

APPENDIX G

SIGNAL WARRANT ANALYSIS

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TECHNICAL MEMORANDUM

DATE: October 3, 2023
TO: Theresa Wallace; LSA, Inc.
FROM: Venera Mandanas, Jimmy Jessup; Parametrix
SUBJECT: Signal Warrant Analysis Results for the Northgate Town Square Project

EXECUTIVE SUMMARY

Parisi Transportation Consulting evaluated whether traffic signal control would be warranted for the Northgate Drive intersections at Thorndale Drive, El Faisan Drive, and Nova Albion Way as a result of the proposed Northgate Town Square Project in the City of San Rafael. As described in the *Traffic Operations Study for the Northgate Town Square Project*¹ the project consists of two buildout scenarios: the Master Plan (estimated completion by 2025), and the Vision Plan (estimated completion by 2040). Traffic impacts to the roadway network are characterized for “Baseline,” “Baseline Plus Master Plan,” “Future,” and “Future Plus Vision Plan” conditions. The San Rafael *Transportation Analysis Guidelines* includes signal warrant analysis of unsignalized study intersections as a threshold of significance to identify if a project would result in a significant impact to the roadway system. This analysis was conducted for the four conditions as listed above.

The analysis was performed according to the California Manual on Uniform Traffic Control Devices (CA MUTCD) standards for establishing traffic signal control. As described in the document *Traffic Operations Study for the Northgate Town Square Project*, the proposed project would result in increased vehicle traffic on the local roadway network during the AM peak period. Therefore, the signal warrant analysis was performed for the AM peak period only, in accordance with the approach applied in the *Transportation Impact Study for the Northgate Town Square Project*.²

The analysis results indicate that vehicle delay and traffic volumes are lower than signal warrant thresholds for all of the three intersections as assessed for “Baseline,” “Baseline Plus Project,” “Future,” and “Future Plus Project” conditions. Accordingly, the project would result in a less-than-significant impact to the roadway system for this threshold of significance.

VEHICLE VOLUMES

Parametrix obtained vehicle traffic volumes for the intersections from the *Traffic Operations Study for the Northgate Town Square Project*. Volume data for this study was collected during peak AM hours in September 2021. At this time, the Northgate mall operated at 88% occupancy. In order to align with trip generation estimates from the *Traffic Operations Study*, which assumed 100% occupancy of the mall, the traffic volume data was adjusted to estimate an “Existing” condition that reflects peak hour traffic volumes corresponding to 100% occupancy of the existing Northgate mall. Volume adjustments conservatively assumed all observed vehicles traveling through the intersection accessed the project site.

¹ W-Trans, *Traffic Operations Study for the Northgate Town Square Project*. January, 2023.

² W-Trans, *Transportation Impact Study for the Northgate Town Square Project*. February, 2023.

Peak hour vehicle traffic volumes for “Baseline,” “Baseline Plus Master Plan,” “Future,” and “Future Plus Vision Plan” conditions were then estimated according to the approach outlined in the *Traffic Operations Study* document. “Baseline” conditions align with the projected year during which the first phase of the project would be completed (2025 Master Plan); “Baseline Plus Master Plan” conditions result from the addition of project-generated traffic from the Master Plan to anticipated “Baseline” volumes; “Future” conditions reflect projected 2040 traffic volumes based on the Transportation Authority of Marin (TAM) travel demand model; and “Future Plus Vision Plan” result from the addition of project-generated traffic from the Vision Plan to anticipated “Future” volumes.

TRAFFIC SIGNAL CONTROL REQUIREMENTS

The California Manual on Traffic Control Devices (CA MUTCD) 2014 Rev. 6 Section 4C.01 provides guidance on criteria for consideration in a traffic signal control study. Based on direction from the City, it was deemed most appropriate to perform the signal warrant analysis by applying Warrant 3, Peak Hour criteria, as available traffic volume inputs include peak hour AM volumes. This warrant contains a Part A and Part B; satisfaction of either part meets the Warrant 3 criteria. Each of three listed Part A sub-criteria must be met in order to satisfy Part A of the warrant criteria. Part B compares major and minor street volumes against an applicable threshold curve that reflects the context of the intersection, accounting for rural or urban environment and number of lanes to each intersection approach. The warrant itself does not define the need for a traffic signal but instead indicates whether a further study of a traffic signal installation is justified at a specific location.

