Module 7: Geology Information
[§77.403-404]

7.1 ***Stratigraphy.***

a) Rock Unit: Period (e.g., Lower Ordovician) LOWER ORDOVICIAN
Formation (e.g., Rockdale Run) Oe EPLER (BEEKMANTOWN GROUP)

b) Attach Geologic Logs of test holes or equivalent information on attached data sheet (test holes should be drilled to the ultimate depth of mining unless waived by the Department based on acceptable equivalent information). Log description must include the surface elevation of each hole submitted, lowest elevation of proposed excavation, elevation of static groundwater (method and date of measurement), lithologic description, location and extent of voids and thickness of strata encountered. Drill holes, highwall sections, or equivalent information should be located to represent the thickness of mineral and overburden to be disturbed in areas of maximum thickness.

c) Provide stratigraphic correlation of the strata by geologic cross sections or fence diagrams to include lithology, stratigraphy, existing ground surface, proposed mining limits, proposed benching, final reclamation slopes, postmining water table, aquifers to be encountered or affected, directions of groundwater movement and underground mines and cave systems. [Horizontal scale shall not be smaller than the scale of Exhibit 6.2 (i.e. not less than 1 inch:400 feet, or 1 inch:200 feet), larger scales are acceptable (e.g. 1 inch:100 feet)]

7.2 ***Structure.***

a) Describe the local geologic structure and its relationship to the regional structure. Use diagrams and regional structural relief maps where applicable.

SEE ATTACHMENTS

7.3 Indicate joint and fracture orientations on the Module 6.2 map (or Module 6.1 if locations not within limits of Module 6.2), using standard joint strike and dip symbols, where fracture/joint measurements were taken. Rose diagrams may be submitted if available.

Type of Joint Or Fracture*	Lithology	Number of Measurements	Depth Below Surface	Aperture (width)	Key to 6.2 (or 6.1)
SEE ATTACHMENTS					

*Type of Joint or Fracture refers to tectonic, stress relief, bedding plane, etc.

Source of information (site specific measurements, publication source, etc.) SEE ATTACHMENTS

NOTE: Operations in karst geology areas may be required to complete the *Karst Permitting Supplement* in addition to supplying this information.

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: SEE ATTACHMENTS
(Key locations to Modules 6.2 and 9)
Surface Elevation: _____
Bottom Elevations: _____
_____
_____
Groundwater Elevations and Date Measured
_____ _____
_____ _____
Surveyed by: _____
Method: _____
Remarks: _____

Operation Name: _____
Method of Drilling: _____
Date Drilled: _____
Drilled By: _____
Logged By: _____
Township: _____
County: _____
Quadrangle: _____
Laboratory: _____
Latitude: ____° ____' ____." Longitude: ____° ____' ____."

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
		10								
		20								
		30								
		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA - CONTINUED

Hole No.: SEE ATTACHMENTS Operation Name: _____

Remarks:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential

*When requested by the Department

7.4 Mine Workings and Solid Waste Sites.

Submit the following data on all active, completed and abandoned underground and surface mines and coal refuse disposal sites which are in or within 1000 feet of the permit area: (Key location to Modules 6.2, 9 and 18.)

Surface and Underground Mines

Operator	*Permit No.*	*Map Key*	*Status*	*Mineral*	*Water Sample No.(s)*
SEE ATTACHMENTS					

List the operator permit number, and type of any solid waste disposal sites in or within 1000 feet of the permit area.

SEE ATTACHMENTS

7.5 Overburden Analysis.

Note: Typically overburden analysis is not required for noncoal mining operations. However, there are geologic conditions that may make overburden analysis necessary due to the potential for surface and/or groundwater pollution. Examples are mines in coal field strata that may be acid-forming, and sites where rock has undergone sulfide mineralization. The necessity for overburden analysis should be determined prior to permit application submittal. This can be done by contacting the appropriate District Mining Office.

The interpretation of overburden analysis should be provided in this Module. However, the operational plans for material placement should be provided in Module 10.

a) Overburden Analysis Report

The overburden analysis report must include at a minimum:

1) Geologic logs of overburden analysis test holes including Munsell color codes. This must include the information requested in Module 7.1b. Overburden holes must be logged by a geologist. Water condition information is the same as that requested in Module 7.1b. This information is to be presented on a completed Module 7.1(B) "Geologic Log Drill Holes/ Overburden Analysis Data."

2) An explanation of considerations employed in determining

   aa) drill hole spacing and number of holes,
   bb) sampling depth; and
   cc) sampling intervals of overburden analysis test holes.

3) A series of stratigraphic cross-sections or fence diagrams including all overburden analysis test holes, plus other representative test holes. The vertical scale must be sufficient to show all potentially acidic and alkaline zones and any zones proposed for special handling; a scale of one (1) inch to twenty (20) feet or greater is recommended. The stratigraphic correlations between overburden holes and other test holes must be shown. In addition, hydrogeologic information (such as water table, perched systems and so forth) should be portrayed.

4) Overburden holes accurately located on Exhibit 6.2. Overburden holes must be surveyed such that surface elevations and hole locations are accurately determined and plotted.

5) Results of the chemical analysis of all overburden strata and strata immediately below the lowest stratum being mined. Acid-base accounting data must be presented on Module 7.1(B) "Geologic Log Drill Holes/ Overburden Analysis Data." Actual laboratory analysis sheets may be submitted in addition to Module 7.1(B). Forms of sulfur (when submitted) should be submitted on a separate sheet.

6) Techniques and methods of chemical analyses. References pertaining to technique or method should be cited as appropriate (e.g. Sobek, and others 1978, p. 47-50; ASTM Method D2492-84) and where a standard method is not used or has been modified, the method used should be described in detail.

7) An identification of any stratigraphic units possessing the potential for significant acid or alkaline production and an overall interpretation of the overburden analysis data. The criterion and rationale by which the overburden is being judged must be explained.

8) The name, address and telephone number of the individual(s) responsible for the collection and analysis of the data and interpretation of the data.

7.6 Special Considerations.

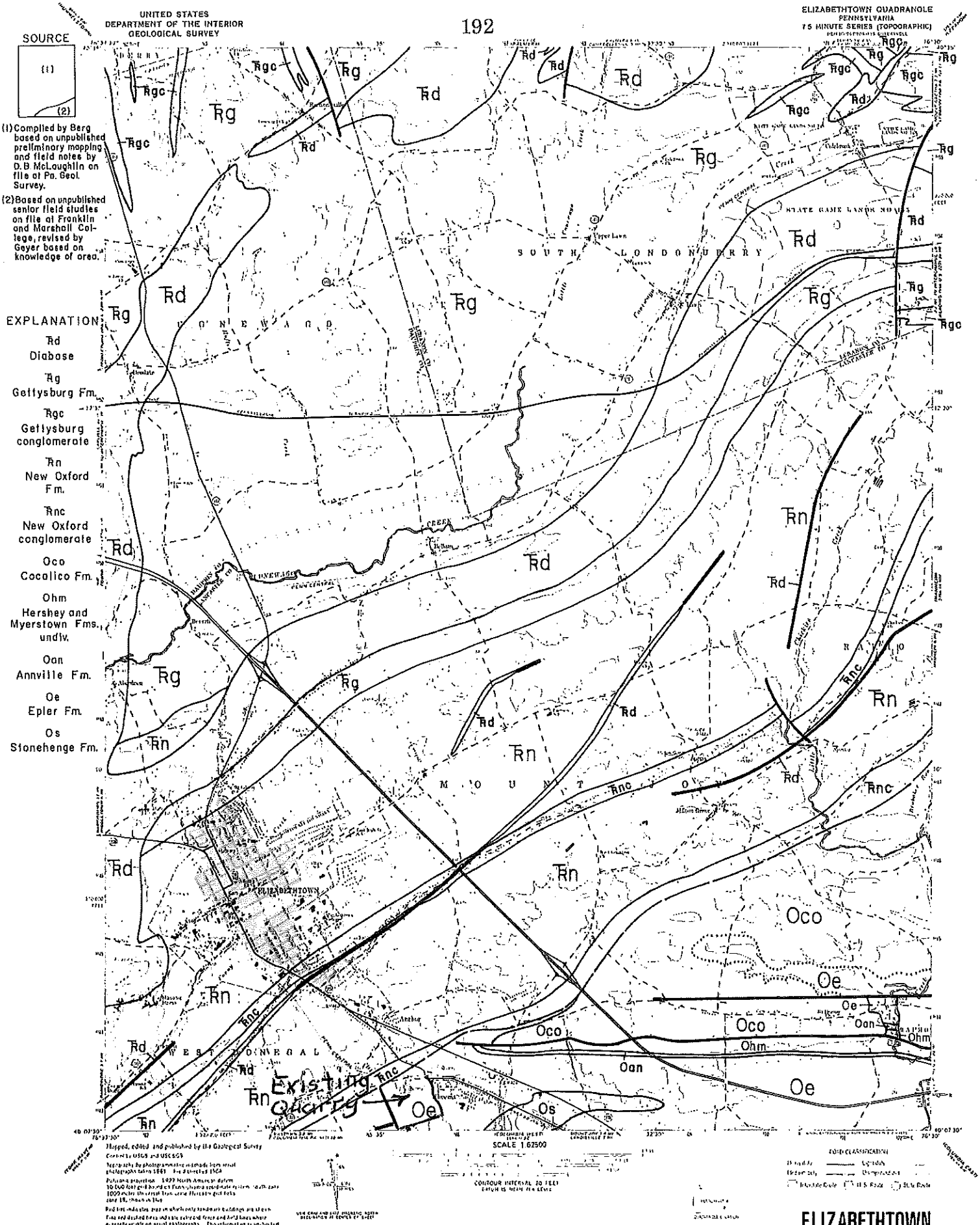
a) Karst Geology. Operations sited within carbonate rock areas (e.g. limestone, dolostone) may be required to complete the *Karst Permitting Supplement* (5600-PM-BMP0456). [§ 77.404(5)]

b) Naturally Occurring Asbestos. Operations sited within areas that contain igneous and/or metamorphic rock types with the potential to host naturally occurring asbestos (NOA) may be required to complete the *Naturally Occurring Asbestos (NOA) Application Supplement*. (5600-PM-BMP0022). [§ 77.404(3)]

If the applicant is unsure if special considerations apply to an operation, please contact the respective District Mining Office.

Module 7: Geology Information – Attachment to 7.1

Stratigraphy



Compiled by T. M. BERG and A. R. GEYER, 1975-1976

ELIZABETHTOWN

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COLUMBIA WEST QUADRANGLE
PENNSYLVANIA
7.5 MINUTE SERIES (TOPOGRAPHIC)

SOURCE

(1) W 23.
(2) D.B. McLaughlin, manuscript files (Triassic) in Pa. Geol. Survey.
(3) Unpublished senior field studies on file at Franklin and Marshall College, revised by Geyer based on knowledge of area.
(4) EG 6.
(5) U.S.G.S. Bull. 840.

EXPLANATION

Trd Diabase

Trn New Oxford Fm.

Trnc New Oxford conglomerate

HAMBURG SEQUENCE

Oco Cocalico Fm.

LEBANON VALLEY SEQUENCE

Ohm Hershey and Myerstown Fms. undiv.

Oan Annville Fm.

Oe Epler Fm.

Os Stonehenge Fm.

O€c Conestoga Fm.

€m Millbach Fm.

€sb Snitz Creek and Buffalo Springs Fms. undiv.

€bs Buffalo Springs Fm.

€zc Zooks Corner Fm.

€l Ledger Fm.

€k Kinzers Fm.

€v Vintage Fm.

€a Antietam Fm.

€ah Antietam and Harpers Fms., undiv.

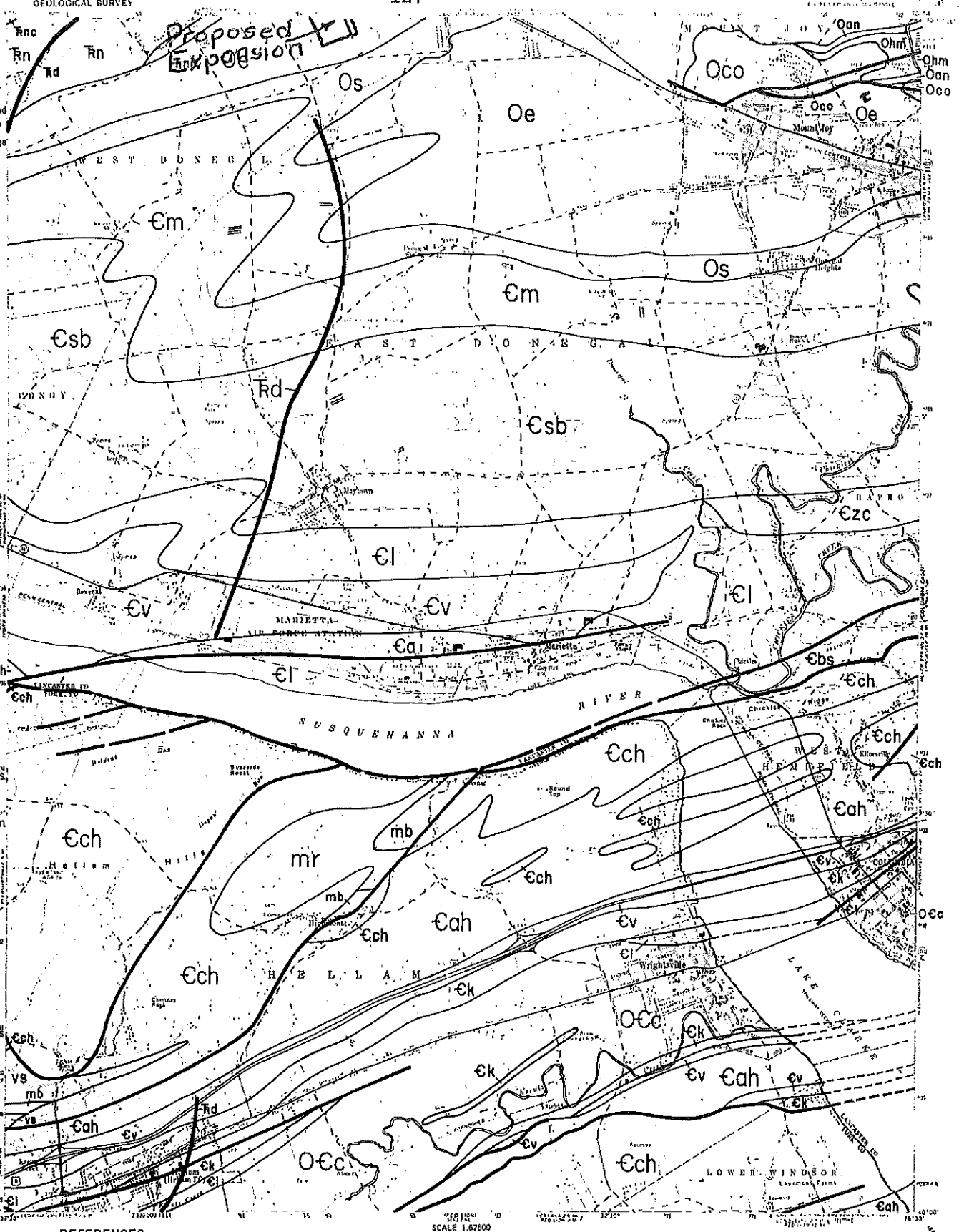
€ch Chickies Fm.

mb Metabasalt

mr Metarhyolite

vs Greenstone schist

Proposed Expansion



SCALE 1:62500

REFERENCES

Johnston, H. E. (1966), Hydrology of the New Oxford Formation in Lancaster County, Pennsylvania, Pennsylvania Geological Survey, 4th ser., Water Resource Report 23, 80 p.

Stose, G. W., and Jonas, A. I. (1933), Geology and mineral resources of the Middletown quadrangle, Pennsylvania, U. S. Geological Survey Bulletin 840, 86 p.

Hillhausen, J. P. (1978), Environmental geology of the greater York area, York County, Pennsylvania, Pennsylvania Geological Survey, 4th ser., Environmental Geology Report 6.

Compiled by A. R. GEYER, 1976

COLUMBIA WEST

(https://www.usgs.gov/)

Mineral Resources (https://www.usgs.gov/energy-and-minerals/mineral-resources-program) / Online Spatial Data (/) / Geology (/geology/) / by state (/geology/state/) / Pennsylvania (/geology/state/state.php?state=PA)

Epler Formation

XML (/geology/state/xml/PAOe;22) JSON (/geology/state/json/PAOe;22) Shapefile (/geology/state/unit-shape.php?unit=PAOe;22)

Very finely crystalline, light-gray limestone interbedded with gray dolomite; coarsely crystalline limestone lenses present.

