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EXPERIENCE EXCEPTIONAL

Downtown Bethesda Two-Way Study

February 2023

Study Outline

- Benefit of Complete Streets

- Project Background and Goals

- Study Area & Existing Conditions

- Trip Generation

- Existing Traffic Operations

- Proposed Alternatives

- Recommendation

Benefits of Complete Streets

Benefits of Complete Streets

- ✓ Improves safety and access for everyone
- ✓ Reduces speeding
- ✓ Promotes business growth
- ✓ Increases real estate values
- ✓ Increases cardiovascular activity for healthy lifestyles
- ✓ Reduces harmful vehicle emissions and greenhouse gases
- ✓ Reduces costs for fuel consumption and vehicle maintenance

Complete Streets improve safety for everyone

- Slower traffic speeds can reduce crashes
- Providing separated and protected space for people walking, biking, and using transit

PEDESTRIAN FATALITY & SERIOUS INJURY RISK

18% — 20 MPH

50% — 30 MPH

77% — 40 MPH

CONE OF VISION

Source: Fairfax County, VA

Complete Streets Promotes Business Growth

- A 2011 UMass Study in Baltimore found that for every **$1M spent on Bike Infrastructure, an additional 14.4 jobs were created**. By comparison - for every $1M in road spending, only 7 jobs were created.

- A 2012 NYCDOT study found **consistent sales revenue growth and jobs growth** with complete street investments in cities **nationwide**

- A 2022 NYCDOT follow up study showed an **increase in sales revenue** on local streets after bike infrastructure was installed, even when parking was reduced.

The Economic Benefits of Sustainable Streets

New York City Department of Transportation
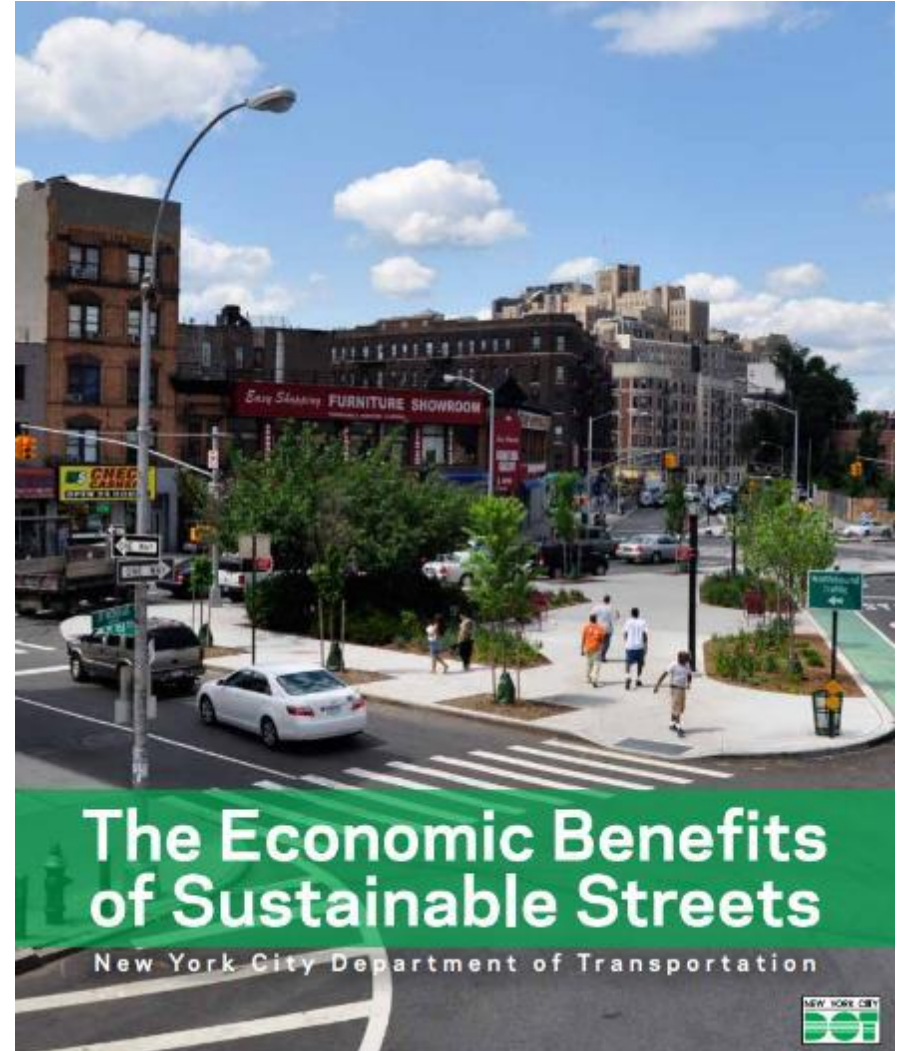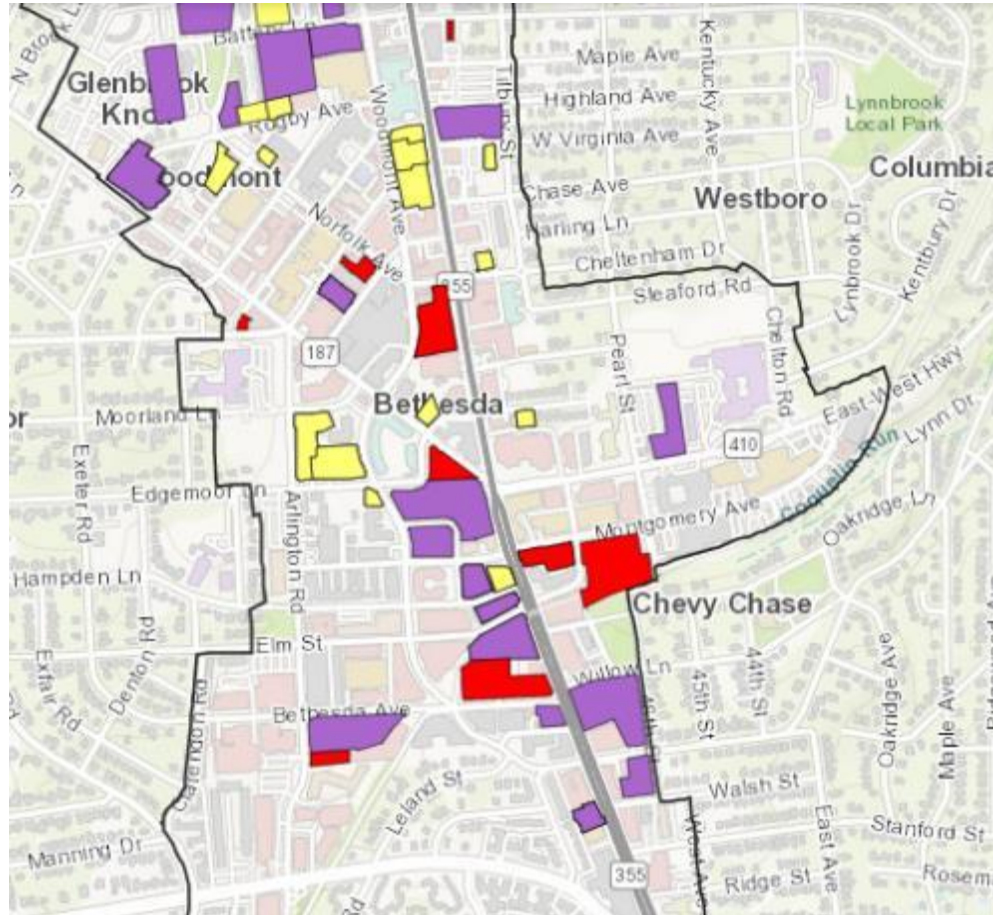
Complete Streets Increase Real Estate Values

- A 2013 study by APTA found that **property values increased on average 42%** when in close proximity to transit, and sometimes up to 130%

- Studies across the country have found an **increase of 2% to 20% for home values** near bike infrastructure – including locally and in Austin TX, Indianapolis IN, and New Castle DE.

- Millennials, older generations, and Women in particular **prefer walkable communities, shorter commutes, and access to transit** according to the National Association of Realtors.

Residential Properties continue to grow in downtown Bethesda with new residential properties like Hampden Row (top left), The Lauren (bottom left), and The Darcy (top right).
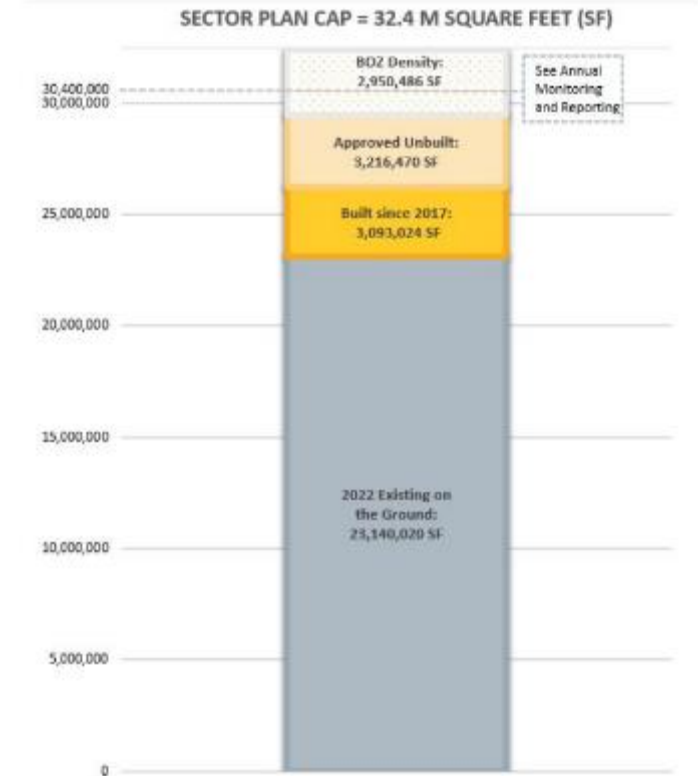
Downtown Bethesda is Growing into an Urban Core

- Higher Density development encourages more walking, biking, and transit ridership

- Limited ROW can not accommodate significant single-occupancy vehicle growth

- Complete Streets are needed to accommodate development growth and roadway safety in Bethesda

Planned Development Sites in Bethesda

Building SF Growth in Bethesda

Bethesda Downtown Plan Monitoring and Tracking Program - Montgomery Planning

BOZ Density Tracking Tool

SECTOR PLAN CAP = 32.4 M SQUARE FEET (SF)

BOZ Density: 2,950,486 SF

See Annual Monitoring and Reporting

Approved Unbuilt: 3,216,470 SF

Built since 2017: 3,093,024 SF

2022 Existing on the Ground: 23,140,020 SF

Project Background and Goals

Previous Planning Documents Supporting Complete Streets

- Implementing Complete Streets are a common theme in previous planning studies:
  - Montgomery County Complete Streets Design Guide
  - 2017 Bethesda Downtown Plan
  - 2020 Bethesda Downtown Streetscape Standards
  - Countywide Vision Zero Plan
  - Draft Thrive Montgomery 2050 Plan
  - 2018 Montgomery County Bicycle Master Plan
  - Countywide Transitway Plan
  - MTA Purple Line Light Rail Design
  - Rockville Pike (MD355) Bus Rapid Transit (BRT) Plan
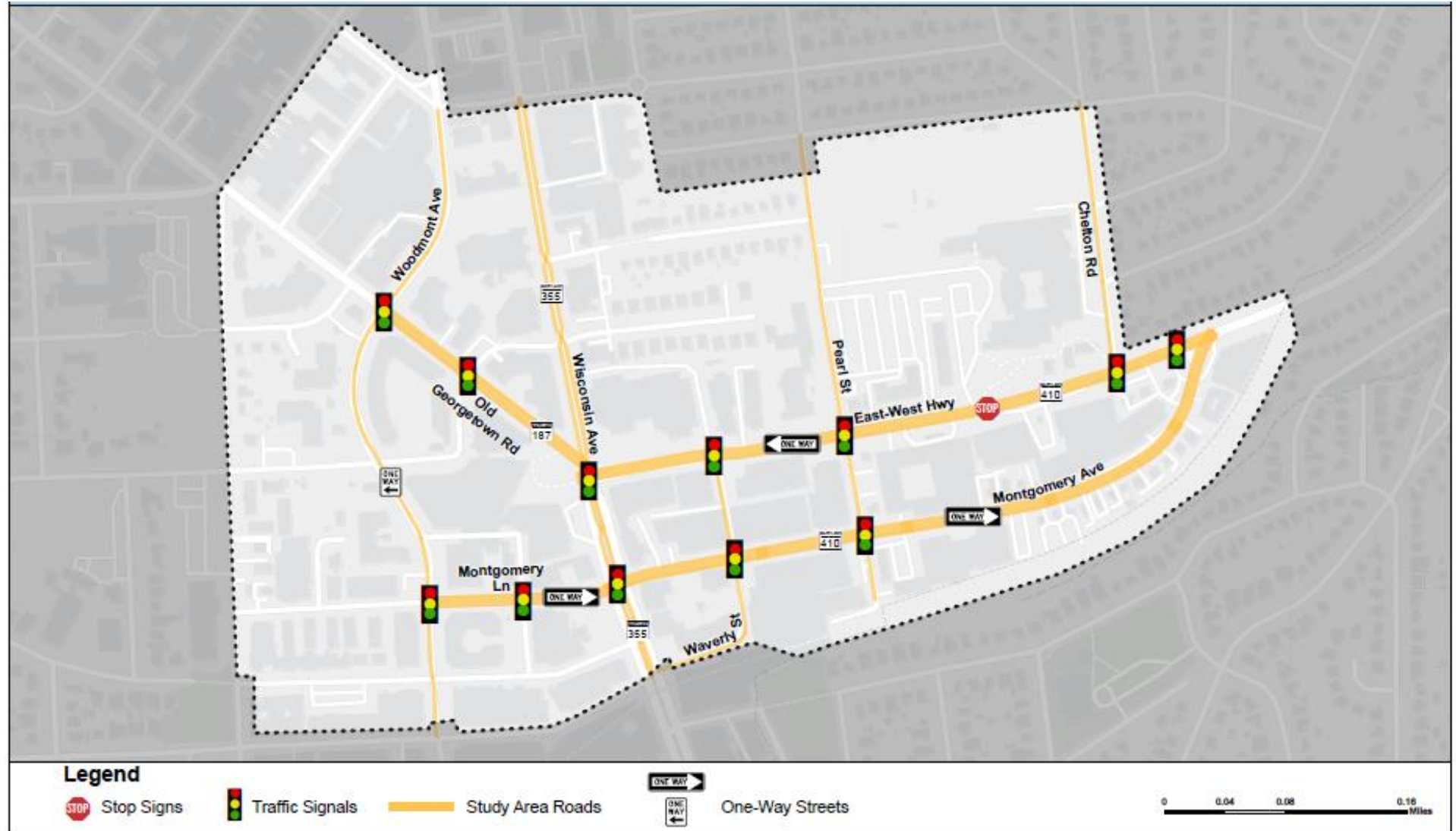 - Traffic studies for private developments
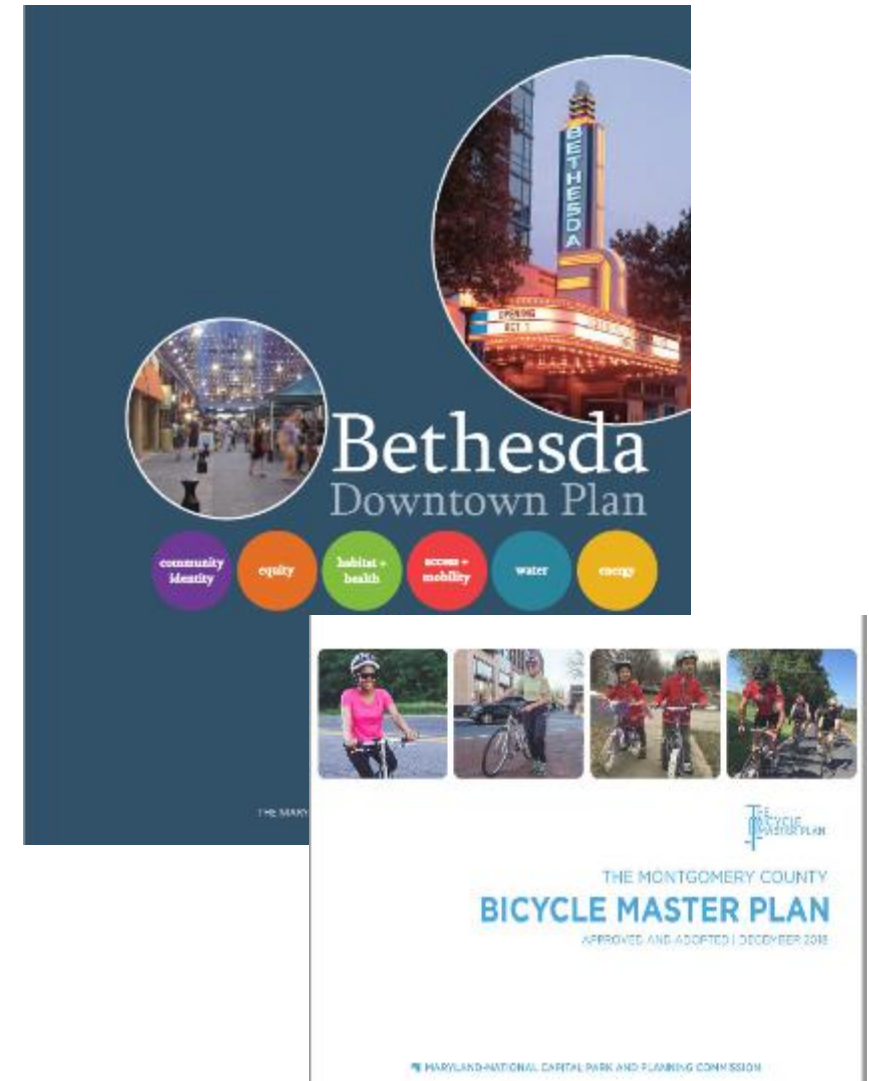
Project Goals and Objectives

- ## Transportation Goals for Downtown Bethesda:
  - Improve safety, connectivity, and comfort for all roadway users, including pedestrians, bicyclists, and transit riders
  - Increase the visibility of the commercial establishments

- ## Recommendations from previous Master Plans
  - 2017 Downtown Bethesda Sector Plan - Convert Montgomery Lane/ Road and East-West Highway to 2-way traffic flow
  - 2020 Bike Master Plan – Implement a connected and protected bike lane network in Downtown Bethesda

