



October 21, 2016

Mr. Andrew Vorce, Director  
Nantucket Planning & Economic Development Commission  
2 Fairgrounds Road  
Nantucket, MA 02554

Attn: Mr. Michael Burns

**Re: Peer Review  
Old South Road Mixed-Use Development  
Nantucket, Massachusetts**

Dear Mr. Vorce:

On behalf of the Nantucket Planning Board, Tetra Tech (TT) has completed a peer review of the August 26, 2016 *Traffic Impact and Access Study* prepared by Ron Muller & Associates for the proposed project located on the south side of Old South Road between Lovers Lane and Daffodil Lane. We have also reviewed the following supplemental documents received on September 19, 2016.

- Master Plan (Richmond Great Point Development LLC, June 10, 2016)
- Greglen Avenue Traffic Redistribution
- Old South Market Driveways Traffic Count Data, dated July 24, 2014

As we understand it, the proposed project includes the construction of 225 apartment units, 100 single family homes and approximately 15,500 s.f. of retail and quality restaurant space.

The *Traffic Impact and Access Study* was reviewed for conformance with standard professional practices in the state of Massachusetts for the preparation of traffic studies for projects of the size and nature proposed on Old South Road.

#### **Project Study Area**

- The study area included eight intersections located on Old South Road from the Milestone Rotary to Nobadeer Farm Road and the intersection of Nobadeer Farm Road/Milestone Road. The study area was discussed with planning staff and is appropriate for this project.

#### **Study Hours**

- The study included an impact analysis of the summer weekday morning, weekday afternoon and Saturday midday peak hours. This is appropriate for a mixed-use development which includes residential, retail and restaurant uses.

#### **Existing Conditions**

- Existing pedestrian and bicycle accommodations and volumes in the study area should be documented.
- The traffic volumes used in the study were collected in July 2014 and August 2015. The MassDOT guidelines for preparation of a traffic study require that the count data be less than 2 years old. In our

opinion the count data, although obtained slightly over 2 years ago, is still adequate for purposes of determining the impact of the project of the study area roadways and intersections.

- Tetra Tech compared the count data included in the report's Appendix to the traffic volumes presented on Figures 2, 3 and 4 and confirmed that the figures accurately depict the count data. However, one notable error was found on Figure 4 – 2016 Existing Saturday Peak Hour Traffic Volumes. At the Old South Road/Nobadeer Farm Road intersection the southbound right turn volume was reported as 117 whereas the count sheets provided in the Appendix indicate this volume is 177 vehicles per hour. This incorrect volume was subsequently used to calculate the 2023 No-Build and Build volumes shown on Figures 7 and 16. The figures should be updated to show the correct volumes.
- No adjustments were made to the 2014/2015 data to reflect 2016 conditions. It is the opinion of the Nantucket Planning & Economic Development Commission (NP&EDC) staff that traffic has been increasing at a rate of 1.0 percent year along the Old South Road. Moreover, based on data provided in the report, traffic volumes on Old South Road, east of Fairgrounds Road, have changed as follows:
  - From 2007 to 2016 (9 years): 0.01% decrease per year
  - From 2010 to 2016 (6 years): 0.66% increase per year
  - From 2014 to 2016 (2 years): 1.34% increase per year
- As 9 years' worth of data suggests traffic is approximately level, a two year look back suggests traffic is increasing at a rate of approximately 1.34 percent per year and the Planning Staff have suggested traffic has been increasing at a rate of 1.0 percent, it is our opinion that a factor should have been applied to the existing volumes to estimate existing 2016 conditions. Additionally, traffic associated with any significant projects built and occupied in the vicinity of the study area intersections since the counts were obtained should have been accounted for in the 2016 existing volumes.

However, applying a growth rate of 1 percent per year (or a factor of 1.02) to the highest volume segment of Old South Road (east of Fairgrounds Road), results in a negligible increase of approximately 26 additional trips (13 trips in each direction) during the peak hours. Therefore, unless a project has been built and occupied between 2014 and 2016 which would significantly increase traffic in the study area, no additional information is required.