State Pennsylvania (/geology/state/state.php?state=PA)

Name Epler Formation

Geologic age Ordovician

Lithologic constituents Major

Sedimentary > Carbonate > Limestone *(Bed)* *very finely crystalline, light-gray limestone; coarsely crystalline limestone lenses present.*

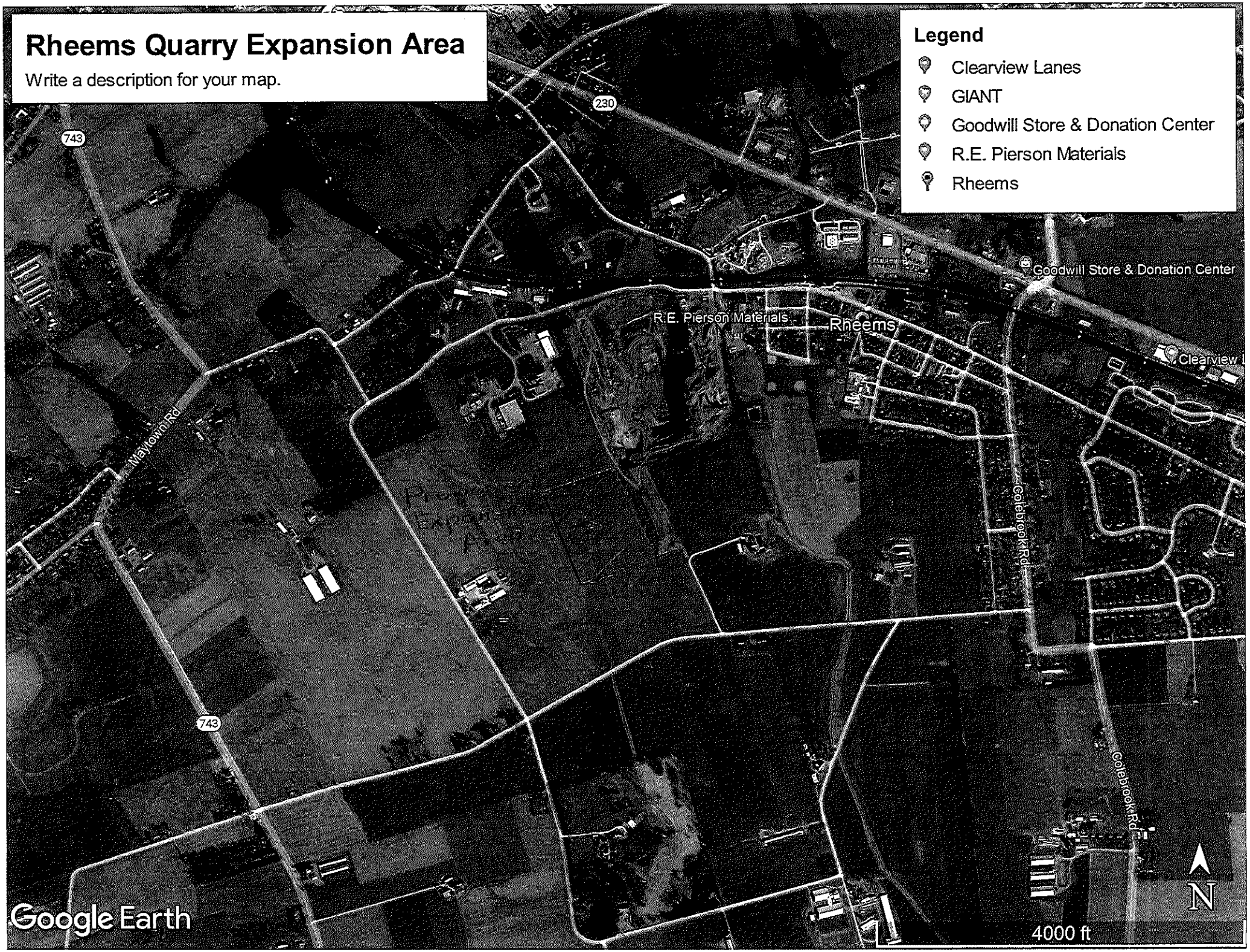
Sedimentary > Carbonate > Dolostone *(Bed)*

References

Berg, T.M., Edmunds, W.E., Geyer, A.R., and others, compilers, 1980, Geologic map of Pennsylvania: Pennsylvania Geological Survey, 4th ser., Map 1, 2nd ed., 3 sheets, scale 1:250,000.

Pennsylvania Bureau of Topographic and Geologic Survey, Department of Conservation and Natural Resources, Miles, C.E., and Whitfield, T.G., compilers, 2001, Bedrock Geology of Pennsylvania, edition: 1.0, digital map, scale 1:250,000.

NGMDB product NGMDB product page for 34341 (https://ngmdb.usgs.gov/Prodesc/proddesc_34341.htm)


Rheems Quarry Expansion Area
Write a description for your map.
Legend
Clearview Lanes
GIANT
Goodwill Store & Donation Center
R.E. Pierson Materials
Rheems
230
743
Goodwill Store & Donation Center
R.E. Pierson Materials
Rheems
Clearview L
Maytown Rd
Colebrook Rd
Colebrook Rd
743
Google Earth
4000 ft
N

Module 7: Geology Information – Attachment to 7.2 Structure and 7.3 Orientation

7.2 a) Local and Regional Geologic Structure

Local Geologic Structure

The Village of Rheems lies in the carbonate valley of northern Lancaster County, in southeastern Pennsylvania, at the edge of the Appalachian Piedmont Province. Rheems is 2 miles east of Elizabethtown, shown on the 7 ½ minute quadrangle bearing that town's name. The quarry is a short distance west of the village, adjacent to Harrisburg Avenue in West Donegal Township.

The quarry exposes only the Lower Ordovician Epler Formation, an approximately 2,500 feet thick carbonate unit within the Beekmantown Group (Meisler and Becher, 1971) present throughout the entire Lebanon Valley nappe from Reading to Harrisburg.

Perhaps the most distinctive aspect of the Epler is the interbedding of limestone and dolomite, which on weathered surfaces provides striking displays of mesoscale structures. The limestone is mostly medium to medium-light gray (locally light pinkish gray) and weather to a light olive-gray or light gray. The finely crystalline bds contain very fine dark gray laminations.

The medium crystalline dolomite beds are medium gray in color, and weather to a yellowish gray. The dolomite is also laminated, and both lithologies tend to be medium to thick bedded. Chert, occurring as dark gray to black nodules, lenses, and stringers, is scattered throughout the Epler Formation.

The quarry highwalls provide excellent exposures of the mesoscale structures that comprise the local tectonic grain. The north and south highwalls approximately parallel the 075-azimuth trend of the folds and display the change along the grain; the east and west walls exhibit good cross sections of the structures.

Thee dominate tectonic factor was the northward transport of the neppe; all other Taconian structures in this quarry are derived from this fundamental movement (Wise, 1958. 1960). A consequence of this movement is that most of the rocks in this underlying limb have undergone, to varying degrees, an extension in the north-south direction. Most of the mesostructures in the quarry amply demonstrate this strain.

The two most dramatic structures are the two recumbent folds in the east wall at Level 1. No evidence of depositional tops of beds has been found in this quarry, so which fold is the anticline, and which is the syncline cannot be determined from the sedimentary criteria. However, because the quarry is in the lower limb of the nappe, one can presume that the stratigraphic section is probably inverted. If so, then the upper fold, the one that is concave toward the north, has younger beds in the core, and thus it is the syncline. Similarly, the lower fold, the one that is convex toward the north, should have older beds in the core, and so it is

the anticline. The axial surfaces of both the anticline and the higher syncline persist across the east wall with a 15 to 25 feet separation, extending horizontally though at least 650 feet of rock. This is an average dip of 3 degrees, not quite a perfect recumbent fold. This exposure also enables one to see that the folds possess a similar geometry.

The highwall exposure in the west wall at Level 1 is in distinct contrast to the east wall; no recumbent folds disturb the gentle south dip of the (presumably) overturned beds. The relation between the different structures displayed in the two walls can be determined from the folds in the north highwall, above the entrance ramp. The 5 degree to 15 degree plunge of the folds at the entrance ramp to the east-northeast demonstrate that the western highwall exposure is structurally below the folds in the eastern wall. This can be verified by examining the east highwalls at Levels 2 and 3. No folds are present at these levels; only the fairly constant gentle south dip is present, similar to that in all three levels in the western part of the quarry.

The important faults present in this quarry occur in two orientations – parallel and transverse to the fold trends (Faill. 1983) Both types of faults, a steeply north-dipping parallel fault and a steeply west-dipping transverse fault, are present at the south wall of Level 1. They are both post folding because they offset parts of a fold. Another steeply west-dipping transverse fault along the southeast wall has an apparent offset of 6 feet down on the west, but its gently south-plunging slickenlines indicate strike-slip movement. This fault extends northward across the quarry to the northeast wall where the slickenlines plunge steeply (obliquely) to the northwest. These complex fault movements may represent a late stage of the Taconian deformation, effects of the late Paleozoic Alleghenian orogeny, or they may even be of Jurassic age and be a consequence of the Mesozoic rifting and opening of the Atlantic Ocean.

It is evident from published literature and numerous field views that Rheems Quarry is so intensely folded and faulted that a single strike and dip reading could not adequately describe the attitude of the rock units exposed here.

Regional Geologic Structure

The Piedmont Province where Rheems Quarry is located is an extensive, gently undulating province which in general slopes southeastward. It has undergone prolonged erosion so that much of its former plateau-like appearance has been modified to slopes and gently rounded hills. It comprises a southeastern belt, adjacent to the Coastal Plain, which is underlain chiefly by Precambrian crystalline rocks but in some places by Ordovician limestone.

The Taconian orogeny during the Ordovician Period produced the alpine-style Lebanon Valley nappe in south-central Pennsylvania. Weathering and erosion have reduced this enormous recumbent anticlinorium to a humble topography, with complexities and grandeur.

The sedimentary rocks at Rheems Quarry were deposited on the carbonate shelf on the edge of the Laurentian continent, the Precambrian core of what is now North America. During the Middle and Late Ordovician, the continental convergence and closing of the proto-Atlantic

Ocean created the Taconian orogeny. During this diastrophism, enormous blocks of the sedimentary shelf and large fragments of the underlying Precambrian rocks were forced up and into a younger shale basin to the (then?) northwest, which contained sediments of the present Martinsburg Formation. In the course of this (presently) northward movement, some of the blocks overrode their leading edge, forming recumbent anticlinoria of considerable complexity. The Lebanon Valley nappe is one of these thrust blocks.

The Lebanon Valley nappe contains rocks of Precambrian, Cambrian, and Ordovician age. The nappe is more than 60 miles in width and extends across the regional trend for at least 30 miles from the Great Valley north of Lebanon well into the Piedmont terrane south of Lancaster. Although the nappe was modified, mostly by faulting, during the late Paleozoic Alleghenian deformation, the structures in the quarry are almost entirely of Taconian age. The southeastern edge of the Mesozoic basin lies only 1,000 feet to the north of the quarry, but the extent to which the quarry was affected by the Jurassic (?) Deformation, if at all, is unknown.

References

Roger T. Faill, Alan R. Geyer, Rheems Quarry; The underside of a Taconian nappe in Lancaster County, Pennsylvania, Geological Society of America Centennial Field Guide – Northeastern Section, 1987.

Rheems Quarry, in Wise, D.U., and Kaufmann, M.E., eds., Some tectonic and structural problems of the Appalachian Piedmont along the Susquehanna River: Guidebook, 25th Annual Field Conference of Pennsylvania Geologist, p. 76 – 83, 1960.

George M. Hall, Ground Water in Southeastern Pennsylvania, Pennsylvania Geological Survey, 1973.

Module 7: Geology Information - Attachment to 7.3 Orientation

REPORT OF A GEOLOGIC INVESTIGATION OF (2) QUARRIES IN LANCASTER COUNTY PERTAINING TO STABILITY PROBLEMS (UNION QUARRY AT ELIZABETHTOWN AND BINKLEY-OBER QUARRY AT EAST PETERSBURG)

BY D. R. THOMPSON

Union Quarry is now Pierson Rheems LLC

Mr. Charles Nork, Chief of the Explosives Section and I met with Inspector Supervisor Frank Sentz and Inspector Tom Rooff on August 15, 1986 to determine if the physical mining conditions in the Union and Binkley-Ober quarries would cause slide or stability problems adjacent to public highways. Both operations have been in operation, at least, since the early 1930's. These quarries are adjacent to two public used roadways. These type of situations became the point of concern with the Department following an experience with Berk's quarry near Reading, Pennsylvania in the Spring of 1985.

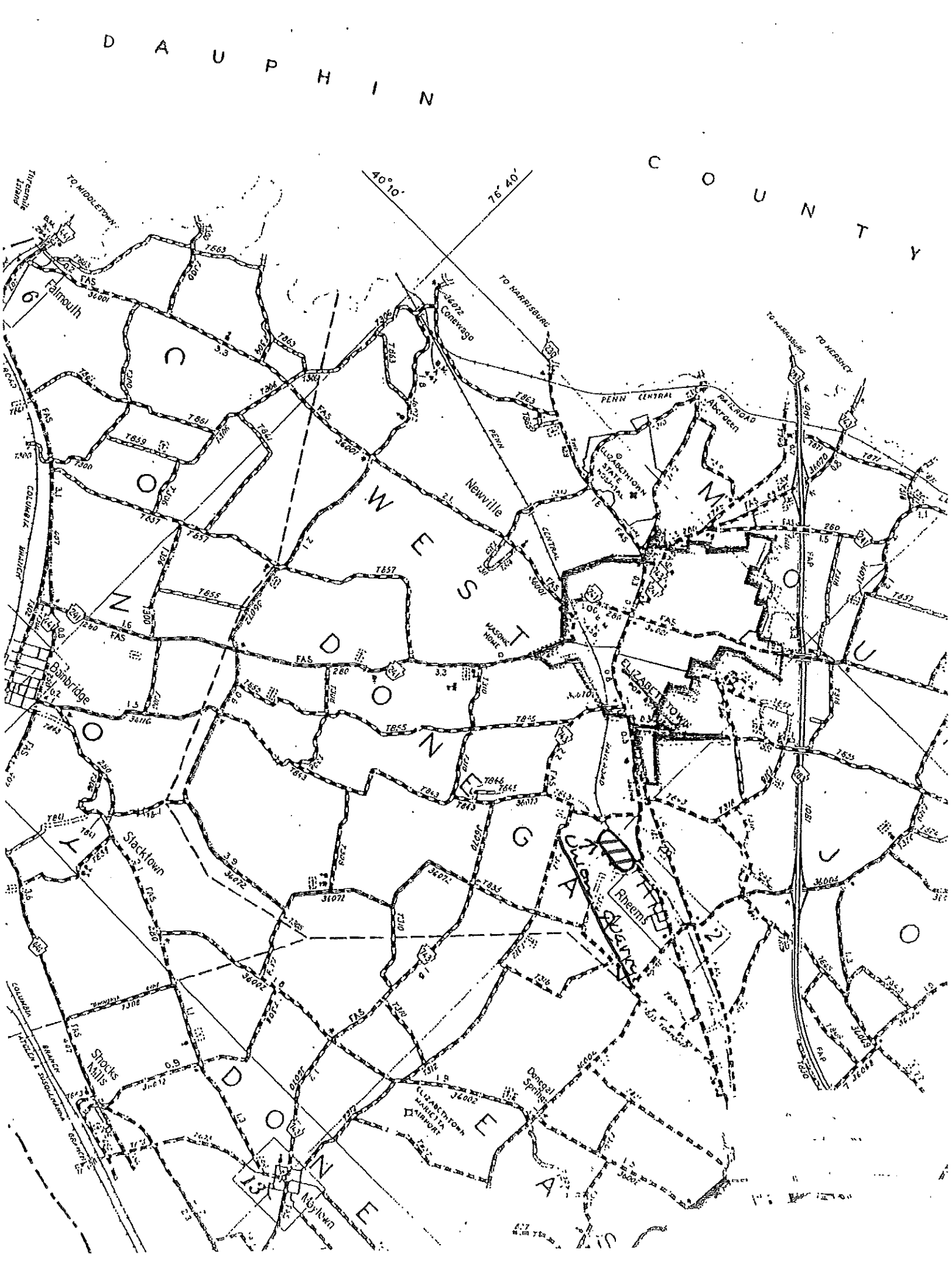
The first quarry inspected was the Union quarry just east of Elizabethtown located on highway L.R. 36148 and the Conrail tracks which is the mainline from Harrisburg to Philadelphia, Pennsylvania. The geologic structure of the quarry has a similar appearance to that of the Eshelman quarry near the town of Marietta. The diagram of the geologic activity in the Eshelman quarry found in the field trip guidebook no. 33 of the Pennsylvania Topographic and Geologic Survey which depicts a condition similar to that found in the Union quarry. The inspection included the face of the quarry adjacent to the road and the railroad. The surface area above the quarry's northface parallels the road and the railroad right-of-way as the closest point to those two right-of-ways. The closest part of the face to the railroad is approximately 80 feet and the closet point of the road is approximately 25-30 feet. It appears that there is not a problem of stability on this adjacent face as no quarrying or removal of stone is being conducted on this north face. Nearly all the advancement in the quarry is to the south and west portions. However, it was suggested that the permit be changed to state that no mining should be conducted on this north face at any time in the future.

