been prepared and submitted for the proposed mine expansion.

The historical timeline of the reports, investigations, comments and responses is provided below. The locations of specific reports and NOIA responses within the DEIS are provided in brackets. Pertinent information regarding each document is also presented in association with each specific document. Some of the items requested by the NYSDEC in NOIAs have been superseded by new information and are not listed here.

1) December 2018 - Hydrogeologic Analysis of the Eagle Harbor Aggregate Mine of Eagle Harbor Sand & Gravel, Inc. [DEIS, Appendix 5]

2) January 2019 - NYSDEC issued a NOIA, with Hydrogeologic Comments [DEIS, Appendix 1]. The following are pertinent items requested by NYSDEC:
   - Survey all wells within 1,000 feet of proposed quarry.
   - Evaluate potential impacts on those wells.
   - Conduct a pumping test as part of a Water Withdrawal Permit application.
   - Evaluate potential impacts to neighboring wetlands KN-9 (to the south) and KN-13 (to the north)
3) May 2019 - Responses to NOIA Hydrogeologic Comments [DEIS, Appendix 1], including:
   - Results of Residential Well Survey
   - Hydrologic Modeling of the Proposed Eagle Harbor Mine Discharge (Revised)
   - Results of Test Pit investigation at Wetland KN-9
4) December 2019 – NYSDEC issued additional hydrogeologic comments pertaining to a Pumping Test Protocol [DEIS, Appendix 1]

   The pertinent items requested by the NYSDEC included:
   - Install a monitoring well (MW-5S) between the proposed quarry and wetland K-9 (to the southeast).
   - Complete a Water Withdrawal Permit application after the pumping test.
5) January 2020 – The Pumping Test Protocol was finalized [contained in Pumping Test Report, DEIS Appendix 4]
6) February 2020 – The Pumping Test was conducted on well PW-1A
7) July 2020 - Analysis of the February 2020 Pumping Test at the Proposed Eagle Harbor Aggregate Mine [DEIS, Appendix 4]
8) September 2020 - Water Withdrawal Permit Application submitted [DEIS, Appendix 4]
9) November 2020 - NYSDEC issued a second NOIA, with Hydrogeologic Comments [DEIS, Appendix 1]

   The pertinent items requested by NYSDEC that are focused on the pumping test results:
   - Provide a ground water drawdown contour map for both the surficial and bedrock aquifers at the full mine buildout.
   - Evaluate drawdown impacts for both surficial and bedrock aquifers at the full mine buildout.
   - Expand the residential well survey to include all wells within the area of influence of the proposed quarry and evaluate drawdown impacts to these wells.
   - Provide a revised SWPPP for a 700 gpm discharge.
10) February 2021 - Responses to the second NOIA Hydrogeologic Comments [DEIS, Appendix 1]

11) February 2021 – Revised SWPPP [DEIS, Appendix 6]
12) July 2022 – DEIS submitted to NYSDEC
13) October 2022 – NYSDEC issued comments on the DEIS, including hydrogeologic comments

The additional testing and evaluations, which were required by the NYSDEC in the four years since the original 2018 Hydrogeologic Analysis report was submitted, have resulted in some changes to Alpha's interpretations and conclusions regarding the potential drawdown impacts from quarry dewatering. The following sections summarize the results and conclusions that are a culmination of the studies and testing conducted to date. Outdated information is not presented herein; however, reference is made to existing documents and their locations in the DEIS when necessary or appropriate.

2.0 SUMMARY OF RESULTS

2.1 Geology

2.1.1 Surficial Deposits

As detailed in Alpha's 2018 Report (DEIS Appendix 5), and presented again here, the geology of the site consists of sand and gravel above bedrock. The sand and gravel deposits are comprised of ice contact kame and esker deposits (Cadwell, 1988). Eagle Harbor has been mining the sand and gravel for decades and is proposing to extend the mine vertically into bedrock. The elongated shape of the SG-1 pond (Plate 1) is due to the fact that it follows the path of a former esker that was mined out. The southward continuation of the esker on the adjacent property can be seen in the site topography as a narrow ridge extending southwest of the SG-1 pond. Much of the area where sand and gravel has been mined within the footprint of the proposed bedrock quarry has already been reclaimed and is being farmed; consequently, the reclaimed material will be excavated over time and sold, or stockpiled, to allow access to the underlying bedrock. The thickness of the unconsolidated material that remains above bedrock at the site ranges from approximately 26 feet to 60 feet.

The kame and esker deposits are consistent with the soils mapped for most of the site; which include the Howard, Bombay, and Colonie soil types (Figure 1). These soils are deep, moderately well drained to somewhat excessively drained sandy and gravelly soils, according to the Soil Survey of Orleans County, New York (Soil Survey).

The topographically low wetland area southeast of the proposed quarry consists of muck soils (Palms, Carlisle) and is referred to as State-regulated wetland KN-9 (Figure 1). The Soil Survey indicates that these muck soils are poorly drained, sapric soils that are commonly underlain by lacustrine silt. Water is at, or near, the surface for extended periods of time throughout the year in these soils. In February, 2019, Alpha directed the excavation of two test pits (TP-1 and TP-2) along the northern boundary of Wetland KN-9 to confirm the soil survey descriptions (locations shown on Figure 1 and Plate 1). Both test pits had similar soil profiles that consist of dark brown, moist to wet, organic soils in the upper one to 1.5 feet, underlain by dry to moist, varved, silty very fine sand to silt, to approximately 6.5 feet. At approximately 6.5 feet, a layer of saturated fine to coarse sand with rounded gravel and cobbles was encountered. Soil samples of the dark brown organic layer (0.5'-1.0'), the silty, very fine sand layer (1.5'-2.5'), and the silt layer (4.0'-5.0') were collected from test pit TP-2. These samples were submitted to Atlantic Testing Laboratories (ATL) for sieve analysis, and the laboratory results are included here as Attachment A (originally Attachment 4 of the 2019 NOIA Response (DEIS Appendix 1). The samples confirm the presence of the muck soil for Wetland KN-9 and the underlying lacustrine silt, as described in the Soil Survey.

State regulated wetland KN-13 exists in the topographically low area north of Maple Street and consists primarily of Lamson soils. Lamson soils formed in depressional or concave areas of glacial lake plains and are poorly to very poorly drained. Deeper, undisturbed soil within the Lamson soils exhibit varved textures with thin layers of material ranging from very fine sand to silt clay loam. These soil textures are consistent with poorly drained soils that are deposited on glacial lake plains.

2.1.2 Bedrock

The unconsolidated deposits at the site are underlain by the dolostones of the Lockport Group. The DeCew Dolostone is below the Lockport Group dolostones and is underlain by the Rochester Shale.

2.2 Water Level Monitoring Network

Surface water and ground water monitoring is vital to the evaluation of the potential hydrogeologic impacts of dewatering the proposed quarry. Water level data were analyzed to assess the relationship between the surficial aquifer and the bedrock aquifer, determine ground water flow patterns, and evaluate the potential impact of the proposed quarry on nearby residential wells and wetlands. Eagle Harbor has been monitoring water levels at staff gauges and culverts, monitoring wells and residential wells on at least a monthly basis since 2016. Water levels were also measured in the accessible residential water supply wells during the 2019 and 2021 residential well surveys, which were conducted in response to the NOIAs issued in 2019 and 2020, respectively. Water levels in certain residential wells were also monitored during the February 2020 pumping test. The location of residential wells are provided on Figure 2.

Plate 1 shows all of the water level monitoring locations that have been routinely used since 2016. Table 1 provides the well construction information for the wells and the measuring point information for the surface water monitoring points. Table 2 presents the water level data, which has been collected on an approximately monthly basis since 2016. The water levels measured during the February 2020 pumping test were collected at a higher frequency and are not provided on Table 2. Updated hydrographs of the surficial aquifer wells and staff gauges are presented on Figure 3, and updated hydrographs of the bedrock aquifer wells are presented on Figure 4. The pumping test data are presented and discussed in Alpha's July 2020 Pumping Test Report, which is part of Eagle Harbor's Water Withdrawal Permit Application (DEIS Appendix 4) and is not practical to include again herein. Water level data from the Residential Well Survey are discussed in the next section of this report.

Data collected by Eagle Harbor and Alpha include water levels from six bedrock monitoring wells (MW-1 through MW-4, PW-1, and PW-1A), two residential bedrock aquifer wells (Miller and Barn Well), five surficial aquifer monitoring wells (MW-1S through MW-5S), five staff gauges (SG-1, SG-2, SG-3, PG-1, WP-1), and two culverts (Maple Street outflow from the site (Outfall 001) and the next culvert downstream at Kams Road). The Barn Well is no longer in use, and there is no pump in the well. The Miller well is no longer relied upon for potable water because the residence has been hooked up to the public water supply line along Maple Street. Additionally, water level data for a USGS surficial aquifer monitoring well (OL-20) was obtained from the USGS website for the same dates as the site water level measurement dates.

2.3 Residential Well Survey

Alpha sent well questionnaires, in response to the 2019 NOIA, to all 14 residences within 1000 feet of the quarry, as well as the owners of the properties if they lived elsewhere. Alpha received questionnaires back from seven of the residences. The results of this initial well survey were presented and discussed in the May 2019 Response to the NOIA [DEIS, Appendix 1]. An additional three residences and a business (Pine Hill Airport) were provided questionnaires in 2021 in response to the 2020 NOIA, which requested that the residential well survey be expanded to include any wells within the projected drawdown impact of the proposed quarry. These additional residences were the only other locations which had not been inventoried already and were also within the projected extent of aquifer drawdown, which was revised after the 2020 pumping test. Figure 2 shows all of the residences and water supply wells within 1000 feet of the proposed quarry, or within the drawdown impact of the proposed quarry, whichever is greater. The extent of potential drawdown impact is discussed later under the Drawdown Impacts section.

Attempts were made to contact all 18 residences by telephone and schedule times to collect well information and water samples in person, regardless of whether a questionnaire was received. Alpha conducted the residential well surveys in the field on April 4, 2019 and March 12, 2021. All 18 residences or businesses were visited during the field survey. Interviews with the homeowners or tenants determined that two homes (4720 and 4816 – Pine Hill Road) receive their water from the well at 4764 Pine Hill Road. Two other homes (4763 and 4803 – Pine Hill Road) were supplied by the well at 4779 Pine Hill Road. The well at 4898 Pine Hill Road also supplies water to 4904 and 4906 Pine Hill Road. Table 3 includes residential well information such as well elevation, well depth, depth to water and ground water elevation. Several of the wells were inaccessible due to pump configurations, or were buried underground.

There were only two wells (4872 and 4917 Pine Hill Road) where Alpha could not obtain any information. The tenant of the rental property at 4872 Pine Hill Road did not know anything about the well characteristics or its location. The tenant gave permission to look for the well, but it could not be found. No well questionnaire was returned from the owner of the property. The tenant informed Alpha that they would contact the owner, who would contact Alpha if they chose to grant permission to access the well. Alpha has not been contacted by the owner of 4872 Pine Hill Road to date. The residence, or business, at 4917 Pine Hill Road was not home at the time of the field visit, did not return a questionnaire, and no further contact information could be found. The business run from the residence was no longer open at the time of the field visit and the building appeared to be vacant.

Alpha measured water quality of the residential wells in the field. The water quality field parameters included total dissolved solids, specific conductivity, pH, temperature, and turbidity and were measured from either an outdoor spigot, a garden hose, or a tap. Water samples were collected, where permission was granted, and sent to a laboratory for testing of alkalinity, chloride, sulfide, total suspended solids, hardness, iron, and manganese. The field and laboratory results of water quality testing are summarized on Table 4.

2.4 Hydrogeology

The hydrology and hydrogeology of the Eagle Harbor site are comprised of surface water, the unconsolidated aquifer (or water table aquifer), and the bedrock aquifer. The surface water at the site consists of shallow ponds and wetlands. Some ponds are the result of past excavation into the water table (like the esker that is now the SG-1 pond) and are a direct expression of the water table. These systems will be described in the following sections.

2.4.1 Surface Water

As discussed in the Geology section, muck soils exist in topographically low areas to the north and southeast of the proposed quarry. These areas are indicated as wetlands on the US Fish & Wildlife Service's National Wetland Inventory (NWI) website and are identified by the NYSDEC as State-regulated wetlands KN-13 and KN-9, respectively. Identification of these areas as wetlands is consistent with the soils being described as having ground water near or at the surface for extended periods of time during the year. Both of these ephemeral wetlands are beyond the life of mine.

The northern boundary of wetland KN-9, which is located southeast of the proposed quarry (Figure 1) and beyond the LOM (Plate 1), was delineated by North Country Ecological Services in September, 2018. The Soil Survey maps most of this wetland as the Carlisle Muck, which is indicated to be poorly drained and underlain by silt. The presence of Carlisle Muck and the underlying silt was confirmed via test pits logged by Alpha (see Section 2.1.1). The silt layer is likely a lacustrine deposit and limits, or retards, percolation. Wetland KN-9 drains toward the south. The original plan for the proposed quarry was to mine the southeastern corner of the bedrock excavation to within approximately 150 feet of the southeastern wetland. Alpha performed a preliminary evaluation of potential drawdown impacts from the original quarry plan. The results indicated that the wetland was potentially within the extent of drawdown from the initially proposed quarry. The proposed excavation boundary of the quarry was subsequently adjusted to be approximately 425 feet away from the delineated wetland boundary to mitigate this potential concern. No drainage or water pumped from the quarry will enter this wetland.

There are several open, shallow ponds in the northeastern part of the site and within the Life of Mine (LOM) that all drain toward the Maple Street culvert (Outfall 001; Plate 1). Some of these ponds are water table ponds and are the result of historic mining; however, others are situated on Palms Muck soil, which can hold water and restrict infiltration to the water table (Figure 1). The surface water in this area, as exemplified by SG-2 and the Maple Street Culvert, is typically several feet higher in elevation than the water table at nearby MW-3S for most of the year (Table 2 and Figure 3). The reverse situation has been true at times during the spring when the water table (MW-3S) surrounding the ponds is higher than the surface water. This characteristic indicates that the water table discharges locally to the ponds during the spring and discharges further north during the rest of the year. Water pumped from the quarry will enter a ditch that leads into a sediment basin prior to being discharged to one of the historically mined ponds on the west side of this wetland. The water from this pond will continue to flow toward Outfall 001 as it currently does.

Wetland KN-13 is located north of Maple Street and west of Kams Road. This wetland is over 800 feet to the north of the quarry. It is situated primarily on Lamson soils (very fine sandy loam) and Fredon Loam. The outflow from the culvert at Maple Street turns northward as it nears this wetland west of Kams Road (Plate 1). The outflow ditch provides some recharge to wetland KN-13 on a seasonal basis during times of low water table conditions. Portions of ephemeral wetland KN-13 likely drain toward the ditch during high water table conditions. The approximate southern boundary of wetland KN-13, where shown on Plate 1 and Figure 1, is based on the topographic slope break and the mapped soil types.

2.4.2 Surficial Aquifer

The water table aquifer, or surficial aquifer, occurs within the unconsolidated sand and gravel deposits at the site. The surficial aquifer is recharged primarily via direct precipitation to the surface of the sand and gravel deposits. The depth to water in the surficial aquifer ranges from several feet in the northeast part of the site to over 30 feet in the southern part of the site**.** The hydrographs for the surficial aquifer wells (Figure 3) show seasonal fluctuations with the high water table occurring in the spring and the low water table occurring in the fall.

The February 2020 water table elevation contour map (see Plate 2 of the Pumping Test Report; DEIS Appendix 4) was expanded to include additional areas to the west and south using topographic features and stream locations. The revised and expanded existing conditions water table map is included herein as Figure 5. The map indicates there is a local water table high (ground water divide) in the southwestern portion of the site. This is consistent with the topographic high that is associated with kame terrace deposits in the same area. Ground water flows from the areas of high water-level elevations toward low water-level elevations, and the flow is perpendicular to the ground water elevation contours. Ground water flow at the site is primarily directed northward, eastward and southeastward. There is a small area in which the ground water flow within the surficial aquifer is to the southwest from the local ground water divide.

2.4.3 Bedrock Aquifer

The primary water-bearing fractures occur in the dolostones, and there is some flow in the underlying Rochester Shale where infrequent natural fractures occur only in the uppermost part of the shale; consequently, the Rochester Shale can be considered the base of the bedrock aquifer at the site (Attachment B – Fracture Logs; originally Appendix B of the 2018 Hydro Report; DEIS Appendix 5). The bedrock aquifer receives most of its recharge from the overlying sand and gravel aquifer where it is in contact with the bedrock; discontinuous or patchy silty/clayey layers occur above the bedrock in some areas and can limit, or retard, recharge and result in a confined, or semi-confined bedrock aquifer, such as beneath Wetland KN-9.

A ground water elevation contour map was constructed from seasonal low ground water elevations for wells that are open within the bedrock aquifer (Figure 6; modified from 2018 Hydro Report, Plate 4; DEIS Appendix 5). The map (Figure 6) represents a potentiometric surface, which is the level to which water in a confined, or semi-confined, aquifer rises when tapped by wells. Water in the bedrock wells at the Eagle

Harbor site rises to a level above the bedrock surface, but it does not rise above the water table except in the northeastern (downgradient) area of the site (represented by MW-3/MW-3S) where the piezometric surface will occasionally be higher than the overlying water table. Same-day (synoptic) water level elevations in well pairs MW-1/1S, MW-2/2S, MW-3/3S, and MW-4/4S indicate that the water table is at a higher elevation than the bedrock aquifer potentiometric surface (Figures 7 and 8). This condition indicates a downward vertical hydraulic gradient wherein the sand and gravel aquifer recharges (drains into) the bedrock aquifer. The downward vertical gradient at the Eagle Harbor site lessens to the north and northeast at the site (compare the hydraulic head differences at MW-4/4S, MW-1/1S versus MW-3/3S). This is consistent with the interpretation that the discharge zone for the bedrock aquifer at the site is typically north of the site. The potentiometric surface at well MW-3 rarely rises above the water table (as expressed by MW-3S), which indicates that the bedrock aquifer rarely discharges to the water table in the northeastern portion of the site. It is apparent that the bedrock discharge zone is further north.

The hydrographs on Figure 4 indicate that the seasonal low for the bedrock aquifer typically occurs during the autumn months, just as it does for the water table aquifer. The ground water flow direction within the bedrock aquifer across most of the site is toward the northeast as indicated in Figure 6. A ground water divide is evident near the southern side of the site in the area of the local topographic high. The northerly ground water flow direction north of the divide is consistent with the overall pattern of stream flow north of the site. South of the divide, the south-southwest ground water flow direction is also consistent with the south-southwestern flowing streams that occur southwest of the site. The bedrock aquifer potentiometric surface and ground water flow direction during the seasonal high water-level conditions are similar to those during the seasonal low, with flow directed northeast, except the water levels are three to five feet higher during the seasonal high than during the seasonal low (Figure 4).

2.5 Future Aquifer Conditions at the End of Mining

2.5.1 Surficial Aquifer

The results of the 2020 pumping test on well PW-1A were used to predict the future water table condition at the end of mining. The February 2020 pumping test was conducted on a bedrock well; however, drawdown in the surficial aquifer at the end of the pumping test developed a roughly symmetrical cone of drawdown around the pumping well (Figure 9; originally from 2020 Pumping Test Report – Plate 4; DEIS Appendix 4). It is conservatively assumed that the surficial aquifer will be drawn down to the top of the bedrock at the edge of the quarry, and that the future water table will slope upward and outward from the quarry edge until it merges with the existing water table, or encounters a recharge boundary condition. The top of bedrock elevation at the quarry edge was determined from a structural contour map of the elevation of the top of bedrock surface (Figure 10; originally from 2020 Pumping Test Report – Plate 8; DEIS Appendix 4). The slope of the impacted water table west of the pumping well, at the end of the February 2020 pumping test (see Figure 9), was used to approximate the slope of the water table outward from the edge of the quarry, starting at the top of bedrock and going outward approximately 600 feet (the lateral extent of most of the water table impact during the February 2020 pumping test). The curve of the future water table was then extended outward and upward west and south of the quarry, in parabolic fashion, until it merged with the existing water table. The existing water table used in this exercise was the February 2020 water table elevation contour map (Figure 5; originally from February 2021 Responses to Second NOIA Hydrogeologic Comments, Figure 3; DEIS, Appendix 1).

The resulting future conditions ground water contour map for the surficial aquifer is presented herein as Figure 11 (originally Figure 3 from February 2021 Responses to second NOIA Hydrogeologic Comments; DEIS, Appendix 1). The map indicates that a portion of the surficial aquifer on the northwest side of the quarry is predicted to be completely dewatered in the future due to the upward sloping bedrock surface that rises more steeply than the drawdown curve in that area.

The ponds to the east of the proposed quarry (and within the LOM), will create a recharge boundary condition beyond which the water table will experience no drawdown because the pond level will be maintained in order to supply water for the wash plant. Similarly, the water table in the northeast part of the site (within the LOM) will be maintained by the quarry discharge, which will be routed through that area on its way to the Maple Street culvert outlet. The water leaving the site via the Maple Street culvert will flow westward along a ditch and then northward through the eastern part of wetland KN-13, north of the site (see Figure 11); consequently, it is assumed that wetland KN-13 will also act as a recharge boundary.

2.5.2 Bedrock Aquifer

The water levels in the bedrock aquifer will be drawn down adjacent to the quarry as it is developed, then return close to the original levels once mining is completed and the quarry fills with water. The greatest potential drawdown could occur when the quarry is at its maximum vertical and lateral extent. The maximum drawdown of ground water is predicated on the interpretation that the base of the aquifer is defined by the deepest fractures associated with the aquifer and that the ground water cannot be drawn down lower than the base of the aquifer. The vast majority of water-bearing fractures that were observed in the core were in the dolostones above the Rochester Shale. Although the Rochester shale is quite fissile, natural fractures are rare. The base of the bedrock aquifer is interpreted to be at the contact between the dolostones and the underlying Rochester Shale.

The maximum drawdown is also based on the premise that ground water will enter the mine through a seepage face on the quarry wall that extends upward from the aquifer base. The predicted seepage face around the quarry walls is anticipated to be approximately one third the vertical distance between the base of the aquifer and the elevation of the existing potentiometric surface. This is a conservative estimate because seepage is often seen coming from quarry faces at elevations higher than one third the way up the wall. The effect of this is that the maximum drawdown, and the extent of drawdown away from the mine, likely would be less than predicted herein. The structural contours for the top of the Rochester Shale (aquifer base) are presented in Figure 10 (originally from 2020 Pumping Test Report – Plate 8; DEIS Appendix 4). The proposed mine floor is roughly coincident with the top of the Rochester Shale in most areas around the perimeter.

The elevation of the aquifer base and the existing potentiometric surface vary slightly around the perimeter of the mine; consequently, the height of the seepage face is expected to vary slightly around the perimeter of the mine. The gradient of the potentiometric surface is assumed to be steeper close to the quarry walls and flatten with distance away from the quarry until it approaches and merges with the original (existing conditions) potentiometric surface at some distance from the quarry. For this analysis, the steeper gradient closer to the quarry walls is taken from the future conditions bedrock aquifer map presented in the December 2018 Hydrogeologic Evaluation (2018 Hydro Report – Plate 6; DEIS Appendix 5). This steeper gradient was used for the first 100 feet away from the quarry walls. The existing conditions potentiometric surface presented herein as Figure 6 (seasonal low conditions) was considered the original potentiometric surface with which the sloping potentiometric surface will merge with away from the quarry. The slope of the potentiometric surface between the first 100 feet from the quarry wall and the original potentiometric surface was constructed by applying the results of the 2020 pumping test on well PW-1A as described in the following paragraph.

A drawdown curve from the February 2020 pumping test was used to project the bedrock aquifer potentiometric surface outward beyond 100 feet until the future potentiometric surface merged with the existing potentiometric surface, which is represented by Figure 6. The drawdown in the bedrock aquifer during the February 2020 pumping test was asymmetrical and the northwest-southeast drawdown curve was much steeper than the northeast-southwest drawdown curve (Figures 12 and 13; originally Figures 3 and 4 from the 2020 Pumping Test Report; DEIS Appendix 4); consequently, the northeast-southwest drawdown curve was used herein to be the most conservative (i.e., using the steeper drawdown curve would have resulted in more limited prediction of drawdown impacts). The future conditions bedrock ground water elevation contour map is presented here as Figure 14 (originally Figure 1 from February 2021 Responses to second NOIA Hydrogeologic Comments; DEIS, Appendix 1). The use of the most conservative drawdown curve coupled with the most conservative seasonal low, potentiometric surface represents a realistic worst-case scenario for predicted drawdown impacts in the bedrock aquifer at the final stage of mining.

2.5.3 Drawdown Impacts

2.5.3.1 Surficial Aquifer Drawdown Impacts

The surficial aquifer ground water contour maps for the existing (Figure 5) and future conditions (Figure 11) were compared and a drawdown contour map was created based on the difference in ground water elevation contours between the two maps. The water table drawdown contour map is presented as Figure 15 (originally Figure 5 from February 2021 Responses to second NOIA Hydrogeologic Comments; DEIS, Appendix 1). The map shows that the lateral extent of drawdown within the surficial aquifer at full buildout of the mine is predicted to be greatest to the west of the mine where drawdown impacts extend as far as 1950 feet. Drawdown at the quarry edge ranges from approximately 20 to 35 feet. The magnitude of the drawdown depends on the bedrock elevation and the elevation of the existing water table.

The four known surficial aquifer wells along Pine Hill Road southwest of the mine could experience drawdowns of between one and 18 feet by the end of full mine buildout (Figure 15). There are three wells in the well survey for which there is no information available because the homeowners opted not to respond. If these three wells are tapping the surficial aquifer, then they could experience between one and 10 feet of drawdown by the end of full mine buildout. All of the residences along Pine Hill Road west of the mine have been connected to the public water supply and no longer rely upon their wells as primary water sources, except for one. It is Alpha's understanding that the residence at 4764 Pine Hill Road relies on a bedrock well and has not been hooked up to the public water supply (see Figure 2 for location).

2.5.3.2 Bedrock Aquifer Drawdown Impacts

The ground water elevation contour maps for the bedrock aquifer under the existing (Figure 6) and future conditions (Figure 14) were compared and a drawdown contour map was created based on the difference in ground water elevation contours between the two maps. The bedrock aquifer drawdown contour map is presented as Figure 16 (originally Figure 4 from February 2021 Responses to second NOIA Hydrogeologic Comments; DEIS, Appendix 1). The map shows that the lateral extent of drawdown within the bedrock aquifer at full buildout of the mine is predicted to be greatest to the west of the mine where drawdown impacts extend as far as 1900 feet.

The three known bedrock water supply wells west of the site could experience between 10 and 18 feet of drawdown by the end of full mine buildout (Figure 16). The aquifer being tapped is unknown for three of the residential water supply wells that are located further south on Pine Hill Road. These wells are at the edge of, or beyond, the lateral extent of bedrock aquifer drawdown impact (Figure 16). No information that pertains to the aquifer that these wells are tapping is available because the homeowners chose not to respond to the well survey. If the two wells at the edge of the lateral extent of drawdown impact are bedrock wells, then they could experience a negligible drawdown of less than a foot by the time of full buildout of the mine. As stated previously, all of the residences along Pine Hill Road west of the mine, except for the bedrock well at 4764 Pine Hill Road (see Figure 2 for location), have been connected to the public water supply and no longer rely upon their wells as primary water sources.

Figure 16 indicates that the bedrock well at on Maple Street, north of the mine, could experience five to 10 feet of drawdown at full buildout of the quarry. The Maple Street well (13303 Maple Street, or Parsons well) had a very strong sulfur odor (see Table 2) and the owner reported his dissatisfaction with the well water to Alpha personnel in 2019, along with his eagerness to have his residence hooked up to the public water supply line. The residence at 13303 Maple Street has since been connected to the public water supply line.

There are no bedrock wells south or east of the mine within the zone of drawdown impact.

2.5.3.3 Wetlands Drawdown Impacts

As discussed previously, there are two state regulated wetlands near the proposed quarry. Wetland KN-9 is over 400 ft southeast of the quarry and Wetland KN-13 is approximately 900 ft north of the proposed quarry. In its October 17, 2022 letter to Tom Biamonte of Eagle Harbor, the DEC provided initial comments on the DEIS and mentioned that:

> *The analysis fails to mention the presence of NYS regulated wetlands located in proximity of the proposed expansion area, such as KN-9 located to the south of the expansion area, and KN-12/KN-13 to the north. An analysis is needed to demonstrate that these areas (which are presumed to be largely made by semi-perched water table conditions related to the surficial aquifer) would not be impacted dewatering for bedrock mining operations. Additionally, an analysis should detail any impacts/changes anticipated to KN-12/KN-13 with any potential increases to discharges related to dewatering.*

Wetlands KN-9 and KN-13 have been extensively discussed in the 2018 Hydro Report (DEIS

Appendix 5) and in the May 2019 Responses to the first NOIA Hydrogeologic Comments (DEIS, Appendix 1). A description of these wetlands is also provided here in Sections 2.2.1 and 2.4.1 of this summary report. A discussion of the potential impacts on these wetlands was presented in the July 2020 Pumping Test Report (DEIS Appendix 4) and the February 2021 Responses to the second NOIA Hydrogeologic Comments (DEIS, Appendix 1]. An up-to-date discussion of the potential impacts to these wetlands is provided again in the following paragraphs.

Wetland KN-9

Wetland KN-9, which is southeast of the proposed quarry, is underlain by Carlisle and Palms muck soils, which are poorly drained and underlain by lacustrine silt, which limits, or retards, percolation. The presence of the muck soil and underlying silt was confirmed by test pit observations and the results of laboratory sieve analyses that were performed on soil samples from the test pits. As discussed in the 2018 Hydro Report (DEIS Appendix 5):

> *…the quarry drawdown is not anticipated to impact the southeastern wetland or the northern wetland due to their distance from the quarry edge and the underlying silt layers that cause them to be perched, or semi-perched, above the water table. All of these wetlands typically experience seasonal draw down based on precipitation rates, temperature, evapotranspiration and other factors. The southern wetland was dry in September, for example, when North Country delineated its northern boundary. No physical disturbance of these wetlands will occur.*

The results of the pumping test (DEIS Appendix 4) indicated negligible, if any, impact in response to pumping at approximately 300 gpm from bedrock well PW-1 for 72 hours. The water level dropped 0.14 feet at staff gauge WP-1 (which is installed in Wetland KN-9) during the test; however, the apparent recovery of 0.11 ft after the test was likely due to snowfall accumulation and associated melting during the last day of the test and for the next two days after the test had ended.

The conclusion that Wetland KN-9 will not be impacted by the drawdown from the quarry is consistent with the observations in test pits TP-1 and TP-2, and the test pit soil sample analyses, discussed in Section 2.1.1. It is also consistent with observations at the Shelby Crushed Stone Quarry Stone Quarry (Shelby), which is a sister company to Eagle Harbor located west of the proposed Eagle Harbor Quarry. At Shelby, there is a large wetland (MD-9) located approximately

100 feet south of the southern quarry highwall (by comparison, wetland KN-9 will be over 400 feet from the Eagle Harbor quarry highwall). The Soil Survey maps the Shelby wetland MD-9 as being the Carlisle Muck, just like at Eagle Harbor. Seepage is observed approximately half way up the face on the southern highwall, approximately 100 feet north of the wetland. The wetland is still very much a wetland, which continues to be wet and mucky with no observable impact related to the drawdown at the quarry. It is reasonable to conclude that the relationship between the proposed Eagle Harbor quarry and wetland KN-9 will be similar to that currently witnessed at Shelby.

Wetland KN-13

Wetland KN-13 is approximately 900 feet north of the proposed quarry. Wetland KN-13 exists in the topographically low area north of Maple Street and consists primarily of Fredon Loam and Lamson very fine sandy loam. Lamson soils are poorly to very poorly drained. Deeper, undisturbed soil within the Lamson soils exhibit varved textures with thin layers of material ranging from very fine sand to silty clay loam. These deeper, varved portions of the Lamson soil limit, or retard, percolation, causing the wetland to be perched, or semi-perched, above the water table.

The quarry discharge will flow off the site via the Maple Street culvert. The receiving ditch on the north side of Maple Street flows westward through a culvert beneath Kams Road and then turns northward as it nears wetland KN-13 (Plate 1). The ditch provides some recharge to wetland KN-13 on a seasonal basis during times of low water table conditions. Portions of ephemeral wetland KN-13 drain toward the ditch during high water table conditions.

The southern edge of Wetland KN-13 is near the edge of the anticipated drawdown impact of the surficial aquifer. Similar to wetland KN-9, it is not anticipated that the drawdown of the surficial aquifer will impact Wetland KN-13. The increased flow in the outfall ditch will likely recharge the wetland KN-13 and offset any negligible drawdown that may occur.

Wetland KN-12

The DEC also mentions state regulated wetland KN-12 in its October 17, 2022 letter, although this wetland had not previously been mentioned in either of the two NOIAs. According to the DEC's Environmental Resource Mapper, KN-12 is completely separated from KN-13 and is over 2500 feet northeast of the proposed quarry (Figure 17). A southward flowing, man-made drainage ditch runs through KN-12. The KN-12 ditch joins a westward flowing ditch, which crosses Kams Rd and joins the drainage from the mine outfall, approximately 2300 ft north of the proposed quarry. Both ditches are oversized, engineered swales that convey the flow through an agricultural field. Wetland KN-12 is well beyond any potential drawdown impacts from the proposed quarry. The quarry discharge also will have no impact on KN-12 because the oversized, engineered swale in the agricultural field is more than capable of handling the increased flow in the ditch due to quarry dewatering (Attachment C - Hydrologic Modeling of the Proposed Eagle Harbor Mine Discharge (Revised); originally Attachment 6 of the May 2019 Responses to Hydrogeologic Comments; DEIS Appendix 1).

2.6 Quarry Discharge Impacts to Downstream Surface Water

The pumping system will have the capacity to pump 700 gpm from the sump to keep the quarry floor dry. The computer software model HydroCAD was used to assess the potential impact that the proposed mine discharge could have on downstream flooding during various precipitation events. The model assessed if the pumping rate of the quarry would exceed the flow capacity of the unnamed creek and the downstream culverts during certain hydrologic events. Alpha prepared a separate report entitled "Hydrologic Modeling of the Proposed Eagle Harbor Mine Discharge (Revised)" to discuss the methods and results of the hydrologic modeling. The report is contained in Attachment C.

The results of the HydroCAD model indicated that for a 5-yr return storm event, the additional flow through the northeast wetland to Outfall 001 (the culvert on Maple Street) created by the hypothetical 700 gpm (1.56 cfs) quarry discharge represents less than 10% of the total runoff (flow) to the culvert. The outflow from the culvert is controlled by the size of the culvert and the available storage within the ponds in the northeast portion of the LOM. For greater return period storms with greater precipitation, the quarry discharge represents an even smaller percentage of the flow directed to the culvert. This relationship continues downstream with the quarry discharge making up a smaller and smaller percentage of the flow through successive culverts.

The model indicated that the first of two downstream culverts is currently undersized for the existing flow, as well as the future flow that includes the quarry discharge. These two culverts are in series and are located near the edge of a cultivated field, and just beyond (north of) the edge of the woods north of the quarry (indicated as Culverts 4P/5P on Figure 2 of Attachment C). The culverts run beneath parallel dirt/gravel field access roads. The model indicated that flow currently overtops the first access road during the 25-yr, or greater, storm events. The flooding that occurs during these events is restricted to the wooded wetland area west of Kams Rd, between Kams Rd and the edge of the field (and south of the two culverts). The model indicates that flooding does not, and will not, occur in the cultivated field downstream of the culverts during these events because the engineered swale that runs through the field is sufficient to contain the flow. The contribution of the mine discharge to the 25-yr or greater storm event is approximately 4%, or less, which is negligible compared to the natural runoff already occurring during the 25-yr storm event.

The potential of overtopping the access roads along the edge of the field could be reduced, or eliminated, by modifying the culverts at the edge of the cultivated field. The HydroCAD model includes a scenario in which the existing 16-inch diameter upstream culvert ("Node 4P") at the edge of the farm field is replaced by two, side-by-side, 18-inch diameter culverts. A second scenario in which the existing pipe was replaced with a single 24-inch culvert was also modeled. The models assumed that the access road would be raised by approximately 0.5 feet to accommodate the larger pipes. The resulting access road elevation would be 2.5 feet above the invert of the new culvert pipe(s). The elevation of the invert of the pipe(s) would remain the same as it is for the existing 16-inch pipe. Both scenarios (double 18-inch pipes or a single 24-inch pipe) eliminated the existing overtopping of the access road, which is projected to occur with the existing 16-inch culvert at the 10, 25, 50 and 100-yr storm event, even without mine discharge (See Table 2 of Attachment D). The model results for both modified scenarios indicate that the culvert(s) will convey the runoff plus the 700 gpm mine discharge and eliminate the overtopping (flooding) of the access road for all modelled precipitation events (1-yr through 100-yr). The elevation of the flooding in the wooded area south of the access road (upstream of the access roads) is also diminished with both culvert replacement scenarios (with, or without, mine discharge) in all modeled storm events except for the 100-yr event.

The model indicates that the 100-yr storm event results in a 0.22-ft increase in water level in the wooded area, even with the modified culvert(s) (and no flooding of the field access roads). This area is downstream of the Maple Street quarry discharge point. According to the HydroCAD model, the natural peak storm runoff occurs approximately 12 to 14 hrs after the storm begins – for all modeled storm events (1 yr through 100 yr storms) and at all model nodes (culverts) (see Appendix A of Attachment C). It takes hours before the quarry discharge reaches the various model nodes due to the onsite discharge ditch, the proposed sediment basin, and the ponds/wetlands within the LOM that the discharge has to travel through before it reaches the outfall at the Maple Street culvert and joins the normal storm water runoff. The onsite sediment basin will have a weir/check-dam system in place so that water can be retained for a while if necessary. The operator also will have the option to divert some water from quarry discharge to the onsite fresh water ponds for use in the wash plant. All of these features significantly increase the travel time for the quarry discharge to reach the downstream culverts and will offset the 0.22 ft rise in water level in the wooded area south of the field access roads during the 100-yr storm event.

Written permission has been provided by the landowner, Mr. Tom Decker, for Eagle Harbor to enter the property to research the proper culvert size needed (Attachment D). Eagle Harbor will review the plans with Mr. Decker prior to conducting any work on his property. Written permission from Mr. Decker to replace the culverts will be forwarded the NYSDEC, as requested, once it has been obtained.

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TABLES

TABLE 1
Summary of Well Construction Data
Eagle Harbor Sand & Gravel, Inc.
Eagle Harbor Mine

	Well ID	Measuring Point for (MP) Water Levels	MP Elevation (ft amsl)	Well Stickup (ft)	Overburden thickness (ft)	Elevation of Top of Bedock (ft amsl)	Depth to Top of Rochester Shale Below Grade (ft)	Screened Interval (ft)	Total Depth Below Grade (ft)
Bedrock Aquifer	MW-1	TOC[1]	679.33	0.85	35.9	642.58	94.2	open corehole	115.9
	MW-2	TOC	687.44[2]	10.83	26.8	649.81	86.3	open corehole	108
	MW-3	TOC	670.25	2.46	34.5	633.29	70	open corehole	80.5
	MW-4	TOC	709.67	2.23	59.7	647.74	124.6	open corehole	128.4
	PW-1	TOC	676.2	1.6	28	646.6	unknown	bedrock 28-95	95
	PW-1A	TOC	677[5]	1.8	28	647.2	unknown	bedrock 38-86	86
	Parsons	TOC	668	1.5	unknown	unknown	unknown	bedrock	unknown
	Miller	TOC	699.01	1	unknown	637.5(est.)	unknown	open borehole	70
	Barn	Top of Concrete	714.42	0	unknown	657.8 (est)	unknown	open borehole	66.1
Surficial Aquifer	MW-1S	TOC	679.41	1.02	>11.94	<667.47	Not Encountered	9.44-11.94	11.94
	MW-2S	TOC	681.57	3.21	>12	<666.36	Not Encountered	~9.5-12	12
	MW-3S	TOC	670.29	2.44	>18	<649.85	Not Encountered	8-18	18
	MW-4S	TOC	709.98	2.46	>40.3	<667.22	Not Encountered	28.5-38.5	40.3
	MW-5S	TOC	677.9	2.96	>25	<649.94	Not Encountered	5-25	25
	USGS OI-20	Grade	695	NM	>54.2	<640.8	Not Encountered	39.1-48.9	54.2
Surface Water	SG-1	top of post	668	NA[4]	NA	NA	NA	NA	NA
	SG-2	top of post	665.71	NA	NA	NA	NA	NA	NA
	SG-3	top of gauge	668.77	NA	NA	NA	NA	NA	NA
	PG-1	top of stake	672.2	NA	NA	NA	NA	NA	NA
	WP-1	top of pipe	672.5	NA	NA	NA	NA	NA	NA
	Kam's Rd	top of culvert	not measured	NA	NA	NA	NA	NA	NA
	Maple St	top of culvert (Lower Lip)	661.34	NA	NA	NA	NA	NA	NA

Notes:

1. TOC = Top of Casing
2. Top of Casing elevation is currently 10.83 ft higher than grade at time of well installation; a 10.83-ft casing extension was added to top of well so that it would not be buried by reclamation fill; grade elevation at time of MW-2 installation was approximately 676.61 ft
3. Top of Barn well casing is in a vault below ground; measurements are made from the top of the concrete slab vault cover, just above grade.
4. NA = Not applicable; surface water monitoring location
5. Measuring point for water levels during February 2020 pumping test was top of stilling tube at elevation 677.8

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	Elevation at Grade (ft amsl)	1/7/2016		2/5/2016		2/8/2016		2/22/2016		3/1/2016		3/9/2016		3/16/2016		3/21/2016		3/31/2016		4/7/2016		4/15/2016	
			Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																								
MW1	679.33		12.98	666.35	13	666.33	13.08	666.25	12.5	666.83	12.17	667.16	11.94	667.39	11.78	667.55	11.82	667.51	11.61	667.72	11.46	667.87	11.55	667.78
MW1S	679.41						6.83	672.58	5.42	673.99	5.17	674.24	5.86	673.55	5.48	673.93	6.35	673.06	5.76	673.65	5.2	674.21	6.11	673.3
MW2	687.44		24.32	663.12	24.5	662.94	24.25	663.19	24.08	663.36	23.92	663.52	23.6	663.84	23.44	664	23.55	663.89	23.36	664.08	23.21	664.23	23.36	664.08
MW2S	681.57																							
MW3	670.25																							
MW3S	670.29																							
MW4	709.67																							
MW4S	709.98																							
MW5S	677.9																							
PW-1	676.2																							
PW-1A	677																							
WP-1	672.5																							
USGS Well																								
OI-20	696.07	695	22.72	673.35	22.82	673.25	22.75	673.32	22.69	673.38	22.13	673.94	21.72	674.35	21.36	674.71	21.26	674.81	20.92	675.15	20.72	675.35	20.7	675.37
Staff Gauges																								
SG-1	668.05		3.6	664.45	2.92	665.13	2.92	665.13	2.5	665.55	2.17	665.88	2.02	666.03	1.81	666.24	1.74	666.31	1.55	666.5	1.38	666.67	1.35	666.7
SG-2	665.71		3.36	662.35	3.25	662.46	3.33	662.38	3.17	662.54	3.25	662.46	3.6	662.11	3.22	662.49	3.27	662.44	3.2	662.51	3.16	662.55	3.2	662.51
SG-3*	668.77																							
Maple St. Culvert	661.34		1.02	660.32	0.96	660.38	1.08	660.26	1	660.34	1	660.34	0.9	660.44	0.92	660.42			1.1	660.24	1	660.34	1.11	660.23
Kams Culvert	NM																							
PG-1	672.2																							
Wells																								
Miller	699.01		38.2	660.81											36.91	662.1	36.85	662.16	36.72	662.29	36.65	662.36	36.6	662.41
Barn	714.42		51.7	662.72					51	663.42	51.42	663.00	50.96	663.46	50.81	663.61	50.91	663.51	50.71	663.71	50.57	663.85	50.75	663.67
Parsons	669.5																							

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	4/22/2016		4/29/2016		5/6/2016		5/13/2016		5/20/2016		6/4/2016		7/23/2016		8/6/2016		9/3/2016		9/17/2016		9/22/2016	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																									
MW1	679.33	11.6	667.73	11.56	667.77	11.43	667.9	11.48	667.85	11.57	667.76	12.22	667.11	13.38	665.95	13.44	665.89	13.42	665.91	13.89	665.44	14.05	665.28
MW1S	679.41	6.58	672.83	5.79	673.62	5.72	673.69	6.23	673.18	6.69	672.72	7.32	672.09	8.38	671.03	8.64	670.77	8.43	670.98	8.94	670.47	8.37	671.04
MW2	687.44	23.42	664.02	23.36	664.08	23.33	664.11	23.63	663.81	23.95	663.49	23.99	663.45	25.13	662.31	25.41	662.03	25.87	661.57	26.16	661.28	26.09	661.35
MW2S	681.57													6.38	675.19	6.56	675.01	16.98	664.59	17.38	664.19	17.18	664.39
MW3	670.25													13.56	656.69	13.31	656.94	13.76	656.49	13.67	656.58	13.68	656.57
MW3S	670.29													11.45	658.84	11.87	658.42	12.45	657.84	12.33	657.96	12.3	657.99
MW4	709.67													47.47	662.2	47.79	661.88	48.14	661.53	47.73	661.94	47.54	662.13
MW4S	709.98													32.01	677.97	32.31	677.67	33.13	676.85	33.73	676.25	33.28	676.7
MW5S	677.9																						
PW-1	676.2																						
PW-1A	677																						
WP-1	672.5																						
USGS Well																									
OI-20	696.07	20.67	675.4	20.57	675.5	20.49	675.58	20.52	675.55	20.58	675.49	20.9	675.17	22.76	673.31	23.16	672.91	23.89	672.18	24.21	671.86	24.3	671.77
Staff Gauges																									
SG-1	668.05	1.36	666.69	1.36	666.69	1.96	666.09	2.97	665.08														
SG-2	665.71	3.28	662.43	3.22	662.49	3.23	662.48	3.21	662.5	3.37	662.34	3.53	662.18	3.53	662.18	3.53	662.18	3.53	662.18	3.53	662.18	3.53	662.18
SG-3*	668.77													2	666.77	2	666.77	1.25	666.02	1.8	666.57	1.74	666.51
Maple St. Culvert	661.34	1.1	660.24	1.1	660.24	1.07	660.27	0.84	660.5	0.88	660.46	0.92	660.42	1.38	659.96	1.38	659.96	1.12	660.22	1.38	659.96	1.15	660.19
Kams Culvert	NM																						
PG-1	672.2																						
Wells																									
Miller	699.01	36.56	662.45	36.55	662.46	36.49	662.52	36.51	662.5	36.56	662.45	36.88	662.13	38.16	660.85	38.43	660.58	38.52	660.49	39.17	659.84		
Barn	714.42	50.85	663.57	50.76	663.66	50.73	663.69	50.95	663.47	50.97	663.45	51.32	663.10	52.57	661.85	52.86	661.56	53.25	661.17	53.44	660.98	53.49	660.93
Parsons	669.5																						

