

MODULE 8

Module 8: Hydrology [§§77.405/77.406/77.407]

8.1 Chemical Analysis.

Provide the following data, in accordance with 8.2 for each point in the background sampling and monitoring program and report on Module 8.1(A).

- a) pH (field & laboratory) **See attached modules 8.1(A)**
- b) Total Suspended Solids (mg/l) **See attached modules 8.1(A)**
- c) Total Dissolved Solids (mg/l) or Specific Conductance ($\mu\text{S}/\text{cm}$ at 25°C) **See attached modules 8.1(A)**
- d) Field temperature at sample source (°C).

See attached modules 8.1(A)

- e) Provide the following in addition to a) through d) above, if requested by the Department. *

Total Alkalinity (mg/l)	See attached modules 8.1(A)
Total Acidity (mg/l)	See attached modules 8.1(A)
Total Iron (Fe) (mg/l)	See attached modules 8.1(A)
Total Manganese (Mn) (mg/l)	See attached modules 8.1(A)
Sulfates (SO_4) (mg/l)	See attached modules 8.1(A)

*If the proposed noncoal minerals to be mined are located within the coal fields or other known acid producing areas or a watershed sensitive to mining impacts, additional parameters may be required by the Department. Contact the appropriate District Mining Office prior to beginning sampling to determine if these parameters are needed.

- f) Flows of perennial streams above and below the operation and surface and underground mine discharges must be measured by approved methods. In addition, other flows from springs, streams, seeps or other discharge points in the representative monitoring program should be measured to reflect seasonal variations. (The Department may waive sampling points if there is a representative sampling of the requested points.) The elevations and flows of springs, seeps, and mine discharges are required.

See attached modules 8.1(A)

- g) Provide a description of the type of sample point (e.g. well, spring, etc.) and its relationship to the mine site (e.g. up-gradient, perched aquifer, down-gradient).

See attached modules 8.1(A)

- h) Provide the name(s), address(es) and telephone number(s) of the individual(s) responsible for the collection and analysis of this data.

Collection:

**SKELLY and LOY, Inc. - Dylan Woodworth
449 Eisenhower Boulevard, Suite 300
Harrisburg, Pennsylvania 17111
800-892-6532**

Analysis:

**Analytical Laboratory Services, Inc.
34 Dogwood Lane
Middletown, Pennsylvania 17057
717-944-5501**

- i) Provide a description of the methodology used to collect and analyze this data.

BACKGROUND SAMPLING AND MONITORING METHODOLOGY

In accordance with Module 8.2 of the Large Noncoal Mine Permit application, Skelly and Loy completed a background sampling and monitoring program to characterize baseline groundwater and surface water quality and flow conditions within the proposed permit area and within 1,000 feet of the permit area. The background sampling and monitoring program was performed on a monthly basis beginning July 13, 2016, in

compliance with PADEP's requirement for a minimum of two consecutive monthly sampling events (and six consecutive monthly sampling events for those points in the proposed monitoring plan) prior to permit approval. Most of the background sampling points (all points with the exception of the private water supplies) were sampled for six consecutive months. Sampling of two private residential supply wells (PWS) was completed coincident with the first two monthly monitoring events (July 13 and August 18, 2016) to meet PADEP's requirement for two consecutive monthly sampling events (for background sampling points) of proximate PWS's prior to permit approval. An additional PWS was added to the permanent monitoring program following the Pre-Application comment letter, and therefore, background samples were collected on this third PWS (PWS-15A16) beginning in September 2017. The background monitoring program consisted of collecting monthly samples from the following:

- Each stream that potentially receives discharge, runoff or drainage from the Northern Tract Quarry mining operation (sample locations SS-TC DS, SS-CHN1 DS, and SS-4)
- Streams, springs or wetlands that are representative of the surface and groundwater flow systems in the general area (W-Pond 1, SS-DCNR CHN, SS-TC DS, SS-CHN1 DS, SS-CHN1 US; SS-4, SS-Lower Seep, SS-DCNR Seep 1, SS-DCNR Seep 2, SS-Upper Seep, W-Wetland C, W-Wetland D, and SS-PFO Wetland)
- Springs, seeps and wetlands within the permitted areas and springs, seeps, and wetlands within 1,000 feet of the permitted area (SS-Lower Seep, SS-DCNR Seep 1, SS-DCNR Seep 2, SS-Upper Seep, W-Wetland C, W-Wetland D, and SS-PFO Wetland)
- Monitoring wells developed to determine the characteristics of the groundwater (Shallow: MW-8S, MW-9S, and MW-14S; Deep: MW-8D, MW-9D, MW-10D, MW-11D, MW-12D, MW-13D, and MW-14D). Note that the monitoring wells were sampled from April to September 2015 by URS (now AECOM), and PWS data was collected by Skelly and Loy from July to November 2016. Both of these data sets are included with the attached Module 8.1(A) Background Report.

The additional PWS and NPDES monitoring locations include:

- PWS-07A16, PWS-16A16, PWS-15A16
- The proposed Northern Tract Quarry expansion will have two NPDES Permit outfalls (001 and 002), which would provide for only rare discharges from spillways from NT Pond Nos 1 and 2, respectively. Such discharges would only occur during extreme storm events, exceeding the equivalent of a 100-year storm. All water generated from the Northern Tract Quarry will be directed back to the Lower Mill Ponds for discharge through a previously permitted NPDES point. The existing Lower Mill Pond system would be used for treating and discharging water from the proposed Northern Tract Quarry expansion. The Lower Mill Pond System is located at SGI's nearby West Ridge Quarry (SMP #6477SM5) and discharges through Outfall #001 as described in NPDES Permit #PA0009059. In the unlikely event that the Northern Tract Quarry Outfalls 001 and 002 discharge (that is, during storm events greater than 100-year/24-hour events), the discharge will be sampled as part of the monitoring program as further described in the Anti-Degradation Supplement to Module 2.

The monthly background sampling and monitoring program included evaluation and measuring (when measureable flow was evident) of the rate of flow at the following seep, wetland, and stream channel locations (SS-DCNR CHN, SS-Lower Seep, SS-CHN 1 DS, SS-CHN1 US, SS-Upper Seep, SS-PFO Wetland, and SS-DCNR Seep 1) in addition to the upstream (SS-TC-US), downstream (SS-TC-DS), and midstream (SS-4) locations in Toms Creek relative to the mine operation.

There are no known discharges from backfilled areas associated with underground or surface coal mines located within the permitted areas or within 1,000 feet of the permitted areas. In addition, there are no known discharges resulting from underground mine workings within the permit areas. Skelly and Loy is not aware of water supplies abandoned because of degradation or pollution as a result of mining within the permitted areas and/or within 1,000 feet of the permitted areas. The methodologies used by Skelly and Loy to collect and analyze groundwater and surface water data are discussed in the following sections.

GROUNDWATER LEVEL AND TOTAL WELL DEPTH MEASUREMENTS

In compliance with PADEP's requirement for monitoring well depths to extend at least 25 feet below the proposed pit floor level, Specialty Granules, LLC installed ten (10) on-site monitoring wells surrounding the perimeter of the proposed Northern Tract Quarry expansion area. These wells are comprised of three (3) shallow screened bedrock wells and seven (7) deep open-rock bedrock wells extending to the 12th level (proposed pit floor) defined in the current life of mine plan. The monitoring wells were sampled along with the two private water supply wells (PWS's Shank and Holbrook).

Depth-to-water (DTW) measurements were recorded in each monitoring well from surveyed reference points at the top of each well casing. The elevation of each PWS was taken from available topographic mapping created for Exhibit 6.2. Water levels were measured using an electric, conductance-activated water level indicator graduated at intervals of 0.01-foot. The water level probe was lowered into each well through a dedicated drop tube until making contact with the groundwater surface as indicated by an audible/visual alarm. After measuring and recording the DTW, the measurement process was repeated at least once to verify that the initial DTW reading was correct and accurately recorded. The DTW from the reference point was read directly from the graduated tape and recorded on field data sheets. All DTW measurements were collected before initiating any purging/sampling of the wells. The total depths of the monitoring wells are based on the driller's logs provided by SGI. The total depths of the two private water supply wells were obtained from the drillers log and notations on the inside of the well cap. The total well depth measurement was used to calculate purge volumes prior to sampling. As mentioned previously, the required groundwater monitoring events were completed during 2015 by others on behalf of SGI. As discussed with and subsequently approved by Mr. Rock Martin of PADEP's Cambria District Mining Office, the monitoring well data collected during 2015 can be used to serve as the required monthly baseline sampling events in lieu of completing additional sampling events coincident with the surface and groundwater sampling events completed by Skelly and Loy from July-November 2016.

PURGING AND SAMPLING METHODOLOGY

Background

Background groundwater monitoring was performed in 2015 for SGI by URS (now AECOM) at the Charmian Quarry Northern Tract Quarry to support the Large Non-coal Mine Permit Application. Six monthly groundwater sampling events were conducted, from April 2015 through September 2015. The monitoring network consists of 10 monitoring wells (MW-8S, MW-9S, and MW-14S and MW-8D through 14D). Field work was conducted in accordance with the Field Investigation Work Plan for Northern Tract Quarry Development, Charmian Facility, Blue Ridge Summit dated August 26, 2013. At the request of the Department following review of the Pre-Application for the Northern Tract Quarry, additional background monitoring (static water levels only) of the wells was conducted by Skelly and Loy coincident with additional surface water flow measurements beginning in September 2017.

Field Activities

URS/AECOM staff conducted the first groundwater monitoring event completed from April 1 to 2, 2015. Prior to any groundwater sampling, water level measurements were collected from all of the accessible wells at the Northern Tract Quarry. The measurements were made prior to purging to ensure that they represented static groundwater conditions. Measurements were recorded on field logs and in a field log book. Skelly and Loy initiated additional monthly static water level collection of the monitoring wells on September 28, 2017, and this data collection is ongoing.

During URS/AECOM's 2015 monitoring activities, the shallow wells were purged using a variable speed submersible pump (Grundfos Redi-Flow 2) with new or dedicated polyethylene tubing using low flow sampling protocol (ASTM D-6771). The wells were purged at flow rates that were generally maintained at <500 mls/minute. Field measured parameters (including pH, specific conductance, DO, turbidity and temperature) were recorded during purging. Once the field parameters had stabilized (+/- 0.2 unit for pH, +/- 3% for conductivity, and +/- 10% for turbidity and DO), the wells were sampled by filling laboratory-prepared bottleware directly from the tubing at low flows. Samples were then placed in a cooler on ice and maintained at a temperature of 4° Celsius or less through delivery to a PADEP-certified laboratory (ALS in Middletown, PA), using a Chain of Custody form to document sample handling.

The deep [bedrock] wells were purged using the dedicated submersible pumps that were installed in each of the wells approximately 20 feet above the bottom of the wells. These wells have depths ranging from 314 feet below ground surface (bgs) (MW-10D) to 394 feet bgs (MW-13D). The flow rates varied depending on the pump depth and well characteristics, and ranged from 5 to 10 gallons per minute. Pumping continued until the field measurements stabilized or the well went dry. Samples were then collected through the use of a valve used to reduce the pumped water to a manageable flow to fill laboratory supplied and preserved bottleware. It should be noted that the pump in MW-8D did not produce any water during sampling events and the well was subsequently found to have silt at the base that blocked the well intake (the pump has since been pulled and the well rehabilitated and sampled).

Quality Assurance/Quality Control (QA/QC)

New, dedicated tubing was used in each shallow well that was sampled with the portable submersible Redi-flow pump. The field team wore new Nitrile gloves during well gauging or sampling, which were changed between each sample location. Any equipment that was re-used (e.g., water level indicators, Redi-Flow pumps) was decontaminated between wells. Decontamination consisted of analconox® detergent solution wash, followed by a thorough rinse with potable water. The decontamination was completed with a deionized water rinse. The decontaminated equipment was wrapped in polyethylene sheeting or aluminum foil for storage or transportation from the decontamination

Samples were collected in bottleware that was prepared with applicable preservatives by the analytical laboratory. All samples were placed in coolers on ice after collection and kept at a temperature less than 4°Celsius through delivery to the laboratory. Chain of custody forms were used to document sample handling through receipt by the laboratory. The laboratory analyzed the samples within prescribed holding times in accordance with accepted methodologies. Laboratory QA/QC procedures were conducted for the analyses and no significant deviations were reported.

Field duplicates samples were collected and submitted to the laboratory for analysis during each sampling event (with the exception of the May event) and were submitted for the same analyte groups as the field samples. Field duplicates were identified as follows: DUP-[date of collection]. The location of the field duplicate was noted in the field logbook, and not provided to the laboratory as was a 'blind sample' for quality control purposes. The identities are listed on the laboratory summary table and are:

- DUP040215 (MW-14D) 4/2/2015
- DUP (MW-9D) 6/3/2015
- DUP (MW-13D) 7/1/2015
- DUP (MW-12D) 8/6/2015
- DUP (MW-9D) 9/3/2015 2

SURFACE WATER FLOW MEASUREMENTS

In accordance with Module 8.1(f) of the Large Noncoal Mine Permit Application, Skelly and Loy measured the flow rate of streams at the designated surface sampling stations established above and below the mining operation and its proposed expansion. Surface water flow measurements were collected from sample stations SS-TC US, W-Pond 1, SS-DCNR CHN, SS-TC DS, SS-4, SS-CHN1 DS, SS-CHN1 US; SS-Lower Seep, SS-DCNR Seep 1, SS-Upper Seep, W-Wetland C, W-Wetland D, and SS-PFO Wetland. Several potential seeps were noted during the field reconnaissance associated with the sampling events. These seeps were examined during each event for flow; however, seep flow rates were often small and precise flow data could not be collected. The locations of the stream and seep sample locations are shown on Exhibit 6.2.

Given the significant flow of Toms Creek and unnamed stream channel discharging along Iron Springs Road (locations SS-TC US, SS-TC DS, SS-4, SS-CHN 1 US and SS-CHN 1 DS), surface water flow was measured using a Marsh-McBirney Flo-Mate 2000® portable electromagnetic flow meter. The flow meter provides instantaneous readouts of stream velocity. After measuring the width of the stream and section, the flow rate was measured at up to 10 locations equally spaced across the stream. The flow rate was determined to be the average of the sum of the readings. In conjunction with determining flow rate, Skelly and Loy also collected the required field measurements (pH and temperature). These flow rates along with field and laboratory data obtained for each groundwater and surface water sampling event are recorded on the attached Module 8.1(A) Background Reports.

SAMPLE STORAGE AND CHAIN-OF-CUSTODY PROCEDURES

Skelly and Loy utilized sample collection and handling procedures consistent with PADEP protocols outlined in the Groundwater Monitoring Guidance Manual (December 1, 2001). All appropriate procedures were followed during the complete sampling chain including sample collection, sample storage, transportation, and delivery to the PADEP-certified laboratory. Following collection, surface water and groundwater samples were immediately placed into labeled laboratory-supplied containers. The sample containers were promptly placed in an insulated cooler filled with ice and maintained at a temperature of 4° Celsius or less during transport and until delivery to the laboratory. Chain-of-custody (COC) forms were completed in the field and accompanied the samples to Analytical Laboratory Services (ALS), a PADEP-certified laboratory (NELAC #22-00293) located in Middletown, Pennsylvania. The COC record was used for delivery and relinquishment of the groundwater and surface water samples to ALS.

8.2 Background Sampling and Monitoring.

a) Background Sampling

Provide the results of the chemical analyses, as required by the Department, that characterize the water quality of sample points listed in 1) through 8). Background sampling points must have at least two (2) complete chemical analyses, at monthly intervals. All sampling points must be keyed to Exhibit 6.2 and identified in Module 8.1(A).

Note: Include sample(s) from a low flow period.

- 1) each stream that receives discharge, runoff or drainage from the operation.
SS-TC DS, SS-CHN1 DS, and SS-4. See Module 8.1(A)
- 2) streams, springs or wetlands that are representative of the surface and groundwater system of the general area.
See above (1). Also, SS-TC US, SS-CHN1 US, SS-Lower Seep, SS-DCNR Seep 1, SS-Upper Seep, SS-DCNR CHN, W-Pond 1, W-Wetland C, W-Wetland D, and SS-PFO Wetland. See Module 8.1(A)
- 3) springs, seeps and wetlands within the permit area and springs, seeps and wetlands within 1,000 feet of the permit area.
W-Wetland C, W-Wetland D, SS-PFO Wetland, SS-Lower Seep, SS-Upper Seep, SS-DCNR Seep 1, SS-DCNR Seep 2, and SS-DCNR Seep 2. See Module 8.1(A)
- 4) impoundments within the permit area and impoundments within 1000 feet of the permit area.
W-Pond 1
- 5) impoundments, impoundment discharges, and discharges from backfilled areas associated with previous or current underground or surface coal mines within the permit area and within 1,000 feet of the permit area.
There are no known discharges from backfilled areas associated with mining located within the permitted area or within 1000 feet of the permitted area.
- 6) discharges within the permit area resulting from underground mines and discharges resulting from underground mines that are within the permit area but discharge outside the permit area.
There are no known discharges or discharges associated with underground mines located within the permitted area or that discharge outside the permitted area.
- 7) any monitoring wells developed to determine the characteristics of the groundwater. (The Department may require additional monitoring wells.)
MW-8S, MW-8D, MW-9S, MW-9D, MW-10D, MW-11D, MW-12D, MW-13D, MW-14S, and MW-14D. See Module 8.1(A)
- 8) private water supplies and water supplies abandoned because of degradation or pollution from mining, within the permit area and within 1,000 feet of the permit area. For each water supply sampled, provide the data required on the Private Water Supply Information Exhibit 8.2(A)(8) and indicate the source of the information (e.g. owner interview, survey by operator, P.E. etc.). (Provide driller logs if available.) (The Department may require additional water supply information on a case-by-case basis.)
PWS-07A16, PWS-16A16, PWS-15A16. See Module 8.1(A)

b) Monitoring Program

Describe the proposed surface and groundwater monitoring plan that will be conducted. The monitoring plan shall include quantity and quality measurements of discharges from the operation; points that will show any effect of the discharge on the receiving stream; and points that will show any effect on the groundwater system. Unless otherwise approved by the District Mining Office prior to permit application submittal, monitoring points must have a minimum series of six (6) complete chemical analyses collected at monthly intervals and should include the month of August, September or October to reflect low flow conditions.

See the *Background Sampling and Monitoring Methodology* narrative provided under section 8.1 above and listing below on the following page. Note that MW-9S and MW-9D will be relocated during Phase 3 of the erosion and sediment control plan to accommodate the installation of NT Pond No. 2. MW-13D will be relocated prior to the installation of NT Pond No. 1 during Phase 2 of the erosion and sediment control plan. Proposed locations for MW-9S, MW-9D, and MW-13D are shown on Exhibit 6.2 and Exhibit 9.

All monitoring points must be keyed to **Exhibit 6.2**. Monitoring plans must provide for collection and monitoring on a quarterly basis unless otherwise specified by the Department. All monitoring data must be compiled on Module 8.1(A) or equivalent facsimile. All monitoring points should be identified in the field with durable markers that can be

maintained (wooden stakes, metal or plastic tags, etc.; not just plastic flagging).

If monitoring Points are added during the pre-application field meeting, the Department will accept the application with three (3) months of sampling results for those points only.

The following monitoring locations should be included in the Northern Tract Quarry expansion monitoring program:

	Monitoring Points (Key to Exhibit 6.2)
1) receiving streams above proposed discharge points	<u>SS-TC US.</u> <u>SS-CHN1 US.</u> <u>SS-4</u>
2) receiving streams below proposed discharge points	<u>SS-TC DS.</u> <u>SS-CHN1 DS.</u> <u>SS-4</u>
3) abandoned underground or surface mine discharges that are hydrologically connected and may be impacted by the proposed mining	<u>None</u>
4) representative springs and seeps within the permit area and within 1,000 feet of the permit area	<u>DCNR Seep 1.</u> <u>Upper Seep</u>
5) representative wetlands with defined discharge points within the permit area and wetlands within 1,000 feet of the permit area that may be impacted by the proposed mining,	<u>Pond 1, Wetland</u> <u>C.</u>
6) water supplies	<u>PWS-15A16</u>
7) cased boreholes/piezometers	<u>MW-8D, MW-9D,</u> <u>MW-10D, MW-</u> <u>11D, MW-13D</u>
8) point source discharges	<u>NPDES Outfall</u> <u>Nos. 001 and 002</u>
9) treatment pond discharges	<u>None</u>
10) sedimentation pond discharges	<u>NPDES Outfall</u> <u>Nos. 001 and 002</u> <u>and NPDES</u> <u>PA0009059 #001</u>
11) pit water during active mining (identify by mineral being mined)	<u>None</u>
12) each monitoring well developed to determine the characteristics of the groundwater and MW-14D	<u>MW-10D, MW-11D,</u> <u>and MW-14D</u>

Note: In cases where cased boreholes/ piezometers or monitoring wells are not necessary, insert NA above and provide an explanation.

Module 8.1(A)
BACKGROUND (check appropriate block)

Operator: _____ Monitoring Point I.D.: _____ Description of Sample Point**: _____
 Operation Name: _____ Latitude: _____° _____' _____" N and _____° _____' _____" W _____
 Permit No.: _____ Longitude: _____° _____' _____" W _____
 Township: _____ Surface Elevation (MSL): _____
 County: _____

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							

Signature of Permittee or Responsible Official or Authorized Representative _____

Date _____

**Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

8.2(A)(8) PRIVATE WATER SUPPLY INFORMATION (key to Module 6.2)

Sample Point No	Owner	Type of Supply (Dug or Drilled Well, Spring)	Use	Surface Elevation (MSL)	Depth of Casing	Diameter of Well	Static Water Elevation (MSL) or Flow, Date of Measurement	Depth of Well	Type of Treatment If Any (iron filter, etc.)
PWS-07A16	Shank	Drilled	Domestic	1110	20'	6"	1,085.30 feet msl; 7 gpm (7/19/16); 1,068.49 feet msl (8/18/16)	250'	None
PWS-16A16	Holbrook	Drilled	Domestic	925	21'	6"	889.23 feet msl; 5 gpm (7/19/16); 890.70 feet msl (8/18/16)	225'	Sediment filter and sand separator
PWS-15A16	SGI/King	Drilled	Domestic	1084	unknown	6"	1050.34 feet msl (9/28/17)	90.45'	none
PWS-95BB16	Merryman	Drilled	Domestic	unknown	20'	6"	12 gpm (unknown date – data from adjacent permit)	500'	unknown
PWS-97B16	Beltowski	Drilled	Domestic	unknown	40'	6"	1.5 gpm (unknown date – data from adjacent permit)	300'	unknown

8.3 Groundwater Information.

- a) State if and when groundwater will be intercepted (e.g., mining below the water table, installation of a production well for support or processing facilities) and describe the groundwater system that exists within the permit and adjacent area. If pumping of groundwater is planned, indicate the estimated gallons/day to be pumped. Include the depth to groundwater and the water table conditions present (artesian, regional, perched, etc.), the relationship to the mineral to be mined, known groundwater problems, and the data and references used to establish the description. Groundwater modeling may be required if the pumping has the potential to adversely impact water supplies, wetlands and other water resources and their affiliated uses. (Key groundwater elevations to cross-sections in 7.1 (c).)

Generally, the water-bearing yields of the rocks underlying the site are very poor. Based on published data, 25% of domestic wells drilled into the metabasalt and metarhyolite yield less than 3 gallons per minute (gpm) and have a specific capacity of <0.23 (Taylor and Royer, 1981, pp. 12-13). The median depth to water in the metabasalt and the metarhyolite ranges from 44 feet to 22 feet respectively (Taylor and Royer, 1981, pp. 16). This data is consistent with the data collected from the site-specific explorations. In addition, the active Pitts quarry located south of the site area has reportedly encountered minimal groundwater during the quarry operations. There are no known groundwater problems in the project area.

Only the 5th through 12th bench levels were simulated in the Groundwater Model (Final Report dated December 19, 2017) since these were the only bench levels encountering groundwater. Published data and site-specific investigations of the project area suggest that permeability decreases with depth and is relatively independent of the geologic formation. Although different geologic formations exist in Adams County including the metabasalts and metarhyolites of the Catoclin Formation, the geologic zones are not consistent with the *hydrogeologic* zones. Generally, the upper 300 to 400 feet of the geologic material provides water; below this zone no water is encountered. Groundwater is inferred to flow radially outward from the topographic high of the proposed Northern Tract Quarry expansion area. The proposed quarry expansion is bounded to the west, north, and east by surface water streams and wetlands that, in some part, receive water from the site area; however, the majority of the water discharging to the streams and wetlands is comprised of surface runoff with only minor amounts derived from groundwater base flow (flow from the bedrock). Minor fluctuations are evident in the water level elevations, however, for the most part the water levels appear to remain steady with no erratic movements or complete lack of movement. This suggests that although the geologic formation exhibits low permeability, and is considered to be a poor aquifer, the formation does act as porous media as a result of the network of small fractures present in the rock material and documented minor fluctuations in water level elevations. However, the areal extent of the fracture network is extremely limited as demonstrated by the *site-specific* subsurface explorations confirming the formation's limited capacity for transmitting any significant quantities of groundwater. The hydrogeologic conditions in the project area are anomalous to those typically encountered throughout most of Pennsylvania. The Catoclin Formation is considered an outlier in that infiltrating precipitation *does not* establish ready hydraulic communication with the underlying bedrock aquifer. This condition is most pronounced during periods of reduced recharge (i.e., drought conditions) when base flow in the bedrock is typically at its lowest level. During these periods of reduced groundwater base flow, streams and wetland features in the project area receive the majority of their recharge from precipitation events and resulting surface water runoff, not base flow seepage emanating from the bedrock aquifer. Typical hydrogeologic environments sustain streams and wetlands with groundwater base flow during the dry season despite groundwater levels being at their lowest. In the case of the proposed Northern Tract Quarry Expansion area, the opposite is true in that streams and wetlands are sustained primarily by storm events, water stored in the shallow soils, and resulting surface runoff occurring during the growing season and drier (low base flow) portion of the year.

Water level measurements from three pairs of shallow/deep wells (MW-8S/MW-8D, MW-9S/MW-9D, MW-14S/MW-14D) do suggest that vertical gradients may exist; however, based on these data, the hydraulic gradients are mixed upward and downward gradients suggesting that the separation may be more a result of the dynamics of the fractured bedrock than actual gradients resulting from either hydrogeologic recharge or discharge zones. Based on these limited data, it is evident that the shallow overburden (consisting of soil and weathered bedrock [cap rock/saprolite]) materials that directly overlie the more competent bedrock have only a limited hydraulic connection to the underlying bedrock. While surficial flow readily occurs within the weathered cap rock/saprolite, little of this surficial flow infiltrates to a depth sufficient to contribute to the base flow present within the deeper competent (unweathered) bedrock. While no significant perched zones appear to be evident, the very low groundwater recharge rate, low conductivity bedrock material, low rate of surface water infiltration, and steeply sloping terrain act to limit the groundwater base flow component to surface streams and wetlands. During development of the proposed Northern Tract Quarry expansion, groundwater pumping will continue in the active Pitts Quarry throughout the early stages of reclamation in the Pitts Quarry. The pumping rate in the proposed Northern Tract Quarry will range from roughly 1 gallon per minute (gpm) (7th bench) to 9 gpm (12th bench). Based on the model simulations, it is evident that, as the quarry expansion deepens, the general zone of influence (drawdown) from the quarry is contained to the west, north, and east by the surface water streams. These pumping rates are shown on Table 9 of the Groundwater Model Report. These relatively low discharge

rates are consistent with the permeability of the bedrock material and the reported seepage rate observed in the Pitts Quarry to the south. No residential wells are impacted from the simulated drawdown of the proposed quarry expansion. Even during drought conditions, no substantial impacts to base flow from adjacent wetlands or streams are anticipated. The results of the Groundwater Model Report enclosed with this formal application contain a detailed evaluation of the quarry dewatering impacts on water supplies, wetlands, and other water resources in the project area along with a full description of the data and references used to create the model simulations.

- b) Describe the groundwater movement of the area and the conditions that control and influence the movement and infiltration. Include the influence of any underground mines, cave systems or other karst features.

Local precipitation is the source of all groundwater in the Northern Tract Quarry project area, which lies within the South Mountain area of Hamiltonban Township. Much of the precipitation in the project area reaches surface streams as overland runoff. Overland runoff is greatest in late winter or early spring, and lowest in late summer and early fall. The remaining precipitation infiltrates into the regolith and underlying bedrock, flowing from areas of high relief (high hydraulic head) to areas of low relief (low hydraulic head), through bedding planes, joints, fractures, faults, and other secondary openings. Infiltration beneath the surficial soils is controlled primarily by the cap rock/ saprolite and upper/weathered bedrock interface. Generally, published data (Taylor and Royer, 1981, pp. 18) suggests that the permeability of the porous material decreases with depth and is relatively independent of the geologic formation. Based on published geologic data, there are generally two hydrogeologic zones; one from the ground surface to approximately 400 feet where groundwater yields are present, and a zone below 400 feet where no groundwater yield exists. In addition, based on site-specific characterization data, a shallow overburden zone also exists as discussed above. Most water supply wells produce their greatest yield at or near this stratigraphic contact or where intersecting a water-bearing fracture within the upper 200 feet of the ground surface. While groundwater flow and yield is limited within this crystalline bedrock, groundwater movement is largely controlled by strike parallel longitudinal faults, fracture density and joint patterns present in the metabasalt. Regional groundwater flow is toward the northeast coincident with the regional geologic strike. Many of the streams originating in South Mountain parallel local faults until they reach the colluvial aprons which flank most of South Mountain (Low, et. al., 2002). Although drought conditions may impact the surface water streams and wetlands as a result of a loss of surface water flow, the impact of the quarry dewatering associated with the drought conditions would have no impact relative to further groundwater base flow loss.

The median yield of wells in this region is less than 5 gpm with 25 percent of supply wells yielding less than 3 gpm. Of 66 wells inventoried, the depth to water ranges from 3 to 100 feet below land surface with a median depth of 35 feet. Water levels also show a strong seasonal influence (Low, et. al., 2002).

The Groundwater Model Report enclosed with this formal application contains additional information regarding groundwater movement and infiltration at the site.

- c) Identify all aquifers above the lowest mineral to be mined and the first aquifer below the lowest mineral to be mined and the presence of any underground mine or cave system. Include stratigraphic units, depths, and any current use.

No underground mine or cave systems are present in the project area. A small exploration adit of limited extent, presumed to be associated with a copper vein or assemblage of index minerals commonly associated with copper, is known to be present near the highest elevation of the proposed Northern Tract Quarry. However, it is evident that no significant mining activity was developed as a result of this limited exploration. Based on published geologic data, published hydraulic conductivities, and site-specific characterization data, a preliminary groundwater model was developed incorporating three hydrogeologic zones with depth; the first zone is composed of the overburden soils and caprock/saprolite present in generally the upper 50 feet (Layer 1), the second zone consisting of bedrock between roughly 50 and 400 feet below the ground surface (Layer 2), and the third zone consisting of impermeable bedrock (Layer 3) generally below 400 feet in depth. Model Layer 1 was developed using site-specific subsurface exploration data, whereas model Layers 2 and 3 correspond to the published literature sources mentioned in preceding Section b above. It should be noted that due to the hydrogeological similarities between the geologic materials, permeability is relatively independent of the geologic formation. The distribution of these hydrogeologic units (layers) within the model domain is presented on Figure 9 of the Groundwater Model Report.

SGI's adjacent quarry operation (at permitted Pitts Quarry) actively mines the same metabasalt of the Catoclin formation that underlies the proposed Northern Tract Quarry expansion area. This existing operation is included in the Groundwater Model Report.

The Groundwater Model Report enclosed with this formal application provides additional information regarding the hydrogeologic units present and aquifers to be mined in the proposed Northern Tract Quarry expansion area.

- d) Identify the effects which any previous mining has had on the quantity and quality of the groundwater in the area, including impacts from increased turbidity, suspended solids or settleable solids. Include the source, rock unit involved

and the reasons for the effect.

SGL's adjacent quarry operation (the permitted Pitts Quarry) actively mines the same metabasalt of the Catoclin formation that underlies the proposed Northern Tract Quarry expansion area. Skelly and Loy has not identified any off-site water supplies that have been adversely impacted, contaminated, diminished, or interrupted as a result of mining activities conducted at the nearby mining operations operated by Specialty Granules, LLC.

The Groundwater Model Report enclosed with this formal application provides additional details related to effects of previous mining in the area on the quantity of the groundwater in the project area.

- e) Identify any other (i.e. non-mining) existing effects on the quantity and quality of the groundwater in the area. Include the source, involved and the reasons for the effect.

Objectionable quantities of background iron concentrations are reported locally (Fauth, 1978).

8.4 Surface Water Information.

- a) Identify each stream receiving drainage from the proposed operation and the 25 Pa Code Chapter 93 projected water use classification.

Stream

Unnamed Tributaries to Toms Creek

Classification

HQ-CWF, MF

Toms Creek

HQ-CWF, MF

- b) Identify the effects which previous mining has had on the quantity and quality of the surface waters in this area, including impacts from increased turbidity, suspended solids or settleable solids. Include the source, rock unit involved, and reasons for the effect.

Previous and current monitoring of the proposed Northern Tract Quarry expansion area and active areas of nearby metabasalt mining (West Ridge and Pitts Quarries) indicates no contamination, degradation of quantity/quality, or water level effects on surface waters. The Groundwater Model Report, enclosed with this formal application, provides additional details regarding this information.

8.5 Public Water Supply Information.

Provide the name, type, and location of all current public (community and non-community) surface water supplies that have intakes on the receiving stream within 10 miles downstream of the proposed permit area; public (community and non-community) water supplies (wells or springs) in or within one half mile of the proposed permit area; and public water supply wells for which any part of the permit area is within the Wellhead Protection Zone. Show the location of these supplies on Exhibit 6.1 or 6.2.

Potable water is supplied to the site by a non-transient, non-community water system consisting of two on-site supply wells equipped with sanitary seals and completed in bedrock. The two wells (designated Wells #2 and #3) are identified by the PA DEP Bureau of Water Supply Management as a Public Water Supply (PWS) #7010375. Review of the PA DEP Water Supply Inspection Report, dated August 15, 2005, indicated that Well #2 was installed in 1984 to a reported depth of 500 feet. This well is located downhill (south) and approximately 25 feet from the north side of Old Waynesboro Road (Latitude: 39°44'45.033" North, Longitude -77°27'19.006" West). Well #3 is also 500 feet in depth and located northwest of Well #2 near the southwest corner of the Specialty Granules, LLC office parking lot (Latitude: 39°44'48.572" North, Longitude -77°27'30.089" West).

According to PA DEP's Water Supply Inspection Report, Well #2 was constructed with 42 feet of 6-inch diameter permanent steel surface casing extending 6 inches below ground surface and is equipped with a submersible pump with a pumping capacity of 10 gpm. According to a July 2005 PA DEP Water Supply Inspection Report, Well #3 is only used during dry conditions, typically one month per year. It contains a submersible pump with a pumping capacity of 1.5 gpm and an unspecified amount of 6-inch diameter surface casing.

Neither Hamiltonban nor Washington Townships maintain public water supply systems within 0.5 mile from the proposed permitted areas. Additionally, there are no public surface water supplies (community and non-community) with intakes within 10 miles downstream of the permitted areas. Based on a December 2012 public records review completed by others, the Fairfield Municipal Authority (FMA) public supply wells were identified in Adams County near the Village of Maria Furnace. The FMA wellfield consists of four wells, which were identified in the United States Geological Survey's (USGS) Water-Resources Investigation Report 99-4108 titled *Summary of Hydrogeologic and Ground-Water Quality Data and Hydrogeologic Framework at Selected Well Sites, Adams County, Pennsylvania* (Low and Dugas, 1999). The *Adams County Water Supply and Wellhead Protection Plan (June 2001)* describes the wellhead protection area (WHPA) Zones 1, 2, and 3 for the FMA wellfield in addition to a number of other Adams County municipalities.

Zone 1 WHPA's were determined from a graphical interpretation of the volumetric flow equation developed by PA DEP (1996). This technique matches pumping rates to a fixed curve corresponding to a particular radius of influence needed to meet WHPA requirements based on specific well construction details. In the Adams County WHPP, Zone 2 areas were determined using safe yield well production values in gallons per day, where available, and considering drought (1 in 10 year frequency) groundwater recharge rates in gpd/square mile. From these values, the land area (in square miles) diverting water to a well under safe yield operating conditions during a 1 in 10-year drought condition can be calculated. Zone 3 WHPA's are determined by evaluating the upgradient land area (watershed) that contributes water to a Zone 2 WHPA.

The Adams County report includes a USGS topographic map depicting the WHPA for the FMA wellfield. Zone 2 is the

critical wellhead protection zone. The FMA's Zone 2 WHPA extends southwest of the wellfield with the proposed Northern Tract Quarry expansion area's permit boundary being approximately 3,500 feet east of this Zone 2 boundary. Therefore, the FMA's wellhead protection Zone 2 is located outside the 0.5 mile setback from the proposed Northern Tract Quarry permit boundary.

Additional public water supply wells owned by the Washington Township Municipal Authority (WTMA) were also identified during a public records review completed by Skelly and Loy in September 2016. Skelly and Loy's review of the wellhead protection zones established for the WTMA wellfield identified nine water supply sources (at least 4 wells and 4 springs) located southwest of the proposed Northern Tract Quarry expansion area. The locations of the wells comprising the WTMA wellfield are described in the Authority's Wellhead Protection Plan located on the Township's website. The plan includes mapping showing the locations of the Authority's Zone 1 and 2 WHPA's. The WTMA's Zone 2 WHPA is located 7,720 feet (1.5 mile) west of the permit boundary for the active Pitts Quarry and approximately 17,000 feet (3.2 miles) west of the permit boundary for the proposed Northern Tract Quarry expansion area. As a result, both the Zone 1 and Zone 2 WHPA's are located west and beyond the quarry's proposed 0.5 mile setback from the permit boundary established for the proposed Northern Tact Quarry expansion area.

8.6 Hydrologic Assessment

- a) Describe the groundwater hydrology in relation to the proposed mining operation (at maximum depth and lateral development) - i.e. - intercept regional water table, above regional water table, intercept perched water table, etc.

See Section 8.3 (above). Also, the Groundwater Model Report enclosed with this formal application contains additional detailed information associated with the groundwater hydrology (hydrogeology) and simulated water level elevations of the proposed Northern Tract Quarry expansion area at its proposed maximum depth and lateral development.

8.6 Hydrologic Assessment (continued)

- a) Identify water supply sources that may be contaminated, diminished or interrupted by the mining operation and the means to restore or replace the affected supply. Include a demonstration that the quantity of the water supply will be sufficient to meet the needs of the water supply use. Note why other water supplies will not be affected. Provide a specific capacity, step-drawdown, or other approved yield test for all water supplies that may be impacted by mining and for each proposed replacement supply source. Yield tests on other wells are at the discretion of the applicant or as requested by the Department. Provide specific capacity data on Module 8.6(A). Please refer to the guidance document, "Procedures for Establishing the Quantity of Water in Low-Yield Wells" for methods.

No residential wells are anticipated to be impacted from development of the proposed quarry based on the predictive simulations provided in the Groundwater Model Report enclosed with this formal application. Specific capacity testing was performed to establish a baseline of the groundwater yield characteristics for the Shank (07A16) and Holbrook (16A16) Private Water Supply (PWS) wells located within the 1,000-foot Permit Buffer. The well yield and capacity testing results for each location are shown below; however the yield of the Holbrook PWS decreased to 2 gpm before the well cavitated after approximately 45 minutes of pumping.

Holbrook (16A16):

Yield 4.5-5 gpm

Capacity 0.149 gpm/ft (before cavitation)

Shank (07A16):

Yield 7.3 gpm

Capacity 0.176 gpm/ft

- 1) Provide the existing operation and maintenance costs for each water supply that may be contaminated, diminished or interrupted by the mining operation and the projected operation and maintenance costs for the proposed replacement supply.

N/A. There are no identified water supplies that may be contaminated, diminished, or interrupted by the mining operation or projected operation.

- aa) If the operation and maintenance costs for the proposed replacement water supply will be more than for the existing water supply, identify the provisions for compensating the water supply owner for the increased costs or provide the consent to Lesser Water Supply Agreement Form 5600-FM-BMP0110 for the increased operation/maintenance costs.

N/A. No water supplies were identified that will be adversely affected by the proposed mining activities.

- b) Describe the probable hydrologic consequences of the proposed noncoal surface mining activities on the hydrologic system of the permit area and adjacent area both during and after the operation. Describe the impact, during and after mining, on existing quantity and quality of the surface and groundwater.

The simulated potentiometric groundwater elevation contours for the site area were used to compare the simulated bench expansions (5th bench through the 12th bench) discussed below to allow comparison and determine the potential impact that each of the anticipated expansions from the proposed Northern Tract Quarry pumping may have on the surrounding areas (i.e. wetlands, streams, residential wells). Based on the groundwater model simulations, it is evident that, as the quarry expansions deepen, the general zone of influence (drawdown) from the quarry is contained to the west, north, and east by the surface water streams. The maximum simulated quarry pit discharge (12th bench) is roughly 9 gallons per minute. This is a relatively low discharge rate but is consistent with the permeability of the bedrock material and the reported seepage rate observed in the existing Pitts Quarry to the south. The groundwater model simulations indicate that no substantial impacts in the form of diminished base flow to the streams and wetlands will occur as a result of the deeper bench advancements. However, there is a potential for water loss as a result of both the reduction in the run-off area (watershed) and the predicted decrease in elevation of the water table (especially in the western edge of Wetland D) adjacent to Wetland D caused by the dewatering of the proposed Northern Tract Quarry. This is discussed in more detail in Module 14.

The groundwater model simulations show that the reclamation water level can be maintained at an elevation of 1020 feet amsl.

The Groundwater Model Report is enclosed with this formal application.

- c) Is there evidence of sinkhole or cavern development in or within 1,000 feet of the proposed permit area? ☐ Yes ☒ No

If "yes" is checked, describe the effects mining will have on sinkhole or cavern development and the steps that will be taken to repair or alleviate sinkholes.

8-14

- d) Has groundwater modeling been conducted? ☒ Yes ☐ No

ATTACHMENT A

FORM 8.1As

Module 8.1(A)
☒ **BACKGROUND** or ☐ **MONITORING REPORT***
 (check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: PWS-07A16
 Latitude: 39° 46' 09.447" N and
 Longitude: -77° 26' 55.083" W
 Surface Elevation (MSL): 1110 feet msl

Description of Sample Point**: Private Water Supply Well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/19/2016	Electric Tape/Purge Rate	1,085.30 feet msl; 7.0 gpm	6.02	6.90	21	134	12.5	63	27	0.22	0.030	ND	13.1		ALS; Ryan Sheidy, Skelly and Loy
8/18/2016	Electric Tape	1,068.49 feet msl	5.72	7.28	ND	130	24.4	67	13	0.12	ND	ND	9.8		ALS; Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: PWS-16A16
 Latitude: 39° 46' 03.619"N and
 Longitude: -77° 25' 58.221"W
 Surface Elevation (MSL): 925 feet msl

Description of Sample Point**: Private Water Supply Well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/19/2016	Electric Tape/Purge Rate	889.23 feet msl; 5.0 gpm	6.54	7.46	ND	240	13.9	61	7	ND	ND	ND	13.7		ALS; Ryan Sheidy, Skelly and Loy
8/18/2016	Electric Tape	890.70 feet msl	5.78	7.52	ND	172	28.3	64	6	ND	ND	ND	12.2		ALS; Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

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** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Module 8.1(A)
☐ **BACKGROUND** or ☒ **MONITORING REPORT***
 (check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: PWS-15A16
 Latitude: 39° 46' 01.51"N and
 Longitude: -77° 26' 42.04"W
 Surface Elevation (MSL): 1085.74 feet msl

Description of Sample Point**: Private Water Supply Well

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{\text{cm}}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
9/28/2017	Electric Tape	1053.4' msl	6.81	7.62	N.D.	77	12.4	45	8	1.5	0.097	N.D.	N.D.		ALS; Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	1052.66' msl	6.43	7.11	18	65	12.9	57	17	5.4	0.16	0.20	3.5		ALS; Dylan Woodworth, Skelly and Loy
11/21/2017	Electric Tape	1058.0' msl	6.98	7.78	5	107	10.8	53	8	2.4	0.17	N.D.	2.8		ALS; Dylan Woodworth, Skelly and Loy
12/19/2017	Electric Tape	1055.75' msl	6.64	Lab results pending			10.9								ALS; Dylan Woodworth,

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-TC US
 Latitude: 39° 46' 4.097"N and
 Longitude: -77° 26' 55.686"W
 Surface Elevation (MSL): 1025 feet msl

Description of Sample Point**: Surface stream sample from Toms Creek, upstream

Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Laboratory and Name of Sampler	
								Submit above as requested by the Department							
7/13/2016	Marsh McBirney Flow Meter	667.54 gpm	6.24	7.94	7	41	18.8	27	ND	0.26	0.017	ND	4.1	ALS; Dylan Woodworth, Skelly and Loy	
8/18/2016	Marsh McBirney Flow Meter	521.46 gpm	6.75	7.59	7	65	22.3	24	ND	0.26	0.022	0.12	3.7	ALS; Dylan Woodworth, Skelly and Loy	
9/27/2016	Marsh McBirney Flow Meter	335.97 gpm	7.6	7.59	ND	57	15.9	26	ND	0.12	0.012	ND	2.8	ALS; Dylan Woodworth, Skelly and Loy	
10/26/2016	Marsh McBirney Flow Meter	292.78 gpm	6.88	7.49	ND	58	8.2	27	ND	0.67	0.0068	ND	4.9	ALS; Dylan Woodworth, Skelly and Loy	
12/7/2016¹	“	1641.35 gpm	6.4	7.27	ND	59	5.9	17	ND	0.17	0.0084	0.14	6.8	ALS; Dylan Woodworth, Skelly and Loy	
12/29/2016	“	836.93 gpm	6.3	7.40	ND	19	3.6	17	ND	0.085	ND	ND	5.9	ALS; Dylan Woodworth, Skelly and Loy	
9/28/2017	“	321.64 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	“	270.73 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/2017	“	1279.65 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/2017	“	597.4 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)
☐ **BACKGROUND** or ☒ **MONITORING REPORT***
 (check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: W-Pond 1
 Latitude: 39° 46' 16.368"N and
 Longitude: -77° 26' 42.309"W
 Surface Elevation (MSL): 985 feet msl

Description of Sample Point**: Surface water sample from pond/wetland
 Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/13/2016	Marsh McBirney Flow Meter	NO FLOW	4.7	8.30	53	57	26.3	50	ND	0.43	0.028	ND	2.3		ALS; Dylan Woodworth, Skelly and Loy
8/18/2016	Marsh McBirney Flow Meter	NO FLOW	7.18	9.04	ND	65	32.3	37	ND	0.21	0.0088	ND	4.1		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	Marsh McBirney Flow Meter	NO FLOW	7.1	7.70	ND	67	18.6	43	5	0.39	0.026	0.12	3.9		ALS; Dylan Woodworth, Skelly and Loy
10/26/2016	Marsh McBirney Flow Meter	NO FLOW	6.0	7.77	5	64	10.7	45	ND	0.27	0.015	ND	5.3		ALS; Dylan Woodworth, Skelly and Loy
12/7/2016¹	“	NO FLOW	5.8	8.64	ND	39	4.7	37	ND	0.12	0.0094	ND	5.5		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	“	NO FLOW	5.7	7.63	44	35	4.5	36	ND	1.9	0.068	0.62	5.0		ALS; Dylan Woodworth, Skelly and Loy
9/28/17	“	NO FLOW	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	“	Flow too minimal to measure.	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/2017	“	Flow too minimal to measure.	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/2017	“	Flow too minimal to measure.	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)
☒ **BACKGROUND** or ☐ **MONITORING REPORT***
 (check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-DCNR CHN
 Latitude: 39° 46' 18.512"N and
 Longitude: -77° 26' 32.732"W
 Surface Elevation (MSL): 998 feet msl

Description of Sample Point**: Surface water stream sample from unnamed tributary to Toms Creek
 Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{\text{cm}}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/13/2016	Marsh McBirney Flow Meter	147.67 gpm	6.27	7.73	ND	67	19.2	30	ND	0.15	0.0083	ND	3.4		ALS; Dylan Woodworth, Skelly and Loy
8/18/2016	Marsh McBirney Flow Meter	146.73 gpm	6.63	7.67	7	80	21.8	30	ND	0.21	0.017	ND	3.2		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	Marsh McBirney Flow Meter	28.64 gpm	7.7	7.71	5	72	14.8	34	ND	0.16	0.013	ND	4.3		ALS; Dylan Woodworth, Skelly and Loy
10/26/2016	Marsh McBirney Flow Meter	18.02 gpm	6.75	7.45	ND	75	6.6	34	ND	0.24	0.010	ND	3.6		ALS; Dylan Woodworth, Skelly and Loy
12/7/2016'	"	197.93 gpm	6.4	7.23	ND	41	5.8	14	ND	0.20	0.0099	0.11	6.8		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	"	136.27 gpm	7.1	7.43	ND	122	3.2	18	ND	0.088	0.0062	ND	5.8		ALS; Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-Lower Seep
 Latitude: 39° 46' 15.802"N and
 Longitude: -77° 26' 31.975"W
 Surface Elevation (MSL): 1003 feet msl

