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38	XS-09	ROADWAY CROSS SECTIONS 03-MR2026005-038 (XS09)

OWNER'S CERTIFICATION

I HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION AND/OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF NATURAL RESOURCES APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT.

DATE

JOSE THOMMANA
CHIEF, DIVISION OF
TRANSPORTATION ENGINEERING

DESIGN CERTIFICATION

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DATE

LORI R. ADGATE, P.E.
MD. REGISTRATION NO. 28255

CERTIFICATION OF THE QUANTITIES

I HEREBY CERTIFY THAT THE ESTIMATED TOTAL AMOUNT OF EXCAVATION AND FILL AS SHOWN ON THESE PLANS HAS BEEN COMPUTED TO XXX CUBIC YARDS OF EXCAVATION, XXX CUBIC YARDS OF FILL AND THE TOTAL AREA TO BE DISTURBED AS SHOWN ON THESE PLANS HAS BEEN DETERMINED TO BE XX,XXX SQUARE FEET.

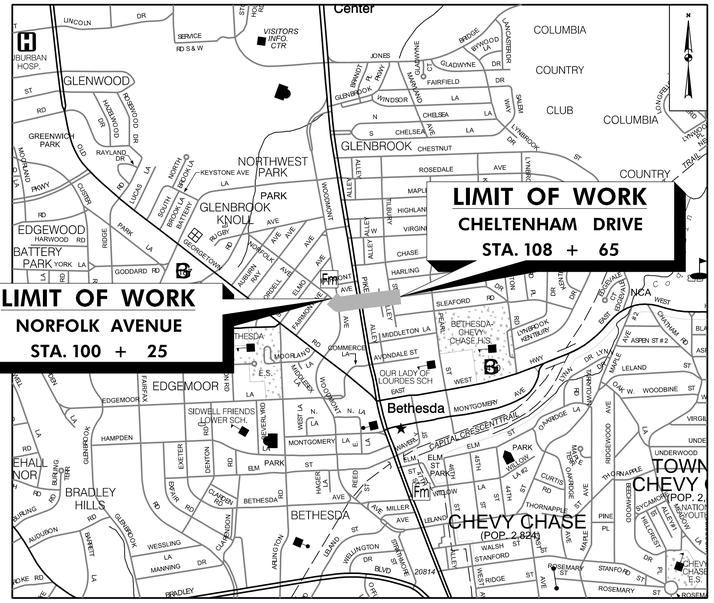
DATE

LORI R. ADGATE, P.E.
MD. REGISTRATION NO. 28255

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION
CHELTENHAM DRIVE BIKEWAY

MR2026005

CIP PROJECT NO. 500119
SHA TRACKING NO. XX-XX-XX-00X-XX



VICINITY MAP
SCALE: 1" = 1000'

LENGTH OF PROJECT:
NORFOLK AVENUE = 0.09 miles
CHELTENHAM DRIVE = 0.08 miles

RELATED REQUIRED PERMITS					
IT IS THE RESPONSIBILITY OF PERMITTEE/OWNER OF THIS SITE TO OBTAIN ALL REQUIRED PERMITS PRIOR TO ISSUANCE OF APPROVED SEDIMENT CONTROL PERMIT					
TYPE OF PERMIT	REQD	NOT REQD	PERMIT NO.	EXPIRATION DATE	WORK RESTRICTION DATES
MCDPS Floodplain District		X			
WATERWAY/WETLAND(S)					
a. Corps of Engineers		X			
b. MDE		X			
c. MDE Water Certification		X			
MDE Dam Safety		X			
DPS Roadside Trees Protection Plan		X			
N.P.D.E.S. NOTICE OF INTENT	X				DATE FILED
FEMA LOMR (Required Post Construction)		X			
SHA Access Permit:	X				
MCDPS SEDIMENT CONTROL	X				

The following standards (construction and temporary traffic control) are required for this project:

A. MD 104.02-10 - Flagging Operation/2-Lane, 2-Way Equal/ Less than 40 MPH
B. MD 580.03 - New Combination Curb & Gutter Placement Along Existing Pavement
C. MD 620.02-01 - Standard Types C And D Concrete Curb and Combination Concrete Curb & Gutter
D. MD 620.03 - Depressed Curb for Combination Curb and Gutter and Depressed Curb for Sidewalk Ramps
E. MD 630.01 - Standard Entrance Construction Residential & Commerial Method No.1
F. MD 630.02 - Standard Entrance Construction Residential & Commerial Method No.2
G. MD 645.01 - Standard Monolithic Concrete Median Type A
H. MD 655.11 - Sidewalk Ramps Perpendicular
I. MD 655.12 - Sidewalk Ramps Parallel
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N. MC-111.01 - Business District Sidewalk

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https://www.montgomerycountymd.gov/dot-dte/common/standards.html

MISS UTILITY

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35% SUBMITTAL
FEB. 2025

OWNER - MONTGOMERY COUNTY DEPT. OF TRANSPORTATION
JOSEPH MOGES
100 Edison Park Drive, 4th Floor
Gaithersburg, MD 20878
(227)251-1268
joseph.moges@montgomerycountymd.gov

PROJECT MANAGER
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NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	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

MR2026005

CHELTENHAM DRIVE BIKEWAY
TITLE SHEET

SCALE: N.T.S. PROJECT NO.: 500119 SHEET 01 of 38

TI-01

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: _____

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

2/27/2025
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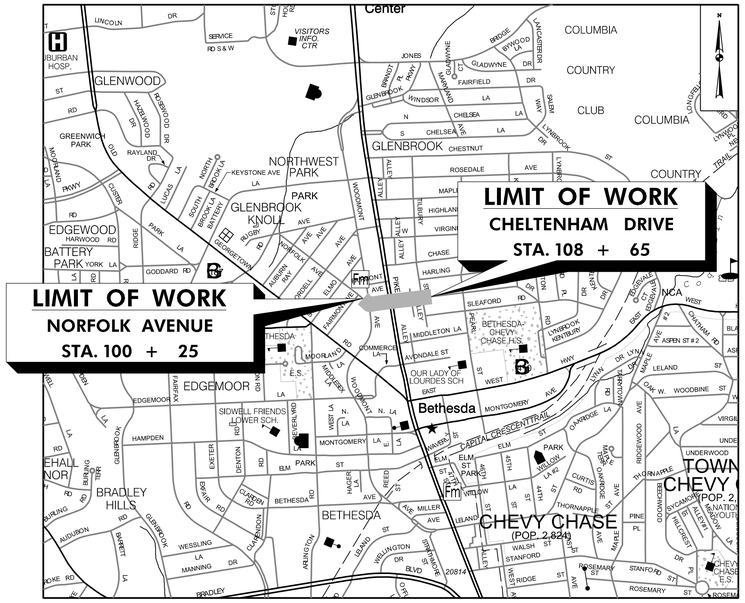
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Chief, Design Section — Date

APPROVED

Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
TITLE SHEET

SCALE: N.T.S. PROJECT NO.: 500119 SHEET 01 of 38

TI-01

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Stantec
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Baltimore, MD 21286
www.stantec.com

2/27/2025
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GENERAL NOTES

1. THE SPECIFICATIONS FOR THIS CONTRACT WILL BE THOSE OF THE MARYLAND STATE HIGHWAY ADMINISTRATION DATED JULY 2024, ALL ERATA AND ADDENDA THERETO, AND THE MARYLAND STATE HIGHWAY ADMINISTRATION BOOK OF STANDARDS FOR HIGHWAY AND INCIDENTAL STRUCTURES.
2. FOR CONSTRUCTION, HORIZONTAL SHALL BE BASED ON NAD 83/91 DATUM AND VERTICAL SHALL BE BASED ON NAVD 1988 DATUM.
3. INFORMATION CONCERNING UNDERGROUND UTILITIES WAS OBTAINED FROM AVAILABLE RECORDS, BUT THE CONTRACTOR MUST DETERMINE THE EXACT LOCATIONS AND ELEVATIONS OF THE LINES BY DIGGING TEST PITS BY HAND AT ALL UTILITY CROSSINGS, WELL IN ADVANCE OF TRENCHING. IF CLEARANCES ARE LESS THAN SHOWN OR SIX (6) INCHES, WHICHEVER IS LESS, CONTACT MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION'S PROJECT INSPECTOR AND THE APPROPRIATE UTILITY OWNER BEFORE PROCEEDING WITH CONSTRUCTION.
4. REPAIRS TO UTILITIES OR PROPERTY DAMAGE AS A RESULT OF THE CONTRACTOR'S NEGLIGENCE OR METHOD OF OPERATION MUST BE MADE AT THE CONTRACTOR'S EXPENSE BEFORE PROCEEDING WITH CONSTRUCTION.
5. CALL "MISS UTILITY" AT 1-800-257-7777 FORTY-EIGHT (48) HOURS PRIOR TO BEGINNING EXCAVATION TO DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES.
6. CLEARING IS TO BE LIMITED TO THE "LIMIT OF DISTURBANCE" AS SHOWN ON THE PLANS.
7. ALL GRADING SHALL BE DONE IN SUCH A MANNER AS TO PROVIDE POSITIVE DRAINAGE.
8. DISTURBED AREAS ADJACENT TO ESTABLISHED LAWNS AND WATER QUALITY SWALES SHALL BE SODDED. OTHER DISTURBED AREAS SHALL BE SEEDED AND MULCHED.
9. THE CONTRACTOR SHALL OBTAIN A ROADSIDE TREE PERMIT FOR ANY MAINTENANCE, TREATMENT, PLANTING, REMOVAL, OR ROOT CUTTING ON TREES WITHIN THE PUBLIC RIGHT OF WAY. PERMIT REQUIREMENTS MAY BE OBTAINED FROM THE DEPARTMENT OF NATURAL RESOURCES, MARYLAND FOREST, PARK AND WILDLIFE SERVICE, TELEPHONE 301-854-6060
10. THE LOCATION OF RIGHT-OF-WAY AND EASEMENT LINES SHOWN ON THE PLANS ARE FOR INFORMATION AND GUIDANCE ONLY. NO GUARANTEE IS MADE AS TO THE ACCURACY OF SAID LOCATIONS. PLEASE REFER TO THE APPROPRIATE RIGHT-OF-WAY PLATS.
11. THE CONTRACTOR SHALL INSTALL PEDESTRIAN DETECTABLE WARNING SURFACES AT ALL SIDEWALK & PEDESTRIAN CROSSINGS. LOCATIONS AS DIRECTED BY THE ENGINEER. THE WARNING SURFACES SHALL BE IN CONFORMANCE WITH ADA REQUIREMENTS AND THE PROJECT SPECIAL PROVISION.
12. THE DESIGN FOR THIS PROJECT HAS INCORPORATED FACILITIES FOR THE ELDERLY AND HANDICAPPED IN COMPLIANCE WITH STATE AND FEDERAL LEGISLATION.
13. ALL UTILITY POLES NOTED FOR RELOCATION SHALL BE PERFORMED BY OTHERS.

SYMBOLS

EXISTING RIGHT OF WAY LINE
PROPOSED RIGHT OF WAY LINE
PROPOSED TRAFFIC BARRIER
EXISTING TRAFFIC BARRIER
EXISTING WOOD FENCE LINE
EXISTING CHAIN LINK FENCE LINE
BASE OR SURVEY LINE
EXISTING FIRE HYDRANT
PROPOSED STORM DRAIN
EXISTING STORM DRAIN
EXISTING INLET
EXISTING UTILITY POLE
EXISTING TREE
EXISTING TREE LINE

CUT SLOPE — C —
FILL SLOPE — F —
LIMIT OF DISTURBANCE — LOD —
SILT FENCE — SF —
SUPER SILT FENCE — SSF —
DIVERSION FENCE — DF —
STONE CHECK DAM CD
TEMPORARY STONE OUTLET STRUCTURE TSOS
TEMPORARY GABION OUTLET STRUCTURE TGOS
AT-GRADE INLET PROTECTION AGIP
CURB INLET PROTECTION CIP
MEDIAN INLET PROTECTION MIP
STANDARD INLET PROTECTION SIP
STABILIZED CONSTRUCTION ENTRANCE SCE

ABBREVIATIONS

A.A.S.H.T.O.	American Association of State Highway Transportation Officials
ABUT.	Abutment
ADT	Average Daily Traffic
AHD	Ahead
APPROX.	Approximate
℄ or B/L	Baseline
BK	Back /Book
BIT.	Bituminous
B.C.	Bituminous Concrete
B.M.	Bench Mark
B.O.F.	Bottom of Footing
BOT.	Bottom
BRG.	Bearing
C.C.	Center of Curve
CATV	Cable Television
C.B.R.	California Bearing Ratio
C.J.	Contraction Joint
℄ or C/L	Centerline
CL.	Class or Clear
CLF	Chainlink Fence
CMP	Corrugated Metal Pipe
C.O.	Cleanout
COMB.	Combination
CONC.	Concrete
CONSTR.	Construction
COR.	Corner
CORR.	Correction
C.Y.	Cubic Yard
DC	Degree of Curve
D.H.V.	Design Hourly Volume
D.I.	Drop Inlet
DIA.	Diameter
D.O.	Double Opening
D.S.	Design Speed
DWG.	Drawing
E	East
E	Electric
e	External Distance
EA.	Each
E.B.	Eastbound
E.J.	Expansion Joint
EL. or ELEV.	Elevation
E.R.C.C.P.	Elliptical Reinforced Cement Concrete Pipe
ES	End Section
EX. or EXIST.	Existing
FT.	Feet
F or FL	Flowline
F.B.D.	Flat Bottom Ditch
F.H.	Fire Hydrant
F.O.	Fiber Optic
F.O.C.	Face of Curb
F.S.	Full Super Elevation
FWD.	Forward
G	Gas
GL	Gutterline
GP	General Purpose Roadway
G.V.	Gas Valve
H.B.	Handbox
H.D.P.	High Density Polyetheylene
HDWL.	Headwall
H.E.R.C.P.	Horizontal Elliptical Reinforced Concrete Pipe
H.P.	High Point
H.S.D.	Headlight Sight Distance
IN	Inch
I.S.T	Inlet Sediment Trap
INV.	Invert
J.B.	Junction Box
K	K Inlet
L	Length
L.F.	Linear Feet
L.L.	Liquid Limit
LOD	Limit of Disturbance
LONG.	Longitudinal
L.P.	Light Pole
LT.	Left
MAC.	Macadam
MC	Moisture Content
MAX.	Maximum
MDD	Maximum Dry Content
MOD.	Modified
MIN.	Minimum
MN.	Managed Roadway
M.S.E.	Mechanically Stabilized Earth
N	North
NB	Northbound
NE	Northeast
NO.	Number
NP	Non-Plastic
N.T.S.	Not To Scale
O.C.	On Center
OH	Overhead
OMC	Optimum Moisture
PAV'T.	Pavement
PC	Point of Curvature
PCC	Point of Compound Curvature
P/C	Point of Crown
P/GE	Profile Grade Elevation
P.G.L.	Profile Grade Line
P/GL	Profile Ground Line
ℙ	Plate
P/R	Point of Rotation
P.I.	Plasticity Index
P.I	Point of Intersection
POC	Point On Curve
POT	Point On Tangent
PR.	Proposed
PR. ROW	Proposed Right of Way
PROP.	Proposed
PRC	Point of Reverse Curve
PT.	Point
PT	Point of Tangency
PVC	Point of Vertical Curve
P.V.C.	Polyvinyl Chloride
PVI	Point of Vertical Intersection
PVRC	Point of Vertical Reverse Curve
PVT	Point of Vertical Tangency
R	Radius
REINF.	Reinforcement
REQ'D	Required
R.F.	Rock Fragments
RT.	Right
RW or R/W	Right of Way
R.C.P.	Reinforced Cement Pipe
R.C.C.P.	Reinforced Cement Concrete Pipe
R.Q.D.	Rock Quality Desgnation
R.M.	Rootmat
S	South
SAN.	Sanitary Sewer
SB or S/B	Southbound
S.D.	Storm Drain
S.D.D.	Surface Drain Ditch
SE	Super Elevation
SF	Silt Fence
S.F.	Square Feet
SHLDR.	Shoulder
SHA	State Highway Administration
SHT.	Sheet
S.P.P.	Structural Plate Pipe
S.P.T.	Standard Penetration Testing
S.S.	Stainless Steel
SSD	Stopping Sight Distance
SSF	Super Silt Fence
STD.	Standard
STA.	Station
STIFF.	Stiffener
SO.	Single Opening
S.Y.	Square Yards
SWM	Stormwater Management
T	Tangent
T	Telephone
T.C.	Top of Cover
TEMP.	Temporary
T.G.	Top of Grate
T or TL	Traverse Line
T.M.	Top of Manhole
T.O.F.	Top of Footing
TRAV.	Traverse
TS	Temporary Swale
T.S.	Top of Slab
T.S.	Topsoil
TYP.	Typical
U.D.	Under Drain
U.G.	Underground
U.O.N.	Unless Otherwise Noted
U.P.	Utility Pole
USC	Unified Soil Classification
USDA	United States Department of Agriculture
VCL	Vertical Clearance
V.C.L.	Vertical Curve Length
W	Water
W	West
W.B.	Westbound
WB	Wetland Buffer
W.M.	Water Meter
W.S.	Wrapped Steel

GN-01

NO.	REVISION	BY	APP'D	DATE

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Chief, Design Section — Date

APPROVED

Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

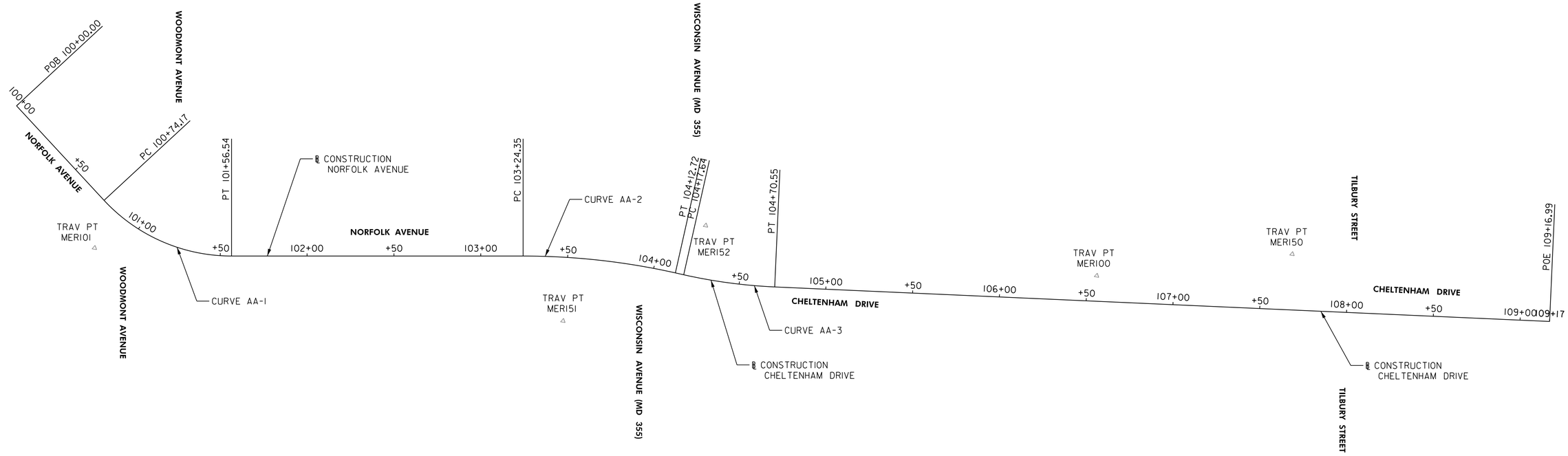
CHELTENHAM DRIVE BIKEWAY
GENERAL NOTES,
ABBREVIATIONS AND SYMBOLS

SCALE: NONE PROJECT NO.: 500119 SHEET 02 of 38

PROFESSIONAL CERTIFICATION:
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NORFOLK AVENUE /CHELTENHAM DRIVE					
CURVE	POINT NO.	STATION	NORTHING	EASTING	BEARING
	POB	100+00.00	481,360.4218	1,284,951.1974	S 52° 19′ 03″ E
AA-1	PC	100+74.17	481,315.0829	1,285,009.8960	S 52° 19′ 03″ E
	PI	101+17.85	481,288.3788	1,285,009.8960	
	CC		481,394.2239	1,285,071.0246	
	PT	101+56.54	481,295.5993	1,285,087.5531	N 80° 29′ 10″ E
	PT	101+56.54	481,295.5993	1,285,087.5531	N 80° 29′ 10″ E
AA-2	PC	103+25.35	481,323.3358	1,285,253.0558	N 80° 29′ 10″ E
	PI	103+68.72	481,330.6685	1,285,296.8096	
	CC		480,928.8375	1,285,319.1696	
	PT	104+12.72	481,328.2355	1,285,341.1069	S 86° 51′ 22″ E
	PT	104+12.72	481,328.2355	1,285,341.1069	S 86° 51′ 22″ E
AA-3	PC	104+17.64	481,327.9657	1,285,346.0184	S 86° 51′ 22″ E
	PI	104+44.17	481,326.5109	1,285,372.5048	
	CC		481,627.5142	1,285,362.4715	
	PT	104+70.55	481,329.7262	1,285,398.8356	N 83° 02′ 16″ E
	POE	109+16.99	481,383.8404	1,285,841.9792	N 83° 02′ 16″ E

CURVE DATA						
CURVE	DELTA	Dc	RADIUS	TANGENT	LENGTH	EXTERNAL
AA-1	47° 11′ 47″ LT	57° 17′ 45″	100.00′	43.69′	82.37′	9.13′
AA-2	12° 39′ 27″ RT	14° 19′ 26″	400.00′	44.36′	88.37′	2.45′
AA-3	10° 06′ 22″ LT	19° 05′ 55″	300.00′	26.53′	52.92′	1.17′

TRAVERSE POINTS			
POINT NO.	NORTHING	EASTING	ELEVATION
MERI01	481,287.1665	1,285,009.0203	352.88′
MERI51	481,290.3034	1,285,281.9454	349.02′
MERI52	481,358.0307	1,285,353.8263	349.99′
MERI00	481,366.7404	1,285,580.5960	341.98′
MERI50	481,397.6040	1,285,689.4999	338.51′

GS-01

30′ 0 30′ 60′
SCALE: 1″ = 30′

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_____ _____
Chief, Division of Transportation Engineering Date

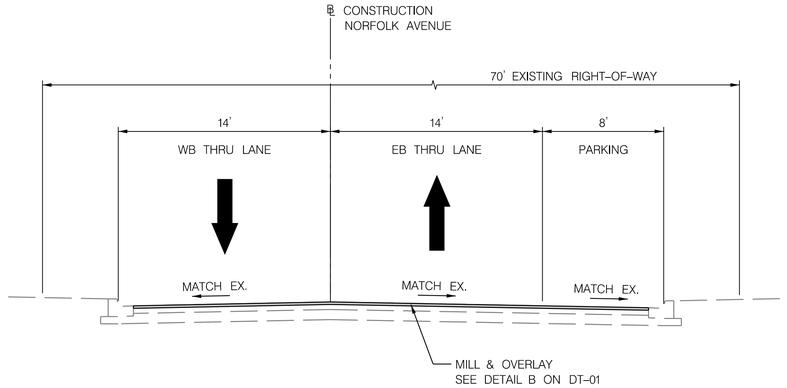
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DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

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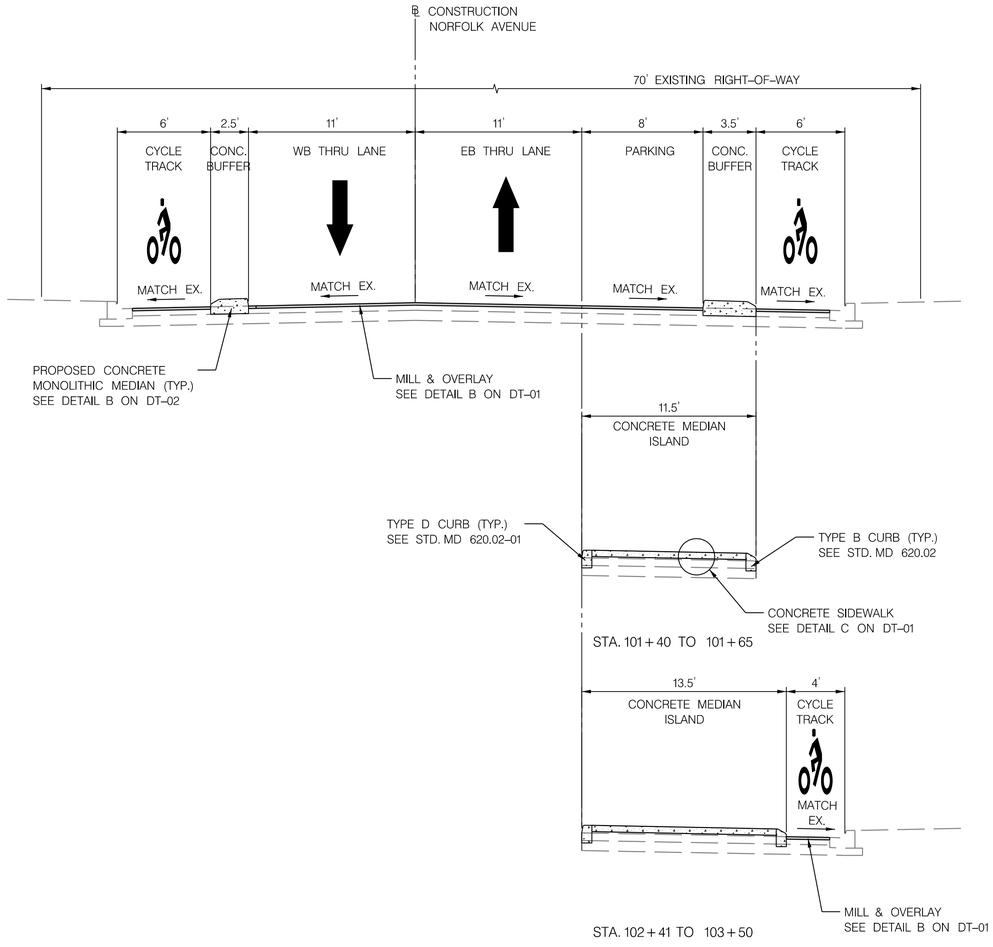
CHELTENHAM DRIVE BIKEWAY GEOMETRY SHEET

SCALE: 1″ = 30′ PROJECT NO.: 500119 SHEET 03 of 38

2/27/2025
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NORFOLK AVENUE TYPICAL SECTION
STA. 100+25 TO 101+40
STA. 103+50 TO 104+35



NORFOLK AVENUE TYPICAL SECTION
STA. 101+40 TO 103+50

TS-01

5' 0 10' 20'
SCALE: 1" = 5'

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_____ _____
Chief, Design Section Date

APPROVED

_____ _____
Chief,
Division of Transportation Engineering Date

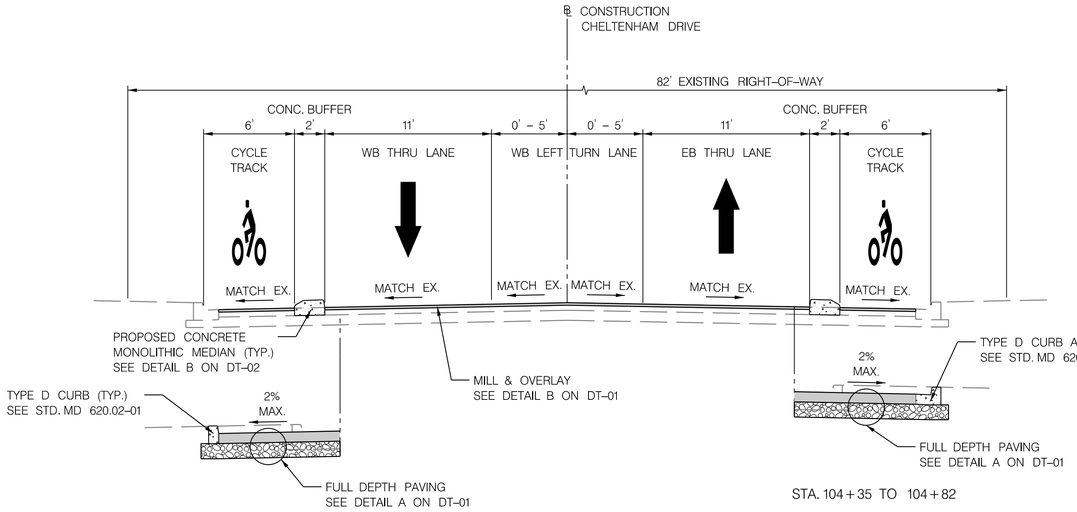
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DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY
TYPICAL SECTIONS

SCALE: 1" = 5' PROJECT NO.: 500119 SHEET 04 of 38

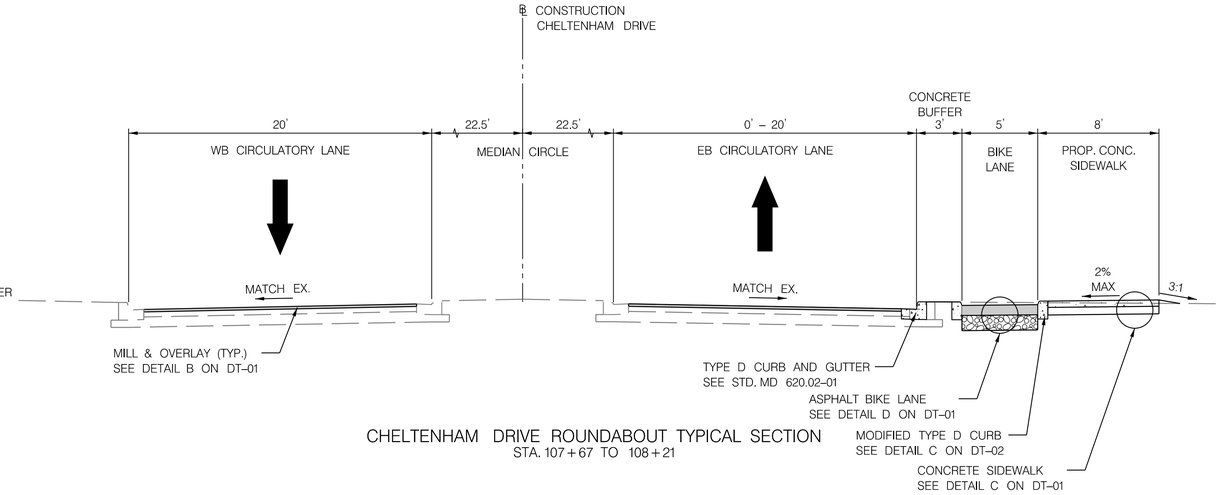
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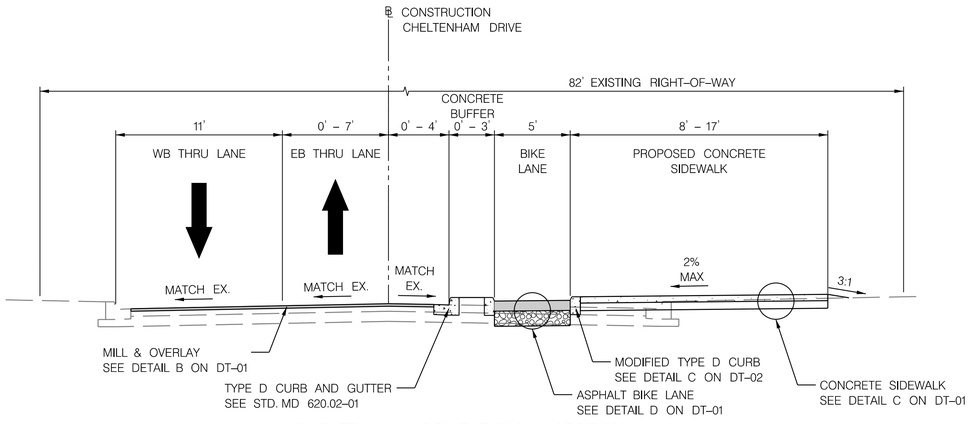
STA. 106+51 TO 106+88

STA. 104+35 TO 104+82

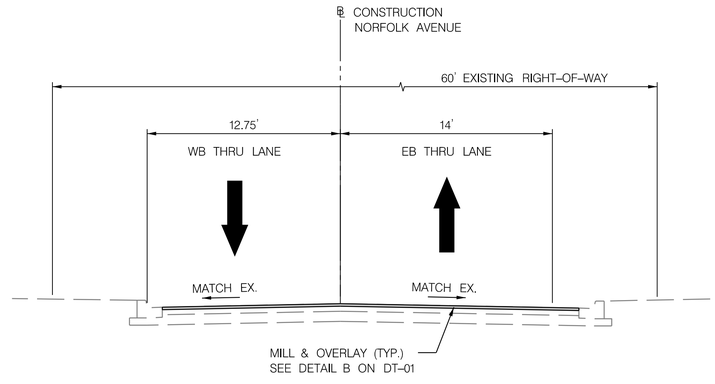
CHELTENHAM DRIVE TYPICAL SECTION
STA. 104+35 TO 107+00



CHELTENHAM DRIVE ROUNDABOUT TYPICAL SECTION
STA. 107+67 TO 108+21



CHELTENHAM DRIVE TYPICAL SECTION
STA. 107+00 TO 107+67



CHELTENHAM DRIVE TYPICAL SECTION
STA. 108+21 TO 108+65

TS-02

5' 0 10' 20'
SCALE: 1" = 5'

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Chief, Design Section — Date

APPROVED

Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

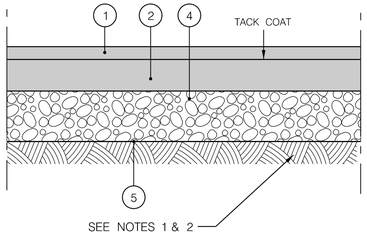
CHELTENHAM DRIVE BIKEWAY
TYPICAL SECTIONS

SCALE: 1"=5' PROJECT NO.: 500119 SHEET 05 of 38

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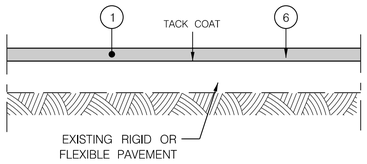
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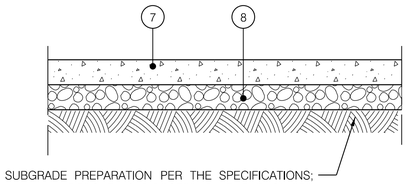
NOTES

1. SUBGRADE PREPARATION SHALL BE AS PER SECTION 204 OF MDOT SHA SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS; PRIOR TO PLACEMENT OF PROPOSED BASE COURSE, SUBGRADE SHALL BE PROOF-ROLLED.
2. UNDERCUT FOR REMOVAL OF SOFT AND/OR UNSUITABLE MATERIALS AND BACKFILLED WITH GRADED AGGREGATE BASE SHALL BE AS DIRECTED BY THE ENGINEER.

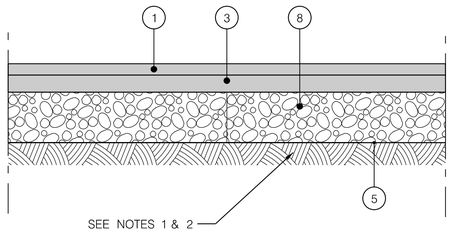
DETAIL A
FULL DEPTH ASPHALT PAVEMENT SECTION



DETAIL B
MILLING AND OVERLAY



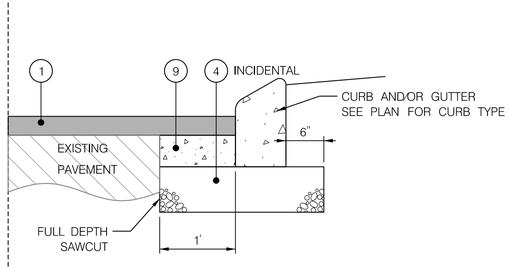
DETAIL C
PORTLAND CEMENT
CONCRETE SIDEWALK



NOTES

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2. UNDERCUT FOR REMOVAL OF SOFT AND/OR UNSUITABLE MATERIALS AND BACKFILLED WITH GRADED AGGREGATE BASE SHALL BE AS DIRECTED BY THE ENGINEER.

DETAIL D
FULL DEPTH ASPHALT BIKE LANE PAVEMENT SECTION



DETAIL E
CONCRETE CURB PATCH

LEGEND

1. 2" SUPERPAVE ASPHALT MIX, 9.5MM FOR SURFACE COURSE, P.G. 64S-22, LEVEL 2
2. 5" SUPERPAVE ASPHALT MIX, 19.0MM FOR BASE COURSE, P.G. 64S-22, LEVEL 2 (2"- 3.5" LIFTS)
3. 2.5" SUPERPAVE ASPHALT MIX, 9.5MM FOR SURFACE COURSE, P.G. 64S-22, LEVEL 2
4. 8 INCH GRADED AGGREGATE BASE, TWO EQUAL LAYERS
5. LIMIT OF CLASS I EXCAVATION
6. FINE MILL EXISTING PAVEMENT TO 2 INCH DEPTH OR SURFACE OF EXISTING RIGID BASE
7. 5 INCH PLAIN PORTLAND CEMENT CONCRETE MIX NO. 7
8. 4 INCH AGGREGATE BASE COURSE (INCIDENTAL)
9. 8 INCH PLAIN PORTLAND CEMENT CONCRETE MIX NO. 9 (INCIDENTAL), STD. MD 580.03 OPTION 1

DT-01

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Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

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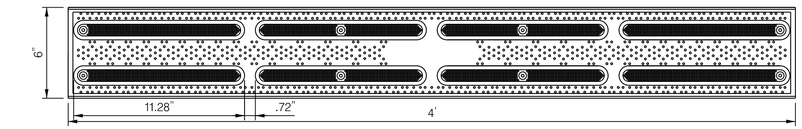
CHELTENHAM DRIVE BIKEWAY
PAVEMENT DETAILS

SCALE: NTS PROJECT NO.: 500119 SHEET 06 of 38

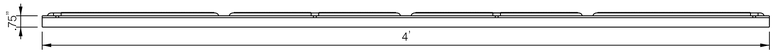
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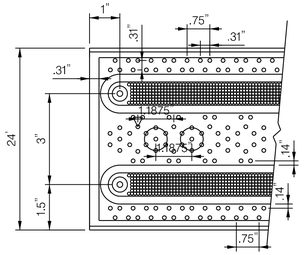
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PLAN



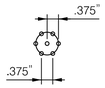
ELEVATION - SIDE



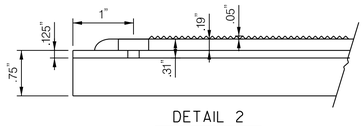
DETAIL I



PATTERN DETAIL A

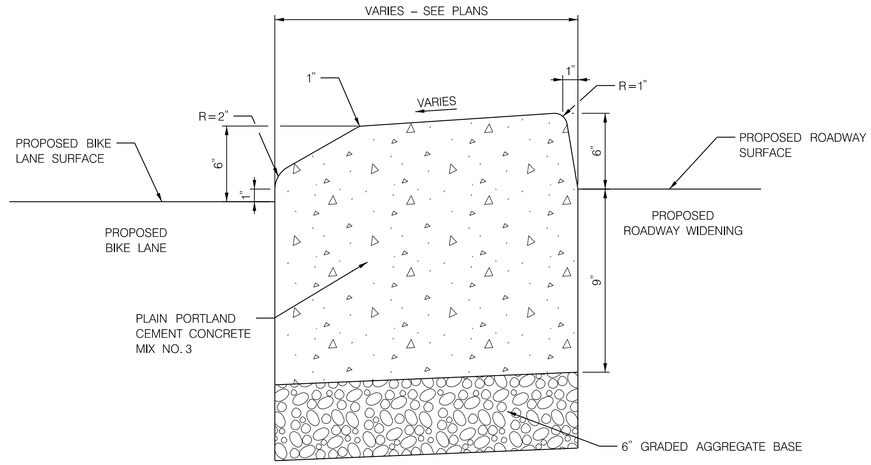


PATTERN DETAIL B

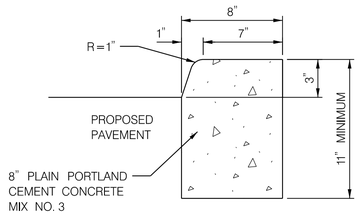


DETAIL 2

DETAIL A
DETECTABLE DIRECTIONAL STRIP



DETAIL B
MODIFIED CONCRETE MONOLITHIC MEDIAN



DETAIL C
MODIFIED TYPE D CURB

DT–02

NO.	REVISION	BY	APP'D	DATE

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Chief, Design Section — Date

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Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

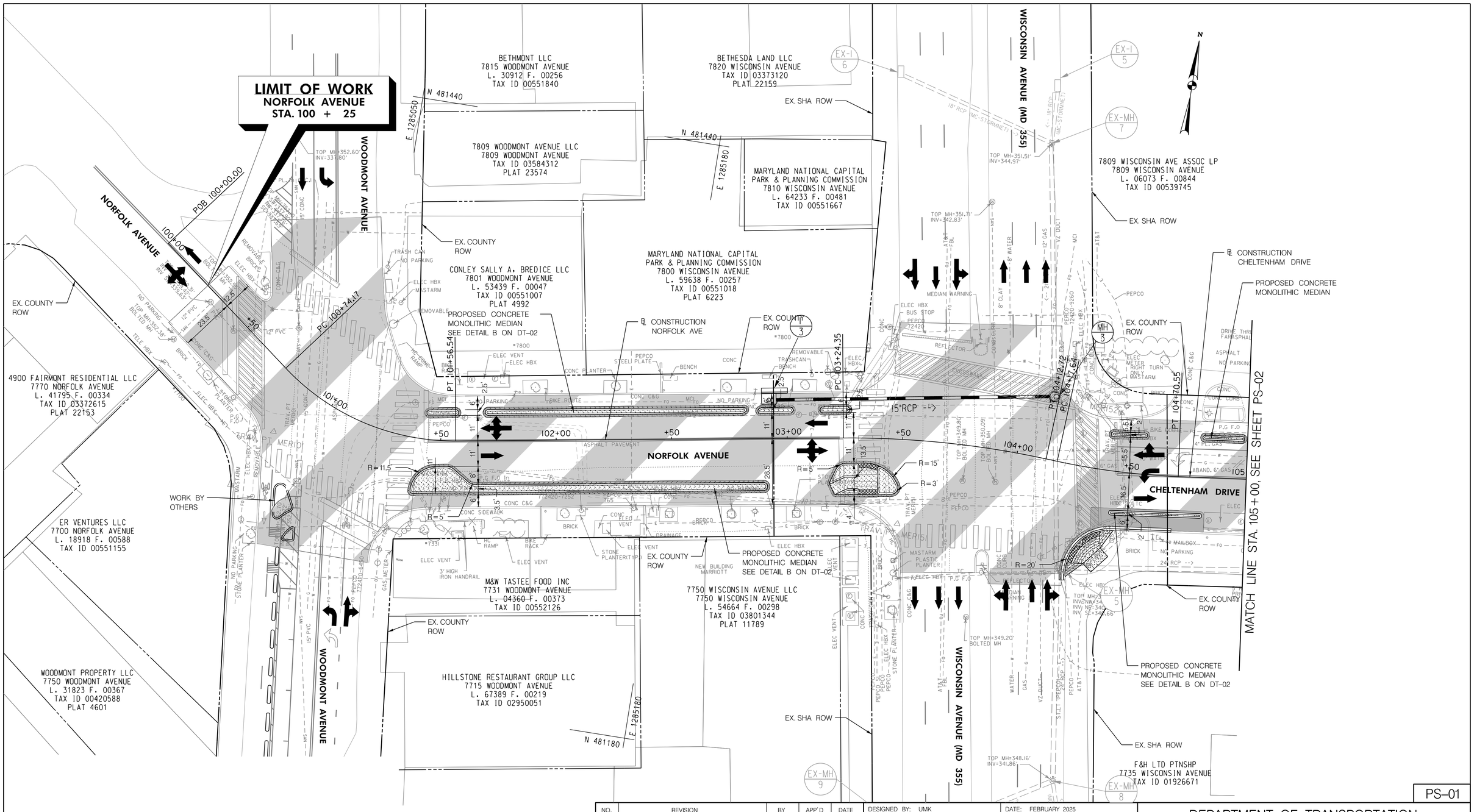
CHELTENHAM DRIVE BIKEWAY
ROADWAY DETAILS

SCALE: NTS PROJECT NO.: 500119 SHEET 07 of 38

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20' 0 20' 40'
SCALE: 1" = 20'

LEGEND
- PROP. DETECTABLE WARNING SURFACE
- PROP. CONCRETE
- PROP. BRICK
- PROP. MILL & OVERLAY
- PROP. FULL DEPTH PAVEMENT
- PROP. FULL DEPTH CYCLE TRACK
- PROP. CURB PATCH

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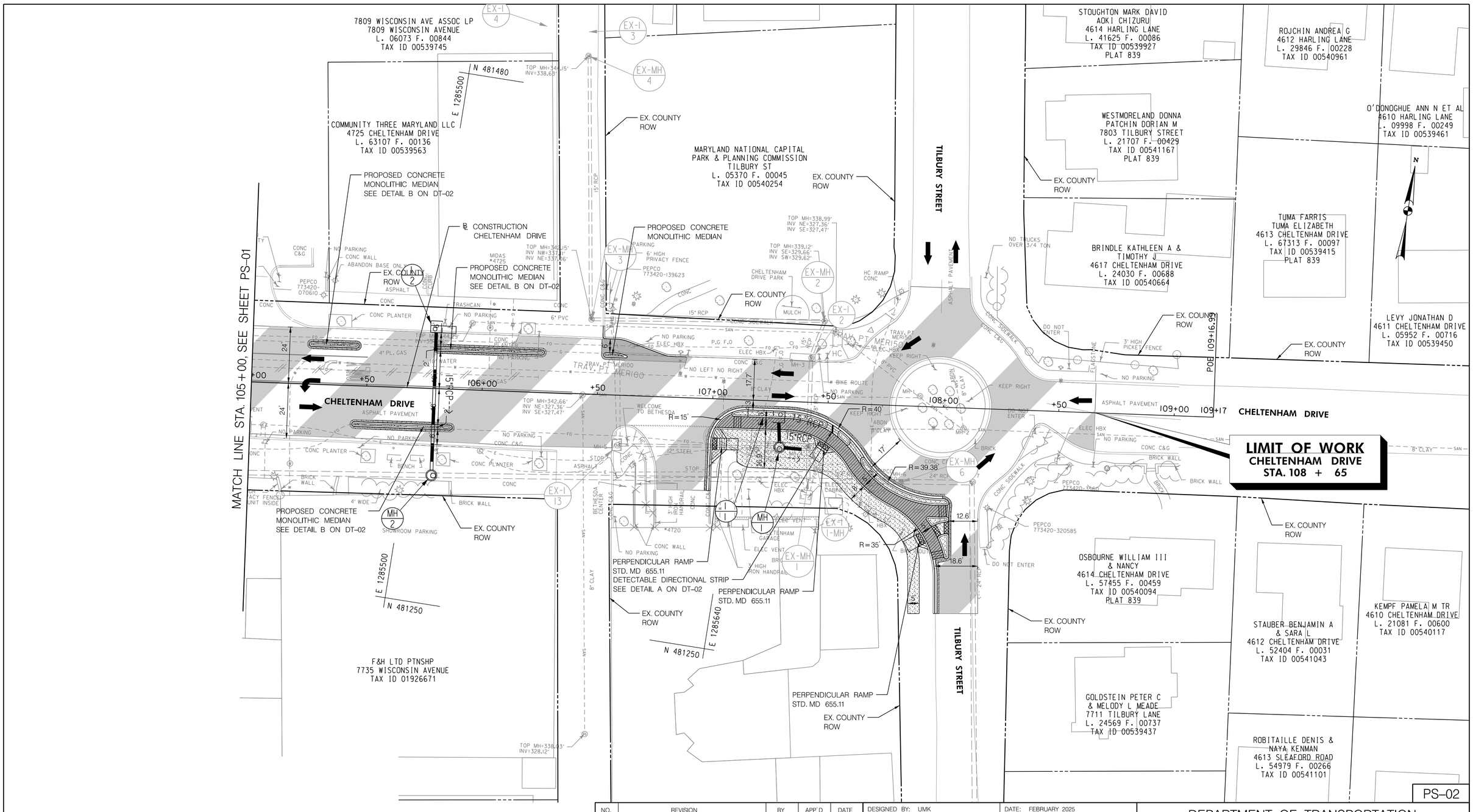
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MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY
ROADWAY PLAN

SCALE: 1" = 20' PROJECT NO.: 500119 SHEET 08 of 38

2/27/2025
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LEGEND

- PROP. DETECTABLE WARNING SURFACE
- PROP. CONCRETE
- PROP. BRICK
- PROP. MILL & OVERLAY
- PROP. FULL DEPTH PAVEMENT
- PROP. FULL DEPTH CYCLE TRACK
- PROP. CURB PATCH

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APPROVED

Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY
ROADWAY PLAN

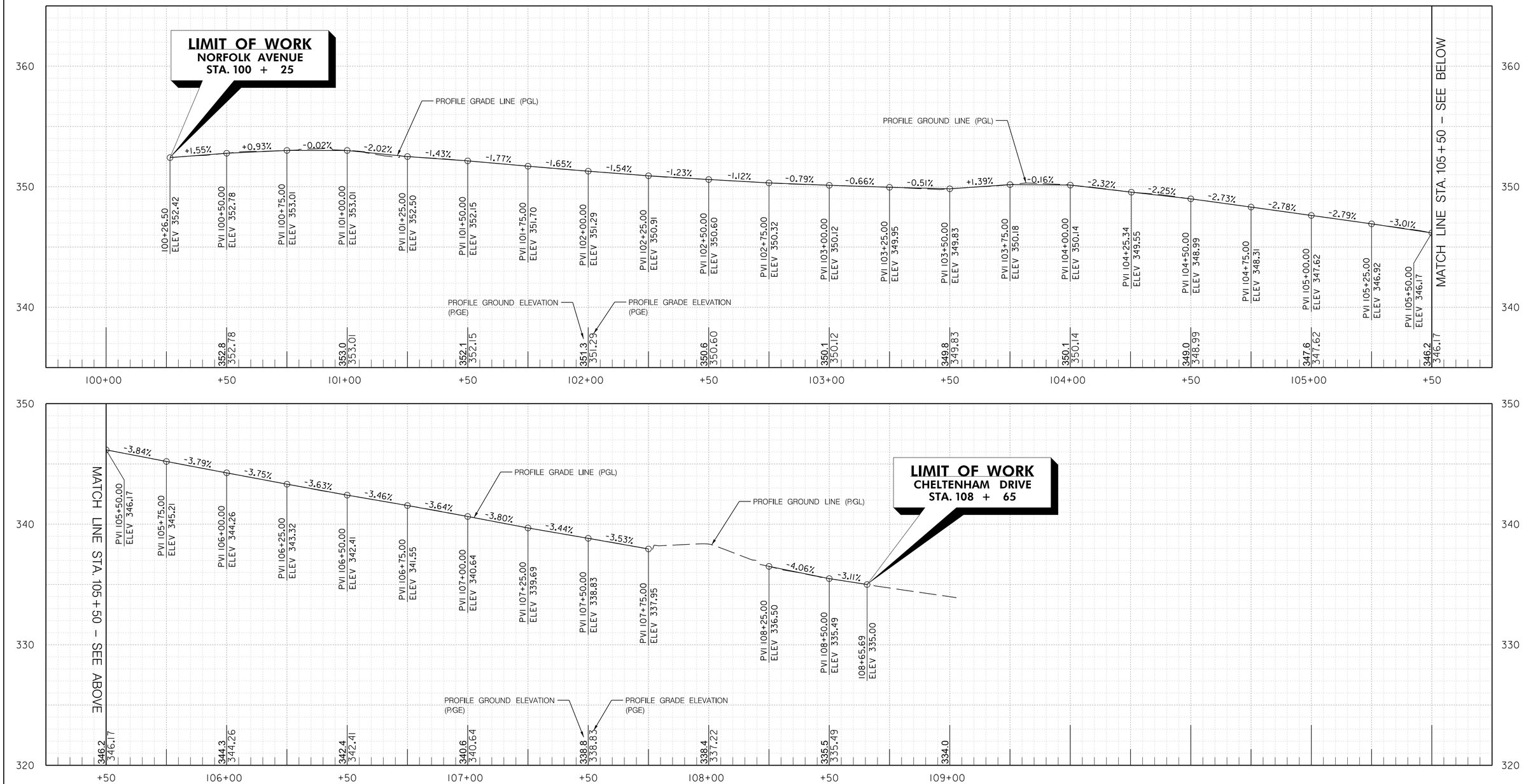
SCALE: 1" = 20' PROJECT NO.: 500119 SHEET 09 of 38

PS-02

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.
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Baltimore, MD 21286
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2/27/2025
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4' 0 4' 5'
VERTICAL SCALE: 1" = 4'

20' 0 20' 40'
HORIZONTAL SCALE: 1" = 20'

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	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

MR2026005

CHELTENHAM DRIVE BIKEWAY
ROADWAY PROFILE

SCALE: H: 1" = 20' V: 1" = 4' PROJECT NO.: 500119 SHEET 10 of 38

HP-01

PROFESSIONAL CERTIFICATION:
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PIPE SCHEDULE							
UPSTREAM STRUCTURE	DOWNSTREAM STRUCTURE	SIZE	TYPE	LENGTH (FT)	UPSTREAM INVERT	DOWNSTREAM INVERT	COMMENTS
I-3	MH-3	15"	RCP CLASS IV	119	343.60	343.00	MCDOT OWNED
I-2	MH-2	15"	RCP CLASS IV	60	337.00	336.34	MCDOT OWNED
I-1	MH-1	15"	RCP CLASS IV	9	335.30	335.10	MCDOT OWNED
MH-1	EX-MH-1	15"	RCP CLASS IV	8	334.30	334.00	MCDOT OWNED

STRUCTURE SCHEDULE								
STRUCTURE	STATION	OFFSET	TYPE	TOP ELEV.	INVERT OUT	OWNERSHIP	STANDARD	REMARKS
I-1	107+29	4.31 RT	"B" INLET (B-15)	339.30	335.30	MCDOT	MC-502.01	15' THROAT OPENING
I-2	105+79	24.22 LT	"B" INLET (B-10)	345.00	337.00	MCDOT	MC-502.01	10' THROAT OPENING
I-3	102+92	17.19 LT	REVERSE "B" INLET (B-10)	350.00	343.60	MCDOT	MC-502.02	10' THROAT OPENING
MH-1	107+30	19.98 RT	MCDOT TYPE "A" MANHOLE	338.78	334.30	MCDOT	MC-510.01	
MH-2	105+79	37.66 RT	MCDOT TYPE "A" MANHOLE	345.00	336.24	MCDOT	MC-510.01	
MH-3	114+76	27.23 LT	48" DIAMETER PRECAST MANHOLE	350.05	342.39	MDOT	MD-384.01	

GENERAL NOTES

1. STATION AND OFFSETS FOR MANHOLES IS GIVEN TO THE GEOMETRIC CENTER OF THE MANHOLE AND THE TOP ELEVATION IS GIVEN TO THE TOP OF MANHOLE COVER.
2. STATIONS FOR COG INLETS IS GIVEN TO THE GEOMETRIC CENTER OF THE BASE UNIT STRUCTURE, THE OFFSET IS GIVEN TO THE FACE OF CURB AT CENTER OF TROUGH AND THE TOP ELEVATION IS GIVEN TO THE TOP OF CURB.
3. CONTRACTOR TO VERIFY ALL EX. STORM DRAIN INVERTS PRIOR TO ORDERING AND FABRICATION ALL PROPOSED INLETS AND MANHOLES.

DD–01

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NO.	REVISION	BY	APP'D	DATE

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CHECKED BY: LRA	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:

RECOMMENDED FOR APPROVAL

_____ _____
Chief, Design Section Date

APPROVED

_____ _____
Chief, Division of Transportation Engineering Date

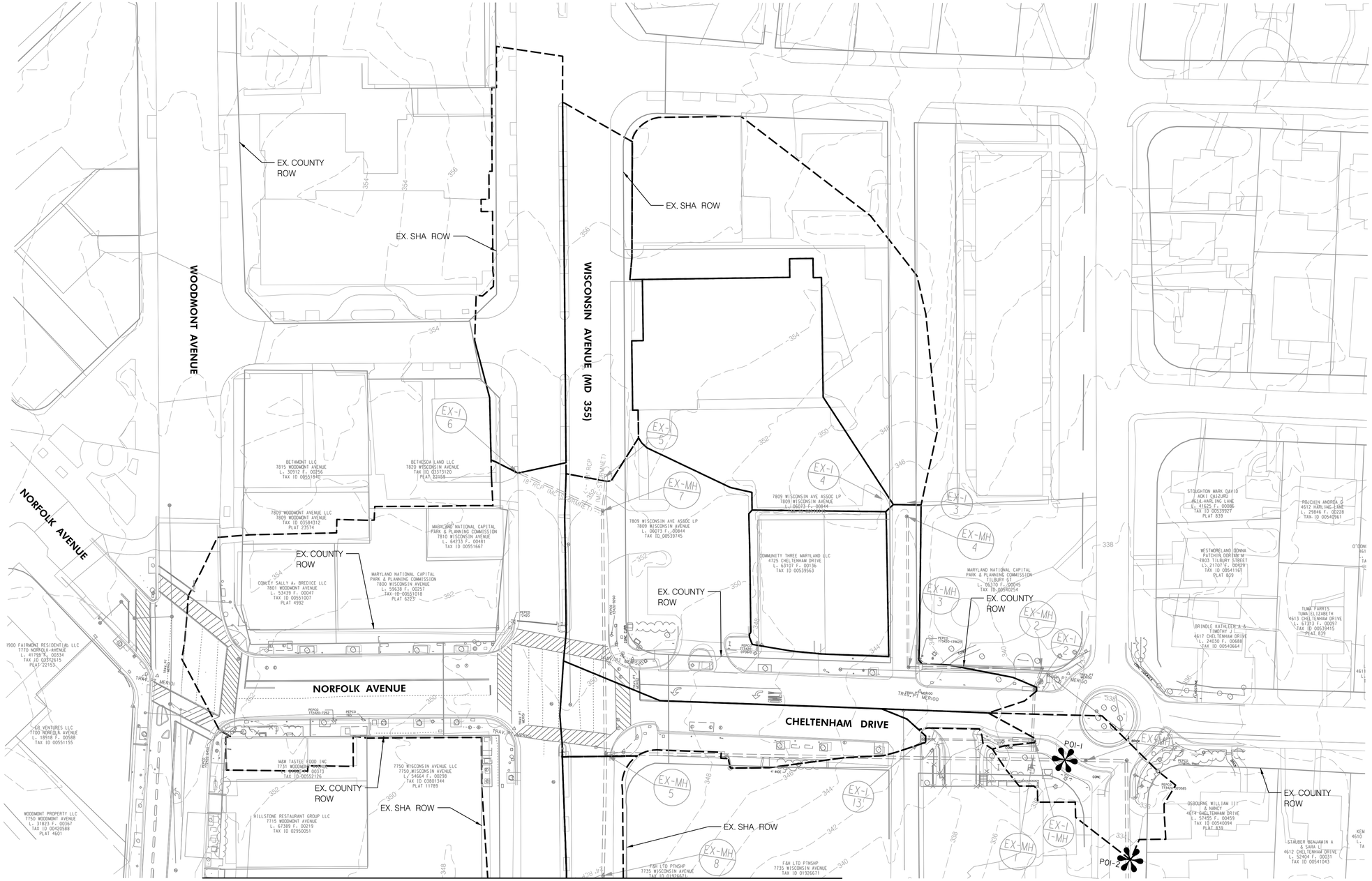
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY
DRAINAGE SCHEDULES

SCALE: NONE PROJECT NO.: 500119 SHEET 11 of 38

2/27/2025
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40' 0 40' 80'
SCALE: 1" = 40'

LEGEND
DRAINAGE AREA BOUNDARY

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NO.	REVISION	BY	APP'D	DATE

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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

MR2026005

CHELTENHAM DRIVE BIKEWAY
EXISTING DRAINAGE AREA MAP

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

DA-01

2/27/2025
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40' 0 40' 80'
SCALE: 1" = 40'

LEGEND
DRAINAGE AREA BOUNDARY

DA–02

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

MR2026005

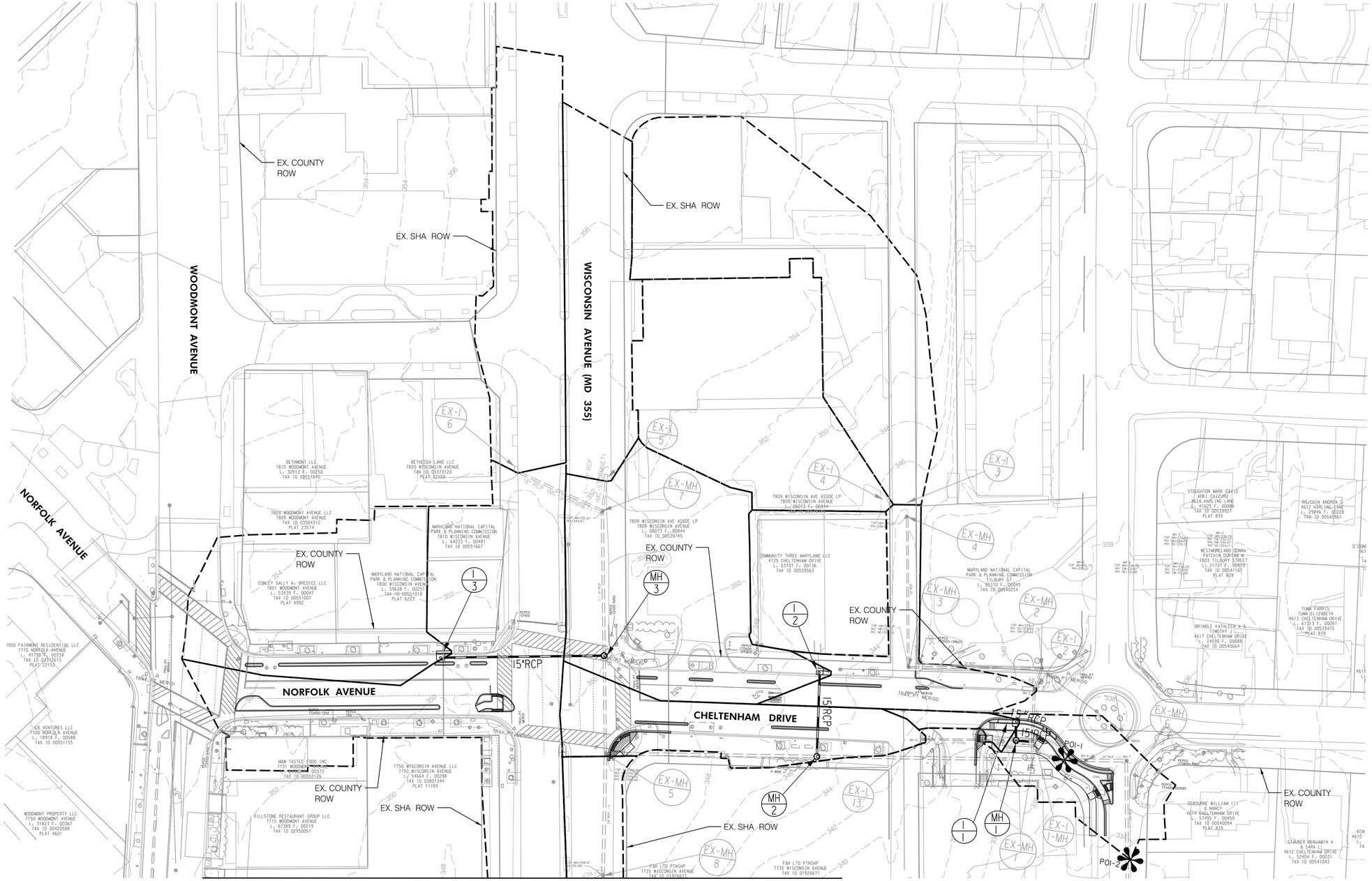
CHELTENHAM DRIVE BIKEWAY
EXISTING DRAINAGE AREA MAP

SCALE: 1" = 40' PROJECT NO.: 500119 SHEET 13 of 38

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LICENSE NO: _____ EXPIRATION DATE: _____

2/27/2025
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MATCH LINE SEE SHEET DA–04

DA–03

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

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: SMH	DATE: FEBRUARY 2025
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CHECKED BY: LRA	DATE: FEBRUARY 2025
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Chief, Design Section — Date

APPROVED

Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY
PROPOSED DRAINAGE AREA MAP

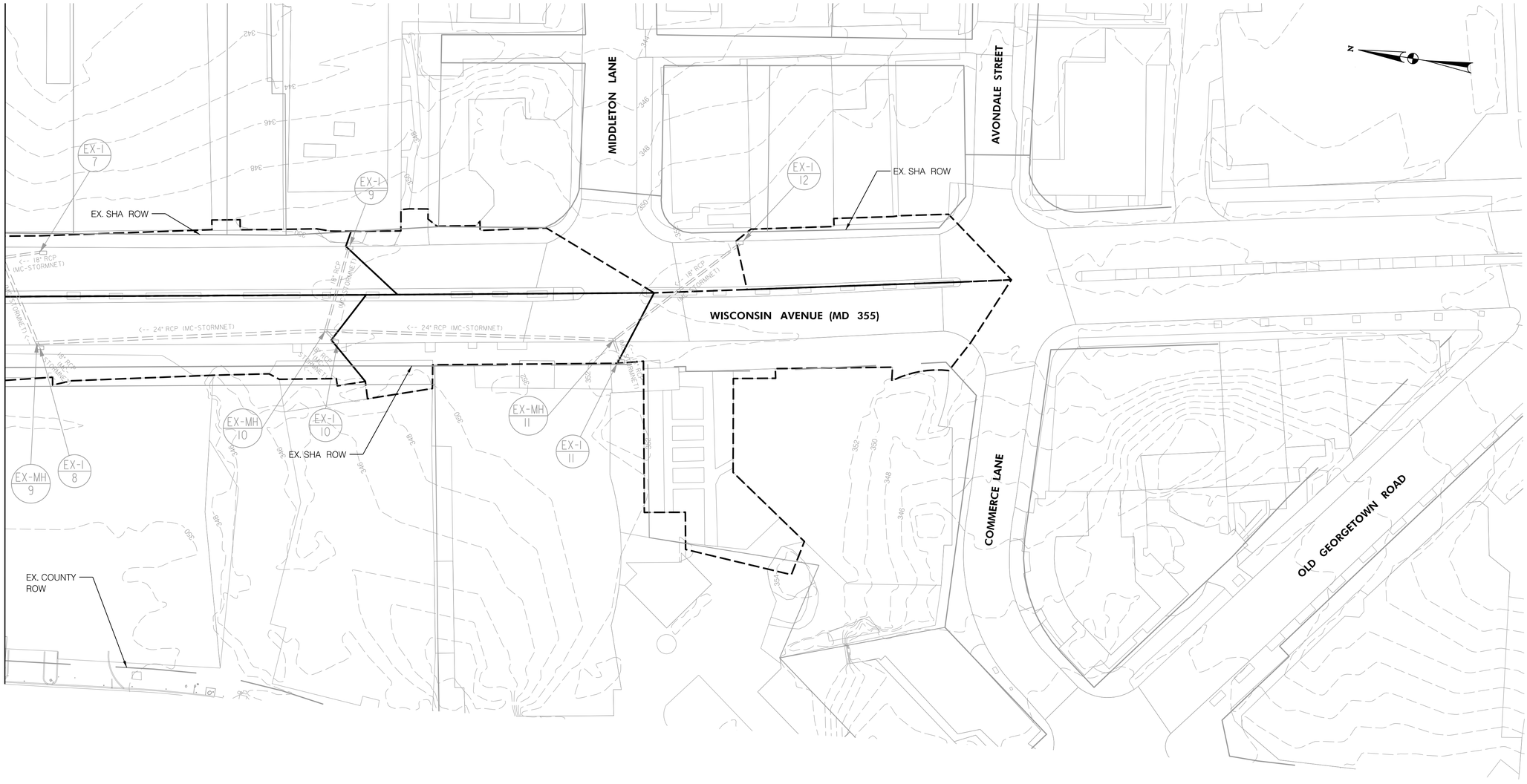
SCALE: 1" = 40' PROJECT NO.: 500119 SHEET 14 of 38

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LEGEND
DRAINAGE AREA BOUNDARY

2/27/2025
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DA–04

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

LEGEND
DRAINAGE AREA BOUNDARY

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Chief, Design Section Date

APPROVED

_____ _____
Chief, Division of Transportation Engineering Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY
PROPOSED DRAINAGE AREA MAP

SCALE: 1" = 40' PROJECT NO.: 500119 SHEET 15 of 38

2/27/2025
U:\2026\21313\700 CADD\702 Sheets\pDA-P002_CheltenhamDr.dgn

MONTGOMERY COUNTY GOVERNMENT
STANDARD EROSION AND SEDIMENT CONTROL NOTES

1. The permittee shall notify the department of permitting services (dps) forty-eight (48) hours before commencing any land disturbing activity and, unless waived by the department, shall be required to hold a pre-construction meeting between them or their representative, their engineer and an authorized representative of the department.

2. The permittee must obtain inspection and approval by dps at the following points:

   A. At the required pre-construction meeting.

   B. Following installation of sediment control measures and prior to any other land disturbing activity.

   C. During the installation of a sediment basin or stormwater management structure at the required inspection points (see inspection checklist on plan). Notification prior to commencing construction is mandatory.

   D. Prior to removal or modification of any sediment control structure(s).

   E. Prior to final acceptance.

3. The permittee shall construct all erosion and sediment control measures per the approved plan and construction sequence, shall have them inspected and approved by the department prior to beginning any other land disturbances, shall ensure that all runoff from disturbed areas is directed to the sediment control devices, and shall not remove any erosion or sediment control measure without prior permission from the department.

4. The permittee shall protect all points of construction ingress and egress to prevent the deposition of materials onto traversed public thoroughfare(s). All materials deposited onto public thoroughfare(s) shall be removed immediately.

5. The permittee shall inspect periodically and maintain continuously in effective operating condition, all erosion and sediment control measures until such time as they are removed with prior permission from the department. The permittee is responsible for immediately repairing or replacing any sediment control measures which have been damaged or removed by the permittee or any other person.

6. Following initial soil disturbance or re-disturbance, permanent or temporary stabilization must be completed within:

   A. three (3) calendar days as to the surface of all perimeter dikes, swales, ditches, perimeter slopes and all slopes steeper than 3 horizontal to 1 vertical (3:1); and

   B. seven (7) calendar days as to all other disturbed or graded areas on the project site not under active grading.

   All areas disturbed outside of the perimeter sediment control system must be minimized and stabilized immediately. Maintenance must be performed as necessary to ensure continued stabilization.

7. The permittee shall apply sod, seed, and anchored straw mulch, or other approved stabilization measures to all disturbed areas within seven (7) calendar days after stripping and grading activities have ceased on that area. Maintenance shall be performed as necessary to ensure continued stabilization. Active construction areas such as borrow or stockpile areas, roadway improvements, and areas within fifty (50) feet of a building under construction may be exempt from this requirement, provided that erosion and sediment control measures are installed and maintained to protect those areas.

8. Prior to removal of sediment control measures, the permittee shall stabilize all contributory disturbed areas with required soil amendments and topsoil, using sod or an approved permanent seed mixture and an approved anchored mulch. Wood fiber mulch may only be used in seeding season when the slope does not exceed 10% and grading has been done to promote sheet flow drainage. Areas brought to finished grade during the seeding season shall be permanently stabilized within seven (7) calendar days of establishment. When property is brought to finished grade during the months of november through february, and permanent stabilization is found to be impractical, an approved temporary seed and straw anchored mulch shall be applied to disturbed areas. The final permanent stabilization of such property shall be completed prior to the following april 15.

9. The site permit, work, materials, approved sc/sm plans, and test reports shall be available at the site for inspection by duly authorized officials of montgomery county.

