



Date of Work Session: September 22, 2014

**TOWN OF LEESBURG
TOWN COUNCIL WORK SESSION**

Subject: Route 15 Bypass Congestion Relief Study

Staff Contact: Thomas A. Mason, P.E., Director of Public Works
Calvin K. Grow, Transportation Engineer

Recommendation: The Department of Public Works recommends that this information be forwarded to the Town Council.

Fiscal Analysis: This item may impact the Department of Public Work's operating budget. This impact can be determined after a decision is made regarding the issue of this memo.

Issue: What improvements can be made to reduce congestion and increase traffic safety on the Route 15 Bypass and Route 15 north of Leesburg.

Route 15 Bypass Northbound Congestion: The frequent afternoon traffic backup on the Route 15 Bypass is due to inadequate roadway capacity of U.S. Route 15 north of Leesburg. This roadway has only one lane in each direction. The traffic engineering firm of Wells and Associates was hired to prepare a model of the existing roadway and traffic conditions and perform an analysis to evaluate improvements that will reduce the traffic congestion and backup caused by the limited road capacity on Route 15 north of Battlefield Parkway. Wells and Associates will provide the Town Council a presentation on an operational analysis completed for Route 15 Bypass that includes the following alternatives:

Alternative 1A – Northbound (NB) traffic merge south of Battlefield Parkway.

- This alternative moves the existing Route 15 Bypass merge point located north of the Battlefield Parkway intersection, south about 1,250 feet or approximately 1/3 of the distance toward the Edwards Ferry Road intersection.

Alternative 1B – NB merge with right-turn lane drop south of Battlefield Parkway.

- This alternative is similar to Alternative 1A except the merge would occur along and with a mandatory right-turn lane movement. The outside through lane from Edwards Ferry Road would turn into a mandatory right-turn lane.

Alternative 2A – N. King Street (Route 15 Business)/Route 15 Bypass weave section lengthened to Tutt Lane.

- This alternative keeps the NB merge point north of Battlefield Parkway and lengthens the weaving section of the N. King Street northbound on-ramp by extending a second lane to Tutt Lane.

Alternative 2B – NB weave lane from N. King Street (Route 15 Business) extended to Tutt Lane with weave area lengthened.

- This alternative is similar to Alternative 2A except the N. King Street northbound on-ramp is configured in a manner that further lengthens the weave section between the northbound on and off ramps. The ramp connection would be configured similar to a loop ramp.

Alternative 3A – NB Lane Extended to Tutt Lane.

- This alternative provides a second through lane from Battlefield Parkway to Tutt Lane.

Alternative 3B – NB weave lane extended to Tutt Lane and weave area lengthened.

- This alternative combines Alternative 3A and Alternative 2B. The alternative provides two northbound through lanes from Battlefield to Tutt Lane and reconfigures the northbound on-ramp to lengthen the weave section between the northbound on and off ramps of N. King Street.

Alternative 4 – NB Lanes extended north of Whites Ferry/Raspberry Falls.

- This alternative provides two through lanes from Battlefield Parkway to just north of Whites Ferry/Raspberry Falls intersection along Route 15.

Alternative 5 – (No drawing or analysis included) Roundabout at the Intersection of Route 15 and Whites Ferry Road.

- A preliminary roundabout study at the intersection of Route 15 and Whites Ferry Road shows that the total traffic volumes are too high for a single-lane roundabout and the traffic flow of the intersection is not conducive for a multi-lane roundabout since most traffic is travelling straight on the mainline with few turning vehicles. Since Route 15 is only two-lane throughout this area, having a multi-lane roundabout would require a merge area immediately beyond the roundabout causing back-ups through the intersection. Additionally, the major/minor percentage split of 94/6 was greater than the generally accepted upper threshold limit of 90/10 which would allow few gaps for side street vehicles to enter the intersection especially during the peak hours.

Conclusion: The analysis show that Alternatives 2A, 3A, 3B and 4 decrease the delay per vehicle on the Route 15 Bypass at Battlefield Parkway and move the end of the backup to an area north of this intersection. Alternative 4 will be difficult to pursue because it does not comply with the adopted County Transportation Improvement Plan. Alternatives 2A, 3A and 3B should be studied further. Alternatives 2A and 3A could be phased with 2A first followed by 3A and almost all of 2A can be used if 3A is implemented.

Most of the studied improvements are located outside the Leesburg Corporate Limits on VDOT maintained roads. Further study and analysis should be performed by VDOT with cooperation and assistance by the Town and Loudoun County

