

**ADDENDUM
TO DRAINAGE REPORT
FOR
SELF STORAGE
934 & 940 HARTFORD TURNPIKE
WATERFORD, CT**

TR-55 MODEL

There will be one on-site drainage area for the proposed development area. Please see the attached plans entitled Drainage Area Map. There is no off-site drainage flow to the development area

For the existing conditions where the project is proposed, the area presently consists of disturbed woodlands, in poor conditions and the old road bed for Route 85. Due to the fact that the area has been previously disturbed with some steep to moderate slopes, we used a CN value of 66, soil type B.

Once the construction is complete, there will be 1.3 acres of impervious surfaces (roofs and pavement). Using a coefficient of $CN = 98$ for the impervious surfaces and $CN = 66$ for lawns/woodlands, poor conditions, soil type B, the overall CN for the drainage area was calculated to be 85.

Both the existing and the proposed conditions for the development site have been analyzed for the 2-year, 10-year, 25-year, and 100-year design storms. The rational method is used for the sizing of catch basin pipes. In this addendum, the TR-55 method was used to model the basins and outfalls. The following are the summary tables for the 2-year, 10-year, 25-year, and 100-year design storms showing first the existing conditions, then the proposed conditions for the drainage area after passing thru the proposed Water Quality Basins. The calculations show that there will be an overall decrease in runoff leaving the site. The following are the results of the TR-55 computer model.

Drainage Area

	<u>2-year</u>	<u>10-year</u>	<u>25-year</u>	<u>100-year</u>
Existing	1.117 cfs	3.066 cfs	4.481 cfs	6.839 cfs
Proposed	0.000 cfs	0.000 cfs	0.590 cfs	5.159 cfs

Test holes and permeability rates were calculated for the forebay and the stormwater basin. These rates were divided by 2 as a safety factor and used to include infiltration in the TR-55 models.

The results of the TR-55 show that there will be no outflow from the basins in up to and including the 10 year design storm event. In the 25 year storm, there will be a peak flow of 0.59 cfs leaving the stormwater basin. And in the 100 year storm event there will be a peak flow of 5.2 cfs leaving the basins thru a 20 foot wide riprap level spreader. There is no potential for erosion even during the 100 year storm event. There is over 1 foot of freeboard provided in the basins during the 100 year storm event.

Hydrograph Summary Report

Hydratlow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	1.117	1	733	5,267	-----	-----	-----	Existing Conditions
2	SCS Runoff	3.603	1	729	13,543	-----	-----	-----	Proposed Conditions
3	Reservoir	0.494	1	767	3,368	2	102.06	7,261	Forebay
4	Reservoir	0.000	1	844	0	3	99.56	1,461	Basin 1 Discharge
Self Storage TR55.gpw					Return Period: 2 Year			Friday, May 13, 2022	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	3.066	1	731	12,642	-----	-----	-----	Existing Conditions
2	SCS Runoff	6.374	1	729	24,202	-----	-----	-----	Proposed Conditions
3	Reservoir	5.203	1	734	13,585	2	102.34	8,321	Forebay
4	Reservoir	0.000	1	735	0	3	101.32	7,343	Basin 1 Discharge
Self Storage TR55.gpw					Return Period: 10 Year			Friday, May 13, 2022	

Hydrograph Summary Report

Hydratlow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	4.481	1	731	18,039	-----	-----	-----	Existing Conditions
2	SCS Runoff	8.129	1	729	31,153	-----	-----	-----	Proposed Conditions
3	Reservoir	7.608	1	731	20,355	2	102.44	8,695	Forebay
4	Reservoir	0.590	1	776	1,835	3	102.06	10,531	Basin 1 Discharge
Self Storage TR55.gpw					Return Period: 25 Year			Friday, May 13, 2022	

Hydrograph Summary Report

Hydratlow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	SCS Runoff	6.839	1	730	27,144	-----	-----	-----	Existing Conditions
2	SCS Runoff	10.84	1	729	42,131	-----	-----	-----	Proposed Conditions
3	Reservoir	10.37	1	731	31,077	2	102.54	9,078	Forebay
4	Reservoir	5.159	1	744	10,312	3	102.29	11,873	Basin 1 Discharge
Self Storage TR55.gpw					Return Period: 100 Year			Friday, May 13, 2022	

CLA ENGINEERS, INC.

