



Fontaine Transportation Planning

Presented by

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Presented to

LUEPC

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Study Objective



Long-Term Vision for Fontaine Park. Source: Fontaine Master Plan

- UVA tasked VHB with conducting a supplementary traffic analysis to the Fontaine Park Master Plan Traffic Study
- The objective was to update the analysis with new 2022 traffic counts, evaluate the roadway performance in 2025 when the Fontaine Parking Deck is anticipated to open, and analyze Fontaine Park buildout with the now funded Fontaine Avenue interchange project
- This analysis would help inform the implementation process of the Fontaine Park Master Plan and determine what traffic signal timing parameters might need to be coordinated at the Fontaine Avenue / Ray C. Hunt Drive intersection

Smart Scale Funded Interchange Project

- Westbound Fontaine Ave to southbound US 29 traffic will “cross-over” on east side of interchange (red)
 - Removes conflict between southbound US 29 off-ramp and westbound left turn onto southbound US 29
- Northbound US 29 to westbound I-64 traffic will “U-turn” via this interchange (white)
- Both eastbound Fontaine Ave to northbound US 29 and northbound US 29 to westbound Fontaine Ave will U-turn at Ray C. Hunt Drive (yellow)



VHB Projected Traffic Volumes

- Probe data utilized to aggregate 8 weeks of Spring 2022 traffic data
- Assumed analysis year of 2045 and full buildout of Fontaine Park Master Plan
- Non-Fontaine Park traffic was grown by a 1% annual background growth rate
- Fontaine Park new vehicle traffic sourced from Master Plan Traffic Study



Traffic Analysis Methodology

- Software
 - VISSIM is a microsimulation traffic software that can accurately model complex traffic conditions and account for the congestion caused by intersection queue spillback
 - As a base model for this new analysis, utilized the calibrated VISSIM model from VHB's 2018 Diverging Diamond Interchange traffic analysis at this location
- Modeled the funded interchange project, 2045 traffic volumes (typical design year), and internal Fontaine Park improvements
- Transportation Metrics
 - Estimated traffic conditions (average vehicle delay, Level of Service, percent demand served, and queue length)
 - VISSIM delay is based on modeled simulation travel time and is not directly translatable to Level of Service (LOS). Level of Service (LOS) is still provided as an easy-to-understand proxy metric for transportation performance, but it is not technically valid
 - Percent demand serviced and maximum queue length are additional transportation performance metrics that can indicate congestion

Traffic Analysis – 2045 AM Peak Projected Conditions

Intersection	Movement	Delay – AM (sec/veh)	LOS – AM	Max Queue – AM (ft)	% Demand Serviced – AM
U.S. 29 Southbound Ramps at Fontaine Ave	EBT	4.2	A	82	98
	EBR	8.7	A	107	98
	WBL	2.8	A	85	99
	WBT	0.3	A	0	95
	SBL / SBR	167.5	F	1,654	77
U.S. 29 Northbound Ramps at Fontaine Ave	EBT	59.0	E	557	78
	WBL	33.4	C	501	99
	WBT	2.2	A	0	95
	WBR	1.9	A	0	98
	NBL	82.2	F	112	100
	NBR	88.7	F	872	98
Fontaine Ave at Ray C. Hunt Dr	EBU	74.6	E	131	95
	EBT	29.9	C	883	88
	EBR	33.0	C	883	97
	WBL	67.6	E	1,022	100
	WBT	19.7	B	759	98
	NBL / NBR	78.7	E	227	98

In the AM Peak Hour, eastbound traffic is projected to be significantly congested

- Eastbound Fontaine Avenue queues back from Ray C. Hunt Drive onto both US 29 off-ramps, inducing heavy delay to off-ramp traffic and extending vehicle queues onto mainline US 29
 - >1,200 eastbound thru vehicles at Ray C. Hunt Drive
- Signal capacity at Ray C. Hunt Drive is limited by the introduction of the U-turn signal phase

Note – orange highlight indicates significant vehicle delay, queueing, or constrained demand

Traffic Analysis – 2045 AM Peak Projected Conditions



Traffic Analysis – 2045 PM Peak Projected Conditions

Intersection	Movement	Delay – PM (sec/veh)	LOS – PM	Max Queue – PM (ft)	% Demand Serviced – PM
U.S. 29 Southbound Ramps at Fontaine Ave	EBT	4.4	A	66	99
	EBR	11.1	B	88	100
	WBL	11.2	B	567	72
	WBT	0.6	A	0	86
	SBL / SBR	110.9	F	1,380	100
U.S. 29 Northbound Ramps at Fontaine Ave	EBT	63.2	E	558	100
	WBL	37.1	D	925	71
	WBT	18.6	B	0	86
	WBR	16.2	B	0	72
	NBL	36.9	D	108	100
	NBR	9.0	A	167	100
Fontaine Ave at Ray C. Hunt Dr	EBU	51.1	D	135	100
	EBT	28.0	C	555	100
	EBR	7.9	A	555	99
	WBL	174.3	F	135	68
	WBT	182.5	F	2,664	65
	NBL / NBR	133.7	F	1,355	79

