EarthRes
ENGINEERING AND SCIENCE

PENNSYLVANIA
P.O. Box 468
Pipersville, PA 18947
215.766.1211

WEST VIRGINIA
P.O. Box 794
Morgantown, WV 26505
304.212.6866

800.264.4553

February 20, 2018

Michael Kutney, P.G.
Licensed Professional Geologist
Pottsville District Mining Office
PA Department of Environmental Protection
5 West Laurel Boulevard
Pottsville, PA 17901

RE: Permit Update
Hanson Aggregates Pennsylvania LLC – Rock Hill Quarry
SMP No. 7974SM1
East Rockhill Township, Bucks County
EarthRes Project No. 061003.052

Dear Mr. Kutney:

Pursuant to the January 22, 2018 Letter regarding the Rock Hill Quarry Permit (SMP No. 7974SM1) and on behalf of Hanson Aggregates Pennsylvania LLC (Hanson), EarthRes Group, Inc. (EarthRes) is hereby submitting three (3) copies of the requested permit documentation. Included are the following items:

- Module 1: Application for Large Noncoal Surface Mining Permit;
- Module 9: Operations Map;
- Module 10: Operational Information;
- Module 12: Erosion and Sedimentation Controls;
- Module 16: Large Noncoal Blast Plan (under separate cover);
- Module 17: Air Pollution and Noise Control Plan; and
- Bonding Increment Application.

Also, please find a check in the amount of $1,150 enclosed to cover the minor permit modification and bonding increment filing fees.

Should you have any questions or need any additional information to complete your review, please contact me at (215) 766-1211.

Sincerely,
EarthRes Group, Inc.

Michael D. Fling, P.E.
Project Manager

Enclosures: As stated

Cc: Mark Kendrick, Hanson (letter only)
Andrew Gutshall, Hanson

HOLD TO LIGHT TO VIEW WATERMARK IN PAPER · HEAT SENSITIVE RED IMAGE DISAPPEARS WITH HEAT · DETECTION AREA REVEALS A LOCK WHEN TESTED

1581

EARTHRES GROUP, INC.
P.O. BOX 468
PIPERSVILLE, PA 18947

EZShield™ Check Fraud Protection for Business
50-7044-2223

DATE 2/20/18

PAY TO THE ORDER OF Commonwealth of Pennsylvania $ 1,150.00/100

One thousand one hundred fifty and 00/100 DOLLARS

FIRST NIAGARA

FOR 061003,051 permitted/bond increment

Susan Yannarella

⑈001581⑈ ⑆222370440⑆00100008749 2⑈

MODULE 1
LARGE NONCOAL MINE PERMIT APPLICATION
(PAGES 1-1, 1-5, &1-6)

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5600-PM-BMP0315-1 Rev. 1/2014

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF MINING PROGRAMS

DEP USE ONLY
Date Received
Permit Number

LARGE NONCOAL (INDUSTRIAL MINERALS) MINE PERMIT APPLICATION

Before completing this form, read the step-by-step instructions provided with this Permit Application Package.

SECTION A. APPLICANT INFORMATION

Applicant Name
Hanson Aggregates Pennsylvania LLC

Applicant Type
- ☐ Individual (INDIV)
- ☒ PA Corporation (PACOR)
- ☐ Non-PA Corporation (NPACO)
- ☐ General Partnership (PARTG)
- ☐ Limited Partnership (PARTL)
- ☐ Municipality (MUNI)
- ☐ Sole Proprietorship (SOLEP)
- ☐ Other (OTHER)

Mailing Address
7660 Imperial Way
(Street # and Name or P.O. Box)

(Address Line 2)

Allentown (City) | PA (State) | 18195 (Zip Code + Four)

(610) 366-4600 Ext. (Telephone #) | (610) 871-5994 (FAX #) | **Surface Mining Operator's License #** 24143 ☐ Pending

Applicant Contact
Gutshall (Last Name) | Andrew (First Name) | J. (MI)

Environmental Manager (Title)

Mailing Address ☒ **Check here if the address is the same as listed above**

(Street # and Name or P.O. Box)

(City) | (State) | (Zip Code + Four)

andrew.gutshall@lehighhanson.com (Email Address) | (610) 366-4819 Ext. (Telephone #) | (610) 871-5994 (FAX #)

SECTION B. DESCRIPTION OF ACTIVITY

Application Type
☐ New ☒ Revision/Modification ☐ Renewal ☐ Transfer Permit Number 7974SM1

Type of Mining Activity(ies)
☒ Surface Mining ☐ Underground Mining (Includes Surface Effects of Underground Mining) ☐ Incidental Coal Extraction
☐ Other (specify)

SECTION C. SITE INFORMATION

Operation/Site Name Rock Hill Quarry

Operation/Site Location

County(ies)	Municipality(ies)
Bucks	East Rockhill Township

SECTION H. (continued)

Provide the following (if applicable to this proposed operation):

Pre-Application No. N/A

Notice of Intent to Explore No. N/A

Application Date: February 2018

Attach the results of the Pennsylvania Natural Diversity Inventory (PNDI) ☐
N/A – Minor Permit Modification/No new surface area

SECTION I. AFFIDAVIT (§77.107)

Commonwealth of Pennsylvania, County of LEHIGH

I, Mark E. Kendrick being duly sworn, according to law, depose and say that I (~~am the applicant~~) (am an officer or official of the applicant) (have the authority to make this application) and that the plans, reports and documents submitted as part of the application are true and correct to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (cross out inapplicable portions in parenthesis)

Sworn and Subscribed to Before Me This

19TH Day of FEBRUARY (month) 2018 (year)

Signature of Applicant or Responsible Official

Kimberly A Olesak
Notary Public

Mark E. Kendrick
Name (Typed)

Vice President
Title and Seal

7660 Imperial Way, Allentown, PA 18195
Address

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Kimberly A. Olesak, Notary Public
Upper Macungie Twp, Lehigh County
My commission expires April 15, 2019

PERSON(S) AUTHORIZED BY APPLICANT TO PREPARE THIS APPLICATION

The application, plans, reports and specifications shall be certified by a registered professional engineer, registered professional geologist or registered professional land surveyor, as appropriate. Geologic and hydrogeologic information must be certified by a registered professional geologist. Impoundments requiring a 25 Pa Code Chapter 105 permit or having a storage capacity of equal to or greater than 20 acre-feet; and final contours/grading other than approximate original contour in conjunction with achieving an alternate postmining land use must be certified by a registered professional engineer. Impoundments which do not require a Chapter 105 permit or have a storage capacity of less than 20 acre-feet must be certified by a registered professional engineer or a registered professional land surveyor.

Registered Professional Engineer

I, Michael D. Fling, P.E. do hereby certify to the best of my knowledge, information and belief, that the application, plans, specifications and reports have been prepared in accordance with accepted practice of engineering, are true and correct, and are in accordance with the Rules and Regulations of the Department of Environmental Protection. I further certify that it is within my professional expertise to verify the correctness of the information. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature

Address 6912 Old Easton Road
Pipersville, PA 18947

Telephone No. (215) 766-1211

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL Seal MICHAEL D. FLING ENGINEER PE060620

Registered Professional Geologist

I, _____ do hereby certify to the best of my knowledge, information and belief, that the application, plans, specifications and reports have been prepared in accordance with accepted practice of geology and hydrology, are true and correct, and are in accordance with the Rules and Regulations of the Department of Environmental Protection. I further certify that it is within my professional expertise to verify the correctness of the information. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature

Address _____

Seal

Telephone No. _____

Registered Professional Land Surveyor

I, _____ do hereby certify to the best of my knowledge, information and belief, that the application, plans, specifications and reports have been prepared in accordance with accepted practice of land surveying and engineering land surveys, are true and correct, and are in accordance with the Rules and Regulations of the Department of Environmental Protection. I further certify that it is within my professional expertise to verify the correctness of the information. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Signature

Address _____

Seal

Telephone No. _____

APPLICATION FORM CERTIFICATION

Complete the following if the application is submitted on forms other than the original Department Forms.

Registered Professional Engineer, Registered Professional Land Surveyor or Registered Professional Geologist

I, Michael D. Fling, P.E. ; being a registered professional

(Engineer's/Surveyor's/Geologist's Name - Print or Type)

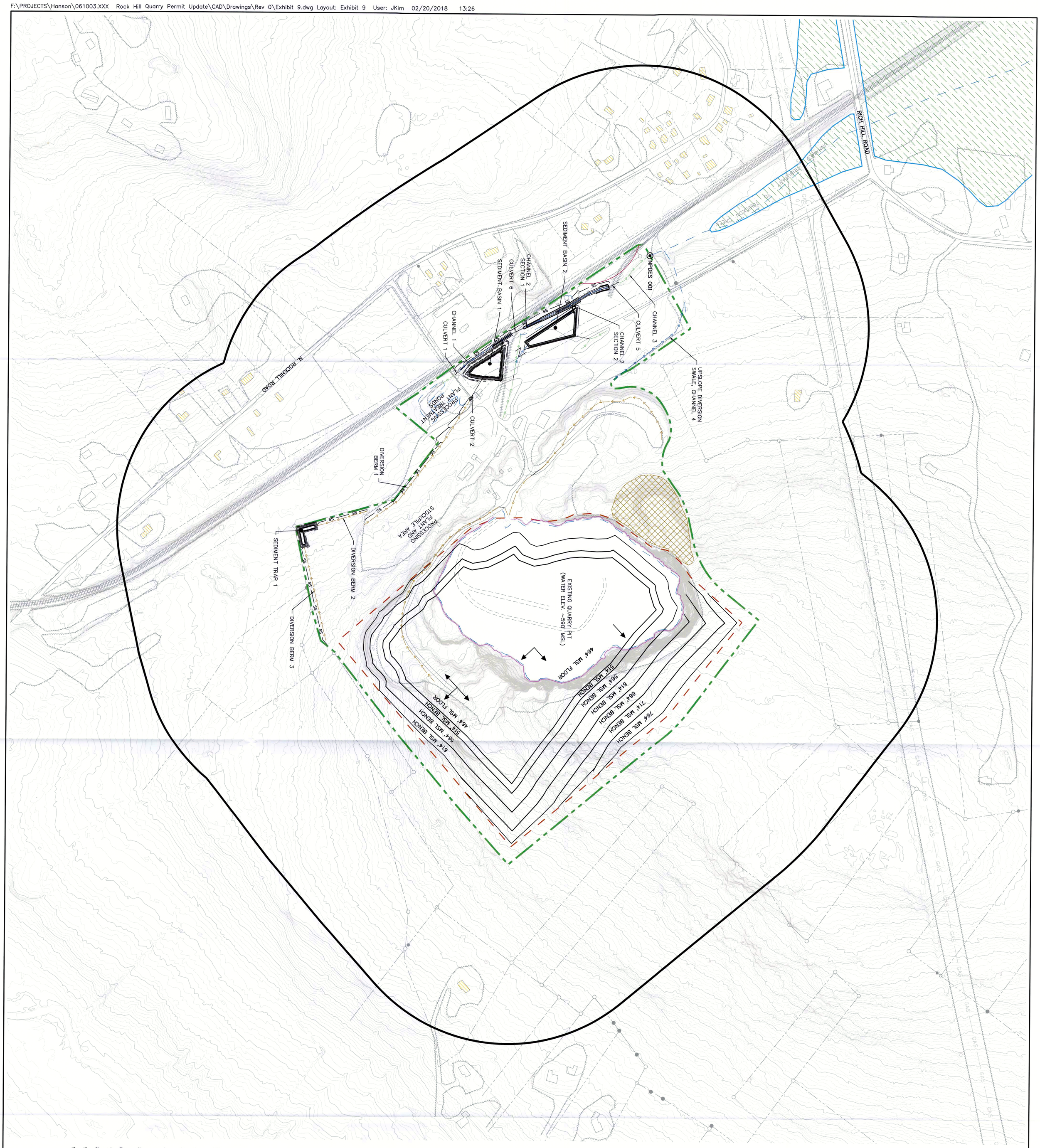
engineer/registered professional land surveyor or registered professional geologist (circle as appropriate) do hereby certify that the forms used in the accompanying application have been reproduced under my supervision and are a facsimile of the forms prepared by the Department. I am aware that there are significant penalties for altering the content of the Department forms including the possibility of fine and imprisonment.

Signature _____ Date 2/20/18

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL Seal MICHAEL D. FLING ENGINEER PE060620

MODULE 9
OPERATIONS MAP

EarthRes
ENGINEERING AND SCIENCE



LEGEND

- EXISTING GRADE CONTOUR (2' INTERVAL)
- EXISTING SMP BOUNDARY
- LIMIT OF MINING
- 1,000' SMP OFFSET
- PRE-ACT HIGHWALL
- 300' BUILDING SETBACK
- PROPERTY BOUNDARY
- EXISTING SURFACE WATER
- EXISTING RAILROAD
- EXISTING TREELINE
- EXISTING GAS PIPELINE
- EXISTING DRAINAGE CHANNEL
- PROPOSED DRAINAGE CHANNEL
- PROPOSED DIVERSION BERM
- PROPOSED COMPOST FILTER SOCK
- EXISTING BUILDING - RESIDENTIAL
- NPDES DISCHARGE POINT
- OVERBURDEN/TOPSOIL STORAGE
- NWI WETLANDS
- DIRECTION OF MINING

NOTES:

1. EXISTING GRADE TOPOGRAPHY COMPILED BY PAMAP PROGRAM, PA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY, DATED JUNE 2010.
2. TOPOGRAPHY AND SITE FEATURES IN WESTERN PERMIT AREA WERE SURVEYED BY EARTHRES GROUP, INC. PERSONNEL JANUARY 2017.
3. BASEMAP FEATURES INCLUDING BUILDINGS, ROADS, UTILITIES, WATER FEATURES, AND TREELINES RETRACED FROM AERIAL PHOTOGRAPHY DATED 2015, PUBLISHED BY THE DELAWARE VALLEY REGIONAL PLANNING COMMISSION.
4. EXISTING PERMIT INFORMATION INCLUDING PERMIT BOUNDARY, MINING LIMIT, DEPTH OF MINING, AND PRE-ACT HIGHWALLS ARE REFERENCED TO THE PERMIT DRAWING "MINING PLAN, SHEET 3 OF 6" PREPARED BY SKELLY AND LOY, DATED MARCH 18, 1980.
5. HANSON PROPERTY BOUNDARY PROVIDED BY MAP TITLED "PLAT OF SURVEY OF LANDS OF GENERAL CRUSHED STONE", PREPARED BY ORANGEVILLE SURVEYING CONSULTANTS, INC., DATED MAY 7, 2001.
6. ADJACENT PARCEL BOUNDARIES ARE REFERENCED TO THE BUCKS COUNTY GIS RECORDS.
7. WETLANDS REFLECT THOSE DEPICTED IN THE NATIONAL WETLANDS INVENTORY FWS WETLANDS MAPPER.
8. PROPERTY OWNERSHIP INFORMATION IS REFERENCED TO MODULE 5 OF THE PERMIT APPLICATION.
9. STREAM INFORMATION IS REFERENCED TO THE PA DEP eMAPPA ONLINE RECORDS.
9. REFER TO THE E&S PLAN DRAWINGS FOR LOCATION OF ALL EROSION AND SEDIMENTATION CONTROL STRUCTURES.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)

1 inch = 200 ft.

DRAWN BY: JTK	CHECKED BY: MDF
DATE: 02/20/18	PROJECT NO: 061003.052
DRAWING NUMBER: R-001	
SHEET 1 OF 1	

EXHIBIT 9
OPERATIONS MAP

HANSON AGGREGATES PENNSYLVANIA LLC
ROCK HILL QUARRY

PREPARED BY:
EarthRes ENGINEERING AND SCIENCE
6912 Old Easton Road
Pipersville, PA 18947 USA
8000 Combs Farm Drive
Morgantown, WV 26508
www.earthres.com
PA office 215.766.1211
WV office 304.212.6666
toll free 800.264.4553

PREPARED FOR:
Hanson HEIDELBERGCEMENT Group

PROJECT SITE:
HANSON AGGREGATES PENNSYLVANIA LLC
SMP NO. 7974SM1
EAST ROCKHILL TOWNSHIP, BUCKS COUNTY
PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — MICHAEL D. FLING — PE080620
MICHAEL D. FLING, P.E.
LICENSE NO. PE080620

NO.	DATE	BY	REVISIONS

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); **N/A**
- ☐ h) public or private cemeteries or Indian burial grounds (include restricted areas); **N/A**
- ☒ 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; **N/A**
- ☐ k) solid waste disposal areas; **N/A**
- ☒ 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); **N/A**
- ☒ v) processing facilities and stockpile areas;
- ☒ w) air pollution control facilities; **Contained within Plant Equipment**
- ☐ x) explosives storage areas; **N/A**
- ☒ y) formation contacts and coal croplines (where applicable);
- ☐ z) test hole locations (key to 7.1 b data). **N/A**
- ☐ aa) incidental coal extraction areas **N/A**

MODULE 10
OPERATIONAL INFORMATION

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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.

Mining of the Rock Hill Quarry is proposed in a single phase. As proposed, bulldozers or track loaders, excavators, and haul trucks will be used to remove and stockpile topsoil and overburden from the mining area. Overburden will be hauled to and stored in the designated overburden material stockpile. The underlying rock will then be drilled and blasted to facilitate its removal. The shot rock will be excavated by front-end loader, track loader, or excavator. The material will then be loaded into a haul truck and transported to the processing plant for size reduction. The material will then be stockpiled in the plant area and staged for sale.

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 maximum depth of mining is approximately 330 feet at a pit floor elevation of 464' MSL.

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.

A maximum highwall height of 50 feet will be maintained, with the exception of the uppermost level, where the maximum highwall height may reach 65 feet to account for variations in the surface topography. A minimum bench width of 25 feet will be maintained between operating levels at all times. A 71.4-foot bench will be utilized in areas where blast to grade reclamation is proposed. The proposed benching and final highwall positions are shown on Exhibit 9: Operations Map.

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.

Reclamation of the proposed mining area will be an alternative to approximate original contour, as grades across the site will be lowered by as much as 330 feet. The final configuration will form a water impoundment area, which will be surrounded by unmanaged natural habitat. The final highwalls along the perimeter edge will be reduced by blasting to achieve the maximum 35° final slopes, merging the surrounding rim elevation with the slope. The proposed water impoundment area will be approximately 39.1 acres, and the final graded perimeter slope areas total approximately 22.4 acres.

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.)

Previous site activities included the installation of multiple structures. Existing structures include processing plant foundations, processing plant settling ponds, stormwater culverts and channels, and sediment ponds. These structures are to be maintained in place and utilized for the current operation. Structures will be rehabbed and/or upgraded as needed.

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.

Overburden is proposed to be placed in the overburden storage area. Upon completion of mining activities, overburden will be returned to the mining area for use in final reclamation and for the establishment of vegetative cover. Material will be placed to achieve the desired reclamation subgrade elevation and to blend into the sloped highwalls (blast-to-grade) and existing perimeter grades. Site topsoil will then be spread over the overburden to provide a base for revegetation.

As piles and berms are removed, the areas impacted by topsoil/overburden storage will be scarified and prepared for final revegetation. Materials will be spread in advance of revegetation when it is a suitable time for planting as noted in Module 23.

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 final reclamation configuration for the Rock Hill Quarry will be a water impoundment, and the post-mining land use will be unmanaged natural habitat. As mining reaches its vertical and horizontal extent, concurrent reclamation will be undertaken. The final perimeter highwalls will be reduced to a maximum 35-degree reclamation configuration by blasting to grade. Overburden materials will be placed over the shot rock. The surface will drain directly to the water-filled-impoundment. The proposed reclamation grading, drainage pattern, and associated stormwater controls are presented on Exhibit 18: Land Use and Reclamation Map.

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.

Stages of reclamation will include 1) a reduction of perimeter highwalls; 2) spreading and grading of overburden materials on slopes; 3) final grading; 4) revegetation; and 5) filling of the water impoundment. To the extent practical, reclamation will be completed concurrent with mine development, except where access cannot be eliminated. Reclamation will be completed according to the concurrent reclamation requirements set forth in 25 PA Code § 77.595.

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.

N/A

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.

There are no known oil or gas wells within 125 feet of the mining operation.

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.

Any well developed at the Site will be sealed at the close of site mining. The well will be grouted from its base to the surface in accordance with State requirements for well closure. A licensed well driller will be contracted to complete the closure.

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.

There are no known underground mines within 500 feet of the mining operation.

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 proposed mining area is not within the 100-foot right-of-way setback for any public road.

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.

No services are anticipated to be adversely affected by mining activities. Agreements are in place with SEPTA for the site access road crossing of the railroad.

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).

A Bonding Increment Application, Bonding Calculations, and a Bonding Map have been included as an attachment to this Application.

MODULE 12
EROSION AND SEDIMENTATION CONTROLS

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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.

Runoff is to be diverted through the use of diversion swales and diversion berms at the Site. Upslope diversions are proposed along the upslope limits of the Quarry to divert surface water from unaffected areas around the Site and to existing drainage networks.

Runoff from the affected area will be collected by diversion controls, rock lined channels and diversion berms, and directed to sediment basins for settlement of solids prior to discharge at Outfall 001. Design calculations, cross sections and details for each proposed device are included in the attachments to this Module.

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.

12.2.1 Site Location and Permit Area Description

The Rock Hill Quarry is located along the east of North Rockhill Road in East Rockhill Township, Bucks County, PA. The Site is situated within the Tohickon Creek Watershed. Per Title 25, Chapter 93, the Tohickon Creek has a designated use of Trout Stocking, Migratory Fishes (TSF, MF). Topography rises from a low of approximately 525' MSL in the northwest to a high of 815' MSL along the eastern boundary. A quarry pit has been established onsite and encompasses a large portion of the eastern permit area. Support areas, including the processing plant and stockpile area as well as the maintenance shop, scalehouse and scales are located within the western portion of the permit. Topography drops from east to west; therefore, the erosion and sedimentation controls, including sediment basins, sediment traps, rock-lined channels, diversion berms and perimeter controls (filter sock), are to be located along the Site's western boundary. A diversion channel runs along the western boundary from south to north and directs drainage from the proposed controls to the Site's existing NPDES discharge point, Outfall 001, along the northwesterly limit of the permit. Discharge flows to the north offsite and enters an Unnamed Tributary to the Tohickon Creek.

12.2.2 Erosion and Sediment Control Facilities

Proposed controls include: sediment basins, diversion channels, diversion berms, culverts sediment traps and compost filter socks.

DESIGN CRITERIA

The following criteria have been used as a basis for the design of the erosion and sedimentation control facilities.

Sediment Ponds:

- **The impoundment capacity shall be based on a minimum of 7,000 cf/acre of storage.**
- **The settling storage portion of the impoundment volume shall be 5,000 cf/acre, and the sediment storage portion shall be 2,000 cf/acre.**
- **The impoundment shall be designed with a pipe outlet with perforations at the sediment storage elevation to provide controlled release of detained water (settling storage portion).**
- **The primary spillway shall be capable of dewatering the impoundment's settling storage volume to the sediment storage level within 2 to 7 days.**
- **The discharge from the impoundment shall be designed with outlet into a proposed rock-lined channel to protect against excessive erosion.**

- The impoundment shall be constructed with an emergency spillway set 0.5 feet above the settling storage capacity elevation.
- The emergency spillway shall be designed to safely pass the peak flow from 2 cfs/acre of contributing drainage area. The emergency spillway shall be constructed in original ground wherever possible and protected with an appropriate channel lining.
- The impoundment shall be cleaned when the storage capacity is reduced to 5,000 cf/acre. The cleanout elevation shall be clearly marked via a cleanout marker to be set in each impoundment.
- The impoundment shall be provided with 2 feet of freeboard above the maximum water level elevation at the emergency spillway required to safely pass the peak flow of the design storm event.
- Drainage channel and culvert outfalls entering impoundments shall be protected against excessive erosion by the use of rip-rap lining.
- Impoundments shall be designed with a minimum embankment top width of 10 feet and a minimum combined embankment side slope of 5:1.
- Impoundments shall have a minimum length to width ratio of 2:1.

Sediment Trap:

- The trap capacity shall be based on a minimum of 2,000 cf/acre of storage.
- The contributing drainage area shall be no larger than 5 acres.
- The dewatering zone portion of the impoundment volume shall be 1,300 cf/acre, and the sediment storage portion shall be 700 cf/acre.
- The trap shall be constructed with a spillway width 3 times the contributing drainage area.
- The spillway shall be constructed in original ground wherever possible and protected with an appropriate channel lining.
- The trap shall be cleaned when the storage capacity is reduced to 1,300 cf/acre. The cleanout elevation shall be clearly marked via a cleanout marker to be set in each impoundment.
- Trap shall be designed with a minimum embankment top width of 5 feet.
- Trap shall have a minimum length to width ratio of 2:1.
- Trap shall be designed to dewater the dewatering zone completely by infiltration.

Channels (Diversion and Collection):

- All channels shall be designed to convey the peak flow from the 10-year/24-hour storm with a minimum 0.5 feet of freeboard.

Diversion Berms:

- Berms shall be constructed of earthen materials and shall be compacted for stability during construction.
- The proposed berms will serve as a diversion or containment structure in the management of runoff.
- The upslope side of the berm shall be lined with the appropriate rock-lining to protect against excessive erosion.

Culverts:

- Culverts shall be designed to convey the peak flow from the 10-year/24-hour storm from the contributing drainage area.

Compost Filter Sock:

- Compost filter sock will be used as a temporary erosion and sedimentation control measure as needed throughout the Site.
- Installation will be in accordance with standard E&S control requirements and accompanying standard details. Compost Filter Sock, Filtrexx Siltsoxx™ 12" barrier or equal, unless another size is specifically noted on plan.

The location of the proposed E&S controls is depicted on Exhibit 9: Operations Map and the Erosion and Sediment Control Plans. Design details are presented on the Erosion and Sediment Control Details drawing. The following sections address their operation and maintenance, the proposed schedule of implementation, and a description of the E&S structures.

12.2.3 Operation and Maintenance of Control Facilities

Operation, maintenance, inspection, and repair of all sedimentation control facilities will be the responsibility of the Site Operator. All erosion and sediment controls shall be inspected after each runoff event and on a weekly basis during dry periods. The permittee shall be responsible for the structural stability of the proposed facilities and their protection against unauthorized acts of third parties.

MAINTENANCE PROGRAM

The following long-term maintenance schedule and procedures are proposed with regard to erosion and sedimentation control features for this project (refer to Exhibit 9). During quarry operations at the Site, E&S control features shall be inspected at least once a week, or more frequently as may be required to comply with this Erosion and Sedimentation Control Plan. Long-term maintenance should not be required after cessation of mining operations and stabilization of the Site.

MAINTENANCE AND REPAIR OF E&SCP FACILITIES

- Where dust or wind erosion is a problem, the unstable surface(s) shall be sprayed with water or other suitable dust suppressor.
- Operator shall employ measures during quarry operations to prevent spills of fuels or lubricants. If a spill occurs, it shall be controlled immediately to prevent its entry into nearby waterways.
- Any temporary erosion control measure applied to exposed soil surfaces shall remain functional until vegetative cover is sufficiently established.
- Permanent soil protection will be completed as early as practical.
- Any debris accumulated at filter sock shall be removed and properly disposed. These temporary barriers shall be checked daily and realigned or reset as required. Sediment shall be removed when it reaches one-half of the fence height.
- Until the Site is stabilized, all erosion and sediment Best Management Practices (BMPs) must be maintained properly. All preventive and remedial maintenance work, including clean-out, repair, replacement, regrading, reseeding, re-mulching, and renetting, must be performed immediately. If erosion and sediment control BMPs fail to perform as expected, replacement BMPs or modifications to what is installed will be required.
- Miscellaneous additions, adjustments or corrections shall be made to any erosion control structure as deemed necessary by the engineer, PA DEP, or County representative in order to correct problems unforeseen or problems caused by storms prior to stabilization.
- All E&SCP measures shall remain in place until the Site has been stabilized. The Site shall be considered stabilized when the entire disturbed area has a minimum, uniform 70% perennial vegetative cover or other non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements. Only upon reaching stabilization and following PA DEP approval may the E&SCP features be removed.
- Sediment removed from BMPs shall be disposed of in landscaped areas outside of steep slopes, wetlands, floodplains or drainage channels, and shall be immediately stabilized or placed in topsoil stockpiles.

12.2.4 Schedule of Implementation

The following sequence is proposed for installation of the E&S Controls measures at the Site.

Northwestern Support Areas

- Downslope perimeter controls, including compost filter sock, shall be installed below all areas to be affected prior to initiation of upslope disturbance;
- The upslope diversion swale, Channel 4, shall be installed to divert drainage from upslope unaffected areas around the proposed limit of disturbance. The channel shall outlet to the existing ephemeral ditch along the northern boundary of the permit and directed along the northern access road. The channel shall be excavated working from downstream to upstream. Excavated material shall be hauled to and stored in the designated overburden storage area and stabilized with vegetation as soon as practical;
- Following installation of downslope and upslope controls, construction/installation of the E&S Control Devices may commence. The initial control device to be installed is Channel 3, located immediately upstream of the NPDES Point. The channel shall be excavated working from the NPDES Point toward Culvert 5. Excavated materials shall be hauled to and stored in the designated overburden storage area and stabilized with vegetation as soon as practical;
- Upon reaching the channel grade and geometry proposed in these plans, the channel lining shall be installed for stabilization;
- Following installation of the channel, Culvert 5 shall be installed. Material shall be excavated from under the existing rail bed and hauled to and stored in the designated overburden storage area. Material shall be stabilized with vegetation as soon as practical;
- Following excavation, Culvert 5 shall be installed and backfilled as proposed;
- The next section of channel, Channel 2, Sections 1 and 2, shall be installed working from Culvert 5 to Culvert 6.

Excavated materials shall be hauled to and stored in the designated overburden storage area and stabilized with vegetation as soon as practical;

- Upon reaching the channel grade and geometry proposed in these plans, the channel lining shall be installed for stabilization;
- Following installation of the channel, Culvert 6 shall be installed. Material shall be excavated from under the existing rail bed and hauled to and stored in the designated overburden storage area. Material shall be stabilized with vegetation as soon as practical;
- Following excavation, Culvert 6 shall be installed and backfilled as proposed;
- The next section of channel, Channel 1, shall then be installed. Material shall be excavated from the channel and hauled to and stored in the designated overburden storage area. Material shall be stabilized with vegetation as soon as practical;
- Upon reaching the channel grade and geometry proposed in these plans, the channel lining shall be installed for stabilization;
- Following installation of the channel, Culvert 1 shall be replaced/installed. Material shall be excavated across the western access road to allow for installation of a replacement culvert. Excavated materials shall be hauled to and stored in the designated overburden storage area and stabilized with vegetation as soon as practical;
- Following excavation, Culvert 1 shall be installed and backfilled as proposed;
- Following installation of the culvert, the western conveyance system shall be complete allowing for installation of upslope detention and treatment controls;
- Sediment Basin 2 shall be installed along with the associated primary and emergency spillways. Material excavated from the basin shall be hauled to and stored in the designated overburden storage area and stabilized with vegetation as soon as practical. The primary spillway, consisting of a 24" perforated riser pipe and 18" outlet barrel shall be installed in the northwest corner of the basin and connected directly into Channel 2, Section 2. The emergency spillway shall be installed along the basin's western embankment, lined with rip-rap and connected to Channel 2, Section 2;
- Following and/or in conjunction with the installation of Sediment Basin 2, construction/installation of Sediment Basin 1 shall commence. Similar to above, material excavated from the basin shall be hauled to and stored in the designated overburden storage area and stabilized with vegetation as soon as practical. The primary spillway, consisting of a 24" perforated riser and 18" outlet barrel shall be installed in the northwest corner of the basin and connected directly to Channel 1. The emergency spillway shall be installed on the basin's western embankment, lined with rip-rap and connected to Channel 1;
- Following installation of Basin 1, Culvert 2 shall be installed under the site access road. Material shall be excavated along the culvert location and hauled to and stored in the designated overburden storage area. Material shall be stabilized with vegetation as soon as practical;
- Following excavation, Culvert 2 shall be installed and backfilled as proposed. The upslope end of Culvert 2 shall be located in an excavated depression along the south of the access road. The upslope diversions shall direct runoff into the depressed inlet to allow for entry into the culvert;
- The upslope diversion berm, Diversion Berm 1, Sections 1 and 2 shall be installed. Material shall be placed along the western boundary of the Processing Plant and Stockpile Area to promote positive drainage from south to north toward Culvert 2. The base of the diversion berm shall be rock-lined to prevent erosion at the toe of slope;
- Installation of the above provides for downslope control and treatment of the Site's access, maintenance, processing, and support areas in the northwest of the Permit.

Processing Plant and Stockpile Area – South End

The following E&S Plan has been included for control and treatment of the five-acre area located at the southern end of the Plant/Stockpile Area:

- Downslope perimeter controls, including compost filter sock, shall be installed along the base of the area prior to affecting upslope areas;
- Following installation of the perimeter controls, Sediment Trap 1 shall be installed in the southwest corner. Material shall be excavated from the trap and utilized for construction of its downslope embankment. Excess material shall be hauled to and stored in the designated overburden storage area. Material shall be stabilized with vegetation as soon as practical. The sediment trap shall be outfitted with a filter berm and infiltration trench at its base for dewatering;
- Following trap installation, the diversion berms, Diversion Berms 2 and 3 shall be installed. Material shall be placed in the footprint of the berms to promote positive drainage to the Trap. The base of the diversion berms shall be rock-lined to prevent erosion at the toe of slope;
- Following installation of the berms, upslope areas may be affected for installation of the Processing Plant and Stockpile Area.

Quarry Pit

The following E&S Plan has been included for control and treatment of runoff within the Quarry Pit and upslope drainage areas:

- The Quarry Pit is self-contained with a large portion of the Site draining directly to the existing open water feature. The water impoundment maintains a water level at approximately elevation 590' MSL and the downslope highwall of the Pit is

maintained at an elevation just above this point.

- Downslope diversions will be installed at the base of the Overburden Storage Areas and haul roads to direct surface water into the western edge of the pit at the downslope highwall;
- Water levels will be monitored to review conditions at the downslope highwall to determine if modification of the crest elevation is needed. Modifications will be proposed if increased containment is needed.
- Installation of the above diversions will allow for surface waters from the Mining and Overburden Storage Areas to be segregated from other Site waters to allow for increased settling within the Pit and eventually the Pit Sump;
- Under initial Site activities pumping of the Pit is not anticipated; however, future activities will require Pit dewatering for access to rock reserves.

12.2.5 Plan for Reclamation

Upon completion of Site mining operations, reclamation grades will be achieved as depicted on Exhibit 18: Land Use and Reclamation Map. Topsoil (including subsoil) will be spread as needed across the reclaimed area to establish vegetation according to the approved Revegetation Plan.

12.2.6 Construction Specifications and Typical Facility Illustrations

Specifications and illustrations of the proposed facilities are presented in this Module and attachments, and on the Erosion and Sediment Control Plan and Details drawings, Sheets ES-001 through ES-003.

CONSTRUCTION SPECIFICATIONS

- All erosion and sedimentation control measures shall meet the requirements set forth in DEP's Technical Guidance Document titled "DEP Engineering Manual for Mining Operations," Document No. 563-0300-101 and Chapter 77.
- For the duration of Site activities, the Site Operator is responsible for maintaining all erosion and sediment control measures until all disturbed areas have been permanently stabilized in accordance with the approved Reclamation Plan on file with the Department.
- All structures, including sediment ponds, channels, diversion berms, and stockpiles, shall be stabilized immediately upon completion.
- All areas where activities have or will cease for more than twenty (20) days shall be stabilized with temporary vegetative cover in accordance with the approved Revegetation Plan in Module 23.

12.2.7 Supporting Design Computations and Data

Design calculations and construction details for the sediment basins, sediment trap, diversion channels, diversion berms, and culverts described in this Erosion and Sedimentation Control Plan are presented as attachments to this Module.

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);

See Exhibit 9 for the location of haul roads.

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;

Haul roads are to be installed and/or maintained as outlined in the cross section included on the E&S Details drawing.

c) Measures to control and prevent erosion and sedimentation; include proposed spacing of sediment traps, turnouts, culverts, check dams, etc.;

All haul roads are to drain to proposed E&S Controls as depicted on the Site Plans.

d) Plan for reclamation after mining is completed;

Haul roads are to be removed during the reclamation process. Roads will be regraded as needed and revegetated per the approved Revegetation Plan.

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

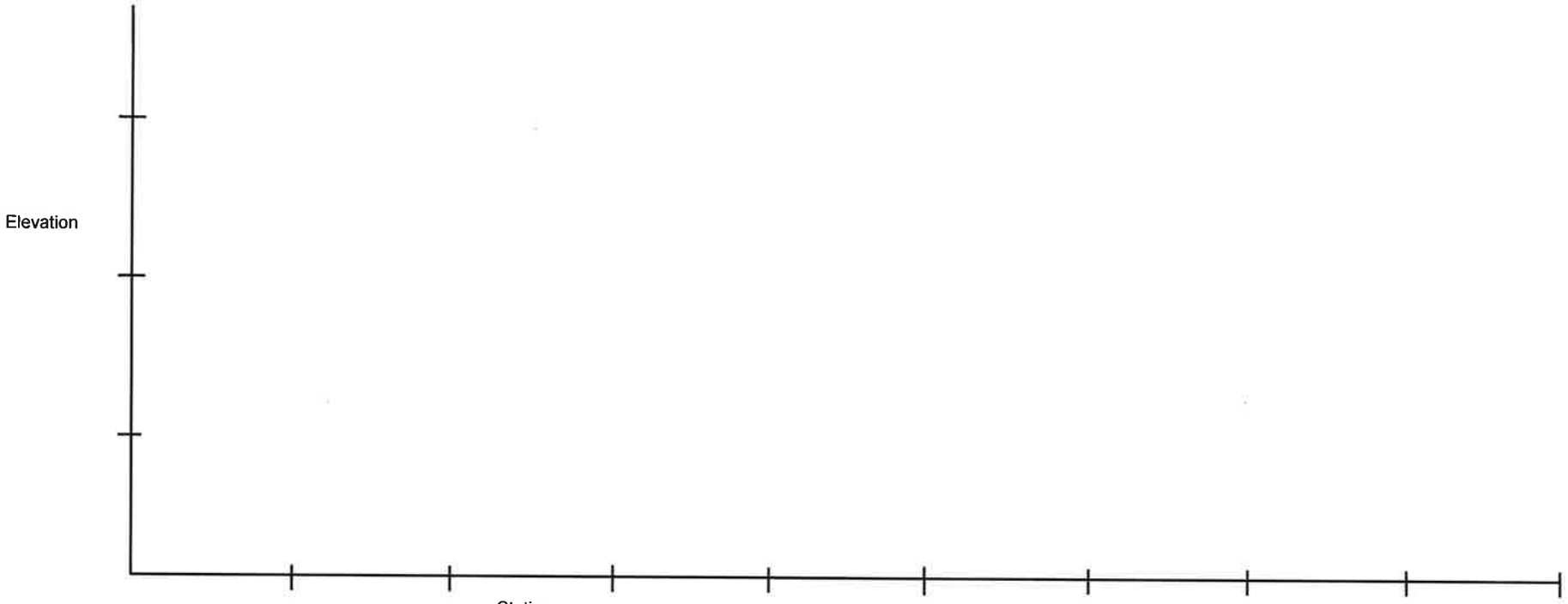
If yes, PennDOT Occupancy Permit number must be submitted prior to permit activation.

12.1 Diversion/Collection Ditch Data Sheet

Title:	Site:	Company:	Permit Number:
Prepared by:	Telephone Number:	Date:	Sheet _____ of _____

Design Calculations:

Station		Drainage Area acres	Design Storm (yrs.)	Average Watershed Slope (%)	Curve Number	Peak Discharge Q cfs	Channel Bed Slope (%)	Freeboafd (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft)	Channel Side Slopes	Flow Area (sq.ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (ft/sec)	Q Available cfs	With Freeboard		
Start	Elevation																	Channel Depth (ft.)	Top Channel Width (ft.)	Q Available cfs
End																				



PROFILE

Vertical Scale 1" = ____
Horizontal Scale 1" ____

Hanson Aggregates Pennsylvania LLC
Rock Hill Quarry – Permit Update
February 2018

E&S CALCULATIONS

EarthRes
ENGINEERING AND SCIENCE

SEDIMENT BASINS

HANSON AGGREGATES - ROCK HILL QUARRY
SEDIMENTATION BASIN NO. 1
Sedimentation Basin Design Notes

Required Storage Volume and Elevations

Drainage Area, DA (acres)	Measured	14.93
Required Sediment Storage Volume (cf)	2,000 x Disturbed DA	29,860
Required Settling Volume (cf)	5,000 x DA	74,650
Required Total Volume (cf)	7,000 x DA	104,510
Total Storage Volume Provided (cf)	Storage Volume Table	119,716
Elevation for Sediment Storage Volume (ft.)	Chosen	530.00
Riser Crest Elevation (ft.)	Chosen	533.91
Emergency Spillway Crest Elevation (ft.)	Riser Crest Elevation + 0.5 ft.	534.41
Principal Spillway and Outlet Protection		
Barrel Diameter (in.)	Chosen	18.00
Riser Dimensions (in.)	Chosen	24.00
Drainage Area, DA (acres)	Measured	14.93
Flow Rate @ 2 cfs per Acre (cfs)	2 x DA	29.86
2 cfs/acre Flow Elevation (ft.)	Combined Spillway Table	534.88
Principal Spillway Capacity @ 2 cfs/acre Flow Elevation	Combined Spillway Table	14.86
Barrel Slope (ft/ft)	Chosen	0.00766
Velocity @ 2 cfs/acres Flow (fps)	Primary Spillway Table	8.41
Rip-Rap	Chosen	R-4
Rip-Rap d50 (in.)	Table 9	6
Controlled Dewatering by Perforation		
Invert Elevation of First Perforation (ft.)	Chosen	530.00
Vertical Spacing of Perforation (ft.)	Chosen	1
Number of Rows	Rows	2
Perforations per Row	Chosen	4
Perforation Diameter (in.)	Chosen	1
Dewatering Time (days)	Dewatering Table	3.59
Emergency Spillway		
Drainage Area, DA (acres)	Measured	14.93
Flow Rate @ 2 cfs per Acre (cfs)	2 x DA	29.86
2 cfs/acre Flow Elevation (ft.)	Combined Spillway Table	534.88
Emergency Spillway Capacity @ 2 cfs/acre Flow Elevation	Emergency Spillway Table	13.27
Bottom Width (ft.)	Chosen	15.00
Side Slope Ratio (z:1)	Chosen	4.00
Emergency Spillway Channel and Outlet Protection		
Depth (ft.)	Chosen	0.47
Emergency Spillway Capacity Requirement (cfs)	Emergency Spillway Table	13.27
Rip-Rap	Chosen	R-3
Rip-Rap d50 (in.)	Table 9	3"
Manning's n	Figure 3	0.03
Bottom Width (ft.)	Chosen	15.00
Side Slope Ratio (z:1)	Chosen	10.00
Velocity (fps)	Emergency Spillway Table	1.42
Top of Embankment Elevation		
Emergency Spillway Crest Elevation (ft.)	As Above	534.41
2 cfs/acre Flow Depth (ft.)	Combined Spillway Table	0.47
2 cfs/acre Flow Elevation (ft.)	Emerg. Spill. Crest Elev.+ Depth	534.88
Freeboard (ft.)	Chosen	2.12
Top of Embankment Elevation (ft.)	Flow Elevation + Freeboard (min.)	537.00

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 1

Sedimentation Basin Storage Volume Check

Elevation ft.	Plan Area sf	Average Area sf	Elevation Difference ft.	Incremental Volume cf	Incremental Volume acre-ft	Cummulative Volume cf	Cummulative Volume acre-ft
527	13,391						
528	14,461	13,923	1	13,923	0.320	13,923	0.320
529	15,566	15,010	1	15,010	0.345	28,933	0.664
530	16,707	16,133	1	16,133	0.370	45,066	1.035
531	17,882	17,291	1	17,291	0.397	62,357	1.432
532	19,094	18,485	1	18,485	0.424	80,842	1.856
533	20,340	19,714	1	19,714	0.453	100,556	2.308
534	21,622	20,978	1	20,978	0.482	121,534	2.790
535	22,940	22,278	1	22,278	0.511	143,812	3.301
536	24,292	23,613	1	23,613	0.542	167,424	3.844
537	25,681	24,983	1	24,983	0.574	192,408	4.417

Design:

Sediment Storage Volume =	45,066 CF
Sediment Storage Volume Elevation =	530.00 ft.
Settling Storage Volume =	119,716 CF
Settling Storage Volume Elevation =	533.91 ft.