10. Surface drainage flows over unstabilized cut and fill slopes shall be controlled by either preventing drainage flows from traversing the slopes or by installing mechanical devices to lower the water down slope without causing erosion. Dikes shall be installed and maintained at the top of cut or fill slopes until the slope and drainage area to it are fully stabilized, at which time they must be removed and final grading done to promote sheet flow drainage. Mechanical devices must be provided at points of concentrated flow where erosion is likely to occur.

11. Permanent swales or other points of concentrated water flow shall be stabilized within 3 calendar days of establishment with sod or seed with an approved erosion control matting or by other approved stabilization measures.

12. Sediment control devices shall be removed, with permission of the department, within thirty (30) calendar days following establishment of permanent stabilization in all contributory drainage areas. Stormwater management structures used temporarily for sediment control shall be converted to the permanent configuration within this time period as well.

13. No permanent cut or fill slope with a gradient steeper than 3:1 will be permitted in lawn maintenance areas or on residential lots. A slope gradient of up to 2:1 will be permitted in non- maintenance areas provided that those areas are indicated on the erosion and sediment control plan with a low-maintenance ground cover specified for permanent stabilization. Slope gradient steeper than 2:1 will not be permitted with vegetative stabilization.

14. The permittee shall install a splashblock at the bottom of each downspout unless the downspout is connected by a drain line to an acceptable outlet.

15. For finished grading, the permittee shall provide adequate gradients so as to prevent water from standing on the surface of lawns more than twenty-four (24) hours after the end of a rainfall, except in designated drainage courses and swale flow areas, which may drain as long as forty-eight (48) hours after the end of a rainfall.

16. Sediment traps or basins are not permitted within 20 feet of a building which is existing or under construction. No building may be constructed within 20 feet of a sediment trap or basin.

17. All inlets in non-sump areas shall have asphalt berms installed at the time of base paving establishment.

18. The sediment control inspector has the option of requiring additional sediment control measures, as deemed necessary.

19. All trap elevations are relative to the outlet elevation, which must be on existing undisturbed ground.

20. Vegetative stabilization shall be performed in accordance with the standards and specifications for soil erosion and sediment control.

21. Sediment trap(s)/basin(s) shall be cleaned out and restored to the original dimensions when sediment has accumulated to the point of one-half (1/2) the wet storage depth of the trap/basin (1/4 the wet storage depth for st-iii) or when required by the sediment control inspector.

22. Sediment removed from traps/basins shall be placed and stabilized in approved areas, but not within a floodplain.

23. All sediment basins and traps must be surrounded with a welded wire safety fence. The fence must be at least 42 inches high, have posts spaced no farther apart than 8 feet, have mesh openings no greater the two inches in width and four inches in height, with a minimum of 14 gauge wire. Safety fence must be maintained in good condition at all times.

24. No excavation in the areas of existing utilities is permitted unless their location has been determined. Call "Miss utility" at 1-800-257-7777, 48 hours prior to the start of work.

25. Off-site spoil or borrow areas must have prior approval by dps.

26. Sediment trap/basin dewatering for cleanout or repair may only be done with the dps inspector's permission. The inspector must approve the dewatering method for each application. The following methods may be considered:

   A. Pump discharge may be directed to another on-site sediment trap or basin, provided it is of sufficient volume and the pump intake is floated to prevent agitation or suction of deposited sediments; or

   B. The pump intake may utilize a removable pumping station and must discharge into an undisturbed area through a non-erosive outlet; or

   C. The pump intake may be floated and discharge into a dirt bag (12 oz. Non-woven fabric), or approved equivalent, located in an undisturbed buffer area.

   Remember: dewatering operation and method must have prior approval by the dps inspector.

27. The permittee must notify the department of all utility construction activities within the permitted limits of disturbance prior to the commencement of those activities.

28. Topsoil must be applied to all pervious areas within the limits of disturbance prior to permanent stabilization in accordance with MDE "Standards and Specifications for Soil Preparation, Topsoiling, and Soil Amendments."

29. The contractor shall utilize a concrete washout structure for all concrete work, if the contractor wishes to use an off site concrete washout structure they shall notify the engineer of said location in writing.

BEFORE BEGINNING CONSTRUCTION CONTACT
"MISS UTILITY"
AT
1-800-257-7777
AT LEAST 48 HOURS PRIOR TO EXCAVATION

STANDARD SYMBOLS

AT-GRADE INLET PROTECTION	AGIP	ROCK OUTLET PROTECTION II	ROPII
BAFFLE BOARDS	BB	ROCK OUTLET PROTECTION III	ROPIII
CATCH BASIN INSERT	CBI	SILT FENCE	SF
CLEAR WATER DIVERSION PIPE	CWD - 12 NOTE: DESIGNATION CWD-12 REFERS TO CLEAR WATER DIVERSION WITH 12 INCH PIPE.	SILT FENCE ON PAVEMENT	SFOP
COMBINATION INLET PROTECTION	COIP	SOD	
CURB INLET PROTECTION	CIP	STABILIZED CONSTRUCTION ENTRANCE	SCE
DIVERSION FENCE	DF	STANDARD INLET PROTECTION	SIP
EARTH DIKE	A-I PLACE DESIGNATION (A-I, B-2, ETC.) ON FLOW CHANNEL SIDE OF DIKE.	STOCKPILE AREA	
EMERGENCY SPILLWAY	ES	STONE CHECK DAM	CD
FILTER BAG	FB	STONE/RIPRAP OUTLET SEDIMENT TRAP ST II	ST-II
FILTER BERM	FB-A FB-B	SUBSURFACE DRAINS	SSD
FILTER LOG	FL-18 NOTE: DESIGNATION FL-18 REFERS TO FILTER LOG WITH 18 INCH DIAMETER.	SUMP PIT	SP
GABION INFLOW PROTECTION	GP	SUPER SILT FENCE	SSF
GABION INLET PROTECTION	GIP	TEMPORARY ACCESS CULVERT	
LIMIT OF DISTURBANCE	LOD	TEMPORARY ASPHALT BERM	TAB
MEDIAN INLET PROTECTION	MIP	TEMPORARY BARRIER DIVERSION	TBD
MEDIAN SUMP INLET PROTECTION	MSIP	TEMPORARY GABION OUTLET STRUCTURE	TGOS
MOUNTABLE BERM	MB	TEMPORARY SOIL STABILIZATION MATTING-TYPE A	
PERIMETER DIKE/SWALE	PDS-I	TEMPORARY SOIL STABILIZATION MATTING-TYPE E	
PERMANENT SOIL STABILIZATION MATTING-TYPE B		TEMPORARY SOIL STABILIZATION MATTING-TYPE D	
PERMANENT SOIL STABILIZATION MATTING-TYPE C		TEMPORARY STONE OUTLET STRUCTURE	TSOS
PIPE OUTLET SEDIMENT TRAP ST I	ST-I	TEMPORARY SWALE	A-I PLACE DESIGNATION (A-I, B-2, ETC.) ON FLOW CHANNEL SIDE OF SWALE.
PIPE SLOPE DRAIN	PSD - 12 NOTE: DESIGNATION PSD-12 REFERS TO PIPE SLOPE DRAIN WITH 12 IN PIPE	WASH RACK OPTION	WR
PLUNGE POOL	PP	CHESAPEAKE BAY CRITICAL AREA	
PORTABLE SEDIMENT TANK	PST	DRAINAGE BOUNDARY	DA
REMOVABLE PUMPING STATION	RPS	EXISTING CONTOURS	- 100 -
RIPRAP INFLOW PROTECTION	RRP	PROPOSED CONTOURS	100
RIPRAP OUTLET SEDIMENT TRAP ST III	ST-III	TREE PROTECTION FENCE	
ROCK OUTLET PROTECTION I	ROPI	WETLAND	
LIMIT OF CUT SLOPE		WETLAND BUFFER	
LIMIT OF FILL SLOPE		100-YEAR FLOODPLAIN	

ESN–01

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

MR2026005
CHELTENHAM DRIVE BIKEWAY
EROSION AND SEDIMENT CONTROL NOTES

SCALE: NONE — PROJECT NO.: 500119 — SHEET 18 of 38

PROFESSIONAL CERTIFICATION:
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SEQUENCE OF CONSTRUCTION

1. Prior to clearing of trees, installing sediment control measures, or grading a preconstruction meeting must be conducted on-site with the Montgomery County Department of Permitting Services (MCDPS) sediment control inspector (240) 777-0311 (48 hours notice), the Owners representative, and the site Engineer. In order for the meeting to occur, the applicant must provide one paper set of approved sediment control plans to the MCDPS sediment control inspector at the preconstruction meeting. If no plans are provided, the meeting shall not occur and will need to be rescheduled prior to commencing any work.
2. The limits of disturbance must be field marked prior to clearing of trees, installation of sediment control measure, construction or other land disturbing activities.
3. Weather should be monitored to ensure construction of proposed drainage facilities are done in a day with no expected rainfall. Proposed drainage facilities should be constructed within one working day.
4. Place Tree Protection Fence. Tree Protection Fencing is shown offset from the Limit of Disturbance (LOD) line for graphic reasons only. Tree protection fence placement is to be executed at the LOD line.
5. Construction can occur coincidentally or any order the contractor chooses as long as approvals are in place.

SITE SPECIFIC SEQUENCE OF CONSTRUCTION

1. Clear and Grade for Installation of sediment control devices, only disturbing the area needed for installation of the sediment control devices.
2. Install Inlet Protection and Tree Protection Fence.
3. Once installed, the permittee must obtain written approval from the MCDPS inspector before proceeding with any additional clearing, grubbing, or grading.
4. Construct roadway, storm drain improvements, curb, sidewalk, and grading.
5. Permanently stabilize disturbed roadside area with topsoil, seed and mulch as indicated on the Typical Sections and Landscape plans.
6. Upon final stabilization and written approval from MCDPS inspector, the permittee shall remove the sediment control devices.

M-NCPPC CONSTRUCTION NOTES

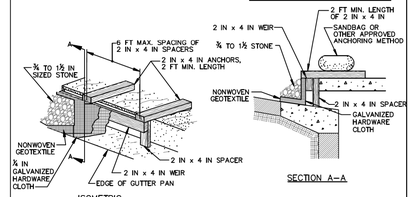
Removal of Existing Pavement within a Tree's Critical Root Zone:

1. The contractor shall meet with the M-NCPPC Urban Forester and Construction Inspector prior to removal of the pavement to discuss methods to be used to remove pavement. Removal of pavement may be required to be done by hand depending on site conditions.
2. The existing top layer of pavement shall be peeled away without disturbing the ground or material beneath. If a base course of rock is beneath the pavement the rock shall be left in place.
3. During the removal of the pavement layer great care shall be taken to not disturb existing tree roots along or under existing pavement. Existing tree roots greater than 1.5" in diameter encountered during the removal process shall not be cut unless approved by the M-NCPPC Urban Forester.
4. Equipment should remain on existing pavement during the removal process. Equipment shall not traverse over areas where pavement was removed in order to protect exposed tree roots.
5. Ground protection such as a 12" mulch layer will be required if equipment is needed to be operated within the critical root zone.
6. Removal of the existing pavement shall be done under supervision of the M-NCPPC Urban Forester and the Construction Inspector.
7. Stabilize area per approved plan or as directed by Construction Inspector.

DETAIL E-9-3 CURB INLET PROTECTION

STANDARD SYMBOL: CIP

MAXIMUM DRAINAGE AREA = ¼ ACRE



ISOMETRIC SECTION A–A

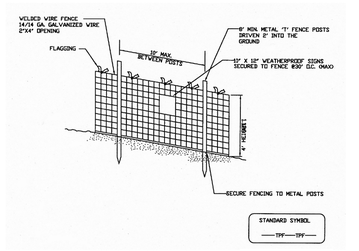
CONSTRUCTION SPECIFICATIONS

1. USE NOMINAL 2 INCH x 4 INCH LUMBER
2. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
3. NAIL THE 2x4 WEIR TO 9 INCH LONG VERTICAL SPACERS (MAXIMUM 6 FEET APART).
4. ATTACH A CONTINUOUS PIECE OF ¼ INCH GALVANIZED HARDWARE CLOTH, WITH A MINIMUM WIDTH OF 30 INCHES AND A MINIMUM LENGTH OF 4 FEET LONGER THAN THE THROAT OPENING, TO THE 2x4 WEIR, EXTENDING IT 2 FEET BEYOND THROAT ON EACH SIDE.
5. PLACE A CONTINUOUS PIECE OF NONWOVEN GEOTEXTILE OF THE SAME DIMENSIONS AS THE HARDWARE CLOTH OVER THE HARDWARE CLOTH AND SECURELY ATTACH TO THE 2x4 WEIR.
6. PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL TO 2x4 ANCHORS (MINIMUM 2 FEET LENGTH). EXTEND THE ANCHORS ACROSS THE INLET TOP AND HOLD IN PLACE BY SANDBAGS OR OTHER APPROVED ANCHORING METHOD.
7. INSTALL END SPACERS A MINIMUM OF 1 FOOT BEYOND THE ENDS OF THE THROAT OPENING.
8. FORM THE HARDWARE CLOTH AND THE GEOTEXTILE TO THE CONCRETE GUTTER AND FACE OF CURB TO SPAN THE INLET OPENING. COVER THE HARDWARE CLOTH AND GEOTEXTILE WITH CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE.
9. AT NON-SUMP LOCATIONS, INSTALL A TEMPORARY SANDBAG OR ASPHALT BERM TO PREVENT INLET BYPASS.
10. STORM DRAIN INLET PROTECTION REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT AFTER EACH RAIN EVENT TO MAINTAIN FUNCTION AND AVOID PREMATURE CLOGGING. IF INLET PROTECTION DOES NOT COMPLETELY DRAIN WITHIN 24 HOURS AFTER A STORM EVENT, IT IS CLOGGED. WHEN THIS OCCURS, REMOVE ACCUMULATED SEDIMENT AND CLEAN, OR REPLACE GEOTEXTILE AND STONE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

Tree Protection Fence Detail

Not to scale



NOTES

1. Practice may be combined with sediment control fencing.
2. Location and limits of fencing should be coordinated in field with arborist.
3. Boundaries of protection area should be staked prior to installing protective device.
4. Root damage should be avoided.
5. Protection signage is required.
6. Fencing shall be maintained throughout construction.

Montgomery County Planning Department • M-NCPPC
MontgomeryPlanning.org

ESN–02

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Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY EROSION AND SEDIMENT CONTROL NOTES

SCALE: NONE PROJECT NO.: 500119 SHEET 17 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.
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LIMIT OF WORK
NORFOLK AVENUE
STA. 100 + 25

NORFOLK AVENUE
WOODMONT AVENUE
WISCONSIN AVENUE (MD 355)
CHELTENHAM DRIVE

POB 100+00.00
100+00
101+00
102+00
03+00
104+00
105
PC 100+74.17
PT 100+56.54
PC 103+24.35
PT 104+70.55
PI 104+13.72
PC 104+47.64
+50

BETHMONT LLC
7815 WOODMONT AVENUE
L. 30912 F. 00256
TAX ID 00551840

BETHESDA LAND LLC
7820 WISCONSIN AVENUE
TAX ID 03373120
PLAT 22159

7809 WOODMONT AVENUE LLC
7809 WOODMONT AVENUE
TAX ID 03584312
PLAT 23574

MARYLAND NATIONAL CAPITAL
PARK & PLANNING COMMISSION
7810 WISCONSIN AVENUE
L. 64233 F. 00481
TAX ID 00551667

7809 WISCONSIN AVE ASSOC LP
7809 WISCONSIN AVENUE
L. 06073 F. 00844
TAX ID 00539745

CONLEY SALLY A, BREDICE LLC
7801 WOODMONT AVENUE
L. 53439 F. 00047
TAX ID 00551007
PLAT 4992

MARYLAND NATIONAL CAPITAL
PARK & PLANNING COMMISSION
7800 WISCONSIN AVENUE
L. 59638 F. 00257
TAX ID 00551018
PLAT 6223

4900 FAIRMONT RESIDENTIAL LLC
7770 NORFOLK AVENUE
L. 41795 F. 00334
TAX ID 03372615
PLAT 22153

ER VENTURES LLC
7700 NORFOLK AVENUE
L. 18918 F. 00588
TAX ID 00551155

WOODMONT PROPERTY LLC
7750 WOODMONT AVENUE
L. 31823 F. 00367
TAX ID 00420588
PLAT 4601

M&W TASTEE FOOD INC
7731 WOODMONT AVENUE
L. 04360 F. 00373
TAX ID 00552126

7750 WISCONSIN AVENUE LLC
7750 WISCONSIN AVENUE
L. 54664 F. 00298
TAX ID 03801344
PLAT 11789

HILLSTONE RESTAURANT GROUP LLC
7715 WOODMONT AVENUE
L. 67389 F. 00219
TAX ID 02950051

F&H LTD PTNSHP
7735 WISCONSIN AVENUE
TAX ID 01926671

EX. COUNTY ROW
EX. SHA ROW
PROPOSED CONCRETE MONOLITHIC MEDIAN
CONSTRUCTION NORFOLK AVE
CONSTRUCTION CHELTENHAM DRIVE
PROPOSED CONCRETE MONOLITHIC MEDIAN
MATCH LINE STA. 105+00, SEE SHEET ES-02
PROPOSED CONCRETE MONOLITHIC MEDIAN

N 481440
E 1285050
N 481440
E 1285180
N 481180
E 1285180

LEGEND

CIP CURB INLET PROTECTION

LOD — LOD LIMIT OF DISTURBANCE

ES-01

20' 0 20' 40'
SCALE: 1" = 20'

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DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005
CHELTENHAM DRIVE BIKEWAY
EROSION AND SEDIMENT
CONTROL PLAN

SCALE: 1" = 20' PROJECT NO.: 500119 SHEET 16 of 38

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7809 WISCONSIN AVE ASSOC LP
7809 WISCONSIN AVENUE
L. 06073 F. 00844
TAX ID 00539745

COMMUNITY THREE MARYLAND LLC
4725 CHELTENHAM DRIVE
L. 63107 F. 00136
TAX ID 00539563

MARYLAND NATIONAL CAPITAL
PARK & PLANNING COMMISSION
TILBURY ST
L. 05370 F. 00045
TAX ID 00540254

STOUGHTON MARK DAVID
AOKI CHIZURU
4614 HARLING LANE
L. 41625 F. 00086
TAX ID 00539927
PLAT 839

ROJCHIN ANDREA G
4612 HARLING LANE
L. 29846 F. 00228
TAX ID 00540961

O'DONOGHUE ANN N ET AL
4610 HARLING LANE
L. 09998 F. 00249
TAX ID 00539461

WESTMORELAND DONNA
PATCHIN DORIAN M
7803 TILBURY STREET
L. 21707 F. 00429
TAX ID 00541167
PLAT 839

BRINDLE KATHLEEN A &
TIMOTHY J
4617 CHELTENHAM DRIVE
L. 24030 F. 00688
TAX ID 00540664

TUMA FARRIS
TUMA ELIZABETH
4613 CHELTENHAM DRIVE
L. 67313 F. 00097
TAX ID 00539415
PLAT 839

LEVY JONATHAN D
4611 CHELTENHAM DRIVE
L. 05952 F. 00716
TAX ID 00539450

OSBOURNE WILLIAM III
& NANCY
4614 CHELTENHAM DRIVE
L. 57455 F. 00459
TAX ID 00540094
PLAT 839

STAUBER BENJAMIN A
& SARA L
4612 CHELTENHAM DRIVE
L. 52404 F. 00031
TAX ID 00541043

KEMPF PAMELA M TR
4610 CHELTENHAM DRIVE
L. 21081 F. 00600
TAX ID 00540117

GOLDSTEIN PETER C
& MELODY L MEADE
7711 TILBURY LANE
L. 24569 F. 00737
TAX ID 00539437

ROBITAILLE DENIS &
NAYA KENMAN
4613 SLEAFORD ROAD
L. 54979 F. 00266
TAX ID 00541101

F&H LTD PTNSHP
7735 WISCONSIN AVENUE
TAX ID 01926671

TILBURY STREET

CHELTENHAM DRIVE

MATCH LINE STA. 105+00, SEE SHEET ES-01

LIMIT OF WORK
CHELTENHAM DRIVE
STA. 108 + 65

LEGEND

CIP CURB INLET PROTECTION

LOD LOD LIMIT OF DISTURBANCE

20' 0 20' 40'
SCALE: 1" = 20'

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DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

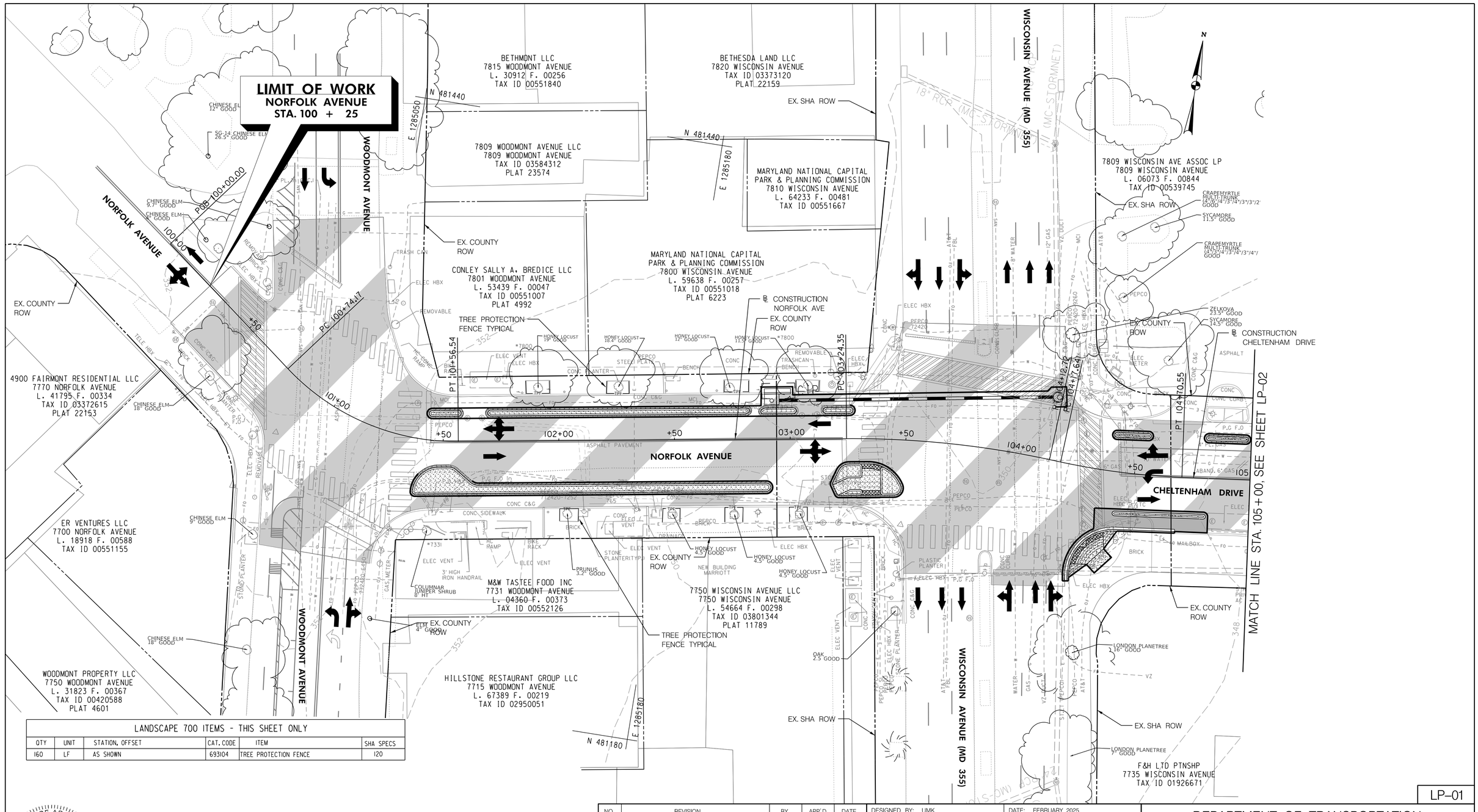
MR2026005
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LANDSCAPE 700 ITEMS - THIS SHEET ONLY					
QTY	UNIT	STATION, OFFSET	CAT. CODE	ITEM	SHA SPECS
160	LF	AS SHOWN	693104	TREE PROTECTION FENCE	120

LANDSCAPE LEGEND

——TPF—— TREE PROTECTION FENCE

NO.	REVISION	BY	APP'D	DATE

LANDSCAPE ARCHITECT 3190 MATTHEW RENDEL DARILL STATE OF MARYLAND

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A REGISTERED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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www.stantec.com

DESIGNED BY: UMK	DATE: FEBRUARY 2025	
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Chief, Division of Transportation Engineering — Date

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DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

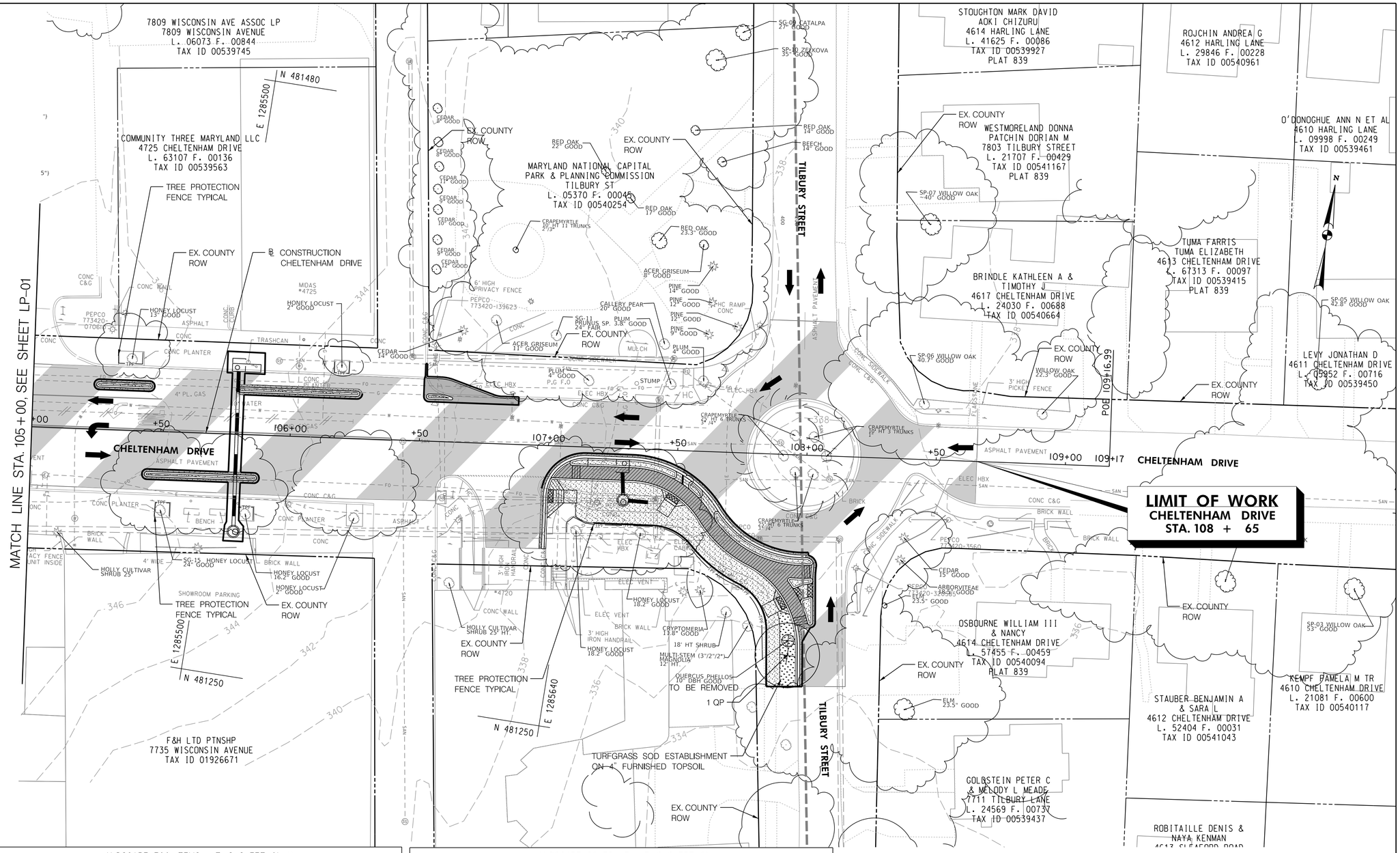
CHELTENHAM DRIVE BIKEWAY
LANDSCAPE PLAN

SCALE: 1" = 20'

PROJECT NO.: 500119 SHEET $LP01$ of TOT

LP-01

2/27/2025
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LANDSCAPE 700 ITEMS - THIS SHEET ONLY					
QTY	UNIT	STATION, OFFSET	CAT. CODE	ITEM	SHA SPECS
205	LF	AS SHOWN	693104	TREE PROTECTION FENCE	120
18	SY	STA. 107+95 L	704345	FURNISHED TOPSOIL 4 INCH DEPTH	701
18	SY	STA. 107+95 L	705565	REFERTILIZING	705
18	SY	STA. 107+95 L	708220	TURFGRASS SOD ESTABLISHMENT	708
125	LF	AS SHOWN	715050	TREE ROOT PRUNING	715

LANDSCAPE SCHEDULE - THIS SHEET ONLY					
QTY	UNIT	BOTANICAL / COMMON NAME	SIZE	ROOT	REMARKS
1	QP	QUERCUS PHELLOS / WILLOW OAK	2 1/2" - 3" CALIPER	B&B	SINGLE LEADER

LANDSCAPE LEGEND
- TPF — TREE PROTECTION FENCE
- EXISTING TREE TO BE REMOVED
- PROPOSED TREE
- TURFGRASS SOD ESTABLISHMENT

LANDSCAPE ARCHITECT 3190 KATHLEEN RENDEL DANIEL STATE OF MARYLAND

PROFESSIONAL CERTIFICATION:
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LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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Chief, Design Section — Date

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Chief, Division of Transportation Engineering — Date

CHELTENHAM DRIVE BIKEWAY
LANDSCAPE PLAN

SCALE: 1" = 20' PROJECT NO.: 500119 SHEET $LP02$ of TOT

LP-02

2/27/2025
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MDOT SHA LANDSCAPE NOTES

7.1 SHA LANDSCAPE NOTES. LANDSCAPE CONSTRUCTION WITHIN SHA PROPERTY, INCLUDING RIGHT OF WAYS, EASEMENT AREAS AND LANDS TO BE CONVEYED TO SHA SHALL CONFORM TO THESE NOTES. FOR GUIDANCE REGARDING DESIGN MODIFICATIONS DURING CONSTRUCTION, REFER TO SHA LANDSCAPE DESIGN GUIDE, SHA LANDSCAPE ESTIMATING MANUAL, AND SHA ENVIRONMENTAL GUIDE FOR ACCESS AND DISTRICT PERMIT APPLICANTS AT HTTP://WWW.ROADS.MARYLAND.GOV/INDEX.ASPX?PAGEID=25.

7.2 SHA STANDARD SPECIFICATIONS. LANDSCAPE CONSTRUCTION SHALL CONFORM TO CATEGORY 700 - LANDSCAPING, AND LANDSCAPE MATERIALS SHALL CONFORM TO SECTION 920 OF THE MOST RECENT REVISION OF SHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, INCLUDING ALL REVISIONS AND SUPPLEMENTS, AND AS SPECIFIED IN THESE NOTES. THESE REQUIREMENTS OF SHA SPECIFICATIONS SHALL SUPERSEDE ALL OTHER SPECIFICATIONS FOR WORK ON SHA PROPERT OR PROPERTY TO BE CONVEYED TO SHA EXCEPT AS SPECIFICALLY INDICATED IN THE PLANS. REFER TO HTTP://WWW.ROADS.MARYLAND.GOV//INDEX.ASPX?PAGEID=44

7.3 EROSION AND SEDIMENT CONTROL MANAGER (ESCM). SOIL DISTURBANCE SUCH AS GRADING, EXCAVATION, SOIL PLACEMENT OR OTHER ACTIVITIES THAT INVOLVE SOIL DISTURBANCE SHALL BE SUPERVISED BY AN ESCM MANAGER WITH A VALID "SHA YELLOW CARD" IN CONFORMANCE WITH SHA STANDARD SPECIFICATIONS AND ANY APPLICABLE EROSION AND SEDIMENT CONTROL PERMIT.

7.4 SHA STANDARD DETAILS FOR TREES, SHRUBS AND PLANTING BEDS. THE INSTALLATION OF TREES, SHRUBS, PLANTING BEDS AND OTHER LANDSCAPE CONSTRUCTION RELATED TO SECTION 710 OF THE SHA STANDARD SPECIFICATIONS SHALL CONFORM TO THE “SHA BOOK OF STANDARDS FOR HIGHWAY & INCIDENTAL STRUCTURES - CATEGORY 7” AT HTTP://APPS.ROADS.MARYLAND.GOV/BUSINESSWITHSHA/BIZSTDSSPECS/DESMANUALSTDPUB /PUBLICATIONSONLINE/OHD/BOOKSTD/TOCCAT7.ASP

7.5 TEMPORARY STABILIZATION SHALL BE INSTALLED IN CONFORMANCE WITH SECTION 704 TO ENSURE THAT AREAS OF SOIL DISTURBANCE ARE PROTECTED FROM WIND, RAINFALL AND FLOWING WATER UNTIL PERMANENT STABILIZATION IS INSTALLED.
1. TEMPORARY MULCH, EITHER AS TEMPORARY STRAW MULCH OR TEMPORARY MATTING MULCH, SHALL BE INSTALLED AT THE END OF EACH WORKING DAY TO PROVIDE "SAME DAY STABILIZATION" UNLESS OTHER APPROVED STABILIZATION IS INSTALLED.
2. TEMPORARY STRAW MULCH SHALL BE INSTALLED ON AREAS AND SLOPES FLATTER THAN 4:1 TEMPORARY MATTING MULCH SHALL BE APPLIED ON SLOPES 4:1 AND STEEPER, AND TO AREAS WITIN CHANNELS.

7.6 PAVEMENT REMOVAL AND RESTORATION. AREAS OF PAVEMENT REMOVAL SHALL BE EXCAVATED TO REMOVED PAVEMENTS, AGGREGATE BASE, AND COMPACTED SOIL AND OTHER UNSUITABLE MATERIALS BEFORE PLACING SOILS IN CONFORMANCE WITH SECTION 701 OF THE SHA STANDARD SPECIFICATIONS.
1. ROADWAYS SHALL BE EXCAVATED TO A DEPTH OF 16 INCHES BELOW FINAL GRADE BEFORE PLACING FURNISHED SUBSOIL 12 IN. DEPTH AND PLACING FURNISHED TOPSOIL 4 IN. DEPTH IN CONFORMANCE IWHT NOTE 7.8.
2. SIDEWALKS AND DRIVEWAYS SHALL BE EXCAVATED TO A DEPTH OF 6 INCHES BELOW FINAL GRADE BEFORE PLACING FURNISHED OPTSOIL 6 IN. DEPTH IN CONFORMANCE WITH NOTE 7.8.

7.7 EXCAVATION AND DEBRIS REMOVAL. DEBRIS RELATED TO THE DEMOLITION OF SIDEWALKS, DRIVEWAYS, CURBS, TREES, STUMPS, ROOTS, FENCING, PIPES, AND OTHER MATERIALS THAT MAY INTERFERE WITH LANDSCAPE INSTALLATION OR FUTURE MAINTENANCE SHALL BE EXCAVATED AS NECESSARY FOR THEIR COMPLETE REMOVAL AND DISPOSAL.

7.8 SOIL RESTORATION. AREAS OF PAVEMENT REMOVAL, EXCAVATION OR DRILLING IN LANDSCAPED AREAS SHALL REMOVE EXCAVATED DEBRIS AND RESTORE THE SUBGRADE WITH APPROVED SUBSOIL AND TOPSOIL PLACED IN CONFORMANCE WITH SECTION 701 OF THE SHA STANDARD SPECIFICATIONS.

1. A LAYER OF APPROVED TOPSOIL AT LEAST 4 INCH DEPTH SHALL BE PLACED ON ALL DISTURBED AREAS FLATTER THAN 2:1 AND IN ALL CHANNELS PRIOR TO SEEDING, SODDING OR OTHER LANDSCAPING, UNLESS OTHERWISE SPECIFIED.
2. A LAYER OF APPROVED TOPSOIL AT LEAST 2 INCH DEPTH SHALL BE PLACED ON ALL DISTURBED AREAS 2:1 AND STEEPER PRIOR TO SEEDING, SODDING OR OTHER LANDSCAPING, UNLESS OTHERWISE SPECIFIED.
3. BIORETENTION SOIL MIX (BSM) AND OTHER MATERIALS INSTALLED IN CONJUNCTION WITH SPI 316 - STORMWATER FILTRATION FACILITIES AND SHA STORMWATER DETAILS SHALL BE INSTALLED IN CONFORMANCE WITH THE SHA LANDSCAPE NOTES AND LANDSCAPE PLANS. PLANT MATERIALS AND MULCH SHALL BE INSTALLED IN BSM IN CONFORMANCE WITH STORMWATER DETAILS, SECTION 710 OR OTHER SHA SPECIFICATIONS.

7.9 TURFGRASS SOD ESTABLISHMENT SHALL BE PERFORMED IN ALL DISTURBED AREAS, OR WITHIN THE AREAS INDICATED IN THE PLANS, IN CONFORMANCE WITH SECTION 708 OF THE SHA STANDARD SPECIFICATIONS. THE REQUIRED APPLICATION RATE OF 20-16-12 FERTILIZER SHALL BE 200 LBS PER ACRE, OR SHALL BE EQUIVALENT FERTILIZER AND APPLICATION RATE AS SPECIFEIED IN SECTION 708. NO FERTILIZER SHALL BE APPLIED FROM NOVEMBER 15 TO MARCH 1.

7.10 TURFGRASS ESTABLISHMENT SHALL BE PERFORMED IN ALL DISTURED AREAS, OR WITHIN THE AREAS INDICATED IN THE PLANS, IN CONFORMANCE WITH SECTION 705 OF THE SHA STANDARD SPECIFICATIONS. THE REQUIRED APPLICATION RATE OF 20-16-12 FERTILIZER SHALL BE 200 LBS PER ACRE OR SHALL BE EQUIVALENT FERTILIZER AND APPLICATION RATE AS SPECIFEIED IN SECTION 708. NO FERTILIZER SHALL BE APPLIED FROM NOVEMBER 15 TO MARCH 1.

7.8 SOIL RESTORATION. AREAS OF PAVEMENT REMOVAL, EXCAVATION OR DRILLING IN LANDSCAPED AREAS SHALL REMOVE EXCAVATED DEBRIS AND RESTORE THE SUBGRADE WITH APPROVED SUBSOIL AND TOPSOIL PLACED IN CONFORMANCE WITH

1. AREAS FLATTER THAN 6:1. TYPE A OR TYPE E MATTING MAY BE INSTALLED IN LIEU OF STRAW MULCH AND HYDROMULCH BINDER IN CONJUCTION WITH TURFGRASS ESTABLISHMENT.
2. AREAS STEEEPER THAN 6:1 AND FLATTER THAN 4:1. TYPE A OR TYPE E MATTING SHALL BE INSTALLED IN LIEU OF STRAW MULCH AND HYDORMULCH BINDER IN CONJUCTION WITH TURFGRASS ESTABLISHMENT, UNLESS DELINEATED AND NOTED OTHERWISE.
3. CHANNELS, STORMWATER MANAGEMENT FACILITIES, AND SLOPES 4:1 AND STEEPER TYPE A SOIL STABILIZATION MATTING SHALL BE INSTALLED IN LIEU OF STRAW MULCH AND HYDROMULCH BINDR IN CONJUCTION WITH TURFGRASS ESTABLISHMENT, UNLESS DELINEATED AND NOTED OTHERWISE.
4. IN AREAS OF MEADOW ESTABLISHMENT WITH TYPE D SOIL STABILIZATION MATTING, THE MATTING SHALL BE INSTALLED IN LIEU OF STRAW MULCH AND HYDROMULCH BINDER WITHIN THE DELINEATED AREAS.
5. IN HIGH VELOCITY CHANNELS WITH TURFGRASS ESTABLISHMENT, TYPE B SOIL STABILIZATION MATTING SHALL BE INSTALLED IN LIEU OF STRAW MULCH AND HYDROMULCH BINDER WITHIN THE DELINEATED AREAS.

7.13 TREE PRESERVATION AREAS. TEMPORARY ORANGE CONSTRUCTION FENCE (TOCF) SHALL BE INSTALLED IN LOCATIONS DELINEATED ON THE PLANS IN CONFORMANCE WITH SECTION 120 OF THE SHA STANDARD SPECIFICATION TO PROTECT EXISTING TREES AND OTHER VEGETATION DURING CONSTRUCTION. AREAS WITHIN TOCF SHALL BE PROTECTED FROM ALL PROHIBITED AND RESTRICTED ACTIVITIES, AS SPECIFIED IN SECTION 120.

7.14 ROADSIDE TREE PERMIT. TREE REMOVAL, TREE INSTALLATION, TREE ROOT AND BRANCH PRUNING, AND OTHER REGULATED IMPACTS TO TREES IN THE SHA RIGHT OF WAY SHALL CONFORM TO THE REQUIREMENTS OF THE ROADSIDE TREE PERMIT (RTP) OF THE MARYLAND DEPARTMENT OF NATURAL RESOURCES, OR THE APPROVED FOREST CONSERVATION ACT PLAN OF THE LOCAL AUTHORITY.

1. A COPY OF THE RTP OR FCP SHALL BE SUBMITTED TO THE SHA OFFICE OF ENVIRONMENTAL DESIGN BEFORE WORK IS PERFORMED, AND A COPY OF THE RTP OR FCP SHALL BE REPRODUCED IN THE PLANS OR BE IN POSSESSION OF THE APPLICANT AT THE PROJECT SITE WHEN THE PERMITTED WORK IS PERFORMED.

2. A MARYLAND LICENSED TREE EXPERT SHALL PERFORM THE SPECIFIED TREE OPERATIONS IN CONFORMANCE WITH THE SHA STANDARD SPECIFICATIONS AND ANSI A300 STANDARDS FOR TREE CARE OPERATIONS.

7.15 TREES AND OTHER PLANT MATERIAL INSTALLATION. TREES, SHRUBS, PERENNIALS, ANNUALS, BULBS, LANDSCAPE BEDS, BARK MULCH AND SIMILAR MATERIALS SHALL BE INSTALLED IN CONFORMANCE WITH SECTION 710 AND 711 OF THE SHA STANDARD SPECIFICATIONS. THE SHA LANDSCAPE PROGRAMS DIVISION WILL APPROVE MATERIALS AND LAYOUT, AND PERFORM OTHER APPROVALS AND INSPECTIONS IN CONFORMATNCE WITH STANDARD SPECIFICATIONS. TREE AND SHRUBS SHALL BE PRUNED AT THE TIME OF INSTALLATION TO ENSURE SIDEWALK CLEARANCE FOR PEDESTRIANS IS MAINTAINED TO A HEIGHT OF 8 FEET. NO TREE OR SHRUB SHALL BE INSTALLED WITHIN 3 FEET OF CURBS, SIDEWALKS, OR PAVEMENT EDGES.

7.17 TREE FELLING IN TURFGRASS AREAS SHALL BE PERFORMED IN CONFORMANCE IWTH OPERATION 1 - FELLING AND STUMP REMOVAL OF SECTION 714. ALLL DEBRIS SHALL BE REMOVED FROM SHA PROPERTY.

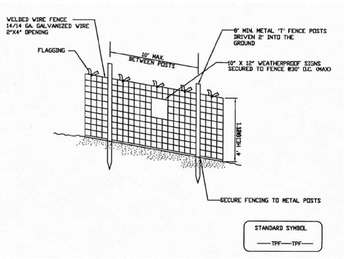
7.20 STUMP REMOVAL. STUMP REMOVAL IN TURFGRASS OR MEADOW AREAS SHALL BE PERMFORMED IN CONFORMANCE WITH OPERATION 5 - STUMP REMOVAL OF SECTION 714. ALL DEBRIS SHALL BE REMOVED FROM SHA PROPERTY

7.21 TREE BRANCH PRUNING SHALL BE PERFORMED OR DIRECTLY SUPERVISED BY A MARYLAND LICENSED TREE EXPERT IN CONFORMANCE WITH ANSI A300 STANDARDS PER SECTION 712 AS NECESSARY FOR ANY OF THE FOLLOWING: TO INSTALL TEMPORARY ORANGE CONSTRUCTION FENCE (TOCF) ALONG DELINEATIONS OF PLANS; TO PERFORM TREE ROOT PRUNING ALONG DELINEATIONS ON PLANS; TO PROVIDE 8 FOOT CLEARANCE ABOVE SIDEWALK PAVEMENTS AND 16 FOOT CLEARANCE ABOVE ROADWAY PAVEMENTS: TO REPAIR TREE WOUNDS; AND TO PERFORM OTHER RECOMMENDED CLEANING, THINNING, REDUCING, AND PRUNING NECESSARY TO ACCOMMODATE UTILITIES. ALL DEBRIS SHALL BE REMOVED FROM SHA PROPERTY.

7.22 TREE ROOT PRUNING SHALL BE PERFORMED ALONG THE LINE SHOWN ON THE PLANS IN CONFORMANCE WITH SECTION 715. TREE ROOT PRUNING SHALL BE COMPLETED BEFORE BEGINNING EXCAVATION OR OTHER CONSTRUCTION ADJACENT TO TREES TO BE PRESERVED.

Tree Protection Fence Detail

Not to scale



NOTES

1. Practice may be combined with sediment control fencing.
2. Location and limits of fencing should be coordinated in field with arborist.
3. Boundaries of protection area should be staked prior to installing protective device.
4. Root damage should be avoided.
5. Protection signage is required.
6. Fencing shall be maintained throughout construction.

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NOTES:
1. RETENTION AREAS WILL BE SET AS PART OF THE REVIEW PROCESS AND PRECONSTRUCTION MEETING.
2. BOUNDARIES OF RETENTION AREAS MUST BE STAKED AT THE PRECONSTRUCTION MEETING AND FLAGGED PRIOR TO TRENCHING.
3. EXACT LOCATION OF TRENCH SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FOREST CONSERVATION (FC) INPECTOR .
4. TRENCH SHOULD BE IMMEDIATELY BACKFILLED WITH EXCAVATED SOIL OR OTHER ORGANIC SOIL AS SPECIFIED PER PLAN OR BY THE FC INSPECTOR.
5. ROOTS SHALL BE CLEANLY CUT USING VIBRATORY KNIFE OR OTHER ACCEPTABLE EQUIPMENT.
6. ALL PRUNING MUST BE EXECUTED WITH LOD SHOWN ON PLANS OR AS AUTHORIZED IN WRITING BY THE FC INSPECTOR.

ROOT PRUNING DETAIL

NTS

LP–03



PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A REGISTERED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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Baltimore, MD 21286
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NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	DATE: FEBRUARY 2025
CHECKED BY: LRA	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:

RECOMMENDED FOR APPROVAL

Chief, Design Section — Date

APPROVED

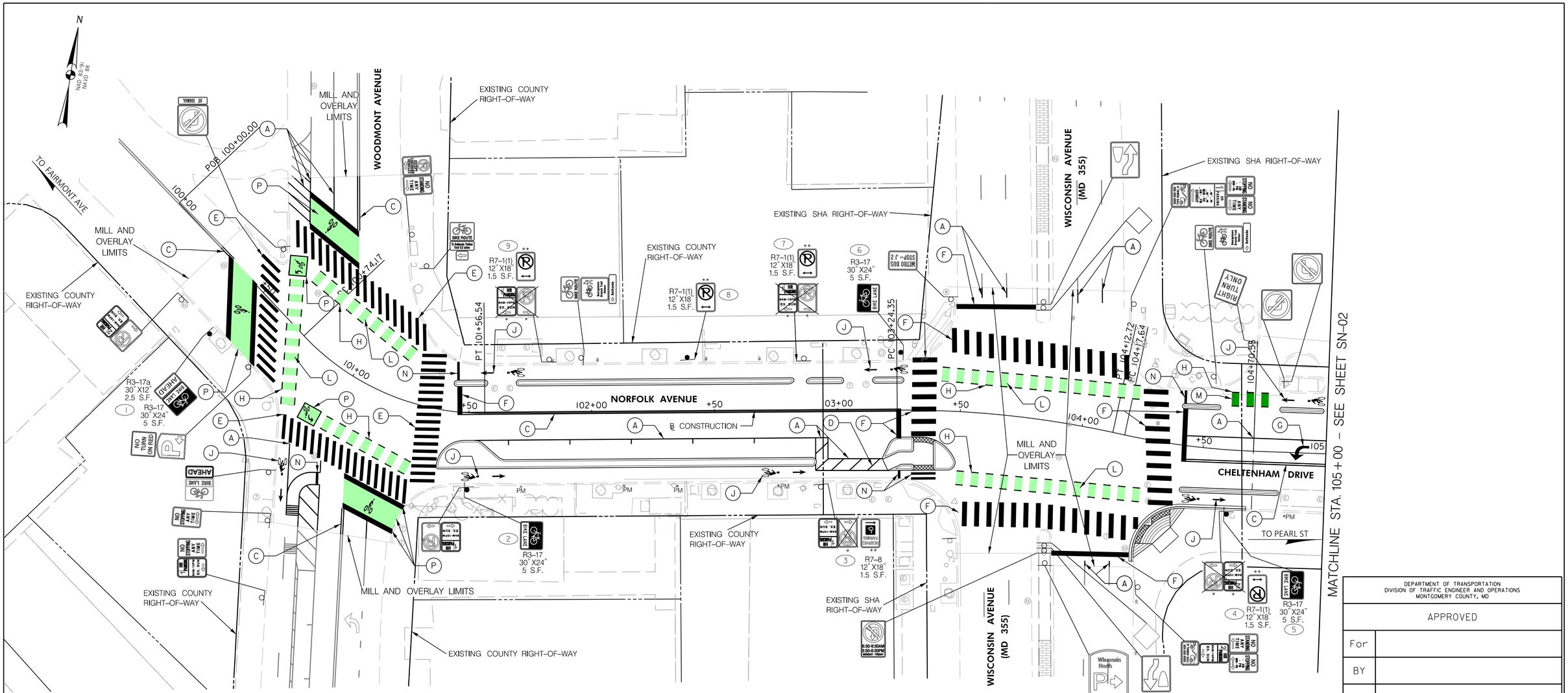
Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
LANDSCAPE PLAN
NOTES & DETAILS

PROJECT NO.: 500119 SHEET 22 of 38

2/27/2025
U:\2026\23133\700 CADD\702 Sheets\pLP-P003_CheltenhamDr.dgn



LEGEND

- EX. SIGN POST
- PR. SIGN POST
- EX. SIGN TO BE REMOVED

SIGNING AND MARKING NOTES:

1. ALL SIGNING AND MARKING SHALL BE DONE IN ACCORDANCE WITH THE LATEST MARYLAND MANUAL ON UNIFORM TRAFFIC CONTOL DEVICES (MD MUTCD), MARYLAND STATE HIGHWAY ADMINISTRATION'S BOOK OF STANDARDS, SPECIFICATIONS AND GUIDELINES.
2. THE CONTRACTOR SHALL USE DIAMOND GRADE REFLECTIVE SHEETING FOR ALL SIGNS.
3. WHEN SIGNS ARE INSTALLED IN CONCRETE OR WITHIN THE SIDEWALK, A PVC SLEEVE SHALL BE PROVIDED USING 40 SCHEDULE PVC (4 INCH DIAMETER).
4. NO PARKING AND OTHER PARKING SIGNS SHALL BE INSTALLED PER MDMUTCD SECTION 2B.48.
5. SIGN HEIGHT SHALL BE MINIMUM 7 FEET HIGH FROM THE BOTTOM OF THE SIGN FACE TO THE GROUND.
6. PARKING SIGNS AND PARKING METERS NOTED AS "REMOVED BY OTHERS" ARE THE RESPONSIBILITY OF MCDOT DIVISION OF PARKING MANAGEMENT. THE CONTRACTOR TO COORDINATE WITH THAT DIVISION, 240-777-8740. CONTACT PERSON IS CARMEN ZALDIVAR.

PAVEMENT MARKING LEGEND

- (A) INSTALL 5 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING (SOLID)
- (B) INSTALL 5 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING (3-9-3 DOTTED)
- (C) INSTALL 5 INCH YELLOW LEAD FREE THERMOPLASTIC PAVEMENT MARKING (DOUBLE)
- (D) INSTALL 5 INCH YELLOW LEAD FREE THERMOPLASTIC PAVEMENT MARKING (SOLID)
- (E) INSTALL 16 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING
- (F) INSTALL 24 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING
- (G) INSTALL WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LEGENDS AND SYMBOLS
- (H) INSTALL 5 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING (3-3-3 DOTTED)
- (J) INSTALL THERMOPLASTIC BIKE SYMBOL WITH AN ARROW PAVEMENT MARKING (SEE DETAIL SHEET SN-03)
- (K) INSTALL THERMOPLASTIC SHARROW PAVEMENT MARKING (SEE DETAIL SHEET SN-03)
- (L) INSTALL GREEN PAVEMENT MARKING; PRE-FORMED THERMOPLASTIC (HIGH VOLUME AREAS)
- (M) INSTALL GREEN PAVEMENT MARKING; EPOXY (LOW VOLUME AREAS)
- (N) INSTALL 12 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING
- (O) REPLACE EXISTING PAVEMENT MARKING
- (P) INSTALL BIKE BOX PAVEMENT MARKING (SEE DETAIL SHEET SN-03)

SIGNING KEY:

- * SIGN(S) TO BE REMOVED BY OTHERS
- ** SIGN(S) TO BE INSTALLED BY OTHERS
- *** SIGN(S) TO BE RELOCATED BY OTHERS
- ⊙PM PARKING METER

20' 0 20' 40'
SCALE: 1" = 20'

NO.	REVISION	BY	APP'D	DATE

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRAFFIC ENGINEER AND OPERATIONS
MONTGOMERY COUNTY, MD

APPROVED

For

BY

DATE:

DESIGNED BY: JRGB	DATE: FEBRUARY 2025		
DRAWN BY: JRGB	DATE: FEBRUARY 2025		
CHECKED BY: RJM	DATE: FEBRUARY 2025		
DRAWING NO.:	DATE:		

RECOMMENDED FOR APPROVAL

Chief, Design Section — Date

APPROVED

Chief, Division of Transportation Engineering — Date

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: _____

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www.stantec.com

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

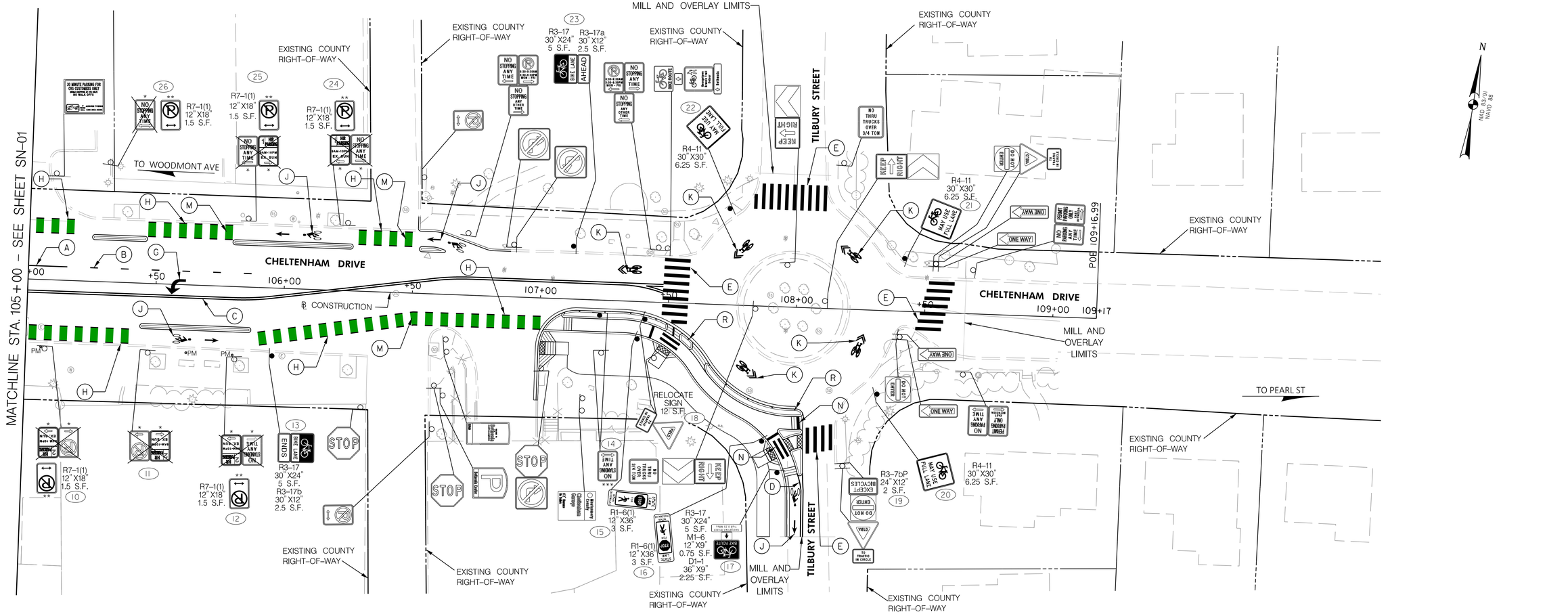
MR2026005

CHELTENHAM DRIVE BIKEWAY
SIGNING AND MARKING PLAN
STA.100+00 TO STA.105+00

SCALE: 1" = 20' PROJECT NO.: 500119 SHEET 23 of 38

SN-01

3/10/2025
U:\2026\21333\700 CADD\702 Sheets\pSN-200I_CheltenhamDr.dgn



SIGNING AND MARKING NOTES:

1. ALL SIGNING AND MARKING SHALL BE DONE IN ACCORDANCE WITH THE LATEST MARYLAND MANUAL ON UNIFORM TRAFFIC CONTOL DEVICES (MD MUTCD), MARYLAND STATE HIGHWAY ADMINISTRATION'S BOOK OF STANDARDS, SPECIFICATIONS AND GUIDELINES.
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SIGNING KEY:

* SIGN(S) TO BE REMOVED BY OTHERS
** SIGN(S) TO BE INSTALLED BY OTHERS
*** SIGN(S) TO BE RELOCATED BY OTHERS
○PM PARKING METER

PAVEMENT MARKING LEGEND

(A) INSTALL 5 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING (SOLID)
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(F) INSTALL 24 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING
(G) INSTALL WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LEGENDS AND SYMBOLS
(H) INSTALL 5 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING (3–3–3 DOTTED)
(J) INSTALL THERMOPLASTIC BIKE SYMBOL WITH AN ARROW PAVEMENT MARKING (SEE DETAIL SHEET SN–03)
(K) INSTALL THERMOPLASTIC SHARROW PAVEMENT MARKING (SEE DETAIL SHEET SN–03)
(L) INSTALL GREEN PAVEMENT MARKING; PRE–FORMED THERMOPLASTIC (HIGH VOLUME AREAS)
(M) INSTALL GREEN PAVEMENT MARKING; EPOXY (LOW VOLUME AREAS)
(N) INSTALL 12 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING
(O) REMOVE PAVEMENT MARKING
(P) INSTALL BIKE BOX PAVEMENT MARKING (SEE DETAIL SHEET SN–03)
(R) INSTALL RAISED PAVEMENT MARKERS

LEGEND
EX. SIGN POST
PR. SIGN POST
EX. SIGN TO BE REMOVED

DEPARTMENT OF TRANSPORTATION DIVISION OF TRAFFIC ENGINEER AND OPERATIONS MONTGOMERY COUNTY, MD	
APPROVED	
For	
BY	
DATE:	

SN–02

20' 0 20' 40'
SCALE: 1" = 20'

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: JRGB	DATE: FEBRUARY 2025
DRAWN BY: JRGB	DATE: FEBRUARY 2025
CHECKED BY: RJM	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

MR2026005

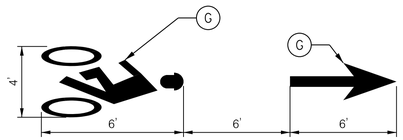
CHELTENHAM DRIVE BIKEWAY SIGNING AND MARKING PLAN STA.105+00 TO STA.109+00

SCALE: 1" = 20' PROJECT NO.: 500119 SHEET 24 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: _____

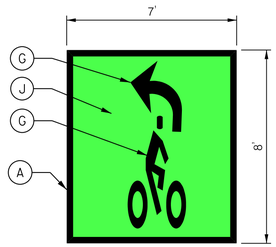
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3/10/2025
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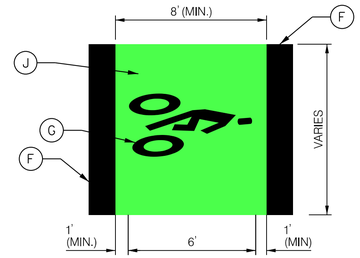
BIKE LANE PAVEMENT MARKING DETAIL

NOT TO SCALE



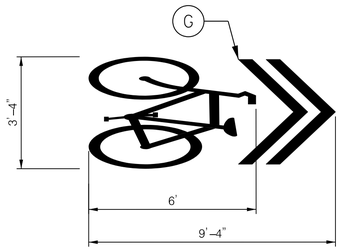
BIKE BOX PAVEMENT MARKING DETAIL

NOT TO SCALE



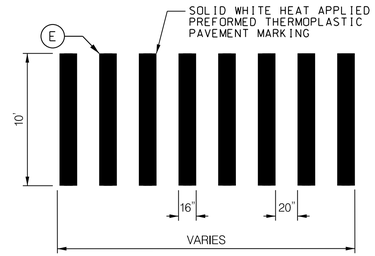
BIKE BOX PAVEMENT MARKING DETAIL

NOT TO SCALE



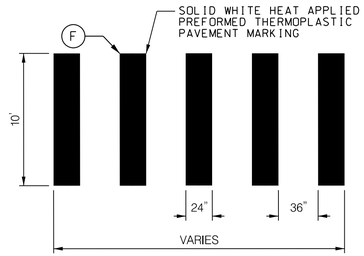
SHARED LANE (SHARROW) PAVEMENT MARKING DETAIL

NOT TO SCALE



MCDOT CROSSWALK PAVEMENT MARKING DETAIL

NOT TO SCALE



SHA CROSSWALK PAVEMENT MARKING DETAIL

NOT TO SCALE

PAVEMENT MARKING LEGEND

- (A) INSTALL 5 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING (SOLID)
- (B) INSTALL 5 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING (3-9-3 DOTTED)
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- (M) INSTALL GREEN PAVEMENT MARKING; EPOXY (LOW VOLUME AREAS)
- (N) INSTALL 12 INCH WHITE LEAD FREE THERMOPLASTIC PAVEMENT MARKING
- (O) REMOVE PAVEMENT MARKING

DEPARTMENT OF TRANSPORTATION DIVISION OF TRAFFIC ENGINEER AND OPERATIONS MONTGOMERY COUNTY, MD	
APPROVED	
For	
BY	
DATE:	

SN-03

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: _____

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NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: JRGB	DATE: FEBRUARY 2025
DRAWN BY: JRGB	DATE: FEBRUARY 2025
CHECKED BY: RJM	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

MR2026005

CHELTENHAM DRIVE BIKEWAY SIGNING AND MARKING PLAN MARKING DETAILS

SCALE: NTS PROJECT NO.: 500119 SHEET 25 of 38

2/27/2025
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SIGN NO.	REMARKS	CODE NUMBERS •															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SN-01																	
1	R3-17, R3-17a	7.5	1	1													
2	R3-17 (MOUNT TO EXISTING POST)	5															
3	R7-8 (MOUNT TO EXISTING POST) BY OTHERS																
4	R7-1(1) (MOUNT TO EXISTING POST) BY OTHERS																
5	R3-17 (MOUNT TO EXISTING POST)	5															
6	R3-17	5	1	1													
7	R7-1(1) (MOUNT TO EXISTING POST) BY OTHERS																
8	R7-1(1) BY OTHERS																
9	R7-1(1) (MOUNT TO EXISTING POST) BY OTHERS																
SN-02																	
10	R7-1(1) (MOUNT TO EXISTING POST) BY OTHERS																
11	BY OTHERS																
12	R7-1(1) (MOUNT TO EXISTING POST) BY OTHERS																
13	R3-17, R3-17b	7.5	1	1													
14	BY OTHERS																
15	R1-6(1)	3	1	1													
16	R1-6(1)	3	1	1													
17	R3-17, M1-6, D1-1	8	1	1													
18	RELOCATE EXISTING SIGNAGE		1	1		12											
19	R3-7bP (MOUNT TO EXISTING POST)	8															
20	R4-11	6.25	1	1													
21	R4-11	6.25	1	1													
22	R4-11	6.25	1	1													
23	R3-17, R3-17a	7.5	1	1													
24	R7-1(1) (MOUNT TO EXISTING POST) BY OTHERS																
25	R7-1(1) (MOUNT TO EXISTING POST) BY OTHERS																
26	R7-1(1) (MOUNT TO EXISTING POST) BY OTHERS																
	TOTALS	72.3	11	11	0	12	1400	1250	99	1037	824	91	72	143	0	1846	774

• CODE NUMBER DESCRIPTION & UNIT

CODE NUMBERS	DESCRIPTION	UNIT	CODE NUMBERS	DESCRIPTION	UNIT
1	SHEET ALUMINUM SIGN(S)	S.F.	9	16" WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	L.F.
2	FURNISH AND INSTALL PERFORATED TUBULAR STEEL SIGN SUPPORTS	EACH	10	24" WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	L.F.
3	FURNISH AND INSTALL ANCHOR BASES FOR SQUARE TUBULAR STEEL POST	EACH	11	WHITE PREFORMED THERMOPLASTIC PAVEMENT MARKING LEGENDS AND SYMBOLS	S.F.
4	REMOVE EXISTING SIGN(S)	S.F.	12	SHARED BIKE LANE PREFORMED THERMOPLASTIC PAVEMENT MARKING	S.F.
5	RELOCATE EXISTING SIGN(S)	S.F.	13	BIKE LANE PREFORMED THERMOPLASTIC PAVEMENT MARKING WITH ARROW	S.F.
6	5" WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	L.F.	14	REMOVAL OF EXISTING PAVEMENT MARKING LINES, ANY WIDTH	L.F.
7	5" YELLOW LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	L.F.	15	PREFORMED THERMOPLASTIC GREEN PAINT	S.F.
8	12" WHITE LEAD FREE REFLECTIVE THERMOPLASTIC PAVEMENT MARKINGS	L.F.	16	EPOXY-MODIFIED ACRYLIC WATERBORNE GREEN PAINT	S.F.

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRAFFIC ENGINEER AND OPERATIONS
MONTGOMERY COUNTY, MD

APPROVED

For

BY

DATE:

SN-04

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: _____

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NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: JRGB	DATE: FEBRUARY 2025
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_____ _____
Chief, Design Section Date

APPROVED

_____ _____
Chief, Division of Transportation Engineering Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY SIGNING AND MARKING PLAN SIGN AND MARKING SCHEDULE

SCALE: NTS PROJECT NO.: 500119 SHEET 26 of 38

2/27/2025
U:\2026213\33\700 CADD\702 Sheets\pSN-2004_CheltenhamDr.dgn

EXISTING SIGNS

MD 355 IS ASSUMED TO RUN IN A NORTH-SOUTH DIRECTION

46 — Wisconsin North — D4-1??? 30" X 24"

6:30-9:30 AM 3:30 - 6:30 PM MONDAY-FRIDAY — D4-1??? 30" X 24"

44 — Wisconsin North — D4-1??? 30" X 24"

35 — NORTH MARYLAND 355 — SHIELD ASSEMBLY (30"x48")

37 — SOUTH MARYLAND 355 — SHIELD ASSEMBLY (30"x48")

21a — Norfolk AVE / Cheltenham DR — D-3(2) (90"X32")

21b — Cheltenham DR / Norfolk AVE — D-3(2) (90"X32")

22a,22b — Wisconsin AVE — D-3(2) (VAR.X16")

43 — 6:30-9:30 AM 3:30 - 6:30 PM MONDAY-FRIDAY — R3-18(1) (24"X36")

39,40 — OM1-3 (18"X18")

25 — ONLY — R3-5(L) (30"x36")

36 — NORTH MARYLAND 355 — SHIELD ASSEMBLY (48"x72")

38 — SOUTH MARYLAND 355 — SHIELD ASSEMBLY (48"x72")

31,32 / 29,30 / 34 / 28 — PUSH BUTTON TO CROSS WISCONSIN AVE — R10-3(1) 9" x 15"

45 — P

41,42 — R4-7 (24"x30")

33 / 27 — PUSH BUTTON TO CROSS CHELTENHAM — R10-3(1) 9" x 15"

24,26 — TURNING VEHICLES TO

48 — SPEED LIMIT 25 — R1-3(1) 9" x 15"

51 — 2 HR PARKING 9 AM - 6 PM EX. SUN

50 — metrobus J2

51 — NO STOPPING 6:30-9:30AM 6:30-9:30AM MON-FRI / NO STOPPING EXCEPT BUSES 6:30-9:30AM 6:30-9:30AM MON-FRI / ANY TIME / NO STANDING ANY TIME

47 — NO STANDING ANY TIME / NO STOPPING 6:30-9:30AM 3:30-6:30PM MONDAY-FRIDAY / 2 HR PARKING 9-3 6-10 MON-FRI 9AM-10PM SATURDAY

49 — NO STOPPING 6:30-9:30AM 6:30-9:30AM MONDAY-FRIDAY / NO STANDING ANY TIME / 1 HR PARKING 9-3 6-10 MON-FRI 9AM-10PM SATURDAY

EXISTING SIGNS TO BE RELOCATED

23a,24b — Wisconsin AVE — D-3(2) (VAR.X16")

EXISTING SIGNALS TO REMAIN

1,2,3, 4,5,6,8,9,10,12

R Y G — 12"

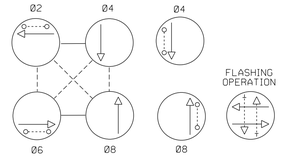
13-20 — 16" LED COUNTDOWN PEDESTRIAN SIGNAL

EXISTING SIGNALS TO RELOCATE

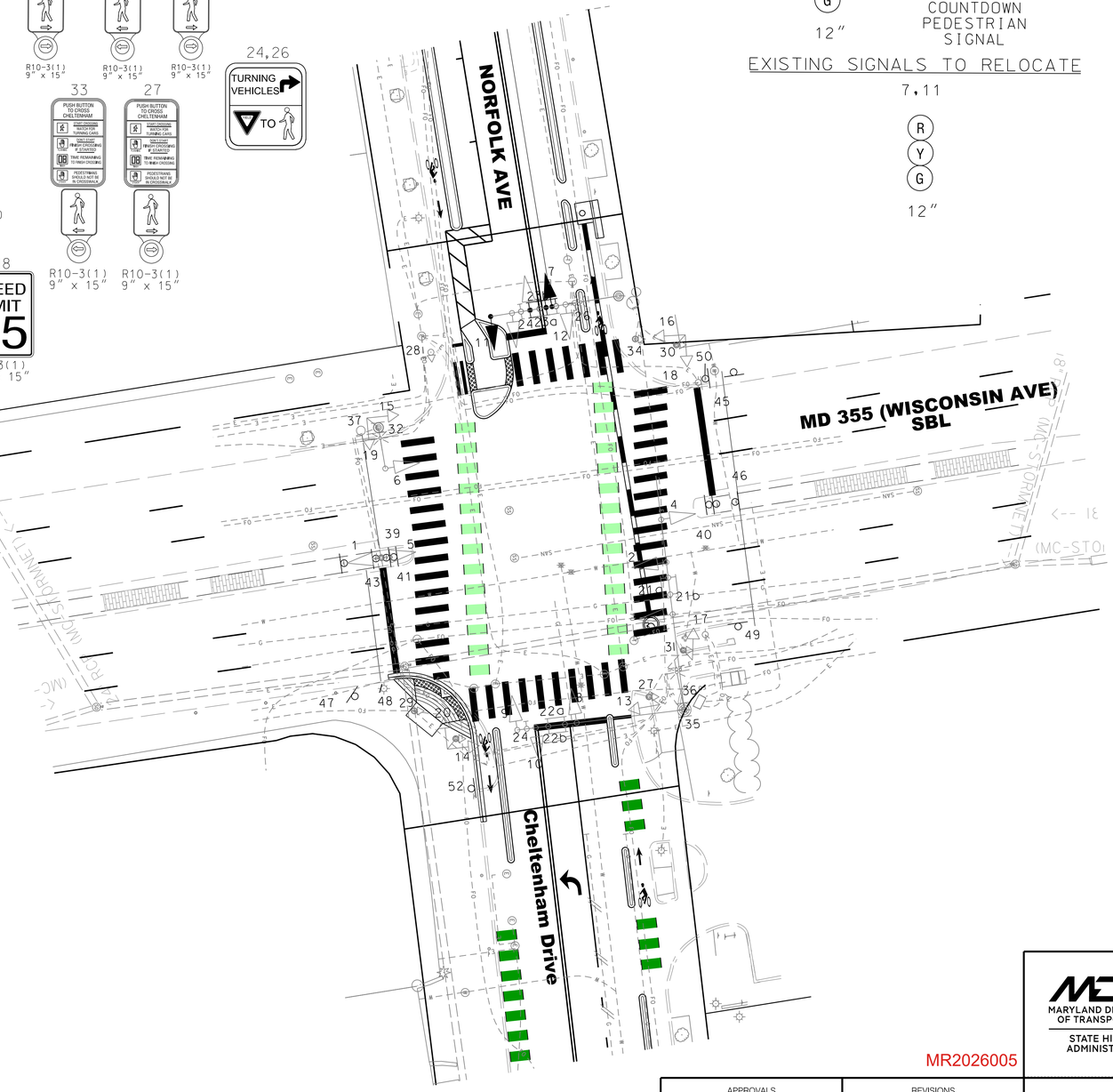
7,11

R Y G — 12"

NEMA PHASING



NOTE:
PHASES ASSOCIATED BY A DASHED LINE WILL OPERATE CONCURRENTLY.
PHASES ASSOCIATED BY A SOLID LINE WILL NOT OPERATE CONCURRENTLY.