Description of Sample Point**: Surface water sample from seep

Note: ¹ With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/13/2016	Marsh McBirney Flow Meter	NO FLOW	7.5	7.45	600	181	23.1	58	18	6.1	0.54	3.9	ND		ALS; Dylan Woodworth, Skelly and Loy
8/18/2016	Marsh McBirney Flow Meter	NO FLOW	7.5	7.64	1290	240	22.0	46	ND	9.6	1.0	6.7	21.3		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	Marsh McBirney Flow Meter	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		Dylan Woodworth, Skelly and Loy
10/26/2016	Marsh McBirney Flow Meter	NO FLOW	6.18	7.20	327	195	8.1	56	12	1.4	0.21	1.2	10.6		ALS; Dylan Woodworth, Skelly and Loy
12/7/2016¹	“	NO FLOW	6.0	6.97	111	152	6.1	31	11	0.62	0.098	0.40	11.4		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	“	NO FLOW	6.6	7.10	18	106	3.8	23	5	0.63	0.11	0.52	10.3		ALS; Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-TC DS
 Latitude: 39° 46' 4.377"N and
 Longitude: -77° 26' 4.545"W
 Surface Elevation (MSL): 918 feet msl

Description of Sample Point**: Surface water sample from Toms Creek, downstream
 Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Laboratory and Name of Sampler	
								Submit above as requested by the Department							
7/13/2016	Marsh McBirney Flow Meter	1060.84 gpm	6.56	7.74	6	27	20.1	26	ND	0.12	0.0078	ND	4.1	ALS; Dylan Woodworth, Skelly and Loy	
8/18/2016	Marsh McBirney Flow Meter	1082.21 gpm	6.42	7.71	6	70	21.6	28	ND	0.23	0.012	ND	4.0	ALS; Dylan Woodworth, Skelly and Loy	
9/27/2016	Marsh McBirney Flow Meter	277.86 gpm	7.7	7.75	ND	60	15.0	35	ND	ND	ND	ND	2.8	ALS; Dylan Woodworth, Skelly and Loy	
10/26/2016	Marsh McBirney Flow Meter	291.41 gpm	6.44	7.62	ND	76	7.1	36	ND	0.088	0.011	ND	4.3	ALS; Dylan Woodworth, Skelly and Loy	
12/7/2016¹	“	1937.92 gpm	6.3	7.39	ND	41	6.3	17	ND	0.15	0.0068	0.12	6.6	ALS; Dylan Woodworth, Skelly and Loy	
12/29/2016	“	927.25 gpm	6.8	7.51	ND	112	2.3	21	ND	ND	ND	ND	5.8	ALS; Dylan Woodworth, Skelly and Loy	
9/28/2017	“	373.27 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	“	524.22 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/2017	“	1586.97 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/2017	“	912.36 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

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Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-CHN1 DS
 Latitude: 39° 46' 3.652"N and
 Longitude: -77° 26' 5.031"W
 Surface Elevation (MSL): 917.5 feet msl

Description of Sample Point**: Surface water sample taken from channel, downstream

Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Laboratory and Name of Sampler	
								Submit above as requested by the Department							
7/13/2016	Marsh McBirney Flow Meter	195.12 gpm	6.81	7.91	6	105	19.9	50	ND	0.15	0.010	ND	4.1	ALS; Dylan Woodworth, Skelly and Loy	
8/18/2016	Marsh McBirney Flow Meter	203.53 gpm	6.84	7.90	12	126	21.4	50	ND	0.18	0.013	0.12	4.3	ALS; Dylan Woodworth, Skelly and Loy	
9/27/2016	Marsh McBirney Flow Meter	65.30 gpm	7.7	7.86	ND	105	14.8	47	ND	ND	ND	ND	3.7	ALS; Dylan Woodworth, Skelly and Loy	
10/26/2016	Marsh McBirney Flow Meter	106.65 gpm	6.68	7.74	ND	123	6.8	52	ND	ND	ND	ND	5.3	ALS; Dylan Woodworth, Skelly and Loy	
12/7/2016¹	“	329.54 gpm	7.1	7.72	ND	65	6.5	44	ND	0.084	ND	ND	8.0	ALS; Dylan Woodworth, Skelly and Loy	
12/29/2016	“	257.14 gpm	6.6	7.69	ND	43	2.7	35	6	0.099	ND	ND	6.7	ALS; Dylan Woodworth, Skelly and Loy	
9/28/2017	“	99.49 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	“	122.16 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/2017	“	379.24 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/2017	“	159.3 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: W-Wetland C
 Latitude: 39° 45' 55.055"N and
 Longitude: -77° 26' 15.192"W
 Surface Elevation (MSL): 964 feet msl

Description of Sample Point**: Surface water sample taken from Wetland C

Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/13/2016	NO FLOW	964 feet msl	7.5	7.59	481	78	21.7	57	9	13.1	1.5	3.0	6.5		ALS; Dylan Woodworth, Skelly and Loy
8/18/2016	NO FLOW	964 feet msl	7.5	7.44	250	117	22.5	54	13	2.1	0.29	0.53	6.9		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	NO FLOW	964 feet msl	7.5	7.61	368	130	13.0	73	6	4.2	0.49	1.3	6.5		ALS; Dylan Woodworth, Skelly and Loy
10/26/2016	NO FLOW	964 feet msl	6.0	7.37	231	140	6.1	66	10	3.7	0.39	0.94	7.5		ALS; Dylan Woodworth, Skelly and Loy
12/7/2016¹	NO FLOW	964 feet msl	5.7	6.95	168	60	7.7	27	15	5.4	0.94	1.2	8.8		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	NO FLOW	964 feet msl	6.5	7.17	27	116	5.5	37	8	1.3	0.11	0.33	8.0		ALS; Dylan Woodworth, Skelly and Loy
9/28/17	No flow. < 1" deep, not flowing	964 feet msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	<1" of water present. Too minimal to measure flow		Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/2017	<1" of water present. Too minimal to measure flow		Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/2017	<1" of water present. Too minimal to measure flow		Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: W-Wetland D
 Latitude: 39° 45' 51.003"N and
 Longitude: -77° 26' 18.332"W
 Surface Elevation (MSL): 978 feet msl

Description of Sample Point**: Surface water sample taken from Wetland D

Note: ¹ With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Submit above as requested by the Department							Laboratory and Name of Sampler
								Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		
7/13/2016	NO FLOW	978 feet msl	8.5	7.63	507	74	22	72	11	2.5	0.24	0.65	5.2		ALS; Dylan Woodworth, Skelly and Loy
8/18/2016	NO FLOW	978 feet msl	8	7.15	148	93	22.9	50	25	2.9	0.22	1.3	16.8		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	NO WATER PRESENT	978 feet msl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		Dylan Woodworth, Skelly and Loy
10/26/2016	NO WATER PRESENT	978 feet msl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		Dylan Woodworth, Skelly and Loy
12/7/2016 ¹	NO FLOW	978 feet msl	5.9	7.00	287	78	7.2	28	14	3.1	0.11	1.5	13.2		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	NO FLOW	978 feet msl	6.3	7.08	104	38	3.5	28	10	2.7	0.074	1.6	10.7		ALS; Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-CHN 1 US
 Latitude: 39° 45' 50.728"N and
 Longitude: -77° 26' 17.821"W
 Surface Elevation (MSL): 975 feet msl

Description of Sample Point**: Surface water sample taken from Channel 1, upstream

Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{\text{cm}}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/13/2016	Marsh McBirney Flow Meter	195.73 gpm	6.92	7.89	13	115	20.3	45	ND	0.23	0.013	0.16	4.2		ALS; Dylan Woodworth, Skelly and Loy
8/18/2016	Marsh McBirney Flow Meter	138.75 gpm	7.00	7.87	19	134	21.1	51	ND	0.30	0.020	0.18	4.0		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	Marsh McBirney Flow Meter	90.68 gpm	7.9	7.84	ND	102	14.7	45	ND	ND	ND	ND	3.8		ALS; Dylan Woodworth, Skelly and Loy
10/26/2016	Marsh McBirney Flow Meter	117.85 gpm	6.4	7.64	ND	120	7.0	51	ND	0.11	0.0076	ND	5.2		ALS; Dylan Woodworth, Skelly and Loy
12/7/2016¹	“	328.61 gpm	6.8	7.67	ND	87	6.5	43	ND	0.071	ND	ND	7.8		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	“	216.85 gpm	6.9	7.61	ND	41	2.5	39	ND	0.11	ND	ND	6.2		ALS; Dylan Woodworth, Skelly and Loy
9/28/2017	“	125.93 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	“	157.22 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/2017	“	394.02 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/2017	“	180.27 gpm	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

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Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-Upper Seep
 Latitude: 39° 46' 9.156" N and
 Longitude: -77° 26' 45.694" W
 Surface Elevation (MSL): 1,013 feet msl

Description of Sample Point**: Surface water seep (often dry during the growing season and minimal water at other times)
 Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Laboratory and Name of Sampler
								Submit above as requested by the Department						
7/13/16	Marsh McBirney Flow Meter	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Dylan Woodworth, Skelly and Loy
8/18/16	Marsh McBirney Flow Meter	Minimal Flow (not measureable)	6.5	6.64	618	107	22.5	11	14	3.3	0.21	1.7	14.6	ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	Marsh McBirney Flow Meter	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Dylan Woodworth, Skelly and Loy
10/26/2016	Marsh McBirney Flow Meter	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Dylan Woodworth, Skelly and Loy
12/7/2016¹	“	NO FLOW	5.7	6.74	ND	63	6.0	12	9	0.41	0.0062	0.42	16.6	ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	“	NO FLOW	6.1	6.88	ND	23	3.6	12	6	0.21	ND	0.16	15.1	ALS; Dylan Woodworth, Skelly and Loy
9/28/17	“	NO WATER PRESENT	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.											Dylan Woodworth, Skelly and Loy
10/23/2017	“	Ponded Surface Water. No Flow	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.											Dylan Woodworth, Skelly and Loy
11/21/2017	“	Ponded Surface Water. No Flow	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.											Dylan Woodworth, Skelly and Loy
12/19/2017	“	Ponded Surface Water. No Flow	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.											Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-PFO Wetland
 Latitude: 39° 46' 15.102" N and
 Longitude: -77° 26' 35.999" W
 Surface Elevation (MSL): 1,004 feet msl

Description of Sample Point**: Surface water wetland (often dry during growing season)
 Note: 1 With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/13/2016	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
8/18/2016	NA	NO FLOW	6.06	7.44	47	137	23.0	26	ND	0.24	0.014	0.16	13.9		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
10/26/2016	NA	NO FLOW	4.68	6.49	360	274	8.9	43	54	14.1	0.46	2.8	ND		ALS; Dylan Woodworth, Skelly and Loy
12/7/2016¹	NA	NO FLOW	6.1	7.11	6	79	5.9	31	10	0.17	ND	0.19	9.0		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	NA	NO FLOW	6.1	6.90	74	75	4.5	17	9	0.50	0.012	0.51	8.1		ALS; Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-DCNR Seep 1
 Latitude: 39° 46' 11.258" N and
 Longitude: -77° 26' 6.147" W
 Surface Elevation (MSL): 937.5 feet msl

Description of Sample Point**: Surface water wetland (often dry during the growing season)
 Note: ¹ With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/13/16	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
8/18/16	NA	NO FLOW	7.0	7.22	10	114	21.3	57	24	0.27	0.081	0.16	10.3		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
10/26/2016	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
12/7/2016¹	NA	NO FLOW	6.3	7.13	ND	78	7.7	33	8	ND	ND	ND	8.0		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	NA	NO FLOW	6.5	7.12	ND	103	4.5	28	5	ND	ND	ND	8.9		ALS; Dylan Woodworth, Skelly and Loy
9/28/17	NA	NO WATER PRESENT	NA												Dylan Woodworth, Skelly and Loy
10/23/2017	NA	NO FLOW. JUST ONE SMALL AREA OF STAGNANT WATER.			Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.										Dylan Woodworth, Skelly and Loy
11/21/2017	Marsh McBirney Flow Meter	5.34			Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.										Dylan Woodworth, Skelly and Loy
12/19/2017	NA	NO FLOW. JUST ONE SMALL AREA OF STAGNANT WATER.			Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.										Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-DCNR Seep 2
 Latitude: 39° 46' 4.317" N and
 Longitude: -77° 26' 2.339" W
 Surface Elevation (MSL): 900 feet msl

Description of Sample Point**: Marginal surface water wetland (unlikely that samples can be collected at any time of the year)

Note: ¹ With PA DEP's prior permission, the November 2016 sampling event was completed on 12.7.2016 to reduce safety hazards to field personnel associated with the opening of Pennsylvania's antlered deer hunting (rifle) season.

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{\text{cm}}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
7/13/16	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
8/18/16	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
9/27/2016	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
10/26/2016	NA	NO WATER PRESENT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		ALS; Dylan Woodworth, Skelly and Loy
12/7/2016¹	NA	NO FLOW	4.8	6.07	ND	29	10.0	ND	10	ND	0.039	ND	6.4		ALS; Dylan Woodworth, Skelly and Loy
12/29/2016	NA	NO FLOW	5.1	6.28	9	23	6.3	7	14	0.19	0.028	ND	5.9		ALS; Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-8S
 Latitude: 39° 45' 48.415"N and
 Longitude: -77° 26' 23.830"W
 Surface Elevation (MSL): 1069.84 feet msl

Description of Sample Point**: Monitoring Well located approximately 750 feet east of the current Pitts Quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{\text{cm}}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Laboratory and Name of Sampler	
								Submit above as requested by the Department							
4/1/2015	Electric Tape	1046.49 msl	6.63	7.16	1190	99	11.48	46	26	43.10	0.990	26.30	9.3	ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS	
5/5/2015	Electric Tape	1046.76 msl	6.10	7.03	440	73	17.59	34	36	15.20	0.380	9.80	9.5	ALS; S. DeSaulniers, B. Martin, D. Coleman, URS	
6/3/2015	Electric Tape	1045.15 msl	6.20	6.5	322	134	15.87	34	49	12.30	0.320	7.80	10.4	ALS, L. Dunn, D. Coleman, URS	
7/1/2015	Electric Tape	1054.95 msl	5.78	6.77	628	155	18.13	46	43	13.20	0.270	8.10	8.6	ALS; L. Dunn, URS	
8/10/2015	Electric Tape	1045.23 msl	5.85	6.83	831	124	17.69	48	19	41.80	1.100	27.30	9.8	ALS; B. Martin, URS	
9/11/2015	Electric Tape	1043.43 msl	5.62	6.49	759	73	17.33	41	21	41.40	1.500	28.20	9.0	ALS; B. Martin, D. Coleman, URS	
9/28/17	Electric Tape	1041.39' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy.
10/23/2017	Electric Tape	1041.25' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	1044.39' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	1040.89' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-8D
 Latitude: 39° 45' 48.435" N and
 Longitude: -77° 26' 23.593" W
 Surface Elevation (MSL): 1068.27 feet msl

Description of Sample Point**: Monitoring Well located approximately 750 feet east of the current Pitts Quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
4/1/2015	Electric Tape	1042.76 msl	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS
5/5/2015	Electric Tape	1043.55 msl	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		ALS; S. DeSaulniers, B. Martin, D. Coleman, URS
6/3/2015	Electric Tape	1041.85 msl	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		ALS, L. Dunn, D. Coleman, URS
7/1/2015	Electric Tape	1052.60 msl	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		ALS; L. Dunn, URS
8/10/2015	Electric Tape	1042.26 msl	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		ALS; B. Martin, URS
9/11/2015	Electric Tape	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		ALS; B. Martin, D. Coleman, URS
9/28/17	Electric Tape	1039.53' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	1039.5' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	1041.96' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	1040.16' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-9S
 Latitude: 39° 45' 59.438" N and
 Longitude: -77° 26' 14.137" W
 Surface Elevation (MSL): 1018.41 feet msl

Description of Sample Point**: Monitoring Well located approximately 875 feet northeast of the current Pitts Quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
4/1/2015	Electric Tape	973.95 msl	5.97	6.46	61	35	16.46	13	52	0.38	0.045	0.42	6.1		ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS
5/5/2015	Electric Tape	994.82 msl	5.69	6.36	62	10	14.20	14	52	0.26	0.024	0.50	5.0		ALS; S. DeSaulniers, B. Martin, D. Coleman, URS
6/3/2015	Electric Tape	990.79 msl	5.19	6.25	956	50	16.00	14	35	1.30	0.220	2.70	4.9		ALS, L. Dunn, D. Coleman, URS
7/1/2015	Electric Tape	993.15 msl	5.15	6.14	187	71	18.24	14	58	0.42	0.030	0.26	<2.0		ALS; L. Dunn, URS
8/10/2015	Electric Tape	987.34 msl	5.62	6.14	619	52	14.26	15	26	0.51	0.150	0.47	2.2		ALS; B. Martin, URS
9/3/2015	Electric Tape	984.09 msl	5.59	6.50	1,260	52	18.19	24	27	2.3	0.43	6.3	2.0		ALS; B. Martin, D. Coleman, URS
9/28/17	Electric Tape	974.13; msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	978.32' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	977.04' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	976.99' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

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Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-9D
 Latitude: 39° 45' 59.354"N and
 Longitude: -77° 26' 14.235"W
 Surface Elevation (MSL): 1018.20 feet msl

Description of Sample Point**: Monitoring Well located approximately 875 feet northeast of the current Pitts Quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Laboratory and Name of Sampler	
								Submit above as requested by the Department							
4/1/2015	Electric Tape	994.49 msl	7.51	8.07	892	140	16.41	70	<5	15.50	0.300	6.90	9.1	ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS	
5/5/2015	Electric Tape	994.06 msl	7.70	7.91	264	87	13.01	70	15	14.30	0.230	1.00	8.7	ALS; S. DeSaulniers, B. Martin, D. Coleman, URS	
6/3/2015	Electric Tape	991.50 msl	7.16	7.93	12	133	12.55	78	<5	2.20	0.0250	0.24	10.2	ALS, L. Dunn, D. Coleman, URS	
7/1/2015	Electric Tape	993.95 msl	6.89	7.98	<5	168	17.34	95	<5	0.42	0.0034	<0.050	9.1	ALS; L. Dunn, URS	
8/6/2015	Electric Tape	989.95 msl	7.86	8.08	13	123	12.65	95	<5	3.20	0.040	<0.050	8.8	ALS; B. Martin, URS	
9/3/2015	Electric Tape	987.50 msl	8.32	8.09	8	136	13.30	99	<5	1.1	0.014	<0.050	9.3	ALS; B. Martin, D. Coleman, URS	
9/28/17	Electric Tape	986.02' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	985.37' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	986.50' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	986.45' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)
☐ **BACKGROUND** or ☒ **MONITORING REPORT***
 (check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-10D
 Latitude: 39° 46' 07.603"N and
 Longitude: -77° 26' 08.441"W
 Surface Elevation (MSL): 1006.93 feet msl

Description of Sample Point**: Monitoring Well located approximately 1.425 feet northeast of the current Pitts Quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l	Laboratory and Name of Sampler	
								Submit above as requested by the Department							
4/1/2015	Electric Tape	945.43 msl	6.28	7.20	14	76	15.20	31	19	0.130	0.010	0.13	7.6	ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS	
5/5/2015	Electric Tape	946.94 msl	6.23	7.01	6	55	12.26	30	12	<0.067	0.007	<0.11	7.7	ALS; S. DeSaulniers, B. Martin, D. Coleman, URS	
6/3/2015	Electric Tape	941.12 msl	5.88	6.97	<5	71	11.33	21	11	0.052	0.0044	0.058	9.9	ALS, L. Dunn, D. Coleman, URS	
7/1/2015	Electric Tape	950.40 msl	5.31	6.92	14	95	14.21	24	13	0.047	<0.0025	0.05	7.5	ALS; L. Dunn, URS	
8/6/2015	Electric Tape	951.09 msl	6.28	7.23	56	65	11.93	33	20	0.089	0.035	0.11	6.2	ALS; B. Martin, URS	
9/3/2015	Electric Tape	940.10 msl	6.61	7.08	<5	90	13.18	41	21	0.087	0.0069	0.12	7.1	ALS; B. Martin, D. Coleman, URS	
9/28/17	Electric Tape	940.86' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	941.51' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	945.97' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	942.57' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)
☐ **BACKGROUND** or ☒ **MONITORING REPORT***
 (check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-11D
 Latitude: 39° 46' 10.992"N and
 Longitude: -77° 26' 24.751"W
 Surface Elevation (MSL): 1046.29 feet msl

Description of Sample Point**: Monitoring Well located approximately 1.125 feet north-northeast of the current Pitts quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
4/2/2015	Electric Tape	1027.25 msl	7.78	8.03	77	158	12.27	132	<5	0.42	0.097	0.24	8.3		ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS
5/7/2015	Electric Tape	1023.06 msl	7.49	7.83	<5	163	12.01	136	6	0.071	0.033	<0.11	10.1		ALS; S. DeSaulniers, B. Martin, D. Coleman, URS
6/3/2015	Electric Tape	1021.84 msl	7.07	7.85	<5	164	12.97	146	9	0.088	0.019	0.058	11.1		ALS, L. Dunn, D. Coleman, URS
7/1/2015	Electric Tape	1023.08 msl	7.07	7.90	75	177	14.21	147	5	0.45	0.046	0.33	10.0		ALS; L. Dunn, URS
8/6/2015	Electric Tape	1021.24 msl	NS	7.98	48	186	NS	151	8	0.19	0.044	0.14	10.6		ALS; B. Martin, URS
9/3/2015	Electric Tape	1005.74 msl	6.14	8.03	7	183	12.03	165	9	0.2	0.020	0.15	10.8		ALS; B. Martin, D. Coleman, URS
9/28/17	Electric Tape	1020.80' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	1020.84' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	1021.06' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	1020.96' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-12D
 Latitude: 39° 46' 11.742"N and
 Longitude: -77° 26' 32.909"W
 Surface Elevation (MSL): 1077.58 feet msl

Description of Sample Point**: Monitoring Well located approximately 1,025 feet north of the current Pitts Quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
4/2/2015	Electric Tape	1067.64 msl	6.64	7.54	1,650	89	17.07	31	7	10.20	0.380	8.00	12.5		ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS
5/5/2015	Electric Tape	1067.32 msl	6.13	7.01	104	43	13.60	24	21	8.60	0.200	1.70	12.9		ALS; S. DeSaulniers, B. Martin, D. Coleman, URS
6/3/2015	Electric Tape	1048.08 msl	6.54	7.47	<5	100	11.77	56	<5	0.063	0.078	<0.050	15.7		ALS, L. Dunn, D. Coleman, URS
7/1/2015	Electric Tape	1069.96 msl	6.48	7.47	15	114	13.01	87	13	1.10	0.069	0.34	12.8		ALS; L. Dunn, URS
8/6/2015	Electric Tape	1064.53 msl	6.97	7.00	19	28	14.37	36	32	0.50	0.046	0.12	12.5		ALS; B. Martin, URS
9/3/2015	Electric Tape	1062.08 msl	7.13	7.67	<5	107	16.05	74	9	0.36	0.015	0.067	12.7		ALS; B. Martin, D. Coleman, URS
9/28/17	Electric Tape	1058.84' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	1059.01' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	1067.98' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/2017	Electric Tape	1065.83' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-13D
 Latitude: 39° 46' 07.853"N and
 Longitude: -77° 26' 37.402"W
 Surface Elevation (MSL): 1077.27 feet msl

Description of Sample Point**: Monitoring Well located approximately 700 feet north of the current Pitts quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
4/1/2015	Electric Tape	1047.64 msl	6.41	7.39	22	63	13.64	36	22	0.70	0.033	0.60	10.9		ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS
5/7/2015	Electric Tape	1045.99 msl	6.07	6.87	12	36	13.24	14	10	0.42	0.021	0.38	10.9		ALS; S. DeSaulniers, B. Martin, D. Coleman, URS
6/3/2015	Electric Tape	1029.03 msl	6.15	6.91	<5	64	13.27	26	14	0.044	0.0046	<0.050	12.0		ALS, L. Dunn, D. Coleman, URS
7/1/2015	Electric Tape	1048.82 msl	5.68	6.54	41	59	16.42	22	32	0.58	0.028	0.59	9.5		ALS; L. Dunn, URS
8/6/2015	Electric Tape	1042.53 msl	5.85	7.19	9	37	12.65	36	14	0.05	0.0057	0.06	10.6		ALS; B. Martin, URS
9/3/2015	Electric Tape	1037.04 msl	7.42	7.27	<5	72	11.65	38	9	0.065	0.0047	0.076	11.1		ALS; B. Martin, D. Coleman, URS
9/28/17	Electric Tape	1044.09' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	1044.55' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	1047.33' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	1046.78' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Module 8.1(A)

☒ **BACKGROUND** or ☐ **MONITORING REPORT***
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-14S
 Latitude: 39° 46' 01.988"N and
 Longitude: -77° 26' 42.859"W
 Surface Elevation (MSL): 1087.99 feet msl

Description of Sample Point**: Monitoring Well located approximately 400 feet north of the current Pitts Quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{\text{cm}}@25^{\circ}\text{C}$	Field Temp. $^{\circ}\text{C}$	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
4/2/2015	Electric Tape	1068.33 msl	6.23	7.12	14	106	11.75	42	23	0.27	0.016	0.22	<2.0		ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS
5/7/2015	Electric Tape	1068.10 msl	5.99	6.86	<5	72	14.57	41	27	0.068	<0.0056	<0.11	2.6		ALS; S. DeSaulniers, B. Martin, D. Coleman, URS
6/3/2015	Electric Tape	1059.61 msl	5.85	7.13	<5	106	13.43	42	<5	0.13	0.0063	0.10	3.2		ALS, L. Dunn, D. Coleman, URS
7/1/2015	Electric Tape	1071.78 msl	5.80	6.76	376	129	15.89	42	31	0.52	0.032	0.44	2.3		ALS; L. Dunn, URS
8/10/2015	Electric Tape	1061.06 msl	6.00	6.72	37	111	13.50	40	28	2.60	0.061	2.10	2.4		ALS; B. Martin, URS
9/3/2015	Electric Tape	1058.01 msl	5.87	7.01	<5	72	12.25	41	21	0.33	0.016	0.28	3.3		ALS; B. Martin, D. Coleman, URS
9/28/17	Electric Tape	1054.35' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	1056.91' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	1059.01' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	1056.91' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

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Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

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Module 8.1(A)
☒ **BACKGROUND** or ☐ **MONITORING REPORT***
 (check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: MW-14D
 Latitude: 39° 46' 02.145"N and
 Longitude: -77° 26' 41.374"W
 Surface Elevation (MSL): 1088.41 feet msl

Description of Sample Point**: Monitoring Well located approximately 400 feet north of the current Pitts Quarry operation (SMP#01930302)

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/\text{cm}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
4/2/2015	Electric Tape	1060.24 msl	6.35	7.22	<5	86	12.08	43	29	2.20	0.029	<0.050	2.6		ALS; S. DeSaulniers, R. Crispino, D. Coleman, URS
5/7/2015	Electric Tape	1059.92 msl	6.44	7.00	49	79	15.50	38	28	29.00	0.084	<0.11	2.5		ALS; S. DeSaulniers, B. Martin, D. Coleman, URS
6/3/2015	Electric Tape	1046.79 msl	6.25	7.09	<5	108	12.12	51	23	3.30	0.110	<0.050	2.9		ALS, L. Dunn, D. Coleman, URS
7/1/2015	Electric Tape	1064.30 msl	6.23	7.08	26	136	16.16	68	24	10.80	0.120	<0.050	2.7		ALS; L. Dunn, URS
8/6/2015	Electric Tape	1052.14 msl	6.22	7.34	83	90	13.59	71	23	25.50	0.130	0.071	2.7		ALS; B. Martin, URS
9/3/2015	Electric Tape	1057.57 msl	6.55	7.17	21	101	15.39	47	16	11.4	0.032	<0.050	3.3		ALS; B. Martin, D. Coleman, URS
9/28/17	Electric Tape	1047.24' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
10/23/2017	Electric Tape	1046.97' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
11/21/17	Electric Tape	1052.34' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy
12/19/17	Electric Tape	1050.34' msl	Not required to collect grab sample – just flow to coincide with static water level measurements in monitoring wells.												Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

Module 8.1(A)

☐ BACKGROUND or ☒ MONITORING REPORT*
(check appropriate block)

Operator: Specialty Granules LLC
 Operation Name: Northern Tract Quarry
 Permit No.: pending
 Township: Hamiltonban
 County: Adams

Monitoring Point I.D.: SS-4
 Latitude: 39° 46' 15.43" N and
 Longitude: -77° 26' 27.21" W
 Surface Elevation (MSL): 995 feet msl

Description of Sample Point**: _____

Instructions: Use a separate sheet for each sample point and list results consecutively by date.

Date Sampled	Method of Flow Measurement	Flow (GPM) or Static Water Elevation	Field pH	Laboratory pH	Suspended Solids mg/l	Total Dissolved Solids mg/l or Specific Conductance $\mu\text{S}/_{\text{cm}}$ @25°C	Field Temp. °C	Alkalinity mg/l	Acidity mg/l	Iron Mg/l	Manganese mg/l	Aluminum mg/l	Sulfate mg/l		Laboratory and Name of Sampler
								Submit above as requested by the Department							
9/28/2017	Marsh McBirney Flow Meter	315.46	7.05	7.57	N.D.	78	52.5	37	N.D.	0.10	0.0087	N.D.	3.2		ALS; Dylan Woodworth, Skelly and Loy
10/23/2017	Marsh McBirney Flow Meter	371.84	7.42	7.37	N.D.	39	13.1	34	N.D.	0.12	0.011	N.D.	4.5		ALS; Dylan Woodworth, Skelly and Loy
11/21/2017	Marsh McBirney Flow Meter	1373.14	7.29	7.44	N.D.	74	6.0	18	N.D.	0.069	0.0058	N.D.	5.5		ALS; Dylan Woodworth, Skelly and Loy
12/19/2017	Marsh McBirney Flow Meter	833.53	7.17	Lab results pending			5.4								ALS; Dylan Woodworth, Skelly and Loy

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature of Permittee or Responsible Official or Authorized Representative ***

Date

* Water Monitoring Report Cover Sheet Form 5600-FM-MR0113 may be used for multiple monitoring point sample submittals.

** Description should include type of sample point, relation to mine site, treatment and other comments (such as odor, color, etc.)

*** Written notification of delegation of signatory authority must be submitted to the Department if signature is other than company official. Signature not necessary if this report is submitted as part of the permit application.

ATTACHMENT B

PRIVATE WATER SUPPLY OWNER COORDINATION

Attached letter sent to the following addresses

006-A16

Mr. George G. Warner
Property Owner
Post Office Box 277
Blue Ridge Summit, PA 17214

007-A16

Mr. and Mrs. Kenneth Shank
Property Owners
15469 Norwood Avenue
Post Office Box 309
Blue Ridge Summit, PA 17214

016-A16

Mr. Stephen W. Holbrook
Property Owner
1698 Iron Springs Road
Fairfield, PA 17320

019-A16

Mr. and Mrs. William Deardorff
Property Owners
220 Petes Lane
Fairfield, PA 17320

034-A17

Mr. and Mrs. David A. Paolini
Property Owners
2150 Iron Springs Road
Fairfield, PA 17320

005-B15

PA Department of Conservation
and Natural Resources
Property Owner
Post Office Box 8451
Harrisburg, PA 17105

095-B16*

J P Morgan Chase Bank, National
Association
Property Owner
111 Polaris Parkway
Columbus, OH 43240

Parcel 097-B16

Beltowski, David D. & Denise L.
1648A Iron Springs Rd.
Fairfield, PA 17320

095A-B16

Mr. and Mrs. John D. Craig
Property Owners
1748 Iron Springs Road
Fairfield, PA 17320

095B-B16**

Wells Fargo Bank
Property Owner
3476 Stateview Boulevard
Fort Mill, SC 29715

99-B16

Mr. and Mrs. Thomas A. Estes, Jr.
Property Owners
Post Office Box 346
Fairfield, PA 17320

99A-B16

Ms. Crystal J. Heller
Property Owner
245 Pete's Lane
Fairfield, PA 17320

96-B16

Mr. Eric E. Shaffer
13902 Wolfsville Road
Smithburg, Maryland 21783-9331

* Note: Since original letter was sent to J P Morgan Chase, parcel ownership for 095-B16 was updated to the landowner (below), and a letter was sent to:

Mr. Bryon Dick
26 Echo Trail
Fairfield, PA 17320

** Note: Since original letter was sent to Wells Fargo, parcel ownership for 095B-B16 was updated to the landowner (below), and a letter was sent to:

Mr. and Mrs. Scott H. Merryman
1682 Iron Springs Road
Fairfield, PA 17320

449 Eisenhower Boulevard, Suite 300
Harrisburg, PA 17111-2302

E-mail: skellyloy@skellyloy.com
Internet: www.skellyloy.com



Phone: 717-232-0593
800-892-6532

Fax: 717-232-1799

October 10, 2017

Mr. Eric E. Shaffer
13902 Wolfsville Road
Smithburg, Maryland 21783-9331

Re: Residential Monitoring Access
Request, Parcel 18B16-96
Specialty Granules, LLC
Hamiltonban Township,
Adams County, Pennsylvania

Dear Mr. Shaffer:

Skelly and Loy, Inc. is an environmental engineering and consulting firm based in Harrisburg, Pennsylvania, that will be completing water sampling to evaluate flow conditions in the vicinity of the Specialty Granules, LLC (SGL) Charmian Quarry located on Old Waynesboro Road near Blue Ridge Summit, Adams County, Pennsylvania. The quarry property is located approximately 1 mile northeast of Greenstone, 2 miles northeast of Charmian, and 3.2 miles northeast of Blue Ridge Summit. Skelly and Loy has been engaged to initiate these efforts on behalf of SGL having its principal place of business in Hagerstown, Maryland.

We are requesting written authorization from selected property owners with potable water supply wells, wetland seeps, springs, or surface water stream access in the immediate vicinity of the project area to allow their properties to be accessed for the purpose of monitoring the *quality* and *quantity* of the above water features. Our "monitoring" will consist of collecting monthly flow measurements and water quality samples from streams, wetlands, and springs for a period of six consecutive months (total of six water samples). Our monitoring of private wells will consist of collecting monthly groundwater samples for a period of two consecutive months (total of two water samples). The total time required to collect each sample is estimated to take no more than 30 minutes and includes ingress and egress from your property. If your property contains a private supply well, we should note that *up to four hours* may be necessary for conducting an initial yield test to assess the quantity or discharge rate of the source. Access to these water features will be coordinated directly with you or with an authorized individual of your selection to ensure that access to your property and any needed subsequent visits can be scheduled at a convenient time for you and/or other occupants.

At this time, we anticipate that these samples will be acquired over a consecutive six-month period extending ~~from September 2017~~ through February 2018. Please also be aware that, while this water monitoring is expected to be completed over a six-month period for surface water sources and a two-month period for private groundwater wells, the projected testing schedule may be modified, delayed, or extended slightly for a variety of reasons (e.g., unfavorable weather conditions [heavy rainfall], low-flow conditions, etc.).

Mr. Eric E. Shaffer
Page 2
October 10, 2017


Water quality and flow data gathered during the monitoring program will be used to establish baseline conditions and evaluate the effects of quarry operations on surrounding groundwater users and surface water resources. These data will further enable us to determine the baseline water quality and avoid any adverse impacts to local water levels, potable groundwater supplies relied on by nearby residential well owners, and surface water resources. Monitoring data generated during the testing program will be compiled into a report documenting the results of our monitoring and testing activities. A copy of these data will be provided to the Pennsylvania Department of Environmental Protection's Cambria District Mining Office. Please note that a copy of the water monitoring results obtained from monitoring your private sources during this monitoring program will be provided to you upon request.

Please understand that you are under no obligation to grant access to your property or water sources per this request; however, we urge you to utilize this opportunity to allow our representatives to access your property for the purpose of collecting the data necessary to perform an appropriate analysis of the water resources in the project area. Having access to water sources located on or adjacent to your property will enable Skelly and Loy to fully characterize the existing water sources on or near your property and enhance the accuracy of the baseline data generated during the monitoring program. Please consider providing Skelly and Loy temporary access to your private residential well and/or nearby surface water resources and acknowledge such approval by providing your signature in the space below.

For your convenience, we are enclosing a self-addressed stamped envelope for returning your signed letter. If you have any questions or concerns regarding this temporary monitoring request or proposed testing schedule, please contact me. Thank you for your time and cooperation in this matter. It is very much appreciated.

Sincerely yours,

SKELLY and LOY, Inc.

 Douglas J. Hess, P.G.
Director of Groundwater and
Site Characterization Services

Enclosures

cc: Laura Berra, P.E., Skelly and Loy
R15-0340.000
File: SHAFFER_DJH.docx

Mr. Eric E. Shaffer
Page 3
October 10, 2017

I WILL allow access to my property for
monitoring

Signature of Property Owner

Name of Property Owner (Please Print)

Date

I WILL NOT allow access to my property for
monitoring

Signature of Property Owner

Name of Property Owner (Please Print)

Date

UNITED STATES POSTAL SERVICE

MD 212

16 OCT 2017

PM 6 L

• Sender: Please print

RECEIVED
OCT 18 2017

RV:.....

2952 ET46 0000 0520 9T02

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
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For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee

\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$	
<input type="checkbox"/> Return Receipt (electronic)	\$	
<input type="checkbox"/> Certified Mail Restricted Delivery	\$	
<input type="checkbox"/> Adult Signature Required	\$	
<input type="checkbox"/> Adult Signature Restricted Delivery	\$	

Postage

\$

Total

\$

Sent

Street

City, State

R15-0340.000-DJH/LDB
ERIC E SHAFFER
13902 WOLFSPVILLE RD
SMITHBURG MD 21783-9331

Postmark
Here

PS Form 3800, April 2015 PSN 7530-02-000-9047

See Reverse for Instructions

SENDER: COMPLETE THIS SECTION


- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-0340.000-DJH/LDB
ERIC E SHAFFER
13902 WOLFSSVILLE RD
SMITHBURG MD 21783-9331

COMPLETE THIS SECTION ON DELIVERY

A. Signature



☐ Agent

☐ Addressee

B. Received by (Printed Name)

Eric Shaffer

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes

If YES, enter delivery address below: ☐ No

3. Service Type

☐ Certified Mail®

☐ Priority Mail Express™

☐ Registered

☐ Return Receipt for Merchandise

☐ Insured Mail

☐ Collect on Delivery

USPS TRACKING# 2507 2559 0000 0212 4102

9590 9402 1391 5285

United States Postal Service

RECEIVED JUN 08 2015

BY:

• Send to

U.S. Postal ServiceTM
CERTIFIED MAIL[®] RECEIPT
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For delivery information, visit our website at www.usps.com.

OFFICIAL USE

Postage	\$	Postmark Here
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		

R15-340.000-DJH
MR & MRS JOHN D CRAIG
1748 IRON SPRINGS RD
FAIRFIELD PA 17320

PS Form 3800, July 2014 See Reverse for Instructions

USPS TRACKING# 6901 2559 0000 0212 4102

9590 9402 1391 5285

United States Postal Service

RECEIVED JUN 08 2015

BY:

• Send to

U.S. Postal ServiceTM
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For delivery information, visit our website at www.usps.com.

OFFICIAL USE

Postage	\$	Postmark Here
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		

Total R15-340.000-DJH
STEPHEN W HOLBROOK
1698 IRON SPRINGS RD
FAIRFIELD PA 17320

Sent To
Street, Apt. N
or PO Box N
City, State, Z

PS Form 3800, July 2014 See Reverse for Instructions

USPS TRACKING# 9264 6489 1000 0090 0702

9590 9402 1793 6074

United States Postal Service

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BY:

• Send to

U.S. Postal ServiceTM
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OFFICIAL USE

Postage	\$	Postmark Here
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		

Total Poste R15-0340.000-DJH
BRYON DICK
26 ECHO TRAIL
FAIRFIELD PA 17320

Sent To
Street, Apt. N
or PO Box N
City, State, Z

PS Form 3800, August 2006 See Reverse for Instructions

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-340.000-DJH
MR & MRS JOHN D CRAIG
1748 IRON SPRINGS RD
FAIRFIELD PA 17320



9590 9402 1391 5285 0172 66

2. A

7014 2120 0003 6527 1052

(over \$500)

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X ☐ Agent
☐ Addressee

B. Received by (Printed Name)

Doug Craig

C. Date of Delivery

6-6-16

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

☐ Adult Signature ☐ Priority Mail Express®
☐ Adult Signature Restricted Delivery ☐ Registered Mail™
☐ Certified Mail® ☐ Registered Mail Restricted Delivery
☐ Certified Mail Restricted Delivery ☐ Return Receipt for Merchandise
☐ Collect on Delivery ☐ Signature Confirmation™
☐ Collect on Delivery Restricted Delivery ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-340.000-DJH
STEPHEN W HOLBROOK
1698 IRON SPRINGS RD
FAIRFIELD PA 17320



9590 9402 1391 5285 0172 11

2. Article Number (Transfer from service label)

7014 2120 0003 6527 1069

(over \$500)

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X ☐ Agent
☐ Addressee

B. Received by (Printed Name)

Stephen W. Holbrook

C. Date of Delivery

6-4-16

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

☐ Adult Signature ☐ Priority Mail Express®
☐ Adult Signature Restricted Delivery ☐ Registered Mail™
☐ Certified Mail® ☐ Registered Mail Restricted Delivery
☐ Certified Mail Restricted Delivery ☐ Return Receipt for Merchandise
☐ Collect on Delivery ☐ Signature Confirmation™
☐ Collect on Delivery Restricted Delivery ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-0340.000-DJH
BRYON DICK
26 ECHO TRAIL
FAIRFIELD PA 17320



9590 9402 1793 6074 7476 89

2. Article Number (Transfer from service label)

7013 0600 0001 8349 4976

(over \$500)

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X ☐ Agent
☐ Addressee

B. Received by (Printed Name)

Bryon Dick


C. Date of Delivery

8/15/16


D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type


☐ Adult Signature ☐ Priority Mail Express®
☐ Adult Signature Restricted Delivery ☐ Registered Mail™
☐ Certified Mail® ☐ Registered Mail Restricted Delivery
☐ Certified Mail Restricted Delivery ☐ Return Receipt for Merchandise
☐ Collect on Delivery ☐ Signature Confirmation™
☐ Collect on Delivery Restricted Delivery ☐ Signature Confirmation Restricted Delivery

SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVERY	
<ul style="list-style-type: none">■ Complete items 1, 2, and 3.■ Print your name and address on the reverse so that we can return the card to you.■ Attach this card to the back of the mailpiece, or on the front if space permits.		A. Signature X <i>Gayle Carr</i> <input type="checkbox"/> Agent <input checked="" type="checkbox"/> Addressee	
1. Article Addressed to: R15-340.000-DJH PA DCNR P O BOX 8451 HARRISBURG PA 17105		B. Received by (Printed Name)	C. Date of Delivery JUN 06 2016
2. A. 7013 0600 0001 8349 7205		D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No	
 9590 9402 1391 5285 0172 42		3. Service Type <input type="checkbox"/> Adult Signature <input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Collect on Delivery Restricted Delivery <input type="checkbox"/> Signature Confirmation Restricted Delivery	

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVERY	
<ul style="list-style-type: none">■ Complete items 1, 2, and 3.■ Print your name and address on the reverse so that we can return the card to you.■ Attach this card to the back of the mailpiece, or on the front if space permits.		A. Signature X <i>Sharon L. Warner</i> <input type="checkbox"/> Agent <input checked="" type="checkbox"/> Addressee	
1. Article Addressed to: R15-340.000-DJH GEORGE G WARNER P O BOX 277 BLUE RIDGE SUMMIT PA 17214		B. Received by (Printed Name)	C. Date of Delivery 6-6-16
2. A. 7013 0600 0001 8349 7045		D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No	
 9590 9402 1391 5285 0171 98		3. Service Type <input type="checkbox"/> Adult Signature <input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Collect on Delivery Restricted Delivery <input type="checkbox"/> Signature Confirmation Restricted Delivery	

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVERY	
<ul style="list-style-type: none">■ Complete items 1, 2, and 3.■ Print your name and address on the reverse so that we can return the card to you.■ Attach this card to the back of the mailpiece, or on the front if space permits.		A. Signature X <input type="checkbox"/> Agent <input checked="" type="checkbox"/> Addressee	
1. Article Addressed to: R15-340.000-DJH MR & MRS THOMAS A ESTES JR P O BOX 346 FAIRFIELD PA 17320		B. Received by (Printed Name)	C. Date of Delivery
2. Article Number (Transfer from service label) 7014 2120 0003 6527 0659		D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No	
 9590 9402 1391 5285 0172 80		3. Service Type <input type="checkbox"/> Adult Signature <input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Collect on Delivery Restricted Delivery <input type="checkbox"/> Signature Confirmation Restricted Delivery	

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

USPS TRACKING#

9590 9402 1391 5285

United States Postal Service

BY:.....

RECEIVED
JUN 08 2006

5022 6488 1000 0090 7202

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Postage	\$	Postmark Here
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		

1 R15-340.000-DJH
PA DCNR
P O BOX 8451
HARRISBURG PA 17105

City, State, ZIP+4

PS Form 3800, August 2006 See Reverse for Instructions

USPS TRACKING#

9590 9402 1391 5285

United States Postal Service

BY:.....

