Coal Combustion Residuals (CCR) Landfill

RUN-ON AND RUN-OFF CONTROL PLAN

SOUTH MISSISSIPPI ELECTRIC POWER ASSOCIATION R.D. Morrow, Sr. Generating Station Purvis, Lamar County, Mississippi (601) 235-2700

Prepared by:



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Revision Record Original Plan: October 12, 2016

Certification

This Run-on and Run-off Control Plan for the CCR Landfill at the South Mississippi Electric Power Association, R.D. Morrow, Sr. Generating Station located in Purvis, Mississippi, was prepared by Environmental Management Services, Inc. (EMS) pursuant to the Scope of Services dated March 17, 2016, agreed to and authorized by SMEPA. This Statement of Professional Opinion is based on information available to EMS at the time the Run-on and Run-off Control Plan was prepared and EMS's technical understanding of the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," published in the Federal Register on April 17, 2015 with an effective date of October 19, 2015 (CCR Rule) and associated public guidance and/or interpretation provided by the U.S. EPA and obtained by EMS as of the date of the Run-on and Run-off Control Plan.

On the basis of and subject to the foregoing it is my professional opinion as a Professional Engineer licensed in the State of Mississippi that the Run-on and Run-off Control Plan has been prepared in accordance with good and accepted engineering practices exercised by other engineers practicing in the same discipline(s) under similar circumstances and at the time and place the Run-on and Run-off Control Plan was prepared, and with the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments", published in the Federal Register on April 17, 2015 with an effective date of October 19, 2015. It is my professional opinion based on my understanding of the technical requirements of the CCR Rule and good and accepted engineering practices that the storm water controls as set forth in the Run-on and Run-off Control Plan meets the technical requirements and/or intent of the CCR Rule (40 CFR 257, Section 257.81. This Statement of Professional Opinion is not and shall not be interpreted or construed as a guarantee, warranty or legal opinion.

Enviropmental Management Services, Inc.

Christopher T. Johnson, P.E., P.S. Engineering Manager/Vice President

Date: 10/12/2016



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1. INTRODUCTION

This Run-on and Run-off Control Plan (Plan) has been developed for the South Mississippi Electric Power Association (SMEPA) R.D. Morrow, Sr. Generating Station located near Purvis, Lamar County, Mississippi. The landfill site is located in the N1/2of the NE1/4 of Sec.21, T3N, R14W, in Lamar County, Mississippi, as shown on the Site Location Map presented as Figure 1. The site is located at latitude 31° 12' 40" and longitude -89° 23' 53". The approximately 72 acre permitted landfill site is located within the 1,200 acre R.D. Morrow, Sr. property. The permitted landfill area is shown on the Existing Site Plan presented as Figure 2. The 72 acre permitted landfill area includes approximately 46 acres of existing permitted landfill and a proposed 26 acre expansion area located to the west of the existing landfill.

Under the federal CCR regulations the existing footprint is classified as an existing CCR landfill, and the proposed expansion would be classified as a new or lateral expansion of the CCR landfill, if the expansion were built.

During the Mississippi Department of Environmental Quality (MDEQ) permitting process for expansion of the landfill in 2003, various studies and investigations were conducted. This Plan contains excerpts from the original permit document. The permit application included the following that pertain to the Plan requirements of the 2015 CCR Rule (40 CFR Part 257.81).

- Subsurface investigation
- Laboratory testing of site soils
- Site characterization
- Climate analyses
- Surface water hydrologic and hydraulic analyses
- Slope Stability analyses
- Settlement analyses
- Earthwork and construction recommendations
- Quality assurance requirements for construction

1.1 Regulatory Overview

In 1977, South Mississippi Electric Power Association (SMEPA) received Permit No. SW0370020308 from the State of Mississippi, Department of Environmental Quality (MDEQ) to operate its onsite industrial waste landfill. The onsite facility is currently owned and operated by SMEPA. The landfill receives only non-hazardous industrial solid waste from the on-site generating plant as specified in the facility MDEQ nonhazardous solid waste landfill permit. The landfill is also an "existing unit" subject to federal CCR regulations as of the effective date of October 19, 2015. However, the federal regulations have no permitting requirements or EPA oversight. This CCR Runon and Run-off Control Plan conforms to the requirements of Section 257.81 of the CCR Rule [run-

Management Regulations (NSWMR). This plan addresses the requirements of federal Coal Combustion Residuals (CCR) regulations (40 CFR 257) for storm water run-on and run-off control for an industrial waste landfill containing CCR which requires owners or operator of CCR landfills and all lateral expansions to design, construct and maintain a run-on control system to prevent flow onto the active portion of these units during the peak discharge from a 24-hour, 25 year storm. These run-on controls are designed to prevent erosion, which may damage the physical structure of the landfill, prevent the surface discharge of CCR in solution or suspension; and to minimize the downward percolation of run-on through wastes, creating leachate. The EPA also requires run-off controls in order to collect and control, at a minimum, the water volume resulting from a 24-hour, 25-year storm. These standards have been proposed in order to protect surface waters from contamination. The facility is regulated under the NSWMR 11 Miss. Admin. Code Pt. 4, Rule. 1.4. E and the referenced federal regulations.

1.2 Project Description

This Plan includes run-on and run-off controls applicable to the entire CCR landfill facility. Existing cells that are active and receiving waste include Cells 1, 2, 3, and 4. The landfill is designed to route run-off from the design storm to ditches that surround the perimeter of the present footprint and discharge to a constructed storm water filtration system. Run-off that has contacted the landfill is shed to the filtration system and is treated by a combination of retention time, infiltration, bio-filtering, and passive filtration prior to exiting the system via NPDES monitored discharge.

1.3 CCR Regulatory Checklist

Table 1-1 provides the breakdown of §257.81 and associated sections and lists the applicable Plan section(s) for reference.

Table 1-1: Run-On & Run-Off Control Ch	ecklist
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§257.81 Section	<i>§257.81</i> Subsection	Requirements	Applicable Plan Section
	The owner of operate, and	r operator of an existing or new CCR Landfill or any lateral expansion of a CCR landfill must design, construct, maintain:	Section 2 – Design Plan
(a)	(1)	A run-on control system to prevent flow onto the active portion of the CCR unit during the peak discharge for a 24-hour, 25-year storm; and	Section 2.1 Design Criteria
	(2)	A run-off control system form the active portion of the CCR unit to collect and control at least the water volume resulting from a 24-hour, 25-year storm.	Section 2.1 – Design Criteria
(b)	Run-off from §257.3-3.	the active portion of the CCR unit must be handled in accordance with the surface water requirements under	Section 2.2-Run-off Compliance with <i>§257.3-3</i> Surface Water
	Run-on and r	un-off control system plan-	Section 3 – Run-on & Run-off Control System Plan
	(1)	Content of the plan. The owner or operator must prepare initial and periodic run-on and run-off control system plans for the CCR unit according to the timeframes specified in paragraphs(c)(3) and (4) of this section. These plans must document how the run-on and run-off control systems have been designed and constructed to meet the applicable requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator has completed the initial run-on and run-off control system plan when the plan has been placed in the facility's operating record as required by § 257.105(g)(3).	Section 3.1 – Design Section 3.2 – Record of Construction
(c)	(2)	Amendment of the plan. The owner or operator may amend the written run-on and runoff control system plan at any time provided the revised plan is placed in the facility's operating record as required by § 257.105(g)(3). The owner or operator must amend the written run-on an run-off control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.	Section 4 – Amendment of the Plan
		Timeframes for preparing the initial plan-	Section 5.2 – Compliance with Timeframes
	(2)	(i) Existing CCR landfills. The owner or operation of the CCR unit must prepare the initial run-on and run-off control system plan no later than October 17, 2016.	Section 5.2 – Compliance with Timeframes
	(3)	(ii) New CCR landfills and any lateral expansion of a CCR landfill. The owner or operator must prepare the initial run-on and run-off control system plan no later than the date of initial receipt of CCR in the CCR unit.	Not Applicable at the time

§257.81 Section	<i>§257.81</i> Subsection	Requirements	Applicable Plan Section
(c)	(4)	Frequency of revising the plan. The owner or operator of the CCR unit must prepare periodic run-on and run-off control system plans required by paragraph (c)(1) of this section every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first subsequent plan. The owner or operator may complete any required plan prior to the required deadline provided the owner or operator places the completed plan into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing a subsequent plan is based on the date of completing the previous plan. For purposes of this paragraph (c)(4), the owner or operator has completed a periodic run-on and run-off control system plan when the plan has been placed in the facility's operating records as required by §257.105(g)(3).	Section 5.3 – Prescribed Frequency of Revisions
	(5)	The owner or operator must obtain a certification form a qualified professional engineer stating that the initial and periodic run-on and run-off control system plans meet the requirements of this section.	Certification Section
(d)		operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(g), the equirements specified in §257.106(g), and the internet requirements specified in §257.107(g).	Section 6 – Recordkeeping Plan

§257.84 Section	<i>§257.84</i> Subsection	Requirements	Applicable Plan Section
	(1)	Weekly inspections by a qualified person	
(a)	(2)	Timeframes-(i)Existing CCR landfills. The owner or operator of the CCR unit must initiate the inspections required under paragraph (a) of this section no later than October 19, 2015.(ii)New CCR landfills and any lateral expansion of a CCR landfill. The owner or operator must initiate the inspections required under paragraph (a) of this section upon initial receipt of CCR by the CCR unit.	
(b)	(1), (2)	Annual inspections and an inspection report by a qualified professional engineer	Section 4 Increation
		Timeframes-	Section 4 – Inspection Plan
		(i) Existing CCR landfills. The owner or operator of the CCR unit must complete the initial inspection required by paragraphs (b)(1) and (2) of this section no later than January 18, 2016.	Fidii
	(3)	(ii) New CCR landfills and any lateral expansion of a CCR landfill. The owner or operator must complete the initial annual inspection required by paragraphs (b) (1) and (2) of this section no later than 14 months following the date of initial receipt of CCR in the CCR unit.	
	(4)	Frequency of Inspections. The owner or operator of the CCR unit must conduct the inspection required by paragraph (b) (1) and (2) of this section on an annual basis	
(c)		perator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(g), the uirements specified in §257.106(g), and the internet requirements specified in §257.107(g).	Section 6 – Recordkeeping Plan

2. DESIGN PLAN

The CCR landfill consists of perimeter and internal berms and storm water collection systems as shown on the design drawings presented in Appendix A. The CCR landfill has an overall permitted area of approximately 72 acres, which is made up of approximately 46 acres of existing landfill and a proposed 26 acre expansion area located to the west of the existing landfill. This landfill is made up of a of a combination of original inactive cells built on existing ground with no improved liner, and 6 newer cells that were constructed with leachate collection and compacted clay liners per approved permit from MDEQ.

As specified in the 2003 MDEQ permit application, final cover surface water diversion berms were designed to minimize erosion. As shown on Figure 2 in Appendix A, the surface diversion berms will be placed approximately every 30 feet in elevation change. These diversion berms will drain at four percent to letdown chutes located around the landfill. Details of the diversion berms and letdown chutes are presented on Figure 4 in Appendix A.

The landfill is designed to route run-off from the design storm to ditches that surround the perimeter of the present landfill footprint and discharge to a designed detention area and storm water filtration system. Run-off that has contacted the active portions of the landfill is shed to the filtration system and is treated by a combination of retention time, infiltration, bio-filtering, and passive filtration prior to exiting the system via NPDES monitored discharge. The north-western portion of the landfill sheds water to the west and around the western edge of the existing landfill. The storm water that contacts the closed slope-face in this area is currently routed to a non-contact storm water ditch which discharges just west of the landfill through an unmonitored outfall.

2.1 Design Criteria

Surface water hydrologic and hydraulic calculations have been performed to establish design peak flows, run-off volumes, channel capacities, minimum channel dimensions, and slopes required to pass the design peak flows from the off-site (non-contact or outside of lined containments) and on-site (inside lined containment) storm events. The facility layout and storm water diversion systems ensure that no up gradient run-off will enter the landfill fancily as run-on. Therefore, storm water considerations are dictated by direct precipitation falling on the facility. On and off-site drainage was evaluated for the 25 year-24 hour storm event.

For containment of precipitation falling on the facility, the Storm Water Filtration Area was conservatively designed to contain 100 percent of the run-off from the eastern (currently developed) portion of the landfill.

2.2 Run-Off Compliance with §257.3-3 Surface Water

The CCR landfill is designed to route any contact storm water through a storm water filtration/detention area then discharge via NPDES monitored outfall.

3. RUN-ON & RUN-OFF CONTROL SYSTEM PLAN

The following sections present a summary of the run-on and run-off control system design for the CCR landfill facility and constitute the Run-on and Run-off Control System Plan (Plan). Referenced design drawings are presented in Appendix A and the hydrologic and hydraulic calculations are presented in Appendix B.

3.1 Landfill Storm Water Diversion (Run-on Prevention)

The landfill area is relatively flat and dissected by small ephemeral drainages that flow generally southward. All up-gradient storm water is directed under Okahola Road via culverts to drainage ditches that convey storm flows to the east and west of the landfill. Perimeter berms/road embankments surround the landfill facility and storm water diversion channels have been established immediately up gradient of the north side of the landfill facility to prevent run-on and divert run-off around the facility.

Storm water diversion channels for the landfill consist of v-shaped or trapezoidal channels, a minimum depth of 2-feet, design gradient of 0.5 percent and 4:1 side slopes. Various depths and bottom widths are used around the perimeter of the landfill to allow for adequate handling of storm flows. Details of each ditch segment are illustrated in the calculations found in Appendix B.

3.2 Landfill Run-off Collection

3.2.1 Collection Channels

The landfill drainage has been designed to collect all storm water in perimeter collection channels to prevent run-on and to convey run-off to storm water filtration/detention areas. The discharge from these areas is monitored under the monitoring requirements of a permitted NPDES discharge.

3.2.2 <u>Storage Ponds</u>

On-site storm water run-off collected in channels is routed to the storm water filtration/detention area for passive treatment and peak flow reduction prior to exiting the facility via NPDES discharge. The storm water filtration/detention area has been designed to accommodate all storm water run-off from the currently developed portion of the landfill. A similar system will be developed should the additional permitted, but as of yet undeveloped portion of the landfill (western expansion area), become necessary.

The required detention area was designed for containment of the run-off-/infiltration created by the 25 year, 24-hour design storm event assuming 100 percent run-off from the entire developed landfill area.

3.3 Record of Construction

The existing CCR landfill facility includes Cells 1 through Cell 6 and were constructed in general accordance with the approved plans and specifications presented to MDEQ in 2003. Landfill cells 4, 5, and 6 were constructed in 2004, while landfill cells 1, 2, and 3 were constructed in 2008. As-built construction plan sets and QA/QC reports were developed for both of these construction efforts. Previous portions of the landfill were constructed prior to MDEQ regulatory oversight and have no construction documents of record.

4. INSPECTION PLAN

Inspections of the CCR landfill are required by the federal CCR regulations under §257.84. These inspections include the run-on and run-off control features of the facility. A summary of the prescribed inspections include:

- Weekly Inspection Reports: A qualified person will inspect for any appearance of actual or potential structural weaknesses and other conditions which are disrupting or have the potential to disrupt the operation or safety of the CCR landfill. The following features will be included in the inspections:
 - Storm water diversion channels for erosion and accumulation of sediments/debris
 - Perimeter berms for damage
 - Exposed liner systems for damage
 - Storm water filtration area water level and apparent damage
 - Evidence of erosion that may affect run-on and run-off control features
- **Annual Inspections**: A qualified professional engineer will make an annual inspection of the CCR landfill to ensure that the design, construction, operation and maintenance of the CCR landfill is consistent with recognized and generally accepted good engineering standards. The inspection will at a minimum include:
 - Review of the existing operating record including weekly and previous annual inspections.
 - Perimeter berms for damage
 - Exposed liner systems for damage
 - Storm water filtration area water level and apparent damage
 - Evidence of erosion that may affect run-on and run-off control features
 - Preparation of an inspection report that addresses the following:
 - Any changes in the geometry of the structure since the previous annual inspection;
 - The approximate volume of the CCR contained in the landfill at the time of the inspection;

- Any appearances of an actual or potential structural weakness of the CCR landfill, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit; and
- Any other changes which may have affected the stability or operation of the CCR unit since the previous inspection.

5. TIMEFRAMES AND REVISIONS

5.1 Amendment of the Plan

It is understood that the Run-on and Run-off Control System Plan may be amended at any time provided that the revised plan is placed in the facility's operating record as required by \$257.105(g)(3) and that an amendment must be made whenever there is a change in conditions that would substantially affect the written plan in effect. Amendments to the Plan are anticipated should construction of the western expansion area and associated detention area be needed.

5.2 Compliance with Timeframes

As an existing facility, the SMEPA R.D. Morrow, Sr. Generating Station is required to prepare an initial Run-on and Run-off Control System Plan for the CCR Landfill by October 17, 2016 per §257.81 (c)(3)(i).

5.3 Prescribed Frequency of Revisions

At a minimum, a periodic Run-on and Run-off Control System Plan must be prepared every five (5) years. The deadline for completion is five (5) years from the date when the initial plan was placed in the facility's operating record.

6. RECORDKEEPING PLAN

This Run-on and Run-off Control Plan must comply with the recordkeeping, notification, and website requirements described in the following sections. Copies of records in electronic and paper (written) formats are kept on site. Unless specified otherwise, records must be retained for at least five (5) years for the date of occurrence, measurement, maintenance, corrective action, report, record or study (§257.105(b)).

6.1 Recordkeeping

In accordance with the requirements of §257.105(g), the following records must be kept as they become available:

- The initial and periodic Run-on and Run-off Control System Plans as required by §257.81(c). The plan is submitted herein and shall be amended or revised no later than five years from the date of the last posted plan, amendment, or revision.
- Documentation detailing the corrective measures taken to remedy a deficiency or release as required by §257.84(b)(5). Documentation detailing corrective measures must be kept in the operating record regarding any deficiency or release identified during an inspection.
- Documentation recording the results of the weekly inspection by a qualified person as required by §257.84(a). Weekly inspection requirements concerning the CCR landfill are presented in Section 4.
- The periodic inspection report as required by 257.84(b)(2). Annual inspection requirements concerning the CCR landfill are presented in Section 4.

6.2 Notification

In accordance with 257.106(g)(3), the following entities must be notified when information has been placed in the operating record and on the owner's or operator's publicly accessible internet site:

Branch ChiefSolid Waste and Mining BranchEnvironmental Compliance & Enforcement DivisionMississippi Department of Environmental QualityStreet Address:515 E. Amite StreetJackson, MS 39201Jackson, MS 39225

6.3 SMEPA CCR Website

In accordance with 257.106(g), the records described in Section 6.1 must be made available on a publicly accessible internet website.

The publicly accessible internet website is:

http://smepa.coop/portfolio/energy-resources

APPENDIX A FIGURES













APPENDIX B

STORM WATER DESIGN CALCULATIONS

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	Drainag Curve N Watersh Watersh Time of Rainfal Storm N Frequen 24-Hr R Ia/P Ra Runoff	EFM-2 SMEPA Lamar Predevelopmen ed Length ted Slope Concentration 1 Type Number hcy (yrs) tainfall (in) atio Used	ESTIMA t Flow : 32.1 : 89 : 1560 : 1.00 : . 525 : III	TING RU State: Rate (W Ac Fe Pe Hc 2 4.1 0.06 0.10 2.92	MS MS estern res et creent 5 5.2 0.05 0.10 3.96	D PEAK] Check Side)	DISCHAR By: KL ed:	GE D D D D D D D D D D D D D D D D D D D	tern Sic VERSION ate: 02- ate: ate: 100 8.3 0.03 0.10 6.98 0.627	06- 33			
	Peak Di	s/acre/in) ischarge (cfs) EFM-2	<u>FM2</u> Pi	e <u>dev</u> e	60	peak d:	<u>to</u> ut fo		ern Sid	e			
							y: KL	Dat	te: 02-0	6-03			
(Client : County :	Lamar		State:			d:	Dat	te:				
(County : . Practice:	Lamar Predevelopment	: Flow R	ate (Ea	stern S:		d:	Dat	te:				
	County : Practice: Drainage Curve Nu Watershe Watershe Time of Rainfall	Lamar Predevelopment mber : d Length : d Slope : Concentration: Type :	Flow R 36.0 89 1620 .99 .572 III	ate (Ea Acr Fee Per Hou	stern S: es t cent rs	idė)							
	County : Practice: Drainage Curve Nu Watershe Watershe Time of Rainfall	Lamar Predevelopment Area : mber : d Length : d Slope : Concentration: Type :	Flow R 36.0 89 1620 .99 .572 III	ate (Ea Acr Fee Per Hou	stern S: es t cent rs	idė)						-	
	County : Practice: Drainage Curve Nu Watershe Watershe Time of Rainfall	Lamar Predevelopment Mber : d Length : d Slope : Concentration: Type : mber	E Flow R 36.0 89 1620 .99 .572 III	ate (Ea Acr Fee Per Hou	stern S: es t cent rs	idė)						1	
	County : Practice: Drainage Curve Nu Watershe Time of Rainfall Storm Nu Frequenc	Lamar Predevelopment Mber : d Length : d Slope : Concentration: Type : mber	Flow R 36.0 89 1620 .99 .572 III	ate (Ea Acr Fee Per Hou	stern S: es t cent rs 3	idė) 4	5	6	7			ł	
	County : Practice: Drainage Curve Nu Watershe Time of Rainfall Storm Nu Frequenc	Lamar Predevelopment Area : mber : d Length : d Slope : Concentration: Type : mber y (yrs) infall (in)	Flow R 36.0 89 1620 .99 .572 III	ate (Ea Acr Fee Per Hou 2 2	stern S: es t cent rs 3 	idė)	5	6 50	7			1	
	County : Practice: Drainage Curve Nu Watershe Watershe Time of Rainfall Storm Nu Frequenc 24-Hr Ra	Lamar Predevelopment Area : mber : d Length : d Slope : Concentration: Type : mber y (yrs) infall (in)	Flow R 36.0 89 1620 .99 .572 III 1 3.5	ate (Ea Acr Fee Per Hou 2 4.1	stern S: es t cent rs 3 5 5 5.2	idė) 	5 25 6.9 0.04	6 50 7.6 0.03	7 100 8.3			ı	
	County : Practice: Drainage Curve Nu Watershe Watershe Time of Rainfall Storm Nu Frequenc 24-Hr Ra Ia/P Rat	Lamar Predevelopment Area : mber : d Length : d Slope : Concentration: Type : mber y (yrs) infall (in) io Used	E Flow R 36.0 89 1620 .99 .572 III 1 3.5 0.07 0.10	ate (Ea Acr Fee Per Hou 2 4.1 0.06 0.10	stern 5: es t cent rs 5 5.2 0.05 0.10	4 10 6 0.04 0.10	5 25 6.9 0.04 0.10	6 50 7.6 0.03 0,10	7 100 8.3 0.03 0.10			ł	
	County : Practice: Drainage Curve Nu Watershe Watershe Time of Rainfall Storm Nu Frequenc 24-Hr Ra Ia/P Rat Runoff (Unit Pea	Lamar Predevelopment Area : mber : d Length : d Slope : Concentration: Type : mber y (yrs) infall (in) io Used	E Flow R 36.0 89 1620 .99 .572 III 1 3.5 0.07 0.10 2.36	ate (Ea Acr Fee Per Hou 2 4.1 0.06 0.10 2.92	stern S: es t cent 75 5.2 0.05 0.10 3.96	4 10 6 0.04 0.10 4.74	5 25 6.9 0.04 0.10 5.61	6 50 7.6 0.03 0,10 6.29	7 100 8.3 0.03			2	

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

Subject: Storm	SMEPA Landfill	Made By: CJ	Date	S, INC 10/11/16	Sheet No.:	3	of	110
	water Design	Checked By:	Date:		Job No.:	0	SMEPA	110
-			ERN SIDE		000110.	-	O.I.L. I.I.	
Calculate Peak	Discharge from Area A8.							
Area		1.48 acres	(0.00 sq. mile	es			
Calculate Trave Sheet								
	Flow Length 1	160 feet			Flow Lengt	h. L	fe	et
Pt. 81	Two-vr 24 br rainfall Po	4.9 inches			Two-yr 24 I			
to Pt.	Land Slope, s	0.25 ft/ft			Land Slope		0.04 ft/1	ft
82	Travel Time, Tt	0.156 hrs	Ref Eq. 8		Travel Time		0.000	-
Shallo	w,Concentrated Flow					,		
	Flow Length, L	52.43 feet						
	Watercourse slope, s	0.04 ft/ft						
	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-	9 "Avg. vel. fo	r est. travel tir	ne for sha	llow	
			concentrate	d flow" - use				
	Travel Time, Tt	0.005 hrs	Ref Eq. 6					
Open (Channel Flow		-					
	Channel Depth, D	2 feet			ÎD	1		
	Channel Width, B	0 feet		1	*	15		
	X-Section Area, a	16 sq ft			< B →		4(H):1(V)
Pt. 82	Wetted Perimeter, pw	16.5 feet						
to Pt.	4 Hydraulic Radus, r	0.970 ft						
	Channel Slope	0.005 ft/ft	Def E o					
	Velocity, V	2.065 ft/sec	Ref Eq. 9	•				
	Flow Length, L Travel Time, Tt	630 0.085 hrs	Dof En 6					
	naver nine, 1t	0.000 115	Ref Eq. 6					
Total T	ravel Time	0.246 hrs]Sum of Sh	eet, Shallow	Concentrat	ed and O	pen Chan	nel
Calculate Peak	Discharge							
	I _a /P ₂₅	0.095 in.						
	Time of Conc. Tc	0.246 hrs	From calcul	ations above				
	Unit Peak Disch. q.	535 csm/in			k discharge" L	lse Tvpe II	1	
	Runoff, Q	5.1 inches	From pg. 1	Foot		,160,1		
	Peak Discharge, qp	6.3097 cu ft/sec						
	p					-		
Calculate Chan	nel Flow Velocity							
	X-Section Area, a	16 sq ft						
	Peak Discharge, qp	6.3097 cu ft/sec	;					
	Peak Velocity	0.3944 ft/sec						
		19% of Calcu	lated Chani	nel Flow Velo	ocity			

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

alculation	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.: 4	of	110
Subject:	Stormw	ater Design	Checked By:	Date:	-	Job No.:	SMEPA	-
1								
Calcula		Discharge from Area A7.2						
	Area		0.94 acres		0.00 sq. mile	S		
Calcula	ite Trave Sheet F	l Time, Tt Flow						
		Flow Length, L	173.6 feet			Flow Length, L	126.4 fee	t
	Pt. 0 to	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 1 to	Two-yr 24 hr rain	fal 4.9	
	Pt. 1	Land Slope, s	0.25 ft/ft		Pt. 2	Land Slope, s	0.04 ft/ft	
	Shallow	Travel Time, Tt Concentrated Flow	0.167 hrs	Ref Eq. 8		Travel Time, Tt	0.270	
		Flow Length, L	116 feet					
		Watercourse slope, s	0.04 ft/ft					
	Pt. 3	Avg. Velocity, V.	3.2 ft/sec	-	9 "Avg. vel. for ed flow" - use l	r est. travel time for : Unpaved	shallow	
		Travel Time, Tt	0.010 hrs	Ref Eq. 6				
	Open C	hannel Flow		~			-	
		Channel Depth, D	2 feet			ÎD		
		Channel Width, B	0 feet			×	5	
		X-Section Area, a	16 sq ft			← B →	4(H):1(V)	
	Pt. 4 to	Wetted Perimeter, pw	16.5 feet			U		
	Pt. 5	Hydraulic Radus, r	0.970 ft					
		Channel Slope	0.005 ft/ft					
		Velocity, V	2.065 ft/sec	Ref Eq. 9				
		Flow Length, L Travel Time, Tt	125 0.017 hrs	Def Ex. C				
		naver fille, ft	0.017 1/15	Ref Eq. 6				
	Total Tr	avel Time	0.464 hrs]Sum of Sh	ieet, Shallow	Concentrated and	d Open Chann	el
Calcula	te Peak I	Discharge						
		I _a /P ₂₅	0.095 in.					
		Time of Conc. Tc	0.464 hrs	From calcul	ations above			
	Area	Unit Peak Disch. qu	425 csm/in			discharge" Use Typ	be III	
	A7.2	Runoff, Q	5.1 inches	From pg. 1		-3 (J)		
		Peak Discharge, qp	3.1835 cu ft/sec					
	Area	Flow Length, L	125					
	Alea A8.1	Travel Time, Tt	0.017 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.263 hrs		Area A8.1 (pg.	•		
	nt 4 to	Unit Peak Disch. q _u	515 csm/in	Ref. Figure	6-3 "Unit peak	discharge" Use Typ	e III	
	Pt. 5)	Runoff, Q	5.1 inches	From pg. 1				
		Peak Discharge, q _p	6.07 cu ft/sec	Eq. 10				
alculat	te Chann	el Flow Velocity						
all standing		X-Section Area, a	16 sq ft					
		Peak Discharge, qp	9.26 cu ft/sec					
		Peak Velocity	0.5786 ft/sec					
		•			nel Flow Velo			

Jaioula	ions For:	SMEPA Landfill	EMENT S Made By: CJ	Date:	10/11/16	Sheet No.:	5	of	140
Subject		water Design	Checked By:	Date:	10/11/10		5	SMEPA	110
and the local division of the local division		Discharge from Area A7.		Date;		Job No.:	_	SIVIEPA	
- and an	Area		0.89 acres		0.00 sq. mile	s			
Calcul	ato Trave	el Time, Tt							
Calcul	Sheet I								
		Flow Length, L	75.6 feet			Flow Lengt	h. L	100 fee	et
A 7 4	Pt. 1 to	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 6 to	Two-yr 24			
A7.1		Land Slope, s	0.25 ft/ft		Pt. 5			0.25 ft/ft	ł
		Travel Time, Tt	0.086 hrs	Ref Eq. 8		Travel Tim		0.098	•
	Open (Channel Flow	01000 1110	Hor Eq. o		TOYOF THE	o, 11	0.030	
		Channel Depth, D	2 feet	-	<	1		/	
		Channel Width, B	0 feet			D	K		
		X-Section Area, a	16 sq ft			k v	2	S	
		Watted Parimeter	16.5 feet			B		4(H):1(V))
	Pt. 5 to	11.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1	0.970 ft						
	Pt. 11	Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	250	rior Eq. o					
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
	Total T	ravel Time	0.217 hrs		neet, Shallow	Concentrat	ed and ()nen Chanr	
				-	,			open enam	
Calcula		Discharge from Area A6.2							
	Area		1.32 acres	(0.00 sq. mile	s			
Calcula		I Time, Tt							
Calcula	ate Trave Sheet F	Flow	71.7 feet			Flow Lengt		228 3 fee	f
Calcula	Sheet F	Flow Length, L	71.7 feet 4.9 inches			Flow Lengtl		228.3 fee	t
Calcula	Sheet F	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂	4.9 inches		Pt. 8 to	Two-yr 24 h	r rainfal	5.9	
Calcula	Sheet F	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s	4.9 inches 0.25 ft/ft	Ref Eq. 8	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope	nr rainfal , s	5.9 0.04 ft/ft	
	Sheet F Pt. 7 to Pt. 8	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt	4.9 inches	Ref Eq. 8	Pt. 8 to Pt. 9	Two-yr 24 h	nr rainfal , s	5.9	
A6.2	Sheet F Pt. 7 to Pt. 8 Shallow	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt (,Concentrated Flow	4.9 inches 0.25 ft/ft 0.082 hrs	Ref Eq. 8	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope	nr rainfal , s	5.9 0.04 ft/ft	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L	4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet	Ref Eq. 8	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope	nr rainfal , s	5.9 0.04 ft/ft	
	Sheet F Pt. 7 to Pt. 8 Shallow	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s	4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft		Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L	4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet	Ref. Fig. 6-9	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s	4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft	Ref. Fig. 6-9 concentrate	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec	Ref. Fig. 6-9	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V.	4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec	Ref. Fig. 6-9 concentrate	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin Inpaved	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow	4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs	Ref. Fig. 6-9 concentrate	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt channel Flow Channel Depth, D	 4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 	Ref. Fig. 6-9 concentrate	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin Inpaved	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	 4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 	Ref. Fig. 6-9 concentrate	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin Inpaved	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10 Open C	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	 4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 	Ref. Fig. 6-9 concentrate	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin Inpaved	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	 4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 	Ref. Fig. 6-9 concentrate	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin Inpaved	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10 Open C	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r	 4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 	Ref. Fig. 6-8 concentrate Ref Eq. 6	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin Inpaved	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10 Open C	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	 4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft 	Ref. Fig. 6-9 concentrate	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin Inpaved	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10 Open C	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	 4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft 2.065 ft/sec 	Ref. Fig. 6-8 concentrate Ref Eq. 6	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tin Inpaved	nr rainfal , s e, Tt	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10 Open C Pt. 5 to Pt. 11	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V Flow Length, L	 4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft 2.065 ft/sec 250 	Ref. Fig. 6-9 concentrate Ref Eq. 6	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tim Jnpaved	nr rainfal , s a, Tt ne for shal	5.9 0.04 ft/ft 0.394	
	Sheet F Pt. 7 to Pt. 8 Shallow Pt. 9 to Pt. 10 Open C Pt. 5 to Pt. 11	Flow Length, L Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Popth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V Flow Length, L Travel Time, Tt	4.9 inches 0.25 ft/ft 0.082 hrs 16.3 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft 2.065 ft/sec 250 0.034 hrs	Ref. Fig. 6-9 concentrate Ref Eq. 6	Pt. 8 to Pt. 9	Two-yr 24 h Land Slope Travel Time est. travel tim Jnpaved	nr rainfal , s a, Tt ne for shal	5.9 0.04 ft/ft 0.394	

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

Area A7.1Ia/P0.095 in. 0.11 Peak Disch. qu Runoff, Q0.217 hrsFrom calculations above 550 csm/inA7.1Time of Conc. Tc Unit Peak Discharge, qp0.217 hrsFrom calculations above 550 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type III 5.1 inchesArea A6.2Ia/P0.095 in. Time of Conc. Tc Unit Peak Discharge, qp0.095 in. 0.512 hrsTom calculations above 400 csm/inArea A6.2Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Discharge, qp0.095 in. 0.512 hrsTom calculations above 400 csm/inArea A8.1Flow Length, L Travel Time, Tt Peak Discharge, qp250 4.21 cu ft/sec Eq. 10Area A7.1Flow Length, L Peak Discharge, qp250 4.21 cu ft/sec Eq. 10Area A7.1Flow Length, L Peak Discharge, qp250 4.21 cu ft/sec Eq. 10Area A7.2Flow Length, L Peak Discharge, qp250 5.90 cu ft/sec Eq. 10Area A7.2Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Discharge, qp250 5.90 cu ft/sec Eq. 10Area A7.2Flow Length, L Travel Time, Tt Unit Peak Discharge, qp250 5.90 cu ft/sec Eq. 10Area A7.2Flow Length, L Travel Time, Tt Unit Peak Disch. qu Uhit Peak Disch. qu Deak Discharge, qp250 5.90 cu ft/sec Eq. 10Area A7.2Flow Length, L Travel Time, Tt Unit Peak Disch. qu Uhit Peak Disch. qu Deak Discharge, qp250 5.90 cu ft/sec Eq. 63 5.90 cu ft/sec Eq. 10Area Pi. 11)Flow Length, L Peak Disch. qu Peak Discharge, qp <t< th=""><th>440</th></t<>	440
alculate Peak Discharge 0.095 in. Area Time of Conc. Tc 0.217 hrs From calculations above A7.1 Time of Conc. Tc 0.217 hrs From calculations above A7.1 Runoff, Q 5.1 inches From pg. 1 Peak Discharge, qp 3.9007 cu fl/sec Eq. 10 Area Ime of Conc. Tc 0.512 hrs From calculations above Area Ime of Conc. Tc 0.512 hrs From calculations above Munoff, Q 5.1 inches From pg. 1 Peak Discharge, qp 4.21 cu fl/sec Eq. 10 Area Flow Length, L 250 Travel Time, Tt 0.034 hrs Ref Eq. 6 Travel Time, Tt 0.034 hrs Ref Eq. 6 Munoff, Q 5.1 inches From pg. 1 Pt. 11) Peak Discharge, qp 5.90 cu fl/sec Eq. 10 Area Ar.2 Flow Length, L 250 Travel Time, Tt 0.034 hrs Ref Eq. 6 Ar.1 Runoff, Q 5.1 inches From pg. 1 Peak Discharge, qp 5.90 cu fl/sec Eq. 10 5.1 inches From pg. 1 Area Ar.2 <	110
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A7.2 (from pt. 5 to Pt. 11) A7.2 (from pt. 1 (from pt. 1) A7.2 (from pt. 1) (from pt. 1)	
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Peak Discharge, qp17.04 cu ft/secPeak Velocity1.0649 ft/sec	
Peak Discharge, qp17.04 cu ft/secPeak Velocity1.0649 ft/sec	
Peak Velocity 1.0649 ft/sec	
32% of Calculated Charmer Flow Velocity	

-		MANAGE	EMENT SI	ERVICES, INC	×	
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 7	of 110
Subject:	Stormv	vater Design	Checked By:	Date:	Job No.:	SMEPA
Calcula	te Peak	Discharge from Area A6.1				
	Area		1.35 acres	0.00 sq. mile	es	
Calculat	te Trave	Time, Tt				
	Sheet I					
		Flow Length, L	170 feet		Flow Length, L	0 feet
40.4	Pt. 8 to	Two-yr 24 hr rainfall, P2	4.9 inches		Two-yr 24 hr rainfal	5.9
A6.1		Land Slope, s	0.25 ft/ft		Land Slope, s	0.04 ft/ft
		Travel Time, Tt	0.164 hrs	Ref Eq. 8	Travel Time, Tt	0.000
	Open C	Channel Flow	011011110		naver nine, it	0.000
		Channel Depth, D	2 feet	~	*	/
		Channel Width, B	0 feet		D	
		X-Section Area, a	16 sq ft		2	
	Pt. 11	Wetted Perimeter, pw	16.5 feet		B	`4(H):1(V)
		Hydraulic Radus, r	0.970 ft			
	14	Channel Slope	0.005 ft/ft			
		Velocity, V	2.065 ft/sec	Def Ca. 0		
		Flow Length, L	250	Ref Eq. 9		
		Travel Time, Tt	0.034 hrs	Dof E - C		
	Total T	avel Time	0.198 hrs	Ref Eq. 6	Concentrated and C	nen Obernal
Calculat		Discharge	0.190 115	Sum of Sheet, Shallov	Concentrated and C	pen Channel
Jaiculat	e r can	•	0.005 in			
		I _a /P	0.095 in.	_		
	Area	Time of Conc. Tc	0.198 hrs	From calculations above		
	A6.1	Unit Peak Disch. qu	560 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type I	11
		Runoff, Q	5.1 inches	From pg. 1		
		Peak Discharge, q _p	6.02 cu ft/sec	c Eq. 10		
	Area	Flow Length, L	250			
	A8.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6		
	(from	Time of Conc. Tc	0.330 hrs	Tt + Tc for Area A8.1 (pg.	4)	
	•	Unit Peak Disch. qu	485 csm/in	Ref. Figure 6-3 "Unit peal		
		Runoff, Q	5.1 inches		- meeninge doo rypen	
	14)	Peak Discharge, q _p	5.72 cu ft/sec			
		Flow Length, L	250			
		Travel Time, Tt	0.034 hrs	Ref Eq. 6		
	•	Time of Conc. Tc	0.531 hrs	Tt + Tc for Area A7.2 (pg.		
		Unit Peak Disch. q _u	395 csm/in		discharge" Use Type II	
		Runoff, Q	5.1 inches			
	14)	Peak Discharge, q _p	2.96 cu ft/sec	: Eq. 10		
	Area	Flow Length, L	250			
		Travel Time, Tt	0.034 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.251 hrs	Tt + Tc for Area A7.1 (pg.	6)	
		Unit Peak Disch. q.	540 csm/in			
		Runoff, Q		Ref. Figure 6-3 "Unit peak	uscharge Use Type III	
	UIL.	runon, Q	5.1 inches	From pg. 1		



Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

		MANAC	EMENT S	FRVICE	S INC	0.			
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	9	of	110
		vater Design	Checked By:	Date:	10/11/10	Job No.:	3	SMEPA	110
		Discharge from Area A5.2	the second se	Date.		100 10	_	SIVILFA	
Galdale	Area	Disonarge nom Area Ao.2	0.97 acres	(.00 sq. mile	s			
Calcula	ate Trave	l Time, Tt							
ouroure	Sheet F								
		Flow Length, L	71.7 feet			Flow Lengt	h, L	228.3 fee	t
	Pt. 7 to	Two-yr 24 hr rainfall, P ₂	4.9 inches		Pt. 8 to	Two-yr 24 I	hr rainfal	5.9	
		Land Slope, s	0.25 ft/ft			Land Slope		0.04 ft/ft	
		Travel Time, Tt	0.082 hrs	Ref Eq. 8		Travel Time		0.394	
A5.2	Shallow	,Concentrated Flow		1					
AJ.2		Flow Length, L	16.3 feet						
		Watercourse slope, s	0.04 ft/ft						
	13	Avg. Velocity, V.	3.2 ft/sec			r est. travel tir	ne for sha	llow	
		Travel Time, Tt	0.001 hrs		d flow" - use I	unpaved			
	Onon C	channel Flow	0.001 115	Ref Eq. 6					
	Open C		0 feet	~		*		-	
		Channel Depth, D	2 feet			D	1		
		Channel Width, B	0 feet			*	2		
	D6 44	X-Section Area, a	16 sq ft			< B >		4(H):1(V)	
		Wetted Perimeter, pw	16.5 feet			5			
		Hydraulic Radus, r	0.970 ft						
	15		0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	80						
		Travel Time, Tt	0.011 hrs	Ref Eq. 6	1				
	lotal ir	avel Time	0.489 hrs	Sum of Sh	eet, Shallow	Concentrate	ed and C	pen Chann	el
Calcula	te Peak I	Discharge							
		I _a /P	0.095 in.						
	Агеа	Time of Conc. Tc	0.489 hrs	From calcula	ations above				
	Afea A5.2	Unit Peak Disch. qu	410 csm/in	Ref. Figure	5-3 "Unit peak	discharge" U	se Type I	11	
	AU.2	Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, q _p	3.17 cu ft/sec	c Eq. 10					
	Area	Flow Length, L	80						
	A8.1	Travel Time, Tt	0.011 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.341 hrs		rea A8.1 (pg.	7)			
		Unit Peak Disch. q _u	465 csm/in			discharge" U	se Type II		
	•	Runoff, Q	5.1 inches	From pg. 1	F	3- 0			
	15)	Peak Discharge, q _p	5.48 cu ft/sec						
		- ip							
		Flow Length, L	80						
		Travel Time, Tt	0.011 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.542 hrs	Tt + Tc for A	rea A7.2 (pg.	7)			
		Link Deals Direction	20E com/in	Rof Eiguro 6	-3 "Unit peak	discharge" Ll	a Type II		
	•	Unit Peak Disch. q _u	395 csm/in	Itel. Liguie C	o one pour	ulscharge U	se rype ii		
	•	Runoff, Q	5.1 inches	From pg. 1	o onic pour	discharge O	зе туре п		

SMEPA Landfill ater Design Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	E M E N T S Made By: CJ Checked By: 80 0.011 hrs 0.262 hrs 520 csm/in 5.1 inches 3.69 cu ft/sed 80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sed 80	From pg. 1 Eq. 10 Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1	16 Sheet No.: 10 Job No.: (pg. 7) peak discharge" Use Ty		110
ater Design Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	Checked By: 80 0.011 hrs 0.262 hrs 520 csm/in 5.1 inches 3.69 cu ft/sec 80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sec	Date: Ref Eq. 6 Tt + Tc for Area A7.1 Ref. Figure 6-3 "Unit From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1	Job No.: (pg. 7) peak discharge" Use Ty (pg. 8)	SMEPA	110
Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	80 0.011 hrs 0.262 hrs 520 csm/in 5.1 inches 3.69 cu ft/sec 80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sec	Ref Eq. 6 Tt + Tc for Area A7.1 Ref. Figure 6-3 "Unit From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1	l (pg. 7) peak discharge" Use Ty : (pg. 8)	/pe III	
Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.011 hrs 0.262 hrs 520 csm/in 5.1 inches 3.69 cu ft/sec 80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sec	Tt + Tc for Area A7.1 Ref. Figure 6-3 "Unit From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1	peak discharge" Use Ty		
Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.262 hrs 520 csm/in 5.1 inches 3.69 cu ft/sec 80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sec	Tt + Tc for Area A7.1 Ref. Figure 6-3 "Unit From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1	peak discharge" Use Ty		
Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	520 csm/in 5.1 inches 3.69 cu ft/sec 80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sec	Ref. Figure 6-3 "Unit From pg. 1 Eq. 10 Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1	peak discharge" Use Ty		
Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	5.1 inches 3.69 cu ft/sed 80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sed	From pg. 1 Eq. 10 Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1	(pg. 8)		
Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	3.69 cu ft/sed 80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sed	Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1		pe III	
Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	80 0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sec	Ref Eq. 6 Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1		pe III	
Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sed	Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1		pe III	
Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.011 hrs 0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sed	Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1		pe III	
Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.556 hrs 390 csm/in 5.1 inches 4.10 cu ft/sec	Tt + Tc for Area A6.2 Ref. Figure 6-3 "Unit From pg. 1		pe III	
Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	390 csm/in 5.1 inches 4.10 cu ft/seo	Ref. Figure 6-3 "Unit From pg. 1		pe III	
Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	5.1 inches 4.10 cu ft/seo	From pg. 1	poar alconargo oco ry	pom	
Peak Discharge, q _p Flow Length, L Travel Time, Tt	4.10 cu ft/sec				
Flow Length, L Travel Time, Tt		-4.10			
Travel Time, Tt	80				
Time of Come To	0.011 hrs	Ref Eq. 6			
Time of Conc. Tc	0.209 hrs	Tt + Tc for Area A6.1	(pg. 7)		
Unit Peak Disch. q _u	550 csm/in		peak discharge" Use Ty	pe III	
Runoff, Q	5.1 inches	From pg. 1		F	
Peak Discharge, q _p	5.92 cu ft/sec				
Peak Discharge, qp	25.32 cu ft/sec 1.5824 ft/sec		Velocity		
	el Flow Velocity X-Section Area, a Peak Discharge, qp Peak Velocity	X-Section Area, a 16 sq ft Peak Discharge, qp 25.32 cu ft/sec Peak Velocity 1.5824 ft/sec	X-Section Area, a 16 sq ft Peak Discharge, qp 25.32 cu ft/sec Peak Velocity 1.5824 ft/sec	X-Section Area, a 16 sq ft Peak Discharge, qp 25.32 cu ft/sec	X-Section Area, a 16 sq ft Peak Discharge, qp 25.32 cu ft/sec Peak Velocity 1.5824 ft/sec

		MANAG	EMENTS	ERVICES,	INC.			
Calculatio	ons For:	SMEPA Landfill	Made By: CJ		11/16 Sheet No.: 11	of 110		
Subject:	Stormw	ater Design	Checked By:	Date:	Job No.:	SMEPA		
Calcula	te Peak	Discharge from Areas A5.	1					
	Агеа		1.02 acres	0.00 s	q. miles			
Jaicula	te Trave Sheet F	l Time, Tt						
	Sheet r	Flow Length, L	210 feet		Flow Length, L	0 feet		
	Pt. 16	Two-yr 24 hr rainfall, P2	4.9 inches		Two-yr 24 hr rair			
A5.1	to Pt.	Land Slope, s	0.25 ft/ft					
	15	Travel Time, Tt	0.194 hrs	Def Ea 8	Land Slope, s	0.04 ft/ft		
	Open C	hannel Flow	0.194 115	Ref Eq. 8	Travel Time, Tt	0.000		
	Open C	Channel Depth, D	2 feet	-	*	-		
		Channel Width, B	0 feet		D			
		X-Section Area, a	16 sq ft			2		
	D4 15		16.5 feet		< B >	4(H):1(V)		
		Wetted Perimeter, pw						
	17	Hydraulic Radus, r	0.970 ft					
	17	Channel Slope	0.005 ft/ft					
		Velocity, V	2.065 ft/sec	Ref Eq. 9				
		Flow Length, L	140					
	T-1-1 T	Travel Time, Tt	0.019 hrs	Ref Eq. 6				
	lotal Ir	avel Time	0.213 hrs	Sum of Sheet, S	Shallow Concentrated an	id Open Channel		
Calculat	e Peak I	Discharge						
Jaicula	ICT CAR I	I _e /P	0.095 in.					
		Time of Conc. Tc	0.213 hrs					
	Area			From calculations				
	A5.1	Unit Peak Disch. qu	555 csm/in		nit peak discharge" Use Ty	pe III		
		Runoff, Q	5.1 inches	10				
		Peak Discharge, q _p	4.51 cu ft/sec	c Eq. 10				
	A	Elow Longth	140					
		Flow Length, L	140	D-(E- 0				
	A8.1	Travel Time, Tt	0.019 hrs	Ref Eq. 6	0.4.(
	(··· = ····	Time of Conc. Tc	0.359 hrs	Tt + Tc for Area A				
		Unit Peak Disch. qu	515 csm/in	-	nit peak discharge" Use Ty	pe III		
		Runoff, Q	5.1 inches	From pg. 1				
	17)	Peak Discharge, q _p	6.07 cu ft/sec	c Eq. 10				
	A	Flow Length, L	140					
			140 0.019 hrs	Dof Ec. 6				
		Travel Time, Tt		Ref Eq. 6	7.0 (no. 0)			
	(·····	Time of Conc. Tc	0.560 hrs	Tt + Tc for Area A				
		Unit Peak Disch. qu	390 csm/in		nit peak discharge" Use Typ	be III		
		Runoff, Q	5.1 inches					
	17)	Peak Discharge, q _p	2.92 cu ft/sec	C Eq. 10				
	•	Flow Longth	140					
		Flow Length, L	140					
		Travel Time, Tt	0.019 hrs	Ref Eq. 6				
	· ·	Time of Conc. Tc	0.281 hrs	Tt + Tc for Area A7				
		Unit Peak Disch. qu	505 csm/in	-	nit peak discharge" Use Typ	be lil		
		Runoff, Q	5.1 inches					
	17)	Peak Discharge, q _p	3.58 cu ft/sec	E. 40				
	MANAG	GEMENT SE	ERVICE	S, INC				
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alculations For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	12	of	110
ubject: Stormv	vater Design	Checked By:	Date:		Job No.:		SMEPA	
Area	Flow Length, L	140						
A6.2	Travel Time, Tt	0.019 hrs	Ref Eq. 6	400/	10)			
	Time of Conc. Tc Unit Peak Disch. q _u	0.575 hrs 385 csm/in		rea A6.2 (pg		Line Truce		
	Runoff, Q	5.1 inches	-	6-3 "Unit pea	k discharge	Use Type	- 111	
17)	Peak Discharge, q _p	4.05 cu ft/sec						
,	r our proonarge, qp	1100 00 10000						
Area	Flow Length, L	140						
A6.1	Travel Time, Tt	0.019 hrs	Ref Eq. 6					
	Time of Conc. Tc	0.227 hrs	Tt + Tc for A		*			
	Unit Peak Disch. qu	550 csm/in	Ref. Figure 6	6-3 "Unit peal	k discharge"	Use Type	ш	
	Runoff, Q	5.1 inches						
17)	Peak Discharge, q _p	5.92 cu ft/sec	: Eq. 10					
Area	Flow Length, L	140						
A5.2	Travel Time, Tt	0.019 hrs	Ref Eq. 6					
(from		0.508 hrs	Tt + Tc for A	rea A5.2 (pg.	9)			
pt. 15	Unit Peak Disch. q _u	400 csm/in	Ref. Figure 6	-3 "Unit peal	discharge"	Use Type	111	
	Runoff, Q	5.1 inches	From pg. 1					
17)	Peak Discharge, q _p	3.09 cu ft/sec	Eq. 10					
	Peak Discharge, qp Peak Velocity	30.15 cu ft/sec 1.8841 ft/sec 91% of Calcu		el Flow Vel	ocity			

