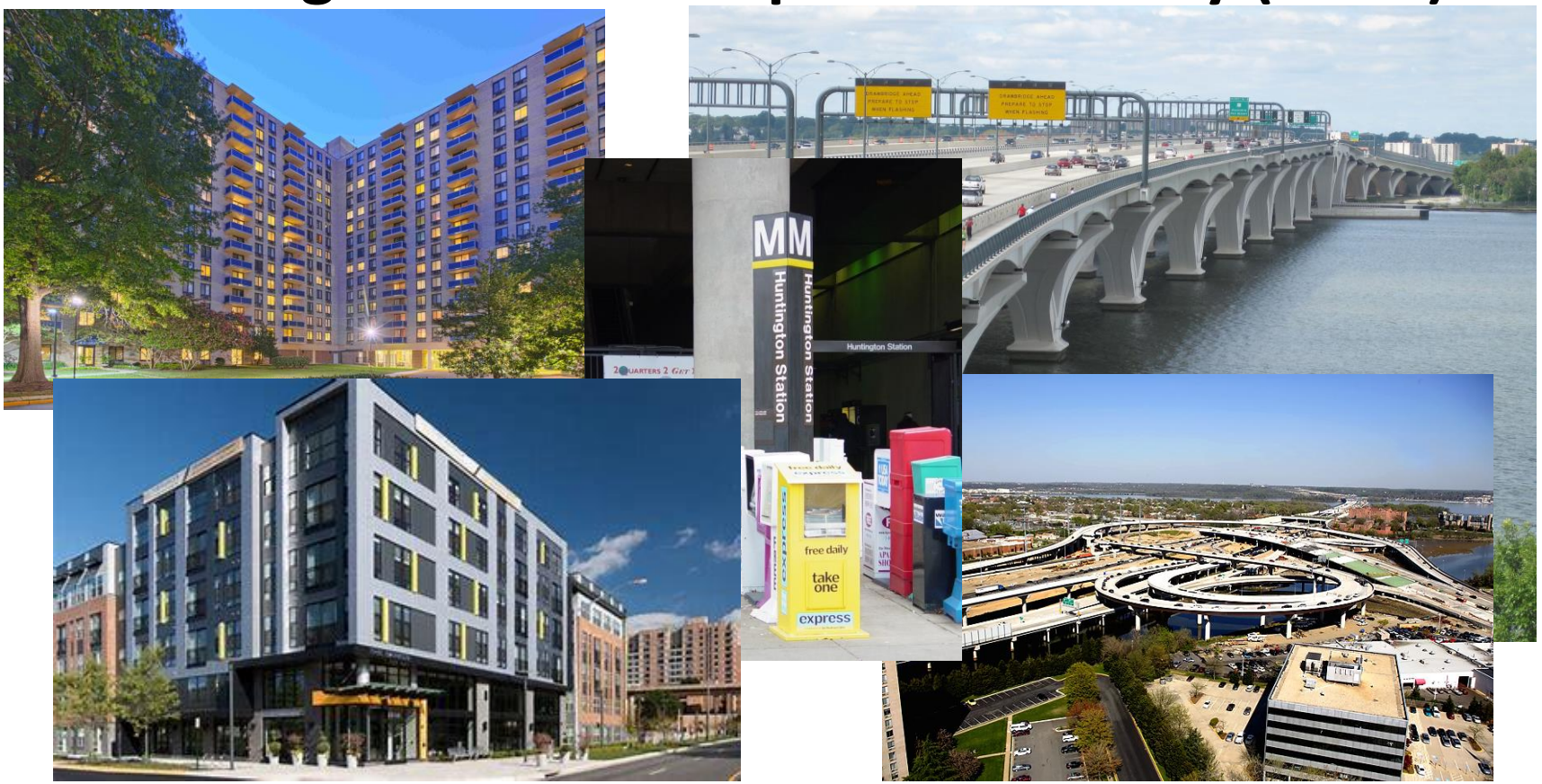
County of Fairfax, Virginia

Huntington Area Transportation Study (HATS)



Mount Vernon Council of Civic Associations

Transportation Committee

April 1, 2019

FCDOT
Serving Fairfax County for 30 Years and More

Purpose

Evaluate potential transportation improvements and mitigation to address existing and forecasted congestion within the Huntington Area and to facilitate better traffic flow through its core.

- Evaluate 2040 horizon (assuming buildout intensities within the Core)
- Facilitate traffic flow through Huntington Core Area
- Analyze 1.65 & 2.0 FAR land use intensities for N Gateway
- Develop at-grade solution(s)to address the Board Motion of taking off the interchange

** Note lack of community support for currently planned grade separated interchange*

Background

2008 BRAC & 2009 South County Area Plans Review (APR) Cycles, highlighted by:

Rendering from Huntington Club PA 2015-IV-MV5

- APRs 09-IV-2MV/09-IV-27MV (Huntington Club)
  - Mixed Use
  - 2.5 million square feet
  - 3.0 Floor Area Ratio (FAR)
  - PA 2015-IV-MV5 increased to 3.5 FAR
- APRs 09-IV-1MV/09-IV-15MV (North Gateway)
  - Mixed Use
  - 1.28 million square feet
  - 1.65 FAR*

**Note that original APR nomination (MVCCA nominated) proposed 2.0 FAR*

Board of Supervisors Motion
Study of Planned Intersection Improvements at Richmond Highway and Huntington Avenue

On September 25, 2018, the Board of Supervisors authorized the consideration of Plan Amendment No. 2018-IV-T1, initiating the study of planned intersection improvements for the intersection of Huntington Avenue and Richmond Highway.

- Assess the potential removal of the currently planned interchange
- Evaluate suitable alternative improvements that are more compatible with the recently updated land use planning, design guidance, and vision for the Richmond Highway Corridor
- Create a proper gateway for Fairfax County and the Huntington community

Board of Supervisors Motion
Consideration of Increase in Land Use Intensity at North Gateway Community Business Center

On September 25, 2018, the Board of Supervisors authorized the consideration of Plan Amendment No. 2018-IV-MV5, considering an increase in land use intensity for Land Units A-1 and A-2

- Evaluate the impacts of increase in land use intensity from currently approved 1.65 FAR to 2.0 FAR
- Consider broadening plan text to allow for consolidation of Land-Unit A-3 with A-1 and A-2
- Reconfigure planned road network to include alternative access from Huntington Avenue

Study Area

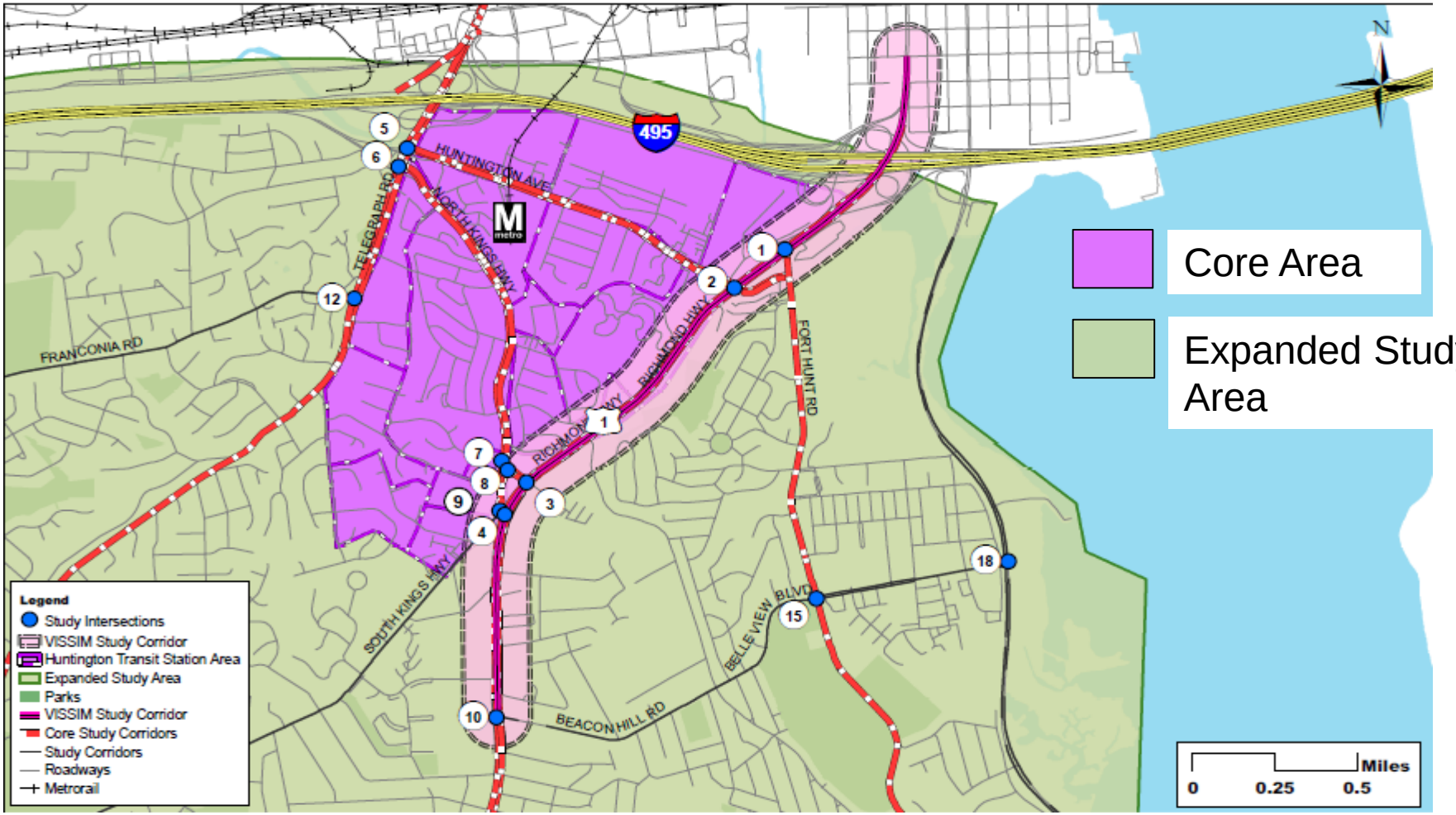
Primary traffic congestion and issues identified at Telegraph Road and Richmond Highway intersections, on County border, serving trips to and from the Beltway and DC Core.

