# **APPENDICES**

Appendix A: Preliminary Signing Plans (Modified) for IJR Addendum Study Area

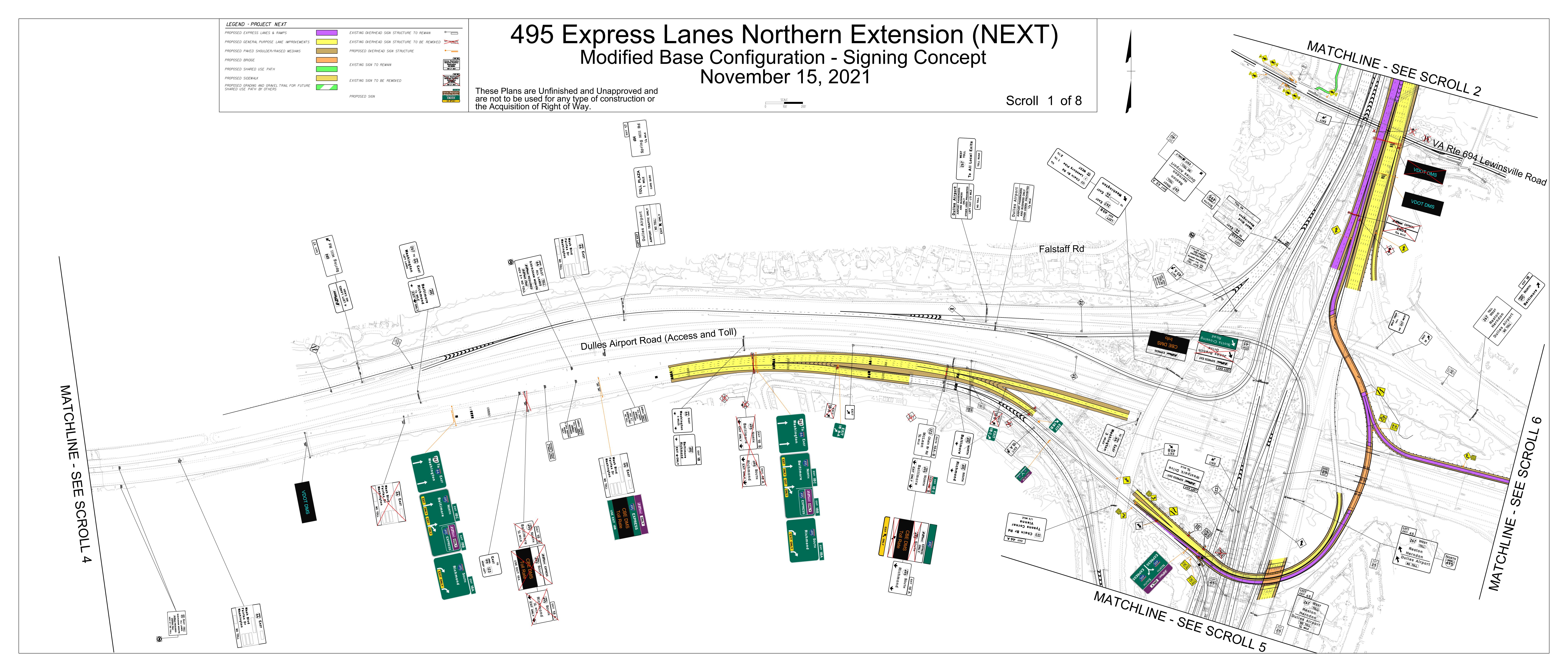
Appendix B: Memorandum on No Build Modeling Considerations

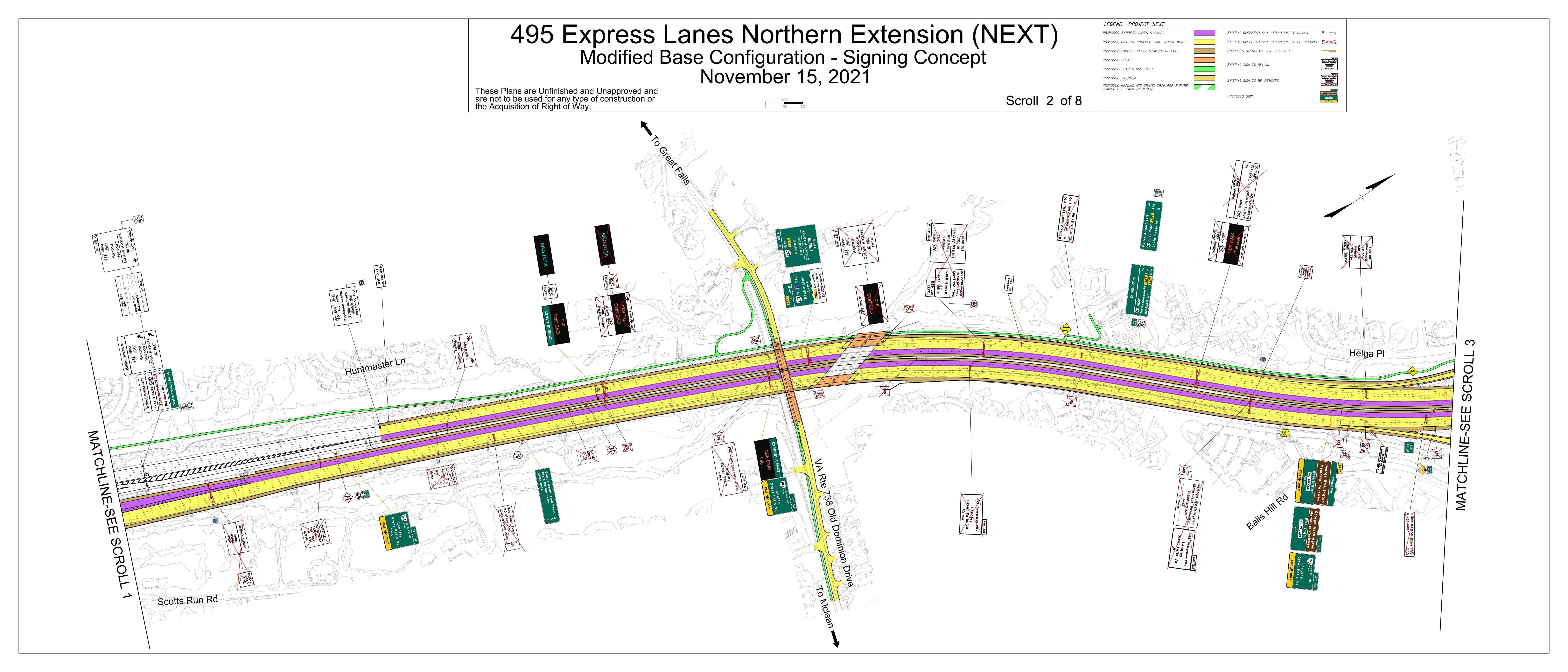
Appendix C: Traffic Models (Provided Electronically via Separate File)

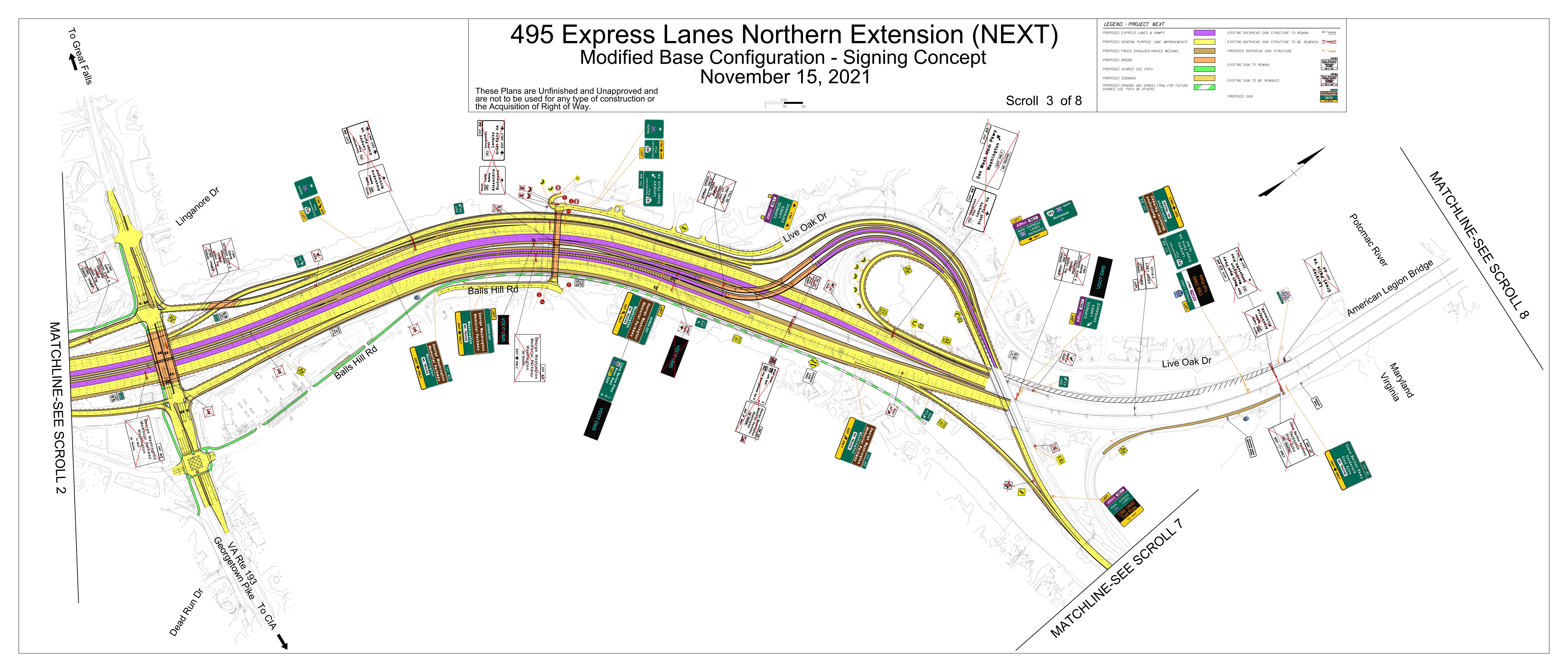
Appendix D: Freeway Segment Densities for IJR Addendum Study Area

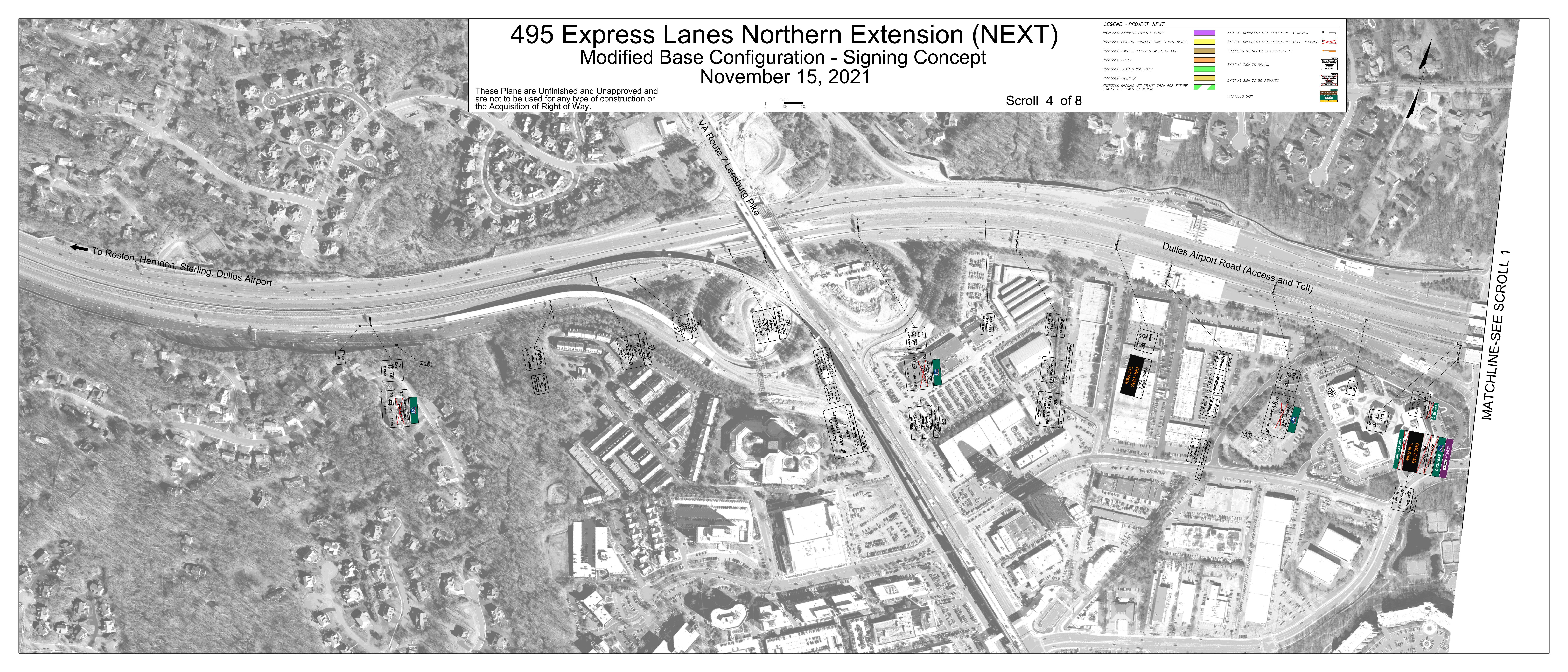
Appendix E: Detailed Queueing Results for IJR Addendum Study Area