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.
SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	10/1/2016		10/22/2016		11/9/2016		11/30/2016		12/13/2016		1/20/2017		2/22/2017		3/3/2017		3/10/2017		3/17/2017		3/24/2017	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																							
MW1	679.33	14.73	664.6	13.82	665.51	11.87	667.46	10.9	668.43	13.88	665.45	13.25	666.08	12.77	666.56	12.65	666.68	12.62	666.71	12.6	666.73	12.34	666.99
MW1S	679.41	9.09	670.32	5.93	673.48	6.76	672.65	7.65	671.76	7.86	671.55	6.88	672.53	6.27	673.14	6.65	672.76	6.7	672.71	6.63	672.78	6.4	673.01
MW2	687.44	26.36	661.08	25.92	661.52	25.73	661.71	25.6	661.84	25.3	662.14	24.9	662.54	24.52	662.92	24.58	662.86	24.5	662.94	24.49	662.95	24.2	663.24
MW2S	681.57	17.52	664.05	17.71	663.86	17.7	663.87	17.7	663.87	17.91	663.66	16.7	664.87	16.5	665.07	16.08	665.49	16.19	665.38	16.05	665.52	16.08	665.49
MW3	670.25	13.83	656.42	13.72	656.53	13.45	656.8	12.5	657.75	12.41	657.84	11.25	659	10.72	659.53	10.63	659.62	10.68	659.57	10.63	659.62	10.32	659.93
MW3S	670.29	12.42	657.87	12.28	658.01	11.93	658.36	11.46	658.83	11.49	658.8	10.52	659.77	9.71	660.58	9.5	660.79	9.52	660.77	9.48	660.81	9.14	661.15
MW4	709.67	47.92	661.75	46.76	662.91	46.86	662.81	46.35	663.32	46.31	663.36	45.5	664.17	45.13	664.54	45.08	664.59	45.02	664.65	45	664.67	44.75	664.92
MW4S	709.98	34.13	675.85	33.92	676.06	34.09	675.89	34.32	675.66	33.68	676.3	34.71	675.27	34.92	675.06	34.77	675.21	34.47	675.51	34.4	675.58	33.95	676.03
MW5S	677.9																						
PW-1	676.2																						
PW-1A	677																						
WP-1	672.5																						
USGS Well																							
OI-20	696.07	24.47	671.6	24.7	671.37	24.68	671.39	24.87	671.2	24.88	671.19	24.43	671.64	23.62	672.45	23.35	672.72	23.12	672.95	23.01	673.06	22.71	673.36
Staff Gauges																							
SG-1	668.05											0	668.05	0	668.05	2.71	665.34	2.71	665.34	2.71	665.34	2	666.05
SG-2	665.71	3.53	662.18	3.53	662.18	3.53	662.18	3.53	662.18	3.53	662.18	3.42	662.29	3.33	662.38	3.3	662.41	2.57	663.14	2.51	663.2	3.12	662.59
SG-3*	668.77	0.95	665.72	1.9	666.67	0.5	665.27		664.77		664.77	0.98	665.75	1.3	666.07	1.24	666.01	1.22	665.99	1.21	665.98	1.4	666.17
Maple St. Culvert	661.34	1.38	659.96	0.82	660.52	0.93	660.41	1	660.34	1.15	660.19	0.98	660.36	1.02	660.32	1.1	660.24	1.12	660.22	1.1	660.24	0.98	660.36
Kams Culvert	NM																						
PG-1	672.2																						
Wells																							
Miller	699.01	39.42	659.59	39.49	659.52	39.25	659.76	39.12	659.89	39.13	659.88	39.17	659.84	38.11	660.9	38.13	660.88	38.1	660.91	38.1	660.91	37.65	661.36
Barn	714.42	53.62	660.80	53.37	661.05	53.25	661.17	52.9	661.52	52.86	661.56	52.3	662.12	51.91	662.51	51.95	662.47	51.92	662.50	51.89	662.53	51.6	662.82
Parsons	669.5																						

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	3/30/2017		4/6/2017		4/14/2017		4/21/2017		4/28/2017		5/4/2017		5/13/2017		5/20/2017		5/27/2017		6/3/2017		6/17/2017	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																							
MW1	679.33	12.17	667.16	11.75	667.58	11.42	667.91	11.15	668.18	11.12	668.21	10.55	668.78	10.15	669.18	10.86	668.47	9.99	669.34	10.33	669	10.52	668.81
MW1S	679.41	6.2	673.21	4.6	674.81	4.9	674.51	3.17	676.24	4.6	674.81	4	675.41	4.95	674.46	5.28	674.13	3.62	675.79	5.33	674.08	5.93	673.48
MW2	687.44	24.1	663.34	23.6	663.84	23.3	664.14	23.2	664.24	23.16	664.28	22.8	664.64	22.4	665.04	22.59	664.85	22.14	665.3	22.29	665.15	22.48	664.96
MW2S	681.57	15.94	665.63	15.93	665.64	15.94	665.63	15.05	666.52	15.04	666.53	13.8	667.77	13.47	668.1	13.27	668.3	13.14	668.43	13.17	668.4	13.23	668.34
MW3	670.25	10.02	660.23	9.6	660.65	9.56	660.69	9.3	660.95	9.35	660.9	8.77	661.48	8.85	661.4	9.38	660.87	9.48	660.77	9.84	660.41	10.02	660.23
MW3S	670.29	8.65	661.64	7.9	662.39	7.84	662.45	7.23	663.06	7.4	662.89	6.75	663.54	6.8	663.49	7.73	662.56	7.48	662.81	8.33	661.96	8.88	661.41
MW4	709.67	44.6	665.07	44.2	665.47	44	665.67	43.7	665.97	43.76	665.91	43.32	666.35	40	669.67	43.26	666.41	40.95	668.72	43.78	665.89	43.58	666.09
MW4S	709.98	33.88	676.1	33.45	676.53	33	676.98	32.3	677.68	31.82	678.16	31.3	678.68	29.8	680.18	29.44	680.54	29.05	680.93	28.79	681.19	28.48	681.5
MW5S	677.9																						
PW-1	676.2																						
PW-1A	677																						
WP-1	672.5																						
USGS Well																							
OI-20	696.07	22.49	673.58	22.02	674.05	21.43	674.64	20.84	675.23	20.54	675.53	19.89	676.18	18.77	677.3	18.58	677.49	18.15	677.92	18.14	677.93	18.69	677.38
Staff Gauges																							
SG-1	668.05	1.96	666.09	1.65	666.4	N/A		N/A		N/A		N/A		N/A									
SG-2	665.71	3.18	662.53	3.15	662.56	3.16	662.55	3.1	662.61	3.08	662.63	3.06	662.65	3.08	662.63	3.14	662.57	3.15	662.56	3.13	662.58	3.23	662.48
SG-3*	668.77	1.48	666.25	1.72	666.49	2.2	666.97	2.44	667.21	3	667.77	3	667.77	3.9	668.67	1.25	666.02	0.5	665.27	0.43	665.2	0.69	665.46
Maple St. Culvert	661.34	0.99	660.35	0.9	660.44	0.92	660.42	0.85	660.49	0.9	660.44	1	660.34	0.98	660.36	1.02	660.32	0.58	660.76	0.63	660.71	0.68	660.66
Kams Culvert	NM																						
PG-1	672.2																						
Wells																							
Miller	699.01	37.6	661.41	37.02	661.99	37	662.01	36.66	662.35	36.68	662.33	36.3	662.71	36.08	662.93	35.49	663.52	35.53	663.48	35.49	663.52	35.57	663.44
Barn	714.42	51.5	662.92	51	663.42	50.9	663.52	50.56	663.86	50.63	663.79	50.22	664.20	50	664.42	50.01	664.41	49.69	664.73	49.87	664.55	50.18	664.24
Parsons	669.5																						

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	7/1/2017		7/15/2017		7/29/2017		8/26/2017		9/25/2017		10/21/2017		11/28/2017		12/20/2017		1/3/2018		2/26/2018		3/16/2018	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																							
MW1	679.33	10.72	668.61	10.23	669.1	10.79	668.54	11.12	668.21	11.78	667.55	11.63	667.7	10.51	668.82	--		10.92	668.41	10.4	668.93	10.43	668.9
MW1S	679.41	5.81	673.6	4.58	674.83	5.29	674.12	5.93	673.48	6.97	672.44	5.69	673.72	3.87	675.54	--		4.4	675.01	4	675.41	5.5	673.91
MW2	687.44	22.51	664.93	22.48	664.96	22.67	664.77	22.98	664.46	23.27	664.17	23.01	664.43	22.69	664.75	--		22.6	664.84	22.1	665.34	22.1	665.34
MW2S	681.57	13.53	668.04	13.25	668.32	13.71	667.86	14.02	667.55	14.42	667.15	15.03	666.54	14.62	666.95	--		13.2	668.37	12.03	669.54	13.5	668.07
MW3	670.25	10.51	659.74	10.87	659.38	11.17	659.08	11.11	659.14	11.84	658.41	11.68	658.57	9.75	660.5	10.95	659.3	10.32	659.93	9.7	660.55	10	660.25
MW3S	670.29	9.53	660.76	9.51	660.78	9.73	660.56	10.13	660.16	10.96	659.33	10.52	659.77	10.37	659.92	9.75	660.54	9	661.29	8.3	661.99	8.62	661.67
MW4	709.67	43.79	665.88	43.66	666.01	43.82	665.85	44.15	665.52	45.05	664.62	44.67	665	43.76	665.91			43.5	666.17	43.3	666.37	43.4	666.27
MW4S	709.98	28.42	681.56	28.32	681.66	29.24	680.74	29.92	680.06	29.91	680.07	30.05	679.93	30.66	679.32			30.3	679.68	30	679.98	29.3	680.68
MW5S	677.9																						
PW-1	676.2																						
PW-1A	677																						
WP-1	672.5																						
USGS Well																							
OI-20	696.07	18.8	677.27	18.94	677.13	19.13	676.94	19.84	676.23	20.66	675.41	20.54	675.53	20.03	676.04	20.25	675.82	20.47	675.6	18.90	677.17	18.73	677.34
Staff Gauges																							
SG-1	668.05															--		_		0.4	667.65	0.4	667.65
SG-2	665.71	3.13	662.58	3.04	662.67	3.54	662.17	--		--		3.43	662.28	--		--		--		3.18	662.53	3.15	662.56
SG-3*	668.77	0.78	665.55	0.98	665.75	0.83	665.6	1.34	666.11	1.75	666.52	2.33	667.1		664.77	--		--		0.6	668.17	0.52	668.25
Maple St. Culvert	661.34	0.69	660.65	0.53	660.81	0.62	660.72	0.68	660.66	0.82	660.52	0.78	660.56	0.59	660.75	--		1.1	660.24	0.9	660.44	0.9	660.44
Kams Culvert	NM																						
PG-1	672.2																						
Wells																							
Miller	699.01	35.46	663.55	36.06	662.95	36.15	662.86	35.62	663.39	37.14	661.87	37.36	661.65	35.96	663.05	--		35.2	663.81	36.1	662.91	_	
Barn	714.42	50.21	664.21	50.2	664.22	50.31	664.11	50.36	664.06	50.45	663.97	50.27	664.15	49.63	664.79	--		50.1	664.32	49.7	664.72	49.72	664.70
Parsons	669.5																						

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	3/30/2018		4/13/2018		4/28/2018		5/12/2018		5/26/2018		6/9/2018		6/27/2018		7/14/2018		7/28/2018		8/11/2018		9/4/2018	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																							
MW1	679.33	9.6	669.73	10.12	669.21	9.71	669.62	9.92	669.41	10	669.33	10.54	668.79	10.76	668.57	11.42	667.91	11.5	667.83	11.68	667.65	11.84	667.49
MW1S	679.41	4	675.41	4.78	674.63	4.29	675.12	5.78	673.63	5.79	673.62	6.73	672.68	6.87	672.54	7.49	671.92	6.15	673.26	6.95	672.46	7.32	672.09
MW2	687.44	21.69	665.75	21.78	665.66	21.42	666.02	21.77	665.67	21.85	665.59	22.21	665.23	22.68	664.76	23.15	664.29	23.1	664.34	23.8	663.64	23.97	663.47
MW2S	681.57	13.5	668.07	13.9	667.67	12.71	668.86	12.85	668.72	12.94	668.63	13.2	668.37	13.02	668.55	13.8	667.77	14.35	667.22	14.6	666.97	15.05	666.52
MW3	670.25	9.6	660.65	9.72	660.53	9.34	660.91	9.76	660.49	10.11	660.14	10.74	659.51	11.45	658.8	13.85	656.4	12.33	657.92	12.68	657.57	13.1	657.15
MW3S	670.29	7.9	662.39	8.1	662.19	7.69	662.6	8.27	662.02	8.62	661.67	9.22	661.07	9.93	660.36	10.75	659.54	10.95	659.34	11.14	659.15	11.42	658.87
MW4	709.67	43.1	666.57	43.13	666.54	42.76	666.91	43.08	666.59	43.19	666.48	43.52	666.15	44.05	665.62	44.65	665.02	44.68	664.99	44.94	664.73	45.06	664.61
MW4S	709.98	29.4	680.58	28.84	681.14	28.57	681.41	28.41	681.57	28.31	681.67	28.32	681.66	28.65	681.33	28.49	681.49	29.31	680.67	29.54	680.44	30.13	679.85
MW5S	677.9																						
PW-1	676.2																						
PW-1A	677																						
WP-1	672.5																						
USGS Well																							
OI-20	696.07	18.43	677.64	18.26	677.81	17.51	678.56	17.54	678.53	17.70	678.37	18.34	677.73	18.85	677.22	19.77	676.3	20.17	675.9	20.69	675.38	21.20	674.87
Staff Gauges																							
SG-1	668.05	0.4	667.65	0.59	667.46	0.1	667.95	_		0.3	667.75	0.2	667.85	_		_		_		_		_	
SG-2	665.71	3.1	662.61	3.71	662	3.14	662.57	3.21	662.5	3	662.71	3.39	662.32	_		_		_		_		_	
SG-3*	668.77	0.53	668.24	0.55	668.22	0.2	668.57	0.7	668.07	1	667.77	1.3	667.47	0.8	667.97	2.95	665.82	1.24	667.53	_		_	
Maple St. Culvert	661.34	0.76	660.58	0.9	660.44	0.94	660.4	0.1	661.24	0.9	660.44	0.99	660.35	0.98	660.36	_		_		1	660.34	1.09	660.25
Kams Culvert	NM																						
PG-1	672.2																						
Wells																							
Miller	699.01	35.9	663.11	35.7	663.31	35.44	663.57	35.37	663.64	35.46	663.55	35.71	663.3	36.11	662.9	36.53	662.48	36.99	662.02	37.3	661.71	37.19	661.82
Barn	714.42	49.5	664.92	46.11	664.07	44.79	665.39	45.03	665.15	45.18	665.00	47.76	662.42	48.02	662.16	47.52	662.66	46.85	663.33	46.9	663.28	47	663.18
Parsons	669.5																						

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Starting 4/13/2018, Barn Well measurements are made from top of casing (elevation 710.18), rather than top of concrete (elevation 714.42)

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	9/21/2018		10/5/2018		10/20/2018		11/19/2018		12/11/2018		1/30/2019		2/15/2019		3/6/2019		4/3/2019		4/12/2019		5/15/2019	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																							
MW1	679.33	11.93	667.4	12	667.33	11.95	667.38	11.7	667.63	11.5	667.83	11.2	668.13	11	668.33	10.8	668.53			10.6	668.73	10.05	669.28
MW1S	679.41	7.49	671.92	7.83	671.58	7.01	672.4	4.86	674.55	4.76	674.65	5.9	673.51	6	673.41	6.3	673.11			5	674.41	3.2	676.21
MW2	687.44	24.14	663.3	24.06	663.38	24.07	663.37	23.46	663.98	23.3	664.14	23.1	664.34	22.8	664.64	22.2	665.24			22.6	664.84	22.5	664.94
MW2S	681.57	15.35	666.22	15.53	666.04	15.7	665.87	15.5	666.07	15.2	666.37	15	666.57	14.22	667.35	13.7	667.87			12.4	669.17	13.15	668.42
MW3	670.25	13.28	656.97	13.01	657.24	12.91	657.34	11.95	658.3	11.22	659.03	11.2	659.05	11	659.25	10.4	659.85			10	660.25	9.8	660.45
MW3S	670.29	11.6	658.69	11.46	658.83	11.25	659.04	10.65	659.64	10	660.29	9.8	660.49	9.2	661.09	9	661.29			8.15	662.14	8.55	661.74
MW4	709.67	45.19	664.48	45.05	664.62	44.63	665.04	44.35	665.32	44.31	665.36	44.2	665.47	43.9	665.77	43.6	666.07			43.3	666.37	42.75	666.92
MW4S	709.98	30.42	679.56	30.75	679.23	31.02	678.96	31.24	678.74	31.1	678.88	31.3	678.68	31.3	678.68	31.2	678.78			29.7	680.28	30.7	679.28
MW5S	677.9																						
PW-1	676.2																						
PW-1A	677																						
WP-1	672.5																						
USGS Well																							
OI-20	696.07	21.55	674.52	21.61	674.46	21.67	674.4	21.41	674.66	20.97	675.1	20.32	675.75	19.60	676.47	19.43	676.64	19.07	677	19.08	676.99	-	-
Staff Gauges																							
SG-1	668.05	_		_		_		_		_		_		_		_				_		_	
SG-2	665.71	_		_		_		3.23	662.48	3.16	662.55	3.12	662.59	3.11	662.6	3	662.71			3.1	662.61	3.0	662.71
SG-3*	668.77	_		_		_		_		_		_		_		_				_		_	
Maple St. Culvert	661.34	1.1	660.24	1.1	660.24	1.04	660.3	1.1	660.24	1.02	660.32	0.95	660.39	0.95	660.39	1	660.34			1	660.34	1.0	660.34
Kams Culvert	NM																						
PG-1	672.2																						
Wells																							
Miller	699.01	38.05	660.96	38.2	660.81	38.35	660.66	38.13	660.88	37.71	661.3	37	662.01	36	663.01	36.2	662.81			36.25	662.76	36.2	662.81
Barn	714.42	47.41	662.77	47.82	662.36	47.25	662.93	46.53	663.65	45.72	664.46	46.22	663.96	46.1	664.08	45.8	664.38			49.9	664.52	48.2	666.22
Parsons	669.5																						

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	6/17/2019		7/13/2019		8/10/2019		10/28/2019		11/11/2019		1/30/2020		2/3/2020		2/7/2020		2/8/2020		2/18/2020		3/9/2020	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																							
MW1	679.33	11.21	668.12	10.72	668.61	11.93	667.4	11.16	668.17	11.00	668.33	10.10	669.23	10.09	669.24	10.26	669.07	-	-	10.00	669.33	9.58	669.75
MW1S	679.41	4.92	674.49	6.75	672.66	8.00	671.41	5.58	673.83	5.70	673.71	4.55	674.86	4.49	674.92	5.66	673.75	-	-	5.90	673.51	4.58	674.83
MW2	687.44	22.2	665.24	22.72	664.72	23.49	663.95	24.00	663.44	23.39	664.05	22.40	665.04	22.33	665.11	-	-	22.4	665.04	22.27	665.17	21.92	665.52
MW2S	681.57	13.48	668.09	13.92	667.65	14.71	666.86	15.80	665.77	15.49	666.08	14.35	667.22	14.17	667.4	-	-	14.28	667.29	14.23	667.34	14.02	667.55
MW3	670.25	10.39	659.86	11.37	658.88	12.39	657.86	12.33	657.92	11.89	658.36	9.98	660.27	10	660.25	-	-	10.21	660.04	10.13	660.12	9.55	660.70
MW3S	670.29	8.97	661.32	9.62	660.67	10.37	659.92	10.63	659.66	10.30	659.99	8.53	661.76	8.6	661.69	-	-	8.81	661.48	8.80	661.49	8.22	662.07
MW4	709.67	43.05	666.62	43.76	665.91	44.52	665.15	43.03	665.05	43.32	666.35	42.40	667.27	42.5	667.17	42.72	666.95	-	-	42.50	667.17	41.95	667.72
MW4S	709.98	29.71	680.27	29.74	680.24	31.09	678.89	31.87	678.11	31.97	678.01	32.09	677.89	32.05	677.93	31.82	678.16	-	-	31.40	678.58	31.07	678.91
MW5S	677.9											6.90	671	6.96	670.94	7.47	670.43	-	-	7.35	670.55	8.78	669.12
PW-1	676.2											-	-	5.84	670.36	6.90	669.3	-	-	6.42	669.78	6.00	670.2
PW-1A	677											7.59	669.41	7.98	669.02	8.48	668.52	-	-	8.17	668.83	7.74	669.26
WP-1	672.5											-	-	2.27	670.23	-	-	2.25	670.25	2.22	670.28	2.30	670.2
USGS Well																							
OI-20	696.07	18.80	677.27	19.68	676.39	20.64	675.43	21.53	674.54	21.16	674.91	21.07	675	19.52	676.55	19.45	676.62	19.57	676.5	19.30	676.77	18.81	677.26
Staff Gauges																							
SG-1	668.05	_		_		_						-	-	0.75	667.25	-	-	0.65	667.35	0.64	667.36	0.35	667.65
SG-2	665.71	3.2	662.51	_		_						-	-	-	-	-	-	-	-	3.06	662.65	3.11	662.6
SG-3*	668.77	_		_		_		-		-		3.18	665.59	-	-	-	-	-	-	-	-	-	
Maple St. Culvert	661.34	1.2	660.14	0.94	660.4	0.06	661.28		661.34			-	-	0.77	660.57	-	-	1.02	660.32	1.15	660.19	1.14	660.2
Kams Culvert	NM											1.60	-	1.3	-	1.53	-	1.53	-	1.50	-	1.52	
PG-1	672.2											-	-	0.58	671.62	-	-	0.76	671.44	0.75	671.45	0.74	671.46
Wells																							
Miller	699.01	36.0	663.01	36.44	662.57	37.06	661.95	-	-	-		37.04	661.97	36.94	662.07	-	-	-	-	36.75	662.26	36.40	662.61
Barn	714.42	45.72	664.46	45.95	664.23	46.82	663.36	-	-	-		45.89	664.29	45.70	664.48			45.92	664.26	45.61	664.57	49.23	665.19
Parsons	669.5											-	-	10.9	658.6	-	-	11.94	657.56	11.19	658.31	10.72	658.78

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

(Shaded) SG-1 reset for pumping test; measuring point on top of staff gauge = 668 ft

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	4/15/2020		5/14/2020		6/18/2020		7/22/2020		8/24/2020		9/15/2020		10/28/2020		11/19/2020		12/28/2020		01/21/21		2/26/2021	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																							
MW1	679.33	9.55	669.78	9.27	670.06	10.36	668.97	10.42	668.91	11.43	667.9	10.46	668.87	11.40	667.93	11.70	667.63	11.50	667.83	11.25	668.08	11.30	668.03
MW1S	679.41	5.27	674.14	8.81	670.6	6.92	672.49	5.42	673.99	7.95	671.46	7.14	672.27	6.48	672.93	7.50	671.91	6.00	673.41	6.50	672.91	6.68	672.73
MW2	687.44	21.72	665.72	22.00	665.44	22.22	665.22	23.02	664.42	23.97	663.47	23.81	663.63	23.85	663.59	23.90	663.54	23.60	663.84	23.40	664.04	23.86	663.58
MW2S	681.57	13.42	668.15	13.44	668.13	13.51	668.06	14.23	667.34	15.18	666.39	15.02	666.55	15.20	666.37	16.10	665.47	15.90	665.67	15.80	665.77	16.04	665.53
MW3	670.25	8.79	661.46	10.55	659.7	11.68	658.57	12.68	657.57	13.78	656.47	14.26	655.99	14.90	655.35	15.30	654.95	13.50	656.75	12.40	657.85	12.51	657.74
MW3S	670.29	8.88	661.41	9.52	660.77	10.58	659.71	11.41	658.88	11.76	658.53	11.76	658.53	14.00	656.29	15.00	655.29	11.70	658.59	11.40	658.89	11.46	658.83
MW4	709.67	41.96	667.71	42.12	667.55	42.83	666.84	42.86	666.81	43.88	665.79	43.96	665.71	43.75	665.92	44.10	665.57	43.80	665.87	43.40	666.27	43.60	666.07
MW4S	709.98	30.02	679.96	30.22	679.76	30.29	679.69	28.55	681.43	29.59	680.39	29.21	680.77	32.20	677.78	32.80	677.18	33.35	676.63	33.30	676.68	33.40	676.58
MW5S	677.9	6.84	671.06	7.16	670.74	7.90	670	7.64	670.26	8.83	669.07	8.92	668.98	8.60	669.3	6.70	671.2	8.20	669.7	8.40	669.50	8.50	669.40
PW-1	676.2	6.00	670.2	6.17	670.03	6.78	669.42	6.73	669.47	8.00	668.2	7.80	668.4	6.75	669.45	7.70	668.5	7.70	668.5	7.50	668.7	7.50	668.7
PW-1A	677	7.67	669.33	7.86	669.14	8.49	668.51	8.50	668.5	9.59	667.41	9.58	667.42	8.62	668.38	9.10	667.9	9.40	667.6	9.30	667.70	9.50	667.50
WP-1	672.5	2.32	670.18	2.39	670.11	damp		damp		damp		damp		damp		2.70	669.8	2.50	670	damp		damp	
USGS Well																							
OI-20	696.07	18.50	677.57	18.48	677.59	19.30	676.77	19.95	676.12	21.15	674.92	21.60	674.47	22.06	674.01	22.35	673.72	22.31	673.76	21.81	674.26	22.09	673.98
Staff Gauges																							
SG-1	668.05	-		-		-		-		-		-		-		-		-		N/A		N/A	
SG-2	665.71	3.12	662.59	3.14	662.57	3.48	662.23	3.92	661.79	3.93	661.78	3.92	661.79	3.93	661.78	3.80	661.91	-		N/A		N/A	
SG-3*	668.77	-		-		-		-		-		-		-	-	-	-	-	-	1.40	667.37	1.88	666.89
Maple St. Culvert	661.34	1.09	660.25	1.05	660.29	1.00	660.34	1.14	660.2	1.08	660.26	1.03	660.31	0.80	660.54	0.90	660.44	1.10	660.24	1.00	660.34	1.00	660.34
Kams Culvert	NM	1.50		1.49		1.34		1.56		1.46		1.38		1.25		1.40		1.40		1.40		1.44	
PG-1	672.2	-		-		-		-		-		-		-		-		-		-		-	
Wells																							
Miller	699.01	36.22	662.79	36.06	662.95	36.19	662.82	39.92	659.09	45.60	653.41	41.69	657.32	43.50	655.51	44.30	654.71	42.40	656.61	42.35	656.66	42.43	656.58
Barn	714.42	49.10	665.32	48.92	665.50	49.12	665.30	50.20	664.22	51.50	662.92	51.72	662.70	51.62	662.80	51.40	663.02	51.00	663.42	50.80	663.62	51.09	663.33
Parsons	669.5	10.52	658.98	10.89	658.61	11.10	658.4	-		-		-		-		-		-		-		-	

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	3/24/2021		4/26/2021		5/28/2021		6/16/2021		7/23/2021		8/12/2021		9/22/2021		9/23/2021		10/11/2021		11/22/2021		12/15/2021	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																							
MW1	679.33	10.97	668.36	10.68	668.65	10.64	668.69	11.28	668.05	11.02	668.31	11.62	667.71	12.24	667.09	-		11.78	667.55	11.23	668.10	11.38	667.95
MW1S	679.41	7.07	672.34	5.72	673.69	7.22	672.19	6.97	672.44	5.31	674.10	7.08	672.33	7.98	671.43	-		6.51	672.9	6.10	673.31	6.79	672.62
MW2	687.44	23.24	664.20	23.00	664.44	23.48	663.96	23.65	663.79	23.65	663.79	23.71	663.73			24.12	663.32	24.02	663.42	23.40	664.04	23.56	663.88
MW2S	681.57	15.92	665.65	14.62	666.95	15.03	666.54	15.20	666.37	15.18	666.39	15.10	666.47			15.87	665.70	16.30	665.27	15.79	665.78	16.02	665.55
MW3	670.25	12.47	657.78	11.33	658.92	13.40	656.85	13.93	656.32	14.08	656.17	15.34	654.91	17.47	652.78	-		16.45	653.8	16.44	653.81	16.21	654.04
MW3S	670.29	11.39	658.90	10.09	660.20	13.30	656.99	13.67	656.62	14.03	656.26	15.53	654.76	16.70	653.59	-		17.23	653.06	18.47	651.82	18.19	652.10
MW4	709.67	43.20	666.47	42.90	666.77	43.30	666.37	43.61	666.06	43.27	666.40	43.88	665.79	44.55	665.12	-		43.90	665.77	43.39	666.28	43.51	666.16
MW4S	709.98	33.56	676.42	33.35	676.63	33.10	676.88	32.93	677.05	33.02	676.96	32.85	677.13	33.17	676.81	-		33.42	676.56	33.28	676.70	32.98	677.00
MW5S	677.9	8.22	669.68	7.55	670.35	8.37	669.53	8.60	669.30	8.06	669.84	8.07	669.83	9.54	668.36			8.71	669.19	8.08	669.82	8.21	669.69
PW-1	676.2	7.26	668.94	6.29	669.91	7.32	668.88	7.92	668.28	7.36	668.84	7.98	668.22	8.62	667.58			8.06	668.14	7.51	668.69	7.63	668.57
PW-1A	677	8.96	668.04	8.65	668.35	9.04	667.96	9.40	667.60	9.08	667.92	9.68	667.32	10.36	666.64	10.36	666.64	9.83	667.17	9.19	667.81	9.36	667.64
WP-1	672.5	2.50	670.00	2.38	670.12	damp		damp		damp		damp		damp				damp		damp		damp	
USGS Well																							
OI-20	696.07	21.43	674.64	20.93	675.14	21.03	675.04	21.45	674.62	21.51	674.56	21.76	674.31	22.71	673.36	22.62	673.45	22.25	673.82	21.42	674.65	21.36	674.71
Staff Gauges																							
SG-1	668.05	N/A		N/A		N/A		N/A		N/A		N/A		N/A				N/A		N/A		-	
SG-2	665.71	N/A		N/A		N/A		N/A		N/A		N/A		N/A				N/A		N/A		-	
SG-3*	668.77	1.88	666.89	1.88	666.89	N/A	-	N/A	-	N/A	-	1.40	667.37		-	1.40	667.37	1.80	666.97	1.80	666.97	1.80	666.97
Maple St. Culvert	661.34	1.00	660.34	0.89	660.45	0.88	660.46	1.00	660.34	0.98	660.36	0.98	660.36			0.90	660.44	0.98	660.36	0.96	660.38	0.96	660.38
Kams Culvert	NM	1.40		1.38		1.37		1.63		1.61		1.63				1.76		1.28		1.27		1.27	
PG-1	672.2	-		-		-		-		-		-		-		-		-		-		-	
Wells																							
Miller	699.01	42.21	656.80	42.01	657.00	41.90	657.11	41.96	657.05	41.81	657.20	41.98	657.03	-		46.45	652.56	46.90	652.11	46.82	652.19	46.78	652.23
Barn	714.42	51.00	663.42	50.42	664.00	50.79	663.63	48.96	665.46	48.79	665.63	48.68	665.74	-		49.53	664.89	49.40	665.02	49.32	665.10	49.34	665.08
Parsons	669.5	-		-		-		-		-		-		-		-		-		-		-	

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'. "Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

Table 2
Water Level Measurements
Eagle Harbor Sand Gravel, Inc.
Eagle Harbor Mine

Sample Point	Measuring Point Elevation (ft amsl)	1/31/2022		2/16/2022		3/17/2022		4/23/2022		5/31/2022		6/17/2022		8/23/2022		9/10/2022		10/29/2022	
		Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)	Depth to Water (ft)	Water Level Elevation (ft amsl)
Monitoring Wells																			
MW1	679.33	12.52	666.81	11.14	668.19	10.06	669.27	10.31	669.02	10.68	668.65	10.97	668.36	11.41	667.92	12.06	667.27	11.92	667.41
MW1S	679.41	7.99	671.42	6.00	673.41	4.92	674.49	5.89	673.52	5.99	673.42	7.54	671.87	8.18	671.23	8.72	670.69	8.90	670.51
MW2	687.44	23.62	663.82	23.48	663.96	22.37	665.07	22.50	664.94	22.91	664.53	22.96	664.48	23.21	664.23	23.32	664.12	25.06	662.38
MW2S	681.57	-		15.02	666.55	13.82	667.75	13.91	667.66	13.98	667.59	14.01	667.56	15.55	666.02	15.83	665.74	15.79	665.78
MW3	670.25	-		-		11.33	658.92	13.88	656.37	15.91	654.34	16.76	653.49	19.78	650.47	19.26	650.99	19.22	651.03
MW3S	670.29	-		-		11.62	658.67	14.98	655.31	18.74	651.55	19.01	651.28	19.35	650.94	19.95	650.34	19.94	650.35
MW4	709.67	43.65	666.02	43.21	666.46	42.49	667.18	42.53	667.14	42.93	666.74	43.26	666.41	44.51	665.16	44.69	664.98	44.48	665.19
MW4S	709.98	32.84	677.14	32.70	677.28	31.80	678.18	30.90	679.08	30.76	679.22	30.26	679.72	32.08	677.90	32.53	677.45	32.39	677.59
MW5S	677.9	8.42		8.09		6.56	671.34	7.14	670.76	7.76	670.14	8.32	669.58	9.40	668.50	9.67	668.23	9.61	668.29
PW-1	676.2	7.75	668.45	7.39	668.81	6.23	669.97	6.54	669.66	7.00	669.2	7.55	668.65	8.24	667.96	8.33	667.87	8.15	668.05
PW-1A	677	9.43	667.57	9.10	667.90	7.95	669.05	8.28	668.72	8.77	668.23	9.08	667.92	9.96	667.04	10.11	666.89	10.08	666.92
WP-1	672.5	-		-		-		-		-		-		-		-		-	
USGS Well																			
OI-20	696.07	21.38	674.69	21.14	674.93	19.44	676.63	18.78	677.29	18.57	677.5	19.02	677.05	22.16	673.91	22.70	673.37	23.64	672.43
Staff Gauges																			
SG-1	668.05	-		-		-		-		-		-		-		-		-	
SG-2	665.71	-		-		-		-		-		-		-		-		-	
SG-3*	668.77	-	-	-	-	2.58	666.19	2.58	666.19	2.58	666.19	2.58	666.19	-	-	-	-	-	-
Maple St. Culvert	661.34	-		-		0.98	660.36	1.05	660.29	1.05	660.29	1.04	660.30	-		-		-	
Kams Culvert	NM	-		-		1.30		1.61		1.59		1.58		-		-		-	
PG-1	672.2	-		-		-		-		-		-		-		-		-	
Wells																			
Miller	699.01	46.82	652.19	46.22	652.79	43.30	655.71	41.79	657.22	41.82	657.19	46.16	652.85	46.65	652.36	46.76	652.25	46.69	652.32
Barn	714.42	-		-		49.81	664.61	49.94	664.48	50.09	664.33	50.22	664.20	51.38	663.04	51.52	662.90	51.40	663.02
Parsons	669.5																		

Notes: * - SG-3 measurements are readings from a graduated staff gauge. The numbers increase upward to 4.00'.

"Depth to water" measurements are readings of the number from the gauge.

SG-3 water level elevation = 668.77-(4.00 - gauge reading).

provisional data subject to revision

TABLE 3
Residential Well Information
Eagle Harbor Sand & Gravel, Inc.
Eagle Harbor Quarry

Well ID (address)		Elevation (grade)	Reported Well Depth (feet)	TOC Elevation (grade+stickup)	4/4/19 DTW (feet)	4/4/19 Water Level Elevation (feet)	Aquifer	Remarks
Pine Hill Road	4720	NA	NA	NA	NA	NA	NA	Water supplied by well at 4764 Pine Hill Rd
	4721	713.0	100	714.75	51.41	663.34	Lockport	Spigot inoperable; no sample collected; nobody home during field survey
	4763	NA	NA	NA	NA	NA	NA	Water supplied by well at 4779 Pine Hill Rd
	4764	711.0	76	706	NA	NA	Lockport	Well inccessible; jet pump in vault below grade; sample collected from hose
	4779	715.0	90	710	unknown	unknown	Lockport	Well inaccessible; jet pump in vault below grade; sample collected from hose
	4803	NA	NA	NA	NA	NA	NA	Water supplied by well at 4779 Pine Hill Rd
	4816	NA	NA	NA	NA	NA	NA	Water supplied by well at 4764 Pine Hill Rd
	4835	677.0	unknown	unknown	unknown	unknown	Sand and Gravel	Sampled from tap, post filter; no softener; well inaccessible; originally a dug well, then a drilled well through the dug well
	4855	670.0	Shallow?	671	13.8	657.2	Sand and Gravel	Low water level during a dry spell; sample collected from outside spigot
	4868	667.0	unknown	667.3	13.8	653.5	Sand and Gravel	Sample collected from hose
	4871	669.0	30	669	unknown	unknown	Sand and Gravel	Well inaccessible; sample collected from outdoor spigot near buried well head
	4872	667.0	unknown	unknown	unknown	unknown	Unknown	Well questionnaire not returned; Refused permission to sample well during field survey; could not find well
	4881	675.0	unknown	unknown	unknown	unknown	unknown	Well questionnaire not returned; Nobody home during field survey; no contact information available
	4898	669.0	unknown	665	unknown	unknown	Sand and Gravel	Well inaccessible; jet pump in vault below grade; originally a dug well, then a well drilled through dug well; no filter or softener; sampled collected from outside spigot at airport
	4904	NA	NA	NA	NA	NA	NA	Water supplied by well at 4898 Pine Hill Rd
	4906 (Airport)	NA	NA	NA	NA	NA	NA	Water supplied by well at 4898 Pine Hill Rd
	4917	675.0	unknown	unknown	unknown	unknown	unknown	Well questionnaire not returned; Nobody home during field survey; no contact information available
Maple Street	13303 (Parsons)	670.0	unknown	671	11.6	659.4	Rochester	Strong sulfur smell; sample collected from hose

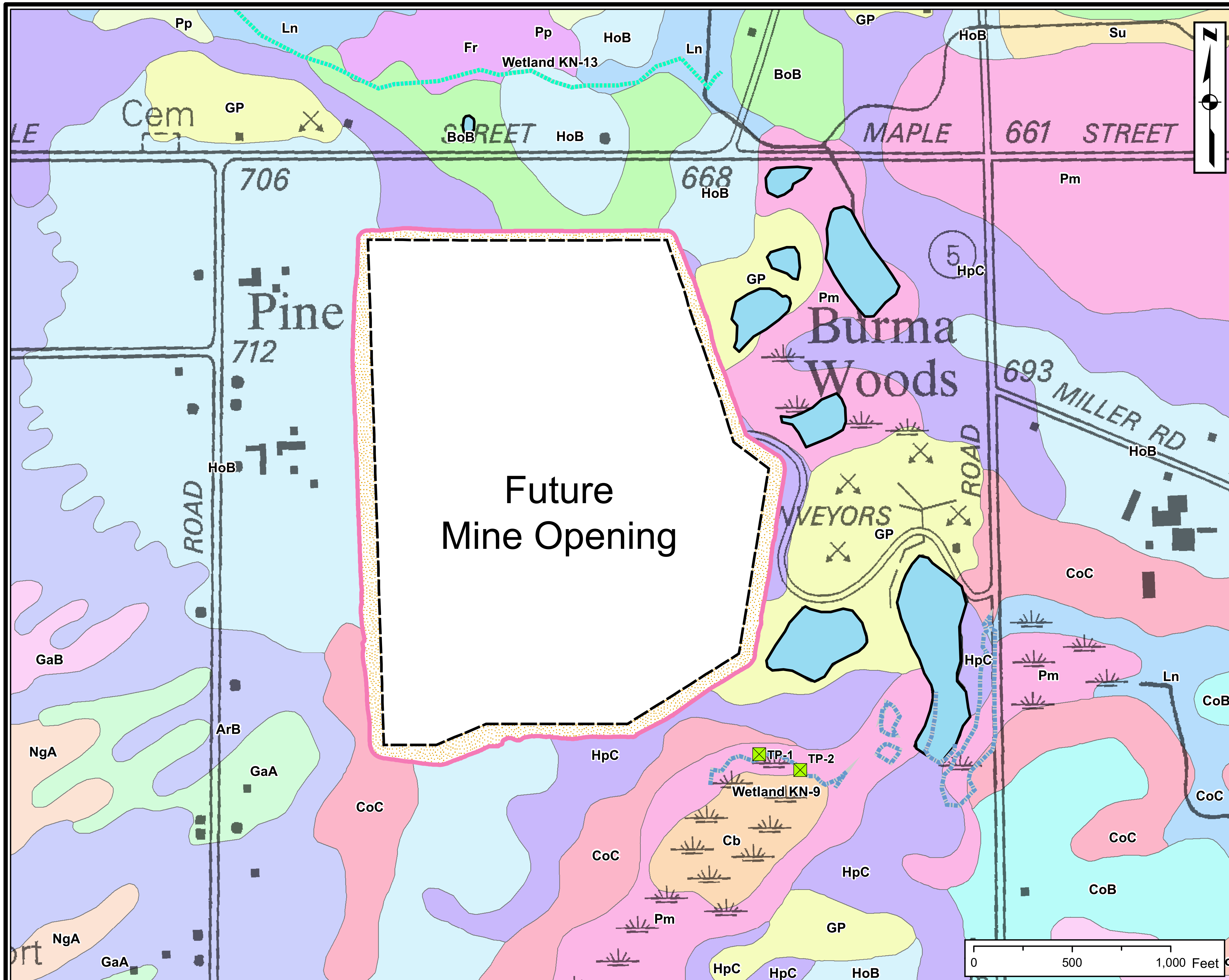
Notes:
TOC = Top of Casing
DTW = Depth of Water from TOC
NA = Not applicable, see remarks

TABLE 4
Residential Well Water Quality
Eagle Harbor Sand & Gravel, Inc.
Eagle Harbor Quarry

Well ID (address)		Total Dissolved Solids (ppm)	Specific Conductivity (µS)	pH	Temperature (°C)	Turbidity (ntu)	Alkalinity-$CaCO_3$ (mg/L)	Chloride (mg/L)	Sulfide (mg/L)	Total Suspended Solids (mg/L)	Hardness (CaCO3) (mg/L)	Iron (mg/L)	Manganese (mg/L)	Remarks
Pine Hill Road	4720													Water supplied by well at 4764 Pine Hill Rd
	4721													Spigot inoperable; no sample collected; nobody home during field survey
	4763													Water supplied by well at 4779 Pine Hill Rd
	4764	425	842	7.9	10.5	<0.1	306	43.1	< 0.05	< 5.0	389	0.02	< 0.001	Well inccessible; jet pump in vault below grade; sample collected from hose
	4779	583	1164	7.3	10.3	1.36	351	42.5	< 0.05	< 5.0	545	0.027	< 0.001	Well inaccessible; jet pump in vault below grade; sample collected from hose
	4803													Water supplied by well at 4779 Pine Hill Rd
	4816													Water supplied by well at 4764 Pine Hill Rd
	4835	376	760	7.2	9.6	1.48	166	80	< 0.05	< 5.0	285	< 0.01	< 0.001	Sampled from tap, post filter; no softener; well inaccessible; originally a dug well, then a drilled well through the dug well
	4855	220	444	8.2	10.4	1.48	140	9.2	< 0.05	< 5.0	204	< 0.01	< 0.001	Low water level during a dry spell; sample collected from outside spigot
	4868	326	649	8.4	11.1	1.23	156	54.3	< 0.05	< 5.0	252	< 0.01	< 0.001	Well questionnaire not returned; sample collected from hose
	4871	230	459	8.4	11.4	1.02	148	9.8	< 0.05	< 5.0	209	< 0.01	0.001	Well inaccessible; samples collected from outside spigot near wellhead
	4872													Well questionnaire not returned; Refused permission to sample well during field survey; could not find well
	4881													Well questionnaire not returned; Nobody home during field survey; no contact information available
	4898	235	473	8.1	9.3	1.61	138	22.5	<0.05	<3.3	211	0.011	< 0.001	Well inaccessible; jet pump in vault below grade; originally a dug well, then a well drilled through dug well; no filter or softener; sampled collected from outside spigot at airport
	4904													Water supplied by well at 4898 Pine Hill Rd
	4906 (Airport)													Water supplied by well at 4898 Pine Hill Rd
	4917													Well questionnaire not returned; Nobody home during field survey; house appears unoccupied; no contact information available
Maple Street	13303 (Parsons)	377	757	7.7	10.8	0.87	248	34.2	1.46	< 5.0	400	0.294	0.034	Strong sulfur smell; sample collected from hose

Notes:
[shaded box] = No Sample Collected; see remarks

FIGURES



LEGEND

- Test Pit Location
- Delineated Wetland Boundary (KN-9)
- Approximate Wetland Boundary (KN-13)
- Top of Stripping Slope
- Toe of Slope
- Graded Stripping Slope

Soils

- W - Water
- ArB - Arkport very fine sandy loam
- BoB - Bombay fine sandy loam
- Cb - Carlisle muck
- CoB - Colonie loamy fine sand
- CoC - Colonie loamy fine sand
- Fr - Fredon loam
- GP - Gravel pits
- GaA - Galen very fine sandy loam
- GaB - Galen very fine sandy loam
- HoB - Howard gravelly loam
- HpC - Howard soils
- Ln - Lamson soils - Very fine sandy loam
- Mo - Minoa very fine sandy loam
- NgA - Niagara silt loam
- Pm - Palms muck
- Pp - Phelps gravelly fine sandy loam
- Su - Sun silt loam

Notes:
- Soil Survey Geographic (SSURGO) database for Orleans County New York, U.S. Department of Agriculture, Natural Resources Conservation Service and modified by Alpha Geoscience.

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Proj. No. 15139

FIGURE 1

Soils Map

Eagle Harbor Sand and Gravel
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\Fig 1 - Soils Map.mxd
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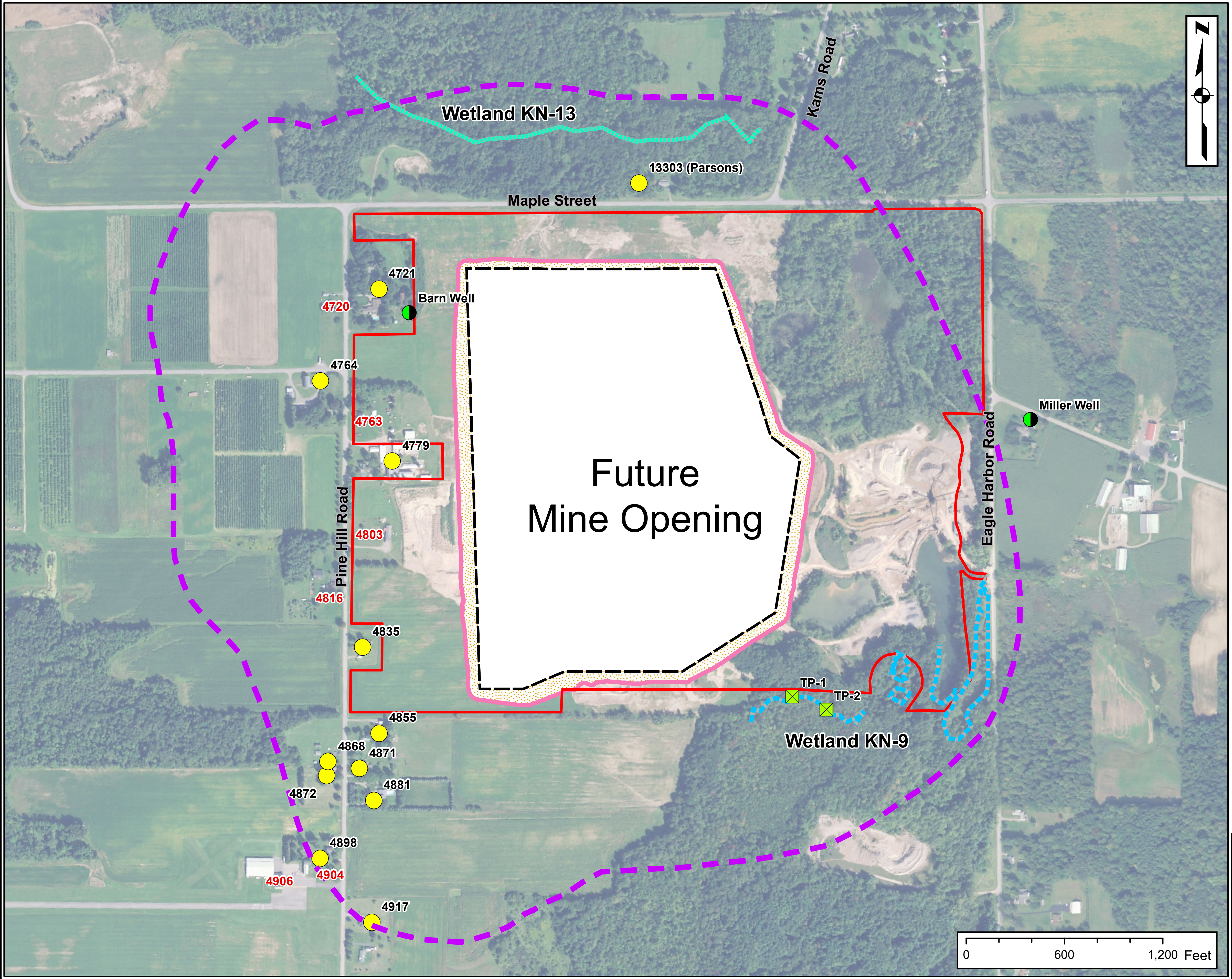

LEGEND

- Test Pit Location
- Extent of Drawdown Impact or 1000' from Proposed Quarry, Whichever is Greater
- Delineated Wetland Boundary (KN-9)
- Approximate Wetland Boundary (KN-13)
- Bedrock Monitoring Well
- 4764 Residential Well Location with Street Address
- 4720 Street Address with no Water Supply Well
- Life of Mine Boundary
- Top of Stripping Slope
- Toe of Slope (Edge of Quarry)
- Graded Stripping Slope

Notes:
-Orleans County 2017 natural color orthoimagery, U.S. Department of Agriculture, Aerial Photography Field Office. Image date: 9/11/2017.