Two-tiered study area was initially developed.

- **Core Study Area** – The "funnel" where significant volumes of vehicles attempt to exit/enter the County via Richmond Highway and Telegraph Road, providing access to the Beltway and points north

- **Expanded Study Area** – The peripheral areas where improvements were thought to be able to potentially divert traffic from, or relieve traffic within, the Core Study Area

Initial Core & Expanded Study Areas



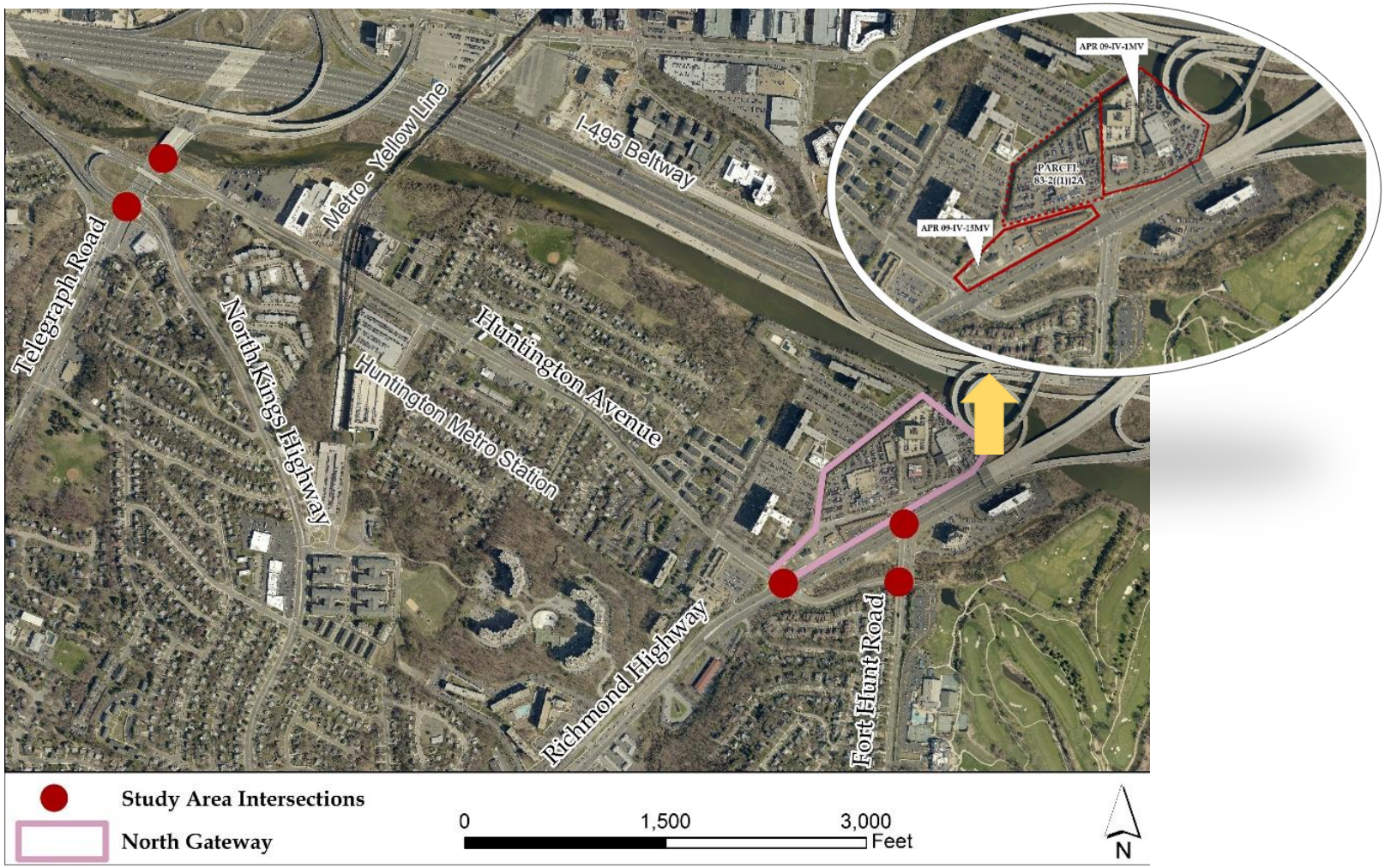
Refined Study Area

More recent, detailed studies take precedence…

- At the time of Authorization, FCDOT had already commenced work to improve traffic flow, reduce cut through, and improve walkability on **North Kings Highway** within the Penn Daw
- Virginia DRPT had also just started their **Route 1 Multimodal Alternatives Analysis**
- The Board authorized the **Embark Richmond Highway** Comprehensive Plan Amendment on May 12, 2015, focusing on improvements and traffic flow south of Penn Daw

➢ FCDOT reduced the HATS study area to focus on a *component* of the Core Study Area, i.e., the primary area of need – those intersections on County boundary, serving Beltway and DC Core

Refined HATS Study Area & Intersections



Existing & Baseline (No Mitigation) Analysis

One intersection operates below the LOS standard* in the AM peak hour under existing conditions (all intersections operate within the standard in the PM peak hour):

- Richmond Highway at Fort Hunt Road – LOS E (71.1 sec avg. delay)

Two intersections operate below LOS standard* in AM peak hour in 2040 under baseline conditions:

- Richmond Highway at Fort Hunt Road – LOS F (134.6 sec)
- Richmond Highway at Huntington Ave – LOS E (56.2 sec)

One intersection operates below LOS standard* in PM peak hour in 2040 under baseline conditions:

- Richmond Highway at Fort Hunt Road – LOS F (107.0 sec)

** Comp Plan calls for an LOS E standard for area facilities, with the exception of National Highway System (Richmond Highway - LOS D)*

Conventional Mitigation Capacity Analysis

Reasonable conventional mitigation was tested first, including traffic signal optimization, additional turn lanes.

Two intersections operate below LOS standard* in AM peak hour in 2040 with conventional mitigation:

- Richmond Highway at Fort Hunt Road – LOS E (74.5 sec)
- Richmond Highway at Huntington Ave – LOS E (63.5 sec)

Two intersections operate below LOS standard* in PM peak hour in 2040 with conventional mitigation:

- Richmond Highway at Fort Hunt Road – LOS F (90.6 sec)
- Telegraph Road at North Kings Highway – LOS F (81.5 sec)

➢ Overall LOS results with conventional mitigation do not adequately portray **more excessive delays to off-peak flow, side streets** (due to disproportionately high north-south peak period volumes)

** Comp Plan calls for an LOS E standard for area facilities, with the exception of National Highway System (Richmond Highway - LOS D)*

Non-Conventional At-Grade Mitigation Options

Need for an interim, at-grade solution to accommodate forecasted traffic on Richmond Highway and meet Comp Plan goals and VDOT standards