- No seasonal adjustment factor was applied. As the counts were obtained during a peak summer month, this is appropriate.

### **Safety Analysis**

- The traffic study provides a crash analysis of the study intersections between 2012 and 2014 based on MassDOT crash data. This methodology is generally consistent with industry standards. The TIAS includes a summary of the crash data, but the crash data itself was not included in the TIAS. Tetra Tech recommends that the crash data be provided for review.
- The assessment indicates that none of the study area intersections have a crash rate that is higher than the MassDOT statewide or District 5 average. Tetra Tech confirmed these findings. It is worth noting that a third of the collisions at the Old South Road/Fairgrounds Road intersection occurred on wet and/or icy conditions indicating poor pavement conditions and approximately half of the crashes reported at the Milestone Rotary and at the Old South Road/Fairgrounds Road intersection were serious crashes involving personal injury.
- The Old South Road/Fairgrounds Road intersection and Milestone Rotary are both listed by MassDOT as 2012-2014 Highway Safety Improvement Program (HSIP) eligible crash clusters indicating that these locations are in the top 5 percent of intersections under the jurisdiction of the

Nantucket Planning and Economic Development Commission Regional Planning Agency for crash incidences and severity.

### **Transit**

- The study did not address the existing transit schedule for residents traveling to/from work, include transit ridership data or confirm that the service has adequate capacity to accommodate the additional ridership potentially generated by the proposed project.

### **Study Time Horizon**

- The traffic assessment utilized a seven-year planning horizon which is consistent with current professional practice in Massachusetts for the preparation of traffic impact studies.

### **Future No-Build Traffic Volumes**

- A one percent growth rate applied for seven years was used to estimate peak hour traffic volumes in 2023. The study indicates that this growth rate was confirmed with planning staff.
- Trips generated by six other projects, located in the vicinity of the study area, and expected to be built and occupied by 2023, were included in the 2023 No-Build volumes. These projects were identified by contacting planning staff and included the Stop & Shop Supermarket on Sparks Road. The Stop & Shop project was occupied in May 2015 and as such traffic associated with this project should have been included in the 2016 existing traffic volumes. The trip generation and assignment for all six projects, included in the future no-build traffic volumes, were generally calculated correctly.

### **Trip Generation**

- The study used *Trip Generation* Land Use Codes (LUC) 210 - Single Family Detached Housing, 220 – Apartment, 826 - Specialty Retail Center and 931 - Quality Restaurant. These are appropriate LUC to estimate trip generation for this project.
- The ITE *Trip Generation* manual provides both weighted average trip rates and fitted curve equations for most land uses. The companion document to the *Trip Generation* manual is the ITE *Trip Generation Handbook*. This document provides guidance on how the data in the manual should be applied. The equation represents a fitted curve depicting data associated with the land use. In general, when the Measure of Correlation ( $R^2$ ) between data points and the fitted curve is less than 0.75, the *Trip Generation Handbook* indicates that trip rates should be utilized rather than the equation to estimate trips. The trip generation calculations provided in the study indicate that equations were utilized, regardless of the  $R^2$  value. This resulted a slightly lower trip estimate for Apartments (Saturday midday) and a slightly higher trip estimate for Retail (Weekday daily). However, the differences are not significant and no additional information is required.
- The trip generation projections for this mix of land uses were 210 trips in the AM peak (entering plus exiting), 321 in the PM peak and 309 during the Saturday peak. When accounting for pass-by trips (i.e., retail/restaurant trips entering and exiting the site that are already in the Old South Road traffic stream), the net new traffic on Old South Road was forecasted to be approximately 210, 293 and 277 trips in the AM, PM and Saturday peak hours, respectively.

### **Trip Distribution/Trip Assignment**

- The distribution of residential and retail project traffic through the study intersections were primarily based on existing traffic flows with some adjustments to account for population densities on Nantucket. For the retail uses, distribution was based on traffic counts obtained at the Old South Market driveways. For the residential components of the project, distribution was based on traffic counts obtained at the Old South Road/Goldfinch Drive intersection. This approach to trip distribution is generally appropriate for a project of this type and location.

