Erosion & Sediment Pollution Control Plan Narrative & Calculations

Project: Proposed Development
Allentown Pike (S.R. 222)
Maidencreek Township
Berks County, PA

Project Number: PP213222

Client: Maiden Creek Associates, L.P.
120 W. Germantown Pike, Suite 120
Plymouth Meeting, PA 19462

Date: June 30th, 2023

Professional Engineer: Cornelius Brown
PA License #PE075317

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EROSION & SEDIMENT POLLUTION CONTROL NARRATIVE

GENERAL PROJECT DESCRIPTION

Maiden Creek Associates, L.P. proposes to build an approximately +/- 930,000 SF warehouse building on the property with two (2) driveway connections to Allentown Pike (S.R. 222). Additional improvements along Allentown Pike to support the development are also proposed. The development also includes the installation of utilities, landscaping and stormwater management controls necessary to support the development. The limit of disturbance for the development is approximately 83.70 acres. Pertinent data characterizing the existing and future site conditions are shown on the accompanying Land Development Plans, prepared by Bohler Engineering PA, LLC.

GENERAL CONSERVATION PROGRAM

The accompanying program is proposed to prevent accelerated erosion of the site soils and subsequent sedimentation of existing streams and wetlands in compliance with 25 Pennsylvania Code Chapter 102 "Erosion and Sediment Control", Pennsylvania Department of Environmental Protection (PADEP), rules and regulations. The conservation program was developed in accordance with the applicable ordinances of Maidencreek Township and the requirements of the Berks County Conservation District. The project, as described herein, is presented on the accompanying Land Development.

The program provides for on-site retention of soils produced during the construction period. The proposed development is sequenced to minimize the extent of grading where possible and to minimize the changes to existing drainage patterns. The extent of cuts/fills is indicated by comparison of the existing and proposed ground surfaces shown on the Erosion and Sedimentation Control Plan.

It is specified that construction be sequenced to minimize the time of exposure of any denuded soil surfaces, and direct runoff from the construction areas to compost filter sock and/or inlet protection. The control structures are to be installed as shown on the Erosion and Sediment Pollution Control Plan prior to land disturbance and in the order specified in the Sequence of Construction.

In addition, the site surfaces will be protected from accelerated soil erosion by the installation of pavements, buildings, and either turf grasses or mulch in all disturbed vegetated areas. Grass slopes will typically be graded to preserve trees and to prevent uncontrolled concentrated runoff patterns down the slope.

Bohler Engineering PA, LLC trusts this Conservation Program is in compliance with the intent of the Clean Streams Act, Pennsylvania Department of the Environmental Protection rules and regulations, and the provisions set forth in the previously referenced Chapter 102.

The E&S Plan is separate from the PCSM Plan and is labeled "Soil Erosion and Sediment Control Plan" and is the final plan for construction.

The overall property is within the tributary area of Peters Creek, which is an Exceptional Value (EV) stream that discharges to Maiden Creek, a designated Warm Water Fishery (WWF).

Documentation has been provided that E&S Plan was prepared by a person trained and experienced in E&S design methods and techniques applicable to the size and scope of the project.

The E&S Plan meets the standard design criteria from the 25 Pa. Code Chapter 102.8(g)(2) and (3).

EARTHWORK ACTIVITY IMPLEMENTATION

The following measures are taken to minimize the extent and duration of earth disturbance:

- Access the construction areas through designated construction entrance. During phase #1, the contractor shall use the designated paths of travel on the E&S plans to access the sediment basin areas to limit disturbance in the initial stages of the project. A formal access road shall not be required for this project.
- Protect existing trees with tree protection fencing.
- Protect existing inlets with inlet protection.
- Sequence construction activities by limiting disturbances to a specific task such that each task is completed before the next task is initiated.
- Stabilization measures shall be implemented immediately.

The following measures are taken to maximize protection of existing drainage features and vegetation:

- Access the site through designated construction entrance. During phase #1, the contractor shall use the designated paths of travel on the E&S plans to access the sediment basin areas to limit disturbance in the initial stages of the project. A formal access road shall not be required for this project.
- Protect existing trees with tree protection fencing.
- Protect existing inlets with inlet protection.

The following measures are taken to minimize soil compaction:

- Access the construction areas through designated construction entrance During phase #1, the contractor shall use the designated paths of travel on the E&S plans to access the sediment basin areas to limit disturbance in the initial stages of the project. A formal access road shall not be required for this project.
- Use of treaded machinery where practical during earthmoving operations
- Grade site to minimize extent of cuts/fills

The following measures are taken to prevent or minimize generation of increased storm water runoff:

- Direct runoff to proposed temporary sediment traps to reduce runoff rates and volume.
- Diversion berms, stone construction staging areas, and inlets/piping shall be required as directed by the Township so as to ensure acceptable conditions during the construction phase.

SITE DESCRIPTION

Within the past 5 years the site has been vacant cultivated farm field.

Soils & Geology

The following is a list of soils that are present on the site per the NRCS's Soil Survey of Berks County as indicated on the attached Soils Map:

Soil Type	Soil Description	HSG
DfC	Duffield-Ryder silt loams, 8 to 15 percent slopes	B
DbA	Duffield silt loam, 0 to 3 percent slopes	B
UmB	Urban land-Duffield complex, 0 to 8 percent slopes	N/A

EROSION & SEDIMENT POLLUTION CONTROL MEASURES

Temporary best management practices (BMPs) to be used during the construction phase include stabilized rock construction entrances, inlet protection, compost filter sock, concrete washout areas, temporary rise and embankment sediment traps, construction fence, tree protection fence, and temporary topsoil stockpiles.

The proposed volume and peak rates of stormwater discharging to the flow path will avoid, minimize, and help mitigate accelerated erosion or sedimentation for storm events up to and including the 10-year/24-hour storm. The peak rates have been reduced to meet the requirements of the Maidencreek Township Stormwater ordinance and the Berks County Conservation District. The calculations have been included as a supplement to this narrative.

GEOLOGIC FORMATIONS OR SOIL CONDITIONS THAT MAY HAVE THE POTENTIAL TO CAUSE POLLUTION

Geologic formations are not anticipated to be encountered during construction activities. If during construction geologic formations are encountered the contractor is to contact the owner, the design professional, Berks County Conservation District, and the PADEP for proper handling.

BEST MANAGEMENT PRACTICES (BMP)

The following are a summary of BMPs that will be utilized during and/or proceeding construction of this site.

1. **Alternative Rock Construction Entrances / Dust Control with a Wash Rack**– Construction traffic must enter and exit the construction areas at the stabilized construction entrance. The purpose is to trap dust and mud that would otherwise be carried off-site by construction traffic.

   Water trucks will be used as needed during construction to reduce dust generated on the site. Dust control must be provided by the Contractor to a degree that is acceptable to the Berks County Conservation District. After construction, the site will be stabilized (as described elsewhere), which will reduce the potential for dust generation.

2. **Solid Waste Disposal** – No solid materials, including building materials, are allowed to be discharged from the site with storm water. All solid waste, including disposable materials incidental to the major construction activities, must be collected and placed in containers. The containers will be emptied as necessary by a contract trash disposal service and hauled away from the site and disposed of at a permitted facility.