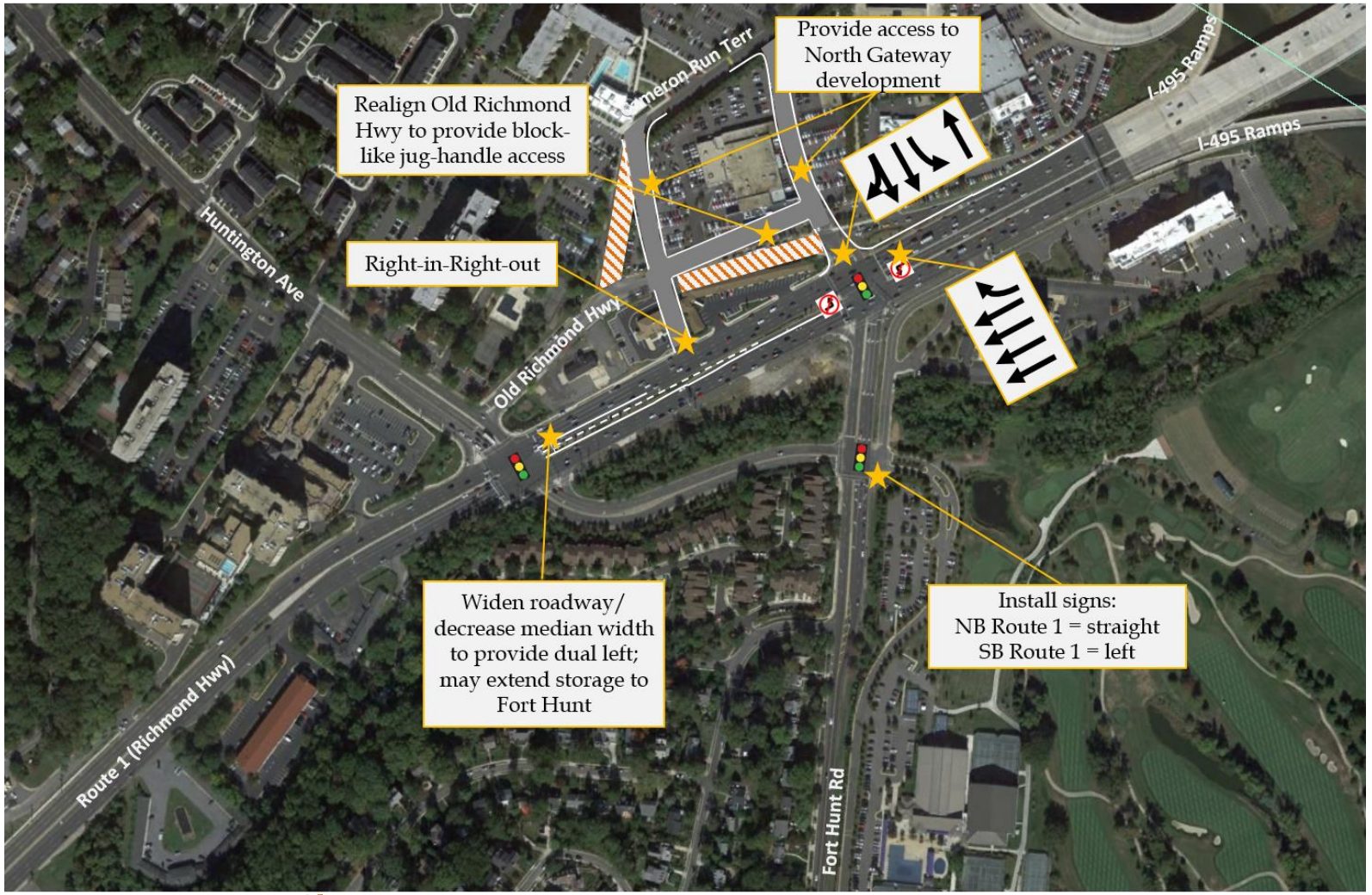
High level assessment of different at-grade options

- Super Street (Two Variations)
- Partially Displaced Left Turns
- Hybrid (Combination of the two Super Street variations)

Planning level analysis was conducted for all options

- Analysis indicated Hybrid option performs relatively better than other at grade options

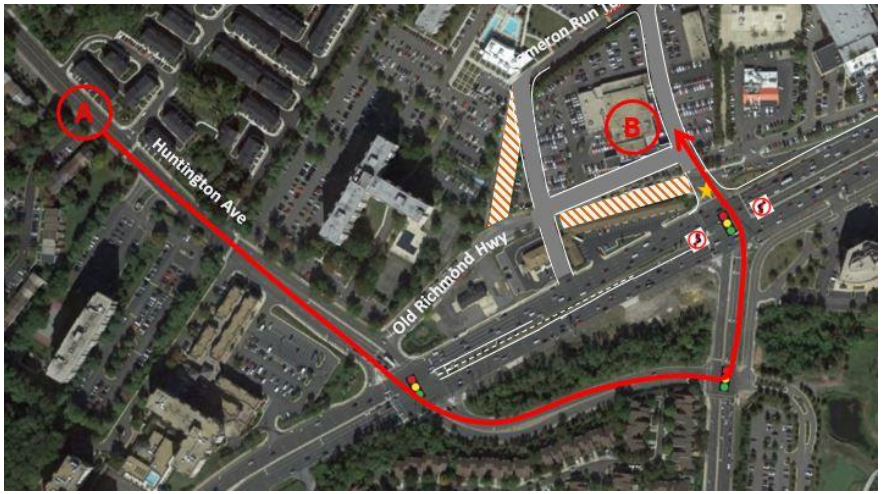
Hybrid Option: Route 1 @ Fort Hunt Left Turns Restricted



Hybrid Option – Features

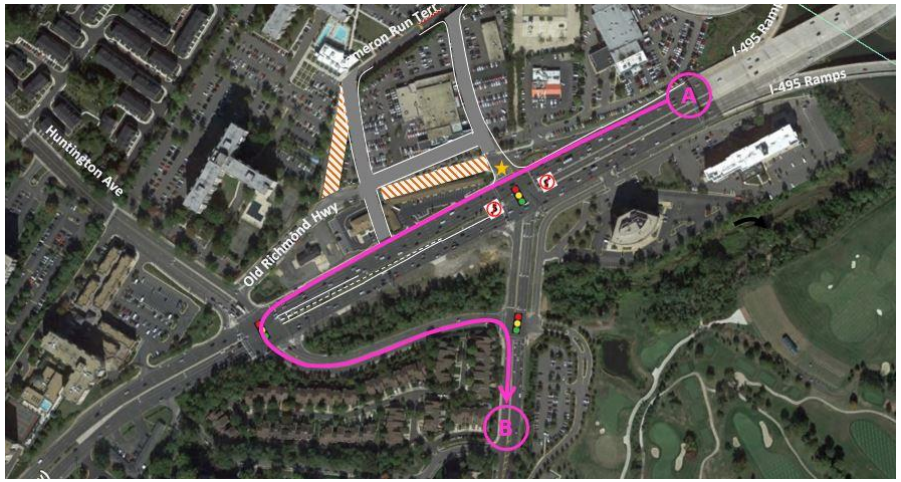
Traffic circulation and access to North Gateway site:

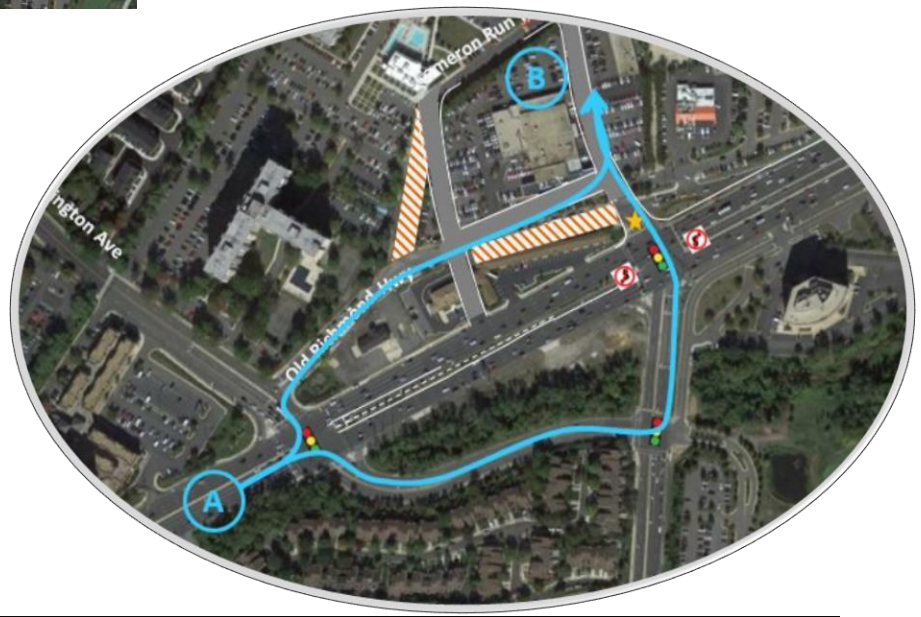
- Old Richmond Highway would realign to provide a grid network connecting Huntington Ave, the realigned Cameron Run Terrace and Fort Hunt Road extension
- Priority given to Richmond Highway through movements
- Left turn movements on Richmond Highway at Fort Hunt Road shifted to Huntington Avenue – thereby reducing one entire signal phase
- Weave from I-495 lengthened to Huntington Avenue due to shifting of left turn movements
- Access to N Gateway improves due to additional southbound right-in/right-out access point
- Maintains access to buildings on Old Richmond Hwy



Access From EB Huntington Ave

Access From NB Route 1





Access to Fort Hunt Road south, from SB Route 1

Hybrid Concept Capacity Analysis

The Hybrid Concept helps the intersection of Richmond Highway and Fort Hunt Road in the AM and PM under 2040 conditions.