Civil • Structural • Survey

317 Main Street
NORWICH, CONNECTICUT 06360

860-886-1966

FAX 860-886-9165

PROJECT NAME: _____

PROJECT NO: _____ SHEET NO. _____ OF _____

BY: _____ DATE _____

SCALE: _____

TR-55

EXISTING CN: 66 (WOODS, POOR CONDITION, SOIL TYPE B)

PROPOSED CN:

$$\begin{array}{r} 1.3 \text{ ACRE} \times 98 = 127.4 \\ 0.7 \text{ ACRES} \times 61 = 42.7 \\ \hline 170.1 \end{array}$$

$$CN = 170.1 / 2.0 = 85$$

 T_L : PROPOSED:

$$T_t = \frac{0.007 \left((0.24)(60) \right)^{0.8}}{(3.4)^{0.5} (0.01)^{0.4}} = 0.20 \text{ HRS} = 12 \text{ MIN}$$

$$\text{PIPEFLOW } V = 5 \text{ FT/S @ } 350 \text{ FT} = 0.11 \text{ MIN}$$

$$T_C = 13 \text{ MIN}$$

PERMEABILITIES:

$$\text{FOREBAY/ - TH \# 2} - 3.38 \text{ FT/DAY} = 1.7 \text{ IN/HR} / 2 = .85$$

$$\text{STORMWATER POND TH \# 1} - 4.12 \text{ FT/DAY} = 2.06 \text{ IN/HR} / 2 = 1.0$$

 T_C EXISTING.

$$T_t = 12 \text{ MIN}$$

SHALLOW CONCENTRATED FLOW - 3 MIN

$$T_C = 15 \text{ MIN}$$

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317 MAIN STREET

NORWICH, CT 06360

(860) 886-1966

(860) 886-9165 FAX

Permeability of Soils using Compaction Permeameter

Date: 4/1/2022

Project: Dunn Self Storage

CLA Project #: 7045

Material: On-site material (Test Pits)

Specification: Compacted to 94.0 lbs/cu ft per Soil Profiles

See attached test log for reference

Sample #1: Test Pit #1

Permeability: 1.45×10^{-3} cm/sec or 4.12 ft/day

Sample #2: Test Pit #2

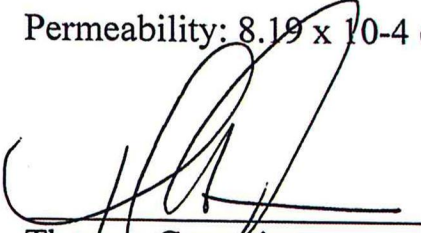
Permeability: 1.19×10^{-3} cm/sec or 3.38 ft/day

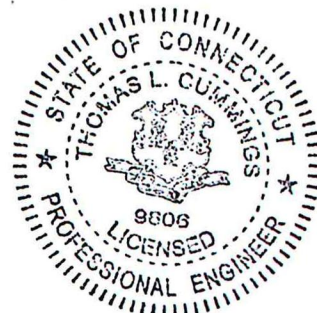
Sample #3: Test Pit #3

Permeability: 1.34×10^{-3} cm/sec or 3.81 ft/day

Sample #4: Test Pit #4

Permeability: 8.19×10^{-4} cm/sec or 2.32 ft/day


Thomas Cummings 4/1/22
PE No. 9606



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Civil • Structural • Survey

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(860) 886-1966

(860) 886-9165 FAX

SIEVE ANALYSIS

Date: 3/25/2022

Project: Dunn Self Storage

CLA Project #: 7045

Material: On-site material (Test Pits)

Specification: N/A

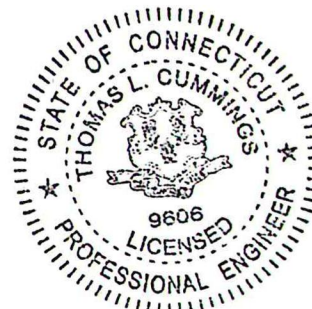
Sample Designation: TH #1

Sieve Size	% Passing
3/4 in	87.3
1/4 in	82.7
#4	78.2
#10	70.1
#20	54.9
#40	34.6
#60	16.9
#100	6.7
#200	1.6



Thomas Cummings
PE No. 9606

1/1/22



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TEST PIT DATA

EXCAVATED NOVEMBER 11, 2016

BY DICESARE-BENTLEY ENGINEERS

TEST HOLE 1 TOTAL DEPTH: 108"

0"-8" TOPSOIL

8"-26" BROWN SILTY FINE SAND

26"-54" COMPACT BROWN SILTY FINE, MOTTLED THROUGHOUT

54" - 108" GREY FINE TO COARSE SAND, TRACE GRAVEL

MOTTILING @ 26", WATER @ 54", NO LEDGE

TEST HOLE 2 TOTAL DEPTH: 72"

0"-12" TOPSOIL

12"-32" BROWN SILTY FINE SAND

32"-72" COMPACT GREY FINE-COARSE SAND, TRACE GRAVEL

MOTTILING @ 32", NO WATER, LEDGE @ 72"

TEST HOLE 3 TOTAL DEPTH: 84"

0"-8" TOPSOIL

8"-36" BROWN SILTY FINE SAND

36"-72" MOIST, MODERATELY COMPACT GREY FINE-COARSE SAND, TRACE GRAVEL

48"-84" GREY COARSE SAND WITH RED LENSES

NO MOTTILING, WATER @ 78", NO LEDGE

TEST HOLE 4 TOTAL DEPTH: 144"

0"-12" TOPSOIL

12"-36" BROWN SILTY FINE-MEDIUM SAND

36"-144" MOIST, MODERATELY COMPACT GREY FINE-COARSE SAND, TRACE GRAVEL

NO WATER, LEDGE @ 144"