3. **Sanitary Facilities** – All personnel involved with construction activities must comply with state and local sanitary or septic system regulations. Temporary sanitary facilities will be provided at the site throughout the construction phase. They must be utilized by all construction personnel and will be serviced by a licensed commercial operator.

4. **Water Source** – Non-storm water components of site discharge must be clean water. Water used for construction which discharges from the site must originate from a public water supply or private well approved by the State Health Department. Water used for construction that does not originate from an approved public supply must not discharge from the site.

5. **Typical Compost Sock Concrete Washout** – Discharge of excess or waste concrete and/or wash water from concrete trucks will be allowed on the construction site, but only in specifically designated diked areas prepared to prevent contact between the concrete and/or wash water and storm water that will be discharged from the site.

6. **Fuel Tanks** – Temporary on-site fuel tanks for construction vehicles shall meet all state and federal

regulations. Tanks shall have approved spill containment with the capacity required by the applicable regulations.

7. **Long-Term Pollutant Controls** – Storm water pollutant control measures installed during construction that will also provide benefits after construction, include two (2) subsurface infiltration beds and permanent grass and pavement cover.

8. **Compost Filter Sock** – Filter Socks allow water to flow through at a controlled rate while trapping sediment. This is accomplished by a fabric filled with organic material. The design of the sock provides intimate contact with the ground preventing water from flowing underneath.

9. **Temporary Soil Stockpile Area –** There will be a designated topsoil stockpile area located on the property. The location shall be as shown on the E&S site plans and all topsoil and excess cut material from the site shall be stockpiled there. The stockpile will be surrounded with a minimum 12" filter sock to prevent sediment-laden runoff.

CONSTRUCTION INSPECTION AND MAINTENANCE PROGRAM

Until the site is stabilized, all erosion and sediment control BMPs must be maintained properly. Maintenance must include inspections of all erosion and sediment control BMPs after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including cleanout, repair, replacement, re-grading, reseeding, re-mulching and re-netting must be performed immediately. If erosion and sediment control BMPs fail to perform as expected, replacement BMPs or modifications of those installed will be required. Any areas disturbed during maintenance must be stabilized immediately in accordance with the general conservation notes and specifications. All site inspections must be documented in an inspection log kept for this purpose indicating the compliance actions and the date, time and name of the person conducting the inspection. The inspection log must be kept on site at all times and made available to the District upon request. All E&S controls shall be maintained in good working order (cleaned, repaired, etc.) until all disturbed tributary areas are stabilized. All temporary E&S controls will remain in place until a uniform 70% perennial vegetative cover is established. Once construction is complete, the Owner shall be responsible for maintenance of all permanent facilities.

1. **Alternative Rock Construction Entrance with a Wash Rack**– Locations where vehicles enter and exit the construction area must be inspected for evidence of off-site sediment tracking. A stabilized construction entrance shall be constructed where vehicles enter and exit. Exits shall be maintained or supplemented as necessary to prevent the release of sediment from vehicles leaving the site. Any sediment deposited on the roadway shall be swept as necessary throughout the day or at the end of every day and disposed of in an appropriate manner. Sediment shall not be washed into storm sewer systems. Sediment tracked onto any roadway or sidewalk shall be returned to the construction site by the end of each workday and disposed as a manner described in this plan. In no case shall the sediment be washed, shoveled or swept into any road side ditch, storm sewer or surface water.

2. **Typical Compost Sock Concrete Washout** – Washouts shall be cleaned out when accumulated materials take up two-thirds of the available storage capacity. Damaged or leaking washouts should be deactivated and repaired/replaced immediately. Materials shall be disposed of in a PADEP-approved facility. Make any repairs to the containment facility as needed.

3. **Compost Filter Socks** – Inspections shall be conducted on a weekly basis and/or after each runoff event. Needed repairs should be initiated immediately after the inspection. Sediment must be removed when accumulations reach ½ the above ground height of the sock. The sediment shall be disposed of on site and/or in accordance with applicable local, state and federal regulations. If the sock has been damaged, it shall be repaired, or replaced if beyond repair. The filter media will be dispersed on site once the disturbed area has been permanently stabilized. Adhere to all manufacturers' recommendations. If failure occurs, pyramiding of the socks is recommended.

4. **Alternate Stone Inlet Protection** – Sediment shall be removed when it reaches half the height of the stone. Damaged or clogged installations shall be repaired or replaced immediately.

5. **Embankment/Riser Sediment Trap** - during construction, sediment laden runoff shall be kept from reaching the MRC underground detention basins. Upstream inlets shall be blocked to prevent sediment laden runoff from entering the MRC aboveground detention basins. MRC aboveground detention basins shall be inspected for litter and sediment accumulation on an annual basis or as directed by the township engineer. Needed maintenance should be initiated immediately after the inspection. The litter and sediment must be removed to restore design capacities. The litter and sediment shall be disposed of in an approved manner and in accordance with applicable local, state and federal regulations. Any areas disturbed during maintenance must be stabilized immediately in accordance with the general conservation notes and specifications.

6. **General E&S BMP's:** Facilities shall be inspected for litter and sediment accumulation on an annual basis or as directed by the Township Engineer. Needed maintenance should be initiated immediately after the inspection. The litter and sediment must be removed to restore design capacities. The litter and sediment shall be disposed of in an approved manner and in accordance with applicable local, state and federal regulations. Any areas disturbed during maintenance must be stabilized immediately in accordance with the general conservation notes and specifications.

    - Sediment barriers must be inspected and they must be cleaned out when their original capacity has been reduced by 50 percent. All material excavated from behind sediment barriers shall be incorporated into on-site soils or spread out on an upland portion of the site and stabilized. Additional sediment barriers must be constructed as needed.

    - Inspections shall evaluate disturbed areas and areas used for storing materials that are exposed to rainfall for evidence of, or the potential for, pollutants entering the drainage system or discharging from the site. If necessary, the materials must be covered or original covers must be repaired or supplemented. Also, protective berms must be constructed, if needed, in order to contain runoff from material storage areas.

    - Grassed areas shall be inspected to confirm that a healthy stand of grass is maintained. The site has achieved final stabilization once all areas are covered with building foundation or pavement, or have a stand of grass with at least 70 percent density or greater in accordance with permit requirements. The vegetative density must be maintained to be considered stabilized. Areas must be watered, fertilized, and reseeded as needed to achieve this requirement.

    - All slopes and discharge points must be inspected to determine whether erosion and sediment control measures are effective in preventing discharge of sediment from the site or impacts to receiving waters.

    - The contractor is responsible for all maintenance and inspections, and shall maintain records of all inspections. Inspections should be logged on PADEP form 3150-FM-BWEW0083, dated 2/2012 or as updated, and kept onsite at all times. These logs showing the dates that E&S BMPs were inspected as well as any deficiencies found and the date that they were corrected shall be maintained on the site and be made available to the County Conservation District or other regulatory agency officials at the time of inspection.

GENERAL NOTES

1. This plan represents the minimum level of implementation of temporary erosion and sedimentation control structures. Additional facilities or measures shall be installed where necessary or where directed by either the Township or County Conservation District as construction progresses.

2. The Owner/Construction Manager is responsible for all temporary and permanent erosion and sediment controls and site stabilization. The owner shall assign one individual to be responsible for proper installation and maintenance of all facilities and measures.

