

**Traffic Signal Warrant and Traffic Impact Memo - June 15, 2018:**

**To:** Eric J. Randall, PE, CFM  
City Engineer  
2190 Atlanta Road  
Smyrna, GA 30080

**Re:** 1837 Roswell St – Proposed Development – Smyrna, GA

**Project Description:**

A proposed development will occupy the currently un-developed land on the northern side of Roswell St SE in the City of Smyrna, GA. The development is anticipated to consist of approximately 81 townhome units with an anticipated full build in 2025.

The proposed development will have access to the external roadway network via a single full-access driveway located across from the southern driveway of the Pine Village North complex. The City of Smyrna has requested that a trip generation and distribution for the development to be performed. Additionally, for the intersection of Roswell St SE and Windy Hill Rd SE a signal warrant analysis was performed.

The site location is shown in Figure 1 and a full site plan is attached to this memo.

**Figure 1: Site Location**



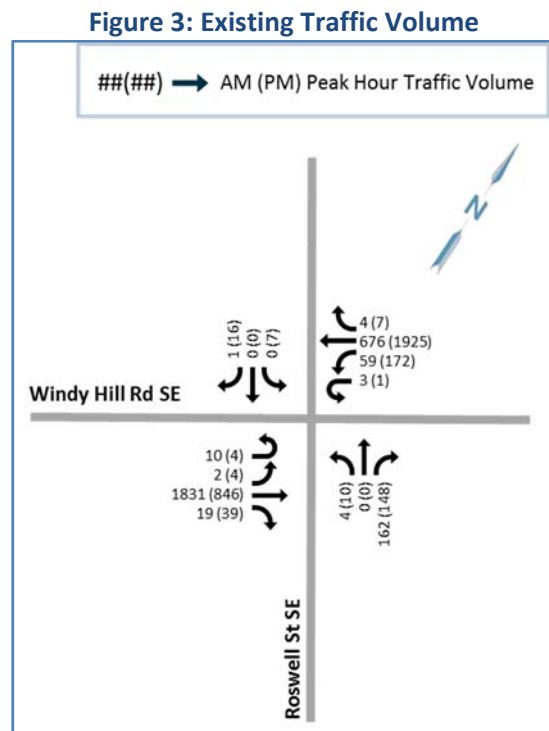
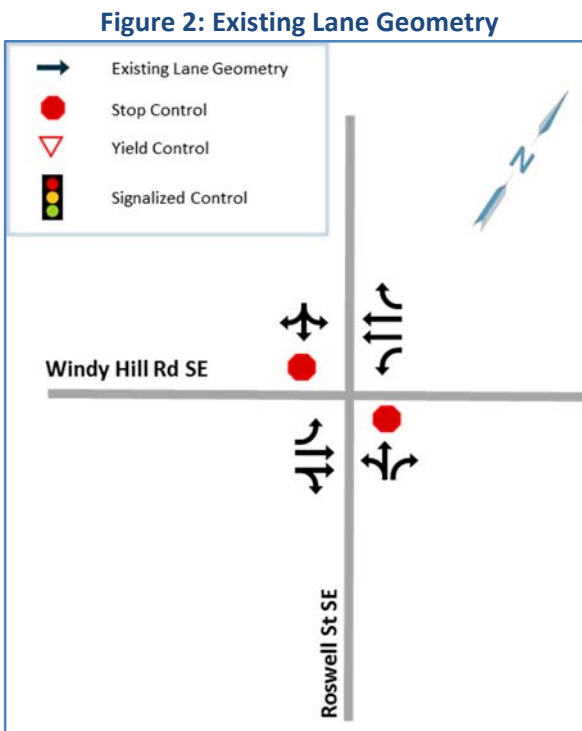
**Roswell St SE** is a two-lane undivided collector with a posted speed limit of 35 mph. The roadway runs primarily southwest to northeast (north to south for the purposes of this analysis), and serves as a connection from Windy Hill Rd to Old Roswell Rd connecting residential and commercial developments to the surrounding roadway network.

**Windy Hill Rd SE** is a four-lane median divided minor arterial with a posted speed limit of 45 mph. The roadway runs primarily east to west, and connects the surrounding area, to I-75 to the east.

Existing lane geometry for the study intersection is shown graphically in Figure 2.

**Existing Volume:**

12-Hour turning movement volumes were obtained on Tuesday May 22th, 2018 at the intersection of Roswell St SE and Windy Hill Rd SE from 6:00AM to 6:00PM. The counts were obtained during the last week of school before the summer break, schools in the area had a shortened school day. Due to the configuration of the unsignalized intersection and high main-line volume it is not expected that the traffic volumes collected are significantly different from a normal school day. Traffic counts are attached to this memo and the AM and PM peak hour volumes are shown graphically in Figure 3.

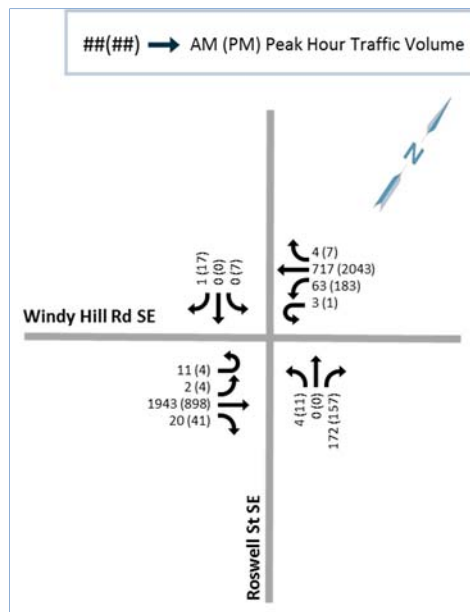


**Background Traffic Volumes:**

Background traffic growth is an analysis method used to estimate the growth of traffic that will contribute to the traffic of the roadway network in and around the study area. The background traffic does not include the proposed project that is being studied. The proposed development is expected to have a full build out by 2025, and a growth rate was estimated for the years between the existing volume counts and the future development build out. Several sources, such as the US Census, Georgia

2030 population projections, historic traffic counts, and comprehensive transportation plans were examined to determine the appropriate growth rate that will be expected for traffic along the roadways. Growth rates for the study area were between 1.35% to 2.11%, a growth rate of 1.50% was used in analysis for this project. A summary of growth rates examined are attached to this memo. Background AM and PM peak hour volumes are shown in Figure 4.

**Figure 4: Background (2025) Traffic Volumes**



**Trip Generation:**

A trip generation analysis was performed for the full-build out of the 81-townhome development. The project trips for the proposed development were calculated using equations contained in the Institute of Transportation Engineers’ (ITE) latest *Trip Generation Manual*, 10<sup>th</sup> Ed, 2017. Table 1 summarizes the trip generation for the proposed development.

**Table 1: Trip Generation**

Project Land Use	Project Density	Project Trips			ITE Code	Variable	Equation Used <sup>1</sup>	In/Out Distribution
		Total	Inbound	Outbound				
Multifamily Housing (Low-Rise)	81 D.U.				220	Dwelling Unit		
Daily		572	286	286		$T=7.56(X) - 40.86$	50% / 50%	
AM Peak Hour		39	9	30		$\ln(T) = 0.95\ln(X)-0.51$	23% / 77%	
PM Road Peak		49	31	18		$\ln(T) = 0.89\ln(X)-0.02$	63% / 37%	

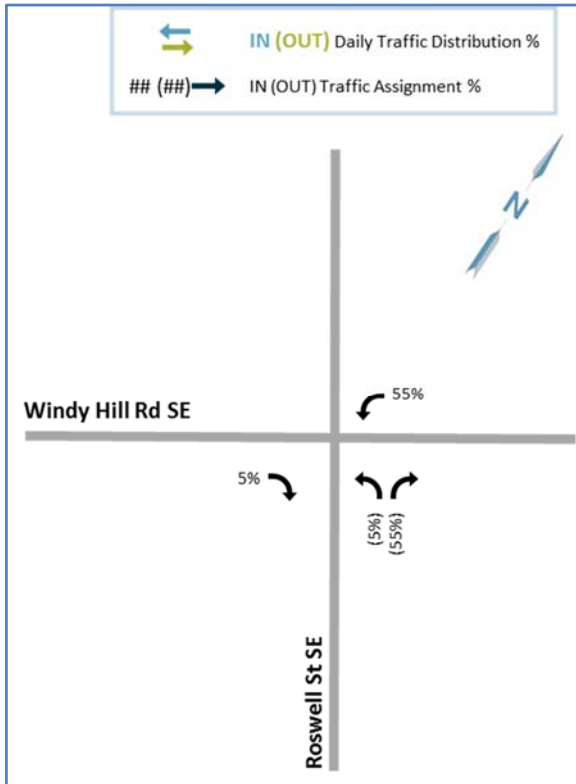
Note: <sup>1</sup> Where: T = Trips; X = Density by Variable

The proposed development is anticipated to generate 572 new daily trips (286 inbound and 286 outbound) with the PM peak being the highest with the 49 new trips (31 inbound and 18 outbound) and 39 new AM trips (9 inbound and 30 outbound).

**Proposed Traffic Volumes:**

The proposed generated traffic volumes were distributed to the intersection of Roswell St SE and Windy Hill Rd SE. The assignment and directional distribution of new project trips was based on the existing traffic counts, the site design, site access, review of land uses, competing developments, schools, and density around the study area. The directional distribution for new trips for the proposed development is shown in Figure 5 for the AM peak hour and Figure 6 for the PM peak hour. Total project trips are shown in Figure 7, and future build traffic volumes are shown in Figure 8.

**Figure 5: Trip Distribution AM**



**Figure 6: Trip Distribution PM**

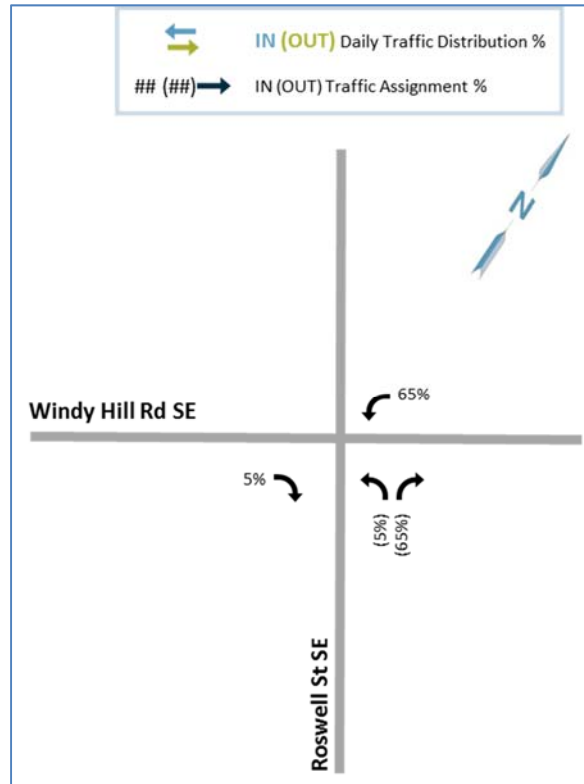


Figure 7: Project Trips

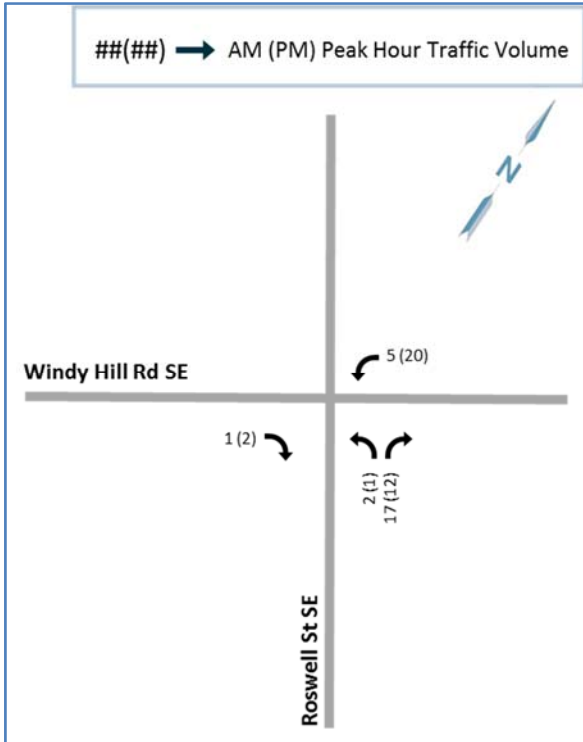
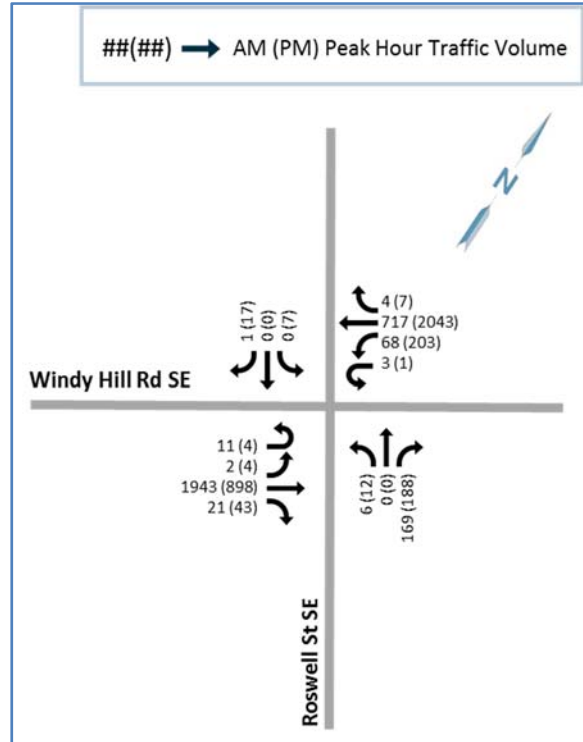


Figure 8: Build (2025) Traffic Volume



**Signal Warrant Analysis:**

A traffic signal warrant analysis was performed per MUTCD guidelines, for the intersection of Roswell St SE and Windy Hill Rd SE. Analysis was run for existing, background, and build conditions. Due to the unsignalized nature of the intersection, and high vehicular volumes on Windy Hill Rd SE there are few left-turning vehicles from Roswell St SE to Windy Hill Rd. NCHRP Report 457 provides guidance on reducing right-turn vehicle volumes from signal warrant analysis. All right-turns from Roswell St SE were reduced for analysis. There is however a large westbound left-turn volume from Windy Hill Rd SE to Roswell St SE. In such conditions, MUTCD states that the major left-turn volume can be used as a minor road volume and the opposing major road volume be a major road volume.

For build conditions project trips were distributed to the intersection using a daily distribution which is found in the ITE Trip Generation Manual 10<sup>th</sup> Edition. The daily distribution of project trips is attached to this memo.

The results of the signal warrant analysis are summarized in Table 2.

**Table 2: Signal Warrant Analysis Summary**

Warrant	Hours Met		Hours Needed	Warranted?
	Major at Minor	Mainline Left		
<b>Existing</b>				
Warrant 1	0	8	8	Yes
Warrant 2	0	4	4	Yes
Warrant 3	0	0	1	No
<b>Background</b>				
Warrant 1	0	9	8	Yes
Warrant 2	0	5	4	Yes
Warrant 3	0	0	1	No
<b>Build</b>				
Warrant 1	0	9	8	Yes
Warrant 2	0	7	4	Yes
Warrant 3	0	0	1	No

A traffic signal is warranted for existing conditions using the major road left-turn volume as the minor road volume. A traffic signal is not warranted for any scenario using the minor road traffic volumes. Full signal warrant analysis is provided attached to this report.

**Conclusions and Recommendations:**

Conclusions and recommendations are summarized by intersection below.