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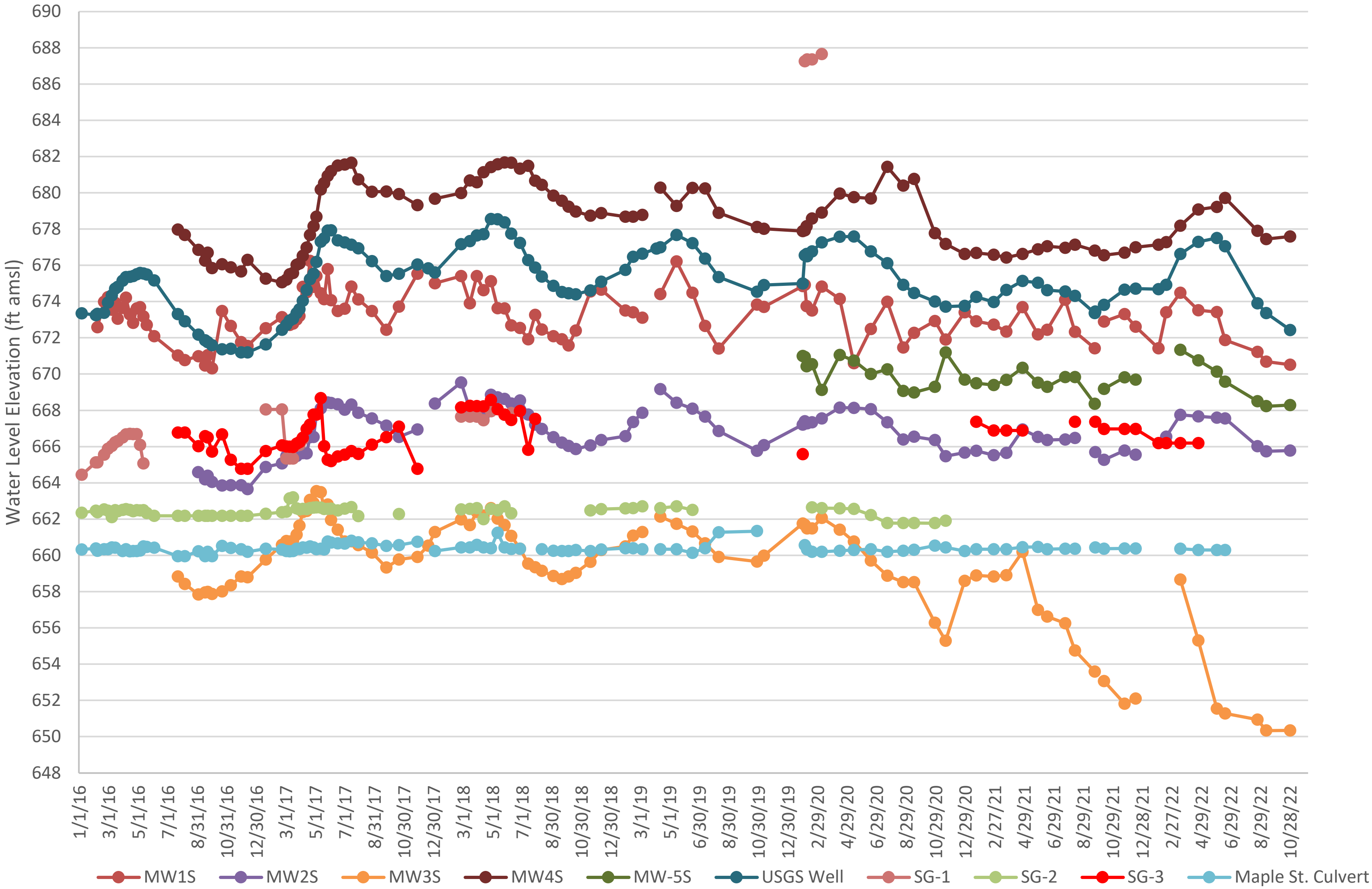
FIGURE 2
Residential Well Survey Location Map

Eagle Harbor Sand and Gravel
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\Fig 2 - Residential Well Survey Map.mxd
Date Saved: 1/5/2023 4:37:17 PM

FIGURE 3
Hydrographs - Surficial Aquifer Wells
Eagle Harbor Mine



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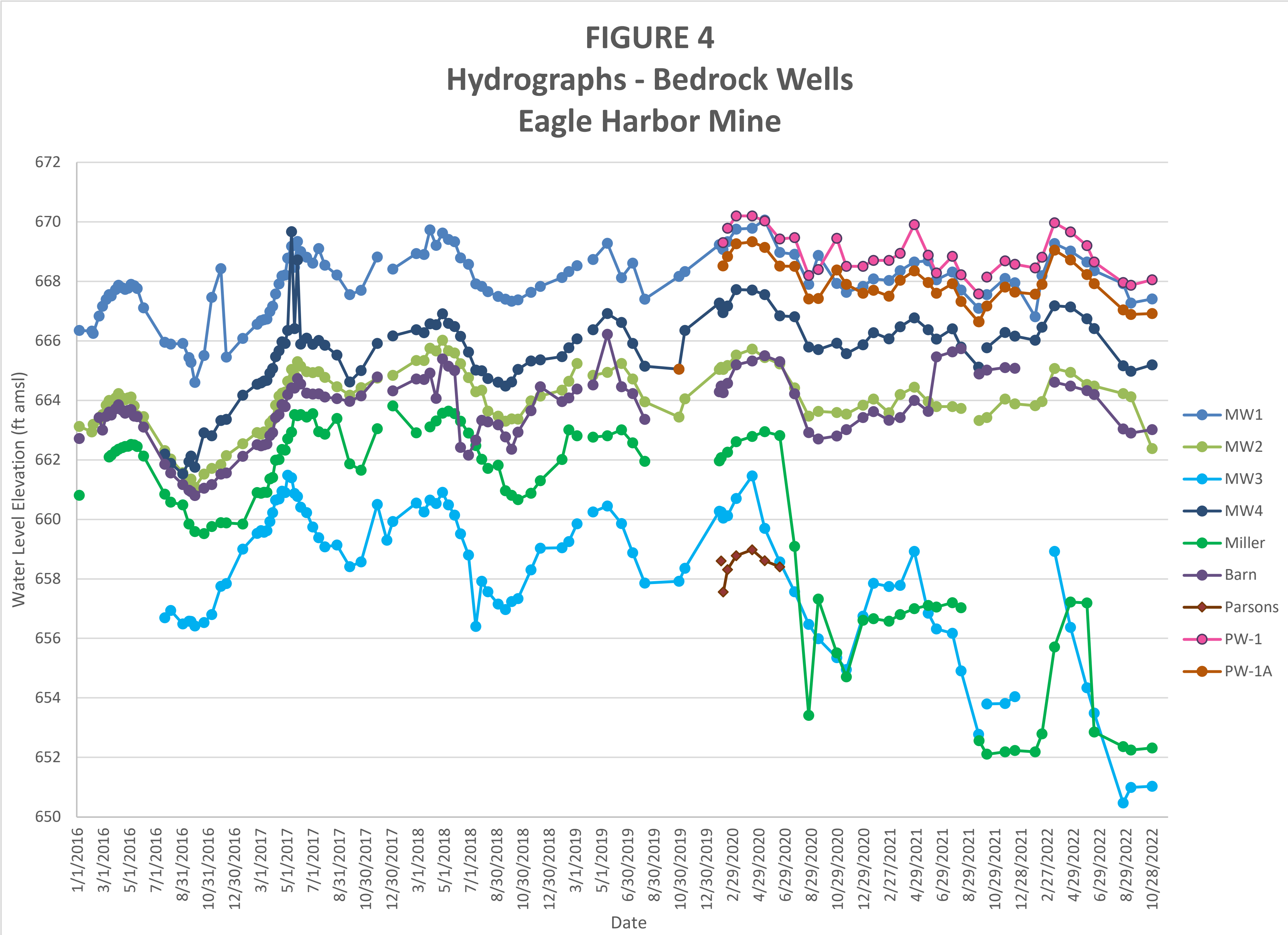

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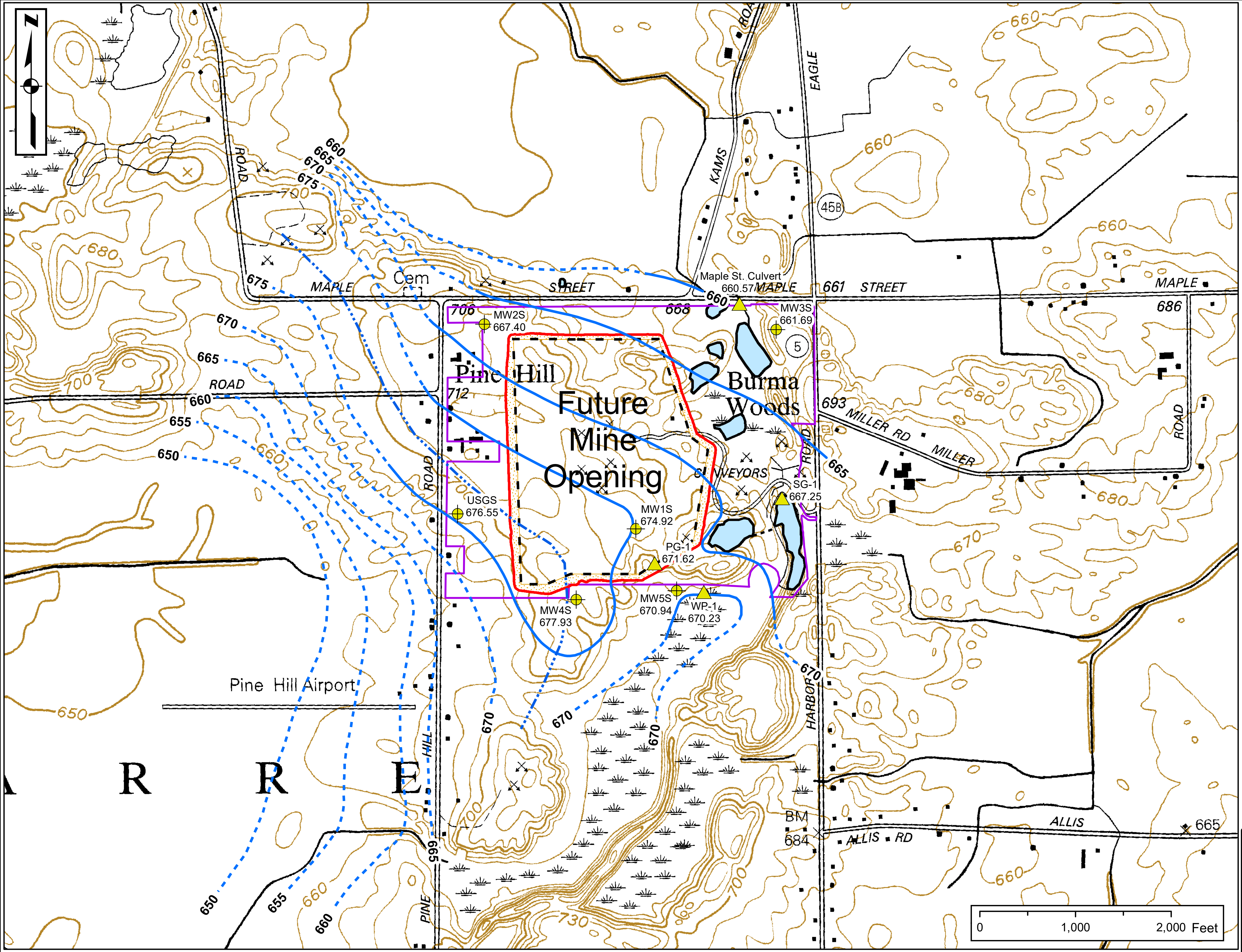

LEGEND

- Surficial Aquifer Monitoring Well
- Staff Guage
- Ground Water Contour (feet) (dashed where inferred)
- Ground Water Divide
- Proposed Mine Opening
- Top of Stripping Slope
- Life of Mine Boundary
- Graded Stripping Slope
- Ditch
- Pond

Notes:
- Basemap: NYSDOT 7.5-minute topographic map (Albion and Knowlesville Quadrangles).
- Elevations are in Feet above mean sea level (NAVD88)l.
- Topographic contour interval is 10 Feet.
- Ground water contours represent February 2020 water levels.
- Ground water contour interval is 5 Feet.

0 1,000 2,000 Feet

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FIGURE 5

Surficial Aquifer Ground Water Elevation Contours -Existing Conditions

Eagle Harbor Sand and Gravel
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\Fig 5 - Surficial Aquifer Ground Water Elevation Contours.mxd
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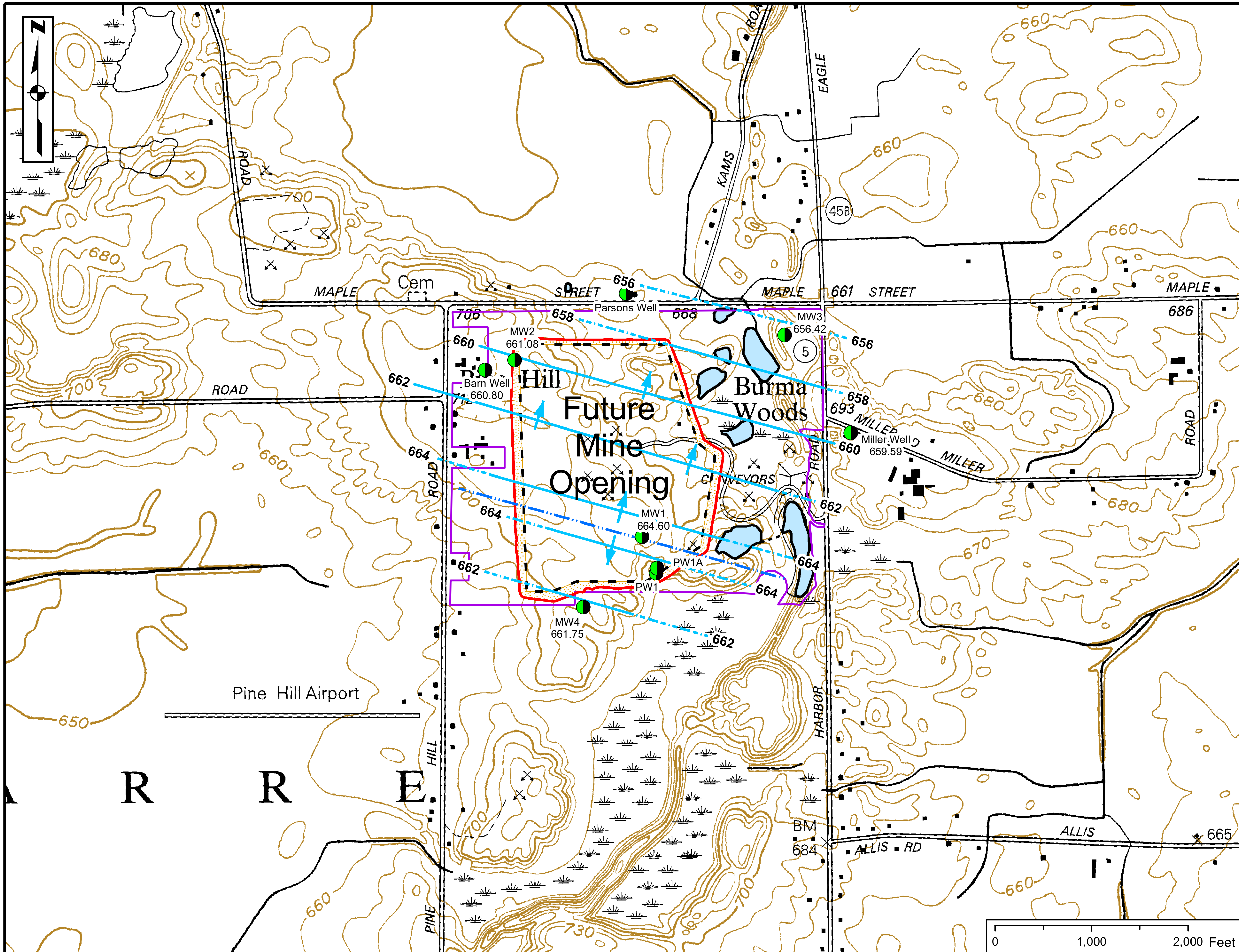

Notes:
-Basemap: NYSDOT 7.5-minute topographic map (Albion and Knowlesville Quadrangles).
-Elevations are in Feet above mean sea level (NAVD88)l.
-Topographic contour interval is 10 Feet.
-Ground water contours represent October 1, 2016 water levels.
-Ground water contour interval is 2 Feet.

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FIGURE 6

Bedrock Aquifer Ground Water Elevation Contours

Eagle Harbor Sand and Gravel
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\Fig 6 - Bedrock Aquifer Ground Water Elevation Contours.mxd
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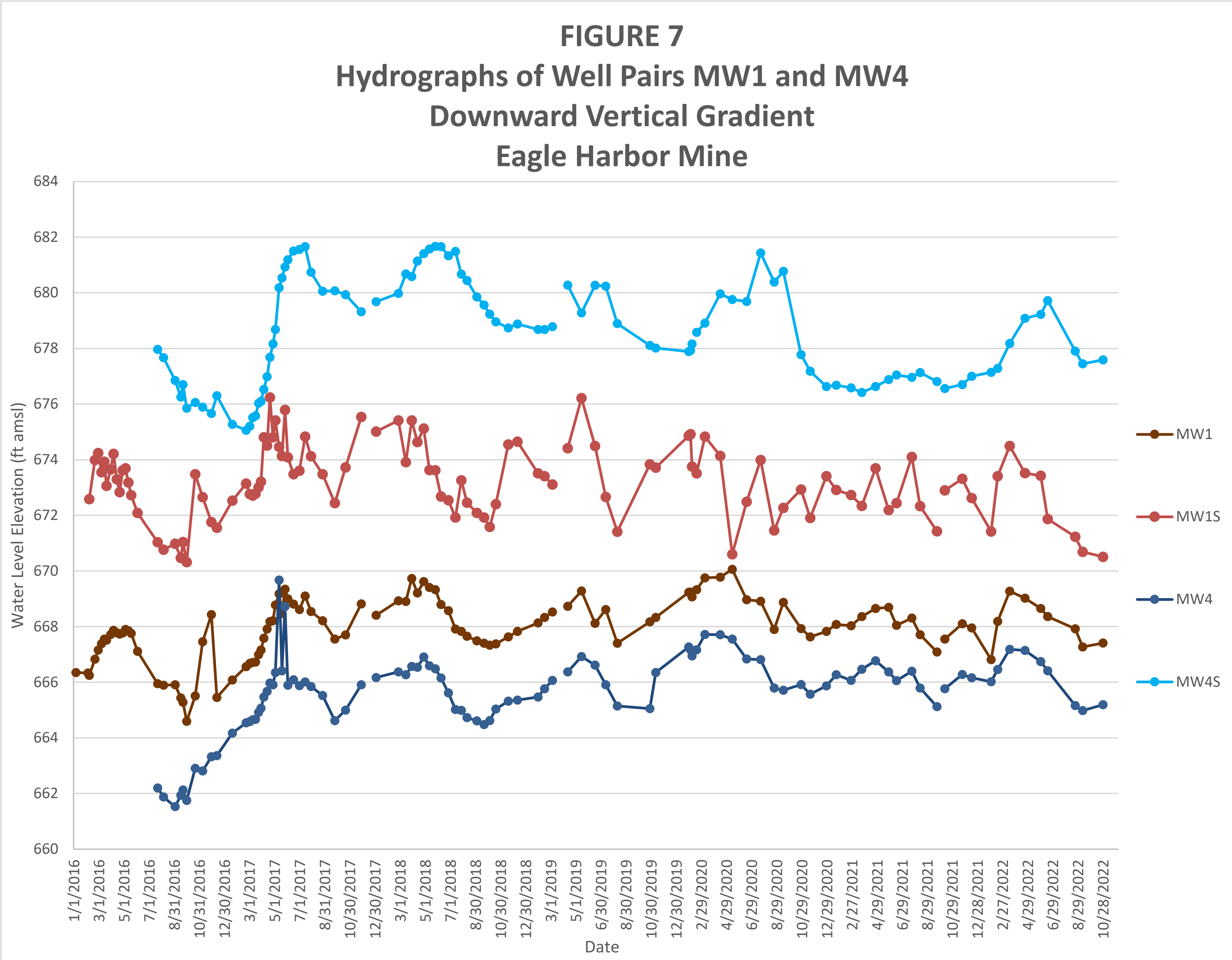

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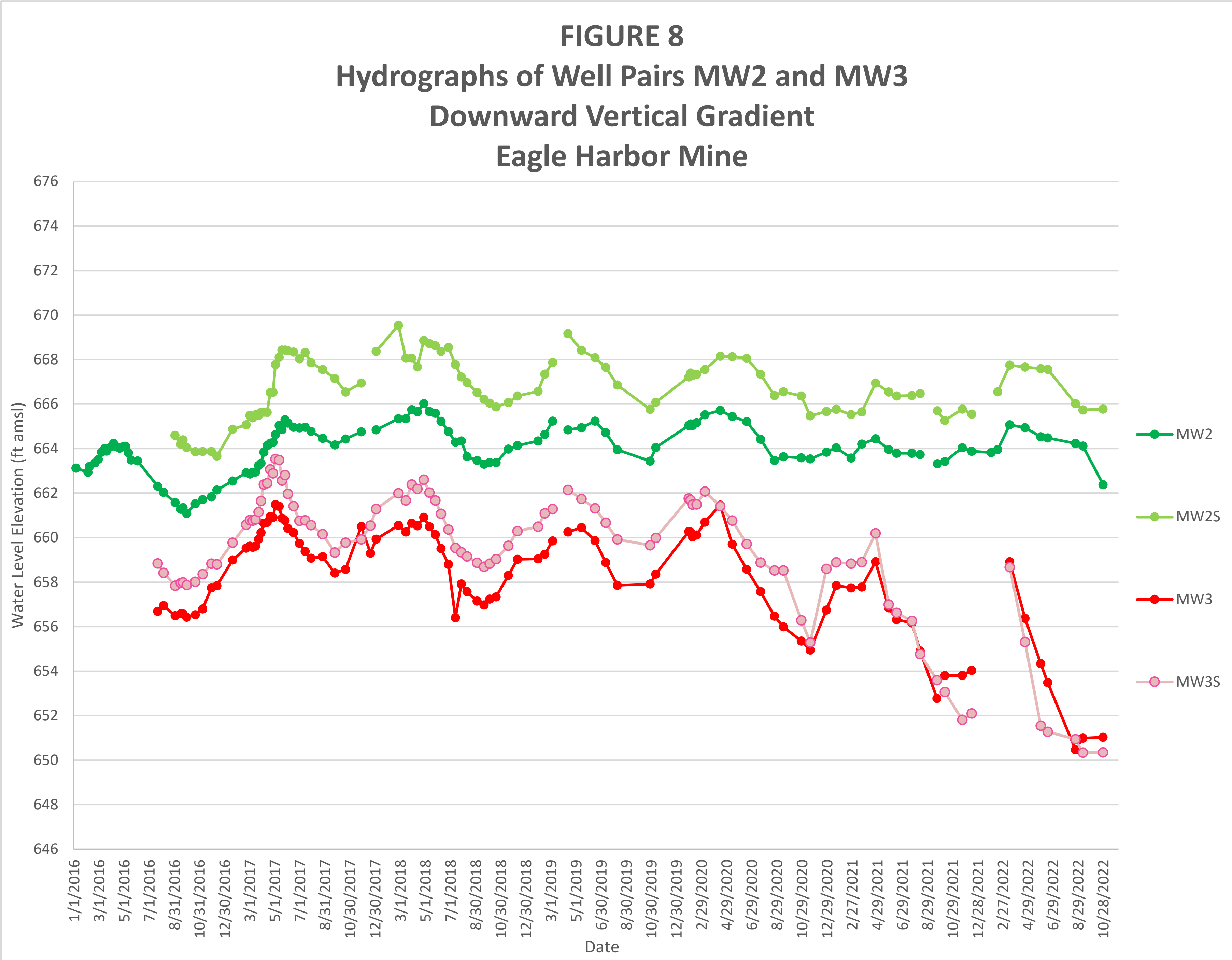

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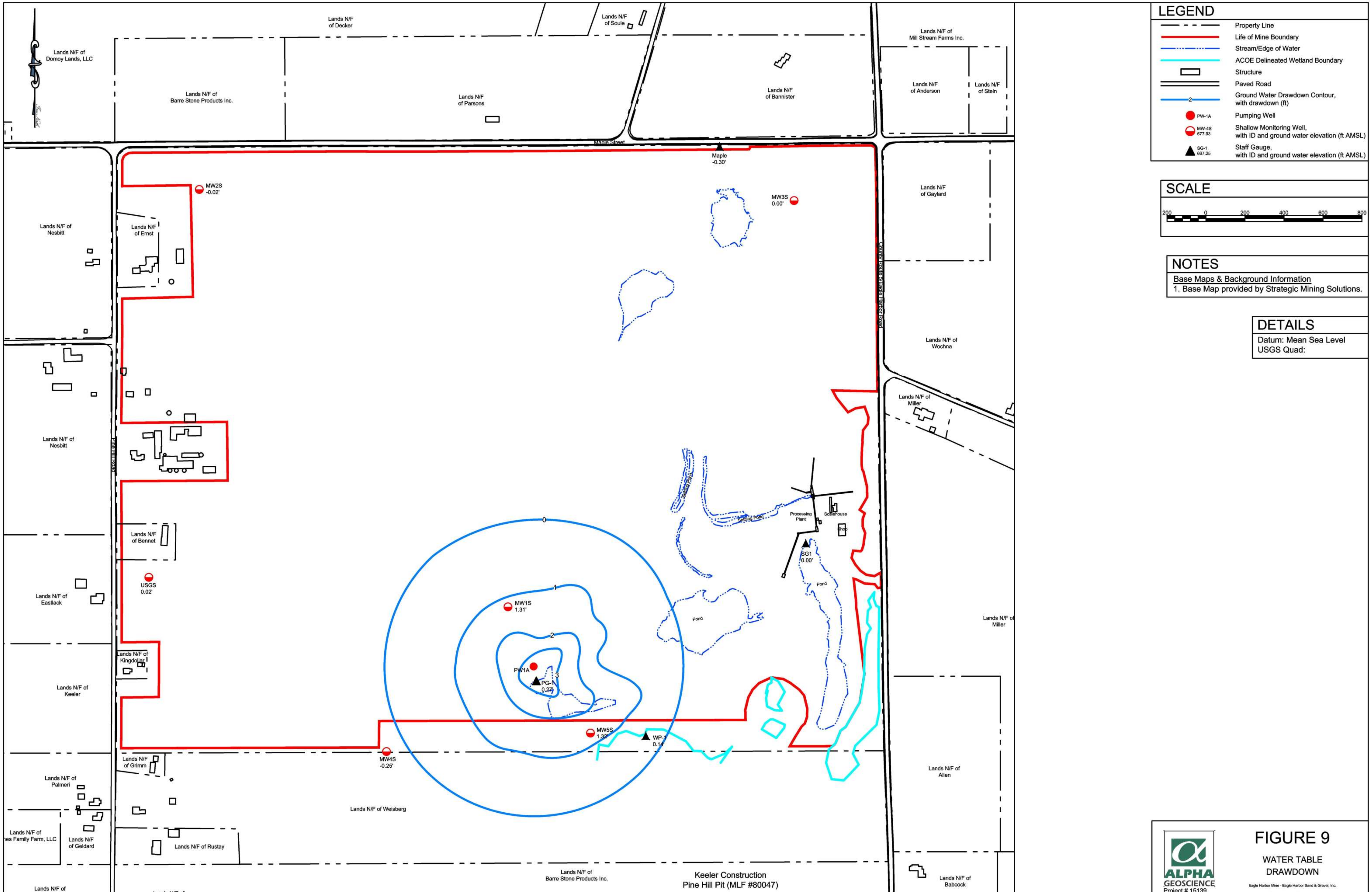
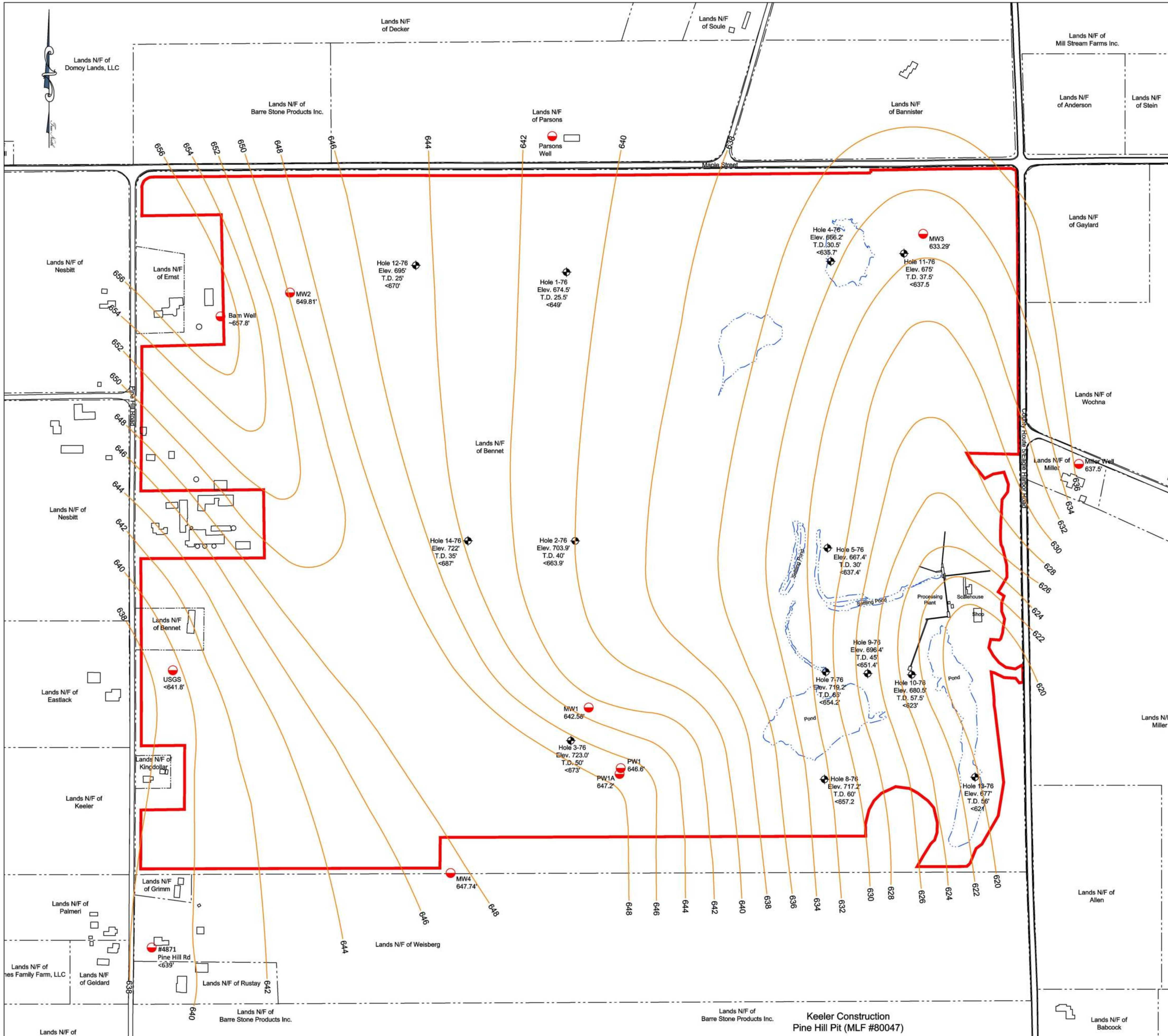


FIGURE 9
WATER TABLE DRAWDOWN

Z:\projects\2015\15121-15140\15139 - Eagle Harbor\15_0 GIS\Data\CAD\Water Table Drawdown GW Contours.dwg



Keeler Construction
Pine Hill Pit (MLF #80047)

LEGEND

- Property Line
- Life of Mine Boundary
- Stream/Edge of Water
- Structure
- Paved Road
- Top of Bedrock Elevation Contour (ft AMSL)
- Monitoring Well, or Residential Well, with ID and bedrock elevation (ft AMSL)
- Historical Exploratory Hole, with ID, grade, total depth, and bedrock elevation

SCALE

200 0 200 400 600 800

NOTES

Base Maps & Background Information

1. Base Map provided by Strategic Mining Solutions.

DETAILS

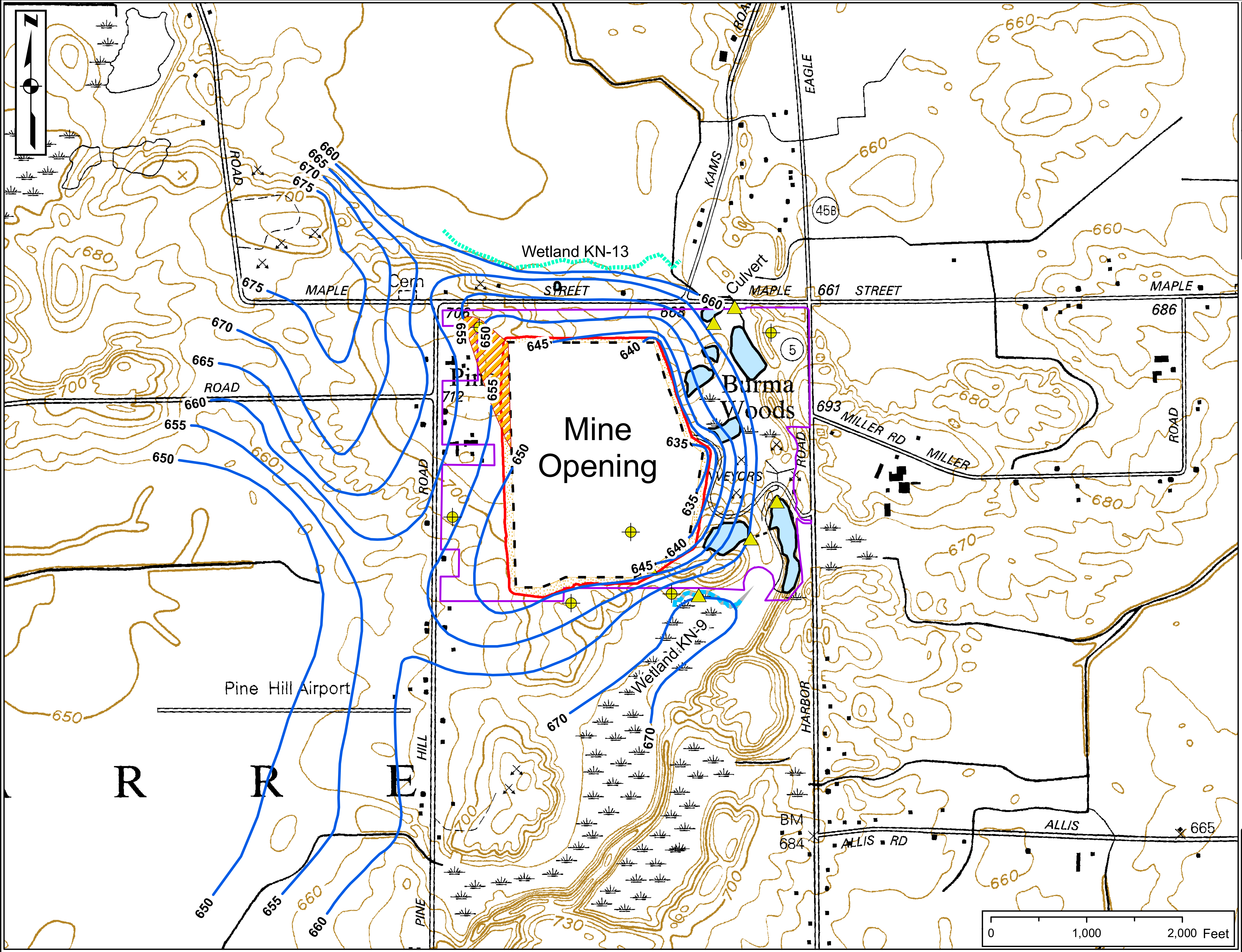
Datum: Mean Sea Level
USGS Quad:

ALPHA GEOSCIENCE
Project # 15139

FIGURE 10

TOP OF BEDROCK STRUCTURAL CONTOURS

Eagle Harbor Mine - Eagle Harbor Sand & Gravel, Inc.
Town of Barre, Orleans County, New York



LEGEND

- Unconsolidated Monitoring Well
- Staff Guage
- Ground Water Contour (Feet)
- Dewatered Area Above Bedrock
- Life of Mine Boundary
- Mine Opening
- Top of Stripping Slope
- Graded Stripping Slope
- Pond
- Ditch
- Delineated Wetland Boundary (KN-9)
- Approximate Wetland Boundary (KN-13)

Notes:
-Basemap: NYSDOT 7.5-minute topographic map (Albion and Knowlesville Quadrangles).
-Elevations are in feet relative to mean sea level. (NAVD88).
-Topographic contour interval is 10 Feet.
-Ground water contour interval is 5 Feet.

0 1,000 2,000 Feet

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Proj. No. 15139

FIGURE 11

Surficial Aquifer Ground Water Elevation Contours -Future Conditions

Eagle Harbor Sand and Gravel
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\Fig 11 - Future conditions.mxd
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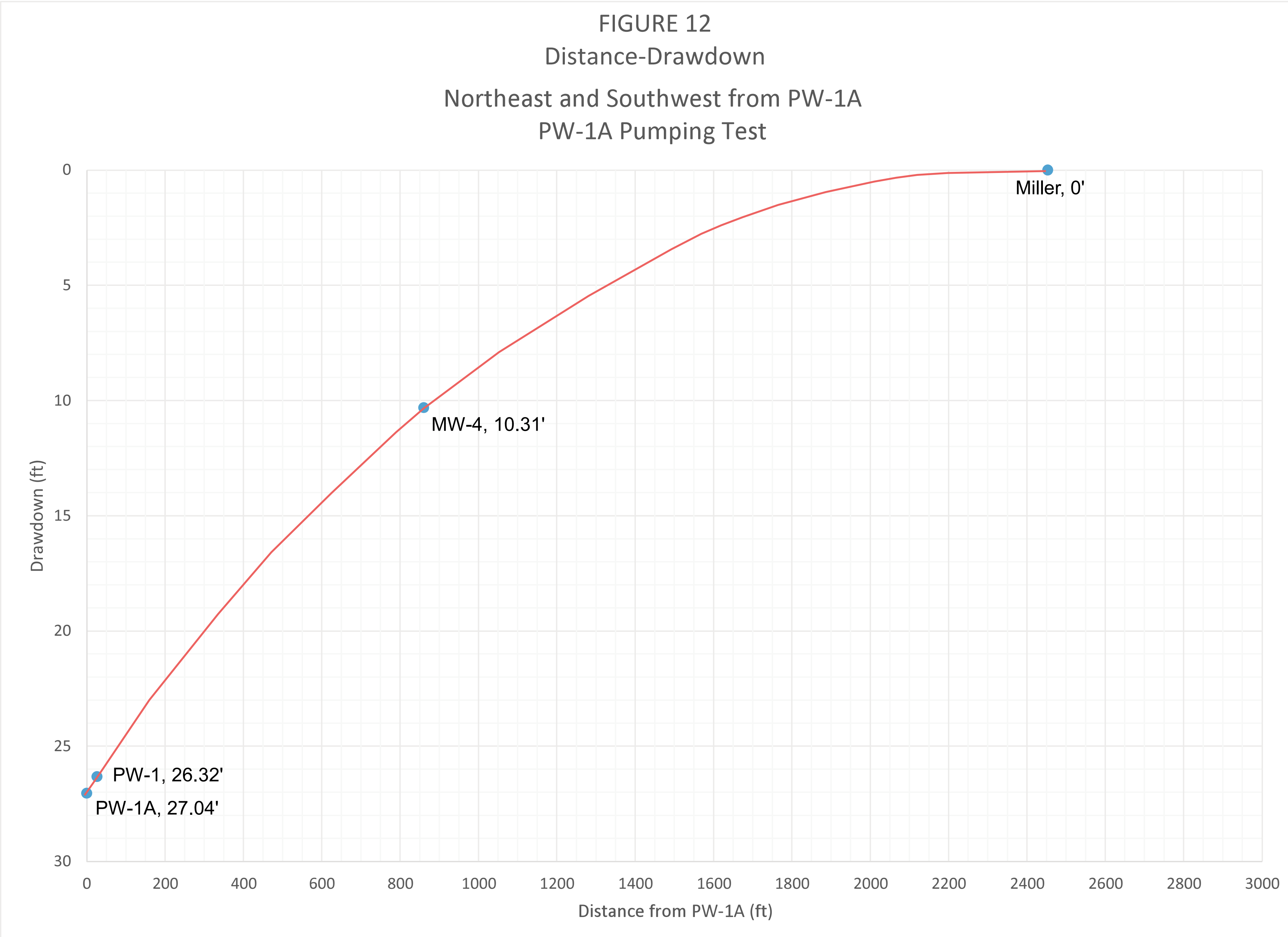


FIGURE 12
Distance-Drawdown
Northeast and Southwest from PW-1A
PW-1A Pumping Test
Drawdown (ft)
0
5
10
15
20
25
30
Distance from PW-1A (ft)
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
Miller, 0'
MW-4, 10.31'
PW-1, 26.32'
PW-1A, 27.04'

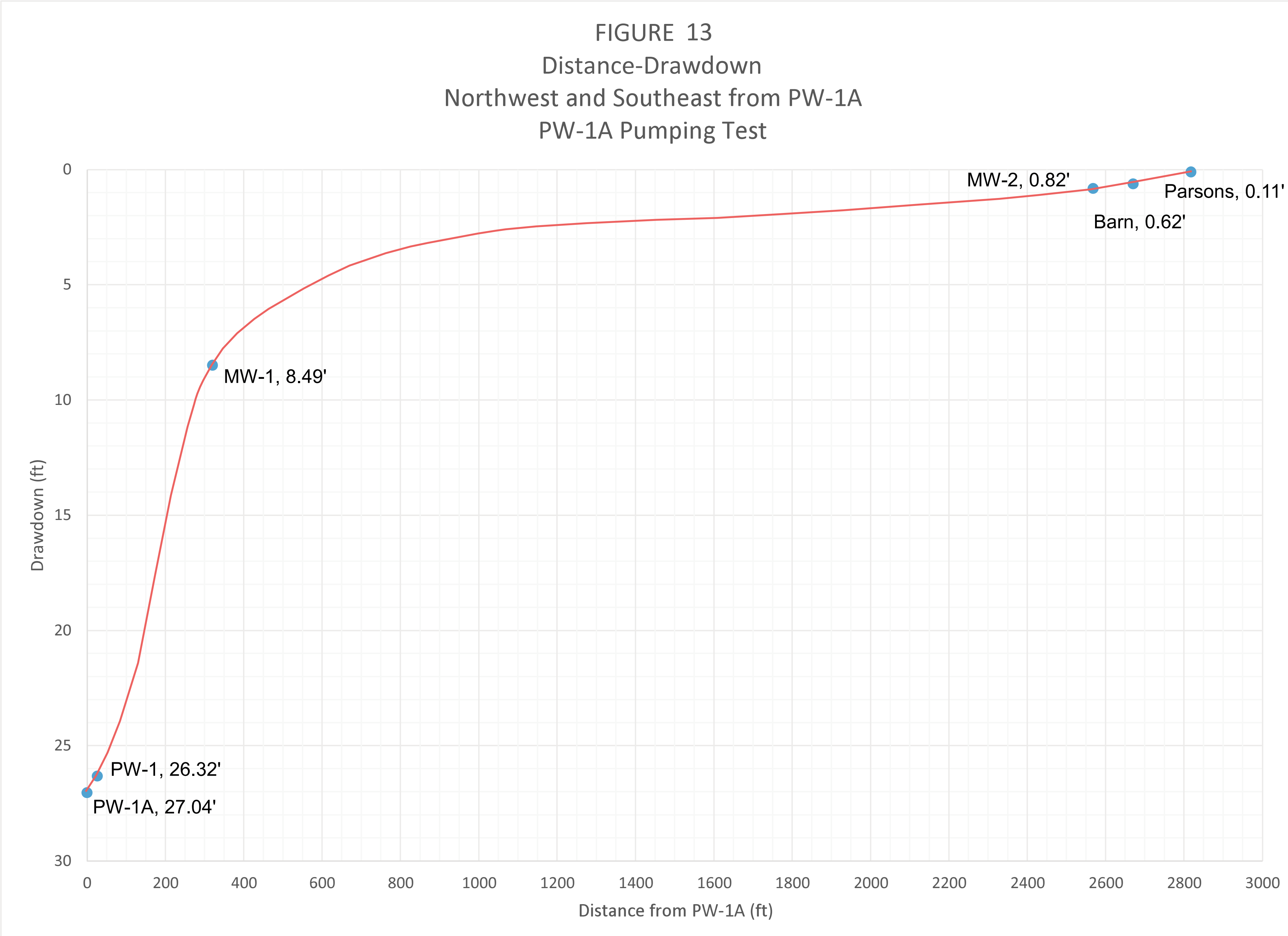
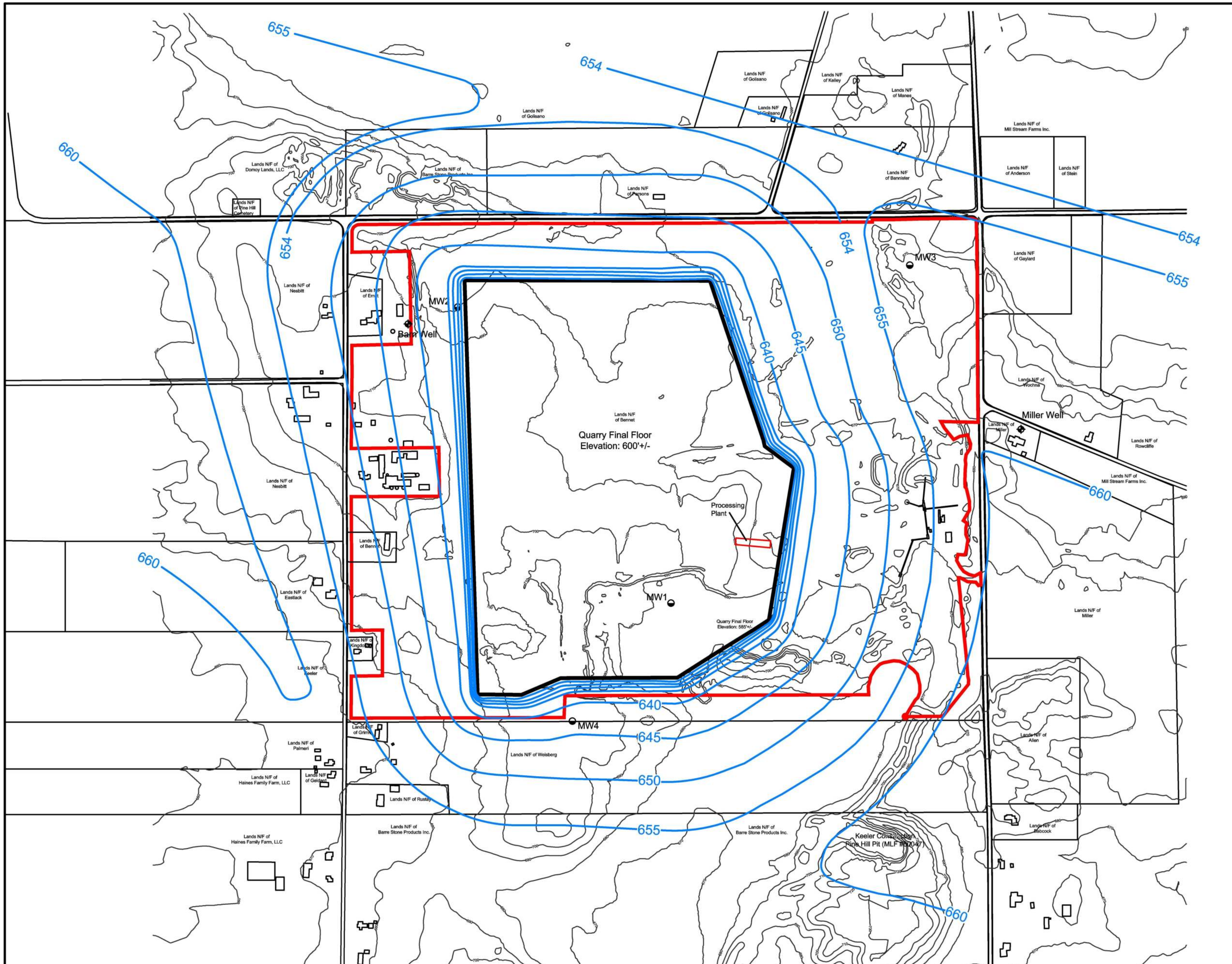