		ENV	IRON	MEN	TA	-0			
		MANAG	EMENT S	ERVICE	S, INC				
Calculation	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	13	of	110
Subject:	Stormv	vater Design	Checked By:	Date:		Job No.:		SMEPA	
Calcula	ate Peak	Discharge from Area A4.2	2						
	Area		1.44 acres	C).00 sq. mile	es			
Calcula	ate Trave	l Time, Tt							
	Sheet H	Flow							
	Pt. 18	Flow Length, L	120 feet		Pt. 19	Flow Leng	ith, L	180 fe	et
	to Pt. 18	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt. 19	Two-yr 24	hr rainfal	5.9	
	19	Land Slope, s	0.25 ft/ft		20	Land Slop	e, s	0.04 ft/	ft
	19	Travel Time, Tt	0.124 hrs	Ref Eq. 8	20	Travel Tim	ne, Tt	0.326	
A4.2	Shallov	v,Concentrated Flow							
A4.2	Pt. 20	Flow Length, L	95 feet						
	to Pt.	Watercourse slope, s	0.04 ft/ft						
	21	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-9	9 "Avg. vel. fo	or est. travel t	ime for sha	llow	
				concentrate	d flow" - use	Unpaved			
		Travel Time, Tt	0.008 hrs	Ref Eq. 6					
	Open C	Channel Flow		100	_				
		Channel Depth, D	2 feet	-		1D	/		
		Channel Width, B	2 feet		-	× ·	1		
		X-Section Area, a	20 sq ft			< B		4(H):1(V	')
		Wetted Perimeter, pw	18.5 feet			Б		. , .	,
		Hydraulic Radus, r	1.082 ft						
	25	energe	0.005 ft/ft						
		Velocity, V	2.220 ft/sec	Ref Eq. 9					
		Flow Length, L	280						
		Travel Time, Tt	0.035 hrs	Ref Eq. 6		-			
	lotal II	ravel Time	0.494 hrs	Sum of Sh	eet, Shallov	v Concentra	ited and C	pen Chan	nel
				-	·				
Calcula		Discharge from Area A4.3	}						
Calcula	ate Peak Area	Discharge from Area A4.3		0	.00 sq. mile	98			
	Area ate Trave	Time, Tt	}	0		es			
	Area	l Time, Tt Flow	1.17 acres	0					
	Area ate Trave Sheet F	Time, Tt Tow Flow Length, L	1.17 acres 100.2 feet	0	.00 sq. mile	Flow Lengt		199.8 fee	ət
	Area ate Travel Sheet F Pt. 22	Time, Tt Tow Flow Length, L Two-yr 24 hr rainfall, P ₂	1.17 acres 100.2 feet 4.9 inches	0	.00 sq. mile Pt. 22	Flow Lengi Two-yr 24	hr rainfal	199.8 fea 5.9	ət
	Area ate Trave Sheet F Pt. 22 to	Time, Tt Tow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft		.00 sq. mile Pt. 22 to Pt.	Flow Leng Two-yr 24 Land Slope	hr rainfal ə, s	5.9 0.04 ft/f	
	Area ate Trave Sheet F Pt. 22 to Pt.18	Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt	1.17 acres 100.2 feet 4.9 inches	O Ref Eq. 8	.00 sq. mile Pt. 22	Flow Lengi Two-yr 24	hr rainfal ə, s	5.9	
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs		.00 sq. mile Pt. 22 to Pt.	Flow Leng Two-yr 24 Land Slope	hr rainfal ə, s	5.9 0.04 ft/f	
	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet		.00 sq. mile Pt. 22 to Pt.	Flow Leng Two-yr 24 Land Slope	hr rainfal ə, s	5.9 0.04 ft/f	
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft	Ref Eq. 8	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet	Ref Eq. 8 Ref. Fig. 6-9	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft	Ref Eq. 8 Ref. Fig. 6-9	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V.	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec	Ref Eq. 8 Ref. Fig. 6-9 concentrated	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec	Ref Eq. 8 Ref. Fig. 6-9 concentrated	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim r est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt A,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt thannel Flow	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs	Ref Eq. 8 Ref. Fig. 6-9 concentrated	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt channel Flow Channel Depth, D	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet	Ref Eq. 8 Ref. Fig. 6-9 concentrated	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim r est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	ft
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24 Open C	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt channel Flow Channel Depth, D Channel Width, B	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 2 feet	Ref Eq. 8 Ref. Fig. 6-9 concentrated	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim r est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	ft
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24 Open C Pt. 17	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt channel Flow Channel Depth, D Channel Width, B X-Section Area, a	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 2 feet 20 sq ft	Ref Eq. 8 Ref. Fig. 6-9 concentrated	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim r est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	ft
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24 Open C Pt. 17	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt A,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 2 feet 20 sq ft 18.5 feet	Ref Eq. 8 Ref. Fig. 6-9 concentrated	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim r est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	ft
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24 Open C Pt. 17 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt A,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 20 sq ft 18.5 feet 1.082 ft	Ref Eq. 8 Ref. Fig. 6-9 concentrated	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim r est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	ft
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24 Open C Pt. 17 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt A,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 20 sq ft 18.5 feet 1.082 ft 0.005 ft/ft	Ref Eq. 8 Ref. Fig. 6-9 concentrated Ref Eq. 6	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim r est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/f 0.354	ft
Calcula	Area ate Travel Sheet F Pt. 22 to Pt.18 Shallow Pt. 23 to Pt. 24 Open C Pt. 17 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt A,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt thannel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	1.17 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 2 feet 20 sq ft 18.5 feet 1.082 ft 0.005 ft/ft 2.220 ft/sec	Ref Eq. 8 Ref. Fig. 6-9 concentrated Ref Eq. 6 Ref Eq. 9 Ref Eq. 6	.00 sq. mile Pt. 22 to Pt. 23	Flow Leng Two-yr 24 Land Slope Travel Tim r est. travel ti Unpaved	hr rainfal e, s e, Tt me for shal	5.9 0.04 ft/f 0.354	ft)

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alculations For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	14	of	110
ubject: Stormv	vater Design	Checked By:	Date:	Job No.:		SMEPA	
alculate Peak	Discharge						
	l _a /P	0.095 in.					
Area	Time of Conc. Tc	0.494 hrs	From calculations above				
Area A4.2	Unit Peak Disch. qu	410 csm/in	Ref. Figure 6-3 "Unit peal	k discharge" Use	e Type I	111	
A4.2	Runoff, Q	5.1 inches	From pg. 1				
	Peak Discharge, qp	4.7048 cu ft/see	c Eq. 10				
	- +						
	l _a /P	0.095 in.					
A	Time of Conc. Tc	0.551 hrs	From calculations above				
Area	Unit Peak Disch. q _u	370 csm/in	Ref. Figure 6-3 "Unit peal	k discharge" Use	e Type I	11	
A4.3	Runoff, Q	5.1 inches	From pg. 1				
	Peak Discharge, q _p	3.45 cu ft/sec	C Eq. 10				
	Flow Longth	000					
Area	Flow Length, L	280 0.035 http					
A8.1	Travel Time, Tt Time of Conc. Tc	0.035 hrs	Ref Eq. 6	443			
(from		0.394 hrs	Tt + Tc for Area A8.1 (pg.				
pt. 17	Unit Peak Disch. q _u	450 csm/in	Ref. Figure 6-3 "Unit peal	discharge" Use	е Туре I	II	
	Runoff, Q	5.1 inches	From pg. 1				
25)	Peak Discharge, q _p	5.31 cu ft/sec	c Eq. 10				
Area	Flow Length, L	280					
A7.2	Travel Time, Tt	0.035 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.595 hrs	Tt + Tc for Area A7.2 (pg.	11)			
pt. 17	Unit Peak Disch. q _u	380 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Use	Type I	11	
to Pt.	Runoff, Q	5.1 inches	From pg. 1				
25)	Peak Discharge, q _p	2.85 cu ft/sec	: Eq. 10				
Area	Flow Length, L	280					
A7.1	Travel Time, Tt	0.035 hrs	Ref Eq. 6				
	Time of Conc. Tc	0.316 hrs	Tt + Tc for Area A7.1 (pg.	11)			
	Unit Peak Disch. qu		Ref. Figure 6-3 "Unit peak			1	
	Runoff, Q	5.1 inches					
25)	Peak Discharge, qp	3.51 cu ft/sec		1			
,	99, чр	2.07 00 10000	_1 .				
Area	Flow Length, L	280					
A6.2	Travel Time, Tt	0.035 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.610 hrs	Tt + Tc for Area A6.2 (pg.	12)			
	Unit Peak Disch. q _u	375 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Use	Type II	I	
	Runoff, Q	5.1 inches	From pg. 1				
25)	Peak Discharge, q _p	3.94 cu ft/sec	Eq. 10				
Area	Flow Length, L	280					
A6.1	Travel Time, Tt	0.035 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.262 hrs	Tt + Tc for Area A6.1 (pg.	12)			
pt. 17	Unit Peak Disch. qu		Ref. Figure 6-3 "Unit peak		Type III		
,	Runoff, Q		From pg. 1	closinge 036	1,40,11		
25)	Peak Discharge, q _p	5.54 cu ft/sec					

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alculatio	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 15		11	0
ubject:	Stormw	rater Design	Checked By:	Date:	Job No.:	SME	PA	
	Area	Flow Length, L	280					
	A5.2	Travel Time, Tt	0.035 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.543 hrs	Tt + Tc for Area A5.2 (pg				
		Unit Peak Disch. q _u	395 csm/in	Ref. Figure 6-3 "Unit peal	k discharge" Use	Type III		
		Runoff, Q		From pg. 1				
	25)	Peak Discharge, q _p	3.05 cu ft/sec	; Eq. 10				
	Area	Flow Length, L	280					
		Travel Time, Tt	0.035 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.248 hrs	Tt + Tc for Area A5.1 (pg.	. 11)			
		Unit Peak Disch. q _u	530 csm/in	Ref. Figure 6-3 "Unit peal	< discharge" Use ⁻	Type III		
		Runoff, Q	5.1 inches	From pg. 1				
	25)	Peak Discharge, q _p	4.31 cu ft/sec					
alculat	e Chanr	el Flow Velocity						
aroura	o onam	X-Section Area, a	20 sq ft					
		Peak Discharge, qp	36.66 cu ft/sec	1				
		Peak Velocity	1.8332 ft/sec					
		· · · · · · · · · · · · · · · · · · ·		lated Channel Flow Vel	ocity			

		MANAG	EMENTS	ERVICES, IN		
Calculatio	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 16	of 11
Subject:	Stormw	ater Design	Checked By:	Date:	Job No.:	SMEPA
-		Discharge from Areas A4.		h		
	Area		1.54 acres	0.00 sq. mil	es	
Calculat	e Trave	Time, Tt				
ouloului	Sheet F					
		Flow Length, L	190 feet		Flow Length, L	0 feet
	Pt. 19	Two-yr 24 hr rainfall, P2	4.9 inches		Two-yr 24 hr rainfa	
A4.1	to Pt.	Land Slope, s	0.25 ft/ft		Land Slope, s	0.04 ft/ft
	25	Travel Time, Tt	0.179 hrs	Ref Eq. 8	Travel Time, Tt	0.000
	Open C	hannel Flow	0.170 115	Nor Eq. 0	naver time, It	0.000
	oponio	Channel Depth, D	2 feet	~	*	/
		Channel Width, B	2 feet		D	
		X-Section Area, a	20 sq ft		The second secon	-
	Df 95				K B	4(H):1(V)
		Wetted Perimeter, pw	18.5 feet			
		Hydraulic Radus, r	1.082 ft			
	26	Channel Slope	0.005 ft/ft			
		Velocity, V	2.220 ft/sec	Ref Eq. 9		
		Flow Length, L	260			
		Travel Time, Tt	0.033 hrs	Ref Eq. 6		
	l'otal Tr	avel Time	0.212 hrs	Sum of Sheet, Shallo	w Concentrated and	Open Channel
Calculat	Peak I	Discharge				
JaiGulat	o i can l	-	0.095 in.			
		I _a /P		—		
	Area	Time of Conc. Tc	0.212 hrs	From calculations above		
	A4.1	Unit Peak Disch. qu	555 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type	: 111
		Runoff, Q	5.1 inches	From pg. 1		
		Peak Discharge, q _p	6.81 cu ft/see	c Eq. 10		
	Area	Flow Length, L	260			
	Area A8.1	Travel Time, Tt	0.033 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.427 hrs	Tt + Tc for Area A8.1 (pg	14)	
	(Unit Peak Disch. qu				ID.
				Ref. Figure 6-3 "Unit pea	k ulscharge. Use Type	113
		Runoff, Q	5.1 inches		(
	26)	Peak Discharge, q _p	5.19 cu ft/sec	3 Eq. 10		
	Агеа	Flow Length, L	260			
		Travel Time, Tt	0.033 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.628 hrs	Tt + Tc for Area A7.2 (pg	. 14)	
		Unit Peak Disch. qu	370 csm/in	Ref. Figure 6-3 "Unit pea	,	10
		Runoff, Q	5.1 inches	From pg. 1	i algonarge use rype	
	26)	Peak Discharge, q _n				
	20)	r eak Discridige, qp	2.77 cu ft/sec	; ⊑q. 10		
	Area	Flow Length, L	260			
		Travel Time, Tt	0.033 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.348 hrs	Tt + Tc for Area A7.1 (pg	14)	
	•	Unit Peak Disch. qu	475 csm/in			111
		Runoff, Q	5.1 inches	Ref. Figure 6-3 "Unit pea From pg. 1	cuscharge Use Type	111

lculatio	ns For:	SMEPA Landfill	Made By: C.	ERVICES, INC J Date: 10/11/16		17	of	110
ubject:	California	vater Design	Checked By:	Date:	Job No.:		SMEPA	110
allo ou		Flow Length, L	260	Date,	1900 110			
	A6.2	Travel Time, Tt	0.033 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.642 hrs	Tt + Tc for Area A6.2 (pg	14)			
		Unit Peak Disch. qu	365 csm/in			a Type III		
		Runoff, Q	5.1 inches		ik discharge tos	етурет		
	26)	Peak Discharge, q _p	3.84 cu ft/s	. –				
	/	r our Discharge, qp	0.04 Cu 103	60 L.q. 10				
	Area	Flow Length, L	260					
	A6.1	Travel Time, Tt	0.033 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.295 hrs	Tt + Tc for Area A6.1 (pg	14)			
	pt. 25	Unit Peak Disch. q _u	500 csm/in					
		Runoff, Q	5.1 inches		k ulscharge Us	етуретп		
	26)	Peak Discharge, q _p						
	20)	Feak Discharge, yp	5.38 cu ft/se	ec Eq. 10				
	Area	Flow Length, L	260					
	A5.2	Travel Time, Tt	0.033 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.575 hrs	Tt + Tc for Area A5.2 (pg.	15)			
	pt. 25	Unit Peak Disch. q _u	385 csm/in	•				
		Runoff, Q	5.1 inches		k discharge" Us	e Type III		
	26)	Peak Discharge, qp	2.98 cu ft/se	10				
	20)	reak Discharge, yp	2.90 CU 10/56	30 ⊑q. 10				
	Area	Flow Length, L	260					
	A5.1	Travel Time, Tt	0.033 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.281 hrs	Tt + Tc for Area A5.1 (pg.	15)			
	pt. 25	Unit Peak Disch. qu		Ref. Figure 6-3 "Unit peal				
	to Pt.	Runoff, Q		From pg. 1	Coscillarge Ose	s iype iii		
	26)	Peak Discharge, qp	4.15 cu ft/se					
	,	, our proonargo, qp	4.10 00 1030	0 Lq. 10				
	Area	Flow Length, L	260					
	A4.2	Travel Time, Tt	0.033 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.526 hrs	Tt + Tc for Area A4.2 (pg.	14)			
		Unit Peak Disch. q _u	400 csm/in			III agvT		
		Runoff, Q	5.1 inches		;			
	26)	Peak Discharge, qp	4.59 cu ft/se					
		U ip		,				
	Агеа	Flow Length, L	260					
	A4.3	Travel Time, Tt	0.033 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.584 hrs	Tt + Tc for Area A4.3 (pg.	14)			
	pt. 25	Unit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Use	Type III		
	to Pt.	Runoff, Q	5.1 inches		Ū			
	26)	Peak Discharge, q _p	3.64 cu ft/se	c Eq. 10				
lculate	e Chann	el Flow Velocity						
		X-Section Area, a	20 sq ft					
		Peak Discharge, qp	42.71 cu ft/se	с				
		Peak Velocity	2.1353 ft/sec					
			96% of Calci	ulated Channel Flow Velo	ocity			

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-		MANAG	EMENTS	ERVICE					
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Subject:	Stormw	/ater Design	Checked By:	Date:		Job No.:		SMEPA	
Calcula	te Peak	Discharge from Area A3.2							
	Area		1.22 acres	().00 sq. mile	es			
Calcula	ate Trave	l Time, Tt							
	Sheet F	Flow							
	Pt. 18	Flow Length, L	120 feet		Pt. 19	Flow Leng	th, L	180 fe	et
	to Pt. 16	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24	hr rainfal	5.9	
	19	Land Slope, s	0.25 ft/ft		27	Land Slop	e, s	0.04 ft/	′ft
	19	Travel Time, Tt	0.124 hrs	Ref Eq. 8	21	Travel Tim	ne, Tt	0.326	
A3.2	Shallow	,Concentrated Flow							
A0.2	Pt. 27	Flow Length, L	95 feet						
	to Pt.	Watercourse slope, s	0.04 ft/ft						
	28	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-	9 "Avg. vel. fo	r est. travel t	ime for sha	llow	
				concentrate	d flow" - use	Unpaved			
		Travel Time, Tt	0.008 hrs	Ref Eq. 6					
	Open C	Channel Flow		4				-	
		Channel Depth, D	2 feet			ÎD	/		
		Channel Width, B	3 feet			×	~		
		X-Section Area, a	22 sq ft					4(H):1(\	/)
	Pt. 26	Wetted Perimeter, pw	19.5 feet						
	to Pt.	Hydraulic Radus, r	1.129 ft						
	31	Channel Slope	0.005 ft/ft						
		Velocity, V	2.284 ft/sec	Ref Eq. 9					
		Flow Length, L	200						
		Travel Time, Tt	0.024 hrs	Ref Eq. 6		_			
	Total T	Travel Time, Tt ravel Time	0.024 hrs 0.483 hrs		ieet, Shallov	v Concentra	ated and C)pen Char	nel
Calcula			0.483 hrs		eet, Shallov	v Concentra	ated and C)pen Char	nnel
Calcula		ravel Time	0.483 hrs	Sum of Sh	neet, Shallov 0.00 sq. mile		ated and C)pen Char	nel
	ite Peak Area ite Trave	ravel Time Discharge from Area A.3.3	0.483 hrs	Sum of Sh			ated and C)pen Char	nel
	ite Peak Area	ravel Time Discharge from Area A.3.3	0.483 hrs	Sum of Sh			ated and C)pen Char	nel
	ite Peak Area ite Trave Sheet F	ravel Time Discharge from Area A.3.: I Time, Tt Flow	0.483 hrs 3 1.13 acres	Sum of Sh		25			
	ite Peak Area ite Trave	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L	0.483 hrs 1.13 acres 100.2 feet	Sum of Sh).00 sq. mile Pt. 22	es Flow Leng	th, L	199.8 fe	
	te Peak Area te Trave Sheet F Pt. 22 to	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂	0.483 hrs 1.13 acres 100.2 feet 4.9 inches	Sum of Sh	0.00 sq. mile Pt. 22 to Pt.	Flow Leng Two-yr 24	th, L hr∘rainfal	199.8 fe 5.9	et
	ite Peak Area ite Trave Sheet F Pt. 22	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft	Sum of Sh).00 sq. mile Pt. 22	Flow Leng Two-yr 24 Land Slop	th, L hr∶rainfai e, s	199.8 fe 5.9 0.04 ft/	et
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt	0.483 hrs 1.13 acres 100.2 feet 4.9 inches	Sum of Sh	0.00 sq. mile Pt. 22 to Pt.	Flow Leng Two-yr 24	th, L hr∶rainfai e, s	199.8 fe 5.9	et
	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs	Sum of Sh	0.00 sq. mile Pt. 22 to Pt.	Flow Leng Two-yr 24 Land Slop	th, L hr∶rainfai e, s	199.8 fe 5.9 0.04 ft/	et
Calcula	tte Peak Area tte Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet	Sum of Sh	0.00 sq. mile Pt. 22 to Pt.	Flow Leng Two-yr 24 Land Slop	th, L hr∶rainfai e, s	199.8 fe 5.9 0.04 ft/	et
Calcula	tte Peak Area tte Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt.	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft	Sum of Sh	0.00 sq. mile Pt. 22 to Pt. 29	Flow Leng Two-yr 24 Land Slop Travel Tim	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et
Calcula	tte Peak Area tte Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et
Calcula	tte Peak Area tte Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt.	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V.	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4 concentrate	0.00 sq. mile Pt. 22 to Pt. 29	Flow Leng Two-yr 24 Land Slop Travel Tim	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4 concentrate	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30	ravel Time Discharge from Area A.3.3 Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4 concentrate	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt V,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 3 feet	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4 concentrate	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et 'ft
Calcula	tte Peak Area tte Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30	ravel Time Discharge from Area A.3.3 Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Flow Channel Depth, D Channel Width, B X-Section Area, a	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 3 feet 22 sq ft	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4 concentrate	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et 'ft
Calcula	tte Peak Area tte Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30 Open C Pt. 26	ravel Time Discharge from Area A.3.3 Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 3 feet 22 sq ft 19.5 feet	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4 concentrate	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et 'ft
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30 Open C Pt. 26 to Pt.	ravel Time Discharge from Area A.3.3 Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 3 feet 22 sq ft 19.5 feet 1.129 ft	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4 concentrate	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et 'ft
Calcula	tte Peak Area tte Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30 Open C Pt. 26	ravel Time Discharge from Area A.3.3 Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 3 feet 22 sq ft 19.5 feet 1.129 ft 0.005 ft/ft	Sum of Sh Ref Eq. 8 Ref. Fig. 6-6 concentrate Ref Eq. 6	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et 'ft
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30 Open C Pt. 26 to Pt.	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 3 feet 22 sq ft 19.5 feet 1.129 ft 0.005 ft/ft 2.284 ft/sec	Sum of Sh Ref Eq. 8 Ref. Fig. 6-4 concentrate	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et 'ft
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30 Open C Pt. 26 to Pt.	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V Flow Length, L	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 3 feet 22 sq ft 19.5 feet 1.129 ft 0.005 ft/ft 2.284 ft/sec 200	Sum of Sh Ref Eq. 8 Ref. Fig. 6-9 concentrate Ref Eq. 6	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et 'ft
Calcula	te Peak Area te Trave Sheet F Pt. 22 to Pt.18 Shallow Pt. 29 to Pt. 30 Open C Pt. 26 to Pt.	ravel Time Discharge from Area A.3.3 I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	0.483 hrs 1.13 acres 100.2 feet 4.9 inches 0.1 ft/ft 0.155 hrs 75.2 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 3 feet 22 sq ft 19.5 feet 1.129 ft 0.005 ft/ft 2.284 ft/sec	Sum of Sh Ref Eq. 8 Ref. Fig. 6-6 concentrate Ref Eq. 6	0.00 sq. mile Pt. 22 to Pt. 29 9 "Avg. vel. fo	Flow Leng Two-yr 24 Land Slop Travel Tim r est. travel t Unpaved	th, L hr∵rainfai e, s ne, Tt	199.8 fe 5.9 0.04 ft/ 0.354	et ′ft

	MANAC	EMENT SI	RVICES, INC	V			
Calculations For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	19	of	110
Subject: Stormy		Checked By:	Date:	Job No.:		SMEPA	
Calculate Peak		Taura alt	Bailor	000 110.1		United to the second se	
Carlo and a second	I _a /P	0.095 in.					
	Time of Conc. Tc	0.483 hrs	From calculations above				
Area	Unit Peak Disch. qu	410 csm/in	Ref. Figure 6-3 "Unit peal	k discharge" l	Jse Tvpe	10	
A3.2	Runoff, Q	5.1 inches			·)		
	Peak Discharge, q _p	3.986 cu ft/see					
	, continue go, qp						
	l _e /P	0.095 in.					
	Time of Conc. Tc	0.541 hrs	From calculations above				
Area	Unit Peak Disch. qu	395 csm/in	Ref. Figure 6-3 "Unit peal	discharge" (Jse Type	III	
A3.3	Runoff, Q	5.1 inches	From pg. 1)		
	Peak Discharge, qp	3.56 cu ft/sec					
		000					
Area	Flow Length, L	200					
A8.1	Travel Time, Tt	0.024 hrs	Ref Eq. 6	10)			
•	Time of Conc. To	0.451 hrs	Tt + Tc for Area A8.1 (pg.	•			
	Unit Peak Disch. q _u	430 csm/in	Ref. Figure 6-3 "Unit peak	(discharge" (Jse Type	111	
10 Pl. 31)	Runoff, Q	5.1 inches	From pg. 1				
51)	Peak Discharge, q _p	5.07 cu ft/sec	; Eq. 10				
Area	Flow Length, L	200					
A7.2	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.652 hrs	Tt + Tc for Area A7.2 (pg.	16)			
pt. 26	Unit Peak Disch. q _u	360 csm/in	Ref. Figure 6-3 "Unit peak	discharge" l	Jse Type I	H	
to Pt.	Runoff, Q	5.1 inches	From pg. 1				
31)	Peak Discharge, q _p	2.70 cu ft/sec	; Eq. 10				
Area	Flow Length, L	200					
A7.1	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.372 hrs	Tt + Tc for Area A7.1 (pg.	16)			
	Unit Peak Disch. qu		Ref. Figure 6-3 "Unit peak		lse Tvne I	1	
•	Runoff, Q	5.1 inches	From pg. 1				
31)	Peak Discharge, q _p	3.23 cu ft/sec			;		
,	чр		t				
Area	Flow Length, L	200					
A6.2	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.667 hrs	Tt + Tc for Area A6.2 (pg.	17)			
pt. 26	Unit Peak Disch. q _u	340 csm/in	Ref. Figure 6-3 "Unit peak	discharge" L	lse Type I	ŧ	
	Runoff, Q	5.1 inches	From pg. 1				
31)	Peak Discharge, q _p	3.58 cu ft/sec	: Eq. 10				
Агеа	Flow Length, L	200					
Alea A6.1	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.319 hrs	Tt + Tc for Area A6.1 (pg.	17)			
	Unit Peak Disch. qu	390 csm/in	Ref. Figure 6-3 "Unit peak		se Type I	11	
	Runoff, Q	5.1 inches					
31)	Peak Discharge, q _p	4.20 cu ft/sec					

	Area A5.2 (from pt. 26 to Pt. 31) Area A5.1 (from pt. 26 to Pt. 31) Area A4.2 (from	SMEPA Landfill rater Design Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt	Made By: CJ Checked By: 200 0.024 hrs 0.600 hrs 380 csm/in 5.1 inches 2.94 cu ft/sec 200 0.024 hrs 0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec 200	Ref Eq. 6 It + Tc for Area A5.1 (p Ref. Figure 6-3 "Unit pe From pg. 1	Job No.: og. 17) eak discharge" U og. 17)			110
	Area A5.2 (from pt. 26 to Pt. 31) Area A5.1 (from pt. 26 to Pt. 31) Area A4.2 (from	Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	200 0.024 hrs 0.600 hrs 380 csm/in 5.1 inches 2.94 cu ft/sec 200 0.024 hrs 0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec	Ref Eq. 6 Tt + Tc for Area A5.2 (p Ref. Figure 6-3 "Unit pe From pg. 1 Eq. 10 Ref Eq. 6 Ft + Tc for Area A5.1 (p Ref. Figure 6-3 "Unit pe From pg. 1	og. 17) eak discharge" U og. 17)		111	
	A5.2 (from pt. 26 to Pt. 31) Area A5.1 (from pt. 26 to Pt. 31) Area A4.2 (from	Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Flow Length, L Travel Time, Tt	0.024 hrs 0.600 hrs 380 csm/in 5.1 inches 2.94 cu ft/sec 200 0.024 hrs 0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec	Tt + Tc for Area A5.2 (p Ref. Figure 6-3 "Unit pe From pg. 1 Eq. 10 Ref Eq. 6 Ft + Tc for Area A5.1 (p Ref. Figure 6-3 "Unit pe From pg. 1	eak discharge" U og. 17)			
	Area A5.1 (from pt. 26 to Pt. 31) Area A4.2 (from	Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	380 csm/in 5.1 inches 2.94 cu ft/sec 200 0.024 hrs 0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec	Ref. Figure 6-3 "Unit pe From pg. 1 Eq. 10 Ref Eq. 6 If + Tc for Area A5.1 (p Ref. Figure 6-3 "Unit pe From pg. 1	eak discharge" U og. 17)			
	Area A5.1 (from pt. 26 to Pt. 31) Area A4.2 (from	Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	5.1 inches 2.94 cu ft/sec 200 0.024 hrs 0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec	From pg. 1 Eq. 10 Ref Eq. 6 It + Tc for Area A5.1 (p Ref. Figure 6-3 "Unit pe From pg. 1	vg. 17)			
	31) Area A5.1 (from pt. 26 to Pt. 31) Area A4.2 (from	Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	2.94 cu ft/sec 200 0.024 hrs 0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec	Eq. 10 Ref Eq. 6 It + Tc for Area A5.1 (p Ref. Figure 6-3 "Unit pe From pg. 1	- •	se Type	111	
	Area A5.1 (from pt. 26 to Pt. 31) Area A4.2 (from	Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	200 0.024 hrs 0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec	Ref Eq. 6 It + Tc for Area A5.1 (p Ref. Figure 6-3 "Unit pe From pg. 1	- •	se Type		
	A5.1 (from pt. 26 to Pt. 31) Area A4.2 (from	Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.024 hrs 0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec	Րt + Tc for Area A5.1 (բ Ref. Figure 6-3 "Unit pe From pg. 1	- •	se Type		
	(from pt. 26 to Pt. 31) Area A4.2 (from	Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.305 hrs 495 csm/in 5.1 inches 4.02 cu ft/sec	Րt + Tc for Area A5.1 (բ Ref. Figure 6-3 "Unit pe From pg. 1	- •	se Type		
	pt. 26 to Pt. 31) Area A4.2 (from	Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	495 csm/in 5.1 inches 4.02 cu ft/sec	Ref. Figure 6-3 "Unit pe From pg. 1	- •	se Type	Ш	
	to Pt. 31) Area A4.2 (from	Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	5.1 inches 4.02 cu ft/sec	From pg. 1	ak discharge" U	se Type	III	
	31) Area A4.2 (from	Peak Discharge, q _p Flow Length, L Travel Time, Tt	4.02 cu ft/sec					
1	Area A4.2 (from	Flow Length, L Travel Time, Tt		=q. 10				
1	A4.2 (from	Travel Time, Tt	200					
1	(from							
ļ	•	T: 10 T	0.024 hrs	Ref Eq. 6				
		Time of Conc. To	0.550 hrs	Ft + Tc for Area A4.2 (p		_		
	-	Unit Peak Disch. q _u	395 csm/in	Ref. Figure 6-3 "Unit pe	ak discharge" U	se Type	111	
	31)	Runoff, Q Peak Discharge, q _p	5.1 inches 4.53 cu ft/sec	From pg. 1 Eq. 10				
	Агеа	Flow Length, L	200					
		Travel Time, Tt	0.024 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.608 hrs	t + Tc for Area A4.3 (p	g. 17)			
F	, pt. 26	Unit Peak Disch. q _u	380 csm/in	Ref. Figure 6-3 "Unit pe	ak discharge" U	se Type	Ш	
1		Runoff, Q	5.1 inches	rom pg. 1				
	31)	Peak Discharge, q _p	3.54 cu ft/sec	Eq. 10				
		Flow Length, L	200					
		Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	•	Time of Conc. Tc		t + Tc for Area A4.1 (p				
		Unit Peak Disch. q _u		Ref. Figure 6-3 "Unit pe	ak discharge" Us	se Type	111	
1		Runoff, Q	5.1 inches 6.63 cu ft/sec	rom pg. 1				
	51)	Peak Discharge, q _p		:q. 10				
Calculate		el Flow Velocity						
		X-Section Area, a	22 sq ft					
		Peak Discharge, qp	47.97 cu ft/sec					
		Peak Velocity	2.1806 ft/sec	ted Channel Flow Ve	alocity			
			30 % Of Calcu		sideity			

		MANACI	EMENT SE	RVICES, INC	· · ·	
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 21	of 110
Subject:	Stormw	ater Design	Checked By:	Date:	Job No.:	SMEPA
-		Discharge from Areas A3.				
	Area	Ŭ	1.32 acres	0.00 sq. mile	es	
Calcula	te Travel	Time, Tt				
	Sheet F					
	Pt. 32	Flow Length, L	185 feet		Flow Length, L	0 feet
40.4		Two-yr 24 hr rainfall, P2	4.9 inches		Two-yr 24 hr rainfal	5.9
A3.1	to Pt.	Land Slope, s	0.25 ft/ft		Land Slope, s	0.04 ft/ft
	31	Travel Time, Tt	0.176 hrs	Ref Eq. 8	Travel Time, Tt	0.000
	Open C	hannel Flow				
		Channel Depth, D	2 feet		1.	/
		Channel Width, B	4 feet		D	
		X-Section Area, a	24 sq ft		k J e	100.400
	Pt 31	Wetted Perimeter, p _w	20.5 feet		B	_4(H):1(V)
		Hydraulic Radus, r	1.171 ft			
	33	•				
	33	Channel Slope	0.005 ft/ft			
		Velocity, V	2.341 ft/sec	Ref Eq. 9		
		Flow Length, L	560			
		Travel Time, Tt	0.066 hrs	Ref Eq. 6		
	Total Tr	avel Time	0.242 hrs	Sum of Sheet, Shallov	v Concentrated and (Open Channel
Jaicula	те Реак і	Discharge	0.005			
		I _a /P	0.095 in.			
	Area	Time of Conc. Tc	0.242 hrs	From calculations above		
	A3.1	Unit Peak Disch. q _u	540 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type	10
	/10.1	Runoff, Q	5.1 inches	From pg. 1		
		Peak Discharge, q _p	5.68 cu ft/sec	: Eq. 10		
	Area	Flow Length, L	560			
	Alea A8,1	Travel Time, Tt	0.066 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.518 hrs	Tt + Tc for Area A8.1 (pg	19)	
	(Ref. Figure 6-3 "Unit pea		11
		Unit Peak Disch. q _u		•	a discharge use rype	117
		Runoff, Q	5.1 inches	From pg. 1		
	33)	Peak Discharge, q _p	4.72 cu ft/sec	; ⊨q. 10		
	Area	Flow Length, L	560			
	A7.2	Travel Time, Tt	0.066 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.719 hrs	Tt + Tc for Area A7.2 (pg	. 19)	
	(··· = · · ·	Unit Peak Disch. qu	350 csm/in	Ref. Figure 6-3 "Unit peal	•	
		Runoff, Q	5.1 inches	From pg. 1	Calsonargo Doo ryper	
	33)	Peak Discharge, q _p	2.62 cu ft/sec	; ⊨q. 10		
	Area	Flow Length, L	560			
	A7.1	Travel Time, Tt	0.066 hrs	Ref Eq. 6		
	(from	Time of Conc. Tc	0.439 hrs	Tt + Tc for Area A7.1 (pg.	19)	
	pt. 31	Unit Peak Disch. q _u	445 csm/in	Ref. Figure 6-3 "Unit peal		11
		Runoff, Q	5.1 inches	From pg. 1	. alsonargo obo ryper	
	to Pt. 33)	Peak Discharge, q _p	3.16 cu ft/sec			

MANAGEMENT SERVICES, INC.								
Calculations For:	SMEPA Landfill	Made By: CJ	1	Sheet No.: 22	of	110		
	water Design	Checked By:	Date:	Job No.:	SMEPA			
	Flow Length, L	560	Duto.	000110	ONLET	-		
A6.2	Travel Time, Tt	0.066 hrs	Ref Eg. 6					
A0.2 (from		0.733 hrs	Tt + Tc for Area A6.2 (pg.	10)				
(··· = · · ·					- 10			
	Unit Peak Disch. qu	345 csm/in	Ref. Figure 6-3 "Unit peal	c discharge" Use Type	e III			
	Runoff, Q	5.1 inches	From pg. 1					
33)	Peak Discharge, q _p	3.63 cu ft/se	c Eq. 10					
Area	Flow Length, L	560						
A6.1	Travel Time, Tt	0.066 hrs	Ref Eq. 6					
(from		0.386 hrs	Tt + Tc for Area A6.1 (pg.	19)				
pt. 31	Unit Peak Disch. qu	455 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Use Type	ə III			
to Pt.	Runoff, Q	5.1 inches	From pg. 1					
33)	Peak Discharge, q _p	4.89 cu ft/see						
Area	Flow Length, L	560						
A5.2	Travel Time, Tt	0.066 hrs	Ref Eq. 6					
(from	Time of Conc. Tc	0.666 hrs	Tt + Tc for Area A5.2 (pg.	20)				
pt. 31		360 csm/in	Ref. Figure 6-3 "Unit peak		111			
	Runoff, Q	5.1 inches	From pg. 1	alconargo oco rype	5 111			
33)	Peak Discharge, q _p	2.78 cu ft/sec	. +					
0.000	Elow Longth	560						
Area	Flow Length, L Travel Time, Tt	0.066 hrs						
A5.1			Ref Eq. 6	00)				
(from		0.372 hrs	Tt + Tc for Area A5.1 (pg.	-				
pt. 31		460 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Use Type	e III			
	Runoff, Q	5.1 inches	From pg. 1					
33)	Peak Discharge, q _p	3.74 cu ft/sec	; Eq. 10					
Area	Flow Length, L	560						
A4.2	Travel Time, Tt	0.066 hrs	Ref Eq. 6					
(from	Time of Conc. Tc	0.617 hrs	Tt + Tc for Area A4.2 (pg.	20)				
pt. 31	Unit Peak Disch. q _u	385 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Use Type	e]			
to Pt.	Runoff, Q	5.1 inches	From pg. 1					
33)	Peak Discharge, q _p	4.42 cu ft/sec						
Area	Flow Length, L	560						
A4.3	Travel Time, Tt	0.066 hrs	Ref Eq. 6					
(from		0.675 hrs	Tt + Tc for Area A4.3 (pg.	20)				
pt. 31		360 csm/in		•	ш			
	Runoff, Q	5.1 inches						
33)	Peak Discharge, q _p	3.36 cu ft/sec						
Area	Flow Length, L	560						
Area A4.1	Travel Time, Tt	0.066 hrs	Ref Eq. 6					
	Time of Conc. Tc		•	20)				
,		0.303 hrs	Tt + Tc for Area A4.1 (pg. :					
pt. 31		500 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Use Type				
	Runoff, Q	5.1 inches						
33)	Peak Discharge, q _o	6.14 cu ft/sec	Eq. 10					

		MANAG	GEMENT S	ERVICI	ES, INC	0			
alculation	is For:	SMEPA Landfill	Made By: CJ	1	10/11/16	1	23	of	110
ibject:	Stormw	ater Design	Checked By:	Date:	1	Job No.:		SMEPA	
		Flow Length, L	560						
	A3.2	Travel Time, Tt	0.066 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.549 hrs		Area A3.2 (pg				
	•	Unit Peak Disch. q _u	395 csm/in	-	e 6-3 "Unit pea	k discharge"	Use Typ	e III	
		Runoff, Q	5.1 inches						
	33)	Peak Discharge, q _p	3.84 cu ft/se	с Eq. 10					
	Area	Flow Length, L	560						
		Travel Time, Tt	0.066 hrs 0.607 hrs	Ref Eq. 6	Area A3.3 (pg	10)			
		Time of Conc. Tc Unit Peak Disch. q _u	380 csm/in		6-3 "Unit pea			- III	
		Runoff, Q	5.1 inches			k uscharge	Use Type	6 111	
	33)	Peak Discharge, q _p	3.42 cu ft/se	• =					
alculat	e Chapr	nel Flow Velocity							
	e serrorii	X-Section Area, a	24 sq ft						
		Peak Discharge, qp	52.39 cu ft/se	с					
		Peak Velocity	2.183 ft/sec						
		-	93% of Calc	ulated Char	inel Flow Vel	locity			

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

		MANAG	EMENT S	FRVICE	S. INC	-10			
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	24	of	110
Subject:	Stormw	ater Design	Checked By:	Date:		Job No.:		SMEPA	-
		Discharge from Areas A2		1					
	Area	Compary Antonio and	0.78 acres		0.00 sq. mile	s			
Calcula	te Trave	l Time, Tt							
	Sheet F	Flow							
	Pt. 34	Flow Length, L	127.4 feet		Pt. 35	Flow Leng	th, L	172.6 fee	t
	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24	hr rainfal	5.9	
	35	Land Slope, s	0.25 ft/ft		36	Land Slop	e, s	0.04 ft/ft	
A2.1	55	Travel Time, Tt	0.130 hrs	Ref Eq. 8		Travel Tim	ne, Tt	0.315	
/ \4		,Concentrated Flow							
		Flow Length, L	55.9 feet						
		Watercourse slope, s	0.04 ft/ft						
	37	Avg. Velocity, V.	3.2 ft/sec						
		Travel Time, Tt	0.005 hrs	Ref Eq. 6					
	Open C	Channel Flow	0.6	1		*		1	
		Channel Depth, D	2 feet		1	∫ D	1		
		Channel Width, B	5 feet			*	2		
	D4 33	X-Section Area, a	26 sq ft 21 5 foot			< B >		4(H):1(V)	1
		Wetted Perimeter, p _w	21.5 feet						
	38	Hydraulic Radus, r Channel Slope	1.210 ft 0.005 ft/ft						
	20	Velocity, V	2.392 ft/sec	Ref Eq. 9					
		Flow Length, L	235	iver Ed. a					
		Travel Time, Tt	0.027 hrs	Ref Eq. 6					
	TAALT								
		ravel Time	0.478 hrs	Sum of St	neet, Shallow	Concentra	ated and O	pen Chanr	lel
1	lotal II	ravel Time	0.478 hrs	Sum of St	neet, Shallow	/ Concentra	ated and O	ipen Chann	iel
Calcula		ravel Time Discharge	0.478 hrs	Sum of St	neet, Shallow	/ Concentra	ited and O	pen Chann	iel
Calcula			0.478 hrs	Sum of St	neet, Shallow	/ Concentra	ited and O	pen Chann	ıel
Calcula	te Peak I	Discharge			neet, Shallow lations above	/ Concentra	ited and O	ipen Chann	ıel
Calcula	te Peak I Area	Discharge I _a /P	0.095 in.	- From calcu					ıel
Calcula	te Peak I	Discharge I _a /P Time of Conc. Tc	0.095 in. 0.478 hrs	- From calcu	lations above 6-3 "Unit peal				iel
Calcula	te Peak I Area	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.095 in. 0.478 hrs 410 csm/in	From calcu Ref. Figure From pg. 1	lations above 6-3 "Unit peal				ıel
Calcula	te Peak I Area	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.095 in. 0.478 hrs 410 csm/in 5.1 inches	From calcu Ref. Figure From pg. 1	lations above 6-3 "Unit peal				ıel
Calcula	te Peak I Area	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.095 in. 0.478 hrs 410 csm/in 5.1 inches	From calcu Ref. Figure From pg. 1	lations above 6-3 "Unit peal				ıel
Calcula	Area Area A2.1	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed	From calcu Ref. Figure From pg. 1	lations above 6-3 "Unit peal				ıel
Calcula	te Peak Area A2.1 Area	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed 235	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6	lations above 6-3 "Unit peal	k discharge"			iel
Calcula	te Peak Area A2.1 Area A8.1	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sec 235 0.027 hrs	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for <i>i</i>	lations above 6-3 "Unit peal	k discharge" . 21)	Use Type II	11	iel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt.	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/set 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches	From calcu Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for <i>i</i> Ref. Figure From pg. 1	lations above 6-3 "Unit peal Area A8.1 (pg.	k discharge" . 21)	Use Type II	11	iel
Calcula	Area A2.1 Area A8.1 (from pt. 33	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed 235 0.027 hrs 0.545 hrs 395 csm/in	From calcu Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for <i>i</i> Ref. Figure From pg. 1	lations above 6-3 "Unit peal Area A8.1 (pg.	k discharge" . 21)	Use Type II	11	iel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt.	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sed	From calcu Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for <i>i</i> Ref. Figure From pg. 1	lations above 6-3 "Unit peal Area A8.1 (pg.	k discharge" . 21)	Use Type II	11	ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt.	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sed 235	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for , Ref. Figure From pg. 1 c Eq. 10	lations above 6-3 "Unit peal Area A8.1 (pg.	k discharge" . 21)	Use Type II	11	ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38)	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sec 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sec 235 0.027 hrs	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for , Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal	k discharge" . 21) k discharge"	Use Type II	11	ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sed 235 0.027 hrs 0.746 hrs	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal Area A7.2 (pg.	k discharge" . 21) k discharge" . 21)	Use Type II Use Type II	11	ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sec 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sec 235 0.027 hrs 0.746 hrs 345 csm/in	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal	k discharge" . 21) k discharge" . 21)	Use Type II Use Type II	11	lel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33 to Pt.	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sec 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sec 235 0.027 hrs 0.746 hrs 345 csm/in 5.1 inches	From calcu Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal Area A7.2 (pg.	k discharge" . 21) k discharge" . 21)	Use Type II Use Type II	11	ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sec 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sec 235 0.027 hrs 0.746 hrs 345 csm/in	From calcu Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal Area A7.2 (pg.	k discharge" . 21) k discharge" . 21)	Use Type II Use Type II	11	ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33 to Pt. 38)	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sec 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sec 235 0.027 hrs 0.746 hrs 345 csm/in 5.1 inches 2.58 cu ft/sec	From calcu Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal Area A7.2 (pg.	k discharge" . 21) k discharge" . 21)	Use Type II Use Type II	11	lel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33 to Pt. 38) Area	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sec 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sec 235 0.027 hrs 0.746 hrs 345 csm/in 5.1 inches 2.58 cu ft/sec 235	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for , Ref. Figure From pg. 1 c Eq. 10 Ref. Figure From pg. 1 c Eq. 10	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal Area A7.2 (pg.	k discharge" . 21) k discharge" . 21)	Use Type II Use Type II	11	ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33 to Pt. 38) Area A7.2	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sed 235 0.027 hrs 0.746 hrs 345 csm/in 5.1 inches 2.58 cu ft/sed 235 0.027 hrs	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal Area A7.2 (pg. 6-3 "Unit peal	k discharge" . 21) k discharge" . 21) k discharge"	Use Type II Use Type II	11	ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33 to Pt. 38) Area	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sed 235 0.027 hrs 0.746 hrs 345 csm/in 5.1 inches 2.58 cu ft/sed 235 0.027 hrs 0.466 hrs	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal Area A7.2 (pg. 6-3 "Unit peal	k discharge" . 21) k discharge" . 21) k discharge" 21)	Use Type II Use Type II Use Type II		ıel
Calcula	Area A2.1 Area A8.1 (from pt. 33 to Pt. 38) Area A7.2 (from pt. 33 to Pt. 38) Area A7.1 (from pt. 33	Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.095 in. 0.478 hrs 410 csm/in 5.1 inches 2.55 cu ft/sed 235 0.027 hrs 0.545 hrs 395 csm/in 5.1 inches 4.66 cu ft/sed 235 0.027 hrs 0.746 hrs 345 csm/in 5.1 inches 2.58 cu ft/sed 235 0.027 hrs	From calcu Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7 Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for 7	lations above 6-3 "Unit peal Area A8.1 (pg. 6-3 "Unit peal Area A7.2 (pg. 6-3 "Unit peal	k discharge" . 21) k discharge" . 21) k discharge" 21)	Use Type II Use Type II Use Type II		lel