Table 1 displays signal warrant analysis results for the intersections of Northgate Drive / Thorndale Drive, Northgate Drive / El Faisan Drive, and Northgate Drive / Nova Albion Way, for each of the “Baseline,” “Baseline Plus Master Plan,” “Future,” and “Future Plus Vision Plan” conditions during the AM peak hour. The resulting Warrant 3 Part B combination of major and minor street approach volumes against warrant threshold conditions are displayed graphically for the three intersections and each condition in Figures 1-4.

Neither warrant Part A nor B is satisfied for any of the scenarios assessed. As such, Warrant 3 is not met for the intersections of Northgate Drive / Thorndale Drive, Northgate Drive / El Faisan Drive, and Northgate Drive / Nova Albion Way for any of “Baseline,” “Baseline Plus Mater Plan,” “Future,” or “Future Plus Vision Plan” conditions.

SUMMARY AND CONCLUSION

Based on the signal warrant analysis above, a traffic signal is not warranted at the intersections of Northgate Drive / Thorndale Drive, Northgate Drive / El Faisan Drive, and Northgate Drive / Nova Albion Way for “Baseline,” “Baseline Plus Project,” “Future,” and “Future Plus Project” scenarios.

The San Rafael *Transportation Analysis Guidelines* states a project would create a significant impact related to the roadway system if at unsignalized intersections, the project results in any of the traffic signal warrants to be satisfied, or for a location where any of the warrants are satisfied prior to the project, the project increases overall travel through the intersection by more than 1 percent. Since signal warrant conditions are not met at any of the intersections assessed, the project would result in a less-than-significant impact for this criterion.

Table 1. AM Peak Hour Signal Warrant Analysis Results

	Condition			
	Baseline	Baseline Plus Master Plan	Future	Future Plus Vision Plan
Northgate Drive / Thorndale Drive				
Part A				
Minor Street Total Delay > 4 Vehicle Hours	0.11 hr. No	0.12 hr. No	0.14 hr. No	0.15 hr. No
Minor Street Vehicle Volume > 100	23 veh. No	23 veh. No	23 veh. No	23 veh. No
Total Entering Vehicle Volume > 800	515 veh. No	631 veh. No	673 veh. No	763 veh. No
Part A Conditions Met?	No	No	No	No
Part B				
Minor Street Vehicle Volume	23 veh.	23 veh.	23 veh.	23 veh.
Major Street Vehicle Volume	492 veh.	608 veh.	650 veh.	740 veh.
Part B Conditions Met? (1 lane & 1 lane)*	No	No	No	No
Northgate Drive / El Faisan Drive				
Part A				
Minor Street Total Delay > 4 Vehicle Hours	0.19 hr. No	0.23 hr. No	0.24 hr. No	0.29 hr. No
Minor Street Vehicle Volume > 100	41 veh. No	41 veh. No	42 veh. No	42 veh. No
Total Entering Vehicle Volume > 650	497 veh. No	656 veh. Yes	658 veh. Yes	766 veh. Yes
Part A Conditions Met?	No	No	No	No
Part B				
Minor Street Vehicle Volume	41 veh.	41 veh.	42 veh.	42 veh.
Major Street Vehicle Volume	456 veh.	535 veh.	616 veh.	658 veh.
Part B Conditions Met? (1 lane & 1 lane)*	No	No	No	No
Northgate Drive / Nova Albion Way				
Part A				
Minor Street Total Delay > 4 Vehicle Hours	1.17 hr. No	1.41 hr. No	1.68 hr. No	2.03 hr. No
Minor Street Vehicle Volume > 100	200 veh. Yes	199 veh. Yes	200 veh. Yes	198 veh. Yes
Total Entering Vehicle Volume > 650	696 veh. Yes	809 veh. Yes	849 veh. Yes	937 veh. Yes
Part A Conditions Met?	No	No	No	No
Part B				
Minor Street Vehicle Volume	200 veh.	199 veh.	200 veh.	198 veh.
Major Street Vehicle Volume	496 veh.	610 veh.	649 veh.	739 veh.
Part B Conditions Met? (1 lane & 1 lane)*	No	No	No	No

Source: Parametrix, 2023. Key: hr. = hours; veh. = vehicles.

*Note: See Figures 1-4 for Part B major and minor street volume condition threshold graphs. All intersections apply 1 lane & 1 lane approach curve.