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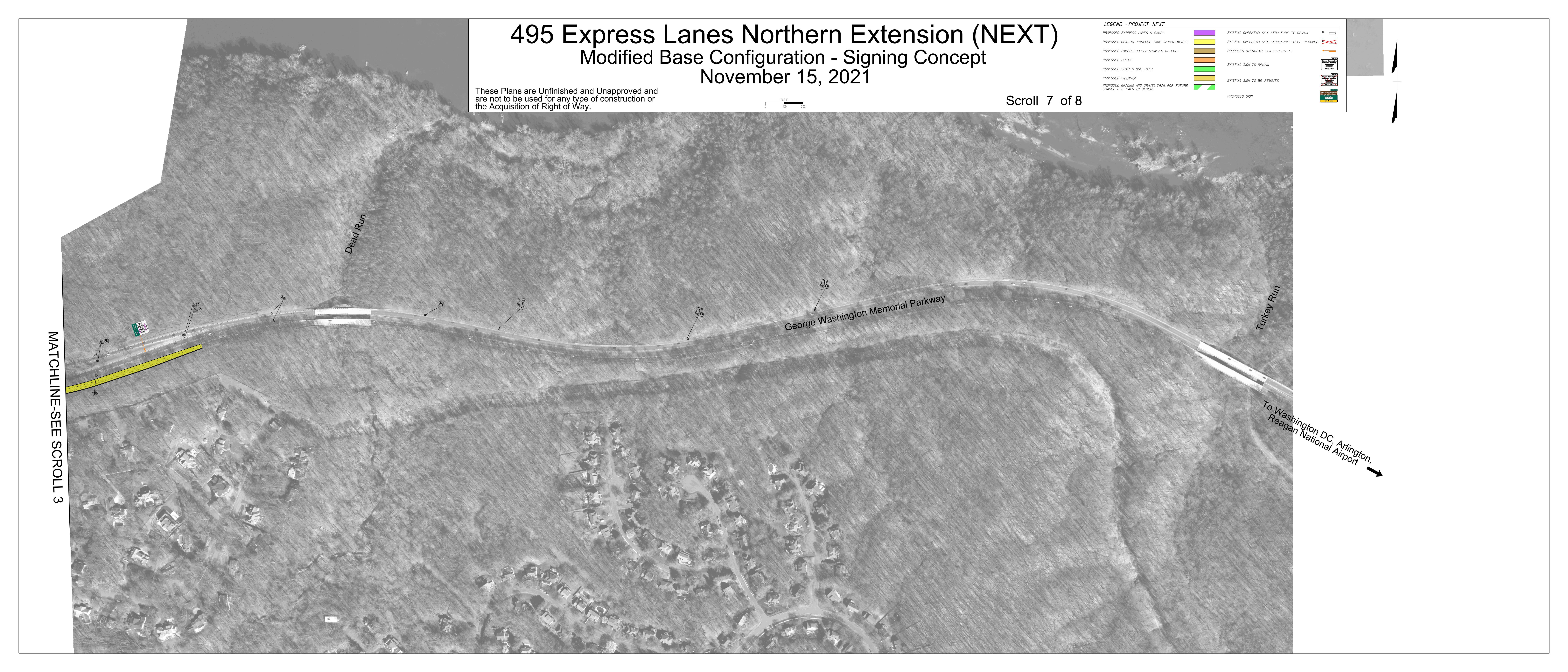




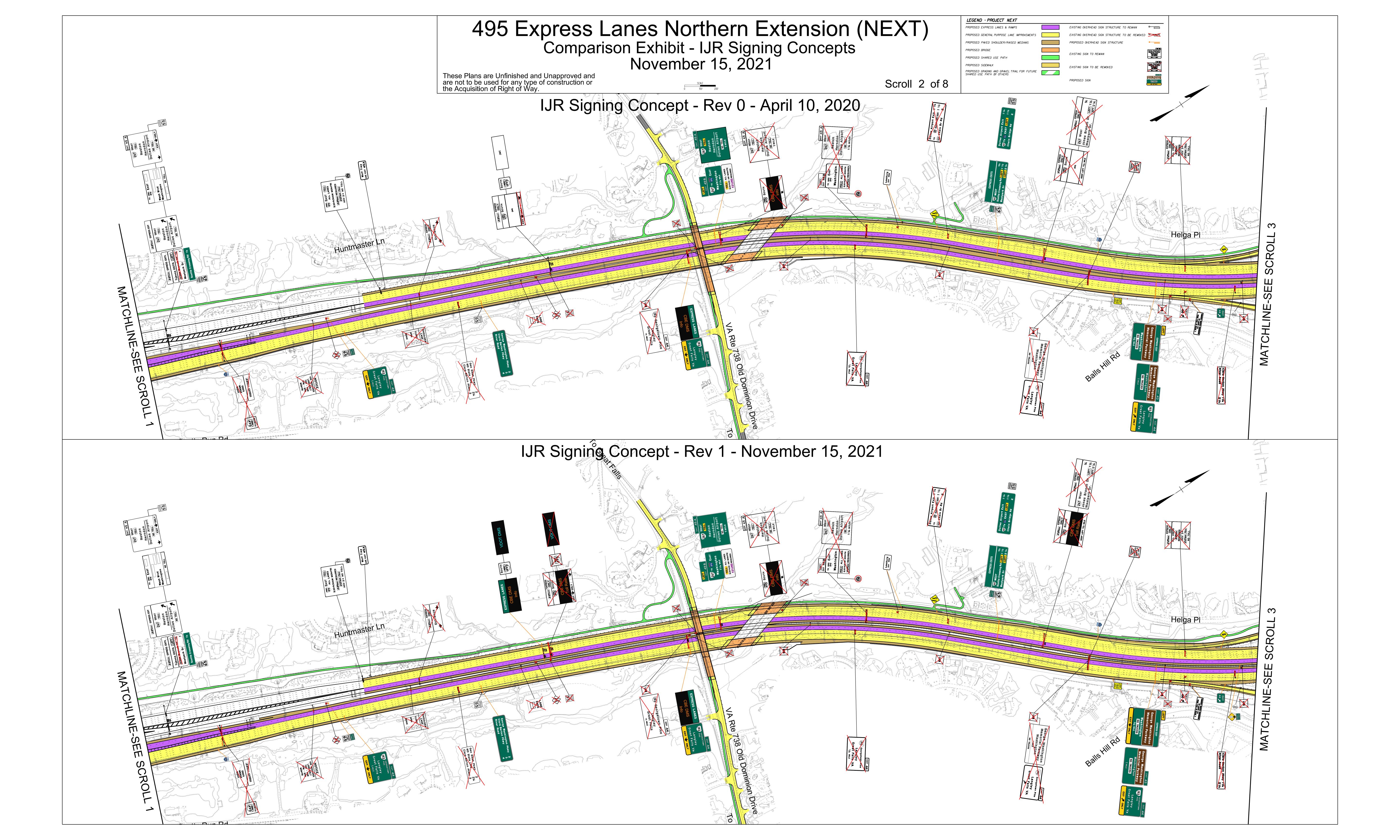


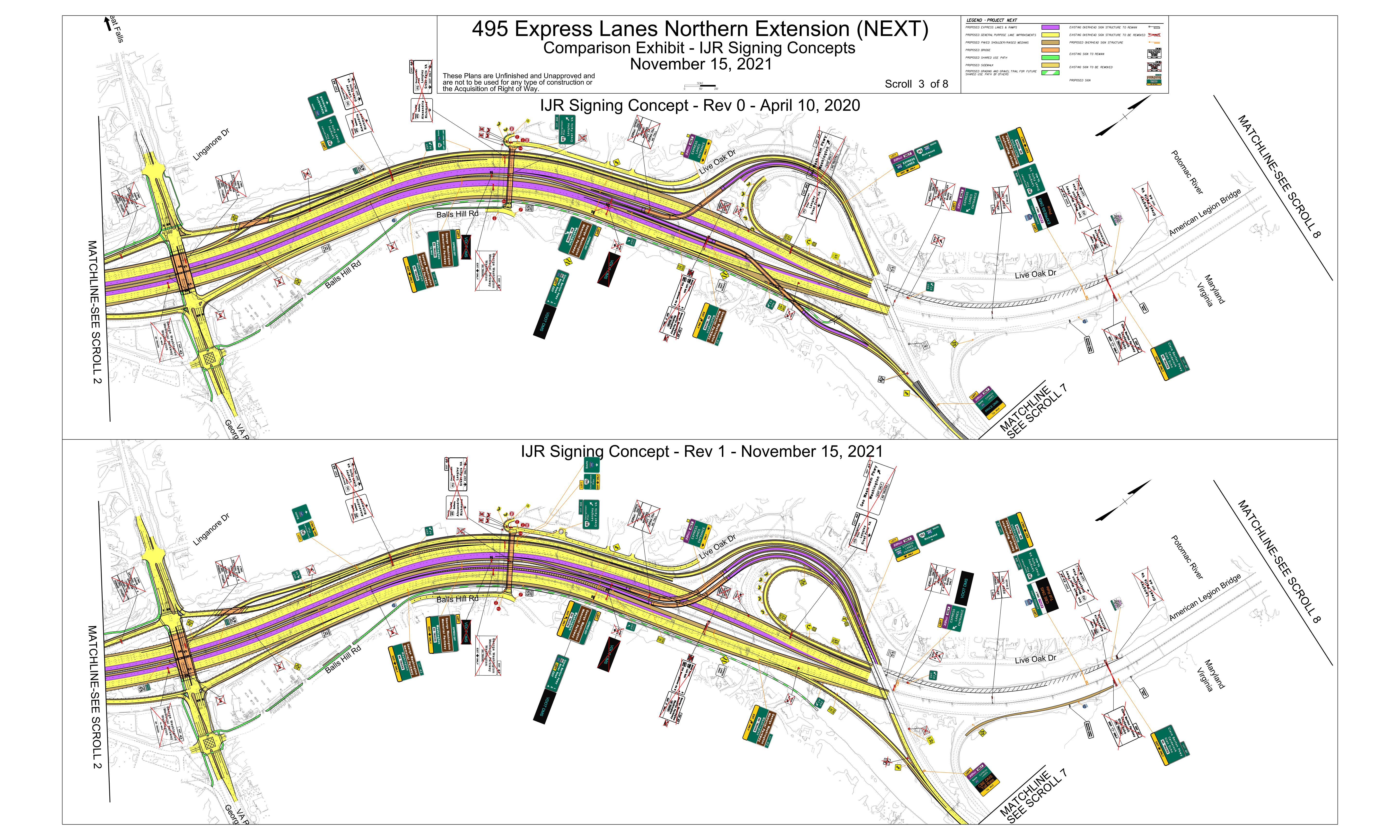
# 495 Express Lanes Northern Extension (NEXT) Modified Base Configuration - Signing Concept November 15, 2021 LEGEND - PROJECT NEXT PROPOSED EXPRESS LANES & RAMPS PROPOSED OVERHEAD SIGN STRUCTURE PROPOSED BRIDGE EXISTING SIGN TO REMAIN PROPOSED SHARED USE PATH PROPOSED SIDEWALK These Plans are Unfinished and Unapproved and are not to be used for any type of construction or the Acquisition of Right of Way. Scroll 5 of 8