GEOMETRIC LEGEND
EXISTING
PROPOSED

UTILITY LEGEND
SD SD STORM DRAIN
G G GAS MAIN
W W WATER MAIN
S S SEWER MAIN
E E ELECTRIC CABLES
A A AERIAL CABLES
T T TELEPHONE CABLES
F F FIBER-OPTIC

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BY: ukota –

PLOTTED: 2/27/2025
FILE: U:\2026213133\700 CADD\702 Sheets\pSG-P002_CheltenhamDr.dgn

MR2026005

APPROVALS
TEAM LEADER
ASST. DIV. CHIEF
DIVISION CHIEF — ORIGINAL ON FILE
OFFICE DIRECTOR

REVISIONS
B 2/2/2010 RECONSTRUCT TRAFFIC SIGNAL DUE TO NEW BIKE LANES — SHA NO. XXXXXXXXX — TIMS NO: XXXX
A 1/4/2010 RECONSTRUCT TRAFFIC SIGNAL WITH APS AND CPS — SHA NO. XX4455185 — TIMS NO: J436 — JWA

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

OFFICE OF TRAFFIC & SAFETY
TRAFFIC ENGINEERING DESIGN DIVISION

MD 355 (WISCONSIN AVE) AND CHELTENHAM DR /NORFOLK AVE.

BETHESDA, MARYLAND

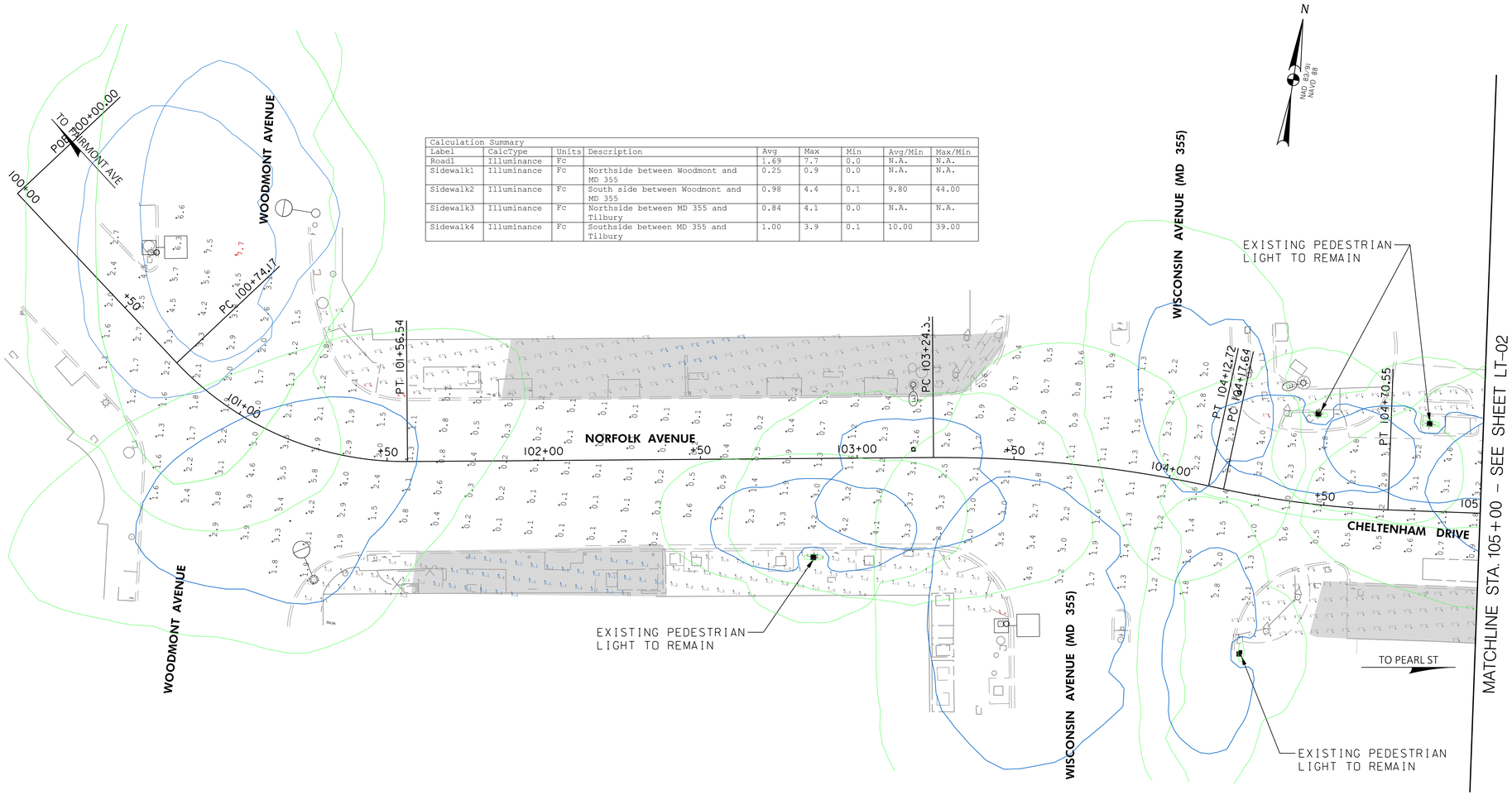
TRAFFIC SIGNAL PLAN

SCALE 1" = 20' ADVERTISED DATE 7/99 CONTRACT NO.

DESIGNED BY
DRAWN BY
CHECKED BY
MDE/PRD

COUNTY MONTGOMERY
LOGMILE 15032001.63
TIMS NO. J436
TOD NO.

TS NO. 2684B | DRAWING SG – 01 OF 03 | SHEET NO. OF 38



Calculation Summary								
Label	CalcType	Units	Description	Avg	Max	Min	Avg/Min	Max/Min
Road1	Illuminance	Fc		1.69	7.7	0.0	N.A.	N.A.
Sidewalk1	Illuminance	Fc	Northside between Woodmont and MD 355	0.25	0.9	0.0	N.A.	N.A.
Sidewalk2	Illuminance	Fc	South side between Woodmont and MD 355	0.98	4.4	0.1	9.80	44.00
Sidewalk3	Illuminance	Fc	Northside between MD 355 and Tilbury	0.84	4.1	0.0	N.A.	N.A.
Sidewalk4	Illuminance	Fc	Southside between MD 355 and Tilbury	1.00	3.9	0.1	10.00	39.00

20' 0 20' 40'
SCALE: 1" = 20'

LEGEND

- EXISTING PEDESTRIAN LUMINAIRE AND POLE
- EXISTING ROADWAY LUMINAIRE
- +0.0 EXISTING NIGHTTIME LIGHT LEVEL
- EXISTING 100W LED LUMINAIRE
- EXISTING 200W LUMINAIRE
- 1.00 FOOT-CANDLE
- 0.25 FOOT-CANDLE
- +0.0 MIN FOOT-CANDLE
- +0.0 MAX FOOT-CANDLE
- LOW LIGHT-LEVEL AREA

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: RJM	DATE: FEBRUARY 2025
DRAWN BY: RJM	DATE: FEBRUARY 2025
CHECKED BY: JRGB	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:

RECOMMENDED FOR APPROVAL

Chief, Design Section — Date

APPROVED

Chief, Division of Transportation Engineering — Date

LT-01

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
LIGHTING PLAN
STA. 100+00 TO STA. 105+00

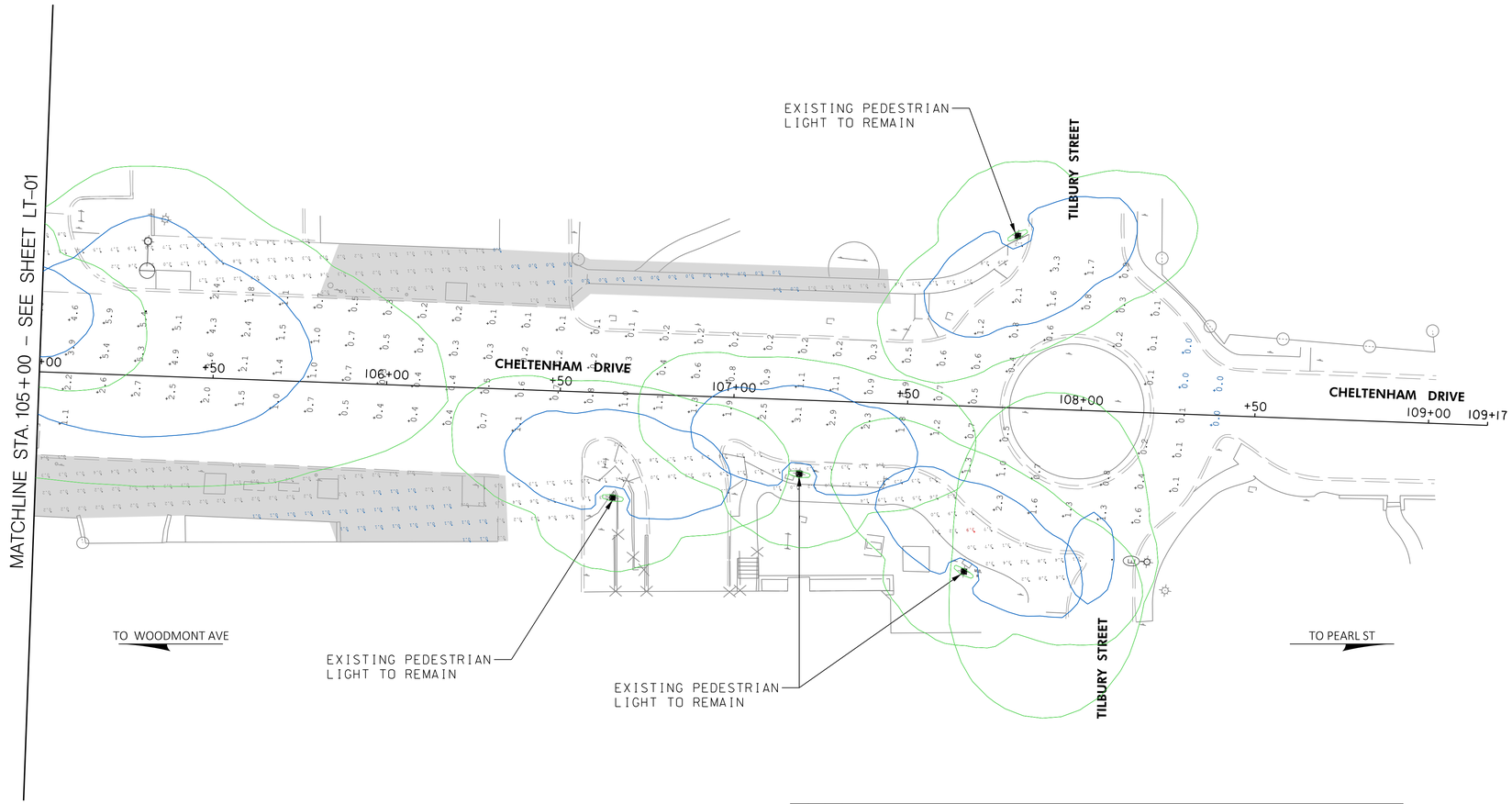
SCALE: 1" = 20'

PROJECT NO.: 500119 SHEET 28 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: _____

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2/27/2025
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Calculation Summary								
Label	CalcType	Units	Description	Avg	Max	Min	Avg/Min	Max/Min
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Sidewalk4	Illuminance	Fc	Southside between MD 355 and Tilbury	1.00	3.9	0.1	10.00	39.00

20' 0 20' 40'
SCALE: 1" = 20'

LEGEND

- EXISTING PEDESTRIAN LUMINAIRE AND POLE
- EXISTING ROADWAY LUMINAIRE
- +0.0 EXISTING NIGHTTIME LIGHT LEVEL
- EXISTING 100W LED LUMINAIRE
- EXISTING 200W LUMINAIRE
- 1.00 FOOT-CANDLE
- 0.25 FOOT-CANDLE
- +0.0 MIN FOOT-CANDLE
- +0.0 MAX FOOT-CANDLE
- LOW LIGHT-LEVEL AREA

PROFESSIONAL CERTIFICATION:
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www.stantec.com

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: RJM	DATE: FEBRUARY 2025
DRAWN BY: RJM	DATE: FEBRUARY 2025
CHECKED BY: JRGB	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:

RECOMMENDED FOR APPROVAL

_____ _____
Chief, Design Section Date

APPROVED

_____ _____
Chief, Division of Transportation Engineering Date

LT-02

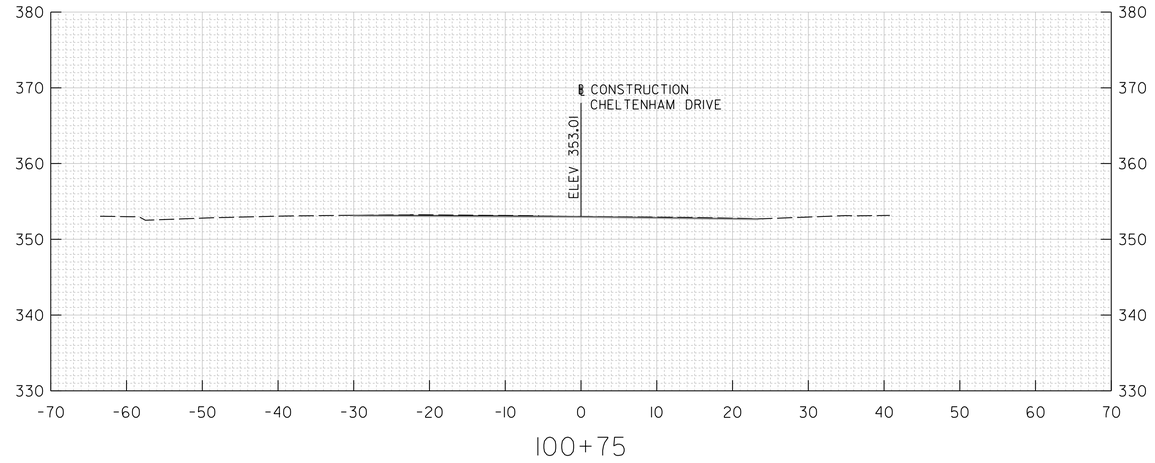
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY LIGHTING PLAN
STA. 105+00 TO STA. 109+17

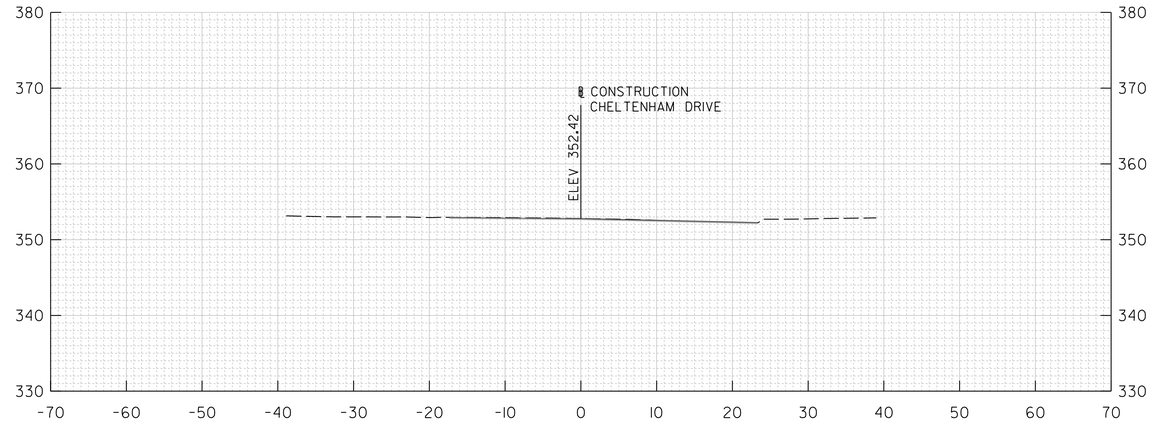
SCALE: 1" = 20'

PROJECT NO.: 500119 SHEET 29 of 38

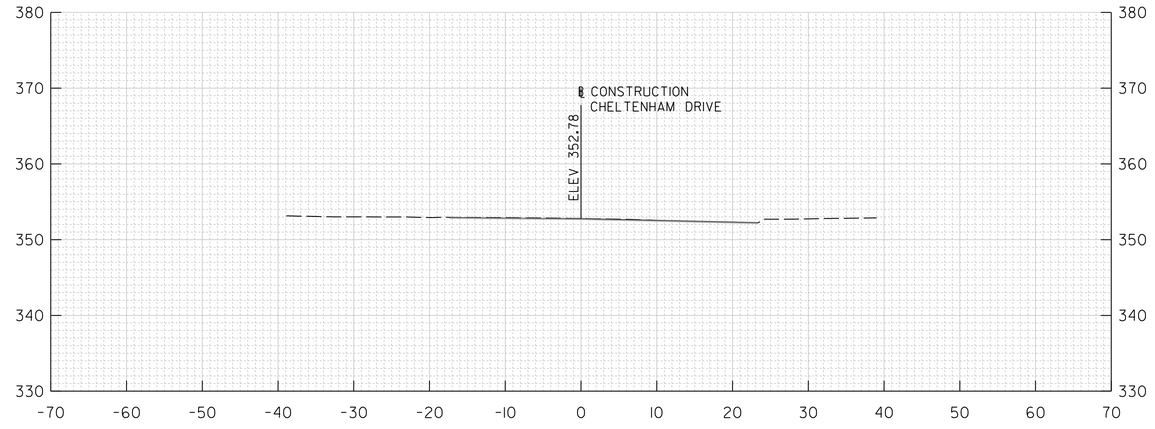
2/27/2025
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100+75



100+26.50



100+50

XS–01

10' 0 10' 20'
SCALE: 1" = 10'

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	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

MR2026005

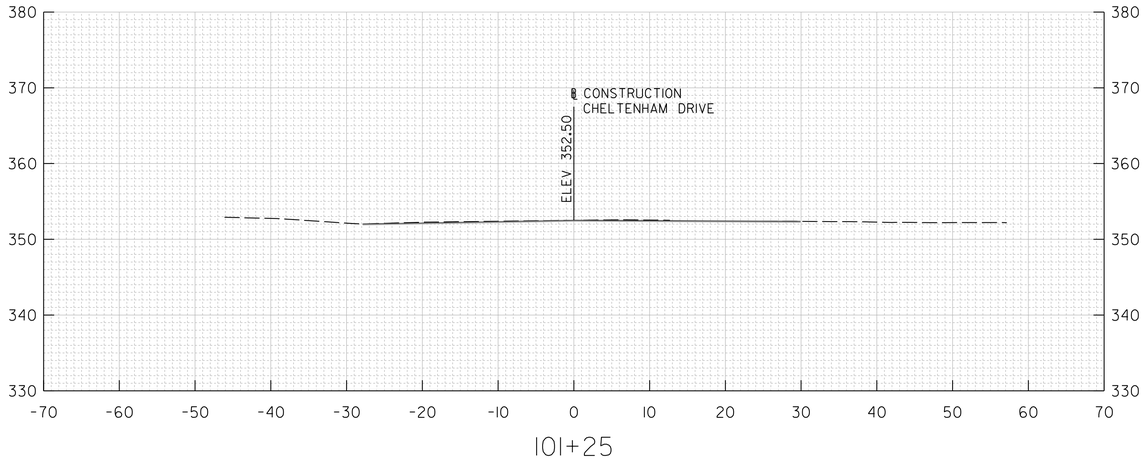
CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 30 of 38

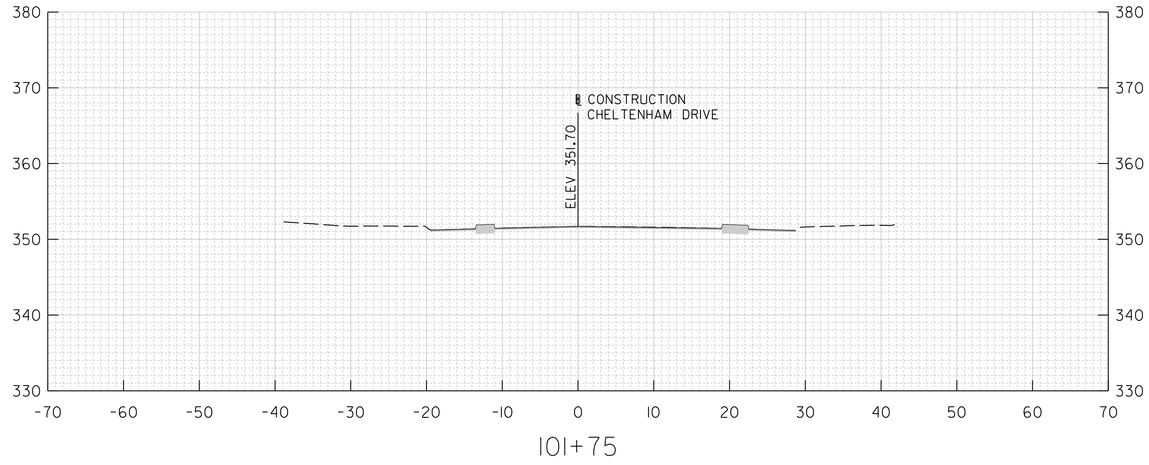
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LICENSE NO: _____ EXPIRATION DATE: _____

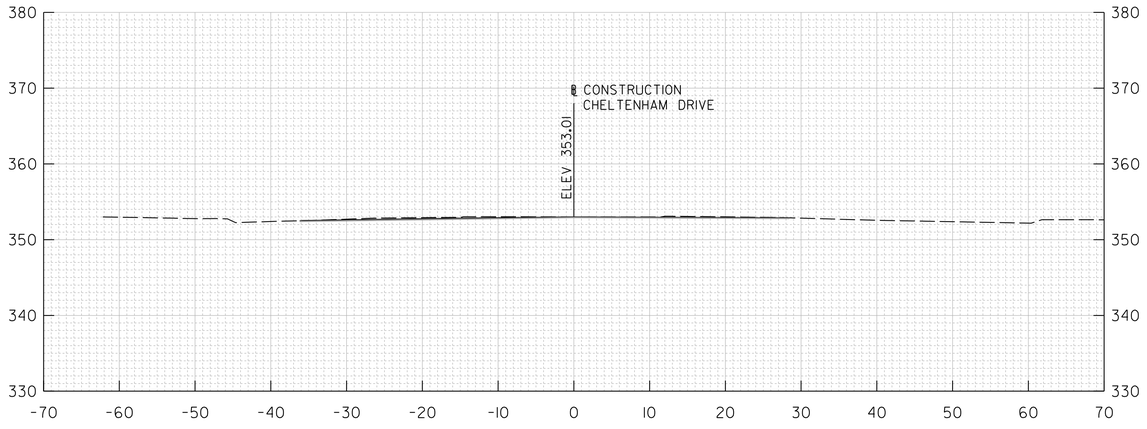
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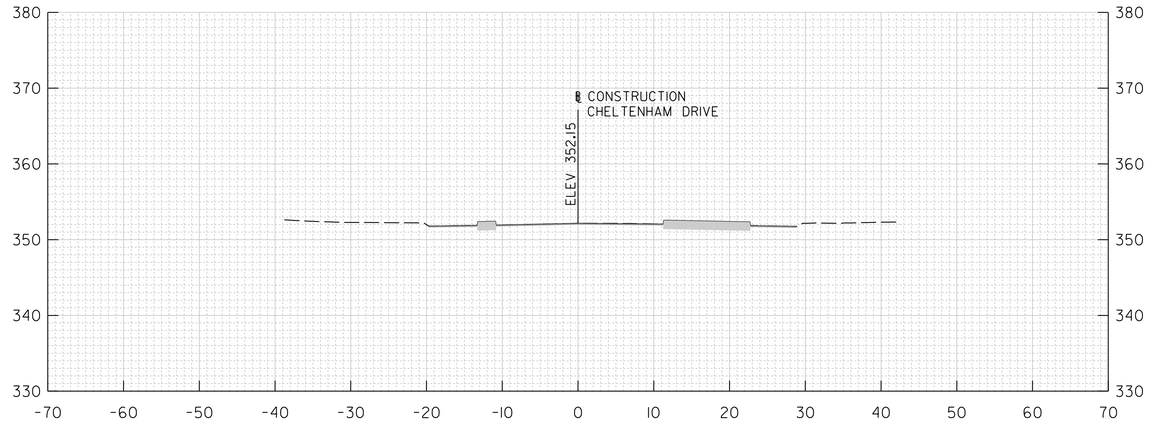
101+25



101+75



101+00



101+50

XS–02

10' 0 10' 20'
SCALE: 1" = 10'

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	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

MR2026005

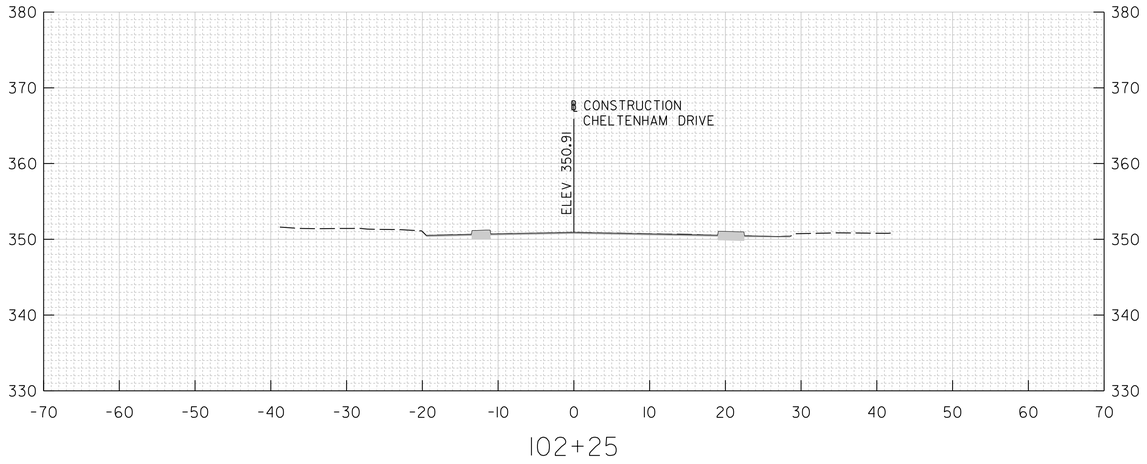
CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 31 of 38

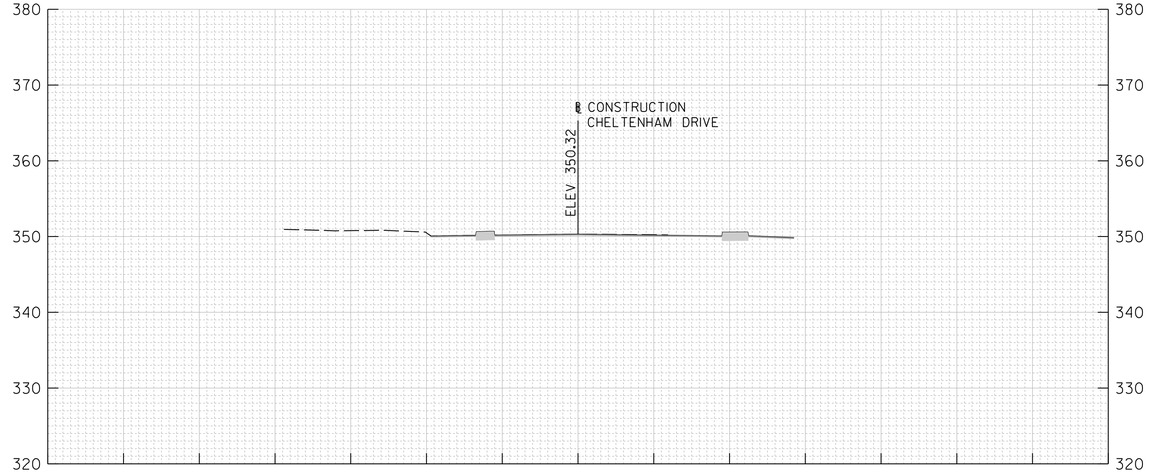
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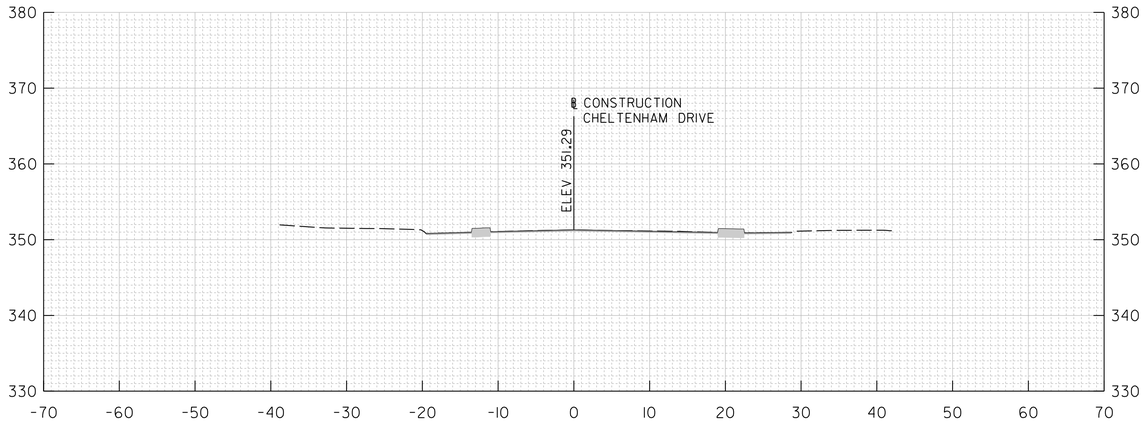
2/27/2025
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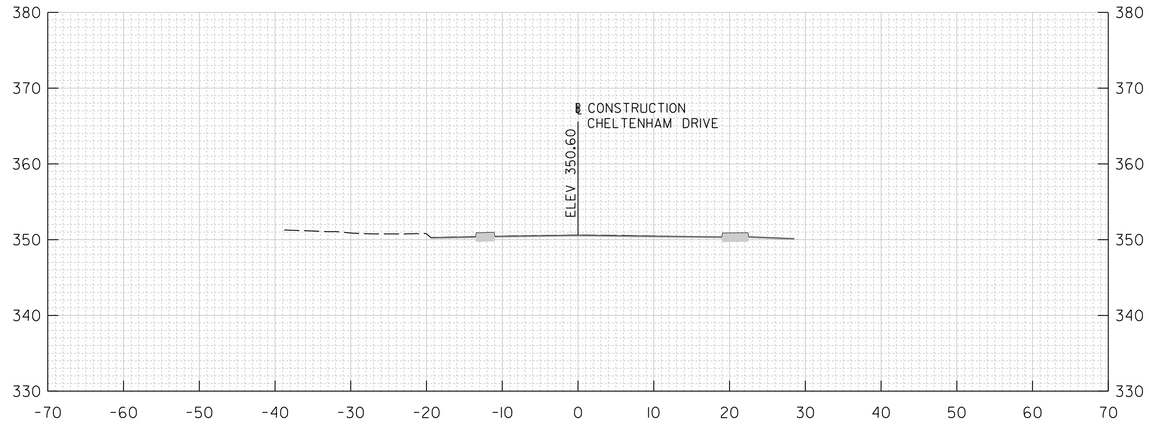
102+25



102+75



102+00



102+50

XS–03

10' 0 10' 20'
SCALE: 1" = 10'

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NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	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

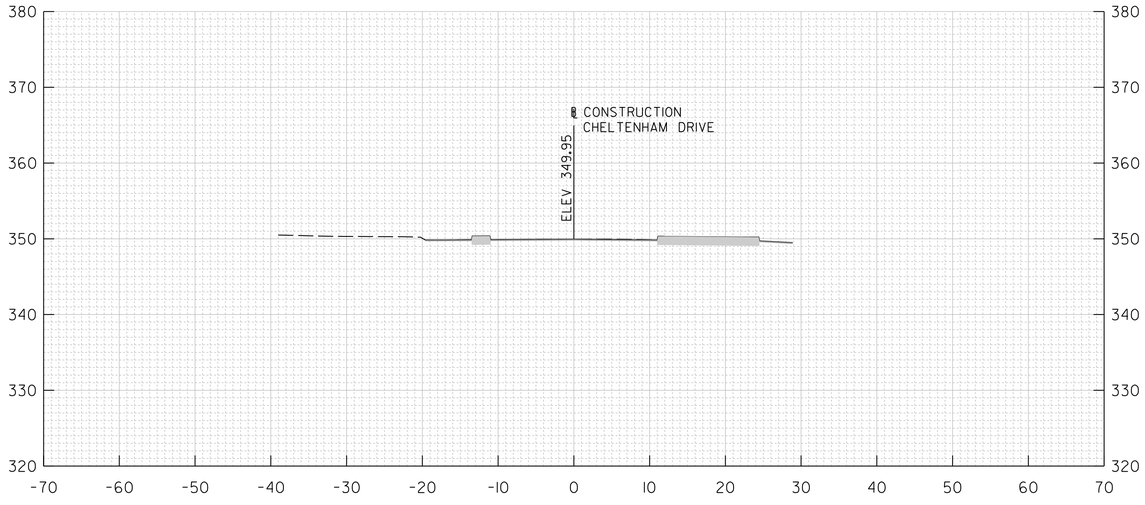
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

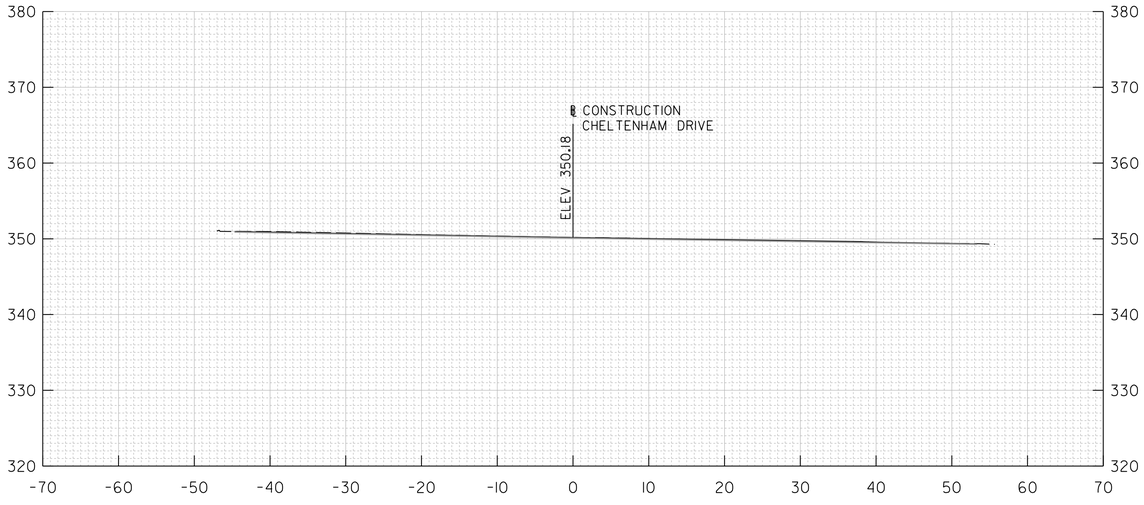
CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 32 of 38

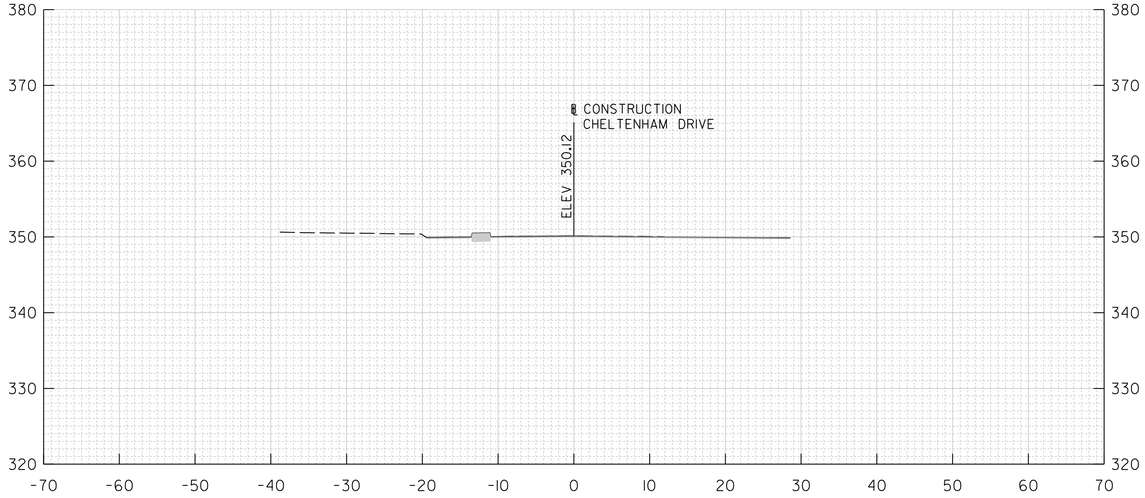
2/27/2025
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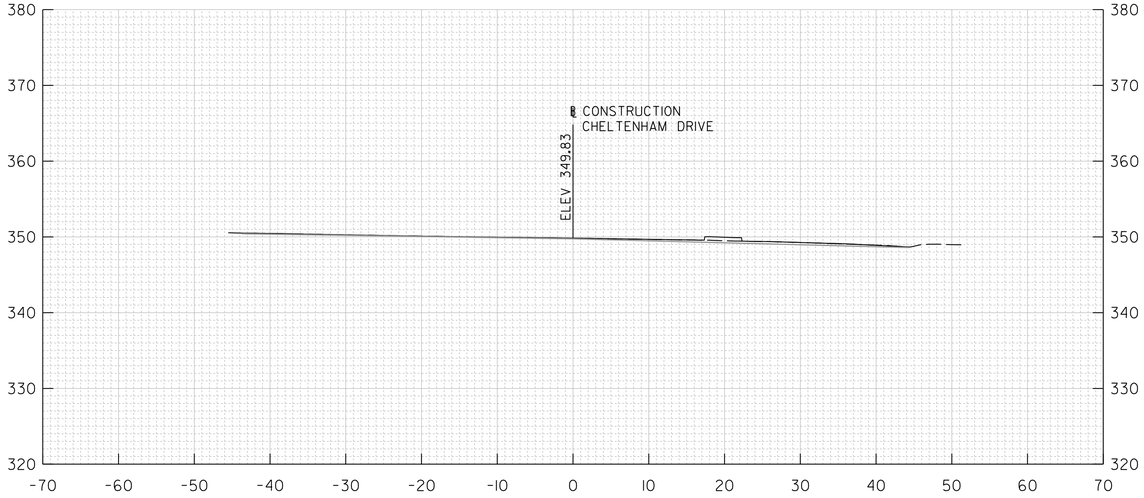
103+25



103+75



103+00



103+50

XS–04

10' 0 10' 20'
SCALE: 1" = 10'

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: _____

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NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	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

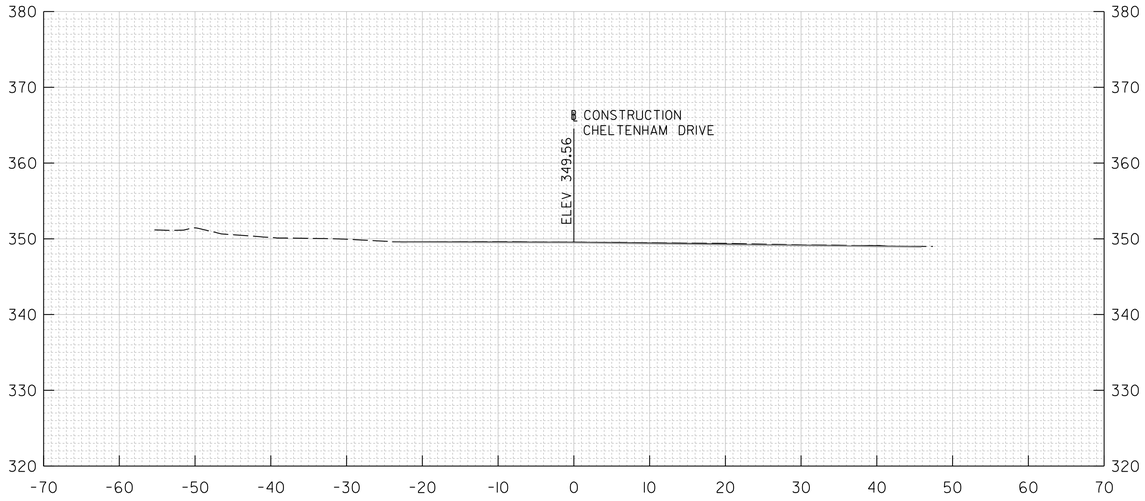
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

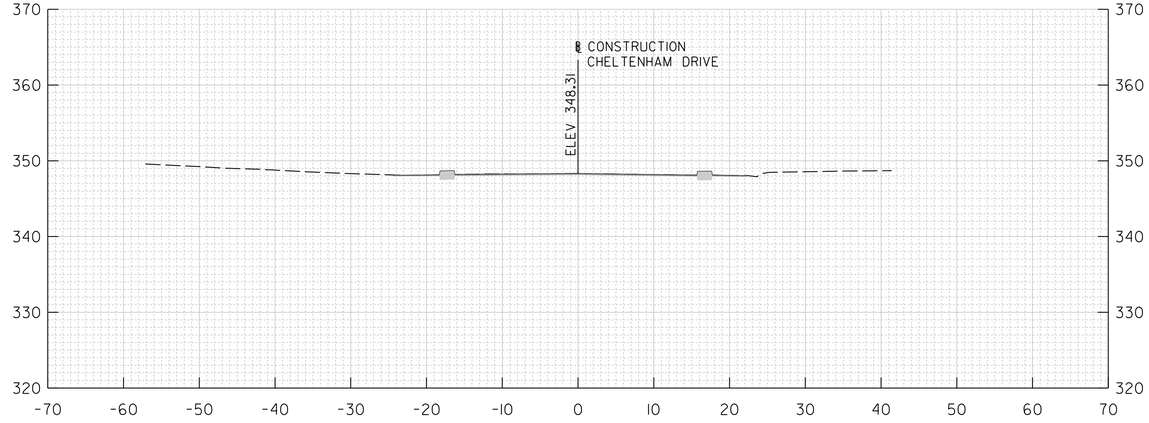
CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 33 of 38

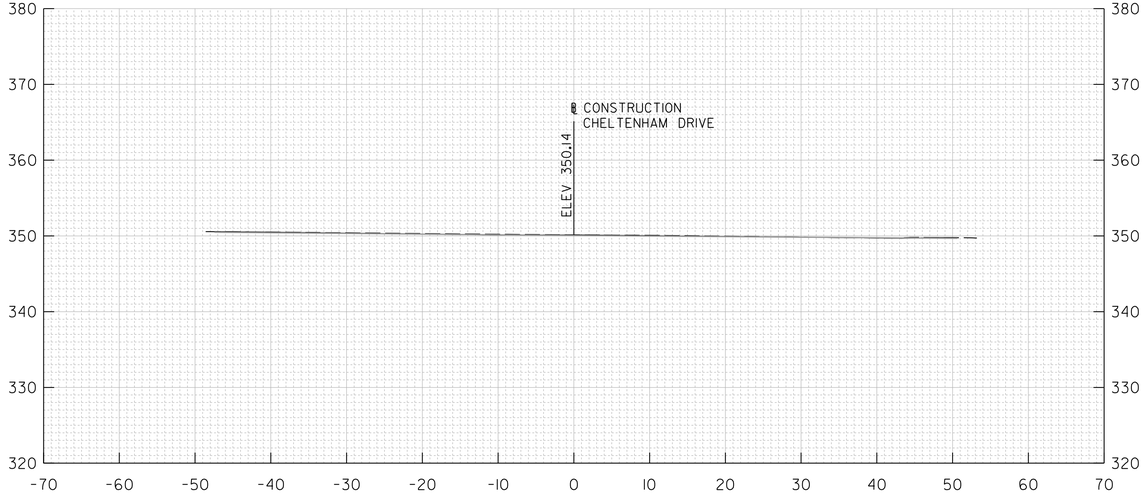
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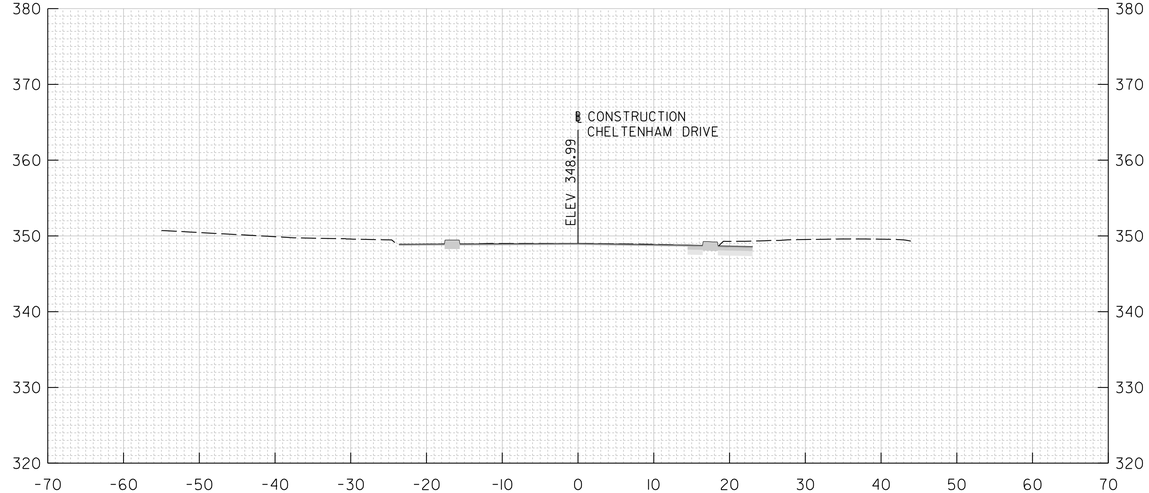
104+25



104+75



104+00



104+50

XS–05

10' 0 10' 20'
SCALE: 1" = 10'

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.
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RECOMMENDED FOR APPROVAL

_____ _____
Chief, Design Section Date

APPROVED

_____ _____
Chief, Division of Transportation Engineering Date

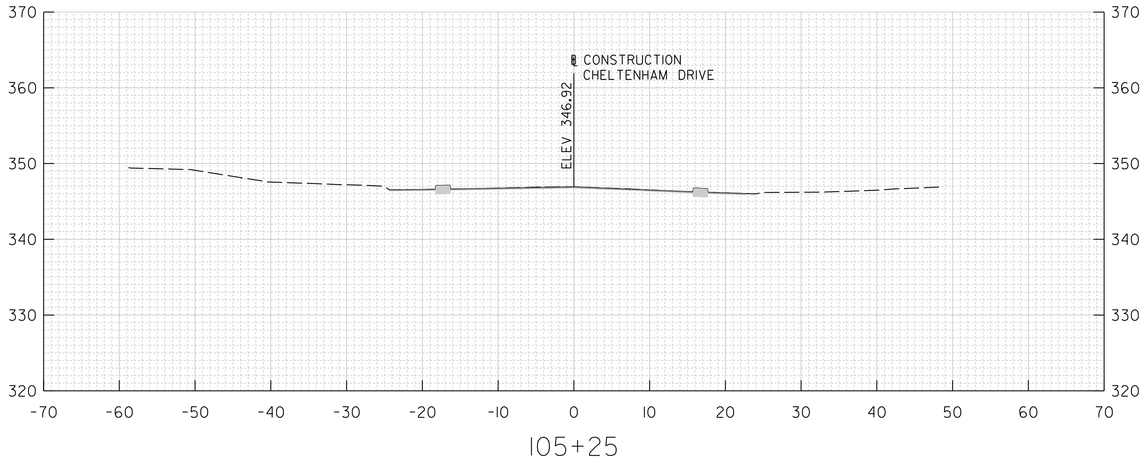
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

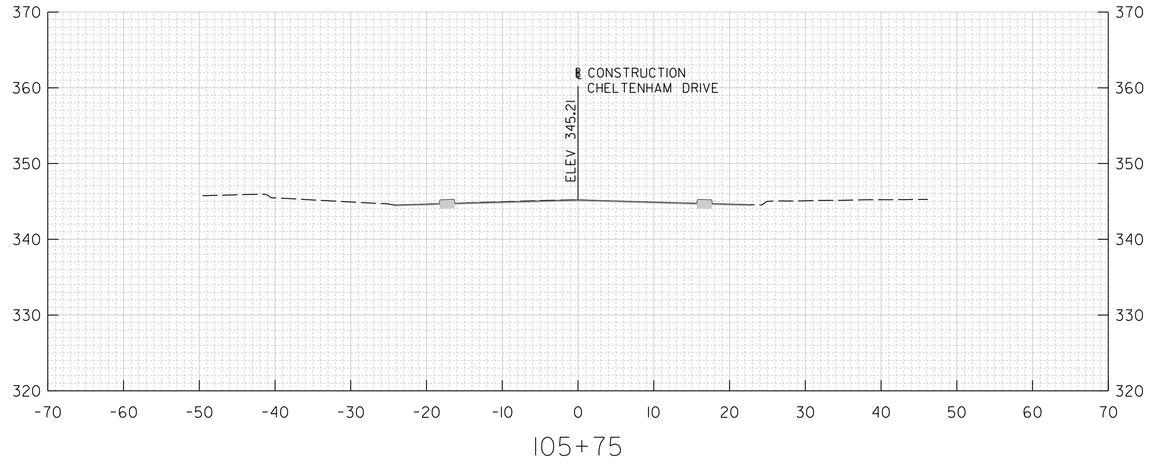
CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 34 of 38

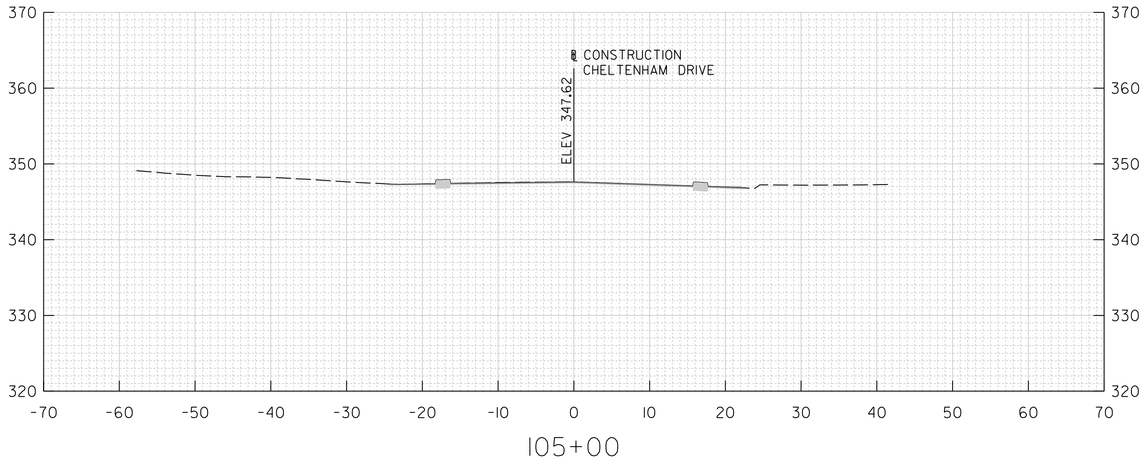
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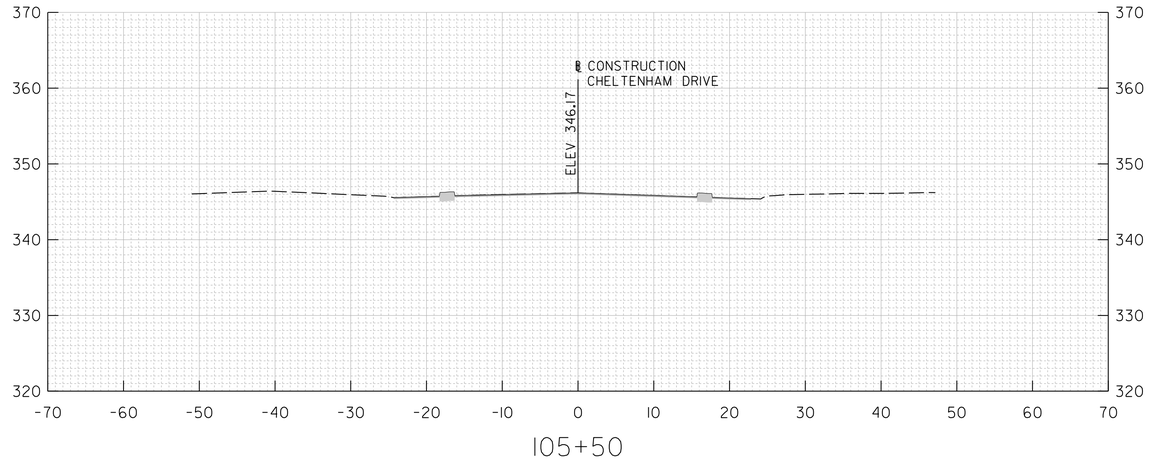
105+25



105+75



105+00



105+50

XS–06

10' 0 10' 20'
SCALE: 1" = 10'

PROFESSIONAL CERTIFICATION:
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DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	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

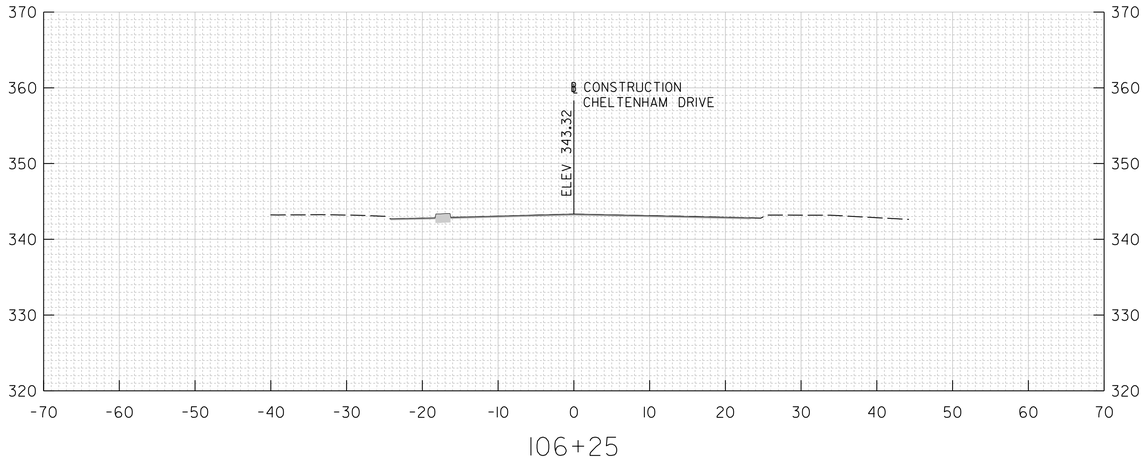
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

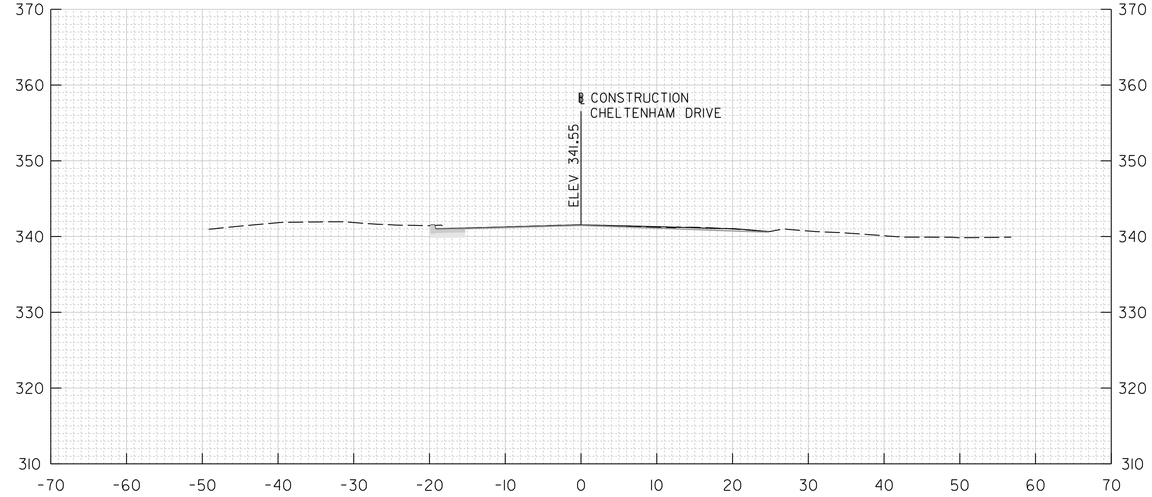
CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 35 of 38

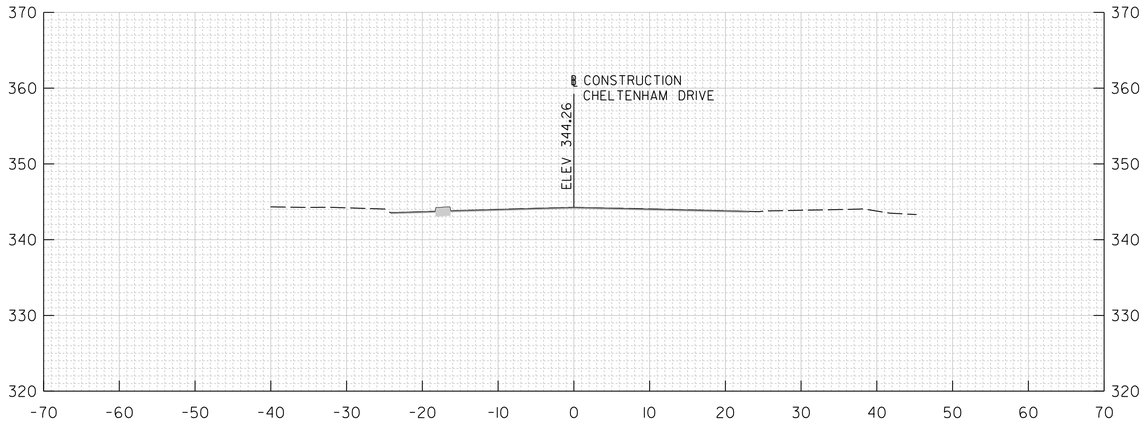
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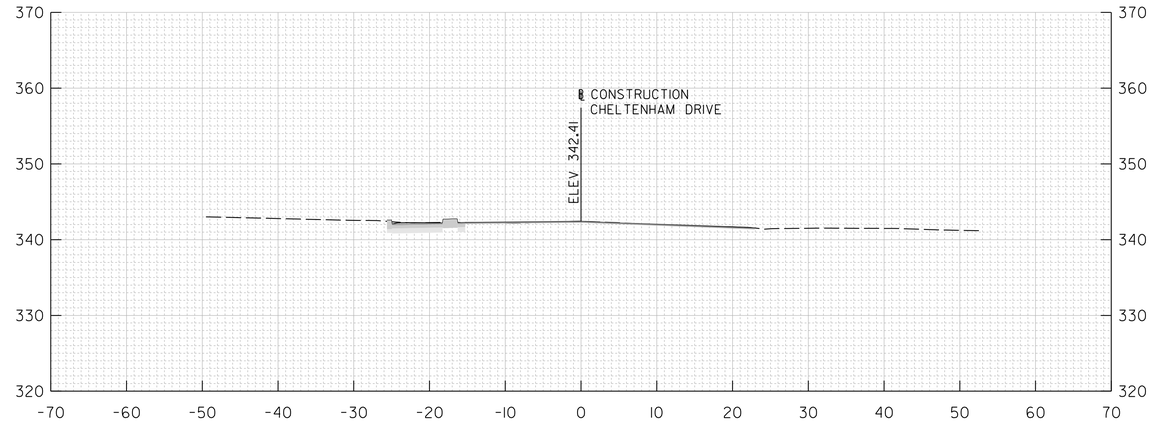
106+25



106+75



106+00



106+50

XS–07

10' 0 10' 20'
SCALE: 1" = 10'

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Chief, Design Section — Date

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Chief, Division of Transportation Engineering — Date

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DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

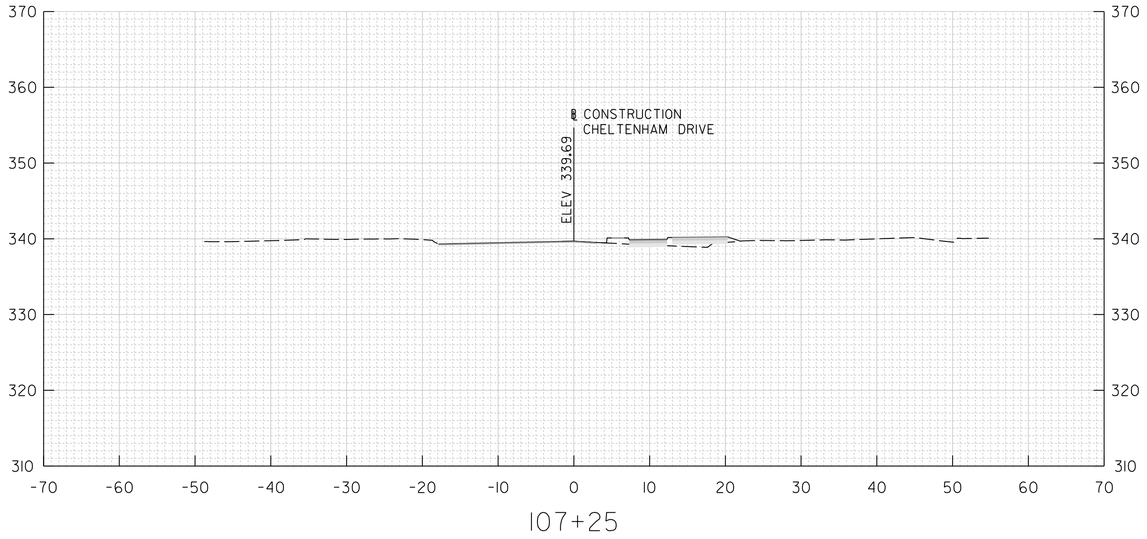
CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 36 of 38

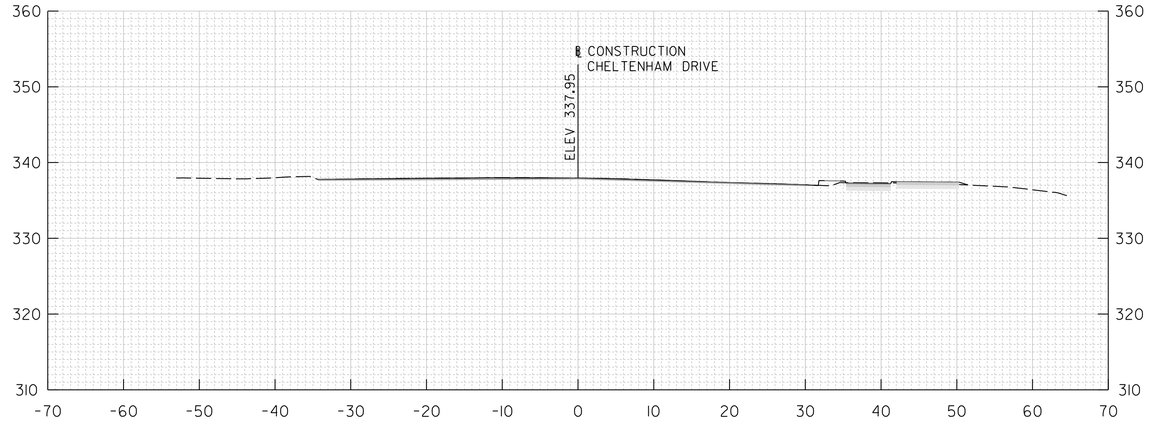
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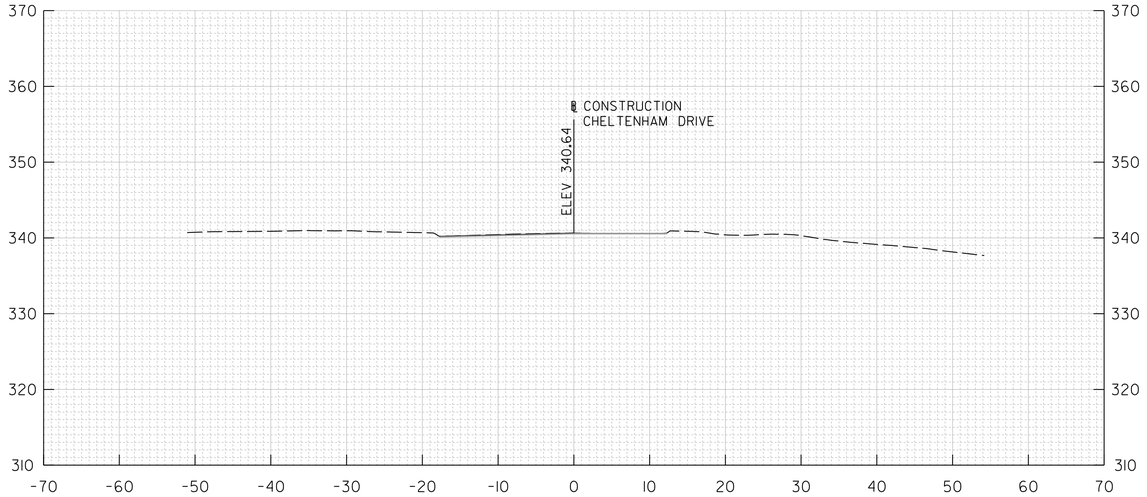
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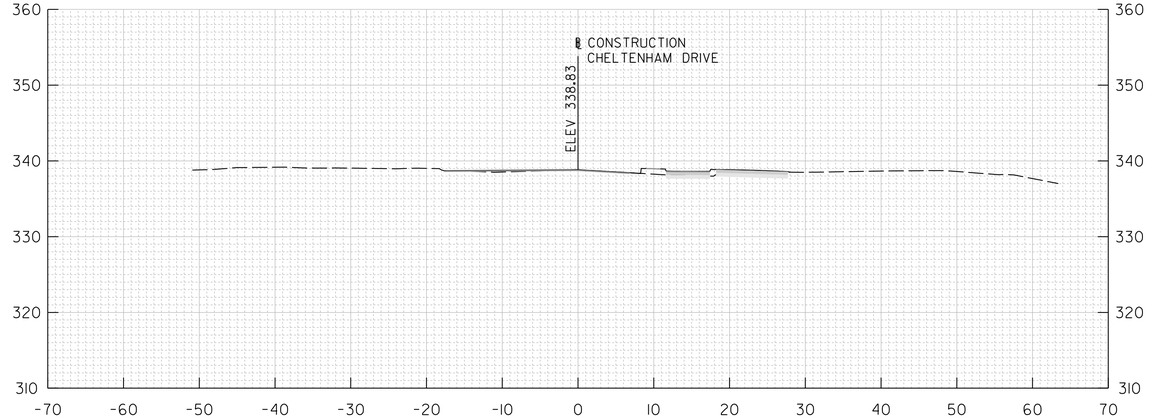
107+25



107+75



107+00



107+50

XS–08

10' 0 10' 20'
SCALE: 1" = 10'

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APPROVED

Chief, Division of Transportation Engineering — Date

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DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

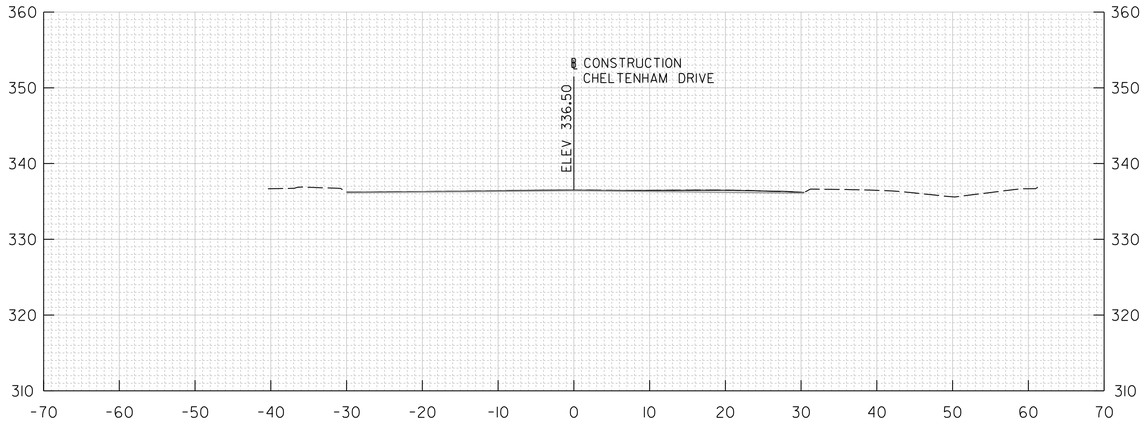
CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 37 of 38