The second inspection was conducted at the Binkley-Ober quarry north of East Petersburg, Pennsylvania. This is another quarry with a face adjacent to a state highway Route 72 southeast of East Petersburg, PA. Geologically this quarry is in the folded Conoco-cheague Limestone. This quarry was cited in the Pennsylvania Topographic and Geologic Survey publication Atlas series No. 168 from field work that was conducted in Lancaster County. The citation is on page 73 of this publication. This quarry was developed from its eastern face toward the west and south and is quite stable. There is, also, an evaluation of the Concocheague Limestone in the Pennsylvania Geologic Survey publication EG-1 Engineering Characteristics of the Rocks of Pennsylvania. Pennsylvania Route 72 was constructed by the Pennsylvania Department of Transportation since the quarry began and the highway department subsequently widened the highway toward the adjacent mine face in the recent past. When the highway department did this, it became necessary to construct a concrete retaining wall. The quarry persons constructed this wall although the highway

department supposedly was obligated to construct it. The highwall is stable although large fractures occur in the highwall. The lateral extent of these fractures are somewhat visible in the highway surface but since there is no active working on the east wall, quarrying should not cause any slope stability or hazard to the highway. It is recommended that the permit indicate that Binkley-Ober or any subsequent operator will not conduct mining on that east wall at any time in the future. This type of statement in the permit would prevent any other company from conducting quarrying on the east face. Under present conditions these quarries do not present a hazard to any of the public roadways.

cc: C. Nork
Pottsville Office (2)
E. F. Giovannetti
DRT
File
30-Day file

DRT:cdc


DAUPHIN
COUNTY
40°10'
76°40'
TO MIDDLETOWN
TO HARRISBURG
TO HERSHEY
Falmouth
Conewago
PENN CENTRAL RAILROAD
Elizabethtown State Hospital
Newville
WEST DONEGAL
MOUNT JOY
Bainbridge
Stacklown
Rheems
Shocks Mills
Donegal Springs
Maytown
Elizabethtown
Masonic Home
COLUMBIA MARIETTA & SUSQUEHANNA BRANCH

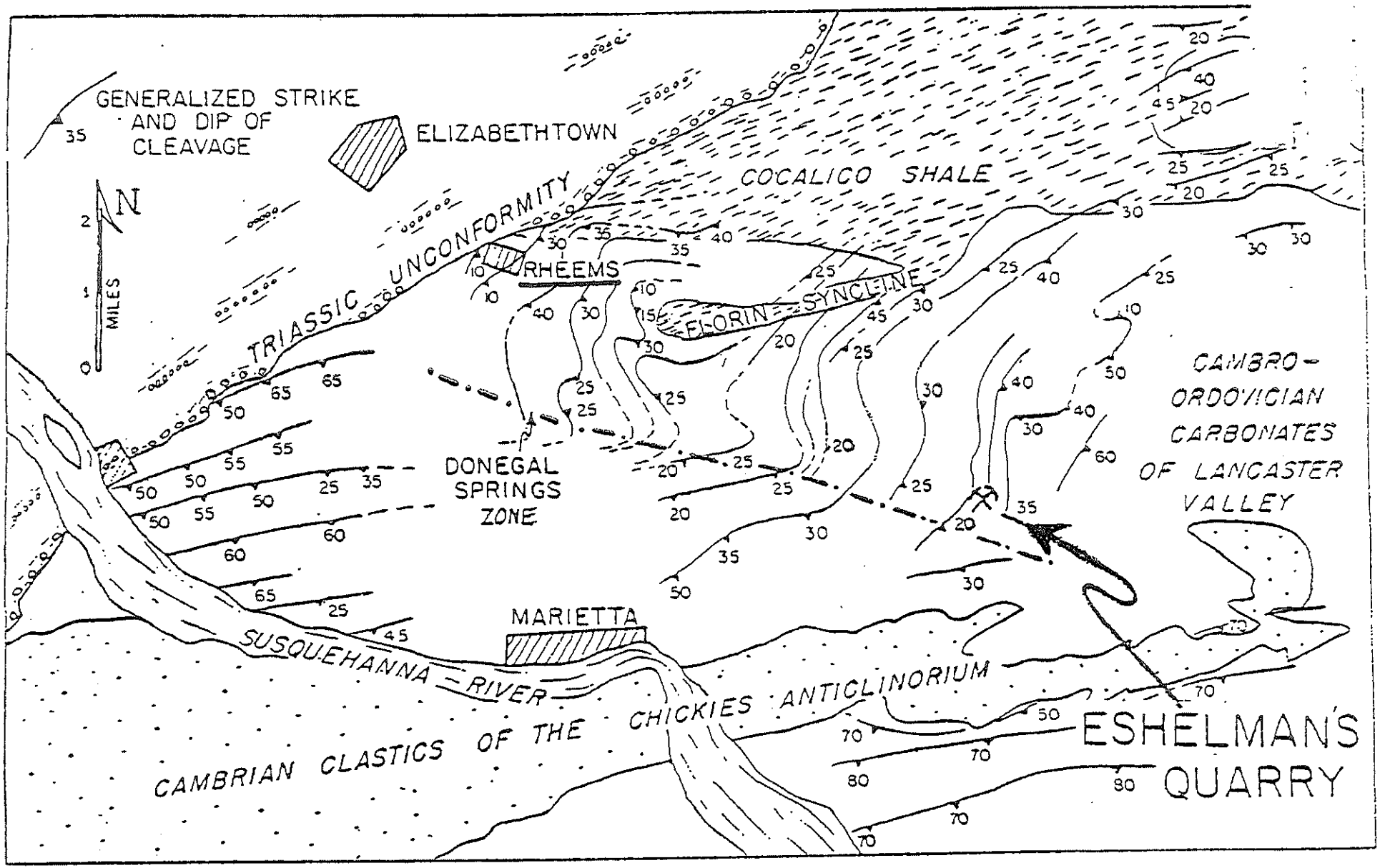


Figure 22 - Disruption of flow cleavage along the Donegal Springs disturbed zone which bounds nappe structures to the northeast against non-nappe folds to the southwest (from Skerlec and Wise, 1968).

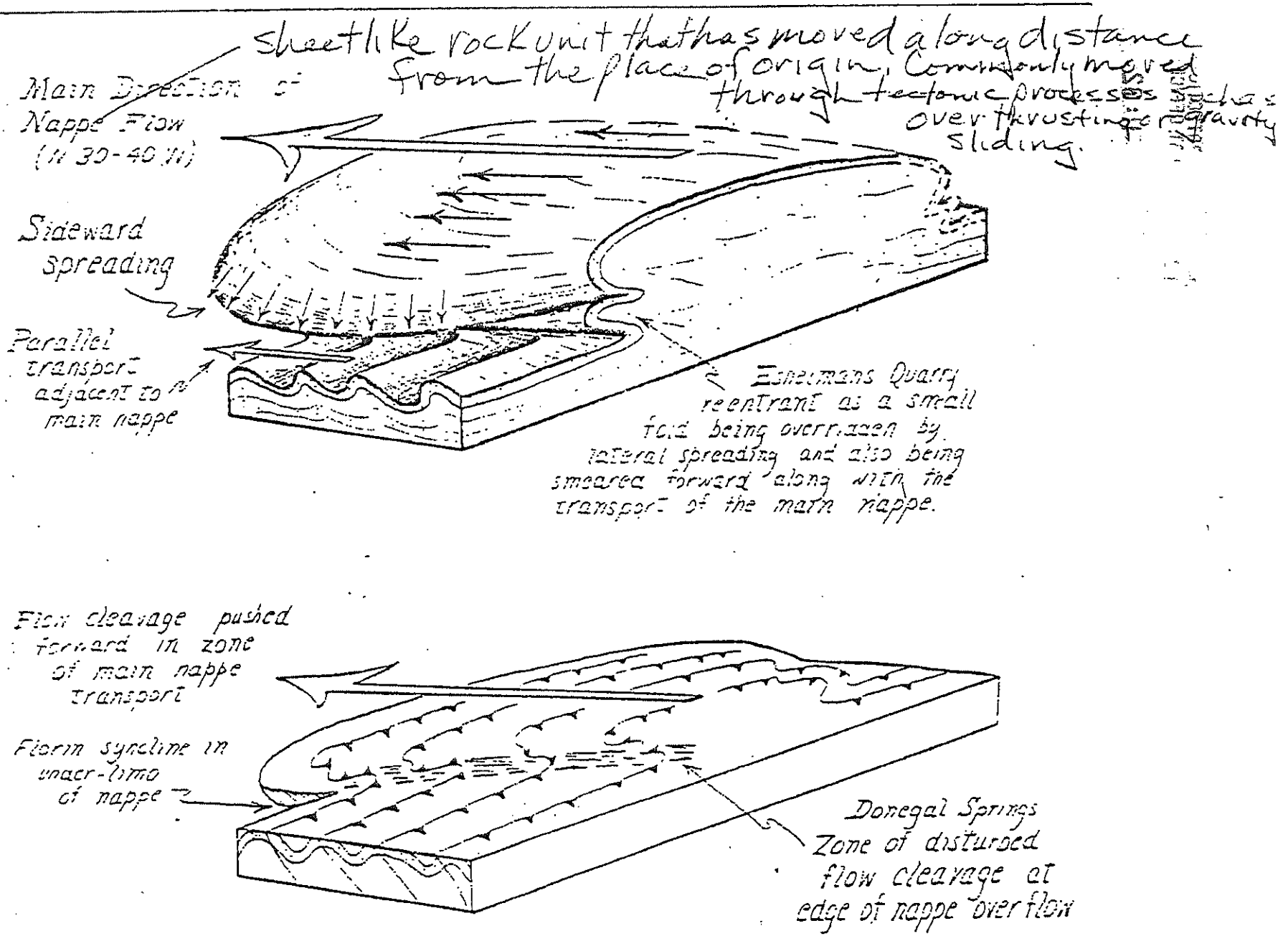


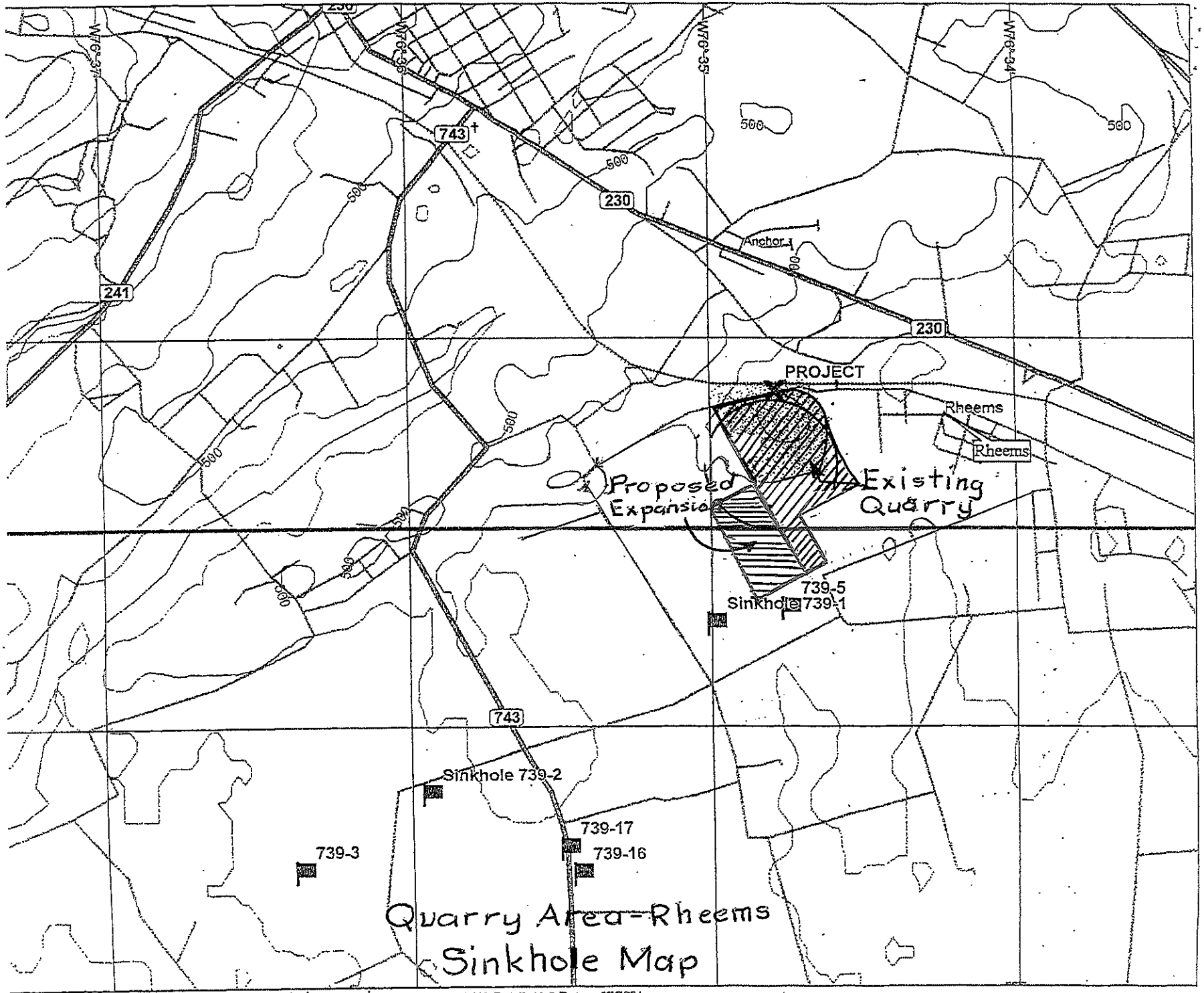
Figure 27 - Interpretation of the origin of the Donegal Springs disturbed zone and Eshelman's Quarry re-entrant in terms of nappe transport and distortion of flow cleavage patterns.

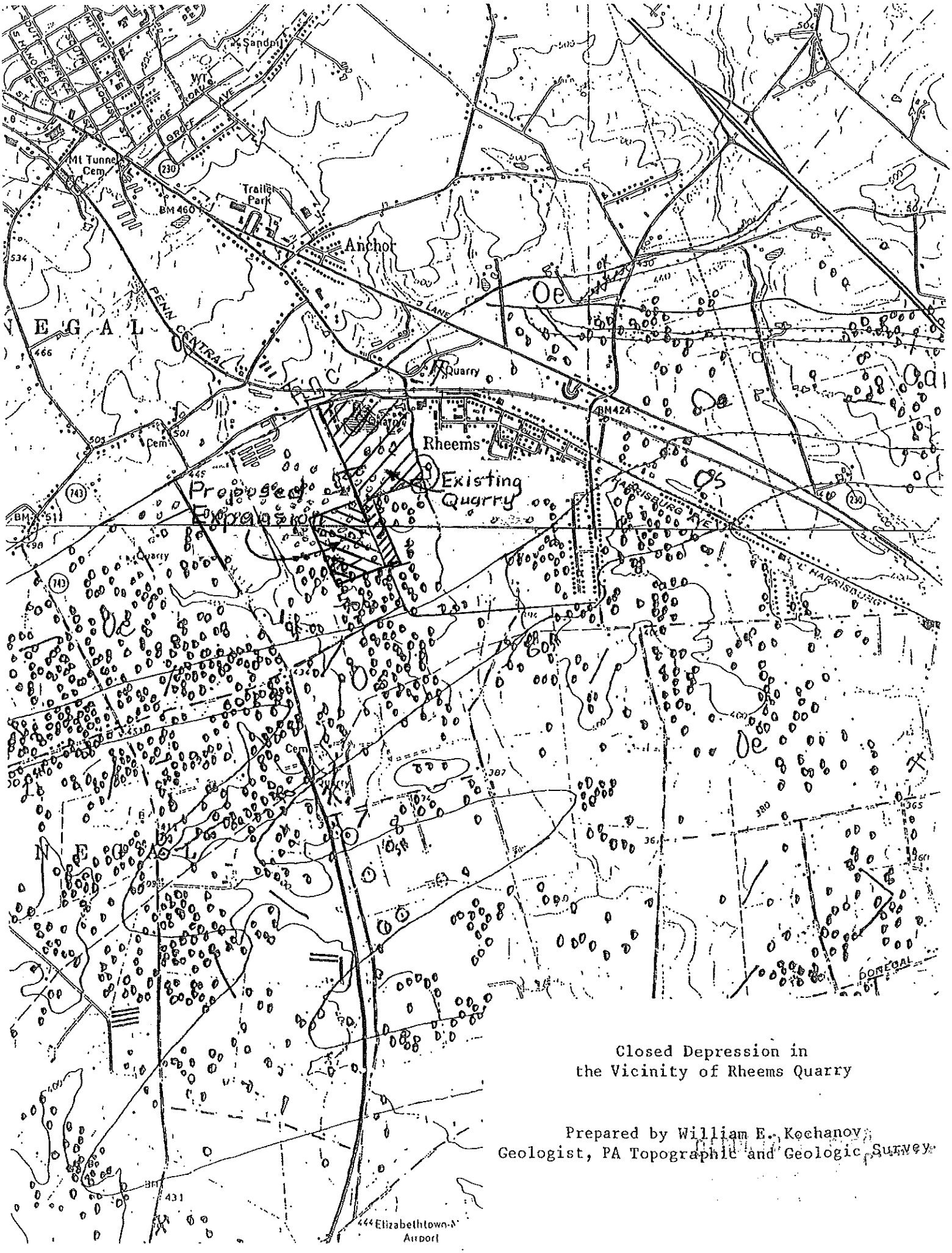
BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY

Department of Conservation and Natural Resources

SINKHOLE QUERY REPORT

Sinkhole	County	Municipality	Quadrangle	Geologic Formation
739 - 1	LANCASTER	WEST DONEGAL T	COLUMBIA WEST	EPLER
	Latitude: 400713	Longitude: 763501		
	Comments:			
739 - 2	LANCASTER	WEST DONEGAL T	COLUMBIA WEST	MILLBACH
	Latitude: 400647	Longitude: 763559		
	Comments:			
739 - 3	LANCASTER	WEST DONEGAL T	COLUMBIA WEST	MILLBACH
	Latitude: 400635	Longitude: 763623		
	Comments:			
739 - 5	LANCASTER	WEST DONEGAL T	COLUMBIA WEST	EPLER
	Latitude: 400716	Longitude: 763447		
	Comments:			
739 - 16	LANCASTER	WEST DONEGAL T	COLUMBIA WEST	STONEHENGE
	Latitude: 400635	Longitude: 763529		
	Comments:			
739 - 17	LANCASTER	WEST DONEGAL T	COLUMBIA WEST	MILLBACH
	Latitude: 400638	Longitude: 763530		
	Comments:			