3. Protection of the existing trees and shrubs shall be taken by the Contractor to eliminate unnecessary damage.

4. Any dry fill hauled offsite must be taken to a location with an erosion and sedimentation control plan which has been reviewed by the county conservation district for adequacy.

5. Erosion and sedimentation control must be constructed, stabilized, and functional before site disturbance within tributary areas of those controls.

6. Stockpiles must be stabilized immediately.

7. No changes shall be made in the contour of the plan. No grading, excavation, removal or destruction of the top soil, trees or other vegetative cover of the land shall be commenced within a proposed subdivision or land development tract until such time that a plan for sedimentation control and minimizing erosion has been reviewed and found satisfactory by the County Conservation District.

8. Before initiating any revisions to the approved erosion and sediment control plan or revisions to other plans which may affect the effectiveness of the approved E&S control plan, the operator must receive approval of the revisions from the County Conservation District.

9. The operator shall assure that an erosion and sediment control plan has been prepared, approved by the County Conservation District, and is being implemented and maintained for all soil and/or rock spoil and borrow areas, regardless of their locations.

10. Contractor shall use treaded machinery and minimize soil compaction where ever possible.

11. The E&S Plan has been designed to:
    a. Minimize extent & duration of earth disturbance
    b. Maximize protection of existing drainage features and vegetation
    c. Minimize soil compaction
    d. Utilize other measures or controls that prevent or minimize generation of increase stormwater runoff.

12. The landscaping on-site will utilize the process of evapotranspiration within the dense vegetation planted on-site to help cool down the surface water before discharging downstream. Also, thermal impacts will be minimized through the use of a subsurface detention bed and a managed release control rain garden. The subsurface detention bed outlet structure will lengthen detention times and discharge to underground piping, where the runoff will be cooled prior to discharge downstream.

13. There are no known geologic/soil condition issues that have the potential to cause pollution.

14. Due to the reduction in stormwater runoff volume and rate, as well as the implementation of the erosion and sediment control measures listed above, it is our opinion that there will be minimal impact to downstream watercourses.

STANDARD E&S WORKSHEET # 22
PLAN PREPARER RECORD OF TRAINING AND EXPERIENCE IN EROSION AND SEDIMENT POLLUTION CONTROL METHODS AND TECHNIQUES

NAME OF PLAN PREPARER: Cornelius Brown, P.E.

FORMAL EDUCATION:

Name of College or Technical Institute: University of Maryland

Curriculum or Program: Civil Engineering

Dates of Attendance: **From:** September 1995 **To:** August 2000

Degree Received: B.S. in Civil Engineering

OTHER TRAINING:

Name of Training: NPDES

Presented By: PA DEP/Villanova University

Date: 2004

EMPLOYMENT HISTORY:

Current Employer: Bohler Engineering, PA LLC

Telephone: (267) 402-3400

Former Employer:

Telephone:

RECENT E&S PLANS PREPARED:

Name of Project:	Cheltenham Square Mall	Springfield Mall	Valley Forge
County:	Montgomery	Delaware	Montgomery
Municipality:	Cheltenham Township	Springfield Township	West Norriton
Permit Number:	PAG2004607194	PAG2002308008	PAG2004605169-1
Approving Agency:	MCCD	DCCD	MCCD

Map Scale: 1:11,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

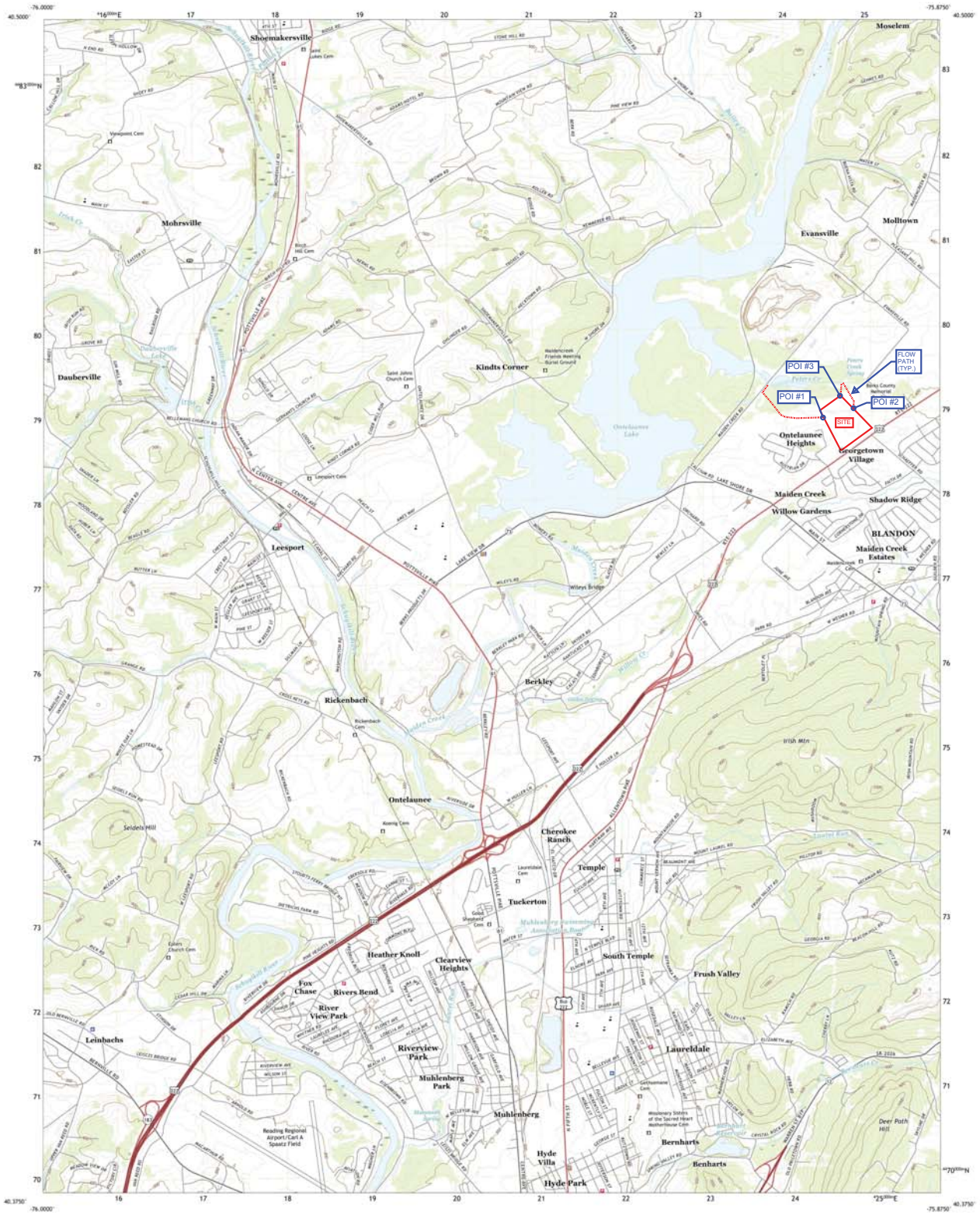
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

