

Route 301/207 Arterial Preservation Plan

February 1, 2018 – King George County

Agenda

1. Introductions
2. Purpose of Study
3. Innovative Intersections
4. Preliminary Recommendations

Purpose of Study

VDOT Statewide Program Perspective

To preserve and enhance the capacity and safety of the Commonwealth's Arterial Preservation Network, while accommodating economic development and avoiding wide-scale road widenings

- Result in a safer arterial highway system
- Preserve and enhance corridor capacity and efficiency
- Maintain Commonwealth's mobility & thus economic competitiveness
- Lower long-term infrastructure capital and maintenance costs

Purpose of Study

VDOT Statewide Program Perspective

State Traffic Engineer approval and District Engineer/Administrator concurrence is required for Signal Justification Reports (SJR) justifying new traffic signals on the Arterial Preservation Network.

Source: IIM-TE-387.0, July 2017

Summary of King George County Comments

December 2017 Stakeholder Meeting

- More innovative intersection options need to be considered
- Further investigate improvements between University Dr and Owens Dr
- There will be significant development near and on Rte 3
- Ongoing development and/or approved plans are occurring along US301 in King George
- Pedestrian and bicycle accommodations need to be considered along US 301/Rte 207
- What is the future traffic growth from the Nice Bridge expansion and planned development?

Rte 207/301 Arterial Management Plan

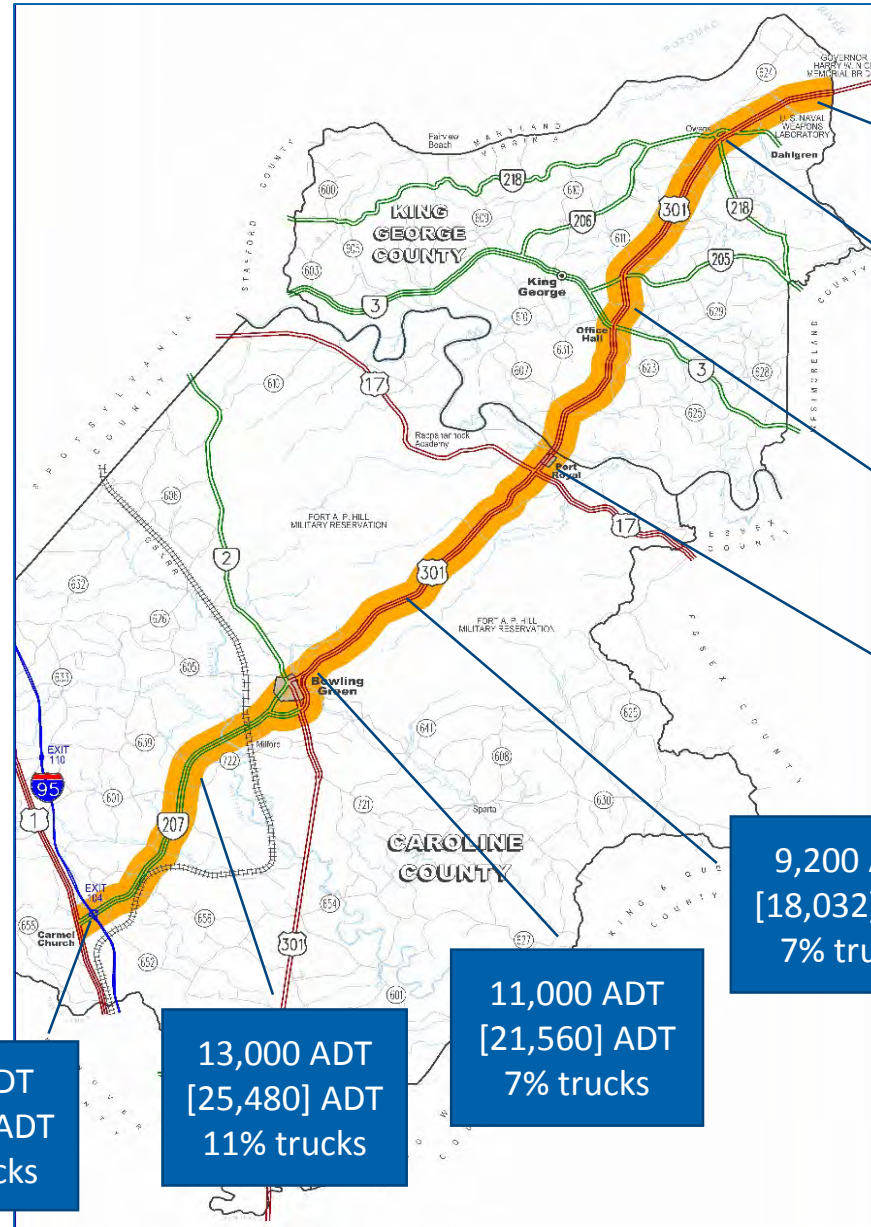
King George County Area

Existing Conditions

Study team collected weekday traffic counts on April 20, 2017. Site visits were performed and available crash data was collected. This information was used to understand and analyze existing conditions.

Traffic Volume Highlights

2016 – X,XXX ADT
 2040 – [X,XXX] ADT
 X% Trucks



26,000 ADT
 [50,960] ADT
 6% trucks

21,000 ADT
 [41,160] ADT
 6% trucks

14,000 ADT
 [27,440] ADT
 6% trucks

14,000 ADT
 [24,440] ADT
 11% trucks

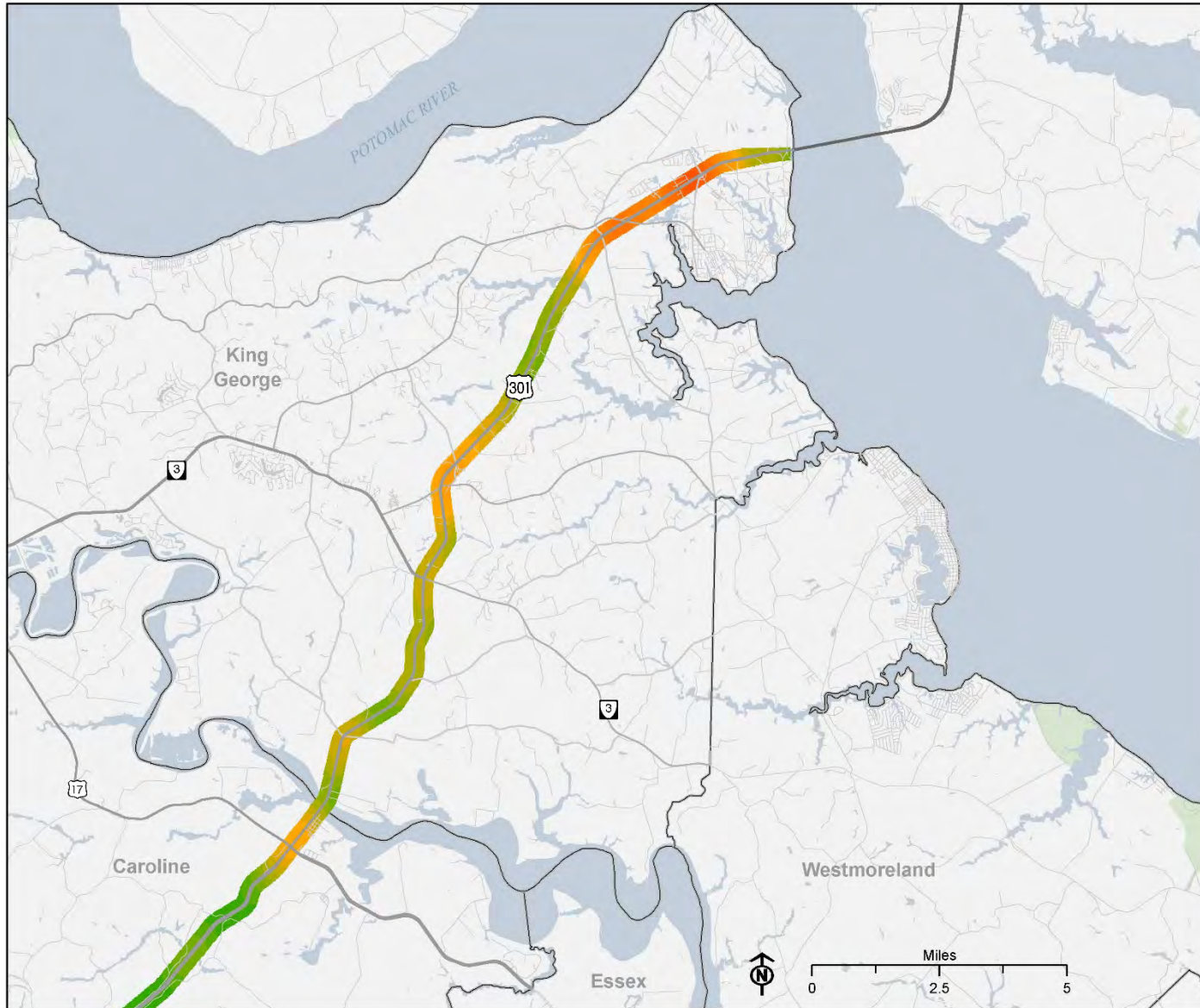
9,200 ADT
 [18,032] ADT
 7% trucks

11,000 ADT
 [21,560] ADT
 7% trucks

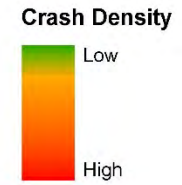
13,000 ADT
 [25,480] ADT
 11% trucks

8,000 ADT
 [15,680] ADT
 11% trucks

Existing Corridor Conditions



Route 301
Corridor Study
King George County
Crash Density



Michael Baker
INTERNATIONAL
11/21/2017

Level of Service Criteria

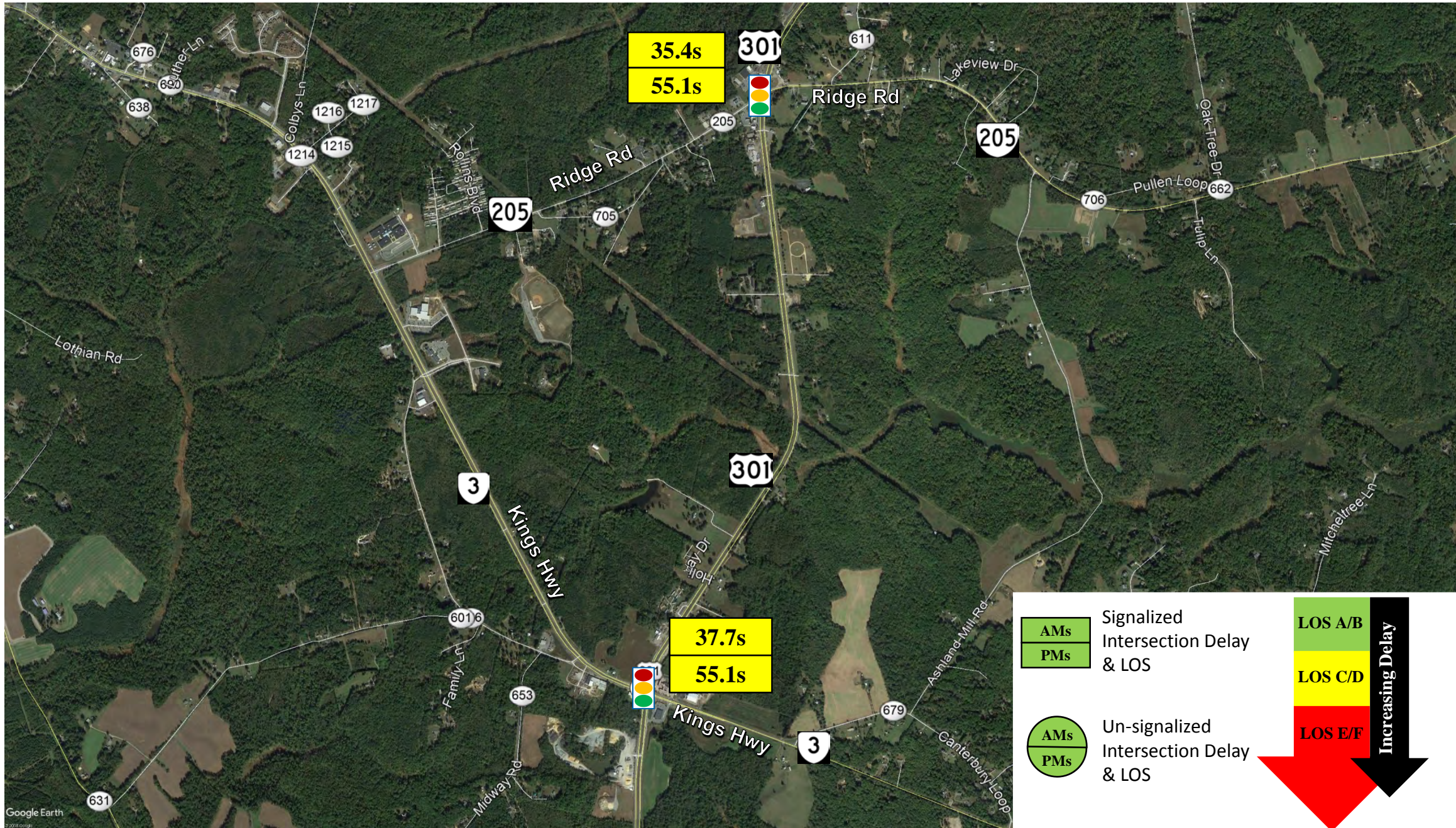
Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Table 2. Level of Service Criteria for Unsignalized Intersections