RECEIVED
JUN 08 2006

5402 6488 1000 0090 7045

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For delivery information visit our website at www.usps.com

OFFICIAL USE

Postage	\$	Postmark Here
Certified Fee		
Return Receipt Fee (Endorsement Required)		
Restricted Delivery Fee (Endorsement Required)		

Total R15-340.000-DJH
GEORGE G WARNER
P O BOX 277
BLUE RIDGE SUMMIT PA 17214

City, State, ZIP+4

PS Form 3800, August 2006 See Reverse for Instructions

USPS TRACKING#

9590 9402 1391 5285 0172 80

United States Postal Service

First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

• Sender: Please print your name, address, and ZIP+4® in this box •

R15-340.000-DJH
SKELLY AND LOY INC
449 EISENHOWER BLVD #300
HARRISBURG, PA 17111-2302

SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVERY	
<p>■ Complete items 1, 2, and 3.</p> <p>■ Print your name and address on the reverse so that we can return the card to you.</p> <p>■ Attach this card to the back of the mailpiece, or on the front if space permits.</p>		<p>A. Signature <input checked="" type="checkbox"/> <i>[Signature]</i> <input type="checkbox"/> Agent <input type="checkbox"/> Addressee</p>	
<p>1. Article Addressed to:</p> <p>R15-340.000-DJH WELLS FARGO BANK 3476 STATEVIEW BLVD FORT MILL SC 29715</p>		<p>B. Received by (Printed Name) <i>ALBERT LANGE</i></p> <p>C. Date of Delivery <i>8/1/16</i></p>	
<p>2. <i>7014 2120 0003 6527 0901</i></p>		<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No</p>	
<p>3. Service Type</p> <p><input type="checkbox"/> Adult Signature <input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Collect on Delivery Restricted Delivery <input type="checkbox"/> Signature Confirmation Restricted Delivery <input type="checkbox"/> Insured Mail <input type="checkbox"/> Restricted Delivery</p>			

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVERY	
<p>■ Complete items 1, 2, and 3.</p> <p>■ Print your name and address on the reverse so that we can return the card to you.</p> <p>■ Attach this card to the back of the mailpiece, or on the front if space permits.</p>		<p>A. Signature <input checked="" type="checkbox"/> <i>[Signature]</i> <input type="checkbox"/> Agent <input type="checkbox"/> Addressee</p>	
<p>1. Article Addressed to:</p> <p>R15-340.000-DJH MR & MRS KENNETH SHANK P O BOX 309 BLUE RIDGE SUMMIT PA 17214</p>		<p>B. Received by (Printed Name) <i>CHRIS SHANK</i></p> <p>C. Date of Delivery <i>8/1/16</i></p>	
<p>2. <i>7013 0600 0001 8349 7489</i></p>		<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No</p>	
<p>3. Service Type</p> <p><input type="checkbox"/> Adult Signature <input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Collect on Delivery Restricted Delivery <input type="checkbox"/> Signature Confirmation Restricted Delivery <input type="checkbox"/> Insured Mail <input type="checkbox"/> Restricted Delivery</p>			

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

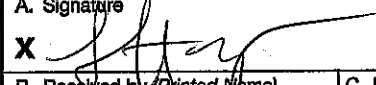

SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVERY	
<p>■ Complete items 1, 2, and 3.</p> <p>■ Print your name and address on the reverse so that we can return the card to you.</p> <p>■ Attach this card to the back of the mailpiece, or on the front if space permits.</p>		<p>A. Signature <input checked="" type="checkbox"/> <i>[Signature]</i> <input type="checkbox"/> Agent <input checked="" type="checkbox"/> Addressee</p>	
<p>1. Article Addressed to:</p> <p>R15-340.000-DJH CRYSTAL J HELLER 245 PETES LN FAIRFIELD PA 17320</p>		<p>B. Received by (Printed Name) <i>Crystal Heller</i></p> <p>C. Date of Delivery <i>6/7/2016</i></p>	
<p>2. Article Number (Transfer from service label) <i>7013 0600 0001 8349 7069</i></p>		<p>D. Is delivery address different from item 1? <input type="checkbox"/> Yes If YES, enter delivery address below: <input type="checkbox"/> No</p>	
<p>3. Service Type</p> <p><input type="checkbox"/> Adult Signature <input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Collect on Delivery Restricted Delivery <input type="checkbox"/> Signature Confirmation Restricted Delivery <input type="checkbox"/> Insured Mail <input type="checkbox"/> Restricted Delivery</p>			


PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt


USPS TRACKING#		U.S. Postal Service TM CERTIFIED MAIL[®] RECEIPT <i>Domestic Mail Only</i>	
For delivery information, visit our website at www.usps.com		OFFICIAL USE	
Postage	\$	Postmark Here	
Certified Fee			
Return Receipt Fee (Endorsement Required)			
Restricted Delivery Fee (Endorsement Required)			
Total	R15-340.000-DJH		
Sent	WELLS FARGO BANK		
Street or PO	3476 STATEVIEW BLVD		
City, State	FORT MILL SC 29715		
PS Form 3800, July 2014		See Reverse for Instructions	


USPS TRACKING#		U.S. Postal Service TM CERTIFIED MAILTM RECEIPT <i>(Domestic Mail Only; No Insurance Coverage Provided)</i>	
For delivery information visit our website at www.usps.com		OFFICIAL USE	
Postage	\$	Postmark Here	
Certified Fee			
Return Receipt Fee (Endorsement Required)			
Restricted Delivery Fee (Endorsement Required)			
Total	R15-340.000-DJH		
Sent	MR & MRS KENNETH SHANK		
Street or PO	P O BOX 309		
City, State	BLUE RIDGE SUMMIT PA 17214		
PS Form 3800, August 2006		See Reverse for Instructions	


USPS TRACKING#		U.S. Postal Service TM CERTIFIED MAILTM RECEIPT <i>(Domestic Mail Only; No Insurance Coverage Provided)</i>	
For delivery information visit our website at www.usps.com		OFFICIAL USE	
Postage	\$	Postmark Here	
Certified Fee			
Return Receipt Fee (Endorsement Required)			
Restricted Delivery Fee (Endorsement Required)			
Total	R15-340.000-DJH		
Sent	CRYSTAL J HELLER		
Street or PO	245 PETES LN		
City, State	FAIRFIELD PA 17320		
PS Form 3800, August 2006		See Reverse for Instructions	

SENDER: COMPLETE THIS SECTION		COMPLETE THIS SECTION ON DELIVERY	
<div>■ Complete items 1, 2, and 3.</div> <div>■ Print your name and address on the reverse so that we can return the card to you.</div> <div>■ Attach this card to the back of the mailpiece, or on the front if space permits.</div>		<div>A. Signature<div><div>X</div><div></div><div><input type="checkbox"/> Agent <input checked="" type="checkbox"/> Addressee</div></div></div> <div>B. Received by (Printed Name)<div></div>C. Date of Delivery<div>8/16</div></div> <div>D. Is delivery address different from item 1? If YES, enter delivery address below:<div></div></div>	
<div>1. Article Addressed to:<div>R15-0340.000-DJH MR & MRS SCOTT H MERRYMAN 1682 IRON SPRINGS RD FAIRFIELD PA 17320</div></div> <div><div>9590 9402 1793 6074 7476 72</div></div>		<div>3. Service Type<div><div><input type="checkbox"/> Adult Signature <input type="checkbox"/> Adult Signature Restricted Delivery <input type="checkbox"/> Certified Mail® <input type="checkbox"/> Certified Mail Restricted Delivery <input type="checkbox"/> Collect on Delivery <input type="checkbox"/> Delivery Restricted Delivery <input type="checkbox"/> Registered Mail <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Signature Confirmation Restricted Delivery</div><div><input type="checkbox"/> Priority Mail Express® <input type="checkbox"/> Registered Mail™ <input type="checkbox"/> Registered Mail Restricted Delivery <input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> Signature Confirmation™ <input type="checkbox"/> Signature Confirmation Restricted Delivery</div></div></div>	
<div>2. Article Number (Transfer from PS Form 3811)<div>7014 2120 0003 6527 0864</div></div>		<div>PS Form 3811, July 2015 PSN 7530-02-000-9053</div> <div>Domestic Return Receipt</div>	

U.S. Postal Service TM CERTIFIED MAIL [®] RECEIPT <i>Domestic Mail Only</i>	
For delivery information, visit our website at www.usps.com [®] .	
OFFICIAL USE	
USPS TRACKING#  9590 9402 1793 6074	<div>Postage \$</div> <div>Certified Fee</div> <div>Return Receipt Fee (Endorsement Required)</div> <div>Restricted Delivery Fee (Endorsement Required)</div> <div>Total</div> <div>Sent</div> <div>Street or PO</div> <div>City, State</div>
United States Postal Service	
• Send to	
RECEIVED AUG 18 2016	
4990 259 E000 0272 4102	
R15-0340.000-DJH MR & MRS SCOTT H MERRYMAN 1682 IRON SPRINGS RD FAIRFIELD PA 17320	
PS Form 3800, July 2014 See Reverse for Instructions	

USPS TRACKING  9590 9402 1391 5285		U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT <i>(Domestic Mail Only; No Insurance Coverage Provided)</i> For delivery information visit our website at www.usps.com ®									
United States Postal Service BY: JUN 08 2006 RECEIVED		OFFICIAL USE									
• Sender's Address 7013 0600 0000 0090 ETOL		<table border="1"> <tr><td>Postage</td><td>\$</td></tr> <tr><td>Certified Fee</td><td></td></tr> <tr><td>Return Receipt Fee (Endorsement Required)</td><td></td></tr> <tr><td>Restricted Delivery Fee (Endorsement Required)</td><td></td></tr> </table>	Postage	\$	Certified Fee		Return Receipt Fee (Endorsement Required)		Restricted Delivery Fee (Endorsement Required)		Postmark Here
Postage	\$										
Certified Fee											
Return Receipt Fee (Endorsement Required)											
Restricted Delivery Fee (Endorsement Required)											
Total R15-340.000-DJH Sent To MR & MRS DAVID A PAOLINI 2150 IRON SPRINGS RD FAIRFIELD PA 17320											
PS Form 3800, August 2006		See Reverse for Instructions									

USPS TRACKING  9590 9402 1391 5285		U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT <i>(Domestic Mail Only; No Insurance Coverage Provided)</i> For delivery information visit our website at www.usps.com ®									
United States Postal Service BY: JUN 08 2006 RECEIVED		OFFICIAL USE									
• Sender's Address 7013 0600 0000 0090 ETOL		<table border="1"> <tr><td>Postage</td><td>\$</td></tr> <tr><td>Certified Fee</td><td></td></tr> <tr><td>Return Receipt Fee (Endorsement Required)</td><td></td></tr> <tr><td>Restricted Delivery Fee (Endorsement Required)</td><td></td></tr> </table>	Postage	\$	Certified Fee		Return Receipt Fee (Endorsement Required)		Restricted Delivery Fee (Endorsement Required)		Postmark Here
Postage	\$										
Certified Fee											
Return Receipt Fee (Endorsement Required)											
Restricted Delivery Fee (Endorsement Required)											
Total R15-340.000-DJH Sent To MR & MRS WILLIAM DEARDORFF 220 PETES LN FAIRFIELD PA 17320											
PS Form 3800, August 2006		See Reverse for Instructions									

USPS TRACKING  9590 9402 1391 5285		U.S. Postal Service™ CERTIFIED MAIL™ RECEIPT <i>(Domestic Mail Only; No Insurance Coverage Provided)</i> For delivery information visit our website at www.usps.com ®									
United States Postal Service BY: JUN 13 2006 RECEIVED		OFFICIAL USE									
• Sender's Address 7013 0600 0000 0090 ETOL		<table border="1"> <tr><td>Postage</td><td>\$</td></tr> <tr><td>Certified Fee</td><td></td></tr> <tr><td>Return Receipt Fee (Endorsement Required)</td><td></td></tr> <tr><td>Restricted Delivery Fee (Endorsement Required)</td><td></td></tr> </table>	Postage	\$	Certified Fee		Return Receipt Fee (Endorsement Required)		Restricted Delivery Fee (Endorsement Required)		Postmark Here
Postage	\$										
Certified Fee											
Return Receipt Fee (Endorsement Required)											
Restricted Delivery Fee (Endorsement Required)											
To R15-340.000-DJH Sent To JP MORGAN CHASE BANK NA 111 POLARIS PARKWAY COLUMBUS OH 43240											
PS Form 3800, August 2006		See Reverse for Instructions									

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-340.000-DJH
MR & MRS DAVID A PAOLINI
2150 IRON SPRINGS RD
FAIRFIELD PA 17320



9590 9402 1391 5285 0172 35

2. Article Number (Transfer from service label)

7013 0600 0001 8349 7038

COMPLETE THIS SECTION ON DELIVERY

A. Signature

- ☐
- Agent
-
- ☐
- Addressee

B. Received by (Printed Name)

C. Date of Delivery

6-4-16

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |

Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-340.000-DJH
MR & MRS WILLIAM DEARDORFF
220 PETES LN
FAIRFIELD PA 17320



9590 9402 1391 5285 0172 28

2. Article Number (Transfer from service label)

7013 0600 0001 8349 4907

COMPLETE THIS SECTION ON DELIVERY

A. Signature

- ☐
- Agent
-
- ☐
- Addressee

B. Received by (Printed Name)

C. Date of Delivery

6-6-16

D. Is delivery address different from item 1? ☒ Yes
If YES, enter delivery address below: ☐ No

PO Box 472
-0472

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |

all Restricted Delivery

(over \$500)

PS Form 3811, July 2015 PSN 7530-02-000-9053

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-340.000-DJH
JP MORGAN CHASE BANK NA
111 POLARIS PARKWAY
COLUMBUS OH 43240



9590 9402 1391 5285 0172 59

2. Article Number (Transfer from service label)

7013 0600 0001 8349 7472

COMPLETE THIS SECTION ON DELIVERY

A. Signature

- ☐
- Agent
-
- ☐
- Addressee

B. Received by (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type

- | | |
|--|---|
| <input type="checkbox"/> Adult Signature | <input type="checkbox"/> Priority Mail Express® |
| <input type="checkbox"/> Adult Signature Restricted Delivery | <input type="checkbox"/> Registered Mail™ |
| <input type="checkbox"/> Certified Mail® | <input type="checkbox"/> Registered Mail Restricted Delivery |
| <input type="checkbox"/> Certified Mail Restricted Delivery | <input type="checkbox"/> Return Receipt for Merchandise |
| <input type="checkbox"/> Collect on Delivery | <input type="checkbox"/> Signature Confirmation™ |
| <input type="checkbox"/> Collect on Delivery Restricted Delivery | <input type="checkbox"/> Signature Confirmation Restricted Delivery |

Mail Restricted Delivery

Mr. and Mrs. Scott H. Merryman
Page 3
December 19, 2017

I WILL allow access to my property for
monitoring


Signature of Property Owner

DAYNA MERRYMAN
Name of Property Owner (Please Print)

12-20-17
Date

I WILL NOT allow access to my property for
monitoring

Signature of Property Owner

Name of Property Owner (Please Print)

Date

UNITED STATES POSTAL SERVICE

• Sender: Please print

DEC 26 2017

4533 E746 0000 0520 9702

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®.

OFFICIAL USE

Certified Mail Fee

\$

Extra Services & Fees (check box, add fee as appropriate)

<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postage

\$

Total P

R15-0340.000-LDB/DJH
MR & MRS SCOTT H MERRYMAN
1682 IRON SPRINGS RD
FAIRFIELD PA 17320

City, S

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-0340.000-LDB/DJH ~~0316-007~~
MR & MRS SCOTT H MERRYMAN
1682 IRON SPRINGS RD
FAIRFIELD PA 17320

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

Scott H Merryman

☐ Agent

☐ Addressee

B. Received by (Printed Name)

Scott Merryman

C. Date of Delivery

12-21

D. Is delivery address different from item 1? ☐ Yes

If YES, enter delivery address below: ☐ No

3. Service Type

- ☐ Certified Mail®
- ☐ Registered
- ☐ Insured Mail
- ☐ Priority Mail Express™
- ☐ Return Receipt for Merchandise
- ☐ Collect on Delivery

4. Restricted Delivery? (Extra Fee)

☐ Yes

U.S. Postal ServiceTM
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at www.usps.com®

OFFICIAL USE



14J3 336L

Certified Mail Fee	
Extra Services & Fees (check box, add fee as appropriate)	\$
<input type="checkbox"/> Return Receipt (hardcopy)	\$
<input type="checkbox"/> Return Receipt (electronic)	\$
<input type="checkbox"/> Certified Mail Restricted Delivery	\$
<input type="checkbox"/> Adult Signature Required	\$
<input type="checkbox"/> Adult Signature Restricted Delivery	\$

Postmark
Here

Postage
\$ R15-0340.000-LDB/DJH

Total Post

Sent To
Street
City, State

MR & MRS DAVID D BELTOWSKI
1648A IRON SPRINGS RD
FAIRFIELD PA 17320

PS Form 3800, April 2015 PSN 7530-02-000-9047 See Reverse for Instructions

MR AND MRS DAVID D BELTOWSKI
1648A IRON SPRINGS RD
FAIRFIELD PA 17320

HARRISBURG PA 171
19 DEC 2017 PM 6 12/19/17

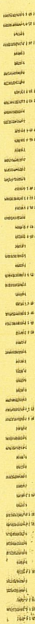


ZIP 17111
041110248679

NIXIE 176 DE 1 0012/27/17

RETURN TO SENDER
NO MAIL RECEIPT
UNABLE TO FORWARD

BC: 1/11/230139 11/19-1/434-19-41



7016 0750 0000 9413 3361

AL: 93260160330139

NMK
17111>2301

DO NOT WRITE IN THESE SPACES
PLACE STICKER TOP OF ENVELOPE TO THE RIGHT

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

R15-0340.000-LDB/DJH
[REDACTED]
MR & MRS DAVID D BELTOWSKI
1648A IRON SPRINGS RD
FAIRFIELD PA 17320

COMPLETE THIS SECTION ON DELIVERY

A. Signature

☒ X

☐ Agent

☐ Addressee

B. Received by (Printed Name)

C. Date of Delivery

D. Is delivery address different from item 1?

If YES, enter delivery address below:

☐ Yes
☐ No

3. Service Type

- ☐ Certified Mail®
- ☐ Registered
- ☐ Insured Mail
- ☐ Priority Mail Express™
- ☐ Return Receipt for Merchandise
- ☐ Collect on Delivery

4. Restricted Delivery? (Extra Fee)

☐ Yes

2. Article (Trace) 7016 0750 0000 9413 3361

PS Form 3811, July 2013 Domestic Return Receipt

Wells Fargo Home Mortgage

One Home Campus

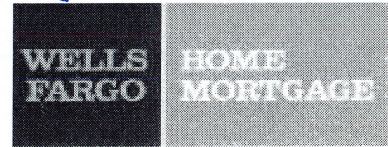
MAC: N0012-01G

Des Moines, IA 50328

Phone: 1-877-617-5274

Fax: 1-866-512-0757

JUG, DSH



RECEIVED
JUN 27 2016

BY: _____

June 23, 2016

Skelly and Loy
449 Eisenhower Blvd
Suite 300
Harrisburg, PA 17111

Subject: Notice of violation on the property

To Whom It May Concern:

Wells Fargo Home Mortgage is returning the enclosed notice of violation for the reason that we do not have enough information to identify the property to address the violation.

Before we can process the violation you will need to provide us with the information below along with the notice of violation.

Parcel/Tax ID Number 095-B / 8-16
Owner's Name (Prior to Wells Fargo Home Mortgage) _____
Complete Property Address, Including Zip Code _____
Wells Fargo Home Mortgage Account Number _____

Please send to the address at the top of this letter.

If you have any questions or need further assistance on the preservation and maintenance of a loan serviced by Wells Fargo Home Mortgage, please contact us by:

Email: codeviolations@wellsfargo.com

Phone: 1-877-617-5274

Fax 1-866-512-0757

Sincerely,

Tiffany Ketcham
Building Code and Compliance
Wells Fargo Home Mortgage

Enclosure

Wells Fargo Home Mortgage is a division of Wells Fargo Bank, N.A. ©2016 Wells Fargo Bank, N.A. All rights reserved.
NMLSR ID 399801

449 Eisenhower Boulevard, Suite 300
Harrisburg, PA 17111-2302

E-mail: skellyloy@skellyloy.com
Internet: www.skellyloy.com



Phone: 717-232-0593
800-892-6532
Fax: 717-232-1799

June 2, 2016

Wells Fargo Bank
Property Owner
3476 Stateview Boulevard
Fort Mill, South Carolina 29715

Re: Monitoring Access Request, Parcel
B-16, 095-B
Specialty Granules, LLC
Hamiltonban Township,
Adams County, Pennsylvania

To Whom It May Concern:

Skelly and Loy, Inc. is an environmental engineering and consulting firm based in Harrisburg, Pennsylvania, that will be completing water sampling to evaluate flow conditions in the vicinity of the Specialty Granules, LLC (SGL) Charmian Quarry located on Old Waynesboro Road near Blue Ridge Summit, Adams County, Pennsylvania. The quarry property is located approximately 1 mile northeast of Greenstone, 2 miles northeast of Charmian, and 3.2 miles northeast of Blue Ridge Summit. Skelly and Loy has been engaged to initiate these efforts on behalf of SGL having its principal place of business in Hagerstown, Maryland.

We are requesting written authorization from selected property owners with potable water supply wells, wetland seeps, springs, or surface water stream access in the immediate vicinity of the project area to allow their properties to be accessed for the purpose of monitoring the *quality* and *quantity* of the above water features. Our "monitoring" will consist of collecting monthly flow measurements and water quality samples from streams, wetlands, and springs for a period of six consecutive months (total of six water samples). Our monitoring of private wells will consist of collecting monthly groundwater samples for a period of two consecutive months (total of two water samples). The total time required to collect each sample is estimated to take no more than 30 minutes and includes ingress and egress from your property. If your property contains a private supply well, we should note that *up to four hours* may be necessary for conducting an initial yield test to assess the quantity or discharge rate of the source. Access to these water features will be coordinated directly with you or with an authorized individual of your selection to ensure that access to your property and any needed subsequent visits can be scheduled at a convenient time for you and/or other occupants.

At this time, we anticipate that these samples will be acquired over a consecutive six-month period extending from June through November 2016. Please also be aware that, while this water monitoring is expected to be completed over a six-month period for surface water sources and a two-month period for private groundwater wells, the projected testing schedule may be modified, delayed, or extended slightly for a variety of reasons (e.g., unfavorable weather conditions [heavy rainfall], low-flow conditions, etc.). The maximum monitoring period should not exceed eight consecutive months (i.e., through January 2017).

Wells Fargo Bank
Page 2
June 2, 2016

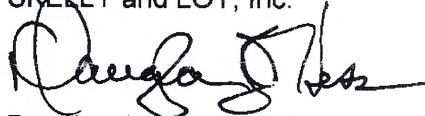
Water quality and flow data gathered during the monitoring program will be used to establish baseline conditions and evaluate the effects of quarry operations on surrounding groundwater users and surface water resources. These data will further enable us to determine the baseline water quality and avoid any adverse impacts to local water levels, potable groundwater supplies relied on by nearby residential well owners, and surface water resources. Monitoring data generated during the testing program will be compiled into a report documenting the results of our monitoring and testing activities. A copy of these data will be provided to the Pennsylvania Department of Environmental Protection's Cambria District Mining Office. Please note that a copy of the water monitoring results obtained from monitoring your private sources during this monitoring program will be provided to you upon request.

Please understand that you are under no obligation to grant access to your property or water sources per this request; however, we urge you to utilize this opportunity to allow our representatives to access your property for the purpose of collecting the data necessary to perform an appropriate analysis of the water resources in the project area. Having access to water sources located on or adjacent to your property will enable Skelly and Loy to fully characterize the existing water sources on or near your property and enhance the accuracy of the baseline data generated during the monitoring program. Please consider providing Skelly and Loy temporary access to your private residential well and/or nearby surface water resources and acknowledge such approval by providing your signature in the space below.

For your convenience, we are enclosing a self-addressed stamped envelope for returning your signed letter. If you have any questions or concerns regarding this temporary monitoring request or proposed testing schedule, please contact me. Thank you for your time and cooperation in this matter. It is very much appreciated.

Sincerely yours,

SKELLY and LOY, Inc.



Douglas J. Hess, P.G.
Director of Groundwater and
Site Characterization Services

Enclosures

cc: Matthew McClure, Specialty Granules, LLC
Matt Watson, Specialty Granules, LLC
Tony Shepeck, P.G., Specialty Granules, LLC
Robert Shusko, P.E., D'Appolonia
Laura Berra, P.E., Skelly and Loy
R15-0340.000
File: OWNERS_DJH.doc

Wells Fargo Bank
Page 3
June 2, 2016

I **WILL** allow access to my property for
monitoring

Signature of Property Owner

Name of Property Owner (Please Print)

Date

I **WILL NOT** allow access to my property for
monitoring

Signature of Property Owner

Name of Property Owner (Please Print)

Date

Well Survey Form

Name: _____

Address: _____

Telephone No.: _____

1) Are you connected to the public water system? ☐ YES ☐ NO

2) Do you have a water supply well on your property? ☐ YES ☐ NO

If you answered yes to question 2, please complete questions 3 through 10 as best you can

3) Is the well still actively used? ☐ YES ☐ NO

4) Is well accessible? ☐ YES ☐ NO

If yes, where is it located? _____

5) If actively used, what is the well used for (i.e., drinking or bathing; watering garden, lawn, flowers, trees, shrubs; washing vehicles; filling kid's swimming pools; etc.)?

6) If actively used, is the well plumbing connected to the household plumbing that supplies water for drinking and bathing?

☐ YES, If Yes How is it Controlled? _____

☐ NO _____

7) If actively used, does the well have a treatment/filtration system in use (i.e., ultra-violet [UV] light, sediment filter, water softener, etc.)?

8) If actively used, has the well water been tested? ☐ YES ☐ NO

If Yes, what is the most recent date tested? _____

Laboratory/Analyses: _____

Are the results available? ☐ YES ☐ NO

9) If you know any details regarding the construction of your well, please provide as much of the following information as possible

a) Date Installed/Installer: _____

b) Total Depth: _____ d) Depth of Pump Setting: _____

c) Depth of Surface Casing: _____ e) Diameter of well: _____

10) If actively used, are there any known or existing problems (i.e., low water pressure, turbid, odors, taste, etc.)?

Contact Name/Daytime Number: _____

Property Owner Signature: _____ Date: _____

Well Survey Form

Name: STEPHEN WILLIAM HOLBROOK
Address: 1698 IRON SPRINGS Rd. Fairfield, p.a. 17320
Telephone No.: 717-642-3705

1) Are you connected to the public water system? ☐ YES ☒ NO

2) Do you have a water supply well on your property? ☒ YES ☐ NO

If you answered yes to question 2, please complete questions 3 through 10 as best you can

3) Is the well still actively used? ☒ YES ☐ NO

4) Is well accessible? ☒ YES ☐ NO

If yes, where is it located? Across The back deck, down the sidewalk, and behind my shed w/ bucket covering it.

5) If actively used, what is the well used for (i.e., drinking or bathing; watering garden, lawn, flowers, trees, shrubs; washing vehicles; filling kid's swimming pools; etc.)?

Drinking, Bathing, washing dishes, Laundry, and water for my Late dog + my chickens. We eat the eggs.

6) If actively used, is the well plumbing connected to the household plumbing that supplies water for drinking and bathing?

☒ YES, If Yes How is it Controlled? It is Run by electricity to the well pump.
☐ NO

7) If actively used, does the well have a treatment/filtration system in use (i.e., ultra-violet [UV] light, sediment filter, water softner, etc.)?

Sediment filter and sand separator at bottom of well. My aerators are still getting slimy + Blocked often.

8) If actively used, has the well water been tested? ☒ YES ☐ NO

If Yes, what is the most recent date tested? 2 years or more

Laboratory/Analyses: Never recieved an answer from Negleys (SGIS CO.)

Are the results available? ? Probably ☐ YES ☐ NO NOT

9) If you know any details regarding the construction of your well, please provide as much of the following information as possible

a) Date Installed/Installer: Dont know exact date. 225' / Alexanders pl.
b) Total Depth: 225' d) Depth of Pump Setting: ?
c) Depth of Surface Casing: ? e) Diameter of well: ?

10) If actively used, are there any known or existing problems (i.e., low water pressure, turbid, odors, taste, etc.)?

Lowering pressure, Blocking of aerators, Shower heads blocking too. Installed a new washer and it is ruined by silt. wont fill!

Contact Name/Daytime Number: Steve or Stephanie Holbrook

Property Owner Signature: Stephen W. Holbrook Date: 717-642-3705 6-4-16

Mr. Stephen W. Holbrook
Page 3
June 2, 2016

I WILL allow access to my property for
monitoring

Stephen W. Holbrook

Signature of Property Owner

STEPHEN W. HOLBROOK

Name of Property Owner (Please Print)

6-4-16

Date

I WILL NOT allow access to my property for
monitoring

Signature of Property Owner

Name of Property Owner (Please Print)

Date

WATER WELL INFORMATION REPORT

PA Well ID: **49672**

Local Well ID: **UL0359**

Local Permit #:

LOCATION INFORMATION

Owner: **RODGERS D**

Original Paper Record
Image Available: **No**

Address of Well:

County: **ADAMS**

Municipality: **HAMILTONBAN
TWP.**

Latitude:

Coordinate Method:

Longitude:

Data Reliability: **LOCATION MAY NOT BE
ACCURATE (WWI paper)**

Description of Well

Location and Other Notes: **RT=GREENSTONE**

WELL CONSTRUCTION INFORMATION

Well Driller:	RANDALL ALEXANDER ALEXANDER'S WELL DRILLING	License:	1665	Driller Well ID:
Type of Activity:	New Well	Date Drilled:	7/1/1986	Drilling Method:
Well Depth (ft):	225	Well Finish:	OPEN HOLE	

CASING

<u>Top (ft)</u>	<u>Bottom (ft)</u>	<u>Diameter (in)</u>	<u>Casing Material</u>	<u>Seal Top</u>	<u>Seal Bottom</u>	<u>Seal Type</u>
0	21	6				NONE

GROUNDWATER AND GEOLOGICAL INFORMATION

Well Yield (GPM - gal per min):	2	Yield Measurement Method:	ESTIMATED
Water Level when not pumped: (ft below land surface)	30	Water Level after yield test: (ft below land surface)	180
Length of Yield Test (minutes):	1	Saltwater Zone (ft):	
Use of Well:	WITHDRAWAL	Use of Water:	DOMESTIC

LEVELS WHERE WATER ENTERS WELL

<u>Top (ft)</u>	<u>Bottom (ft)</u>	<u>Yield (GPM)</u>
60		

Well Survey Form

CHRIS SHANK

717.794.2799

Name: M. Patricia Shank

Address: 201 Gum Springs Road, Fairfield, PA 17320

Telephone No.: 717-794-2799

1) Are you connected to the public water system? ☐ YES ☒ NO

2) Do you have a water supply well on your property? ☒ YES ☐ NO

If you answered yes to question 2, please complete questions 3 through 10 as best you can

3) Is the well still actively used? ☒ YES ☐ NO

4) Is well accessible? ☒ YES ☐ NO

If yes, where is it located? behind the house

5) If actively used, what is the well used for (i.e., drinking or bathing, watering garden, lawn, flowers, trees, shrubs, washing vehicles, filling kid's swimming pools, etc.)?

drinking, bathing, watering flowers + shrubs, washing vehicles

6) If actively used, is the well plumbing connected to the household plumbing that supplies water for drinking and bathing?

☒ YES, If Yes How is it Controlled? _____

☐ NO _____

7) If actively used, does the well have a treatment/filtration system in use (i.e., ultra-violet [UV] light, sediment filter, water softner, etc.)?

No

8) If actively used, has the well water been tested? ☒ YES ☐ NO

If Yes, what is the most recent date tested? 2013

Laboratory/Analyses: tested by WRS

Are the results available? ☐ YES ☐ NO

9) If you know any details regarding the construction of your well, please provide as much of the following information as possible

a) Date Installed/Installer: 1997 Alexander's Plumbing + Pumps, Inc.

b) Total Depth: 250 ft. d) Depth of Pump Setting: _____

c) Depth of Surface Casing: _____ e) Diameter of well: _____

10) If actively used, are there any known or existing problems (i.e., low water pressure, turbid, odors, taste, etc.)?

No

Contact Name/Daytime Number: M. Patricia Shank 717-794-2850

Property Owner Signature: M. Patricia Shank Date: June 12, 2016

Mr. and Mrs. Kenneth Shank
Page 3
June 2, 2016

I WILL allow access to my property for
monitoring

M. Patricia Shank
Signature of Property Owner

M. Patricia Shank
Name of Property Owner (Please Print)

June 12, 2016
Date

I WILL NOT allow access to my property for
monitoring

Signature of Property Owner

Name of Property Owner (Please Print)

Date

**SKELLY AND LOY**

449 Eisenhower Boulevard, Suite 300
Harrisburg, PA 17111
717-232-0593 (Office)
800-892-6532
717-232-1799 (Fax)

LETTER OF TRANSMITTAL

TO: Pennsylvania Department of Conservation and Natural Resources

Bureau of Forestry, Michaux State Forest, District #1

10099 Lincoln Way East, Fayetteville, PA 17222

DATE	6.27.2016	JOB NO.	R14-0108.000
ATTENTION	Mr. Roy Brubaker, District Forester		
RE	LOA Transmittal for Monitoring Access Request		
	Michaux State Forest		

WE ARE SENDING YOU:☒ Attached☐ Under separate cover via _____ the following items:☐ Shop Drawings☐ Prints☐ Plans☐ Samples☐ Specifications☐ Copy of Letter☐ Change Order☐ Bid Proposal for Geotechnical Oversight of Well Redevelopment

COPIES	DATE	DESCRIPTION
1	6.22.2016	Executed Letter of Authorization (for State forest access)

THESE ARE TRANSMITTED as checked below:☐ For Approval☐ Approved as Submitted☐ Resubmit _____ Copies for Your Approval.☒ For your Use☐ Approved as Noted☐ Submit _____ Copies for Distribution.☒ As Requested☐ Return for Corrections☐ Return _____ Corrected Prints.☐ For Review and Comment☐ Other _____

FOR BIDS DUE _

☐ PRINTS RETURNED AFTER LOAN TO US**REMARKS:** Mr Brubaker:

Please find the above-listed Letter of Authorization for access to Michaux State Forest land for the purpose of collecting surface water samples.

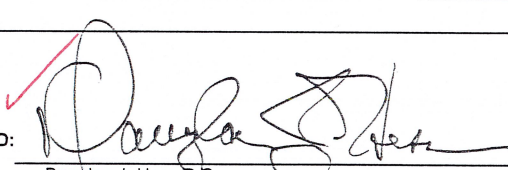
We would like to access the identified location on a monthly basis for 6 consecutive months beginning in July 2016. We appreciate your cooperation in providing authorization for access to this location.

Please let me know if you have any other questions concerning the enclosed sampling location or schedule.

COPY TO: DJH; R14-0108.000

SIGNED:

FROM:


Douglas J. Hess P.E.
Director of Groundwater and Site Characterization
Geo-Environmental Services



pennsylvania

DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

BUREAU OF FORESTRY

LETTER OF AUTHORIZATION

June 22, 2016

Mr. Douglas Hess
Skelly and Loy, Inc.
449 Eisenhower Blvd, Suite 300
Harrisburg, PA 17111


Dear Mr. Hess:

In follow-up to our conversation and correspondence, we are writing to confirm permission for you to collect surface water samples in the Michaux State Forest in July, 2016. Your activity must be confined to the area shown on the ACTIVITY Map. See Attachment "B".

The Special Requirements for your event are included in Attachment "E". General Conditions for events held on Pennsylvania State Forests are given in Attachment "A". Event participants must observe State Forest Rules and Regulations. Attachment "C" is a summary of the rules and regulations for you to review with the participants. The Participant/Spectator Risk Management Plan, Attachment "D", which you completed and filed with this office, is attached. **Please complete Attachment "I"** (if not applicable, write N/A for each question) **and return it to this office.**

Please sign the Acknowledgement on page 2 of this letter. Keep the original packet and return the remaining copy to this office. Please contact this office during business hours at the number given below if you have any questions on the enclosed materials, or if for any reason you are canceling this event. Best wishes for a safe and successful event.

Sincerely yours,


Roy D. Brubaker
District Forester
Michaux State Forest

Attachments

conserve

sustain

enjoy

10099 Lincoln Way East, Fayetteville, PA 17222, ph. 717-352-2211, fax 717-352-3007

Mr. Douglas Hess

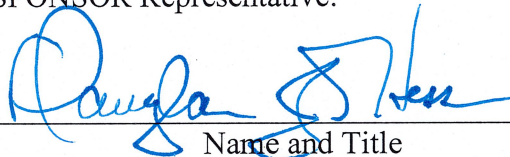
2

June 22, 2016

ACKNOWLEDGEMENT

I have read and shall abide by this Letter of Authorization and the attached conditions and provisions regarding the use of State Forest land and facilities.

SPONSOR Representative:



Name and Title

6.27.16

Date

DIRECTOR OF GROUNDWATER AND SITE
CHARACTERIZATION SERVICES

Attachments

- "A" General Conditions
- "B" ACTIVITY Map
- "C" State Forest Rules and Regulations
- "D" Participant/Spectator Risk Management Plan
- "E" Special Requirements
- "G" Contractor Integrity Provisions
- "H" Nondiscrimination/Sexual Harassment Clause
- "I" Recreation Data

cc: File

Operations and Recreation Div., Recreation Section

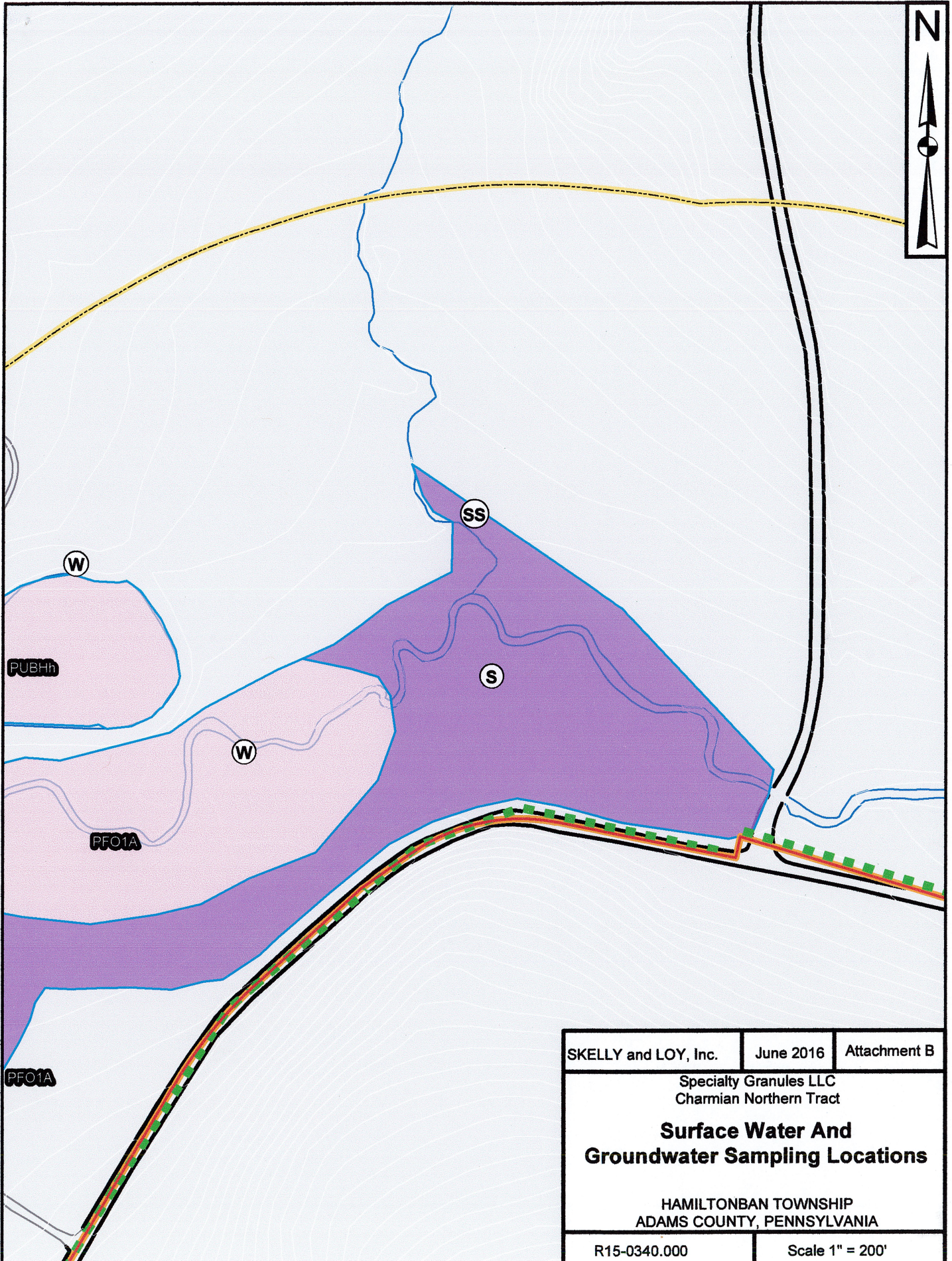
**Letter of Authorization
ATTACHMENT "A"**

**COMMONWEALTH OF PENNSYLVANIA
Department of Conservation and Natural Resources
BUREAU OF FORESTRY**

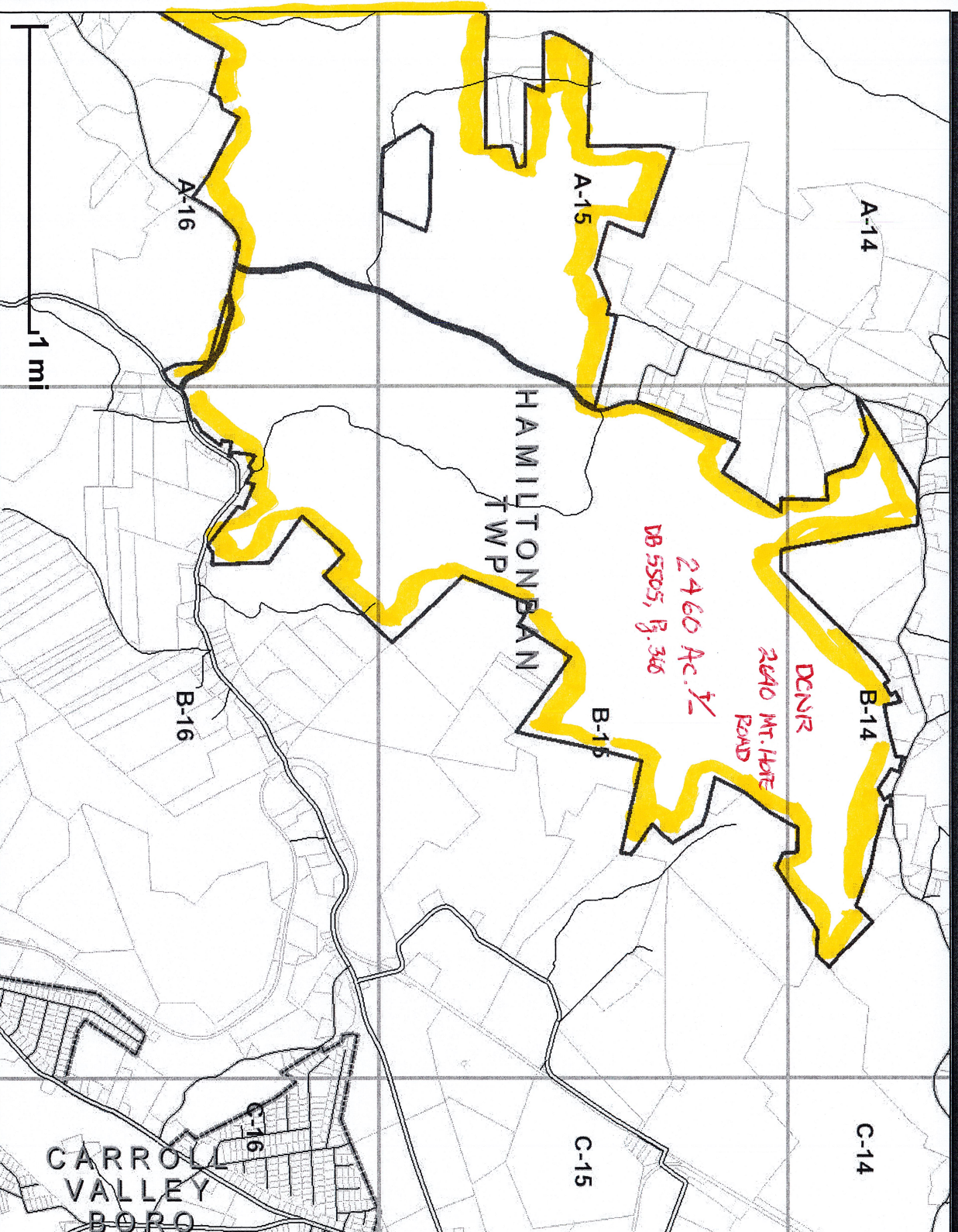
GENERAL CONDITIONS

The conditions listed below will apply to any and all individuals or groups, hereinafter called SPONSORS, who use Bureau of Forestry lands or facilities to conduct special activities, hereinafter called ACTIVITIES, approved by the District Forester in conjunction with a Letter of Authorization given to that SPONSOR for conducting said ACTIVITY:

1. The SPONSOR shall indemnify and hold harmless the Department of Conservation and Natural Resources, hereinafter called DEPARTMENT, from and against claims of damages to property or injuries including death to any persons and other losses, damages, expenses claims, demands, suits and actions by any party against the DEPARTMENT in connection with this ACTIVITY, the condition of the property of the DEPARTMENT or the DEPARTMENT's actions or failure to act hereunder.
2. The SPONSOR understands that the DEPARTMENT assumes no responsibility or liability for the safety of the SPONSOR, or the safety of participants in or spectators of this ACTIVITY, or for the consequences of the SPONSOR'S ACTIVITY, nor shall this Letter of Authorization be construed as a waiver of any immunity the DEPARTMENT has, or may have in the future.
3. The SPONSOR shall comply with all applicable federal, state, and local statutes, rules and regulations, including but not limited to the Pennsylvania State Forest Rules and Regulations, ATTACHMENT "C". The SPONSOR has full responsibility to have knowledge of all applicable rules and regulations.
4. The SPONSOR shall be aware of and comply with 1) Department of Agriculture (Bureau of Food Safety and Laboratory Services) requirements for food establishments and 2) local (municipal) sewage enforcement guidelines for adequate sanitary sewage facilities at mass gatherings. The SPONSOR is responsible for acquiring necessary licenses.
5. The SPONSOR shall fully coordinate this ACTIVITY with the District Forester. The SPONSOR shall provide any additional facilities or services, as the District Forester deems necessary. The District Forester has full authority to place further conditions on, suspend, or terminate the ACTIVITY as deemed in the best interest of the Commonwealth of Pennsylvania. The SPONSOR is fully responsible for the conduct of the ACTIVITY.
6. The District Forester shall be the sole judge of any conflict between normal recreational activities carried on by the public within the forest and subject ACTIVITY. The District Forester shall have the full authority to resolve the conflict in the best interest of the DEPARTMENT. SPONSOR shall abide by the decision of the District Forester.
7. Upon completion of this ACTIVITY, there shall be a joint inspection of the premises by the SPONSOR and the District Forester or his assigns. The SPONSOR shall clean up all litter and other debris resulting from the ACTIVITY. SPONSOR is responsible for repairs of damages to DEPARTMENT property caused by SPONSOR, participants or spectators of the ACTIVITY.
8. Should SPONSOR fail to complete said clean-up and / or repairs, DEPARTMENT may complete said work with District personnel and invoice SPONSOR for same. The SPONSOR shall pay said invoice within thirty (30) days after invoice date.
9. This Letter of Authorization shall remain in effect until
 - the SPONSOR has cleaned and repaired, if needed, the area and facilities used during the ACTIVITY
 - the District Forester has inspected and approved the area and facilities used during the ACTIVITY.
10. Should ACTIVITY be postponed due to inclement weather or other reasons approved by the District Forester, a new ACTIVITY date(s) may be agreed upon in writing by SPONSOR and the District Forester. These conditions shall remain in effect for the new date(s).

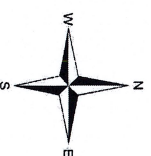


SKELLY and LOY, Inc.	June 2016	Attachment B
Specialty Granules LLC Charmian Northern Tract		
Surface Water And Groundwater Sampling Locations		
HAMILTONBAN TOWNSHIP ADAMS COUNTY, PENNSYLVANIA		
R15-0340.000	Scale 1" = 200'	



Legend

- Adams County Parks
- Municipal Boundaries
- Municipal Building
- Major Streams
- Stream Tributaries
- FEMA 100 Year Flood Zone
- Soils
- Geologic Formations
- 25' Contours
- Fire Stations
- Police Stations
- Interstate
- Major Roads
- Roads
- Railroads
- Polling Places
- Voting Districts
- School Districts
- Gettysburg National Military Park
- Michaux State Forest
- Pa. State Game Lands #249
- Adams County Land Conservancy
- Preserved Farms
- Agricultural Security Areas
- 1" = 100' Tax Maps
- 1" = 400' Tax Maps



The geographic information contained on this page is NOT to be construed as a "legal description." While every effort has been made to ensure the highest accuracy, the information at best is only as good as the source document. The County of Adams assumes no liability either for any errors, omissions, or inaccuracies in the information provided regardless of their cause or for any decision made, action taken, or action not taken by the user in reliance upon any maps or information provided herein.

Mon., 06/06/2016

RULES AND REGULATIONS
TITLE 17. PENNSYLVANIA CODE, PART I. DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
Subpart C. STATE FORESTS

CHAPTER 21. GENERAL PROVISIONS

§ 21.101. Definitions.

The following words and terms, when used in this chapter, have the following meanings, unless the context clearly indicates otherwise:

Act—The Conservation and Natural Resources Act (71 P.S. §§ 1340.101—1340.1103).

All-terrain vehicle—The term as defined in section 7702 of the Vehicle Code (relating to definitions).

Commercial activity—An activity in which a person directly or indirectly accepts consideration of value as compensation for the provision of goods or services, including transportation.

Crimes Code—Title 18 *Pennsylvania Consolidated Statutes*.

Department—

(i) The Department of Conservation and Natural Resources of the Commonwealth.

(ii) The term includes authorized officials of the Department.

Fish and Boat Code—Title 30 *Pennsylvania Consolidated Statutes*.

Game and Wildlife Code—Title 34 *Pennsylvania Consolidated Statutes*.

Motor vehicle—

(i) The term as defined in section 102 of the Vehicle Code (relating to definitions).

(ii) The term does not include a snowmobile or all-terrain vehicle as defined in section 7702 of the Vehicle Code.

Motorized off-road vehicle—

(i) A motorized recreational vehicle designed for either off-road use or for both off-road and road use.

(ii) The term does not include a snowmobile or all-terrain vehicle.

Permission of the Department or permitted by the Department—Approval obtained from the Department, including a district forester or designee.

Permit—Written approval obtained from the Department, including a district forester or designee, on a form prescribed by the Department.

Person—A corporation, company, club, firm, association, society, partnership, joint stock company, governmental agency or individual.

Picnic area—An area in a State forest designated by the Department as a State forest picnic area.

Snowmobile—The term as defined in section 7702 of the Vehicle Code.

State forest—An area under the jurisdiction of the Department acquired or administered as a State forest under section 302 of the act (71 P.S. § 1340.302).

Vehicle—The term as defined in section 102 of the Vehicle Code.

Vehicle Code—Title 75 *Pennsylvania Consolidated Statutes*.

Watercraft—The term as defined in section 102 of the Fish and Boat Code (relating to definitions).

§ 21.102. Scope.

This chapter applies to State forests.

§ 21.103. Trespass.

(a) A person who violates this chapter or disregards instructions or warnings given by a State forest officer or Department-commissioned officer or interferes in the performance of the duties of a State forest officer or Department-commissioned officer may be ordered to leave a State forest.

(b) A person who refuses to leave a State forest after receiving an order to leave from a State forest officer or Department-commissioned officer commits an act of criminal trespass under section 3503(b) of the Crimes Code (relating to criminal trespass).

§ 21.104. Closure.

(a) *Closings and restrictions.* The Department may close a State forest, portion of a State forest or State forest facility, or may restrict it to certain uses or activities.

(b) *Prohibited activities.* The Department may prohibit certain uses or activities in a State forest, portion of a State forest or State forest facility.

(c) *Informing the public.* The public will be informed of the closure, restriction or prohibition under subsection (a) or (b) by any form of communication, including this chapter or posting, or by fencing, barricade, gate, or other structure or device manifestly designed to exclude the public.

(d) *Prohibitions.*

(1) Entering, using or remaining in a State forest, area or facility that is not open to the public or that has been closed under this section is prohibited, unless permitted by the Department.

(2) Using, or engaging in activities in, a State forest, area or facility in violation of a restriction or prohibition under subsection (a) or (b) is prohibited, unless permitted by the Department.

§ 21.105. Property left in a State forest.

(a) Leaving personal property in a State forest for more than 24 hours without written permission of the Department is prohibited, unless permitted under § 21.120 (relating to ground blinds and tree stands).

(b) The following personal property may be moved or removed by the Department, placed in storage and is subject to disposal in accordance with law:

(1) Personal property that has been left in a State forest for more than 24 hours without written permission of the Department as required in subsection (a).

(2) Personal property that impedes public access or navigation.

(3) Vehicles or other personal property parked in violation of § 21.111 (relating to parking).

(c) Personal property that is in storage under this section will be released from storage only upon adequate proof of ownership and, if appropriate, payment of a reasonable storage fee.

§ 21.106. Picnic areas.

(a) Picnic areas are open to the public between sunrise and sunset.

(b) Entering a picnic area when it is not open to the public under subsection (a) is permitted for the purpose of fishing or gaining access to another area of State forest land that is open for public use.

(c) Except as provided in subsection (b) or with written permission of the Department, entering, using or remaining in a picnic area when it is not open to the public under subsection (a) is prohibited.

(d) Possessing or consuming alcoholic beverages is prohibited.

(e) An owner, keeper or handler of a pet may have the pet in a picnic area only under the following conditions, a violation of which is prohibited:

(1) The pet is on a leash with a maximum length of 6 feet.

(2) The pet is attended and under physical control of an individual.

(3) The pet does not behave in a manner that may reasonably be expected to disturb or intimidate another person.

(4) The pet does not behave in a manner that may cause damage to property or resources.

(5) The pet's droppings are disposed of in trash receptacles or outside the State forest.

(f) Removing facilities, including picnic tables, fire rings and containers for disposal of waste or charcoal, is prohibited.

(g) Hunting, trapping and using a device that is capable of discharging or propelling a projectile is prohibited.

