



Washington Metropolitan Area Transit Authority

RTSP Strategies:

PCN+, Streetcar, Light Rail, Beltway Line, Brown Line, Metrorail extensions, spurs/bypasses

Presentation to the Technical Advisory Group
May 05, 2011



Overview of New Model Results

- Review of Base Case (Max CLRP)
- Definition of Strategies and Impact on Ridership & Capacity (Round 4)
 - Set 1: Enhanced Surface Transit
 - PCN+
 - Streetcar Network
 - Light Rail Expansion
 - Set 2: New Metrorail Lines
 - Beltway Line
 - Brown Line
 - Set 3: Metrorail Enhancements
 - Relocated Silver Line with Ballston-Rosslyn Bypass
 - Metrorail Extensions B
- Preliminary Evaluation

REVIEW OF BASE CASE (MAX CLRP)



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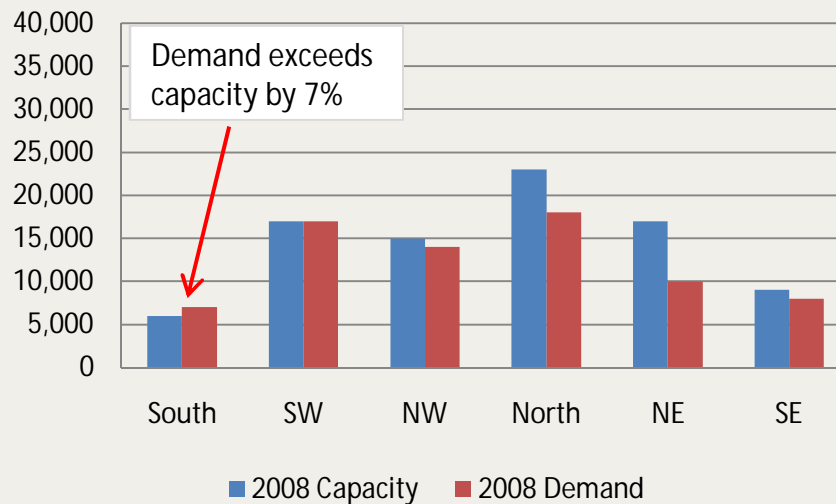
Base Case (2040 Max CLRP)

- Address CLRP* issues related to capacity by:
 - Increasing train frequencies to maximum supported by the infrastructure
 - Reallocate Orange/Silver/Blue Line train frequencies to better balance demand
- Improve system understandability by eliminating multiple destinations for single color train
 - Extend Silver Line trains to Largo & route all Orange Line trains to New Carrollton
 - Rename “Blue Line Split” via 14th Street Bridge to “Yellow Line”
- Basis for comparing various strategies

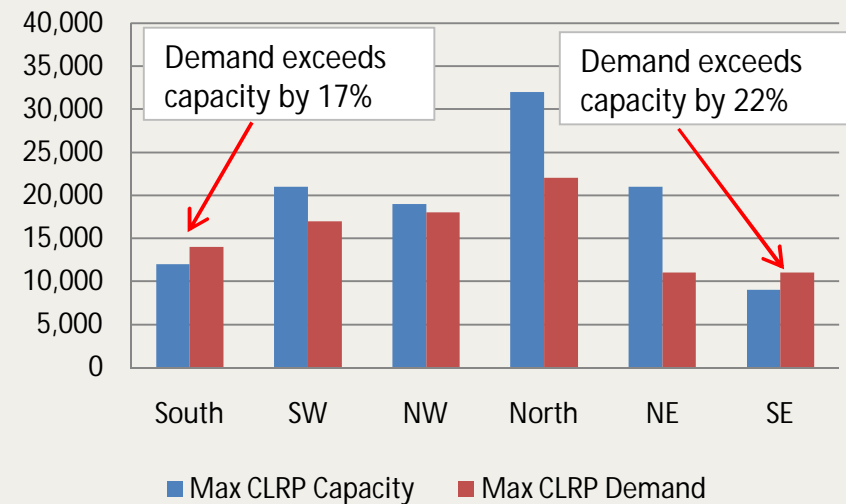
(*MWCOC 2030 CLRP Modeled with 2040 Land Use)

Core Capacity Analysis- 2040 Max CLRP

Year 2008



Base Case (Max CLRP)



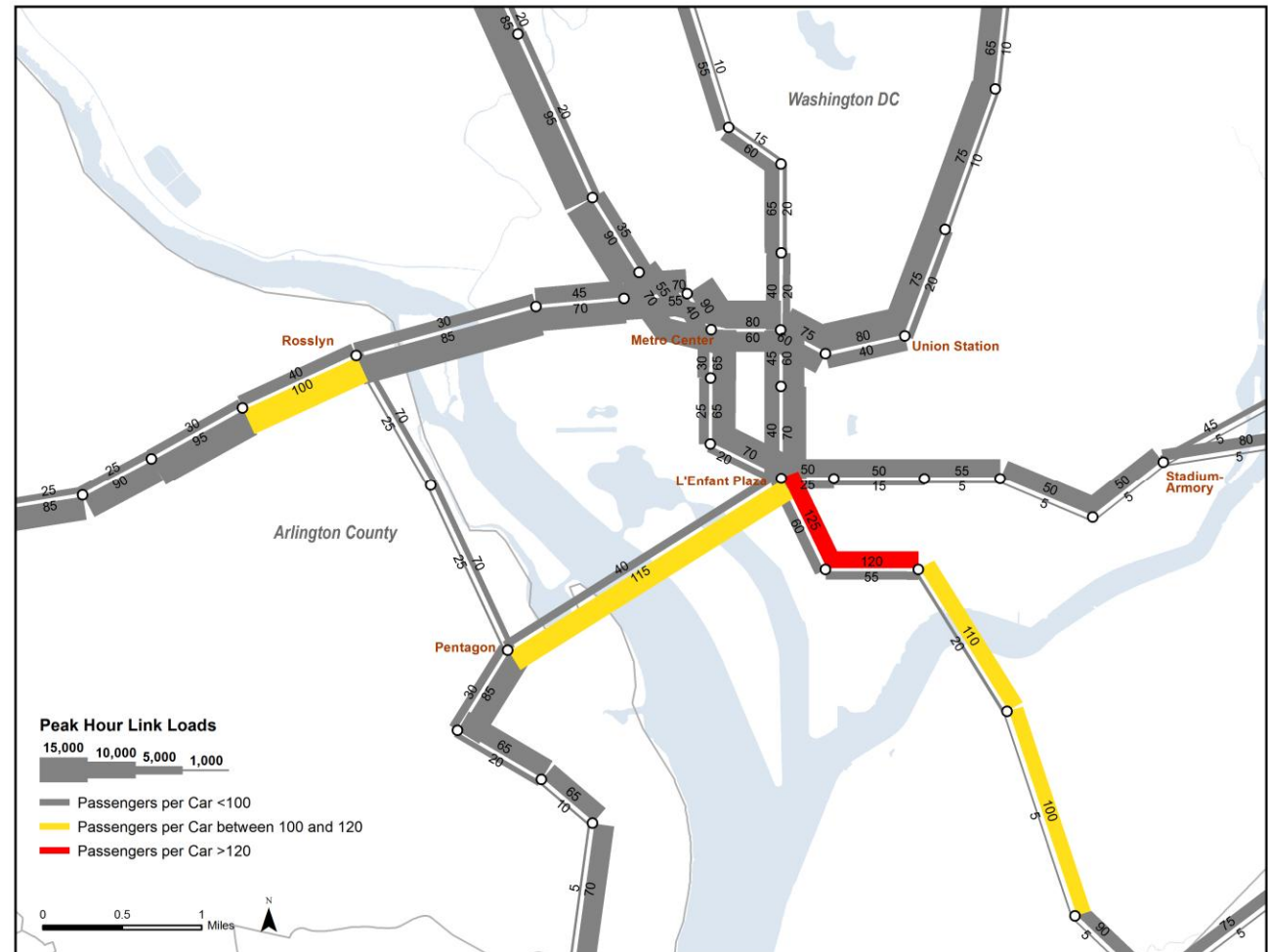
Screenline definition:

- South: Metrorail services from Virginia on Yellow line crossing Potomac
- Southwest: Metrorail services from Virginia on Orange and Blue lines crossing Potomac
- Northwest: Red Line approaching Dupont Circle
- North: Green/Yellow lines approaching Mt. Vernon Square and Red line approaching Union Station
- Northeast: Blue/Orange/[Silver] from Eastern Market to Capitol South
- Southeast: Green line approaching L'Enfant Plaza

Note: Metrorail capacity assumes 100 passengers per car

Base Case (Max CLRP): 2040 Peak Hour Link Loads

Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.



DEFINITION OF STRATEGIES

SET 1: ENHANCED SURFACE TRANSIT



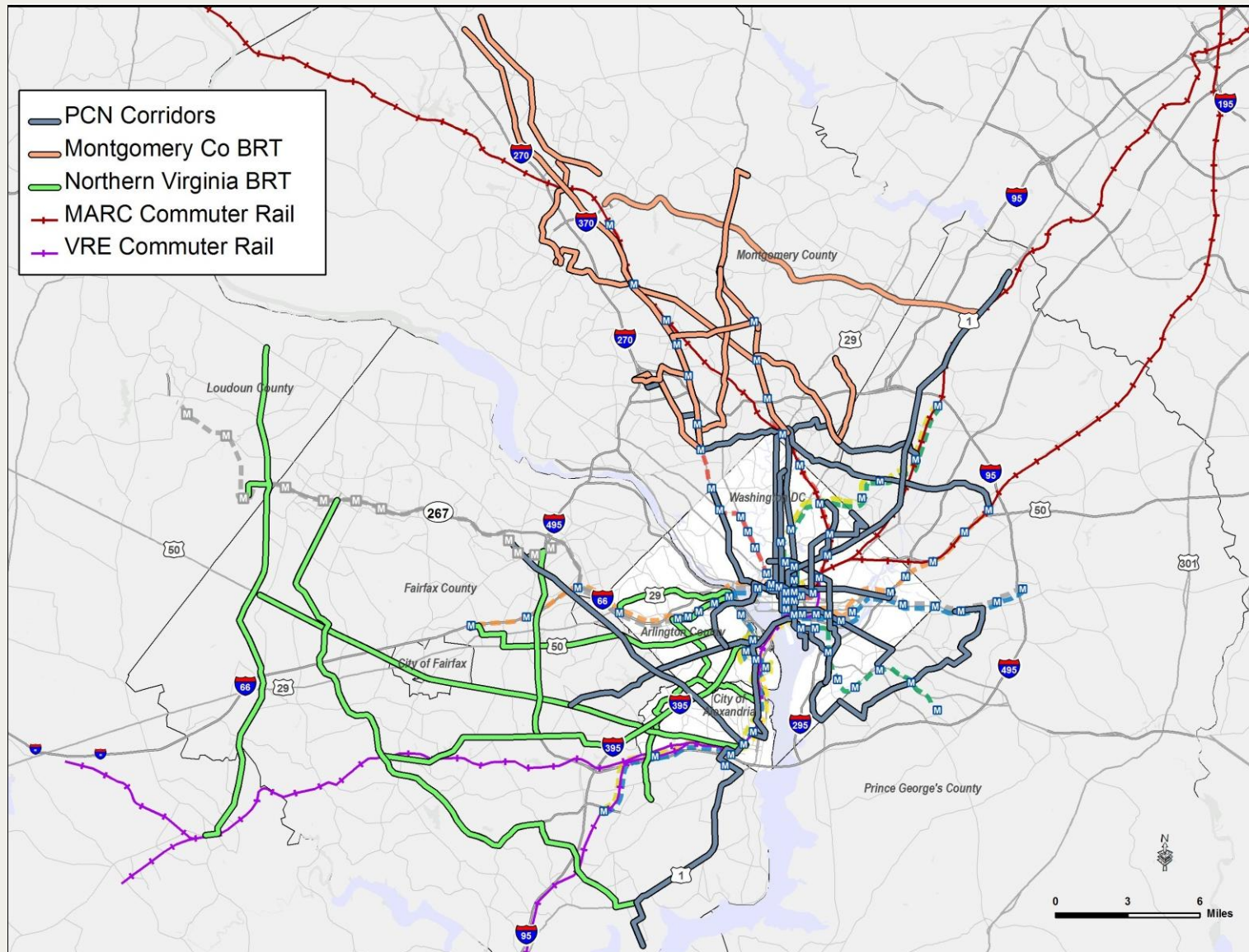
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Priority Corridor Network Plus (PCN+)

- Improve the PCN network strategy by implementing the following:
 - Add Montgomery County BRT networks
 - Typical headway: 10 minute peak, 15 minute off-peak
 - Average Speed: 18.2 miles/hour
 - Add Northern Virginia BRT networks
 - Typical headway: 5-15 minutes peak, 10-30 minutes off-peak
 - Average Speed: 20.0 miles/hour
 - Extend select PCN routes to core and to new markets
 - Interline existing PCN routes where possible
 - Identify PCN corridors with opportunity for:
 - Express BRT
 - Off-Board Fare Collection
 - Commuter Rail Enhancements:
 - MARC to Crystal City
 - VRE to Haymarket
 - Bi-directional and off-peak service
- Refer to Appendix A for details about PCN plus routes