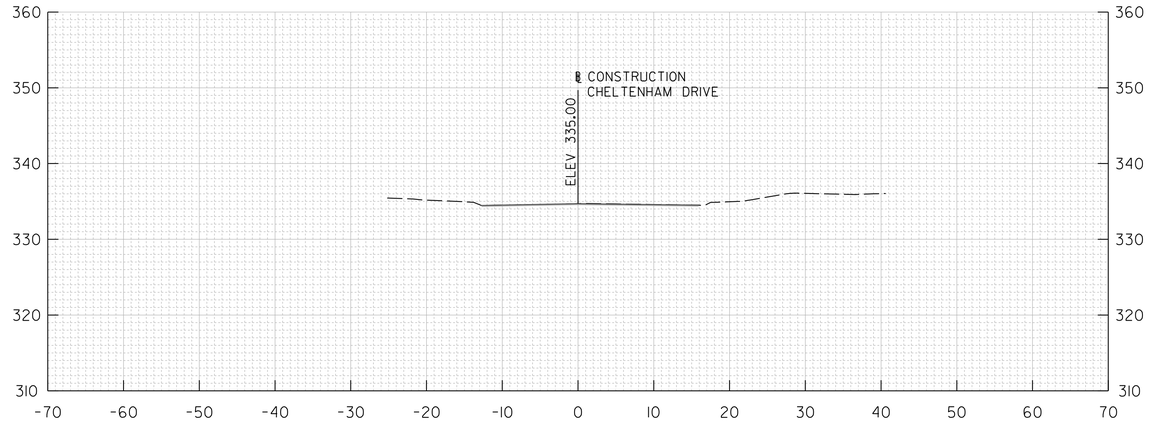
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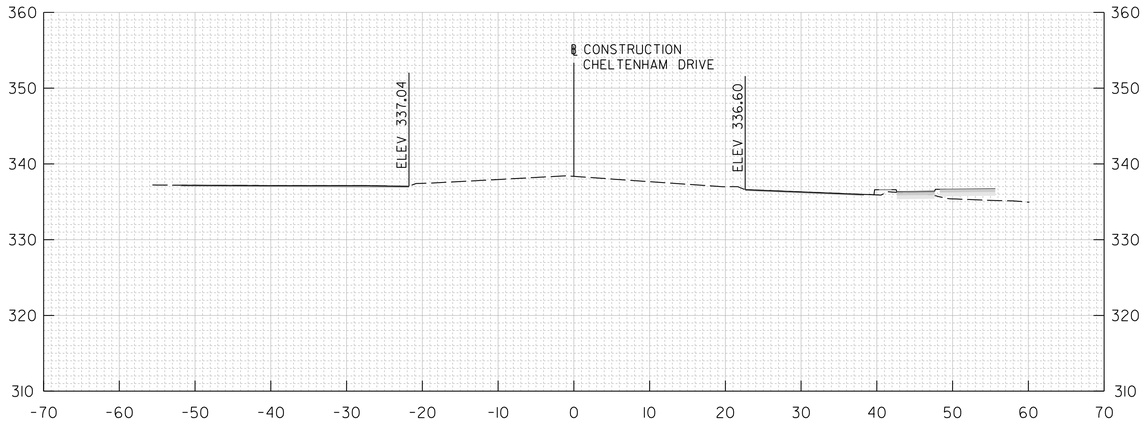
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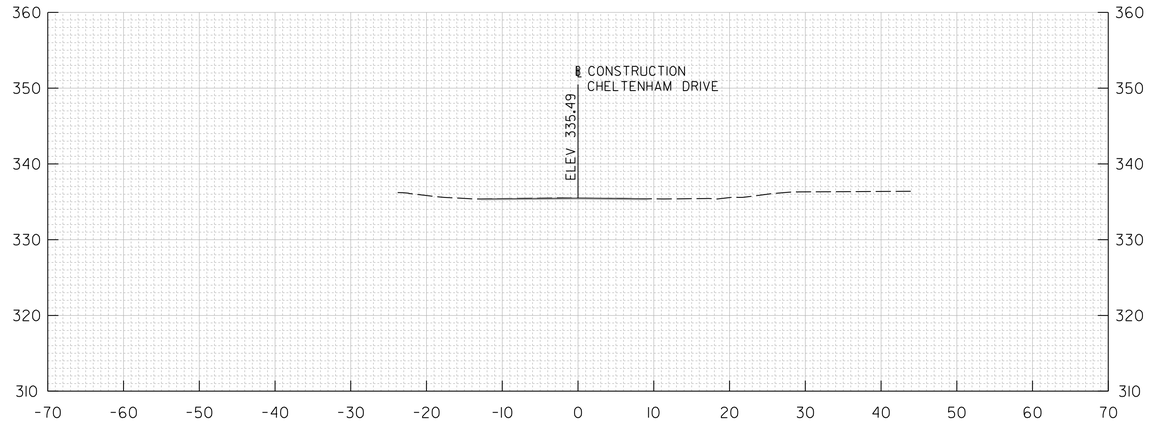
108+25



108+65.69



108+00



108+50

XS–09

10' 0 10' 20'
SCALE: 1" = 10'

PROFESSIONAL CERTIFICATION:
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Chief, Design Section Date

APPROVED

_____ _____
Chief,
Division of Transportation Engineering Date

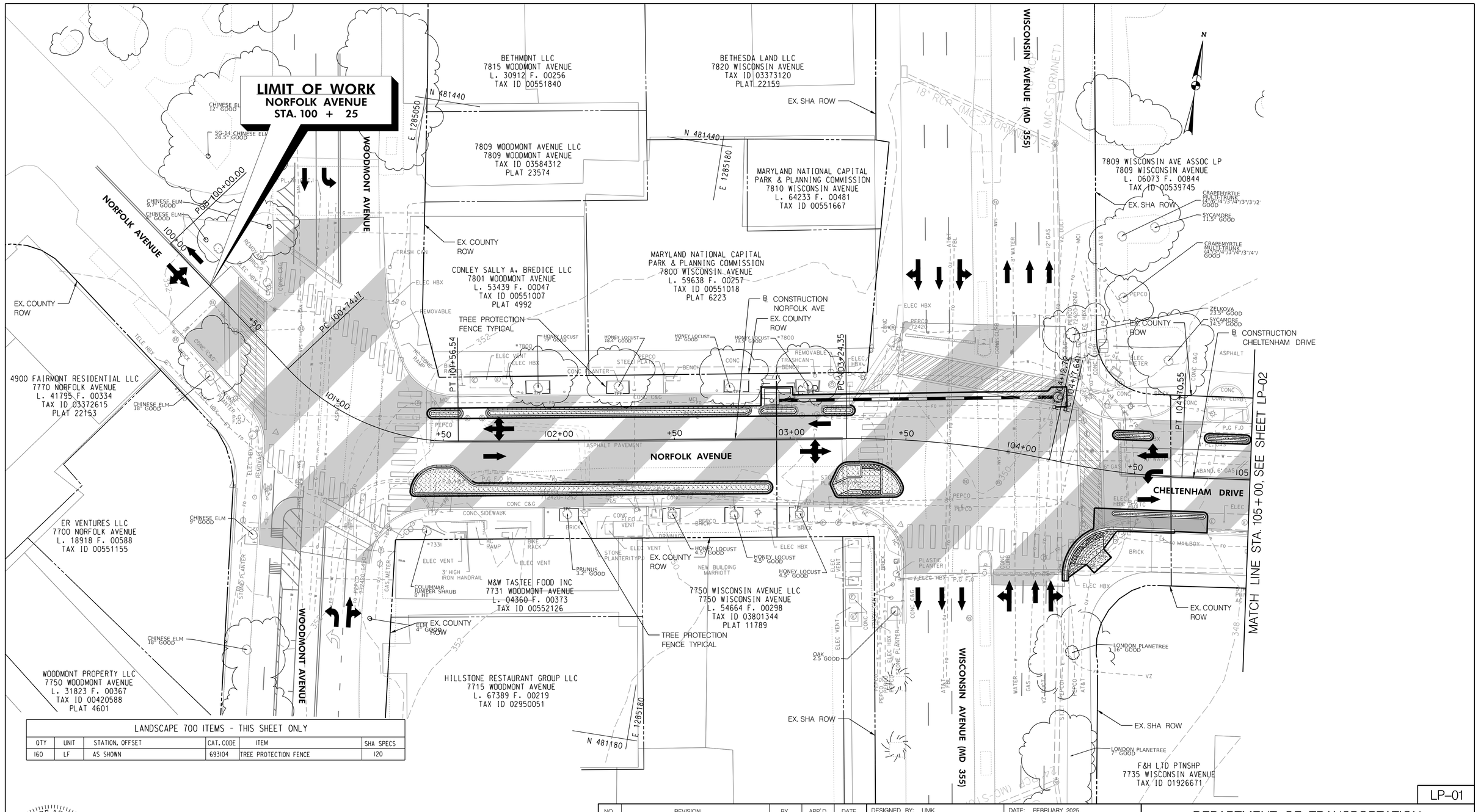
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DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

MR2026005

CHELTENHAM DRIVE BIKEWAY
ROADWAY CROSS SECTIONS

SCALE: 1" = 10' PROJECT NO.: 500119 SHEET 38 of 38

2/27/2025
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LANDSCAPE 700 ITEMS - THIS SHEET ONLY					
QTY	UNIT	STATION, OFFSET	CAT. CODE	ITEM	SHA SPECS
160	LF	AS SHOWN	693104	TREE PROTECTION FENCE	120

LANDSCAPE LEGEND

——TPF—— TREE PROTECTION FENCE

NO.	REVISION	BY	APP'D	DATE

LANDSCAPE ARCHITECT 3190 MATTHEW RENDEL DARILL STATE OF MARYLAND

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A REGISTERED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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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

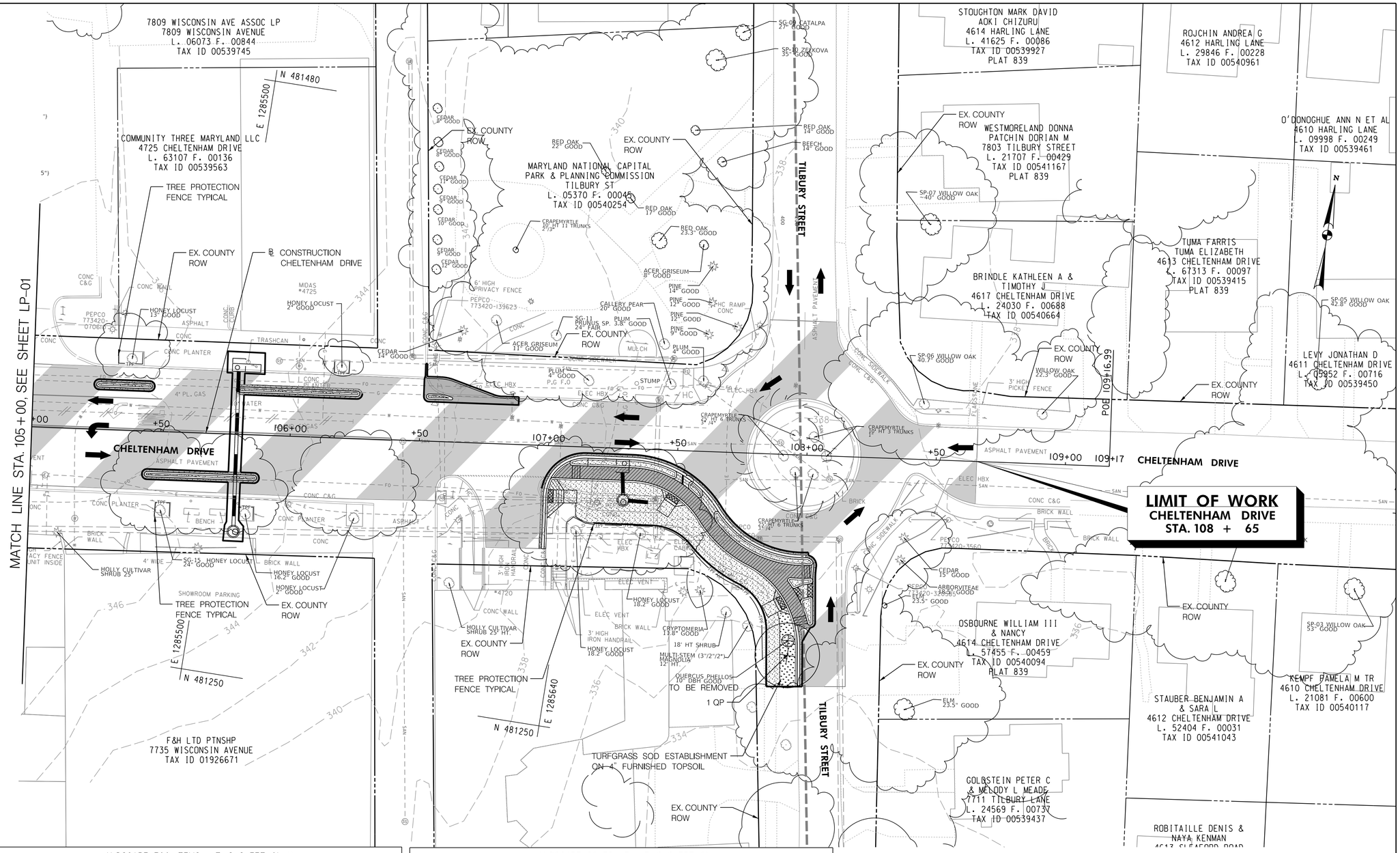
CHELTENHAM DRIVE BIKEWAY
LANDSCAPE PLAN

SCALE: 1" = 20'

PROJECT NO.: 500119 SHEET $LP01$ of TOT

LP-01

2/27/2025
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LANDSCAPE 700 ITEMS - THIS SHEET ONLY					
QTY	UNIT	STATION, OFFSET	CAT. CODE	ITEM	SHA SPECS
205	LF	AS SHOWN	693104	TREE PROTECTION FENCE	120
18	SY	STA. 107+95 L	704345	FURNISHED TOPSOIL 4 INCH DEPTH	701
18	SY	STA. 107+95 L	705565	REFERTILIZING	705
18	SY	STA. 107+95 L	708220	TURFGRASS SOD ESTABLISHMENT	708
125	LF	AS SHOWN	715050	TREE ROOT PRUNING	715

LANDSCAPE SCHEDULE - THIS SHEET ONLY					
QTY	UNIT	BOTANICAL / COMMON NAME	SIZE	ROOT	REMARKS
1	QP	QUERCUS PHELLOS / WILLOW OAK	2 1/2" - 3" CALIPER	B&B	SINGLE LEADER

LANDSCAPE LEGEND
- TPF — TREE PROTECTION FENCE
- EXISTING TREE TO BE REMOVED
- PROPOSED TREE
- TURFGRASS SOD ESTABLISHMENT

LANDSCAPE ARCHITECT 3190 KATHLEEN RENDEL DANIEL STATE OF MARYLAND

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A REGISTERED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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DRAWN BY: UMK	DATE: FEBRUARY 2025	DIVISION OF TRANSPORTATION ENGINEERING	
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RECOMMENDED FOR APPROVAL
Chief, Design Section — Date

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Chief, Division of Transportation Engineering — Date

CHELTENHAM DRIVE BIKEWAY
LANDSCAPE PLAN

SCALE: 1" = 20' PROJECT NO.: 500119 SHEET $LP02$ of TOT

LP-02

2/27/2025
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MDOT SHA LANDSCAPE NOTES

7.1 SHA LANDSCAPE NOTES. LANDSCAPE CONSTRUCTION WITHIN SHA PROPERTY, INCLUDING RIGHT OF WAYS, EASEMENT AREAS AND LANDS TO BE CONVEYED TO SHA SHALL CONFORM TO THESE NOTES. FOR GUIDANCE REGARDING DESIGN MODIFICATIONS DURING CONSTRUCTION, REFER TO SHA LANDSCAPE DESIGN GUIDE, SHA LANDSCAPE ESTIMATING MANUAL, AND SHA ENVIRONMENTAL GUIDE FOR ACCESS AND DISTRICT PERMIT APPLICANTS AT HTTP://WWW.ROADS.MARYLAND.GOV/INDEX.ASPX?PAGEID=25.

7.2 SHA STANDARD SPECIFICATIONS. LANDSCAPE CONSTRUCTION SHALL CONFORM TO CATEGORY 700 - LANDSCAPING, AND LANDSCAPE MATERIALS SHALL CONFORM TO SECTION 920 OF THE MOST RECENT REVISION OF SHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, INCLUDING ALL REVISIONS AND SUPPLEMENTS, AND AS SPECIFIED IN THESE NOTES. THESE REQUIREMENTS OF SHA SPECIFICATIONS SHALL SUPERSEDE ALL OTHER SPECIFICATIONS FOR WORK ON SHA PROPERT OR PROPERTY TO BE CONVEYED TO SHA EXCEPT AS SPECIFICALLY INDICATED IN THE PLANS. REFER TO HTTP://WWW.ROADS.MARYLAND.GOV//INDEX.ASPX?PAGEID=44

7.3 EROSION AND SEDIMENT CONTROL MANAGER (ESCM). SOIL DISTURBANCE SUCH AS GRADING, EXCAVATION, SOIL PLACEMENT OR OTHER ACTIVITIES THAT INVOLVE SOIL DISTURBANCE SHALL BE SUPERVISED BY AN ESCM MANAGER WITH A VALID "SHA YELLOW CARD" IN CONFORMANCE WITH SHA STANDARD SPECIFICATIONS AND ANY APPLICABLE EROSION AND SEDIMENT CONTROL PERMIT.

7.4 SHA STANDARD DETAILS FOR TREES, SHRUBS AND PLANTING BEDS. THE INSTALLATION OF TREES, SHRUBS, PLANTING BEDS AND OTHER LANDSCAPE CONSTRUCTION RELATED TO SECTION 710 OF THE SHA STANDARD SPECIFICATIONS SHALL CONFORM TO THE “SHA BOOK OF STANDARDS FOR HIGHWAY & INCIDENTAL STRUCTURES - CATEGORY 7” AT HTTP://APPS.ROADS.MARYLAND.GOV/BUSINESSWITHSHA/BIZSTDSSPECS/DESMANUALSTDPUB /PUBLICATIONSONLINE/OHD/BOOKSTD/TOCCAT7.ASP

7.5 TEMPORARY STABILIZATION SHALL BE INSTALLED IN CONFORMANCE WITH SECTION 704 TO ENSURE THAT AREAS OF SOIL DISTURBANCE ARE PROTECTED FROM WIND, RAINFALL AND FLOWING WATER UNTIL PERMANENT STABILIZATION IS INSTALLED.
1. TEMPORARY MULCH, EITHER AS TEMPORARY STRAW MULCH OR TEMPORARY MATTING MULCH, SHALL BE INSTALLED AT THE END OF EACH WORKING DAY TO PROVIDE "SAME DAY STABILIZATION" UNLESS OTHER APPROVED STABILIZATION IS INSTALLED.
2. TEMPORARY STRAW MULCH SHALL BE INSTALLED ON AREAS AND SLOPES FLATTER THAN 4:1 TEMPORARY MATTING MULCH SHALL BE APPLIED ON SLOPES 4:1 AND STEEPER, AND TO AREAS WITIN CHANNELS.

7.6 PAVEMENT REMOVAL AND RESTORATION. AREAS OF PAVEMENT REMOVAL SHALL BE EXCAVATED TO REMOVED PAVEMENTS, AGGREGATE BASE, AND COMPACTED SOIL AND OTHER UNSUITABLE MATERIALS BEFORE PLACING SOILS IN CONFORMANCE WITH SECTION 701 OF THE SHA STANDARD SPECIFICATIONS.
1. ROADWAYS SHALL BE EXCAVATED TO A DEPTH OF 16 INCHES BELOW FINAL GRADE BEFORE PLACING FURNISHED SUBSOIL 12 IN. DEPTH AND PLACING FURNISHED TOPSOIL 4 IN. DEPTH IN CONFORMANCE IWHT NOTE 7.8.
2. SIDEWALKS AND DRIVEWAYS SHALL BE EXCAVATED TO A DEPTH OF 6 INCHES BELOW FINAL GRADE BEFORE PLACING FURNISHED OPTSOIL 6 IN. DEPTH IN CONFORMANCE WITH NOTE 7.8.

7.7 EXCAVATION AND DEBRIS REMOVAL. DEBRIS RELATED TO THE DEMOLITION OF SIDEWALKS, DRIVEWAYS, CURBS, TREES, STUMPS, ROOTS, FENCING, PIPES, AND OTHER MATERIALS THAT MAY INTERFERE WITH LANDSCAPE INSTALLATION OR FUTURE MAINTENANCE SHALL BE EXCAVATED AS NECESSARY FOR THEIR COMPLETE REMOVAL AND DISPOSAL.

7.8 SOIL RESTORATION. AREAS OF PAVEMENT REMOVAL, EXCAVATION OR DRILLING IN LANDSCAPED AREAS SHALL REMOVE EXCAVATED DEBRIS AND RESTORE THE SUBGRADE WITH APPROVED SUBSOIL AND TOPSOIL PLACED IN CONFORMANCE WITH SECTION 701 OF THE SHA STANDARD SPECIFICATIONS.

1. A LAYER OF APPROVED TOPSOIL AT LEAST 4 INCH DEPTH SHALL BE PLACED ON ALL DISTURBED AREAS FLATTER THAN 2:1 AND IN ALL CHANNELS PRIOR TO SEEDING, SODDING OR OTHER LANDSCAPING, UNLESS OTHERWISE SPECIFIED.
2. A LAYER OF APPROVED TOPSOIL AT LEAST 2 INCH DEPTH SHALL BE PLACED ON ALL DISTURBED AREAS 2:1 AND STEEPER PRIOR TO SEEDING, SODDING OR OTHER LANDSCAPING, UNLESS OTHERWISE SPECIFIED.
3. BIORETENTION SOIL MIX (BSM) AND OTHER MATERIALS INSTALLED IN CONJUNCTION WITH SPI 316 - STORMWATER FILTRATION FACILITIES AND SHA STORMWATER DETAILS SHALL BE INSTALLED IN CONFORMANCE WITH THE SHA LANDSCAPE NOTES AND LANDSCAPE PLANS. PLANT MATERIALS AND MULCH SHALL BE INSTALLED IN BSM IN CONFORMANCE WITH STORMWATER DETAILS, SECTION 710 OR OTHER SHA SPECIFICATIONS.

7.9 TURFGRASS SOD ESTABLISHMENT SHALL BE PERFORMED IN ALL DISTURBED AREAS, OR WITHIN THE AREAS INDICATED IN THE PLANS, IN CONFORMANCE WITH SECTION 708 OF THE SHA STANDARD SPECIFICATIONS. THE REQUIRED APPLICATION RATE OF 20-16-12 FERTILIZER SHALL BE 200 LBS PER ACRE, OR SHALL BE EQUIVALENT FERTILIZER AND APPLICATION RATE AS SPECIFEIED IN SECTION 708. NO FERTILIZER SHALL BE APPLIED FROM NOVEMBER 15 TO MARCH 1.

7.10 TURFGRASS ESTABLISHMENT SHALL BE PERFORMED IN ALL DISTURED AREAS, OR WITHIN THE AREAS INDICATED IN THE PLANS, IN CONFORMANCE WITH SECTION 705 OF THE SHA STANDARD SPECIFICATIONS. THE REQUIRED APPLICATION RATE OF 20-16-12 FERTILIZER SHALL BE 200 LBS PER ACRE OR SHALL BE EQUIVALENT FERTILIZER AND APPLICATION RATE AS SPECIFEIED IN SECTION 708. NO FERTILIZER SHALL BE APPLIED FROM NOVEMBER 15 TO MARCH 1.

7.8 SOIL RESTORATION. AREAS OF PAVEMENT REMOVAL, EXCAVATION OR DRILLING IN LANDSCAPED AREAS SHALL REMOVE EXCAVATED DEBRIS AND RESTORE THE SUBGRADE WITH APPROVED SUBSOIL AND TOPSOIL PLACED IN CONFORMANCE WITH

1. AREAS FLATTER THAN 6:1. TYPE A OR TYPE E MATTING MAY BE INSTALLED IN LIEU OF STRAW MULCH AND HYDROMULCH BINDER IN CONJUCTION WITH TURFGRASS ESTABLISHMENT.
2. AREAS STEEEPER THAN 6:1 AND FLATTER THAN 4:1. TYPE A OR TYPE E MATTING SHALL BE INSTALLED IN LIEU OF STRAW MULCH AND HYDORMULCH BINDER IN CONJUCTION WITH TURFGRASS ESTABLISHMENT, UNLESS DELINEATED AND NOTED OTHERWISE.
3. CHANNELS, STORMWATER MANAGEMENT FACILITIES, AND SLOPES 4:1 AND STEEPER TYPE A SOIL STABILIZATION MATTING SHALL BE INSTALLED IN LIEU OF STRAW MULCH AND HYDROMULCH BINDR IN CONJUCTION WITH TURFGRASS ESTABLISHMENT, UNLESS DELINEATED AND NOTED OTHERWISE.
4. IN AREAS OF MEADOW ESTABLISHMENT WITH TYPE D SOIL STABILIZATION MATTING, THE MATTING SHALL BE INSTALLED IN LIEU OF STRAW MULCH AND HYDROMULCH BINDER WITHIN THE DELINEATED AREAS.
5. IN HIGH VELOCITY CHANNELS WITH TURFGRASS ESTABLISHMENT, TYPE B SOIL STABILIZATION MATTING SHALL BE INSTALLED IN LIEU OF STRAW MULCH AND HYDROMULCH BINDER WITHIN THE DELINEATED AREAS.

7.13 TREE PRESERVATION AREAS. TEMPORARY ORANGE CONSTRUCTION FENCE (TOCF) SHALL BE INSTALLED IN LOCATIONS DELINEATED ON THE PLANS IN CONFORMANCE WITH SECTION 120 OF THE SHA STANDARD SPECIFICATION TO PROTECT EXISTING TREES AND OTHER VEGETATION DURING CONSTRUCTION. AREAS WITHIN TOCF SHALL BE PROTECTED FROM ALL PROHIBITED AND RESTRICTED ACTIVITIES, AS SPECIFIED IN SECTION 120.

7.14 ROADSIDE TREE PERMIT. TREE REMOVAL, TREE INSTALLATION, TREE ROOT AND BRANCH PRUNING, AND OTHER REGULATED IMPACTS TO TREES IN THE SHA RIGHT OF WAY SHALL CONFORM TO THE REQUIREMENTS OF THE ROADSIDE TREE PERMIT (RTP) OF THE MARYLAND DEPARTMENT OF NATURAL RESOURCES, OR THE APPROVED FOREST CONSERVATION ACT PLAN OF THE LOCAL AUTHORITY.

1. A COPY OF THE RTP OR FCP SHALL BE SUBMITTED TO THE SHA OFFICE OF ENVIRONMENTAL DESIGN BEFORE WORK IS PERFORMED, AND A COPY OF THE RTP OR FCP SHALL BE REPRODUCED IN THE PLANS OR BE IN POSSESSION OF THE APPLICANT AT THE PROJECT SITE WHEN THE PERMITTED WORK IS PERFORMED.

2. A MARYLAND LICENSED TREE EXPERT SHALL PERFORM THE SPECIFIED TREE OPERATIONS IN CONFORMANCE WITH THE SHA STANDARD SPECIFICATIONS AND ANSI A300 STANDARDS FOR TREE CARE OPERATIONS.

7.15 TREES AND OTHER PLANT MATERIAL INSTALLATION. TREES, SHRUBS, PERENNIALS, ANNUALS, BULBS, LANDSCAPE BEDS, BARK MULCH AND SIMILAR MATERIALS SHALL BE INSTALLED IN CONFORMANCE WITH SECTION 710 AND 711 OF THE SHA STANDARD SPECIFICATIONS. THE SHA LANDSCAPE PROGRAMS DIVISION WILL APPROVE MATERIALS AND LAYOUT, AND PERFORM OTHER APPROVALS AND INSPECTIONS IN CONFORMATNCE WITH STANDARD SPECIFICATIONS. TREE AND SHRUBS SHALL BE PRUNED AT THE TIME OF INSTALLATION TO ENSURE SIDEWALK CLEARANCE FOR PEDESTRIANS IS MAINTAINED TO A HEIGHT OF 8 FEET. NO TREE OR SHRUB SHALL BE INSTALLED WITHIN 3 FEET OF CURBS, SIDEWALKS, OR PAVEMENT EDGES.

7.17 TREE FELLING IN TURFGRASS AREAS SHALL BE PERFORMED IN CONFORMANCE IWTH OPERATION 1 - FELLING AND STUMP REMOVAL OF SECTION 714. ALLL DEBRIS SHALL BE REMOVED FROM SHA PROPERTY.

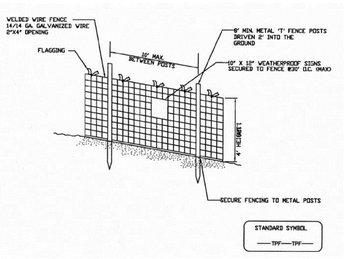
7.20 STUMP REMOVAL. STUMP REMOVAL IN TURFGRASS OR MEADOW AREAS SHALL BE PERMFORMED IN CONFORMANCE WITH OPERATION 5 - STUMP REMOVAL OF SECTION 714. ALL DEBRIS SHALL BE REMOVED FROM SHA PROPERTY

7.21 TREE BRANCH PRUNING SHALL BE PERFORMED OR DIRECTLY SUPERVISED BY A MARYLAND LICENSED TREE EXPERT IN CONFORMANCE WITH ANSI A300 STANDARDS PER SECTION 712 AS NECESSARY FOR ANY OF THE FOLLOWING: TO INSTALL TEMPORARY ORANGE CONSTRUCTION FENCE (TOCF) ALONG DELINEATIONS OF PLANS; TO PERFORM TREE ROOT PRUNING ALONG DELINEATIONS ON PLANS; TO PROVIDE 8 FOOT CLEARANCE ABOVE SIDEWALK PAVEMENTS AND 16 FOOT CLEARANCE ABOVE ROADWAY PAVEMENTS: TO REPAIR TREE WOUNDS; AND TO PERFORM OTHER RECOMMENDED CLEANING, THINNING, REDUCING, AND PRUNING NECESSARY TO ACCOMMODATE UTILITIES. ALL DEBRIS SHALL BE REMOVED FROM SHA PROPERTY.

7.22 TREE ROOT PRUNING SHALL BE PERFORMED ALONG THE LINE SHOWN ON THE PLANS IN CONFORMANCE WITH SECTION 715. TREE ROOT PRUNING SHALL BE COMPLETED BEFORE BEGINNING EXCAVATION OR OTHER CONSTRUCTION ADJACENT TO TREES TO BE PRESERVED.

Tree Protection Fence Detail

Not to scale



NOTES

1. Practice may be combined with sediment control fencing.
2. Location and limits of fencing should be coordinated in field with arborist.
3. Boundaries of protection area should be staked prior to installing protective device.
4. Root damage should be avoided.
5. Protection signage is required.
6. Fencing shall be maintained throughout construction.

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MontgomeryPlanning.org

NOTES:
1. RETENTION AREAS WILL BE SET AS PART OF THE REVIEW PROCESS AND PRECONSTRUCTION MEETING.
2. BOUNDARIES OF RETENTION AREAS MUST BE STAKED AT THE PRECONSTRUCTION MEETING AND FLAGGED PRIOR TO TRENCHING.
3. EXACT LOCATION OF TRENCH SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FOREST CONSERVATION (FC) INPECTOR .
4. TRENCH SHOULD BE IMMEDIATELY BACKFILLED WITH EXCAVATED SOIL OR OTHER ORGANIC SOIL AS SPECIFIED PER PLAN OR BY THE FC INSPECTOR.
5. ROOTS SHALL BE CLEANLY CUT USING VIBRATORY KNIFE OR OTHER ACCEPTABLE EQUIPMENT.
6. ALL PRUNING MUST BE EXECUTED WITH LOD SHOWN ON PLANS OR AS AUTHORIZED IN WRITING BY THE FC INSPECTOR.

ROOT PRUNING DETAIL

NTS

LP–03



PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A REGISTERED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	DATE: FEBRUARY 2025
CHECKED BY: LRA	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:

RECOMMENDED FOR APPROVAL

Chief, Design Section — Date

APPROVED

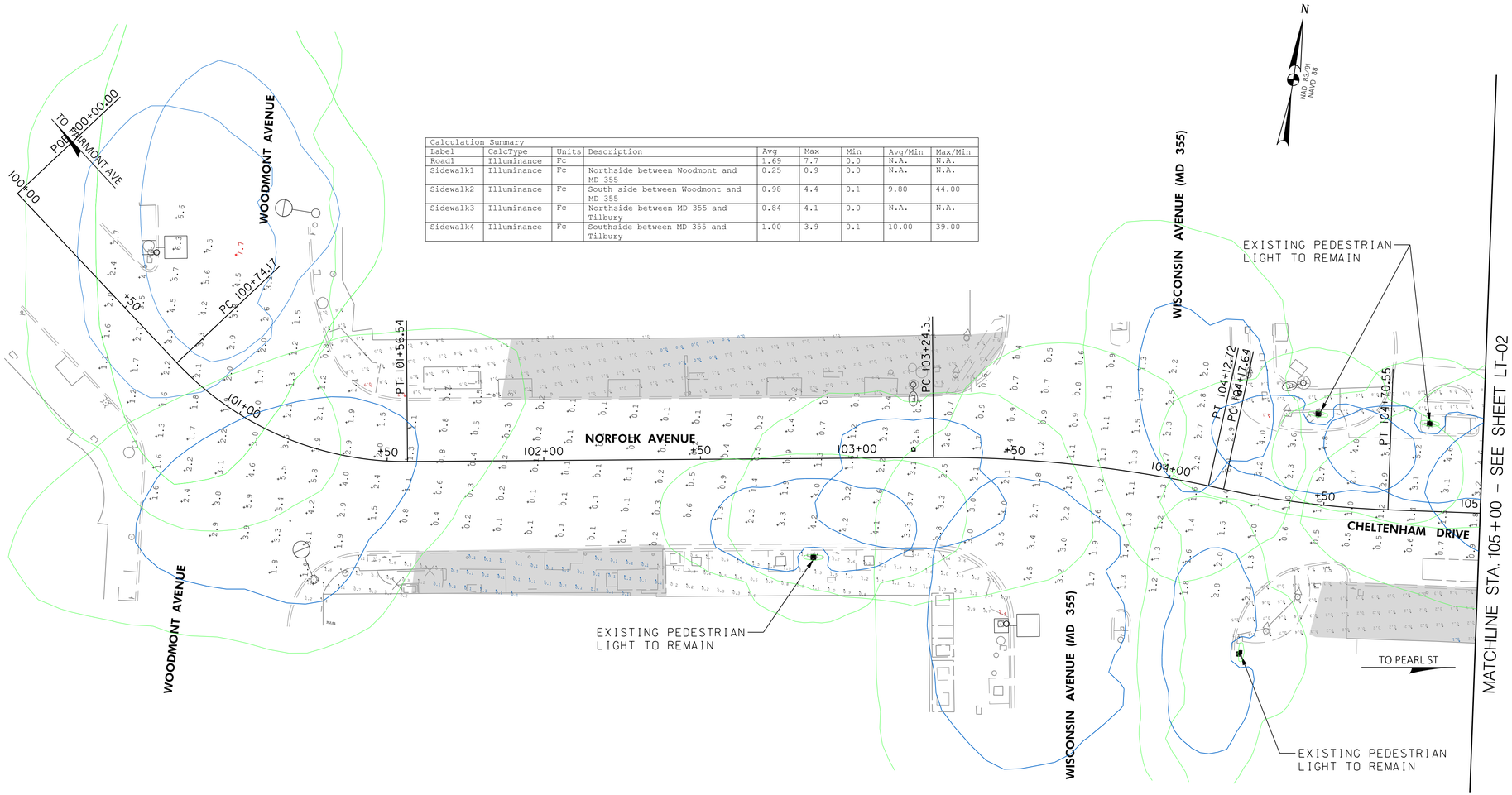
Chief, Division of Transportation Engineering — Date

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
LANDSCAPE PLAN
NOTES & DETAILS

PROJECT NO.: 500119 SHEET 22 of 38

2/27/2025
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Calculation Summary								
Label	CalcType	Units	Description	Avg	Max	Min	Avg/Min	Max/Min
Road1	Illuminance	Fc		1.69	7.7	0.0	N.A.	N.A.
Sidewalk1	Illuminance	Fc	Northside between Woodmont and MD 355	0.25	0.9	0.0	N.A.	N.A.
Sidewalk2	Illuminance	Fc	South side between Woodmont and MD 355	0.98	4.4	0.1	9.80	44.00
Sidewalk3	Illuminance	Fc	Northside between MD 355 and Tilbury	0.84	4.1	0.0	N.A.	N.A.
Sidewalk4	Illuminance	Fc	Southside between MD 355 and Tilbury	1.00	3.9	0.1	10.00	39.00

20' 0 20' 40'
SCALE: 1" = 20'

LEGEND

- EXISTING PEDESTRIAN LUMINAIRE AND POLE
- EXISTING ROADWAY LUMINAIRE
- +0.0 EXISTING NIGHTTIME LIGHT LEVEL
- EXISTING 100W LED LUMINAIRE
- EXISTING 200W LUMINAIRE
- 1.00 FOOT-CANDLE
- 0.25 FOOT-CANDLE
- +0.0 MIN FOOT-CANDLE
- +0.0 MAX FOOT-CANDLE
- LOW LIGHT-LEVEL AREA

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: RJM	DATE: FEBRUARY 2025
DRAWN BY: RJM	DATE: FEBRUARY 2025
CHECKED BY: JRGB	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:

RECOMMENDED FOR APPROVAL

Chief, Design Section — Date

APPROVED

Chief, Division of Transportation Engineering — Date

LT-01

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
LIGHTING PLAN
STA. 100+00 TO STA. 105+00

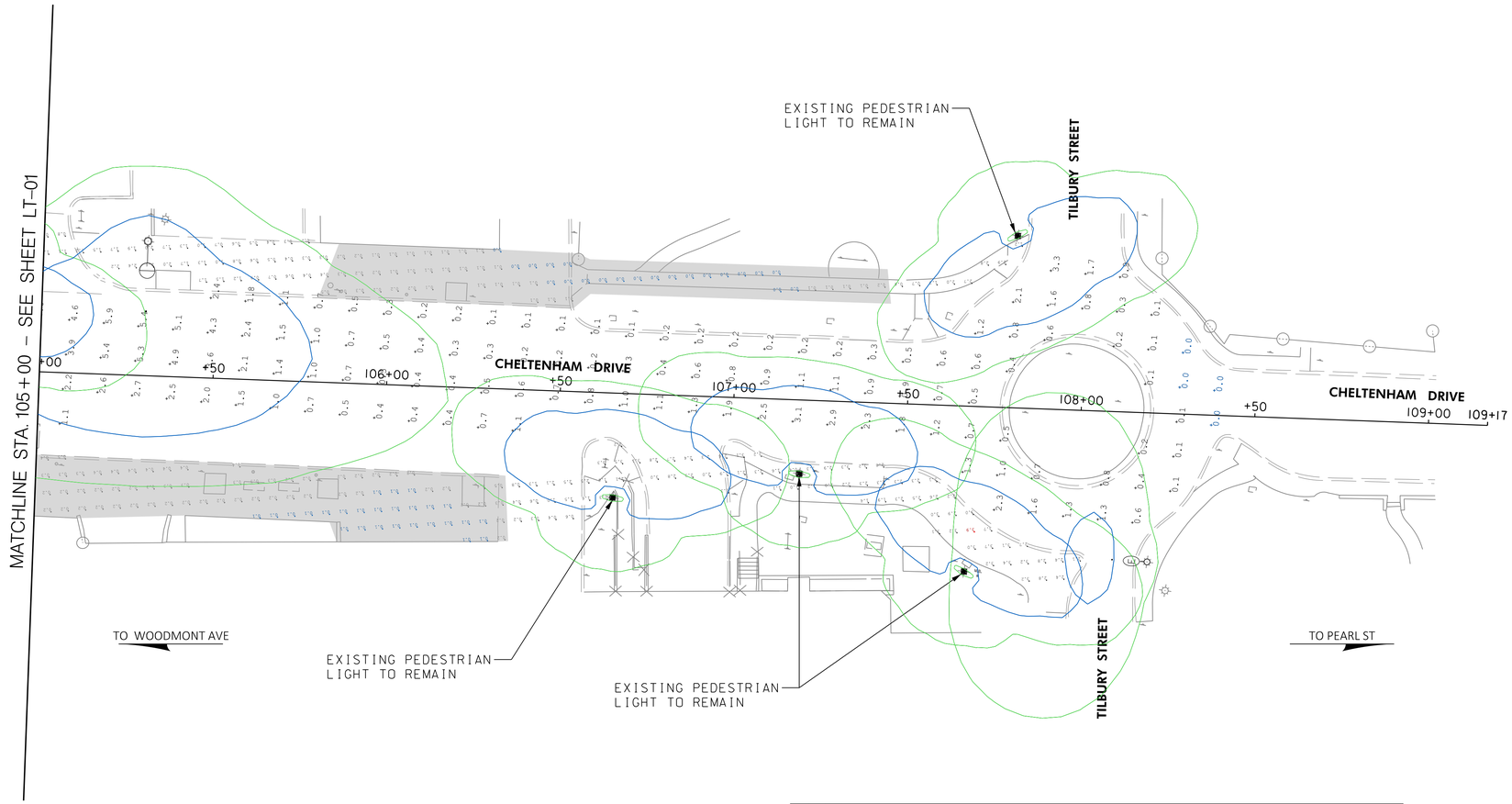
SCALE: 1" = 20'

PROJECT NO.: 500119 SHEET 28 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: _____

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2/27/2025
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Calculation Summary								
Label	CalcType	Units	Description	Avg	Max	Min	Avg/Min	Max/Min
Road1	Illuminance	Fc		1.69	7.7	0.0	N.A.	N.A.
Sidewalk1	Illuminance	Fc	Northside between Woodmont and MD 355	0.25	0.9	0.0	N.A.	N.A.
Sidewalk2	Illuminance	Fc	South side between Woodmont and MD 355	0.98	4.4	0.1	9.80	44.00
Sidewalk3	Illuminance	Fc	Northside between MD 355 and Tilbury	0.84	4.1	0.0	N.A.	N.A.
Sidewalk4	Illuminance	Fc	Southside between MD 355 and Tilbury	1.00	3.9	0.1	10.00	39.00

20' 0 20' 40'
SCALE: 1" = 20'

LEGEND

- EXISTING PEDESTRIAN LUMINAIRE AND POLE
- EXISTING ROADWAY LUMINAIRE
- +0.0 EXISTING NIGHTTIME LIGHT LEVEL
- EXISTING 100W LED LUMINAIRE
- EXISTING 200W LUMINAIRE
- 1.00 FOOT-CANDLE
- 0.25 FOOT-CANDLE
- +0.0 MIN FOOT-CANDLE
- +0.0 MAX FOOT-CANDLE
- LOW LIGHT-LEVEL AREA

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CHECKED BY: JRGB	DATE: FEBRUARY 2025
DRAWING NO.:	DATE:

RECOMMENDED FOR APPROVAL

_____ _____
Chief, Design Section Date

APPROVED

_____ _____
Chief, Division of Transportation Engineering Date

LT-02

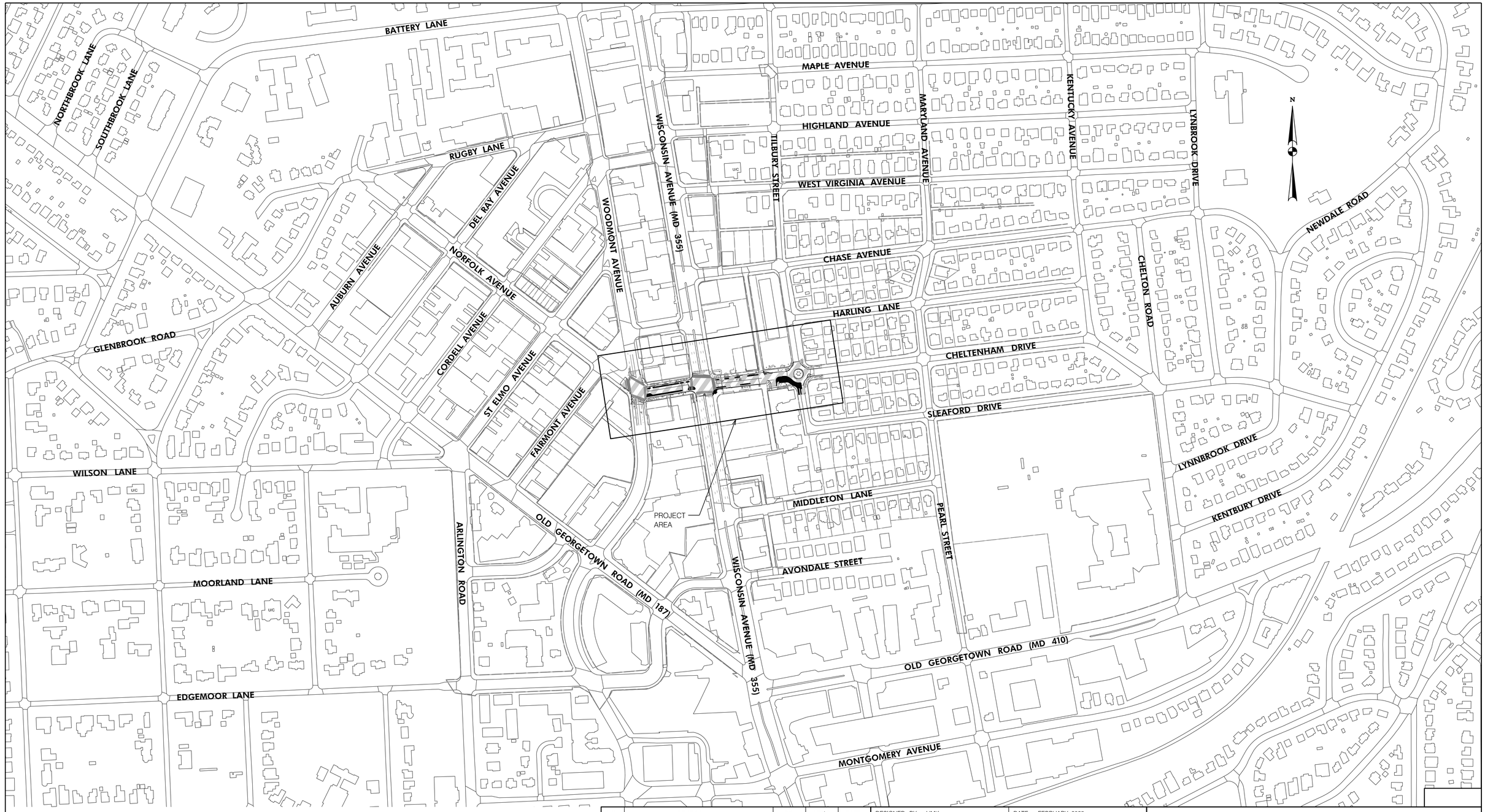
DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY LIGHTING PLAN
STA. 105+00 TO STA. 109+17

SCALE: 1" = 20'

PROJECT NO.: 500119 SHEET 29 of 38

2/27/2025
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NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: UMK	DATE: FEBRUARY 2025
DRAWN BY: UMK	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

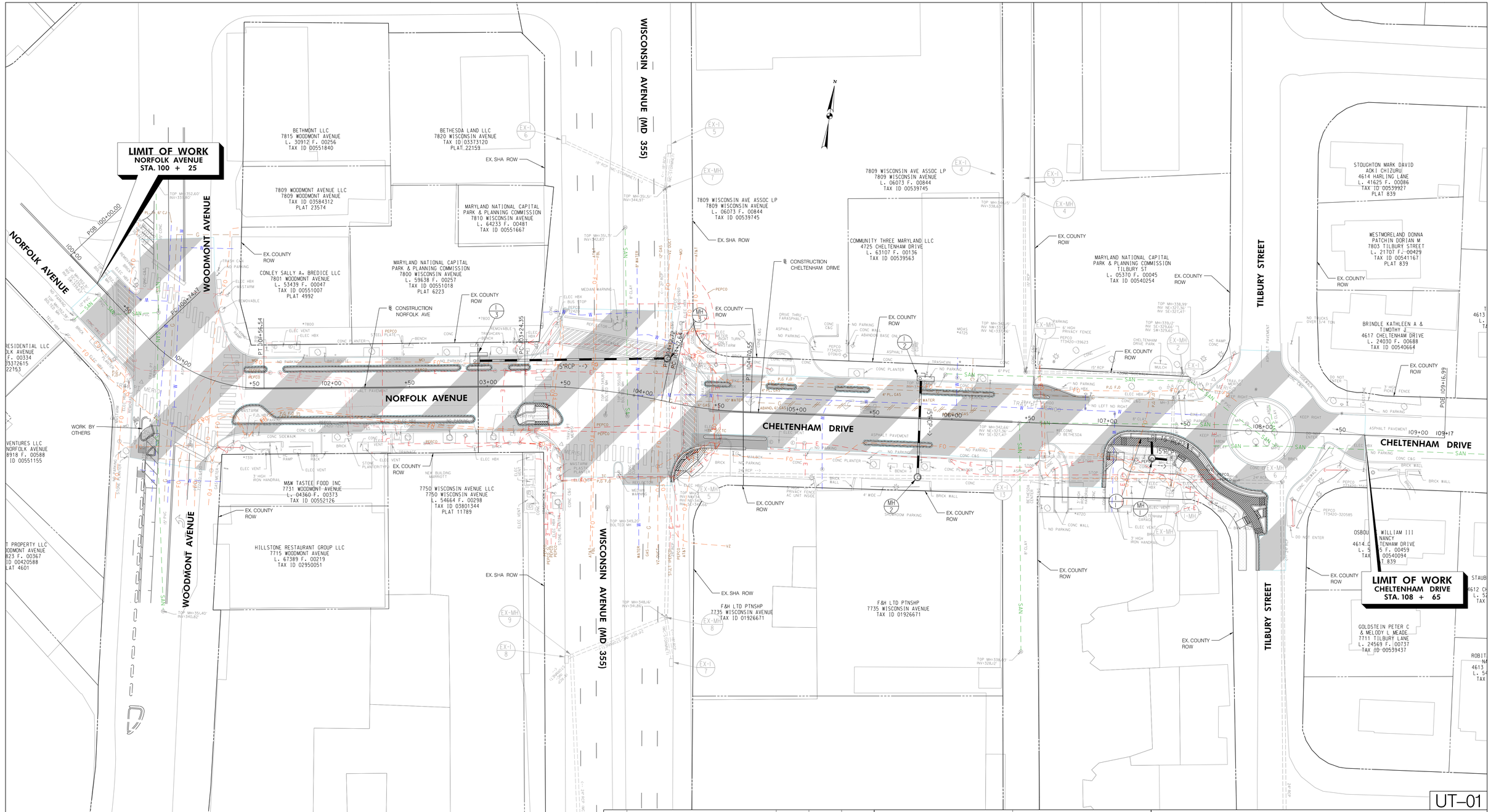
LOCAL AREA DRAWING

SCALE: 1" = 200' PROJECT NO.: 500119 SHEET 1 of 1

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PROFESSIONAL CERTIFICATION:
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LICENSE NO: _____ EXPIRATION DATE: _____

4/10/2025
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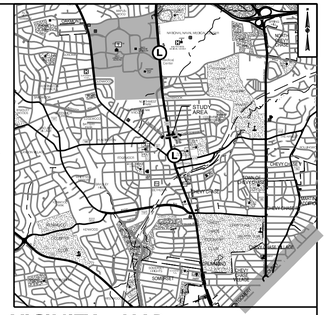

LIMIT OF WORK
NORFOLK AVENUE
STA. 100 + 25
NORFOLK AVENUE
WOODMONT AVENUE
WISCONSIN AVENUE (MD 355)
TILBURY STREET
CHELTENHAM DRIVE
LIMIT OF WORK
CHELTENHAM DRIVE
STA. 108 + 65
BETHMONT LLC
7815 WOODMONT AVENUE
L. 30912 F. 00256
TAX ID 00551840
BETHESDA LAND LLC
7820 WISCONSIN AVENUE
TAX ID 03373120
PLAT 22159
7809 WOODMONT AVENUE LLC
7809 WOODMONT AVENUE
TAX ID 03584312
PLAT 23574
MARYLAND NATIONAL CAPITAL
PARK & PLANNING COMMISSION
7810 WISCONSIN AVENUE
L. 64233 F. 00481
TAX ID 00551667
CONLEY SALLY A. BREDICE LLC
7801 WOODMONT AVENUE
L. 53459 F. 00047
TAX ID 00551007
PLAT 4992
MARYLAND NATIONAL CAPITAL
PARK & PLANNING COMMISSION
7800 WISCONSIN AVENUE
L. 59638 F. 00257
TAX ID 00551018
PLAT 6223
7809 WISCONSIN AVE ASSOC LP
7809 WISCONSIN AVENUE
L. 06073 F. 00844
TAX ID 00539745
COMMUNITY THREE MARYLAND LLC
4725 CHELTENHAM DRIVE
L. 63107 F. 00136
TAX ID 00539563
MARYLAND NATIONAL CAPITAL
PARK & PLANNING COMMISSION
TILBURY ST
L. 05370 F. 00045
TAX ID 00540254
STOUGHTON MARK DAVID
ADKI CHIZURU
4614 HARLING LANE
L. 41625 F. 00086
TAX ID 00539927
PLAT 839
WESTMORELAND DONNA
PATCHIN DORIAN M
7803 TILBURY STREET
L. 21707 F. 00429
TAX ID 00541167
PLAT 839
BRINDLE KATHLEEN A &
TIMOTHY J
4617 CHELTENHAM DRIVE
L. 24030 F. 00688
TAX ID 00540664
M&W TASTEE FOOD INC
7731 WOODMONT AVENUE
L. 04360 F. 00373
TAX ID 00552126
7750 WISCONSIN AVENUE LLC
7750 WISCONSIN AVENUE
L. 54664 F. 00298
TAX ID 03801344
PLAT 11789
HILLSTONE RESTAURANT GROUP LLC
7715 WOODMONT AVENUE
L. 67389 F. 00219
TAX ID 02950051
F&H LTD PTNSHP
7735 WISCONSIN AVENUE
TAX ID 01926671
GOLDSTEIN PETER C
& MELODY L MEADE
7711 TILBURY LANE
L. 24569 F. 00737
TAX ID 00539437
OSBOU WILLIAM III
NANCY
4614 C TENHAM DRIVE
L. 5 F. 00459
TAX 00540094
F 839
ROBIT NA
4613
L. 54
TAX
STAUB
4612 CH
L. 54
TAX
WORK BY OTHERS
EX. COUNTY ROW
EX. SHA ROW
CONSTRUCTION NORFOLK AVE
CONSTRUCTION CHELTENHAM DRIVE
PC 100+74.47
PT 101+56.54
PC 103+24.35
PT 104+10.55
PC 105+72.72
PC 107+17.66
PT 108+16.99
POB 100+00.00
100+00
101+00
102+00
103+00
104+00
105+00
106+00
107+00
108+00
109+00
109+17
+50
15" RCP
NORFOLK AVENUE
CHELTENHAM DRIVE
TILBURY STREET
WISCONSIN AVENUE (MD 355)
WOODMONT AVENUE
T PROPERTY LLC
ODMONT AVENUE
823 F. 00367
ID 00420588
LAT 4601
VENTURES LLC
NORFOLK AVENUE
8918 F. 00588
ID 00551155
RESIDENTIAL LLC
LK AVENUE
F. 00334
03372615
22153
EX. COUNTY ROW
EX. SHA ROW
EX. COUNTY ROW
EX. SHA ROW
EX. COUNTY ROW
EX. COUNTY ROW
EX. COUNTY

MONTGOMERY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
APPROVED - 42025104E
Ariel Zelaya
01/28/25

MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION SIMPLIFIED NATURAL RESOURCE INVENTORY (SNRI) FOREST STAND DELINEATION – FOREST CONSERVATION EXEMPTION NO. 42025104E /TREE SAVE PLAN

CHELTENHAM DRIVE FROM WOODMONT AVE. TO TILBURY ST. CAPITAL IMPROVEMENT PROGRAM, CIP PROJECT NO. 507596

LEGEND
ROAD
SCHOOL
LIBRARY
PARK
STUDY AREA
2UB SOILS BOUNDARY
2UC SOILS SYMBOL



VICINITY MAP
SCALE: 1" = 2000'
LENGTH OF PROJECT: CHELTENHAM DRIVE BIKEWAY 775 FEET

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Wes Moore, Governor
Aruna Miller, Lt. Governor
Joan Kertz, Secretary
David Goshorn, Deputy Secretary

November 26, 2024

Ms. Kathleen Dahill
Stantec Consulting Services, Inc.
6110 Frost Place
Laurel, MD 20707-2927

RE: Environmental Review for Montgomery County Department of Transportation, Cheltenham Drive Bikeway, Montgomery County, Maryland.

Dear Ms. Dahill:

The Wildlife and Heritage Service has no official records for State or Federal listed, candidate, proposed, or rare plant or animal species within the project area shown on the map provided. As a result, we have no specific concerns regarding potential impacts to such species or recommendations for protection measures at this time. If the project changes in the future such that the limits of proposed disturbance or overall site boundaries are modified, please provide us with revised project maps and we will provide you with an updated evaluation.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at lori.byrne@maryland.gov or at (410) 260-8573.

Sincerely,

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2024.1865.mo

Tawes State Office Building – 580 Taylor Avenue – Annapolis, Maryland 21401
410-260-8DNR or toll free in Maryland 877-620-8DNR – dnr.maryland.gov – TTY Users Call via the Maryland Relay



RESOURCE DATA TABLE FEATURES	TRACT ACRES 0.15	STUDY ACRES 5.33
FOREST	0.0	0.0
FLOODPLAIN	0.0	0.0
FLOODPLAIN IN FOREST	0.0	0.0
WETLAND	0.0	0.0
FORESTED WETLAND	0.0	0.0
FORESTED STREAM BUFFER	0.0	0.0
STREAM BUFFER	0.0	0.0
STREAM LENGTH	0.0	0.0
STREAM CLASSIFICATION	0.0	0.0
SLOPES 15% - 25%	0.0	0.0
SLOPES 25% AND GREATER	0.0	0.0

TREE LIST (24" AND GREATER)

SYM	NAME	DBH (IN)	CRZ (IN)	CONDITION	REMARKS
SP-07	QUERCUS PHELLOS/WILLOW OAK	~40"	~60	GOOD	ON PRIVATE PROPERTY TO REMAIN
SG-11	PRUNUS SP. / PRUNUS	24	36	FAIR	LARGE LIMB BROKEN OFF GASH IN TRUNK TO REMAIN
SG-15	GLEDITSIA TRIACANTHOS / HONEYLOCUST	24	36	GOOD	TO REMAIN

SOIL TABLE

SYMBOL	SOILS	ERODIBLE	HYDRIC YES/NO GROUP	PRIME AGRICUTURAL SOIL
2UB	GLENELG-URBAN LAND COMPLEX 0 -8% SLOPES	NO	NO B	NO
400	URBAN LAND	NO	NO D	NO

LANDSCAPE ARCHITECT 3190 STATE OF MARYLAND KATHLEEN RENDEL DAHILL

Digitally signed by Dahill, Kathleen
DN: CN="Dahill, Kathleen", OU=Internal, OU=Users, OU=stantec, DC=corp, DC=ads
Date: 2025.01.24 11:24:01-05'00'

PROFESSIONAL CERTIFICATION:
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LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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

OWNER:
JOSE THOMMANA, ACTING CHIEF
MCDOT DIVISION OF TRANSPORTAITON ENGINEERING
100 EDISON PARK DRIVE, 4TH FLOOR
GAITHERSBURG, MD 20878
240-777-8740 JOSE.THOMMANA@MONTGOMERYCOUNTYMD.GOV

FOREST EXEMPTION NARRATIVE:

IN SUPPORT OF MONTGOMERY COUNTY DIVISION OF TRANSPORTATION ENGINEERING, DEPARTMENT OF TRANSPORTATION BICYCLE AND PEDESTRIAN PRIORITY AREAS (BIPPA) PROJECT #507596 WILL CONSTRUCT THE CHELTENHAM DRIVE BIKEWAY. THE PURPOSE OF THIS PROJECT IS TO PROVIDE SEPARATED BIKE LANES AND CONCRETE BUFFERS ALONG NORFOLK AVENUE /CHELTENHAM DRIVE FROM WOODMONT AVENUE TO TILBURY STREET IN BETHESDA, MD. 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. AS PART OF THE IMPROVEMENTS, STANTEC WILL RECONSTRUCT EXISTING SIDEWALKS AND PROVIDE ADA–COMPLIANT SIDEWALK RAMPS AS NECESSARY WITHIN THE PROJECT LIMITS. STANTEC WILL ALSO PROVIDE STORM DRAIN DESIGN, LANDSCAPING AND PEDESTRIAN LIGHTING WHERE IMPACTS TO THESE EXISTING FEATURES OCCUR. THE CONSTRUCTION IS DESIGNED TO MINIMIZE TREE REMOVAL. NO SPECIMEN OR CHAMPION TREES OR FORESTS WILL BE CLEARED WITHIN OR ADJACENT TO THE PROJECT LIMITS (0.15 ACRES).

THE FOLLOWING EXCERPT PROVIDES THE REQUIREMENTS UNDER SECTION 22A–9 AS IT PERTAINS TO COUNTY HIGHWAY PROJECTS SEC. 22A–9. COUNTY HIGHWAY PROJECTS
"(A) GENERAL.
(1) THIS SECTION APPLIES TO CONSTRUCTION OF A HIGHWAY BY THE COUNTY FOR A MUNICIPALITY AS PART OF AN APPROVED CAPITAL IMPROVEMENTS PROGRAM PROJECT.
(2) THE CONSTRUCTION SHOULD MINIMIZE FOREST REMOVAL, LAND DISTURBANCE, AND LOSS OF SIGNIFICANT, SPECIMEN OR CHAMPION TREES TO THE EXTENT POSSIBLE WHILE BALANCING OTHER DESIGN, CONSTRUCTION, AND ENVIRONMENTAL STANDARDS. THE CONSTRUCTING AGENCY MUST MAKE A REASONABLE EFFORT TO MINIMIZE LAND DISTURBANCE TO AVOID CUTTING OR CLEARING OF TREES AND OTHER WOODY PLANTS.
(B) IF THE FOREST TO BE CUT OR CLEARED FOR A COUNTY HIGHWAY PROJECT EQUALS OR EXCEEDS 20,000 SQUARE FEET, THE CONSTRUCTING AGENCY MUST REFOREST A SUITABLE AREA AT THE RATE OF ONE ACRE OF PROTECTED REFORESTATION FOR EACH ACRE OF FOREST CLEARED.
(C) REFORESTATION FOR COUNTY HIGHWAY PROJECTS MUST MEET THE STANDARDS IN SUBSECTIONS 22A–12(E), (G) AND (H).
(D) ANY MITIGATION REQUIREMENT FOR LOSS OF SIGNIFICANT, SPECIMEN, OR CHAMPION TREES MUST BE BASED ON THE SIZE AND CHARACTER OF THE TREE."

IN ACCORDANCE WITH SECTION 22A–9, THE CHELTENHAM DRIVE BIKEWAY PROJECT MEETS THESE REQUIREMENTS FOR AN EXEMPTION AS FOLLOWS:
(1) THE PROJECT IS AN APPROVED CAPITAL IMPROVEMENTS PROGRAM PROJECT (CIP NO. 0507596).
(2) THE PROJECT HAS NO FOREST CLEARING OR FOREST LOCATED WITHIN 200 FEET OF THE LIMITS OF DISTURBANCE. THE MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION HAS MINIMIZED IMPACTS TO TREES TO THE GREATEST EXTENT POSSIBLE, ALL RETAINED TREES WILL BE PROTECTED DURING CONSTRUCTION. THERE IS ONE SPECIMEN TREE AND TWO SIGNIFICANT TREES WITHIN THE STUDY AREA ADJACENT. NO SPECIMEN /SIGNIFICANT TREES ARE LOCATED WITHIN THE LOD BOUNDARY. THERE ARE NO CHAMPION TREES OR TREE WITHIN 75% OF A CHAMPION TREES WITHIN OR NEAR THE PROJECT AREA. THE PROJECT IS DESIGNED TO MINIMIZE IMPACTS TO ALL WOODY VEGETATION AND SITE GRADING TO THE EXTENT PRACTICABLE.

THE MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION WILL PROVIDE MITIGATION FOR TREE REMOVAL UNDER THE MONTGOMERY COUNTY CHAPTER 22A SECTION 22A–6, CHAPTER 55 TREE CANOPY LAW, AND MARYLAND DNR ROADSIDE TREE PROTECTION LAW. THE PROJECT DESIGN CURRENTLY WILL NOT REMOVE ANY SIGNIFICANT OR SPECIMEN TREES (24"DBH OR GREATER).

GENERAL NRI/FSD NOTES:

1. THIS PROJECT IS WITHIN MONTGOMERY COUNTY AND STATE RIGHT OF WAY WITHIN BETHESDA OVERLAY ZONE. ADJACENT PROPERTIES ARE ZONED R-60, CRN AND CRT. THE PROJECT LIES WITIN ELECTION DISTRICTS 07-01 AND 07-08.
2. THE TAX IDENTIFICTION NUMBERS ARE NOT ASSOCIATED WITH THIS PROJECT. THE 200 SCALE BASE MAPS ARE 209NW05, TAX MAPS HN122 & HN123.
3. THE TOTAL TRACT AREA IS 0.15 ACRES, THE STUDY AREA IS 5.33 ACRES.
4. SURVEY DATA WAS SUPPLIED BY MONTGOMERY COUNTY DEPARTMENT OF TRANSPORTATION IN SUPPORT OF THIS PROJECT.
5. NO RARE, THREATENED OR ENDANGERED SPECIES WERE OBSERVED ON OR OFFSITE AT THE TIME OF THE FIELD INVESTIGATION. MD DNR HAS BEEN NOTIFIED OF THIS PROJECT AND THEIR RESPONSE WAS RECIEVED ON NOV. 26, 2024.
6. FEMA FLOODPLAIN MAP PANEL #240031C0455D STATES THERE IS NO FLOODPLAIN WITHIN 100' OF THE PROPERTY.
7. ACCORDING TO MD MERLIN ONLINE, US FISH & WILDLIFE SERVICE: NWI AND FIELD OBSERVATION; THERE ARE NO WETLANDS OR ASSOCIATED BUFFERS WITHIN 100' OF THE PROJECT.
8. THIS PROPERTY LIES WITHIN THE LOWER ROCK CREEK WATERSHED #021402060836. THERE ARE NO STREAMS OR ASSOCIATED BUFFERS WITHIN 100' OF THE PROJECT.
9. THE PROJECT IS NOT ADJACENT TO A REGISTERED HISTORIC SITE ACCORDING TO THE MONTGOMERY COUNTY DESIGNATED HISTORIC SITE AND DISTRICTS INTERACTIVE MAP.
10. THERE ARE NO NATIONAL, STATE OR COUNTY CHAMPION TREES OR TREES THAT ARE AT LEAST 75% OF THE CURENT STATE CHAMPION WITHIN THE STUDY AREA. THERE ARE TWO SIGNIFICANT TREES AND ONE SPECIMEN TREES WITHIN THE STUDY AREA.
11. ALL TREES 24"AND GREATER ONSITE ARE SURVEYED LOCATED AND MEASURED WITH A FORESTERS' DIAMETER TAPE MEASURE.
12. THIS PROPERTY IS / IS NOT WITHIN A PMA OR SPECIAL PROTECTION AREA.
13. SITE FIELD WORK WAS PERFORMED ON NOVEMBER 6, 2024, BY KATHLEEN DAHILL, RLA, AND MIKE KIM, STANTEC CONSULTING INC. AN ADDITAL TREE SURVEY WAS PERFORMED BY MIKE KIM ON JANUARY 23, 2025.
14. THIS PROJECT QUALIFIES FOR A FOREST CONSERVATION EXEMPTION PER CHAPTER 22A, SECTION 22A-9 COUNTY HIGHWAY PROJECTS.

NR-01

NO.	REVISION	BY	APP'D	DATE

SHEET INDEX	
NO.	TITLE
NR-01	COVER SHEET
NR-02	PLAN VIEW
NR-03	PLAN VIEW
NR-04	NOTES AND DETAILS

WSSC MAP 209NW05
TAX MAPS HN122 & HN123.

