

N&N Associates, Inc.

Compassion Center

703 Kingstown Road (Route 108)
South Kingstown, Rhode Island

Traffic Impact Analysis



Proposed Compassion Center Site

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1.0 Introduction

1.1 Purpose of Study

This traffic study was prepared at the request of N&N Associates, Inc. in connection with its study of a proposed compassion center to be located on Kingstown Road in South Kingstown, Rhode Island. For the benefit of the boards and citizens of South Kingstown, the traffic impacts of the proposed development have been evaluated. The study analyzes traffic use attributable to the proposed development of the site and discusses transportation impacts in the vicinity of the site.

1.2 Description of Project

The project site is located on Assessor's Plat 57-1, Lot 92 on Kingstown Road (Route 108) in South Kingstown, Rhode Island, as shown in Figure No. 1. The existing building at 703 Kingstown Road will be converted to a compassion center. The proposed compassion center will service an estimated 3,173 patients, with approximately 380 patients a day. Access to the proposed development will be provided through two existing driveways on Kingstown Road. The expected hours of operation are from 10 A.M. to 8 P.M.



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2.0 Existing Conditions

2.1 Study Area

The proposed development will primarily use Kingstown Road (Route 108) for access to and from the site. Traffic volumes are heavy on Kingstown Road, which is classified as an Urban Principal Arterial, as presented in Technical Paper 165, Rhode Island Statewide Planning Program, Department of Administration, 2014. Technical Paper 165 provides the functional classification of all public roadways within the State of Rhode Island. An arterial highway emphasizes a high level of mobility for through traffic and access to local roadways. Land use in the vicinity of the site is mixed residential and commercial.

Kingstown Road at the existing northern driveway is a three-lane, two-way bituminous roadway approximately 44 feet in width, with 10 to 19.5-foot travel lanes and one to three-foot shoulders. There is concrete curb and sidewalk on both sides of the roadway. There are utility poles on the west side of the roadway. The speed limit is posted at 25 miles per hour (mph). The curb cut opening at the existing driveway on Kingstown Road is approximately 42.5 feet in width. The two adjacent businesses share the curb cut opening with the 703 Kingstown Road property. The driveway opening for 703 Kingstown Road is a two-way unmarked bituminous driveway with bituminous concrete curb on both sides of the roadway.

Kingstown Road at the existing southern driveway is a four-lane, two-way bituminous roadway approximately 43 feet in width, with 10 to 10.5-foot travel lanes and one-foot shoulders. There is concrete curb and sidewalk on both sides of the roadway. There are utility poles on the west side of the roadway. The curb cut opening at the existing driveway on Kingstown Road is approximately 41 feet in width and narrows to approximately 25.5 feet with concrete curb/bituminous concrete curb on both sides of the two-way bituminous driveway.

The intersection of Kingstown Road (Route 108 and 1A/108), Main Street (Route 1A), and Old Tower Hill Road, south of the proposed site, is a four-way, signalized intersection. There are crosswalks across all of the approaches. Kingstown Road at its intersection with Main Street and Old Tower Hill Road is a five-lane, two-way bituminous roadway approximately 61.5 feet in width, with four 11.5 to 12-foot travel lanes, a 12-foot left turn lane, and one-foot shoulders. There is concrete curb and sidewalk on both sides of the roadway. To the north, there are utility poles on the west side of the roadway. To the south, there are utility poles on the east side of the roadway. The speed limit is posted at 25 mph. Main Street at its intersection with Kingstown Road and Old Tower Hill Road is a four-lane, two-way bituminous roadway approximately 47.5 feet in width, with two eastbound 11-foot travel lanes, a 13-foot westbound travel lane, a staggered eastbound 10.5-foot left turn lane, and one-foot shoulders. There is concrete curb and sidewalk on both sides of the roadway. There are utility poles on the south side of the roadway. The speed limit is posted at 25 mph. Old Tower Hill Road at its intersection with Kingstown Road and Main Street is a five-lane, two-way bituminous roadway approximately 57 feet in width, with a 12-foot westbound travel lane, two eastbound 10.5 to 11-foot

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travel lanes, a westbound 10.5-foot left turn lane, a westbound 11-foot right turn lane, and one-foot shoulders. There is concrete curb and sidewalk on both sides of the roadway. There are utility poles on the south side of the roadway. The speed limit is posted at 25 mph.

2.2 Data Collection

Due to the on-going pandemic and the resulting executive orders from the Governor that impact traffic volumes, it is not possible to collect accurate traffic volumes at this time. Previous traffic volume data was requested and received from the South Kingstown Planning Department and the Rhode Island Department of Transportation. Turning traffic movement counts and traffic volumes in the vicinity of the proposed site driveways were estimated using counts collected at the intersection of Kingstown Road, Main Street, and Old Tower Hill Road between the hours of 6:00 A.M. and 10:00 P.M. on Tuesday, January 29, 2013. The traffic count data is shown in Appendix A.