Attachments: Route 15 Bypass Operational Analysis Summary Table and Maps

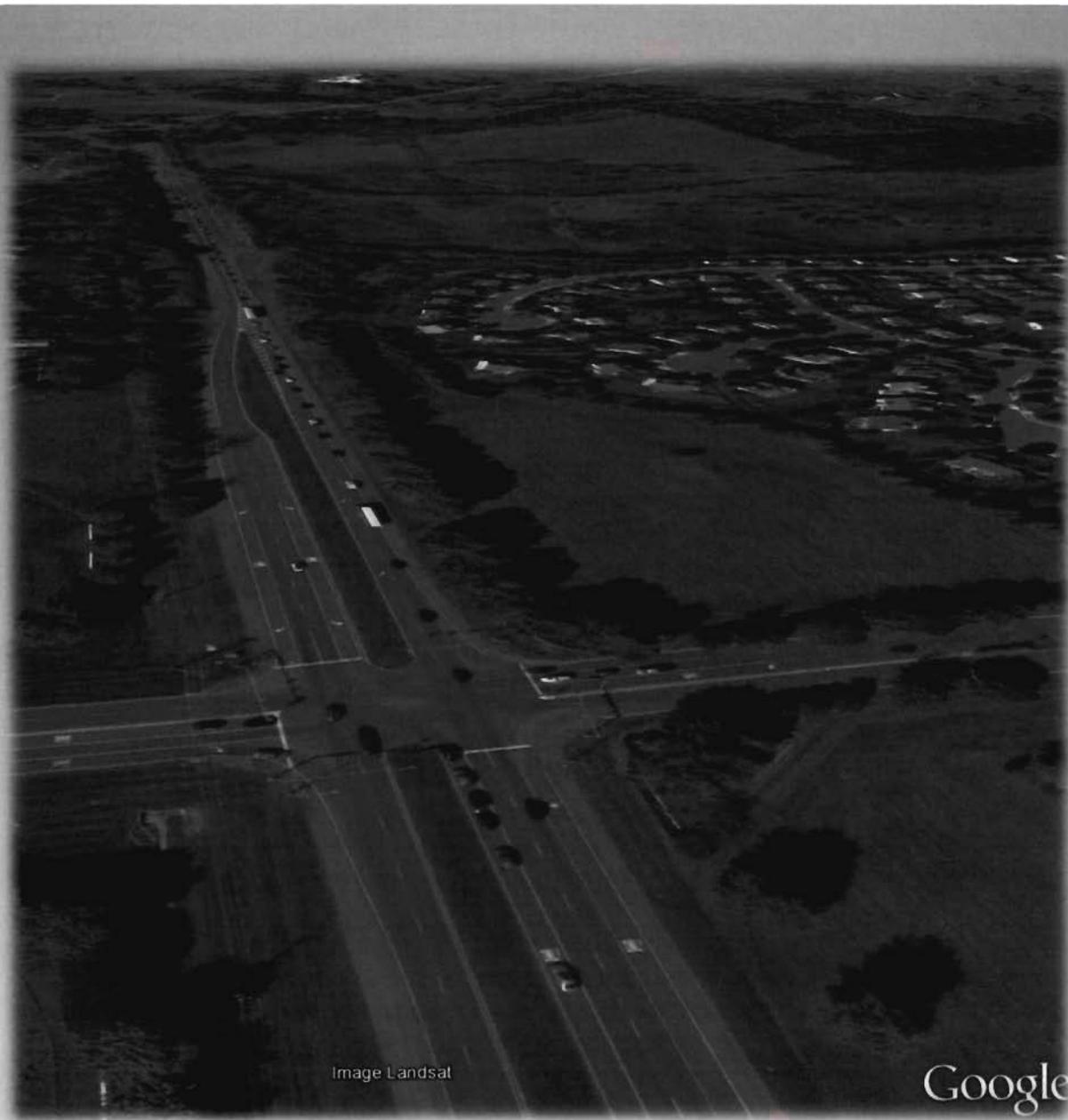
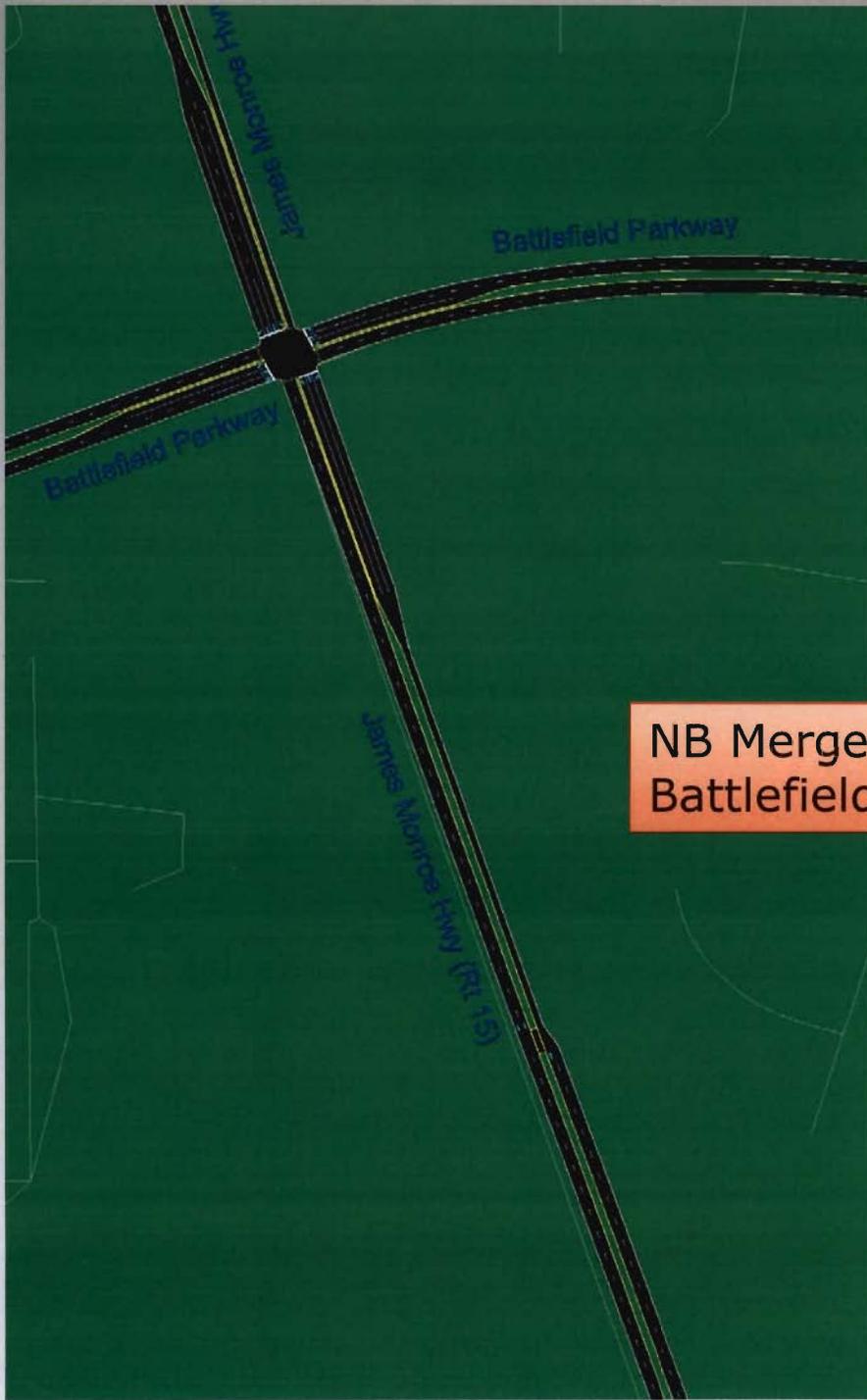