§ 21.107. Hunting, trapping and shooting.

- (a) Hunting and trapping are permitted unless otherwise posted.
- (b) Hunting and trapping shall be in accordance with the Game and Wildlife Code and 58 Pa. Code Part III (relating to Game Commission).
- (c) Using a device that is capable of discharging or propelling a projectile is prohibited except in accordance with the Game and Wildlife Code and except for target shooting at a location authorized by the Department.
- (d) This section applies to State forest land other than picnic areas.

§ 21.108. Fishing.

- (a) Fishing is permitted unless otherwise posted.
- (b) Fishing shall be in accordance with the Fish and Boat Code and 58 Pa. Code Part II (relating to Fish and Boat Commission).

§ 21.109. Boating.

(a) *Operation.* Watercraft may be operated on State forest waters unless posted as closed.

(b) *Statutes and regulations.* Boating shall be in accordance with the Fish and Boat Code and 58 Pa. Code Part II (relating to Fish and Boat Commission).

(c) *Prohibition.* The use of a motor type other than electric motor for propulsion of motorized watercraft is prohibited.

(d) *Mooring.*

(1) Mooring watercraft at a location without possession of a valid watercraft mooring permit issued by the Department for that location is prohibited.

(2) A decal issued by the Department evidencing issuance of the permit shall be affixed aft of amidship on the starboard (right) side of the watercraft.

(3) The Department will establish a schedule of fees for mooring permits. The schedule and subsequent revisions will be effective upon publication in the *Pennsylvania Bulletin*.

(e) *Launching.*

(1) Subject to paragraph (2), watercraft may be launched or removed at any location except where prohibited by posting.

(2) Watercraft launched from trailers may be launched and removed only at designated launching areas.

(3) Launching watercraft without one of the following is prohibited:

(i) A valid watercraft launching or mooring permit issued by the Department. If a decal evidencing the issuance of a permit has been provided by the Department, the decal shall be affixed to the watercraft aft of amidship on the starboard (right) side. If another form of evidence of the issuance of a permit has been provided by the Department instead of a decal, this evidence shall be carried on the watercraft.

(ii) A valid registration number and validation decal, or a valid use permit, issued and displayed in accordance with 58 Pa. Code Part II.

(4) The Department will establish a schedule of fees for launching permits. The schedule and subsequent revisions will be effective upon publication in the *Pennsylvania Bulletin*.

(f) *Docks.* Maintaining a dock at any location without possession of a valid dock permit issued by the Department for that location is prohibited. A dock tag evidencing issuance of a permit shall be securely attached to the offshore end of the dock. The Department will establish a schedule of fees for dock permits. The schedule and subsequent revisions will be effective upon publication in the *Pennsylvania Bulletin*.

§ 21.110. Traffic.

(a) Operating a vehicle or a motor vehicle is permitted in accordance with this section.

(b) The following are prohibited:

(1) Operating a vehicle in a manner that is any of the following:

(i) Reckless or negligent.

(ii) Creates a nuisance or excessive noise.

(iii) Demonstrates careless disregard for the safety of persons or property.

(2) Operating a motor vehicle in excess of the posted speed limit or, where a speed limit is not posted, in excess of 25 miles per hour.

(3) Operating a motor vehicle on roads, trails or other areas posted as closed to motor vehicles unless permitted in writing by the Department.

(4) Using State forest roads, trails or other areas in connection with or arising out of commercial activity without written permission of the Department. Occasional deliveries to residents of property adjoining a State forest are permitted.

(5) Operating an unregistered, uninspected or uninsured motor vehicle.

(6) Operating a motor vehicle without a valid driver's license.

(c) A violation of this section constitutes a summary offense under section 7505 of the Crimes Code (relating to violation of governmental rules regarding traffic).

§ 21.111. Parking.

(a) *Prohibitions.* The following are prohibited:

(1) Parking a vehicle in an area designated by the Department for persons with a disability unless one of the following requirements is met:

(i) The Department has given written permission.

(ii) A valid plate or valid placard has been issued to a user of the vehicle under section 1338 or 1342(a) or (b) of the Vehicle Code (relating to person with disability plate and placard; and veteran plates and placard). A valid plate or valid placard for a person with a disability issued by a jurisdiction outside of this Commonwealth is deemed to be in compliance with the plate and placard requirements of this subparagraph. Placards shall be displayed in the manner required under section 1338(b) or 1342(b) of the Vehicle Code.

(2) Parking a vehicle as follows without written permission of the Department:

(i) In a location that obstructs a gate, road, trail, access way, drinking fountain, entrance, exit or road turnaround.

(ii) In an area that is posted as closed.

(iii) When the State forest is closed under § 21.104 (relating to closure).

(b) *Violations.*

(1) *Summary offense.* A violation of this section constitutes a summary offense under section 7505 of the Crimes Code (relating to violation of governmental rules regarding traffic).

(2) *Parking tickets.*

(i) For a violation of subsection (a) or a parking provision of the Vehicle Code, the Department may issue a parking ticket, as provided for in 234 Pa. Code Rule 401 (relating to means of instituting proceedings in summary cases charging parking violations), which will be handed to the violator or placed on the windshield of the violator's vehicle.

(ii) If the Department has issued a parking ticket, the Department will file a citation if the violator fails to pay a charge to the Department in the amount provided in this subparagraph within 5 days of the violation and in the manner specified on the ticket.

(A) For violations of subsection (a), the charge will be in the amount of the maximum fine as provided in section 7505 of the Crimes Code.

(B) For violations of a parking provision of the Vehicle Code other than section 3354(d)(3) or (e) of the Vehicle Code (relating to additional parking regulations), the charge will be in the amount of the maximum fine as provided in the Vehicle Code.

(C) For violations of section 3354(d)(3) or (e) of the Vehicle Code, the charge will be in the amount of the minimum fine required under section 3354(f) of the Vehicle Code.

(iii) If the Department has not issued a parking ticket, the Department may issue a citation as provided for in 234 Pa. Code Rule 401.

§ 21.112. Snowmobiles.

(a) Operating a snowmobile is permitted in accordance with this section.

(b) Operating a snowmobile in violation of Chapter 77 of the Vehicle Code (relating to snowmobiles and all-terrain vehicles) is prohibited.

(c) The following are prohibited except with written permission of the Department:

(1) Operating a snowmobile on a road, trail or area that has not been posted as open for snowmobiles.

(2) Operating a snowmobile outside of the period from the day following the last day of regular or extended rifle deer season as established by the Game Commission through the following April 1, unless the district forester designates an earlier date that is prior to April 1.

(3) Operating or riding on a snowmobile without wearing a securely fastened helmet which meets the specifications established for motorcycle helmets in 67 Pa. Code Chapter 107 (relating to motorcycle helmets).

§ 21.113. All-terrain vehicles.

(a) Operating an all-terrain vehicle is permitted in accordance with this section.

(b) Operating an all-terrain vehicle in violation of Chapter 77 of the Vehicle Code (relating to snowmobiles and all-terrain vehicles) is prohibited.

(c) The following are prohibited except with written permission of the Department:

(1) Operating an all-terrain vehicle on a road, trail or area that has not been posted as open for all-terrain vehicles.

(2) Operating an all-terrain vehicle outside of the period from the Friday before Memorial Day through the last full weekend in September and from the day following the last day of regular or extended rifle deer season as established by the Game Commission through the following April 1.

(3) Operating or riding on an all-terrain vehicle without wearing a securely fastened helmet which meets the specifications established for motorcycle helmets in 67 Pa. Code Chapter 107 (relating to motorcycle helmets).

§ 21.114. Motorized off-road vehicles.

(a) Operating a motorized off-road vehicle is permitted in accordance with this section.

(b) The following are prohibited except with written permission of the Department:

(1) Operating a motorized off-road vehicle on a road, trail or area that has not been posted as open for motorized off-road vehicles.

(2) Operating a motorized off-road vehicle on a road, trail or area that has not been posted as open outside of the following periods:

(i) From the Friday before Memorial Day through the last full weekend in September.

(ii) From the day following the last day of the regular or extended rifle deer season as established by the Game Commission through the following April 1.

(3) Operating or riding a motorized off-road vehicle without wearing a securely fastened helmet which meets the specifications established for motorcycle helmets in 67 Pa. Code Chapter 107 (relating to motorcycle helmets).

§ 21.115. Natural resources.

(a) The following activities are prohibited without written permission of the Department:

(1) Cutting, picking, digging, damaging or removing, in whole or in part, a living or dead plant, vine, shrub, tree or flower, including fungus, lichen and moss, except as permitted in subsection (b) and § 21.120 (relating to ground blinds and tree stands).

(2) Removing rocks, shale, sand, clay, soil or other mineral products.

(3) Removing peat, bark, mulch, pine straw or other natural resources.

(4) Planting a tree, shrub or plant.

(5) Releasing an animal that was brought into a State forest.

(b) The following activities are permitted:

(1) Gathering edible wild plants or plant parts for an individual's personal or family consumption, unless the plant is listed in Chapter 45 (relating to conservation of Pennsylvania native wild plants) as threatened, endangered, rare or vulnerable.

(2) Gathering dead and down wood for building fires on State forest land as permitted in § 21.118 (relating to fires).

§ 21.116. Feeding wildlife.

(a) Except as provided in subsection (b), feeding wildlife or laying or placing food, fruit, hay, grain, chemical, salt or other minerals is prohibited without written permission of the Department.

(b) Placing of elevated songbird feeders of less than 1/2 bushel capacity is permitted.

§ 21.117. Camping.

(a) *Primitive camping.* Primitive camping without a permit is prohibited if the camper stays more than one night at a campsite. Primitive camping is overnight camping when a motor vehicle is not used for storage or transportation during the camping experience. Primitive camping does not include water trail camping.

(b) *Motorized camping.* Motorized camping without a permit is prohibited. Motorized camping is overnight camping in or near a vehicle when the vehicle is used for storage or transportation during the camping experience.

(c) *Group camping.* Group camping without written permission of the Department is prohibited. Group camping is primitive or motorized camping by a group consisting of more than ten persons.

(d) *Water trail camping.* Water trail camping is allowed without a permit but is limited to two nights at a site. Water trail camping is overnight camping at sites designated for water trail camping along designated water trails.

§ 21.118. Fires.

(a) *Prohibition.* Fires are prohibited except in accordance with this section.

(b) *Gas grills and camp stoves.* Fires are permitted in gas grills and camp stoves when these appliances are used as designed.

(c) *Charcoal fires.* Charcoal fires are permitted in appliances designed for them. Disposing of hot charcoal, except in a facility designed for charcoal disposal, is prohibited.

(d) *Fire rings.* Fires are permitted in fire rings that are either provided by the Department or, if not provided by the Department, do not exceed 2 feet in diameter. Fire rings must be constructed of noncombustible material.

(e) *Fireplaces.* Fires are permitted in fireplaces provided by the Department.

(f) *Forest-fire danger.* Fires in fire rings and fireplaces are prohibited at the following times unless permitted by the Department:

(1) When the forest-fire danger is determined by the Department to be high, very high or extreme.

(i) The Department will notify the public of these danger ratings by means of the Department's web site, signs, news releases, fire wardens or volunteer fire departments.

(ii) The public may contact the district forester to obtain forest-fire danger ratings.

(2) From March 1 through May 25.

(g) *Attending a fire.* Failure to attend a fire at all times is prohibited.

(h) *Extinguishing a fire.* Leaving a fire that has not been completely extinguished is prohibited.

(i) *Liability.* A person who has caused a wildfire, in addition to possible criminal penalty, is liable for damages, costs of extinction and fines.

§ 21.119. Group activities.

(a) Participating in a group that engages in any of the following types of activity is prohibited without written permission of the Department:

(1) An activity that the Department determines requires a large land area or unique land formation.

(2) An activity that the Department determines may impact or conflict with normal or traditional visitor uses or experiences on State forest land.

(3) An activity that the Department determines may have a greater than normal impact on natural resources or the environment.

(b) This section does not apply to group hunting that is in compliance with 58 Pa. Code §§ 141.22 and 141.42 (relating to small game; and big game animal hunting roster).

§ 21.120. Ground blinds and tree stands.

(a) Ground blinds and tree stands may be placed, used and occupied subject to the following requirements:

(1) They must be portable.

(2) Their placement, use or occupation may not cause damage to a tree.

(3) They may not be left overnight except as follows:

(i) They may be left for any length of time within the period beginning 2 weeks prior to the first deer season and ending 2 weeks after the close of the last deer season.

(ii) Ground blinds may be left for any length of time during the spring turkey season and the water fowl season.

(iii) They may be left overnight outside of the periods in subparagraphs (i) and (ii) with written permission of the Department.

(4) Ground blinds must be constructed in accordance with the requirements for turkey blinds under the Game and Wildlife Code.

(b) Ground blinds or tree stands that do not comply with this section and accompanying personal property may be removed, stored or disposed of by the Department.

(c) This section applies to State forest land other than picnic areas.

§ 21.121. Pets.

(a) An owner, keeper or handler of a pet may have the pet in a State forest only under the following conditions:

(1) It is attended and under control of an individual.

(2) It does not behave in a manner that may reasonably be expected to disturb or intimidate another person.

(3) It does not behave in a manner that may cause damage to property or resources.

(b) This section applies to State forest land other than picnic areas.

§ 21.122. Other prohibitions.

(a) The following activities are prohibited without written permission of the Department:

(1) Using State forest land in connection with or arising out of commercial activity.

(2) Removing or disturbing historical or archeological resources.

(3) Posting signs or soliciting.

(4) Plowing or removing snow.

(5) Constructing, altering or removing a structure or other improvement. This paragraph does not apply to ground blinds and tree stands under § 21.120 (relating to ground blinds and tree stands).

(6) Excavating.

(b) The following activities are prohibited:

(1) Littering or disposing of trash, garbage, paper, refuse, waste, pollutants or other materials, except that any materials that have been accumulated during a visit to a State forest may be placed in receptacles or facilities provided by the Department for this purpose.

(2) Damaging or defacing any sign, structure, equipment or other material.

(3) Disorderly conduct, including any of the following:

(i) Fighting.

(ii) Threatening.

(iii) Engaging in violent or tumultuous behavior.

(iv) Making unreasonable noise.

(v) Using obscene language.

(vi) Making an obscene gesture.

(vii) Creating a hazardous or physically offensive condition by any act which does not serve a legitimate purpose of the actor.

(4) Operating a chainsaw, snowmobile, all-terrain vehicle or motorized off-road vehicle without a fully functioning spark arrestor.

(5) Possessing or consuming alcoholic beverages by persons under 21 years of age.

(6) Washing in water outlets, springs, lakes or waterways.

(7) Discharging trailer, camper or motor home sewage, sink water or bath water except in receptacles or facilities provided by the Department for this purpose and in accordance with posted instructions.

(8) Placing or leaving personal property where it obstructs or impedes access to a gate, road, trail, path, access way, drinking fountain, entrance, exit, road turnaround, vehicle parking area or other facility.

(9) Failing to comply with a condition of a permit issued by the Department.

§ 21.123. Violation of rules regarding conduct in State forests.

Engaging in activity prohibited under §§ 21.104—21.109 and 21.112—21.122 constitutes a summary offense under section 7506 of the Crimes Code (relating to violation of rules regarding conduct on Commonwealth property).

SPONSOR: Please complete Items 1 through 8 below.

**Letter of Authorization
ATTACHMENT “_D_”**

**COMMONWEALTH OF PENNSYLVANIA
Department of Conservation and Natural Resources
BUREAU OF FORESTRY**

PARTICIPANT/SPECTATOR RISK MANAGEMENT PLAN

Sampling surface water from streams, seeps, and/or springs

Activity

SKELLY and LOY, Inc.

Sponsor

449 Eisenhower Blvd., Suite 300

Address

Harrisburg, PA, 17111

City, State, Zip Code

Micheaux

State Forest

Douglas Hess

Sponsor's Contact Person

717-574-3961

Home Telephone Number

800-892-6532

Business Telephone Number

Estimated Number of Participants: 3

Estimated Number of Spectators: 0

Date(s) of ACTIVITY Early-mid July 2016

1. Describe the ACTIVITY to be conducted.
Access to DCNR property for collecting surface water samples (springs, unnamed tributary stream and seeps) needed to complete PA DEP mine permit modules for adjacent (to the south) Specialty Granules, LLC non-coal surface mining operation.
2. Identify the State Forest area or roads within or upon which the ACTIVITY will be held.
(Delineate area or route on a State Forest Public Use Map or other appropriate map, and label as Attachment “B”.)
You must provide (2) two copies of your event map. A map labeled as Attachment B is provided showing the proposed surface water sampling location as location “SS”. The location is on DCNR property and 500’ west of the nearest roadway.
3. Identify any special requirements the participants must meet. Part 46 MSHA and OSHA HAZWOPER hazardous site operations safety training.
4. Identify the procedures used to screen participants. Maintenance of the above certifications.

Participant / Spectator Risk Management Plan

**Letter of Authorization
ATTACHMENT "D"**

5. Identify the procedures used to make sure that participants and spectators recognize the risks involved in the ACTIVITY and, where appropriate, agree to release and hold harmless the DEPARTMENT from any and all liability arising from participation in the ACTIVITY. SKELLY and LOY agrees to hold harmless the DEPARTMENT from any and all liability arising from access to the identified DCNR property arising from participation in the ACTIVITY.

6. List possible safety risks involving personal injury or property damage to participants, spectators and the forest due to the ACTIVITY. Possible safety risks include slips, trips, and falls as well as bites from ticks, mosquitoes, and snakes.

7. Provide a Safety Plan for the protection of the participants, spectators and the forest in reference to the ACTIVITY and to the safety risks identified above, detailing, but not limited to, type and number of personnel/staff, equipment and procedures for monitoring ACTIVITY, traffic control procedures, and emergency response procedures.

A site-specific Health and Safety Plan (HASP) for protecting the participants and forest during the ACTIVITY is attached. The number of participants will be limited to three (3) during the ACTIVITY. Due to the surface water sampling location approximately 500 feet from any paved or unpaved roadway, no traffic control procedures will be necessary.

8. Other provisions: N/A

Letter of Authorization
ATTACHMENT "E"

COMMONWEALTH OF PENNSYLVANIA
Department of Conservation and Natural Resources
BUREAU OF FORESTRY

SPECIAL REQUIREMENTS

SPONSOR: Douglas Hess
ACTIVITY: Collection of surface water samples
DATES: July, 2016

1. This agreement is for the Michaux State Forest only; not private property or State Parks.
2. DEPARTMENT does not grant exclusive use of any site on the state forest. Other forest users may be encountered. Participants shall not conflict with normal forest activities or users.
3. SPONSOR shall review and abide by the state forest rules and regulations.
4. SPONSOR shall conduct a thorough litter cleanup and shall remove all trash from the area. No receptacles are available.
5. SPONSOR and participants must not damage living trees in any manner.
6. This Letter of Authorization may be terminated by either party upon 30 days written notification to the other party.
7. SPONSOR shall minimize disturbance to surrounding soil and vegetation.

CONTRACTOR INTEGRITY PROVISIONS

It is essential that those who seek to contract with the Commonwealth of Pennsylvania ("Commonwealth") observe high standards of honesty and integrity. They must conduct themselves in a manner that fosters public confidence in the integrity of the Commonwealth contracting and procurement process.

1. DEFINITIONS. For purposes of these Contractor Integrity Provisions, the following terms shall have the meanings found in this Section:

- a. **"Affiliate"** means two or more entities where (a) a parent entity owns more than fifty percent of the voting stock of each of the entities; or (b) a common shareholder or group of shareholders owns more than fifty percent of the voting stock of each of the entities; or (c) the entities have a common proprietor or general partner.
- b. **"Consent"** means written permission signed by a duly authorized officer or employee of the Commonwealth, provided that where the material facts have been disclosed, in writing, by prequalification, bid, proposal, or contractual terms, the Commonwealth shall be deemed to have consented by virtue of the execution of this contract.
- c. **"Contractor"** means the individual or entity, that has entered into this contract with the Commonwealth.
- d. **"Contractor Related Parties"** means any affiliates of the Contractor and the Contractor's executive officers, Pennsylvania officers and directors, or owners of 5 percent or more interest in the Contractor.
- e. **"Financial Interest"** means either:
 - (1) Ownership of more than a five percent interest in any business; or
 - (2) Holding a position as an officer, director, trustee, partner, employee, or holding any position of management.
- f. **"Gratuity"** means tendering, giving, or providing anything of more than nominal monetary value including, but not limited to, cash, travel, entertainment, gifts, meals, lodging, loans, subscriptions, advances, deposits of money, services, employment, or contracts of any kind. The exceptions set forth in the Governor's Code of Conduct, Executive Order 1980-18, the 4 Pa. Code §7.153(b), shall apply.
- g. **"Non-bid Basis"** means a contract awarded or executed by the Commonwealth with Contractor without seeking bids or proposals from any other potential bidder or offeror.

2. In furtherance of this policy, Contractor agrees to the following:

- a. Contractor shall maintain the highest standards of honesty and integrity during the performance of this contract and shall take no action in violation of state or federal laws or regulations or any other applicable laws or regulations, or other requirements applicable to Contractor or that govern contracting or procurement with the Commonwealth.

ATTACHMENT "G"

- b. Contractor shall establish and implement a written business integrity policy, which includes, at a minimum, the requirements of these provisions as they relate to the Contractor activity with the Commonwealth and Commonwealth employees and which is made known to all Contractor employees. Posting these Contractor Integrity Provisions conspicuously in easily-accessible and well-lighted places customarily frequented by employees and at or near where the contract services are performed shall satisfy this requirement.
- c. Contractor, its affiliates, agents, employees and anyone in privity with Contractor shall not accept, agree to give, offer, confer, or agree to confer or promise to confer, directly or indirectly, any gratuity or pecuniary benefit to any person, or to influence or attempt to influence any person in violation of any federal or state law, regulation, executive order of the Governor of Pennsylvania, statement of policy, management directive or any other published standard of the Commonwealth in connection with performance of work under this contract, except as provided in this contract.
- d. Contractor shall not have a financial interest in any other contractor, subcontractor, or supplier providing services, labor, or material under this contract, unless the financial interest is disclosed to the Commonwealth in writing and the Commonwealth consents to Contractor's financial interest prior to Commonwealth execution of the contract. Contractor shall disclose the financial interest to the Commonwealth at the time of bid or proposal submission, or if no bids or proposals are solicited, no later than Contractor's submission of the contract signed by Contractor.
- e. Contractor certifies to the best of its knowledge and belief that within the last five (5) years Contractor or Contractor Related Parties have not:
 - (1) been indicted or convicted of a crime involving moral turpitude or business honesty or integrity in any jurisdiction;
 - (2) been suspended, debarred or otherwise disqualified from entering into any contract with any governmental agency;
 - (3) had any business license or professional license suspended or revoked;
 - (4) had any sanction or finding of fact imposed as a result of a judicial or administrative proceeding related to fraud, extortion, bribery, bid rigging, embezzlement, misrepresentation or anti-trust; and
 - (5) been, and is not currently, the subject of a criminal investigation by any federal, state or local prosecuting or investigative agency and/or civil anti-trust investigation by any federal, state or local prosecuting or investigative agency.

If Contractor cannot so certify to the above, then it must submit along with its bid, proposal or contract a written explanation of why such certification cannot be made and the Commonwealth will determine whether a contract may be entered into with the Contractor. The Contractor's obligation pursuant to this certification is ongoing from and after the effective date of the contract through the termination date thereof. Accordingly, the Contractor shall have an obligation to immediately notify the Commonwealth in writing if at any time during the term of the contract if becomes aware of any event which would cause the Contractor's certification or explanation to change. Contractor acknowledges that the Commonwealth may, in its sole discretion, terminate the contract for cause if it learns that any of the certifications made herein are currently false due to intervening factual circumstances or were false or should have been known to be false when entering into the contract.

ATTACHMENT "G"

- f. Contractor shall comply with the requirements of the *Lobbying Disclosure Act (65 Pa.C.S. §13A01 et seq.)* regardless of the method of award. If this contract was awarded on a Non-bid Basis, Contractor must also comply with the requirements of the *Section 1641 of the Pennsylvania Election Code (25 P.S. §3260a)*.
- g. When Contractor has reason to believe that any breach of ethical standards as set forth in law, the Governor's Code of Conduct, or these Contractor Integrity Provisions has occurred or may occur, including but not limited to contact by a Commonwealth officer or employee which, if acted upon, would violate such ethical standards, Contractor shall immediately notify the Commonwealth contracting officer or the Office of the State Inspector General in writing.
- h. Contractor, by submission of its bid or proposal and/or execution of this contract and by the submission of any bills, invoices or requests for payment pursuant to the contract, certifies and represents that it has not violated any of these Contractor Integrity Provisions in connection with the submission of the bid or proposal, during any contract negotiations or during the term of the contract, to include any extensions thereof. Contractor shall immediately notify the Commonwealth in writing of any actions for occurrences that would result in a violation of these Contractor Integrity Provisions. Contractor agrees to reimburse the Commonwealth for the reasonable costs of investigation incurred by the Office of the State Inspector General for investigations of the Contractor's compliance with the terms of this or any other agreement between the Contractor and the Commonwealth that results in the suspension or debarment of the Contractor. Contractor shall not be responsible for investigative costs for investigations that do not result in the Contractor's suspension or debarment.
- i. Contractor shall cooperate with the Office of the State Inspector General in its investigation of any alleged Commonwealth agency or employee breach of ethical standards and any alleged Contractor non-compliance with these Contractor Integrity Provisions. Contractor agrees to make identified Contractor employees available for interviews at reasonable times and places. Contractor, upon the inquiry or request of an Inspector General, shall provide, or if appropriate, make promptly available for inspection or copying, any information of any type or form deemed relevant by the Office of the State Inspector General to Contractor's integrity and compliance with these provisions. Such information may include, but shall not be limited to, Contractor's business or financial records, documents or files of any type or form that refer to or concern this contract. Contractor shall incorporate this paragraph in any agreement, contract or subcontract it enters into in the course of the performance of this contract/agreement solely for the purpose of obtaining subcontractor compliance with this provision. The incorporation of this provision in a subcontract shall not create privity of contract between the Commonwealth and any such subcontractor, and no third party beneficiaries shall be created thereby.
- j. For violation of any of these Contractor Integrity Provisions, the Commonwealth may terminate this and any other contract with Contractor, claim liquidated damages in an amount equal to the value of anything received in breach of these Provisions, claim damages for all additional costs and expenses incurred in obtaining another contractor to complete performance under this contract, and debar and suspend Contractor from doing business with the Commonwealth. These rights and remedies are cumulative, and the use or non-use of any one shall not preclude the use of all or any other. These rights and remedies are in addition to those the Commonwealth may have under law, statute, regulation, or otherwise.

NONDISCRIMINATION/SEXUAL HARASSMENT CLAUSE

The Contractor agrees:

1. In the hiring of any employee(s) for the manufacture of supplies, performance of work, or any other activity required under the contract or any subcontract, the Contractor, each subcontractor, or any person acting on behalf of the Contractor or subcontractor shall not discriminate in violation of the *Pennsylvania Human Relations Act* (PHRA) and applicable federal laws against any citizen of this Commonwealth who is qualified and available to perform the work to which the employment relates.
2. Neither the Contractor nor any subcontractor nor any person on their behalf shall in any manner discriminate in violation of the PHRA and applicable federal laws against or intimidate any employee involved in the manufacture of supplies, the performance of work, or any other activity required under the contract.
3. The Contractor and each subcontractor shall establish and maintain a written nondiscrimination and sexual harassment policy and shall inform their employees of the policy. The policy must contain a provision that sexual harassment will not be tolerated and employees who practice it will be disciplined. Posting this Nondiscrimination/Sexual Harassment Clause conspicuously in easily-accessible and well-lighted places customarily frequented by employees and at or near where the contract services are performed shall satisfy this requirement.
4. The Contractor and each subcontractor shall not discriminate in violation of PHRA and applicable federal laws against any subcontractor or supplier who is qualified to perform the work to which the contract relates.
5. The Contractor and each subcontractor represents that it is presently in compliance with and will maintain compliance with all applicable federal, state, and local laws and regulations relating to nondiscrimination and sexual harassment. The Contractor and each subcontractor further represents that it has filed a Standard Form 100 Employer Information Report ("EEO-1") with the U.S. Equal Employment Opportunity Commission ("EEOC") and shall file an annual EEO-1 report with the EEOC as required for employers subject to *Title VII of the Civil Rights Act of 1964*, as amended, that have 100 or more employees and employers that have federal government contracts or first-tier subcontracts and have 50 or more employees. The Contractor and each subcontractor shall, upon request and within the time periods requested by the Commonwealth, furnish all necessary employment documents and records, including EEO-1 reports, and permit access to their books, records, and accounts by the contracting agency and the Bureau of Small Business Opportunities (BSBO), for purpose of ascertaining compliance with provisions of this Nondiscrimination/Sexual Harassment Clause.

6. The Contractor shall include the provisions of this Nondiscrimination/Sexual Harassment Clause in every subcontract so that those provisions applicable to subcontractors will be binding upon each subcontractor.
7. The Contractor's and each subcontractor's obligations pursuant to these provisions are ongoing from and after the effective date of the contract through the termination date thereof. Accordingly, the Contractor and each subcontractor shall have an obligation to inform the Commonwealth if, at any time during the term of the contract, it becomes aware of any actions or occurrences that would result in violation of these provisions.
8. The Commonwealth may cancel or terminate the contract and all money due or to become due under the contract may be forfeited for a violation of the terms and conditions of this Nondiscrimination/Sexual Harassment Clause. In addition, the agency may proceed with debarment or suspension and may place the Contractor in the Contractor Responsibility File.

COMMONWEALTH OF PENNSYLVANIA
Department of Conservation and Natural Resources
BUREAU OF FORESTRY

RECREATION DATA

Has this event/activity been relocated here from another state forest?

NO

If so, why?

Has Marcellus shale gas related activities changed your recreational use of another state forest?

NO

If so, which forest?

Has Marcellus shale gas related activities changed your recreational use of this forest? If so, how?

NO

Has Marcellus shale gas related activities changed your experience in another state forest? If so, how?

YES. TRAFFIC IN NORMALLY QUIET AND PRISTINE AREAS.
SEGMENTED / FRAGMENTED TRACTS OF OTHERWISE CONTIGUOUS
FOREST LAND WITH INDUSTRIAL OPERATIONS / ACTIVITIES.

If so, which forest?

Has Marcellus shale gas related activities changed your experience in this state forest? If so, please describe.

NO

ATTACHMENT C

MONITORING WELL AQUIFER TESTING

**[EXCERPTED FROM HYDROGEOLOGIC AND HYDRAULIC ANALYSIS
REPORT FOR PITTS QUARRY BY URS]**

Summary of Well Drawdown/Recovery Test Results
 Specialty Granules Inc. Charmian Facility
 Blue Ridge Summit, Pennsylvania

Well Location	Total Depth (ft)	Depth to Water (ft)	Aquifer Thickness (ft) ⁽¹⁾	Drawdown (Δs) (ft) ⁽²⁾	Transmissivity (T) (ft ² /day) ⁽³⁾	Hydraulic Conductivity (K) (ft/day) ⁽⁴⁾	Hydraulic Conductivity (cm/sec) ⁽⁴⁾
MW-3R	560	37.26	522.74	50.18	3.52	5.13×10^{-3}	1.8×10^{-6}
MW-4R	720	51.56	668.44	84.302	0.837	1.22×10^{-3}	4.0×10^{-7}
MW-5	550	8.65	541.35	31.076	6.81	9.59×10^{-3}	3.3×10^{-6}
MW-7	500	28.15	471.85	94.271	0.75	1.07×10^{-3}	3.0×10^{-7}

Notes:

- (1) Aquifer thickness (b) = total well depth - depth to water.
 (2) Change in Drawdown (Δs) between two times (10 and 10 minutes) whose ratio is 10
 (3) Coefficient of transmissivity (T) calculated using the equation $T = 264 Q / \Delta s$ where Q = pumping rate. $\Delta s = h_0 - h_1$
 (4) Hydraulic conductivity (K) is calculated as $K = T/b$ and expressed as feet/day.
 ft = feet

DEP CAMBRIA OFFICE
 NOV 18 2013

ATTACHMENT D
GROUNDWATER MODEL REPORT



V.F. Britton Group, LLC

ENVIRONMENTAL AND HYDROGEOLOGICAL CONSULTING

**GROUNDWATER MODEL REPORT
EVALUATION OF POTENTIAL EXPANSION IMPACTS
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA**

Prepared For:

Skelly and Loy, Inc.
449 Eisenhower Blvd., Suite 300
Harrisburg, PA 17111-2302

Prepared By:

V.F. Britton Group, LLC
326 Conestoga Road
Wayne, PA 19087
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December 19, 2017

Val F. Britton, P.G.
Senior Hydrogeologist



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Figure 27 – Site Area Simulated 7th Level (990 ft-amsl) Drawdown

Figure 28 –Site Area Simulated 8th Level (940 ft-amsl) Drawdown
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1.0 General

1.1 Background

The Specialty Granules LLC (SGI) Charmian Facility – Northern Tract Quarry is a proposed surface mining operation that is located in Hamiltonban Township (Blue Ridge Summit), Adams County, Pennsylvania (site). The site quarry is situated west of Jacks Mountain and just east of the Franklin/Adams County line. **Figure 1** presents the location of the site.

The Pitts Quarry, an existing and operating quarry located south of the site, has currently been mined to an elevation of 990 feet above mean sea level (ft-amsl) – 7th level. Reportedly, minimal groundwater has been encountered in this quarry; however, inflow into the quarry is very limited due to the low permeability characteristics of the rock being quarried at the Pitts Quarry location. It is SGI's intention to utilize the Pitts Quarry for the placement of rock fines generated from their processing plant as well as overburden soils and cap rock to support the quarrying operations at the proposed Northern Tract Quarry. The backfilling of the Pitts Quarry precludes the need to control groundwater.

It is anticipated that 12 levels will be developed on the 112-acre Northern Tract Quarry parcel, each 50 feet in depth extending upward from the proposed quarry base elevation (Level 12) of 740 ft-amsl. **Table 1** provides an inventory of the anticipated level expansions and their associated floor elevation. It should be noted that proposed levels 1 through 3 do not encounter the potentiometric groundwater surface and; therefore; were not evaluated as part of this groundwater model evaluation. Surface water streams and wetland areas are present along the perimeter of the proposed quarry area. In addition, several residential properties are located west and east of the proposed quarry area.

Monitoring wells have been installed as part of the characterization activities of the proposed quarry and their locations have been included on **Figure 1**. An inventory of the monitoring wells used as part of the groundwater model evaluation is provided on **Table 2**. In addition, water levels in four core holes (NT-13-07, NT-13-08, NT-13-09, and NT-13-12) were evaluated relative to the model development. Due to erratic water level data at the core hole locations, these data were not used in the development of the groundwater model. It should be noted that other subsurface explorations were advanced on or around the site area (e.g. shallow test borings to evaluate site soil infiltration properties, geotechnical core holes, etc.); however, groundwater data from these explorations were either repeated and provided no relevant information or the data sets associated with these explorations were incomplete when compared to the range of dates used in the evaluation. For instance, groundwater observed in any of the shallow test borings that were completed down to or above bedrock is associated with a perched water zone that exists within the overburden soil, above the impervious rock layer, and is not representative of the regional groundwater table. As a result, the results of these other explorations were not used as part of the groundwater model evaluation.

1.2 Physical Site Characteristics

Topography

The site is located in the Blue Ridge province of Pennsylvania which consists of moderate to rugged topography with subparallel ridges and valleys resulting from alternating belts of volcanic and sedimentary rocks. **Figure 2** provides the topography in the area of the site based on a United States Geologic Survey (USGS) 3-meter digital elevation model of the area. **Figure 3** provides a three-dimensional oblique view of the site. The proposed Northern Tract Quarry is situated on a topographic knob located just north of the Pitts Quarry.

Geology

The Precambrian (Proterozoic) age rocks under the site area proposed for mining consist of alternating layers of metabasalt and metarhyolite of the Catoclin Formation. The relationship of deposition of these subaerial volcanic flows is unknown; however, they are believed to occur in alternating layers (Fauth, 1978, pp. 31-35). The Catoclin Formation is approximately 2,500 feet thick and trends from the southwest to the northeast along the west side of Adams County. The competent bedrock material is relatively dense with apparent cleavage planes (Fauth, 1978, pp.11). A geologic map of the general area of the Northern Tract Quarry is provided as **Figure 4**.

A fault is mapped on the eastern edge of the Northern Tract Quarry with the up-thrown side of the fault (metabasalt) to the east and the down-thrown side (metarhyolite) to the west. It should be noted that there are no topographic features identifying the location of the fault, suggesting that the two rock types are very similar in physical characteristics (i.e. weathering, erosion, etc.).

Explorations advanced at the site confirm the presence of metabasalt and metarhyolite bedrock material. In addition, based on the site-specific explorations, the site stratigraphy is composed of overburden soils, overlying a weathered metabasalt zone (saprolitic cap rock) that overlies the competent metabasalt. The overburden saprolitic soils/cap rock zone ranges from 0 to 50 feet in thickness and may tend to be thicker in the valleys than the top of the hills. The overburden soil has been described as sand, silt, or clay, and the cap rock does appear to be a saprolite of the parent rock material. The boundary of the cap rock to the competent bedrock (metabasalt) appears to be transitional.

Hydrogeology

Generally, the water-bearing yields of the rocks underlying the site are very poor. Based on published data, 25% of domestic wells drilled into the metabasalt and metarhyolite yield less than 3 gallons per minute (gpm) and have a specific capacity of < 0.23 (Taylor and Royer, 1981, pp. 12-13). The median depth to water in the metabasalt and the metarhyolite ranges from 44 feet to 22 feet respectively (Taylor and Royer, 1981, pp. 16). These data are consistent with the data collected from the site-specific explorations. In

addition, the active Pitts Quarry located south of the site area has reportedly encountered minimal groundwater during the quarry operations.

Perched water in the cap rock material (saprolite) has been observed on the site as a result of past shallow explorations and is unassociated with the deeper bedrock groundwater that is the focus of this report.

Metabasalt and Metarhyolite are relatively low permeability (low hydraulic conductivity) rock materials known to have poor intrinsic porosity (pore space available for transmitting water). Aquifer testing (pumping and slug testing) has been completed at the site producing site-specific values that were relied upon to develop the groundwater model. Based on the observed site conditions and characteristic low permeability of the bedrock, extended constant rate discharge aquifer testing at this site is not feasible for providing estimates of hydraulic conductivity. Slug testing and short duration pumping test methods provide a more adaptable method to these types of site conditions and are often used to provide reliable estimates of hydraulic conductivity. Given these constraints, slug testing and short duration pumping test results were used to create the representative aquifer hydraulic input parameters necessary for constructing the groundwater model. In addition to Skelly and Loy's pumping tests inclusive of all Northern Tract perimeter wells, aquifer tests were previously completed by others on wells MW-3R, MW-4R, MW-5, and MW-7 surrounding the Pitts Quarry from March 1 through 4, 2011. These test results were previously provided to the Pennsylvania Department of Environmental Protection's (PA DEP) Cambria District Mining Office (CDMO) in a Hydrogeologic and Hydraulic Analysis Report of December 2011.

Aquifer testing completed in the site area associated with 9 of the monitoring wells have provided hydraulic conductivity values for the underlying bedrock that range from 0.0047 to 0.1591 feet/day and overburden hydraulic conductivities that range from 0.025 to 1.31 feet/day. These data are consistent with the characteristics described in the published data. **Table 3** provides a summary of the hydraulic conductivity values obtained from site wells.

Although different geologic formations exist in Adams County including the metabasalts and metarhyolites of the Catoclin Formation, the geologic zones are not consistent with the hydrogeologic zones. Generally, the upper 300 to 400 feet of the geologic material provides water; below this zone no water is encountered (Taylor and Royer, 1981, pp. 18).

Based on the general site topography, groundwater flow is inferred to flow radially outward from the topographic high of the proposed quarry location. The proposed quarry area is bounded to the west, north, and east by surface water streams and wetlands that, in some part, receive surface water and groundwater from the site area. **Figure 5** provides the locations of the streams and wetlands. Several of these streams are unnamed tributaries and as a result, for the purpose of reference throughout this groundwater model report document, have been assigned names. The stream reach to the west of the site is referred to as Stream Reach A, the stream to the north is referred to as Stream Reach B,

and the stream to the east is referred to as Stream Reach C (see **Figure 5**). Wetlands associated with these stream reaches have also been categorized (based on documents provided by Skelly and Loy, Inc.) as Delineated Wetland Areas A, B, C, D, and E, Wetland Seep Areas 1 through 4, and National Wetland Inventory Area (National Wetland Area). The locations of the wetland areas are provided on **Figure 5**.

Skelly and Loy also collected surface water flow associated with the stream reaches (A, B, and C) and both low flow and high flow rates were recorded. Based on these data, low flow and high flow rates for Stream Reach A, B, and C are provided on **Figure 5**.

The hydrogeology of the wetland areas has not been well characterized; however, due to the low permeability of the geologic formation, the large area of the water basins associated with the streams and wetlands, and precipitation in the area, it is likely that the majority of the water that is discharging to the streams and wetlands is surface runoff with only minor amounts from groundwater base flow. The Wetland Seep Areas all appear to be associated with areas in the valleys that may have more alluvial type sediments associated with them and as a result, surface water may flow more readily through these shallow surface sediments allowing seeps to develop over the areal extent of the Wetland Seep Areas.

Groundwater level measurements have been collected from the network of monitoring wells since 2010; however, as new monitoring wells have been installed, complete sets of water level data from the existing monitoring wells have only been available since 2013. Five sets of water level monitoring data collected between 12/20/13 and 12/1/14 were used to determine the mean groundwater elevation at each well location to calibrate the steady state groundwater model (discussed below). **Table 4** provides a tabulation of the data used to determine the mean groundwater elevation data collected from the site monitoring wells used to calibrate the groundwater model.

Minor fluctuations are evident in the water elevations, however, for the most part the water levels appear to remain steady with no erratic movements or complete lack of movement. This suggests that although the geologic formation exhibits low permeability, the formation does act as porous media likely through networks of small fractures in the rock material; however, the areal extent of the fracture network is most likely poorly connected.

Water level data collected from existing bedrock monitoring wells located along the perimeter of both the existing Pitts and proposed Northern Tract Quarries have historically demonstrated a very strong correlation with local surface topography. Throughout the period of record (2000-2016), only minor fluctuations in the depth to water have been recorded in these monitoring wells resulting in correspondingly minor deviations in both the regional and secondary (local) groundwater flow directions within the bedrock. The semi-radial groundwater flow direction in the bedrock closely mimics surface topography which variably slopes moderately to steeply from the higher elevations at the center of the Northern Tract area to the northwest, north, northeast, and

east toward discharge areas situated at lower elevations along the unnamed tributary and Toms Creek (Stream Reaches A, B and C).

Based on the high degree of correlation between these water level data, hydraulic gradient mapping of the potentiometric surface, and predictive simulations performed using the groundwater model, the proposed Northern Tract Quarry perimeter wells were found to provide depth to water data consistently representative of the observed groundwater elevations and hydraulic gradients observed in the bedrock throughout the proposed Northern Tract Quarry area. As a result, the existing Northern Tract Quarry perimeter wells are judged to be effective for evaluating the impacts to surrounding areas from the proposed development of the Northern Tract quarry.

There are no monitoring wells in the interior portion of the proposed quarry area; however, four core holes (NTs) remaining from past rock quality evaluation were maintained and used to collect some water level data. In addition, approximately thirty-eight shallow Infiltration Test Borings (ITBs) were installed along the eastern and western perimeters of the proposed Northern Tract. The ITBs were completed by others for the purpose of identifying and evaluating potential locations suitable for storm water infiltration. As such, the ITBs were designed to be open (screened) only within the overburden soil for the purpose of evaluating infiltration. These field evaluations showed unfavorable conditions for on-site infiltration of storm water runoff as a result of relatively low permeability of the soils and the underlying shallow rock causing isolated and shallow perched groundwater conditions in many areas of the site.

The core hole and ITB water level data are generally not consistent with water levels measured in the bedrock monitoring wells. The ITBs were generally established at relatively shallow depths within the overburden soils and thus are monitoring a perched water zone within the soil overburden. Elevated water levels in the core holes could be related to the construction details (e.g., potentially inadequate casing seals) of the core holes. Depending on the configuration of the core holes, the perched water in the overburden soil could be interfering (mixing) with the bedrock ground water resulting in water levels that are not representative of the bedrock groundwater. Therefore, the core holes and ITBs are not considered to be representative of the true (bedrock potentiometric heads) water levels and the water levels in the ITBs and core holes would not be relevant to evaluating potential quarry expansion impacts to streams, wetlands, residential wells, or groundwater drawdown within the bedrock being mined. Additionally, the perched water zone in the overburden soil will have no impact on the groundwater budget since this overburden will be removed when the bedrock mining begins. For these reasons, these data are deemed to be unreliable, and were excluded from the database used to generate the model simulations.

Water level measurements from three pairs of shallow/deep wells (MW-8S/MW-8D, MW-9S/MW-9D, MW-14S/MW-14D) do suggest that vertical gradients may exist; however, based on these data, the hydraulic gradients are mixed upward and downward gradients suggesting that the separation may be more a result of the dynamics of the fractured bedrock than actual gradients resulting from either hydrogeologic recharge or

discharge zones. Based on the data, it is evident that the shallow overburden material in places may not be well connected to the underlying bedrock material.

The rock to be quarried is the metabasalt. Based on observations in the Pitts Quarry to the south (same formation), the metabasalt is structurally massive, crystalline, and lacks bedding planes. This suggests that preferential flow along bedding planes or joint sets does not likely exist in the area of the site.

Precipitation and Recharge

Precipitation in the area of the site has been estimated to be between 47 and 49 inches per year (Reese and Risser, 2010, Plate 1). Recharge rates in southwestern Adams County in the general area that include the metabasalt and metarhyolite formations have been as low as 5.3 inches per year; however, this includes some geologic formations (part of the watershed) that are much more permeable than the metabasalts and metarhyolites (Reese and Risser, 2010, Plate 6) and as a result the recharge rates may be skewed higher where recharge rates in the metabasalt and metarhyolite alone are likely significantly lower than 5.3 inches per year. The domain of the model falls solely within the metabasalt and metarhyolite zones and as a result, would be expected to have a lower recharge rate.

Conceptual Model

A schematic cross section of the general conceptual model that the groundwater model construction was based upon is provided as **Figure 6**. It should be noted that the model layers have been constructed independently of the geologic formations (discussed in detail in Section 2.0). This was based on published data that suggests that permeability decreases with depth and is relatively independent of the geologic formation (Taylor, and Royer, 1981, pp. 18).

1.3 Purpose and Reliance

The purpose of the groundwater model discussed in this report is to provide the anticipated zone of influence impacts from the anticipated expansion of the newly proposed Northern Tract Quarry north of the existing Pitts Quarry.

Water level data collected between 12/30/13 and 12/1/14 (mean groundwater elevation data) have been used to calibrate the groundwater model associated with the site. The model is a numeric representation of the hydro-geologic conditions existing at the site and the surrounding area based on the existing site conceptual model. The model has allowed the evaluation of groundwater flow at the site and in the surrounding areas under existing site conditions through numeric simulations based on existing data. The model has been relied upon for the predictive evaluation of the groundwater impact on surrounding areas as a result of the proposed level expansions.

Others have collected hydro-geologic data (i.e. water level data, stream flow data, aquifer parameter data, etc.) and related site characteristic data relied upon for the construction of

the groundwater model. It is not the intent of this groundwater model document to describe the methods used to collect these data, however, in some cases a brief explanation of the quality of the data is discussed where interpretation is warranted.

Groundwater Modeling Systems (GMS) software, Version 10.0, developed by the United States Department of Defense and distributed by Aquaveo, Inc. was utilized in the development of the groundwater model for the site. This modeling software consists of numerous modules that are interfaced to allow more accurate representation of hydrogeologic conditions and greater flexibility in simulating and evaluating flow conditions on the site and surrounding area.

As discussed above, data provided by others was incorporated into the model. The data included drilling logs, static water levels, site topography, aquifer testing results, and other physical site characteristic data.

The “site” generally encompasses the entire region of the groundwater model that incorporates numerous properties within the general drainage basin of the site.

It is not the intent of the groundwater model to solely define the hydrogeologic characteristics that exist at the site, but rather the model is intended to be used as an additional evaluation tool in conjunction with the more conventional evaluation methods (i.e. soil borings, monitoring wells, aquifer testing, etc.) that have been applied to the site.

Figures that have been included as part of this report are provided in an 11 x 17 paper size format and are in color allowing the data to be graphically presented. Black and white copies and/or smaller paper size copies of the figures may not present the data in the clarity originally intended.

2.0 Model Construction

2.1 General

Some assumptions and speculation relative to the site's geologic or hydro-geologic characteristics have been made during the development of this groundwater model. All of the assumptions and speculations have been based on sound and accepted geologic and hydro-geologic theory and are identified and explained when utilized.

The model was constructed in three stages. The first stage consisted of developing a three-dimensional conceptual model representing the physical characteristics of the site. The second stage consisted of converting the three-dimensional conceptual model into a numeric model for calibration. MODFLOW 2005, a finite difference computer model, was utilized for creating the numeric model. The model was constructed as a steady-state model, which allows the input data to be interpolated through numerous iterations to solve the finite difference equation. The third step consisted of running predictive flow simulations to represent existing groundwater conditions at the site and the subsequent simulation of the proposed level expansions used to determine the zone of influence and the potential impact to neighboring properties and surface water areas. The modeled simulations presented in this report are steady state conditions.

2.2 Numeric Flow Model Construction

Boundary Conditions

The boundary conditions of the model are presented on **Figure 7**. The selection of the model boundary was based on isolating the groundwater drainage basin that the quarry lies within: groundwater that flows into the basin interacts with the model domain and becomes incorporated into the water budget and water that flows outside of the basin does not interact with the model domain and is not part of the water budget and; therefore, is not part of the model domain.

