

## Module 13: Impoundments/Treatment Facilities

[§§77.457/77.461/77.526/77.531/Chapter 105]

### 13.1 Treatment

Provide a plan for the treatment of surface and groundwater drainage from the areas disturbed by the mining activities. Include a construction and treatment narrative, flow diagram, design criteria, and design calculations (which include the proposed capacity) of the treatment facilities. Identify treatment chemicals to be used. Do not include any facilities included in Module 12.

Water treatment will consist primarily of clarification of the suspended solids associated with mining operations. Water will be clarified primarily by settling within the pit sump. Pit water will be pumped out and into Sediment Pond SP-2. Should it prove necessary, flocculants may be added at Sediment Pond SP-2 via a drip system to the inflow, recirculation via a pump system, or gel logs placed in the inflow. This will only be done, should the content of the water contain colloidal fine particles that are not able to be settled with simple retention. Flocculants may be added to SP-1 and SP-3 and the Process Ponds. See attached flocculant plan approval.

The existing basins left by Keyrock may be used for treatment ponds A & B below the potentially acidic material stockpile area. TP-1 will treat any surface runoff that comes in contact with coal or other potentially acidic materials. The stockpile area is shown on Exhibit 9. The existing ponds to the north of proposed SP-1 will be upgraded to be converted into TP-1. The existing underdrain will be kept in place and a new liner installed. The new liner will comply with TGD 563-0300-101 and the treatment ponds will be certified prior to usage. See attached flow diagram and design criteria/calculations.

### 13.2 Quarry/Pit Sump

Provide a description of the sump including size, location, depth, method of pumping, etc. (Key location to Exhibits 6.2 and 9).

A pit sump will be constructed at the lowest point of all pits to collect runoff from the pit workings. Electric or diesel pumps will be used to pump water from the pit sump to Sediment Pond SP-2 for additional settling time and discharge. The pit sump has been designed to capture runoff from the entire pit footprint. A 10-year rainfall was used to size the pit sump. Water will be pumped out of the sump into SP-2 at an approximate rate of 1.5 cfs. Pumped water circulating through Sediment Pond SP-2 will provide approximately 12 hours of additional retention time prior to discharging.

### 13.3 Dams and Impoundments (General) Do not include any facilities included in Module 12

#### a) Proposed use.

Sediment Pond SP-1 will be used to control runoff from the proposed processing pad and part of the haul road. Sediment Pond SP-2 will be used to control runoff from the mineral extraction areas and the remaining portion of the haul road. SP-3 will be used to control runoff from construction of the process water ponds. Two process water ponds may be installed and used for settling of fines generated by washing aggregate products. No dams or impoundments meeting the definition requiring a dam safety permit are proposed.

#### b) Map and location (key to maps).

See Exhibit 9 for locations.

- c) **Provide a design report and construction plans and specifications to include detailed cross-sections and plan view scale drawings of the proposed structure which show: principal spillway, dewatering devices, embankment details (including maximum height, top width, and cutoff trench), crest of emergency spillway and existing ground.**

See sheets titled Sediment Pond 1 Details, Sediment Pond 2 Details, and Sediment Pond 3 Details. Hydrocad software was used to perform the design calculations.

Sediment Pond 1 will control 44.8 acres. It was designed with a minimum of 7,000 cubic feet per acre capacity with a minimum of 2,000 cubic feet per acre designated to sediment storage and 5,000 cubic feet per acre for the dewatering zone. The 50-year, 24-hour storm (4.76") was used to design the emergency spillway, while the 10-year, 24-hour storm (3.56") was used to size the principal spillway. The resulting emergency spillway has a crest length of 35 feet. The principal spillway has a diameter of 18 inches. The dewatering pipe was designed so that the pond would dewater in 4 to 7 days. A dewatering pipe of 6 inches was chosen due to the size of the pond and longevity of the site. SP-1 has been designed as a permanent structure that will remain post-mining as an industrial stormwater pond. The constructed portion of the embankment will utilize 3:1 slopes inside and out. Regular dewatering of the pond will still occur post-mining, so no further upgrades are needed.

Sediment Pond 2 will control 31.5 acres. It was designed with a minimum of 7,000 cubic feet per acre capacity with a minimum of 2,000 cubic feet per acre designated to sediment storage and 5,000 cubic feet per acre for the dewatering zone. The 50-year, 24-hour storm (4.76") was used to design the emergency spillway, while the 10-year, 24-hour storm (3.56") was used to size the principal spillway. The resulting emergency spillway has a crest length of 44 feet. The principal spillway has a diameter of 18 inches. The dewatering pipe was designed so that the pond would dewater in 4 to 7 days. A dewatering pipe of 6 inches was chosen due to the size of the pond and longevity of the site. This pond will outlet toward an existing pond. See calculations proving that no additional flow will be created that may jeopardize the existing farm pond.

Sediment Pond 3 will control 11.2 acres. It was designed with a minimum of 7,000 cubic feet per acre capacity with a minimum of 2,000 cubic feet per acre designated to sediment storage and 5,000 cubic feet per acre for the dewatering zone. The 25-year, 24-hour storm (4.22") was used to design the emergency spillway. The resulting emergency spillway has a crest length of 18 feet. A principal spillway is not required for ponds with a drainage area less than 20 acres; however, a 12" diameter principal spillway was designed to help control normal flows. The dewatering pipe was designed so that the pond would dewater in 4 to 7 days. A dewatering pipe of 4 inches was chosen due to the size of the pond and longevity of the site. The constructed portion of the embankment will utilize 3:1 slopes inside and out, since the pond will be in use for over 10 years.

Process Water ponds may be constructed to settle fines created by a closed loop sand washing system. The water will be pumped from the lower pond to the washing area on the process pad. The washing will be done with equipment designed for this purpose such as sand screw or other type. The fines pulled from the product will flow through a pipe into the first process pond. The fines will settle out via gravity and primarily gather in the first pond. The water will then circulate into the second (lower) pond, where it will be pumped out and provided back to the wash plant. The system is closed loop. A valved discharge pipe will be installed in each of the process ponds to allow dewatering for cleaning the ponds out. The valves are to remain closed at all times except for when the ponds need cleaning. Cleaning will be done by excavators dipping out the fines and loading haul trucks. The material will be taken back to open pits where the aggregate was mined from and placed in the backfill. The ponds have been designed to have large top widths for equipment access and will be constructed well in excess of minimum embankment criteria. There will be no drainage area contributing into the process ponds that would necessitate spillways.

- d) **Complete a Certification Form for each structure as appropriate:  
Sediment Pond Certification form 5600-PM-BMP0408  
Treatment Pond Certification form 5600-PM-BMP0455**

See the attached forms.

- e) **If the impoundment is located outside of the area covered by the geology and hydrology description contained in Modules 7 and 8, include a preliminary geology and hydrology report.**

N/A. All sediment ponds are within the area covered by the reports in Modules 7 and 8.

- f) Describe the potential effect on the structure from subsidence from underground mining when applicable.

N/A. There are no anticipated problems from underground mining subsidence. The sediment ponds are located approximately 100 feet or greater above the Pittsburgh coal seam. Subsidence does not typically occur in areas 100 feet or greater above abandoned underground workings.

- g) If the detailed design plans are not included with the initial submittal of this application, identify when the detailed design plans will be submitted. (Note: The detailed design plans must be approved by the Department before construction of the structure begins.)

N/A. Detailed design plans are included in this submission.

#### **13.4 Class C Dams**

A separate permit is required for impoundments that meet one or more of the following:

- 1) a contributory drainage area exceeding 100 acres;
- 2) a depth of water measured by the upstream toe of the dam at maximum storage elevation exceeding 15 ft;
- 3) an impounding capacity at maximum storage elevation exceeding 50 acre-feet.

#### **13.5 Operation and Maintenance Requirements**

Describe the operation and maintenance requirements for the structure, including dewatering of the impoundments following storm events.

All sediment ponds will be inspected on a weekly basis and after every runoff event to ensure proper function of the inlets, outlets, dewatering device, and sediment elevation. A stake showing the cleanout elevation will be placed near the center of each pond. Once the sediment reaches this level, that pond will be cleaned out. All dewatering devices are valved and require the valve to be opened after storm events to dewater the ponds. After the ponds have been dewatered down to the sediment elevation, the valves must be closed.

#### **13.6 Removal**

Describe the timetable and plans for removal of the impoundment and reclamation of the area.

Sediment Pond SP-2 and SP-3 and the process ponds will be reclaimed after mining is complete. After the tributary areas to SP-2 and SP-3 have been reclaimed and has established proper vegetation, SP-2 and SP-3 will be completely dewatered, regraded to AOC, and seeded with the permanent seed mixture. Sediment Pond SP-1 will remain post-mining per the attached, notarized request from the landowner.

**LIGONIER STONE & LIME COMPANY  
SMT EAST  
CLAY LINER ESTIMATE**

	TOP OF POND AREA (S.F.)	LINER THICKNESS (FT)	VOLUME OF CLAY REQUIRED (C.Y.)
SP-1	49274	2	3650
SP-3	18228	2	1350
TP-1A	9311	2	690
TP-1B	9853	2	730
<b>TOTAL VOLUME OF CLAY NEEDED</b>			<b>6420</b>

BORROW AREA (S.F.) 63549  
 CLAY THICKNESS FOR  
 GyC SOILS (FT) 3.25  
**VOLUME OF CLAY  
 AVAILABLE (C.Y.) 7649**

**GyC—Guernsey silt loam, 8 to 15 percent slopes**

**Map Unit Setting**

National map unit symbol: 2t32f  
 Elevation: 600 to 1,880 feet  
 Mean annual precipitation: 37 to 49 inches  
 Mean annual air temperature: 47 to 53 degrees F  
 Frost-free period: 165 to 205 days  
 Farmland classification: Farmland of statewide importance

**Map Unit Composition**

Guernsey and similar soils: 85 percent  
 Minor components: 15 percent  
 Estimates are based on observations, descriptions, and transects of the mapunit.

**Description of Guernsey**

**Setting**

Landform: Hills  
 Landform position (two-dimensional): Summit, backslope, shoulder  
 Landform position (three-dimensional): Interfluvial, crest, side slope, head slope  
 Down-slope shape: Convex  
 Across-slope shape: Linear  
 Parent material: Colluvium derived from limestone and shale over residuum weathered from limestone and shale

**Typical profile**

Ap - 0 to 8 inches: silt loam  
 BE - 8 to 15 inches: silt loam  
 Bt1 - 15 to 22 inches: silty clay loam  
 Bt2 - 22 to 37 inches: silty clay } 3.25' clay  
 Btg - 37 to 54 inches: silty clay loam  
 2C - 54 to 60 inches: channery silt loam  
 2Cr - 60 to 70 inches: bedrock

**Properties and qualities**

Slope: 8 to 15 percent  
 Depth to restrictive feature: 59 to 62 inches to paralithic bedrock  
 Drainage class: Moderately well drained  
 Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)  
 Depth to water table: About 16 to 23 inches  
 Frequency of flooding: None  
 Frequency of ponding: None



**PROPERTY OWNER REQUEST TO LEAVE THE PROCESSING YARD, POND  
1 AND ITS DITCHES, HAUL ROAD, AND CHANGE THE POST-MINING  
LANDUSE TO THIS AREA**

**TO:** The PA Department of Environmental Protection  
Bureau of Mining & Reclamation, or  
To Whom it May Concern:

I, David S. Herrholtz – President of Ligonier Stone & Lime Company, the owner of the property located approximately 1.0 mile southwest of Blairsville, on the western side of State Route 217, in Derry Township, Westmoreland County, PA, hereby request that Ligonier Stone & Lime Company leave the processing yard, Sediment Pond 1, its associated ditches and the haul road following reclamation for my use. Once all of the reclamation has been completed, I want this processing yard area, pond, its ditches, and the haul road to permanently remain as part of the post-mining landuse. I then accept all of the maintenance and liability of the previously listed items. The area included with these items that is currently classified as forestland, unmanaged natural habitat and pastureland and/or land occasionally cut for hay I want to be industrial/commercial following mining activities. This is what I want the land to be so it's consistent with my nearby properties and it suits my needs post-mining on my property.

Owner's Signature(s) \_\_\_\_\_  
David S. Herrholtz – President of  
Ligonier Stone & Lime Company

\_\_\_\_\_  
**Notary**

State of Pennsylvania

County of Westmoreland

Before me, the undersigned notary, personally appeared David S. Herrholtz, known to me (or satisfactorily proven) to be the person subscribed to in this instrument and who executed the same,

this 13 day of December, 2021.

Notary Public

Nichole W. Rose

seal

My Commission Expires: November 30, 2023

Commonwealth of Pennsylvania - Notary Seal  
Nichole W. Rose, Notary Public  
Westmoreland County  
My commission expires November 30, 2023  
Commission number 1238330  
Member, Pennsylvania Association of Notaries

**PROPERTY OWNER REQUEST TO LEAVE POND 1, ITS DITCHES,  
AND THE HAUL ROAD**

**TO:** The PA Department of Environmental Protection  
Bureau of Mining & Reclamation, or  
To Whom it May Concern:

I, David S. Herrholtz – President of Ligonier Stone & Lime Company, the owner of the property located approximately 1.0 mile southwest of Blairsville, on the western side of State Route 217, in Derry Township, Westmoreland County, PA, hereby request that Ligonier Stone & Lime Company leave Sediment Pond 1, the corresponding portions of the associated ditches and the haul road following reclamation for my use. Once all of the reclamation has been completed, I want this pond, portions of its ditches, and the haul road to permanently remain as part of the post-mining landuse. I then accept all of the maintenance and liability of the previously listed items.

Owner's Signature(s) \_\_\_\_\_

David S. Herrholtz – President of  
Ligonier Stone & Lime Company

\_\_\_\_\_  
**Notary**

State of Pennsylvania

County of Westmoreland

Before me, the undersigned notary, personally appeared David S. Herrholtz, known to me (or satisfactorily proven) to be the person subscribed to in this instrument and who executed the same,

this 25 day of November, 2020.

Notary Public \_\_\_\_\_

Nichole W. Rose  
Commonwealth of Pennsylvania - Notary Seal  
Nichole W. Rose, Notary Public  
Westmoreland County  
My commission expires November 30, 2023  
Commission number 1238330  
Member, Pennsylvania Association of Notaries



My Commission Expires: November 30, 2023

**Keyrock Energy LLC  
POBox 2223  
Johnson City, TN 37605**

**Ligonier Stone and Lime Company  
117 Marcia Street  
Latrobe, PA 15650**

**ATTN: Dave Herrholtz**

Please be advised that Keyrock Energy has no interest in ever using the abandoned Water Treatment Facility located on your property in Derry Township.

1. Keyrock sold all Coalbed Methane Assets located in Derry Township to Apollo Resources LLC located in Yatesboro, Pa (724-783-5035).
2. There are no producing Coalbed Methane Wells located in Derry Township.
3. Without any producing CBM wells in the Field, there is no reason to have a Water Treatment Facility.
4. The NPDES permit that Keyrock Energy had for the Derry Water Treatment Plant was not renewed with DEP.
5. Keyrock Energy did not own the property. Keyrock Energy leased the property from Bentley Coal/Bentley Development.
6. The Water Treatment Facility Site, per the requirements of the Lease Agreement, had to be restored to its original state when the Lessee elected not to renew the lease. Subsequently, the Lessor, Bentley Coal/Bentley Development asked Keyrock to leave the ponds for the proposed future use of the new Landowner, Ligonier Construction. However, Keyrock was asked to remove the Liner, the Fencing, the discharge piping, and the Inflow piping.
7. At this point in time, Keyrock Energy LLC does not have any operational Coalbed Methane Assets located in Pennsylvania.