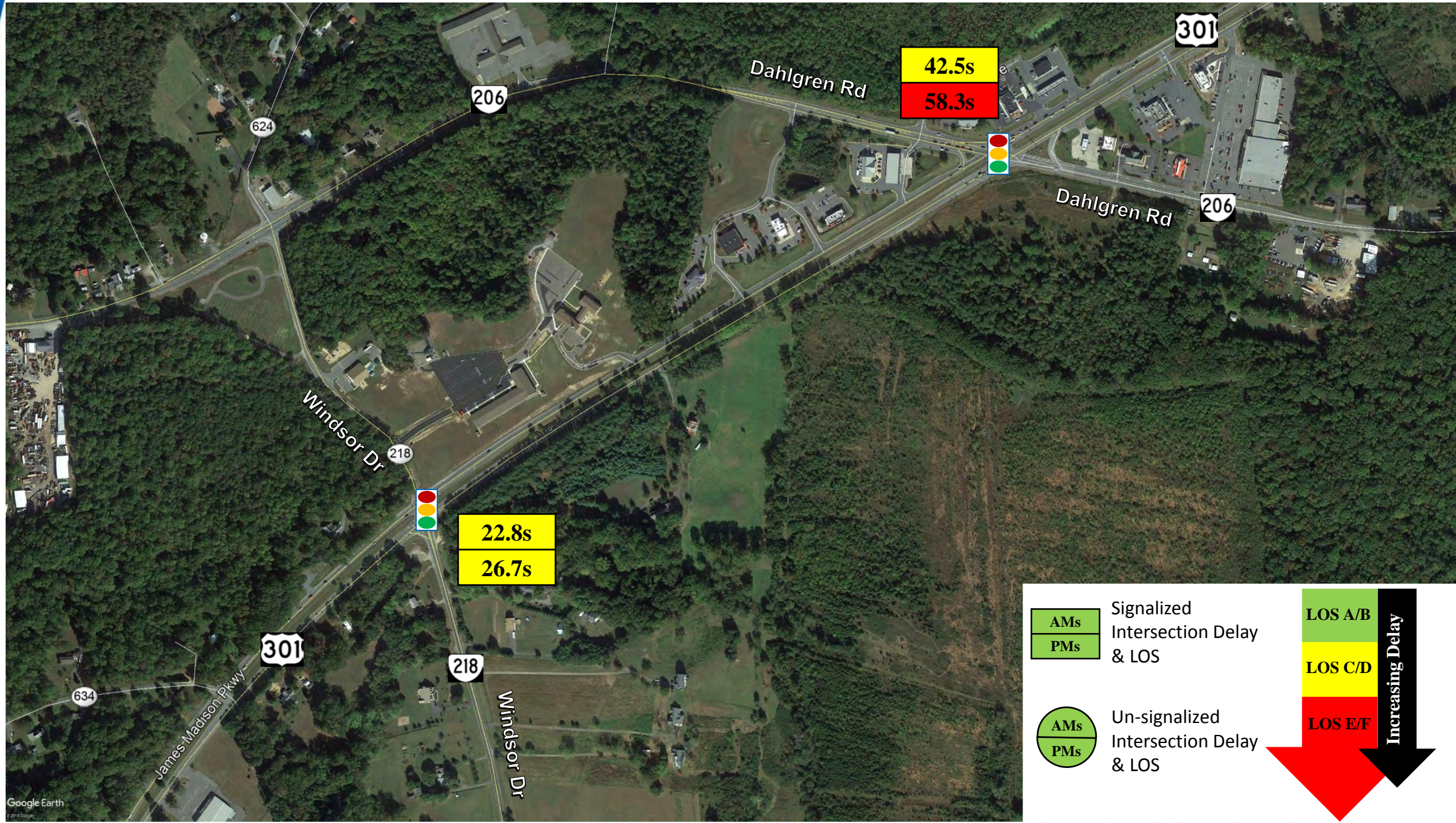
Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Existing Weekday Corridor Conditions



Signalized	Intersection Delay & LOS	LOS A/B	Increasing Delay ↓
AMs PMs		LOS C/D	
Un-signalized	Intersection Delay & LOS	LOS E/F	
AMs PMs			

Existing Weekday Corridor Conditions



<table border="1"> <tr><td>AMs</td></tr> <tr><td>PMs</td></tr> </table>	AMs	PMs	Signalized Intersection Delay & LOS	LOS A/B	
AMs					
PMs					
<table border="1"> <tr><td>AMs</td></tr> <tr><td>PMs</td></tr> </table>	AMs	PMs	Un-signalized Intersection Delay & LOS	LOS C/D	
AMs					
PMs					
		LOS E/F			

Existing Weekday Corridor Conditions



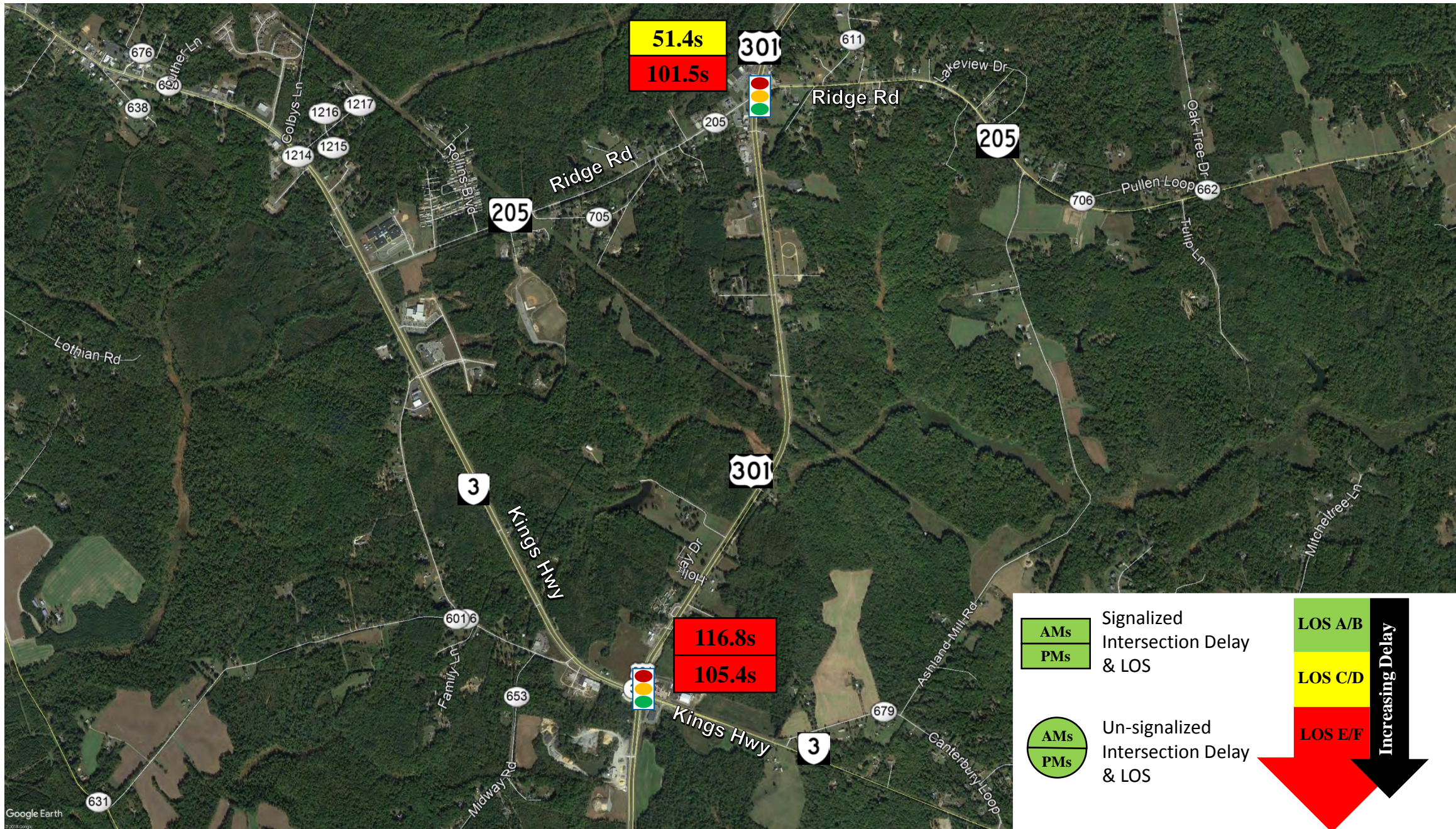
Rte 207/301 Arterial Management Plan

King George County Area

2040 Traffic Growth

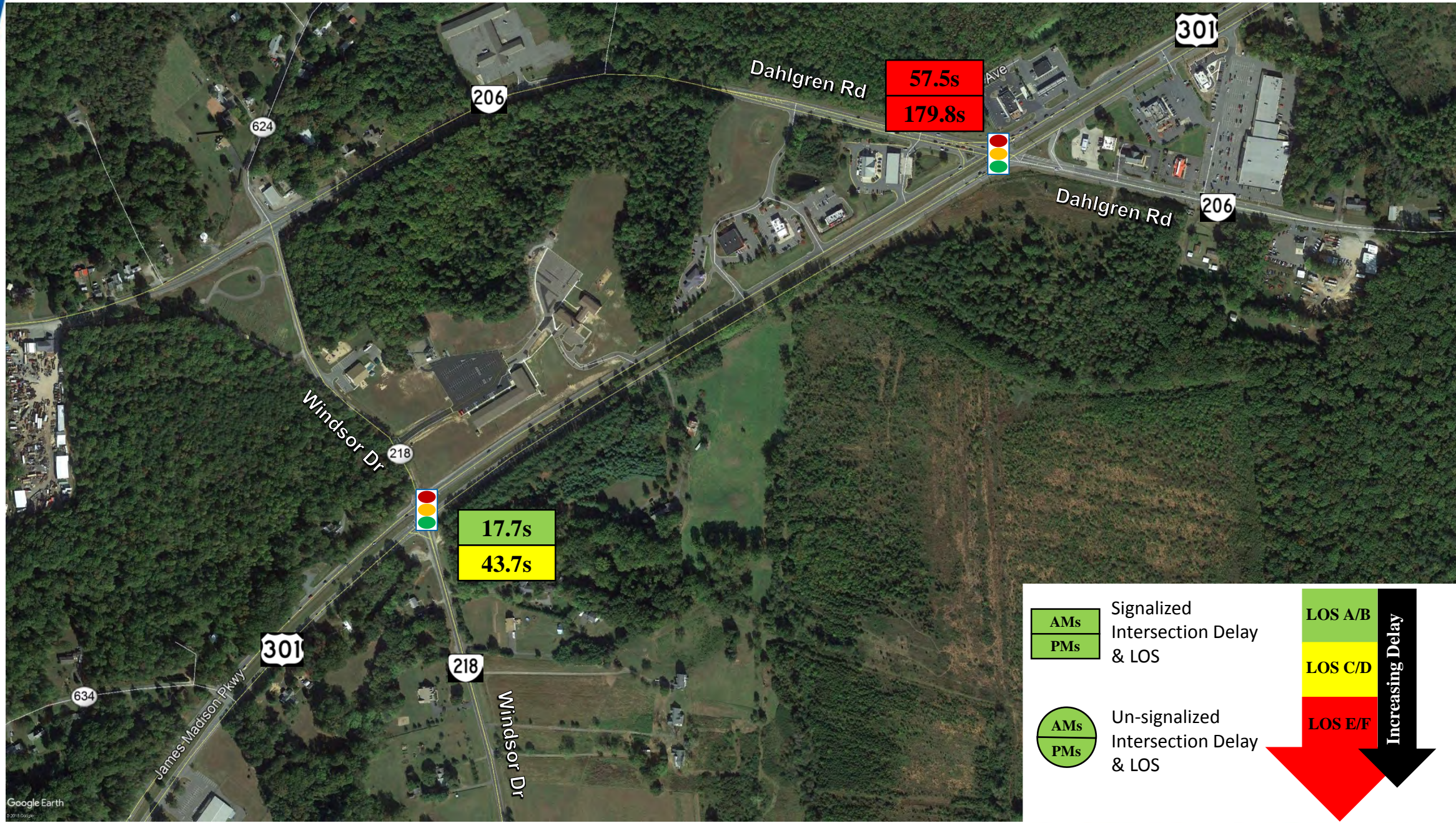
Study team prepared 2040 weekday traffic forecasts with available information in which traffic volumes roughly doubled from existing conditions. These volumes were used to test various levels of improvements along the corridor