The general model area (model domain) is bordered to the north, south, and west by well-defined groundwater divides (MODFLOW no flow boundaries). The eastern boundary is also a groundwater divide; however, this boundary allows surface water flow out of the drainage basin that was modeled. The model boundaries were set far enough from the proposed quarry area so as not to interfere with the modeling results.

Surface Water

MODFLOW drain arcs represent locations where natural (undisturbed by mining operations) surface water drainage would simulate the removal of water from the model domain as base flow. Drain arcs were used to simulate the tributaries that, based on the geomorphology, likely only have discharge as base flow and surface water would not likely enter the porous media as recharge. As discussed earlier, relatively rugged topography exists in the area resulting in relatively fast overland run-off and drainage.

The elevations of the surface water bodies (drain nodes) were based on the United States Geologic Survey (USGS) topographic quadrangle map of the area. The natural creek elevations were estimated from the USGS maps and then 2.0 feet was subtracted from the estimated surface water elevation at each node location to estimate the bottom of the bed elevation. The bottom of the stream bed elevation was used in the model as the node elevation. The node locations used for the construction of the model are presented on **Figure 7**.

The starting conductance values assigned to the drain traces were determined from the estimated creek dimensions and the estimated hydraulic conductivity of the stream bed material. In addition, the calibration of the model also guided the conductance values used in the drain traces. Typically, conductance is the leakage of water through the stream bed material that can discharge as base flow to the stream or leak back into the aquifer as recharge. Conductance is calculated by the product of the creek width and the hydraulic conductivity divided by the creek bed thickness. This provides a conductance value per unit distance (per foot) for the stream bed material. When this value is assigned to MODFLOW, the unit distance is multiplied by the length of the stream bed material in each cell of the model and the conductance of each cell is assigned to the MODFLOW model.

It has been assumed that much of the stream bed length sits on the surface of saprolitic material derived from the bedrock; therefore, the hydraulic conductivity of the saprolitic material was used in the calculation of the conductance value. The natural creek bed conductance values were initially set at 3.33 feet per day per foot (ft/day/ft). This was based on an average stream width of 15 feet, a mean hydraulic conductivity of the overburden material (saprolite) of 0.6675 ft/day (see Table 3), and a stream bed thickness of 3 feet. Based on the calibration of the model (discussed below), a stream conductance value of 0.5 allowed the best calibration and was used in the model as the final stream conductance.

Model Grid

Based on site specific geologic information collected from the quarry (provided by Skelly and Loy, Inc.), observations in the Pitts Quarry to the south (same formation), and available publication data, structural components of the bedrock material promoting preferential flow directions (bedding planes, joint sets) are not apparent and as a result, the model grid was oriented north to south. However, a very fine grid was used to allow detailed components of flow to be registered in the model. No preferential flow was assigned in the model.

A grid spacing of approximately 50 by 50 feet was assigned to the entire domain of the model. The general model grid is presented on **Figure 8**.

Hydraulic Conductivity Assignment

The model layer configuration (discussed below) was based on the distribution of the hydraulic conductivities associated with the site and in the model domain area. **Figure 6** provides the general conceptual model of the site used in the numeric model. Generally, publication data (Taylor and Royer, 1981, pp. 18) suggests that the permeability of the porous material decreases with depth and is relatively independent of the geologic formation. Based on published geologic data, there are generally two hydrogeologic zones; one from the ground surface to approximately 400 feet where groundwater yields are present, and a zone below 400 feet where no groundwater yield exists. In addition, based on site-specific characterization data, a shallow overburden zone also exists as discussed above.

As discussed below and presented on **Figure 6**, the groundwater model layers were divided into three units: the uppermost model layer (Layer 1) consists of the overburden and saprolitic cap rock, Layer 2 consists of the upper 400 feet of competent bedrock where groundwater yields exist, and Layer 3 consists of competent bedrock below 400 feet in depth where no groundwater yields exist.

Published data suggests the hydraulic conductivity (groundwater yield) of the underlying bedrock is very low (Taylor and Royer, 1981, pp. 12-13). In addition, aquifer testing completed in the site area associated with 9 of the monitoring wells have provided hydraulic conductivity values for the underlying bedrock that range from 0.0047 to 0.1591 feet/day and overburden hydraulic conductivities that range from 0.025 to 1.31 feet/day. This data is consistent with the characteristics described in the published data. **Table 3** provides a summary of the site-specific hydraulic conductivity values. Typical of groundwater modeling, these values were initially used in the model prior to the calibration process as starting values for hydraulic conductivity. During the calibration process these values were adjusted to allow a better calibration to be achieved. To achieve the best calibration, a hydraulic conductivity value of 0.0011 feet/day was used for the overburden material (Layer 1 of the model), 0.0014 feet/day was used for the competent bedrock material to a depth of 400 feet, and 0.0005 feet/day was used for the bedrock material below 400 feet. **Table 5** provides a summary of the hydraulic conductivity parameters used in the model.

Generally, lower hydraulic conductivity values were used in the model relative to the site-specific hydraulic conductivity values obtained from on-site testing. The reason for this is that site-specific hydraulic conductivity testing evaluates specific site locations and does not evaluate the average regional hydraulic conductivity of the domain of the model. To achieve calibration, the model requires that the entire domain of the model meets a hydraulic conductivity value that allows the simulated water levels in the calibrated target wells to match the water levels observed in the site wells. Hydraulic conductivity values obtained from site-specific aquifer testing are typically a starting point for the calibration process and not necessarily the final value(s) ultimately used in the model.

Horizontal Anisotropy

No horizontal anisotropy (preferential flow) was used in the model calibration since no preferential flow was identified on the site as discussed above.

Vertical Anisotropy

No vertical anisotropy ratios were available; therefore, these values were assigned a value of 1.0 for all of the geologic material within the model. It should be noted that this parameter is typically not a sensitive parameter in this type of groundwater model. Geologic formations with distinct horizontal structure (i.e. horizontal shales, sediments with flat lying mica flakes, etc.) that can impede vertical flow require vertical anisotropy values to simulate the preferential flow along the horizontal axis. It can be assumed that structurally massive rocks, as exist at the site, with no apparent horizontal structural components typically can be modeled with the assumption that the vertical flow is equivalent to the horizontal flow and no preferential flow exists.

Model Layers and Geologic Characteristics

Three hydrogeologic layers (Layers 1, 2 and 3) were recognized and simulated in the model domain. Divisions of the layers were based on the published hydraulic conductivities discussed above. Based on published geologic data and site-specific characterization data, there are generally three hydrogeologic zones with depth; the first zone is the overburden soil and saprolitic cap rock that is present in the upper 50 feet (Layer 1), the second zone consisting of bedrock between 50 and 400 feet below the ground surface (Layer 2), and the third zone consisting of impermeable bedrock (Layer 3) below 400 feet in depth. It should be noted that due to the hydrogeological similarities between the geologic materials, permeability is relatively independent of the geologic formation. The distribution of these hydrogeologic units (layers) within the model domain is presented on **Figure 9**. Generally, Layer 1 and Layer 2 of the model have similar hydrogeologic characteristics and are the two layers that will be impacted by dewatering of the proposed quarry.

Recharge

Recharge is not a value that can be evaluated through exploration, but a hydraulic parameter typically evaluated on a regional watershed basis. This parameter is typically based on measured rates of precipitation, stream flow, surface runoff, etc. These values are published by the USGS and are used as a starting point in the groundwater model. The groundwater model provides an evaluation tool that is much better suited to refining a regional recharge rate to match site-specific conditions than any type of site exploration or evaluation method. The amount of site-specific recharge is essentially defined as the hydrologic balance between the amount of water moving into the model domain (recharge) and water leaving the model domain (discharge). As such, the rate of site-specific recharge must closely match the measured groundwater elevations recorded in both the nearby wells and stream flow rates. As stated below, a regional recharge rate

was initially used with the site-specific recharge rate refined by adjusting the recharge rate until the resultant monitoring well groundwater levels and adjacent stream flows closely matched existing site conditions.

Groundwater recharge is based on annual precipitation, infiltration rates, stream base flow rates, and evapotranspiration rates. As a general “rule of thumb”, typical recharge is approximately 1/3 of the actual precipitation that occurs in relatively flat and porous terrain. Initial recharge values were obtained from publication data (Reese and Risser, 2010, Plate 6) and were refined during the calibration process. Based on these publication data, recharge in the general site region ranges from 5.3 to 8.5 inches per year. The recharge values used in the model were initially the published values and were modified based on the model calibration. The final mean recharge value used to obtain the best fit calibration for the model domain was approximately 1.0 inch per year.

A lower recharge value than the published range (5.3 to 8.5 inches per year) is justifiable because general recharge rates in southwestern Adams County in the general area of the metabasalt and metarhyolite formations have been as low as 5.3 inches per year as stated above; however, calculation of these values included some geologic formations (part of the watershed) that are much more permeable than the metabasalts and metarhyolites (Reese and Risser, 2010, Plate 6). As a result, recharge in the metabasalt and metarhyolite alone could be significantly lower than 5.3 inches per year due to the low permeability of these specific rock types (i.e. metabasalt and metarhyolite) which directly underlie the site area. The domain of the model falls solely over the metabasalt and metarhyolite and does not include the more permeable rock types used to establish the recharge values in the published data.

A sensitivity analysis of average recharge (1.0 inch per year) was conducted to better understand the impact that this parameter has on groundwater movement beneath the site. Average recharge was used for the sensitivity analyses because the head elevation data collected from the site monitoring wells is more consistent with average recharge conditions. Higher and lower values of recharge were evaluated. It was determined that the model was very sensitive to recharge: the use of higher values caused flooding in the model in areas where none was observed, and the lower recharge values resulted in “dry cells” in the model where groundwater was known to exist. Additionally, the sensitivity analysis was compared to the residual error between the observed groundwater elevations and simulated groundwater elevations.

Table 5 provides a summary of all the final hydrogeological parameters used in the model based on the model calibration producing the least amount of error.

2.3 Numeric Flow Model Calibration

General

Calibration refers to the process of demonstrating that the model is capable of producing field measured heads and flows. Calibration can be evaluated both qualitatively and quantitatively; however, even in a quantitative evaluation, the judgment of when the fit

between model and reality is satisfactory is a subjective one (Anderson and Woessner, 1992, pp. 223).

The groundwater model was calibrated to the mean groundwater elevation (head) data collected from the site monitoring wells. **Table 4** provides the data utilized to calculate the mean groundwater elevation level for each monitoring well location. An inventory of these wells is provided on **Table 2**.

Groundwater level measurements have been collected from the network of monitoring wells since 2010; however, as new monitoring wells have been installed since 2010, complete sets of water level data for the existing monitoring wells have been available since 2013. The five sets of water level monitoring data collected between 12/20/13 and 12/1/14 (provided on **Table 4**) were used to determine the mean groundwater elevation at each well location and to calibrate the steady state groundwater model (discussed below). Again, these monitoring events provided the most complete sets of groundwater elevation data.

From 4/1/15 through 9/11/15, an additional six monthly water level monitoring events were completed by others utilizing the proposed Northern Tract monitoring well network. This data was used in the Northern Tract pre-application as the background monitoring data for the on-site groundwater monitoring locations. Because these 2015 water level elevation data are within the range of the water level data (2013 to 2014) already used to construct and calibrate the existing model, and would not have any significant effect on the model output, the 2015 water level data were not incorporated as model inputs.

Monitoring Well Calibration (Head Elevation)

The mean groundwater elevation data collected from the site monitoring wells and tabulated on **Table 4** were used for the model calibration of hydraulic heads. It should be noted that the data obtained from the monitoring wells from the period of 12/30/13 through 12/1/14 represent no active pumping from the proposed Northern Tract Quarry; however, active pumping at the Pitts Quarry located south of the proposed Northern Tract Quarry was simulated in the calibration of the model. The Pitts Quarry was simulated with a dewatering level floor elevation of 1040 ft-amsl (the pit floor elevation at the time of the model calibration as well as at the time the monitoring well data was collected). The dewatering of the existing Pitts Quarry floor elevation of 1040 ft-amsl was simulated with a MODFLOW drain polygon configured to match the existing floor elevation.

Groundwater elevation data used to calibrate the groundwater model were collected at the site at the time that the Pitts Quarry was actively being mined to a level elevation of 1040 ft-amsl. Groundwater elevation levels at the site would be impacted by the dewatering of the Pitts Quarry at the elevation of 1040 ft-amsl at the time they were collected. For this reason, the Pitts Quarry dewatering level was simulated in the model calibration process at an elevation of 1040 ft-amsl which allowed the existing site conditions (i.e. Pitts Quarry at 1040 ft-amsl) to be replicated and calibrated to the associated groundwater elevation data from the same time period. Based on this calibration, the Pitts Quarry is

pumping a negligible amount of groundwater to dewater the quarry (9 gpm). Based on observations at the quarry, very little pumping has been reported, and when pumping does occur it is associated with the removal of storm water runoff, not groundwater. Only a small portion of the accumulated water consists of groundwater infiltration. The pumping system is primarily used to remove rainfall or snowmelt runoff. Therefore, the pumping rate in the Pitts Quarry would not be indicative of groundwater infiltration alone and thus would only have limited applicability to the groundwater model. Completing a new calibration of the model once the Pitts quarry reaches the maximum depth will require the quarry operations to first reach the maximum depth in the Pitts Quarry along with an associated set of groundwater level measurements at that time in nearby monitoring wells for comparison. This is not anticipated to occur for many years. Secondly, this calibration will have no impact on the accuracy of the current calibration.

During the calibration process, sensitivity analyses of the recharge values and hydraulic conductivity values for each modeled layer were conducted to identify the most unique parameter values that best matched the calibration targets (head elevations in the wells). The final hydrogeological parameter values used in the model are discussed above and provided on **Table 5**. The sensitivity analysis is provided on **Table 6**.

The result of the monitoring well calibration (residual error) is presented in tabular format on **Table 7** and is graphically presented on **Figure 10** and **Figure 11**. Based on the distribution of calibration points (groundwater head values) associated with the perfect fit line (see **Figure 10**), a calibration was achieved using the mean monitoring well data. The model calibrated with a mean error of 5.03 feet, an absolute mean error of 17.58 feet, a root mean square (RMS) error of 22.75 feet, and a normalized RMS percent error of 6.1%.

It should be noted that although a mean error of 5.03 feet was achieved, several of the wells diverged significantly from the target elevations (i.e. MW-2, MW-4, MW-7, and MW-12D). All reasonable attempts were made to reduce the error in these wells; however, it was determined that due to the characteristics of the geologic formation, a closer calibration was not likely. Review of well logs for these wells and others identified isolated fractures that may be poorly connected to the entire formation and as a result, some wells may not fall into place with the modeled potentiometric groundwater elevation for the site. Isolated fractures filled with water result in anomalous water level readings in wells that are associated with these types of fracture characteristics.

Flow Budget

The flow budget of the MODFLOW model was evaluated to determine if reasonable balance between inflows and outflows of the model had been achieved. Based on a conceptual understanding of the site's hydrologic cycle, it was apparent that the aquifer on the site was recharged from precipitation. Groundwater was lost from the aquifer through drainage into surface water streams. Results of the flow budget are presented on **Table 8**.

Based on the results of the flow budget, it is evident that the inflow of water to the model domain closely matches the outflow of water from the model domain suggesting a reasonable water budget balance.

3.0 Simulated Groundwater Flow

3.1 Existing Site Groundwater Elevation Conditions

Based on the calibrated groundwater model, **Figure 12** provides the simulated existing regional potentiometric groundwater elevations associated with the domain of the model. **Figure 13** presents the same simulation; however, it provides only the area proximate to the site. This simulation (presented on **Figures 12 and 13**) represents the current site conditions used in the calibration process with no active pumping of the proposed Northern Tract Quarry area; however, the Pitts Quarry south of the site is actively being dewatered to an elevation of 1040 ft-amsl.

For the purpose of the proposed level expansion simulations, active pumping of the Pitts Quarry was removed and a “no pumping” static groundwater scenario was simulated. While the exact quarry level sequencing is unknown at this time and will depend on time to permit the Northern Tract, field conditions encountered, and market demand, once the maximum depth of mining is reached in the Pitts Quarry (840 ft-amsl), we understand that SGI plans to reclaim the Pitts Quarry by depositing rock fines, overburden, and cap rock in the quarry at a rate greater than the groundwater inflow rate. As a result, we have assumed that any dewatering of the Pitts Quarry will not involve pumping groundwater, but will be comprised of primarily surface (storm) water discharge. **Figure 14** provides the no pumping simulated potentiometric groundwater elevation contours for the site area that were used to compare the simulated level expansion water levels (4th level through the 12th level) discussed below to allow comparison and determine the potential impact that each of the anticipated expansions from the proposed Northern Tract Quarry pumping may have on the surrounding areas (i.e. wetlands, streams, residential wells).

3.2 Simulation of Level Elevation Expansion

To simulate the level expansion of the Northern Tract Quarry area (4th level through the 12th level), the proposed level configuration areas were simulated with the MODFLOW “drain” package. This package simulates the dewatering of the quarry to the assigned elevation and level configuration. It should be noted that groundwater was not encountered until the 4th level, therefore, the first three levels were not evaluated.

The Pitts Quarry was assumed to be developed to its final configuration with the lowest level at an elevation of 840 ft-amsl for this simulation. SGI proposes to backfill the Pitts Quarry in a manner which will not require active dewatering of the Pitts Quarry. Therefore, no active pumping was assumed in the Pitts Quarry for the de-watering simulations for the proposed Northern Tract Quarry.

As discussed in Section 1, the proposed level elevation expansions were simulated to determine potential impact to the proximate areas. The areas of the proposed quarry level configurations are provided on **Figure 5** and a tabulation of the level expansions is provided in **Table 1**. Each level elevation was expanded inward from the level elevation being simulated with the same elevation which simulated the removal of the entire

elevation of rock from the quarry from the specific level elevation. The quarry levels were simulated as steps as the quarry was deepened allowing the actual three-dimensional configuration of the proposed quarry to be simulated. **Figure 15 through Figure 23** provide the results of the potentiometric groundwater elevations for the proposed 4th level through the 12th level. **Figure 24 through Figure 32** provide the associated drawdown for the proposed 4th level through the 12th level. It should be noted that the model simulation, and the associated figures, represent long term, steady state groundwater conditions.

Based on the model simulations, it is evident that, as the quarry expansions deepen, the general zone of influence (drawdown) from the quarry is contained to the west, north, and east by the surface water streams. The maximum simulated quarry pit discharge (12th level) is 1749 ft³/day (13,083 gallons per day or 9.0 gallons per minute). This is a relatively low discharge rate but is consistent with the permeability of the bedrock material and the reported seepage rate observed in the Pitts Quarry to the south.

Table 9 provides a tabulation of the quarry discharge rates for each level expansion. In addition, based on the model simulations, **Table 9** provides the base flow stream and wetland water loss volumes associated with each level expansion. Comparisons of each level expansion were made to the “no pumping” site groundwater flow volumes associated with each of the stream reaches and each of the wetland areas. The MODFLOW model allows each of the level simulation solutions to be queried for the flow rates of each stream reach and each wetland area. These values were recorded on **Table 9**. **Table 9** results only include base flow loss (loss from groundwater) contributions to the surface water bodies and do not include the contribution of overland flow to the total stream flows. For this reason, **Table 10** has included the total flow volumes (base flow and overland flow) to the surface water bodies. A “total flow loss percentage” to the surface water bodies has been calculated and is provided on **Table 10** for both low and high flow conditions (see **Figure 5** for low and high flow rates). No significant impact to the surface water bodies is evident based on the results.

The extent of the drawdown influence on **Figures 24 through 32** was set at a 10-foot contour interval. A 0-foot drawdown contour does not exist and 1-foot contour did not fit the 10-foot contour interval provided on the Figures. In addition, it should be noted that a steady state model typically over predicts drawdown since the model solution reaches a “steady state” which typically does not occur in a natural condition. For these reasons the outer edges of the drawdown contours used on the figures were set at 10 feet.

At the 6th level (**Figure 26**) the outermost contour reaches the approximate elevation of the Delineated Wetland Area (Area D) and has a maximum drawdown of 20 feet below this area. From this level forward through the 12th level expansion, drawdown is exhibited under this wetland area and progresses under other wetland areas (see **Figures 26 through 32**). The groundwater loss from each of the wetland areas and the perimeter streams (Stream Reach A through C) is tabulated on **Table 9** and the percent loss to overall total flow is provided on **Table 10**.

As provided on **Table 10**, the maximum water loss from the wetland areas is a 1.2% loss from Wetland D (12 Level – low flow conditions) which equates to 0.5 gallon per minute. The maximum water loss from the overall stream reaches is 5.8% from Stream Reach C (12 Level – low flow conditions) which equates to a total loss of 3.8 gallons per minute. No significant surface water losses were evident.

Although water losses from the wetlands and the streams exist, the amount of water loss is relatively very small as a result of the simulated drawdown from the quarry shown on **Figures 26 through 32**. It is apparent that the connection between the groundwater and the streams/wetlands is poor. The streams and wetlands are likely perched on the ground surface due to the low permeability of the underlying geologic material. While some connection exists due to fractures, the overall hydraulic connection is poor. It has been estimated, based on field observations, that the surface water flow through the streams ranges from 65 gallons per minute to 1,938 gallons per minute (see **Figure 5**). Water losses from the wetlands as a result of the simulated quarry drawdown would be only a small percentage of the overall flow through these areas. Overall, very little impact to the streams and wetlands was evident.

No residential wells are impacted from the simulated drawdown of the proposed quarry expansion.

3.3 Drought Conditions

Drought conditions are typically simulated in a groundwater model by reducing the mean recharge. The mean recharge used in the model was 1.0 inch per year. As previously discussed, a recharge rate of 1.0 inch per year was necessary to achieve the best model calibration due to the extremely low hydraulic conductivity of the underlying geologic formation. Because of these site-specific characteristics, drought conditions would not likely have any significant impact on groundwater underlying the site. A simulation was run for the 12th level expansion that reduced the recharge by 15% and produced no noticeable change in drawdown or flow losses. Although drought conditions would likely impact the surface water streams and wetlands as a result of a loss of surface water flow, the impact of the quarry dewatering associated with the drought conditions would have no impact relative to further groundwater base flow loss.

3.4 Static Groundwater Conditions - Quarry Pit Reclamation

Static groundwater elevation conditions were simulated for the final static conditions of the proposed Northern Tract Quarry once dewatering is discontinued from the 12th level expansion (740 ft-amsl) and the water level in the quarry recovers to a static level. **Figure 33** presents this simulation. Based on the model simulation, the water in the quarry returns to a static level of approximately 1020 ft-amsl. The reclamation elevation of the quarry rim (lowest point) will be elevation 1030 ft-amsl.

Once the maximum depth of mining is reached in the Pitts Quarry (840 ft-amsl), we understand that SGI plans to reclaim the Pitts Quarry by depositing rock fines,

overburden soils, and cap rock in the quarry at a rate greater than the groundwater inflow rate. As a result, we have assumed that any dewatering of the Pitts Quarry will not involve pumping groundwater, but will be comprised of primarily surface (storm) water discharge.

4.0 Summary and Conclusions

Based on the results of the groundwater model simulation discussed in this document, the following conclusions have been reached:

- The geologic material underlying the proposed Northern Tract Quarry area consists of metabasalt and metarhyolite both with very low permeability which significantly limits the movement of groundwater through the material.
- The maximum pumping rate of the proposed Northern Tract Quarry at the 12th Level expansion is approximately 9.0 gallons per minute which is a direct result of the low hydraulic conductivity of the geologic formations.
- The drawdown (zone of influence) from the maximum quarry dewatering depth (12th Level) does not extend beyond the surface water streams bounding the quarry area.
- Although drawdown of the groundwater levels as a result of developing the proposed Northern Tract Quarry occurs beneath the streams and wetland areas proximate to the quarry area, the actual maximum dewatering rate (12th Level) associated with the quarry pumping has no significant water loss impact on the surface water features (Wetlands, Unnamed Tributary to Toms Creek–HQCWF and Toms Creek-HQCWF).
- The reclamation water level in the quarry is estimated to be at an elevation of 1020 ft-amsl. The reclamation elevation of the quarry rim (lowest point) will be elevation 1030 ft-amsl.
- No residential wells are impacted from the simulated drawdown of the proposed quarry expansion.

5.0 Limitations

The modeling in this report was performed using a commercially available software package (Groundwater Modeling System-GMS, Version 8.1 developed by the United States Department of Defense) designed to simulate groundwater flow. Where available, actual data from the site was utilized to calibrate the models and develop the graphical representations presented in this document. In other instances, assumptions were necessary to complete the model and limitations associated with the site data result in a level of uncertainty in the model predictions. Therefore, the results of the model predictions should be independently evaluated using actual site monitoring data.

The results of the model may differ from actual site conditions because of unknown subsurface conditions. The results of the models presented in this document shall not be construed to create any warranty or representation with regard to the site. The conclusions presented in this report were based on the services described, and not on scientific tasks or procedures beyond the described scope of services.

6.0 References

Anderson, M.P., Woessner, W. W., 1992, Applied Groundwater Modeling – Simulation of Flow and Advective Transport, Academic Press, Inc., pp. 223-246.

Fauth, J. L., 1978, Geology and Mineral Resources of the Iron Springs Area, Adams County and Franklin Counties, Pennsylvania, Commonwealth of Pennsylvania Department of Environmental Resources Bureau of Topographic and Geologic Survey, Atlas 129c.

Reese, S.O. and Risser, D.W., 2010, Summary of Groundwater-Recharge Estimates for Pennsylvania, Pennsylvania Geological Survey, Fourth Series, Water Resources Report 70.

Taylor, L.E. and Royer, D.W., 1981, Summary Groundwater Resources of Adams County, Pennsylvania, Commonwealth of Pennsylvania Department of Environmental Resources Bureau of Topographic and Geologic Survey, Water Resources Report 52.

TABLES

TABLE 1

Anticipated Quarry Level Elevations
SGI Charmian Facility - Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

Level ID	Quarry Level Base Elevation (feet above mean sea level)
4th	1140
5th	1090
6th	1040
7th	990
8th	940
9th	890
10th	840
11th	790
12th	740

NOTES:

Groundwater was first encountered in the 4th level, therefore, model simulations are for Level 4 through Level 12.

TABLE 2

Monitoring Well Inventory
SGI Charmian Facility-Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

Well ID	Well Depth (feet)	Reference Elevation (ft-amsl)	Ground Surface Elevation (ft-amsl)	Open Borehole or Screen Interval Length (feet)	Top of Open Borehole or Screen Interval (ft-amsl)	Bottom of Well Elevation (ft-amsl)	Approximate Depth To Competent Rock (feet)	Approximate Elevation of Competent Rock (feet)	Mean Groundwater Elevation (ft-amsl)
MW-1	No Data	1059.9	1056.75	No Data	No Data	791.75	No Data	No Data	1036.09
MW-2	No Data	1263.73	1258.57	No Data	No Data	794.57	No Data	No Data	1230.25
MW-3	No Data	1181.83	1178	No Data	No Data	793	No Data	No Data	1105.90
MW-3R	560	1161.5	1158.96	502	1098.96	596.96	47	1111.96	1122.09
MW-4	No Data	1274.77	1270.83	No Data	No Data	790.83	No Data	No Data	1227.21
MW-4R	720	1308.95	1309.62	623	1212.62	589.62	35	1274.62	1267.84
MW-5	550	1148.56	1147.13	No Data	No Data	597.13	No Data	No Data	1135.90
MW-6	325	1354.52	1354.52	307	1336.52	1030	7	1347.52	1315.26
MW-7	550	1084.44	1083.98	470	1003.98	534	94	989.98	1058.38
MW-8S	30	1073.33	1069.84	16	1055.84	1039.84	Not Applicable	Not Applicable	1045.75
MW-8D	374	1070.26	1068.27	336	1030.27	694.27	30	1038.27	1043.69
MW-9S	45	1020.39	1018.41	23	996.41	973.41	Not Applicable	Not Applicable	983.28
MW-9D	325	1019.95	1018.2	275	968.2	693.2	45	973.20	991.22
MW-10D	315	1008.37	1006.93	300	991.93	691.93	9	997.93	941.54
MW-11D	350	1047.16	1046.29	338	1034.29	696.29	7	1039.29	1023.09
MW-12D	380	1079.18	1077.58	368	1065.58	697.58	5.5	1072.08	1068.52
MW-13D	382	1079.23	1077.27	369	1064.27	695.27	8	1069.27	1047.59
MW-14S	74	1090.71	1087.99	10	1023.99	1013.99	74	1013.99	1066.16
MW-14D	394	1090.34	1088.41	316	1010.41	694.41	72	1016.41	1058.83

NOTES:

See Table 4 for mean groundwater elevation data.

TABLE 3

Hydraulic Conductivity Values
SGI Charmian Facility-Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

Monitoring Well ID	Hydraulic Conductivity (ft/day)
Slug Testing	
MW-9S	0.025
MW-14S	1.31
Pumping Tests	
MW-8D	0.0058
MW-9D	0.0074
MW-10D	0.0693
MW-11D	0.0058
MW-12D	0.0047
MW-13D	0.1591
MW-14D	0.6384

NOTES:

Aquifer testing results provided by Skelly and Loy, Inc.

TABLE 4

Mean Groundwater Elevation Data
SGI Charmian Facility-Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

Monitoring Well ID	Reference Elevation Top of Casing (ft-amsl)	Groundwater Elevation Measurement Date					Mean Groundwater Elevation (ft-amsl)
		12/20/2013	1/20/2013	2/27/2014	3/20/2014	12/1/2014	
MW-1	1059.90	1035.45	1035.41	1041.33	1034.95	1033.30	1036.09
MW-2	1263.73	1218.90	1233.15	1235.12	1233.82	No Data	1230.25
MW-3	1181.83	No Data	1109.18	No Data	No Data	1102.61	1105.90
MW-3R	1161.5	1120.83	1123.38	1127.21	1123.89	1115.14	1122.09
MW-4	1274.77	1226.48	1228.48	1230.81	1228.77	1221.53	1227.21
MW-4R	1308.95	1271.18	1274.45	No Data	No Data	1257.90	1267.84
MW-5	1148.56	1134.19	1136.32	1140.48	1137.16	1131.33	1135.90
MW-6	1354.52	1318.20	1319.66	1321.40	1302.61	1314.44	1315.26
MW-7	1084.44	1057.41	1059.42	1059.82	1060.23	1055.04	1058.38
MW-8S	1073.33	1046.55	1047.94	1052.42	1047.41	1034.43	1045.75
MW-8D	1070.26	1042.37	1043.70	1050.30	1043.14	1038.96	1043.69
MW-9S	1020.39	979.64	984.38	987.00	988.39	977.00	983.28
MW-9D	1019.95	986.64	990.97	992.11	992.70	993.70	991.22
MW-10D	1008.37	924.09	946.27	948.60	945.52	943.22	941.54
MW-11D	1047.16	1021.38	1022.12	1022.83	1022.25	1026.89	1023.09
MW-12D	1079.18	1068.21	1068.91	1069.31	1068.42	1067.77	1068.52
MW-13D	1079.23	1046.82	1047.58	1048.56	1047.55	1047.45	1047.59
MW-14S	1090.71	1064.80	1068.14	1071.29	1068.04	1058.54	1066.16
MW-14D	1090.34	1057.88	1061.19	1064.00	1060.77	1050.29	1058.83

NOTES:

- 1) Groundwater elevation data was provided from 9/9/10 through 12/1/14; however, the majority of this data was incomplete and many of the wells either did not exist at the time earlier measurements were made or were not accessible. As a result, the most complete date sets of data were used in determining the mean groundwater elevation. The five sets presented above provided the most complete date sets of data and were the basis for determining the mean groundwater elevation for each well.
- 2) ft-amsl - Feet Above Mean Sea Level.

TABLE 5

Hydrogeological Parameters Used in Model
SGI Charmian Facility - Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

Material Identification	Model Layer Identification	Range of Hydraulic Conductivity ¹ (k - ft/day)	Model Hydraulic Conductivity (k - ft/day)	Horizontal Anisotropy* (y/x ratio)	Vertical Anisotropy (x/z ratio)	Source of Data
Overburden Material	Layer 1	0.025 to 1.31	0.0011	1	1	Estimated based on Model Calibration and Site Data
Catoctin Formation	Layer 2	0.0047 to 0.6384	0.0014	1	1	Estimated based on Model Calibration and Site Data
Catoctin Formation	Layer 3	No Data	0.0005	1	1	Estimated based on Model Calibration

NOTES:

1. * Ratio based on GMS MODFLOW using y/x instead of x/y.
2. Hydraulic conductivity values based on data provided by Skelly and Loy, Inc.

Recharge (see report text)

Model Domain: 0.00019 ft/day (1 Inch per year)

TABLE 6

Parameter Sensitivity
SGI Charmian Facility – Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

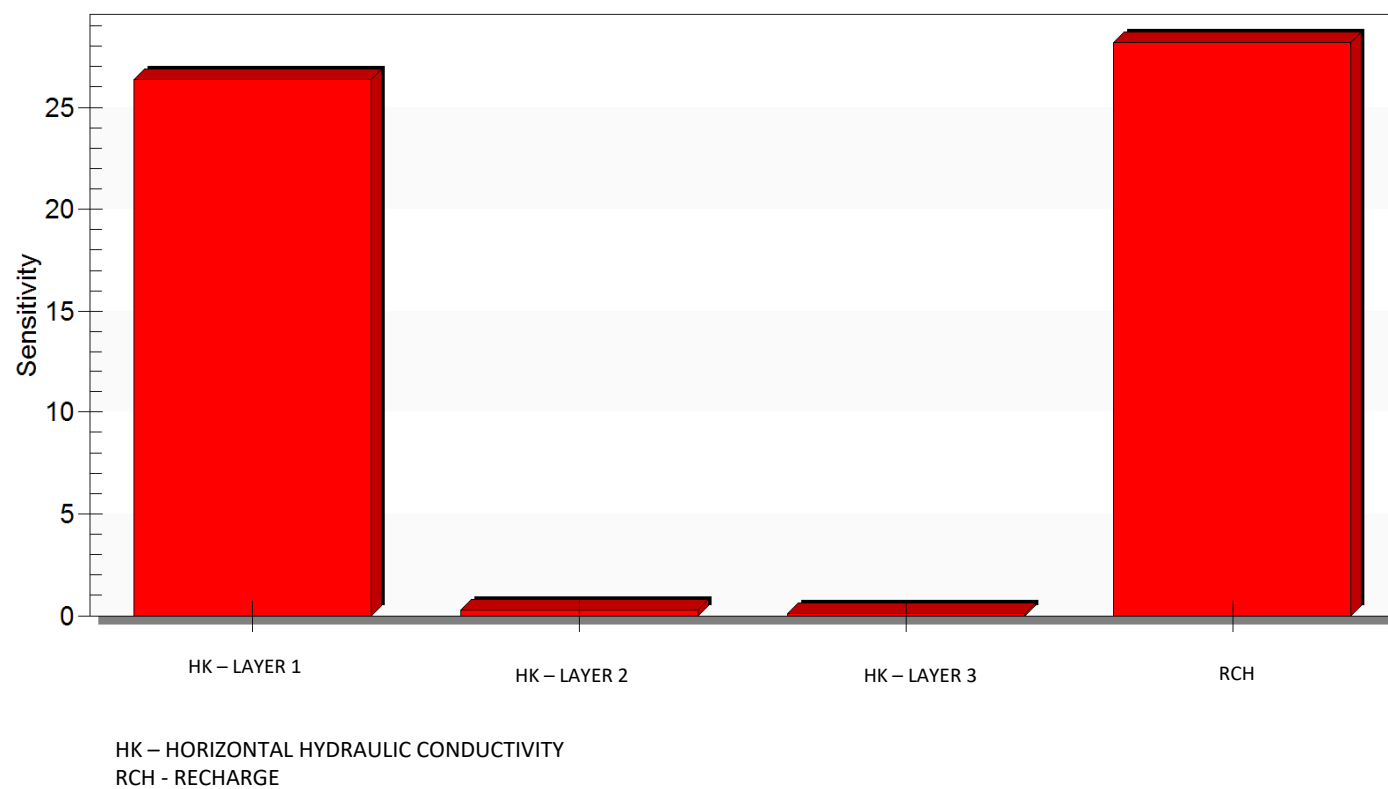


TABLE 7

Calibration (Residual Error) of Target Well Data
 SGI Charmian Facility-Proposed Northern Tract Quarry
 Blue Ridge Summit, Pennsylvania

Well ID	Computed (Simulated) Groundwater Elevation (feet/msl)	Observed Mean Groundwater Elevation (2014 Data Set) (feet-msl)	Residual Error (feet)
MW-1	1047.33	1036.09	-11.24
MW-2	1271.17	1230.25	-40.92
MW-3	1104.6	1105.90	1.30
MW-3R	1100.68	1122.09	21.41
MW-4	1172.05	1227.21	55.16
MW-4R	1248.53	1267.84	19.31
MW-5	1146.99	1135.90	-11.09
MW-6	1291.8	1315.26	23.46
MW-7	1094.59	1058.38	-36.21
MW-8S	1038	1045.75	7.75
MW-8D	1036.04	1043.69	7.65
MW-9S	984.3	983.28	-1.02
MW-9D	985.07	991.22	6.15
MW-10D	957.16	941.54	-15.62
MW-11D	1021.86	1023.09	1.23
MW-12D	1032.77	1068.52	35.75
MW-13D	1060.13	1047.59	-12.54
MW-14S	1085.45	1066.16	-19.29
MW-14D	1085.07	1058.83	-26.24

Mean Residual Error:	5.03 Feet
Absolute Mean Error:	17.58 Feet
Root Mean Square (RMS) Error:	22.75 Feet
Normalized RMS:	6.10%

TABLE 8

Flow Budget
SGI Charmian Facility - Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

	Flow In (ft ³ /day)	Flow Out (ft ³ /day)
Source/Sinks		
Drains (Creeks)	0.00	25987.94
Recharge	25979.41	0.00
Total	25979.41	25987.94
% Difference		-0.0340

TABLE 9

Base Flow Stream and Wetland Loss Volumes
SGI Charmian Facility - Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

	Existing Conditions Base Flow Volume (Model Calibration) (feet ³ /day)	Existing Conditions Base Flow Loss (Model Calibration) (feet ³ /day)	No Quarry Pumping Base Flow Volume (feet ³ /day)	No Quarry Pumping Base Flow Loss (feet ³ /day)	4th Level Elevation 1140 ft-amsl Base Flow Volume (feet ³ /day)	4th Level Elevation 1140 ft-amsl Base Flow Loss (feet ³ /day)	5th Level Elevation 1090 ft-amsl Base Flow Volume (feet ³ /day)	5th Level Elevation 1090 ft-amsl Base Flow Loss (feet ³ /day)	6th Level Elevation 1040 ft-amsl Base Flow Volume (feet ³ /day)	6th Level Elevation 1040 ft-amsl Base Flow Loss (feet ³ /day)	7th Level Elevation 990 ft-amsl Base Flow Volume (feet ³ /day)	7th Level Elevation 990 ft-amsl Base Flow Loss (feet ³ /day)
Stream Reach A	2117	406	2523	0	2507	16	2440	83	2328	195	2205	318
Stream Reach B	576	13	589	0	587	2	569	20	537	52	465	124
Stream Reach C	2463	609	3072	0	3052	20	2969	103	2847	225	2701	371
Delineated Wetland Area A	25	0	25	0	25	0	24	1	23	2	22	3
Delineated Wetland Area B	40	0	40	0	40	0	38	2	35	5	30	10
Delineated Wetland Area C	28	0	28	0	28	0	26	2	24	4	20	8
Delineated Wetland Area D	107	19	126	0	125	1	113	13	96	30	73	53
Delineated Wetland Area E	28	0	28	0	27	1	25	3	21	7	16	12
Wetland Seep Area 1	721	91	812	0	806	6	765	47	689	123	589	223
Wetland Seep Area 2	48	0	48	0	48	0	47	1	47	1	45	3
Wetland Seep Area 3	20	0	20	0	19	1	18	2	18	2	16	4
Wetland Seep Area 4	23	0	23	0	22	1	22	1	21	2	19	4
National Wetland Area	235	20	255	0	254	1	247	8	231	24	203	52
N.T. Quarry Discharge (ft ³ /day)	0	0	0	0	36	36	208	208	421	421	914	914

	8th Level Elevation 940 ft-amsl Base Flow Volume (feet ³ /day)	8th Level Elevation 940 ft-amsl Base Flow Loss (feet ³ /day)	9th Level Elevation 890 ft-amsl Base Flow Volume (feet ³ /day)	9th Level Elevation 890 ft-amsl Base Flow Loss (feet ³ /day)	10th Level Elevation 840 ft-amsl Base Flow Volume (feet ³ /day)	10th Level Elevation 840 ft-amsl Base Flow Loss (feet ³ /day)	11th Level Elevation 790 ft-amsl Base Flow Volume (feet ³ /day)	11th Level Elevation 790 ft-amsl Base Flow Loss (feet ³ /day)	12th Level Elevation 740 ft-amsl Base Flow Volume (feet ³ /day)	12th Level Elevation 740 ft-amsl Base Flow Loss (feet ³ /day)
Stream Reach A	2126	397	2072	451	2038	485	2021	502	2014	509
Stream Reach B	323	266	219	370	171	418	133	456	112	477
Stream Reach C	2572	500	2449	623	2389	683	2368	704	2349	723
Delineated Wetland Area A	19	6	14	11	12	13	11	14	10	15
Delineated Wetland Area B	23	17	17	23	12	28	11	29	10	30
Delineated Wetland Area C	15	13	14	14	10	18	10	18	10	18
Delineated Wetland Area D	56	70	43	83	37	89	36	90	35	91
Delineated Wetland Area E	9	19	6	22	4	24	3	25	2	26
Wetland Seep Area 1	520	292	475	337	447	365	433	379	428	384
Wetland Seep Area 2	40	8	35	13	33	15	32	16	31	17
Wetland Seep Area 3	11	9	7	13	5	15	4	16	3	17
Wetland Seep Area 4	14	9	8	15	6	17	5	18	4	19
National Wetland Area	183	72	168	87	157	98	151	104	148	107
N.T. Quarry Discharge (ft ³ /day)	1252	1252	1538	1538	1632	1632	1729	1729	1749	1749

NOTES:

1. The *Existing Condition* is the simulation used to calibrate the model in which the Pitts Quarry was mined to a depth of 1040 ft-amsl and is actively pumping 711 cubic feet of water per day (3.7 gpm) .
2. The *No Quarry Pumping* simulation, neither the Pitts Quarry or the Northern Tract Quarry is actively pumping.
3. Base flow volumes are base flow from groundwater only and do not include stream flow volumes from surface runoff or other surface discharge. Comparisons for flow loss were made to the No Quarry Pumping simulation that allows the total flow loss from the quarry to be calculated (worst-case scenario).
4. The 4th Level (elevation 1140 ft-amsl) is the first level to penetrate the groundwater surface at the Northern Tract Quarry.
5. ft-amsl - Feet Above Mean Sea Level. N.T. - Northern Tract

TABLE 10

Total Stream and Wetland Losses
SGI Charmian Facility - Proposed Northern Tract Quarry
Blue Ridge Summit, Pennsylvania

	No Quarry Pumping Total Flow Volume Low Flow (gpm)	No Quarry Pumping Total Flow Volume High Flow (gpm)	4th Level Elevation 1140 ft-amsl Base Flow Loss (feet3/day)	4th Level Elevation 1140 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions	5th Level Elevation 1090 ft-amsl Base Flow Loss (feet3/day)	5th Level Elevation 1090 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions	6th Level Elevation 1040 ft-amsl Base Flow Loss (feet3/day)	6th Level Elevation 1040 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions	7th Level Elevation 990 ft-amsl Base Flow Loss (feet3/day)	7th Level Elevation 990 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions
Stream Reach A	293	1641	16	0.08	0.0	0.0	83	0.4	0.1	0.0	195	1.0	0.3	0.1	318	1.7	0.6	0.1
Stream Reach B	278	1938	2	0.01	0.0	0.0	20	0.1	0.0	0.01	52	0.3	0.1	0.01	124	0.6	0.2	0.0
Stream Reach C	65	330	20	0.10	0.2	0.0	103	0.5	0.8	0.2	225	1.2	1.8	0.4	371	1.9	3.0	0.6
Delineated Wetland Area A	65	330	0	0.00	0.0	0.0	1	0.01	0.0	0.0	2	0.01	0.0	0.0	3	0.02	0.0	0.0
Delineated Wetland Area B	65	330	0	0.00	0.0	0.0	2	0.01	0.0	0.0	5	0.03	0.0	0.0	10	0.05	0.1	0.0
Delineated Wetland Area C	65	330	0	0.00	0.0	0.0	2	0.01	0.0	0.0	4	0.02	0.0	0.0	8	0.04	0.1	0.0
Delineated Wetland Area D	39	198	1	0.01	0.0	0.0	13	0.07	0.2	0.0	30	0.16	0.4	0.1	53	0.28	0.7	0.1
Delineated Wetland Area E	65	330	1	0.01	0.0	0.0	3	0.02	0.0	0.0	7	0.04	0.1	0.0	12	0.06	0.1	0.0
Wetland Seep Area 1	293	1641	6	0.03	0.0	0.0	47	0.2	0.1	0.0	123	0.6	0.2	0.0	223	1.2	0.4	0.1
Wetland Seep Area 2	278	1938	0	0.00	0.0	0.0	1	0.01	0.0	0.00	1	0.01	0.0	0.00	3	0.02	0.0	0.0
Wetland Seep Area 3	278	1938	1	0.01	0.0	0.0	2	0.0	0.0	0.0	2	0.0	0.0	0.0	4	0.0	0.0	0.0
Wetland Seep Area 4	65	330	1	0.01	0.0	0.0	1	0.0	0.0	0.0	2	0.0	0.0	0.0	4	0.0	0.0	0.0
National Wetland Area	65	330	1	0.01	0.0	0.0	8	0.0	0.1	0.0	24	0.1	0.2	0.0	52	0.3	0.4	0.1

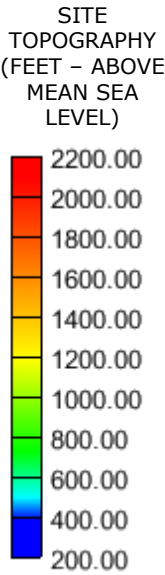
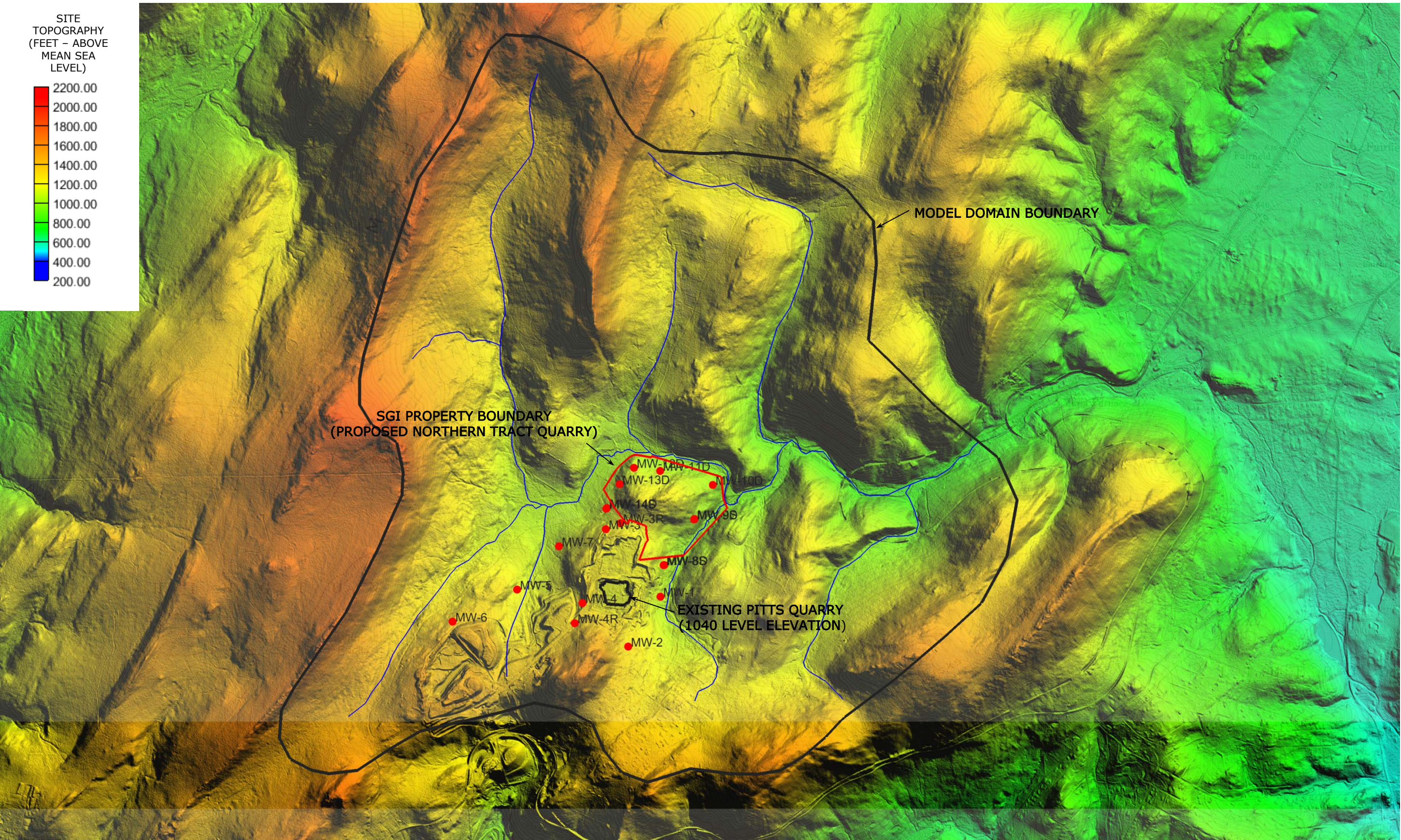
	No Quarry Pumping Total Flow Volume Low Flow (gpm)	No Quarry Pumping Total Flow Volume High Flow (gpm)	8th Level Elevation 940 ft-amsl Base Flow Loss (feet3/day)	8th Level Elevation 940 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions	9th Level Elevation 890 ft-amsl Base Flow Loss (feet3/day)	9th Level Elevation 890 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions	10th Level Elevation 840 ft-amsl Base Flow Loss (feet3/day)	10th Level Elevation 840 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions	11th Level Elevation 790 ft-amsl Base Flow Loss (feet3/day)	11th Level Elevation 790 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions
Stream Reach A	293	1641	397	2.1	0.7	0.1	451	2.3	0.8	0.1	485	2.5	0.9	0.2	502	2.6	0.9	0.2
Stream Reach B	278	1938	266	1.4	0.5	0.1	370	1.9	0.7	0.1	418	2.2	0.8	0.1	456	2.4	0.9	0.1
Stream Reach C	65	330	500	2.6	4.0	0.8	623	3.2	5.0	1.0	683	3.5	5.5	1.1	704	3.7	5.6	1.1
Delineated Wetland Area A	65	330	6	0.0	0.0	0.0	11	0.1	0.1	0.0	13	0.1	0.1	0.0	14	0.1	0.1	0.0
Delineated Wetland Area B	65	330	17	0.09	0.1	0.0	23	0.12	0.2	0.0	28	0.15	0.2	0.0	29	0.15	0.2	0.0
Delineated Wetland Area C	65	330	13	0.07	0.1	0.0	14	0.07	0.1	0.0	18	0.09	0.1	0.0	18	0.09	0.1	0.0
Delineated Wetland Area D	39	198	70	0.36	0.9	0.2	83	0.43	1.1	0.2	89	0.46	1.2	0.2	90	0.47	1.2	0.2
Delineated Wetland Area E	65	330	19	0.10	0.2	0.0	22	0.11	0.2	0.0	24	0.12	0.2	0.0	25	0.13	0.2	0.0
Wetland Seep Area 1	293	1641	292	1.5	0.5	0.1	337	1.8	0.6	0.1	365	1.9	0.6	0.1	379	2.0	0.7	0.1
Wetland Seep Area 2	278	1938	8	0.0	0.0	0.0	13	0.1	0.0	0.0	15	0.1	0.0	0.0	16	0.1	0.0	0.0
Wetland Seep Area 3	278	1938	9	0.0	0.0	0.0	13	0.1	0.0	0.0	15	0.1	0.0	0.0	16	0.1	0.0	0.0
Wetland Seep Area 4	65	330	9	0.0	0.1	0.0	15	0.1	0.1	0.0	17	0.1	0.1	0.0	18	0.1	0.1	0.0
National Wetland Area	65	330	72	0.4	0.6	0.1	87	0.5	0.7	0.1	98	0.5	0.8	0.2	104	0.5	0.8	0.2

	No Quarry Pumping Total Flow Volume Low Flow (gpm)	No Quarry Pumping Total Flow Volume High Flow (gpm)	12th Level Elevation 740 ft-amsl Base Flow Loss (feet3/day)	12th Level Elevation 740 ft-amsl Base Flow Loss (gpm)	Total Water Flow Loss (%) Low Flow Conditions	Total Water Flow Loss (%) High Flow Conditions
Stream Reach A	293	1641	509	2.6	0.9	0.1
Stream Reach B	278	1938	477	2.5	0.9	0.0
Stream Reach C	65	330	723	3.8	5.8	1.8
Delineated Wetland Area A	65	330	15	0.08	0.1	0.0
Delineated Wetland Area B	65	330	30	0.2	0.2	0.1
Delineated Wetland Area C	65	330	18	0.1	0.1	0.0
Delineated Wetland Area D	39	198	91	0.5	1.2	0.6
Delineated Wetland Area E	65	330	26	0.1	0.2	0.1
Wetland Seep Area 1	293	1641	384	2.0	0.7	0.0
Wetland Seep Area 2	278	1938	17	0.1	0.0	0.0
Wetland Seep Area 3	278	1938	17	0.1	0.0	0.0
Wetland Seep Area 4	65	330	19	0.1	0.2	0.0
National Wetland Area	65	330	107	0.6	0.9	0.3

NOTES:

- 1) The *Total Water Flow Loss* (%) is based on comparisons to low and high surface water flow rates measured in the stream reaches by Skelly and Loy. Stream reach locations and high and low stream flows measured by Skelly and Loy are provided on Figure 5.
- 2) The total flow volumes in the stream reaches are a result of the base flow and the surface runoff volumes. The majority of the flow in the stream reaches is surface runoff with a very small contribution from base flow. Surface runoff volumes change significantly with precipitation events; however, baseflow is expected to remain fairly constant.
- 3) Values in this table assume that wetlands (with exception of Wetland Seep Area D) receive the majority of water from surface water flow based on their topographic location and proximity to streams. For this reason, the total flow volumes (low and high) through the streams was applied to the wetland areas to calculate flow loss for both low flow and high flow conditions.
- 4) *Wetland Seep Area D is located further from the stream channels and has a higher topographic elevation and as a result, likely does not receive the full volume of surface water flow (100%) from Stream Reach C. For this reason, it has been assumed that only 60% of the surface water flow in Stream Reach C impacts Wetland Seep Area D. Total Water Flow Losses (%) were based on 60% of the total surface water flow for Stream Reach C provided on Figure 5.