Requirements:

Sediment Storage Volume (2,000 CF/disturbed area acres) =	29,860 CF
Settling Storage Volume (5,000 CF/drainage area acres) =	74,650 CF
Drainage Area (acres) =	14.93 acres

Average area calculated as follows: [A+B+sqrt(A*B)]/3

By:	JTK
Date:	2/14/2018
Chk'd:	MDF
Date:	2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 1

PRINCIPAL SPILLWAY DISCHARGE CAPACITY

WATER SURFACE ELEV (FT)	RISER						TOTAL SPILLWAY CAPACITY (CFS) (5)
	ORIFICE FLOW		WEIR FLOW		PIPE FLOW		
	HEAD H (FT)	FLOW (1) Q (CFS)	HEAD H (FT)	FLOW (2) Q (CFS)	PIPE HEAD H (FT)	FLOW (3) Q (CFS)	
533.91	0.00	0.00	0.00	0.00	3.66	15.63	0.00
534.00	0.09	4.45	0.09	0.50	3.75	15.82	0.50
534.25	0.34	8.78	0.34	3.80	4.00	16.34	3.80
534.41	0.50	10.66	0.50	6.82	4.16	16.66	6.82
534.50	0.59	11.59	0.59	8.75	4.25	16.84	8.75
534.75	0.84	13.84	0.84	14.91	4.50	17.33	13.84
535.00	1.09	15.77	1.09	22.06	4.75	17.80	15.77
535.25	1.34	17.49	1.34	30.10	5.00	18.26	17.49
535.50	1.59	19.05	1.59	38.93	5.25	18.72	18.72
535.75	1.84	20.50	1.84	48.48	5.50	19.16	19.16
536.00	2.09	21.85	2.09	58.71	5.75	19.59	19.59
536.25	2.34	23.12	2.34	69.57	6.00	20.01	20.01
536.50	2.59	24.33	2.59	81.03	6.25	20.42	20.42
536.75	2.84	25.48	2.84	93.06	6.50	20.82	20.82
537.00	3.09	26.58	3.09	105.63	6.75	21.22	21.22

Notes:

(1) Orifice flow through top of riser, $Q = Ca(2gh)^{0.5}$

where:
- C = orifice coefficient = 0.60
- a = cross-sec. area of inlet, sq. ft., = 3.14
- where: riser diameter, inches = 24.00
- g = acceleration of gravity = 32.2 ft/sec^2
- H = head on top of riser (See table)
- Note: Q = total flow through all submerged orifices.

(2) Weir flow, $Q = CLH^{1.5}$

where:
- C = weir coefficient = 3.10
- L = weir length, ft = 6.28
- where: riser diameter, inches = 24.00
- H = head over weir, ft (See table)

(3) Pipe flow, $Q = cA[(2gH)/(1+Km+(Kp)L)]^{0.5}$

where:
- A = cross-sec area of barrel, sq ft, = 1.77
- g = acceleration of gravity, 32.2 ft/sec^2
- H = head above centerline of outlet of pipe, where 530.25
  - elev. of outlet of pipe = 529.50
- Km = coeff. of minor losses = 1.00
- Kp = pipe friction coefficient; 0.0155
- Kp = (5087n^2)/d^(4/3)
- where:
- n = Manning's roughness coefficient = 0.012
- d = inside diameter of barrel, inches 18.00
- L = pipe length, ft, = 65.32
- c = number of pipes = 1.00

By: JTK
Date: 2/14/2018
Chk'd: MDF
Date: 2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 1

Sedimentation Basin Dewatering Time

Water Surface Elevation (ft.)	Storage Volume (cu. ft.)	Incremental Storage Volume (cu. ft.)	Discharge (cfs)	Average Discharge (cfs)	Time (hrs)	Accumulated Time (hrs)
533.91	119,716		0.39			
		19,160		0.37	14.20	
533.00	100,556		0.36			14.20
		19,714		0.33	16.66	
532.00	80,842		0.29			30.86
		18,485		0.25	20.63	
531.00	62,357		0.20			51.50
		17,291		0.14	34.65	
530.00	45,066		0.07			86.15

Dewatering Time = 3.59 days

By: JTK
Date: 2/14/2018
Chk'd: MDF
Date: 2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 1

EMERGENCY SPILLWAY DISCHARGE CAPACITY

WEIR FLOW		
WATER SURFACE ELEV (FT)	HEAD H (FT)	FLOW (1) Q (CFS)
534.41	0.00	0.00
534.50	0.09	1.22
534.75	0.34	8.92
535.00	0.59	20.39
535.25	0.84	34.64
535.50	1.09	51.21
535.75	1.34	69.80
536.00	1.59	90.22
536.25	1.84	112.32
536.50	2.09	135.97
536.75	2.34	161.08
537.00	2.59	187.57

Notes:

(1) Weir Flow, $Q = CLH^{1.5}$

where: C = weir coefficient = 3.00

L = bottom width of the spillway crest, ft. = 15.00

H = depth of flow above the spillway crest, ft. Variable

By: JTK

Date: 2/14/2018

Chk'd: MDF

Date: 2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 1

COMBINED SPILLWAY STAGE/DISCHARGE DATA

BASIN WATER ELEVATION (FT)	PRINCIPAL SPILLWAY FLOW (CFS)	EMERGENCY SPILLWAY FLOW (CFS)	COMBINED FLOW (CFS)
533.91	0.00	0.00	0.00
534.00	0.50	0.00	0.50
534.25	3.80	0.00	3.80
534.41	6.82	0.00	6.82
534.50	8.75	1.22	9.97
534.75	13.84	8.92	22.76
535.00	15.77	20.39	36.16
535.25	17.49	34.64	52.13
535.50	18.72	51.21	69.93
535.75	19.16	69.80	88.96
536.00	19.59	90.22	109.81
536.25	20.01	112.32	132.32
536.50	20.42	135.97	156.39
536.75	20.82	161.08	181.90
537.00	21.22	187.57	208.79

Notes:

(1) 2 cfs/acre flowrate = 29.86 cfs

(2) 2 cfs/acre elevation = 534.88 ft.

By: JTK
Date: 2/14/2018
Chk'd: MDF
Date: 2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY
SEDIMENTATION BASIN NO. 2
Sedimentation Basin Design Notes

Required Storage Volume and Elevations

Drainage Area, DA (acres)	Measured	9.34
Required Sediment Storage Volume (cf)	2,000 x Disturbed DA	18,680
Required Settling Volume (cf)	5,000 x DA	46,700
Required Total Volume (cf)	7,000 x DA	65,380
Total Storage Volume Provided (cf)	Storage Volume Table	81,440
Elevation for Sediment Storage Volume (ft.)	Chosen	526.75
Riser Crest Elevation (ft.)	Chosen	528.77
Emergency Spillway Crest Elevation (ft.)	Riser Crest Elevation + 0.5 ft.	529.27
Principal Spillway and Outlet Protection		
Barrel Diameter (in.)	Chosen	18.00
Riser Dimensions (in.)	Chosen	24.00
Drainage Area, DA (acres)	Measured	9.34
Flow Rate @ 2 cfs per Acre (cfs)	2 x DA	18.68
2 cfs/acre Flow Elevation (ft.)	Combined Spillway Table	529.53
Principal Spillway Capacity @ 2 cfs/acre Flow Elevation	Combined Spillway Table	12.42
Barrel Slope (ft/ft)	Chosen	0.00607
Velocity @ 2 cfs/acres Flow (fps)	Primary Spillway Table	7.03
Rip-Rap	Chosen	R-4
Rip-Rap d50 (in.)	Table 9	6
Controlled Dewatering by Perforation		
Invert Elevation of First Perforation (ft.)	Chosen	526.75
Vertical Spacing of Perforation (ft.)	Chosen	1
Number of Rows	Rows	2
Perforations per Row	Chosen	4
Perforation Diameter (in.)	Chosen	1
Dewatering Time (days)	Dewatering Table	2.55
Emergency Spillway		
Drainage Area, DA (acres)	Measured	9.34
Flow Rate @ 2 cfs per Acre (cfs)	2 x DA	18.68
2 cfs/acre Flow Elevation (ft.)	Combined Spillway Table	529.53
Emergency Spillway Capacity @ 2 cfs/acre Flow Elevation	Emergency Spillway Table	6.36
Bottom Width (ft.)	Chosen	15.00
Side Slope Ratio (z:1)	Chosen	4.00
Emergency Spillway Channel and Outlet Protection		
Depth (ft.)	Chosen	0.26
Emergency Spillway Capacity Requirement (cfs)	Emergency Spillway Table	6.36
Rip-Rap	Chosen	R-3
Rip-Rap d50 (in.)	Table 9	3.00
Manning's n	Figure 3	0.03
Bottom Width (ft.)	Chosen	15.00
Side Slope Ratio (z:1)	Chosen	10.00
Velocity (fps)	Emergency Spillway Table	1.37
Top of Embankment Elevation		
Emergency Spillway Crest Elevation (ft.)	As Above	529.27
2 cfs/acre Flow Depth (ft.)	Combined Spillway Table	0.26
2 cfs/acre Flow Elevation (ft.)	Emerg. Spill. Crest Elev.+ Depth	529.53
Freeboard (ft.)	Chosen	2.47
Top of Embankment Elevation (ft.)	Flow Elevation + Freeboard (min.)	532.00

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 2

Sedimentation Basin Storage Volume Check

Elevation ft.	Plan Area sf	Average Area sf	Elevation Difference ft.	Incremental Volume cf	Incremental Volume acre-ft	Cummulative Volume cf	Cummulative Volume acre-ft
525	17,544						
526	20,427	18,967	1	18,967	0.435	18,967	0.435
527	21,923	21,171	1	21,171	0.486	40,138	0.921
528	23,454	22,684	1	22,684	0.521	62,822	1.442
529	25,021	24,233	1	24,233	0.556	87,056	1.999
530	26,624	25,818	1	25,818	0.593	112,874	2.591
531	28,264	27,440	1	27,440	0.630	140,314	3.221
532	29,936	29,096	1	29,096	0.668	169,410	3.889

Design:

Sediment Storage Volume =	34,740 CF
Sediment Storage Volume Elevation =	526.75 ft.
Settling Storage Volume =	81,440 CF
Settling Storage Volume Elevation =	528.77 ft.

Requirements:

Sediment Storage Volume (2,000 CF/disturbed area acres) =	18,680 CF
Settling Storage Volume (5,000 CF/drainage area acres) =	46,700 CF
Drainage Area (acres) =	9.34 acres

Average area calculated as follows: [A+B+sqrt(A*B)]/3

By:	JTK
Date:	2/15/2018
Chk'd:	MDF
Date:	2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 2

PRINCIPAL SPILLWAY DISCHARGE CAPACITY

WATER SURFACE ELEV (FT)	RISER						TOTAL SPILLWAY CAPACITY (CFS) (5)
	ORIFICE FLOW		WEIR FLOW		PIPE FLOW		
	HEAD H (FT)	FLOW (1) Q (CFS)	HEAD H (FT)	FLOW (2) Q (CFS)	PIPE HEAD H (FT)	FLOW (3) Q (CFS)	
528.77	0.00	0.00	0.00	0.00	1.52	10.75	0.00
529.25	0.48	10.50	0.48	6.51	2.00	12.34	6.51
529.27	0.50	10.71	0.50	6.92	2.02	12.41	6.92
529.50	0.73	12.94	0.73	12.19	2.25	13.09	12.19
529.75	0.98	14.99	0.98	18.95	2.50	13.80	13.80
530.00	1.23	16.79	1.23	26.63	2.75	14.47	14.47
530.25	1.48	18.41	1.48	35.13	3.00	15.12	15.12
530.50	1.73	19.91	1.73	44.39	3.25	15.74	15.74
530.75	1.98	21.29	1.98	54.34	3.50	16.33	16.33
531.00	2.23	22.60	2.23	64.94	3.75	16.90	16.90
531.25	2.48	23.83	2.48	76.15	4.00	17.46	17.46
531.50	2.73	25.00	2.73	87.94	4.25	17.99	17.99
531.75	2.98	26.12	2.98	100.29	4.50	18.52	18.52
532.00	3.23	27.19	3.23	113.16	4.75	19.02	19.02

Notes:

(1) Orifice flow through top of riser, $Q = Ca(2gh)^{0.5}$

where:

C = orifice coefficient =	0.60
a = cross-sec. area of inlet, sq. ft., =	3.14
where: riser diameter, inches =	24.00
g = acceleration of gravity = 32.2 ft/sec^2	
H = head on top of riser (See table)	
Note: Q = total flow through all submerged orifices.	

(2) Weir flow, $Q = CLH^{1.5}$

where:

C = weir coefficient =	3.10
L = weir length, ft =	6.28
where: riser diameter, inches =	24.00
H = head over weir, ft (See table)	

(3) Pipe flow, $Q = cA[(2gH)/(1+Km+(Kp)L)]^{0.5}$

where:

A = cross-sec area of barrel, sq ft, =	1.77
g = acceleration of gravity, 32.2 ft/sec^2	
H = head above centerline of outlet of pipe, where	527.25
elev. of outlet of pipe =	526.50
Km = coeff. of minor losses =	1.00
Kp = pipe friction coefficient;	0.0155
Kp = (5087n^2)/d^(4/3)	
where:	
n = Manning's roughness coefficient =	0.012
d = inside diameter of barrel, inches	18.00
L = pipe length, ft, =	41.20
c = number of pipes =	1.00

By:	JTK
Date:	2/15/2018
Chk'd:	MDF
Date:	2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 2

Sedimentation Basin Dewatering Time

Water Surface Elevation (ft.)	Storage Volume (cu. ft.)	Incremental Storage Volume (cu. ft.)	Discharge (cfs)	Average Discharge (cfs)	Time (hrs)	Accumulated Time (hrs)
528.77	81,440		0.30			
		18,618		0.29	17.85	
528.00	62,822		0.28			17.85
		22,684		0.23	27.17	
527.00	40,138		0.18			45.02
		5,398		0.09	16.27	
526.75	34,740		0.00			61.29

Dewatering Time = 2.55 days

By: JTK
Date: 2/14/2018
Chk'd: MDF
Date: 2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 2

EMERGENCY SPILLWAY DISCHARGE CAPACITY

WEIR FLOW		
WATER SURFACE ELEV (FT)	HEAD H (FT)	FLOW (1) Q (CFS)
529.27	0.00	0.00
529.50	0.23	4.96
529.75	0.48	14.96
530.00	0.73	28.07
530.25	0.98	43.66
530.50	1.23	61.39
530.75	1.48	81.02
531.00	1.73	102.40
531.25	1.98	125.37
531.50	2.23	149.85
531.75	2.48	175.75
532.00	2.73	202.98

Notes:

(1) Weir Flow, $Q = CLH^{1.5}$

where: C = weir coefficient = 3.00

L = bottom width of the spillway crest, ft. = 15.00

H = depth of flow above the spillway crest, ft. Variable

By: JTK

Date: 2/15/2018

Chk'd: MDF

Date: 2/20/2018

HANSON AGGREGATES - ROCK HILL QUARRY

SEDIMENTATION BASIN NO. 2

COMBINED SPILLWAY STAGE/DISCHARGE DATA

BASIN WATER ELEVATION (FT)	PRINCIPAL SPILLWAY FLOW (CFS)	EMERGENCY SPILLWAY FLOW (CFS)	COMBINED FLOW (CFS)
528.77	0.00	0.00	0.00
529.25	6.51	0.00	6.51
529.27	6.92	0.00	6.92
529.50	12.19	4.96	17.16
529.75	13.80	14.96	28.77
530.00	14.47	28.07	42.54
530.25	15.12	43.66	58.77
530.50	15.74	61.39	77.12
530.75	16.33	81.02	97.35
531.00	16.90	102.40	119.30
531.25	17.46	125.37	142.83
531.50	17.99	149.85	167.85
531.75	18.52	175.75	194.26
532.00	19.02	202.98	222.00

Notes:

(1) 2 cfs/acre flowrate = 18.68 cfs

(2) 2 cfs/acre elevation = 529.53 ft.

By: JTK
Date: 2/14/2018
Chk'd: MDF
Date: 2/20/2018

SEDIMENT TRAP

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Hanson Aggregates - Rock Hill Quarry

Sediment Trap 1

Design Notes

Required Storage Volume and Elevations		
Drainage Area, DA (acres)	Measured	4.97
Required Sediment Storage Volume (cf)	700 x DA	3,479
Required Settling Volume (cf)	1300 x DA	6,461
Required Total Volume (cf)	Sediment + Settling	9,940
Total Storage Volume Provided (cf)	Storage Volume Table	11,550
Elevation for Sediment Storage Volume (ft.)	Chosen	540.36
Total Volume Elevation (ft.)	Chosen	542.50
Top of Embankment Elevation		
Total Volume Elevation (ft.)	Primary Spillway Table	542.50
Freeboard (ft.)	Required	1.00
Top of Embankment Elevation (ft.)	Flow Elevation + Freeboard (min.)	544.00
Trap Dimensions		
Bottom Length (ft.)	Chosen	78.56
Bottom Width (ft.)	Chosen	13.00
Crest Length (ft.)	Chosen	85.56
Crest Width (ft.)	Chosen	20.00
Top Length (ft.)	Chosen	88.56
Top Width (ft.)	Chosen	33.00

Hanson Aggregates - Rock Hill Quarry

Sediment Trap 1

Storage Volume Check

Elevation ft.	Plan Area sf	Average Area sf	Elevation Difference ft.	Incremental Volume cf	Incremental Volume acre-ft	Cummulative Volume cf	Cummulative Volume acre-ft
539	2,021					0	0
540	2,717	2,361	1.0	2,361	0.054	2,361	0.054
541	3,446	3,074	1.0	3,074	0.071	5,435	0.125
542	4,206	3,820	1.0	3,820	0.088	9,255	0.212
543	4,999	4,597	1.0	4,597	0.106	13,852	0.318
544	5,823	5,406	1.0	5,406	0.124	19,257	0.442

Design:

Sediment Storage Volume =	3479.00 CF
Sediment Storage Volume Elevation =	540.36 ft.
Settling Storage Volume =	6461.00 CF
Settling Storage Volume Elevation =	542.50 ft.

Requirements:

Sediment Storage Volume (700 CF/disturbed area acres) =	3,479 CF
Settling Storage Volume (1,300 CF/drainage area acres) =	6,461 CF
Drainage Area (acres) =	4.97 acres

Average area calculated as follows: [A+B+sqrt(A*B)]/3

By:	JTK
Date:	2/18/2018
Chk'd:	MDF
Date:	2/20/2018

Hanson Aggregates - Rock Hill Quarry

Sediment Trap 1

EMERGENCY SPILLWAY DISCHARGE CAPACITY

WEIR FLOW		
WATER SURFACE ELEV (FT)	HEAD H (FT)	FLOW (1) Q (CFS)
542.50	0.00	0.00
542.75	0.25	11.25
543.00	0.50	31.82
543.25	0.75	58.46
543.50	1.00	90.00
543.75	1.25	125.78
544.00	1.50	165.34

Notes:

(1) Weir Flow, $Q = CLH^{1.5}$

where: C = weir coefficient = 3.00

L = bottom width of the spillway crest, ft. = 30.00

H = depth of flow above the spillway crest, ft.

By: JTK

Date: 2/15/2018

Chk'd: MDF

Date: 2/20/2018

HYDRAFLOW HYDROGRAPHS

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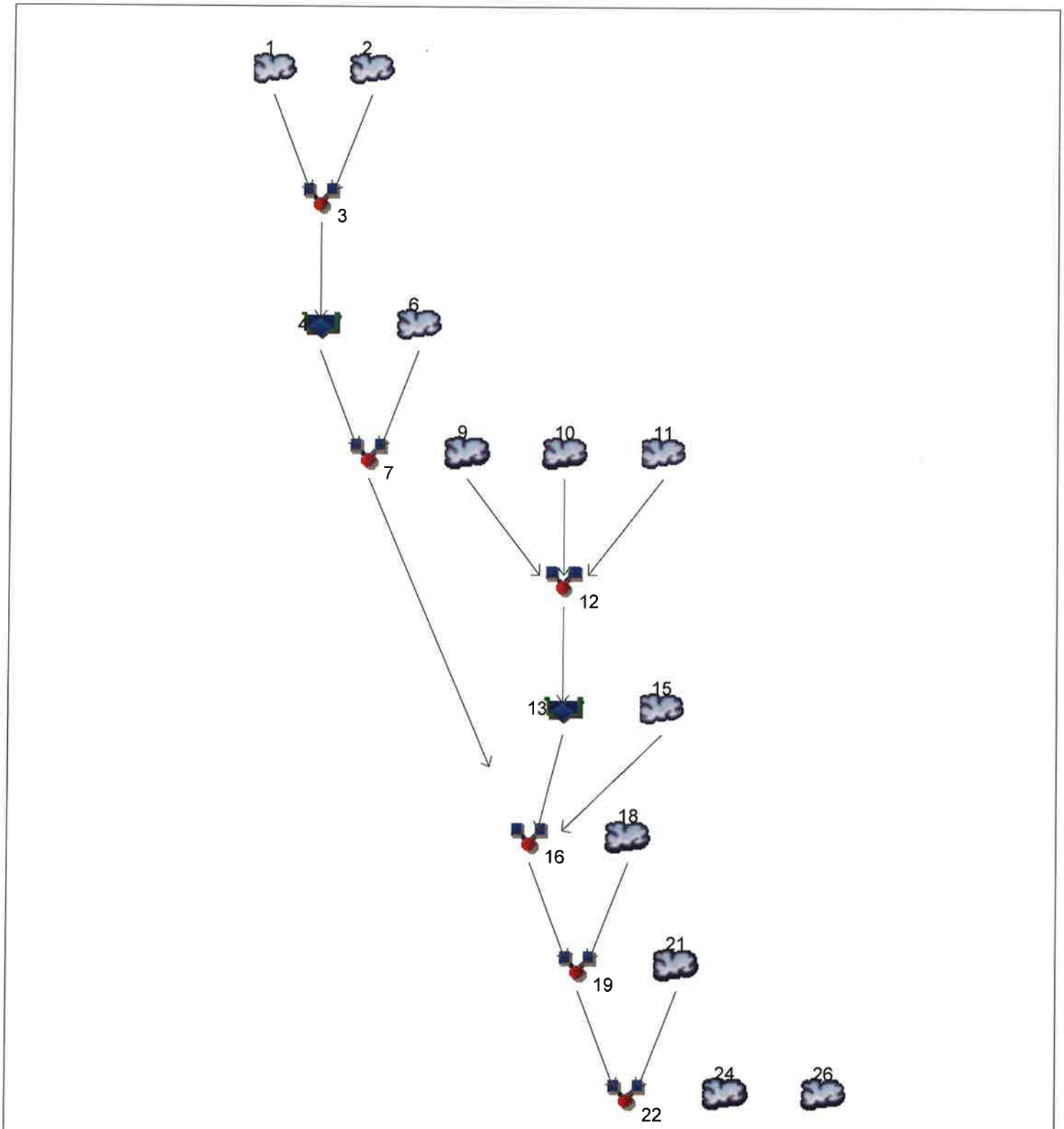
Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	52.95	2	722	152,803	------	------	------	Culvert 2 & Berm 1 DA
2	SCS Runoff	15.37	2	716	32,583	------	------	------	Basin 1 DA
3	Combine	84.70	2	716	179,509	1, 2	------	------	Basin 1 Inflow
4	Reservoir	2.615	2	830	81,615	3	534.30	128,136	Basin 1 Routing
6	SCS Runoff	1.759	2	716	3,727	------	------	------	Channel 1 DA
7	Combine	2.670	2	828	85,342	4, 6	------	------	Channel 1 & Culvert 6 Inflow
9	SCS Runoff	12.93	2	716	27,413	------	------	------	Culvert 3 DA
10	SCS Runoff	11.80	2	716	25,009	------	------	------	Culvert 4 DA
11	SCS Runoff	28.19	2	716	59,756	------	------	------	Basin 2 DA
12	Combine	52.93	2	716	112,178	9, 10, 11	------	------	Basin 2 Inflow
13	Reservoir	1.089	2	924	47,085	12	528.98	86,558	Basin 2 Routing
15	SCS Runoff	4.595	2	716	9,739	------	------	------	Channel 2 Section 1 DA
16	Combine	6.441	2	716	142,166	7, 13, 15	------	------	Channel 2 Section 1 Inflow
18	SCS Runoff	4.879	2	716	10,340	------	------	------	Channel 2 Section 2 DA
19	Combine	11.32	2	716	152,506	16, 18	------	------	Channel 2 Section 2 & Culvert 5 Inflo
21	SCS Runoff	19.91	2	716	42,202	------	------	------	Channel 3 DA
22	Combine	31.23	2	716	194,708	19, 21	------	------	Channel 3 Inflow
24	SCS Runoff	28.19	2	716	59,756	------	------	------	Berms 2 and 3 DA
26	SCS Runoff	42.43	2	716	85,675	------	------	------	Diversion Channel

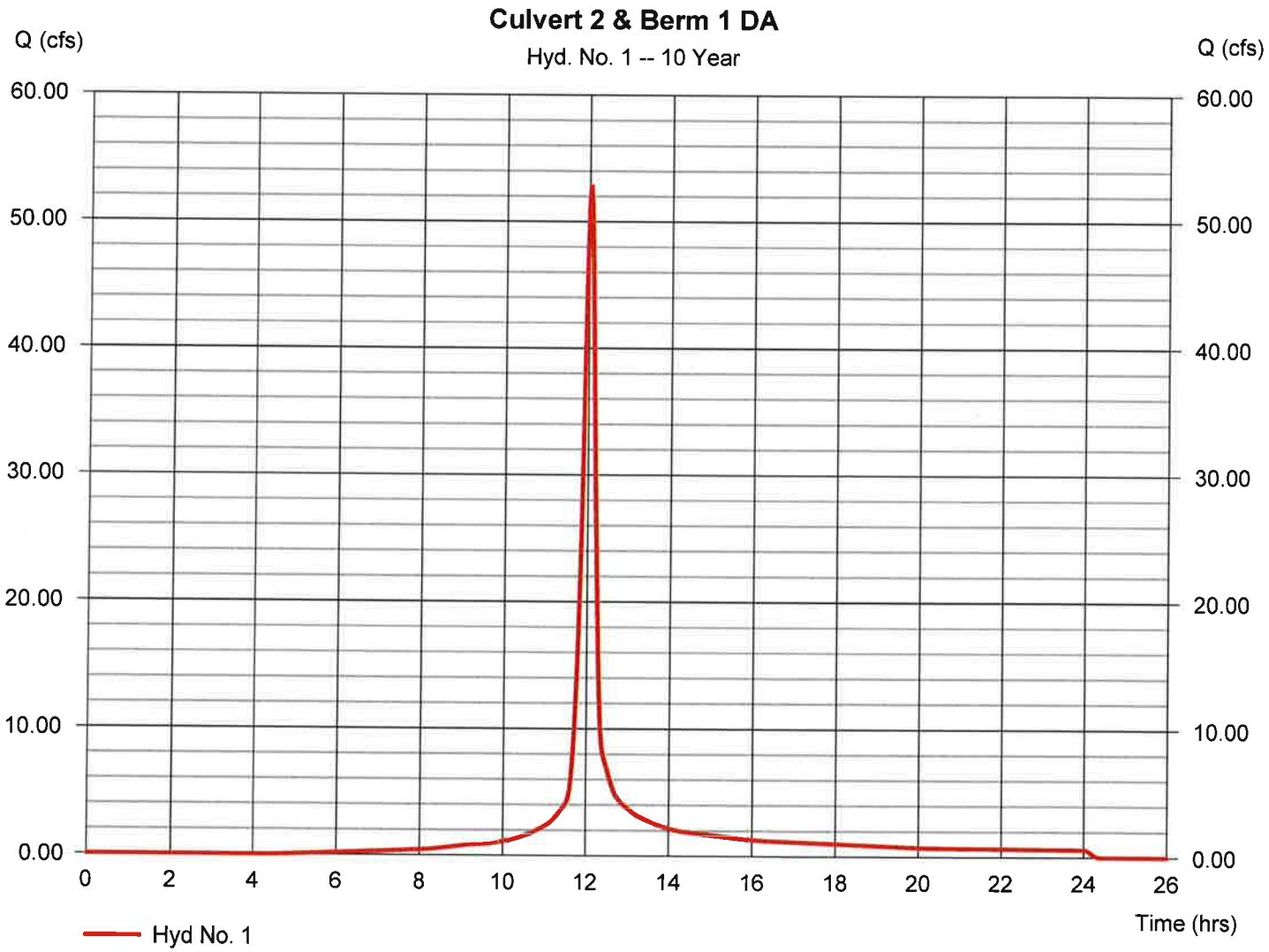
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 1

Culvert 2 & Berm 1 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 52.95 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 152,803 cuft
Drainage area	= 12.220 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 15.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



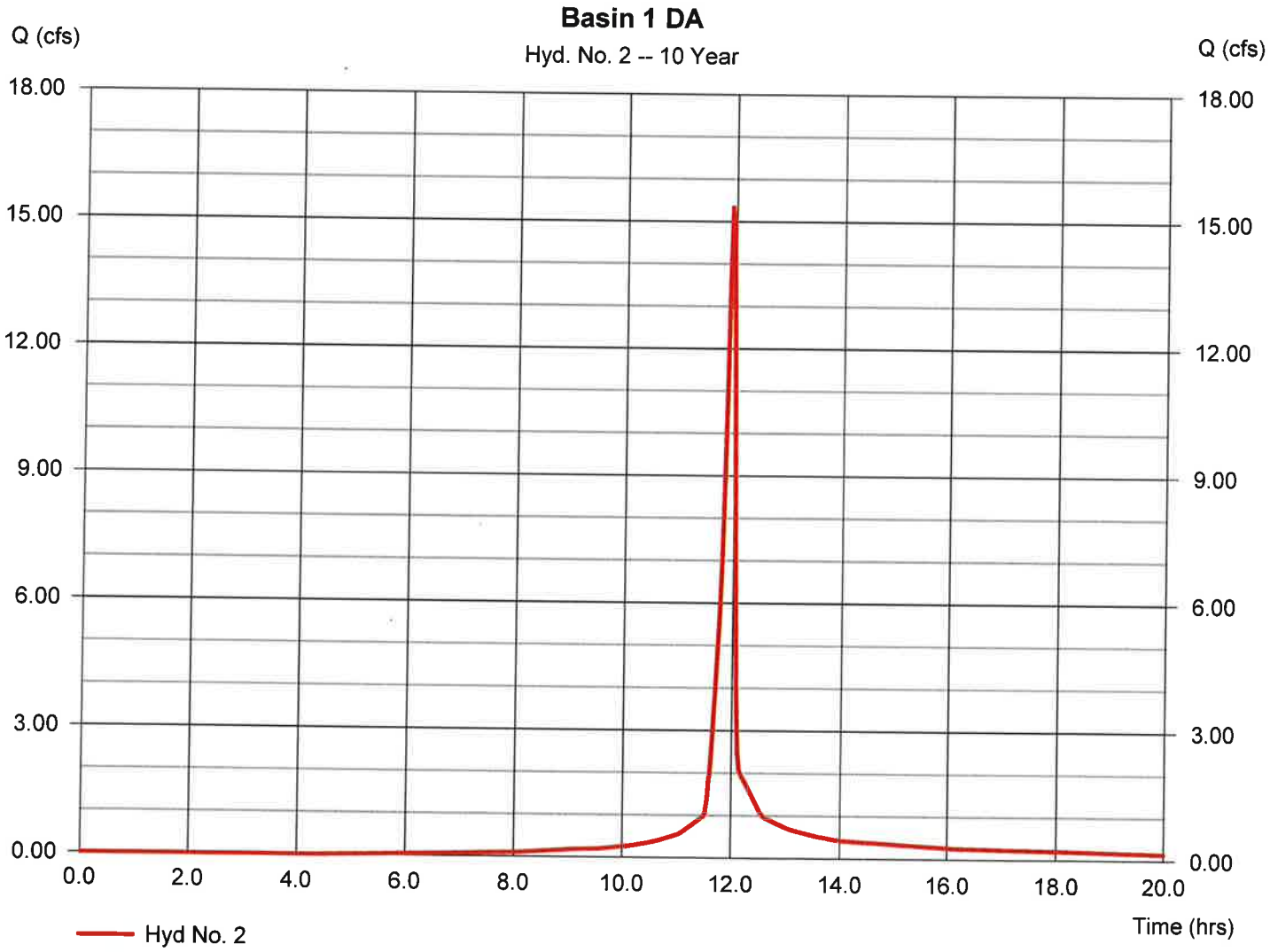
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 2

Basin 1 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 15.37 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 32,583 cuft
Drainage area	= 2.710 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



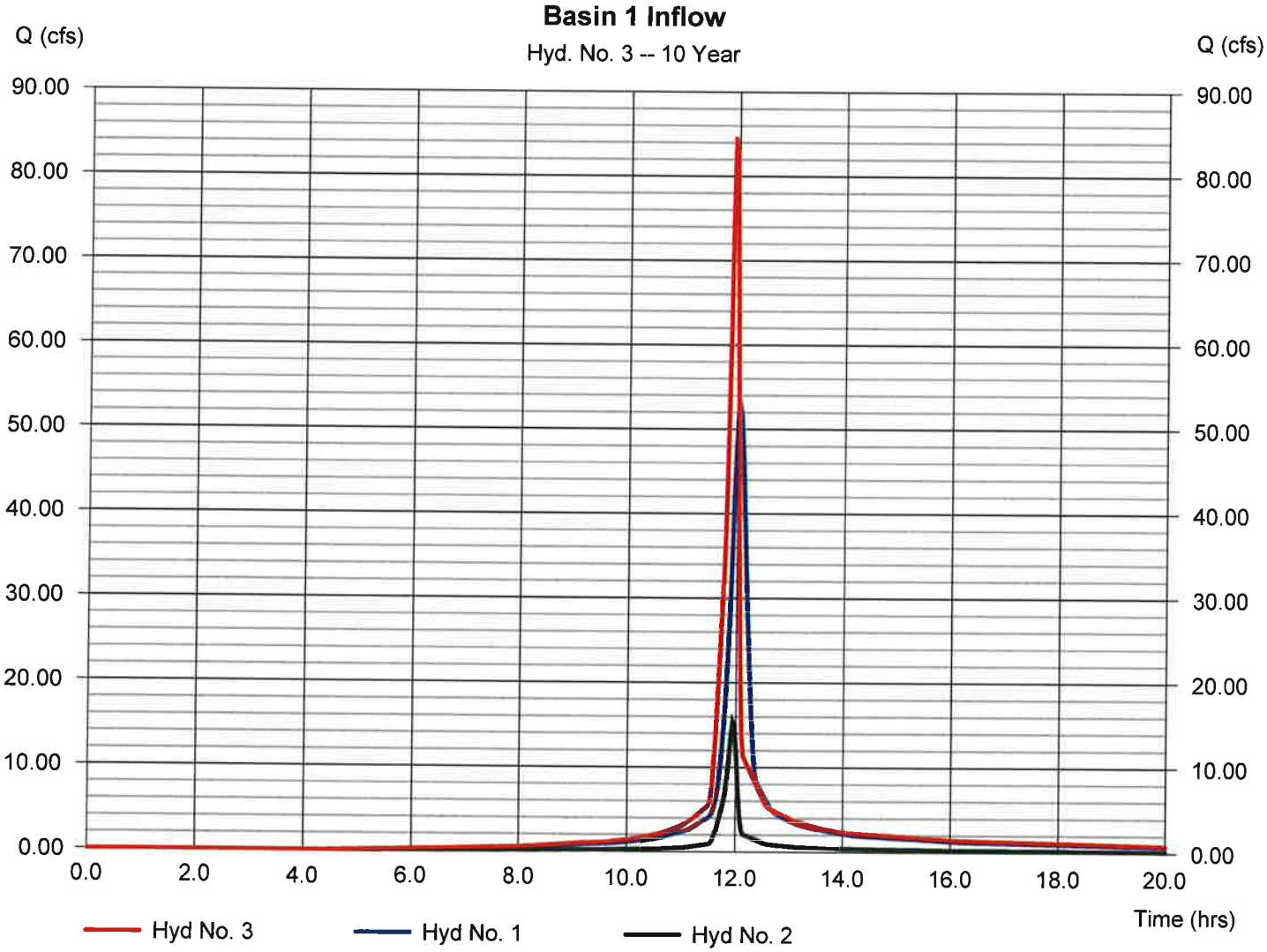
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 3

Basin 1 Inflow

Hydrograph type	= Combine	Peak discharge	= 84.70 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 179,509 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 14.930 ac



Hydrograph Report

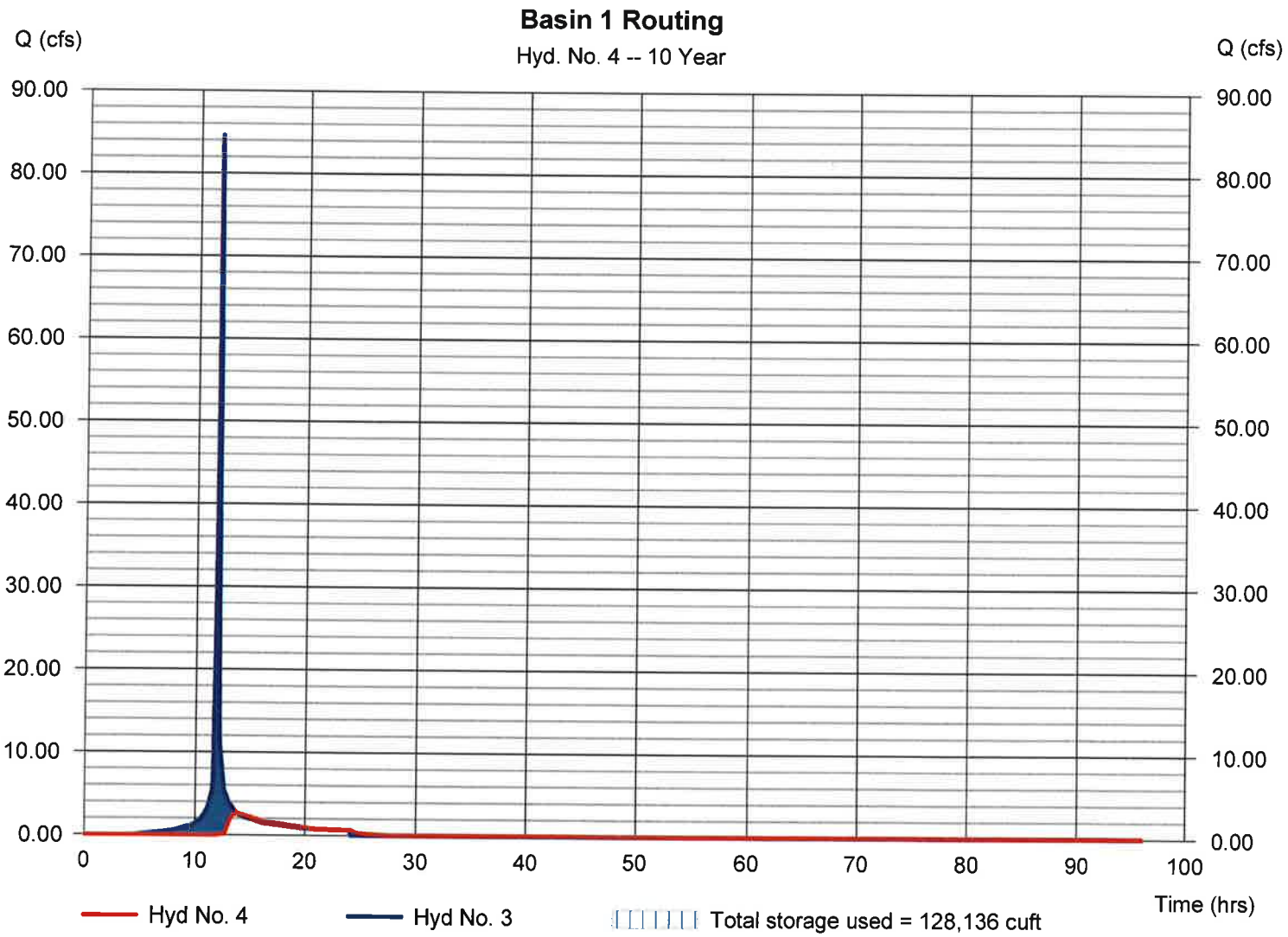
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 4