2040 Minimally Managed Weekday Corridor Conditions

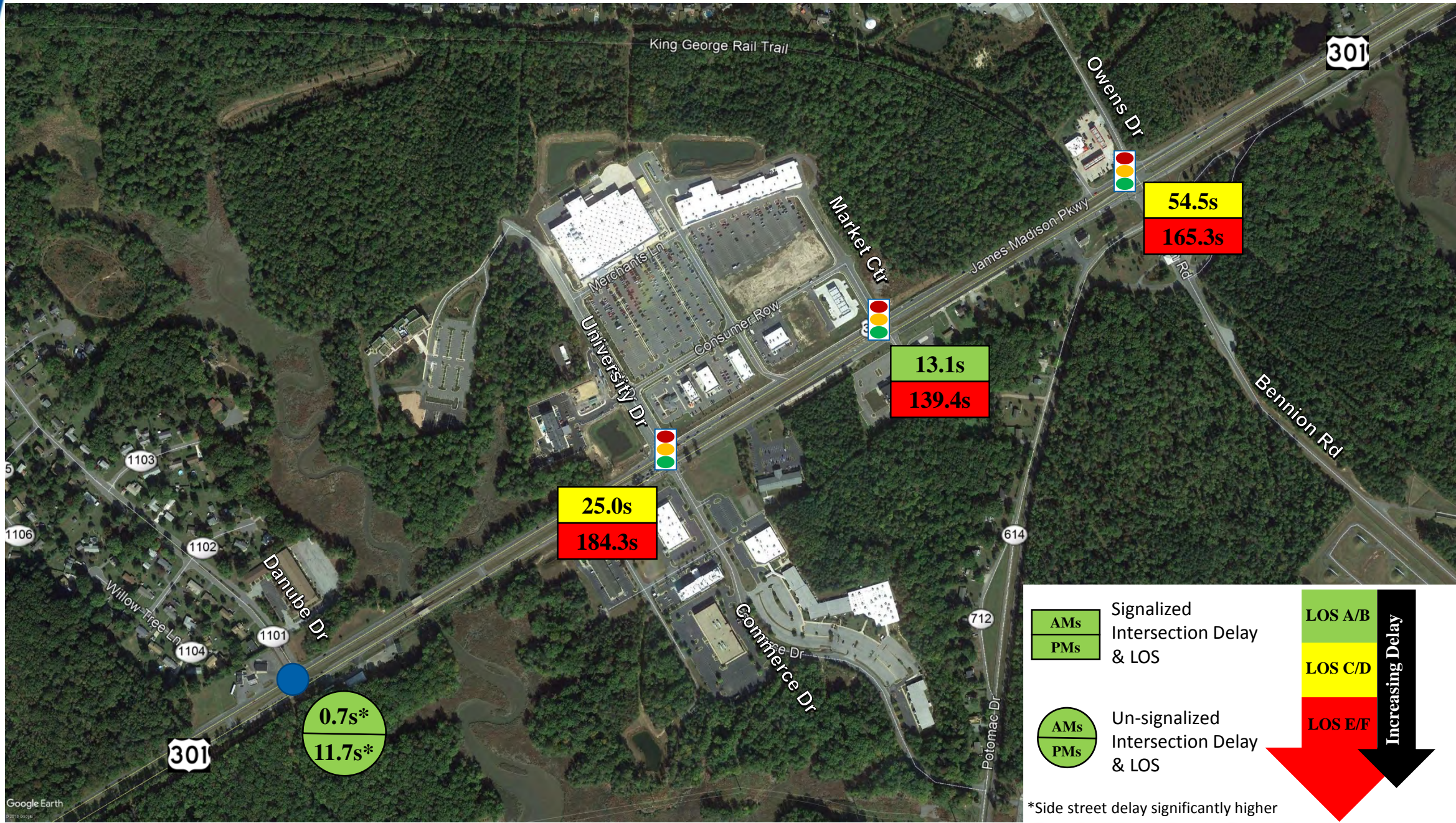


AMs	Signalized Intersection Delay & LOS	LOS A/B	Increasing Delay ↓
PMs		LOS C/D	
AMs	Un-signalized Intersection Delay & LOS	LOS E/F	
PMs			

2040 Minimally Managed Weekday Corridor Conditions



2040 Minimally Managed Weekday Corridor Conditions

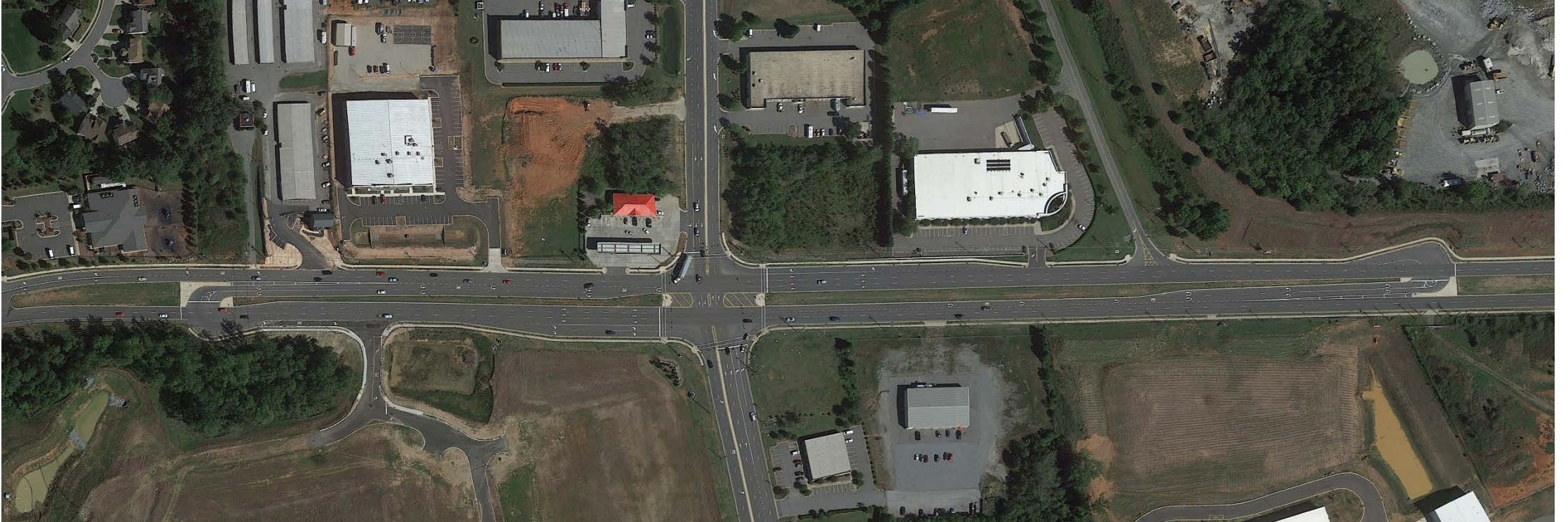


AMs	Signalized Intersection Delay & LOS	LOS A/B	Increasing Delay ↓
PMs		LOS C/D	
AMs	Un-signalized Intersection Delay & LOS	LOS E/F	
PMs			

*Side street delay significantly higher

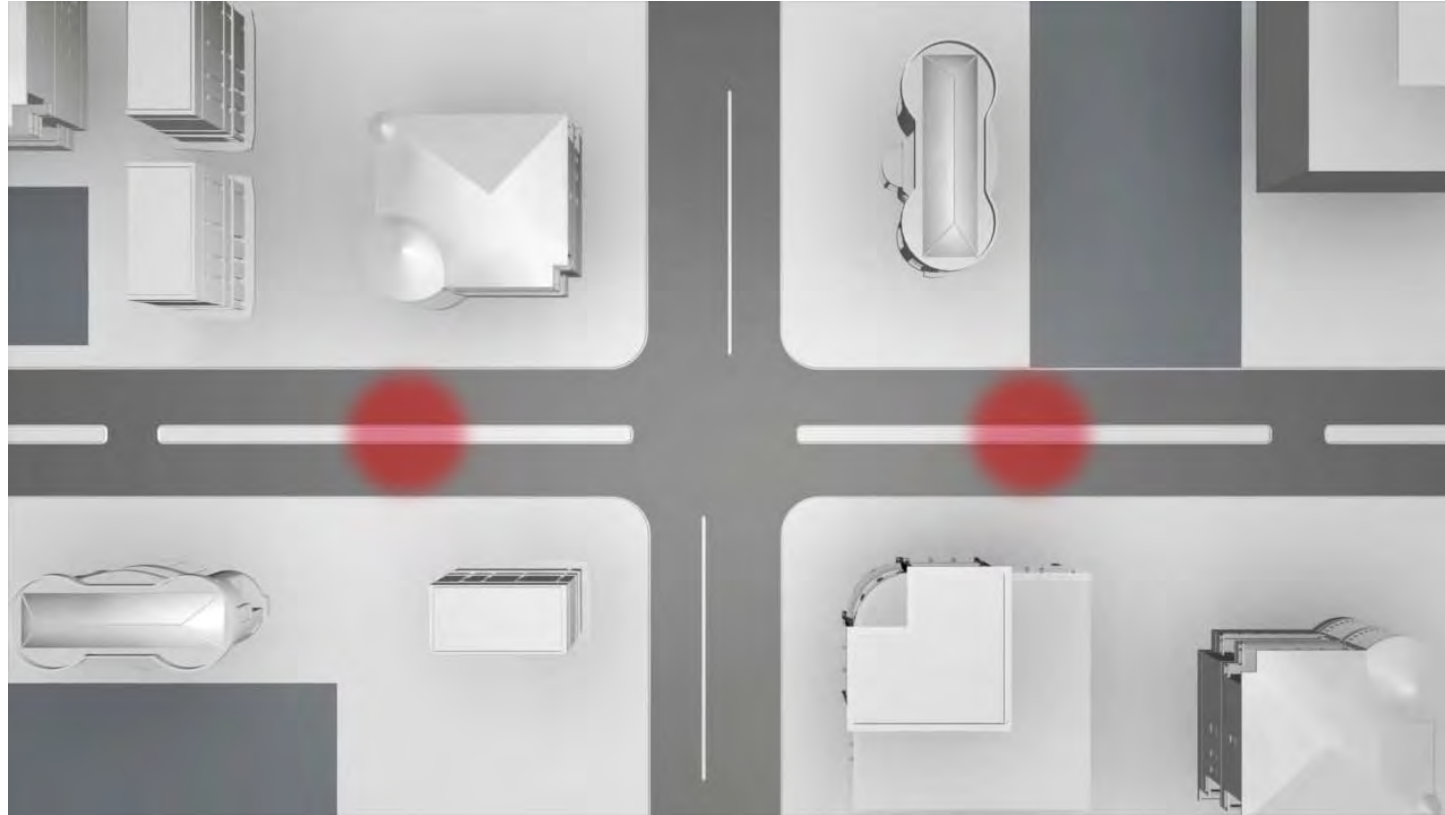
Innovative Intersections

Median U-Turn (MUT)



Poplar Tent Rd and Derita Rd Rd– Concord, NC

Median U-Turn (MUT)



Video Link at

<https://www.youtube.com/watch?v=fshW O Xggl&t=149s>

Quadrant Roadway (QR)



At-grade Quadrant at Route 4 and Ross Rd
Fairfield, OH



Grade Separated Quadrant at Lee Victory Pkwy and Old Nashville Hwy
Smyrna, TN

Quadrant Roadway (QR)



US 50 and US 15, Aldie, VA

Quadrant Roadway (QR)



Strasburg Rd and N Shenandoah Ave, Warren County, VA – Under Construction

Quadrant Roadway (QR)



Video Link at

<https://www.youtube.com/watch?v=ZtIL2GqQJbs>

I-77 and Hwy 73, Huntersville, NC

Continuous Green-T (CGT)



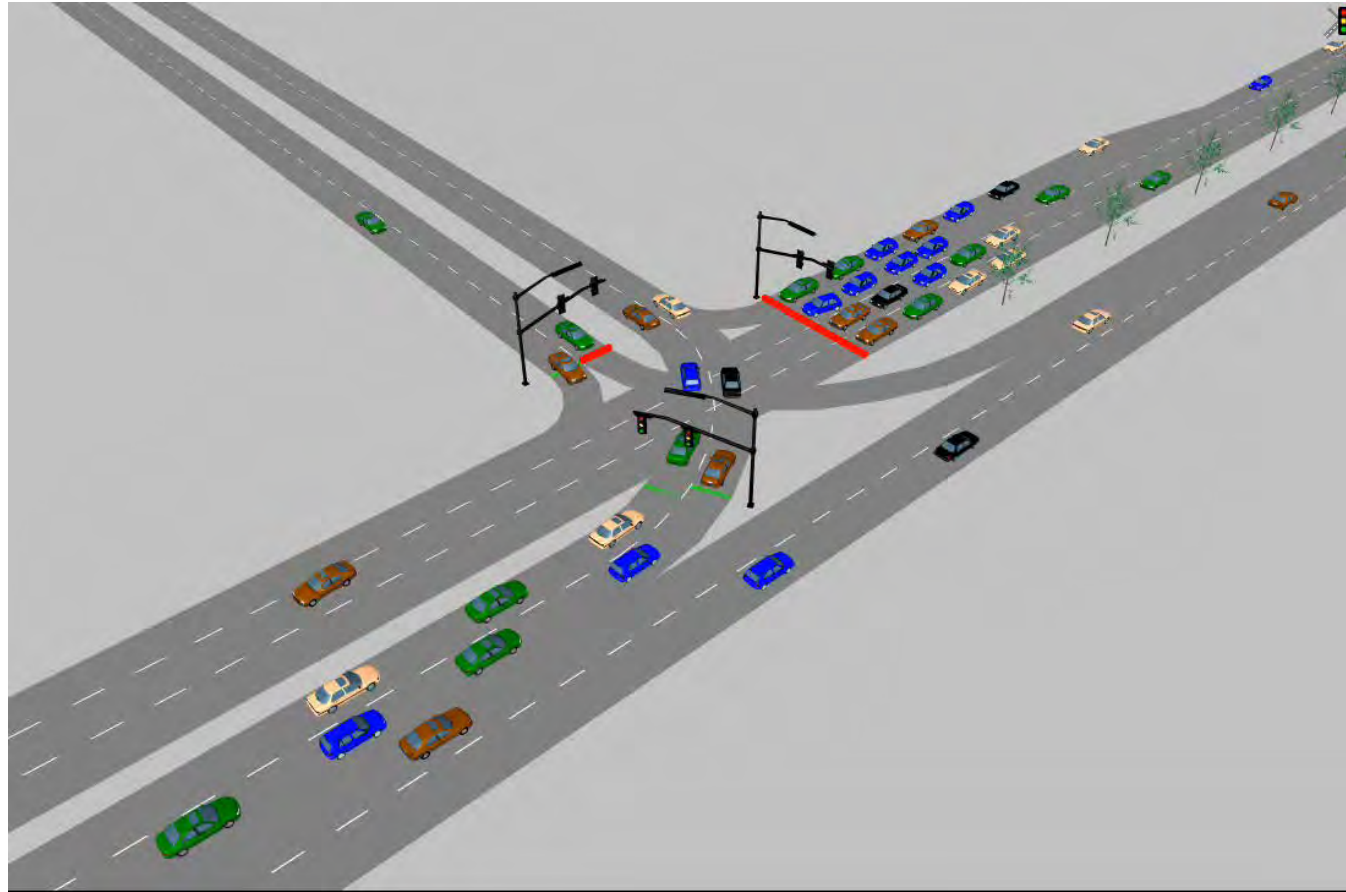
Rivers Edge Rd and Columbia Pike – Howard County, MD