DESIGNED BY: KRD	DATE: NOVEMBER, 2024
DRAWN BY: KRD	DATE: NOVEMBER, 2024
CHECKED BY: HC	DATE: NOVEMBER, 2024
DRAWING NO.:	DATE:

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
NRI/FSD & TREE SAVE PLAN
#42025104E
COVER SHEET

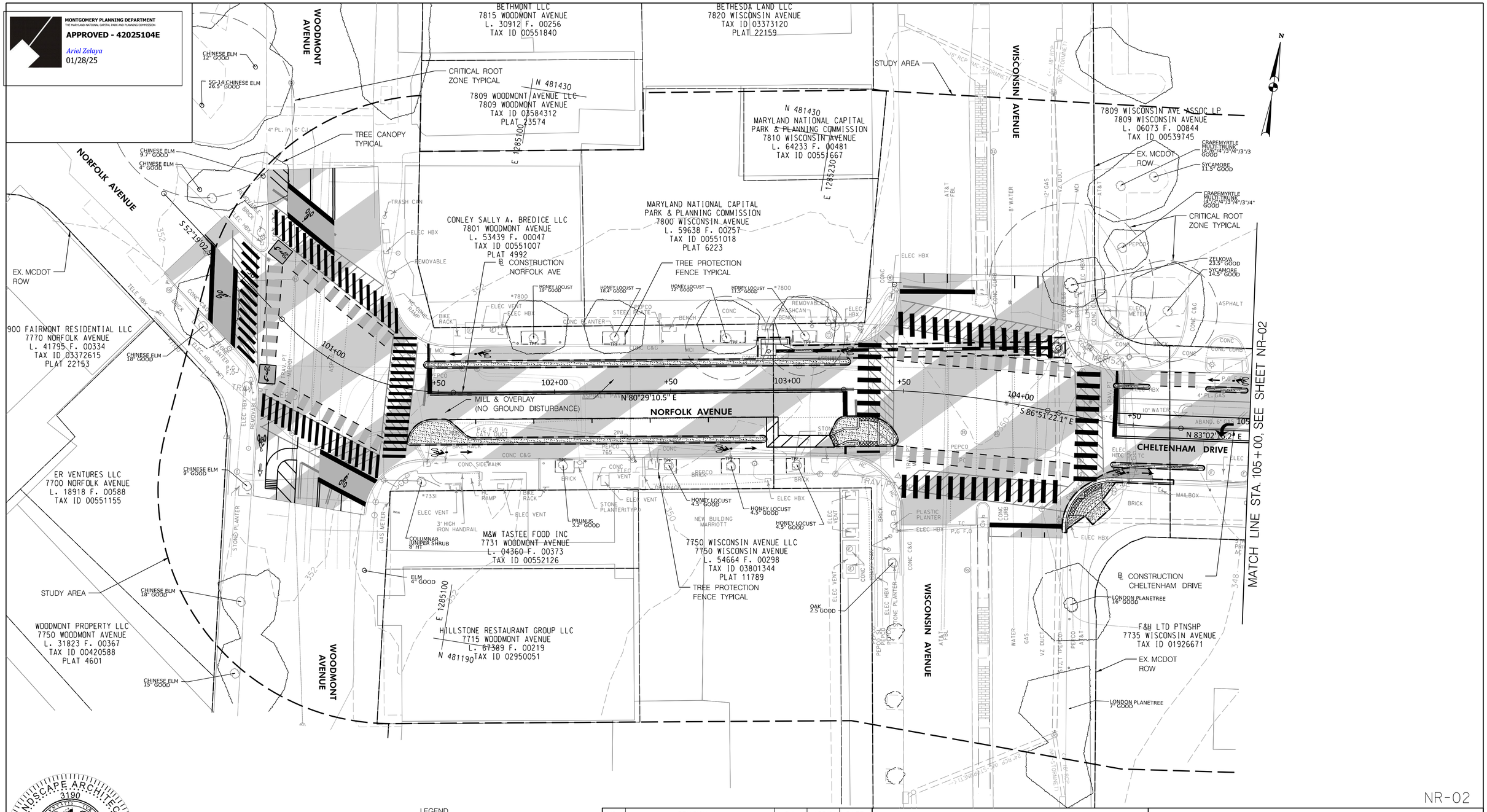
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1/24/2025
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MONTGOMERY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

APPROVED - 42025104E

Ariel Zelaya
01/28/25



LANDSCAPE ARCHITECT
3190
KATHLEEN RENDEL DAHILL
STATE OF MARYLAND

Dahill, Kathleen — Digitally signed by Dahill, Kathleen DN: CN=Dahill, Kathleen, OU=Internal, OU=users, OU=stantec, DC=corp, DC=ads Date: 2025.01.24 11:14:18-05'00'

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A REGISTERED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

20' 0 20' 40'
SCALE: 1" = 20'

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

LEGEND
- ROW
- 350 EXISITNG TOPOGRAPHY
- STUDY AREA
- TREE CANOPY
- EXISTING TREE & CRITICAL ROOT ZONE
- TREE PROTECTION FENCE
- LIMIT OF DISTURBANCE (LOD)
- PROP. MILL & OVERLAY
- PROP. CONCRETE

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: KRD	DATE: NOVEMBER, 2024
DRAWN BY: KRD	DATE: NOVEMBER, 2024
CHECKED BY: HC	DATE: NOVEMBER, 2024
DRAWING NO.:	DATE:

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
NRI/FSD & TREE SAVE PLAN
#42025104E
PLAN VIEW

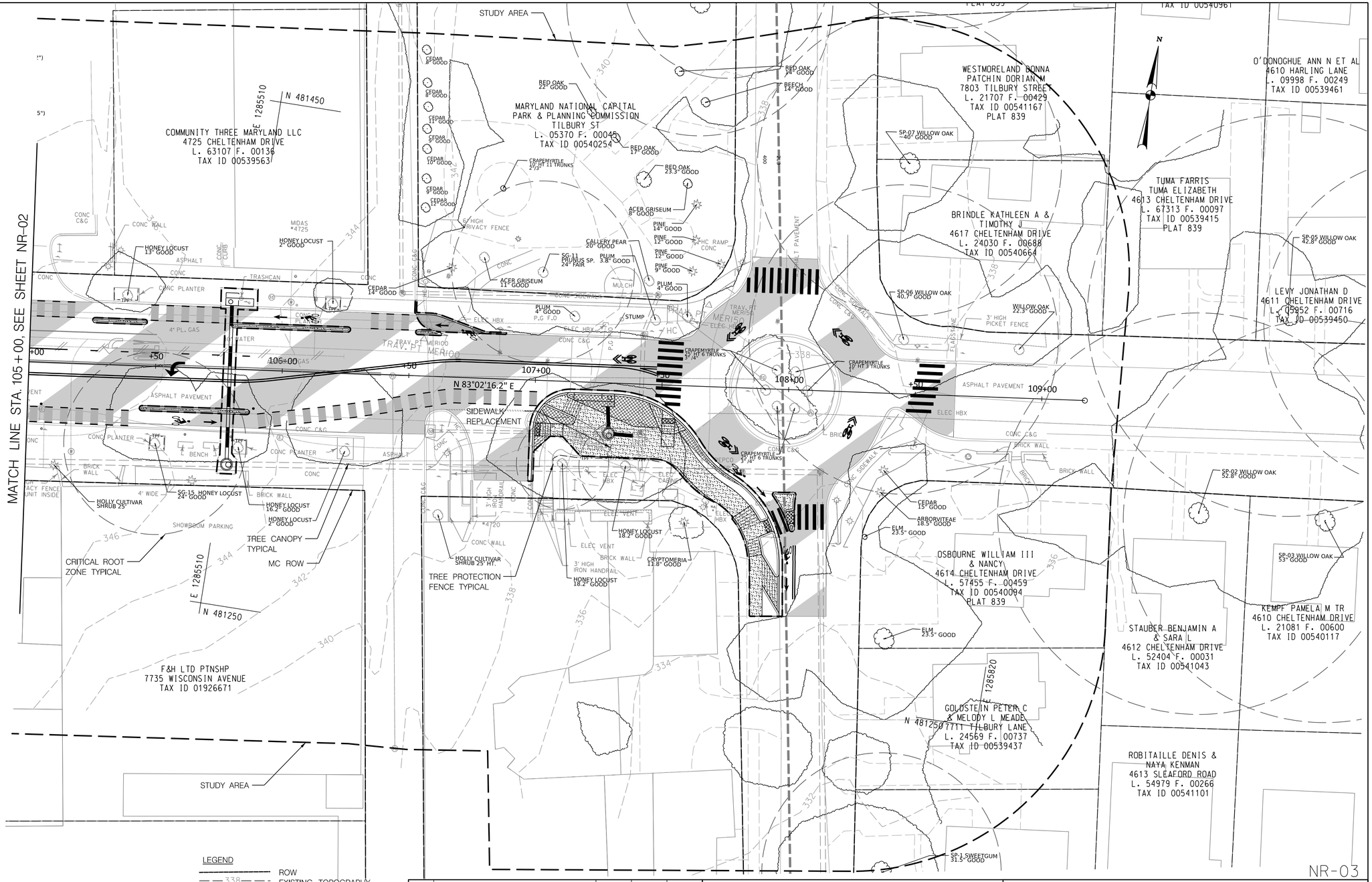
SCALE: 1"=20' SHEET 2 of 4

1/24/2025
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MONTGOMERY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

APPROVED - 42025104E

Ariel Zelaya
01/28/25



LEGEND

- ROW
- 338 EXISTING TOPOGRAPHY
- STUDY AREA
- 2UB / 400 SOIL BOUNDARY / SOIL LABEL
- TREE CANOPY
- TREE PROTECTION FENCE
- EXISTING TREE & CRITICAL ROOT ZONE
- LIMIT OF DISTURBANCE (LOD)
- PROP. CONCRETE
- PAVEMENT REMOVAL
- PROP. MILL & OVERLAY

20' 0 20' 40'
SCALE: 1" = 20'

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: KRD	DATE: NOVEMBER, 2024
DRAWN BY: KRD	DATE: NOVEMBER, 2024
CHECKED BY: HC	DATE: NOVEMBER, 2024
DRAWING NO.:	DATE:

LANDSCAPE ARCHITECT 3190 — KATHLEEN RENDEL DAHILL — STATE OF MARYLAND

Digitally signed by Dahill, Kathleen
DN: CN="Dahill, Kathleen", OU=Internal, OU=Users, OU=stantec, DC=corp, DC=ads
Date: 2025.01.24 11:13:13-05'00'

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LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
NRI/FSD & TREE SAVE PLAN
#42025104E
PLAN VIEW

SCALE: 1"=20' SHEET 3 of 4

1/24/2025
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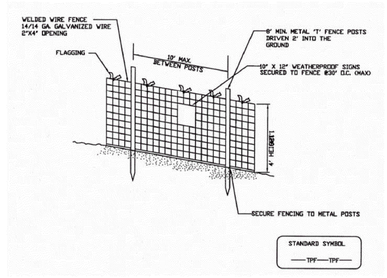
MONTGOMERY PLANNING DEPARTMENT
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

APPROVED - 42025104E

Ariel Zelaya
01/28/25

Tree Protection Fence Detail

Not to scale



NOTES

1. Practice may be combined with sediment control fencing.
2. Location and limits of fencing should be coordinated in field with arborist.
3. Boundaries of protection area should be staked prior to installing protective device.
4. Root damage should be avoided.
5. Protection signage is required.
6. Fencing shall be maintained throughout construction.

Montgomery County Planning Department • M-NCPPC
MontgomeryPlanning.org

NOTES:
1. RETENTION AREAS WILL BE SET AS PART OF THE REVIEW PROCESS AND PRECONSTRUCTION MEETING.
2. BOUNDARIES OF RETENTION AREAS MUST BE STAKED AT THE PRECONSTRUCTION MEETING AND FLAGGED PRIOR TO TRENCHING.
3. EXACT LOCATION OF TRENCH SHALL BE DETERMINED IN THE FIELD IN COORDINATION WITH THE FOREST CONSERVATION (FC) INPECTOR.
4. TRENCH SHOULD BE IMMEDIATELY BACKFILLED WITH EXCAVATED SOIL OR OTHER ORGANIC SOIL AS SPECIFIED PER PLAN OR BY THE FC INSPECTOR.
5. ROOTS SHALL BE CLEANLY CUT USING VIBRATORY KNIFE OR OTHER ACCEPTABLE EQUIPMENT.
6. ALL PRUNING MUST BE EXECUTED WITH LOD SHOWN ON PLANS OR AS AUTHORIZED IN WRITING BY THE FC INSPECTOR.

ROOT PRUNING DETAIL

NTS

Sequence of Events for Properties Required to Comply With Forest Conservation Plans, Exemptions from Submitting Forest Conservation Plans, and Tree Save Plans

The property owner is responsible for ensuring all tree protection measures are performed in accordance with the approved final forest conservation plan or tree save plan, and as modified in the field by a Planning Department Forest Conservation Inspector. The measures must meet or exceed the most recent standards published by the American National Standards Institute (ANSI A300).

Pre-Construction

1. An on-site pre-construction meeting is required after the limits of disturbance have been staked and flagged and before any land disturbance.

2. The property owner must arrange for the meeting and following people ~~should~~ must participate at the pre-construction meeting: the property owner or their representative, construction superintendent, International Society of Arboriculture (ISA) certified arborist/Maryland Licensed Tree Expert (representing owner) that will implement the tree protection measures, The Planning Department Forest Conservation Inspector, and Montgomery County Department of Permitting Services (DPS) Sediment Control Inspector. The purpose of this meeting is verify the limits of disturbance and discuss specific tree protection and tree care measures shown on the approved plan. No land disturbance shall begin before tree protection and stress-reduction measures have been implemented and approved by the Planning Department's Forest Conservation Inspector.
   a. Typical tree protection devices include:
      i. Chain link fence (four feet high)
      ii. Super silt fence with wire strung between the support poles (minimum 4 feet high) with high visibility flagging.
      iii. 14 gauge, 2 inch x 4 inch welded wire fencing supported by steel T-bar posts (minimum 4 feet high) with high visibility flagging.
   b. Typical stress reduction measures may include, but are not limited to:
      i. Root pruning with a root cutter or vibratory plow designed for that purpose. Trenchers are not allowed, unless approved by the Forest Conservation Inspector
      ii. Crown Reduction or pruning
      iii. Watering
      iv. Fertilizing
      v. Vertical mulching
      vi. Root aeration systems

   Measures not specified on the Forest Conservation Plan may be required as determined by the Forest Conservation Inspector in coordination with the property owner's arborist.

3. A Maryland Licensed Tree expert must perform, or directly supervise, the implementation of all stress reduction measures. Documentation of the process (including photographs) may be required by the Forest Conservation Inspector, and will be determined at the pre-construction meeting.

4. Temporary tree protection devices must be installed per the approved Forest Conservation Plan, Exemption Plan, or Tree Save Plan and prior to any land disturban The Forest Conservation Inspector, in coordination with the DPS Sediment Control Inspector, may make field adjustments to increase the survivability of trees and forest shown as saved on the approved plan.

5. Tree protection fencing must be installed and maintained by the property owner for th duration of construction project and must not be altered without prior approval from th Forest Conservation Inspector. All construction activity within protected tree and fore areas is prohibited. This includes the following activities:
   a. Parking or driving of equipment, machinery or vehicles of any type.
   b. Storage of any construction materials, equipment, stockpiling, fill, debris, etc.
   c. Dumping of any chemicals (i.e., paint thinner), mortar or concrete remainder, trash, garbage, or debris of any kind.
   d. Felling of trees into a protected area.
   e. Trenching or grading for utilities, irrigation, drainage, etc.

6. Forest and tree protection signs must be installed as required by the Forest Conservatio Inspector. The signs must be waterproof and wording provided in both English and Spanish.

During Construction

7. Periodic inspections will be made by the Forest Conservation Inspector. Corrections a repairs to tree protection devices must be completed within the timeframe given by the Inspector.

8. The property owner must immediately notify the Forest Conservation Inspector of any damage to trees, forests, understory, ground cover, and any other undisturbed areas shown on the approved plan. Remedial actions, and the relative timeframes to restore these areas, will be determined by the Forest Conservation Inspector.

Post-Construction

9. After construction is completed, but before tree protection devices have been removed the property owner must request a final inspection with the Forest Conservation Inspector. At the final inspection, the Forest Conservation Inspector may require additional corrective measures, which may include:
   a. Removal, and possible replacement, of dead, dying, or hazardous trees
   b. Pruning of dead or declining limbs
   c. Soil aeration
   d. Fertilization
   e. Watering
   f. Wound repair
   g. Clean up of retention areas, including trash removal

10. After the final inspection and completion of all corrective measures the Forest Conservation Inspector will request all temporary tree and forest protection devices be removed from the site. Removal of tree protection devices that also operate for erosion and sediment control must be coordinated with both DPS and the Forest Conservation Inspector and cannot be removed without permission of the Forest Conservation Inspector. No additional grading, sodding, or burial may take place after the tree protection fencing is removed.

11. Long-term protection measures, including permanent signage, must be installed per the approved plan. Installation will occur at the appropriate time during the construction project. Refer to the approved plan drawing for the long-term protection measures to be installed.

INSPECTIONS

All field inspections must be requested by the applicant.

Field Inspections must be conducted as follows:

Plans without Planting Requirements

1. After the limits of disturbance have been staked and flagged, but before any clearing or grading begins.
2. After necessary stress reduction measures have been completed and protection measures have been installed, but before any clearing and grading begin and before release of the building permit.
3. After completion of all construction activities, but before removal of tree protection fencing, to determine the level of compliance with the provision of the forest conservation.

Additional Requirements for Plans with Planting Requirements

4. Before the start of any required reforestation and afforestation planting.
5. After the required reforestation and afforestation planting has been completed to verify that the planting is acceptable and prior to the start the maintenance period.
6. 2 years after reforestation and afforestation have been completed, to determine survival and assess necessary maintenance activities for the remaining duration of the maintenance and management period.
7. At the end of the maintenance period to determine the level of compliance with the provisions of the planting plan, and if appropriate, release of the performance bond.

TREE PROTECTION NOTES

1. THE CONTRACTOR SHALL INSTALL TREE PROTECTION TO TREES TO BE PRESERVED AND THAT ARE WITHIN THE LIMITS OF DISTURBANCE (LOD) OR DIRECTLY ADJACENT TO WORK AREA. TREE PROTECTION SHALL BE INSTALLED PRIOR TO AND THROUGH-OUT CONSTRUCTION AND REMOVED AT THE END OF THE PROJECT. TREE PROTECTION DEVICES SHALL REMAIN IN PLACE UNTIL AFTER FINAL INSPECTION.

2. THE CONTRACTOR SHALL INSTALL TREE PROTECTION FENCE AND ROOT PRUNING AT LOD BOUNDARY. FINAL LOCATION / EXTENTS TO BE DETERMINED AT PRECONTRUCTION MEETING.

3. CRITICAL ROOT ZONE IS 1:1.5 X DBH INCH (TREE DIAMETER AT BREAST HEIGHT = DBH). E.G. THE CRITICAL ROOT ZONE FOR A TREE WITH A 10-INCH DBH, OR DIAMETER AT BREAST HEIGHT IS 15 FEET ON EVERY SIDE MEASURED FROM THE BASE OF THE TREE.

4. THE CONTRACTOR SHALL PROTECT THE CRZ BY ERECTING TREE PROTECTION FENCING IN LOCATIONS DELINEATED ON THE TREE SAVE PLAN AND AS DETERMINED AT THE PRECONSTRUCTION MEETING IN ORDER TO PROTECT TREE ROOT SYSTEMS AND OTHER VEGETATION. THE AREA WITHIN THE TREE PROTECTION FENCE IS RESTRICTED, ALL CONSTRUCTION ACTIVITIES ARE NOT ALLOWED.

5. AVOID CRZ DISTURBANCE OUTSIDE OF THE LOD.

6. DO NOT STORE CONSTRUCTION MATERIALS, EQUIPMENT, SOIL OR DEBRIS WITHIN THE CRZ.

7. DO NOT DISPOSE ANY LIQUIDS, CONCRETE, GAS, OIL, PAINT, AND/OR BLACKTOP WITHIN THE CRZ.

8. RETAINED TREES WITH CRZ IN THE PROJECT AREA MUST BE WATERED EVERY 10 DAYS FROM APRIL THROUGH SEPTEMBER. PRIOR TO WATERING OF ANY TREE LOCATED OFFSITE ON PRIVATE LAND, THE CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER FOR APPROVAL.

9. PRUNING OF ALL TREES SHOULD BE IN ACCORDANCE WITH INDUSTRY STANDARDS OF THE INTERNATIONAL SOCIETY OF ARBORICULTURE OR ANZI 133.1 OR BY A CERTIFIED ARBORIST.

10. PRUNING SHOULD BE LIMITED TO THE REMOVAL OF DEAD WOOD AND THE CORRECTION OF POTENTIALLY HAZARDOUS CONDITIONS, AS EVALUATED BY A CERTIFIED ARBORIST. TREE BRANCH PRUNING SHALL BE PERFORMED BY OR DIRECTLY SUPERVISED BY A LICENSED TREE PROFESSIONAL IN CONFORMANCE IWTH ANSI A200 STANDARDS AS NECESSARY FOR ANY OF THE FOLLOWING:
- TO INSTALL TREE PROTECTION FENCE ALONG THE LOD.
- TO PROVIDE 8 FOOT CLEARANCE ABOVE SIDEWALK PAVEMENTS AND 16 FOOT CLEARANCE ABOVE ROADWAY PAVEMENTS.
- TO REPAIR TREE WOUNDS.
- AND TO PERFORM OTHER RECOMMENDED CLEANING, THINNING, REDUCING, AND PRUNING NECESSARY TO ACCOMMODATE ALL UTILITIES.
- ALL DEBRIS SHALL BE REMOVED FROM PROJECT AREA.

LANDSCAPE ARCHITECT 3190 STATE OF MARYLAND KATHLEEN RENDEL DAHILL

Digitally signed by Dahill, Kathleen
DN: CN="Dahill, Kathleen", OU=Internal, OU=Users, OU=stantec, DC=corp, DC=rads
Date: 2024.12.18 14:04:23-05'00'

PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A REGISTERED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO: 3190 EXPIRATION DATE: MAY 07, 2025

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

NO.	REVISION	BY	APP'D	DATE

DESIGNED BY: KRD	DATE: NOVEMBER, 2024
DRAWN BY: KRD	DATE: NOVEMBER, 2024
CHECKED BY: HC	DATE: NOVEMBER, 2024
DRAWING NO.:	DATE:

NR-04

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRANSPORTATION ENGINEERING
MONTGOMERY COUNTY, MARYLAND

CHELTENHAM DRIVE BIKEWAY
NRI/FSD & TREE SAVE PLAN #42025104E
NOTES AND DETAILS

SHEET 4 of 4

12/18/2024
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Intake and Regulatory Coordination
Montgomery County Planning Department
Maryland-National Capital Park and Planning Commission

Effective: January 29, 2021

2425 Reedie Drive
Wheaton, Maryland 20902
www.montgomeryplanning.org
Phone 301.495.4550
Fax 301.495.1306

MANDATORY REFERRAL APPLICATION

Date Application Filed	9/22/2025	MR Type (check One) __✓__ 1 – Comprehensive _____ 2 – Administrative _____ 3 – Consent

CLEAR FORM

An application will not be accepted for review unless all required information and fees are provided. If an item requires more space, attach a separate sheet.

Project Name (Subdivision): Cheltenham Drive Bikeway Acres 0.14 (sf / 43,560)

200 scale Base Map # 209NW05 Tax Map # HN22 Special Protection Area _ Not within an SPA _

Property Tax Account Number(s) associated with the plan *(8 digits)*

A. 551018 B. _____ C. _____ D. _____ E. _____
F. _____ G. _____ H. _____ I. _____ J. _____

Location: *(Complete either A or B)*

A. On Norfolk Avenue / Cheltenham Drive *(Street Name)*, _____ feet W *(N,S,E,W etc.)* of Wisconsin Avenue (MD 355) *(Nearest Intersecting Street)*

B. N *(N,S,E,W etc.)* quadrant, intersection of _____ *(Street Name)* and _____ *(Street Name)*

Subdivision Information: *(Complete either C, if located within a recorded subdivision, or D)*

C. Lot _____ Block _____ Subdivision _____

D. Parcel _____ Liber _____ Folio _____; Parcel _____ Liber _____ Folio _____; Parcel _____ Liber _____ Folio _____

Description of Project:

The purpose of this project is to provide separated bike lanes and concrete buffers along Norfolk Avenue / Cheltenham Drive from Woodmont Avenue to Tilbury Street.

Primary Contact *(Person who will be the primary contact and point person for future electronic review process.)*

Stantec		Lori Adgate	
Company Name		*Contact Person*	
810 Gleneagles Court, Suite 300			
Street Address			
Baltimore		MD	21286
City		*State*	*Zip Code*
(443) 632-3043		lori.adgate@stantec.com	
Telephone Number	*Fax Number*	*E-mail*	

NOTE: This email will be used to create the ePlans project account.

Applicant ☑ Agency/Department Head or ☐ Agency/Department Representative

Would you like to receive ePlans notifications? * ☐ Yes ☑ No

Montgomery County Department of Transportation	Joe Moges	
Submitting Agency or Department	*Contact Person*	
100 Edison Park Drive, 4th Floor		
Street Address		
Gaithersburg	MD	20878
City	*State*	*Zip Code*
(240) 777-7220	joseph.moges@montgomerycountymd.gov	
Telephone Number *Fax Number*	*E-mail* *required if checked yes	

Engineer/Plan Preparer

Would you like to receive ePlans notifications? * ☑ Yes ☐ No

Stantec	Lori Adgate	
Name	*Contact Person*	
810 Gleneagles Court, Suite 300		
Street Address		
Baltimore	MD	21286
City	*State*	*Zip Code*
(443) 632-3043	lori.adgate@stantec.com	
Telephone Number *Fax Number*	*E-mail* *required if checked yes	

Other Contact Person (if applicable)

Would you like to receive ePlans notifications? * ☑ Yes ☐ No

Montgomery County Department of Transportation	Matt Johnson	
Name	*Contact Person*	
100 Edison Park Drive, 4th Floor		
Street Address		
Gaithersburg	MD	20878
City	*State*	*Zip Code*
(240) 777-7237	matt.johnson@montgomerycountymd.gov	
Telephone Number *Fax Number*	*E-mail* *required if checked yes	

Signature of Applicant

Joseph Moges

Signature

9/25/2025

Date

Joseph Moges

Name (Type or Print)

Narrative

The purpose of this project is to provide 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. 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. The project also includes storm drain improvements and landscaping where impacts to these existing features occur. Pedestrian lighting is being evaluated for the project, and new lighting will be proposed where dark spots exist.

The Cheltenham Drive Bikeway project is located within the congested, urban area of Bethesda, Maryland. The intersection with Wisconsin Avenue (MD 355) is located within the project limits. The surrounding area is comprised of businesses, parking garages, and residential apartments/condos and neighborhoods. There are high pedestrian and bicycle volumes within the project and surrounding areas. The proposed improvements aim to enhance bicyclist safety and provide connectivity to existing and future bikeways located within the Bethesda area.

The proposed improvements provide for bicycle facilities and pedestrians as recommended in the Bethesda Downtown Master Plan. ADA compliant sidewalk ramps and crosswalks will also be provided.

The proposed typical sections are in compliance with County standards.

The project does not affect any historic properties or resources.

This is a County-funded roadway project. CIP number 500119.

The Cheltenham Drive Bikeway project does not propose any impacts to park property.

Circulation Map

This item is not being submitted since the Cheltenham Drive Bikeway is a bicycle and pedestrian safety project.

Special Protection Area Map / Water Quality Plan

This item is not being submitted since the Cheltenham Drive Bikeway is not located within a Special Protection Area.

Montgomery Planning
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

2425 Reedie Drive
Floor 13
Wheaton, MD 20902

MontgomeryPlanning.org

January 27, 2025

Eric Willis
100 Edison Park Drive, 4th Floor
Gaithersburg, Maryland 20878

Re: Forest Conservation Exemption: 42025104E Cheltenham Drive Bikeway
Property Name: Cheltenham Drive Bikeway

Dear Mr. Willis,

Based on the review by staff of the Montgomery County Planning Department, the exemption request submitted on December 13, 2024, for the plan identified above is **confirmed**. The project is exempt from Article II of the Montgomery County Code, Chapter 22A (Forest Conservation Law), under Section 22A-9 as a County and Municipal Highway Project per the following:

(a) General.

(1) This Section applies to construction of a highway by the County or a municipality as part of an approved Capital Improvements Program project.

(2) The construction should minimize forest removal, land disturbance, and loss of significant, specimen, or champion trees to the extent possible while balancing other design, construction, and environmental standards. The constructing agency must make a reasonable effort to minimize land disturbance to avoid the cutting or clearing of trees and other woody plants.

(b) If the forest to be cut or cleared for a County highway project equals or exceeds 20,000 square feet, the constructing agency must reforest a suitable area at the rate of one acre of protected reforestation for each acre of forest cleared.

(c) Reforestation for County highway projects must meet the standards in subsections 22A-12(e), (g) and (h).

(d) Any mitigation requirement for loss of significant, specimen, or champion trees must be based on the size and character of the tree.

cc: Kathleen Dahill (Stantec)

Montgomery Planning
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

2425 Reedie Drive
Floor 13
Wheaton, MD 20902

MontgomeryPlanning.org

A pre-construction meeting is required after the limits of disturbance have been staked prior to clearing and grading to verify the limits of disturbance and tree protection measures are in place per the accompanying Tree Save Plan. The M-NCPPC forest conservation inspection staff may require additional tree protection measures.

Please contact Stephen Peck at 240-638-6681 or at stephen.peck@montgomeryplanning.org at least 7 days in advance to schedule your pre-construction meeting. The site supervisor, construction superintendent, forest conservation inspector, a private Maryland licensed tree expert, and the Montgomery County Department of Permitting Services sediment control inspector shall attend this pre-construction meeting.

Any changes from the approved exemption request may constitute grounds to rescind or amend any approval actions taken and to take appropriate enforcement actions. If there are any subsequent modifications planned to the approved plan, a new application must be submitted to M-NCPPC for review and confirmation prior to those activities occurring.

If you have any questions regarding these actions, please feel free to contact me at (301) 495-4509 or Ariel.Zelaya@montgomeryplanning.org.

Sincerely,

Ariel Zelaya

Ariel Zelaya
Planner II
DownCounty Planning Division
Montgomery County Planning Department

cc: Kathleen Dahill (Stantec)

DEPARTMENT OF PERMITTING SERVICES

Marc Elrich
County Executive

Rabbiah Sabbakhan
Director

January 14, 2025

Stantec
Ms. Susan Handley
810 Gleneagles Court, STE 300
Baltimore, MD 21286

Re: **COMBINED STORMWATER MANAGEMENT CONCEPT/*SITE DEVELOPMENT STORMWATER MANAGEMENT PLAN*** for
Cheltenham Drive Bikeway
Preliminary Plan #:NA
SM File #: 296627
Tract Size/Zone: 0.14 ac
Total Concept Area: 0.14ac
Lots/Block: NA
Parcel(s): NA
Watershed: Rock Creek/I
Redevelopment (Yes/No): No

Dear Ms. Handley:

Based on a review by the Department of Permitting Services Review Staff, the stormwater management concept for the above-mentioned site is **acceptable**. The plan proposes to meet required stormwater management goals via the use of a full waiver due to limited available space and utility conflicts.

The following items will need to be addressed during the detailed sediment control/stormwater management plan stage:

1. An engineered sediment control plan must be submitted for this project.

This list may not be all-inclusive and may change based on available information at the time.

Payment of a stormwater management contribution in accordance with Section 2 of the Stormwater Management Regulation 4-90 **is not required** for the Department of Transportation.

This letter must appear on the sediment control/stormwater management plan at its initial submittal. The concept approval is based on all stormwater management structures being located outside of the Public Utility Easement, the Public Improvement Easement, and the Public Right of Way unless specifically approved on the concept plan. Any divergence from the information provided to this office; or additional information received during the development process; or a change in an applicable Executive Regulation may constitute grounds to rescind or amend any approval actions taken, and to reevaluate the site for additional or amended stormwater management requirements. If there are subsequent additions or modifications to the development, a separate concept request shall be required.

If you have any questions regarding these actions, please feel free to contact Joel Karpas at 240-777-6206.

Sincerely,

Mark Etheridge

Mark Etheridge, Manager
Water Resources Section
Division of Land Development Services

cc: Neil Braunstein
SM File # 296627

ESD: Required/Provided 903 cf / 0 cf
PE: Target/Achieved: 2.0"/0"
STRUCTURAL: 0 cf
WAIVED: 903 cf.

Statement of Compliance

In accordance with Montgomery County's Noise Ordinance, Section 31B-10(a)(3), the proposed improvements are subject to federal and state noise regulations. The proposed Cheltenham Drive Bikeway project does not meet the definition of a Type I or Type II project as defined in the Code of Federal Regulations (23 CRD 772), Procedures for Abatement of Highway Traffic Noise and Construction Noise and MDOT SHA's Noise Policy and therefore, the project does not warrant consideration of the evaluation of noise effects and noise abatement opportunities.

Architectural Drawing

This item is not being submitted since the Cheltenham Drive Bikeway is a bicycle and pedestrian safety project.

Cheltenham Drive Bikeway

Traffic Impact Study

Prepared for:
MCDOT

Prepared by:
Robert Brander

June 26, 2025

Project/File:
2026213133



Stantec Consulting Services Inc.

Cheltenham Drive Bikeway TIS

Revision Schedule

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date

Disclaimer

The conclusions in the Report titled Cheltenham Drive Bikeway TIS are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from MCDOT (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

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Prepared by: Robert Brander

Reviewed by: Robert J Milstead

Robert Milstead

Approved by: Lori Adgate

Lori Adgate

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Executive Summary

This Report provides a summary of the traffic analysis to support the construction of separated bike lanes along Cheltenham Drive and Norfolk Avenue between Tilbury Street and Woodmont Avenue, including the intersection with MD 355 (Wisconsin Avenue). This project will connect to the existing two-way cycle track on Woodmont Avenue to the south of Norfolk Avenue and is a continuation of the County's effort to expand the bikeway network within the Bethesda area. Two (2) alternatives were analyzed to recommend a configuration for the proposed separated bike lanes, and are as follows:

- Alternative 1 reconfigures the roadway cross-section to provide separated bike lanes (with concrete buffers). This alternative eliminates the Norfolk Avenue on-street parking in the westbound direction between MD 355 (Wisconsin Avenue) and Woodmont Avenue, as well as the Cheltenham Drive on-street parking in the eastbound direction between MD 355 (Wisconsin Avenue) and the Cheltenham Public Parking Garage. The Norfolk Avenue on-street parking (eastbound direction) from Woodmont Avenue to MD 355 (Wisconsin Avenue) was retained. This alternative has concurrent phasing for the Cheltenham Drive / Norfolk Avenue approaches to the intersection at MD 355 (Wisconsin Avenue)
- Alternative 2 has the same lane configuration as Alternative 1, except that the signal phasing for the MD 355 (Wisconsin Avenue)/ Cheltenham Drive / Norfolk Avenue was revised to be split phasing for the minor roadway approaches (meaning one approach goes then the other). Split phasing removes the left turn conflict with opposing through movements and pedestrians.

Alternative 1 does have the better operational performance at the MD 355 (Wisconsin Avenue) / Cheltenham Drive / Norfolk Avenue intersection as Alternative 1's Level-of-Service in the AM, PM and Saturday peak hours is B, C and B, respectively, and Alternative 2 will have Level-of-Service C for all three time periods. However Alternative 1 has safety disadvantages that Alternative 2 eliminates – the left turn conflict and misaligned eastbound approach at MD 355 (Wisconsin Avenue). With the safety benefits of split phasing at the MD 355 (Wisconsin Avenue) / Cheltenham Drive / Norfolk Avenue intersection, Stantec recommends that Alternative 2 be carried forward into the design process.

Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
APS	Accessible Pedestrian Signals
CPS	Countdown Pedestrian signals
HCM	Highway Capacity Manual
LOS	Level-of-Service
MCDOT	Montgomery County Department of Transportation
MD SHA	Maryland Department of Transportation State Highway Administration
NEMA	National Electrical Manufacturers Association
RRFB	Rectangular Rapid Flashing Beacon
TIA	Traffic Impact Analysis
TIS	Traffic Impact Study

1 Introduction

This Report provides a summary of the traffic analysis to support the construction of separated bike lanes along Cheltenham Drive and Norfolk Avenue between Tilbury Street and Woodmont Avenue, including the intersection with MD 355 (Wisconsin Avenue). This project will connect to the existing two-way cycle track on Woodmont Avenue to the south of Norfolk Avenue and is a continuation of the County's effort to expand the bikeway network within the Bethesda area.

The project elements include:

- Separated bike lanes between Tilbury Street and Woodmont Avenue.
- Removal of on-street parking on eastbound Cheltenham Drive and westbound Norfolk Avenue to accommodate the separated bike lanes. The project will retain the existing on-street parking along eastbound Norfolk Avenue.
- Connect to the existing two-way cycle track along Woodmont Avenue at its northern terminus at Norfolk Avenue.

The traffic analysis presented in this report examined the 2025 Existing Conditions, the 2030 No-Build Conditions and two (2) alternatives for 2030 Build Conditions. The description of the two (2) alternatives are as follows:

- Alternative 1 reconfigures the roadway cross-section to provide separated bike lanes (with concrete buffers). This alternative eliminates the Norfolk Avenue on-street parking in the westbound direction between MD 355 (Wisconsin Avenue) and Woodmont Avenue, as well as the Cheltenham Drive on-street parking in the eastbound direction between MD 355 (Wisconsin Avenue) and the Cheltenham Public Parking Garage. The Norfolk Avenue on-street parking (eastbound direction) from Woodmont Avenue to MD 355 (Wisconsin Avenue) was retained. This alternative has concurrent phasing for the Cheltenham Drive / Norfolk Avenue approaches to the intersection at MD 355 (Wisconsin Avenue)

- Alternative 2 has the same lane configuration as Alternative 1, except that the signal phasing for the MD 355 (Wisconsin Avenue)/ Cheltenham Drive / Norfolk Avenue was revised to be split phasing for the minor roadway approaches (meaning one approach goes then the other). Split phasing removes the left turn conflict with opposing through movements and pedestrians.

This report analyzed five (5) key intersections in the study area (Refer to **Figure 1: Project Intersections**), they are as follows (listed with their traffic control device):

1. Norfolk Avenue / Woodmont Avenue – signalized
2. Cheltenham Drive / Norfolk Avenue / MD 355 (Wisconsin Avenue) – signalized
3. Cheltenham Drive / Tilbury Street – roundabout
4. MD 355 (Wisconsin Avenue) / Middelton Lane – signalized
5. Woodmont Avenue / MD 187 (Old Georgetown Road) – signalized

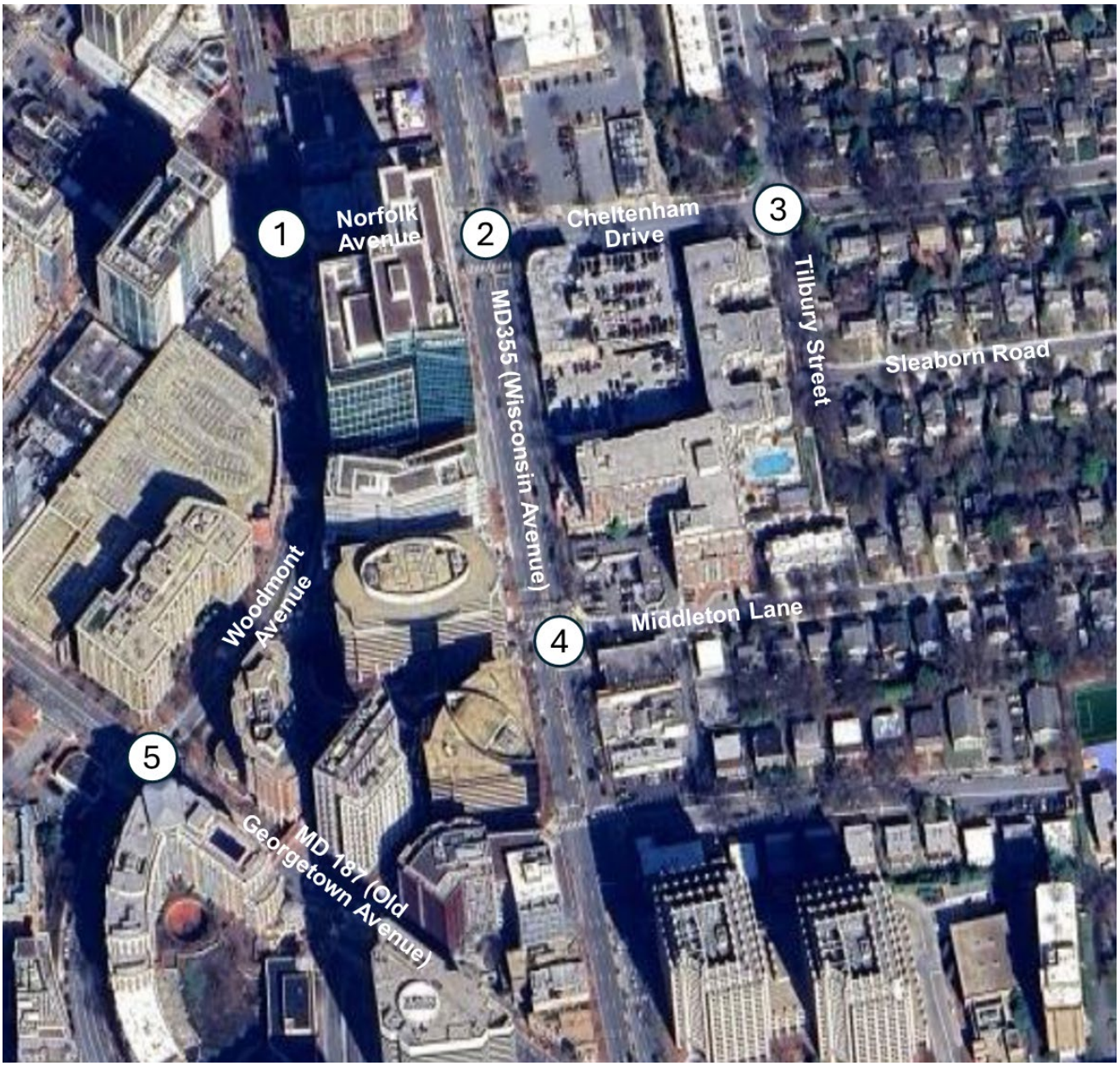


Figure 1: Project Intersections

2 Existing Conditions

This section presents the existing roadway geometry, traffic data and the existing conditions traffic operational analysis.

2.1 Project Area and Roadways Configuration

The project area consists of residential (single family homes and multi-family apartments), retail stores, restaurants, offices and salons.

Cheltenham Drive between MD 355 (Wisconsin Avenue) and Tilbury Street is a two-lane roadway; east of Tilbury Street, Cheltenham Drive is one-way westbound. This roadway is classified as a Downtown Street by Montgomery County Department of Transportation (MCDOT). Currently there is no on-street parking (existing meters have been bagged, restricting parking) between MD 355 (Wisconsin Avenue) and Tilbury Street. There is a public parking garage (paid by the hour) located on this block. Cheltenham Drive is signalized at its intersections with MD 355 (Wisconsin Avenue) and Norfolk Avenue. There is a roundabout with its intersection at Tilbury Street. For the Cheltenham/MD 355 (Wisconsin Avenue)/Norfolk intersection, there are marked crosswalks on all four (4) approaches with accessible pedestrian signals (APS) and countdown pedestrian signals (CPS).

Norfolk Avenue is a two-lane roadway with on-street parking on both sides. This roadway is classified as a Downtown Street by MCDOT. It is signaled at its intersections with MD 355 (Wisconsin Avenue) and Woodmont Avenue. For the Norfolk/Woodmont intersection, there are marked crosswalks on all four (4) approaches with APS and CPS.

MD 355 (Wisconsin Avenue) is a north-south six-lane roadway and is classified as an Urban Principal Arterial (other) by Maryland State Highway Administration (MD SHA) and a Downtown Boulevard by MCDOT. MD 355 (Wisconsin Avenue) connects Washington DC to points north, including Rockville, Gaithersburg and Frederick Maryland. This corridor has both signalized and unsignalized intersections as well as midblock marked pedestrian crossings controlled by rectangular rapid flashing beacons (RRFB).

Woodmont Avenue is generally a two-lane roadway with on-street parking. At key intersections along this roadway, there are turn bays. South of MD 187 (Old Georgetown Road), the roadway is one-way southbound and has four (4) travel lanes. Woodmont Avenue is classified as an Urban Major Collector by MD SHA and a Downtown Street by MCDOT. There is a two-way cycle track along the west side of the roadway to the south of Norfolk Avenue. This corridor has both signalized and unsignalized intersections.

MD 187 (Old Georgetown Road) is classified as an Urban Principal Arterial (other) by MD SHA and a Downtown Boulevard by MCDOT. To the east of Woodmont Avenue, MD 187 (Old Georgetown Road) has three westbound travel lanes. To the west of Woodmont Avenue, MD 187 (Old Georgetown Road) has a five-lane cross-section with two (2) westbound and three (3) eastbound travel lanes. All eastbound traffic

must turn left or right onto Woodmont Avenue at the signalized intersection. Marked crosswalks exist on all four (4) approaches with APS and CPS.

Tilbury Street is a two-lane roadway north of Cheltenham Drive and a single lane northbound south of Cheltenham Drive. Tilbury Street is classified as a Neighborhood Connector. There is a roundabout at the intersection of Tilbury Street and Cheltenham Drive.

Middelton Lane is a two-lane roadway that is classified as a Downtown Street by MCDOT. Middelton Lane is signalized at the intersection with MD 355 (Wisconsin Avenue). There are marked crosswalks on the north and east legs of the intersection with APS and CPS.

A field visit was conducted on May 20th to observe traffic patterns and validate signal operations. Several key observations are as follows:

- The eastbound direction of Norfolk Avenue approaching the MD 355 (Wisconsin Avenue) intersection includes a parking lane. The field team observed that when vehicles were not parked in the parking spaces nearest to MD 355 (Wisconsin Avenue), through and right turning vehicles would use those parking spaces to form a second lane at the intersection. These vehicles completed this maneuver so they would not be delayed by left turning vehicles that were waiting for a gap in opposing thru traffic or for pedestrians to clear the sidewalk.
- Both directions of Norfolk Avenue approaching the Woodmont Avenue intersection includes a parking lane. Whenever vehicles were not parked in the parking lane nearest to the intersection, right turning vehicles would form a separate right turn lane. Also, occasionally a vehicle would park briefly in the area signed for NO STOPPING close to the intersection.

The existing lane configuration is presented in **Figure 2: Existing Lane Configuration**.

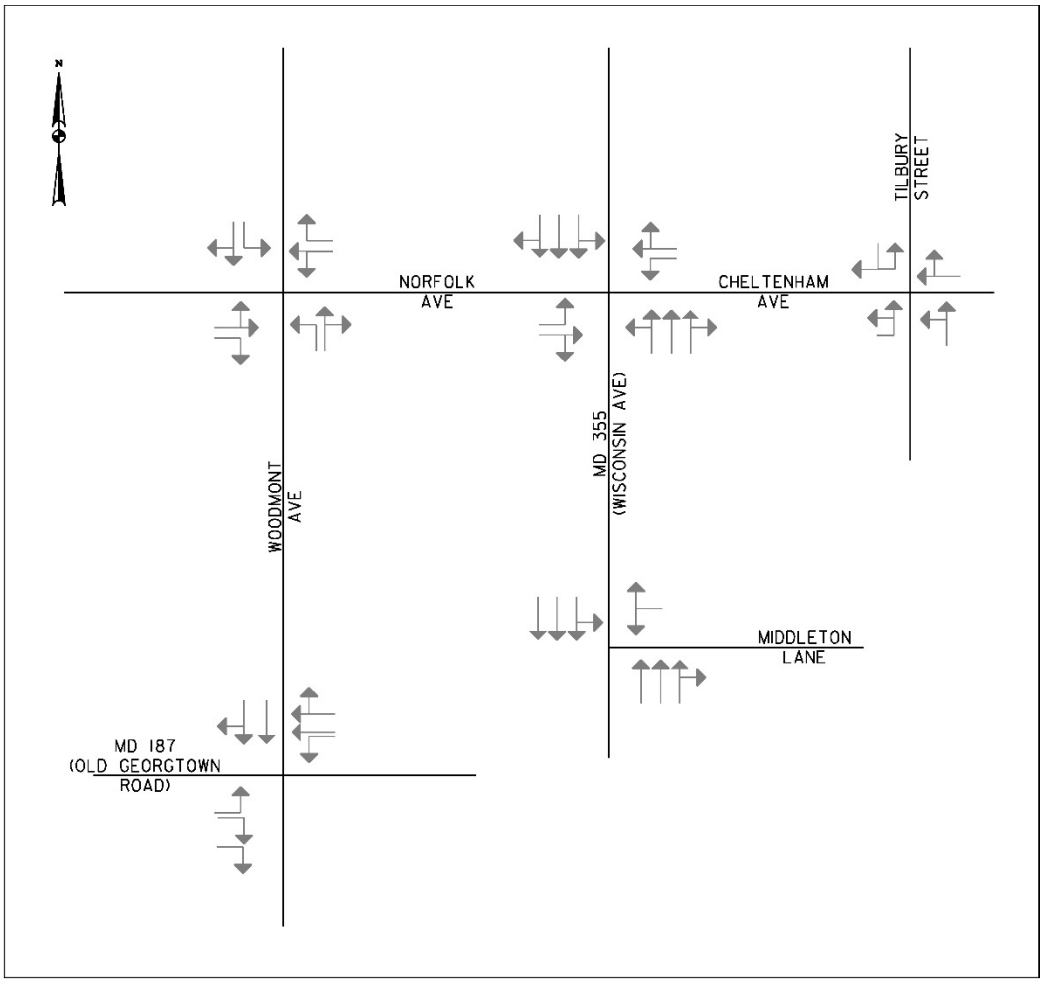


Figure 2: Existing Lane Configuration

2.2 Traffic Counts

Traffic counts for the five (5) study intersections were completed on Thursday May 15th (a typical weekday while schools were in session) from 6:00 to 10:00 AM and 3:00 to 7:00PM, as well as Saturday May 17th from 11:00AM to 3:00PM. The team coordinated the days to complete the counts by monitoring the weather to select days that would be sunny/partly cloudy and dry, so that pedestrians and cyclists were more likely to be out. The intersection turning movement counts included cars, buses, trucks, pedestrians and cyclists. Given that the study intersections are in close proximity to each other, a common peak hour was utilized for the study area rather than individual intersection peak hour. The 2025 Existing Conditions AM, PM and Saturday peak hour volumes were developed. (Refer to **Figure 3: Existing Conditions (2025) AM, PM and Saturday Peak Hour Volumes**) (Refer to **Appendix A Traffic Counts** for the intersection counts).

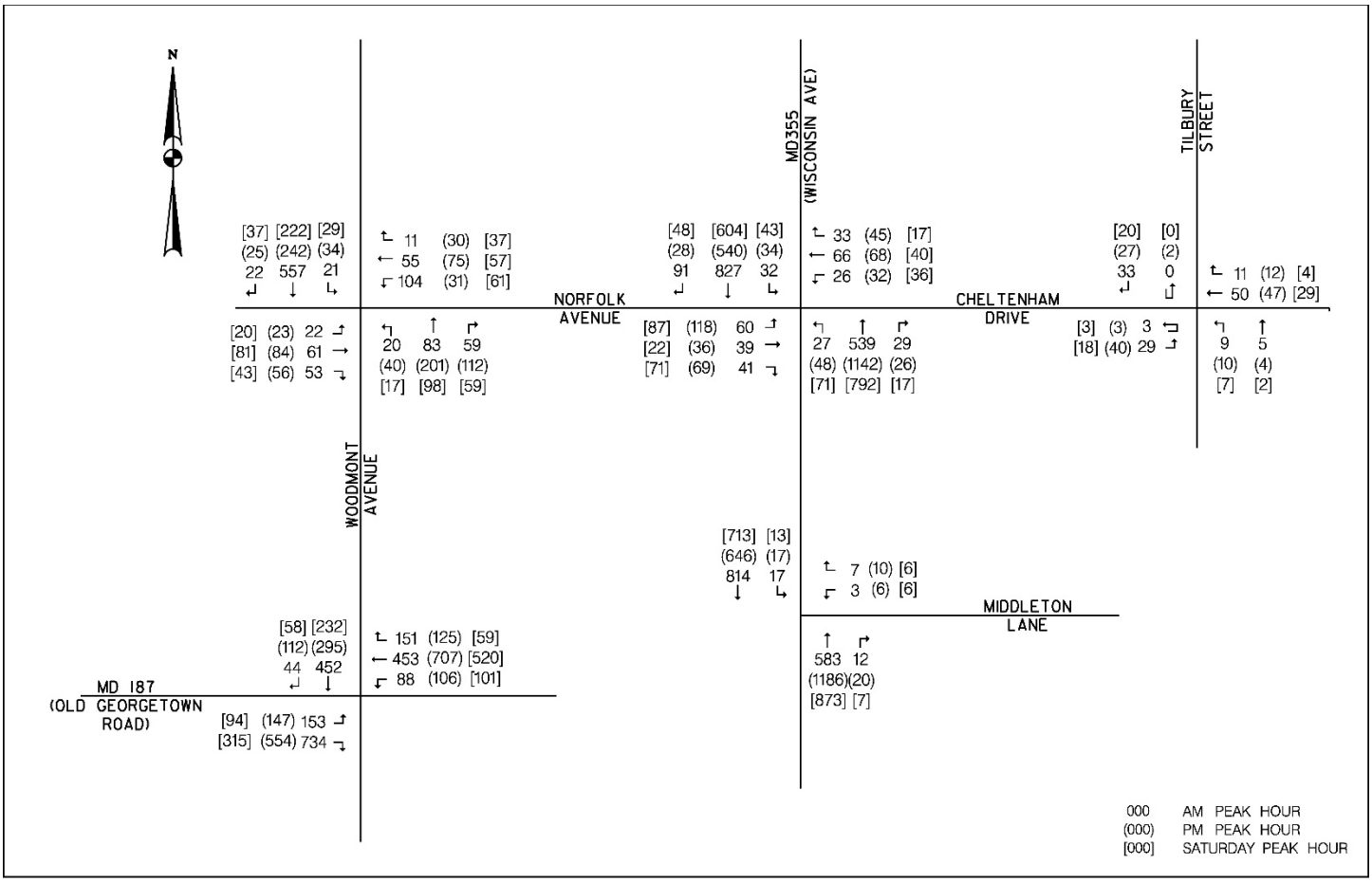


Figure 3: Existing Conditions (2025) AM, PM and Saturday Peak Hour Volumes

2.3 Traffic Analysis

Synchro (version 12) was utilized to evaluate the study signalized intersections for the AM, PM, and Saturday Peak Hour. MCDOT provided the existing timings for the four (4) signalized intersections. Synchro follows the Highway Capacity Manual (HCM) methodology, and the following measures of effectiveness were extracted from the outputs:

- Lane group delay and Level-of-Service (LOS)
- Movement 95th percentile queue length
- Approach delay and LOS
- Overall intersection LOS

For the four (4) signalized intersections, the HCM 2000 reports were utilized, as newer HCM methodology requires that the intersections have typical National Electrical Manufacturers Association (NEMA) phasing, which several intersections do not. The HCM 7th Edition Roundabout report was utilized for the roundabout at Tilbury Street and Cheltenham Drive. The delay, LOS and queues were summarized. (Refer to **Table 1:**

2025 Existing Conditions Delay and LOS) (Refer to **Appendix B Traffic Analysis Outputs** What is the name of Appendix B).

Findings from the Existing Conditions analysis include:

- All five (5) study intersections operate at LOS D or better in the AM, PM, and Saturday peaks, respectively.
- Several approaches operate at LOS E which are all on the minor approaches to these intersections. As the study area is within the Bethesda Central Business District policy area, these are still acceptable LOS.
- All 95th percentile queues at all locations remain within the provided storage, including the short block of Norfolk Avenue between the intersections at Woodmont Avenue and MD 355 (Wisconsin Avenue). The westbound Norfolk Avenue queue at Woodmont Avenue and the eastbound Norfolk Avenue queue at MD 355 (Wisconsin Avenue) remained within storage.

Table 1: 2025 Existing Conditions Delay and LOS

	Existing Conditions					
	AM		PM		Sat	
Approach	Delay	LOS	Delay	LOS	Delay	LOS
Woodmont & Norfolk						
EB	21.3	C	55.0	D	32.4	C
WB	35.0	C	52.9	D	40.4	D
NB	10.1	B	4.4	A	4.3	A
SB	8.3	A	3.7	A	4.3	A
OVERALL	**14.5**	**B**	**19.8**	**B**	**17.0**	**B**
MD 355 & Norfolk / Cheltenham						
EB	46.4	D	70.0	E	53.3	D
WB	53.9	D	45.9	D	48.2	D
NB	2.8	A	5.2	A	3.5	A
SB	3.2	A	4.8	A	3.7	A
OVERALL	**9.9**	**A**	**14.4**	**B**	**10.7**	**B**
Tilbury & Cheltenham						
EB	2.9	A	2.9	A	2.7	A
WB	3.2	A	3.2	A	3.0	A
NB	2.8	A	2.8	A	2.7	A
SB	3.1	A	3.1	A	2.9	A
OVERALL	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**
Middleton & MD 355						
WB	63.2	E	59.6	E	59.7	E
NB	0.6	A	1.0	A	0.8	A
SB	1.0	A	0.6	A	0.6	A
OVERALL	**1.3**	**A**	**1.4**	**A**	**1.2**	**A**
Woodmont & MD 187						
EB	8.5	A	7.2	A	4.0	A
WB	47.1	D	41.4	D	47.2	D
SB	55.9	E	56.6	E	53.5	D
OVERALL	**32.7**	**C**	**32.7**	**C**	**35.7**	**D**

3 Horizon Year Volumes

The study horizon year was selected as 2030.Traffic volumes were projected from 2025 to 2030 (the horizon year) in a two-step process:

- Trip generation was also included for the planned developments within a mile of the MD 355 (Wisconsin Avenue) / Cheltenham / Norfolk intersection. These trips were distributed onto the study intersections.
- Existing traffic volumes were increased at a rate of 0.5 percent per year to account for regional traffic growth passing through the Bethesda area.

3.1 Adjacent Developments

Approved developments within the Bethesda area will increase traffic volumes along the roadway at the study intersection. Listed below are descriptions of the adjacent developments, including the development ID, which are located within a mile radius of the study intersection. The developments' information was downloaded from Montgomery County's portal for pending and recent project approvals including traffic impact analysis (TIA) reports with trip generation tabulation. The trips were distributed onto the roadway network of study intersections. The list of nearby development projects include:

1. **Clark Building (81980028A)** is located at 7500 Old Georgetown Road. It is a plan amendment to add an additional 2,875 sf ft of office and 764 sq ft of retail space.
2. **Primrose Bethesda (81981081A)** is located at 8101 Glenbrook Road. It consists of the conversion of approximately 13,000 sq ft of office space to a 231-student daycare facility.
3. **Bright Horizons - 2 BMC (81989060D)** is located to the southwest of the Wisconsin Avenue and Old Georgetown Road intersection. It consists of the conversion of approximately 9,000 sq ft of office space to a 120-student daycare facility.
4. **8240 Wisconsin (820180230)**, located along Wisconsin Avenue, will demolish the existing 12-pump gas station and replace with approximately 30,000 sq ft of retail and 81,000 sq ft of office space.
5. **7900 Wisconsin (82013017A)**, located along Wisconsin Avenue, consists of 322 dwelling units and 21,600 sq ft of retail
6. **St Elmo Apartments (82017003A)** is located at 4924 St. Elmo Avenue. The project will remove 13,350 sq ft of office and 9,100 sq ft of retail space, then construct 280 dwelling units and 6,350 sq ft of retail space.
7. **The Claiborne (82017008A, B, C; 820220190)** is located at 4820 Auburn Avenue. It consists of 84 dwelling units and approximately 5,100 sq ft of retail.
8. **7359 Wisconsin (820180040 & 820180040A)**, located along Wisconsin Avenue, will construct a hotel with 225 rooms and approximately 17,000 sq ft of retail space.

9. **4824 Edgemoor (820210040)**, located along Edgemoor Lane, will demolish approximately 3,000 sq ft of retail space to construct 112 dwelling units.
10. **7749 Old Georgetown (120240070 & (820240090**), located along Old Georgetown Road, will demolish approximately 18,800 sq ft of retail and 4,300 sq ft of office space to construct 270 dwelling units with 6,000 sq ft of retail space.
11. **4702 West Virginia (120240110, 820200100, 820240140)** is located along West Virginia Avenue. This project will demolish an existing detached home to construct 68 dwelling units.
12. **8000 Wisconsin (820190040)**, located along Wisconsin Avenue, will demolish the existing 30,500 sq ft of retail space to construct 441 dwelling units and approximately19,500 sq ft of new retail space.
13. **820210070** is located in the 4700 block of Hampden Lane and Montgomery Lane. It will demolish approximately 96,000 sq ft of general office and 13,900 sq ft of retail space to construct approximately 350,000 sq ft of general office space and 150 dwelling units.
14. **4526 and 4530 Avondale (820210140)** is located at 4526 and 4530 Avondale Street. The project will demolish the existing 8 dwelling units to construct a new building with 60 dwelling units.
15. **820220060** is located at 4725 Cheltenham Drive. This project demolished the existing 5,000 sq ft of an auto service center and will construct 110 dwelling units.
16. **820220160** is located at 4901 Battery Lane. The project will demolish the existing apartment building (approximately 50 dwelling units) and construct a new residential building with 372 dwelling units.
17. **820230010** is located at 7340 Wisconsin Avenue. It will demolish the existing 12-pump gas station and replace it with 308 high-rise dwelling units and commercial space (note that the TIA did not quantify amount of commercial space, it utilized ITE land use code 232 to generate trips).
18. **LOT 25** (820250030) is located at 4700 Maple Avenue. The project will construct 235 dwelling units on an existing surface lot. Note that the TIA did not deduct trips for the existing lot.
19. **820220230** is located at 4890 & 4900 Battery Lane. This development will demolish the existing 315 dwelling units and replace with 315 dwelling units. As the number of existing and proposed dwelling units are the same, the TIA did not conduct any analysis.

3.2 Study Area 2030 Volumes

The 2030 volumes were developed by layering on the adjacent developments' site traffic and the regional growth onto the study intersections. The 2030 AM, PM and Saturday peak hour volumes were developed (Refer to **Figure 4: 2030 Conditions AM, PM and Saturday Peak Hour Volumes**).

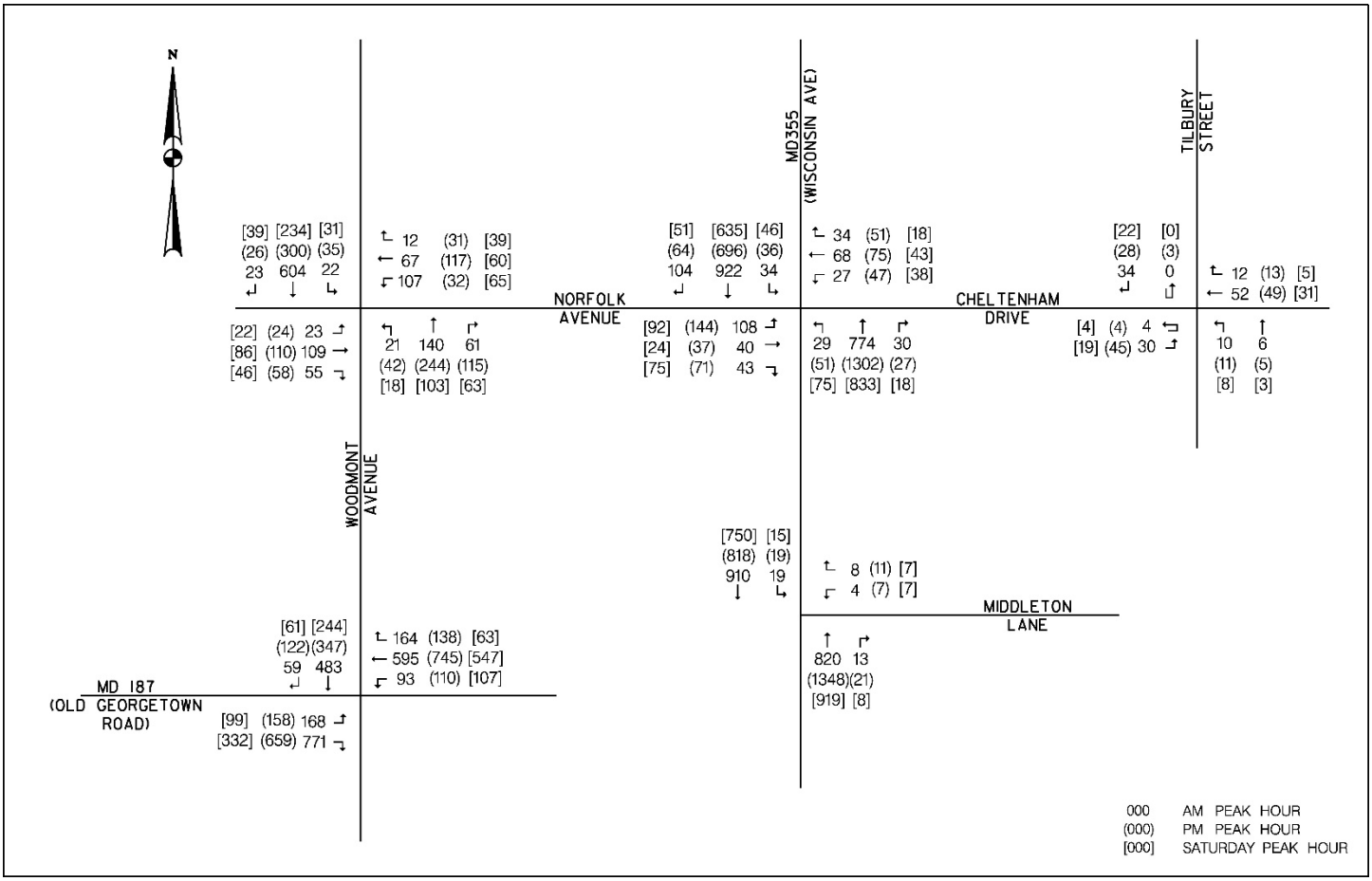


Figure 4: 2030 Conditions AM, PM and Saturday Peak Hour Volumes

4 Future Traffic Conditions

This chapter presents the traffic analysis for the 2030 No-Build Conditions and the two (2) Build Alternatives. As the proposed alternatives did not restrict any turn movements, the volumes as presented in **Figure 4: 2030 Conditions AM and PM Peak Hour Volumes** were used for all 2030 analyses.

4.1 2030 No-Build Conditions

The 2030 volumes (see prior chapter) were inputted into the Existing Conditions Synchro models to develop the 2030 No-Build Conditions Synchro model. The No-Build Conditions analysis assumes the same roadway geometry as the Existing Conditions. The delay, LOS and queues were summarized. Refer to **Table 2: Existing and No-Build Conditions Delay and LOS** for a comparison of the delay and LOS by approach and overall between the Existing and No-Build Conditions (Refer to **Appendix B Traffic Analysis Outputs**).

Findings from the 2030 No-Build Conditions analysis include:

- All five study intersections are expected to continue to operate at Level of Service (LOS) D or better in the AM, PM, and Saturday peaks, respectively.
- More approaches are expected to operate at LOS E; in all cases it is the minor approaches at these intersections. It is noted that those approaches that were LOS D and now expected to be LOS E, were just below the LOS D-E threshold of 55.0 seconds per vehicle.
- All 95th percentile queues at all locations are expected to remain within the provided storage, consistent with the Existing Conditions.
- Signal optimization was not completed as the approaches and the overall LOS were acceptable for all study intersections. Any signal optimization would reduce minor street delay but increase major street delay.

Table 2: Existing and No-Build Conditions Delay and LOS

	Existing Conditions						2030 No Build					
	AM		PM		Sat		AM		PM		Sat	
Approach	delay	LOS	delay	LOS	delay	LOS	delay	LOS	delay	LOS	delay	LOS
Woodmont & Norfolk												
EB	21.3	C	55.0	D	32.4	C	19.4	B	57.4	E	29.8	C
WB	35.0	C	52.9	D	40.4	D	26.8	C	60.7	E	33.9	C
NB	10.1	B	4.4	A	4.3	A	11.4	B	5.3	A	5.3	A
SB	8.3	A	3.7	A	4.3	A	11.2	B	4.6	A	5.3	A
OVERALL	**14.5**	**B**	**19.8**	**B**	**17.0**	**B**	**14.8**	**B**	**22.7**	**C**	**15.8**	**B**
MD355 & Norfolk / Cheltenham												
EB	46.4	D	70.0	E	53.3	D	49.9	D	73.3	E	53.4	D
WB	53.9	D	45.9	D	48.2	D	47.4	D	43.8	D	47.9	D
NB	2.8	A	5.2	A	3.5	A	4.5	A	6.9	A	3.8	A
SB	3.2	A	4.8	A	3.7	A	4.9	A	6.1	A	4.0	A
OVERALL	**9.9**	**A**	**14.4**	**B**	**10.7**	**B**	**11.1**	**B**	**15.5**	**B**	**11.0**	**B**
Tilbury & Cheltenham												
EB	2.9	A	2.9	A	2.7	A	2.9	A	3.0	A	2.8	A
WB	3.2	A	3.2	A	3.0	A	3.2	A	3.3	A	3.0	A
NB	2.8	A	2.8	A	2.7	A	2.8	A	2.9	A	2.8	A
SB	3.1	A	3.1	A	2.9	A	3.1	A	3.1	A	2.9	A
OVERALL	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**
Middleton & MD 355												
WB	63.2	E	59.6	E	59.7	E	63.2	E	59.7	E	59.7	E
NB	0.6	A	1.0	A	0.8	A	0.6	A	1.1	A	0.8	A
SB	1.0	A	0.6	A	0.6	A	0.2	A	0.7	A	0.6	A
OVERALL	**1.3**	**A**	**1.4**	**A**	**1.2**	**A**	**0.8**	**A**	**1.4**	**A**	**1.2**	**A**
Woodmont & MD 187												
EB	8.5	A	7.2	A	4.0	A	10.1	A	9.1	A	4.3	A
WB	47.1	D	41.4	D	47.2	D	44.3	D	40.5	D	46.5	D
SB	55.9	E	56.6	E	53.5	D	57.6	E	56.2	E	53.4	D
OVERALL	**32.7**	**C**	**32.7**	**C**	**35.7**	**D**	**33.6**	**C**	**32.5**	**C**	**35.4**	**D**

4.2 2030 Build Conditions

4.2.1 Alternative 1

Alternative 1 reconfigures the roadway cross-section to provide separated bike lanes (with concrete buffers) between the Norfolk/Woodmont intersection and the roundabout at Cheltenham/Tilbury. This alternative eliminates the on-street parking in the westbound direction between MD 355 (Wisconsin Avenue) and Woodmont Avenue, as well as the on-street parking in the eastbound direction between MD 355 (Wisconsin Avenue) and the Cheltenham Public Parking Garage. The eastbound on-street parking from Woodmont Avenue and MD 355 (Wisconsin Avenue) was retained. With the reconfiguration of the Norfolk block between Woodmont and MD 355 (Wisconsin Avenue), the ability for some vehicles to sneak around left turning vehicles is being eliminated. For this analysis, the existing timings were retained to gauge the impact of the geometric changes (Refer to **Figure 5: Alternative 1 Lane Configuration)**.

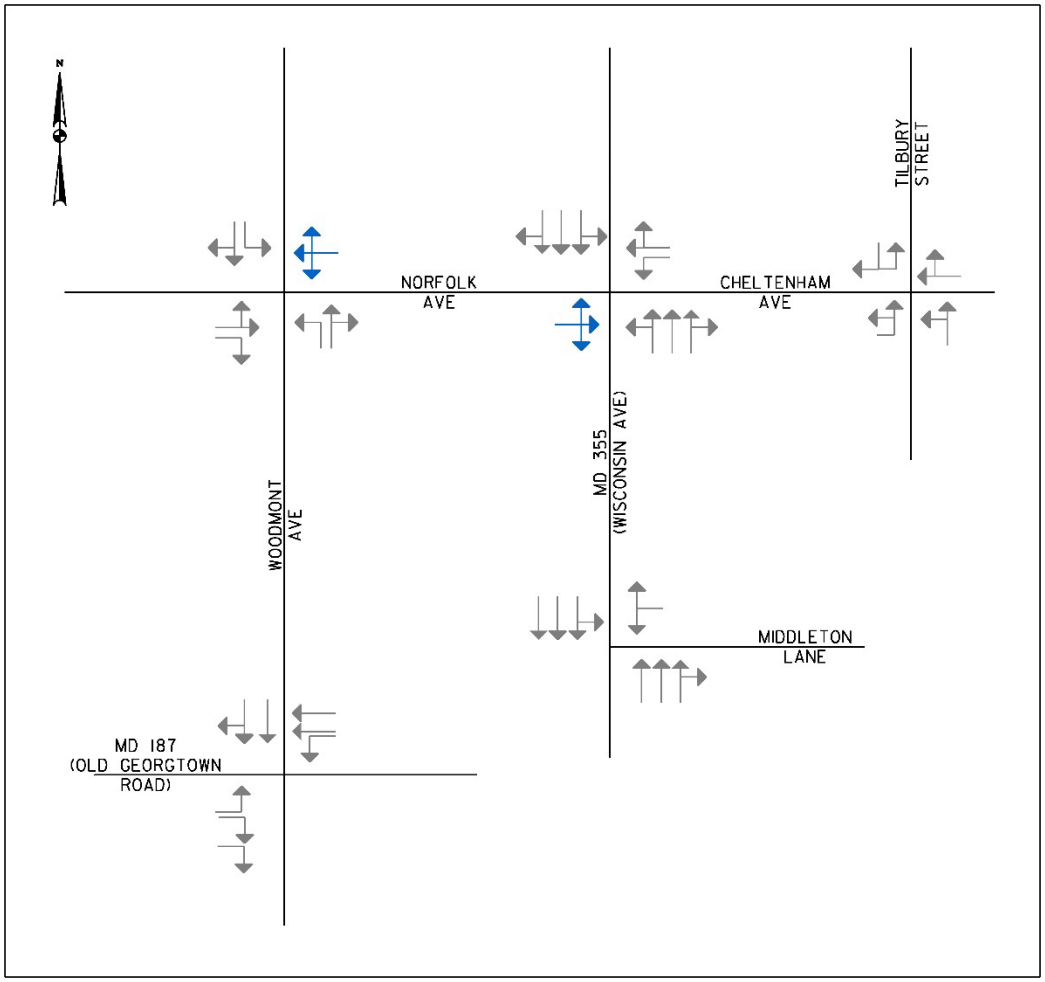


Figure 5: Alternative 1 Lane Configuration

The delay, LOS and queues were summarized for a comparison of the delay and LOS between Alternative 1 and Alternative 2 by approach and overall (Refer to **Table 3: 2030 Build Alternatives Delay and LOS** and Refer to **Appendix B Traffic Analysis Outputs**). Findings from the 2030 Alternative 1 analysis include:

- All five (5) study intersections are expected to continue to operate at LOS D or better in the AM, PM, and Saturday peaks, respectively.
- Two (2) approaches had geometric changes that impacted traffic operations:
    - The westbound Norfolk Avenue approach to Woodmont Avenue:
        - The loss of ability for the westbound right turning vehicles to sneak around through and left turning vehicles had no bearing on the approach delay.
        - In the PM peak hour, the westbound queue will extend back into the MD 355 (Wisconsin Avenue) intersection.
    - The eastbound Norfolk Avenue approach to MD 355 (Wisconsin Avenue):
        - As through and right turning vehicles no longer have ability to sneak around left turning vehicles waiting for a gap in traffic, the delay on this approach is expected to increase in all time periods. The increase is most noticeable in the PM peak hour where the delay is expected to increase from 73.3 (No-Build) to 114.3 seconds per vehicle, or from LOS E to LOS F.
        - The queue on this approach is expected to extend back to the Woodmont Avenue intersection in all three peak hours.
    - To address operational deficiencies at these two locations, a separate analysis was performed in which timing splits were optimized, key take-aways include:
        - The westbound Norfolk Avenue queue at Woodmont Avenue (PM peak hour) would not extend back into the MD 355 (Wisconsin Avenue) intersection.
        - The eastbound Norfolk Avenue approach at MD 355 (Wisconsin Avenue) would operate similar to the No-Build conditions and queues would not impact the Woodmont Avenue intersection (queues expected to remain within the block).
        - For the northbound and southbound MD 355 (Wisconsin Avenue) approaches, the LOS increased from A to B for the PM peak hour
- No operational changes were noted at the other three study intersections as compared to the No-Build Conditions.