FIGURE 13
Distance-Drawdown
Northwest and Southeast from PW-1A
PW-1A Pumping Test
Drawdown (ft)
Distance from PW-1A (ft)
0
5
10
15
20
25
30
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
MW-2, 0.82'
Parsons, 0.11'
Barn, 0.62'
MW-1, 8.49'
PW-1, 26.32'
PW-1A, 27.04'



LEGEND

- Property Line
- Life of Mine Boundary
- 680 Topographic Contour
- Limit of Bedrock Excavation
- Paved Road
- 680 Ground Water Elevation Contour
- Monitoring Well
- Bedrock Monitoring Well (Residential)

SCALE

300 0 300 600 900

DETAILS

Topographic Survey Date: August 17, 2016
Datum: Mean Sea Level
USGS Quad:
Ground Water Interval: 5 feet except where indicated
Topographi Contour Interval: 2 feet

NOTES

Base Maps & Background Information

1. Base Map provided by Strategic Mining Solutions, Mining And Reclamation Plan Map

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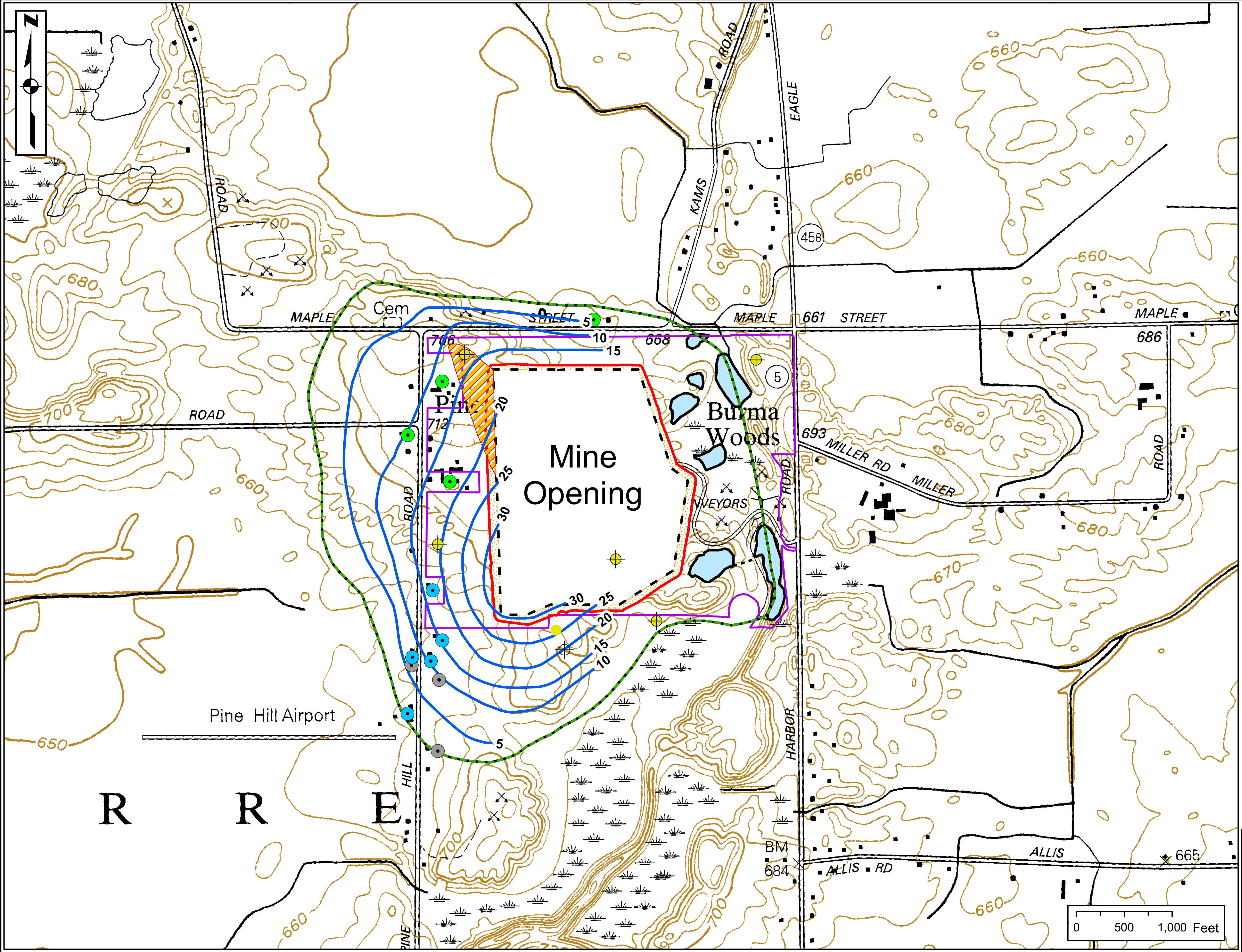
Project #15139

FIGURE 14

Future Ground Water Elevation Contour Map
Bedrock Aquifer

Eagle Harbor Mine - Eagle Harbor Sand & Gravel, Inc.
Town of Barre, Orleans County, New York

Z:\projects\2015\15121-15140\15139 - Eagle Harbor\15_0 GIS\Data\CAD\NOIA 2 Drawings\Fig 1 Future GW Cont.dwg



Refer to Figure 2 for location addressess of residential wells

Notes:
-Basemap: NYSDOT 7.5-minute topographic map (Albion and Knowlesville Quadrangles).
-Elevations are in feet relative to mean sea level. (NAVD88).
-Topographic contour interval is 10 Feet.
-Surficial Aquifer drawdown contour interval is 5 Feet.

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Proj. No. 15139

FIGURE 15

Drawdown Impact -Surficial Aquifer

Eagle Harbor Sand and Gravel
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\Fig 15 - Drawdown Impact Surficial Aquifer.mxd
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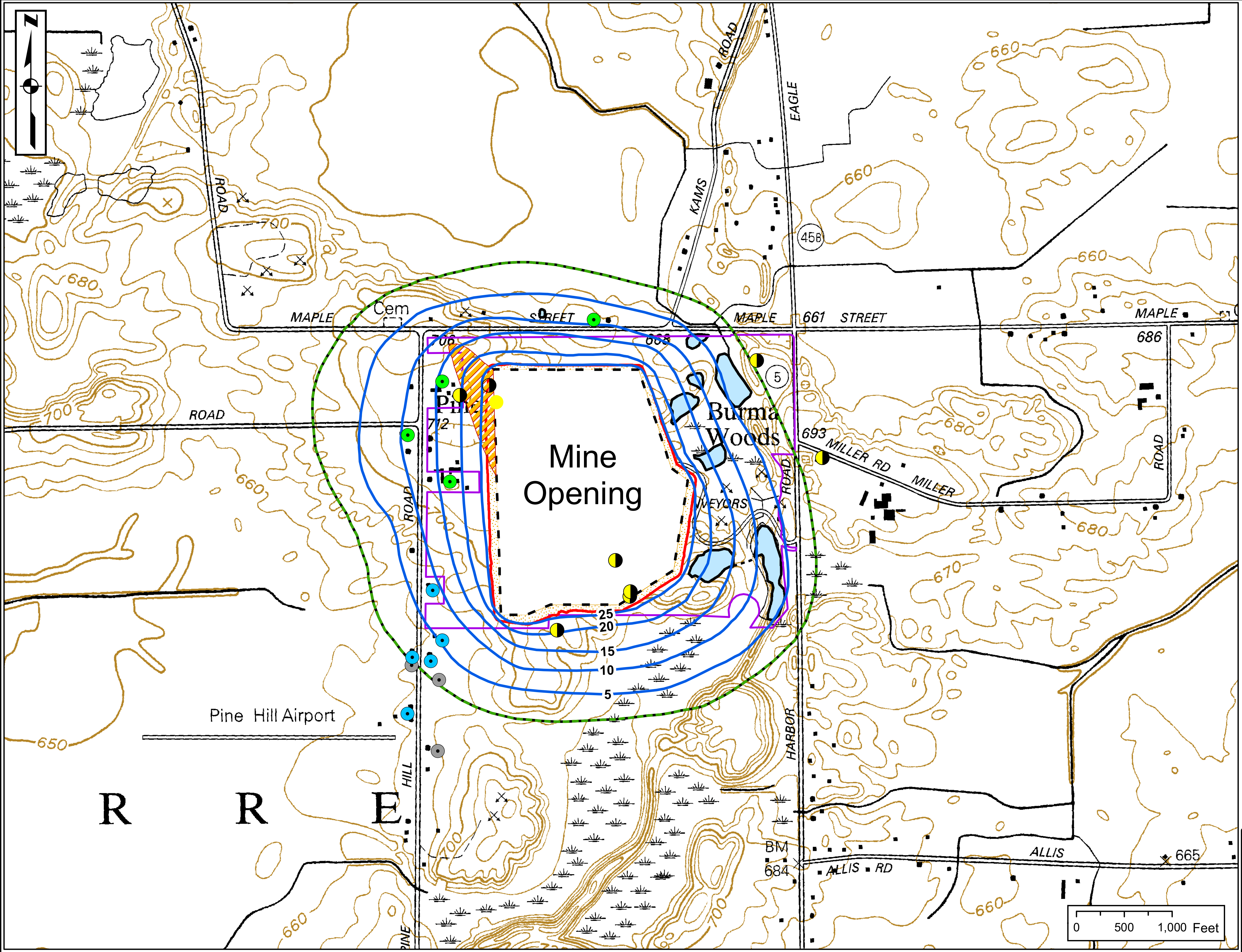

LEGEND

- Bedrock Monitoring Well
- Residential Well (Aquifer Unkown)
- Residential Well (Surficial Aquifer)
- Residential Well (Bedrock Aquifer)
- Drawdown Contour (Feet)
- Extent of Bedrock Aquifer Drawdown
- Dewatered Area Above Bedrock
- Life of Mine Boundary
- Mine Opening
- Top of Stripping Slope
- Graded Stripping Slope
- Pond
- Ditch

Refer to Figure 2 for location addressess of residential wells

Notes:
-Basemap: NYSDOT 7.5-minute topographic map (Albion and Knowlesville Quadrangles).
-Elevations are in feet relative to mean sea level (NAVD88).
-Topographic contour interval is 10 Feet.
-Bedrock Aquifer drawdown contour interval is 5 Feet.

ALPHA GEOSCIENCE

Proj. No. 15139

FIGURE 16

Drawdown Impact -Bedrock Aquifer

Eagle Harbor Sand and Gravel
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\Fig 16 - Drawdown Impact Bedrock Aquifer.mxd
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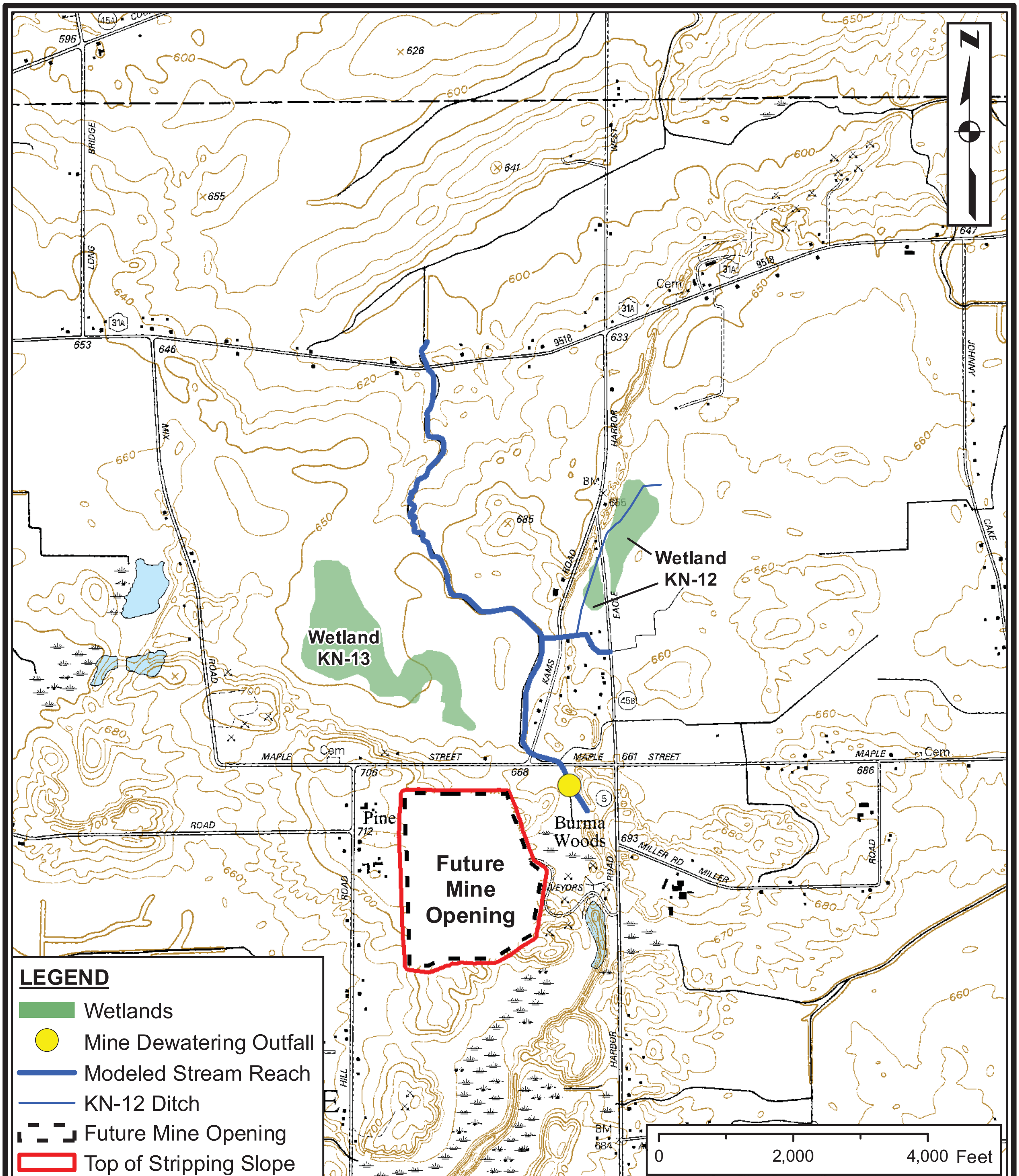
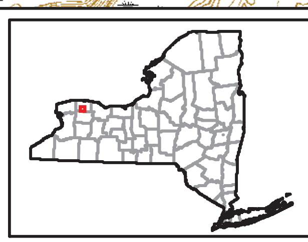


Source:
-Index of New York State Regulatory Freshwater Wetlands, NYSDEC, 1994-2013,
CUGIR, https://cugir.library.cornell.edu/
- NYS GIS Clearinghouse 2020 Orthoimagery Index, gis.ny.com
-NYSDOT 7.5-minute topographic map (Kowlesville and Albion quadrangles).
-Elevations are shown in feet above mean sea level.
-Contour interval is 10 feet.



ALPHA GEOSCIENCE
Proj. No. 15139

FIGURE 17
Mine Discharge Route and Northern Wetlands
Hydrologic Evaluation
Eagle Harbor Sand & Gravel Mine
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\Fig 17 - Mine Discharge Route & Wetlands Topo.mxd
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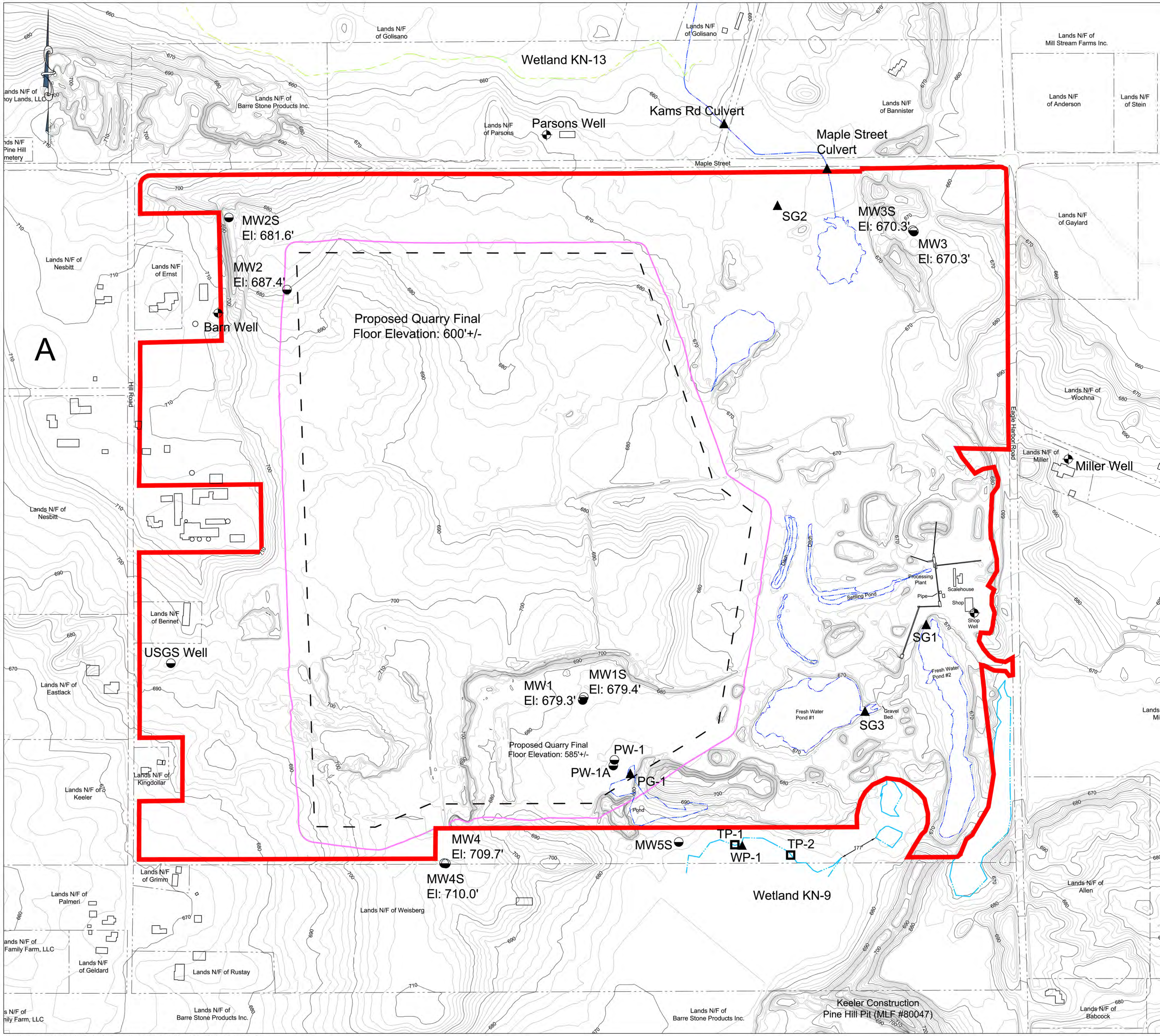
PLATE



LEGEND

- Property Line
- Life of Mine Boundary
- 10' Contour Line
- 2' Contour Line
- Stream/Edge of Water
- Structure
- Paved Road
- Proposed Limit of Bedrock Excavation
- Proposed Top of Stripping Slope
- Delineated Wetland Boundary (KN-9)
- Approximate Wetland Boundary (KN-13)
- Staff Gauge, with ID
- Monitoring Well, with ID and grade (ft AMSL)
- Residential Well, with ID
- Test Pit, with ID

SCALE

200 0 200 400 600 800

NOTES

Base Maps & Background Information

1. Base Map provided by Strategic Mining Solutions, Mining and Reclamation Plan Map.
2. Shallow water table monitoring wells are denoted with an "S" e.g. "MW-1S"

DETAILS

Topographic Survey Date: August 17, 2016
Horizontal Scale: 1" = 200'
Datum: Mean Sea Level
USGS Quad:
Contour Interval: 2 feet

ALPHA GEOSCIENCE
Project # 15139

PLATE 1

SITE MAP WITH
MONITORING LOCATIONS

Eagle Harbor Mine - Eagle Harbor Sand & Gravel, Inc.
Town of Barre, Orleans County, New York

Z:\projects\2015\15121-15140\15139 - Eagle Harbor\15_0 GIS\Data\CAD\Plate 1 Site Map.dwg

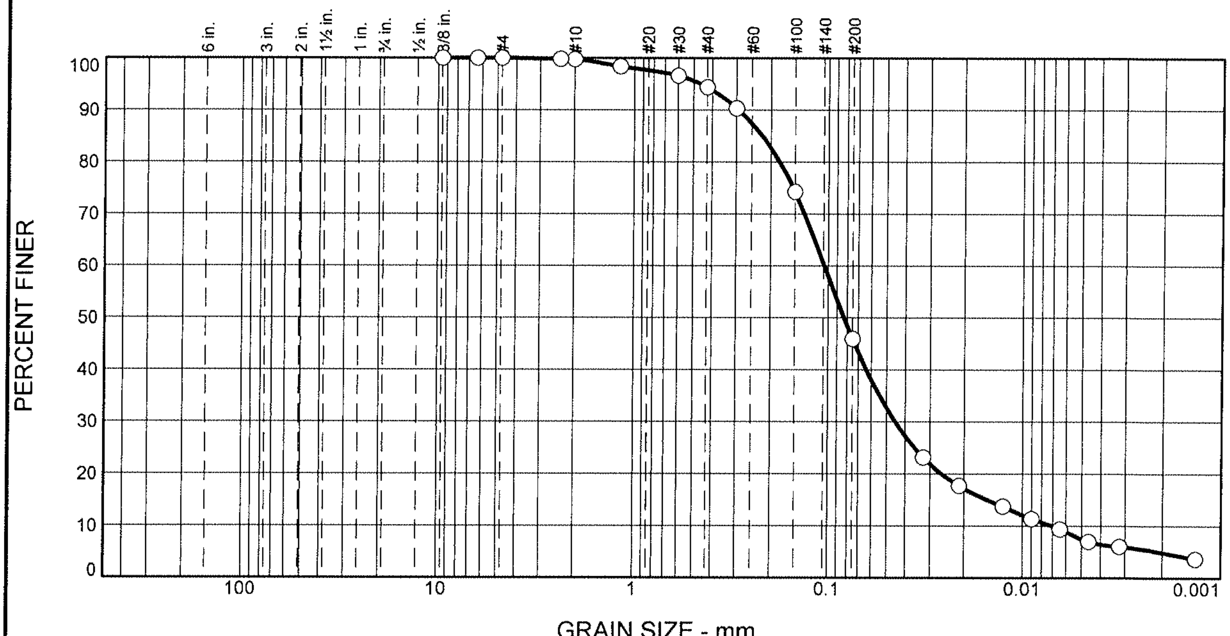
ATTACHMENT A

FRACTURE LOGS

ATLANTIC TESTING LABORATORIES

WBE certified company

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	6	48	39	7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC (X)
.375	100		
.25	100		
#4	100		
#8	100		
#10	100		
#16	98		
#30	97		
#40	94		
#50	90		
#100	74		
#200	46		

* (no specification provided)

Soil Description

TP-2 0.5-1.0

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 0.2218 D_{60}= 0.1051 D_{50}= 0.0831
D_{30}= 0.0452 D_{15}= 0.0151 D_{10}= 0.0071
C_u= 14.82 C_c= 2.74

Classification

USCS= AASHTO=

Remarks

Material delivered by client on 2/7/19
ASTM D 422 with hydrometer

Source of Sample: Project # 15139 **Depth:** N/A
Sample Number: AT2874S03

ATLANTIC TESTING LABORATORIES, LIMITED
Albany, New York

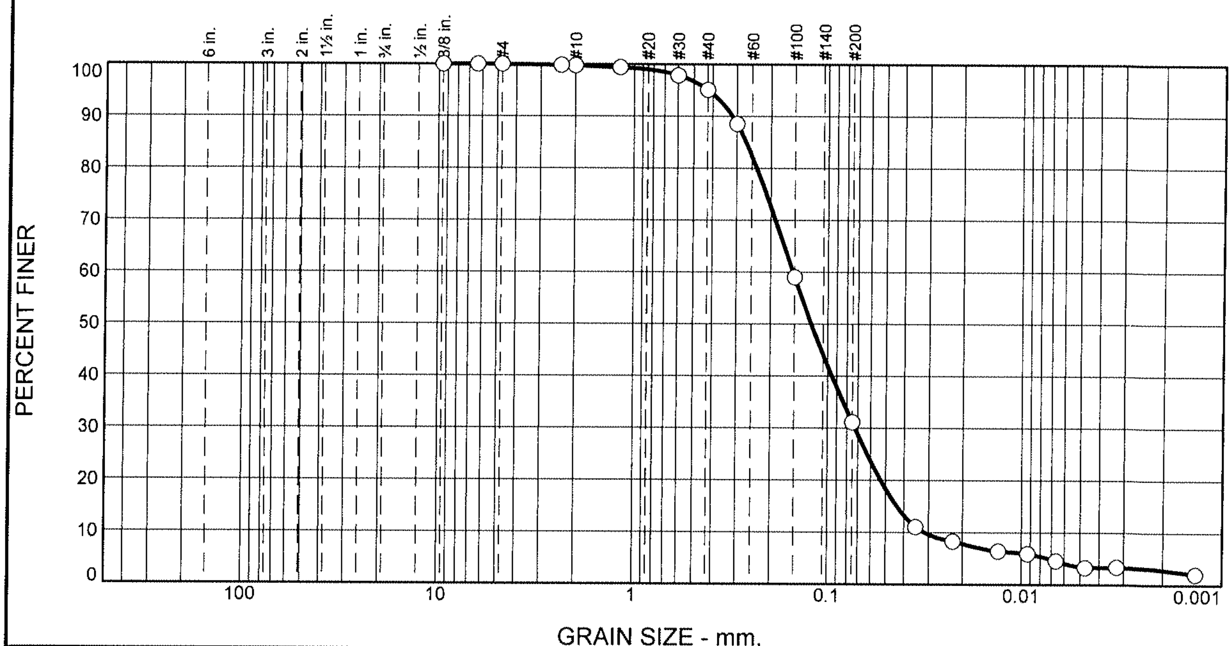
Client: Alpha Geoscience
Project: Laboratory Analysis
Report No: AT2874SL-03-02-19 **Date:** 2/14/19

Tested by: RL Date: 2/11/19
Reviewed by: RF Date: 2/14/19

ATLANTIC TESTING LABORATORIES

WBE certified company

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	5	64	28	3

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC (X)
.375	100		
.25	100		
#4	100		
#8	100		
#10	100		
#16	99		
#30	98		
#40	95		
#50	88		
#100	59		
#200	31		

* (no specification provided)

Soil Description

TP-2 1.5-2.5

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 0.2691 D_{60}= 0.1532 D_{50}= 0.1223
D_{30}= 0.0726 D_{15}= 0.0437 D_{10}= 0.0317
C_u= 4.83 C_c= 1.08

Classification

USCS= AASHTO=

Remarks

Material delivered by client on 2/7/19
ASTM D 422 with hydrometer

Source of Sample: Project # 15139 **Depth:** N/A
Sample Number: AT2874S04

ATLANTIC TESTING LABORATORIES, LIMITED Albany, New York	**Client:** Alpha Geoscience **Project:** Laboratory Analysis **Report No:** AT2874SL-04-02-19 **Date:** 2/14/19

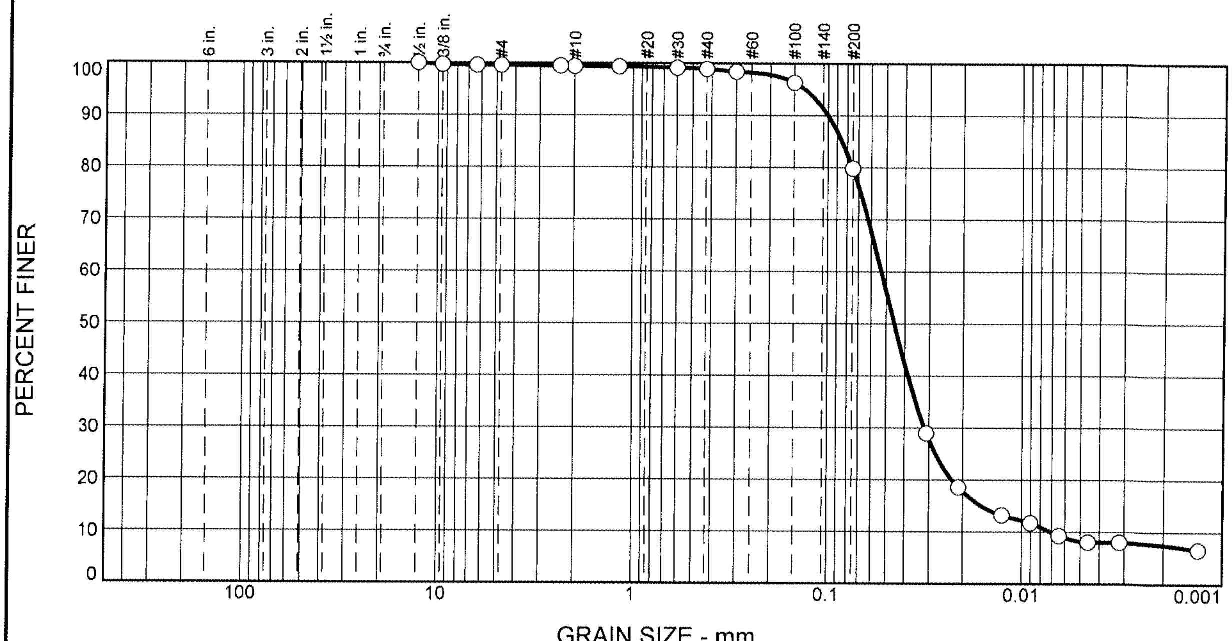
Tested by: RL Date: 2/11/19

Reviewed by: RF Date: 2/14/19

ATLANTIC TESTING LABORATORIES

WBE certified company

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	0	19	72	8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	OUT OF SPEC (X)
.5	100		
.375	100		
.25	100		
#4	100		
#8	99		
#10	99		
#16	99		
#30	99		
#40	99		
#50	98		
#100	96		
#200	80		

* (no specification provided)

Soil Description

TP-2 4-5

Atterberg Limits

PL= --- LL= --- PI= ---

Coefficients

D_{85}= 0.0851 D_{60}= 0.0531 D_{50}= 0.0454
D_{30}= 0.0318 D_{15}= 0.0162 D_{10}= 0.0072
C_u= 7.42 C_c= 2.66

Classification

USCS= AASHTO=

Remarks

Material delivered by client on 2/7/19
ASTM D 422 with hydrometer

Source of Sample: Project # 15139 **Depth:** N/A
Sample Number: AT2874S05

ATLANTIC TESTING LABORATORIES, LIMITED
Albany, New York

Client: Alpha Geoscience
Project: Laboratory Analysis
Report No: AT2874SL-05-02-19 **Date:** 2/14/19

Tested by: RL Date: 2/11/19
Reviewed by: RF Date: 2/14/19

ATTACHMENT B

SOIL TEST RESULTS

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

FRACTURE LOG

Boring ID: MW1-08

Project Number/Name: 15139 - Eagle Harbor | Location: Town of Barre, Orleans County, New York

Drilling Contractor/Personnel: unknown

Geologist/Inspector: Steve Trader | Start/ Finish Date: 1/21/2016

Drilling Equip/Method: unknown | Size/Type of Bit:

Sampling Method: | Well Installed? Yes

Elevation/Ground Surface:

Depth to Ground Water from Ground Surface (Date):

REMARKS: Core has been split down the z-axis to ~94.5' (with samples removed to ~79')

Depth (Ft)	DESCRIPTION
32	
34	
	(Lockport Formation, Goat Island Member)
36	Core starts at 36.5'; driller log reports top of bedrock at 35.9'
38	38 - 38.2': Driller log notes, *"noted 2" drop while coring 38.0 to 38.2', lost all water returns."* Though core has been split, remnants of a potential angular fracture remain in leftover core; interval associated with several small chunks that appear to have occurred during, or been present during, drilling (surfaces have been somewhat smoothed during drilling)
40	39.1': broken section of core, many small fragments along vuggy interval
	40.6': apparent natural break, roughly parallel to bedding; brown to reddish brown mud (possibly from drilling fluids) on irregular surface; with edges of core missing at the break (most of the core breaks are clean and fresh-looking - this one is not)
50	
	54.8': core spin with abraded edges
60	
	(Gasport Member)

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Clifton Park, New York 12065

FRACTURE LOG

Boring ID: MW1-08

Project Number/Name: 15139 - Eagle Harbor

Location: Town of Barre, Orleans Co., NY

Depth (Ft)	DESCRIPTION
70	
	75.2' & 75.4': paper-thin, white to clear mineralization (selenite?) on smooth, carbonaceous surfaces
	79.3'
80	(Decew Member)
90	
	91.9': this selenite / gypsum on break, parallel to bedding
	94.2'
	(Rochester Shale)
100	
	106.7' & 106.9': core spins, with abraded surfaces (unit is very fissile)
110	
	115.2' - 115.3': calcitic tan mud w/ a few tiny pebbles of dolostone (remnant of drilling?)
	TD = 115.9'
120	

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Clifton Park, New York 12065

FRACTURE LOG

Boring ID: MW2-08

Project Number/Name: 15139 - Eagle Harbor

Location: Town of Barre, Orleans County, New York

Drilling Contractor/Personnel: unknown

Geologist/Inspector: Steve Trader

Start/ Finish Date: 1/21/2016

Drilling Equip/Method: unknown

Size/Type of Bit:

Sampling Method:

Well Installed? Yes

Elevation/Ground Surface:

Depth to Ground Water from Ground Surface (Date):

REMARKS: Core has been split down the z-axis to ~87'

Depth (Ft)	DESCRIPTION
	(Lockport Formation, Goat Island Member)
	Core starts at 28.3'; driller log reports top of bedrock at 26.8'
30	30': Angular fracture at 30' w/ calcite mineralization.
	Driller log notes: 28.3' - 32.0', *"lost all water returns."*
32	
34	Unit is stylolitic, with core breaks occasionally on stylolitic partings parallel to bedding
36	
38	
40	
50	
	53.1': possible natural fracture, roughly parallel to bedding; surface has paper-thin, mineralization that is smooth on surface (not calcite); probably gypsum / selenite
60	
	62.3'
	(Gasport Member)
	64.1': similar to possible fracture at 53.1' with remnants of paper-thin mineralization gypsum / selenite coating on stylolitic surface

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679 Plank Road
Clifton Park, New York 12065

FRACTURE LOG

Boring ID: MW2-08

Project Number/Name: 15139 - Eagle Harbor

Location: Town of Barre, Orleans Co., NY

Depth (Ft)	DESCRIPTION
70	
76.1'	(Decew Member)
80	
~84.5	~84.5: Thin (mm-thick) layer of mineralization (selenite?) on possible natural fracture surface; core is broken into 3 sections, each <1" thick, at this interval, whereas the rest of the core above and below is of good quality (typically 2" - 5" sections due to splitting)
86.3'	(Rochester Shale)
90	
93.3'	93.3': Core spin; core spins very uncommon in the MW2-08 core; unit is argillaceous mudstone, fissile, and not dolomitic. No natural fractures.
100	
108	TD = 108'

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Clifton Park, New York 12065

FRACTURE LOG

Boring ID: DH 1-80

Project Number/Name: 15139 - Eagle Harbor

Location: Town of Barre, Orleans County, New York

Drilling Contractor/Personnel: unknown

Geologist/Inspector: Steve Trader

Start/ Finish Date: 1/21/2016

Drilling Equip/Method: unknown

Size/Type of Bit:

Sampling Method:

Well Installed? No

Elevation/Ground Surface: unknown

Depth to Ground Water from Ground Surface (Date): unknown

REMARKS:

Depth (Ft)	DESCRIPTION
	RQD = 0 from 40 - 52'; Top of Rock labeled at 52'; (boulders/cobbles)
42	
44	
46	40.6': apparent natural break, roughly parallel to bedding; brown to reddish brown mud (possibly from drilling) on irregular surface; with edges of core missing at the break (most of the core breaks are clean and fresh-looking - this one is not)
48	
50	
	Top of Bedrock (as noted by driller) 52'
	52.4': parting, with dirt 53.1': irregular core break; weathered
60	
	62': possible natural break; core spin; appears to be an interval missing
	65.5': possible natural break; core spin; appears to be an interval missing
	67.4' & 67.7': irregular breaks along carbonaceous, or stylolitic partings; with white mineralization film on surface
70	
	73.6': core break or irregular surface; white mineralization coating surface
	75.8': core break or irregular surface; white mineralization coating surface
	79.7': white nodules ~0.05' thick; not calcite (celestite?)

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Clifton Park, New York 12065

FRACTURE LOG

Boring ID: DH 1- 80

Project Number/Name: 15139 - Eagle Harbor

Location: Town of Barre, Orleans Co., NY

Depth (Ft)	DESCRIPTION
80	
90	89.9' – 92.5' Core spins, every approximately 0.4' in this fissile interval
	(Rochester Shale ~dolomitic shale - gradational contact)
	Multiple breaks along fissile intervals; occasional core spins; vuggy layers; no natural fractures
100	
	No 'soil partings' encountered
110	
120	
	TD = 122'
130	

ATTACHMENT C

HYDROLOGIC MODELING OF THE PROPOSED

EAGLE HARBOR MINE DISCHARGE (REVISED)

MAY 2019

HYDROLOGIC MODELING OF THE PROPOSED EAGLE HARBOR MINE DISCHARGE (REVISED)

TOWN OF BARRE
ORLEANS COUNTY, NEW YORK

Prepared for

Eagle Harbor Sand & Gravel
4780 Eagle Harbor Road
Albion, New York 14411

Prepared by

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

May 2019

ALPHA GEOSCIENCE

ALPHA GEOSCIENCE

Geology

Hydrology

Remediation

Water Supply#

HYDROLOGIC MODELING OF THE PROPOSED EAGLE HARBOR MINE DISCHARGE (REVISED)

TOWN OF BARRE
ORLEANS COUNTY, NEW YORK

Prepared for:

Eagle Harbor Sand & Gravel
4780 Eagle Harbor Road
Albion, New York 14411

Prepared by:

Alpha Geoscience
679 Plank Road
Clifton Park, New York 12065

May 2019

TABLE OF CONTENTS

1.0 INTRODUCTION

This report was prepared by Alpha Geoscience (Alpha) on behalf of Eagle Harbor Sand & Gravel, Inc. (Eagle Harbor) to present the methods and findings from the hydrologic modeling of the unnamed stream in the Town of Barre, Orleans County, New York (Figure 1). Eagle Harbor proposes to expand the existing sand and gravel mine downward into the bedrock and create a dolostone quarry within the existing life-of-mine. De-watering of the quarry will be necessary to maintain a dry, working floor. The mine discharge will be directed to the existing surface water system. The purpose of the hydrologic model was to assess the potential impact that the proposed mine discharge could have on downstream flooding during various precipitation events.

2.0 BACKGROUND & SETTING

Alpha performed a water budget analysis as part of a hydrogeologic evaluation of the potential impacts of the proposed quarry on the local water resources (Alpha 2018). The water budget analysis indicated the total quantity of water entering the quarry via runoff, direct precipitation, or ground water seepage on an annualized basis would be 275 gpm. This total, average, annual flow rate is based on an average (normal) year of precipitation; consequently, the flow rate will be higher or lower depending on whether the year is wetter or drier than normal. The primary yearly change will be in the natural recharge from the basin. The inflow to the quarry will vary seasonally above and below 275 gpm (0.61 cubic feet per second [cfs], or 0.396 million gallons per day [mgd]), rather than being normalized as represented by the annualized water budget. The model described in this report assesses if the pumping rate of the quarry would exceed the flow capacity of the creek and the culverts during certain hydrologic events. The pumping rate is based on the capacity of the pump(s) installed at the mine sump. It is assumed for this analysis that the pumping system will have the capacity to pump 700 gpm from the sump to keep the quarry floor dry during significant rainfall events, or to quickly remove water that has collected in the mine during an extended shut down.

The unnamed creek originates on the north side of the mine and flows north approximately 2.8 miles to the confluence with Otter Creek. The model described in this report is focused on the approximately 1.7-mile upper portion of the creek from the Maple Street culvert to the NYS Route 31A box culvert (1P and 8P, respectively, on Figure 2). The primary concern within the 1.7-mile reach of the creek are the capacity of the culverts located on the south side of the farm field west of Kams Road (culverts 4P and 5P on Figure 2). The drainage area for the study area is approximately 928 acres (1.45 square miles).

3.0 HYDROLOGIC MODELING METHODS

The computer program HydroCAD 10.0 was used to generate hydrographs for the 24-hour duration, 1-year, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year storm events and the proposed mine discharge. HydroCAD incorporates the methods of the NRCS's TR-20 to generate runoff hydrographs for a given watershed and precipitation event. The TR-20 antecedent moisture condition II (normal) was assumed. The current precipitation data for the project area published by the National Oceanic and Atmospheric Administration (NOAA), Atlas 14, Point Precipitation Frequency Estimates were applied (NOAA, 2018). The precipitation information from the NOAA website indicates 24-hour duration precipitation depths for the drainage basin centroid (43.188876ºN, 78.264092ºW). These data are summarized in the following table.

Storm Return Period (years)	24-Hour Precipitation Depth (inches)
1	1.87
2	2.20
5	2.76
10	3.21
25	3.84
50	4.33
100	4.81

NOAA, 2018 https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html

The watershed has been separated into multiple sub-catchments to model existing drainage conditions and runoff patterns (Table 1 and Figure 2). Generally, areas that drain to ponds or culverts, significant streams, and low-lying wetland areas have been evaluated separately in order to account for available storage capacity and attenuation of peak flows within their respective areas. This resulted in the delineation of 10 sub-catchments upstream of the Route 31A bridge, including the Quarry (model sub-catchment 1SQ), which diverts runoff to a sump, and the processing and scale facility (model sub-catchment 1SM), which diverts runoff to a series of settling ponds (model node 1PM). The ground water seepage, precipitation and runoff collected in the sump will be pumped to a settling pond, where it will be used in processing the sand and gravel. The pond is one of several settling ponds connected by a ditch (see Plate 2 contained in *Hydrogeologic Analysis of the Eagle Harbor Aggregate Mine*). The water ultimately leaves the site after it is discharged to the upstream end of the Maple Street culvert.

Curve number (CN) definitions, time of concentration (Tc) calculations, and catchment boundaries used in the model were determined by a combination of field observations and desktop information, which includes current aerial imagery, hydrologic soil groups (USDA, 2017a), and LiDAR elevation data (NYSITS, 2018). The CN is a function of the hydrologic soil group (Figure 3) and ground cover (Figure 4). The CN is used to determine the portion of precipitation that is available as runoff. An area-weighted, composite CN was estimated for each sub-catchment using hydrologic soils group data from the USDA soil survey (USDA, 2017a) and land cover approximated based on orthoimagery (USDA, 2017b) and the national wetlands inventory map (USFWS, 2010).

The Tc is defined as the time required for runoff to travel from the most hydrologically distant point of the sub-catchment to the point of collection or discharge. The Tc value for each sub-catchment has been determined by summing the travel time for all flow segments within the Tc path, which is calculated based on the type of flow occurring in each segment, segment length and slope, as well as surface and/or channel characteristics. The longest flow path (the Tc path) within each sub-catchment is shown on Figure 3. The flow types identified for the Tc calculations used in this model are limited to Sheet Flow (100-ft maximum segment length), Shallow-Concentrated Flow, and Channel Flow. Specific information on each of the sub-catchments evaluated is provided in the HydroCAD Report in Appendix A.

The ground water seepage into the mine for the model was estimated to be 275 gpm (0.61 cfs). A seepage rate of 275 gpm is similar to the percolation rate estimated for the quarry's recharge area in the water budget analysis (Alpha, 2018). This rate is not expected to change or react quickly during storm event as it takes longer for the precipitation to percolate and move through the ground water system than the duration of the storm event. The mine discharge rate into the settling pond from the proposed quarry sump was assumed constant at 700 gpm. This rate is over 2.5 times the annualized discharge rate from the mine as predicted by the water budget analysis. The pump will cycle on and off to maintain the water level in the mine sump during periods of no runoff. During periods of runoff that exceed the capacity of the pump, the pump will operate at 700 gpm until the water level is pumped down to a level that the pump begins to cycle again. The volume of runoff within the mine resulting from a 100-year precipitation event is approximately 26 acre-feet, based on modelling results.

4.0 RESULTS & CONCLUSIONS

The model output summary report is included in Appendix A. The purpose of the hydrologic model was to assess potential downstream flooding during various precipitation events in combination with the proposed mine discharge. Based on the model output, as summarized in the table below, the contribution of the mine discharge (700 gpm or 1.56 cfs) to the peak inflow to the northeastern wetland area south of Maple Street (model node 1P), is less than 10% for the 24-hour duration, 25-year storm event (3.84") or greater. The outflow of the area upstream of Maple Street, including the mine, is controlled by the series of ponds, the available storage in the wetland area, and the Maple Street culvert.

Summary of Peak Inflow & Outflow to Maple Street Culvert

Storm Return Period (years)	24-Hour Precipitation Depth (inches)	Node 1P Peak Inflow (cfs)	Percent of Inflow from Quarry	Node 1P Peak Outflow (cfs)
1	1.87	4.09	38.1%	1.74
2	2.20	5.72	27.3%	2.86
5	2.76	10.13	15.4%	4.50
10	3.21	14.51	10.8%	5.40
25	3.84	21.50	7.3%	6.35
50	4.33	27.46	5.7%	6.99
100	4.81	36.65	4.3%	7.56

Note: See Appendix A for model output

The culverts on the south end of the farmer's field (model nodes 4P and 5P) and the stream reach through the field (node 5R) are of particular interest. Farmer's Field Culvert #1 is upstream from Culvert #2. Culvert #1 currently consists of a single 16-inch diameter corrugated metal pipe (CMP). Culvert #2 consists of an 18-inch diameter corrugated plastic pipe (CPP). Each culvert is beneath a dirt/gravel access road and there is a ditch between the two access roads. The two access roads elevations (653.82 feet msl) are approximately 2.0 feet above Culvert #1 invert elevation (651.81 ft msl). The model output (Appendix A) indicates that the reach through the field is large enough to convey the peak flow (34 cfs) from the 100-year precipitation event (4.81 inches) without overbanking and flooding the field.