Basin 1 Routing

Hydrograph type	= Reservoir	Peak discharge	= 2.615 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.83 hrs
Time interval	= 2 min	Hyd. volume	= 81,615 cuft
Inflow hyd. No.	= 3 - Basin 1 Inflow	Max. Elevation	= 534.30 ft
Reservoir name	= Sediment Basin 1	Max. Storage	= 128,136 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Pond No. 1 - Sediment Basin 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 527.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	527.00	13,391	0	0
1.00	528.00	14,461	13,921	13,921
2.00	529.00	15,566	15,009	28,930
3.00	530.00	16,707	16,131	45,062
4.00	531.00	17,882	17,289	62,351
5.00	532.00	19,094	18,483	80,834
6.00	533.00	20,340	19,712	100,546
7.00	534.00	21,622	20,976	121,522
8.00	535.00	22,940	22,276	143,797
9.00	536.00	24,292	23,611	167,408
10.00	537.00	25,681	24,981	192,389

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.50	0.50	0.00
Span (in)	= 18.00	0.50	0.50	0.00
No. Barrels	= 1	4	4	0
Invert El. (ft)	= 530.00	530.00	531.00	0.00
Length (ft)	= 65.32	0.10	0.10	0.00
Slope (%)	= 0.77	0.10	0.10	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.14	15.00	0.00	0.00
Crest El. (ft)	= 533.91	534.41	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	527.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.00	13,921	528.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.00	28,930	529.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
3.00	45,062	530.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
4.00	62,351	531.00	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.025
5.00	80,834	532.00	0.06 ic	0.04 ic	0.03 ic	---	0.00	0.00	---	---	---	---	0.062
6.00	100,546	533.00	0.08 ic	0.04 ic	0.04 ic	---	0.00	0.00	---	---	---	---	0.081
7.00	121,522	534.00	0.38 ic	0.05 ic	0.05 ic	---	0.28	0.00	---	---	---	---	0.379
8.00	143,797	535.00	3.57 ic	0.05 ic	0.05 ic	---	3.46 ic	17.68	---	---	---	---	21.24
9.00	167,408	536.00	4.94 ic	0.06 ic	0.06 ic	---	4.79 ic	78.19	---	---	---	---	83.10
10.00	192,389	537.00	5.96 oc	0.06 ic	0.06 ic	---	5.82 ic	162.56	---	---	---	---	168.51

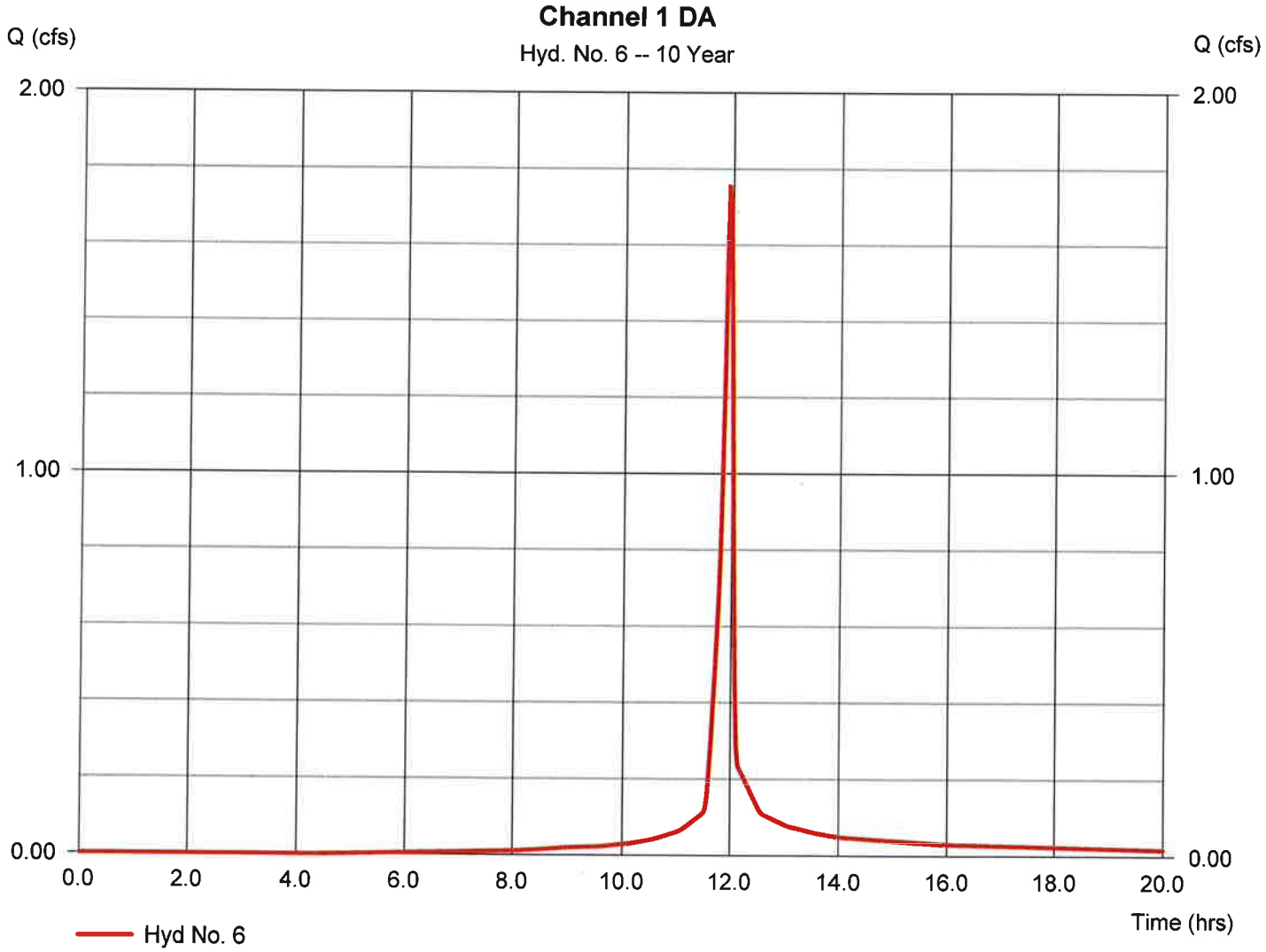
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 6

Channel 1 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 1.759 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 3,727 cuft
Drainage area	= 0.310 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



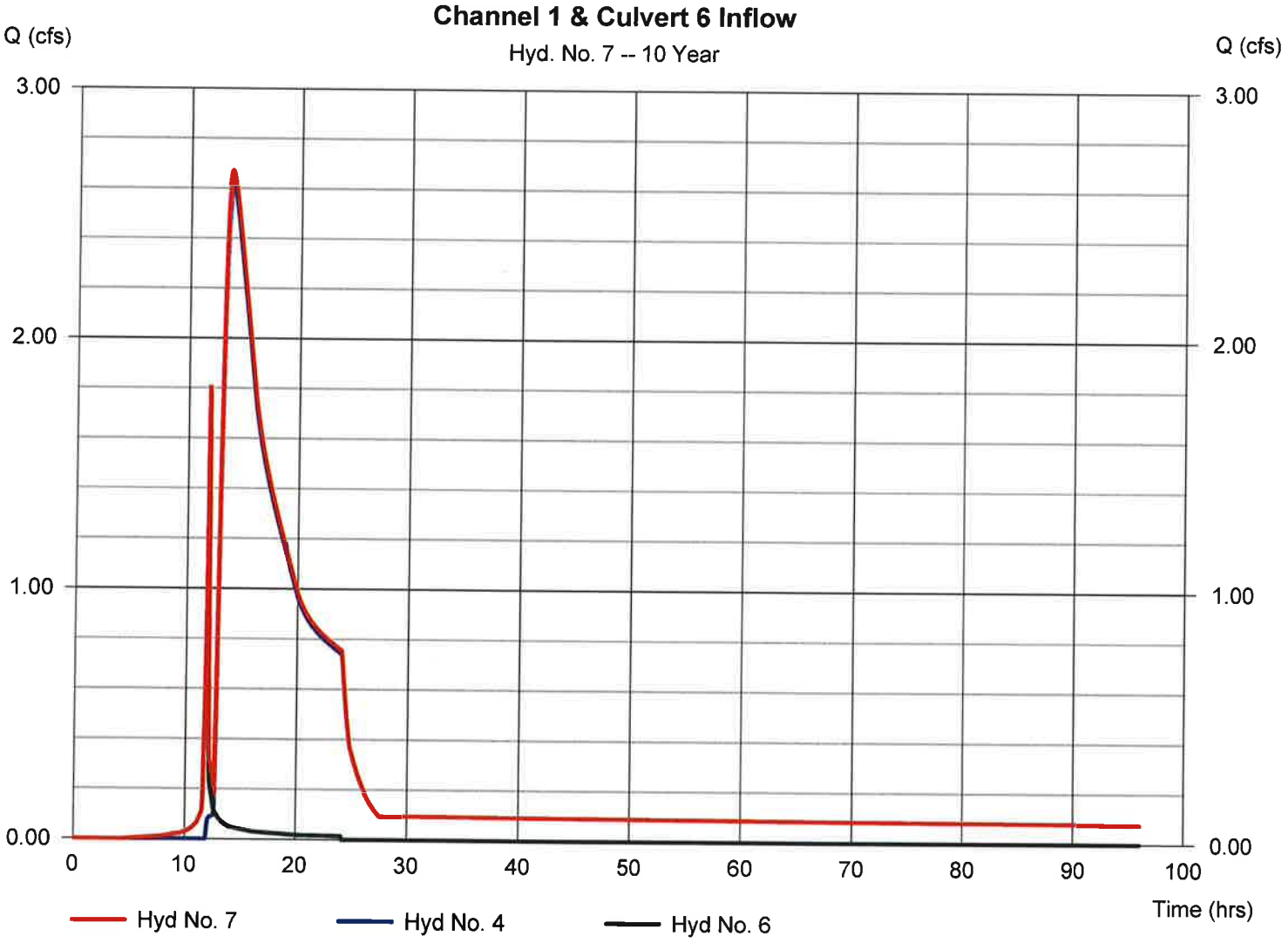
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 7

Channel 1 & Culvert 6 Inflow

Hydrograph type	= Combine	Peak discharge	= 2.670 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.80 hrs
Time interval	= 2 min	Hyd. volume	= 85,342 cuft
Inflow hyds.	= 4, 6	Contrib. drain. area	= 0.310 ac



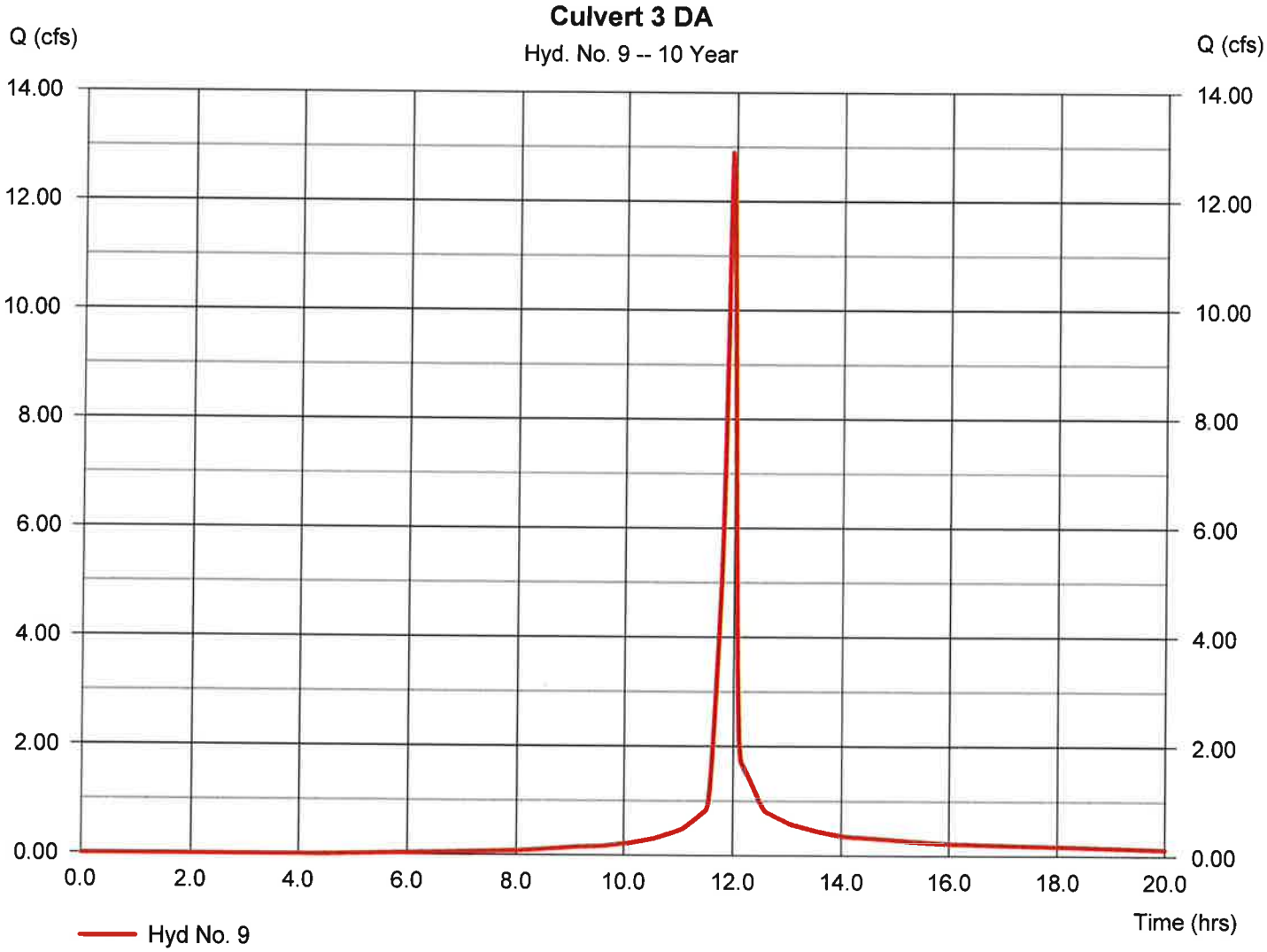
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 9

Culvert 3 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 12.93 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 27,413 cuft
Drainage area	= 2.280 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



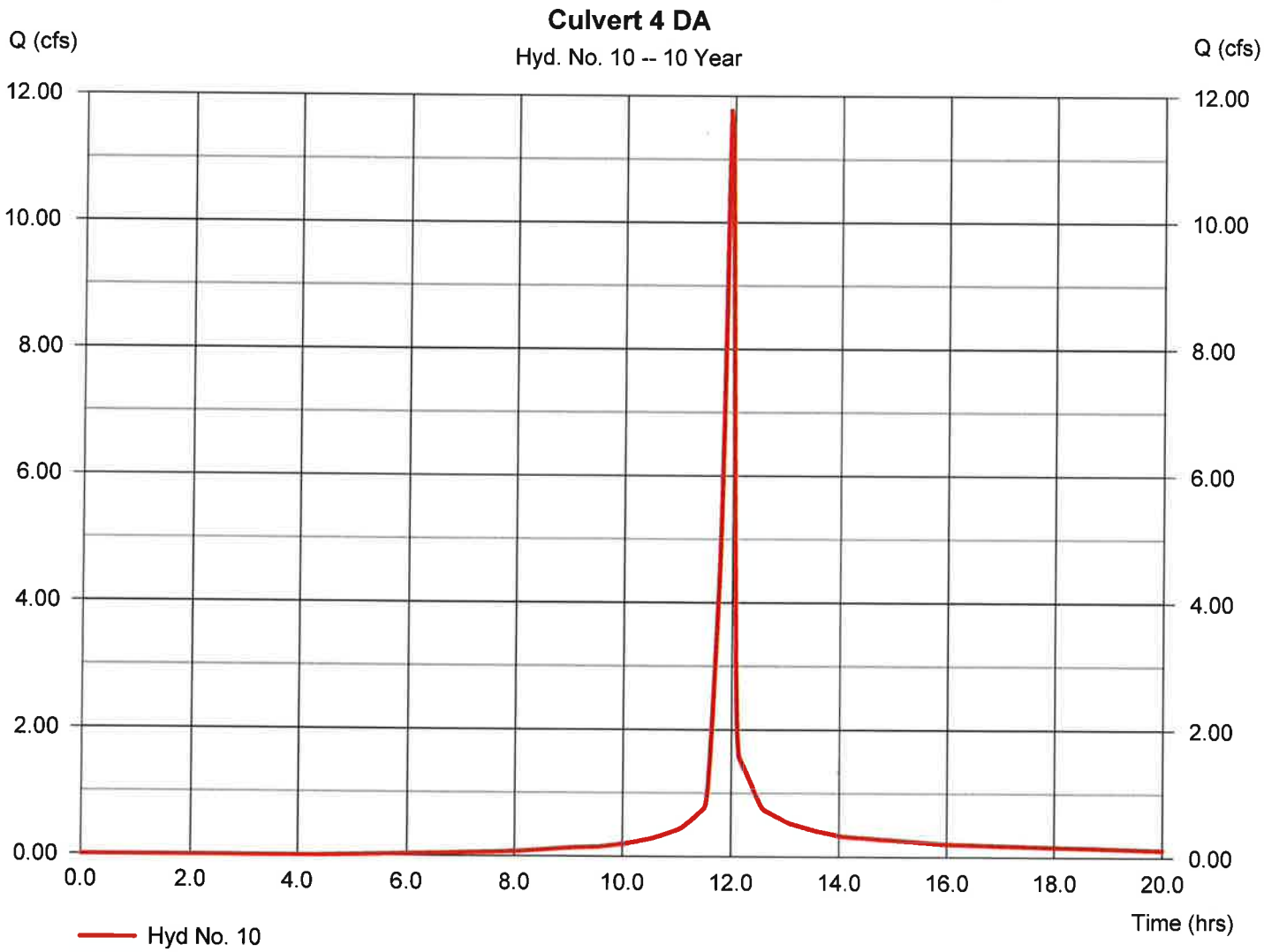
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 10

Culvert 4 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 11.80 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 25,009 cuft
Drainage area	= 2.080 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



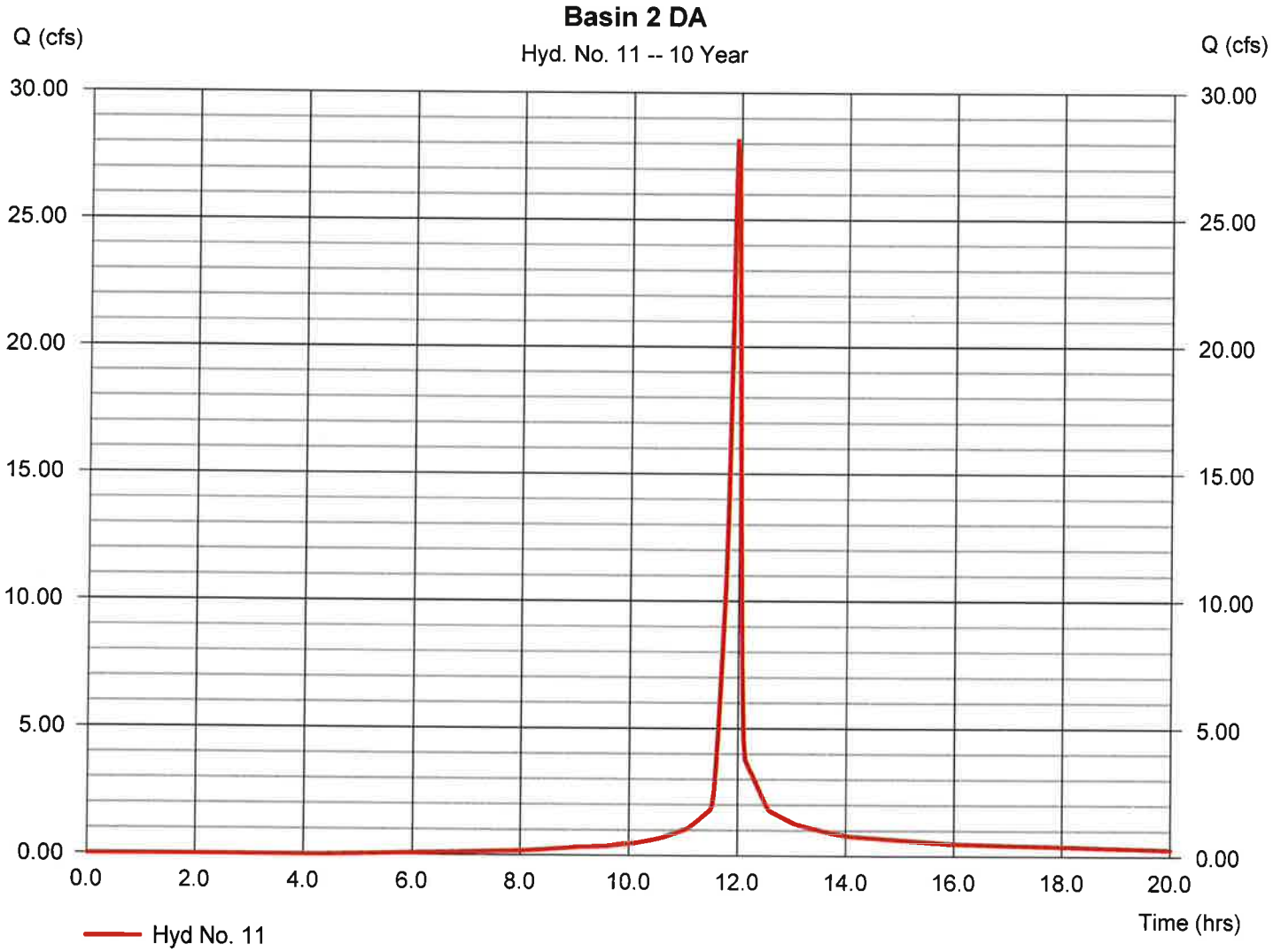
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 11

Basin 2 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 28.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 59,756 cuft
Drainage area	= 4.970 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



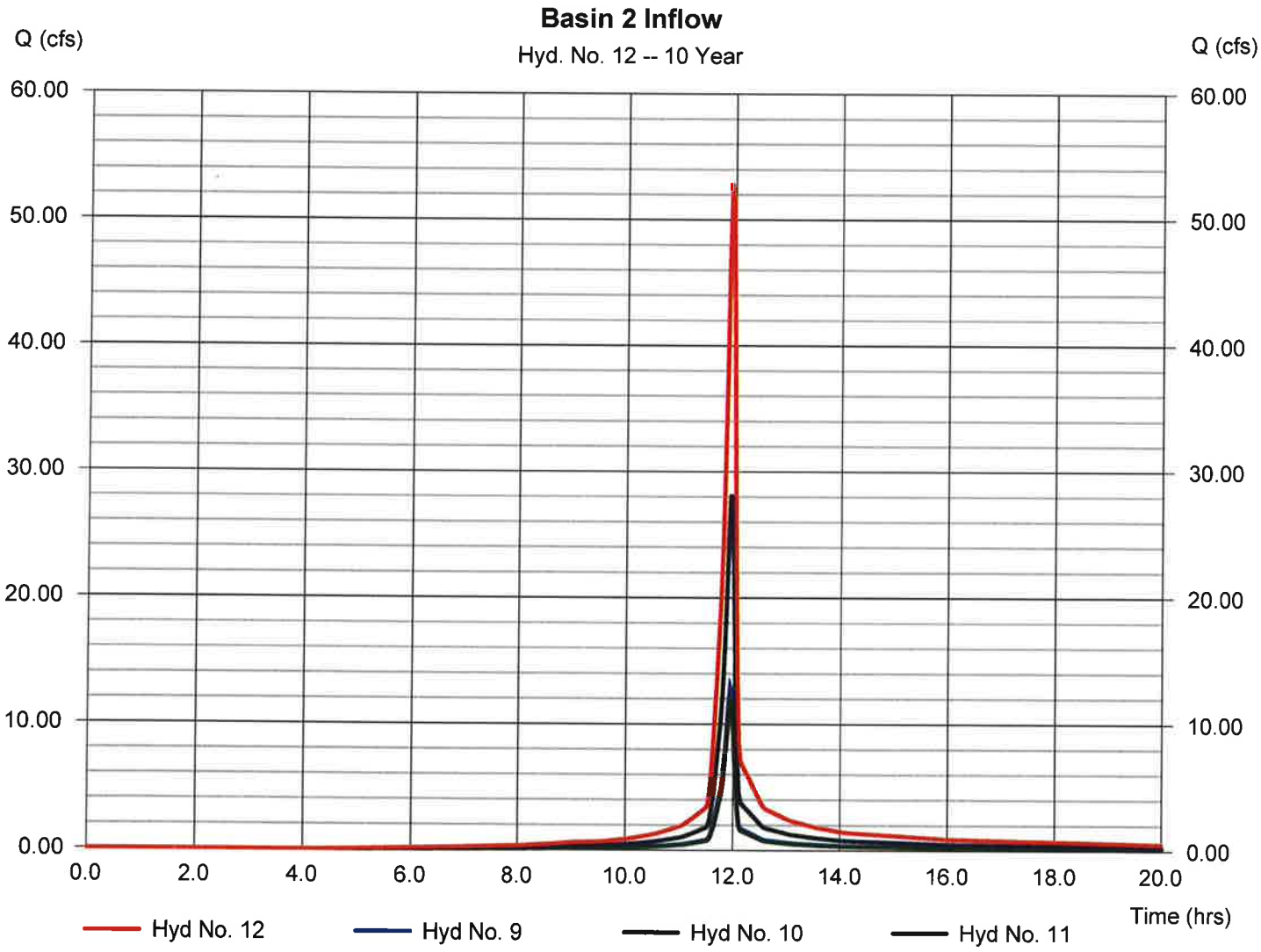
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 12

Basin 2 Inflow

Hydrograph type	= Combine	Peak discharge	= 52.93 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 112,178 cuft
Inflow hyds.	= 9, 10, 11	Contrib. drain. area	= 9.330 ac



Hydrograph Report

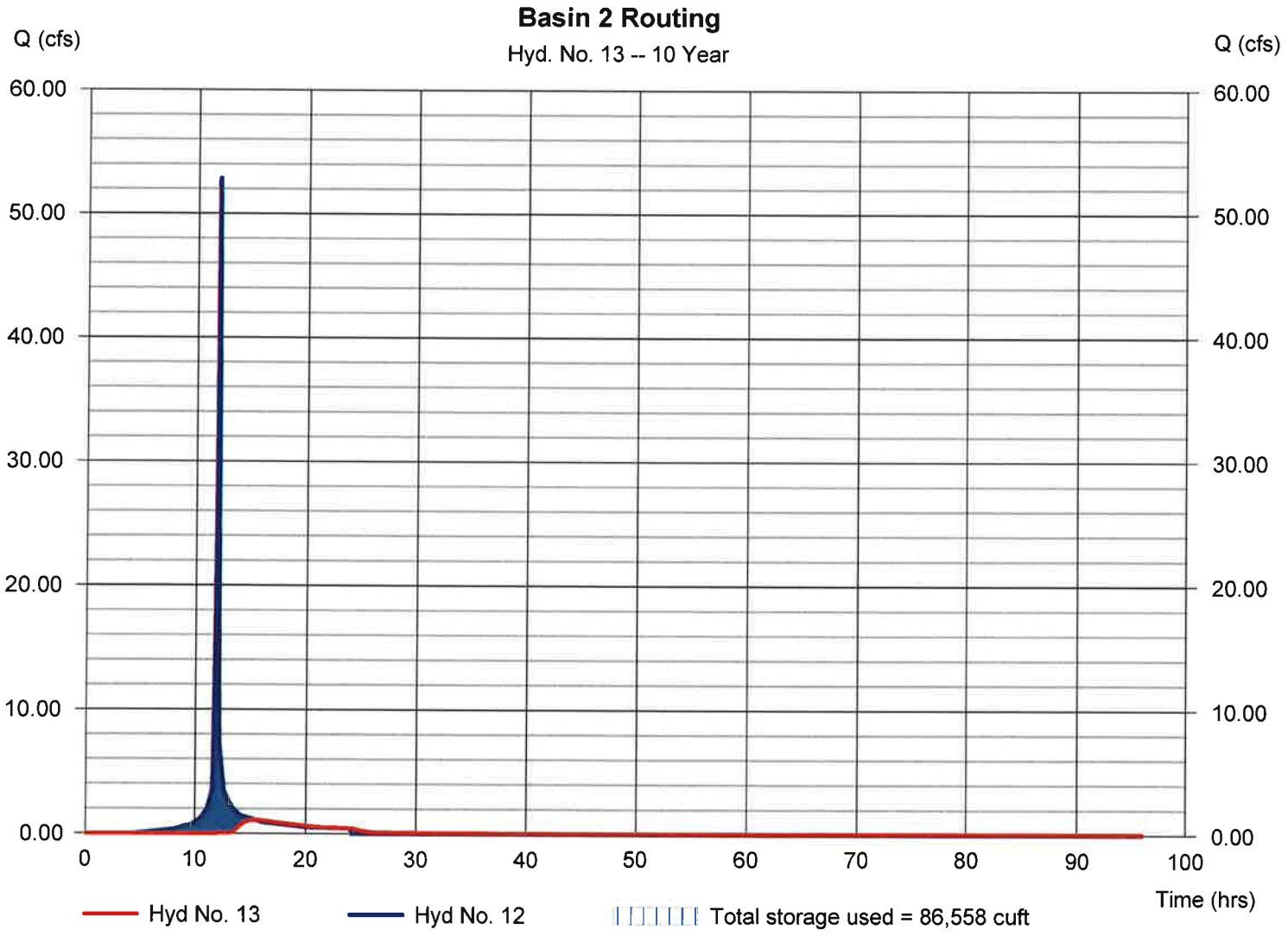
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 13

Basin 2 Routing

Hydrograph type	= Reservoir	Peak discharge	= 1.089 cfs
Storm frequency	= 10 yrs	Time to peak	= 15.40 hrs
Time interval	= 2 min	Hyd. volume	= 47,085 cuft
Inflow hyd. No.	= 12 - Basin 2 Inflow	Max. Elevation	= 528.98 ft
Reservoir name	= Sediment Basin 2	Max. Storage	= 86,558 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Pond No. 2 - Sediment Basin 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 525.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	525.00	17,544	0	0
1.00	526.00	20,427	18,965	18,965
2.00	527.00	21,923	21,169	40,134
3.00	528.00	23,454	22,682	62,816
4.00	529.00	25,021	24,231	87,047
5.00	530.00	26,624	25,816	112,863
6.00	531.00	28,264	27,437	140,299
7.00	532.00	29,936	29,093	169,393

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	0.50	0.50	0.00
Span (in)	= 18.00	0.50	0.50	0.00
No. Barrels	= 1	4	4	0
Invert El. (ft)	= 526.75	526.75	526.75	0.00
Length (ft)	= 41.20	0.10	0.10	0.00
Slope (%)	= 0.61	0.10	0.10	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.14	15.00	0.00	0.00
Crest El. (ft)	= 528.77	529.27	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= 1	Broad	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	525.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.00	18,965	526.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
2.00	40,134	527.00	0.02 ic	0.01 ic	0.01 ic	---	0.00	0.00	---	---	---	---	0.023
3.00	62,816	528.00	0.06 ic	0.03 ic	0.03 ic	---	0.00	0.00	---	---	---	---	0.056
4.00	87,047	529.00	1.26 ic	0.03 ic	0.03 ic	---	1.15	0.00	---	---	---	---	1.223
5.00	112,863	530.00	3.78 oc	0.04 ic	0.04 ic	---	3.67 ic	24.32	---	---	---	---	28.08
6.00	140,299	531.00	5.03 oc	0.04 ic	0.04 ic	---	4.95 ic	88.74	---	---	---	---	93.78
7.00	169,393	532.00	6.05 oc	0.05 ic	0.05 ic	---	5.95 ic	175.92	---	---	---	---	181.97

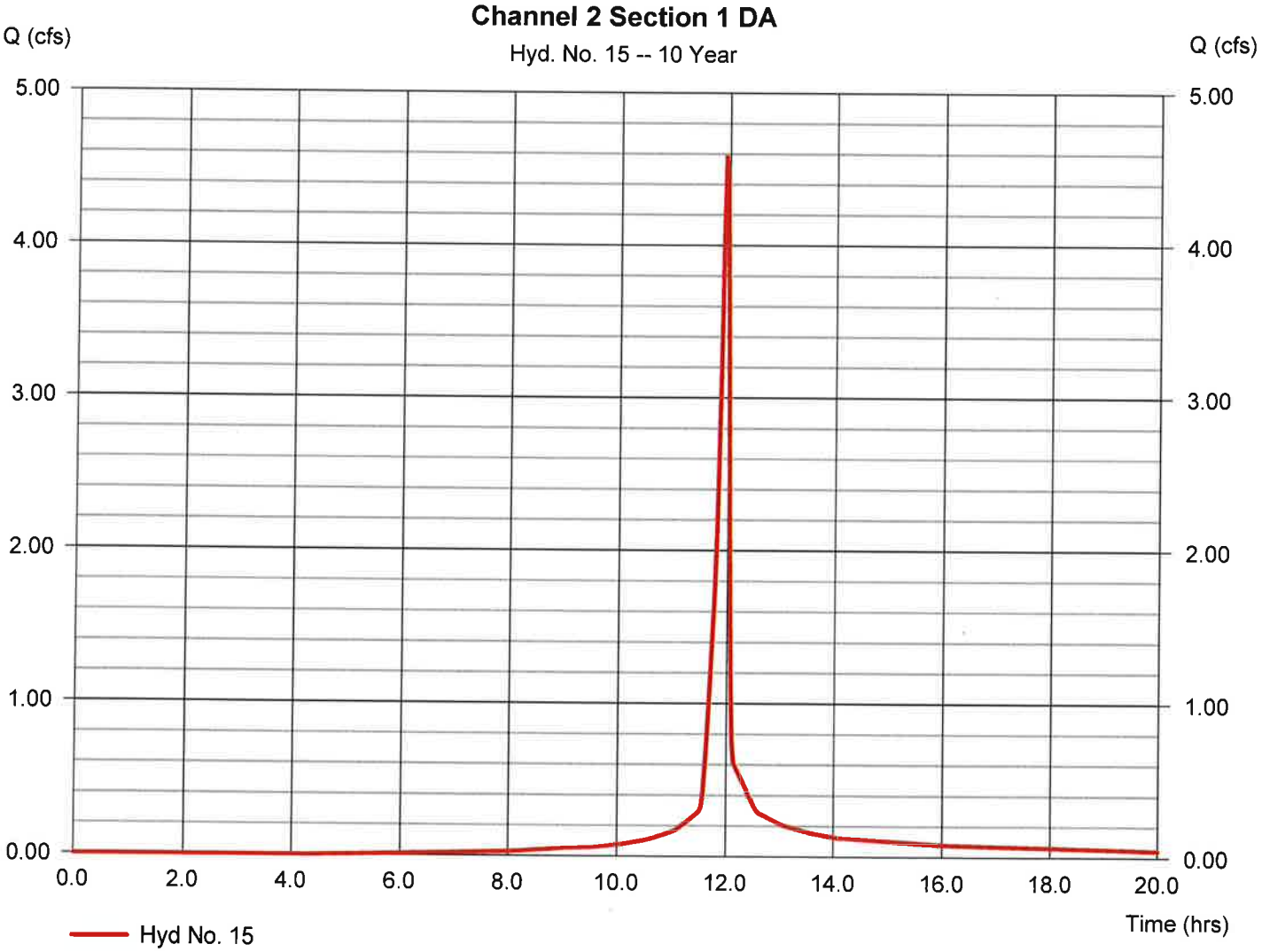
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 15

Channel 2 Section 1 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 4.595 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 9,739 cuft
Drainage area	= 0.810 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



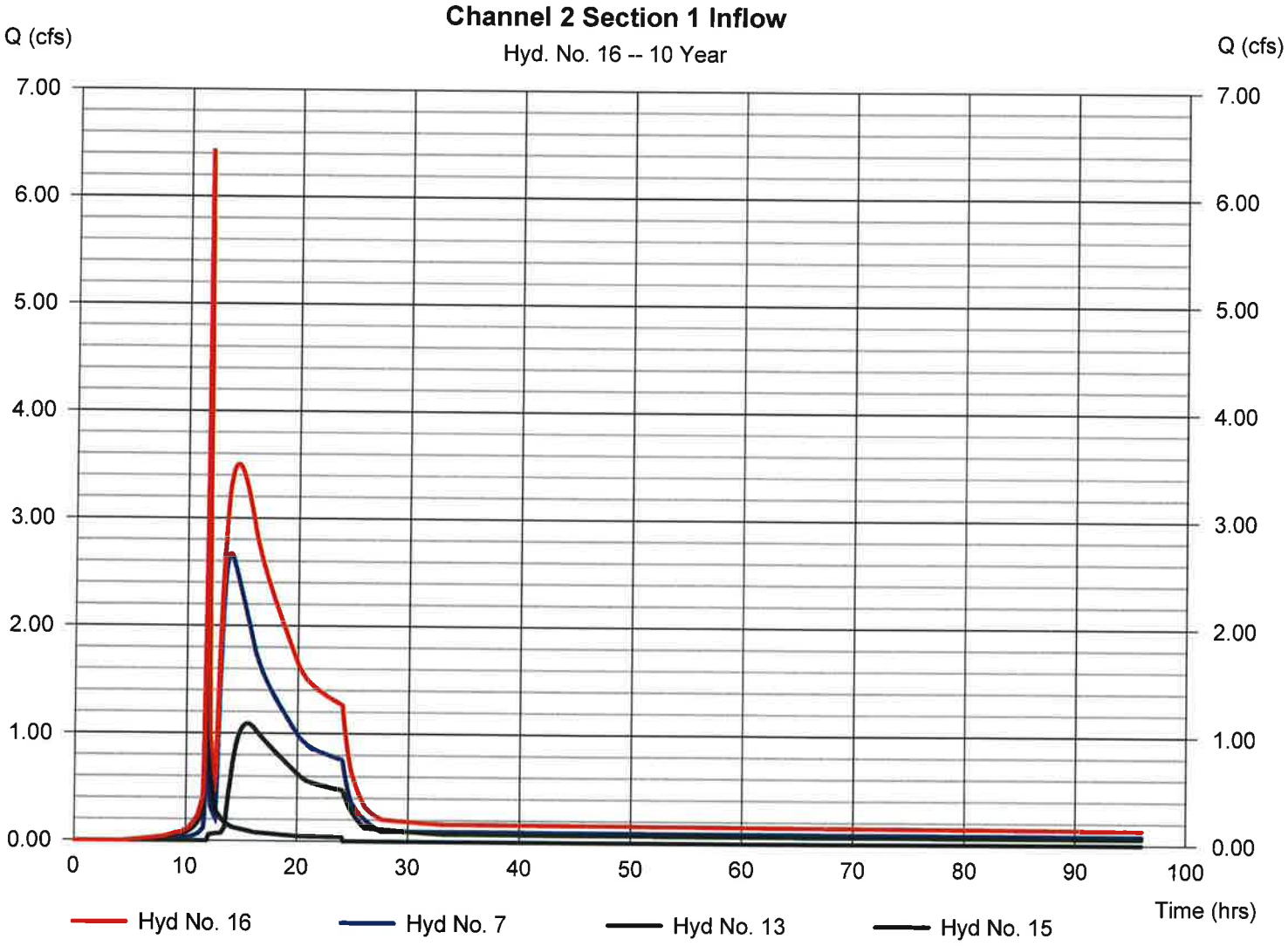
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 16

Channel 2 Section 1 Inflow

Hydrograph type	= Combine	Peak discharge	= 6.441 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 142,166 cuft
Inflow hyds.	= 7, 13, 15	Contrib. drain. area	= 0.810 ac