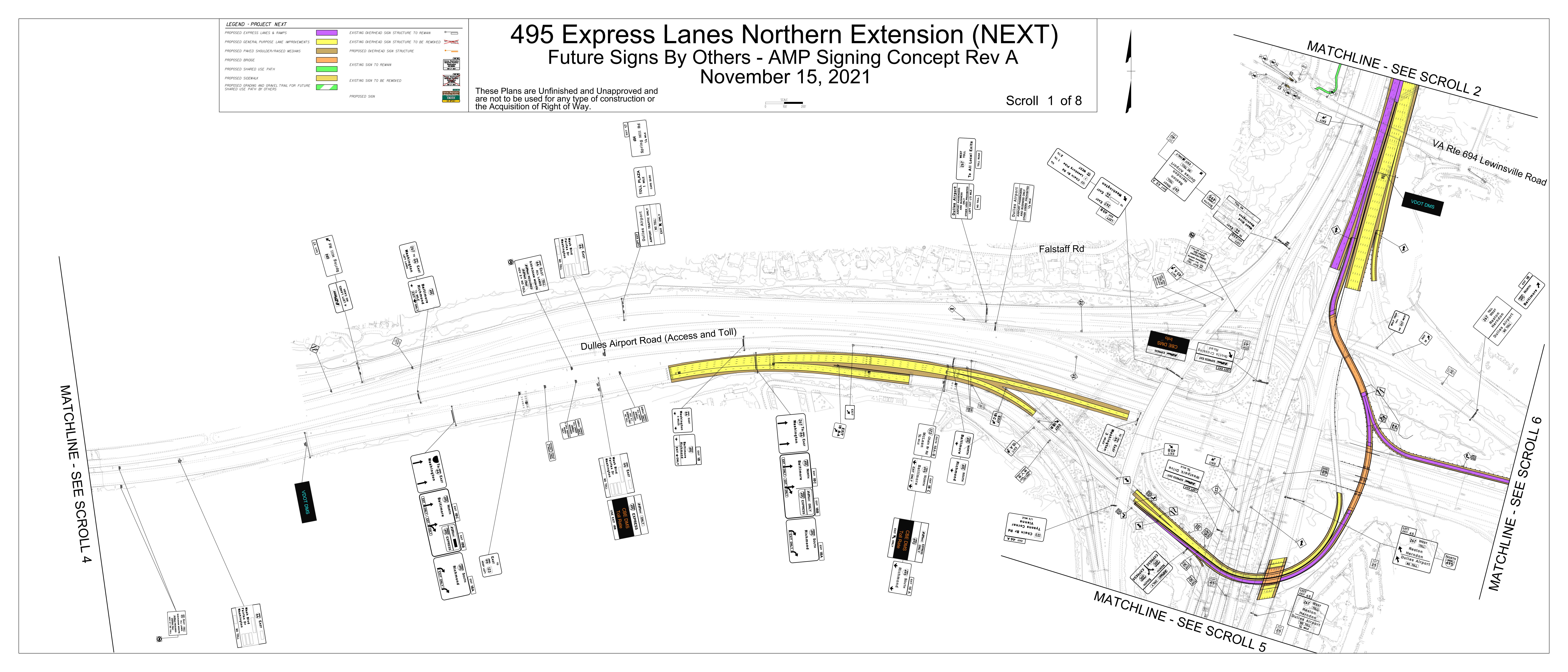


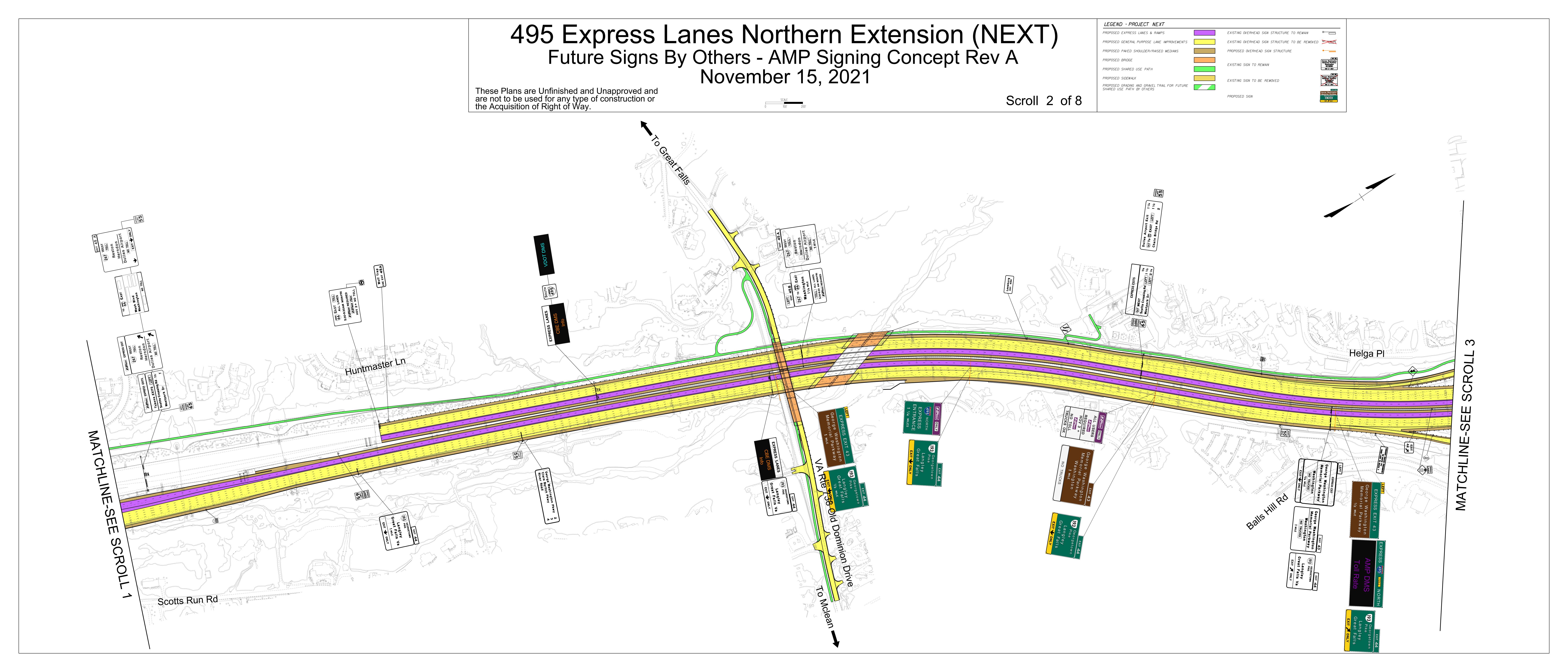


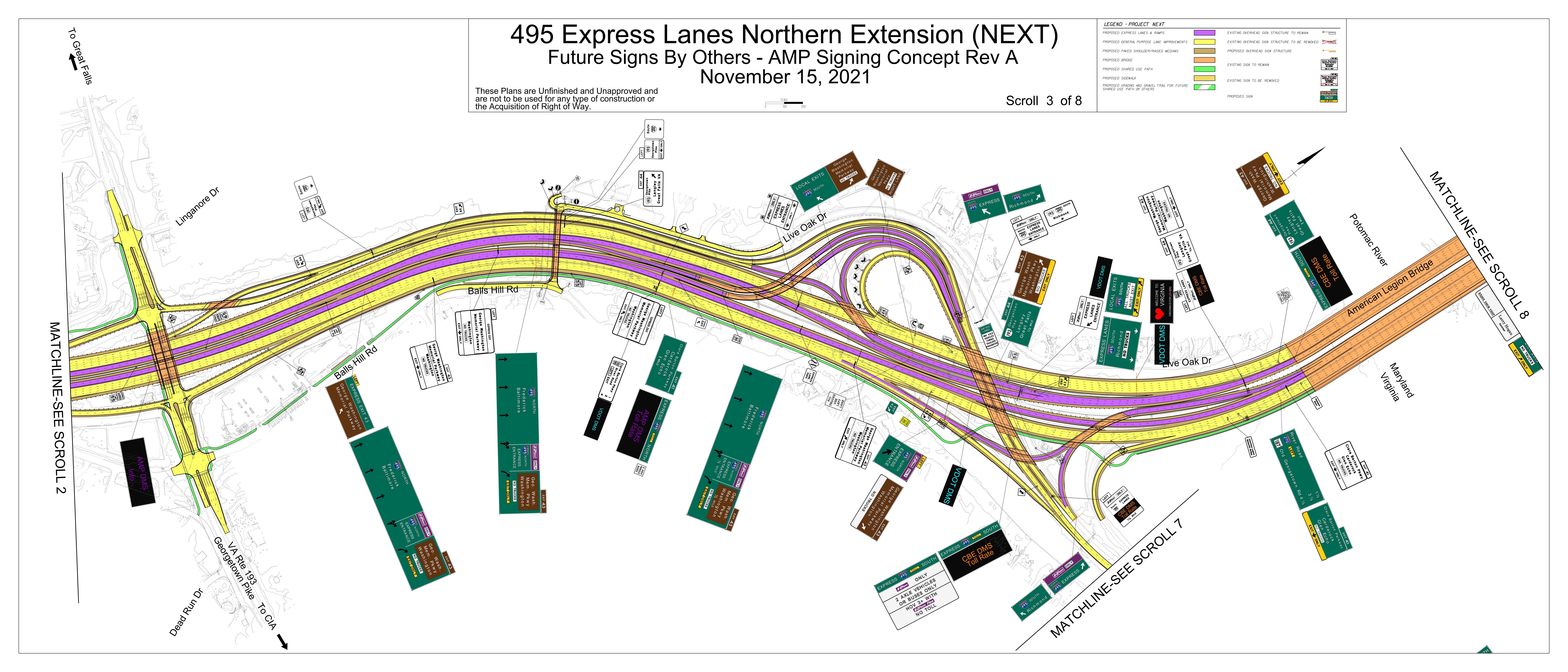


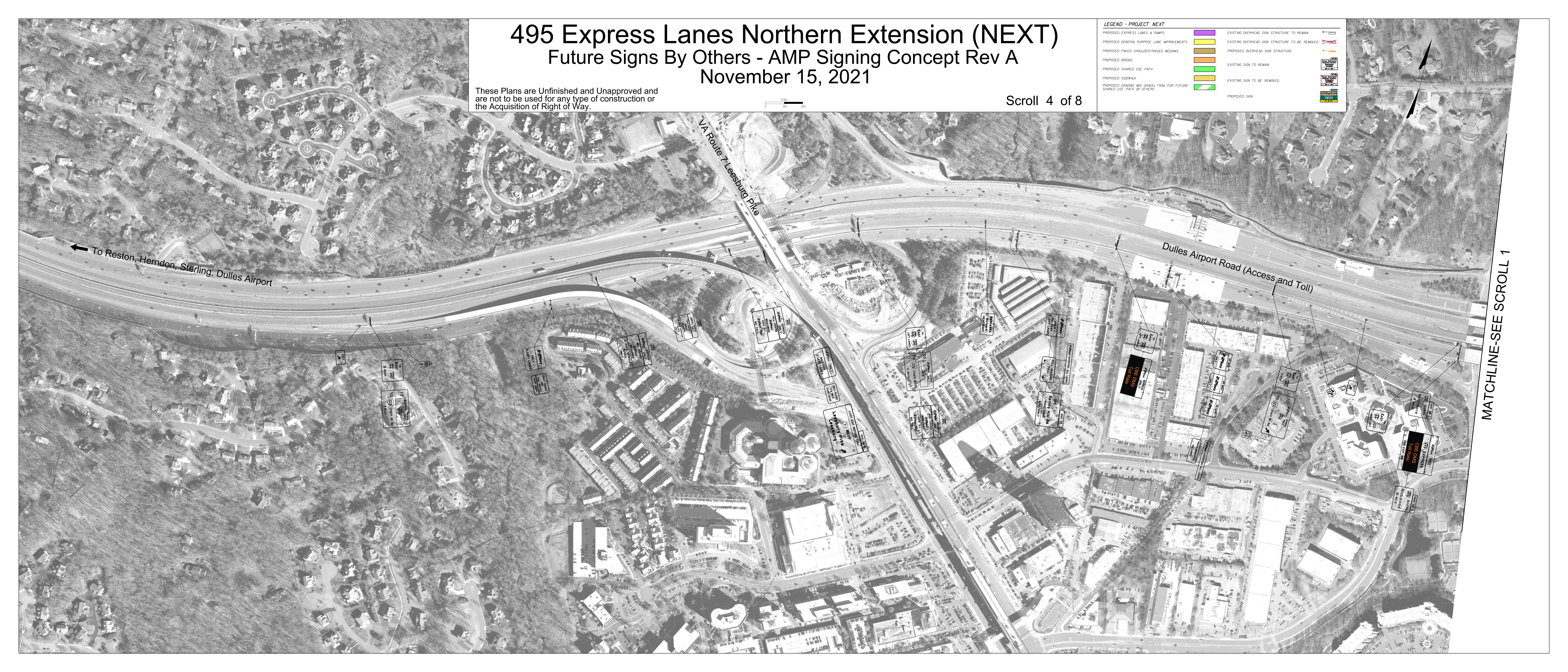




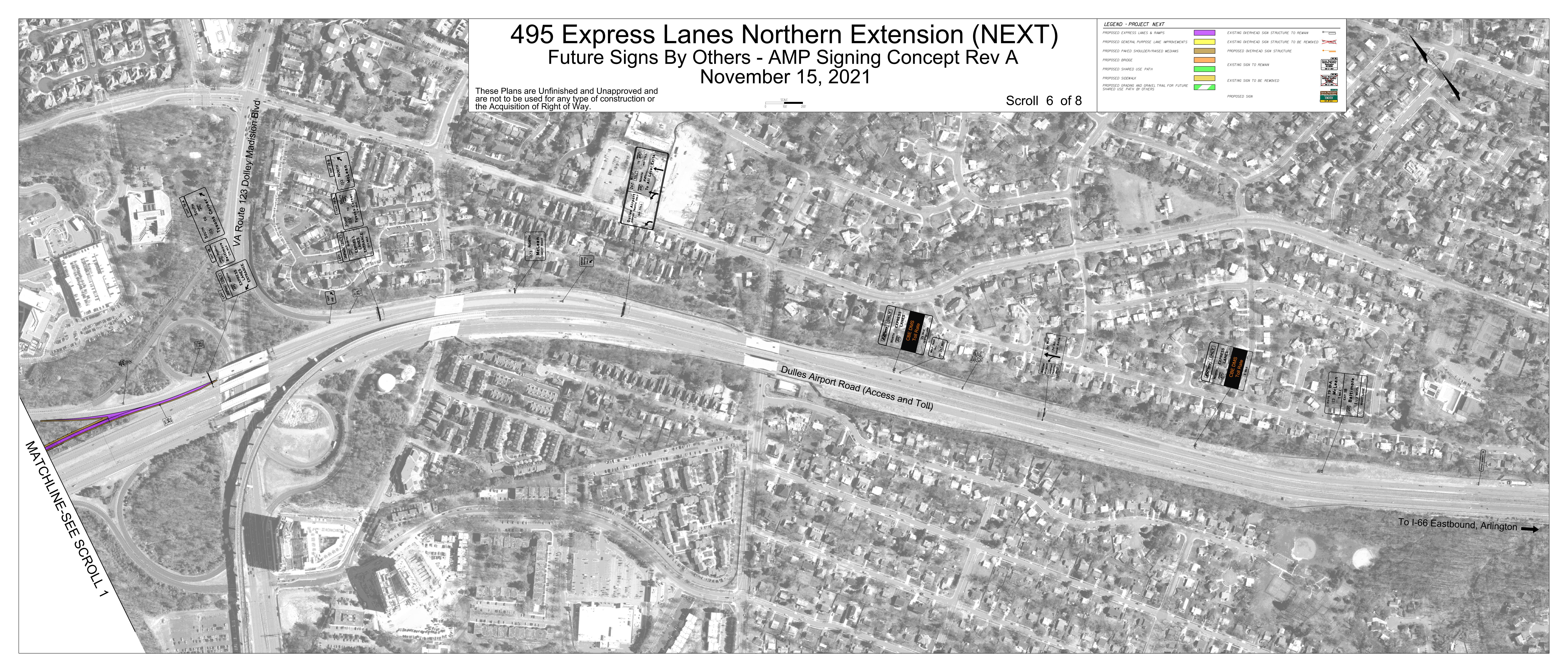


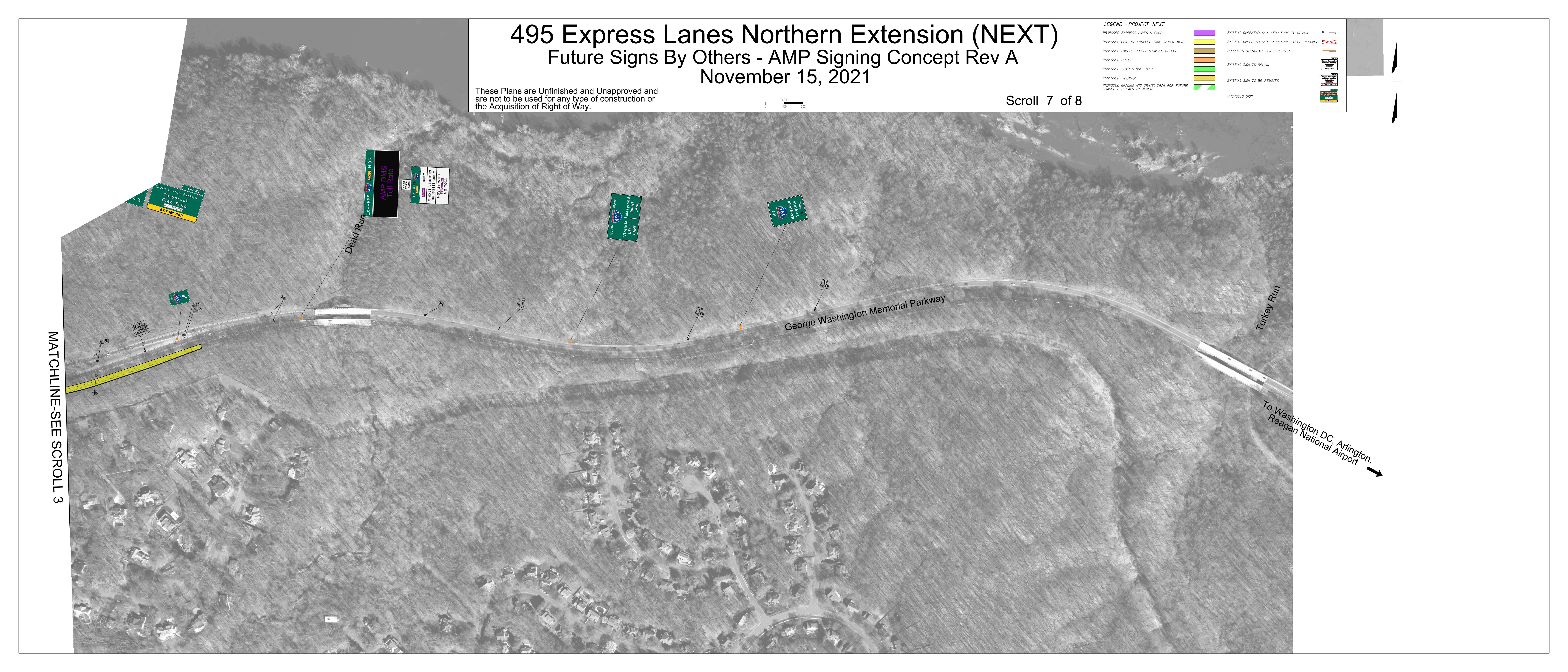


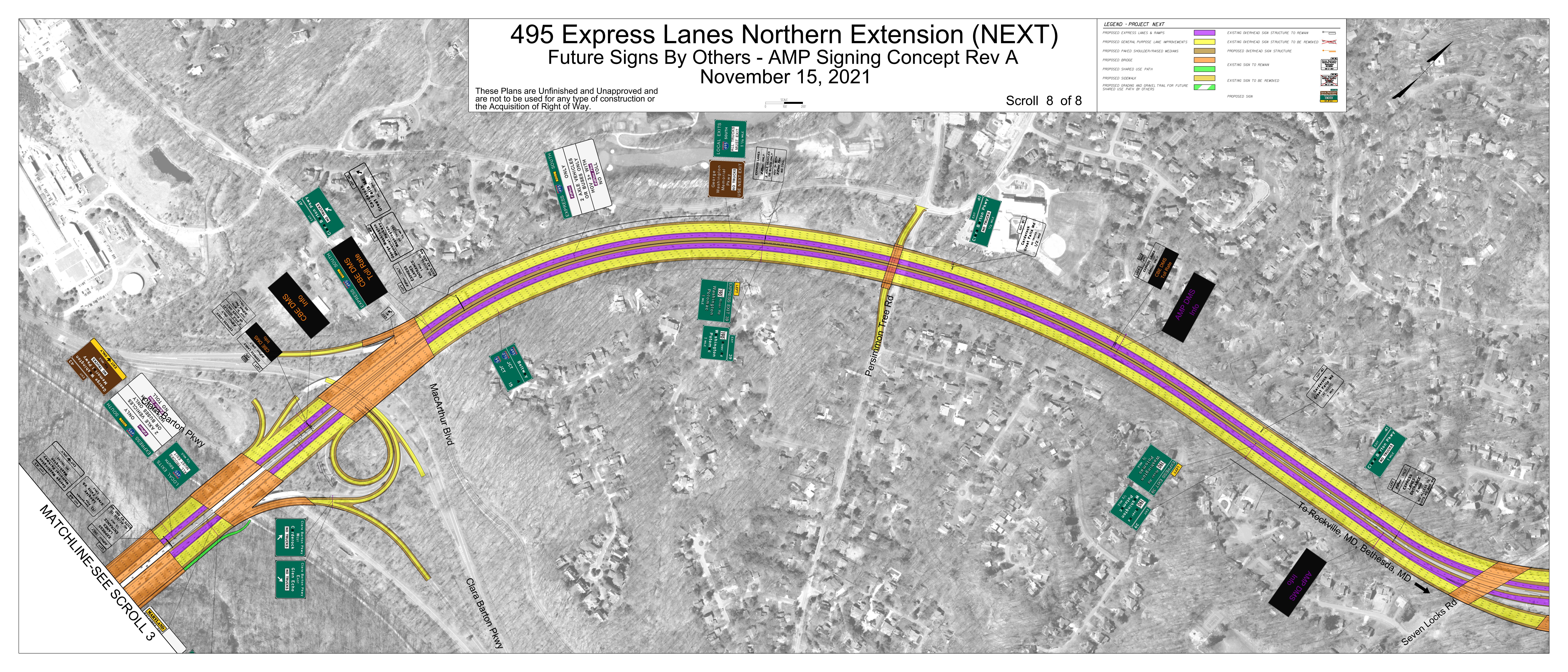




# 495 Express Lanes Northern Extension (NEXT) Future Signs By Others - AMP Signing Concept Rev A November 15, 2021 LEGEND - PROJECT NEXT PROPOSED EXPRESS LANES & RAMPS PROPOSED OVERHEAD SIGN STRUCTURE PROPOSED BRIDGE EXISTING SIGN TO REMAIN PROPOSED SHARED USE PATH PROPOSED SIDEWALK These Plans are Unfinished and Unapproved and are not to be used for any type of construction or the Acquisition of Right of Way. Scroll 5 of 8







Appendix B: Memorandum on No Build Modeling Consideration	IS

I-495 Express Lanes Northern Extension

Interchange Justification Report



### **MEMORANDUM**

To: Abraham Lerner, P.E.

**VDOT Associate Manager Special Projects** 

Gilbert Chlewicki, P.E.

VDOT NOVA District Traffic Engineer

Tarsem Lal, P.E., PMP

FHWA Major Projects Oversight Manager

sdPOM for DC/MD/VA

From: Rob Prunty, P.E.

Kavita Chapuri, P.E. Anthony Gallo, P.E.

Kimley-Horn and Associates, Inc.

Date: November 15, 2021

Subject: I-495 NEXT IJR Addendum – No Build Scenario Considerations

# Introduction and Background

This memorandum summarizes considerations regarding the No Build condition for the I-495 Express Lanes Northern Extension (NEXT) project in support of an upcoming Addendum to the approved project Interchange Justification Report (IJR), which was originally approved by FHWA on June 11, 2021. VDOT is currently preparing this IJR Addendum in which geometric changes are proposed for the project Build condition, including some proposed changes in Maryland *outside* of the project study area that may impact traffic forecasts *within* the study area. In response to these changes in Maryland, VDOT prepared this memorandum to address whether the project No Build condition should also be re-analyzed for traffic operations and safety.

**Figure 1** at the end of this document shows the assumed conceptual I-495 NEXT No Build geometry for both the 2025 and 2045 analysis years at the George Washington Memorial Parkway (GWMP) interchange and across the American Legion Memorial Bridge (ALMB) into Maryland. In the No Build condition for the I-495 NEXT project, the planned managed lanes system in Maryland, which is included in the regional constrained long-range plan (CLRP), would terminate on the south side of the ALMB within the GWMP interchange. This terminus is assumed to feature left-side slip ramps for the northbound entrance and southbound exit from the Maryland system, tying into the I-495 general purpose (GP) lanes south of the GWMP. Two managed lanes in each direction would develop across the ALMB and run in the center of I-495 in Maryland, similar to the existing geometry of the I-495 Express Lanes in Virginia. This managed lane system, according to the CLRP, would continue around the entirety of the I-495 Beltway in Maryland and also along I-270 north to I-370.