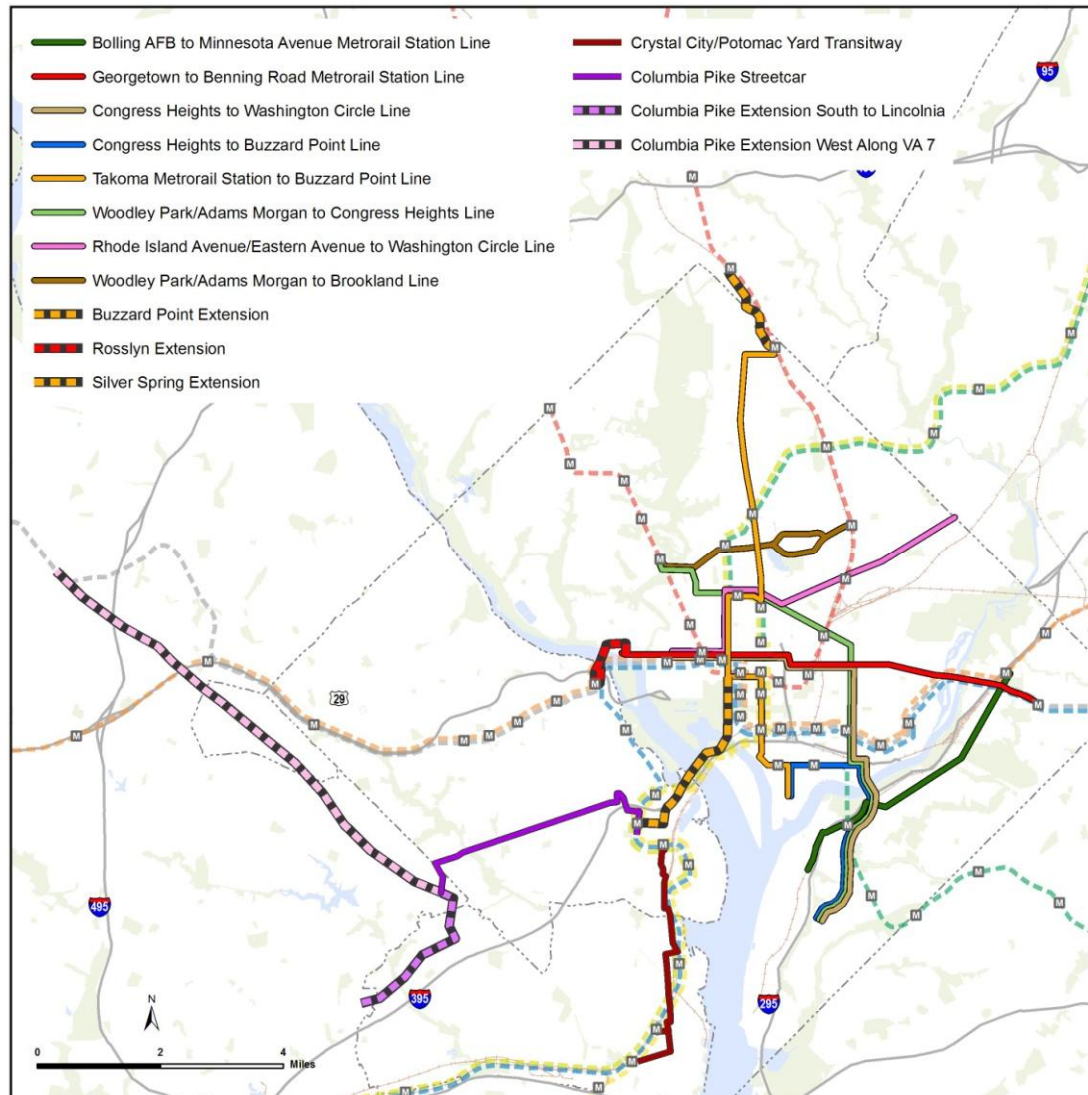
Priority Corridor Network Plus (PCN+)



Streetcar Network

- DC Streetcar:
 - Remainder of 37-mile network
 - DC Streetcar Extensions:
 - From SW to Pentagon City
 - Georgetown to Rosslyn
 - Georgia Avenue to Silver Spring
 - 10 minute all day service
- Columbia Pike Streetcar Extensions:
 - From Skyline west along VA7
 - From Skyline south to Lincolnia
 - 6 minute peak, 12 minute off-peak service on extensions
- Crystal City/Potomac Yard Transitway Extensions:
 - From Braddock Road Metro to King Street
 - 6 minute peak, 12 minute off-peak service
- Streetcar Average Speed: 13.9 miles/hour

Streetcar Network



Light Rail Expansion

Purple Line

- Extended from New Carrollton to King Street Metro
- Connects to Metrorail stations at:
 - Largo
 - Branch Avenue
 - King Street
- PNR lots located at:
 - Ritchie
 - Marlboro/Sansbury
 - Darcy/Westphalia
 - St. Barnabas/Beltway
- 6 minute peak and 10 minute off-peak headway
- Average Speed: 18.2 mph

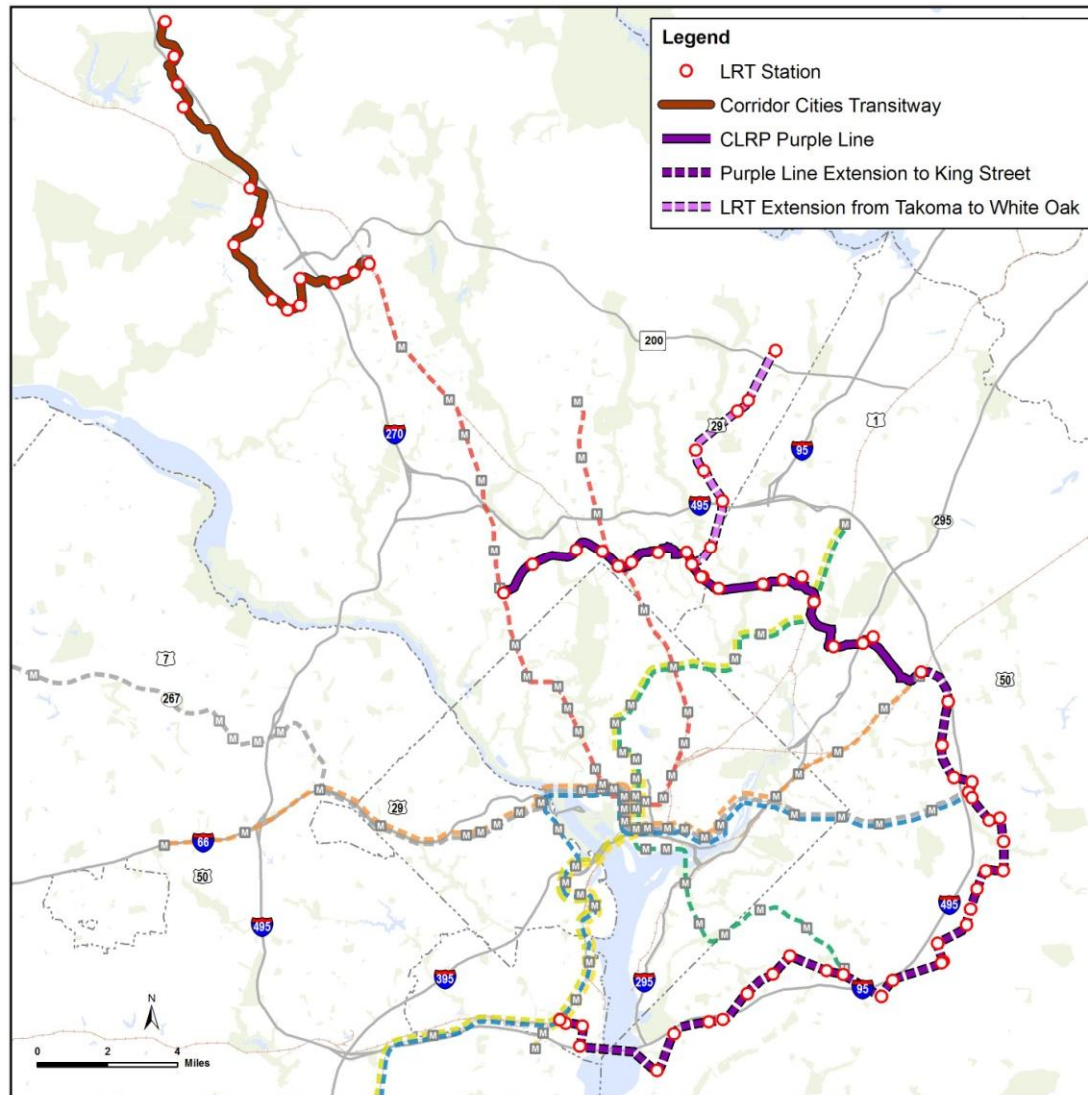
LRT Spur

- Purple Line Spur from Takoma Langley Transit Center to White Oak
- LRT Stations at:
 - Piney Branch
 - Beltway and 650
 - FDA North
 - White Oak/Columbia Pike
 - FDA East
 - Cherry Hill Road
 - Briggs Chaney (PNR)
- 6 minute peak and 12 minute off-peak headway
- Average speed: 22.4 mph

CCT

- Revised alignment to include stations at:
 - Life Science Center Belward
 - Life Science Center West
 - Life Science Center Central
 - Crown Farm
- PNR lots added at:
 - COMSAT
 - Germantown
- 6 minute peak and 12 minute off-peak headway
- Average Speed: 20.5 mph

Light Rail Expansion



IMPACT ON RIDERSHIP AND CAPACITY

SET 1: ENHANCED SURFACE TRANSIT



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Year 2040 Linked Transit Trips

Summary of Weekday Transit Share by 4 Districts: 2040

		2040 Base (Max CLRP)	Priority Corridor Network (Round 2)	Priority Corridor Network + (Round 4)	Streetcar Network (Round 4)	LRT Expansion (Round 4)
Attraction Location	Core (DC/Arl CBD)	70.7%	72.3%	73.8%	72.5%	70.9%
	Central Jurisdictions Outside Core	9.5%	9.9%	10.3%	10.0%	9.6%
	Inner Suburbs	2.1%	2.2%	2.3%	2.1%	2.2%
	Outer Suburbs	0.0%	0.0%	0.0%	0.0%	0.0%
	Region-wide	4.4%	4.6%	4.7%	4.5%	4.5%

Summary of Weekday Transit Linked Trips by 4 Districts: 2040

		2040 Base (Max CLRP)	Priority Corridor Network (Round 2)	Priority Corridor Network + (Round 4)	Streetcar Network (Round 4)	LRT Expansion (Round 4)
Attraction Location	Core (DC/Arl CBD)	754,000	764,000	773,000	765,000	755,000
	Central Jurisdictions Outside Core	322,000	335,000	346,000	336,000	324,000
	Inner Suburbs	277,000	294,000	304,000	281,000	289,000
	Outer Suburbs	4,000	4,000	4,000	4,000	4,000
	Region-wide	1,357,000	1,397,000	1,427,000	1,386,000	1,372,000
	Percent growth vs. 2040 Max CLRP		2.9%	5.2%	2.1%	1.1%

Year 2040 Transit Boardings

Summary of Weekday Transit Boardings by Mode: 2040

	2040 Base (Max CLRP)	Priority Corridor Network (Round 2)	Priority Corridor Network + (Round 4)	Streetcar Network (Round 4)	LRT Expansion (Round 4)
Metrorail (Fare gate to fare gate)	1,054,000	1,039,000	1,027,000	1,029,000	1,058,000
Commuter Rail	51,000	49,000	60,000	51,000	52,000
Light Rail	37,000	27,000	28,000	37,000	93,000
Streetcar/BRT/Rapid Bus	29,000	244,000	345,000	215,000	19,000
Metrobus	554,000	450,000	414,000	449,000	544,000
Other Bus	193,000	181,000	159,000	190,000	187,000
Total Transit Boardings	1,918,000	1,990,000	2,033,000	1,971,000	1,953,000
% Growth vs. 2040 Max CLRP		3.8%	6.0%	2.8%	1.8%

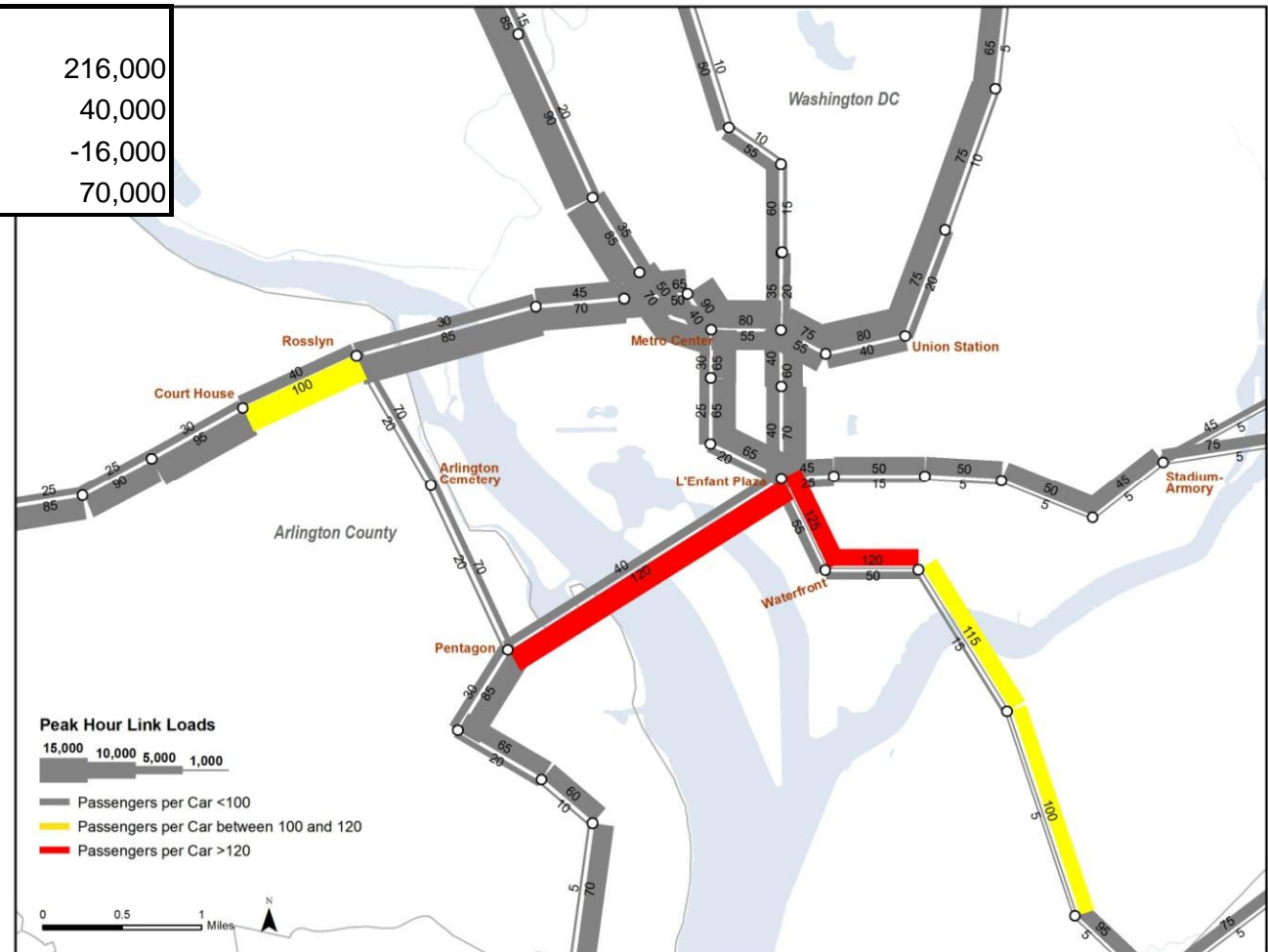
Metrorail Boardings by Line (2040)