- ## Project Objectives:
  - Identify opportunities to modify roadway operations to support Complete Streets
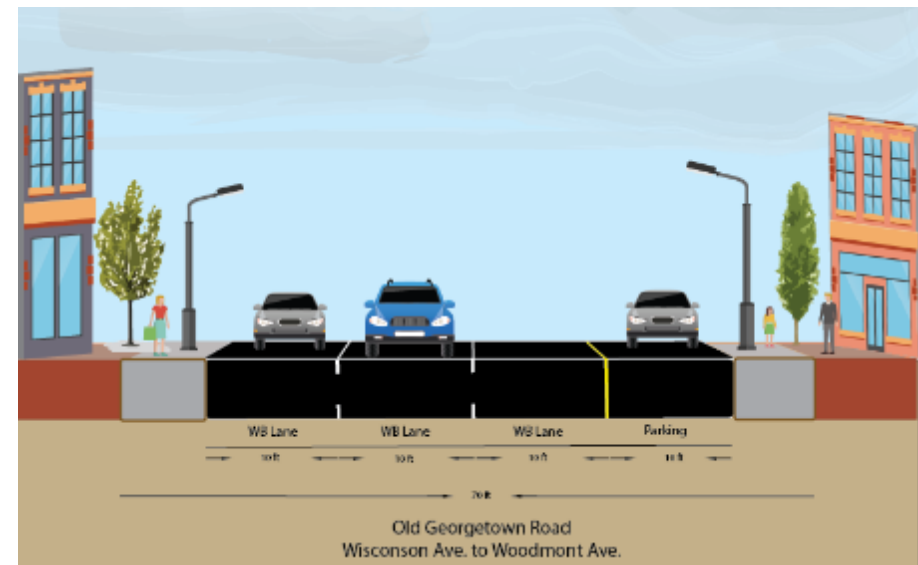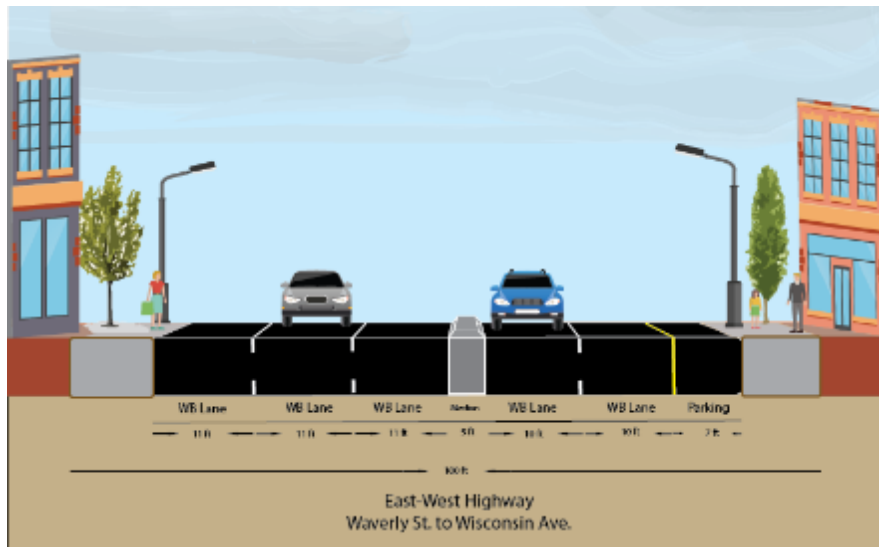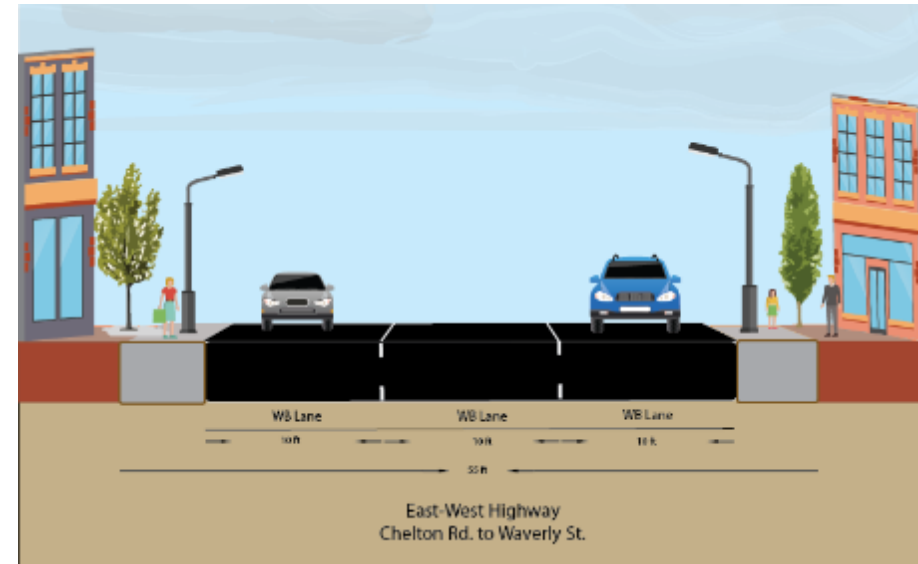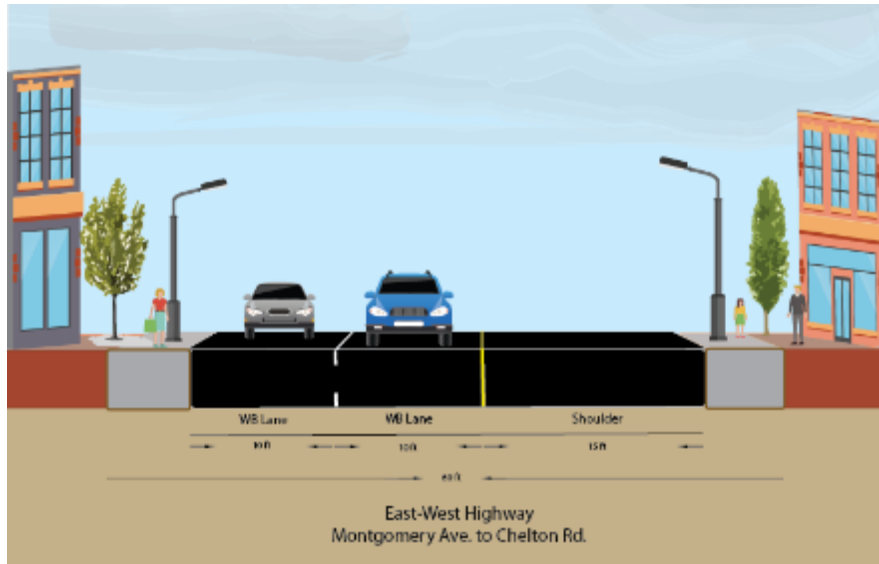 - Evaluate the impacts, advantages, and disadvantages for potential roadway reconfigurations
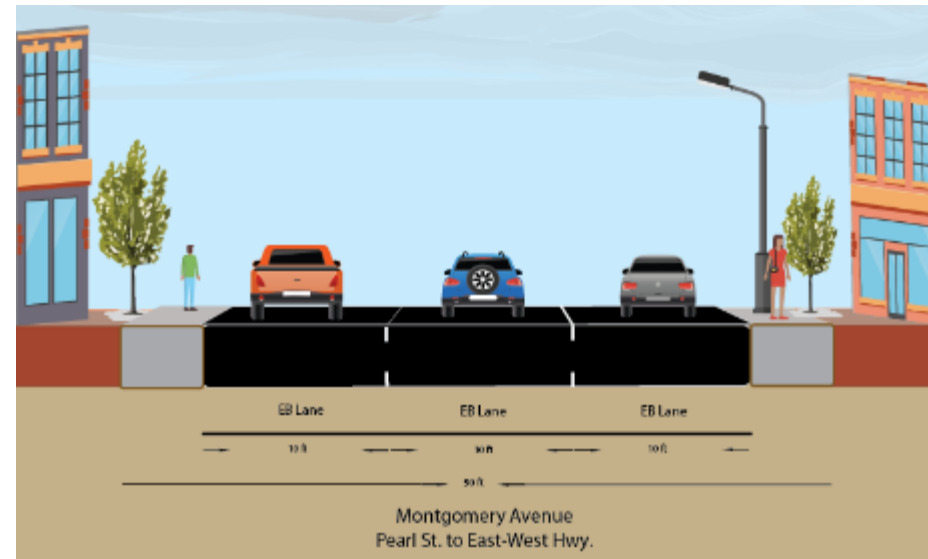
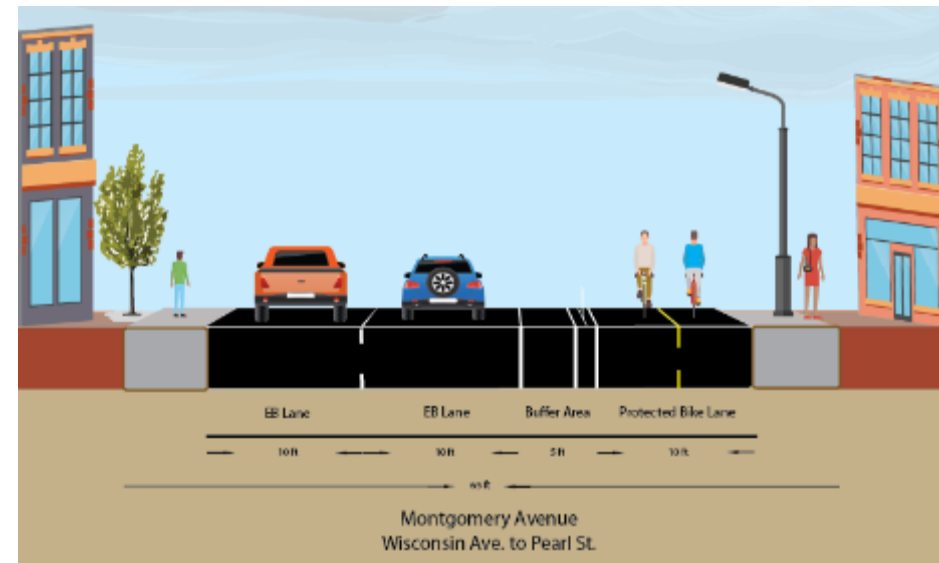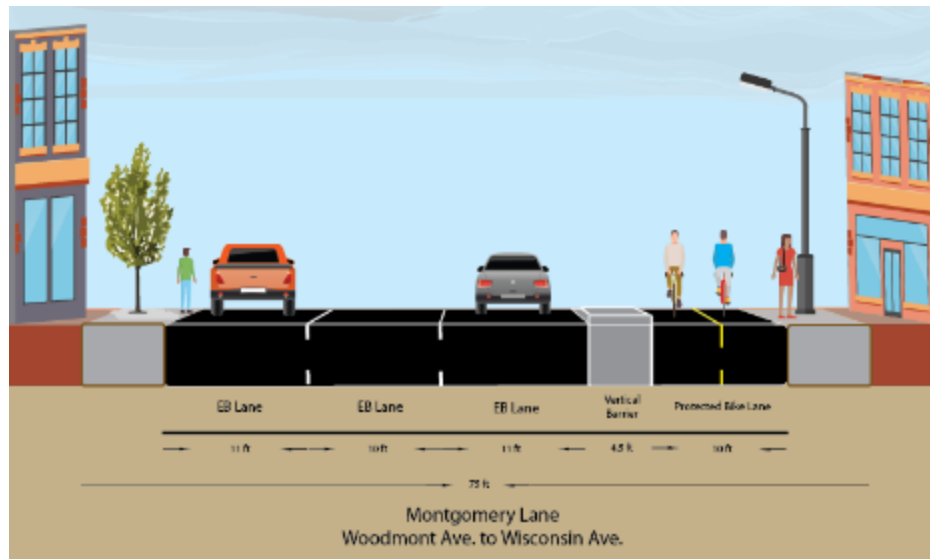# Study Area & Existing Conditions

Study Area

- East West Highway (MD 410 westbound)
- Montgomery Avenue (MD 410 eastbound)
- Wisconsin Avenue (MD 355)
- Old Georgetown Road (MD 187)
- Montgomery Lane
- Woodmont Avenue
- Edgemore Lane
- Waverly Street
- Pearl Street
- Chelton Road

East-West Highway Existing Typical Sections (Westbound)

East-West Highway
Montgomery Ave. to Chelton Rd.

East-West Highway
Chelton Rd. to Waverly St.

East-West Highway
Waverly St. to Wisconsin Ave.

Old Georgetown Road
Wisconson Ave. to Woodmont Ave.

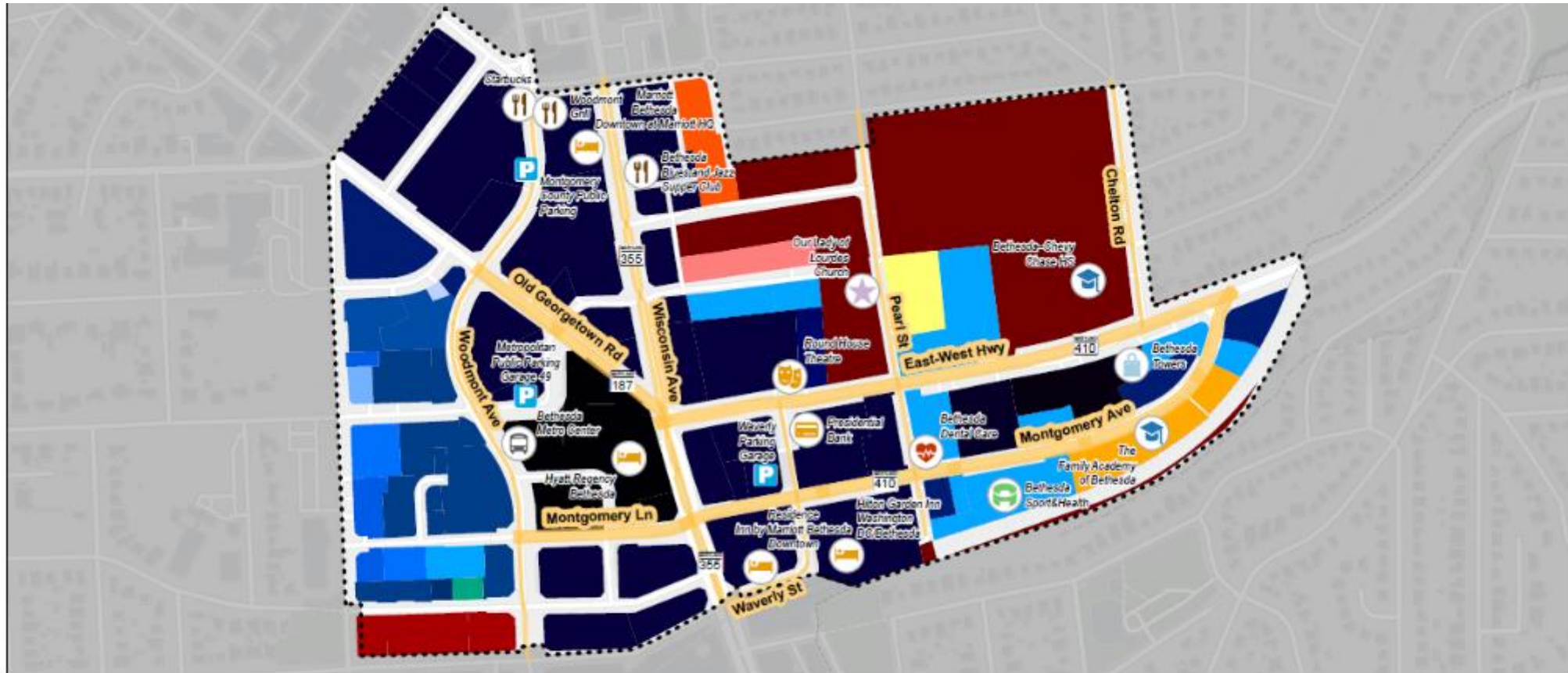# Montgomery Lane/ Ave Existing Typical Sections (Eastbound)

Woodmont Existing Conditions

Woodmont Ave
Old Georgetown Rd to Montgomery Ln

Woodmont Ave
Montomgery Ln to Hampden Ln
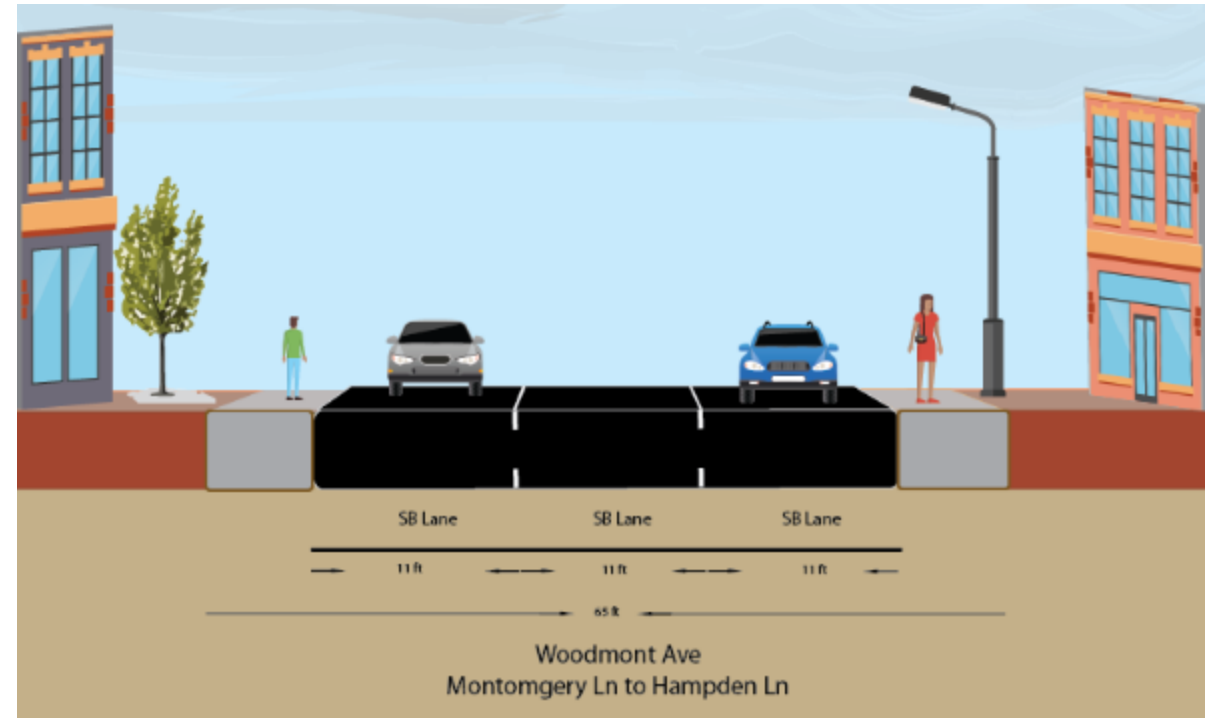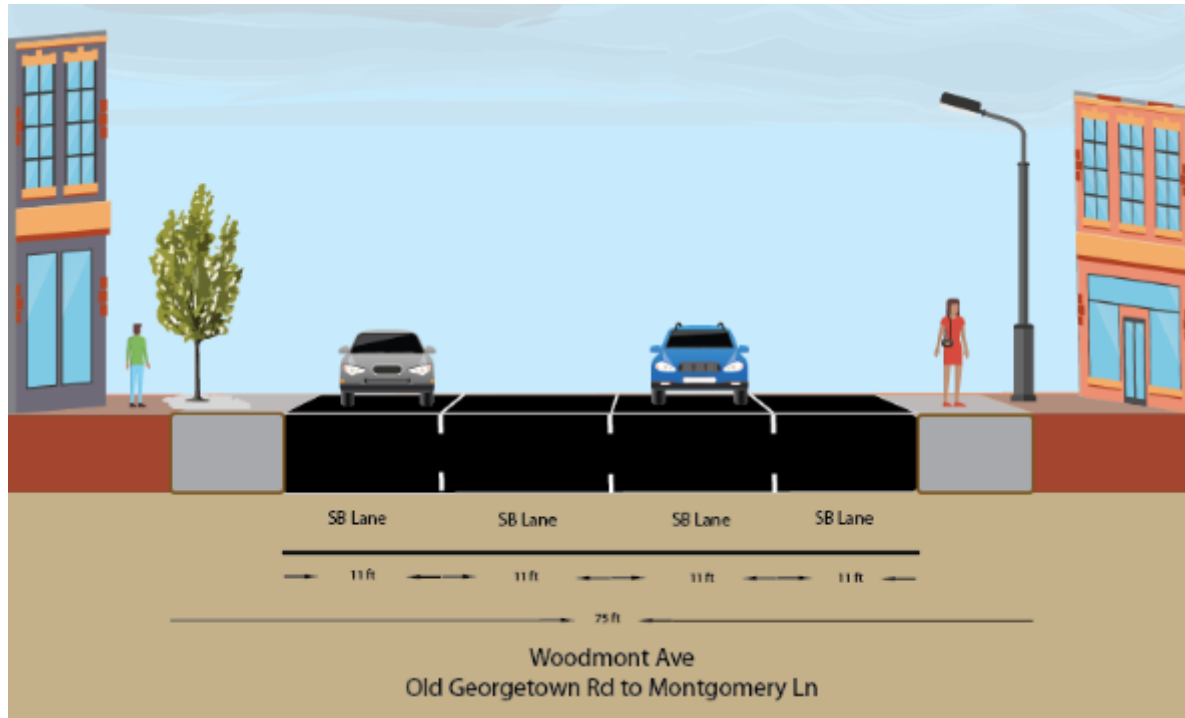
Existing Land Use
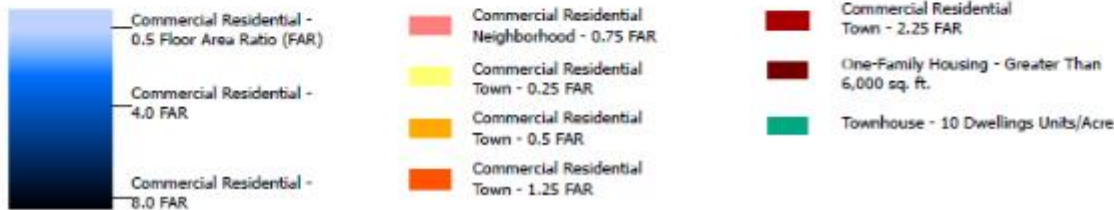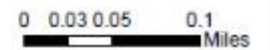
Planned Infill Development
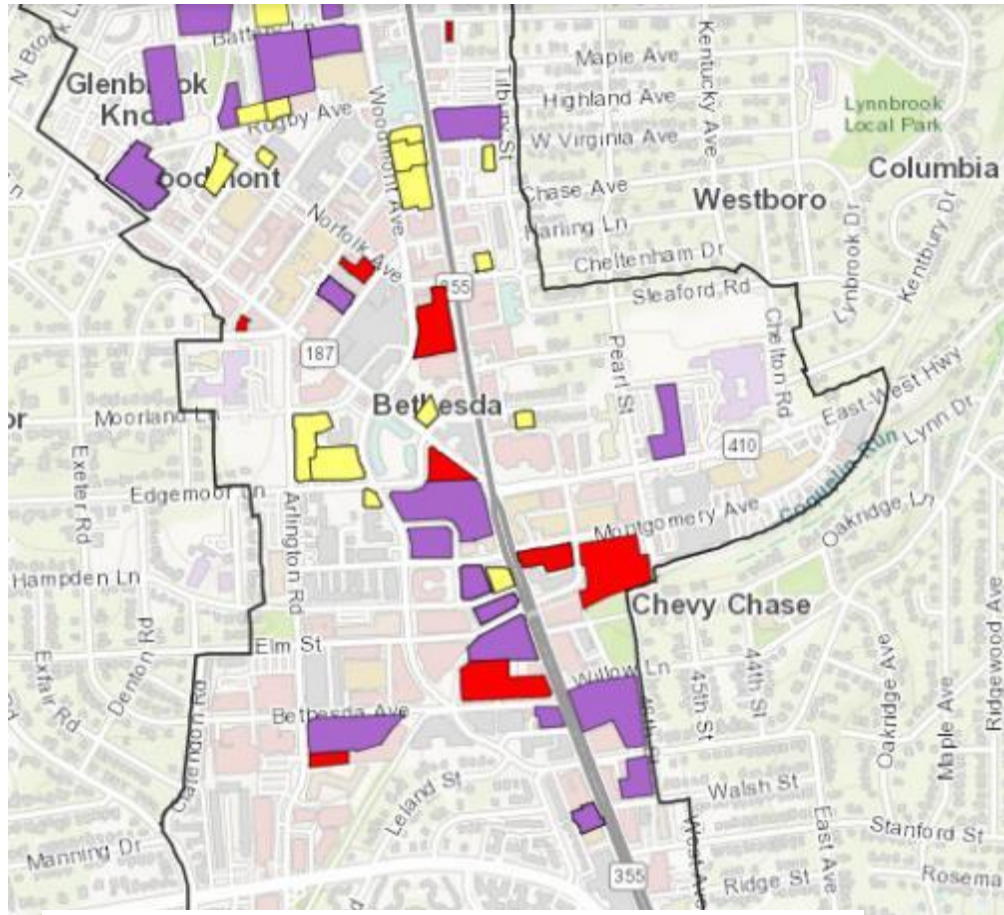
Planned Development Sites in Bethesda
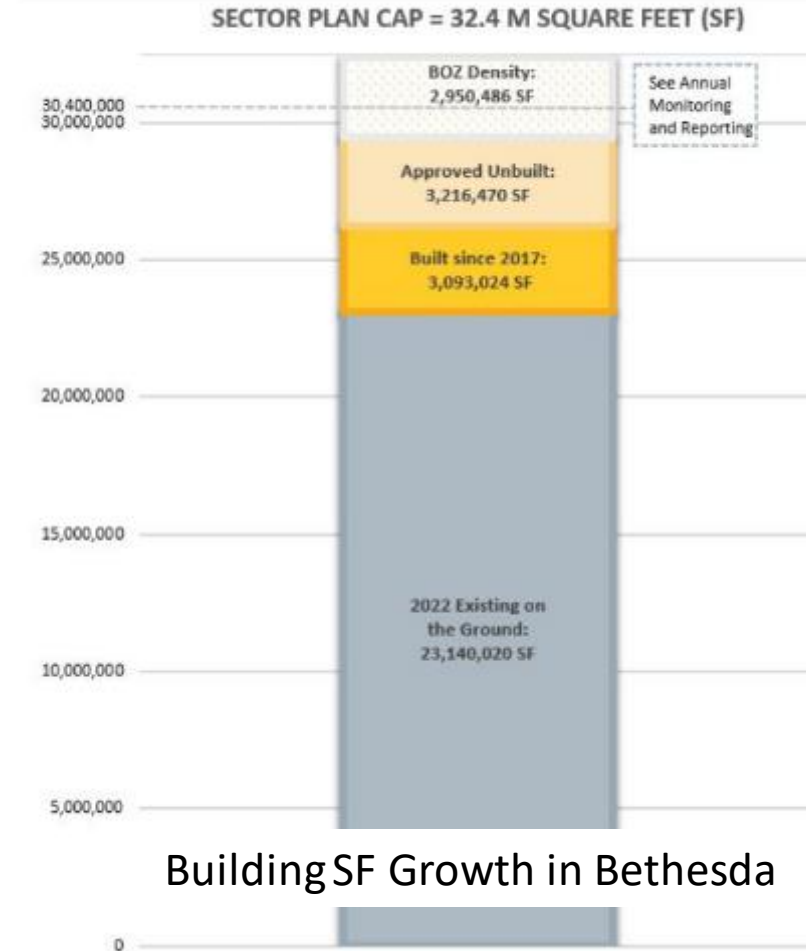
Building SF Growth in Bethesda

Bethesda Downtown Plan Monitoring and Tracking Program - Montgomery Planning

Study Area Crashes

- According to MDOT SHA crash data, there were **138 reported vehicle crashes** in this area between 2017 and 2021

