



CHELTENHAM DRIVE BIKEWAY
35% Drainage Computations Report

February 2025

Prepared for:
Montgomery County DOT

100 Edison Park Drive, 4th Floor

Gaithersburg, MD 20878

Prepared by:
Stantec Consulting Services Inc.

810 Gleneagles Court

Suite 300

Towson, MD 21286

410-583-6700

Stantec Project No. 2026213125

*Professional Certification. I hereby certify that these documents
were prepared or approved by me, and that I am a duly licensed
professional engineer under the laws of the State of Maryland.*

CIP No. 500119

License No. _____, Expiration Date: _____

Table of Contents

Purpose	1
Project Site Description	1
Drainage Design.....	1
Appendices	3
A – RATIONALS	i
B – INLET SPREAD	ii
C – PIPE CAPACITY	iii
D – DA MAPS	iv

Purpose

On behalf of the Montgomery County Department of Transportation (MCDOT), Stantec has completed this Drainage Report for the separated bike lanes and concrete buffers along Norfolk Avenue / Cheltenham Drive from Woodmont Avenue to Tilbury Street. The project is part of the Bethesda Bikeway Network and will provide much needed connectivity between existing and proposed bicycle facilities. The project will begin at Woodmont Avenue, tying to the adjacent MCDOT project, Woodmont Phase 2 (north). The project terminus is located at the Tilbury Street roundabout where shared bike lanes are proposed.

Project Site Description

The proposed work includes mill and overlay, removal and replacement of curb and gutter, and the addition of islands, new drainage structures, and striping.

The project will utilize existing roadway space to provide the new bike lanes and concrete buffers. As part of the improvements, existing sidewalks will be reconstructed and ADA-compliant sidewalk ramps provided as necessary within the project limits. Project limits:

- Norfolk Avenue – from Woodmont Avenue to Wisconsin Avenue (MD 355)
- Cheltenham Drive – from Wisconsin Avenue (MD 355) to Tilbury Street

Generally, the construction results in removing one type of impervious area and either replacing it with a different type of impervious area or with open space / grass area. The project improvements will result in a net increase of 77 square feet of impervious area within the project site.

Drainage Design

There is currently an existing 24" RCP storm drain trunkline (inlets and storm drainpipe) located along the sidewalk on the southern side of Cheltenham Drive that is MCDOT owned. Offsite runoff from the commercial parking areas at the intersection of Cheltenham Drive and Wisconsin Avenue is also captured into this system as well. There are inlets and connecting pipes located on Wisconsin Avenue (355) that are SHA owned that tie into the MCDOT trunkline. The trunkline continues east to the roundabout on Cheltenham Drive where it turns south on Tilbury Street. All the existing inlets observed are COG inlets.

Storm runoff drains from the west to the east down Cheltenham Drive and Norfolk Avenue. The area north of Cheltenham Drive, between Wisconsin Avenue, Chase Avenue, and Tilbury Street drains south toward Cheltenham Drive. Wisconsin Avenue south of Cheltenham Drive drains to the north toward Cheltenham Drive from Middleton Lane. There are no existing stormwater management facilities located in the project area.

Due to the installation of concrete buffers, additional inlets and storm drains need to be added to minimize spread and meet efficiency requirements.

There are currently two adjacent projects that are under design or that have been approved. The first is in the existing Midas property at 4725 Cheltenham Drive. The certified site plan number is 820220060. It has dates from 2022 but is not yet under construction. The other adjacent project is the Woodmont Avenue Cycle Track Phase 2 project along Woodmont Avenue on the western limit of the project.

There are no wetlands and/or Waters of the US (WUS) located at the site. The USDA Natural Resources Conservation Service (NRCS) Web Soil Survey was used to determine the soil types present in the area. The site is comprised of primarily Hydrologic Soil Group (HSG) D soils.

The project lies in the Rock Creek Watershed (02-14-02-06) which is a Use I (water contact recreation, and protection of nontidal warmwater aquatic life nontidal stream). The project is not located within the Chesapeake Bay Critical Area (CBCA) or within a FEMA floodplain.

In proposed conditions, three inlets and three manholes are added to the existing drainage network. All the structures except one manhole are within the MCDOT right-of-way and will be MCDOT owned. One manhole will be SHA owned. The proposed inlets will improve roadway drainage by intercepting more runoff and limiting spread and bypass prior to entering the intersection and within the bikeways.

Proposed inlet spacing is based on a maximum spread of 8-ft and flow interception of 70% or greater. The rainfall intensity used for both was from Table 3-8 of the Montgomery County Drainage Design Criteria manual. Due to existing limitations with utilities, drive entrances, and tree planters two of the proposed inlets are unable to meet the spread requirements, and one does not meet the pick-up requirements. However, they are improving the existing condition for safer driving and biking conditions. Storm drains were sized for the 10-year storm. HGL analyses have not been performed at this 35% design stage and will be performed during the 65% design stage.

The modification to the existing storm drain system with the proposed additions along Cheltenham Drive will result in minor changes to the existing drainage divides, and a slight decrease to overall project discharges.

TABLE 1: EXISTING AND PROPOSED DISCHARGES

POI	EXISTING 10-YR (CFS)	PROPOSED 10-YR (CFS)	CHANGE (CFS)
POI-1	35.11	35.11	0
POI-2	0.81	0.80	-.01

Appendices

A – RATIONALS

EXISTING CONDITIONS

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

		BY	DATE
EX I-1			
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	1285.00	0.90	1156.50	0.90	1156.50
D	2-7%	Open Space	143.00	0.24	34.32	0.24	34.32
TOTALS			1428.00		1190.82		1190.82

COMPOSITE C FACTOR (2, 10-YR): 0.83
COMPOSITE C FACTOR (25-YR): 0.83

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	0.15
10	7.07	0.19
25	8.05	0.22

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

EX I-2		BY	DATE
		COMPUTED	SMH 12/10/2024
		CHECKED	LA

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM	
				C	CA	C
---	---	Impervious	29403.00	0.90	26462.70	0.90
D	2-7%	Open Space	4566.00	0.24	1095.84	0.24
TOTALS			33969.00		27558.54	27558.54