		MANIAC	EMENT CE	RVICES, INC	- W			
Calculations	For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16		25	of	110
Subject: S	Stormw	ater Design	Checked By:	Date:	Job No.:		SMEPA	
	Area	Flow Length, L	235					
	A6.2	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.761 hrs	Tt + Tc for Area A6.2 (pg.				
		Unit Peak Disch. q _u	340 csm/in	Ref. Figure 6-3 "Unit peak	< discharge"	Use Type	111	
		Runoff, Q	5.1 inches	From pg. 1				
	38)	Peak Discharge, q _p	3.58 cu ft/sec	; Eq. 10				
	Area	Flow Length, L	235					
	Afea A6.1	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	/from	Time of Conc. Tc	0.413 hrs	Tt + Tc for Area A6.1 (pg.	22)			
		Unit Peak Disch. qu	445 csm/in	Ref. Figure 6-3 "Unit peal		Use Type	111	
		Runoff, Q	5.1 inches	From pg. 1				
	38)	Peak Discharge, qp	4.79 cu ft/sec					
	/			I				
	Area	Flow Length, L	235					
	A5.2	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.693 hrs	Tt + Tc for Area A5.2 (pg.				
	pt. 33	Unit Peak Disch. q _u	355 csm/in	Ref. Figure 6-3 "Unit peal	discharge"	Use Type	111	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	38)	Peak Discharge, q _p	2.74 cu ft/sec	: Eq. 10				
	A	Flow Length, L	235					
	Area A5.1	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	AU.T	Time of Conc. Tc	0.399 hrs	Tt + Tc for Area A5.1 (pg.	22)			
		Unit Peak Disch. qu	450 csm/in	Ref. Figure 6-3 "Unit peal	•	Use Tvpe I	01	
		Runoff, Q	5.1 inches	From pg. 1				
	38)	Peak Discharge, q _p	3.66 cu ft/sec					
	,	. con _ con go, qp		- 1				
	Area	Flow Length, L	235					
	A4.2	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.644 hrs	Tt + Tc for Area A4.2 (pg.				
	1°	Unit Peak Disch. q _u	365 csm/in	Ref. Figure 6-3 "Unit peal	discharge"	Use Type I		
		Runoff, Q	5.1 inches	From pg. 1				
	38)	Peak Discharge, q _p	4.19 cu ft/sec	: Eq. 10				
	A	Flow Length, L	235					
	Area A4.3	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(from		0.702 hrs	Tt + Tc for Area A4.3 (pg.	22)			
		Unit Peak Disch. q _u	355 csm/in	Ref. Figure 6-3 "Unit peak		Use Type I	11	
	•	Runoff, Q	5.1 inches	•		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
	38)	Peak Discharge, q _p	3.31 cu ft/sec					
)			17 Y				
	Area	Flow Length, L	235					
	A4.1	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(from		0.330 hrs	Tt + Tc for Area A4.1 (pg.				
		Unit Peak Disch. q _u	490 csm/in	Ref. Figure 6-3 "Unit peak	discharge"	Jse Type I	11	
		Runoff, Q	5.1 inches					
	38)	Peak Discharge, q _p	6.01 cu ft/sec	: Eq. 10				

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alculation	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/		26	of	110
		ater Design	Checked By:	Date:	Job No.:		SMEPA	
-	Area	Flow Length, L	235					
	A3.2	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	1	Time of Conc. Tc	0.577 hrs	Tt + Tc for Area A3.2				
		Unit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit	peak discharge" l	Jse Type	- 118	
		Runoff, Q	5.1 inches	From pg. 1				
	38)	Peak Discharge, q _p	3.79 cu ft/se	5 Eq. 10				
	Area	Flow Length, L	235					
	A3.3	Travel Time, Tt	0.027 hrs	Ref Eq. 6	(n.g. 02)			
		Time of Conc. Tc	0.634 hrs	Tt + Tc for Area A3.3		leo Type		
		Unit Peak Disch. qu	375 csm/in 5.1 inches	Ref. Figure 6-3 "Unit From pg. 1	peak discharge i	Jse Type		
	38)	Runoff, Q	3.38 cu ft/se					
	30)	Peak Discharge, q _p	3.30 CU 1/580	, Eq. 10				
	Area	Flow Length, L	235					
	A3.1	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.269 hrs	Tt + Tc for Area A3.1				
	pt. 33	Unit Peak Disch. qu	505 csm/in	Ref. Figure 6-3 "Unit	peak discharge" (Jse Type	- CII	
		Runoff, Q	5.1 inches					
	38)	Peak Discharge, q _p	5.31 cu ft/se	5 Eq. 10				
alculat	e Chanr	nel Flow Velocity	00 #					
· .		X-Section Area, a	26 sq ft 53.56 cu ft/se					
		Peak Discharge, qp Peak Velocity	2.0601 ft/sec	;				
		Feak velocity		lated Channel Flow	Velocity			
					·,			

		MANAG	EMENT SE	RVICE	S, INC	. ~	_		_
Calculation	ns For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16		27	of	110
Subject:	Stormw	ater Design	Checked By:	Date:		Job No.:		SMEPA	
		Discharge from Areas A1.	1						
	Area		1.33 acres	0.	00 sq. mile	s			
Calculat		Time, Tt							
	Sheet F		000 fast			Flow Leng	th I	0	
	Pt. 35	Flow Length, L	200 feet 4.9 inches			Two-yr 24		-	
A1.1	to Pt.	Two-yr 24 hr rainfall, P ₂	0.25 ft/ft			Land Slop		0.04	
	38	Land Slope, s	0.187 hrs	Ref Eq. 8		Travel Tin		0.000	
		Travel Time, Tt	0.107 115	Rei Eq. o		110/01/111	10, 11	0.000	
	Onen C	hannel Flow				1.0			
	openo	Channel Depth, D	2 feet	1		1D	_	/	
		Channel Width, B	5 feet		-	+	K		
		X-Section Area, a	26 sq ft			< B →		4(H):1(\	/)
	Pt. 38	Wetted Perimeter, pw	21.5 feet			D		. / .	·
		Hydraulic Radus, r	1.210 ft						
	39	Channel Slope	0.005 ft/ft						
		Velocity, V	2.392 ft/sec	Ref Eq. 9					
		Flow Length, L	380						
		Travel Time, Tt	0.051 hrs	Ref Eq. 6				0	
	Total T	ravel Time	0.238 hrs	Sum of She	eet, Shallov	v Concentra	ated and	Open Char	nnei
Calcula	te Peak	Discharge	0.005						
		l _a /P	0.095 in.	From calcula	tions above				
	Area	Time of Conc. Tc	0.238 hrs	Ref. Figure 6		k disebarge'		5 III	
	A1.1	Unit Peak Disch. qu	545 csm/in		5 Onit pea	k uscharge	USE Type	5 111	
		Runoff, Q	5.1 inches 5.78 cu ft/se	From pg. 1					
		Peak Discharge, q _p	5.78 CU IVSe	C Eq. 10					
		Flow Length, L	380						
	Area	Travel Time, Tt	0.051 hrs	Ref Eq. 6					
	A8.1	Time of Conc. Tc	0.596 hrs	•	rea A8.1 (pg	. 24)			
		Unit Peak Disch. q _u		Ref. Figure (' Use Type	e III	
		Runoff, Q	5.1 inches		•	2			
	39)	Peak Discharge, q _p	4.48 cu ft/se						
	00)	, our bioonargo, qp		1					
	Area	Flow Length, L	380						
	Area A7.2	Travel Time, Tt	0.051 hrs	Ref Eq. 6					
	(from	The Course Te	0.797 hrs	Tt + Tc for A	rea A7.2 (pg				
	pt. 38		340 csm/in	Ref. Figure	6-3 "Unit pea	k discharge	" Use Typ	e III	
		Runoff, Q	5.1 inches	From pg. 1					
	39)	Peak Discharge, qp	2.55 cu ft/se	c Eq. 10					
		μ							
	Area	Flow Length, L	380						
	A7.1	Travel Time, Tt	0.051 hrs	Ref Eq. 6					
0.1	(from	T (0 T	0.517 hrs		Area A7.1 (pg				
	pt. 38		400 csm/in	Ref. Figure	6-3 "Unit pea	k discharge	" Use Typ	e III	
		Runoff, Q	5.1 inches						
				• -					

		ENV	IKUNI	MENTAL	- (2)			
		MANAG	SEMENT SI	RVICES, INC	0			
Calculatio	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	28	of	110
Subject:	Stormw	/ater Design	Checked By:	Date:	Job No.:		SMEPA	
	Area	Flow Length, L	380					
	A6.2	Travel Time, Tt	0.051 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.812 hrs	Tt + Tc for Area A6.2 (pg.	25)			
		Unit Peak Disch. q _u	335 csm/in	Ref. Figure 6-3 "Unit peal		e Type	111	
		Runoff, Q	5.1 inches	From pg. 1	9			
	39)	Peak Discharge, q _p	3.52 cu ft/se					
	00)	r our Disonargo, q _p	0.02 00 1000	5 Eq. 10				
	Area	Flow Length, L	380					
	A6.1	Travel Time, Tt	0.051 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.464 hrs	Tt + Tc for Area A6.1 (pg.	25)			
	pt. 38	Unit Peak Disch. q _u	415 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	е Туре	11	
		Runoff, Q	5.1 inches	From pg. 1				
	39)	Peak Discharge, q _p	4.46 cu ft/sec					
		- • F						
	Area	Flow Length, L	380					
	A5.2	Travel Time, Tt	0.051 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.744 hrs	Tt + Tc for Area A5.2 (pg.	25)			
	pt. 38	Unit Peak Disch. q _u	345 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	е Туре		
		Runoff, Q	5.1 inches	From pg. 1				
	39)	Peak Discharge, q _p	2.67 cu ft/sec					
	Area	Flow Length, L	380					
	A5.1	Travel Time, Tt	0.051 hrs	Ref Eq. 6				
	(fróm	Time of Conc. Tc	0.450 hrs	Tt + Tc for Area A5.1 (pg.				
	pt. 38	Unit Peak Disch. q _u	430 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	е Туре I	11	
		Runoff, Q	5.1 inches					
	39)	Peak Discharge, q _p	3.50 cu ft/sec	; Eq. 10				
	Aroa	Flow Length, L	380					
	Area	Travel Time, Tt	0.051 hrs	Ref Eq. 6				
	A4.2	Time of Conc. Tc	0.695 hrs	Tt + Tc for Area A4.2 (pg.	25)			
						o Turo I	11	
		Unit Peak Disch. q _u		Ref. Figure 6-3 "Unit peak	uscharge" US	e iype i		
		Runoff, Q	5.1 inches	From pg. 1				
	39)	Peak Discharge, q _p	4.07 cu ft/sec	; Eq. 10				
	Area	Flow Length, L	380					
	A4.3	Travel Time, Tt	0.051 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.753 hrs	Tt + Tc for Area A4.3 (pg.	25)			
	pt. 38	Unit Peak Disch. q.	345 csm/in	Ref. Figure 6-3 "Unit peak	-	e Tvde I	11	
		Runoff, Q	5.1 inches	From pg. 1				
	39)	Peak Discharge, q _p	3.22 cu ft/sec	10				
	00)	r car bischarge, qp	0,22 00 10300	· =4. 10				
	Area	Flow Length, L	380					
	A4.1	Travel Time, Tt	0.051 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.381 hrs	Tt + Tc for Area A4.1 (pg.	25)			
	pt. 38	Unit Peak Disch. qu	455 csm/in	Ref. Figure 6-3 "Unit peak		e Type I	11	
		Runoff, Q	5.1 inches	From pg. 1		21		
	39)	Peak Discharge, q _p	5.58 cu ft/sec					
	00)		0.00 00 10000					

alculations For:	SMEPA Landfill	Made By: CJ	RVICES, INC. Date: 10/11/16 Sheet No.: 29 of 110
			Date: Job No.: SMEPA
	water Design	Checked By: 380	Date: JOD NO.: SIVIEFA
Area	Flow Length, L Travel Time, Tt	0.051 hrs	Ref Eq. 6
A3.2		0.628 hrs	Tt + Tc for Area A3.2 (pg. 26)
(from		380 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	Unit Peak Disch. q _u		
39)	Runoff, Q Peak Discharge, q _p	3.69 cu ft/sec	From pg. 1
00)	reak Discharge, qp	3.03 Cu 1/3ec	, Eq. 10
Area	Flow Length, L	380	
A3.3	Travel Time, Tt	0.051 hrs	Ref Eq. 6
(from		0.685 hrs	Tt + Tc for Area A3.3 (pg. 26)
	Unit Peak Disch. qu	355 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	Runoff, Q		From pg. 1
39)	Peak Discharge, q _p	3.20 cu ft/sec	
Area	Flow Length, L	380	
Alea A3.1	Travel Time, Tt	0.051 hrs	Ref Eq. 6
(from	Time of Conc. Tc	0.321 hrs	Tt + Tc for Area A3.1 (pg. 26)
	Unit Peak Disch. q _u	490 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	Runoff, Q	5.1 inches	From pg. 1
39)	Peak Discharge, q _p	5.15 cu ft/sec	
Area	Flow Length, L	380	
A2.1	Travel Time, Tt	0.051 hrs	Ref Eq. 6
(from		0.529 hrs	Tt + Tc for Area A2.1 (pg. 24)
	Unit Peak Disch. q _u	400 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
to Pt.	Runoff, Q	5.1 inches	From pg. 1
39)	Peak Discharge, q _p	2.49 cu ft/sec	Eq. 10
Calculate Chan	nel Flow Velocity		
	X-Section Area, a	26 sq ft	
	Peak Discharge, qp	57.20 cu ft/sec	;
	Peak Velocity	2.1999 ft/sec	
		92% of Calcu	lated Channel Flow Velocity

		SMEPA Landfill							
			Made By: CJ		10/11/16	Sheet No.:	30	of SMEPA	110
Calculat	Stormw	ater Design	Checked By:	Date:		Job No.:		SIVIEFA	
	te Peak	Discharge from Area B5.1		INN SIDE					
	Area		1.33 acres	0.0	00 sq. mile	s			
Calculat	te Travel	Time, Tt							
	Sheet F								
	Pt. 41	Flow Length, L	280 feet			Flow Lengt		0 fee	et
B.5.1	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24 ł		5.9	
D.J. I	135	Land Slope, s	0.25 ft/ft			Land Slope		0.04 ft/f	t
		Travel Time, Tt	0.245 hrs	Ref Eq. 8		Travel Time	e, Tt	0.000	
	Open C	hannel Flow		~		A		~	
		Channel Depth, D	2 feet			ÎD	/		
		Channel Width, B	0 feet		/	*	~		
		X-Section Area, a	16 sq ft			< B >		_4(H):1(V)
		Wetted Perimeter, pw	16.5 feet						
		Hydraulic Radus, r	0.970 ft						
	44	- · · · · - · - F -	0.005 ft/ft	D.(5					
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L Travel Time, Tt	250	Dof Eq. 6					
	Total T	avel Time	0.034 hrs 0.278 hrs	Ref Eq. 6	of Shallow	/ Concentrat	od and (nen Chan	nel
			0.2101110			- concentrat		Pon Onan	
Calculat	te Peak I	Discharge							
		I _a /P	0.095 in.						
		Time of Conc. Tc	0.278 hrs	From calculat	ions above				
	Area	Unit Peak Disch. qu	505 csm/in	Ref. Figure 6-		k discharge" L	Jse Tvpe I	1	
	B5.1	Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, q _p	5.3522 cu ft/sec						
		U Trip		,					
Calculat	te Chanr	el Flow Velocity							
		X-Section Area, a	16 sq ft						
		Peak Discharge, qp	5.35 cu ft/sec	0					
		Peak Velocity	0.3345 ft/sec						
			16% of Calcu	lated Channe	el Flow Vel	ocity			

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

biget: Stormwater Design Checked By: Date: Job No.: SMEPA alculate Peak Discharge from Area B4.2 Area 1.1 acres 0.00 sq. miles alculate Travel Time, Tt Sheet Flow 120 feet Pt. 41 Flow Length, L 180 feet 3.4.2 40 Two-yr 24 hr rainfall, P.2 4.9 inches to Pt. 42 3.4.2 41 Land Slope, s 0.25 ft/ht 0.124 hrs Ref Eq. 8 3.4.2 41 Land Slope, s 0.25 ft/ht 0.124 hrs Ref Eq. 8 Shallow, Concentrated Flow 0.326 0.41 ft/ht Travel Time, Tt 0.326 Shallow, Concentrated Flow 83.4 feet 0.41 ft/ht 0.007 hrs Ref Eq. 6 Open Channel How 2 feet 0.007 hrs Ref Eq. 6 Channel Width, B 0 feet 0.970 ft 0.970 ft Yet A44 Wetted Perimeter, p.w 16.5 feet 0.970 hrs Flow Length, L 370 0.950 hrs Ref Eq. 6 Other Hydraulic Radus, r 0.050 hrs Fer Eq. 6 Total Travel Time, Tt 0.050 hrs Sum of Sheet, Shallow Concentrated and Open Channel J/P 0.095 in. 0.050 hrs Fer Eq. 6 Total Travel Time, Tt 0.050 hrs Fer Eq. 6	alculatio	ons For:	SMEPA Landfill	MENT S Made By: CJ	Date:	10/11/16	Sheet No.:	31	of	110
Salculate Peak Discharge from Area B4.2 1.1 acres 0.00 sq. miles Salculate Travel Time, Tt Sheet Flow 1.1 acres 0.00 sq. miles B4.2 to Pt. 40 Flow Length, L 120 feet to Pt. 41 Flow Length, L 180 feet B.4.2 to Pt. 41 Two-yr 24 hr rainfall, P2 0.25 ft/h 49 to Pt. 41 Two-yr 24 hr rainfall, 5.9 B.4.2 to Pt. 42 Flow Length, L 0.25 ft/h 9.25 ft/h 10 pt. Land Slope, s 0.04 ft/h Shallow, Concentrated Flow 0.124 hrs Ref Eq. 6 12 stravel Time, Tt 0.326 Yave Vitation Pt. 42 Flow Length, L 0.04 ft/h 3.2 ft/sec Ref. Fig. 6-9 "Avg. vel. for est. travel time for shallow concentrated flow" - use Unpaved Travel Time, Tt 0.007 hrs Ref Eq. 6 16.5 feet Open Channel Flow 0.970 ft 0.005 ft/h 16.5 feet Channel With, B 0.970 ft 0.005 hrs Sum of Sheet, Shallow Concentrated and Open Channel Yelootly, V 2.065 ft/sec Ref Eq. 6 10.007 hrs Sum of Sheet, Shallow Concentrated and Open Channel Yelootly, V 2.065 ft/sec 0.005 hrs For Eq. 6 0.507 hrs Sum of Sheet, Shallow Concentrated and Open Channel Salculate Peak Discharge 0.095 in. 0.507 hrs <th>Subject:</th> <th></th> <th></th> <th></th> <th>-</th> <th>10/11/10</th> <th></th> <th>•.</th> <th></th> <th></th>	Subject:				-	10/11/10		•.		
Area 1.1 acres 0.00 sq. miles Calculate Travel Time, Tt Sheat Flow Two-yr 24 h rainfall, P2 Land Slope, s 41 Travel Time, Tt 120 feet 4.9 inches 0.25 ft/tt Pt. 41 40 Flow Length, L 40 inches 0.25 ft/tt Flow Length, L 40 inches 0.25 ft/tt 120 feet 40 pt. 42 Two-yr 24 h rainfall, 5.9 42 180 feet 40 pt. 42 B.4.2 Flow Length, L 44 0.124 hrs Ref Eq. 6 42 Travel Time, Tt 0.024 ft/tt 0.326 B.4.2 Flow Length, L 43 0.41 ft/tt 0.24 hrs Ref Eq. 6 42 Travel Time, Tt 0.04 ft/tt Travel Time, Tt Open Channel Flow Channel Depth, D Channel Depth, D Channel Depth, D Channel Slope Velocity, V 2 feet 0.005 ft/ft 0.005 ft/ft Travel Time, Tt Open Channel Slope Velocity, V 2 feet 0.050 ft/ft 0.970 ft 0.970 ft 45 Channel Slope Velocity, V 0.905 in. 0.905 ft/ft 0.905 in. Travel Time, Tt Open Channel Slope Velocity, V 0.505 hrs Ref Eq. 6 0.050 hrs Ref Eq. 6 0.507 hrs Sum of Sheet, Shallow Concentrated and Open Channel 2085 ft/ft 0.507 hrs Sum of Sheet, Shallow Concentrated and Open Channel 21 11 inches 505 csrr/in Ref Eq. 6 0.507 hrs Sum of Sheet, Shallow Concentrated and Open Channel 22 11 inches 505 csrr/in 24.2<					Duto.		1000 110			
Sheet Flow B.4.2 Flow Length, L to Pt. 41 Two-yr 24 hr rainfall, P ₂ 41 Two-yr 24 hr rainfall, P ₂ 42 Flow Length, L Travel Time, Tt 0.25 ft/ft 0.124 hrs Ref Eq. 8 0.25 ft/ft 0.124 hrs Ref Eq. 8 0.25 ft/ft 0.124 hrs Ref Eq. 8 0.25 ft/ft 0.124 hrs Ref Eq. 8 0.4 ft/ft 7 ravel Time, Tt 0.326 0.4 ft/ft 7 ravel Time, Tt 0.326 0.4 ft/ft 7 ravel Time, Tt 0.26 ft/fsec Channel Depth, D Channel Widt, B X-Section Area, a 16 sq ft 16 sq ft 17 ravel Time, Tt 0.007 hrs Ref Eq. 9 16.5 feet 10 Pt. 44 Watercourse slope, s 0.007 hrs Ref Eq. 9 16.5 feet 16 sq ft 17 ravel Time, Tt 0.005 hrs Ref Eq. 9 10 Pt. 44 10 Feet 10 Pt. 44 10 Pt. 41 10					(0.00 sq. mil	es			
Sheet Flow B.4.2 to Pt 4.1 Two-yr 24 hr rainfall, P2 Land Slope, s Travel Time, Tt 0.25 ft/ft 4.9 inches 0.25 ft/ft 0.124 hrs Ref Eq. 8 0.25 ft/ft 0.124 hrs Ref Eq. 8 0.04 ft/ft Travel Time, Tt 0.326 Travel Time, Tt 0.326 0.007 hrs Ref Eq. 6 0.007 hrs Ref Eq. 9 Flow Length, L Travel Time, Tt 0.005 ft/ft 0.005 ft/ft 0.005 hrs Ref Eq. 6 0.007 hrs Stallow Concentrated and Open Channel 0.005 hrs Ref Eq. 6 0.007 hrs Stallow Concentrated and Open Channel 0.005 hrs Ref Eq. 6 0.007 hrs Stallow Concentrated and Open Channel 24Culate Peak Discharge 1//P 0.050 hrs Ref Eq. 6 0.057 hrs From calculations above 0.050 hrs Ref Eq. 6 0.057 hrs From calculations above 0.050 hrs Ref Eq. 6 0.050 hrs Ref Eq. 6 0.288 hrs Tt + To for Area B5.1 (pg. 30) 45) Peak Discharge, qp 5.19 cu tf/sec 0.6012 ft/sec										
Pt. 40 Flow Length, L 120 feet Pt. 41 Flow Length, L 180 feet B.4.2 to Pt. Travel Time, Ti 0.25 ft/th 42 Travel Time, Ti 0.326 Shallow, Concentrated Flow Pt. 42 Flow Length, L 0.326 0.41 ft/t Travel Time, Ti 0.326 Shallow, Concentrated Flow Pt. 42 Flow Length, L 83.4 feet 0.04 ft/t Travel Time, Ti 0.326 Yet 43 Age routing, L 83.4 feet 0.04 ft/th 3.2 ft/sec Ref. Fig. 6-9 "Avg. vel. for est. travel time for shallow concentrated flow" - use Unpaved Open Channel Flow Channel Depth, D 2 feet 0.007 hrs Ref Eq. 6 Channel Stope 16.5 feet 0.005 ft/ft 0.005 ft/ft 0.005 ft/ft Velocity, V 2.065 ft/sec Ref Eq. 6 0.005 intravel Time, Ti 0.050 ft/ft Travel Time, Ti 0.050 ft/sec Ref Eq. 6 0.050 ft/ft 0.050 ft/ft Velocity, V 2.065 ft/sec Ref Eq. 6 0.050 ft/ft 0.050 ft/ft Travel Time, Ti 0.050 ft/s 0.050 ft/sec 10.50 ft/sec 10.50 ft/sec Flow Length, L	Calcula									
 B.4.2 to Pt. 40 Two-yr 24 hr rainfall, P₂ 4.9 inches to Pt. 41 Land Slope, s 0.04 ft/ft Travel Time, Tt 0.124 hrs Shallow, Concentrated Flow Pt. 42 National Equit, L 43 Avg. Velocity, V. 43 Avg. Velocity, V. 44 Travel Time, Tt 0.007 hrs 45 Channel Slope 16.5 feet 16.5 f		Sheet r		120 foot			Flow Long	h l	180 for	at
 B.4.2 40 FL Land Slope, s 0.04 ft/ft 41 Travel Time, Tt 0.124 hrs Ref Eq. 8 Avg. Velocity, V. Travel Time, Tt 0.124 hrs Ref Eq. 8 Flow Length, L 0.04 ft/ft 0.04 ft/ft 3.2 ft/sec Ref. Fig. 6-9 "Avg. vel. for est. travel time for shallow concentrated flow" - use Unpaved Travel Time, Tt 0.007 hrs Ref Eq. 6 Open Channel Pith, D 2 feet 0.007 hrs Ref Eq. 6 Channel Depth, D 2 feet 0.007 hrs Ref Eq. 6 Channel Nicht, B 2 for the travel time for shallow concentrated flow" - use Unpaved Travel Time, Tt 0.007 hrs Ref Eq. 6 Open Channel Flow Channel Slope 1.0007 hrs Ref Eq. 6 Channel Slope 0.005 ft/ft 0.005 hrs Ref Eq. 6 Calculate Peak Discharge 1.0007 hrs 0.005 in. Travel Time, Tt 0.050 hrs Ref Eq. 6 Calculate Peak Discharge 1.0007 hrs 0.005 in. 0.507 hrs 0.505 rsm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III 0.507 hrs 0.505 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III 0.500 hrs Ref Eq. 6 Channel Disch. qu 5.1 inches From gp. 1 Peak Discharge qu 4.43 cu ft/sec Eq. 10 Area Flow Length, L 370 0.500 hrs Ref Eq. 6 Travel Time, Tt 0.050 hrs Ref Eq. 6 Travel Time, Tt 0.050 hrs Ref Eq. 6 Travel Time, Tt 0.050 hrs Ref Eq. 6 Montin Ref. Figure 6-3 "Unit peak discharge" Use Type III 5.1 inches From gp. 1 S.1 inches From gp. 1 S.1 inches Pick Pick 6.3 (Dit peak discharge" Use Type III 5.1 inches From gp. 1 S.1 inches Pick Pick 6.3 (Dit peak discharge" Use Type III 5.1 inches From gp. 1 S.1 inches Pick Pick 6.3 (Dit peak discharge" Use Type III 5.1 inches Pick 9.3 (Dit peak discharge" Use Type III 5.1 inches Pick 9.3 (Dit peak discharge" Use Type III 5.1 inches Pick 9.3 (Dit peak discharge" Use Type III 5.1 inches Pick 9.3 (Dit peak discharge" Use Type III 5.1 i		Pt. 40				Pt. 41	-			51
 ⁴¹ Travel Time, Ti Shallow, Concentrated Flow Pt. 42 Shallow, Concentrated Flow Pt. 42 Flow Length, L Avg. Velocity, V. 3.2 ft/sec Travel Time, Ti Open Channel Epth, D Channel Depth, D Channel Depth, D 2 feet Channel Depth, D 2 feet Channel Slope Velocity, V 3.2 ft/sec Ref. Fig. 6-9 "Avg. vel. for est. travel time for shallow concentrated flow" - use Unpaved 0.007 hrs Ref Eq. 6 Pri. 44 Wetted Perimeter, p.w. 0.007 hrs Ref Eq. 6 Pri. 44 Wetted Perimeter, p.w. 0.005 ft/ft Velocity, V 2.065 ft/sec Ref Eq. 6 Calculate Peak Discharge Imme of Conc. Tc B4.2 Unit Peak Disch. qu B5.1 Travel Time, Tt O.500 hrs Ref Eq. 6 Calculate Peak Discharge, qp 4.43 cu ft/sec Eq. 10 Area Flow Length, L 370 B5.1 Travel Time, Tt O.500 hrs Ref Eq. 6 Calculate Channel Sicher, qp Area Flow Length, L 370 B5.1 Travel Time, Tt O.500 hrs Ref Eq. 6 Calculate Channel Flow Velocity X-Section Area, a Peak Discharge, qp S.1 Inches From pg. 1 S.1 Inc	B.4.2	to Pt.	The second se			to Pt.	-			u.
Shallow, Concentrated Flow Pt. 42 to Pt. 43 Travel Time, Tt Open Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a 16 sq ft 45 Pt. 44 Wetted Perimeter, pw to Pt. Hydraulic Radus, r 45 Pt. 44 Wetted, Perimeter, pw 16 st 17 seel Time, Tt Outor Time of Conc. Tc pt. 44 Unit Peak Disch. qw B4.2 Flow Length, L Travel Time, Tt Outor Time of Conc. Tc pt. 44 Unit Peak Disch. qw B4.2 Flow Length, L Travel Time, Tt Outor Time of Conc. Tc pt. 44 Unit Peak Disch. qw B4.2 Pick Length, L Travel Time, Tt Outor Time of Conc. Tc pt. 44 Unit Peak Disch. qw B4.2 Flow Length, L Travel Time, Tt Outor Time of Conc. Tc pt. 44 Unit Peak Disch. qw B4.2 Pick Length, L Travel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Travel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Stravel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Stravel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Stravel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Stravel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Stravel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Stravel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Stravel Time, Tt Outor Time of Conc. Tc Discharge, qp Area Flow Length, L Stravel Time, Tt Outor Time of Conc. Tc Discharge, qp Stravel Time, Tt Discharge, qp Stravel Time, Tt Discharge, qp Stravel Time, Tt Discharge, qp Stravel Time, Tt Discharge, qp Stravel Time, Tt Peak Discharge, qp Stravel Time, Tt Discharge, qp Stravel Time, Tt Dis		41				42				t
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				29% of Calcu	lated Chan	nel Flow Vel	ocity			

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Calculatio		SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	32	of	110
		vater Design	Checked By:	Date:		Job No.:		SMEPA	_
Calcula	Area	Discharge from Area B4.1	1,67 acres		0.00 sq. mile	26			
	Alea		1.07 acres	,	5.00 Sq. mile	55			
Calcula	te Trave	Time, Tt							
	Sheet F								
	Pt. 46	Flow Length, L	160 feet			Flow Leng		fe	et
B4.1	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24		5.9	
	45	Land Slope, s	0.25 ft/ft			Land Slop		0.04 ft/	ft
		Travel Time, Tt	0.156 hrs	Ref Eq. 8		Travel Tim	e, Tt	0.000	
	Open C	channel Flow						/	
		Channel Depth, D	2 feet			ÎD	1		
		Channel Width, B	0 feet			*	2		
		X-Section Area, a	16 sq ft			< B >		4(H):1(V	()
		Wetted Perimeter, pw	16.5 feet						
		Hydraulic Radus, r	0.970 ft						
	47	Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	345						
		Travel Time, Tt	0.046 hrs	Ref Eq. 6					
	Total Tr	ravel Time	0.203 hrs	Sum of Sh	neet, Shallov	v Concentra	ted and C	pen Chan	nel
		Disala							
Calcula	te Peak I	Discharge							
		I _a /P	0.095 in.						
	Area	Time of Conc. Tc	0.203 hrs		ations above				
	B4.1	Unit Peak Disch. q _u	555 csm/in	+	6-3 "Unit pea	k discharge"	Use Type I	11	
		Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, q _p	7.39 cu ft/sec	Eq. 10					
		-	0.15						
	Area	Flow Length, L	345						
	B5.1	Travel Time, Tt	0.046 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.375 hrs		Area B5.1 (pg				
		Unit Peak Disch. qu	455 csm/in		6-3 "Unit pea	k discharge"	Use Type I	H	
		Runoff, Q	5.1 inches	From pg. 1					
	47)	Peak Discharge, q _p	4.82 cu ft/sec	: Eq. 10 '					
			0.45						
	Area	Flow Length, L	345						
		Travel Time, Tt	0.046 hrs	Ref Eq. 6					
	V	Time of Conc. Tc	0.554 hrs		Area B4.2 (pg	,			
		Unit Peak Disch. q _u	390 csm/in		6-3 "Unit pea	k discharge"	Jse Type II	I	
		Runoff, Q	5.1 inches	From pg. 1					
	47)	Peak Discharge, q _p	3.42 cu ft/sec	; Eq. 10					
	te Chanr	el Flow Velocity							
Calcula		X-Section Area, a	16 sq ft						
Calcula			15.63 cu ft/sec	:					
Calcula		Peak Discharge, qp							
Calcula		Peak Discharge, qp Peak Velocity	0.9767 ft/sec 47% of Calcul						

0.1.1.1.1		MANAG	EMENT SI	RVICE	S, INC			_
Calculatio	ns For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.: 33	of	110
Subject:	Stormw	ater Design	Checked By:	Date:		Job No.:	SMEPA	
Caicula	te Peak	Discharge from Areas B3	.2					
	Агеа		1.1 acres	C	0.00 sq. mile	S		
Calcula	te Trave	l Time, Tt						
	Sheet F	and the second block because the second s						
	Pt. 48	Flow Length, L	56.8 feet		Pt. 46	Flow Length, L	243.2 feet	
B3.2	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24 hr ra		
05.2	46	Land Slope, s	0.25 ft/ft		49	Land Slope, s	0.04 ft/ft	
	40	Travel Time, Tt	0.068 hrs	Ref Eq. 8	40	Travel Time, Tt	0.415	
	Shallow	,Concentrated Flow						
	D4 40	Flow Length, L	97.8 feet					
	Pt. 49	Watercourse slope, s	0.04 ft/ft					
	to Pt.	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-9) "Avg. vel. fo	r est. travel time fo	or shallow	
	50	AN ALL MORE ALL		concentrate	d flow" - use	Unpaved		
		Travel Time, Tt	0.008 hrs	Ref Eq. 6		Sec. 1		
	Open C	hannel Flow		1.0			and the second second	
		Channel Depth, D	2 feet	1	/	1		
		Channel Width, B	0 feet			D	5	
		X-Section Area, a	16 sq ft			<>	4(H):1(V)	
	Pt 47	Wetted Perimeter, pw	16.5 feet			B	4(1).1(*)	
		Hydraulic Radus, r	0.970 ft					
	51	Channel Slope	0.005 ft/ft					
	01	Velocity, V	2.065 ft/sec	Ref Eq. 9				
		velocity, v		Nei Ly. a				
		Elow Longth	275					
		Flow Length, L	375 0.050 brs	Pef Eq. 6				
	Total T	Travel Time, Tt	0.050 hrs	Ref Eq. 6	eet Shallov	Concentrated a	and Open Channe	4
	Total T				eet, Shallov	v Concentrated a	and Open Channe	el
Calcula		Travel Time, Tt	0.050 hrs		eet, Shallov	v Concentrated a	and Open Channe	e)
Calcula		Travel Time, Tt ravel Time	0.050 hrs		eet, Shallov	v Concentrated a	and Open Channe)
Calcula	te Peak	Travel Time, Tt ravel Time Discharge	0.050 hrs 0.542 hrs	Sum of Sh	eet, Shallov ations above	v Concentrated a	and Open Channe)
Calcula	te Peak Area	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc	0.050 hrs 0.542 hrs 0.095 in.	Sum of Sh	ations above			2
Calcula	te Peak	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in	Sum of Sh From calcul Ref. Figure	ations above	v Concentrated a k discharge" Use T)
Calcula	te Peak Area	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches	Sum of Sh From calcul Ref. Figure From pg. 1	ations above			2
Calcula	te Peak Area	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in	Sum of Sh From calcul Ref. Figure From pg. 1	ations above			b)
Calcula	te Peak Area B3.2	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches	Sum of Sh From calcul Ref. Figure From pg. 1	ations above			bl
Calcula	te Peak Area B3.2 Area	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375	Sum of Sh From calcul Ref. Figure From pg. 1	ations above			el.
Calcula	te Peak Area B3.2 Area B5.1	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6	ations above 6-3 "Unit pea	k discharge" Use ⊺		6
Calcula	te Peak Area B3.2 Area B5.1 (from	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for <i>i</i>	ations above 6-3 "Unit pea Area B5.1 (pg	k discharge" Use T . 32)	Гуре III	bl
Calcula	te Peak Area B3.2 Area B5.1 (from pt. 47	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure	ations above 6-3 "Unit pea Area B5.1 (pg	k discharge" Use ⊺	Гуре III	5
Calcula	te Peak Area B3.2 Area B5.1 (from pt. 47 to Pt.	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in 5.1 inches	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1	ations above 6-3 "Unit pea Area B5.1 (pg	k discharge" Use T . 32)	Гуре III	bl
Całcula	te Peak Area B3.2 Area B5.1 (from pt. 47	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1	ations above 6-3 "Unit pea Area B5.1 (pg	k discharge" Use T . 32)	Гуре III	14
Calcula	te Peak Area B3.2 Area B5.1 (from pt. 47 to Pt. 51)	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in 5.1 inches	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1	ations above 6-3 "Unit pea Area B5.1 (pg	k discharge" Use T . 32)	Гуре III	[4
Calcula	te Peak Area B3.2 Area B5.1 (from pt. 47 to Pt. 51) Area	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in 5.1 inches 4.66 cu ft/set 375	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1	ations above 6-3 "Unit pea Area B5.1 (pg	k discharge" Use T . 32)	Гуре III	b)
Calcula	te Peak Area B3.2 Area B5.1 (from pt. 47 to Pt. 51) Area B4.2	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in 5.1 inches 4.66 cu ft/set 375 0.050 hrs	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6	ations above 6-3 "Unit pea Area B5.1 (pg 6-3 "Unit pea	k discharge" Use ⊺ . 32) k discharge" Use ⊺	Гуре III	5
Calcula	te Peak Area B3.2 Area B5.1 (from pt. 47 to Pt. 51) Area B4.2 (from	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in 5.1 inches 4.66 cu ft/set 375 0.050 hrs 0.050 hrs 0.050 hrs 0.050 hrs	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for /	ations above 6-3 "Unit pea Area B5.1 (pg 6-3 "Unit pea Area B4.2 (pg	k discharge" Use T . 32) k discharge" Use T	Гуре III Гуре III	5
Całcula	te Peak Area B3.2 Area B5.1 (from pt. 47 to Pt. 51) Area B4.2 (from pt. 47	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in 5.1 inches 4.66 cu ft/set 375 0.050 hrs 0.604 hrs 380 csm/in	Sum of Sh From calcul Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure	ations above 6-3 "Unit pea Area B5.1 (pg 6-3 "Unit pea Area B4.2 (pg	k discharge" Use ⊺ . 32) k discharge" Use ⊺	Гуре III Гуре III	5
Calcula	te Peak Area B3.2 Area B5.1 (from pt. 47 to Pt. 51) Area B4.2 (from pt. 47	Travel Time, Tt ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.050 hrs 0.542 hrs 0.095 in. 0.542 hrs 395 csm/in 5.1 inches 3.46 cu ft/set 375 0.050 hrs 0.425 hrs 440 csm/in 5.1 inches 4.66 cu ft/set 375 0.050 hrs 0.050 hrs 0.050 hrs 0.050 hrs	Sum of Sh From calcul Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for / Ref. Figure From pg. 1	ations above 6-3 "Unit pea Area B5.1 (pg 6-3 "Unit pea Area B4.2 (pg	k discharge" Use T . 32) k discharge" Use T	Гуре III Гуре III	5

			EMENT SE		10/11/16		34	of	110
alculatio		SMEPA Landfill	Made By: CJ	Date:	10/11/16	Job No.:	34	SMEPA	110
ubject:		ater Design	Checked By: 375	Date:		300 140.		Offici / C	
	Area B4.1	Flow Length, L Travel Time, Tt	0.050 hrs	Ref Eq. 6					
	D4.1	Time of Conc. Tc	0.253 hrs		Area B4.1 (pg	32)			
	nt 47	Unit Peak Disch. qu	530 csm/in		6-3 "Unit peal		Use Typ	e III	
		Runoff, Q	5.1 inches						
	51)	Peak Discharge, qp	7.05 cu ft/sec						
Calcula	te Chanr	nel Flow Velocity							
		X-Section Area, a	16 sq ft 18.51 cu ft/sec						
		Peak Discharge, qp Peak Velocity	1.1569 ft/sec						
		r duit voloony	56% of Calcu	lated Chan	nel Flow Vel	ocity			

		MANAG	EMENT	2 F	RVICE	S, INC				_
Calculatio	ns For:	SMEPA Landfill		CJ	Date:	10/11/16		35	of	110
Subject:	Stormw	ater Design	Checked By:		Date:		Job No.:		SMEPA	
		Discharge from Area B3.								
	Area		2.34 acres	s	0	.00 sq. mile	s			
Calcula	te Travel	Time, Tt								
	Sheet F								6	
	Pt. 52	Flow Length, L	170 feet				Flow Lengt		fee	τ
B3.1	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inche	es			Two-yr 24		5.9	
20.1	51	Land Slope, s	0.25 ft/ft				Land Slope		0.04 ft/ft	
		Travel Time, Tt	0.164 hrs		Ref Eq. 8		Travel Time	e, It	0.000	
	Open C	hannel Flow			~		*		/	
		Channel Depth, D	2 feet				D	~		
		Channel Width, B	0 feet				*	2		
	D1 54	X-Section Area, a	16 sq ft				B		4(H):1(V)	
		Wetted Perimeter, pw	16.5 feet							
		Hydraulic Radus, r	0.970 ft							
	60	Channel Slope	0.005 ft/ft 2.065 ft/sec		Ref Eq. 9					
		Velocity, V	615	-	Rei Eq. 9					
		Flow Length, L Travel Time, Tt	0.083 hrs		Ref Eq. 6					
	Total T	ravel Time	0.247 hrs	-		eet Shallov	v Concentra	ted and C) Den Chanr	nel
	TUIALI	aver mile	0.247 110	-		oot, onanot			P	
Calcula	te Peak i	Discharge								
Galoala	lo i ouit	I _a /P	0.095 in.							
		Time of Conc. Tc	0.247 hrs		From calcul	ations above				
	Area	Unit Peak Disch. qu	535 csm/	'n	Ref. Figure	6-3 "Unit pea	k discharge"	Use Type I	1	
	B3.1	Runoff, Q	5,1 inche		From pg. 1	· ·	U			
		Peak Discharge, q _p	9.9761 cu ft/							
		1 oak Dioonargo, qp			-1					
	Area	Flow Length, L	615							
	B5.1	Travel Time, Tt	0.083 hrs		Ref Eq. 6					
	(from	Time of Conc. Tc	0.508 hrs		Tt + Tc for A	vrea B5.1 (pg	. 33)			
	pt. 51		400 csm/	'in	Ref. Figure	6-3 "Unit pea	k discharge"	Use Type I	li i	
		Runoff, Q	5.1 inche	es	From pg. 1					
	60)	Peak Discharge, q _p	4.24 cu ft/							
		μ								
	Area	Flow Length, L	615							
	B4.2	Travel Time, Tt	0.083 hrs		Ref Eq. 6					
	(from	Time of Conc. Tc	0.687 hrs			rea B4.2 (pg	. 33)			
	pt. 51	Unit Peak Disch. q _u	345 csm/	/in	Ref. Figure	6-3 "Unit pea	k discharge"	Use Type I	11	
		Runoff, Q	5.1 inche	es	From pg. 1					
	60)	Peak Discharge, q _p	3.02 cu ft/		• =					
8	,	υ υ τ								
	Area	Flow Length, L	615							
	B4.1	Travel Time, Tt	0.083 hrs		Ref Eq. 6					
	(from	Time of Conc. Tc	0.336 hrs			Area B4.1 (pg	. 34)			
		Unit Peak Disch. qu	485 csm/	/in			k discharge"	Use Type I	II	
1					-		-			
	to Pt	Runoff, Q	5.1 inche	es	From pg. 1					

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	ons For:	SMEPA Landfill	Made By: C.	the second se	10/11/16	Sheet No.:	36	of SMEPA	110
bject:		ater Design	Checked By:	Date:		Job No.:		SIVIEFA	-
		Flow Length, L	615 0.083 bro	Def Ea C					
	B3.2	Travel Time, Tt	0.083 hrs	Ref Eq. 6	A D2 2 /	221			
	(from	Time of Conc. Tc	0.625 hrs		Area B3.2 (pg				
		Unit Peak Disch. q _u	370 csm/ir		6-3 "Unit peal	k discharge"	Use Typ	e III	
		Runoff, Q		From pg. 1					
	60)	Peak Discharge, q _p	3.24 cu ft/s	ec Eq. 10					
alcula	ite Chanr	nel Flow Velocity							
		X-Section Area, a	16 sq ft						
		Peak Discharge, qp	26.94 cu ft/s	ec					
		Peak Velocity	1.6836 ft/sec						
			82% of Cal	culated Char	nel Flow Vel	ocity			

		LITT	IRONI	VIEN	IAI	-(2)			
		MANAG	EMENT SE	RVICE					
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	37	of	110
		ater Design	Checked By:	Date:		Job No.:		SMEPA	
Calcula	te Peak	Discharge from Area B2.2	1						
	Area		1.62 acres	0.	00 sq. mile	S			
Calcula	ite Trave	Time, Tt							
	Sheet F	low							
	D4 04	Flow Length, L	64.5 feet		Pt. 52	Flow Lengt		235.5 fee	et
	Pt. 61	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24	hr rainfal	5.9	
	to Pt.	Land Slope, s	0.25 ft/ft		62	Land Slope		0.04 ft/1	ft
	52	Travel Time, Tt	0.076 hrs	Ref Eq. 8	01	Travel Tim	e, Tt	0.404	
	Shallow	,Concentrated Flow							
B2.2		Flow Length, L	200 feet						
		Watercourse slope, s	0.04 ft/ft						
	63	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-9	"Avg. vel. fo	r est. travel ti	me for shal	low	
				concentrated	-				
		Travel Time, Tt	0.017 hrs	Ref Eq. 6					
	Open C	channel Flow		2.20					
	oponio	Channel Depth, D	2 feet	1		1	/	/	
		Channel Width, B	2 feet		-	D	K		
		X-Section Area, a	20 sq ft			$ \rightarrow $	-	4(H):1(V	3
	Pt 60	Wetted Perimeter, pw	18.5 feet			B			,
		Hydraulic Radus, r	1.082 ft						
	67	Channel Slope	0.005 ft/ft						
	01	Velocity, V	2.220 ft/sec	Ref Eq. 9					
		Flow Length, L	275	110. Eq. 0					
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
	Total T	ravel Time	0.532 hrs	Sum of She	et Shallov	v Concentra	ted and C	ben Chan	nel
	TUtal 1		0.002 110	7	,				
Calcula	ate Peak	Discharge from Area B2.	3						
Oulouic	Area	Diddinargo nonir neu 221	0.96 acres	0.	00 sq. mile	s			
Colouis	ate Trave	I Time, Tt							
Calcula									
Calcula	Sheet I								
Calcula	Sheet I	Flow	96.6 feet		D4 70	Flow Leng	th, L	203.4 fe	et
Calcula	Sheet F Pt, 73	Flow Flow Length, L			Pt. 70	Flow Leng Two-yr 24		203.4 fe 5.9	et
Calcula	Sheet F Pt. 73 to Pt.	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂	4.9 inches		to Pt.	Two-yr 24	hr rainfal		
Calcula	Sheet F Pt, 73	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s	4.9 inches 0.1 ft/ft	Ref Ea. 8		-	hr rainfal ə, s	5.9	
	Sheet F Pt. 73 to Pt. 70	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt	4.9 inches	Ref Eq. 8	to Pt.	Two-yr 24 Land Slope	hr rainfal ə, s	5.9 0.04 ft/	
B2.3	Sheet F Pt, 73 to Pt, 70 Shallov	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow	4.9 inches 0.1 ft/ft 0.151 hrs	Ref Eq. 8	to Pt.	Two-yr 24 Land Slope	hr rainfal ə, s	5.9 0.04 ft/	
	Sheet F Pt, 73 to Pt. 70 Shallov Pt. 64	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L	4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet	Ref Eq. 8	to Pt.	Two-yr 24 Land Slope	hr rainfal ə, s	5.9 0.04 ft/	
	Sheet F Pt, 73 to Pt. 70 Shallov Pt. 64 to Pt.	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s	4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft		to Pt. 64	Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	
	Sheet F Pt, 73 to Pt. 70 Shallov Pt. 64	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L	4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet	Ref. Fig. 6-9	to Pt. 64	Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	
	Sheet F Pt, 73 to Pt. 70 Shallov Pt. 64 to Pt.	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V.	4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec	Ref. Fig. 6-9 concentrated	to Pt. 64	Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	
	Sheet F Pt, 73 to Pt. 70 Shallov Pt. 64 to Pt. 65	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft	Ref. Fig. 6-9	to Pt. 64	Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	
	Sheet F Pt, 73 to Pt. 70 Shallov Pt. 64 to Pt. 65	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow	4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs	Ref. Fig. 6-9 concentrated	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	
	Sheet F Pt, 73 to Pt. 70 Shallov Pt. 64 to Pt. 65	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 	Ref. Fig. 6-9 concentrated	to Pt. 64	Two-yr 24 Land Slope Travel Tim	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	
	Sheet F Pt, 73 to Pt. 70 Shallov Pt. 64 to Pt. 65	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 2 feet 2 feet 	Ref. Fig. 6-9 concentrated	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	ft
	Sheet F Pt. 73 to Pt. 70 Shallov Pt. 64 to Pt. 65	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B X-Section Area, a	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 2 feet 2 feet 20 sq ft 	Ref. Fig. 6-9 concentrated	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	ft
	Sheet F Pt. 73 to Pt. 70 Shallov Pt. 64 to Pt. 65 Open C Pt. 60	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 2 feet 2 feet 20 sq ft 18.5 feet 	Ref. Fig. 6-9 concentrated	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	ft
	Sheet F Pt. 73 to Pt. 70 Shallov Pt. 64 to Pt. 65 Open C Pt. 60 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 2 feet 2 sq ft 18.5 feet 1.082 ft 	Ref. Fig. 6-9 concentrated	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	ft
	Sheet F Pt. 73 to Pt. 70 Shallov Pt. 64 to Pt. 65 Open C Pt. 60	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 2 feet 20 sq ft 18.5 feet 1.082 ft 0.005 ft/ft 	Ref. Fig. 6-9 concentrated Ref Eq. 6	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	ft
	Sheet F Pt. 73 to Pt. 70 Shallov Pt. 64 to Pt. 65 Open C Pt. 60 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 2 feet 20 sq ft 18.5 feet 1.082 ft 0.005 ft/ft 2.220 ft/sec 	Ref. Fig. 6-9 concentrated	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	ft
	Sheet F Pt. 73 to Pt. 70 Shallov Pt. 64 to Pt. 65 Open C Pt. 60 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V Flow Length, L	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 2 feet 2 feet 2 feet 20 sq ft 18.5 feet 1.082 ft 0.005 ft/ft 2.220 ft/sec 275 	Ref. Fig. 6-9 concentrated Ref Eq. 6	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt	5.9 0.04 ft/ 0.360	ft
	Sheet F Pt. 73 to Pt. 70 Shallov Pt. 64 to Pt. 65 Open 0 Pt. 60 to Pt. 67	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 2 feet 20 sq ft 18.5 feet 1.082 ft 0.005 ft/ft 2.220 ft/sec 	Ref. Fig. 6-9 concentrated Ref Eq. 6 Ref Eq. 9 Ref Eq. 9	to Pt. 64	Two-yr 24 Land Slope Travel Tim or est. travel ti Unpaved	hr rainfal e, s e, Tt me for sha	5.9 0.04 ft/ 0.360	ft /)