The calculated P.M. peak hour for the intersection of Kingstown Road, Main Street, and Old Tower Hill Road and Kingstown Road is 3:45-4:45. Since the compassion center is not anticipated to be open until 10 A.M., the A.M. peak hour was not reviewed.

Pertinent field observations including existing stopping sight distance, location of existing utilities, posted speed limits, traffic control devices, etc. were made on Wednesday, April 29, 2020. Crash data (Appendix D) for the period January 1, 2017, through April 28, 2020, was obtained from the South Kingstown Police Department.

3.0 Traffic Forecasts

3.1 Traffic Volumes

Traffic volumes for the study area were provided by RIDOT from a previous analysis done in 2013.

The 16-hour two-way traffic volume (from the turning traffic movement counts at the intersection of Kingstown Road, Main Street, and Old Tower Hill Road) on Kingstown Road in the vicinity of the proposed site is approximately 17,000 vehicles between 6:00 A.M. and 10:00 P.M.

The calculated P.M. peak hour for the intersection of Kingstown Road, Main Street, and Old Tower Hill Road, as indicated in Section 2.2, occurred between 3:45 and 4:45, with 2013 two-way traffic volumes of 1490 vehicles during the peak hour on Kingstown Road, 929 vehicles on Main Street, and 1566 vehicles on Old Tower Hill Road.

3.2 Area Traffic Growth Rate

The counts for the intersection of Kingstown Road, Main Street, and Old Tower Hill Road from RIDOT were expanded from 2013 to 2020. Kingstown Road is classified as an urban principal arterial. Main Street and Old Tower Hill Road are classified as urban minor arterials. The Rhode Island Statewide Planning Program published the [Rhode Island Statewide Model Update](#) (Technical Paper #166) in

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July 2016, which presents the estimated total traffic growth for each county and roadway functional class. The Technical Paper #166 provides Washington County Total Growth from 2010 to 2015 of 1.01269 and from 2015 to 2020 of 1.03560 for urban principal arterials. Washington County Total Growth from 2010 to 2015 is 1.00121 and Total Growth from 2015 to 2020 is 1.02814 for urban minor arterials. This translates to 0.25% of growth per year for urban principal arterials and 0.02% of growth per year for urban minor arterials from 2010 to 2015 and 0.70% of growth per year for urban principal arterials and 0.56% of growth per year for urban minor arterials from 2015 and 2020. These annual growth rates were utilized for expanding the existing traffic counts, accordingly. The traffic anticipated to be generated by the development was added to the expanded traffic volumes for use in determining levels of service (LOS). It should be noted that comparison of other traffic data in the area that was reviewed indicates that the growth rates used are conservative.

3.3 Vehicle Trip Generation

To evaluate the traffic impacts of the proposed project, it is necessary to determine the amount of traffic expected to be generated by the proposed improvements. The trip generation calculations are typically based on data compiled in Trip Generation (10th edition), an informational report published by the Institute of Transportation Engineers (ITE). Trip Generation is a tool for planners, transportation professionals, zoning boards, and others who are interested in estimating the number of vehicle trips generated by a proposed development or land use. This document is based on thousands of trip generation studies submitted to the Institute by public agencies, developers, consulting firms, and associations. However, the trip generation was determined using information based on the expected usage of the Compassion Center to determine the expected peak traffic during the peak hour.

As stated in Section 1.2, the proposed compassion center will provide services to an estimated 3,173 patients, with approximately 380 patients a day. Since the Compassion Center is not anticipated to be open in the early morning the trip generation has not been calculated for the A.M. peak hour. The majority of the patients, approximately 50%, are anticipated to arrive in the afternoon between 3:00 P.M. and 6 P.M. To be conservative it was assumed that half of these afternoon trips will occur in the peak hour. It is likely that the trip generation during the P.M. peak hour will be much less. Table No. 1 contains the anticipated proposed compassion center traffic volumes for the P.M. peak hour.

Table No. 1
Trip Generation Summary
Total New Trips

Time Period	Direction	Compassion Center
P.M. Peak Hour	Enter	95
	Exit	95

The distribution of the anticipated new vehicle trips by direction was based upon the existing trip patterns observed in the traffic count data and the expected usage of the roadways for the development. These trips were added to the no-build volumes for analysis of the build conditions. The

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trip generation calculations and the distribution of the traffic anticipated to be generated by the developments are shown in Appendix B.

