

# WELLS + ASSOCIATES

## MEMORANDUM



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**TO:** J. David Sittler  
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**FROM:** William F. Johnson, P.E., PTOE  
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**RE:** Inova Alexandria Hospital Redevelopment

**SUBJECT:** Trip Generation Analysis

**DATE:** May 10, 2021

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The purpose of this memorandum is to provide a summary of the trip generation analysis completed by Wells + Associates associated with the potential redevelopment of the existing Inova Hospital site located in the City of Alexandria, Virginia. The property is located south of Seminary Road (Route 420), predominantly west of N. Howard Street (Route 6707), with a portion of the property to the east of N. Howard Street. The Inova Alexandria Hospital is currently housed in an approximate 404,838 square foot facility on the site. Inova plans to relocate the Alexandria Hospital to the Landmark Mall property and, therefore, is investigating the potential redevelopment of the existing hospital site as a residential community comprised of a mix of townhouses and/or single family detached units.

To understand the traffic impact of the proposed redevelopment, a trip generation analysis was performed comparing the vehicle trips generated by the existing hospital campus to the trips generated by conceptual residential redevelopment scenarios. For purposes of this analysis, two redevelopment scenarios (options) were examined: 1) 312 dwelling units comprised of a mix of 53 single family detached units and 259 townhouse units, and 2) 380 townhouse units and no single family detached units.

As per standard traffic engineering industry practice, the trip generation analysis was performed using the Institute of Transportation Engineers (ITE) [Trip Generation Manual](#), 10<sup>th</sup> Edition. The analysis evaluated the weekday AM and PM peak commute hours (peak hours of the adjacent street) as well as the weekday average daily trips (vehicle trips occurring over a 24-hour weekday period). As defined in the Trip Generation Manual, the Adjacent Street Peak Hour is “The one hour within the morning and evening weekday commuter peak periods when the combination of site-generated vehicle traffic and the traffic on the adjacent street is the highest.” The Manual goes on to state that the commuter peak periods are typically between 7:00 and 9:00 AM and between 4:00 and 6:00 PM and that the “peak hour” occurs within these hourly ranges, with trips continuing to occur outside of these peak periods. Said differently, the peak hour trips do not

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represent the entire AM or PM commute- only the portion which occur during the one highest commuting hour during each of the AM and PM periods. The weekday average daily trips encompass both the AM and PM peak hours.

The analysis also evaluated the Saturday peak hour and the Saturday average daily (24-hour) trips. As the Trip Generation Manual does not provide adjacent street traffic estimates for the Saturday peak hour, the peak hour of the generator was used. The Trip Generation Manual defines the Saturday Peak Hour of Generator as, "The hour with the highest volume of vehicle trips entering and exiting a site on a Saturday." According to ITE, single family units typically experience their peak trip generation from 3:00 to 4:00 PM on a Saturday. The Saturday peak hour for hospital uses vary somewhat during the early to mid-afternoon period. Therefore, for purposes of this analysis it was assumed the Saturday peak hour for the hospital coincided with the peak hour for the residential uses (3:00 to 4:00 PM). The trip generation analysis is shown in Table 1.

Trips generated by the existing hospital campus were estimated using the Hospital Land Use Code (LUC) 610, and the Clinic LUC 630. The gross square footages of 395,926 and 8,912 were applied for the hospital and clinic uses, respectively, to estimate the existing trips shown in Table 1. As shown in Table 1, the existing hospital campus generates approximately 452 weekday AM peak hour trips, 413 weekday PM peak hour trips, and 4,584 average weekday daily trips according to ITE. The existing hospital campus (excluding the clinic which does not operate on Saturdays) generates approximately 331 Saturday peak hour trips and 3,057 Saturday average daily trips.

The estimate of trips to be generated by the residential redevelopment options was performed using the mid-rise multifamily LUC 221 (which encompasses apartment, townhouse, and condominium residential unit types) for the townhouse component, and the Single Family Detached LUC 210 for the single family detached component, as applicable. ITE provides separate trip generation rates for these residential unit types since these uses differ in their per-unit trip rates and overall trip patterns. Based on residential trip generation data collected by ITE and used in the development of these rates, townhouse and multi-family dwelling units generate fewer trips than single family detached units on a per-unit basis. Furthermore, the ITE data indicate that townhouse trips are generally more dispersed over several hours during the AM and PM commute periods than single family detached trips which tend to have a more confined weekday AM and PM peak period.