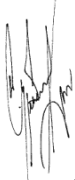
The proposed development is anticipated to generate 572 new daily trips (286 inbound and 286 outbound) with the PM peak being the highest with the 49 new trips (31 inbound and 18 outbound) and 39 new AM trips (9 inbound and 30 outbound).

A traffic signal at the intersection of Windy Hill Rd SE and Roswell St SE is warranted for existing conditions when analyzing the westbound left-turn as the minor road traffic volume. A traffic signal is not warranted for existing, background, or build conditions when running the signal warrant with the Roswell St SE traffic volumes.

Please contact me or Blake Bredbenner at 770-368-1399 if you have any questions or need additional information. Thank you for your time and consideration.

Sincerely,

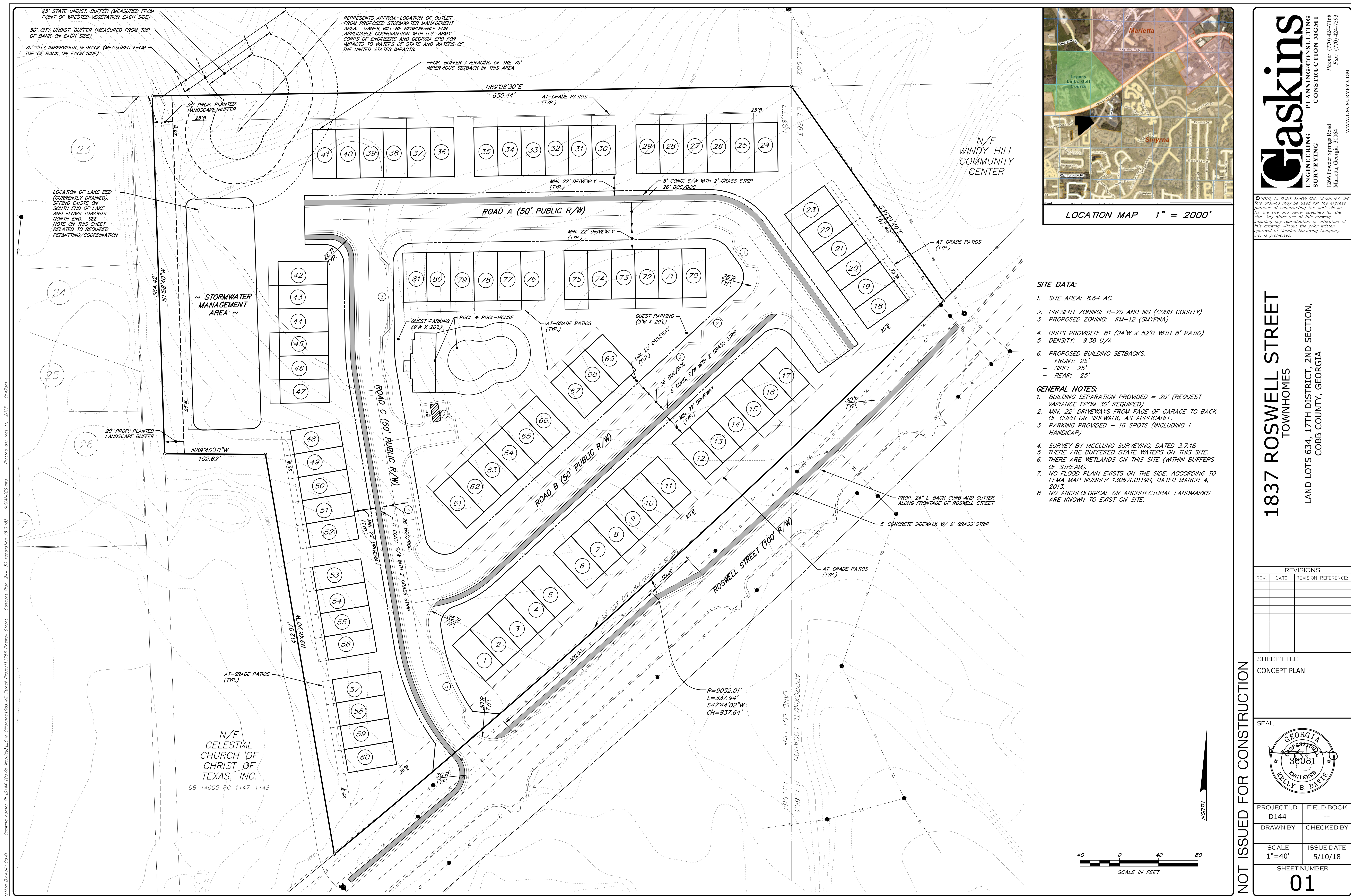
**FORESITE GROUP, INC.**



Sameer S. Patharkar  
Project Manager

**Attachments:**

- Site Plan
- Traffic Counts
- Daily Project Trip Distribution
- Growth Rate Summary
- Traffic Signal Warrants



**Gaskins**  
 ENGINEERING  
 PLANNING/CONSULTING  
 SURVEYING  
 CONSTRUCTION MGMT

1266 Powder Springs Road  
 Marietta, Georgia 30064  
 Phone: (770) 424-7168  
 Fax: (770) 424-7595  
 WWW.GASKINSURVEY.COM

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- SITE DATA:**
- SITE AREA: 8.64 AC.
  - PRESENT ZONING: R-20 AND NS (COBB COUNTY)
  - PROPOSED ZONING: RM-12 (SMYRNA)
  - UNITS PROVIDED: 81 (24'W X 52'D WITH 8' PATIO)
  - DENSITY: 9.38 U/A
  - PROPOSED BUILDING SETBACKS:
    - FRONT: 25'
    - SIDE: 25'
    - REAR: 25'
- GENERAL NOTES:**
- BUILDING SEPARATION PROVIDED = 20' (REQUEST VARIANCE FROM 30' REQUIRED)
  - MIN. 22' DRIVEWAYS FROM FACE OF GARAGE TO BACK OF CURB OR SIDEWALK, AS APPLICABLE.
  - PARKING PROVIDED - 16 SPOTS (INCLUDING 1 HANDICAP)
  - SURVEY BY MCCLUNG SURVEYING, DATED 3.7.18
  - THERE ARE BUFFERED STATE WATERS ON THIS SITE.
  - THERE ARE WETLANDS ON THIS SITE (WITHIN BUFFERS OF STREAM).
  - NO FLOOD PLAIN EXISTS ON THE SIDE, ACCORDING TO FEMA MAP NUMBER 13067C0119H, DATED MARCH 4, 2013.
  - NO ARCHEOLOGICAL OR ARCHITECTURAL LANDMARKS ARE KNOWN TO EXIST ON SITE.

**1837 ROSWELL STREET  
 TOWNHOMES**  
 LAND LOTS 634, 17TH DISTRICT, 2ND SECTION,  
 COBB COUNTY, GEORGIA

REVISIONS		
REV.	DATE	REVISION REFERENCE:

SHEET TITLE  
 CONCEPT PLAN

SEAL

KELLY B. DAVIS

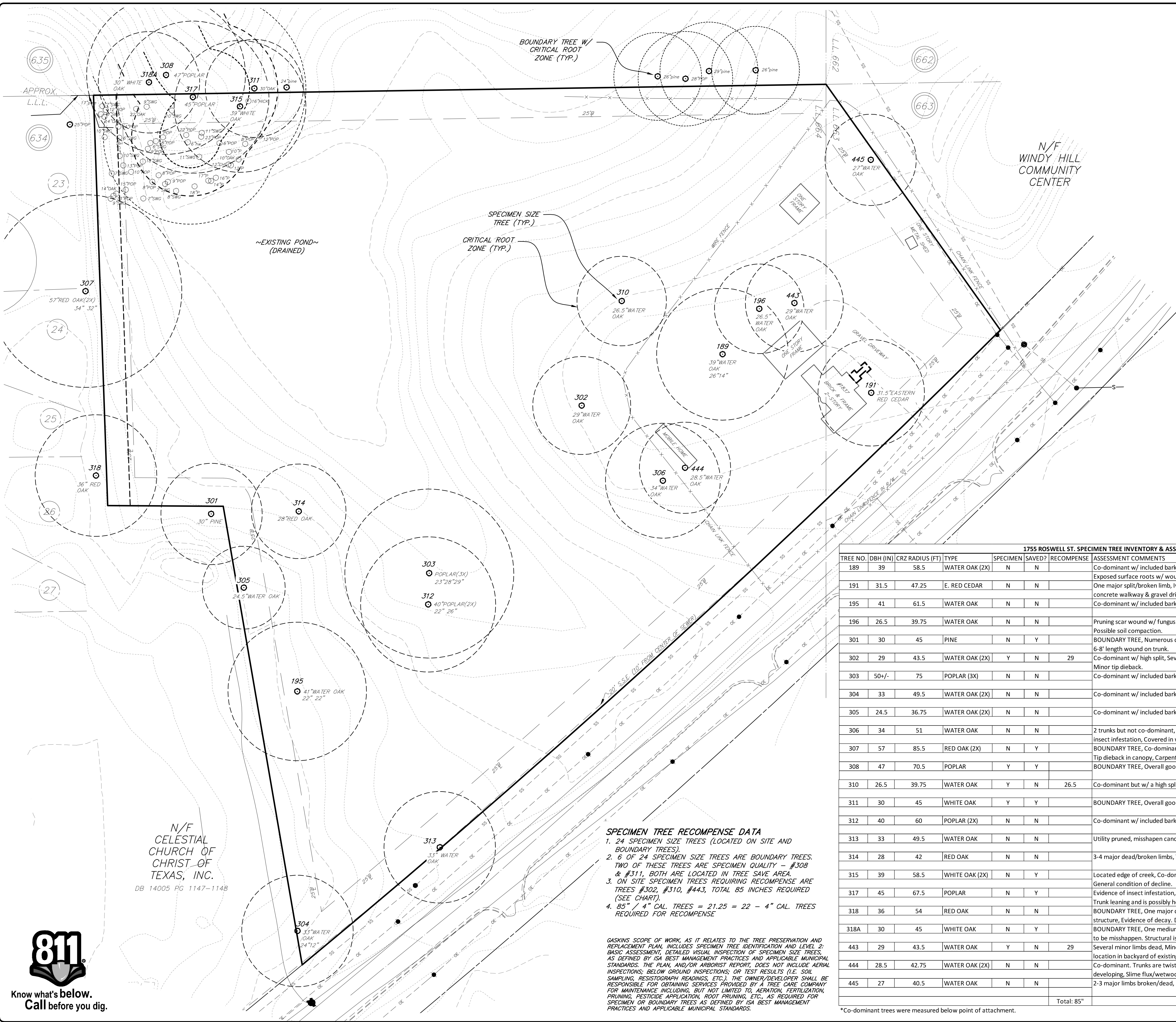
PROJECT I.D. D144	FIELD BOOK --
DRAWN BY --	CHECKED BY --
SCALE 1"=40'	ISSUE DATE 5/10/18
SHEET NUMBER <b>01</b>	

Drawing name: P:\D144 (David Mendley)\Due Diligence\Roswell Street Project\1705 Roswell Street - Concept Plan-24x-30 separation (5.8.18) - VARIANCES.dwg  
 Plotted on: May 11, 2018 - 9:47am  
 Plotted By: Kelly Davis

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 CELESTIAL  
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 TEXAS, INC.  
 DB 14005 PG 1147-1148

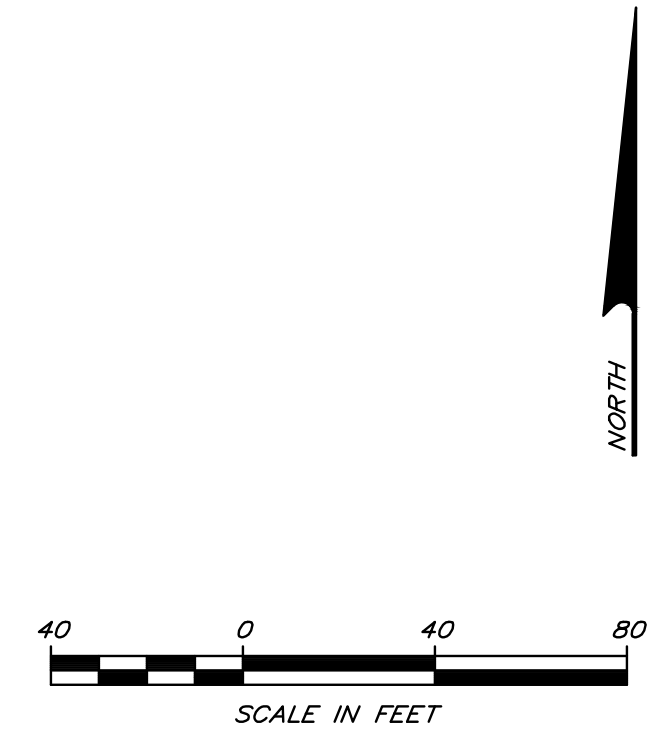


Drawing name: P: 1714 (David Mendley) - Due Diligence (Roswell Street Project) From 1750 Roswell Street - zoning tree plan.dwg  
 Printed on: May 11, 2018 - 9:48am  
 Plotted by: Kelly Davis



**TREE SURVEY NOTES:**  
 1. EXISTING TREE LOCATIONS WERE TAKEN FROM A SURVEY PROVIDED BY MCCLUNG SURVEYING SERVICES, INC. DATED 3-1-18.

TREE SIZE (INCH)	QTY.	TOTAL INCHES
6	5	30
7	4	28
8	4	32
9	4	36
10	6	60
11	2	22
12	4	48
13	2	26
14	5	70
15	1	15
16	2	32
17	1	17
18	3	54
22	2	44
23	1	23
39	1	39
45	1	45
<b>TOTAL</b>	<b>48</b>	<b>621</b>



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- SPECIMEN TREE RECOMPENSE DATA**
- 24 SPECIMEN SIZE TREES (LOCATED ON SITE AND BOUNDARY TREES).
  - 6 OF 24 SPECIMEN SIZE TREES ARE BOUNDARY TREES. TWO OF THESE TREES ARE SPECIMEN QUALITY - #308 & #311, BOTH ARE LOCATED IN TREE SAVE AREA.
  - ON SITE SPECIMEN TREES REQUIRING RECOMPENSE ARE TREES #302, #310, #443, TOTAL 85 INCHES REQUIRED (SEE CHART).
  - 85" / 4" CAL. TREES = 21.25 = 22 - 4" CAL. TREES REQUIRED FOR RECOMPENSE

GASKINS SCOPE OF WORK, AS IT RELATES TO THE TREE PRESERVATION AND REPLACEMENT PLAN, INCLUDES SPECIMEN TREE IDENTIFICATION AND LEVEL 2-BASIC ASSESSMENT, DETAILED VISUAL INSPECTION OF SPECIMEN SIZE TREES, AS DEFINED BY ISA BEST MANAGEMENT PRACTICES AND APPLICABLE MUNICIPAL STANDARDS. THE PLAN AND/OR ARBORIST REPORT DOES NOT INCLUDE AERIAL INSPECTIONS; BELOW GROUND INSPECTIONS; OR TEST RESULTS (I.E. SOIL SAMPLING, RESISTOGRAPH READINGS, ETC.). THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING SERVICES PROVIDED BY A TREE CARE COMPANY FOR MAINTENANCE INCLUDING, BUT NOT LIMITED TO, AERATION, FERTILIZATION, PRUNING, PESTICIDE APPLICATION, ROOT PRUNING, ETC., AS REQUIRED FOR SPECIMEN OR BOUNDARY TREES AS DEFINED BY ISA BEST MANAGEMENT PRACTICES AND APPLICABLE MUNICIPAL STANDARDS.