The model results for Culvert #1 using various scenarios are summarized on Table 2. Table 2 shows that, under the current scenario without the mine discharge, overtopping of the access road may occur during the 10-year precipitation event (3.21"), or greater. The addition of the mine discharge increases the maximum flood elevation at Culvert #1 by 0.01 to 0.02 feet during the 10-year precipitation event, or greater, indicating that the increase of the magnitude of flooding resulting from the mine pumping is minimal. Scenarios for reducing the frequency of flooding were evaluated by modifying the 16-inch diameter Culvert #1. The model was run with Culvert #1 replaced with double 18-inch diameter pipes, and then with Culvert #1 replaced with a single 24-inch diameter pipe. Both scenarios assumed that the modified culverts would have the same invert elevation as the existing 16-inch pipe and that the access roads would be raised to 2.2 feet above the invert. The model results for the two modified scenarios (Table 2) indicate that the culvert will convey the runoff without overtopping the access road for all modelled precipitation events; however, the scenario using double 18-inch culverts will result in slightly lower maximum elevations than with a single 24-inch culvert.

The results indicate that the increased magnitude of flooding resulting from mine discharge in addition to precipitation runoff is minimal. Regardless, the frequency of flooding at Culvert #1 can be eliminated by increasing the size of the culvert (whether by two 18-inch pipes, or a single 24-inch pipe).

5.0 LIMITATIONS

This model was prepared using a combination of site-specific survey data pertaining to the locations and pitch of the culverts, remote sensing elevation data, and published reference values common in TR-20. A number of assumptions were made that may affect the model results. Additional model runs and calibration are recommended as more site-specific data and engineering designs, or as-built information, is made available.

6.0 REFERENCES

Alpha Geoscience, November 2018, Hydrogeologic Analysis of the Eagle Harbor Mine.

NOAA 2018. *NOAA Atlas 14 Point Precipitation Frequency Estimates-New York.* (https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html), accessed 7/16/2018.

NYSITS, 2018. *FEMA Bare earth DEM (1-Meter) – Great Lakes Area*. New York Office of Information Technology Services GIS Program Office. Imagery Date: February 4, 2015. Published Date: January 31, 2018.

USDA, 2017a. *Soil Survey Geographic (SSURGO) Database for Orleans County, New York*. U.S. Department of Agriculture, Natural Resources Conservation Service. October 8, 2017.

USDA, 2017b. *Digital Ortho Mosaic – Orleans County, New York.* U.S. Department of Agriculture, Aerial Photography Field Office. Image date: September 11-16, 2017.

USFWS, 2010. *National Wetlands Inventory Maps.* U.S. Fish and Wildlife Service. October 1, 2010.

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TABLES

TABLE 1
Summary of HydroCAD Nodes
Eagle Harbor Hydrologic Model
Town of Barre, New York

Node	Type	Routing	Description
1SQ (Quarry)	Subbasin	1MP	Proposed quarry. Surface runoff and ground water seepage is diverted to a sump. The sump is pumped to settling pond 1P.
1SM	Subbasin	1MP	Mine area, including processing plant, scales, and office. Surface runoff is diverted to settling pond 1P.
1MP (Settling Pond)	Pond/ Culvert	1P	Settling pond for mine discharge and processing area runoff. Outlet assumed to be a 18" culvert.
1S	Subbasin	1P	Catchment south of Maple Street. Surface runoff is towards shallow ponded and wetland area northeast of mine.
1P (Maple Street culvert)	Pond/ Culvert	2R	Shallow ponded and wetland area northeast of mine that is the headwaters for the creek. Modeled as a pond with outlet via Maple Street culvert.
2S	Subbasin	2R	Catchment area between Maple Street and Kams Road culverts
2R	Reach	2P	Stream reach between Maple Street and Kams Road culverts
2P (Kams Road culvert)	Culvert	4R	Kams Road culvert
3S	Subbasin	3RT	Catchment area north of Maple Road and east of Eagle Harbor Road
3RT	Reach	3P	Tributary reach east of Eagle Harbor Road to Kams Road
3P	Culvert	5RT	Eagle Harbor Road culvert for tributary reach
5RT	Reach	6R	Tributary reach west of Eagle Harbor Road
4S	Subbasin	4R	Catchment area west of Kams Road and south of farmer's field
4R	Reach	4P	Stream reach between Kams Road culvert and farmer's field
4P (Farmer's Field #1)	Pond/ Culvert	5P	Wetland area between Kams Road culvert and farmer's field. Modeled as a pond with outlet via the first of two culverts (Culvert #1) south of the farmer's field. The current configuration includes a single 18-inch pipe. Double 18-inch and single 24-inch pipe scenarios were modelled to evaluate th e potential for reducing flood frequency.
5P (Farmer's Field #2)	Culvert	5R	Second of two culverts (Culvert #2) south of the farmer's field
5S	Subbasin	5R	Catchment area on south end of farmers field
5R	Reach	6R	Stream reach through south end of farmer's field
5RT	Reach	6R	Tributary reach between Eagle Harbor Road and main stream
6S	Subbasin	6R	Catchment area on north end of farmer's field
6R	Reach	8R	Stream reach through north end of farmer's field
7S	Subbasin	6R	Catchment area west of farmer's field. Includes large wooded marsh area.
8S	Subbasin	8R	Catchment area on north end of modeled area.
8R	Reach	8P	Stream reach between farmer's field and Route 31A.
8P (Rte. 31A Bridge)	Culvert	9R	Route 31A bridge 6'Hx 7'W box culvert
9R	Reach	--	Stream reach north of Route 31A.

Notes:
-Routing diagram is shown on Figure 2.
-See Appendix A for node details.

TABLE 2

Summary of Model Results for Farmer's Field Culvert #1 (Node 4P)

Eagle Harbor Hydrologic Model

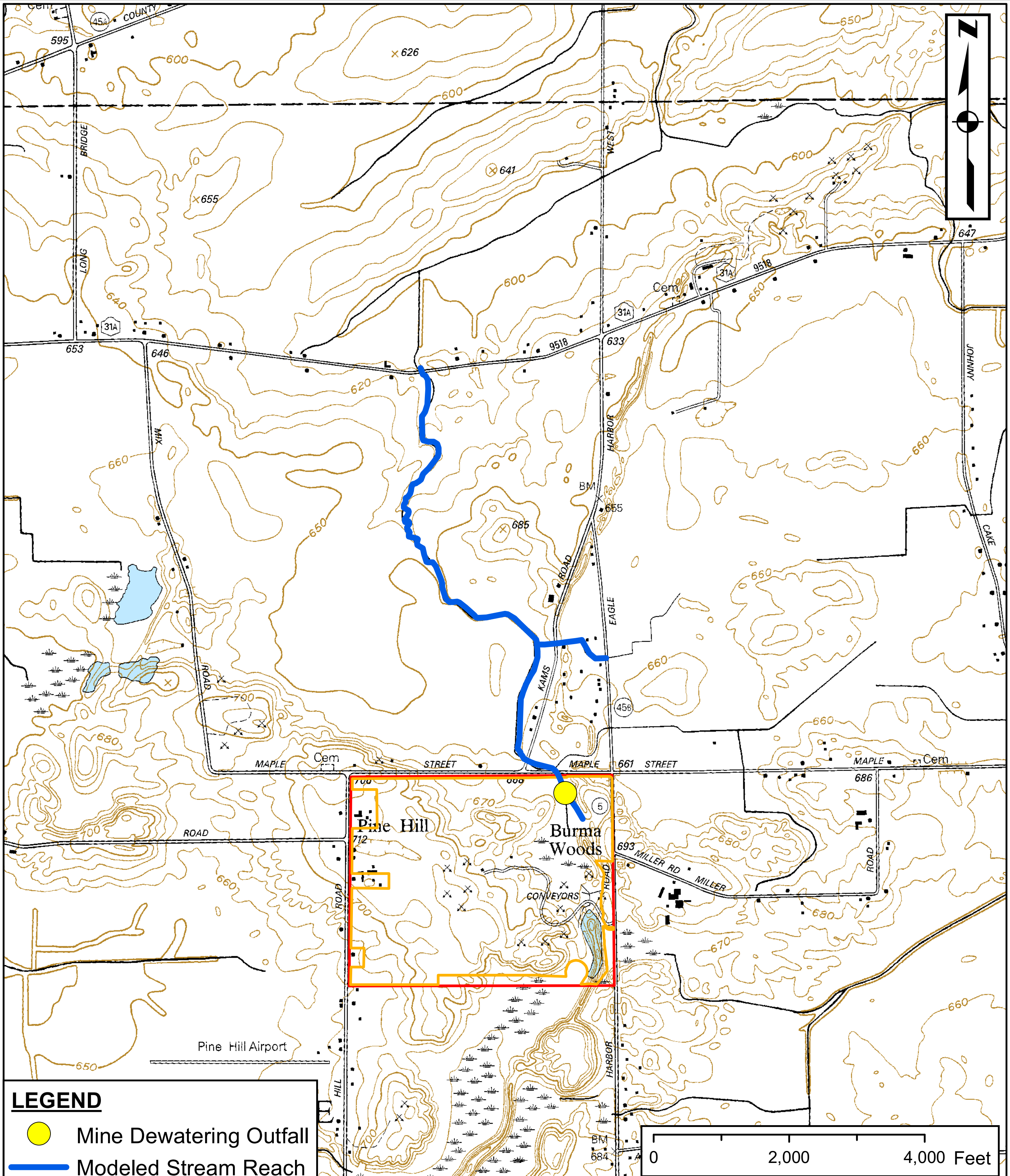
Town of Barre, New York

Storm Return Period (years)	24-Hour Precipitation Depth (inches)	Current Scenerio (16" CMP, no Mine Discharge		Current Scenerio (16" CMP, with Mine Discharge		Modified Culvert Scenario 1 (dual 18" pipe)		Modified Culvert Scenario 2 (24" pipe)	
		Outlow (cfs)	Maximum Elevation	Outlow (cfs)	Maximum Elevation	Outlow (cfs)	Maximum Elevation	Outlow (cfs)	Maximum Elevation
1	1.87	2.04	652.86	2.82	653.08	2.97	652.66	2.93	652.88
2	2.2	3.09	653.16	3.66	653.33	4.03	652.80	3.94	653.06
5	2.76	4.36	653.64	4.76	653.73	5.83	653.02	5.44	653.29
10	3.21	5.85	653.84	6.30	653.85	7.48	653.25	6.48	653.44
25	3.84	7.50	653.87	7.65	653.88	8.90	653.63	7.76	653.70
50	4.33	9.08	653.91	9.37	653.92	9.72	653.91	8.59	653.97
100	4.81	12.66	653.95	13.13	653.96	10.16	654.17	9.26	654.22

Notes:

- The current culvert scenario includes a single 16-inch corrugated metal pipe. The access road is approximately 2.0' above the pipe inlet invert.
- The modified culvert scenarios include either a double 18-inch diameter pipe or a single 24-inch diameter pipe and a driveway elevaton 2.5 feet above the inlet invert.
- Shaded cells indicate flooding (ie maximum elevation is greater than the elevation of the access road.)
- The inlet invert elevation for all scenarios is 651.81 feet msl, based on the FEMA DEMs (NYSITS, 2018).

FIGURES



LEGEND

- Mine Dewatering Outfall
- Modeled Stream Reach
- Property Boundary
- Life of Mine Boundary

Source:
-NYSDOT 7.5-minute topographic map (Kowlesville and Albion quadrangles).
-Elevations are shown in feet above mean sea level.
-Contour interval is 10 feet.

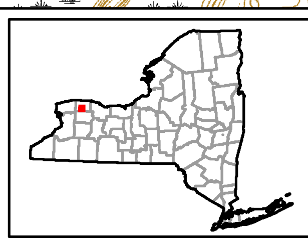


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FIGURE 1
Site Location Map

Hydrologic Evaluation
Eagle Harbor Sand & Gravel Mine
Town of Barre
Orleans County, New York

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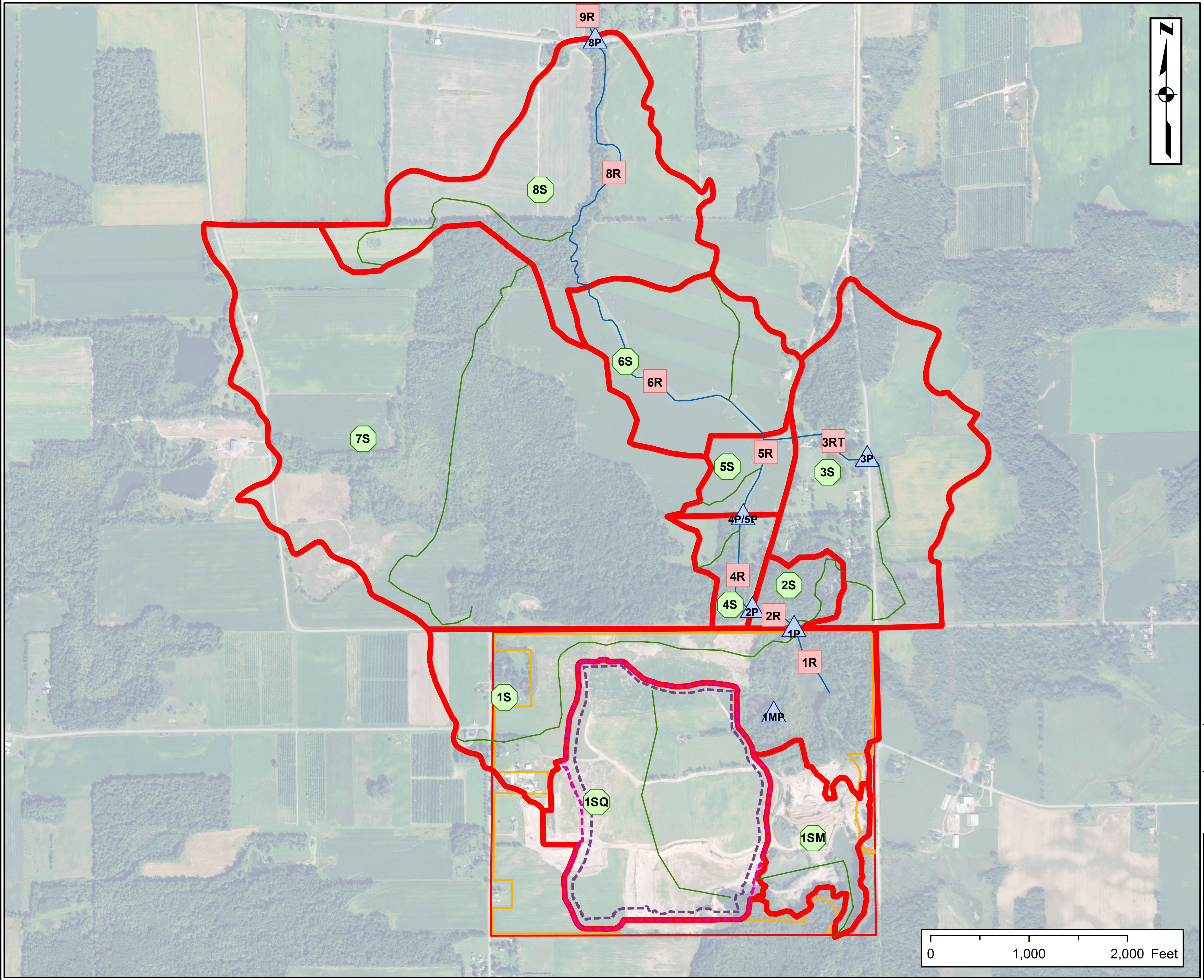

LEGEND

- Culvert or Pond
- Subbasin Longest Flow Path
- Modeled Reach
- Model Subbasin
- Property Boundary
- Life of Mine Boundary
- Proposed Quarry Floor
- Proposed Quarry Top of Berm

Notes:
- Orleans County 2017 natural color orthoimagery, U.S. Department of Agriculture, Aerial Photography Field Office (http//www.apfo.usda.gov). Image Date: 9/11-16/2017.
- Soil Survey Geographic (SSURGO) database for Orleans County New York, U.S. Department of Agriculture, Natural Resources Conservation Service and modified by Alpha Geoscience.

ALPHA GEOSCIENCE

Proj. No. 15139

FIGURE 2

Modeled Catch Basin and Sub-Basins

Hydrologic Evaluation
Eagle Harbor Sand & Gravel Mine
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\EH_Drainage_Basin_Map_11x17.mxd
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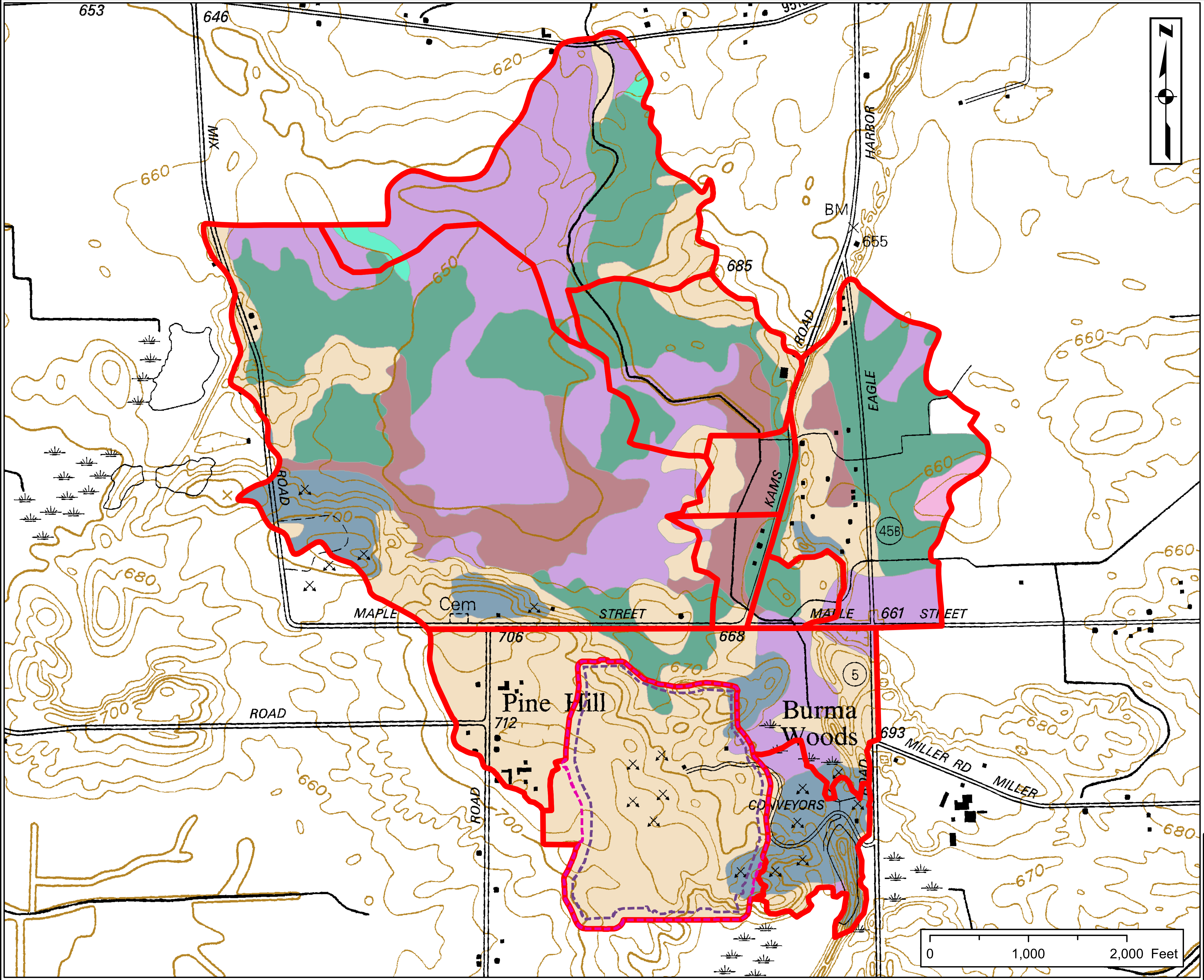

LEGEND

- Proposed Quarry Floor
- Proposed Quarry Top of Berm
- Model Subbasin

Hydrologic Soil Group

- A
- A/D
- B
- B/D
- C
- C/D
- Unassigned

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils arenot protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes. For the model, dual class, mined land and unassigned soils were assigned to Group "D."

Notes:
- Soil Survey Geographic (SSURGO) database for Orleans County New York, U.S. Department of Agriculture, Natural Resources Conservation Service and modified by Alpha Geoscience.
- NYSDOT 7.5-minute topographic map (Kowlesville and Albion quadrangles).
- Contours based on FEMA Bare earth DEM (1-Meter) – Great Lakes Area.
- Contour interval is 10 feet.

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FIGURE 3

Hydrologic Soil Groups

Hydrologic Evaluation
Eagle Harbor Sand & Gravel Mine
Town of Barre
Orleans County, New York

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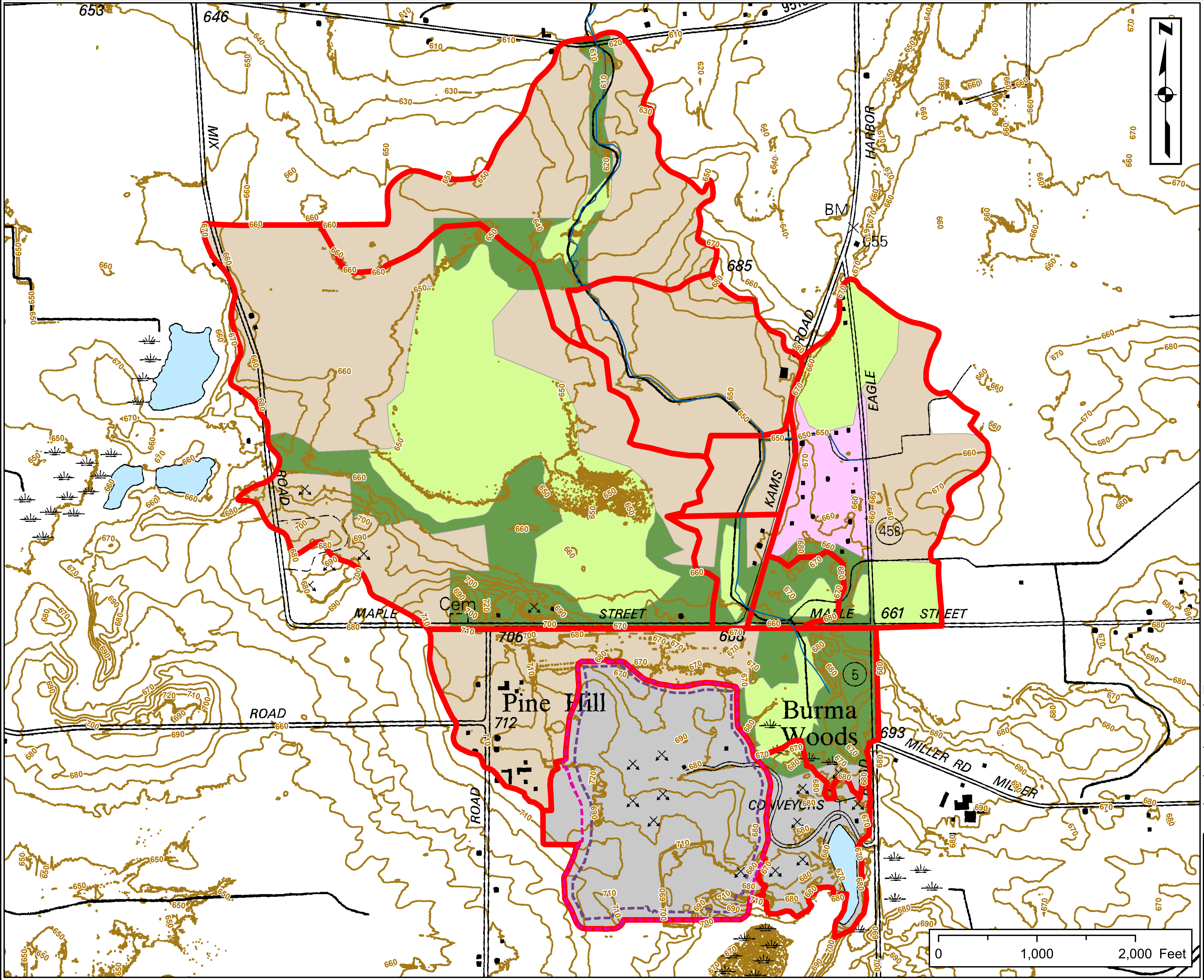

LEGEND

- Modeled Reach
- Proposed Quarry Floor
- Proposed Quarry Top of Berm
- Model Subbasin
- Forest
- Forested Wetland
- Mined Land
- Row Crops
- Residential

Notes:
- -Land use based on Orleans County natural color orthoimagery, U.S. Department of Agriculture, Aerial Photography Field Office. Image Date: 9/11-16/2017.
- -Forested wetlands based on US Fish & Wildlife National Wetlands Inventory Maps.
- -NYSDOT 7.5-minute topographic map (Kowlesville and Albion quadrangles).
- -Contours based on FEMA Bare earth DEM (1-Meter) – Great Lakes Area. Contour interval is 10 feet.

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FIGURE 4

Land Cover Map

Hydrologic Evaluation
Eagle Harbor Sand & Gravel Mine
Town of Barre
Orleans County, New York

Path: Z:\projects\2015\15121 - 15140\15139 - Eagle Harbor\15_0 GIS\EH_Land Cover_Map_11x17.mxd
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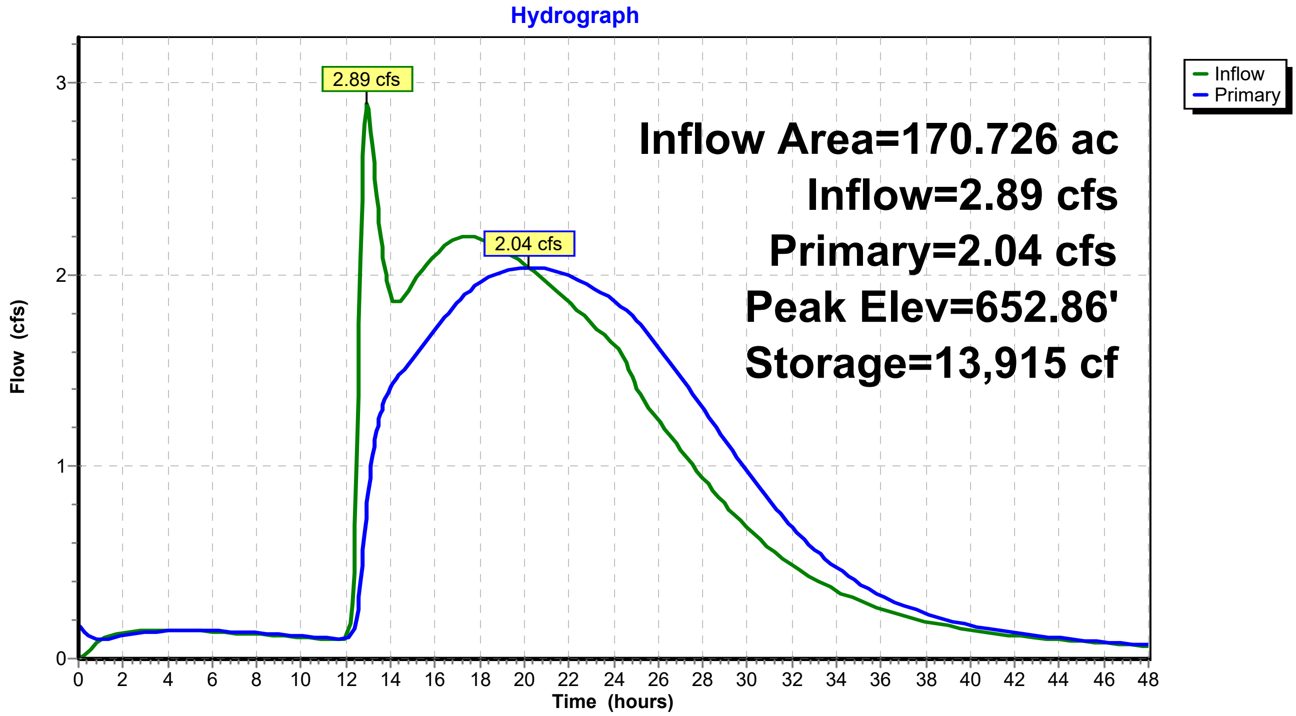
APPENDIX A
HydroCAD Model Output Summary Report

Project Notes

CarlsonStageIncrement|1.0000|

Pond 4P: Farmer's Field #1



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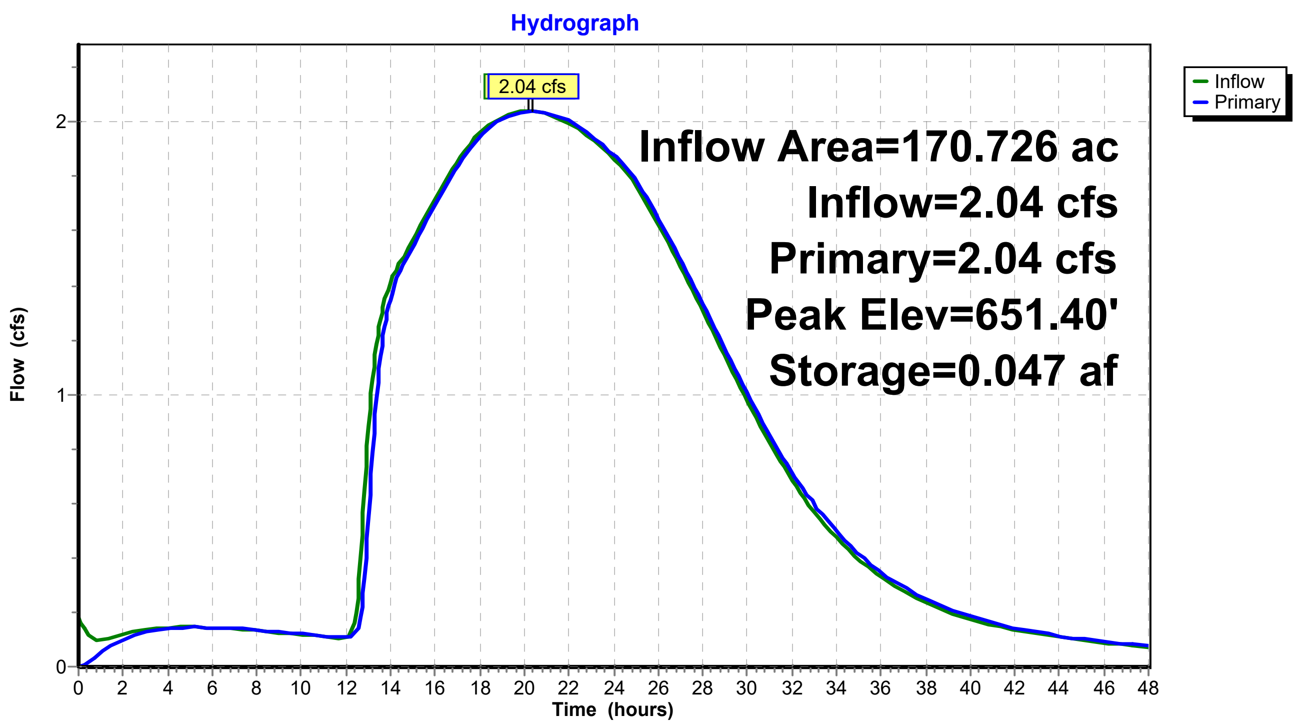

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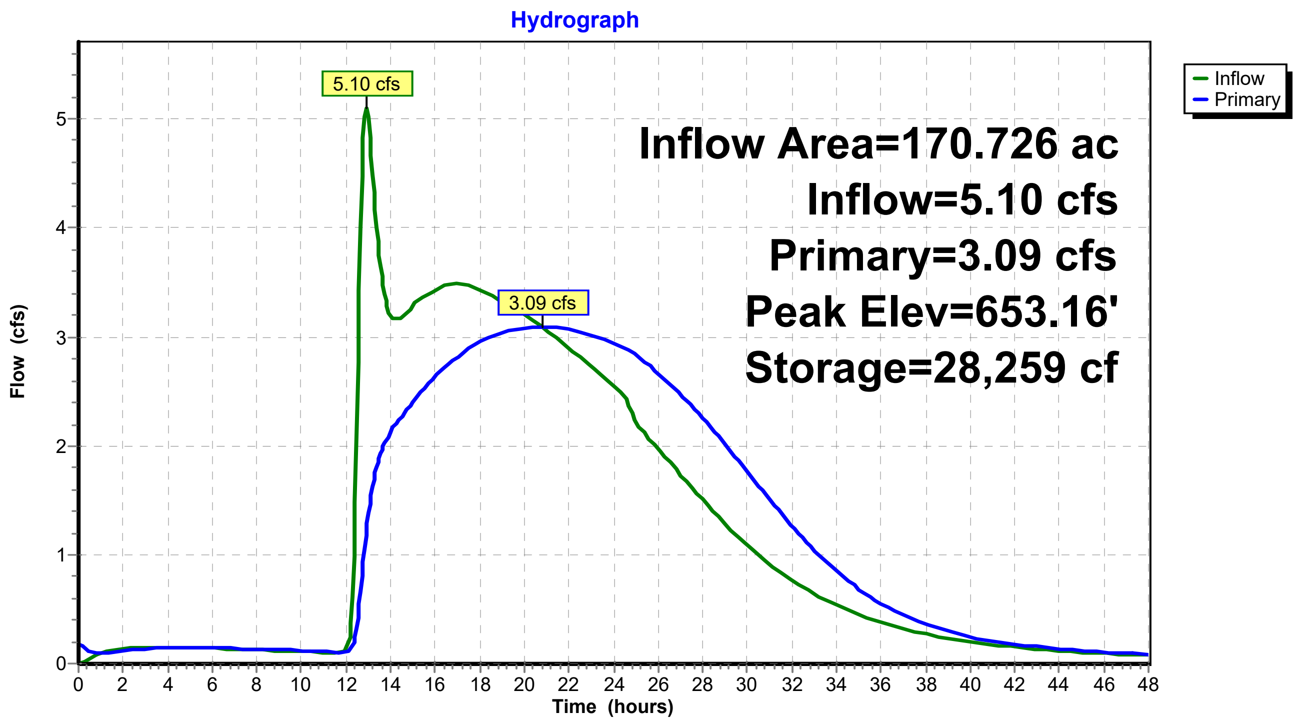

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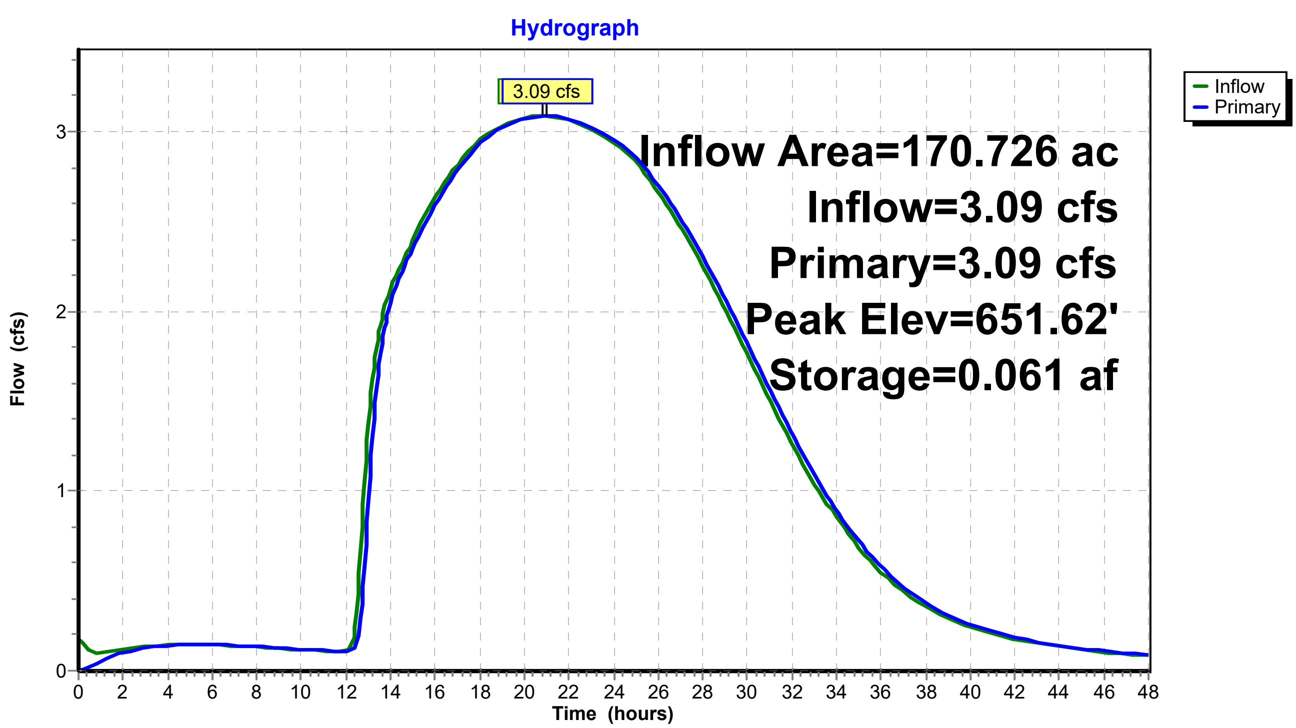

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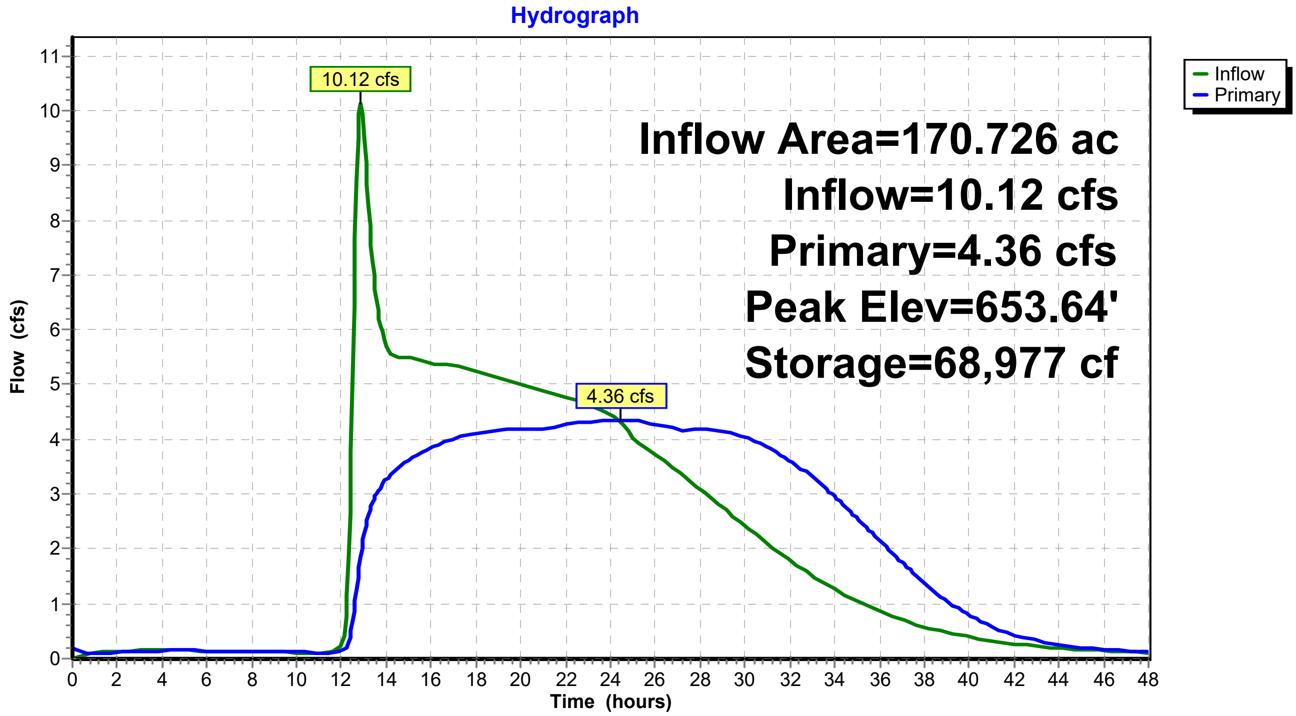

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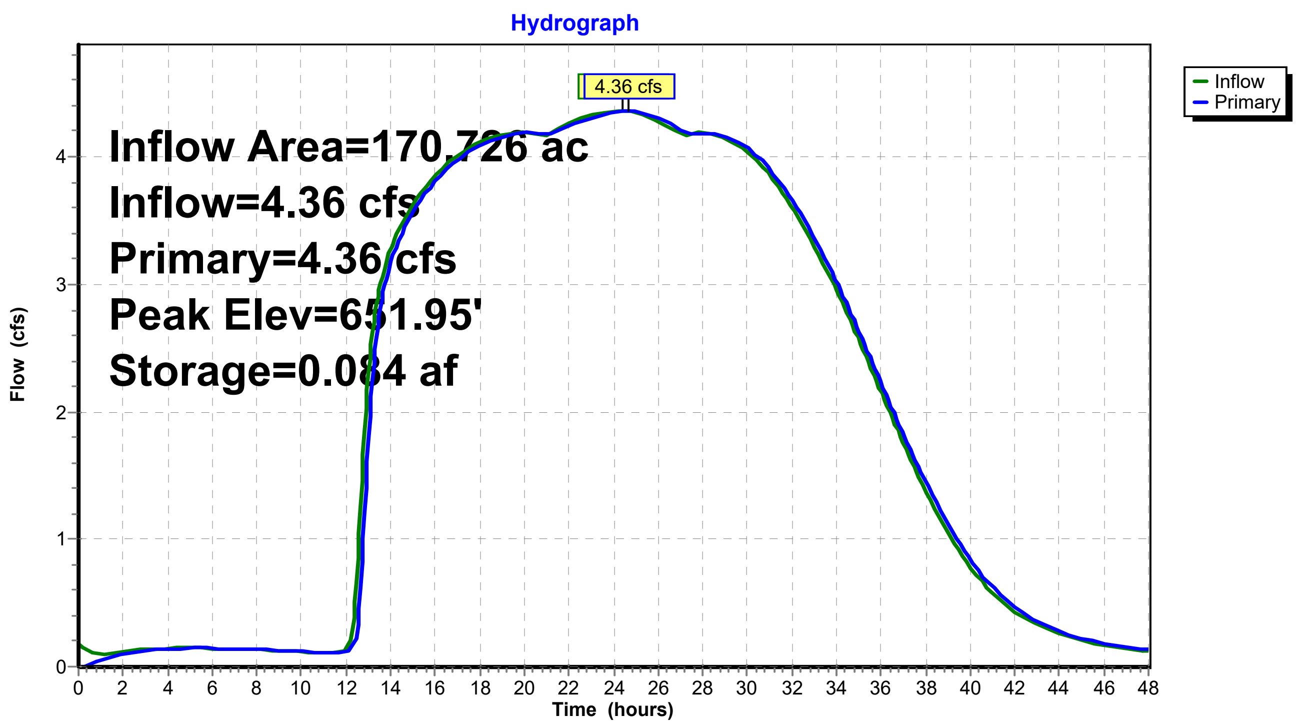

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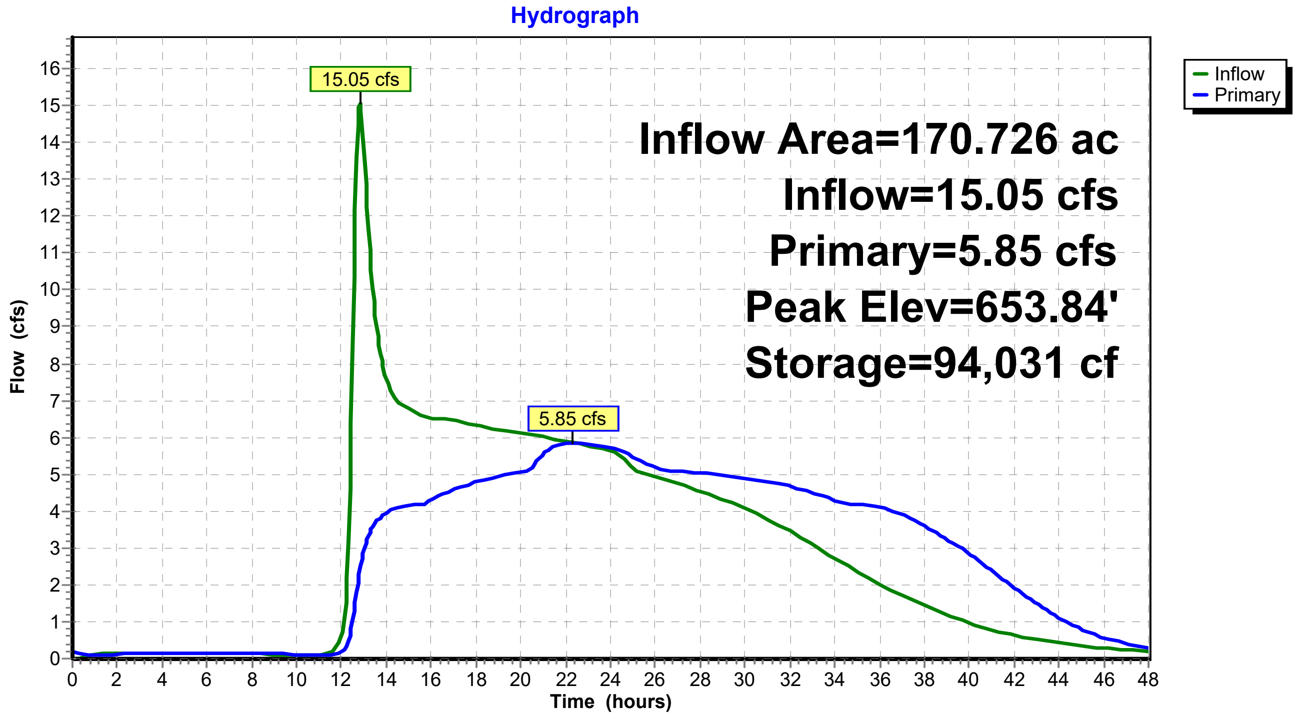

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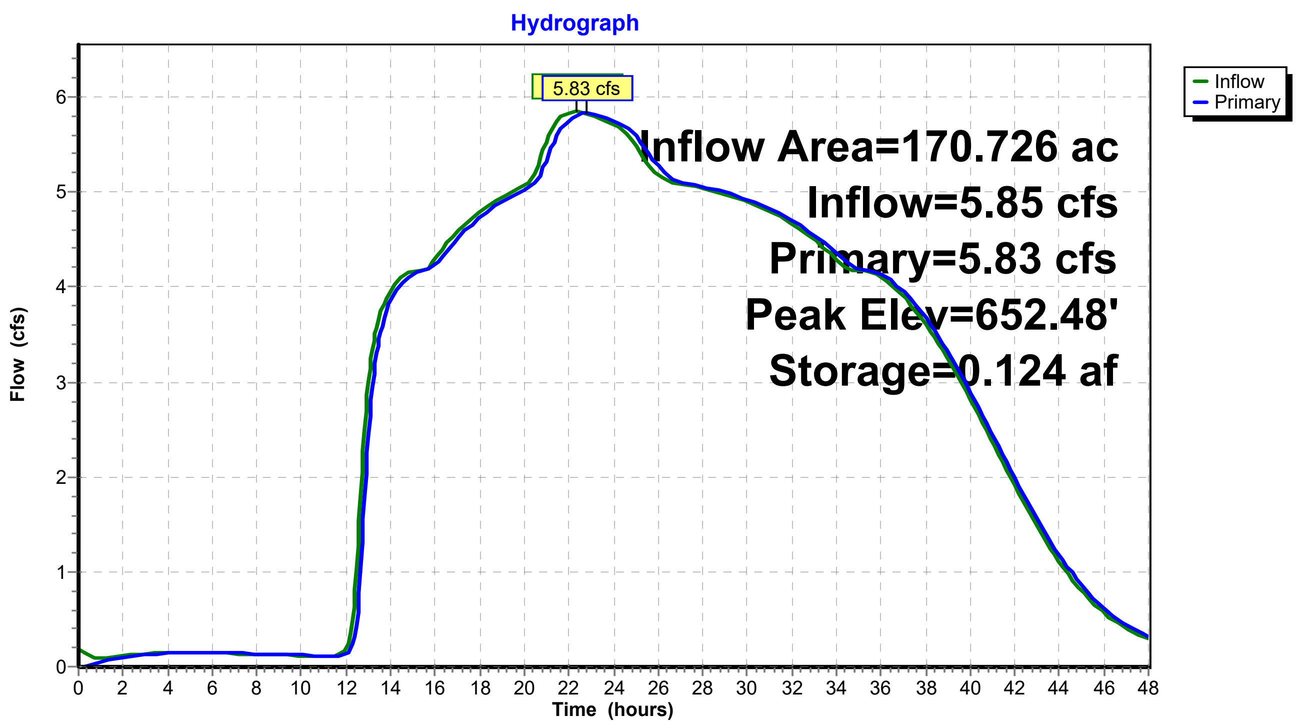