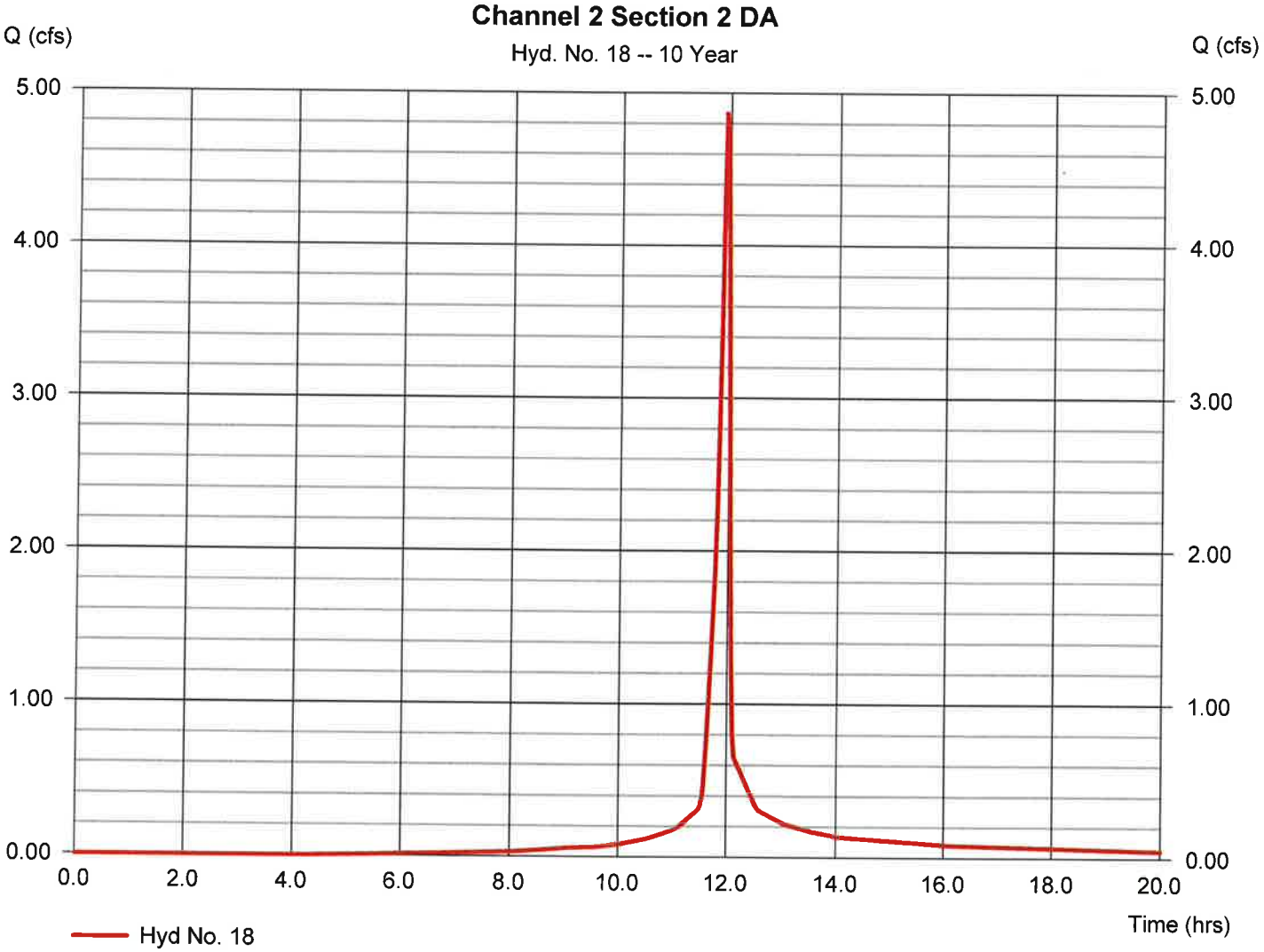
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 18

Channel 2 Section 2 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 4.879 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 10,340 cuft
Drainage area	= 0.860 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



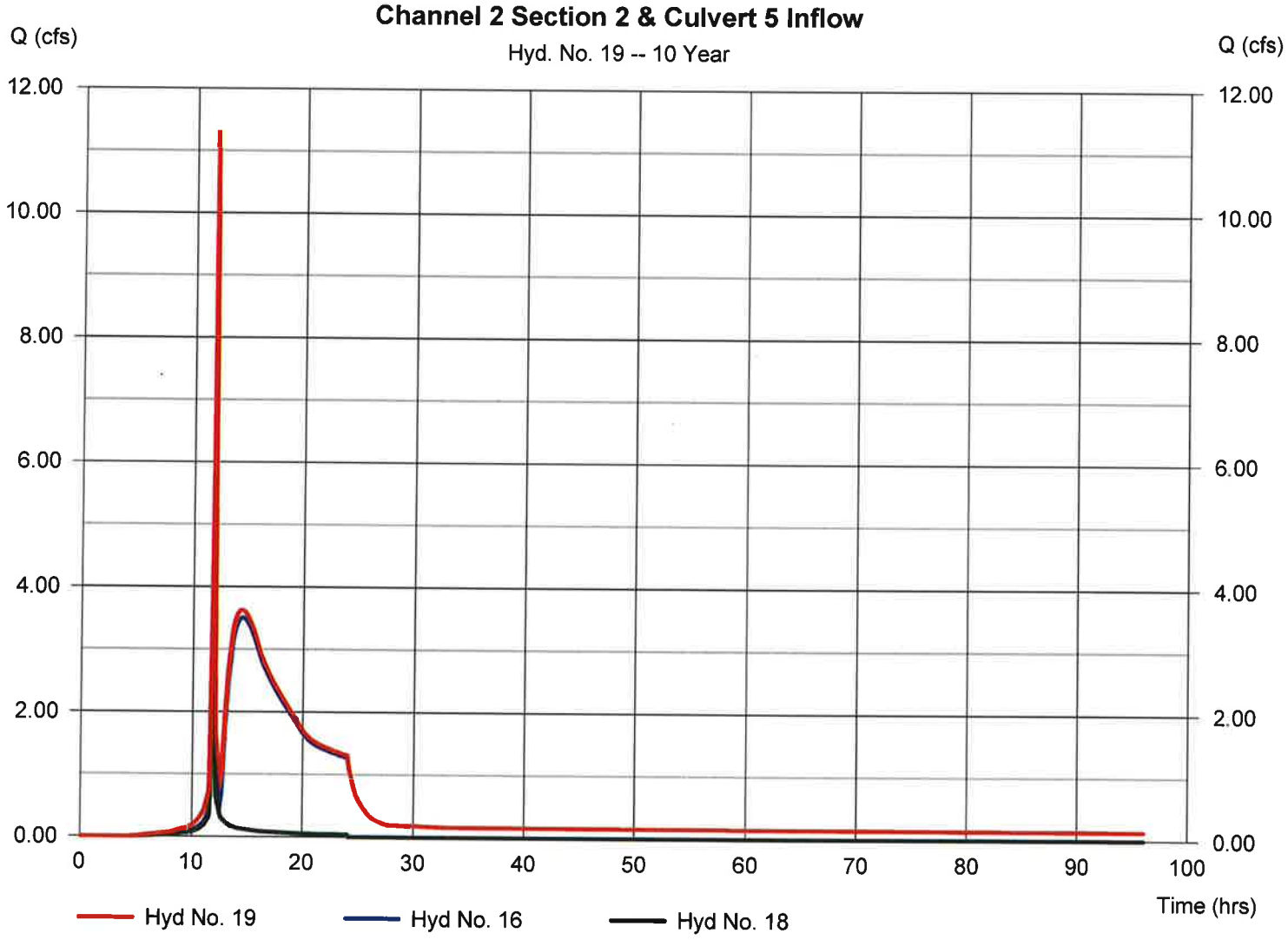
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 19

Channel 2 Section 2 & Culvert 5 Inflow

Hydrograph type	= Combine	Peak discharge	= 11.32 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 152,506 cuft
Inflow hyds.	= 16, 18	Contrib. drain. area	= 0.860 ac



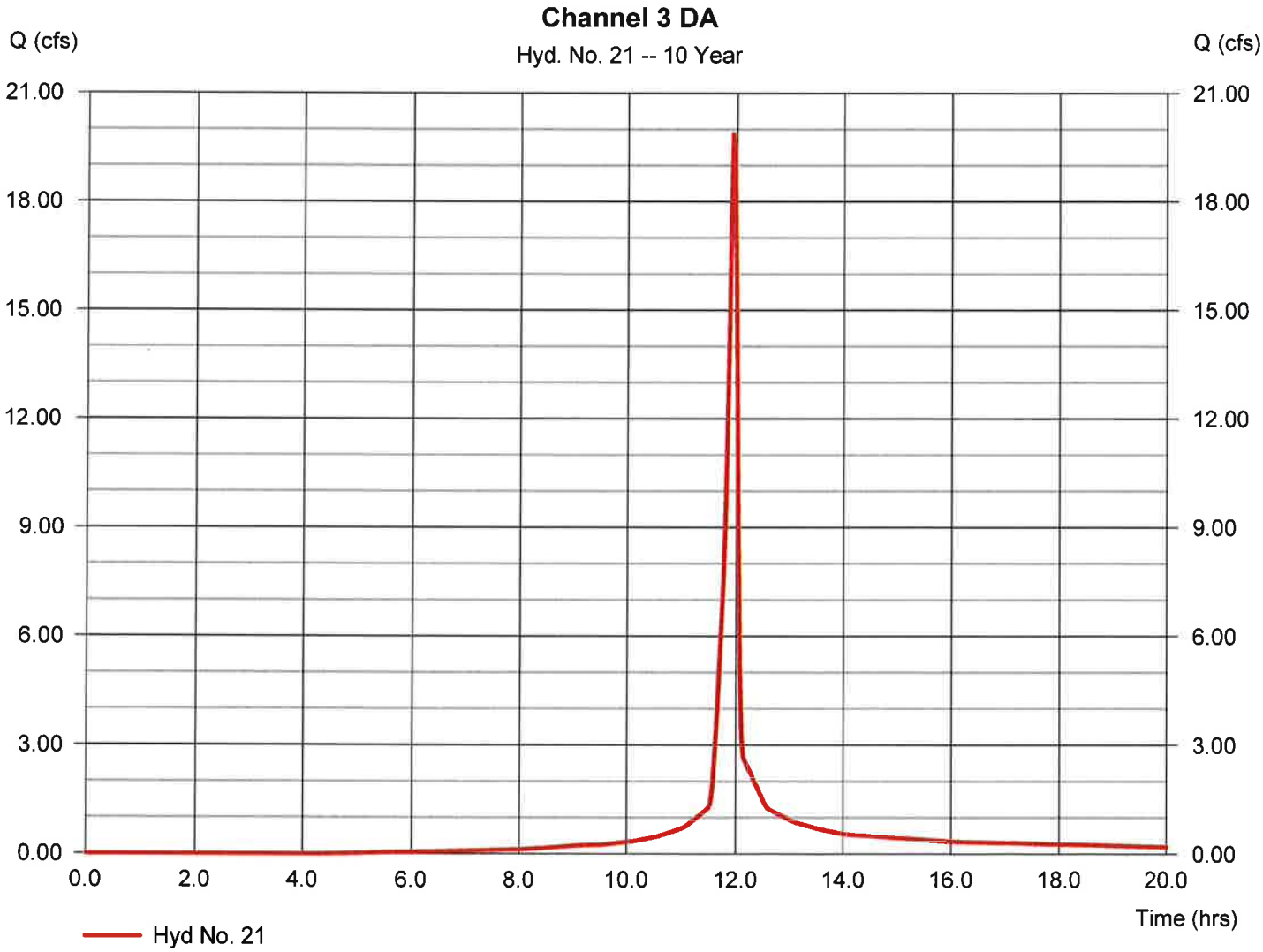
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 21

Channel 3 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 19.91 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 42,202 cuft
Drainage area	= 3.510 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



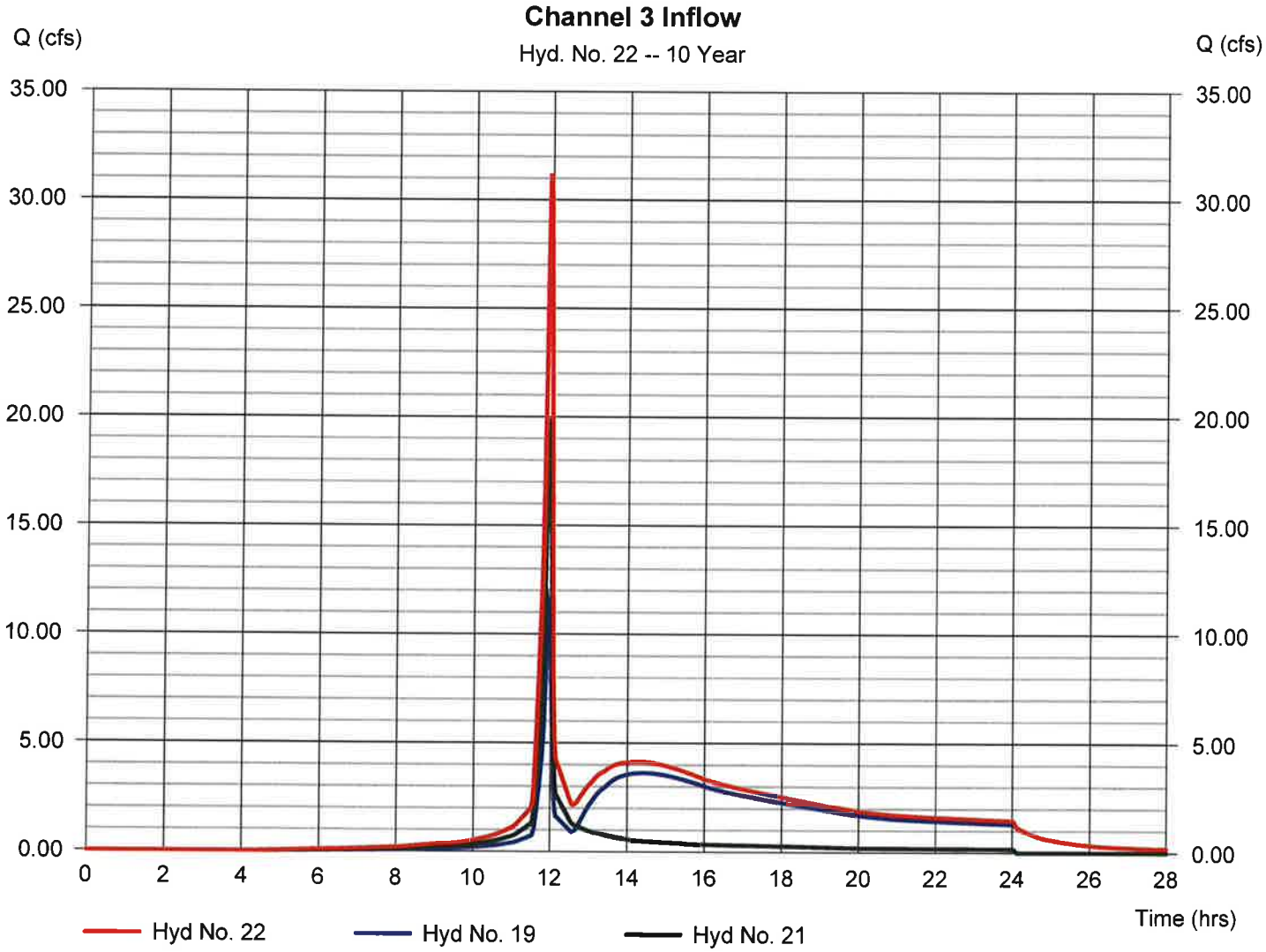
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 22

Channel 3 Inflow

Hydrograph type	= Combine	Peak discharge	= 31.23 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 194,708 cuft
Inflow hyds.	= 19, 21	Contrib. drain. area	= 3.510 ac



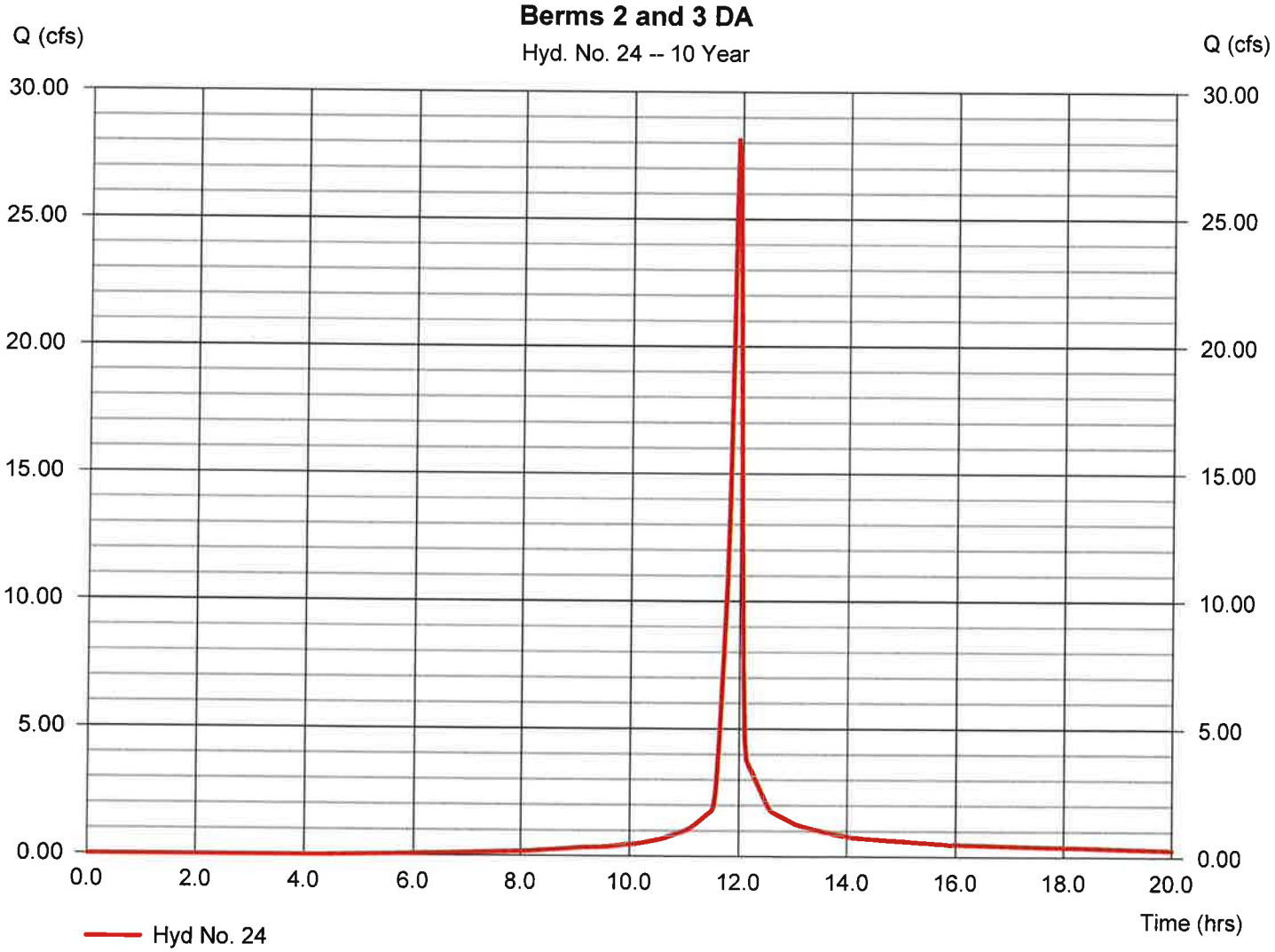
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 24

Berms 2 and 3 DA

Hydrograph type	= SCS Runoff	Peak discharge	= 28.19 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 59,756 cuft
Drainage area	= 4.970 ac	Curve number	= 89
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



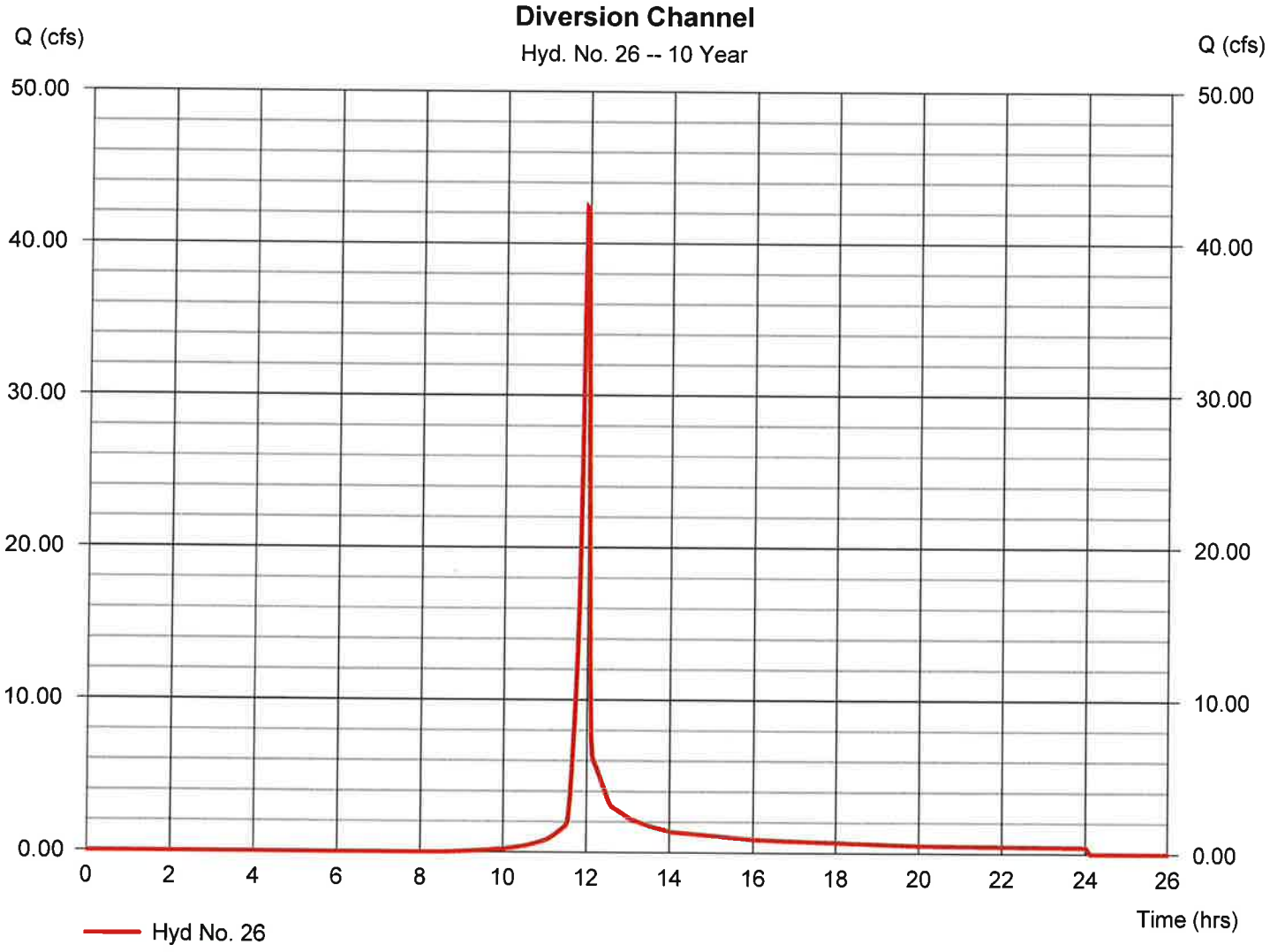
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Tuesday, 02 / 20 / 2018

Hyd. No. 26

Diversion Channel

Hydrograph type	= SCS Runoff	Peak discharge	= 42.43 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.93 hrs
Time interval	= 2 min	Hyd. volume	= 85,675 cuft
Drainage area	= 10.800 ac	Curve number	= 76
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 6.00 min
Total precip.	= 4.75 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



CHANNELS

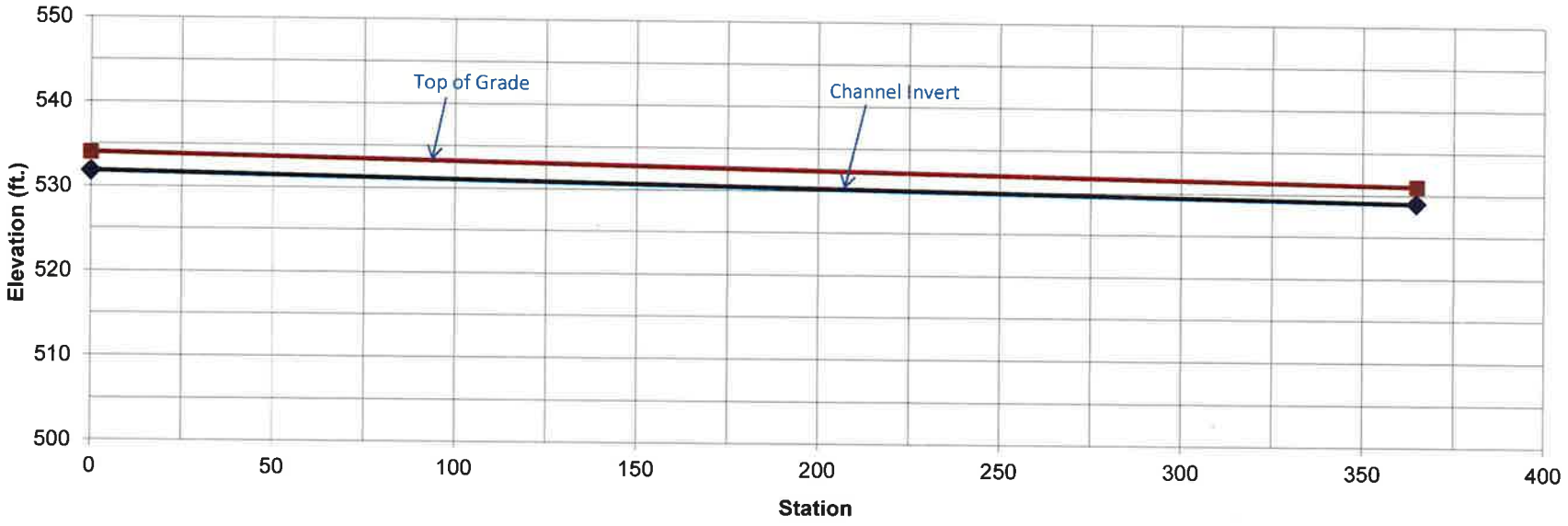
12.1 Diversion/Collection Ditch Data Sheet

Title: **Channel 1**	Site: **Rock Hill Quarry**	Company: **Hanson Aggregates**	Permit Number: **7974SM1**
Prepared By: **EarthRes Group, Inc.**	Telephone Number: 215-766-1211	Date: **2/20/18**	Sheet: 1 **of 5**

Design Calculations : Channel 1

Station		Minimum Required Channel Design															With Freeboard		
Start (ft.) / End (ft.)	Elevation (ft.)	Drainage Area (acres)	Design Criteria	Average Watershed Slope (%)	Curve Number	Peak Discharge Q (cfs)	Channel Bed Slope (%)	Freeboard (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft)	Channel Side Slopes z:1	Flow Area (sq. ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (fps)	Q Available (cfs)	Channel Depth (ft.)	Top Channel Width (ft.)	Q Available (cfs)
0	531.85	15.24	10 Year	N/A	89	12.67	-0.78	1.13	R-3	0.038	4.0	2	4.99	0.87	7.48	2.54	12.67	2.00	12.0	20
364.68	529.00	15.24	10 Year	N/A	89	12.67	-0.78	1.13	R-3	0.038	4.0	2	4.99	0.87	7.48	2.54	12.67	2.00	12.0	20

Channel Profile



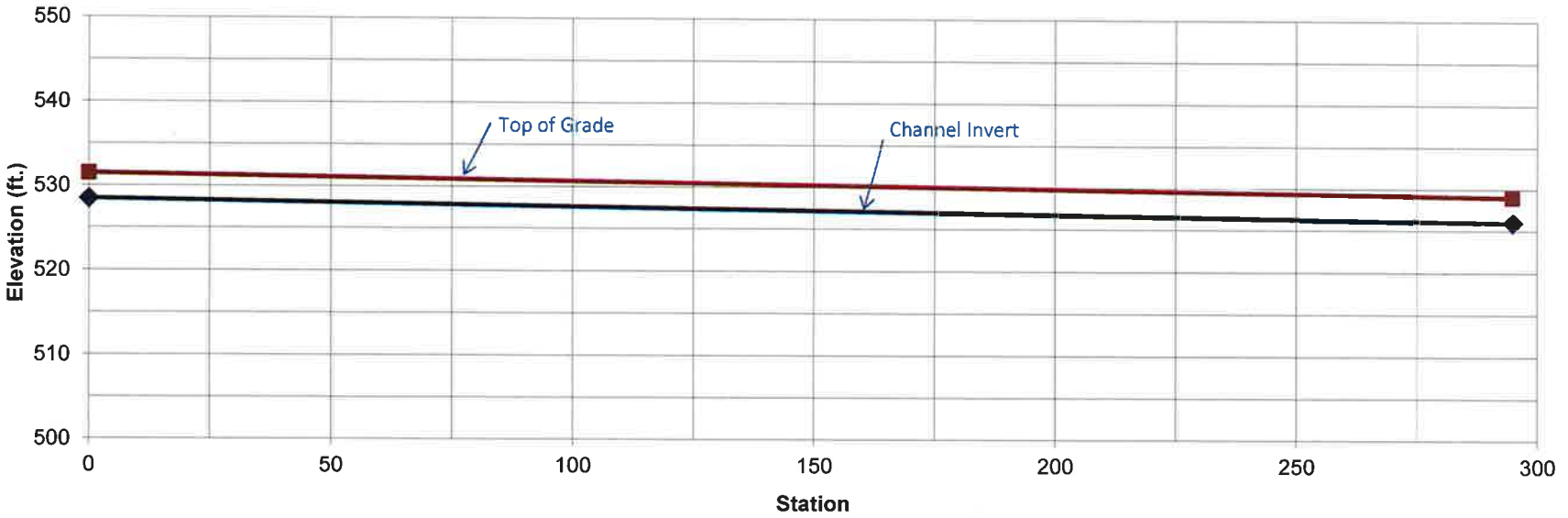
12.1 Diversion/Collection Ditch Data Sheet

Title: **Channel 2 Section 1**	Site: **Rock Hill Quarry**	Company: **Hanson Aggregates**	Permit Number: **7974SM1**
Prepared By: **EarthRes Group, Inc.**	Telephone Number: 215-766-1211	Date: **2/20/18**	Sheet: 2 **of 5**

Design Calculations : Channel 2 Section 1

Station		Minimum Required Channel Design																With Freeboard		
Start (ft.) / End (ft.)	Elevation (ft.)	Drainage Area (acres)	Design Criteria	Average Watershed Slope (%)	Curve Number	Peak Discharge Q (cfs)	Channel Bed Slope (%)	Freeboard (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft)	Channel Side Slopes z:1	Flow Area (sq. ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (fps)	Q Available (cfs)	Channel Depth (ft.)	Top Channel Width (ft.)	Q Available (cfs)
0	528.50	25.38	10 Year	N/A	89	16.44	-0.85	2.03	R-3	0.037	4.0	2	5.76	0.97	7.88	2.85	16.44	3.00	16.0	21
294.88	526.00	25.38	10 Year	N/A	89	16.44	-0.85	2.03	R-3	0.037	4.0	2	5.76	0.97	7.88	2.85	16.44	3.00	16.0	21

Channel Profile



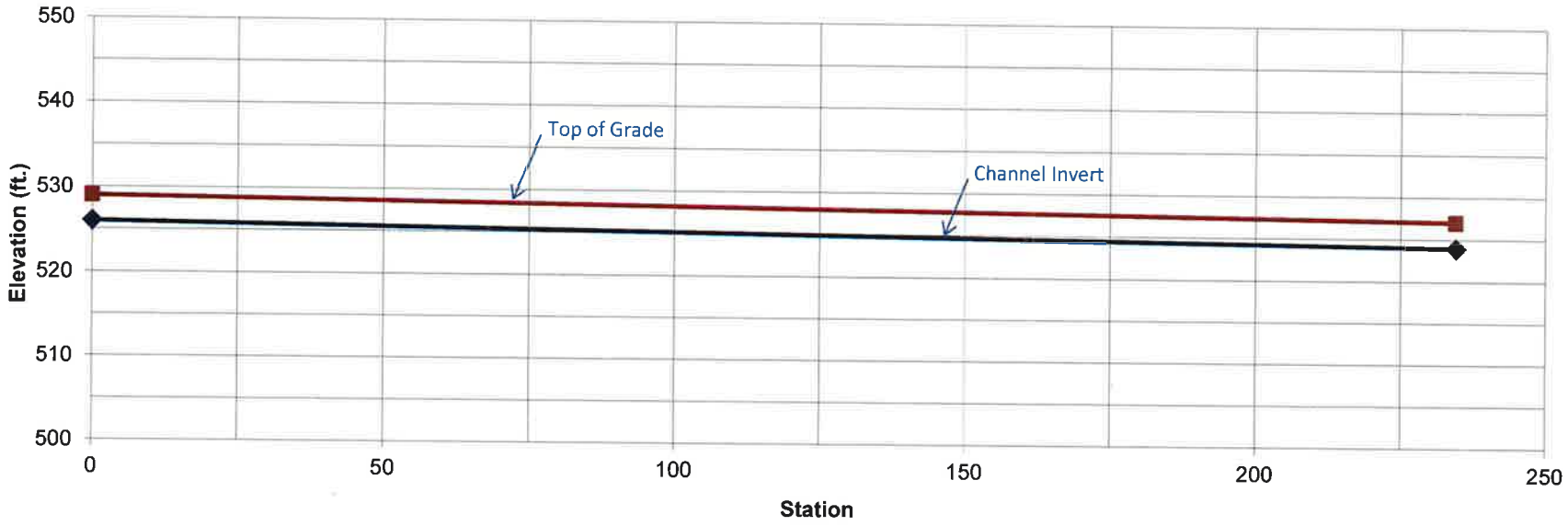
12.1 Diversion/Collection Ditch Data Sheet

Title: **Channel 2 Section 2**	Site: **Rock Hill Quarry**	Company: **Hanson Aggregates**	Permit Number: **7974SM1**
Prepared By: **EarthRes Group, Inc.**	Telephone Number: 215-766-1211	Date: **2/20/18**	Sheet: 3 **of 5**

Design Calculations : Channel 2 Section 2

Station		Minimum Required Channel Design															With Freeboard		
Start (ft.) / End (ft.)	Elevation (ft.)	Drainage Area (acres)	Design Criteria	Average Watershed Slope (%)	Curve Number	Peak Discharge Q (cfs)	Channel Bed Slope (%)	Freeboard (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft)	Channel Side Slopes z:1	Flow Area (sq. ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (fps)	Q Available (cfs)	Channel Depth (ft.)	Top Channel Width (ft.)	Q Available (cfs)
0	526.00	26.24	10 Year	N/A	89	21.32	-0.85	1.91	R-3	0.036	4.0	2	6.74	1.09	8.36	3.16	21.32	3.00	16.0	22
234.52	524.00	26.24	10 Year	N/A	89	21.32	-0.85	1.91	R-3	0.036	4.0	2	6.74	1.09	8.36	3.16	21.32	3.00	16.0	22

Channel Profile



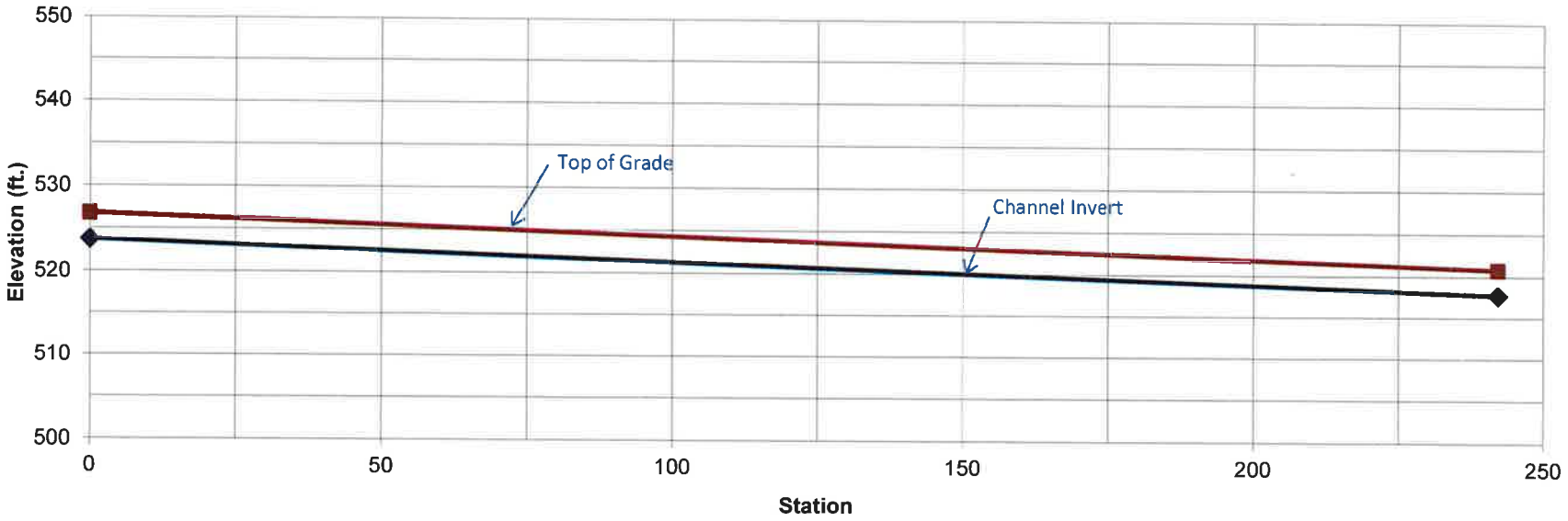
12.1 Diversion/Collection Ditch Data Sheet

Title: **Channel 3**	Site: **Rock Hill Quarry**	Company: **Hanson Aggregates**	Permit Number: **7974SM1**
Prepared By: **EarthRes Group, Inc.**	Telephone Number: 215-766-1211	Date: **2/20/18**	Sheet: 4 **of 5**

Design Calculations : Channel 3

Station		Minimum Required Channel Design															With Freeboard		
Start (ft.) / End (ft.)	Elevation (ft.)	Drainage Area (acres)	Design Criteria	Average Watershed Slope (%)	Curve Number	Peak Discharge Q (cfs)	Channel Bed Slope (%)	Freeboard (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft)	Channel Side Slopes z:1	Flow Area (sq. ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (fps)	Q Available (cfs)	Channel Depth (ft.)	Top Channel Width (ft.)	Q Available (cfs)
0	523.78	29.75	10 Year	N/A	89	41.23	-2.49	1.83	R-3	0.036	4.0	2	7.42	1.17	8.68	5.56	41.23	3.00	16.0	38
242.18	517.75	29.75	10 Year	N/A	89	41.23	-2.49	1.83	R-3	0.036	4.0	2	7.42	1.17	8.68	5.56	41.23	3.00	16.0	38

Channel Profile



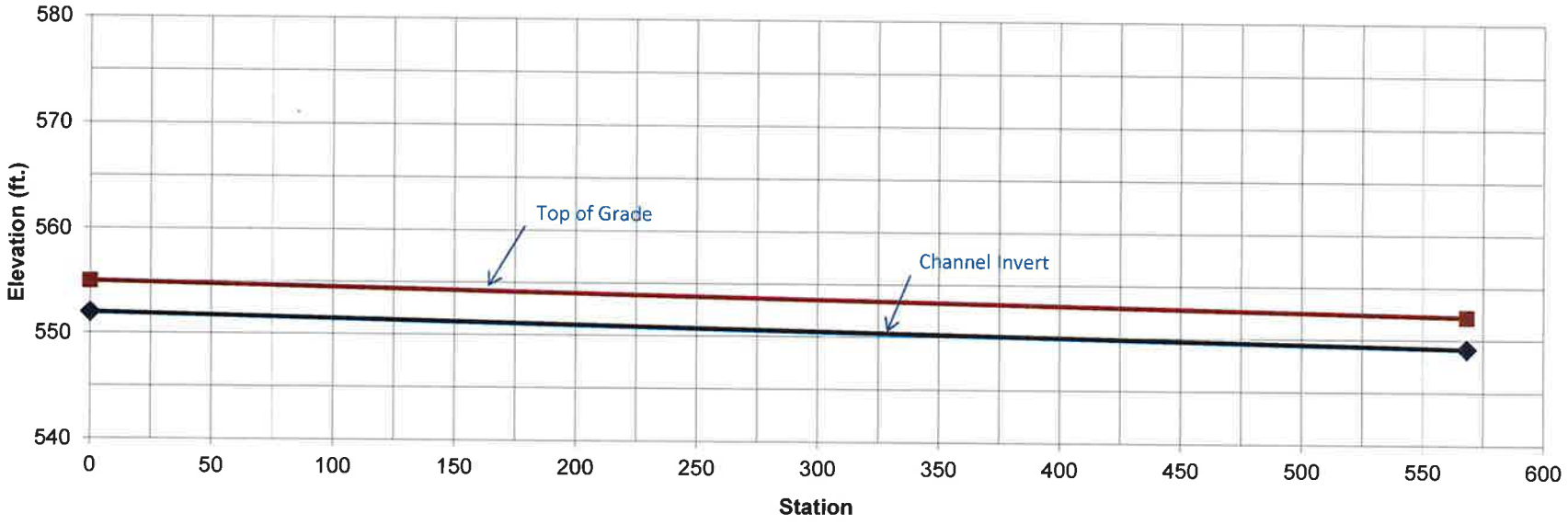
12.1 Diversion/Collection Ditch Data Sheet

Title: **Diversion Channel**	Site: **Rock Hill Quarry**	Company: **Hanson Aggregates**	Permit Number: **7974SM1**
Prepared By: **EarthRes Group, Inc.**	Telephone Number: 215-766-1211	Date: **2/20/18**	Sheet: 5 **of 5**

Design Calculations : Channel 4

Station		Minimum Required Channel Design															With Freeboard		
Start (ft.) / End (ft.)	Elevation (ft.)	Drainage Area (acres)	Design Criteria	Average Watershed Slope (%)	Curve Number	Peak Discharge Q (cfs)	Channel Bed Slope (%)	Freeboard (ft.)	Channel Lining	Manning's Coefficient (n)	Channel Bottom Width (ft)	Channel Side Slopes z:1	Flow Area (sq. ft.)	Flow Depth (ft.)	Top Flow Width (ft.)	Flow Velocity (fps)	Q Available (cfs)	Channel Depth (ft.)	Top Channel Width (ft.)	Q Available (cfs)
0	552.00	10.80	10 Year	N/A	89	42.43	-0.50	1.27	R-3	0.033	4.0	2	12.91	1.73	10.92	3.29	42.43	3.00	16.0	18
568.26	549.16	10.80	10 Year	N/A	89	42.43	-0.50	1.27	R-3	0.033	4.0	2	12.91	1.73	10.92	3.29	42.43	3.00	16.0	18

Channel Profile



STANDARD E&S WORKSHEET #11
Channel Design Data

PROJECT NAME: ROCK HILL QUARRY
LOCATION: EAST ROCKHILL TOWNSHIP, BUCKS COUNTY, PA
PREPARED BY: JTK DATE: 2/15/2018
CHECKED BY: MDF DATE: 2/20/2018

CHANNEL OR CHANNEL SECTION	Channel 1	Channel 2 Section 1	Channel 2 Section 2	Channel 3	Channel 4
TEMPORARY OR PERMANENT? (T OR P)	P	P	P	P	P
DESIGN STORM (2, 5, OR 10)	10	10	10	10	10
ACRES	15.24	25.38	26.24	29.75	10.80
MULTIPLIER (1.6, 2.25, OR 2.75) [1]	N/A	N/A	N/A	N/A	N/A
Qr (REQUIRED CAPACITY, CFS)	12.67	16.44	21.32	41.23	42.43
Q (CALCULATED AT FLOW DEPTH d, CFS)	12.67	16.44	21.32	41.23	42.43
PROTECTIVE LINING [2]	R-3	R-3	R-3	R-3	R-3
n (MANNING'S COEFFICIENT) [2]	0.0380	0.0370	0.0360	0.0360	0.0340
Va (ALLOWABLE VELOCITY, FPS)	6.5	6.5	6.5	6.5	6.5
V (CALCULATED AT FLOW DEPTH d, FPS)	2.54	2.85	3.16	5.56	3.29
τ_a (MAX ALLOWABLE SHEAR STRESS, LB/FT$^{2)}$	N/A	N/A	N/A	N/A	N/A
τ_d (SHEAR STRESS AT FLOW DEPTH d, LB/FT$^{2)}$	0.42	0.51	0.39	1.82	0.54
CHANNEL BOTTOM WIDTH (FT)	4	4	4	4	4
CHANNEL SIDE SLOPES (H:V)	2:1, 2:1	2:1, 2:1	2:1, 2:1	2:1, 2:1	2:1, 2:1
D (TOTAL DEPTH IN FT)	2.00	3.00	3.00	3.00	3.00
CHANNEL TOP WIDTH (FT)@ D	12.00	16.00	16.00	16.00	16.00
d (FLOW DEPTH IN FT)	0.87	0.97	1.09	1.17	1.73
CHANNEL TOP WIDTH (FT)@ d	7.48	7.88	8.36	8.68	10.92
BOTTOM WIDTH:DEPTH RATIO (12:1 MAX)	4.60	4.12	3.67	3.42	2.31
d50 STONE SIZE (IN)	3	3	3	3	3
A (CROSS-SECTIONAL AREA IN SQ. FT.)	4.99	5.76	6.74	7.42	12.91
P (WETTED PERIMETER IN FT)	7.89	8.34	8.87	9.23	11.74
R (HYDRAULIC RADIUS)	0.63	0.69	0.76	0.80	1.10
S (BED SLOPE, FT/FT) [3]	0.0078	0.0085	0.0057	0.0249	0.005
Sc (CRITICAL SLOPE)	0.0258	0.0239	0.0219	0.0216	0.0175
.7Sc	0.0181	0.0167	0.0154	0.0151	0.0123
1.3Sc	0.0336	0.0310	0.0285	0.0281	0.0228
STABLE FLOW? (Y/N)	Y	Y	Y	N	Y
FREEBOARD BASED ON UNSTABLE FLOW FT	N/A	N/A	N/A	0.49	N/A
FREEBOARD BASED ON STABLE FLOW FT	0.50	0.75	0.75	0.75	0.75
MINIMUM REQUIRED FREEBOARD FT [4]	0.50	0.75	0.75	0.50	0.75
DESIGN METHOD FOR PROTECTIVE LINING [5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)	V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.