- Site generated trips was not assigned to Lovers Lane via Nancy Ann Lane or via adjacent property driveways. It is expected that a portion of site generated trips oriented to/from the west would use this route, avoiding delays at the Main Site Drive approach to Old South Road. The applicant should explain why site trips were not assigned to Lovers Lane.
- Tetra Tech reviewed the assignment of site trips to each study area intersection as depicted on Figures 8-13. The site trips in these figures were consistent with the trip generation estimates presented in Table 6 and the trip distribution patterns shown in Table 8.

### **Intersection Operational Analysis**

- The TIAS utilized the HCM 2010 methodology using Synchro 8 software to conduct the capacity analyses which is consistent with industry standard methodology.
- Some minor differences in how the capacity analyses were conducted as compared to current MassDOT standards for conducting capacity analyses were noted, but were not considered significant, These included:
  - A common truck percentage for each approach was utilized. Current MassDOT standards for impact analysis specify that truck percentages by individual turn movement should be utilized.
  - Capacity analyses conducted of the future conditions utilized existing peak hour factors. Current MassDOT standards for impact analysis specify that future peak hour factors should be assumed to be 0.92.
- Pedestrians were not account for in the analyses. The applicant should either confirm that the volume of pedestrians at the study intersection would not have a significant impact on the results of the analyses or redo the analyses to account for pedestrians.
- Nobdadeer Farm Road approaches Milestone Road with one lane although it widens for a distance of approximately 25 feet before the intersection. This intersection should be reanalyzed with one northbound approach lane.
- The 2016 Existing, 2023 No-Build and 2023 Build Saturday peak hour analyses of the Old South Road/Nobadeer Farm Road intersection were conducted with incorrect southbound right turn volumes. The volumes utilized in the analyses were lower than they should be. Therefore, the Saturday peak hour capacity analyses for this location should be reanalyzed with the correct volumes.
- The 2023 No-Build morning peak hour analysis of the Old South Road/Greglen Avenue/Goldfinch Drive was conducted with incorrect volumes. The volumes utilized in the analysis were higher than they need to be. Because the analyzed volumes were higher, the analysis results were conservative and therefore, in our opinion, do not need to be revised.
- The 2023 Build afternoon peak our analysis of the Milestone Rotary was conducted with incorrect volumes. The Milestone Road approach volumes were lower than they should be. The analysis should be reanalyzed with the correct volumes.
- The Town is proposing modifying the Old South Road/Fairground Road intersection to a modern roundabout. Based on discussions with planning staff, it is currently envisioned that the project would be funded at the local level and design would be begin in 2017 with construction completed by 2019. The 2023 future condition analyses of this location should assume these improvements are complete. The project's impact to the proposed single lane roundabout should be identified by the applicant. A concept plan of the roundabout can be obtained on-line (<http://www.nantucket-ma.gov/DocumentCenter/View/1222>).

## Project Impacts

- Table 1 provides a summary of potential increases to afternoon peak hour traffic at the five major intersections, which with approval of the project, could occur by 2023. With approximately 55 percent of the project’s residential trips and 48 percent of project’s retail trips traveling through the Old South Road/Fairgrounds Road intersection, the project will increase traffic at that intersection by approximately 11 percent during the afternoon peak hour.

**Table 1 Project Traffic at Key Study Area Intersections**

Location	2023 No-Build	Project Trips			Percent Increase
		Residential	Retail	Total	
Milestone Rotary	2,645	136	18	154	6%
Old South Road at Fairgrounds Road	1,854	173	23	196	11%
Old South Road at Macy’s Lane	1,325	73	20	93	7%
Old South Road at Nobadeer Farm Road	741	36	10	46	6%
Milestone Road at Nobadeer Farm Road	1,214	36	8	44	4%

