

**South Main  
403 South Main**

**Rolesville, NC  
Wake County**

## **Erosion Control Calculations**

**July 25, 2022**

**Revised: January 5, 2023**

**Prepared for:**

**Toy Storage, LLC  
2700 Gresham lake Rd.  
Raleigh, NC 27615**



# **South Main**

## **Erosion Control Calculations**

**Project Name:** South Main

**Project Address:** 403 South Main Street  
Rolesville, NC

**Pins:** 1758784708 (1.8 acres)  
1758785571 (.23 acres)

**Latitude:** N 35.916120  
**Longitude:** W -78.468430

**Zoning:** GC

**River Basin:** Neuse

**Watershed:** Milburnie Lake

**HUC:** 0302020107

**Developer:** Toy Storage, LLC  
2700 Gresham lake Rd.  
Raleigh, NC 27615

**Telephone:** (919) 604-0505

**Email:** Storit@AOL.com

### **1.0 Site Description**

The project consists of a single parcel located at the intersection of Wall Creek Drive and South Main Street in downtown Rolesville. The lot is approximately 1.80 acres (78,408 sq feet) and a portion of the lot on the south property line will be used for the BMP (approximately 0.23 acres from parcel 1758.08-78-5571). The parcel is vacant with grassy vegetation with approximately 4195 sq ft of impervious area. The project will consist of a commercial / residential building.

The site is in the Neuse River Basin, Milburnie Lake Watershed and subject to those rules regarding nutrient management and post storm water runoff.

The parcel is not located within a flood zone as noted per FEMA map 3720175800K, Dated July 19, 2022.

Based on the Wake County SCS soils map (attached) the onsite soils are primarily Durham Series (DuB), soil group B, throughout the tract. The Durham Series soil type is considered to be well drained soils.

## **2.0 Erosion Control**

Analysis for the skimmer basins used the Wake County Tool to size the skimmer basin. Approximately 1.83 acres is draining to the sediment basin.

Total disturbance is approximately 2.16 acres.

The site does not have an area of wetlands, and is not within a FEMA mapped flood plain.

## Skimmer Basin

**Okay**

1.83 Drainage Area (Acres)  
 5.06 Peak Flow from 10-year Storm (cfs)

3294 Required Volume (ft<sup>3</sup>)  
 2201 Required Surface Area (ft<sup>2</sup>)  
 33.2 Suggested Width (ft)  
 66.3 Suggested Length (ft)

52 Trial Top Width at Spillway Invert (ft)  
 82 Trial Top Length at Spillway Invert (ft)  
 2 Trial Side Slope Ratio Z:1  
 2 Trial Depth (ft) (2 to 3.5 feet above grade)

44 Bottom Width (ft)  
 74 Bottom Length (ft)  
 3256 Bottom Area (ft<sup>2</sup>)

7499 Actual Volume (ft<sup>3</sup>) **Okay**  
 4264 Actual Surface Area (ft<sup>2</sup>) **Okay**

10 Trial Weir Length (ft)  
 0.5 Suggested Trial Depth of Flow (ft)

10.6 Spillway Capacity (cfs) **Okay**

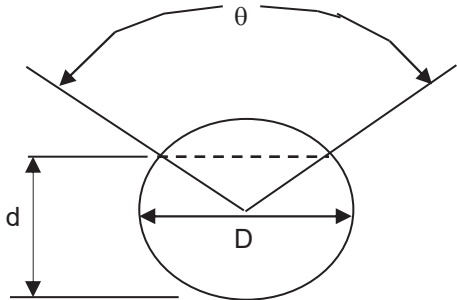
1.5 Skimmer Size (inches)  
 0.125 Head on Skimmer (feet)  
 1 Orifice Size (1/4 inch increments)  
 4.03 Dewatering Time (days)  
 Required 3 to 5 days for Wake County

Skimmer Size	
(Inches)	
	1.5
	2
	2.5
	3
	4
	5
	6
	8

# MANNING'S EQUATION FOR PIPE FLOW

Project: South Main Location: Rolesville  
 By: A4-A5 Date:   
 Chk. By: Date: mdo version 12.8.00

Clear Data  
Entry Cells



INPUT

D= 15 inches  
 d= 10.9 inches  
 n= 0.013 manning's coeff  
 theta= 126.1 degrees  
 S= 0.01 slope in/in