TREE NO.	DBH (IN)	CRZ RADIUS (FT)	TYPE	SPECIMEN	SAVED?	RECOMPENSE	ASSESSMENT COMMENTS
189	39	58.5	WATER OAK (2X)	N	N		Co-dominant w/ included bark, low split, Girdled roots, Epicormic shoots, Pruning scars w/ fungus & decay, Exposed surface roots w/ wounding & decay. Possible soil compaction.
191	31.5	47.25	E. RED CEDAR	N	N		One major split/broken limb, Ivy growth on trunk, Tip dieback, Compacted soil. CRZ impacted by existing concrete walkway & gravel driveway.
195	41	61.5	WATER OAK	N	N		Co-dominant w/ included bark, Epicormic shoots, Dead limb w/ sap rot, Poor structure.
196	26.5	39.75	WATER OAK	N	N		Pruning scar wound w/ fungus & decay, Epicormic shoots, No central leader, Poor limb attachments. Possible soil compaction.
301	30	45	PINE	N	Y		BOUNDARY TREE, Numerous dead/broken limbs, Thinning canopy, Evidence of insect infestation, 6-8' length wound on trunk.
302	29	43.5	WATER OAK (2X)	Y	N	29	Co-dominant w/ high split, Several dead limbs, Heavy ivy growth in canopy, Minor tip dieback.
303	50+/-	75	POPLAR (3X)	N	N		Co-dominant w/ included bark, Cavity at base of trunk, Vines on trunk.
304	33	49.5	WATER OAK (2X)	N	N		Co-dominant w/ included bark, Heavy vine growth on trunk, Epicormic shoots
305	24.5	36.75	WATER OAK (2X)	N	N		Co-dominant w/ included bark, Heavy vine growth on trunk, Tip dieback, several minor dead limbs.
306	34	51	WATER OAK	N	N		2 trunks but not co-dominant, Epicormic shoots, Asymmetrical crown w/ poor structure, Evidence of insect infestation, Covered in wisteria vines, Deadwood in canopy.
307	57	85.5	RED OAK (2X)	N	Y		BOUNDARY TREE, Co-dominant w/ included bark, Decay present at joint, 2 major dead limbs, Tip dieback in canopy, Carpenter ant infestation.
308	47	70.5	POPLAR	Y	Y		BOUNDARY TREE, Overall good condition, One medium-size dead limb.
310	26.5	39.75	WATER OAK	Y	N	26.5	Co-dominant but w/ a high split, Epicormic shoots, Full healthy canopy.
311	30	45	WHITE OAK	Y	Y		BOUNDARY TREE, Overall good condition, 3-4 minor dead limbs.
312	40	60	POPLAR (2X)	N	N		Co-dominant w/ included bark, Epicormic shoots, Evidence of insect infestation.
313	33	49.5	WATER OAK	N	N		Utility pruned, misshapen canopy. Epicormic shoots.
314	28	42	RED OAK	N	N		3-4 major dead/broken limbs, Thinning canopy, tip dieback. General condition of decline.
315	39	58.5	WHITE OAK (2X)	N	Y		Located edge of creek, Co-dominant. Minor trunk is dead. 2-3 major dead limbs, Asymmetrical form. General condition of decline.
317	45	67.5	POPLAR	N	Y		Evidence of insect infestation, One major dead limb, Cavity in trunk 5-6' length with decay. Trunk leaning and is possibly hollow. Declining condition.
318	36	54	RED OAK	N	N		BOUNDARY TREE, One major dead limb, Thinning canopy, Tip dieback, Asymmetrical form with poor structure, Evidence of decay. Declining condition.
318A	30	45	WHITE OAK	N	Y		BOUNDARY TREE, One medium-size limb dead, Asymmetrical form, trunk curves and appears to be misshapen. Structural issues.
443	29	43.5	WATER OAK	Y	N	29	Several minor limbs dead, Minor tip dieback, Trunk leans. Possible soil compaction due to location in backyard of existing house.
444	28.5	42.75	WATER OAK (2X)	N	N		Co-dominant. Trunks are twisted/fused together. Galls developing. Some areas of decay appear to be developing. Slime flux/wetwood present, Epicormic shoots, Wisteria vines in canopy.
445	27	40.5	WATER OAK	N	N		2-3 major limbs broken/dead, Possible storm damage to canopy, Tip dieback.
Total: 85"							

\*Co-dominant trees were measured below point of attachment.

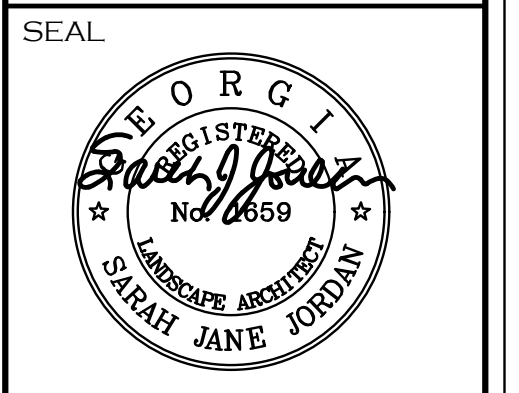


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**1837 ROSWELL STREET**  
 TOWNHOMES  
 LAND LOTS 634, 17TH DISTRICT, 2ND SECTION,  
 COBB COUNTY, GEORGIA

REVISIONS		
REV.	DATE	REVISION REFERENCE:

SHEET TITLE  
 EXISTING TREE SURVEY  
 FOR ZONING ONLY

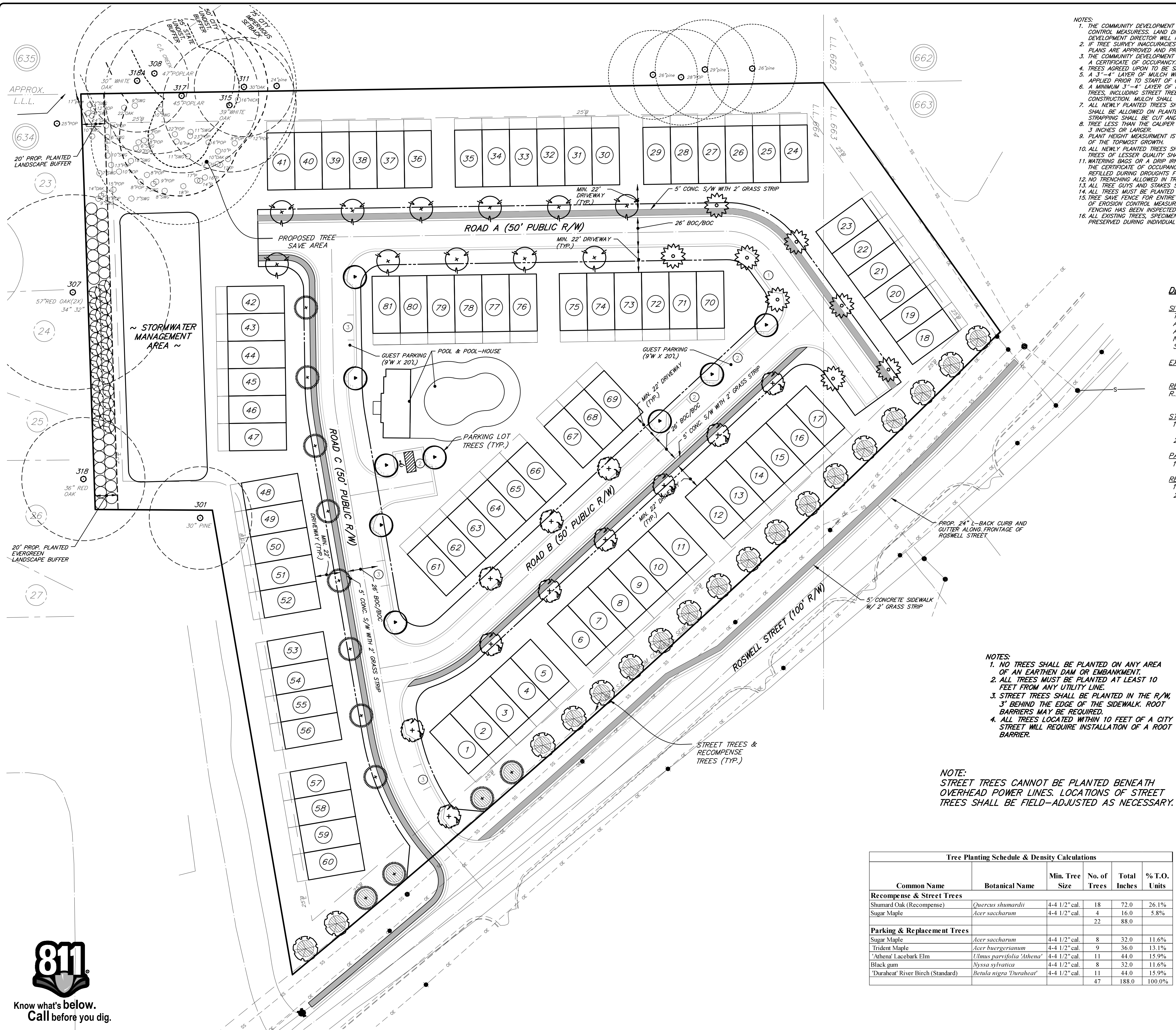


PROJECT I.D. D144	FIELD BOOK --
DRAWN BY JBS	CHECKED BY SJJ
SCALE 1" = 40'	ISSUE DATE 5/10/18
SHEET NUMBER <b>02</b>	



NOT ISSUED FOR CONSTRUCTION

Drawing name: P: 17144 (David Mendley) - Due Diligence (Roswell Street Project) from 1759 Roswell Street - zoning tree planting  
 Plotted on: May 11, 2018 - 9:48am  
 Plotted by: Kelly Davis



- NOTES:**
- THE COMMUNITY DEVELOPMENT DIRECTOR MUST INSPECT THE SITE BEFORE INSTALLATION OF EROSION CONTROL MEASURES. LAND DISTURBANCE WITHOUT A SITE INSPECTION AND APPROVAL BY THE COMMUNITY DEVELOPMENT DIRECTOR WILL RESULT IN A "STOP-WORK ORDER" AND FINES.
  - IF TREE SURVEY INACCURACIES ARE FOUND ON-SITE, A STOP WORK ORDER WILL BE ISSUED UNTIL REVISED PLANS ARE APPROVED AND PROCESSED BASED ON ACCURATE INFORMATION.
  - THE COMMUNITY DEVELOPMENT DIRECTOR MUST INSPECT AND APPROVE THE SITE BEFORE THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
  - TREES AGREED UPON TO BE SAVED ARE THE RESPONSIBILITY OF THE OWNER.
  - A 3"-4" LAYER OF MULCH WILL BE REQUIRED FOR THE CRZ OF SPECIMEN TREES. MULCH MUST BE APPLIED PRIOR TO START OF CONSTRUCTION. KEEP MULCH AT LEAST 5' FROM THE TRUNK OF THE TREE.
  - A MINIMUM 3"-4" LAYER OF MULCH WILL BE REQUIRED FOR ALL EXISTING NON SPECIMEN, LANDSCAPE TREES, INCLUDING STREET TREES AND PARKING LOT TREES. MULCH MUST BE APPLIED PRIOR TO START OF CONSTRUCTION. MULCH SHALL NOT BE PLACED DIRECTLY AGAINST TREE TRUNKS.
  - ALL NEWLY PLANTED TREES SHALL HAVE VISIBLE ROOT FLARES AT FINISHED GRADE. NO CIRCLING ROOTS SHALL BE ALLOWED ON PLANTED TREES. THE UPPER 2-3 OF THE WIRE BASKET, ALL BURLAP, AND STRAPPING SHALL BE CUT AND REMOVED PRIOR TO BACKFILL.
  - TREES LESS THAN THE CALIPER INCH SHOWN WILL NOT BE ACCEPTED; I.E.: 3/4" CALIPER TREES MUST BE 3/4" INCHES OR LARGER.
  - PLANT HEIGHT MEASUREMENT IS TAKEN AT THE TOP OF THE MAIN BODY OF THE PLANT AND NOT AT THE TIP OF THE TOPMOST GROWTH.
  - ALL NEWLY PLANTED TREES SHALL BE EQUIVALENT IN QUALITY TO A FLORIDA #1 GRADE OR BETTER. ALL TREES OF LESSER QUALITY SHALL BE REJECTED BY THE COMMUNITY DEVELOPMENT DIRECTOR.
  - WATERING BAGS OR A DRIP IRRIGATION SYSTEM WILL BE PROVIDED FOR ALL TREES PRIOR TO ISSUANCE OF THE CERTIFICATE OF OCCUPANCY. DURING FIRST YEAR, BAGS WILL BE REFILLED WEEKLY BY OWNER AND REFILLED DURING DROUGHTS FOR A MINIMUM OF 2 YEARS AFTER INSTALLATION.
  - NO TRENCHING ALLOWED IN TREE SAVE AREAS - INCLUDING IRRIGATION.
  - ALL TREE GUYS AND STAKES SHALL BE REMOVED FROM TREE ONE YEAR AFTER PLANTING OR BEFORE.
  - ALL TREES MUST BE PLANTED AT LEAST 10 FEET FROM ANY UTILITY LINE.
  - TREE SAVE FENCE FOR ENTIRE SITE MUST BE INSTALLED, INSPECTED AND APPROVED PRIOR TO INSTALLATION OF EROSION CONTROL MEASURES. NO LAND DISTURBANCE OR DEMOLITION IS ALLOWED BEFORE TREE SAVE FENCING HAS BEEN INSPECTED AND APPROVED BY COMMUNITY DEVELOPMENT DIRECTOR.
  - ALL EXISTING TREES, SPECIMEN TREES AND NON-SPECIMEN, COUNTED FOR EDF CREDITS MUST BE FULLY PRESERVED DURING INDIVIDUAL LOT PERMITTING.

**DENSITY CALCULATIONS:**

**SITE DENSITY FACTOR (S.D.F.)**  
 TOTAL ACRES = 8.64 ACRES  
 AREA OF STREAM BUFFER = 0.21 ACRES  
 AREA OF PROPOSED STORMWATER FACILITY = 0.37 ACRES  
 NET AREA = 8.06 ACRES  
 S.D.F. = 8.06 ACRES X 100 INCHES = 806 INCHES

**EXISTING SITE DENSITY FACTOR (E.D.F.)**  
 = 621 INCHES

**REPLACEMENT DENSITY FACTOR (R.D.F.)**  
 R.D.F. 806 INCHES > S.D.F. 621 INCHES.  
 THEREFORE, 185 INCHES OF TREES TO BE PLANTED.

**STREET TREES:**

- 838 L.F. OF RIGHT OF WAY, FRONTAGE ROSWELL ST. = 838 L.F. / 40 L.F. = 21 TREES REQUIRED.
- RECOMPENSE TREES MAY BE COUNTED AS STREET TREES.