2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation in separate columns.

3. Slopes may not be averaged.

4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater

5. Permissible velocity lining design method is not acceptable for channels with bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Channel 1

Trapezoidal

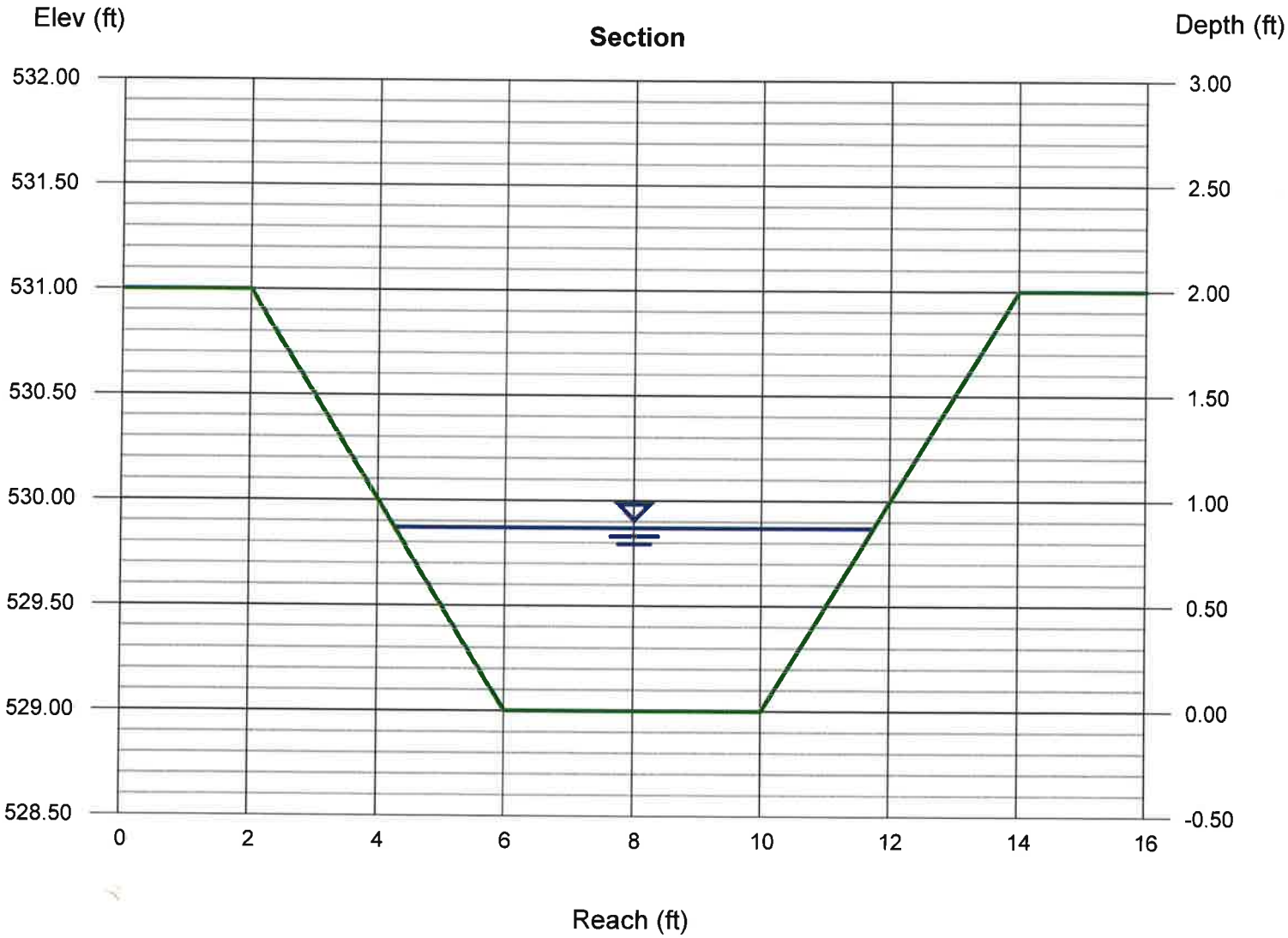
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 529.00
Slope (%)	= 0.78
N-Value	= 0.038

Calculations

Compute by:	Known Q
Known Q (cfs)	= 12.67

Highlighted

Depth (ft)	= 0.87
Q (cfs)	= 12.67
Area (sqft)	= 4.99
Velocity (ft/s)	= 2.54
Wetted Perim (ft)	= 7.89
Crit Depth, Yc (ft)	= 0.61
Top Width (ft)	= 7.48
EGL (ft)	= 0.97



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Channel 2 Section 1

Trapezoidal

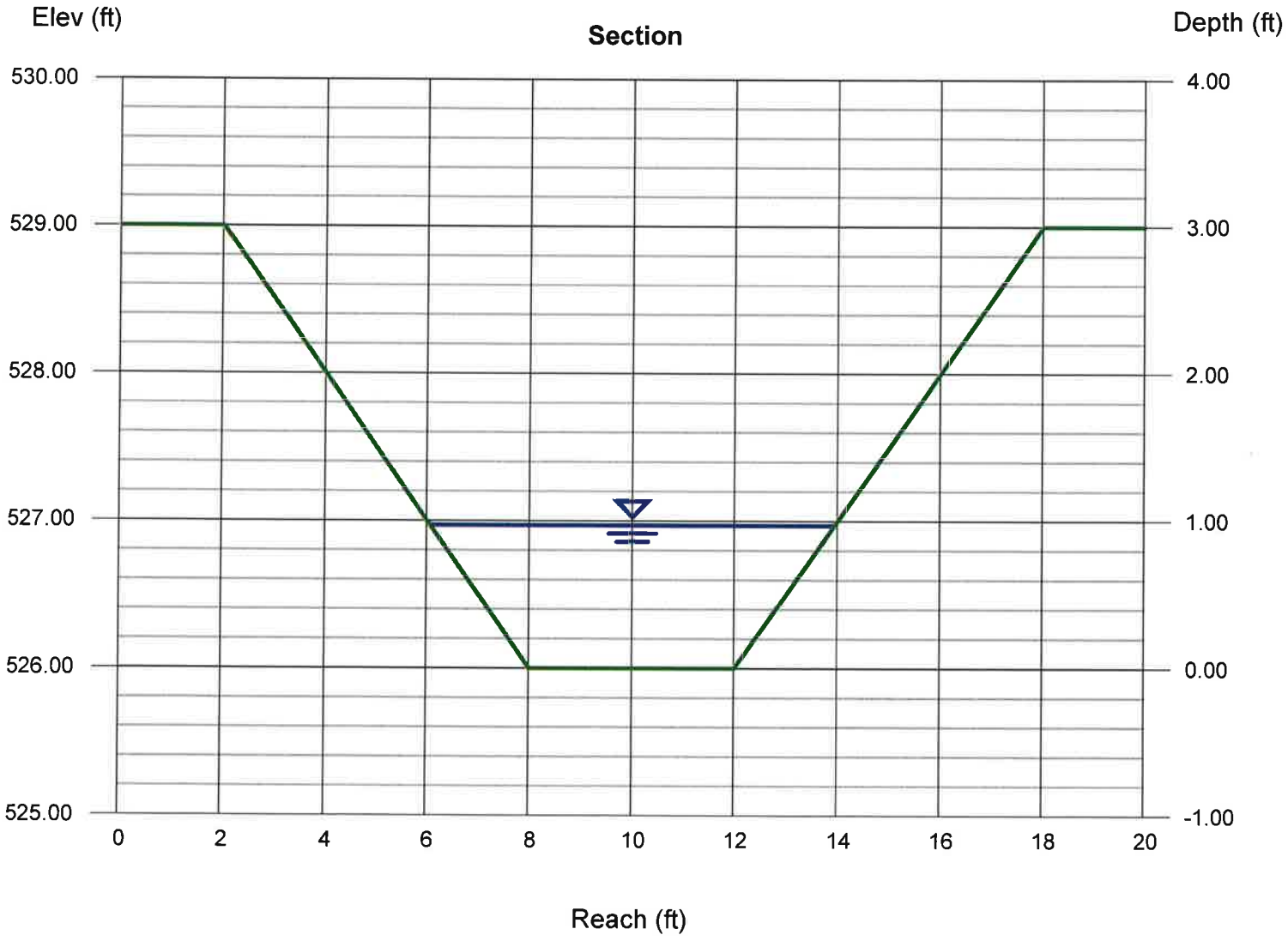
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 526.00
Slope (%)	= 0.85
N-Value	= 0.037

Calculations

Compute by:	Known Q
Known Q (cfs)	= 16.44

Highlighted

Depth (ft)	= 0.97
Q (cfs)	= 16.44
Area (sqft)	= 5.76
Velocity (ft/s)	= 2.85
Wetted Perim (ft)	= 8.34
Crit Depth, Yc (ft)	= 0.72
Top Width (ft)	= 7.88
EGL (ft)	= 1.10



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Channel 2 Section 2

Trapezoidal

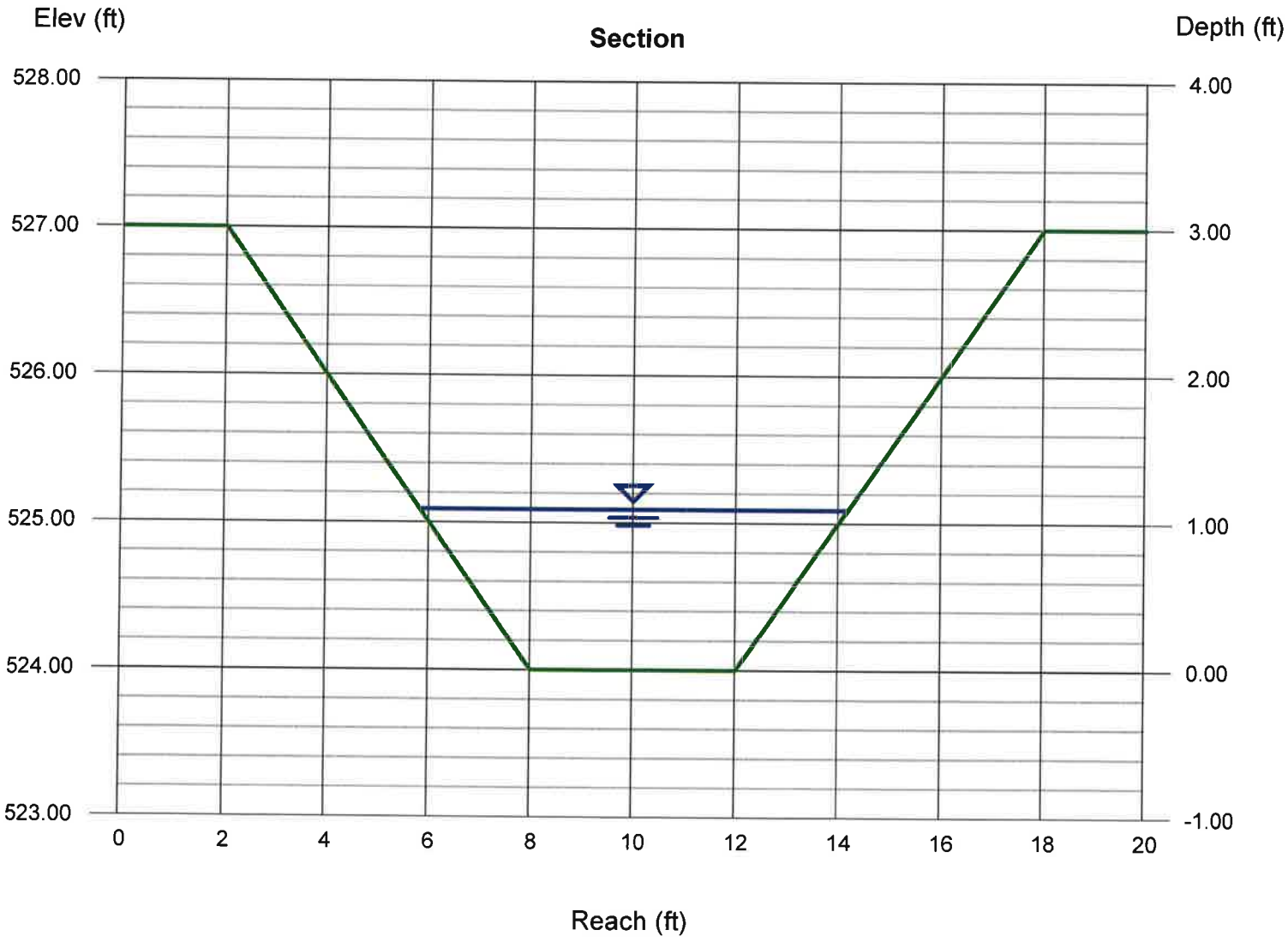
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 524.00
Slope (%)	= 0.85
N-Value	= 0.036

Calculations

Compute by:	Known Q
Known Q (cfs)	= 21.32

Highlighted

Depth (ft)	= 1.09
Q (cfs)	= 21.32
Area (sqft)	= 6.74
Velocity (ft/s)	= 3.16
Wetted Perim (ft)	= 8.87
Crit Depth, Yc (ft)	= 0.83
Top Width (ft)	= 8.36
EGL (ft)	= 1.25



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Channel 3

Trapezoidal

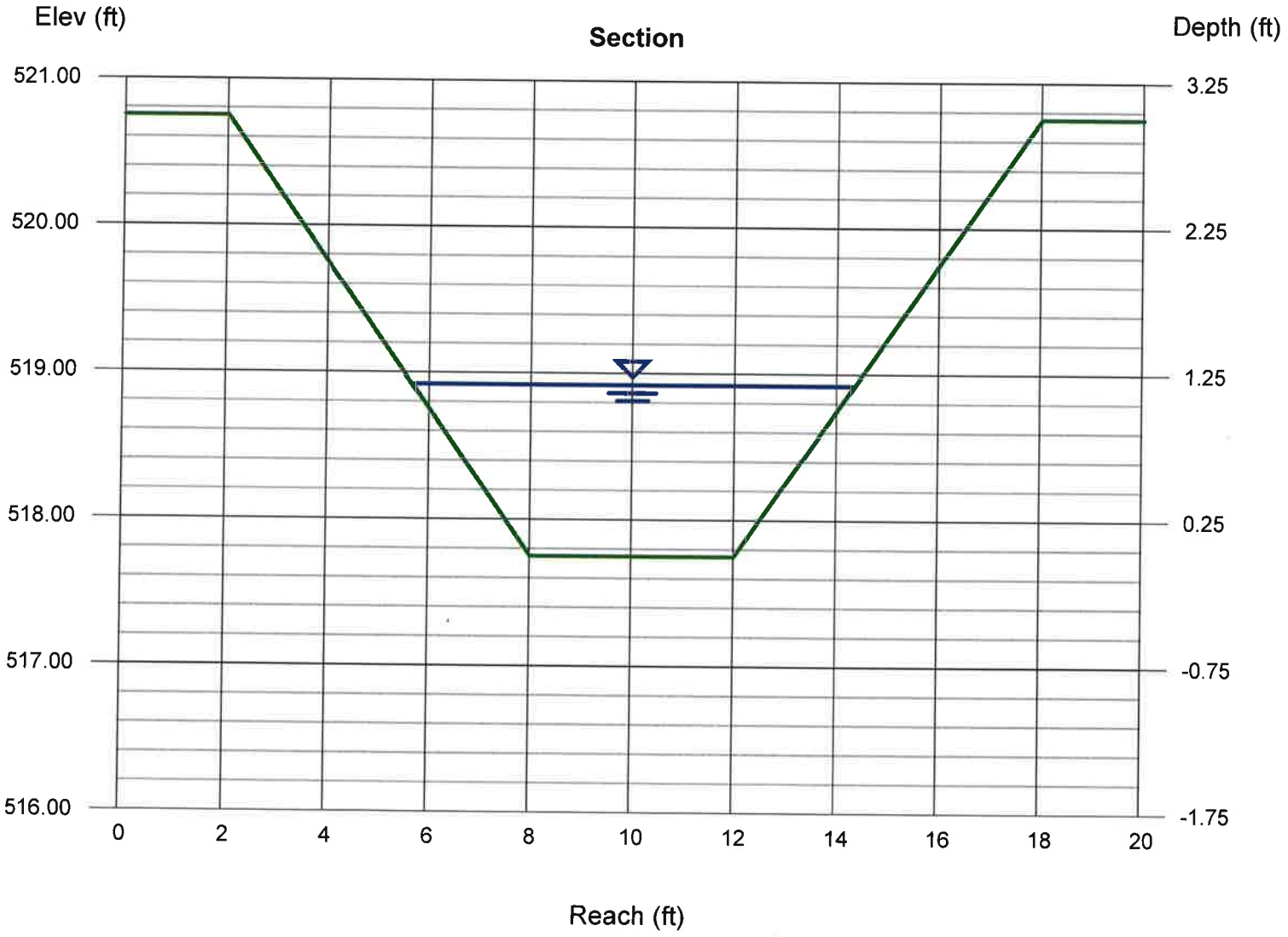
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 517.75
Slope (%)	= 2.49
N-Value	= 0.036

Calculations

Compute by:	Known Q
Known Q (cfs)	= 41.23

Highlighted

Depth (ft)	= 1.17
Q (cfs)	= 41.23
Area (sqft)	= 7.42
Velocity (ft/s)	= 5.56
Wetted Perim (ft)	= 9.23
Crit Depth, Yc (ft)	= 1.21
Top Width (ft)	= 8.68
EGL (ft)	= 1.65



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Channel 4

Trapezoidal

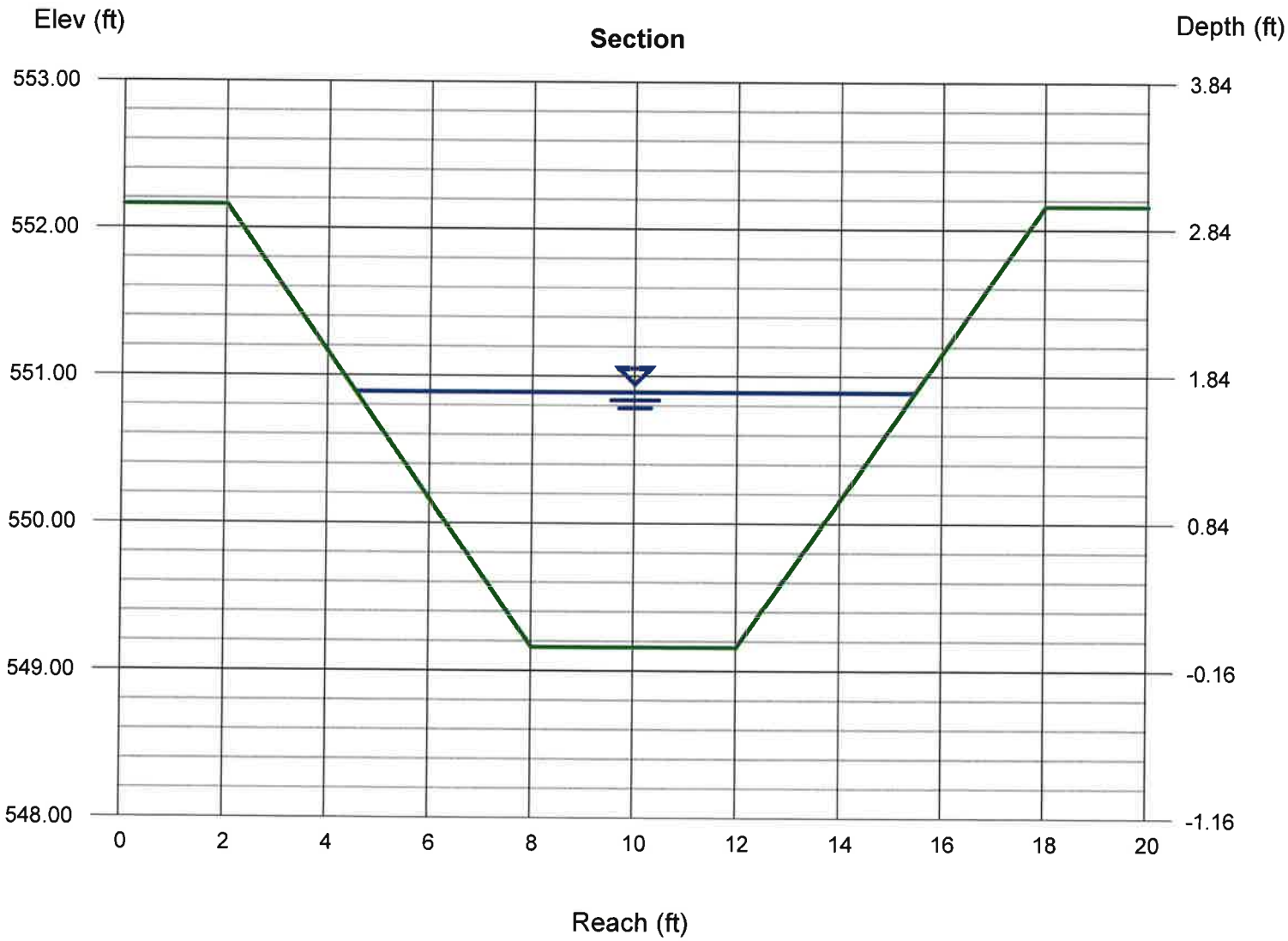
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 549.16
Slope (%)	= 0.50
N-Value	= 0.034

Calculations

Compute by:	Known Q
Known Q (cfs)	= 42.43

Highlighted

Depth (ft)	= 1.73
Q (cfs)	= 42.43
Area (sqft)	= 12.91
Velocity (ft/s)	= 3.29
Wetted Perim (ft)	= 11.74
Crit Depth, Yc (ft)	= 1.23
Top Width (ft)	= 10.92
EGL (ft)	= 1.90



CULVERTS

EarthRes
ENGINEERING AND SCIENCE

CLIENT HANSON AGGREGATES
PROJECT ROCK HILL QUARRY
SUBJECT CULVERT ANALYSIS

PROJECT NO. 061003.052
BY JTK DATE 2/15/18
CHK MDF DATE 2/20/18

TASK: Analyze the stormwater flow from the proposed project area and design the proposed stormwater culverts.

REFERENCES:

1. AutoCAD, Civil 3D Series 2018, Autodesk, Inc.
2. Hydraflow Hydrographs for AutoCAD® Civil 3D® 2016, Version 10.5, by AutoDesk, Inc.

VARIABLES/ASSUMPTIONS:

1. Culverts 1, 2, 5, and 6 were designed using the peak flow from the 10-year/24-hour storm.
2. Culvert flows include an estimated 10 cfs of contribution from Plant Flow.
3. Peak flows were calculated considering upstream erosion and sediment control features including basins.

CALCULATIONS:

1. **Drainage Areas**

Table 1 - Culvert Peak Flow

Culvert	10-Year Peak Flow	Plant Flow (cfs)	Total Peak Q (cfs)
1	N/A	10.00	10.00
2	52.95	N/A	52.95
5	11.32	10.00	21.32
6	2.67	10.00	12.67

2. **Proposed Culverts**

The proposed culverts are designed as outlined in the following table.

Table 3 – Culvert Design Parameters

Culvert No.	Length (ft.)	Inlet Elev. (ft.)	Outlet Elev. (ft.)	Slope (%)	No. Barrels	Culvert Size (in)	Peak Flow (cfs)	Max Allowable Headwater (ft)	Max Projected Headwater (ft)
1	26.25	531.98	531.85	0.50	1	24	10.00	536.50	533.67
2	127.13	534.64	534.00	0.50	2	24	52.95	540.00	538.80
5	66.93	524.00	523.67	0.50	1	24	21.32	530.00	527.12
6	75.28	529.00	528.50	0.66	1	24	12.67	532.00	530.95

Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Culvert 1

Invert Elev Dn (ft)	= 531.85
Pipe Length (ft)	= 26.25
Slope (%)	= 0.50
Invert Elev Up (ft)	= 531.98
Rise (in)	= 24.0
Shape	= Circular
Span (in)	= 24.0
No. Barrels	= 1
n-Value	= 0.013
Culvert Type	= Circular Concrete
Culvert Entrance	= Square edge w/headwall (C)
Coeff. K,M,c,Y,k	= 0.0098, 2, 0.0398, 0.67, 0.5

Embankment

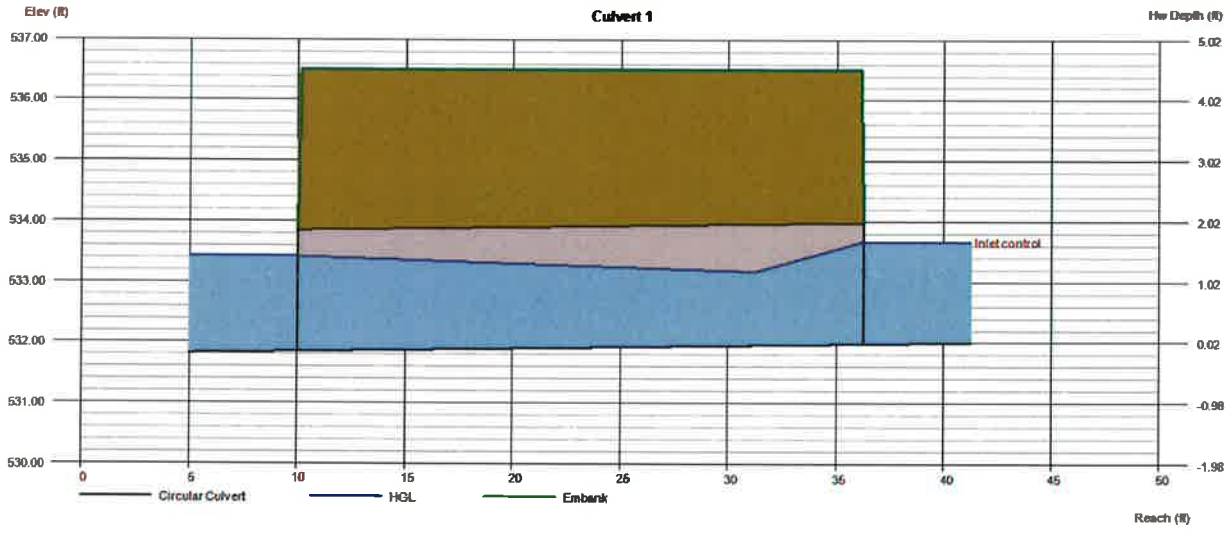
Top Elevation (ft)	= 536.50
Top Width (ft)	= 26.00
Crest Width (ft)	= 100.00

Calculations

Qmin (cfs)	= 10.00
Qmax (cfs)	= 10.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 10.00
Qpipe (cfs)	= 10.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 3.79
Veloc Up (ft/s)	= 5.46
HGL Dn (ft)	= 533.42
HGL Up (ft)	= 533.11
Hw Elev (ft)	= 533.67
Hw/D (ft)	= 0.84
Flow Regime	= Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Culvert 2

Invert Elev Dn (ft)	= 534.00
Pipe Length (ft)	= 127.13
Slope (%)	= 0.50
Invert Elev Up (ft)	= 534.64
Rise (in)	= 24.0
Shape	= Circular
Span (in)	= 24.0
No. Barrels	= 2
n-Value	= 0.013
Culvert Type	= Circular Concrete
Culvert Entrance	= Square edge w/headwall (C)
Coeff. K,M,c,Y,k	= 0.0098, 2, 0.0398, 0.67, 0.5

Embankment

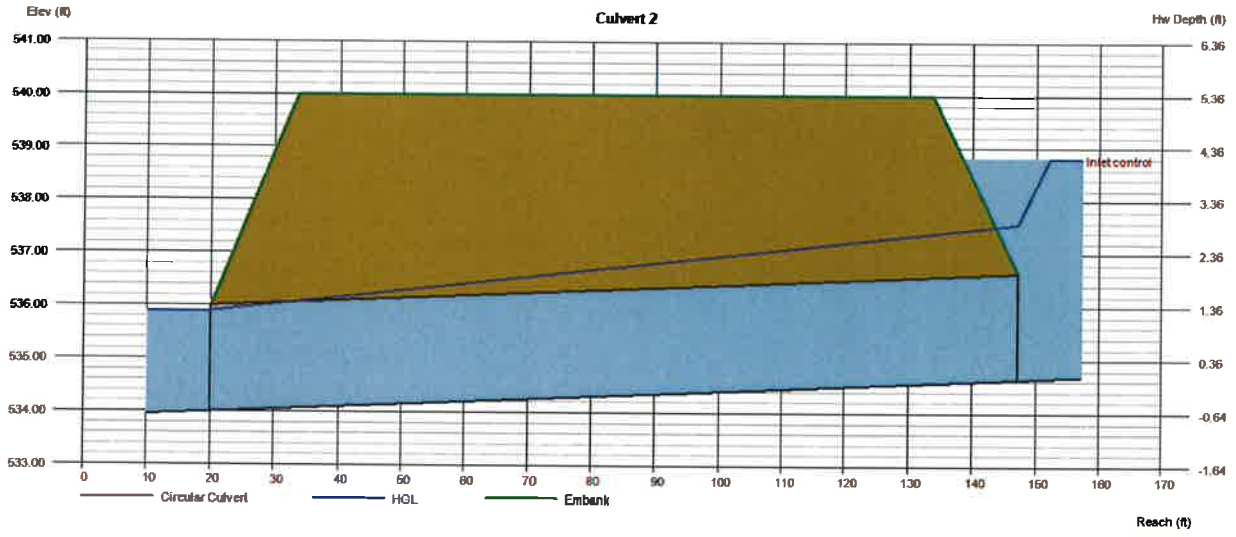
Top Elevation (ft)	= 540.00
Top Width (ft)	= 100.00
Crest Width (ft)	= 100.00

Calculations

Qmin (cfs)	= 52.95
Qmax (cfs)	= 52.95
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 52.95
Qpipe (cfs)	= 52.95
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 8.59
Veloc Up (ft/s)	= 8.43
HGL Dn (ft)	= 535.90
HGL Up (ft)	= 537.57
Hw Elev (ft)	= 538.80
Hw/D (ft)	= 2.08
Flow Regime	= Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Culvert 5

Invert Elev Dn (ft)	= 523.67
Pipe Length (ft)	= 66.93
Slope (%)	= 0.49
Invert Elev Up (ft)	= 524.00
Rise (in)	= 24.0
Shape	= Circular
Span (in)	= 24.0
No. Barrels	= 1
n-Value	= 0.012
Culvert Type	= Circular Corrugate Metal Pipe
Culvert Entrance	= Headwall
Coeff. K,M,c,Y,k	= 0.0078, 2, 0.0379, 0.69, 0.5

Embankment

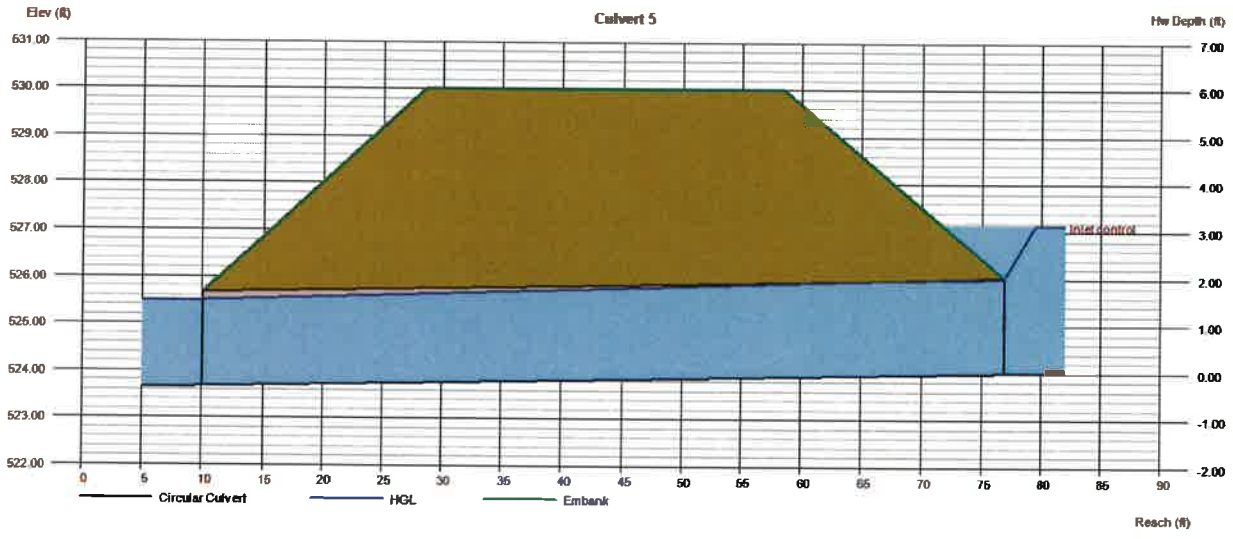
Top Elevation (ft)	= 530.00
Top Width (ft)	= 30.00
Crest Width (ft)	= 50.00

Calculations

Qmin (cfs)	= 21.32
Qmax (cfs)	= 21.32
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 21.32
Qpipe (cfs)	= 21.32
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 7.09
Veloc Up (ft/s)	= 6.79
HGL Dn (ft)	= 525.50
HGL Up (ft)	= 526.03
Hw Elev (ft)	= 527.12
Hw/D (ft)	= 1.56
Flow Regime	= Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Culvert 6

Invert Elev Dn (ft)	= 528.50
Pipe Length (ft)	= 75.28
Slope (%)	= 0.66
Invert Elev Up (ft)	= 529.00
Rise (in)	= 24.0
Shape	= Circular
Span (in)	= 24.0
No. Barrels	= 1
n-Value	= 0.012
Culvert Type	= Circular Corrugate Metal Pipe
Culvert Entrance	= Headwall
Coeff. K,M,c,Y,k	= 0.0078, 2, 0.0379, 0.69, 0.5

Embankment

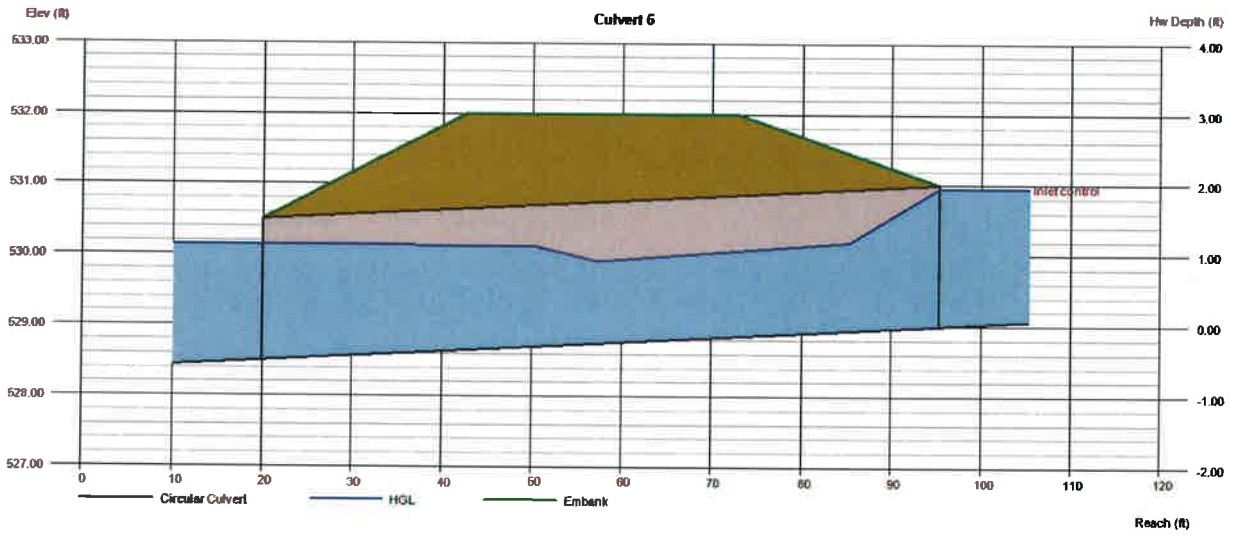
Top Elevation (ft)	= 532.00
Top Width (ft)	= 30.00
Crest Width (ft)	= 50.00

Calculations

Qmin (cfs)	= 12.67
Qmax (cfs)	= 12.67
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 12.67
Qpipe (cfs)	= 12.67
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 4.60
Veloc Up (ft/s)	= 5.97
HGL Dn (ft)	= 530.14
HGL Up (ft)	= 530.28
Hw Elev (ft)	= 530.95
Hw/D (ft)	= 0.98
Flow Regime	= Inlet Control



DIVERSION BERMS

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Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Berm 1 Section 1

Triangular

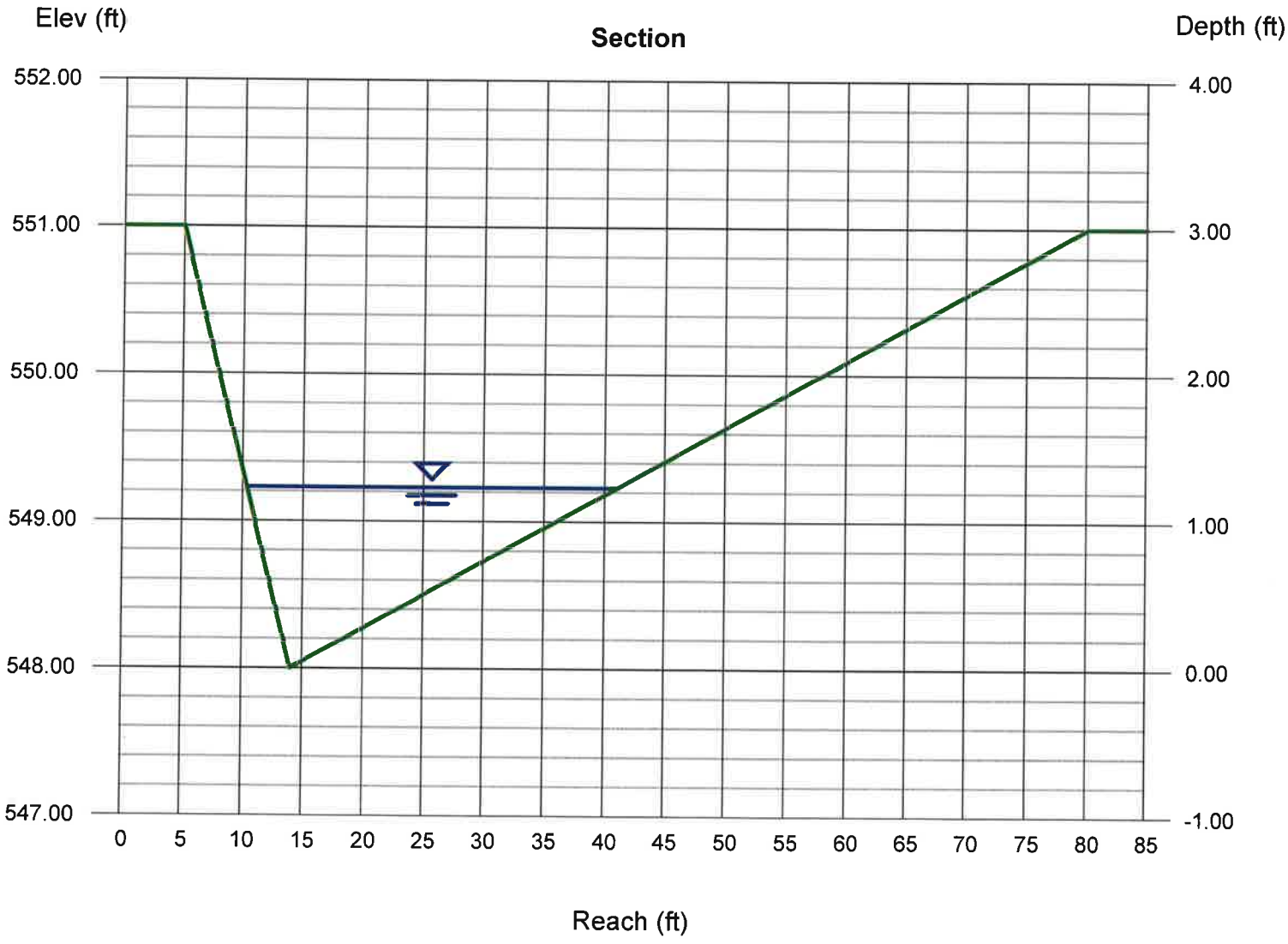
Side Slopes (z:1)	= 3.00, 22.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 548.00
Slope (%)	= 0.89
N-Value	= 0.036