For the I-495 NEXT IJR Addendum, this conceptual No Build geometry is assumed to remain consistent within the I-495 NEXT study area. However, during Summer 2021, Maryland Department of Transportation (MDOT) provided VDOT with updated conceptual drawings for the Maryland managed lanes system immediately north of the I-495 NEXT study area at the I-495 interchanges with Cabin John Parkway, MD-190/River Road, and I-270. These changes to the Maryland system include revised access into and out of the managed lanes as compared to access assumed in the I-495 NEXT travel demand model. Therefore, VDOT conducted an analysis using the I-495 NEXT travel demand model to understand how these changes in access would affect the No Build condition demand.

## **Travel Demand Model Analysis Summary**

VDOT ran modified versions of the I-495 NEXT No Build travel demand models for the 2025 and 2045 analysis years, assuming the changes in access in Maryland at Cabin John Parkway, River Road, and I-270. The only changes made to the travel demand model runs were the network edits in this area reflecting the updates provided by MDOT.

**Table 1** provides a comparison of the 2025 travel demand model assigned daily output volumes across the ALMB, at the start of the Maryland managed lanes system at the GWMP interchange, and south of the GWMP. **Table 2** provides this same comparison for the 2045 travel demand model.

Segment		2025 No Build (IJR)	2025 No Build (Modified)	Difference from IJR (vehicles)	Difference from IJR (%)
	NB GP	115,800	117,100	1,300	1.1%
	NB Exp	21,700	19,200	-2,500	-11.5%
ALMB	NB Total	137,500	136,300	-1,200	-0.9%
	SB GP	119,500	120,800	1,300	1.1%
	SB Exp	27,100	24,700	-2,400	-8.9%
	SB Total	146,600	145,500	-1,100	-0.8%
Start of MD	NB GP	109,600	111,000	1,400	1.3%
Managed Lanes @ GWMP	NB Exp	19,100	16,600	-2,500	-13.1%
	NB Total	128,700	127,600	-1,100	-0.9%
	SB GP	96,400	97,400	1,000	1.0%



Segment		2025 No Build (IJR)	2025 No Build (Modified)	Difference from IJR (vehicles)	Difference from IJR (%)	
	SB Exp 18,200		15,900	-2,300	-12.6%	
	SB Total	114,600	113,300	-1,300	-1.1%	
South of	NB GP	128,700	127,700	-1,000	-0.8%	
GWMP	SB GP	114,700	113,300	-1,400	-1.2%	

In the 2025 travel demand model outputs, the most notable changes in volumes are in the Maryland managed lanes, in which daily volumes show a reduction ranging from 9 to 15 percent. However, the volumes in the GP lanes change by less than 2 percent, including the GP segments south of GWMP in which there are no managed lanes in the No Build condition. The total volume along I-495 across the ALMB changes by less than 1 percent in each direction.