4.2.2 Alternative 2

MD SHA has requested, during the 35 percent plans review, that split phasing be considered for the MD 355 (Wisconsin Avenue) intersection at Norfolk Avenue / Cheltenham Drive. This request is due to the shift in the eastbound through traffic across the intersection as part of the proposed design. When an eastbound vehicle is stopped at the intersection, they line up with the opposing left turn lane, rather than the receiving through lane. Converting the side-street has benefits as left turn conflicts with opposing through vehicles and pedestrians are removed. However, split phasing with pedestrians in both phases reduces the available green time for MD 355 (Wisconsin Avenue) approaches roadway (as cycle length cannot change due to

progression along MD 355 (Wisconsin Avenue)). The timing splits were optimized with the signal being converted to split phasing.

The delay, LOS and queues were summarized for a comparison of the delay and LOS between Alternative 1 and Alternative 2 by approach and overall (Refer to **Table 3: 2030 Build Alternatives Delay and LOS** and Refer to **Appendix B Traffic Analysis Outputs**).

Table 3: 2030 Build Alternatives Delay and LOS

	2030 Alternative 1						2030 Alternative 1 - Optimized						2030 Alternative 2					
	AM		PM		Sat		AM		PM		Sat		AM		PM		Sat	
Approach	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Woodmont & Norfolk																		
EB	18.9	B	46.1	D	27.0	C	18.7	B	46.8	D	26.9	C	18.5	B	46.1	D	26.4	C
WB	25.2	C	55.3	E	38.4	D	24.0	C	56.4	E	37.8	C	25.6	C	56.7	E	39.1	D
NB	11.9	B	7.6	A	6.5	A	12.6	B	5.1	A	6.5	A	12.8	B	5.3	A	6.9	A
SB	11.8	B	5.8	A	6.3	A	11.9	B	5.9	A	6.4	A	12.2	B	6.0	A	6.8	A
OVERALL	**14.8**	**B**	**21.1**	**C**	**16.8**	**B**	**14.9**	**B**	**20.4**	**C**	**16.7**	**B**	**15.3**	**B**	**20.6**	**C**	**17.1**	**B**
MD 355 & Norfolk / Cheltenham																		
EB	59.6	E	114.3	F	66.7	E	50.5	D	63.8	E	59.4	E	66.7	E	54.9	D	60.9	E
WB	42.2	D	39.0	D	42.1	D	41.0	D	35.3	D	41.3	D	54.9	D	55.5	E	56.9	E
NB	6.3	A	9.3	A	5.9	A	6.8	A	11.9	B	6.3	A	14.9	B	26.9	C	14.6	B
SB	6.9	A	8.2	A	6.0	A	7.4	A	10.2	B	6.3	A	16.4	B	22.1	C	13.6	B
OVERALL	**13.3**	**B**	**21.2**	**C**	**13.8**	**B**	**12.8**	**B**	**18.0**	**B**	**13.3**	**B**	**22.4**	**C**	**30.1**	**C**	**20.9**	**C**
Tilbury & Cheltenham																		
EB	2.9	A	3.0	A	2.8	A	2.9	A	3.0	A	2.8	A	2.9	A	3.0	A	2.8	A
WB	3.2	A	3.3	A	3.0	A	3.2	A	3.3	A	3	A	3.2	A	3.3	A	3	A
NB	2.8	A	2.9	A	2.8	A	2.8	A	2.9	A	2.8	A	2.8	A	2.9	A	2.8	A
SB	3.1	A	3.1	A	2.9	A	3.1	A	3.1	A	2.9	A	3.1	A	3.1	A	2.9	A
OVERALL	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**
Middleton & MD 355																		
WB	63.2	E	59.7	E	59.7	E	63.2	E	59.7	E	59.7	E	63.2	E	59.7	E	59.7	E
NB	0.6	A	1.1	A	0.8	A	0.6	A	1.1	A	0.8	A	0.6	A	1.1	A	0.8	A
SB	0.2	A	0.7	A	0.6	A	1.5	A	0.6	A	0.7	A	0.4	A	0.3	A	0.9	A
OVERALL	**0.8**	**A**	**1.4**	**A**	**1.2**	**A**	**1.5**	**A**	**1.4**	**A**	**1.3**	**A**	**0.9**	**A**	**1.3**	**A**	**1.3**	**A**
Woodmont & MD 187																		
EB	10.1	A	9.1	A	4.3	A	10.1	A	9.1	A	4.3	A	10.1	B	9.1	A	4.3	A
WB	44.3	D	40.5	D	46.5	D	44.3	D	40.5	D	46.5	D	44.3	D	40.5	D	46.5	D
SB	57.2	E	55.0	D	53.4	D	55.4	E	56.2	E	53.4	D	54.4	D	56.0	E	53.4	D
OVERALL	**33.5**	**C**	**32.3**	**C**	**35.4**	**D**	**33.1**	**C**	**32.5**	**C**	**35.4**	**D**	**32.9**	**C**	**32.5**	**C**	**35.4**	**D**

Findings from the 2030 Alternative 2 analysis include:

- All five (5) study intersections are expected to continue to operate at Level of Service (LOS) D or better in the AM, PM, and Saturday peaks, respectively.
- For the MD 355 (Wisconsin Avenue) intersection at Norfolk Avenue / Cheltenham Drive:
    - The overall LOS will increase from LOS B to LOS C for all time periods.
    - The eastbound Norfolk Avenue approach's queue will exceed the length of the block and extend into the intersection with Woodmont Avenue during the AM and PM peak hours. The Saturday queue will extend to, but not into, the intersection with Woodmont Avenue (note that for all 3 time periods, the 50th percentile queue will not impact the adjacent intersections). This could be remedied by further increasing green time for this approach, however, this will impact MD 355 (Wisconsin Avenue) movements and lengthen that queue which could impact the adjacent intersections to the north and south on MD 355 (Wisconsin Avenue).
    - The LOS for the northbound and southbound approaches increase from LOS A to LOS B for the AM and Saturday peak hours, and LOS C for the PM peak hour. It is noted that the queues on these approaches will not impact adjacent intersections.
    - Changes to the cycle length were not consider at this intersection, as it would impact other signals along the MD 355 (Wisconsin Avenue) corridor. To maintain progression along a major corridor, cycle lengths would need to be consistent along the corridor's signals.
- The other four (4) study intersections are expected to operate similar to No-Build Conditions and Alternative 1 (with optimized timings at Woodmont Avenue / Norfolk Avenue).

5 Summary and Recommendations

The project proposes to add separated bike lanes along Cheltenham Drive and Norfolk Avenue between Tilbury Street and Woodmont Avenue. Two (2) Build Alternatives were examined, which are as follows:

1. Alternative 1 reconfigures the roadway cross-section to provide separated bike lanes (with concrete buffers). This alternative eliminates the Norfolk Avenue on-street parking in the westbound direction between MD 355 (Wisconsin Avenue) and Woodmont Avenue, as well as the Cheltenham Drive on-street parking in the eastbound direction between MD 355 (Wisconsin Avenue) and the Cheltenham Public Parking Garage. The Norfolk Avenue on-street parking (eastbound direction) from Woodmont Avenue to MD 355 (Wisconsin Avenue) was retained. This alternative has concurrent phasing for the Cheltenham Drive / Norfolk Avenue approaches to the intersection at MD 355 (Wisconsin Avenue).

2. Alternative 2 has the same lane configuration as Alternative 1, except that the signal phasing for the MD 355 (Wisconsin Avenue)/ Cheltenham Drive / Norfolk Avenue intersection was revised to be split phasing for the minor roadway approaches (meaning one approach goes then the other). Split phasing removes the left turn conflict with opposing through movements and pedestrians.

The operational analysis indicates that generally acceptable traffic operations would occur at the study intersections (with optimized timings) for both Alternatives, except that for Alternative 2, the eastbound Norfolk Avenue 95th percentile queue at MD 355 (Wisconsin Avenue) would extend back into the intersection at Woodmont Avenue. That operational impact is due to converting the concurrent phase operations for the minor approaches to split phasing. Converting to split phasing has several safety benefits. First, split phasing eliminates the left turning conflicts with opposing through vehicles and pedestrians. Second, split phasing alleviates the misalignment on the eastbound approach. When an eastbound vehicle is stopped at the intersection, they line up with the opposing left turn lane, rather than the receiving through lane. Splitting the phase provides a safer transition across the intersection for these eastbound through vehicles.

Alternative 1 does have the better operational performance at the MD 355 (Wisconsin Avenue) / Cheltenham Drive / Norfolk Avenue intersection as Alternative 1's LOS in the AM, PM and Saturday peak hours is B, C and B, respectively, and Alternative 2 will have LOS C for all three time periods. However Alternative 1 has safety disadvantages that Alternative 2 eliminates – the left turn conflict and misaligned eastbound approach at MD 355 (Wisconsin Avenue). With the safety benefits of split phasing at the MD 355 (Wisconsin Avenue) / Cheltenham Drive / Norfolk Avenue intersection, Stantec recommends that Alternative 2 be carried forward into the design process.

Appendices

Appendix A Traffic Counts

Start Date: 5/15/2025 TOTAL VEHICLES
Start Time: 6:00:00 AM
Site Code: NORFOLK AND WOODMONT

	WOODMONT From North				NORFOLK From East				WOODMONT From South				NORFOLK From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
6:00:00 AM	0	2	25	1	0	10	5	5	0	1	4	5	0	3	8	1
6:15:00 AM	0	4	17	3	0	8	1	6	0	3	6	4	0	2	3	2
6:30:00 AM	0	4	23	2	0	8	3	2	0	1	7	8	0	1	7	1
6:45:00 AM	0	8	51	4	0	7	11	6	0	1	4	9	0	3	10	6
7:00:00 AM	1	5	56	6	0	5	8	2	0	1	7	13	0	1	17	8
7:15:00 AM	0	8	56	5	0	9	8	4	0	1	12	9	0	2	15	7
7:30:00 AM	0	6	93	7	0	24	21	3	0	0	12	14	0	4	22	5
7:45:00 AM	0	6	141	3	0	21	20	4	1	3	15	8	0	0	14	8
8:00:00 AM	0	9	127	7	0	20	10	2	0	2	8	15	0	3	8	12
8:15:00 AM	0	6	129	4	0	31	15	6	0	8	18	17	0	6	11	11
8:30:00 AM	0	8	131	9	0	21	18	0	0	1	12	10	0	3	15	11
8:45:00 AM	0	3	150	7	0	16	12	2	0	8	25	18	0	5	16	19
9:00:00 AM	0	4	147	2	0	36	10	3	0	3	28	14	0	8	19	12
9:15:00 AM	0	8	136	7	0	34	12	4	0	6	18	15	0	1	9	9
9:30:00 AM	0	4	108	4	0	41	11	5	0	2	11	12	0	3	15	11
9:45:00 AM	0	3	82	7	0	25	14	3	0	5	21	12	0	6	15	13
	1	**88**	**1472**	**78**	**0**	**316**	**179**	**57**	**1**	**46**	**208**	**183**	**0**	**51**	**204**	**136**
3:00:00 PM	0	7	54	4	0	12	18	9	0	13	47	39	0	4	16	12
3:15:00 PM	0	6	47	5	1	15	21	6	0	9	36	41	0	9	11	15
3:30:00 PM	0	5	52	6	1	9	8	4	0	4	43	25	0	4	17	13
3:45:00 PM	0	5	59	4	0	10	7	5	0	8	39	26	0	7	19	16
4:00:00 PM	0	7	48	5	0	7	11	8	0	5	54	31	0	6	17	12
4:15:00 PM	0	4	56	11	0	10	20	8	0	9	57	34	0	4	18	11
4:30:00 PM	0	2	58	6	0	13	16	14	0	8	64	38	0	6	16	16
4:45:00 PM	0	10	59	10	0	16	14	11	0	8	51	22	0	3	23	7
5:00:00 PM	0	4	62	6	0	4	23	9	0	13	45	29	0	11	19	17
5:15:00 PM	0	6	56	9	0	3	19	5	0	12	47	32	0	4	18	9
5:30:00 PM	0	5	65	9	0	8	19	5	0	7	58	29	0	5	24	23
5:45:00 PM	0	8	63	12	0	3	19	9	0	4	47	15	1	1	15	7
6:00:00 PM	0	5	51	9	0	7	16	4	0	9	47	26	0	4	23	7
6:15:00 PM	0	8	52	15	0	11	13	11	0	7	48	22	0	9	22	9
6:30:00 PM	0	4	73	9	0	5	12	10	0	3	31	32	0	5	23	17
6:45:00 PM	0	4	59	16	0	6	21	8	0	0	24	15	0	5	14	15
	0	**90**	**914**	**136**	**2**	**139**	**257**	**126**	**0**	**119**	**738**	**456**	**1**	**87**	**295**	**206**

Start Date: 5/17/2025 TOTAL VEHICLES
Start Time: 11:00:00 AM
Site Code: NORFOLK AND WOODMONT

	WOODMONT From North				NORFOLK From East				WOODMONT From South				NORFOLK From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
11:00:00 AM	0	7	53	7	0	9	16	8	0	5	18	17	0	8	24	13
11:15:00 AM	0	3	37	8	0	11	24	6	0	5	21	8	0	6	21	15
11:30:00 AM	0	9	53	6	0	13	20	9	0	1	26	14	0	5	21	14
11:45:00 AM	0	4	59	12	0	19	16	8	0	7	14	17	0	8	20	7
12:00:00 PM	0	8	62	6	0	10	17	13	0	2	24	22	0	3	17	14
12:15:00 PM	0	13	51	11	0	12	21	10	0	2	16	18	0	8	16	10
12:30:00 PM	0	3	59	15	0	18	6	5	0	2	22	12	0	4	28	11
12:45:00 PM	0	8	53	5	0	20	11	10	0	4	30	12	0	1	19	13
1:00:00 PM	0	5	59	6	0	11	19	12	0	9	30	17	0	7	18	9
1:15:00 PM	0	9	44	10	0	10	15	8	0	7	20	18	0	4	17	11
1:30:00 PM	0	8	60	3	0	9	17	7	0	9	22	19	0	6	14	19
1:45:00 PM	0	4	53	4	0	13	11	7	0	2	29	19	0	3	17	9
2:00:00 PM	0	7	55	6	0	13	18	6	0	7	25	14	0	7	9	15
2:15:00 PM	0	6	52	7	1	13	20	8	0	2	20	18	0	5	22	14
2:30:00 PM	0	4	47	8	0	19	12	11	0	5	16	18	0	7	21	13
2:45:00 PM	1	5	71	4	0	22	8	10	0	4	13	20	0	3	22	8
	1	**103**	**868**	**118**	**1**	**222**	**251**	**138**	**0**	**73**	**346**	**263**	**0**	**85**	**306**	**195**

Start Date: 5/15/2025 TOTAL VEHICLES
Start Time: 6:00:00 AM
Site Code: CHELTENHAM-NORFOLK-MD 355

	MD 355 From North				CHELTENHAM From East				MD 355 From South				NORFOLK From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
6:00:00 AM	0	1	77	9	0	1	2	1	0	9	38	1	0	6	1	8
6:15:00 AM	0	1	88	7	0	3	2	1	0	5	59	0	0	4	1	4
6:30:00 AM	1	5	112	7	0	5	3	2	0	3	60	2	0	8	4	7
6:45:00 AM	0	6	159	8	0	4	10	2	1	5	67	2	0	12	5	7
7:00:00 AM	2	9	156	4	0	3	10	5	0	3	84	2	0	14	6	17
7:15:00 AM	5	8	229	7	0	5	8	11	2	4	117	7	0	12	10	11
7:30:00 AM	2	5	193	15	0	11	30	22	0	7	124	6	0	18	13	5
7:45:00 AM	0	9	192	18	0	9	22	18	0	4	165	6	0	15	8	6
8:00:00 AM	4	4	186	17	0	4	13	9	2	4	135	6	0	16	8	14
8:15:00 AM	1	7	207	30	0	2	17	6	0	4	123	7	0	14	10	11
8:30:00 AM	1	7	214	15	0	10	23	13	3	3	138	5	0	13	8	11
8:45:00 AM	0	10	229	22	0	6	14	9	6	2	150	8	0	15	9	9
9:00:00 AM	1	5	177	24	0	8	12	5	3	6	128	9	0	18	12	10
9:15:00 AM	4	6	188	39	0	6	6	6	2	10	135	5	0	12	10	8
9:30:00 AM	2	12	190	32	0	8	16	9	4	4	134	10	0	16	6	8
9:45:00 AM	5	4	172	22	0	9	14	8	7	6	146	11	0	11	8	9
	28	**99**	**2769**	**276**	**0**	**94**	**202**	**127**	**30**	**79**	**1803**	**87**	**0**	**204**	**119**	**145**
3:00:00 PM	2	3	132	9	0	8	19	15	6	14	233	4	0	35	10	16
3:15:00 PM	5	8	143	14	0	14	17	13	7	8	256	5	0	33	11	19
3:30:00 PM	5	5	141	9	0	13	7	16	4	7	188	8	0	31	6	21
3:45:00 PM	1	6	140	11	0	5	8	9	3	6	206	10	0	26	10	18
4:00:00 PM	2	5	149	6	0	6	8	12	1	7	219	11	0	27	8	13
4:15:00 PM	2	10	131	8	0	8	17	12	1	14	247	8	0	30	9	17
4:30:00 PM	1	6	149	16	0	7	16	9	2	11	281	8	0	27	8	18
4:45:00 PM	1	5	122	10	0	10	23	11	2	6	273	5	0	33	9	18
5:00:00 PM	0	6	146	5	0	11	12	12	3	20	276	11	0	25	7	15
5:15:00 PM	3	8	114	3	0	7	18	11	0	7	306	4	0	28	11	17
5:30:00 PM	2	9	158	10	0	4	15	11	1	9	287	6	0	32	9	19
5:45:00 PM	2	6	141	11	0	6	12	10	0	10	284	10	0	18	9	15
6:00:00 PM	4	7	134	6	0	12	13	10	2	8	295	5	0	30	8	14
6:15:00 PM	2	8	97	9	0	8	19	9	2	8	276	11	0	22	10	20
6:30:00 PM	1	3	104	3	0	4	10	11	3	14	264	7	0	27	10	22
6:45:00 PM	1	6	89	4	0	7	11	7	2	22	225	8	0	19	5	14
	34	**101**	**2090**	**134**	**0**	**130**	**225**	**178**	**39**	**171**	**4116**	**121**	**0**	**443**	**140**	**276**

Start Date: 5/17/2025 TOTAL VEHICLES
Start Time: 11:00:00 AM
Site Code: CHELTANHAM-NORFOLK-MD 355

	MD 355 From North				CHELTENHAM From East				MD 355 From South				NORFOLK From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
11:00:00 AM	2	3	119	15	0	10	8	6	2	13	176	8	0	28	7	14
11:15:00 AM	0	9	141	15	0	11	19	9	0	5	183	5	0	9	5	15
11:30:00 AM	1	3	131	16	0	5	15	6	1	10	190	5	0	13	11	19
11:45:00 AM	5	11	119	15	0	12	14	11	3	17	185	5	0	21	6	13
12:00:00 PM	4	6	117	12	0	6	6	8	5	17	190	5	0	23	6	12
12:15:00 PM	4	6	160	9	0	12	6	5	1	23	218	4	0	26	9	16
12:30:00 PM	2	7	133	13	0	7	8	6	0	12	175	2	0	24	3	20
12:45:00 PM	4	9	158	14	0	8	12	5	0	14	191	5	0	13	5	16
1:00:00 PM	0	11	153	12	0	9	14	1	0	21	208	6	0	24	5	19
1:15:00 PM	3	9	156	8	0	8	7	11	0	14	192	11	0	23	5	17
1:30:00 PM	1	6	136	8	0	8	12	13	3	11	188	8	0	19	3	18
1:45:00 PM	3	6	174	15	0	7	5	9	1	9	198	7	0	18	5	12
2:00:00 PM	0	6	114	7	0	10	13	2	2	18	224	4	0	19	3	11
2:15:00 PM	3	11	151	18	0	10	9	9	1	18	185	6	0	17	10	20
2:30:00 PM	7	5	133	14	0	10	9	7	1	10	198	7	0	19	7	16
2:45:00 PM	4	8	174	18	0	4	9	7	0	15	183	3	0	28	4	14
	43	**116**	**2269**	**209**	**0**	**137**	**166**	**115**	**20**	**227**	**3084**	**91**	**0**	**324**	**94**	**252**

Start Date: 5/15/2025 TOTAL VEHICLES
Start Time: 6:00:00 AM
Site Code: CHELTENHAM-TILBURY ROUNDABOUT

	TILBURY From North				CHELTENHAM From East				TILBURY From South				CHELTENHAM From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
6:00:00 AM	0	0	0	2	0	0	1	0	0	1	0	0	1	0	0	0
6:15:00 AM	0	0	0	0	0	0	1	2	0	2	0	0	0	0	0	0
6:30:00 AM	0	0	0	0	0	0	3	2	0	0	1	0	0	1	0	1
6:45:00 AM	0	0	0	3	0	0	7	0	0	0	0	0	0	2	0	0
7:00:00 AM	0	0	0	3	0	0	6	1	0	2	0	0	0	1	0	0
7:15:00 AM	0	0	0	7	0	0	14	2	0	5	1	0	1	6	0	0
7:30:00 AM	0	0	0	7	0	0	39	9	0	9	2	0	2	16	0	0
7:45:00 AM	0	0	0	5	0	0	30	8	0	5	1	0	0	7	0	0
8:00:00 AM	0	0	0	8	0	0	12	4	0	3	0	0	3	3	0	1
8:15:00 AM	0	0	0	6	0	0	9	4	0	2	3	0	0	9	0	0
8:30:00 AM	0	0	0	10	0	0	20	2	0	4	1	0	1	5	0	1
8:45:00 AM	0	0	0	6	0	0	11	4	0	2	0	0	1	11	0	0
9:00:00 AM	0	0	0	11	0	0	10	1	0	1	1	0	1	4	0	2
9:15:00 AM	0	0	0	10	0	0	4	2	0	0	2	0	3	4	0	1
9:30:00 AM	0	0	0	8	0	0	8	1	0	3	1	0	1	5	0	0
9:45:00 AM	0	0	0	8	0	0	11	5	0	1	0	0	4	5	0	0
	0	**0**	**0**	**94**	**0**	**0**	**186**	**47**	**0**	**40**	**13**	**0**	**18**	**79**	**0**	**6**
3:00:00 PM	0	0	0	10	0	0	18	6	0	2	0	0	1	5	0	0
3:15:00 PM	0	0	0	3	0	0	19	4	0	1	0	0	4	10	0	0
3:30:00 PM	0	0	0	7	0	0	11	1	0	0	1	0	1	4	0	0
3:45:00 PM	0	0	0	5	0	0	7	6	0	1	0	0	0	15	0	0
4:00:00 PM	0	0	0	2	0	0	9	2	0	3	0	0	2	18	0	0
4:15:00 PM	0	0	0	3	0	0	14	1	0	2	0	0	2	7	0	0
4:30:00 PM	0	0	0	4	0	0	12	4	0	1	1	0	0	13	0	0
4:45:00 PM	0	0	0	9	0	0	15	1	0	3	0	0	1	6	0	0
5:00:00 PM	1	0	0	7	0	0	8	2	0	3	0	0	1	8	0	0
5:15:00 PM	1	0	0	4	0	0	15	4	0	3	1	0	1	11	0	1
5:30:00 PM	0	0	0	7	0	0	9	5	0	1	3	0	0	15	0	0
5:45:00 PM	0	0	0	9	0	0	12	1	0	0	0	0	2	10	0	0
6:00:00 PM	0	0	0	8	0	0	9	3	0	5	1	0	1	9	0	0
6:15:00 PM	0	0	0	4	0	0	11	2	0	3	1	0	1	12	0	1
6:30:00 PM	1	0	0	8	0	0	8	3	0	1	1	0	0	6	0	2
6:45:00 PM	1	0	0	3	0	0	4	1	0	1	1	0	1	4	0	1
	4	**0**	**0**	**93**	**0**	**0**	**181**	**46**	**0**	**30**	**10**	**0**	**18**	**153**	**0**	**5**

Start Date: 5/17/2025 TOTAL VEHICLES
Start Time: 11:00:00 AM
Site Code: CHELTANHAM-TILBURY ROUNDABOUT

	TILBURY From North				CHELTENHAM From East				TILBURY From South				CHELTENHAM From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
11:00:00 AM	0	0	0	8	0	0	6	3	0	1	0	0	0	3	0	0
11:15:00 AM	0	0	0	5	0	0	12	2	0	3	1	0	3	6	0	0
11:30:00 AM	0	0	0	5	0	0	8	3	0	1	1	0	1	3	0	0
11:45:00 AM	0	0	0	6	0	0	11	0	0	2	0	0	2	3	0	0
12:00:00 PM	0	0	0	3	0	0	6	2	0	3	1	0	0	3	0	0
12:15:00 PM	0	0	0	3	0	0	10	0	0	3	1	0	1	6	0	0
12:30:00 PM	0	0	0	4	0	0	8	3	0	0	0	0	0	4	0	1
12:45:00 PM	0	0	0	2	0	0	3	1	0	2	1	0	2	4	0	0
1:00:00 PM	0	0	0	11	0	0	8	0	0	2	0	0	0	4	0	0
1:15:00 PM	0	0	0	4	0	0	8	4	0	1	3	0	3	1	0	1
1:30:00 PM	0	0	0	4	0	0	9	4	0	2	0	0	1	4	0	0
1:45:00 PM	0	0	0	6	0	0	8	1	0	1	0	0	2	6	0	1
2:00:00 PM	0	0	0	7	0	0	5	3	0	2	0	0	0	7	0	0
2:15:00 PM	1	0	0	7	0	0	2	2	0	2	2	0	4	2	0	0
2:30:00 PM	0	0	0	5	0	0	4	2	0	0	1	0	2	6	0	0
2:45:00 PM	0	0	0	4	0	0	4	3	0	2	0	0	2	4	0	0
	1	**0**	**0**	**84**	**0**	**0**	**112**	**33**	**0**	**27**	**11**	**0**	**23**	**66**	**0**	**3**

Start Date: 5/15/2025 TOTAL VEHICLES
Start Time: 6:00:00 AM
Site Code: MD 355 AND MIDDLETON LN

	MD 355 From North				MIDDLETON From East				MD 355 From South				NOT AN APPROACH From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
6:00:00 AM	1	0	90	0	0	0	0	0	0	0	52	0	0	0	0	0
6:15:00 AM	0	1	84	0	0	0	0	0	0	0	63	0	0	0	0	0
6:30:00 AM	0	0	131	0	0	0	0	1	1	0	68	0	0	0	0	0
6:45:00 AM	1	0	162	1	0	0	0	0	0	0	70	1	0	0	0	0
7:00:00 AM	0	2	178	5	0	0	0	2	0	0	98	5	0	0	0	0
7:15:00 AM	1	1	233	1	0	0	0	1	0	0	120	1	0	0	0	0
7:30:00 AM	1	4	205	3	0	2	0	4	0	0	151	3	0	0	0	0
7:45:00 AM	1	2	189	1	0	2	0	2	0	0	151	1	0	0	0	0
8:00:00 AM	2	2	193	2	0	1	0	2	0	0	152	2	0	0	0	0
8:15:00 AM	3	1	198	3	0	3	0	1	2	0	128	3	0	0	0	0
8:30:00 AM	2	0	214	1	0	0	0	2	0	0	151	1	0	0	0	0
8:45:00 AM	3	5	200	5	0	0	0	4	2	0	150	5	0	0	0	0
9:00:00 AM	1	2	190	3	0	0	0	0	0	0	150	3	0	0	0	0
9:15:00 AM	1	2	165	4	0	1	0	1	0	0	148	4	0	0	0	0
9:30:00 AM	2	5	229	2	0	0	0	1	0	0	153	2	0	0	0	0
9:45:00 AM	1	7	167	1	0	4	0	2	1	0	157	1	0	0	0	0
	20	**34**	**2828**	**32**	**0**	**13**	**0**	**23**	**6**	**0**	**1962**	**32**	**0**	**0**	**0**	**0**
3:00:00 PM	4	2	196	0	0	4	0	6	1	0	259	3	0	0	0	0
3:15:00 PM	4	2	181	0	0	1	0	4	1	0	256	2	0	0	0	0
3:30:00 PM	4	1	183	0	0	1	0	1	2	0	207	2	0	0	0	0
3:45:00 PM	3	0	162	0	0	0	0	4	1	0	207	2	0	0	0	0
4:00:00 PM	3	3	174	0	0	1	0	3	0	0	242	4	0	0	0	0
4:15:00 PM	3	3	152	0	0	2	0	2	0	0	249	6	0	0	0	0
4:30:00 PM	6	1	178	0	0	1	0	5	0	0	289	1	0	0	0	0
4:45:00 PM	5	4	146	0	0	1	0	4	2	0	276	7	0	0	0	0
5:00:00 PM	2	3	173	0	0	0	0	2	1	0	310	7	0	0	0	0
5:15:00 PM	0	0	144	0	0	3	0	3	1	0	303	2	0	0	0	0
5:30:00 PM	0	3	183	0	0	2	0	1	0	0	293	4	0	0	0	0
5:45:00 PM	2	1	164	0	0	2	0	3	0	0	282	4	0	0	0	0
6:00:00 PM	2	2	158	0	0	1	0	2	0	0	310	3	0	0	0	0
6:15:00 PM	3	1	125	0	0	1	0	2	2	0	272	2	0	0	0	0
6:30:00 PM	4	0	129	0	0	1	0	1	0	0	284	3	0	0	0	0
6:45:00 PM	4	4	99	9	0	0	0	7	2	0	241	9	0	0	0	0
	49	**30**	**2547**	**9**	**0**	**21**	**0**	**50**	**13**	**0**	**4280**	**61**	**0**	**0**	**0**	**0**

Start Date: 5/17/2025 TOTAL VEHICLES
Start Time: 11:00:00 AM
Site Code: MD 355 AND MIDDLETON

	MD 355 From North				MIDDLETON From East				MD 355 From South				NOT AN APPROACH From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
11:00:00 AM	1	3	141	0	0	2	0	4	0	0	202	2	0	0	0	0
11:15:00 AM	1	2	165	0	0	1	0	3	0	0	184	2	0	0	0	0
11:30:00 AM	1	2	156	0	0	3	0	1	2	0	210	2	0	0	0	0
11:45:00 AM	0	0	141	0	0	0	0	1	1	0	202	1	0	0	0	0
12:00:00 PM	2	5	142	0	0	0	0	0	1	0	233	0	0	0	0	0
12:15:00 PM	2	2	183	0	0	2	0	1	0	0	225	2	0	0	0	0
12:30:00 PM	1	1	165	0	0	2	0	0	0	0	204	1	0	0	0	0
12:45:00 PM	2	4	177	0	0	1	0	2	2	0	196	1	0	0	0	0
1:00:00 PM	1	0	188	0	0	1	0	3	0	0	246	3	0	0	0	0
1:15:00 PM	1	2	178	0	1	0	0	1	2	0	201	0	0	0	0	0
1:30:00 PM	0	4	167	0	0	3	0	1	0	0	215	1	0	0	0	0
1:45:00 PM	2	5	188	0	0	2	0	2	2	0	210	3	0	0	0	0
2:00:00 PM	1	1	138	0	0	2	0	2	0	0	250	3	0	0	0	0
2:15:00 PM	1	1	178	0	0	2	0	1	1	0	206	2	0	0	0	0
2:30:00 PM	0	1	164	0	0	1	0	1	0	0	220	1	0	0	0	0
2:45:00 PM	1	1	186	0	0	1	0	2	1	0	191	2	0	0	0	0
	17	**34**	**2657**	**0**	**1**	**23**	**0**	**25**	**12**	**0**	**3395**	**26**	**0**	**0**	**0**	**0**

Start Date: 5/15/2025 TOTAL VEHICLES
Start Time: 6:00:00 AM
Site Code: WOODMONT AT MD 187

	MD 187 From North				WOODMONT From East				MD 187 From South				WOODMONT From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
6:00:00 AM	0	8	0	25	0	0	20	8	0	9	30	5	0	0	0	0
6:15:00 AM	0	7	0	31	0	0	12	4	0	9	49	10	0	0	0	0
6:30:00 AM	0	11	0	37	0	0	17	2	0	13	53	10	0	0	0	0
6:45:00 AM	0	12	0	64	0	0	30	9	0	4	72	12	0	0	0	0
7:00:00 AM	0	14	0	81	0	0	46	10	0	11	79	14	0	0	0	0
7:15:00 AM	0	18	0	119	0	0	41	13	0	12	96	16	0	0	0	0
7:30:00 AM	0	18	0	129	0	0	88	10	0	12	76	17	0	0	0	0
7:45:00 AM	0	28	0	167	0	0	113	10	0	12	121	18	0	0	0	0
8:00:00 AM	0	29	0	160	0	0	118	13	0	15	108	18	0	0	0	0
8:15:00 AM	0	38	0	185	0	0	109	8	0	13	128	35	0	0	0	0
8:30:00 AM	0	37	0	175	0	0	107	15	0	27	88	27	0	0	0	0
8:45:00 AM	0	43	0	192	0	0	107	11	0	18	129	56	0	0	0	0
9:00:00 AM	0	35	0	182	0	0	129	10	0	30	108	33	0	0	0	0
9:15:00 AM	0	33	0	161	0	0	104	7	0	23	123	29	0	0	0	0
9:30:00 AM	0	31	0	110	0	0	101	18	0	32	100	14	0	0	0	0
9:45:00 AM	0	18	0	108	0	0	81	9	0	26	100	23	0	0	0	0
	0	**380**	**0**	**1926**	**0**	**0**	**1223**	**157**	**0**	**266**	**1460**	**337**	**0**	**0**	**0**	**0**
3:00:00 PM	0	30	0	83	0	0	62	11	0	28	145	32	0	0	0	0
3:15:00 PM	0	26	0	113	0	0	60	22	0	28	135	22	0	0	0	0
3:30:00 PM	0	22	0	123	0	0	71	24	0	26	177	21	0	0	0	0
3:45:00 PM	0	29	0	113	0	0	65	14	0	20	162	27	0	0	0	0
4:00:00 PM	0	25	0	129	0	0	88	20	0	18	181	34	0	0	0	0
4:15:00 PM	0	39	0	134	0	0	65	17	0	32	166	28	0	0	0	0
4:30:00 PM	0	22	0	118	0	0	75	26	0	15	175	22	0	0	0	0
4:45:00 PM	0	36	0	154	0	0	71	19	0	24	167	29	0	0	0	0
5:00:00 PM	0	31	0	125	0	0	81	29	0	28	199	31	0	0	0	0
5:15:00 PM	0	46	0	145	0	0	53	23	0	34	190	32	0	0	0	0
5:30:00 PM	0	34	0	130	0	0	90	41	0	20	151	33	0	0	0	0
5:45:00 PM	0	22	0	149	0	0	79	22	0	30	160	26	0	0	0	0
6:00:00 PM	0	13	0	107	0	0	56	19	0	18	156	26	0	0	0	0
6:15:00 PM	0	27	0	143	0	0	60	18	0	34	141	37	0	0	0	0
6:30:00 PM	0	27	0	91	0	0	92	21	0	21	140	25	0	0	0	0
6:45:00 PM	0	17	0	98	0	0	62	15	0	25	134	24	0	0	0	0
	0	**446**	**0**	**1955**	**0**	**0**	**1130**	**341**	**0**	**401**	**2579**	**449**	**0**	**0**	**0**	**0**

Start Date: 5/17/2025 TOTAL VEHICLES
Start Time: 11:00:00 AM
Site Code: WOODMONT AT MD 187

	MD 187 From North				WOODMONT From East				MD 187 From South				WOODMONT From West			
Start Time	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT	U-TURN	LEFT	THRU	RIGHT
11:00:00 AM	0	24	0	50	0	0	59	11	0	27	97	16	0	0	0	0
11:15:00 AM	0	22	0	78	0	0	56	12	0	23	129	18	0	0	0	0
11:30:00 AM	0	23	0	69	0	0	61	14	0	23	130	10	0	0	0	0
11:45:00 AM	0	30	0	85	0	0	67	9	0	26	105	14	0	0	0	0
12:00:00 PM	0	25	0	81	0	0	60	14	0	22	109	16	0	0	0	0
12:15:00 PM	0	15	0	74	0	0	49	11	0	15	153	10	0	0	0	0
12:30:00 PM	0	17	0	69	0	0	62	15	0	34	124	12	0	0	0	0
12:45:00 PM	0	22	0	88	0	0	63	13	0	22	132	20	0	0	0	0
1:00:00 PM	0	40	0	84	0	0	58	19	0	30	111	17	0	0	0	0
1:15:00 PM	0	24	0	84	0	0	54	6	0	25	122	27	0	0	0	0
1:30:00 PM	0	19	0	63	0	0	76	12	0	26	98	23	0	0	0	0
1:45:00 PM	0	18	0	72	0	0	56	11	0	22	110	31	0	0	0	0
2:00:00 PM	0	18	0	64	0	0	64	14	0	29	111	24	0	0	0	0
2:15:00 PM	0	18	0	84	0	0	64	9	0	28	124	22	0	0	0	0
2:30:00 PM	0	15	0	73	0	0	60	13	0	23	88	18	0	0	0	0
2:45:00 PM	0	21	0	86	0	0	63	13	0	12	133	20	0	0	0	0
	0	**351**	**0**	**1204**	**0**	**0**	**972**	**196**	**0**	**387**	**1876**	**298**	**0**	**0**	**0**	**0**

Appendix B Traffic Analysis Outputs

2025 Existing Conditions

2030 Baseline Conditions

2030 Alternative 1

2030 Alternative 1 Mitigation

2030 Alternative 2

OVERALL SUMMARY

	Existing Conditions						2030 No Build Conditions						2030 Alternative 1						2030 Alternative 1 - Optimized						2030 Alternative 2					
	AM		PM		Sat		AM		PM		Sat		AM		PM		Sat		AM		PM		Sat		AM		PM		Sat	
Approach	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Woodmont & Norfolk																														
EB	21.3	C	55.0	D	32.4	C	19.4	B	57.4	E	29.8	C	18.9	B	46.1	D	27.0	C	18.7	B	46.8	D	26.9	C	18.5	B	46.1	D	26.4	C
WB	35.0	C	52.9	D	40.4	D	26.8	C	60.7	E	33.9	C	25.2	C	55.3	E	38.4	D	24.0	C	56.4	E	37.8	C	25.6	C	56.7	E	39.1	D
NB	10.1	B	4.4	A	4.3	A	11.4	B	5.3	A	5.3	A	11.9	B	7.6	A	6.5	A	12.6	B	5.1	A	6.5	A	12.8	B	5.3	A	6.9	A
SB	8.3	A	3.7	A	4.3	A	11.2	B	4.6	A	5.3	A	11.8	B	5.8	A	6.3	A	11.9	B	5.9	A	6.4	A	12.2	B	6.0	A	6.8	A
OVERALL	**14.5**	**B**	**19.8**	**B**	**17.0**	**B**	**14.8**	**B**	**22.7**	**C**	**15.8**	**B**	**14.8**	**B**	**21.1**	**C**	**16.8**	**B**	**14.9**	**B**	**20.4**	**C**	**16.7**	**B**	**15.3**	**B**	**20.6**	**C**	**17.1**	**B**
MD 355 & Norfolk / Cheltenham																														
EB	46.4	D	70.0	E	53.3	D	49.9	D	73.3	E	53.4	D	59.6	E	114.3	F	66.7	E	50.5	D	63.8	E	59.4	E	66.7	E	54.9	D	60.9	E
WB	53.9	D	45.9	D	48.2	D	47.4	D	43.8	D	47.9	D	42.2	D	39.0	D	42.1	D	41.0	D	35.3	D	41.3	D	54.9	D	55.5	E	56.9	E
NB	2.8	A	5.2	A	3.5	A	4.5	A	6.9	A	3.8	A	6.3	A	9.3	A	5.9	A	6.8	A	11.9	B	6.3	A	14.9	B	26.9	C	14.6	B
SB	3.2	A	4.8	A	3.7	A	4.9	A	6.1	A	4.0	A	6.9	A	8.2	A	6.0	A	7.4	A	10.2	B	6.3	A	16.4	B	22.1	C	13.6	B
OVERALL	**9.9**	**A**	**14.4**	**B**	**10.7**	**B**	**11.1**	**B**	**15.5**	**B**	**11.0**	**B**	**13.3**	**B**	**21.2**	**C**	**13.8**	**B**	**12.8**	**B**	**18.0**	**B**	**13.3**	**B**	**22.4**	**C**	**30.1**	**C**	**20.9**	**C**
Tilbury & Cheltenham																														
EB	2.9	A	2.9	A	2.7	A	2.9	A	3.0	A	2.8	A	2.9	A	3.0	A	2.8	A	2.9	A	3.0	A	2.8	A	2.9	A	3.0	A	2.8	A
WB	3.2	A	3.2	A	3.0	A	3.2	A	3.3	A	3.0	A	3.2	A	3.3	A	3.0	A	3.2	A	3.3	A	3	A	3.2	A	3.3	A	3	A
NB	2.8	A	2.8	A	2.7	A	2.8	A	2.9	A	2.8	A	2.8	A	2.9	A	2.8	A	2.8	A	2.9	A	2.8	A	2.8	A	2.9	A	2.8	A
SB	3.1	A	3.1	A	2.9	A	3.1	A	3.1	A	2.9	A	3.1	A	3.1	A	2.9	A	3.1	A	3.1	A	2.9	A	3.1	A	3.1	A	2.9	A
OVERALL	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**	**3.1**	**A**	**3.1**	**A**	**2.9**	**A**
Middleton & MD 355																														
WB	63.2	E	59.6	E	59.7	E	63.2	E	59.7	E	59.7	E	63.2	E	59.7	E	59.7	E	63.2	E	59.7	E	59.7	E	63.2	E	59.7	E	59.7	E
NB	0.6	A	1.0	A	0.8	A	0.6	A	1.1	A	0.8	A	0.6	A	1.1	A	0.8	A	0.6	A	1.1	A	0.8	A	0.6	A	1.1	A	0.8	A
SB	1.0	A	0.6	A	0.6	A	0.2	A	0.7	A	0.6	A	0.2	A	0.7	A	0.6	A	1.5	A	0.6	A	0.7	A	0.4	A	0.3	A	0.9	A
OVERALL	**1.3**	**A**	**1.4**	**A**	**1.2**	**A**	**0.8**	**A**	**1.4**	**A**	**1.2**	**A**	**0.8**	**A**	**1.4**	**A**	**1.2**	**A**	**1.5**	**A**	**1.4**	**A**	**1.3**	**A**	**0.9**	**A**	**1.3**	**A**	**1.3**	**A**
Woodmont & MD 187																														
EB	8.5	A	7.2	A	4.0	A	10.1	A	9.1	A	4.3	A	10.1	A	9.1	A	4.3	A	10.1	A	9.1	A	4.3	A	10.1	B	9.1	A	4.3	A
WB	47.1	D	41.4	D	47.2	D	44.3	D	40.5	D	46.5	D	44.3	D	40.5	D	46.5	D	44.3	D	40.5	D	46.5	D	44.3	D	40.5	D	46.5	D
SB	55.9	E	56.6	E	53.5	D	57.6	E	56.2	E	53.4	D	57.2	E	55.0	D	53.4	D	55.4	E	56.2	E	53.4	D	54.4	D	56.0	E	53.4	D
OVERALL	**32.7**	**C**	**32.7**	**C**	**35.7**	**D**	**33.6**	**C**	**32.5**	**C**	**35.4**	**D**	**33.5**	**C**	**32.3**	**C**	**35.4**	**D**	**33.1**	**C**	**32.5**	**C**	**35.4**	**D**	**32.9**	**C**	**32.5**	**C**	**35.4**	**D**

Int: #1 Woodmont & Norfolk

2025 Existing Conditions AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	21.5	C	54
EBR	30	20.9	C	39
EB overall		**21.3**	**C**	
WBL+T	214	35.6	D	110
WBR	30	25.5	C	15
WB overall		**35.0**	**C**	
NBL	100	7.9	A	23
NBT+R	689	10.4	B	154
NB overall		**10.1**	**B**	
SBL	200	4.8	A	14
SBT	1000	8.5	A	250
SBR	5	4.6	A	0
SB Overall		**8.3**	**A**	
OVERALL		**14.5**	**B**	

2030 No-Build Conditions AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	19.8	B	77
EBR	30	18.6	B	38
EB overall		**19.4**	**B**	
WBL+T	214	27.2	C	114
WBR	30	19.8	B	12
WB overall		**26.8**	**C**	
NBL	100	8.2	A	14
NBT+R	689	11.7	B	182
NB overall		**11.4**	**B**	
SBL	200	6.0	A	15
SBT	1000	11.6	B	296
SBR	5	5.8	A	0
SB Overall		**11.2**	**B**	
OVERALL		**14.8**	**B**	

2030 Alternative 1 AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	19.2	B	75
EBR	30	18.1	B	37
EB overall		**18.9**	**B**	
WBL+T+R	214	25.2	C	114
WB overall		**25.2**	**C**	
NBL	100	8.6	A	15
NBT+R	689	12.2	B	185
NB overall		**11.9**	**B**	
SBL	200	6.3	A	15
SBT	1000	12.2	B	317
SBR	5	6.0	A	0
SB Overall		**11.8**	**B**	
OVERALL		**14.8**	**B**	

2030 Alternative 1 Optimized AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	19.0	B	74
EBR	30	17.9	B	37
EB overall		**18.7**	**B**	
WBL+T+R	214	24.0	C	110
WB overall		**24.0**	**C**	
NBL	100	9.3	A	16
NBT+R	689	12.9	B	190
NB overall		**12.6**	**B**	
SBL	200	6.4	A	16
SBT	1000	12.4	B	327
SBR	5	6.1	A	0
SB Overall		**11.9**	**B**	
OVERALL		**14.9**	**B**	

2030 Alternative 2 AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	18.8	B	73
EBR	30	17.8	B	37
EB overall		**18.5**	**B**	
WBL+T+R	214	25.6	C	112
WB overall		**25.6**	**C**	
NBL	100	9.6	A	17
NBT+R	689	13.2	B	192
NB overall		**12.8**	**B**	
SBL	200	6.6	A	16
SBT	1000	12.7	B	362
SBR	5	6.3	A	0
SB Overall		**12.2**	**B**	
OVERALL		**15.3**	**B**	

2025 Existing Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	56.9	E	143
EBR	30	51.5	D	86
EB overall		**55.0**	**D**	
WBL+T	214	55.6	E	149
WBR	30	43.5	D	57
WB overall		**52.9**	**D**	
NBL	100	2.1	A	11
NBT+R	689	4.7	A	140
NB overall		**4.4**	**A**	
SBL	200	3.3	A	13
SBT	1000	3.8	A	84
SBR	5	3.2	A	4
SB Overall		**3.7**	**A**	
OVERALL		**19.8**	**B**	

2030 No-Build Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	61.3	E	172
EBR	30	48.3	D	86
EB overall		**57.4**	**E**	
WBL+T	214	64.8	E	193
WBR	30	41.0	D	52
WB overall		**60.7**	**E**	
NBL	100	2.6	A	15
NBT+R	689	5.6	A	224
NB overall		**5.3**	**A**	
SBL	200	4.1	A	20
SBT	1000	4.8	A	120
SBR	5	3.8	A	1
SB Overall		**4.6**	**A**	
OVERALL		**22.7**	**C**	

2030 Alternative 1 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	47.0	D	160
EBR	30	44.2	D	81
EB overall		**46.1**	**D**	
WBL+T	214	55.3	E	224
WB overall		**55.3**	**E**	
NBL	100	3.8	A	21
NBT+R	689	8.0	A	286
NB overall		**7.6**	**A**	
SBL	200	5.2	A	23
SBT	1000	6.0	A	140
SBR	5	4.8	A	1
SB Overall		**5.8**	**A**	
OVERALL		**21.1**	**C**	

2030 Alternative 1 Optimized PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	46.8	D	159
EBR	30	44.2	D	81
EB overall		**46.0**	**D**	
WBL+T	214	56.4	E	214
WB overall		**56.4**	**E**	
NBL	100	2.7	A	15
NBT+R	689	5.3	A	227
NB overall		**5.1**	**A**	
SBL	200	5.2	A	23
SBT	1000	6.0	A	141
SBR	5	4.8	A	1
SB Overall		**5.9**	**A**	
OVERALL		**20.4**	**C**	

2030 Alternative 2 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	46.0	D	158
EBR	30	46.5	D	85
EB overall		**46.1**	**D**	
WBL+T	214	56.7	E	207
WB overall		**56.7**	**E**	
NBL	100	2.8	A	16
NBT+R	689	5.6	A	238
NB overall		**5.3**	**A**	
SBL	200	5.4	A	24
SBT	1000	6.2	A	144
SBR	5	5.0	A	1
SB Overall		**6.0**	**A**	
OVERALL		**20.6**	**C**	

2025 Existing Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	32.8	C	89
EBR	30	31.4	C	47
EB overall		**32.4**	**C**	
WBL+T	214	43.0	D	106
WBR	30	32.0	C	43
WB overall		**40.4**	**D**	
NBL	100	3.7	A	11
NBT+R	689	4.4	A	62
NB overall		**4.3**	**A**	
SBL	200	4.0	A	17
SBT	1000	4.4	A	81
SBR	5	3.7	A	1
SB Overall		**4.3**	**A**	
OVERALL		**17.0**	**B**	

2030 No-Build Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	30.2	C	92
EBR	30	29.0	C	48
EB overall		**29.8**	**C**	
WBL+T	214	35.2	D	111
WBR	30	29.5	C	44
WB overall		**33.9**	**C**	
NBL	100	4.5	A	12
NBT+R	689	5.4	A	68
NB overall		**5.3**	**A**	
SBL	200	4.8	A	18
SBT	1000	5.4	A	88
SBR	5	4.6	A	2
SB Overall		**5.2**	**A**	
OVERALL		**15.8**	**B**	

2030 Alternative 1 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	27.3	C	85
EBR	30	26.4	C	45
EB overall		**27.0**	**C**	
WBL+T	214	38.4	D	135
WB overall		**38.4**	**D**	
NBL	100	5.5	A	14
NBT+R	689	6.6	A	76
NB overall		**6.5**	**A**	
SBL	200	5.9	A	20
SBT	1000	6.5	A	102
SBR	5	5.6	A	2
SB Overall		**6.3**	**A**	
OVERALL		**16.8**	**B**	

2030 Alternative 1 Optimized Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	27.2	C	84
EBR	30	26.3	C	44
EB overall		**26.9**	**C**	
WBL+T	214	37.8	D	134
WB overall		**37.8**	**C**	
NBL	100	5.6	A	14
NBT+R	689	6.6	A	79
NB overall		**6.5**	**A**	
SBL	200	5.9	A	21
SBT	1000	6.6	A	104
SBR	5	5.6	A	2
SB Overall		**6.4**	**A**	
OVERALL		**16.7**	**B**	

2030 Alternative 2 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL+T	1000	26.4	C	81
EBR	30	26.6	C	45
EB overall		**26.4**	**C**	
WBL+T	214	39.1	D	134
WB overall		**39.1**	**D**	
NBL	100	5.9	A	15
NBT+R	689	7.0	A	83
NB overall		**6.9**	**A**	
SBL	200	6.3	A	22
SBT	1000	7.0	A	109
SBR	5	5.9	A	2
SB Overall		**6.8**	**A**	
OVERALL		**17.1**	**B**	

Note: the EB and WB right turn lanes refer to vehicles creating a turn lane due to the wide lane configuration to bypass thru and left turning vehicles

Int: #2 MD 355 & Norfolk/Cheltenham

2025 Existing Conditions AM Peak Hour

AM Peak Hour				
EBL	214	51.5	D	100
EBT+R	50	42.6	D	75
EB overall		**46.4**	**D**	
WBL	269	50.9	D	48
WBT+R	140	54.6	D	121
WB overall		**53.9**	**D**	
NBL+T+R	469	2.8	A	54
NB overall		**2.8**	**A**	
SBL+T+R	1000	3.2	A	91
SB Overall		**3.2**	**A**	
OVERALL		**9.9**	**A**	

2025 Existing Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	69.5	E	165
EBT+R	50	70.5	E	100
EB overall		**70.0**	**E**	
WBL	269	44.7	D	52
WBT+R	140	46.3	D	119
WB overall		**45.9**	**D**	
NBL+T+R	469	5.2	A	183
NB overall		**5.2**	**A**	
SBL+T+R	1000	4.8	A	80
SB Overall		**4.8**	**A**	
OVERALL		**14.4**	**B**	

2025 Existing Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	59.4	E	123
EBT+R	50	47.6	D	66
EB overall		**53.3**	**D**	
WBL	269	48.8	D	60
WBT+R	140	47.9	D	70
WB overall		**48.2**	**D**	
NBL+T+R	469	3.5	A	105
NB overall		**3.5**	**A**	
SBL+T+R	1000	3.7	A	78
SB Overall		**3.7**	**A**	
OVERALL		**10.7**	**B**	

2030 No-Build Conditions AM Peak Hour

AM Peak Hour				
EBL	214	56.7	E	156
EBT+R	50	40.9	D	68
EB overall		**49.9**	**D**	
WBL	269	45.8	D	46
WBT+R	140	47.8	D	115
WB overall		**47.4**	**D**	
NBL+T+R	469	4.5	A	106
NB overall		**4.5**	**A**	
SBL+T+R	1000	4.9	A	139
SB Overall		**4.9**	**A**	
OVERALL		**11.1**	**B**	

2030 No-Build Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	77.4	E	208
EBT+R	50	67.7	E	103
EB overall		**73.3**	**E**	
WBL	269	43.1	D	70
WBT+R	140	44.1	D	132
WB overall		**43.8**	**D**	
NBL+T+R	469	6.9	A	223
NB overall		**6.9**	**A**	
SBL+T+R	1000	6.1	A	109
SB Overall		**6.1**	**A**	
OVERALL		**15.5**	**B**	

2030 No-Build Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	60.2	E	127
EBT+R	50	47.2	D	69
EB overall		**53.4**	**D**	
WBL	269	48.5	D	62
WBT+R	140	47.5	D	75
WB overall		**47.9**	**D**	
NBL+T+R	469	3.8	A	117
NB overall		**3.8**	**A**	
SBL+T+R	1000	4.0	A	85
SB Overall		**4.0**	**A**	
OVERALL		**11.0**	**B**	

2030 Alternative 1 AM Peak Hour

AM Peak Hour				
EBL	214	59.6	E	241
EB overall		**59.6**	**E**	
WBL	150	41.1	D	45
WBT+R	269	42.5	D	112
WB overall		**42.2**	**D**	
NBL+T+R	469	6.3	A	115
NB overall		**6.3**	**A**	
SBL+T+R	1000	6.9	A	150
SB Overall		**6.9**	**A**	
OVERALL		**13.3**	**B**	

2030 Alternative 1 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	114.3	F	378
EB overall		**114.3**	**F**	
WBL	150	38.5	D	70
WBT+R	269	39.2	D	132
WB overall		**39.0**	**D**	
NBL+T+R	469	9.3	A	223
NB overall		**9.3**	**A**	
SBL+T+R	1000	8.2	A	109
SB Overall		**8.2**	**A**	
OVERALL		**21.2**	**C**	

2030 Alternative 1 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	66.7	E	220
EB overall		**66.7**	**E**	
WBL	150	42.7	D	59
WBT+R	269	41.8	D	72
WB overall		**42.1**	**D**	
NBL+T+R	469	5.9	A	135
NB overall		**5.9**	**A**	
SBL+T+R	1000	6.0	A	99
SB Overall		**6.0**	**A**	
OVERALL		**13.8**	**B**	

2030 Alternative 1 Optimized AM Peak Hour

AM Peak Hour				
EBL	214	50.5	D	179
EB overall		**50.5**	**D**	
WBL	150	40.1	D	42
WBT+R	269	41.3	D	100
WB overall		**41.0**	**D**	
NBL+T+R	469	6.8	A	138
NB overall		**6.8**	**A**	
SBL+T+R	1000	7.4	A	182
SB Overall		**7.4**	**A**	
OVERALL		**12.8**	**B**	

2030 Alternative 1 Optimized PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	63.8	E	208
EB overall		**63.8**	**E**	
WBL	150	34.8	C	57
WBT+R	269	35.5	D	111
WB overall		**35.3**	**D**	
NBL+T+R	469	11.9	B	333
NB overall		**11.9**	**B**	
SBL+T+R	1000	10.2	B	164
SB Overall		**10.2**	**B**	
OVERALL		**18.0**	**B**	

2030 Alternative 1 Optimized Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	59.4	E	201
EB overall		**59.4**	**E**	
WBL	150	41.9	D	56
WBT+R	269	40.9	D	65
WB overall		**41.3**	**D**	
NBL+T+R	469	6.3	A	159
NB overall		**6.3**	**A**	
SBL+T+R	1000	6.3	A	117
SB Overall		**6.3**	**A**	
OVERALL		**13.3**	**B**	

2030 Alternative 2 AM Peak Hour

AM Peak Hour				
EBL	214	66.7	E	233
EB overall		**66.7**	**E**	
WBL	150	52.0	D	51
WBT+R	269	55.6	E	125
WB overall		**54.9**	**D**	
NBL+T+R	469	14.9	B	216
NB overall		**14.9**	**B**	
SBL+T+R	1000	16.4	B	287
SB Overall		**16.4**	**B**	
OVERALL		**22.4**	**C**	

2030 Alternative 2 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	54.9	D	255
EB overall		**54.9**	**D**	
WBL	150	52.9	D	76
WBT+R	269	56.5	E	145
WB overall		**55.5**	**E**	
NBL+T+R	469	26.9	C	452
NB overall		**26.9**	**C**	
SBL+T+R	1000	22.1	C	227
SB Overall		**22.1**	**C**	
OVERALL		**30.1**	**C**	

2030 Alternative 2 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	214	60.9	E	207
EB overall		**60.9**	**E**	
WBL	150	62.7	E	66
WBT+R	269	53.4	D	80
WB overall		**56.9**	**E**	
NBL+T+R	469	14.6	B	221
NB overall		**14.6**	**B**	
SBL+T+R	1000	13.6	B	189
SB Overall		**13.6**	**B**	
OVERALL		**20.9**	**C**	

Note: the EB thru+right turn bay refer to vehicles creating a second lane due to the wide lane configuration, in order to bypass left turning vehicles

Int: #3 Tilbury & Cheltenham

2025 Existing Conditions AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.9	A	0
WB	269	3.2	A	0
NB	1000	2.8	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2030 No-Build Conditions AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.9	A	0
WB	269	3.2	A	0
NB	1000	2.8	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2030 Alternative 1 AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.9	A	0
WB	269	3.2	A	0
NB	1000	2.8	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2030 Alternative 1 Optimized AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.9	A	0
WB	269	3.2	A	0
NB	1000	2.8	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2030 Alternative 2 AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.9	A	0
WB	269	3.2	A	0
NB	1000	2.8	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2025 Existing Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.9	A	0
WB	269	3.2	A	0
NB	1000	2.8	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2030 No-Build Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	3.0	A	0
WB	269	3.3	A	0
NB	1000	2.9	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2030 Alternative 1 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	3.0	A	0
WB	269	3.3	A	0
NB	1000	2.9	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2030 Alternative 1 Optimized PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	3.0	A	0
WB	269	3.3	A	0
NB	1000	2.9	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2030 Alternative 2 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	3.0	A	0
WB	269	3.3	A	0
NB	1000	2.9	A	0
SB	1000	3.1	A	0
OVERALL		**3.1**	**A**	

2025 Existing Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.7	A	0
WB	269	3.0	A	0
NB	1000	2.7	A	0
SB	1000	2.9	A	0
OVERALL		**2.9**	**A**	

2030 No-Build Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.8	A	0
WB	269	3.0	A	0
NB	1000	2.8	A	0
SB	1000	2.9	A	0
OVERALL		**2.9**	**A**	

2030 Alternative 1 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.8	A	0
WB	269	3.0	A	0
NB	1000	2.8	A	0
SB	1000	2.9	A	0
OVERALL		**2.9**	**A**	

2030 Alternative 1 Optimized Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.8	A	0
WB	269	3.0	A	0
NB	1000	2.8	A	0
SB	1000	2.9	A	0
OVERALL		**2.9**	**A**	

2030 Alternative 2 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EB	1000	2.8	A	0
WB	269	3.0	A	0
NB	1000	2.8	A	0
SB	1000	2.9	A	0
OVERALL		**2.9**	**A**	

Int: #4 Middleton & MD355

2025 Existing Conditions AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	63.2	E	22
WB overall		**63.2**	**E**	
NBL+T+R	1000	0.6	A	24
NB overall		**0.6**	**A**	
SBL+T+R	469	1.0	A	76
SB Overall		**1.0**	**A**	
OVERALL		**1.3**	**A**	

2030 No-Build Conditions AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	63.2	E	22
WB overall		**63.2**	**E**	
NBL+T+R	1000	0.6	A	24
NB overall		**0.6**	**A**	
SBL+T+R	469	0.2	A	1
SB Overall		**0.2**	**A**	
OVERALL		**0.8**	**A**	

2030 Alternative 1 AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	63.2	E	22
WB overall		**63.2**	**E**	
NBL+T+R	1000	0.6	A	24
NB overall		**0.6**	**A**	
SBL+T+R	469	0.2	A	6
SB Overall		**0.2**	**A**	
OVERALL		**0.8**	**A**	

2030 Alternative 1 Optimized AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	63.2	E	22
WB overall		**63.2**	**E**	
NBL+T+R	1000	0.6	A	24
NB overall		**0.6**	**A**	
SBL+T+R	469	1.5	A	94
SB Overall		**1.5**	**A**	
OVERALL		**1.5**	**A**	

2030 Alternative 2 AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	63.2	E	22
WB overall		**63.2**	**E**	
NBL+T+R	1000	0.6	A	24
NB overall		**0.6**	**A**	
SBL+T+R	469	0.4	A	19
SB Overall		**0.4**	**A**	
OVERALL		**0.9**	**A**	

2025 Existing Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	59.6	E	29
WB overall		**59.6**	**E**	
NBL+T+R	1000	1.0	A	59
NB overall		**1.0**	**A**	
SBL+T+R	469	0.6	A	22
SB Overall		**0.6**	**A**	
OVERALL		**1.4**	**A**	

2030 No-Build Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	59.7	E	32
WB overall		**59.7**	**E**	
NBL+T+R	1000	1.1	A	70
NB overall		**1.1**	**A**	
SBL+T+R	469	0.7	A	28
SB Overall		**0.7**	**A**	
OVERALL		**1.4**	**A**	

2030 Alternative 1 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	59.7	E	32
WB overall		**59.7**	**E**	
NBL+T+R	1000	1.1	A	70
NB overall		**1.1**	**A**	
SBL+T+R	469	0.7	A	27
SB Overall		**0.7**	**A**	
OVERALL		**1.4**	**A**	

2030 Alternative 1 Optimized PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	59.7	E	32
WB overall		**59.7**	**E**	
NBL+T+R	1000	1.1	A	70
NB overall		**1.1**	**A**	
SBL+T+R	469	0.6	A	21
SB Overall		**0.6**	**A**	
OVERALL		**1.4**	**A**	

2030 Alternative 2 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBL+R	150	59.7	E	32
WB overall		**59.7**	**E**	
NBL+T+R	1000	1.1	A	70
NB overall		**1.1**	**A**	
SBL+T+R	469	0.3	A	10
SB Overall		**0.3**	**A**	
OVERALL		**1.3**	**A**	

2025 Existing Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBT+R	150	59.7	E	27
WB overall		**59.7**	**E**	
NBL+T+R	1000	0.8	A	39
NB overall		**0.8**	**A**	
SBL+T+R	469	0.6	A	24
SB Overall		**0.6**	**A**	
OVERALL		**1.2**	**A**	

2030 No-Build Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBT+R	150	59.7	E	28
WB overall		**59.7**	**E**	
NBL+T+R	1000	0.8	A	41
NB overall		**0.8**	**A**	
SBL+T+R	469	0.6	A	26
SB Overall		**0.6**	**A**	
OVERALL		**1.2**	**A**	

2030 Alternative 1 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBT+R	150	59.7	E	28
WB overall		**59.7**	**E**	
NBL+T+R	1000	0.8	A	41
NB overall		**0.8**	**A**	
SBL+T+R	469	0.6	A	24
SB Overall		**0.6**	**A**	
OVERALL		**1.2**	**A**	

2030 Alternative 1 Optimized Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBT+R	150	59.7	E	28
WB overall		**59.7**	**E**	
NBL+T+R	1000	0.8	A	41
NB overall		**0.8**	**A**	
SBL+T+R	469	0.7	A	25
SB Overall		**0.7**	**A**	
OVERALL		**1.3**	**A**	

2030 Alternative 2 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
WBT+R	150	59.7	E	28
WB overall		**59.7**	**E**	
NBL+T+R	1000	0.8	A	41
NB overall		**0.8**	**A**	
SBL+T+R	469	0.9	A	7
SB Overall		**0.9**	**A**	
OVERALL		**1.3**	**A**	

Int: #5 Woodmont & MD187/MD197

2025 Existing Conditions AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	10.5	B	114
EBR	1000	8.1	A	198
EB overall		**8.5**	**A**	
WBL	1000	21.4	C	32
WBT+R	1000	50.9	D	299
WB overall		**47.1**	**D**	
SBT+R	689	55.9	E	284
SB Overall		**55.9**	**E**	
OVERALL		**32.7**	**C**	

2030 No-Build Conditions AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	15.5	B	184
EBR	1000	8.9	A	213
EB overall		**10.1**	**A**	
WBL	1000	26.5	C	39
WBT+R	1000	46.4	D	354
WB overall		**44.3**	**D**	
SBT+R	689	57.6	E	307
SB Overall		**57.6**	**E**	
OVERALL		**33.6**	**C**	

2030 Alternative 1 AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	15.5	B	184
EBR	1000	8.9	A	213
EB overall		**10.1**	**A**	
WBL	1000	26.5	C	39
WBT+R	1000	46.4	D	354
WB overall		**44.3**	**D**	
SBT+R	689	57.2	E	307
SB Overall		**57.2**	**E**	
OVERALL		**33.5**	**C**	

2030 Alternative 1 Optimized AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	15.5	B	184
EBR	1000	8.9	A	213
EB overall		**10.1**	**A**	
WBL	1000	26.5	C	39
WBT+R	1000	46.4	D	354
WB overall		**44.3**	**D**	
SBT+R	689	55.4	E	304
SB Overall		**55.4**	**E**	
OVERALL		**33.1**	**C**	

2030 Alternative 2 AM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	15.5	B	184
EBR	1000	8.9	A	213
EB overall		**10.1**	**B**	
WBL	1000	26.5	C	39
WBT+R	1000	46.4	D	354
WB overall		**44.3**	**D**	
SBT+R	689	54.4	D	298
SB Overall		**54.4**	**D**	
OVERALL		**32.9**	**C**	

2025 Existing Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	12.2	B	158
EBR	1000	5.9	A	127
EB overall		**7.2**	**A**	
WBL	1000	25.9	C	52
WBT+R	1000	43.4	D	376
WB overall		**41.4**	**D**	
SBT+R	689	56.6	E	214
SB Overall		**56.6**	**E**	
OVERALL		**32.7**	**C**	

2030 No-Build Conditions PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	17.5	B	228
EBR	1000	7.1	A	159
EB overall		**9.1**	**A**	
WBL	1000	29.1	C	59
WBT+R	1000	42.0	D	392
WB overall		**40.5**	**D**	
SBT+R	689	56.2	E	249
SB Overall		**56.2**	**E**	
OVERALL		**32.5**	**C**	

2030 Alternative 1 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	17.5	B	228
EBR	1000	7.1	A	159
EB overall		**9.1**	**A**	
WBL	1000	29.1	C	58
WBT+R	1000	42.0	D	392
WB overall		**40.5**	**D**	
SBT+R	689	55.0	D	249
SB Overall		**55.0**	**D**	
OVERALL		**32.3**	**C**	

2030 Alternative 1 Optimized PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	17.5	B	228
EBR	1000	7.1	A	159
EB overall		**9.1**	**A**	
WBL	1000	29.1	C	58
WBT+R	1000	42.0	D	392
WB overall		**40.5**	**D**	
SBT+R	689	56.2	E	249
SB Overall		**56.2**	**E**	
OVERALL		**32.5**	**C**	

2030 Alternative 2 PM Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	17.5	B	228
EBR	1000	7.1	A	159
EB overall		**9.1**	**A**	
WBL	1000	29.1	C	58
WBT+R	1000	42.0	D	392
WB overall		**40.5**	**D**	
SBT+R	689	56.0	E	249
SB Overall		**56.0**	**E**	
OVERALL		**32.5**	**C**	

2025 Existing Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	5.0	A	47
EBR	1000	3.7	A	56
EB overall		**4.0**	**A**	
WBL	1000	15.5	B	36
WBT+R	1000	52.8	D	292
WB overall		**47.2**	**D**	
SBT+R	689	53.5	D	157
SB Overall		**53.5**	**D**	
OVERALL		**35.7**	**D**	

2030 No-Build Conditions Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	5.5	A	53
EBR	1000	3.9	A	61
EB overall		**4.3**	**A**	
WBL	1000	16.6	B	38
WBT+R	1000	51.8	D	305
WB overall		**46.5**	**D**	
SBT+R	689	53.4	D	165
SB Overall		**53.4**	**D**	
OVERALL		**35.4**	**D**	

2030 Alternative 1 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	5.5	A	53
EBR	1000	3.9	A	61
EB overall		**4.3**	**A**	
WBL	1000	16.6	B	38
WBT+R	1000	51.8	D	305
WB overall		**46.5**	**D**	
SBT+R	689	53.4	D	165
SB Overall		**53.4**	**D**	
OVERALL		**35.4**	**D**	

2030 Alternative 1 Optimized Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	5.5	A	53
EBR	1000	3.9	A	61
EB overall		**4.3**	**A**	
WBL	1000	16.6	B	38
WBT+R	1000	51.8	D	305
WB overall		**46.5**	**D**	
SBT+R	689	53.4	D	165
SB Overall		**53.4**	**D**	
OVERALL		**35.4**	**D**	

2030 Alternative 2 Sat. Peak Hour

	Storage (ft)	delay	LOS	95% Queue (ft)
EBL	1000	5.5	A	53
EBR	1000	3.9	A	61
EB overall		**4.3**	**A**	
WBL	1000	16.6	B	38
WBT+R	1000	51.8	D	305
WB overall		**46.5**	**D**	
SBT+R	689	53.4	D	165
SB Overall		**53.4**	**D**	
OVERALL		**35.4**	**D**	

2025 Base Conditions

Queues

1: Woodmont & Norfolk

05/29/2025



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	90	58	173	12	22	154	23	605	24
v/c Ratio	0.26	0.18	0.58	0.04	0.05	0.16	0.04	0.50	0.02
Control Delay (s/veh)	19.9	18.8	33.3	21.3	11.5	13.0	7.3	10.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.9	18.8	33.3	21.3	11.5	13.0	7.3	10.2	0.0
Queue Length 50th (ft)	27	17	89	0	11	96	3	118	0
Queue Length 95th (ft)	54	39	110	15	m23	154	14	250	0
Internal Link Dist (ft)	351		214			689		583	
Turn Bay Length (ft)		30		30	100		200		60
Base Capacity (vph)	406	373	347	336	443	960	573	1211	1011
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.16	0.50	0.04	0.05	0.16	0.04	0.50	0.02