*Michael A. Bucheit*

**Michael A. Bucheit  
Land Agent for Keyrock Energy LLC  
724-771-4275 (cell)  
mbucheit@wpa.net**



### SEDIMENT POND CERTIFICATION

Permittee: Ligonier Stone & Lime Company Site Name: SMT East Surface Mine SMP No.: 65210301  
 Engineer/Land Surveyor: Earthtech, Inc. Structure ID #: SP-1 NPDES Outfall ID #: 001  
 Location (point of discharge): Latitude (DMS): 40°24'46" Longitude (DMS): 79°16'03"  
 Drainage Area: 44.8 acres Design Storm: 50 year / 24 hour Rainfall Amount: 4.76 inches  
 Average Watershed Slope: 10% Land Use: Quarry Soil Type: C Curve Number: 85  
 Peak Discharge: 137.6 cubic feet/second NPDES Average Flow: 0.54 mgd NPDES Design Flow: 146.0 mgd

	<i>Permit Application</i>	<i>As Constructed</i>	
Embankment	Top Width (Minimum)	<u>10'</u>	
	Outside Slope (Maximum) (H:V)	<u>3h:1v</u>	
	Inside Slope (Maximum) (H:V)	<u>3h:1v</u>	
	Top Elevation	<u>1033.0</u>	
	Bottom Elevation	<u>1018.0</u>	
	Upstream Toe Elevation		
	Downstream Toe Elevation		
	Type of Cover	<u>Vegetation</u>	
	Incised Slope (if any)		
	Inside Slope (Maximum) (H:V)	<u>2h:1v</u>	
Top Elevation			
Bottom Elevation			
Principal Spillway	Type	<u>Barrel</u>	
	Conduit Diameter (if barrel/riser give both)	<u>18"</u>	
	Inlet Elevation	<u>1029.0</u>	
	Outlet Protection	<u>R-4 Rip-Rap</u>	
	Spillway Capacity (cubic feet/second)	<u>7.6 cfs</u>	
Dewatering Device	Type/Size	<u>6" Perf PVC w/capped top</u>	
	Inlet Elevation	<u>1021.8</u>	
	Discharge Regulation (self-draining or valved)	<u>Valved</u>	
	Discharge Capacity (cubic feet/second)	<u>1.64 cfs</u>	
	Time to Dewater Full Pond	<u>6.98 days</u>	
Emergency Spillway	Type	<u>Trapezoidal Weir</u>	
	Width	<u>35'</u>	
	Depth (with 2 feet of freeboard)	<u>3.5'</u>	
	Length	<u>115' / (20' control)</u>	
	Sideslopes (H:V)	<u>2h:1v</u>	
	Crest Elevation	<u>1029.5</u>	
	Slope	<u>10%</u>	
	Type of Lining/Protection	<u>R-4 Rip-Rap</u>	
Spillway Capacity (provide design calculations)	<u>225.9 cfs</u>		
Storage Capacity	Length @ Bottom	<u>280'</u>	
	Width @ Bottom	<u>75'</u>	
	Length @ Dewatering Device	<u>295.2'</u>	
	Width @ Dewatering Device	<u>90.2'</u>	
	Volume @ Dewatering Device	<u>90,345 c.f.</u>	
	Length @ Principal Spillway	<u>324'</u>	
	Width @ Principal Spillway	<u>119'</u>	
	Volume @ Principal Spillway	<u>324,009</u>	
	Length @ Crest of Emergency Spillway	<u>328'</u>	
	Width @ Crest of Emergency Spillway	<u>123'</u>	
Volume @ Crest of Emergency Spillway	<u>363,456</u>		

Will the sediment pond be constructed in previously disturbed, fractured, or unconsolidated material?  Yes  No  
 If yes, specify the type of liner that will be used: 2 ft Best On-Site Clay Material



## SEDIMENT POND CONSTRUCTION CERTIFICATION

Permittee: Ligonier Stone & Lime Company Site Name: SMT East Surface Mine SMP No.: 65210301  
 Engineer/Land Surveyor: Earthtech, Inc. Structure ID #: SP-1 NPDES Outfall ID #: 001

- |  |                              |                             |                             |
|--|------------------------------|-----------------------------|-----------------------------|
| 1. Has the facility been constructed at the location shown in the approved permit?           | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 2. Is the emergency spillway constructed at the location shown in the approved plan?         | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 3. Is the principal spillway constructed at the location shown in the approved plan?         | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 4. Is the dewatering device constructed at the location shown in the approved plan?          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 5. Are the collection channel inlets constructed at the location shown in the approved plan? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 6. Do the collection channel inlets have adequate inlet protection?                          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 7. Has the liner been installed in accordance with the approved plan?                        | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 8. Has the non-discharge alternative been constructed in accordance with the approved plan?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 9. Was coal encountered during construction of the pond?                                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 10. If yes, was a liner used?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 11. Identify any conditions or deficiencies in the facility that need to be corrected.       |                              |                             | <input type="checkbox"/> NA |

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**Stage of Construction**

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

**Date of Inspection**

**Inspected By**


Supervising Professional Engineer/Registered Professional Land Surveyor \_\_\_\_\_  
 Address and phone \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

\_\_\_\_\_  
 Signature of Registered Professional Engineer/Registered Professional Land Surveyor Date

\_\_\_\_\_  
 Registration Number and Expiration Date

\_\_\_\_\_  
 Signature of Permittee or Responsible Official Date

**SEAL**

\_\_\_\_\_  
 Title

Pond 1 Report

Top of dam elevation: 1033.0000  
 Bottom of pond elevation: 1018.0000  
 Top of dam width: 10.0000  
 Cut Slope: 50.00% 2.000:1 26.57°  
 Fill Slope: 33.33% 3.000:1 18.43°  
 Interior Slope: 50.00% 2.000:1 26.57°  
 Existing Surface: U:\Mining\Permits\Ligonier Stone & Lime\SMT East\DWG&  
 DATA\EXISTING 2020 PASDA 1'.tin

Pond Earthwork Volumes

Total cut : 501,493.4 C.F., 18,573.83 C.Y.  
 Total fill: 136,656.1 C.F., 5,061.34 C.Y.

Pond Storage Volumes

Water Elev	Storage(AcreFt)	(C.Y.)	(C.F.)	(Gallons)	Area(Acre)
1018.00	0.00000	0.0	0.0	0.0	0.482
1018.50	0.24514	395.5	10678.2	79878.2	0.498
1019.00	0.49852	804.3	21715.3	162442.0	0.515
1019.50	0.76023	1226.5	33115.5	247721.1	0.532
1020.00	1.03036	1662.3	44882.7	335745.6	0.549
1020.50	1.30902	2111.9	57020.8	426545.4	0.566
1021.00	1.59628	2575.3	69534.0	520150.4	0.583
1021.50	1.89224	3052.8	82426.2	616590.5	0.601
1022.00	2.19700	3544.5	95701.3	715895.7	0.618
1022.50	2.51064	4050.5	109363.5	818095.8	0.636
1023.00	2.83326	4571.0	123416.7	923220.7	0.654
1023.50	3.16494	5106.1	137864.8	1031300.5	0.672
1024.00	3.50579	5656.0	152712.0	1142365.0	0.691
1024.50	3.85588	6220.8	167962.2	1256444.2	0.710
1025.00	4.21532	6800.7	183619.3	1373567.9	0.728
1025.50	4.58419	7395.8	199687.5	1493766.2	0.747
1026.00	4.96260	8006.3	216170.7	1617068.8	0.766
1026.50	5.35062	8632.3	233072.8	1743505.8	0.786
1027.00	5.74835	9274.0	250398.0	1873107.0	0.805
1027.50	6.15588	9931.5	268150.2	2005902.5	0.825
1028.00	6.57331	10604.9	286333.3	2141922.0	0.845
1028.50	7.00072	11294.5	304951.5	2281195.6	0.865
1029.00	7.43822	12000.3	324008.7	2423753.1	0.885
1029.50	7.88588	12722.5	343508.8	2569624.4	0.906
1030.00	8.34380	13461.3	363456.0	2718839.6	0.926
1030.50	8.81208	14216.8	383854.2	2871428.5	0.947
1031.00	9.29080	14989.2	404707.3	3027421.0	0.968
1031.50	9.78006	15778.5	426019.5	3186847.0	0.989
1032.00	10.27995	16585.0	447794.7	3349736.6	1.010
1032.50	10.79056	17408.8	470036.8	3516119.6	1.032
1033.00	11.31198	18250.0	492750.0	3686025.8	1.054

SP-1 Emergency Spillway Design  
2021

Wed Dec 29 09:02:08

Shape:	Trapezoidal	
Side Slope Ratio (V:H):	0.50	
Crest Length:	35.00	ft
Invert Elevation:	1029.50	ft
Coefficient:	2.63	
Number of Openings:	1	

Calculation Result

Headwater Elevation:	1031.00	ft
Discharge:	225.8782	cfs
Velocity:	3.96	ft/s

## Design Parameters

## Section

Shape:	Circular
Material:	HDPE
Diameter:	18.00 in
Manning's n:	0.0120
Number of Barrels:	1

## Inlet

Inlet Type:	Mitered to Slope
Ke:	0.70

## Inverts

Inlet Invert Elevation:	1029.000	ft
Outlet Invert Elevation:	1027.000	ft
Length:	100.000	ft
Slope:	2.00	%

## Culvert Calculation

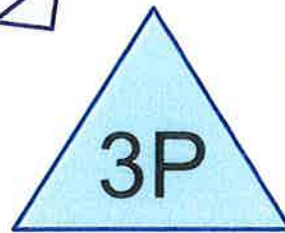
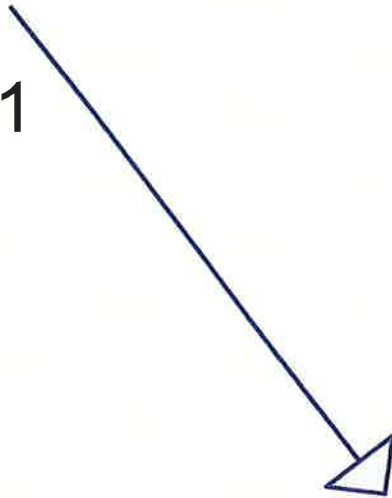
Discharge:	7.5895	cfs
Headwater Elevation:	1031.000	ft
Tailwater Elevation:	0.000	ft
Downstream Velocity:	8.97	ft/s
Downstream Flow Depth:	0.725	ft
Flow Control Type:	Inlet Control, Unsub/submerged	

### SP-1 DEWATERING

Elevation	Storage (cf)	Discharge (cfs)	Time (hr)	# of Openings	Orifice Size (in)
1021.8	90345	0.00	0	2	1.5
1022.3	103852	0.08	44.90		
1022.8	117748	0.12	32.66	2	1.5
1023.3	132038	0.23	17.39		
1023.8	146725	0.29	14.30	2	1.5
1024.3	161813	0.42	10.10		
1024.8	177307	0.49	8.78	2	1.5
1025.3	193211	0.64	6.94		
1025.8	209527	0.73	6.24	2	1.5
1026.3	226261	0.89	5.24		
1026.8	243417	0.99	4.81	2	1.5
1027.3	260998	1.16	4.20		
1027.8	279008	1.28	3.91	2	1.5
1028.3	297452	1.47	3.50		
1028.8	316333	1.59	3.29		
1029.0	324009	1.64	1.30		
		<b>Total</b>	<b>167.56</b>	<b>hours</b>	
			<b>6.98</b>	<b>days</b>	



AREA-1



SP-1 EMS



**Summary for Subcatchment 4S: AREA-1**

Runoff = 151.58 cfs @ 12.13 hrs, Volume= 10.898 af, Depth> 2.92"

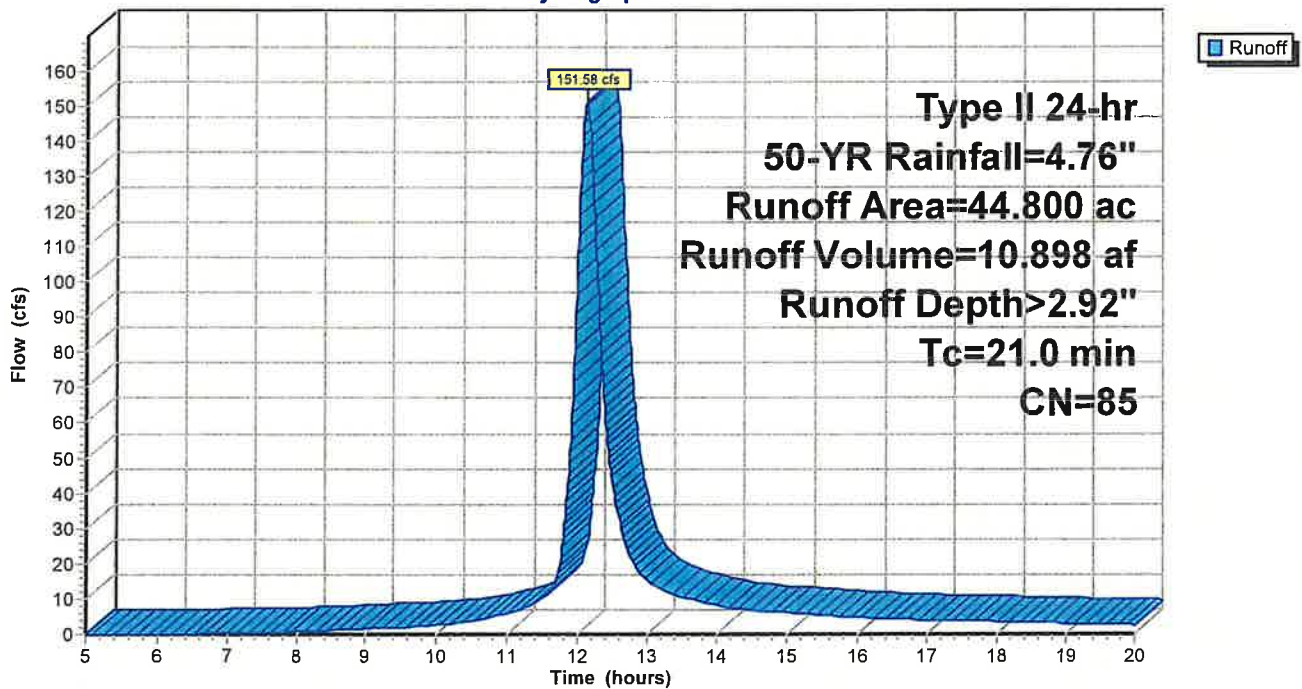
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 50-YR Rainfall=4.76"

Area (ac)	CN	Description
* 44.800	85	
44.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0					Direct Entry,

**Subcatchment 4S: AREA-1**

Hydrograph



**SP-1**

Type II 24-hr 50-YR Rainfall=4.76"

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**Summary for Pond 3P: SP-1 EMS**