USGS science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

TEMPLE QUADRANGLE
PENNSYLVANIA - BERKS COUNTY
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid:Universal Transverse Mercator, Zone 18T
This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery ..... NAIP, June 2017 - December 2017
Roads ..... U.S. Census Bureau, 2016
Names ..... GNIS, 1979 - 2019
Hydrography ..... National Hydrography Dataset, 2001 - 2018
Contours ..... National Elevation Dataset, 2011
Boundaries ..... Multiple sources; see metadata file 2017 - 2018
Wetlands ..... FWS National Wetlands Inventory 1981 - 1983

UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011. A metadata file associated with this product is draft version 0.6.18

QUADRANGLE LOCATION

ADJOINING QUADRANGLES
1 Auburn
2 Hamburg
3 Kutztown
4 Bernville
5 Fleetwood
6 Sinking Spring
7 Reading
8 Birdsboro

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

TEMPLE, PA
2019

EROSION AND SEDIMENT CONTROL DESIGN CALCULATIONS

Sediment Basin Capacity Requirements

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-A**

Basin Number	**Sediment Basin SB-A**
Permanent or Temporary Basin - (*P or T*)	**Perm.**
Special Protection Watershed - (*Yes or No*)	**Yes**
Karst Soils - (Yes or No)	**Yes**
A - Maximum Total Drainage Area - (Ac)	**15.44**
Is drainage Area (A) More than 10% Larger than the Preconstruction Condition? - (*Yes or No*)	**No**
A_1 - Disturbed Acres in drainage area - (AC)	**15.44**
I - Initial Required Dewatering Zone (5000 x A) - (cf)	**77,200**
T - Reduction for Top Dewatering (-700 x A) - (cf)	**0**
P - Reduction for Permanent Pool (-700 x A) - (cf)	**0**
L - Reduction for 4:1 Flow Ratio (-350 x A) - (cf)	**0**
D - Reduction for 4-7 Day Dewatering (-350 x A) - (cf)	**0**
Sv - Required Dewatering Zone [I - (T + P + L + D)] - (cf)[1]	**77,200**
Sd - Required Sediment Storage Volume (1000 x A_1) - (cf)	**15,440**
St - Total Required Storage Volume (Sv + Sd) - (cf)	**92,640**
Total Storage Volume Provided (@ Elev 3) - (cf)[2]	**238,740**
Dewatering Time for Dewatering Zone - (days)	**4 Days**
Required Discharge Capacity (25-Yr/24hr Storm)[3]	**97.97**
Principal Spillway Type	**SKIMMER**
Peak Flow from 10yr/24hr Storm for Drainage Area (A) - (cfs)	**73.37**
Principal Spillway Capacity (@ Elev 5) - (cfs)[4]	**93.12**
Emergency Spillway Capacity (@ Elev 5) - (cfs)[4]	**4.85**
Total Basin Discharge Capacity (@ Elev 5) - (cfs)	**97.97**
Emergency Spillway Protective Lining[5]	**NAG SC150**
Outlet to a Surface Water - (*Yes or No*)	**No**
Peak Flow from a 25yr/24hr Storm for Drainage Area (A) - (cfs)	**97.97**

(1) The minimim dewatering zone capacity for sediment basins is (3,600 x A). No reduction is permitted in Special Protection (HQ and EV) Watersheds.

(2) Total Storage Volumed provided at riser crest.

(3) Or provide calcualtions to show peak flow from 25yr/24hr storm for area (A) is routed through the basin

(4) Provide supporting computations

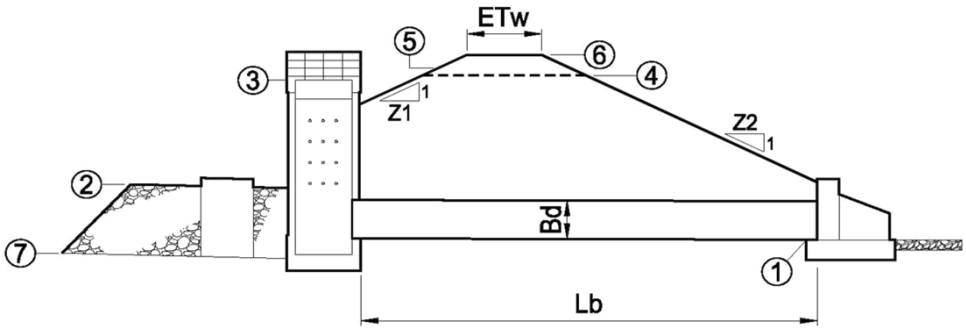
(5) If grass lining is proposed, spillways should be constructed in original ground unless a suitable TRM lining is used. Wherever a TRM is used, riprap should be placed at the bottom of the embankment to prevent scour.

(6) if NO, and basin is permanent or drainage area is more than 10% larger than preconstruction, provide supporting calculations to show accelerated erosion will not result from the proposed discharge. For discharges increasing volume or rate flow onto a neighboring property prior to entering a surface water, an easement should be obtained prior to plan submittal.

Sediment Basin Dimensions and Elevations

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-A**



Basin Number	Sediment Basin SB-A
1 - Discharge Pipe Elevation - (ft)	323.50
2 - Sediment Storage Elevation (@ Sd) *(minimum 1.0' above elevation 7)* - (ft)	331.00
3 - Elevation at Top of Settling Volume (St) *(crest of principal spillway)* - (ft)	334.00
4 - Emergency Spillway Crest Elevation *(min. 0.5' above elevation 3)* - (ft)	336.00
5 - 2 cfs/acre or 25yr/24hr Flow Elevation - (ft)	336.11
6 - Top of Embankment Elevation *(min. 24" above elevation 5 OR 12" with routed 100yr/24hr storm)* - (ft)	338.00
7 - Bottom Elevation - (ft)	330.00
Average Bottom Width - (ft)	86
Average Bottom Length - (ft)	595
SA_{min} - Required Surface Area at Elevation 2 - (sf)	1,860
Surface Area Provided at Elevation 2 - (sf)	55,440
W - Average Basin Width at Elevation 3 - (ft)	111
L - Flow Length at Elevation 3 - (ft)	450
L/W - Flow Length:Width Ratio at Elevation 3	4.07
Silt Curtain or Forebay (*if yes, indicate which*)	Neither
ETw - Embankment Top Width - (ft) *(8' min.)*	8.00
Embankment Soil Type(s)	SC
Key Trench Depth *(2' min.)* - (ft)	2.00
Key Trench Width *(4' min)* - (ft)	4.00
TRd - Riser Diameter/Type *(15" min.)* - (in)	-
Bd - Barrel Diameter/Type *(12" min.)* - (in)	-
Lb - Barrel Length - (ft)	97
Emergency Spillway Width - (ft)	50
Emergency Spillway Side Slopes (H:V)	3:1
Emergency Spillway Depth - (ft)	2.00