W76°37'
W76°36'
W76°35'
W76°34'
743
230
241
500
Anchor
PROJECT
Rheems
Rheems
Proposed Expansio
Existing Quarry
739-5
Sinkhole 739-1
743
Sinkhole 739-2
739-17
739-16
739-3
Quarry Area-Rheems
Sinkhole Map
unds Copyright © 1999 DeLorme Yarmouth, ME 04096
950 ft Scale: 1 : 24,000 Detail: 12-5 Datum: WGS84



Closed Depression in
the Vicinity of Rheems Quarry

Prepared by William E. Kochanov
Geologist, PA Topographic and Geologic Survey

Module 7: Geology Information – Attachment to 7.1(B)

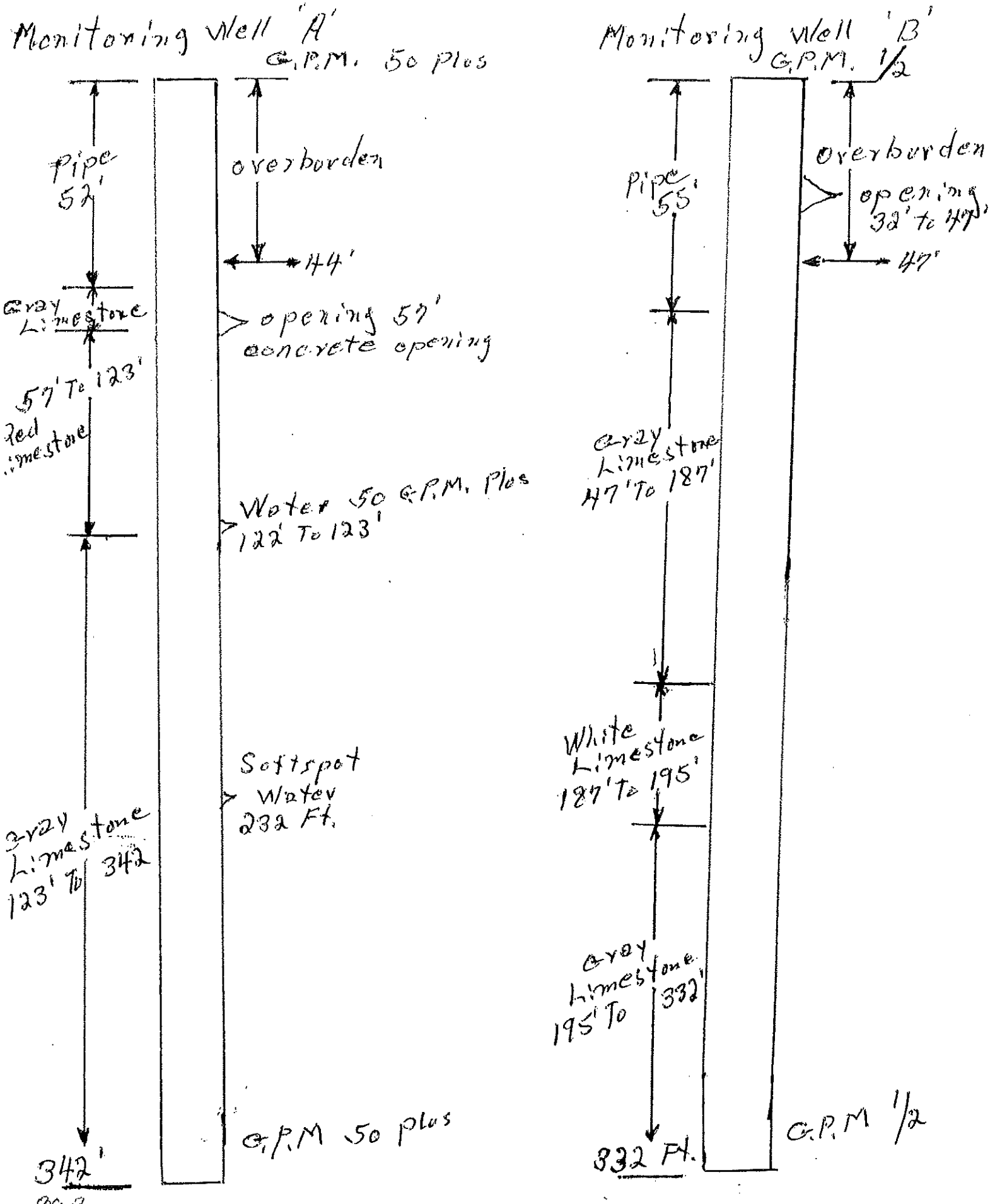
Geologic Log Drill Holes

NOTE: The attached is the field logs of Monitoring Wells "A", "B", "C", & "D".

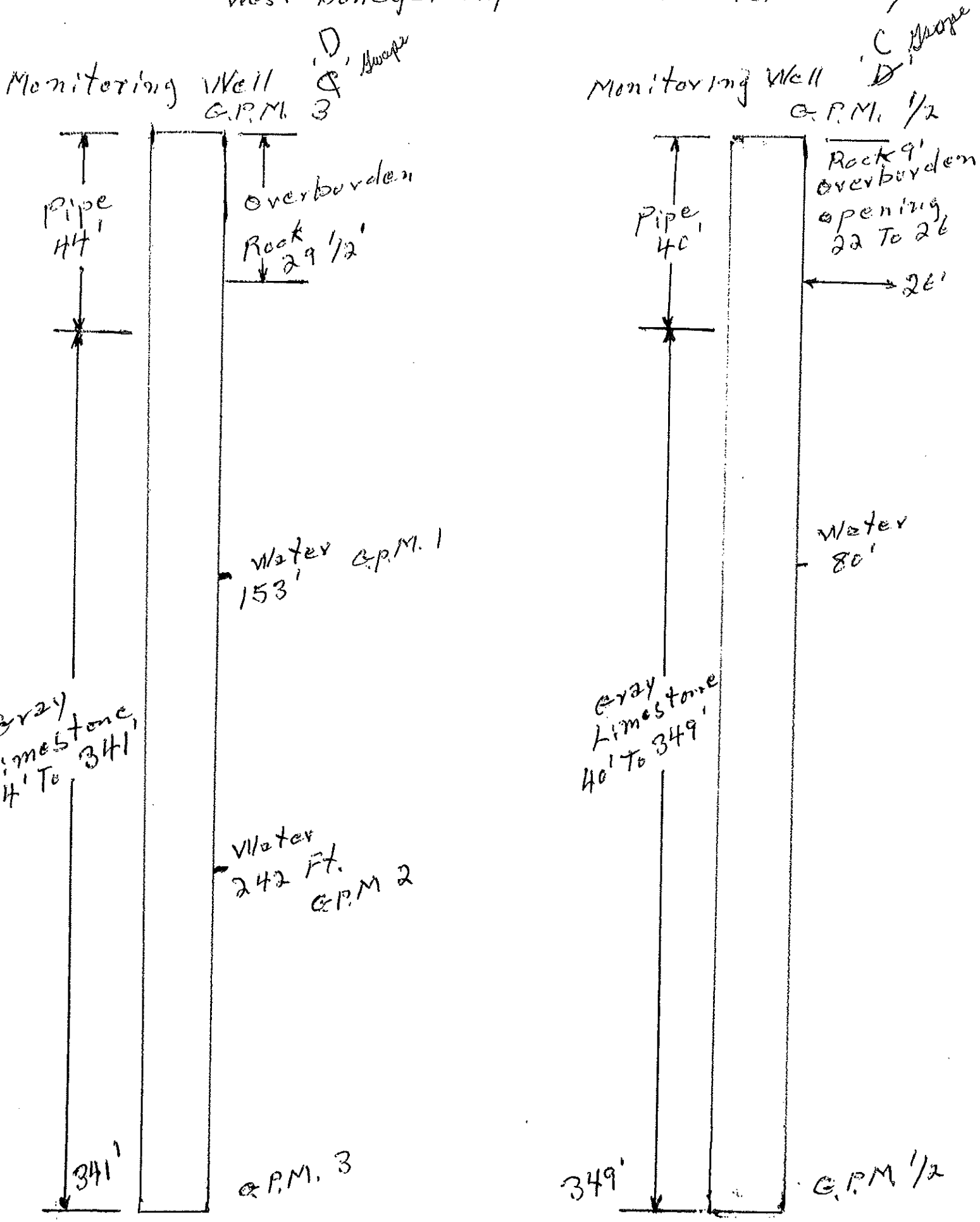
Drilled in June of 1994, Well "C" has been mined thru, the rest are intact.

Union Quarries Inc 'Rheems'

West Donegal Twp - Lancaster County



Union Quarries Inc. Rheems
West Donegal Twp – Lancaster County



Module 7: Geology Information – Attachment to 7.1(B)

Geologic Log Drill Holes

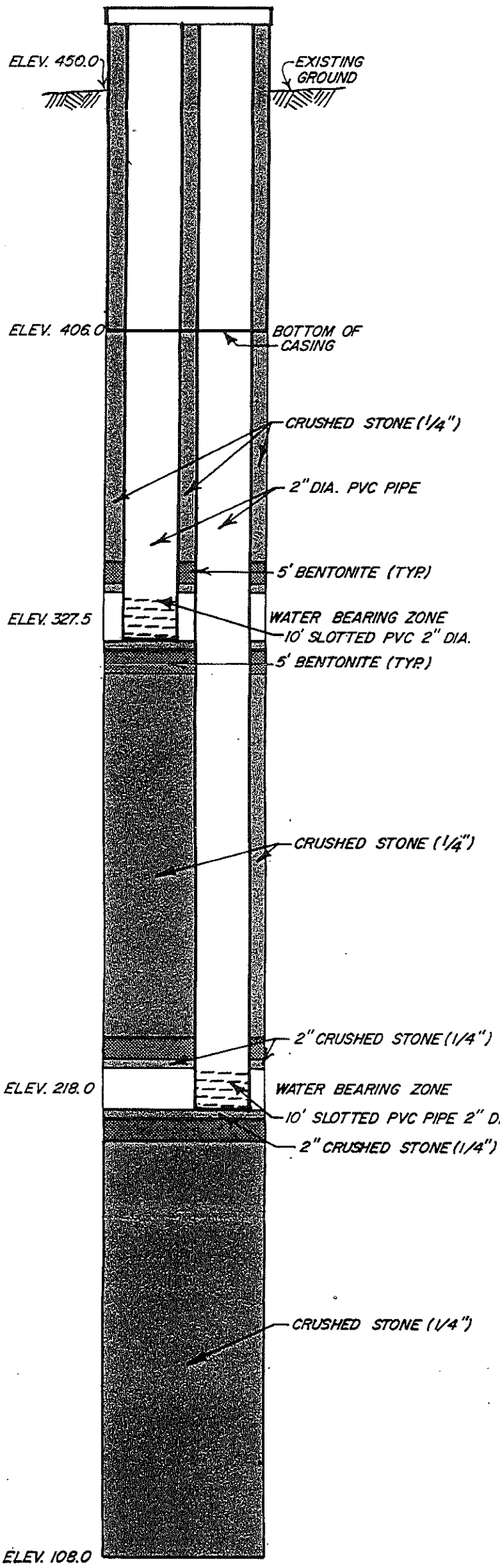
NOTE: The attached is the historic 6.1b Geologic Log Drill Holes, as prepared in June of 1994, of Monitoring Wells "A", "B", "C", & "D".

RHEEMS QUARRY

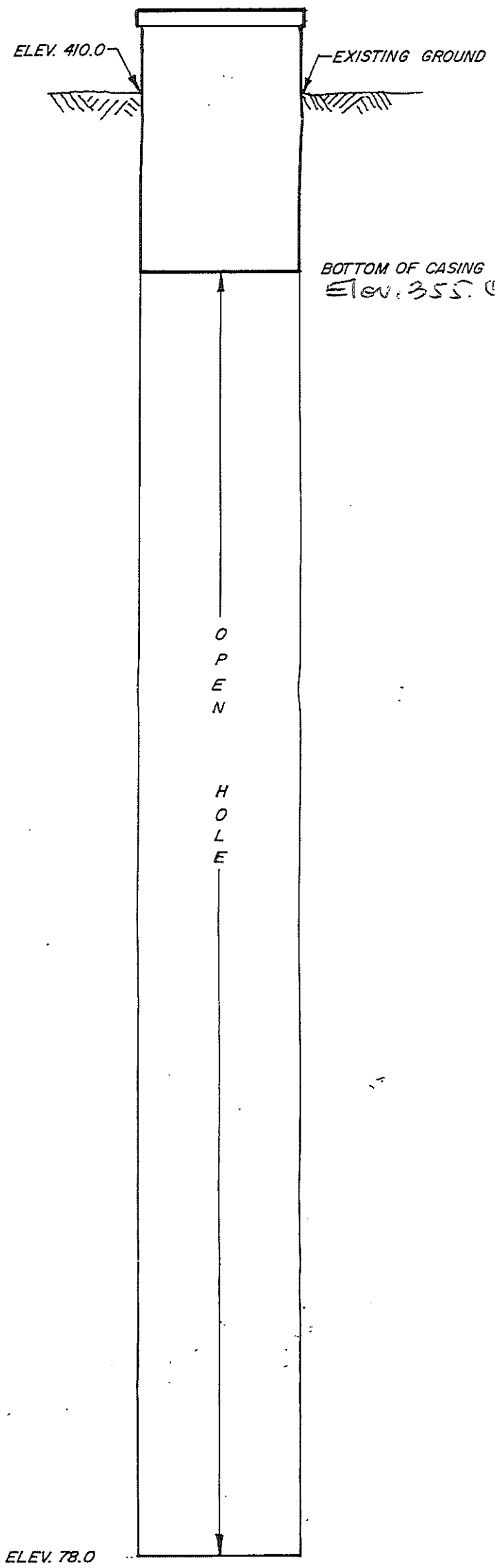
WEST DONEGAL TWP.
LANCASTER COUNTY

S.M.P. 6276SM6A-1

MONITORING WELL "A"



MONITORING WELL "B"



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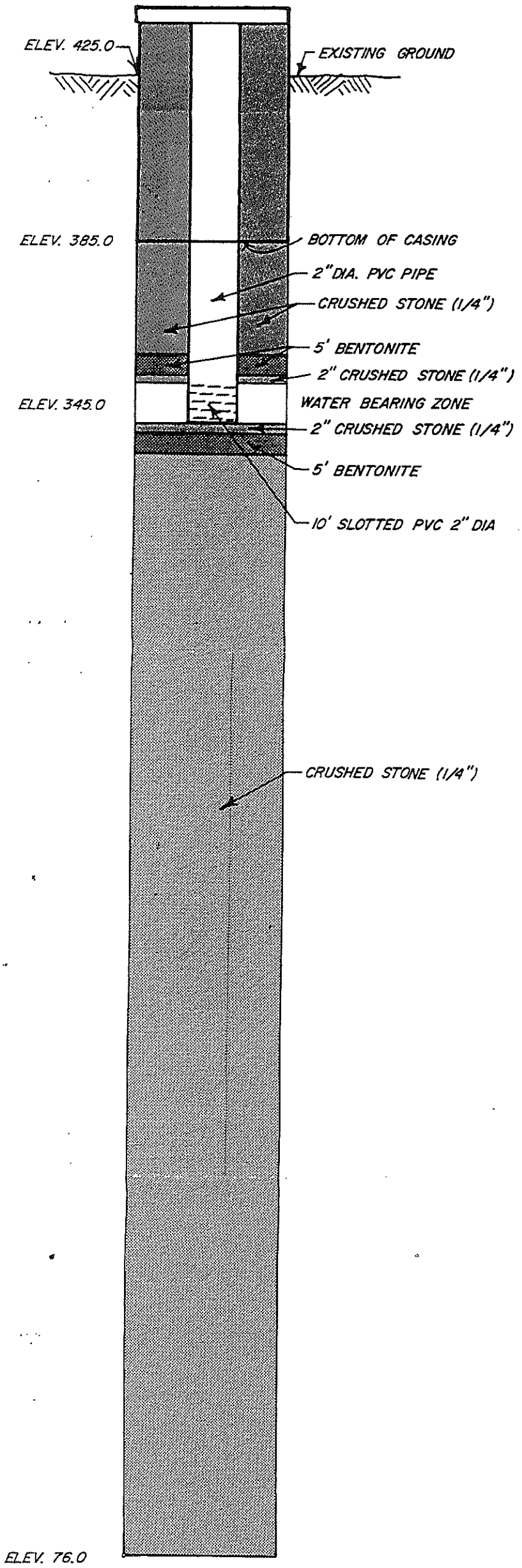
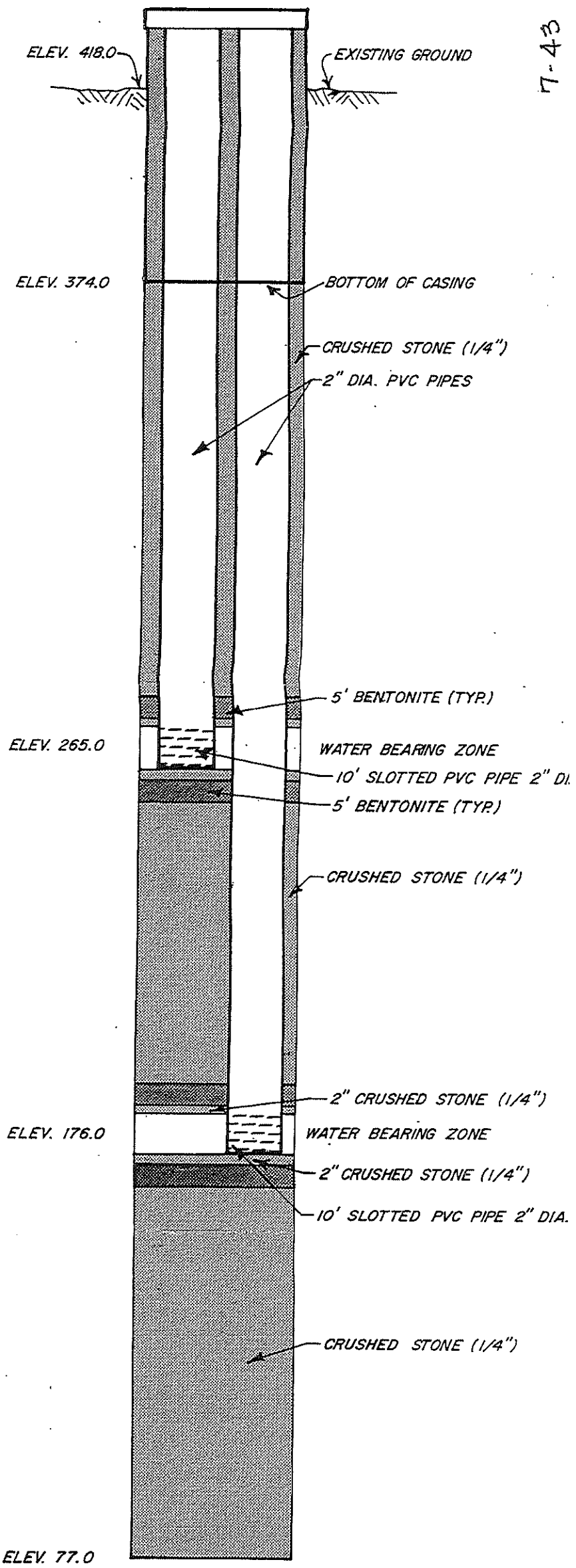
RHEEMS QUARRY