		2040 Base (Max CLRP)	Priority Corridor Network (Round 2)	Priority Corridor Network + (Round 4)	Streetcar Network (Round 4)	LRT Expansion (Round 4)
Red	Shady Grove - Glenmont	466,000	458,400	449,100	455,300	469,400
Yellow 1	Huntington - Mount Vernon Square	126,300	128,300	129,400	123,500	129,400
Yellow 2	Franconia - Greenbelt (Yellow Track)	53,500	52,500	52,500	52,700	54,600
Green1	Greenbelt - Branch Avenue	199,600	192,600	183,900	189,500	194,800
Blue 1	Franconia - Largo Town Center	164,800	160,900	159,700	159,400	162,800
Orange 1	Vienna - New Carrollton	202,100	199,100	193,500	197,300	207,600
Silver 1	VA 772 / Dulles North - Stadium Armory	142,200	139,700	140,800	137,900	142,200
Silver 2	Dulles - Largo Town Center	60,200	58,700	58,500	58,800	58,600
Grand Total		1,414,700	1,390,200	1,367,400	1,374,400	1,419,400

Priority Corridor Network (PCN): 2040 Peak Hour Link Loads and Key Statistics (Round 2)

Daily Volumes

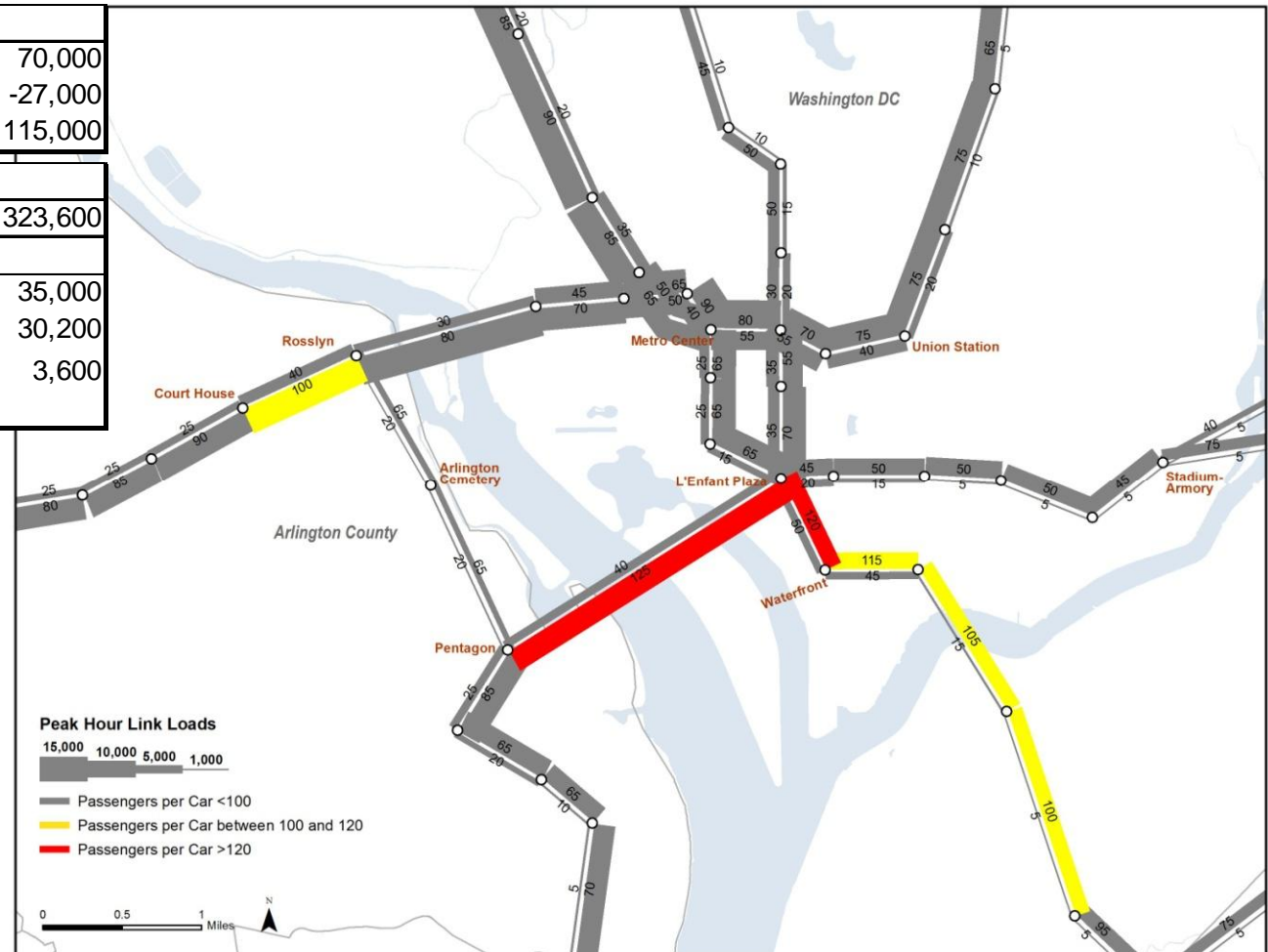
Total ridership on PCN Routes	216,000
Change in linked transit trips vs. Max CLRP	40,000
Change in Metrorail trips vs. Max CLRP	-16,000
Change in transit boardings vs. Max CLRP	70,000



Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

Priority Corridor Network Plus (PCN+): 2040 Peak Hour Link Loads and Key Statistics (Round 4)

Change vs. Max CLRP	
Change in linked transit trips vs. Max CLRP	70,000
Change in Metrorail trips vs. Max CLRP	-27,000
Change in transit boardings vs. Max CLRP	115,000
2040 Weekday Boardings	
BRT/Priority Corridor Routes	323,600
Commuter Rail:	
VRE	35,000
MARC	30,200
MARC boardings at L'Enfant and Crystal City	3,600
New off-peak Commuter rail attracts 5,500 patrons	



Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

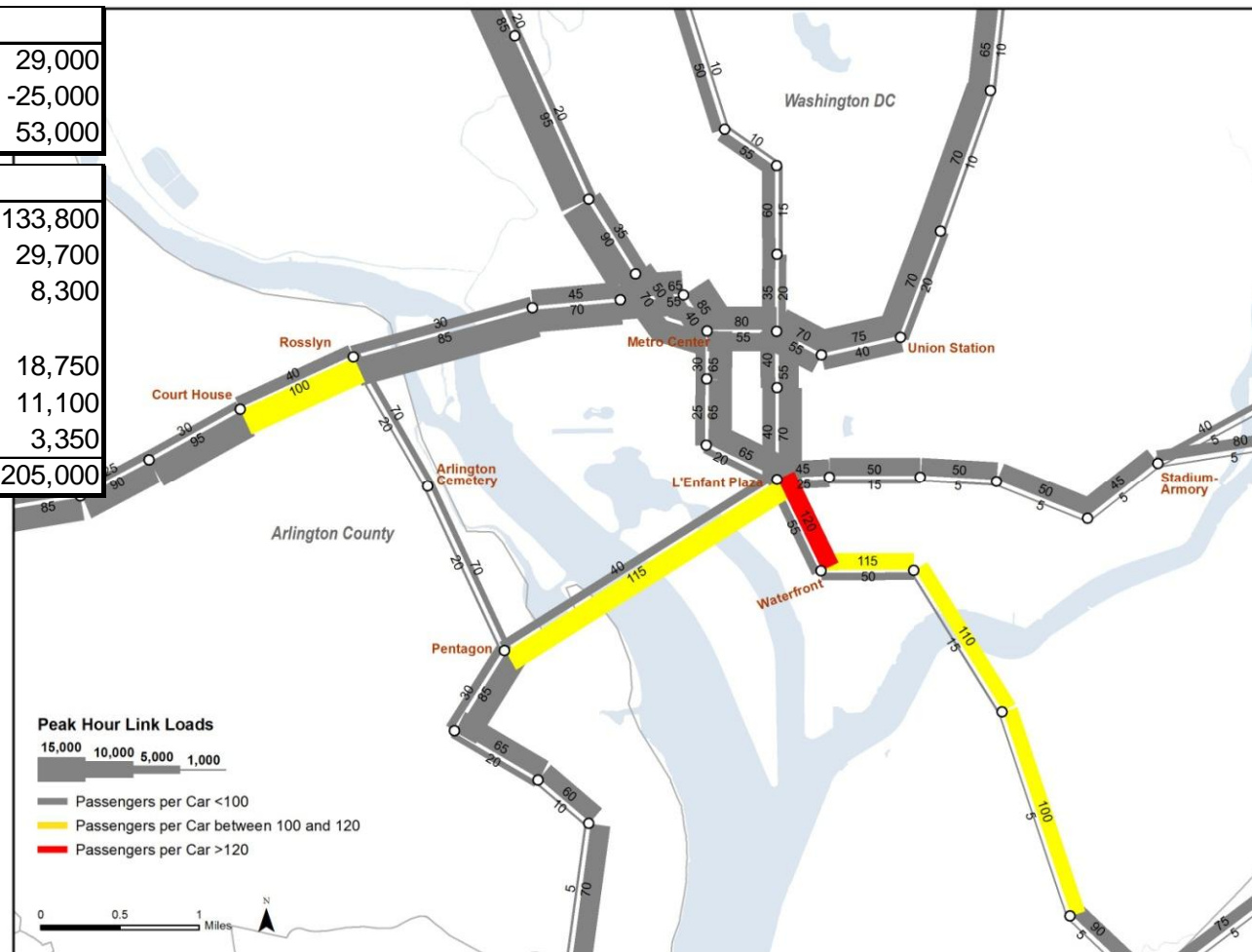
Streetcar System

- 2040 Weekday Boardings:
 - DC Streetcar:
 - 37 Mile Network: 133,800
 - DC Streetcar extensions: 29,700
 - From SW to Pentagon City: 13,450
 - Georgetown to Rosslyn: 12,700
 - Takoma to Silver Spring: 3,550
 - Columbia Pike Streetcar:
 - Tysons - Pentagon City: 18,750
 - Lincolnia - Pentagon City: 11,100
 - Tysons - Lincolnia (peak only): 3,350
 - Crystal City/Potomac Yard Transitway: 8,300 vs. 6,050 in Max CLRP

Streetcar Network:

2040 Peak Hour Link Loads and Key Statistics

Change vs. Max CLRP	
Change in linked transit trips vs. Max CLRP	29,000
Change in Metrorail trips vs. Max CLRP	-25,000
Change in transit boardings vs. Max CLRP	53,000
2040 Weekday Boardings	
DC Streetcar (37 mile network)	133,800
DC Streetcar Extensions	29,700
Crystal City/Potomac Yard	8,300
Columbia Pike Streetcar	
Tysons - Pentagon City	18,750
Lincolnia - Pentagon City	11,100
Tysons - Lincolnia (peak only)	3,350
Total	205,000

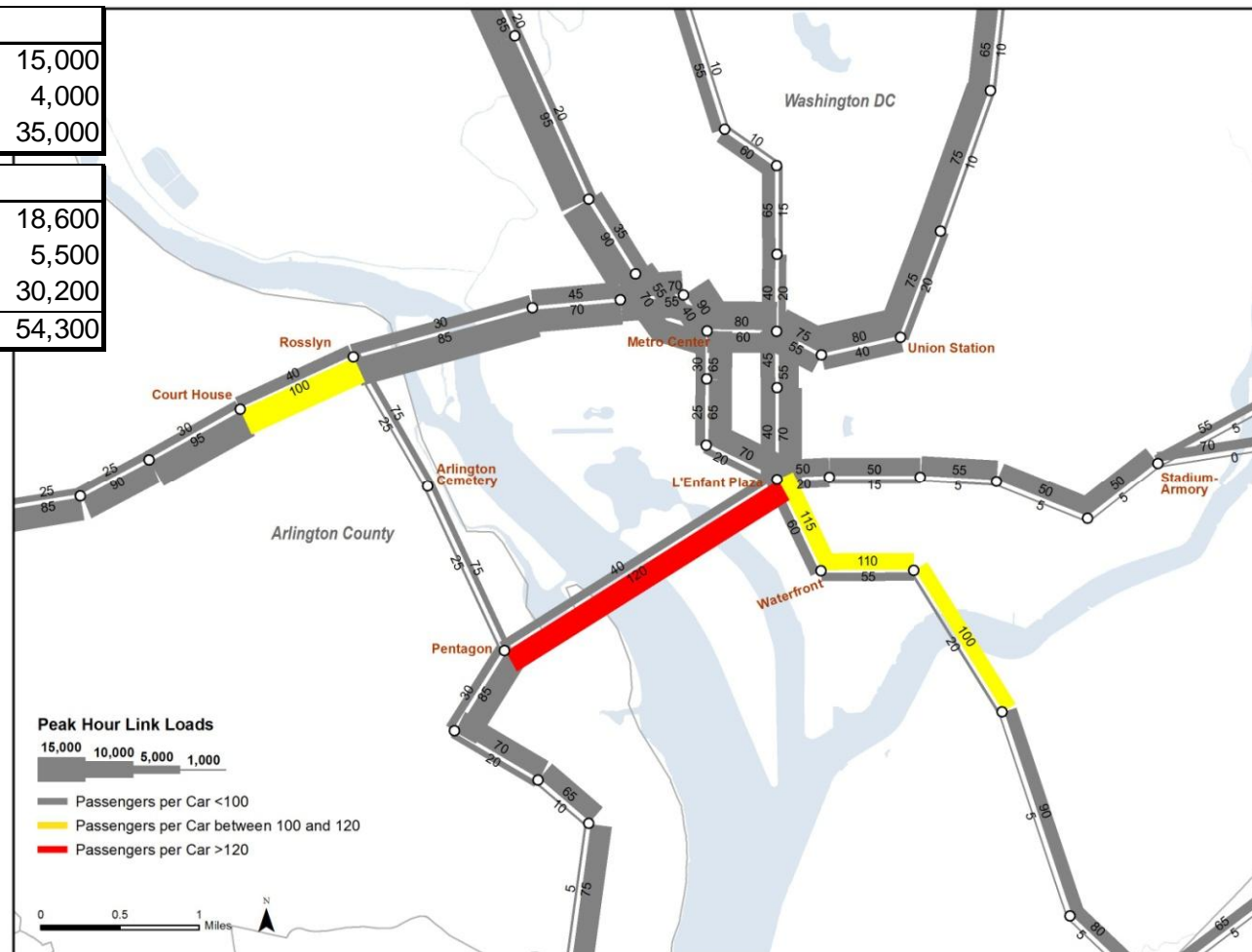


Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

Light Rail Expansion:

2040 Peak Hour Link Loads and Key Statistics

Change vs. Max CLRP	
Change in linked transit trips vs. Max CLRP	15,000
Change in Metrorail trips vs. Max CLRP	4,000
Change in transit boardings vs. Max CLRP	35,000
Project Ridership	
Purple Line Extension	18,600
Purple Line Spur	5,500
Corridor Cities Transitway LRT	30,200
Total	54,300



Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

PRELIMINARY EVALUATION

SET 1: ENHANCED SURFACE TRANSIT



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Key Findings: PCN Plus

- Improves transit coverage and access to regional activity centers resulting in improved transit share and access to jobs
- Metrorail Core Capacity:
 - Reduces peak loads on all lines except Yellow
 - Increases crowding on Yellow line due to significant increase in service from Virginia to Pentagon
 - Limited relief to parking overflow at Metrorail stations
- Commuter Rail:
 - Modest demand for new reverse peak/outbound Commuter rail service
 - Commuter rail loses 5,000 patrons to new BRT/PCN routes

Key Findings: Streetcar Network

- Streetcar is intended to serve a primarily local market so has a lesser impact to the regional network than other strategies do
- Provides some relief to crowding on Green Line
- Modest relief to core capacity on other lines
 - Peak Metrorail flows reduce on lines with spare capacity (North and Northeast screenlines)
 - Total Metrorail boardings decreases by 25,000
- Ridership shifts are limited by capacity of streetcar lines (~600 passengers per hour versus upwards of 20,000 on Metrorail)
- A more integrated streetcar system would be required to shift greater numbers of riders from Metrorail to Streetcar (e.g., DC Streetcar interlined with Columbia Pike and Crystal City/Potomac Yard line without any need for transfer)

Key Findings: Light Rail Expansion

- Capacity:
 - Relieves congestion on Green Line by re-distributing flows to Core on Blue/Orange/[Silver] and Blue/Yellow Lines
 - New riders from MD and VA increase loads on Yellow Line
 - Relieves parking capacity constraint on Red Line (Shady Grove), Green Line (Branch Ave.) and Blue Line (Largo)
 - Provides limited relief to core capacity

DEFINITION OF STRATEGIES

SET 2: NEW METRORAIL LINES



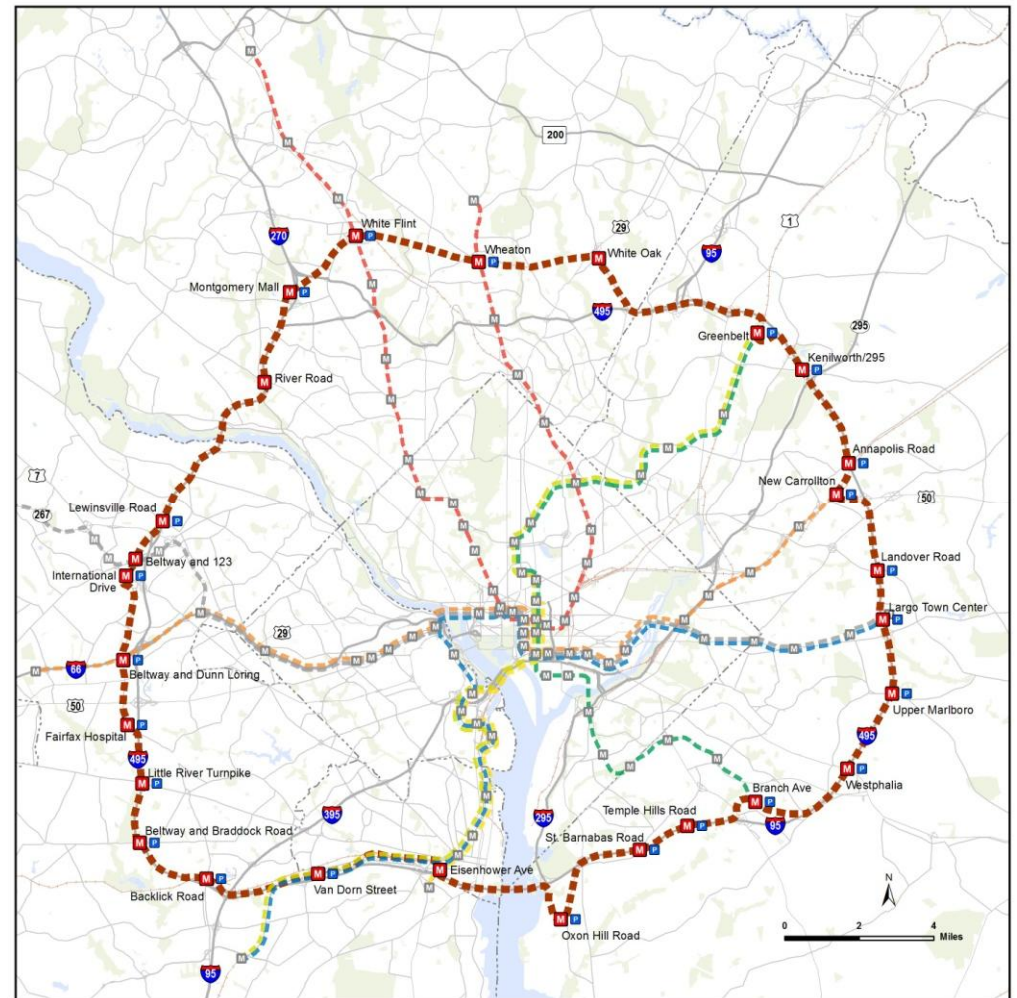
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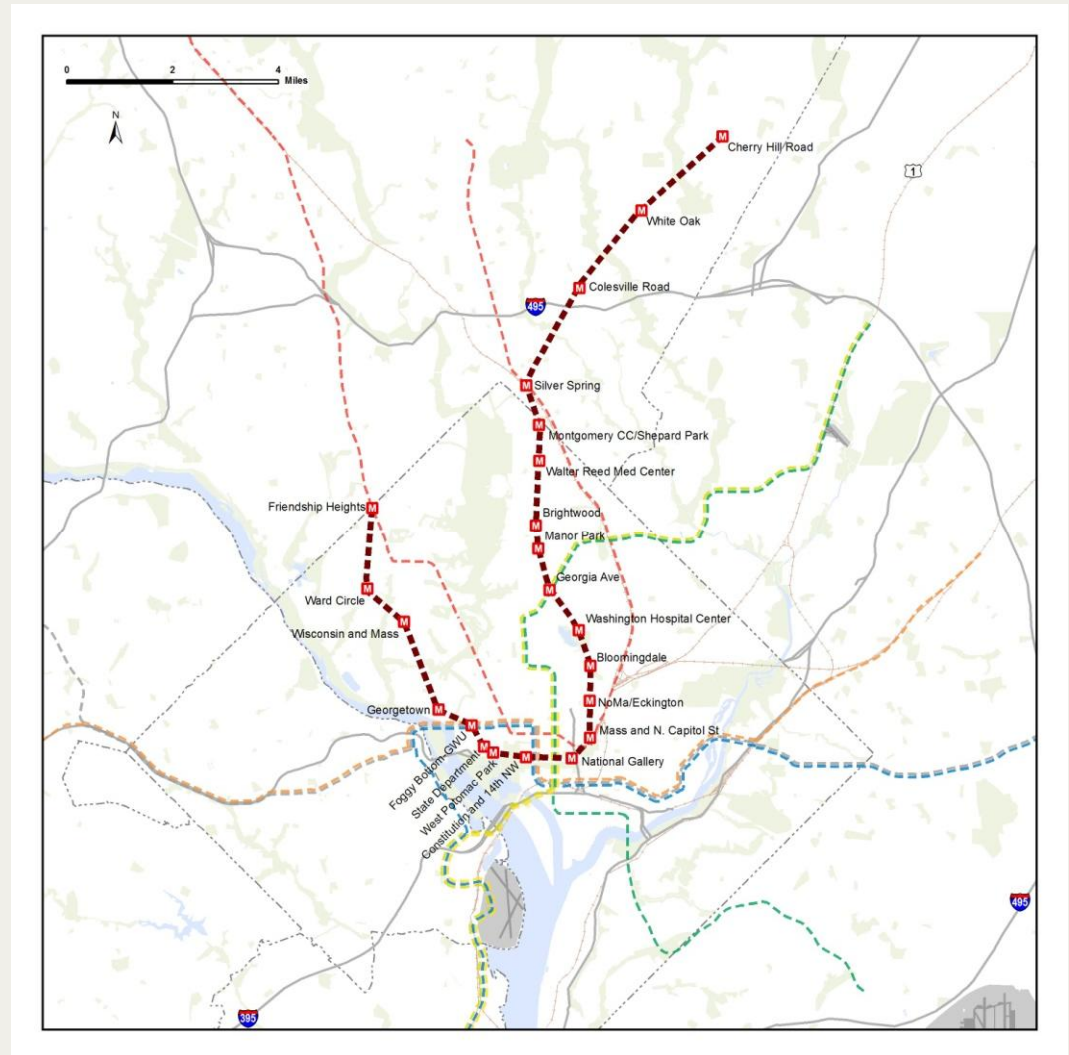
Metrorail Beltway Line

- Full loop around Capital Beltway
- Connects to existing Metrorail stations at:
 - White Flint
 - Wheaton
 - Greenbelt
 - New Carrollton
 - Largo Town Center
 - Branch Avenue
 - Van Dorn Street
- Pedestrian connection to enable connections to existing stations at:
 - Eisenhower Avenue
 - Dunn Loring - Merrifield
 - Tysons 123 Central
- 6 minute peak and 12 minute off-peak headway
- Average speed: 37.8 miles/hour



Metrorail Brown Line

- Red line spur from Friendship Heights to Cherry Hill
- Connects to existing Metrorail stations at:
 - Friendship Heights
 - Foggy Bottom
 - Federal Triangle
 - Union Station
 - Georgia Ave. - Petworth
 - Silver Spring
- New Metrorail park-and-ride at:
 - White Oak
- 6 minute peak and 12 minute off-peak headway
- Average speed: 26.2 miles/hour



IMPACT ON RIDERSHIP AND CAPACITY

SET 2: NEW METRORAIL LINES



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Year 2040 Linked Transit Trips

Summary of Weekday Transit Share by 4 Districts: 2040

		2040 Base (Max CLRP)	Metrorail Beltway Line	Metrorail Brown Line
Attraction Location	Core (DC/Arl CBD)	70.7%	71.4%	74.2%
	Central Jurisdictions Outside Core	9.5%	9.7%	9.7%
	Inner Suburbs	2.1%	2.2%	2.1%
	Outer Suburbs	0.0%	0.0%	0.0%
	Region-wide	4.4%	4.5%	4.5%

Summary of Weekday Transit Linked Trips by 4 Districts: 2040

		2040 Base (Max CLRP)	Metrorail Beltway Line	Metrorail Brown Line
Attraction Location	Core (DC/Arl CBD)	754,000	758,000	775,000
	Central Jurisdictions Outside Core	322,000	326,000	326,000
	Inner Suburbs	277,000	294,000	278,000
	Outer Suburbs	4,000	4,000	4,000
	Region-wide	1,357,000	1,382,000	1,383,000
Percent growth vs. 2040 Max CLRP			1.8%	1.9%

Year 2040 Transit Boardings

Summary of Weekday Transit Boardings by Mode: 2040

	2040 Base (Max CLRP)	Metrorail Beltway Line	Metrorail Brown Line
Metrorail (Fare gate to fare gate)	1,054,000	1,085,000	1,110,000
Commuter Rail	51,000	51,000	51,000
Light Rail	37,000	32,000	36,000
Streetcar/BRT/Rapid Bus	29,000	29,000	29,000
Metrobus	554,000	543,000	514,000
Other Bus	193,000	187,000	190,000
Total Transit Boardings	1,918,000	1,927,000	1,930,000
% Growth vs. 2040 Max CLRP		0.5%	0.6%

Metrorail Boardings by Line (2040)

		2040 Base (Max CLRP)	Metrorail Beltway Line	Metrorail Brown Line
Red	Shady Grove - Glenmont	466,000	473,700	464,200
Yellow 1	Huntington - Mount Vernon Square	126,300	131,000	126,400
Yellow 2	Franconia - Greenbelt (Yellow Track)	53,500	53,500	51,300
Green1	Greenbelt - Branch Avenue	199,600	196,700	194,500
Blue 1	Franconia - Largo Town Center	164,800	157,700	168,900
Orange 1	Vienna - New Carrollton	202,100	197,300	206,000
Silver 1	VA 772 / Dulles North - Stadium Armory	142,200	141,300	145,600
Silver 2	Dulles - Largo Town Center	60,200	57,700	61,100
Beltway	Metrorail Beltway Line Full Loop		115,000	0
Brown	Metrorail Brown Line			101,900
Grand Total		1,414,700	1,523,900	1,519,900

Metrail Beltway Line:

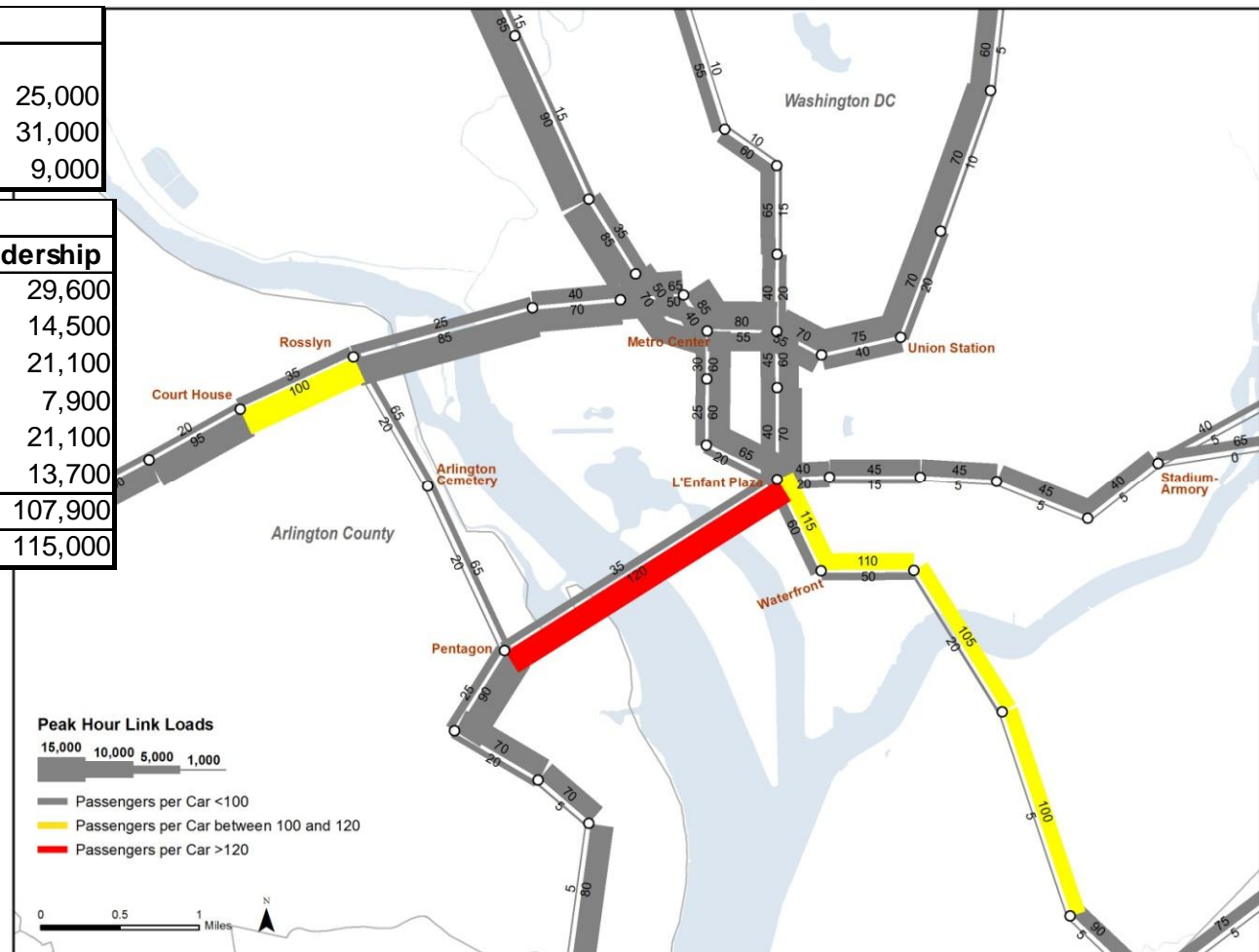
2040 Peak Hour Link Loads and Key Statistics