Continuous Green-T (CGT)



Rock Point Rd and US 301 – Newburg, MD

Continuous Green-T (CGT)



Video Link at

[https://attap.gitbooks.io/muid/content/at-grade & signalized/continunous green-t.html](https://attap.gitbooks.io/muid/content/at-grade%20&%20signalized/continunous%20green-t.html)

Restricted Crossing U-Turn (RCUT)



Liberty Church Rd and Hwy 9 – Loris, SC

Restricted Crossing U-Turn (RCUT)



North Main St and Route 460 – Blacksburg, VA
Est. Completion Fall 2018

Restricted Crossing U-Turn (RCUT)

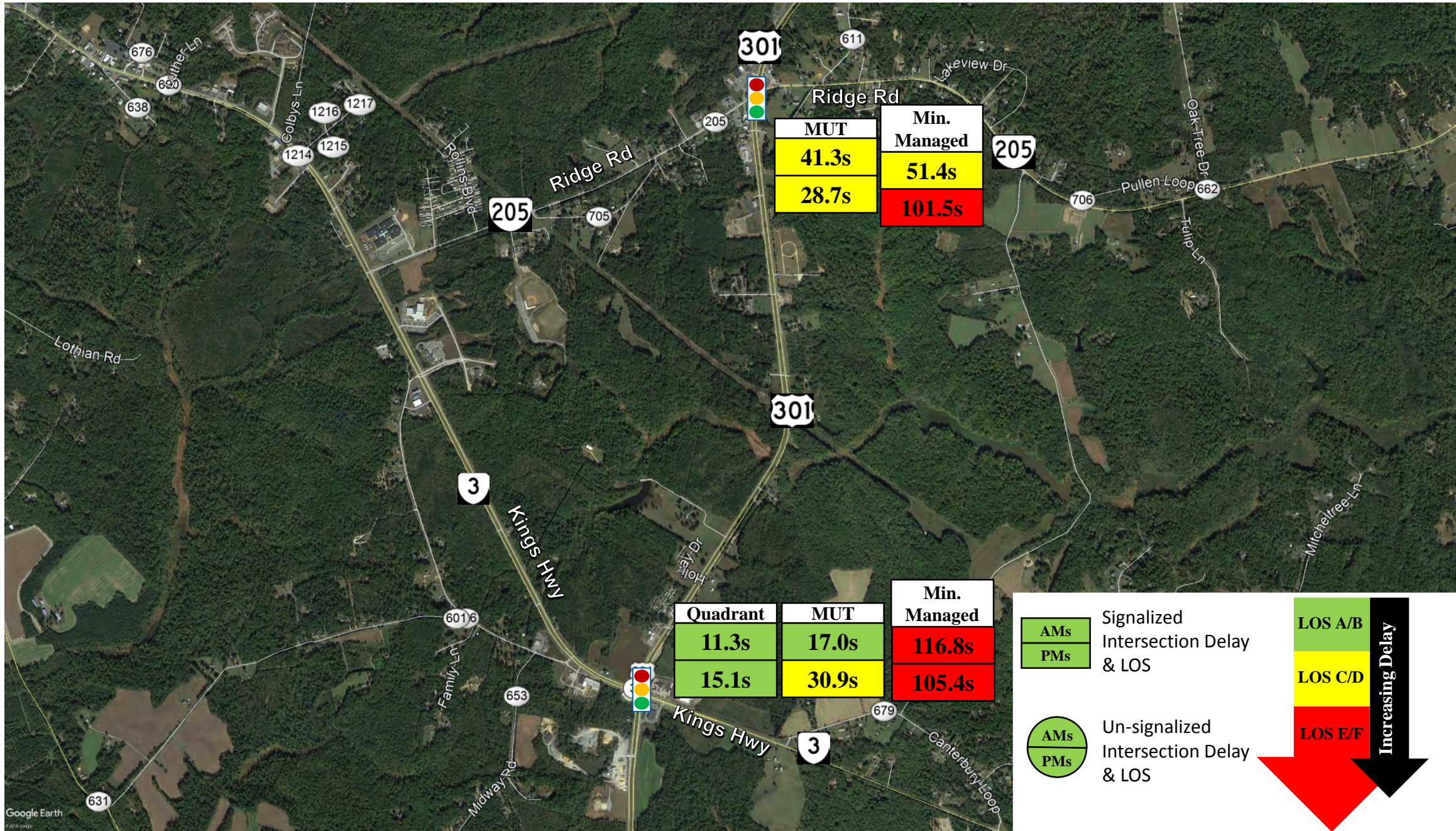


Video Link at

<https://www.youtube.com/watch?v=BLwl01NCp9I&t=190s>

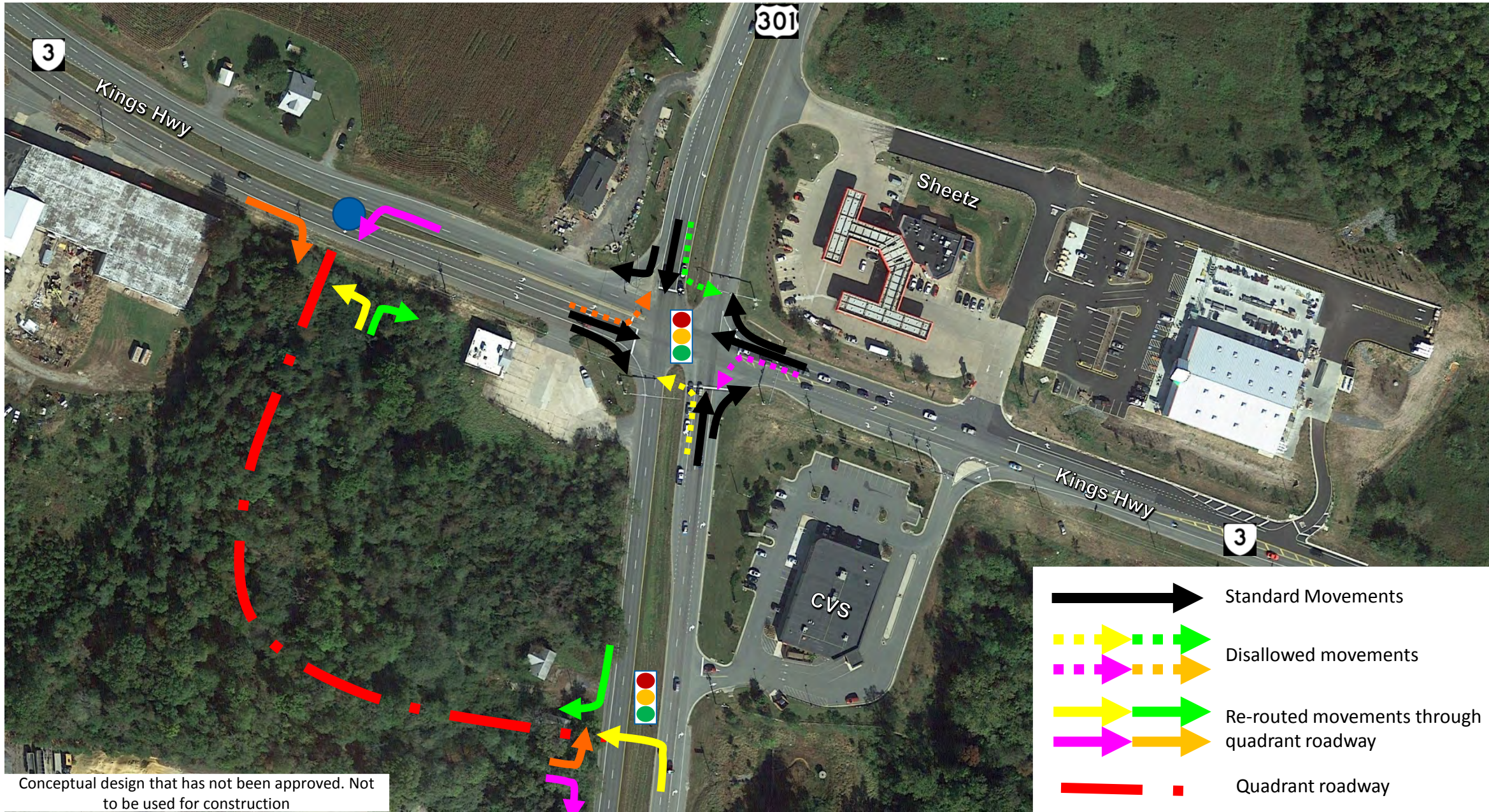
2040 Weekday Corridor Conditions – Recommended Configurations

King George Area 1



Route 301/207 Arterial Preservation Plan – King George Area 1

US 301 & Rte 3 Conceptual Quadrant Roadway

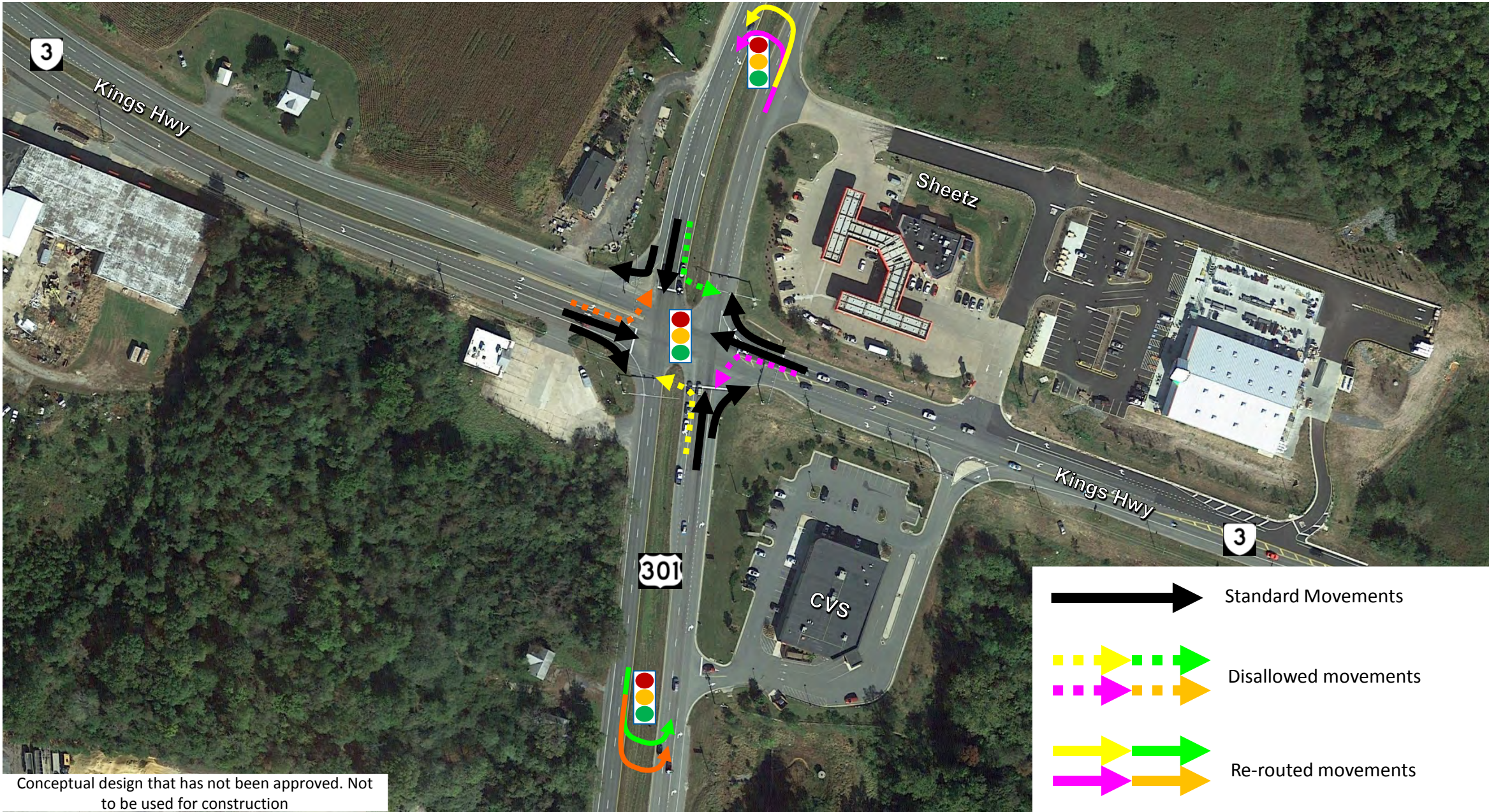


- Standard Movements
- Disallowed movements
- Re-routed movements through quadrant roadway
- Quadrant roadway