MOISTURE DENSITY

(4" Mold)

CLIENT:	Dunn Self Storage	DATE:	3/30 & 3/31/2022
PROJECT:	Dunn Self Storage	BY:	JB
SAMPLE:	Test Pits #1, 2, 3, & 4	SOURCE:	TP
SAMPLING METHOD:	Sampled On-site Sample + Pan - Pan Weight + Sample	SPEC:	Compacted to 94.0 lb/cu ft

SAMPLE #1

	wet /		-		=	0.200			
	dry /		-		=	0.176	M/C	13.64	
	wet /		-	dry/	=	0.024	/dry	13.6	=M/C
Net Weight							6.950		
5.728	-4.126 =	1.602	/ 0.033 =	48.55	* 2.2 =	106.80	/1.M/C=	94.0	

Full Mold Weight - Mold = Net Weight

Sample + Pan - Pan Weight + Sample

SAMPLE #2

	wet /		-		=	0.200			
	dry /		-		=	0.173	M/C	15.61	
	wet /		-	dry/	=	0.027	/dry	15.6	=M/C
Net Weight							6.950		
5.756	-4.126 =	1.630	/ 0.033 =	49.39	* 2.2 =	108.67	/1.M/C=	94.0	

Full Mold Weight - Mold = Net Weight

Sample + Pan - Pan Weight + Sample

SAMPLE #3

	wet /		-		=	0.200			
	dry /		-		=	0.188	M/C	6.38	
	wet /		-	dry/	=	0.012	/dry	6.4	=M/C
Net Weight							6.950		
5.626	-4.126 =	1.500	/ 0.033 =	45.45	* 2.2 =	100.00	/1.M/C=	94.0	

Full Mold Weight - Mold = Net Weight

Sample + Pan - Pan Weight + Sample

SAMPLE #4

	wet /		-		=	0.200			
	dry /		-		=	0.158	M/C	26.58	
	wet /		-	dry/	=	0.042	/dry	26.6	=M/C
Net Weight							6.950		
5.911	-4.126 =	1.785	/ 0.033 =	54.09	* 2.2 =	119.00	/1.M/C=	94.0	

Full Mold Weight - Mold = Net Weight

Sample + Pan - Pan Weight + Sample

SAMPLE #5

	wet /		-		=	0.200			
	dry /		-		=		M/C	#DIV/0!	
	wet /		-	dry/	=	0.200	/dry	#DIV/0!	=M/C
Net Weight							6.950		
	-4.126 =	-4.126	/ 0.033 =	-125.03	* 2.2 =	-275.07	/1.M/C=	#DIV/0!	

Full Mold Weight - Mold = Net Weight

DUNN SELF STORAGE

3/30, 3/31 & 4/1/2022

CLA JOB # 7045

PERMEABILITY - COMPACTED TO 94.0 lb/cu ft per profile

TH #1 - BROWN SILTY SAND W/SOME STONES

$$K = \frac{11.5 \times 39}{56.55 \times 182 \times 30}$$

$$K = \frac{448.5}{308763}$$

$$K = 1.453 \times 10^{-3}$$

$$K = .001453 \times 2834.646$$

$$K = 4.12 \text{ ft/day}$$

TH #2 - BROWN SILTY SAND W/FEW STONES

$$K = \frac{11.5 \times 32}{56.55 \times 182 \times 30}$$

$$K = \frac{368}{308763}$$

$$K = 1.192 \times 10^{-3}$$

$$K = .001192 \times 2834.646$$

$$K = 3.378 \text{ ft/day}$$

TH #3 - GREY SILTY SAND W/FEW STONES

$$K = \frac{11.5 \times 36}{56.55 \times 182 \times 30}$$

$$K = \frac{414}{308763}$$

$$K = 1.341 \times 10^{-3}$$

$$K = .00341 \times 2834.646$$

$$K = 3.81 \text{ ft/day}$$

TH #4 - DARK BROWN V. SILTY SAND SOME STON

$$K = \frac{11.5 \times 22}{56.55 \times 182 \times 30}$$

$$K = \frac{253}{308763}$$

$$K = 8.193 \times 10^{-4}$$

$$K = .0008193 \times 2834.646$$

$$K = 2.32 \text{ ft/day}$$

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SIEVE ANALYSIS

Date: 3/25/2022

Project: Dunn Self Storage

CLA Project #: 7045

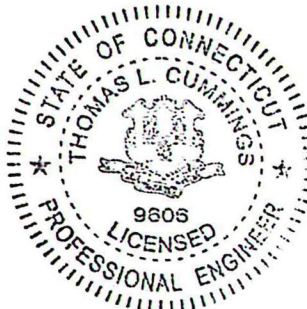
Material: On-site material (Test Pits)

Specification: N/A

Sample Designation: TH #2

Sieve Size	% Passing
3/4 in	94.7
1/4 in	82.0
#4	80.5
#10	63.5
#20	49.3
#40	47.5
#60	36.0
#100	24.8
#200	13.6


Thomas Cummings 1A1L22
PE No. 9606



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