Change vs. Max CLRP

Change in linked transit trips vs. Max CLRP	25,000
Change in Metrorail trips vs. Max CLRP	31,000
Change in transit boardings vs. Max CLRP	9,000

Weekday Project Ridership by Segments

Segment	Length	Ridership
Branch Avenue – Eisenhower Ave.	11.3	29,600
Eisenhower Ave. – Dunn Loring	14.3	14,500
Dunn Loring – White Flint	14.7	21,100
White Flint – Wheaton	3.4	7,900
Wheaton – Largo Town Center	18.6	21,100
Largo Town Center – Branch Ave.	9.4	13,700
Total (independent segments)	71.6	107,900
Total Beltway Line	71.6	115,000

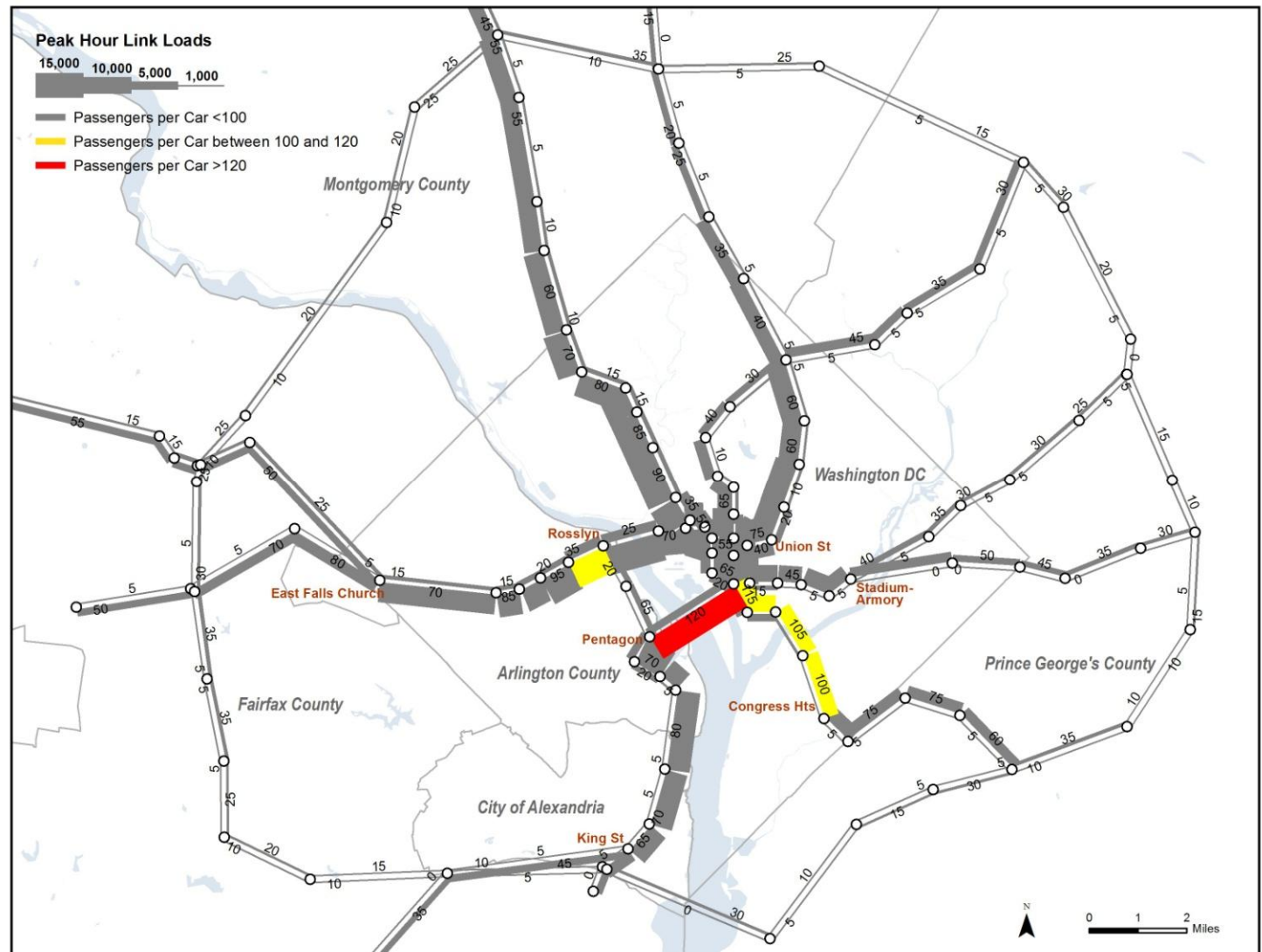


Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

Metrorail Beltway Line: 2040 Peak Hour Link Loads

Note 1: The Beltway line assumes 6-car train consist.

Note 2: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.



Metrorail Beltway Line: 2040 Parking Utilization

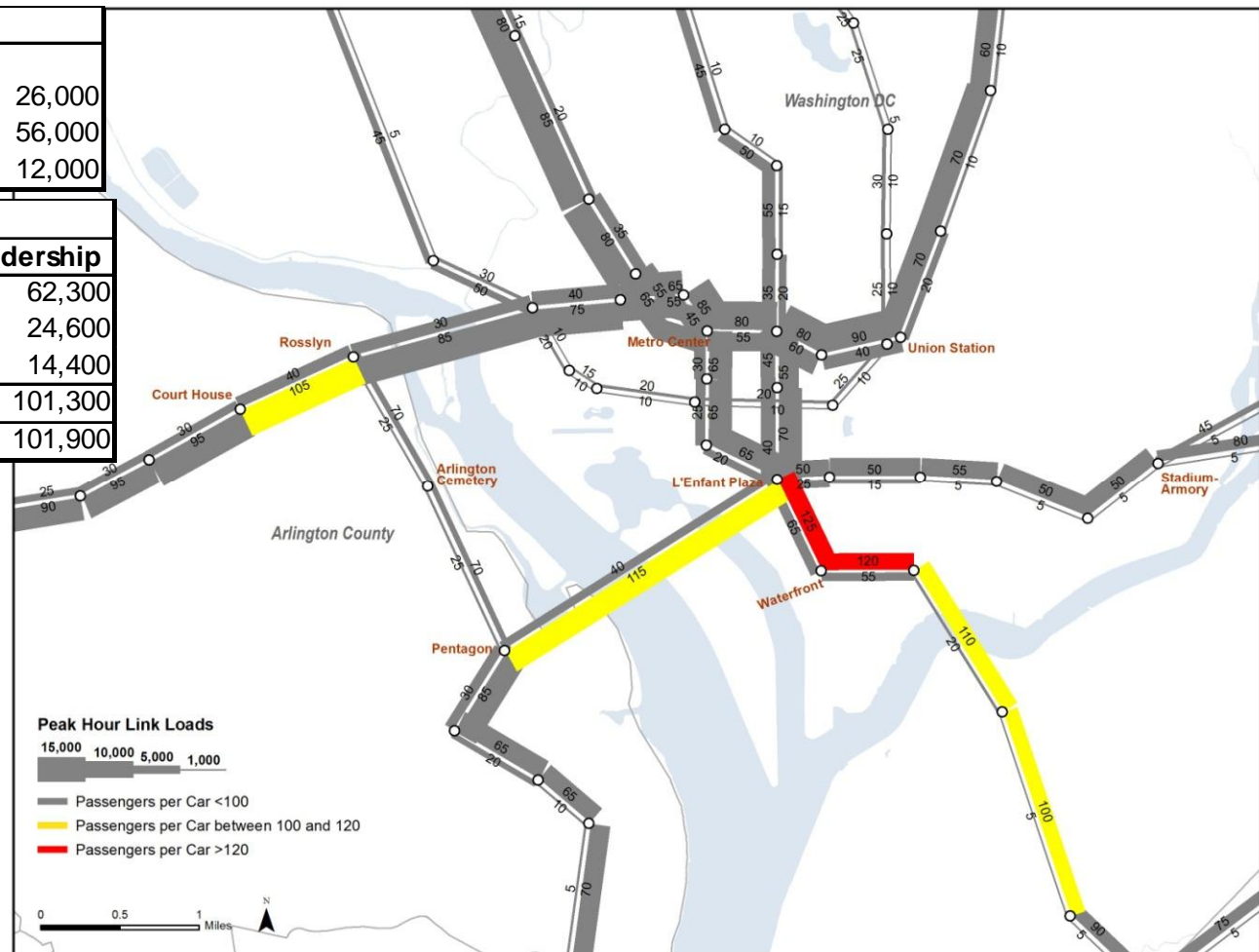
Metrorail Segment	Year 2040 Parking Lot Utilization		
	2040 Base (Max CLRP)	Metrorail Beltway Line	% Change
Red Line - Shady Grove-Grosvenor	94%	89%	-5%
Red Line - New York Ave-Takoma	112%	112%	0%
Red Line - Silver Spring-Glenmont	122%	119%	-2%
Green Line - Greenbelt-West Hyattsville	109%	88%	-20%
Green Line - Waterfront-Congress Heights	104%	77%	-26%
Green Line - Southern Avenue-Branch Avenue	128%	63%	-51%
Yellow/Blue - Fran-Springfield, Van Dorn & Huntington	123%	117%	-5%
Orange Line - Vienna/Fairfax/GMU-West Falls Church	86%	72%	-16%
Orange Line - East Falls Church-Court House	138%	137%	-1%
Orange Line - Minnesota Avenue-New Carrollton	66%	48%	-27%
Blue Line - Benning Road-Largo Town Center	136%	95%	-30%
Silver Line - Tysons East-Route 772	41%	40%	-1%
Total (Metrorail Parking Spaces in 2040 Base Max CLRP)	93%	76%	-18%
Total (Metrorail Parking Spaces in 2008 Base)	106%	85%	-19%

Metrorail Brown Line:

2040 Peak Hour Link Loads and Key Statistics

Change vs. Max CLRP	
Change in linked transit trips vs. Max CLRP	26,000
Change in Metrorail trips vs. Max CLRP	56,000
Change in transit boardings vs. Max CLRP	12,000

Weekday Project Ridership by Segments		
Segment	Length	Ridership
Friendship Heights to Union Station	8.2	62,300
Union Station to Silver Spring	7.5	24,600
Silver Spring to Cherry Hill	6.2	14,400
Total (independent segments)	21.9	101,300
Total Brown Line	21.9	101,900



Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

PRELIMINARY EVALUATION

SET 2: NEW METRORAIL LINES



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Key Findings: Metrorail Beltway Line

- Reduces transfer activity at key transfer stations
- Provides improved access to regional activity centers and jobs
- Provides alternate Metrorail paths by connecting all radial lines outside the core
- Reduces peak flow into DC core on all lines except on Yellow Line from south
 - Additional load on Yellow Line worsens peak crowding on Yellow Line
- Provides significant parking capacity relief to all Metrorail stations outside the beltway

Key Findings: Metrorail Brown Line

- No significant improvement to core capacity and parking sufficiency issue
- Marginal improvement to transit share and access to regional jobs
- Potential for significant optimization by realigning and/or increasing frequency
- Most of the ridership is derived from existing bus corridors

DEFINITION OF STRATEGIES

SET 3: METRORAIL ENHANCEMENTS

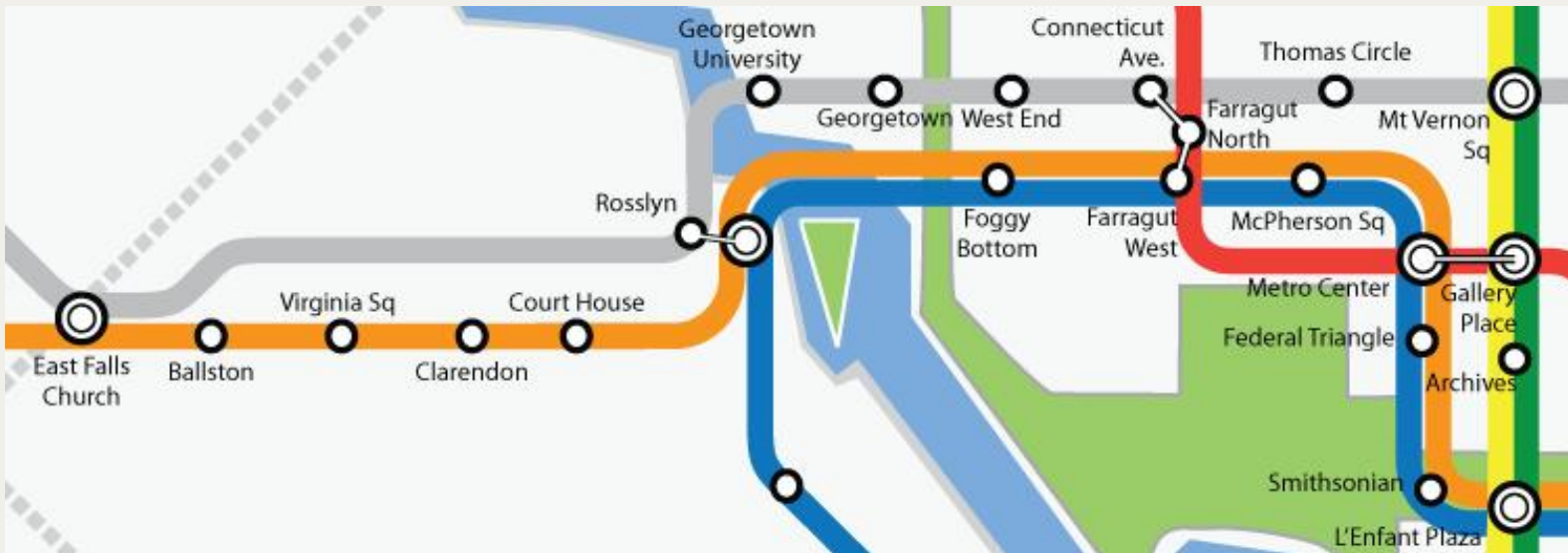


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Relocated Silver Line with Rosslyn-Ballston Bypass