Conceptual design that has not been approved. Not to be used for construction

Route 301/207 Arterial Preservation Plan – King George Area 1

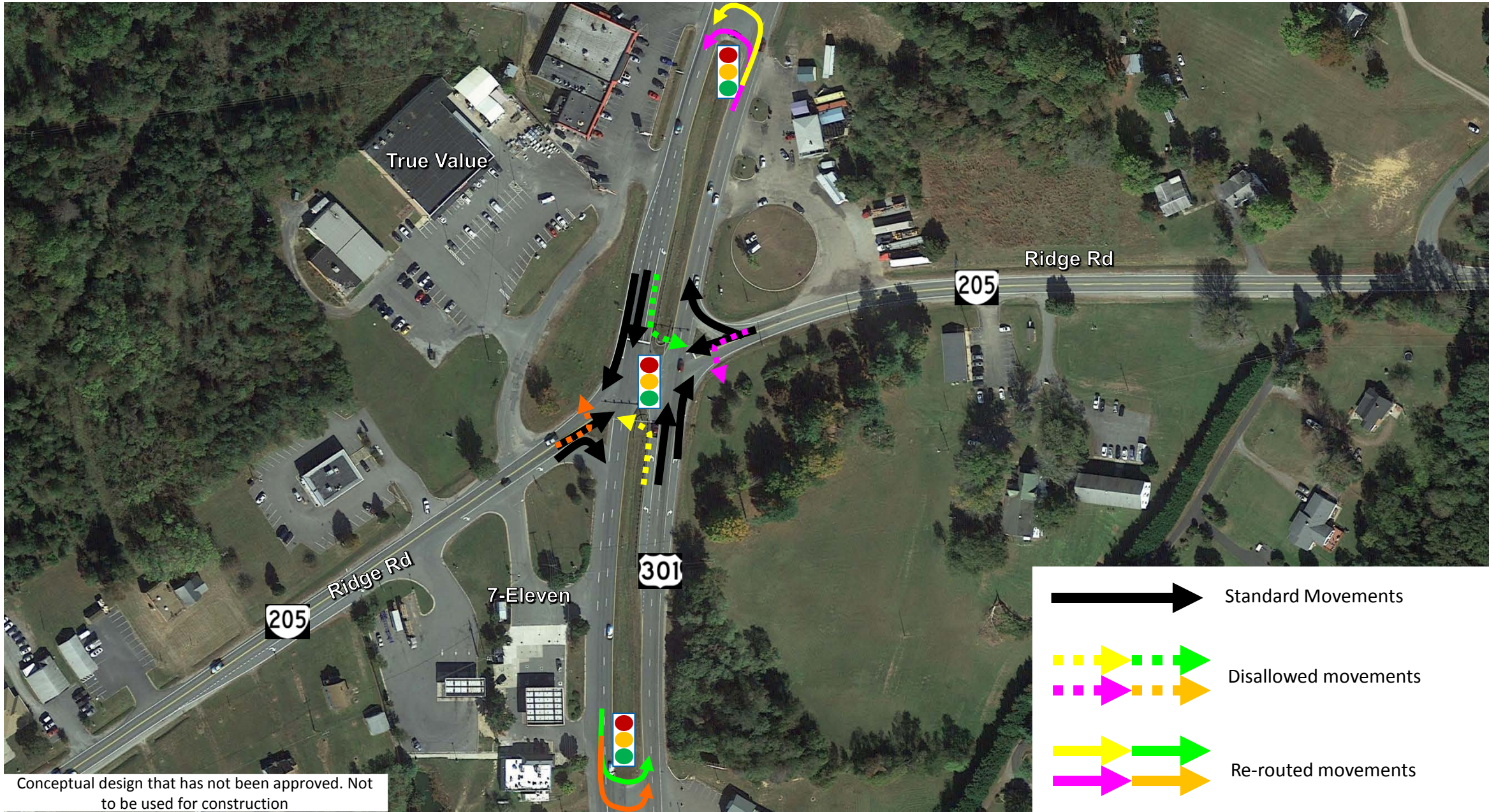
US 301 & Rte 3 Conceptual Median U-turn Roadway



Conceptual design that has not been approved. Not to be used for construction

Route 301/207 Arterial Preservation Plan – King George Area 1

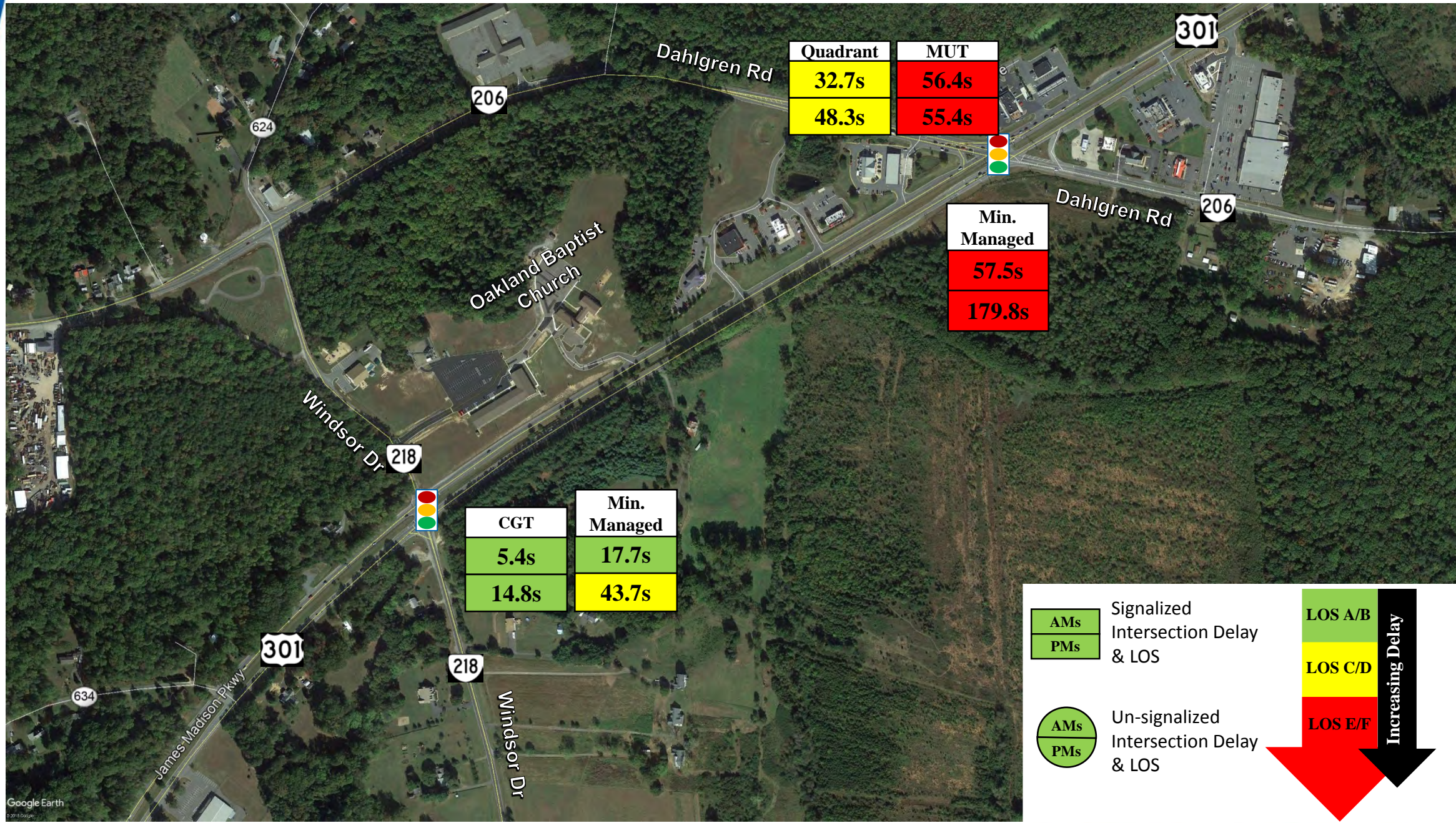
US 301 & Rte 205 Conceptual Median U-turn Roadway



Conceptual design that has not been approved. Not to be used for construction

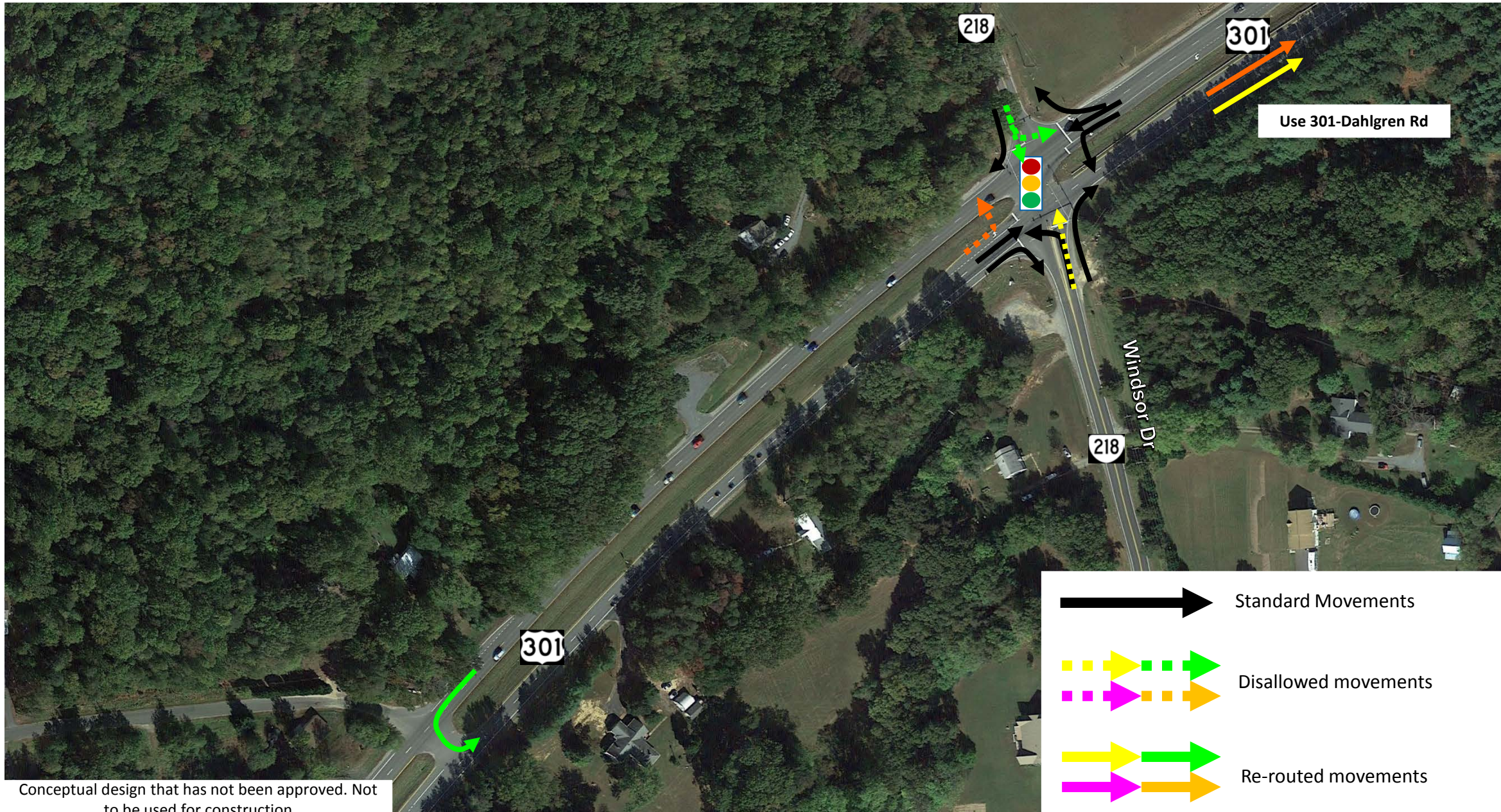
2040 Weekday Corridor Conditions – Recommended Configurations