	MANAC	SEMENT SE	RVICES, INC	V			
Calculations For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16		38	of	110
Subject: Stormw	ater Design	Checked By:	Date:	Job No.:		SMEPA	
Calculate Peak	the second se						
ouround to i ouri	I _a /P	0.095 in.					
	Time of Conc. Tc	0.532 hrs	From calculations above				
Area	Unit Peak Disch. q _u	400 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Tvpe I	11	
B2.2		5.1 inches	From pg. 1	(dibbildige o	00 ()po (
	Runoff, Q						
	Peak Discharge, q _p	5.1638 cu ft/sec	; Eq. 10				
	I _a /P	0.095 in.					
	Time of Conc. Tc	0.551 hrs	From calculations above				
Area	Unit Peak Disch. qu	395 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Type I	11	
B2.3	Runoff, Q	5.1 inches	From pg. 1	5			
	Peak Discharge, q _p	3.02 cu ft/sec					
Area	Flow Length, L	275					
B5.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6	0.51			
(0.542 hrs	Tt + Tc for Area B5.1 (pg.				
pt. 60	Unit Peak Disch. q _u	400 csm/in	Ref. Figure 6-3 "Unit peak	k discharge" U	se Type I	11	
to Pt.	Runoff, Q	5.1 inches	From pg. 1				
67)	Peak Discharge, q _p	4.24 cu ft/sec	2 Eq. 10				
A.200	Flow Length, L	275					
Area B4.2	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.721 hrs	Tt + Tc for Area B4.2 (pg.	35)			
	Unit Peak Disch. qu	350 csm/in	Ref. Figure 6-3 "Unit peal		se Tvpe I	11	
		5.1 inches	From pg. 1	(disculary o)		
	Runoff, Q	3.07 cu ft/sec					
67)	Peak Discharge, q _p	3.07 Cu 10360	лец. 10				
Area	Flow Length, L	275					
B4.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.370 hrs	Tt + Tc for Area B4.1 (pg.				
pt. 60	Unit Peak Disch. q _u	455 csm/in	Ref. Figure 6-3 "Unit peal	< discharge" U	se Type I	H	
	Runoff, Q	5.1 inches	From pg. 1				
67)	Peak Discharge, q _p	6.06 cu ft/sec	c Eq. 10				
	Elow Longth	275					
Area	Flow Length, L	0.034 hrs	Ref Eq. 6				
B3.2	Travel Time, Tt	0.659 hrs	Tt + Tc for Area B3.2 (pg.	36)			
(from	Time of Conc. Tc		Ref. Figure 6-3 "Unit peal		eo Tuno I		
	Unit Peak Disch. qu	360 csm/in	-	alsonarye u	ae i àhe i	•1	
	Runoff, Q	5.1 inches	From pg. 1				
67)	Peak Discharge, q _p	3.16 cu ft/sec	C Eq. 10				
Area	Flow Length, L	275					
B3.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.281 hrs	Tt + Tc for Area B3.1 (pg.	. 35)			
	Unit Peak Disch. qu	505 csm/in	Ref. Figure 6-3 "Unit peal		lse Type I	11	
	Runoff, Q	5.1 inches	From pg. 1	-			
IO PI							



		MANAG	EMENT S	ERVICE	S, INC	· · ·			
Calculatio	ns For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16		40	of	110
Subject:	Stormw	vater Design	Checked By:	Date:		Job No.:		SMEPA	-
Calcula	te Peak	Discharge from Areas B2.	1	-					
	Area		1.53 acres	0.	.00 sq. mile	es			
Calcula		I Time, Tt							
	Sheet F		105 5 1						
	Pt. 68	Flow Length, L	195 feet			Flow Lengt		0 fee	et
B2.1	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24 h		5.9	
	67	Land Slope, s	0.25 ft/ft			Land Slope		0.04 ft/f	t
		Travel Time, Tt	0.183 hrs	Ref Eq. 8		Travel Time	e, Tt	0.000	
	Open C	hannel Flow		-				-	
		Channel Depth, D	2 feet			ÎD	/		
		Channel Width, B	2 feet		-	*	15		
		X-Section Area, a	20 sq ft			< B →		4(H):1(V))
		Wetted Perimeter, pw	18.5 feet						
		Hydraulic Radus, r	1.082 ft						
	69	Channel Slope	0.005 ft/ft						
		Velocity, V	2.220 ft/sec	Ref Eq. 9					
		Flow Length, L	275						
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.218 hrs	Sum of She	eet, Shallov	v Concentrat	ed and C	pen Chanr	nel
Calculat	e Peak I	Discharge							
		l _a /P	0.095 in.						
	Area	Time of Conc. Tc	0.218 hrs	From calcula	itions above				
	B2.1	Unit Peak Disch. qu	555 csm/in	Ref. Figure 6	5-3 "Unit pea	k discharge" L	lse Type I	II	
	02.1	Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, qp	6.77 cu ft/sec	c Eq. 10					
	Area	Flow Length, L	275						
	B5.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6					
	(Time of Conc. Tc	0.577 hrs	Tt + Tc for Ar					
		Unit Peak Disch. q _u	385 csm/in	Ref. Figure 6	-3 "Unit peal	k discharge" U	se Type I	II	
		Runoff, Q	5.1 inches	From pg. 1					
	69)	Peak Discharge, q _p	4.08 cu ft/sec	C Eq. 10					
		Flow Length, L	275						
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
	(Time of Conc. Tc	0.756 hrs	Tt + Tc for Ar					
		Unit Peak Disch. q _u	345 csm/in	Ref. Figure 6-	-3 "Unit peal	k discharge" U	se Type II	1	
		Runoff, Q	5.1 inches	From pg. 1					
	69)	Peak Discharge, q _p	3.02 cu ft/sec	Eq. 10					
		۰r							
	Area	Flow Length, L	275						
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.405 hrs	Tt + Tc for Ar	ea B4.1 (pg.	38)			
	(· · · · · · · · · · · · · · · · · · ·	Unit Peak Disch. q _u	445 csm/in			k discharge" U	se Type II	1	
		Runoff, Q	5.1 inches	From pg. 1			- 7 F - 11		
		Peak Discharge, q _o	5.92 cu ft/sec						
	,	qr 1-6							

		MANAGEMENT SERVICES, INC. Calculations For: SMEPA Landfill Made By: CJ Date: 10/11/16 Sheet No.: 41 Of 110												
Subject:	Stormw			Date: 10/11/16	Sheet No.:	41	of	110						
		vater Design	Checked By:	Date:	Job No.:	_	SMEPA							
	Area	Flow Length, L	275											
	B3.2	Travel Time, Tt	0.034 hrs	Ref Eq. 6										
		Time of Conc. Tc	0.694 hrs	Tt + Tc for Area B3.2 (pg.										
		Unit Peak Disch. q _u	350 csm/in	Ref. Figure 6-3 "Unit peak	k discharge" L	lse Type	10							
		Runoff, Q	5.1 inches	P.9.										
	69)	Peak Discharge, q _p	3.07 cu ft/se	c Eq. 10										
	Area	Flow Length, L	275											
	B3.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6										
	(from	Time of Conc. Tc	0.316 hrs	Tt + Tc for Area A.4.2 (pg.	. 38)									
		14	495 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Type	111							
		Runoff, Q	5.1 inches	From pg. 1										
	69)	Peak Discharge, q _p	9.23 cu ft/se	c Eq. 10										
	Area	Flow Length, L	275											
	B2.2	Travel Time, Tt	0.034 hrs	Ref Eq. 6										
	(from	Time of Conc. Tc	0.566 hrs	Tt + Tc for Area B2.2 (pg.	38)									
	pt. 67	Unit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Type	111							
	to Pt.	Runoff, Q	5.1 inches	From pg. 1										
	69)	Peak Discharge, q _p	5.03 cu ft/sec	c Eq. 10										
	Area	Flow Length, L	275											
	B2.3	Travel Time, Tt	0.034 hrs	Ref Eq. 6										
	(from	Time of Conc. Tc	0.585 hrs	Tt + Tc for Area B2.3 (pg.	38)									
	pt. 67	Unit Peak Disch. q _u	385 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	se Туре	III							
	to Pt.	Runoff, Q	5.1 inches	From pg. 1	-									
	69)	Peak Discharge, q _p	2.95 cu ft/sec	c Eq. 10										

20 sq ft 40.07 cu ft/sec 2.0036 ft/sec 90% of Calculated Channel Flow Velocity

Peak Velocity

		MANAGI	EMENT SI				
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16		of 110
		ater Design	Checked By:	Date:		Job No.:	SMEPA
Calcula	te Peak	Discharge from Areas B1.					
	Area		1.19 acres	(0.00 sq. mile	S	
Calcula		Time, Tt					
	Sheet F	Flow Length, L	120 feet			Flow Length, L	180 feet
	Pt. 70	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 68	Two-yr 24 hr rainfal	
	to Pt.	Land Slope, s	0.25 ft/ft		to Pt.	Land Slope, s	0.04 ft/ft
202	68	Travel Time, Tt	0.124 hrs	Ref Eq. 8	71	Travel Time, Tt	0.326
B1.2	Shallow	Concentrated Flow					
		Flow Length, L	95 feet				
		Watercourse slope, s	0.04 ft/ft				
	72	Avg. Velocity, V.	3.2 ft/sec				
		Travel Time, Tt	0.008 hrs	Ref Eq. 6			
	Open C	hannel Flow		-		-	1
		Channel Depth, D	2 feet			D	
		Channel Width, B	4 feet		-	*	
	54 00	X-Section Area, a	24 sq ft			B	4(H):1(V)
		Wetted Perimeter, pw	20.5 feet 1.171 ft				
	το Pt. 76	Hydraulic Radus, r	0.005 ft/ft				
	10	Channel Slope Velocity, V	2.341 ft/sec	Ref Eq. 9			
		Flow Length, L	155	1101 24.0			
		Travel Time, Tt	0.018 hrs	Ref Eq. 6			
	Total T	ravel Time	0.477 hrs		neet, Shallov	v Concentrated and	Open Channel
Calcula	te Peak	Discharge from Areas B1					
	Area		.3 1.37 acres		0.00 sq. mile	es	
	Area ate Trave	l Time, Tt			0.00 sq. mile	95	
	Area	I Time, Tt Flow	1.37 acres	2	0.00 sq. mile		202.4. foot
	Area ate Trave Sheet F	I Time, Tt Flow Flow Length, L	1.37 acres 96.6 feet	7	0.00 sq. mile Pt. 70	Flow Length, L	203.4 feet
	Area ate Trave Sheet F Pt. 73	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂	1.37 acres 96.6 feet 4.9 inches	7		Flow Length, L Two-yr 24 hr rainfa	I 5.9
	Area ate Trave Sheet F	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft		Pt. 70	Flow Length, L Two-yr 24 hr rainfa Land Slope, s	l 5.9 0.04 ft/ft
	Area ate Trave Sheet F Pt. 73 to Pt. 70	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt	1.37 acres 96.6 feet 4.9 inches	Ref Eq. 8	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa	I 5.9
Calcula	Area ate Trave Sheet F Pt. 73 to Pt. 70 Shallov	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs		Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s	l 5.9 0.04 ft/ft
Calcula	Area Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet		Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s	l 5.9 0.04 ft/ft
Calcula	Area Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt.	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft		Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s	l 5.9 0.04 ft/ft
Calcula	Area Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V.	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec	Ref Eq. 8	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s	l 5.9 0.04 ft/ft
Calcula	Area Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft		Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s	l 5.9 0.04 ft/ft
Calcula	Area Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec	Ref Eq. 8	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfal Land Slope, s Travel Time, Tt	l 5.9 0.04 ft/ft
Calcula	Area Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs	Ref Eq. 8	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s	l 5.9 0.04 ft/ft
Calcula	Area Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet	Ref Eq. 8	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s Travel Time, Tt	1 5.9 0.04 ft/ft 0.360
Calcula	Area Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75 Open C	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 4 feet	Ref Eq. 8	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfal Land Slope, s Travel Time, Tt	l 5.9 0.04 ft/ft
Calcula	Area ate Trave Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75 Open C Pt. 69	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B X-Section Area, a	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 4 feet 24 sq ft	Ref Eq. 8	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s Travel Time, Tt	1 5.9 0.04 ft/ft 0.360
Calcula	Area ate Trave Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75 Open C Pt. 69	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 4 feet 24 sq ft 20.5 feet	Ref Eq. 8 Ref Eq. 6	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s Travel Time, Tt	1 5.9 0.04 ft/ft 0.360
Calcula	Area ate Trave Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75 Open C Pt. 69 to Pt.	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 4 feet 24 sq ft 20.5 feet 1.171 ft	Ref Eq. 8	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s Travel Time, Tt	1 5.9 0.04 ft/ft 0.360
Calcula	Area ate Trave Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75 Open C Pt. 69 to Pt.	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 4 feet 24 sq ft 20.5 feet 1.171 ft 0.005 ft/ft	Ref Eq. 8 Ref Eq. 6	Pt. 70 to Pt.	Flow Length, L Two-yr 24 hr rainfa Land Slope, s Travel Time, Tt	1 5.9 0.04 ft/ft 0.360
Calcula	Area ate Trave Sheet F Pt. 73 to Pt. 70 Shallov Pt. 74 to Pt. 75 Open C Pt. 69 to Pt.	I Time, Tt Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt v,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt Channel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	1.37 acres 96.6 feet 4.9 inches 0.1 ft/ft 0.151 hrs 71.6 feet 0.04 ft/ft 3.2 ft/sec 0.006 hrs 2 feet 4 feet 24 sq ft 20.5 feet 1.171 ft 0.005 ft/ft 2.341 ft/sec	Ref Eq. 8 Ref Eq. 6 Ref Eq. 9 Ref Eq. 6	Pt. 70 to Pt. 74	Flow Length, L Two-yr 24 hr rainfa Land Slope, s Travel Time, Tt	1 5.9 0.04 ft/ft 0.360 4(H):1(V)

	MANAC	GEMENT SE	RVICES, INC				
Calculations For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16			of	110
Subject: Stormw	ater Design	Checked By:	Date:	Job No.:	SN	ИЕРА	
Calculate Peak							
	I _a /P	0.095 in.					
	Time of Conc. Tc	0.477 hrs	From calculations above				
Area	Unit Peak Disch. qu	415 csm/in	Ref. Figure 6-3 "Unit peal	discharge" Use ⁻	Type III		
B1.2	Runoff, Q	5.1 inches	-	-			
	Peak Discharge, q _p	3.94 cu ft/sec					
	r our bioonargo, qp						
	l _a /P	0.095 in.					
	Time of Conc. Tc	0.535 hrs	From calculations above				
Area	Unit Peak Disch. qu	400 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Use -	Type III		
B1.3	Runoff, Q	5.1 inches	-	Ū			
	Peak Discharge, q _p	4.37 cu ft/sec					
	r ear Disonarge, qp	1.07 04 10000					
Area	Flow Length, L	155					
B5.1	Travel Time, Tt	0.018 hrs	Ref Eq. 6				
	Time of Conc. Tc	0.595 hrs	Tt + Tc for Area B5.1 (pg.	40)			
	Unit Peak Disch. qu	385 csm/in	Ref. Figure 6-3 "Unit peal	discharge" Use ⁻	Type II		
	Runoff, Q	5.1 inches	From pg. 1				
76)	Peak Discharge, q _o	4.08 cu ft/sec					
	e · · ·						
Area	Flow Length, L	155					
B4.2	Travel Time, Tt	0.018 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.774 hrs	Tt + Tc for Area B4.2 (pg.				
pt. 69	Unit Peak Disch. q _u	340 csm/in	Ref. Figure 6-3 "Unit peal	discharge" Use '	Type III		
to Pt.	Runoff, Q	5.1 inches	From pg. 1				
76)	Peak Discharge, q_p	2.98 cu ft/sec	: Eq. 10				
	-	455					
Area	Flow Length, L	155 0.018 hrs	Ref Eq. 6				
B4.1	Travel Time, Tt	0.423 hrs	Tt + Tc for Area B4.1 (pg.	40)			
(from	Time of Conc. To		Ref. Figure 6-3 "Unit peal		Tupo III		
	Unit Peak Disch. qu			Culscharge Use	гуре ш		
	Runoff, Q	5.1 inches					
76)	Peak Discharge, q _p	5.86 cu ft/sec	; Eq. 10				
A	Flow Length, L	155					
Area	Travel Time, Tt	0.018 hrs	Ref Eq. 6				
B3.2	Time of Conc. Tc	0.712 hrs	Tt + Tc for Area B3.2 (pg.	41)			
(from	Unit Peak Disch. q _u	350 csm/in	Ref. Figure 6-3 "Unit peal		Tvpe III		
pt. 69		5.1 inches	From pg. 1				
	Runoff, Q	3.07 cu ft/sec	10				
76)	Peak Discharge, q _p	3.07 Cu IVSec	, Ly. 10				
Area	Flow Length, L	155					
B3.1	Travel Time, Tt	0.018 hrs	Ref Eq. 6				
(from	Time of Conc. Tc	0.334 hrs	Tt + Tc for Area A.4.2 (pg	. 41)			
	Unit Peak Disch. q	485 csm/in	Ref. Figure 6-3 "Unit peal		Type III		
	Runoff, Q	5.1 inches	From pg. 1	0			
10 ml.	NUTION, W	0.1 110100					

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bject: Stormw	ater Design	Checked By:	Date:		Job No.:		SMEPA	
Area	Flow Length, L	155						
B2.2	Travel Time, Tt	0.018 hrs	Ref Eq. 6					
(from	Time of Conc. Tc	0.584 hrs	Tt + Tc for Ar					
•	Unit Peak Disch. qu	390 csm/in	-	-3 "Unit pea	k discharge"	Use Type	111	
	Runoff, Q	5.1 inches	• =					
76)	Peak Discharge, q _p	5.03 cu ft/sec	C Eq. 10					
Area	Flow Length, L	155						
B2.3	Travel Time, Tt	0.018 hrs	Ref Eq. 6	00 2 /	44)			
(Time of Conc. Tc	0.604 hrs	Tt + Tc for Ar				ш	
	Unit Peak Disch. q _u	385 csm/in	Ref. Figure 6-	-s onit pear	v discharge.	озе туре	111	
	Runoff, Q	5.1 inches	From pg. 1					
76)	Peak Discharge, q _p	2.95 cu ft/sec	; ⊑q. 10					
Area	Flow Length, L	155						
B2.1	Travel Time, Tt	0.018 hrs	Ref Eq. 6					
(from	Time of Conc. Tc	0.236 hrs	Tt + Tc for Ar			–		
pt. 69		545 csm/in	Ref. Figure 6-	-3 "Unit pea	k discharge"	Use Type	11	
	Runoff, Q	5.1 inches	From pg. 1					
76)	Peak Discharge, q _p	6.64 cu ft/sec	c Eq. 10					
	X-Section Area, a Peak Discharge, qp Peak Velocity	24 sq ft 47.95 cu ft/sec 1.9981 ft/sec 85% of Calcu		el Fiow Vel	ocity			

		MANIACI	EMENT SE	EDVICES	INC	V			
Calculatio	ins For	SMEPA Landfill	Made By: CJ			Sheet No.:	45	of	110
		ater Design	Checked By:	Date:	7	lob No.:		SMEPA	
		Discharge from Areas B1.		1					
Jaicula	Area	Discharge nom Alous D1.	0.93 acres	0.00	sq. miles				
Coloula		Time, Tt	0.00 00.00		- 4				
Galcula	Sheet F								
		Flow Length, L	190 feet		1	-low Lengt	h. L	0	
	Pt. 77	Two-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24		5.9	
B1.1	to Pt.	and the second se	0.25 ft/ft			_and Slope		0.04	
	76	Land Slope, s	0.179 hrs	Ref Eq. 8		Fravel Tim		0.000	
		Travel Time, Tt	0.179 115	Rei Eq. 0			o, n	0.000	
	0	hannel Flow							
	Open C		2 feet	~	-	1		/	
		Channel Depth, D Channel Width, B	4 feet			D	K		
		,	24 sq ft			· · ·	5	4/10.40	^
	D4 70	X-Section Area, a	20.5 feet		P	B		4(H):1(\	()
		Wetted Perimeter, pw				D			
		Hydraulic Radus, r	1.171 ft						
	39	Channel Slope	0.005 ft/ft						
		Velocity, V	2.341 ft/sec	Ref Eq. 9					
		Flow Length, L	285	D. (C. 0					
		Travel Time, Tt	0.034 hrs	Ref Eq. 6	Ohallaur	Concentre	ted and C	han Char	
	Total Ti	ravel Time	0.213 hrs	Sum of Sheet,	Shallow	Concentra	teu anu C	pen ona	Inei
Calcula	ite Peak	Discharge	0.005.1						
		l _a /P	0.095 in.						
	Area	Time of Conc. Tc	0.213 hrs	From calculation					
	B1.1	Unit Peak Disch. q _u	555 csm/in	Ref. Figure 6-3 "	'Unit peak	discharge"	Use Type I		
	01.1	Runoff, Q	5.1 inches	• =					
		Peak Discharge, q _p	4.11 cu ft/se	c Eq. 10					
	Area	Flow Length, L	285						
	B5.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.629 hrs	Tt + Tc for Area					
	•	Unit Peak Disch. q _u	375 csm/in	Ref. Figure 6-3 '	'Unit peak	discharge"	Use Type I	11	
		Runoff, Q	5.1 inches	From pg. 1					
1	39)	Peak Discharge, q _p	3.97 cu ft/se						
	/-/	4F 1-6		•					
	Area	Flow Length, L	285						
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
	B4.2	Time of Conc. Tc	0.808 hrs	Tt + Tc for Area	B4.2 (pa	43)			
		Unit Peak Disch. q _u	335 csm/in	Ref. Figure 6-3			Use Type I		
	•		5.1 inches	From pg. 1	Sin poar		762		
		Runoff, Q	2.94 cu ft/se						
	39)	Peak Discharge, q _p	2.94 CU TI/SE	ic ⊑q. 10					
			005						
	Area	Flow Length, L	285						
	B4.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6	D 4.4.4	40)			
	(from	Time of Conc. Tc	0.457 hrs	Tt + Tc for Area			–		
	pt. 76	Unit Peak Disch. q _u	425 csm/in	Ref. Figure 6-3 '	"Unit peak	discharge"	Use Type I	111	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1					
1									

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	Area	Flow Length, L	285					
	B3.2	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.746 hrs	Tt + Tc for Area B3.2 (p	g. 43)			
	•	Unit Peak Disch. g _u		Ref. Figure 6-3 "Unit pe	ak discharge" l	Jse Type	III	
		Runoff, Q	5.1 inches		_			
	39)	Peak Discharge, qp	3.02 cu ft/see					
	,	т осла 2700 700 3 -1 чр		,				
	Area	Flow Length, L	285					
	B3.1	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.368 hrs	Tt + Tc for Area A.4.2 (p	og. 43)			
	pt. 76	Unit Peak Disch. q _u	460 csm/in	Ref. Figure 6-3 "Unit pe	ak discharge" l	Jse Type	10	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	39)	Peak Discharge, q _p	8.58 cu ft/see	c Eq. 10				
		-						
	Area	Flow Length, L	285	D (D)				
	B2.2	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.618 hrs	Tt + Tc for Area B2.2 (p		1		
		Unit Peak Disch. qu	380 csm/in	Ref. Figure 6-3 "Unit pe	ak discharge" (Jse Type	111	
		Runoff, Q	5.1 inches	From pg. 1				
	39)	Peak Discharge, q _p	4.91 cu ft/see	; Eq. 10				
	Area	Flow Length, L	285					
	B2.3	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.638 hrs	Tt + Tc for Area B2.3 (p	g. 44)			
	`	Unit Peak Disch. q _u	375 csm/in	Ref. Figure 6-3 "Unit pe	ak discharge" l	Jse Type	111	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	39)	Peak Discharge, q _p	2.87 cu ft/se	c Eq. 10				
		Flow Longth	285					
	Area	Flow Length, L Travel Time, Tt	0.034 hrs	Ref Eq. 6				
	B2.1	Time of Conc. Tc		Tt + Tc for Area B2.1 (p	a. 44)			
		Unit Peak Disch. qu		Ref. Figure 6-3 "Unit pe		Jse Tvoe	111	
		Runoff, Q	5.1 inches	-				
	39)	Peak Discharge, qp	6.22 cu ft/see					
	Area	Flow Length, L	285					
	B1.2	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.511 hrs	Tt + Tc for Area B2.2 (p				
		Unit Peak Disch. qu	400 csm/in	Ref. Figure 6-3 "Unit pe	ак discharge" l	Jse Type	ul.	
		Runoff, Q	5.1 inches					
	79)	Peak Discharge, q _p	3.79 cu ft/see	C Eq. 10				
	Area	Flow Length, L	285					
	B1.3	Travel Time, Tt	0.034 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.569 hrs	Tt + Tc for Area B2.3 (p	g. 43)			
	•	Unit Peak Disch. qu	390 csm/in	Ref. Figure 6-3 "Unit pe		Jse Type	Ш	
		Runoff, Q	5.1 inches	From pg. 1				
	79)	Peak Discharge, qp	4.26 cu ft/se	c Ea. 10				



Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994
			EMENT SI		S INC	0			
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		vater Design	Checked By:	Date:		Job No.:		SMEPA	
		Discharge from Areas A1		1		1			
ouround	Area	biodriaige irentrated i th	0.8 acres		0.00 sq. mile	es			
Calcula		Time, Tt							
	Sheet F								
		Flow Length, L	127.4 feet		-	Flow Leng	th, L	172.6	
44.0	Pt. 34	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 35	Two-yr 24	hr rainfal	5.9	
A1.2	to Pt.	Land Slope, s	0.25 ft/ft		to Pt. 78	Land Slop	e, s	0.04	
	35	Travel Time, Tt	0.130 hrs	Ref Eq. 8	10	Travel Tin		0.315	
	Shallow	,Concentrated Flow							
	Pt. 78	Flow Length, L	55.9 feet						
	to Pt.	Watercourse slope, s	0.04 ft/ft						
	79	Avg. Velocity, V.	3.2 ft/sec						
		Travel Time, Tt	0.005 hrs	Ref Eq. 6					
	Open C	hannel Flow		1		-			
		Channel Depth, D	2.5 feet			ÎD	/		
		Channel Width, B	8 feet			*	10		
		X-Section Area, a	45 sq ft			<>		4(H):1(V)	
		Wetted Perimeter, pw	28.6 feet			P.			
		Hydraulic Radus, r	1.573 ft						
	80	Channel Slope	0.005 ft/ft						
		Velocity, V	2.850 ft/sec	Ref Eq. 9					
		Flow Length, L	150						
		Travel Time, Tt	0.015 hrs	Ref Eq. 6					
	lotal Ir	avel Time	0.465 hrs	JSum of Sr	eet, Shallow	v Concentra	ated and C	ipen Chann	e
Calcula	Dook I	Discharge							
Calcula	GI CAN	l _a /P	0.095 in.						
		Time of Conc. Tc	0.465 hrs	From calcu	ations above				
	Area	Unit Peak Disch. qu	415 csm/in		6-3 "Unit peal	k disebaraa"		11	
	A1.2	Runoff, Q	5.1 inches	From pg. 1	o-o onic pear	n ulsondiye	ope Type I		
		Peak Discharge, qp	2.65 cu ft/sec						
		Peak Discharge, qp	2.05 CU 1/Sec	; Eq. 10					
	A====	Flow Length, L	150						
	Area B5.1	Travel Time, Tt	0.015 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.643 hrs		Area B5.1 (pg.	45)			
	(Unit Peak Disch. qu	360 csm/in		6-3 "Unit peal		Use Type I	1	
		Runoff, Q	5.1 inches	From pg. 1	e e onicpea	alconarge	See Type I		
	80)	Peak Discharge, q _o	3.82 cu ft/sec	10					
	00)	i can Discharge, yp	0.02 CU 10580	, Eq. 10					
	Area	Flow Length, L	150						
	Area B4.2	Travel Time, Tt	0.015 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.823 hrs		Area B4.2 (pg.	45)			
	(from	Unit Peak Disch. qu	330 csm/in		6-3 "Unit peal		lise Tyne II	1	
		Runoff, Q	5.1 inches	From pg. 1	o o onicpear	, alconarge	See Type II		
	10 Pl. 80)	•	2.89 cu ft/sec						
	00)	Peak Discharge, q _p	2.09 CU 11/SeC	, ⊑y. IU					
	Α.	Flow Longth	150						
	Area	Flow Length, L	150 0.015 bro	Dof Ea C					
	B4.1	Travel Time, Tt	0.015 hrs	Ref Eq. 6	000 P/ 4 /r-	(5)			
	(from	Time of Conc. Tc	0.472 hrs		Area B4.1 (pg.		Lieo Turre "	_	
		Unit Peak Disch. q _u	420 csm/in		6-3 "Unit peal	k alscharge"	Use Type II	I	
		Runoff, Q	5.1 inches	From pg. 1					
	80)	Peak Discharge, qp	5.59 cu ft/sec	⊨q. 10					

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Subject:		ater Design	Checked By:		Job No.:		SMEPA		
bubject.	Area	Flow Length, L	150						
	B3.2	Travel Time, Tt	0.015 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.760 hrs	Tt + Tc for Area B3.2 (pg.	46)				
		Unit Peak Disch. qu	340 csm/in			lse Type	ш		
		Runoff, Q	5.1 inches	-	_				
	80)	Peak Discharge, q _p	2.98 cu ft/sec						
	,	, our bioonargo, qp							
	Area	Flow Length, L	150						
	B3.1	Travel Time, Tt	0.015 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.383 hrs	Tt + Tc for Area A.4.2 (pg	46)				
		Unit Peak Disch. q _u	455 csm/in	Ref. Figure 6-3 "Unit peak	discharge" L	lse Type	111		
	•	Runoff, Q	5.1 inches	From pg. 1					
	80)	Peak Discharge, q	8.48 cu ft/sec						
	,	di ve G							
	Area	Flow Length, L	150						
	B2.2	Travel Time, Tt	0.015 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.633 hrs	Tt + Tc for Area B2.2 (pg.	46)				
	pt. 39	Unit Peak Disch. q _u	370 csm/in	Ref. Figure 6-3 "Unit peak	discharge" L	lse Type	111		
		Runoff, Q	5.1 inches	From pg. 1					
	80)	Peak Discharge, qp	4.78 cu ft/sec	: Eq. 10					
	Area	Flow Length, L	150						
	B2.3	Travel Time, Tt	0.015 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.652 hrs	Tt + Tc for Area B2.3 (pg.		_			
		Unit Peak Disch. q _u	365 csm/in		discharge" L	lse Type	[1]		
		Runoff, Q	5.1 inches	10					
	80)	Peak Discharge, q _p	2.79 cu ft/sec	c Eq. 10					
			150						
	Area	Flow Length, L	150 0.015 bro	Def Ea 6					
	B2.1	Travel Time, Tt	0.015 hrs 0.284 hrs	Ref Eq. 6 Tt + Tc for Area B2.1 (pg.	46)				
		Time of Conc. To		Ref. Figure 6-3 "Unit peak		lse Tyne			
	*	Unit Peak Disch. q _u			alsonarge c	se type			
		Runoff, Q	5.1 inches 6.16 cu ft/sec						
	80)	Peak Discharge, q_{ρ}	0.10 CU IVSet	л ц. то					
	Area	Flow Length, L	150						
	B1.2		0.015 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.525 hrs	Tt + Tc for Area B2.2 (pg.	46)				
		Unit Peak Disch. qu	400 csm/in			Jse Type	18		
		Runoff, Q	5.1 inches	•	5				
	80)	Peak Discharge, qp	3.79 cu ft/sec						
	,	U ip							
	Агеа	Flow Length, L	150						
	B1.3	Travel Time, Tt	0.015 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.583 hrs	Tt + Tc for Area B2.3 (pg.					
		Ùnit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit peak	discharge" L	lse Type	10		
	to Pt.	Runoff, Q	5.1 inches	From pg. 1					
	80)	Peak Discharge, qp	4.26 cu ft/sec	c Eq. 10					

alculatio	- Fer	SMEPA Landfill		ERVICES, INC.
ubject:		vater Design	Made By: CJ	Date: 10/11/16 Sheet No.: 50 of 110 Date: Job No.: SMEPA
Inject.	Area	Flow Length, L	Checked By: 150	Date: Job No.: SMEPA
	B1.1	Travel Time, Tt	0.015 hrs	Ref Eq. 6
		Time of Conc. Tc	0.228 hrs	Tt + Tc for Area B2.3 (pg. 45)
	V	Unit Peak Disch. qu	550 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
	80)	Peak Discharge, q _p	6.00 cu ft/sec	
	00)	Feak Discharge, qp	0.00 Cu I/Set	5 Eq. 10
	Area	Flow Length, L	150	
	A8.1	Travel Time, Tt	0.015 hrs	Ref Eq. 6
		Time of Conc. Tc	0.611 hrs	Tt + Tc for Area A8.1 (pg. 27)
		Unit Peak Disch. q _u	380 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
	80)	Peak Discharge, q _p	4.48 cu ft/sec	c Eq. 10
	Area	Flow Length, L	150	
	A7.2	Travel Time, Tt	0.015 hrs	Ref Eq. 6
	(from	Time of Conc. Tc	0.812 hrs	Tt + Tc for Area A7.2 (pg. 27)
	pt. 39	Unit Peak Disch. q _u	335 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
	80)	Peak Discharge, q _p	2.51 cu ft/sec	C Eq. 10
	Area	Flow Length, L	150	
	A7.1	Travel Time, Tt	0.015 hrs	Ref Eq. 6
	(from	Time of Conc. Tc	0.532 hrs	Tt + Tc for Area A7.1 (pg. 27)
	pt. 39	Unit Peak Disch. q _u	400 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	to Pt.	Runoff, Q	5.1 inches	From pg. 1
	80)	Peak Discharge, q _p	2.84 cu ft/sec	; Eq. 10
	Агеа	Flow Length, L	150	
	A6.2	Travel Time, Tt	0.015 hrs	Ref Eq. 6
	(from	Time of Conc. Tc	0.826 hrs	Tt + Tc for Area A6.2 (pg. 28)
	•	Unit Peak Disch. q _u	330 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	
	80)	Peak Discharge, q _p	3.47 cu ft/sec	; Eq. 10
	Area	Flow Length, L	150	
	A6.1	Travel Time, Tt	0.015 hrs	Ref Eq. 6
		Time of Conc. Tc	0.479 hrs	Tt + Tc for Area A6.1 (pg. 28)
	pt. 39	Unit Peak Disch. q _u	410 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	to Pt.	Runoff, Q	5.1 inches	From pg. 1
	80)	Peak Discharge, q _p	4.41 cu ft/sec	: Eq. 10
	Area	Flow Length, L	150	
		Travel Time, Tt	0.015 hrs	Ref Eq. 6
		Time of Conc. Tc	0.759 hrs	Tt + Tc for Area A5.2 (pg. 28)
	·	Unit Peak Disch. q _u	345 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	•	Runoff, Q	5.1 inches	
		Peak Discharge, q _p	2.67 cu ft/sec	

MANAGEMENT SERVICES, INC.								
		1				440		
Calculations For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16		of	110		
	nwater Design	Checked By:	Date:	Job No.:	SMEPA	-		
Are		150						
A5.		0.015 hrs	Ref Eq. 6					
(fro	m Time of Conc. Tc	0.465 hrs	Tt + Tc for Area A5.1 (pg.	. 28)				
pt. 3	9 Unit Peak Disch. qu	425 csm/in	Ref. Figure 6-3 "Unit peal	< discharge" Use Ty	/pe III			
to F	t. Runoff, Q	5.1 inches	From pg. 1					
80		3.45 cu ft/sec	: Eq. 10					
	C ip							
Are	a Flow Length, L	150						
A4.		0.015 hrs	Ref Eq. 6					
(fro		0.710 hrs	Tt + Tc for Area A4.2 (pg.	28)				
	9 Unit Peak Disch. qu	350 csm/in	Ref. Figure 6-3 "Unit peal		/pe III			
	t. Runoff, Q	5.1 inches	From pg. 1		1			
80		4.02 cu ft/sec						
00	, i can Discharge, yp							
Are	a Flow Length, L	150						
Ale A4.		0.015 hrs	Ref Eq. 6					
(fro		0.768 hrs	Tt + Tc for Area A4.3 (pg.	28)				
	B9 Unit Peak Disch. qu	345 csm/in	Ref. Figure 6-3 "Unit peal		ne III			
				Culsonarge Ose Ty	pe m			
	t. Runoff, Q	5.1 inches						
80) Peak Discharge, q _p	3.22 cu ft/sec	; Eq. 10					
Are	a Flow Length, L	150						
A4.		0.015 hrs	Ref Eq. 6					
(fro		0.396 hrs	Tt + Tc for Area A4.1 (pg.	28)				
· · · · · · · · · · · · · · · · · · ·	39 Unit Peak Disch. qu	455 csm/in			/pe III			
	Pt. Runoff, Q	5.1 inches	•	0,				
80		5.58 cu ft/sec						
	, i can picchaige, qp							
Are	a Flow Length, L	150						
A3.	2 Travel Time, Tt	0.015 hrs	Ref Eq. 6					
	m Time of Conc. Tc	0.642 hrs	Tt + Tc for Area A3.2 (pg.	29)				
	39 Unit Peak Disch. qu	360 csm/in	Ref. Figure 6-3 "Unit peal	k discharge" Use Ty	/pe III			
	Pt. Runoff, Q	5.1 inches		-				
80	,	3.50 cu ft/sec	· •					
Are		150						
A3		0.015 hrs	Ref Eq. 6					
(fro		0.700 hrs	Tt + Tc for Area A3.3 (pg.					
pt. 3	39 Unit Peak Disch. qu	350 csm/in	Ref. Figure 6-3 "Unit peal	< discharge" Use Ty	/pe III			
to F	Pt. Runoff, Q	5.1 inches	From pg. 1					
80		3.15 cu ft/sec	c Eq. 10					
		450						
Are		150						
A3		0.015 hrs	Ref Eq. 6	2 2)				
(fro		0.335 hrs	Tt + Tc for Area A3.1 (pg.					
pt. 3	39 Unit Peak Disch. qu	495 csm/in	Ref. Figure 6-3 "Unit peal	discharge" Use Ty	/pe III			
to F	Pt. Runoff, Q	5.1 inches	From pg. 1					
) Peak Discharge, q _o	5.21 cu ft/sec						

			MA	NAG	EMEN	VI SE	RVIC	CES.	INC		
Calculatio	ons For:	SMEPA	Landfill		Made By:		Date		/11/16	Sheet No.: 52	of 110
Subject:	Stormw	ater Des	ign		Checked		Date		-	Job No.:	SMEPA
	Area	Flow Le	ength, L		150		1.00	_			
	A2.1	Travel			0.015		Ref Eq.				
	V	Time of			0.544				A2.1 (pg		
		Unit Pe		. q _u		csm/in	-		"Unit pea	k discharge" Use Typ	e III
		Runoff,					From pg	ļ . 1			
	80)	Peak D	ischarge	, q _p	2.46	i cu ft/seo	C Eq. 10				
	Area	Flow Le	ngth, L		150	I					
	A1.1	Travel 7			0.015		Ref Eq. I				
	(from	Time of			0.253				A2.1 (pg		
		Unit Pea		. q _u		csm/in	-		"Unit pea	k discharge" Use Typ	e III
		Runoff,		-		inches	From pg	. 1			
	80)	геак DI	scharge	Чр	5.62	cu ft/sec	, Ed. 10				
Calcula	te Chanr	nel Flow '									
		X-Section				sq ft					
			scharge,	, qp		cu ft/sec	;				
		Peak Ve	HOCITY		2.4615	n/sec of Calcu	lated Ch	annal		ocity	
		-					2			<	
		-	-	/	*	D Cut		4(H	0:1(V)	<	
	-	F		Ditch	Btm	D Cut		_	l):1(V)	Area of Cut/Fill	Volume Cut/Fi
	Point	Existing	Design	Ditch	Btm Width	B	Length	Cut	Fill	Area of Cut/Fill	Volume Cut/Fi
	Point 80	F	Design Depth	Ditch Elev 216.5	Btm Width 8		(ft)	Cut (ft)	Fill (ft)	(ft ²)	Volume Cut/Fi (yd ³)
	Point 80 39	Existing Grade	Design Depth	Elev	Width	B Slope	(ft)	Cut	Fill (ft)		
	80 39 39	Existing Grade 218.5 221.5 221.5	Design Depth 2.5 2.5 2.0	Elev 216.5 217.3 217.3	Width 8 8 5	B Slope 0.50% 0.50% 0.50%	(ft) 150 0 380	Cut (ft) 2.00 4.25 4.25	Fill (ft) 0.50 0.00 0.00	(ft ²) 27.0 106.3 93.5	(yd ³) 370.1 0.0
	80 39 39 38	Existing Grade 218.5 221.5 221.5 223.0	Design Depth 2.5 2.5 2.0 2.0	Elev 216.5 217.3 217.3 219.2	Width 8 8 5 5	B Slope 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235	Cut (ft) 2.00 4.25 4.25 3.85	Fill (ft) 0.50 0.00 0.00 0.00	(ft ²) 27.0 106.3 93.5 78.5	(yd ³) 370.1 0.0 1210.7
	80 39 39 38 33	Existing Grade 218.5 221.5 221.5 223.0 224.0	Design Depth 2.5 2.5 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3	Width 8 5 5 5 5	B Slope 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0	Cut (ft) 2.00 4.25 4.25 3.85 3.67	Fill (ft) 0.50 0.00 0.00 0.00 0.00	(ft ²) 27.0 106.3 93.5 78.5 72.4	(yd ³) 370.1 0.0 1210.7 656.9
	80 39 39 38 33 33	Existing Grade 218.5 221.5 221.5 223.0 224.0 224.0	Design Depth 2.5 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3	Width 8 8 5 5 5 4	B Slope 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560	Cut (ft) 2.00 4.25 4.25 3.85 3.67 3.67	Fill (ft) 0.50 0.00 0.00 0.00 0.00 0.00	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7	(yd ³) 370.1 0.0 1210.7 656.9 0.0
	80 39 39 38 33 33 33 31	Existing Grade 218.5 221.5 223.0 224.0 224.0 224.0	Design Depth 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 220.3	Width 8 8 5 5 5 4 4 4	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87	Fill (ft) 0.50 0.00 0.00 0.00 0.00 0.00 1.13	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4
D	80 39 39 38 33 33 31 31	Existing Grade 218.5 221.5 223.0 224.0 224.0 224.0 224.0	Design Depth 2.5 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 223.1 223.1	Width 8 8 5 5 5 4	B Slope 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560	Cut (ft) 2.00 4.25 4.25 3.85 3.67 3.67	Fill (ft) 0.50 0.00 0.00 0.00 0.00 0.00	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0
Drain	80 39 39 38 33 33 33 31	Existing Grade 218.5 221.5 223.0 224.0 224.0 224.0	Design Depth 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 220.3	Width 8 5 5 5 4 4 4 3	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87	Fill (ft) 0.50 0.00 0.00 0.00 0.00 0.00 1.13 1.13	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4
Drainage	80 39 39 38 33 33 31 31 26 26 26 25	Existing Grade 218.5 221.5 223.0 224.0 224.0 224.0 224.0 224.0 225.0 225.0 225.5	Design Depth 2.5 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 220.3 223.1 223.1 223.1 224.1 224.1 224.1	Width 8 5 5 5 4 4 3 3 2 2 2	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200 0 200 0 260 280	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87 0.87 0.87 0.87 0.07	Fill (ft) 0.50 0.00 0.00 0.00 0.00 1.13 1.13 1.13 1.1	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8 -16.8 -16.8 -17.7 -63.0	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0 -124.5 0.0 -388.3
Drainage Ar	80 39 38 33 33 31 31 26 26 25 17	Existing Grade 218.5 221.5 221.5 223.0 224.0 224.0 224.0 224.0 225.0 225.0 225.0 225.5 226.7	Design Depth 2.5 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 223.1 223.1 224.1 224.1 224.1 225.4 226.8	Width 8 5 5 5 4 4 3 3 2 2 2 2	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200 0 260 280 0 0	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87 0.87 0.87 0.87 0.87 0.07 -0.13	Fill (ft) 0.50 0.00 0.00 0.00 0.00 1.13 1.13 1.13 1.1	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8 -16.8 -17.7 -63.0 -76.7	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0 -124.5 0.0 -388.3 -724.1
Drainage Area	80 39 38 33 33 33 31 26 26 26 25 17 17	Existing Grade 218.5 221.5 221.5 223.0 224.0 224.0 224.0 224.0 225.0 225.0 225.0 225.5 226.7 226.7	Design Depth 2.5 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 223.1 223.1 224.1 224.1 224.1 225.4 226.8 226.8	Width 8 8 5 5 5 4 4 3 3 2 2 2 0	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200 0 260 280 0 140	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.7 -0.13 -0.13	Fill (ft) 0.50 0.00 0.00 0.00 0.00 1.13 1.13 1.13 1.1	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8 -16.8 -16.8 -17.7 -63.0 -76.7 -76.4	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0 -124.5 0.0 -388.3 -724.1 0.0
Drainage Area A	80 39 38 33 33 31 31 26 26 25 17 17 17	Existing Grade 218.5 221.5 221.5 223.0 224.0 224.0 224.0 224.0 225.0 225.0 225.5 226.7 226.7 228.5	Design Depth 2.5 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 223.1 223.1 224.1 224.1 224.1 225.4 226.8 226.8 227.5	Width 8 8 5 5 5 4 4 3 3 2 2 2 0 0 0	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200 0 260 280 0 140 80	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.8	Fill (ft) 0.50 0.00 0.00 0.00 0.00 1.13 1.13 1.13 1.1	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8 -16.8 -16.8 -16.8 -17.7 -63.0 -76.7 -76.4 -15.1	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0 -124.5 0.0 -388.3 -724.1 0.0 -237.2
	80 39 39 38 33 31 26 25 17 15 14	Existing Grade 218.5 221.5 221.5 223.0 224.0 224.0 224.0 224.0 225.0 225.0 225.5 226.7 226.7 228.5 233.0	Design Depth 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 223.1 223.1 224.1 224.1 224.1 225.4 226.8 226.8 226.8 227.5 227.9	Width 8 8 5 5 5 4 4 3 3 2 2 2 0 0 0 0 0	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200 0 260 280 0 140 80 250	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.8	Fill (ft) 0.50 0.00 0.00 0.00 0.00 1.13 1.13 1.13 1.1	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8 -16.8 -16.8 -17.7 -63.0 -76.7 -76.4 -15.1 103.0	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0 -124.5 0.0 -388.3 -724.1 0.0 -237.2 130.3
	80 39 39 38 33 31 26 25 17 15 14 11	Existing Grade 218.5 221.5 221.5 223.0 224.0 224.0 224.0 224.0 225.0 225.0 225.0 225.0 225.5 226.7 226.7 228.5 233.0 232.0	Design Depth 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 223.1 223.1 224.1 224.1 225.4 226.8 226.8 226.8 227.5 227.9 229.2	Width 8 8 5 5 5 4 4 3 3 2 2 2 0 0 0 0 0 0 0	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200 0 200 0 260 280 0 140 80 250 250	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.8	Fill (ft) 0.50 0.00 0.00 0.00 0.00 1.13 1.13 1.13 1.1	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8 -16.8 -16.8 -17.7 -63.0 -76.7 -76.4 -15.1 103.0 31.9	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0 -124.5 0.0 -388.3 -724.1 0.0 -237.2 130.3 624.7
	80 39 39 38 33 31 26 26 25 17 15 14 11 5	Existing Grade 218.5 221.5 221.5 223.0 224.0 224.0 224.0 224.0 225.0 225.0 225.0 225.0 225.5 226.7 226.7 226.7 228.5 233.0 232.0 231.0	Design Depth 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 223.1 223.1 224.1 224.1 224.1 224.4 226.8 226.8 226.8 227.5 227.9 229.2 230.4	Width 8 8 5 5 5 4 4 3 3 2 2 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200 0 260 280 0 140 80 250	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.8	Fill (ft) 0.50 0.00 0.00 0.00 0.00 1.13 1.13 1.13 1.1	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8 -16.8 -16.8 -16.8 -17.7 -63.0 -76.7 -76.4 -15.1 103.0 31.9 -34.0	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0 -124.5 0.0 -388.3 -724.1 0.0 -237.2 130.3 624.7 -9.7
	80 39 39 38 33 31 26 25 17 15 14 11	Existing Grade 218.5 221.5 221.5 223.0 224.0 224.0 224.0 224.0 225.0 225.0 225.0 225.0 225.5 226.7 226.7 228.5 233.0 232.0	Design Depth 2.5 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	Elev 216.5 217.3 217.3 219.2 220.3 220.3 223.1 223.1 224.1 224.1 225.4 226.8 226.8 226.8 227.5 227.9 229.2	Width 8 8 5 5 5 4 4 3 3 2 2 2 0 0 0 0 0 0 0	B Slope 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50% 0.50%	(ft) 150 0 380 235 0 560 0 200 0 200 0 260 280 0 140 80 250 250 250 125	Cut (ft) 2.00 4.25 3.85 3.67 3.67 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.8	Fill (ft) 0.50 0.00 0.00 0.00 0.00 1.13 1.13 1.13 1.1	(ft ²) 27.0 106.3 93.5 78.5 72.4 68.7 -15.9 -16.8 -16.8 -16.8 -17.7 -63.0 -76.7 -76.4 -15.1 103.0 31.9	(yd ³) 370.1 0.0 1210.7 656.9 0.0 547.4 0.0 -124.5 0.0 -388.3 -724.1 0.0 -237.2 130.3 624.7