FIGURES

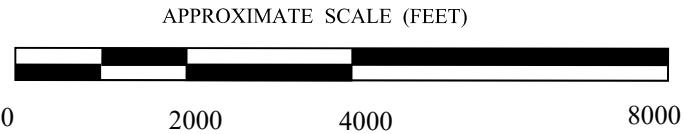


NOTES:

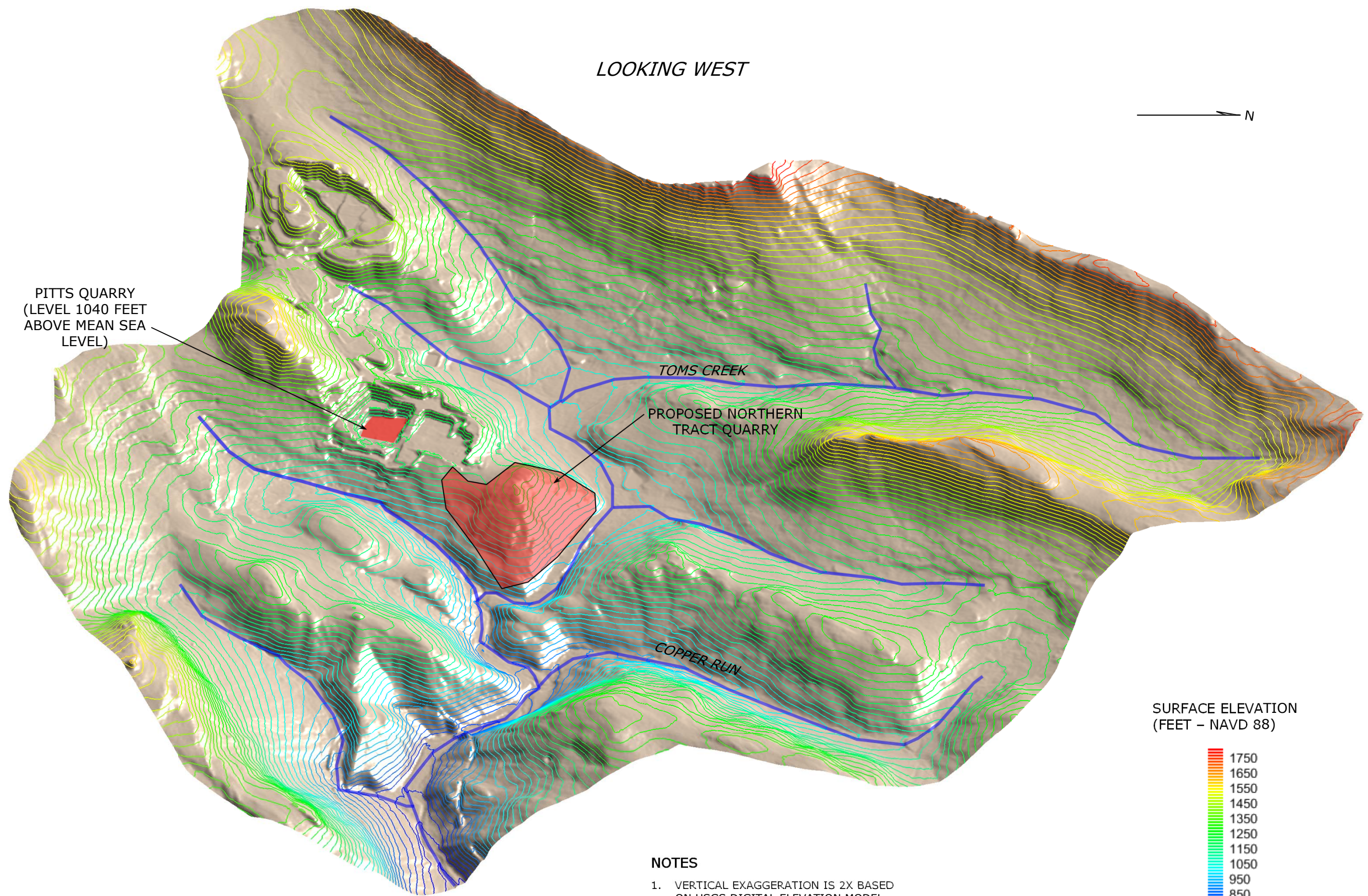
1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE DIGITAL ELEVATION MODEL (DEM) DATA (3-METER).
2. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

- MONITORING WELL LOCATION
- SURFACE WATER STREAM



 V.F. Britton Group, LLC ENVIRONMENTAL AND HYDROGEOLOGIC CONSULTING	SITE LOCATION MAP (DIGITAL ELEVATION BASE MAP)	
	PROJECT LOCATION SGI CHARMIAN FACILITY PROPOSED NORTHERN TRACT QUARRY BLUE RIDGE SUMMIT, PENNSYLVANIA	
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FIGURE NUMBER 2		



LOOKING WEST



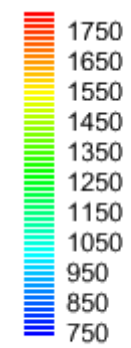
PITTS QUARRY
(LEVEL 1040 FEET
ABOVE MEAN SEA
LEVEL)

TOMS CREEK

PROPOSED NORTHERN
TRACT QUARRY


COPPER RUN

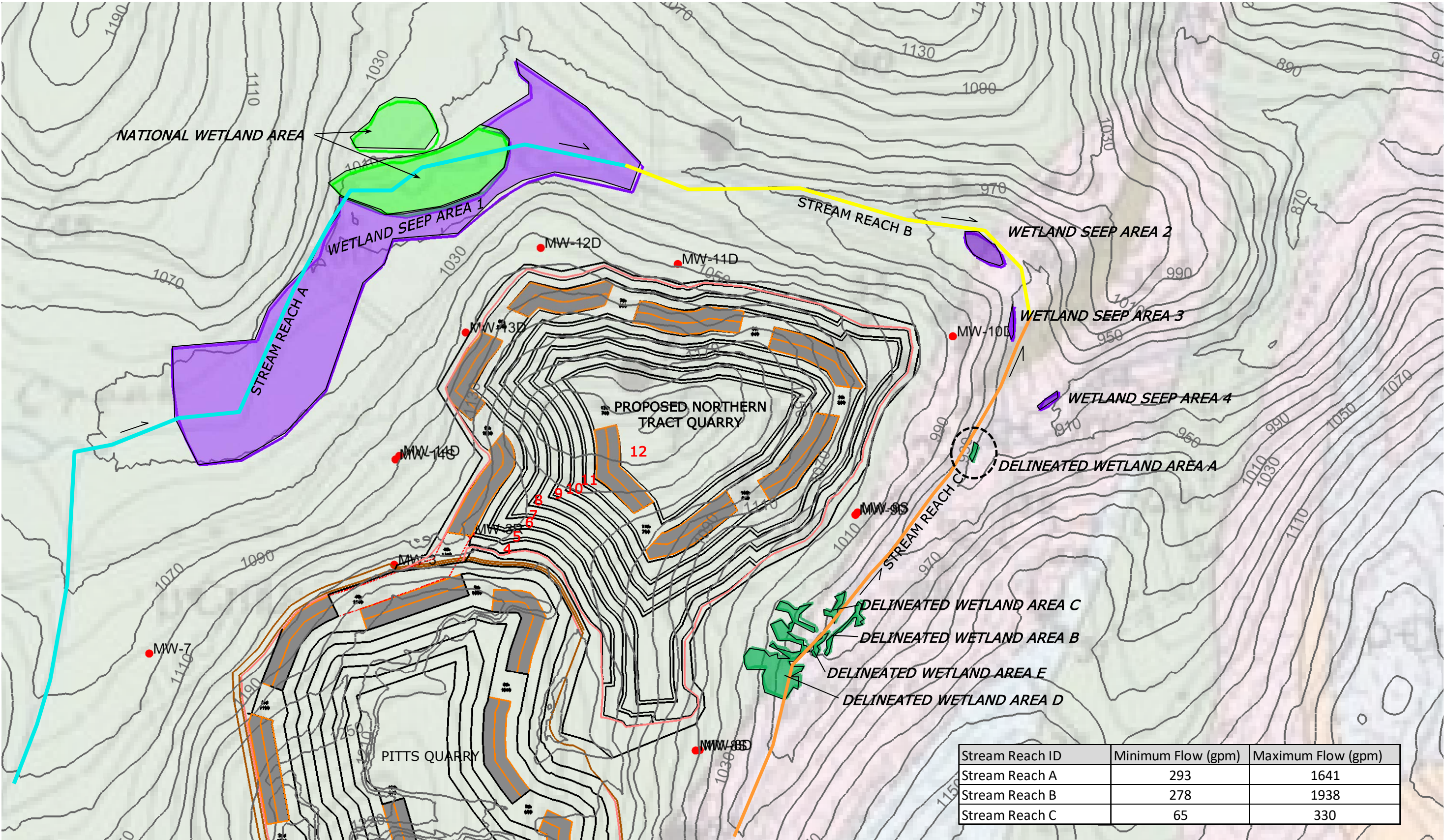
SURFACE ELEVATION
(FEET - NAVD 88)



NOTES

1. VERTICAL EXAGGERATION IS 2X BASED ON USGS DIGITAL ELEVATION MODEL DATA (3-METER).

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THREE-DIMENSIONAL MODEL DOMAIN		
PROJECT LOCATION SGI CHARMIAN FACILITY PROPOSED NORTHERN TRACT QUARRY BLUE RIDGE SUMMIT, PENNSYLVANIA	DRAWN BY VFB	DATE 12-12-17
	FIGURE NUMBER 3	



NOTES

1. GEOLOGY BASE MAP (FAUTH, J.L., 1978, PLATE 1).
2. TOPOGRAPHIC CONTOURS FROM USGS TOPOGRAPHIC DEM DATA (3 METER).
3. STREAM REACH FLOW RATES ARE BASED ON STREAM FLOW MEASUREMENTS PROVIDED BY SKELLY AND LOY.
4. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

- DELINEATED WETLAND AREA
- WETLAND SEEP AREA
- NATIONAL WETLAND AREA

12 PROPOSED QUARRY LEVEL



MONITORING WELL LOCATION



STREAM REACH A



STREAM REACH B



STREAM REACH C

1030

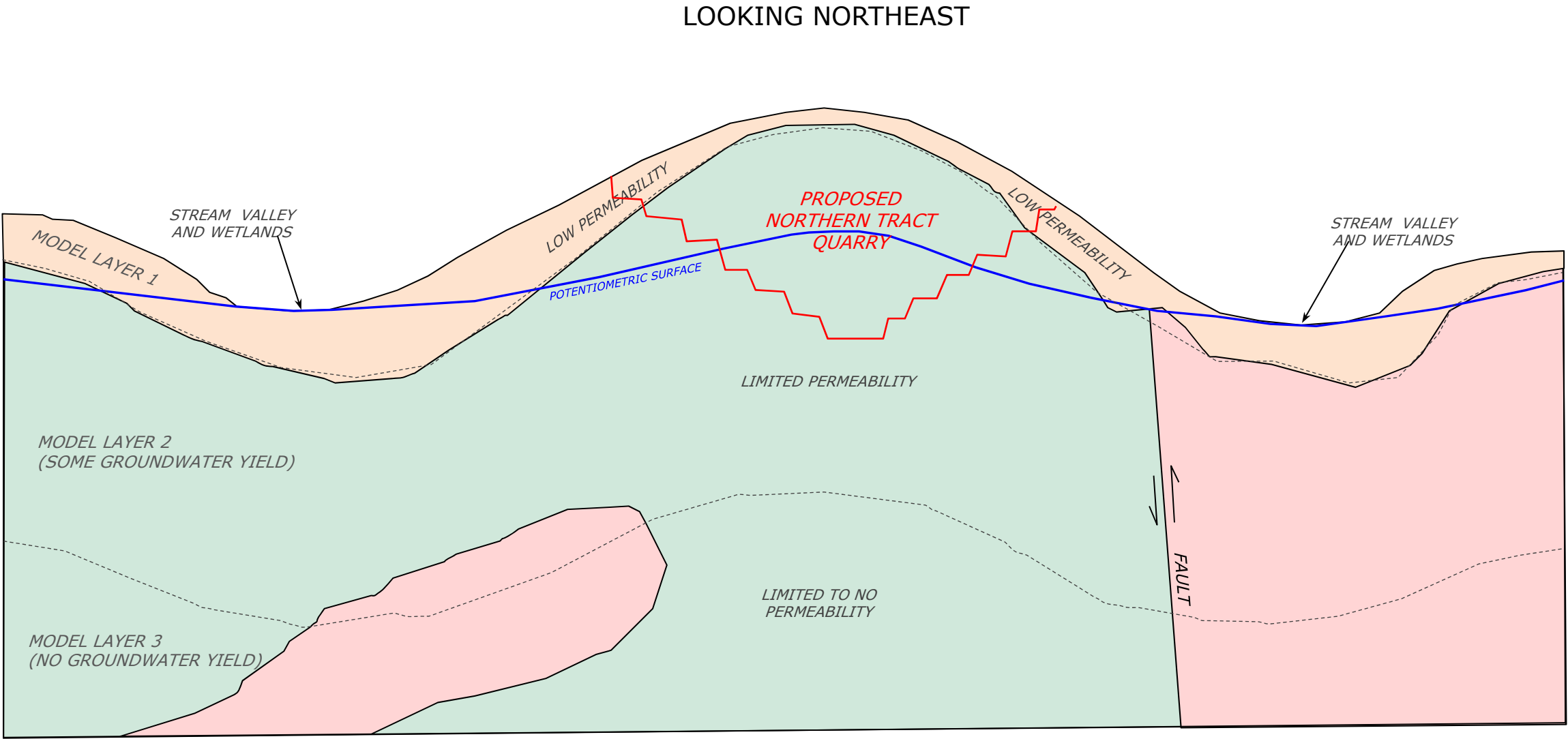
GROUND SURFACE ELEVATION (FT-NAVD 88)

Stream Reach ID	Minimum Flow (gpm)	Maximum Flow (gpm)
Stream Reach A	293	1641
Stream Reach B	278	1938
Stream Reach C	65	330

APPROXIMATE SCALE (FEET)



0 250 500 1000

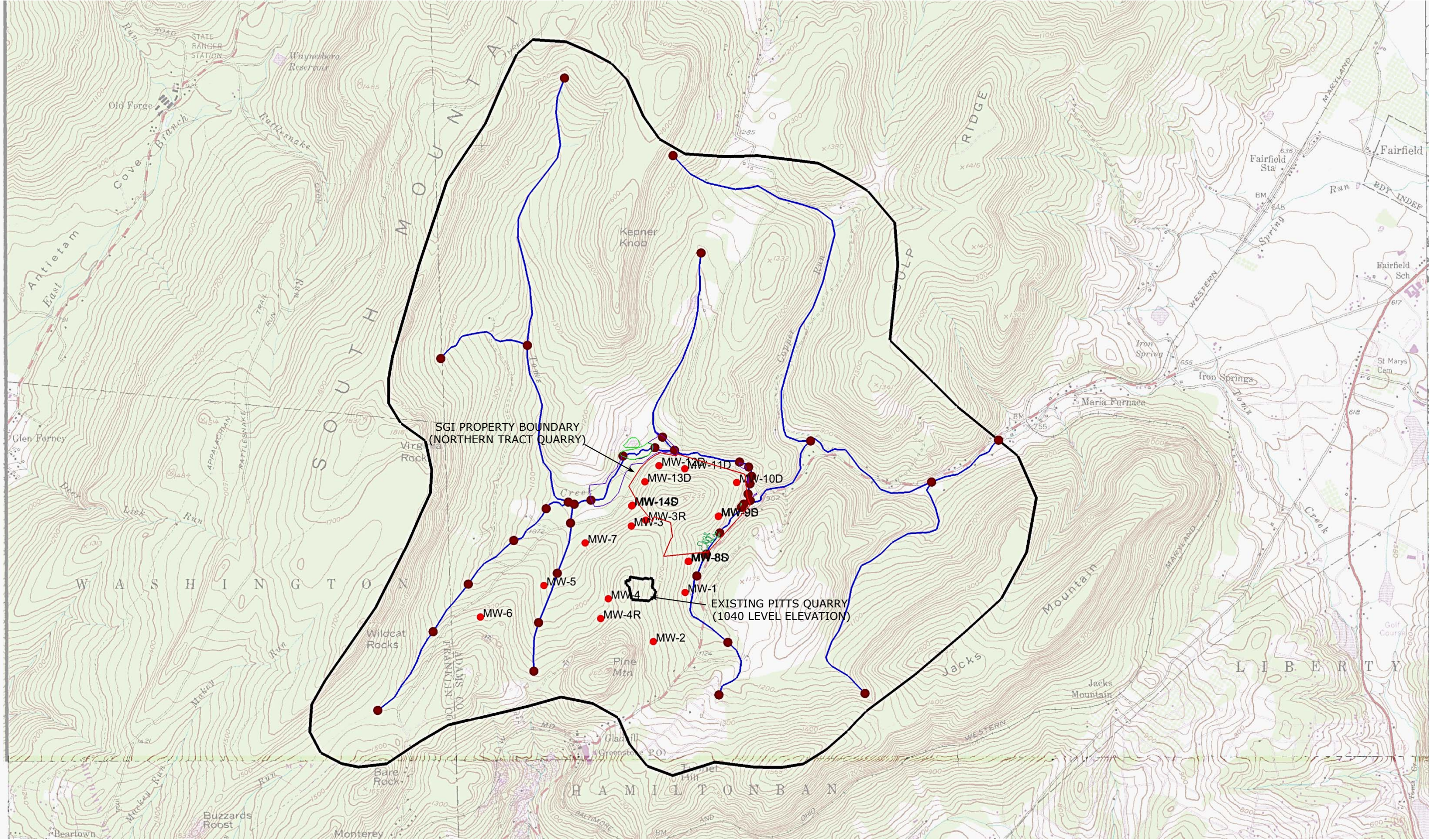


NOTES

1. DRAWING IS A SCHEMATIC AND IS NOT TO SCALE.
2. CONCEPTUAL MODEL IS BASED ON SITE SPECIFIC DATA AND REGIONAL CHARACTERISTICS PROVIDED IN PUBLICATION DATA .
3. LAYER DESIGNATIONS ARE ASSOCIATED WITH MODEL CONSTRUCTION DISCUSSED IN SECTION 2.0 OF REPORT.

EXPLANATION

	SOIL/WEATHERED ZONE (SAPROLITIC CAP ROCK)
	PRECAMBRIAN AGE METABASALT
	PRECAMBRIAN AGE METARHYOLITE



NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE MAP.
- 2. NODAL ELEVATION VALUES WERE BASED ON THE TOPOGRAPHIC ELEVATION AT THE NODE LOCATION AND TWO FEET WAS SUBTRACTED FOR THE FINAL NODAL ELEVATION. THIS REPRESENTS THE BOTTOM OF THE STREAM BED MATERIAL.

EXPLANATION

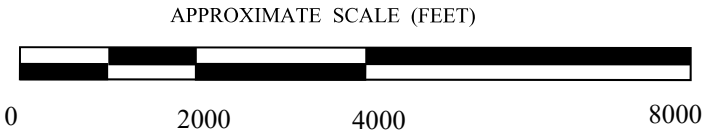
BOUNDARY CONDITIONS

DRAIN

NO FLOW

NODAL ELEVATION

MONITORING WELL LOCATION



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GENERAL MODEL CONSTRUCTION
BOUNDARY CONDITIONS

PROJECT LOCATION

SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

DRAWN BY

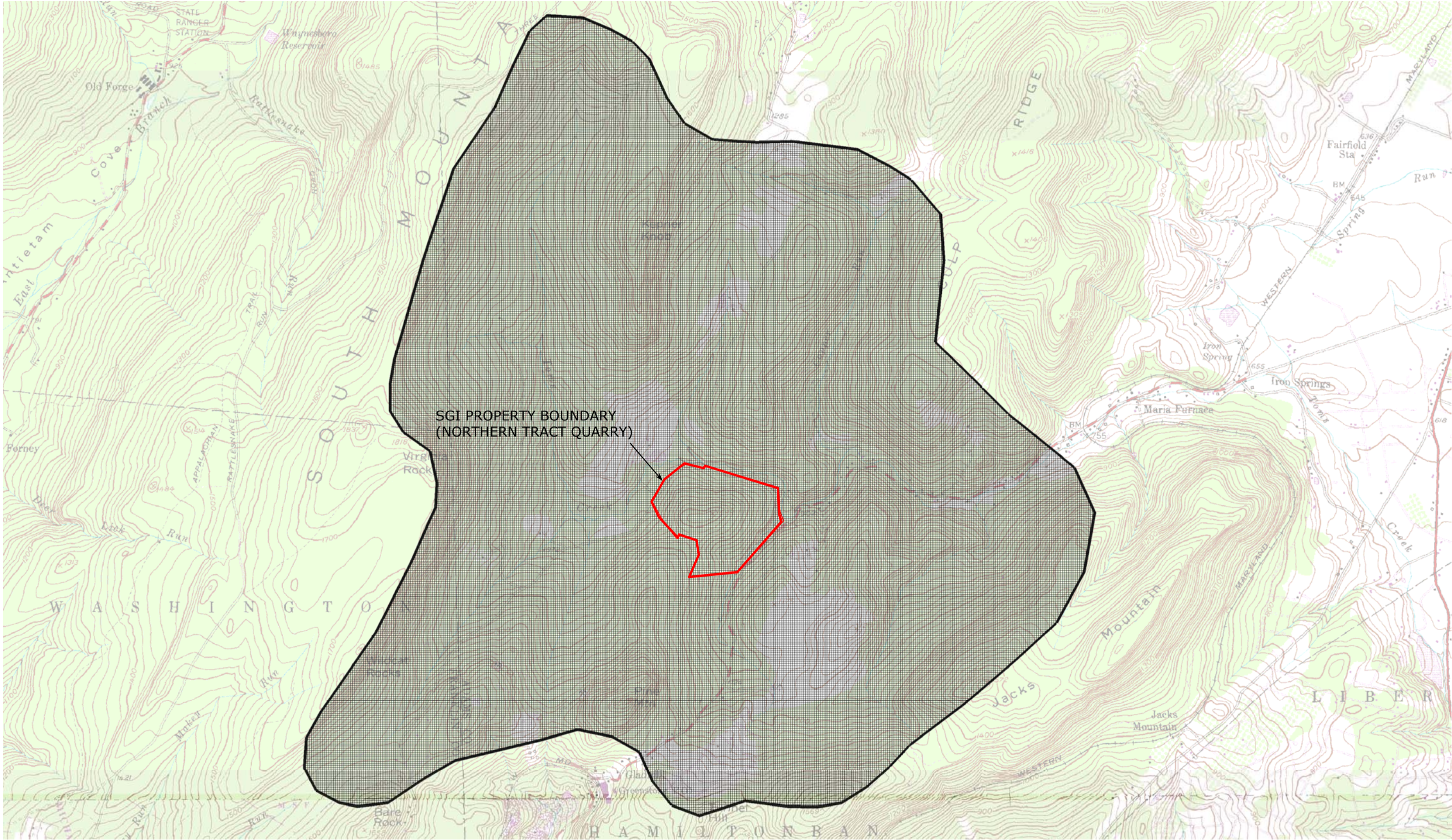
VFB

DATE

12-12-17

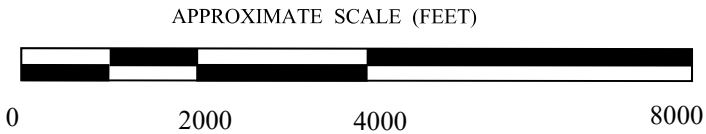
FIGURE NUMBER

7



NOTES

1. NO SPECIFIC PREFERENTIAL FLOW DIRECTIONS WERE IDENTIFIED EITHER THROUGH PUBLISHED DATA OR BASED ON SITE-SPECIFIC DATA. THEREFORE THE GRID WAS ORIENTATED NORTH TO SOUTH.
2. GRID DIMENSION OVER ENTIRE MODEL DOMAIN IS 50 FEET BY 50 FEET.



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GENERAL MODEL CONSTRUCTION MODEL GRID			
PROJECT LOCATION SGI CHARMIAN FACILITY PROPOSED NORTHERN TRACT QUARRY BLUE RIDGE SUMMIT, PENNSYLVANIA		DRAWN BY VFB	DATE 12-12-17
FIGURE NUMBER 8			

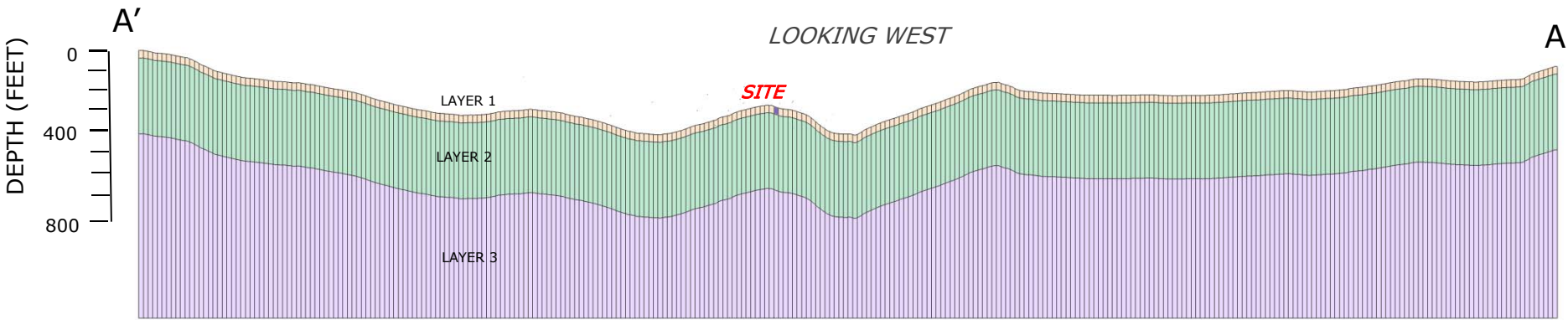
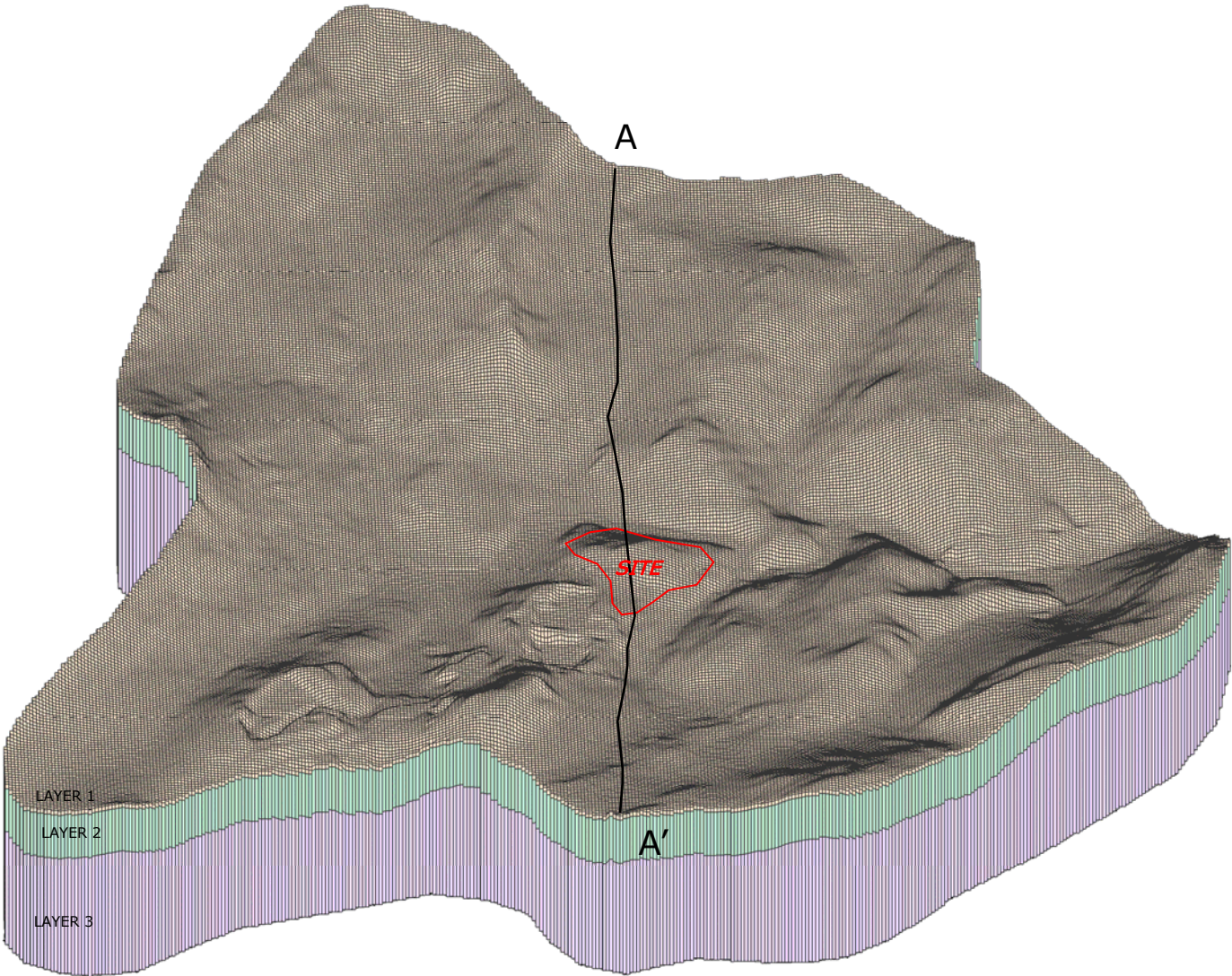
EXPLANATION

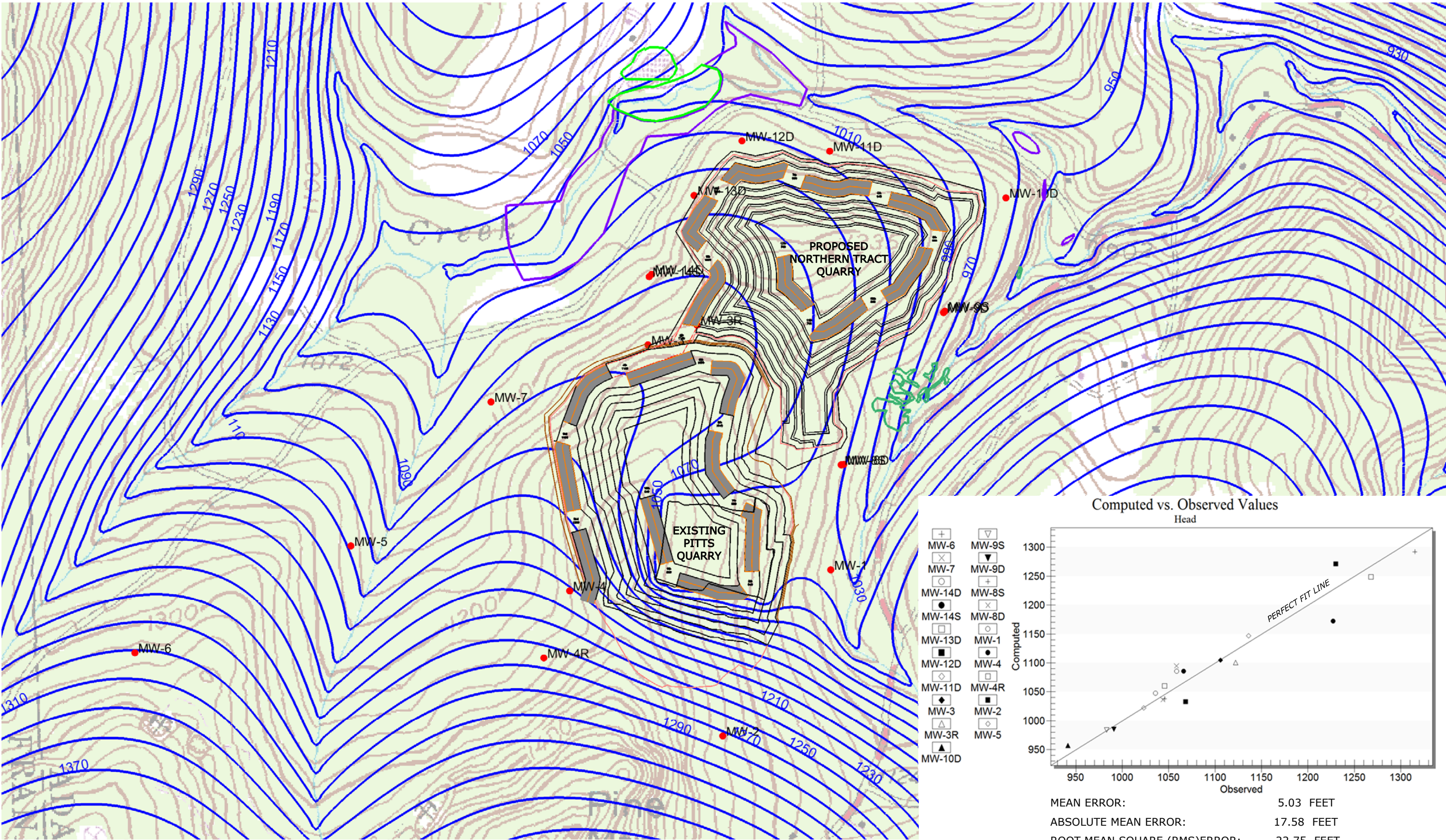
HYDROGEOLOGIC ZONES

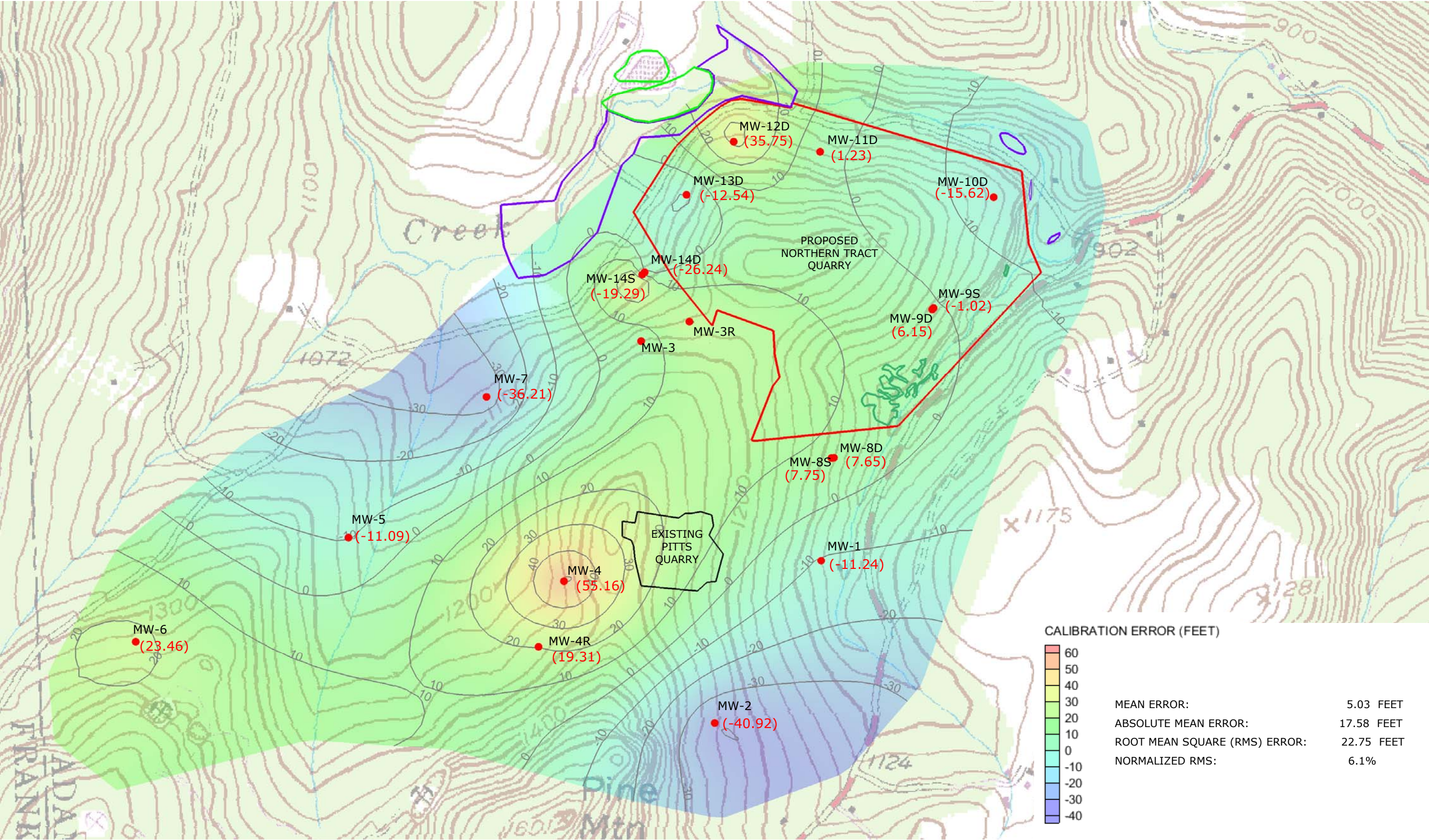
- OVERBURDEN /SAPROLITIC CAP ROCK (LIMITED PERMEABILITY)
- BEDROCK (LIMITED PERMEABILITY)
- BEDROCK (NO PERMEABILITY)

NOTES

1. VERTICAL EXAGGERATION IS 2X.
2. SEE TABLE 5 FOR HYDRAULIC PARAMETERS ASSIGNED TO MODEL LAYERS.







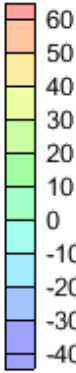
NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
- 2. RESIDUAL ERROR FOR EACH WELL IS PROVIDED ON TABLE 7.
- 3. NEGATIVE RESIDUAL CALIBRATION ERROR VALUE INDICATES CALIBRATED WATER LEVEL IS BELOW OBSERVED TARGET VALUE. POSITIVE RESIDUAL CALIBRATION ERROR VALUE INDICATES CALIBRATED WATER LEVEL IS ABOVE OBSERVED TARGET VALUE.