- LOS E (74.5 sec) improves to LOS D (47.6 sec) in the AM peak hour
- LOS F (90.6 sec) improves to LOS F (81.5 sec) in the PM peak hour

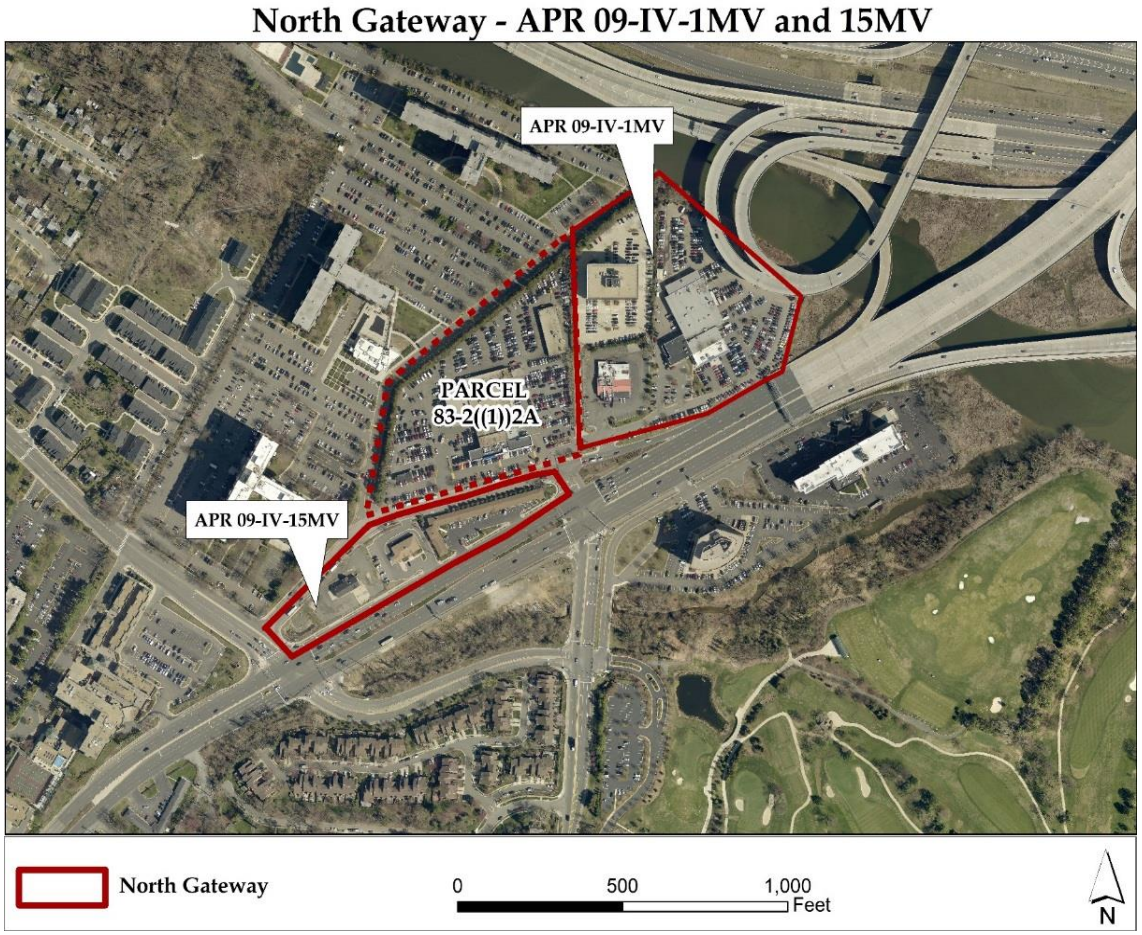
The Hybrid Concept has minimal impact on the intersection of Richmond Highway and Huntington Avenue under 2040 conditions.

The Hybrid Concept has slightly negative impact on intersection of Huntington Ave and Fort Hunt Road under 2040 conditions.

- While all intersections have not been mitigated to LOS standard, all delays have been mitigated to less than 90 sec ***and side street delays have been significantly reduced*** with the Hybrid Concept and may be considered acceptable

** Comp Plan calls for an LOS E standard for area facilities, with the exception of National Highway System (Richmond Highway - LOS D)*

North Gateway Alternative Land Use (2.0 FAR)



- Original APR nomination proposed 2.0 FAR
- Task Force recommended modification effectively reducing FAR to 1.65
- BOS authorized study of land use intensity increased to 2.0 FAR
- Assess whether mitigation strategies from 1.65 FAR can support land use intensity of 2.0 FAR

North Gateway Land Use & Trip Comparison

Item	1.65 FAR	2.0 FAR	Difference	% Change
Households	1,968	2,119	151	7.7%
Population	2,889	3,111	222	7.7%
Total Employment	3,348	3,761	413	12.3%
– Retail	705	738	33	4.7%
– Office	2,643	2,792	149	5.6%
– Other	–	230	230	NA
Trip Production	**8,362**	**8,999**	**637**	**7.6%**
Trip Attraction	**12,294**	**13,540**	**1,246**	**10.1%**

1.65 FAR vs. 2.0 FAR Capacity Analysis

Increasing the intensity at North Gateway to a 2.0 FAR has a negative effect on traffic operations under 2040 conditions.

Richmond Highway at Fort Hunt Road

- LOS F (81.5 sec) worsens to LOS F (109.5 sec) in the PM peak hour

Richmond Highway at Huntington Ave

- LOS E (66.3 sec) worsens to LOS E (74.9 sec) in the AM peak hour
- LOS F (83.6 sec) worsens to LOS F (95.2 sec) in the PM peak hour

Huntington Ave at Fort Hunt Road

- LOS E (75.9 sec) worsens to LOS F (81.0 sec) in the PM peak hour

➢ Additional mitigation needed to accommodate the increased 2.0 FAR at North Gateway

** Comp Plan calls for an LOS E standard for area facilities, with the exception of National Highway System (Richmond Highway - LOS D)*

Mitigating 2.0 FAR – Hybrid+ Option

Inadequate performance of Hybrid Option with N Gateway @ 2.0 FAR land use led to the need for additional mitigation

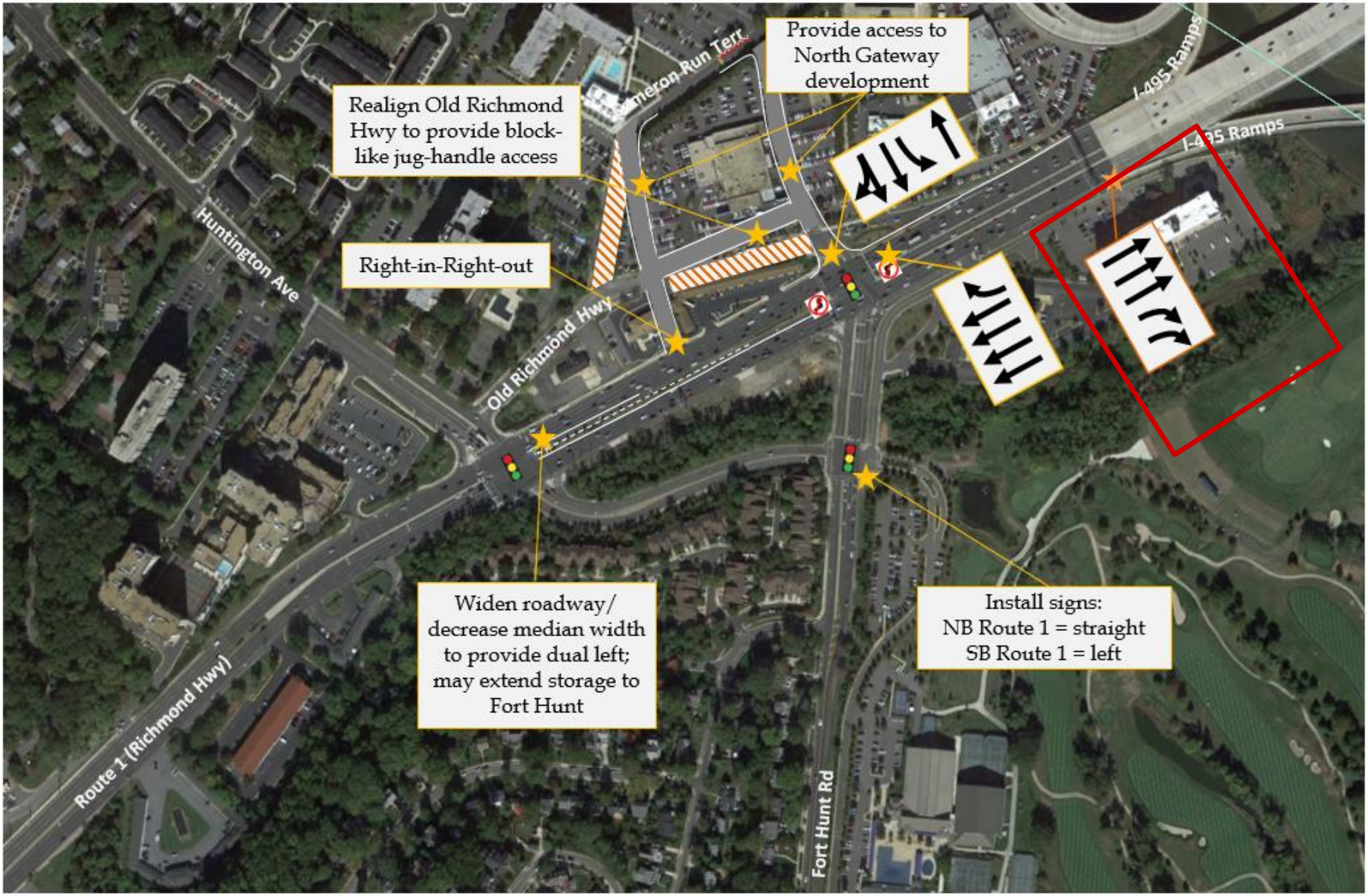
- Analysis results indicated bottleneck at the northbound Beltway ramp
- Bottleneck at the Beltway leads to queueing and congestion at the downstream Richmond Highway intersections