- 50 caused a **severe injury**, and 1 caused a **fatality**

- 12 of these crashes **injured a pedestrian**

CRASH SEVERITY BY YEAR
MD 410

CRASH SEVERITY BY YEAR
MONTGOMERY AVE, MONTGOMERY LN
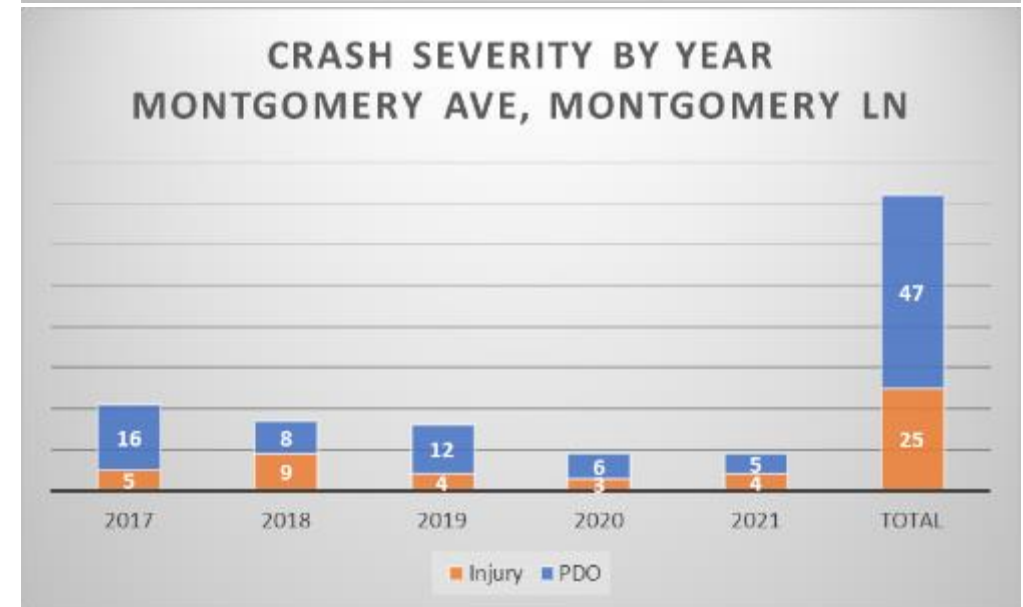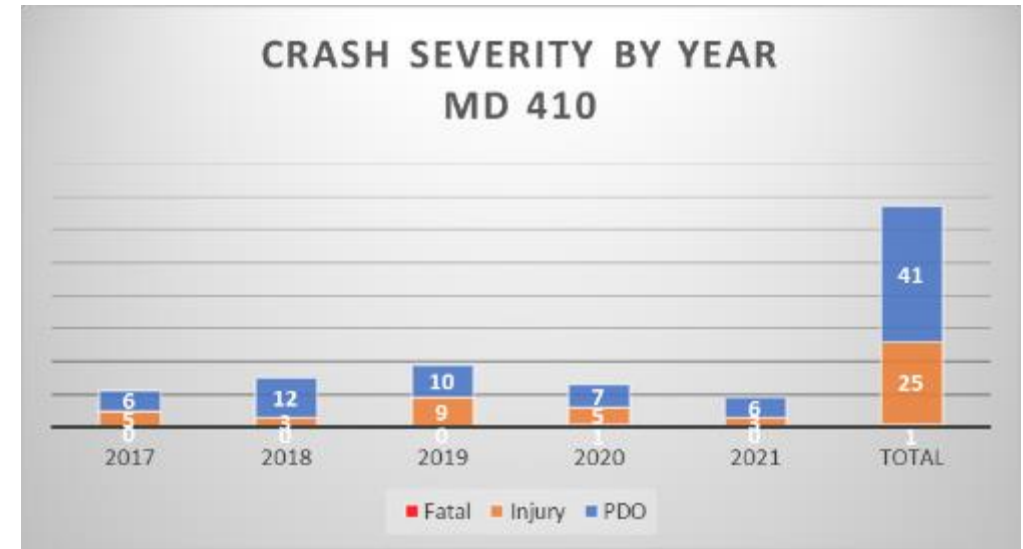
Existing Intersection Crash Experience
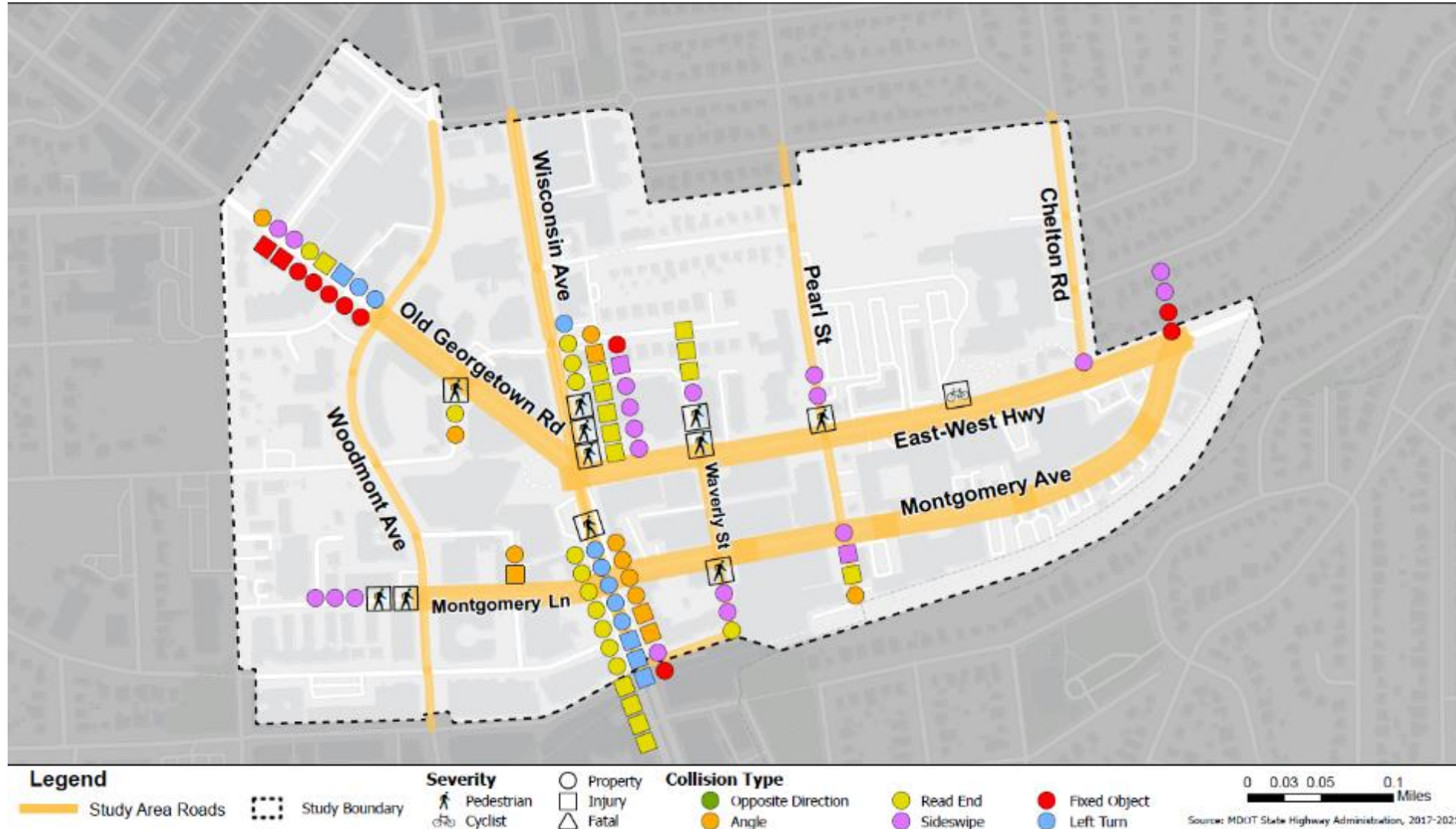
Master Planned Bicycle Facilities

Existing Bicycle Network

Bicycle Level of Traffic Stress

- East-West and Montgomery Lane highly stressful for bicyclists unless separated bikeway in place

Legend

Level of Stress (LTS)

Study Area Roads	
1, 2 - Very Low, Low	
2.5 Moderate Low	
3, 4 - Moderate High, High	

0   0.03 0.05   0.1 Miles

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Pedestrian Infrastructure
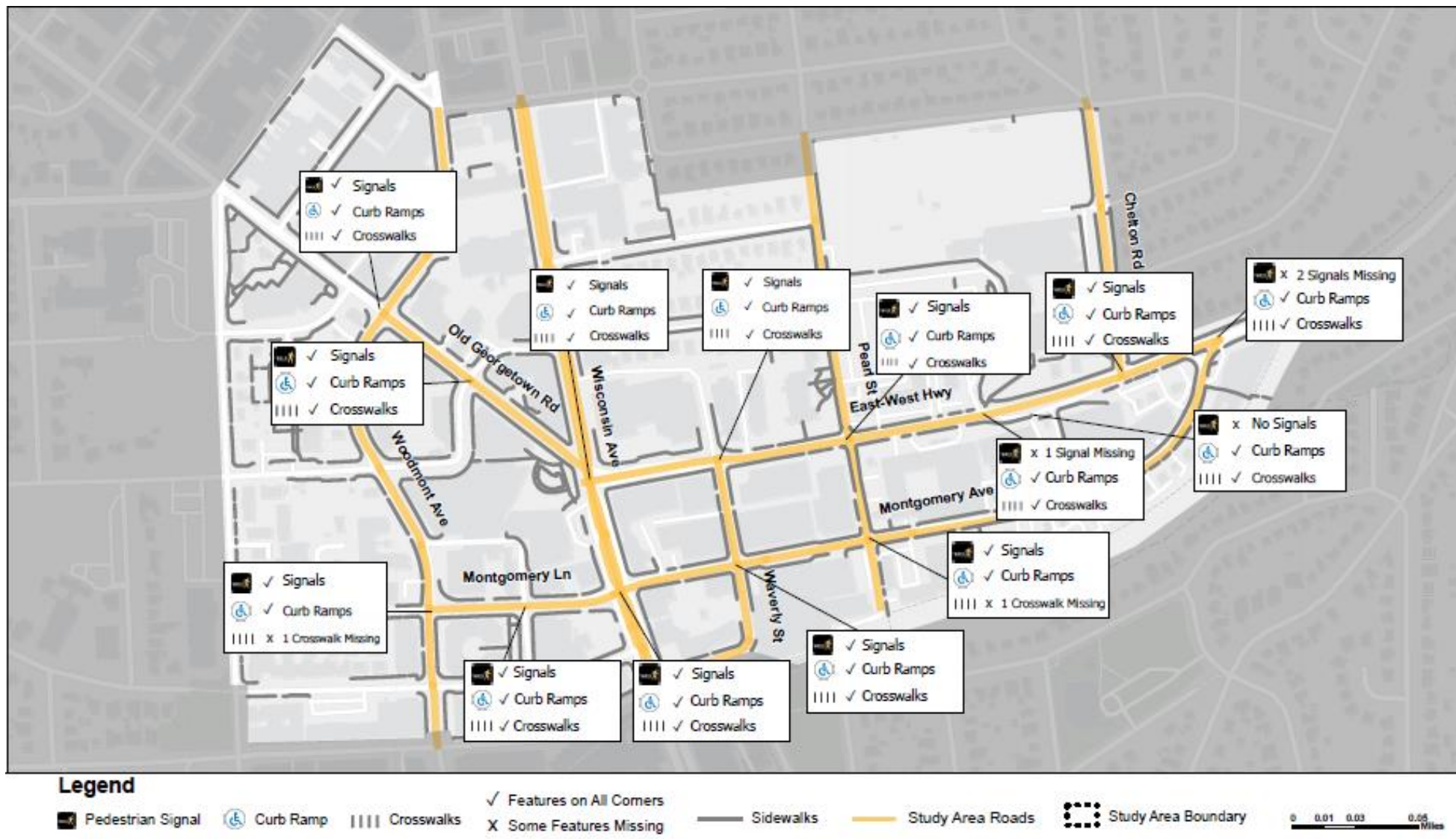
On-Street Parking

- Most blocks of MD 355, MD 187 and MD 410 prohibit curbside parking at all times

Legend

Metered Parking	No Parking Anytime	No Parking Other Times	Study Area Roads	Number of Parking Spaces
Permit Parking	No Parking Rush Hour	Passenger Drop Off/Pick Up	Study Area Boundary	
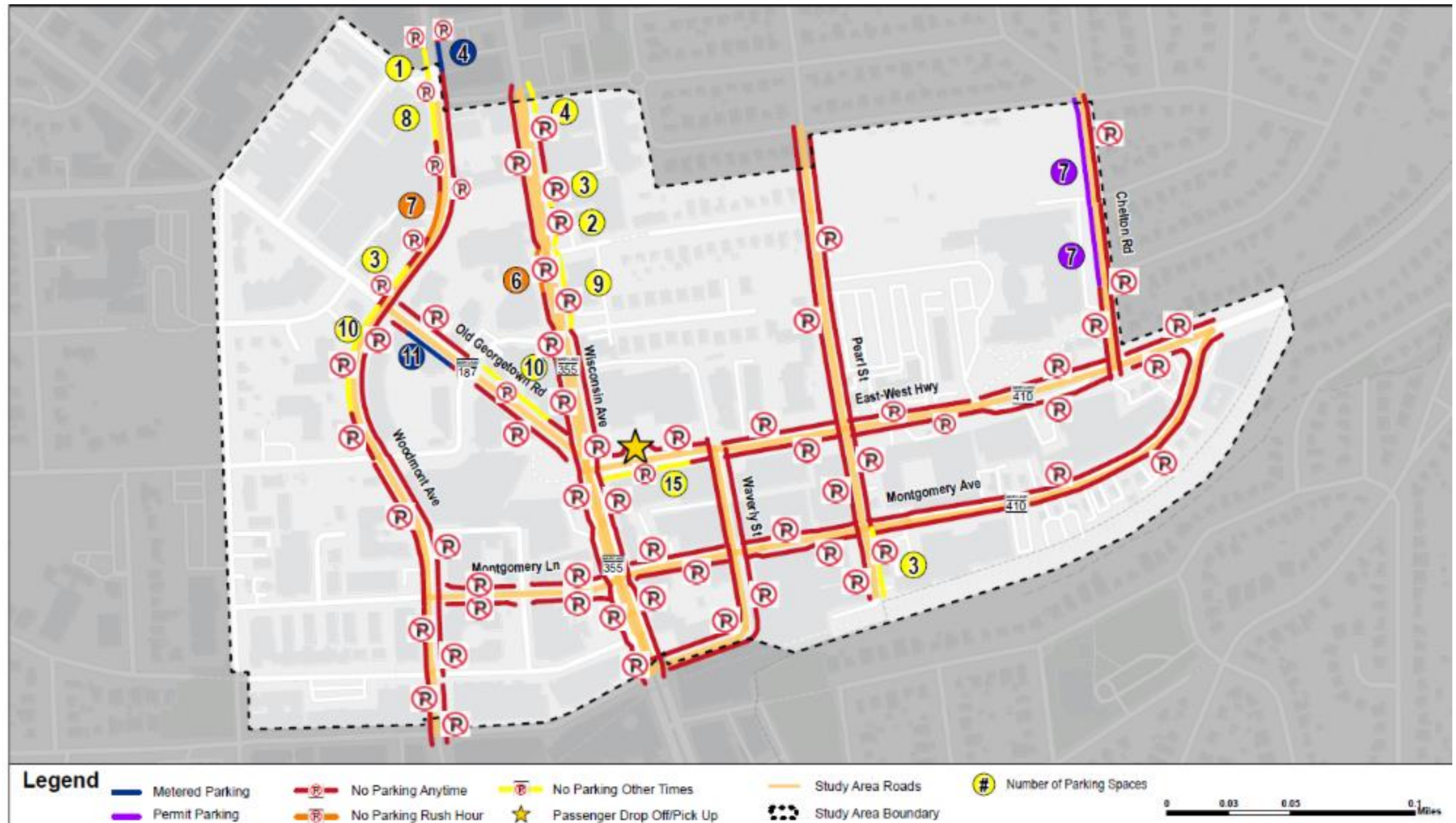
Existing Bus Stops and Peak Hour Service Levels
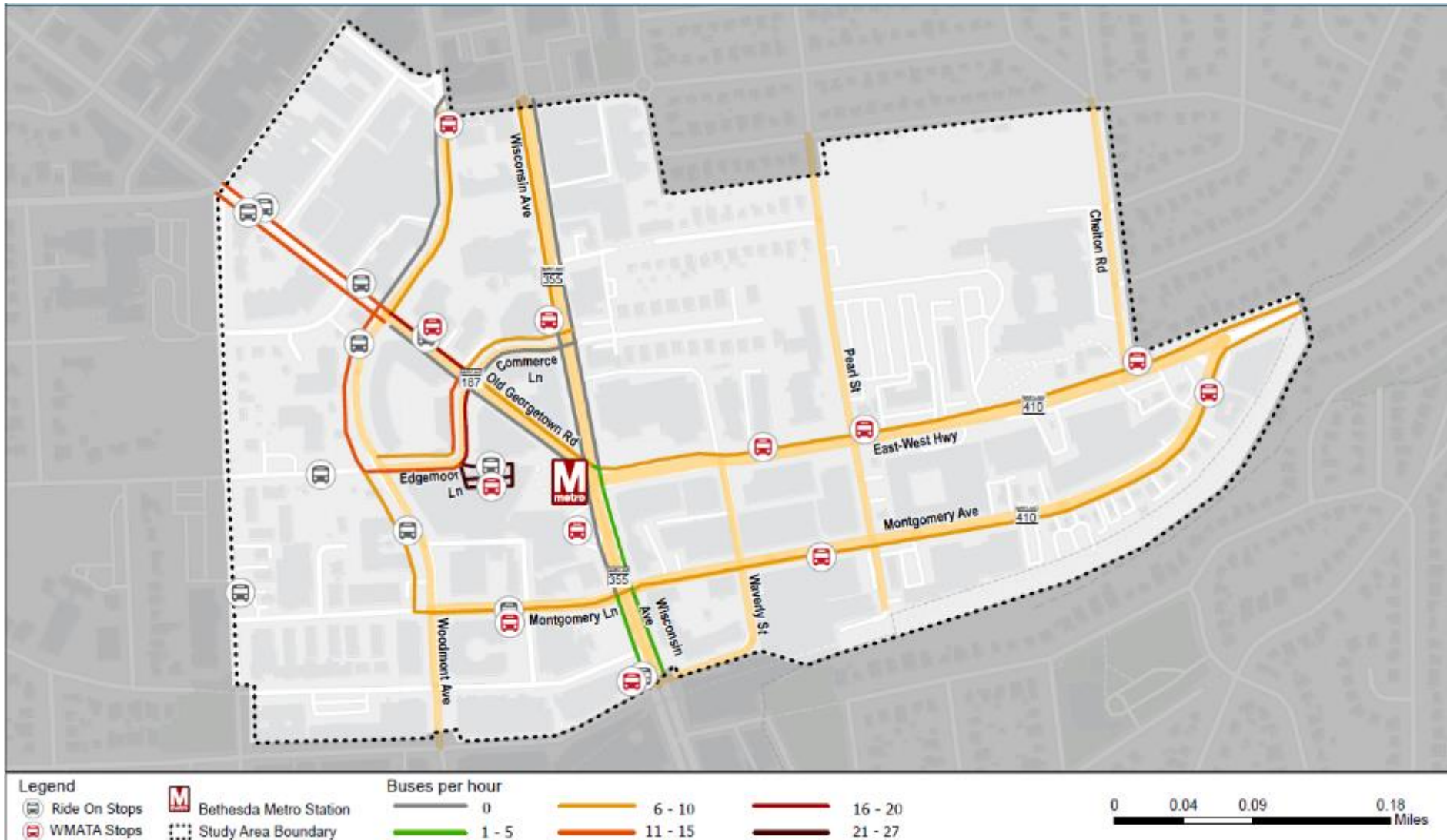
Bus Stop Infrastructure

- Several bus stops do not meet ADA requirements (e.g. landing area)
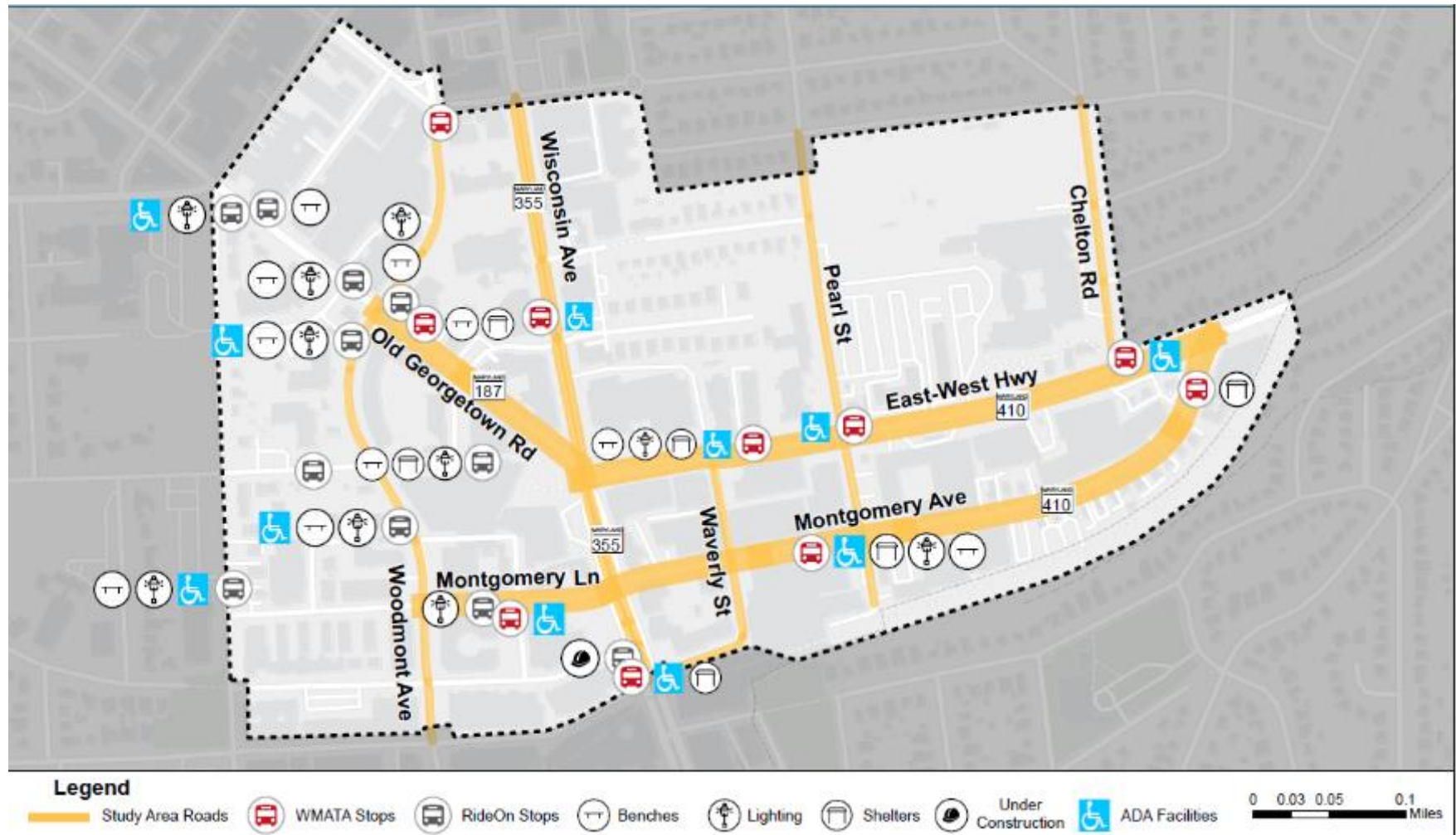
Existing Daily Bus Stop Ridership