WEST DONEGAL TWP.
LANCASTER COUNTY
S.M.P. 6276SM6A-1

MONITORING WELL "C"



MONITORING WELL "D"



7-43

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "A"	Operation Name:	Rheems Quarry
Surface Elevation:	450.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	108.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
Static water Elevations and Date Measured		Township:	West Donegal
		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		80		Red Limestone	
		90			
	65'	100			
		110			
		120			
328.0					
327.0				water - 50 gpm	
		130		Gray Limestone	
		140			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.: Monitoring Well "A"
Surface Elevation: 450.0
Bottom of Mineral Elevation: 108.0

Static water Elevations and Date Measured

Operation Name: Rheems Quarry
Method of Drilling: rotary
Date Drilled: 6/28/94
Drilled By: Honberger Well Drilling
Logged By: Harold Honberger
Township: West Donegal
County: Lancaster
Quadrangle: Elizabethtown, PA
Remarks:
Latitude and Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		150			
		160			
219'		170		Gray Limestone	
		180			
		190			
		200			
		210			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.: Monitoring Well "A"
Surface Elevation: 450.0
Bottom of Mineral Elevation: 108.0

Static water Elevations and Date Measured

Operation Name: Rheems Quarry
Method of Drilling: rotary
Date Drilled: 6/28/94
Drilled By: Honberger Well Drilling
Logged By: Harold Honberger
Township: West Donegal
County: Lancaster
Quadrangle: Elizabethtown, PA
Remarks:
Latitude and Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		220		Gray Limestone	
		230			
218.0				Softspot - water(unknown quanity due to large amount of inflow from the above water bearing zone).	
		240			
		250		Gray Limestone	
	110'	260			
		270			
		280			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "A"	Operation Name:	Rheems Quarry
Surface Elevation:	450.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	108.0	Date Drilled:	6/28/94
		Drilled By:	Hnoberger Well Drilling
		Logged By:	Harold Honberger
Static water Elevations and Date Measured		Township:	West Donegal
		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		290			
		300			
		310			
		320			
		330			
		340			
108.0				Bottom of hole	
		350			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "B"	Operation Name:	Rheems Quarry
Surface Elevation:	410.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	78.0	Date Drilled:	6-28-94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
		Township:	West Donegal
Static water Elevations and Date Measured		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
	32'	10, 20, 30		Overburden	
378.0	15'	40		Opening	
363.0	8'	50			
355.0		60, 70		Bottom of casing Gray Limestone	

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "B"	Operation Name:	Rheems Quarry
Surface Elevation:	410.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	78.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
Static water Elevations and Date Measured		Township:	West Donegal
		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		80			
		90			
		100			
				Gray Limestone	
		110			
		120			
		130			
		140			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "B"	Operation Name:	Rheems Quarry
Surface Elevation:	410.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	78.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
Static water Elevations and Date Measured		Township:	West Donegal
		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
	132'	150 160 170 180		Gray Limestone	
223.0	8'	190		White Limestone - water .5 gpm approx.	
215.0		200 210		Gray Limestone	

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "B"	Operation Name:	Rheems Quarry
Surface Elevation:	410.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	78.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
		Township:	West Donegal
Static water Elevations and Date Measured		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		220			
		230			
		240		Gray Limestone	
	137'	250			
		260			
		270			
		280			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "B"	Operation Name:	Rheems Quarry
Surface Elevation:	410.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	78.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
		Township:	West Donegal
Static water Elevations and Date Measured		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Office Use On
		290			
		300			
		310			
		320			
		330			
78.0				Bottom of hole	
		340			
		350			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.: Monitoring Well "C"
Surface Elevation: 425.0
Bottom of Mineral Elevation: 76.0

Static water Elevations and Date Measured

Operation Name: Rheems Quarry
Method of Drilling: rotary
Date Drilled: 6/28/94
Drilled By: Honberger Well Drilling
Logged By: Harold Honberger
Township: West Donegal
County: Lancaster
Quadrangle: Elizabethtown, PA
Remarks:
Latitude and Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
	9'			Overburden	
416.0	13'	10, 20			
403.0	4'			Opening	
399.0	14'	30, 40		Bottom of Casing	
385.0	40'	50, 60, 70		Gray Limestone	

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.: Monitoring Well "C"
Surface Elevation: 425.0
Bottom of Mineral Elevation: 76.0

Static water Elevations and Date Measured

Operation Name: Rheems Quarry
Method of Drilling: rotary
Date Drilled: 6/28/94
Drilled By: Honberger Well Drilling
Logged By: Harold Honberger
Township: West Donegal
County: Lancaster
Quadrangle: Elizabethtown, PA
Remarks:
Latitude and Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		80		Water	
345.0		90			
		100			
		110		Gray Limestone	
		120			
		130			
		140			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "C"	Operation Name:	Rheems Quarry
Surface Elevation:	425.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	76.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
Static water Elevations and Date Measured		Township:	West Donegal
		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		150			
		160			
		170			
	269'			Gray Limestone	
		180			
		190			
		200			
		210			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.: Monitoring Well "C"
Surface Elevation: 425.0
Bottom of Mineral Elevation: 76.0

Static water Elevations and Date Measured

Operation Name: Rheems Quarry
Method of Drilling: rotary
Date Drilled: 6/28/94
Drilled By: Honberger Well Drilling
Logged By: Harold Honberger
Township: West Donegal
County: Lancaster
Quadrangle: Elizabethtown, PA
Remarks:
Latitude and Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		220			
		230			
		240		Gray Limestone	
		250			
		260			
		270			
		280			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.: Monitoring Well"C"
Surface Elevation: 425.0
Bottom of Mineral Elevation: 76.0

Static water Elevations and Date Measured

Operation Name: Rheems Quarry
Method of Drilling: rotary
Date Drilled: 6/28/94
Drilled By: Honberger Well Drilling
Logged By: Harold Honberger
Township: West Donegal
County: Lancaster
Quadrangle: Elizabethtown, PA
Remarks:
Latitude and Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		290			
		300		Gray Limestone	
		310			
		320			
		330			
		340			
76.0		350		Bottom of Hole	

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "D"	Operation Name:	Rheems Quarry
Surface Elevation:	418.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	77.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
		Township:	West Donegal
Static water Elevations and Date Measured		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
	29.5'	10, 20		Overburden	
388.5	14.5'	30, 40			
374.0		50, 60, 70		Bottom of Casing Gray Limestone	

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.: Monitioring Well "D"
Surface Elevation: 418.0
Bottom of Mineral Elevation: 77.0

Static water Elevations and Date Measured

Operation Name: Rheems Quarry
Method of Drilling: rotary
Date Drilled: 6/28/94
Drilled By: Honberger Well Drilling
Logged By: Harold Honberger
Township: West Donegal
County: Lancaster
Quadrangle: Elizabethtown, PA
Remarks:
Latitude and Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		80			
		90			
	109'	100		Gray Limestone	
		110			
		120			
		130			
		140			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "D"	Operation Name:	Rheems Quarry
Surface Elevation:	418.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	77.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
Static water Elevations and Date Measured		Township:	West Donegal
		County:	Lancaster
		Quadrangle:	Elizabethtown, PA
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
		150			
265.0				water 1 gpm	
		160			
		170		Gray Limestone	
		180			
		190			
		200			
		210			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.: Monitoring Well "D"
Surface Elevation: 418.0
Bottom of Mineral Elevation: 77.0

Static water Elevations and Date Measured

Operation Name: Rheems Quarry
Method of Drilling: rotary
Date Drilled: 6/28/94
Drilled By: Honberger Well Drilling
Logged By: Harold Honberger
Township: West Donegal
County: Lancaster
Quadrangle: Elizabethtown, PA
Remarks:
Latitude and Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
	89'	220		Gray Limestone	
		230			
		240		water 2 gpm	
176.0		250		Gray Limestone	
		260			
		270			
		280			

(use additional sheets as needed)

ER-MR-314: Rev. 2/90

6.1b GEOLOGIC LOG DRILL HOLES

Hole No.:	Monitoring Well "D"	Operation Name:	Rheems Quarry
Surface Elevation:	418.0	Method of Drilling:	rotary
Bottom of Mineral Elevation:	77.0	Date Drilled:	6/28/94
		Drilled By:	Honberger Well Drilling
		Logged By:	Harold Honberger
Static water Elevations and Date Measured		Township:	West Donegal
		County:	Lancaster
		Quadrangle:	
		Remarks:	
		Latitude and Longitude:	

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Official Use Only
	99'	290, 300, 310, 320, 330, 340		Gray Limestone	
77.0		350		Bottom of Hole	

(use additional sheets as needed)

Brown Consulting Group | Test Boring/Well Construction Log

Project: Pierson Rheems		Boring No. MW-22-1
Client: Akens Engineering / Pennsy Supply, Inc.		Sheet 1 of 2
Purpose: Hydrologic Study		Job No. 240-1-51
Drilling Contractor: Myers Bros. Well Drilling	Driller: Nathan	Total Depth 350'
Logger: Chuck Brown	Hammer Weight: N/A	Date Started 01/10/2022
Boring Coordinates:	Note: Near Asphalt Plant Est. ~ 4-5 gpm total	Date Finished 01/11/2022 S.W.L. Elevation-TOC

Depth (Feet)	Lithologic Description	Water Bearing Zones	Notes/Observations
0	0'-37' - Overburden and fill		60' of casing set @ 58' with 2' of stick up sealed with bentonite, Drive shoe added
	37' - Top of rock Lt. gray limestone with some intermittent beds of darker gray limestone	Some water at top of rock - cased off	
50	64'-67' - Darker		
	81'-85' - Darker 88' - Possible small fracture / bedding plane	No water	
100	94'-97' - Darker 106'-109' - Darker		
	122'-124' - Darker		
	140'-143' - Darker		
150	148'-157' - Pink to salmon limestone 157' - Gray limestone	No water	148'-151- Softer
	168' - 6" Clay seam	Small amount of water < 0.5 gpm	
	171'-182' - Pink limestone 182' - Light gray limestone		
200	195'-198' - Darker		
	216'-219' - Darker		
	231'-238' - Pink limestone 238' - Gray limestone 240' - Small fracture	Small water zone @ 240' ~ 4 gpm or less	
250			
	277'-280' - Pink 280' - Light gray		
300	294'-297' - Dark		

Brown Consulting Group	Test Boring/Well Construction Log	
Project: Pierson Rheems		Boring No. MW-22-1
Client: Akens Engineering / Pennsy Supply, Inc.		Sheet 2 of 2
Purpose: Hydrologic Study		Job No. 240-1-51
Drilling Contractor: Myers Bros. Well Drilling	Driller: Nathan	Total Depth 350'
Logger: Chuck Brown	Hammer Weight: N/A	Date Started 01/10/2022
Boring Coordinates:	Note: Near Asphalt Plant Est. ~ 4-5 gpm total	Date Finished 01/11/2022
		S.W.L.
		Elevation-TOC

Depth (Feet)	Lithologic Description	Water Bearing Zones	Notes/Observations
300			
	326'-330' - Dark		
	336'-338' - Dark		
350	TD = 350'	Estimated blown yield 4-5 gpm	
400			
450			
500			
550			
600			

Brown Consulting Group | Test Boring/Well Construction Log

Project: Pierson Rheems		Boring No. MW-22-2
Client: Akens Engineering / Pennsy Supply, Inc.		Sheet 1 of 2
Purpose: Hydrologic Study		Job No. 240-1-51
Drilling Contractor: Myers Bros. Well Drilling	Driller: Charlie	Total Depth 350'
Logger: Chuck Brown	Hammer Weight: N/A	Date Started 01/10/2022
Boring Coordinates:	Note: Total of estimated blown yield is 4 gpm	Date Finished 01/11/2022
		S.W.L.
		Elevation-TOC

Depth (Feet)	Lithologic Description	Water Bearing Zones	Notes/Observations
0	0'-8' - Overburden		20' of casing set @ 18' with 2' of stick up sealed with bentonite
	8' - Top of rock - gray limestone, broken and weathered at surface		
	16' - Solid rock - light gray limestone		
	34' - Slight color change - somewhat darker		
	47' - Lighter in color		
50	52'-56' - Darker		
	56' - Lighter		
	62'-66' - Darker		
	71' - Possible small fracture / bedding plane	No water	
	83'-89' - Darker		
100	103'-109' - Darker		
	133'-137' - Darker		
	141'-144' - Darker		
150	156'-162' - Darker		
	181'-184' - Darker		
200	215'-218' - Darker		
250	251'-254' - Darker		
	265' - 6-inch pinkish red softer zone		
	267'-270' - Darker		
	279'-283' - Darker		
300			

Brown Consulting Group | Test Boring/Well Construction Log

Project: Pierson Rheems		Boring No. MW-22-2
Client: Akens Engineering / Pennsy Supply, Inc.		Sheet 2 of 2
Purpose: Hydrologic Study		Job No. 240-1-51
Drilling Contractor: Myers Bros. Well Drilling	Driller: Charlie	Total Depth 350'
Logger: Chuck Brown	Hammer Weight: N/A	Date Started 01/10/2022
Boring Coordinates:	Note: Total of estimated blown yield is 4 gpm	Date Finished 01/11/2022
		S.W.L.
		Elevation-TOC

Depth (Feet)	Lithologic Description	Water Bearing Zones	Notes/Observations
300			
	308'-312' - Darker		
	321'-325' - Darker		
	330' - Bedding plane / small fracture	330' small amount of water ~ 4 gpm	
350	TD = 350'	Total estimated blown yield = 4 gpm	
400			
450			
500			
550			
600			

Brown Consulting Group | Test Boring/Well Construction Log

Project: Pierson Rheems		Boring No. MW-22-3
Client: Akens Engineering / Pennsy Supply, Inc.		Sheet 1 of 2
Purpose: Hydrologic Study		Job No. 240-1-51
Drilling Contractor: Myers Bros. Well Drilling	Driller: Charlie	Total Depth 350'
Logger: Chuck Brown	Hammer Weight: N/A	Date Started 01/11/2022
Boring Coordinates:	Note:	Date Finished 01/12/2022
		S.W.L.
		Elevation-TOC

Depth (Feet)	Lithologic Description	Water Bearing Zones	Notes/Observations
0	0'-21' - Overburden		40' of casing set @ 38' with 2' of stick up sealed with bentonite, Drive shoe installed
	21' - Top of bedrock - light gray limestone Hard competent rock @ 26'		
	28'-30' - Darker		
50			
	53'-58' - Darker		
	77'-80' - Darker		
100			
	112'-115' - Darker		
	142'-146' - Darker		
150			
	177' - Possible small fracture	No water	
200			
	208'-210' - Darker		
	231'-233' - Darker		
	243'-246' - Darker		
250			
	259'-262' - Darker		
	286'-289' - Darker		
300			

Brown Consulting Group | Test Boring/Well Construction Log

Project: Pierson Rheems		Boring No. MW-22-3
Client: Akens Engineering / Pennsy Supply, Inc.		Sheet 2 of 2
Purpose: Hydrologic Study		Job No. 240-1-51
Drilling Contractor: Myers Bros. Well Drilling	Driller: Charlie	Total Depth 350'
Logger: Chuck Brown	Hammer Weight: N/A	Date Started 01/11/2022
Boring Coordinates:	Note:	Date Finished 01/12/2022
		S.W.L.
		Elevation-TOC