Image Landsat

Google

Route 15 By-Pass Operational Study



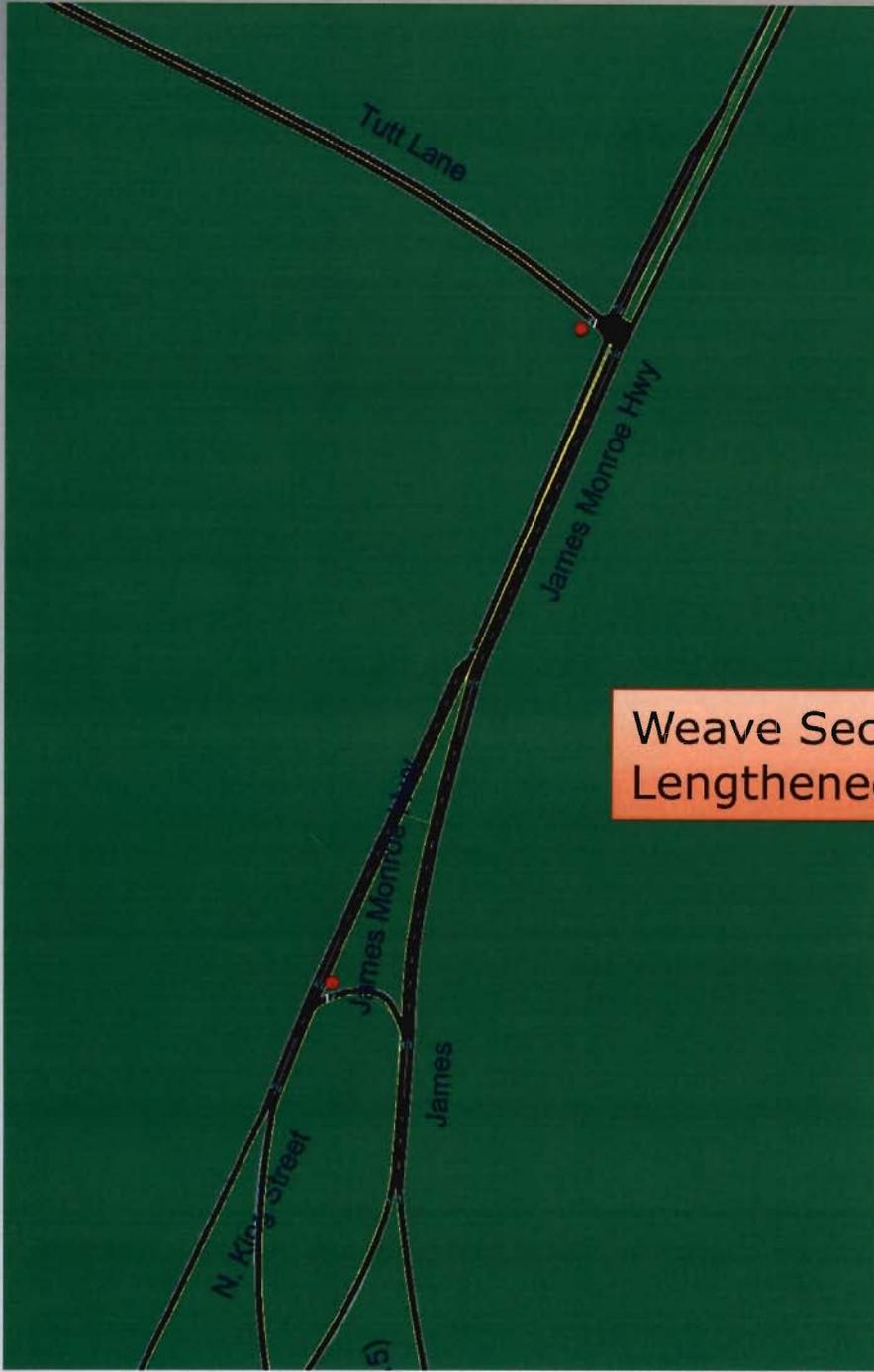
NB Merge South of Battlefield Parkway