			MAI	NAGI	EMEN	NT SE	RVIC	CES,	INC	~	
alculations Fo	or:	SMEPA	Landfill		Made By:	CJ	Date	10	/11/16	Sheet No.: 53	of 110
ubject: Sto	ormwa	ater Desi	gn		Checked	By:	Date		-	Job No.:	SMEPA
	1	F			*	D Cut	K	4(H):1(V)		
		-		Ditch	Btm		Length		Fill	Area of Cut/Fill	Volume Cut/Fill
	oint	Grade	Depth	Elev	Width	Slope	(ft)	(ft)	(ft)	(ft ²)	(yd ³)
	39	221.5	2.0	221.5	4	0.50%	285	0.00	2.00	-68.0	004.0
	76	225.2	2.0	222.9	4	0.50%	155	2.27	0.00	29.8	-201.6
	69	225.7	2.0	223.7	4	0.50%	0	2.00	0.00	24.0	154.4
	69	225.7	2.0	223.7	2	0.50%	275	2.00	0.00	20.0	0.0 319.1
	67	228.1	2.0	225.1	2	0.50%	275	3.02	0.00	42.7	319.1
ag	60	228.6	2.0	226.5	2	0.50%	0 615	2.15	0.00	18.5	0.0
e A	60 51	228.6 238.5	2.0	226.5 229.5	0	0.50%	375	8.97	0.00	322.2	3880.1
rea	47	238.5	2.0	231.4	0	0.50%	345	7.10	0.00	201.6	3637.8
	45	237.8	2.0	233.1	0	0.50%	370	4.68	0.00	87.4	1846.8
	44	233.3	2.0	235.0	0	0.50%	250	-1.67	3.67	-212.2	-855.1
	35	234.7	2.0	236.2	0	0.50%		-1.53	3.53	-196.6	-1892.5
	00 1	20111				Total		1			9,114.8
ecommen		to sh (2)	Elev. 21 ould be	7.3' whe placed. ost devel	en it mee opment	ets up with	the dra	inage c as 111	litch fror cfs and	ow the water to drop m Area A. Either rip I the predevelopmen	-rap or concrete

			EMENT S		S, INC	210			
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	1	10/11/16	Sheet No.:	54	of	110
Subject:	Stormw	ater Design	Checked By:	Date:		Job No.:		SMEPA	
			EASTE	RN SIDE					
Calcula	te Peak	Discharge from Area C4.2							
	Area		1.4 acres	(0.00 sq. mile	s			
Calcula		l Time, Tt							
	Sheet F		452 feet			Flow Longt	6 1	147 fe	ot
	Pt. 84	Flow Length, L	153 feet		Pt. 85	Flow Lengt		5.9	ει
	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24 I		0.04 ft/	F4
	85	Land Slope, s	0.25 ft/ft 0.151 hrs	Def Ex. P	86	Land Slope Travel Time		0.04 10	IL.
C4.2	Challout	Travel Time, Tt ,Concentrated Flow	0.151 115	Ref Eq. 8		Traver Time	3, IL	0.277	
		Flow Length, L	56.5 feet						
		Watercourse slope, s	0.04 ft/ft						
	87	Avg. Velocity, V.	3.2 ft/sec	Ref Fig 6-	9 "Avg. vel. fo	r est travel tir	ne for sha	llow	
	01		0.2 10000	-	ed flow" - use				
		Travel Time, Tt	0.005 hrs	Ref Eq. 6					
	Open C	channel Flow							
	- F -·· -	Channel Depth, D	2 feet	-		1D	-	/	
		Channel Width, B	0 feet			+	K		
		X-Section Area, a	16 sq ft			< ->	-	4(H):1(V	')
	Pt. 83	Wetted Perimeter, pw	16.5 feet			B			/
	to Pt.	Hydraulic Radus, r	0.970 ft						
	92	Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	135						
		Travel Time, Tt	0.018 hrs	Ref Eq. 6					
	Total Tr	ravel Time	0.451 hrs	Sum of Sh	neet, Shallow	/ Concentrat	ed and C	Open Chan	nel
0	ta Daala	Disaharra from Area C4.2							
Calcula	Area	Discharge from Area C4.3	0.84 acres	().00 sq. mile	\$			
	Alea		0.04 20105		7.00 Sq. mile	.0			
Calcula	te Trave	I Time, Tt							
Gaidala	Sheet F								
		Flow Length, L	61.1 feet		54 66	Flow Lengt	η, L	238.9 fee	et
	Pt. 88	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 89	Two-yr 24 h	r rainfal	5.9	
	to Pt.	Land Slope, s	0.25 ft/ft		to Pt.	Land Slope		0.04 ft/1	ft
	89	Travel Time, Tt	0.072 hrs	Ref Eq. 8	90	Travel Time		0.409	
C4.3	Shallow	,Concentrated Flow							
64.3	Pt. 90	Flow Length, L	11.1 feet						
	to Pt.	Watercourse slope, s	0.04 ft/ft						
	91	Avg. Velocity, V.	3.2 ft/sec	-	9 "Avg. vel. fo		ne for sha	llow	
					d flow" - use	Jnpaved			
		Travel Time, Tt	0.001 hrs	Ref Eq. 6					
	Open C	hannel Flow		~				-	
		Channel Depth, D	2 feet			ÎD	/		
		Channel Width, B	0 feet		-	*	2		
		X-Section Area, a	16 sq ft			← B →		_4(H):1(V)
		Wetted Perimeter, pw	16.5 feet			-			
		Hydraulic Radus, r	0.970 ft						
	92	Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		-	405						
		Flow Length, L	135	D. (C. A.					
	Tatal T	-	135 0.018 hrs 0.500 hrs	Ref Eq. 6	eet, Shallow	Concentrat	ad and O	non Chan	nel

	MANAG	GEMENT SE	RVICES, INC	×		
Calculations For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 55		110
	vater Design	Checked By:	Date:	Job No.:	SMEPA	
Gubject: Stormw Calculate Peak Area C4.2 Area C4.3	SMEPA Landfill	Made By: CJ Checked By: 0.095 in. 0.451 hrs 440 csm/in 5.1 inches 4.9088 cu ft/sec 0.095 in. 0.095 in. 0.500 hrs 410 csm/in 5.1 inches 2.74 cu ft/sec 16 sq ft 7.65 cu ft/sec 0.4783 ft/sec 0.4783 ft/sec	Date: 10/11/16 Date: From calculations above Ref. Figure 6-3 "Unit pea From pg. 1 Eq. 10 From calculations above Ref. Figure 6-3 "Unit pea From pg. 1 Eq. 10	Sheet No.: 55 Job No.: ak discharge" Use	SMEPA Type III	110

Calculatio	ons For:	SMEPA Landfill	MENT SI Made By: CJ		0/11/16	Sheet No.:	56	of	110
		ater Design	Checked By:	Date:		Job No.:		SMEPA	
		Discharge from Area C4.							
	Area	0	0.84 acres	0.00) sq. mile	es			
0-1-1-1-	4- T	Time Th							
Calcula	Sheet F	l Time, Tt Flow							
		Flow Length, L	160 feet			Flow Leng	h I	0 fee	et
	Pt. 93	Two-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24		5.9	
C4.1	to Pt.	Land Slope, s	0.25 ft/ft			Land Slope		0.04 ft/f	ł
	92	Travel Time, Tt	0.156 hrs	Ref Eq. 8		Travel Tim		0.000	L
	Open C	hannel Flow	0.100 113	Nor Eq. 0		ITavel 1111	с, п.	0.000	
	openo	Channel Depth, D	2 feet	~		*		/	
		Channel Width, B	0 feet			D	K		
		X-Section Area, a	16 sq ft		-		5		
	Pt 92	Wetted Perimeter, pw	16.5 feet			B		4(H):1(V))
		Hydraulic Radus, r	0.970 ft						
	94	Channel Slope	0.005 ft/ft						
	04	Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	60	Rei Eq. 9					
		Travel Time, Tt	0.008 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.165 hrs	Sum of Sheet	E Shallov		tod and O		
Calcula		Discharge	0.105 115		, Shallov	Concentra		pen cham	IEI
Jaicula	le reak i		0.095 in.						
		Time of Conc. Tc	0.165 hrs						
	Area			From calculatio			1		
	C4.1	Unit Peak Disch. qu	600 csm/in	Ref. Figure 6-3	"Unit pea	k discharge" i	Jse Type II	H.	
		Runoff, Q	5.1 inches	10					
		Peak Discharge, q _p	4.02 cu ft/sec	c Eq. 10					
	Area	Flow Length, L	60						
	C4.2	Travel Time, Tt	0.008 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.459 hrs	Tt + Tc for Area	C4 2 (pg	55)			
		Unit Peak Disch. qu	435 csm/in	Ref. Figure 6-3		•	lee Type II		
		Runoff, Q		•	onit pea	k ulacharge k	be type ii	'	
	10 Pl. 94)		5.1 inches						
	34)	Peak Discharge, q _p	4.85 cu ft/sec	c =q. 10					
	Area	Flow Length, L	60						
		Travel Time, Tt	0.008 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.509 hrs	Tt + Tc for Area	C4.3 (pg	. 55)			
	(··· = · · · ·	Unit Peak Disch. q.	410 csm/in	Ref. Figure 6-3		-	Jse Type II		
		Runoff, Q	5.1 inches	From pg. 1	-	9- 1	.,		
	94)	Peak Discharge, qp	2.74 cu ft/sec						
Calculat		el Flow Velocity							
Jaiouidi	to ondill	X-Section Area, a	16 sq ft						
		Peak Discharge, qp	11.61 cu ft/sec	n.					
		Peak Velocity	0.7259 ft/sec	0					
		- our voloity		ulated Channel	Flow Vel	ocity			
						oony			

		ENV	RONI	MEN	IAI	-02		
		MANAGI	EMENT SE	ERVICE	S, INC	- V		
Calculati		SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.: 57	of	110
		ater Design	Checked By:	Date:		Job No.:	SMEPA	
Calcula		Discharge from Area C3.2						
<u>.</u>	Area		1.72 acres		0.00 sq. mile	S		
Calcula		l Time, Tt						
	Sheet F	Flow						
	Pt. 95	Flow Length, L	103.4 feet		Pt. 96	Flow Length, L	196.6 fee	t
	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24 hr rain		
	96	Land Slope, s	0.25 ft/ft		97	Land Slope, s	0.04 ft/ft	
		Travel Time, Tt	0.110 hrs	Ref Eq. 8		Travel Time, Tt	0.350	
C3.2	Shallow	,Concentrated Flow						
00.2	Pt. 97	Flow Length, L	108.2 feet					
	to Pt.	Watercourse slope, s	0.04 ft/ft					
	98	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-	9 "Avg. vel. fo	r est. travel time for s	shallow	
		-		concentrate	d flow" - use	Unpaved		
		Travel Time, Tt	0.009 hrs	Ref Eq. 6				
	Open C	hannel Flow		10.2				
		Channel Depth, D	2 feet	1		1D	/	
		Channel Width, B	0 feet				>	
		X-Section Area, a	16 sq ft			<>	4(1).4(1)	
	Pt. 94	Wetted Perimeter, pw	16.5 feet			вл	4(H):1(V)	
		Hydraulic Radus, r	0.970 ft					
		Channel Slope	0.005 ft/ft					
		Velocity, V	2.065 ft/sec	Ref Eq. 9				
		Flow Length, L	265	Ttor Eq. 0				
		Travel Time, Tt	0.036 hrs	Ref Eq. 6				
	Total Tr	avel Time	0.505 hrs	and the second se	eet Shallow	Concentrated and	d Open Chann	ല
	Total H		0.000 1113		icet, onalion	Concentrated and		
Calcula	te Peak i	Discharge from Area C3.3						
oulouic	Area	biobilargo nom raca colo	1.74 acres	(.00 sq. mile	s		
						•		
Calcula	ate Travel	Time, Tt						
Calcula		Time, Tt						
Calcula	Sheet F	low	92 6 feet			Flow Length	207 4 feet	
Calcula	Sheet F Pt. 99	low Flow Length, L	92.6 feet		Pt. 100	Flow Length, L	207.4 feet	t
Calcula	Sheet F Pt. 99 to Pt.	low Flow Length, L Two-yr 24 hr rainfall, P ₂	4.9 inches		to Pt.	Two-yr 24 hr rainf	al 5.9	
Calcula	Sheet F Pt. 99	low Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s	4.9 inches 0.25 ft/ft	Pof For 9		Two-yr 24 hr rainf Land Slope, s	al 5.9 0.04 ft/ft	
	Sheet F Pt. 99 to Pt. 100	low Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt	4.9 inches	Ref Eq. 8	to Pt.	Two-yr 24 hr rainf	al 5.9	
Calcula	Sheet F Pt. 99 to Pt. 100 Shallow	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow	4.9 inches 0.25 ft/ft 0.101 hrs	Ref Eq. 8	to Pt.	Two-yr 24 hr rainf Land Slope, s	al 5.9 0.04 ft/ft	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet	Ref Eq. 8	to Pt.	Two-yr 24 hr rainf Land Slope, s	al 5.9 0.04 ft/ft	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft		to Pt. 101	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt	al 5.9 0.04 ft/ft 0.365	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet	Ref. Fig. 6-	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s	al 5.9 0.04 ft/ft 0.365	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt c,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V.	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec	Ref. Fig. 6-s	to Pt. 101	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s	al 5.9 0.04 ft/ft 0.365	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft	Ref. Fig. 6-	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s	al 5.9 0.04 ft/ft 0.365	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs	Ref. Fig. 6-s	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s	al 5.9 0.04 ft/ft 0.365	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D	 4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 	Ref. Fig. 6-s	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s Jnpaved	al 5.9 0.04 ft/ft 0.365	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 0 feet	Ref. Fig. 6-s	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s	al 5.9 0.04 ft/ft 0.365	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102 Open C	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	 4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 0 feet 16 sq ft 	Ref. Fig. 6-s	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s Jnpaved	al 5.9 0.04 ft/ft 0.365 hallow	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102 Open C Pt. 94	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 0 feet	Ref. Fig. 6-s	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s Jnpaved	al 5.9 0.04 ft/ft 0.365	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102 Open C Pt. 94 to Pt.	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	 4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 0 feet 16 sq ft 	Ref. Fig. 6-s	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s Jnpaved	al 5.9 0.04 ft/ft 0.365 hallow	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102 Open C Pt. 94	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	 4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 0 feet 16 sq ft 16.5 feet 	Ref. Fig. 6-s	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s Jnpaved	al 5.9 0.04 ft/ft 0.365 hallow	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102 Open C Pt. 94 to Pt.	Flow Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft	Ref. Fig. 6-s	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s Jnpaved	al 5.9 0.04 ft/ft 0.365 hallow	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102 Open C Pt. 94 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft	Ref. Fig. 6- concentrate Ref Eq. 6	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s Jnpaved	al 5.9 0.04 ft/ft 0.365 hallow	
	Sheet F Pt. 99 to Pt. 100 Shallow Pt. 101 to Pt. 102 Open C Pt. 94 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	4.9 inches 0.25 ft/ft 0.101 hrs 42.6 feet 0.04 ft/ft 3.2 ft/sec 0.004 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft 2.065 ft/sec	Ref. Fig. 6- concentrate Ref Eq. 6	to Pt. 101 9 "Avg. vel. for	Two-yr 24 hr rainf Land Slope, s Travel Time, Tt est. travel time for s Jnpaved	al 5.9 0.04 ft/ft 0.365 hallow	

			RONI MENT SE		S INC	-0			
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	58	of	110
Subject:	Stormw	ater Design	Checked By:	Date:		Job No.;		SMEPA	
		Discharge from Area C3.4							
	Area		0.78 acres	(0.00 sq. mile	s			
Calcula	te Travel	Time, Tt							
	Sheet F	low							
								170 1 5	
	Pt. 103	Flow Length, L	126.6 feet		Pt. 104	Flow Leng		173.4 fee	et
	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24		5.9	
	104	Land Slope, s	0.1 ft/ft		105	Land Slop		0.04 ft/f	t
	104	Travel Time, Tt	0.187 hrs	Ref Eq. 8		Travel Tim	e, Tt	0.316	
C3.4		Concentrated Flow							
00.1		Flow Length, L	15.5 feet						
		Watercourse slope, s	0.04 ft/ft						
	106	Avg. Velocity, V.	3.2 ft/sec	-	9 "Avg. vel. fo		me for sha	llow	
				concentrate	ed flow" - use	Unpaved			
		Travel Time, Tt	0.001 hrs	Ref Eq. 6					
	Open C	hannel Flow		-					
		Channel Depth, D	2 feet			ÎD	/		
		Channel Width, B	0 feet		1	+	K		
		X-Section Area, a	16 sq ft			< ->		4(H):1(V)
	Pt. 94	Wetted Perimeter, pw	16.5 feet			В			/
	to Pt.	Hydraulic Radus, r	0.970 ft						
	107	Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	265						
		Travel Time, Tt	0.036 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.541 hrs	Sum of Sh	neet, Shallow	/ Concentra	ted and C	Open Chani	nel
				3					
Calcula	te Peak l	Discharge							
		I _a /P	0.095 in.						
	A	Time of Conc. Tc	0.505 hrs	From calcu	lations above				
	Area	Unit Peak Disch. q _u	410 csm/in	Ref. Figure	6-3 "Unit peal	k discharge"	Use Type I	II.	
	C3.2	Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, q _p	5.62 cu ft/sec	Eq. 10					
		U ip							
		l _a /P	0.095 in.						
		Time of Conc. Tc	0.510 hrs	From calcu	lations above				
	Area	Unit Peak Disch. qu	410 csm/in		6-3 "Unit peal	k discharge"	Use Type I	11	
	C3.3	Runoff, Q	5.1 inches	From pg. 1	e e entreou				
		Peak Discharge, q _p	5.68 cu ft/sec						
		reak Discharge, qp	5.00 Cu IVSec	- Ly, 10					
		l _a /P	0.095 in.						
		-		Erom celas	ationa about				
	Area	Time of Conc. To	0.541 hrs		ations above	(dioche "	les Trons f		
	C3.4	Unit Peak Disch. q _u	395 csm/in	-	6-3 "Unit peal	vuischarge"	use Type I	П	
		Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, q _p	2.46 cu ft/sec	: Eq. 10					
			0.05						
	Area	Flow Length, L	265						
		Travel Time, Tt	0.036 hrs	Ref Eq. 6					
	V	Time of Conc. Tc	0.495 hrs		Area C4.2 (pg				
	pt. 94	Unit Peak Disch. qu	415 csm/in	Ref. Figure	6-3 "Unit peal	discharge"	Use Type I	H	
		Runoff, Q	5.1 inches 4.63 cu ft/sec	From pg. 1					

			GEMENT SE	1					
Calculation		SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	59	of	110
Subject:		ater Design	Checked By:	Date:		Job No.:	_	SMEPA	
		Flow Length, L	265						
		Travel Time, Tt	0.036 hrs	Ref Eq. 6		50)			
		Time of Conc. Tc	0.544 hrs		Area C4.3 (pg				
		Unit Peak Disch. q _u	400 csm/in	-	6-3 "Unit pea	k discharge"	Use Type	e III	
		Runoff, Q	5.1 inches						
	107)	Peak Discharge, q _p	2.68 cu ft/sec	CEq. 10					
	Area	Flow Length, L	265						
	C4.1	Travel Time, Tt	0.036 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.200 hrs	Tt + Tc for A	Area C4.1 (pg	. 56)			
		Unit Peak Disch. q _u	555 csm/in	Ref. Figure	6-3 "Unit peal	k discharge"	Use Type	e 111	
		Runoff, Q	5.1 inches	From pg. 1					
	107)	Peak Discharge, q _p	3.72 cu ft/sec	Eq. 10					
Coloulot	o Chapr	nel Flow Velocity							
Jaicuidl	e unani	X-Section Area, a	16 sq ft						
		Peak Discharge, qp	24.78 cu ft/sec						
		Peak Velocity	1.5489 ft/sec						
		I Car Velocity	75% of Calcu	lated Chan	el Flow Vel	ocitv			

					C INC	E Q			
Calculatio	no For		MENT SI Made By: CJ	Date:	<u>5, TNC</u> 10/11/16		60	of	110
		rater Design		-	10/11/10	Job No.:	00	SMEPA	110
Subject:		Discharge from Areas C3.	Checked By:	Date:		JOD 140.:		SIVIL FA	-
Calcula	Area	Discharge nom Areas 00.	1.92 acres	0.	.00 sq. mile	es			
Calcula	te Travel	Time, Tt							
	Sheet F								
	D4 00	Flow Length, L	275 feet			Flow Length	, L	0 fee	t
02.4	Pt. 96 to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24 hr	rainfal	5.9	
C3.1	10 Pt. 94	Land Slope, s	0.25 ft/ft			Land Slope,	s	0.04 ft/ft	
	94	Travel Time, Tt	0.241 hrs	Ref Eq. 8		Travel Time,		0.000	
	Open C	hannel Flow		1.00					
	•	Channel Depth, D	2 feet	-	-	ÎD	-	/	
		Channel Width, B	2 feet			10	K		
		X-Section Area, a	20 sq ft			<>	-	4(H):1(V)	
	Pt. 107	Wetted Perimeter, pw	18.5 feet			B			
		Hydraulic Radus, r	1.082 ft						
		Channel Slope	0.005 ft/ft						
		Velocity, V	2.220 ft/sec	Ref Eq. 9					
		Flow Length, L	475						
		Travel Time, Tt	0.059 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.301 hrs		et, Shallow	v Concentrate	d and O	pen Chann	el
Calculat	e Peak I	Discharge							
		I _a /P	0.095 in.						
		Time of Conc. Tc	0.301 hrs	From calcula	tions above				
	Area	Unit Peak Disch. qu	500 csm/in			k discharge" Us	e Type II	1	
	C3.1	Runoff, Q	5.1 inches	From pg. 1			AL		
		Peak Discharge, qp	7.65 cu ft/sed						
		, cen eleona go, yp		q. 10					
	Area	Flow Length, L	475						
		Travel Time, Tt	0.059 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.554 hrs	Tt + Tc for A	rea C4.2 (po	. 58)			
	(Unit Peak Disch. qu				k discharge" Us	e Type II	1	
		Runoff, Q	5.1 inches	-			.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
		Peak Discharge, q _o	4.41 cu ft/sec						
	,	, can bioonargo, qp							
	Агеа	Flow Length, L	475						
		Travel Time, Tt	0.059 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.604 hrs	Tt + Tc for A	rea C4.3 (pg.	. 59)			
	`	Unit Peak Disch. qu	380 csm/in			k discharge" Us	e Type II		
		Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, q _p	2.54 cu ft/sec						
	,	, our bioonarge, qp	2.04 00 10000						
	Area	Flow Length, L	475						
		Travel Time, Tt	0.059 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.260 hrs	Tt + Tc for Ar	ea C4.1 (pg.	59)			
	`	Unit Peak Disch. qu	515 csm/in			(discharge" Us	e Tvpe II		
	•	Runoff, Q	5.1 inches	From pg. 1	2 on pour				
	016			10					
	108)	Peak Discharge, q _p	3.45 cu ft/sec	Eq. 10					

		MANAG	GEMENT SERVICES, INC.	
Calculatio	ons For:	SMEPA Landfill	Made By: CJ Date: 10/11/16 Sheet No.: 61 of	110
Subject:	Stormw	ater Design	Checked By: Date: Job No.: SMEPA	
		Flow Length, L	475	
	C3.2	Travel Time, Tt	0.059 hrs Ref Eq. 6	
		Time of Conc. Tc Unit Peak Disch. q _u	0.565 hrs Tt + Tc for Area C3.2 (pg. 58) 395 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III	
		Runoff, Q	5.1 inches From pg. 1	
		Peak Discharge, q _p	5.41 cu ft/sec Eq. 10	
	Area	Flow Length, L	475	
		Travel Time, Tt	0.059 hrs Ref Eq. 6	
	`	Time of Conc. Tc	0.570 hrs Tt + Tc for Area C3.3 (pg. 58)	
		Unit Peak Disch. qu	395 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III	
		Runoff, Q Peak Discharge, q _p	5.1 inches From pg. 1 5.48 cu ft/sec Eq. 10	
	Area	Flow Length, L	475	
	C3.4	Travel Time, Tt	0.059 hrs Ref Eq. 6	
	(from	Time of Conc. Tc	0.600 hrs Tt + Tc for Area C3.4 (pg. 58)	
		Unit Peak Disch. q _u	380 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III	
	to Pt. 108)	Runoff, Q Peak Discharge, q₀	5.1 inches From pg. 1 2.36 cu ft/sec Eq. 10	
Calcula	te Chanr	el Flow Velocity X-Section Area, a Peak Discharge, qp Peak Velocity	20 sq ft 31.30 cu ft/sec 1.565 ft/sec 70% of Calculated Channel Flow Velocity	
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Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

		ENV	IRON	MEN	TAI	-0			
		MANAG	EMENT S	ERVICE	S, INC				
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.;	62	of	110
Subject:	Stormw	/ater Design	Checked By:	Date:		Job No.:		SMEPA	
Calcula	te Peak	Discharge from Area C2.2	2						
	Area		1.42 acres	().00 sq. mile	es			
Calcula	te Trave	l Time, Tt							
	Sheet F	Flow							
	D4 400	Flow Length, L	119.7 feet		Pt. 110	Flow Leng	ith, L	180.3 fe	et
	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	' Two-yr 24	hr rainfal	5.9	
	110	Land Slope, s	0.25 ft/ft		111	Land Slop	e, s	0.04 ft/	ft
	110	Travel Time, Tt	0.124 hrs	Ref Eq. 8		Travel Tim	ne, Tt	0.326	
C2.2	Shallow	,Concentrated Flow							
62.2	Pt. 111	Flow Length, L	128.7 feet						
	to Pt.	Watercourse slope, s	0.04 ft/ft						
	112	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-	9 "Avg. vel. fo	r est. travel t	ime for sha	llow	
				-	d flow" - use				
		Travel Time, Tt	0.011 hrs	Ref Eq. 6					
	Open C	hannel Flow			_				
		Channel Depth, D	2 feet			1D	-		
		Channel Width, B	3 feet			Y	K		
		X-Section Area, a	22 sq ft			< ->		4(H):1(\	1
	Pt. 108	Wetted Perimeter, pw	19.5 feet			BI			/
	to Pt.	Hydraulic Radus, r	1.129 ft						
	119	Channel Slope	0.005 ft/ft						
		Velocity, V	2.284 ft/sec	Ref Eq. 9					
		Flow Length, L	385						
		Travel Time, Tt	0.047 hrs	Ref Eq. 6					
	Total Tr	ravel Time	0.509 hrs	Sum of Sh	eet, Shallov	/ Concentra	ated and C	pen Char	inel
Calcula		Discharge from Area C2.3	1.11 acres	0	.00 sq. mile	•			
	Area		1.11 dules	0	.00 Sq. mile	3			
Calcula	te Travel	Time, Tt							
Salcula	Sheet F								
	Chooti								
		Flow Length, L	118.5 feet			Flow Leng	th. L	181.5 fe	et
	Pt. 113	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 114	Two-yr 24		5.9	
	to	Land Slope, s	0.25 ft/ft		to Pt.	Land Slope		0.04 ft/	ft
	Pt.114	Travel Time, Tt	0.123 hrs	Ref Eq. 8	115	Travel Tim		0.328	
00.0	Shallow	,Concentrated Flow							
C2.3		Flow Length, L	52.4 feet						
		Watercourse slope, s	0.04 ft/ft						
		Avg. Velocity, V.	3.2 ft/sec	Ref. Fia. 6-9	a "Avg. vel. fo	r est. travel ti	me for shal	low	
		J,,		-	d flow" - use l				
		Travel Time, Tt	0.005 hrs	Ref Eq. 6					
	Open C	hannel Flow							
		Channel Depth, D	2 feet	1		1 D		/	
		Channel Width, B	3 feet		1	D	~		
		X-Section Area, a	22 sq ft			< . >	2	_ 4(H):1(∨	()
	Pt. 108	Wetted Perimeter, pw	19.5 feet		1	BI		-+(□), I(V)
		Hydraulic Radus, r	1.129 ft						
		Channel Slope	0.005 ft/ft						
		Velocity, V	2.284 ft/sec	Ref Eq. 9					
		Flow Length, L	385						
		Travel Time. Tt	0.047 hrs	Ref Ea. 6					
	Total Tr	Travel Time, Tt avel Time	0.047 hrs 0.503 hrs	Ref Eq. 6	eet, Shallow		ted and O	nen Chan	nel

				ERVICES, INC. Date: 10/11/16 Sheet No.: 63 of 110
Calculatio		SMEPA Landfill	Made By: CJ	
		ater Design	Checked By:	Date: Job No.: SMEPA
Jaicula		Discharge from Area C2.4	+ 0.58 acres	0.00 sq. miles
Coloula	Area	Time, Tt	0.50 acres	0.00 sq. mies
Jaicula	Sheet F			
		Flow Length, L	126.6 feet	Flow Length, L 173.4 feet
	Pt. 103	Two-yr 24 hr rainfall, P2	4.9 inches	Pt. 104 Two-yr 24 hr rainfal 5.9
	to Pt.	Land Slope, s	0.1 ft/ft	to Pt. Land Slope s 0.04 ft/ft
	104	Travel Time, Tt	0.187 hrs	Ref Eq. 8 Travel Time, Tt 0.316
00.4	Shallow	Concentrated Flow		,
C2.4		Flow Length, L	15.5 feet	
		Watercourse slope, s	0.04 ft/ft	
		Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-9 "Avg. vel. for est. travel time for shallow
				concentrated flow" - use Unpaved
		Travel Time, Tt	0.001 hrs	Ref Eq. 6
	Open C	hannel Flow		>
		Channel Depth, D	2 feet	ÎD
		Channel Width, B	3 feet	
		X-Section Area, a	22 sq ft	4(H):1(V)
	Pt. 108	Wetted Perimeter, pw	19.5 feet	
		Hydraulic Radus, r	1.129 ft	
	119	Channel Slope	0.005 ft/ft	
		Velocity, V	2.284 ft/sec	Ref Eq. 9
		Flow Length, L	385	
		Travel Time, Tt	0.047 hrs	Ref Eq. 6
	Total Tr	avel Time	0.552 hrs	Sum of Sheet, Shallow Concentrated and Open Channel
Calcula	to Dook	Discharge		
Calcula	ite Peak I	Discharge	0.095 in	
Calcula	ite Peak I	I _a /P	0.095 in. 0.509 brs	From calculations above
Calcula	Area	I _a /P Time of Conc. Tc	0.509 hrs	From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III
Calcula		I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.509 hrs 405 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
Calcula	Area	I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.509 hrs 405 csm/in 5.1 inches	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area	I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.509 hrs 405 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area	I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in.	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10
Calcula	Area	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above
Calcula	Area C2.2	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III
Calcula	Area C2.2 Area	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area C2.2 Area	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area C2.2 Area	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area C2.2 Area	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in.	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10
Calcula	Area C2.2 Area	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above
Calcula	Area C2.2 Area C2.3	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III
Calcula	Area C2.2 Area C2.3	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in 5.1 inches	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area C2.2 Area C2.3	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area C2.2 Area C2.3 Area C2.4	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in 5.1 inches 1.83 cu ft/sec	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1
Calcula	Area C2.2 Area C2.3 Area C2.4	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Disch. q_u Runoff, Q	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in 5.1 inches 1.83 cu ft/sec 385	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10
Calcula	Area C2.2 Area C2.3 Area C2.4 Area C4.2	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Flow Length, L Travel Time, Tt	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in 5.1 inches 1.83 cu ft/sec 385 0.047 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 Ref Eq. 6
Calcula	Area C2.2 Area C2.3 Area C2.4 Area C4.2 (from	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in 5.1 inches 1.83 cu ft/sec 385 0.047 hrs 0.601 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area C4.2 (pg. 60)
Calcula	Area C2.2 Area C2.3 Area C2.4 Area C2.4 Area C4.2 (from pt. 108	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q_u	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in 5.1 inches 1.83 cu ft/sec 385 0.047 hrs 0.601 hrs 385 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area C4.2 (pg. 60) Ref. Figure 6-3 "Unit peak discharge" Use Type III
Calcula	Area C2.2 Area C2.3 Area C2.4 Area C2.4 Area C4.2 (from pt. 108 to Pt.	I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p I_a/P Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.509 hrs 405 csm/in 5.1 inches 4.5828 cu ft/sec 0.095 in. 0.503 hrs 405 csm/in 5.1 inches 3.58 cu ft/sec 0.095 in. 0.552 hrs 395 csm/in 5.1 inches 1.83 cu ft/sec 385 0.047 hrs 0.601 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area C4.2 (pg. 60) Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1

	_		110	RVICES, INC		0.4		440
Calculatio		SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	64	of SMEPA	110
Subject:		ater Design	Checked By: 385	Date:	Job No.:		SIVIEFA	
		Flow Length, L Travel Time, Tt	0.047 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.650 hrs	Tt + Tc for Area C4.3 (pg	60)			
						las Trucs (
		Unit Peak Disch. qu	365 csm/in		k discharge "C	ise Type i	11	
		Runoff, Q	5.1 inches	, -				
	115)	Peak Discharge, q _p	2.44 cu ft/sec	; Eq. 10				
	Area	Flow Length, L	385					
		Travel Time, Tt	0.047 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.306 hrs	Tt + Tc for Area C4.1 (pg	. 60)			
	`	Unit Peak Disch. q _u	500 csm/in	Ref. Figure 6-3 "Unit peal	k discharge" L	lse Type I	11	
		Runoff, Q	5.1 inches	•	v			
		Peak Discharge, q _p	3.35 cu ft/sec					
	Area	Flow Length, L	385					
		Travel Time, Tt	0.047 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.612 hrs	Tt + Tc for Area A3.2 (pg.	61)			
	•	Unit Peak Disch. q _u	375 csm/in	Ref. Figure 6-3 "Unit peal	-	leo Typo I	0	
		Runoff, Q	5.1 inches		Culscharge C	se type i	11	
		Peak Discharge, q _p	5.14 cu ft/sec	1.4				
	115)	Fear Discharge, qp	5.14 Cu 105eu	; Eq. 10				
	Area	Flow Length, L	385					
	C3.3	Travel Time, Tt	0.047 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.616 hrs	Tt + Tc for Area C3.3 (pg.	61)			
	pt. 108	Unit Peak Disch. qu	375 csm/in	Ref. Figure 6-3 "Unit peak	k discharge" U	se Type I	11	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	119)	Peak Discharge, q _p	5.20 cu ft/sec	: Eq. 10				
	Area	Flow Length, L	385					
		Travel Time, Tt	0.047 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.647 hrs	Tt + Tc for Area C3.4 (pg.	61)			
		Unit Peak Disch. qu	360 csm/in	Ref. Figure 6-3 "Unit peak		se Type I	1	
		Runoff, Q	5.1 inches			91		
		Peak Discharge, q _p	2.24 cu ft/sec					
	A == =	Elow Length	385					
	Area	Flow Length, L Travel Time, Tt	0.047 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.348 hrs	Tt + Tc for Area C3.1 (pg.	60)			
	V			•	•			
		Unit Peak Disch. q _u	565 csm/in	Ref. Figure 6-3 "Unit peak	vuischarge" U	se rype li		
		Runoff, Q		From pg. 1				
	119)	Peak Discharge, q _p	8.64 cu ft/sec	Eq. 10				
Calcula	te Chann	el Flow Velocity						
		X-Section Area, a	22 sq ft					
		Peak Discharge, qp	41.30 cu ft/sec					
		Peak Velocity	1.8772 ft/sec					
			82% of Calcu	lated Channel Flow Velo	ocity			

		MANAGI	EMENT S	ERVICES, IN	C.	
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16		of 110
Subject:	Stormw	ater Design	Checked By:	Date:	Job No.:	SMEPA
		Discharge from Areas C2.	A COLUMN AND A COLUMNA			
	Area		1.99 acres	0.00 sg. mil	es	
				·		
Calcula	te Travel	Time, Tt				
	Sheet F	low				
	Pt. 110	Flow Length, L	300 feet		Flow Length, L	0 feet
C2.1	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		Two-yr 24 hr rainfa	5.9
02.1	119	Land Slope, s	0.25 ft/ft		Land Slope, s	0.04 ft/ft
	119	Travel Time, Tt	0.259 hrs	Ref Eq. 8	Travel Time, Tt	0.000
	Open C	hannel Flow			2.4	
		Channel Depth, D	2 feet		ÎD /	
		Channel Width, B	4 feet		V K	2
		X-Section Area, a	24 sq ft		<>	4(H):1(V)
	Pt. 119	Wetted Perimeter, pw	20.5 feet		B	-((), (())
		Hydraulic Radus, r	1.171 ft			
		Channel Slope	0.005 ft/ft			
		Velocity, V	2.341 ft/sec	Ref Eq. 9		
		Flow Length, L	360			
		Travel Time, Tt	0.043 hrs	Ref Eq. 6		
	Total Tr	avel Time	0.301 hrs	Sum of Sheet, Shallo	w Concentrated and	Open Channel
Calcula	te Peak I	Discharge				
		I _a /P	0.095 in.			
		Time of Conc. Tc	0.301 hrs	From calculations above)	
	Area	Unit Peak Disch. qu	500 csm/in	Ref. Figure 6-3 "Unit pea	ak discharge" Use Type	Ш
	C2.1	Runoff, Q	5.1 inches	From pg. 1	•	
		Peak Discharge, qp	7.93 cu ft/see			
		U Th		,		
	Area	Flow Length, L	360			
	C4.2	Travel Time, Tt	0.043 hrs	Ref Eq. 6		
	(from	Time of Conc. Tc	0.644 hrs	Tt + Tc for Area C4.2 (pg	g. 63)	
	· ·	Unit Peak Disch. q _u	360 csm/in	Ref. Figure 6-3 "Unit pea	ak discharge" Use Type	111
	•	Runoff, Q	5.1 inches	•		
		Peak Discharge, qp	4.02 cu ft/sec			
	ŕ	ο, φ				
	Area	Flow Length, L	360			
	C4.3	Travel Time, Tt	0.043 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.693 hrs	Tt + Tc for Area C4.3 (pg	g. 64)	
	•	Unit Peak Disch. qu	355 csm/in	Ref. Figure 6-3 "Unit pea		11
		Runoff, Q	5.1 inches	From pg. 1	C	
	120)	Peak Discharge, q _p	2.38 cu ft/sed			
	,	от то то чи чр				
	Area	Flow Length, L	360			
	C4.1	Travel Time, Tt	0.043 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.349 hrs	Tt + Tc for Area C4.1 (pg	1, 64)	
	(11011)		475 csm/in	Ref. Figure 6-3 "Unit pea		11
		Unit Peak Lliscn d				
	pt. 119	Unit Peak Disch. q _u		÷ .		
	pt. 119 to Pt.	Runoff, Q Peak Discharge, q _p	5.1 inches 3.18 cu ft/sec	From pg. 1		

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		MANAG	GEMENT SI	RVICES, INC	0			
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	66	of	110
Subject:	Stormw	ater Design	Checked By:	Date:	Job No.:		SMEPA	-
-		Flow Length, L	360					-
		Travel Time, Tt	0.043 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.654 hrs	Tt + Tc for Area C3.2 (pg	. 64)			
	`	Unit Peak Disch. q _u	360 csm/in	Ref. Figure 6-3 "Unit pea	k discharge"	Use Type	111	
	•	Runoff, Q	5.1 inches					
		•	4.93 cu ft/se					
	,	r oun Dioonargot qp						
	Area	Flow Length, L	360					
	C3.3	Travel Time, Tt	0.043 hrs	Ref Eg. 6				
	(from	Time of Conc. Tc	0.659 hrs	Tt + Tc for Area C3.3 (pg	. 64)			
		Unit Peak Disch. q	360 csm/in		-	Use Type	111	
		Runoff, Q	5.1 inches	-		9F -		
	120)	Peak Discharge, q _p	4.99 cu ft/sec					
	Area	Flow Length, L	360					
	C3.4	Travel Time, Tt	0.043 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.690 hrs	Tt + Tc for Area C3.4 (pg	64)			
	V	Unit Peak Disch. q _u	355 csm/in	Ref. Figure 6-3 "Unit peal		Jse Type	111	
		Runoff, Q	5.1 inches	•	0	51		
	120)	Peak Discharge, q	2.21 cu ft/sec					
	,	о						
	Area	Flow Length, L	360					
	C3.1	Travel Time, Tt	0.043 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.390 hrs	Tt + Tc for Area C3.1 (pg.	64)			
	pt. 119	Unit Peak Disch. q _u	455 csm/in	Ref. Figure 6-3 "Unit peal	discharge" l	Jse Type	111	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	120)	Peak Discharge, q _p	6.96 cu ft/sec	5 Eq. 10				
	Area	Flow Length, L	360					
		Travel Time, Tt	0.043 hrs	Ref Eq. 6	00)			
		Time of Conc. Tc	0.551 hrs	Tt + Tc for Area C2.2 (pg.				
	•	Unit Peak Disch. q _u		Ref. Figure 6-3 "Unit peak	(discharge" l	lse lybe	111	
		Runoff, Q	5.1 inches					
	120)	Peak Discharge, q _p	4.47 cu ft/sec	; ⊨q. 10				
	A	Flow Length, L	360					
	Area	Travel Time, Tt	0.043 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.545 hrs	Tt + Tc for Area C2.3 (pg.	63)			
	(from	Unit Peak Disch. qu						
			400 csm/in		เปล่ายาย	ae iyhe	111	
		Runoff, Q Book Discharge, G	5.1 inches					
	120)	Peak Discharge, q _p	3.54 cu ft/sec	; Eq. 10				
	Area	Flow Length, L	360					
	C2.4	Travel Time, Tt	0.043 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.594 hrs	Tt + Tc for Area C2.3 (pg.	63)			
	N	Unit Peak Disch. q _u	380 csm/in			lse Type	111	
	•	Runoff, Q	5.1 inches		albonargo (se ishe		
		Peak Discharge, q	3.36 cu ft/sec	. –				
	120)	, oak bischarge, yp	0.00 00 10360	сц, iv				



Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

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		MANAG	EMENT S	ERVICE	S, INC	- V		_	
Calculati	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	68	of	110
Subject:	Stormv	/ater Design	Checked By:	Date:		Job No.:		SMEPA	
Calcula	ate Peak	Discharge from Area C1.2	2						
	Area		1.98 acres	().00 sq. mile	s			
Calcula	ate Trave	I Time, Tt							
	Sheet F	Flow							
	Pt. 121	Flow Length, L	130.8 feet		Pt. 122	Flow Length	, L	169.2 feet	:
	to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt. 122	Two-yr 24 hr	rainfal	5.9	
	122	Land Slope, s	0.25 ft/ft		123	Land Slope,	s	0.04 ft/ft	
	122	Travel Time, Tt	0.133 hrs	Ref Eq. 8	123	Travel Time,	Tt	0.310	
C1.2	Shallov	,Concentrated Flow				,			
01.2		Flow Length, L	151.3 feet						
	to Pt.	Watercourse slope, s	0.04 ft/ft						
	124	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-	a "Avg. vel. fo	r est. travel time	e for sha	llow	
				concentrate	d flow" - use	Unpaved			
		Travel Time, Tt	0.013 hrs	Ref Eq. 6					
	Open C	hannel Flow		12					
		Channel Depth, D	2 feet			↑ D	/		
		Channel Width, B	7 feet		-	*	R		
		X-Section Area, a	30 sq ft			< B →	-	4(H):1(V)	
	Pt. 120	Wetted Perimeter, pw	23.5 feet			. В ,			
		Hydraulic Radus, r	1.277 ft						
	133	Channel Slope	0.005 ft/ft						
		Velocity, V	2.480 ft/sec	Ref Eq. 9					
		Flow Length, L	240						
		Travel Time, Tt	0.027 hrs	Ref Eq. 6					
	Total Ti	avel Time	0.483 hrs	Sum of Sh	eet, Shallow	Concentrate	d and O	pen Channe	el
Calcula	ite Peak	Discharge from Area C1.3							
	Area		1.85 acres	0	.00 sq. mile	s			
Calcula	ite Travel	Time, Tt							
Calcula	Sheet F								
oulouid	Oneeri	low							
Calcula	Offeet								
Calcula		Flow Length, L	119.3 feet		Pt. 126	Flow Length,		180.7 feet	
Calcula	Pt. 125	Flow Length, L Two-yr 24 hr rainfall, P ₂	4.9 inches		Pt. 126 to Pt.	Two-yr 24 hr	rainfal	5.9	
	Pt. 125 to	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s	4.9 inches 0.25 ft/ft		to Pt.	Two-yr 24 hr Land Slope, s	rainfal s	5.9 0.04 ft/ft	
	Pt. 125 to Pt.126	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt	4.9 inches	Ref Eq. 8		Two-yr 24 hr	rainfal s	5.9	
C1.3	Pt. 125 to Pt.126 Shallow	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow	4.9 inches 0.25 ft/ft 0.124 hrs	Ref Eq. 8	to Pt.	Two-yr 24 hr Land Slope, s	rainfal s	5.9 0.04 ft/ft	
	Pt. 125 to Pt.126 Shallow Pt. 127	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet	Ref Eq. 8	to Pt.	Two-yr 24 hr Land Slope, s	rainfal s	5.9 0.04 ft/ft	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft		to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time,	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet	Ref. Fig. 6-9	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V.	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec	Ref. Fig. 6-9 concentrate	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft	Ref. Fig. 6-9	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs	Ref. Fig. 6-9 concentrate	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D	 4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 	Ref. Fig. 6-9 concentrate	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 7 feet	Ref. Fig. 6-9 concentrate	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128 Open C	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 7 feet 30 sq ft	Ref. Fig. 6-9 concentrate	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128 Open C Pt. 120	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 7 feet 30 sq ft 23.5 feet	Ref. Fig. 6-9 concentrate	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128 Open C Pt. 120 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft	Ref. Fig. 6-9 concentrate	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128 Open C Pt. 120	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft 0.005 ft/ft	Ref. Fig. 6-5 concentrate Ref Eq. 6	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128 Open C Pt. 120 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft 0.005 ft/ft 2.480 ft/sec	Ref. Fig. 6-9 concentrate	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128 Open C Pt. 120 to Pt.	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V Flow Length, L	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft 0.005 ft/ft 2.480 ft/sec 240	Ref. Fig. 6-9 concentrate Ref Eq. 6	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt	5.9 0.04 ft/ft 0.327	
	Pt. 125 to Pt.126 Shallow Pt. 127 to Pt. 128 Open C Pt. 120 to Pt. 133	Flow Length, L Two-yr 24 hr rainfall, P ₂ Land Slope, s Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	4.9 inches 0.25 ft/ft 0.124 hrs 85.4 feet 0.04 ft/ft 3.2 ft/sec 0.007 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft 0.005 ft/ft 2.480 ft/sec	Ref. Fig. 6-9 concentrate Ref Eq. 6 Ref Eq. 9 Ref Eq. 6	to Pt. 127	Two-yr 24 hr Land Slope, s Travel Time, est. travel time Inpaved	rainfal s Tt e for shall	5.9 0.04 ft/ft 0.327	