As shown in Table 1, the mixed residential redevelopment scenario would generate approximately 129 weekday AM peak hour trips, 165 weekday PM peak hour trips, 1,990 weekday average daily trips, 177 Saturday peak hour trips, and 1,812 Saturday average daily trips. When compared to the trips generated by the existing hospital campus, trips will be reduced by 323 trips during the weekday AM peak hour, 248 trips during the weekday PM peak hour, 2,594 trips during the average weekday, 154 trips during the Saturday peak hour, and 1,245 trips during the average Saturday.

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As further shown in Table 1, the all townhouse redevelopment scenario would generate approximately 127 weekday AM peak hour trips, 160 weekday PM peak hour trips, 2,069 weekday average daily trips, 167 Saturday peak hour trips, and 1,866 Saturday average daily trips. When compared to the estimated trips generated by the existing uses, trips will be reduced by 325 trips during the weekday AM peak hour, 253 trips during the weekday PM peak hour, 2,515 trips during the average weekday, 164 trips during the Saturday peak hour, and 1,191 trips during the average Saturday.

In conclusion, both redevelopment scenarios would result in a significant reduction in the number of vehicle trips when compared to trips generated by the existing hospital campus.

Comments or questions on this analysis should be directed to Will Johnson at 703-676-3653 or at [wfjohnson@wellsandassociates.com](mailto:wfjohnson@wellsandassociates.com).

Inova - Alexandria

Site Trip Generation<sup>(1)</sup> - Peak Hour of the Adjacent Street

Scenario	Amount	Units	Weekday AM Peak Hour ( 7:30AM - 8:30AM)			Weekday PM Peak Hour (4:30PM - 5:30PM)			Weekday Average Daily Trips	SAT Peak Hour of the Generator <sup>(2)</sup> (3:00PM - 4:00PM)			Saturday Average Daily Trips
			In	Out	Total	In	Out	Total		In	Out	Total	
<b>Existing Uses</b>													
Hospital <sup>(3)</sup>	395,926	GSF	285	134	419	123	261	384	4,244	156	175	331	3,057
Clinic <sup>(4)</sup>	8,912	GSF	<u>26</u>	<u>7</u>	<u>33</u>	<u>8</u>	<u>21</u>	<u>29</u>	<u>340</u>				
Total Existing Trips:			311	141	452	131	282	413	4,584	156	175	331	3,057
<b>Proposed Redevelopment Options</b>													
Single-family Detached	53	Dwellings	11	31	42	35	20	55	580	34	29	63	540
Townhomes	<u>259</u>	Dwellings	<u>23</u>	<u>64</u>	<u>87</u>	<u>67</u>	<u>43</u>	<u>110</u>	<u>1,410</u>	<u>56</u>	<u>58</u>	<u>114</u>	<u>1,272</u>
Residential	312	Dwellings	34	95	129	102	63	165	1,990	90	87	177	1,812
<b>Redevelopment Change from Existing Uses:</b>			<b>(277)</b>	<b>(46)</b>	<b>(323)</b>	<b>(29)</b>	<b>(219)</b>	<b>(248)</b>	<b>(2,594)</b>	<b>(66)</b>	<b>(88)</b>	<b>(154)</b>	<b>(1,245)</b>
Single-family Detached	0	Dwellings											
Townhomes	<u>380</u>	Dwellings	<u>33</u>	<u>94</u>	<u>127</u>	<u>98</u>	<u>62</u>	<u>160</u>	<u>2,069</u>	<u>82</u>	<u>85</u>	<u>167</u>	<u>1,866</u>
Residential	380	Dwellings	33	94	127	98	62	160	2,069	82	85	167	1,866
<b>Redevelopment Change from Existing Uses:</b>			<b>(278)</b>	<b>(47)</b>	<b>(325)</b>	<b>(33)</b>	<b>(220)</b>	<b>(253)</b>	<b>(2,515)</b>	<b>(74)</b>	<b>(90)</b>	<b>(164)</b>	<b>(1,191)</b>

Note(s):

(1) Trip generation based on the Institute of Transportation Engineers' [Trip Generation Manual](#), 10th Edition.

(2) ITE [Trip Generation Manual](#), 10th Edition does not provide Saturday Peak Hour of the Adjacent Street data for any land use; Therefore Peak Hour of the Generator was used, where available.

(3) Saturday Peak Hour trips calculated using an independent variable of 168 Beds.

(4) Calculated using Average Rate.