Inflow Area = 44.800 ac, 0.00% Impervious, Inflow Depth > 2.92" for 50-YR event  
 Inflow = 151.58 cfs @ 12.13 hrs, Volume= 10.898 af  
 Outflow = 137.57 cfs @ 12.20 hrs, Volume= 10.820 af, Atten= 9%, Lag= 4.2 min  
 Tertiary = 137.57 cfs @ 12.20 hrs, Volume= 10.820 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,029.50' Surf.Area= 0.906 ac Storage= 7.886 af  
 Peak Elev= 1,030.80' @ 12.20 hrs Surf.Area= 0.960 ac Storage= 9.101 af (1.215 af above start)  
 Flood Elev= 1,031.00' Surf.Area= 0.968 ac Storage= 9.291 af (1.405 af above start)

Plug-Flow detention time= 275.9 min calculated for 2.932 af (27% of inflow)  
 Center-of-Mass det. time= 8.6 min ( 789.4 - 780.8 )

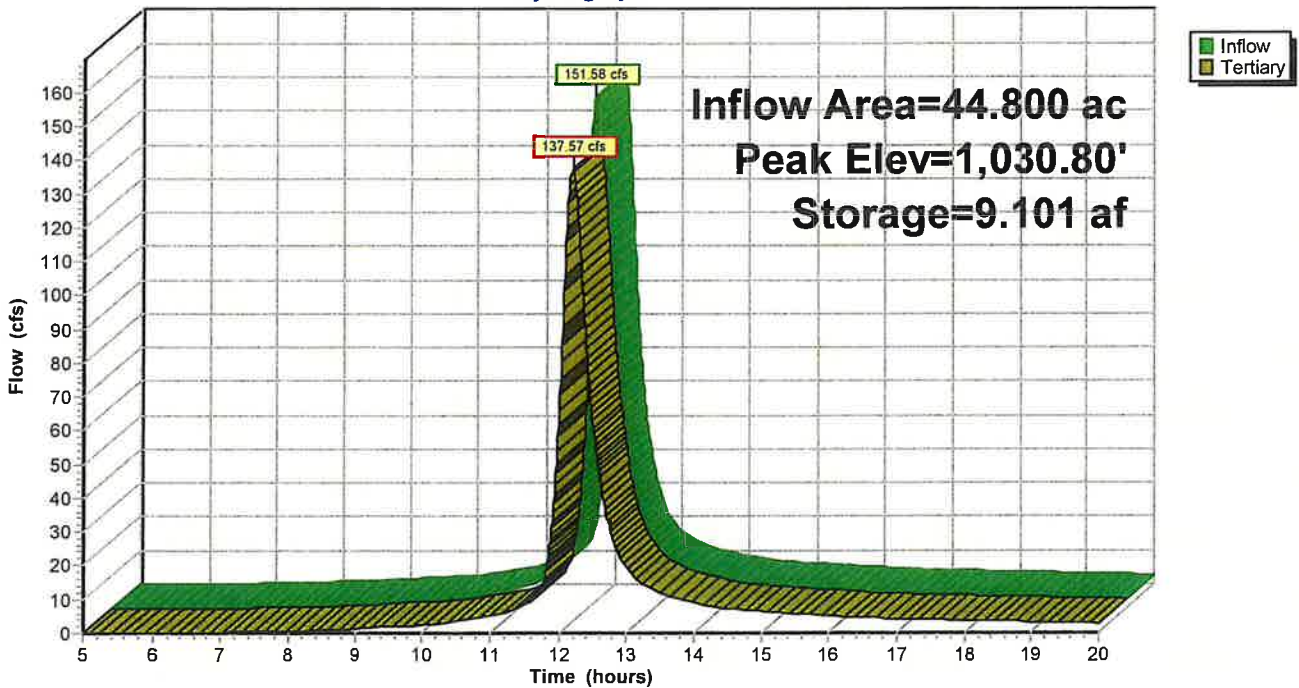
Volume	Invert	Avail.Storage	Storage Description
#1	1,018.00'	11.312 af	75.00'W x 280.00'L x 15.00'H Prismatic Z=2.0

Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,029.50'	35.0' long x 20.0' breadth EMERGENCY SPILLWAY Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Tertiary OutFlow Max=137.36 cfs @ 12.20 hrs HW=1,030.80' (Free Discharge)  
 ←1=EMERGENCY SPILLWAY (Weir Controls 137.36 cfs @ 3.01 fps)

**Pond 3P: SP-1 EMS**

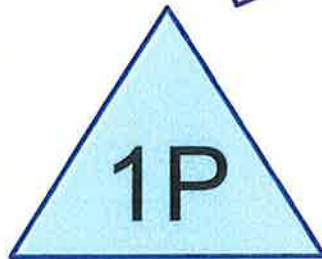
Hydrograph







AREA-1



SP-1



### Summary for Subcatchment 4S: AREA-1

Runoff = 100.23 cfs @ 12.14 hrs, Volume= 7.119 af, Depth> 1.91"

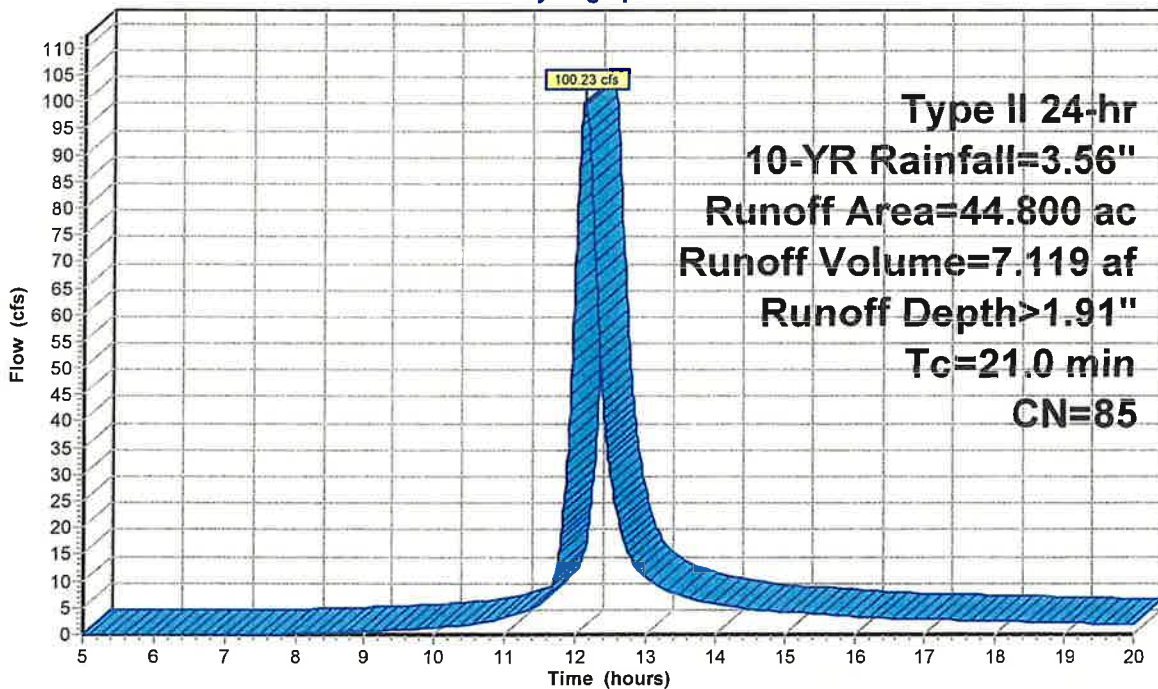
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type II 24-hr 10-YR Rainfall=3.56"

Area (ac)	CN	Description
* 44.800	85	
44.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.0					Direct Entry,

### Subcatchment 4S: AREA-1

Hydrograph



Runoff

**Type II 24-hr  
10-YR Rainfall=3.56"  
Runoff Area=44.800 ac  
Runoff Volume=7.119 af  
Runoff Depth>1.91"  
Tc=21.0 min  
CN=85**

**SP-1**

Type II 24-hr 10-YR Rainfall=3.56"

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Page 3

**Summary for Pond 1P: SP-1**

Inflow Area = 44.800 ac, 0.00% Impervious, Inflow Depth > 1.91" for 10-YR event  
 Inflow = 100.23 cfs @ 12.14 hrs, Volume= 7.119 af  
 Outflow = 2.56 cfs @ 18.09 hrs, Volume= 1.370 af, Atten= 97%, Lag= 357.2 min  
 Primary = 1.66 cfs @ 18.09 hrs, Volume= 1.054 af  
 Secondary = 0.90 cfs @ 18.09 hrs, Volume= 0.316 af  
 Tertiary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,021.80' Surf.Area= 0.611 ac Storage= 2.074 af  
 Peak Elev= 1,029.48' @ 18.09 hrs Surf.Area= 0.905 ac Storage= 7.865 af (5.791 af above start)  
 Flood Elev= 1,031.00' Surf.Area= 0.968 ac Storage= 9.291 af (7.217 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)  
 Center-of-Mass det. time= 198.5 min ( 988.8 - 790.3 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,018.00'	11.312 af	<b>75.00'W x 280.00'L x 15.00'H Prismaoid Z=2.0</b>

Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,029.50'	<b>35.0' long x 20.0' breadth EMERGENCY SPILLWAY</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	1,029.00'	<b>18.0" Round PRINCIPAL SPILLWAY</b> L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,029.00' / 1,027.00' S= 0.0333 1' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Primary	1,021.80'	<b>6.0" Round DEWATERING PIPE</b> L= 140.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,021.80' / 1,019.80' S= 0.0143 1' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.20 sf
#4	Device 3	1,021.80'	<b>1.5" Vert. ORIFICES X 2.00 columns</b> X 7 rows with 12.0" cc spacing C= 0.600

Primary OutFlow Max=1.66 cfs @ 18.09 hrs HW=1,029.48' (Free Discharge)  
 ↑3=DEWATERING PIPE (Barrel Controls 1.66 cfs @ 8.46 fps)  
 ↑4=ORIFICES (Passes 1.66 cfs of 1.73 cfs potential flow)

Secondary OutFlow Max=0.90 cfs @ 18.09 hrs HW=1,029.48' (Free Discharge)  
 ↑2=PRINCIPAL SPILLWAY (Inlet Controls 0.90 cfs @ 1.86 fps)

Tertiary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,021.80' (Free Discharge)  
 ↑1=EMERGENCY SPILLWAY (Controls 0.00 cfs)

**SP-1**

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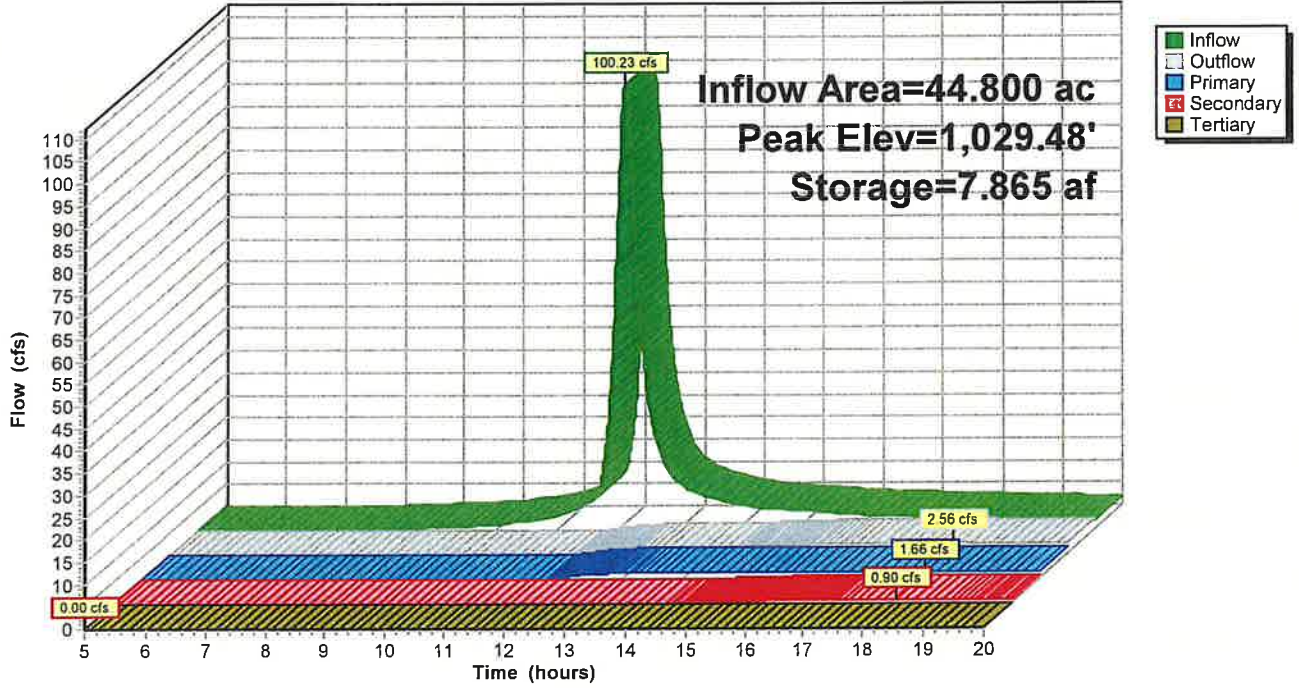
Type II 24-hr 10-YR Rainfall=3.56"

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Page 4

**Pond 1P: SP-1**

Hydrograph





### SEDIMENT POND CERTIFICATION

Permittee: Ligonier Stone & Lime Company Site Name: SMT East Surface Mine SMP No.: 65210301  
 Engineer/Land Surveyor: Earthtech, Inc. Structure ID #: SP-2 NPDES Outfall ID #: 002  
 Location (point of discharge): Latitude (DMS): 40°24'32" Longitude (DMS): 79°16'38"  
 Drainage Area: 31.5 acres Design Storm: 50 year / 24 hour Rainfall Amount: 4.76 inches  
 Average Watershed Slope: 15% Land Use: Quarry Soil Type: C Curve Number: 85  
 Peak Discharge: 87.1 cubic feet/second NPDES Average Flow: 0.36 mgd NPDES Design Flow: 96.9 mgd

		<i>Permit Application</i>	<i>As Constructed</i>
Embankment	Top Width (Minimum)	<u>10'</u>	
	Outside Slope (Maximum) (H:V)	<u>3h:1v</u>	
	Inside Slope (Maximum) (H:V)	<u>2h:1v</u>	
	Top Elevation	<u>1100.0</u>	
	Bottom Elevation	<u>1085.0</u>	
	Upstream Toe Elevation		
	Downstream Toe Elevation		
	Type of Cover	<u>Vegetation</u>	
	Incised Slope (if any)		
	Inside Slope (Maximum) (H:V)		
	Top Elevation		
	Bottom Elevation		
Principal Spillway	Type	<u>Barrel</u>	
	Conduit Diameter (if barrel/riser give both)	<u>18"</u>	
	Inlet Elevation	<u>1096.0</u>	
	Outlet Protection	<u>R-4 Rip-Rap</u>	
	Spillway Capacity (cubic feet/second)	<u>7.6 cfs</u>	
Dewatering Device	Type/Size	<u>6" Perf PVC w/capped top</u>	
	Inlet Elevation	<u>1089.0</u>	
	Discharge Regulation (self-draining or valved)	<u>Valved</u>	
	Discharge Capacity (cubic feet/second)	<u>1.10 cfs</u>	
	Time to Dewater Full Pond	<u>6.44 days</u>	
Emergency Spillway	Type	<u>Trapezoidal Weir</u>	
	Width	<u>44'</u>	
	Depth (with 2 feet of freeboard)	<u>3'</u>	
	Length	<u>80' / (20' control)</u>	
	Sideslopes (H:V)	<u>2h:1v</u>	
	Crest Elevation	<u>1097.0</u>	
	Slope	<u>2%</u>	
	Type of Lining/Protection	<u>Grass</u>	
	Spillway Capacity (provide design calculations)	<u>149.9 cfs</u>	
Storage Capacity	Length @ Bottom	<u>223'</u>	
	Width @ Bottom	<u>72' (average)</u>	
	Length @ Dewatering Device	<u>239'</u>	
	Width @ Dewatering Device	<u>88' (average)</u>	
	Volume @ Dewatering Device	<u>71,680 c.f.</u>	
	Length @ Principal Spillway	<u>267'</u>	
	Width @ Principal Spillway	<u>116' (average)</u>	
	Volume @ Principal Spillway	<u>247,100 c.f.</u>	
	Length @ Crest of Emergency Spillway	<u>271'</u>	
	Width @ Crest of Emergency Spillway	<u>120' (average)</u>	
	Volume @ Crest of Emergency Spillway	<u>277,852 c.f.</u>	