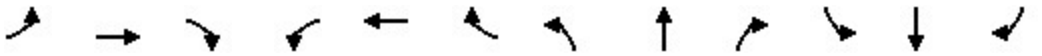
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	61	53	104	55	11	20	83	59	21	557	22
Future Volume (vph)	22	61	53	104	55	11	20	83	59	21	557	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.90		1.00	0.81	1.00	0.85		1.00	1.00	0.94
Flpb, ped/bikes		0.97	1.00		0.95	1.00	0.99	1.00		0.72	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1775	1430		1717	1285	1748	1479		1271	1863	1490
Flt Permitted		0.87	1.00		0.75	1.00	0.37	1.00		0.66	1.00	1.00
Satd. Flow (perm)		1556	1430		1328	1285	674	1479		882	1863	1490
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	66	58	113	60	12	22	90	64	23	605	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	9
Lane Group Flow (vph)	0	90	58	0	173	12	22	154	0	23	605	15
Confl. Peds. (#/hr)	77		65	65		77	14		128	128		14
Confl. Bikes (#/hr)			3			4			15			3
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)		11.4	11.4		11.4	11.4	36.6	36.6		36.6	36.6	36.6
Effective Green, g (s)		11.4	11.4		11.4	11.4	36.6	36.6		36.6	36.6	36.6
Actuated g/C Ratio		0.19	0.19		0.19	0.19	0.61	0.61		0.61	0.61	0.61
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		295	271		252	244	411	902		538	1136	908
v/s Ratio Prot								0.10			c0.32	
v/s Ratio Perm		0.06	0.04		c0.13	0.01	0.03			0.03		0.01
v/c Ratio		0.31	0.21		0.69	0.05	0.05	0.17		0.04	0.53	0.02
Uniform Delay, d1		20.9	20.5		22.6	19.9	4.7	5.1		4.7	6.8	4.6
Progression Factor		1.00	1.00		1.25	1.28	1.64	1.97		1.00	1.00	1.00
Incremental Delay, d2		0.6	0.4		7.4	0.1	0.2	0.4		0.1	1.8	0.0
Delay (s)		21.5	20.9		35.6	25.5	7.9	10.4		4.8	8.5	4.6
Level of Service		C	C		D	C	A	B		A	A	A
Approach Delay (s/veh)		21.3			35.0			10.1			8.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/29/2025



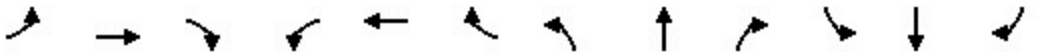
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	65	87	28	108	647	1033
v/c Ratio	0.59	0.44	0.24	0.58	0.19	0.29
Control Delay (s/veh)	63.5	30.0	52.9	53.7	3.0	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	63.5	30.0	52.9	53.7	3.0	3.3
Queue Length 50th (ft)	43	26	20	67	32	56
Queue Length 95th (ft)	100	75	48	121	54	91
Internal Link Dist (ft)		214		160	469	362
Turn Bay Length (ft)						
Base Capacity (vph)	250	394	265	401	3457	3567
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.22	0.11	0.27	0.19	0.29

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	39	41	26	66	33	27	539	29	32	827	91
Future Volume (vph)	60	39	41	26	66	33	27	539	29	32	827	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes	1.00	0.94		1.00	0.97			0.99			0.99	
Flpb, ped/bikes	0.94	1.00		0.91	1.00			1.00			1.00	
Frt	1.00	0.92		1.00	0.95			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1668	1615		1603	1719			4999			4949	
Flt Permitted	0.64	1.00		0.70	1.00			0.86			0.89	
Satd. Flow (perm)	1116	1615		1182	1719			4286			4421	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	42	45	28	72	36	29	586	32	35	899	99
RTOR Reduction (vph)	0	37	0	0	17	0	0	3	0	0	6	0
Lane Group Flow (vph)	65	50	0	28	91	0	0	644	0	0	1027	0
Confl. Peds. (#/hr)	47		74	74		47	29		42	42		29
Confl. Bikes (#/hr)						4			2			1
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.9	11.9		11.9	11.9			96.6			96.6	
Effective Green, g (s)	11.9	11.9		11.9	11.9			96.6			96.6	
Actuated g/C Ratio	0.10	0.10		0.10	0.10			0.81			0.81	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	110	160		117	170			3450			3558	
v/s Ratio Prot		0.03			0.05							
v/s Ratio Perm	c0.06			0.02				0.15			c0.23	
v/c Ratio	0.59	0.31		0.24	0.53			0.19			0.29	
Uniform Delay, d1	51.7	50.2		49.9	51.4			2.7			3.0	
Progression Factor	0.84	0.83		1.00	1.00			1.00			1.00	
Incremental Delay, d2	8.2	1.1		1.1	3.2			0.1			0.2	
Delay (s)	51.5	42.6		50.9	54.6			2.8			3.2	
Level of Service	D	D		D	D			A			A	
Approach Delay (s/veh)		46.4			53.9			2.8			3.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	9.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	35	66	15	36
Demand Flow Rate, veh/h	36	67	15	37
Vehicles Circulating, veh/h	0	51	36	68
Vehicles Exiting, veh/h	105	0	0	50
Ped Vol Crossing Leg, #/h	5	8	9	10
Ped Cap Adj	0.999	0.999	0.999	0.999
Approach Delay, s/veh	2.9	3.2	2.8	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	36	67	15	37
Cap Entry Lane, veh/h	1380	1310	1330	1287
Entry HV Adj Factor	0.971	0.984	0.993	0.973
Flow Entry, veh/h	35	66	15	36
Cap Entry, veh/h	1338	1287	1320	1251
V/C Ratio	0.026	0.051	0.011	0.029
Control Delay, s/veh	2.9	3.2	2.8	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/29/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	11	647	903
v/c Ratio	0.13	0.13	0.20
Control Delay (s/veh)	37.0	0.4	0.7
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.0	0.4	0.7
Queue Length 50th (ft)	2	0	0
Queue Length 95th (ft)	22	24	76
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	362	4923	4541
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.03	0.13	0.20

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Middleton & MD355

05/29/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	7	583	12	17	814
Future Volume (vph)	3	7	583	12	17	814
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.90		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.90		1.00			1.00
Flt Protected	0.99		1.00			1.00
Satd. Flow (prot)	1483		5064			5069
Flt Permitted	0.99		1.00			0.92
Satd. Flow (perm)	1483		5064			4667
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	8	634	13	18	885
RTOR Reduction (vph)	8	0	1	0	0	0
Lane Group Flow (vph)	3	0	646	0	0	903
Confl. Peds. (#/hr)		77		76	76	
Confl. Bikes (#/hr)		1				
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		109.5			109.5
Effective Green, g (s)	1.5		109.5			109.5
Actuated g/C Ratio	0.01		0.91			0.91
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	18		4620			4258
v/s Ratio Prot	c0.00		0.13			
v/s Ratio Perm						c0.19
v/c Ratio	0.17		0.14			0.21
Uniform Delay, d1	58.6		0.5			0.6
Progression Factor	1.00		1.00			1.56
Incremental Delay, d2	4.5		0.1			0.1
Delay (s)	63.2		0.6			1.0
Level of Service	E		A			A
Approach Delay (s/veh)	63.2		0.6			1.0
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

5: Woodmont & MD187/MD197

05/29/2025



Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	166	798	96	656	539
v/c Ratio	0.45	0.44	0.15	0.85	0.78
Control Delay (s/veh)	13.0	8.8	4.7	53.3	57.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	13.0	8.8	4.7	53.3	57.4
Queue Length 50th (ft)	50	134	0	255	226
Queue Length 95th (ft)	114	198	32	299	284
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	372	1819	654	1435	822
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.44	0.15	0.46	0.66

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/29/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	0	734	88	453	151	0	0	0	0	452	44
Future Volume (vph)	153	0	734	88	453	151	0	0	0	0	452	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.94	1.00	0.91						0.98	
Flpb, ped/bikes	0.92		1.00	0.92	1.00						1.00	
Frt	1.00		0.85	1.00	0.96						0.99	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1628		2633	1637	3104						3438	
Flt Permitted	0.33		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	561		2633	1637	3104						3438	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	0	798	96	492	164	0	0	0	0	491	48
RTOR Reduction (vph)	0	0	0	56	0	0	0	0	0	0	6	0
Lane Group Flow (vph)	166	0	798	40	656	0	0	0	0	0	533	0
Confl. Peds. (#/hr)	108		103	103		108	101		120	120		101
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	84.9		84.9	49.4	30.0						24.1	
Effective Green, g (s)	84.9		84.9	49.4	30.0						24.1	
Actuated g/C Ratio	0.71		0.71	0.41	0.25						0.20	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	396		1862	673	776						690	
v/s Ratio Prot					c0.21						c0.15	
v/s Ratio Perm	0.30		c0.30	0.02								
v/c Ratio	0.42		0.43	0.06	0.85						0.77	
Uniform Delay, d1	7.3		7.4	21.3	42.8						45.4	
Progression Factor	1.00		1.00	1.00	1.00						1.13	
Incremental Delay, d2	3.2		0.7	0.2	8.1						4.8	
Delay (s)	10.5		8.1	21.4	50.9						55.9	
Level of Service	B		A	C	D						E	
Approach Delay (s/veh)		8.5			47.1			0.0			55.9	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/29/2025

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	116	61	116	33	43	340	27	263	37
v/c Ratio	0.64	0.46	0.70	0.34	0.07	0.31	0.05	0.18	0.06
Control Delay (s/veh)	65.1	59.0	64.6	49.6	2.6	5.3	4.0	4.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	65.1	59.0	64.6	49.6	2.6	5.3	4.0	4.2	0.5
Queue Length 50th (ft)	87	45	92	25	6	105	4	44	0
Queue Length 95th (ft)	143	86	149	57	m11	140	13	84	4
Internal Link Dist (ft)	351		214			689		583	
Turn Bay Length (ft)		30		30	100		200		60
Base Capacity (vph)	334	243	304	176	627	1081	597	1447	663
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.25	0.38	0.19	0.07	0.31	0.05	0.18	0.06

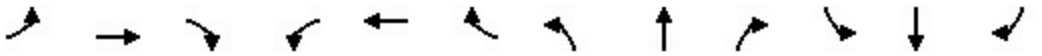
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	84	56	31	75	30	40	201	112	25	242	34
Future Volume (vph)	23	84	56	31	75	30	40	201	112	25	242	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.68		1.00	0.49	1.00	0.79		1.00	1.00	0.53
Flpb, ped/bikes		0.91	1.00		0.93	1.00	0.68	1.00		0.64	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1684	1077		1702	782	1207	1392		1140	1863	837
Flt Permitted		0.88	1.00		0.79	1.00	0.60	1.00		0.55	1.00	1.00
Satd. Flow (perm)		1492	1077		1360	782	758	1392		666	1863	837
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	91	61	34	82	33	43	218	122	27	263	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	116	61	0	116	33	43	340	0	27	263	29
Confl. Peds. (#/hr)	115		130	130		115	84		162	162		84
Confl. Bikes (#/hr)			8			2			3			9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)		14.8	14.8		14.8	14.8	93.2	93.2		93.2	93.2	93.2
Effective Green, g (s)		14.8	14.8		14.8	14.8	93.2	93.2		93.2	93.2	93.2
Actuated g/C Ratio		0.12	0.12		0.12	0.12	0.78	0.78		0.78	0.78	0.78
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		184	132		167	96	588	1081		517	1446	650
v/s Ratio Prot								c0.24			0.14	
v/s Ratio Perm		0.08	0.06		c0.09	0.04	0.06			0.04		0.03
v/c Ratio		0.63	0.46		0.69	0.34	0.07	0.31		0.05	0.18	0.04
Uniform Delay, d1		50.0	48.9		50.4	48.2	3.2	4.0		3.1	3.5	3.1
Progression Factor		1.00	1.00		0.88	0.86	0.60	1.02		1.00	1.00	1.00
Incremental Delay, d2		6.9	2.6		11.4	2.1	0.2	0.7		0.2	0.3	0.1
Delay (s)		56.9	51.5		55.6	43.5	2.1	4.7		3.3	3.8	3.2
Level of Service		E	D		E	D	A	A		A	A	A
Approach Delay (s/veh)		55.0			52.9			4.4			3.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/29/2025

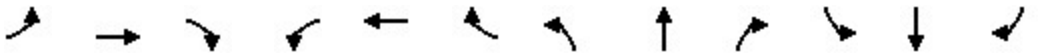


Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	128	114	35	123	1321	654
v/c Ratio	0.76	0.39	0.21	0.43	0.40	0.22
Control Delay (s/veh)	77.2	30.5	44.4	38.9	5.7	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay (s/veh)	77.2	30.5	44.4	38.9	5.8	5.2
Queue Length 50th (ft)	103	50	24	68	116	47
Queue Length 95th (ft)	165	100	52	119	183	80
Internal Link Dist (ft)		214		160	469	362
Turn Bay Length (ft)						
Base Capacity (vph)	241	391	235	397	3286	3006
Starvation Cap Reductn	0	0	0	0	591	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.29	0.15	0.31	0.49	0.22

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham 05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	118	36	69	32	68	45	48	1142	26	34	540	28
Future Volume (vph)	118	36	69	32	68	45	48	1142	26	34	540	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes	1.00	0.89		1.00	0.96			1.00			0.99	
Flpb, ped/bikes	0.92	1.00		0.86	1.00			1.00			1.00	
Frt	1.00	0.90		1.00	0.94			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1626	1486		1524	1675			5032			4993	
Flt Permitted	0.63	1.00		0.65	1.00			0.87			0.80	
Satd. Flow (perm)	1073	1486		1048	1675			4398			4020	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	128	39	75	35	74	49	52	1241	28	37	587	30
RTOR Reduction (vph)	0	62	0	0	22	0	0	2	0	0	3	0
Lane Group Flow (vph)	128	52	0	35	101	0	0	1319	0	0	651	0
Confl. Peds. (#/hr)	69		115	115		69	54		46	46		54
Confl. Bikes (#/hr)									3			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.9	18.9		18.9	18.9			89.6			89.6	
Effective Green, g (s)	18.9	18.9		18.9	18.9			89.6			89.6	
Actuated g/C Ratio	0.16	0.16		0.16	0.16			0.75			0.75	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	168	234		165	263			3283			3001	
v/s Ratio Prot		0.03			0.06							
v/s Ratio Perm	c0.12			0.03				c0.30			0.16	
v/c Ratio	0.76	0.22		0.21	0.38			0.40			0.22	
Uniform Delay, d1	48.4	44.1		44.1	45.3			5.5			4.6	
Progression Factor	1.07	1.59		1.00	1.00			0.88			1.00	
Incremental Delay, d2	17.8	0.5		0.6	0.9			0.4			0.2	
Delay (s)	69.5	70.5		44.7	46.3			5.2			4.8	
Level of Service	E	E		D	D			A			A	
Approach Delay (s/veh)		70.0			45.9			5.2			4.8	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	46	64	15	29
Demand Flow Rate, veh/h	47	65	15	30
Vehicles Circulating, veh/h	0	62	47	66
Vehicles Exiting, veh/h	96	0	0	61
Ped Vol Crossing Leg, #/h	6	14	8	17
Ped Cap Adj	0.999	0.998	0.999	0.998
Approach Delay, s/veh	2.9	3.2	2.8	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	47	65	15	30
Cap Entry Lane, veh/h	1380	1295	1315	1290
Entry HV Adj Factor	0.977	0.984	0.995	0.967
Flow Entry, veh/h	46	64	15	29
Cap Entry, veh/h	1348	1273	1307	1244
V/C Ratio	0.034	0.050	0.011	0.023
Control Delay, s/veh	2.9	3.2	2.8	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/29/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	18	1311	720
v/c Ratio	0.19	0.27	0.17
Control Delay (s/veh)	37.5	0.9	0.6
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.5	0.9	0.6
Queue Length 50th (ft)	5	0	0
Queue Length 95th (ft)	29	59	22
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	387	4784	4249
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.05	0.27	0.17

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	10	1186	20	17	646
Future Volume (vph)	6	10	1186	20	17	646
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.95		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1598		5067			5073
Flt Permitted	0.98		1.00			0.89
Satd. Flow (perm)	1598		5067			4498
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	11	1289	22	18	702
RTOR Reduction (vph)	11	0	1	0	0	0
Lane Group Flow (vph)	7	0	1311	0	0	720
Confl. Peds. (#/hr)		42		80	80	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	3.0		108.0			108.0
Effective Green, g (s)	3.0		108.0			108.0
Actuated g/C Ratio	0.03		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	39		4560			4048
v/s Ratio Prot	c0.00		c0.26			
v/s Ratio Perm						0.16
v/c Ratio	0.19		0.29			0.18
Uniform Delay, d1	57.3		0.8			0.7
Progression Factor	1.00		1.00			0.75
Incremental Delay, d2	2.3		0.2			0.1
Delay (s)	59.6		1.0			0.6
Level of Service	E		A			A
Approach Delay (s/veh)	59.6		1.0			0.6
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197

05/29/2025



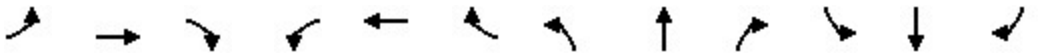
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	160	602	115	904	443
v/c Ratio	0.59	0.33	0.22	0.85	0.77
Control Delay (s/veh)	19.6	6.5	8.5	45.2	54.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.6	6.5	8.5	45.2	54.8
Queue Length 50th (ft)	50	80	3	341	163
Queue Length 95th (ft)	158	127	52	376	214
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	271	1827	513	1553	704
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.59	0.33	0.22	0.58	0.63

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	0	554	106	707	125	0	0	0	0	295	112
Future Volume (vph)	147	0	554	106	707	125	0	0	0	0	295	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.92	1.00	0.92						0.93	
Flpb, ped/bikes	1.00		1.00	0.86	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.96	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2573	1530	3187						3154	
Flt Permitted	0.23		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	433		2573	1530	3187						3154	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	0	602	115	768	136	0	0	0	0	321	122
RTOR Reduction (vph)	0	0	0	70	0	0	0	0	0	0	35	0
Lane Group Flow (vph)	160	0	602	45	904	0	0	0	0	0	408	0
Confl. Peds. (#/hr)	175		161	161		175	144		97	97		144
Confl. Bikes (#/hr)			2			4						16
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	88.4		88.4	42.8	40.1						20.6	
Effective Green, g (s)	88.4		88.4	42.8	40.1						20.6	
Actuated g/C Ratio	0.74		0.74	0.36	0.33						0.17	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	318		1895	545	1064						541	
v/s Ratio Prot					c0.28						c0.13	
v/s Ratio Perm	c0.37		0.23	0.03								
v/c Ratio	0.50		0.32	0.08	0.85						0.75	
Uniform Delay, d1	6.6		5.4	25.6	37.1						47.3	
Progression Factor	1.00		1.00	1.00	1.00						1.07	
Incremental Delay, d2	5.6		0.4	0.3	6.2						5.9	
Delay (s)	12.2		5.9	25.9	43.4						56.6	
Level of Service	B		A	C	D						E	
Approach Delay (s/veh)		7.2			41.4			0.0			56.6	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/29/2025

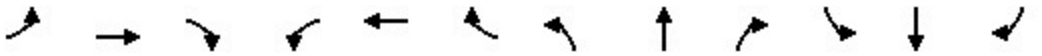
Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	110	47	128	40	18	171	32	241	40
v/c Ratio	0.41	0.25	0.59	0.27	0.03	0.17	0.06	0.18	0.05
Control Delay (s/veh)	33.1	30.5	41.3	31.9	5.6	5.7	5.8	5.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	33.1	30.5	41.3	31.9	5.6	5.7	5.8	5.5	0.1
Queue Length 50th (ft)	50	21	60	18	3	26	5	37	0
Queue Length 95th (ft)	89	47	106	43	11	62	17	81	1
Internal Link Dist (ft)	351		214			689		583	
Turn Bay Length (ft)		30		30	100		200		60
Base Capacity (vph)	390	272	314	216	646	1033	524	1365	788
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.17	0.41	0.19	0.03	0.17	0.06	0.18	0.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	81	43	61	57	37	17	98	59	29	222	37
Future Volume (vph)	20	81	43	61	57	37	17	98	59	29	222	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.69		1.00	0.54	1.00	0.80		1.00	1.00	0.66
Flpb, ped/bikes		0.93	1.00		0.87	1.00	0.77	1.00		0.59	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1708	1088		1572	860	1355	1411		1048	1863	1042
Flt Permitted		0.90	1.00		0.78	1.00	0.61	1.00		0.65	1.00	1.00
Satd. Flow (perm)		1560	1088		1259	860	869	1411		716	1863	1042
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	88	47	66	62	40	18	107	64	32	241	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	12
Lane Group Flow (vph)	0	110	47	0	128	40	18	171	0	32	241	28
Confl. Peds. (#/hr)	154		184	184		154	90		161	161		90
Confl. Bikes (#/hr)			5			4			5			3
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)		11.8	11.8		11.8	11.8	56.2	56.2		56.2	56.2	56.2
Effective Green, g (s)		11.8	11.8		11.8	11.8	56.2	56.2		56.2	56.2	56.2
Actuated g/C Ratio		0.15	0.15		0.15	0.15	0.70	0.70		0.70	0.70	0.70
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		230	160		185	126	610	991		502	1308	732
v/s Ratio Prot								0.12			c0.13	
v/s Ratio Perm		0.07	0.04		c0.10	0.05	0.02			0.04		0.03
v/c Ratio		0.48	0.29		0.69	0.32	0.03	0.17		0.06	0.18	0.04
Uniform Delay, d1		31.3	30.4		32.4	30.5	3.6	4.0		3.7	4.1	3.6
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.6	1.0		10.6	1.5	0.1	0.4		0.2	0.3	0.1
Delay (s)		32.8	31.4		43.0	32.0	3.7	4.4		4.0	4.4	3.7
Level of Service		C	C		D	C	A	A		A	A	A
Approach Delay (s/veh)		32.4			40.4			4.3			4.3	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/29/2025



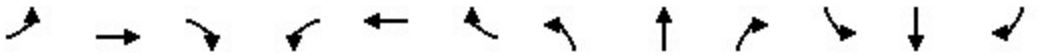
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	95	101	39	61	956	756
v/c Ratio	0.65	0.41	0.28	0.27	0.31	0.24
Control Delay (s/veh)	69.0	20.0	50.7	37.6	3.8	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	69.0	20.0	50.7	37.6	3.8	4.0
Queue Length 50th (ft)	71	17	28	32	64	46
Queue Length 95th (ft)	123	66	60	70	105	78
Internal Link Dist (ft)		214		160	469	362
Turn Bay Length (ft)						
Base Capacity (vph)	266	389	250	397	3117	3160
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.26	0.16	0.15	0.31	0.24

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	22	71	36	40	17	71	792	17	43	604	48
Future Volume (vph)	87	22	71	36	40	17	71	792	17	43	604	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes	1.00	0.89		1.00	0.96			1.00			0.99	
Flpb, ped/bikes	0.89	1.00		0.88	1.00			1.00			1.00	
Frt	1.00	0.89		1.00	0.96			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1571	1464		1558	1711			5005			4934	
Flt Permitted	0.72	1.00		0.68	1.00			0.80			0.82	
Satd. Flow (perm)	1186	1464		1116	1711			3996			4043	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	24	77	39	43	18	77	861	18	47	657	52
RTOR Reduction (vph)	0	67	0	0	14	0	0	1	0	0	5	0
Lane Group Flow (vph)	95	34	0	39	47	0	0	955	0	0	751	0
Confl. Peds. (#/hr)	85		96	96		85	65		74	74		65
Confl. Bikes (#/hr)									1			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.9	14.9		14.9	14.9			93.6			93.6	
Effective Green, g (s)	14.9	14.9		14.9	14.9			93.6			93.6	
Actuated g/C Ratio	0.12	0.12		0.12	0.12			0.78			0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	147	181		138	212			3116			3153	
v/s Ratio Prot		0.02			0.03							
v/s Ratio Perm	c0.08			0.03				c0.24			0.19	
v/c Ratio	0.65	0.19		0.28	0.22			0.31			0.24	
Uniform Delay, d1	50.0	47.1		47.7	47.3			3.8			3.6	
Progression Factor	1.00	1.00		1.00	1.00			0.85			1.00	
Incremental Delay, d2	9.4	0.5		1.1	0.5			0.3			0.2	
Delay (s)	59.4	47.6		48.8	47.9			3.5			3.7	
Level of Service	E	D		D	D			A			A	
Approach Delay (s/veh)		53.3			48.2			3.5			3.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	2.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	23	36	10	22
Demand Flow Rate, veh/h	23	37	10	22
Vehicles Circulating, veh/h	0	33	23	44
Vehicles Exiting, veh/h	66	0	0	26
Ped Vol Crossing Leg, #/h	6	10	4	7
Ped Cap Adj	0.999	0.999	0.999	0.999
Approach Delay, s/veh	2.7	3.0	2.7	2.9
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	23	37	10	22
Cap Entry Lane, veh/h	1380	1334	1348	1319
Entry HV Adj Factor	0.997	0.983	0.996	1.000
Flow Entry, veh/h	23	36	10	22
Cap Entry, veh/h	1375	1309	1342	1318
V/C Ratio	0.017	0.028	0.007	0.017
Control Delay, s/veh	2.7	3.0	2.7	2.9
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/29/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	14	957	789
v/c Ratio	0.15	0.20	0.18
Control Delay (s/veh)	41.5	0.7	0.6
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	41.5	0.7	0.6
Queue Length 50th (ft)	5	0	0
Queue Length 95th (ft)	27	39	24
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	394	4802	4400
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.04	0.20	0.18

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	6	873	7	13	713
Future Volume (vph)	6	6	873	7	13	713
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.97		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.93		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1638		5076			5074
Flt Permitted	0.98		1.00			0.92
Satd. Flow (perm)	1638		5076			4650
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	7	949	8	14	775
RTOR Reduction (vph)	7	0	0	0	0	0
Lane Group Flow (vph)	7	0	957	0	0	789
Confl. Peds. (#/hr)		36		85	85	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	2.9		108.1			108.1
Effective Green, g (s)	2.9		108.1			108.1
Actuated g/C Ratio	0.02		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	39		4572			4188
v/s Ratio Prot	c0.00		c0.19			
v/s Ratio Perm						0.17
v/c Ratio	0.18		0.21			0.19
Uniform Delay, d1	57.4		0.7			0.7
Progression Factor	1.00		1.00			0.76
Incremental Delay, d2	2.3		0.1			0.1
Delay (s)	59.7		0.8			0.6
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		0.8			0.6
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197

05/29/2025



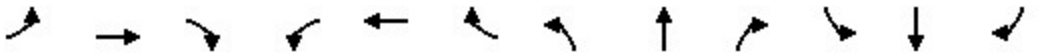
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	102	342	110	629	315
v/c Ratio	0.26	0.18	0.16	0.84	0.69
Control Delay (s/veh)	6.3	4.1	4.5	55.1	53.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.3	4.1	4.5	55.1	53.4
Queue Length 50th (ft)	19	32	0	246	114
Queue Length 95th (ft)	47	56	36	292	157
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	392	1920	694	1500	822
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.26	0.18	0.16	0.42	0.38

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	0	315	101	520	59	0	0	0	0	232	58
Future Volume (vph)	94	0	315	101	520	59	0	0	0	0	232	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.93	1.00	0.95						0.95	
Flpb, ped/bikes	0.87		1.00	0.91	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.97	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1547		2592	1609	3301						3267	
Flt Permitted	0.34		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	561		2592	1609	3301						3267	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	0	342	110	565	64	0	0	0	0	252	63
RTOR Reduction (vph)	0	0	0	55	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	102	0	342	55	629	0	0	0	0	0	294	0
Confl. Peds. (#/hr)	170		152	152		170	131		58	58		131
Confl. Bikes (#/hr)						1						18
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	92.9		92.9	60.3	27.1						16.1	
Effective Green, g (s)	92.9		92.9	60.3	27.1						16.1	
Actuated g/C Ratio	0.77		0.77	0.50	0.23						0.13	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	434		2006	808	745						438	
v/s Ratio Prot					c0.19						c0.09	
v/s Ratio Perm	c0.18		0.13	0.03								
v/c Ratio	0.24		0.17	0.07	0.84						0.67	
Uniform Delay, d1	3.7		3.5	15.4	44.4						49.4	
Progression Factor	1.00		1.00	1.00	1.00						1.00	
Incremental Delay, d2	1.3		0.2	0.2	8.3						4.0	
Delay (s)	5.0		3.7	15.5	52.8						53.5	
Level of Service	A		A	B	D						D	
Approach Delay (s/veh)		4.0			47.2			0.0			53.5	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2030 Baseline Conditions

Queues

1: Woodmont & Norfolk

05/29/2025

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	143	60	189	13	23	218	24	657	25
v/c Ratio	0.37	0.18	0.62	0.04	0.07	0.25	0.05	0.62	0.03
Control Delay (s/veh)	20.9	18.1	31.7	17.8	10.3	13.1	7.8	13.4	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	20.9	18.1	31.7	17.8	10.3	13.1	7.8	13.4	0.0
Queue Length 50th (ft)	44	18	96	6	9	133	3	140	0
Queue Length 95th (ft)	77	38	114	m12	m14	182	15	296	0
Internal Link Dist (ft)	351		214			689		583	
Turn Bay Length (ft)		30		30	100		200		60
Base Capacity (vph)	444	381	348	342	320	888	480	1053	892
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.16	0.54	0.04	0.07	0.25	0.05	0.62	0.03

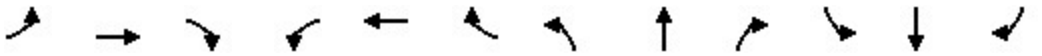
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	109	55	107	67	12	21	140	61	22	604	23
Future Volume (vph)	23	109	55	107	67	12	21	140	61	22	604	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.90		1.00	0.81	1.00	0.89		1.00	1.00	0.94
Flpb, ped/bikes		0.98	1.00		0.96	1.00	0.99	1.00		0.73	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1805	1426		1729	1279	1752	1574		1299	1863	1484
Flt Permitted		0.91	1.00		0.73	1.00	0.30	1.00		0.62	1.00	1.00
Satd. Flow (perm)		1663	1426		1302	1279	563	1574		850	1863	1484
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	118	60	116	73	13	23	152	66	24	657	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	143	60	0	189	13	23	218	0	24	657	14
Confl. Peds. (#/hr)	79		67	67		79	15		132	132		15
Confl. Bikes (#/hr)			4			5			16			4
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)		14.1	14.1		14.1	14.1	33.9	33.9		33.9	33.9	33.9
Effective Green, g (s)		14.1	14.1		14.1	14.1	33.9	33.9		33.9	33.9	33.9
Actuated g/C Ratio		0.24	0.24		0.24	0.24	0.56	0.56		0.56	0.56	0.56
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		390	335		305	300	318	889		480	1052	838
v/s Ratio Prot								0.14			c0.35	
v/s Ratio Perm		0.09	0.04		c0.15	0.01	0.04			0.03		0.01
v/c Ratio		0.37	0.18		0.62	0.04	0.07	0.25		0.05	0.62	0.02
Uniform Delay, d1		19.2	18.3		20.5	17.7	5.9	6.6		5.8	8.8	5.7
Progression Factor		1.00	1.00		1.15	1.12	1.32	1.69		1.00	1.00	1.00
Incremental Delay, d2		0.6	0.3		3.6	0.1	0.4	0.5		0.2	2.8	0.0
Delay (s)		19.8	18.6		27.2	19.8	8.2	11.7		6.0	11.6	5.8
Level of Service		B	B		C	B	A	B		A	B	A
Approach Delay (s/veh)		19.4			26.8			11.4			11.2	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/29/2025



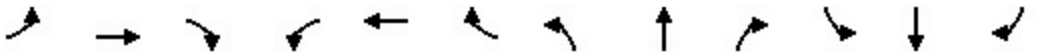
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	117	90	29	111	906	1152
v/c Ratio	0.72	0.34	0.17	0.43	0.28	0.35
Control Delay (s/veh)	65.4	25.3	45.0	42.4	4.9	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	65.4	25.3	45.0	42.4	4.9	5.2
Queue Length 50th (ft)	94	30	20	65	64	86
Queue Length 95th (ft)	156	68	46	115	106	139
Internal Link Dist (ft)		214		160	469	362
Turn Bay Length (ft)						
Base Capacity (vph)	257	394	264	401	3275	3302
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.23	0.11	0.28	0.28	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	40	43	27	68	34	29	774	30	34	922	104
Future Volume (vph)	108	40	43	27	68	34	29	774	30	34	922	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes	1.00	0.94		1.00	0.97			0.99			0.99	
Flpb, ped/bikes	0.94	1.00		0.90	1.00			1.00			1.00	
Frt	1.00	0.92		1.00	0.95			0.99			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1664	1610		1599	1718			5020			4948	
Flt Permitted	0.65	1.00		0.70	1.00			0.85			0.87	
Satd. Flow (perm)	1146	1610		1176	1718			4290			4319	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	43	47	29	74	37	32	841	33	37	1002	113
RTOR Reduction (vph)	0	36	0	0	16	0	0	2	0	0	8	0
Lane Group Flow (vph)	117	54	0	29	95	0	0	904	0	0	1144	0
Confl. Peds. (#/hr)	49		76	76		49	30		44	44		30
Confl. Bikes (#/hr)						5			3			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0			91.5			91.5	
Effective Green, g (s)	17.0	17.0		17.0	17.0			91.5			91.5	
Actuated g/C Ratio	0.14	0.14		0.14	0.14			0.76			0.76	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	162	228		166	243			3271			3293	
v/s Ratio Prot		0.03			0.06							
v/s Ratio Perm	c0.10			0.02				0.21			c0.26	
v/c Ratio	0.72	0.24		0.17	0.39			0.28			0.35	
Uniform Delay, d1	49.2	45.7		45.3	46.8			4.3			4.6	
Progression Factor	0.86	0.88		1.00	1.00			1.00			1.00	
Incremental Delay, d2	14.4	0.5		0.5	1.0			0.2			0.3	
Delay (s)	56.7	40.9		45.8	47.8			4.5			4.9	
Level of Service	E	D		D	D			A			A	
Approach Delay (s/veh)		49.9			47.4			4.5			4.9	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	37	70	18	37
Demand Flow Rate, veh/h	38	71	18	38
Vehicles Circulating, veh/h	0	56	38	73
Vehicles Exiting, veh/h	111	0	0	54
Ped Vol Crossing Leg, #/h	6	9	10	11
Ped Cap Adj	0.999	0.999	0.999	0.998
Approach Delay, s/veh	2.9	3.2	2.8	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	38	71	18	38
Cap Entry Lane, veh/h	1380	1303	1327	1281
Entry HV Adj Factor	0.972	0.984	0.992	0.974
Flow Entry, veh/h	37	70	18	37
Cap Entry, veh/h	1340	1281	1315	1245
V/C Ratio	0.028	0.055	0.014	0.030
Control Delay, s/veh	2.9	3.2	2.8	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/29/2025



Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	11	647	903
v/c Ratio	0.13	0.13	0.20
Control Delay (s/veh)	37.0	0.4	0.1
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.0	0.4	0.1
Queue Length 50th (ft)	2	0	0
Queue Length 95th (ft)	22	24	1
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	361	4923	4540
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.03	0.13	0.20

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Middleton & MD355

05/29/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	7	583	12	17	814
Future Volume (vph)	3	7	583	12	17	814
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.89		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.90		1.00			1.00
Flt Protected	0.99		1.00			1.00
Satd. Flow (prot)	1480		5064			5069
Flt Permitted	0.99		1.00			0.92
Satd. Flow (perm)	1480		5064			4667
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	8	634	13	18	885
RTOR Reduction (vph)	8	0	1	0	0	0
Lane Group Flow (vph)	3	0	646	0	0	903
Confl. Peds. (#/hr)		79		78	78	
Confl. Bikes (#/hr)		1				
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		109.5			109.5
Effective Green, g (s)	1.5		109.5			109.5
Actuated g/C Ratio	0.01		0.91			0.91
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	18		4620			4258
v/s Ratio Prot	c0.00		0.13			
v/s Ratio Perm						c0.19
v/c Ratio	0.17		0.14			0.21
Uniform Delay, d1	58.6		0.5			0.6
Progression Factor	1.00		1.00			0.08
Incremental Delay, d2	4.5		0.1			0.1
Delay (s)	63.2		0.6			0.2
Level of Service	E		A			A
Approach Delay (s/veh)	63.2		0.6			0.2
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	0.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

5: Woodmont & MD187/MD197

05/29/2025



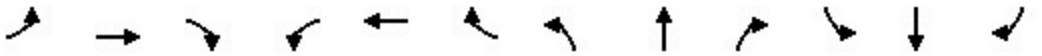
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	183	838	101	825	589
v/c Ratio	0.62	0.47	0.18	0.85	0.81
Control Delay (s/veh)	22.4	9.6	6.4	48.2	58.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.4	9.6	6.4	48.2	58.9
Queue Length 50th (ft)	70	153	0	315	252
Queue Length 95th (ft)	184	213	39	354	307
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	294	1786	562	1459	818
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.62	0.47	0.18	0.57	0.72

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	0	771	93	595	164	0	0	0	0	483	59
Future Volume (vph)	168	0	771	93	595	164	0	0	0	0	483	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.94	1.00	0.92						0.98	
Flpb, ped/bikes	1.00		1.00	0.91	1.00						1.00	
Frt	1.00		0.85	1.00	0.97						0.98	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2627	1606	3155						3413	
Flt Permitted	0.26		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	476		2627	1606	3155						3413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	0	838	101	647	178	0	0	0	0	525	64
RTOR Reduction (vph)	0	0	0	66	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	183	0	838	35	825	0	0	0	0	0	581	0
Confl. Peds. (#/hr)	111		106	106		111	104		124	124		104
Confl. Bikes (#/hr)			2			2			2			2
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	83.6		83.6	41.4	36.7						25.4	
Effective Green, g (s)	83.6		83.6	41.4	36.7						25.4	
Actuated g/C Ratio	0.70		0.70	0.35	0.31						0.21	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	331		1830	554	964						722	
v/s Ratio Prot					c0.26						c0.17	
v/s Ratio Perm	c0.38		0.32	0.02								
v/c Ratio	0.55		0.46	0.06	0.86						0.80	
Uniform Delay, d1	9.0		8.1	26.3	39.2						44.9	
Progression Factor	1.00		1.00	1.00	1.00						1.16	
Incremental Delay, d2	6.5		0.8	0.2	7.3						5.4	
Delay (s)	15.5		8.9	26.5	46.4						57.6	
Level of Service	B		A	C	D						E	
Approach Delay (s/veh)		10.1			44.3			0.0			57.6	
Approach LOS		B			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/29/2025



Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	146	63	162	34	46	390	38	326	28
v/c Ratio	0.73	0.40	0.82	0.31	0.08	0.36	0.07	0.23	0.04
Control Delay (s/veh)	68.6	52.7	71.6	44.6	3.2	6.4	5.1	5.4	0.2
Queue Delay	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	68.6	52.7	71.8	44.6	3.2	6.4	5.1	5.4	0.2
Queue Length 50th (ft)	109	45	128	25	6	111	7	64	0
Queue Length 95th (ft)	172	86	193	m52	m15	224	20	120	1
Internal Link Dist (ft)	351		214			689		583	
Turn Bay Length (ft)		30		30	100		200		60
Base Capacity (vph)	312	242	307	173	611	1084	579	1406	627
Starvation Cap Reductn	0	0	8	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	27	14	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.26	0.54	0.20	0.08	0.37	0.07	0.23	0.04

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/29/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	110	58	32	117	31	42	244	115	35	300	26
Future Volume (vph)	24	110	58	32	117	31	42	244	115	35	300	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.68		1.00	0.49	1.00	0.81		1.00	1.00	0.51
Flpb, ped/bikes		0.94	1.00		0.95	1.00	0.71	1.00		0.69	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1734	1074		1753	768	1248	1437		1228	1863	811
Flt Permitted		0.80	1.00		0.77	1.00	0.56	1.00		0.52	1.00	1.00
Satd. Flow (perm)		1392	1074		1368	768	736	1437		671	1863	811
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	120	63	35	127	34	46	265	125	38	326	28
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	0	146	63	0	162	34	46	390	0	38	326	21
Confl. Peds. (#/hr)	118		134	134		118	87		167	167		87
Confl. Bikes (#/hr)			9			3			4			10
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)		17.4	17.4		17.4	17.4	90.6	90.6		90.6	90.6	90.6
Effective Green, g (s)		17.4	17.4		17.4	17.4	90.6	90.6		90.6	90.6	90.6
Actuated g/C Ratio		0.14	0.14		0.14	0.14	0.76	0.76		0.76	0.76	0.76
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		201	155		198	111	555	1084		506	1406	612
v/s Ratio Prot								c0.27			0.18	
v/s Ratio Perm		0.10	0.06		c0.12	0.04	0.06			0.06		0.03
v/c Ratio		0.73	0.41		0.82	0.31	0.08	0.36		0.08	0.23	0.03
Uniform Delay, d1		49.0	46.6		49.8	45.9	3.8	4.9		3.8	4.4	3.7
Progression Factor		1.00	1.00		0.87	0.86	0.61	0.97		1.00	1.00	1.00
Incremental Delay, d2		12.3	1.7		21.4	1.5	0.3	0.8		0.3	0.4	0.1
Delay (s)		61.3	48.3		64.8	41.0	2.6	5.6		4.1	4.8	3.8
Level of Service		E	D		E	D	A	A		A	A	A
Approach Delay (s/veh)		57.4			60.7			5.3			4.6	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	22.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/29/2025



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	157	117	51	137	1499	864
v/c Ratio	0.84	0.36	0.27	0.42	0.48	0.30
Control Delay (s/veh)	84.3	29.3	43.9	37.9	7.4	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0
Total Delay (s/veh)	84.3	29.3	43.9	37.9	7.5	6.5
Queue Length 50th (ft)	126	52	34	75	165	76
Queue Length 95th (ft)	#208	103	70	132	223	109
Internal Link Dist (ft)		214		160	469	362
Turn Bay Length (ft)						
Base Capacity (vph)	232	391	235	396	3108	2863
Starvation Cap Reductn	0	0	0	0	382	0
Spillback Cap Reductn	0	0	0	0	15	14
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.30	0.22	0.35	0.55	0.30

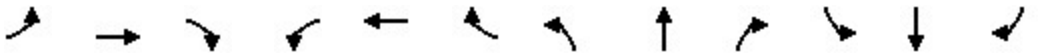
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	37	71	47	75	51	51	1302	27	36	695	64
Future Volume (vph)	144	37	71	47	75	51	51	1302	27	36	695	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes	1.00	0.88		1.00	0.95			1.00			0.99	
Flpb, ped/bikes	0.92	1.00		0.86	1.00			1.00			1.00	
Frt	1.00	0.90		1.00	0.94			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1626	1482		1518	1672			5038			4940	
Flt Permitted	0.60	1.00		0.66	1.00			0.85			0.80	
Satd. Flow (perm)	1035	1482		1048	1672			4296			3945	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	40	77	51	82	55	55	1415	29	39	755	70
RTOR Reduction (vph)	0	61	0	0	21	0	0	1	0	0	7	0
Lane Group Flow (vph)	157	56	0	51	116	0	0	1498	0	0	857	0
Confl. Peds. (#/hr)	71		118	118		71	56		48	48		56
Confl. Bikes (#/hr)									4			3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.7	21.7		21.7	21.7			86.8			86.8	
Effective Green, g (s)	21.7	21.7		21.7	21.7			86.8			86.8	
Actuated g/C Ratio	0.18	0.18		0.18	0.18			0.72			0.72	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	187	267		189	302			3107			2853	
v/s Ratio Prot		0.04			0.07							
v/s Ratio Perm	c0.15			0.05				c0.35			0.22	
v/c Ratio	0.84	0.21		0.27	0.38			0.48			0.30	
Uniform Delay, d1	47.5	41.8		42.3	43.3			7.1			5.9	
Progression Factor	1.09	1.61		1.00	1.00			0.90			1.00	
Incremental Delay, d2	25.6	0.4		0.8	0.8			0.5			0.3	
Delay (s)	77.4	67.7		43.1	44.1			6.9			6.1	
Level of Service	E	E		D	D			A			A	
Approach Delay (s/veh)		73.3			43.8			6.9			6.1	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	53	67	17	30
Demand Flow Rate, veh/h	54	68	17	31
Vehicles Circulating, veh/h	0	71	54	70
Vehicles Exiting, veh/h	101	0	0	69
Ped Vol Crossing Leg, #/h	7	14	9	18
Ped Cap Adj	0.999	0.998	0.999	0.998
Approach Delay, s/veh	3.0	3.3	2.9	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	54	68	17	31
Cap Entry Lane, veh/h	1380	1283	1306	1285
Entry HV Adj Factor	0.980	0.984	0.994	0.968
Flow Entry, veh/h	53	67	17	30
Cap Entry, veh/h	1351	1261	1297	1240
V/C Ratio	0.039	0.053	0.013	0.024
Control Delay, s/veh	3.0	3.3	2.9	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/29/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	20	1488	910
v/c Ratio	0.21	0.31	0.22
Control Delay (s/veh)	37.6	1.0	0.6
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.6	1.0	0.6
Queue Length 50th (ft)	6	0	0
Queue Length 95th (ft)	32	70	28
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	387	4788	4191
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.05	0.31	0.22

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	11	1348	21	19	818
Future Volume (vph)	7	11	1348	21	19	818
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.95		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1595		5068			5075
Flt Permitted	0.98		1.00			0.87
Satd. Flow (perm)	1595		5068			4437
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	12	1465	23	21	889
RTOR Reduction (vph)	12	0	0	0	0	0
Lane Group Flow (vph)	8	0	1488	0	0	910
Confl. Peds. (#/hr)		46		83	83	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	3.1		107.9			107.9
Effective Green, g (s)	3.1		107.9			107.9
Actuated g/C Ratio	0.03		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	41		4556			3989
v/s Ratio Prot	c0.01		c0.29			
v/s Ratio Perm						0.21
v/c Ratio	0.20		0.33			0.23
Uniform Delay, d1	57.2		0.9			0.8
Progression Factor	1.00		1.00			0.73
Incremental Delay, d2	2.4		0.2			0.1
Delay (s)	59.7		1.1			0.7
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		1.1			0.7
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197 05/29/2025



Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	172	716	120	960	510
v/c Ratio	0.70	0.40	0.26	0.85	0.81
Control Delay (s/veh)	29.0	7.8	10.0	43.5	55.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.0	7.8	10.0	43.5	55.6
Queue Length 50th (ft)	70	115	6	358	190
Queue Length 95th (ft)	#228	159	58	392	249
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	246	1779	468	1547	703
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.40	0.26	0.62	0.73

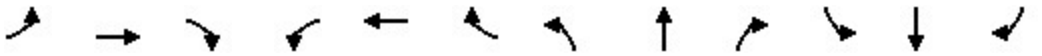
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	0	659	110	745	138	0	0	0	0	347	122
Future Volume (vph)	158	0	659	110	745	138	0	0	0	0	347	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.92	1.00	0.92						0.93	
Flpb, ped/bikes	1.00		1.00	0.84	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.96	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2562	1493	3172						3169	
Flt Permitted	0.21		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	397		2562	1493	3172						3169	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	0	716	120	810	150	0	0	0	0	377	133
RTOR Reduction (vph)	0	0	0	74	0	0	0	0	0	0	31	0
Lane Group Flow (vph)	172	0	716	46	960	0	0	0	0	0	479	0
Confl. Peds. (#/hr)	180		166	166		180	148		100	100		148
Confl. Bikes (#/hr)			3			5						17
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	86.4		86.4	38.3	42.6						22.6	
Effective Green, g (s)	86.4		86.4	38.3	42.6						22.6	
Actuated g/C Ratio	0.72		0.72	0.32	0.36						0.19	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	285		1844	476	1126						596	
v/s Ratio Prot					c0.30						c0.15	
v/s Ratio Perm	c0.43		0.28	0.03								
v/c Ratio	0.60		0.39	0.10	0.85						0.80	
Uniform Delay, d1	8.3		6.5	28.7	35.8						46.6	
Progression Factor	1.00		1.00	1.00	1.00						1.04	
Incremental Delay, d2	9.1		0.6	0.4	6.2						7.7	
Delay (s)	17.5		7.1	29.1	42.0						56.2	
Level of Service	B		A	C	D						E	
Approach Delay (s/veh)		9.1			40.5			0.0			56.2	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/29/2025

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	117	50	136	42	20	180	34	254	42
v/c Ratio	0.42	0.26	0.61	0.29	0.03	0.19	0.07	0.20	0.06
Control Delay (s/veh)	32.7	30.0	41.4	31.9	5.9	6.4	6.2	6.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	32.7	30.0	41.4	31.9	5.9	6.4	6.2	6.2	0.3
Queue Length 50th (ft)	53	22	64	18	3	29	5	41	0
Queue Length 95th (ft)	92	48	111	44	12	68	18	88	2
Internal Link Dist (ft)	351		214			689		583	
Turn Bay Length (ft)		30		30	100		200		60
Base Capacity (vph)	389	271	311	206	582	939	476	1249	710
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.18	0.44	0.20	0.03	0.19	0.07	0.20	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/29/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	86	46	65	60	39	18	103	63	31	234	39
Future Volume (vph)	22	86	46	65	60	39	18	103	63	31	234	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.68		1.00	0.52	1.00	0.80		1.00	1.00	0.64
Flpb, ped/bikes		0.92	1.00		0.86	1.00	0.76	1.00		0.59	1.00	1.00
Frt		1.00	0.85		1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.97	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1699	1083		1568	825	1340	1402		1048	1863	1013
Flt Permitted		0.91	1.00		0.77	1.00	0.60	1.00		0.64	1.00	1.00
Satd. Flow (perm)		1557	1083		1247	825	849	1402		710	1863	1013
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	93	50	71	65	42	20	112	68	34	254	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	14
Lane Group Flow (vph)	0	117	50	0	136	42	20	180	0	34	254	28
Confl. Peds. (#/hr)	162		194	194		162	95		170	170		95
Confl. Bikes (#/hr)			6			5			6			4
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)		14.3	14.3		14.3	14.3	53.7	53.7		53.7	53.7	53.7
Effective Green, g (s)		14.3	14.3		14.3	14.3	53.7	53.7		53.7	53.7	53.7
Actuated g/C Ratio		0.18	0.18		0.18	0.18	0.67	0.67		0.67	0.67	0.67
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0	0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		278	193		222	147	569	941		476	1250	679
v/s Ratio Prot								0.13			c0.14	
v/s Ratio Perm		0.08	0.05		c0.11	0.05	0.02			0.05		0.03
v/c Ratio		0.42	0.26		0.61	0.29	0.04	0.19		0.07	0.20	0.04
Uniform Delay, d1		29.2	28.3		30.3	28.4	4.4	5.0		4.5	5.0	4.4
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		1.0	0.7		4.9	1.1	0.1	0.5		0.3	0.4	0.1
Delay (s)		30.2	29.0		35.2	29.5	4.5	5.4		4.8	5.4	4.6
Level of Service		C	C		D	C	A	A		A	A	A
Approach Delay (s/veh)		29.8			33.9			5.3			5.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/29/2025



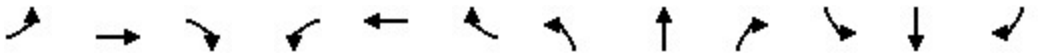
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	100	108	41	67	1008	795
v/c Ratio	0.66	0.42	0.30	0.29	0.33	0.26
Control Delay (s/veh)	69.1	19.5	50.6	37.8	4.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	69.1	19.5	50.6	37.8	4.2	4.3
Queue Length 50th (ft)	75	18	29	36	72	51
Queue Length 95th (ft)	127	69	62	75	117	85
Internal Link Dist (ft)		214		160	469	362
Turn Bay Length (ft)						
Base Capacity (vph)	263	391	241	396	3047	3095
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.28	0.17	0.17	0.33	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	24	75	38	43	18	76	833	18	46	635	51
Future Volume (vph)	92	24	75	38	43	18	76	833	18	46	635	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes	1.00	0.88		1.00	0.96			1.00			0.99	
Flpb, ped/bikes	0.88	1.00		0.88	1.00			0.99			1.00	
Frt	1.00	0.89		1.00	0.96			1.00			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1561	1457		1551	1706			5001			4930	
Flt Permitted	0.71	1.00		0.66	1.00			0.78			0.81	
Satd. Flow (perm)	1172	1457		1074	1706			3933			3987	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	100	26	82	41	47	20	83	905	20	50	690	55
RTOR Reduction (vph)	0	71	0	0	14	0	0	1	0	0	5	0
Lane Group Flow (vph)	100	37	0	41	53	0	0	1007	0	0	790	0
Confl. Peds. (#/hr)	90		101	101		90	69		78	78		69
Confl. Bikes (#/hr)									2			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.5	15.5		15.5	15.5			93.0			93.0	
Effective Green, g (s)	15.5	15.5		15.5	15.5			93.0			93.0	
Actuated g/C Ratio	0.13	0.13		0.13	0.13			0.78			0.78	
Clearance Time (s)	6.0	6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)	151	188		138	220			3048			3089	
v/s Ratio Prot		0.03			0.03							
v/s Ratio Perm	c0.09			0.04				c0.26			0.20	
v/c Ratio	0.66	0.19		0.30	0.24			0.33			0.26	
Uniform Delay, d1	49.8	46.7		47.3	47.0			4.1			3.8	
Progression Factor	1.00	1.00		1.00	1.00			0.85			1.00	
Incremental Delay, d2	10.4	0.5		1.2	0.6			0.3			0.2	
Delay (s)	60.2	47.2		48.5	47.5			3.8			4.0	
Level of Service	E	D		D	D			A			A	
Approach Delay (s/veh)		53.4			47.9			3.8			4.0	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	2.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	25	39	12	24
Demand Flow Rate, veh/h	25	40	12	24
Vehicles Circulating, veh/h	0	37	25	48
Vehicles Exiting, veh/h	72	0	0	29
Ped Vol Crossing Leg, #/h	7	11	5	8
Ped Cap Adj	0.999	0.998	0.999	0.999
Approach Delay, s/veh	2.8	3.0	2.8	2.9
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	25	40	12	24
Cap Entry Lane, veh/h	1380	1329	1345	1314
Entry HV Adj Factor	0.997	0.983	0.995	1.000
Flow Entry, veh/h	25	39	12	24
Cap Entry, veh/h	1374	1304	1338	1312
V/C Ratio	0.018	0.030	0.009	0.018
Control Delay, s/veh	2.8	3.0	2.8	2.9
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/29/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	15	1007	831
v/c Ratio	0.16	0.21	0.19
Control Delay (s/veh)	40.1	0.8	0.6
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	40.1	0.8	0.6
Queue Length 50th (ft)	5	0	0
Queue Length 95th (ft)	28	41	26
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	392	4799	4370
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.04	0.21	0.19

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	7	918	8	15	750
Future Volume (vph)	6	7	918	8	15	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.96		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.93		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1626		5075			5073
Flt Permitted	0.98		1.00			0.91
Satd. Flow (perm)	1626		5075			4620
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	8	998	9	16	815
RTOR Reduction (vph)	8	0	0	0	0	0
Lane Group Flow (vph)	7	0	1007	0	0	831
Confl. Peds. (#/hr)		38		90	90	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	2.9		108.1			108.1
Effective Green, g (s)	2.9		108.1			108.1
Actuated g/C Ratio	0.02		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	39		4571			4161
v/s Ratio Prot	c0.00		c0.20			
v/s Ratio Perm						0.18
v/c Ratio	0.18		0.22			0.20
Uniform Delay, d1	57.4		0.7			0.7
Progression Factor	1.00		1.00			0.75
Incremental Delay, d2	2.3		0.1			0.1
Delay (s)	59.7		0.8			0.6
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		0.8			0.6
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197

05/29/2025



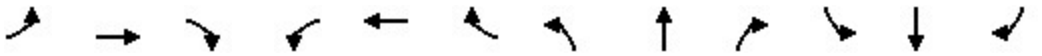
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	108	361	116	663	331
v/c Ratio	0.29	0.19	0.17	0.85	0.70
Control Delay (s/veh)	7.0	4.3	4.8	54.1	53.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	7.0	4.3	4.8	54.1	53.4
Queue Length 50th (ft)	21	36	0	259	121
Queue Length 95th (ft)	53	61	38	305	165
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	373	1896	665	1498	820
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.19	0.17	0.44	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/29/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	0	332	107	547	63	0	0	0	0	244	61
Future Volume (vph)	99	0	332	107	547	63	0	0	0	0	244	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.93	1.00	0.95						0.95	
Flpb, ped/bikes	0.88		1.00	0.90	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.97	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1565		2583	1595	3297						3261	
Flt Permitted	0.33		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	541		2583	1595	3297						3261	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	0	361	116	595	68	0	0	0	0	265	66
RTOR Reduction (vph)	0	0	0	60	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	108	0	361	56	663	0	0	0	0	0	310	0
Confl. Peds. (#/hr)	179		160	160		179	138		61	61		138
Confl. Bikes (#/hr)						2						19
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	92.3		92.3	58.3	28.5						16.7	
Effective Green, g (s)	92.3		92.3	58.3	28.5						16.7	
Actuated g/C Ratio	0.77		0.77	0.49	0.24						0.14	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	416		1986	774	783						453	
v/s Ratio Prot					c0.20						c0.10	
v/s Ratio Perm	c0.20		0.14	0.04								
v/c Ratio	0.26		0.18	0.07	0.85						0.69	
Uniform Delay, d1	4.0		3.7	16.4	43.7						49.1	
Progression Factor	1.00		1.00	1.00	1.00						1.00	
Incremental Delay, d2	1.5		0.2	0.2	8.1						4.3	
Delay (s)	5.5		3.9	16.6	51.8						53.4	
Level of Service	A		A	B	D						D	
Approach Delay (s/veh)		4.3			46.5			0.0			53.4	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2030 Alternative 1

Queues

1: Woodmont & Norfolk

05/30/2025

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	143	60	202	23	218	24	657	25
v/c Ratio	0.35	0.17	0.64	0.07	0.25	0.05	0.64	0.03
Control Delay (s/veh)	20.0	17.4	29.5	11.0	13.8	8.2	14.3	0.0
Queue Delay	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	20.2	17.4	29.5	11.0	13.8	8.2	14.3	0.0
Queue Length 50th (ft)	43	17	98	10	136	4	145	0
Queue Length 95th (ft)	75	37	114	m15	185	15	#317	0
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	457	389	355	309	872	472	1034	878
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	59	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.15	0.57	0.07	0.25	0.05	0.64	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	109	55	107	67	12	21	140	61	22	604	23
Future Volume (vph)	23	109	55	107	67	12	21	140	61	22	604	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.90		0.99		1.00	0.89		1.00	1.00	0.94
Flpb, ped/bikes		0.98	1.00		0.96		0.99	1.00		0.73	1.00	1.00
Frt		1.00	0.85		0.99		1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1810	1426		1701		1753	1574		1299	1863	1484
Flt Permitted		0.92	1.00		0.74		0.30	1.00		0.62	1.00	1.00
Satd. Flow (perm)		1676	1426		1301		551	1574		850	1863	1484
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	118	60	116	73	13	23	152	66	24	657	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	143	60	0	202	0	23	218	0	24	657	14
Confl. Peds. (#/hr)	79		67	67		79	15		132	132		15
Confl. Bikes (#/hr)			4			5			16			4
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		14.7	14.7		14.7		33.3	33.3		33.3	33.3	33.3
Effective Green, g (s)		14.7	14.7		14.7		33.3	33.3		33.3	33.3	33.3
Actuated g/C Ratio		0.25	0.25		0.25		0.55	0.55		0.55	0.55	0.55
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		410	349		318		305	873		471	1033	823
v/s Ratio Prot								0.14			c0.35	
v/s Ratio Perm		0.09	0.04		c0.16		0.04			0.03		0.01
v/c Ratio		0.35	0.17		0.64		0.08	0.25		0.05	0.64	0.02
Uniform Delay, d1		18.7	17.9		20.3		6.2	6.9		6.1	9.2	6.0
Progression Factor		1.00	1.00		1.05		1.33	1.69		1.00	1.00	1.00
Incremental Delay, d2		0.5	0.2		4.0		0.4	0.6		0.2	3.0	0.0
Delay (s)		19.2	18.1		25.2		8.6	12.2		6.3	12.2	6.0
Level of Service		B	B		C		A	B		A	B	A
Approach Delay (s/veh)		18.9			25.2			11.9			11.8	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/30/2025

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	207	29	111	906	1152
v/c Ratio	0.84	0.15	0.33	0.29	0.37
Control Delay (s/veh)	63.6	40.4	36.2	6.7	7.2
Queue Delay	1.8	0.0	0.0	0.0	0.0
Total Delay (s/veh)	65.3	40.4	36.2	6.7	7.2
Queue Length 50th (ft)	148	19	61	84	113
Queue Length 95th (ft)	#241	45	112	115	150
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	294	234	401	3076	3103
Starvation Cap Reductn	22	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.76	0.12	0.28	0.29	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham 05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	40	43	27	68	34	29	774	30	34	922	104
Future Volume (vph)	108	40	43	27	68	34	29	774	30	34	922	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.97		1.00	0.97			0.99			0.99	
Flpb, ped/bikes		0.97		0.94	1.00			1.00			1.00	
Frt		0.97		1.00	0.95			0.99			0.99	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1651		1657	1719			5020			4948	
Flt Permitted		0.75		0.60	1.00			0.85			0.87	
Satd. Flow (perm)		1273		1045	1719			4287			4317	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	43	47	29	74	37	32	841	33	37	1002	113
RTOR Reduction (vph)	0	9	0	0	15	0	0	3	0	0	10	0
Lane Group Flow (vph)	0	198	0	29	96	0	0	903	0	0	1142	0
Confl. Peds. (#/hr)	49		76	76		49	30		44	44		30
Confl. Bikes (#/hr)						5			3			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.5		22.5	22.5			86.0			86.0	
Effective Green, g (s)		22.5		22.5	22.5			86.0			86.0	
Actuated g/C Ratio		0.19		0.19	0.19			0.72			0.72	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		238		195	322			3072			3093	
v/s Ratio Prot					0.06							
v/s Ratio Perm		c0.16		0.03				0.21			c0.26	
v/c Ratio		0.83		0.15	0.30			0.29			0.37	
Uniform Delay, d1		46.9		40.7	41.9			6.1			6.6	
Progression Factor		0.82		1.00	1.00			1.00			1.00	
Incremental Delay, d2		20.9		0.4	0.5			0.2			0.3	
Delay (s)		59.6		41.1	42.5			6.3			6.9	
Level of Service		E		D	D			A			A	
Approach Delay (s/veh)		59.6			42.2			6.3			6.9	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	37	70	18	37
Demand Flow Rate, veh/h	38	71	18	38
Vehicles Circulating, veh/h	0	56	38	73
Vehicles Exiting, veh/h	111	0	0	54
Ped Vol Crossing Leg, #/h	6	9	10	11
Ped Cap Adj	0.999	0.999	0.999	0.998
Approach Delay, s/veh	2.9	3.2	2.8	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	38	71	18	38
Cap Entry Lane, veh/h	1380	1303	1327	1281
Entry HV Adj Factor	0.972	0.984	0.992	0.974
Flow Entry, veh/h	37	70	18	37
Cap Entry, veh/h	1340	1281	1315	1245
V/C Ratio	0.028	0.055	0.014	0.030
Control Delay, s/veh	2.9	3.2	2.8	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	11	647	903
v/c Ratio	0.13	0.13	0.20
Control Delay (s/veh)	37.0	0.4	0.2
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.0	0.4	0.2
Queue Length 50th (ft)	2	0	0
Queue Length 95th (ft)	22	24	6
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	361	4923	4540
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.03	0.13	0.20

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	7	583	12	17	814
Future Volume (vph)	3	7	583	12	17	814
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.89		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.90		1.00			1.00
Flt Protected	0.99		1.00			1.00
Satd. Flow (prot)	1480		5064			5069
Flt Permitted	0.99		1.00			0.92
Satd. Flow (perm)	1480		5064			4667
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	8	634	13	18	885
RTOR Reduction (vph)	8	0	1	0	0	0
Lane Group Flow (vph)	3	0	646	0	0	903
Confl. Peds. (#/hr)		79		78	78	
Confl. Bikes (#/hr)		1				
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		109.5			109.5
Effective Green, g (s)	1.5		109.5			109.5
Actuated g/C Ratio	0.01		0.91			0.91
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	18		4620			4258
v/s Ratio Prot	c0.00		0.13			
v/s Ratio Perm						c0.19
v/c Ratio	0.17		0.14			0.21
Uniform Delay, d1	58.6		0.5			0.6
Progression Factor	1.00		1.00			0.18
Incremental Delay, d2	4.5		0.1			0.1
Delay (s)	63.2		0.6			0.2
Level of Service	E		A			A
Approach Delay (s/veh)	63.2		0.6			0.2
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	0.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

5: Woodmont & MD187/MD197

05/30/2025



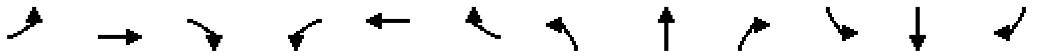
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	183	838	101	825	589
v/c Ratio	0.62	0.47	0.18	0.85	0.81
Control Delay (s/veh)	22.4	9.6	6.4	48.2	58.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.4	9.6	6.4	48.2	58.4
Queue Length 50th (ft)	70	153	0	315	249
Queue Length 95th (ft)	184	213	39	354	307
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	294	1786	562	1459	818
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.62	0.47	0.18	0.57	0.72

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	0	771	93	595	164	0	0	0	0	483	59
Future Volume (vph)	168	0	771	93	595	164	0	0	0	0	483	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.94	1.00	0.92						0.98	
Flpb, ped/bikes	1.00		1.00	0.91	1.00						1.00	
Frt	1.00		0.85	1.00	0.97						0.98	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2627	1606	3155						3413	
Flt Permitted	0.26		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	476		2627	1606	3155						3413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	0	838	101	647	178	0	0	0	0	525	64
RTOR Reduction (vph)	0	0	0	66	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	183	0	838	35	825	0	0	0	0	0	581	0
Confl. Peds. (#/hr)	111		106	106		111	104		124	124		104
Confl. Bikes (#/hr)			2			2			2			2
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	83.6		83.6	41.4	36.7						25.4	
Effective Green, g (s)	83.6		83.6	41.4	36.7						25.4	
Actuated g/C Ratio	0.70		0.70	0.35	0.31						0.21	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	331		1830	554	964						722	
v/s Ratio Prot					c0.26						c0.17	
v/s Ratio Perm	c0.38		0.32	0.02								
v/c Ratio	0.55		0.46	0.06	0.86						0.80	
Uniform Delay, d1	9.0		8.1	26.3	39.2						44.9	
Progression Factor	1.00		1.00	1.00	1.00						1.15	
Incremental Delay, d2	6.5		0.8	0.2	7.3						5.3	
Delay (s)	15.5		8.9	26.5	46.4						57.2	
Level of Service	B		A	C	D						E	
Approach Delay (s/veh)		10.1			44.3			0.0			57.2	
Approach LOS		B			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/30/2025

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	146	63	196	46	390	38	326	28
v/c Ratio	0.54	0.33	0.78	0.08	0.38	0.07	0.24	0.05
Control Delay (s/veh)	51.2	45.9	60.7	4.8	9.2	6.5	6.8	0.2
Queue Delay	0.0	0.0	1.0	0.0	0.7	0.1	0.0	0.0
Total Delay (s/veh)	51.2	45.9	61.7	4.8	9.8	6.6	6.8	0.2
Queue Length 50th (ft)	104	43	150	9	168	8	75	0
Queue Length 95th (ft)	160	81	224	m21	286	23	140	1
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	350	245	323	580	1038	547	1347	603
Starvation Cap Reductn	0	0	29	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	343	180	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.26	0.67	0.08	0.56	0.10	0.24	0.05

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	110	58	32	117	31	42	244	115	35	300	26
Future Volume (vph)	24	110	58	32	117	31	42	244	115	35	300	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.68		0.91		1.00	0.81		1.00	1.00	0.51
Flpb, ped/bikes		0.96	1.00		0.96		0.72	1.00		0.71	1.00	1.00
Frt		1.00	0.85		0.98		1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1769	1076		1575		1268	1437		1257	1863	811
Flt Permitted		0.86	1.00		0.89		0.55	1.00		0.51	1.00	1.00
Satd. Flow (perm)		1541	1076		1417		741	1437		677	1863	811
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	120	63	35	127	34	46	265	125	38	326	28
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	146	63	0	196	0	46	390	0	38	326	20
Confl. Peds. (#/hr)	118		134	134		118	87		167	167		87
Confl. Bikes (#/hr)			9			3			4			10
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		21.2	21.2		21.2		86.8	86.8		86.8	86.8	86.8
Effective Green, g (s)		21.2	21.2		21.2		86.8	86.8		86.8	86.8	86.8
Actuated g/C Ratio		0.18	0.18		0.18		0.72	0.72		0.72	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		272	190		250		535	1039		489	1347	586
v/s Ratio Prot								c0.27			0.18	
v/s Ratio Perm		0.09	0.06		c0.14		0.06			0.06		0.02
v/c Ratio		0.54	0.33		0.78		0.09	0.38		0.08	0.24	0.03
Uniform Delay, d1		44.9	43.2		47.2		4.9	6.3		4.9	5.6	4.7
Progression Factor		1.00	1.00		0.87		0.73	1.12		1.00	1.00	1.00
Incremental Delay, d2		2.0	1.0		14.0		0.3	0.9		0.3	0.4	0.1
Delay (s)		47.0	44.2		55.3		3.8	8.0		5.2	6.0	4.8
Level of Service		D	D		E		A	A		A	A	A
Approach Delay (s/veh)		46.1			55.3			7.6			5.8	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	21.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/30/2025

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	274	51	137	1499	864
v/c Ratio	1.03	0.23	0.35	0.51	0.32
Control Delay (s/veh)	109.3	41.3	34.3	9.4	8.0
Queue Delay	14.4	0.0	0.0	0.1	0.0
Total Delay (s/veh)	123.7	41.3	34.3	9.5	8.0
Queue Length 50th (ft)	~223	33	72	189	87
Queue Length 95th (ft)	#378	70	132	223	109
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	267	223	396	2918	2685
Starvation Cap Reductn	11	0	0	352	0
Spillback Cap Reductn	0	0	1	60	55
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.07	0.23	0.35	0.58	0.33

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham 05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	37	71	47	75	51	51	1302	27	36	695	64
Future Volume (vph)	144	37	71	47	75	51	51	1302	27	36	695	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.95		1.00	0.95			1.00			0.99	
Flpb, ped/bikes		0.95		0.92	1.00			1.00			1.00	
Frt		0.96		1.00	0.94			1.00			0.99	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1577		1623	1672			5039			4940	
Flt Permitted		0.70		0.58	1.00			0.85			0.80	
Satd. Flow (perm)		1138		994	1672			4294			3941	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	40	77	51	82	55	55	1415	29	39	755	70
RTOR Reduction (vph)	0	12	0	0	20	0	0	2	0	0	9	0
Lane Group Flow (vph)	0	262	0	51	117	0	0	1497	0	0	855	0
Confl. Peds. (#/hr)	71		118	118		71	56		48	48		56
Confl. Bikes (#/hr)									4			3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0		27.0	27.0			81.5			81.5	
Effective Green, g (s)		27.0		27.0	27.0			81.5			81.5	
Actuated g/C Ratio		0.23		0.23	0.23			0.68			0.68	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		256		223	376			2916			2676	
v/s Ratio Prot					0.07							
v/s Ratio Perm		c0.23		0.05				c0.35			0.22	
v/c Ratio		1.02		0.23	0.31			0.51			0.32	
Uniform Delay, d1		46.5		38.0	38.7			9.5			7.9	
Progression Factor		1.14		1.00	1.00			0.92			1.00	
Incremental Delay, d2		61.5		0.5	0.5			0.6			0.3	
Delay (s)		114.3		38.5	39.2			9.3			8.2	
Level of Service		F		D	D			A			A	
Approach Delay (s/veh)		114.3			39.0			9.3			8.2	
Approach LOS		F			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	53	67	17	30
Demand Flow Rate, veh/h	54	68	17	31
Vehicles Circulating, veh/h	0	71	54	70
Vehicles Exiting, veh/h	101	0	0	69
Ped Vol Crossing Leg, #/h	7	14	9	18
Ped Cap Adj	0.999	0.998	0.999	0.998
Approach Delay, s/veh	3.0	3.3	2.9	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	54	68	17	31
Cap Entry Lane, veh/h	1380	1283	1306	1285
Entry HV Adj Factor	0.980	0.984	0.994	0.968
Flow Entry, veh/h	53	67	17	30
Cap Entry, veh/h	1351	1261	1297	1240
V/C Ratio	0.039	0.053	0.013	0.024
Control Delay, s/veh	3.0	3.3	2.9	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	20	1488	910
v/c Ratio	0.21	0.31	0.22
Control Delay (s/veh)	37.6	1.0	0.6
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.6	1.0	0.6
Queue Length 50th (ft)	6	0	0
Queue Length 95th (ft)	32	70	m27
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	387	4788	4191
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.05	0.31	0.22