COMPOSITE C FACTOR (2, 10-YR): 0.81
COMPOSITE C FACTOR (25-YR): 0.81

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	3.49
10	7.07	4.47
25	8.05	5.09

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-3		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	
	CHECKED	LA	

SOIL TYPE							
	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM		25-YR STORM	
---				C	CA	C	CA
D	---	Impervious	24085.00	0.90	21676.50	0.90	21676.50
	2-7%	Open Space	6470.00	0.24	1552.80	0.24	1552.80
TOTALS			30555.00		23229.30		23229.30

COMPOSITE C FACTOR (2, 10-YR): 0.76
COMPOSITE C FACTOR (25-YR): 0.76

TIME OF CONCENTRATION

Tc = 7.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	4.94	2.63
10	6.52	3.48
25	7.49	3.99

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-4		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	22537.00	0.90	20283.30	0.90	20283.30
D	2-7%	Open Space	2109.00	0.24	506.16	0.24	506.16
TOTALS			24646.00		20789.46		20789.46

COMPOSITE C FACTOR (2, 10-YR): 0.84
COMPOSITE C FACTOR (25-YR): 0.84

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	2.63
10	7.07	3.37
25	8.05	3.84

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

MIDAS LOT		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	10084.00	0.90	9075.60	0.90	9075.60
D	2-7%	Open Space	1047.00	0.24	251.28	0.24	251.28
TOTALS			11131.00		9326.88		9326.88

TIME OF CONCENTRATION COMPOSITE C FACTOR (2, 10-YR): 0.84
COMPOSITE C FACTOR (25-YR): 0.84

Tc =
5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.18
10	7.07	1.51
25	8.05	1.72

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

		BY	DATE
EX I-5			
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	13402.00	0.90	12061.80	0.90	12061.80
D	2-7%	Open Space	694.00	0.24	166.56	0.24	166.56
TOTALS			14096.00		12228.36		12228.36

COMPOSITE C FACTOR (2, 10-YR): 0.87
COMPOSITE C FACTOR (25-YR): 0.87

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.55
10	7.07	1.98
25	8.05	2.26

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-6		BY	DATE
		COMPUTED	SMH 12/10/2024
		CHECKED	LA

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM	
				C	CA	C
---	---	Impervious	16796.00	0.90	15116.40	0.90
D	2-7%	Open Space	1239.00	0.24	297.36	0.24
TOTALS			18035.00		15413.76	15413.76

COMPOSITE C FACTOR (2, 10-YR): 0.85
COMPOSITE C FACTOR (25-YR): 0.85

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.95
10	7.07	2.50
25	8.05	2.85

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-7		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	14323.00	0.90	12890.70	0.90	12890.70
D	2-7%	Open Space	1615.00	0.24	387.60	0.24	387.60
TOTALS			15938.00		13278.30		13278.30

COMPOSITE C FACTOR (2, 10-YR): 0.83
COMPOSITE C FACTOR (25-YR): 0.83

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.68
10	7.07	2.16
25	8.05	2.45

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-8		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	67838.00	0.90	61054.20	0.90	61054.20
D	2-7%	Open Space	2881.00	0.24	691.44	0.24	691.44
TOTALS			70719.00		61745.64		61745.64

COMPOSITE C FACTOR (2, 10-YR): 0.87
COMPOSITE C FACTOR (25-YR): 0.87

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	7.82
10	7.07	10.02
25	8.05	11.41

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX-I-13		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	11720.00	0.90	10548.00	0.90	10548.00
D	2-7%	Open Space	182.00	0.24	43.68	0.24	43.68
TOTALS			11902.00		10591.68		10591.68

COMPOSITE C FACTOR (2, 10-YR): 0.89
COMPOSITE C FACTOR (25-YR): 0.89

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.34
10	7.07	1.72
25	8.05	1.96

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

		BY	DATE
EX I-9			
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	7599.00	0.90	6839.10	0.90	6839.10
D	2-7%	Open Space	459.00	0.24	110.16	0.24	110.16
TOTALS			8058.00		6949.26		6949.26

COMPOSITE C FACTOR (2, 10-YR): 0.86
COMPOSITE C FACTOR (25-YR): 0.86

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	0.88
10	7.07	1.13
25	8.05	1.28

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

<i>EX I-10</i>		BY	DATE
		COMPUTED	SMH 12/10/2024
		CHECKED	LA

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM	
				C	CA	CA
---	---	Impervious	10484.00	0.90	9435.60	9435.60
D	2-7%	Open Space	831.00	0.24	199.44	199.44
TOTALS			11315.00		9635.04	9635.04

COMPOSITE C FACTOR (2, 10-YR): 0.85
COMPOSITE C FACTOR (25-YR): 0.85

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.22
10	7.07	1.56
25	8.05	1.78

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-11		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	23205.00	0.90	20884.50	0.90	20884.50
D	2-7%	Open Space	921.00	0.24	221.04	0.24	221.04
TOTALS			24126.00		21105.54		21105.54

COMPOSITE C FACTOR (2, 10-YR): 0.87
COMPOSITE C FACTOR (25-YR): 0.87

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	2.67
10	7.07	3.43
25	8.05	3.90

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-12		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	7476.00	0.90	6728.40	0.90	6728.40
D	2-7%	Open Space	349.00	0.24	83.76	0.24	83.76
TOTALS			7825.00		6812.16		6812.16

COMPOSITE C FACTOR (2, 10-YR): 0.87
COMPOSITE C FACTOR (25-YR): 0.87

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	0.86
10	7.07	1.11
25	8.05	1.26

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

POI-2		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	5182.00	0.90	4663.80	0.90	4663.80
D	2-7%	Open Space	3195.00	0.24	766.80	0.24	766.80
TOTALS			8377.00		5430.60		5430.60

COMPOSITE C FACTOR (2, 10-YR): 0.65
COMPOSITE C FACTOR (25-YR): 0.65

TIME OF CONCENTRATION

Tc = 7.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	4.94	0.62
10	6.52	0.81
25	7.49	0.93