King George Area 2



Route 301/207 Arterial Preservation Plan – King George Area 2

US 301 & Rte 218 Conceptual Continuous Green-T with U-turn area



Use 301-Dahlgren Rd

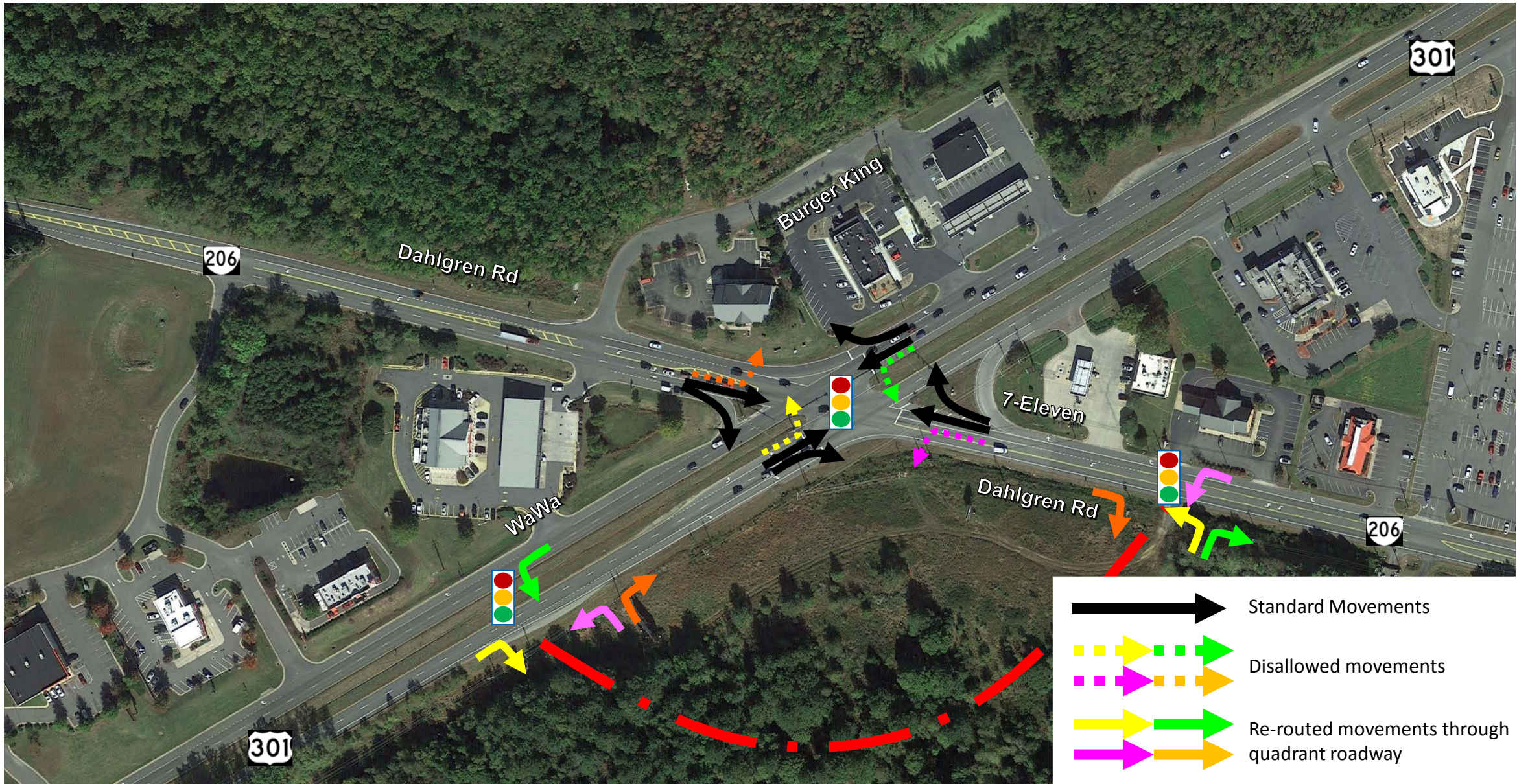
Windsor Dr


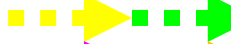


- Standard Movements
- Disallowed movements
- Re-routed movements

Conceptual design that has not been approved. Not to be used for construction

Route 301/207 Arterial Preservation Plan – King George Area 2

US 301 & Rte 206 Conceptual Quadrant Roadway

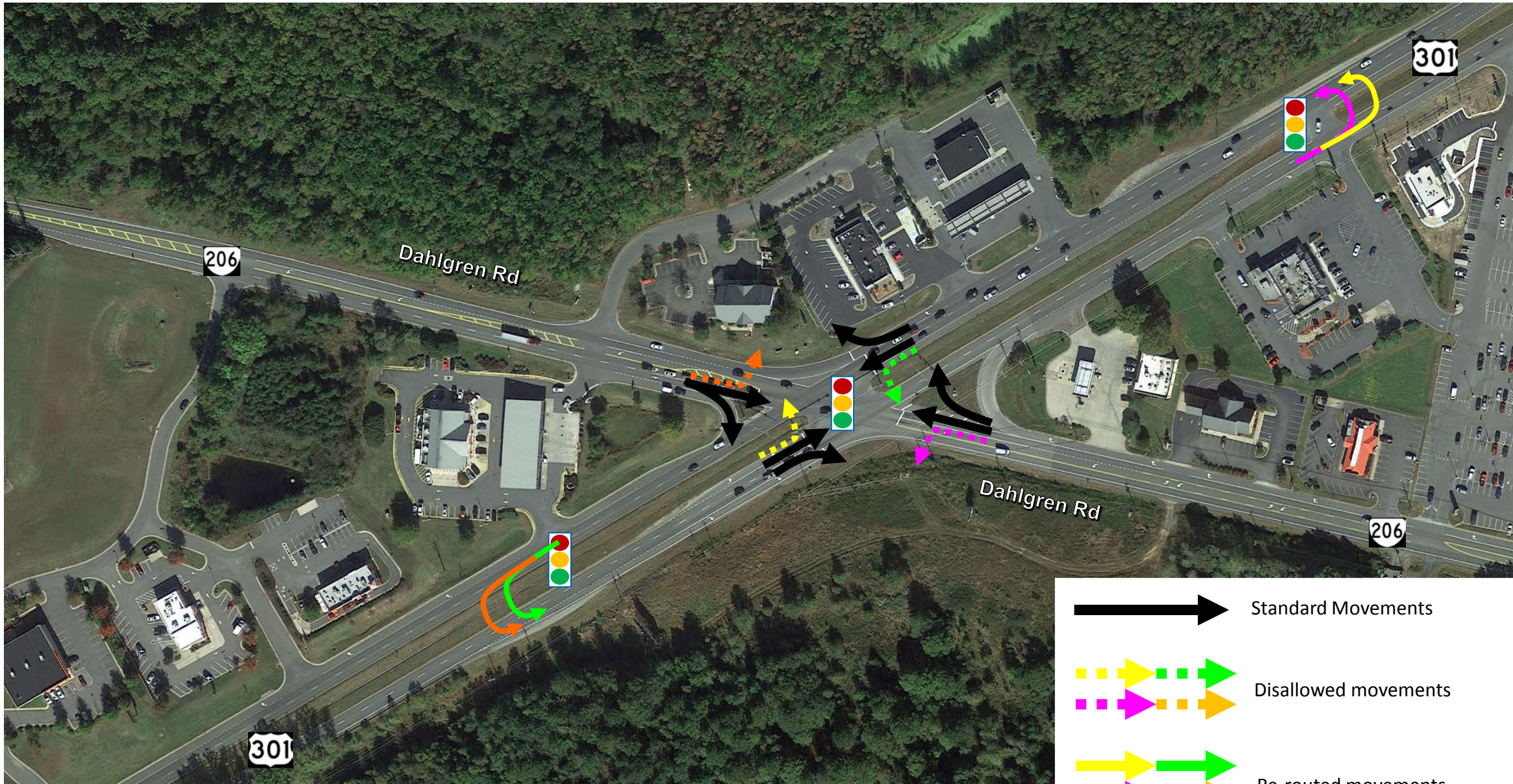


-  Standard Movements
-  Disallowed movements
-  Re-routed movements through quadrant roadway
-  Quadrant roadway

Conceptual design that has not been approved. Not to be used for construction

Route 301/207 Arterial Preservation Plan – King George Area 2

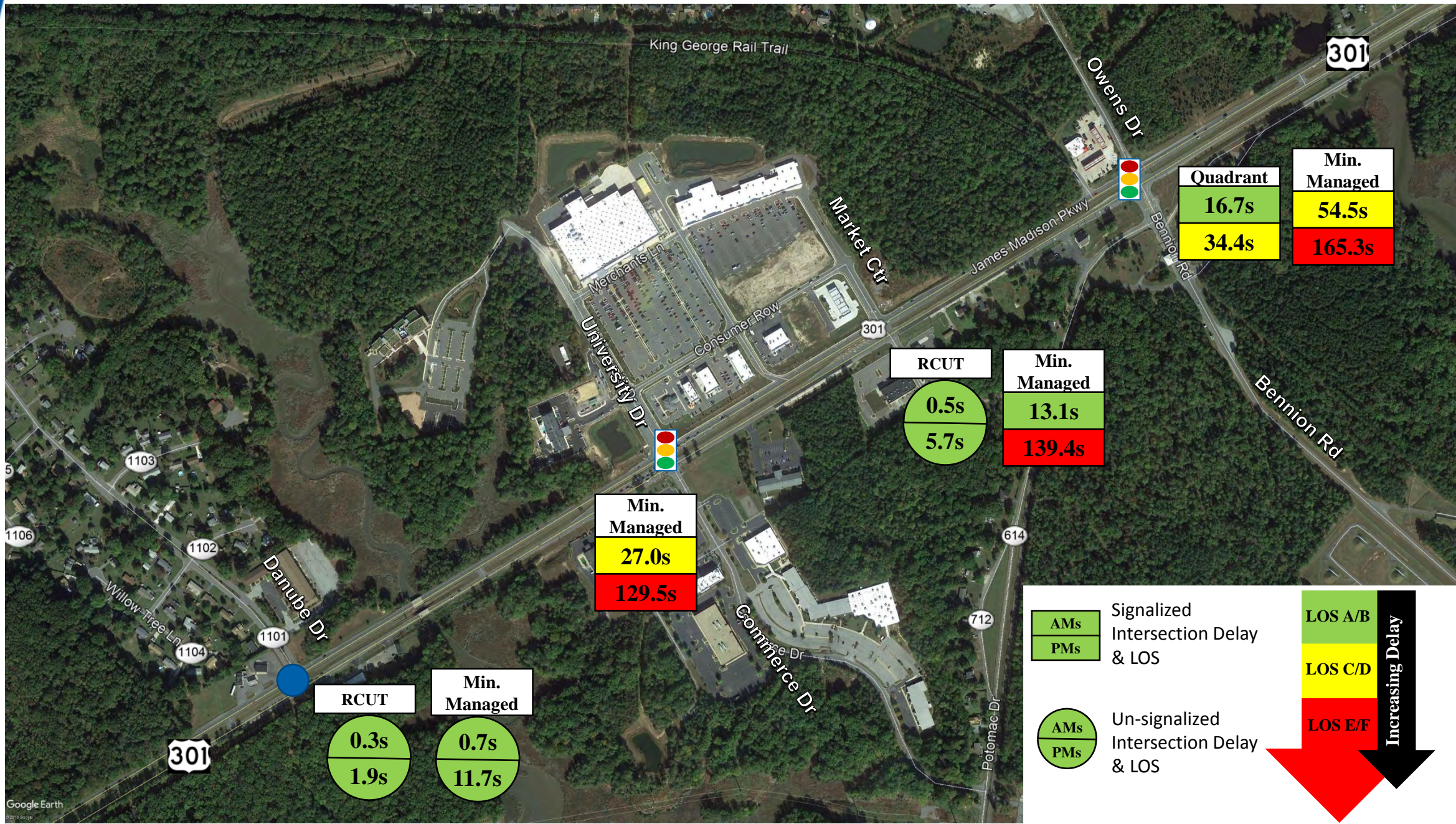
US 301 & Rte 206 Conceptual Median U-turn



Conceptual design that has not been approved. Not to be used for construction

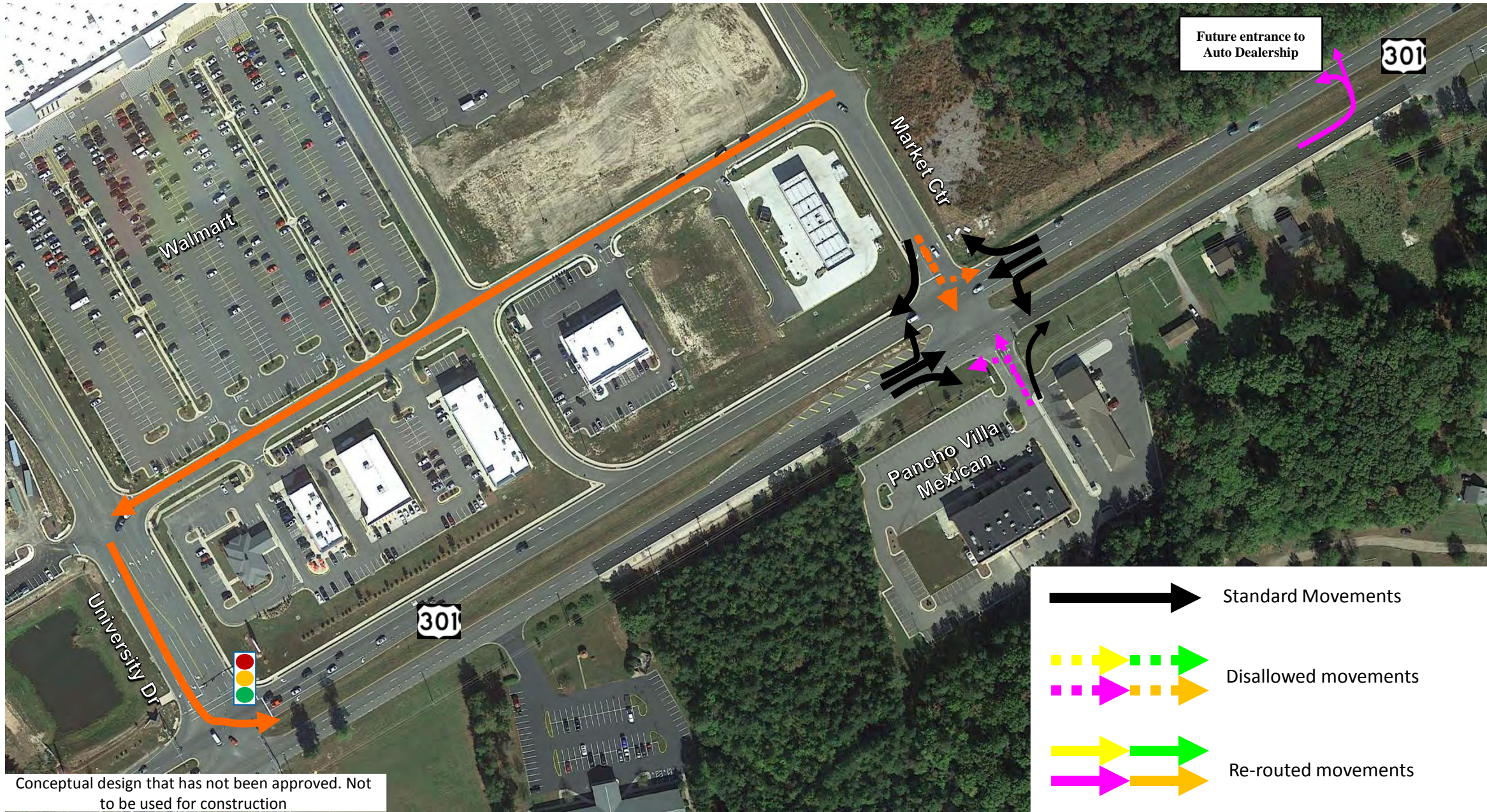
2040 Weekday Corridor Conditions – Recommended Configurations