- Highest ridership stops near Metro station
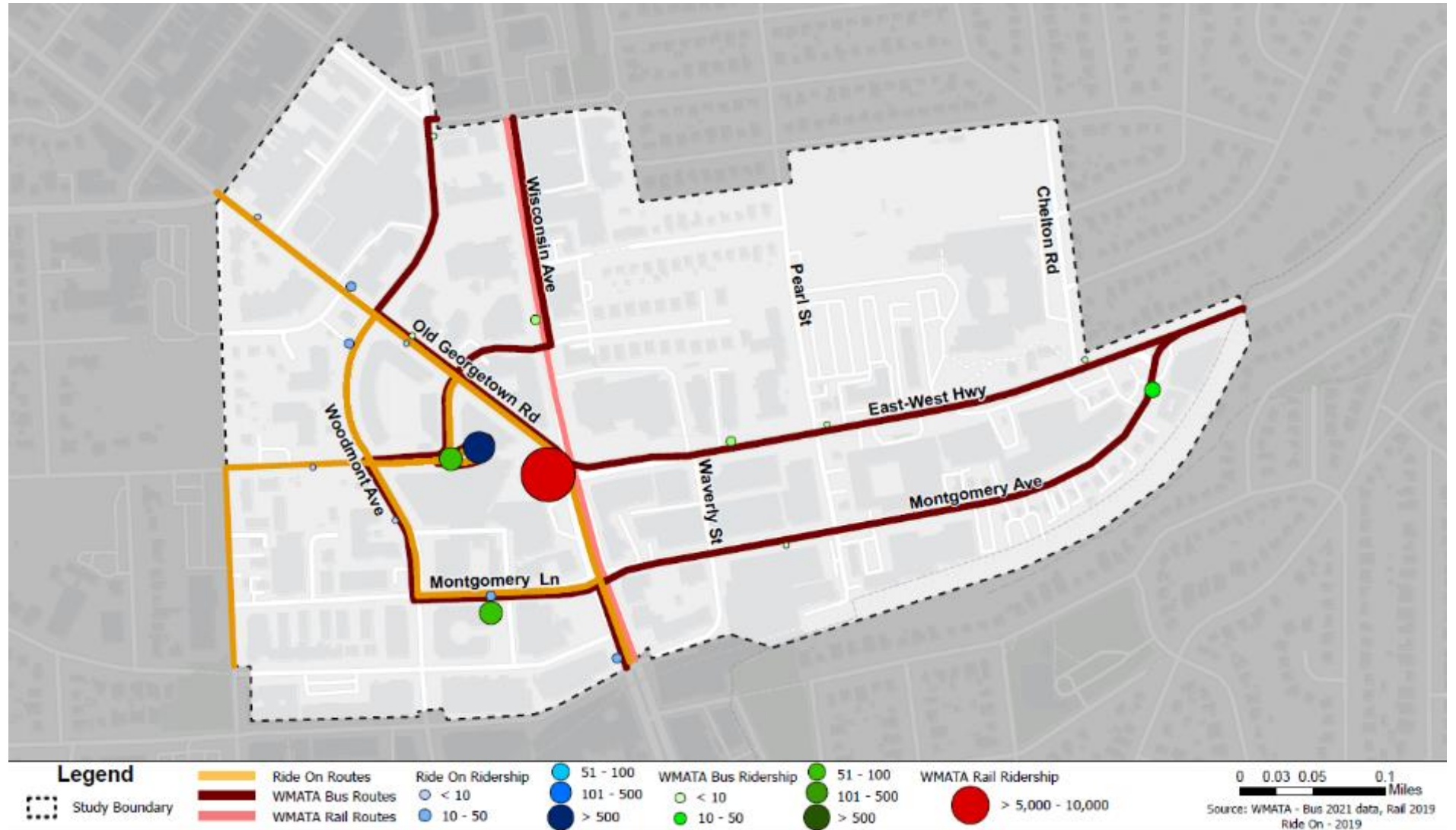
Trip Generation

Existing Cordon Level Data

- Downtown Trip Origins and Destinations by Trip Type
  - Thursdays September to November 2019

Destination in Downtown

REPLICA

Most common trip purpose

43.4% – Work

Number of trips for each purpose
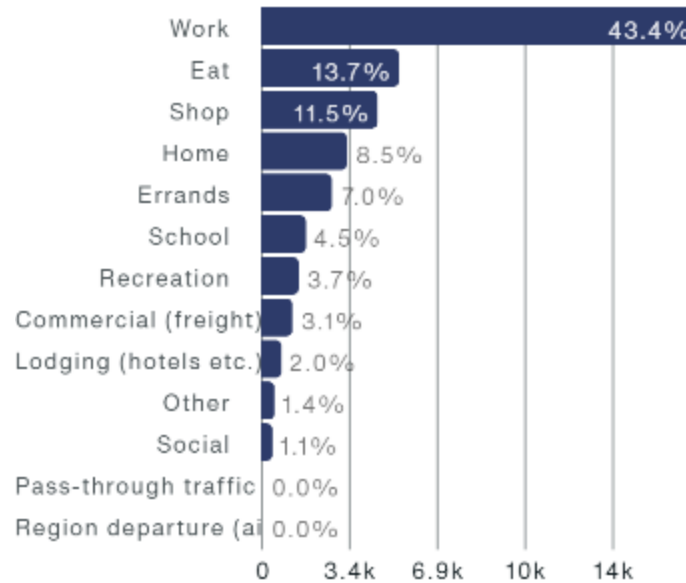
Origination in Downtown

REPLICA

Most common trip purpose

44.1% – Home

Number of trips for each purpose
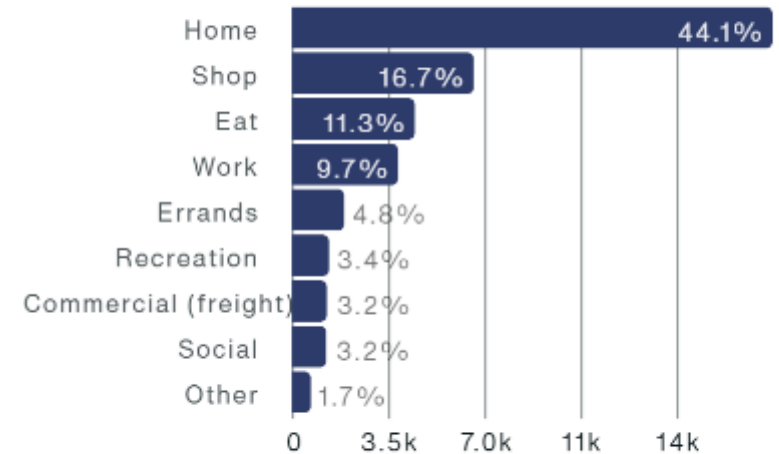
Existing Cordon Level Data

- Weekday Daily trips and mode share (2021)
  - Local trips
  - Non-local (e.g. through trips)

Through Trips

~70k trips made by ~54k people

2 filters applied   Reset all

Trip Passes Through ⊗   Primary Mode ⊗

Most common mode
53.2% – Private auto

Number of trips using each primary mode

Mode	%
Private auto	53.2%
Taxi/TNC	7.0%
Commercial veh...	6.1%
Auto passenger	27%
Public transit	5.9%
Walking	0.1%
Biking	0.0%
Other	0.0%

0   11k   22k   34k   45k
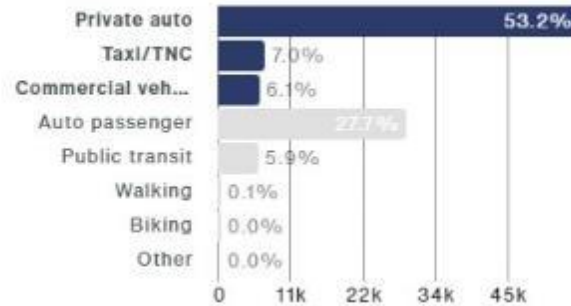
Local Trips

~37k trips made by ~24k people

2 filters applied   Reset all

Primary Mode ⊗   Network Link Volume ⊗

Most common mode
53.6% – Private auto

Number of trips using each primary mode

Mode	%
Private auto	53.6%
Taxi/TNC	5.7%
Commercial veh...	5.2%
Public transit	17.6%
Auto passenger	18.6%
Walking	1.0%
Biking	0.1%
Other	0.0%

0   6.2k   12k   19k   25k
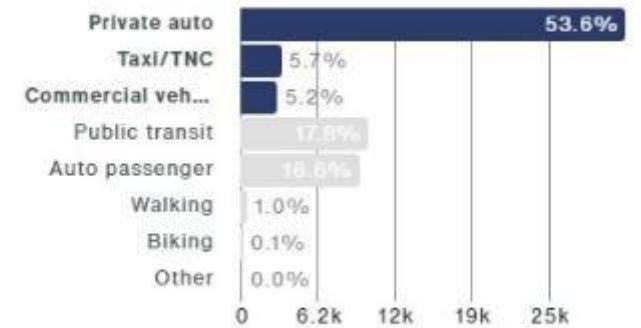
Trip Origins for non-local traffic
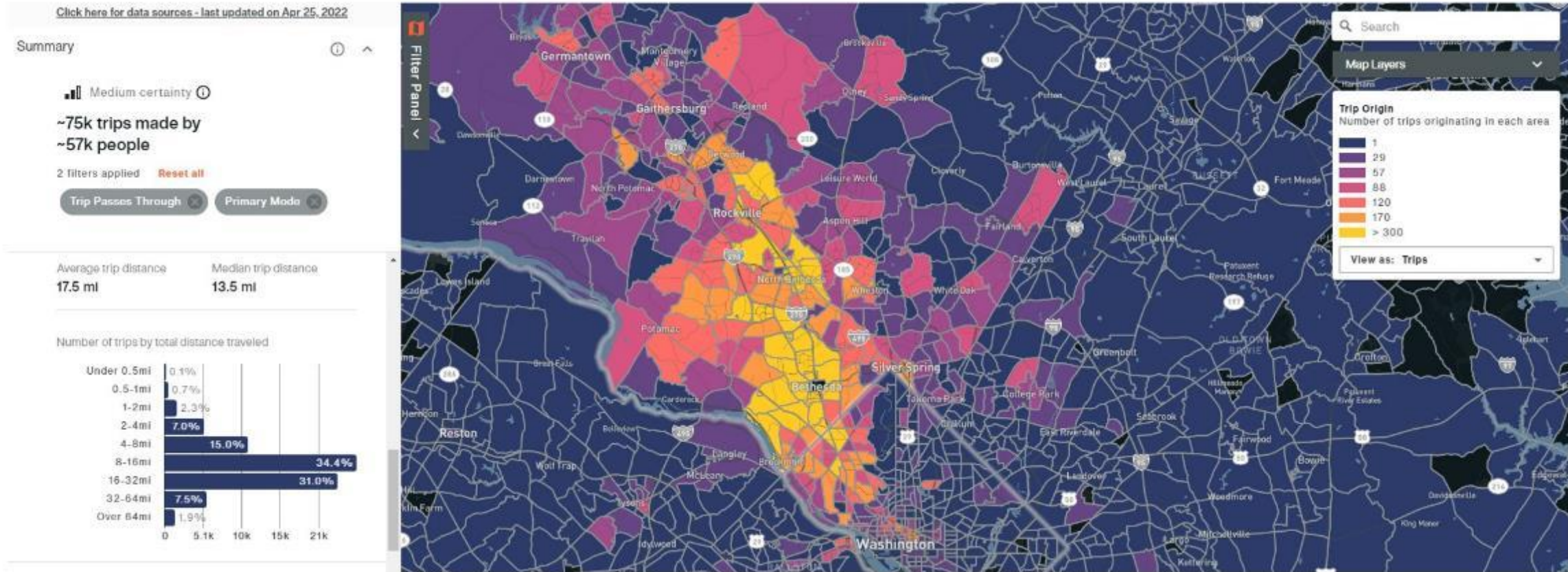
COVID recovery of trip volumes, purpose and mode

- Personal trips by auto recovering faster

BethesdaDowntownSubArea

Trip Purpose

Trip volume in this geography, typical weekday

Week of Jan 4, 2021 to the week of May 23, 2022

Change Data

6 Selections ▾

Home | Work | Eat | Social | Shop | Recreation

BethesdaDowntownSubArea

Total Trips

Trips in this geography, typical weekday

Week of Jan 4, 2021 to the week of May 23, 2022

Total
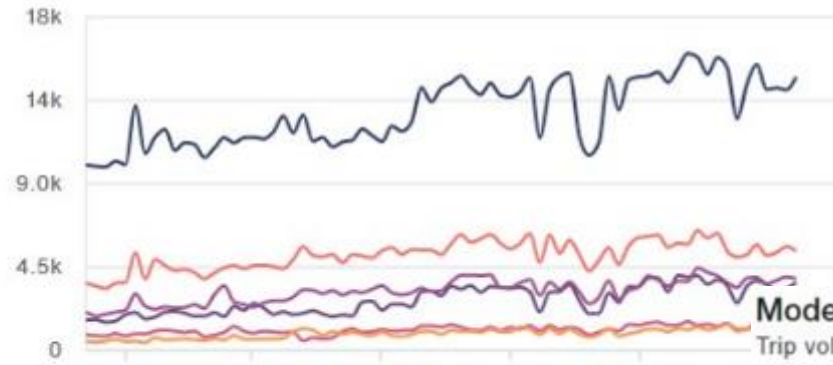
Mode Split

Trip volume in this geography, typical weekday

Week of Jan 4, 2021 to the week of May 23, 2022

Change Data

5 Selections ▾
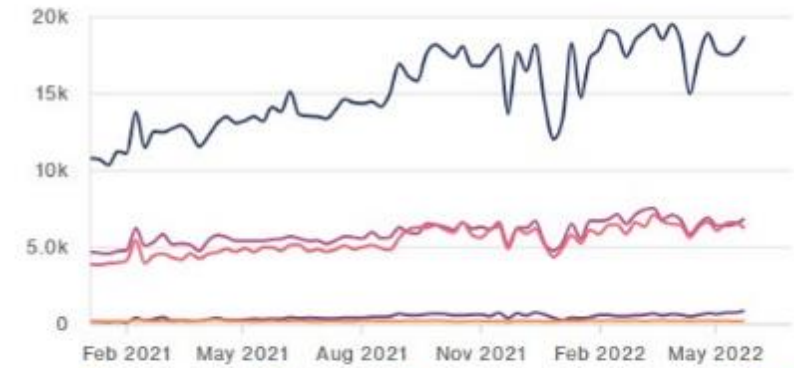
Private Auto | Transit | Auto Passenger | Walking | Biking

Mead&Hunt
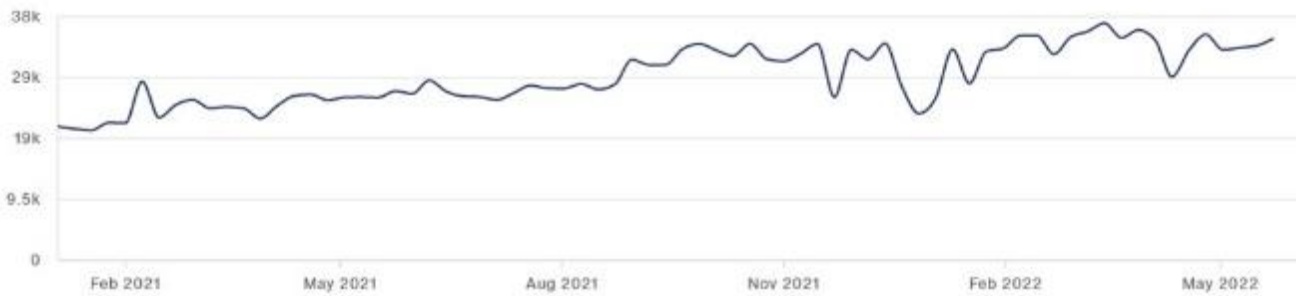
Existing Traffic Operations

Lane Utilization Analysis Methodology

- Volumes from 2019 or prior – Pre-Covid baseline

- Geometry reflects current bike lane under construction on Montgomery Lane/ Avenue
  - The bike lane removes 1 lane from Woodmont Ave to Pearl St. on Montgomery Ln/Ave. No other changes are considered to the road network for the baseline calculations.

- The lane utilization was calculated for 3 peaks; AM, Midday, and PM

Key Assumptions

- Current year traffic volumes (reduced between 30% to 50% from 2019/ pre-COVID)

- Geometry reflects recently constructed bike lane on Montgomery Lane/ Avenue
  - The bike lane removes 1 lane from Woodmont Ave to Pearl St. on Montgomery Ln/Ave. No other changes are considered to the road network for the baseline calculations.

Signal Timing Assumptions

- Existing cycle lengths were retained in the build model
  - 60 seconds at Old Georgetown Rd & Commerce Ln
  - 120 seconds at all other study intersections

- Protected phasing was introduced for opposing movements. Left turns along Old Georgetown/East-West were typically permissive, which allowed the new movement to run at the same time as the existing opposing movement.

- Turn restrictions introduced in the form of protected lefts where cycle track will be installed for existing conditions.

Lane Utilization – Calculation

- Volumes calculated by summing total vehicles throughout and dividing by the number of lanes entering the intersection. See below:

2 entering lanes
Entering Volume = 1450 veh
(PM Peak)
Utilization = 1450/2 = 725 veh/ln
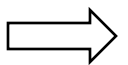
Urban Street Capacity

- Lane utilization thresholds are based on typical capacity of an urban street
  - Capacity = 600-800 veh/lane → use 800 veh/lane to be conservative
  - 750 veh/lane is greater than 90% capacity = display with red arrow
  - 500 veh/lane is approx. 60% capacity = between 500-750, display with yellow arrow
  - Less than 500 veh/lane is less than 60% capacity = display with green arrow

Old Georgetown Rd (MD 187)

Wisconsin Ave (MD 355)

Pearl St

Chelton Rd

East-West Hwy (MD 410)

Woodmont Ave

Montgomery Ave
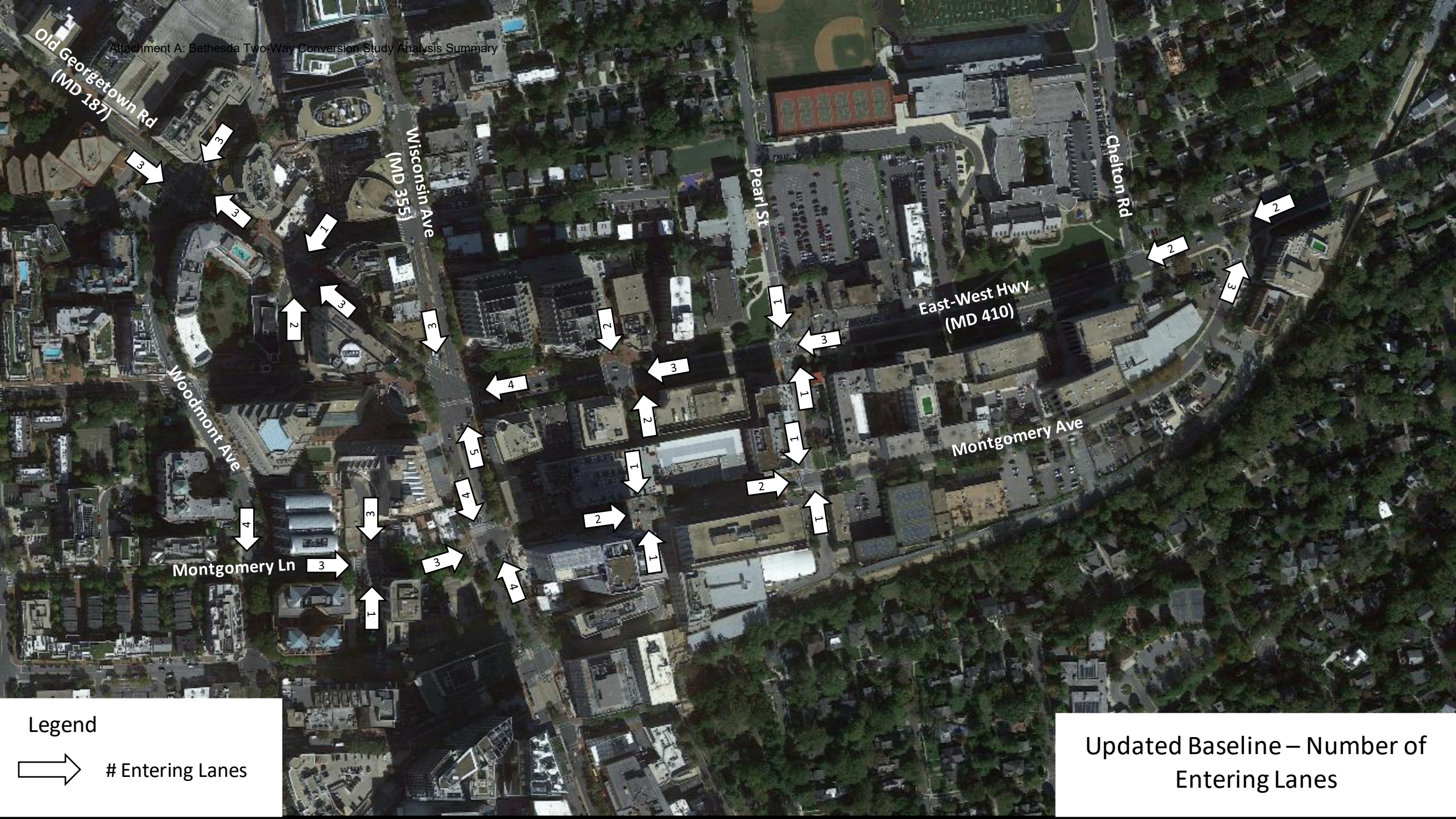
Montgomery Ln

Legend

Entering Lanes

Updated Baseline – Number of Entering Lanes

Attachment A: Bethesda Two-Way Conversion Study Analysis Summary

Old Georgetown Rd (MD 187)

Wisconsin Ave (MD 355)

Pearl St

Chelton Rd

East-West Hwy (MD 410)

Woodmont Ave

Montgomery Ave

Montgomery Ln

225
468
305
90
293
53
569
10
300
610
225
628
140
125
160
215
278
679
568
95
51
690
355
413
303
372
296
103
875
958
380