Table 2. Travel Demand Model Daily Volume Comparison – 2045 No Build Condition

Segment		2045 No Build (IJR)	2045 No Build (Modified)	Difference from IJR (vehicles)	Difference from IJR (%)
	NB GP	128,000	128,600	600	0.5%
	NB Exp	33,600	32,900	-700	-2.1%
ALMB	NB Total	161,600	161,500	-100	-0.1%
	SB GP	134,500	137,000	2,500	1.9%
	SB Exp	36,000	34,600	-1,400	-3.9%
	SB Total	170,500	171,600	1,100	0.6%
	NB GP	127,500	128,700	1,200	0.9%
Start of MD	NB Exp	22,700	21,200	-1,500	-6.6%
Managed Lanes @ GWMP	NB Total	150,200	149,900	-300	-0.2%
	SB GP	96,100	99,200	3,100	3.2%
	SB Exp	22,300	20,500	-1,800	-8.1%



Segment		2045 No Build (IJR)	2045 No Build (Modified)	Difference from IJR (vehicles)	Difference from IJR (%)
	SB Total 118,400		119,700	1,300	1.1%
South of			149,900	-300	-0.2%
GWMP	SB GP	118,300	119,700	1,400	1.2%

In the 2045 travel demand model outputs, the most notable changes in volumes are again in the Maryland managed lanes, in which daily volumes show a reduction ranging from 2 to 8 percent. The change in volumes in the GP lanes ranges from 0 to just over 3 percent, including the GP segments south of GWMP in which there are no managed lanes in the No Build condition. The total volume along I-495 across the ALMB again changes by less than 1 percent in each direction.

### **Conclusions and Recommendations**

Based on the outputs of the modified travel demand model runs, VDOT does not recommend creating modified versions of the I-495 NEXT No Build Vissim models with revised traffic forecasts for the I-495 NEXT IJR Addendum. Rather, because the modified travel demand model runs resulted in a slight decrease in traffic in the Maryland managed lanes and essentially no change in the GP lanes, the conservative approach would be to assume the same traffic forecasts and traffic analysis results for the No Build scenarios from the approved I-495 NEXT IJR.

For the I-495 NEXT IJR Addendum, VDOT has developed modified traffic forecasts and Vissim models for the 2025 and 2045 Build conditions accounting for proposed geometric changes within the I-495 NEXT study area. The proposed changes in access in Maryland provided by MDOT for the Cabin John Parkway, River Road, and I-270 interchanges were included in the VDOT travel demand models for developing the modified traffic forecasts. The assumptions for the rest of the Maryland managed lanes system beyond the I-495/I-270 interchange were consistent with the access assumed in the CLRP.

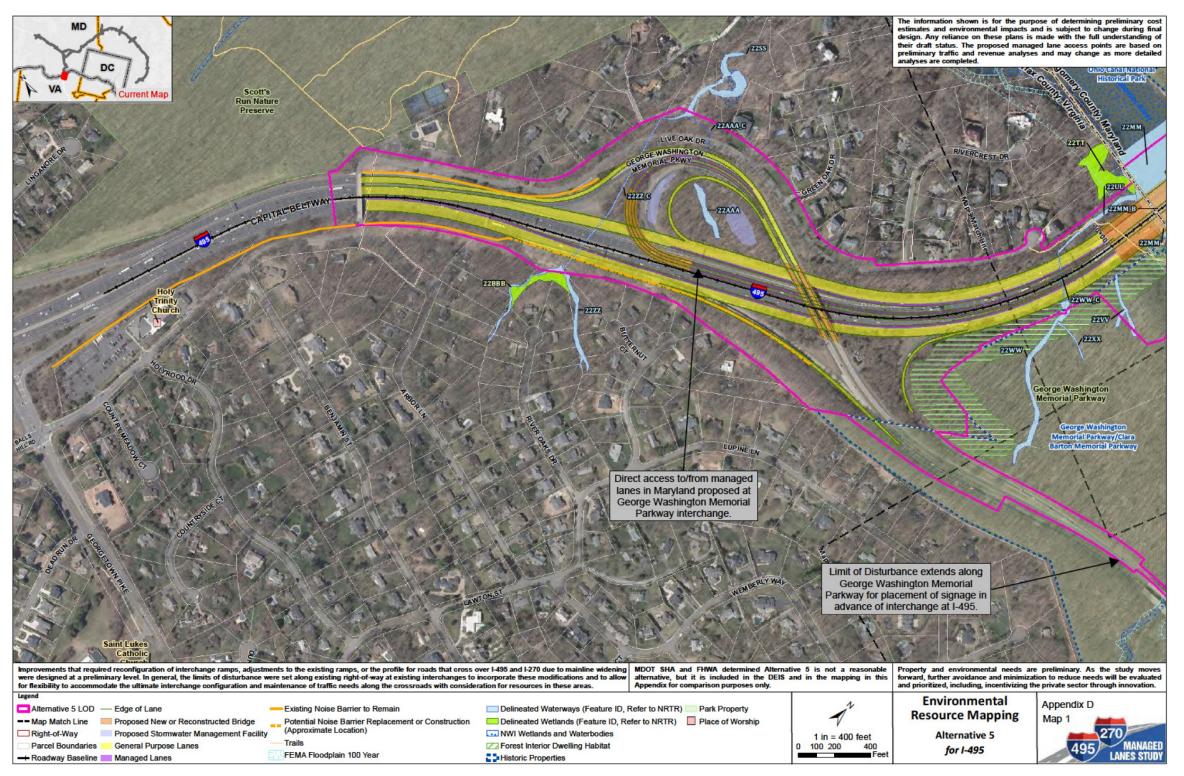
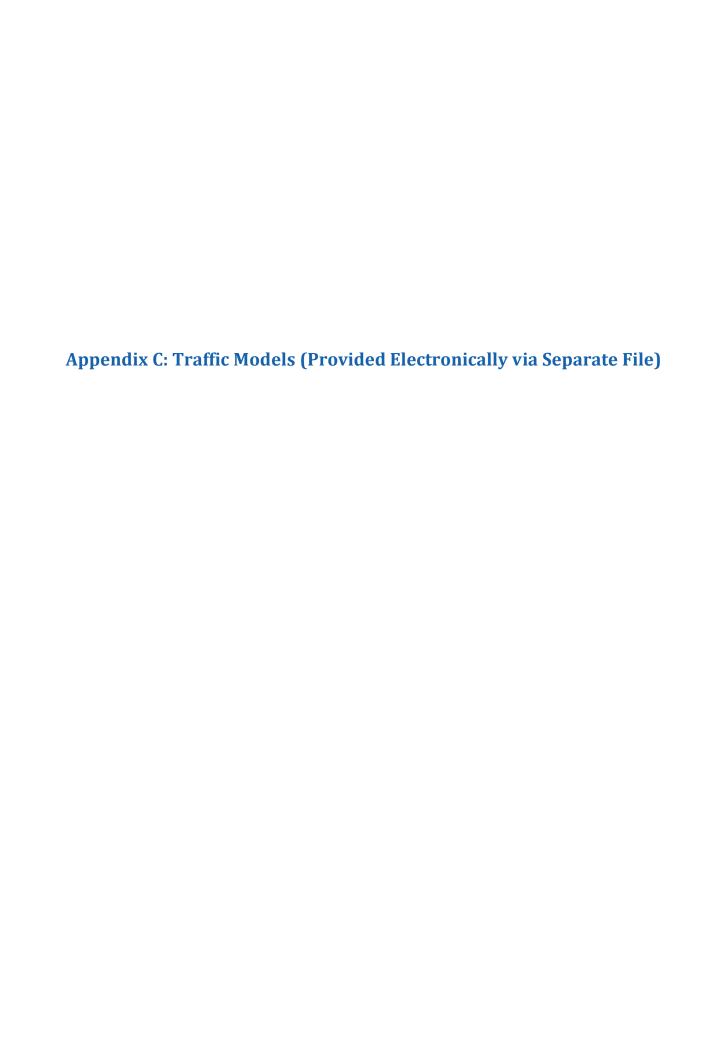


Figure 1. I-495 NEXT No Build Geometry at GWMP Interchange with Maryland Managed Lanes Project in Place1

<sup>&</sup>lt;sup>1</sup> Maryland has reconfigured the proposed interchange geometry at GWMP since this graphic was initially developed to provide access from westbound GWMP to northbound I-495 Priced Managed Lanes via a direct flyover ramp that parallels the existing general purpose ramp from westbound to northbound I-495.



495 Express Lanes Northern Extension	Interchange Justification Report
Appendix D: Freeway Segment Densities for IJI	R Addendum Study Area

# 2025 No Build AM Freeway Segment HCM-Analogous Densities in IJR Addendum Study Area

			2025 No	o Build AM
Interchange	Segment	Туре	Average Density (vpmpl)	Congestion Level
	NORTHBOUND	I-495		
I	-495 between DTR and Route 193	Basic	62.5	Severely Congested
	Upstream of Route 193	Diverge	51.9	Severely Congested
Route 193	Between off-ramp to Route 193 and on-ramp to Route 193	Basic	65.9	Severely Congested
I-4	195 between Route 193 and GWMP	Weave	91.1	Severely Congested
GWMP	Between off-ramp to NB I-495 HOT and off-ramp to GWMP	Diverge	66.8	Severely Congested
OWIII	Between off-ramp to GWMP and on-ramp from GWMP	Basic	65.9	Severely Congested
I-495 be	tween GWMP and Clara Barton Parkway	Weave	59.3	Severely Congested
	NORTHBOUND I-495 EX	PRESS LAN	NES	
І-495 Ехрі	ress Lanes Begin (MD Southern Terminus)	Basic	16.4	Light to Moderate
GWMP	Downstream of on-ramp from GWMP	Merge	13.8	Light to Moderate
OTTIMI	Downstream of on-ramp from GWMP	Basic	13.8	Light to Moderate
	SOUTHBOUND	I-495		
I-495 be	tween Clara Barton Parkway and GWMP	Weave	34.0	Heavy
	Between off-ramp to GWMP and on Ramp from GWMP (C-D Road)	Basic	17.3	Light to Moderate
	Between on-ramp from GWMP and off-ramp to Route 193 (C-D Road)	Weave	8.4	Light to Moderate
	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Basic	57.0	Severely Congested
GWMP/Route 193	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Merge	71.7	Severely Congested
	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)  Between on-ramp from C-D road and on-ramp	Basic	82.3	Severely Congested
	from Route 193	Merge	53.2	Severely Congested
	Downstream of on-ramp from Route 193	Merge	43.9	Congested
	Downstream of on-ramp from Route 193	Basic	35.6	Congested
ı	I-495 between Route 193 and DTR		27.4	Heavy
	SOUTHBOUND I-495 EX	PRESS LAN		
	Upstream of off-ramp to GWMP and I-495 SB GP	Basic	13.0	Light to Moderate
GWMP	Upstream of off-ramp to GWMP and I-495 SB GP	Diverge	12.9	Light to Moderate
	Upstream of off-ramp to GWMP and I-495 SB GP	Merge	12.8	Light to Moderate
	press Lanes End (MD Southern Terminus)	Basic	19.2	Light to Moderate
I-495 Exp	ress Lanes Begin (VA Northern Terminus)	Basic	5.1	Light to Moderate

# 2025 Build AM (Approved IJR and Modified) Freeway Segment HCM-Analogous Densities in IJR Addendum Study Area

				Approved IJR) AM	2025 Build	(Modified) AM
Interchange	Segment	Туре	Average Density (vpmpl)	Congestion Level	Average Density (vpmpl)	Congestion Level
	<u> </u>	ORTHBOL	JND I-495			
I-49	5 between DTR and Route 193	Basic	24.1	Light to Moderate	25.1	Light to Moderate
Route 193	Upstream of Route 193	Diverge	25.6	Light to Moderate	26.8	Heavy
Route 133	Between off-ramp to Route 193 and on- ramp to Route 193	Basic	28.6	Heavy	29.8	Heavy
I-495	between Route 193 and GWMP	Weave	25.7	Light to Moderate	26.9	Heavy
GWMP	Between off-ramp to NB I-495 HOT/GWMP and on-ramp from GWMP	Merge	32.3	Heavy	30.5	Heavy
I-495 between	een GWMP and Clara Barton Parkway	Weave	34.4	Heavy	29.7	Heavy
	NORTHBO	OUND I-495	EXPRESS LA	NES		
І-495 Ехрі	ress Lanes between DTR and GWMP	Basic	16.1	Light to Moderate	14.2	Light to Moderate
	Upstream of off-ramp to GWMP	Diverge	10.7	Light to Moderate	9.7	Light to Moderate
GWMP	Between off-ramp to GWMP and on- ramp from I-495 GP/GWMP	Basic	14.8	Light to Moderate	12.9	Light to Moderate
	Downstream of on-ramp from I-495 GP/GWMP	Merge	12.1	Light to Moderate	12.7	Light to Moderate
I-495 Express	Lanes between GWMP and River Road	Basic	18.3	Light to Moderate	13.1	Light to Moderate
	8	SOUTHBOL	JND I-495			
I-495 betwe	een Clara Barton Parkway and GWMP	Weave	30.3	Heavy	29.9	Heavy
	Between off-ramp to GWMP and off- ramp to Route 193	Basic	36.2	Congested	35.5	Congested
GWMP/ Route 193	Between off-ramp to GWMP and off- ramp to Route 193	Diverge	31.4	Heavy	31.0	Heavy
110010 100	Downstream of off-ramp to Route 193	Merge	32.6	Heavy	32.0	Heavy
	Between on-ramp from C-D road and on- ramp from Route 193	Basic	26.2	Heavy	26.8	Heavy
I-49	5 between Route 193 and DTR	Diverge	27.1	Heavy	27.7	Heavy
	SOUTHBO	UND I-495	EXPRESS LAI			
I-495 Express	Lanes between River Road and GWMP	Basic	14.5	Light to Moderate	16.7	Light to Moderate
	Upstream of off-ramp to GWMP/C-D Road	Diverge	10.3	Light to Moderate	13.3	Light to Moderate
GWMP	Between off-ramp to GWMP/C-D Road and on-ramp from GWMP	Basic	10.0	Light to Moderate	9.7	Light to Moderate
	Downstream of on-ramp from GWMP	Merge	7.4	Light to Moderate	7.2	Light to Moderate