Depth (Feet)	Lithologic Description	Water Bearing Zones	Notes/Observations
300	311'-314' - Darker		
	329'-341' - Darker		
350	TD = 350'	Final estimated blown yield = ½ 1 gpm	
400			
450			
500			
550			
600			

Brown Consulting Group | Test Boring/Well Construction Log

Project: Pierson Rheems		Boring No. MW-22-4
Client: Akens Engineering / Pennsy Supply, Inc.		Sheet 1 of 2
Purpose: Hydrologic Study		Job No. 240-1-51
Drilling Contractor: Myers Bros. Well Drilling	Driller: Charlie	Total Depth 350'
Logger: Chuck Brown	Hammer Weight: N/A	Date Started 01/13/2022
Boring Coordinates:	Note: Yard of farmhouse	Date Finished 01/14/2022
		S.W.L.
		Elevation-TOC

Depth (Feet)	Lithologic Description	Water Bearing Zones	Notes/Observations
0	0'-4' - Overburden 4' - Top of bedrock Gray limestone with intermittent beds of dark gray limestone 11'-14' - Darker		40' of casing set @ 38' with 2' of stick up sealed with bentonite, Drive shoe installed
	32'-35' - Darker		
50			
	72'-74' - Darker		
			Hard, even drilling 15'-165'
100	96'-98' - Darker		
	113'-115' - Darker		
	120'-122' - Darker		
	134'-138' - Darker		
150			
	155'-157' - Darker 162'-164' - Darker 167'-169' - Slightly softer / broken zone	No water	
	170'-200' - Hard, even drilling		
200	@ 200' added water to keep dust minimized		
	212'-215' - Darker		
250	246'-249' - Darker		
	263'-266' - Darker		
	289'-305' - Pink limestone	Some water 290'-295'	
300			

Brown Consulting Group | Test Boring/Well Construction Log

Project: Pierson Rheems		Boring No. MW-22-4
Client: Akens Engineering / Pennsy Supply, Inc.		Sheet 2 of 2
Purpose: Hydrologic Study		Job No. 240-1-51
Drilling Contractor: Myers Bros. Well Drilling	Driller: Charlie	Total Depth 350'
Logger: Chuck Brown	Hammer Weight: N/A	Date Started 01/13/2022
Boring Coordinates:	Note: Yard of farmhouse	Date Finished 01/14/2022
		S.W.L.
		Elevation-TOC

Depth (Feet)	Lithologic Description	Water Bearing Zones	Notes/Observations
300	305' - Gray limestone		
	322'-326' - Pink 326' - Gray limestone 332'-334' - Darker		
350	TD = 350'	Final estimated blown yield = 1 gpm	
400			
450			
500			
550			
600			

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: W-1
(Key locations to Modules 6.2 and 9)
Surface Elevation: 420.5
Bottom Elevations: 386.0

Groundwater Elevations and Date Measured

Surveyed by: G. Akens
Method: Contour Interpretation
Remarks: Hot (84°F)

Operation Name: Wolgemuth Property
Method of Drilling: Air Drill
Date Drilled: 8-19-03
Drilled By: Brown Bros.
Logged By: G. Akens
Township: West Donegal
County: Lancaster

Quadrangle:
Laboratory:
Latitude: ° ' . " Longitude: ° ' . "

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
0'	14.5'	10		Light gray, coarse, soft, medium chips, limestone with red silty clay balls.		H-a B A = 10" B = 10" C = 40"				
14.5	4'			Light gray limestone, medium chips, hard						
18.5	16'	20 30		Gray limestone, medium chips, some dust, hard, occasional red silty clay balls.						
34.5'		40 50 60 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: W-2
(Key locations to Modules 6.2 and 9)
Surface Elevation: 420.0
Bottom Elevations: 402.0

Groundwater Elevations and Date Measured

Surveyed by: G. Akens
Method: Contour Interpretation
Remarks: Hot (84°F)

Operation Name: Wolgemuth Property
Method of Drilling: Air Drill
Date Drilled: 8-19-03
Drilled By: Brown Bros.
Logged By: G. Akens
Township: West Donegal
County: Lancaster

Quadrangle:
Laboratory:
Latitude: ° ' . " Longitude: ° ' . "

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
0'	1.5'			Red Silty Loam	Light gray, soft (large chips) Limestone with red silty clay balls,					
1.5'	2'									
3.5'	14.5'	10		Light gray hard limestone, small and occasional medium chips.		Ha A A=10" B=10" C=40"				
18'		20 30 40 50 60 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: W-3
(Key locations to Modules 6.2 and 9)
Surface Elevation: 418.5
Bottom Elevations: 394.5

Groundwater Elevations and Date Measured

Surveyed by: G. Akens
Method: Contour Interpretation
Remarks: Hot (84° F)

Operation Name: Wolgemuth Property
Method of Drilling: Air Drill
Date Drilled: 8-19-03
Drilled By: Brown Bros.
Logged By: G. Akens
Township: West Donegal
County: Lancaster

Quadrangle:
Laboratory:
Latitude: ° ' . " Longitude: ° ' . "

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
0'										
2'	2'			Red Silt Clay		Ha A A = 10" B = 10" C = 40"				
6'	4'			Red Silt Clay, some cobbles						
10'	4'			Gray limestone, soft, large chips						
13'	3'	10		Red silt clay, some cobbles						
15'	2'			Dark Gray Limestone, Hard, Large chips						
24'	9'	20		Light gray, hard limestone, small chips, very dusty.						
		30								
		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: W-4
(Key locations to Modules 6.2 and 9)
Surface Elevation: 415.0
Bottom Elevations: 365.0

Groundwater Elevations and Date Measured

Surveyed by: G. Akens
Method Contour Interpretation
Remarks: Hot (84° F)

Operation Name: Wolgemuth Property
Method of Drilling: Air Drill
Date Drilled: 8-19-03
Drilled By: Brown Bros.
Logged By: G. Akens
Township: West Donegal
County: Lancaster

Quadrangle:
Laboratory:
Latitude: ____° ____' ____." Longitude: ____° ____' ____."

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs* Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
0'-1'	1'				Soybean Root Mat					
	12'	10		Red Silt Clay Loam.		HaA A=10" B=10" C=40"				
13'	7'			Void - Required ½ ton of 2-B's b'fill.						
20'	18'	20 30		Rotten top rock, very soft lime-stone with crys-talline pebbles.						
38'	12'	40 50		Light gray limestone, hard, small chips, some dust.						
50'		60 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: W-5
(Key locations to Modules 6.2 and 9)
Surface Elevation: 415.5
Bottom Elevations: 382.5

Groundwater Elevations and Date Measured

Surveyed by: G. Akens
Method Contour Interpretation
Remarks: Hot (84°F)

Operation Name: Wolgemuth Property
Method of Drilling: Air Drill
Date Drilled: 8-19-03
Drilled By: Brown Bros.
Logged By: G. Akens
Township: West Donegal
County: Lancaster

Quadrangle:
Laboratory:
Latitude: ° ' . " Longitude: ° ' . "

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs* Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
0'	17.5'	10		Red to Brown silty clay to silty clay loam		HaB A=10" B=10" C=40"				
17.5'	5'	20		Light Gray Limestone with clayey balls.						
22.5'	10.5	30		Light Gray Limestone, Hard, small chips.						
33'		40 50 60 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: W-6
(Key locations to Modules 6.2 and 9)
Surface Elevation: 411.5
Bottom Elevations: 389.0

Groundwater Elevations and Date Measured

Surveyed by: G. Akens
Method Contour Interpretation.
Remarks: Hot (84°F)

Operation Name: Wolgemuth Property
Method of Drilling: Air Drill
Date Drilled: 8-19-03
Drilled By: Brown Bros.
Logged By: G. Akens
Township: West Donegal
County: Lancaster

Quadrangle:
Laboratory:
Latitude: ° ' . " Longitude: ° ' . "

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
0'	8'			Red silty clay with some limestone chips.		Db B A=10" B=30" C=30"				
8'	8.5'	10		Light gray limestone, hard, small chips, some wet, no water.						
16.5'	6'	20		Gray limestone, hard, small chips, dusty, some clay balls.						
22.5'		30								
		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: W-7
(Key locations to Modules 6.2 and 9)
Surface Elevation: 408.0
Bottom Elevations: 368.5

Groundwater Elevations and Date Measured

Surveyed by: G. Akens
Method Contour Interpretation
Remarks: Hot (84°F)

Operation Name: Wolgemuth Property
Method of Drilling: Air Drill
Date Drilled: 8-19-03
Drilled By: Brown Bros.
Logged By: G. Akens
Township: West Donegal
County: Lancaster

Quadrangle:
Laboratory:
Latitude: ° ' . " Longitude: ° ' . "

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs* Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
0'	7.5'			Brown silty clay loam		Ha B A=10" B=10" C=40"				
7.5'	10.0'	10		Red clay with limestone chips, very soft, large						
17.5'	2.0'			Limestone, soft, large chips						
19.5'	3.0'	20		Void						
22.5	7.0'			Limestone, hard small chips with many red clay balls						
29.5'	10.0'	30		Limestone, hard small chips						
39.5'		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: W-8
(Key locations to Modules 6.2 and 9)
Surface Elevation: 403.0
Bottom Elevations: 361.0

Groundwater Elevations and Date Measured

Surveyed by: G. Akens
Method Contour Interpretation.
Remarks: Hot (84°F)

Operation Name: Wolgemuth Property
Method of Drilling: Air Drill
Date Drilled: 8-19-03
Drilled By: Brown Bros.
Logged By: G. Akens
Township: West Donegal
County: Lancaster

Quadrangle:
Laboratory:
Latitude: ° ' . " Longitude: ° ' . "

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
0'	17.5'	10		Brown to Red silty clay loam		HaB A=10" B=10" C=40"				
17.5'	5.0'	20		Void						
22.5'	6.5'			Limestone, hard small chips with red clay balls						
29.0'	13.0'	30 40		Limestone, hard small chips.						
42'		50 60 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: A-5
(Key locations to Modules 6.2 and 9)
Surface Elevation: 415.0
Bottom Elevations: 362.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	43'	10 / 20 / 30 / 40		Dirt						
43'	10'	50		Rock						
53'		60 / 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: A-4
(Key locations to Modules 6.2 and 9)
Surface Elevation: 420.0
Bottom Elevations: 370.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	50'	10 / 20 / 30 / 40 / 50		Dirt						
50'										
	10'			Rock						
60'		60 / 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: A-3
(Key locations to Modules 6.2 and 9)
Surface Elevation: 417.5
Bottom Elevations: 374.5

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	33'	10		Dirt						
33'		20								
	10'	30		Rock						
43'		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: B-5
(Key locations to Modules 6.2 and 9)
Surface Elevation: 409.0
Bottom Elevations: 359.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
		10								
		20		Dirt						
	50'									
		30								
		40								
50'		50								
	10'			Rock						
60'		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: B-4
(Key locations to Modules 6.2 and 9)
Surface Elevation: 413.0
Bottom Elevations: 377.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	26'	10		Dirt						
26'		20								
	10'	30		Rock						
36'		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: B-3
(Key locations to Modules 6.2 and 9)
Surface Elevation: 417.0
Bottom Elevations: 399.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	8'			Dirt						
8"										
	10'	10		Rock						
18'										
		20								
		30								
		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: C-5
(Key locations to Modules 6.2 and 9)
Surface Elevation: 410.0
Bottom Elevations: 364.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
		10		Dirt						
	36'	20								
		30								
36'										
	10'	40		Rock						
46'										
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: C-4
(Key locations to Modules 6.2 and 9)
Surface Elevation: 414.9
Bottom Elevations: 372.9

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	32'	10		Dirt						
		20								
		30								
32'										
	10'	40		Rock						
42'										
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: C-3
(Key locations to Modules 6.2 and 9)
Surface Elevation: 413.0
Bottom Elevations: 363.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	50'	10		Dirt						
		20								
		30								
		40								
50'		50								
	10'			Rock						
60'		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: D-5
(Key locations to Modules 6.2 and 9)
Surface Elevation: 404.0
Bottom Elevations: 362.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Ellzabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	32'	10 20 30		Dirt						
32'	10'	40		Rock						
42'		50 60 70								

*When requested by the Department

17-12

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: D-4
(Key locations to Modules 6.2 and 9)
Surface Elevation: 408.0
Bottom Elevations: 365.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	33'	10		Dirt						
		20								
		30								
33'	10'	40		Rock						
43'		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: D-3
(Key locations to Modules 6.2 and 9)
Surface Elevation: 408.0
Bottom Elevations: 368.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	30'	10		Dirt						
		20								
30'		30								
	10'			Rock						
40'		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: D-2
(Key locations to Modules 6.2 and 9)
Surface Elevation: 399.0
Bottom Elevations: 354.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	45'	10 20 30 40		Dirt						
45'	10'	50		Rock						
55'		60 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: D-1
(Key locations to Modules 6.2 and 9)
Surface Elevation: 397.0
Bottom Elevations: 361.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	36'	10 20 30		Dirt						
36'										
	10'	40		Rock						
46'										
		50 60 70								

*When requested by the Department

17-16

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: E-5
(Key locations to Modules 6.2 and 9)
Surface Elevation: 400.0
Bottom Elevations: 374.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	26'	10 20		Dirt						
26'										
	10'	30		Rock						
36'										
		40 50 60 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: E-4
(Key locations to Modules 6.2 and 9)
Surface Elevation: 402.0
Bottom Elevations: 380.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	12.5'	10		Dirt						
12.5'	9.5'	20		Rock						
22'		30 40 50 60 70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: E-3
(Key locations to Modules 6.2 and 9)
Surface Elevation: 400.0
Bottom Elevations: 367.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	23'	10		Dirt						
		20								
23"	10'									
		30		Rock						
33'										
		40								
		50								
		60								
		70								

*When requested by the Department

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: E-2
(Key locations to Modules 6.2 and 9)
Surface Elevation: 398.0
Bottom Elevations: 363.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	25'	10		Dirt						
20''		20								
	10'	30		Rock						
35'		40								
		50								
		60								
		70								

*When requested by the Department

7-20

7.1(B) GEOLOGIC LOG DRILL HOLES/OVERBURDEN ANALYSIS DATA

Hole No.: E-1
(Key locations to Modules 6.2 and 9)
Surface Elevation: 398.0
Bottom Elevations: 350.0

Groundwater Elevations and Date Measured

Surveyed by:
Method
Remarks:

Operation Name: Rheems Quarry
Method of Drilling:
Date Drilled: 2-26-90
Drilled By: J. Roy's, Inc.
Logged By:
Township: West Donegal
County: Lancaster

Quadrangle: Elizabethtown, PA
Laboratory:
Latitude: Longitude:

Depth	Thickness	Scale	Graphic Log	Lithologic Description and Water Conditions	Overburden Analysis Logs*					
					Color or Munsell Code	OBA Sample Number	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
	38'	10 20 30		Dirt						
38'										
	10'	40		Rock/ water						
48'		60 60 70								

*When requested by the Department

Module 7: Geology Information – Attachment to 7.4 - Mine Workings and Solid Waste Sites

A completely backfilled historic quarry is located within 1,000 feet northeast of the Pierson Rheems Quarry operation, on property owned by Pierson Rheems LLC.

There are no solid waste disposal sites located within 1,000 feet of the existing or proposed permit area.

A portion of the Elizabethtown PA and Columbia West PA 7.5 Minute quadrangle maps have been attached which indicate mapped depression features in the vicinity of the Pierson Rheems Quarry Operation. This map has been prepared by William E. Kochanov, Geologist for the Bureau of Topographic and Geologic Survey.

A Sinkhole Query Report and map, prepared by the Bureau of Topographic and Geologic Survey has also been attached.

Field investigations by Akens Engineering Associates, Inc. to the North, east, south and west of the Pierson Rheems quarry operation did not reveal any sinkholes or distinct closed depressions that corresponded to or did not correspond to those indicated on the attached maps. A 1,000-foot perimeter of the proposed operation is apparently free of sinkholes or distinct closed depressions.

The open areas to the south and west are cultivated fields, the open field to the east is a monitoring well field, and the area to the north is predominately commercial. Sinkholes or closed depressions could be disguised by agricultural or commercial activities.

Module 9: Operations Map

[§77.454]

Provide a map or plan that includes the permit area and the area within 1,000 feet of the permit area. The map or plan shall be clear, accurate, easily read and on a scale of no smaller than 1 inch = 400 feet. Maps on the scale of 1 inch = 200 feet for permit areas of 100 acres or less and 1 inch = 400 feet for permit areas larger than 100 acres are preferred. Use the same scale as used for Exhibits 6.2 and 18. Identify the map or plan as Exhibit 9 Operations Map. Each map or plan must bear the seal or facsimile imprint of a registered professional engineer; or the seal or facsimile imprint of a registered professional land surveyor. Show all the following information within the permit area and for a distance of 1000 feet from the permit area, unless specified otherwise. Include an appropriate legend on the map. Indicate which items are present by placing a check mark in the box before the item. Please provide the permit number (if is has been assigned) or a space for it in the title block. Please also include the acreage of the total permit area.