Legend

→ veh/ln

→ < 500

→ 500 - 750

→ > 750
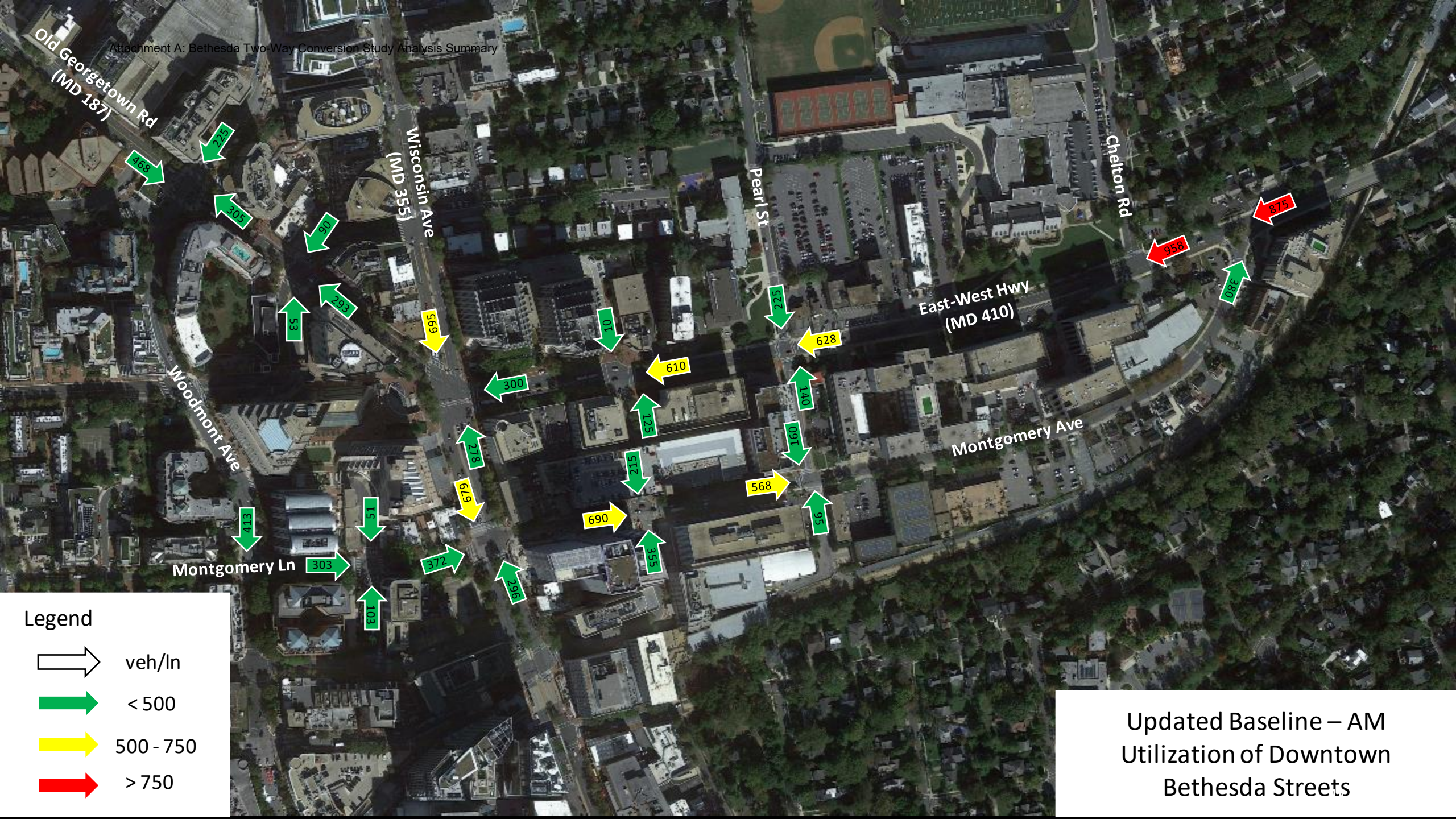
Updated Baseline – AM
Utilization of Downtown
Bethesda Streets
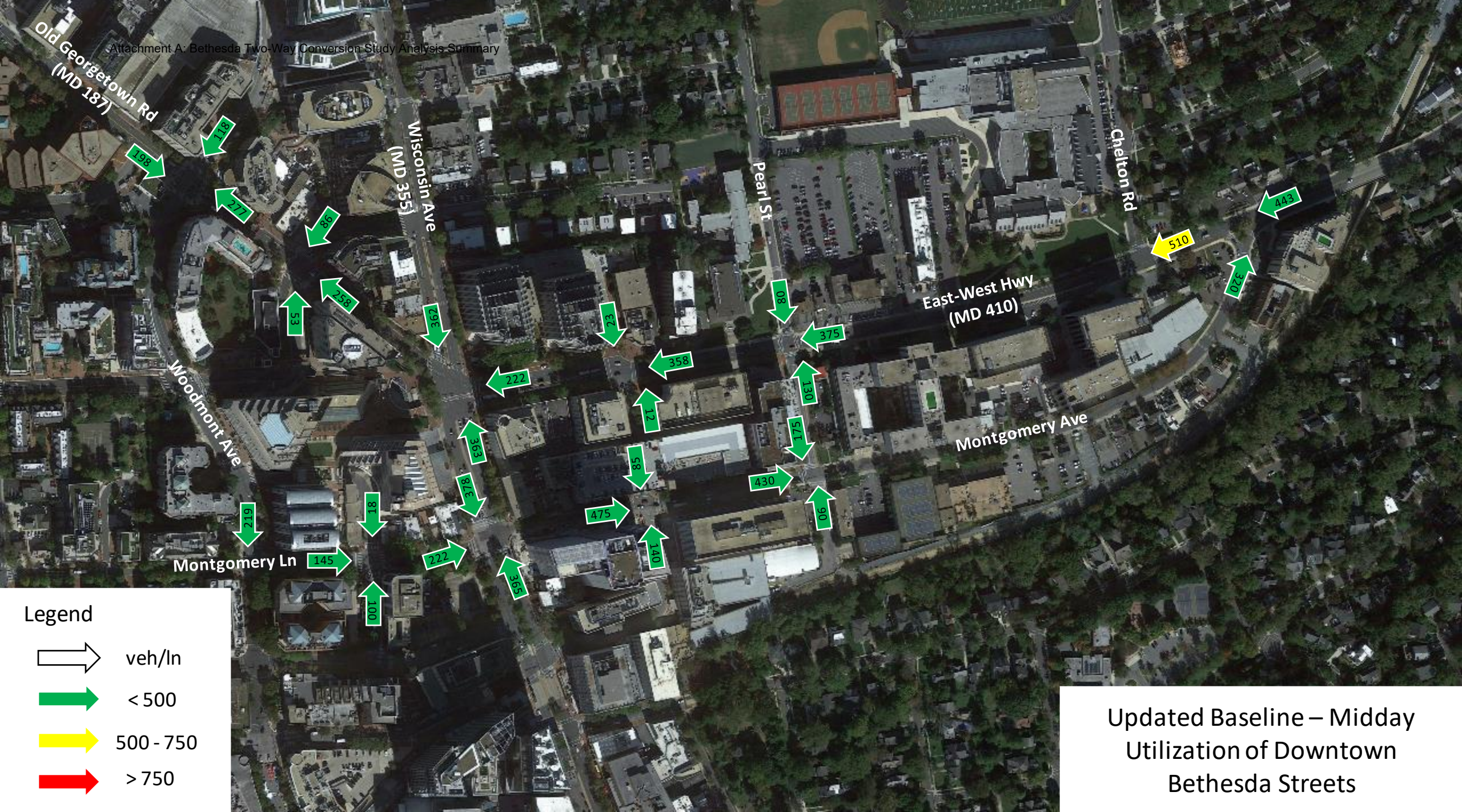
Attachment A: Bethesda Two-Way Conversion Study Analysis Summary

Old Georgetown Rd (MD 187)

Wisconsin Ave (MD 355)

Pearl St

Chelton Rd

East-West Hwy (MD 410)

Woodmont Ave

Montgomery Ave

Montgomery Ln

118
198
277
86
258
53
392
23
80
510
443
370
375
222
358
130
12
363
175
85
430
378
18
475
90
219
145
222
140
365
100

Legend

→ veh/ln

→ < 500

→ 500 - 750

→ > 750

Updated Baseline – Midday Utilization of Downtown Bethesda Streets

Attachment A: Bethesda Two-Way Conversion Study Analysis Summary

Old Georgetown Rd (MD 187)

Wisconsin Ave (MD 355)

Pearl St

Chelton Rd

East-West Hwy (MD 410)

Woodmont Ave

Montgomery Ave

Montgomery Ln

186
335
469
111
389
121
267
132
114
563
725
710
538
540
290
243
365
132
224
378
233
1069
18
109
219
895
390
145
222
365
100

Legend

→ veh/ln

→ < 500

→ 500 - 750

→ > 750
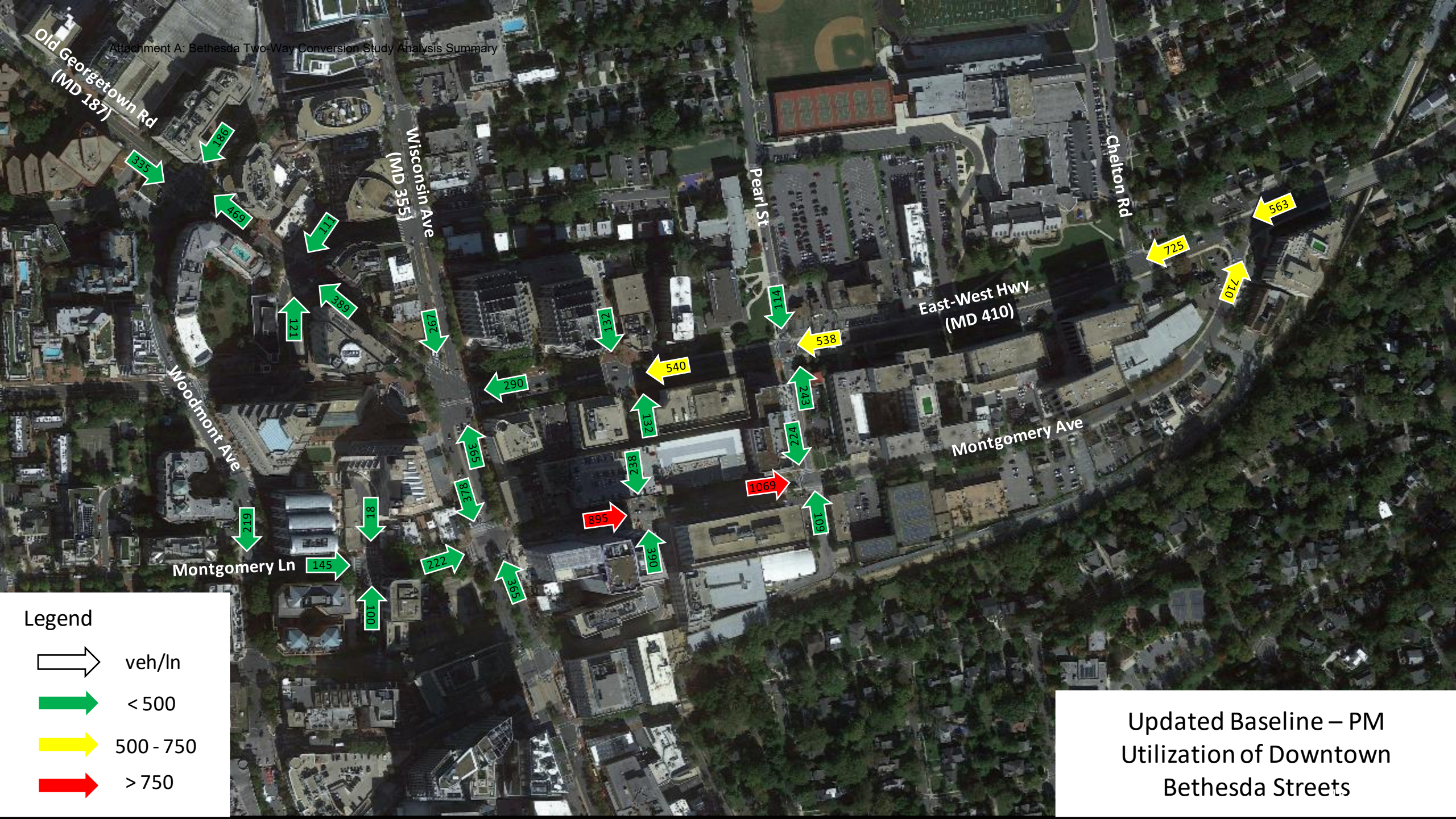
Updated Baseline – PM Utilization of Downtown Bethesda Streets

Existing ADT

- ADT on East West and Montgomery are fairly even

Vehicle Speeds
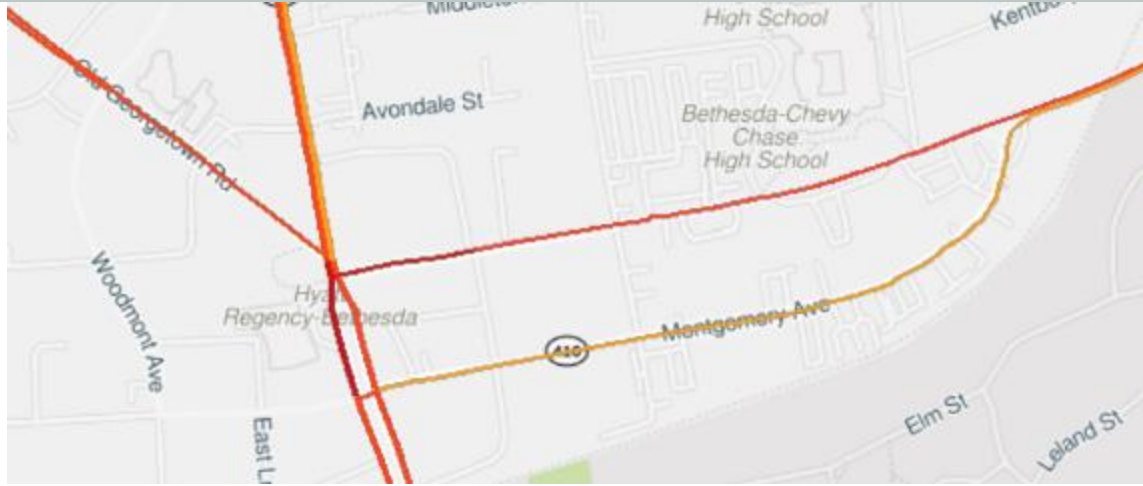
AM Peak – Week of April 25th , 2022
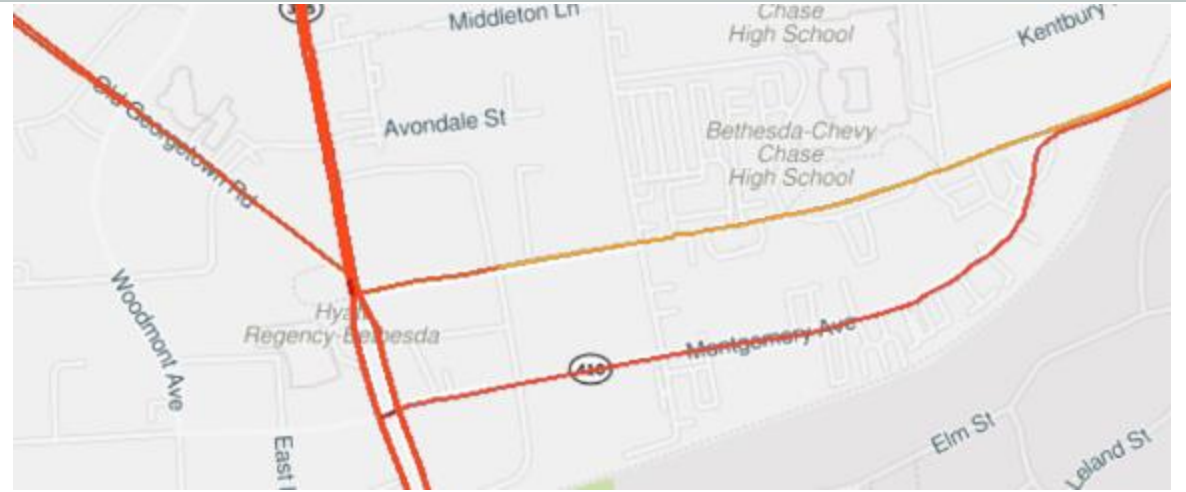
PM Peak – Week of April 25th , 2022
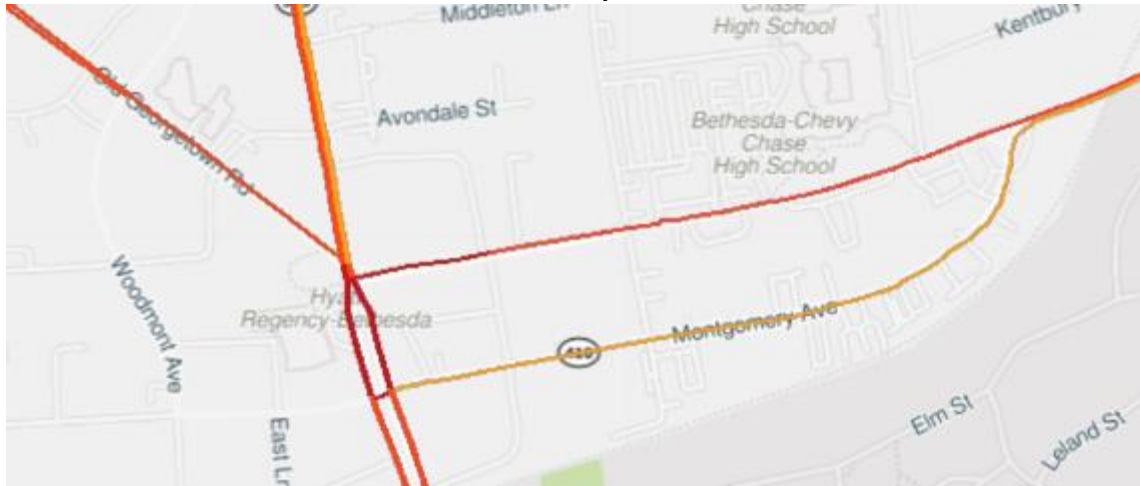
AM Peak – Week of April 22nd, 2019

PM Peak – Week of April 22nd , 2019

0 mph   50 mph

| 10 | 20 | 30 | 40 | 50 |

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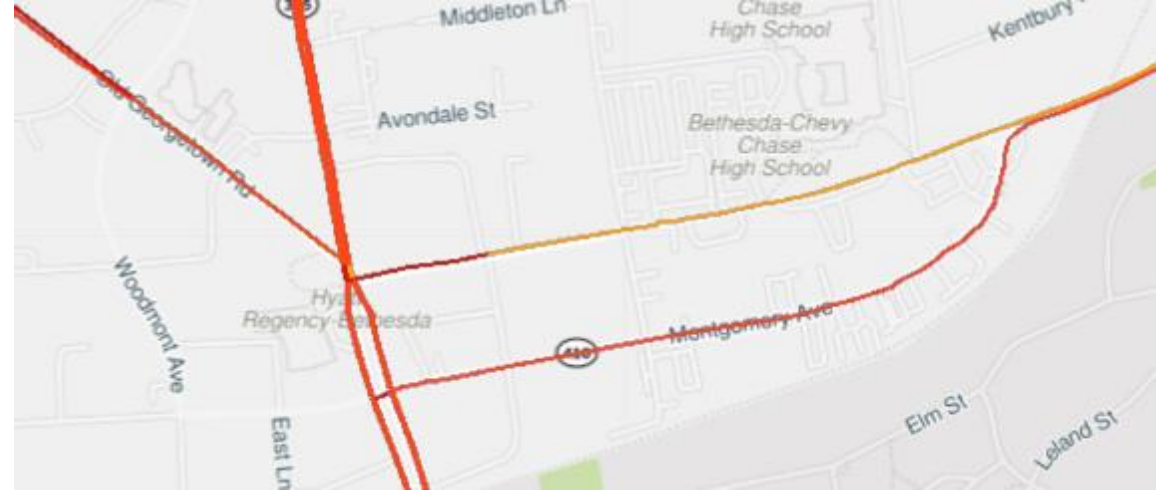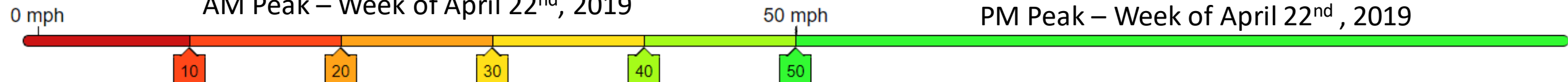
Existing Pedestrian Volumes (2019 PM)

- 355 and Woodmont corridors have highest pedestrian traffic levels

Existing Bicycle V (2019 PM)

- Moderate bicycle activity along Woodmont and Old Georgetown
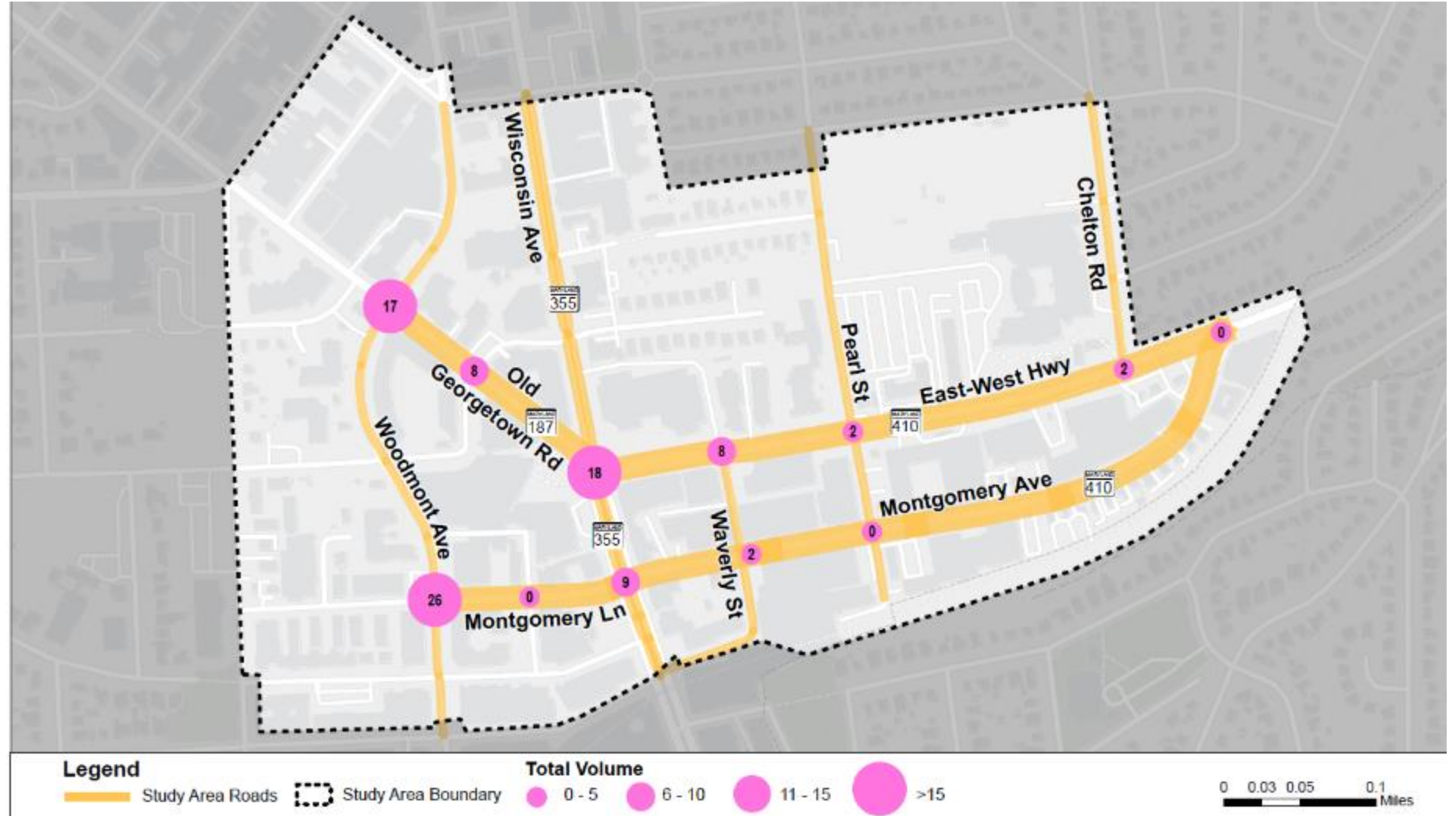
Intersection Level of Service (2019 vs. 2022)

- Policy Area Standard is a delay threshold of 120 seconds (e.g. LOS F)