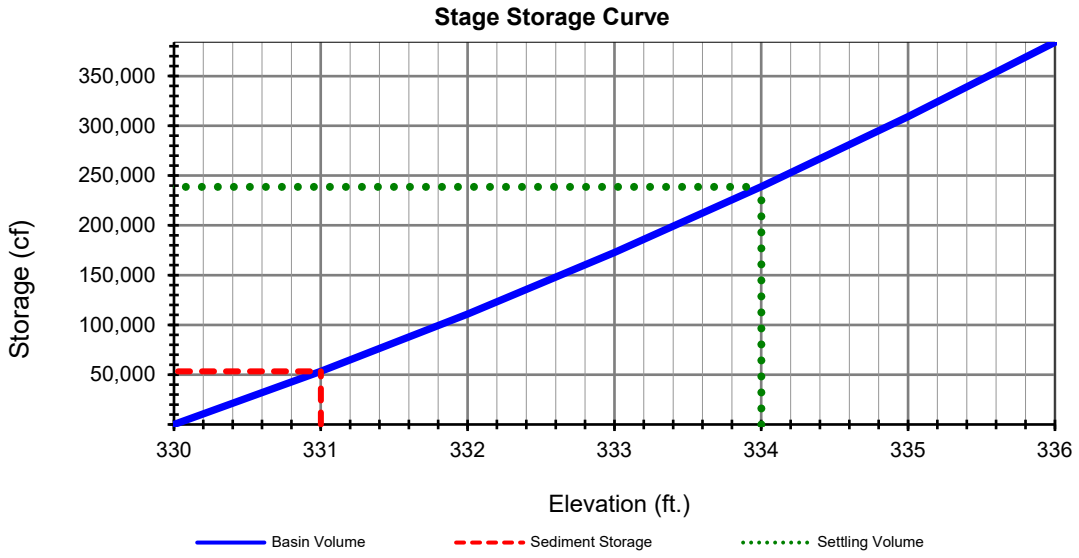
For irregular shaped traps, provide stage storage data

Sediment Basin Storage Data

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-A**

Water Surface Elevation (ft)	Area (s.f.)	Average Area (s.f.)	Difference in Elevation (ft)	Storage Volume (cuft)	
				Incremental	Total
330.00	51,300				
		53,370	1.00	53,370	
331.00	55,440				53,370
		57,545	1.00	57,545	
332.00	59,650				110,915
		61,775	1.00	61,775	
333.00	63,900				172,690
		66,050	1.00	66,050	
334.00	68,200				238,740
		70,400	1.00	70,400	
335.00	72,600				309,140
		74,803	1.00	74,803	
336.00	77,005				383,943



SEDIMENT BASIN DISCHARGE CAPACITY

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-A**

Principal Spillway Discharge Capacity

Water Surface Elevation[1]	Flow Into Top of Temporary Riser			Flow Into Top of Permanent Riser			Barrel			Principal Spillway Capacity[4]
	Head (ft)	Orifice Flow[2] Q (cfs) *	Weir Q (cfs)	Head (ft)	Orifice Flow[2] Q (cfs) *	Weir Q (cfs)	C.L. Elevation	Head[3] (ft)	Q (cfs)	
336.00	**-**	**-**	**-**	**2.00**	**-**	**175.36**	**329.00**	**7.00**	**93.12**	**93.12**

Emergency Spillway Discharge Capacity

Water Surface Elevation[1] (ft)	Bottom Width[5] (ft)	Table or C Value Used[6]	Emergency Spillway Capacity (cfs)	Required Discharge Capacity (cfs)	Total Discharge Capacity Provided[7] (cfs)
336.11	**50.00**	**2.80**	**4.85**	**4.85**	**97.97**

(1) 24" below top of embankment (12" if 100yr storm routed through basin).

(2) Flow into top of riser only (Flow through perforations not included).

(3) Water surface elevation minus elevation at centerline of pipe outlet.

(4) Least of orifice, weir, or pipe flow (Peak flow from 10yr/24hr storm min.).

(5) 8' minimum.

(6) Use Tables 7.5 through 7.8 or equation for broad-crested weir [$Q = CLH^{1.5}$, where $C \leq 2.8$ (max)]; for Riprap larger than R-3 or flows less than 1.5' deep adjust C downward.

(7) Principal Spillway Capacity + Emergency Spillway Capacity

Skimmer Calculations

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-A**

Skimmer Dewatering Time

Determine Skimmer Size:

	77,200	cuft (Dewatering Volume)
Size:	**3.5**	**inches (Skimmer Dia.)**
	14,942	cuft/day (Approx. Dewatering Capacity)
	5.2	Days (Dewatering Time)

→ Make orifice size the same as skimmer size

→ **Orifice:** **3.5** inches

Dewatering Time: **5.2** **Days**

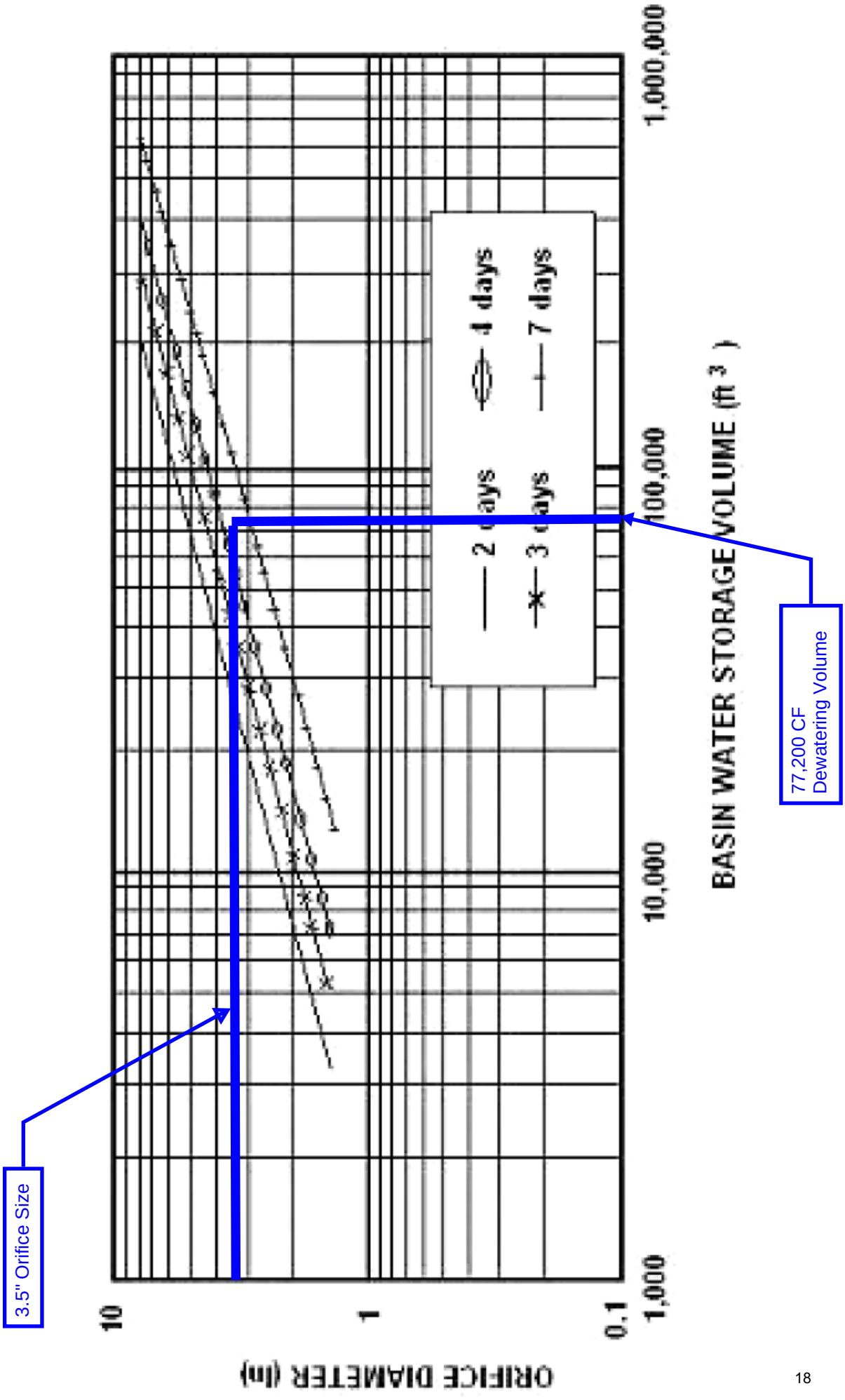
Determine Arm Length:

334.00	(Max. Water Surface Elevation)
330.00	(Skimmer Invert Elevation)
4.00	ft. (Max. Water Depth)
45	Deg. (Skimmer Arm Angle)

5.7 **ft. (Arm Length)**

Note: Calculations based on a document entitled: "Determining the Skimmer Size and the Required Orifice for the Faircloth Skimmer Surface Drain", dated November 2007

FIGURE 7.2 - SEDIMENT BASIN "A"



Sediment Basin Capacity Requirements

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-B**

Basin Number	**Sediment Basin SB-B**
Permanent or Temporary Basin - (*P or T*)	**Perm.**
Special Protection Watershed - (*Yes or No*)	**Yes**
Karst Soils - (Yes or No)	**Yes**
A - Maximum Total Drainage Area - (Ac)	**61.10**
Is drainage Area (A) More than 10% Larger than the Preconstruction Condition? - (*Yes or No*)	**No**
A_1 - Disturbed Acres in drainage area - (AC)	**61.10**
I - Initial Required Dewatering Zone (5000 x A) - (cf)	**305,500**
T - Reduction for Top Dewatering (-700 x A) - (cf)	**0**
P - Reduction for Permanent Pool (-700 x A) - (cf)	**0**
L - Reduction for 4:1 Flow Ratio (-350 x A) - (cf)	**0**
D - Reduction for 4-7 Day Dewatering (-350 x A) - (cf)	**0**
Sv - Required Dewatering Zone [I - (T + P + L + D)] - (cf)[1]	**305,500**
Sd - Required Sediment Storage Volume (1000 x A_1) - (cf)	**61,100**
St - Total Required Storage Volume (Sv + Sd) - (cf)	**366,600**
Total Storage Volume Provided (@ Elev 3) - (cf)[2]	**368,821**
Dewatering Time for Dewatering Zone - (days)	**6 days**
Required Discharge Capacity (2 x A) - (cfs)[3]	**176.14**
Principal Spillway Type	**SKIMMER**
Peak Flow from 10yr/24hr Storm for Drainage Area (A) - (cfs)	**135.58**
Principal Spillway Capacity (@ Elev 5) - (cfs)[4]	**140.41**
Emergency Spillway Capacity (@ Elev 5) - (cfs)[4]	**35.73**
Total Basin Discharge Capacity (@ Elev 5) - (cfs)	**176.14**
Emergency Spillway Protective Lining[5]	**NAG SC150**
Outlet to a Surface Water - (*Yes or No*)[6]	**No**
Peak Flow from a 25yr/24hr Storm for Drainage Area (A) - (cfs)	**176.14**

(1) The minimim dewatering zone capacity for sediment basins is (3,600 x A). No reduction is permitted in Special Protection (HQ and EV) Watersheds.

(2) Total Storage Volumed provided at riser crest.

(3) Or provide calcualtions to show peak flow from 25yr/24hr storm for area (A) is routed through the basin

(4) Provide supporting computations

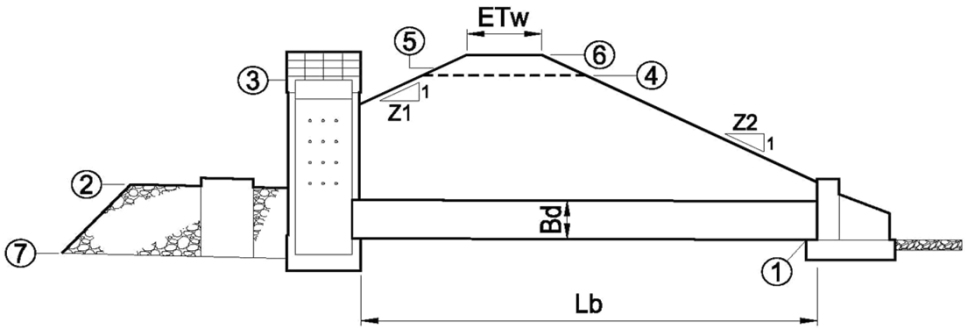
(5) If grass lining is proposed, spillways should be constructed in original ground unless a suitable TRM lining is used. Wherever a TRM is used, riprap should be placed at the bottom of the embankment to prevent scour.

(6) if NO, and basin is permanent or drainage area is more than 10% larger than preconstruction, provide supporting calculations to show accelerated erosion will not result from the proposed discharge. For discharges increasing volume or rate flow onto a neighboring property prior to entering a surface water, an easement should be obtained prior to plan submittal.

Sediment Basin Dimensions and Elevations

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-B**



Basin Number	Sediment Basin SB-B
1 - Discharge Pipe Elevation - (ft)	323.00
2 - Sediment Storage Elevation (@ Sd) *(minimum 1.0' above elevation 7)* - (ft)	330.00
3 - Elevation at Top of Settling Volume (St) *(crest of principal spillway)* - (ft)	334.05
4 - Emergency Spillway Crest Elevation *(min. 0.5' above elevation 3)* - (ft)	335.60
5 - 2 cfs/acre or 25yr/24hr Flow Elevation - (ft)	335.72
6 - Top of Embankment Elevation *(min. 24" above elevation 5 OR 12" with routed 100yr/24hr storm)* - (ft)	337.00
7 - Bottom Elevation - (ft)	329.00
Average Bottom Width - (ft)	74
Average Bottom Length - (ft)	810
SA_{min} - Required Surface Area at Elevation 2 - (sf)	9,863
Surface Area Provided at Elevation 2 - (sf)	65,195
W - Average Basin Width at Elevation 3 - (ft)	102
L - Flow Length at Elevation 3 - (ft)	410
L/W - Flow Length:Width Ratio at Elevation 3	4.00
Silt Curtain or Forebay (*if yes, indicate which*)	Neither
ETw - Embankment Top Width - (ft) *(8' min.)*	8.00
Embankment Soil Type(s)	SC
Key Trench Depth *(2' min.)* - (ft)	2.00
Key Trench Width *(4' min)* - (ft)	4.00
TRd - Riser Diameter/Type *(15" min.)* - (in)	-
Bd - Barrel Diameter/Type *(12" min.)* - (in)	-
Lb - Barrel Length - (ft)	44
Emergency Spillway Width - (ft)	325
Emergency Spillway Side Slopes (H:V)	3:1
Emergency Spillway Depth - (ft)	1.40