☒ a) topographic contours (contour intervals of 20 feet or less);

☒ b) proposed surface mine permit area, and initial bond increment;

☒ c) surface water bodies such as streams, lakes, ponds, springs, wetlands, mine discharges and constructed or natural drains (include restricted or variance areas, and names of streams and lakes/use a unique label for each unnamed tributary);

☒ d) property lines (key ownership to Module 5);

☒ e) buildings (include current use and restricted or variance areas);

☒ f) man-made features such as public highways, railroads, utility lines including right-of-ways or easements, and other man-made features (include the name of the highway, railroad and utility and the restricted or variance areas);

☐ g) oil and gas wells in and within 125 feet of the permit area (include restricted or variance areas);

☐ h) public or private cemeteries or Indian burial grounds (include restricted areas);

☒ i) existing or previously surface-mined areas, preact highwalls, existing structures and existing areas of refuse, spoil, waste, and processing waste disposal;

☐ j) areal extent of active and abandoned underground mines if mining above or through;

☐ k) solid waste disposal areas;

☒ l) final working face limit for mineral to be mined (i.e., maximum lateral extent of mineral extraction prior to final postmining slope development);

☒ m) phases of mining (indicate initial phase, sequence, and direction of mining);

☒ n) water treatment facilities;

☐ o) surface water diversions;

☒ p) erosion and sedimentation control facilities, including location and size of existing structures, road culverts and drainage ways;

☐ q) dams and impoundments;

☒ r) berms and spoil storage areas;

☒ s) topsoil storage areas;

☒ t) haul roads (outside of area being mined);

☒ u) refuse disposal areas (indicate any material in the refuse which may be acid forming);

☒ v) processing facilities and stockpile areas;

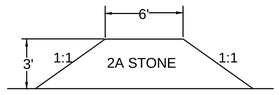
☐ w) air pollution control facilities;

☐ x) explosives storage areas;

☒ y) formation contacts and coal croplines (where applicable);

☒ z) test hole locations (key to 7.1 b data).

☐ aa) incidental coal extraction areas



STONE FILTER BERM DETAIL

NO SCALE

NOTE: STONE FILTER BERM TO BE MAINTAINED AROUND THE PERIMETER OF THE PIT POOL AT ALL TIMES, IN ORDER TO FILTER STORM WATER RUN OFF FROM THE PIT FLOOR INTO THE PIT POOL

NOTES:

1. THE DRAINAGE STRUCTURE UNDER W. HARRISBURG AVE. AT ENTRY TO THE QUARRY IS A CONCRETE BOX 8' WIDE x 4'-6" HIGH (WATERWAY OPENING). THE DRAINAGE STRUCTURE UNDER THE DRIVEWAY CONNECTING THE QUARRY & THE PENNSYLVANIA GROWERS PROPERTY IS A 72"x 44" C.M.P ARCH.
2. THE PERMITTEE IS HEREBY GRANTED A WAIVER, PER TITLE 25 SECTION 77.504(b)(2), TO CONDUCT SUPPORT ACITIVIES ONLY WITHIN 300 FEET OF COMMERCIAL BUILDINGS OWNED BY PENNSYLVANIA GROWERS, LLC, AS EXISTED UNDER PREVIOUS MDP NO. 6276SM6.
3. THE AERIAL PHOTOGRAPHY AND CONTOURS ARE ACQUIRED FROM A DRONE FLIGHT TAKEN ON AUGUST 13, 2020 CONTROLLED BY RTK GPS NAVD 88 (2011) ON THE NAD83 PENNSYLVANIA STATE PLANES SOUTH ZONE COORDINATE SYSTEM.
4. OUTSIDE THE FLIGHT, THE IMAGE IS ACQUIRED FROM A 2018 PEMA ORTHOIMAGERY FILE, AND THE CONTOURS ARE ACQUIRED FROM 2006 PAMAP PROGRAM 3.2 FT DIGITAL ELEVATION MODEL OF PENNSYLVANIA.

AERIAL TOPOGRAPHY ACQUIRED FROM DRONE FLIGHT ON AUGUST 13, 2020.

LEGEND

- EXISTING 5' CONTOUR
- EXISTING 25' CONTOUR
- PIERSON-RHEEMS LLC PROPERTY LINE
- ADJOINER PROPERTY LINE
- SETBACK
- TOWNSHIP LINE
- ZONING LINE
- RAILWAY
- FENCELINE
- UTILITY POLE
- LIGHT POLE
- EXISTING MONITORING WELL LOCATION
- 5004 EXISTING WELL LOCATION
- PW-15 PRIVATE WATER SUPPLY
- E-1 W-1 BORE HOLES
- BACKGROUND & PROPOSED MONITORING POINTS
- 1,000 FOOT PERIMETER
- LIMIT OF MINING AS OF 01/01/72
- PROPOSED LIMIT OF MINING AND BONDING
- PROPOSED SURFACE MINE PERMIT
- EXISTING SURFACE MINE PERMIT
- EXISTING TREE LINE
- EXISTING EDGE OF WATER
- 189 PROPOSED 5' CONTOUR
- PROPOSED 25' CONTOUR
- DIRECTION AND PROGRESSION OF MINING
- MAPPED BEDROCK GEOLOGY
- MAPPED FAULT
- MAPPED FOLD
- 300' RADIUS TO OCCUPIED STRUCTURE

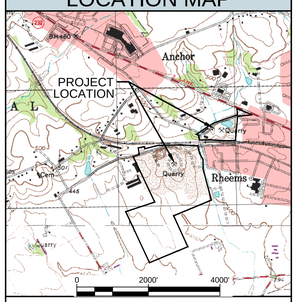
NOTE:

THE 30-ACRE QUARRY EXPANSION AREA IS CLASSIFIED AS PRIMARY AGRICULTURAL LAND, OVERBURDEN BERMS TO BE LABELED AS PRIME FARMLAND SOILS.

Akens Engineering Associates, Inc.
219 E. Main St. Shiremanstown, Pa. 17011
(P) 717-975-9933 (F) 717-975-5507
www.akensengineering.com

"Providing Quality Engineering & Surveying Services since 1983."

LOCATION MAP

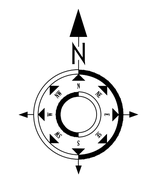


SCALE: 1" = 2000'

REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF PENNSYLVANIA
SCOTT WILLIAM AKENS
ENGINEER PE073141

I hereby certify that this plan is correct and accurate to the best of my knowledge.

SCOTT W. AKENS
Professional Engineer, PE073141
Submitted on this 25th day of April, 2023.



REVISIONS:

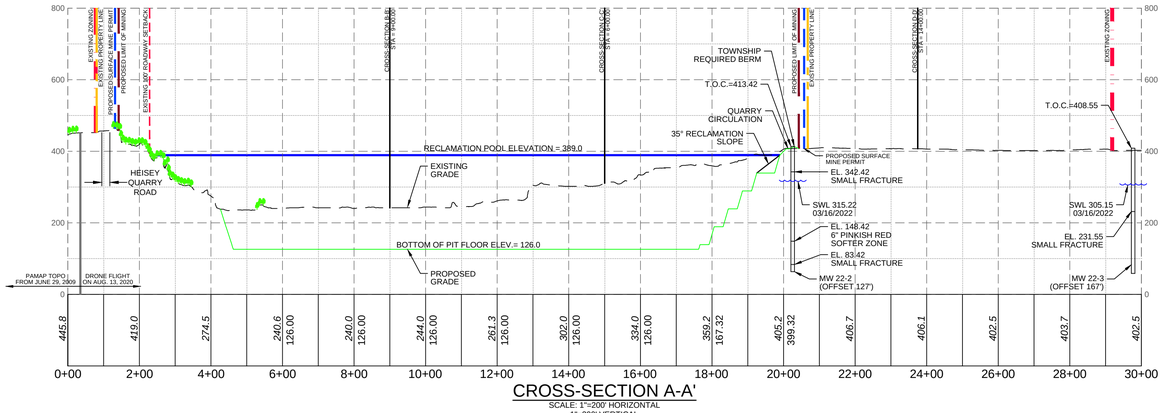
EXHIBIT 9
OPERATIONS MAP

SURFACE MINE PERMIT NO. 36080301
NPDES PERMIT NO. PA 0224651
AUTHORIZATION TO MINE
PERMIT NO. 6980-36080301-01

PIERSON RHEEMS LLC
QUARRY OPERATION

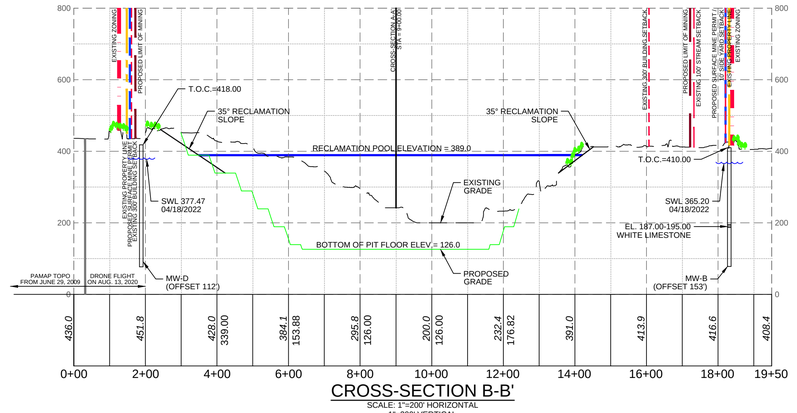
WEST DONEGAL & MT JOY TOWNSHIPS
LANCASTER COUNTY, PA

SCALE:	SHEET NUMBER:
1" = 200'	4 of 6
PLAN DATE:	
APRIL 25, 2023	
FILE NAME:	
X:\240-1-51 Expansion\Drawing\240-1-51 Base.dwg	



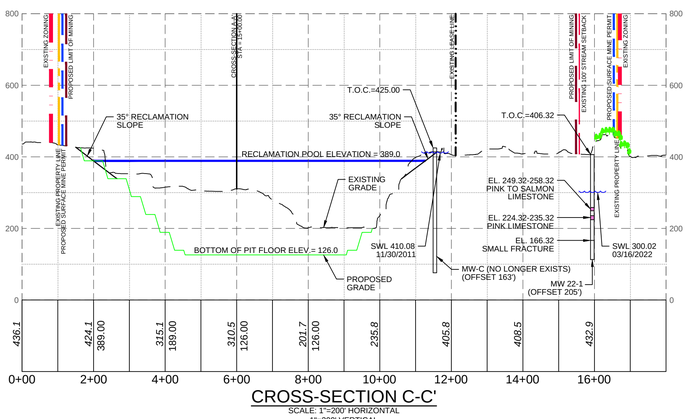
CROSS-SECTION A-A'

SCALE: 1"=200' HORIZONTAL
1"=200' VERTICAL



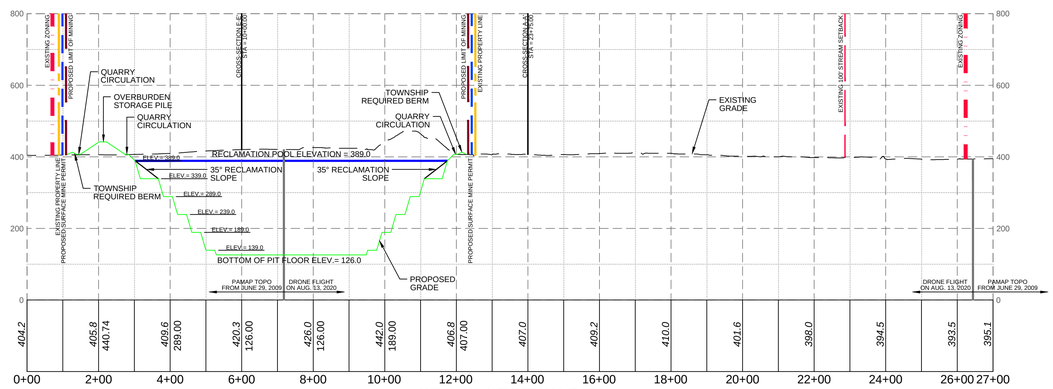
CROSS-SECTION B-B'

SCALE: 1"=200' HORIZONTAL
1"=200' VERTICAL



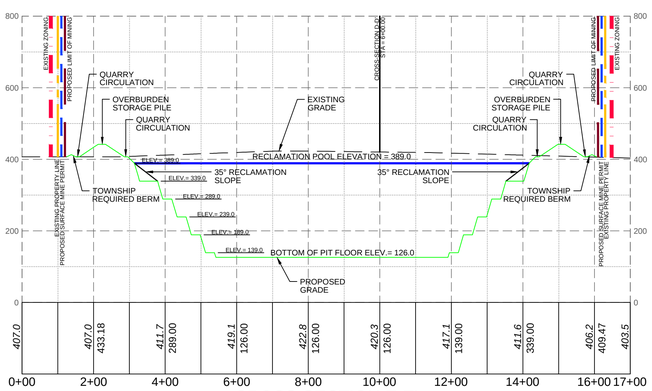
CROSS-SECTION C-C'

SCALE: 1"=200' HORIZONTAL
1"=200' VERTICAL



CROSS-SECTION D-D'

SCALE: 1"=200' HORIZONTAL
1"=200' VERTICAL



CROSS-SECTION E-E'

SCALE: 1"=200' HORIZONTAL
1"=200' VERTICAL

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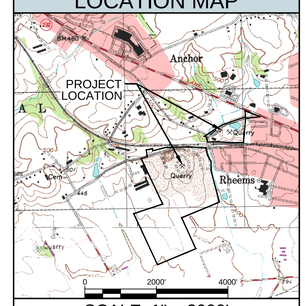
LOCATION MAP



SCALE: 1" = 2000'

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
SCOTT WILLIAM AKENS
ENGINEER PE073141

I hereby certify that this plan is correct and accurate to the best of my knowledge.

SCOTT W. AKENS
Professional Engineer, PE073141
Submitted on this 25th day of April 2023.

0 200' 400'

REVISIONS:

CROSS-SECTIONS

SURFACE MINE PERMIT NO. 36080301
NPDES PERMIT NO. PA 0224651
AUTHORIZATION TO MINE
PERMIT NO. 6980-36080301-01

PIERSON RHEEMS LLC
QUARRY OPERATION
115.95 ACRES

WEST DONEGAL & MT JOY TOWNSHIPS
LANCASTER COUNTY, PA

SCALE:	SHEET NUMBER:
1" = 200'	6 of 6
PLAN DATE:	
APRIL 25, 2023	
FILE NAME:	
X:\240-1-51 Expansion\Drawing\240-1-51 Base.dwg	

Module 10: Operational Information
[§§77.452/77.456/77.563/77.564]

10.1 Equipment and Operation Plan

For each phase of mining, identify the type and method of mining; engineering techniques; major equipment to be used; starting point; and the anticipated sequence in which the phases are to be mined.

The Pierson Rheems Quarry is a historic quarry operation, opened before 1940. It operated under the original permit within 87.7 acres until 2008, when it was expanded southwardly by 14.94 acres to the current 102.64 acres. It is now proposed that the quarry be expanded southwesterly by 30 acres, with 21 mining and 9 support acres. See Exhibits 6.2,9 and 18.. There are no phases of mining, although the 21 acre mineral extraction expansion area wil be the focus of mining going forward. The parent limestone/dolomite formation is blasted, the blasted material is loaded onto off road haulage vehicles, and transported to the primary crusher, which is located on the quarry floor, then conveyed 200' upward to the secondary and tertiary crushing facilities located on the surface, and processed and stockpiled for sale to the public. See the attachment to Module 17 for a complete list of equipment used in the operation. The current processing equipment will continue to be used for expansion area.

10.2 Pit Configuration

a) Identify the maximum depth of mining and the elevation of the pit floor at the maximum depth of mining for each mining phase.

The permitted depth of mining in the existing portion of the mine, as well as in the major modification portion is 275', to an elevation of 126.The existing pit floor is at elevation 200, the surface elevation is 400 +/- , for a current depth of pit of 200'. There are no proposed phases.

b) If mining consolidated rock, identify the maximum highwall height and the benching interval to include the distance between the benches measured vertically (i.e. height of the working face of the bench) and the width of the benches.

The quarry is operated using, ultimately, 50' highwalls, separated by 25' benches.

c) If mining consolidated rock and the reclamation plan is an alternative to approximate original contour involving restoration of the pit floor and final working face, identify the total acreage of pit floor and final graded slopes.

The 30 acre major modification pit floor area, as well as the existing pit floor, at the currently proposed extent of mining, will be 100 acres,+ /-, under a reclamation pool depth of 263', or pool surface elevation of 389. The upper bench which is designed to contain the 35 degree reclamation slope to an elevation of 339, being 50' below the reclamation pool surface, is 16 acres in aerial extent, and will ultimately be under the reclamation pool elevation. The face of the reclamation slope on the upper bench will be revegetated in accordance with Module 23, in consideration of the extended period of time that the post mining pool will require to reach elevation 389.

10.3 Existing Structures

Identify and describe the intended use of all existing structures or facilities to be used in connection with or to facilitate mineral removal activities. (Common existing structures include impoundments, stream crossing facilities, water obstructions and processing waste dams.)

The quarry is operated such that all precipitation and infiltrating groundwater drains to a pit pool on the existing quarry floor, at approximaly elevation 175, where particulate matter falls out of the water, the water is then pumped to a pit sump at approximately elevation 250, and allowed to further clarify, from which it is pumped to NPDES Discharge Point 001, into an unnamed tributary to Donegal Creek, at approximately elevation 400.