PROPOSED CONDITIONS

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

EX I-2		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM		25-YR STORM	
				C	CA	C	CA
---	---	Impervious	7609.00	0.90	6848.10	0.90	6848.10
D	2-7%	Open Space	1248.00	0.24	299.52	0.24	299.52
TOTALS			8857.00		7147.62		7147.62

COMPOSITE C FACTOR (2, 10-YR): 0.81
COMPOSITE C FACTOR (25-YR): 0.81

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	0.91
10	7.07	1.16
25	8.05	1.32

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

EX I-3		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	
	CHECKED	LA	

SOIL TYPE							
	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM		25-YR STORM	
---				C	CA	C	CA
D	---	Impervious	24085.00	0.90	21676.50	0.90	21676.50
	2-7%	Open Space	6470.00	0.24	1552.80	0.24	1552.80
TOTALS			30555.00		23229.30		23229.30

COMPOSITE C FACTOR (2, 10-YR): 0.76
COMPOSITE C FACTOR (25-YR): 0.76

TIME OF CONCENTRATION

Tc = 7.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	4.94	2.63
10	6.52	3.48
25	7.49	3.99

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-4		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM	
				C	CA	CA
---	---	Impervious	22537.00	0.90	20283.30	20283.30
D	2-7%	Open Space	2109.00	0.24	506.16	506.16
TOTALS			24646.00		20789.46	20789.46

COMPOSITE C FACTOR (2, 10-YR): 0.84
COMPOSITE C FACTOR (25-YR): 0.84

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	2.63
10	7.07	3.37
25	8.05	3.84

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

MIDAS LOT		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM	
				C	CA	CA
---	---	Impervious	10084.00	0.90	9075.60	9075.60
D	2-7%	Open Space	1047.00	0.24	251.28	251.28
TOTALS			11131.00		9326.88	9326.88

TIME OF CONCENTRATION COMPOSITE C FACTOR (2, 10-YR): 0.84
COMPOSITE C FACTOR (25-YR): 0.84

Tc =

5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.18
10	7.07	1.51
25	8.05	1.72

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

I-2		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM	
				C	CA	CA
---	---	Impervious	21891.00	0.90	19701.90	19701.90
D	2-7%	Open Space	3222.00	0.24	773.28	773.28
TOTALS			25113.00		20475.18	20475.18

TIME OF CONCENTRATION COMPOSITE C FACTOR (2, 10-YR): 0.82
COMPOSITE C FACTOR (25-YR): 0.82

Tc =

5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	2.59
10	7.07	3.32
25	8.05	3.78

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

		BY	DATE
EX I-5			
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	13402.00	0.90	12061.80	0.90	12061.80
D	2-7%	Open Space	694.00	0.24	166.56	0.24	166.56
TOTALS			14096.00		12228.36		12228.36

COMPOSITE C FACTOR (2, 10-YR): 0.87
COMPOSITE C FACTOR (25-YR): 0.87

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.55
10	7.07	1.98
25	8.05	2.26

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

EX I-6		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM		25-YR STORM	
				C		CA	C
---	---	Impervious	16796.00	0.90	15116.40	0.90	15116.40
D	2-7%	Open Space	1239.00	0.24	297.36	0.24	297.36
TOTALS			18035.00		15413.76		15413.76

COMPOSITE C FACTOR (2, 10-YR): 0.85
COMPOSITE C FACTOR (25-YR): 0.85

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.95
10	7.07	2.50
25	8.05	2.85

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

<i>EX I-7</i>		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM		25-YR STORM	
				C		CA	C
---	---	Impervious	14323.00	0.90	12890.70	0.90	12890.70
D	2-7%	Open Space	1615.00	0.24	387.60	0.24	387.60
TOTALS			15938.00		13278.30		13278.30

COMPOSITE C FACTOR (2, 10-YR): 0.83
COMPOSITE C FACTOR (25-YR): 0.83

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.68
10	7.07	2.16
25	8.05	2.45

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-8		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	47658.00	0.90	42892.20	0.90	42892.20
D	2-7%	Open Space	2699.00	0.24	647.76	0.24	647.76
TOTALS			50357.00		43539.96		43539.96

COMPOSITE C FACTOR (2, 10-YR): 0.86
COMPOSITE C FACTOR (25-YR): 0.86

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	5.52
10	7.07	7.07
25	8.05	8.05

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

<i>EX-I-13</i>		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	11720.00	0.90	10548.00	0.90	10548.00
D	2-7%	Open Space	182.00	0.24	43.68	0.24	43.68
TOTALS			11902.00		10591.68		10591.68

COMPOSITE C FACTOR (2, 10-YR): 0.89
COMPOSITE C FACTOR (25-YR): 0.89

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.34
10	7.07	1.72
25	8.05	1.96

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

I-3		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	20181.00	0.90	18162.90	0.90	18162.90
D	2-7%	Open Space	181.00	0.24	43.44	0.24	43.44
TOTALS			20362.00		18206.34		18206.34

COMPOSITE C FACTOR (2, 10-YR): 0.89
COMPOSITE C FACTOR (25-YR): 0.89

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT (YR)	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	2.31
10	7.07	2.95
25	8.05	3.36

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB #: 2026213133

		BY	DATE
EX I-9			
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM		25-YR STORM	
				C	CA	C	CA
---	---	Impervious	7599.00	0.90	6839.10	0.90	6839.10
D	2-7%	Open Space	459.00	0.24	110.16	0.24	110.16
TOTALS			8058.00		6949.26		6949.26

COMPOSITE C FACTOR (2, 10-YR): 0.86
COMPOSITE C FACTOR (25-YR): 0.86

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	0.88
10	7.07	1.13
25	8.05	1.28

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-10		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	CA	25-YR STORM	
				C		C	CA
---	---	Impervious	10484.00	0.90	9435.60	0.90	9435.60
D	2-7%	Open Space	831.00	0.24	199.44	0.24	199.44
TOTALS			11315.00		9635.04		9635.04

COMPOSITE C FACTOR (2, 10-YR): 0.85
COMPOSITE C FACTOR (25-YR): 0.85

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	1.22
10	7.07	1.56
25	8.05	1.78