FIGURE 1 – WARRANT 3 PART B: BASELINE CONDITIONS

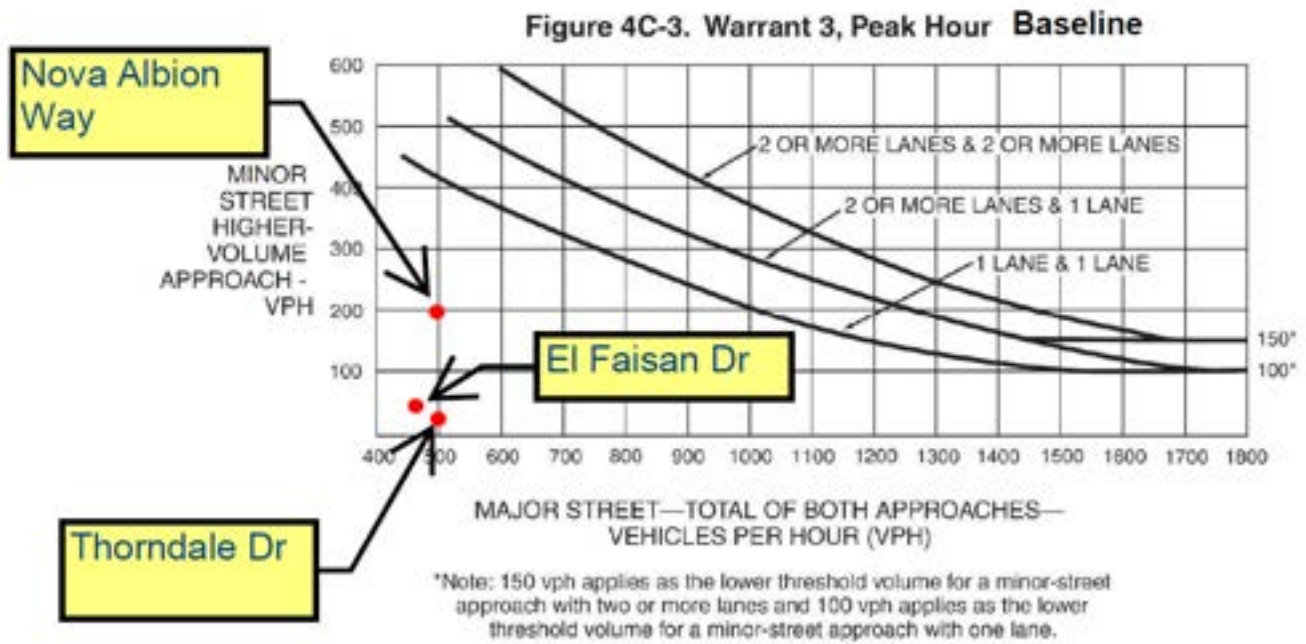


FIGURE 2 – WARRANT 3 PART B: BASELINE PLUS MASTER PLAN CONDITIONS