Alternative 1A



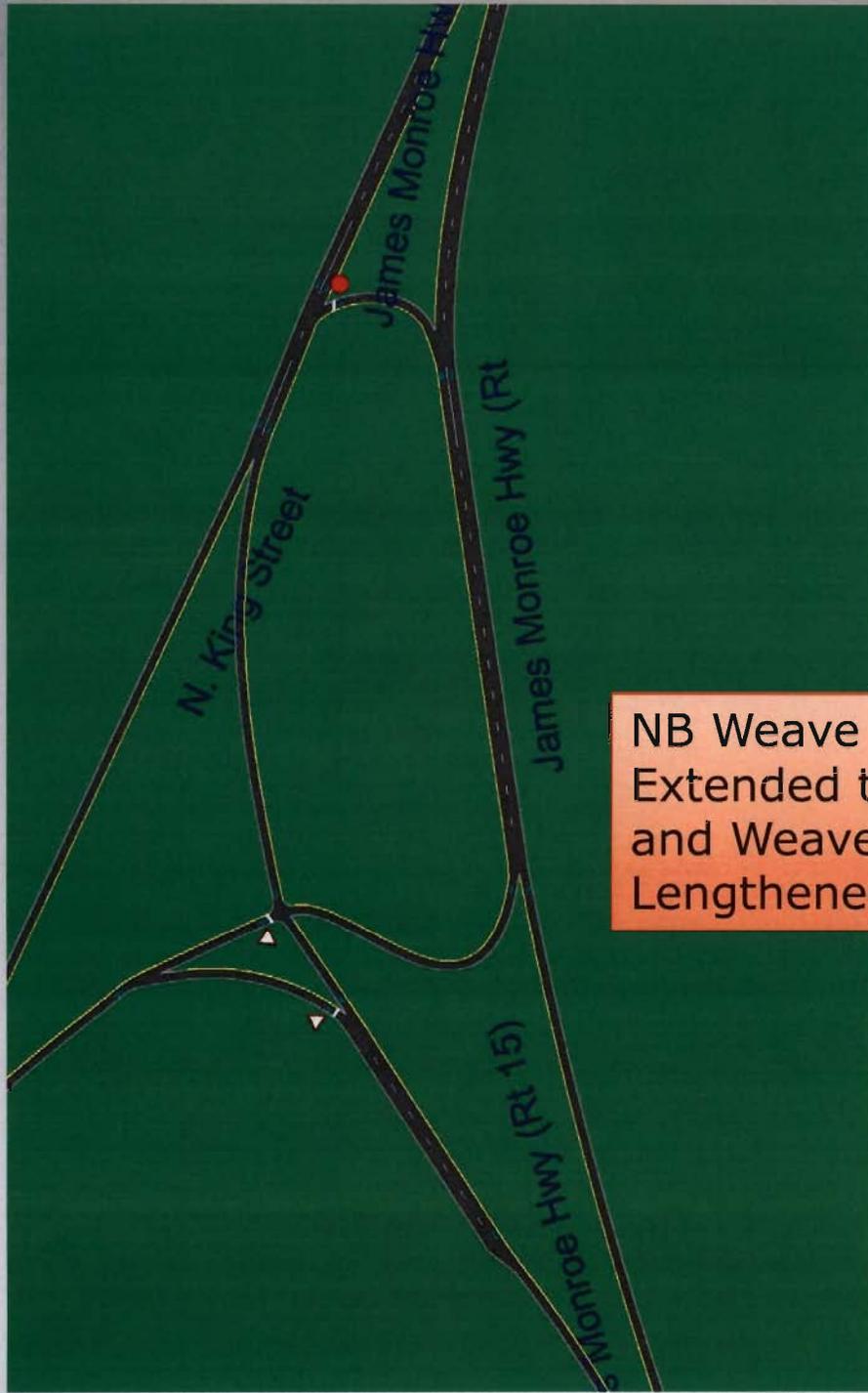
NB Merge with
Right Turn Lane
Drop South of
Battlefield Parkway