EXPLANATION

- MONITORING LOCATION (CALIBRATION TARGET)
- (1.23) RESIDUAL CALIBRATION ERROR (FEET)
- 10 RESIDUAL CALIBRATION ERROR CONTOUR (FEET)
- DELINEATED WETLAND AREA
- WETLAND SEEP AREA
- NATIONAL WETLAND AREA

CALIBRATION ERROR (FEET)



MEAN ERROR:	5.03 FEET
ABSOLUTE MEAN ERROR:	17.58 FEET
ROOT MEAN SQUARE (RMS) ERROR:	22.75 FEET
NORMALIZED RMS:	6.1%

APPROXIMATE SCALE (FEET)

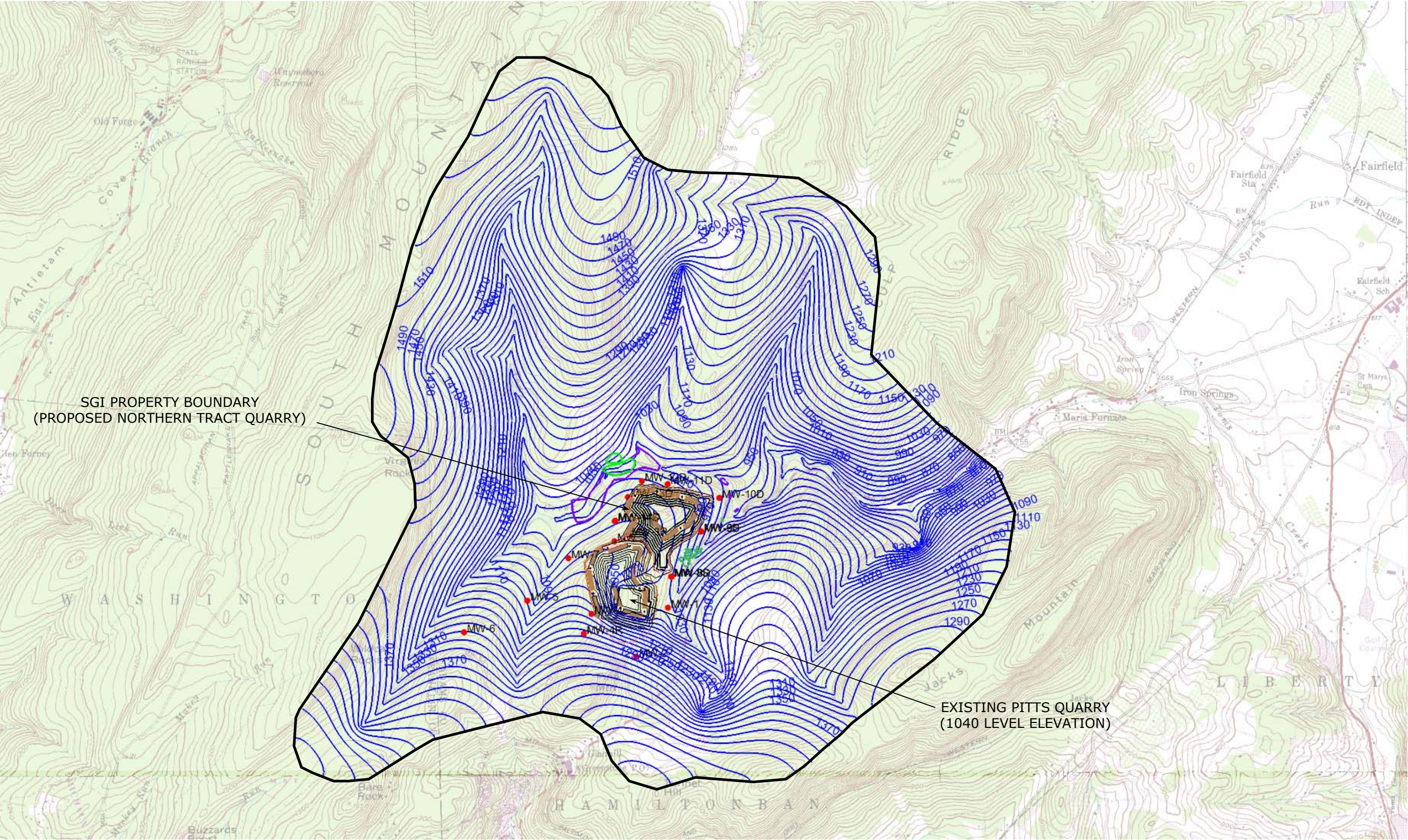


CALIBRATION - REGIONAL
DISTRIBUTION OF RESIDUAL ERROR

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

DRAWN BY VFB DATE 12-12-17

FIGURE NUMBER

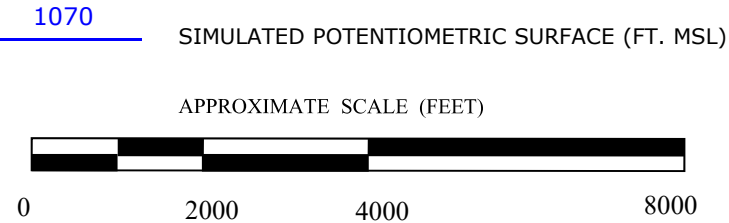


NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
- 2. EXISTING PITTS QUARRY IS ACTIVELY PUMPING AT FLOOR LEVEL ELEVATION 1040 FEET MSL (SIMULATED).
- 3. ANTICIPATED LEVEL CONFIGURATION WAS PROVIDED BY SKELLY AND LOY, INC.
- 4. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING LOCATION



REGIONAL

SIMULATED EXISTING CONDITIONS
POTENTIOMETRIC GROUNDWATER
ELEVATION CONTOUR MAP

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

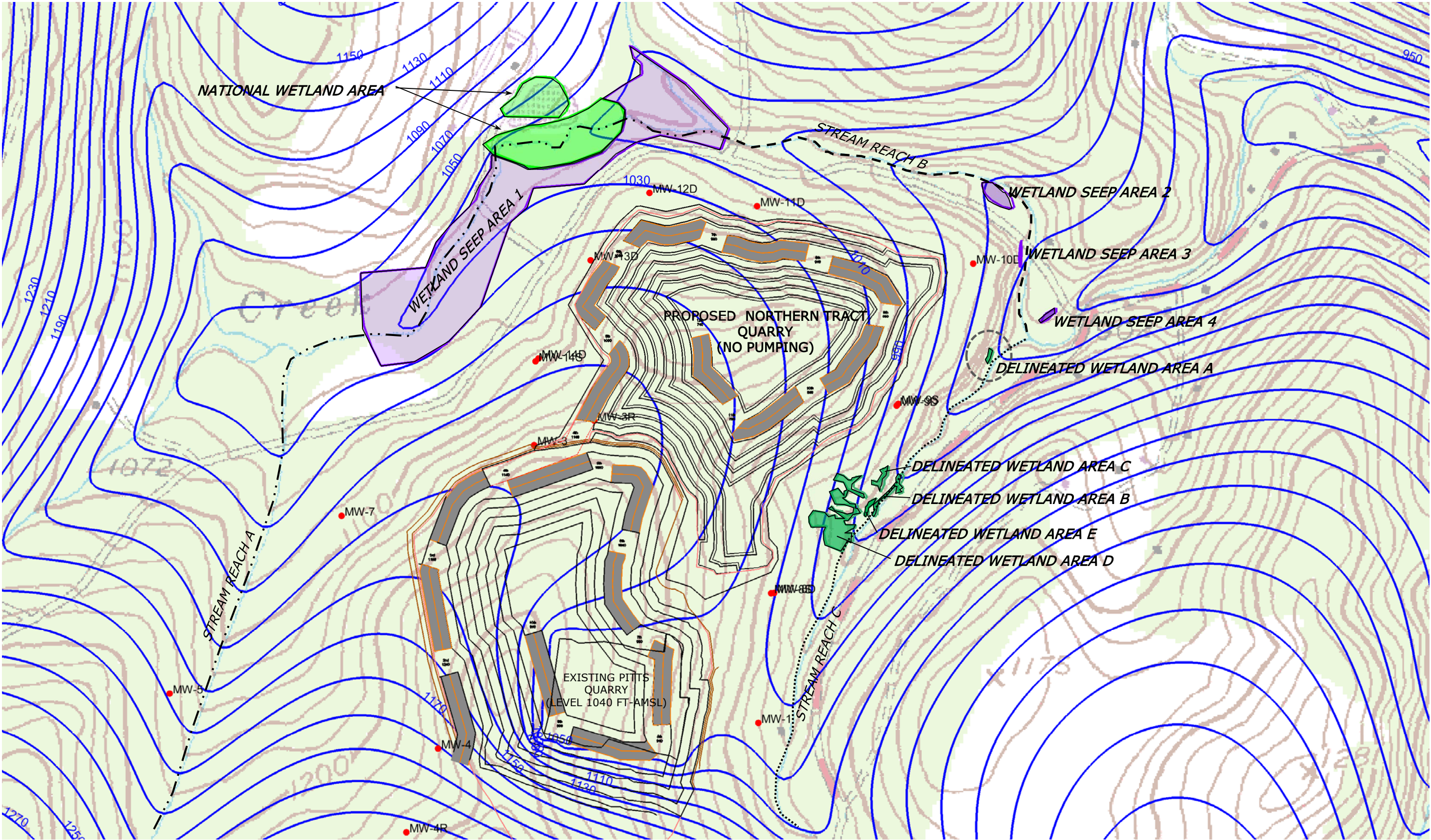
FIGURE NUMBER

12

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NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. EXISTING PITTS QUARRY IS ACTIVELY PUMPING AT LEVEL 1040 FT-AMSL. (SIMULATED)
3. NORTHERN TRACT QUARRY HAS NO ACTIVE PUMPING.
4. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

1070 SIMULATED POTENTIOMETRIC SURFACE (FT. MSL)

APPROXIMATE SCALE (FEET)



0 1000 2000 4000

N

SITE AREA
SIMULATED EXISTING SITE
CONDITIONS
POTENTIOMETRIC GROUNDWATER
ELEVATION CONTOUR MAP

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

DRAWN BY VFB DATE 12-12-17

FIGURE NUMBER

13

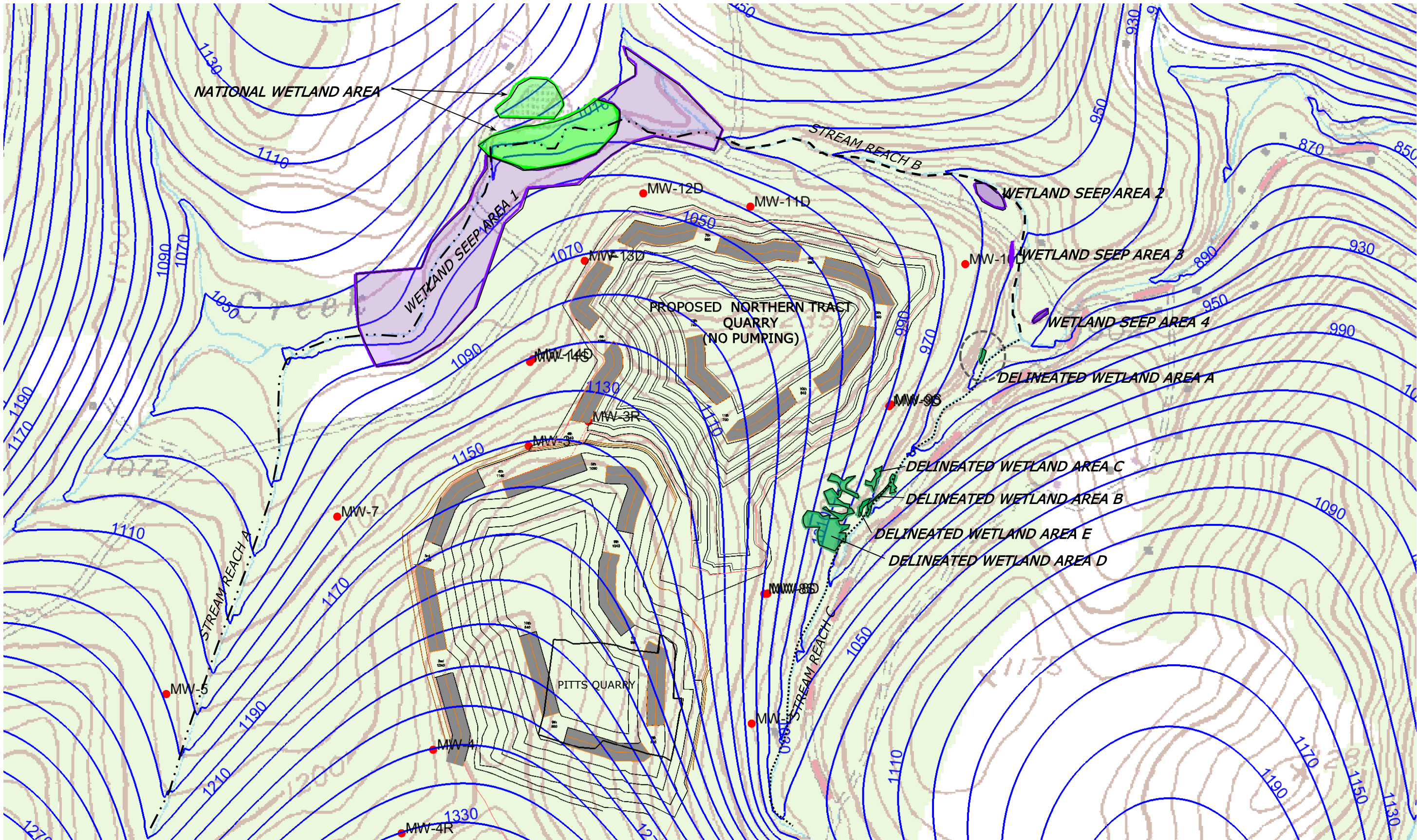
V.F. Britton Group, LLC

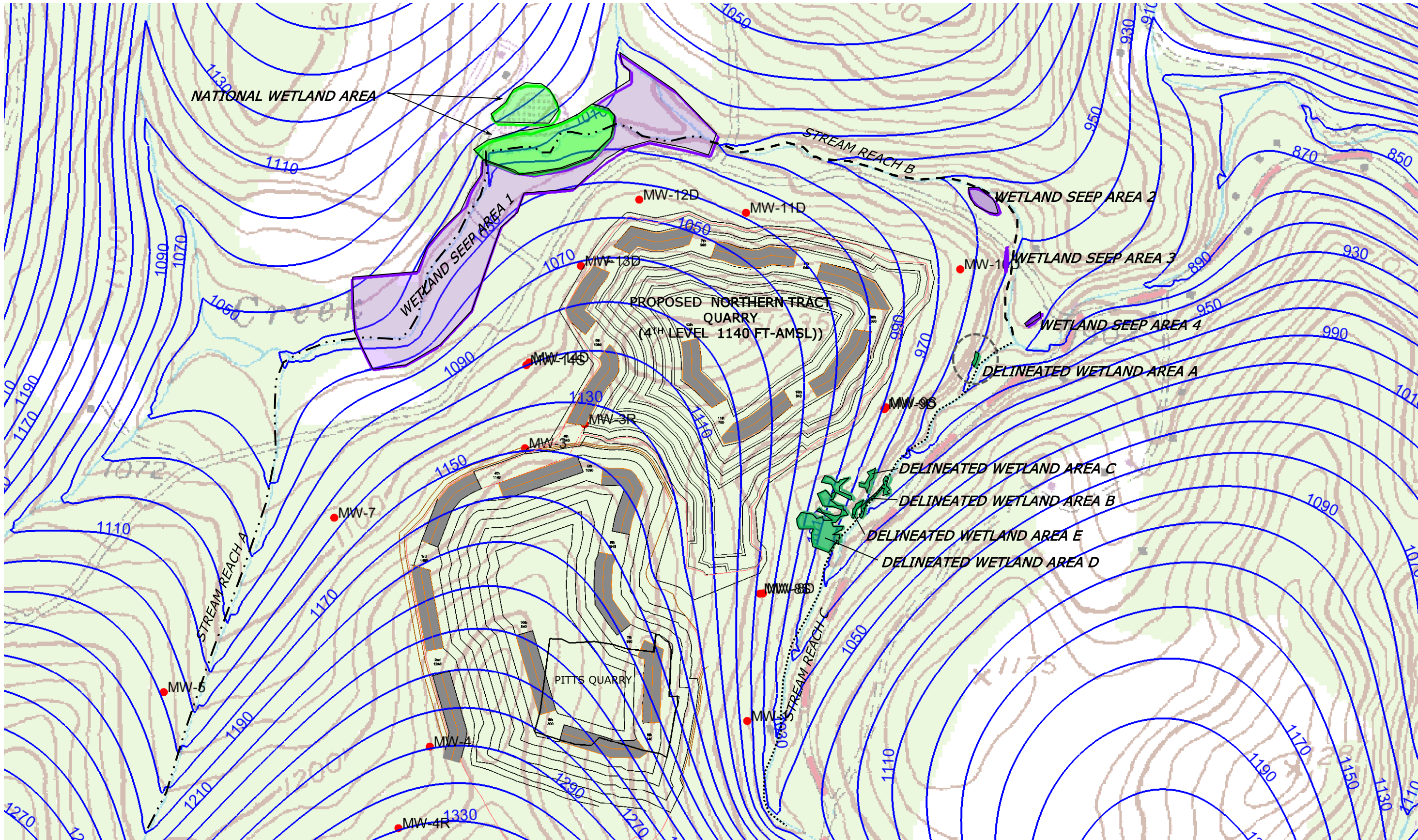
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NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
- 2. NORTHERN TRACT QUARRY PUMPING 4TH LEVEL AT 36 FT³/DAY.
- 3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
- 4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
- 5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

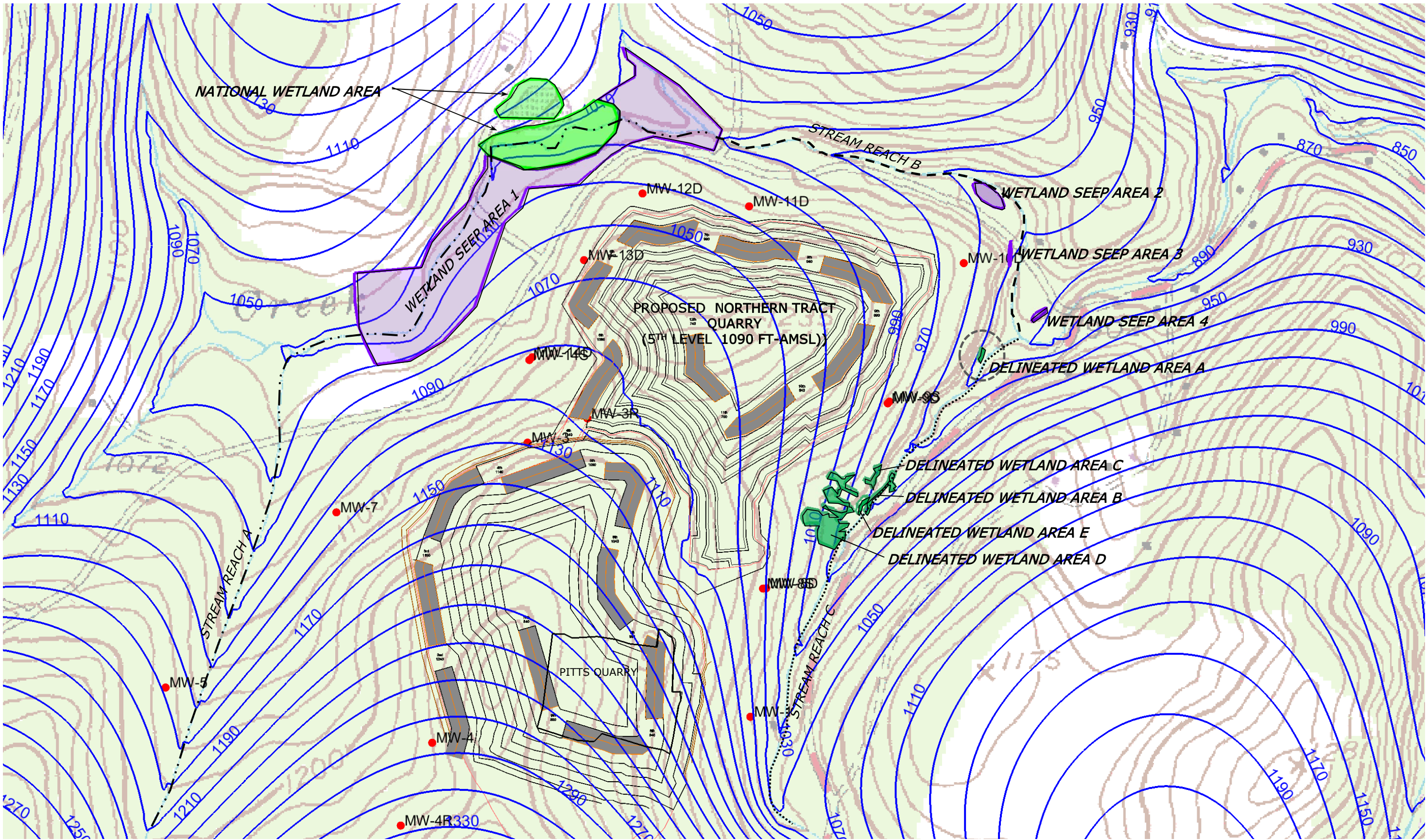
1070 SIMULATED POTENTIOMETRIC SURFACE (FT. MSL)

APPROXIMATE SCALE (FEET)



0 1000 2000 4000





NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 5TH LEVEL AT 208 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

1070 SIMULATED POTENTIOMETRIC SURFACE (FT. MSL)

APPROXIMATE SCALE (FEET)



0 1000 2000 4000

N

PROJECT LOCATION

SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

SITE AREA

SIMULATED 5TH LEVEL (1090 FT-AMSL)
POTENTIOMETRIC GROUNDWATER
ELEVATION CONTOUR MAP

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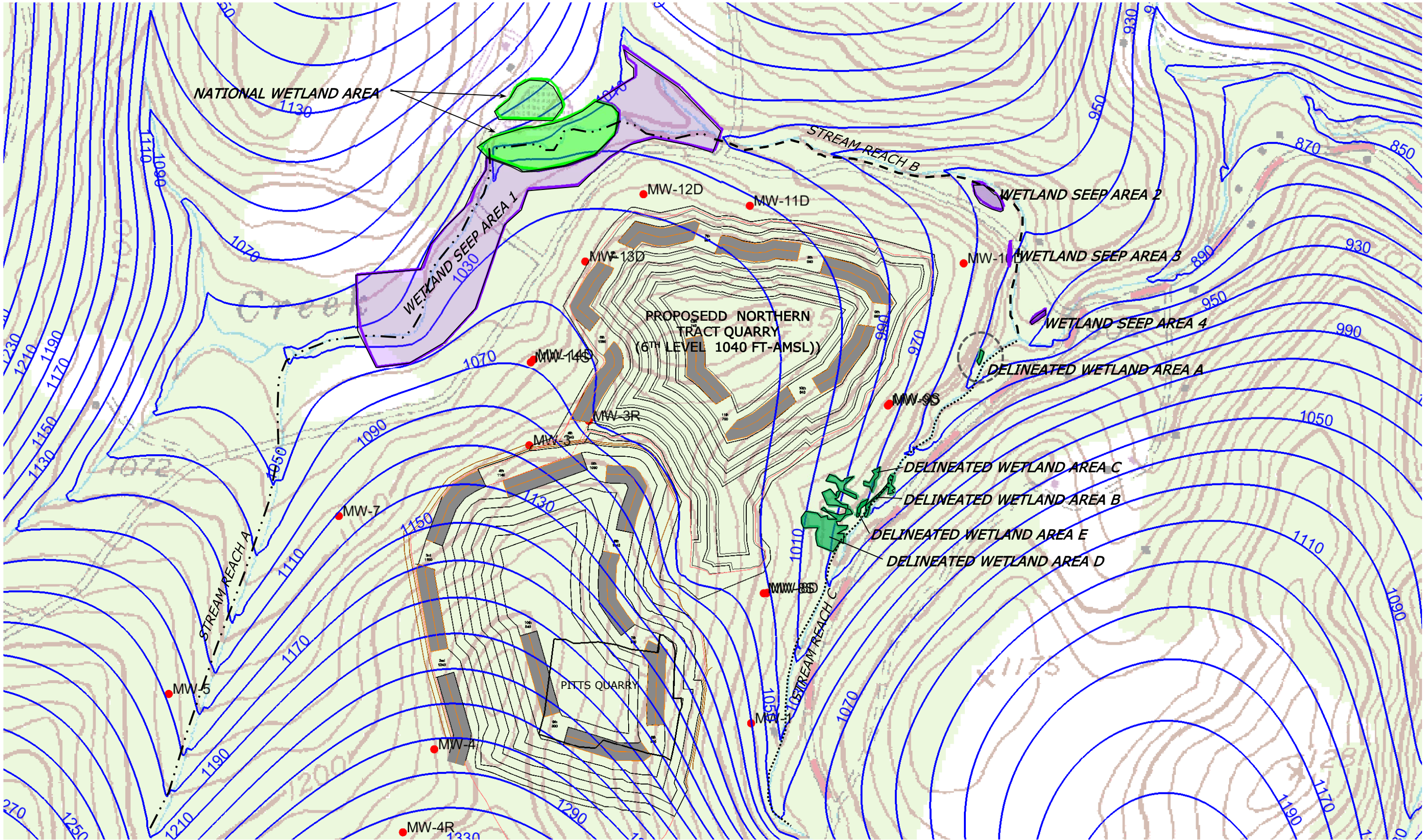
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FIGURE NUMBER

16



NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 6TH LEVEL AT 421 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

1070 SIMULATED POTENTIOMETRIC SURFACE (FT. MSL)

APPROXIMATE SCALE (FEET)



0 1000 2000 4000

N

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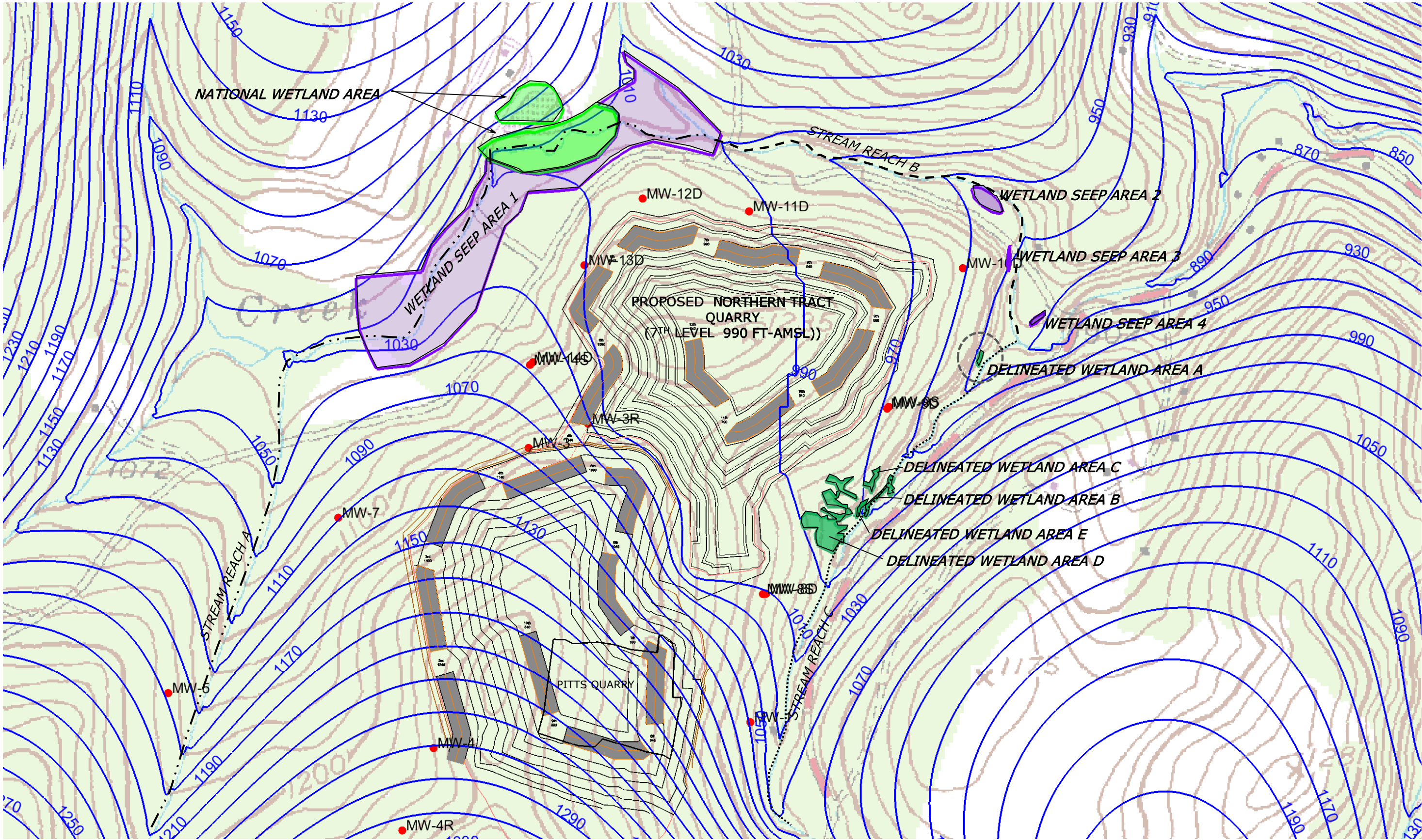
SITE AREA
SIMULATED 6TH LEVEL (1040 FT-AMSL)
POTENTIOMETRIC GROUNDWATER
ELEVATION CONTOUR MAP

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

DRAWN BY VFB **DATE** 12-12-17

FIGURE NUMBER

17



NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 7TH LEVEL AT 914 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

1070 SIMULATED POTENTIOMETRIC SURFACE (FT. MSL)

APPROXIMATE SCALE (FEET)



0 1000 2000 4000

N

PROJECT LOCATION

SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

SITE AREA

SIMULATED 7TH LEVEL (990 FT-AMSL)
POTENTIOMETRIC GROUNDWATER
ELEVATION CONTOUR MAP

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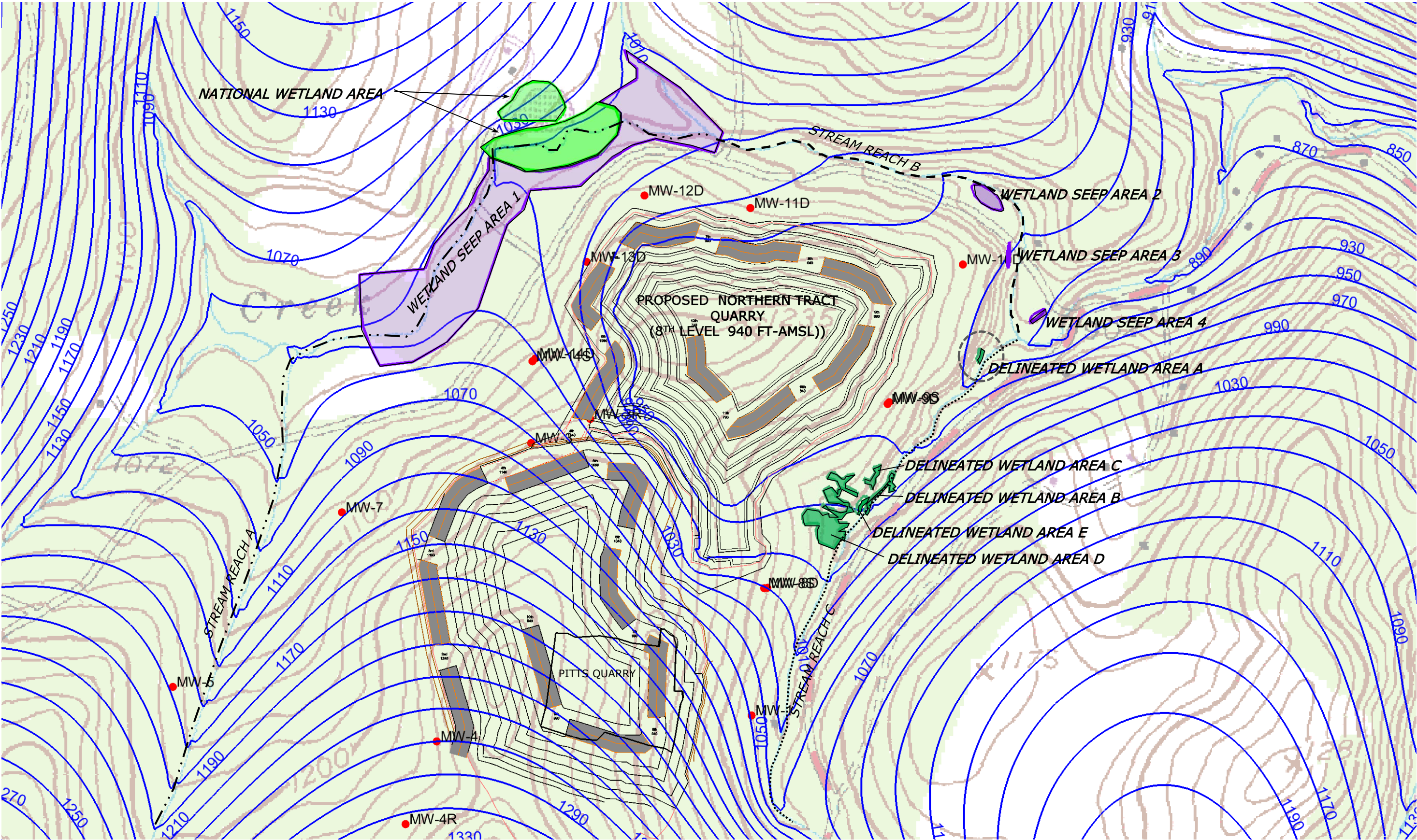
326 Conestoga Road Wayne, PA 19087

610-964-1462

val@vbritton.com www.vbritton.com

FIGURE NUMBER

18



NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 8TH LEVEL AT 1252 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

1070 SIMULATED POTENTIOMETRIC SURFACE (FT. MSL)

APPROXIMATE SCALE (FEET)



0 1000 2000 4000

N

PROJECT LOCATION

SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

SITE AREA

SIMULATED 8TH LEVEL (940 FT-AMSL)
POTENTIOMETRIC GROUNDWATER
ELEVATION CONTOUR MAP

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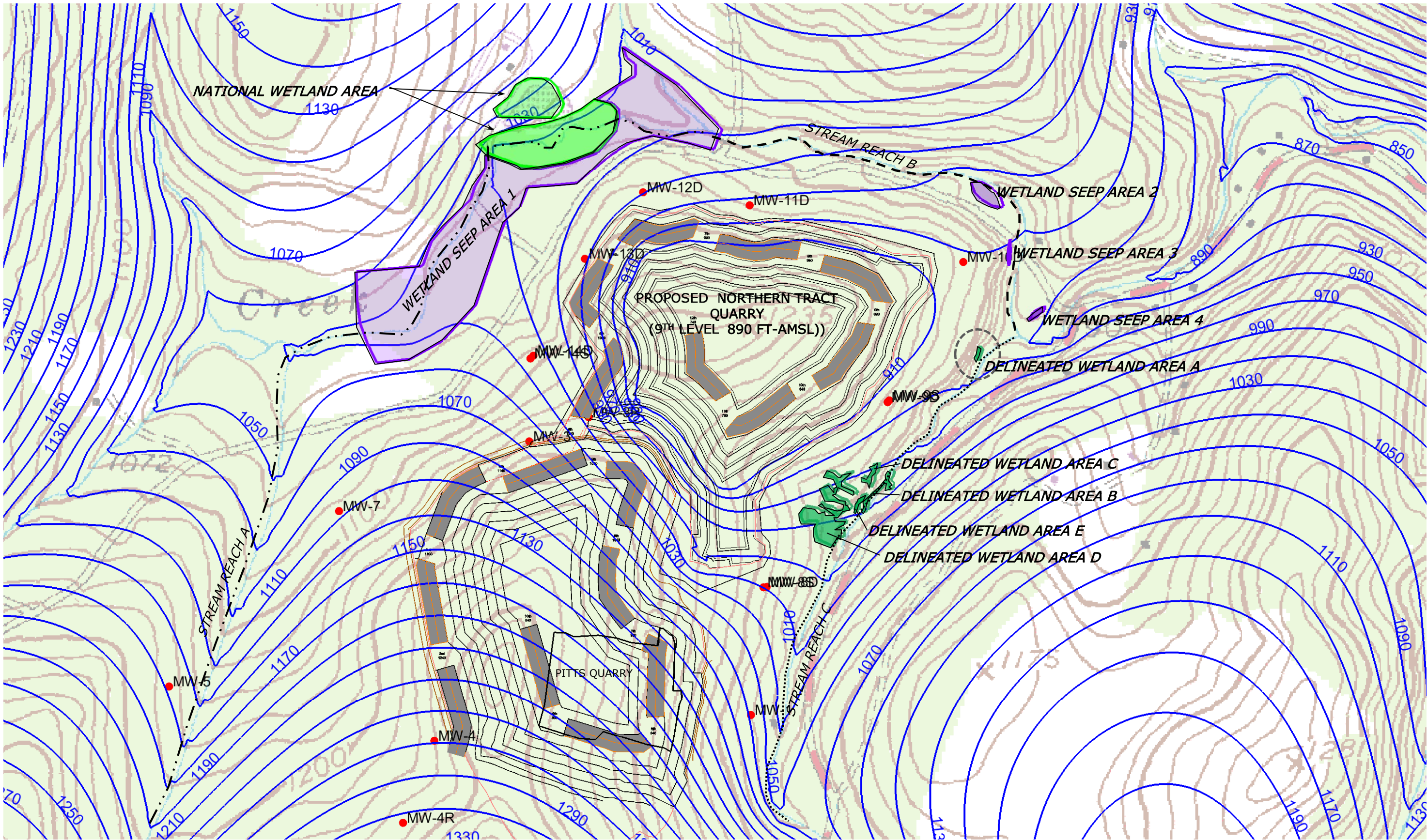
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FIGURE NUMBER

19



NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
- 2. NORTHERN TRACT QUARRY PUMPING 9TH LEVEL AT 1538 FT³/DAY.
- 3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
- 4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
- 5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

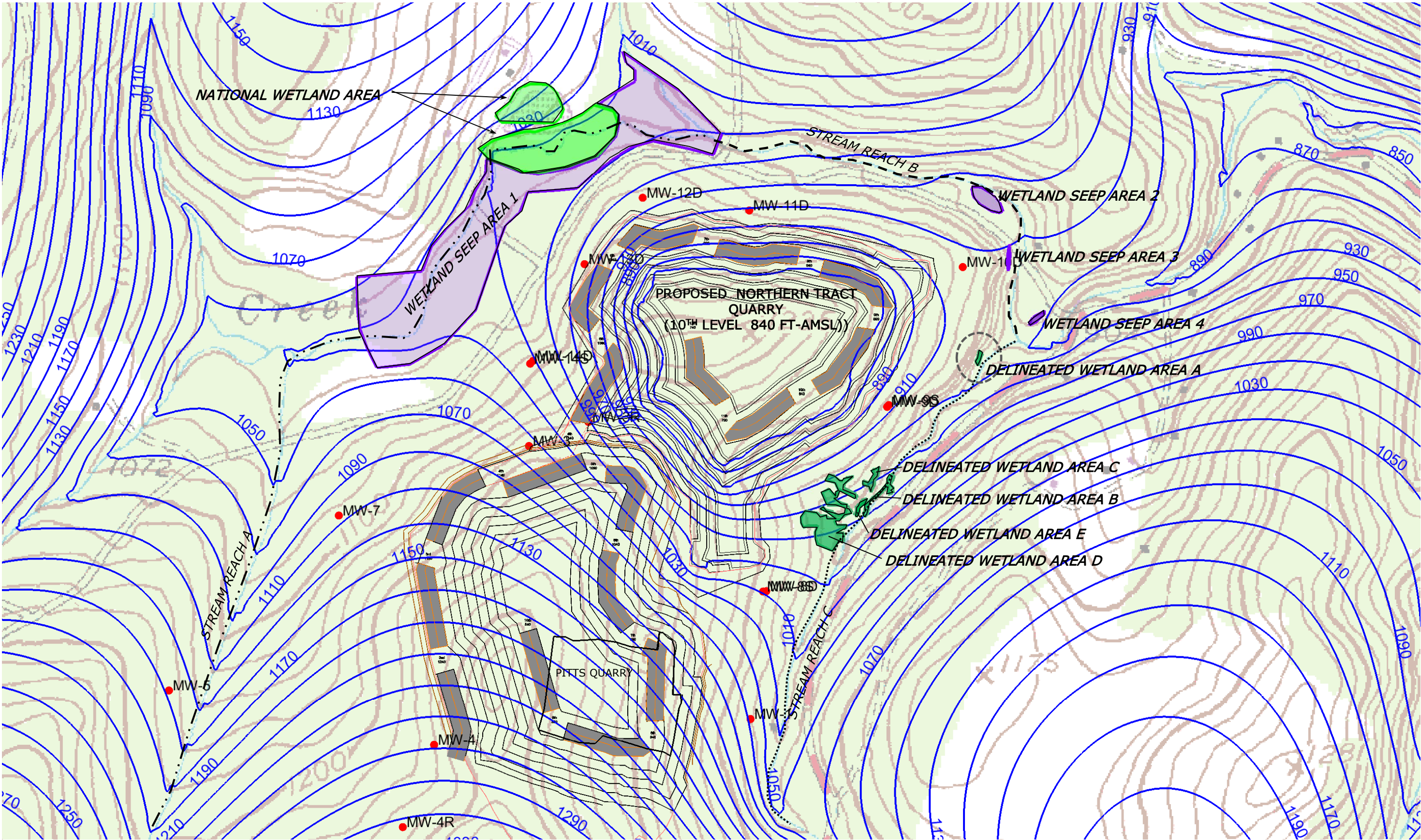
● MONITORING WELL LOCATION

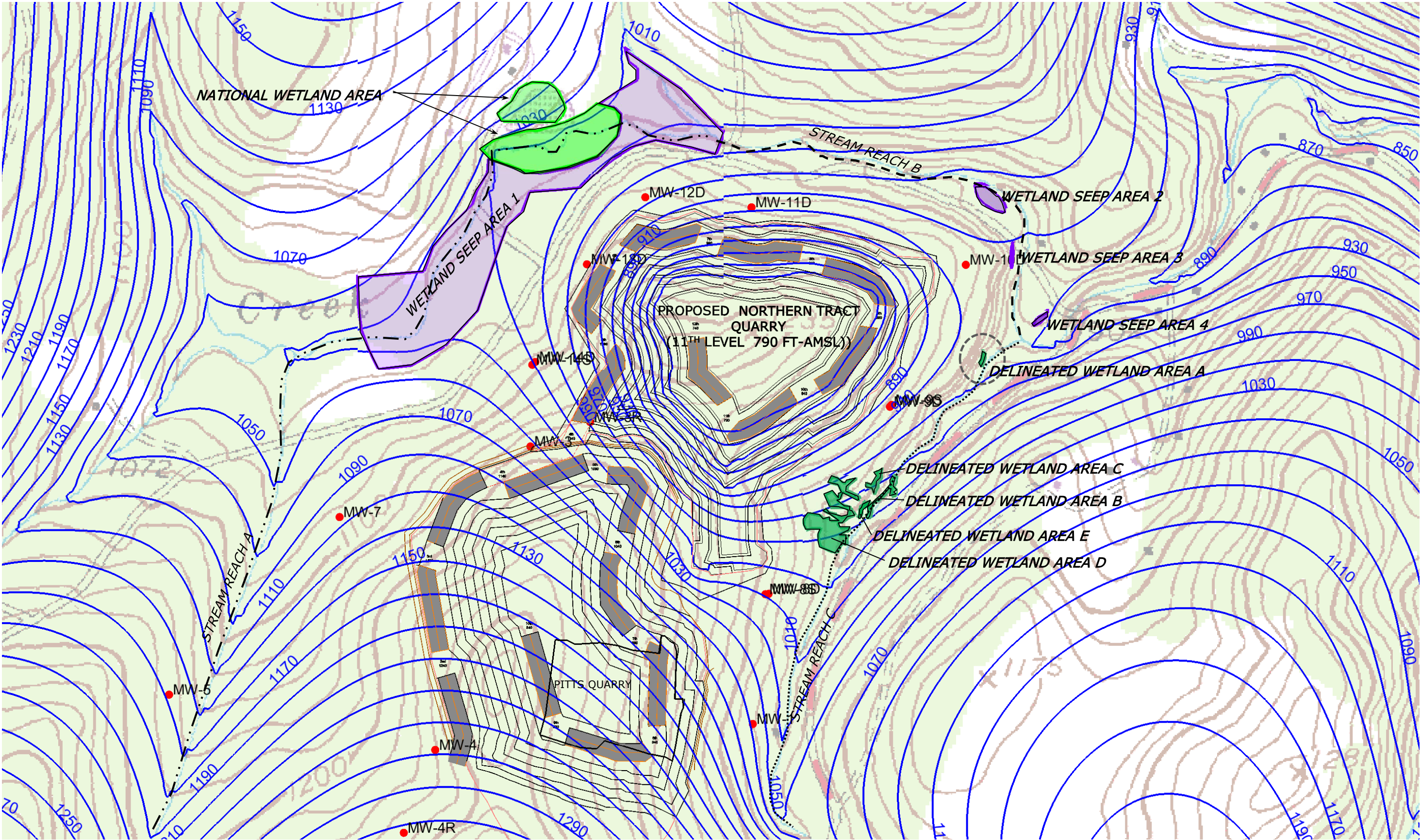
1070 SIMULATED POTENTIOMETRIC SURFACE (FT. MSL)

APPROXIMATE SCALE (FEET)



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PROJECT LOCATION SGI CHARMIAN FACILITY PROPOSED NORTHERN TRACT QUARRY BLUE RIDGE SUMMIT, PENNSYLVANIA		DRAWN BY VFB	DATE 12-12-17
SITE AREA SIMULATED 9 TH LEVEL (890 FT-AMSL) POTENTIOMETRIC GROUNDWATER ELEVATION CONTOUR MAP		FIGURE NUMBER 20	



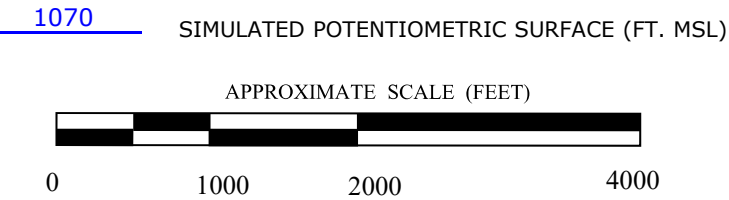


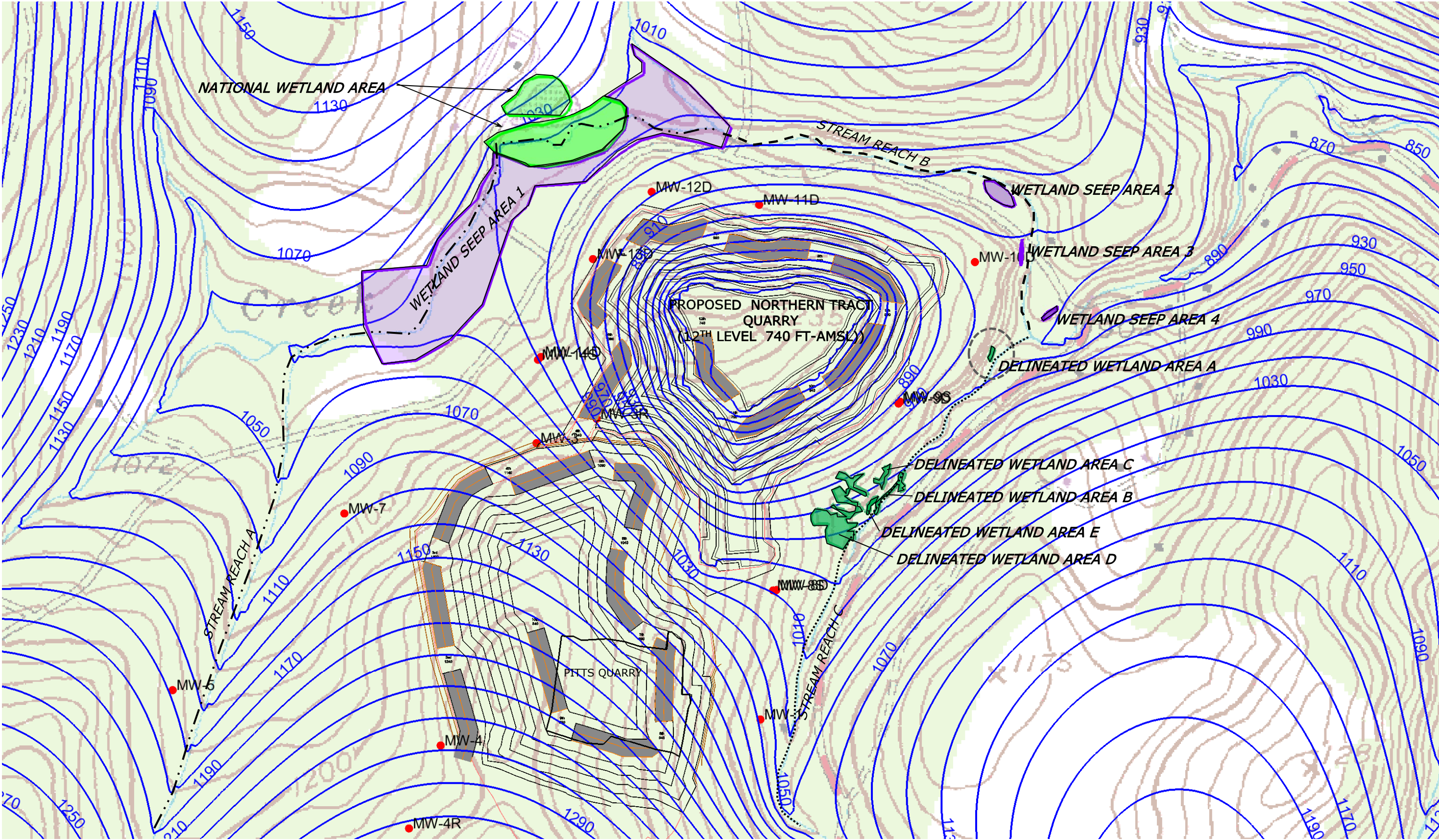
NOTES

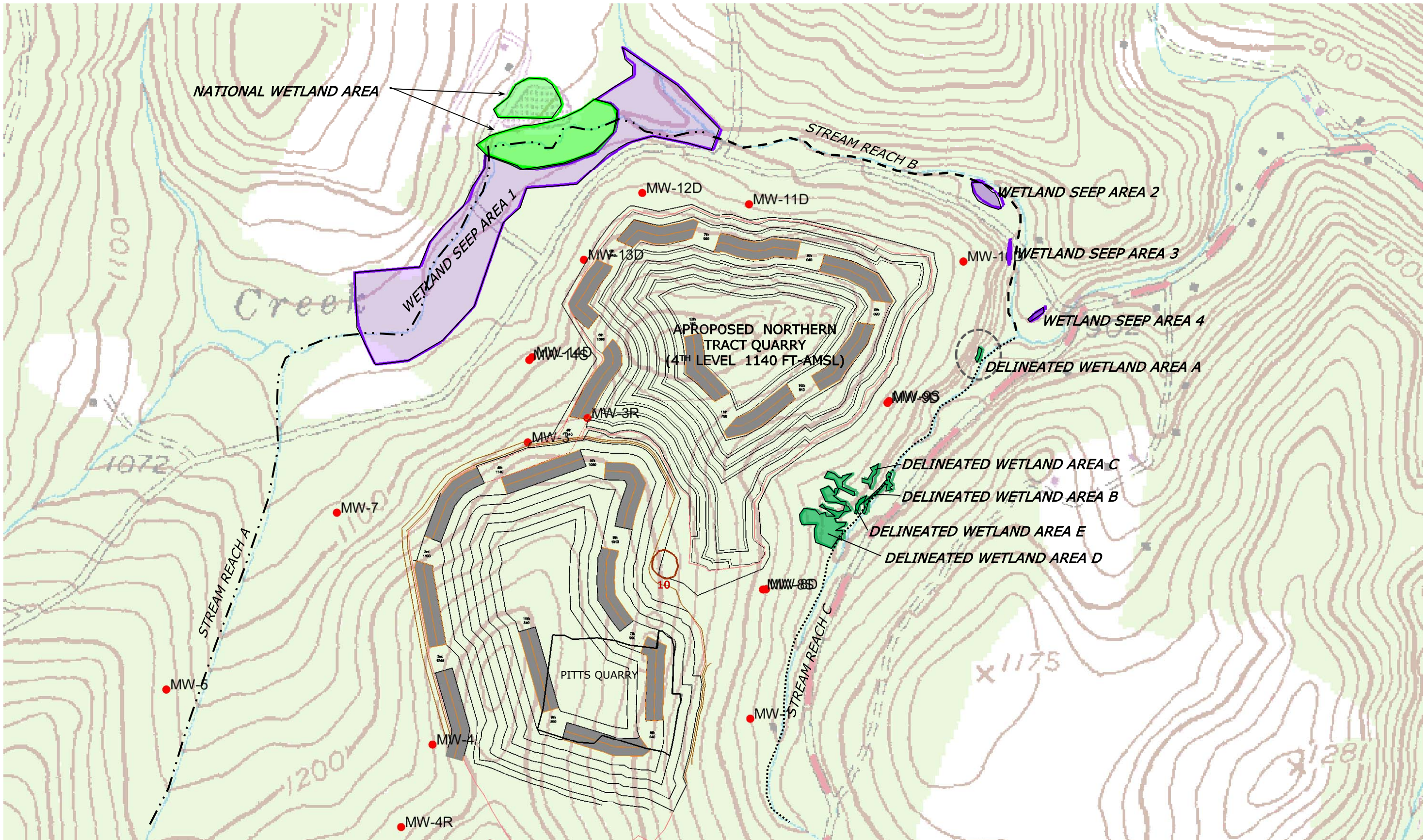
1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 11TH LEVEL AT 1729 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION







NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 4TH LEVEL AT 36 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

— 10 — SIMULATED DRAWDOWN (FEET)