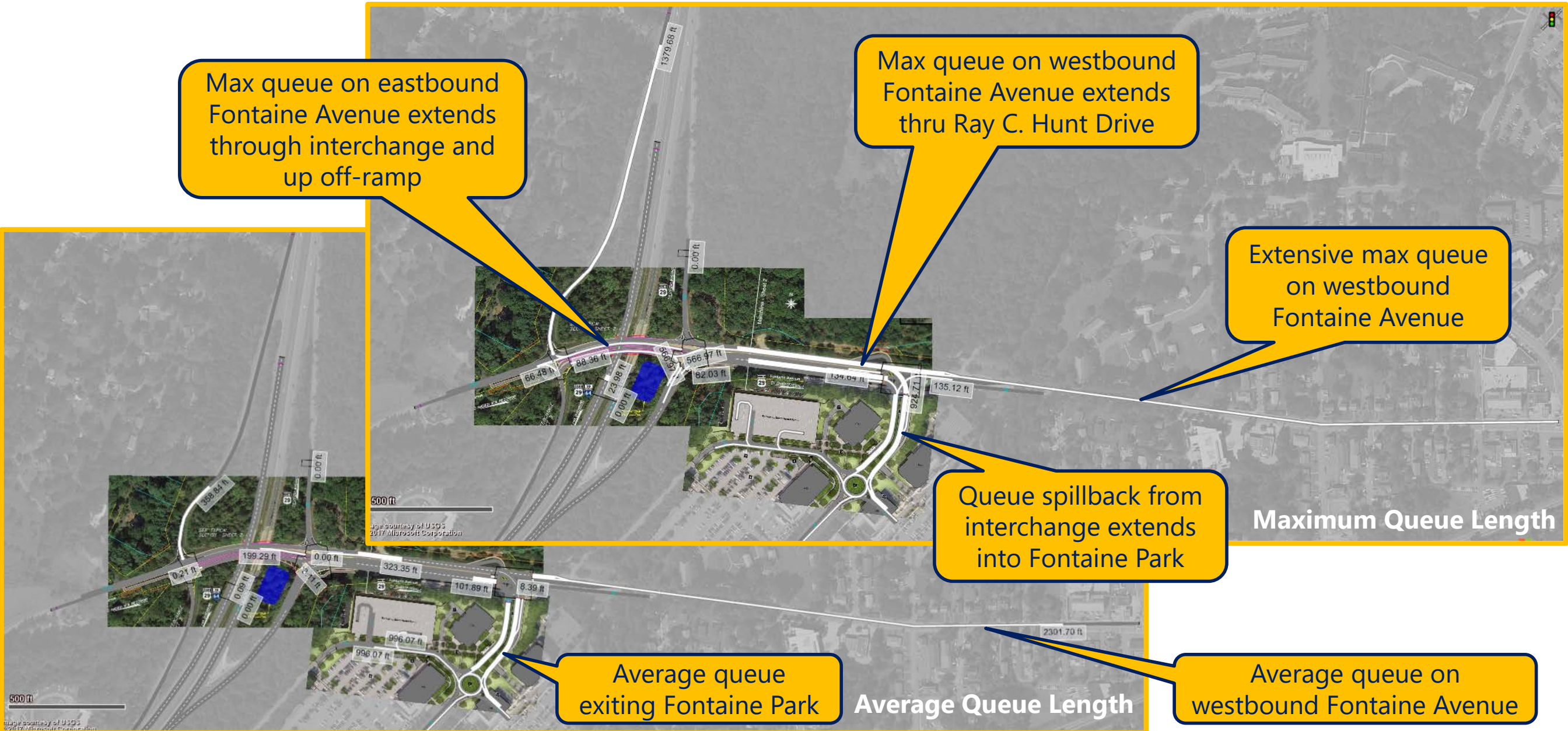
In the PM Peak Hour, the single westbound left turn lane at the northbound ramps signal is projected to significantly underserve the demand (> 1,350 vehicles)

- The westbound Fontaine Avenue queue extends into the Ray C. Hunt Drive signal, thereby limiting the ability of traffic to progress thru that signal

Signal capacity at Ray C. Hunt Drive is further limited by the introduction of the U-turn signal phase

Note – orange highlight indicates significant vehicle delay, queueing, or constrained demand

Traffic Analysis – 2045 PM Peak Projected Conditions



VHB Traffic Analysis – Conclusions

- The funded interchange project is not projected to accommodate 2045 traffic volumes (typical design year), which will have operational and safety impacts
 - AM peak: queueing within interchange
 - PM peak: queueing on westbound Fontaine Avenue
- Some of the congestion is due to limitations of the funded interchange project, while some is due to capacity constraints along Fontaine Avenue at the Ray C. Hunt Drive signal
 - Eastbound demand (1,250) and westbound demand (1,350) exceed typical capacity of a single approach lane at a traffic signal
 - More study is warranted for the ultimate cross-section of Fontaine Avenue

Summary

- The funded interchange is a capacity enhancement compared to existing conditions, but it is not projected to accommodate 2045 volume demand. It has not yet been identified when additional improvements beyond what it is funded would be required
- In addition to the interchange, the effective single lane of eastbound and westbound Fontaine Avenue travel at Ray C. Hunt Drive is a transportation capacity constraint due to background growth along Fontaine Avenue
- The engineering team ultimately contracted by VDOT to conduct preliminary engineering of the funded interchange improvements will likely do a traffic study to finalize the design. The project can be tweaked in design, but the budget is largely fixed, so design alterations are limited

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