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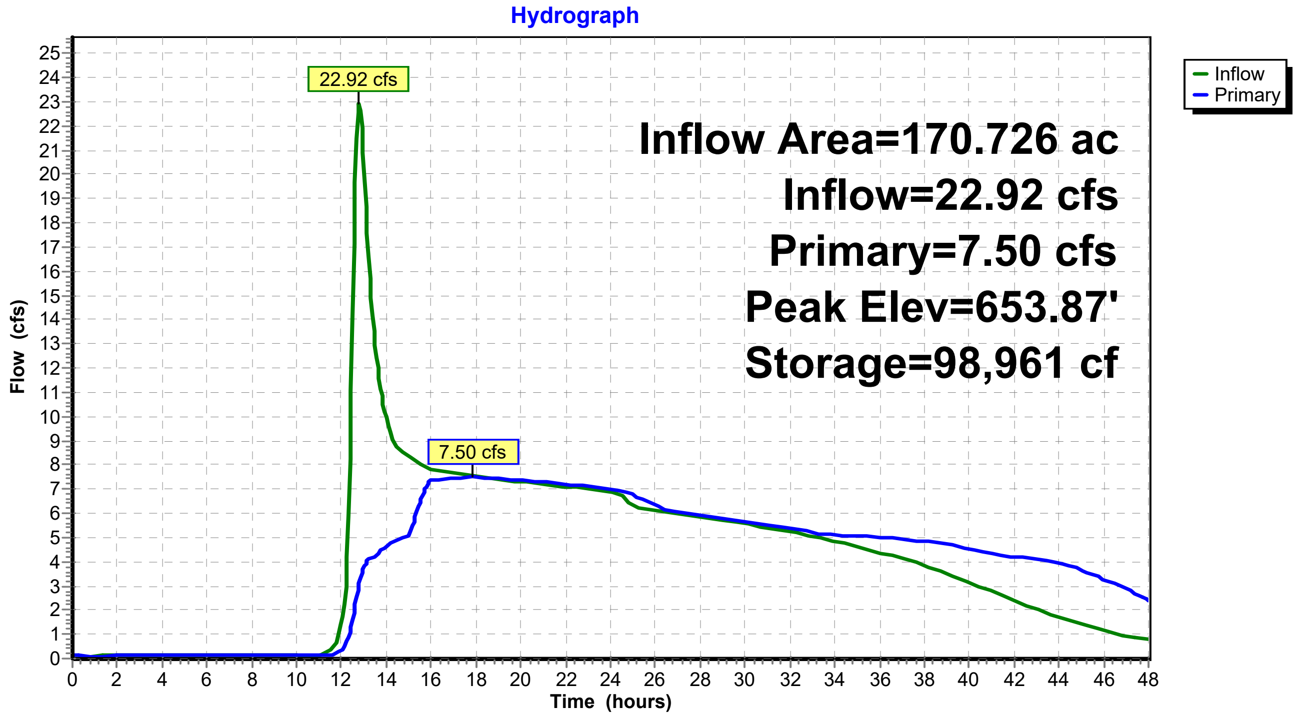

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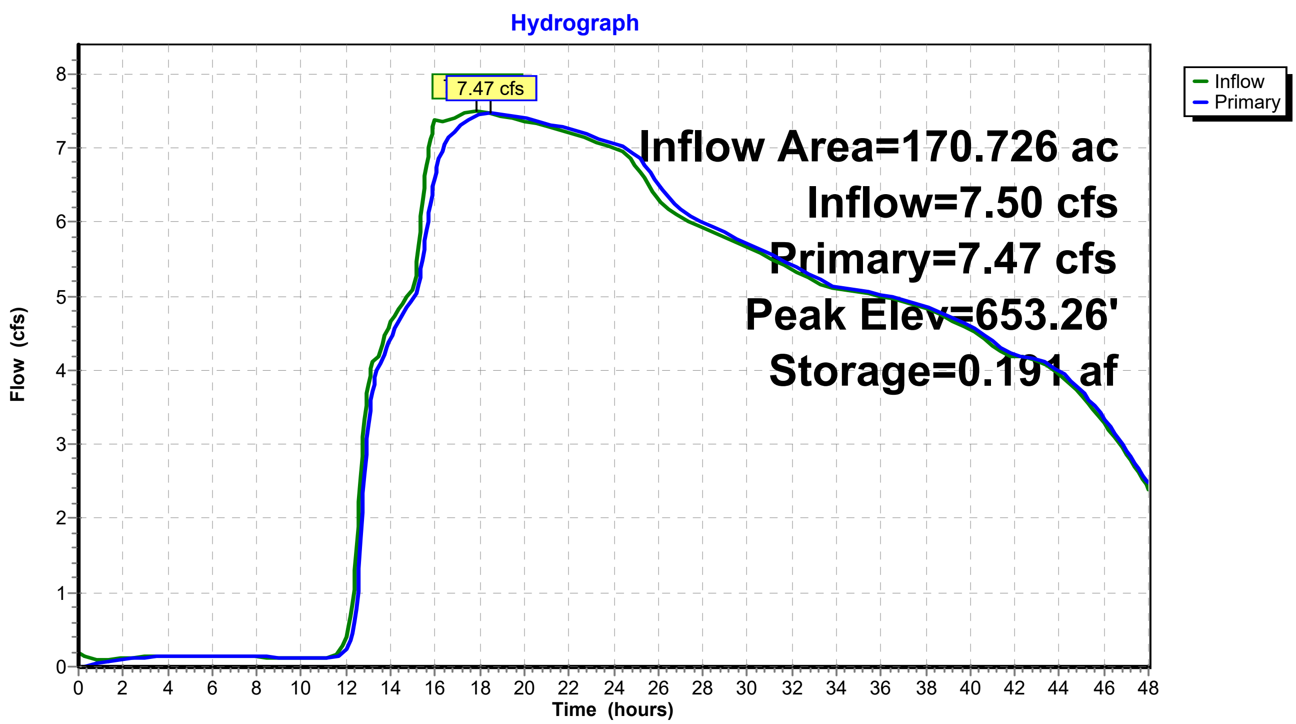

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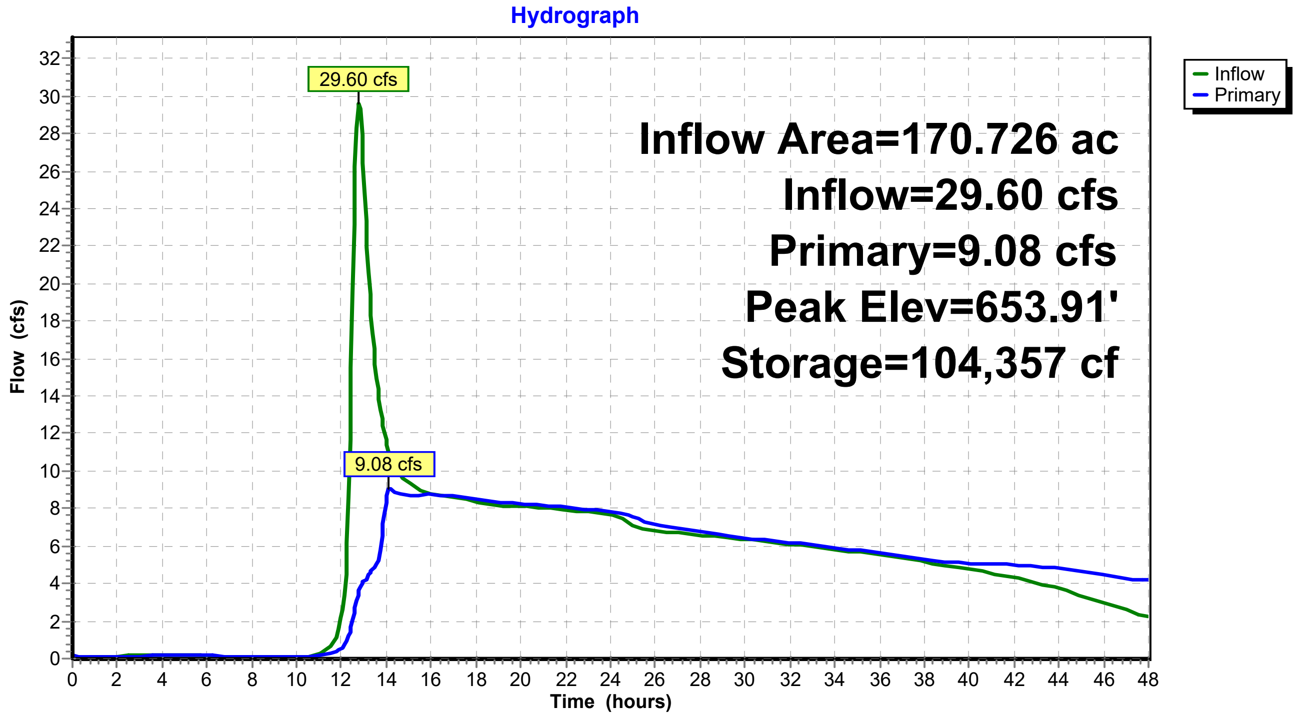

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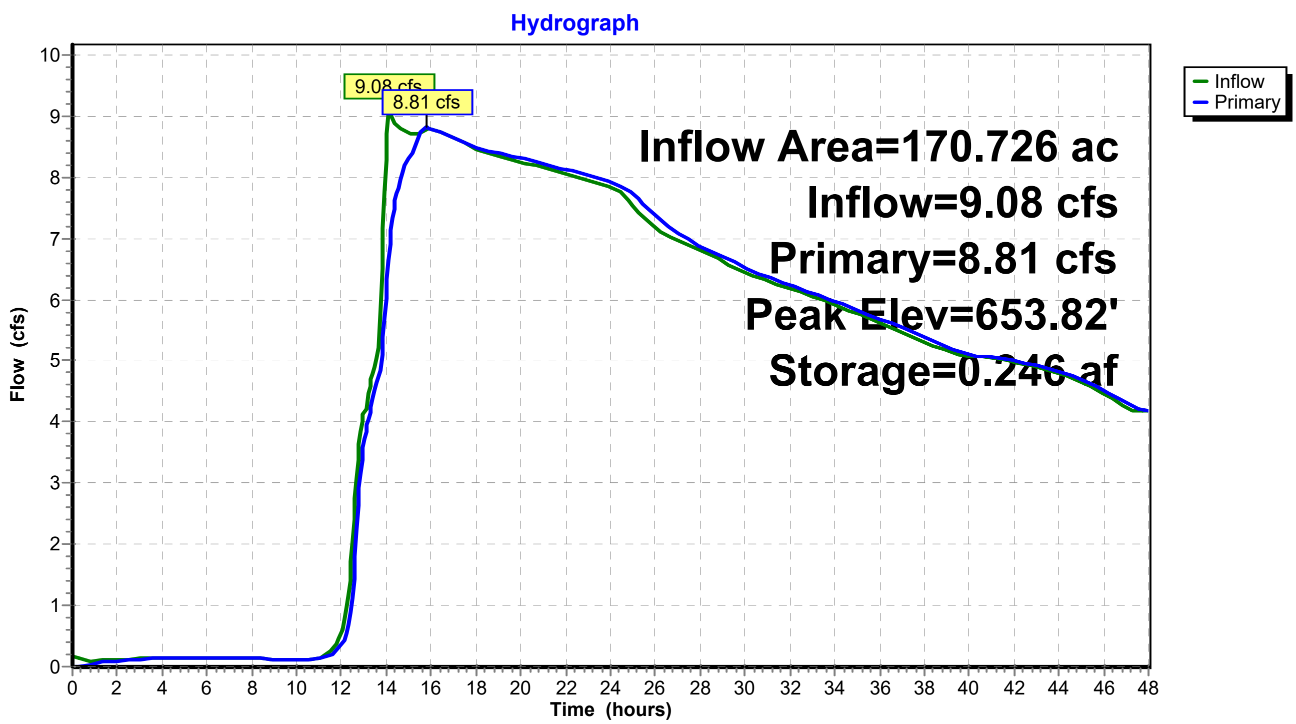

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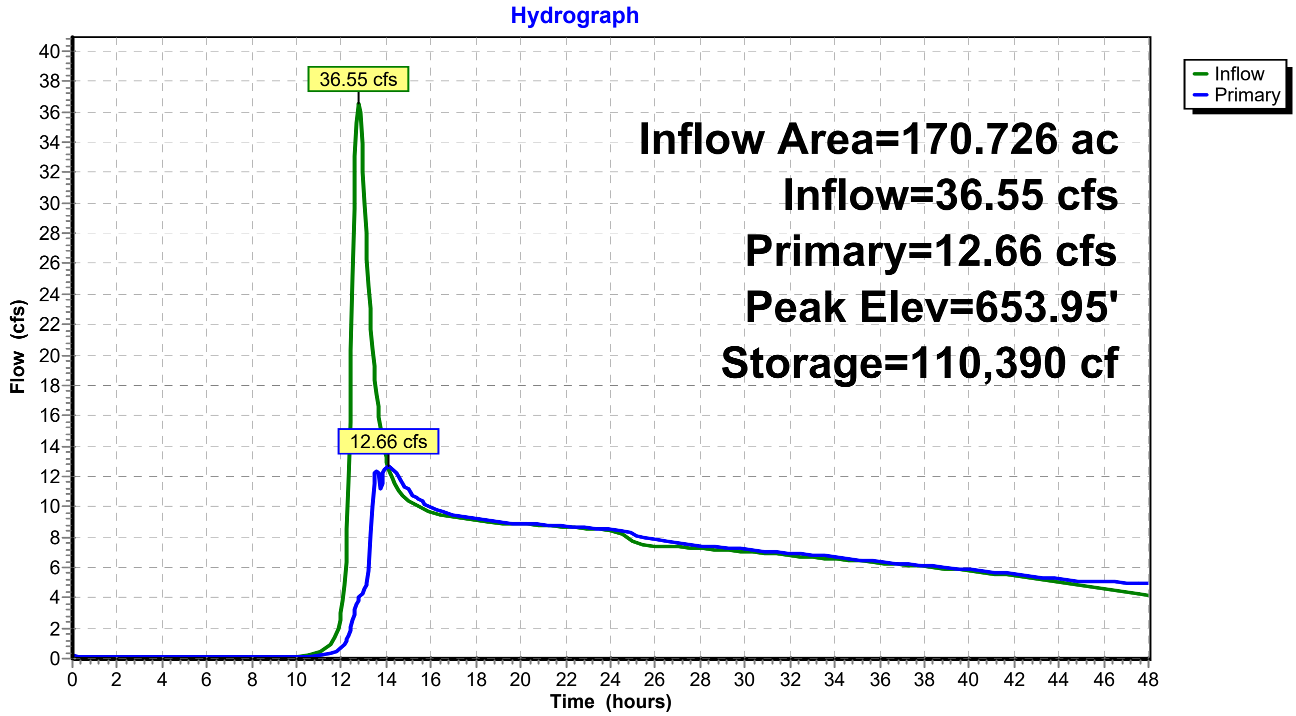

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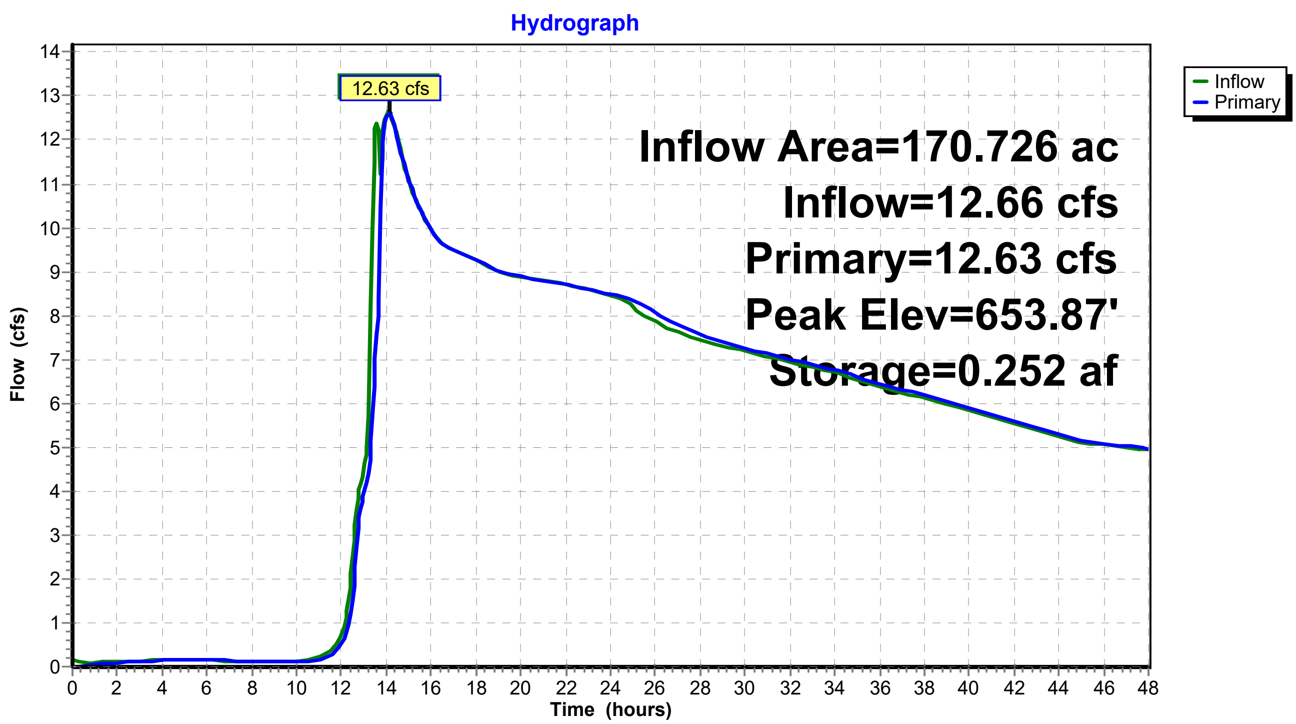
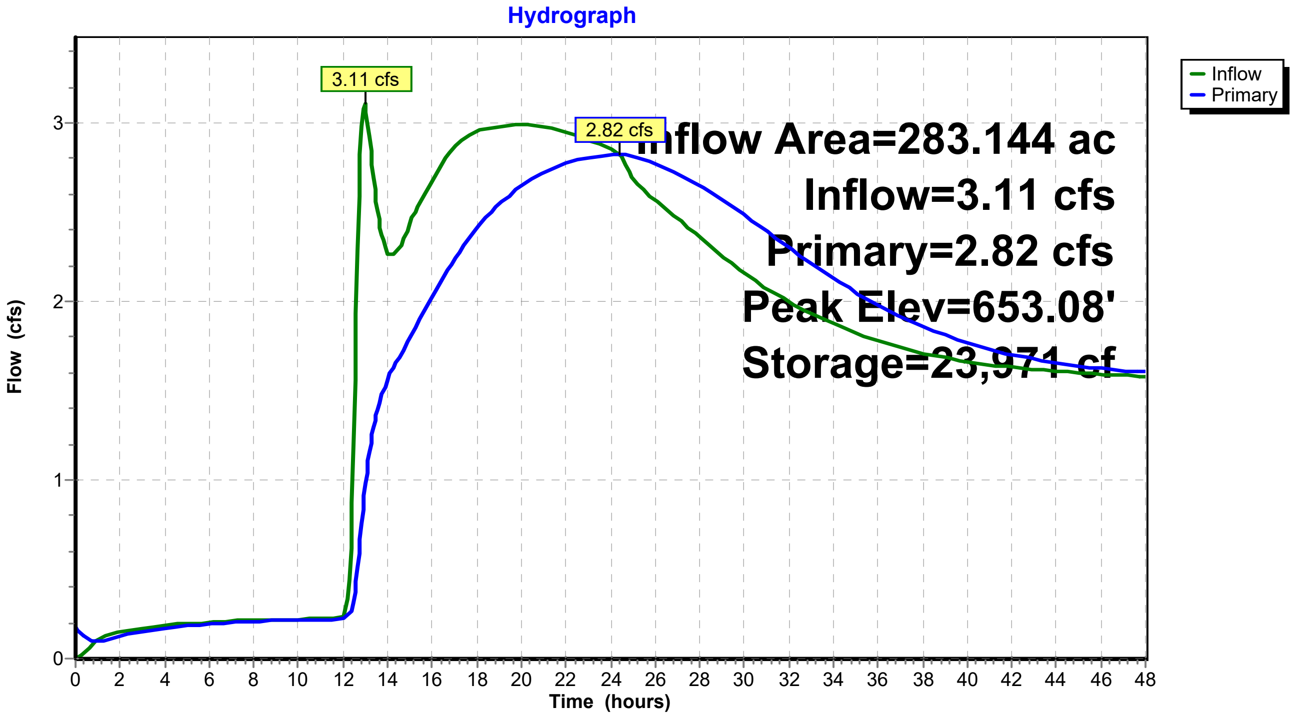


Project Notes

CarlsonStageIncrement|1.0000|

Pond 4P: Farmer's Field #1



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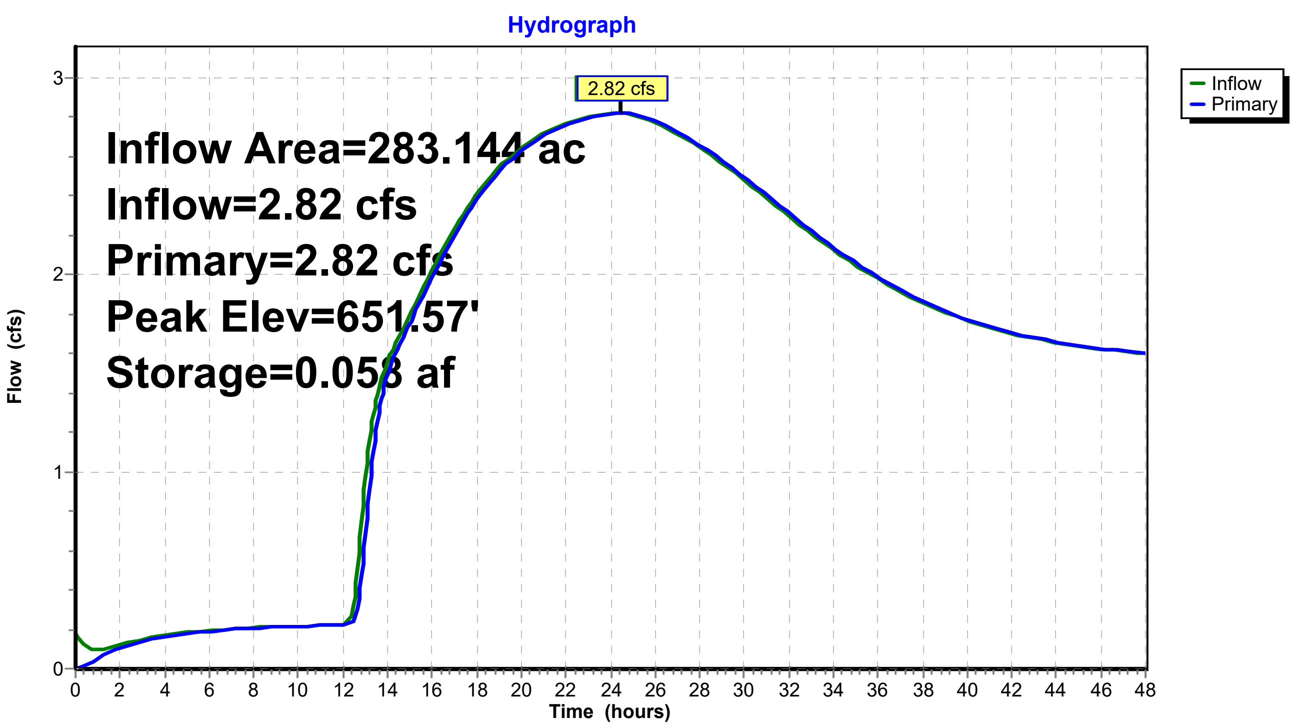

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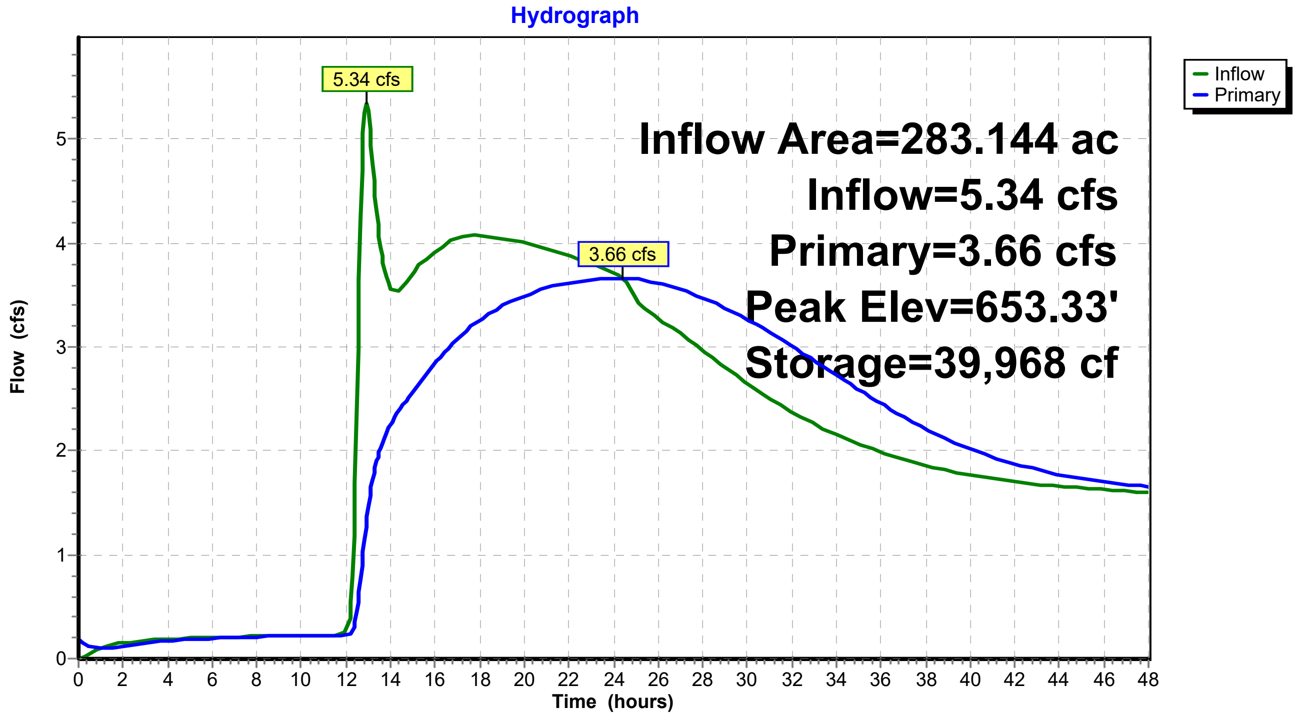

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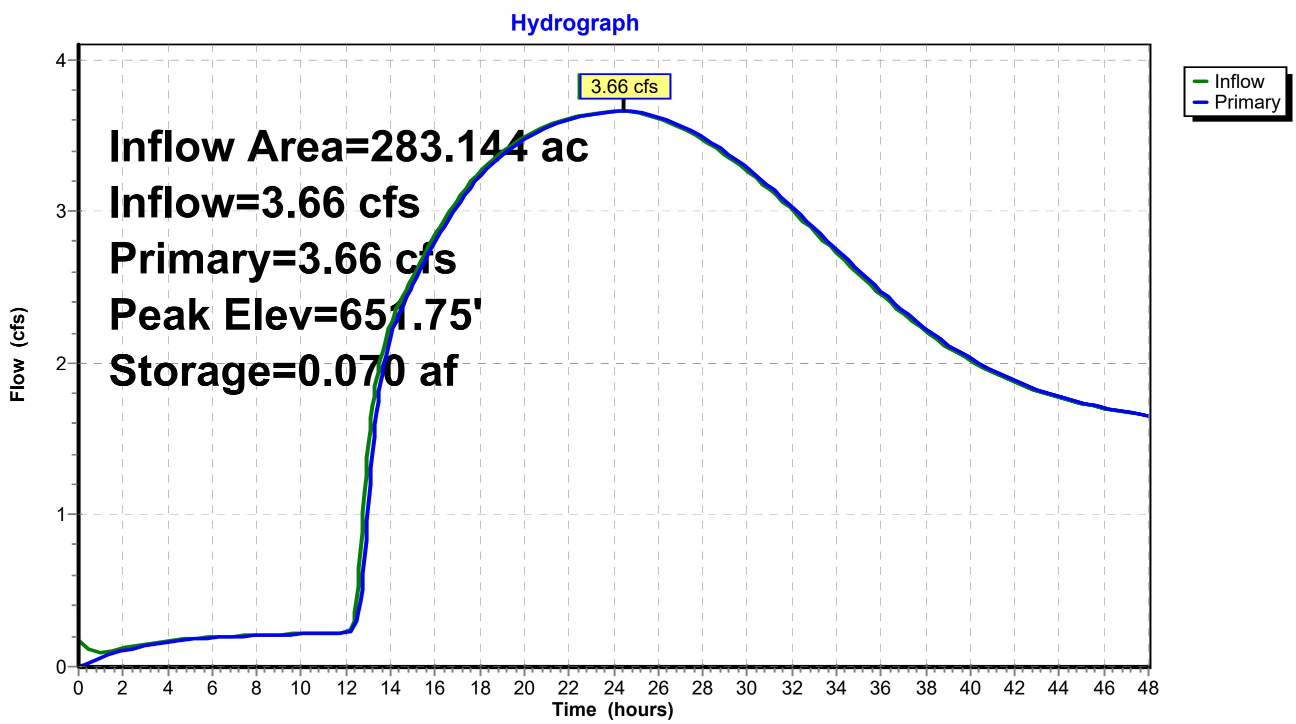

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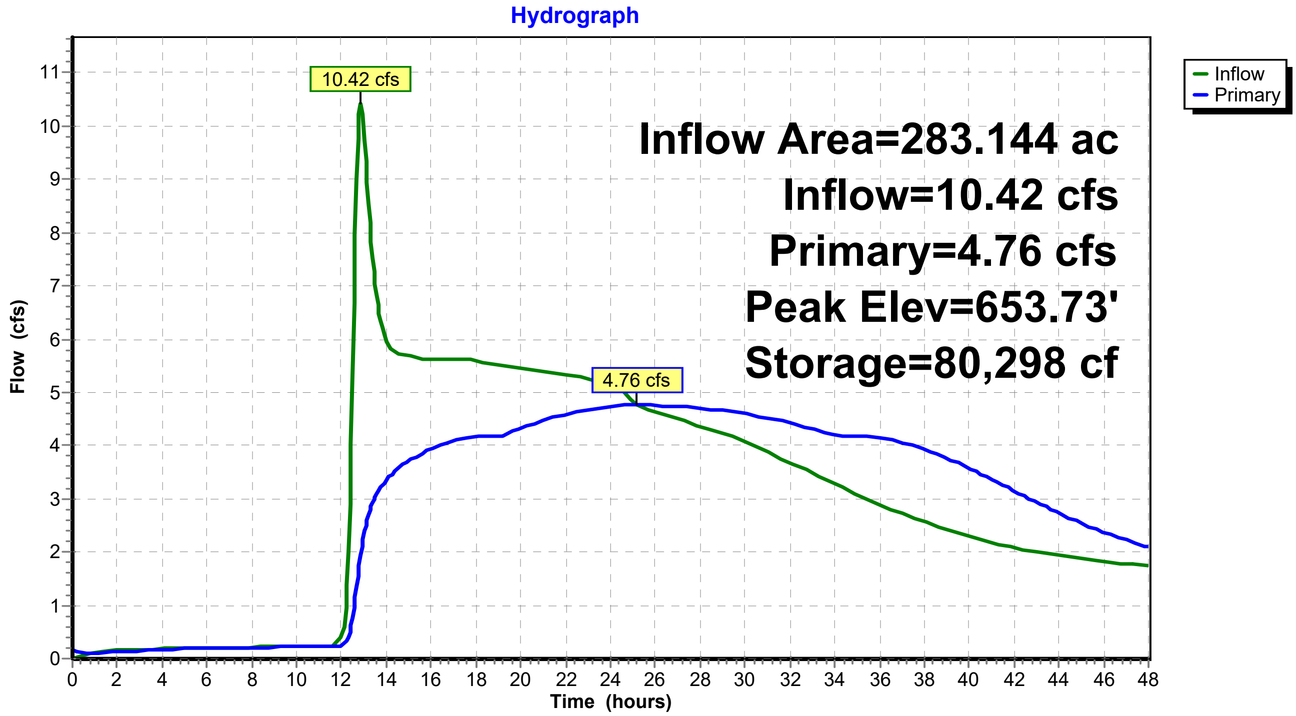

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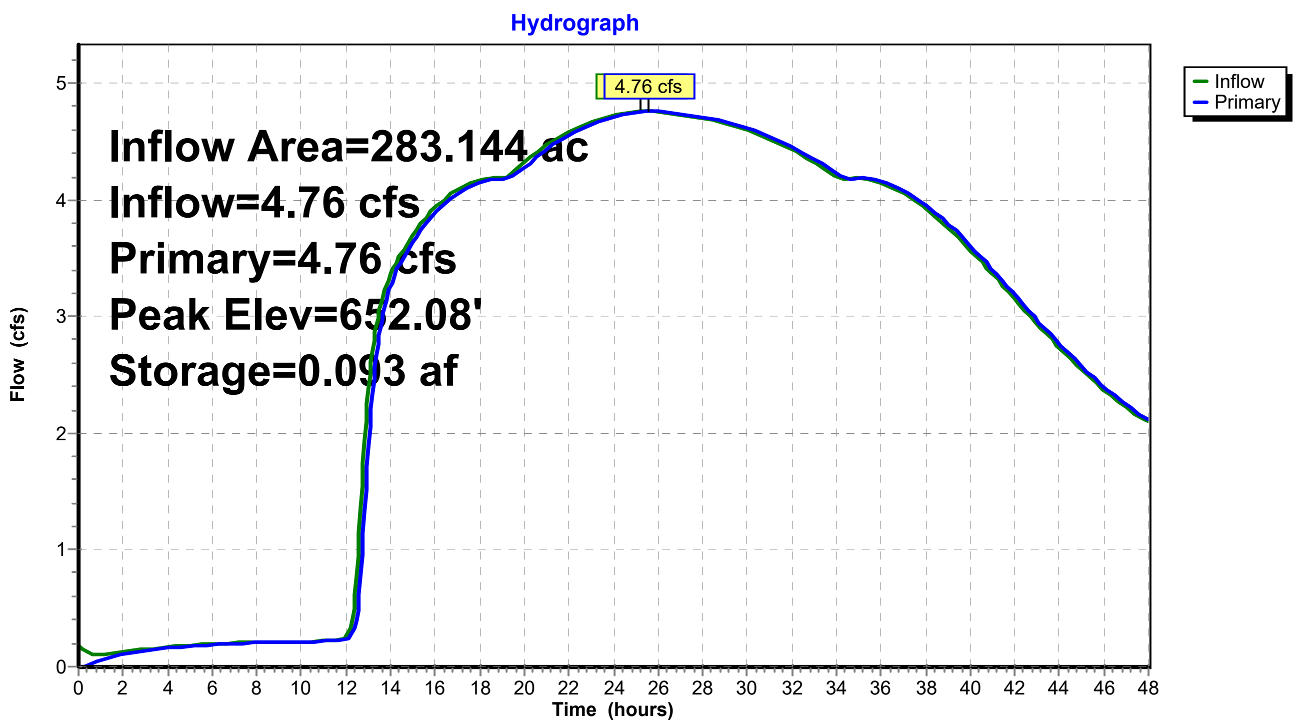

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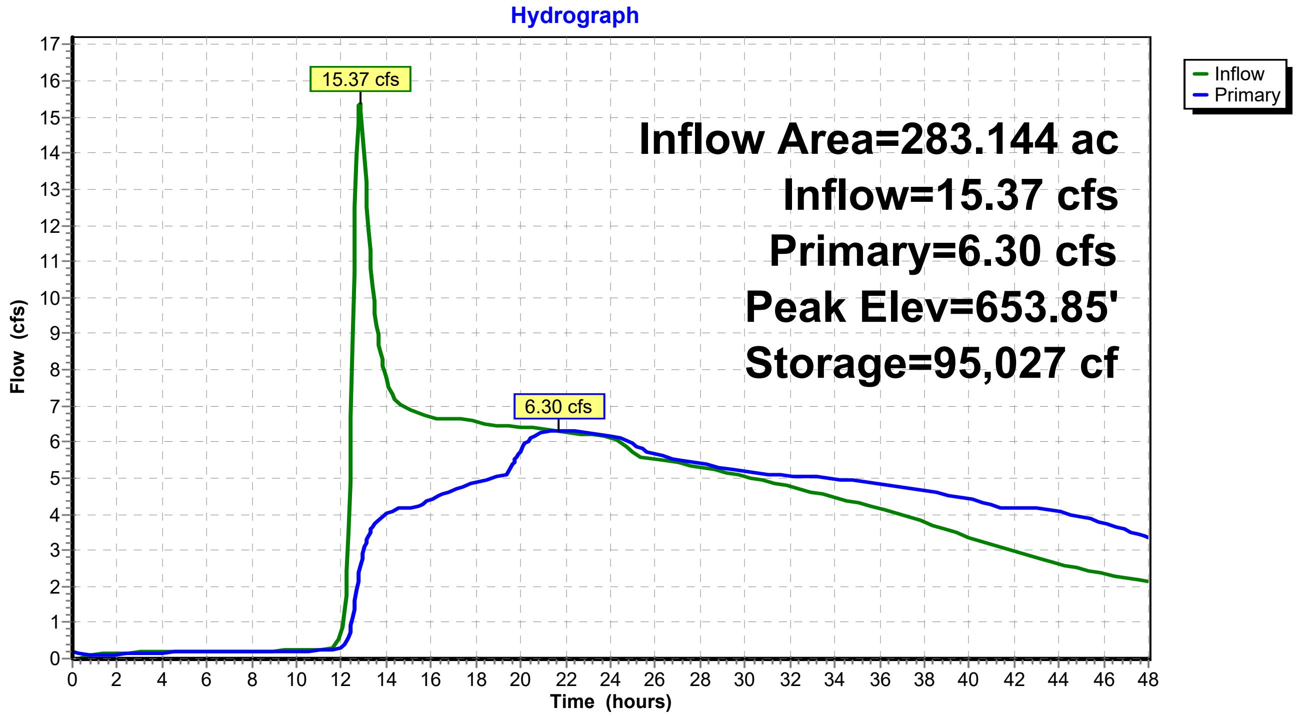

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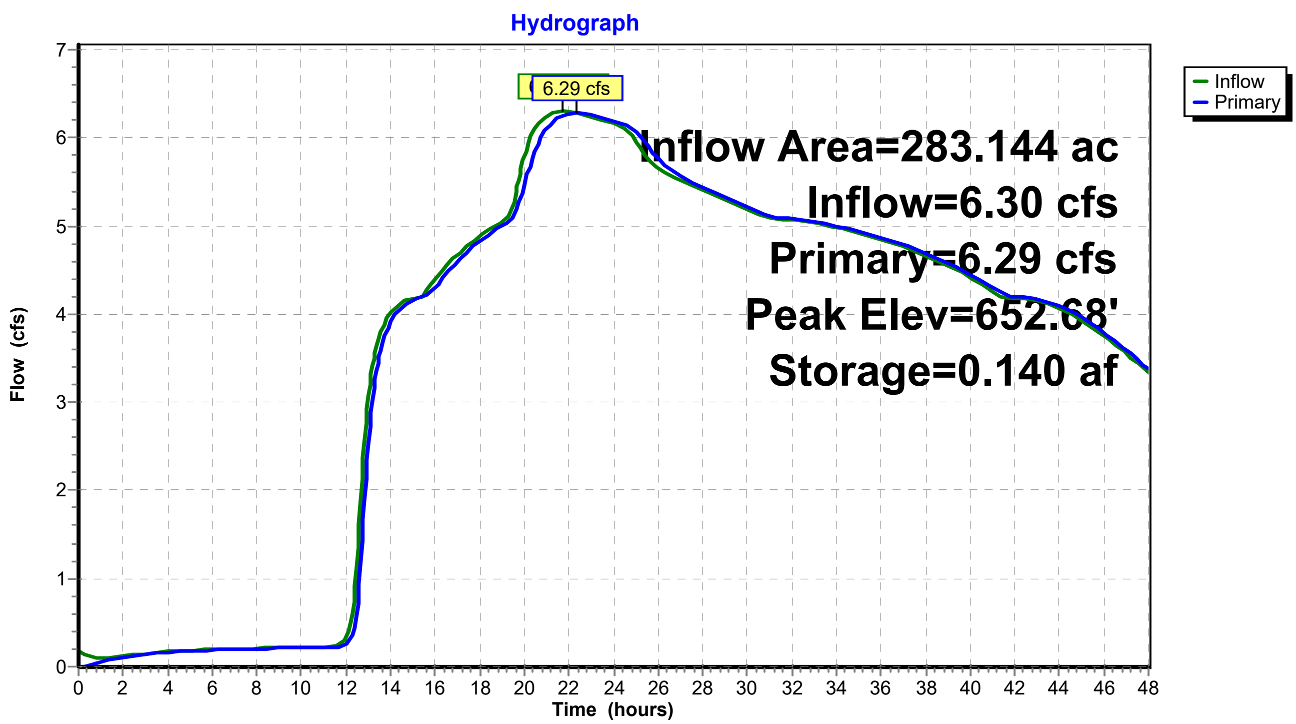

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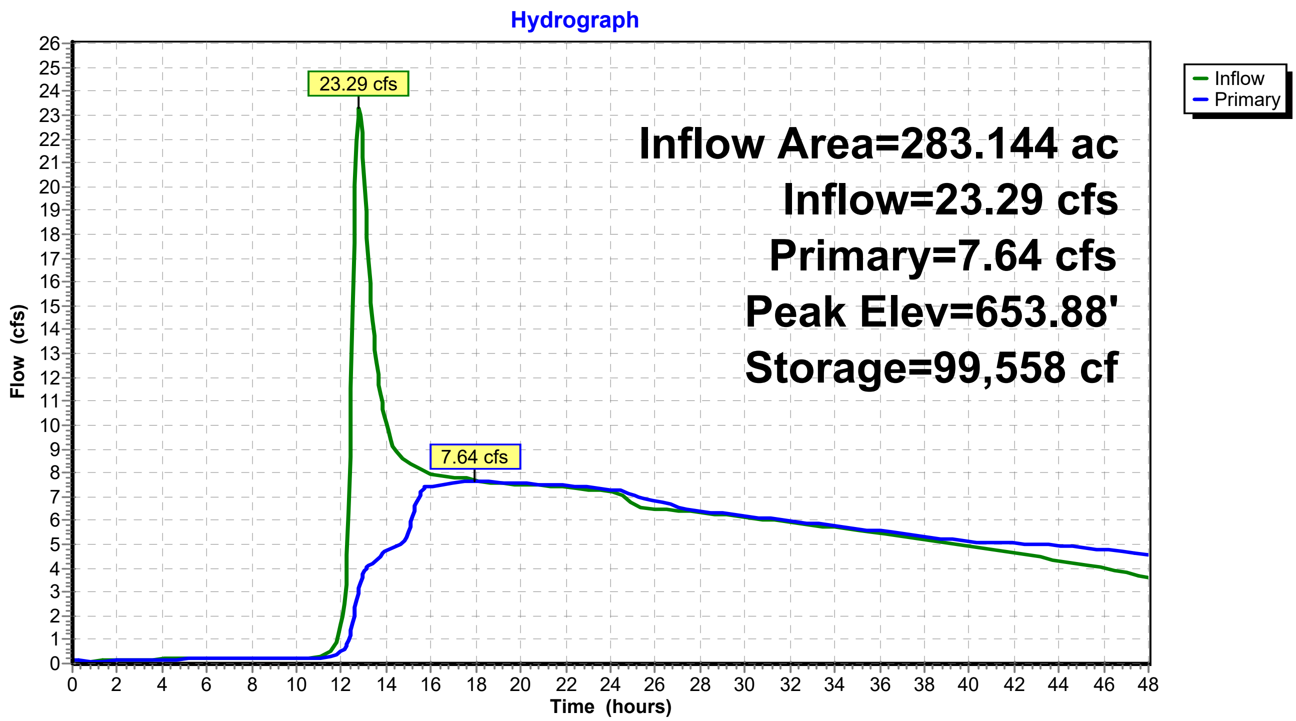

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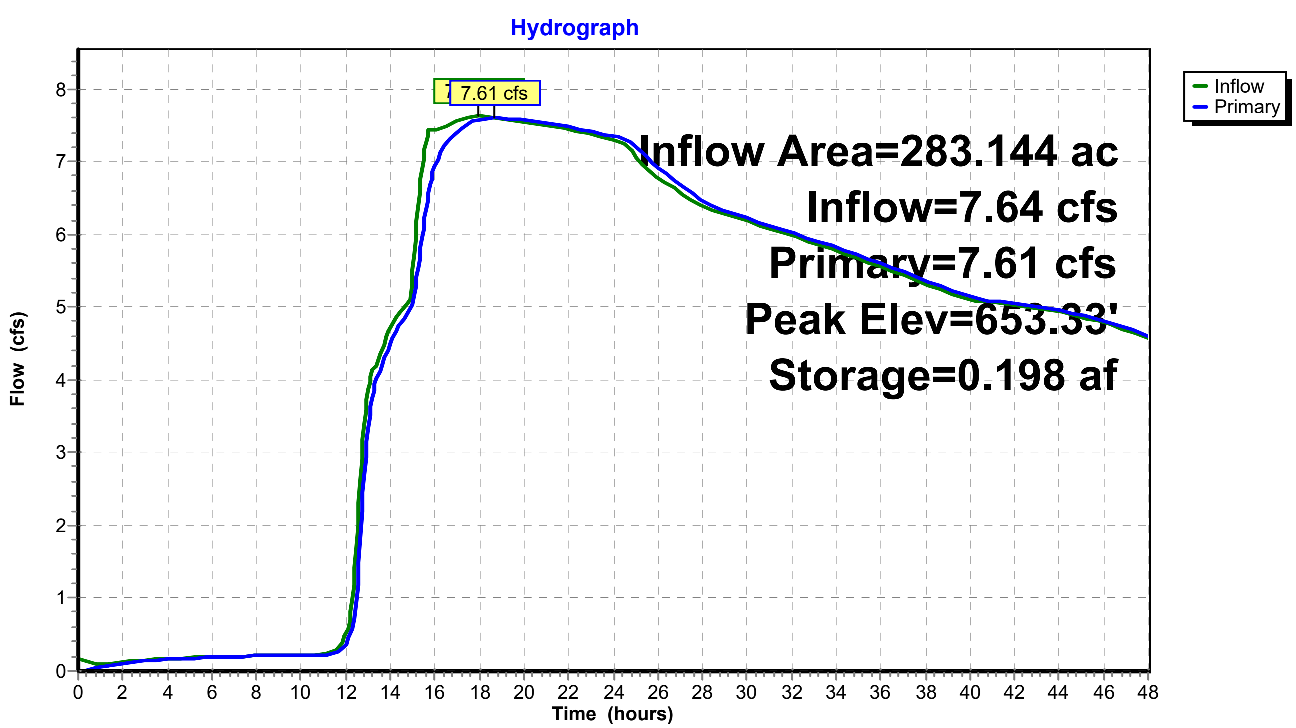