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-11		BY	DATE
		COMPUTED	SMH 12/10/2024
		CHECKED	LA

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM	
				C	CA	C CA
---	---	Impervious	23205.00	0.90	20884.50	0.90 20884.50
D	2-7%	Open Space	921.00	0.24	221.04	0.24 221.04
TOTALS			24126.00		21105.54	21105.54

COMPOSITE C FACTOR (2, 10-YR): 0.87
COMPOSITE C FACTOR (25-YR): 0.87

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	2.67
10	7.07	3.43
25	8.05	3.90

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

EX I-12		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM		25-YR STORM	
				C		CA	C
---	---	Impervious	7476.00	0.90	6728.40	0.90	6728.40
D	2-7%	Open Space	349.00	0.24	83.76	0.24	83.76
TOTALS			7825.00		6812.16		6812.16

COMPOSITE C FACTOR (2, 10-YR): 0.87
COMPOSITE C FACTOR (25-YR): 0.87

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	0.86
10	7.07	1.11
25	8.05	1.26

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

I-1		BY	DATE
	COMPUTED	SMH	12/10/2024
	CHECKED	LA	

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM	25-YR STORM		
				C	CA	C	CA
---	---	Impervious	1210.00	0.90	1089.00	0.90	1089.00
D	2-7%	Open Space	93.00	0.24	22.32	0.24	22.32
TOTALS			1303.00		1111.32		1111.32

COMPOSITE C FACTOR (2, 10-YR): 0.85
COMPOSITE C FACTOR (25-YR): 0.85

TIME OF CONCENTRATION

Tc = 5.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	5.52	0.14
10	7.07	0.18
25	8.05	0.21

STANTEC
PROJECT: CHELTENHAM DRIVE
STANTEC JOB # : 2026213133

POI-2		BY	DATE
		COMPUTED	SMH 12/10/2024
		CHECKED	LA

SOIL TYPE	% SLOPE	LANDUSE	AREA (SF)	2, 10-YR STORM		25-YR STORM	
				C		CA	C
---	---	Impervious	5055.00	0.90	4549.50	0.90	4549.50
D	2-7%	Open Space	3418.00	0.24	820.32	0.24	820.32
TOTALS			8473.00		5369.82		5369.82

COMPOSITE C FACTOR (2, 10-YR): 0.63
COMPOSITE C FACTOR (25-YR): 0.63

TIME OF CONCENTRATION

Tc = 7.0 MIN

STORM EVENT	RAINFALL INTENSITY	DISCHARGE (CFS)
2	4.94	0.61
10	6.52	0.80
25	7.49	0.92

B – INLET SPREAD

EXISTING CONDITIONS

INLET NO.	INCR. AREA (ac)	TOTAL AREA (ac)	C	CA	T.C. (min)	I ₁₀ (in/hr)	Base Flow (cfs)	OVER FLOW (cfs)	TOTAL INFLOW (cfs)	EFFICIENCY		FLOW BYPASS		INLET LENGTH		INLET TYPE	STREET SLOPE (%)	CROSS SLOPE (ft/ft)	CURB HEIGHT (ft)	THROAT DEPRESS. (in)	GUTTER FLOW				
										(cfs)	%	(cfs)	TO	COMP. (ft)	ACTUAL (ft)						DEPTH (ft)	SPREAD (ft)			
										(cfs)															
EX I-1	0.033	0.033	0.83	0.027	5.0	7.07	0.19	0.72	0.91	0.91	100.00%	0.00		15.00	15.00	15' COG	4.98%	0.042	0.5	1.5	0.13	3.16			
EX I-2	0.780	0.780	0.81	0.633	5.0	7.07	4.47	0.54	5.01	2.67	53.29%	2.34		10.00	10.00	10' COG	2.23%	0.0145	0.5	1.5	0.23	13.36			
EX I-6	0.414	0.414	0.85	0.354	5.0	7.07	2.50		2.50	1.96	78.40%	0.54	EX-I-2	2.50	5.00	COMBINED GRATE	1.37%	0.02	0.5	1.5	0.19	9.35			
EX-I-13	0.2732	0.273	0.89	0.243	5.0	7.07	1.72		1.72	1.00	58.14%	0.72	EX-I-1	5	5	5' COG	3.33%	0.042	0.5	1.5	0.18	4.34			
(FIRM NAME)					INLET COMPUTATION (EXISTING CONDITIONS)																	COMPUTED: SMH		DATE: 2/25/2025	
STANTEC																						CHECKED: RLP			
					PROJECT NAME CHELTENHAM DRIVE BIKEWAY																	SHEET NO.		PROJECT NO. 2026213133	

PROPOSED CONDITIONS

INLET NO.	INCR. AREA (ac)	TOTAL AREA (ac)	C	CA	T.C. (min)	I ₁₀ (in/hr)	Base Flow (cfs)	OVER FLOW (cfs)	TOTAL INFLOW (cfs)	EFFICIENCY		FLOW BYPASS		INLET LENGTH		INLET TYPE	STREET SLOPE (%)	CROSS SLOPE (ft/ft)	CURB HEIGHT (ft)	THROAT DEPRESS. (in)	GUTTER FLOW		
										(cfs)	%	(cfs)	TO	COMP. (ft)	ACTUAL (ft)						DEPTH (ft)	SPREAD (ft)	
I-1	0.030	0.030	0.85	0.026	5.0	7.07	0.18	0.72	0.90	0.90	100.00%	0.00		15.00	15.00	15' COG	4.98%	0.02	0.5	1.5	0.12	4.83	
EX I-5	0.324	0.324	0.87	0.281	5.0	7.07	1.98		1.98	1.59	80.30%	0.39	I-3	5.00	5.00	COMBINED GRATE	1.97%	0.02	0.5	1.5	0.16	8	
EX I-2	0.203	0.203	0.81	0.164	5.0	7.07	1.16	1.61	2.77	1.94	70.04%	0.83	OFFSITE	10.00	10.00	10' COG	2.23%	0.0145	0.5	1.5	0.19	10.61	
EX I-6	0.414	0.414	0.85	0.354	5.0	7.07	2.50		2.50	1.96	78.40%	0.54	I-2	2.50	5.00	COMBINED GRATE	1.37%	0.02	0.5	1.5	0.19	9.35	
EX-I-13	0.27323	0.273	0.89	0.243	5.0	7.07	1.72		1.72	1.00	58.14%	0.72	I-1	5	5	5' COG	3.33%	0.042	0.5	1.5	0.18	4.34	
I-2	0.577	0.577	0.82	0.470	5.0	7.07	3.32	0.54	3.86	2.25	58.29%	1.61	EX-I-2	10	10	10' COG	4.13%	0.02	0.5	1.5	0.2	8.79	
I-3	0.467	0.467	0.89	0.418	5.0	7.07	2.95	0.39	3.34	2.61	78.14%	0.73	OFFSITE	10	10	10' COG	1.03%	0.02	0.5	1.5	0.25	10.87	
STANTEC					INLET COMPUTATION (EXISTING CONDITIONS)															COMPUTED: SMH		DATE: 2/25/2025	
					PROJECT NAME															CHECKED: RLP			
					CHELTENHAM DRIVE BIKEWAY															SHEET NO.		PROJECT NO.	
																	2026213133						