**PARKING LOT TREES:**

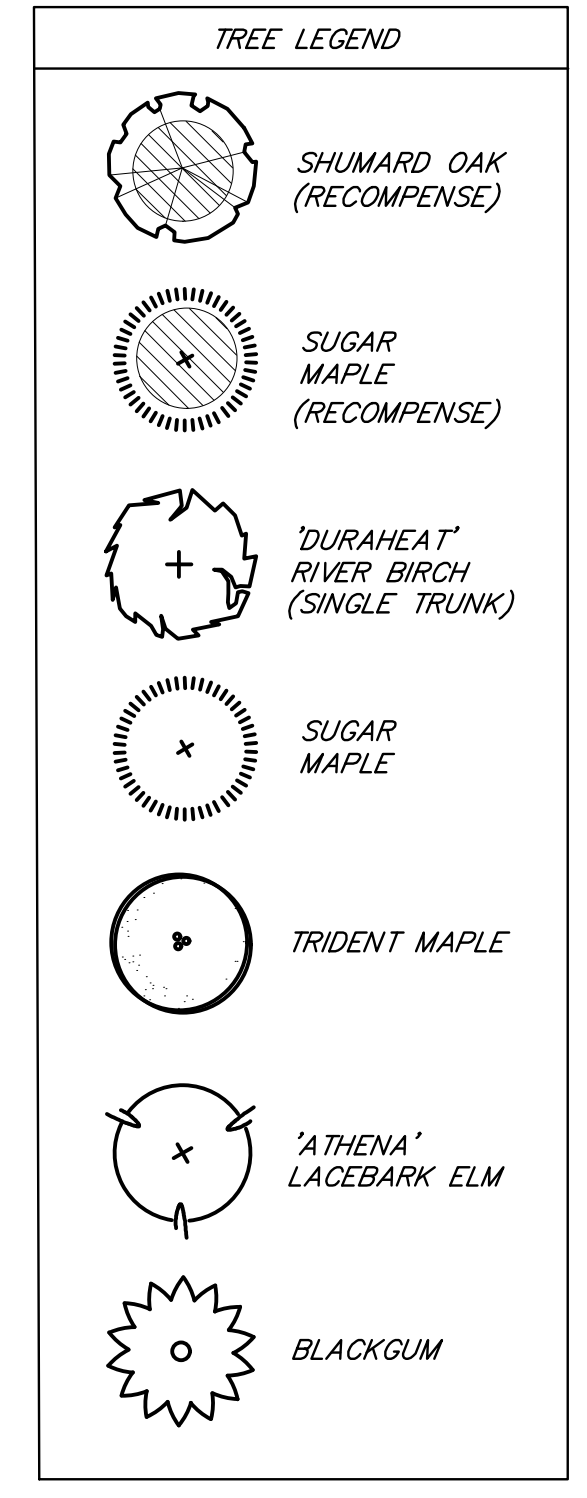
- 13 - 4" CAL. PARKING LOT TREES ARE PROVIDED.

**RECOMPENSE TREES:**

- 85 INCHES TO BE RECOMPENSED
- 22 - 4" CAL. TREES REQUIRED, 22 TREES (88 INCHES) PROVIDED.

- NOTES:**
- NO TREES SHALL BE PLANTED ON ANY AREA OF AN EARTHEN DAM OR EMBANKMENT.
  - ALL TREES MUST BE PLANTED AT LEAST 10 FEET FROM ANY UTILITY LINE.
  - STREET TREES SHALL BE PLANTED IN THE R/W, 3' BEHIND THE EDGE OF THE SIDEWALK. ROOT BARRIERS MAY BE REQUIRED.
  - ALL TREES LOCATED WITHIN 10 FEET OF A CITY STREET WILL REQUIRE INSTALLATION OF A ROOT BARRIER.

**NOTE:**  
 STREET TREES CANNOT BE PLANTED BENEATH OVERHEAD POWER LINES. LOCATIONS OF STREET TREES SHALL BE FIELD-ADJUSTED AS NECESSARY.



Tree Planting Schedule & Density Calculations					
Common Name	Botanical Name	Min. Tree Size	No. of Trees	Total Inches	% T.O. Units
<b>Recompense &amp; Street Trees</b>					
Shumard Oak (Recompense)	<i>Quercus shumardii</i>	4-4 1/2" cal.	18	72.0	26.1%
Sugar Maple	<i>Acer saccharum</i>	4-4 1/2" cal.	4	16.0	5.8%
			22	88.0	
<b>Parking &amp; Replacement Trees</b>					
Sugar Maple	<i>Acer saccharum</i>	4-4 1/2" cal.	8	32.0	11.6%
Trident Maple	<i>Acer buergerianum</i>	4-4 1/2" cal.	9	36.0	13.1%
'Athena' Lacebark Elm	<i>Ulmus parvifolia 'Athena'</i>	4-4 1/2" cal.	11	44.0	15.9%
Black gum	<i>Nyssa sylvatica</i>	4-4 1/2" cal.	8	32.0	11.6%
'Duraheat' River Birch (Standard)	<i>Betula nigra 'Duraheat'</i>	4-4 1/2" cal.	11	44.0	15.9%
			47	188.0	100.0%



**Gaskins**  
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 CONSTRUCTION MGMT

1266 Powder Springs Road  
 Marietta, Georgia 30064  
 Phone: (770) 424-7168  
 Fax: (770) 424-7595  
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**1837 ROSWELL STREET**  
 TOWNHOMES  
 LAND LOTS 634, 17TH DISTRICT, 2ND SECTION,  
 COBB COUNTY, GEORGIA

**REVISIONS**

REV.	DATE	REVISION REFERENCE:

SHEET TITLE  
 TREE PRESERVATION AND  
 REPLACEMENT PLAN  
 FOR ZONING ONLY

SEAL

PROJECT I.D.	FIELD BOOK
D144	--
DRAWN BY	CHECKED BY
JBS	SJJ
SCALE	ISSUE DATE
1"=40'	5/10/18
SHEET NUMBER	

**03**

Know what's below.  
 Call before you dig.

NOT ISSUED FOR CONSTRUCTION



Project ID: 18-09329-001  
 Location: Roswell St & Windy Hill Rd SE  
 City: Smyrna

**PEAK HOURS**

Day: Tuesday  
 Date: 05/22/2018

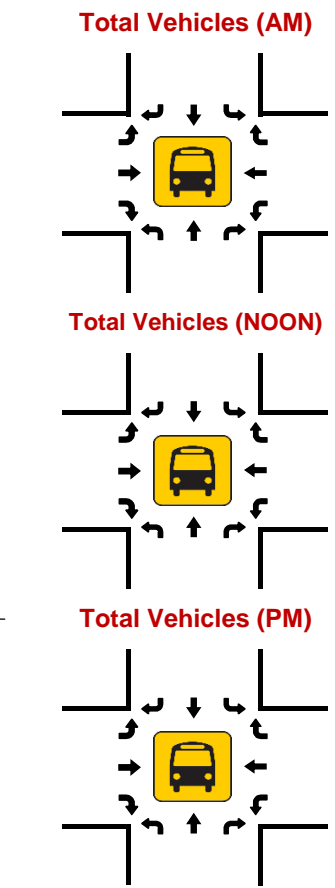
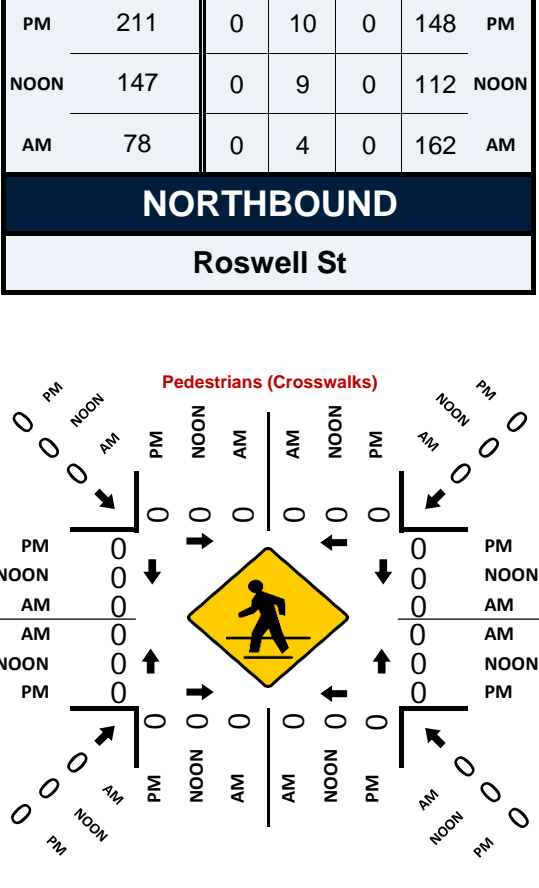
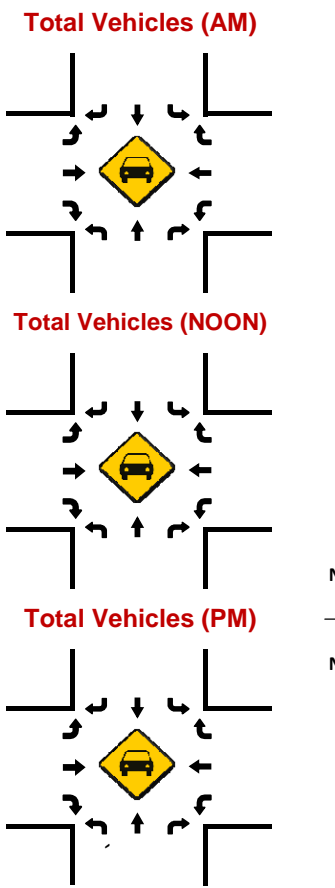
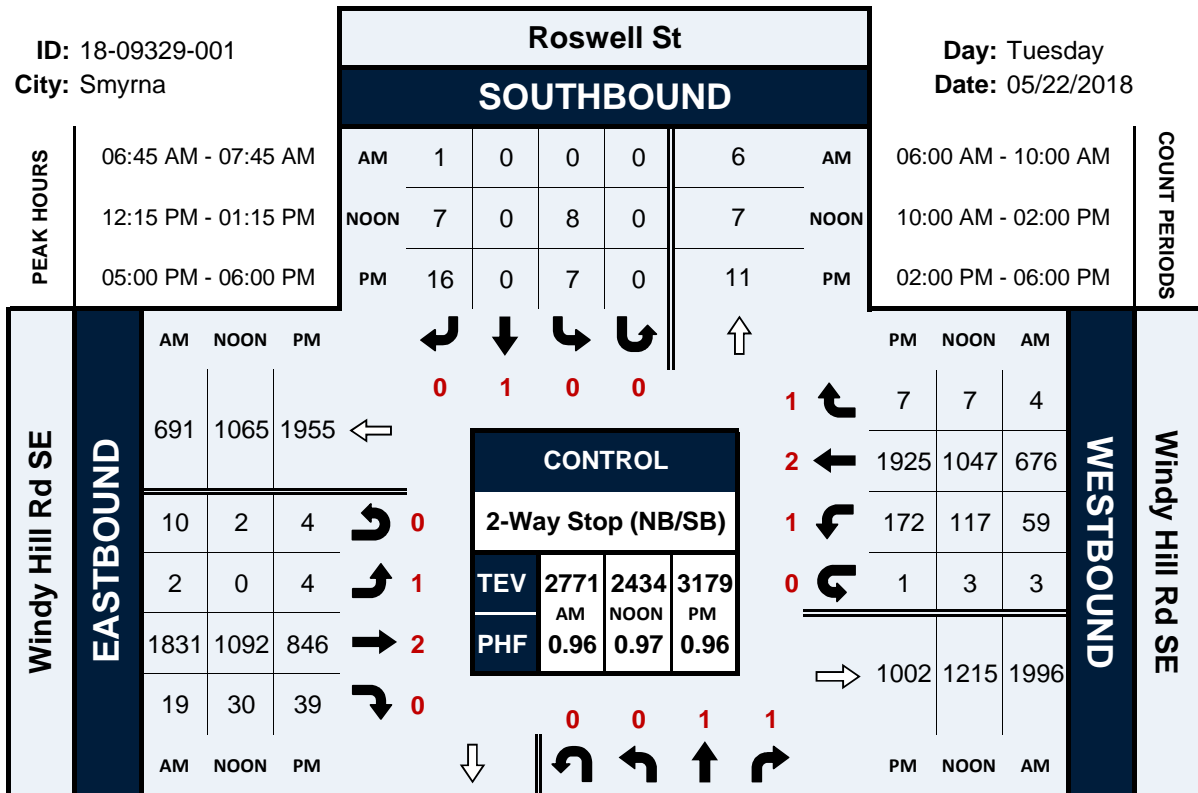
AM																					
Start Time	Roswell St Northbound				Roswell St Southbound				Windy Hill Rd SE Eastbound				Windy Hill Rd SE Westbound				Int. Total				
	Left	Thru	Rgt	Utum	App. Total	Left	Thru	Rgt	Utum	App. Total	Left	Thru	Rgt	Utum	App. Total	Left		Thru	Rgt	Utum	App. Total
Peak Hour Analysis from 06:00 AM to 10:00 AM																					
Peak Hour for Entire Intersection Begins at 06:45 AM																					
6:45 AM	2	0	21	0	23	0	0	0	0	0	2	517	4	2	525	13	142	1	1	157	705
7:00 AM	0	0	33	0	33	0	0	0	0	0	0	429	7	2	438	13	186	1	0	200	671
7:15 AM	0	0	48	0	48	0	0	0	0	0	0	463	6	3	472	15	180	2	1	198	718
7:30 AM	2	0	60	0	62	0	0	1	0	1	0	422	2	3	427	18	168	0	1	187	677
Total Volume	4	0	162	0	166	0	0	1	0	1	2	1831	19	10	1862	59	676	4	3	742	2771
% App. Total	2.4	0.0	97.6	0.0	100	0.0	0.0	100.0	0.0	100	0.1	98.3	1.0	0.5	100	8.0	91.1	0.5	0.4	100	
PHF					0.669					0.250					0.887					0.928	0.965
Cars, PU, Vans	4	0	162	0	166	0	0	1	0	1	2	1831	19	10	1862	59	676	4	3	742	2771
% Cars, PU, Vans	100.0	0.0	100.0	0.0	100.0	0.0	0.0	100.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
NOON																					
Start Time	Roswell St Northbound				Roswell St Southbound				Windy Hill Rd SE Eastbound				Windy Hill Rd SE Westbound				Int. Total				
	Left	Thru	Rgt	Utum	App. Total	Left	Thru	Rgt	Utum	App. Total	Left	Thru	Rgt	Utum	App. Total	Left		Thru	Rgt	Utum	App. Total
Peak Hour Analysis from 10:00 AM to 02:00 PM																					
Peak Hour for Entire Intersection Begins at 12:15 PM																					
12:15 PM	1	0	29	0	30	0	0	4	0	4	0	271	9	0	280	29	276	4	2	311	625
12:30 PM	3	0	32	0	35	2	0	0	0	2	0	270	8	0	278	22	270	0	0	292	607
12:45 PM	4	0	26	0	30	2	0	1	0	3	0	267	6	2	275	35	254	1	0	290	598
1:00 PM	1	0	25	0	26	4	0	2	0	6	0	284	7	0	291	31	247	2	1	281	604
Total Volume	9	0	112	0	121	8	0	7	0	15	0	1092	30	2	1124	117	1047	7	3	1174	2434
% App. Total	7.4	0.0	92.6	0.0	100	53.3	0.0	46.7	0.0	100	0.0	97.2	2.7	0.2	100	10.0	89.2	0.6	0.3	100	
PHF					0.864					0.625					0.966					0.944	0.974
Cars, PU, Vans	9	0	112	0	121	8	0	7	0	15	0	1092	30	2	1124	117	1047	7	3	1174	2434
% Cars, PU, Vans	100.0	0.0	100.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
PM																					
Start Time	Roswell St Northbound				Roswell St Southbound				Windy Hill Rd SE Eastbound				Windy Hill Rd SE Westbound				Int. Total				
	Left	Thru	Rgt	Utum	App. Total	Left	Thru	Rgt	Utum	App. Total	Left	Thru	Rgt	Utum	App. Total	Left		Thru	Rgt	Utum	App. Total
Peak Hour Analysis from 02:00 PM to 06:00 PM																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
5:00 PM	3	0	23	0	26	0	0	2	0	2	1	213	7	2	223	33	512	3	0	548	799
5:15 PM	3	0	46	0	49	5	0	7	0	12	2	201	10	2	215	47	446	1	0	494	770
5:30 PM	1	0	48	0	49	2	0	3	0	5	1	226	13	0	240	47	487	2	1	537	831
5:45 PM	3	0	31	0	34	0	0	4	0	4	0	206	9	0	215	45	480	1	0	526	779
Total Volume	10	0	148	0	158	7	0	16	0	23	4	846	39	4	893	172	1925	7	1	2105	3179
% App. Total	6.3	0.0	93.7	0.0	100	30.4	0.0	69.6	0.0	100	0.4	94.7	4.4	0.4	100	8.2	91.4	0.3	0.0	100	
PHF					0.806					0.479					0.930					0.960	0.966
Cars, PU, Vans	10	0	148	0	158	7	0	16	0	23	4	846	39	4	893	172	1925	7	1	2105	3179
% Cars, PU, Vans	100.0	0.0	100.0	0.0	100.0	100.0	0.0	100.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