10.4 Overburden Piles

Provide a narrative plan for reclamation of overburden piles specifying the timing and extent of overburden piles returned to the pit and final grading of the overburden pile areas for blending into existing contours.

The quantity of overburden available to reclaim the upper bench is 871,650 C.Y., the amount of overburden required to reclaim the upper bench to an elevation of 339, or 50' below the reclamation pool, is 815,550 C.Y. See attached Overburden Calculations. There is ample room within the permit area to store the reclamation overburden. The upper lift will be backfilled and revegetated as the pit floor elevation below the area to be reclaimed is reached. The overburden is stored on the existing surface grades, which are flat, and which can readily be fine graded to drain toward the pit pool as the stored overburden is removed. It is estimated that the quarry life will be 30 years, with final grading and reclamation activities occurring throughout that period of time.

10.5 Final Grade and Drainage

Identify the final grading and drainage pattern, including topographic contours on Exhibit 18 and a description of compaction and stabilization techniques. Provide cross-sections or a contour map showing permit line setback(s), final postmining slopes, postmining watertable and safety benches.

The attached Exhibit 18 and Cross Sections show the post reclamation surface contours graded to direct surface precipitation runoff to the quarry pit. The material to be re-distributed will be placed in such a manner that only native topsoil will be used as the final top dressing. See attached Module 21. Wheel loading on relatively flat areas and chain dragging on the top lift backfilling to a 35 degree slope, will be the compaction technique of choice.

10.6 Reclamation Timetable

Provide a sequence of operations for the accomplishment of major stages in the reclamation plan demonstrating compliance with the concurrent reclamation requirements in 25 Pa Code 77.595. Include an estimated timetable for reclamation which is tied to the mining phases and the termination of mineral extraction.

Concurrent reclamation in accordance with 25 Pa. Code 77.595, has been completed on the upper lift of the northern face. Typical reclamation activities will occur during the winter grading activities. The parent formation is very deep, with the 30 acre expansion being requested with this application allowing the operator the option of working away from the "existing" quarry pit. There is a conveyor system attached to the eastern face preventing concurrent reclamation in that area. Once the horizontal and vertical extents of the the proposed 30 acre pit for the expansion is achieved then concurrent reclamation sahll occur. mArket conditions shall dictate overall timeframe.

10.7 Identification of Toxic Materials

When applicable (e.g., noncoal operation in coal measures) provide a detailed description of the methods used in the identification of potentially acid and toxic forming materials (boney, rooster, blossom or other inferior coal and noncoal strata) which will be encountered and separately handled. Correlate and identify these strata in the test hole data.

This operation is located exclusively within the Eppler Formation, with no Toxic Materials in evidence over it's approximately 65 year existance.

10.8 Special Handling of Toxic Material

When applicable (e.g. noncoal operation in coal measures) provide a detailed description of the methods to be used in the separation and handling of acid and toxic forming materials. Include transportation, storage, treatment and return of the material to the backfill. Identify the amount and source of clean fill to be placed above and below the material and the compaction and other methods to preclude combustion of the material and prevent groundwater contamination. Indicate all disposal areas on Exhibits 9 and 18.

N /A

10.9 Oil and Gas Wells

Where mining activities are proposed to be conducted within 125 feet of any oil or gas well, identify the location on Exhibits 6, 9 and 18 and provide a description of the activity. Provide a demonstration that the well has been sealed; or describe the measures to be taken to insure the integrity of the well, access to the well at all times and the well operator's consent to the proposed activity.

N / A

10.10 Wells, Exploration Holes and Bore Holes

Identify the type and location of wells, exploration holes, bore holes and monitoring wells and provide a description of the manner in which each will be cased, sealed or otherwise managed.

There are seven monitoring wells located within the quarry area that serve the purpose of establishing groundwater elevations. Six of them will be either mined out, or will be backfilled with bentonite at the termination of mining. One well, located within the Wolgemuth farm complex, will remain, at the Wolgemuth's request.

10.11 Underground Mines

Where proposed surface mining activities will be conducted within 500 feet of any point of either an active or abandoned underground mine (coal or noncoal), provide a description of the nature, timing, and sequence of the operation. Identify the location of each underground mine opening and the manner in which the opening will be sealed or otherwise managed including appropriate cross sections and design specifications for mine seals. Provide a description of the potential hydrologic impacts of the proposed activities, the effects on the existing groundwater system, and the effect the proposed activities will have upon abatement of pollution or the elimination of hazards to the health and safety of the public.

N / A

10.12 Public Highways

Where opening or expansion of pits are proposed within 100 feet of the outside right-of-way of a public highway, or a relocation of a public highway is proposed, identify the name and section of the public highway involved, a description of the activities to be conducted and detailed plans and cross-sections of the proposed activities. Include the written approval of the government agency having jurisdiction over the highway.

(**Note:** If the initial public notice advertisement does not contain a notice of the variance request, attach the proof of publication for advertisement of the variance.)

The 30 acre major modification expansion area is not located within 100 feet of a piblic roadway. All access will occur through the existing mine.

10.13 Public Parks and Historic Places

Where the proposed mining activities may affect any public park or historic place, provide a demonstration of the measures which will be taken to minimize or prevent adverse impacts.

N / A

10.14 Utilities

Where the proposed mining activities may adversely affect services provided by oil, gas, and water wells; oil and gas pipelines; railroads; utility lines; and water and sewage lines, provide a demonstration of the measures which will be taken to minimize or prevent these impacts.

N / A

10.15 Bonding Calculations

Attach a completed Bond Calculation Summary-Noncoal for consolidated (5600-FM-BMP0474) or unconsolidated (5600-FM-BMP0473) material (sand, gravel, shale, soil). Complete a Bonding Increment Application and Authorization To Conduct Noncoal Mining Activities (5600-FM-BMP0304).

Module 12: Erosion and Sedimentation Controls
[§§77.458/77.461/77.466/77.525/77.527/77.531/Chapter 102]

12.1 Diversion Controls

Provide a plan for the collection and conveyance to a natural drainageway of the runoff from upslope undisturbed areas. Provide a separate general design for a temporary highwall diversion which limits the amount of runoff which can enter the pit (where applicable). Include design criteria, capacity calculations, profile of proposed channel slopes, typical cross-sections, required channel linings and applicable details on 12.1 Data Sheet.

This application to mine is concerned with a 30-acre parcel of land located contiguous to the existing operation. See the various plan sheets attached hereto. Historically, as the quarry pit and the surface support area has been enlarged, virtually all stormwater runoff has drained to the pit sump, allowed to quiesce, and pumped thru NPDES Discharge Point #1 to an unnamed tributary to Donegal Creek. This application proposes to continue that existing operation. The 30-acre expansion will be accessed from the southwest area of the existing pit in such a way as to cause all precipitation runoff to drain to the existing pit sump. Surface water runoff from lands surrounding the quarry site is unique in that very little surface drainage reaches the quarry site, as follows:

From the east, flowing westwardly, the off-site surface drainage is intercepted by an unnamed tributary to Donegal Creek. The quarry surface area that contains the stockpiles, office trailer, etc. lies along and very close to the Western edge of tne unnamed tributary to Donegal Creek, with very little surface area for precipitation runoff to gather and drain into, ultimately, the pit sump. A variance to use the area within 100' of the stream, for support activities, has been granted.

From the south, the surface drainage pattern is away from the quarry.

From the west, the surface drainage pattern is predominately away from the quarry.

From the North, the surface drainage area is very limited, due to the railroad and roadway that traverse the extent of the quarry.

Ultimately, except for a minor inflow point in the northwesterly corner of the operation, which is captured in the pit sump and discharged thru NPDES Discharge Point #1, as above, and the accumulation of in-quarry surface area contributions, which are likewise disposed of, there is no need for diversion controls.

A 13 acre parcel of land, owned by Pierson Rheemns LLC, is located north of the Conrail Tracks and is completely separate from the land that is being quarried. This parcel is occupied by Delaware Valley Concrete, and has it's own E & S control system.

12.2 Erosion and Sediment Control

Provide a plan for the control of erosion and sedimentation for lands within the permit area to be disturbed by mining activities. Include a narrative describing the implementation of the plan, and detailed design and construction plans and specifications for structures or facilities used in the plan. The plan must include each phase or phases of mining. Include design criteria, capacity calculations, profile of proposed channel slopes, typical cross-sections, required channel linings and applicable details on 12.1 Diversion/Collection Ditch Data Sheet for collection and interceptor ditches. Provide documentation of the capacity of the existing drainage system and the effect proposed mining activities will have on the drainage. Show discharge points to natural drainageways and culverts that intercept upslope drainage or carry drainage away from the site. Show facilities to scale on Modules 9 and 16 as appropriate.

This application to mine proposes no change to the E & S controls presently existing. The increased volume of water that reaches the existing pit sump, from the 30-acre expansion area, is discharged as noted above.

It is important to note that the existing discharge system is made up of two parts. Initially, runoff drains to a low point on the quarry floor and is pumped to the actual pit sump, on an as needed basis, utilizing a diesel-powered pump. This quarry floor "containment area" is very large, is located in a mined-out area of the quarry and can easily contain any runoff contributed from the 30-acre expansion area. The sump itself is drained by an electric pump, which is normally float controlled, but can be operated on an as needed basis, if necessary, to handle any additional inflow from the 30-acre (18 acres, ultimately, of mined area) expansion.

12.3 Haul Roads

Provide the following information for each haul road to be constructed, reconstructed or used in the operation:

Note: Activities proposed to be conducted under General permit for Temporary Road Crossings (BMR-GP-101) and General Permit for Access Road Crossings (BMR-GP-102) must include a completed Notification Form, with attachments, for the respective General Permit (i.e., Form 5600-FM-MR0054 for BMR-GP-101 and Form 5600-FM-MR0059 for BMR-GP-102). BMR-GP-102 may not be used for haul roads.

a) Location; show on Exhibit 9 (and Exhibit 18 if road will remain as part of postmining land use);
None

b) Description and typical cross-sections showing the construction of the haul road including existing ground, grades, slopes, culvert locations, outlet protection and other drainage control;
None

c) Measures to control and prevent erosion and sedimentation; include proposed spacing of sediment traps, turnouts, culverts, check dams, etc.;
None - All "roads" are in pit, and are relocated as needed to facilitate mineral removal activities.

d) Plan for reclamation after mining is completed;
None

e) If the haul road involves the crossing of any intermittent or perennial stream or wetland include Module 14 Streams/Wetlands;
N / A

f) Will a PennDOT highway occupancy permit be needed? ☐ Yes ☒ No

If yes, PennDOT Occupancy Permit number must be submitted prior to permit activation.

Module 17: Air Pollution and Noise Control Plan

[Chapters 121,123,127,129/NSMCRA 3323(a)(3)/§§ 77.455/77.575]

17.1 Processing Facilities

a) Indicate whether or not there are any processing facilities in the permit area. (Key to Exhibit 9) and specify the mineral(s) to be processed.

Type of Processing Facility	YES	NO	If YES: DRY	WET	Minerals/Product
Crushing	☒	☐	☒	☐	Dolomitic Limestone
Screening	☒	☐	☒	☐	Dolomitic Limestone
Cleaning	☐	☒	☐	☐	
Stockpiling	☒	☐	☒	☐	Dolomitic Limestone

b) Describe the processing facilities and the amount of minerals to be processed.

One aggregate processing plant - 800 tons/hour - See attached State Only A.Q. Permit #36-05153, and the data submitted to secure same. A complete list of the equipment used in the quarry operation is also attached.

c) Provide the date that the DEP Regional Air Quality Office was contacted or, if applicable, provide a copy of the DEP Air Quality Program's determination to grant an exemption from the Air Quality Permit requirements and of any authorizations granted under the Air Quality General Permit for Portable Nonmetallic Mineral Processing Plants (BAQ-GPA/GP-3).

The Southcentral Region Air Quality Office was contacted in Sertember, 2021, to apply for a renewal of the quarry A.Q. permit.

Note: All crushing and screening of noncoal minerals other than sand and gravel will require a separate Air Quality Permit from the DEP Regional Office Air Quality Program unless that Program makes a determination to grant an exemption. Crushing and/or screening of sand and gravel will require a separate Air Quality Permit from the DEP Regional Office Air Quality Program except for wet sand and gravel operations (screening only) and wet or dry sand and gravel operations (crushing and/or screening) unconsolidated material with a rated capacity of processing less than 150 tons per hour unless that Program makes a determination to grant an exemption. BAQ-GPA/GP-3 may be used for authorizing the construction, operation, and modification of portable nonmetallic mineral processing plants that will be located at the mine site.

d) Is the processing facility to be operated by the mining permittee? Yes ☒ No ☐
If so, will the Air Quality permit be held by the mining permittee or a third party? Permittee ☒ Third Party ☐

17.2 Air Pollution Control Plan

Provide a description of the air pollution control plan including what measures will be taken to reduce dust from the following activities:

a) thru h) below describes the individual dust control activities. The wind blows from the west 95% of the time, the receptor adjoining the quarry to the east is a processing plant and an empty field that is used for spray irregation of the effluent from the processing plants treatment facility. The nearest receptor to the west is a manufacturing facility.

a) Access roads, haul roads and adjoining portions of the public road

Access and haul roads are sprayed on a regular basis by a dedicated water spray truck. The adjoining public road, at the entrance to the quarry, is flushed with water regularly, in order to remove quarry related foreign material from the road surface.

b) Truck traffic (including fugitive particulate material from truck loads).

A spray bar is available to wet down loaded trucks. A tarping station is located at the quarry exit onto the public road.

c) Drilling operation.

If the drilling contractor judges that an area to be drilled is likely to generate dust, the water truck will flood the area to be drilled with water prior to commencement of drilling.

d) Overburden removal and mineral extraction

Overburden is removed by front loaders and placed into haulage vehicles with as little, dust producing, drop as possible. The mineral to be extracted is shot from the parent deposit and allowed to drop to the quarry floor or bench with a minimum amount of blasting. The mineral is then loaded onto rock trucks, in the same manner as the overburden, and transported to the primary crusher, which is located on the quarry floor, approximately 200' below the surface of the quarry. The rock is then dumped into the primary hopper, which is fitted with spray nozzles to control the generation of dust.

e) Stockpiles (overburden, topsoil, product).

Overburden stockpiles, less topsoil, are placed so as to have as small an active work face as possible, with the remainder of the pile being seeded. See Module 21: Topsoil/ Subsoil. This practice allows the minimum dust producing area to be disturbed by wind erosion. This practice applies to any pile that is to be in place and undisturbed for more than 7 days. Topsoil is to be segregated from subsoil, placed in an area that is to be undisturbed for the duration of the operation, and seeded as above for "overburden". The active face of product stockpiles are to be wetted down by the water truck as necessary.

f) Loading and unloading areas.

These areas are to be wetted down as necessary. Vertical dropping of product, the primary source of dust generation, is to be minimized to the greated extent possible.

g) Crushing and other processing equipment.

See the attached drawing entitled Richard E. Pierson Construction Co., Inc., Rheems Quarry Plan Approval Application which shows the number and location of the water spray nozzles to be used. Water carried over from the crushing facilities will control dust on those portions of the conveyor system that do not incorporate discrete conveyor nozzles.

h) Conveyors.

See "g)" above.

Activities under 17.2 a) through h) which are addressed and regulated as part of a separate Air Quality Permit do not need to be included in this module. Indicate which activities (or specific aspects of an activity) are addressed under a separate Air Quality Permit.

See "17.1 b) above.

17.3 Noise Control Plan

a) List all noise sources from equipment and mining activity that will originate within the permit area.

See attachment to Module 17 for plant and mobile equipment, and the attached Air Quality Permit.

b) Indicate the hours of operation for mobile and stationary equipment:

☐ Continuous 24 hours a day. Which equipment? **None**
☐ Night time hours. Which equipment? **None**
☒ Weekends. Which equipment? **Saturday A.M.-All equipment and plant in operation.**
☐ Holidays. Which equipment? **None**

c) Are any of the following located adjacent to the proposed mine operation? Check all that apply and include distance and details.

☒ Residential Areas
☒ Schools
☐ Hospitals

☐ Churches

Details: **The existing quarry operations relationship to residential areas and the school will remain as it has been for decades. The 30-acre expansion being requested is in the far southwest quadrant of the existing operation, and is moving farther from the residential and school areas.**

d) Describe the pre-mining environmental sound levels within the adjacent area during weekdays, night time, weekends, and holidays.

Rheems Quarry has been in operation for at least 60 years, The area around the quarry has adjusted to the noise of the quarry and such noise has become a part of the ambient noise situation. The requested 30-acre expansion will generate noise such as the existing quarry is producing, therefore there will be no change in the environmental sound levels pre and proposed situation.

e) Has a noise study been conducted to characterize the pre-mining noise levels of the surrounding area and estimate the noise levels from the proposed mine operation? ☐ Yes ☒ No
If yes, submit that study.

f) Describe the measures (best management practices) that will be taken to mitigate noise and prevent noise from becoming a public nuisance.

1. The primary crusher is located on the quarry floor, approximately 200' below the surface of the quarry.
2. 21 pieces of the equipment used in the mining process are rubber tired, with only 5 pieces being metal tracked.
3. "J" brakes are not in use within the quarry.
4. All mobile and stationary equipment is muffled.
5. Vegetated berms, far exceeding heights required by ordinance, are to be constructed around the 30-acre expansion. Summation - Rheems Quarry is an existing operation that has been in operation for decades. The purpose of this application is to allow the operation to continue with the current, unchanged, operating parameters. The ambient noise level in the area surrounding the quarry will remain static.