Will the sediment pond be constructed in previously disturbed, fractured, or unconsolidated material?  Yes  No

If yes, specify the type of liner that will be used: \_\_\_\_\_

## SEDIMENT POND CONSTRUCTION CERTIFICATION

Permittee: Ligonier Stone & Lime Company Site Name: SMT East Surface Mine SMP No.: 65210301  
 Engineer/Land Surveyor: Earthtech, Inc. Structure ID #: SP-2 NPDES Outfall ID #: 002

- |  |                              |                             |                             |
|--|------------------------------|-----------------------------|-----------------------------|
| 1. Has the facility been constructed at the location shown in the approved permit?           | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 2. Is the emergency spillway constructed at the location shown in the approved plan?         | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 3. Is the principal spillway constructed at the location shown in the approved plan?         | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 4. Is the dewatering device constructed at the location shown in the approved plan?          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 5. Are the collection channel inlets constructed at the location shown in the approved plan? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 6. Do the collection channel inlets have adequate inlet protection?                          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 7. Has the liner been installed in accordance with the approved plan?                        | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 8. Has the non-discharge alternative been constructed in accordance with the approved plan?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 9. Was coal encountered during construction of the pond?                                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 10. If yes, was a liner used?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 11. Identify any conditions or deficiencies in the facility that need to be corrected.       |                              |                             | <input type="checkbox"/> NA |

---



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### Stage of Construction

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

	Date of Inspection	Inspected By
<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>

Supervising Professional Engineer/Registered Professional Land Surveyor 

---

Address and phone 

---

---

---

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

Signature of Registered Professional Engineer/Registered Professional Land Surveyor 

---

 Date 

---

Registration Number and Expiration Date 

---

Signature of Permittee or Responsible Official 

---

 Date 

---

**SEAL**

---

 Title 

---

Pond 2 Report

Top of dam elevation: 1100.0000  
 Bottom of pond elevation: 1085.0000  
 Top of dam width: 10.0000  
 Cut Slope: 50.00% 2.000:1 26.57°  
 Fill Slope: 33.33% 3.000:1 18.43°  
 Interior Slope: 50.00% 2.000:1 26.57°  
 Existing Surface: U:\Mining\Permits\Ligonier Stone & Lime\SMT East\DWG&  
 DATA\EXISTING PASDA 2'.tin

Pond Earthwork Volumes

Total cut : 414,694.87 C.F., 15,359.07 C.Y.  
 Total fill: 31,525.59 C.F., 1,167.61 C.Y.

Pond Storage Volumes

Water Elev	Storage(AcreFt)	(C.Y.)	(C.F.)	(Gallons)	Area(Acre)
1085.00	0.00000	0.0	0.0	0.0	0.357
1085.50	0.18181	293.3	7919.6	59242.9	0.370
1086.00	0.37026	597.4	16128.7	120651.2	0.384
1086.50	0.56545	912.3	24631.2	184254.0	0.397
1087.00	0.76747	1238.2	33430.9	250080.5	0.411
1087.50	0.97640	1575.3	42531.8	318159.8	0.425
1088.00	1.19233	1923.6	51937.7	388521.0	0.439
1088.50	1.41535	2283.4	61652.6	461193.4	0.453
1089.00	1.64555	2654.8	71680.3	536206.0	0.468
1089.50	1.88303	3038.0	82024.8	613588.1	0.482
1090.00	2.12787	3433.0	92689.9	693368.7	0.497
1090.50	2.38016	3840.0	103679.6	775577.1	0.512
1091.00	2.63998	4259.2	114997.7	860242.4	0.527
1091.50	2.90744	4690.7	126648.1	947393.7	0.543
1092.00	3.18262	5134.6	138634.8	1037060.2	0.558
1092.50	3.46560	5591.2	150961.6	1129271.0	0.574
1093.00	3.75648	6060.5	163632.4	1224055.4	0.590
1093.50	4.05535	6542.6	176651.2	1321442.4	0.606
1094.00	4.36230	7037.8	190021.7	1421461.3	0.622
1094.50	4.67741	7546.2	203748.0	1524141.0	0.638
1095.00	5.00078	8067.9	217833.9	1629510.9	0.655
1095.50	5.33249	8603.1	232283.4	1737600.1	0.672
1096.00	5.67264	9151.9	247100.2	1848437.7	0.689
1096.50	6.02131	9714.4	262288.3	1962052.9	0.706
1097.00	6.37860	10290.8	277851.7	2078474.8	0.723
1097.50	6.74459	10881.3	293794.1	2197732.6	0.741
1098.00	7.11937	11485.9	310119.6	2319855.4	0.758
1098.50	7.50303	12104.9	326831.9	2444872.4	0.776
1099.00	7.89566	12738.3	343935.1	2572812.8	0.794
1099.50	8.29736	13386.4	361432.9	2703705.6	0.813
1100.00	8.70820	14049.2	379329.3	2837580.1	0.831

SP-2 Emergency Spillway Design

Tue Jan 19 07:41:15 2021

Shape:	Trapezoidal	
Side Slope Ratio (V:H):	0.50	
Crest Length:	44.00	ft
Invert Elevation:	1097.00	ft
Coefficient:	2.63	
Number of Openings:	1	

Calculation Result

Headwater Elevation:	1098.00	ft
Discharge:	149.9100	cfs
Velocity:	3.26	ft/s



## Design Parameters

## Section

Shape:	Circular
Material:	HDPE
Diameter:	18.00 in
Manning's n:	0.0120
Number of Barrels:	1

## Inlet

Inlet Type:	Mitered to Slope
Ke:	0.70

## Inverts

Inlet Invert Elevation:	1096.000	ft
Outlet Invert Elevation:	1094.600	ft
Length:	70.000	ft
Slope:	2.00	%

## Culvert Calculation

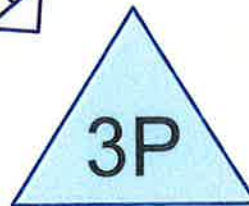
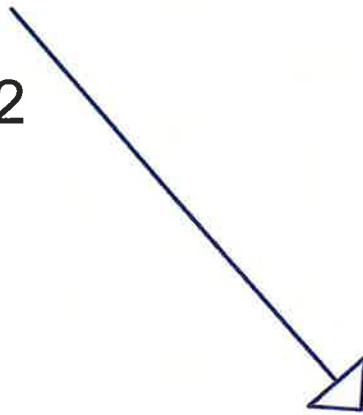
Discharge:	7.5895	cfs
Headwater Elevation:	1098.000	ft
Tailwater Elevation:	0.000	ft
Downstream Velocity:	8.97	ft/s
Downstream Flow Depth:	0.725	ft
Flow Control Type:	Inlet Control, Unsub/submerged	

### SP-2 DEWATERING

Elevation	Storage (cf)	Discharge (cfs)	Time (hr)	# of Openings	Orifice Size (in)
1089.0	71680	0.00	0	2	1.375
1089.5	82025	0.07	40.92		
1090.0	92690	0.10	29.83	2	1.375
1090.5	103680	0.19	15.91		
1091.0	114998	0.24	13.11	2	1.375
1091.5	126648	0.35	9.28		
1092.0	138635	0.41	8.09	2	1.375
1092.5	150962	0.53	6.40		
1093.0	163632	0.61	5.77	2	1.375
1093.5	176651	0.75	4.85		
1094.0	190022	0.83	4.46		
1094.5	203748	0.91	4.20		
1095.0	217834	0.98	4.01		
1095.5	232283	1.04	3.86		
1096.0	247100	1.10	3.75		
		<b>Total</b>	<b>154.45</b>	<b>hours</b>	
			<b>6.44</b>	<b>days</b>	



AREA-2



SP-2 EMS



**SP-2**

Prepared by Earthtech, Inc.

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Type II 24-hr 50-YR Rainfall=4.76"

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**Summary for Subcatchment 4S: AREA-2**

Runoff = 89.68 cfs @ 12.22 hrs, Volume= 7.645 af, Depth> 2.91"

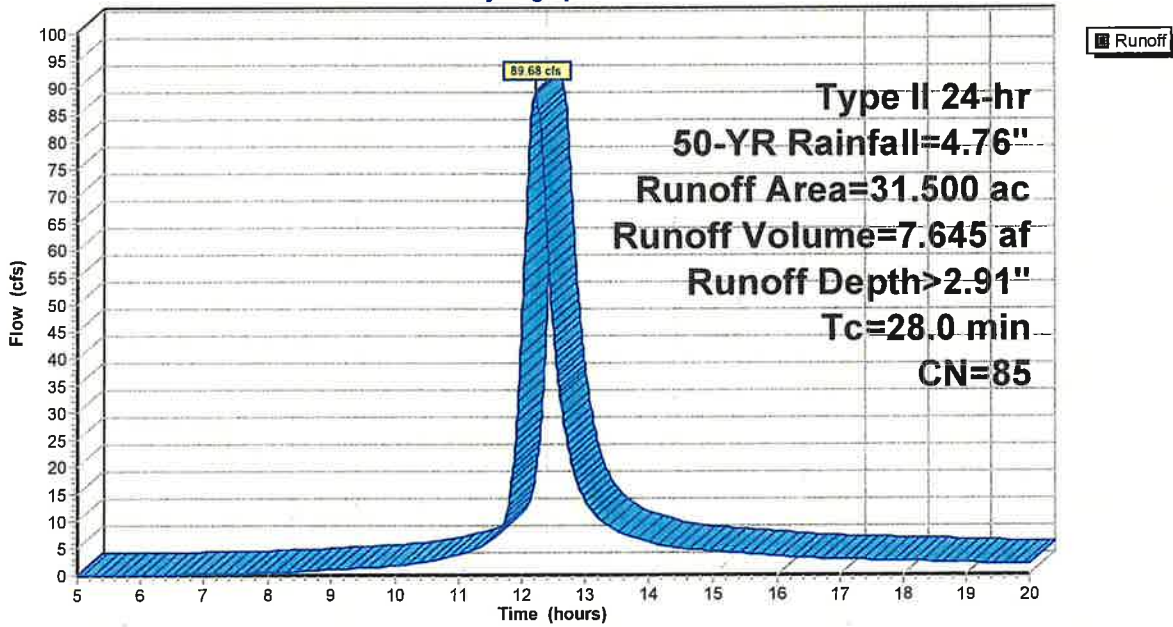
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type II 24-hr 50-YR Rainfall=4.76"

Area (ac)	CN	Description
* 31.500	85	
31.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.0					Direct Entry,

**Subcatchment 4S: AREA-2**

Hydrograph



**SP-2**

Type II 24-hr 50-YR Rainfall=4.76"

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Page 3

**Summary for Pond 3P: SP-2 EMS**

Inflow Area = 31.500 ac, 0.00% Impervious, Inflow Depth > 3.62" for 50-YR event  
 Inflow = 91.18 cfs @ 12.22 hrs, Volume= 9.506 af, Incl. 1.50 cfs Base Flow  
 Outflow = 87.06 cfs @ 12.28 hrs, Volume= 9.450 af, Atten= 5%, Lag= 3.3 min  
 Tertiary = 87.06 cfs @ 12.28 hrs, Volume= 9.450 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,097.00' Surf.Area= 0 sf Storage= 277,852 cf  
 Peak Elev= 1,097.82' @ 12.28 hrs Surf.Area= 0 sf Storage= 304,328 cf (26,476 cf above start)  
 Flood Elev= 1,098.00' Surf.Area= 0 sf Storage= 310,120 cf (32,268 cf above start)

Plug-Flow detention time= 322.5 min calculated for 3.071 af (32% of inflow)  
 Center-of-Mass det. time= 6.2 min ( 785.4 - 779.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,085.00'	379,329 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (cubic-feet)
1,085.00	0
1,085.50	7,920
1,086.00	16,129
1,086.50	24,631
1,087.00	33,431
1,087.50	42,532
1,088.00	51,938
1,088.50	61,653
1,089.00	71,680
1,089.50	82,025
1,090.00	92,690
1,090.50	103,680
1,091.00	114,998
1,091.50	126,648
1,092.00	138,635
1,092.50	150,962
1,093.00	163,632
1,093.50	176,651
1,094.00	190,022
1,094.50	203,748
1,095.00	217,834
1,095.50	232,283
1,096.00	247,100
1,096.50	262,288
1,097.00	277,852
1,097.50	293,794
1,098.00	310,120
1,098.50	326,832
1,099.00	343,935
1,099.50	361,433
1,100.00	379,329

Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,097.00'	<b>44.0' long x 20.0' breadth EMERGENCY SPILLWAY</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**SP-2**

Prepared by Earthtech, Inc.

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Type II 24-hr 50-YR Rainfall=4.76"

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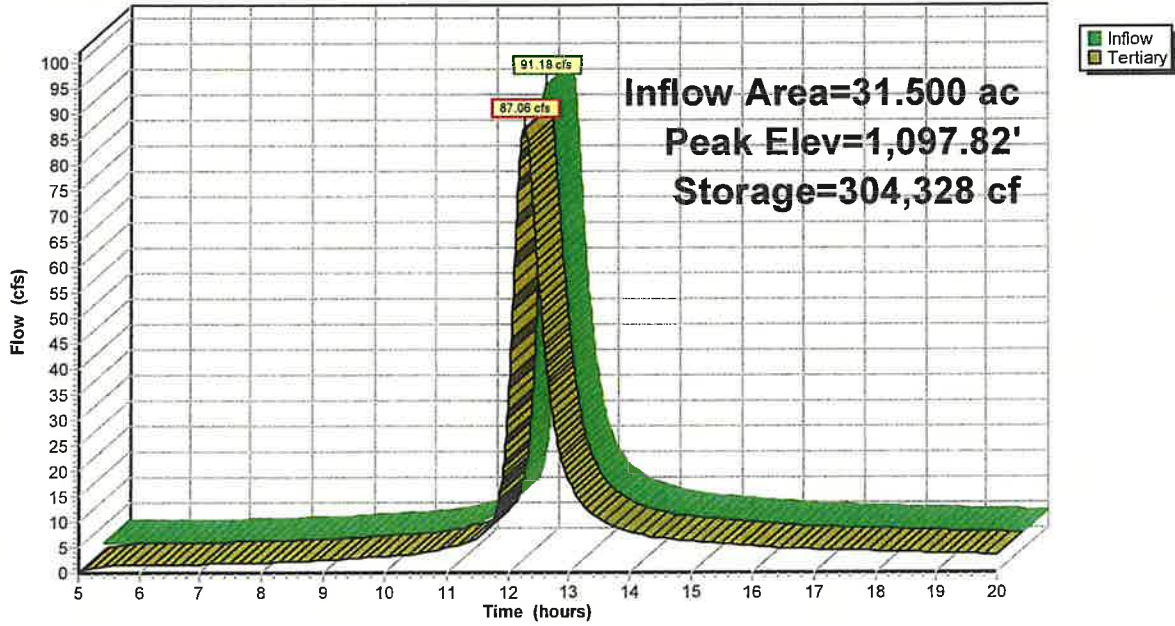
Page 4

Tertiary OutFlow Max=86.60 cfs @ 12.28 hrs HW=1,097.82' (Free Discharge)

↳ 1=EMERGENCY SPILLWAY (Weir Controls 86.60 cfs @ 2.39 fps)

**Pond 3P: SP-2 EMS**

Hydrograph





AREA-2



SP-2



**SP-2**

Prepared by Earthtech, Inc.