LIMITED BY TREES AND ENTRANCES

LIMITED BY PLANTERS

C – PIPE CAPACITY COMPUTATIONS

EXISTING CONDITIONS

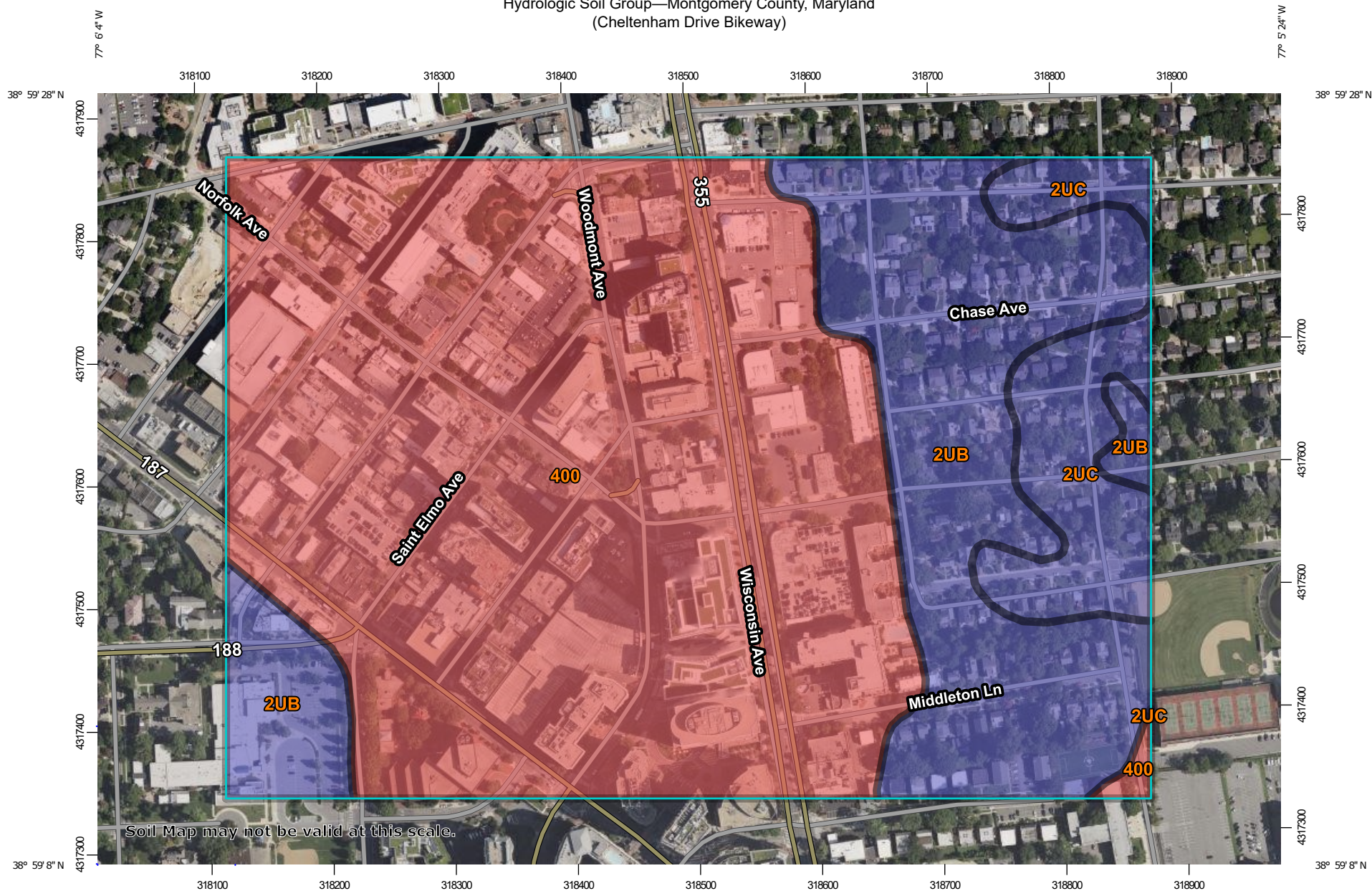
Structure		Contributing Area					10 Year Runoff					Pipe										REMARKS	
FROM	TO	C AREA (#)	A AREA (AC.)	C RUNOFF COEF.	C*A	ADJ. C*A	ΣA	ΣCA	tc Conc> (MIN)	Rain Intens. (IN/HR)	Q (CFS)	Size (IN)	Type	n MANNING Coef.	So Slope (%)	Top	L Length (FT)	Vo Vel. (FT/SEC)	Time in Pipe (MIN)	Capacity Full (CFS)	Normal Depth (IN)	% FULL	
EX-I-12	EX-MH-11		0.18	0.87	0.156		0.180	0.156	5.00	7.07	1.11	18	EX. RCP	0.013	0.50%	352.10	80	3.20	0.42	7.45	4.5	14.8%	
EX-I-11	EX-MH-11		0.55	0.87	0.485		0.554	0.485	5.00	7.07	3.43	18	EX. RCP	0.013	0.50%	351.80	12	4.20	0.05	7.45	8.5	46.0%	
EX-MH-11	EX-MH-10		---	---	---		0.733	0.641	5.42	6.95	4.46	21	EX. RCP	0.013	0.79%	351.50	225	5.31	0.71	14.09	8.0	31.6%	
EX-I-10	EX-MH-10		0.26	0.85	0.221		0.260	0.221	5.00	7.07	1.56	18	EX. RCP	0.013	0.50%	349.90	7	3.35	0.03	7.45	5.6	21.0%	
EX-I-9	EX-MH-10		0.185	0.86	0.160		0.185	0.160	5.00	7.07	1.13	18	EX. RCP	0.013	0.50%	350.00	78	3.09	0.42	7.45	4.7	15.1%	
EX-MH-10	EX-MH-9		---	---	---		1.178	1.022	6.12	6.75	6.90	24	EX. RCP	0.013	0.50%	349.90	183	5.03	0.61	16.04	10.8	43.0%	
EX-I-8	EX-MH-9		1.623	0.87	1.417		1.623	1.417	5.00	7.07	10.02	18	EX. RCP	0.013	1.00%	349.00	9	6.86	0.02	10.53	13.9	95.1%	
EX-MH-9	EX-MH-8		---	---	---		2.802	2.439	6.73	6.60	16.09	24	EX. RCP	0.013	0.57%	349.00	81	6.20	0.22	17.09	18.5	94.1%	
EX-I-7	EX-MH-8		0.366	0.83	0.305		0.366	0.305	5.00	7.07	2.16	18	EX. RCP	0.013	0.50%	348.00	41	3.76	0.18	7.45	6.5	28.9%	
EX-MH-8	EX-MH-5		---	---	---		3.168	2.744	6.95	6.55	17.96	24	EX. RCP	0.013	1.33%	348.16	90	9.13	0.16	26.19	14.4	68.6%	