# Roswell St & Windy Hill Rd SE

## Peak Hour Turning Movement Count

ID: 18-09329-001  
City: Smyrna

Day: Tuesday  
Date: 05/22/2018



	Roadway	Direction
Major	Windy Hill Rd	EB/WB
Minor	Roswell St	NB/SB

Time	Total	In	Out	% of Daily
Daily	572	286	286	
AM	39	9	30	6.82%
PM	49	31	18	8.57%

In Out Dist	In	Out
AM	23%	77%
PM	63%	37%

	% of Daily
12:00 AM	0.70%
1:00 AM	0.40%
2:00 AM	0.30%
3:00 AM	0.40%
4:00 AM	0.60%
5:00 AM	1.30%
6:00 AM	2.90%
7:00 AM	7.40%
8:00 AM	6.30%
9:00 AM	5.30%
10:00 AM	4.00%
11:00 AM	5.30%
12:00 PM	5.40%
1:00 PM	4.60%
2:00 PM	5.70%
3:00 PM	6.20%
4:00 PM	7.60%
5:00 PM	9.10%
6:00 PM	7.90%
7:00 PM	5.70%
8:00 PM	5.10%
9:00 PM	3.60%
10:00 PM	2.90%
11:00 PM	1.20%

Daily	In	Out	Distribution				Volumes										
			NBL	NBR	EBR	WBL	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT
4	50%	50%	5%	55%	5%	55%	0		1					0		1	
2	50%	50%	5%	55%	5%	55%	0		1					0		1	
2	50%	50%	5%	55%	5%	55%	0		1					0		1	
2	50%	50%	5%	55%	5%	55%	0		1					0		1	
3	50%	50%	5%	55%	5%	55%	0		1					0		1	
7	30%	70%	5%	55%	5%	55%	0		3					0		1	
17	25%	75%	5%	55%	5%	55%	1		7					0		2	
42	23%	77%	5%	55%	5%	55%	2		18					0		5	
36	25%	75%	5%	55%	5%	55%	1		15					0		5	
30	30%	70%	5%	60%	5%	60%	1		13					0		5	
23	35%	65%	5%	60%	5%	60%	1		9					0		5	
30	45%	55%	5%	65%	5%	65%	1		11					1		9	
31	50%	50%	5%	65%	5%	65%	1		10					1		10	
26	50%	50%	5%	65%	5%	65%	1		8					1		8	
33	55%	45%	5%	65%	5%	65%	1		10					1		12	
35	60%	40%	5%	65%	5%	65%	1		9					1		14	
43	63%	37%	5%	65%	5%	65%	1		10					1		18	
52	60%	40%	5%	65%	5%	65%	1		14					2		20	
45	55%	45%	5%	65%	5%	65%	1		13					1		16	
33	50%	50%	5%	65%	5%	65%	1		11					1		11	
29	50%	50%	5%	65%	5%	65%	1		9					1		9	
21	50%	50%	5%	65%	5%	65%	1		7					1		7	
17	50%	50%	5%	60%	5%	60%	0		5					0		5	
7	50%	50%	5%	55%	5%	55%	0		2					0		2	

### GROWTH RATE SUMMARY

Description	Year Range	Past Growth Rate	Future Projected Growth Rate
<b>GDOT TCDS Area Traffic Volume Trend</b> <div style="text-align: right; padding-right: 20px;">Windy Hill Rd</div>	2011 - 2016	-1.02%	
	2013 - 2016	0.03%	
<b>Actual Population Growth</b> <div style="text-align: right; padding-right: 20px;">Cobb County - US Census Bureau</div> <div style="text-align: right; padding-right: 20px;">Smyrna, GA - US Census Bureau</div> <div style="text-align: right; padding-right: 20px;">Cobb County - Google</div> <div style="text-align: right; padding-right: 20px;">Smyrna, GA - Google</div>	2010 - 2017	1.35%	
	2010 - 2017	1.44%	
	2010 - 2015	1.46%	
	2010 - 2016	1.61%	
<b>Projected Population Growth</b> <div style="text-align: right; padding-right: 20px;">Cobb County - Georgia 2030 Population Projections</div> <div style="text-align: right; padding-right: 20px;">Smyrna, Georgia - Georgia 2030 Population Projections</div>	2010 - 2020		1.61%
	2020 - 2030		1.50%
	2010 - 2030		1.56%
	2010 - 2020		2.11%
	2020 - 2020		2.11%
	2010 - 2030		2.11%

Selected Growth Rate      1.50%

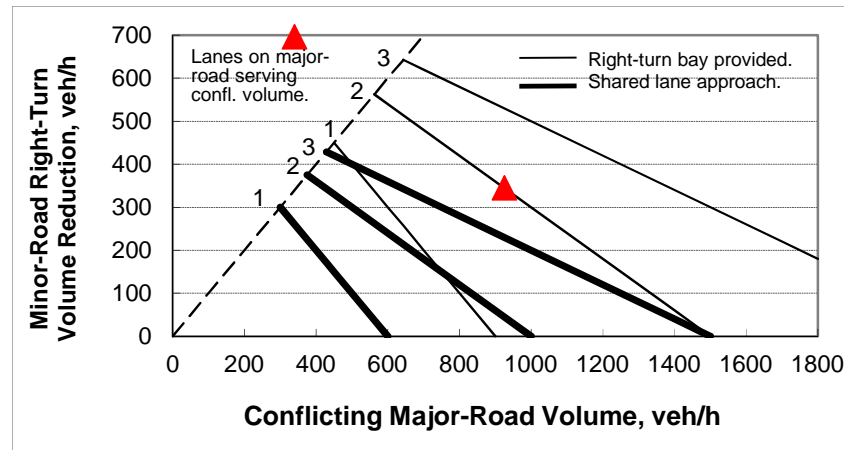
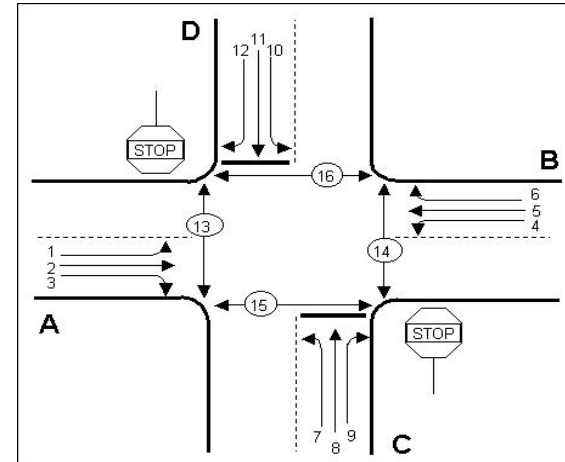
**Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.**

**INPUT**

Number of lanes on major-road approach:		2	
Right-turn geometry on minor-road:		Right-turn bay provided	
Approach	Number	Movement	Volume
Major A	2	Through	1831
	3	Right	19
Major B	5	Through	676
	6	Right	4
Minor C	7	Left	4
	8	Through	0
	9	Right	162
Minor D	10	Left	0
	11	Through	0
	12	Right	1

**OUTPUT**

Variable	Value
Conflicting major-road volume ( $V_{c9}$ ), veh/h:	925
Conflicting major-road volume ( $V_{c12}$ ), veh/h:	340
Right-turn volume reduction ( $V_{r9}$ ), veh/h:	345
Right-turn volume reduction ( $V_{r12}$ ), veh/h:	696
Adjusted right-turn volume reduction ( $V_{r9}$ ), veh/h:	162
Adjusted right-turn volume reduction ( $V_{r12}$ ), veh/h:	1
Adjusted minor-road volume, veh/h:	4
<b>Guidance:</b>	<b>Conduct warrant check again using adjusted minor road volume.</b>









































1
2
3

needed for filling combobox

Box Output: 2  
Slope 0.6

Box Output: Right-turn bay provided

(0=shared) 1

Intercept 900

SLA

RTB

Right-turn bay provided
Shared-lane approach

needed for filling combobox

2

V <sub>o</sub>	SHARED LANE APPROACH			RIGHT-TURN BAY R	
	Number of lanes on Major - road				
(one dir)	1	2	3	1	2
(vph)	1	0.6	0.4	1	0.6
0					
100					
200					
300	300				
375	225	375			
429	171	343	428		
450	150	330	420	450	
562	38	263	375	338	563
600	0	240	360	300	540
643		214	343	257	514
700		180	320	200	480
800		120	280	100	420
900		60	240	0	360
1000		0	200		300
1100			160		240
1200			120		180
1300			80		120
1400			40		60
1500			0		0
1600					
1700					
1800					

POVIDED

3

0.4

643

620

580

540

500

460

420

380

340

300

260

220

180

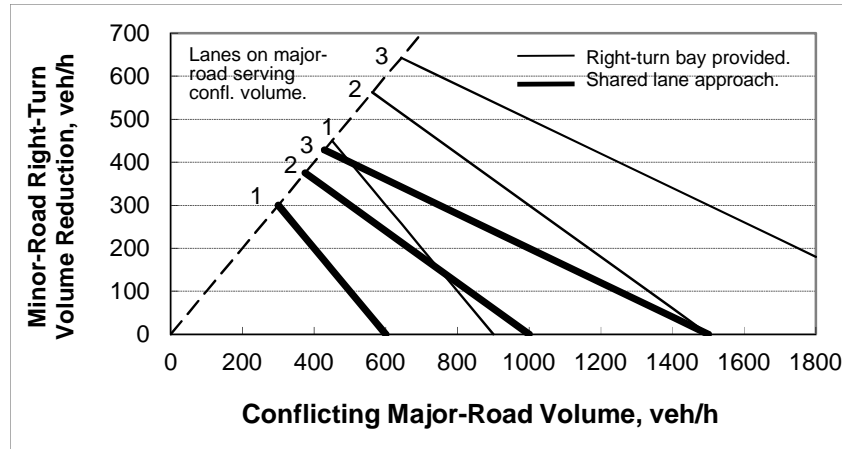
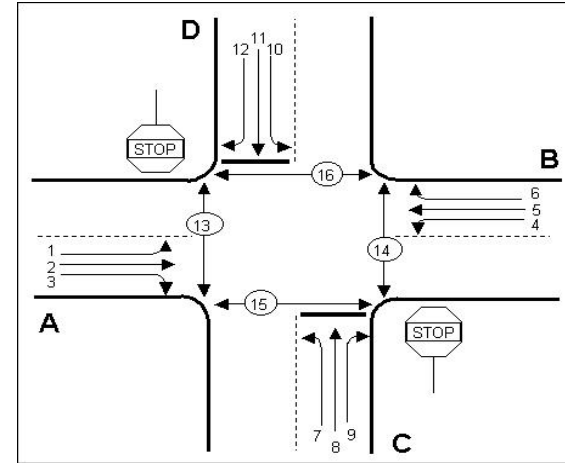
**Figure 2 - 11. Minor-road right-turn volume reduction for warrant check.**

**INPUT**

Number of lanes on major-road approach:		2	
Right-turn geometry on minor-road:		Right-turn bay provided	
Approach	Number	Movement	Volume
Major A	2	Through	72
	3	Right	94
Major B	5	Through	43
	6	Right	446
Minor C	7	Left	52
	8	Through	0
	9	Right	131
Minor D	10	Left	0
	11	Through	0
	12	Right	0

**OUTPUT**

Variable	Value
Conflicting major-road volume ( $V_{c9}$ ), veh/h:	83
Conflicting major-road volume ( $V_{c12}$ ), veh/h:	245
Right-turn volume reduction ( $V_{r9}$ ), veh/h:	850
Right-turn volume reduction ( $V_{r12}$ ), veh/h:	753
Adjusted right-turn volume reduction ( $V_{r9}$ ), veh/h:	131
Adjusted right-turn volume reduction ( $V_{r12}$ ), veh/h:	0
Adjusted minor-road volume, veh/h:	52
<b>Guidance:</b>	<b>Conduct warrant check again using adjusted minor road volume.</b>







































1
2
3

needed for filling combobox

Box Output: 2  
Slope 0.6

Box Output: Right-turn bay provided

(0=shared) 1

Intercept 900

SLA

RTB

Right-turn bay provided
Shared-lane approach

needed for filling combobox

2

V <sub>o</sub>	SHARED LANE APPROACH			RIGHT-TURN BAY R	
	Number of lanes on Major - road				
(one dir)	1	2	3	1	2
(vph)	1	0.6	0.4	1	0.6
0					
100					
200					
300	300				
375	225	375			
429	171	343	428		
450	150	330	420	450	
562	38	263	375	338	563
600	0	240	360	300	540
643		214	343	257	514
700		180	320	200	480
800		120	280	100	420
900		60	240	0	360
1000		0	200		300
1100			160		240
1200			120		180
1300			80		120
1400			40		60
1500			0		0
1600					
1700					
1800					

POVIDED

3

0.4

643

620

580

540

500

460

420

380

340

300

260

220

180

**Warrant 1 - Eight-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)



<b>Name</b> Number of Lanes by Approach	<b>Major Road</b>	<b>Minor Road</b>
	Windy Hill Rd SE 2	Roswell St SE 1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2018
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Existing

<b>Time Of Day</b>	<b>Windy Hill Rd SE</b>		<b>Roswell St SE</b>		<b>Warrant 1, Condition A</b>		<b>Warrant 1, Condition B</b>		<b>Warrant 1, Combination A&amp;B</b>						
	<b>Major Road Volume (vph)</b>		<b>Minor Road Volume (vph)</b>		<b>Major Road Condition Met?</b>		<b>Minor Road Condition Met?</b>		<b>Condition A</b>		<b>Condition B</b>				
	<b>Both Approaches</b>		<b>Highest Approach</b>		<b>&gt; 600 vph</b>		<b>&gt; 150 vph</b>		<b>&gt; 480 vph</b>		<b>&gt; 120 vph</b>		<b>&gt; 720 vph</b>		<b>&gt; 60 vph</b>
12:00 AM to 1:00 AM	0	0	No	No	No	No	No	No	No	No	No	No	No		
1:00 AM to 2:00 AM	0	0	No	No	No	No	No	No	No	No	No	No	No		
2:00 AM to 3:00 AM	0	0	No	No	No	No	No	No	No	No	No	No	No		
3:00 AM to 4:00 AM	0	0	No	No	No	No	No	No	No	No	No	No	No		
4:00 AM to 5:00 AM	0	0	No	No	No	No	No	No	No	No	No	No	No		
5:00 AM to 6:00 AM	0	0	No	No	No	No	No	No	No	No	No	No	No		
6:00 AM to 7:00 AM	2285	8	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
7:00 AM to 8:00 AM	2539	2	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
8:00 AM to 9:00 AM	2303	13	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
9:00 AM to 10:00 AM	1901	8	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
10:00 AM to 11:00 AM	1813	8	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
11:00 AM to 12:00 PM	2097	11	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
12:00 PM to 1:00 PM	2282	12	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
1:00 PM to 2:00 PM	2272	9	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
2:00 PM to 3:00 PM	2295	12	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
3:00 PM to 4:00 PM	2651	16	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
4:00 PM to 5:00 PM	2999	17	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
5:00 PM to 6:00 PM	2998	10	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No		
6:00 PM to 7:00 PM	0	0	No	No	No	No	No	No	No	No	No	No	No		
7:00 PM to 8:00 PM	0	0	No	No	No	No	No	No	No	No	No	No	No		
8:00 PM to 9:00 PM	0	0	No	No	No	No	No	No	No	No	No	No	No		
9:00 PM to 10:00 PM	0	0	No	No	No	No	No	No	No	No	No	No	No		
10:00 PM to 11:00 PM	0	0	No	No	No	No	No	No	No	No	No	No	No		
11:00 PM to 12:00 AM	0	0	No	No	No	No	No	No	No	No	No	No	No		
<b>Total Hours Condition is Met</b>			0		0		0		0						
<b>Meets Warrant?</b>			No - Warrant is Not Met		No - Warrant is Not Met		No - Warrant is Not Met								