1.		MANIAC		MEN		210			
Calculatio	ons For:	MANAG SMEPA Landfill	EMENT SE Made By: CJ	Date:	10/11/16	Sheet No.:	69	of	110
-		ater Design	Checked By:	Date:		Job No.:		SMEPA	
		Discharge from Area C1.4	And and a second se			Then then			-
Culture	Area	bioonalige nonn noa e n	1.08 acres		0.00 sg. mil	es			
Calcula		Time, Tt							
	Sheet F								
		Flow Length 1	101.8 feet			Flow Leng	th, L	198.2 fee	et
	Pt. 129	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 130	Two-yr 24		5.9	
	to Pt.	Land Slope, s	0.1 ft/ft		to Pt.	Land Slop	e, s	0.04 ft/f	ť
	130	Travel Time, Tt	0.157 hrs	Ref Eq. 8	131	Travel Tin		0.352	
C1.4	Shallow	,Concentrated Flow		·					
01.4	Pt. 131	Flow Length, L	25.1 feet						
	to Pt.	Watercourse slope, s	0.04 ft/ft						
		Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-	9 "Avg. vel. fo	or est. travel t	time for sha	llow	
				concentrate	ed flow" - use	Unpaved			
		Travel Time, Tt	0.002 hrs	Ref Eq. 6					
	Ореп С	hannel Flow		-				-	
		Channel Depth, D	2 feet			ÎD	/		
		Channel Width, B	7 feet		-	×			
		X-Section Area, a	30 sq ft			< R >		4(H):1(V)
		Wetted Perimeter, pw	23.5 feet						
		Hydraulic Radus, r	1.277 ft						
	133	Channel Slope	0.005 ft/ft						
		Velocity, V	2.480 ft/sec	Ref Eq. 9					
		Flow Length, L	240						
		Travel Time, Tt	0.027 hrs	Ref Eq. 6					
								_	
	Total Tr	avel Time	0.538 hrs		neet, Shallov	v Concentra	ated and C)pen Chan	nel
Calad		avel Time			neet, Shallov	v Concentra	ated and C)pen Chan	nel
Calcula		avel Time Discharge	0.538 hrs		neet, Shallov	v Concentra	ated and C)pen Chan	nel
Calcula		ravel Time Discharge I _a /P	0.538 hrs 0.095 in.	Sum of St		v Concentra	ated and C)pen Chani	nel
Calcula		ravel Time Discharge I _a /P Time of Conc. Tc	0.538 hrs 0.095 in. 0.483 hrs	Sum of St	lations above				nel
Çalcula	te Peak I	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in	Sum of Sh From calcu Ref. Figure					nel
Calcula	te Peak I Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches	Sum of Sh From calcu Ref. Figure From pg. 1	lations above				nel
Calcula	te Peak I Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in	Sum of Sh From calcu Ref. Figure From pg. 1	lations above				nel
Calcula	te Peak I Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec	Sum of Sh From calcu Ref. Figure From pg. 1	lations above				nel
Calcula	te Peak I Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in.	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10	lations above 6-3 "Unit pea				nel
Çalcula	te Peak I Area C1.2	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu	lations above 6-3 "Unit pea lations above	k discharge"	Use Type I		nel
Çalcula	te Peak Area C1.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure	lations above 6-3 "Unit pea	k discharge"	Use Type I		nel
Çalcula	te Peak I Area C1.2	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1	lations above 6-3 "Unit pea lations above	k discharge"	Use Type I		nel
Calcula	te Peak Area C1.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1	lations above 6-3 "Unit pea lations above	k discharge"	Use Type I		nel
Çalcula	te Peak Area C1.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1	lations above 6-3 "Unit pea lations above	k discharge"	Use Type I		nel
Çalcula	te Peak Area C1.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in.	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1	lations above 6-3 "Unit pea lations above	k discharge"	Use Type I		nel
Çalcula	te Peak Area C1.2 Area C1.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10	lations above 6-3 "Unit pea lations above	k discharge"	Use Type I		nel
Calcula	te Peak Area C1.2 Area C1.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in.	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul	lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge"	Use Type I Use Type I	11	nel
Çalcula	te Peak Area C1.2 Area C1.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul Ref. Figure	lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula,	te Peak Area C1.2 Area C1.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs 395 csm/in	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul Ref. Figure From calcul Ref. Figure From pg. 1	lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula,	te Peak l Area C1.2 Area C1.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs 395 csm/in 5.1 inches	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul Ref. Figure From calcul Ref. Figure From pg. 1	lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge"	Use Type I Use Type I	11	nel
Çalcula	te Peak l Area C1.2 Area C1.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs 395 csm/in 5.1 inches	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul Ref. Figure From calcul Ref. Figure From pg. 1	lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge"	Use Type I Use Type I	11	nel
Çalcula	te Peak I Area C1.2 Area C1.3 Area C1.4	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs 395 csm/in 5.1 inches 3.40 cu ft/sec	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul Ref. Figure From calcul Ref. Figure From pg. 1	lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge"	Use Type I Use Type I	11	nel
Çalcula	te Peak I Area C1.2 Area C1.3 Area C1.4 Area C4.2	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs 395 csm/in 5.1 inches 3.40 cu ft/sec 240	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul Ref. Figure From pg. 1 Eq. 10 Ref. Figure	lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge" k discharge"	Use Type I Use Type I	11	nel
<u>C</u> alcula	te Peak Area C1.2 Area C1.3 Area C1.4 Area C4.2 (from	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs 395 csm/in 5.1 inches 3.40 cu ft/sec 240 0.027 hrs	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul Ref. Figure From pg. 1 Eq. 10 Ref. Figure From pg. 1 Eq. 10	lations above 6-3 "Unit pea lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge" k discharge"	Use Type I Use Type I Use Type I	11	nel
Çalcula	te Peak I Area C1.2 Area C1.3 Area C1.4 Area C1.4 Area C4.2 (from pt. 120	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.538 hrs 0.095 in. 0.483 hrs 415 csm/in 5.1 inches 6.5479 cu ft/sec 0.095 in. 0.485 hrs 415 csm/in 5.1 inches 6.12 cu ft/sec 0.095 in. 0.538 hrs 395 csm/in 5.1 inches 3.40 cu ft/sec 240 0.027 hrs 0.671 hrs	Sum of Sh From calcu Ref. Figure From pg. 1 Eq. 10 From calcu Ref. Figure From pg. 1 Eq. 10 From calcul Ref. Figure From pg. 1 Eq. 10 Ref. Figure From pg. 1 Eq. 10	lations above 6-3 "Unit pea lations above 6-3 "Unit pea lations above 6-3 "Unit pea	k discharge" k discharge" k discharge"	Use Type I Use Type I Use Type I	11	nel

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		MANAG	GEMENT SE	RVICES, IN				
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	70	of	110
Subject:	Stormw	ater Design	Checked By:	Date:	Job No.:		SMEPA	
	Area	Flow Length, L	240					
	C4.3	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.720 hrs	Tt + Tc for Area C4.3 (pg. 65)			
	•	Unit Peak Disch. q _u	350 csm/in	Ref. Figure 6-3 "Unit p	eak discharge" U	se Type	III	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	133)	Peak Discharge, q _p	2.34 cu ft/sec	Eq. 10				
	Area	Flow Length, L	240					
	C4.1	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.376 hrs	Tt + Tc for Area C4.1 (
	pt. 120	Unit Peak Disch. q _u	455 csm/in	Ref. Figure 6-3 "Unit pe	eak discharge" Us	se Туре	111	
		Runoff, Q	5.1 inches	From pg. 1				
	133)	Peak Discharge, q _p	3.05 cu ft/sec	: Eq. 10				
	Area	Flow Length, L	240					
	C3.2	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.681 hrs	Tt + Tc for Area C3.2 (
		Unit Peak Disch. qu	355 csm/in	Ref. Figure 6-3 "Unit po	eak discharge" Us	se Туре	111	
		Runoff, Q	5.1 inches	From pg. 1				
	133)	Peak Discharge, q _p	4.87 cu ft/sec	: Eq. 10				
	Area	Flow Length, L	240					
		Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(Time of Conc. Tc	0.686 hrs	Tt + Tc for Area C3.3 (
		Unit Peak Disch. q _u	355 csm/in	Ref. Figure 6-3 "Unit pe	eak discharge" Us	ве Туре	111	
		Runoff, Q	5.1 inches	From pg. 1				
	133)	Peak Discharge, q _p	4.92 cu ft/sec	c Eq. 10				
	Area	Flow Length, L	240					
	C3.4	Travel Time, Tt	0.027 hrs	Ref Eq. 6	27 66)			
	`	Time of Conc. Tc	0.716 hrs	Tt + Tc for Area C3.4 () Ref. Figure 6-3 "Unit po			ш	
		Unit Peak Disch. q _u	345 csm/in		san usunarye Us	e iyhe		
		Runoff, Q Peak Discharge, q _o	5.1 inches 2.14 cu ft/sec	From pg. 1				
	155)	r eak Discharge, qp	2.1+ Cu 1/Set	л шү. то				
	Area	Flow Length, L	240					
	C3.1	Travel Time, Tt	0.027 hrs	Ref Eq. 6	27 66)			
	(from	Time of Conc. Tc	0.417 hrs	Tt + Tc for Area C3.1 ()	-		111	
		Unit Peak Disch. q _u	445 csm/in	Ref. Figure 6-3 "Unit pe	ar uscharge Us	e iype	11	
		Runoff, Q	5.1 inches	From pg. 1				
	133)	Peak Discharge, q _p	6.81 cu ft/sec	; Eq. 10				
	Area	Flow Length, L	240					
	C2.2	Travel Time, Tt	0.027 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.578 hrs	Tt + Tc for Area C2.2 (-	_		
		Unit Peak Disch. qu	390 csm/in	Ref. Figure 6-3 "Unit pe	eak discharge" Us	е Туре	111	
		Runoff, Q	5.1 inches					
	133)	Peak Discharge, q _p	4.41 cu ft/sec	: Eq. 10				

AreaFlow Length, L240C2.3Travel Time, Tt0.027 hrsRef Eq. 6(from Time of Conc. Tc0.572 hrsTt + Tc for Area C2.3 (pg. 66)pt. 120Unit Peak Disch. qu390 csm/into Pt.Runoff, Q5.1 inches133)Peak Discharge, qp3.45 cu ft/sec Eq. 10AreaFlow Length, L240C2.4Travel Time, Tt0.027 hrs(from Time of Conc. Tc0.621 hrsTt + Tc for Area C2.3 (pg. 66)pt. 120Unit Peak Disch. qu375 csm/into Pt. Runoff, Q5.1 inchesFrom pg. 1133)Peak Disch. qu375 csm/into Pt. Runoff, Q5.1 inchesFrom pg. 1133)Peak Disch. qu375 csm/into Pt. Runoff, Q5.1 inchesFrom pg. 1133)Peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L240C2.1Travel Time, Tt0.027 hrsRef Eq. 60.027 hrsRef Eq. 6(from Time of Conc. Tc0.328 hrsTt + Tc for Area C2.1 (pg. 65)550 csm/inpt. 120Unit Peak Disch. qu550 csm/into Pt. Runoff, Q550 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type IIIto Pt. Runoff, Q5.1 inchesFrom pg. 1133)Peak Discharge, qp8.72 cu ft/sec Eq. 10	IEPA Landfill Made By: CJ Date: 10/11/16 Sheet No.: 71 O	
Area Flow Length, L 240 C2.3 Travel Time, Tt 0.027 hrs Ref Eq. 6 (from Time of Conc. Tc 0.572 hrs Tt + Tc for Area C2.3 (pg. 66) pt. 120 Unit Peak Disch. qu 390 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III to Pt. Runoff, Q 5.1 inches From pg. 1 133) Peak Discharge, qp 3.45 cu ft/sec Eq. 10 Area Flow Length, L 240 C2.4 Travel Time, Tt 0.027 hrs Area Flow Length, L 240 C2.4 Travel Time, Tt 0.027 hrs Area Flow Length, L 240 C2.4 Travel Time, Tt 0.027 hrs 133) Peak Discharge, qp 3.45 cu ft/sec Eq. 10 Area Flow Length, L 240 C2.1 Travel Time, Tt 0.027 hrs 133) Peak Discharge, qp 3.32 cu ft/sec Eq. 10 Area Flow Length, L 240 C2.1 Travel Time, Tt 0.027 hrs 133) Peak Discharge, qp 3.32 cu ft/sec Eq. 10 Area Flow Length, L <th></th> <th>of 110</th>		of 110
Area Flow Length, L 240 C2.3 Travel Time, Tt 0.027 hrs Ref Eq. 6 (from Time of Conc. Tc 0.572 hrs Tt + Tc for Area C2.3 (pg. 66) pt. 120 Unit Peak Disch. qu 390 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III to Pt. Runoff, Q 5.1 inches From pg. 1 133) Peak Discharge, qp 3.45 cu ft/sec Eq. 10 Area Flow Length, L 240 C2.4 Travel Time, Tt 0.027 hrs Ref Eq. 6 (from Time of Conc. Tc 0.621 hrs Tt + Tc for Area C2.3 (pg. 66) pt. 120 Unit Peak Disch. qu 375 csm/in Ref Eq. 6 (from Time of Conc. Tc 0.621 hrs Tt + Tc for Area C2.3 (pg. 66) pt. 120 Unit Peak Disch. qu 375 csm/in Ref Eq. 6 133) Peak Discharge, qp 3.32 cu ft/sec Eq. 10 Area Flow Length, L 240 C2.1 Travel Time, Tt 0.027 hrs Ref Eq. 6 (from Time of Conc. Tc 0.328 hrs Tt + Tc for Area C2.1 (pg. 65) pt. 120 Unit Peak Disch. qu 550 csm/in Ref. Figure 6-3 "Unit peak disch	D	
C2.3Travel Time, Tt0.027 hrsRef Eq. 6(from Time of Conc. Tc0.572 hrsTt + Tc for Area C2.3 (pg. 66)pt. 120Unit Peak Disch. qu390 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type IIIto Pt.Runoff, Q5.1 inchesFrom pg. 1133)Peak Discharge, qp3.45 cu ft/sec Eq. 10AreaFlow Length, L240C2.4Travel Time, Tt0.027 hrsRef Eq. 6(from Time of Conc. Tc0.621 hrsTt + Tc for Area C2.3 (pg. 66)pt. 120Unit Peak Disch. qu375 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type IIIto Pt.Runoff, Q5.1 inchesFrom pg. 1133)Peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L240C2.1Travel Time, Tt0.027 hrsRef Eq. 6(from Time of Conc. Tc0.328 hrsTt + Tc for Area C2.1 (pg. 65)pt. 120Unit Peak Disch. qu550 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type IIIto Pt.Runoff, Q5.1 inchesFrom pg. 1133)Peak Discharge, qp8.72 cu ft/sec Eq. 10Calculate Channel Flow VelocityX-Section Area, a Peak Discharge, qp30 sq ft 64.11 cu ft/secCalculate Channel Flow Velocity2.1371 ft/sec	- colg.	ICFA
OtherTime of Conc. Tc (from Time of Conc. Tc pt. 120 Unit Peak Disch. qu to Pt. Runoff, Q0.572 hrs 390 csm/inTt + Tc for Area C2.3 (pg. 66)330 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type III 5.1 inches5.1 inches133)Peak Discharge, qp3.45 cu ft/sec Eq. 10AreaFlow Length, L (from Time of Conc. Tc (from Time of Conc. Tc 0.621 hrs240 0.027 hrs133)Peak Disch. qu 133)375 csm/in 8.61 kit peak discharge" Use Type III 5.1 inches133)Peak Discharge, qp at 133)3.32 cu ft/sec Eq. 10AreaFlow Length, L 133)240 2.1 Travel Time, Tt 0.027 hrs133)Peak Discharge, qp peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L 133)240 2.1 Travel Time, Tt 133)133)Peak Discharge, qp peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L 133)240 2.1 Travel Time, Tt 133)133)Peak Disch. qu 1405.1 inches133)Peak Disch. qu 1405.1 inches133)Peak Disch. qu 1405.1 inches133)Peak Discharge, qp 133)8.72 cu ft/sec Eq. 10Calculate Channel Flow Velocity X-Section Area, a Peak Discharge, qp Peak Velocity30 sq ft 64.11 cu ft/sec 2.1371 ft/sec		
pt. 120Unit Peak Disch. qu to Pt. Runoff, Q390 csm/in 5.1 inchesRef. Figure 6-3 "Unit peak discharge" Use Type III 5.1 inches133)Peak Discharge, qp3.45 cu ft/sec Eq. 10AreaFlow Length, L240C2.4Travel Time, Tt0.027 hrs(from Time of Conc. Tc0.621 hrsTt + Tc for Area C2.3 (pg. 66)pt. 120Unit Peak Disch. qu to Pt. Runoff, Q375 csm/in133)Peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L240C2.1Travel Time, Tt0.027 hrs133)Peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L240C2.1Travel Time, Tt0.027 hrs(from Time of Conc. Tc0.328 hrspt. 120Unit Peak Disch. qu to Pt. Runoff, Q5.1 inchespt. 120Unit Peak Disch. qu to Pt. Runoff, Q5.1 inchespt. 120Unit Peak Disch. qu to Pt. Runoff, Q5.1 inchesjt. 133)Peak Discharge, qp Peak Discharge, qp8.72 cu ft/sec Eq. 10Calculate Channel Flow Velocity X-Section Area, a Peak Discharge, qp Peak Velocity30 sq ft 64.11 cu ft/sec 2.1371 ft/sec		
to Pt. Runoff, Q 133) Peak Discharge, q _p Area Flow Length, L C2.4 Travel Time, Tt (from Time of Conc. Tc pt. 120 Unit Peak Disch. q _u to Pt. Runoff, Q 133) Peak Discharge, q _p Area Flow Length, L C2.1 Travel Time, Tt (from Time of Conc. Tc Peak Discharge, q _p Area Flow Length, L C2.1 Travel Time, Tt (from Time of Conc. Tc pt. 120 Unit Peak Disch q _u to Pt. Runoff, Q Area Flow Length, L C2.1 Travel Time, Tt (from Time of Conc. Tc pt. 120 Unit Peak Disch. q _u to Pt. Runoff, Q Area Flow Length, L C2.1 Travel Time, Tt (from Time of Conc. Tc pt. 120 Unit Peak Disch. q _u to Pt. Runoff, Q Area Flow Length, L C2.1 Travel Time, Tt (from Time of Conc. Tc pt. 120 Unit Peak Disch. q _u to Pt. Runoff, Q Area Discharge, q _p Area Flow Length, L C2.1 Travel Time, Tt (from Time of Conc. Tc peak Discharge, q _p Area Flow Length, C C2.1 Travel Time, Tt (from Time of Conc. Tc (from Time of Conc. Tc		
133) Peak Discharge, qp3.45 cu ft/sec Eq. 10AreaFlow Length, L240C2.4Travel Time, Tt0.027 hrsRef Eq. 6(from Time of Conc. Tc0.621 hrsTt + Tc for Area C2.3 (pg. 66)pt. 120 Unit Peak Disch. qu375 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type IIIto Pt.Runoff, Q5.1 inches133) Peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L240C2.1Travel Time, Tt0.027 hrs(from Time of Conc. Tc0.328 hrspt. 120 Unit Peak Disch. qu50 csm/into Pt.Runoff, Qto Pt.Scharge, qpArea Discharge, qp8.72 cu ft/sec Eq. 10Calculate Channel Flow Velocity30 sq ftX-Section Area, a30 sq ftPeak Discharge, qp64.11 cu ft/secPeak Velocity2.1371 ft/sec	id	
C2.4Travel Time, Tt0.027 hrsRef Eq. 6(from Time of Conc. Tc0.621 hrsTt + Tc for Area C2.3 (pg. 66)pt. 120Unit Peak Disch. qu375 csm/into Pt.Runoff, Q5.1 inches133)Peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L240C2.1Travel Time, Tt0.027 hrs(from Time of Conc. Tc0.22 hrspt. 120Unit Peak Disch. quto Pt.Runoff, Q3.32cu ft/sec Eq. 10		
(fromTime of Conc. Tc0.621 hrsTt + Tc for Area C2.3 (pg. 66)pt. 120Unit Peak Disch. qu375 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type IIIto Pt.Runoff, Q5.1 inchesFrom pg. 1133)Peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L240C2.1Travel Time, Tt0.027 hrsRef Eq. 6(fromTime of Conc. Tc0.328 hrsTt + Tc for Area C2.1 (pg. 65)pt. 120Unit Peak Disch. qu550 csm/inRef. Figure 6-3 "Unit peak discharge" Use Type IIIto Pt.Runoff, Q5.1 inchesFrom pg. 1133)Peak Discharge, qp8.72 cu ft/sec Eq. 10Calculate Channel Flow Velocity X-Section Area, a Peak Discharge, qp30 sq ft64.11 cu ft/sec 2.13712.1371 ft/sec		
pt. 120Unit Peak Disch. qu to Pt.375 csm/in csm/inRef. Figure 6-3 "Unit peak discharge" Use Type III 5.1 inches133)Peak Discharge, qp3.32 cu ff/sec Eq. 10AreaFlow Length, L C2.1240 Travel Time, Tt (from Time of Conc. Tc pt. 120240 Unit Peak Disch. qu 550 csm/inAreaFlow Length, L C2.1240 Travel Time, Tt 0.027 hrs65) S50 csm/inpt. 120Unit Peak Disch. qu to Pt.550 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III 5.1 inches133)Peak Discharge, qp Peak Discharge, qp8.72 cu ff/sec Eq. 10Calculate Channel Flow Velocity X-Section Area, a Peak Discharge, qp Peak Velocity30 sq ft 64.11 cu ff/sec 2.1371 ff/sec	······································	
to Pt. Runoff, Q 133) Peak Discharge, q _p Area Flow Length, L C2.1 Travel Time, Tt (from Time of Conc. Tc pt. 120 Unit Peak Disch. q _u to Pt. Runoff, Q 133) Peak Discharge, q _p Calculate Channel Flow Velocity X-Section Area, a Peak Discharge, qp Peak Velocity X-Section Area, a Peak Discharge, qp Peak Velocity 2.1371 ft/sec		
133)Peak Discharge, qp3.32 cu ft/sec Eq. 10AreaFlow Length, L240C2.1Travel Time, Tt0.027 hrs(from Time of Conc. Tc0.328 hrsTt + Tc for Area C2.1 (pg. 65)pt. 120Unit Peak Disch. qu550 csm/into Pt.Runoff, Q5.1 inches133)Peak Discharge, qp8.72 cu ft/sec Eq. 10Calculate Channel Flow Velocity30 sq ftX-Section Area, a30 sq ftPeak Discharge, qp64.11 cu ft/secPeak Velocity2.1371 ft/sec		
C2.1 Travel Time, Tt 0.027 hrs Ref Eq. 6 (from Time of Conc. Tc 0.328 hrs Tt + Tc for Area C2.1 (pg. 65) pt. 120 Unit Peak Disch. qu 550 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III to Pt. Runoff, Q 5.1 inches From pg. 1 133) Peak Discharge, qp 8.72 cu ft/sec Eq. 10 Calculate Channel Flow Velocity X-Section Area, a 30 sq ft Peak Discharge, qp 64.11 cu ft/sec Peak Velocity 2.1371 ft/sec		
C2.1 Travel Time, Tt 0.027 hrs Ref Eq. 6 (from Time of Conc. Tc 0.328 hrs Tt + Tc for Area C2.1 (pg. 65) pt. 120 Unit Peak Disch. qu 550 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III to Pt. Runoff, Q 5.1 inches From pg. 1 133) Peak Discharge, qp 8.72 cu ft/sec Eq. 10 Calculate Channel Flow Velocity X-Section Area, a 30 sq ft Peak Discharge, qp 64.11 cu ft/sec Peak Velocity 2.1371 ft/sec		
pt. 120 Unit Peak Disch. qu 550 csm/in Ref. Figure 6-3 "Unit peak discharge" Use Type III to Pt. Runoff, Q 5.1 inches From pg. 1 133) Peak Discharge, qp 8.72 cu ft/sec Eq. 10 Calculate Channel Flow Velocity X-Section Area, a 30 sq ft Peak Discharge, qp 64.11 cu ft/sec Peak Velocity 2.1371 ft/sec	avel Time, Tt 0.027 hrs Ref Eq. 6	
to Pt. Runoff, Q 5.1 inches From pg. 1 133) Peak Discharge, q _p 8.72 cu ft/sec Eq. 10 Calculate Channel Flow Velocity X-Section Area, a 30 sq ft Peak Discharge, qp 64.11 cu ft/sec Peak Velocity 2.1371 ft/sec		
133) Peak Discharge, q _p 8.72 cu ft/sec Eq. 10 Calculate Channel Flow Velocity X-Section Area, a 30 sq ft Peak Discharge, qp 64.11 cu ft/sec Peak Velocity 2.1371 ft/sec		
Calculate Channel Flow Velocity X-Section Area, a 30 sq ft Peak Discharge, qp 64.11 cu ft/sec Peak Velocity 2.1371 ft/sec		
X-Section Area, a 30 sq ft Peak Discharge, qp 64.11 cu ft/sec Peak Velocity 2.1371 ft/sec	ak Discharge, q _p 8.72 cu ft/sec Eq. 10	
	Section Area, a 30 sq ft ak Discharge, qp 64.11 cu ft/sec ak Velocity 2.1371 ft/sec	

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

		MANAGI	EMENT SE	RVICES, INC	- · · ·	
Calculatio	ons For:		Made By: CJ	Date: 10/11/16	Sheet No.: 72	of 110
Subject:	Stormw	ater Design	Checked By:	Date:	Job No.:	SMEPA
		Discharge from Areas C1.				
	Area	and a second con-	1.25 acres	0.00 sq. mil	es	
Calcula		Time, Tt				
	Sheet F		175 feet		Flow Length, L	0 feet
	Pt. 122	Flow Length, L Two-yr 24 hr rainfall, P ₂	4.9 inches		Two-yr 24 hr rainfal	5.9
C1.1	to Pt.		0.25 ft/ft		Land Slope, s	0.04 ft/ft
	133	Land Slope, s Travel Time, Tt	0.168 hrs	Ref Eq. 8	Travel Time, Tt	0.000
	Open C	hannel Flow	0.100 115	Nei Ly. o	naver nine, rt	0.000
	Open O	Channel Depth, D	2 feet	~	1	/
		Channel Width, B	7 feet		D	
		X-Section Area, a	30 sq ft			4/10.400
	Pf 133	Wetted Perimeter, pw	23.5 feet		r B 1	4(H):1(V)
		Hydraulic Radus, r	1.277 ft			
		Channel Slope	0.005 ft/ft			
		Velocity, V	2.480 ft/sec	Ref Eq. 9		
		Flow Length, L	240			
		Travel Time, Tt	0.027 hrs	Ref Eq. 6		
	Total Tr	avel Time	0.195 hrs	Sum of Sheet, Shallow	w Concentrated and C	Dpen Channel
Calcula	te Peak I	Discharge				
		l _a /P	0,095 in.			
	Area	Time of Conc. Tc	0.195 hrs	From calculations above		
	C1.1	Unit Peak Disch. q _u	560 csm/in	Ref. Figure 6-3 "Unit pea	ik discharge" Use Type	11
	01.1	Runoff, Q	5.1 inches	From pg. 1		
		Peak Discharge, q _p	5.58 cu ft/sec	; Eq. 10		
	Area	Flow Length, L	240			
	C4.2	Travel Time, Tt	0.027 hrs	Ref Eq. 6	202)	
	(from	Time of Conc. Tc	0.698 hrs	Tt + Tc for Area C4.2 (pg		
	•	Unit Peak Disch. qu		Ref. Figure 6-3 "Unit pea	k discharge" Use Type I	
		Runoff, Q	5.1 inches			
	134)	Peak Discharge, q _p	3.96 cu ft/sec	; Eq. 10		
		Flow Longth	240			
	Area	Flow Length, L Travel Time, Tt	240 0.027 hrs	Ref Eg. 6		
					(70)	
	•	Time of Conc. Tc	0.747 hrs 345 csm/in	Tt + Tc for Area C4.3 (pg Ref. Figure 6-3 "Unit pea		141
		Unit Peak Disch. q _u	5.1 inches	-	in discharge Use Type I	
		Runoff, Q		From pg. 1		
	134)	Peak Discharge, q _p	2.31 cu ft/sec	Eq. 10		
	A ====	Flow Length, L	240			
			0.027 hrs	Ref Eq. 6		
	C 4 4		0.403 hrs	Tt + Tc for Area C4.1 (pg	70)	
	C4.1	Lime of Conc. Lo		- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 (PS		
	(from	Time of Conc. To		Pof Figuro 6-2 "Unit poo	k discharge" Lleo Turo I	11
	(from pt. 133	Unit Peak Disch. q _u	450 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type I	11
	(from pt. 133 to Pt.			From pg. 1	k discharge" Use Type I	11

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		MANAG	GEMENT	SE	RVIC	ES, IN	c. V			
Calculatio	ns For:	SMEPA Landfill	Made By:	CJ	Date:	10/11/16	Sheet No.:	73	of	110
Subject:	Stormw	ater Design	Checked By:		Date:		Job No.:		SMEPA	
	Area	Flow Length, L	240							
		Travel Time, Tt	0.027 hr	s	Ref Eq. 6					
	(from	Time of Conc. Tc	0.708 hr	s	Tt + Tc for	Area C3.2 (p	og. 70)			
	pt. 133	Unit Peak Disch. q _u	355 cs	m/in	Ref. Figure	e 6-3 "Unit pe	ak discharge"	Use Type	e	
	to Pt.	Runoff, Q	5.1 in	ches	From pg. 1					
	134)	Peak Discharge, q _p	4.87 cu	l ft/sec	Eq. 10					
	Area	Flow Length, L	240							
		Travel Time, Tt	0.027 hr	s	Ref Eq. 6					
		Time of Conc. Tc	0.713 hr	S		Area C3.3 (p				
		Unit Peak Disch. q _u	355 cs	m/in	Ref. Figure	e 6-3 "Unit pe	ak discharge"	Use Type	e III	
	•	Runoff, Q	5.1 inc	ches	From pg. 1					
		Peak Discharge, q _p	4.92 cu	l ft/sec	; Eq. 10					
	Агеа	Flow Length, L	240							
	C3.4	Travel Time, Tt	0.027 hr	s	Ref Eq. 6					
		Time of Conc. Tc	0.743 hr	s	Tt + Tc for	Area C3.4 (p	og. 70)			
	1	Unit Peak Disch. qu	340 cs		Ref. Figure	e 6-3 "Unit pe	ak discharge"	Use Type	e III	
		Runoff, Q	5.1 in	ches	From pg. 1		-			
		Peak Discharge, q _p	2.11 cu							
	Area	Flow Length, L	240							
	C3.1	Travel Time, Tt	0.027 hr	s	Ref Eq. 6					
		Time of Conc. Tc	0.444 hr	s	Tt + Tc for	Area C3.1 (p	og. 70)			
		Unit Peak Disch. q _u	435 cs	m/in	Ref. Figure	e 6-3 "Unit pe	ak discharge"	Use Type	e	
		Runoff, Q	5.1 in	ches	From pg. 1					
		Peak Discharge, q _p	6.66 cu							
	Area	Flow Length, L	240							
		Travel Time, Tt	0.027 hr	s	Ref Eq. 6					
		Time of Conc. Tc	0.605 hr			Area C2.2 (p	÷ .			
	•	Unit Peak Disch. q _u	380 cs	m/in	Ref. Figure	e 6-3 "Unit pe	ak discharge"	Use Type	ə 111	
		Runoff, Q			From pg. 1					
		Peak Discharge, q _p	4.30 cu	ı ft/seo	Eq. 10					
	Агеа	Flow Length, L	240							
		Travel Time, Tt	0.027 hr	S	Ref Eq. 6					
		Time of Conc. Tc	0.599 hr			Area C2.3 (p	og. 71)			
	(Unit Peak Disch. q _u	380 cs				ak discharge"	Use Type	e 111	
		Runoff, Q	5.1 in		From pg. '		-			
		Peak Discharge, q _p	3.36 ci							
	Area	Flow Length, L	240							
	C2.4	Travel Time, Tt	0.027 hr	s	Ref Eq. 6					
		Time of Conc. Tc	0.648 hr			Area C2.4 (p	og. 71)			
		Unit Peak Disch. qu	360 cs				ak discharge"	Use Type	e III	
	•	Runoff, Q	5.1 in		From pg. 1			11-1		
		Peak Discharge, q _p	3.18 cL	ı ft/seo	c Eq. 10					

1 1.0		SMEPA Landfill		RVICES, INC Date: 10/11/16	Sheet No.: 74	of	110
alculation		ater Design	Made By: CJ Checked By:	Date:	Job No.:	SMEPA	110
ibject:		Flow Length, L	240	Date.	1000 110	Onitin	
		Travel Time, Tt	0.027 hrs	Ref Eq. 6			
		Time of Conc. Tc	0.355 hrs	Tt + Tc for Area C2.1 (pg	71)		
			475 csm/in				
	•	Unit Peak Disch. qu		Ref. Figure 6-3 "Unit pea	kuischarge Ose ryp		
		Runoff, Q		From pg. 1			
	134)	Peak Discharge, q _p	7.53 cu ft/sec	; Eq. 10			
		Flow Length, L	240				
		Travel Time, Tt	0.027 hrs	Ref Eq. 6			
	(from	Time of Conc. Tc	0.510 hrs	Tt + Tc for Area C1.2 (pg			
	pt. 133	Unit Peak Disch. q _u	405 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Typ	e III	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1			
	134)	Peak Discharge, q _p	6.39 cu ft/sec	2 Eq. 10			
		Flow Length, L	240				
	C1.3	Travel Time, Tt	0.027 hrs	Ref Eq. 6			
	(from	Time of Conc. Tc	0.512 hrs	Tt + Tc for Area C1.3 (pg	. 69)		
		Unit Peak Disch. q _u	405 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Typ	e III	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1			
	134)	Peak Discharge, q _p	5.97 cu ft/sec	5 Eq. 10			
	Area	Flow Length, L	240				
	C1.4	Travel Time, Tt	0.027 hrs	Ref Eq. 6			
	(from	Time of Conc. Tc	0.565 hrs	Tt + Tc for Area C1.4 (pg	. 69)		
	pt. 133	Unit Peak Disch. q _u	385 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Typ	e III	
		Runoff, Q	5.1 inches	From pg. 1			
	134)	Peak Discharge, q _p	3.31 cu ft/sec	: Eq. 10			
alculat	e Chanr	el Flow Velocity					
		X-Section Area, a	30 sq ft				
		Peak Discharge, qp	67.47 cu ft/sec				
		Peak Velocity	2.249 ft/sec				
			91% of Calcu	lated Channel Flow Vel	locity		
			-				
							-1

			EMENT S	1.2.5		二(2)			
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	75	of	110
Subject:	Stormw	ater Design	Checked By:	Date:		Job No.:		SMEPA	
oubjeet.				ERN SIDE		1000 11011		onie n	
Calcula	ate Peak	Discharge from Area D6.2							
ourouro	Area		1.38 acres		0.00 sq. mile	s			
Calcula	= +1	Time, Tt							
	Sheet F								
	DI 40	Flow Length, L	119.8 feet		D4 44	Flow Leng	th, L	180.2 fe	et
	Pt. 40 to Pt.	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 41 to Pt.	Two-yr 24	hr rainfal	5.9	
	41	Land Slope, s	0.25 ft/ft		137	Land Slope	e, s	0.04 ft/	ft
D6.2		Travel Time, Tt	0.124 hrs	Ref Eq. 8	137	Travel Tim	e, Tt	0.326	
00.2	Shallow	,Concentrated Flow							
	Pt. 137	Flow Length, L	69.8 feet						
		Watercourse slope, s	0.04 ft/ft						
	138	Avg. Velocity, V.	3.2 ft/sec		9 "Avg. vel. fo		me for sha	llow	
					ed flow" - use	Unpaved			
		Travel Time, Tt	0.006 hrs	Ref Eq. 6					
	Open C	hannel Flow		~				-	
		Channel Depth, D	2 feet			D	1		
		Channel Width, B	0 feet			*	15		
	D1 400	X-Section Area, a	16 sq ft			< B >		4(H):1(V)
		Wetted Perimeter, p _w	16.5 feet						
		Hydraulic Radus, r	0.970 ft						
	142	Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec 260	Ref Eq. 9					
		Flow Length, L Travel Time, Tt	200 0.035 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.491 hrs		neet, Shallow	Concentra	tod and C	non Chan	nol
	TULAT TI	aver time	0.491 1115		ieer, Shallow	Concentra	teu anu C	pen Grian	nei
Calcula	ite Peak l	Discharge from Area D6.3							
oulouid	Area	aloundigo nonri tiod a oro	0.83 acres	().00 sq. mile	s			
Calcula	ate Travel	Time, Tt							
	Sheet F	low							
	Pt. 88	Flow Length, L	60.7 feet		D6 420	Flow Lengt	h, L	239.3 fee	ət
	to Pt. 88	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 139 to Pt.	Two-yr 24	h r rainfa l	5.9	
	139	Land Slope, s	0.25 ft/ft		to Pt. 140	Land Slope		0.04 ft/f	ť
	139	Travel Time, Tt	0.072 hrs	Ref Eq. 8	140	Travel Time	e, Tt	0.409	
D6.3		,Concentrated Flow							
00.0		Flow Length, L	10.7 feet						
		Watercourse slope, s	0.04 ft/ft						
	141	Avg. Velocity, V.	3.2 ft/sec	-	9 "Avg. vel. for		me for shal	low	
					d flow" - use l	Jnpaved			
		Travel Time, Tt	0.001 hrs	Ref Eq. 6					
	Open C	hannel Flow		~				~	
		Channel Depth, D	2 feet			ÎD	/		
		Channel Width, B	0 feet		1	*	2		
	B (485	X-Section Area, a	16 sq ft			< B >		4(H):1(V)
		Wetted Perimeter, pw	16.5 feet			av v			
		Hydraulic Radus, r	0.970 ft						
	142	Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	260	D-(E)					
		Travel Time, Tt	0.035 hrs	Ref Eq. 6					
	Total Tr	aval Tima	0.517 hrs	Sum of Sh	oot Shallow	Concentrat	od and O	non Chan	

_			1	RVICES, INC	1			-
Calculation		SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	76	of	110
		/ater Design Discharge	Checked By:	Date:	Job No.:	-	SMEPA	
Jaioulate	Fear	l _a /P	0.095 in.					
		Time of Conc. Tc	0.491 hrs	From calculations above				
	Area	Unit Peak Disch. qu	410 csm/in	Ref. Figure 6-3 "Unit pea		Use Type	111	
	D6.2	Runoff, Q	5.1 inches			000 1300		
		Peak Discharge, q _p	4.5087 cu ft/sec					
		l _a /P	0.095 in.					
		Time of Conc. Tc	0.517 hrs	From calculations above				
	Area	Unit Peak Disch. qu	405 csm/in	Ref. Figure 6-3 "Unit pea			ш	
	D6.3	Runoff, Q	5.1 inches		ik ulscharge i	Use Type	111	
		Peak Discharge, q _p	2.68 cu ft/sec					
	Chann							
alculate	Chani	nel Flow Velocity X-Section Area, a	16 sq ft					
		Peak Discharge, qp	7.19 cu ft/sec					
		Peak Velocity	0.4492 ft/sec					
			22% of Calcu	ated Channel Flow Ve	locity			

Calculat	Stormw	ates Decise							
Calculat		aler Design	Checked By:	Date:		Job No.;		SMEPA	
	te Peak	Discharge from Area D6.1							
	Area	and the second second	1.34 acres	0.0	0 sq. mile	es			
Calculat	te Travel	Time, Tt							
	Sheet F								
	Pt. 143	Flow Length, L	165 feet			Flow Length,	L	0 fee	ət
DO 4		Two-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24 hr	rainfal	5.9	
D6.1	to Pt.	Land Slope, s	0.25 ft/ft			Land Slope,	s	0.04 ft/f	ť
	142	Travel Time, Tt	0.160 hrs	Ref Eq. 8		Travel Time,		0.000	
	Open C	hannel Flow							
		Channel Depth, D	2 feet	/	-	1 D	-	/	
		Channel Width, B	0 feet		1	-	-5		
		X-Section Area, a	16 sq ft		1.00	<>	-	4(H):1(V)
	Pt. 142	Wetted Perimeter, pw	16.5 feet			B		-(1).1(V	/
		Hydraulic Radus, r	0.970 ft						
		Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	250						
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.194 hrs		et, Shallov	v Concentrated	d and O	pen Chan	nel
Calculat	te Peak I	Discharge		-				'	
		I _a /P	0.095 in.						
		Time of Conc. Tc	0.194 hrs	From calculation	ons above				
	Area	Unit Peak Disch. qu	600 csm/in			k discharge" Us	e Type II		
	D6.1	Runoff, Q	5.1 inches	From pg. 1	o onic pou	i ciconargo eo	o i jpo i		
		Peak Discharge, qp	6.41 cu ft/sec						
		r our ploonargo, qp	0.11 00 10000	5 Eq. 10					
	Area	Flow Length, L	250						
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.525 hrs	Tt + Tc for Are	a D6.2 (pg	76)			
	(Unit Peak Disch. qu	400 csm/in			k discharge" Us	e Tvne II	1	
		Runoff, Q	5.1 inches		- entryou		, po n	-	
		Peak Discharge, q _p	4.40 cu ft/sec						
	,	r oak bioonalyo, yp	-1TO OU 10360	о <u></u> ч. то					
	Area	Flow Length, L	250						
		Travel Time, Tt	0.034 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.551 hrs	Tt + Tc for Are	a D6 3 (ng	76)			
		Unit Peak Disch. q _u	395 csm/in			k discharge" Use			
		Runoff, Q	5.1 inches	From pg. 1	onic pear	Coloriarge US	e i î he li	'	
		-		10					
ا مامنام (Peak Discharge, q _p	2.61 cu ft/sec	, ⊏q. 10					
aiculat	e Unann	el Flow Velocity	16 #						
		X-Section Area, a	16 sq ft						
		Peak Discharge, qp	13.42 cu ft/sec	;					
		Peak Velocity	0.8386 ft/sec	datad Channel	Elow Vel	ooity			
			41% of Calcu	lated Channel	riow vel	oony			

					C INC	0			
Calculatio	ons For:	MANAGI SMEPA Landfill	MENT SI Made By: CJ	Date;	S, INC 10/11/16	Sheet No.:	78	of	110
		/ater Design	Checked By:	Date:	10/11/10	Job No.:	10	SMEPA	110
		Discharge from Area D5.2		Duto.		000 1101		GILLITT	
Caroaro	Area	electica general a ca	1.06 acres	(0.00 sq. mile	s			
Calcula		I Time, Tt							
ourouro	Sheet F								
	0.10001								
		Flow Length, L	119.9 feet		-	Flow Length	η, L	180.1 fee	et
	Pt. 145	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 143	Two-yr 24 h		5.9	
	to Pt.	Land Slope, s	0.25 ft/ft		to Pt.	Land Slope		0.04 ft/f	t
	143	Travel Time, Tt	0.124 hrs	Ref Eq. 8	146	Travel Time		0.326	•
	Shallow	,Concentrated Flow	0.121110	1101 24. 0			,	0.010	
D5.2		Flow Length, L	69.9 feet						
		Watercourse slope, s	0.04 ft/ft						
		Avg. Velocity, V.	3.2 ft/sec	Ref Fig 6-	9 "Ava vel fo	r est. travel tin	he for sha	llow	
		,		-	d flow" - use I				
		Travel Time, Tt	0.006 hrs	Ref Eq. 6	a non aco	onparoa			
	Open C	channel Flow							
		Channel Depth, D	2 feet	1	~	1		/	
		Channel Width, B	0 feet			D	K		
		X-Section Area, a	16 sq ft			· .	2	400.400	
	Pt. 142	Wetted Perimeter, pw	16.5 feet			BI		4(H):1(V))
		Hydraulic Radus, r	0.970 ft						
		Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	140	rior Eq. o					
		Travel Time, Tt	0.019 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.475 hrs		eet. Shallow	Concentrate	ed and C	pen Chanr	nel
				-				F - · · · · · · · ·	
Calcula	ite Peak I	Discharge from Area D5.3							
	Агеа		0.87 acres	C	.00 sq. mile	s			
Calcula	ate Travel	Time, Tt							
	Sheet F	low							
	Pt. 88	Flow Length, L	60.7 feet		Pt. 139	Flow Length	i, L	239.3 fee	t
	1.00	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24 h	r rainfal	5.9	
	to Pt		O OF UU			Land Slope,	s	0.04 ft/ft	
	to Pt.	Land Slope, s	0.25 ft/ft					0.409	
	139	Travel Time, Tt	0.25 ft/ft 0.072 hrs	Ref Eq. 8		Travel Time	, Tt		
D5 3	139 Shallow	Travel Time, Tt ,Concentrated Flow	0.072 hrs	Ref Eq. 8			, Tt		
D5.3	139 Shallow Pt. 148	Travel Time, Tt Concentrated Flow Flow Length, L	0.072 hrs 10.7 feet	Ref Eq. 8			, Tt		
D5.3	139 Shallow Pt. 148	Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s	0.072 hrs 10.7 feet 0.04 ft/ft	Ref Eq. 8			, Tt		
D5.3	139 Shallow Pt. 148	Travel Time, Tt Concentrated Flow Flow Length, L	0.072 hrs 10.7 feet		140			low	
D5.3	139 Shallow Pt. 148 to Pt.	Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V.	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec	Ref. Fig. 6-	140	Travel Time est. travel tim		low	
D5.3	139 Shallow Pt. 148 to Pt. 149	Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	0.072 hrs 10.7 feet 0.04 ft/ft	Ref. Fig. 6-) "Avg. vel. for	Travel Time est. travel tim		low	
D5.3	139 Shallow Pt. 148 to Pt. 149	Travel Time, Tt Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs	Ref. Fig. 6-s) "Avg. vel. for	Travel Time est. travel tim		low	
D5.3	139 Shallow Pt. 148 to Pt. 149	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet	Ref. Fig. 6-s) "Avg. vel. for	Travel Time est. travel tim Jnpaved		low	
D5.3	139 Shallow Pt. 148 to Pt. 149	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet	Ref. Fig. 6-s) "Avg. vel. for	Travel Time est. travel tim		low	
D5.3	139 Shallow Pt. 148 to Pt. 149 Open C	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet	Ref. Fig. 6-s) "Avg. vel. for	Travel Time est. travel tim Jnpaved		/	
D5.3	139 Shallow Pt. 148 to Pt. 149 Open C	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet	Ref. Fig. 6-s) "Avg. vel. for	Travel Time est. travel tim Jnpaved		low 4(H):1(V)	
D5.3	139 Shallow Pt. 148 to Pt. 149 Open C Pt. 142 to Pt.	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft	Ref. Fig. 6-s) "Avg. vel. for	Travel Time est. travel tim Jnpaved		/	
D5.3	139 Shallow Pt. 148 to Pt. 149 Open C Pt. 142	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, pw	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet	Ref. Fig. 6-s) "Avg. vel. for	Travel Time est. travel tim Jnpaved		/	
D5.3	139 Shallow Pt. 148 to Pt. 149 Open C Pt. 142 to Pt.	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, pw Hydraulic Radus, r	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft	Ref. Fig. 6-s) "Avg. vel. for	Travel Time est. travel tim Jnpaved		/	
D5.3	139 Shallow Pt. 148 to Pt. 149 Open C Pt. 142 to Pt.	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, pw Hydraulic Radus, r Channel Slope	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft	Ref. Fig. 6-5 concentrate Ref Eq. 6) "Avg. vel. for	Travel Time est. travel tim Jnpaved		/	
D5.3	139 Shallow Pt. 148 to Pt. 149 Open C Pt. 142 to Pt. 151	Travel Time, Tt ,Concentrated Flow Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, pw Hydraulic Radus, r Channel Slope Velocity, V	0.072 hrs 10.7 feet 0.04 ft/ft 3.2 ft/sec 0.001 hrs 2 feet 0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft 2.065 ft/sec	Ref. Fig. 6-5 concentrate Ref Eq. 6 Ref Eq. 9 Ref Eq. 6) "Avg. vel. for d flow" - use L	Travel Time est. travel tim Jnpaved	e for shal	4(H):1(V)	