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Type II 24-hr 10-YR Rainfall=3.56"

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Page 2

**Summary for Subcatchment 4S: AREA-2**

Runoff = 59.19 cfs @ 12.22 hrs, Volume= 4.993 af, Depth> 1.90"

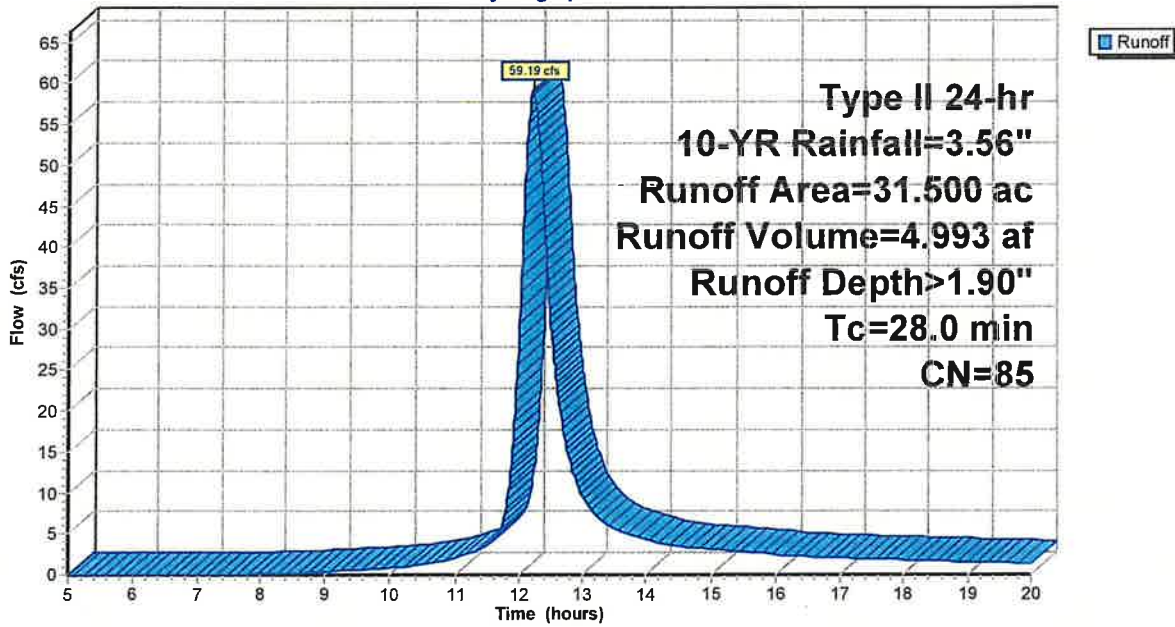
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type II 24-hr 10-YR Rainfall=3.56"

Area (ac)	CN	Description
* 31.500	85	
31.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.0					Direct Entry,

**Subcatchment 4S: AREA-2**

Hydrograph





**SP-2**

Type II 24-hr 10-YR Rainfall=3.56"

Prepared by Earthtech, Inc.

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Page 3

**Summary for Pond 5P: SP-2**

Inflow Area = 31.500 ac, 0.00% Impervious, Inflow Depth > 2.61" for 10-YR event  
 Inflow = 60.69 cfs @ 12.22 hrs, Volume= 6.854 af, Incl. 1.50 cfs Base Flow  
 Outflow = 4.43 cfs @ 15.33 hrs, Volume= 2.335 af, Atten= 93%, Lag= 186.3 min  
 Primary = 1.24 cfs @ 15.33 hrs, Volume= 0.857 af  
 Secondary = 3.19 cfs @ 15.33 hrs, Volume= 1.477 af  
 Tertiary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs

Starting Elev= 1,089.00' Surf.Area= 0 sf Storage= 71,680 cf

Peak Elev= 1,096.91' @ 15.33 hrs Surf.Area= 0 sf Storage= 274,896 cf (203,216 cf above start)

Flood Elev= 1,098.00' Surf.Area= 0 sf Storage= 310,120 cf (238,440 cf above start)

Plug-Flow detention time= 667.9 min calculated for 0.689 af (10% of inflow)

Center-of-Mass det. time= 187.2 min ( 970.6 - 783.4 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,085.00'	379,329 cf	<b>Custom Stage Data</b> Listed below

Elevation (feet)	Cum.Store (cubic-feet)
1,085.00	0
1,085.50	7,920
1,086.00	16,129
1,086.50	24,631
1,087.00	33,431
1,087.50	42,532
1,088.00	51,938
1,088.50	61,653
1,089.00	71,680
1,089.50	82,025
1,090.00	92,690
1,090.50	103,680
1,091.00	114,998
1,091.50	126,648
1,092.00	138,635
1,092.50	150,962
1,093.00	163,632
1,093.50	176,651
1,094.00	190,022
1,094.50	203,748
1,095.00	217,834
1,095.50	232,283
1,096.00	247,100
1,096.50	262,288
1,097.00	277,852
1,097.50	293,794
1,098.00	310,120
1,098.50	326,832
1,099.00	343,935
1,099.50	361,433
1,100.00	379,329

**SP-2**

Type II 24-hr 10-YR Rainfall=3.56"

Prepared by Earthtech, Inc.

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Page 4

Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,097.00'	<b>44.0' long x 20.0' breadth EMERGENCY SPILLWAY</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63
#2	Secondary	1,096.00'	<b>18.0" Round PRINCIPAL SPILLWAY</b> L= 70.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,096.00' / 1,094.60' S= 0.0200 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#3	Primary	1,089.00'	<b>18.0" Round DEWATERING PIPE</b> L= 300.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,089.00' / 1,085.00' S= 0.0133 '/ Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf
#4	Device 3	1,089.00'	<b>1.4" Vert. ORIFICES X 2.00 columns</b> X 5 rows with 12.0" cc spacing C= 0.600

Primary OutFlow Max=1.24 cfs @ 15.33 hrs HW=1,096.91' (Free Discharge)

↑3=DEWATERING PIPE (Passes 1.24 cfs of 18.12 cfs potential flow)

↑4=ORIFICES (Orifice Controls 1.24 cfs @ 11.55 fps)

Secondary OutFlow Max=3.19 cfs @ 15.33 hrs HW=1,096.91' (Free Discharge)

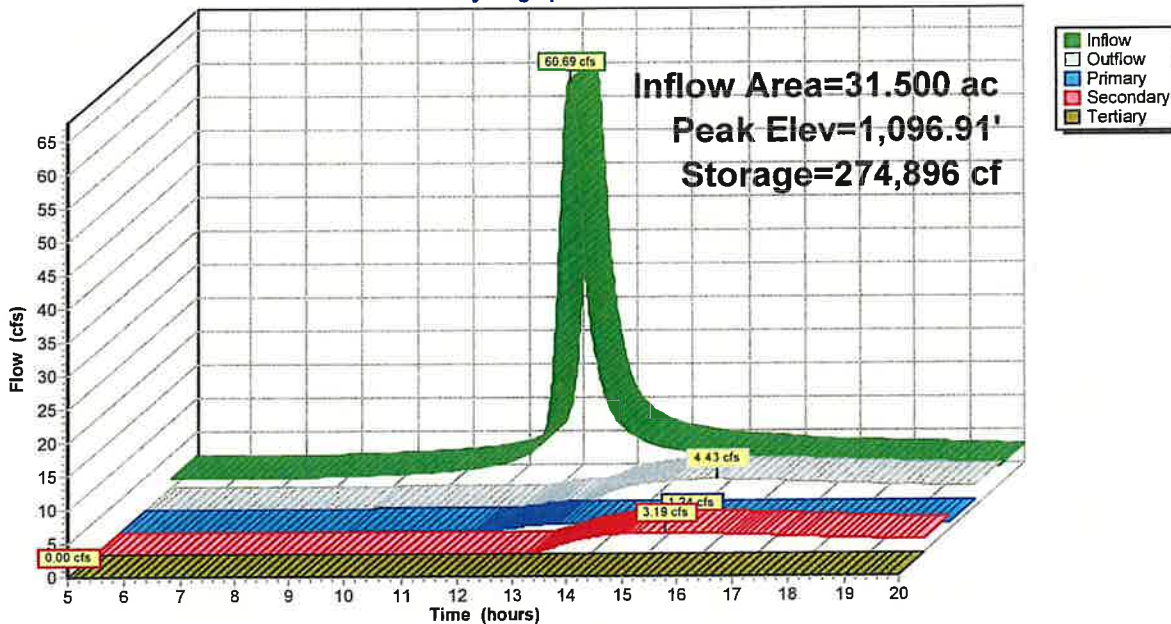
↑2=PRINCIPAL SPILLWAY (Inlet Controls 3.19 cfs @ 2.86 fps)

Tertiary OutFlow Max=0.00 cfs @ 5.00 hrs HW=1,089.00' (Free Discharge)

↑1=EMERGENCY SPILLWAY ( Controls 0.00 cfs)

**Pond 5P: SP-2**

Hydrograph





### SEDIMENT POND CERTIFICATION

Permittee: Ligonier Stone & Lime Company Site Name: SMT East Surface Mine SMP No.: 65210301  
 Engineer/Land Surveyor: Earthtech, Inc. Structure ID #: SP-3 NPDES Outfall ID #: 004  
 Location (point of discharge): Latitude (DMS): 40°24'41" Longitude (DMS): 79°16'06"  
 Drainage Area: 11.2 acres Design Storm: 25 year / 24 hour Rainfall Amount: 4.22 inches  
 Average Watershed Slope: 15% Land Use: Quarry Soil Type: C Curve Number: 85  
 Peak Discharge: 38.8 cubic feet/second NPDES Average Flow: 0.09 mgd NPDES Design Flow: 41.6 mgd

	<i>Permit Application</i>	<i>As Constructed</i>	
Embankment	Top Width (Minimum)	<u>8'</u>	
	Outside Slope (Maximum) (H:V)	<u>3h:1v</u>	
	Inside Slope (Maximum) (H:V)	<u>3h:1v</u>	
	Top Elevation	<u>1061.0</u>	
	Bottom Elevation	<u>1046.0</u>	
	Upstream Toe Elevation		
	Downstream Toe Elevation		
	Type of Cover	<u>Vegetation</u>	
	Incised Slope (if any)		
	Inside Slope (Maximum) (H:V)	<u>2h:1v</u>	
Top Elevation			
Bottom Elevation			
Principal Spillway	Type	<u>Barrel</u>	
	Conduit Diameter (if barrel/riser give both)	<u>12"</u>	
	Inlet Elevation	<u>1057.5</u>	
	Outlet Protection	<u>R-4 Rip-Rap</u>	
	Spillway Capacity (cubic feet/second)	<u>3.1 cfs</u>	
Dewatering Device	Type/Size	<u>4" Perf PVC w/capped top</u>	
	Inlet Elevation	<u>1051.5</u>	
	Discharge Regulation (self-draining or valved)	<u>Valved</u>	
	Discharge Capacity (cubic feet/second)	<u>0.27 cfs</u>	
	Time to Dewater Full Pond	<u>6.13 days</u>	
Emergency Spillway	Type	<u>Trapezoidal Weir</u>	
	Width	<u>18'</u>	
	Depth (with 2 feet of freeboard)	<u>3'</u>	
	Length	<u>80' / (20' control)</u>	
	Sideslopes (H:V)	<u>2h:1v</u>	
	Crest Elevation	<u>1058.0</u>	
	Slope	<u>8%</u>	
	Type of Lining/Protection	<u>R-4 Rip-Rap</u>	
Spillway Capacity (provide design calculations)	<u>64.4 cfs</u>		
Storage Capacity	Length @ Bottom	<u>120'</u>	
	Width @ Bottom	<u>30'</u>	
	Length @ Dewatering Device	<u>142'</u>	
	Width @ Dewatering Device	<u>52'</u>	
	Volume @ Dewatering Device	<u>29,762 c.f.</u>	
	Length @ Principal Spillway	<u>166'</u>	
	Width @ Principal Spillway	<u>76'</u>	
	Volume @ Principal Spillway	<u>89,186 c.f.</u>	
	Length @ Crest of Emergency Spillway	<u>168'</u>	
	Width @ Crest of Emergency Spillway	<u>78'</u>	
Volume @ Crest of Emergency Spillway	<u>95,616 c.f.</u>		

Will the sediment pond be constructed in previously disturbed, fractured, or unconsolidated material?  Yes  No  
 If yes, specify the type of liner that will be used: 2 ft Best On-Site Clay

## SEDIMENT POND CONSTRUCTION CERTIFICATION

Permittee: Ligonier Stone & Lime Company Site Name: SMT East Surface Mine SMP No.: 65210301  
 Engineer/Land Surveyor: Earthtech, Inc. Structure ID #: SP-3 NPDES Outfall ID #: 004

- |  |                              |                             |                             |
|--|------------------------------|-----------------------------|-----------------------------|
| 1. Has the facility been constructed at the location shown in the approved permit?           | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 2. Is the emergency spillway constructed at the location shown in the approved plan?         | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 3. Is the principal spillway constructed at the location shown in the approved plan?         | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 4. Is the dewatering device constructed at the location shown in the approved plan?          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 5. Are the collection channel inlets constructed at the location shown in the approved plan? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 6. Do the collection channel inlets have adequate inlet protection?                          | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 7. Has the liner been installed in accordance with the approved plan?                        | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 8. Has the non-discharge alternative been constructed in accordance with the approved plan?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 9. Was coal encountered during construction of the pond?                                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 10. If yes, was a liner used?  | <input type="checkbox"/> Yes | <input type="checkbox"/> No |                             |
| 11. Identify any conditions or deficiencies in the facility that need to be corrected.       |                              |                             | <input type="checkbox"/> NA |

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### Stage of Construction

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

	Date of Inspection	Inspected By

Supervising Professional Engineer/Registered Professional Land Surveyor \_\_\_\_\_  
 Address and phone \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

\_\_\_\_\_  
 Signature of Registered Professional Engineer/Registered Professional Land Surveyor Date

\_\_\_\_\_  
 Registration Number and Expiration Date

**SEAL**

\_\_\_\_\_  
 Signature of Permittee or Responsible Official Date

\_\_\_\_\_  
 Title

SP-3 Report

Top of dam elevation: 1061.0000  
 Bottom of pond elevation: 1046.0000  
 Top of dam width: 10.0000  
 Cut Slope: 50.00% 2.000:1 26.57°  
 Fill Slope: 33.33% 3.000:1 18.43°  
 Interior Slope: 50.00% 2.000:1 26.57°  
 Existing Surface: U:\Mining\Permits\Ligonier Stone & Lime\SMT East\DWG&  
 DATA\EXISTING 2020 PASDA 1'.tin

Pond Earthwork Volumes

Total cut : 107,522.1 C.F., 3,982.30 C.Y.  
 Total fill: 37,168.9 C.F., 1,376.63 C.Y.