# 2025 No Build PM Freeway Segment HCM-Analogous Densities in IJR Addendum Study Area

			2025 No Build PM		
Interchange	Segment	Туре	Average Density (vpmpl)	Congestion Level	
	NORTHBOUND	I-495			
I	-495 between DTR and Route 193	Basic	18.2	Light to Moderate	
	Upstream of Route 193	Diverge	15.2	Light to Moderate	
Route 193	Between off-ramp to Route 193 and on-ramp to Route 193	Basic	20.6	Light to Moderate	
I-	495 between Route 193 and GWMP	Weave	26.1	Heavy	
GWMP	Between off-ramp to NB I-495 HOT and off-ramp to GWMP	Diverge	35.2	Congested	
	Between off-ramp to GWMP and on-ramp from GWMP	Basic	46.2	Severely Congested	
I-495 be	etween GWMP and Clara Barton Parkway	Weave	36.6	Congested	
	NORTHBOUND I-495 EX	PRESS LAI	NES		
	I-495 Express Lanes End	Basic	9.9	Light to Moderate	
I-495 Exp	ress Lanes Begin (MD Southern Terminus)	Basic	12.4	Light to Moderate	
GWMP	Downstream	Merge	11.1	Light to Moderate	
	Downstream	Basic	11.3	Light to Moderate	
	SOUTHBOUND	I-495			
I-495 be	etween Clara Barton Parkway and GWMP	Weave	58.3	Severely Congested	
	Between off-ramp to GWMP and on Ramp from GWMP (C-D Road)	Basic	17.4	Light to Moderate	
	Between on-ramp from GWMP and off-ramp to Route 193 (C-D Road)	Weave	41.7	Congested	
	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Basic	93.1	Severely Congested	
GWMP/Route 193	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Merge	68.7	Severely Congested	
	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Basic	91.6	Severely Congested	
	Between on-ramp from C-D road and on-ramp from Route 193	Merge	71.7	Severely Congested	
	Downstream of on-ramp from Route 193	Merge	80.5	Severely Congested	
	Downstream of on-ramp from Route 193	Basic	78.0	Severely Congested	
	-495 between Route 193 and DTR	Diverge	87.7	Severely Congested	
	SOUTHBOUND I-495 EXI				
014/747	Upstream of off-ramp to GWMP and I-495 SB GP	Basic	8.0	Light to Moderate	
GWMP	Upstream of off-ramp to GWMP and I-495 SB GP	Diverge	8.1	Light to Moderate	
1 40E E	Upstream of off-ramp to GWMP and I-495 SB GP	Merge	8.1	Light to Moderate	
	oress Lanes End (MD Southern Terminus)	Basic	11.8	Light to Moderate	
1-495 EXP	ress Lanes Begin (VA Northern Terminus)	Basic	8.3	Light to Moderate	

# 2025 Build PM (Approved IJR and Modified) Freeway Segment HCM-Analogous Densities in IJR Addendum Study Area

	Segment		2025 Build	(Approved IJR) PM	2025 Build (Modified) PM	
Interchange		Type	Average Density (vpmpl)	Congestion Level	Average Density (vpmpl)	Congestion Level
	NOF	RTHBOUND	I-495			
I-495	between DTR and Route 193	Basic	15.1	Light to Moderate	15.1	Light to Moderate
Route 193	Upstream of Route 193	Diverge	15.3	Light to Moderate	15.2	Light to Moderate
Route 193	Between off-ramp to Route 193 and on- ramp to Route 193	Basic	18.3	Light to Moderate	18.1	Light to Moderate
I-495	between Route 193 and GWMP	Weave	17.3	Light to Moderate	17.4	Light to Moderate
GWMP	Between off-ramp to NB I-495 HOT/GWMP and on-ramp from GWMP	Merge	21.6	Light to Moderate	20.5	Light to Moderate
I-495 betwe	en GWMP and Clara Barton Parkway	Weave	20.6	Light to Moderate	20.0	Light to Moderate
	NORTHBOUN	ID I-495 EXF			20.0	Wodorato
I-495 Expre	ess Lanes between DTR and GWMP	Basic	18.0	Light to Moderate	16.6	Light to Moderate
	Upstream of off-ramp to GWMP	Diverge	11.9	Light to Moderate	11.0	Light to Moderate
GWMP	Between off-ramp to GWMP and on-ramp from I-495 GP/GWMP	Basic	16.5	Light to Moderate	15.5	Light to Moderate
	Downstream of on-ramp from I-495 GP/GWMP	Merge	12.7	Light to Moderate	15.5	Light to Moderate
I-495 Express	Lanes between GWMP and River Road	Basic	19.4	Light to Moderate	13.7	Light to Moderate
	SOL	THBOUND	I-495			
I-495 betwe	en Clara Barton Parkway and GWMP	Weave	23.2	Light to Moderate	19.8	Light to Moderate
	Between off-ramp to GWMP and off-ramp to Route 193	Basic	31.6	Heavy	22.6	Light to Moderate
GWMP/ Route	Between off-ramp to GWMP and off-ramp to Route 193	Diverge	26.7	Heavy	17.5	Light to Moderate
193	Downstream of off-ramp to Route 193	Merge	30.4	Heavy	18.2	Light to Moderate
	Between on-ramp from C-D road and on- ramp from Route 193	Basic	30.3	Heavy	19.4	Light to Moderate
I-495	between Route 193 and DTR	Diverge	34.8	Heavy	21.7	Light to Moderate
	SOUTHBOUN	ID I-495 EXP	RESS LANES			
I-495 Express	Lanes between River Road and GWMP	Basic	16.4	Light to Moderate	19.1	Light to Moderate
	Upstream of off-ramp to GWMP/C-D Road	Diverge	11.3	Light to Moderate	13.1	Light to Moderate
GWMP	Between off-ramp to GWMP/C-D Road and on-ramp from GWMP	Basic	13.2	Light to Moderate	12.8	Light to Moderate
	Downstream of on-ramp from GWMP	Merge	9.6	Light to Moderate	9.1	Light to Moderate

# 2045 No Build AM Freeway Segment HCM-Analogous Densities in IJR Addendum Study Area

			2045 N	lo Build AM
Interchange	Segment	Туре	Average Density (vpmpl)	Congestion Level
	NORTHBOUND	I-495		
	I-495 between DTR and Route 193	Weave	101.6	Severely Congested
Route 193	Between off-ramp to Route 193 and on-ramp to Route 193	Basic	78.1	Severely Congested
	I-495 between Route 193 and GWMP	Weave	109.0	Severely Congested
GWMP	Between off-ramp to NB I-495 HOT and off-ramp to GWMP	Diverge	106.3	Severely Congested
	Between off-ramp to GWMP and on-ramp from GWMP	Basic	83.0	Severely Congested
I-495	between GWMP and Clara Barton Parkway	Weave	85.7	Severely Congested
	NORTHBOUND I-495 EX	PRESS LANE	S	
I-495 Ex	press Lanes Begin (MD Southern Terminus)	Basic	18.3	Light to Moderate
GWMP	Downstream of on-ramp from GWMP	Merge	17.5	Light to Moderate
GVVIVIE	Downstream of on-ramp from GWMP	Basic	17.6	Light to Moderate
	SOUTHBOUND	I-495		
I-495	between Clara Barton Parkway and GWMP	Weave	98.0	Severely Congested
	Between off-ramp to GWMP and on Ramp from GWMP (C-D Road)	Basic	12.8	Light to Moderate
	Between on-ramp from GWMP and off-ramp to Route 193 (C-D Road)	Weave	6.2	Light to Moderate
GWMP &	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Basic	99.7	Severely Congested
Route 193	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Merge	94.3	Severely Congested
	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Basic	86.0	Severely Congested
	Between on-ramp from C-D road and on-ramp from Route 193	Merge	70.5	Severely Congested
	I-495 between Route 193 and DTR	Weave	30.2	Heavy
	SOUTHBOUND I-495 EX	PRESS LANE		
	Upstream of off-ramp to GWMP and I-495 SB GP	Basic	18.5	Light to Moderate
GWMP	Upstream of off-ramp to GWMP and I-495 SB GP	Diverge	22.6	Light to Moderate
	Upstream of off-ramp to GWMP and I-495 SB GP	Merge	47.4	Severely Congested
	xpress Lanes End (MD Southern Terminus)	Basic	23.6	Light to Moderate
I-495 Ex	rpress Lanes Begin (VA Northern Terminus)	Basic	8.3	Light to Moderate

## 2045 Build AM (Approved IJR and Modified) Freeway Segment HCM-Analogous Densities in IJR Addendum Study Area

		Sta	iuy Area			
				(Approved IJR) AM	2045 Bu	uild (Modified) AM
Interchange	Segment	Type	Average Density (vpmpl)	Congestion Level	Average Density (vpmpl)	Congestion Level
		NORTH	IBOUND I-495			
I-495 bet	ween DTR and Route 193	Weave	50.4	Severely Congested	43.3	Congested
Route 193	Between off-ramp to Route 193 and on-ramp to Route 193Between Ramps	Basic	48.1	Severely Congested	51.6	Severely Congested
I-495 betw	een Route 193 and GWMP	Weave	54.4	Severely Congested	52.3	Severely Congested
GWMP	Between off-ramp to NB I-495 HOT/GWMP and on-ramp from GWMP	Basic	65.0	Severely Congested	37.7	Congested
I-495 betwe	en GWMP and Clara Barton Parkway	Weave	66.9	Severely Congested	36.1	Congested
	NOR	THBOUND I	-495 EXPRES	S LANES		
I-495 Express L	anes between DTR and GWMP	Basic	20.5	Light to Moderate	16.2	Light to Moderate
	Upstream of off-ramp to GWMP	Basic	20.3	Light to Moderate	15.0	Light to Moderate
GWMP	Between off-ramp to GWMP and on-ramp from I-495 GP/GWMP	Merge	21.5	Light to Moderate	16.8	Light to Moderate
	Downstream of on-ramp from I- 495 GP/GWMP	Basic	25.7	Light to Moderate	25.3	Light to Moderate
		SOUTH	BOUND I-495			
I-495 betwee	n Clara Barton Parkway and GWMP	Weave	72.5	Severely Congested	51.8	Severely Congested
	Between off-ramp to GWMP and off-ramp to Route 193	Diverge	41.2	Congested	40.9	Congested
GWMP & Route 193	Downstream of off-ramp to Route 193	Basic	37.8	Congested	37.0	Congested
	Between on-ramp from C-D road and on-ramp from Route 193	Basic	30.0	Heavy	32.6	Heavy
I-495 bety	ween Route 193 and DTR	Weave	29.6	Heavy	32.4	Heavy
100.300			-495 EXPRES		UL.T	1 louvy
	Upstream of off-ramp to GWMP/C-D Road	Basic	21.1	Light to Moderate	25.1	Light to Moderate
GWMP	Between off-ramp to GWMP/C- D Road and on-ramp from GWMP	Diverge	20.1	Light to Moderate	24.1	Light to Moderate
	Downstream of on-ramp from GWMP	Basic	15.9	Light to Moderate	13.4	Light to Moderate
I-495 Express	Lanes between G.W. Parkway and DTR	Basic	16.5	Light to Moderate	14.0	Light to Moderate

# 2045 No Build PM Freeway Segment HCM-Analogous Densities in IJR Addendum Study Area

Interchange	Segment	Type	2045 No Build PM									
interchange	Segment	Type	Average Density (vpmpl)	Congestion Level								
	NORTHBOUND I-495	5										
ı	-495 between DTR and Route 193	Weave	128.1	Severely Congested								
Route 193	Between off-ramp to Route 193 and on-ramp to Route 193	Basic	105.1	Severely Congested								
1-4	195 between Route 193 and GWMP	Weave	98.1	Severely Congested								
GWMP	Between off-ramp to NB I-495 HOT and off-ramp to GWMP	Diverge	123.5	Severely Congested								
GWMP	Between off-ramp to GWMP and on-ramp from GWMP	Basic	96.5	Severely Congested								
I-495 be	tween GWMP and Clara Barton Parkway	Weave	65.3	Severely Congested								
	NORTHBOUND I-495 EXPRES	S LANES										
I-495 Expi	ress Lanes Begin (MD Southern Terminus)	Basic	15.5	Light to Moderate								
GWMP	Downstream of on-ramp from GWMP	Merge	15.8	Light to Moderate								
GVVIVIE	Downstream of on-ramp from GWMP	Basic	16.0	Light to Moderate								
	SOUTHBOUND I-495											
I-495 be	tween Clara Barton Parkway and GWMP	Weave	33.2	Heavy								
	Between off-ramp to GWMP and on Ramp from GWMP (C-D Road)	Basic	15.5	Light to Moderate								
	Between on-ramp from GWMP and off-ramp to Route 193 (C-D Road)	Weave	11.5	Light to Moderate								
GWMP/ Route 193	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Basic	24.4	Light to Moderate								
OVIIII / Route 130	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Merge	23.8	Light to Moderate								
	Between off-ramp to C-D road and on-ramp from C-D road (Mainline)	Basic	28.7	Heavy								
	Between on-ramp from C-D road and on-ramp from Route 193	Merge	32.9	Heavy								
I	-495 between Route 193 and DTR	Weave	28.4	Heavy								
	SOUTHBOUND I-495 EXPRES	S LANES										
	Upstream of off-ramp to GWMP and I-495 SB GP	Basic	13.4	Light to Moderate								
GWMP	Upstream of off-ramp to GWMP and I-495 SB GP	Diverge	13.5	Light to Moderate								
	Upstream of off-ramp to GWMP and I-495 SB GP	Merge	18.2	Light to Moderate								
I-495 Exp	oress Lanes End (MD Southern Terminus)	Basic	17.8	Light to Moderate								