Mannings Formula

$$Q = (1.486/n) A R_h^{2/3} S^{1/2}$$

R=A/P  
 A=cross sectional area  
 P=wetted perimeter  
 S=slope of channel  
 n=Manning's roughness coefficient

$$V = (1.49/n) R_h^{2/3} S^{1/2}$$

$$Q = V \times A$$

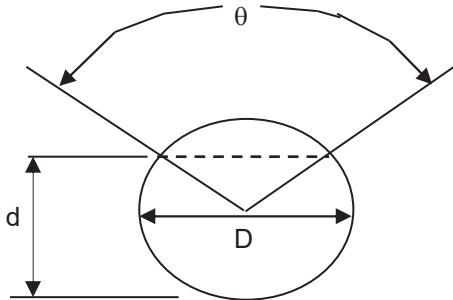
			Solution to Mannings Equation		Manning's n-values	
wetted Area,ft <sup>2</sup>	Perimeter, ft	Hydraulic Radius, ft	velocity ft/s	flow, cfs		
0.96	2.55	0.37	5.94	5.67	PVC	0.01
					PE (<9"dia)	0.015
					PE (>12"dia)	0.02
					PE(9-12"dia)	0.017
					CMP	0.025
					ADS N12	0.012
					HCMP	0.023
					Conc	0.013

Created by: Mike O'Shea

# MANNING'S EQUATION FOR PIPE FLOW

Project: South Main Location: Rolesville  
 By: B2-B3 Date:   
 Chk. By: Date: mdo version 12.8.00

Clear Data  
Entry Cells



## INPUT

D= 15 inches  
 d= 8.7 inches  
 n= 0.013 manning's coeff  
 theta= 161.6 degrees  
 S= 0.01 slope in/in

Mannings Formula

$$Q = (1.486/n) A R_h^{2/3} S^{1/2}$$

$$R = A/P$$

A=cross sectional area

P=wetted perimeter

S=slope of channel

n=Manning's roughness coefficient

$$V = (1.49/n) R_h^{2/3} S^{1/2}$$

$$Q = V \times A$$

			Solution to Mannings Equation		Manning's n-values	
wetted Area,ft <sup>2</sup>	Perimeter, ft	Hydraulic Radius, ft	velocity ft/s	flow, cfs		
0.74	2.16	0.34	5.58	4.12	PVC	0.01
					PE (<9"dia)	0.015
					PE (>12"dia)	0.02
					PE(9-12"dia)	0.017
					CMP	0.025
					ADS N12	0.012
					HCMP	0.023
					Conc	0.013