Alternative 1B



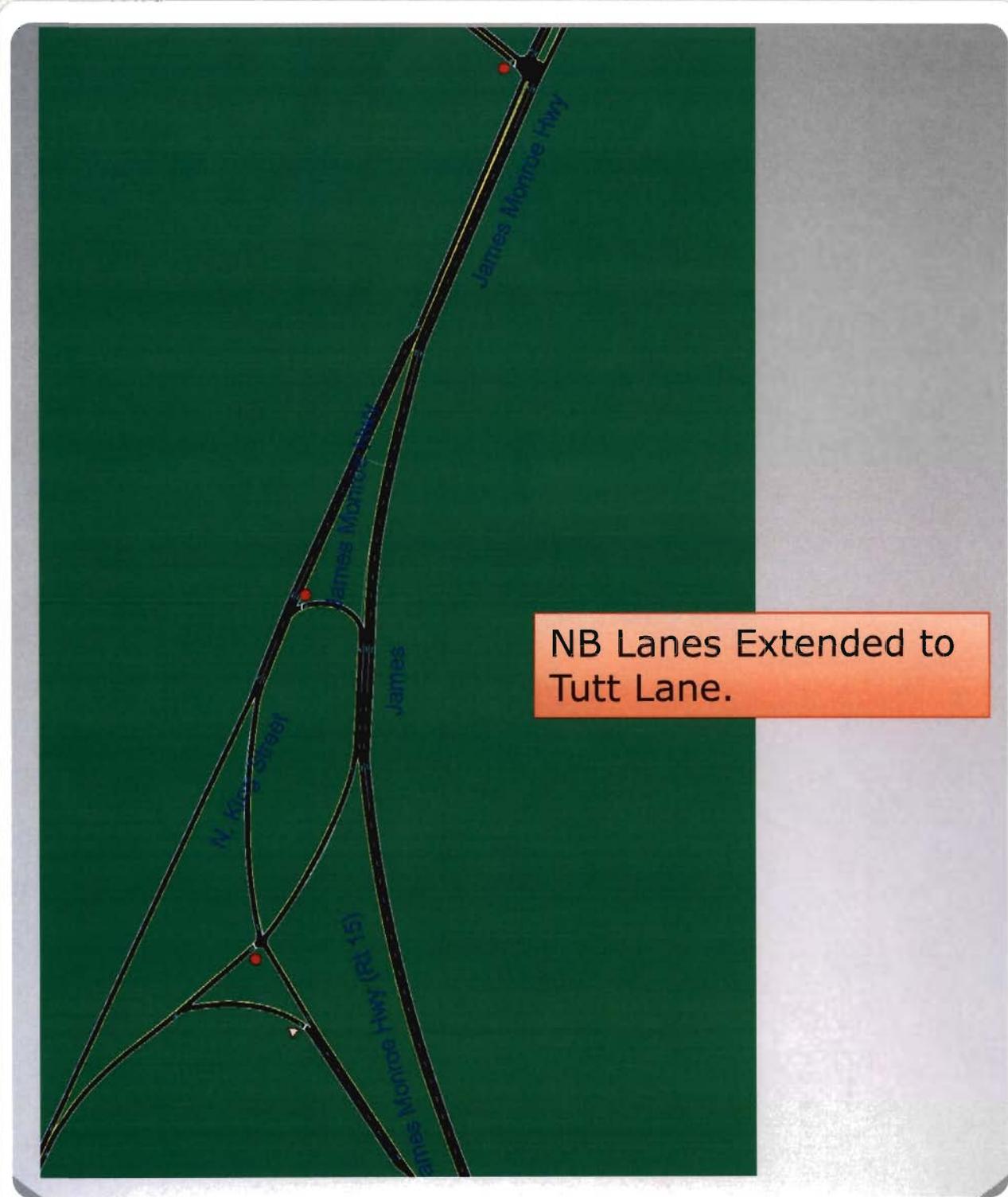
Weave Section
Lengthened to Tuttle Ln

Alternative 2A