# 2045 Build PM (Approved IJR and Modified) Freeway Segment HCM-Analogous Densities in IJR Addendum Study Area

		Stu	iuy Area					
			2045 Build	I (Approved IJR) PM	2045 Build (Modified) PM			
Interchange	Segment	Туре	Average Density (vpmpl)	Congestion Level	Average Density (vpmpl)	Congestion Level		
	NORTHB	OUND I-495 (	GENERAL PU	RPOSE LANES				
I-495 between	een DTR and Route 193	Weave	122.3	Severely Congested	121.2	Severely Congested		
Route 193	Between off-ramp to Route 193 and on-ramp to Route 193Between Ramps	Basic	95.0	Severely Congested	94.5	Severely Congested		
I-495 betwee	en Route 193 and GWMP	Weave	84.2	Severely Congested	84.5	Severely Congested		
GWMP	Between off-ramp to NB I-495 HOT/GWMP and on-ramp from GWMP	Basic	97.4	Severely Congested	96.8	Severely Congested		
I-495 betweer	n GWMP and Clara Barton Parkway	Weave	73.3	Severely Congested	72.8	Severely Congested		
	NO	RTHBOUND I	-495 EXPRES	S LANES				
	anes between DTR and G.W. morial Parkway	Basic	17.8	Light to Moderate	18.9	Light to Moderate		
	Upstream of off-ramp to GWMP	Basic	17.7	Light to Moderate	18.1	Light to Moderate		
GWMP	Between off-ramp to GWMP and on-ramp from I-495 GP/GWMP	Merge	18.6	Light to Moderate	17.8	Light to Moderate		
	Downstream of on-ramp from I-495 GP/GWMP	Basic	22.5	Light to Moderate	23.2	Light to Moderate		
	SOUTHB	OUND I-495 (	GENERAL PU	RPOSE LANES				
I-495 between	Clara Barton Parkway and GWMP	Weave	27.5	Heavy	26.9	Heavy		
	Between off-ramp to GWMP and off-ramp to Route 193	Diverge	29.2	Heavy	28.4	Heavy		
GWMP & Route 193	Downstream of off-ramp to Route 193	Basic	27.2	Heavy	26.4	Heavy		
	Between on-ramp from C-D road and on-ramp from Route 193	Basic	24.3	Light to Moderate	28.1	Heavy		
		UTHBOUND I	-495 EXPRES	S LANES				
	Upstream of off-ramp to GWMP/C-D Road	Basic	20.8	Light to Moderate	22.2	Light to Moderate		
GWMP	Between off-ramp to GWMP/C-D Road and on- ramp from GWMP	Diverge	19.4	Light to Moderate	10.0	Light to Moderate		
	Downstream of on-ramp from GWMP	Basic	16.8	Light to Moderate	13.0	Light to Moderate		
I-495 Express L	anes between G.W. Parkway and DTR	Basic	18.2	Light to Moderate	14.8	Light to Moderate		

		No Build 2025		202	5 Build (Approved	IJR)	2025 Build (Modified)			
Ramp Name	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	
I-495 NB GP to Route 193	34	1,225	No	46	1,225	No	63	1,225	No	
I-495 SB GP to Route 193	82	1,100	No	71	820	No	78	820	No	
Route 193 to I-495 NB GP	33	930	No	0	930	No	0	930	No	
Route 193 to I-495 SB GP	0	815	No	0	815	No	0	815	No	
I-495 NB GP to GWMP	0	2,310	No	0	1,670	No	0	1,670	No	
I-495 SB GP to GWMP	0	900	No	0	900	No	0	900	No	
GWMP to I-495 NB GP	0	2,220	No	0	2,220	No	0	2,220	No	
GWMP to I-495 SB GP	0	805	No	0	1,051	No	0	1,051	No	
I-495 NB EXP to GWMP	-	-	-	0	3,265	No	-	3,265	-	
I-495 SB EXP to GWMP	0	2,850	No	0	2,830	No	-	2,830	-	
GWMP to I-495 NB EXP	0	2,180	No	0	2,000	No	-	2,000	-	
GWMP to I-495 SB EXP	-	-	-	0	1,180	No	0	1,180	No	
I-495 NB GP to Clara Barton EB	0	1,700	No	0	1,700	No	0	1,700	No	
I-495 NB GP to Clara Barton WB	0	725	No	0	725	No	0	725	No	
I-495 SB GP to Clara Barton WB	0	1,485	No	0	1,485	No	0	1,485	No	
Clara Barton EB to I-495 NB GP	0	2,515	No	0	2,515	No	0	2,515	No	
Clara Barton EB to I-495 SB GP	0	1,100	No	0	1,100	No	0	1,100	No	
Clara Barton WB to I-495 SB GP	0	2,095	No	0	2,095	No	0	2,095	No	

ea

		No Build 2025		202!	5 Build (Approved	IJR)	2025 Build (Modified)			
Ramp Name	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	
I-495 NB GP to Route 193	21	1225	No	20	1225	No	24	1225	No	
I-495 SB GP to Route 193	160	1100	No	109	820	No	142	820	No	
Route 193 to I-495 NB GP	904	930	No	0	930	No	0	930	No	
Route 193 to I-495 SB GP	36	815	No	0	815	No	0	815	No	
I-495 NB GP to GWMP	0	2310	No	0	1670	No	0	1670	No	
I-495 SB GP to GWMP	0	900	No	0	900	No	0	900	No	
GWMP to I-495 NB GP	0	2220	No	0	2220	No	0	2220	No	
GWMP to I-495 SB GP	0	805	No	93	1051	No	0	1051	No	
I-495 NB EXP to GWMP	-	-	-	0	3265	No	0	3265	No	
I-495 SB EXP to GWMP	0	2850	No	0	2830	No	0	2830	No	
GWMP to I-495 NB EXP	0	2180	No	0	2000	No	-	2000	-	
GWMP to I-495 SB EXP	-	-	-	0	1180	No	0	1180	No	
I-495 NB GP to Clara Barton EB	0	1700	No	0	1700	No	0	1700	No	
I-495 NB GP to Clara Barton WB	0	725	No	0	725	No	0	725	No	
I-495 SB GP to Clara Barton WB	0	1485	No	0	1485	No	0	1485	No	
Clara Barton EB to I-495 NB GP	0	2515	No	0	2515	No	0	2515	No	
Clara Barton EB to I-495 SB GP	0	1100	No	0	1100	No	0	1100	No	
Clara Barton WB to I-495 SB GP	7122	2095	Yes	6887	2095	Yes	0	2095	No	

		No Build 2045		204	5 Build (Approved	IJR)	2045 Build (Modified)			
Ramp Name	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	
I-495 NB GP to Route 193	4995	1225	Yes	152	1,225	No	80	1,225	No	
I-495 SB GP to Route 193	82	1100	No	109	820	No	180	820	No	
Route 193 to I-495 NB GP	1106	930	Yes	0	930	No	0	930	No	
Route 193 to I-495 SB GP	0	815	No	0	815	No	0	815	No	
I-495 NB GP to GWMP	0	2310	No	0	1,670	No	0	1,670	No	
I-495 SB GP to GWMP	0	900	No	0	900	No	0	900	No	
GWMP to I-495 NB GP	1751	2220	No	0	2,220	No	0	2,220	No	
GWMP to I-495 SB GP	0	805	No	0	1,051	No	0	1,051	No	
I-495 NB EXP to GWMP	-	-	-	0	3,265	No	0	3,265	No	
I-495 SB EXP to GWMP	0	2850	No	0	2,830	No	0	2,830	No	
GWMP to I-495 NB EXP	0	2180	No	0	2,000	No	-	2,000	-	
GWMP to I-495 SB EXP	-	-	-	0	1,830	No	0	1,830	No	
I-495 NB GP to Clara Barton EB	0	1700	No	0	1,700	No	0	1,700	No	
I-495 NB GP to Clara Barton WB	0	725	No	0	725	No	0	725	No	
I-495 SB GP to Clara Barton WB	0	1485	No	0	1,485	No	0	1,485	No	
Clara Barton EB to I-495 NB GP	0	2515	No	0	2,515	No	0	2,515	No	
Clara Barton EB to I-495 SB GP	3142	1100	Yes	237	1,100	No	0	1,100	No	
Clara Barton WB to I-495 SB GP	7123	2095	Yes	2,821	2,095	Yes	0	2,095	No	

		No Build 2045		204	5 Build (Approved	UR)	2045 Build (Modified)			
Ramp Name	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	95th % Average Ramp Queues	Ramp Storage	Storage Exceeded?	
I-495 NB GP to Route 193	136	1225	No	91	1,225	No	87	1,225	No	
I-495 SB GP to Route 193	90	1100	No	88	820	No	145	820	No	
Route 193 to I-495 NB GP	1066	930	Yes	25	930	No	10	930	No	
Route 193 to I-495 SB GP	0	815	No	0	815	No	0	815	No	
I-495 NB GP to GWMP	0	2310	No	0	1,670	No	0	1,670	No	
I-495 SB GP to GWMP	0	900	No	0	900	No	0	900	No	
GWMP to I-495 NB GP	0	2220	No	12	2,220	No	11	2,220	No	
GWMP to I-495 SB GP	0	805	No	0	1,051	No	0	1,051	No	
I-495 NB EXP to GWMP	-	-	-	0	3,265	No	0	3,265	No	
I-495 SB EXP to GWMP	0	2850	No	0	2,830	No	0	2,830	No	
GWMP to I-495 NB EXP	0	2180	No	0	2,000	No	-	2,000	-	
GWMP to I-495 SB EXP	-	-	-	0	1,830	No	0	1,830	No	
I-495 NB GP to Clara Barton EB	0	1700	No	0	1,700	No	0	1,700	No	
I-495 NB GP to Clara Barton WB	0	725	No	0	725	No	0	725	No	
I-495 SB GP to Clara Barton WB	0	1485	No	0	1,485	No	0	1,485	No	
Clara Barton EB to I-495 NB GP	0	2515	No	0	2,515	No	0	2,515	No	
Clara Barton EB to I-495 SB GP	0	1100	No	0	1,100	No	0	1,100	No	
Clara Barton WB to I-495 SB GP	7124	2095	Yes	68	2,095	No	68	2,095	No	

				2025	No Build		20	025 Build ( <i>i</i>	Approved I	JR)	2025 Build (Modified)			
Intersection	Approach	Movement		ue Length et)	Storage Length (feet)	Storage Exceeded?		ue Length eet)	Storage Length (feet)	Storage Exceeded?		ue Length eet)	Storage Length (feet)	Storage Exceeded?
		LT	61		780	No	54		780	No	52		780	No
	NB	TH	62	62	780	No	54	54	780	No	53	53	780	No
		RT	60		780	No	53		780	No	51	1	780	No
Route 193		LT	55		280	No	54		280	No	63		280	No
and Helga	SB	TH	73	82	280	No	71	80	280	No	81	89	280	No
Place/		RT	82		280	No	80		280	No	89		280	No
	EB	TH	2,713	2.713	1,285	Yes	1,385	1.385	1,285	Yes	442	442	1,285	No
Linganore	EB	RT	2,713	2,713	195	Yes	1,385	1,365	195	Yes	442	] 442	195	Yes
Drive		LT	41		265	No	52		265	No	47		265	No
	WB	TH	53	53	385	No	50	52	385	No	63	63	385	No
		RT	53		295	No	50	1	295	No	63	1	295	No
	Inters	ection				-		•		-				-
		LT	333		1,140	No	362		920	No	353		920	No
	SB	TH	333	333	1,140	No	362	362	920	No	353	353	920	No
Route 193		RT	286	""	1,210	No	298	1 552	985	No	311	1	985	No
and I-495		TH	546		410	Yes	532	-	410	Yes	534		410	Yes
Southbound	EB	RT	440	546	550	No	427	532	550	No	544	544	550	No
		LT	339		120	Yes	355	-	120	Yes	273		120	Yes
Ramps	WB	TH	339	339	345	No	355	355	345	Yes	273	273	345	No
	Intoro		339		343	-	333		343	1 es -	213		343	-
	Intersection							_						
	NB	LT	248	0.40	1,270	No	245	245	1,270	No	276	070	1,270	No
	NB	TH	248	248	1,270	No	245	245	1,270	No	276	276	1,270	No
Route 193		RT	219		1,370	No	217		1,370	No	248		1,370	No
and I-495	EB	LT	430	430	135	Yes	427	427	135	Yes	407	407	135	Yes
Northbound		TH	430	.00	345	Yes	427		345	Yes	407		345	Yes
Ramps	WB	TH	394	394	320	Yes	379	379	320	Yes	257	257	320	No
		RT	0	001	395	No	0	0,0	395	No	176	201	395	No
	Inters	ection				-				-				-
		LT	465		110	Yes	463		110	Yes	420		110	Yes
	NB	TH	465	465	110	Yes	463	463	110	Yes	420	420	110	Yes
		RT	455		120	Yes	453	1	120	Yes	410	1	120	Yes
		LT	116		145	No	133		145	No	152		145	Yes
	SB	TH	116	116	145	No	133	133	145	No	152	152	145	Yes
Route 193		RT	105		305	No	122	1	305	No	141	1	305	No
and Balls Hill		LT	330		195	Yes	345		195	Yes	359		195	Yes
Road	EB	TH	330	341	325	Yes	345	361	325	Yes	359	375	325	Yes
		RT	341		215	Yes	361	1	215	Yes	375	1	215	Yes
		LT	231		225	Yes	230		225	Yes	221		225	No
	WB	TH	231	231	500	No	230	230	500	No	221	221	500	No
		RT	231		125	Yes	230	†	125	Yes	221	1	125	Yes
	Inters	ection				-		·		-				-
		LT	97		1,555	No	86	T	1,555	No	108	1	1,555	No
	NB	RT	94	97	1,555	No	83	86	1,555	No	106	108	1,555	No
Route 193		TH	130		510	No	181		510	No	176		510	No
and Dead Run	EB	RT	130	130	510	No	181	181	510	No	176	176	510	No
		LT	59		465	No	59	+	465	No	70		465	No No
Drive	WB	TH	59 4	59	565	No	59	59	565	No No	70	70	565	No No
	Intere	ection	4		505	INO -	5		505	NO -			303	INO -
	inters	CCHOIL				-								