- 2022 LOS at key locations improved due to 30 to 50% traffic volume reductions
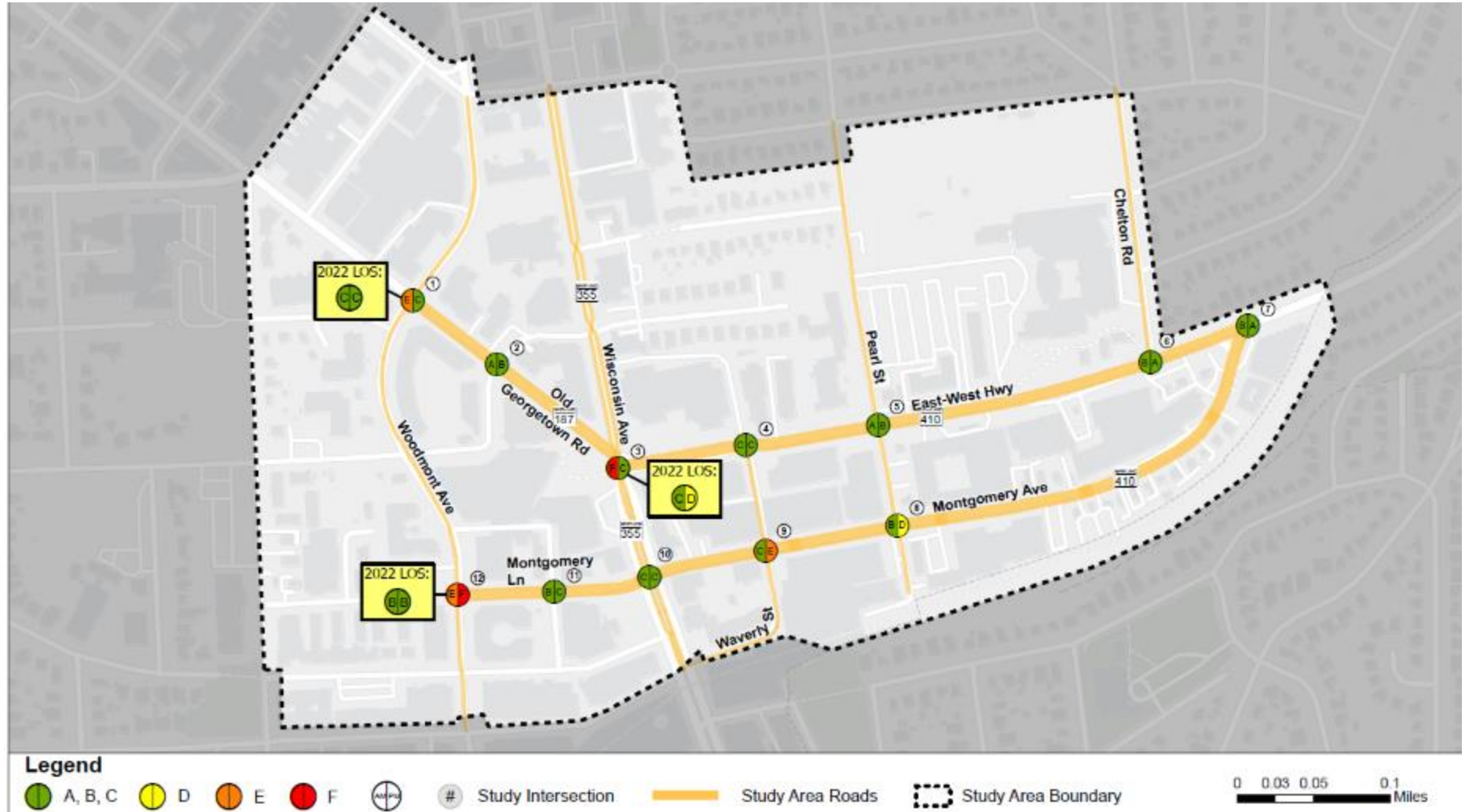
Roadway Space Allocation vs. Usage (East West Highway)
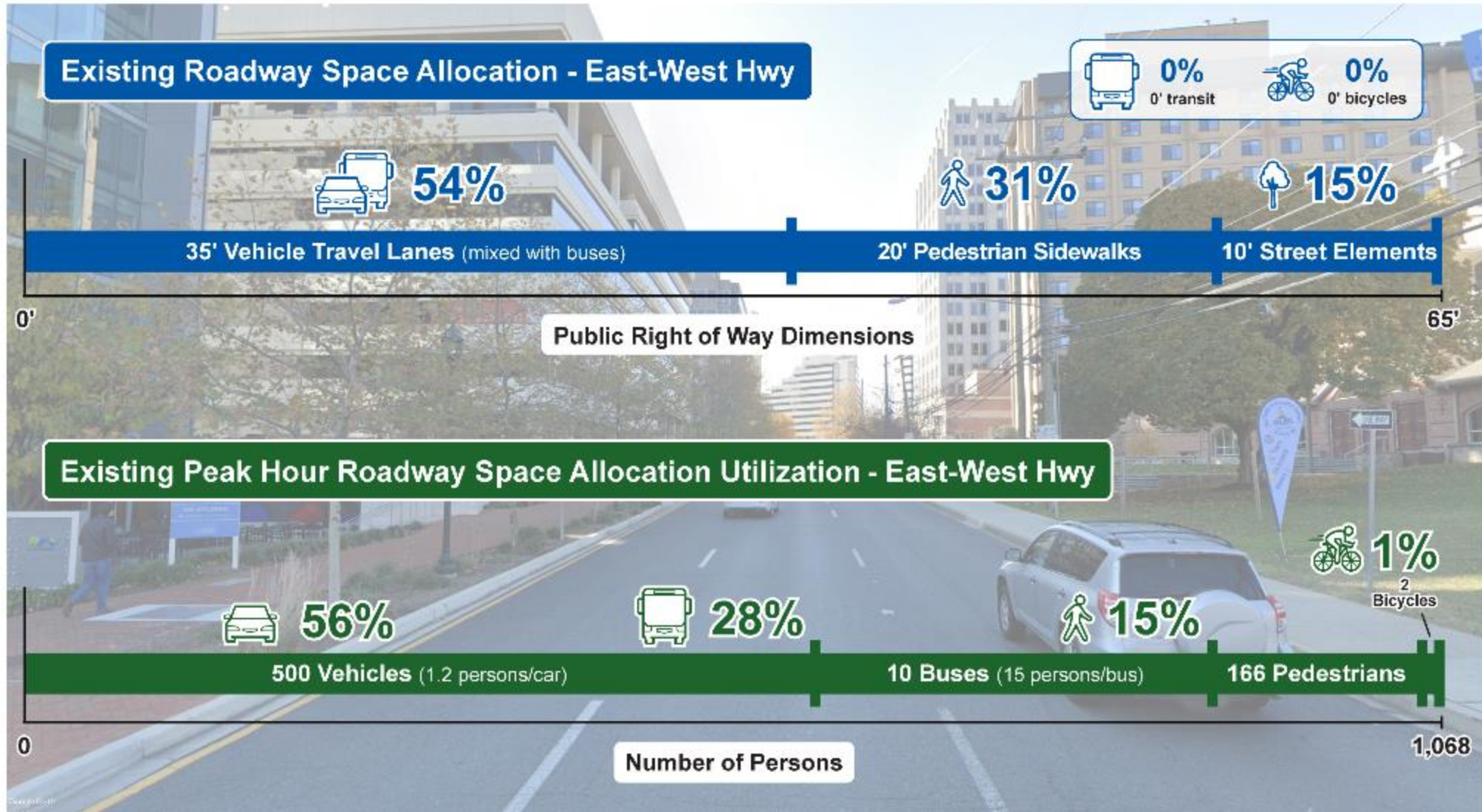
Roadway Space Allocation vs. Usage (Montgomery Lane/ Ave)
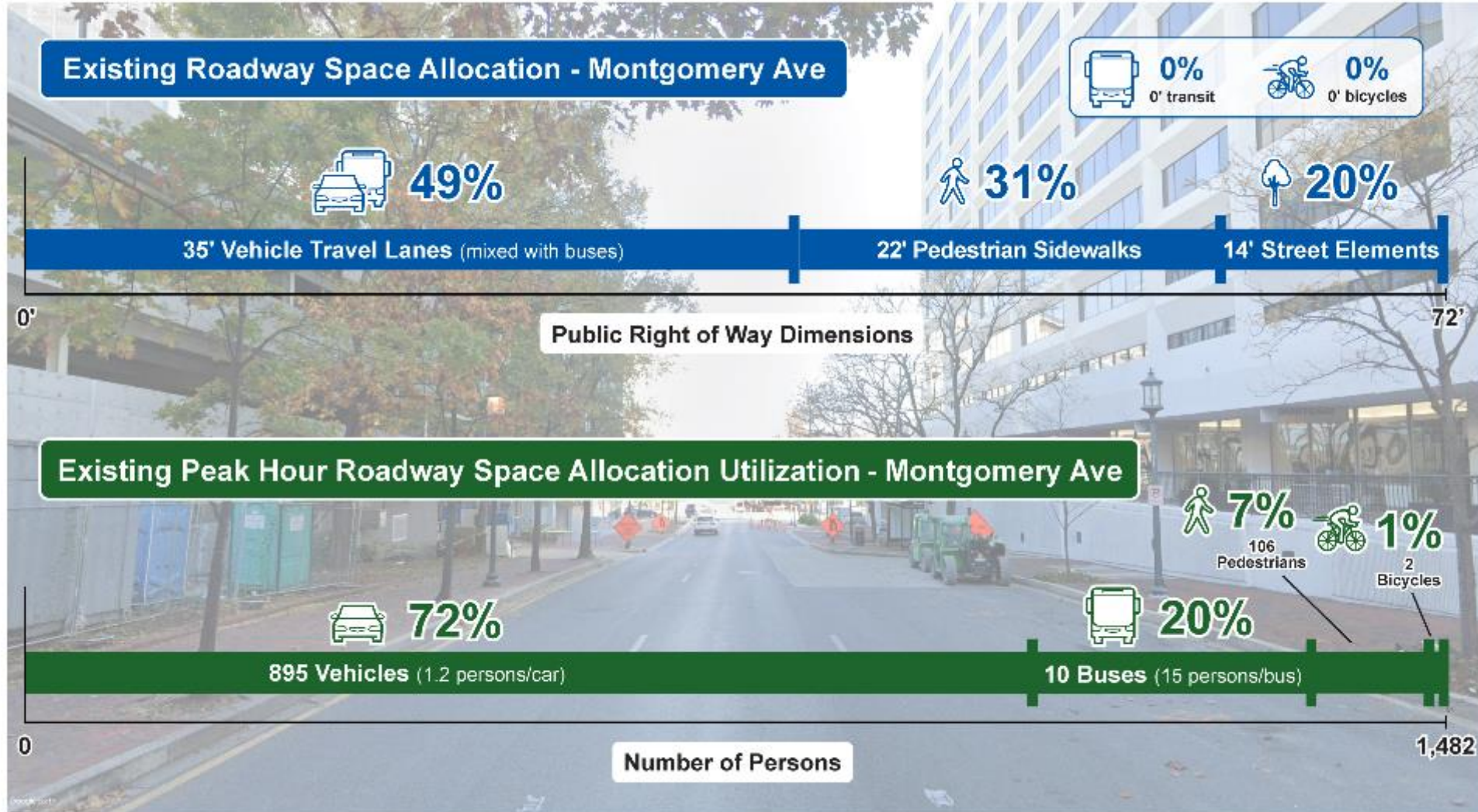
Proposed Alternatives

- Alternative 1: Two-Way Road Diet with Separated Bike Lanes
- Alternative 2: Partial Two-Way Road Diet with Separated Bike Lanes
- Alternative 3: One-way Couplet Road Diet with Dedicated Bus Lanes with Separated Bike Lanes
- Alternative 3a: One-way Couplet Partial Road Diet with Separated Bike Lanes

Alternative 1: Full Two-Way Road Diet with Separated Bike Lanes

Alternative 1: East-West Highway –Two Way

East-West Highway
Montgomery Ave. to Chelton Rd.

East-West Highway
Chelton Rd. to Waverly St.

East-West Highway
Waverly St. to Wisconsin Ave.

Old Georgetown Road
Wisconson Ave. to Woodmont Ave.
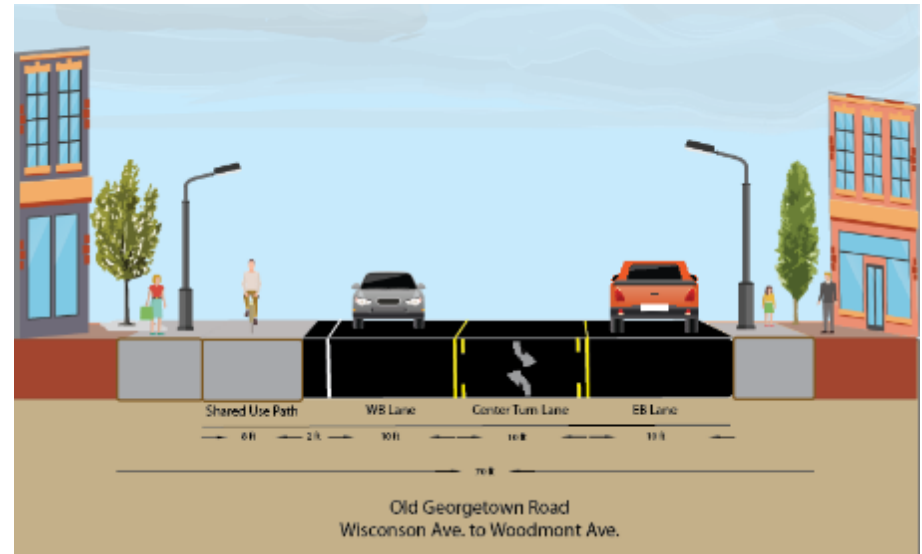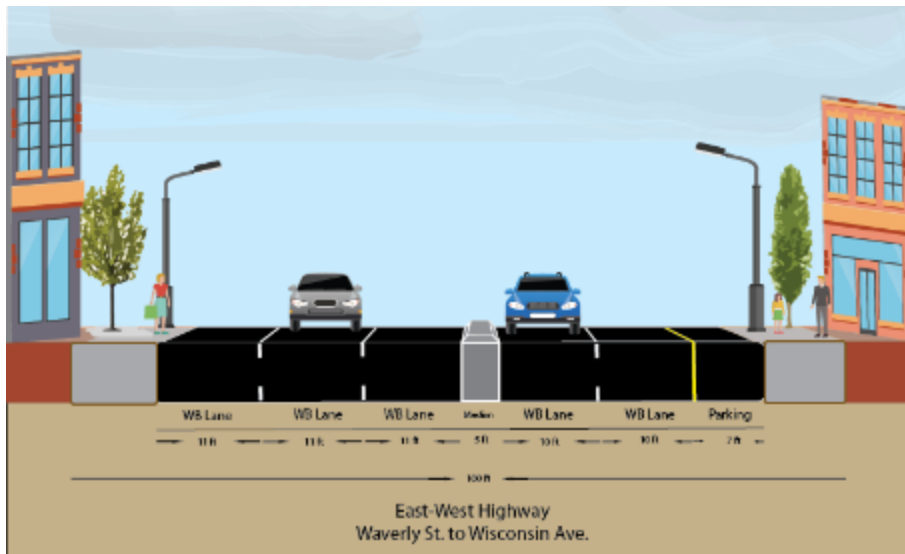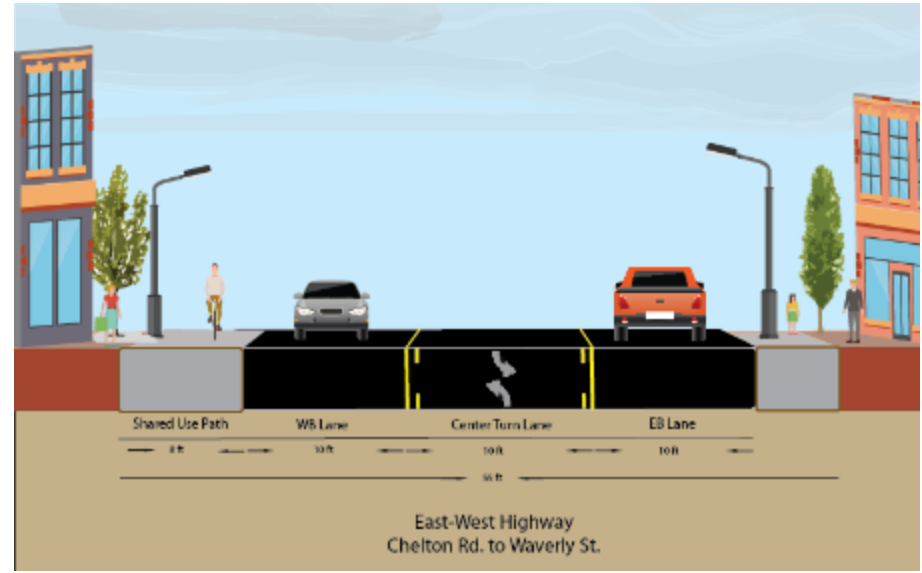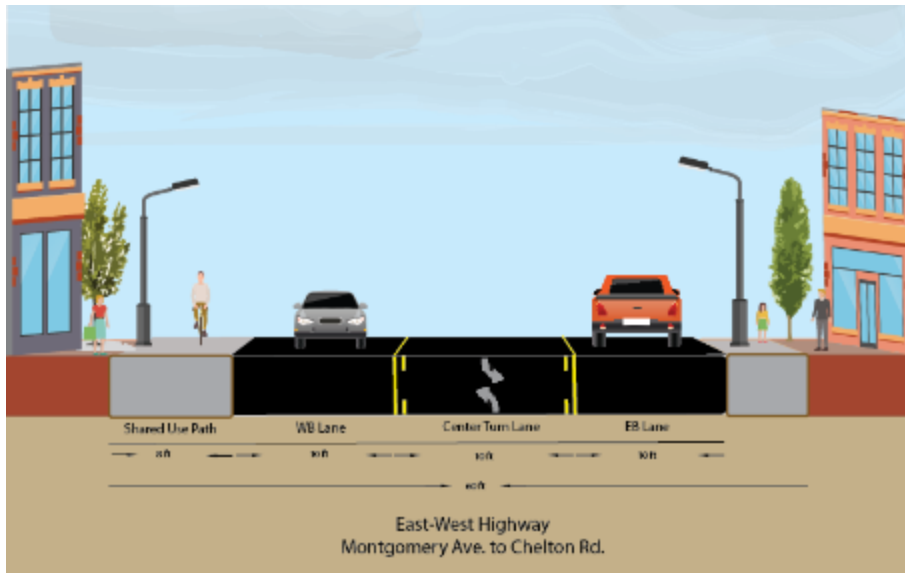
Alternative 1: Montgomery Lane/ Ave Two-Way

Montgomery Lane
Woodmont Ave. to Wisconsin Ave.

Montgomery Avenue
Wisconsin Ave. to Pearl St.

Montgomery Avenue
Pearl St. to East-West Hwy.
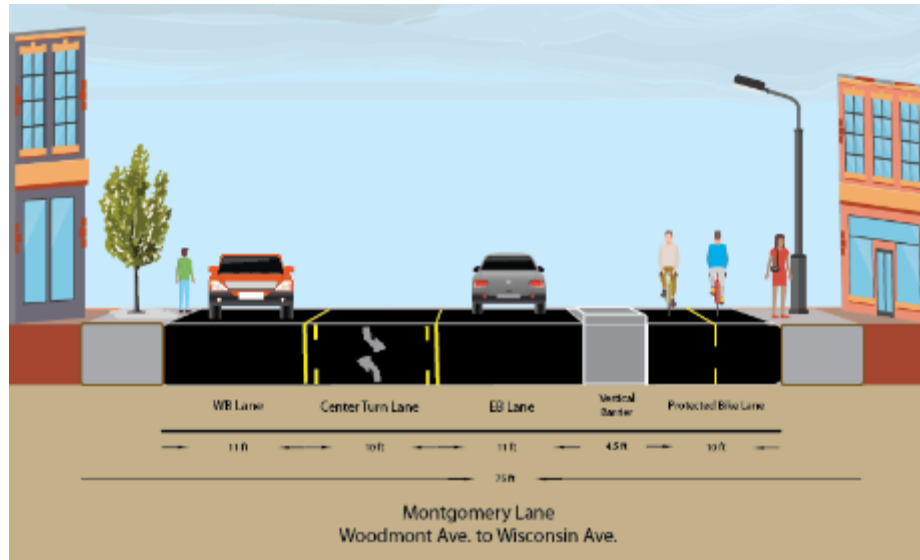
Alternative 1: Woodmont Two-Way

Woodmont Ave
Old Georgetown Rd to Montgomery Ln

Woodmont Ave
Montomgery Ln to Hampden Ln

Alternative 1: Two-Way Level of Service (LOS)
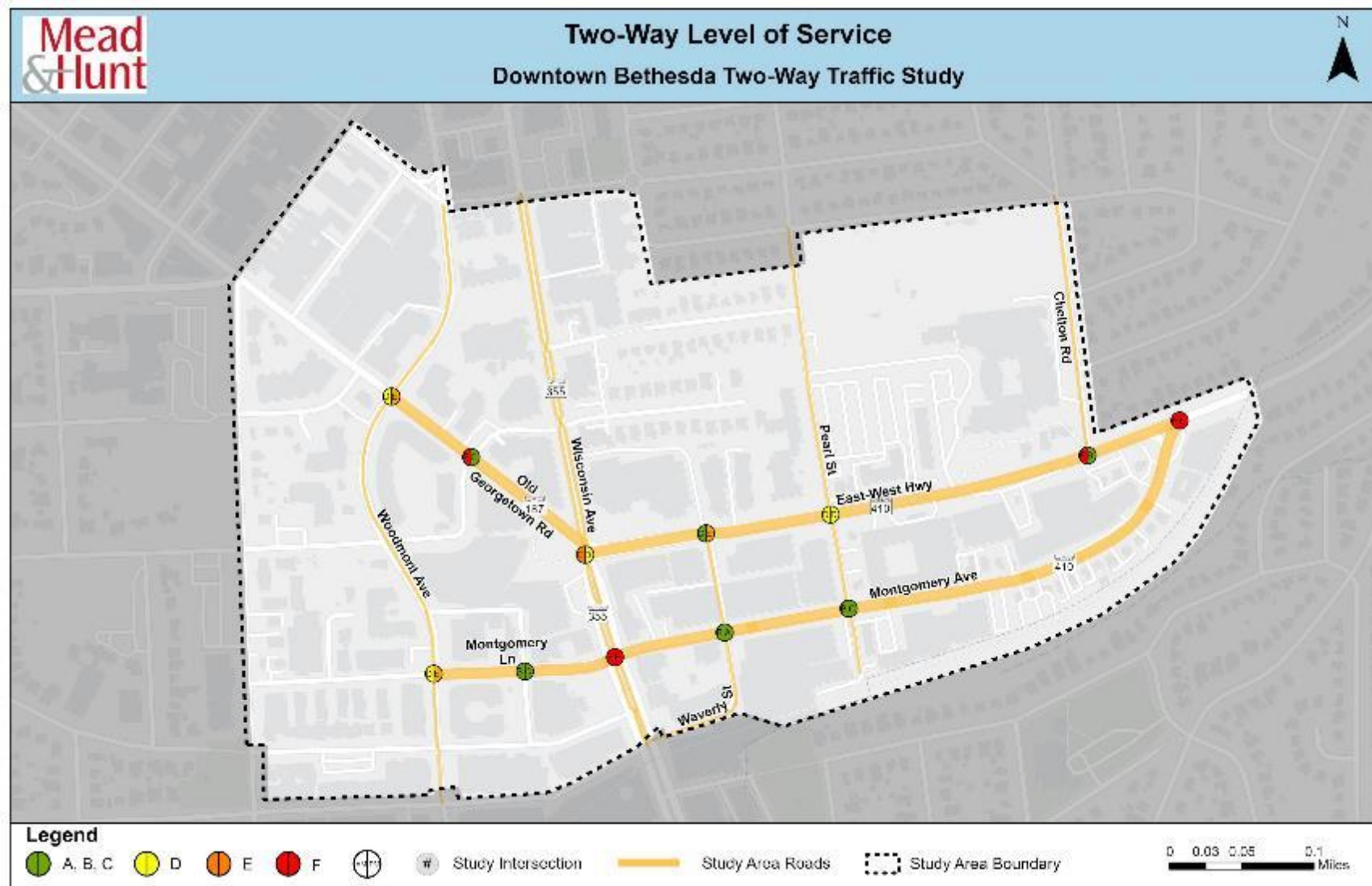
HCM Analysis - Intersection Level Summary Comparison