The Hybrid+ Option includes an additional northbound right turn lane to the Beltway ramps, with channelization of the on-ramp lanes

Hybrid Plus option was able to accommodate queues and their impact on adjacent intersections

NOTE: Hybrid+ Option likely requires an Interchange Modification Report (IMR)

Hybrid Plus Option: Route 1 @ Fort Hunt Left Turns Restricted



Existing traffic signal

Closed roadway

Hybrid Option restricts left turns from Route 1. Helps reduce delay, and requires alternative paths be taken to access fort Hunt Road

Hybrid+ is necessary with North Gateway at a 2.0 FAR: Would add additional mitigation at the on-ramp to I-495 by creating two channelized lanes onto the ramp.

Hybrid+ Concept Capacity Analysis

The Hybrid+ Concept has a positive impact on the Richmond Highway intersections operations vs. the Hybrid results under 2040 conditions in the AM and PM peak hours.

Richmond Highway at Fort Hunt Road

- LOS D (53.0 sec) improves to LOS D (45.5 sec) in the AM
- LOS F (109.5 sec) improves to LOS F (96.3 sec) in the PM

Richmond Highway at Huntington Avenue

- LOS E (74.9 sec) improves to LOS E (67.8 sec) in the AM
- LOS F (95.2 sec) improves to LOS E (76.8 sec) in the PM

➢ While all intersections have not been mitigated to LOS D standard, all delays have been mitigated to less than 100 sec with the Hybrid+ Concept and may be considered acceptable

Conclusions and Recommendations

For currently adopted land uses, Hybrid and Conventional mitigation are not significantly different, overall, but the Hybrid option performs better than the Conventional, when considering all movements.

Performance criteria show the Hybrid Concept performs well at 1.65 FAR & mitigates majority of congestion in the study area.

- The Hybrid Concept, or similar, may prove sufficient to accommodate currently planned land uses in the Huntington Area

Hybrid Concept at 2.0 FAR cannot adequately sustain the land use intensity.

- The Hybrid+ Concept, or similar, may prove sufficient to accommodate current plans, plus a 2.0 FAR at N Gateway.

Note, the Hybrid+ Concept also works best for 1.65 FAR

VDOT Chapter 870 Submittal

- Board Motion warranted a VDOT Chapter 870 Comprehensive Plan Amendment Submission
- VDOT Chapter 870 Submission assembled based on HATS Analysis & Report
- VDOT Chapter 870 Submission transmitted to VDOT in November 2018
- VDOT review and FCDOT coordination remain ongoing
- VDOT concurrence and acceptance are still pending

Plan Amendment Schedule

- Currently striving to meet the following schedule for Plan Amendments
  - Board of Supervisors Public Hearing in July 2019
  - Planning Commission Public Hearing in June 2019
  - Publication of Staff Report in May 2019
- Ongoing VDOT review and coordination may play a role in whether we are able to maintain this schedule, or be delayed

Questions?

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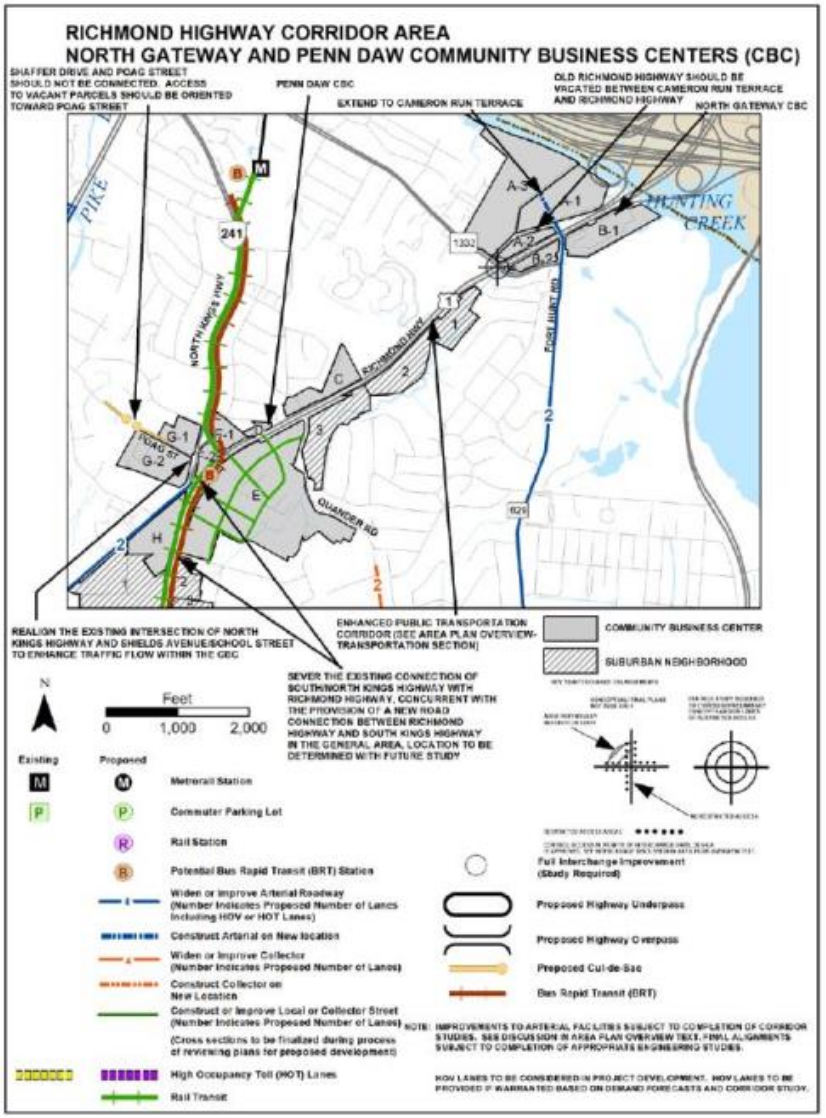
Current Long Range Plans

The Comprehensive Plan currently includes the following:

- Grade-separated interchange at Richmond Highway and Huntington Ave/Fort Hunt Road *
- Extension of Fort Hunt Road to Cameron Run Terrace
- Embark Richmond Highway improvements to the south:
  - Bus Rapid Transit to Ft Belvoir
  - Metrorail Extension to Hybla Valley
  - Grids of streets within 4 CBCs



** Note lack of community support for currently planned grade separated interchange*

VDOT Chapter 870 Traffic Impact Analyses (TIA)

Huntington Club and North Gateway PAs were both subject to VDOT Chapter 870 TIA review

Existing and forecasted traffic congestion problematic

Significant amounts of traffic destined for the Washington DC Core in the AM, and for home in the PM

Large amounts of traffic funneling through:

- Richmond Hwy @ Huntington Ave and Fort Hunt Rd
- Telegraph Rd @ North Kings Hwy and Huntington Ave

Demand exceeds capacity provided by:

- Woodrow Wilson Bridge improvements
- Telegraph Road improvements

Plan Text & Authorization

Adopted plan text for North Gateway reads (RE: increasing intensity):

- Sub-units A-1 and A-2 may be appropriate for redevelopment at a higher intensity as recommended by the optional level of development when area-wide transportation issues can be addressed. The Plan for the mixture of uses and higher intensity should be evaluated following the completion of transportation studies for the Huntington area and the Richmond Highway Corridor, when mitigation strategies are identified.