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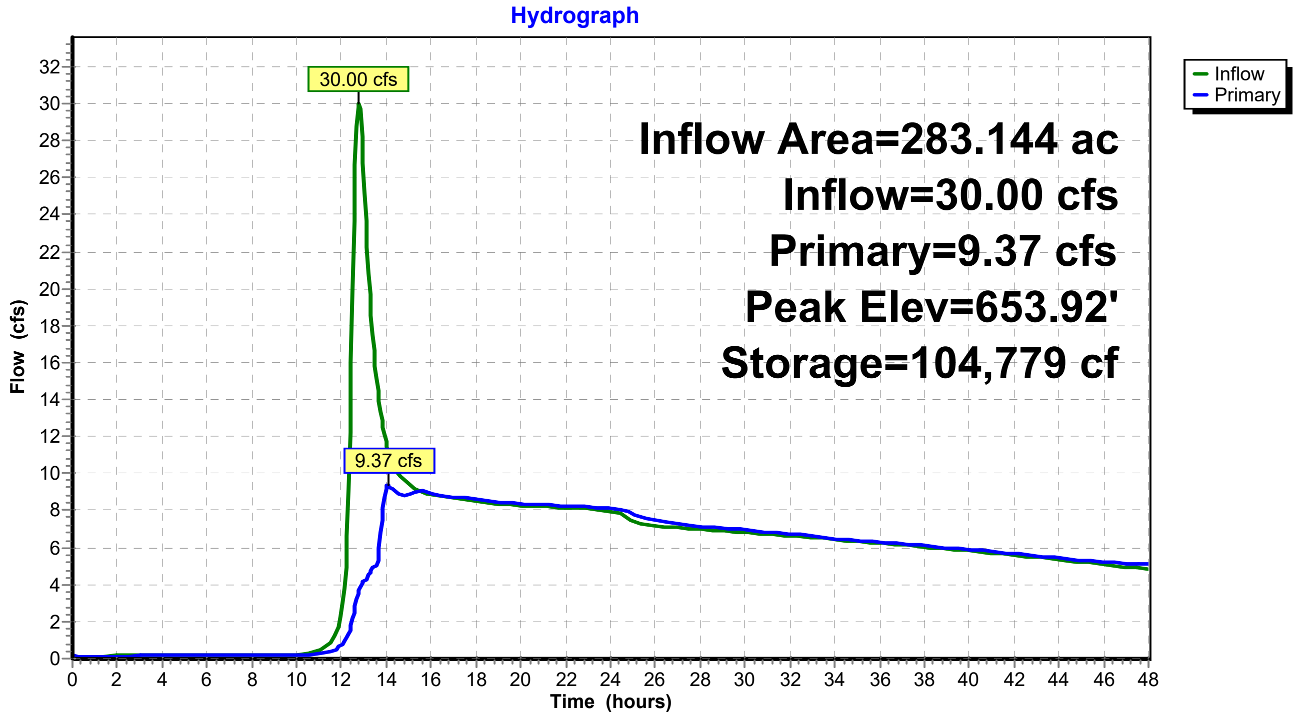

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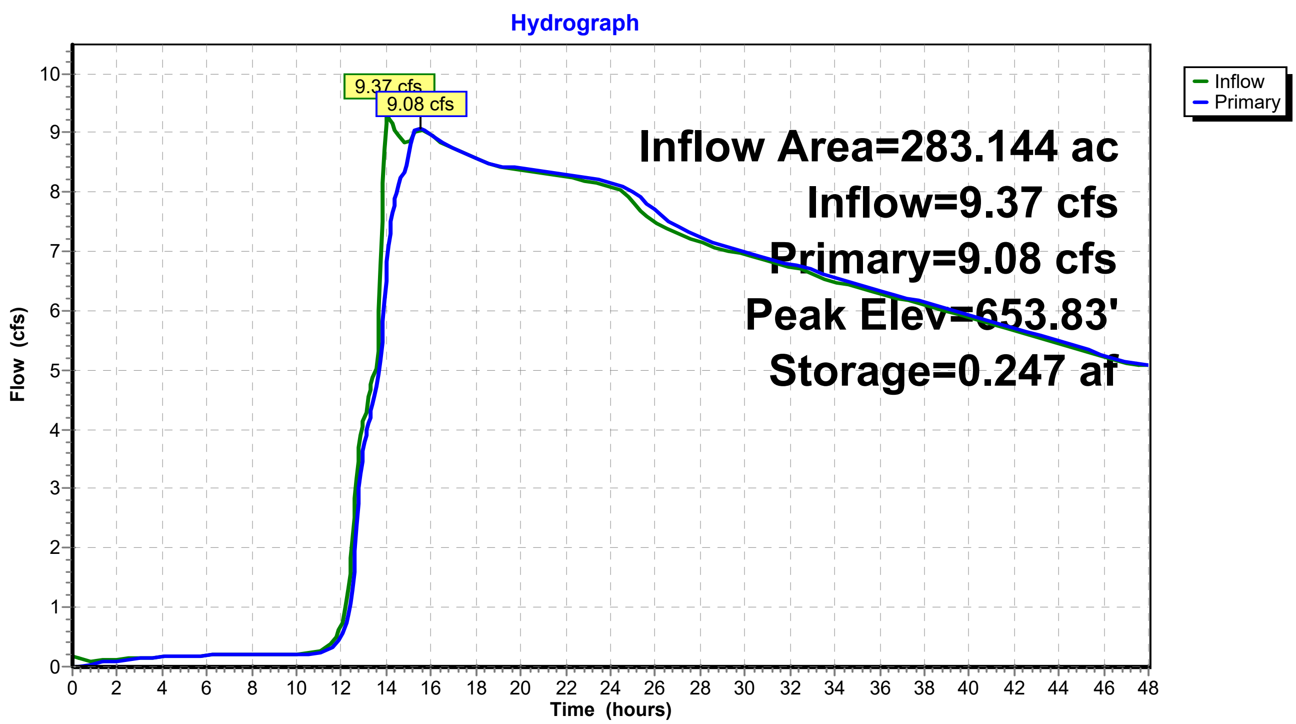

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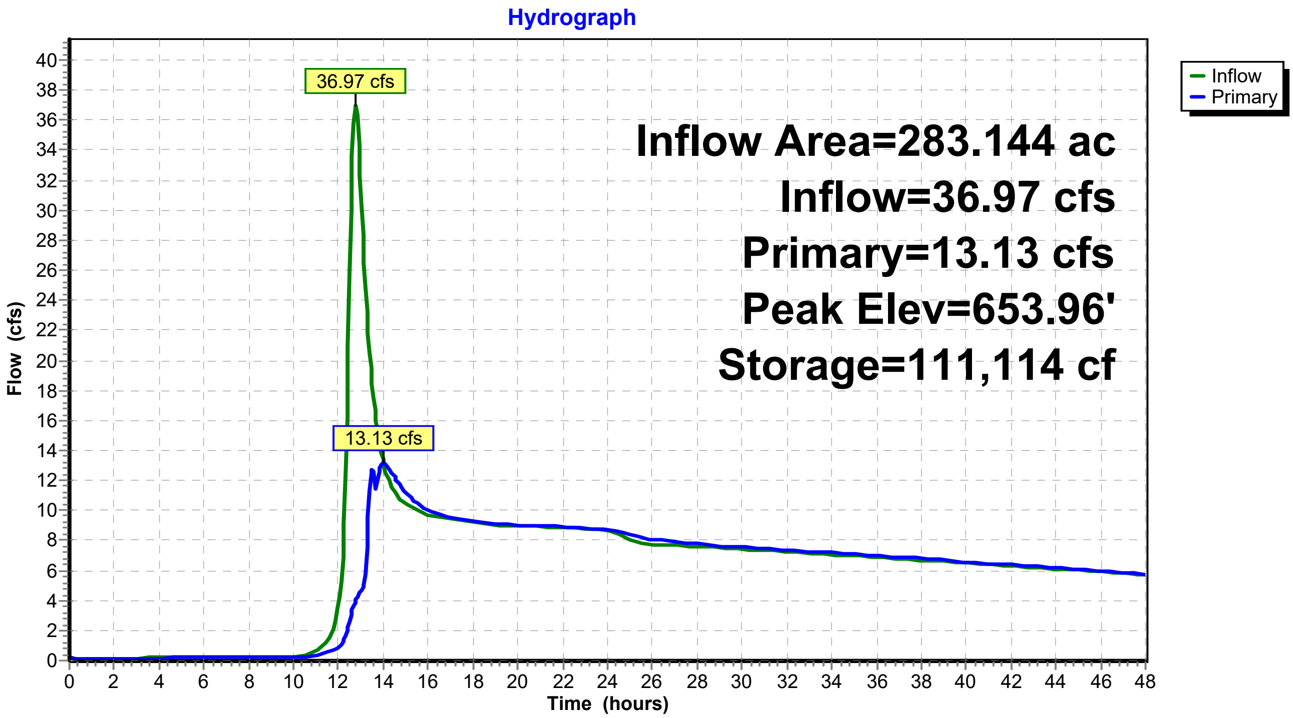

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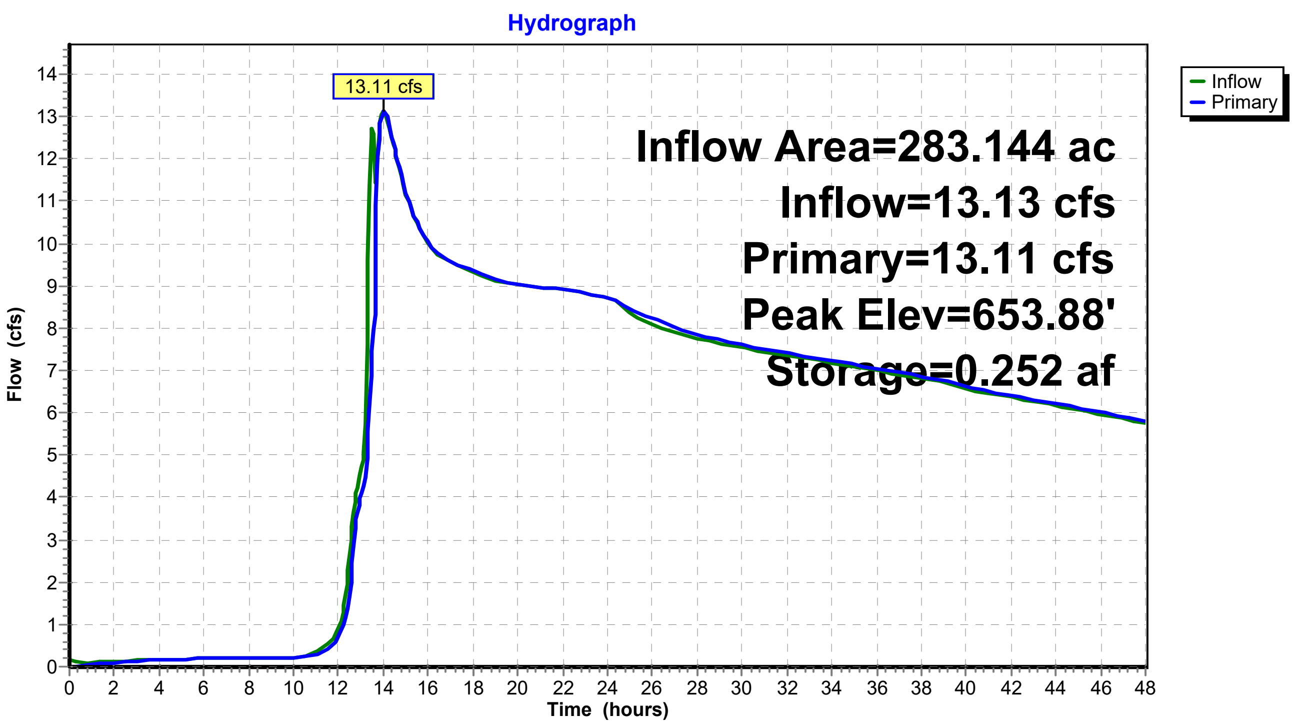

Project Notes

CarlsonStageIncrement|1.0000|

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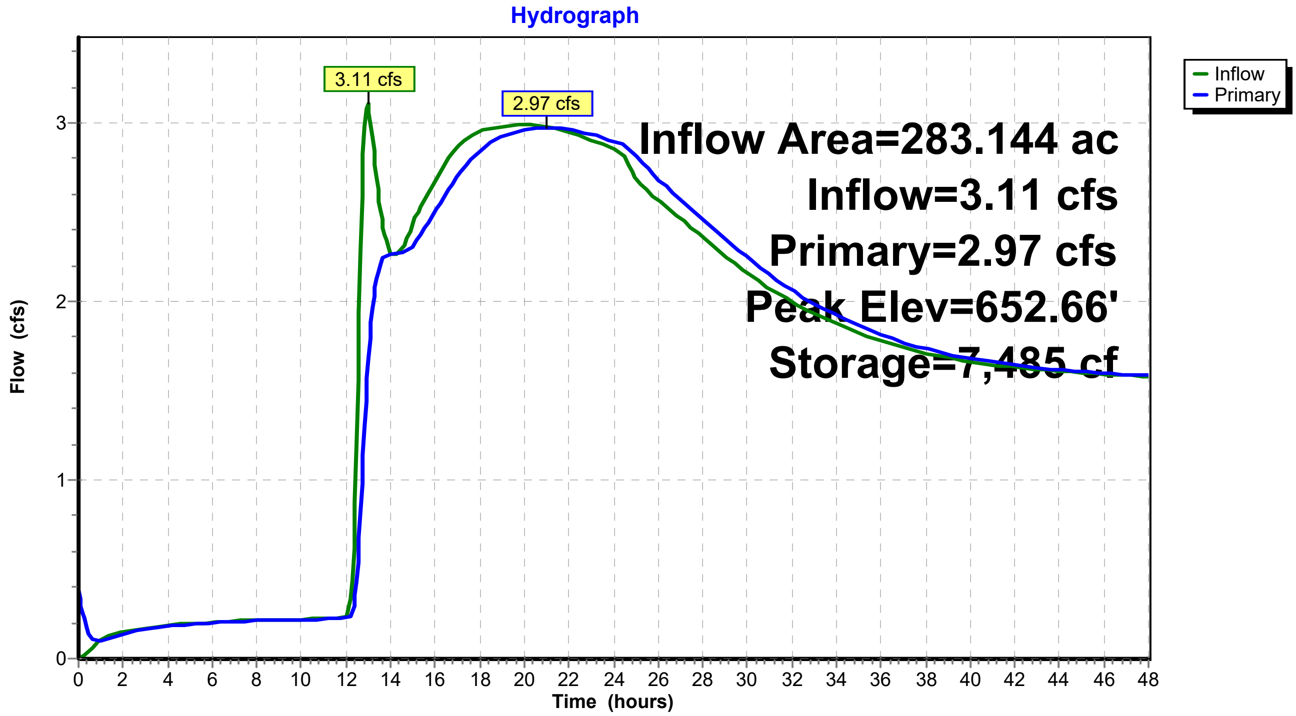

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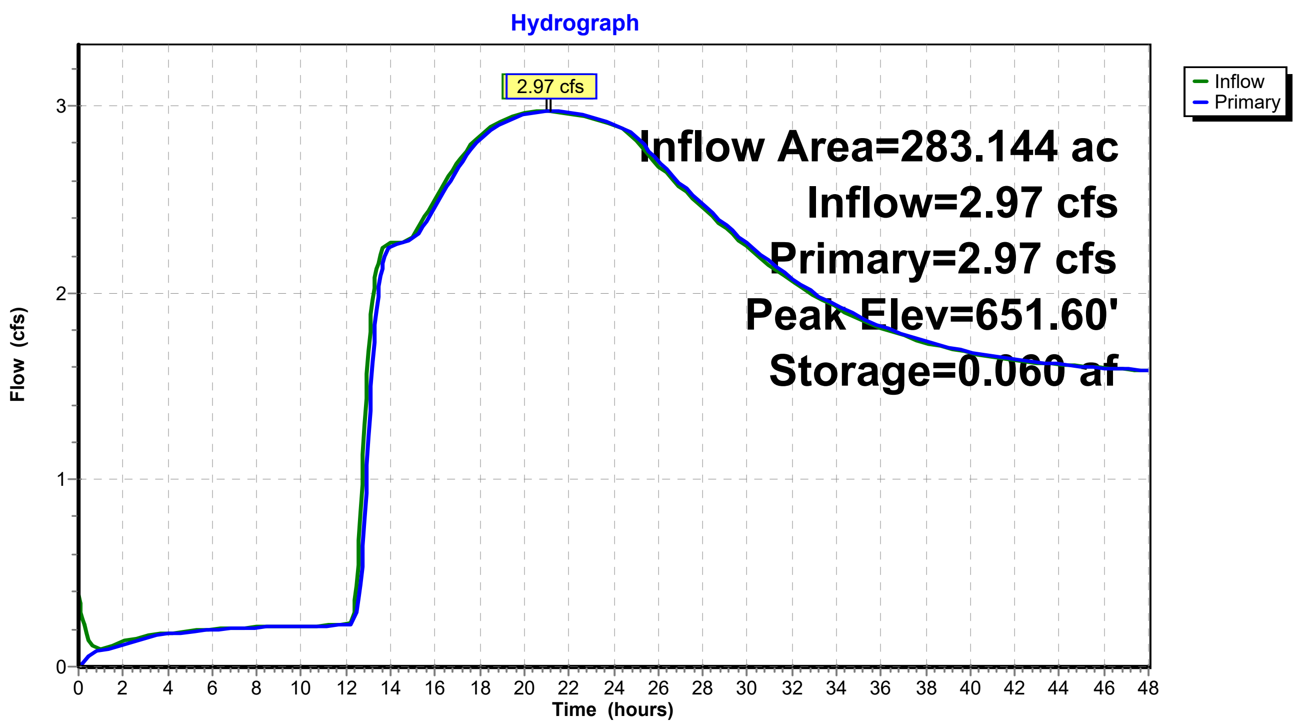

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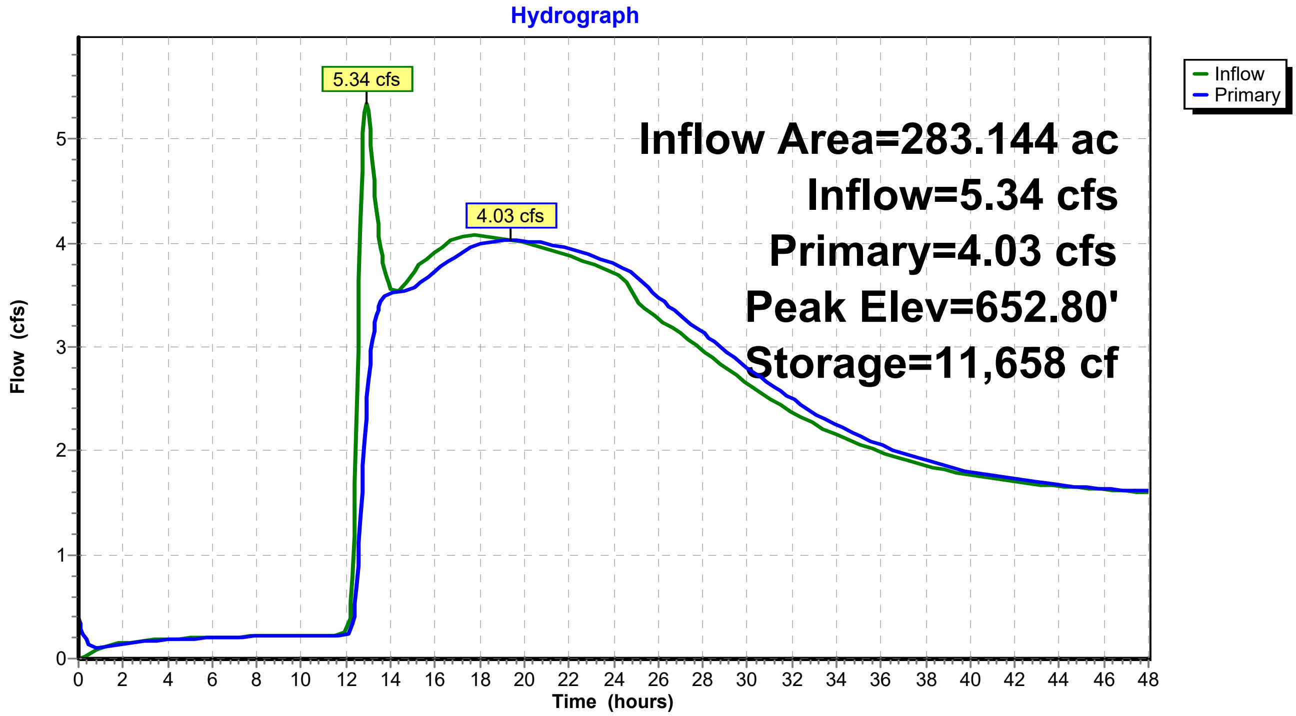

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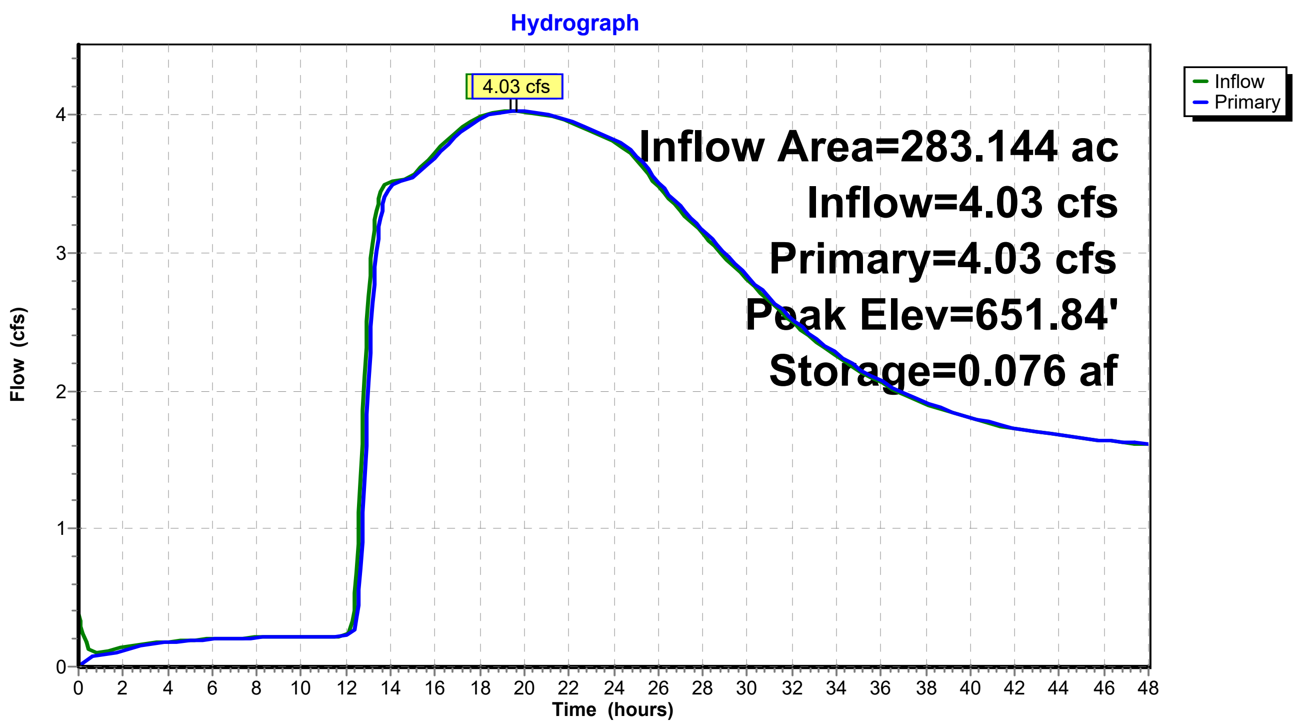

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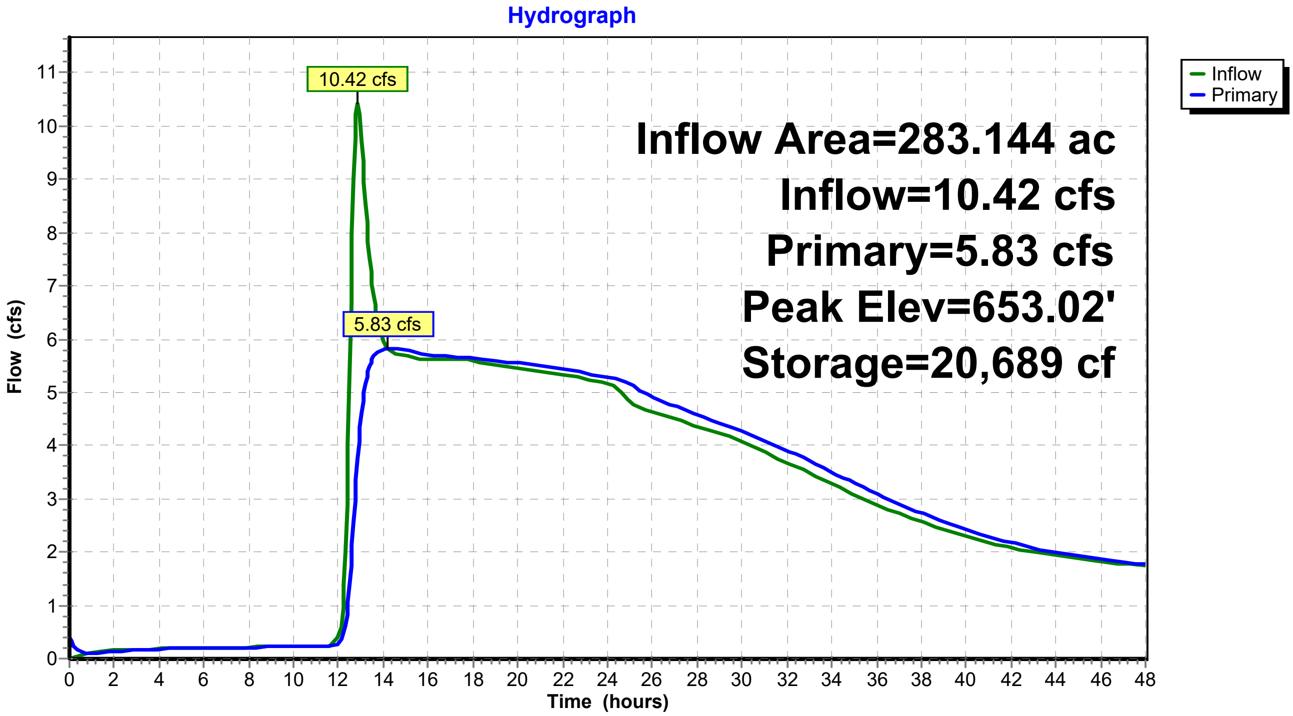

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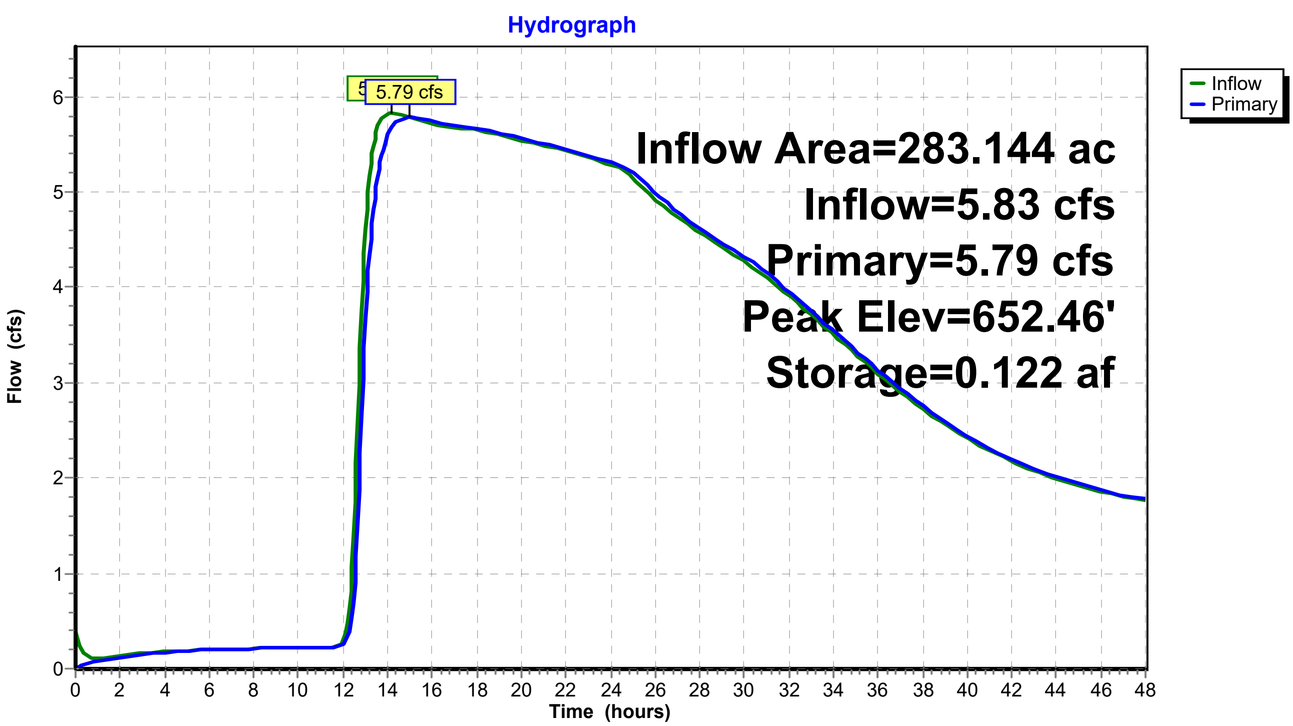

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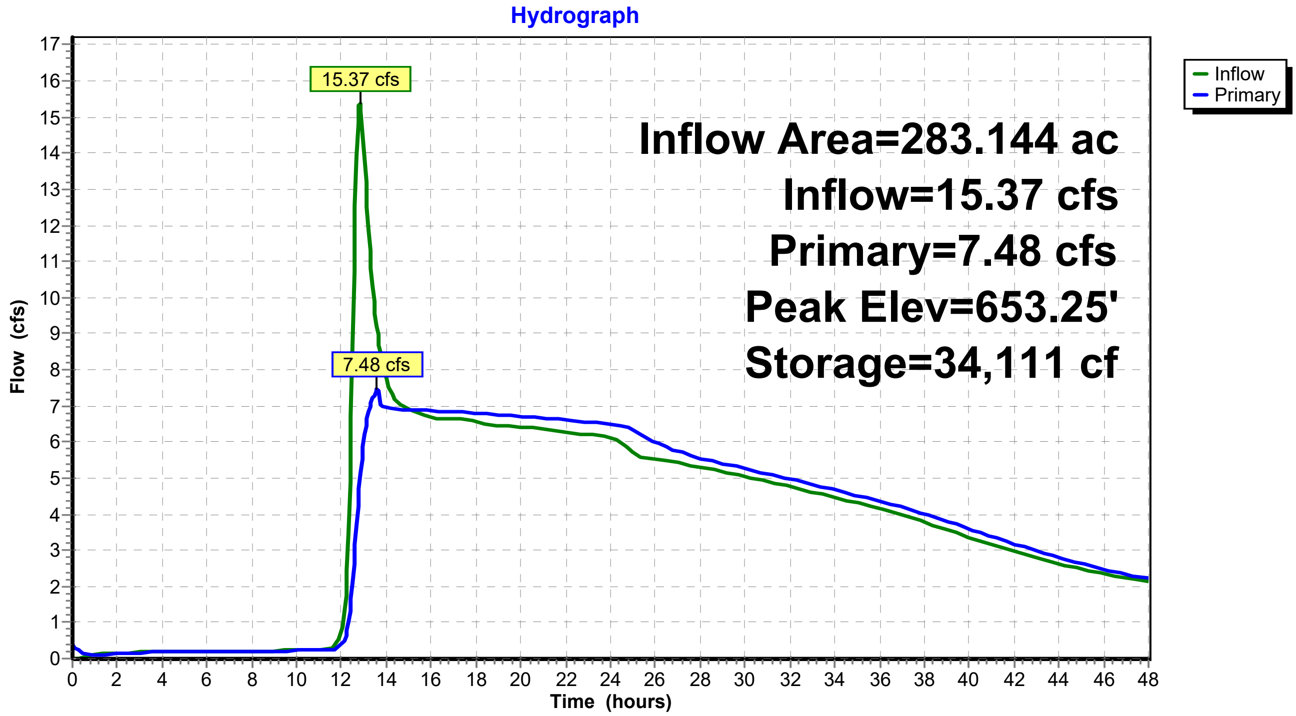

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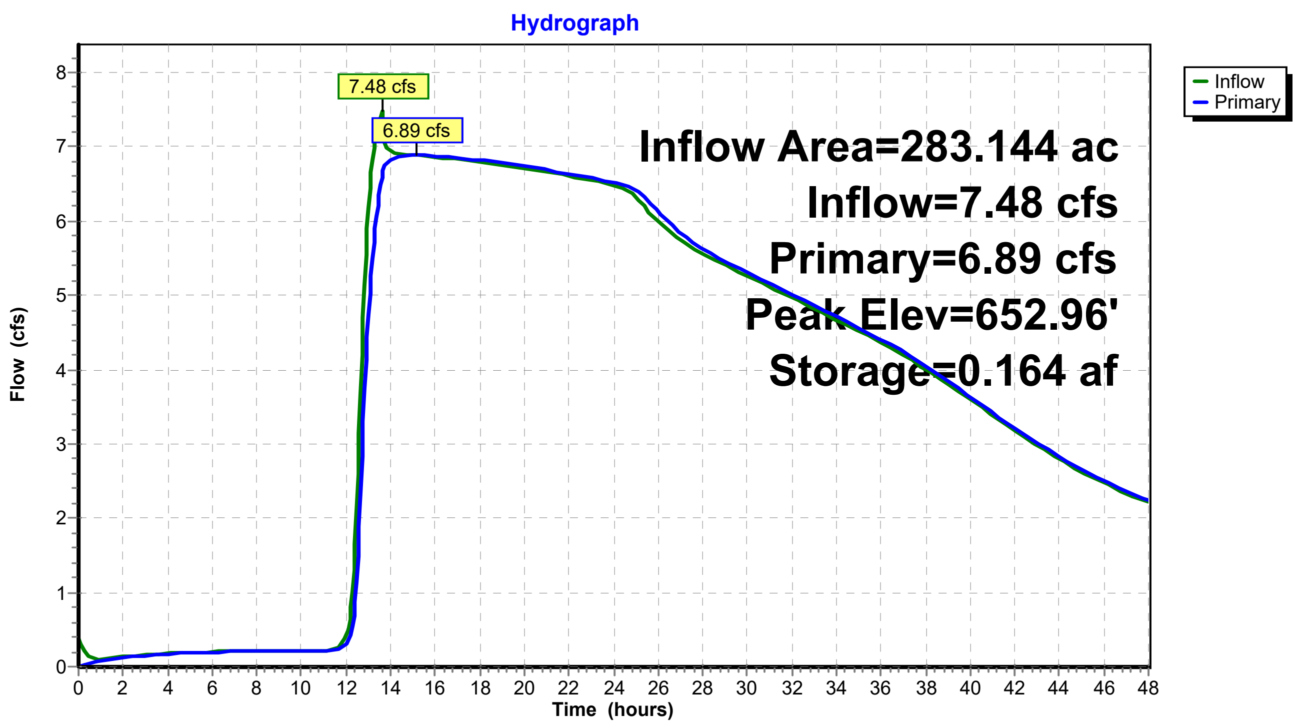

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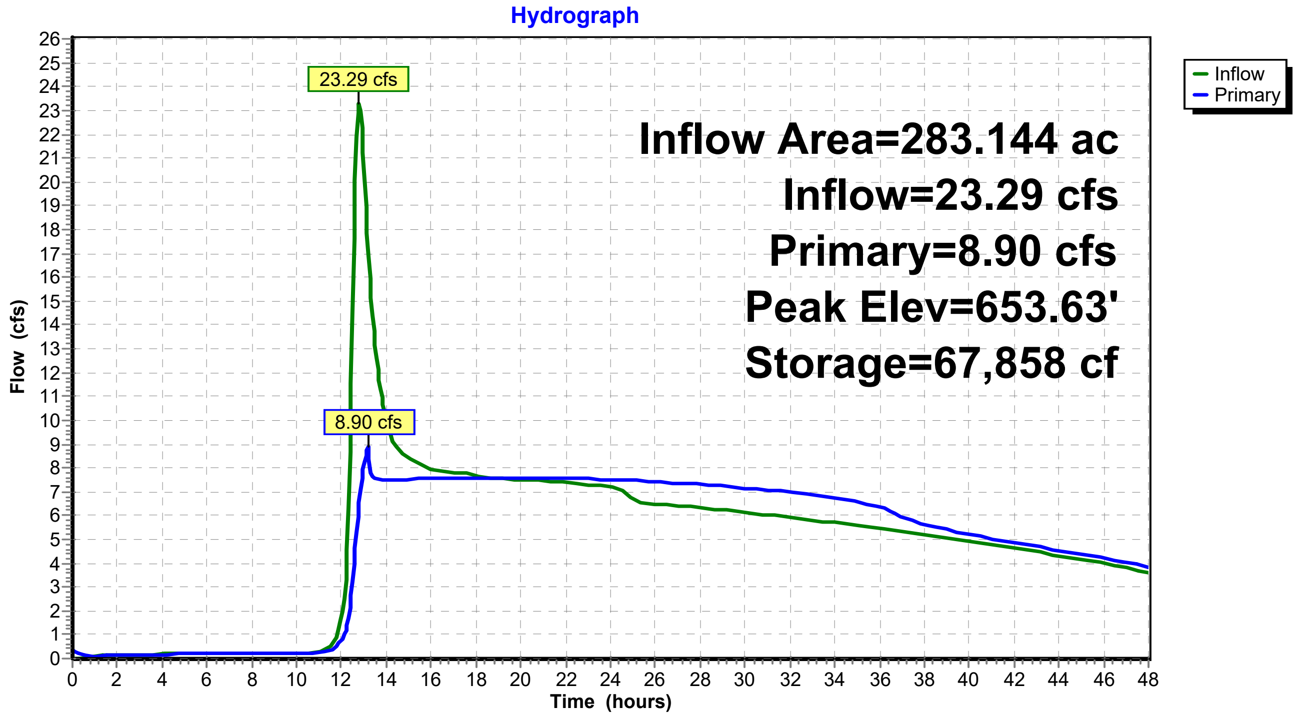

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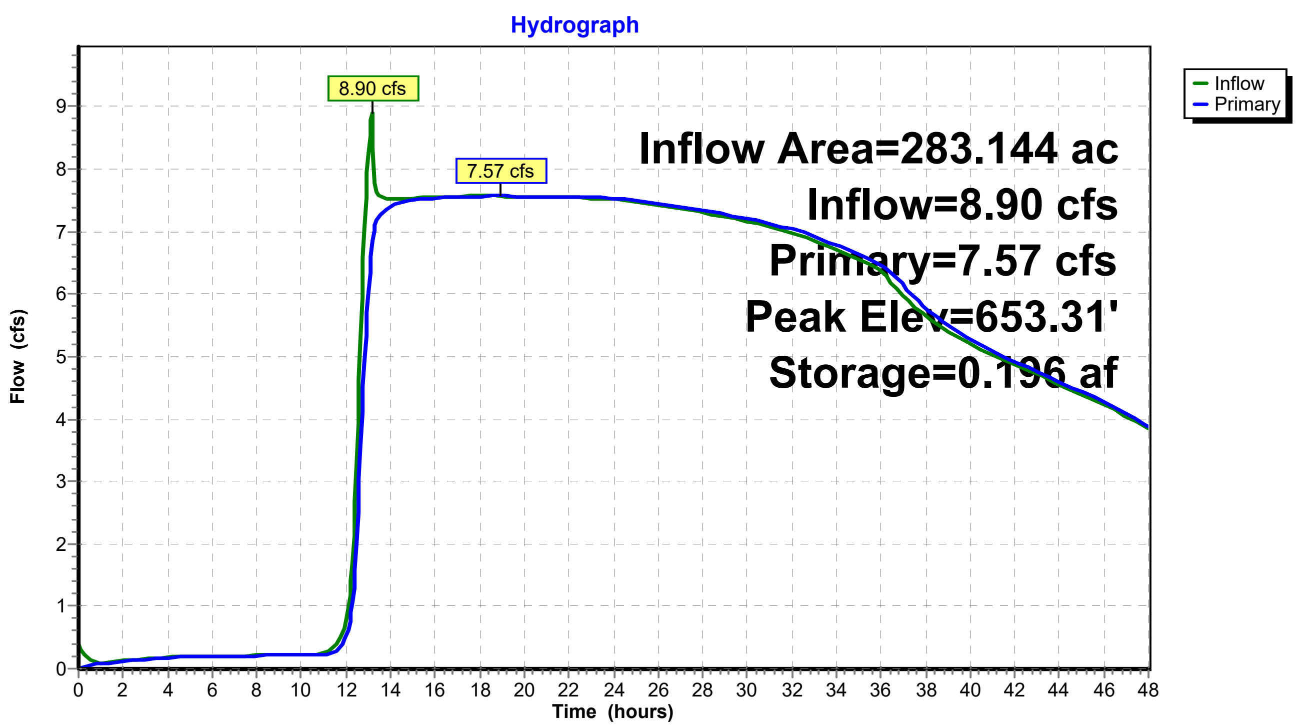

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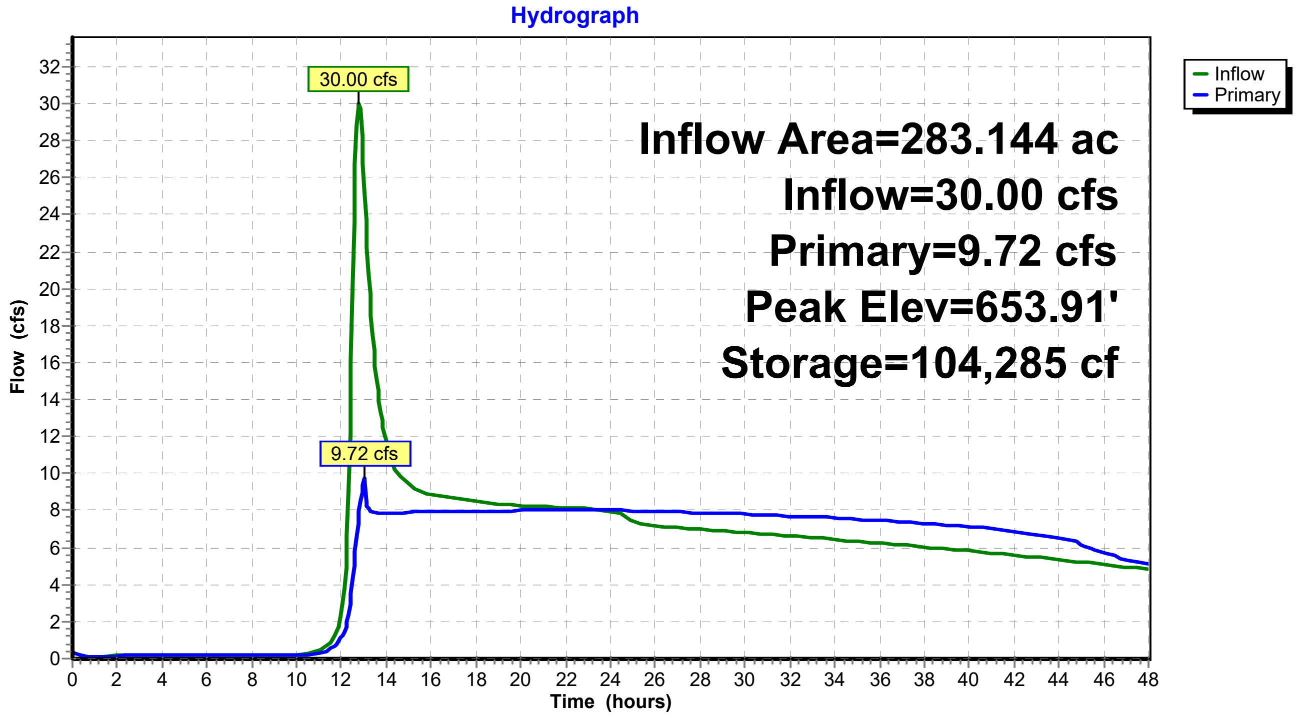

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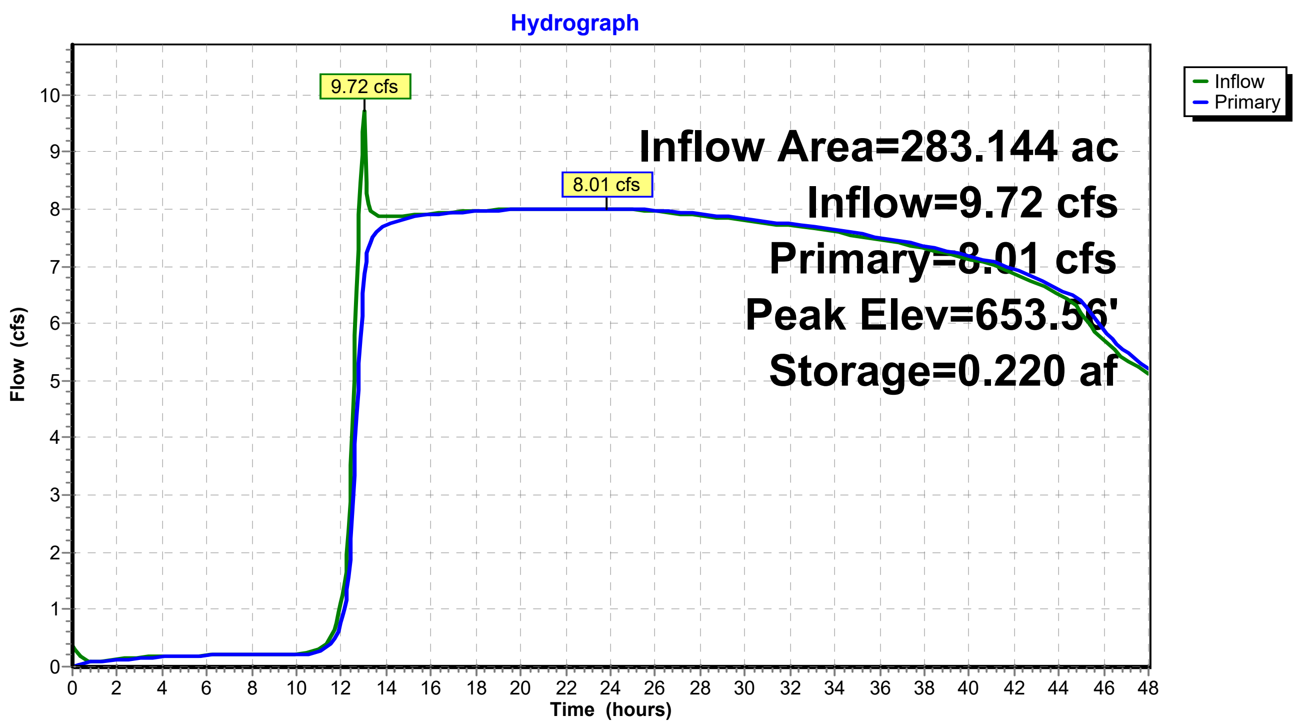