- Silver Line continues on I-66 until Rosslyn
- Operates as express service between East Falls Church and Rosslyn
- Travel time between EFC and Rosslyn reduces from 12.5 minutes to 7 minutes on Silver Line
- Follows relocated Blue Line's M Street and New Jersey Ave. alignment and re-joins Blue/Orange Line at Benning Rd./Minnesota Ave.
- Improved peak service on Blue/Orange/Yellow/Green Lines

Operating Plan				
	Base (Max CLRP)		New Silver (M/NJ)	
	Peak	Off-Peak	Peak	Off-Peak
Red	2.5	6.0	2.5	6.0
Orange	6.0	12.0	4.0	12.0
Silver	6.0	12.0	5.5	12.0
Blue	10.0	12.0	6.0	12.0
Yellow 1	6.0	12.0	5.5	12.0
Yellow 2	12.0	-----	-----	-----
Green	5.5	12.0	4.0	12.0

Silver (Base): VA 772/Dulles Greenway - Largo

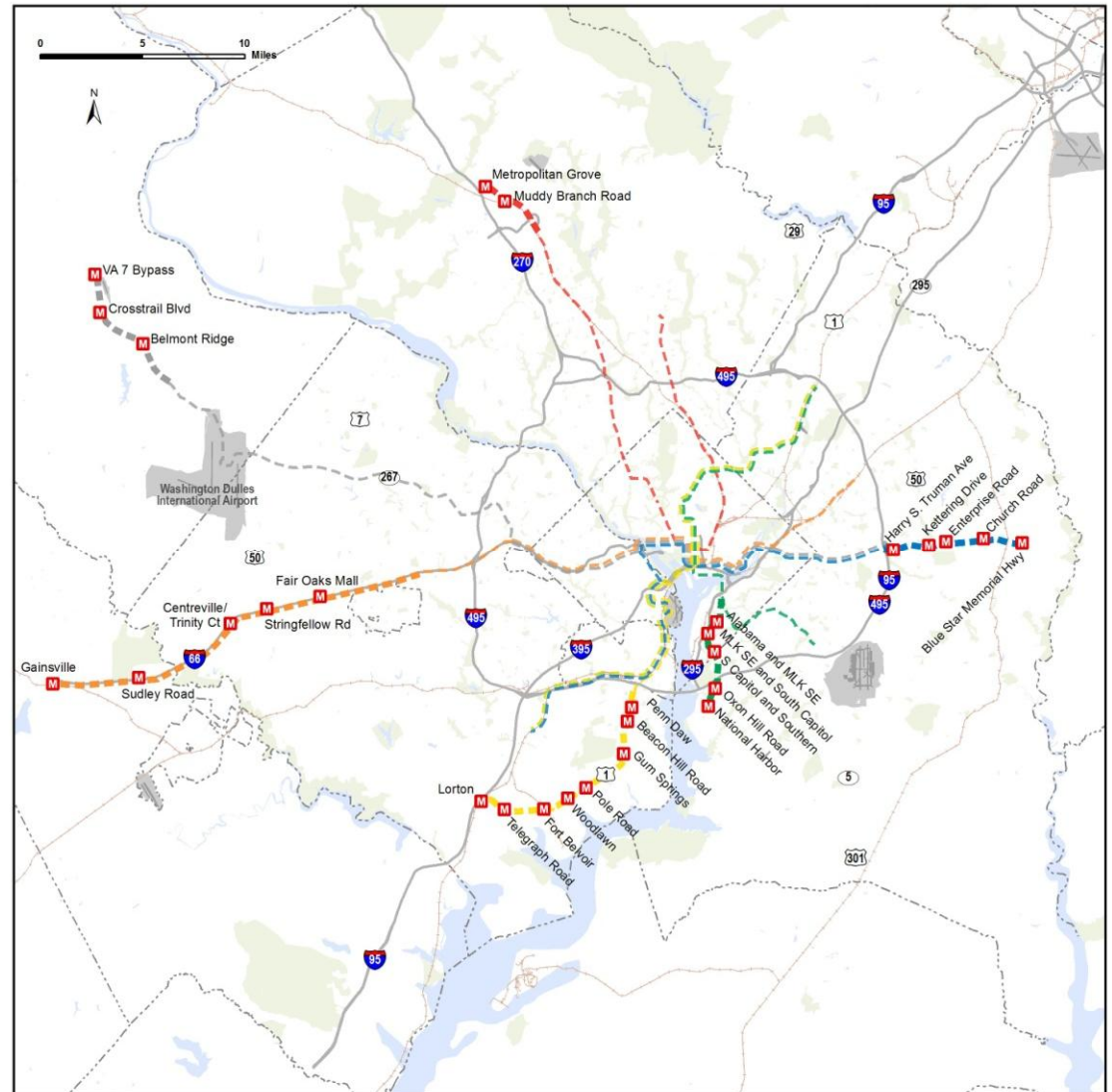
Silver (New Silver M/NJ): VA 772/Dulles Greenway - Largo via M St/NJ Ave (RB Bypass)

Metro Extensions - Run B

Extensions:

- Vienna/Fairfax-GMU to Gainesville (Orange)
- VA-772/Dulles Greenway to Leesburg (Silver)
- Shady Grove to Metropolitan Grove (Red)
- Largo Town Center to Bowie (Blue)
- Green Line spur from Congress Heights to National Harbor
- Huntington to Lorton via US-1 (Yellow)

Service Plan: same as
Max CLRP (Base
Case)



IMPACT ON RIDERSHIP AND CAPACITY

SET 3: METRORAIL ENHANCEMENTS



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Year 2040 Linked Transit Trips

Summary of Weekday Transit Share by 4 Districts: 2040

		2040 Base (Max CLRP)	Relocated E- W Blue Line (Round 2)	Silver Line Rosslyn- Ballston Bypass (Round 4)	Metrorail Extension A (Round 3)	Metrorail Extension B (Round 4)
Attraction Location	Core (DC/Arl CBD)	70.7%	74.8%	74.3%	75.0%	72.7%
	Central Jurisdictions Outside Core	9.5%	9.7%	9.7%	10.0%	9.8%
	Inner Suburbs	2.1%	2.1%	2.1%	2.2%	2.2%
	Outer Suburbs	0.0%	0.0%	0.0%	0.0%	0.0%
	Region-wide	4.4%	4.5%	4.5%	4.6%	4.6%

Summary of Weekday Transit Linked Trips by 4 Districts: 2040

		2040 Base (Max CLRP)	Relocated E- W Blue Line (Round 2)	Silver Line Rosslyn- Ballston Bypass (Round 4)	Metrorail Extension A (Round 3)	Metrorail Extension B (Round 4)
Attraction Location	Core (DC/Arl CBD)	754,000	779,000	776,000	779,000	766,000
	Central Jurisdictions Outside Core	322,000	328,000	326,000	337,000	330,000
	Inner Suburbs	277,000	278,000	278,000	287,000	293,000
	Outer Suburbs	4,000	4,000	4,000	4,000	4,000
	Region-wide	1,357,000	1,389,000	1,384,000	1,407,000	1,393,000
Percent growth vs. 2040 Max CLRP			2.4%	2.0%	3.7%	2.7%

Year 2040 Transit Boardings

Summary of Weekday Transit Boardings by Mode: 2040

	2040 Base (Max CLRP)	Relocated E- W Blue Line (Round 2)	Silver Line Rosslyn- Ballston Bypass (Round 4)	Metrorail Extension A (Round 3)	Metrorail Extension B (Round 4)
Metrorail (Fare gate to fare gate)	1,054,000	1,109,000	1,101,000	1,127,000	1,098,000
Commuter Rail	51,000	50,000	51,000	34,000	44,000
Light Rail	37,000	37,000	36,000	36,000	36,000
Streetcar/BRT/Rapid Bus	29,000	29,000	30,000	29,000	27,000
Metrobus	554,000	534,000	533,000	535,000	540,000
Other Bus	193,000	192,000	192,000	173,000	175,000
Total Transit Boardings	1,918,000	1,951,000	1,943,000	1,934,000	1,920,000
% Growth vs. 2040 Max CLRP		1.7%	1.3%	0.8%	0.1%

Metrorail Boardings by Line (2040)

		2040 Base (Max CLRP)	Relocated E- W Blue Line (Round 2)	Silver Line Rosslyn- Ballston Bypass (Round 4)	Metrorail Extension A (Round 3)	Metrorail Extension B (Round 4)
Red	Shady Grove - Glenmont	466,000	455,900	461,300	471,700	477,400
Yellow 1	Huntington - Mount Vernon Square	126,300	123,500	128,300	127,700	150,100
Yellow 2	Franconia - Greenbelt (Yellow Track)	53,500	0	0	49,100	49,500
Green1	Greenbelt - Branch Avenue	199,600	222,700	226,900	243,700	203,000
Green2	Congress Heights - National Harbor					23,000
Blue 1	Franconia - Largo Town Center	164,800	247,800	226,800	194,200	165,400
Orange 1	Vienna - New Carrollton	202,100	236,600	272,700	244,300	229,400
Silver 1	VA 772 / Dulles North - Stadium Armory	142,200	126,400	106,500	141,500	146,800
Silver 2	Dulles - Largo Town Center	60,200	55,100	49,500	56,800	56,300
Grand Total		1,414,700	1,468,000	1,472,000	1,529,000	1,500,900

Note: Metrorail Boardings by Line includes extensions (Ext A and B) if any.

Relocated Silver Line with RB Bypass

- Faster trip on Silver Line results in 3,200 new Metrorail attractions:
 - 1,000 to Core
 - 1,700 to destinations on Silver Line west of EFC
 - 250 to destinations on Blue line south of Rosslyn
 - 250 to rest of the region
- Reduced service between Ballston and Courthouse results in 8,200 fewer Metrorail boardings

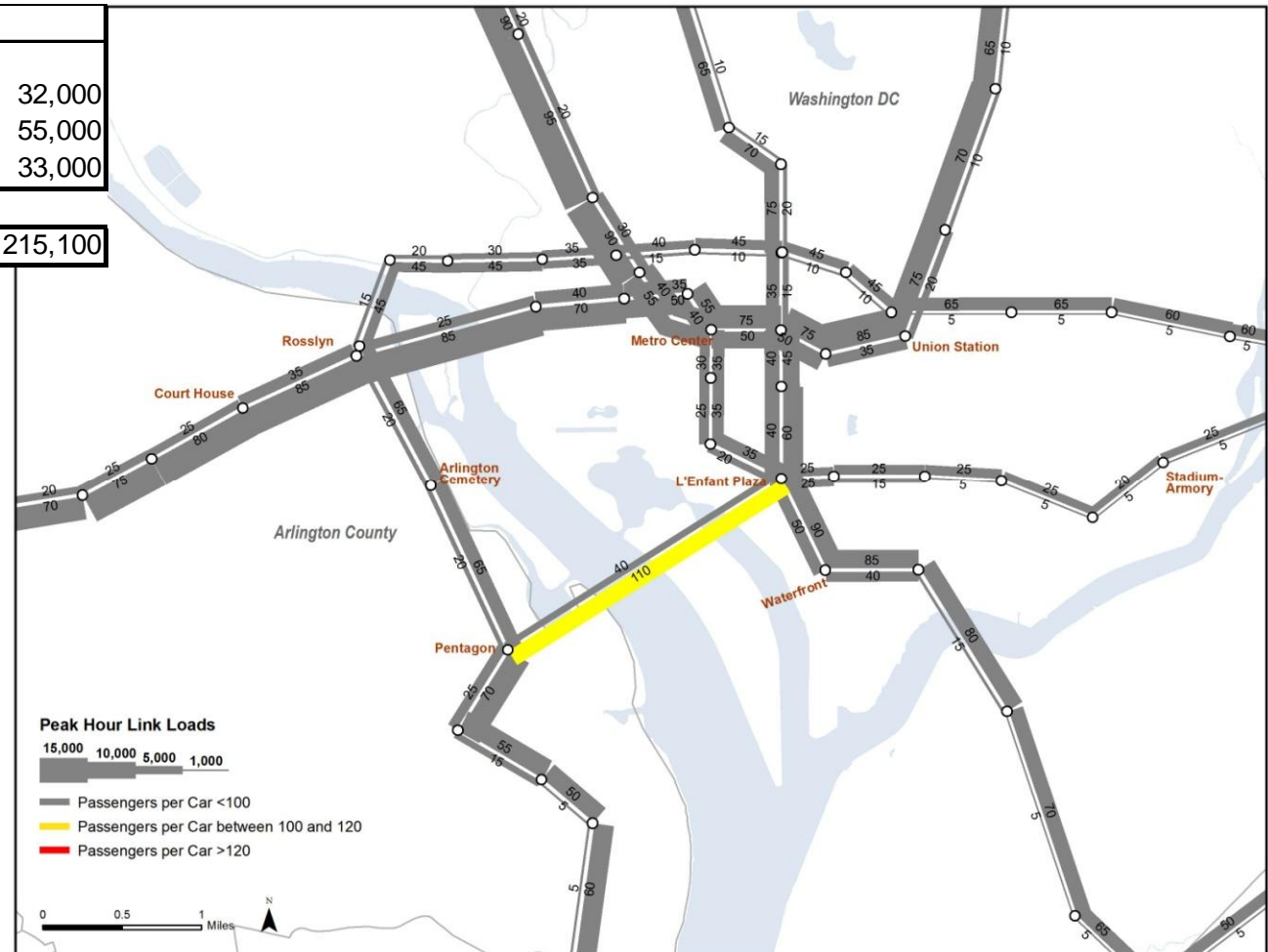
Daily Weekday Boardings		
New Metrorail Stations	New Blue (M St and NJ Ave., NW) - Round 2	New Silver (M St and NJ Ave., NW) - Round 4
Rosslyn II	7,020	2,820
Georgetown University	2,340	2,160
Georgetown (31st & M St, NW)	14,850	13,790
West End (23rd & M St NW)	11,230	5,140
Conn. & M Streets, NW	18,360	6,770
Thomas Cir (14 & M St NW)	7,740	2,470
Mt Vernon Square II	5,880	4,630
NoMa (NJ and L, NW)	1,280	570
Union Station II	16,930	10,580
8th & H Streets, NE	1,640	1,270
Atlas Dist MD & Benn RdNE	4,080	3,630
Langston Dwellings	2,670	2,550
Benn Road & Minn Ave. NE	2,270	4,930
Total	96,290	61,310