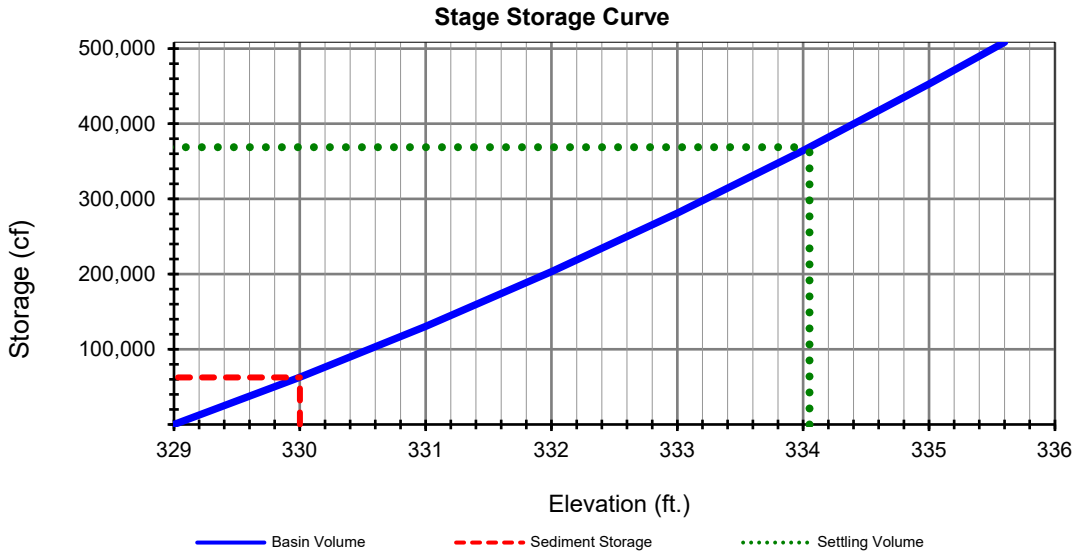
For irregular shaped traps, provide stage storage data

Sediment Basin Storage Data

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-B**

Water Surface Elevation (ft)	Area (s.f.)	Average Area (s.f.)	Difference in Elevation (ft)	Storage Volume (cuft)	
				Incremental	Total
329.00	60,200				
		62,698	1.00	62,698	
330.00	65,195				62,698
		67,728	1.00	67,728	
331.00	70,260				130,425
		72,822	1.00	72,822	
332.00	75,383				203,247
		77,972	1.00	77,972	
333.00	80,561				281,219
		83,181	1.00	83,181	
334.00	85,800				364,399
		88,445	1.00	88,445	
335.00	91,090				452,844
		92,690	0.60	55,614	
335.60	94,290				508,458



SEDIMENT BASIN DISCHARGE CAPACITY

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-B**

Principal Spillway Discharge Capacity

Water Surface Elevation[1]	Flow Into Top of Temporary Riser			Flow Into Top of Permanent Riser			Barrel			Principal Spillway Capacity[4]
	Head (ft)	Orifice Flow[2] Q (cfs) *	Weir Q (cfs)	Head (ft)	Orifice Flow[2] Q (cfs) *	Weir Q (cfs)	C.L. Elevation	Head[3] (ft)	Q (cfs)	
335.60	**-**	**-**	**-**	**1.55**	**-**	**143.57**	**328.25**	**7.35**	**140.41**	**140.41**

Emergency Spillway Discharge Capacity

Water Surface Elevation[1] (ft)	Bottom Width[5] (ft)	Table or C Value Used[6]	Emergency Spillway Capacity (cfs)	Required Discharge Capacity (cfs)	Total Discharge Capacity Provided[7] (cfs)
335.72	**325.00**	**2.80**	**35.73**	**35.73**	**176.14**

(1) 24" below top of embankment (12" if 100yr storm routed through basin).

(2) Flow into top of riser only (Flow through perforations not included).

(3) Water surface elevation minus elevation at centerline of pipe outlet.

(4) Least of orifice, weir, or pipe flow (Peak flow from 10yr/24hr storm min.).

(5) 8' minimum.

(6) Use Tables 7.5 through 7.8 or equation for broad-crested weir [$Q = CLH^{1.5}$, where $C \leq 2.8$ (max)]; for Riprap larger than R-3 or flows less than 1.5' deep adjust C downward.

(7) Principal Spillway Capacity + Emergency Spillway Capacity

Skimmer Calculations

Project: **PP213222 - Maidecreek Warehouse**

Description: **Sediment Basin SB-B**

Skimmer Dewatering Time

Determine Skimmer Size:

	305,500	cuft (Dewatering Volume)
Size:	**6**	**inches (Skimmer Dia.)**
	51,840	cuft/day (Approx. Dewatering Capacity)
	5.9	Days (Dewatering Time)

→ Make orifice size the same as skimmer size

Orifice: **6** inches

Dewatering Time: **5.9** **Days**

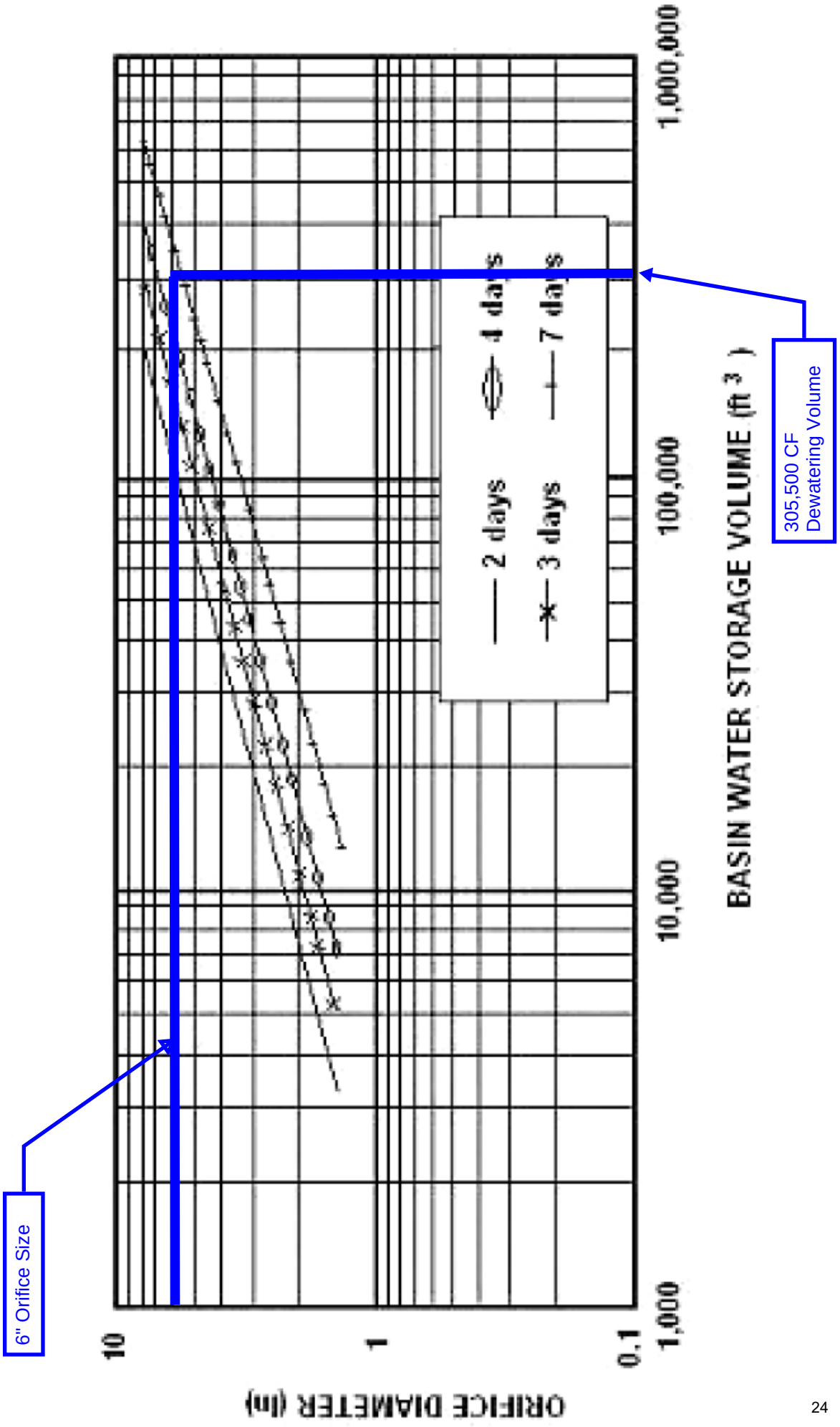
Determine Arm Length:

334.05	(Max. Water Surface Elevation)
329.00	(Skimmer Invert Elevation)
5.05	ft. (Max. Water Depth)
45	Deg. (Skimmer Arm Angle)

7.1 **ft. (Arm Length)**

Note: Calculations based on a document entitled: "Determining the Skimmer Size and the Required Orifice for the Faircloth Skimmer Surface Drain", dated November 2007

FIGURE 7.2 - SEDIMENT BASIN "B"



Spillway Calculations

Project Name: **PP213222 - Maidencreek Warehouse**

Description: **MRC Basin #2 (BMP #2)**

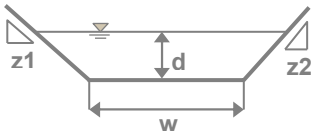
Determine Values for Equation $Q = CLH^{1.5}$

Q =	234.03	Post-development 100-year flow (cfs)
L =	325	Length (LF)
C =	2.80	Weir Coefficient
H =	0.40	Flow Depth Over Weir (ft)

Determine Required Top of Berm Elevation

	335.60	Spillway Elevation
+	1.00	Required Freeboard
+	0.40	Depth of Flow (from above)
=	337.00	Required Top of Berm Elevation
	337.00	Provided Top of Berm Elevation

Determine Spillway Lining



Z1 & Z2 = 3.00 ft : ft

Slope = 0.33 ft/ft (downslope of spillway)

Velocity	Design Method
1.77	Calculated Velocity (fps)
NAG SC150	Spillway Lining
8.00	Allowable Velocity (fps)

Spillway Calculations

Project Name: **PP213222 - Maidencreek Warehouse**

Description: **MRC Basin #3 (BMP #3)**

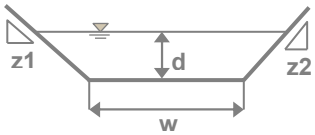
Determine Values for Equation $Q = CLH^{1.5}$

Q =	133.70	Post-development 100-year flow (cfs)
L =	50	Length (LF)
C =	2.80	Weir Coefficient
H =	0.97	Flow Depth Over Weir (ft)

Determine Required Top of Berm Elevation

	336.00	Spillway Elevation
+	1.00	Required Freeboard
+	0.97	Depth of Flow (from above)
=	337.97	Required Top of Berm Elevation
	338.00	Provided Top of Berm Elevation

Determine Spillway Lining



Z1 & Z2 = 3.00 ft : ft

Slope = 0.33 ft/ft (downslope of spillway)

Velocity	Design Method
2.61	Calculated Velocity (fps)
NAG SC150	Spillway Lining
8.00	Allowable Velocity (fps)

ANTI-SEEP COLLAR DESIGN

PROJECT: *PP213222 - Maidencreek Warehouse*
Aboveground MRC Basin #2

DATE: *6/30/2023*
LAST REV:
BY: *SJA*
CHECKED BY:

Calculate length of pipe within the saturated zone of the embankment

Ls = y * (z + 4) * [1 + (pipe slope)/(.25-pipe slope)]

Ls = Length of pipe in the saturated zone (ft)
y = Distance in feet from the outlet structure invert to the emergency spillway (highest normal water level expected to occur during the life of the structure)
z = Slope of the upstream embankment (ratio of z horizontal to 1' vertical)

y = 5.6 ft.
z = 3.0 ft.
s = 0.0768 ft./ft. (Outlet Structure Pipe Slope)

Ls = | *56.58* | *ft.*

Calculate the minimum number of collars required

N = (.075*Ls)/P

N = Number of anti-seep collars required
Ls= Length of pipe in the saturated zone (ft)
P= Vertical projection of collar from pipe (ft)

Ls = 56.58 ft. (from above)
P = 3.0 ft.

N = | *1.41* |

Therefore use | 2.00 | **anti-seep collars**

Collar spacing shall be between 5 and 14 times the vertical projection

5 * P = | *15.00* |

14 * P = | *42.00* |

ANTI-SEEP COLLAR DESIGN

PROJECT: *PP213222 - Maidencreek Warehouse*
Aboveground MRC Basin #3

DATE: *6/30/2023*
LAST REV:
BY: *SJA*
CHECKED BY:

Calculate length of pipe within the saturated zone of the embankment

Ls = y * (z + 4) * [1 + (pipe slope)/(.25-pipe slope)]

Ls = Length of pipe in the saturated zone (ft)
y = Distance in feet from the outlet structure invert to the emergency spillway (highest normal water level expected to occur during the life of the structure)
z = Slope of the upstream embankment (ratio of z horizontal to 1' vertical)

y = 6 *ft.*
z = 3.0 *ft.*
s = 0.0412 *ft./ft.* *(Outlet Structure Pipe Slope)*

Ls = 50.29 *ft.*

Calculate the minimum number of collars required

N = (.075*Ls)/P

N = Number of anti-seep collars required
Ls= Length of pipe in the saturated zone (ft)
P= Vertical projection of collar from pipe (ft)

Ls = 50.29 *ft.* (from above)
P = 2.0 *ft.*

N = 1.89

Therefore use 2.00 **anti-seep collars**

Collar spacing shall be between 5 and 14 times the vertical projection

5 * P = 10.00

14 * P = 28.00

Compost Filter Sock Worksheet

Project: **PP213222 - Maidencreek Warehouse**

Description: **Compost Filter Socks**

Location	SiltSoxx Size (inches)	Slope (%)	Max. Allowable Slope Length Above Barrier (ft)*	Provided Slope Length Above Barrier (ft)
S-1	12	4.01%	520	180
S-2	12	3.35%	520	493
S-3	18	8.36%	700	658
S-3	18	8.36%	700	55
S-4	18	3.87%	700	635
S-5	12	7.79%	520	222
S-6	18	4.17%	700	402
S-2.1	12	4.01%	520	180
S-2.2	18	33.00%	700	65

**Silt socks greater in size than 32" are the total stacked size. Refer to the plans for stacked configuration.*