Pond Storage Volumes

Water Elev	Storage(AcreFt)	(C.Y.)	(C.F.)	(Gallons)	Area(Acre)
1046.00	0.00000	0.0	0.0	0.0	0.083
1046.50	0.04306	69.5	1875.7	14031.0	0.090
1047.00	0.08965	144.6	3905.3	29213.9	0.097
1047.50	0.13988	225.7	6093.0	45578.8	0.104
1048.00	0.19382	312.7	8442.7	63155.5	0.112
1048.50	0.25157	405.9	10958.3	81974.0	0.119
1049.00	0.31322	505.3	13644.0	102064.2	0.127
1049.50	0.37887	611.2	16503.7	123456.0	0.135
1050.00	0.44861	723.8	19541.3	146179.3	0.144
1050.50	0.52252	843.0	22761.0	170264.1	0.152
1051.00	0.60070	969.1	26166.7	195740.3	0.161
1051.50	0.68325	1102.3	29762.3	222637.7	0.170
1052.00	0.77025	1242.7	33552.0	250986.4	0.179
1052.50	0.86179	1390.4	37539.7	280816.2	0.188
1053.00	0.95797	1545.5	41729.3	312157.1	0.197
1053.50	1.05888	1708.3	46125.0	345038.9	0.207
1054.00	1.16462	1878.9	50730.7	379491.7	0.216
1054.50	1.27526	2057.4	55550.3	415545.3	0.226
1055.00	1.39091	2244.0	60588.0	453229.7	0.236
1055.50	1.51165	2438.8	65847.7	492574.7	0.247
1056.00	1.63759	2642.0	71333.3	533610.4	0.257
1056.50	1.76880	2853.7	77049.0	576366.5	0.268
1057.00	1.90539	3074.0	82998.7	620873.1	0.279
1057.50	2.04744	3303.2	89186.3	667160.1	0.290
1058.00	2.19504	3541.3	95616.0	715257.3	0.301
1058.50	2.34829	3788.6	102291.7	765194.8	0.312
1059.00	2.50728	4045.1	109217.3	817002.4	0.324
1059.50	2.67211	4311.0	116397.0	870710.0	0.336
1060.00	2.84285	4586.5	123834.7	926347.6	0.347
1060.50	3.01961	4871.6	131534.3	983945.1	0.360
1061.00	3.20248	5166.7	139500.0	1043532.4	0.372

SP-3 Emergency Spillway Design

Tue Dec 21 14:46:01 2021

Shape:	Trapezoidal	
Side Slope Ratio (V:H):	0.50	
Crest Length:	18.00	ft
Invert Elevation:	1058.00	ft
Coefficient:	2.63	
Number of Openings:	1	

Calculation Result

Headwater Elevation:	1059.00	ft
Discharge:	64.4350	cfs
Velocity:	3.22	ft/s

Design Parameters

Section

Shape: Circular  
 Material: HDPE  
 Diameter: 12.00 in  
 Manning's n: 0.0120  
 Number of Barrels: 1

Inlet

Inlet Type: Mitered to Slope  
 Ke: 0.70

Inverts

Inlet Invert Elevation: 1057.500 ft  
 Outlet Invert Elevation: 1056.500 ft  
 Length: 50.000 ft  
 Slope: 2.00 %

Culvert Calculation

Discharge: 3.1314 cfs  
 Headwater Elevation: 1059.000 ft  
 Tailwater Elevation: 0.000 ft  
 Downstream Velocity: 7.19 ft/s  
 Downstream Flow Depth: 0.543 ft  
 Flow Control Type: Inlet Control, Unsub/submerged

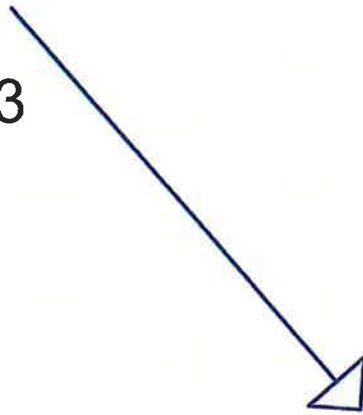
### SP-3 DEWATERING

Elevation	Storage (cf)	Discharge (cfs)	Time (hr)	# of Openings	Orifice Size (in)
1051.5	29762	0.00	0	1	1.25
1052.0	33552	0.03	36.28		
1052.5	37540	0.04	26.99	1	1.25
1053.0	41729	0.08	14.68		
1053.5	46125	0.10	12.33	1	1.25
1054.0	50731	0.14	8.88		
1054.5	55550	0.17	7.87		
1055.0	60588	0.19	7.29		
1055.5	65848	0.21	6.92		
1056.0	71333	0.23	6.66		
1056.5	77049	0.24	6.48		
1057.0	82999	0.26	6.36		
1057.5	89186	0.27	6.27		
		<b>Total</b>	<b>147.00</b>	<b>hours</b>	
			<b>6.13</b>	<b>days</b>	





AREA-3



SP-3 EMS



**SP-3**

Type II 24-hr 25-YR Rainfall=4.22"

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Page 2

**Summary for Subcatchment 4S: AREA-3**

Runoff = 43.85 cfs @ 12.03 hrs, Volume= 2.301 af, Depth> 2.47"

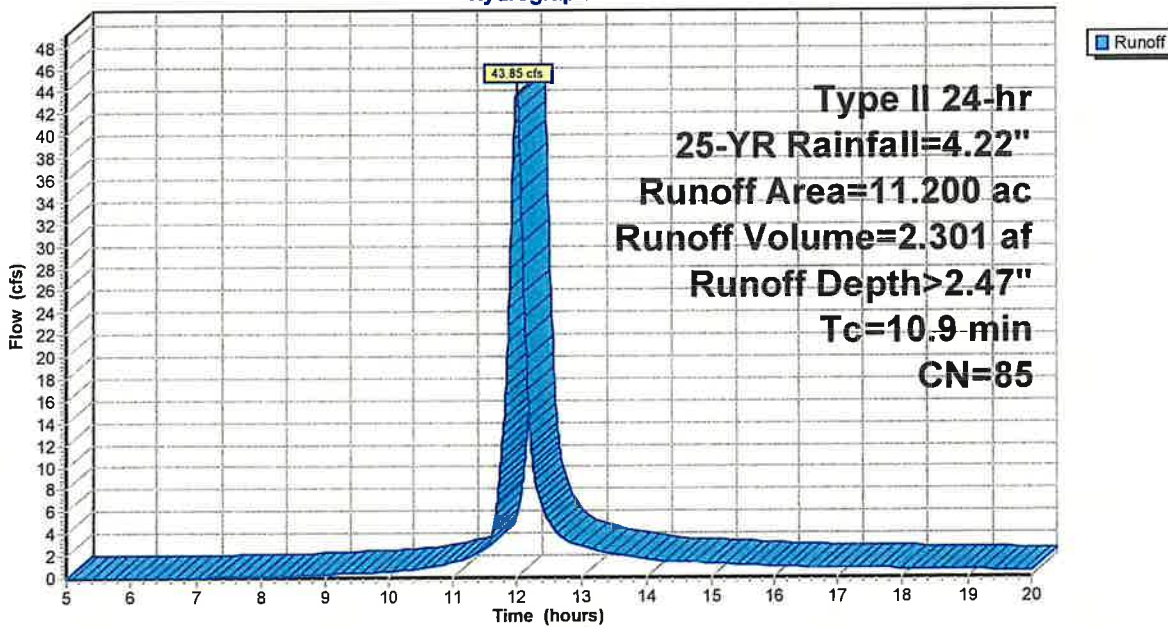
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
Type II 24-hr 25-YR Rainfall=4.22"

Area (ac)	CN	Description
* 11.200	85	
11.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.9					Direct Entry,

**Subcatchment 4S: AREA-3**

Hydrograph



**SP-3**

Prepared by Earthtech, Inc.

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Type II 24-hr 25-YR Rainfall=4.22"

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Page 3

**Summary for Pond 3P: SP-3 EMS**

Inflow Area = 11.200 ac, 0.00% Impervious, Inflow Depth > 2.47" for 25-YR event  
 Inflow = 43.85 cfs @ 12.03 hrs, Volume= 2.301 af  
 Outflow = 38.77 cfs @ 12.07 hrs, Volume= 2.291 af, Atten= 12%, Lag= 2.9 min  
 Tertiary = 38.77 cfs @ 12.07 hrs, Volume= 2.291 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,058.00' Surf.Area= 13,104 sf Storage= 95,616 cf  
 Peak Elev= 1,058.87' @ 12.07 hrs Surf.Area= 13,975 sf Storage= 107,428 cf (11,812 cf above start)  
 Flood Elev= 1,059.00' Surf.Area= 14,104 sf Storage= 109,217 cf (13,601 cf above start)

Plug-Flow detention time= 582.6 min calculated for 0.096 af (4% of inflow)  
 Center-of-Mass det. time= 6.9 min ( 783.6 - 776.7 )

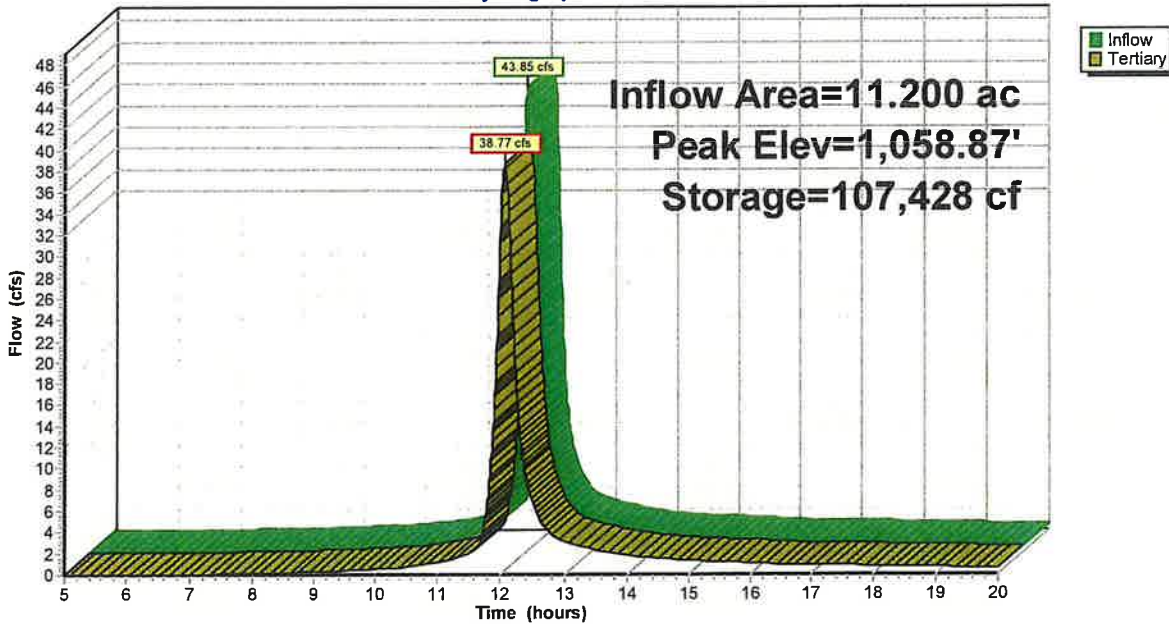
Volume	Invert	Avail.Storage	Storage Description
#1	1,046.00'	139,500 cf	<b>30.00'W x 120.00'L x 15.00'H Prismaoid Z=2.0</b>

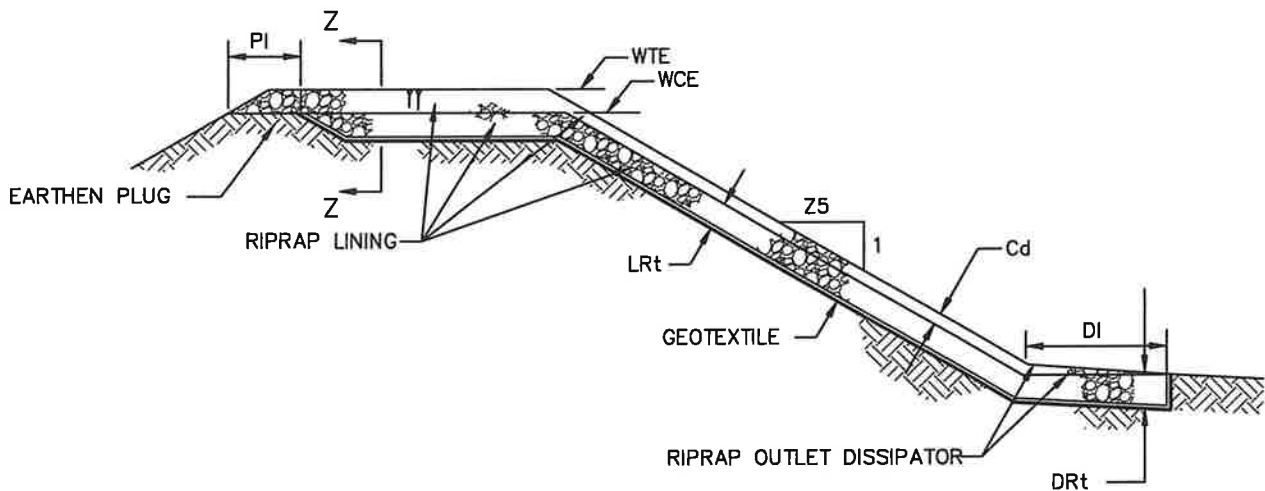
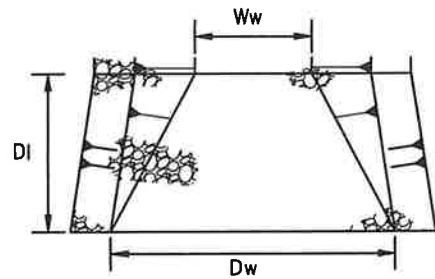
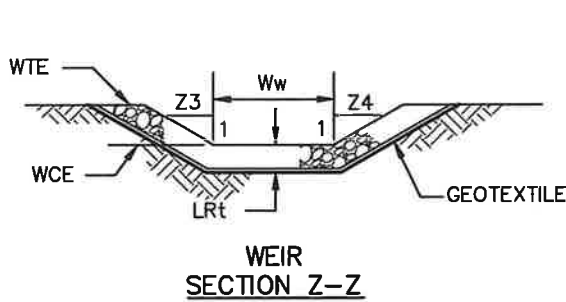
Device	Routing	Invert	Outlet Devices
#1	Tertiary	1,058.00'	<b>18.0' long x 20.0' breadth EMERGENCY SPILLWAY</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Tertiary OutFlow** Max=38.65 cfs @ 12.07 hrs HW=1,058.87' (Free Discharge)  
 ↳ **EMERGENCY SPILLWAY** (Weir Controls 38.65 cfs @ 2.46 fps)

**Pond 3P: SP-3 EMS**

Hydrograph





**EMBANKMENT SECTION ALONG EMERGENCY SPILLWAY**

BASIN NO.	WEIR					LINING		CHANNEL		DISSIPATOR			
	Z3 (FT)	Z4 (FT)	TOP ELEV WTE (FT)	CREST ELEV WCE (FT)	WIDTH Ww (FT)	RIPRAP SIZE (R-)	RIPRAP THICK. Lrt (IN)	Z5 (FT)	DEPTH Cd (FT)	LENGTH DI (FT)	WIDTH Dw (FT)	RIPRAP SIZE (R-)	RIPRAP THICK. Drt (IN)
SP-1	2	2	1033.0	1029.5	35	4	18	10	3	36	71	4	18
SP-2	2	2	1100.0	1097.0	44	4	18	12.5	3	34	78	4	18
SP-3	2	2	1061.0	1058.0	18	4	18	12.5	3	24	42	4	18

**NOTES:**

DIMENSION PI SHALL BE 5' MINIMUM.