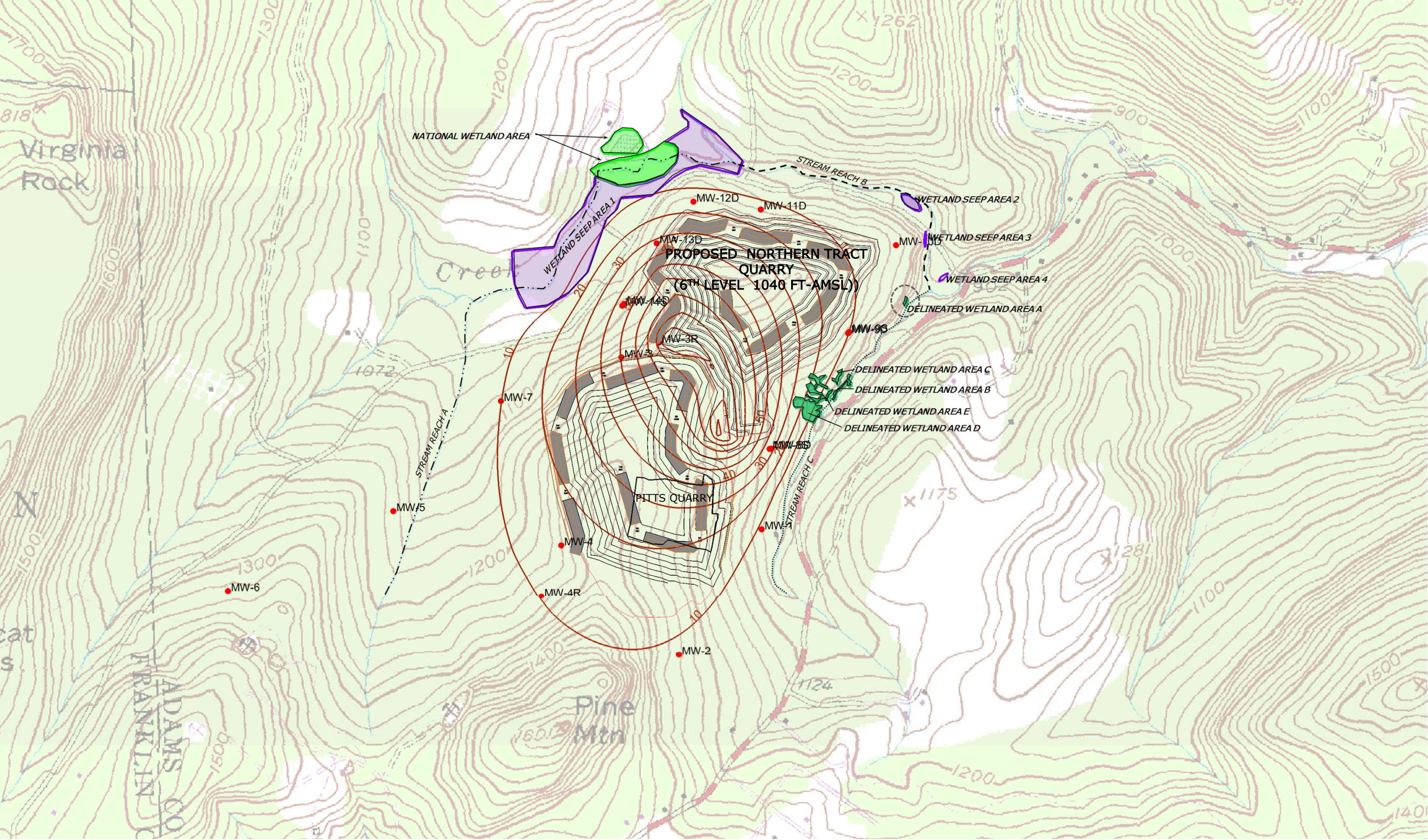
APPROXIMATE SCALE (FEET)



0 1000 2000 4000



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SITE AREA SIMULATED 4 TH LEVEL (1140 FT-AMSL) DRAWDOWN			
PROJECT LOCATION SGI CHARMIAN FACILITY PROPOSED NORTHERN TRACT QUARRY BLUE RIDGE SUMMIT, PENNSYLVANIA		DRAWN BY VFB	DATE 12-12-17
FIGURE NUMBER 24			



NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
- 2. NORTHERN TRACT QUARRY PUMPING 6TH LEVEL AT 421 FT³/DAY.
- 3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
- 4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
- 5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

10 SIMULATED DRAWDOWN (FEET)

APPROXIMATE SCALE (FEET)



SITE AREA
SIMULATED 6TH LEVEL
(1040 FT-AMSL)
DRAWDOWN

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

DRAWN BY VFB DATE 12-12-17

FIGURE NUMBER

26

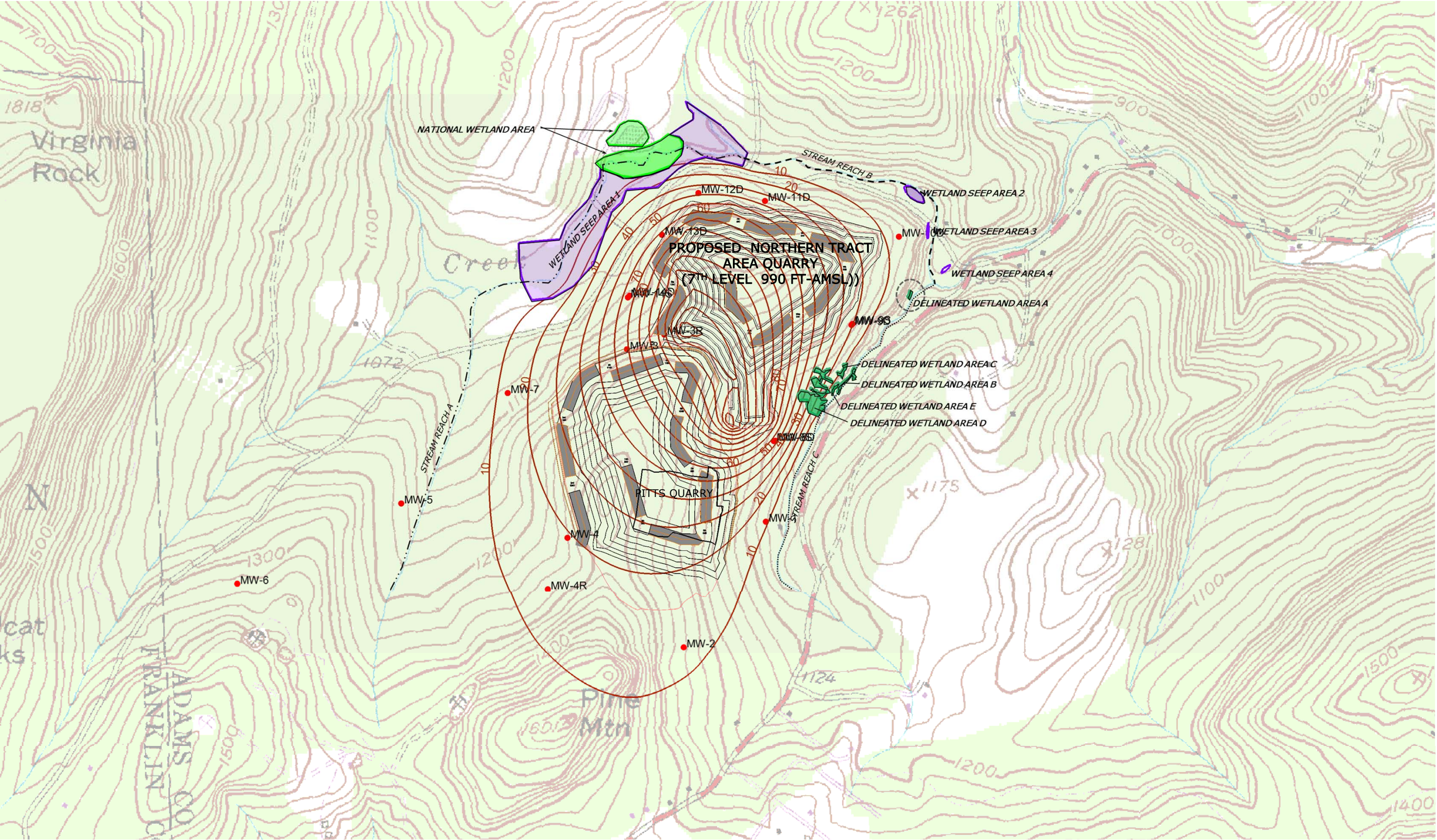
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NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 7TH LEVEL AT 914 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

10 SIMULATED DRAWDOWN (FEET)

APPROXIMATE SCALE (FEET)

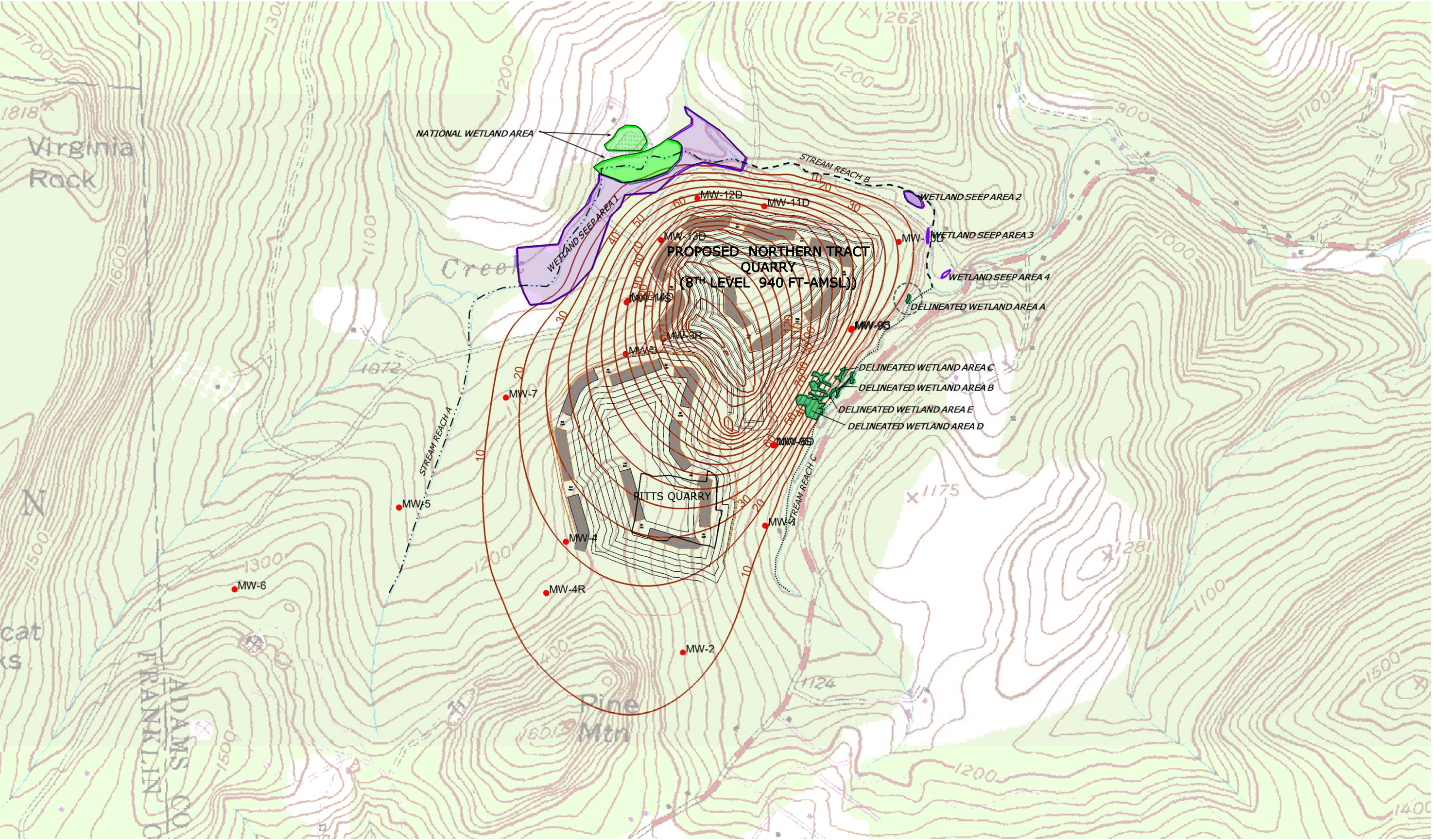


SITE AREA
SIMULATED 7TH LEVEL
(990 FT-AMSL)
DRAWDOWN

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

FIGURE NUMBER

27



NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
- 2. NORTHERN TRACT QUARRY PUMPING 8TH LEVEL AT 1252 FT³/DAY.
- 3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
- 4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
- 5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

10 SIMULATED DRAWDOWN (FEET)

APPROXIMATE SCALE (FEET)



SITE AREA
SIMULATED 8TH LEVEL
(940 FT-AMSL)
DRAWDOWN

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

FIGURE NUMBER

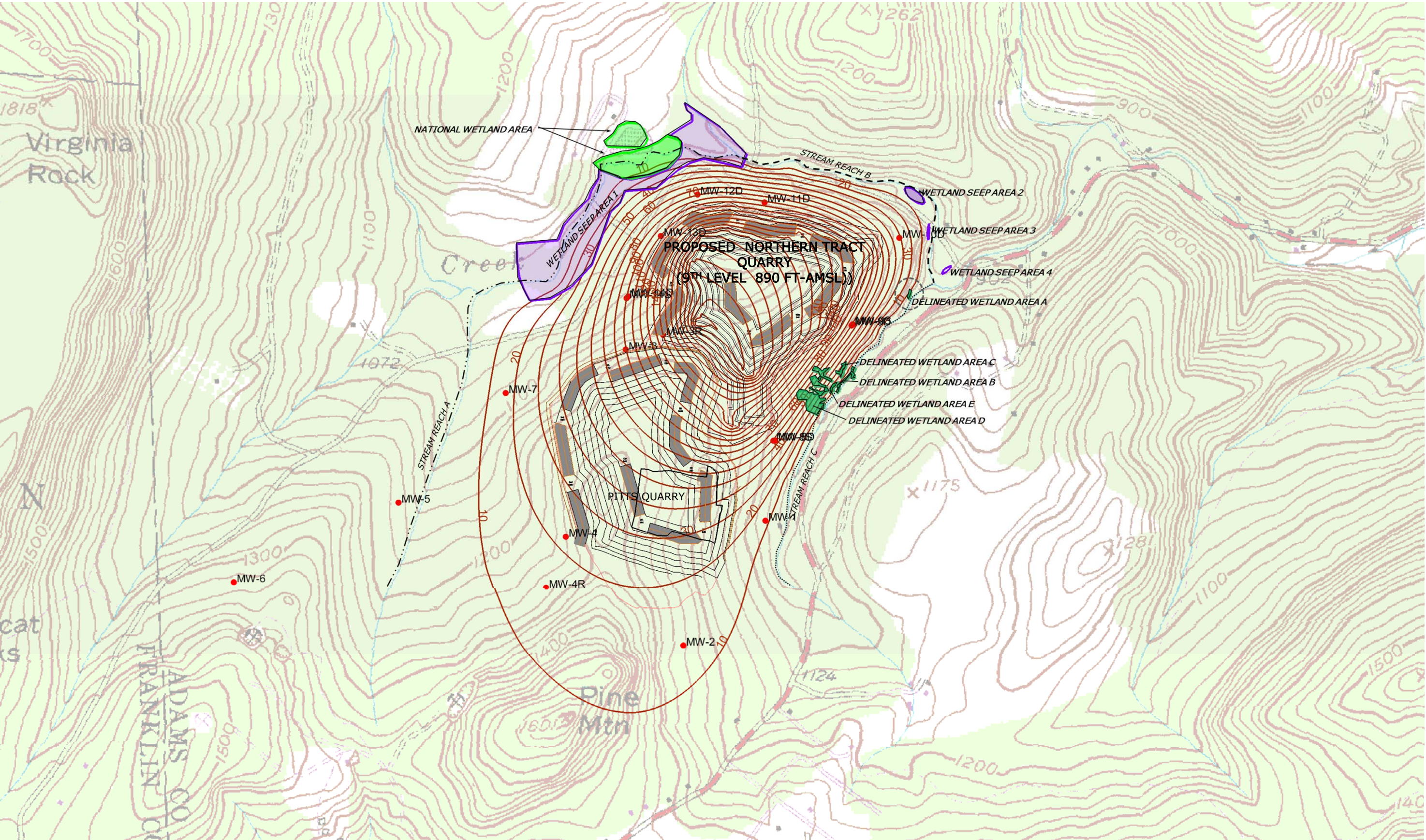
28

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NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
- 2. NORTHERN TRACT QUARRY PUMPING 9TH LEVEL AT 1538 FT³/DAY.
- 3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
- 4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
- 5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

10 SIMULATED DRAWDOWN (FEET)

APPROXIMATE SCALE (FEET)



SITE AREA
SIMULATED 9TH LEVEL
(890 FT-AMSL)
DRAWDOWN

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

FIGURE NUMBER

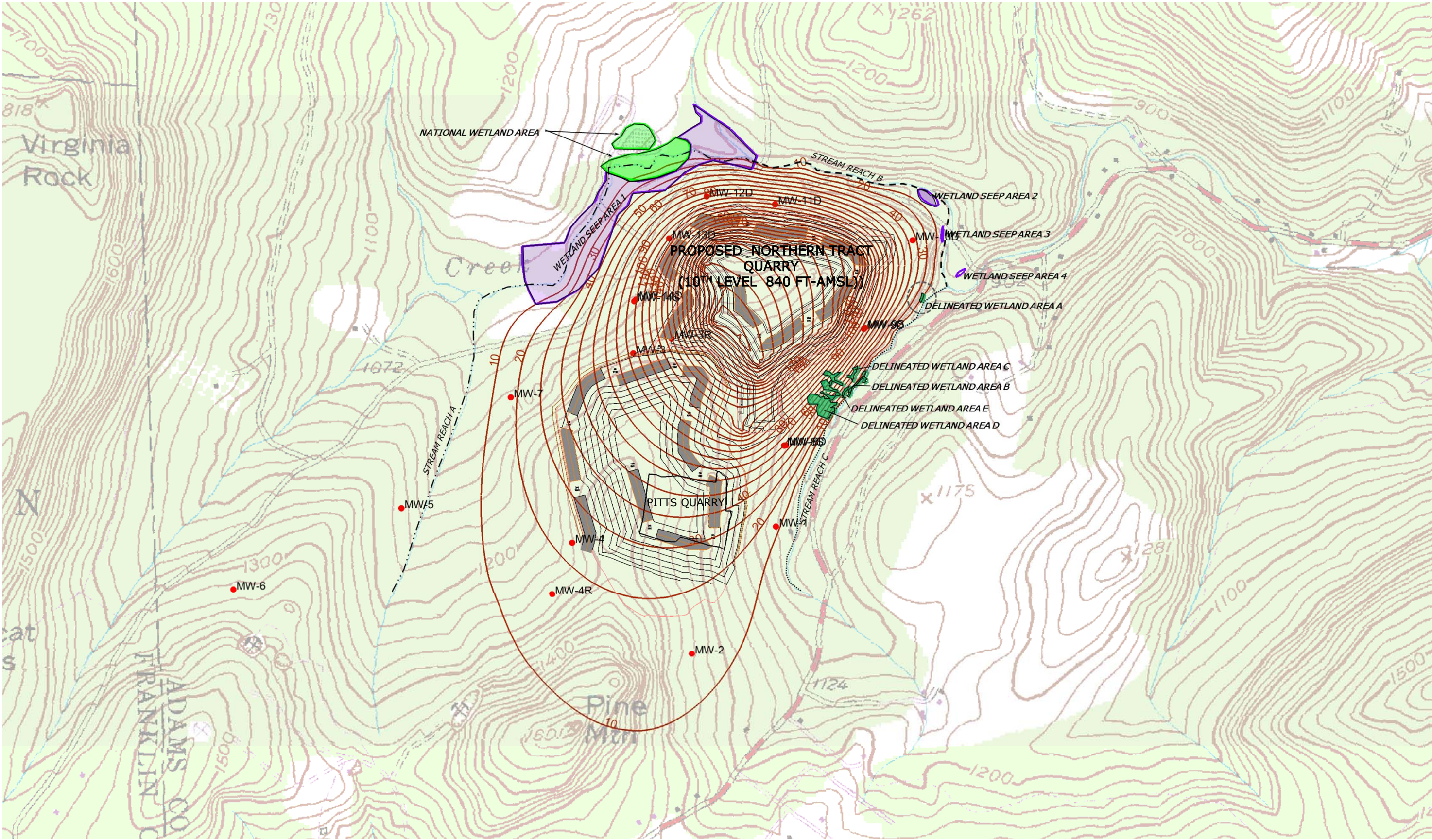
29

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NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 10TH LEVEL AT 1632 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

10 SIMULATED DRAWDOWN (FEET)

APPROXIMATE SCALE (FEET)



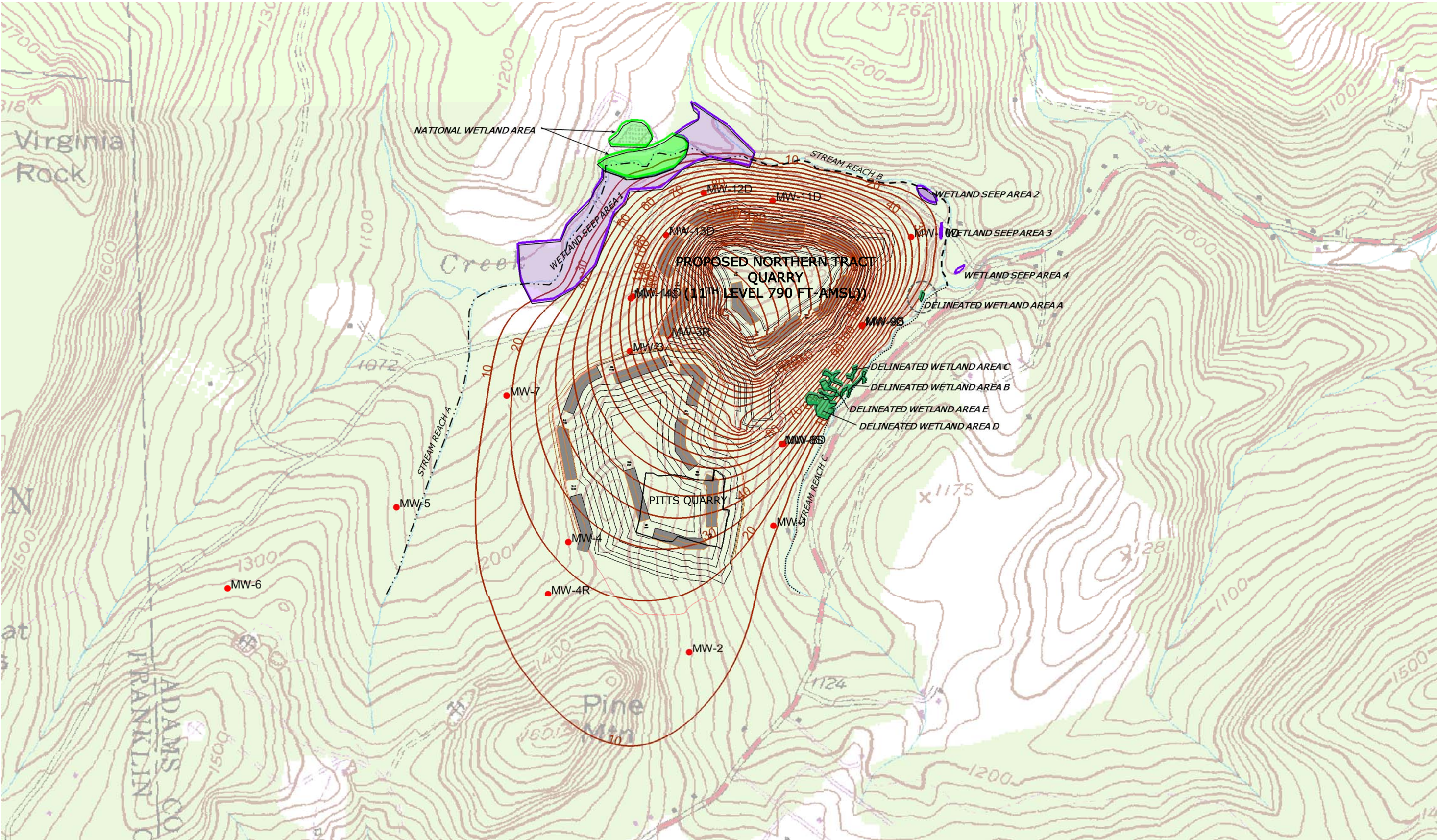
SITE AREA
SIMULATED 10TH LEVEL
(840 FT-AMSL)
DRAWDOWN

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

DRAWN BY VFB DATE 12-12-17

FIGURE NUMBER

30



NOTES

1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
2. NORTHERN TRACT QUARRY PUMPING 11TH LEVEL AT 1729 FT³/DAY.
3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL.
5. NESTED WELL PAIRS OVERLAP DUE TO CLOSE PROXIMITY OF WELLS TO EACH OTHER (MW-8S/D, MW-9S/D, AND MW-14S/D).

EXPLANATION

● MONITORING WELL LOCATION

10 SIMULATED DRAWDOWN (FEET)

APPROXIMATE SCALE (FEET)



SITE AREA
SIMULATED 11TH LEVEL
(790 FT-AMSL)
DRAWDOWN

PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

FIGURE NUMBER

31

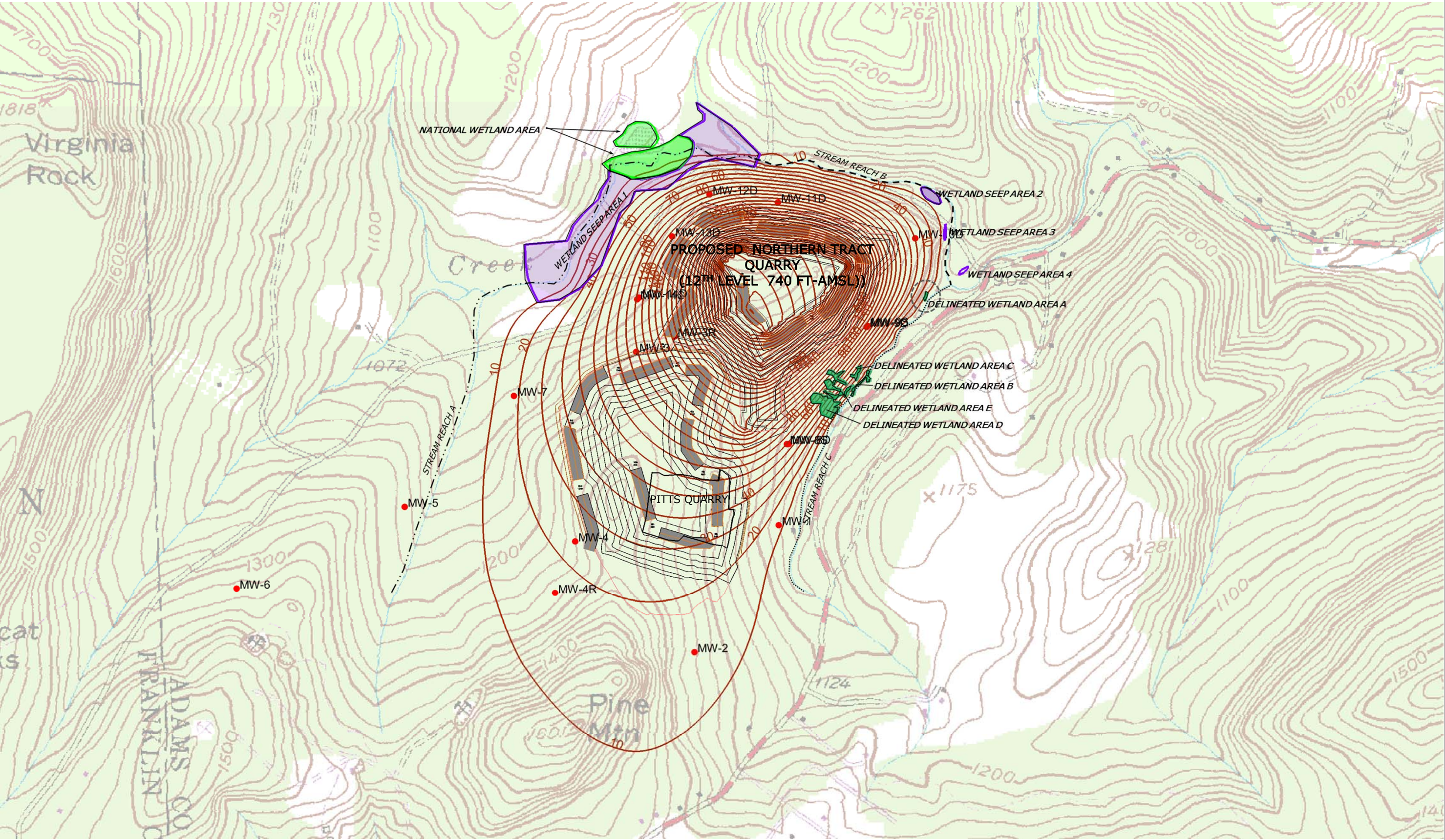
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NOTES

- 1. BASE MAP FROM USGS TOPOGRAPHIC QUADRANGLE.
- 2. NORTHERN TRACT QUARRY PUMPING 12TH LEVEL AT 1749 FT³/DAY.
- 3. NORTHERN TRACT QUARRY CONFIGURATION DATA PROVIDED BY SKELLY AND LOY, INC.
- 4. FT-AMSL – FEET ABOVE MEAN SEA LEVEL

EXPLANATION

● MONITORING WELL LOCATION

10 SIMULATED DRAWDOWN (FEET)

APPROXIMATE SCALE (FEET)



SITE AREA
SIMULATED 12TH LEVEL
(740 FT-AMSL)
DRAWDOWN

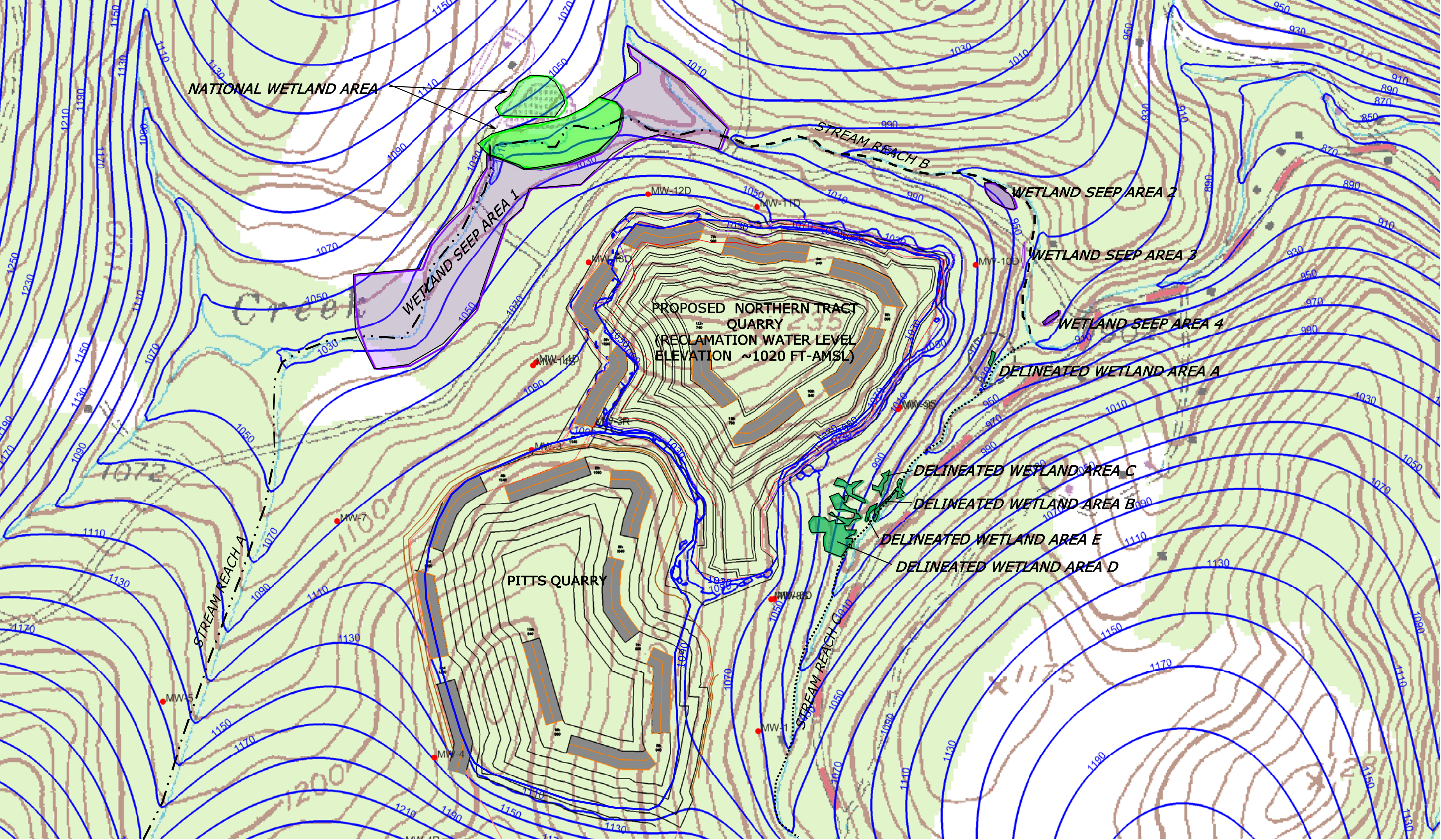
PROJECT LOCATION
SGI CHARMIAN FACILITY
PROPOSED NORTHERN TRACT QUARRY
BLUE RIDGE SUMMIT, PENNSYLVANIA

DRAWN BY VFB DATE 12-12-17

FIGURE NUMBER

32





ATTACHMENT E

PITTS QUARRY GROUNDWATER INFILTRATION CALCULATION

By: AMR Date: 11/06/17 Subject: Water Balance Analysis Sheet No.: 1 of 5
Chkd. By: DBB Date: 11/15/17 Northern Tract Quarry Proj. No.: 152596A
Revised By: MDW Date: 12/21/2017

W:\2015\152596 A - SGI - Northern Tract Surface Mine Permit\Field Data\Pitts Quarry Pumping Data\[Pump_Data-Dapp revised.xlsx]Summary

**PITTS QUARRY WATER BALANCE ANALYSIS
NORTHERN TRACT QUARRY
CHARMIAN SITE, SPECIALTY GRANULES, LLC.
ADAMS COUNTY, PENNSYLVANIA**

PURPOSE

The purpose of these calculations is to evaluate the overall water balance in the existing Pitts Quarry as a way to roughly confirm the calculated groundwater infiltration rate determined by the groundwater model developed for the adjacent, proposed Northern Tract Quarry. SGI currently maintains the pool level in the bottom of Pitts Quarry by using a pump intermittently to remove any accumulated water. SGI installed an automated monitoring system to tabulate the pumping rates and durations for a time period from June 6, 2017 to August 29, 2017. Additionally, SGI routinely collected daily precipitation depths at two rain gauges on site, located at the Lower Mill Pond System and the Pitts Pond. This calculation will compare the incoming precipitation and groundwater infiltration to the pumping and evaporation as a way to evaluate the overall water balance in the quarry and confirm estimated groundwater infiltration rates. It is assumed that the groundwater infiltration rate estimated for the Pitts Quarry will be comparable to the proposed Northern Tract given their proximity.

MASS BALANCE CALCULATIONS

The following sections will determine the various evaporation, groundwater infiltration, precipitation, and pumping rates for comparison in evaluating the water mass balance in the Pitts Quarry.

*Evaporation***Evaporation Rates (inches)**

The evaporation rates for the area were obtained from References 1, 2, and 3. The average evaporation rate is a weighted average based on the distance of the observation point to the project site.

Month	Beltsville, MD		Sterling, VA	
	Evap. (IN)	Dist. (MI)	Evap. (IN)	Dist. (MI)
June	6.46	59.10	6.57	50.40
July	7.14		6.82	
August	6.19		6.23	

Month	Shaver Creek, PA		Landisville, PA		Raystown Lake, PA	
	Evap. (IN)	Dist. (MI)	Evap. (IN)	Dist. (MI)	Evap. (IN)	Dist. (MI)
June	4.89	66.20	6.61	60.3	6.05	53.8
July	5.56		7.17		6.24	
August	4.81		5.91		5.73	

Watershed Area 2,915,200 SF
Quarry Pool Area 55,105 SF

D'APPOLONIA

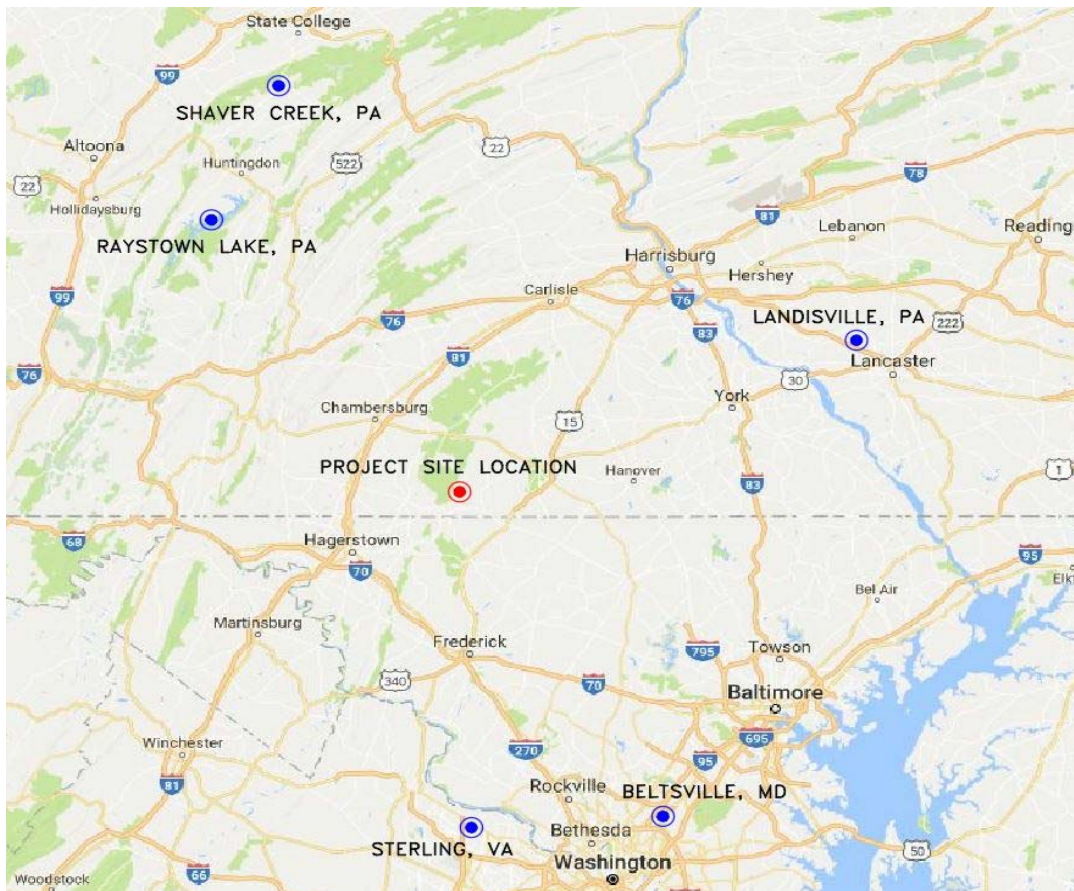
By: AMR Date: 11/06/17 Subject: Water Balance Analysis Sheet No.: 2 of 5
 Chkd. By: DBB Date: 11/15/17 Northern Tract Quarry Proj. No.: 152596A
 Revised By: MDW Date: 12/21/2017

W:\2015\152596 A - SGI - Northern Track Surface Mine Permit\Field Data\Pitts Quarry Pumping Data\[Pump_Data-Dapp revised.xlsx]Summary

Average Evaporation	
June	6.15
July	6.61
August	5.81

Evaporation Duration (Days)	
June	25
July	31
August	28
Total Duration	84

Evaporation Volume (CF)	
June	23,162
July	30,228
August	24,494
Total Volume	77,885



Precipitation

Precipitation Depths (IN)	Rain Gauge No. 1	Rain Gauge No. 2
June	2.33	1.89
July	6.13	6.78
August	5.60	4.81
Total Precipitation	14.06	13.48

Precipitation Volume (CF)	Rain Gauge No. 1	Rain Gauge No. 2
June	10,700	8,680
July	28,150	31,135
August	25,716	22,088
Total Precipitation	64,566	61,903

D'APPOLONIA

By: AMR Date: 11/06/17 Subject: Water Balance Analysis Sheet No.: 3 of 5
 Chkd. By: DBB Date: 11/15/17 Northern Tract Quarry Proj. No.: 152596A
 Revised By: MDW Date: 12/21/2017

W:\2015\152596 A - SGI - Northern Track Surface Mine Permit\Field Data\Pitts Quarry Pumping Data\[Pump_Data-Dapp revised.xlsx]Summary

Pumping

Average Pump Rate 640 GPM

	Time Pumping (MIN)	Volume (Gallons)	Volume (CF)
June	8,699.00	5,567,360.00	744,248.00
July	8,639.00	5,528,960.00	739,115.00
August	12,954.00	8,290,560.00	1,108,287.00
Total	30,292.00	19,386,880.00	2,591,650.00

The average pumping rate presented above was calculated using flow data obtained from the Pitts Quarry provided by SGI. A flow meter is established at the pump location to passively monitor flow rates when the pump is activated. The pump is located near the bottom of Pitts Quarry and is connected to a high density polyethylene (HDPE) pipe which travels overland to the top of the quarry. The raw flow monitoring data was adjusted to remove outlier points which were not representative of the pumping system. For instance, larger flows observed during the beginning of a pumping event were eliminated from the dataset as these flow rates are associated with initial filling of the piping system and prior to the pumping system reaching equilibrium.

Infiltration and Runoff

Map Unit	Unit Name	Area (AC)	Percent Area	Hyd. Soil Group	Curve No.
HKB	Highfield, Catoctin, and Myersville soils	14.0	18.02	B	72
HMF	Highfield and Catoctin channery silt loams	11.1	14.29	B	60
RcD	Ravenrock-Highfield-Rock Outcrop	52.6	67.70	B	86
Composite CN					79.76

Potential Maximum Retention 2.54 IN Ref. No. 4, Eq. 2-4
 Initial Abstraction 0.51 IN Ref. No. 4, Eq. 2-2
 Total Volume of Water Due to Surface Infiltration 120,940 CF

Gauge 1 Gauge 2
 Surface Runoff 11.42 10.85 Ref. No. 4, Eq. 2-1
 Surface Runoff Volume 2,720,793 2,586,121

D'APPOLONIA

By: AMR Date: 11/06/17 Subject: Water Balance Analysis Sheet No.: 4 of 5
Chkd. By: DBB Date: 11/15/17 Northern Tract Quarry Proj. No.: 152596A
Revised By: MDW Date: 12/21/2017

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Quarry Water Management

	Minimum	Maximum
Surface Runoff (CF)	2,720,793	2,586,121
Rainfall (CF)	64,566	61,903
Surface Infiltration (CF)	120,940	120,940
Evaporation (CF)	77,885	77,885
Pumping (CF)	2,591,650	2,591,650
Groundwater Infiltration (CF)	5,116	142,451

The minimum and maximum values above vary by using the two different rain gauge values, Gauge 1 and Gauge 2, respectively.

Groundwater Infiltration Rate

	Minimum	Maximum
Volume of Groundwater	5,116	142,451
Groundwater Infiltration Rate	61	1,694
	1	9

CF
CF/Day
GPM

D'APPOLONIA

By: AMR Date: 11/06/17 Subject: Water Balance Analysis Sheet No.: 5 of 5
Chkd. By: DBB Date: 11/15/17 Northern Tract Quarry Proj. No.: 152596A
Revised By: MDW Date: 12/21/2017

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REFERENCES

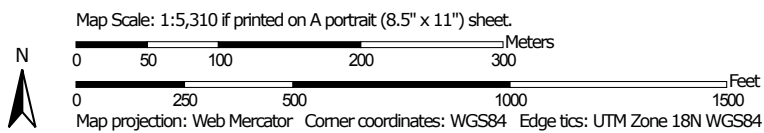
1. Technical Paper No. 13 - Mean Monthly and Annual Evaporation From Free Water Surface for the United States, Alaska, Hawaii, and West Indies, Hydrologic Branch Division of Climatological and Hydrologic Services, U.S. Department of Commerce, 1950.
2. Technical Report NWS 34 - Mean Monthly, Seasonal, and Annual Pan Evaporation for the United States, Office of Hydrology, National Weather Service, U.S. Department of Commerce, 1982.
3. Raystown Evaporation, Retrieved November 06, 2017, from The Pennsylvania State Climatologist:
<http://climate.psu.edu/features/evap/rayevap.php>
4. TR-55 - Urban Hydrology for Small Watersheds, Conservation Engineering Division, Natural Resources Conservation Service, United States Department of Agriculture, 1986

SOIL SURVEY DATA

Soil Map—Adams County, Pennsylvania



Soil Map may not be valid at this scale.



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey


11/7/2017
Page 1 of 3


MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Adams County, Pennsylvania

Survey Area Data: Version 13, Oct 3, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 14, 2011—Nov 6, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HKB	Highfield, Catoctin, and Myersville soils, 0 to 8 percent slopes, very stony	14.0	18.1%
HMF	Highfield and Catoctin channery silt loams, 25 to 70 percent slopes, very stony	11.1	14.3%
RcD	Ravenrock-Highfield-Rock outcrop complex, 15 to 25 percent slopes	52.6	67.7%
Totals for Area of Interest		77.7	100.0%

Adams County, Pennsylvania

HKB—Highfield, Catoctin, and Myersville soils, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 19qq

Elevation: 200 to 2,800 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 45 to 59 degrees F

Frost-free period: 120 to 220 days

Farmland classification: Not prime farmland

Map Unit Composition

Highfield, very stony, and similar soils: 40 percent

Catoctin, very stony, and similar soils: 25 percent

Myersville, very stony, and similar soils: 15 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Highfield, Very Stony

Setting

Landform: Mountainsides

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from greenstone

Typical profile

H1 - 0 to 9 inches: channery silt loam

H2 - 9 to 24 inches: channery silt loam

H3 - 24 to 42 inches: very channery silt loam

H4 - 42 to 52 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 1.6 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to high (0.06 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Catoctin, Very Stony

Setting

Landform: Mountainsides

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from greenstone

Typical profile

H1 - 0 to 9 inches: channery silt loam

H2 - 9 to 16 inches: very channery silt loam

H3 - 16 to 24 inches: extremely channery silt loam

H4 - 24 to 34 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent

Percent of area covered with surface fragments: 1.6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to high (0.06 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Myersville, Very Stony

Setting

Landform: Mountainsides

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from greenstone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 14 inches: silty clay loam
H3 - 14 to 27 inches: channery silty clay loam
H4 - 27 to 38 inches: channery silt loam
H5 - 38 to 48 inches: channery loam
H6 - 48 to 60 inches: bedrock
H7 - 60 to 70 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock;
60 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very
low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Glenville

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear, concave
Hydric soil rating: No

Baile

Percent of map unit: 4 percent
Landform: Depressions
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

Buchanan

Percent of map unit: 4 percent
Landform: Mountainsides
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Edgemont, channery

Percent of map unit: 4 percent

Landform: Mountainsides

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Upper third of mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Neshaminy, extremely bouldery

Percent of map unit: 4 percent

Landform: Hillsides

Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Data Source Information

Soil Survey Area: Adams County, Pennsylvania

Survey Area Data: Version 13, Oct 3, 2017

Adams County, Pennsylvania

HMF—Highfield and Catoctin channery silt loams, 25 to 70 percent slopes, very stony

Map Unit Setting

National map unit symbol: 19qs

Elevation: 500 to 2,800 feet

Mean annual precipitation: 35 to 48 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 135 to 210 days

Farmland classification: Not prime farmland

Map Unit Composition

Highfield, very stony, and similar soils: 45 percent

Catoctin, very stony, and similar soils: 35 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Highfield, Very Stony

Setting

Landform: Mountainsides

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Center third of mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from greenstone

Typical profile

H1 - 0 to 9 inches: channery silt loam

H2 - 9 to 24 inches: channery silt loam

H3 - 24 to 42 inches: very channery silt loam

H4 - 42 to 52 inches: bedrock

Properties and qualities

Slope: 25 to 70 percent

Percent of area covered with surface fragments: 1.6 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to high (0.06 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Catoctin, Very Stony

Setting

Landform: Mountainsides

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Center third of mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from greenstone

Typical profile

H1 - 0 to 9 inches: channery silt loam

H2 - 9 to 16 inches: very channery silt loam

H3 - 16 to 24 inches: extremely channery silt loam

H4 - 24 to 34 inches: bedrock

Properties and qualities

Slope: 25 to 35 percent

Percent of area covered with surface fragments: 1.6 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to high (0.06 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Myersville, silt loam

Percent of map unit: 9 percent

Landform: Mountainsides

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Center third of mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

Buchanan

Percent of map unit: 6 percent

Landform: Mountainsides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Edgemont, very stony

Percent of map unit: 5 percent
Landform: Mountainsides
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Center third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Adams County, Pennsylvania
Survey Area Data: Version 13, Oct 3, 2017

Adams County, Pennsylvania

RcD—Ravenrock-Highfield-Rock outcrop complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 19s9

Mean annual precipitation: 35 to 48 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 150 to 215 days

Farmland classification: Not prime farmland

Map Unit Composition

Ravenrock, extremely stony, and similar soils: 40 percent

Highfield, extremely stony, and similar soils: 40 percent

Rock outcrop: 11 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ravenrock, Extremely Stony

Setting

Landform: Mountainsides

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Center third of mountainflank

Down-slope shape: Linear

Across-slope shape: Concave

Parent material: Colluvium derived from greenstone over residuum weathered from greenstone

Typical profile

H1 - 0 to 4 inches: gravelly loam

H2 - 4 to 7 inches: gravelly silt loam

H3 - 7 to 16 inches: gravelly silt loam

H4 - 16 to 43 inches: gravelly loam

H5 - 43 to 57 inches: gravelly silty clay

H6 - 57 to 65 inches: gravelly clay loam

H7 - 65 to 80 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 60 to 80 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 42 to 72 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Highfield, Extremely Stony

Setting

Landform: Mountainsides

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Center third of mountainflank

Down-slope shape: Convex

Across-slope shape: Convex

Parent material: Residuum weathered from greenstone

Typical profile

H1 - 0 to 3 inches: channery silt loam

H2 - 3 to 21 inches: channery silt loam

H3 - 21 to 64 inches: very channery silt loam

H4 - 64 to 70 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent

Percent of area covered with surface fragments: 9.0 percent

Depth to restrictive feature: 40 to 80 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat):

Moderately low to high (0.06 to 2.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Valley sides

Landform position (two-dimensional): Shoulder, backslope

Down-slope shape: Linear, convex

Across-slope shape: Linear, convex

Parent material: Bedrock exposures

Typical profile

H1 - 0 to 60 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: 0 inches to lithic bedrock

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat):
Moderately low to high (0.06 to 6.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s

Hydric soil rating: No

Data Source Information

Soil Survey Area: Adams County, Pennsylvania

Survey Area Data: Version 13, Oct 3, 2017