New E-W Blue Line via M St and New Jersey Ave NW: 2040 Peak Hour Link Loads and Daily Ridership on Key Facilities (Round 2)

Change vs. Max CLRP

Change in linked transit trips vs. Max CLRP	32,000
Change in Metrorail trips vs. Max CLRP	55,000
Change in transit boardings vs. Max CLRP	33,000

New E-W Blue Line Project Ridership	215,100
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Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

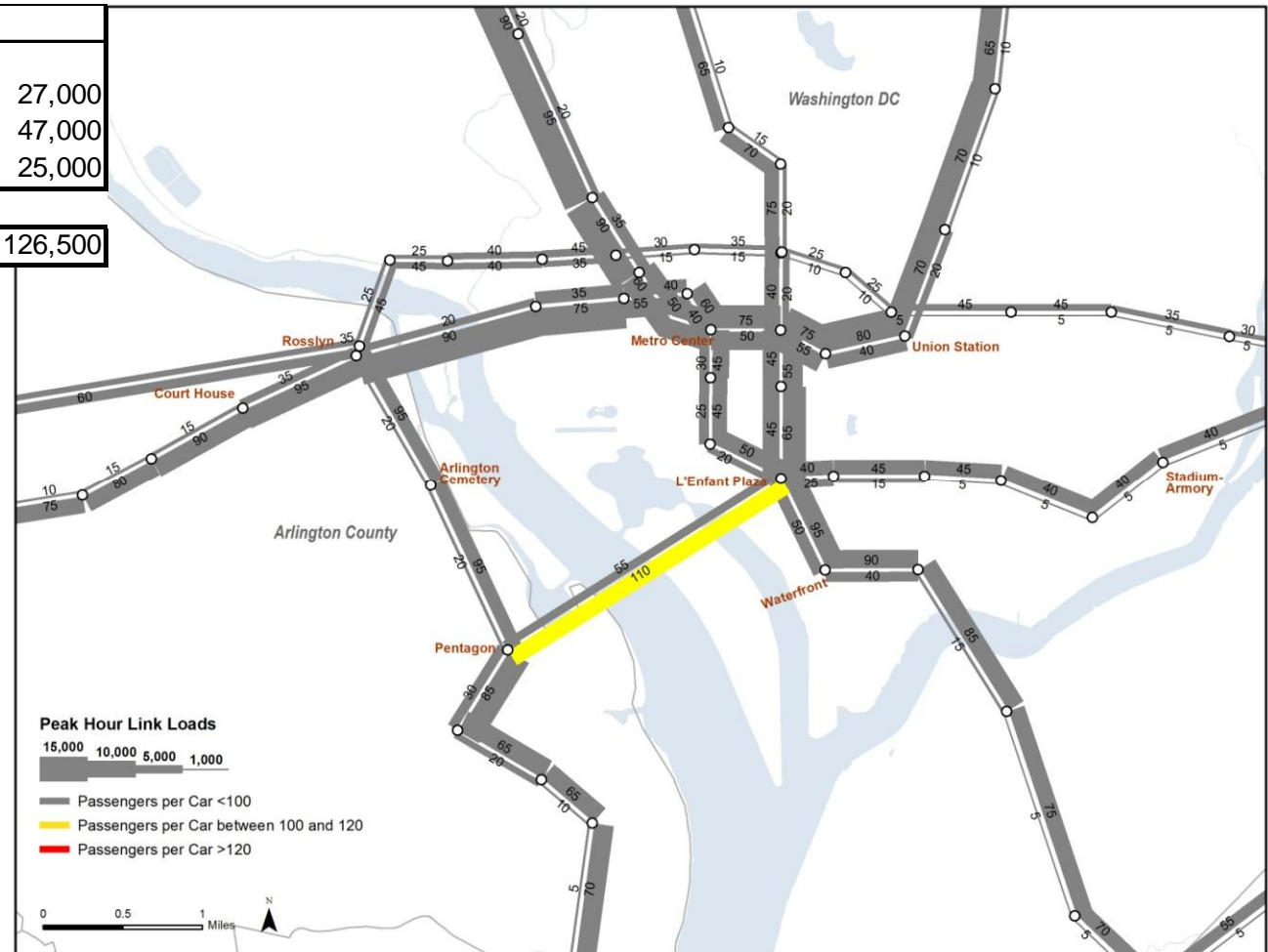
Relocated Silver Line with RB Bypass :

2040 Peak Hour Link Loads and Daily Ridership on Key Facilities (Round 4)

Change vs. Max CLRP

Change in linked transit trips vs. Max CLRP	27,000
Change in Metrorail trips vs. Max CLRP	47,000
Change in transit boardings vs. Max CLRP	25,000

Silver Line RB Bypass Project Ridership 126,500



Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

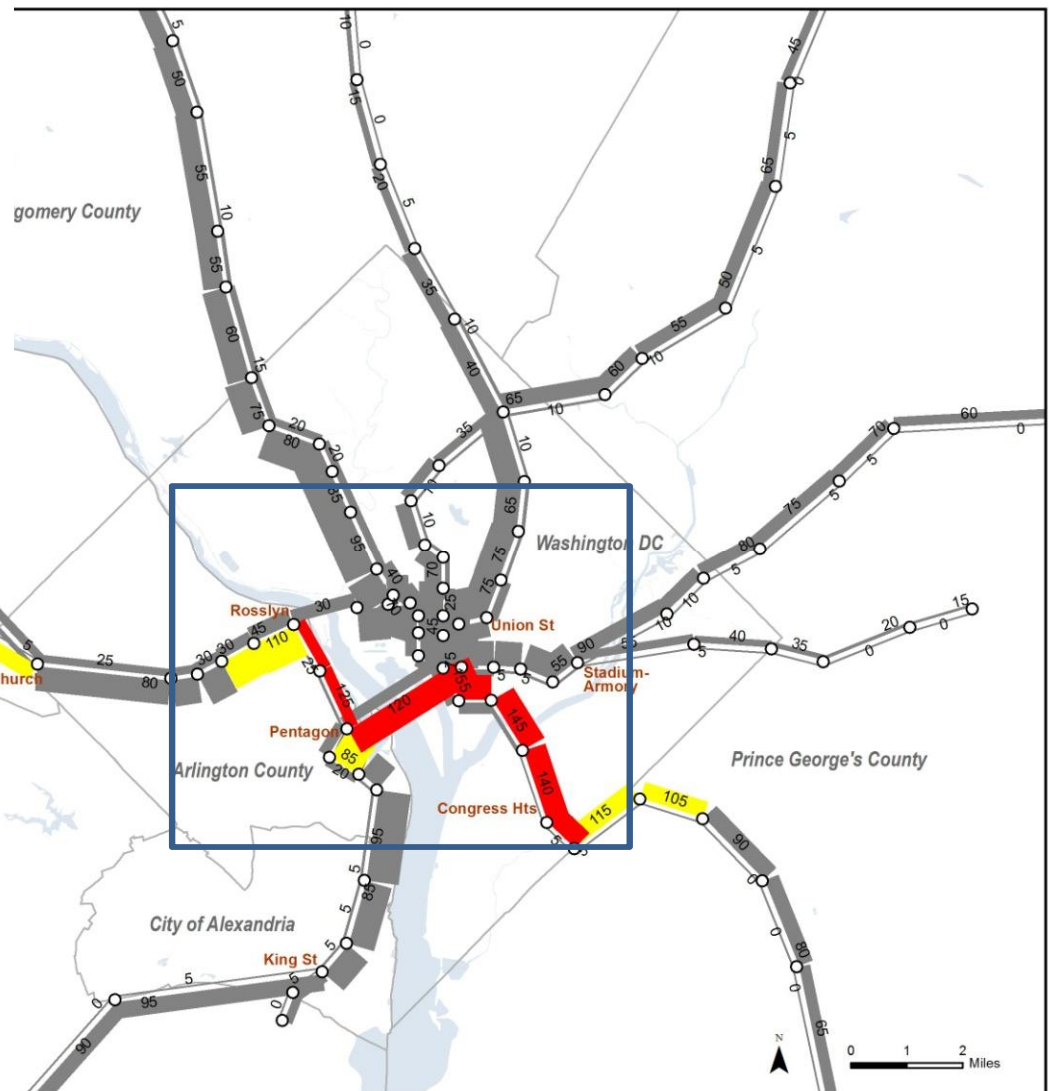
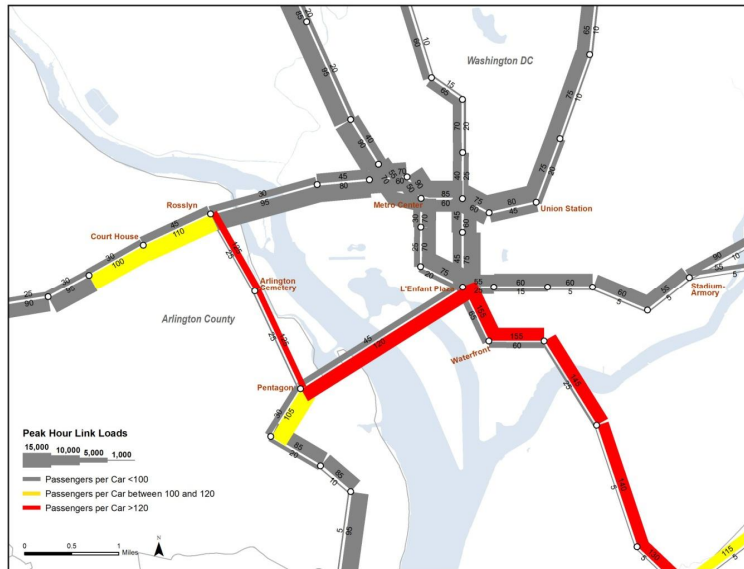
Metro Extensions: Run A, Run B

Metro Extension Run A Segments	2040 Max CLRP (Base Case)	2040 Metro Extension A (Round 3)	Difference
Vienna/Fairfax-GMU to Centreville	31,200	47,800	16,600
New Carrollton to Bowie	18,600	42,600	24,000
Franconia/Springfield to Prince William County	30,200	64,400	34,200
Branch Avenue to Charles County	27,100	56,800	29,700
Greenbelt to Marshall-BWI Airport	18,500	34,700	16,200
Total	125,600	246,300	120,700

Metro Extension Run B Segments	2040 Max CLRP (Base Case)	2040 Metro Extension B (Round 4)	Difference
Vienna/Fairfax-GMU to Gainesville (Orange Line)	31,200	59,300	28,100
Huntington to Lorton (Yellow Line)	25,900	55,300	29,400
VA-772/Dulles Greenway to Leesburg (Silver Line)	3,200	9,300	6,100
Shady Grove to Metropolitan Grove (Red Line)	45,700	61,600	15,900
Largo Town Center to Bowie (Blue Line)	14,300	24,500	10,200
Congress Heights to National Harbor (Green Line Spur)	---	23,000	23,000
Total	120,300	233,000	112,700

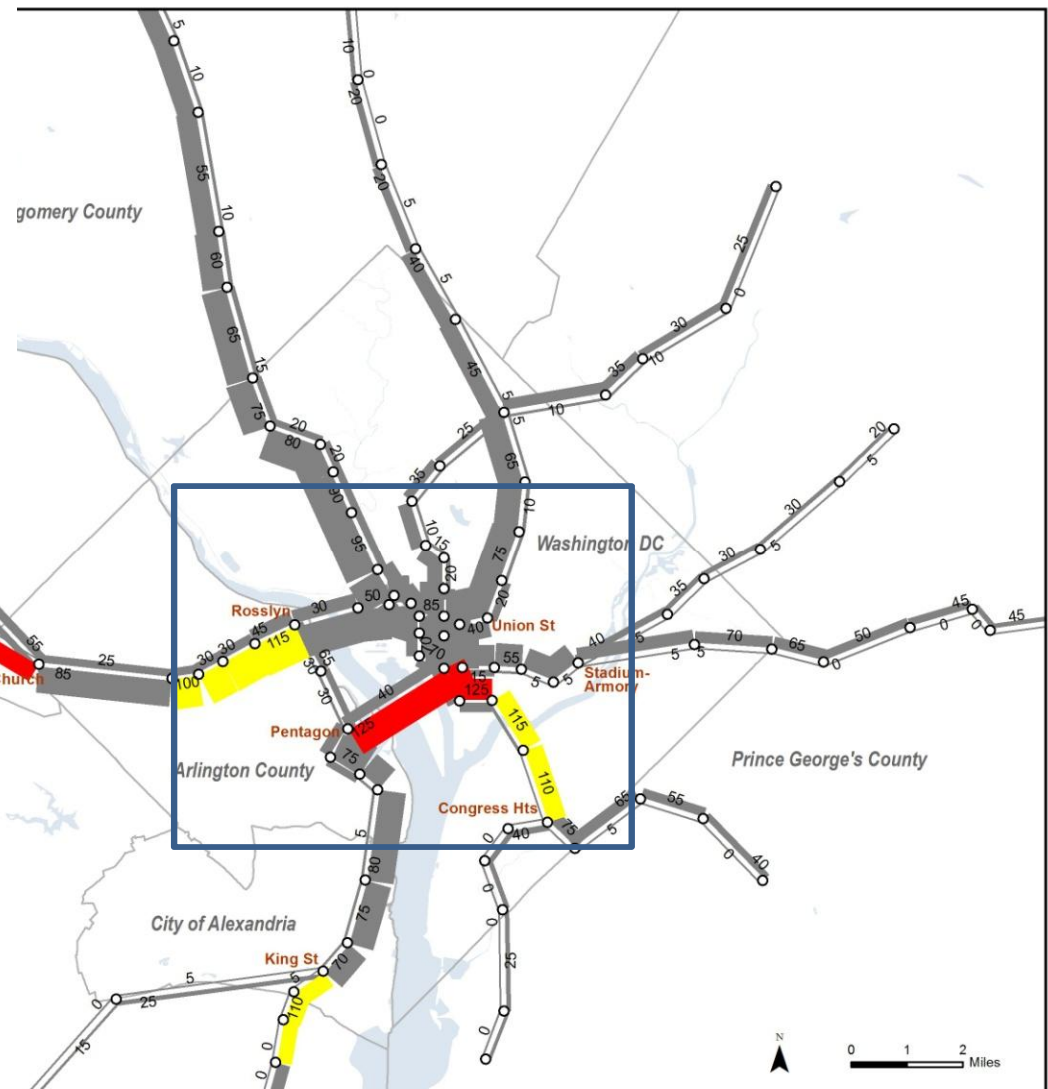
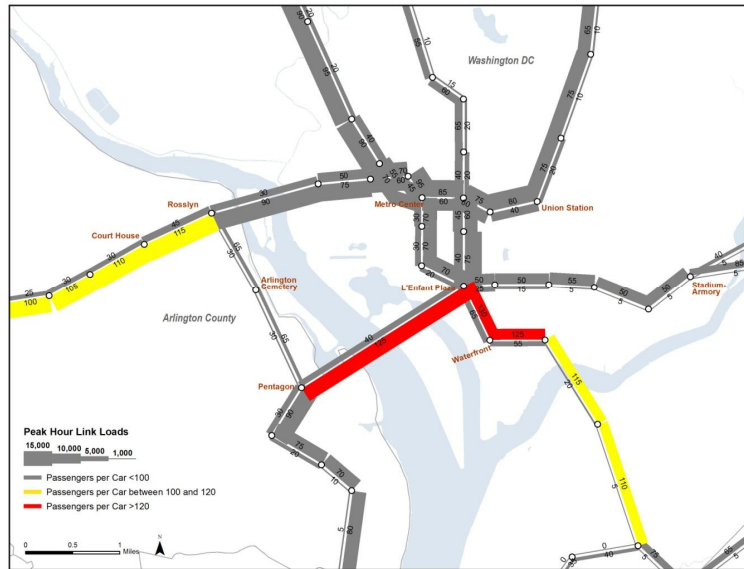
- The 2040 Max CLRP (Base Case) column shows the ridership activity (ons and offs) at the current end of the line station
- The 2040 Metro Extension A and B columns show the ridership activity (ons and offs) at the current end of the line station plus the new stations.