King George Area 3



Route 301/207 Arterial Preservation Plan – King George Area 3

US 301 & Market Ctr Conceptual RCUT



Future entrance to Auto Dealership

301

Walmart

Market Ctr

Pancho Villa Mexican

University Dr

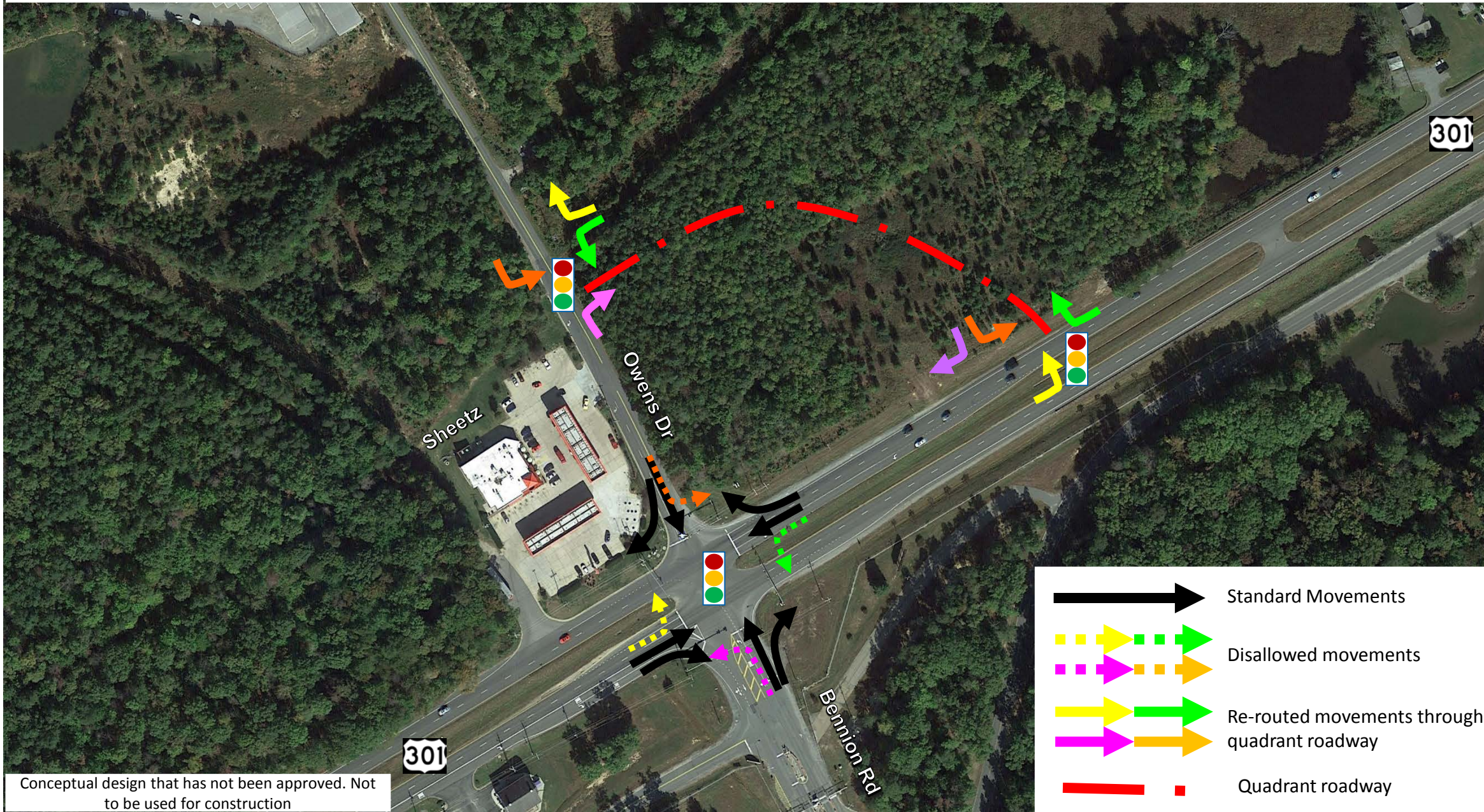
301

- Standard Movements
- Disallowed movements
- Re-routed movements

Conceptual design that has not been approved. Not to be used for construction

Route 301/207 Arterial Preservation Plan – King George Area 3

US 301 & Rte 614 Conceptual Quadrant Roadway



- Standard Movements
- Disallowed movements
- Re-routed movements through quadrant roadway
- Quadrant roadway

Conceptual design that has not been approved. Not to be used for construction

Comparison of Configurations for 2040 Weekday Traffic Conditions

Intersecting road with US 301	Minimally Managed	RCUT/CGT	MUT	Quadrant Roadway
Rte 3	116.8s (105.4s)		17.0s (30.9s)	11.3s (15.1s)
Rte 205	51.4s (101.5s)		41.3s (28.7s)	
Rte 218	17.7s (43.7s)	5.4s (14.8s)		
Rte 206	57.5s (179.8s)		56.4s (55.4s)	32.7s (48.3s)
Danube Dr	0.7s (11.7s)	0.3s (1.0s)		
University Dr	27.0s (129.5s)*			
Market Ctr	13.1s (139.4s)	0.5s (5.7s)		
Rte 614	54.5s (165.3s)			16.7s (34.4s)

*University Dr does not have any recommended innovative intersections for 2040

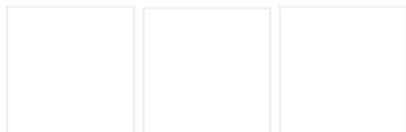
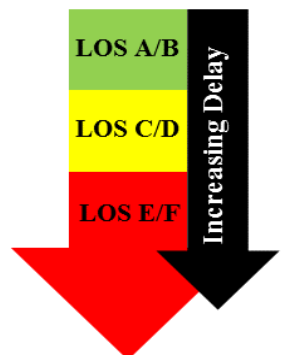
AM Delay (PM Delay) in seconds

RCUT – Restricted Crossing U-turn

CGT – Continuous Green-T

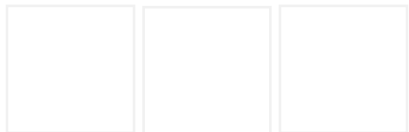
MUT – Median U-turn

See innovate intersection slides for explanation



Overview for Traffic Operations & Recommendations

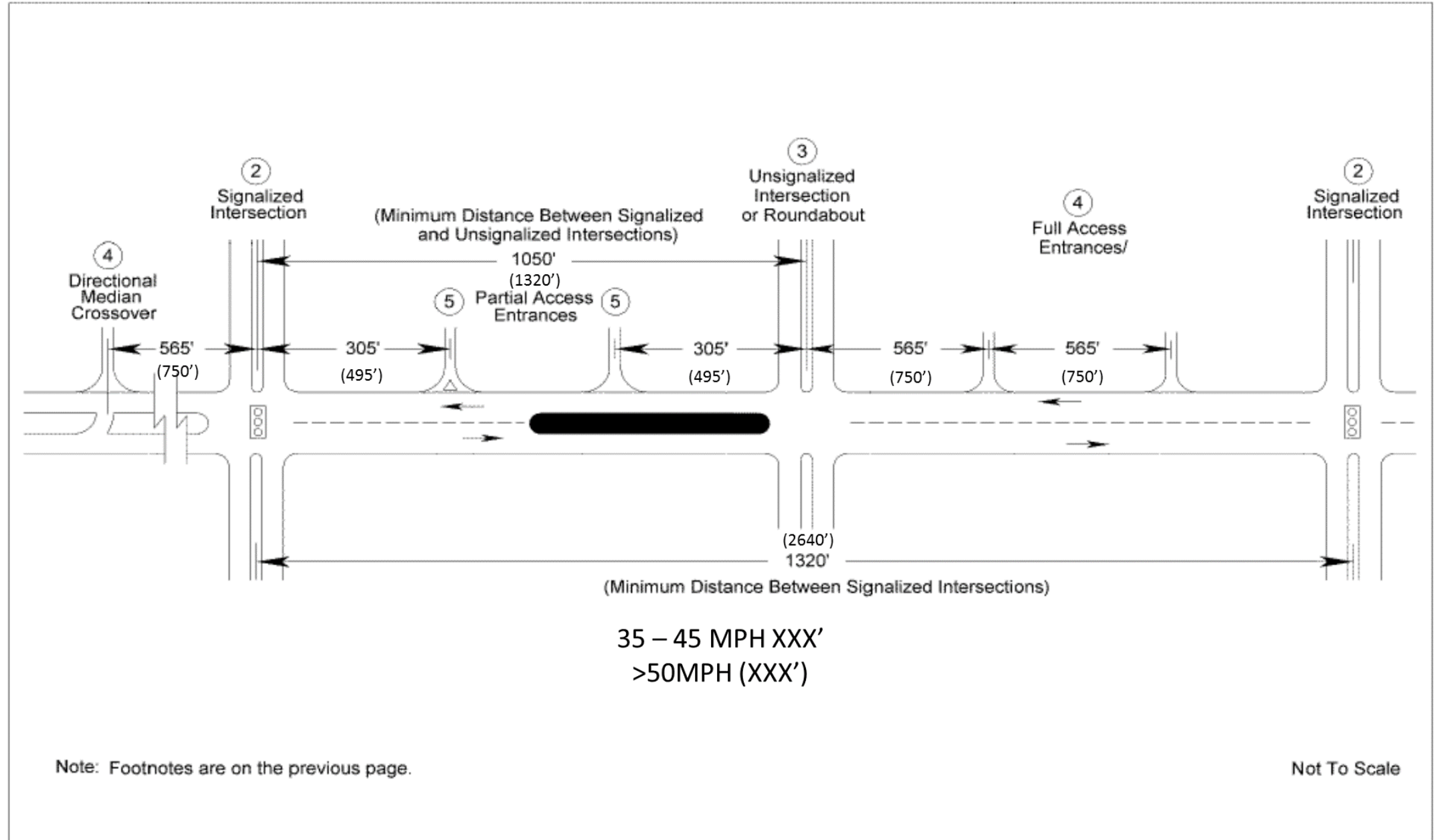
- Traffic demand is expected to roughly double between 2017 and 2040
- Minimally managed conditions cannot provide effective traffic flow for expected growth
- Median U-turns, RCUTs, and CGT recommendations can be pursued today as a permanent or interim solutions
- Recommend further study for Rte 205 and Rte 206 to determine when lane-widening would be appropriate
- Grade separated intersections and/or expanding US 301 from 4-lane to 6-lane should be considered between Nice Bridge and Rte 206/218 area



Geometric/Access Management Recommendations

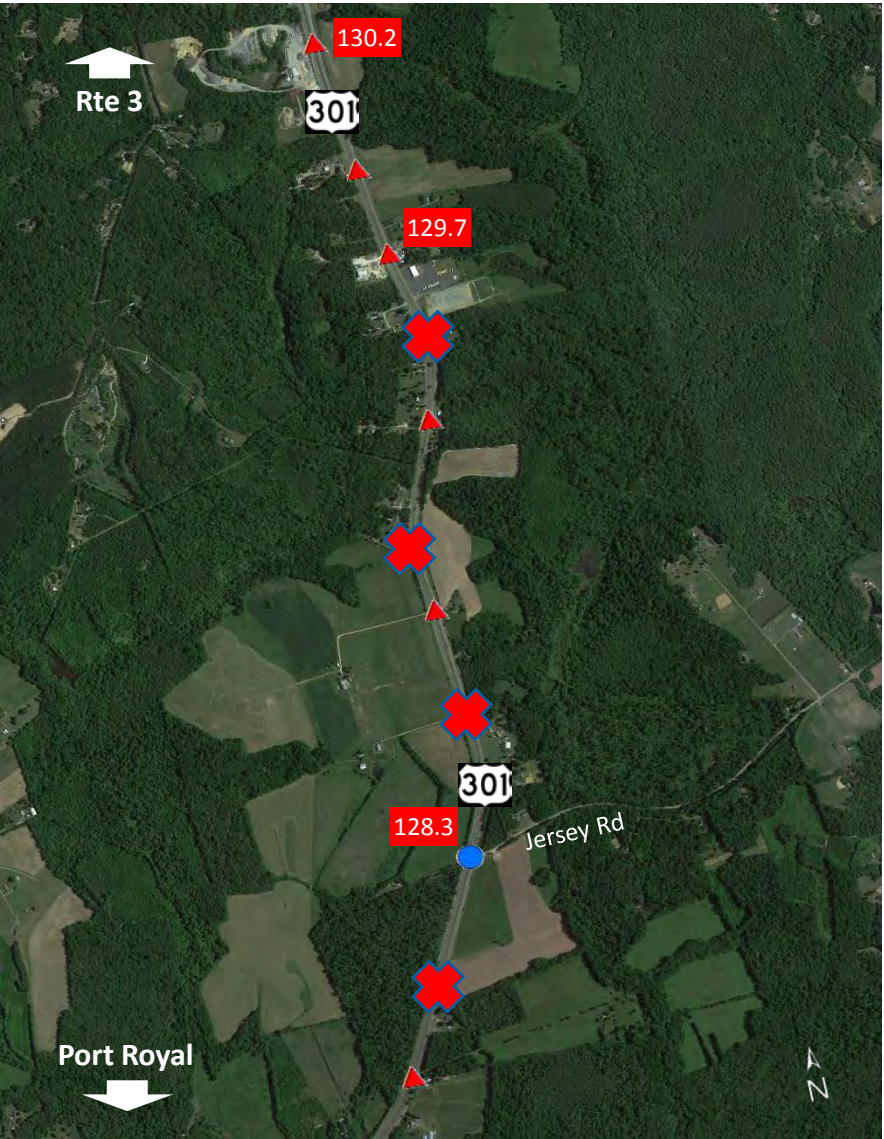
The study team included a higher level analysis for the remaining crossovers and median openings in King George County between the Town of Port Royal and the Governor Nice Bridge