January 28, 2014 Board of Supervisors Meeting (Authorization)

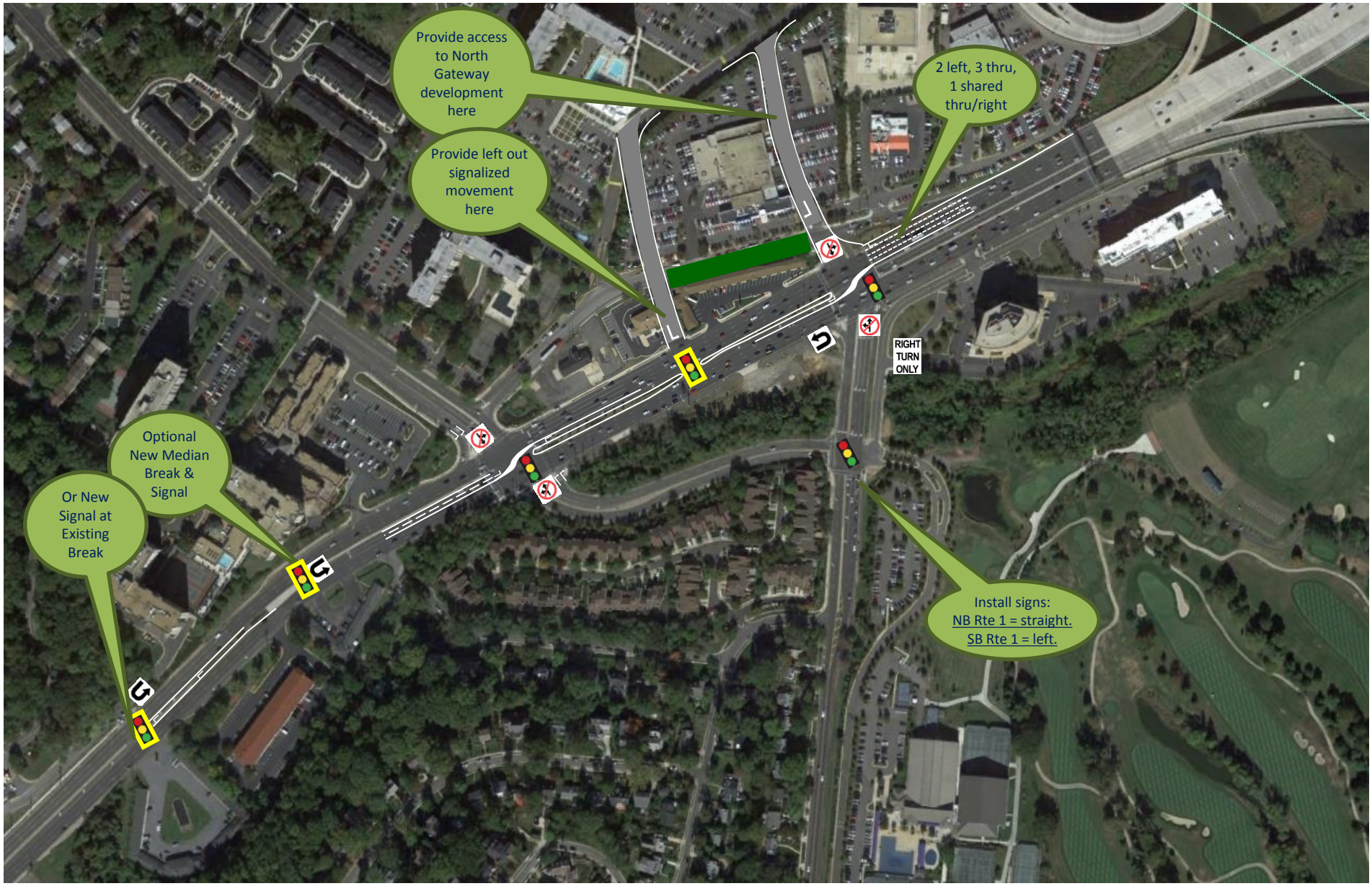
- While making a motion for approval on APRs 09-IV-1MV and 15MV, Supervisor Gerald Hyland moved that the Board direct staff to prepare a traffic study to consider land uses at an intensity up to 2.0 FAR.