Due to the inability to currently collect accurate traffic counts, the traffic volumes at the existing northern driveway were estimated using ITE Trip Generation Land Use Code 817, Nursery (Garden Center), and Land Use Code 943, Automobile Parts and Service Center, which sets forth trips generated at facilities similar to Clarks Farms and the Midas store, respectively, that share the northern driveway. The distribution of these estimated existing vehicle trips from the adjacent business using the shared driveway was based upon the existing trip patterns observed in the traffic count data. These trips were incorporated into the no-build volumes used in the analysis.

4.0 Capacity Analysis

4.1 General

Capacity analyses in this report focus on the peak hour of traffic volume because it represents the most critical period for operations and has the highest capacity requirements. If traffic operates at acceptable levels of service during the peak hour, then it will operate at acceptable levels during the remaining hours of the day.

4.2 Intersections

The intersection capacity analysis was prepared using the Highway Capacity Manual (HCM), 2016 edition, published by the Transportation Research Board. HCM is the most commonly used reference for evaluating traffic operations. The analysis utilizes the concept of Level of Service. The term “level of service” is defined as a qualitative measure describing operational conditions within a traffic stream based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. There are six levels of service utilized for the analysis. They are given letter designations from A to F, with Level of Service A representing the most favorable operating conditions and Level of Service F the least. Level of Service F is assigned to the movement if the volume-to-capacity ratio for the movement exceeds 1.0, regardless of the control delay. The level of service criteria for unsignalized and signalized intersections is shown in Table No. 2.

The computer software, Synchro 10, was utilized to perform the capacity analysis for the study area.

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Table No. 2
Level of Service Criteria for Unsignalized Intersections
 Source: Highway Capacity Manual, 2016

Level Of Service	Average Total Delay (Second/Vehicle)	
	Unsignalized Intersection	Signalized Intersection
A	≤10	≤10
B	>10 and ≤15	>10 and ≤20
C	>15 and ≤25	>20 and ≤35
D	>25 and ≤35	>35 and ≤55
E	>35 and ≤50	>55 and ≤80
F	>50	>80

The capacity analysis was only performed for the P.M. peak because as previously stated in Section 3.3 the Compassion Center is not anticipated to be open during the A.M. peak hour.

Unsignalized intersection capacity analysis for the intersections of Kingstown Road and the northern driveway and Kingstown Road and the southern driveway was undertaken using the P.M. peak hour traffic volumes under no build and build conditions. The computations are included in Appendix C. A summary of the level of service for these intersections is shown in Table No. 3 during the P.M. peak hour.

Table No. 3
P.M. Peak Hour - Level of Service Summary
Unsignalized Intersections

Intersection/ Critical Movement	Level of Service (Delay-Second/Vehicle)	
	No-Build	Build
Kingstown Road/North Driveway		
Southbound Approach	A (0.7)	A (1.6)
Westbound Approach	C (18.1)	C (21.0)
Kingstown Road/South Driveway		
Southbound Approach	N/A	A (0.3)
Westbound Approach	N/A	D (30.9)

The unsignalized intersection capacity analysis shows that there will be no change in level of service at the north driveway. The north and south driveways will operate at adequate levels of service during the P.M. peak hour under build conditions.

Signalized intersection capacity analysis for the intersection of Kingstown Road, Main Street, and Old Tower Hill Road was undertaken using the P.M. peak hour traffic volumes under no build and build conditions. A summary of the level of service for this intersection is shown in Table No. 4 during the P.M. peak hour.

Table No. 4
P.M. Peak Hour - Level of Service Summary
Signalized Intersection

Intersection/ Critical Movement	Level of Service (Delay-Second/Vehicle)	
	No-Build	Build
Kingstown Road/Main Street/Old Tower Hill Road		
Overall Intersection	D (49.2)	D (51.9)
Northbound Approach	E (73.0)	F (81.1)
Southbound Approach	D (43.9)	D (46.6)
Eastbound Approach	D (44.8)	D (44.7)
Westbound Approach	D (39.4)	D (39.4)

The signalized intersection capacity analysis shows that there will be no change in level of service during the P.M. peak hour at the intersection of Kingstown Road, Main Street, and Old Tower Hill Road with the exception of the northbound approach which will change from LOS E to LOS F, which is just over the threshold for LOS F. Based on our conservative assumptions of expanded traffic counts and anticipated trip generation, it is likely that the actual increase in delay will not result in a change in LOS.

5.0 Safety Analysis

5.1 Geometrics

The geometric configuration of the intersection affected by traffic generated by the proposed development was examined with regard to safe stopping sight distance using principles presented in A Policy on Geometric Design of Highways and Streets, 2018, of the American Association of State Highway and Transportation Officials (AASHTO). AASHTO provides recommendations for necessary sight distance at intersections.