Intersection	Approach	Movement	Existing (2022)			Alt 1: Two Way (2022)		
			Delay	LOS	V/C	Delay	LOS	V/C
Old Georgetown Rd #1 & Woodmont Avenue	Control Type			Signal			Signal	
	Overall		24.6 (23.1)	C (C)	0.59 (0.49)	>300 (>300)	F (F)	1.24 (1.23)
Old Georgetown Rd #1 & Commerce Lane	Control Type			Signal			Signal	
	Overall		10.8 (9.9)	B (A)	0.30 (0.30)	98.1 (39.3)	F (D)	0.85 (0.86)
Wisconsin Avenue & Old Georgetown Rd #1/East West Highway #1	Control Type			Signal			Signal	
	Overall		45.9 (28.9)	D (C)	0.72 (0.77)	276.2 (280.3)	F (F)	1.34 (1.27)
Waverly Street & East West Highway #1	Control Type			Signal			Signal	
	Overall		26.0 (15.8)	C (B)	0.40 (0.40)	22.6 (26.2)	C (C)	0.50 (0.68)
Pearl Street & East West Highway #1	Control Type			Signal			Signal	
	Overall		22.8 (13.7)	C (B)	0.59 (0.33)	24.5 (11.8)	C (B)	0.71 (0.57)
East West Highway #1 & Chelton	Control Type			Signal			Signal	
	Overall		15.7 (4.4)	B (A)	0.63 (0.38)	24.6 (12.7)	C (B)	0.91 (0.55)
Montgomery Avenue & East West Highway #1	Control Type			Signal			Signal	
	Overall		10.5 (5.2)	B (A)	0.52 (0.59)	65.3 (>300)	E (F)	1.10 (2.05)
Pearl Street & Montgomery Avenue	Control Type			Signal			Signal	
	Overall		28.2 (15.0)	C (B)	0.64 (0.64)	25.5 (19.4)	C (B)	0.78 (0.72)
Waverly Street & Montgomery Avenue	Control Type			Signal			Signal	
	Overall		16.5 (18.0)	B (B)	0.36 (0.60)	14.3 (97.3)	B (F)	0.51 (1.08)
Wisconsin Avenue & Montgomery Avenue	Control Type			Signal			Signal	
	Overall		20.7 (29.8)	C (C)	0.60 (0.88)	75.0 (161.5)	E (F)	1.16 (1.37)
East Lane & Montgomery Avenue	Control Type			Signal			Signal	
	Overall		11.3 (38.2)	B (D)	0.18 (0.18)	18.1 (31.7)	B (C)	0.42 (0.72)
Woodmont Avenue & Montgomery Avenue	Control Type			Signal			Signal	
	Overall		10.4 (12.4)	B (B)	0.18 (0.13)	41.6 (59.4)	D (E)	0.59 (0.70)

Alternative 1: Full Two-Way Road Diet with Protected Bike Lanes

✓ Conforms with Downtown Bethesda Sector Plan and Bike Master Plan recommendations

✓ Incorporates Road Diet and Complete Street elements with reduced through lanes and a connected network of separated bike lanes
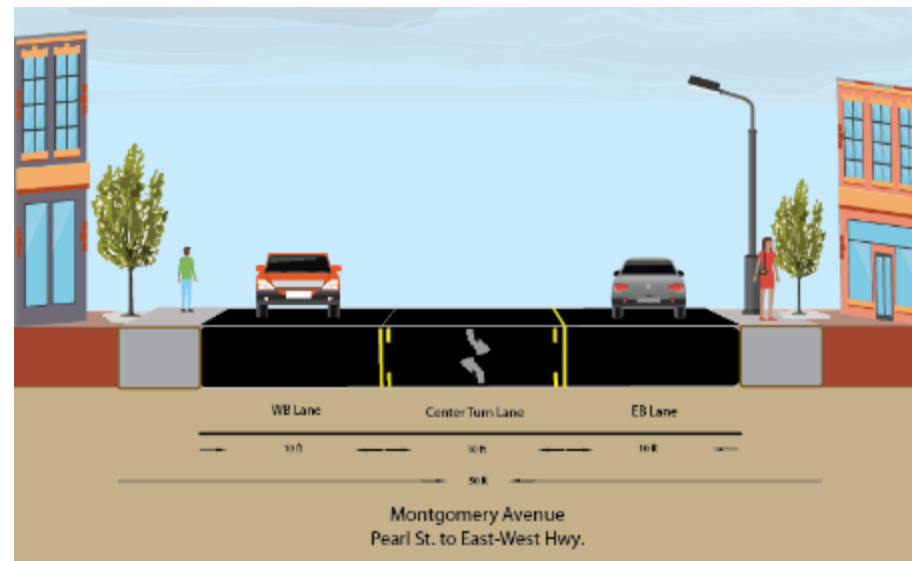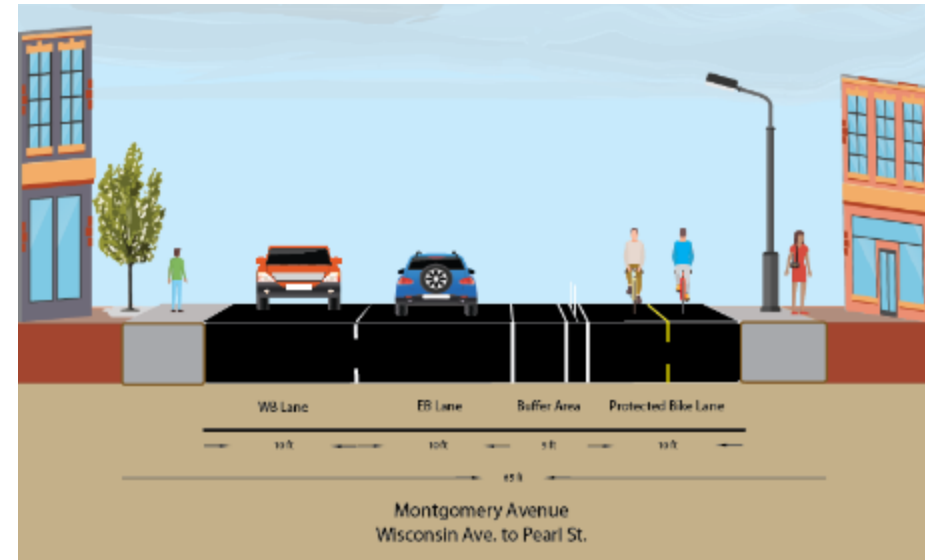
X Failing traffic operations

Alternative 2: Partial Two-Way Road Diet with Separated Bike Lanes

HCM Analysis - Intersection Level Summary Comparison

Intersection	Approach	Movement	Existing (2022)			Alt 2: Partial Two Way (2022)			Alt 2: Partial Two Way (2019 pre-COVID)		
			Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C
Old Georgetown Rd #1 & Woodmont Avenue	Control Type		Signal			Signal			Signal		
	Overall		24.6 (23.1)	C (C)	0.59 (0.49)	>300 (>300)	F (F)	1.30 (1.20)	>300 (>300)	F (F)	>2.00 (1.97)
Old Georgetown Rd #1 & Commerce Lane	Control Type		Signal			Signal			Signal		
	Overall		10.8 (9.9)	B (A)	0.30 (0.30)	>300 (40.3)	F (D)	1.16 (0.95)	>300 (269.7)	F (F)	1.35 (1.44)
Wisconsin Avenue & Old Georgetown Rd #1/East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		45.9 (28.9)	D (C)	0.72 (0.77)	>300 (258.6)	F (F)	1.49 (1.27)	>300 (292.7)	F (F)	2.37 (1.89)
Waverly Street & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		26.0 (15.8)	C (B)	0.40 (0.40)	101.9 (39.3)	F (D)	0.93 (0.84)	248.1 (>300)	F (F)	1.41 (3.52)
Pearl Street & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		22.8 (13.7)	C (B)	0.59 (0.33)	49.8 (17.9)	D (B)	1.06 (0.72)	264.7 (137.7)	F (F)	1.47 (1.31)
East West Highway #1 & Chelton	Control Type		Signal			Signal			Signal		
	Overall		15.7 (4.4)	B (A)	0.63 (0.38)	114.1 (8.5)	F (A)	1.22 (0.80)	269.6 (97.9)	F (F)	1.53 (1.19)
Montgomery Avenue & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		10.5 (5.2)	B (A)	0.52 (0.59)	21.9 (26.5)	C (C)	0.94 (0.88)	125.4 (94.2)	F (F)	1.31 (1.33)
Pearl Street & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		28.2 (15.0)	C (B)	0.64 (0.64)	12.1 (13.7)	B (B)	0.33 (0.50)	15.2 (66.1)	B (E)	0.38 (0.90)
Waverly Street & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		16.5 (18.0)	B (B)	0.36 (0.60)	21.2 (18.8)	C (B)	0.32 (0.53)	30.4 (49.4)	C (D)	0.78 (0.87)
Wisconsin Avenue & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		20.7 (29.8)	C (C)	0.60 (0.88)	23.8 (22.1)	C (C)	0.62 (0.65)	76.5 (18.1)	E (B)	1.04 (0.66)
East Lane & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		11.3 (38.2)	B (D)	0.18 (0.18)	18.9 (23.3)	B (C)	0.18 (0.36)	27.3 (37.6)	C (D)	0.15 (0.49)
Woodmont Avenue & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		10.4 (12.4)	B (B)	0.18 (0.13)	4.1 (4.0)	A (A)	0.23 (0.21)	5.0 (5.6)	A (A)	0.36 (0.43)

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✓ Conforms with Bike Master Plan and partially conforms to Downtown Bethesda Sector Plan recommendations

✓ Incorporates Road Diet and Complete Street elements with reduced through lanes and a connected network of separated bike lanes

X Failing traffic operations

Alternative 3: One-way Couplet with Dedicated Bus Lanes with Separated Bicycle Lanes

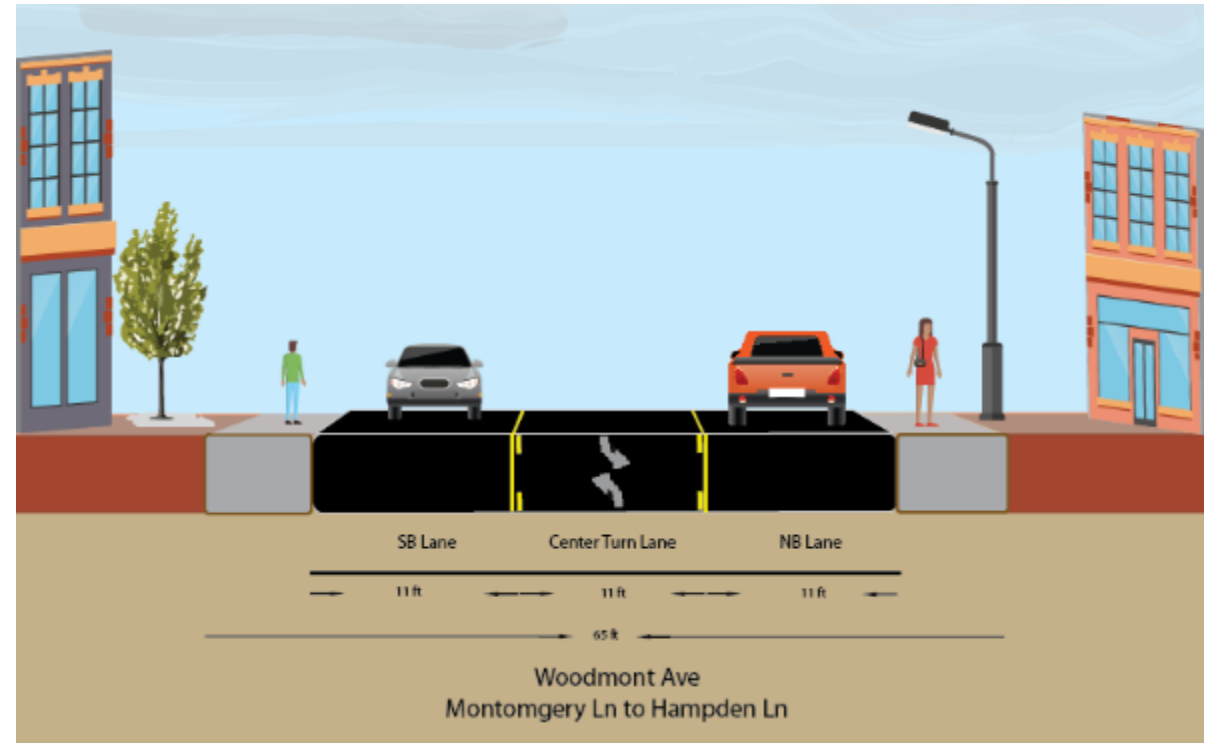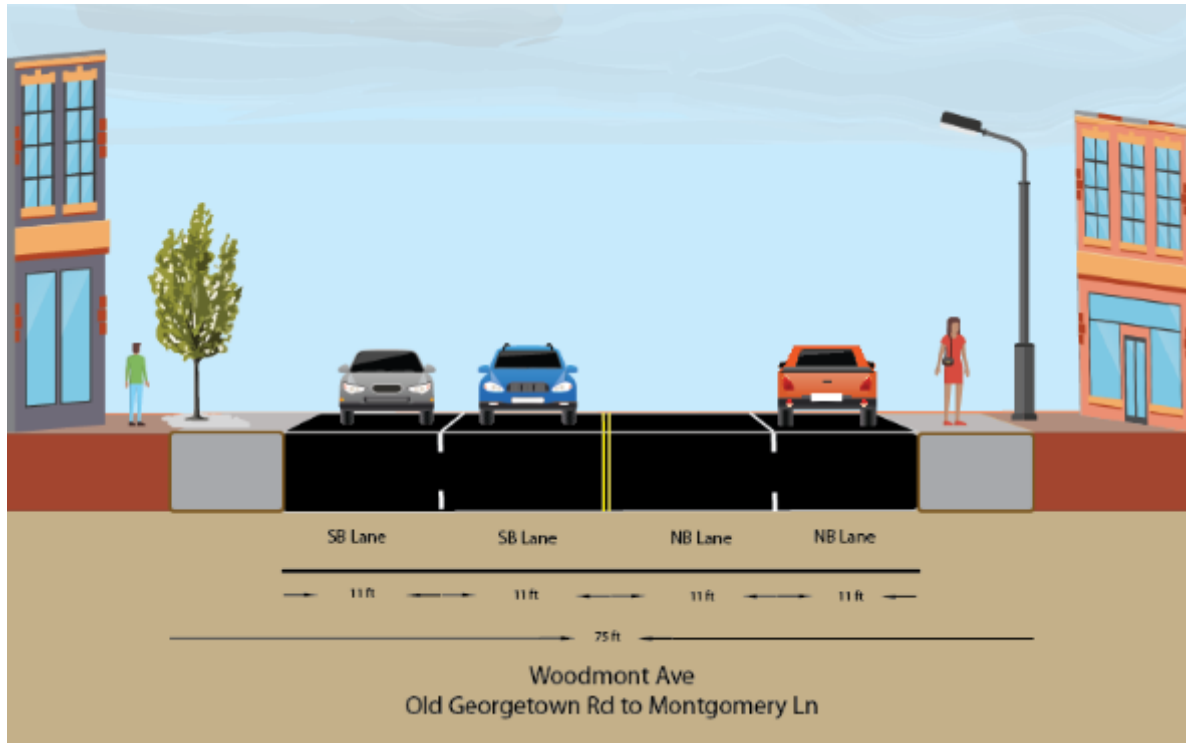# Alternative 3: One-way Couplet with Dedicated Bus Lanes with Separated Bicycle Lanes

East-West Highway
Montgomery Ave. to Pearl St

East-West Highway
Pearl St. to Wisconsin Ave.

Old Georgetown Road
Wisconson Ave. to Woodmont Ave.

Alternative 3: One-way Couplet with Dedicated Bus Lanes with Separated Bicycle Lanes

Montgomery Avenue
Wisconsin Ave. to East-West Hwy.

Montgomery Lane
Woodmont Ave. to Wisconsin Ave.

Woodmont Ave
Old Georgetown Rd. to Hampden Ln.
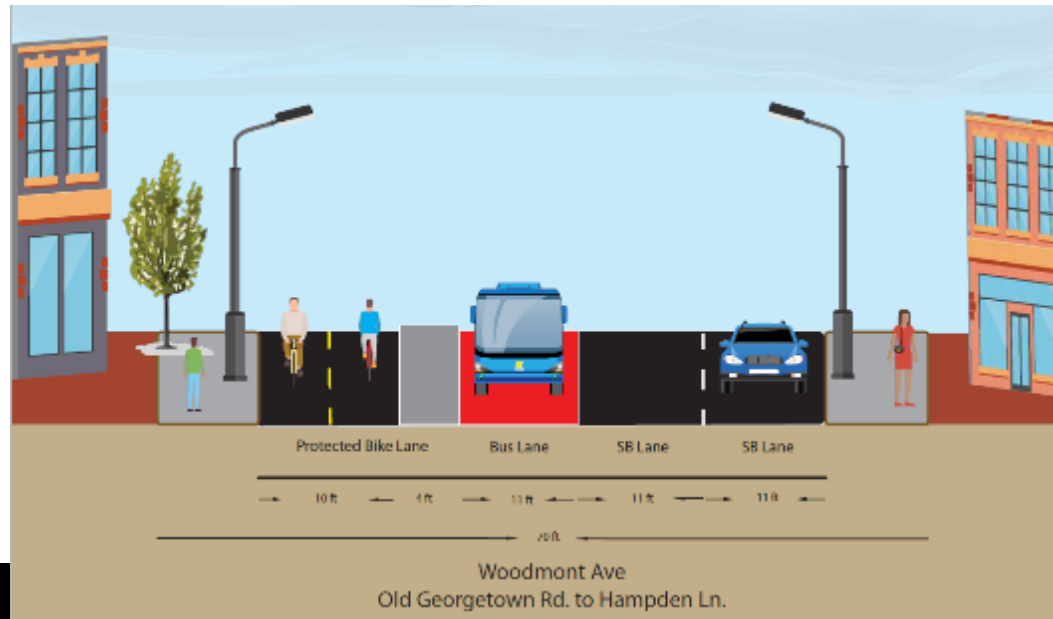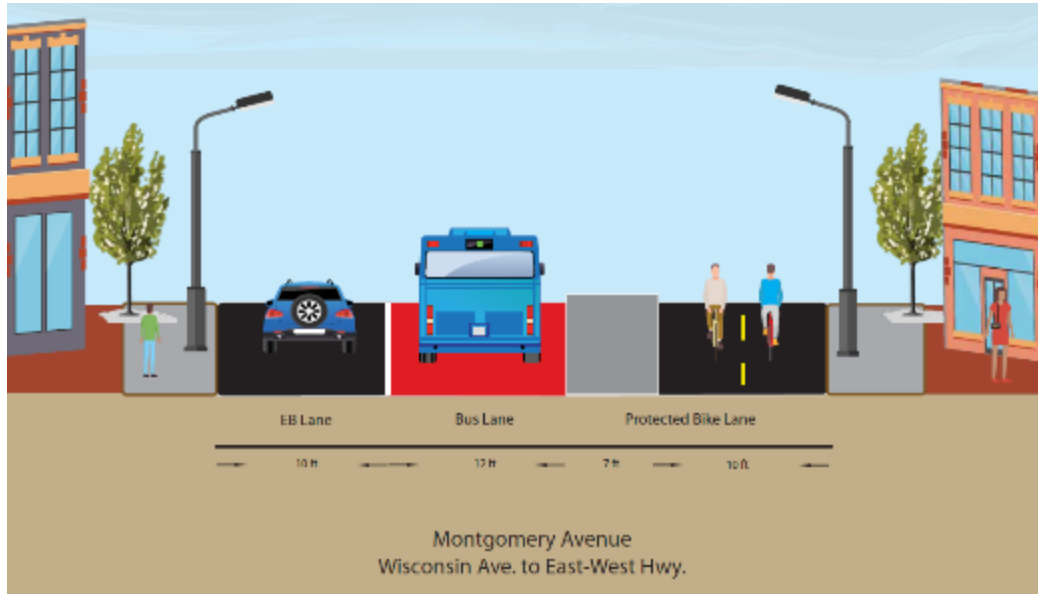
HCM Analysis - Intersection Level Summary Comparison

Intersection	Approach	Movement	Existing (2022)			Alt 3: One Way (2022)			Alt 3: One Way (2019 pre-COVID)		
			Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C
Old Georgetown Rd #1 & Woodmont Avenue	Control Type		Signal			Signal			Signal		
	Overall		24.6 (23.1)	C (C)	0.59 (0.49)	24.4 (21.2)	C (C)	0.55 (0.40)	57.5 (28.4)	E (C)	0.95 (0.72)
Old Georgetown Rd #1 & Commerce Lane	Control Type		Signal			Signal			Signal		
	Overall		10.8 (9.9)	B (A)	0.30 (0.30)	16.8 (11.7)	B (B)	0.39 (0.43)	13.9 (13.7)	B (B)	0.44 (0.64)
Wisconsin Avenue & Old Georgetown Rd #1/East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		45.9 (28.9)	D (C)	0.72 (0.77)	42.8 (37.0)	D (D)	0.84 (0.88)	126.0 (40.8)	F (D)	1.20 (0.96)
Waverly Street & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		26.0 (15.8)	C (B)	0.40 (0.40)	19.6 (14.0)	B (B)	0.54 (0.51)	36.9 (31.7)	D (C)	0.81 (0.90)
Pearl Street & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		22.8 (13.7)	C (B)	0.59 (0.33)	19.9 (12.3)	B (B)	0.68 (0.43)	11.8 (20.4)	B (C)	0.86 (0.79)
East West Highway #1 & Chelton	Control Type		Signal			Signal			Signal		
	Overall		15.7 (4.4)	B (A)	0.63 (0.38)	24.8 (6.7)	C (A)	0.92 (0.68)	271.9 (43.6)	F (D)	1.31 (1.02)
Montgomery Avenue & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		10.5 (5.2)	B (A)	0.52 (0.59)	25.9 (12.2)	C (B)	0.94 (1.04)	139.2 (167.6)	F (F)	1.40 (1.57)
Pearl Street & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		28.2 (15.0)	C (B)	0.64 (0.64)	44.0 (54.2)	D (D)	0.91 (1.05)	22.9 (>300)	C (F)	0.98 (1.78)
Waverly Street & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		16.5 (18.0)	B (B)	0.36 (0.60)	26.2 (37.3)	C (D)	0.63 (1.01)	151.9 (>300)	F (F)	1.33 (1.77)
Wisconsin Avenue & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		20.7 (29.8)	C (C)	0.60 (0.88)	24.2 (38.3)	C (D)	0.65 (1.06)	34.8 (32.2)	C (C)	1.05 (0.98)
East Lane & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		11.3 (38.2)	B (D)	0.18 (0.18)	17.6 (27.7)	B (C)	0.33 (0.46)	17.7 (27.8)	B (C)	0.41 (0.62)
Woodmont Avenue & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		10.4 (12.4)	B (B)	0.18 (0.13)	5.5 (4.5)	A (A)	0.41 (0.30)	9.4 (8.2)	A (A)	0.66 (0.60)