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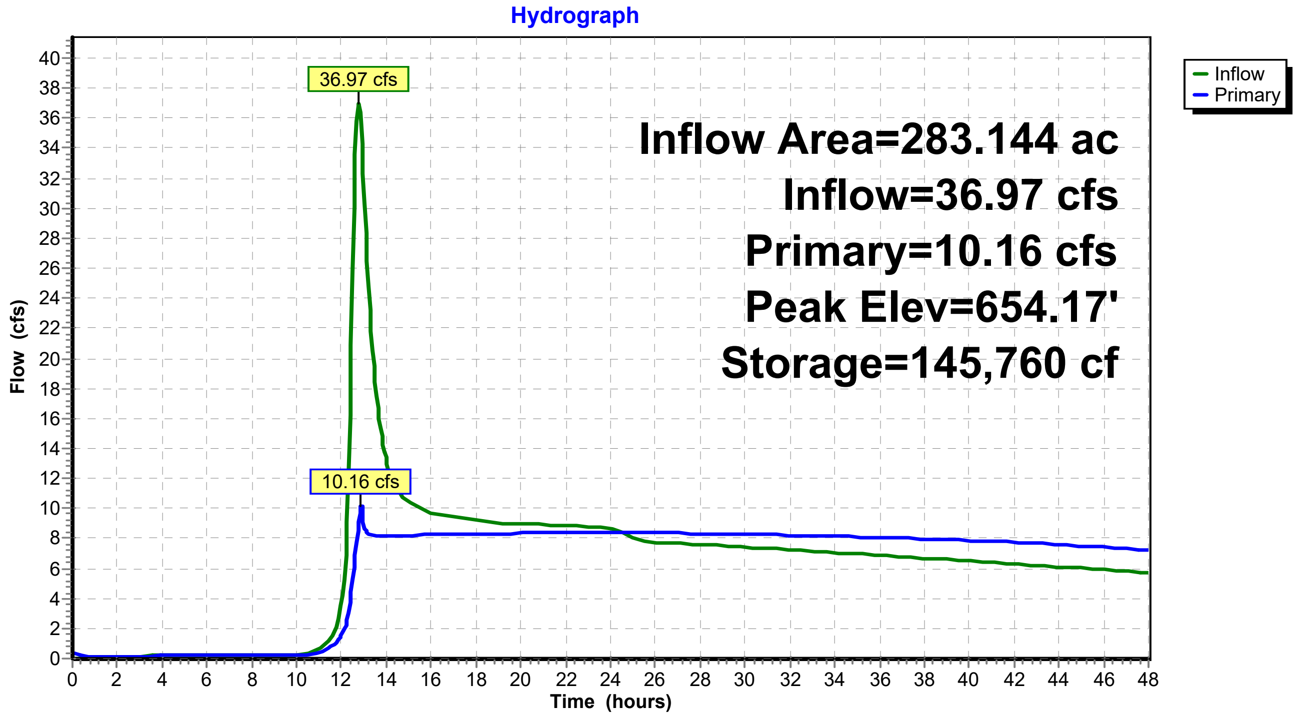

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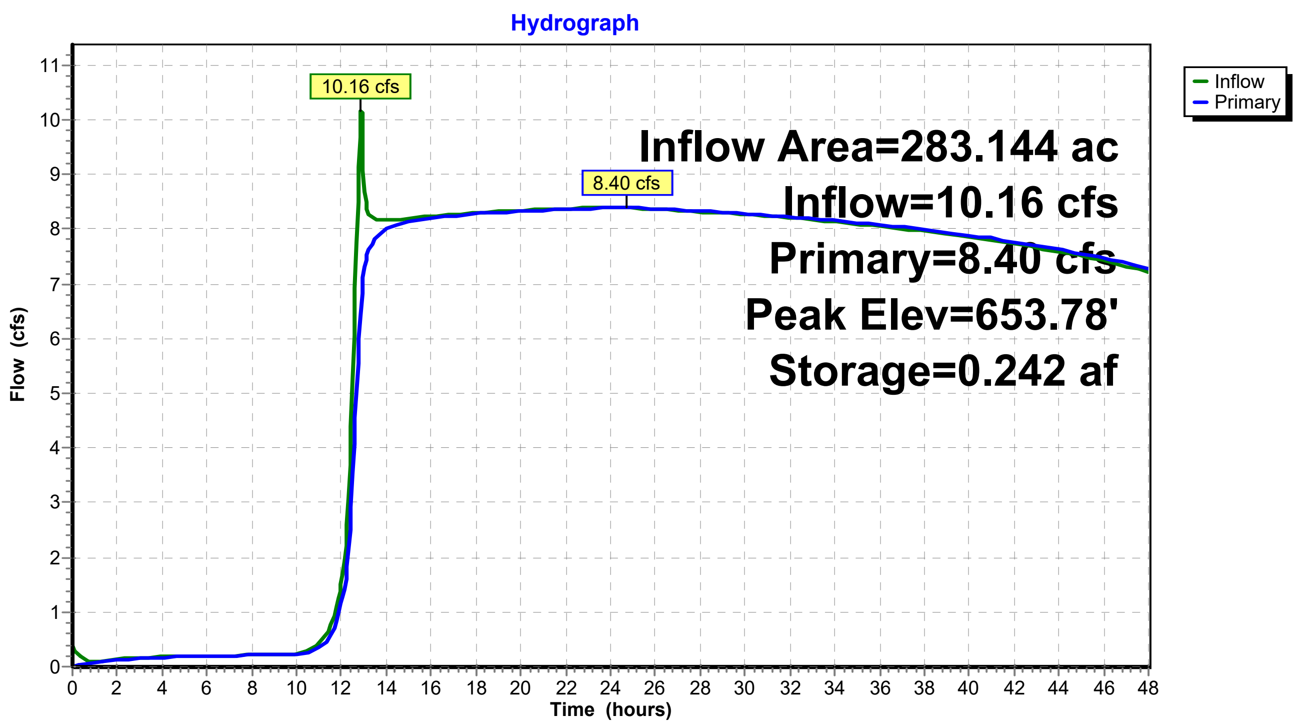
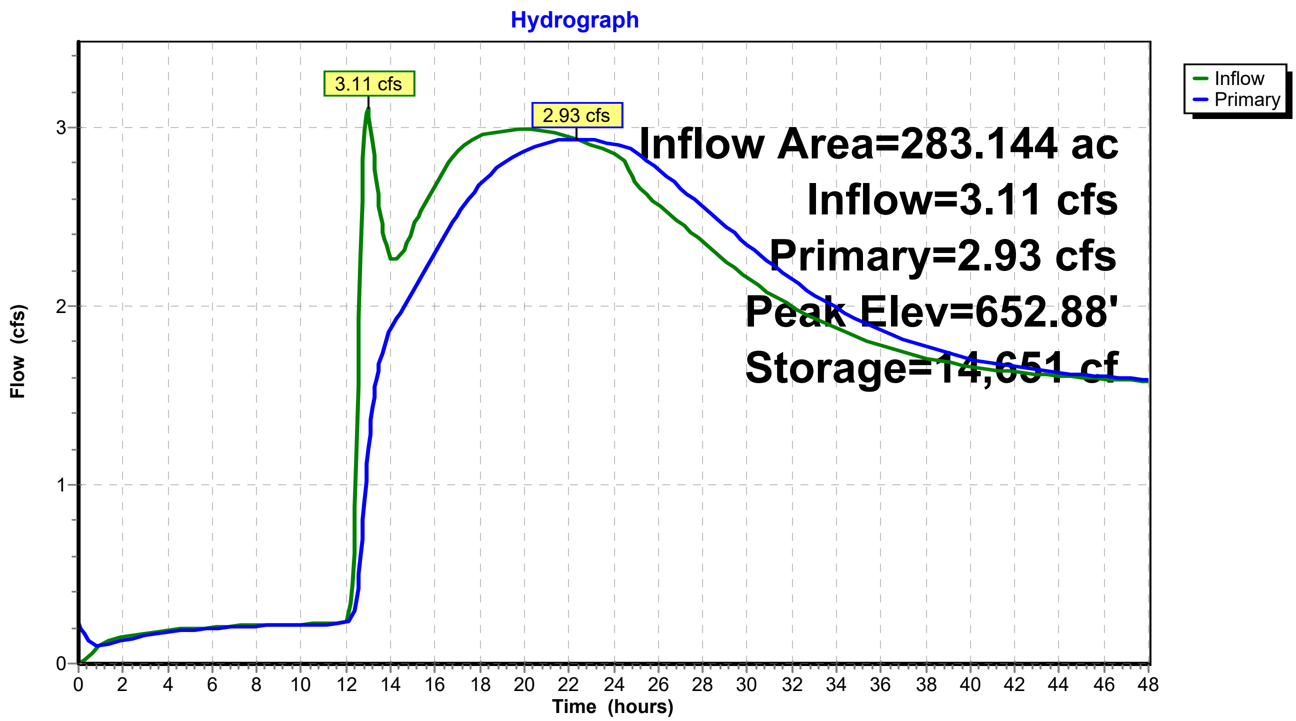


Project Notes

CarlsonStageIncrement|1.0000|

Pond 4P: Farmer's Field #1



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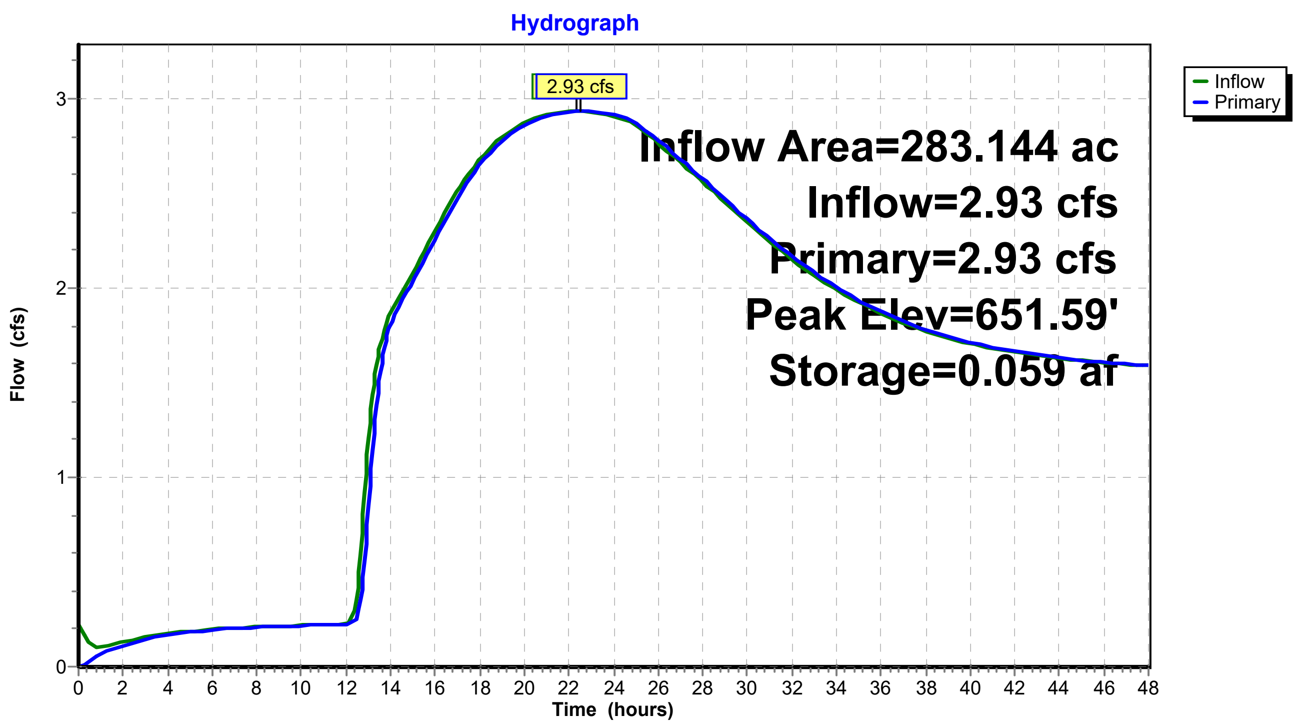

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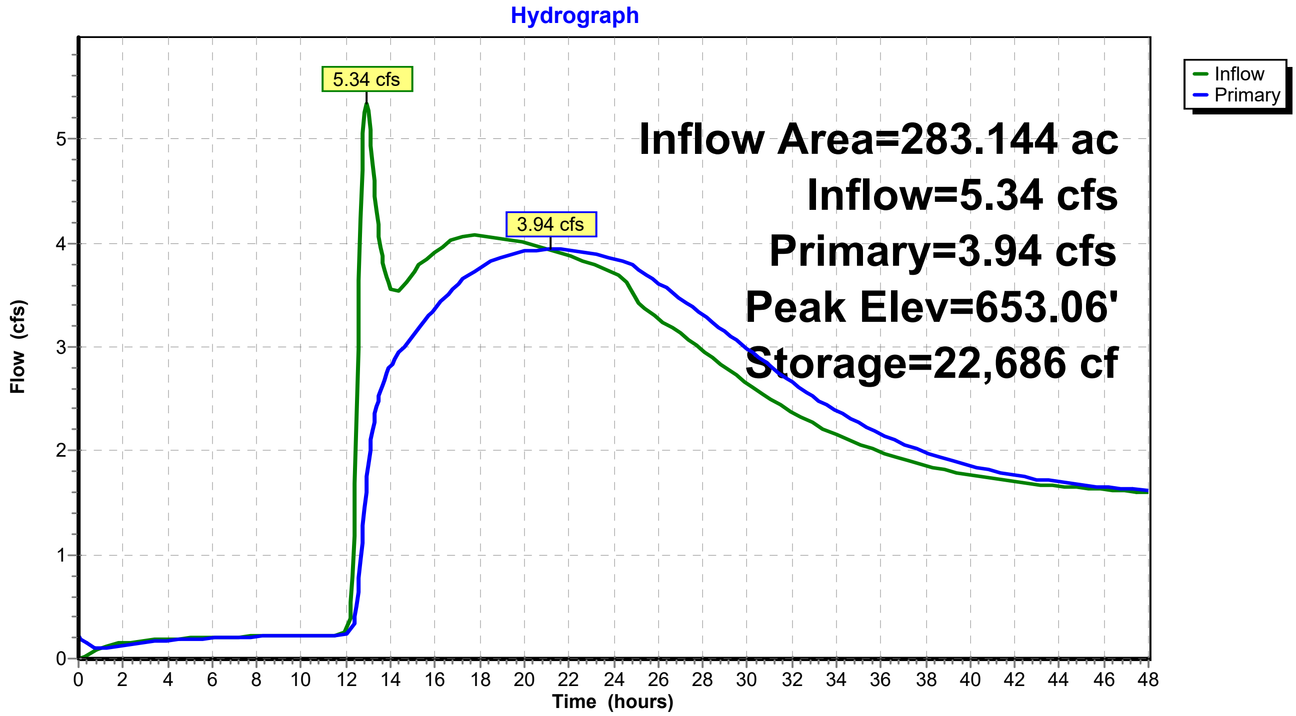

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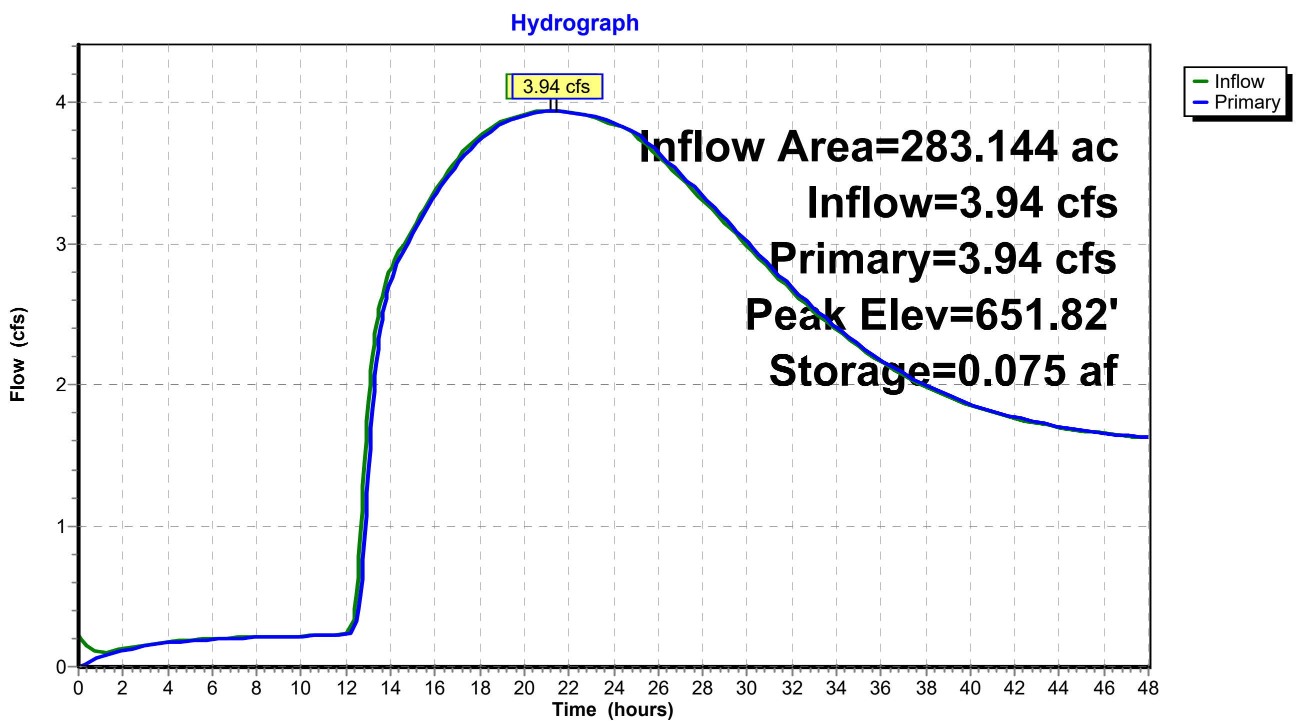

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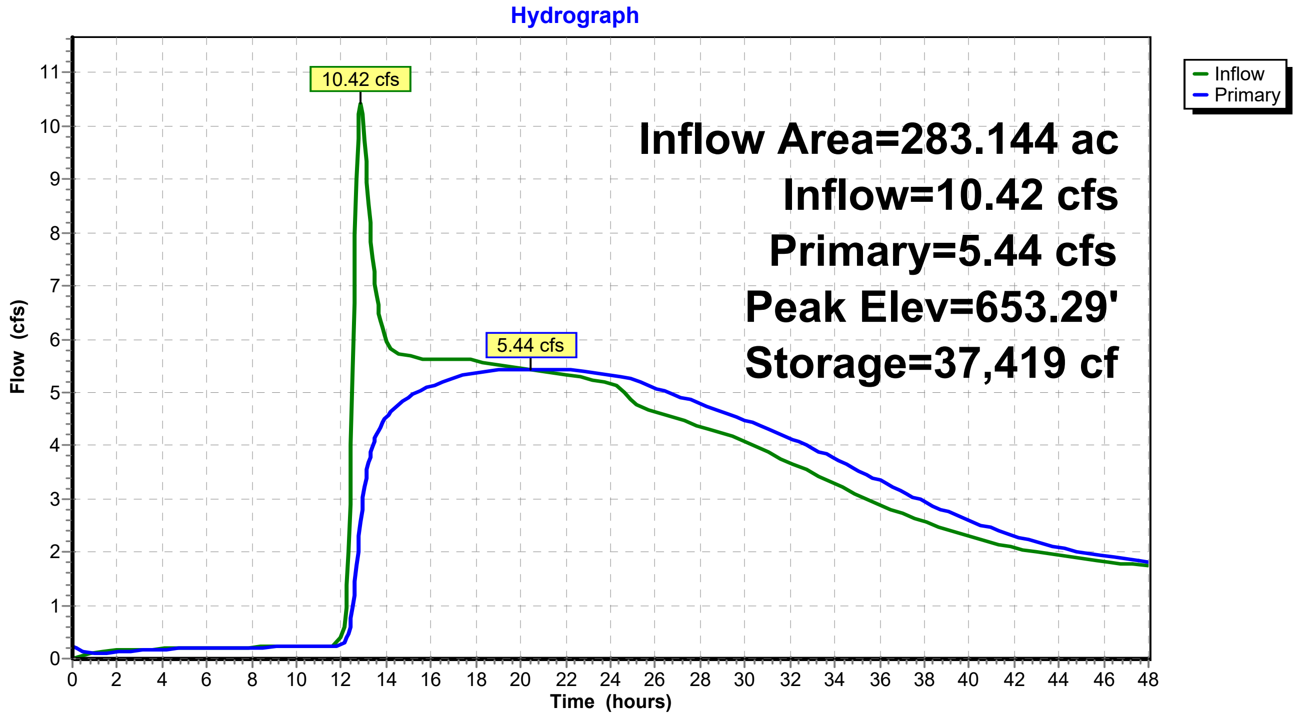

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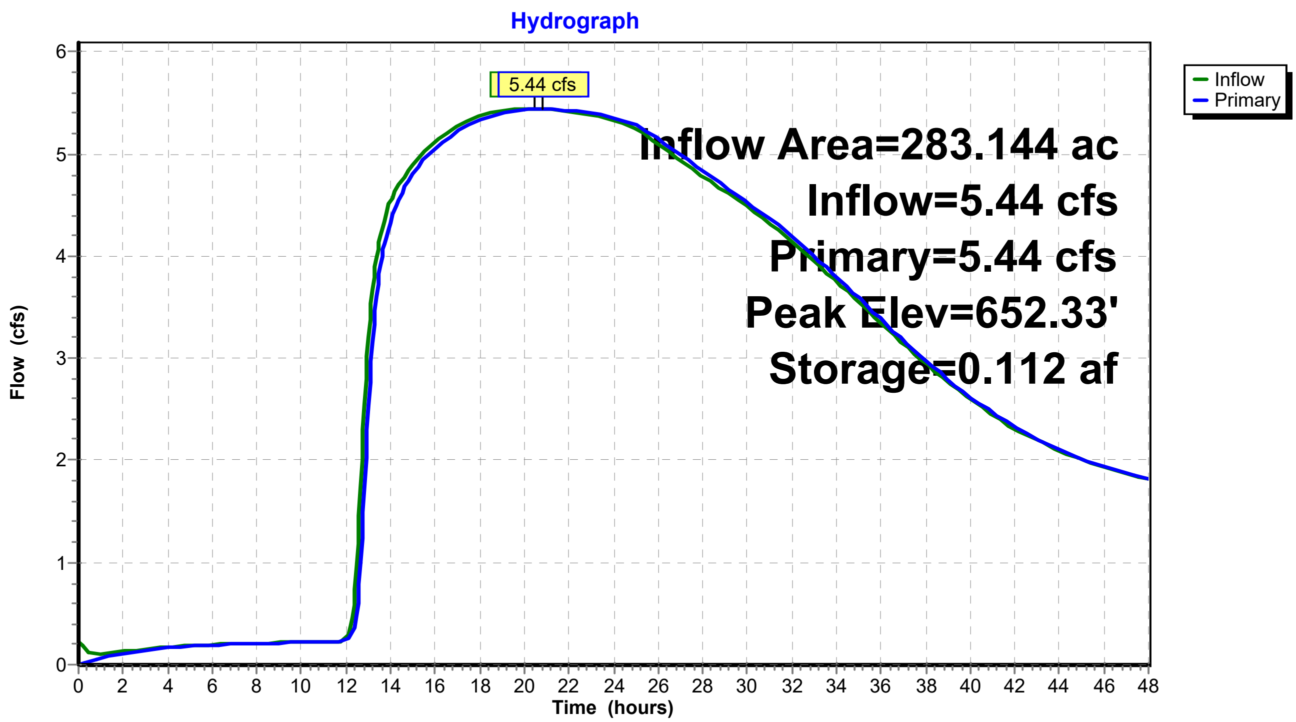

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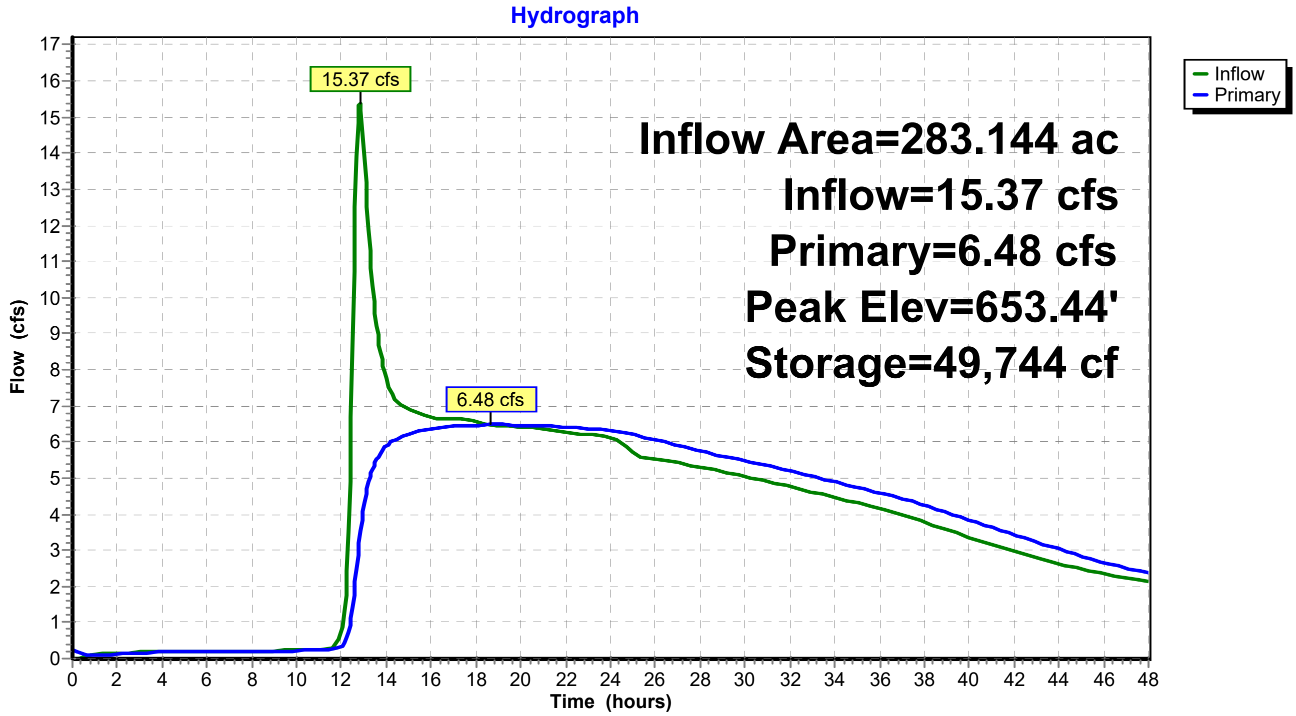

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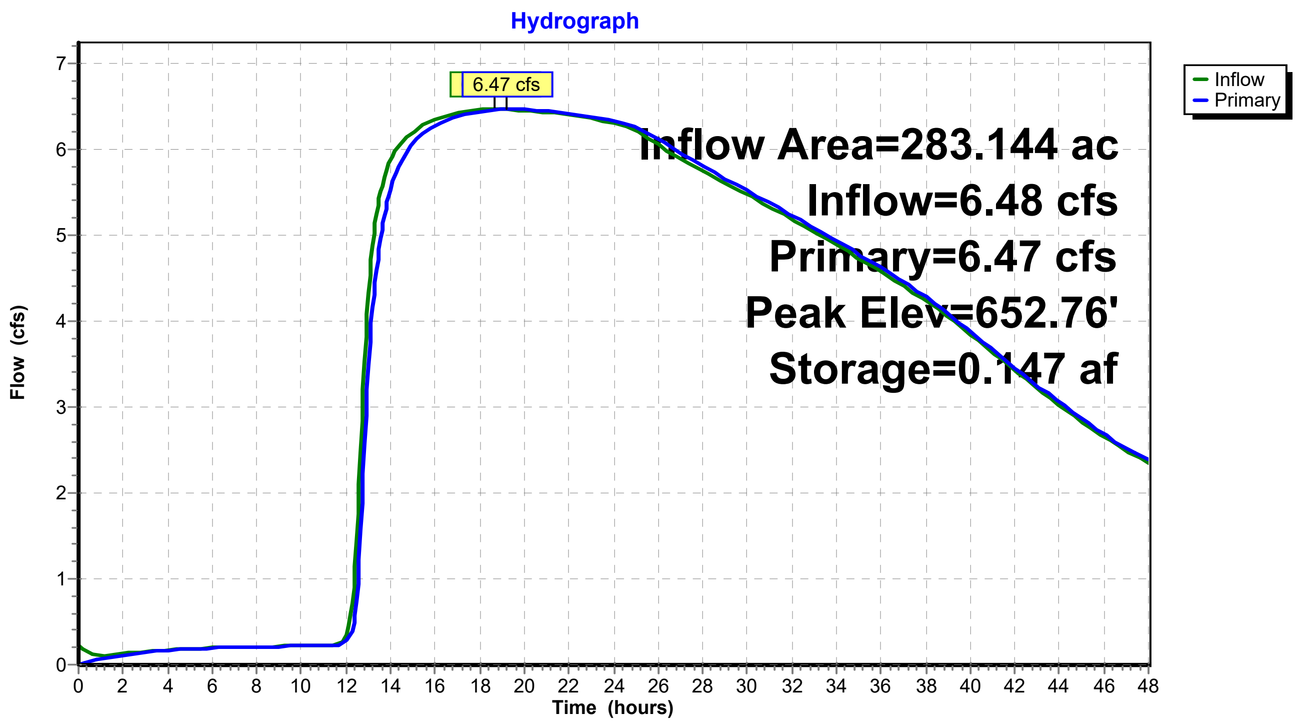

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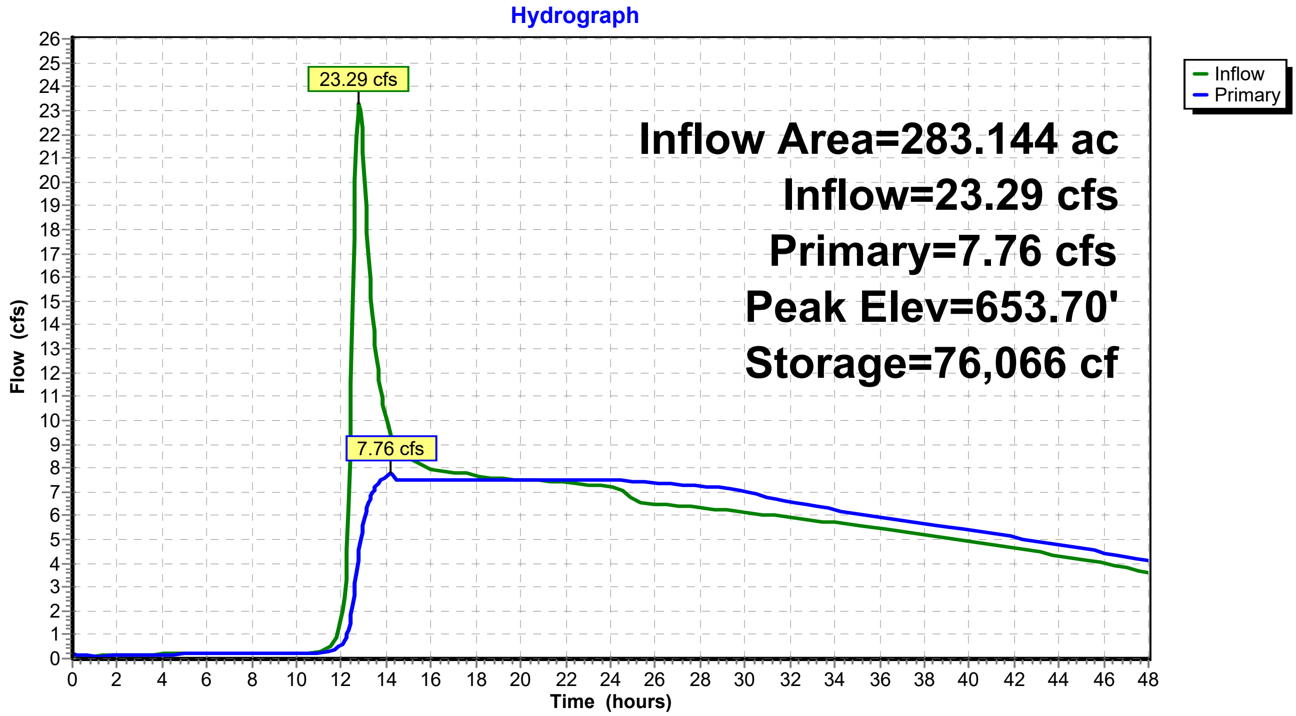

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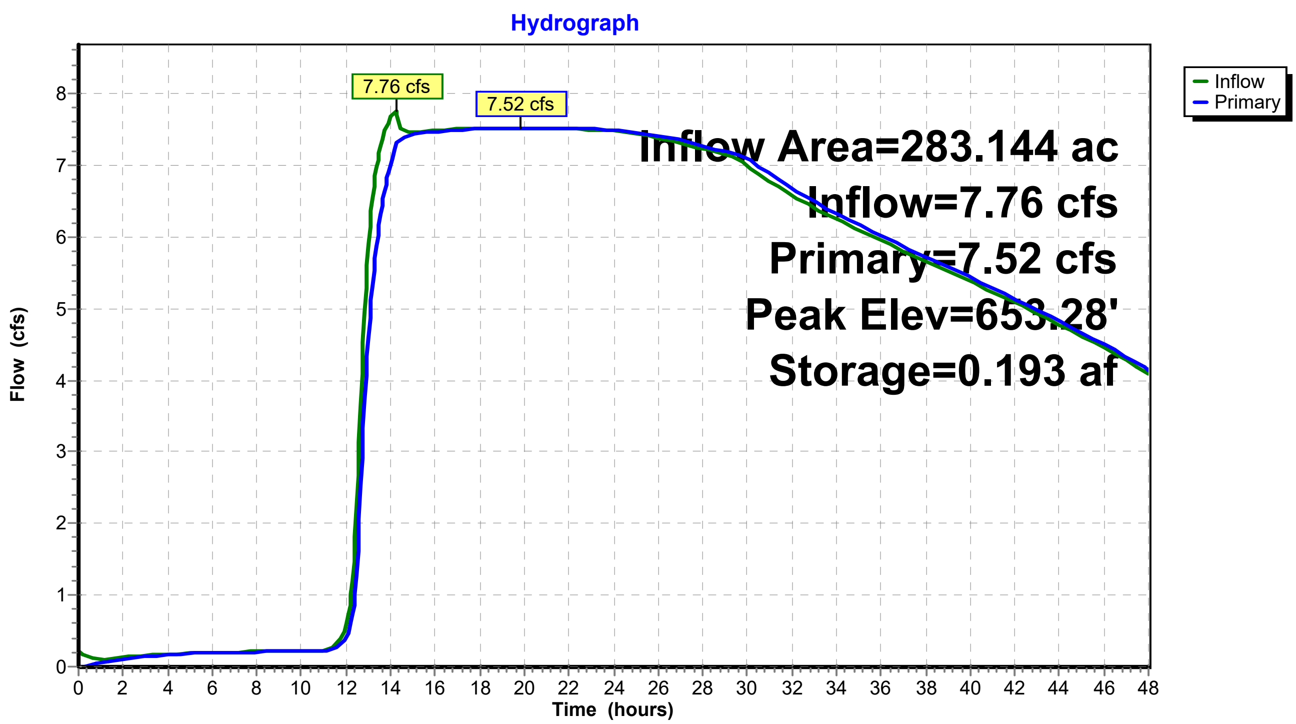

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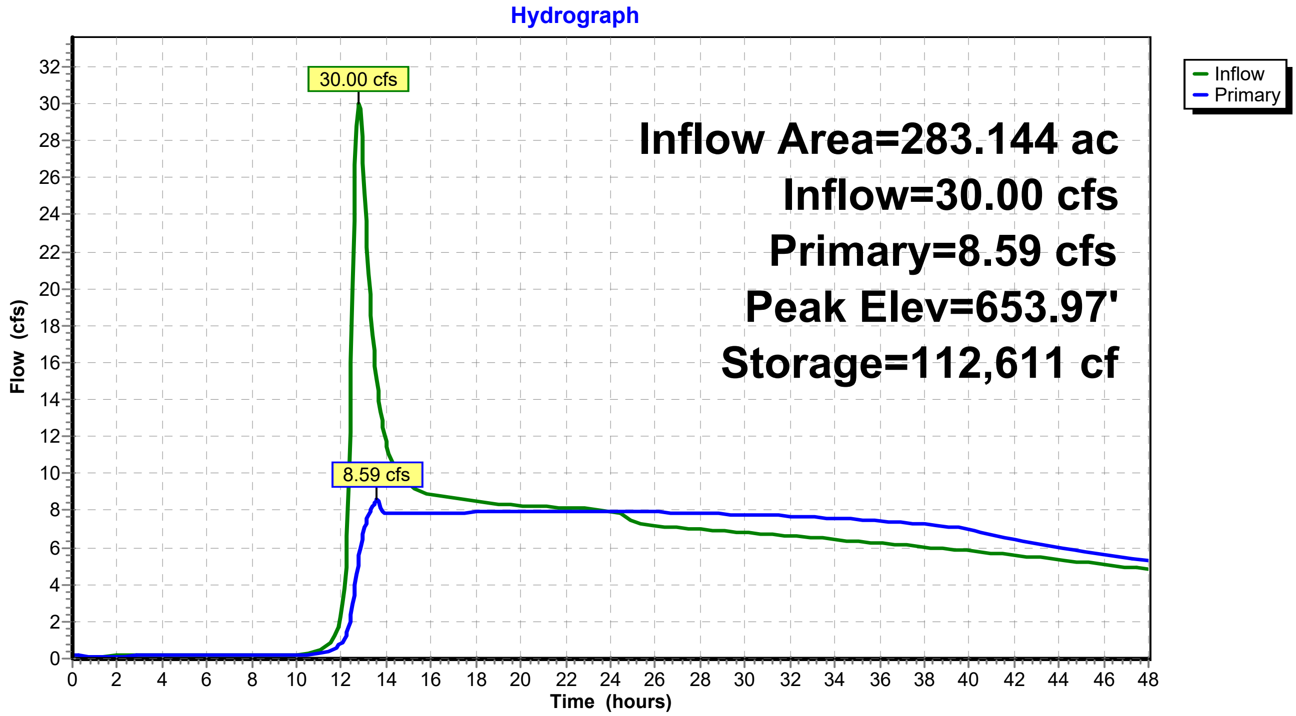
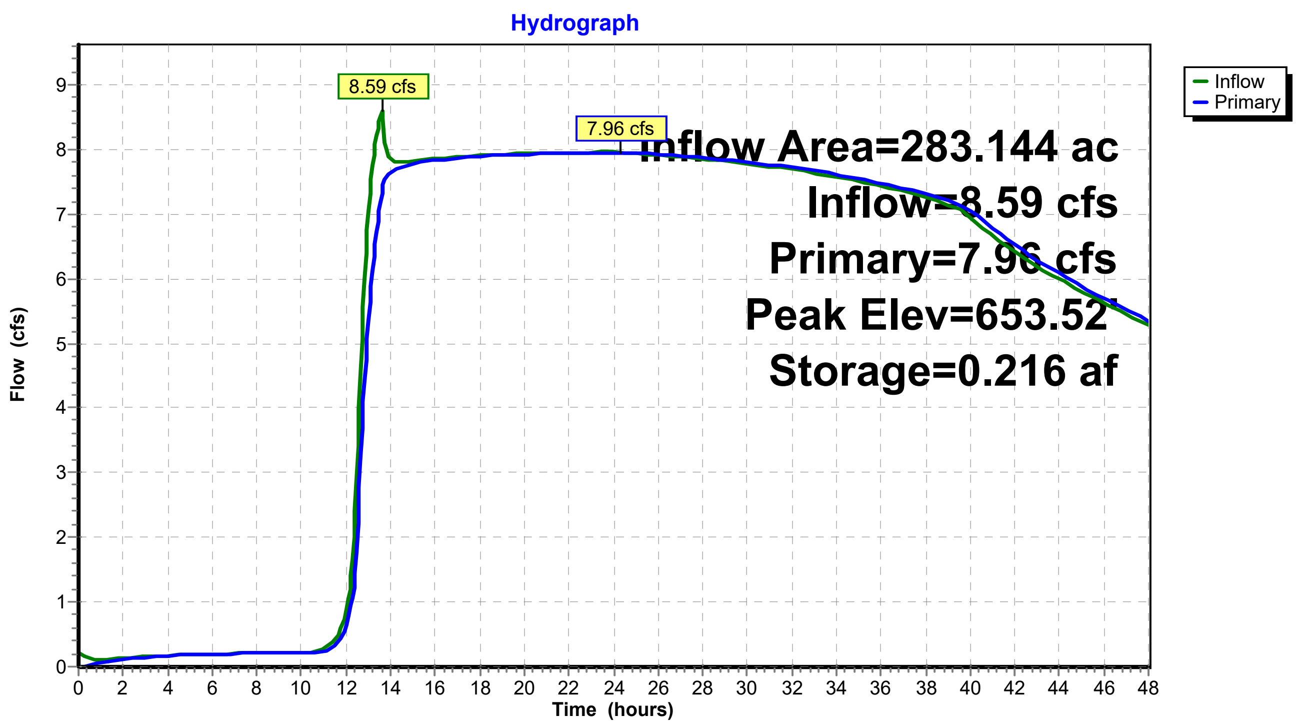
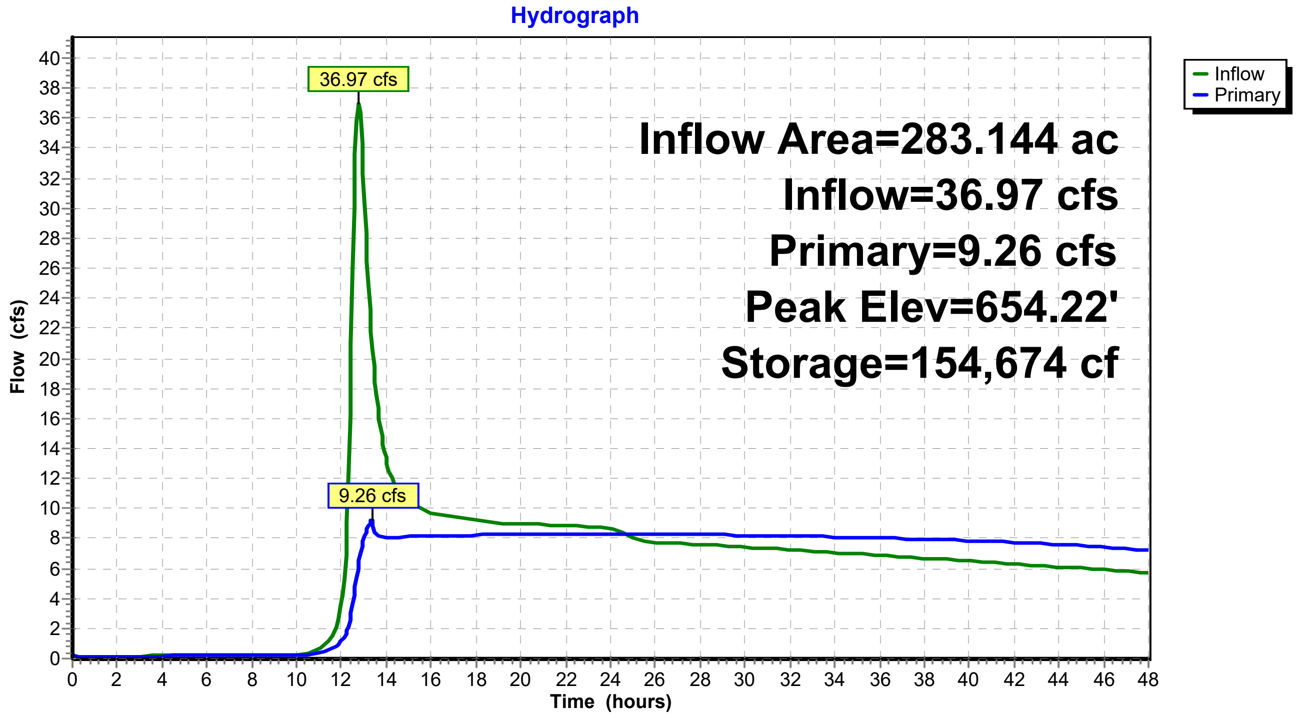


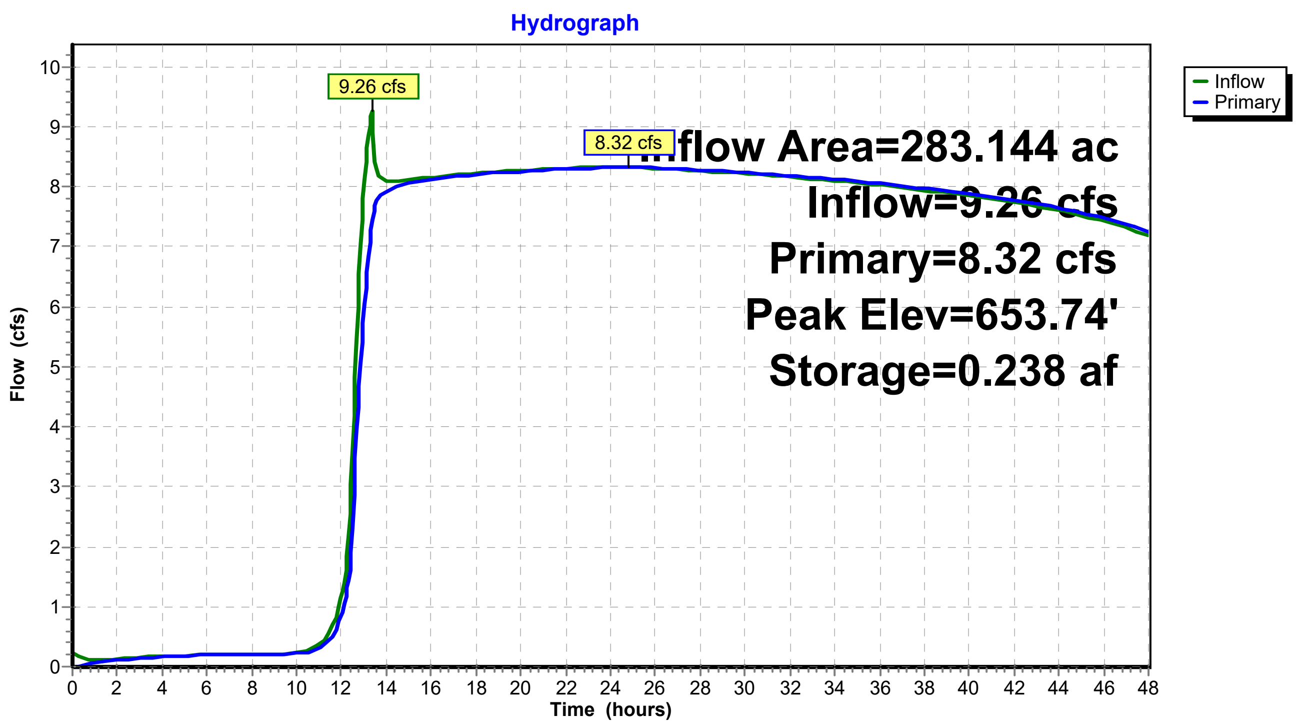
Pond 5P: Farmer's Field #2



Pond 4P: Farmer's Field #1



Pond 5P: Farmer's Field #2



ATTACHMENT D

SIGNED PERMISION LETTER

TO ACCESS LAND FOR CULVERT ASSESSMENT

Eagle Harbor

SAND & GRAVEL, INC.

August 1, 2019

Mr. Tom Decker
4626 Kams Road
Albion, New York 14411

Re: Property Culvert

Dear Tom:

As we discussed on the telephone, Eagle Harbor Sand & Gravel, Inc. seeks permission to evaluate the proper size of the culvert pipe located on the north side of your property on Kams Rd in the Town of Barre (map attached).

Once the evaluation is complete, we will contact you with our findings and discuss the proper procedure in which to move forward with possibly replacing with a larger size culvert pipe.

If this is agreeable, please sign and return this letter in the self-address stamped envelope enclosed.

If you have any questions in regard to this letter or any other items you wish to discuss, please feel free to contact me at 585-798-4501. Thanks for your consideration.

Sincerely,

Thomas Biamonte
Vice President

Tom Decker

10830 Blair Road
Medina, New York 14103
voice 585-798-4501
fax 585-798-1451