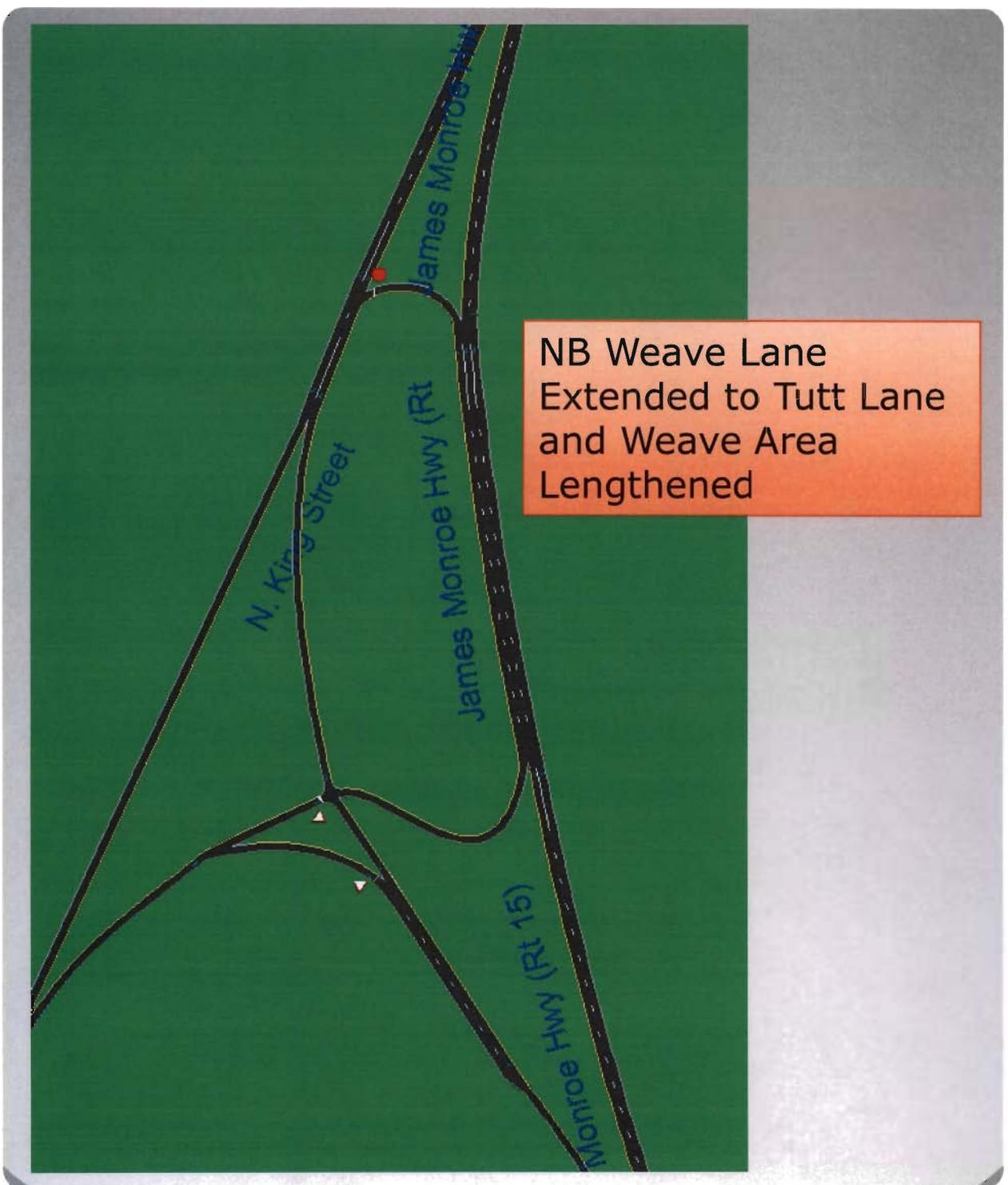


NB Weave Lane
Extended to Tutt Lane
and Weave Area
Lengthened

Alternative 2B

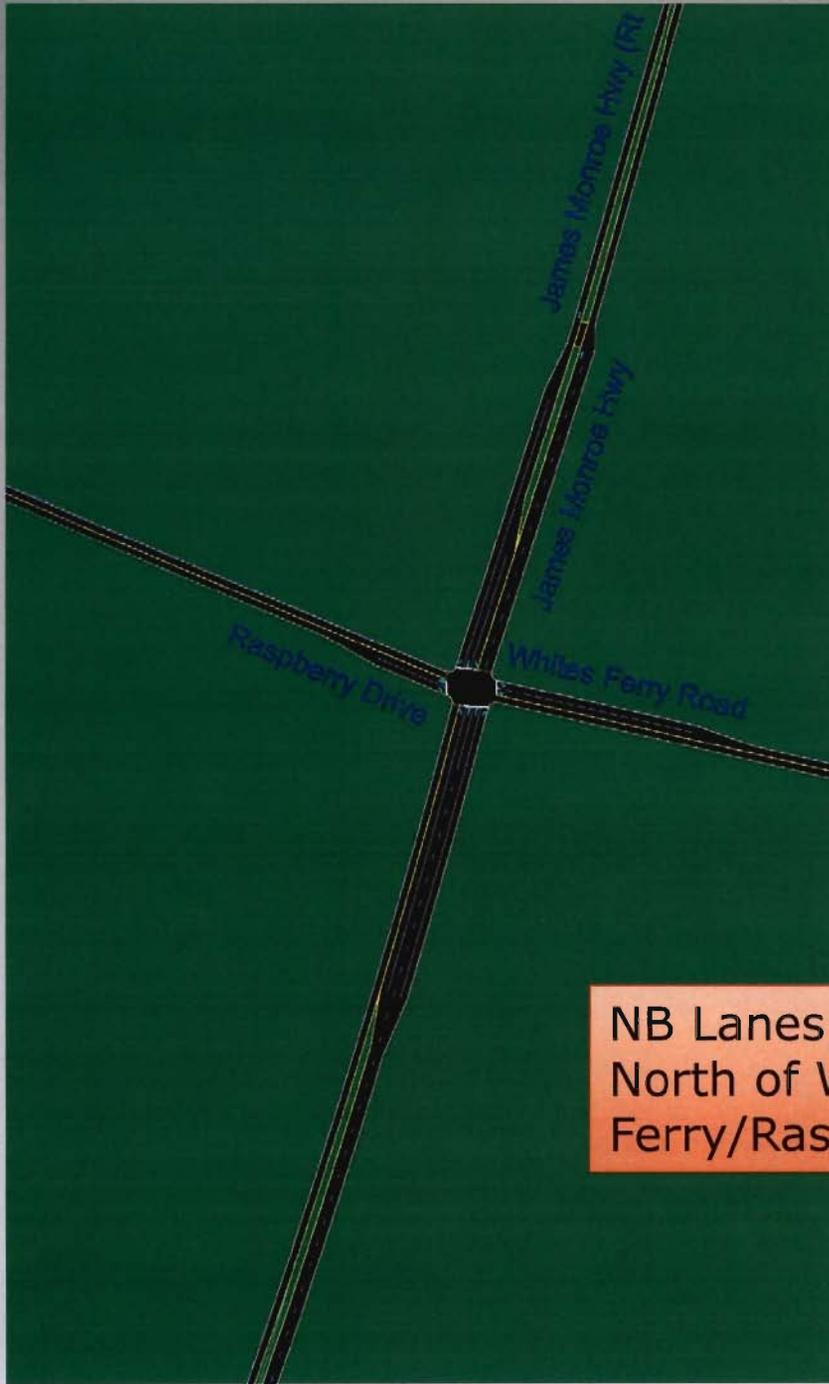