**Warrant 2 - Four-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

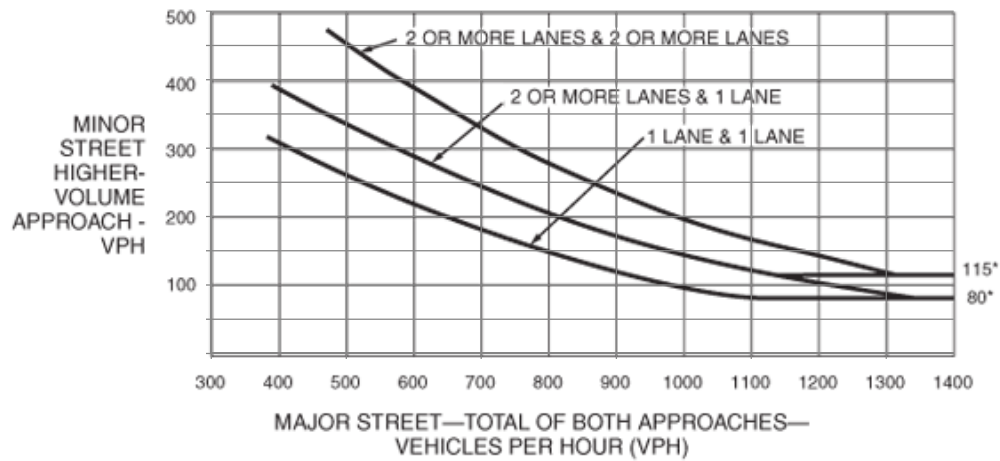


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2018
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Existing

Time Of Day	Windy Hill Rd SE	Roswell St SE	Warrant 2 Four-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph) Both Approaches	Minor Road Volume (vph) Highest Approach	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	0	0	No
6:00 AM to 7:00 AM	2285	8	No
7:00 AM to 8:00 AM	2539	2	No
8:00 AM to 9:00 AM	2303	13	No
9:00 AM to 10:00 AM	1901	8	No
10:00 AM to 11:00 AM	1813	8	No
11:00 AM to 12:00 PM	2097	11	No
12:00 PM to 1:00 PM	2282	12	No
1:00 PM to 2:00 PM	2272	9	No
2:00 PM to 3:00 PM	2295	12	No
3:00 PM to 4:00 PM	2651	16	No
4:00 PM to 5:00 PM	2999	17	No
5:00 PM to 6:00 PM	2998	10	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.



**Warrant 1 - Peak-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

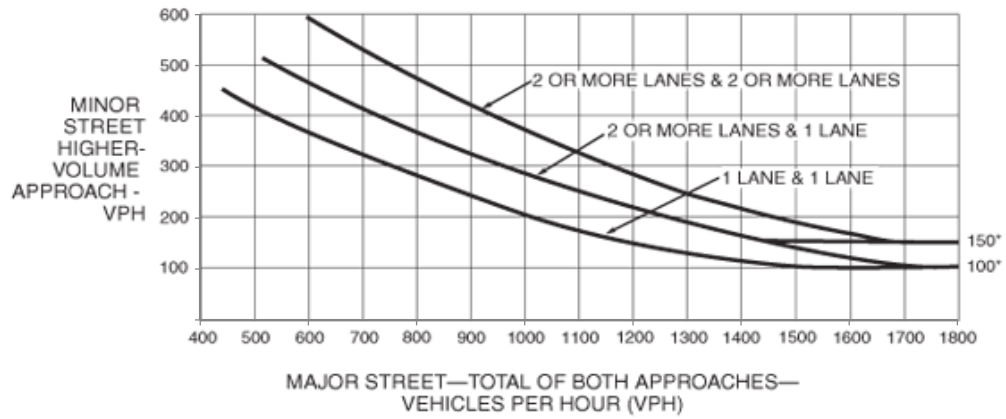


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2018
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Existing

Time Of Day	Windy Hill Rd SE	Roswell St SE	Warrant 3 Peak-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph) Both Approaches	Minor Road Volume (vph) Highest Approach	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	0	0	No
6:00 AM to 7:00 AM	2285	8	No
7:00 AM to 8:00 AM	2539	2	No
8:00 AM to 9:00 AM	2303	13	No
9:00 AM to 10:00 AM	1901	8	No
10:00 AM to 11:00 AM	1813	8	No
11:00 AM to 12:00 PM	2097	11	No
12:00 PM to 1:00 PM	2282	12	No
1:00 PM to 2:00 PM	2272	9	No
2:00 PM to 3:00 PM	2295	12	No
3:00 PM to 4:00 PM	2651	16	No
4:00 PM to 5:00 PM	2999	17	No
5:00 PM to 6:00 PM	2998	10	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Eight-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)



<b>Name</b> Number of Lanes by Approach	<b>Major Road</b>	<b>Minor Road</b>
	Windy Hill Rd SE 2	Roswell St SE 1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2018
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Existing

Time Of Day	Windy Hill Rd SE		Warranty 1, Condition A		Warranty 1, Condition B		Warranty 1, Combination A&B			
	Major Road Volume (vph)	Westbound Left Volume (vph)	Major Road Condition Met?	Westbound Left Condition Met?	Major Road Condition Met?	Westbound Left Condition Met?	Condition A		Condition B	
	Opposite Approach	Left Turn	> 600 vph	> 150 vph	> 900 vph	> 75 vph	Major Road Condition Met?	Westbound Left Condition Met?	Major Road Condition Met?	Westbound Left Condition Met?
12:00 AM to 1:00 AM	0	0	No	No	No	No	No	No	No	No
1:00 AM to 2:00 AM	0	0	No	No	No	No	No	No	No	No
2:00 AM to 3:00 AM	0	0	No	No	No	No	No	No	No	No
3:00 AM to 4:00 AM	0	0	No	No	No	No	No	No	No	No
4:00 AM to 5:00 AM	0	0	No	No	No	No	No	No	No	No
5:00 AM to 6:00 AM	332	6	No	No	No	No	No	No	No	No
6:00 AM to 7:00 AM	1794	57	Yes	No	Yes	No	Yes	No	Yes	No
7:00 AM to 8:00 AM	1742	61	Yes	No	Yes	No	Yes	No	Yes	Yes
8:00 AM to 9:00 AM	1490	81	Yes	No	Yes	Yes	Yes	No	Yes	Yes
9:00 AM to 10:00 AM	1144	75	Yes	No	Yes	No	Yes	No	Yes	Yes
10:00 AM to 11:00 AM	1007	81	Yes	No	Yes	Yes	Yes	No	Yes	Yes
11:00 AM to 12:00 PM	1181	80	Yes	No	Yes	Yes	Yes	No	Yes	Yes
12:00 PM to 1:00 PM	1124	120	Yes	No	Yes	Yes	Yes	No	Yes	Yes
1:00 PM to 2:00 PM	1021	119	Yes	No	Yes	Yes	Yes	No	Yes	Yes
2:00 PM to 3:00 PM	1008	116	Yes	No	Yes	Yes	Yes	No	Yes	Yes
3:00 PM to 4:00 PM	991	147	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
4:00 PM to 5:00 PM	959	159	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5:00 PM to 6:00 PM	670	140	Yes	No	No	Yes	Yes	Yes	No	Yes
6:00 PM to 7:00 PM	0	0	No	No	No	No	No	No	No	No
7:00 PM to 8:00 PM	0	0	No	No	No	No	No	No	No	No
8:00 PM to 9:00 PM	0	0	No	No	No	No	No	No	No	No
9:00 PM to 10:00 PM	0	0	No	No	No	No	No	No	No	No
10:00 PM to 11:00 PM	0	0	No	No	No	No	No	No	No	No
11:00 PM to 12:00 AM	0	0	No	No	No	No	No	No	No	No
Total Hours Condition is Met			1		8		2			
Meets Warrant?			No - Warrant is Not Met		Yes - Warrant is Met		No - Warrant is Not Met			

**Warrant 2 - Four-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

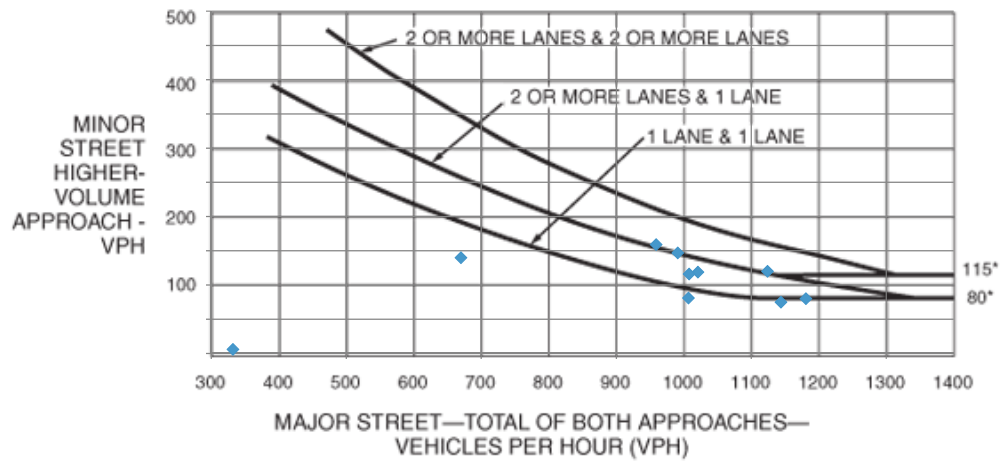


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2018
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Existing

Time Of Day	Windy Hill Rd SE	Windy Hill Rd SE	Warrant 2 Four-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph)	Westbound Left Volume (vph)	
	Opposite Approach	Left Turn	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	332	6	No
6:00 AM to 7:00 AM	1794	57	No
7:00 AM to 8:00 AM	1742	61	No
8:00 AM to 9:00 AM	1490	81	Yes
9:00 AM to 10:00 AM	1144	75	No
10:00 AM to 11:00 AM	1007	81	No
11:00 AM to 12:00 PM	1181	80	No
12:00 PM to 1:00 PM	1124	120	Yes
1:00 PM to 2:00 PM	1021	119	No
2:00 PM to 3:00 PM	1008	116	No
3:00 PM to 4:00 PM	991	147	Yes
4:00 PM to 5:00 PM	959	159	Yes
5:00 PM to 6:00 PM	670	140	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			4
<b>Meets Warrant?</b>			<b>Yes - Warrant is Met</b>

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Peak-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

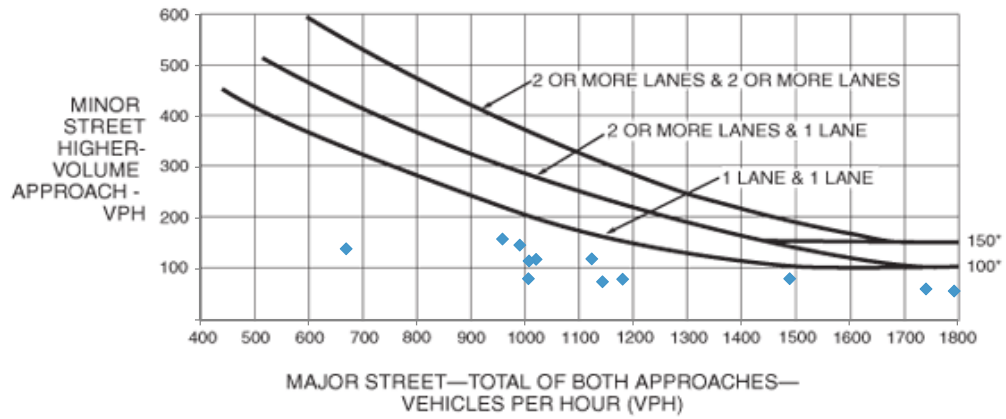


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2018
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Existing

Time Of Day	Windy Hill Rd SE	Windy Hill Rd SE	Warrant 3 Peak-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph)	Westbound Left Volume (vph)	
	Opposite Approach	Left Turn	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	332	6	No
6:00 AM to 7:00 AM	1794	57	No
7:00 AM to 8:00 AM	1742	61	No
8:00 AM to 9:00 AM	1490	81	No
9:00 AM to 10:00 AM	1144	75	No
10:00 AM to 11:00 AM	1007	81	No
11:00 AM to 12:00 PM	1181	80	No
12:00 PM to 1:00 PM	1124	120	No
1:00 PM to 2:00 PM	1021	119	No
2:00 PM to 3:00 PM	1008	116	No
3:00 PM to 4:00 PM	991	147	No
4:00 PM to 5:00 PM	959	159	No
5:00 PM to 6:00 PM	670	140	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Eight-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)



<b>Name</b> Number of Lanes by Approach	<b>Major Road</b>	<b>Minor Road</b>
	Windy Hill Rd SE 2	Roswell St SE 1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 1.50%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Background

<b>Time Of Day</b>	<b>Warrant 1, Combination A&amp;B</b>											
	<b>Windy Hill Rd SE</b>		<b>Roswell St SE</b>		<b>Warrant 1, Condition A</b>		<b>Warrant 1, Condition B</b>		<b>Condition A</b>		<b>Condition B</b>	
	Major Road Volume (vph)	Minor Road Volume (vph)	Major Road Condition Met?	Minor Road Condition Met?	Major Road Condition Met?	Minor Road Condition Met?	Major Road Condition Met?	Minor Road Condition Met?	Major Road Condition Met?	Minor Road Condition Met?	Major Road Condition Met?	Minor Road Condition Met?
	Both Approaches	Highest Approach	> 600 vph	> 150 vph	> 900 vph	> 75 vph	> 480 vph	> 120 vph	> 720 vph	> 60 vph		
12:00 AM to 1:00 AM	0	0	No	No	No	No	No	No	No	No	No	No
1:00 AM to 2:00 AM	0	0	No	No	No	No	No	No	No	No	No	No
2:00 AM to 3:00 AM	0	0	No	No	No	No	No	No	No	No	No	No
3:00 AM to 4:00 AM	0	0	No	No	No	No	No	No	No	No	No	No
4:00 AM to 5:00 AM	0	0	No	No	No	No	No	No	No	No	No	No
5:00 AM to 6:00 AM	0	0	No	No	No	No	No	No	No	No	No	No
6:00 AM to 7:00 AM	2424	8	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
7:00 AM to 8:00 AM	2692	2	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
8:00 AM to 9:00 AM	2441	13	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
9:00 AM to 10:00 AM	2016	8	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
10:00 AM to 11:00 AM	1922	8	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
11:00 AM to 12:00 PM	2222	11	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
12:00 PM to 1:00 PM	2422	12	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1:00 PM to 2:00 PM	2408	9	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
2:00 PM to 3:00 PM	2435	12	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
3:00 PM to 4:00 PM	2813	16	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
4:00 PM to 5:00 PM	3180	17	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
5:00 PM to 6:00 PM	3181	10	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
6:00 PM to 7:00 PM	0	0	No	No	No	No	No	No	No	No	No	No
7:00 PM to 8:00 PM	0	0	No	No	No	No	No	No	No	No	No	No
8:00 PM to 9:00 PM	0	0	No	No	No	No	No	No	No	No	No	No
9:00 PM to 10:00 PM	0	0	No	No	No	No	No	No	No	No	No	No
10:00 PM to 11:00 PM	0	0	No	No	No	No	No	No	No	No	No	No
11:00 PM to 12:00 AM	0	0	No	No	No	No	No	No	No	No	No	No
<b>Total Hours Condition is Met</b>			0		0		0					
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>		<b>No - Warrant is Not Met</b>		<b>No - Warrant is Not Met</b>					