DISPLACED RIPRAP WITHIN THE SPILLWAY AND/OR OUTLET CHANNEL SHALL BE REPLACED IMMEDIATELY.

**STANDARD CONSTRUCTION DETAIL #7-12**  
**SEDIMENT BASIN EMERGENCY SPILLWAY**  
**WITH RIPRAP LINING**

NOT TO SCALE

## E-TEMPLATE TREATMENT POND CERTIFICATION

Permittee: Ligonier Stone & Lime Company Site Name: SMT East Surface Mine SMP No.: 65210301  
 Engineer/Land Surveyor: Earthtech, Inc. Structure ID #: TP-1 NPDES Outfall ID #: 003  
 Location (point of discharge): Latitude (DMS): 40° 24' 52.0" Longitude (DMS): 79° 16' 08.1"  
 Treatment Basin Sizing Calculation:  $V = 1.33 (A R C) + (\text{Expected Groundwater Inflow Rate to Pit} \times \text{Design Detention Time})$   
 Drainage Area to System: 1.15 acres Design Storm: 10 year / 24-hour Rainfall Amount: 3.56 inches  
 Detention Time: 12 hours Expected Groundwater Inflow Rate to Pit: 0 gpm  
 Required Basin Volume: 6,905 cubic feet NPDES Average Flow: Rainfall Dependent mgd  
 NPDES Design Flow: 0.10 mgd

	<i>Permit Application</i>	<i>As Constructed</i>
Basin #: <u>A</u> Embankment	Top Width (Minimum)	5'
	Outside Slope (Maximum) (H:V)	3:1
	Inside Slope (Maximum) (H:V)	2:1
	Top Elevation (with 2 feet of freeboard)	1017'
	Bottom Elevation	1009'
	Upstream Toe Elevation	
	Downstream Toe Elevation	
	Type of Cover	Vegetation
	Incised Slope (if any)	
	Inside Slope (Maximum) (H:V)	
	Top Elevation	
	Bottom Elevation	
Basin #: <u>A</u> Spillway	Size/Type	8" Tee or Elbow
	Inlet Elevation	1015'
	Outlet Protection	Splashboard
	Spillway Capacity (cubic feet/second)	0.16
Basin #: <u>A</u> Storage Capacity	Length @ Bottom	36'
	Width @ Bottom	12'
	Length @ Spillway	60'
	Width @ Spillway	36'
	Volume @ Spillway	6,912 c.f.
	Sludge Cleanout Elevation	1012.5'
Basin #: <u>B</u> Embankment	Top Width (Minimum)	5'
	Outside Slope (Maximum) (H:V)	3:1
	Inside Slope (Maximum) (H:V)	2:1
	Top Elevation (with 2 feet of freeboard)	1012'
	Bottom Elevation	1004'
	Upstream Toe Elevation	
	Downstream Toe Elevation	
	Type of Cover	Vegetation
	Incised Slope (if any)	
	Inside Slope (Maximum) (H:V)	
	Top Elevation	
	Bottom Elevation	
Basin #: <u>B</u> Spillway	Size/Type	8" Tee or Elbow
	Inlet Elevation	1010'
	Outlet Protection	R-4 Rip-Rap
	Spillway Capacity (cubic feet/second)	0.16
Basin #: <u>B</u> Storage Capacity	Length @ Bottom	36'
	Width @ Bottom	12'
	Length @ Spillway	60'
	Width @ Spillway	36'
	Volume @ Spillway	6,912 c.f.
	Sludge Cleanout Elevation	1007.5'

Will the treatment pond be constructed in previously disturbed, fractured, or unconsolidated material?  Yes  No  
 If yes, specify the type of liner that will be used: 2 ft best on-site clay material

Note: If additional basins are necessary, please complete and attach an additional form.

### TREATMENT POND CONSTRUCTION CERTIFICATION

Permittee: Ligonier Stone & Lime Company Site Name: SMT East Surface Mine SMP No.: 65210301  
 Engineer/Land Surveyor: Earthech, Inc. Structure ID #: TP-1 NPDES Outfall ID #: 003

- 1. Has the facility been constructed at the location shown in the approved permit?  Yes  No
- 2. Is the spillway constructed at the location shown in the approved plan?  Yes  No
- 3. Has the liner been installed in accordance with the approved plan?  Yes  No  NA
- 4. Has the non-discharge alternative been constructed in accordance with the approved plan?  Yes  No  NA
- 5. Was coal encountered during construction of the pond?  Yes  No
- 6. If yes, was a liner used?  Yes  No
- 7. Identify any conditions or deficiencies in the facility that need to be corrected.  NA

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

#### Stage of Construction

(specify stage e.g. layout, impoundment/embankment construction, spillway/piping installation, non-discharge alternative construction)

Date of Inspection

Inspected By

Stage of Construction	Date of Inspection	Inspected By
_____	_____	_____
_____	_____	_____
_____	_____	_____

Supervising Professional Engineer/Registered Professional Land Surveyor \_\_\_\_\_

Address and phone \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

I certify in accordance with 25 Pa Code Section 77.531, 87.112, 89.101, or 90.112 that the above-mentioned structure is complete and has been constructed.

Signature of Registered Professional Engineer/Registered Professional Land Surveyor \_\_\_\_\_ Date \_\_\_\_\_

Registration Number and Expiration Date \_\_\_\_\_

**SEAL**

Signature of Permittee or Responsible Official \_\_\_\_\_ Date \_\_\_\_\_

\_\_\_\_\_ Title \_\_\_\_\_

### Treatment Basins Design Sheet

**Project:** SMT EAST SURFACE MINE  
**Client:** LIGONIER STONE & LIME COMPANY

**Treatment**  
**TP-1 (A&B)**

$$V = 1.33(A \cdot D \cdot R \cdot C)$$

#### Max Pit Drainage Area (ft<sup>2</sup>)

		Total
$A_1$ = Area of Pit	0.00	0.00
$A_2$ = Stockpile Area	50,000.00	50,000.00
		50,000.00

#### Design Criteria

$A$ = Total Area ( $A_1 + A_2$ ) (ft <sup>2</sup> ) =	50,000.00
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10 Year Storm (inches) =	3.56
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D = Detention Time (Hours) =	12
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R = Rainfall (Feet / Day) =	0.30
-----------------------------	------

C = Runoff coefficient =	0.7
--------------------------	-----

V = Required volume of Basin (ft <sup>3</sup> ) =	6,904.92
---	----------

Q = flow rate out of basin (ft <sup>3</sup> /sec) =	0.16
---	------

Q = flow rate out of basin (GPM) =	72 (maximum pump rate)
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#### Basin Dimensions

Inside Slope Ratio (H/1V) =	2
-----------------------------	---

Depth (feet) =	6
----------------	---

Bottom Width (feet) =	12
-----------------------	----

Bottom Length (feet) =	36
------------------------	----

Volume of Basin (ft <sup>3</sup> ) =	6,912.00
--------------------------------------	----------

**NOTE: Basins will be lined with 2 feet of clay or equivalent.**

**NOTE: Sludge shall be periodically removed**

**NOTE: Primary and Secondary Basin shall be the same size**

Lower Left Grid Corner : 1545427.93,397275.62  
 Upper right Grid Corner: 1545540.93,397417.62  
 X grid resolution: 113, Y grid resolution: 142  
 X grid cell size : 1.00, Y grid cell size: 1.00  
 Elevation Range: 1009.00 to 1017.00

Storage Volumes

Elevation	Storage(AcreFt)	(C.Y.)	(C.F.)	(Gallons)	Area(Acre)
1009.00	0.00000	0.0	0.0	0.0	0.000
1009.50	0.00743	12.0	323.6	2420.7	0.021
1010.00	0.02061	33.3	897.9	6717.1	0.032
1010.50	0.03923	63.3	1709.0	12784.0	0.043
1011.00	0.06339	102.3	2761.1	20654.5	0.054
1011.50	0.09318	150.3	4059.1	30364.0	0.065
1012.00	0.12873	207.7	5607.4	41946.6	0.077
1012.50	0.17013	274.5	7410.7	55435.6	0.089
1013.00	0.21748	350.9	9473.6	70867.6	0.101
1013.50	0.27090	437.1	11800.6	88274.4	0.113
1014.00	0.33050	533.2	14396.4	107692.3	0.125
1014.50	0.39636	639.5	17265.6	129155.4	0.138
1015.00	0.46861	756.0	20412.6	152697.1	0.151
1015.50	0.54735	883.1	23842.4	178353.4	0.164
1016.00	0.63267	1020.7	27559.2	206157.0	0.177
1016.50	0.72471	1169.2	31568.3	236147.4	0.191
1017.00	0.82382	1329.1	35885.7	268443.8	0.205



Lower Left Grid Corner : 1545536.82,397302.10  
 Upper right Grid Corner: 1545655.82,397445.10  
 X grid resolution: 119, Y grid resolution: 143  
 X grid cell size : 1.00, Y grid cell size: 1.00  
 Elevation Range: 1004.00 to 1012.00

Storage Volumes

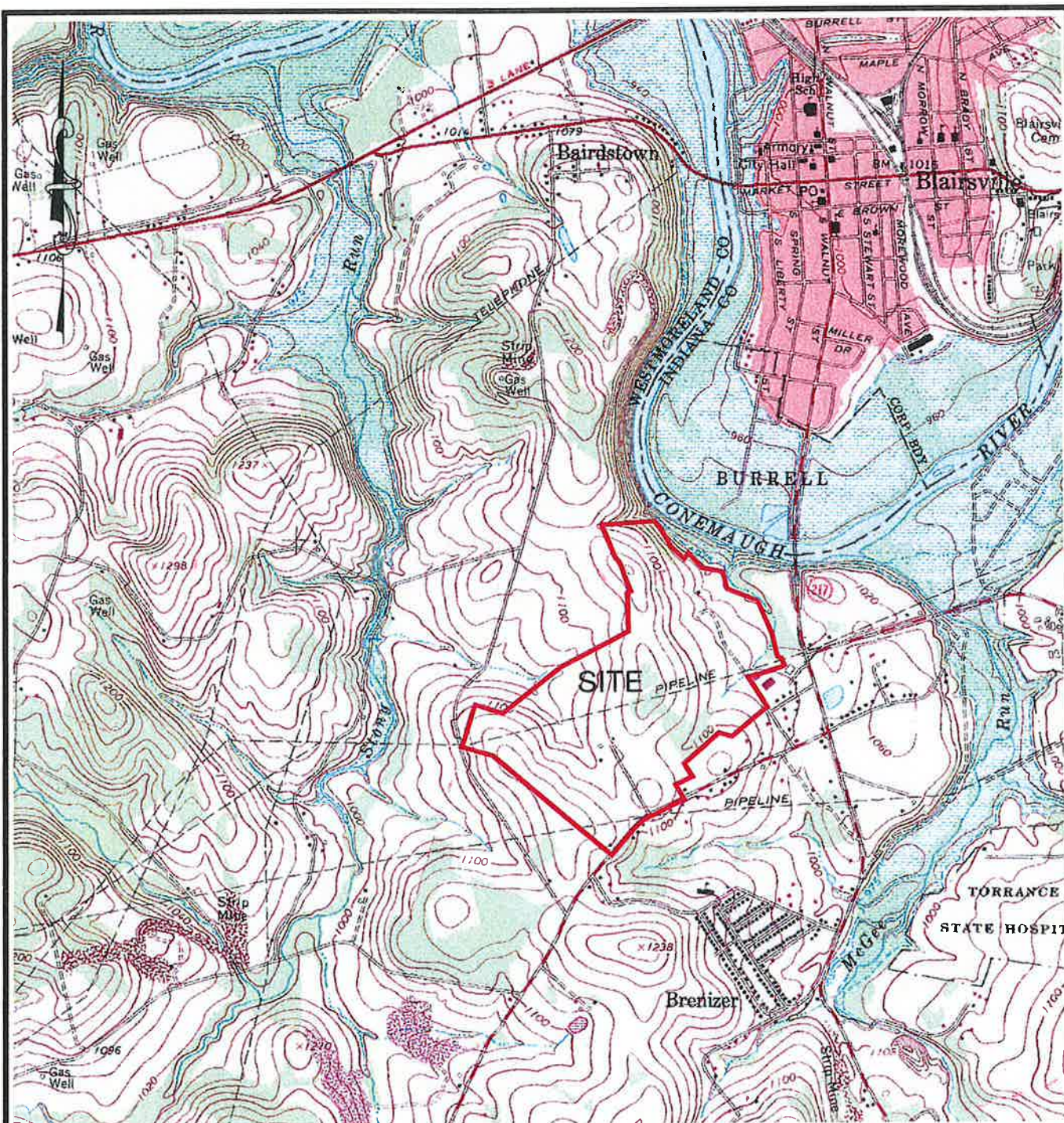
Elevation	Storage(AcreFt)	(C.Y.)	(C.F.)	(Gallons)	Area(Acre)
1004.00	0.00000	0.0	0.0	0.0	0.000
1004.50	0.01677	27.1	730.4	5464.0	0.040
1005.00	0.03975	64.1	1731.6	12953.5	0.052
1005.50	0.06856	110.6	2986.6	22341.1	0.064
1006.00	0.10328	166.6	4498.9	33654.0	0.075
1006.50	0.14398	232.3	6272.0	46917.7	0.087
1007.00	0.19076	307.8	8309.5	62159.6	0.100
1007.50	0.24369	393.1	10615.0	79405.8	0.112
1008.00	0.30285	488.6	13192.0	98682.8	0.125
1008.50	0.36832	594.2	16044.0	120017.3	0.137
1009.00	0.44019	710.2	19174.5	143435.4	0.150
1009.50	0.51853	836.6	22587.2	168963.6	0.163
1010.00	0.60343	973.5	26285.6	196629.7	0.176
1010.50	0.69497	1121.2	30273.1	226458.5	0.190
1011.00	0.79324	1279.8	34553.4	258477.4	0.203
1011.50	0.89831	1449.3	39130.4	292716.0	0.217
1012.00	1.01058	1630.4	44020.8	329298.6	0.231

Ligonier Stone & Lime Company  
SMT East Surface Mine

**Flocculant Usage Information & Procedure**

Per telephone correspondence with Dan Ryan of PFBC on November 22, 2021 the following flocculant information and proposed usage procedure at the SMT East Surface Mine is provided.


- Flocculants including Neutron Products Inc.'s "log-in-stream" photafloc gel logs may be used to aid in settling of suspended solids, colloidal fines and other parameters for NPDES pond outfalls.
- Flocculant logs will be placed in the collection ditch to a sediment pond and downslope of active site areas. They would be placed in the flow channel and fixed in place by staking. This allows for the flocculant to be placed in an effective area and away from the pond outlet. The goal is to promote surface contact between the flocculant and runoff water.
- The flocculant will be applied using a "log-in-stream" method by strategically placing the flocculant log in the flow path as indicated by the manufacturer. This allows the water to dissolve the flocculant as it flows past. Quantity used can vary as indicated by the manufacturer and they offer technical assistance on optimizing the amount used.
- After contact with the flocculant, the water will flow into the sediment pond to promote settling of suspended solids. Subsequently, the water will flow out of the pond and discharge to the unnamed tributary. See attached flow diagrams.
- The Safety Data Sheet for the proposed flocculant has been provided by Neutron Products, Inc. and is attached to this summary.