PA Landfill Design arge of Conc. Tc Peak Disch. qu off, Q Discharge, qp of Conc. Tc Peak Disch. qu off, Q Discharge, qp Length, L bi Time, Tt of Conc. Tc Peak Disch. qu off, Q	Made By: CJ Checked By: 0.095 in. 0.475 hrs 415 csm/in 5.1 inches 3.51 cu ft/sec 0.095 in. 0.095 in. 0.095 in. 0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 Ref Eq. 6
of Conc. Tc Peak Disch. q _u off, Q Discharge, q _p of Conc. Tc Peak Disch. q _u off, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	0.095 in. 0.475 hrs 415 csm/in 5.1 inches 3.51 cu ft/sec 0.095 in. 0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 Ref Eq. 6
of Conc. Tc Peak Disch. q _u off, Q Discharge, q _p of Conc. Tc Peak Disch. q _u off, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	0.475 hrs 415 csm/in 5.1 inches 3.51 cu ft/sec 0.095 in. 0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 Ref Eq. 6
Peak Disch. q _u off, Q Discharge, q _p of Conc. Tc Peak Disch. q _u off, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	0.475 hrs 415 csm/in 5.1 inches 3.51 cu ft/sec 0.095 in. 0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 Ref Eq. 6
Peak Disch. q _u off, Q Discharge, q _p of Conc. Tc Peak Disch. q _u off, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	415 csm/in 5.1 inches 3.51 cu ft/sec 0.095 in. 0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 Ref Eq. 6
off, Q of Conc. Tc Peak Disch. q_u off, Q Discharge, q_p Length, L el Time, Tt of Conc. Tc Peak Disch. q_u	5.1 inches 3.51 cu ft/sec 0.095 in. 0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	From pg. 1 c Eq. 10 From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 c Eq. 10 Ref Eq. 6
of Conc. Tc Peak Disch. q _u off, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	3.51 cu ft/sec 0.095 in. 0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 Ref Eq. 6
of Conc. Tc Peak Disch. q _u off, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	0.095 in. 0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	From calculations above Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 Ref Eq. 6
Peak Disch. q _u ff, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	0.501 hrs 410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 Ref Eq. 6
Peak Disch. q _u ff, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	410 csm/in 5.1 inches 2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	Ref. Figure 6-3 "Unit peak discharge" Use Type III From pg. 1 Eq. 10 Ref Eq. 6
ff, Q Discharge, q _p Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	5.1 inches 2.84 cu ft/seo 140 0.019 hrs 0.544 hrs	From pg. 1 Eq. 10 Ref Eq. 6
Discharge, q _p Length, L al Time, Tt of Conc. Tc Peak Disch. q _u	2.84 cu ft/sec 140 0.019 hrs 0.544 hrs	Ref Eq. 6
Length, L el Time, Tt of Conc. Tc Peak Disch. q _u	140 0.019 hrs 0.544 hrs	Ref Eq. 6
el Time, Tt of Conc. Tc Peak Disch. q _u	0.019 hrs 0.544 hrs	
el Time, Tt of Conc. Tc Peak Disch. q _u	0.019 hrs 0.544 hrs	
of Conc. Tc Peak Disch. q _u	0.544 hrs	
Peak Disch. q _u		Tt + Tc for Area D6.2 (pg. 77)
	400 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	5.1 inches	
Discharge, q _p	4.40 cu ft/sec	
Length, L	140	
el Time, Tt	0.019 hrs	Ref Eq. 6
of Conc. Tc	0.570 hrs	Tt + Tc for Area D6.3 (pg. 77)
		Ref. Figure 6-3 "Unit peak discharge" Use Type III
Discharge, q _p		
length 1	140	
		Ref Eq. 6
of Conc. Tc		Tt + Tc for Area D6.1 (pg. 77)
Peak Disch. q _u	555 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
ff, Q	5.1 inches	From pg. 1
Discharge, q _p	5.93 cu ft/sec	Eq. 10
w Velocitv		
ction Area, a	16 sq ft	
Discharge, qp		
Velocity	1.2053 ft/sec	
	58% of Calcu	lated Channel Flow Velocity
	Peak Disch. q _u ff, Q Discharge, q _p Length, L I Time, Tt of Conc. Tc Peak Disch. q _u ff, Q Discharge, q _p w Velocity ction Area, a Discharge, qp	Peak Disch. q_u 395 csm/inff, Q5.1 inchesDischarge, q_p 2.61 cu ft/secLength, L140I Time, Tt0.019 hrsof Conc. Tc0.213 hrsPeak Disch. q_u 555 csm/inff, Q5.1 inchesDischarge, q_p 5.93 cu ft/secw Velocity16 sq ftDischarge, qp19.29 cu ft/secVelocity1.2053 ft/sec

		MANACI	EMENT S	ERVICE	S INC	0			
Calculatio	ons For:		Made By: CJ	Date:	10/11/16	1	0	of	110
		vater Design	Checked By:	Date:	10/11/10	Job No.:		SMEPA	
		Discharge from Areas D5.		J Date.		000110		U.I.I.I.I.I	
oulouid	Area		0.65 acres	C	0.00 sq. mile	S			
Calcula	te Travei	l Time, Tt							
	Sheet F								
	Pt. 150	Flow Length, L	140 feet			Flow Length, I		0 fee	et
D5.1	to Pt.	I wo-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24 hr r		5.9	
00.1	151	Land Slope, s	0.25 ft/ft			Land Slope, s		0.04 ft/ft	
		Travel Time, Tt	0.141 hrs	Ref Eq. 8		Travel Time, 1	Гt	0.000	
	Open C	hannel Flow						1.4	
		Channel Depth, D	2 feet			1D	-		
		Channel Width, B	0 feet		1	*	R		
		X-Section Area, a	16 sq ft			< D >		4(H):1(V)	
	Pt. 151	Wetted Perimeter, pw	16.5 feet			БЛ			
		Hydraulic Radus, r	0.970 ft						
	152	-	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	140	· · ·					
		Travel Time, Tt	0.019 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.159 hrs	and a second sec	eet, Shallow	/ Concentrated	and O	pen Chanr	nel
					0				
Calcula	te Peak I	Discharge							
		I _a /P	0.095 in.						
		Time of Conc. Tc	0.159 hrs	From calculation	ations above				
	Area	Unit Peak Disch. qu	600 csm/in			k discharge" Use	Type II	1	
	D5.1	Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, q _p	3.11 cu ft/see						
		r can bischarge, qp	0.11 00 1030	o Eq. 10					
	Area	Flow Length, L	140						
	D6.2	Travel Time, Tt	0.019 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.563 hrs	•	rea D6.2 (pg	, 79)			
		Unit Peak Disch. qu				 discharge" Use 	Type II		
		Runoff, Q	5.1 inches	-	e o onicpodi	Colonargo 036	13001		
	152)		4.29 cu ft/sec						
	152)	Peak Discharge, q _p	4.25 CU 1/Sec	5 Ey. 10					
	Area	Flow Length, L	140						
	D6.3	Travel Time, Tt	0.019 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.589 hrs		rea D6.3 (pg.	79)			
		Unit Peak Disch. q _u	385 csm/in			k discharge" Use	Type II	1	
		Runoff, Q		From pg. 1		30 000			
	152)	Peak Discharge, q _p	2.55 cu ft/sec						
	152)	reak Discridige, qp	2.00 Gu 11/Set	- Eq. 10					
	Area	Flow Length, L	140						
	C6.1	Travel Time, Tt	0.019 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.232 hrs		rea D6.1 (pg.	79)			
		Unit Peak Disch. q _u	550 csm/in			discharge" Use	Type II		
	hr 191			-	5 o onic pear	Colonalye Use	i she ii	•	
	to Dt	Pupoff O	5 1 inches	From no. 1					
		Runoff, Q Peak Discharge, q₀	5.1 inches 5.87 cu ft/seo	From pg. 1					

	_			RVICES, INC				
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		Flow Length, L	140					
		Travel Time, Tt	0.019 hrs	Ref Eq. 6	70)			
		Time of Conc. Tc	0.494 hrs	Tt + Tc for Area D5.2 (pg				
		Unit Peak Disch. q _u	410 csm/in		ik discharge"	Use Typ	e III	
		Runoff, Q	5.1 inches					
	152)	Peak Discharge, q _p	3.46 cu ft/sec	5 Eq. 10				
		Flow Length, L	140					
		Travel Time, Tt	0.019 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.520 hrs	Tt + Tc for Area D5.3 (pg				
		Unit Peak Disch. q _u	395 csm/in		k discharge"	Use Type	ə III	
		Runoff, Q	5.1 inches	From pg. 1				
	152)	Peak Discharge, q _p	2.74 cu ft/sec	: Eq. 10				
Calculat	e Chanr	el Flow Velocity						
		X-Section Area, a	16 sq ft					
		Peak Discharge, qp	22.02 cu ft/sec	;				
		Peak Velocity	1.3761 ft/sec					
			67% of Calcu	lated Channel Flow Vel	locity			

Calculatio			IRON			20			
Jaiculatic	East	MANAG SMEPA Landfill	EMENT S Made By: CJ	ERVICE Date:	<u>S, INC</u> 10/11/16	Sheet No.:	82	of	110
Cublects		vater Design	Checked By:	Date:	10/11/10	Job No.:	02	SMEPA	110
		Discharge from Area D4.		Date.		J00 N0.		OWELLA	
Jaioura	Area	Discharge from Area D4.	0.91 acres		0.00 sq. mile	ie i			
Calcula		I Time, Tt	0.01 00100		0.00 Sq. mile	.0			
Calcula	Sheet F	-							
		Flow Length 1	121.75 feet			Flow Lengtl	n 1	178.25 fee	at .
	Pt. 153	Two-yr 24 hr rainfall, P2			Pt. 154	Two-yr 24 h			
	to Pt.	Land Slope, s	0.25 ft/ft		to Pt.	Land Slope		0.04 ft/f	¥
	154	Travel Time, Tt	0.126 hrs	Ref Eq. 8	155	Travel Time		0.324	
	Shallow	,Concentrated Flow	0.120 113	iter Eq. 0			, 11	0.524	
D4.2		Flow Length, L	66.75 feet						
		Watercourse slope, s	0.04 ft/ft						
		Avg. Velocity, V.	3.2 ft/sec	Ref Fig 6-	9 "Ava vel fo	r est. travel tin	e for ehe	llow	
			5.2 .3000		ed flow" - use l				
		Travel Time, Tt	0.006 hrs	Ref Eq. 6					
	Open C	Channel Flow							
		Channel Depth, D	2 feet	1		1 D	1000	/	
		Channel Width, B	0 feet		-	D	~		
		X-Section Area, a	16 sq ft			<>	<	4(H):1(V	`
	Pt. 152	Wetted Perimeter, pw	16.5 feet			В		4(1).1(*	,
		Hydraulic Radus, r	0.970 ft						
	163	Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	225						
		Travel Time, Tt	0.030 hrs	Ref Eq. 6					
	Total Ti	ravel Time	0.485 hrs	Sum of Sh	eet, Shallow	Concentrate	ed and C	pen Chanı	nel
Calcula	te Peak	Discharge from Area D4.3	3						
- alouie	Area		1.18 acres	(0.00 sq. mile	S			
Calcula	te Trave	Time, Tt							
	Sheet F	low							
		FIGURE AND A						100 E (
	Pt. 157	Flow Length, L	119.5 feet		Pt. 158	Flow Length		180.5 fee	εt
	to	Two-yr 24 hr rainfall, P ₂	4.9 inches		to Pt.	Two-yr 24 h		5.9	
	Pt.158	Land Slope, s	0.25 ft/ft		159	Land Slope,		0.04 ft/f	l I
	OF -11	Travel Time, Tt	0.124 hrs	Ref Eq. 8		Travel Time	, ιτ	0.327	
D4.3		Concentrated Flow	67 Q fact						
		Flow Length, L Watercourse slope, s	67.8 feet						
	to Pt. 160	Avg. Velocity, V.	0.04 ft/ft 3.2 ft/sec	Dof Ela C	Ave vel for	ont trouble-	o for ch-	low	
	100	Avg. velocity, v.	J.Z IVSEC		d flow" - use L	est. travel tim	e ior sna	IUW	
			0.006 hrs	Ref Eq. 6		npaveu			
		Irave lime it	0.000 115	Nor Eq. 0					
	Open C	Travel Time, Tt bannel Flow						/	
	Open C	hannel Flow	2 feet	~		T			
	Open C	hannel Flow Channel Depth, D	2 feet	1] D	K		
	Open C	hannel Flow Channel Depth, D Channel Width, B	0 feet	4		D	K		
		hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	0 feet 16 sq ft	1	-		K	4(H):1(V)	
	Pt. 152	hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	0 feet 16 sq ft 16.5 feet	1	-		K	4(H):1(V)	
	Pt. 152 to Pt.	hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r	0 feet 16 sq ft 16.5 feet 0.970 ft	1	ŀ	↓D ←B→	K	4(H):1(V)	
	Pt. 152	hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft	Ref Eq. 9	-	↓	K	[∼] 4(H):1(V)	
	Pt. 152 to Pt.	hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft 2.065 ft/sec	Ref Eq. 9	Ť	↓ ← B→	K	[∼] 4(H):1(V)	
	Pt. 152 to Pt.	hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	0 feet 16 sq ft 16.5 feet 0.970 ft 0.005 ft/ft	Ref Eq. 9 Ref Eq. 6	-	↓ ← B→	K	[∼] 4(H):1(V)	

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			EMENT SI			1			
Calculatio		SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	83	of	110
Subject:		ater Design	Checked By:	Date;		Job No.:		SMEPA	_
Calcula		Discharge from Area D4.4			0.00				
	Area	77	0.84 acres		0.00 sq. mile	es			
Calcula		Time, Tt							
	Sheet F	Flow Length, L	49.6 feet			Flow Long	ath 1	245 fe	ot
	Pt. 161	Two-yr 24 hr rainfall, P ₂	4.9 inches		Pt. 157	, Flow Leng Two-yr 24			CL
D4.4	to Pt.	Land Slope, s	0.1 ft/ft		to Pt.	Land Slop		0.04 ft/	· F1
	157	Travel Time, Tt	0.088 hrs	Ref Eq. 8	162	Travel Tin		0.417	n.
	Open C	hannel Flow	0.000 113	Rei Ly. o		Traver Till	110, 11	0.417	
	Openio	Channel Depth, D	2 feet	-	_	1		/	
		Channel Width, B	0 feet			D	K		
		X-Section Area, a	16 sq ft				3	4/10.40	0
	Pt. 152	Wetted Perimeter, pw	16.5 feet			B		4(H):1(\	()
		Hydraulic Radus, r	0.970 ft						
		Channel Slope	0.005 ft/ft						
		Velocity, V	2.065 ft/sec	Ref Eq. 9					
		Flow Length, L	225						
		Travel Time, Tt	0.030 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.536 hrs		heet, Shallov	v Concentra	ated and	Open Char	nel
								•	
Calcula	te Peak I	Discharge							
		l _a /P	0.095 in.						
	Δ	Time of Conc. Tc	0.485 hrs	From calcu	lations above				
	Area	Unit Peak Disch. q _u	40 csm/in	Ref. Figure	6-3 "Unit pea	k discharge"	Use Type	111	
	D4.2	Runoff, Q	5.1 inches	From pg. 1		-			
		Peak Discharge, q _p	0.2901 cu ft/sec	Eq. 10					
		I _a /P	0.095 in.						
	A === =	Time of Conc. Tc	0.487 hrs	From calcu	lations above				
	Area	Unit Peak Disch. q _u	410 csm/in	Ref. Figure	6-3 "Unit pea	k discharge"	Use Type	111	
	D4.3	Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, q _p	3.86 cu ft/sec						
		- 'F							
		I _a /P	0.095 in.						
	A .	Time of Conc. Tc	0.536 hrs	From calcu	lations above				
	Area	Unit Peak Disch. q _u	400 csm/in	Ref. Figure	6-3 "Unit pea	k discharge"	Use Type	10	
	D4.4	Runoff, Q	5.1 inches	From pg. 1					
		Peak Discharge, qp	2.68 cu ft/sec	• =					
		ער י-ט		•					
	Area	Flow Length, L	225						
	D6.2	Travel Time, Tt	0.030 hrs	Ref Eq. 6					
	(from	Time of Conc. Tc	0.593 hrs		Area D6.2 (pg	. 80)			
	•	Unit Peak Disch. q _u	390 csm/in	Ref. Figure	6-3 "Unit pea	k discharge"	Use Type	111	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1	•	-			
	163)	Peak Discharge, q _p	4.29 cu ft/sec	, =					
	·	- 1							
		Flow Length, L	225						
		Travel Time, Tt	0.030 hrs	Ref Eq. 6					
	(Time of Conc. Tc	0.619 hrs		Area D6.3 (pg				
		Unit Peak Disch. q _u	380 csm/in	-	6-3 "Unit pea	k discharge"	Use Type	111	
		Runoff, Q	5.1 inches	From pg. 1					
	163)	Peak Discharge, q _p	2.51 cu ft/sec	; Eq. 10					
	MANA	GEMENT S	ERVICES, IN	c. 🔍					
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alculations For:	SMEPA Landfill	Made By: C.	J Date: 10/11/16	Sheet No.:	84	of	110		
ubject: Storn	nwater Design	Checked By:	Date:	Job No.:		SMEPA			
ubject: Storm Area D6. (fror pt. 1! to P 163 Area D5.2 (fror pt. 1! to P 163 Area D5.3 (fron pt. 1! to P! 163 Area D5.3 (fron pt. 1! to P! 163 Area D5.4 (fron pt. 1! to P! 163 Area D5.1 (fron pt. 1! to P! 163 Area D5.1 (fron pt. 1! pt. 1! 163	 Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q 	Checked By: 225 0.030 hrs 0.262 hrs 515 csm/in 5.11 inches 5.50 cu ft/se 225 0.030 hrs 0.524 hrs 400 csm/in 5.1 inches 3.38 cu ft/se 225 0.030 hrs 0.524 hrs 400 csm/in 5.1 inches 3.38 cu ft/se 225 0.030 hrs 0.550 hrs 395 csm/in 5.1 inches 2.74 cu ft/se 225 0.030 hrs 0.190 hrs 575 csm/in 5.1 inches 2.98 cu ft/se 16 sq ft 28.22 cu ft/se 1.7637 ft/sec	Date: Ref Eq. 6 Tt + Tc for Area D6.1 (p Ref. Figure 6-3 "Unit per From pg. 1 Bc Eq. 6 Tt + Tc for Area D5.2 (pr Ref. Figure 6-3 "Unit per From pg. 1 Bc Eq. 6 Tt + Tc for Area D5.2 (pr Ref. Figure 6-3 "Unit per From pg. 1 Bc Eq. 6 Tt + Tc for Area D5.3 (pr Ref. Figure 6-3 "Unit per From pg. 1 Bc Eq. 6 Tt + Tc for Area D5.3 (pr Ref. Figure 6-3 "Unit per From pg. 1 Bc Eq. 6 Tt + Tc for Area D5.1 (pr Ref. Figure 6-3 "Unit per From pg. 1 C Eq. 10	Job No.: g. 80) ak discharge" U g. 81) ak discharge" Us g. 81) ak discharge" Us	se Type II se Type II	I I			

-		MANAG	EMENT S	ERVICES, INC		
Calculatio	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 85	of 110
		ater Design	Checked By:	Date:	Job No.:	SMEPA
Calcula	te Peak I	Discharge from Areas D4				
	Area		1.22 acres	0.00 sq. mil	es	
Calcula		Time, Tt				
	Sheet F		175.5.1			0 feet
	Pt. 164	Flow Length, L	175 feet		Flow Length, L	
D4.1	to Pt.	Two-yr 24 hr rainfall, P ₂	4.9 inches		Two-yr 24 hr rainfal	
	163	Land Slope, s	0.25 ft/ft		Land Slope, s Travel Time, Tt	0.04 ft/ft
	0.000	Travel Time, Tt	0.168 hrs	Ref Eq. 8	Traver Time, Tt	0.000
	Open C	hannel Flow Channel Depth, D	2 feet	~	*	/
		Channel Width, B	2 feet		D	
		X-Section Area, a	20 sq ft		E J Z	400.400
	Pt 163	Wetted Perimeter, p _w	18.5 feet		B	4(H):1(V)
		Hydraulic Radus, r	1.082 ft			
		Channel Slope	0.005 ft/ft			
		Velocity, V	2.220 ft/sec	Ref Eq. 9		
		Flow Length, L	225			
		Travel Time, Tt	0.028 hrs	Ref Eq. 6		
	Total Tr	avel Time	0.196 hrs	Sum of Sheet, Shallo	w Concentrated and (Open Channel
Calculat	te Peak [Discharge				
		l _a /P	0.095 in.			
	A	Time of Conc. Tc	0.196 hrs	From calculations above		
	Area	Unit Peak Disch. qu	560 csm/in	Ref. Figure 6-3 "Unit pea	ak discharge" Use Type	Ш
	D4.1	Runoff, Q	5.1 inches	From pg. 1		
		Peak Discharge, qp	5.44 cu ft/se	c Eq. 10		
	Area	Flow Length, L	225			
	D6.2	Travel Time, Tt	0.028 hrs	Ref Eq. 6		
	(from	Time of Conc. Tc	0.621 hrs	Tt + Tc for Area D6.2 (pg	j. 83)	
	pt. 163	Unit Peak Disch. q _u	370 csm/in	Ref. Figure 6-3 "Unit pea	ak discharge" Use Type	10
		Runoff, Q	5.1 inches			
	165)	Peak Discharge, q _p	4.07 cu ft/see	c Eq. 10		
	Area	Flow Length, L	225			
		Travel Time, Tt	0.028 hrs	Ref Eq. 6		
		Time of Conc. Tc	0.647 hrs	Tt + Tc for Area D6.3 (pg		
		Unit Peak Disch. q _u	365 csm/in	Ref. Figure 6-3 "Unit pea	ik discharge" Use Type	III
		Runoff, Q	5.1 inches	. –		
	165)	Peak Discharge, q _p	2.41 cu ft/sec	c Eq. 10		
	Area	Flow Length, L	225			
	D6.1	Travel Time, Tt	0.028 hrs	Ref Eq. 6		
	,	Time of Conc. Tc	0.290 hrs	Tt + Tc for Area D6.1 (pg		
	pt. 163	Unit Peak Disch. q _u	500 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type	11
		Runoff, Q Peak Discharge, q₀	5.1 inches 5.34 cu ft/seo	From pg. 1		

		MANAC	IEMENI SI	ERVICES, INC				_
Calculatio	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	86	of	110
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		Flow Length, L	225					
		Travel Time, Tt	0.028 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.553 hrs	Tt + Tc for Area D5.2 (pg.				
		Unit Peak Disch. q _u	395 csm/in	Ref. Figure 6-3 "Unit peal	< discharge" U	se Type		
		Runoff, Q	5.1 inches	From pg. 1				
	165)	Peak Discharge, q _p	3.34 cu ft/sec	c Eq. 10				
	Area	Flow Length, L	225					
		Travel Time, Tt	0.028 hrs	Ref Eq. 6				
	· ·	Time of Conc. Tc	0.579 hrs	Tt + Tc for Area D5.3 (pg.				
	•	Unit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Type I	II.	
		Runoff, Q	5.1 inches	From pg. 1				
	165)	Peak Discharge, q _p	2.70 cu ft/sec	: Eq. 10				
	Area	Flow Length, L	225					
	D5.1	Travel Time, Tt	0.028 hrs	Ref Eq. 6				
	· ·	Time of Conc. Tc	0.218 hrs	Tt + Tc for Area D5.1 (pg.	84)			
	pt. 163	Unit Peak Disch. q _u	555 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Туре I	11	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	165)	Peak Discharge, q _p	2.87 cu ft/sec	; Eq. 10				
	Area	Flow Length, L	225					
		Travel Time, Tt	0.028 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.513 hrs	Tt + Tc for Area D4.2 (pg.	83)			
	pt. 163	Unit Peak Disch. q _u	405 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	se Туре I	1	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	165)	Peak Discharge, q _p	2.94 cu ft/sec	: Eq. 10				
	Area	Flow Length, L	225					
	D4.3	Travel Time, Tt	0.028 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.515 hrs	Tt + Tc for Area D4.3 (pg.	83)			
	pt. 163	Unit Peak Disch. q _u	405 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	e Type II	1	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	165)	Peak Discharge, q _p	3.81 cu ft/sec	Eq. 10				
	Area	Flow Length, L	225					
		Travel Time, Tt	0.028 hrs	Ref Eq. 6				
	(Time of Conc. Tc	0.564 hrs	Tt + Tc for Area D4.3 (pg.	83)			
		Unit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	e Type II	t	
		Runoff, Q	5.1 inches	From pg. 1				
	165)	Peak Discharge, q _p	3.67 cu ft/sec	Eq. 10				
Calculat	e Chann	el Flow Velocity						
		X-Section Area, a	20 sq ft					
		Peak Discharge, qp	36.59 cu ft/sec					
		Peak Velocity	1.8297 ft/sec					
			82% of Calcul	ated Channel Flow Velo	citv			

			EMENT S		S INC	二(2)			
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		Discharge from Area D3.							
	Area	5	1.15 acres	C	.00 sq. mile	s			
Calcula	ate Trave	l Time, Tt							
	Sheet F	Flow							
	Pt. 153	Flow Length, L	121.75 feet		Pt. 154	Flow Leng	th, L	178.25 fe	et
	to Pt. 153	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt.	Two-yr 24	hr rainfal	5.9	
	154	Land Slope, s	0.25 ft/ft		166	Land Slop	e, s	0.04 ft/1	ft
	134	Travel Time, Tt	0.126 hrs	Ref Eq. 8	100	Travel Tim	ne, Tt	0.324	
D3.2		v,Concentrated Flow							
20.2		Flow Length, L	66.75 feet						
		Watercourse slope, s	0.04 ft/ft						
	167	Avg. Velocity, V.	3.2 ft/sec	-	} "Avg. vel. fo d flow" - use		ime for sha	llow	
		Travel Time, Tt	0.006 hrs	Ref Eq. 6					
	Open C	Channel Flow							
		Channel Depth, D	2 feet			1 D	-	/	
		Channel Width, B	3 feet		1	+	K		
		X-Section Area, a	22 sq ft			< B >		4(H):1(V)
		Wetted Perimeter, pw	19.5 feet			В			·
		Hydraulic Radus, r	1.129 ft						
	172	Channel Slope	0.005 ft/ft						
		Velocity, V	2.284 ft/sec	Ref Eq. 9					
		Flow Length, L	200						
		Travel Time, Tt	0.024 hrs	Ref Eq. 6		-			
	Total Ti	ravel Time	0.479 hrs	JSum of Sh	eet, Shallow	Concentra	ited and C	pen Chan	nel
Calcula	ite Peak	Discharge from Area D3.3							
	Area		1.43 acres	0	.00 sq. mile	S			
Calcula	te Trave	l Time, Tt							
	Sheet F								
	D4 457	Flow Length, L	119.5 feet		Pt. 158	Flow Lengt	th, L	180.5 fee	et
	Pt. 157	Two-yr 24 hr rainfall, P2	4.9 inches		to Pt. 158	Two-yr 24	hr rainfal	5.9	
	to Pt.158	Land Clans a	0.25 ft/ft		168	Land Slope	e, s	0.04 ft/f	ť
	FU130	Travel Time, Tt	0.124 hrs	Ref Eq. 8	100	Travel Tim	e, Tt	0.327	
		,Concentrated Flow							
D2 2		Flow Length, L	70.9 feet						
D3.3		Watercourse slope, s	0.04 ft/ft						
D3.3					"Avg. vel. for	est. travel ti	me for shal	llow	
D3.3		Avg. Velocity, V.	3.2 ft/sec		d flow" - use l	Jnpaved			
D3.3		Avg. Velocity, V. Travel Time, Tt	3.2 ft/sec 0.006 hrs			Jnpaved			
D3.3	169			concentrate		Jnpaved			
D3.3	169	Travel Time, Tt		concentrate		*		/	
D3.3	169	Travel Time, Tt thannel Flow	0.006 hrs	concentrate		Jnpaved	K	/	
D3.3	169	Travel Time, Tt hannel Flow Channel Depth, D	0.006 hrs 2 feet	concentrate			K	4(H):1(V)
D3.3	169 Open C	Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B	0.006 hrs 2 feet 3 feet	concentrate		*	K	4(H):1(V)
D3.3	169 Open C Pt. 165 to Pt.	Travel Time, Tt Channel Flow Channel Depth, D Channel Width, B X-Section Area, a	0.006 hrs 2 feet 3 feet 22 sq ft	concentrate			K	4(H):1(V)
D3.3	169 Open C Pt. 165	Travel Time, Tt channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	0.006 hrs 2 feet 3 feet 22 sq ft 19.5 feet	concentrate			K	4(H):1(V)
D3.3	169 Open C Pt. 165 to Pt.	Travel Time, Tt channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	0.006 hrs 2 feet 3 feet 22 sq ft 19.5 feet 1.129 ft 0.005 ft/ft 2.284 ft/sec	concentrate			K	4(H):1(V)
D3.3	169 Open C Pt. 165 to Pt.	Travel Time, Tt channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V Flow Length, L	0.006 hrs 2 feet 3 feet 22 sq ft 19.5 feet 1.129 ft 0.005 ft/ft 2.284 ft/sec 200	concentrated Ref Eq. 6			K	4(H):1(V)
D3.3	169 Open C Pt. 165 to Pt. 172	Travel Time, Tt channel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	0.006 hrs 2 feet 3 feet 22 sq ft 19.5 feet 1.129 ft 0.005 ft/ft 2.284 ft/sec	concentrated Ref Eq. 6 Ref Eq. 9 Ref Eq. 6			K		

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

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-			EMENT S			1	00		
Calculatio		SMEPA Landfill	Made By: CJ	Date:	10/11/16	Sheet No.:	88	of	110
		/ater Design	Checked By:	Date:		Job No.:		SMEPA	_
Calcula		Discharge from Area D3.		0	00				
0	Area	I Time Th	0.45 acres	0.	00 sq. mile	95			
Calcula		I Time, Tt							
	Sheet F		49.6 feet			FlowLong	th I	250.4 fee	of
	Pt. 161	Flow Length, L			Pt. 157	Flow Leng			51
	to Pt.	Two-yr 24 hr rainfall, P2			to Pt.	Two-yr 24		0.04 ft/i	F4
	157	Land Slope, s	0.1 ft/ft		170	Land Slop			IL.
	Challau	Travel Time, Tt	0.088 hrs	Ref Eq. 8		Travel Tim	ie, n	0.425	
D3.4		,Concentrated Flow	11.2 foot						
		Flow Length, L	11.3 feet 0.04 ft/ft						
		Watercourse slope, s		Dof Fig 6.0	"Ave unl 4-	r oot trouble	imo for et -	llow	
	171	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-9	-		ime tor sna	WOII	
		Travel Time, Tt	0.001 hrs	concentrated	now - use	unpaved			
	Open C		0.001 115	Ref Eq. 6					
	Open C	Channel Flow Channel Depth, D	2 feet	~		*		/	
		Channel Width, B	3 feet		1	D	K		
		X-Section Area, a	22 sq ft			*	2		
	D4 405					< B →		4(H):1(V	')
		Wetted Perimeter, p _w	19.5 feet						
		Hydraulic Radus, r	1.129 ft						
	1/2	Channel Slope	0.005 ft/ft						
		Velocity, V	2.284 ft/sec 200	Ref Eq. 9					
		Flow Length, L	0.024 hrs	Def Ea 6					
			111124 058						
	Total T	Travel Time, Tt		Ref Eq. 6	of Shallow	Concontra	atod and C)non Chan	nol
	Total Tr	ravel Time	0.538 hrs	Sum of She	et, Shallov	v Concentra	ated and C	pen Chan	nel
Calcula		ravel Time			eet, Shallov	v Concentra	ated and C)pen Chan	nel
Calcula		ravel Time Discharge	0.538 hrs		eet, Shallov	v Concentra	ated and C)pen Chan	nel
Calcula		ravel Time Discharge I _a /P	0.538 hrs 0.095 in.	Sum of She		v Concentra	ated and C)pen Chan	nel
Calcula		ravel Time Discharge I _a /P Time of Conc. Tc	0.538 hrs 0.095 in. 0.479 hrs	Sum of She	tions above				nel
Calcula	ite Peak	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in	Sum of She From calcula Ref. Figure 6	tions above				nel
Calcula	te Peak Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches	Sum of She From calcula Ref. Figure 6 From pg. 1	tions above				nel
Calcula	te Peak Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in	Sum of She From calcula Ref. Figure 6 From pg. 1	tions above				nel
Calcula	te Peak Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se	Sum of She From calcula Ref. Figure 6 From pg. 1	tions above				nel
Calcula	te Peak Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in.	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10	tions above -3 "Unit pea				nel
Calcula	te Peak Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula	tions above -3 "Unit pea tions above	k discharge"	Use Type I	II	nel
Calcula	te Peak Area D3.2	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6	tions above -3 "Unit pea tions above	k discharge"	Use Type I	II	nel
Calcula	te Peak Area D3.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1	tions above -3 "Unit pea tions above	k discharge"	Use Type I	II	nel
Calcula	te Peak Area D3.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1	tions above -3 "Unit pea tions above	k discharge"	Use Type I	II	nel
Calcula	te Peak Area D3.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1	tions above -3 "Unit pea tions above	k discharge"	Use Type I	II	nel
Calcula	te Peak Area D3.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in.	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10	tions above -3 "Unit pea tions above -3 "Unit pea	k discharge"	Use Type I	II	nel
Calcula	te Peak Area D3.2 Area	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula	tions above -3 "Unit pea tions above -3 "Unit pea tions above	k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6	tions above -3 "Unit pea tions above -3 "Unit pea tions above	k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in 5.1 inches	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1	tions above -3 "Unit pea tions above -3 "Unit pea tions above	k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1	tions above -3 "Unit pea tions above -3 "Unit pea tions above	k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3 Area D3.4	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in 5.1 inches 1.43 cu ft/se	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1	tions above -3 "Unit pea tions above -3 "Unit pea tions above	k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3 Area D3.4	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in 5.1 inches 1.43 cu ft/se 200	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10	tions above -3 "Unit pea tions above -3 "Unit pea tions above	k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3 Area D3.4 Area D3.4	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in 5.1 inches 1.43 cu ft/se 200 0.024 hrs	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 Ref Eq. 6	tions above -3 "Unit pea tions above -3 "Unit pea tions above -3 "Unit pea	k discharge" k discharge" k discharge"	Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3 Area D3.4 Area D6.2 (from	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in 5.1 inches 1.43 cu ft/se 200 0.024 hrs 0.646 hrs	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Ar	tions above -3 "Unit pea tions above -3 "Unit pea tions above -3 "Unit pea	k discharge" k discharge" k discharge"	Use Type I Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3 Area D3.4 Area D3.4 Area D6.2 (from pt. 165	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in 5.1 inches 1.43 cu ft/se 200 0.024 hrs	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 Ref Eq. 6	tions above -3 "Unit pea tions above -3 "Unit pea tions above -3 "Unit pea	k discharge" k discharge" k discharge"	Use Type I Use Type I Use Type I	11	nel
Calcula	Area D3.2 Area D3.3 Area D3.4 Area D3.4 Area D6.2 (from pt. 165	ravel Time Discharge I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p I _a /P Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.538 hrs 0.095 in. 0.479 hrs 410 csm/in 5.1 inches 3.7573 cu ft/se 0.095 in. 0.481 hrs 410 csm/in 5.1 inches 4.67 cu ft/se 0.095 in. 0.538 hrs 400 csm/in 5.1 inches 1.43 cu ft/se 200 0.024 hrs 0.646 hrs	Sum of She From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 From calcula Ref. Figure 6 From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Ar	tions above -3 "Unit pea tions above -3 "Unit pea tions above -3 "Unit pea	k discharge" k discharge" k discharge"	Use Type I Use Type I Use Type I	11	nel

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alculation	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	89	of	110
ubject:	Stormw	ater Design	Checked By:	Date:	Job No.:		SMEPA	
	Area	Flow Length, L	200					
		Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.671 hrs	Tt + Tc for Area D6.3 (pg.	85)			
	pt. 165	Unit Peak Disch. q _u	360 csm/in	Ref. Figure 6-3 "Unit peal	discharge" U	se Туре	III	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	172)	Peak Discharge, q _p	2.38 cu ft/se	c Eq. 10				
	Area	Flow Length, L	200					
	D6.1	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.314 hrs	Tt + Tc for Area D6.1 (pg.				
	•	Unit Peak Disch. q _u	495 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Type I	111	
		Runoff, Q	5.1 inches	From pg. 1				
	172)	Peak Discharge, q _p	5.29 cu ft/sec	c Eq. 10				
	Area	Flow Length, L	200					
	D5.2	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.577 hrs	Tt + Tc for Area D5.2 (pg.	86)			
	pt. 165	Unit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	se Type I	[]]	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	172)	Peak Discharge, q _p	3.29 cu ft/sec	5 Eq. 10				
	Area	Flow Length, L	200					
	D5.3	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.603 hrs	Tt + Tc for Area D5.3 (pg.	86)			
	•	Unit Peak Disch. q _u		Ref. Figure 6-3 "Unit peak	discharge" Us	se Type I	11	
		Runoff, Q	5.1 inches					
	172)	Peak Discharge, q _p	2.67 cu ft/sec	c Eq. 10				
		Flow Length, L	200					
		Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	•	Time of Conc. Tc	0.242 hrs	Tt + Tc for Area D5.1 (pg.				
		Unit Peak Disch. q _u		Ref. Figure 6-3 "Unit peak	discharge" Us	e Type I	H	
		Runoff, Q	5.1 inches					
	172)	Peak Discharge, q _p	2.80 cu ft/sec	: Eq. 10				
	Area	Flow Length, L	200					
		Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	(Time of Conc. Tc	0.538 hrs	Tt + Tc for Area D4.2 (pg.	86)			
		Unit Peak Disch. q _u	400 csm/in		discharge" Us	e Type II	11	
		Runoff, Q	5.1 inches	· -				
	172)	Peak Discharge, q _p	2.90 cu ft/sec	; Eq. 10				
	Area	Flow Length, L	200					
	D4.3	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.539 hrs	Tt + Tc for Area D4.3 (pg.	86)			
	pt. 165	Unit Peak Disch. q _u	400 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	e Type II	ll	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				

Area D4.4 (from ot. 165 to Pt. 172) Area D4.1 (from ot. 165 to Pt.	SMEPA Landfill ater Design Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	Made By: CJ Checked By: 200 0.024 hrs 0.588 hrs 385 csm/in 5.1 inches 3.62 cu ft/sec 200 0.024 hrs	Eq. 10	Job No.:	90 se Type	of SMEPA	110
Area D4.4 (from ot. 165 to Pt. 172) Area D4.1 (from ot. 165 to Pt.	Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	200 0.024 hrs 0.588 hrs 385 csm/in 5.1 inches 3.62 cu ft/sec 200 0.024 hrs	Ref Eq. 6 Tt + Tc for Area D4.4 (pg Ref. Figure 6-3 "Unit pea From pg. 1 Eq. 10	. 86)	se Туре		
D4.4 (from ot. 165 to Pt. 172) Area D4.1 (from ot. 165 to Pt.	Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.024 hrs 0.588 hrs 385 csm/in 5.1 inches 3.62 cu ft/sec 200 0.024 hrs	Tt + Tc for Area D4.4 (pg Ref. Figure 6-3 "Unit pea From pg. 1 Eq. 10		se Туре	111	
(from ot. 165 to Pt. 172) Area D4.1 (from ot. 165 to Pt.	Time of Conc. Tc Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	0.588 hrs 385 csm/in 5.1 inches 3.62 cu ft/sec 200 0.024 hrs	Tt + Tc for Area D4.4 (pg Ref. Figure 6-3 "Unit pea From pg. 1 Eq. 10		зе Туре	111	
Area D4.1 (from ot. 165 to Pt.	Unit Peak Disch. q _u Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	385 csm/in 5.1 inches 3.62 cu ft/sec 200 0.024 hrs	Ref. Figure 6-3 "Unit pea From pg. 1 Eq. 10		se Туре	111	
to Pt. 172) Area D4.1 (from ot. 165 to Pt.	Runoff, Q Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	5.1 inches 3.62 cu ft/sec 200 0.024 hrs	From pg. 1 Eq. 10	k discharge Os	se Type		
172) Area D4.1 (from ot. 165 to Pt.	Peak Discharge, q _p Flow Length, L Travel Time, Tt Time of Conc. Tc	3.62 cu ft/sec 200 0.024 hrs	Eq. 10				
Area D4.1 (from ot. 165 to Pt.	Flow Length, L Travel Time, Tt Time of Conc. Tc	200 0.024 hrs					
D4.1 (from ot. 165 to Pt.	Travel Time, Tt Time of Conc. Tc	0.024 hrs					
(from ot. 165 to Pt.	Time of Conc. Tc						
ot. 165 to Pt.			Ref Eq. 6	95)			
to Pt.		0.221 hrs	Tt + Tc for Area D4.1 (pg		- Tu	m	
	Unit Peak Disch. q _u	550 csm/in 5.1 inches	Ref. Figure 6-3 "Unit peak From pg. 1	k uischarge" Us	ье туре	111	
1721	Peak Discharge, q _p	5.35 cu ft/sec					
		5.55 CU 1/580	ц. то				
		22 og ft					
	r car velocity		lated Channel Flow Vel	ocitv			
		Channel Flow Velocity X-Section Area, a Peak Discharge, qp Peak Velocity	X-Section Area, a22 sq ftPeak Discharge, qp45.93 cu ft/secPeak Velocity2.0879 ft/sec	X-Section Area, a22 sq ftPeak Discharge, qp45.93 cu ft/secPeak Velocity2.0879 ft/sec	X-Section Area, a 22 sq ft Peak Discharge, qp 45.93 cu ft/sec	X-Section Area, a22 sq ftPeak Discharge, qp45.93 cu ft/secPeak Velocity2.0879 ft/sec	X-Section Area, a22 sq ftPeak Discharge, qp45.93 cu ft/secPeak Velocity2.0879 ft/sec

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

		MANAGI	MENT SE	ERVICES, INC	V	
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 91	of 110
Subject:	Stormw	ater Design	Checked By:	Date:	Job No.:	SMEPA
		Discharge from Areas D3.	and the second sec			
	Area		0.98 acres	0.00 sq. mile	es	
Calcula	te Trave	Time, Tt				
	Sheet F	low				
	Pt. 173	Flow Length, L	150 feet		Flow Length, L	0 feet
D2 4		Two-yr 24 hr rainfall, P2	4.9 inches		Two-yr 24 hr rainfal	5.9
D3.1	to Pt.	Land Slope, s	0.25 ft/ft		Land Slope, s	0.04 ft/ft
	172	Travel Time, Tt	0.149 hrs	Ref Eq. 8	Travel Time, Tt	0.000
	Open C	hannel Flow		200	Sec. 1	
		Channel Depth, D	2 feet	1	ÎD	
		Channel Width, B	4 feet		V S	
		X-Section Area, a	24 sq ft		< . >	4(H):1(V)
	Pt. 172	Wetted Perimeter, pw	20.5 feet		В	······································
		Hydraulic Radus, r	1.171 ft			
		Channel Slope	0.005 ft/ft			
		Velocity, V	2.341 ft/sec	Ref Eq. 9		
		Flow Length, L	200			
		Travel Time, Tt	0.024 hrs	Ref Eq. 6		
	Total T	ravel Time	0.172 hrs	Sum of Sheet, Shallov	v Concentrated and (Open Channel
Calcula	te Peak	Discharge				
- Li contra		I _a /P	0.095 in.			
		Time of Conc. Tc	0.172 hrs	From calculations above		
	Area	Unit Peak Disch. q _u	590 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type	
	D3.1	Runoff, Q	5.1 inches	From pg. 1	. aloonargo ooo rypo	
		Peak Discharge, q _p	4.61 cu ft/sec	seq. IV		
	Area	Flow Length, L	200			
	D6.2	Travel Time, Tt	0.024 hrs	Ref Eq. 6		
	(from	Time of Conc. Tc	0.669 hrs	Tt + Tc for Area D6.2 (pg	. 88)	
	•	Unit Peak Disch. q _u	360 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type	III
		Runoff, Q	5.1 inches	-	_ ,	
		Peak Discharge, q _p	3.96 cu ft/sec			
	,	U i v ip				
	Area	Flow Length, L	200			
	D6.3	Travel Time, Tt	0.024 hrs	Ref Eq. 6		
	(from	Time of Conc. Tc	0.695 hrs	Tt + Tc for Area D6.3 (pg	. 89)	
		Unit Peak Disch. q _u	355 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type	111
		Runoff, Q	5.1 inches	From pg. 1		
	174)		2.35 cu ft/sec			
		Flow Longth	200			
	Area	Flow Length, L		Dof Eq. 6		
	D6.1	Travel Time, Tt	0.024 hrs	Ref Eq. 6	90)	
	(Time of Conc. Tc	0.338 hrs	Tt + Tc for Area D6.1 (pg		
	pt. 172	Unit Peak Disch. qu	475 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type	111
	to Pt. 174)	Runoff, Q Peak Discharge, q₀	5.1 inches 5.07 cu ft/sec	From pg. 1		

		MANAC	CEMENT C	ERVICES, INC	0			
Calculation	ns For:	SMEPA Landfill	Made By: CJ		Sheet No.:	92	of	110
		ater Design	Checked By:	Date:	Job No.:		SMEPA	
Jubject		Flow Length, L	200		000 1101.		OMELTIC	-
		Travel Time, Tt	0.024 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.601 hrs	Tt + Tc for Area D5.2 (pg.	89)			
	•	Unit Peak Disch. q	380 csm/in		-	Use Type	IN	
		Runoff, Q	5.1 inches		caloonargo	000 1300		
		Peak Discharge, q _p	3.21 cu ft/set					
	,	r our bioonargo, qp	0.21 00 1000	5 Eq. 10				
	Area	Flow Length, L	200					
	D5.3	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.627 hrs	Tt + Tc for Area D5.3 (pg.	89)			
		Unit Peak Disch. q _u	370 csm/in			Use Type	11	
		Runoff, Q	5.1 inches	- ,	0-	71 -		
		Peak Discharge, qp	2.57 cu ft/sec					
		- "						
	Area	Flow Length, L	200					
	D5.1	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.266 hrs	Tt + Tc for Area D5.1 (pg.	89)			
		Unit Peak Disch. q _u	515 csm/in	Ref. Figure 6-3 "Unit peak	discharge"	Use Type		
		Runoff, Q	5.1 inches	From pg. 1				
	174)	Peak Discharge, q _p	2.67 cu ft/sec	C Eq. 10				
	A === =	Flow Length, L	200					
		Travel Time, Tt	0.024 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.562 hrs	Tt + Tc for Area D4.2 (pg.	80)			
	`	Unit Peak Disch. qu	390 csm/in					
		Runoff, Q	5.1 inches		uischarge	use Type I		
		Peak Discharge, qp	2.83 cu ft/sec					
	17-17	reak Discharge, qp	2.03 CU 10360	, Eq. 10				
	Area	Flow Length, L	200					
	D4.3	Travel Time, Tt	0.024 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.563 hrs	Tt + Tc for Area D4.3 (pg.	89)			
		Unit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit peak		Use Type i	11	
	to Pt.	Runoff, Q	5.1 inches		-			
	174)	Peak Discharge, q _p	3.67 cu ft/sec	: Eq. 10				
			000					
		Flow Length, L	200	Dof For C				
		Travel Time, Tt	0.024 hrs	Ref Eq. 6	00)			
	`	Time of Conc. Tc	0.612 hrs	Tt + Tc for Area D4.3 (pg.				
		Unit Peak Disch. q _u	375 csm/in	- ,	aischarge"	use iype i	11	
		Runoff, Q	5.1 inches					
	174)	Peak Discharge, q _p	3.53 cu ft/sec	; ⊏q. 10				
	Area	Flow Length, L	200					
		Travel Time, Tt	0.024 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.244 hrs	Tt + Tc for Area D4.1 (pg.	90)			
	`	Unit Peak Disch. qu	540 csm/in	Ref. Figure 6-3 "Unit peak		Jse Type II	II III	
		Runoff, Q	5.1 inches	From pg. 1				
		Peak Discharge, q _p	5.25 cu ft/sec					