Calculations

Compute by:	Known Q
Known Q (cfs)	= 52.95

Highlighted

Depth (ft)	= 1.23
Q (cfs)	= 52.95
Area (sqft)	= 18.91
Velocity (ft/s)	= 2.80
Wetted Perim (ft)	= 30.98
Crit Depth, Yc (ft)	= 1.03
Top Width (ft)	= 30.75
EGL (ft)	= 1.35



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Berm 1 Section 2

Triangular

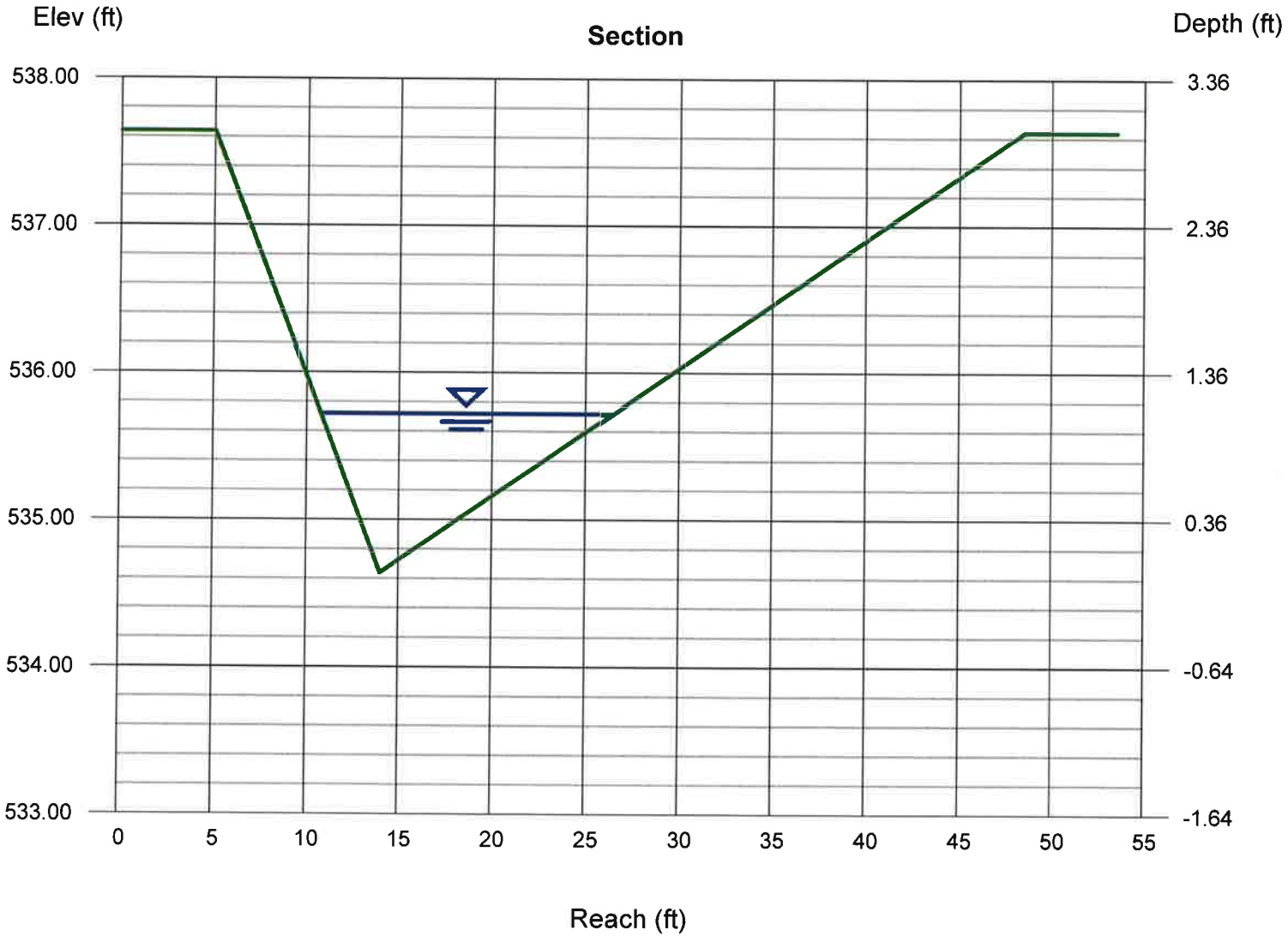
Side Slopes (z:1)	= 3.00, 11.50
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 534.64
Slope (%)	= 5.35
N-Value	= 0.036

Calculations

Compute by:	Known Q
Known Q (cfs)	= 52.95

Highlighted

Depth (ft)	= 1.08
Q (cfs)	= 52.95
Area (sqft)	= 8.46
Velocity (ft/s)	= 6.26
Wetted Perim (ft)	= 15.88
Crit Depth, Yc (ft)	= 1.28
Top Width (ft)	= 15.66
EGL (ft)	= 1.69



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Berm 2

Triangular

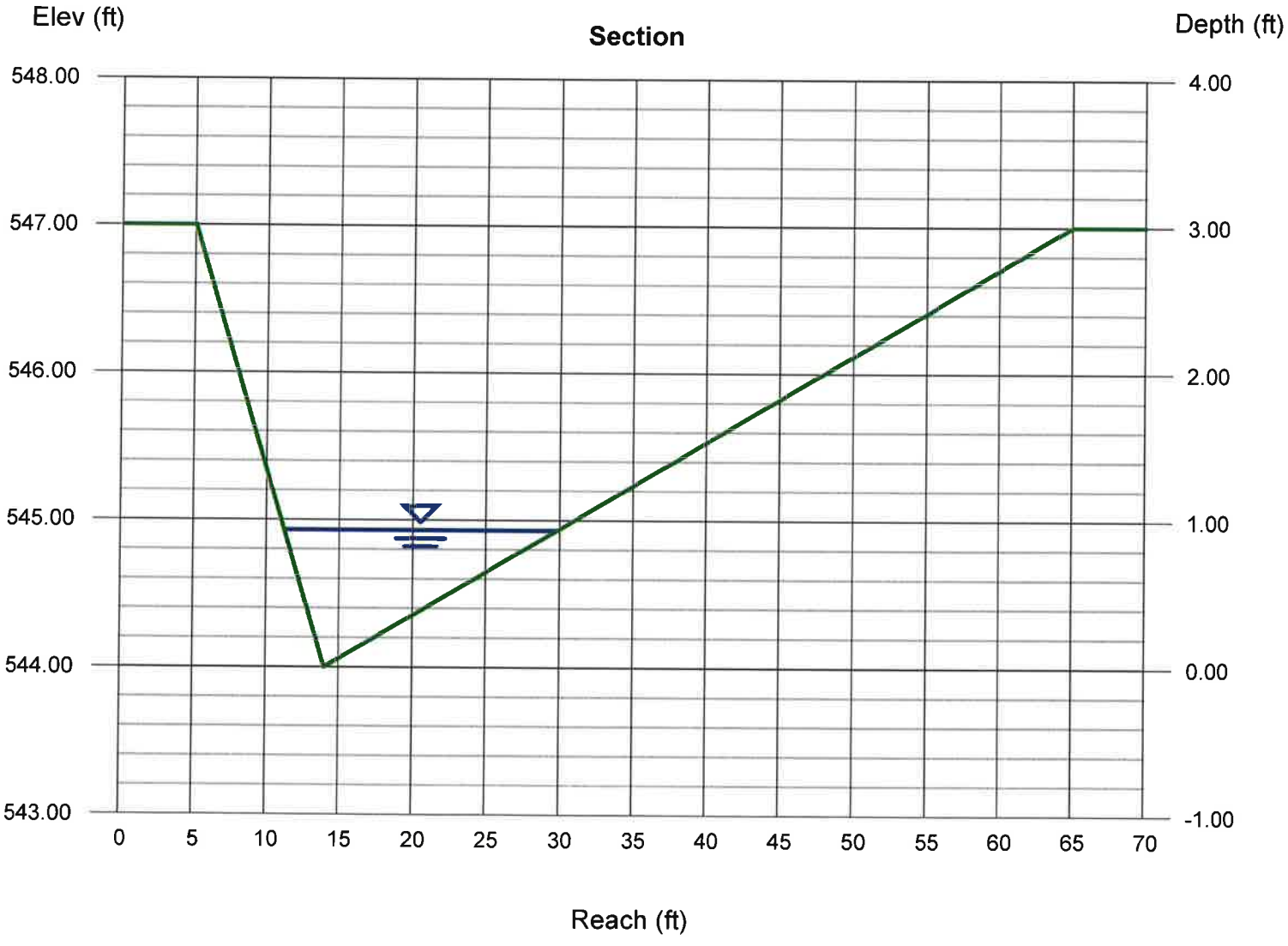
Side Slopes (z:1)	= 3.00, 17.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 544.00
Slope (%)	= 2.02
N-Value	= 0.038

Calculations

Compute by:	Known Q
Known Q (cfs)	= 28.19

Highlighted

Depth (ft)	= 0.93
Q (cfs)	= 28.19
Area (sqft)	= 8.65
Velocity (ft/s)	= 3.26
Wetted Perim (ft)	= 18.78
Crit Depth, Yc (ft)	= 0.87
Top Width (ft)	= 18.60
EGL (ft)	= 1.10



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Feb 20 2018

Berm 3

Triangular

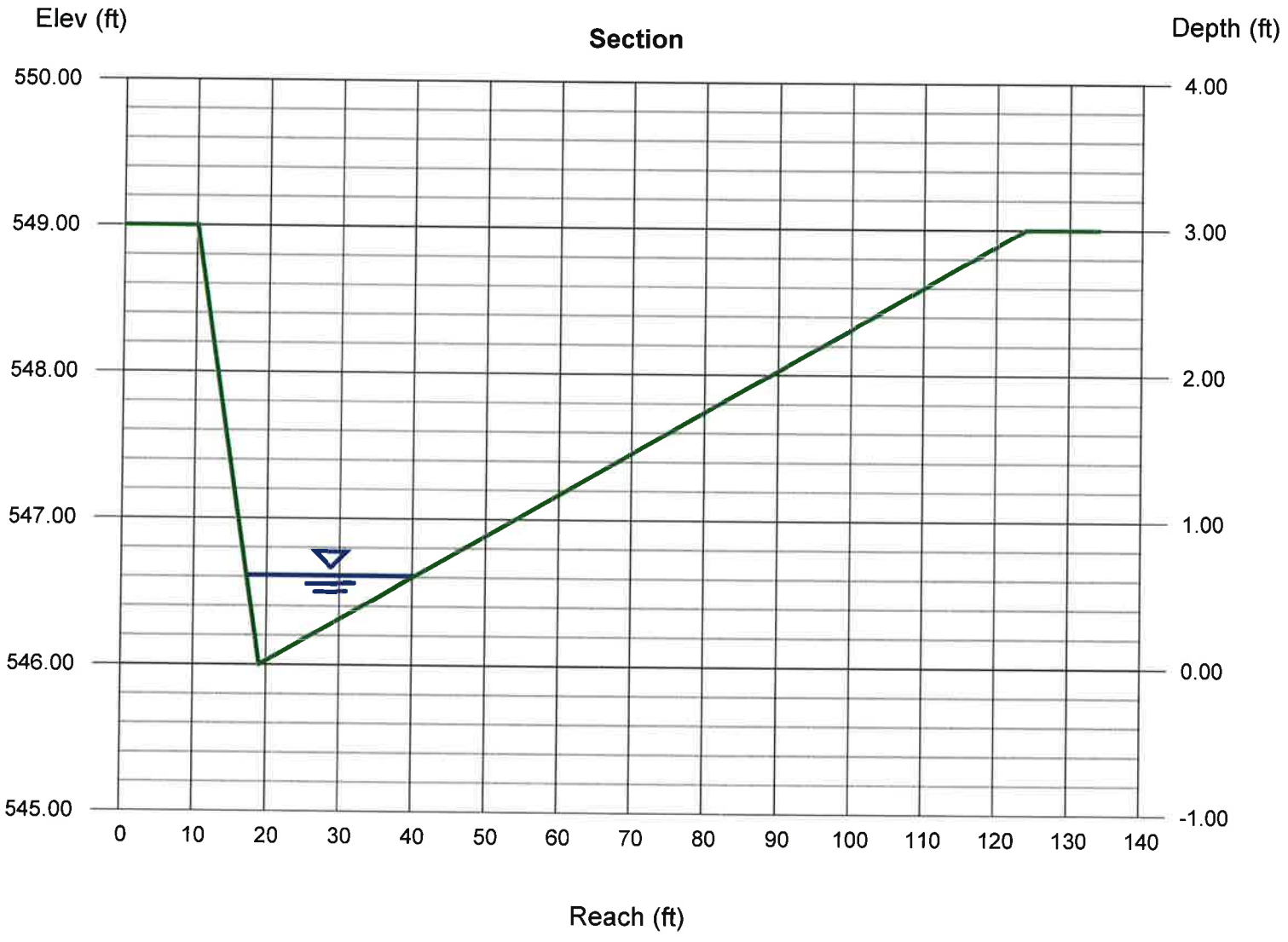
Side Slopes (z:1)	= 3.00, 35.00
Total Depth (ft)	= 3.00
Invert Elev (ft)	= 546.00
Slope (%)	= 6.00
N-Value	= 0.041

Calculations

Compute by:	Known Q
Known Q (cfs)	= 28.19

Highlighted

Depth (ft)	= 0.61
Q (cfs)	= 28.19
Area (sqft)	= 7.07
Velocity (ft/s)	= 3.99
Wetted Perim (ft)	= 23.29
Crit Depth, Yc (ft)	= 0.68
Top Width (ft)	= 23.18
EGL (ft)	= 0.86



E&S PLANS

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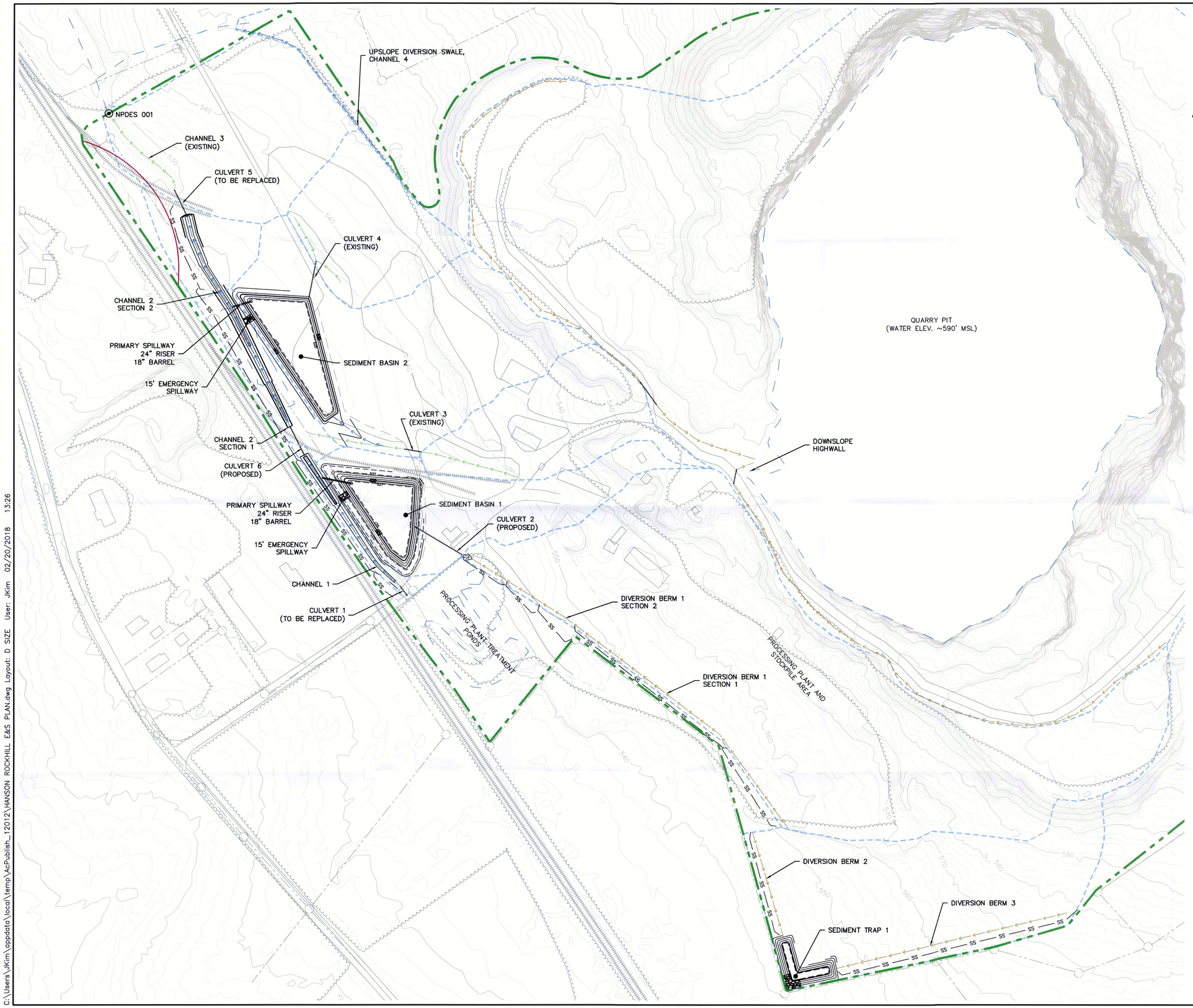

LEGEND

- EXISTING GRADE CONTOUR
- PROPOSED GRADE CONTOUR
- EXISTING SMP BOUNDARY
- EXISTING SURFACE WATER
- EXISTING RAILROAD
- EXISTING TREELINE
- PROPERTY BOUNDARY
- DRAINAGE AREA BOUNDARIES
- EXISTING DRAINAGE CHANNEL
- PROPOSED DRAINAGE CHANNEL
- PROPOSED DIVERSION BERM
- COMPOST FILTER SOCK
- LIMIT OF EARTHRES SURVEY
- NPDES DISCHARGE POINT

NOTES:

1. EXISTING GRADE TOPOGRAPHY COMPILED BY PAMAP PROGRAM, PA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY, DATED JUNE 2010.
2. TOPOGRAPHY AND SITE FEATURES IN WESTERN PERMIT AREA WERE SURVEYED BY EARTHRES GROUP, INC. PERSONNEL, JANUARY 2017.
3. BASEMAP FEATURES INCLUDING BUILDINGS, ROADS, UTILITIES, WATER FEATURES, AND TREELINES RETRACED FROM AERIAL PHOTOGRAPHY DATED 2015, PUBLISHED BY THE DELAWARE VALLEY REGIONAL PLANNING COMMISSION.
4. EXISTING PERMIT INFORMATION INCLUDING PERMIT BOUNDARY, MINING LIMIT, DEPTH OF MINING, AND PRE-ACT HIGHWALLS ARE REFERENCED TO THE PERMIT DRAWING "MINING PLAN, SHEET 3 OF 6" PREPARED BY SKELLY AND LOY, DATED MARCH 18, 1980.
5. HANSON PROPERTY BOUNDARY PROVIDED BY MAP TITLED "PLAT OF SURVEY OF LANDS OF GENERAL CRUSHED STONE", PREPARED BY ORANGEVILLE SURVEYING CONSULTANTS, INC., DATED MAY 7, 2001.
6. ADJACENT PARCEL BOUNDARIES ARE REFERENCED TO THE BUCKS COUNTY GIS RECORDS.
7. STREAM INFORMATION IS REFERENCED TO THE PA DEP eMAPPA ONLINE RECORDS.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

NO.	DATE	BY	REVISIONS

COMMONWEALTH OF PENNSYLVANIA — MICHAEL D. TONG — ENGINEER PE030920

MICHAEL D. TONG, P.E.
LICENSE NO. PE030920

PREPARED FOR: Hanson HEIDELBERGCEMENT Group

PREPARED BY: EarthRes ENGINEERING AND SCIENCE

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E&S SITE PLAN

HANSON AGGREGATES PENNSYLVANIA LLC
ROCK HILL QUARRY
EAST ROCKHILL TOWNSHIP, BUCKS COUNTY
PENNSYLVANIA

DRAWN BY:	CHECKED BY:	PROJECT NO.
JTK	MDF	061003.052
DATE: 02/02/18		DRAWING NUMBER: ES-001

SHEET 1 OF 3

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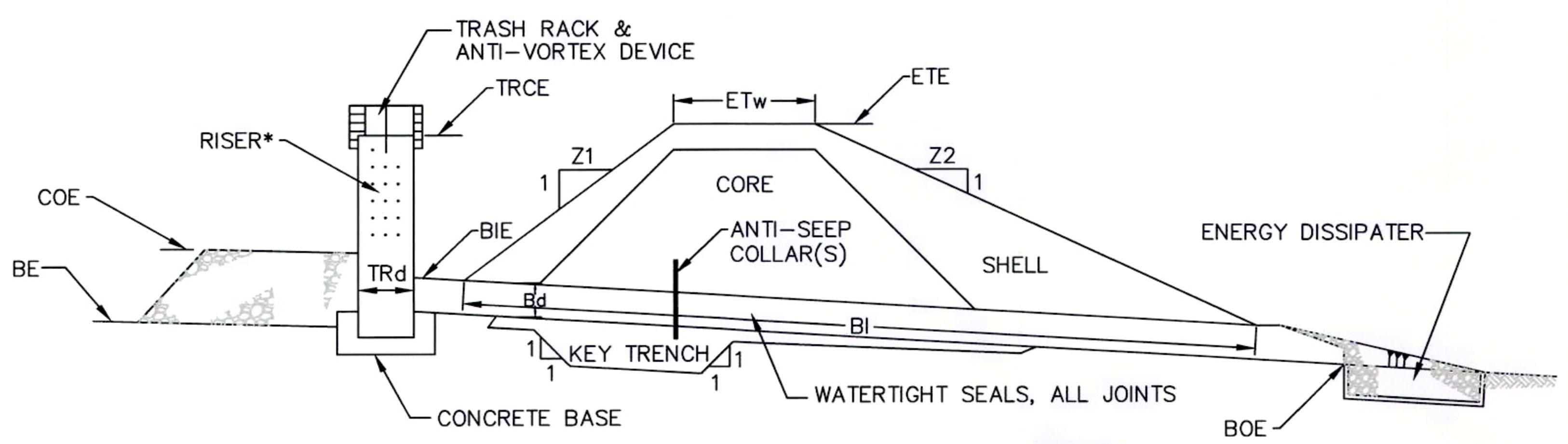


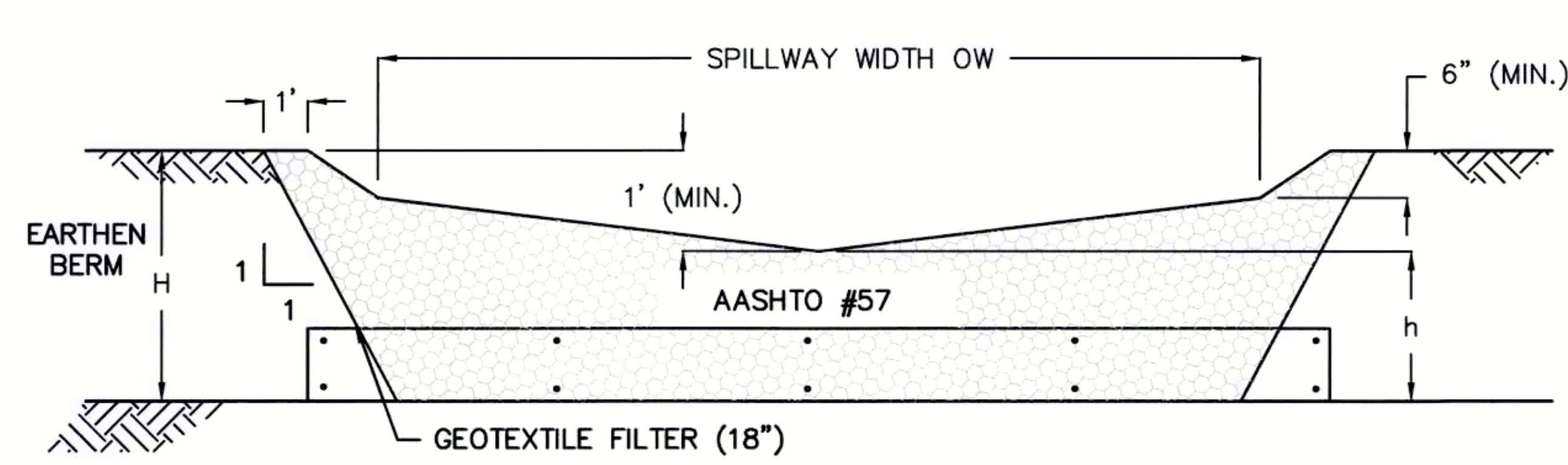
EMBANKMENT SECTION SLOPING PRINCIPAL SPILLWAY

NOT TO SCALE

BASIN NO.	Z1 (FT)	Z2 (FT)	TEMPORARY RISER			BARREL					EMBANKMENT		CLEAN OUT ELEV COE (FT)	BOTTOM ELEV BE (FT)
			DIA TRd (IN)	CREST ELEV TRCE (FT)	MAT'L	DIA Bd (IN)	INLET ELEV BIE (FT)	MAT'L	LENGTH BI (FT)	OUTLET ELEV BOE (FT)	TOP ELEV ETE (FT)	TOP WIDTH ETw (FT)		
1	2	3	24	533.91	CMP	18	530.00	ADS	65.32	529.50	537.00	10	530.00	527.00
2	2	3	24	528.77	CMP	18	526.75	ADS	41.20	526.50	532.00	10	526.75	525.00

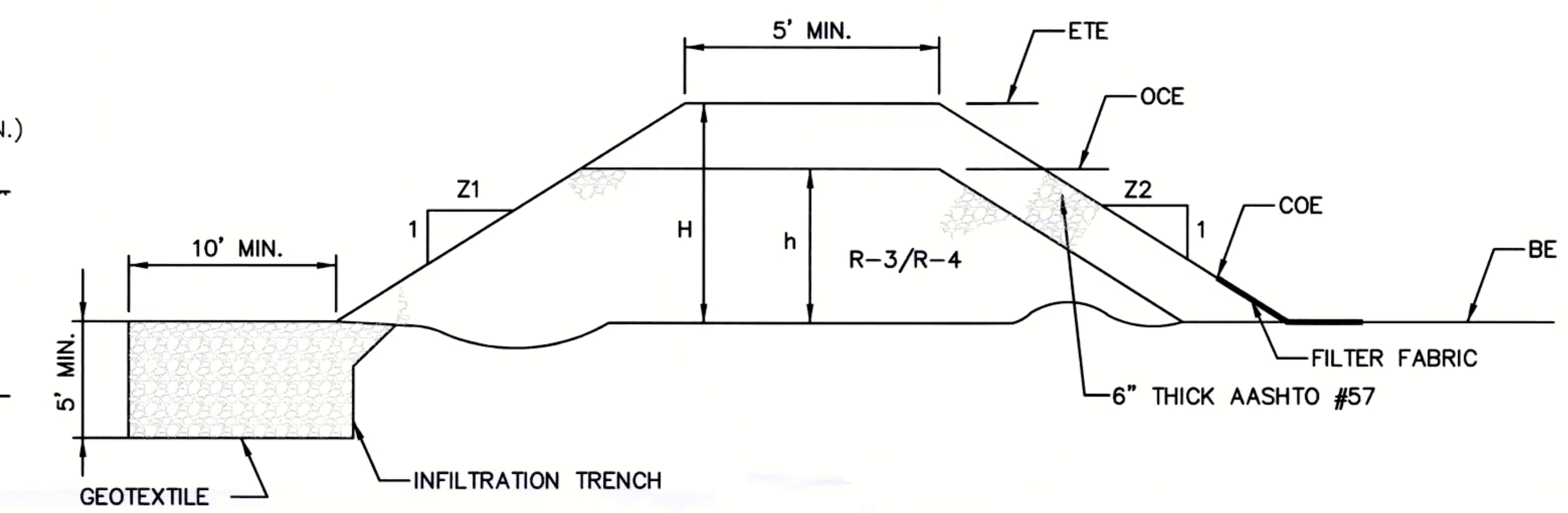
* ALSO REFER TO SEDIMENT BASIN RISER, EMERGENCY SPILLWAY, TRASH RACK & ANTI-VORTEX DEVICE DETAILS.

* A CLEAN OUT STAKE SHALL BE PLACED NEAR THE CENTER OF EACH BASIN. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT HAS REACHED THE CLEAN OUT ELEVATION ON THE STAKE.



SECTION THROUGH TRAP EMBANKMENT

NOT TO SCALE

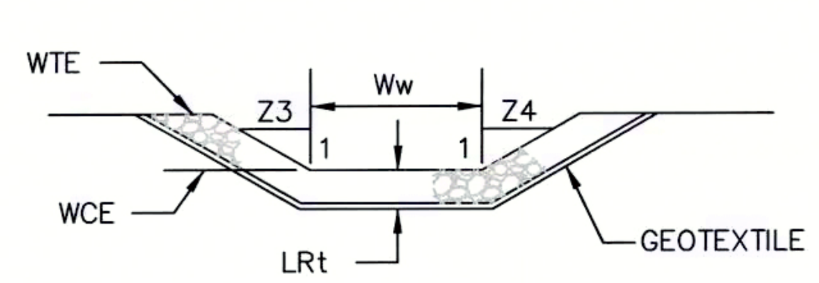


SECTION THROUGH SPILLWAY

NOT TO SCALE

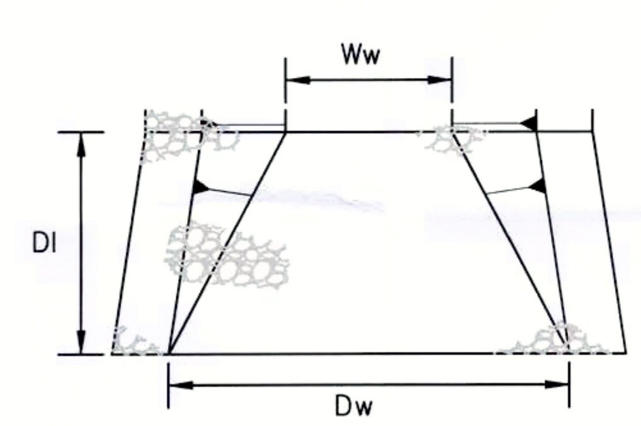
SEDIMENT TRAP DETAIL

TRAP NO.	Z1 (FT)	H (FT)	h (FT)	Z2 (FT)	EMBANK. TOP ELEV. ETE (FT)	OUTLET CREST ELEV. OCE (FT)	CLEAN OUT ELEV. COE (FT)	BOTTOM ELEV. BE (FT)	OUTLET WIDTH OW (FT)	TOP LENGTH (FT)	TOP WIDTH (FT)	BOTTOM LENGTH (FT)	BOTTOM WIDTH (FT)	MINIMUM VOLUME (CF)	R-_ STONE
1	2	5.00	3.50	2	544.00	542.50	540.36	539	30	88.56	33.00	78.56	13.00	9,940	3



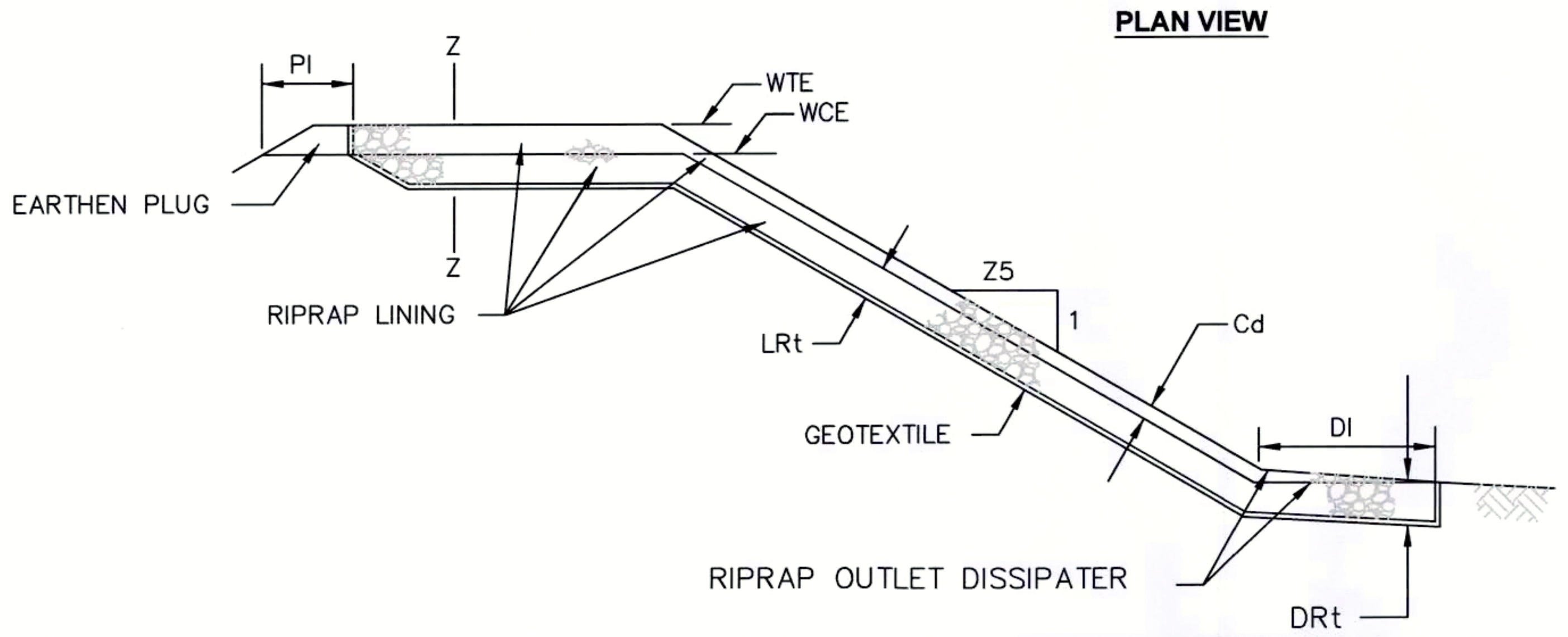
WEIR

SECTION Z-Z



RIPRAP OUTLET DISSIPATER

PLAN VIEW

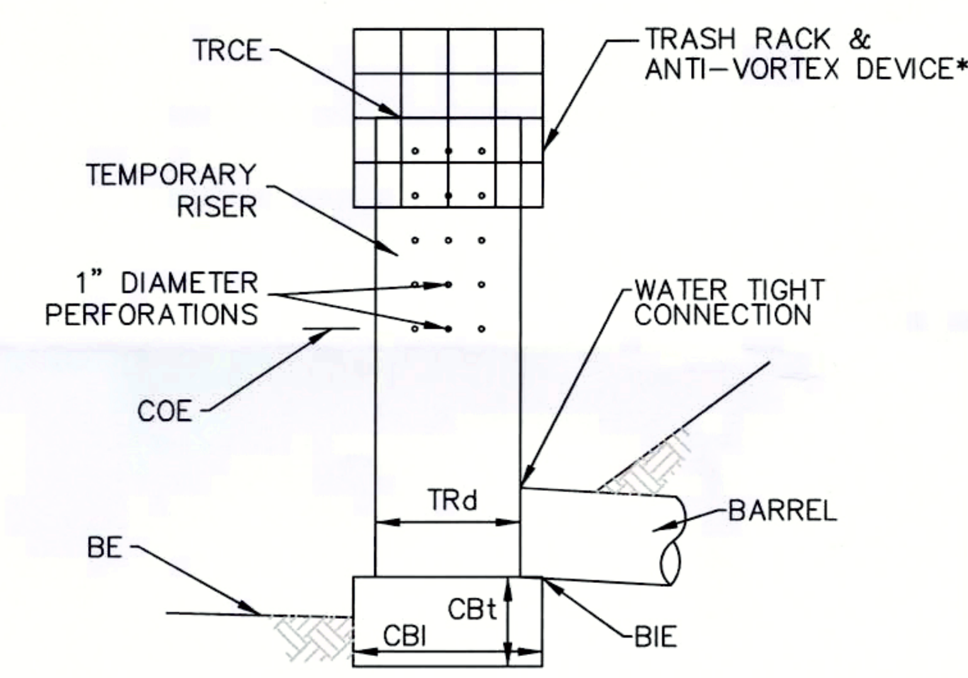


EMBANKMENT SECTION ALONG EMERGENCY SPILLWAY

BASIN NO.	WEIR					LINING		CHANNEL	
	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)
1	4	4	537.00	534.41	15	4	18	3	2.0
2	4	4	532.00	529.27	15	4	18	3	2.0

SEDIMENT BASIN EMERGENCY SPILLWAYS

NOT TO SCALE



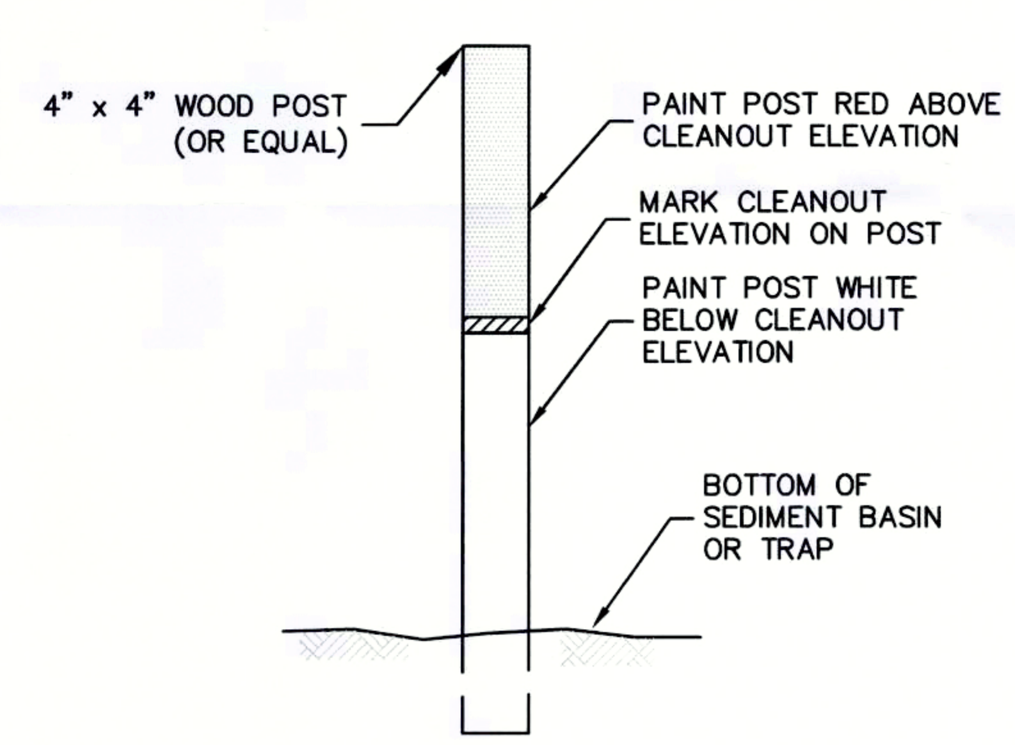
CONCRETE BASE

BASIN NO.	TEMPORARY RISER			PERFORATIONS		CONCRETE BASE			BARREL	
	DIA TRd (IN)	CREST ELEV TRCE (FT)	MAT'L	NO. HOLES PER ROW	VERTICAL SPACING OF ROWS (FT)	LENGTH CBI (IN)	WIDTH CBw (IN)	THICK. CBt (IN)	INLET ELEV BIE (FT)	DIA (IN)
1	24	533.91	CMP	4	1.00	48	48	18	530.00	18
2	24	528.77	CMP	4	1.00	48	48	18	526.75	18

* SEE TRASH RACK & ANTI-VORTEX DEVICE DETAIL

SEDIMENT BASIN RISER

NOT TO SCALE

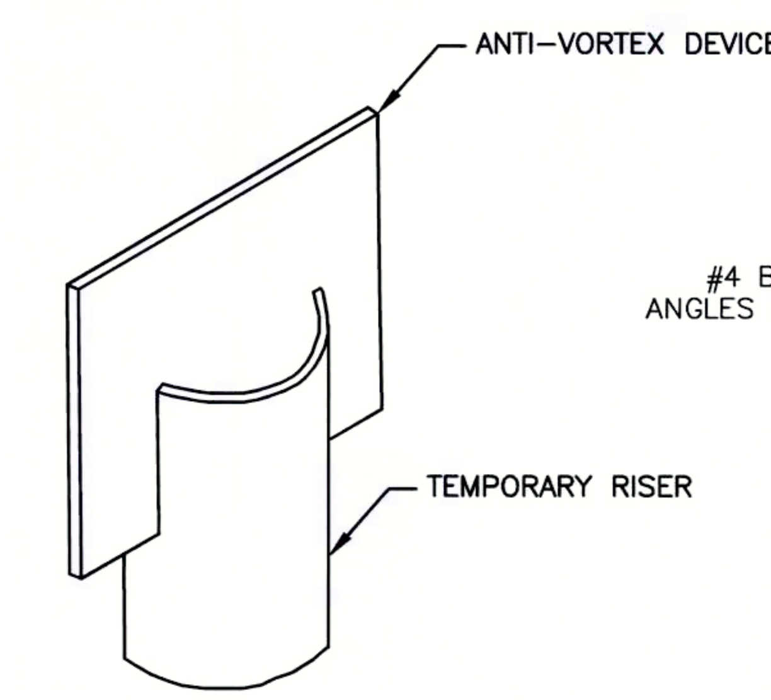


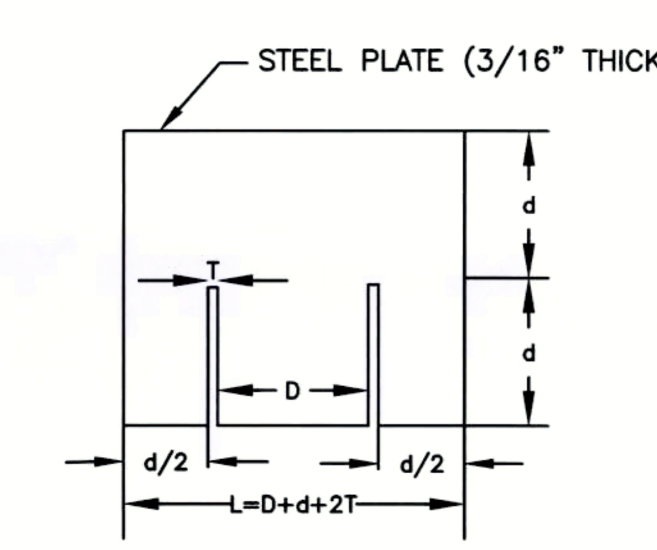
CLEANOUT MARKER

NOT TO SCALE

NOTES:

1. SEDIMENT BASIN SHALL BE CLEANED OUT WHEN SEDIMENT REACHES CLEANOUT ELEVATION MARKED ON STAKE.
2. SEDIMENT TRAPS SHALL BE CLEANED OUT WHEN TRAP IS ONE-THIRD FULL OF SEDIMENT.
3. SET BASE OF CLEANOUT MARKER A MINIMUM OF 3-FEET INTO GROUND SURFACE.