Created by: Mike O'Shea



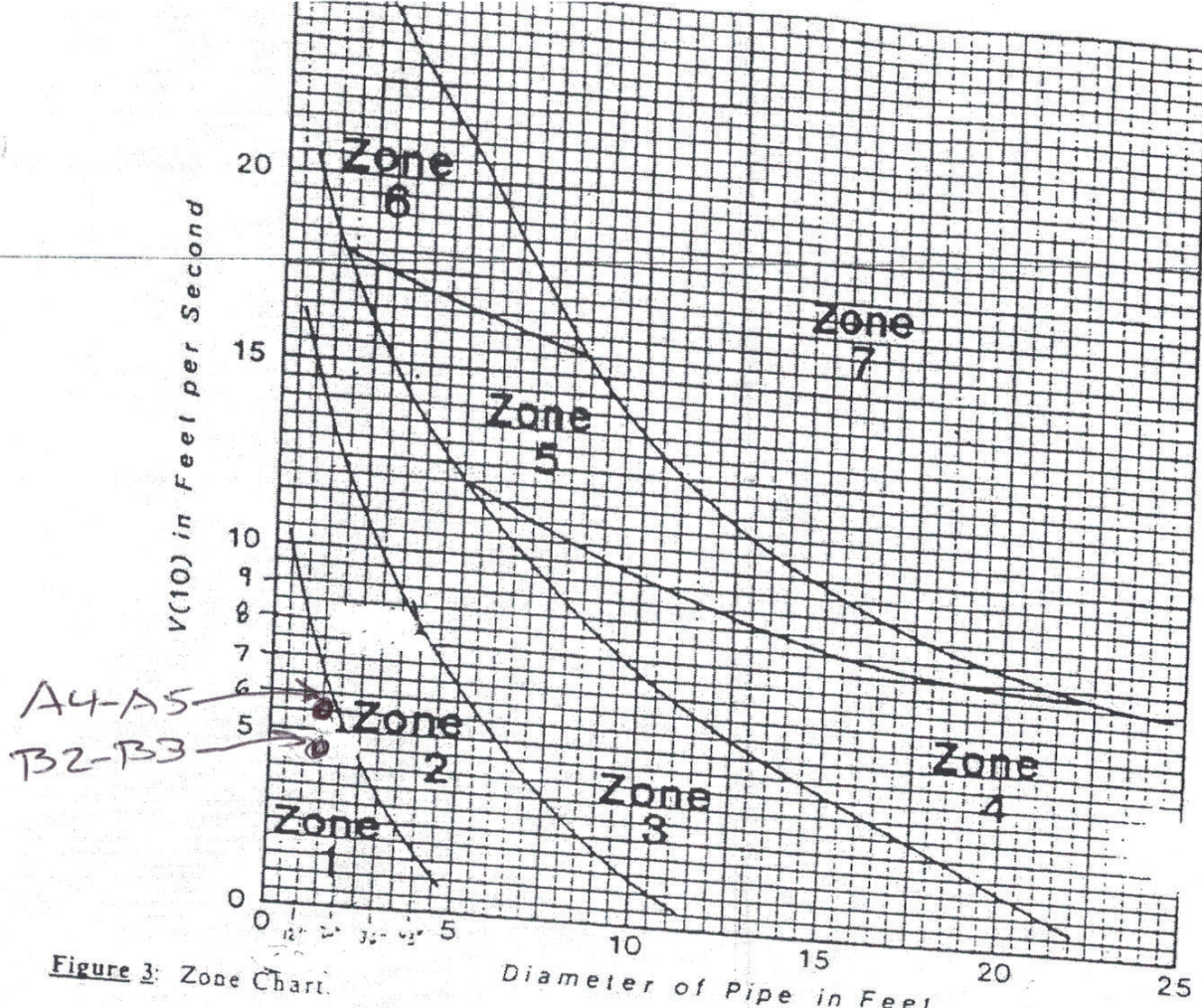


Figure 3: Zone Chart.

ZONE	APRON MATERIAL	CLASS OF STONE	SIZE OF STONE	LENGTH OF APRON	MIN. THICKNESS OF STONE
1	STONE	FINE	3"	4 X D	9"
2	STONE	LIGHT	6"	6 X D	12"
3	STONE	MEDIUM	13"	8 X D	18"
4	STONE	HEAVY	23"	8 X D	30"
5	STONE	HEAVY	23"	10 X D	30"
6	STONE	HEAVY	23"	12 X D	30"
7	REQUIRES LARGER STONE OR ANOTHER TYPE OF DEVICE, SUCH AS A STILLING BASIN, IMPACT STRUCTURE, ETC. DESIGN IS BEYOND THE SCOPE OF THIS PROCEDURE.				

Figure 4: Apron Dimensions



## CHART 2: Precalculated Apron Sizes for Maximum TW Conditions

Apron Sizing Based on NCDENR Charts for Sizing

ZONE 1 APRONS - Class A Erosion Control Stone

Pipe Diameter inch	Inlet			Outlet		
	L ft	W ft	T inch	L ft	W ft	T inch
12	3	3	12	4	3	12
15	3.75	3.75	12	5	3.75	12
18	4.5	4.5	12	6	4.5	12
24	6	6	12	8	6	12
30	7.5	7.5	12	10	7.5	12
36	9	9	12	12	9	12
42	10.5	10.5	12	14	10.5	12
48	12	12	12	16	12	12
54	13.5	13.5	12	18	13.5	12
60	15	15	12	20	15	12

ZONE 3/4 APRONS - Class 1 Rip Rap

Pipe Diameter inch	Inlet			Outlet		
	L ft	W ft	T inch	L ft	W ft	T inch
12	4	3	24	8	4.2	24
15	5	3.75	24	10	5.25	24
18	6	4.5	24	12	6.3	24
24	8	6	24	16	8.4	24
30	10	7.5	24	20	10.5	24
36	12	9	24	24	12.6	24
42	14	10.5	24	28	14.7	24
48	16	12	24	32	16.8	24
54	18	13.5	24	36	18.9	24
60	20	15	24	40	21	24

ZONE 2 APRONS - Class B Erosion Control Stone

Pipe Diameter inch	Inlet			Outlet		
	L ft	W ft	T inch	L ft	W ft	T inch
12	3	3	18	6	3.4	18
15	3.75	3.75	18	7.5	4.25	18
18	4.5	4.5	18	9	5.1	18
24	6	6	18	12	6.8	18
30	7.5	7.5	18	15	8.5	18
36	9	9	18	18	10.2	18
42	10.5	10.5	18	21	11.9	18
48	12	12	18	24	13.6	18
54	13.5	13.5	18	27	15.3	18
60	15	15	18	30	17	18

ZONE 5 APRONS - Class 2 Rip Rap

Pipe Diameter inch	Inlet			Outlet		
	L ft	W ft	T inch	L ft	W ft	T inch
12	5	3	36	10	5	36
15	6.25	3.75	36	12.5	6.25	36
18	7.5	4.5	36	15	7.5	36
24	10	6	36	20	10	36
30	12.5	7.5	36	25	12.5	36
36	15	9	36	30	15	36
42	17.5	10.5	36	35	17.5	36
48	20	12	36	40	20	36
54	22.5	13.5	36	45	22.5	36
60	25	15	36	50	25	36