EX-I-6	EX-MH-7		0.414	0.85	0.354		0.414	0.354	5.00	7.07	2.50	18	EX. RCP	0.013	0.50%	353.00	90	3.92	0.38	7.45	7.0	33.6%	
EX-I-5	EX-MH-7		0.324	0.87	0.281		0.324	0.281	5.00	7.07	1.98	18	EX. RCP	0.013	0.50%	352.00	19	3.60	0.09	7.45	6.3	26.6%	
EX-MH-7	EX-MH-5		---	---	---		0.738	0.635	5.38	6.95	4.41	21	EX. RCP	0.013	2.34%	351.51	181	8.01	0.38	24.32	5.9	18.1%	
EX-MH-5	EX-MH-1		---	---	---		3.905	3.379	7.11	6.50	21.95	24	EX. RCP	0.013	2.40%	348.88	322	11.86	0.45	35.12	13.7	62.5%	
EX-I-4	EX-MH-4		0.566	0.84	0.477		0.566	0.477	5.00	7.07	3.37	15	EX. RCP	0.013	6.14%	346.00	22	10.41	0.04	16.05	4.7	21.0%	
EX-I-3	EX-MH-4		0.70	0.760	0.533		0.70	0.533	5.00	7.07	3.77	15	EX. RCP	0.013	7.00%	344.50	10	11.63	0.01	17.14	4.7	22.0%	
MIDAS	EX-MH-4		0.26	0.838	0.214		0.256	0.214	5.00	7.07	1.51	15	EX. RCP	0.013	0.50%	346.00	10	3.42	0.05	4.58	5.9	33.1%	
EX-MH-4	EX-MH-3		---	---	---		1.523	1.225	5.05	7.07	8.66	15	EX. RCP	0.013	1.33%	344.15	114	7.06	0.27	7.48	15.0	115.8%	
EX-MH-3	EX-MH-2		---	---	---		1.523	1.225	5.05	7.07	8.66	15	EX. RCP	0.013	2.23%	342.15	100	9.02	0.18	9.67	11.0	89.5%	
EX-MH-2	EX-I-2		---	---	---		1.523	1.225	5.05	7.07	8.66	15	EX. RCP	0.013	0.01%	339.12	16	7.06	0.04	0.72	15.0	1195.6%	
EX-I-2	EX-I-1		0.780	0.81	0.633		2.303	1.857	5.32	6.98	12.97	18	EX. RCP	0.013	0.63%	339.25	38	7.34	0.09	8.37	18.0	154.9%	
EX-I-13	EX-I-1		0.273	0.89	0.243		0.273	0.243	5.00	7.07	1.72	12	EX. STEEL	0.012	5.90%	341.73	82	9.55	0.14	9.40	3.4	18.3%	
EX-I-1	EX-MH-1		0.03	0.83	0.027		2.609	2.128	5.40	6.95	14.80	18	EX. RCP	0.013	2.13%	338.78	16	10.01	0.03	15.35	14.0	96.4%	
EX-MH-1	EX-MH-6		---	---	---		6.514	5.506	7.56	6.38	35.11	24	EX. RCP	0.013	2.40%	339.00	40	12.88	0.05	35.14	19.4	99.9%	