BLAIRSVILLE PA 7.5 MINUTE QUADRANGLE

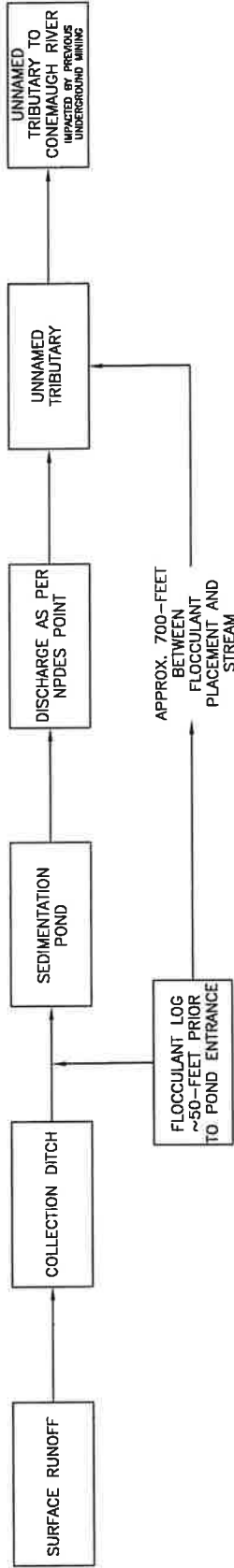
**LEGEND**

 PROPOSED SMT EAST PERMIT LINE

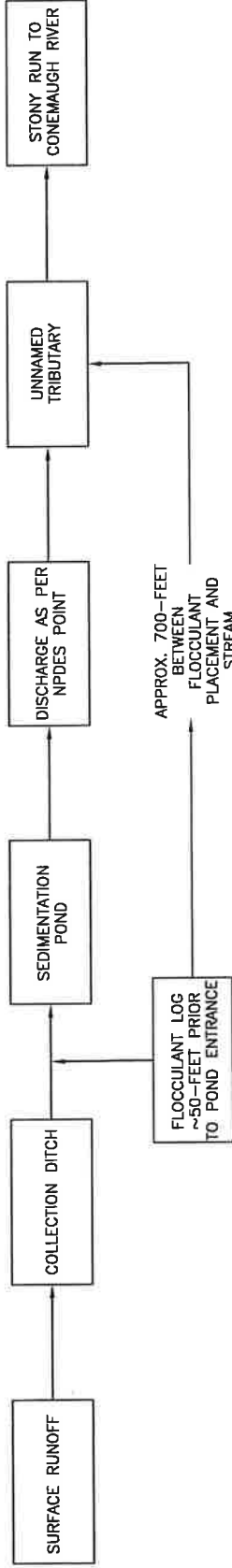
<p><b>LOCATION MAP</b></p>	<p>FILE NAME: LS&amp;L-SMT East.dwg</p>	<p>SCALE: 1"=2000'</p>	<p>DATE: DECEMBER 2021</p>	<p>DWN. BY: AMR</p>	<p>CHK. BY: BV</p>
<p>LIGONIER STONE &amp; LIME COMPANY SMT EAST SURFACE MINE DERRY TOWNSHIP WESTMORELAND COUNTY, PA</p>		<p> <b>Earthtech, Inc.</b> Uniontown Office P.O. Box 4-A Lemont Furnace, PA 15456 Telephone 724-439-1513 Fax 724-439-0633 <a href="http://www.earthtechinc.net/">http://www.earthtechinc.net/</a></p>			

# FLOCCULANT USE FLOW DIAGRAM

## EASTERN NPDES DISCHARGE POINTS



## WESTERN NPDES DISCHARGE POINT



MATERIAL SAFETY DATA SHEET  
NEUTRON PRODUCTS INC.

Revised March 31, 1989

I. PRODUCT IDENTIFICATION

Product Name: Photafloc 1137

Chemical Name: Cationic copolymer of acrylamide and a quaternized comonomer

Chemical Formula:  $-(\text{CH}_2-\underset{\text{NH}_2}{\text{C}}\text{O})_x-(\text{CH}_2-\underset{\text{COOR}_1\text{N}^+(\text{R}_2\text{R}_3\text{R}_4)}{\text{C}})_y-$  CAS NO. 69418-26-4

Appearance: Photafloc 1137 is a mildly acidic, water soluble, high molecular weight polymer in the form of a gel log. It varies in color from water white to slightly yellow and has a mild, slightly sweet odor.

II. HAZARD SPECIFICATIONS

Product Hazard: The polymer gel and its solutions are nonhazardous.

Hazardous Ingredients: The polymer gel contains a small amount of unreacted acrylamide monomer, CAS 79-06-1, (0.1 - 0.3%), which has an OSHA-PEL (permissible exposure limit) of 0.03 mg/m<sup>3</sup>. The American Council of Governmental Hygenists recommends a TLV-TWA (threshold value limit; 8 hour time weighted average) of 0.03 mg/m<sup>3</sup>, A2, skin. This acrylamide monomer level will not normally be reached when handling the polymer gel or its solutions. Also present is a small amount of unreacted cationic comonomer.

NFPA Hazard Rating:

Health -	0	minimal
Flammability -	0	minimal
Reactivity -	0	minimal
Special -	0	minimal

III. PHYSICAL HAZARDS

Flammability: The polymer gel and its solutions are nonflammable, noncombustible, and nonexplosive. No special fire extinguishing methods are needed.

Stability: The product is stable and compatible with aqueous systems. It has no hazardous decomposition products. Combustion products are carbon monoxide, carbon dioxide, ammonia, nitrogen oxides, and water.

Spillage: The spilled product solution and wet gel logs are very slippery. Use caution to avoid injury when handling. Follow cleanup and disposal methods listed in Section VI.

Irritation: Overexposure may result in the following:

Eyes: May cause mild eye irritation.

Skin: May cause irritation and dermatitis.

Ingestion: May cause irritation of the mouth and throat, nausea, and vomiting.

Emergency and First Aid Procedures:

Eyes: Flush gently with water for at least 15 minutes. Contact physician.

Skin: Wash with soap and running water. Remove contaminated clothing and wash before reuse.

Ingestion: Drink a large quantity of liquid to dilute the product. Induce vomiting. Call a physician.

Special Handling Requirements: Gloves should be worn when handling gel logs, polymer solutions, and surfaces contacted by them. Safety glasses are recommended. Product should be handled in ventilated areas. No special respiratory protection is required. Skid prevention methods should be employed in wet areas.

## IV. TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point:  $>100^{\circ}\text{C}$  ( $212^{\circ}\text{F}$ )

Freezing Point:  $<-17^{\circ}\text{C}$  ( $1^{\circ}\text{F}$ )

Vapor Pressure @  $10^{\circ}\text{C}$ : Not determined

Vapor Density: Not determined

% Volatile (vol): Negligible at  $70^{\circ}\text{F}$

Water Solubility: Infinite

Specific Gravity: 1.09 - 1.15

pH of 1% Solution: 4-6

Evaporation Rate: Slower than butyl acetate

## V. HEALTH HAZARD INFORMATION

Medical conditions generally recognized as aggravated by exposure: None

Primary route of entry: If standard industrial hygiene and recommended procedure are followed, entry of the product or listed ingredients is not expected.

Product: Photafloc 1137 is not listed as a carcinogen by the NTP, not regulated by OSHA, and not evaluated by IARC. No human effects are known for the polymer.

Ingredients: Acrylamide, present as a residual monomer, has been given an A2 notation "suspected of carcinogenic potential for man," by the ACGIH. Symptoms reported in humans due to excessive exposure to acrylamide monomer, generally thought to be due to skin absorption, include: fatigue, difficulty climbing stairs, weakness in hands and feet, tremors, ataxia, loss of deep tendon reflexes, numbness in the feet, tingling or cold sensations, and increased sensitivity to touch, all of which occur early. Secondary muscle atrophy, particularly in hands and feet, and weight loss, occur later. Urinary retention may occur. Central nervous system effects, which may occur, are abnormal sleepiness, poor memory, confusion, hallucinations, slurred speech,

hyperactive reflexes, abnormal behavior, positive Romberg sign, abnormal EEG, and changes in visual fields. Recovery can occur, but can take months to years. Increased sweating and erythema of the hands is reported as being characteristic; peeling of the skin of the palms has occurred.

#### VI. SPILL AND LEAK PROCEDURES

Polymer Gel: Avoid getting gel wet, as it becomes slippery and makes surfaces it contacts slippery. Sweep up or collect gel pieces, using gloves, and reuse or dispose of in accordance with local, state, and Federal regulations. The product is not listed in Federal hazardous waste regulations 40 CFR 261.33, Paragraphs (e) and (f). It does not exhibit any of the hazardous characteristics listed in 40 CFR 261, Subpart C.

Polymer Solutions: Contacted surfaces are slippery. Rinse with large amounts of water until slickness can no longer be detected. If extensive rinsing is impractical, apply an absorbant material, such as sawdust, and discard as a solid waste. Areas that remain slick can be treated with household bleach (aqueous sodium hypochlorite) and washed.

#### VII. CONTROL MEASURES

Appropriate Hygienic Practices: Avoid breathing mist. Do not allow eye or skin contact. Wash thoroughly after handling. Remove and wash contaminated clothing. Avoid contamination of food, beverages, or smoking materials.

Protective Equipment: Impervious gloves; safety glasses or goggles.

Work Practices: Keep work areas clean and dry. Surfaces subject to spills can become slippery.

Handling and Storage: Store in a cool, dry, well-ventilated area.

Engineering Controls: Provide adequate ventilation. Install antiskid devices on steps and potentially slippery areas.

#### Manufacturer Data

Neutron Products, Inc.  
22301 Mt. Ephraim Road  
Dickerson, Maryland 20842

Contacts: Joannes C. Tang, Jeffrey D. Williams

Inquiry Telephone Number: 301/349-5001



Angela Rinier &lt;arinier@earthtechinc.net&gt;

## Flocc Log Application on Mine Site

3 messages

**Brian Verwelst** <bverwelst@earthtechinc.net>

Thu, Nov 18, 2021 at 12:53 PM

To: "Ryan, Daniel" &lt;daniryan@pa.gov&gt;

Cc: Angela Rinier &lt;arinier@earthtechinc.net&gt;

Hello Dan,

I am writing to verify the correct procedure with usage of flocculant / gel logs on mine sites. My company, Earthtech, is applying for a new non-coal permit in Derry Township, Westmoreland County. The New Stanton DEP has provided a comment as follows:

"The Module 13.1 narrative discusses possible use of flocculants or gel logs in Sediment Pond SP-2 if necessary. If the use of flocculants or gel logs are a possibility, they must be approved by the Pennsylvania Fish and Boat Commission (PFBC) prior to use, due to the potential toxicity and impact to aquatic life. Please provide information to Daniel Ryan, PFBC Fisheries Biologist (814.359.5140; daniryan@pa.gov) regarding planned or potential usage of flocculant/gel logs. PFBC requires a written site-specific plan to review how and where the flocculants will be applied. The submittal should include the following.

- a. Safety Data Sheets (SDSs) for each flocculant (or type of gel log) that will potentially be used.
  - b. Location of each type of flocculant application and distance from the discharge. The flocculant application should be as far removed from pond outlet as possible.
  - c. Quantity of flocculant to be applied and demonstration to adherence to the manufacturer's recommendations.
  - d. Provisions to prevent flocculant from being washed into waterways (i.e. applicant may propose to close pond outlet while flocculant is being dispensed, etc.).
- Provide the Department a copy of the approved flocculant usage plan, as well as the correspondence with/approval of PFBC and a copy of the PPC plan that accounts for onsite storage and use of flocculant, as an attachment to Section F. (§92a, 29 CFR 1910.1200(g))"

### My questions:

**Do you or your staff have an application format or paper to fill out and submit for this type of application?**

**Maybe a project example?**

**Does this get submitted to your office now or would down the road at the time of application be better suited?**

**Timeline of approval for application?**

Thanks

--

**Brian Verwelst, P.E.**

Earthtech, Inc. P.O. Box 4A, Lemont Furnace PA 15456

Office: (724) 439-1313 Cell: (724) 787-1127

<http://earthtechinc.net>

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**Angela Rinier** <arinier@earthtechinc.net>

Fri, Dec 10, 2021 at 9:32 AM

To: daniryan@pa.gov, Brian Verwelst &lt;bverwelst@earthtechinc.net&gt;

Cc: Heather Leydig &lt;hleydig@earthtechinc.net&gt;, Kari Hissem &lt;khissem@earthtechinc.net&gt;

Mr. Ryan -

Per your conversation with Brian Verwelst of our office, please see the attached flocculant usage information for Ligonier Stone & Lime Company SMT East site. If you have any questions or require additional information please feel free to contact Brian or myself. If this information is satisfactory to you please let us know so it can be incorporated in the permit application.



Thank you,

Angela

[Quoted text hidden]

**Angela Rinier**

Geologic Specialist

Earthtech, Inc.

P.O. Box 4A

Lemont Furnace, PA 15456

Phone: 724-439-1313 ext. 229

<http://earthtechinc.net>

[Quoted text hidden]

 **SMT East 12.2021 Flocculant Useage Procedure.pdf**  
4770K

**Ryan, Daniel** <daniryan@pa.gov>

Fri, Dec 10, 2021 at 10:22 AM

To: Angela Rinier <arinier@earthtechinc.net>, Brian Verwelst <bverwelst@earthtechinc.net>

Cc: Heather Leydig <hleydig@earthtechinc.net>, Kari Hissem <khissem@earthtechinc.net>

Angela, Brian,

Thank you for providing this information. I have reviewed the information provided for the use of flocculant logs at Ligonier Stone and Lime Company's SMT East Surface Mine. The product appears to be used consistent with manufacture's specifications and placed an appropriate distance away from the permitted NPDES point of discharge. The PFBC has no concerns with the use of the flocculent described in the information provided. You can take this email as official PFBC correspondence for flocculant approval for inclusion into the mining permit application. Any questions feel free to contact me.

Thanks,

Daniel Ryan

Fisheries Biologist

PFBC Centre Region Office

595 E. Rolling Ridge Drive

Bellefonte, PA 16823

Office Phone: 814-359-5140

Mobile Phone: 814-470-5782

Fax: 814-359-5175

Email: [daniryan@pa.gov](mailto:daniryan@pa.gov)

**From:** Angela Rinier <arinier@earthtechinc.net>

**Sent:** Friday, December 10, 2021 9:33 AM

**To:** Ryan, Daniel <daniryan@pa.gov>; Brian Verwelst <bverwelst@earthtechinc.net>

12/10/21, 10:30 AM

Earthtech, Inc. Mail - Floc Log Application on Mine Site

**Cc:** Heather Leydig <hleydig@earthtechinc.net>; Kari Hissem <khissem@earthtechinc.net>

**Subject:** [External] Re: Floc Log Application on Mine Site

**ATTENTION:** *This email message is from an external sender. Do not open links or attachments from unknown sources. To report suspicious email, forward the message as an attachment to CWOPA\_SPAM@pa.gov.*

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