Alternative 3A



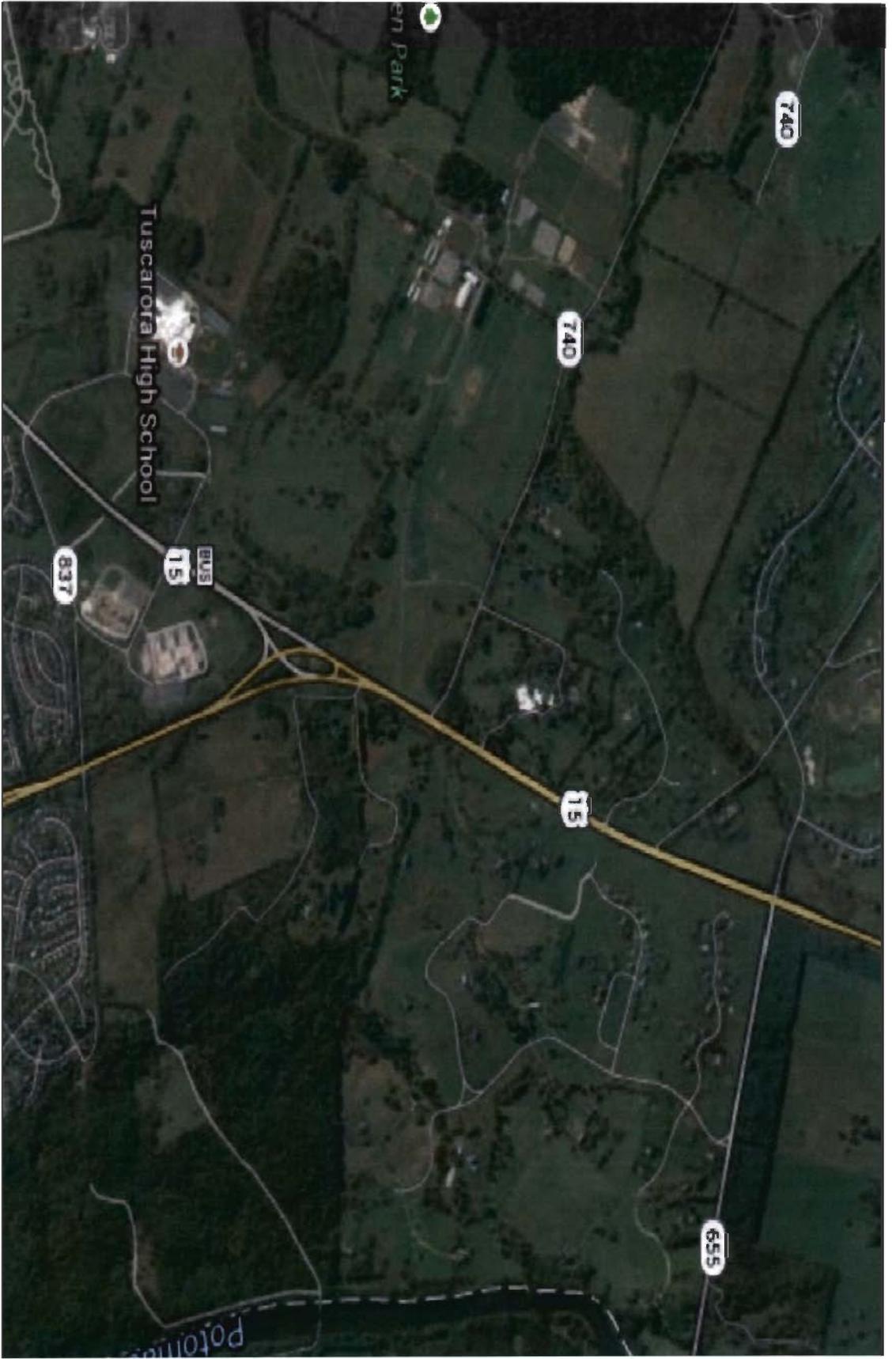
NB Weave Lane
Extended to Tutt Lane
and Weave Area
Lengthened