Metro Extensions Run A (Round 3): 2040 Peak Hour Link Loads



Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

Metro Extensions Run B (Round 4): 2040 Peak Hour Link Loads



Note: The values posted on the plot are the passengers per car during peak hour. The width of the band represents peak hour volumes.

PRELIMINARY EVALUATION

SET 3: METRORAIL ENHANCEMENTS



05/05/2011

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Key Findings: Relocated Silver Line with RB Bypass

- Gain in ridership due to faster service bypassing Ballston to Courthouse does not offset the loss in ridership due to decreased service to Arlington stations
- Increased core capacity, reduces crowding on Orange, Silver, and Green lines and many core stations
- Increases Metrorail coverage and transit share to core areas with moderately-high levels of demand
- Does not perform as well as new Blue Line via M St. and New Jersey Ave., NW due to:
 - Direct competition from Orange Line
 - Silver Line constrained by joint track between West Falls Church and Ballston

Key Findings: Metro Extensions Run B

- Metro Extensions to outer suburbs results in 36,000 new transit trips and 44,000 new Metrorail boardings
- Addition of new Metrorail parking at new stations results in parking capacity relief at many existing Metrorail park-and-ride lots
- Severe impact on Metrorail core capacity:
 - Peak hour loads as high as 130 passengers per car on Green Line
 - Higher peak loads on Orange Line between Clarendon and Rosslyn
 - Higher peak loads on Yellow lines approaching L'Enfant
 - Peak loads exceed capacity approaching East Falls Church (130 ppc) on Orange Line and King Street merge (115 ppc) on Yellow Line

Preliminary Evaluation

Alternative	Measures of Effectiveness										
	Core Capacity			Access				Mobility		Efficiency	Auto Travel
	Sufficient Capacity to Serve Demand	Reserve Capacity/Redundancy	Station Capacity	Transit system coverage	Service to Major Activity Centers	Metrorail Parking Sufficiency	Reduce Dependence on Automobile to Access Metrorail	Region-wide Transit Share	Transit Access to jobs	Passenger Miles Per Route Mile	Auto VMT and Trips
Existing Conditions in 2008	⬇️	⬇️	⬇️	○	●	⬇️	○	○	○	○	⬇️
2040 CLRP	●	●	●	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 Max CLRP	⬇️	⬇️	●	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 New N-S Yellow Line 10th St SW/NW	⬆️	⬆️	○	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 New N-S Yellow Line 2nd St SE/NE	⬇️	⬇️	○	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 Split N-S Yellow Line 2nd St SE/NE	⬆️	⬆️	⬇️	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 New E-W Blue Line via M St and NJ Ave	⬆️	⬆️	○	⬇️	⬇️	●	○	○	○	⬆️	●
2040 New E-W Blue Line via M St and Const Ave	○	○	⬇️	⬇️	⬇️	●	○	○	○	⬆️	●
2040 Interline Rosslyn "Y"	⬇️	⬇️	⬇️	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 Four Interline Connections	●	○	○	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 Enhanced Surface Transit - PCN	⬇️	⬇️	●	⬇️	⬇️	⬇️	⬆️	⬆️	○	⬆️	●
2040 Improved Walkability	●	●	●	⬇️	⬇️	⬆️	⬆️	●	⬇️	●	●

- Strategies developed so far address many of the issues (core capacity, parking capacity, mobility); however, some issues (transit coverage, auto VMT) are not addressed by any of the strategies studied so far.
- No one strategy addresses all/most of the issues. Addressing most issues will require combining strategies into scenarios.

Key	● Very Poor	⬇️ Poor	○ Neutral	⬆️ Good	● Excellent
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Preliminary Evaluation (cont'd)

Alternative	Measures of Effectiveness										
	Core Capacity			Access				Mobility		Efficiency	Auto Travel
	Sufficient Capacity to Serve Demand	Reserve Capacity/Redundancy	Station Capacity	Transit system coverage	Service to Major Activity Centers	Metrorail Parking Sufficiency	Reduce Dependence on Automobile to Access Metrorail	Region-wide Transit Share	Transit Access to jobs	Passenger Miles Per Route Mile	Auto VMT and Trips
2040 Parking Capacity Relief Strategy	⬇️	⬇️	●	⬇️	⬇️	⬇️	○	○	⬇️	⬆️	●
2030 CLRP Aspirations Land Use	○	○	●	⬇️	⬇️	⬇️	⬆️	⬆️	○	●	●
2040 In-fill Stations	⬇️	⬇️	●	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 Metro Extensions Run A	●	●	●	⬇️	○	●	⬇️	⬆️	○	⬆️	●
2040 Enhanced Surface Transit - PCN Plus	⬇️	⬇️	⬇️	○	⬆️	⬇️	⬆️	⬆️	○	⬆️	●
2040 Streetcar Network	○	⬇️	⬇️	⬇️	⬇️	●	○	○	⬇️	⬆️	●
2040 LRT Expansion	○	⬇️	●	⬇️	⬇️	⬇️	○	○	⬇️	⬆️	●
2040 Beltway Line	○	⬇️	⬇️	⬇️	○	●	○	○	⬆️	⬆️	●
2040 Brown Line	⬇️	⬇️	●	⬇️	⬇️	●	○	○	○	⬆️	●
2040 New Silver Line via M St. and NJ Ave., NW	⬆️	⬆️	○	⬇️	⬇️	●	○	○	○	⬆️	●
2040 Metro Extensions Run B	●	●	●	⬇️	○	●	⬇️	⬆️	○	⬆️	●

- Strategies developed so far address many of the issues (core capacity, parking capacity, mobility, transit coverage); however, some issues (auto VMT) are not addressed by any of the strategies studied so far.
- No one strategy addresses all/most of the issues. Addressing most issues will require combining strategies into scenarios.

Key	● Very Poor	⬇️ Poor	○ Neutral	⬆️ Good	● Excellent
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Appendix

Enhanced Surface Transit – PCN+

- **Montgomery County BRT network:**
 - Viers Mill Road between Rockville and Wheaton
 - Georgia Ave between Olney and Wheaton
 - Georgia Ave between Wheaton and Silver Spring
 - MD 28 between Rockville and Regional Institute for Children and Adolescents (RICA)
 - Muddy Branch Road from RICA to Lake Forest Mall
 - Connecticut Avenue from Georgia Avenue to NIH
 - North Frederick Road from Clarksburg to Rockville
 - North Frederick Road from Clarksburg to Shady Grove
 - Rockville Pike from Rockville to Bethesda
 - New Hampshire Ave from White Oak to Fort Totten
 - Old Georgetown Road from Montgomery Mall to Bethesda
 - Tucker Lane from Montgomery Mall to Grosvenor-Strathmore
 - ICC from RICA to Briggs Chaney Road
 - MD 193 from Wheaton to Langley Park
 - Columbia Pike from Burtonsville Crossing to Silver Spring
 - Randolph Road from Rockville Pike to Georgia Avenue
- Operated at 10 minute peak, 15 minute off-peak headway
- Average speed: 18.2 miles/hour

Enhanced Surface Transit – PCN+

- Northern Virginia BRT network:
 - Glebe Road between Ballston and Potomac Yard (10 minute all day)
 - Wilson and Clarendon Boulevards between Ballston and Rosslyn (10 minute all day)
 - Lee Highway between East Falls Church and Rosslyn (10/15 peak/off-peak)
 - Chantilly to King Street Metro via US 50 and VA 236 (30 minute all day)
 - Kingstowne to Pentagon City via I-395 (5/10 peak/off-peak)
 - Vienna to Pentagon via US 50 (12 minute all day)
 - Burke Lake to Tysons/Pentagon via I-495/I-395 HOT lanes (15/30 peak/off-peak)
 - Fairfax County Parkway between VA 267 and Fort Belvoir (15/30 peak/off-peak)
 - VA 28 between VA 7 and Manassas (15/30 peak/off-peak)
- Average speed: 20.0 miles/hour

Enhanced Surface Transit – PCN+

- Extend select PCN routes to cross jurisdictions or serve new markets:
 - PCN4 “Pentagon Metro to Braddock Road Metro” extended to Independence and 7th
 - PCN16 “L'Enfant Plaza Metro to S Capitol St and Southern Ave SE” extended north to Mt. Vernon Square
 - PCN19 “Anacostia Metro to Woodley Park Metro” extended south to MLK and Alabama
- Interline corridors where possible:
 - PCN 8 “McPherson Square Metro to Silver Spring Metro” and PCN12 “Minnesota Ave Metro to McPherson Square Metro”
- Add peak direction express service to supplement high ridership PCN corridors
 - PCN 2 “Eisenhower Metro to Ft. Belvoir”: Express from Spring Drive to Huntington
 - PCN 3 “P St and Half St SW to Silver Spring Metro”: Express from Kennedy/Georgia to New York/7th
 - PCN 6 “Naylor Road Metro to Friendship Hts. Metro”: Express between Wisconsin/Woodley and Foggy Bottom with stops at 35th Street and M Street. The local route is terminated at 35th Street
 - PCN 9 “King St Metro to Tysons Westpark”: Split into two interlined express service with transfer point at Patrick Henry Drive
 - PCN 16 “L'Enfant Plaza Metro to S Capitol St and Southern Ave SE”: Express from Xenia Street to Anacostia. Additional local service from Xenia Street to Mt. Vernon Sq.
 - PCN 18 “Rhode Island Ave Metro to Cherry Lane”: New service starting at Cherry Lane to Rhode Island Ave. and then express to College Park to Amherst

Enhanced Surface Transit – PCN+

- Enhance PCN corridors with features like Off-board fare collection and express skip-stop
 - Average speed for PCN routes improved by 4%
- Discontinue PCN routes that overlap with Montgomery County or Northern Virginia BRT corridors:
 - PCN 10 “Silver Spring Metro to Shady Grove Metro”
 - PCN 11 “Fort Totten Metro to White Oak”
 - PCN 13 “Silver Spring Metro to Montgomery General Hospital”
 - PCN 14 “Greenbelt Metro to Twinbrook Metro”
 - PCN 17 “King St Metro to Route 123”
 - PCN 22 “Silver Spring Metro to Columbia Pike and Sandy Spring Road”

Enhanced Surface Transit – PCN+

- Enhancements to Commuter Rail
- MARC:
 - All lines extended to Crystal City via L'Enfant Plaza
 - Additional Off-peak service:
 - Brunswick line: Added inbound service
 - Camden line: Added bi-directional service
- VRE:
 - Manassas line extended to Haymarket
 - Haymarket – DC: 60 minute inbound and 180 minute outbound peak headway, no service in off-peak
 - Haymarket – Alexandria: 30 minute peak, 60 minute off-peak headway, both directions
 - Bi-directional all day service
 - Manassas – DC: 30 minute inbound and 60 minute outbound peak headway, 60 minute inbound off-peak headway

Metrorail Beltway Line:

2040 Weekday Metrorail Entries by Station

Station	2040 Base (Max CLRP)	Metrorail Beltway Line	Station	2040 Base (Max CLRP)	Metrorail Beltway Line
New Carrollton P	9,250	9,050	Fairfax Hospital P	-	1,800
Landover Road P	-	550	Dunn Loring P	6,100	5,450
Largo Town Center P	10,250	8,350	International Drive P	-	2,100
Upper Marlboro P	-	2,350	Tysons Central Rt 123	8,850	10,850
Westphalia P	-	5,000	Lewinsville Road P	-	1,100
Branch Avenue P	13,550	8,850	River Road	-	600
Temple Hills Road P	-	2,650	Montgomery Mall P	-	4,600
St. Barnabas Road P	-	2,950	White Flint P	7,350	8,200
National Harbor P	-	4,500	Wheaton P	6,800	7,950
Eisenhower Ave.	1,950	2,950	White Oak	-	3,200
Van Dorn Street P	6,600	7,300	Greenbelt P	9,250	8,100
Backlick Road P	-	1,650	Kenilworth/295 P	-	2,700
Braddock Road P	-	2,000	Annapolis Road P	-	3,550
Little River Turnpike P	-	2,850	Total	79,950	121,200

Metrorail Brown Line:

2040 Weekday Metrorail Entries by Station

Station	2040 Base (Max CLRP)	Metrorail Brown Line
Friendship Heights	15,650	15,800
Ward Circle	-	7,050
Wisconsin and Mass	-	3,700
Georgetown	-	13,150
Foggy Bottom-GWU	38,350	35,800
State Department	-	3,400
West Potomac Park	-	2,150
Federal Triangle	5,900	9,450
National Gallery	-	1,500
Union Station	42,300	56,800
NoMa/Eckington	-	2,000
Bloomingdale	-	3,200
Washington Hospital Ctr	-	3,200
Georgia Ave	8,350	7,350
Manor Park	-	1,450
Brightwood	-	2,200
Walter Reed Med Center	-	2,550
Montgomery CC/ShepardPk	-	450
Silver Spring P	20,200	18,350
Colesville Road	-	900
White Oak P	-	4,850
Cherry Hill Road	-	2,050
Total	130,750	197,350