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Alternative 3: One-way Couplet with Dedicated Bus Lanes with Separated Bicycle Lanes

✓Conforms with Bike Master Plan recommendations

✓ Incorporates Road Diet and Complete Street elements with reduced through lanes and a connected network of separated bike lanes
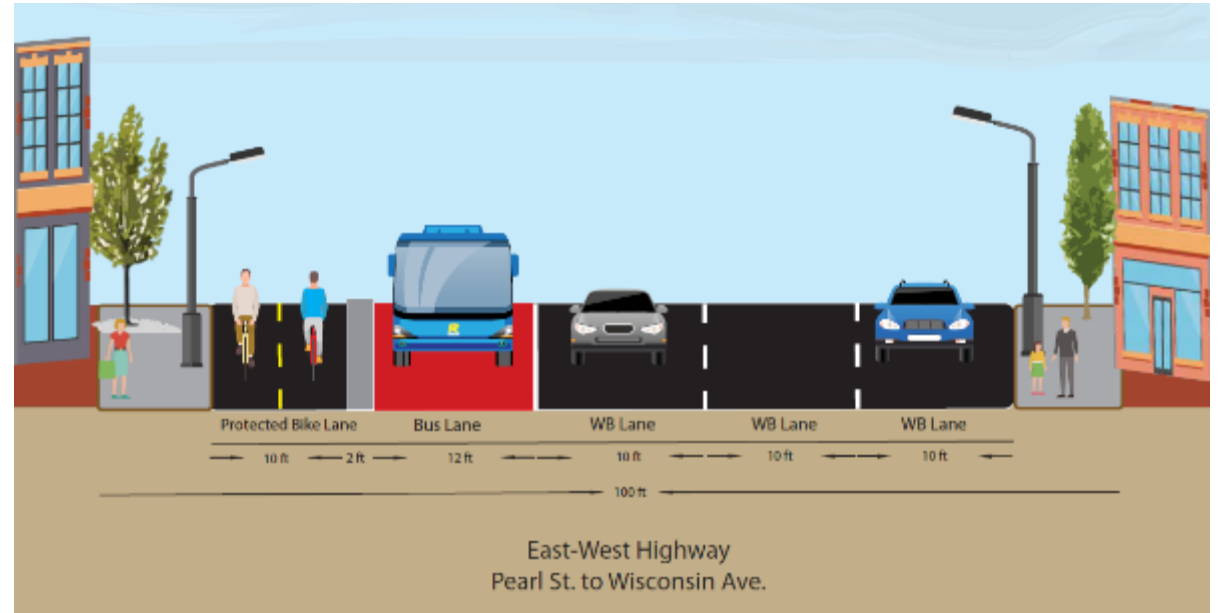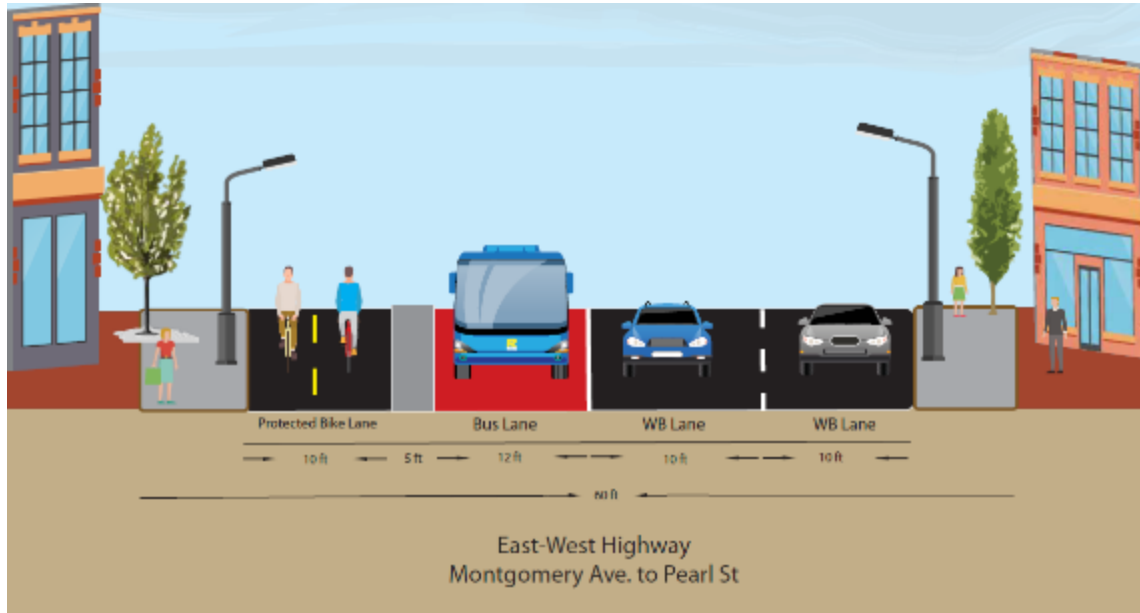
X Does not conform to Downtown Bethesda Sector Plan recommendations for two-way streets

X Failing traffic operations

Alternative 3a: One-way Couplet with Partial Road Diet and Separated Bicycle Lanes

East-West Highway – Alt #3a One Way Partial Road Diet
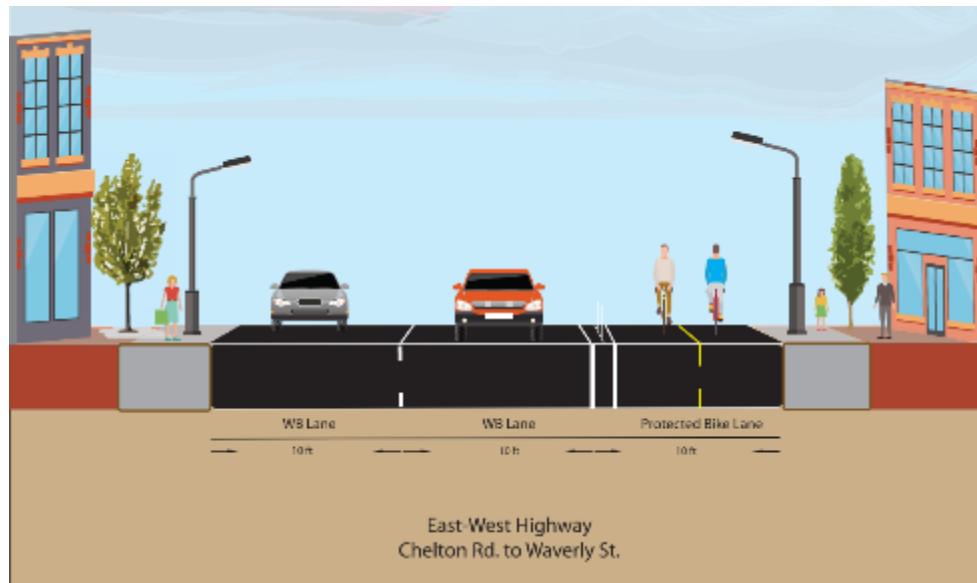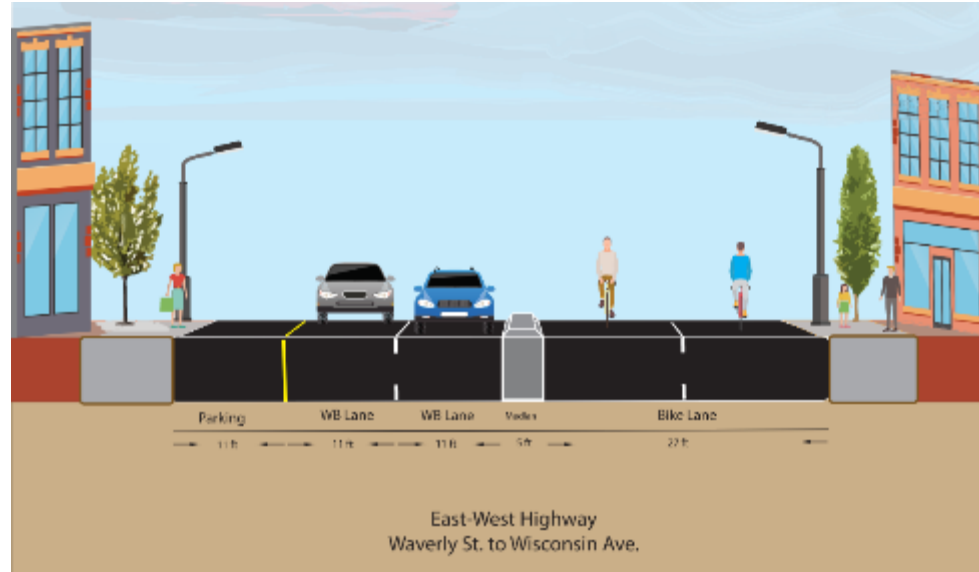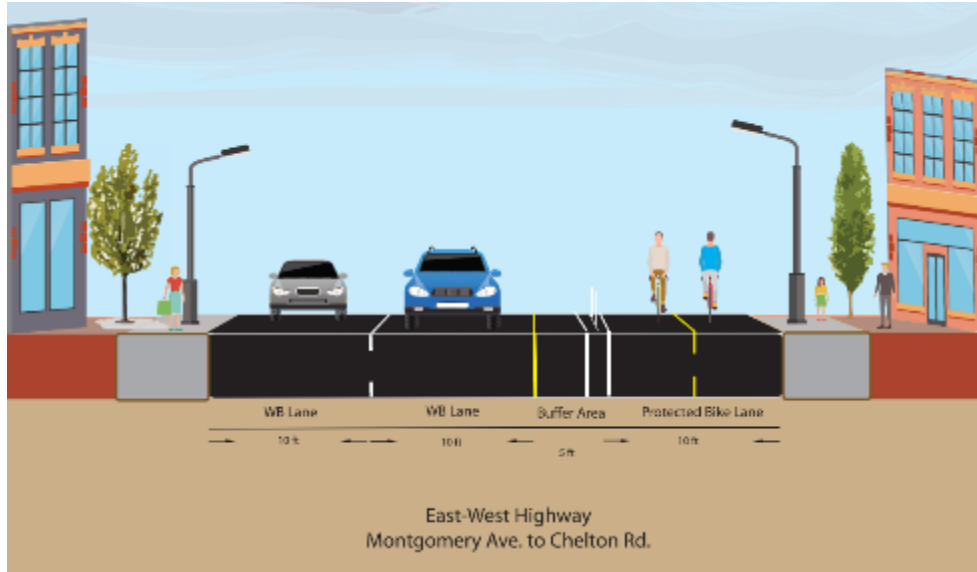
Montgomery Lane/ Ave Alt #3a One Way Partial Road Diet

Montgomery Lane
Woodmont Ave. to Wisconsin Ave.

Montgomery Avenue
Pearl St. to East-West Hwy.

Montgomery Avenue
Wisconsin Ave. to Pearl St.

HCM Analysis - Intersection Level Summary Comparison

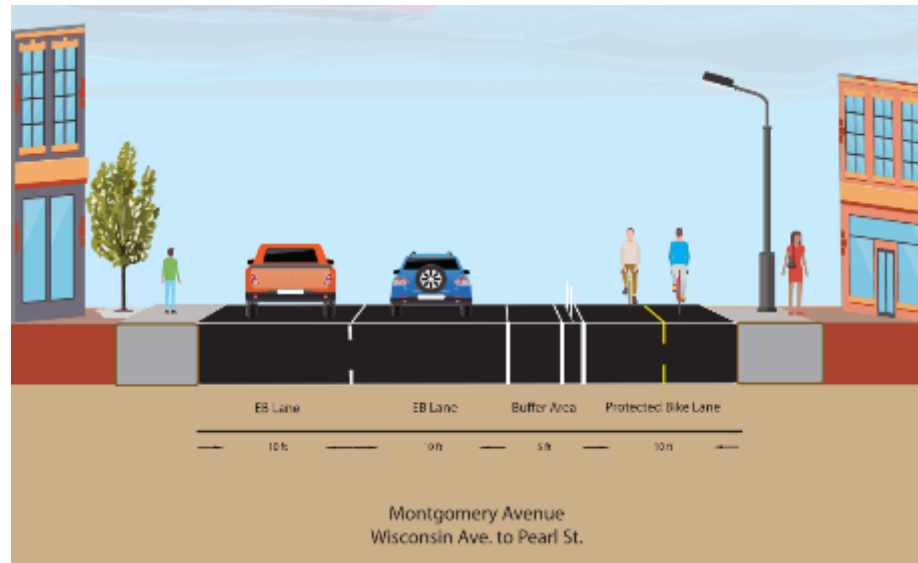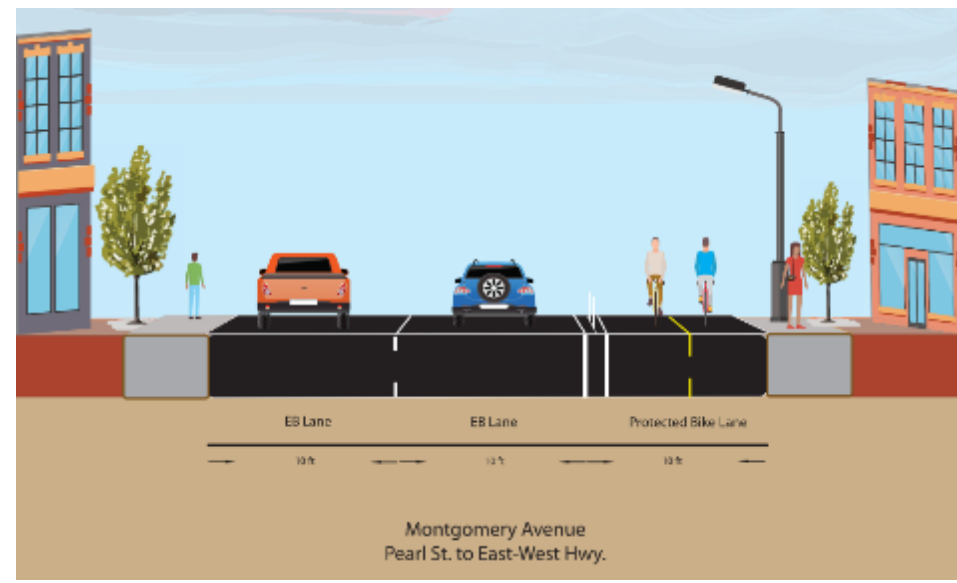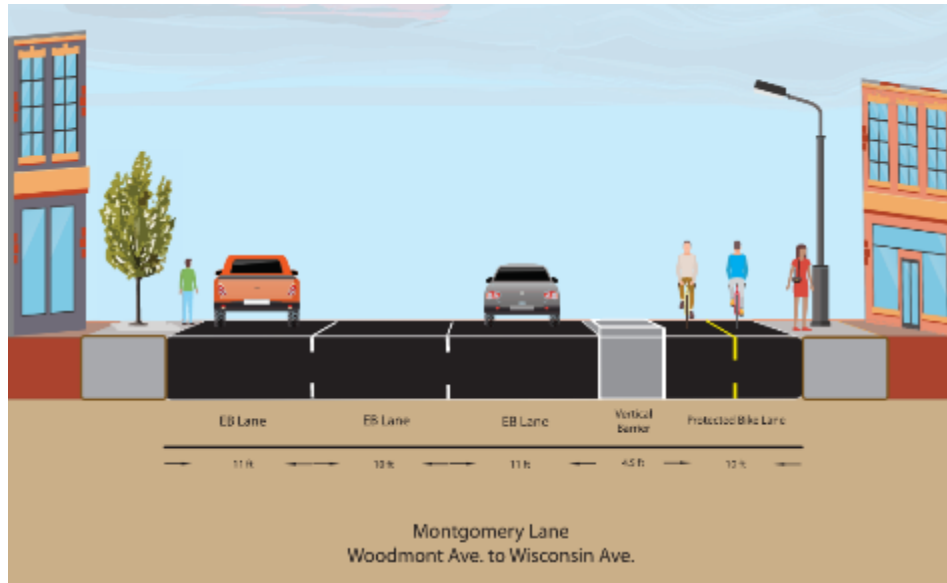| Intersection	Approach	Movement	Existing (2022)			Alt 3a: One Way (2022)			Alt 3a: One Way (2019 pre-covid)		
			Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C
Old Georgetown Rd #1 & Woodmont Avenue	Control Type		Signal			Signal			Signal		
	Overall		24.6 (23.1)	C (C)	0.59 (0.49)	25.8 (23.3)	C (C)	0.61 (0.50)	60.1 (28.2)	E (C)	1.03 (0.72)
Old Georgetown Rd #1 & Commerce Lane	Control Type		Signal			Signal			Signal		
	Overall		10.8 (9.9)	B (A)	0.30 (0.30)	7.9 (10.2)	A (B)	0.30 (0.35)	11.9 (13.9)	B (B)	0.34 (0.64)
Wisconsin Avenue & Old Georgetown Rd #1/East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		45.9 (28.9)	D (C)	0.72 (0.77)	29.1 (30.4)	C (C)	0.72 (0.77)	131.9 (41.6)	F (D)	1.20 (0.96)
Waverly Street & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		26.0 (15.8)	C (B)	0.40 (0.40)	16.3 (15.6)	B (B)	0.40 (0.40)	14.3 (17.0)	B (B)	0.67 (0.70)
Pearl Street & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		22.8 (13.7)	C (B)	0.59 (0.33)	17.5 (13.1)	B (B)	0.56 (0.33)	10.6 (15.9)	B (B)	0.66 (0.63)
East West Highway #1 & Chelton	Control Type		Signal			Signal			Signal		
	Overall		15.7 (4.4)	B (A)	0.63 (0.38)	16.4 (3.8)	B (A)	0.71 (0.42)	13.6 (5.0)	B (A)	0.76 (0.60)
Montgomery Avenue & East West Highway #1	Control Type		Signal			Signal			Signal		
	Overall		10.5 (5.2)	B (A)	0.52 (0.59)	11.5 (14.7)	B (B)	0.60 (1.04)	12.6 (160.6)	B (F)	0.83 (1.57)
Pearl Street & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		28.2 (15.0)	C (B)	0.64 (0.64)	22.2 (11.2)	C (B)	0.64 (0.64)	13.0 (43.4)	B (D)	0.60 (1.07)
Waverly Street & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		16.5 (18.0)	B (B)	0.36 (0.60)	13.9 (20.5)	B (C)	0.44 (0.64)	22.4 (78.1)	C (E)	0.80 (1.12)
Wisconsin Avenue & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		20.7 (29.8)	C (C)	0.60 (0.88)	18.8 (26.5)	B (C)	0.64 (0.92)	34.1 (30.9)	C (C)	1.05 (0.98)
East Lane & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		11.3 (38.2)	B (D)	0.18 (0.18)	18.5 (24.5)	B (C)	0.27 (0.41)	16.7 (27.2)	B (C)	0.32 (0.51)
Woodmont Avenue & Montgomery Avenue	Control Type		Signal			Signal			Signal		
	Overall		10.4 (12.4)	B (B)	0.18 (0.13)	14.3 (14.1)	B (B)	0.52 (0.44)	52.9 (8.2)	D (A)	0.82 (0.60)

HCM Analysis - Intersection Level Summary Comparison

Comparison of recommended alternative HCM results to Existing 2019 results

Intersection	Approach	Movement	Existing (2019)			Alt 3a: One Way (2019 pre-covid)		
			Delay	LOS	V/C	Delay	LOS	V/C
Old Georgetown Rd #1 & Woodmont Avenue	Control Type		Signal			Signal		
	Overall		73.2 (26.5)	E (C)	1.01 (0.83)	60.1 (28.2)	E (C)	1.03 (0.72)
Old Georgetown Rd #1 & Commerce Lane	Control Type		Signal			Signal		
	Overall		9.3 (14.5)	A (B)	0.31 (0.52)	11.9 (13.9)	B (B)	0.34 (0.64)
Wisconsin Avenue & Old Georgetown Rd #1/East West Highway #1	Control Type		Signal			Signal		
	Overall		105.9 (28.6)	F (C)	1.03 (0.74)	131.9 (41.6)	F (D)	1.20 (0.96)
Waverly Street & East West Highway #1	Control Type		Signal			Signal		
	Overall		24.2 (20.4)	C (C)	0.62 (0.64)	14.3 (17.0)	B (B)	0.67 (0.70)
Pearl Street & East West Highway #1	Control Type		Signal			Signal		
	Overall		9.1 (17.5)	A (B)	0.62 (0.61)	10.6 (15.9)	B (B)	0.66 (0.63)
East West Highway #1 & Chelton	Control Type		Signal			Signal		
	Overall		11.9 (4.1)	B (A)	0.71 (0.54)	13.6 (5.0)	B (A)	0.76 (0.60)
Montgomery Avenue & East West Highway #1	Control Type		Signal			Signal		
	Overall		10.3 (5.4)	B (A)	0.77 (0.87)	12.6 (160.6)	B (F)	0.83 (1.57)
Pearl Street & Montgomery Avenue	Control Type		Signal			Signal		
	Overall		12.9 (21.1)	B (C)	0.46 (0.83)	13.0 (43.4)	B (D)	0.60 (1.07)
Waverly Street & Montgomery Avenue	Control Type		Signal			Signal		
	Overall		18.1 (50.9)	B (D)	0.59 (0.94)	22.4 (78.1)	C (E)	0.80 (1.12)
Wisconsin Avenue & Montgomery Avenue	Control Type		Signal			Signal		
	Overall		22.8 (17.1)	C (B)	0.90 (0.79)	34.1 (30.9)	C (C)	1.05 (0.98)
East Lane & Montgomery Avenue	Control Type		Signal			Signal		
	Overall		12.7 (22.4)	B (C)	0.22 (0.31)	16.7 (27.2)	B (C)	0.32 (0.51)
Woodmont Avenue & Montgomery Avenue	Control Type		Signal			Signal		
	Overall		58.9 (97.9)	E (F)	0.29 (0.24)	52.9 (8.2)	D (A)	0.82 (0.60)

Alternative 3a: One-way Couplet with Partial Road Diet and Separated Bicycle Lanes

✓Incorporates Road Diet and Complete Street elements by repurposing shoulder and roadside for connected bicycle network

✓Optimizes signal timing to mitigate operational impacts and better accommodate pedestrian and bicycle movements

✓Best accommodates existing and projected traffic volumes without adding significant congestion

✓Conforms with Bicycle Master Plan recommendations

X Does not conform to Downtown Bethesda Sector Plan recommendations for two-way streets

Recommendation: Alternative 3a - One-way Couplet with Partial Road Diet and Separated Bicycle Lanes

Considerations:

- Alt 3a provides road diet and complete street amenities sought for multimodal access and safety in downtown Bethesda
- Alt 3a performs better with fewer failing intersections under 2019 pre-COVID level traffic volumes (what we are using as a proxy for our future year forecast) than other alternatives
- The analysis using 2019 existing conditions shows more congestion with all alternatives
- Some of the queueing results show longer queues in some intersections for the Alt 3a - but that's mainly due to the bottleneck shift once the bus lane is removed
- It's unknown if traffic volumes will return to pre-covid levels, and additional mitigation measures with signal optimization can help reduce queuing
- Additional streetscape amenities can improve comfort and placemaking to enhance downtown Bethesda