Access Management VDOT Requirements



Preliminary Recommendations

King George County



-  Signalized Intersection
-  Unsignalized Intersection
-  Median Crossovers
-  Recommended Crossover Removal
-  Milepost

Preliminary Recommendations

King George County



Milepost	Recommendation
125.6	Reconfigure existing crossover to a directional median allowing left turns from northbound US 301
126.6	Lengthen existing left-turn lanes on US 301; Future VDOT project to provide actuated advance warning prior to intersection and potential project to reconfigure intersection for RCUT; Potential for road realignment (< 55°)
128.3	Lengthen existing turn-lanes on US 301; Expand spacing between opening in median to accommodate traffic cutting median; Potential for road realignment (< 50°)
129.7	Construct northbound and southbound left-turn lanes ; Expand spacing between opening in median to accommodate trucks turning



Preliminary Recommendations

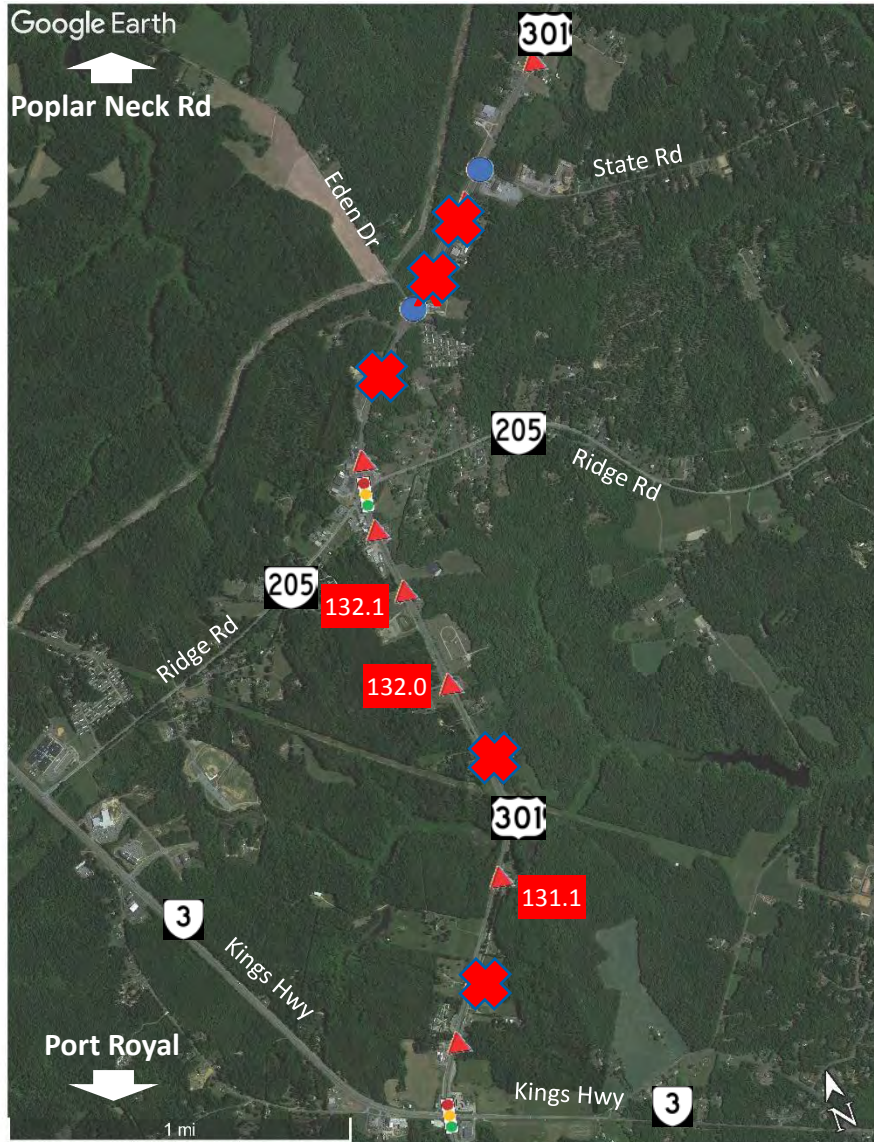
King George County



Milepost	Recommendation
130.2	Construct northbound and southbound left-turn lanes and lengthen southbound US 301 right-turn lane storage and taper; Expand spacing between opening in median to accommodate trucks turning

Preliminary Recommendations

King George County



-  Signalized Intersection
-  Unsignalized Intersection
-  Median Crossovers
-  Recommended Crossover Removal
-  Milepost

Preliminary Recommendations

King George County



Milepost	Recommendation
131.1	Construct northbound and southbound left-turn lanes on US 301
132.0	Construct northbound and southbound left-turn lanes on US 301
132.1	Construct northbound and southbound left-turn lanes on US 301
134.0	Eliminate multiple non-residential driveways on Rte 301. Maintain, Improve, and/or eliminate Will Loop access to Rte 301

Preliminary Recommendations

King George County



Milepost	Recommendation
135.5	Reconfigure area for RCUT. Reconfigure existing crossovers to U-turn areas and create main crossover near mini-storage. Possible site for future residential development
136.0	Lengthen existing southbound left-turn lane on US 301; Construct northbound left-turn lane on US 301. Potential for road realignment (< 50°)

Preliminary Recommendations

King George County

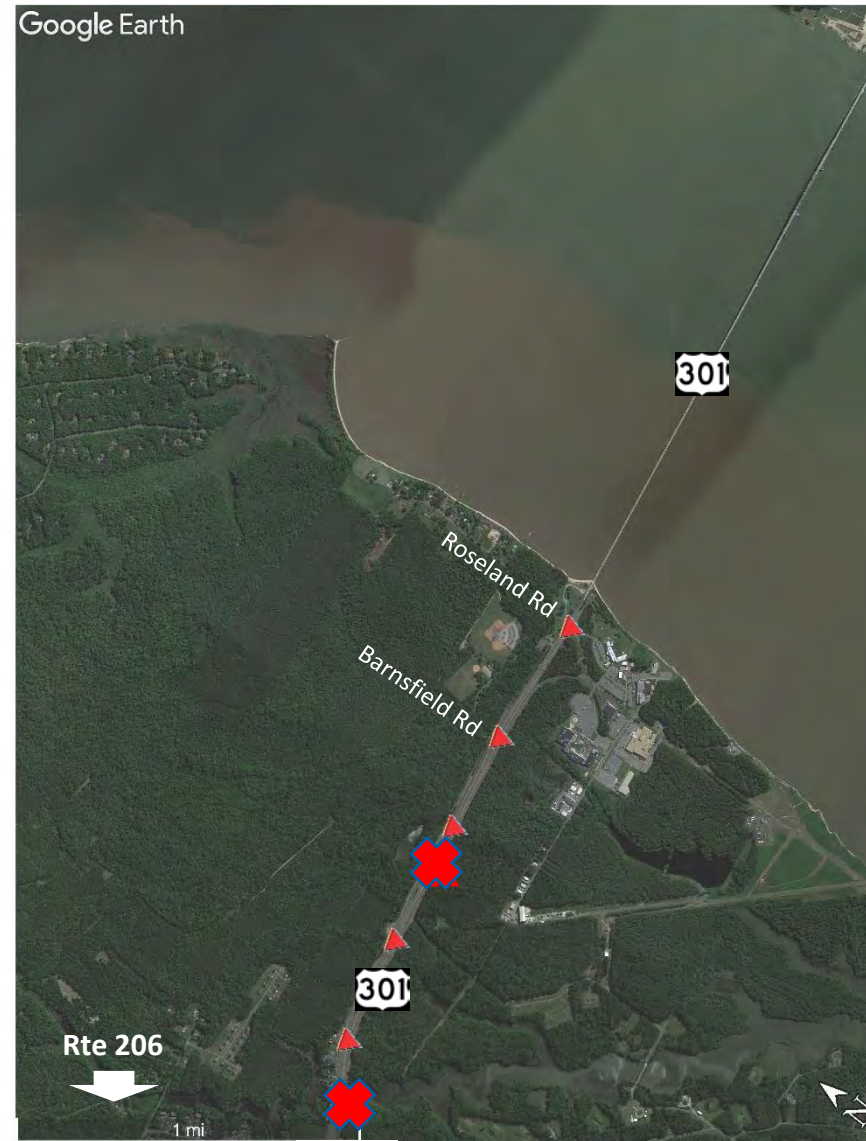
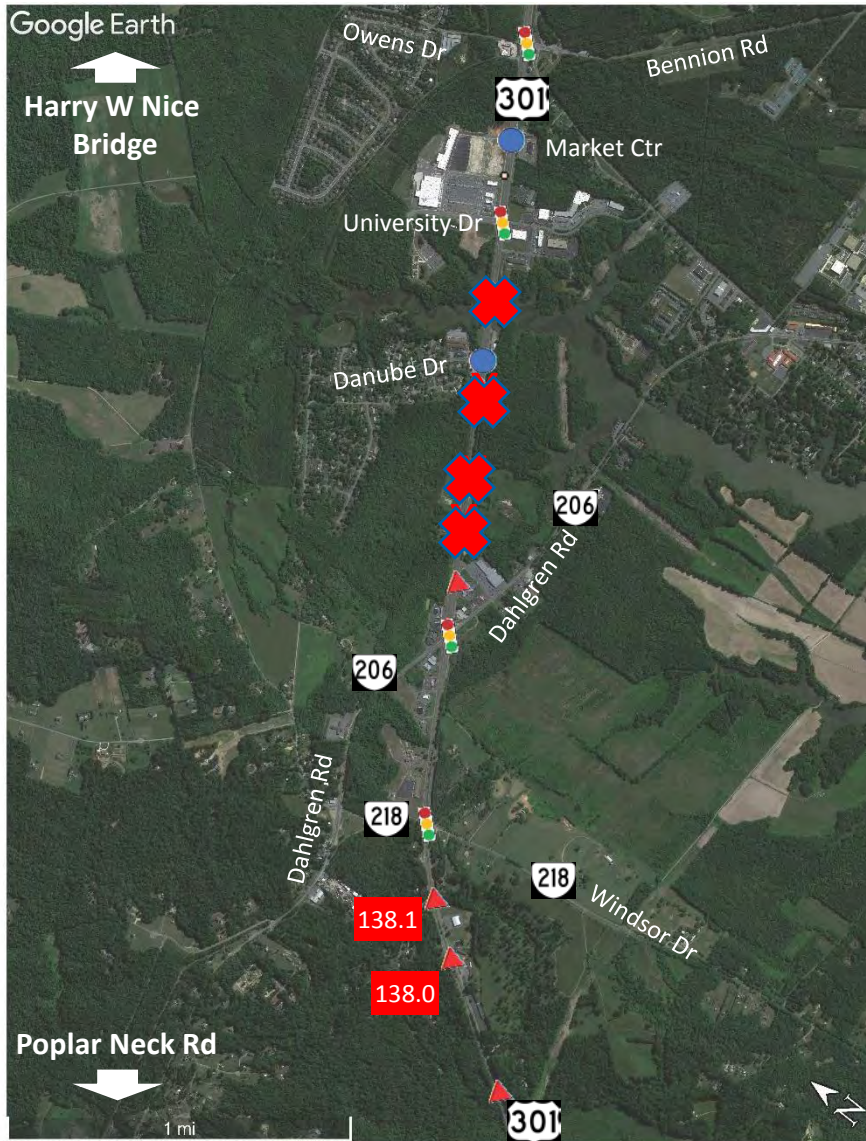


Milepost	Recommendation
135.5	Construct northbound and southbound left-turn lanes on US 301. Construct northbound right-turn lane on US 301
135.8	Construct northbound and southbound left-turn lanes on US 301.



Preliminary Recommendations

King George County



-  Signaled Intersection
-  Unsignaled Intersection
-  Median Crossovers
-  Recommended Crossover Removal
-  Milepost

Preliminary Recommendations

King George County



Milepost	Recommendation
138.0	Construct northbound left-turn lanes on US 301
138.1	Construct southbound left-turn lanes and lengthen existing northbound left-turn lane on US 301



Route 301/207 Arterial Preservation Plan

February 1, 2018 – King George County

Open Discussion