Option A: Route 1 Left Turn Movements Prohibited

No left/right turns

Existing traffic signal

Option B: Side Street Left Turn & Through Movements Prohibited

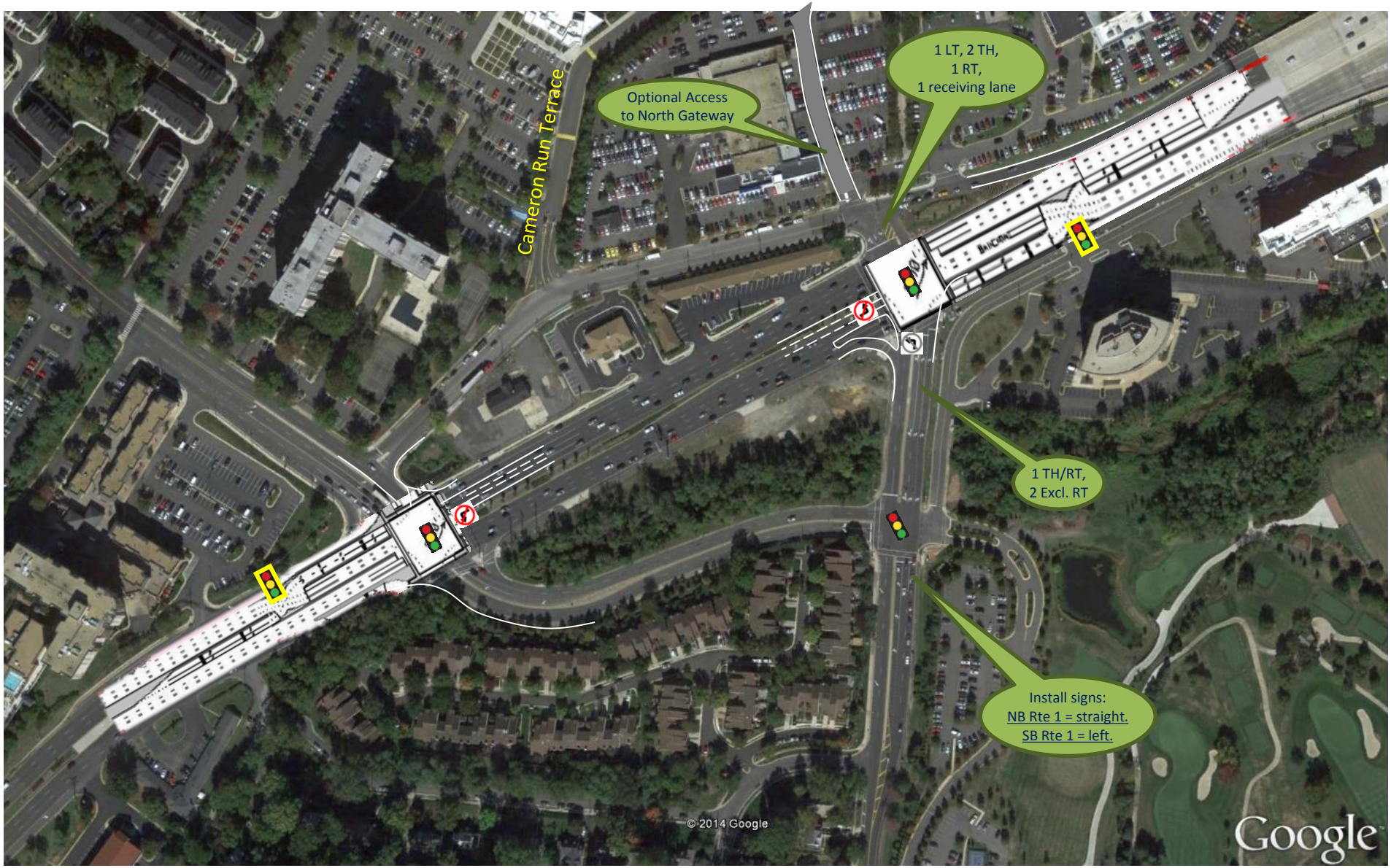


New traffic signal

Existing traffic signal

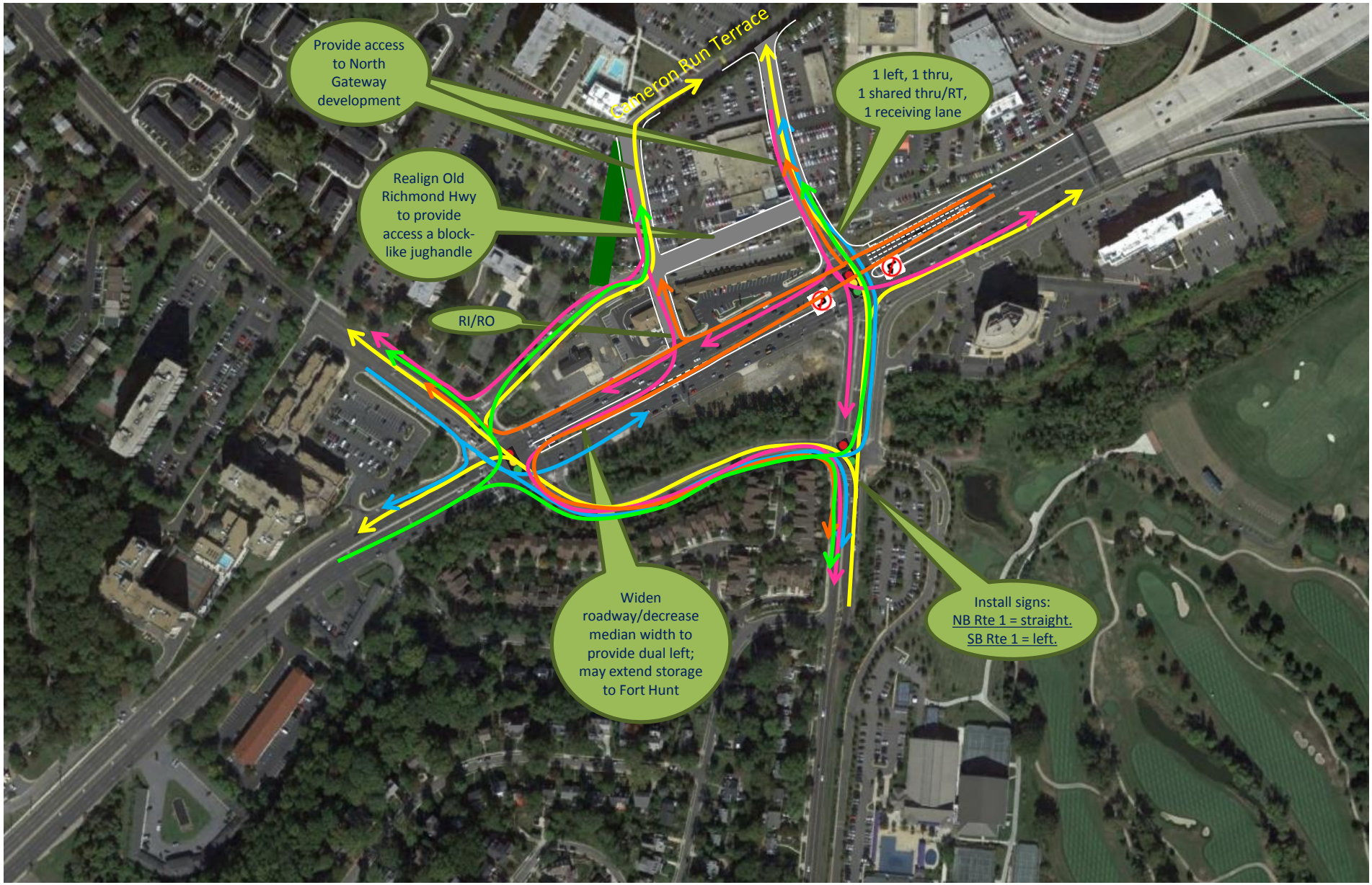
Right turn on red prohibitions are recommended during peak hours to reduce the speed differentials on Route 1, unless add lanes can be used.

Option C: Partial Displaced Left Turn Intersection



New traffic signal Existing traffic signal

Hybrid Option: Route 1 to Fort Hunt Left Turns Shifted to Huntington



Existing traffic signal

For this Hybrid Option, Route 1/Fort Hunt Rd operates better. The other two intersections operate slightly worse. Overall, there is a small 3-5% increase in the CLV & v/c ratios when compared to the No Build.

Level of Service (LOS)

- LOS measures how well traffic flows, or how much delay (sec/vehicle) exists at an intersection during the peak hours
- Overall LOS is based on average delay experienced by all vehicles traversing through an intersection
- An intersection may have an acceptable overall LOS, but experience failing movements (e.g., side streets, left turns)

	Delay (sec/vehicle)
LOS	Signalized Intersections
A	≤ 10
B	> 10 - 20
C	> 20 - 35
D	> 35 - 55
E	> 55 - 80
F	> 80

Existing Conditions – LOS and Delay

Intersections	AM		PM	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Richmond Highway and Fort Hunt Road	71.1	E	39.7	D
Richmond Highway and Huntington Avenue	27.3	C	42.0	D
Fort Hunt Road and Huntington Avenue	29.8	C	17.2	B
Telegraph Road and North Kings Highway	28.0	C	28.4	C
Telegraph Road and Huntington Avenue	15.1	B	17.2	B

2040 1.65 FAR Scenario - LOS and Delay

Intersections	AM		PM	
	Delay	LOS	Delay	LOS
Richmond Highway and Fort Hunt Road	**134.6**	**F**	**107.0**	**F**
Richmond Highway and Huntington Avenue	56.2	E	50.5	D
Fort Hunt Road and Huntington Avenue	22.1	C	17.8	B
North Kings Highway and Telegraph Road	37.4	D	65.5	E
Huntington Avenue and Telegraph Road	29.0	C	28.5	C

Analysis Notes:

- Intersection movements along Richmond Highway at Huntington Avenue and Fort Hunt Road experience significant delays

- Intersection movements along Telegraph Road at North Kings and Huntington Avenue also experienced significant delays

Mitigation- 2040 *(1.65 FAR)*

- Staged mitigation strategies were developed and tested to study whether LOS could be improved above LOS F
  - Mitigation A, B and C→ 3 sets of tested mitigations
  - These mitigations also assessed Right-of-Way impacts

Intersections	Mitigation A	Mitigation B	Mitigation C
Richmond Highway and Fort Hunt		• Old Richmond Highway and Fort Hunt Road intersection - add one lane at EB and WB approaches • Optimize signals	• Add one EB through lane and one NB right-turn lane • Optimize signal timings
Richmond Highway and Huntington Avenue	• Optimize signal timings		
Fort Hunt Road and Huntington Avenue			
North Kings Highway and Telegraph Road	• Optimize signal timings		
Huntington Avenue and Telegraph Road			

2040 Conventional Mitigation Results

Intersections	2040 Conventional Mitigation			
	AM		PM	
	Delay	LOS	Delay	LOS
Richmond Highway and Fort Hunt	74.5	E	90.6	**F**
Richmond Highway and Huntington Avenue	63.5	E	81.5	**F**
Fort Hunt Road and Huntington Avenue	46.4	D	65.7	E

- Mitigation strategies improved performance of Telegraph Road intersections
- However, Fort Hunt Road and Huntington Avenue intersection movements at Richmond Highway continued to show delays
- *VISSIM* was introduced at this stage for detailed operation analysis of North Gateway intersections

** {Considering the complexity of North Gateway region with its proximity to the Beltway interchange, weaving ramps and Route 1 being a National Highway, VISSIM was used for analysis purpose}*

Hybrid Vs Conventional Mitigation

Intersections	AM			
	2040 Conventional		2040 Hybrid	
	Delay	LOS	Delay	LOS
Richmond and Fort Hunt	74.5	E	47.6	D
Richmond and Huntington	63.5	E	66.3	E
Fort Hunt and Huntington	46.4	D	56.3	E

Intersections	PM			
	2040 Conventional		2040 Hybrid	
	Delay	LOS	Delay	LOS
Richmond and Fort Hunt	90.6	F	81.5	F
Richmond and Huntington	81.5	F	83.6	F
Fort Hunt and Huntington	65.7	E	75.9	E

- Under the Hybrid Option, some of the movements of Fort Hunt and Richmond Highway intersection cease to exist
- The PM scenario performs relatively better than the Conventional Option by reducing the delay in seconds for couple of approaches for the intersection of Richmond Highway @ Fort Hunt

Hybrid 1.65 Vs 2.0 FAR

AM				
Intersections	2040 Hybrid (1.65 FAR)		2040 Hybrid (2.0 FAR)	
	Delay	LOS	Delay	LOS
Richmond and Fort Hunt	47.6	D	53.0	D
Richmond and Huntington	66.3	E	74.9	E
Fort Hunt and Huntington	56.3	E	50.2	D

PM				
Intersections	2040 Hybrid (1.65 FAR)		2040 Hybrid (2.0FAR)	
	Delay	LOS	Delay	LOS
Richmond and Fort Hunt	81.5	F	109.5	F
Richmond and Huntington	83.6	F	95.2	F
Fort Hunt and Huntington	75.9	E	81.0	F

- In the AM, two of the three intersections perform more poorly under the 2.0 FAR scenario
- In the PM, delays are significantly higher for the intersections at Fort Hunt (more than an average of 20 seconds per vehicle) and Huntington under the 2.0 FAR scenario – additionally, the intersection of Fort Hunt and Huntington now fails under the 2.0 FAR scenario
- The Hybrid Option cannot support land use intensity of 2.0 FAR

Hybrid Vs Hybrid + (2.0 FAR)

AM				
Intersections	2040 Hybrid (2.0 FAR)		2040 Hybrid + (2.0 FAR)	
	Delay	LOS	Delay	LOS
Richmond and Fort Hunt	53.0	D(1)	45.5	D(1)
Richmond and Huntington	74.9	E(2)	67.8	E(2)
Fort Hunt and Huntington	50.2	D	55.2	E

PM				
Intersections	2040 Hybrid (2.0 FAR)		2040 Hybrid + (2.0FAR)	
	Delay	LOS	Delay	LOS
Richmond and Fort Hunt	109.5	F(3)	96.3	F(3)
Richmond and Huntington	95.2	F(1)	76.8	E(1)
Fort Hunt and Huntington	81.0	F(1)	86.6	F(2)

Note: Number in parentheses indicates number of movements where delay exceeds 100 seconds

- Overall intersection delay (in sec) significantly improves under the Hybrid + scenario for both AM and PM
- Approach delay (in sec) for the Route 1 movements significantly improves under the Hybrid + for both AM and PM
- Hybrid + can more or less sustain land use intensity of 2.0 FAR

Hybrid + (1.65 Vs 2.0 FAR)