A design speed of 35 mph was assumed for Kingstown Road in the vicinity of the proposed site driveways, which is 10 mph over the posted speed limit of 25 mph for both directions of travel. The minimum safe stopping sight distance for roadways with a design speed of 35 mph is 250 feet, as required by AASHTO, Table 3-1. Stopping Sight Distance on Level Roadways, P. 3-4. The sight distances at the development driveways on Kingstown Road are in excess of the minimum sight distances required.

5.2 Crash History

Crash data for the study area was obtained from the South Kingstown Police Department for the period of January 1, 2017 through April 28, 2020. A summary of the data received is contained in Appendix D. None of the crash reports obtained from the police department reported crashes occurring at the intersections of Kingstown Road and the existing driveways of the proposed site located at 703 Kingstown Road during this time period.

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There were two crashes at the intersection of Kingstown Road and School Street as shown in Table No. 5. These crashes include an angle crash and a rear-end crash. Both crashes occurred on wet pavement and one of these crashes resulted in an injury.

Table No. 5
Summary of Crashes
Source: South Kingstown Police Department

Crash Location	January 1, 2017 through April 28, 2020
Intersection of Kingstown Road and the 703 Kingstown Road Driveways	0
Intersection of Kingstown Road and School Street	2
Kingstown Road between School Street and the 703 Kingstown Road North Driveway	6
Kingstown Road between the 703 Kingstown Road North Driveway and Dale Carlia Drift Way	5
Signalized Intersection of Kingstown Road and Dale Carlia Drift Way	4
Intersection of Kingstown Road, Dale Carlia Street, and the Dale Carlia Shopping Center Driveway	14
Kingstown Road between Dale Carlia Street and Main Street/Old Tower Hill Road	1
Intersection of Kingstown Road, Main Street, and Old Tower Hill Road	17
TOTAL	49

There were six crashes on Kingstown Road between School Street and the 703 Kingstown Road north driveway. These crashes include three sideswipe crashes and three rear-end crashes. Two of these crashes occurred on wet pavement and one of these crashes resulted in injuries.

There were five crashes on Kingstown Road between the 703 Kingstown Road north driveway and the signalized Dale Carlia Drift Way intersection. These crashes include two angle crashes, a sideswipe crash, and two rear-end crashes. Two of these crashes resulted in an injury.

There were four crashes at the signalized intersection of Kingstown Road and Dale Carlia Drift Way. These crashes include an angle crash, a sideswipe crash, and two rear-end crashes. Two of these crashes occurred on wet pavement and one of these crashes resulted in injuries.

There were fourteen crashes at the intersection of Kingstown Road, Dale Carlia Street, and Dale Carlia Shopping Center driveway. These crashes include nine angle crashes, two sideswipe crashes, and three rear-end crashes. Two of these crashes occurred on wet pavement and four of these crashes resulted in injuries.

There was one crash on Kingstown Road between Dale Carlia Street and Main Street/Old Tower Hill Road. It was a rear-end crash, which did not result in injury.

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There were seventeen crashes at the intersection of Kingstown Road, Main Street, and Old Tower Hill Road. These crashes include three angle crashes, a sideswipe crash, and thirteen rear-end crashes. Three of these crashes occurred on wet pavement and seven of these crashes resulted in an injury

The number of crashes that occurred over this three-year plus period does not indicate the presence of unusual conditions that might be worsened by the proposed compassion center.

6.0 Conclusions and Recommendations

This traffic impact analysis was conducted to evaluate the impacts on surrounding roadways and intersections due to the proposed compassion center on Kingstown Road (Route 108) in South Kingstown, Rhode Island.

The unsignalized intersection capacity analysis shows that there will be no change in level of service at the north driveway. The north and south driveways will operate at adequate levels of service during the P.M. peak hour under build conditions.

The signalized intersection capacity analysis shows that there will be no change in level of service during the P.M. peak hour at the intersection of Kingstown Road, Main Street, and Old Tower Hill Road with the exception of the northbound approach which will change from LOS E to LOS F, which is just over the threshold for LOS F. Based on our conservative assumptions of expanded traffic counts and anticipated trip generation, it is likely that the actual increase in delay will not result in the change in LOS.

The geometric configuration of the proposed site driveways is such that adequate safe stopping sight distances exist for traffic passing and/or utilizing the site.

Based upon the analyses, traffic operations on the surrounding roadways and intersections will experience minimal to no change with the addition of the traffic generated by the proposed compassion center development. No reduction in safety will occur due to the development as proposed.