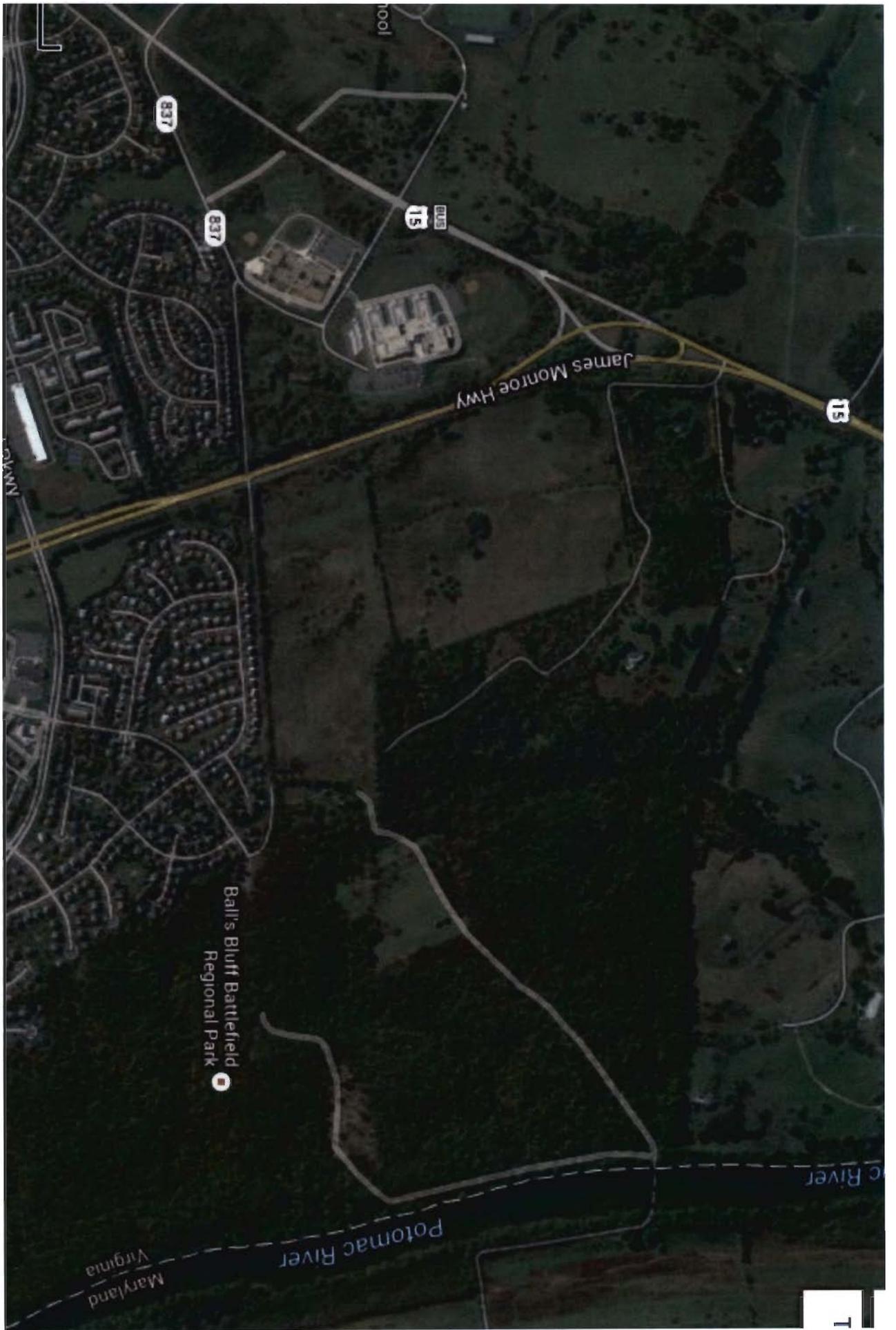
Alternative 3B



NB Lanes Extended
North of Whites
Ferry/Raspberry Falls

Alternative 4





Route 15 Operational Analysis MOE Summary Table

Node #	Location	Available Distance	Exist.	Condition								
				Alt 1A	Alt 1B	Alt 2A	Alt 2B	Alt 3A	Alt 3B	Alt 4		
1	<u>Whites Ferry</u>											
	Delay/Veh (sec)		271	233	220	237	234	221	214	483		
	Avg Speed (mph)		15	14	15	13	14	13	14	6		
	Density (ft/veh)		150	140	149	139	139	136	144	76		
	Max Queue	4,400	4,420	4,420	4,420	4,420	4,420	4,420	4,420	4,420		
2	<u>Tutt Lane</u>											
	Delay/Veh (sec)		11	15	11	25	23	24	22	31		
	Avg Speed (mph)		20	17	19	12	13	12	13	10		
	Density (ft/veh)		131	110	124	84	88	84	88	93		
	Max Queue	580	600	600	600	640	625	625	662	600		
9	<u>North King St</u>											
	Delay/Veh (sec)		118	97	98	81	8	259	189	32		
	Avg Speed (mph)		8	9	9	10	16	4	7	18		
	Density (ft/veh)	- / 2B,3B	35	41	39	46	134	35	61	141		
	Max Queue	1,355 / 940	1,370	1,370	1,370	1,375	960	1,440	1,020	1,190		
10	<u>Route 15</u>											
	Delay/Veh (sec)		98	91	78	101	161	186	189	3		
	Avg Speed (mph)		12	13	14	12	8	7	7	41		
	Density (ft/veh)		53	58	61	50	41	65	61	324		
	Max Queue	2,935	3,140	3,096	3,115	3,150	3,110	3,150	2,343	0		
16	<u>Battlefield Pkwy</u>											
	Delay/Veh (sec)		112	(1)	(1)	144	185	91	424	30	34	27
	Avg Speed (mph)		17	5	4	20	6	31	30	30	32	
	Density (ft/veh)		355	93	68	402	142	639	594	632		
	Max Queue	4,615	2,150	4,500	4,500	1,434	4,320	605	610	430		
Arterial												
	Travel Time (sec)		1,194	1,531	1,369	1,315	1,681	1,458	1,558	1,261		
	Travel Time(minutes)		20	26	23	22	28	24	26	21		
	Avg Speed (mph)		14	11	10	13	9	11	11	14		
14	<u>N. King St (EB)</u>											
	Delay/Veh (sec)		57	58	60	64	24	37	38	55		
	Avg Speed (mph)	N/A	-	-	-	-	-	-	-	-		
	Density (ft/veh)		25	25	25	25	43	34	30	25		
	Max Queue	3,670	3,780	3,790	3,760	3,780	950	2,830	2,860	3,780		

Notes:

(1) Merge point located south of intersection approximately 1,255'. Max Que estimated based on static display in SimTraffic.

Density is the average distance per vehicle over the simulation period.

Coded for Critical NB Nodes only

 Better Operation compared to Existing (20% or more decrease in delay/veh, increase in density and/or 5 mph increase in speed)

 Worse Operation compared to Existing (20% or more increase in delay/veh, decrease in density and/or 5 mph decrease in speed)