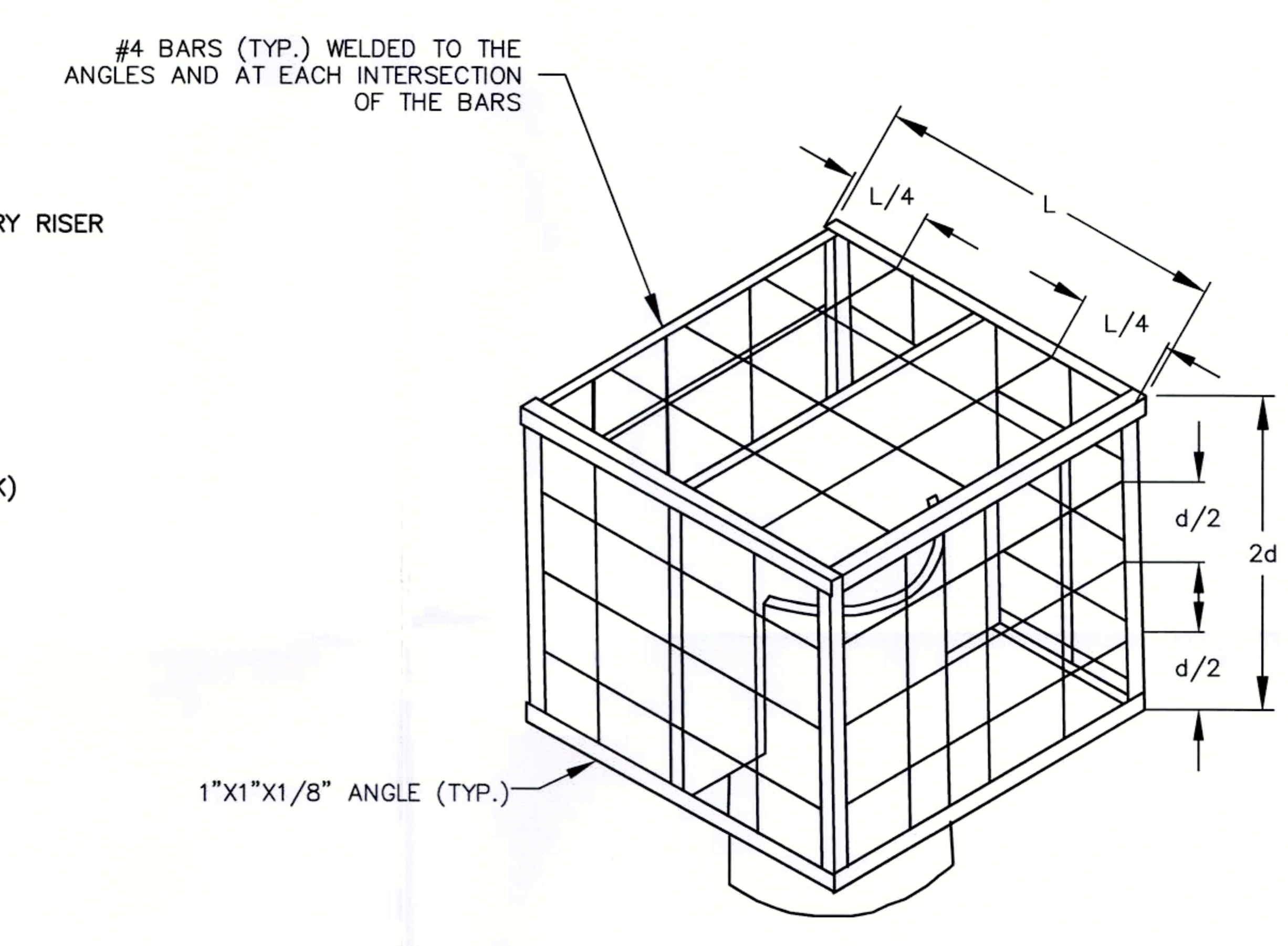


ANTI-VORTEX DEVICE

T = THICKNESS OF RISER PIPE
D = DIAMETER OF RISER PIPE
d = DIAMETER OF OUTLET BARREL
L = LENGTH OF THE PLATE

ANTI-VORTEX DEVICE

NOT TO SCALE



TRASH RACK

NOT TO SCALE

REVISIONS

NO.	DATE	BY

COMMONWEALTH OF PENNSYLVANIA PROFESSIONAL ENGINEER MICHAEL D. FLING
MICHAEL D. FLING, P.E. LICENSE NO. PE080620

PREPARED FOR: Hanson HEIDELBERGCEMENT Group

PREPARED BY: EarthRes ENGINEERING AND SCIENCE

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E&S DETAILS (SHEET 1 OF 2)

HANSON AGGREGATES PENNSYLVANIA LLC
ROCK HILL QUARRY
EAST ROCKHILL TOWNSHIP, BUCKS COUNTY
PENNSYLVANIA

DRAWN BY: JTK
CHECKED BY: MDF
DATE: 02/20/18
PROJECT NO: 061003.052
DRAWING NUMBER: ES-002
SHEET 2 OF 3

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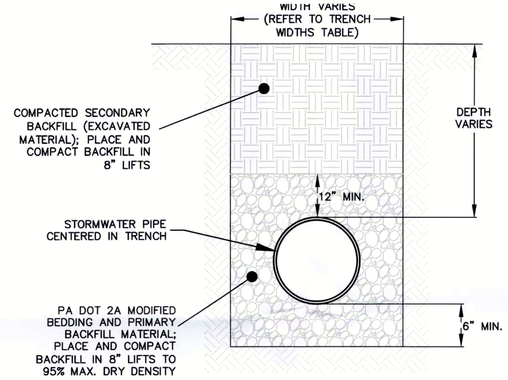
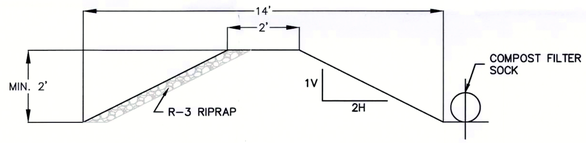


CULVERT PIPE SECTION (TYP.)

NOT TO SCALE

CULVERT NO.	PIPE DIAMETER/TYPE	INLET INVERT (FT)	OUTLET INVERT (FT)	LENGTH (FT)	SLOPE (FT/FT)	WIDTH (FT)
1	24"/CMP	531.98	531.85	26.25	0.005	3
2	2-24"/CMP (DUAL)	534.64	534.00	127.13	0.005	6
5	24"/CMP	524.00	523.67	66.93	0.005	3
6	24"/CMP	529.00	528.50	75.28	0.0066	3

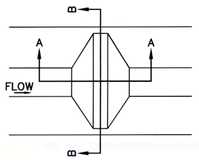
NOTES:
1. A MINIMUM OF 6" SPACING SHALL BE KEPT IN BETWEEN DUAL CULVERTS.
2. CULVERTS HAVE NOT BEEN DESIGNED PER RAILROAD CROSSING CRITERIA. ADDITIONAL COORDINATION AND/OR UPGRADES MAY BE REQUIRED IN THE FUTURE IF RAIL IS PUT INTO SERVICE.



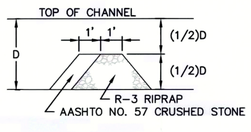
TYPICAL DIVERSION BERM DETAIL

NOT TO SCALE

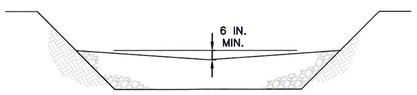
NOTES:
1. DIVERSION BERMS SHALL BE VEGETATED WITH CLASS C VEGETATION OR EQUAL.
2. BERMS SHALL BE INSPECTED WEEKLY AND FOLLOWING EACH STORMWATER EVENT FOR EROSION OF LOSS OF VEGETATION.



PLAN



SECTION A-A

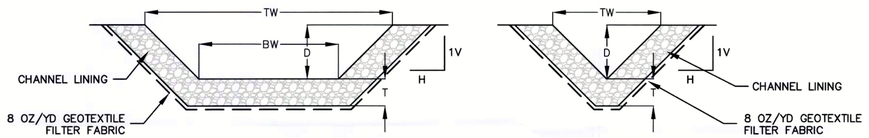


SECTION B-B

ROCK FILTER DETAIL

NOT TO SCALE

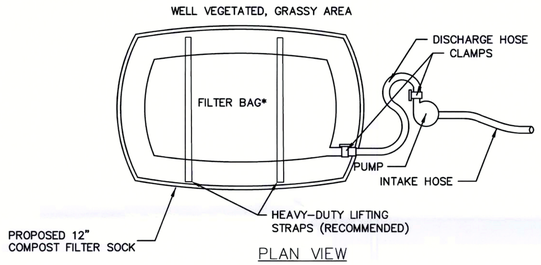
NOTES:
1. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE FILTERS.



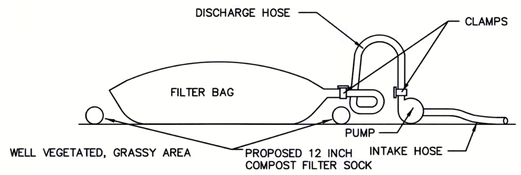
CHANNEL DETAIL, TYPICAL

NOT TO SCALE

CHANNEL NO.	SLOPE (FT/FT)	LINING TYPE	"T" LINING THICKNESS	SIDESLOPES H:V	"D" DESIGN DEPTH (FT)	"TW" TOP WIDTH (FT)	"BW" BOTTOM WIDTH (FT)
CHANNEL 1	0.0078	RIPRAP R-3, D50=3"	9"	2:1	2.0	12	4
CHANNEL 2 SECTION 1	0.0085	RIPRAP R-3, D50=3"	9"	2:1	3.0	16	4
CHANNEL 2 SECTION 2	0.0057	RIPRAP R-3, D50=3"	9"	2:1	3.0	16	4
CHANNEL 3	0.0249	RIPRAP R-3, D50=3"	9"	2:1	3.0	16	4
CHANNEL 4	0.0050	RIPRAP R-3, D50=3"	9"	2:1	3.0	16	4



PLAN VIEW



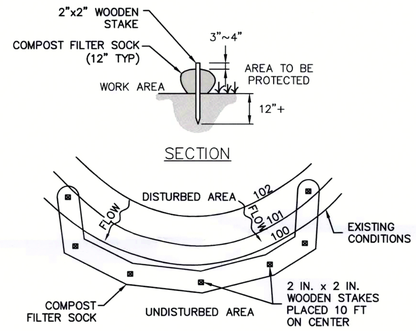
ELEVATION VIEW

PUMPED WATER FILTER BAG DETAIL

NOT TO SCALE

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

NOTES:
1. FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE SEWN WITH HIGH STRENGTH, DOUBLE STITCHED 'J' TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS SHALL BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE ABOVE STANDARDS.
2. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME HALF FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT.
3. BAGS SHALL BE LOCATED IN WELL VEGETATED AREAS AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
5. THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ONE-HALF OF THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.



PLAN VIEW

COMPOST FILTER SOCK DETAIL

NOT TO SCALE

NOTES:
1. SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.
2. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
5. COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
6. BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
7. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

TABLE 4.1 - COMPOST SOCK FABRIC MINIMUM SPECIFICATIONS					
MATERIAL TYPE	3 MIL HDPE	5 MIL HDPE	5 MIL HDPE	MULTI-FILAMENT POLYPROPYLENE (MFPP)	HEAVY DUTY MULTI-FILAMENT POLYPROPYLENE (HDMFPP)
MATERIAL CHARACTERISTICS	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE	BIO-DEGRADABLE	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE
SOCK DIAMETERS	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
MESH OPENING	3/8"	3/8"	3/8"	3/8"	1/8"
TENSILE STRENGTH		26 PSI	26 PSI	44 PSI	202 PSI
ULTRAVIOLET STABILITY % ORIGINAL STRENGTH (ASTM G-155)	23% AT 1,000 HR.	23% AT 1,000 HR.		100% AT 1,000 HR.	100% AT 1,000 HR.
MINIMUM FUNCTIONAL LONGEVITY	6 MONTHS	9 MONTHS	6 MONTHS	1 YEAR	2 YEARS
TWO-PLY SYSTEMS					
INNER CONTAINMENT NETTING	HDPE BIAXIAL NET CONTINUOUSLY WOUND FUSION-WELDED JUNCTURES 3/4"x3/4" MAX. APERTURE SIZE				
OUTER FILTRATION MESH	COMPOSITE POLYPROPYLENE FABRIC (WOVEN LAYER AND NON-WOVEN FLEECE MECHANICALLY FUSED VIA NEEDLE PUNCH) 3/16" MAX. APERTURE SIZE				
SOCK FABRICS COMPOSED OF BURLAP MAY BE USED ON PROJECTS LASTING 6 MONTHS OR LESS					

TABLE 4.2 - COMPOST STANDARDS	
ORGANIC MATTER CONTENT	25% - 100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5 - 8.5
MOISTURE CONTENT	30% - 60%
PARTICLE SIZE	30%-50% PASS THROUGH 3/8" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 dS/M (MMHOS/CM) MAXIMUM

REVISIONS

NO.	DATE	BY

COMMONWEALTH OF PENNSYLVANIA
MICHAEL D. FLING
PROFESSIONAL ENGINEER
MICHAEL D. FLING, P.E.
LICENSE NO. PE060620

PREPARED FOR:
Hanson HEIDELBERGCEMENT Group

PREPARED BY:
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toll free 800.264.4653

E&S DETAILS (SHEET 2 OF 2)

HANSON AGGREGATES PENNSYLVANIA LLC
ROCK HILL QUARRY
EAST ROCKHILL TOWNSHIP, BUCKS COUNTY
PENNSYLVANIA

DRAWN BY:	CHECKED BY:
JTK	MDF
DATE: 02/20/18	PROJECT NO: 06100.3.052
DRAWING NUMBER: ES-003	SHEET 3 OF 3

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MODULE 17
AIR POLLUTION AND NOISE CONTROL PLAN

EarthRes
ENGINEERING AND SCIENCE

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	☒	☐	☒	☐	Diabase
Screening	☒	☐	☒	☐	Diabase
Cleaning	☒	☐	☒	☒	Diabase
Stockpiling	☒	☐	☒	☒	Diabase

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

The initial phase of aggregate production will utilize portable non-metallic processing units operating under GP-3/GP-9 authorization from the Pennsylvania Department of Environmental Protection - Southeast Regional Office dated 12/27/2017.

A fixed aggregate plant is planned for the site with minimum production targeted for 300,000 tons per year. The aggregate plant will likely include a primary jaw crusher, scalping screens, secondary gyratory cone crusher, finishing screens, a tertiary cone crusher, and a quaternary cone crusher. A State Only Operating Permit will be secured from the Pennsylvania Department of Protection - Southeast Regional Office.

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).

GP3-03-0153 issued on 12/27/2017 - expires 12/27/2022
GP9-09-0080 issued on 12/27/2017 - expires 12/27/2022
DEP Air Quality Permits attached

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

Dust will be controlled with water or calcium chloride.

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

All trucks carrying products from the site are required to tarp their loads prior to exiting the site.

c) Drilling operation.

To control dust, drill rigs will either add water during the drilling process or vent the exhaust through the drill rig's baghouse to minimize fugitive dust emissions.

d) Overburden removal and mineral extraction

Overburden will be removed using heavy construction equipment and be placed in stockpiles. Upon placement, the material will be stabilized with vegetation to prevent erosion by wind or water.

A water truck will be used to wet non-paved road surfaces to minimize fugitive emissions from the active mining and support areas. If water applications alone are not effective in controlling dust from the internal unpaved roads, calcium chloride may be applied with water. Calcium chloride retains moisture for prolonged periods, which prevents fugitive dust emissions.

e) Stockpiles (overburden, topsoil, product).

Overburden materials will be stabilized with vegetation to prevent erosion by wind or water. In accordance with the Pennsylvania Department of Environmental Protection Air Quality Permits, wet suppression (water sprays, etc.) methods will be used to control dust associated with the production of aggregate products. Sufficient moisture should be applied to the aggregate product during production to control dust emissions during stockpiling.

f) Loading and unloading areas.

Sufficient moisture should exist in the stockpiled aggregate products to control dust emissions during loadout. Water should also be applied to the surfaces in the loading and unloading areas as needed.

g) Crushing and other processing equipment.

The processing equipment approved under the GP-3 Air Quality Permit employs wet suppression to reduce fugitive emissions during material processing. Should a fixed aggregate plant be installed at the site, a combination of wet suppression and / or baghouse(s) will be used to control dust emissions. Wet suppression systems typically consist of high pressure water pumps supplying multiple manifold spray bars positioned at transfer points, outlets of crushers and the primary dump hopper.

h) Conveyors.

Conveyors associated with the processing equipment will use wet suppression to control fugitive emissions.

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.

Site processing activities of bedrock material are addressed under separate Air Quality Permits. See attached.

17.3 Noise Control

Describe the measures that will be taken to prevent noise from becoming a public nuisance.

The area between the quarry permit area and all surrounding residences is wooded, consisting of mostly deciduous vegetation. The trees and other vegetation assist in defusing sound.

Aggregate product stockpiles and berms may also shield residences from noise.

The site operator may potentially utilize an acceptable alternative to standard backup alarms (i.e. multi-frequency, white noise, etc.) if allowable under MSHA regulations.

AIR QUALITY PERMITS
GP-3 & GP-9

EarthRes
ENGINEERING AND SCIENCE

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

SOUTHEAST REGIONAL OFFICE

December 28, 2017

Mr. Curt Mitchell
Facility Director
PO Box 714
Bridgeport, NJ 08014

Re: Application No. GP3-03-0153
APS ID No. 956988, **AUTH ID No.** 1209931
Portable Crushing Plant
Application No. GP9-09-0080
APS ID No. 957000, AUTH ID No. 1209933
Diesel-Fired Internal Combustion Engines
East Rockhill Township
Bucks County

Dear Mr. Mitchell:

The Department of Environmental Protection (DEP) has received and reviewed your application for use of the General Plan Approval and General Operating Permit (BAQ-GPA/GP9) for five diesel-fired internal combustion engines and a General Plan Approval and General Operating Permit (BAQ-GPA/GP3) for a portable crusher. You are authorized to install the diesel-fired internal combustion engines and portable crusher in accordance with the BAQ-GPA/GP9 and the BAQ-GPA/GP3. The diesel-fired internal combustion engines and portable crusher must be operated as specified in your applications and in compliance with all conditions contained in the BAQ-GPA/GP9 and BAQ-GPA/GP3, copies of which are enclosed. Please be advised that coverage under any General Permit (GP) does not relieve the permittee of the obligation to obtain all other required DEP permits or approvals before the initiation of construction under any GP.

As per your applications, the diesel-fired internal combustion engines and portable crusher will be operated at a quarry site at 2055 North Rockhill Road in Sellersville, PA 18960.

These authorizations are valid for two years from the issuance date located on the cover sheet of the General Permit.

Condition No. 13 of the GP3 and condition No. 15 of the GP9 require you to comply with all applicable federal, state, and local laws and regulations that may not be specifically written in the General Permits.

Please carefully review the BAQ-GPA/GP9 and BAQ-GPA/GP3 to ensure that all applicable terms and conditions will be met. If you have any questions, please call Mr. Steve Steirer at 484.250.5071.

Sincerely,

James A. Beach

James A. Beach, P.E.
Environmental Engineer Manager
Air Quality

Enclosure:

cc: Mr. Steirer
Mr. Mountain
File Nos. GP9-09-0153 and GP9-09-0080
Re 30 (TDB17) 349

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FIELD OPERATIONS - BUREAU OF AIR QUALITY

GENERAL PLAN APPROVAL AND GENERAL OPERATING PERMIT (BAQ-GPA/GP3)

In accordance with provisions of the Air Pollution Control Act, the act of January 8, 1960, P.L. 2119, as amended, and after due consideration of an application received under Chapter 127 of the Rules and Regulations of the Department of Environmental Protection (DEP), DEP hereby issues this permit for the operation of the air contamination source(s) described below:

Permit No.	GP3-09-0153	**Source(s)**	Portable Nonmetallic Mineral Processing Plant Manufacturer: Sandvik, Model UJ440i Max. Throughput: 550 tons/hr
Owner	Richard E. Pierson Materials Corp.	**Air**	
Address	PO Box 714	**Cleaning**	Water Spray Dust Suppression
	Bridgeport, NJ 08014	**Device**	
Attention	Mr. Curt Mitchell	**Location**	East Rockhill Quarry 2105 North Rockhill Road Sellersville, PA 18960 East Rockhill Township Bucks County
	Facility Director		

This general Plan Approval and General Permit is subject to the attached conditions for portable nonmetallic mineral processing plants (BAQ-GPA/GP3):

(SEE CONDITIONS ATTACHED)

Failure to comply with the conditions placed on this permit is a violation of Section 127.444. Violation of this or any other provision of Article III of the Rules and Regulations of DEP will result in suspension or revocation of this permit and/or prosecution under Section 9 of the Air Pollution Control Act.

Issued December 27th, 2017

James D. Rebarchak
Regional Manager
Air Quality

Expires December 27th, 2022

cc: Division of Permits
Mr. Mountain
File No. GP3-09-0153
Re 30

3. Application for Use:

Any person proposing to operate or construct under this Diesel Engine(s) General Permit shall notify the Department using the Diesel Engine(s) General Permit Application provided by the Department and shall receive prior written approval from the Department as required under 25 *Pa. Code* §127.621 (relating to application for use of general plan approvals and general operating permits). The Department will take action on the application within 30 days of receipt.

4. Compliance:

Any applicant authorized to operate a diesel-fired internal combustion engine(s) under this Diesel Engine(s) General Permit must comply with the terms and conditions of the general permit. The diesel-fired internal combustion engine(s) shall be:

a. operated in such a manner as not to cause air pollution, as defined in 25 Pa. Code §121.1;

b. operated and maintained in a manner consistent with good operating and maintenance practices; and

c. operated and maintained in accordance with the manufacturer's specifications and the applicable terms and conditions of this General Permit.

5. Permit Modification, Suspension, and Revocation:

This Diesel Engine(s) General Permit may be modified, suspended, or revoked if the Department determines that the affected diesel-fired internal combustion engines cannot be regulated under this general permit. Authorization to use this Diesel Engine(s) General Permit shall be suspended or revoked if the permittee fails to comply with the applicable terms and conditions of the Diesel Engine(s) General Permit.

The approval herein granted to operate the Diesel Engine(s) General Permit shall be suspended, if, at any time, the permittee causes, permits or allows any modification (as defined in 25 *Pa. Code* §121.1) without Department approval of the internal combustion engine(s) covered by this General Permit. Upon suspension of the General Permit, the permittee may not continue to operate or use the diesel-fired internal combustion engines. If warranted, the Department will require that the diesel-fired internal combustion engine(s) be permitted under the State Operating Permit and/or Title V Operating Permit requirements in 25 *Pa. Code* Chapter 127, if appropriate.

6. Notice Requirements:

The applications and notifications required by 25 *Pa. Code* §127.621 shall be submitted to the appropriate Regional Office responsible for issuing general permits in the county in which the diesel-fired internal combustion engine is, or will be, located. As required under 25 *Pa. Code* §127.621(b), the application shall be either hand delivered or transmitted by certified mail return receipt requested.

The permittee shall not construct a new source under the Diesel Engine(s) General Permit until and unless the appropriate Regional Office is notified that construction is to be conducted and written authorization to construct is received. The fees described in Condition 13 shall accompany the notification of construction.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR QUALITY

GENERAL PLAN APPROVAL AND/OR GENERAL OPERATING PERMIT (BAQ-GPA/GP 9)

Diesel or No. 2 Fuel-fired Internal Combustion Engines

1. Statutory Authority and General Description:

In accordance with Section 6.1(f) and (g) of the Air Pollution Control Act, 35 P.S. §4006.1, and 25 *Pa. Code* §§127.611 and 127.631, the Department of Environmental Protection ("Department") hereby issues this general plan approval and/or general operating permit for diesel or No. 2 fuel-fired engine(s) (hereinafter referred to as "Diesel Engine(s) General Permit").

2. Applicability/Source Coverage Limitations:

This Diesel Engine(s) General Permit authorizes construction and/or operation of diesel engine(s) including, but not limited to, electrical power generation, rock crushing operation, portable non-metallic processing plants, and those engine(s) used in other processes, which are not covered by other General Permits. GP-11 and GP-12 shall be used for Non-road engines and engines located at coal or coal refuse mining sites respectively.

This Diesel Engine(s) General Permit has been established in accordance with the provisions described in 25 *Pa. Code* Chapter 127, Subchapter H (relating to general plan approvals and general operating permits). If the diesel or No. 2 oil-fired engine(s) at the facility cannot be regulated by the requirements of this General Permit, a plan approval and/or an operating permit issued in accordance with 25 *Pa. Code* Chapter 127, Subchapters B (relating to plan approval requirements) and/or Subchapter F (relating to operating permit requirements) will be required, or if the facility is a Title V facility, a Title V operating permit issued in accordance with Subchapters F and G (relating to Title V Operating Permits) will be required.

Plan Approval:

This Diesel Engine(s) General Permit authorizes the construction of internal combustion engine(s) that meet the best available technology (BAT) required under 25 *Pa. Code* §§127.1 and 127.12(a)(5). For purposes of this Diesel Engine(s) General Permit, BAT for any diesel-fired engine shall include the installation and operation of available control measures that reduce emissions to the limitations described in Condition 7.

Operating Permit:

Once authorization to use this Diesel Engine(s) General Permit is granted, operation may proceed provided that the permittee notifies the Department in accordance with condition 6.

Any diesel-fired engine(s) located at a "Title V facility" as defined in 25 Pa. Code §121.1, shall comply with the requirements of 25 *Pa. Code* §127.514 (relating to general operating permits at Title V facilities).

Facilities Located in the "Severe" Ozone Non-Attainment Area

Engine Rating (BHP) >	Engine Rating (BHP) ≤	Actual Annual Operating Hours ≥
200	500	2,000
500	1,000	700
1,000	-----	500

Facilities Located in "Moderate" (or lower classified) Ozone Non-Attainment Areas

Engine Rating (BHP) >	Engine Rating (BHP) ≤	Actual Annual Operating Hours ≥
200	250	7,000
250	500	4,000
500	750	1,700
750	1,000	1,500
1,000	1,500	1,100
1,500	2,000	750
2,000	-----	500

If NO_x emissions from engine(s) are controlled using control technology that uses ammonia or urea as a reagent, then the company shall limit the exhaust ammonia slip at 10 ppmvd, or less corrected at 15% O_2.

All other diesel engines shall at a minimum comply with the NO_x emission standard of 6.9 gms/hp-hr.

iii. If the diesel-fired engine is equal to or greater than 100 brake horsepower and number of hours of operation of engine are equal to or greater than the hours per year listed in the following table, then the engine shall be installed with CO Oxidation Catalyst control device with a minimum of 90% control efficiency.

Engine Rating (BHP) >	Engine Rating (BHP) ≤	Actual Annual Operating Hours ≥
100	150	4,800
150	250	2,800
250	500	1,850
500	750	1,200
750	1,000	950
1,000	1,500	700
1,500	2,000	670
2,000	2,500	500
2,500	----	100

All other diesel engines shall at a minimum comply with CO emission standard of 2.0 gms/bhp-hr.

iv. The sulfur content in diesel fuel shall not, at any time exceed 0.3 percent (by weight).

v. The particulate matter emissions from each engine shall not exceed 0.4 gms/bhp-hr.

This Diesel Engine(s) General Permit may be used by a new source owner or operator to authorize operation provided that the Department receives written notice from the permittee of the completion of construction and the intent to commence operation at least five (5) working days prior to completion of construction.

The permittee shall notify the Department, in writing, within 24 hours of the discovery of any malfunction during a business day or by 5:00 p.m. on the first business day after a weekend or holiday of any malfunction of the diesel-fired internal combustion engine(s) which results in, or may result in, the emission of air contaminants in excess of the limitations specified in, or established pursuant to, any applicable rule or regulation contained in 25 *Pa. Code*, Subpart C, Article III (relating to air resources).

7. Emissions Limits for Diesel Engines:

a. Any diesel engine for which construction commenced prior to July 1, 1972: any diesel engine(s) operated under this general permit may not, at any time, result in the emission of:

i. Visible emissions in excess of the limitations specified in 25 *Pa. Code* §123.41 (relating to limitations) as follows:

A. Equal to or greater than 20% for a period or periods aggregating more than three (3) minutes in any one (1) hour; and

B. Equal to or greater than 60% at any time.

ii. Particulate matter in excess of 0.04 grain per dry standard cubic foot (dscf), when the effluent gas volume is less than 150,000 dry standard cubic feet per minute as specified in 25 *Pa. Code* §123.13 (c)(1)(i). Compliance with Condition 7.a.i. will be considered demonstration of compliance with the above particulate matter emission requirement of 0.04 grain per dscf.

iii. Sulfur oxides in such a manner that the concentration of sulfur oxides, expressed as SO_2, in the effluent gas exceeds 500 parts per million by volume, dry basis. Compliance with sulfur content of the diesel fuel of 0.3% (by weight) or less would ensure compliance with this requirement.

iv. Odor emissions in such a manner that the malodors are detectable outside the property of the permittee as specified in 25 *Pa. Code* §123.31.

b. Any diesel engine for which construction commenced on or after July 1, 1972 and best available technology requirements have not been previously established:

i. If the diesel-fired internal combustion engine has an engine rating greater than 100 brake horsepower, the engine shall, at a minimum, comply with a Total Hydrocarbon (THC) emission standard of 1.0 gm/bhp-hr.

ii. If the diesel-fired internal combustion engine is equal to or greater than 200 brake horsepower and number of hours of operation of engine are equal to or greater than the hours per year listed in the following table, then the engine shall be installed with NO_x control device with a minimum of 80% NO_x control efficiency.

i. Within sixty (60) days after achieving the maximum production rate at which the affected facility will be operated, but no later than one hundred eighty (180) days after the initial startup of the source and the owner or operator shall demonstrate compliance with the applicable emission limits.

ii. At least sixty (60) days prior to the test, the company shall submit to the Department for approval the procedures for the test and a sketch with dimensions indicating the location of sampling ports and other data to ensure the collection of representative samples.

iii. At least thirty (30) days prior to the test, the Department shall be informed of the date and time of the test.

iv. Within sixty (60) days after the source test(s), two copies of the complete test report, including all operating conditions, shall be submitted to the Department.

9. Monitoring, Recordkeeping and Reporting:

a. The permittee shall maintain accurate records, which, at a minimum, shall include:

i. The number of hours per calendar year that each engine or piece of equipment operated using non-resettable hour meter.

ii. The amount of fuel used per calendar year in each engine or piece of equipment.

b. When a new diesel-fired internal combustion engine is installed in accordance with Conditions 2 and 7.b and is required to conduct a performance test, the permittee shall maintain records or report the following:

i. Records including a description of testing methods, results, all engine operating data collected during the tests and a copy of the calculations performed to determine compliance with emission standards.

ii. Copies of the report that demonstrates that the engines were operating at rated brake horsepower and rated speed conditions during performance testing.

iii. Submittal of reports in accordance with the requirements and schedules outlined in this Diesel Engine(s) General Permit.

c. These records shall be retained for a minimum of five (5) years and shall be made available to the Department upon request. The Department reserves the right to expand the list contained in this condition as it may reasonably prescribe pursuant to the provisions of Section 4 of the Pennsylvania Air Pollution Control Act (35 P. S. §§4004), and as it may deem necessary to determine compliance with any condition contained herein.

10. Small Sources of NO_x requirements:

Each diesel engine rated at greater than 1,000 brake horsepower and located in severe non-attainment area for ozone shall comply with small sources of NO_x requirements as established in 25 *Pa. Code* §§129.203 through 129.205.

vi. Visible emissions from diesel engine(s) stacks shall not exceed the following limitations:

A. Equal to or greater than 10% for a period or periods aggregating more than three (3) minutes in any one (1) hour; and

B. Equal to or greater than 30% at any time.

vii. Odor emissions in such a manner that the malodors are detectable outside the property of the permittee as specified in 25 *Pa. Code* §123.31.

8. Performance Testing:

a. For a new diesel-fired internal combustion engine installed in accordance with Conditions 2 and 7.b. and which has a rated capacity equal to or less than 500 brake horsepower, vendor guarantees shall be sufficient to fulfill this requirement. However, the Department reserves the right to require an additional verification of emission rates which may include source testing in accordance with applicable provisions of 25 *Pa. Code* Chapter 139 (relating to sampling and testing) or portable exhaust gas analyzers approved by the Department if the NO_x emissions from the facility including the proposed diesel engines are equal to or greater than:

i. 22.5 tons per year if the facility is located in severe ozone non-attainment areas; and

ii. 90 tons per year if the facility is located in any other area than those listed above in 8.a.i.

b. For a new internal combustion engine installed in accordance with Conditions 2 and 7.b. and which has a rated capacity greater than 500 brake horsepower, within 180 days of receiving authority to construct under this general permit, the permittee shall perform stack testing in accordance with 25 *Pa. Code* Chapter 139.

c. In addition to the stack testing required by this condition, within 12 months after the initial stack testing, and annually thereafter, the permittee shall perform NO_x emissions tests upon each of the respective engines subjected to the BAT as stated in Condition 7.b. herein using a portable analyzer approved by the Department. The Department may alter the frequency of annual portable analyzer tests based on the results. The Department may also waive all or parts of this requirement if the permittee demonstrates compliance, in lieu of testing, through alternate means satisfactory to the Department.

d. The Department reserves the right to require stack tests in accordance with EPA reference methods should the data from the portable analyzer warrant such tests. The purpose of this testing is to demonstrate compliance with the emission limitations required for new engines.

e. The Department may accept the vendor guarantees or recent on-site test data on similar engines, or any other means approved by the Department as a verification of NO_x emission if the NO_x emissions from a diesel engine located in severe non-attainment area for ozone are less than 2.5 tons per year or 10 tons per year if a diesel engine is located in areas other than severe non-attainment for ozone.

f. If performance stack tests are required for the demonstration of compliance with applicable emissions limits, the owner or operator of the affected facility shall comply with the following requirements:

15. Applicable Laws:

Nothing in this Diesel Engine(s) General Permit relieves the permittee of its obligation to comply with all applicable Federal, state, and local laws and regulations.

16. Prohibited Use:

Any stationary air contamination source that is subject to the requirements of 25 *Pa. Code* Chapter 127, Subchapter D (relating to prevention of significant deterioration), 25 *Pa. Code* Chapter 127, Subchapter E (relating to new source review), 25 Pa. *Code Chapter* 127, Subchapter G (relating to Title V operating permits), or 25 *Pa. Code* §129.91 (relating to control of major sources of NO_x and VOCs) may not operate a diesel-fired internal combustion engines under this Diesel Engine(s) General Permit. Title V facilities may use this Diesel Engine(s) General Permit as a plan approval when the major new source review and prevention of significant deterioration review requirements are not applicable.

17. Transfer of Ownership or Operation:

The permittee may not transfer the authorization to operate diesel engine(s). New owners or operators shall submit a new application and fees as described in Condition 13.

18. Department and Municipality Notification:

The permittee shall notify the Department and the municipality prior to relocation of any diesel-fired engine(s) used for operating a portable nonmetallic mineral processing plant as required under 25 *Pa. Code* §127.641(b)(2). The notification for relocation of any diesel-fired engine(s) to the Department and the municipality shall be either hand delivered or transmitted by certified mail return receipt requested as required under 25 *Pa. Code* §127.641(c).

19. Start-up and Shut-down Exclusion:

The emission limitations stated in Condition 7 of this General Permit shall apply at all times except during periods of start-up and shut-down, provided, however, that the duration of start-up and shut-down do not exceed one hour per occurrence.

20. Emission Limitations and/or Operating Requirements Previously Established Pursuant to Best Available Technology and/or Imposed to Give Synthetic Minor Status:

This Diesel Engine(s) General Permit cannot be used to vacate or reestablish best available technology or other emission limitations or requirements established through the air quality permitting process. Also, this General Permit was not intended to establish a new best available technology or other emissions limitations previously established through the air quality permitting process. The Department shall memorialize these limitations in the letter of authorization granted in accordance with Condition 2.

11. Interstate Pollution Transport Reduction Requirements:

Each diesel engine rated equal to or greater than 3,000 brake horsepower that emitted greater or equal to 153 tons of NO_x from May 1 through September 30 in 1995 or from May 1 through September 30 of any year thereafter shall comply with the applicable requirements as established in 25 *Pa. Code* §§145.11 through 145.115.

12. Term of Authorization to Use Diesel Engine(s) General Permit:

Authority to operate under this Diesel Engine(s) General Permit is granted for a fixed term of five (5) years. The Department will notify each applicant, by letter, when authority to operate under this general permit is granted.

Authority to operate Diesel Fired Engine(s) required to operate any portable nonmetallic mineral processing plants under this Diesel Engine(s) General Permit is granted for no longer than 24 months if it is temporarily located at construction sites. Authority to operate the same plant beyond 24 months would require a new authorization, in writing, from the Department.

13. Permit Fees:

The Diesel Engine(s) General Permit establishes the following application and renewal fees payable every five (5) years if no equipment changes occur:

Three hundred seventy five dollars.

An additional application fee as indicated above is required each time the permittee installs or modifies a diesel-fired internal combustion engine. The installation or modification of a diesel-fired internal combustion engine must be conducted according to the terms and conditions of this general permit. Two (2) or more diesel-fired engines may be installed under a single plan approval fee.

14. Expiration and Renewal of Authorization to Use Diesel Engine(s) General Permit:

The permittee's right to operate under this Diesel Engine(s) General Permit terminates on the date of expiration of the authorization to operate under this permit unless a timely and complete renewal application is submitted to the Department 30 days prior to the permit expiration date.

Upon receipt of a complete and timely application for renewal, the diesel-fired internal combustion engines may continue to operate subject to final action by the Department on the renewal application. This protection shall cease to exist if, subsequent to a completeness determination, the applicant fails to submit by the deadline specified in writing by the Department any additional information required by the Department to process the renewal application.

The Diesel Engine(s) General Permit application for renewal shall include: the identity of the owner or operator; location of the diesel-fired internal combustion engines; current permit number; description of the engines and equipment located at the facility; information regarding previously imposed limitations; the appropriate renewal fee listed in Condition 13; and, any other information requested by the Department. At a minimum, the permit renewal fee shall be submitted to the Department at least 30 days prior to the expiration of the Diesel Engine(s) General Permit.

Note: A permittee may choose to apply for a plan approval for an engine in lieu of this general plan approval. If this option is chosen the applicable requirements shall be determined on a case-by-case basis.

Approved by: _____

Joyce E. Epps
Director
Bureau of Air Quality

Date Approved: March 17, 2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FIELD OPERATIONS - BUREAU OF AIR QUALITY

GENERAL PLAN APPROVAL AND GENERAL OPERATING PERMIT (BAQ-GPA/GP9)

In accordance with provisions of the Air Pollution Control Act, the act of January 8, 1960, P.L. 2119, as amended, and after due consideration of an application received under Chapter 127 of the Rules and Regulations of the Department of Environmental Protection (DEP), DEP hereby issues this permit for the operation of the air contamination source(s) described below:

Permit No.	GP9-09-0080	**Source(s)**	Five (5) Diesel or No. 2 Fuel-Fired Internal Combustion Engines
Owner	Richard E. Pierson Materials Corp.		1-Volvo, Model D-13, Tier 4, 422 bhp
Address	PO Box 714	**Air Cleaning Device**	2-Caterpillar, Model C-9, Tier 4, 350 bhp each
	Bridgeport, NJ 08014		1-Caterpillar, Model C4.4, 129 bhp
Attention	Mr. Curt Mitchell		1-Deutz, Model BF4M2012, 100 bhp
	Facility Director	**Location**	East Rockhill Quarry
			2105 North Rockhill Road
			Sellersville, PA 18960
			East Rockhill Township
			Bucks County

This general Plan Approval and General Permit is subject to the attached conditions for Diesel or No. 2 Fuel-Fired Internal Combustion Engines (BAQ-GPA/GP9):

(SEE CONDITIONS ATTACHED)

Failure to comply with the conditions placed on this permit is a violation of Section 127.444. Violation of this or any other provision of Article III of the Rules and Regulations of DEP will result in suspension or revocation of this permit and/or prosecution under Section 9 of the Air Pollution Control Act.