Are D3 (fro pt. 1 to F 17- Are D3 (fro pt. 1 to F 17- Are D3 (fro pt. 1 to F 17- 17-	SMEPA Landfill nwater Design a Flow Length, L 2 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q _u t. Runoff, Q) Peak Discharge, q _p a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q _u t. Runoff, Q) Peak Discharge, q _p a Flow Length, L	Made By: CJ Checked By: 200 0.024 hrs 0.503 hrs 405 csm/in 5.1 inches 3.71 cu ft/set 200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 3.71 cu ft/set 200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/set 200 0.024 hrs 3.51 inches 4.62 cu ft/set 200 0.024 hrs 3.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/set 2.4 sq ft 49.43 cu ft/set 24 sq ft	Ref Eq. 6 Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	i Sheet No.: 9: Job No.: g. 89) ak discharge" Use g. 89) ak discharge" Use	SMEPA	110
Are D3 (fro pt. 1 to F 17- Are D3 (fro pt. 1 to F 17- Are D3 (fro pt. 1 to F 17- 17-	 a Flow Length, L 2 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Discharge, qp a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Discharge, qp a numel Flow Velocity X-Section Area, a Peak Discharge, qp 	Checked By: 200 0.024 hrs 0.503 hrs 405 csm/in 5.1 inches 3.71 cu ft/set 200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/set 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/set	Date: Ref Eq. 6 Tt + Tc for Area D3.2 (p Ref. Figure 6-3 "Unit pe From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	Job No.: g. 89) ak discharge" Use g. 89) ak discharge" Use g. 89)	SMEPA	
Are D3 (fro pt. 1 to F 17- Are D3 (fro pt. 1 to F 17- Are D3 (fro pt. 1 to F 17- 17-	 a Flow Length, L 2 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Discharge, qp a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Discharge, qp a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Discharge, qp a Flow Discharge, qp a nnel Flow Velocity X-Section Area, a Peak Discharge, qp 	200 0.024 hrs 0.503 hrs 405 csm/in 5.1 inches 3.71 cu ft/sed 200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/sed 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sed	Ref Eq. 6 Tt + Tc for Area D3.2 (p Ref. Figure 6-3 "Unit pe From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	g. 89) ak discharge" Use g. 89) ak discharge" Use g. 89)	e Type III e Type III	
D3 (fro pt. 1 to F 17- D3 (fro pt. 1 to F 17- Are D3 (fro pt. 1 to F 17- 17-	 2 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a multi Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p annel Flow Velocity X-Section Area, a Peak Discharge, qp 	0.503 hrs 405 csm/in 5.1 inches 3.71 cu ft/sec 200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/sec 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	Tt + Tc for Area D3.2 (p Ref. Figure 6-3 "Unit pe From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	ak discharge" Use g. 89) ak discharge" Use g. 89)	Type III	
(fro pt. 1 to F 174 Are D3 (fro pt. 1 to F 174 Are D3 (fro pt. 1 to F 174	 m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a mnel Flow Velocity X-Section Area, a Peak Discharge, qp 	405 csm/in 5.1 inches 3.71 cu ft/set 200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/set 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/set	Ref. Figure 6-3 "Unit per From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit per From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit per From pg. 1	ak discharge" Use g. 89) ak discharge" Use g. 89)	Type III	
to F 174 D3 (fro pt. 1 to F 174 Are D3 (fro pt. 1 to F 174	 t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Discharge, q_u a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Discharge, q_u a Runoff, Q) Peak Discharge, q_p a mnel Flow Velocity X-Section Area, a Peak Discharge, qp 	5.1 inches 3.71 cu ft/set 200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/set 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/set 24 sq ft	From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	g. 89) ak discharge" Use g. 89)	Type III	
174 D3 (fro pt. 1 to F 174 Are D3 (fro pt. 1 to F 174	 Peak Discharge, q_p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Runoff, Q Peak Discharge, q_p Runoff, Q Peak Discharge, q_p 	3.71 cu ft/set 200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/set 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/set 24 sq ft	Ref Eq. 6 Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	ak discharge" Use g. 89)		
Are D3 (fro pt. 1 to F 174 Are D3 (fro pt. 1 to F 174	 a Flow Length, L 3 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp innel Flow Velocity X-Section Area, a Peak Discharge, qp 	200 0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/sec 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	Ref Eq. 6 Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	ak discharge" Use g. 89)		
D3 (fro pt. 1 to F 174 Are D3 (fro pt. 1 to F 174	 Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. qu Runoff, Q Peak Discharge, qp Innel Flow Velocity X-Section Area, a Peak Discharge, qp 	0.024 hrs 0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/sec 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	ak discharge" Use g. 89)		
(fro pt. 1 to F 174 Are D3 (fro pt. 1 to F 174	 m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p innel Flow Velocity X-Section Area, a Peak Discharge, qp 	0.505 hrs 405 csm/in 5.1 inches 4.62 cu ft/sed 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sed 24 sq ft	Tt + Tc for Area D3.3 (p Ref. Figure 6-3 "Unit pe From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	ak discharge" Use g. 89)		
pt. 1 to F 174 Are D3 (fro pt. 1 to F 174	 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p innel Flow Velocity X-Section Area, a Peak Discharge, qp 	405 csm/in 5.1 inches 4.62 cu ft/sec 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	Ref. Figure 6-3 "Unit pe From pg. 1 C Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	ak discharge" Use g. 89)		
to F 174 D3 (fro pt. 1 to F 174	 t. Runoff, Q) Peak Discharge, q_p a Flow Length, L 4 Travel Time, Tt n Time of Conc. Tc 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p innel Flow Velocity X-Section Area, a Peak Discharge, qp 	5.1 inches 4.62 cu ft/sec 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	From pg. 1 c Eq. 10 Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1	g. 89)		
174 D3 (fro pt. 1 to F 174	 Peak Discharge, q_p Flow Length, L Travel Time, Tt Time of Conc. Tc Unit Peak Disch. q_u Runoff, Q Peak Discharge, q_p Innel Flow Velocity X-Section Area, a Peak Discharge, qp 	4.62 cu ft/sec 200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1		Type III	
Are D3 (fro pt. 1 to F 174	 a Flow Length, L 4 Travel Time, Tt m Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp innel Flow Velocity X-Section Area, a Peak Discharge, qp 	200 0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	Ref Eq. 6 Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1		Туре III	
D3 (fro pt. 1 to F 174	 4 Travel Time, Tt n Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp innel Flow Velocity X-Section Area, a Peak Discharge, qp 	0.024 hrs 0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1		Туре III	
D3 (fro pt. 1 to F 174	 4 Travel Time, Tt n Time of Conc. Tc 72 Unit Peak Disch. qu t. Runoff, Q) Peak Discharge, qp innel Flow Velocity X-Section Area, a Peak Discharge, qp 	0.562 hrs 390 csm/in 5.1 inches 1.40 cu ft/sec 24 sq ft	Tt + Tc for Area D3.4 (p Ref. Figure 6-3 "Unit pe From pg. 1		- Туре III	
pt. 1 to F 174	 72 Unit Peak Disch. q_u t. Runoff, Q) Peak Discharge, q_p innel Flow Velocity X-Section Area, a Peak Discharge, qp 	390 csm/in 5.1 inches 1.40 cu ft/sed 24 sq ft	Ref. Figure 6-3 "Unit pe From pg. 1		Type III	
to F 174	 t. Runoff, Q) Peak Discharge, q_p innel Flow Velocity X-Section Area, a Peak Discharge, qp 	5.1 inches 1.40 cu ft/sed 24 sq ft	From pg. 1	ak discharge" Use	Type III	
174) Peak Discharge, q _p innel Flow Velocity X-Section Area, a Peak Discharge, qp	1.40 cu ft/seo 24 sq ft				
	nnel Flow Velocity X-Section Area, a Peak Discharge, qp	24 sq ft	c Eq. 10			
alculate Ch	X-Section Area, a Peak Discharge, qp					
	Peak Discharge, qp					
		10 13 ou ft/cov				
	Peak Velocity					
	FEAR VEIDULY	2.0594 ft/sec				
		88% of Calcu	Ilated Channel Flow Ve	elocity		

		MANAG	EMENT	SF	RVICE	ES. INC	0			
Calculatio	ns For:	SMEPA Landfill	Made By:	CJ	Date:	10/11/16	Sheet No.:	94	of	110
Subject:	Stormw	ater Design	Checked By:	-	Date:		Job No.:		SMEPA	
		Discharge from Areas D2.								
	Area		0.57 ac	res		0.00 sq. mile	S			
Calcula	te Travel	Time, Tt								
	Sheet F									
	Pt. 175	Flow Length, L	125.8 fe	et		D4 476	Flow Leng	th, L	112.1 fee	et
D0 0		Two-yr 24 hr rainfall, P2	4.9 ind	ches		Pt. 176	Two-yr 24	hr rainfal	5.9	
D2.2	to Pt.	Land Slope, s	0.25 ft/1	ft		to Pt. 177	Land Slop	e, s	0.04 ft/f	t
	176	Travel Time, Tt	0.129 hr		Ref Eq. 8	177	Travel Tim		0.223	
	Open C	hannel Flow								
	•	Channel Depth, D	2 fee	et	-		1		/	
		Channel Width, B	4 fee	et		-	D	5		
		X-Section Area, a	24 sq	ft			<->	4	4(H):1(V)	`
	Pt. 174	Wetted Perimeter, pw	20.5 fee				B			'
		Hydraulic Radus, r	1.171 ft							
		Channel Slope	0.005 ft/1	ft						
		Velocity, V	2.341 ft/s		Ref Eq. 9					
		Flow Length, L	255		,					
		Travel Time, Tt	0.030 hrs	s	Ref Eq. 6					
	Total Tr	avel Time	0.383 hrs	-	-	neet, Shallow	Concentra	ited and O	pen Chanr	nel
			1.							
Calculat	e Peak I	Discharge								
		I _a /P	0.095 in.							
		Time of Conc. Tc	0.383 hrs	S	From calcu	lations above				
	Area	Unit Peak Disch. qu	455 cs	m/in	Ref. Figure	6-3 "Unit peal	discharge"	Use Type II	1	
	D2.2	Runoff, Q	5.1 inc		From pg. 1			,,,		
		Peak Discharge, q _p	2.07 cu		. =					
		Pour Bioonargo, qp	2.07 00	10000	щ. то					
	Area	Flow Length, L	255							
	D6.2	Travel Time, Tt	0.030 hrs	5	Ref Eq. 6					
		Time of Conc. Tc	0.700 hrs			Area D6.2 (pg.	91)			
	(Unit Peak Disch. qu				6-3 "Unit peak		Use Type II	1	
		Runoff, Q			From pg. 1					
		Peak Discharge, q _o	3.90 cu							
		, san sisonarys, qp	0.00 00	12000	-4. 10					
	Area	Flow Length, L	255							
		Travel Time, Tt	0.030 hrs	5	Ref Eq. 6					
		Time of Conc. Tc	0.725 hrs			Area D6.3 (pg.	91)			
	V	Unit Peak Disch. qu	350 cs			6-3 "Unit peak	,	Use Tvpe II	1	
		Runoff, Q	5.1 inc		From pg. 1					
	178)	Peak Discharge, q _o	2.31 cu		. 🗸					
		r oak bioonarye, yp	2.01.00	10360						
	Area	Flow Length, L	255							
	D6.1	Travel Time, Tt	0.030 hrs	6	Ref Eq. 6					
		Time of Conc. Tc	0.368 hrs			Area D6.1 (pg.	91)			
	(Unit Peak Disch. qu	455 csi			6-3 "Unit peak		Use Type II		
		Runoff, Q	5.1 inc		From pg. 1					
		Peak Discharge, qp	4.86 cu		• =					
				10000						

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				RVICES, INC.	
Calculatio		SMEPA Landfill	Made By: CJ	Date: 10/11/16 Sheet No.: 95	of 110
Subject:		ater Design	Checked By:	Date: Job No.:	SMEPA
		Flow Length, L	255		
		Travel Time, Tt	0.030 hrs	Ref Eq. 6	
	•	Time of Conc. Tc	0.631 hrs	Tt + Tc for Area D5.2 (pg. 92)	
		Unit Peak Disch. q _u	370 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type	e 111
		Runoff, Q	5.1 inches	From pg. 1	
	178)	Peak Discharge, q _p	3.13 cu ft/se	5 Eq. 10	
	Area	Flow Length, L	255		
		Travel Time, Tt	0.030 hrs	Ref Eq. 6	
	`	Time of Conc. Tc	0.657 hrs	Tt + Tc for Area D5.3 (pg. 92)	
	•	Unit Peak Disch. qu	355 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type	111
		Runoff, Q	5.1 inches	From pg. 1	
	178)	Peak Discharge, q _p	2.46 cu ft/se	Eq. 10	
	Агеа	Flow Length, L	255		
	D5.1	Travel Time, Tt	0.030 hrs	Ref Eq. 6	
	· ·	Time of Conc. Tc	0.296 hrs	Tt + Tc for Area D5.1 (pg. 92)	
		Unit Peak Disch. qu	500 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type	III
		Runoff, Q	5.1 inches	From pg. 1	
	178)	Peak Discharge, q _p	2.59 cu ft/se	Eq. 10	
	Area	Flow Length, L	255		
		Travel Time, Tt	0.030 hrs	Ref Eq. 6	
	· ·	Time of Conc. Tc	0.592 hrs	Tt + Tc for Area D4.2 (pg. 92)	
		Unit Peak Disch. qu	385 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type	11
		Runoff, Q	5.1 inches		
	178)	Peak Discharge, q _p	2.79 cu ft/se	Eq. 10	
		Flow Length, L	255		
		Travel Time, Tt	0.030 hrs	Ref Eq. 6	
	•	Time of Conc. To		Tt + Tc for Area D4.3 (pg. 92)	
	•	Unit Peak Disch. q _u Runoff, Q		Ref. Figure 6-3 "Unit peak discharge" Use Type	111
		Peak Discharge, q _p	5.1 inches		
			3.62 cu ft/sec	Eq. 10	
		Flow Length, L	255		
		Travel Time, Tt	0.030 hrs	Ref Eq. 6	
		Time of Conc. To	0.642 hrs	Tt + Tc for Area D4.3 (pg. 92)	
		Unit Peak Disch. q _u	360 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type	III
		Runoff, Q	5.1 inches	From pg. 1	
	170)	Peak Discharge, q _p	3.39 cu ft/sec	Eq. 10	
		Flow Length, L	255	- /	
		Travel Time, Tt	0.030 hrs	Ref Eq. 6	
	•	Time of Conc. Tc	0.275 hrs	Tt + Tc for Area D4.1 (pg. 92)	
		Unit Peak Disch. qu	510 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type	
		Runoff, Q Peak Discharge, q₀	5.1 inches	From pg. 1	
	(10)	r car Discharge, q _p	4.96 cu ft/sec	Eq. 10	

Cacuations For: SMEPA Landfill Vade By: CJ Date: 10/11/16 Sheat No: 96 of Subject Stormwater Design Checked By: Date: Job No: SMEPA Area Flow Length, L D3.2 Travel Time, Tt 0.25 Travel Time, Tt 0.030 hrs Ref Eq. 6 from Time of Conc. Tc 178) Peak Discharge, qp 178) Peak Discharge, qp Peak Velocity X-Section Area, a Peak Discharge, qp X-Section Area, a Peak Discharge, qp X-Section Area, a Peak Discharge, qp X-Section Area, a Y-Section Area, a Y-Section Area, a Y-Section Area, a Y-Section Area, a Y-Section Area	440
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(from pt. 174Time of Conc. Tc pt. 1740.533 hrs ut (Pt. Runoff, Q to Pt. Runoff, Q to Pt. Runoff, QTt + Tc for Area D3.2 (pg. 93)178)Peak Discharge, qp3.67 cu ff/sec Eq. 10Area (from Time of Conc. Tc (from to Pt. Runoff, Q255 0.33 travel Time, Tt 0.535 hrs to Pt. Runoff, Q255 0.535 hrs to Pt. T44 Unit Peak Disch. qu 400 csm/in to Pt. Runoff, QArea (from Time of Conc. Tc (from Time of Conc. Tc0.535 hrs 0.535 hrs to 1.74Tt + Tc for Area D3.3 (pg. 93) to 1.74Area (from Time of Conc. Tc D3.4255 0.33 hrs to Pt. Runoff, Q5.1 inches 5.1 inches From pg. 1Area (from Time of Conc. Tc0.535 hrs 0.30 hrs to Pt. Runoff, Q5.1 inches 5.1 inches From pg. 1Area (from Time of Conc. Tc pt. 174255 0.34 travel Time, Tt to Pt. Runoff, Q255 0.30 hrs to Pt. Tt + Tc for Area D3.4 (pg. 93) to Pt. Runoff, QArea (from Time of Conc. Tc pt. 174255 0.30 hrs to Pt. Runoff, Q380 csm/in to Ref. Figure 6-3 "Unit peak discharge" Use Type III to Pt. Runoff, QArea (from Time of Conc. Tc (from Time of Conc. Tc D3.1 to Pt. Runoff, Q255 to 2030 hrs to 11 inches to 255 to 2030 hrs to 11 inches to 255 to 2030 hrs to 11 inches to 2030 hrs to 2030 hrs to 11 inches to 2030 hrs to 2030 hrs 	
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Peak Discharge, qp50.00 cu ft/secPeak Velocity2.0832 ft/sec	
Peak Velocity 2.0832 ft/sec	
Peak Velocity 2.0832 ft/sec	
89% of Calculated Channel Flow Velocity	

		MANAU	EMENT SI	ERVICES	, INC				
Calculatio	ons For:	SMEPA Landfill	Made By: CJ	Date: 10	0/11/16	Sheet No.:	97	of	110
		ater Design	Checked By:	Date:		Job No.:		SMEPA	_
Calcula		Discharge from Areas D2.							
	Area		1.14 acres	0.0) sq. mile	es			
		The T							
aicula	Sheet F	Time, Tt							
		Flow Longth 1	165 feet			Flow Length		fe	ot
	Pt. 176	Two-yr 24 hr rainfall, P2	4.9 inches			Two-yr 24 h		5.9	
D2.1	to Pt.	Land Slope, s	0.25 ft/ft			Land Slope,		0.04 ft/1	ft
	178	Travel Time, Tt	0.160 hrs	Ref Eq. 8		Travel Time		0.000	
	Open C	hannel Flow	0.100 110	rtor Eq. o		indiron mino	,	0.000	
	opon o	Channel Depth, D	2 feet	/		10		/	
		Channel Width, B	5 feet		1	D	K		
		X-Section Area, a	26 sq ft			<>	<	4/11)-1/1/	~
	Pt. 178	Wetted Perimeter, pw	21.5 feet			вл		4(H):1(V)
		Hydraulic Radus, r	1.210 ft						
		Channel Slope	0.005 ft/ft						
		Velocity, V	2.392 ft/sec	Ref Eq. 9					
		Flow Length, L	255						
		Travel Time, Tt	0.030 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.190 hrs	Sum of Shee	t, Shallow	/ Concentrate	ed and O	pen Chan	nel
alculat	te Peak I	Discharge							
		l _a /P	0.095 in.						
	Area	Time of Conc. Tc	0.190 hrs	From calculation					
	D2.1	Unit Peak Disch. q _u	455 csm/in	Ref. Figure 6-3	"Unit peal	< discharge" U	se Type II	1	
	02.1	Runoff, Q	5.1 inches						
		Peak Discharge, q _p	4.13 cu ft/sec	c Eq. 10					
		Flow Length, L	255						
		Travel Time, Tt	0.030 hrs	Ref Eq. 6					
	•	Time of Conc. Tc	0.729 hrs	Tt + Tc for Area		•			
		Unit Peak Disch. q _u		Ref. Figure 6-3	"Unit peak	discharge" U	se Type II	1	
		Runoff, Q		From pg. 1					
	179)	Peak Discharge, q _p	3.85 cu ft/sec	c Eq. 10					
		Flow Length, L	255						
		Travel Time, Tt	0.030 hrs	Ref Eq. 6					
		Time of Conc. Tc	0.755 hrs	Tt + Tc for Area					
		Unit Peak Disch. qu	345 csm/in	Ref. Figure 6-3	"Unit peak	discharge" U	se Type II		
		Runoff, Q	5.1 inches	From pg. 1					
	179)	Peak Discharge, q _p	2.28 cu ft/sec	: Eq. 10					
		-	0.55						
		Flow Length, L	255						
		Travel Time, Tt	0.030 hrs	Ref Eq. 6	DA <i>i i</i>	0 (1)			
	(Time of Conc. Tc	0.398 hrs	Tt + Tc for Area		-	_		
		Unit Peak Disch. qu	450 csm/in	Ref. Figure 6-3	"Unit peak	discharge" Us	se Type II		
		Runoff, Q	5.1 inches	From pg. 1					
	179)	Peak Discharge, q _p	4.81 cu ft/sec	; Ea. 10					

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abjeon		Flow Length, L	255	Date.	000 110		UNLIN	
		Travel Time, Tt	0.030 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.660 hrs	Tt + Tc for Area D5.2 (pg.	95)			
	•	Unit Peak Disch. qu	365 csm/in	Ref. Figure 6-3 "Unit peak			111	
		Runoff, Q		-	cuischarge c	ise type	10	
		-	5.1 inches	10				
	(19)	Peak Discharge, q _p	3.08 cu ft/see	c Eq. 10				
	Area	Flow Length, L	255					
	D5.3	Travel Time, Tt	0.030 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.686 hrs	Tt + Tc for Area D5.3 (pg.	95)			
	pt. 178	Unit Peak Disch. q _u	350 csm/in	Ref. Figure 6-3 "Unit peak		lse Type	ш	
		Runoff, Q	5.1 inches	From pg. 1	-			
		Peak Discharge, q _p	2.43 cu ft/sec	· +				
	Агеа	Flow Length, L	255					
	D5.1	Travel Time, Tt	0.030 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.326 hrs	Tt + Tc for Area D5.1 (pg.	05)			
	•	Unit Peak Disch. qu	490 csm/in		-	-		
				Ref. Figure 6-3 "Unit peak	discharge" U	se Type	111	
		Runoff, Q	5.1 inches	From pg. 1				
	179)	Peak Discharge, q _p	2.54 cu ft/sec	c Eq. 10				
	Area	Flow Length, L	255					
		Travel Time, Tt	0.030 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.621 hrs	Tt + Tc for Area D4.2 (pg.	95)			
	pt. 178	Unit Peak Disch. q _u	375 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Туре	111	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	179)	Peak Discharge, q _p	2.72 cu ft/sec	: Eq. 10				
	Area	Flow Length, L	255					
		Travel Time, Tt	0.030 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.623 hrs	Tt + Tc for Area D4.3 (pg.	95)			
	•	Unit Peak Disch. q _u		Ref. Figure 6-3 "Unit peak		se Tvpe		
		Runoff, Q	5.1 inches			· 7 F - 5		
		Peak Discharge, q _p	3.53 cu ft/sec					
	A ====	Flow Length, L	255					
		Travel Time, Tt	0.030 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.672 hrs		05)			
				Tt + Tc for Area D4.3 (pg.	-			
		Unit Peak Disch. q _u	355 csm/in	е I	uischarge" Us	se type l	11	
		Runoff, Q	5.1 inches	From pg. 1				
	179)	Peak Discharge, q _p	3.34 cu ft/sec	: ⊨q. 10				
		Flow Length, L	255					
		Travel Time, Tt	0.030 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.304 hrs	Tt + Tc for Area D4.1 (pg.	95)			
	pt. 178	Unit Peak Disch. q _u	495 csm/in	Ref. Figure 6-3 "Unit peak	discharge" Us	se Type I	0	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1				
	179)	Peak Discharge, q₀	4.81 cu ft/sec	Eq. 10				

Area D3.2	ater Design		Date: 10/11/16	Sheet No.: 99	of	110
D3.2		Checked By:	Date:	Job No.:	SMEPA	
	Flow Length, L	255				
15	Travel Time, Tt	0.030 hrs	Ref Eq. 6			
(from	Time of Conc. Tc	0.563 hrs	Tt + Tc for Area D3.2 (pg	. 96)		
`	Unit Peak Disch. q _u	390 csm/in	Ref. Figure 6-3 "Unit pea		Type III	
	Runoff, Q	5.1 inches		<u> </u>		
	Peak Discharge, q _p	3.57 cu ft/see				
Area	Flow Length, L	255				
	Travel Time, Tt	0.030 hrs	Ref Eq. 6			
	Time of Conc. Tc	0.565 hrs	Tt + Tc for Area D3.3 (pg	. 96)		
· ·	Unit Peak Disch. qu	390 csm/in	Ref. Figure 6-3 "Unit peal			
	Runoff, Q	5.1 inches	From pg. 1	Conscharge Ose	ype m	
	Peak Discharge, q _p	4.44 cu ft/sec				
Area	Flow Length, L	255				
	Travel Time, Tt	0.030 hrs	Ref Eq. 6			
	Time of Conc. Tc	0.622 hrs	Tt + Tc for Area D3.4 (pg	96)		
· ·	Unit Peak Disch. q _u	375 csm/in	Ref. Figure 6-3 "Unit peal	•	vne III	
	Runoff, Q		From pg. 1	(dibbinargo boo i	ype m	
	Peak Discharge, q _p	1.34 cu ft/sec	10			
Area	Flow Length, L	255				
	Travel Time, Tt	0.030 hrs	Ref Eq. 6			
	Time of Conc. Tc	0.232 hrs	Tt + Tc for Area D3.1 (pg.	96)		
•	Unit Peak Disch. qu	545 csm/in	Ref. Figure 6-3 "Unit peal		vne III	
	Runoff, Q	5.1 inches	-	alconargo obo i	3po in	
	Peak Discharge, q _p	4.26 cu ft/sec				
Area	Flow Length, L	255				
	Travel Time, Tt	0.030 hrs	Ref Eq. 6			
	Time of Conc. Tc	0.412 hrs	Tt + Tc for Area D2.2 (pg.	94)		
	Unit Peak Disch. q _u		Ref. Figure 6-3 "Unit peak		vpe III	
	Runoff, Q	5.1 inches		ge eee) ···	
	Peak Discharge, q _p	2.04 cu ft/sec				
alculate Chann	el Flow Velocity					
	X-Section Area, a	26 sq ft				
	Peak Discharge, qp	53.18 cu ft/sec	;			
	Peak Velocity	2.0452 ft/sec				
		85% of Calcu	lated Channel Flow Velo	ocity		

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

1		ENV	IKUN.	MEL	IAI	-0			
		MANAG	EMENT S	ERVICE	S, INC				
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Concession in the local division in the loca		vater Design	Checked By:	Date:		Job No.:		SMEPA	
Calcula		Discharge from Areas D1							
	Area		1.15 acres	I	0.00 sq. mile	es			
Calcula		l Time, Tt							
	Sheet F	Flow							
	Pt 121	Flow Length, L	130.8 feet		Pt. 122	Flow Length		169.2 fee	et
D1.2		Two-yr 24 nr rainiail, P2	4.9 inches		to Pt.	Two-yr 24 hr	rainfal	5.9	
01.2	122	Land Slope, s	0.25 ft/ft		180	Land Slope,	s	0.04 ft/f	t
		Travel Time, Tt	0.133 hrs	Ref Eq. 8	100	Travel Time,	Τt	0.310	
	Shallow	,Concentrated Flow							
	Pt. 180	Flow Length, L	152.9 feet						
	to Pt.	Watercourse slope, s	0.04 ft/ft						
	181	Avg. Velocity, V.	3.2 ft/sec	Ref. Fig. 6-	9 "Avg. vel. fo	r est. travel tim	e for sha	llow	
				-	ed flow" - use I				
		Travel Time, Tt	0.013 hrs	Ref Eq. 6					
	Open C	hannel Flow							
		Channel Depth, D	2 feet	-	-	10		/	
		Channel Width, B	7 feet			D _	5		
		X-Section Area, a	30 sq ft			<>	-	4(H):1(V)	
	Pt. 179	Wetted Perimeter, pw	23.5 feet			в		4(□). I(V)	
		Hydraulic Radus, r	1.277 ft						
		Channel Slope	0.005 ft/ft						
		Velocity, V	2.480 ft/sec	Ref Eq. 9					
		Flow Length, L	235	rtor Eq. o					
		Travel Time, Tt	0.026 hrs	Ref Eq. 6					
	Total Tr	avel Time	0.483 hrs		eet Shallow	Concentrate	d and O	nen Chanr	el
			01100 110			eeneeniate		pon onan	
Calcula	ate Peak I	Discharge from Areas D1.	3						
	Area	0	0.92 acres	C	.00 sq. mile:	S			
Calcula	te Travel	Time, Tt							
	Sheet F								
		Flow Length, L	110.3 feet			Flow Length,	L	189.7 fee	t
	Pt. 182	Two-yr 24 hr rainfall, P2	4.9 inches		Pt. 183	Two-yr 24 hr		5.9	
D1.3	to Pt.	Land Slope, s	0.25 ft/ft		to Pt.	Land Slope,		0.04 ft/ft	
	183	Travel Time, Tt	0.116 hrs	Ref Eq. 8		Travel Time,		0.340	
	Shallow	Concentrated Flow	01110 1110					0.040	
			36 3 feet						
	Pt. 184	Flow Length, L	36.3 feet						
	Pt. 184 to Pt.	Flow Length, L Watercourse slope, s	0.04 ft/ft	Dof Eig 6 (Ave vel for	out travel time	for al-	0.11	
	Pt. 184 to Pt.	Flow Length, L		-	-	est. travel time	for shall	low	
	Pt. 184 to Pt.	Flow Length, L Watercourse slope, s Avg. Velocity, V.	0.04 ft/ft 3.2 ft/sec	concentrate) "Avg. vel. for d flow" - use L		for shall	low	
	Pt. 184 to Pt. 185	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt	0.04 ft/ft	-	-		for shall	low	
	Pt. 184 to Pt. 185	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow	0.04 ft/ft 3.2 ft/sec 0.003 hrs	concentrate	-	Inpaved	for shall	ow	
	Pt. 184 to Pt. 185	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet	concentrate	-		for shall	low	
	Pt. 184 to Pt. 185	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet 7 feet	concentrate	-	Inpaved	for shall	/	
	Pt. 184 to Pt. 185 Open C	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet 7 feet 30 sq ft	concentrate	-	Inpaved	for shall	4(H):1(V)	
	Pt. 184 to Pt. 185 Open C Pt. 179	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet 7 feet 30 sq ft 23.5 feet	concentrate	-	Inpaved	for shall	/	
	Pt. 184 to Pt. 185 Open C Pt. 179 to Pt.	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, pw Hydraulic Radus, r	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft	concentrate	-	Inpaved	for shall	/	
	Pt. 184 to Pt. 185 Open C Pt. 179 to Pt. 186	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft 0.005 ft/ft	concentrate Ref Eq. 6	-	Inpaved	for shall	/	
	Pt. 184 to Pt. 185 Open C Pt. 179 to Pt. 186	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft 0.005 ft/ft 2.480 ft/sec	concentrate	-	Inpaved	for shall	/	
	Pt. 184 to Pt. 185 Open C Pt. 179 to Pt. 186	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V Flow Length, L	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft 0.005 ft/ft 2.480 ft/sec 235	concentrate Ref Eq. 6	-	Inpaved	for shall	/	
	Pt. 184 to Pt. 185 Open C Pt. 179 to Pt. 186	Flow Length, L Watercourse slope, s Avg. Velocity, V. Travel Time, Tt hannel Flow Channel Depth, D Channel Width, B X-Section Area, a Wetted Perimeter, p _w Hydraulic Radus, r Channel Slope Velocity, V	0.04 ft/ft 3.2 ft/sec 0.003 hrs 2 feet 7 feet 30 sq ft 23.5 feet 1.277 ft 0.005 ft/ft 2.480 ft/sec	concentrate Ref Eq. 6 Ref Eq. 9 Ref Eq. 6	d flow" - use L	Inpaved	K	4(H):1(V)	

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

	MANA	GEMENT SI	ERVICES, INC	. *			
alculations For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	101	of	110
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alculate Peak							
	I _a /P	0.095 in.					
	Time of Conc. Tc	0.483 hrs	From calculations above				
Area	Linit Peak Disch a	410 csm/in	Ref. Figure 6-3 "Unit peal	discharge" l	Jse Tvpe	10	
D1.2	Runoff, Q	5.1 inches		Ũ	21-1		
	Peak Discharge, q	3.76 cu ft/see					
	01/ Ip						
	l _a /P	0.095 in.					
	Time of Conc. To	0.486 hrs	From calculations above				
Area	Unit Pook Diech a	410 csm/in	Ref. Figure 6-3 "Unit peak	discharge" L	Jse Type	111	
D1.3	Runoff, Q	5.1 inches		-			
	Peak Discharge, q _p	3.01 cu ft/sec	Eq. 10				
Area	÷ .	235					
D6.2		0.026 hrs	Ref Eq. 6				
1	Time of Conc. Tc	0.755 hrs	Tt + Tc for Area D6.2 (pg.				
	9 Unit Peak Disch. qu	345 csm/in	Ref. Figure 6-3 "Unit peak	discharge" L	Jse Type	111	
	Runoff, Q	5.1 inches	From pg. 1				
186)	Peak Discharge, q _p	3.79 cu ft/sec	2 Eq. 10				
Area	Flow Length, L	235					
D6.3		0.026 hrs	Ref Eg. 6				
(from		0.781 hrs	Tt + Tc for Area D6.3 (pg.	97)			
· ·) Unit Peak Disch. q _u	340 csm/in	Ref. Figure 6-3 "Unit peak	•	lse Type		
	Runoff, Q	5.1 inches		Ŭ	51		
186)	Peak Discharge, q _p	2.25 cu ft/sec					
	Elevel en effe t	005					
Area	Flow Length, L Travel Time, Tt	235 0.026 hrs					
D6.1	Time of Conc. Tc	0.424 hrs	Ref Eq. 6 Tt + Tc for Area D6.1 (pg.	07)			
	Unit Peak Disch. q		Ref. Figure 6-3 "Unit peak		so Typo	ru	
	Runoff, Q	5.1 inches		uischarge u	se rype		
	Peak Discharge, q _p	4.70 cu ft/sec					
1007	r eak Discharge, qp	4.70 60 10360	, Lq. 10				
Area	Flow Length, L	235					
D5.2	Travel Time, Tt	0.026 hrs	Ref Eq. 6				
	Time of Conc. Tc	0.687 hrs	Tt + Tc for Area D5.2 (pg.	98)			
pt. 179) Unit Peak Disch. q _u	355 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Type i	11	
	Runoff, Q	5.1 inches					
186)	Peak Discharge, q _p	3.00 cu ft/sec	Eq. 10				
A	Flow Length, L	235					
Area D5.3	Travel Time, Tt	235 0.026 hrs	Ref Eq. 6				
	Time of Conc. Tc	0.713 hrs	Tt + Tc for Area D5.3 (pg.	98)			
•	Unit Peak Disch. qu	350 csm/in	Ref. Figure 6-3 "Unit peak		se Ture I	u –	
	Runoff, Q		From pg. 1	alsonalye U	og i she i		
016	Peak Discharge, q _p	0,1 1101103	on pg. 1				

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Calculation	ns For:	SMEPA Landfill	Made By: CJ	ERVICES, INC Date: 10/11/16	Sheet No.:	102	of	110
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ubject.		Flow Length, L	235	Date.	JOD 140	-	OWELLA	
	D5.1	Travel Time, Tt	0.026 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.352 hrs	Tt + Tc for Area D5.1 (pg	08)			
	· · · · · · · · · · · · · · · · · · ·	Unit Peak Disch. q.	465 csm/in	Ref. Figure 6-3 "Unit peal				
	•				Colscharge U	se Type		
		Runoff, Q	5.1 inches	1.0				
	186)	Peak Discharge, q _p	2.41 cu ft/sec	C Eq. 10				
	Area	Flow Length, L	235					
	D4.2	Travel Time, Tt	0.026 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.648 hrs	Tt + Tc for Area D4.2 (pg.	•			
		Unit Peak Disch. q _u	365 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Type	111	
		Runoff, Q	5.1 inches	From pg. 1				
	186)	Peak Discharge, q _p	2.65 cu ft/sec	c Eq. 10				
	Area	Flow Length, L	235					
	D4.3	Travel Time, Tt	0.026 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.649 hrs	Tt + Tc for Area D4.3 (pg.	98)			
	pt. 179	Unit Peak Disch. q _u	365 csm/in	Ref. Figure 6-3 "Unit peak	discharge" U	se Type	11	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1	_			
	186)	Peak Discharge, q _p	3.43 cu ft/sec	Eq. 10				
	Area	Flow Length, L	235					
		Travel Time, Tt	0.026 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.698 hrs	Tt + Tc for Area D4.3 (pg.	98)			
	· ·	Unit Peak Disch. qu	350 csm/in	Ref. Figure 6-3 "Unit peak	-	se Type	111	
		Runoff, Q		From pg. 1	diodinargo of			
		Peak Discharge, q _p	3.29 cu ft/sec					
	Area	Flow Length, L	235					
		Travel Time, Tt	0.026 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.330 hrs	Tt + Tc for Area D4.1 (pg.	98)			
	•	Unit Peak Disch. q _u	480 csm/in	Ref. Figure 6-3 "Unit peak	,	se Type I	18	
		Runoff, Q	5.1 inches		5			
		Peak Discharge, q _p	4.67 cu ft/sec					
	Area	Flow Length, L	235					
		Travel Time, Tt	0:026 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.589 hrs	Tt + Tc for Area D3.2 (pg.	99)			
	•	Unit Peak Disch. qu	385 csm/in	Ref. Figure 6-3 "Unit peak		e Type I	11	
		Runoff, Q		From pg. 1				
		Peak Discharge, q _p	3.53 cu ft/sec					
	Area	Flow Length, L	235					
		Travel Time, Tt	0.026 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.591 hrs	Tt + Tc for Area D3.3 (pg.	99)			
	•	Unit Peak Disch. qu	385 csm/in	Ref. Figure 6-3 "Unit peak	•	a Tuna I		
	•	Runoff, Q			uscharge Us	eiypei		
		Peak Discharge, q _p	4.39 cu ft/sec	From pg. 1				
	,	r our Disonarye, yp	UI 1/360	Lq. 10				

	_			ERVICES, INC				
Calculatio		SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.:	103	of	110
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	Area	Flow Length, L	235					
	D3.4	Travel Time, Tt	0.026 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.648 hrs	Tt + Tc for Area D3.4 (pg	-			
		Unit Peak Disch. qu	360 csm/in	Ref. Figure 6-3 "Unit peal	k discharge" (Jse Type	111	
		Runoff, Q	5.1 inches					
	186)	Peak Discharge, q _p	1.29 cu ft/see	c Eq. 10				
	Area	Flow Length, L	235					
	D3.1	Travel Time, Tt	0.026 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.258 hrs	Tt + Tc for Area D3.1 (pg.	99)			
		Unit Peak Disch. q _u	515 csm/in	Ref. Figure 6-3 "Unit peak	k discharge" l	Jse Type	111	
		Runoff, Q	5.1 inches	From pg. 1				
	186)	Peak Discharge, q _p	4.02 cu ft/sec	c Eq. 10				
	Area	Flow Length, L	235					
		Travel Time, Tt	0.026 hrs	Ref Eq. 6				
	(from	Time of Conc. Tc	0.438 hrs	Tt + Tc for Area D2.2 (pg.	99)			
	•	Unit Peak Disch. q _u	435 csm/in	Ref. Figure 6-3 "Unit peak	discharge" (Jse Type	111	
	to Pt.	Runoff, Q	5.1 inches	From pg. 1	Ŧ	•••		
	186)	Peak Discharge, q _p	1.98 cu ft/sec	Eq. 10				
	Area	Flow Length, L	235					
		Travel Time, Tt	0.026 hrs	Ref Eq. 6				
		Time of Conc. Tc	0.216 hrs	Tt + Tc for Area D2.1 (pg.	97)			
	pt. 179	Unit Peak Disch. q _u	550 csm/in	Ref. Figure 6-3 "Unit peak		lse Type l	1	
		Runoff, Q	5.1 inches	-	0	71		
		Peak Discharge, q _p	5.00 cu ft/sec					
Calculat	e Chann	el Flow Velocity						
		X-Section Area, a	30 sq ft					
		Peak Discharge, qp	59.57 cu ft/sec	:				
		Peak Velocity	1.9858 ft/sec					
			80% of Calcu	lated Channel Flow Velo	ocity			

		MANAG	EMENT S.	ERVICES, INC	· ·	
Calculatio	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 104	of 110
Subject:	Stormw	vater Design	Checked By:	Date:	Job No.:	SMEPA
Calculat	e Peak	Discharge from Areas D1.	.1			
	Area		0.97 acres	0.00 sq. mil	es	
Calculat	e Trave	Time, Tt				
ouround	Sheet F					
		Flow Longth L	150 feet		Flow Length, L	feet
	Pt. 187	Two-yr 24 hr rainfall, P2	4.9 inches		Two-yr 24 hr rainfal	
D1.1	to Pt.	Land Slope, s	0.25 ft/ft		Land Slope, s	0.04 ft/ft
	186	Travel Time, Tt	0.149 hrs	Ref Eq. 8	Travel Time, Tt	0.000
	Open C	hannel Flow				0.000
	- F - · · ·	Channel Depth, D	2 feet	<	1	/
		Channel Width, B	7 feet		D	
		X-Section Area, a	30 sq ft		K S C	400.400
	Pt. 186	Wetted Perimeter, pw	23.5 feet		r B 1	4(H):1(V)
		Hydraulic Radus, r	1.277 ft			
		Channel Slope	0.005 ft/ft			
		Velocity, V	2.480 ft/sec	Ref Eq. 9		
		Flow Length, L	235	nor Eq. o		
		Travel Time, Tt	0.026 hrs	Ref Eq. 6		
	Total Tr	avel Time	0.175 hrs	Sum of Sheet, Shallow	v Concentrated and C	pen Channel
Calculat	e Peak I	Discharge				
		I _a /P	0.095 in.			
	A	Time of Conc. Tc	0.175 hrs	From calculations above		
	Area	Unit Peak Disch. q _u	585 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type I	11
	D1.1	Runoff, Q	5.1 inches	From pg. 1	5 J.	
		Peak Discharge, qp	4.52 cu ft/sec			
		O • • • •		,		
	Area	Flow Length, L	235			
	D6.2	Travel Time, Tt	0.026 hrs	Ref Eq. 6		
	(from	Time of Conc. Tc	0.782 hrs	Tt + Tc for Area D6.2 (pg	. 101)	
	pt. 186	Unit Peak Disch. q _u	340 csm/in	Ref. Figure 6-3 "Unit pea	k discharge" Use Type I	11
		Runoff, Q	5.1 inches	- ·		
		Peak Discharge, q _p	3.74 cu ft/sec			
		Flow Length, L	235			
		Travel Time, Tt	0.026 hrs	Ref Eq. 6		
	•	Time of Conc. Tc	0.808 hrs	Tt + Tc for Area D6.3 (pg		
		Unit Peak Disch. qu	335 csm/in	Ref. Figure 6-3 "Unit peal	k discharge" Use Type II	11
		Runoff, Q	5.1 inches	From pg. 1		
	134)	Peak Discharge, q _p	2.22 cu ft/sec	Eq. 10		
	۸	Flow Length	235			
		Flow Length, L	235 0.026 bro	Dof Ea 6		
		Travel Time, Tt	0.026 hrs	Ref Eq. 6	404)	
		Time of Conc. Tc	0.451 hrs	Tt + Tc for Area D6.1 (pg.		
		Unit Peak Disch. qu	430 csm/in	Ref. Figure 6-3 "Unit peal	< discharge" Use Type II	I
		Runoff, Q	5.1 inches	From pg. 1		
	134)	Peak Discharge, q _p	4.59 cu ft/sec	Eq. 10		

		ENV	IRONI	MENTAL
_		MANAG	GEMENT SI	ERVICES, INC.
alculatio	ns For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16 Sheet No.: 105 of 110
bject:		vater Design	Checked By:	Date: Job No.: SMEPA
		Flow Length, L	235	
	D5.2	Travel Time, Tt	0.026 hrs	Ref Eq. 6
	(from	Time of Conc. Tc	0.713 hrs	Tt + Tc for Area D5.2 (pg. 101)
	pt. 186	Unit Peak Disch. q _u	350 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	to Pt.	Runoff, Q	5.1 inches	From pg. 1
	134)	Peak Discharge, q _p	2.96 cu ft/sec	c Eq. 10
	Area	Flow Length, L	235	
	D5.3	Travel Time, Tt	0.026 hrs	Ref Eq. 6
	(from	Time of Conc. Tc	0.739 hrs	Tt + Tc for Area D5.3 (pg. 101)
	pt. 186	Unit Peak Disch. q _u	345 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	to Pt.	Runoff, Q	5.1 inches	From pg. 1
	134)	Peak Discharge, q _p	2.39 cu ft/sec	c Eq. 10
		· .		
	Area	Flow Length, L	235	
	D5.1	Travel Time, Tt	0.026 hrs	Ref Eq. 6
	(··· = ··· ·	Time of Conc. Tc	0.378 hrs	Tt + Tc for Area D5.1 (pg. 102)
		Unit Peak Disch. q _u	455 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	to Pt.	Runoff, Q	5.1 inches	From pg. 1
	134)	Peak Discharge, q _p	2.36 cu ft/sec	: Eq. 10
		F 1	005	
	Area	Flow Length, L	235	
		Travel Time, Tt	0.026 hrs	Ref Eq. 6
	·	Time of Conc. Tc	0.674 hrs	Tt + Tc for Area D4.2 (pg. 102)
		Unit Peak Disch. qu	355 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
	134)	Peak Discharge, q _p	2.57 cu ft/sec	Eq. 10
	Area	Flow Length, L	235	
		Travel Time, Tt	0.026 hrs	Ref Eq. 6
		Time of Conc. Tc	· ·	Tt + Tc for Area D4.3 (pg. 102)
		Unit Peak Disch. qu		Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	
		Peak Discharge, q _p	3.34 cu ft/sec	
	,	т. – . – . – . – , –р		
		Flow Length, L	235	
		Travel Time, Tt	0.026 hrs	Ref Eq. 6
	(from	Time of Conc. Tc	0.725 hrs	Tt + Tc for Area D4.3 (pg. 102)
	pt. 186	Unit Peak Disch. q _u	345 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	to Pt.	Runoff, Q	5.1 inches	From pg. 1
		Peak Discharge, q _p	3.24 cu ft/sec	10
		Flow Length, L	235	
		Travel Time, Tt	0.026 hrs	Ref Eq. 6
	`	Time of Conc. Tc		Tt + Tc for Area D4.1 (pg. 102)
		Unit Peak Disch. q _u	465 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
	134)	Peak Discharge, q _p	4.52 cu ft/sec	Eq. 10

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alculatio	ins For	SMEPA Landfill	Made By: CJ	ERVICES, INC. Date: 10/11/16 Sheet No.: 106 of 110
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abjeet.		Flow Length, L	235	
		Travel Time, Tt	0.026 hrs	Ref Eq. 6
		Time of Conc. Tc	0.616 hrs	Tt + Tc for Area D3.2 (pg. 102)
	``	Unit Peak Disch. qu	380 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	•	Runoff, Q	5.1 inches	From pg. 1
		Peak Discharge, q _p	3.48 cu ft/sec	
		r σαιτρισσπαιζο, φρ		
	Area	Flow Length, L	235	
	D3.3	Travel Time, Tt	0.026 hrs	Ref Eq. 6
	(from	Time of Conc. Tc	0.617 hrs	Tt + Tc for Area D3.3 (pg. 102)
	pt. 186	Unit Peak Disch. q _u	380 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
	134)		4.33 cu ft/sec	
	Area	Flow Length, L	235	
	D3.4	Travel Time, Tt	0.026 hrs	Ref Eq. 6
	(from	Time of Conc. Tc	0.675 hrs	Tt + Tc for Area D3.4 (pg. 103)
	pt. 186	Unit Peak Disch. q _u	355 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
	to Pt.	Runoff, Q	5.1 inches	From pg. 1
	134)	Peak Discharge, q _p	1.27 cu ft/sec	5 Eq. 10
	Area	Flow Length, L	235	
	D3.1	Travel Time, Tt	0.026 hrs	Ref Eq. 6
	•	Time of Conc. Tc	0.285 hrs	Tt + Tc for Area D3.1 (pg. 103)
		Unit Peak Disch. q _u	500 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
	134)	Peak Discharge, q _p	3.90 cu ft/sec	; Eq. 10
		Flow Longth	235	
	Area	Flow Length, L Travel Time, Tt	0.026 hrs	Dof Eq. 6
		Time of Conc. Tc	0.465 hrs	Ref Eq. 6 Tt + Tc for Area D2.2 (pg. 103)
		Unit Peak Disch. q _u		Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	
	134)	Peak Discharge, q _p	1.91 cu ft/sec	; Eq. 10
	Агеа	Flow Length, L	235	
	D2.1	Travel Time, Tt	0.026 hrs	Ref Eq. 6
		Time of Conc. Tc	0.243 hrs	Tt + Tc for Area D2.1 (pg. 103)
	•	Unit Peak Disch. qu	535 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
		Peak Discharge, q	4.86 cu ft/sec	
	/			
	Area	Flow Length, L	235	
	D1.2	Travel Time, Tt	0.026 hrs	Ref Eq. 6
		Time of Conc. Tc	0.509 hrs	Tt + Tc for Area D1.2 (pg. 101)
	•	Unit Peak Disch. q _u	400 csm/in	Ref. Figure 6-3 "Unit peak discharge" Use Type III
		Runoff, Q	5.1 inches	From pg. 1
		Peak Discharge, qp	3.67 cu ft/sec	

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	s For:	rater Design	Checked By:	Date: 10/11/16	Job No.:	107	SMEPA	110
oct:		Flow Length, L	235	Date.	100 NO		ONERA	
		Travel Time, Tt		Ref Eq. 6				
		Time of Conc. Tc		Tt + Tc for Area D1.3 (pg	101)			
	•	Unit Peak Disch. qu		Ref. Figure 6-3 "Unit pea			م اال	
		Runoff, Q		From pg. 1	k discharge	USE Type	5 III	
		Peak Discharge, q _p	2.93 cu ft/sec					
ulate	e Chanr	iel Flow Velocity X-Section Area, a	30 sq ft					
		Peak Discharge, qp	62.81 cu ft/sec					
		Peak Velocity	2.0936 ft/sec					
			84% of Calculation	ated Channel Flow Vel	ocity			
		bw from C & D at poin hannel Flow Channel Depth, D	3 feet	he slope is between (0.5 and 2 p	ercent t	o the outfa	ull
		Channel Width, B	5 feet		*		-	
	D4 404	X-Section Area, a	51 sq ft		< B →		4(H):1(\	/)
		Wetted Perimeter, pw	29.7 feet					
	to Outfall	Hydraulic Radus, r Channel Slope	1.715 ft 0.005 to	0.02 ft/ft				
	Outian	Velocity, V	3.019 to	6.038 ft/sec Ref Eq. 9	`			
		Flow Length, L	0	0.000 10300 Nei Eq. 8	7			
		Travel Time, Tt		Ref Eq. 6				
	Total Tr	avel Time		Sum of Sheet, Shallow	Concentra	ted and	Open Char	nnel
ulate	Chann	el Flow Velocity						
		X-Section Area, a	51 sq ft					
		Peak Discharge, qp	130.28 cu ft/sec					
		Peak Velocity	2.5544 ft/sec					
			85% to	42% of Calculated	Channel Flo	w Veloc	ity	



Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

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alculations For:	SMEPA Landfill	Made By: CJ	Date: 10/11/16	Sheet No.: 109	of 110
ubject: Stormv	vater Design	Checked By:	Date:	Job No.:	SMEPA
	calculated as 122 Currently SMEPA that has been inst	elopment rate is ca cfs; therefore, the has substantial sto alled. This system hows that the amo	lculated as 130.3 cfs flow needs to be rest orage at their outfall d appears to have stor unt of storage necess	and the predevelopr ricted and some stor lue to the culverts ar rage over 120,000 c sary is 110,000 cubio	ment rate was rage is necessary. nd filtration system ubic feet. The
	(122/130.3) =	0.94	the bollon of the pa	ge.	
Vs/Vr =	0.15 Ref. Figure 6-2 "A	Approximate detention	n basin routing" Use Typ	be III	
Q' =	5.61" See page 2 from	the output of EFM2			
Vs = Acreage	(Vs/Vr) * Q' * Acreage e ~ 36 acres				
	0.15 * 5.61"/12 (in/ft) * 3		acre-ft =	109,967 ft ³	

Reference "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater", NRCS, April 1994