PROPOSED CONDITIONS

Structure		Contributing Area					10 Year Runoff					Pipe							
FROM	TO	C AREA (#)	A AREA (AC.)	C RUNOFF COEF.	C*A	ADJ. C*A	ΣA	ΣCA	tc Time Conc> (MIN)	if Rain Intens. (IN/HR)	Q (CFS)	Size (IN)	Type	n MANNING Coef.	So Slope (%)	lower invert	upper invert	Top	L Length (FT)
EX-I-12	EX-MH-11		0.18	0.87	0.156		0.180	0.156	5.00	7.07	1.11	18	EX. RCP	0.013	0.50%			352.10	80
EX-I-11	EX-MH-11		0.55	0.87	0.485		0.554	0.485	5.00	7.07	3.43	18	EX. RCP	0.013	0.50%			351.80	12
EX-MH-11	EX-MH-10		---	---	---		0.733	0.641	5.42	6.95	4.46	21	EX. RCP	0.013	0.79%	344.32	346.09	351.50	225
EX-I-10	EX-MH-10		0.26	0.85	0.221		0.260	0.221	5.00	7.07	1.56	18	EX. RCP	0.013	0.50%	344.32		349.90	7
EX-I-9	EX-MH-10		0.185	0.86	0.160		0.185	0.160	5.00	7.07	1.13	18	EX. RCP	0.013	0.50%	344.32		350.00	78
EX-MH-10	EX-MH-9		---	---	---		1.178	1.022	6.12	6.75	6.90	24	EX. RCP	0.013	0.50%		344.32	349.90	183
EX-I-8	EX-MH-9		1.156	0.86	1.000		1.156	1.000	5.00	7.07	7.07	18	EX. RCP	0.013	1.00%	343.00		349.00	9
EX-MH-9	EX-MH-8		---	---	---		2.334	2.021	6.73	6.60	13.34	24	EX. RCP	0.013	0.57%	342.54	343.00	349.00	81
EX-I-7	EX-MH-8		0.366	0.83	0.305		0.366	0.305	5.00	7.07	2.16	18	EX. RCP	0.013	0.50%	342.54		348.00	41
EX-MH-8	EX-MH-5		---	---	---		2.700	2.326	6.95	6.52	15.17	24	EX. RCP	0.013	1.33%	340.66	341.86	348.16	90
EX-I-6	EX-MH-7		0.414	0.85	0.354		0.414	0.354	5.00	7.07	2.50	18	EX. RCP	0.013	0.50%	346.00		353.00	90
EX-I-5	EX-MH-7		0.324	0.87	0.281		0.324	0.281	5.00	7.07	1.98	18	EX RCP	0.013	0.50%	346.00		352.00	19
EX-MH-7	MH-3		---	---	---		0.738	0.635	5.38	6.95	4.41	21	EX RCP	0.013	2.34%	342.49	344.97	351.51	106
I-3	MH-3		0.467	0.89	0.418		0.467	0.418	5.00	7.07	2.95	15	RCP	0.013	0.50%	343.00	343.60	350.00	119
MH-3	EX-MH-5		---	---	---		1.205	1.053	5.38	6.95	7.32	21	EX RCP	0.013	2.34%	340.73	342.39	350.05	71
EX-MH-5	MH-2		---	---	---		3.905	3.379	7.12	6.50	21.95	24	EX RCP	0.013	2.39%	336.79	340.55	348.88	157
EX-I-4	EX-MH-4		0.566	0.84	0.477		0.566	0.477	5.00	7.07	3.37	15	EX RCP	0.013	6.14%	340.05	341.40	346.00	22
EX-I-3	EX-MH-4		0.70	0.760	0.533		0.70	0.533	5.00	7.07	3.77	15	EX RCP	0.013	7.00%	341.25	341.95	344.50	10
MIDAS	EX-MH-4		0.26	0.838	0.214		0.256	0.214	5.00	7.07	1.51	15	EX RCP	0.013	0.50%			346.00	10
EX-MH-4	EX-MH-3		---	---	---		1.523	1.225	5.05	7.07	8.66	15	EX RCP	0.013	1.33%	337.11	338.63	344.15	114
I-2	MH-2		0.577	0.82	0.470		0.577	0.470	5.00	7.07	3.32	15	RCP	0.013	1.08%	336.34	337.00	345.00	61
MH-2	EX-MH-1		---	---	---		4.482	3.849	7.34	6.45	24.82	24	RCP	0.013	2.12%	332.83	336.24	345.00	161
EX-MH-3	EX-MH-2		---	---	---		1.523	1.225	5.32	6.98	8.55	15	EX RCP	0.013	2.23%	334.83	337.06	342.15	100
EX-MH-2	EX-I-2		---	---	---		1.523	1.225	5.32	6.98	8.55	15	EX RCP	0.013	0.01%	334.74	334.74	339.12	16
EX-I-2	EX-I-1-MH		0.203	0.81	0.164		1.726	1.389	5.32	6.98	9.70	18	EX RCP	0.013	0.63%	334.47	334.71	339.25	38
EX-I-13	MH-1		0.273	0.89	0.243		0.273	0.243	5.00	7.07	1.72	12	EX STEEL	0.012	5.90%	335.26	339.21	341.73	67
I-1	MH-1		0.030	0.85	0.026		0.030	0.026	5.00	7.07	0.18	15	RCP	0.013	2.22%	335.10	335.30	339.30	9
MH-1	EX-I-1-MH		---	---	---		0.303	0.269	5.12	7.04	1.89	15	RCP	0.013	3.75%	334.00	334.30	338.78	8
EX-I-1-MH	EX-MH-1		---	---	---		2.029	1.657	5.43	6.95	11.53	18	EX RCP	0.013	2.13%	332.83	333.17	338.78	16
EX-MH-1	EX-MH-6		---	---	---		6.511	5.506	7.57	6.38	35.11	24	EX RCP	0.013	2.40%	331.87	332.83	339.00	40

D – DRAINAGE AREA MAPS

Hydrologic Soil Group—Montgomery County, Maryland (Cheltenham Drive Bikeway)



Soil Map may not be valid at this scale.

Map Scale: 1:4,430 if printed on A landscape (11" x 8.5") sheet.