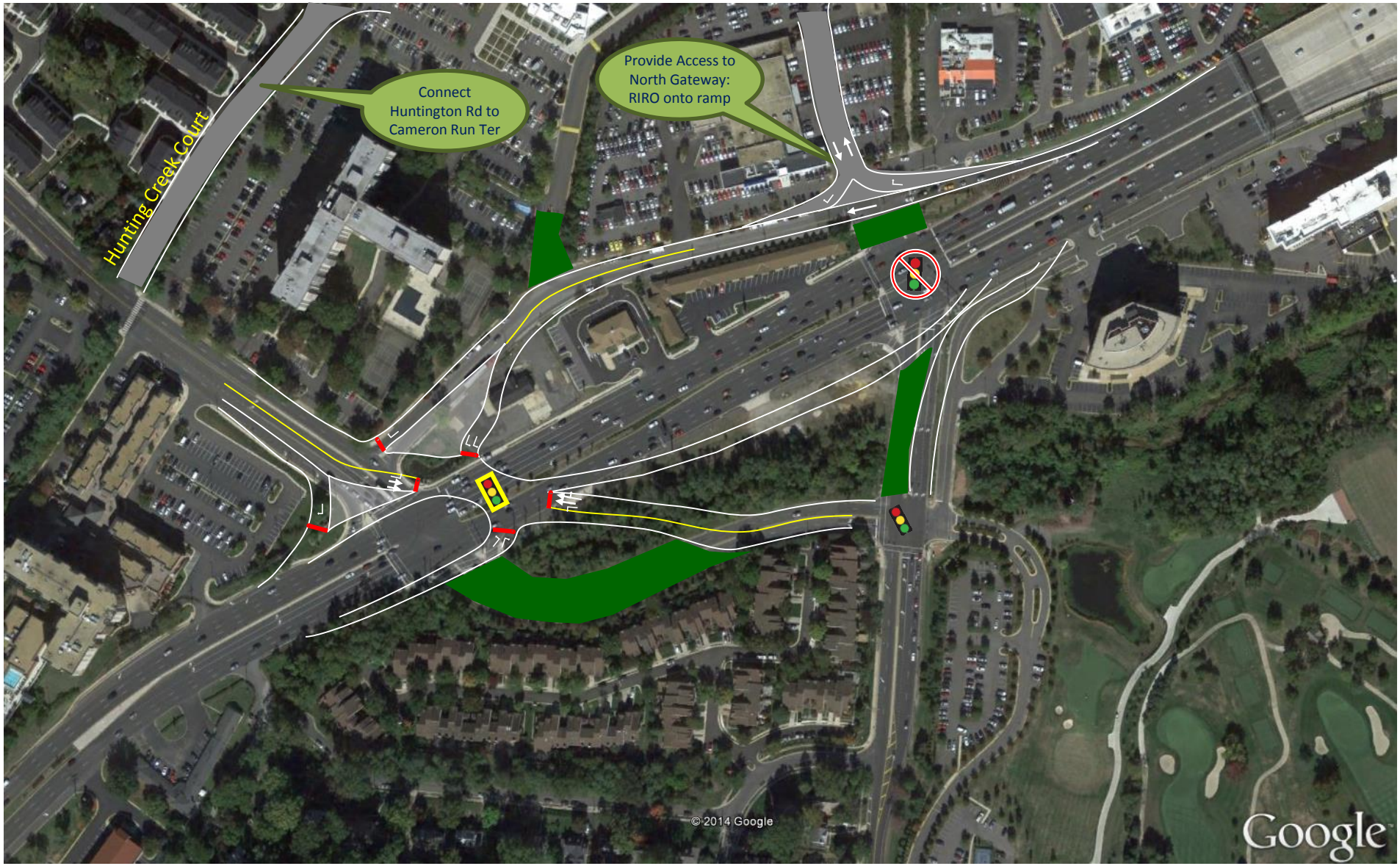
AM				
Intersections	2040 Hybrid + (1.65 FAR)		2040 Hybrid + (2.0 FAR)	
	Delay	LOS	Delay	LOS
Richmond and Fort Hunt	41.3	D(1)	45.5	D(1)
Richmond and Huntington	65.2	E(1)	67.8	E(2)
Fort Hunt and Huntington	63.0	E	55.2	E

PM				
Intersections	2040 Hybrid + (1.65 FAR)		2040 Hybrid + (2.0FAR)	
	Delay	LOS	Delay	LOS
Richmond and Fort Hunt	77.6	E(3)	96.3	F(3)
Richmond and Huntington	50.5	D(1)	76.8	E(1)
Fort Hunt and Huntington	86.1	F(2)	86.6	F(2)

Note: Number in parentheses indicates number of movements where delay exceeds 100 seconds

- At 1.65 FAR, Hybrid + scenario results in reduction in delay at the Route 1 intersections
- Approach delay (in sec) for the Route 1 movements significantly improves under the Hybrid + scenario at 1.65 FAR
- Safe to conclude that Hybrid + can sustain land use intensity of 1.65 FAR

Option D: Single Point Urban Interchange (SPUI)

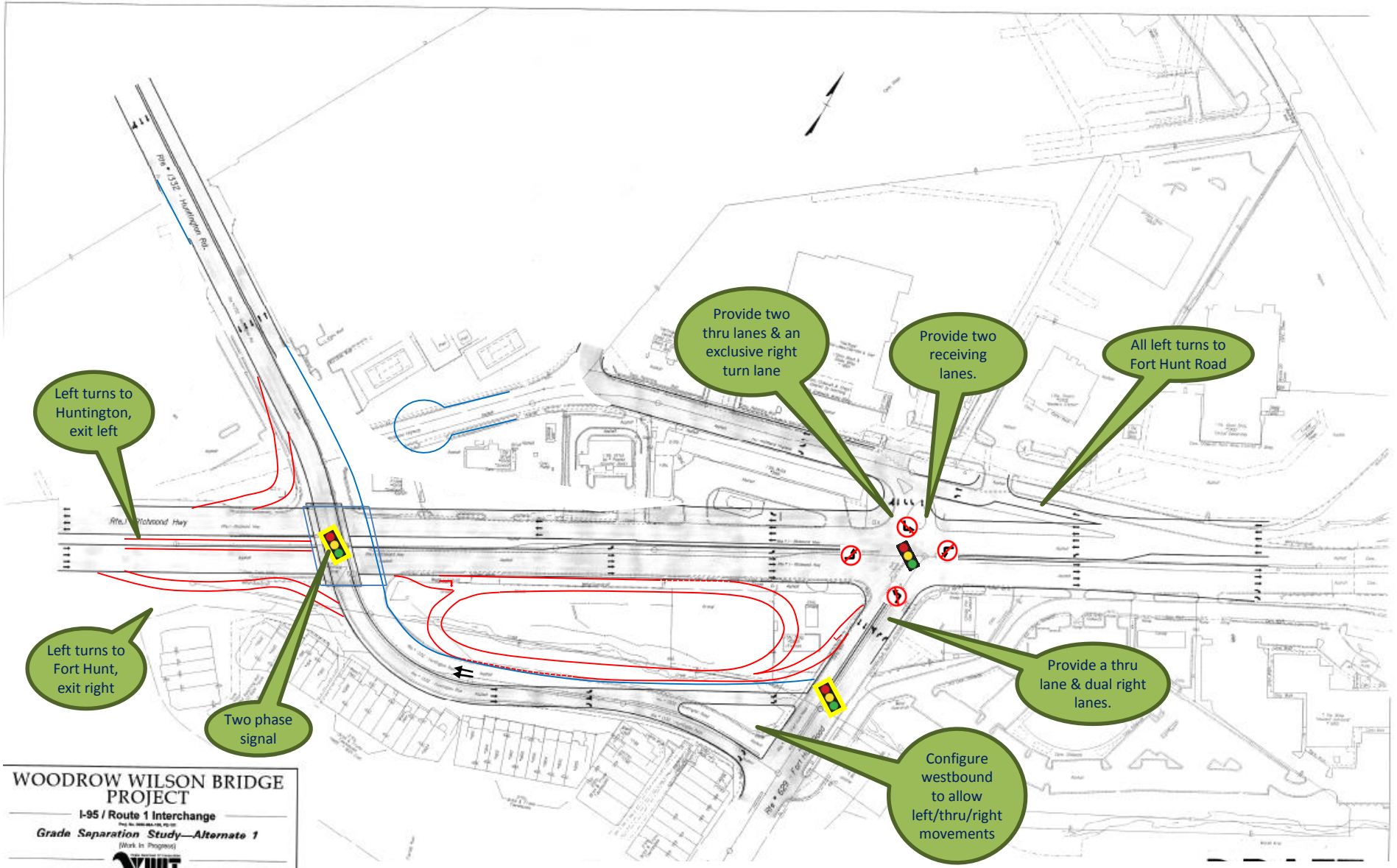


New traffic signal

Existing traffic signal

Route 1 lowered. SPUI raised. Through movements on Route 1 are uncontrolled.

Option E: Huntington Road Interchange



Route 1 lowered. Bridge over Huntington Rd raised.
NB Fort Hunt to SB Route 1 prohibited. (24 veh in AM, 30 veh in PM)