**Warrant 2 - Four-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

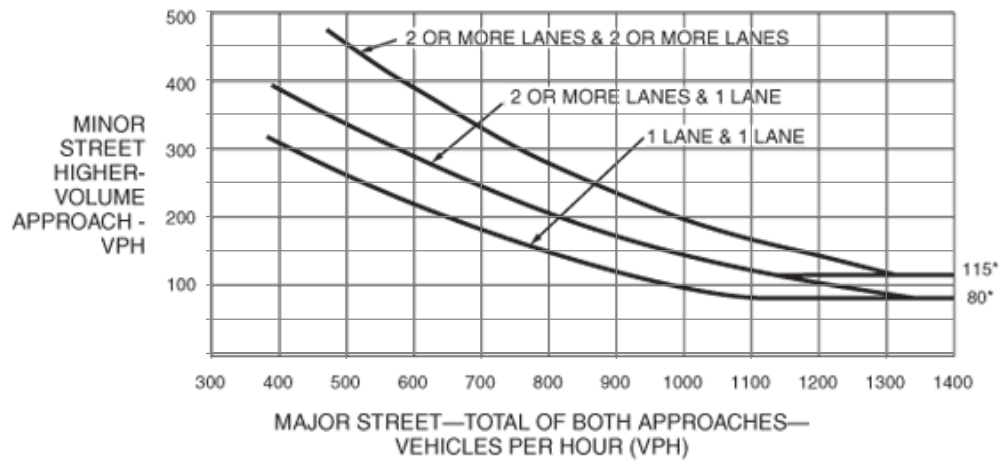


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 1.50%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Background

Time Of Day	Windy Hill Rd SE	Roswell St SE	<b>Warrant 2</b> <b>Four-Hour</b> Vehicular Volume Condition Met?
	Major Road Volume (vph)	Minor Road Volume (vph)	
	Both Approaches	Highest Approach	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	0	0	No
6:00 AM to 7:00 AM	2424	8	No
7:00 AM to 8:00 AM	2692	2	No
8:00 AM to 9:00 AM	2441	13	No
9:00 AM to 10:00 AM	2016	8	No
10:00 AM to 11:00 AM	1922	8	No
11:00 AM to 12:00 PM	2222	11	No
12:00 PM to 1:00 PM	2422	12	No
1:00 PM to 2:00 PM	2408	9	No
2:00 PM to 3:00 PM	2435	12	No
3:00 PM to 4:00 PM	2813	16	No
4:00 PM to 5:00 PM	3180	17	No
5:00 PM to 6:00 PM	3181	10	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>

**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Peak-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

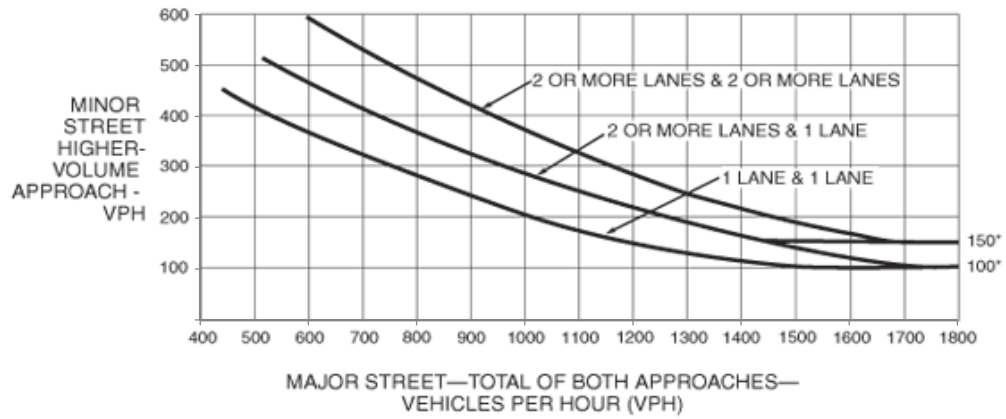


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 1.50%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Background

Time Of Day	Windy Hill Rd SE	Roswell St SE	Warrant 3 Peak-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph) Both Approaches	Minor Road Volume (vph) Highest Approach	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	0	0	No
6:00 AM to 7:00 AM	2424	8	No
7:00 AM to 8:00 AM	2692	2	No
8:00 AM to 9:00 AM	2441	13	No
9:00 AM to 10:00 AM	2016	8	No
10:00 AM to 11:00 AM	1922	8	No
11:00 AM to 12:00 PM	2222	11	No
12:00 PM to 1:00 PM	2422	12	No
1:00 PM to 2:00 PM	2408	9	No
2:00 PM to 3:00 PM	2435	12	No
3:00 PM to 4:00 PM	2813	16	No
4:00 PM to 5:00 PM	3180	17	No
5:00 PM to 6:00 PM	3181	10	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Eight-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)



<b>Name</b> Number of Lanes by Approach	<b>Major Road</b>	<b>Minor Road</b>
	Windy Hill Rd SE 2	Roswell St SE 1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 1.50%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Background

<b>Time Of Day</b>	<b>Windy Hill Rd SE</b>		<b>Warrant 1, Condition A</b>		<b>Warrant 1, Condition B</b>		<b>Warrant 1, Combination A&amp;B</b>			
	<b>Major Road Volume (vph)</b>	<b>Westbound Left Volume (vph)</b>	<b>Major Road Condition Met?</b>	<b>Westbound Left Condition Met?</b>	<b>Major Road Condition Met?</b>	<b>Westbound Left Condition Met?</b>	<b>Condition A</b>		<b>Condition B</b>	
	<b>Opposite Approach</b>	<b>Left Turn</b>	<b>&gt; 600 vph</b>	<b>&gt; 150 vph</b>	<b>&gt; 900 vph</b>	<b>&gt; 75 vph</b>	<b>Major Road Condition Met?</b>	<b>Westbound Left Condition Met?</b>	<b>Major Road Condition Met?</b>	<b>Westbound Left Condition Met?</b>
12:00 AM to 1:00 AM	0	0	No	No	No	No	No	No	No	No
1:00 AM to 2:00 AM	0	0	No	No	No	No	No	No	No	No
2:00 AM to 3:00 AM	0	0	No	No	No	No	No	No	No	No
3:00 AM to 4:00 AM	0	0	No	No	No	No	No	No	No	No
4:00 AM to 5:00 AM	0	0	No	No	No	No	No	No	No	No
5:00 AM to 6:00 AM	352	6	No	No	No	No	No	No	No	No
6:00 AM to 7:00 AM	1903	61	Yes	No	Yes	No	Yes	No	Yes	Yes
7:00 AM to 8:00 AM	1847	64	Yes	No	Yes	No	Yes	No	Yes	Yes
8:00 AM to 9:00 AM	1580	86	Yes	No	Yes	Yes	Yes	No	Yes	Yes
9:00 AM to 10:00 AM	1213	80	Yes	No	Yes	Yes	Yes	No	Yes	Yes
10:00 AM to 11:00 AM	1066	86	Yes	No	Yes	Yes	Yes	No	Yes	Yes
11:00 AM to 12:00 PM	1252	84	Yes	No	Yes	Yes	Yes	No	Yes	Yes
12:00 PM to 1:00 PM	1192	127	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
1:00 PM to 2:00 PM	1081	127	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
2:00 PM to 3:00 PM	1070	123	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
3:00 PM to 4:00 PM	1051	156	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4:00 PM to 5:00 PM	1016	168	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5:00 PM to 6:00 PM	712	149	Yes	No	No	Yes	Yes	Yes	No	Yes
6:00 PM to 7:00 PM	0	0	No	No	No	No	No	No	No	No
7:00 PM to 8:00 PM	0	0	No	No	No	No	No	No	No	No
8:00 PM to 9:00 PM	0	0	No	No	No	No	No	No	No	No
9:00 PM to 10:00 PM	0	0	No	No	No	No	No	No	No	No
10:00 PM to 11:00 PM	0	0	No	No	No	No	No	No	No	No
11:00 PM to 12:00 AM	0	0	No	No	No	No	No	No	No	No
<b>Total Hours Condition is Met</b>			2		9		5			
<b>Meets Warrant?</b>			No - Warrant is Not Met		Yes - Warrant is Met		No - Warrant is Not Met			

**Warrant 2 - Four-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

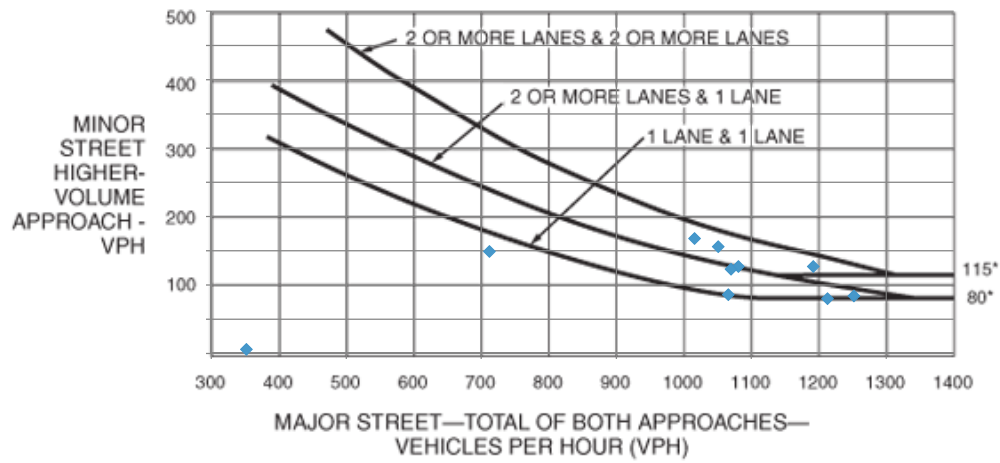


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 1.50%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Background

Time Of Day	Windy Hill Rd SE	Windy Hill Rd SE	Warrant 2 Four-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph)	Westbound Left Volume (vph)	
	Opposite Approach	Left Turn	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	352	6	No
6:00 AM to 7:00 AM	1903	61	No
7:00 AM to 8:00 AM	1847	64	No
8:00 AM to 9:00 AM	1580	86	Yes
9:00 AM to 10:00 AM	1213	80	No
10:00 AM to 11:00 AM	1066	86	No
11:00 AM to 12:00 PM	1252	84	No
12:00 PM to 1:00 PM	1192	127	Yes
1:00 PM to 2:00 PM	1081	127	Yes
2:00 PM to 3:00 PM	1070	123	No
3:00 PM to 4:00 PM	1051	156	Yes
4:00 PM to 5:00 PM	1016	168	Yes
5:00 PM to 6:00 PM	712	149	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			5
<b>Meets Warrant?</b>			<b>Yes - Warrant is Met</b>

**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Peak-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)



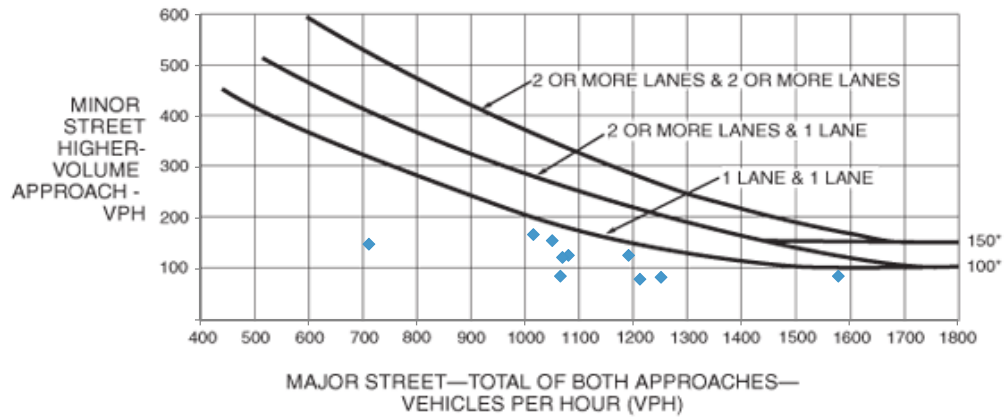
	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2018
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 1.50%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Background

Time Of Day	Windy Hill Rd SE	Windy Hill Rd SE	Warrant 3 Peak-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph) Opposite Approach	Westbound Left Volume (vph) Left Turn	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	352	6	No
6:00 AM to 7:00 AM	1903	61	No
7:00 AM to 8:00 AM	1847	64	No
8:00 AM to 9:00 AM	1580	86	No
9:00 AM to 10:00 AM	1213	80	No
10:00 AM to 11:00 AM	1066	86	No
11:00 AM to 12:00 PM	1252	84	No
12:00 PM to 1:00 PM	1192	127	No
1:00 PM to 2:00 PM	1081	127	No
2:00 PM to 3:00 PM	1070	123	No
3:00 PM to 4:00 PM	1051	156	No
4:00 PM to 5:00 PM	1016	168	No
5:00 PM to 6:00 PM	712	149	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>



Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Eight-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)



<b>Name</b> Number of Lanes by Approach	<b>Major Road</b>	<b>Minor Road</b>
	Windy Hill Rd SE 2	Roswell St SE 1

<b>% of Volume</b>	100%	<b>Data Year</b> 2022
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Build

Time Of Day	Windy Hill Rd SE		Roswell St SE		Warrant 1, Condition A		Warrant 1, Condition B		Warrant 1, Combination A&B			
	Major Road Volume (vph)		Minor Road Volume (vph)		Major Road Condition Met?		Minor Road Condition Met?		Condition A		Condition B	
	Both Approaches	Highest Approach	> 600 vph	> 150 vph	> 900 vph	> 75 vph	> 480 vph	> 120 vph	> 720 vph	> 60 vph		
12:00 AM to 1:00 AM	0	0	No	No	No	No	No	No	No	No		
1:00 AM to 2:00 AM	0	0	No	No	No	No	No	No	No	No		
2:00 AM to 3:00 AM	0	0	No	No	No	No	No	No	No	No		
3:00 AM to 4:00 AM	0	0	No	No	No	No	No	No	No	No		
4:00 AM to 5:00 AM	0	0	No	No	No	No	No	No	No	No		
5:00 AM to 6:00 AM	0	0	No	No	No	No	No	No	No	No		
6:00 AM to 7:00 AM	2428	8	Yes	No	Yes	No	Yes	No	Yes	No		
7:00 AM to 8:00 AM	2696	6	Yes	No	Yes	No	Yes	No	Yes	No		
8:00 AM to 9:00 AM	2445	13	Yes	No	Yes	No	Yes	No	Yes	No		
9:00 AM to 10:00 AM	2020	8	Yes	No	Yes	No	Yes	No	Yes	No		
10:00 AM to 11:00 AM	1926	8	Yes	No	Yes	No	Yes	No	Yes	No		
11:00 AM to 12:00 PM	2230	11	Yes	No	Yes	No	Yes	No	Yes	No		
12:00 PM to 1:00 PM	2434	12	Yes	No	Yes	No	Yes	No	Yes	No		
1:00 PM to 2:00 PM	2416	9	Yes	No	Yes	No	Yes	No	Yes	No		
2:00 PM to 3:00 PM	2447	12	Yes	No	Yes	No	Yes	No	Yes	No		
3:00 PM to 4:00 PM	2829	16	Yes	No	Yes	No	Yes	No	Yes	No		
4:00 PM to 5:00 PM	3200	17	Yes	No	Yes	No	Yes	No	Yes	No		
5:00 PM to 6:00 PM	3205	10	Yes	No	Yes	No	Yes	No	Yes	No		
6:00 PM to 7:00 PM	0	0	No	No	No	No	No	No	No	No		
7:00 PM to 8:00 PM	0	0	No	No	No	No	No	No	No	No		
8:00 PM to 9:00 PM	0	0	No	No	No	No	No	No	No	No		
9:00 PM to 10:00 PM	0	0	No	No	No	No	No	No	No	No		
10:00 PM to 11:00 PM	0	0	No	No	No	No	No	No	No	No		
11:00 PM to 12:00 AM	0	0	No	No	No	No	No	No	No	No		
Total Hours Condition is Met			0		0		0					
Meets Warrant?			No - Warrant is Not Met		No - Warrant is Not Met		No - Warrant is Not Met					