Issued December 27th, 2017

Expires December 27th, 2022

James D. Rebarchak
Regional Manager
Air Quality

cc: Division of Permits
Mr. Mountain
File No. GP9-09-0080
Re 30 (TDB17) 349b

a. Crushed and broken stone, including limestone, dolomite, granite, traprock, sandstone, quartz, quartzite, marl, marble, slate, shale, oil shale, and shell;
b. Sand and gravel;
c. Clay including kaolin, fireclay, bentonite, Fuller's earth, ball clay, and common clay;
d. Rock salt;
e. Gypsum;
f. Sodium compounds, including sodium carbonate, sodium chloride, and sodium sulfate;
g. Pumice;
h. Gilsonite;
i. Talc and pyrophyllite;
j. Boron, including borax, kernite, and colemanite;
k. Barite;
l. Flourospar;
m. Feldspar;
n. Diatomite;
o. Perlite;
p. Vermiculite;
q. Mica; and
r. Kyanite, including andalusite, sillimanite, topaz, and dumortierite.

Nonmetallic minerals do not include coals of any type.

This General Permit is designed to serve as both a general plan approval and a general operating permit for one or more portable nonmetallic mineral processing plant located in a facility. The specific use of the General Permit will depend upon permit status, emission levels and location of the facility as outlined below.

Plan Approval

This General Permit authorizes the construction of portable nonmetallic mineral processing plants that meet the best available technology (BAT) required under 25 Pa. Code §§127.1 and 127.12(a)(5), provided the respective construction is not subject to the requirements of 25 Pa. Code Chapter 127, Subchapter D (relating to prevention of significant deterioration), or 25 Pa. Code Chapter 127, Subchapter E (relating to new source review). For the purpose of this General Permit, BAT shall include the installation of water spray dust suppression systems, fabric collectors, combinations of these or other measures capable of meeting the emission limitations described in Condition 21.

Operating Permit

This General Permit authorizes the operation of portable nonmetallic mineral processing plants for a period of no longer than twenty four (24) months for plants located at a construction site and maximum up to five (5) years for plants located at a site for which a valid mining permit or an air quality permit exists for the operation of a nonmetallic mineral processing plant. A facility, which is subject to the requirements of 25 Pa. Code Chapter 127, Subchapter F (relating to Operating Permit Requirements), or Subchapters F and G (relating to Title V Operating Permits Requirements) may use this General Permit as a plan approval to construct and an operating permit to operate a qualifying portable nonmetallic mineral processing plant on a temporary basis until such time as the operating permit required pursuant to 25 Pa. Code Chapter 127, Subchapter F, or Subchapters F and G, has been obtained or amended to include the terms and conditions of this General Permit.

Once authorization to use this General Permit is granted, operation may proceed provided that the permittee notifies the Department in accordance with Condition 6.

Any portable nonmetallic mineral processing plant located at a "Title V facility" as defined in 25 Pa. Code § 121.1, shall comply with the requirements of 25 Pa. Code §127.514 (relating to general operating permits at Title V facilities).

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR QUALITY

GENERAL PLAN APPROVAL AND/OR GENERAL OPERATING PERMIT For

Portable Nonmetallic Mineral Processing Plants

(BAQ-PGPA/GP-3)

1. Statutory Authority and General Description

In accordance with Section 6.1(f) and (g) of the Air Pollution Control Act, 35 P.S. § 4006.1(f) and (g), 25 Pa. Code §§ 127.514 and 127.631, the Department of Environmental Protection (Department) hereby issues this general plan approval and general operating permit for portable nonmetallic mineral processing plants (hereinafter referred to as "General Permit").

2. Applicability/Source Coverage Limitations

This General Permit is limited to the erection, operation, and modification of portable nonmetallic mineral processing plants:

a. Which are temporarily (no longer than 24 months) located at construction sites;

or,

b. Which are located at sites for which a valid mining permit or an air quality permit exists for the operation of a nonmetallic mineral processing plant.

"Nonmetallic mineral processing plants," as defined in 40 CFR § 60.671, means any combination of equipment that is used to crush or grind any nonmetallic mineral. Nonmetallic mineral processing plants are designed to process nonmetallic minerals, and consist of affected units like crushers, grinders, screening operations, belt conveyors, bucket elevators, storage bins, bagging operations, and enclosed truck and rail car loading stations.

"Portable plant" means any of the nonmetallic mineral processing plants that is mounted on any chassis or skids and may be moved by the application of a lifting or pulling force. In addition, there shall be no cable, chain, turn-buckle, bolt or other means (except electrical connections) by which any piece of equipment is attached or clamped to any anchor, slab, or structure, including bedrock that must be removed prior to the application of a lifting or pulling force for the purpose of transporting the unit.

Diesel-fired internal combustion engine(s) required to operate nonmetallic mineral processing plants are not covered by this General Permit. Internal combustion engine(s) may be covered by general plan approval and general operating permit for a diesel or No. 2 fuel-fired internal combustion engines (BAQ-GPA/GP 9) or nonroad engines (BAQ-GPA/GP-11) as applicable.

This General Permit has been established in accordance with the provisions described in 25 Pa. Code Chapter 127, Subchapter H (relating to general plan approvals and general operating permits). If the portable nonmetallic mineral processing plant at the facility cannot be regulated by the requirements of this General Permit, a plan approval and/or an operating permit issued in accordance with 25 Pa. Code Chapter 127, Subchapter B (relating to plan approval requirements) and/or F (relating to operating permit requirements) will be required, or, if the facility is a Title V facility, a Title V operating permit issued in accordance with Subchapters F and G (relating to Title V Operating Permits) will be required.

Nonmetallic mineral means any of the following minerals or any mixture of which the majority is any of the following minerals:

6. **Notice Requirements**

The applications and notifications required by 25 Pa. Code § 127.621 shall be submitted to the appropriate Regional Office responsible for authorizing the use of General Permits in the county in which the portable nonmetallic mineral processing plant is, or will be located. As required under § 127.621(b), the application shall be either hand delivered or transmitted by certified mail with a return receipt.

The permittee shall notify the Department, in writing, of the permittee's intent to commence operation of source(s) authorized by the General Plan Approval at least five (5) working days prior to the completion of construction. The notice shall specify the expected date of completion of construction and date of commencement of operation for the source(s).

The permittee shall notify the Department, by telephone, within 24 hours of the discovery of any malfunction of a portable nonmetallic mineral processing plant operating pursuant to this General Permit, or any malfunction of an associated air cleaning device, which results in, or may possibly be resulting in, the emission of air contaminants in excess of any applicable limitation specified herein or in excess of the limitations specified in any applicable rule or regulation contained in 25 Pa. Code Chapters 121 through 145 or which otherwise results in, or may possibly be resulting in, noncompliance with the requirements specified in any applicable condition of this General Permit (if the permittee is unable to provide notification within 24 hours of discovery due to a weekend or holiday, the notification shall be made to the Department by no later than 4 p.m. on the first Department business day following the respective weekend or holiday). The permittee shall additionally provide whatever subsequent written report the Department may request regarding any reported malfunction.

7. **Sampling and Testing**

No later than one hundred and eighty (180) days after initial start-up, the permittee shall demonstrate compliance with the emission limitations for particulate matters established in Condition 21.

If, at any time, the Department has cause to believe that air contaminant emissions from a nonmetallic mineral processing plant covered by this General Permit are in excess of the limitations specified in, or established pursuant to, any applicable regulation contained in 25 Pa. Code, Subpart C, Article III, the permittee shall conduct tests deemed necessary by the Department to determine the actual emission rate(s).

The permittee shall perform such testing in accordance with applicable provisions of 25 Pa. Code Chapter 139 (relating to sampling and testing) and in accordance with any restrictions or limitations established by the Department at the time the permittee is notified, in writing, of the testing requirement.

8. **Monitoring, Recordkeeping and Reporting**

The permittee shall comply with applicable monitoring, recordkeeping and reporting requirements set forth in 25 Pa. Code Chapter 139 (relating to sampling and testing), the Air Pollution Control Act (35 P.S. §4001 et seq.), the Clean Air Act (42 U.S.C. §7401 et seq.), and the applicable regulations under the acts.

Records maintained under this General Permit shall be kept for a period of five (5) years and shall be made available to the Department upon its request.

3. **Application for Use**

Any person proposing to install, operate or modify under this General Permit shall notify the Department using the Portable Nonmetallic Mineral Processing Plant General Permit Application provided by the Department. In accordance with 25 Pa. Code § 127.641 (relating to application for use of general plan approvals and general operating permits for portable sources), the applicant shall receive written authorization from the Department prior to installing, operating or modifying under this General Permit. The Department will take action on the application within 30 days of receipt.

Any portable nonmetallic mineral processing plant driven by internal combustion engine(s) must also apply for General Plan Approval and/or General Operating Permit for Diesel or No. 2 Fuel-Fired Internal Combustion Engines (BAQ-GPA/GP 9), or General Plan Approval and/or General Operating Permit for Nonroad Engines (BAQ-GPA/GP 11), in conjunction with the portable nonmetallic mineral plant general permit application.

4. **Compliance**

Any portable nonmetallic mineral processing plant operating under this General Permit must comply with the terms and conditions of the General Permit. The portable nonmetallic mineral processing plant and any associated air cleaning devices shall be:

a. Operated in such a manner as not to cause air pollution, as the term is defined in 25 Pa. Code § 121.1.

b. Operated and maintained in a manner consistent with good operating and maintenance practices.

c. Operated and maintained in accordance with the manufacturer's specifications and the applicable terms and conditions of this General Permit.

5. **Permit Modification, Suspension and Revocation**

This General Permit may be modified, suspended, or revoked if the Department determines that affected nonmetallic mineral processing plants cannot be adequately regulated under this General Permit. Authorization to use this General Permit shall be suspended or revoked if the permittee fails to comply with applicable terms and conditions of the General Permit.

Authorization to operate the portable nonmetallic mineral processing plant shall be suspended, if, at any time, the permittee causes, permits or allows any modification without Department approval (as defined in 25 Pa. Code §121.1) of the portable nonmetallic mineral processing plant and any associated air pollution control device covered by this General Permit. Upon suspension of the General Permit, the permittee may not continue to operate or use said nonmetallic mineral processing plant. If warranted, the Department will require that the nonmetallic mineral processing plant be permitted under the state operating permit or Title V operating permit requirements in 25 Pa. Code Chapter 127, as appropriate.

plan approval when major new source review and prevention of significant deterioration requirements are not applicable.

15. **Transfer of Ownership or Operation**

The permittee may not transfer authorization to operate under this General Permit. A new owner shall submit a new application and fees as described in Condition 10.a.

16. **Regulatory Conflicts**

Wherever a conflict occurs between this general plan approval and operating permit and any of the regulations listed below, the permittee shall, in all cases, meet the more stringent requirement:

a. 25 Pa. Code §§ 123.1, 123.2, 123.13(c), and 123.41.

b. 40 CFR 60, Subpart OOO.

17. **Emission Limitations**

The operation of a portable nonmetallic mineral processing plant shall not at any time result in the emission of:

a. Fugitive air contaminants in excess of the limitations specified in 25 Pa. Code §§ 123.1 and 123.2. All reasonable actions shall be taken to prevent particulate matter from becoming airborne. These actions include, but are not limited to, the following:

i. Proper installation of a water spray dust suppression system and operation in accordance with Condition 18 or proper design, installation, and operation of a fabric collector.

ii. Application of asphalt, water or suitable chemicals on dirt roads, material stockpiles and other surfaces that may give rise to airborne dusts.

iii. Paving and maintenance of plant roadways.

iv. Prompt removal of earth or other material from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosions by water, or other means.

b. Particulate matter emissions from air pollution control devices in excess of 0.04 gr/dscf as specified in 25 Pa. Code § 123.13(c).

c. Visible emissions from air pollution control devices in excess of the following limitations:

i. Equal to or greater than 20% for a period or periods aggregating more than three minutes in any one (1) hour.

ii. Equal to or greater than 60% at any time.

18. **Air Pollution Control Device Specifications**

a. Water Spray Dust Suppression Systems.

Water spray dust suppression systems on portable nonmetallic mineral processing plants shall be operated on any and all occasions that the respective plant is operated. Operation without simultaneous operation of the water spray dust suppression system can take place only in those unusual instances where processed materials contain sufficient moisture so as not to create air contaminant emissions in excess of the limitations and standards of this General Permit. If, however, the water spray dust suppression system is incapable of operation due to weather conditions or any other reason, the permittee may not operate the plant. A pressure gauge will be installed to indicate a normal operation of the dust suppression system.

9. **Term of Permit**

Authority to use this General Permit is granted for a fixed period of five years.

The authority to operate the portable nonmetallic mineral processing plants at one location would be allowed for:

a. No longer than twenty-four (24) months for plants, which are temporarily located at construction sites.

b. A maximum up to (5) years for plants, which are located at sites for which a valid mining permit or an air quality permit exists for the operation of nonmetallic mineral processing plant.

Authority to operate the portable nonmetallic mineral processing plants beyond the stipulated periods in 9a and 9b above at one location would require a new authorization from the Department.

The Department will notify each applicant, in writing, when authority to construct and/or operate under this General Permit is granted.

10. **Permit Fees**

a. This General Permit establishes the following application fees for a new authorization:

One thousand ($1000) dollars.

b. The following additional fees are applicable each time a change in location of the nonmetallic mineral processing plant along with its diesel-fired or nonroad engine(s), which may be used to operate it occurs:

Three hundred seventy five ($375) dollars.

A new plan approval application and fee as indicated in Condition 10.a is required each time the permittee installs or modifies a portable nonmetallic mineral processing plant. The installation or modification of a portable nonmetallic mineral processing plant must be conducted according to the terms and conditions of this General Permit and only after written authorization is received from the Department.

11. **Expiration and Renewal of Authorization**

The permittee's authority to use this General Permit terminates after a fixed term of five years from the date of issuance of the authorization and cannot be renewed for another term.

12. **Change of Location**

In advance of each change in location without any modification of the portable nonmetallic mineral processing plant the permittee shall, in accordance with 25 Pa. Code § 127.641, notify both the Department and the municipality where the operation will take place. The notice to the Department shall require an application and appropriate fees required by Condition 10.b.

13. **Applicable Laws**

Nothing in this General Permit relieves the permittee from its obligation to comply with all applicable Federal, state and local laws and regulations.

14. **Prohibited Use**

Any stationary air contamination source that is subject to the requirements of 25 Pa. Code Chapter 127, Subchapter D (relating to prevention of significant deterioration), 25 Pa. Code Chapter 127, Subchapter E (relating to new source review), or 25 Pa. Code Chapter 127, Subchapter G (relating to Title V operating permits), may not operate under this General Permit. Title V facilities may use this General Permit as a general

21. **Standard for particulate matter**

a. The operation of a portable nonmetallic mineral processing plant shall not cause to be discharged into the atmosphere from any transfer point on belt conveyors or from any other affected facility any stack emissions which:

i. Contain particulate matter in excess of 0.05 g/dscm (0.022 gr/dscf); and

ii. Exhibit greater than 7 percent opacity, unless the stack emissions are discharged from an affected facility using a wet scrubber control device. Facilities using a wet scrubber must comply with the reporting provisions of Condition 23.c., d. and e.

b. On and after the sixtieth (60th) day after achieving the maximum production rate at which the processing plant will be operated, but not later than one hundred and eighty (180) days after initial startup as required under 40 CFR § 60.11, the operation of nonmetallic mineral processing equipment shall not cause to be discharged into the atmosphere from any transfer point on belt conveyors or from any other affected facility any fugitive emissions which exhibit greater than 10 percent opacity, except as provided in Condition 21.c. or d.

c. On and after the sixtieth (60th) day after achieving the maximum production rate at which the processing equipment will be operated, but not later than one hundred and eighty (180) days after initial startup as required under 40 CFR § 60.11, the operation of a nonmetallic mineral processing plant shall not cause to be discharged into the atmosphere from any crusher, at which a capture system is not used, fugitive emissions which exhibit greater than 15 percent opacity.

d. If any transfer point on a conveyor belt or any affected facility is enclosed in a building, then each enclosed affected facility must comply with the emission limits in Paragraphs 21.a. b. and c., or the building enclosing the affected facility or facilities must comply with the following limits:

i. Operation of nonmetallic mineral processing equipment shall not cause to be discharged into the atmosphere from any building enclosing any other affected emissions unit any visible fugitive emissions except from a vent.

ii. Operation of nonmetallic mineral processing equipment shall not cause to be discharged into the atmosphere from any vent of any building enclosing any transfer point on a conveyor belt or any other affected facility emissions which exceed the stack emissions limits in Paragraph 21.a.

e. On and after the sixtieth (60th) day after achieving the maximum production rate at which the processing plant will be operated, but not later than one hundred and eighty (180) days after initial startup as required under 40 CFR § 60.11, the operation of nonmetallic mineral processing equipment shall not cause to be discharged into the atmosphere from any baghouse that controls emissions from only an individual, enclosed storage bin, stack emissions which exhibit greater than 7 percent opacity.

f. The operation of multiple storage bins with combined stack emissions shall comply with the emission limits in paragraph a.i. and a.ii. of this condition.

g. On and after the sixtieth (60th) day after achieving the maximum production rate at which the processing plant will be operated, but not later than one hundred and eighty (180) days after initial startup, the operation of nonmetallic mineral processing equipment shall not cause to be discharged into the atmosphere from:

i. Wet screening operations and subsequent screening operations, bucket elevators, and belt conveyors that process saturated material in the production line up to the next crusher, grinding mill or storage bin.

1. There are no individual readings greater than 10 percent opacity;

2. There are no more than 3 readings of 10 percent for the 1-hour period.

iv. When determining compliance with the fugitive emissions standard for any crusher at which a capture system is not used as described under Condition 21.c., the duration of the Method 9 observations may be reduced from 3 hours (thirty 6-minute averages) to 1 hour (ten 6-minute averages) only if both of the following apply:

1. There are no individual readings greater than 15 percent opacity;

2. There are no more than 3 readings of 15 percent for the 1-hour period.

d. In determining compliance with Condition 21.d., the permittee shall use Method 22 to determine fugitive emissions. The performance test shall be conducted while all affected facilities inside the building are operating. The performance test for each building shall be at least 75 minutes in duration, with each side of the building and the roof being observed for at least 15 minutes.

e. The permittee may use the following as alternatives to the reference methods and procedures specified in Condition 23:

i. For the method and procedures of Paragraph (c) of this condition, if emissions from two or more facilities continuously interfere so that the opacity of fugitive emissions from an individual affected facility cannot be read, either of the following procedures may be used:

1. Use for the combined emission stream the highest fugitive opacity standard applicable to any of the individual affected facilities contributing to the emissions stream.

2. Separate the emissions so that the opacity of emissions from each affected facility can be read.

f. To comply with Condition 24.d., the permittee shall record the measurements as required in Condition 24.c. using the monitoring devices in Condition 22.a. and b. during each particulate matter run and shall determine the averages.

g. If, after thirty (30) days notice for an individual scheduled performance test, there is a delay (due to operational problems, etc.) in conducting any rescheduled performance test required by this condition, the permittee shall submit a notice to the Department and EPA at least 7 days prior to any rescheduled performance test.

h. Initial Method 9 performance tests under 40 CFR § 60.11 and Condition 21. of this General Permit are not required for:

i. Wet screening operations and subsequent screening operations, bucket elevators, and belt conveyors that process saturated material in the production line up to, but not including the next crusher, grinding mill or storage bin.

ii. Screening operations, bucket elevators, and belt conveyors in the production line downstream of wet mining operations, that process saturated materials up to the first crusher, grinding mill, or storage bin in the production line.

i. On and after the sixtieth (60^{th}) day after achieving the maximum production rate at which processing equipment will be operated, but not later than one hundred and eighty (180) days after initial startup the permittee shall conduct the tests required under 40 CFR § 60.11.

24. **Reporting and Recordkeeping**

b. Fabric Collectors

Fabric collectors shall be equipped with pressure drop measuring instrumentation and operated in accordance with manufacturer's specifications. Compressed air sources for fabric collectors shall be equipped and operated with air dryers and oil traps.

c. Scrubbers

Scrubbers shall be equipped with pressure drop and flow measuring instrumentation for water and gas streams and operated in accordance with manufacturer's specifications.

19. **Maintenance**

a. The permittee shall keep on hand a sufficient quantity of spare fabric collector bags for any fabric collector associated with a portable nonmetallic mineral processing plant in order to be able to immediately replace any bags requiring replacement due to deterioration resulting from routine operation of the plant.

b. The permittee shall keep on hand such equipment and materials as are necessary to take reasonable action (including, but not limited to the application of water, oil or chemicals) to prevent fugitive particulate matter resulting from the use of any roadways and/or material stockpiling operations associated with the plant from becoming airborne and shall be used, as necessary, to prevent such fugitive particulate matter from becoming airborne.

c. The storage and handling of any material collected in any air cleaning device associated with the plant shall not at any time result in the emission of fugitive air contaminants in excess of the limitations specified in 25 Pa. Code § 123.1(a).

20. **Portable nonmetallic mineral processing equipment manufactured and commenced construction, reconstruction, or modification on or after August 31, 1983**

Conditions 21 through 25 detail requirements of the federal New Source Performance Standards (40 CFR Part 60, Subpart OOO) and are applicable to all portable nonmetallic mineral processing plant equipment manufactured and commencing construction, reconstruction, or modification on or after August 31, 1983.

ii. Screening operations, bucket elevators, and belt conveyors in the production line downstream of wet mining operations, where such screening operation, bucket elevator, and belt conveyors process saturated materials up to the first crusher, grinding mill, or storage bin in the production line.

22. **Monitoring**

Any permittee which uses a wet scrubber, baghouse or dust suppression system to control emissions shall install, calibrate, maintain and operate the following monitoring devices:

a. A device for the continuous measurement of the pressure loss of the gas stream through the scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±1 inch water gauge pressure and must be calibrated on an annual basis in accordance with manufacturer's instructions.

b. A device for the continuous measurement of the scrubbing liquid flow rate to the wet scrubber. The monitoring device must be certified by the manufacturer to be accurate within ±5 percent of design scrubbing liquid flow rate and must be calibrated on an annual basis in accordance with manufacturer's instructions.

c. A device for measurement of pressure drop across the baghouse. Monitoring must be performed daily to ensure pressure drop is within manufacturer's recommended pressure drop range for normal operations. In cases of deviations, the permittee shall take corrective actions to return the operations of the baghouse to within the recommended operating range. The monitoring device must be calibrated on an annual basis in accordance with manufacturer's instructions.

23. **Test Methods and Procedures**

a. In conducting the performance tests required by 40 CFR §60.8, the permittee shall use as reference methods and procedures the test methods in Appendix A of 40 CFR Part 60 or other methods and procedures as approved by the Department or the Environmental Protection Agency. Acceptable alternative methods and procedures are given in Paragraph (e) of this condition.

b. Compliance with the particulate matter standards in Condition 21.a. shall be conducted as follows:

i. Method 5 or Method 17 shall be used to determine the particulate matter concentration. The sample volume shall be at least 1.70 dscm (60 dscf). For Method 5, if the gas stream being sampled is at ambient temperature, the sampling probe and filter may be operated without heaters. If the gas stream is above ambient temperature, the sampling probe and filter may be operated at a temperature high enough, but no higher than 121 °C (250 °F), to prevent water condensation on the filter.

ii. Method 9 and the procedures in 40 CFR § 60.11 shall be used to determine opacity.

c. In determining compliance with the particulate matter standards in Condition 21.b. and c., the permittee shall use Method 9 and the procedures in 40 CFR § 60.11, with the following additions:

i. The minimum distance between the observer and the emission source shall be 4.57 meters (15 feet).

ii. In determining compliance with the opacity of stack emissions from any baghouse that controls emissions only from an individual enclosed storage bin under Condition 21.e., using Method 9, the duration of the Method 9 observations shall be 1 hour (ten 6-minute averages).

iii. When determining compliance with the fugitive emissions standard described in Condition 21.b., the duration of the Method 9 observations may be reduced from 3 hours (thirty 6-minute averages) to 1 hour (ten 6-minute averages) only if both of the following apply:

g. The semiannual reports required under Paragraph d. and f. shall be postmarked within thirty (30) days following end of the second and fourth calendar quarters.

h. The permittee shall submit written reports of the results of all performance tests conducted to demonstrate compliance with the standards set forth in Condition 21, including reports of opacity observations made using Method 9 to demonstrate compliance with Condition 21.b., c., and e. and reports of observations using Method 22 to demonstrate compliance with Condition 21.d.

i. A permittee who operates any screening operation, bucket elevator, or belt conveyor that processes saturated material and is subject to Condition 21.g. and subsequently processes unsaturated materials, shall submit a report of this change within thirty (30) days following such change. This screening operation, bucket elevator, or belt conveyor is then subject to the 10 percent opacity limit in Condition 21.b. and the emission test requirements of 40 CFR § 60.11.

Likewise, a screening operation, bucket elevator, or belt conveyor that processes unsaturated material but subsequently processes saturated material shall submit a report of this change within thirty (30) days following such change. This screening operation, bucket elevator, or belt conveyor is then subject to the no visible emission limit in Condition 21.g.

j. The notification requirement under 40 CFR § 60.7(a)(2), of the anticipated date of initial startup of portable nonmetallic mineral processing plant equipment shall be waived for a permittee operating under this General Permit.

k. A notification of the actual date of initial startup of each affected facility shall be submitted to the Department and EPA.

i. For a combination of affected facilities in a production line that begin actual initial startup on the same day, a single notification of start may be submitted by the permittee to the Department and EPA. The notification shall be postmarked within fifteen (15) days after such date and shall include a description of each affected facility, equipment manufacturer, and serial number of the equipment, if available.

ii. The notification of the actual date of initial startup shall include both the home office and the current address or location of the portable plant.

25. **Additional Requirement**

Pursuant to the federal New Source Performance Standards under 40 CFR § 60.4, the permittee shall submit copies of all requests, reports, applications, submittals, and other communications to both EPA and the appropriate Regional Office of the Department. Copies of all the documents shall be submitted to:

Air Enforcement Branch, Mail Code 3AP12
U.S. EPA, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Approved by: _____

Joyce E. Epps
Director
Bureau of Air Quality

Date approved: March 6, 2006

a. This General Permit allows the replacement of existing nonmetallic mineral processing plant equipment with equipment of equal or smaller size and having the same function as defined in 40 CFR § 60.671. Each permittee shall submit the following information about the existing unit being replaced and the replacement piece of equipment.

i. For a crusher, grinding mill, bucket elevator, bagging operation or enclosed truck or railcar loading station:

1. The rated capacity in tons per hour of the existing equipment being replaced; and

2. The rated capacity in tons per hour of the replacement equipment.

ii. For a screening operation:

1. The total surface area of the top screen of the existing screening operation being replaced; and

2. The total surface area of the top screen of the replacement screening operation.

iii. For a conveyor belt:

1. The width of the existing belt being replaced; and

2. The width of the replacement conveyor belt.

iv. For a storage bin:

1. The rated capacity in tons of the existing storage bin being replaced; and

2. The rated capacity in tons of replacement storage bins.

b. Each permittee shall also submit the following data to the Director of the Emissions Standards and Engineering Division (MD-13), U.S. Environmental Protection Agency (EPA), Research Triangle Park, NC, 27711.

i. The information described in Condition 24.a.;

ii. A description of the control device used to reduce particulate matter emissions from the existing facility and a list of all other pieces of equipment controlled by the same control device; and

iii. The estimated age of the existing facility.

c. During the initial performance test of a wet scrubber, and daily thereafter, the permittee shall record the measurements of both the change in pressure of the gas stream across the scrubber and the scrubbing liquid flow rate.

d. After the initial performance test of a wet scrubber, the permittee shall submit semiannual reports of such occurrences when the measurements of the scrubber pressure low (or gain) and liquid flow rate differ by more than ±30 percent from the averaged determined during the most recent performance test.

e. The permittee shall record the measurements of pressure drop for the gas stream across the baghouse daily.

f. The permittee shall submit semiannual reports of such occurrences when the measurements of the pressure drop for the gas stream across the baghouse deviate from manufacturer's suggested operating range.

Hanson Aggregates Pennsylvania LLC
Rock Hill Quarry – Permit Update
February 2018

BONDING INCREMENT APPLICATION

EarthRes
ENGINEERING AND SCIENCE

5600-FM-BMP0304 Rev. 10/2012

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF MINING PROGRAMS

BONDING INCREMENT APPLICATION AND AUTHORIZATION TO CONDUCT NONCOAL MINING ACTIVITIES

DEP Use Only
No.
Bond No.
Filing Fee
Amount
Date Received

Instructions

No portion of the permit area shall be affected by noncoal mining activities unless the operator has provided a bond to the Department and the Department has approved the bond and issued a written authorization to affect such area.

Submit the original of this application and two copies. The affidavit (Part F) must be properly signed and executed.

Include proper bond endorsement documents for the type of bond being used.

Part A GENERAL

Applicant: Hanson Aggregates Pennsylvania LLC
Address: 7660 Imperial Way
Allentown, PA 18195
Telephone: (610) 366-4819

Mine Drainage Permit No or
Surface Mining Permit No. 7974SM1
Operation Name Rock Hill Quarry
Municipality East Rockhill Township
County Bucks

Name of Landowner	Municipality	County	Acres to be Affected
Hanson Aggregates Pennsylvania LLC f.k.a Milestone Materials	East Rockhill Township	Bucks	109.8

Part B Consent of Landowner Form (check applicable)

☐ The Consent of Landowner Form is attached and it has been recorded with the Recorder of Deeds.

☒ The Consent of Landowner Form was filed with Bonding Increment and Mining Authorization No. _____ and it has been recorded with the Recorder of Deeds.

☐ Not filing Consent of Landowner Form because lease was in existence prior to January 1, 1972. Operator must provide 1) a true and correct copy of the lease; 2) execute a Consent of Landowner Form as Lessee; and 3) provide a Chain of Title for the Lease. The lease, Consent of Landowner Form, and Chain of Title have been recorded with the Recorder of Deeds.

Part C Map

Attach a copy of Exhibit 9. Operations Map indicating each area where mining authorization has been granted, and the area where this bonding increment approval and mining authorization is being requested. **See attached Bonding Map.**

Part D Additional Information

1. Are you revising your erosion and sediment control plan? ☒ Yes ☐ No

   If yes, briefly describe the revisions and complete the appropriate modules and submit with this application

   Refer to Module 12 submitted with this Application for more information regarding the E&S Plan.

2. Briefly describe any proposed revisions to the surface mining permit. Include application modules and plans for the revision and professional certification where appropriate. If the revisions are subject to public notice or a stream or road variance is being requested, the proof of publication must be submitted to the Department prior to any mining authorization being granted. **Permit Modules are being updated per the request of the Department.**

3. Are you modifying your approved blasting plan for this bonding increment? ☒ Yes ☐ No
   If yes, submit blasting plan with this request (use Module 16: Blasting Plan).

   See attached Module 16.

Part E Bonding

Type of Bond ☒ Surety ☐ Collateral ☐ PILB Other (Specify) _____

Bond Amount

1. Bonding Calculations – Consolidated Noncoal

   Is the Bond Calculation Summary (5600-FM-MR0474) for consolidated Noncoal mining operations attached?

   ☒ Yes ☐ No

2. Bonding Calculations – Unconsolidated Noncoal (sand & gravel, unconsolidated shale, clay, etc.)

   Is the Bond Calculation Summary (5600-FM-MR0473) for unconsolidated noncoal mining operations attached? ☐ Yes ☒ No

3. Bond calculation is not applicable with this submittal. ☐ Date of current bond calculation _____.

Part F Application Fee

There is a fee required under 25 PA Code Chapter 77.106 for each bonding increment application. The fee is $450. Is the fee being submitted with the application? ☒ Yes ☐ No

Part G Affidavit

Commonwealth of Pennsylvania, County of LEHIGH

I, Mark E. Kendrick being duly sworn, according to law, depose and say that I (~~am the applicant~~) (am an officer or official of the applicant) (have the authority to make this application) and that the plans, reports and documents submitted as part of the application are true and correct to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (cross out inapplicable portions in parenthesis)

Sworn and Subscribed to Before Me This

19TH Day of FEBRUARY (month) 2018 (year)

Kimberly A Olesak
Notary Public

Vice President
Title and Seal

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
Kimberly A. Olesak, Notary Public
Upper Macungie Twp, Lehigh County
My commission expires April 15, 2019

Mark E Kendrick
Signature of Applicant or Responsible Official

Mark E. Kendrick
Name (Typed)

7660 Imperial Way, Allentown, PA 18195
Address

5600-FM-BMP0474 12/2013

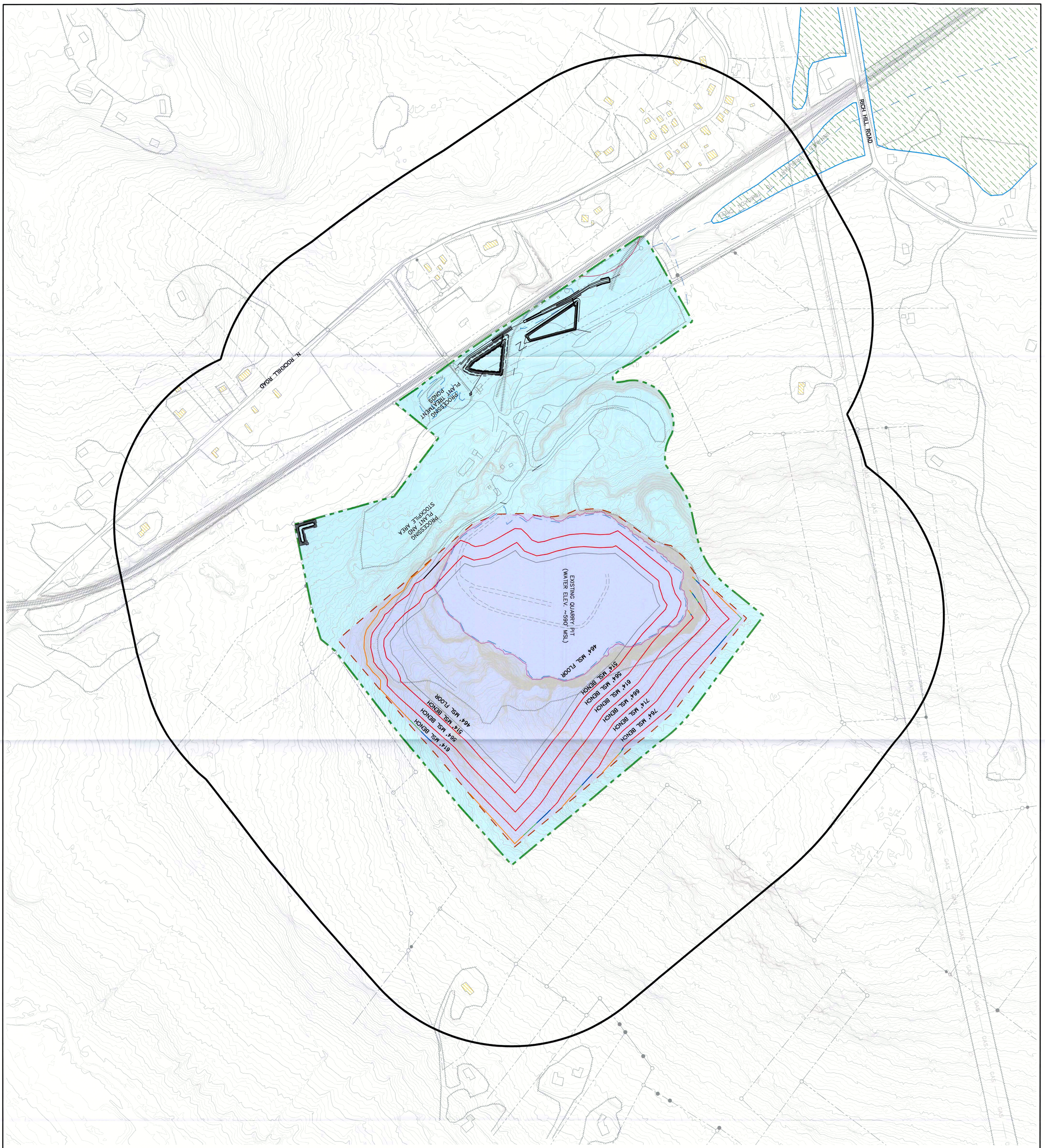
pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF MINING PROGRAMS

BOND CALCULATION SUMMARY-NONCOAL CONSOLIDATED

Permittee: **Hanson Aggregates Pennsylvania LLC**		Date: **February 2018**
Permit #: **7974SM1**	Mine Name: **Rock Hill Quarry**	
Municipality: **East Rockhill Township**		County: **Bucks**

Operation (see attached calculations)	Quantity	Units	Rate $/Unit	Bond Amount
Mining Area (i.e. minor grading/vegetation)	55.0	Acres	$3,500	$192,500
Support Area (revegetation)	54.8	Acres	$1,900	$104,120
Spoil Storage/Earthmoving		Cubic yards		
Highwall Blasting				
Up to 20 ft Height	2,051	Linear foot	$10.00	$20,510
>20 up to 30 Height	490	Linear foot	$20.00	$9,800
>30 up to 40 Height	506	Linear foot	$40.00	$20,240
>40 up to 50 Height	15,310	Linear foot	$55.00	$842,050
>50 Height		Linear foot		
Mine Sealing		Calculation		
Ponds	5	No of Ponds	$3,800	$19,000
Demolition of Structures	Lump Sum	Calculation		
Large Tires		Each		
Other Costs				
Mobilization/Demobilization	Lump Sum	Calculation		$40,000
Total Reclamation Cost				$1,248,220



NORTH

LEGEND

- EXISTING GRADE CONTOUR (2' INTERVAL)
- EXISTING SMP BOUNDARY
- LIMIT OF MINING
- 1,000' SMP OFFSET
- PRE-ACT HIGHWALL
- 300' BUILDING SETBACK
- PROPERTY BOUNDARY
- EXISTING SURFACE WATER
- EXISTING RAILROAD
- EXISTING TREELINE
- EXISTING GAS PIPELINE
- EXISTING BUILDING - RESIDENTIAL
- NWI WETLANDS
- BONDED MINING AREA (55.0 AC)
- BONDED SUPPORT AREA (54.8 AC)

BONDED HIGHWALL HEIGHTS

HEIGHT	LENGTH (LINEAR FEET)
>40' UP TO 50'	15,310
>30' UP TO 40'	506
>20' UP TO 30'	490
UP TO 20'	2,051

NOTES:

1. EXISTING GRADE TOPOGRAPHY COMPILED BY PAMAP PROGRAM, PA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY, DATED JUNE 2010.
2. TOPOGRAPHY AND SITE FEATURES IN WESTERN PERMIT AREA WERE SURVEYED BY EARTHRES GROUP, INC. PERSONNEL, JANUARY 2017.
3. BASEMAP FEATURES INCLUDING BUILDINGS, ROADS, UTILITIES, WATER FEATURES, AND TREELINES RETRACED FROM AERIAL PHOTOGRAPHY DATED 2015, PUBLISHED BY THE DELAWARE VALLEY REGIONAL PLANNING COMMISSION.
4. EXISTING PERMIT INFORMATION INCLUDING PERMIT BOUNDARY, MINING LIMIT, DEPTH OF MINING, AND PRE-ACT HIGHWALLS ARE REFERENCED TO THE PERMIT DRAWING "MINING PLAN, SHEET 3 OF 6" PREPARED BY SKELLY AND LOY, DATED MARCH 18, 1980.
5. HANSON PROPERTY BOUNDARY PROVIDED BY MAP TITLED "PLAT OF SURVEY OF LANDS OF GENERAL CRUSHED STONE", PREPARED BY ORANGEVILLE SURVEYING CONSULTANTS, INC., DATED MAY 7, 2001.
6. ADJACENT PARCEL BOUNDARIES ARE REFERENCED TO THE BUCKS COUNTY GIS RECORDS.
7. WETLANDS REFLECT THOSE DEPICTED IN THE NATIONAL WETLANDS INVENTORY FWS WETLANDS MAPPER.
8. PROPERTY OWNERSHIP INFORMATION IS REFERENCED TO MODULE 5 OF THE PERMIT APPLICATION.
9. STREAM INFORMATION IS REFERENCED TO THE PA DEP eMAPPA ONLINE RECORDS.
9. REFER TO THE E&S PLAN DRAWINGS FOR LOCATION OF ALL EROSION AND SEDIMENTATION CONTROL STRUCTURES.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)

1 inch = 200 ft.

DRAWN BY: JTK	CHECKED BY: MDF
DATE: 02/20/18	PROJECT NO: 061003.052
DRAWING NUMBER: R-002	
SHEET 1 OF 1	

BONDING MAP

HANSON AGGREGATES PENNSYLVANIA LLC
ROCK HILL QUARRY

PREPARED BY:
EarthRes ENGINEERING AND SCIENCE
6912 Old Easton Road
Pipersville, PA 18947 USA
8000 Combs Farm Drive
Morgantown, WV 26508
www.earthres.com
PA office 215.766.1211
WV office 304.212.6866
toll free 800.264.4553

PREPARED FOR:
Hanson HEIDELBERGCEMENT Group

PROJECT SITE:
HANSON AGGREGATES PENNSYLVANIA LLC
SMP NO. 7974SM1
EAST ROCKHILL TOWNSHIP, BUCKS COUNTY
PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL MICHAEL D. FLING ENGINEER PE080620

MICHAEL D. FLING, P.E.
LICENSE NO. PE080620

NO.	DATE	BY	REVISIONS