0 50 100 200 300 Meters

0 200 400 800 1200 Feet

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



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

12/3/2024
Page 1 of 4

Hydrologic Soil Group—Montgomery County, Maryland (Cheltenham Drive Bikeway)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines

 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points

 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available

Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
 Web Soil Survey URL:
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Montgomery County, Maryland
 Survey Area Data: Version 20, Sep 6, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 30, 2022—Sep 1, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
2UB	Glenelg-Urban land complex, 0 to 8 percent slopes	B	25.9	26.4%
2UC	Glenelg-Urban land complex, 8 to 15 percent slopes	B	7.4	7.6%
400	Urban land	D	64.9	66.1%
Totals for Area of Interest			98.2	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

EXISTING CONDITIONS

2/26/2025
U:\2026\213133\700 CADD\702 Sheets\pDA-E001_CheltenhamDr.dgn



MATCH LINE SEE SHEET DA-02

DA-01

40' 0 40' 80'
SCALE: 1" = 40'



810 Glenaeles Court, Suite 300
Baltimore, MD 21286
www.stantec.com

LEGEND
--- DRAINAGE AREA BOUNDARY

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: SMH	DATE: FEBRUARY 2025
DRAWN BY: SMH	DATE: FEBRUARY 2025
CHECKED BY: LRA	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:
RECOMMENDED FOR APPROVAL	
Chief, Design Section	Date
APPROVED	
Chief, Division of Transportation Engineering	Date

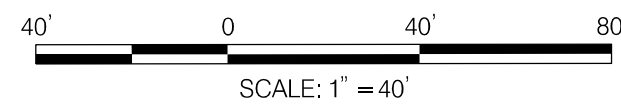
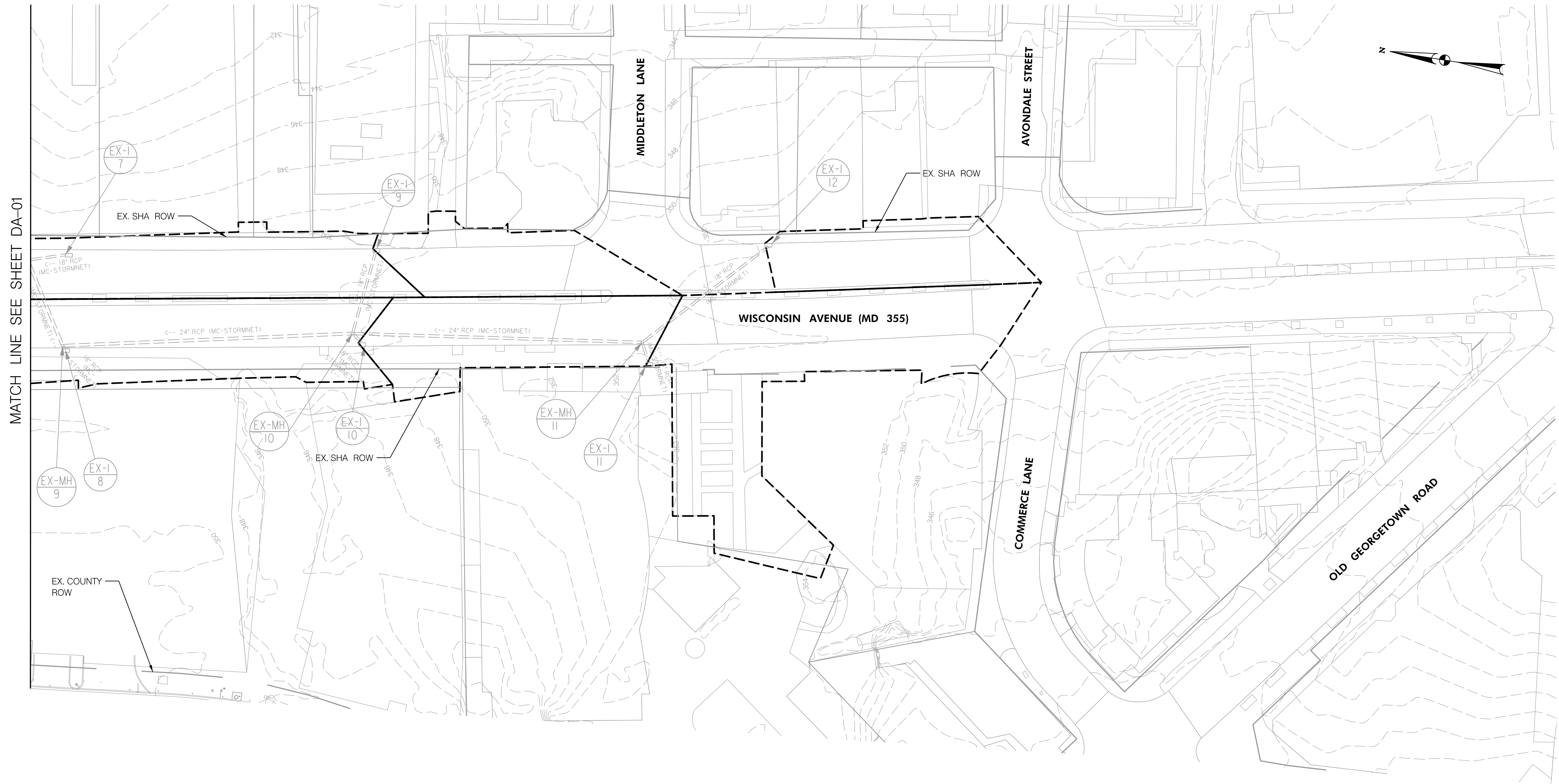
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELtenham DRIVE BIKEWAY
EXISTING DRAINAGE AREA MAP

SCALE: 1" = 40' PROJECT NO.: 500119 SHEET 12 of 38

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED
OR APPROVED BY ME, AND THAT I AM A DULY LICENSED
PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE
OF MARYLAND.
LICENSE NO: _____ EXPIRATION DATE: _____

2/26/2025
U:\2026\2133\700 CADD\702 Sheets\pDA-E002.CheltenhamDr.dgn



810 Gleneagles Court, Suite 300
Baltimore, MD 21286
www.stantec.com

LEGEND

--- DRAINAGE AREA BOUNDARY

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: SMH	DATE: FEBRUARY 2025
DRAWN BY: SMH	DATE: FEBRUARY 2025
CHECKED BY: LRA	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:
RECOMMENDED FOR APPROVAL	
Chief, Design Section	Date
APPROVED	
Chief, Division of Transportation Engineering	Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
EXISTING DRAINAGE AREA MAP

SCALE: 1" = 40'

PROJECT NO.: 500119 SHEET 13 of 38

DA-02

PROPOSED CONDITIONS