**Warrant 2 - Four-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

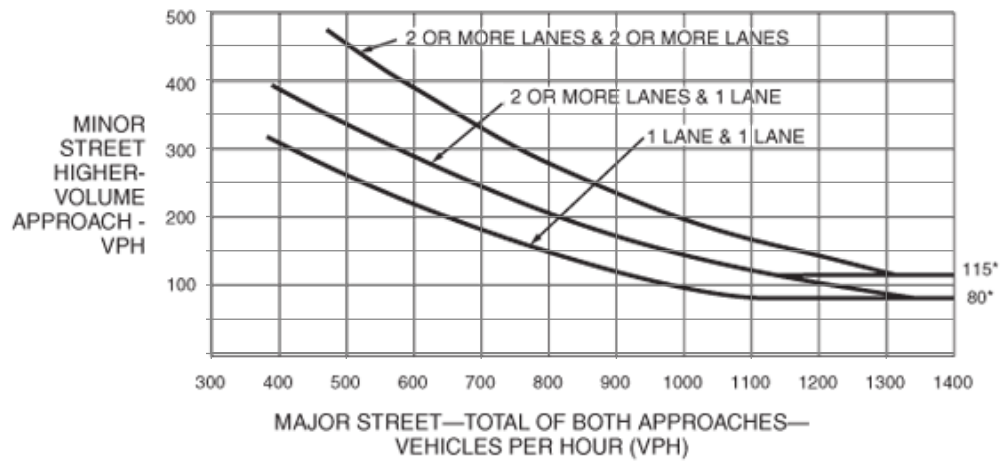


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2022
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Build

Time Of Day	Windy Hill Rd SE	Roswell St SE	Warrant 2 Four-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph)	Minor Road Volume (vph)	
	Both Approaches	Highest Approach	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	0	0	No
6:00 AM to 7:00 AM	2428	8	No
7:00 AM to 8:00 AM	2696	6	No
8:00 AM to 9:00 AM	2445	13	No
9:00 AM to 10:00 AM	2020	8	No
10:00 AM to 11:00 AM	1926	8	No
11:00 AM to 12:00 PM	2230	11	No
12:00 PM to 1:00 PM	2434	12	No
1:00 PM to 2:00 PM	2416	9	No
2:00 PM to 3:00 PM	2447	12	No
3:00 PM to 4:00 PM	2829	16	No
4:00 PM to 5:00 PM	3200	17	No
5:00 PM to 6:00 PM	3205	10	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Peak-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

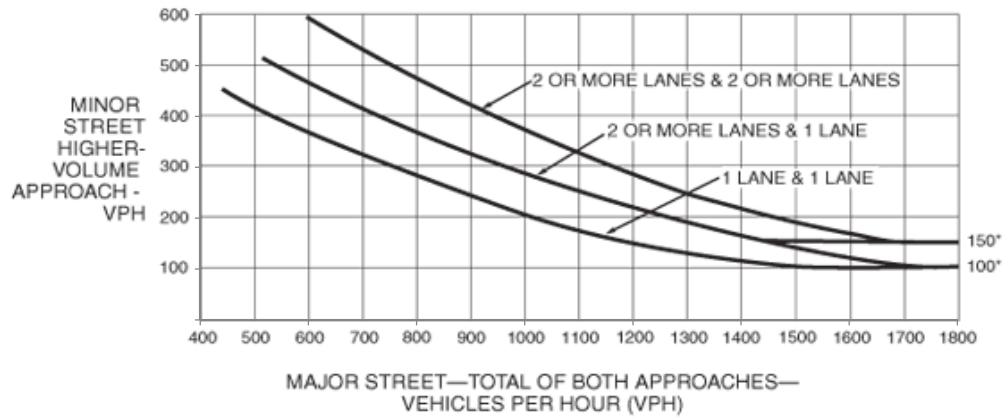


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2022
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	0	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	No	<b>Scenario</b> Build

Time Of Day	Windy Hill Rd SE	Roswell St SE	Warrant 3 Peak-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph) Both Approaches	Minor Road Volume (vph) Highest Approach	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	0	0	No
6:00 AM to 7:00 AM	2428	8	No
7:00 AM to 8:00 AM	2696	6	No
8:00 AM to 9:00 AM	2445	13	No
9:00 AM to 10:00 AM	2020	8	No
10:00 AM to 11:00 AM	1926	8	No
11:00 AM to 12:00 PM	2230	11	No
12:00 PM to 1:00 PM	2434	12	No
1:00 PM to 2:00 PM	2416	9	No
2:00 PM to 3:00 PM	2447	12	No
3:00 PM to 4:00 PM	2829	16	No
4:00 PM to 5:00 PM	3200	17	No
5:00 PM to 6:00 PM	3205	10	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Eight-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)



<b>Name</b> Number of Lanes by Approach	<b>Major Road</b>	<b>Minor Road</b>
	Windy Hill Rd SE 2	Roswell St SE 1

<b>% of Volume</b>	100%	<b>Data Year</b> 2022
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Build

<b>Time Of Day</b>	<b>Windy Hill Rd SE</b>		<b>Warrant 1, Condition A</b>		<b>Warrant 1, Condition B</b>		<b>Warrant 1, Combination A&amp;B</b>			
	<b>Major Road Volume (vph)</b>	<b>Westbound Left Volume (vph)</b>	<b>Major Road Condition Met?</b>	<b>Westbound Left Condition Met?</b>	<b>Major Road Condition Met?</b>	<b>Westbound Left Condition Met?</b>	<b>Condition A</b>		<b>Condition B</b>	
	<b>Opposite Approach</b>	<b>Left Turn</b>	<b>&gt; 600 vph</b>	<b>&gt; 150 vph</b>	<b>&gt; 900 vph</b>	<b>&gt; 75 vph</b>	<b>Major Road Condition Met?</b>	<b>Westbound Left Condition Met?</b>	<b>Major Road Condition Met?</b>	<b>Westbound Left Condition Met?</b>
12:00 AM to 1:00 AM	0	0	No	No	No	No	No	No	No	No
1:00 AM to 2:00 AM	0	0	No	No	No	No	No	No	No	No
2:00 AM to 3:00 AM	0	0	No	No	No	No	No	No	No	No
3:00 AM to 4:00 AM	0	0	No	No	No	No	No	No	No	No
4:00 AM to 5:00 AM	0	0	No	No	No	No	No	No	No	No
5:00 AM to 6:00 AM	352	7	No	No	No	No	No	No	No	No
6:00 AM to 7:00 AM	1903	65	Yes	No	Yes	No	Yes	No	Yes	Yes
7:00 AM to 8:00 AM	1847	68	Yes	No	Yes	No	Yes	No	Yes	Yes
8:00 AM to 9:00 AM	1580	90	Yes	No	Yes	Yes	Yes	No	Yes	Yes
9:00 AM to 10:00 AM	1213	84	Yes	No	Yes	Yes	Yes	No	Yes	Yes
10:00 AM to 11:00 AM	1066	91	Yes	No	Yes	Yes	Yes	No	Yes	Yes
11:00 AM to 12:00 PM	1252	93	Yes	No	Yes	Yes	Yes	No	Yes	Yes
12:00 PM to 1:00 PM	1192	138	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
1:00 PM to 2:00 PM	1081	136	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
2:00 PM to 3:00 PM	1070	136	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
3:00 PM to 4:00 PM	1051	173	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4:00 PM to 5:00 PM	1017	188	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5:00 PM to 6:00 PM	715	164	Yes	Yes	No	Yes	Yes	Yes	No	Yes
6:00 PM to 7:00 PM	0	0	No	No	No	No	No	No	No	No
7:00 PM to 8:00 PM	0	0	No	No	No	No	No	No	No	No
8:00 PM to 9:00 PM	0	0	No	No	No	No	No	No	No	No
9:00 PM to 10:00 PM	0	0	No	No	No	No	No	No	No	No
10:00 PM to 11:00 PM	0	0	No	No	No	No	No	No	No	No
11:00 PM to 12:00 AM	0	0	No	No	No	No	No	No	No	No
<b>Total Hours Condition is Met</b>			3		9		5			
<b>Meets Warrant?</b>			No - Warrant is Not Met		Yes - Warrant is Met		No - Warrant is Not Met			

**Warrant 2 - Four-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)



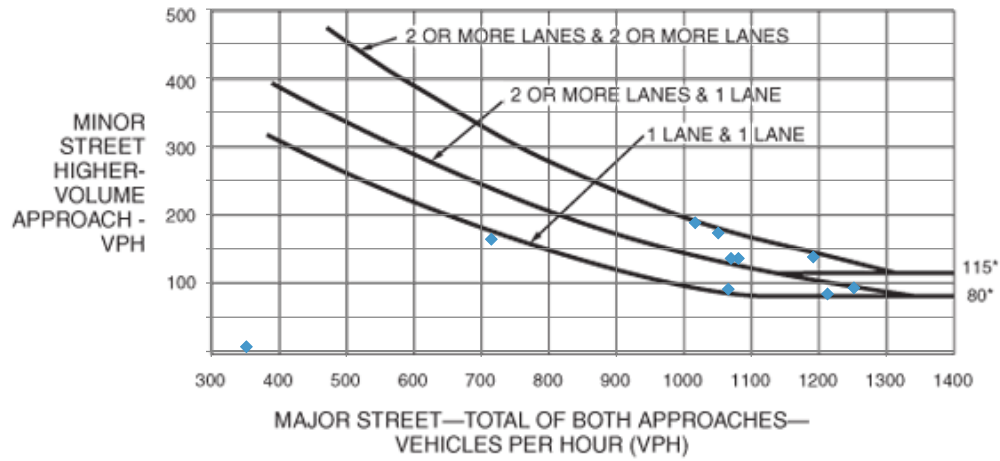
	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2022
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Build

Time Of Day	Windy Hill Rd SE	Windy Hill Rd SE	Warrant 2 Four-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph)	Westbound Left Volume (vph)	
	Opposite Approach	Left Turn	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	352	7	No
6:00 AM to 7:00 AM	1903	65	No
7:00 AM to 8:00 AM	1847	68	No
8:00 AM to 9:00 AM	1580	90	Yes
9:00 AM to 10:00 AM	1213	84	No
10:00 AM to 11:00 AM	1066	91	No
11:00 AM to 12:00 PM	1252	93	Yes
12:00 PM to 1:00 PM	1192	138	Yes
1:00 PM to 2:00 PM	1081	136	Yes
2:00 PM to 3:00 PM	1070	136	Yes
3:00 PM to 4:00 PM	1051	173	Yes
4:00 PM to 5:00 PM	1017	188	Yes
5:00 PM to 6:00 PM	715	164	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			7
<b>Meets Warrant?</b>			<b>Yes - Warrant is Met</b>



**Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume**



\*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

**Warrant 1 - Peak-Hour Vehicular Volume**

Based on Section 4C.02 of the Manual on Uniform Traffic Control Devices, 2009 Edition (rev. 2)

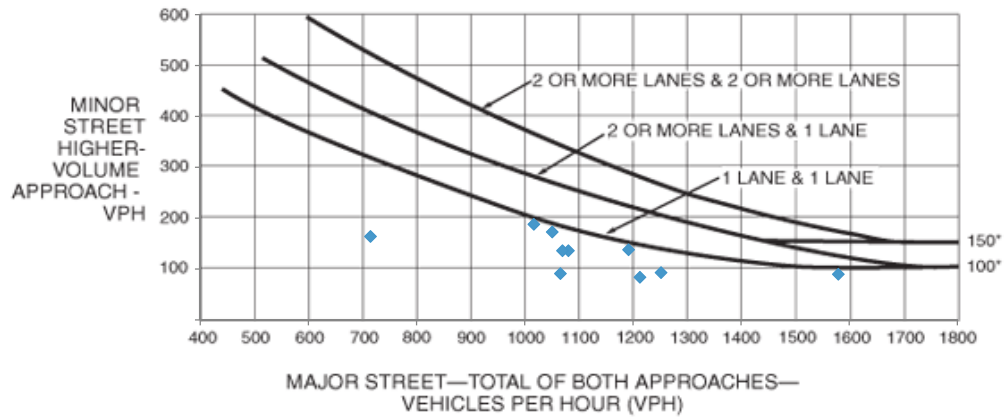


	Major Road	Minor Road
<b>Name</b>	Windy Hill Rd SE	Roswell St SE
<b>Number of Lanes by Approach</b>	2	1

<b>% of Volume</b>	100%	<b>Data Year</b> 2022
<b>Right Turn Reduction?</b>	Yes	<b>Future Year</b> 2022
<b>15 Min Interval Start</b>	15	<b>Growth Rate</b> 0.00%
<b>Mainline Left as Minor?</b>	Westbound	<b>Scenario</b> Build

Time Of Day	Windy Hill Rd SE	Windy Hill Rd SE	Warrant 3 Peak-Hour Vehicular Volume Condition Met?
	Major Road Volume (vph) Opposite Approach	Westbound Left Volume (vph) Left Turn	
12:00 AM to 1:00 AM	0	0	No
1:00 AM to 2:00 AM	0	0	No
2:00 AM to 3:00 AM	0	0	No
3:00 AM to 4:00 AM	0	0	No
4:00 AM to 5:00 AM	0	0	No
5:00 AM to 6:00 AM	352	7	No
6:00 AM to 7:00 AM	1903	65	No
7:00 AM to 8:00 AM	1847	68	No
8:00 AM to 9:00 AM	1580	90	No
9:00 AM to 10:00 AM	1213	84	No
10:00 AM to 11:00 AM	1066	91	No
11:00 AM to 12:00 PM	1252	93	No
12:00 PM to 1:00 PM	1192	138	No
1:00 PM to 2:00 PM	1081	136	No
2:00 PM to 3:00 PM	1070	136	No
3:00 PM to 4:00 PM	1051	173	No
4:00 PM to 5:00 PM	1017	188	No
5:00 PM to 6:00 PM	715	164	No
6:00 PM to 7:00 PM	0	0	No
7:00 PM to 8:00 PM	0	0	No
8:00 PM to 9:00 PM	0	0	No
9:00 PM to 10:00 PM	0	0	No
10:00 PM to 11:00 PM	0	0	No
11:00 PM to 12:00 AM	0	0	No
Total Hours Condition is Met			0
<b>Meets Warrant?</b>			<b>No - Warrant is Not Met</b>

Figure 4C-3. Warrant 3, Peak Hour



\*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.