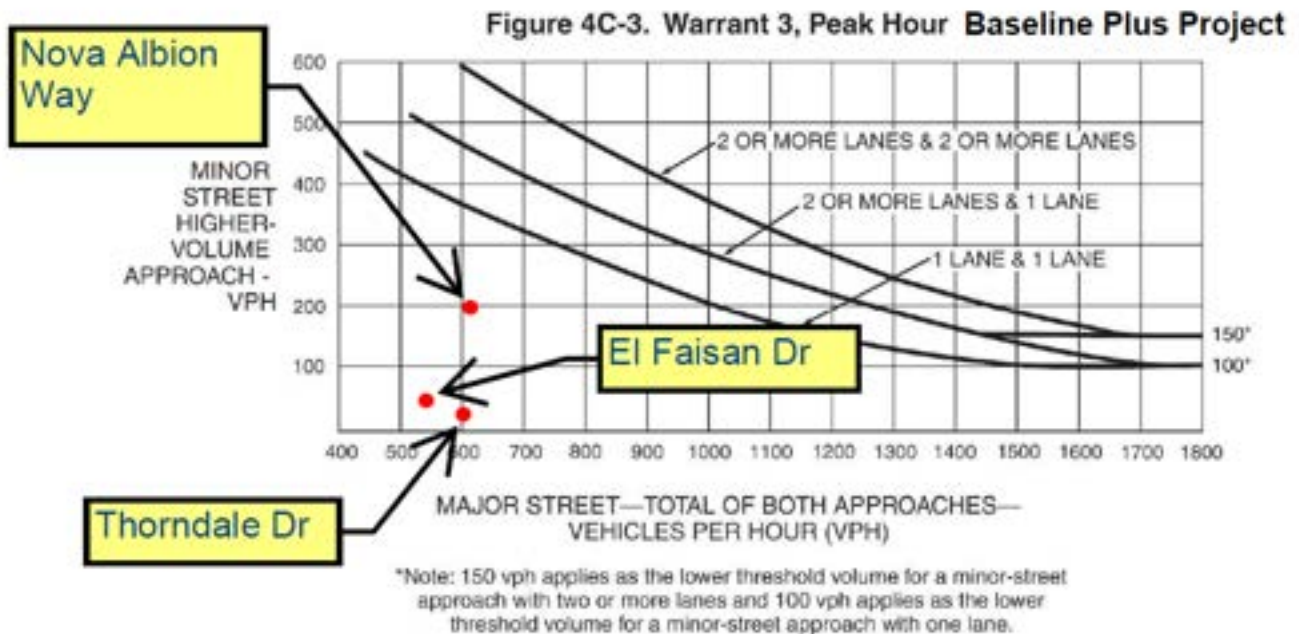


FIGURE 3 – WARRANT 3 PART B: FUTURE CONDITIONS

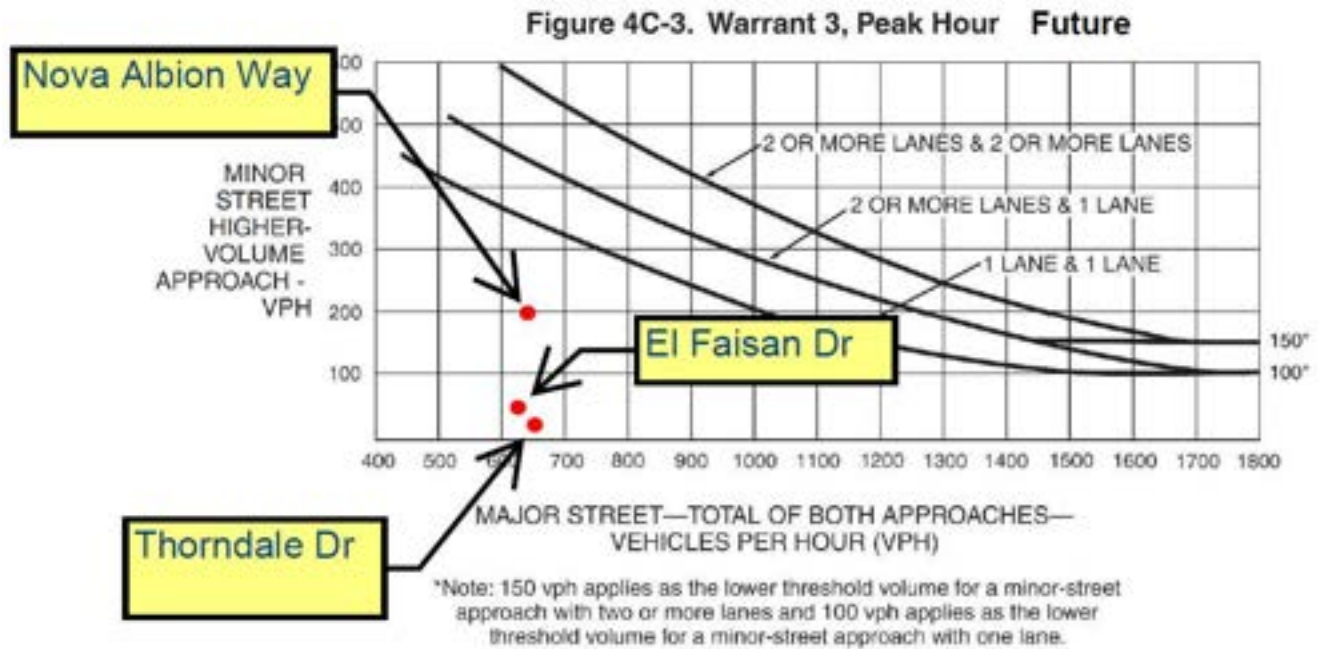


FIGURE 4 – WARRANT 3 PART B: FUTURE PLUS VISION PLAN CONDITIONS