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	11	1348	21	19	818
Future Volume (vph)	7	11	1348	21	19	818
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.95		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1595		5068			5075
Flt Permitted	0.98		1.00			0.87
Satd. Flow (perm)	1595		5068			4437
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	12	1465	23	21	889
RTOR Reduction (vph)	12	0	0	0	0	0
Lane Group Flow (vph)	8	0	1488	0	0	910
Confl. Peds. (#/hr)		46		83	83	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	3.1		107.9			107.9
Effective Green, g (s)	3.1		107.9			107.9
Actuated g/C Ratio	0.03		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	41		4556			3989
v/s Ratio Prot	c0.01		c0.29			
v/s Ratio Perm						0.21
v/c Ratio	0.20		0.33			0.23
Uniform Delay, d1	57.2		0.9			0.8
Progression Factor	1.00		1.00			0.68
Incremental Delay, d2	2.4		0.2			0.1
Delay (s)	59.7		1.1			0.7
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		1.1			0.7
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197

05/30/2025



Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	172	716	120	960	510
v/c Ratio	0.70	0.40	0.26	0.85	0.81
Control Delay (s/veh)	29.0	7.8	10.0	43.5	54.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.0	7.8	10.0	43.5	54.4
Queue Length 50th (ft)	70	115	6	358	190
Queue Length 95th (ft)	#228	159	58	392	249
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	246	1779	468	1547	703
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.40	0.26	0.62	0.73

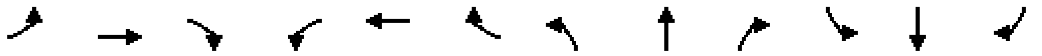
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	0	659	110	745	138	0	0	0	0	347	122
Future Volume (vph)	158	0	659	110	745	138	0	0	0	0	347	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.92	1.00	0.92						0.93	
Flpb, ped/bikes	1.00		1.00	0.84	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.96	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2562	1493	3172						3169	
Flt Permitted	0.21		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	397		2562	1493	3172						3169	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	0	716	120	810	150	0	0	0	0	377	133
RTOR Reduction (vph)	0	0	0	74	0	0	0	0	0	0	31	0
Lane Group Flow (vph)	172	0	716	46	960	0	0	0	0	0	479	0
Confl. Peds. (#/hr)	180		166	166		180	148		100	100		148
Confl. Bikes (#/hr)			3			5						17
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	86.4		86.4	38.3	42.6						22.6	
Effective Green, g (s)	86.4		86.4	38.3	42.6						22.6	
Actuated g/C Ratio	0.72		0.72	0.32	0.36						0.19	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	285		1844	476	1126						596	
v/s Ratio Prot					c0.30						c0.15	
v/s Ratio Perm	c0.43		0.28	0.03								
v/c Ratio	0.60		0.39	0.10	0.85						0.80	
Uniform Delay, d1	8.3		6.5	28.7	35.8						46.6	
Progression Factor	1.00		1.00	1.00	1.00						1.02	
Incremental Delay, d2	9.1		0.6	0.4	6.2						7.6	
Delay (s)	17.5		7.1	29.1	42.0						55.0	
Level of Service	B		A	C	D						D	
Approach Delay (s/veh)		9.1			40.5			0.0			55.0	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/30/2025

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	117	50	178	20	180	34	254	42
v/c Ratio	0.34	0.22	0.71	0.04	0.18	0.06	0.21	0.06
Control Delay (s/veh)	27.7	25.9	43.9	7.6	7.7	7.6	7.8	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.7	25.9	43.9	7.6	7.7	7.6	7.8	0.3
Queue Length 50th (ft)	50	21	83	3	33	6	48	0
Queue Length 95th (ft)	85	45	135	14	76	20	102	2
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	418	282	306	552	981	576	1185	678
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.18	0.58	0.04	0.18	0.06	0.21	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	86	46	65	60	39	18	103	63	31	234	39
Future Volume (vph)	22	86	46	65	60	39	18	103	63	31	234	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.68		0.89		1.00	0.80		1.00	1.00	0.64
Flpb, ped/bikes		0.94	1.00		0.90		0.76	1.00		0.59	1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.94		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1731	1084		1406		1340	1402		1048	1863	1013
Flt Permitted		0.92	1.00		0.82		0.60	1.00		0.64	1.00	1.00
Satd. Flow (perm)		1609	1084		1173		849	1402		710	1863	1013
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	93	50	71	65	42	20	112	68	34	254	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	15
Lane Group Flow (vph)	0	117	50	0	178	0	20	180	0	34	254	27
Confl. Peds. (#/hr)	162		194	194		162	95		170	170		95
Confl. Bikes (#/hr)			6			5			6			4
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		17.1	17.1		17.1		50.9	50.9		50.9	50.9	50.9
Effective Green, g (s)		17.1	17.1		17.1		50.9	50.9		50.9	50.9	50.9
Actuated g/C Ratio		0.21	0.21		0.21		0.64	0.64		0.64	0.64	0.64
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		343	231		250		540	892		451	1185	644
v/s Ratio Prot								0.13			c0.14	
v/s Ratio Perm		0.07	0.05		c0.15		0.02			0.05		0.03
v/c Ratio		0.34	0.22		0.71		0.04	0.20		0.08	0.21	0.04
Uniform Delay, d1		26.7	25.9		29.2		5.4	6.1		5.6	6.1	5.4
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.6	0.5		9.2		0.1	0.5		0.3	0.4	0.1
Delay (s)		27.3	26.4		38.4		5.5	6.6		5.9	6.5	5.6
Level of Service		C	C		D		A	A		A	A	A
Approach Delay (s/veh)		27.0			38.4			6.5			6.3	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/30/2025

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	208	41	67	1008	795
v/c Ratio	0.83	0.24	0.21	0.35	0.28
Control Delay (s/veh)	67.3	43.4	32.0	6.4	6.3
Queue Delay	0.7	0.0	0.0	0.0	0.0
Total Delay (s/veh)	67.9	43.4	32.0	6.4	6.3
Queue Length 50th (ft)	137	27	33	97	69
Queue Length 95th (ft)	220	59	72	135	99
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	305	213	396	2843	2885
Starvation Cap Reductn	12	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.71	0.19	0.17	0.35	0.28

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham 05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	24	75	38	43	18	76	833	18	46	635	51
Future Volume (vph)	92	24	75	38	43	18	76	833	18	46	635	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.94		1.00	0.96			1.00			0.99	
Flpb, ped/bikes		0.94		0.92	1.00			0.99			1.00	
Frt		0.95		1.00	0.96			1.00			0.99	
Flt Protected		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1525		1621	1706			5001			4931	
Flt Permitted		0.81		0.56	1.00			0.78			0.81	
Satd. Flow (perm)		1271		949	1706			3930			3984	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	100	26	82	41	47	20	83	905	20	50	690	55
RTOR Reduction (vph)	0	20	0	0	13	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	188	0	41	54	0	0	1007	0	0	789	0
Confl. Peds. (#/hr)	90		101	101		90	69		78	78		69
Confl. Bikes (#/hr)									2			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		21.8		21.8	21.8			86.7			86.7	
Effective Green, g (s)		21.8		21.8	21.8			86.7			86.7	
Actuated g/C Ratio		0.18		0.18	0.18			0.72			0.72	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		230		172	309			2839			2878	
v/s Ratio Prot					0.03							
v/s Ratio Perm		c0.15		0.04				c0.26			0.20	
v/c Ratio		0.82		0.24	0.17			0.35			0.27	
Uniform Delay, d1		47.2		42.0	41.5			6.2			5.8	
Progression Factor		1.00		1.00	1.00			0.90			1.00	
Incremental Delay, d2		19.5		0.7	0.3			0.3			0.2	
Delay (s)		66.7		42.7	41.8			5.9			6.0	
Level of Service		E		D	D			A			A	
Approach Delay (s/veh)		66.7			42.1			5.9			6.0	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	2.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	25	39	12	24
Demand Flow Rate, veh/h	25	40	12	24
Vehicles Circulating, veh/h	0	37	25	48
Vehicles Exiting, veh/h	72	0	0	29
Ped Vol Crossing Leg, #/h	7	11	5	8
Ped Cap Adj	0.999	0.998	0.999	0.999
Approach Delay, s/veh	2.8	3.0	2.8	2.9
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	25	40	12	24
Cap Entry Lane, veh/h	1380	1329	1345	1314
Entry HV Adj Factor	0.997	0.983	0.995	1.000
Flow Entry, veh/h	25	39	12	24
Cap Entry, veh/h	1374	1304	1338	1312
V/C Ratio	0.018	0.030	0.009	0.018
Control Delay, s/veh	2.8	3.0	2.8	2.9
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	15	1007	831
v/c Ratio	0.16	0.21	0.19
Control Delay (s/veh)	40.1	0.8	0.6
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	40.1	0.8	0.6
Queue Length 50th (ft)	5	0	0
Queue Length 95th (ft)	28	41	24
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	392	4799	4370
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.04	0.21	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Middleton & MD355

05/30/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	7	918	8	15	750
Future Volume (vph)	6	7	918	8	15	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.96		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.93		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1626		5075			5073
Flt Permitted	0.98		1.00			0.91
Satd. Flow (perm)	1626		5075			4620
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	8	998	9	16	815
RTOR Reduction (vph)	8	0	0	0	0	0
Lane Group Flow (vph)	7	0	1007	0	0	831
Confl. Peds. (#/hr)		38		90	90	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	2.9		108.1			108.1
Effective Green, g (s)	2.9		108.1			108.1
Actuated g/C Ratio	0.02		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	39		4571			4161
v/s Ratio Prot	c0.00		c0.20			
v/s Ratio Perm						0.18
v/c Ratio	0.18		0.22			0.20
Uniform Delay, d1	57.4		0.7			0.7
Progression Factor	1.00		1.00			0.70
Incremental Delay, d2	2.3		0.1			0.1
Delay (s)	59.7		0.8			0.6
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		0.8			0.6
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197

05/30/2025

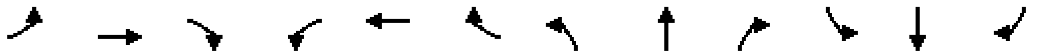
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	108	361	116	663	331
v/c Ratio	0.29	0.19	0.17	0.85	0.70
Control Delay (s/veh)	7.0	4.3	4.8	54.1	53.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	7.0	4.3	4.8	54.1	53.4
Queue Length 50th (ft)	21	36	0	259	121
Queue Length 95th (ft)	53	61	38	305	165
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	373	1896	665	1498	820
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.19	0.17	0.44	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	0	332	107	547	63	0	0	0	0	244	61
Future Volume (vph)	99	0	332	107	547	63	0	0	0	0	244	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.93	1.00	0.95						0.95	
Flpb, ped/bikes	0.88		1.00	0.90	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.97	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1565		2583	1595	3297						3261	
Flt Permitted	0.33		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	541		2583	1595	3297						3261	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	0	361	116	595	68	0	0	0	0	265	66
RTOR Reduction (vph)	0	0	0	60	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	108	0	361	56	663	0	0	0	0	0	310	0
Confl. Peds. (#/hr)	179		160	160		179	138		61	61		138
Confl. Bikes (#/hr)						2						19
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	92.3		92.3	58.3	28.5						16.7	
Effective Green, g (s)	92.3		92.3	58.3	28.5						16.7	
Actuated g/C Ratio	0.77		0.77	0.49	0.24						0.14	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	416		1986	774	783						453	
v/s Ratio Prot					c0.20						c0.10	
v/s Ratio Perm	c0.20		0.14	0.04								
v/c Ratio	0.26		0.18	0.07	0.85						0.69	
Uniform Delay, d1	4.0		3.7	16.4	43.7						49.1	
Progression Factor	1.00		1.00	1.00	1.00						1.00	
Incremental Delay, d2	1.5		0.2	0.2	8.1						4.3	
Delay (s)	5.5		3.9	16.6	51.8						53.4	
Level of Service	A		A	B	D						D	
Approach Delay (s/veh)		4.3			46.5			0.0			53.4	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2030 Alternative 1 with mitigations

Queues

1: Woodmont & Norfolk

05/30/2025

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	143	60	202	23	218	24	657	25
v/c Ratio	0.35	0.17	0.63	0.08	0.25	0.05	0.64	0.03
Control Delay (s/veh)	19.7	17.2	28.4	11.8	14.6	8.4	14.6	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.7	17.2	28.4	11.8	14.6	8.4	14.6	0.0
Queue Length 50th (ft)	43	17	77	10	138	4	146	0
Queue Length 95th (ft)	74	37	110	m16	190	16	#327	0
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	446	380	347	305	867	469	1028	874
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	7	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.16	0.58	0.08	0.25	0.05	0.64	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	109	55	107	67	12	21	140	61	22	604	23
Future Volume (vph)	23	109	55	107	67	12	21	140	61	22	604	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.90		0.99		1.00	0.89		1.00	1.00	0.94
Flpb, ped/bikes		0.98	1.00		0.96		0.99	1.00		0.73	1.00	1.00
Frt		1.00	0.85		0.99		1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1810	1426		1701		1753	1574		1299	1863	1484
Flt Permitted		0.92	1.00		0.74		0.30	1.00		0.62	1.00	1.00
Satd. Flow (perm)		1672	1426		1301		547	1574		850	1863	1484
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	118	60	116	73	13	23	152	66	24	657	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	143	60	0	202	0	23	218	0	24	657	14
Confl. Peds. (#/hr)	79		67	67		79	15		132	132		15
Confl. Bikes (#/hr)			4			5			16			4
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		14.9	14.9		14.9		33.1	33.1		33.1	33.1	33.1
Effective Green, g (s)		14.9	14.9		14.9		33.1	33.1		33.1	33.1	33.1
Actuated g/C Ratio		0.25	0.25		0.25		0.55	0.55		0.55	0.55	0.55
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		415	354		323		301	868		468	1027	818
v/s Ratio Prot								0.14			c0.35	
v/s Ratio Perm		0.09	0.04		c0.16		0.04			0.03		0.01
v/c Ratio		0.34	0.17		0.63		0.08	0.25		0.05	0.64	0.02
Uniform Delay, d1		18.5	17.7		20.1		6.3	7.0		6.2	9.3	6.1
Progression Factor		1.00	1.00		1.02		1.42	1.77		1.00	1.00	1.00
Incremental Delay, d2		0.5	0.2		3.6		0.4	0.6		0.2	3.1	0.0
Delay (s)		19.0	17.9		24.0		9.3	12.9		6.4	12.4	6.1
Level of Service		B	B		C		A	B		A	B	A
Approach Delay (s/veh)		18.7			24.0			12.6			11.9	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

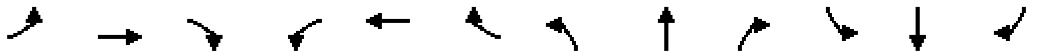
2: MD355 & Norfolk/Cheltenham 05/30/2025

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	207	29	111	906	1152
v/c Ratio	0.79	0.14	0.31	0.30	0.38
Control Delay (s/veh)	53.6	37.9	32.2	7.6	8.1
Queue Delay	0.1	0.0	0.0	0.0	0.0
Total Delay (s/veh)	53.7	37.9	32.2	7.6	8.1
Queue Length 50th (ft)	121	19	57	84	114
Queue Length 95th (ft)	179	42	100	138	182
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	487	390	660	3029	3054
Starvation Cap Reductn	23	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.07	0.17	0.30	0.38

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham 05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	40	43	27	68	34	29	774	30	34	922	104
Future Volume (vph)	108	40	43	27	68	34	29	774	30	34	922	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.97		1.00	0.97			0.99			0.99	
Flpb, ped/bikes		0.97		0.94	1.00			1.00			1.00	
Frt		0.97		1.00	0.95			0.99			0.99	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1650		1656	1719			5020			4948	
Flt Permitted		0.75		0.60	1.00			0.85			0.87	
Satd. Flow (perm)		1278		1049	1719			4287			4317	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	43	47	29	74	37	32	841	33	37	1002	113
RTOR Reduction (vph)	0	11	0	0	19	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	196	0	29	92	0	0	904	0	0	1145	0
Confl. Peds. (#/hr)	49		76	76		49	30		44	44		30
Confl. Bikes (#/hr)						5			3			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.7		23.7	23.7			84.8			84.8	
Effective Green, g (s)		23.7		23.7	23.7			84.8			84.8	
Actuated g/C Ratio		0.20		0.20	0.20			0.71			0.71	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		252		207	339			3029			3050	
v/s Ratio Prot					0.05							
v/s Ratio Perm		c0.15		0.03				0.21			c0.27	
v/c Ratio		0.78		0.14	0.27			0.30			0.38	
Uniform Delay, d1		45.6		39.7	40.8			6.5			7.0	
Progression Factor		0.81		1.00	1.00			1.00			1.00	
Incremental Delay, d2		13.7		0.3	0.4			0.3			0.4	
Delay (s)		50.5		40.1	41.3			6.8			7.4	
Level of Service		D		D	D			A			A	
Approach Delay (s/veh)		50.5			41.0			6.8			7.4	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	37	70	18	37
Demand Flow Rate, veh/h	38	71	18	38
Vehicles Circulating, veh/h	0	56	38	73
Vehicles Exiting, veh/h	111	0	0	54
Ped Vol Crossing Leg, #/h	6	9	10	11
Ped Cap Adj	0.999	0.999	0.999	0.998
Approach Delay, s/veh	2.9	3.2	2.8	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	38	71	18	38
Cap Entry Lane, veh/h	1380	1303	1327	1281
Entry HV Adj Factor	0.972	0.984	0.992	0.974
Flow Entry, veh/h	37	70	18	37
Cap Entry, veh/h	1340	1281	1315	1245
V/C Ratio	0.028	0.055	0.014	0.030
Control Delay, s/veh	2.9	3.2	2.8	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	11	647	903
v/c Ratio	0.13	0.13	0.20
Control Delay (s/veh)	37.0	0.4	1.0
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.0	0.4	1.0
Queue Length 50th (ft)	2	0	0
Queue Length 95th (ft)	22	24	94
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	361	4923	4540
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.03	0.13	0.20

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Middleton & MD355

05/30/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	7	583	12	17	814
Future Volume (vph)	3	7	583	12	17	814
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.89		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.90		1.00			1.00
Flt Protected	0.99		1.00			1.00
Satd. Flow (prot)	1480		5064			5069
Flt Permitted	0.99		1.00			0.92
Satd. Flow (perm)	1480		5064			4667
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	8	634	13	18	885
RTOR Reduction (vph)	8	0	1	0	0	0
Lane Group Flow (vph)	3	0	646	0	0	903
Confl. Peds. (#/hr)		79		78	78	
Confl. Bikes (#/hr)		1				
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		109.5			109.5
Effective Green, g (s)	1.5		109.5			109.5
Actuated g/C Ratio	0.01		0.91			0.91
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	18		4620			4258
v/s Ratio Prot	c0.00		0.13			
v/s Ratio Perm						c0.19
v/c Ratio	0.17		0.14			0.21
Uniform Delay, d1	58.6		0.5			0.6
Progression Factor	1.00		1.00			2.39
Incremental Delay, d2	4.5		0.1			0.1
Delay (s)	63.2		0.6			1.5
Level of Service	E		A			A
Approach Delay (s/veh)	63.2		0.6			1.5
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

5: Woodmont & MD187/MD197

05/30/2025



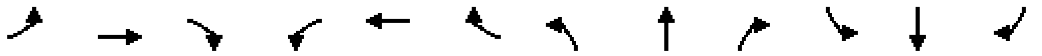
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	183	838	101	825	589
v/c Ratio	0.62	0.47	0.18	0.85	0.81
Control Delay (s/veh)	22.4	9.6	6.4	48.2	56.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.4	9.6	6.4	48.2	56.7
Queue Length 50th (ft)	70	153	0	315	241
Queue Length 95th (ft)	184	213	39	354	304
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	294	1786	562	1459	818
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.62	0.47	0.18	0.57	0.72

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	0	771	93	595	164	0	0	0	0	483	59
Future Volume (vph)	168	0	771	93	595	164	0	0	0	0	483	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.94	1.00	0.92						0.98	
Flpb, ped/bikes	1.00		1.00	0.91	1.00						1.00	
Frt	1.00		0.85	1.00	0.97						0.98	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2627	1606	3155						3413	
Flt Permitted	0.26		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	476		2627	1606	3155						3413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	0	838	101	647	178	0	0	0	0	525	64
RTOR Reduction (vph)	0	0	0	66	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	183	0	838	35	825	0	0	0	0	0	581	0
Confl. Peds. (#/hr)	111		106	106		111	104		124	124		104
Confl. Bikes (#/hr)			2			2			2			2
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	83.6		83.6	41.4	36.7						25.4	
Effective Green, g (s)	83.6		83.6	41.4	36.7						25.4	
Actuated g/C Ratio	0.70		0.70	0.35	0.31						0.21	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	331		1830	554	964						722	
v/s Ratio Prot					c0.26						c0.17	
v/s Ratio Perm	c0.38		0.32	0.02								
v/c Ratio	0.55		0.46	0.06	0.86						0.80	
Uniform Delay, d1	9.0		8.1	26.3	39.2						44.9	
Progression Factor	1.00		1.00	1.00	1.00						1.12	
Incremental Delay, d2	6.5		0.8	0.2	7.3						5.3	
Delay (s)	15.5		8.9	26.5	46.4						55.4	
Level of Service	B		A	C	D						E	
Approach Delay (s/veh)		10.1			44.3			0.0			55.4	
Approach LOS		B			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	33.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/30/2025

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	146	63	196	46	390	38	326	28
v/c Ratio	0.54	0.33	0.78	0.08	0.38	0.07	0.24	0.05
Control Delay (s/veh)	51.0	45.7	62.0	3.3	6.1	6.6	6.9	0.2
Queue Delay	0.0	0.0	0.4	0.0	0.2	0.0	0.0	0.0
Total Delay (s/veh)	51.0	45.7	62.4	3.3	6.3	6.6	6.9	0.2
Queue Length 50th (ft)	104	43	153	5	92	8	75	0
Queue Length 95th (ft)	159	81	214	m15	227	23	141	1
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	422	296	390	593	1037	564	1345	602
Starvation Cap Reductn	0	0	29	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	153	83	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.21	0.54	0.08	0.44	0.08	0.24	0.05

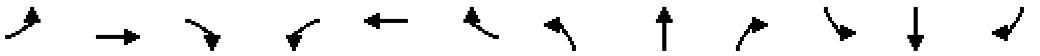
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	110	58	32	117	31	42	244	115	35	300	26
Future Volume (vph)	24	110	58	32	117	31	42	244	115	35	300	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.68		0.91		1.00	0.81		1.00	1.00	0.51
Flpb, ped/bikes		0.96	1.00		0.96		0.72	1.00		0.71	1.00	1.00
Frt		1.00	0.85		0.98		1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1769	1076		1575		1269	1437		1258	1863	811
Flt Permitted		0.86	1.00		0.89		0.55	1.00		0.51	1.00	1.00
Satd. Flow (perm)		1544	1076		1420		741	1437		677	1863	811
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	120	63	35	127	34	46	265	125	38	326	28
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	146	63	0	196	0	46	390	0	38	326	20
Confl. Peds. (#/hr)	118		134	134		118	87		167	167		87
Confl. Bikes (#/hr)			9			3			4			10
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		21.3	21.3		21.3		86.7	86.7		86.7	86.7	86.7
Effective Green, g (s)		21.3	21.3		21.3		86.7	86.7		86.7	86.7	86.7
Actuated g/C Ratio		0.18	0.18		0.18		0.72	0.72		0.72	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		274	190		252		535	1038		489	1346	585
v/s Ratio Prot								c0.27			0.18	
v/s Ratio Perm		0.09	0.06		c0.14		0.06			0.06		0.02
v/c Ratio		0.53	0.33		0.78		0.09	0.38		0.08	0.24	0.03
Uniform Delay, d1		44.8	43.1		47.1		4.9	6.3		4.9	5.6	4.7
Progression Factor		1.00	1.00		0.91		0.48	0.70		1.00	1.00	1.00
Incremental Delay, d2		2.0	1.0		13.4		0.3	0.9		0.3	0.4	0.1
Delay (s)		46.8	44.2		56.4		2.7	5.3		5.2	6.0	4.8
Level of Service		D	D		E		A	A		A	A	A
Approach Delay (s/veh)		46.0			56.4			5.1			5.9	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/30/2025

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	274	51	137	1499	864
v/c Ratio	0.86	0.20	0.30	0.54	0.34
Control Delay (s/veh)	64.6	32.9	29.5	13.2	11.1
Queue Delay	1.4	0.0	0.0	0.1	0.0
Total Delay (s/veh)	66.0	32.9	29.5	13.3	11.1
Queue Length 50th (ft)	208	31	71	217	102
Queue Length 95th (ft)	208	57	111	333	164
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	456	378	653	2755	2534
Starvation Cap Reductn	64	0	0	279	0
Spillback Cap Reductn	0	0	0	36	33
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.13	0.21	0.61	0.35

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	37	71	47	75	51	51	1302	27	36	695	64
Future Volume (vph)	144	37	71	47	75	51	51	1302	27	36	695	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.95		1.00	0.95			1.00			0.99	
Flpb, ped/bikes		0.95		0.91	1.00			1.00			1.00	
Frt		0.96		1.00	0.94			1.00			0.99	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1577		1619	1672			5039			4940	
Flt Permitted		0.72		0.58	1.00			0.85			0.80	
Satd. Flow (perm)		1162		995	1672			4292			3937	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	40	77	51	82	55	55	1415	29	39	755	70
RTOR Reduction (vph)	0	14	0	0	15	0	0	1	0	0	6	0
Lane Group Flow (vph)	0	260	0	51	122	0	0	1498	0	0	858	0
Confl. Peds. (#/hr)	71		118	118		71	56		48	48		56
Confl. Bikes (#/hr)									4			3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.5		31.5	31.5			77.0			77.0	
Effective Green, g (s)		31.5		31.5	31.5			77.0			77.0	
Actuated g/C Ratio		0.26		0.26	0.26			0.64			0.64	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		305		261	438			2754			2526	
v/s Ratio Prot					0.07							
v/s Ratio Perm		c0.22		0.05				c0.35			0.22	
v/c Ratio		0.85		0.20	0.28			0.54			0.34	
Uniform Delay, d1		42.0		34.4	35.2			11.8			9.8	
Progression Factor		1.06		1.00	1.00			0.94			1.00	
Incremental Delay, d2		19.3		0.4	0.3			0.8			0.4	
Delay (s)		63.8		34.8	35.5			11.9			10.2	
Level of Service		E		C	D			B			B	
Approach Delay (s/veh)		63.8			35.3			11.9			10.2	
Approach LOS		E			D			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	53	67	17	30
Demand Flow Rate, veh/h	54	68	17	31
Vehicles Circulating, veh/h	0	71	54	70
Vehicles Exiting, veh/h	101	0	0	69
Ped Vol Crossing Leg, #/h	7	14	9	18
Ped Cap Adj	0.999	0.998	0.999	0.998
Approach Delay, s/veh	3.0	3.3	2.9	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	54	68	17	31
Cap Entry Lane, veh/h	1380	1283	1306	1285
Entry HV Adj Factor	0.980	0.984	0.994	0.968
Flow Entry, veh/h	53	67	17	30
Cap Entry, veh/h	1351	1261	1297	1240
V/C Ratio	0.039	0.053	0.013	0.024
Control Delay, s/veh	3.0	3.3	2.9	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	20	1488	910
v/c Ratio	0.21	0.31	0.22
Control Delay (s/veh)	37.6	1.0	0.5
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.6	1.0	0.5
Queue Length 50th (ft)	6	0	0
Queue Length 95th (ft)	32	70	21
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	387	4788	4191
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.05	0.31	0.22

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Middleton & MD355

05/30/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	11	1348	21	19	818
Future Volume (vph)	7	11	1348	21	19	818
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.95		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1595		5068			5075
Flt Permitted	0.98		1.00			0.87
Satd. Flow (perm)	1595		5068			4437
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	12	1465	23	21	889
RTOR Reduction (vph)	12	0	0	0	0	0
Lane Group Flow (vph)	8	0	1488	0	0	910
Confl. Peds. (#/hr)		46		83	83	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	3.1		107.9			107.9
Effective Green, g (s)	3.1		107.9			107.9
Actuated g/C Ratio	0.03		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	41		4556			3989
v/s Ratio Prot	c0.01		c0.29			
v/s Ratio Perm						0.21
v/c Ratio	0.20		0.33			0.23
Uniform Delay, d1	57.2		0.9			0.8
Progression Factor	1.00		1.00			0.60
Incremental Delay, d2	2.4		0.2			0.1
Delay (s)	59.7		1.1			0.6
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		1.1			0.6
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197 05/30/2025



Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	172	716	120	960	510
v/c Ratio	0.70	0.40	0.26	0.85	0.81
Control Delay (s/veh)	29.0	7.8	10.0	43.5	55.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.0	7.8	10.0	43.5	55.6
Queue Length 50th (ft)	70	115	6	358	190
Queue Length 95th (ft)	#228	159	58	392	249
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	246	1779	468	1547	703
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.40	0.26	0.62	0.73

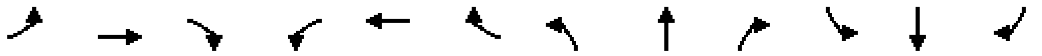
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	0	659	110	745	138	0	0	0	0	347	122
Future Volume (vph)	158	0	659	110	745	138	0	0	0	0	347	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.92	1.00	0.92						0.93	
Flpb, ped/bikes	1.00		1.00	0.84	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.96	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2562	1493	3172						3169	
Flt Permitted	0.21		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	397		2562	1493	3172						3169	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	0	716	120	810	150	0	0	0	0	377	133
RTOR Reduction (vph)	0	0	0	74	0	0	0	0	0	0	31	0
Lane Group Flow (vph)	172	0	716	46	960	0	0	0	0	0	479	0
Confl. Peds. (#/hr)	180		166	166		180	148		100	100		148
Confl. Bikes (#/hr)			3			5						17
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	86.4		86.4	38.3	42.6						22.6	
Effective Green, g (s)	86.4		86.4	38.3	42.6						22.6	
Actuated g/C Ratio	0.72		0.72	0.32	0.36						0.19	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	285		1844	476	1126						596	
v/s Ratio Prot					c0.30						c0.15	
v/s Ratio Perm	c0.43		0.28	0.03								
v/c Ratio	0.60		0.39	0.10	0.85						0.80	
Uniform Delay, d1	8.3		6.5	28.7	35.8						46.6	
Progression Factor	1.00		1.00	1.00	1.00						1.04	
Incremental Delay, d2	9.1		0.6	0.4	6.2						7.7	
Delay (s)	17.5		7.1	29.1	42.0						56.2	
Level of Service	B		A	C	D						E	
Approach Delay (s/veh)		9.1			40.5			0.0			56.2	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/30/2025

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	117	50	178	20	180	34	254	42
v/c Ratio	0.34	0.21	0.71	0.04	0.20	0.08	0.21	0.06
Control Delay (s/veh)	27.6	25.7	43.3	7.7	8.1	8.0	7.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	27.6	25.7	43.3	7.7	8.1	8.0	7.9	0.3
Queue Length 50th (ft)	50	21	83	3	33	6	48	0
Queue Length 95th (ft)	84	44	134	14	79	21	104	2
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	560	380	410	561	888	450	1182	676
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.13	0.43	0.04	0.20	0.08	0.21	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	86	46	65	60	39	18	103	63	31	234	39
Future Volume (vph)	22	86	46	65	60	39	18	103	63	31	234	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.68		0.89		1.00	0.80		1.00	1.00	0.64
Flpb, ped/bikes		0.94	1.00		0.90		0.76	1.00		0.59	1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.94		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1731	1084		1406		1340	1402		1048	1863	1013
Flt Permitted		0.92	1.00		0.82		0.60	1.00		0.64	1.00	1.00
Satd. Flow (perm)		1608	1084		1173		849	1402		710	1863	1013
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	93	50	71	65	42	20	112	68	34	254	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	15
Lane Group Flow (vph)	0	117	50	0	178	0	20	180	0	34	254	27
Confl. Peds. (#/hr)	162		194	194		162	95		170	170		95
Confl. Bikes (#/hr)			6			5			6			4
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		17.2	17.2		17.2		50.8	50.8		50.8	50.8	50.8
Effective Green, g (s)		17.2	17.2		17.2		50.8	50.8		50.8	50.8	50.8
Actuated g/C Ratio		0.22	0.22		0.22		0.64	0.64		0.64	0.64	0.64
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		345	233		252		539	890		450	1183	643
v/s Ratio Prot								0.13			c0.14	
v/s Ratio Perm		0.07	0.05		c0.15		0.02			0.05		0.03
v/c Ratio		0.34	0.21		0.71		0.04	0.20		0.08	0.21	0.04
Uniform Delay, d1		26.6	25.8		29.1		5.5	6.1		5.6	6.2	5.5
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.6	0.5		8.7		0.1	0.5		0.3	0.4	0.1
Delay (s)		27.2	26.3		37.8		5.6	6.6		5.9	6.6	5.6
Level of Service		C	C		D		A	A		A	A	A
Approach Delay (s/veh)		26.9			37.8			6.5			6.4	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/30/2025

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	208	41	67	1008	795
v/c Ratio	0.78	0.23	0.20	0.36	0.28
Control Delay (s/veh)	58.5	41.2	28.5	7.1	7.0
Queue Delay	0.1	0.0	0.0	0.0	0.0
Total Delay (s/veh)	58.7	41.2	28.5	7.1	7.0
Queue Length 50th (ft)	133	27	31	97	69
Queue Length 95th (ft)	201	56	65	159	117
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	495	355	651	2811	2854
Starvation Cap Reductn	26	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.44	0.12	0.10	0.36	0.28

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	24	75	38	43	18	76	833	18	46	635	51
Future Volume (vph)	92	24	75	38	43	18	76	833	18	46	635	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.94		1.00	0.96			1.00			0.99	
Flpb, ped/bikes		0.94		0.92	1.00			0.99			1.00	
Frt		0.95		1.00	0.96			1.00			0.99	
Flt Protected		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1525		1620	1706			5001			4931	
Flt Permitted		0.81		0.56	1.00			0.78			0.81	
Satd. Flow (perm)		1271		956	1706			3929			3983	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	100	26	82	41	47	20	83	905	20	50	690	55
RTOR Reduction (vph)	0	25	0	0	16	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	183	0	41	51	0	0	1007	0	0	791	0
Confl. Peds. (#/hr)	90		101	101		90	69		78	78		69
Confl. Bikes (#/hr)									2			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.7		22.7	22.7			85.8			85.8	
Effective Green, g (s)		22.7		22.7	22.7			85.8			85.8	
Actuated g/C Ratio		0.19		0.19	0.19			0.72			0.72	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		240		180	322			2809			2847	
v/s Ratio Prot					0.03							
v/s Ratio Perm		c0.14		0.04				c0.26			0.20	
v/c Ratio		0.76		0.23	0.16			0.36			0.28	
Uniform Delay, d1		46.1		41.2	40.7			6.6			6.1	
Progression Factor		1.00		1.00	1.00			0.91			1.00	
Incremental Delay, d2		13.3		0.6	0.2			0.4			0.2	
Delay (s)		59.4		41.9	40.9			6.3			6.3	
Level of Service		E		D	D			A			A	
Approach Delay (s/veh)		59.4			41.3			6.3			6.3	
Approach LOS		E			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.5
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	2.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	25	39	12	24
Demand Flow Rate, veh/h	25	40	12	24
Vehicles Circulating, veh/h	0	37	25	48
Vehicles Exiting, veh/h	72	0	0	29
Ped Vol Crossing Leg, #/h	7	11	5	8
Ped Cap Adj	0.999	0.998	0.999	0.999
Approach Delay, s/veh	2.8	3.0	2.8	2.9
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	25	40	12	24
Cap Entry Lane, veh/h	1380	1329	1345	1314
Entry HV Adj Factor	0.997	0.983	0.995	1.000
Flow Entry, veh/h	25	39	12	24
Cap Entry, veh/h	1374	1304	1338	1312
V/C Ratio	0.018	0.030	0.009	0.018
Control Delay, s/veh	2.8	3.0	2.8	2.9
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	15	1007	831
v/c Ratio	0.16	0.21	0.19
Control Delay (s/veh)	40.1	0.8	0.6
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	40.1	0.8	0.6
Queue Length 50th (ft)	5	0	0
Queue Length 95th (ft)	28	41	25
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	392	4799	4370
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.04	0.21	0.19

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	7	918	8	15	750
Future Volume (vph)	6	7	918	8	15	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.96		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.93		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1626		5075			5073
Flt Permitted	0.98		1.00			0.91
Satd. Flow (perm)	1626		5075			4620
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	8	998	9	16	815
RTOR Reduction (vph)	8	0	0	0	0	0
Lane Group Flow (vph)	7	0	1007	0	0	831
Confl. Peds. (#/hr)		38		90	90	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	2.9		108.1			108.1
Effective Green, g (s)	2.9		108.1			108.1
Actuated g/C Ratio	0.02		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	39		4571			4161
v/s Ratio Prot	c0.00		c0.20			
v/s Ratio Perm						0.18
v/c Ratio	0.18		0.22			0.20
Uniform Delay, d1	57.4		0.7			0.7
Progression Factor	1.00		1.00			0.83
Incremental Delay, d2	2.3		0.1			0.1
Delay (s)	59.7		0.8			0.7
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		0.8			0.7
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197

05/30/2025



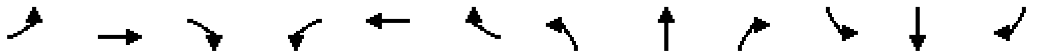
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	108	361	116	663	331
v/c Ratio	0.29	0.19	0.17	0.85	0.70
Control Delay (s/veh)	7.0	4.3	4.8	54.1	53.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	7.0	4.3	4.8	54.1	53.4
Queue Length 50th (ft)	21	36	0	259	121
Queue Length 95th (ft)	53	61	38	305	165
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	373	1896	665	1498	820
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.19	0.17	0.44	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	0	332	107	547	63	0	0	0	0	244	61
Future Volume (vph)	99	0	332	107	547	63	0	0	0	0	244	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.93	1.00	0.95						0.95	
Flpb, ped/bikes	0.88		1.00	0.90	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.97	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1565		2583	1595	3297						3261	
Flt Permitted	0.33		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	541		2583	1595	3297						3261	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	0	361	116	595	68	0	0	0	0	265	66
RTOR Reduction (vph)	0	0	0	60	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	108	0	361	56	663	0	0	0	0	0	310	0
Confl. Peds. (#/hr)	179		160	160		179	138		61	61		138
Confl. Bikes (#/hr)						2						19
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	92.3		92.3	58.3	28.5						16.7	
Effective Green, g (s)	92.3		92.3	58.3	28.5						16.7	
Actuated g/C Ratio	0.77		0.77	0.49	0.24						0.14	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	416		1986	774	783						453	
v/s Ratio Prot					c0.20						c0.10	
v/s Ratio Perm	c0.20		0.14	0.04								
v/c Ratio	0.26		0.18	0.07	0.85						0.69	
Uniform Delay, d1	4.0		3.7	16.4	43.7						49.1	
Progression Factor	1.00		1.00	1.00	1.00						1.00	
Incremental Delay, d2	1.5		0.2	0.2	8.1						4.3	
Delay (s)	5.5		3.9	16.6	51.8						53.4	
Level of Service	A		A	B	D						D	
Approach Delay (s/veh)		4.3			46.5			0.0			53.4	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

2030 Alternative 2

Queues

1: Woodmont & Norfolk

05/30/2025

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBR
Lane Group Flow (vph)	143	60	202	23	218	24	657	25
v/c Ratio	0.34	0.18	0.63	0.08	0.25	0.05	0.65	0.03
Control Delay (s/veh)	19.3	17.0	29.6	12.3	15.0	8.7	15.2	0.0
Queue Delay	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.4	17.0	29.6	12.3	15.0	8.7	15.2	0.0
Queue Length 50th (ft)	42	17	86	11	139	4	149	0
Queue Length 95th (ft)	73	37	112	m17	192	16	#362	0
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	453	358	343	298	859	464	1018	867
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	44	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.17	0.59	0.08	0.25	0.05	0.65	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	109	55	107	67	12	21	140	61	22	604	23
Future Volume (vph)	23	109	55	107	67	12	21	140	61	22	604	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.83		0.99		1.00	0.89		1.00	1.00	0.94
Flpb, ped/bikes		0.98	1.00		0.93		0.99	1.00		0.73	1.00	1.00
Frt		1.00	0.85		0.99		1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1810	1321		1653		1753	1574		1299	1863	1484
Flt Permitted		0.91	1.00		0.74		0.29	1.00		0.62	1.00	1.00
Satd. Flow (perm)		1669	1321		1264		541	1574		850	1863	1484
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	118	60	116	73	13	23	152	66	24	657	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	11
Lane Group Flow (vph)	0	143	60	0	202	0	23	218	0	24	657	14
Confl. Peds. (#/hr)	79		67	67		79	15		132	132		15
Confl. Bikes (#/hr)			4			5			16			4
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		15.2	15.2		15.2		32.8	32.8		32.8	32.8	32.8
Effective Green, g (s)		15.2	15.2		15.2		32.8	32.8		32.8	32.8	32.8
Actuated g/C Ratio		0.25	0.25		0.25		0.55	0.55		0.55	0.55	0.55
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		422	334		320		295	860		464	1018	811
v/s Ratio Prot								0.14			c0.35	
v/s Ratio Perm		0.09	0.05		c0.16		0.04			0.03		0.01
v/c Ratio		0.34	0.18		0.63		0.08	0.25		0.05	0.65	0.02
Uniform Delay, d1		18.3	17.5		19.9		6.4	7.2		6.3	9.5	6.2
Progression Factor		1.00	1.00		1.10		1.42	1.76		1.00	1.00	1.00
Incremental Delay, d2		0.5	0.3		3.8		0.4	0.6		0.2	3.2	0.0
Delay (s)		18.8	17.8		25.6		9.6	13.2		6.6	12.7	6.3
Level of Service		B	B		C		A	B		A	B	A
Approach Delay (s/veh)		18.5			25.6			12.8			12.2	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

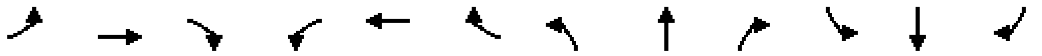
2: MD355 & Norfolk/Cheltenham 05/30/2025

Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	207	29	111	906	1152
v/c Ratio	0.79	0.29	0.60	0.38	0.48
Control Delay (s/veh)	69.1	56.0	55.3	16.5	18.0
Queue Delay	0.7	0.0	0.0	0.0	0.0
Total Delay (s/veh)	69.9	56.0	55.3	16.5	18.0
Queue Length 50th (ft)	122	21	69	136	183
Queue Length 95th (ft)	233	51	125	216	287
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	346	211	373	2401	2423
Starvation Cap Reductn	26	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.65	0.14	0.30	0.38	0.48

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham 05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	108	40	43	27	68	34	29	774	30	34	922	104
Future Volume (vph)	108	40	43	27	68	34	29	774	30	34	922	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.97		1.00	0.97			0.99			0.99	
Flpb, ped/bikes		0.97		0.94	1.00			1.00			1.00	
Frt		0.97		1.00	0.95			0.99			0.99	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1650		1659	1716			5021			4948	
Flt Permitted		0.76		0.57	1.00			0.85			0.87	
Satd. Flow (perm)		1296		994	1716			4276			4309	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	117	43	47	29	74	37	32	841	33	37	1002	113
RTOR Reduction (vph)	0	10	0	0	17	0	0	2	0	0	8	0
Lane Group Flow (vph)	0	197	0	29	94	0	0	904	0	0	1144	0
Confl. Peds. (#/hr)	49		76	76		49	30		44	44		30
Confl. Bikes (#/hr)						5			3			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2			6		
Actuated Green, G (s)		23.4		11.8	11.8			67.3			67.3	
Effective Green, g (s)		23.4		11.8	11.8			67.3			67.3	
Actuated g/C Ratio		0.19		0.10	0.10			0.56			0.56	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		252		97	168			2398			2416	
v/s Ratio Prot					c0.05							
v/s Ratio Perm		c0.15		0.03				0.21			c0.27	
v/c Ratio		0.78		0.30	0.56			0.38			0.47	
Uniform Delay, d1		45.9		50.3	51.6			14.7			15.8	
Progression Factor		1.14		1.00	1.00			0.98			1.00	
Incremental Delay, d2		14.3		1.7	4.0			0.5			0.7	
Delay (s)		66.7		52.0	55.6			14.9			16.4	
Level of Service		E		D	E			B			B	
Approach Delay (s/veh)		66.7			54.9			14.9			16.4	
Approach LOS		E			D			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	37	70	18	37
Demand Flow Rate, veh/h	38	71	18	38
Vehicles Circulating, veh/h	0	56	38	73
Vehicles Exiting, veh/h	111	0	0	54
Ped Vol Crossing Leg, #/h	6	9	10	11
Ped Cap Adj	0.999	0.999	0.999	0.998
Approach Delay, s/veh	2.9	3.2	2.8	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	38	71	18	38
Cap Entry Lane, veh/h	1380	1303	1327	1281
Entry HV Adj Factor	0.972	0.984	0.992	0.974
Flow Entry, veh/h	37	70	18	37
Cap Entry, veh/h	1340	1281	1315	1245
V/C Ratio	0.028	0.055	0.014	0.030
Control Delay, s/veh	2.9	3.2	2.8	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	11	647	903
v/c Ratio	0.13	0.13	0.20
Control Delay (s/veh)	37.0	0.4	0.3
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.0	0.4	0.3
Queue Length 50th (ft)	2	0	0
Queue Length 95th (ft)	22	24	19
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	361	4923	4540
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.03	0.13	0.20

Intersection Summary

HCM Signalized Intersection Capacity Analysis

4: Middleton & MD355

05/30/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	3	7	583	12	17	814
Future Volume (vph)	3	7	583	12	17	814
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.89		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.90		1.00			1.00
Flt Protected	0.99		1.00			1.00
Satd. Flow (prot)	1480		5064			5069
Flt Permitted	0.99		1.00			0.92
Satd. Flow (perm)	1480		5064			4667
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	8	634	13	18	885
RTOR Reduction (vph)	8	0	1	0	0	0
Lane Group Flow (vph)	3	0	646	0	0	903
Confl. Peds. (#/hr)		79		78	78	
Confl. Bikes (#/hr)		1				
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	1.5		109.5			109.5
Effective Green, g (s)	1.5		109.5			109.5
Actuated g/C Ratio	0.01		0.91			0.91
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	18		4620			4258
v/s Ratio Prot	c0.00		0.13			
v/s Ratio Perm						c0.19
v/c Ratio	0.17		0.14			0.21
Uniform Delay, d1	58.6		0.5			0.6
Progression Factor	1.00		1.00			0.57
Incremental Delay, d2	4.5		0.1			0.1
Delay (s)	63.2		0.6			0.4
Level of Service	E		A			A
Approach Delay (s/veh)	63.2		0.6			0.4
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	0.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

5: Woodmont & MD187/MD197

05/30/2025



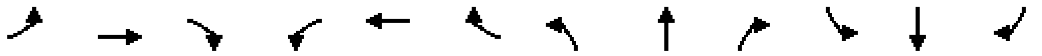
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	183	838	101	825	589
v/c Ratio	0.62	0.47	0.18	0.85	0.81
Control Delay (s/veh)	22.4	9.6	6.4	48.2	55.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.4	9.6	6.4	48.2	55.7
Queue Length 50th (ft)	70	153	0	315	237
Queue Length 95th (ft)	184	213	39	354	298
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	294	1786	562	1459	818
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.62	0.47	0.18	0.57	0.72

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	0	771	93	595	164	0	0	0	0	483	59
Future Volume (vph)	168	0	771	93	595	164	0	0	0	0	483	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.94	1.00	0.92						0.98	
Flpb, ped/bikes	1.00		1.00	0.91	1.00						1.00	
Frt	1.00		0.85	1.00	0.97						0.98	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2627	1606	3155						3413	
Flt Permitted	0.26		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	476		2627	1606	3155						3413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	183	0	838	101	647	178	0	0	0	0	525	64
RTOR Reduction (vph)	0	0	0	66	0	0	0	0	0	0	8	0
Lane Group Flow (vph)	183	0	838	35	825	0	0	0	0	0	581	0
Confl. Peds. (#/hr)	111		106	106		111	104		124	124		104
Confl. Bikes (#/hr)			2			2			2			2
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	83.6		83.6	41.4	36.7						25.4	
Effective Green, g (s)	83.6		83.6	41.4	36.7						25.4	
Actuated g/C Ratio	0.70		0.70	0.35	0.31						0.21	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	331		1830	554	964						722	
v/s Ratio Prot					c0.26						c0.17	
v/s Ratio Perm	c0.38		0.32	0.02								
v/c Ratio	0.55		0.46	0.06	0.86						0.80	
Uniform Delay, d1	9.0		8.1	26.3	39.2						44.9	
Progression Factor	1.00		1.00	1.00	1.00						1.09	
Incremental Delay, d2	6.5		0.8	0.2	7.3						5.3	
Delay (s)	15.5		8.9	26.5	46.4						54.4	
Level of Service	B		A	C	D						D	
Approach Delay (s/veh)		10.1			44.3			0.0			54.4	
Approach LOS		B			D			A			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/30/2025

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	146	63	196	46	390	38	326	28
v/c Ratio	0.52	0.47	0.77	0.08	0.38	0.07	0.24	0.05
Control Delay (s/veh)	49.8	53.5	61.9	3.5	6.4	6.8	7.1	0.2
Queue Delay	0.0	0.0	0.4	0.0	0.2	0.0	0.0	0.0
Total Delay (s/veh)	49.8	53.5	62.2	3.5	6.6	6.8	7.1	0.2
Queue Length 50th (ft)	103	44	148	5	99	8	77	0
Queue Length 95th (ft)	158	85	m207	m16	238	24	144	1
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	425	204	383	588	1032	560	1337	599
Starvation Cap Reductn	0	0	27	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	154	84	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.31	0.55	0.08	0.44	0.08	0.24	0.05

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	110	58	32	117	31	42	244	115	35	300	26
Future Volume (vph)	24	110	58	32	117	31	42	244	115	35	300	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.47		0.91		1.00	0.81		1.00	1.00	0.51
Flpb, ped/bikes		0.96	1.00		0.93		0.72	1.00		0.71	1.00	1.00
Frt		1.00	0.85		0.98		1.00	0.95		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1769	739		1531		1271	1437		1261	1863	811
Flt Permitted		0.87	1.00		0.90		0.55	1.00		0.51	1.00	1.00
Satd. Flow (perm)		1555	739		1397		741	1437		678	1863	811
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	120	63	35	127	34	46	265	125	38	326	28
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	8
Lane Group Flow (vph)	0	146	63	0	196	0	46	390	0	38	326	20
Confl. Peds. (#/hr)	118		134	134		118	87		167	167		87
Confl. Bikes (#/hr)			9			3			4			10
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		21.8	21.8		21.8		86.2	86.2		86.2	86.2	86.2
Effective Green, g (s)		21.8	21.8		21.8		86.2	86.2		86.2	86.2	86.2
Actuated g/C Ratio		0.18	0.18		0.18		0.72	0.72		0.72	0.72	0.72
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		282	134		253		532	1032		487	1338	582
v/s Ratio Prot								c0.27			0.18	
v/s Ratio Perm		0.09	0.09		c0.14		0.06			0.06		0.02
v/c Ratio		0.52	0.47		0.77		0.09	0.38		0.08	0.24	0.03
Uniform Delay, d1		44.4	43.9		46.8		5.1	6.5		5.0	5.8	4.9
Progression Factor		1.00	1.00		0.95		0.49	0.72		1.00	1.00	1.00
Incremental Delay, d2		1.6	2.6		12.2		0.3	0.9		0.3	0.4	0.1
Delay (s)		46.0	46.5		56.7		2.8	5.6		5.4	6.2	5.0
Level of Service		D	D		E		A	A		A	A	A
Approach Delay (s/veh)		46.1			56.7			5.3			6.0	
Approach LOS		D			E			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/30/2025

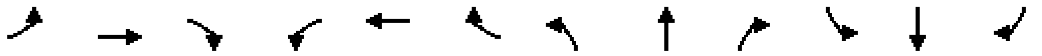
Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	274	51	137	1499	864
v/c Ratio	0.83	0.45	0.66	0.73	0.47
Control Delay (s/veh)	57.6	61.1	55.6	28.8	23.4
Queue Delay	22.9	0.0	0.0	0.2	0.0
Total Delay (s/veh)	80.5	61.1	55.6	28.9	23.4
Queue Length 50th (ft)	209	38	84	344	164
Queue Length 95th (ft)	#255	76	145	452	227
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	342	210	368	2043	1826
Starvation Cap Reductn	67	0	0	77	0
Spillback Cap Reductn	0	0	0	37	33
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.00	0.24	0.37	0.76	0.48

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham 05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	37	71	47	75	51	51	1302	27	36	695	64
Future Volume (vph)	144	37	71	47	75	51	51	1302	27	36	695	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.95		1.00	0.95			1.00			0.99	
Flpb, ped/bikes		0.95		0.92	1.00			1.00			1.00	
Frt		0.96		1.00	0.94			1.00			0.99	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1575		1620	1672			5039			4942	
Flt Permitted		0.75		0.57	1.00			0.85			0.77	
Satd. Flow (perm)		1210		980	1672			4279			3813	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	157	40	77	51	82	55	55	1415	29	39	755	70
RTOR Reduction (vph)	0	11	0	0	22	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	263	0	51	115	0	0	1497	0	0	857	0
Confl. Peds. (#/hr)	71		118	118		71	56		48	48		56
Confl. Bikes (#/hr)									4			3
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2			6		
Actuated Green, G (s)		31.8		13.5	13.5			57.2			57.2	
Effective Green, g (s)		31.8		13.5	13.5			57.2			57.2	
Actuated g/C Ratio		0.27		0.11	0.11			0.48			0.48	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		320		110	188			2039			1817	
v/s Ratio Prot					c0.07							
v/s Ratio Perm		c0.22		0.05				c0.35			0.22	
v/c Ratio		0.82		0.46	0.61			0.73			0.47	
Uniform Delay, d1		41.4		49.9	50.7			25.3			21.2	
Progression Factor		0.96		1.00	1.00			0.97			1.00	
Incremental Delay, d2		15.0		3.1	5.8			2.3			0.9	
Delay (s)		54.9		52.9	56.5			26.9			22.1	
Level of Service		D		D	E			C			C	
Approach Delay (s/veh)		54.9			55.5			26.9			22.1	
Approach LOS		D			E			C			C	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	104.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	3.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	53	67	17	30
Demand Flow Rate, veh/h	54	68	17	31
Vehicles Circulating, veh/h	0	71	54	70
Vehicles Exiting, veh/h	101	0	0	69
Ped Vol Crossing Leg, #/h	7	14	9	18
Ped Cap Adj	0.999	0.998	0.999	0.998
Approach Delay, s/veh	3.0	3.3	2.9	3.1
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	54	68	17	31
Cap Entry Lane, veh/h	1380	1283	1306	1285
Entry HV Adj Factor	0.980	0.984	0.994	0.968
Flow Entry, veh/h	53	67	17	30
Cap Entry, veh/h	1351	1261	1297	1240
V/C Ratio	0.039	0.053	0.013	0.024
Control Delay, s/veh	3.0	3.3	2.9	3.1
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	20	1488	910
v/c Ratio	0.21	0.31	0.22
Control Delay (s/veh)	37.6	1.0	0.3
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	37.6	1.0	0.3
Queue Length 50th (ft)	6	0	0
Queue Length 95th (ft)	32	70	10
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	387	4788	4191
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	99	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.05	0.32	0.22

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	7	11	1348	21	19	818
Future Volume (vph)	7	11	1348	21	19	818
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.95		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.92		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1595		5068			5075
Flt Permitted	0.98		1.00			0.87
Satd. Flow (perm)	1595		5068			4437
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	12	1465	23	21	889
RTOR Reduction (vph)	12	0	0	0	0	0
Lane Group Flow (vph)	8	0	1488	0	0	910
Confl. Peds. (#/hr)		46		83	83	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	3.1		107.9			107.9
Effective Green, g (s)	3.1		107.9			107.9
Actuated g/C Ratio	0.03		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	41		4556			3989
v/s Ratio Prot	c0.01		c0.29			
v/s Ratio Perm						0.21
v/c Ratio	0.20		0.33			0.23
Uniform Delay, d1	57.2		0.9			0.8
Progression Factor	1.00		1.00			0.28
Incremental Delay, d2	2.4		0.2			0.1
Delay (s)	59.7		1.1			0.3
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		1.1			0.3
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197

05/30/2025



Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	172	716	120	960	510
v/c Ratio	0.70	0.40	0.26	0.85	0.81
Control Delay (s/veh)	29.0	7.8	10.0	43.5	55.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.0	7.8	10.0	43.5	55.3
Queue Length 50th (ft)	70	115	6	358	190
Queue Length 95th (ft)	#228	159	58	392	249
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	246	1779	468	1547	703
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.70	0.40	0.26	0.62	0.73

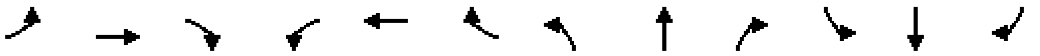
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	0	659	110	745	138	0	0	0	0	347	122
Future Volume (vph)	158	0	659	110	745	138	0	0	0	0	347	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.92	1.00	0.92						0.93	
Flpb, ped/bikes	1.00		1.00	0.84	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.96	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1770		2562	1493	3172						3169	
Flt Permitted	0.21		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	397		2562	1493	3172						3169	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	172	0	716	120	810	150	0	0	0	0	377	133
RTOR Reduction (vph)	0	0	0	74	0	0	0	0	0	0	31	0
Lane Group Flow (vph)	172	0	716	46	960	0	0	0	0	0	479	0
Confl. Peds. (#/hr)	180		166	166		180	148		100	100		148
Confl. Bikes (#/hr)			3			5						17
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	86.4		86.4	38.3	42.6						22.6	
Effective Green, g (s)	86.4		86.4	38.3	42.6						22.6	
Actuated g/C Ratio	0.72		0.72	0.32	0.36						0.19	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	285		1844	476	1126						596	
v/s Ratio Prot					c0.30						c0.15	
v/s Ratio Perm	c0.43		0.28	0.03								
v/c Ratio	0.60		0.39	0.10	0.85						0.80	
Uniform Delay, d1	8.3		6.5	28.7	35.8						46.6	
Progression Factor	1.00		1.00	1.00	1.00						1.04	
Incremental Delay, d2	9.1		0.6	0.4	6.2						7.6	
Delay (s)	17.5		7.1	29.1	42.0						56.0	
Level of Service	B		A	C	D						E	
Approach Delay (s/veh)		9.1			40.5			0.0			56.0	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Woodmont & Norfolk

05/30/2025

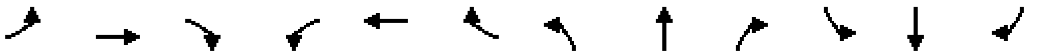
Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	117	50	178	20	180	34	254	42
v/c Ratio	0.32	0.29	0.73	0.04	0.21	0.08	0.22	0.06
Control Delay (s/veh)	26.3	27.7	44.5	8.3	8.7	8.6	8.4	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.3	27.7	44.5	8.3	8.7	8.6	8.4	0.3
Queue Length 50th (ft)	49	21	83	3	35	6	50	0
Queue Length 95th (ft)	81	45	134	15	83	22	109	2
Internal Link Dist (ft)	351		214		689		583	
Turn Bay Length (ft)		30		100		200		60
Base Capacity (vph)	558	263	378	551	873	442	1160	666
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.19	0.47	0.04	0.21	0.08	0.22	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

1: Woodmont & Norfolk

05/30/2025



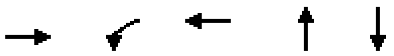
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	86	46	65	60	39	18	103	63	31	234	39
Future Volume (vph)	22	86	46	65	60	39	18	103	63	31	234	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.47		0.89		1.00	0.80		1.00	1.00	0.64
Flpb, ped/bikes		0.94	1.00		0.83		0.76	1.00		0.59	1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.94		1.00	1.00	0.85
Flt Protected		0.99	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1730	751		1297		1340	1402		1048	1863	1013
Flt Permitted		0.92	1.00		0.82		0.60	1.00		0.64	1.00	1.00
Satd. Flow (perm)		1603	751		1082		849	1402		710	1863	1013
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	93	50	71	65	42	20	112	68	34	254	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	16
Lane Group Flow (vph)	0	117	50	0	178	0	20	180	0	34	254	26
Confl. Peds. (#/hr)	162		194	194		162	95		170	170		95
Confl. Bikes (#/hr)			6			5			6			4
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		18.1	18.1		18.1		49.9	49.9		49.9	49.9	49.9
Effective Green, g (s)		18.1	18.1		18.1		49.9	49.9		49.9	49.9	49.9
Actuated g/C Ratio		0.23	0.23		0.23		0.62	0.62		0.62	0.62	0.62
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)		362	169		244		529	874		442	1162	631
v/s Ratio Prot								0.13			c0.14	
v/s Ratio Perm		0.07	0.07		c0.16		0.02			0.05		0.03
v/c Ratio		0.32	0.30		0.73		0.04	0.21		0.08	0.22	0.04
Uniform Delay, d1		25.8	25.7		28.7		5.8	6.5		5.9	6.6	5.8
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.5	1.0		10.4		0.1	0.5		0.3	0.4	0.1
Delay (s)		26.4	26.6		39.1		5.9	7.0		6.3	7.0	5.9
Level of Service		C	C		D		A	A		A	A	A
Approach Delay (s/veh)		26.4			39.1			6.9			6.8	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

2: MD355 & Norfolk/Cheltenham 05/30/2025

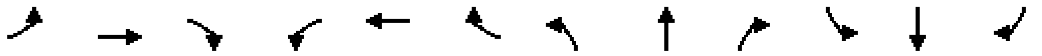


Lane Group	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	208	41	67	1008	795
v/c Ratio	0.80	0.50	0.39	0.44	0.34
Control Delay (s/veh)	61.3	70.4	44.4	16.6	15.4
Queue Delay	0.7	0.0	0.0	0.0	0.0
Total Delay (s/veh)	62.0	70.4	44.4	16.6	15.4
Queue Length 50th (ft)	137	31	38	156	113
Queue Length 95th (ft)	207	66	80	221	189
Internal Link Dist (ft)	214		160	469	362
Turn Bay Length (ft)		150			
Base Capacity (vph)	349	182	367	2314	2350
Starvation Cap Reductn	25	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.64	0.23	0.18	0.44	0.34

Intersection Summary

HCM Signalized Intersection Capacity Analysis

2: MD355 & Norfolk/Cheltenham 05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	24	75	38	43	18	76	833	18	46	635	51
Future Volume (vph)	92	24	75	38	43	18	76	833	18	46	635	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.5			5.5	
Lane Util. Factor		1.00		1.00	1.00			0.91			0.91	
Frpb, ped/bikes		0.94		1.00	0.96			1.00			0.99	
Flpb, ped/bikes		0.94		0.91	1.00			1.00			1.00	
Frt		0.95		1.00	0.96			1.00			0.99	
Flt Protected		0.98		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1525		1616	1706			5003			4932	
Flt Permitted		0.81		0.50	1.00			0.78			0.80	
Satd. Flow (perm)		1271		848	1706			3919			3972	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	100	26	82	41	47	20	83	905	20	50	690	55
RTOR Reduction (vph)	0	21	0	0	15	0	0	1	0	0	5	0
Lane Group Flow (vph)	0	187	0	41	52	0	0	1007	0	0	790	0
Confl. Peds. (#/hr)	90		101	101		90	69		78	78		69
Confl. Bikes (#/hr)									2			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			3			2			6	
Permitted Phases	4			3			2			6		
Actuated Green, G (s)		22.7		10.2	10.2			69.6			69.6	
Effective Green, g (s)		22.7		10.2	10.2			69.6			69.6	
Actuated g/C Ratio		0.19		0.09	0.09			0.58			0.58	
Clearance Time (s)		6.0		6.0	6.0			5.5			5.5	
Vehicle Extension (s)		3.0		3.0	3.0			0.2			0.2	
Lane Grp Cap (vph)		240		72	145			2273			2303	
v/s Ratio Prot					0.03							
v/s Ratio Perm		c0.15		c0.05				c0.26			0.20	
v/c Ratio		0.78		0.57	0.36			0.44			0.34	
Uniform Delay, d1		46.3		52.8	51.8			14.2			13.2	
Progression Factor		1.00		1.00	1.00			0.98			1.00	
Incremental Delay, d2		14.7		9.9	1.5			0.6			0.4	
Delay (s)		60.9		62.7	53.4			14.6			13.6	
Level of Service		E		E	D			B			B	
Approach Delay (s/veh)		60.9			56.9			14.6			13.6	
Approach LOS		E			E			B			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	71.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay, s/veh	2.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	25	39	12	24
Demand Flow Rate, veh/h	25	40	12	24
Vehicles Circulating, veh/h	0	37	25	48
Vehicles Exiting, veh/h	72	0	0	29
Ped Vol Crossing Leg, #/h	7	11	5	8
Ped Cap Adj	0.999	0.998	0.999	0.999
Approach Delay, s/veh	2.8	3.0	2.8	2.9
Approach LOS	A	A	A	A

Lane	Left	Left	Left	Left
Designated Moves	L	TR	LT	R
Assumed Moves	L	TR	LT	R
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	25	40	12	24
Cap Entry Lane, veh/h	1380	1329	1345	1314
Entry HV Adj Factor	0.997	0.983	0.995	1.000
Flow Entry, veh/h	25	39	12	24
Cap Entry, veh/h	1374	1304	1338	1312
V/C Ratio	0.018	0.030	0.009	0.018
Control Delay, s/veh	2.8	3.0	2.8	2.9
LOS	A	A	A	A
95th %tile Queue, veh	0	0	0	0

Queues

4: Middleton & MD355

05/30/2025

Lane Group	WBL	NBT	SBT
Lane Group Flow (vph)	15	1007	831
v/c Ratio	0.16	0.21	0.19
Control Delay (s/veh)	40.1	0.8	0.8
Queue Delay	0.0	0.0	0.0
Total Delay (s/veh)	40.1	0.8	0.8
Queue Length 50th (ft)	5	0	0
Queue Length 95th (ft)	28	41	7
Internal Link Dist (ft)	600	207	469
Turn Bay Length (ft)			
Base Capacity (vph)	392	4799	4370
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.04	0.21	0.19

Intersection Summary



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	6	7	918	8	15	750
Future Volume (vph)	6	7	918	8	15	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5			4.5
Lane Util. Factor	1.00		0.91			0.91
Frpb, ped/bikes	0.96		1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.93		1.00			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1626		5075			5073
Flt Permitted	0.98		1.00			0.91
Satd. Flow (perm)	1626		5075			4620
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	8	998	9	16	815
RTOR Reduction (vph)	8	0	0	0	0	0
Lane Group Flow (vph)	7	0	1007	0	0	831
Confl. Peds. (#/hr)		38		90	90	
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		6			2
Permitted Phases					2	
Actuated Green, G (s)	2.9		108.1			108.1
Effective Green, g (s)	2.9		108.1			108.1
Actuated g/C Ratio	0.02		0.90			0.90
Clearance Time (s)	4.5		4.5			4.5
Vehicle Extension (s)	3.0		6.0			6.0
Lane Grp Cap (vph)	39		4571			4161
v/s Ratio Prot	c0.00		c0.20			
v/s Ratio Perm						0.18
v/c Ratio	0.18		0.22			0.20
Uniform Delay, d1	57.4		0.7			0.7
Progression Factor	1.00		1.00			1.10
Incremental Delay, d2	2.3		0.1			0.1
Delay (s)	59.7		0.8			0.9
Level of Service	E		A			A
Approach Delay (s/veh)	59.7		0.8			0.9
Approach LOS	E		A			A

Intersection Summary			
HCM 2000 Control Delay (s/veh)	1.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Queues

5: Woodmont & MD187/MD197

05/30/2025



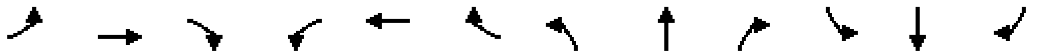
Lane Group	EBL	EBR	WBL	WBT	SBT
Lane Group Flow (vph)	108	361	116	663	331
v/c Ratio	0.29	0.19	0.17	0.85	0.70
Control Delay (s/veh)	7.0	4.3	4.8	54.1	53.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	7.0	4.3	4.8	54.1	53.4
Queue Length 50th (ft)	21	36	0	259	121
Queue Length 95th (ft)	53	61	38	305	165
Internal Link Dist (ft)				557	689
Turn Bay Length (ft)					
Base Capacity (vph)	373	1896	665	1498	820
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.29	0.19	0.17	0.44	0.40

Intersection Summary

HCM Signalized Intersection Capacity Analysis

5: Woodmont & MD187/MD197

05/30/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	0	332	107	547	63	0	0	0	0	244	61
Future Volume (vph)	99	0	332	107	547	63	0	0	0	0	244	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5	5.5						5.5	
Lane Util. Factor	1.00		0.88	1.00	0.95						0.95	
Frpb, ped/bikes	1.00		0.93	1.00	0.95						0.95	
Flpb, ped/bikes	0.88		1.00	0.90	1.00						1.00	
Frt	1.00		0.85	1.00	0.98						0.97	
Flt Protected	0.95		1.00	0.95	1.00						1.00	
Satd. Flow (prot)	1565		2583	1595	3297						3261	
Flt Permitted	0.33		1.00	0.95	1.00						1.00	
Satd. Flow (perm)	541		2583	1595	3297						3261	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	0	361	116	595	68	0	0	0	0	265	66
RTOR Reduction (vph)	0	0	0	60	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	108	0	361	56	663	0	0	0	0	0	310	0
Confl. Peds. (#/hr)	179		160	160		179	138		61	61		138
Confl. Bikes (#/hr)						2						19
Turn Type	Perm		Perm	custom	NA						NA	
Protected Phases					5						4	
Permitted Phases	2 6		2	6								
Actuated Green, G (s)	92.3		92.3	58.3	28.5						16.7	
Effective Green, g (s)	92.3		92.3	58.3	28.5						16.7	
Actuated g/C Ratio	0.77		0.77	0.49	0.24						0.14	
Clearance Time (s)			5.5	5.5	5.5						5.5	
Vehicle Extension (s)			0.2	3.0	0.2						3.0	
Lane Grp Cap (vph)	416		1986	774	783						453	
v/s Ratio Prot					c0.20						c0.10	
v/s Ratio Perm	c0.20		0.14	0.04								
v/c Ratio	0.26		0.18	0.07	0.85						0.69	
Uniform Delay, d1	4.0		3.7	16.4	43.7						49.1	
Progression Factor	1.00		1.00	1.00	1.00						1.00	
Incremental Delay, d2	1.5		0.2	0.2	8.1						4.3	
Delay (s)	5.5		3.9	16.6	51.8						53.4	
Level of Service	A		A	B	D						D	
Approach Delay (s/veh)		4.3			46.5			0.0			53.4	
Approach LOS		A			D			A			D	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	35.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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