				2025 N	lo Build		2	025 Build ( <i>A</i>	Approved IJI	R)	2025 Build (Modified)			
Intersection	Approach	Movement		ue Length eet)	Storage Length (feet)	Storage Exceeded?		ue Length eet)	Storage Length (feet)	Storage Exceeded?		ue Length eet)	Storage Length (feet)	Storage Exceeded?
		LT	41		780	No	0		780	No	0		780	No
	NB	TH	41	41	780	No	0	0	780	No	0	0	780	No
		RT	40		780	No	0		780	No	0		780	No
Route 193		LT	50		280	No	53	]	280	No	51	]	280	No
and Helga	SB	TH	68	77	280	No	71	79	280	No	68	77	280	No
Place/		RT	77		280	No	79		280	No	77		280	No
Linganore	EB	TH	693	693	1,285	No	2	2	1,285	No	4	4	1,285	No
Drive		RT	693		195	Yes	2		195	No	4		195	No
5	14/15	LT	44	400	265	No	40		265	No	41		265	No
	WB	TH	169	169	385	No	87	87	385	No	73	73	385	No
	14	RT	169		295	No	87		295	No	73		295	No
	Inters	ection				<u> </u>				-				-
		LT	652	050	1,140	No	487	407	920	No	483	400	920	No
D-114- 400	SB	TH	652	652	1,140	No	487	487	920	No	483	483	920	No
Route 193		RT	606		1,210	No	415		985	No	438		985	No
and I-495	EB	TH	542	542	410	Yes	378	378	410	No	430	430	410	Yes
Southbound		RT	436		550	No	272		550	No	430		550	No
Ramps	WB	LT	443	443	120	Yes	439	439	120	Yes	342	342	120	Yes
		TH	443		345	Yes	439		345	Yes	342		345	No
	Intersection			1		<u> </u>				-				-
		LT	176		1,270	No	180		1,270	No	201		1,270	No
	NB	TH	176	176	1,270	No	180	180	1,270	No	201	201	1,270	No
Route 193		RT	146		1,370	No	151		1,370	No	161		1,370	No
and I-495	EB	LT	432	432	135	Yes	353	353	135	Yes	286	286	135	Yes
Northbound		TH	432		345	Yes	353		345	No	286		345	No
Ramps	WB	TH	453	453	320	Yes	443	443	320	Yes	330	330	320	Yes
	l4	RT	238		395	No	0		395	No	330		395	No
	inters	ection			110	-			110	-	005	_	110	-
		LT	1,142	4 4 4 0	110	Yes	324		110	Yes	325	005	110	Yes
	NB	TH	1,142	1,142	110	Yes	324	324	110	Yes	325	325	110	Yes
		RT	1,133		120	Yes	251		120	Yes	246		120	Yes
	0.5	LT	317	0.17	145	Yes	225		145	Yes	227	007	145	Yes
Route 193	SB	TH	317	317	145	Yes	225	225	145	Yes	227	227	145	Yes
and Balls Hill		RT	305		305	Yes	213 114		305 195	No	216 106	1	305 195	No No
	EB	LT	106	121	195 325	No		117		No	106	114	195 325	No No
Road	EB	TH RT	106 121	'2'	215	No No	114 117	<del> </del> '''	325 215	No No	106	1 ''*	215	No No
		LT	608		225	Yes	405	-	225	Yes	338	<del>                                     </del>	225	Yes
	WB	TH	608	608	500	Yes	405	405	500	No Yes	338	338	500	No Yes
	WD	RT	608	- 000	125	Yes	405	403	125	Yes	338	330	125	Yes
	Intere	ection	000		123	-	400		123	-	330		123	-
		LT	509	1	1,555	No	209	I	1,555	l No	207		1,555	l No
	NB	RT	507	509	1,555	No	209	209	1,555	No	207	207	1,555	No
Route 193		TH	0		510	No	16	<u> </u>	510	No	3	<del>                                     </del>	510	No
and Dead	EB	RT	0	0	510	No	16	16	510	No	3	3	510	No
Run Drive		LT	1,360		465	Yes	144	<del> </del>	465	No	28	t	465	No
Kuii Diive	WB	TH TH	1,295	1,360	565	Yes	105	144	565	No	0	28	565	No
	Inters	ection	1,200		000	-	100	_	000	-		_		-

				2045 N	lo Build		2	045 Build ( <i>F</i>	Approved IJI	R)	2045 Build (IJR Addendum)			
Intersection	Approach	Movement		ue Length eet)	Storage Length (feet)	Storage Exceeded?		ue Length eet)	Storage Length (feet)	Storage Exceeded?		ue Length eet)	Storage Length (feet)	Storage Exceeded?
		LT	54		780	No	52		780	No	54		780	No
	NB	TH	55	55	780	No	53	53	780	No	55	55	780	No
		RT	53		780	No	51	1	780	No	53	Ī	780	No
Route 193		LT	68		280	No	63		280	No	55		280	No
and Helga	SB	TH	86	94	280	No	81	89	280	No	73	82	280	No
Place/		RT	94		280	No	89		280	No	82		280	No
	EB	TH	2,721	2.721	1,285	Yes	681	681	1,285	No	547	547	1,285	No
Linganore	EB	RT	2,721	2,721	195	Yes	681	7 001	195	Yes	547	347	195	Yes
Drive		LT	42		265	No	54		265	No	53		265	No
	WB	TH	90	90	385	No	77	77	385	No	117	117	385	No
		RT	90	1	295	No	77	7	295	No	117	7	295	No
	Inters	ection				-				-				-
		LT	338		1,140	No	404	T T	920	No	531		920	No
	SB	TH TH	338	338	1,140	No	404	404	920	No	531	531	920	No
Route 193		RT	283	1	1,210	No	359	1	985	No	489	1	985	No
and I-495		TH	538		410	Yes	550	+	410	Yes	543	+	410	Yes
Southbound	EB	RT	432	538	550	No	445	550	550	No	550	550	550	No
Ramps		LT	432		120	Yes	433	+	120	Yes	419	+	120	Yes
Kallips	WB	TH TH	432	432	345	Yes	433	433	345	Yes	419	419	345	Yes
	Intore	ection	432		343	-	433		343	163	419		343	163
<del> </del>	inters	LT	2.620		1,270	Yes	624	_	1,270	No	347	_	1,270	No No
	NB			2,620				624		No	_	347		No
Route 193	ND	TH	2,620	2,020	1,270	Yes	624	024	1,270		347	347	1,270	
and I-495		RT	2,597		1,370	Yes	575		1,370	No	320	1	1,370	No
	EB	LT	444	444	135	Yes	459	459	135	Yes	437	437	135	Yes
Northbound		TH	444		345	Yes	459	-	345	Yes	437	-	345	Yes
Ramps	WB	TH	448	448	320	Yes	446	446	320	Yes	330	330	320	Yes
	1-4	RT	352		395	No	0		395	No	330		395	No
	inters	ection				-		_		-		_		-
		LT	1,265		110	Yes	399	1	110	Yes	406	4	110	Yes
	NB	TH	1,265	1,265	110	Yes	399	461	110	Yes	406	446	110	Yes
		RT	1,255		120	Yes	461		120	Yes	446		120	Yes
		LT	234		145	Yes	153	4	145	Yes	153	1	145	Yes
I	SB	TH	234	234	145	Yes	153	153	145	Yes	153	153	145	Yes
Route 193		RT	222		305	No	142		305	No	141	1	305	No
and Balls Hill		LT	419		195	Yes	410	J	195	Yes	396	<b>↓</b>	195	Yes
Road	EB	TH	419	431	325	Yes	410	425	325	Yes	396	411	325	Yes
		RT	431		215	Yes	425		215	Yes	411	1	215	Yes
		LT	548	]	225	Yes	335	1	225	Yes	332	1	225	Yes
	WB	TH	548	548	500	Yes	335	335	500	No	332	332	500	No
		RT	548		125	Yes	335		125	Yes	332		125	Yes
	Inters	ection								-				-
	NB	LT	109	109	1,555	No	117	117	1,555	No	127	127	1,555	No
		RT	107	100	1,555	No	115	1 '''	1,555	No	124	121	1,555	No
Route 193	EB	TH	245	245	510	No	253	253	510	No	224	224	510	No
and Dead		RT	245	240	510	No	253	200	510	No	224		510	No
Run Drive	WB	LT	722	722	465	Yes	104	104	465	No	101	101	465	No
	VVD	TH	656	122	565	Yes	35	104	565	No	35	101	565	No
	Inters	ection				-				-				-

Intersection	Approach	Movement	2045 No Build				2045 Build (Approved IJR)				2045 Build (Modified)			
			Max Queue Length (feet)		Storage Length (feet)	Storage Exceeded?	Max Queue Length (feet)		Storage Length (feet)	Storage Exceeded?	Max Queue Length (feet)		Storage Length (feet)	Storage Exceeded?
Route 193	NB	LT	40		780	No	40		780	No No	40	41	780	No
		TH	41	41	780	No	41	41	780		41		780	No
		RT	39		780	No	39		780	No	39		780	No
	SB	LT	50	76	280	No	50	76	280	No	50		280	No
and Helga		TH	67		280	No	67		280	No	67	76	280	No
Place/ Linganore Drive		RT	76	1	280	No	76	1	280	No	76	1	280	No
	EB	TH	624	624	1,285	No	0	0	1,285	No	0	0	1,285	No
		RT	624	024	195	Yes	0	1 °	195	No	0	1 "	195	No
	WB	LT	153	349	265	No	152	407	265	No	79	434	265	No
		TH	349		385	No	407		385	Yes	434		385	Yes
		RT	349	1	295	Yes	407		295	Yes	434		295	Yes
	Intersection					-		0	0	-				-
Route 193 and I-495 Southbound Ramps	SB	LT	476	476	1.140	No	436	436	920	No	511		920	No
		TH	476		1,140	No	436		920	No	511	511	920	No
		RT	425		1,210	No	391		985	No	455		985	No
		TH	535		410	Yes	364		410	No	248		410	No
	EB	RT	430	535	550	No	258	364	550	No	120	248	550	No
		LT	423		120	Yes	420		120	Yes	432	+	120	Yes
	WB	TH	423	423	345	Yes	420	420	345	Yes	432	432	345	Yes
	Intersection		423		343	-		0	0	-	432		343	-
	LT		410		1,270	No		1	1,270	No	410		1,270	No
Route 193 and I-495 Northbound Ramps	NB		418	418		No	407	407		No		410		No
		TH	418		1,270		407		1,270		410		1,270	
		RT	390		1,370	No	369 354		1,370	No	381		1,370	No
	EB	LT	441	441	135	Yes		- 354 - 443	135	Yes	220	220	135	Yes
		TH	441		345	Yes	354		345	Yes	220		345	No
	WB	TH RT	458	458	320	Yes No	443 0		320	Yes No	366		320	Yes No
	l4		353		395				395		280		395	
	Intersection					-		U	0	-				-
Route 193 and Balls Hill Road	NB	LT	596	500	110	Yes	312	312	110	Yes	282	282	110	Yes
		TH	596	596	110	Yes	312		110	Yes	282		110	Yes
		RT	586		120	Yes	303		120	Yes	272		120	Yes
	SB	LT	243	243	145	Yes	193	193	145	Yes	217	217	145	Yes
		TH	243		145	Yes	193		145	Yes	217		145	Yes
		RT	232		305	No	182		305	No	206		305	No
	ЕВ	LT	240		195	Yes	241	1	195	Yes	187		195	No
		TH	240	240	325	No	241	257	325	No	187	199	325	No
		RT	240		215	Yes	257		215	Yes	199	ļ	215	No
	WB	LT	603	000	225	Yes	436	436	225	Yes	462		225	Yes
		TH	603	603	500	Yes	436		500	No	462	479	500	No
	RT		603		125	Yes	436		125	Yes	479		125	Yes
	Intersection					-		0	0	-				-
	NB	LT	516	516	1,555	No	214	214	1,555	No	209	209	1,555	No
<b> </b>		RT	513	0.0	1,555	No	212		1,555	No	206		1,555	No
Route 193	EB	TH	18	18	510	No	16	16	510	No	8	8	510	No
and Dead		RT	18		510	No	16		510	No	8		510	No
Run Drive	WB	LT	1,586	1.586	465	Yes	20	20	465	No	70	70	465	No
		TH	1,520	.,,555	565	Yes	0		565	No	39		565	No
	Inters	Intersection				-		0	0	-				-