- The study does a good job of describing the overall operating conditions at the study area intersection for the conditions analyzed. In summary, intersections which by 2023 (with or without the project) will operate with long delays and volume to capacity ratios close to or exceeding 1.0 are listed below. In all cases, the project will exacerbate delays and increase queues at these locations.
  - Milestone Rotary – all approaches to the rotary will operate poorly during all peak hours
  - Old South Road/Fairgrounds Road – the Fairgrounds Road approach will operate poorly during all peak hours.
  - Old South Road/Lovers Lane – the Lovers Lane approach will operate poorly during the weekday afternoon and Saturday midday peak hours.
  - Old South Road/Main Site Drive – the Main Site Drive approach will operate poorly during the weekday afternoon peak hour.
  - Old South Road/Macy’s Lane – the Old South Road eastbound approach will operate poorly during the weekday afternoon and Saturday midday peak hours.
- Other Stop controlled intersection will operate at LOS E/F conditions during one or more peak hours, but with volume to capacity ratios below 1.0. These locations include:
  - Old South Road/Amelia Drive
  - Old South Road/Youngs Way
  - Milestone Road/Nobader Farm Road

## Sight Distance

- Intersection Sight Lines (ISD) were measured at the Main Site Drive and Retail Drive and presented in the report. At the Main Site Drive and Retail Drive, the ISD measurements reported in the study, indicate sight lines equal to or greater than 445 feet which is sufficient for the reported 85<sup>th</sup> percentile speed of 40 mph on Old South Road. It is not clear from the study if these measurements were based on the existing configuration of Old South Road or accounted for the roadway widening associated with the proposed two-way left turn lane.

- ISD at the Retail Drive were also shown graphically on a figure presented in the Appendix. The ISD were shown on a plan and profile of the proposed two-way left turn lane on Old South Road. The figure also indicates that ISD is equal to the desirable 445 feet.
- ISD were measured at the proposed Lovers Lane site driveway and presented in the report. At the proposed driveway on Lovers Lane, the ISD measurements reported in the study, indicate sight lines equal to or greater than 300 feet which is sufficient for 25 mph.
- The applicant should confirm that any clearing needed in the intersection sight triangles can be conducted within the Old South Road and Lovers Lane right of ways.
- Stopping Sight Distance (SSD) measurements were not presented in the report. The applicant should provide measurements which indicate that adequate SSD is available for all sight driveways.

### **Site Access and Circulation**

Access to the site is provide by two driveways on Old South Road (Main Site Drive and Retail Drive) and a driveway on Lovers Lane. Access to the Lovers Lane driveway would be via an adjacent property, also believed to be owned by Richmond Great Point Development, LLC. There is also a connection between the site and Lovers Lane via Nancy Ann Lane.

Main Site Drive will form an unsignalized intersection with the south side of Old South Road approximately 270 feet east of Goldfinch Drive (West). The driveway, along with a section of Nancy Ann Lane, form a north-south roadway through the site. This driveway will primarily serve the residential elements of the project which are located east of the north-south road.

Main Site Drive at Old South Road is designed with three travel lanes including one inbound lane and two outbound lanes accommodating separate left and right turn lanes. The inbound and outbound lanes will be divided by a median. In the vicinity of the intersection, sidewalk will be provided along the west side of the driveway.

Retail Drive is proposed approximately 550 feet west of Main Site Drive and is currently designed with one lane inbound and one lane outbound.

- The applicant is encouraged to work with the Town of Nantucket to make the following roadway segments public right of ways:
  - Main Site Drive
  - Nancy Ann Lane from Main Site Drive to Davkim Lane
  - Nancy Ann Lane from Main Site Drive to Lovers Lane
  - Davkim Lane from Lovers Lane to Nancy Ann Lane
- Based on the Master Plan provided, it appears that pedestrian accommodations will be provided throughout the site. However, a more detailed review should be conducted when a more detailed site plan is submitted.
- The site plan and traffic study should indicate how the site's pedestrian and bicycle accommodations will be connected to surrounding neighborhoods.
- As described in the traffic study, the section of Greglen Avenue between Nancy Ann Lane and Old South Road will be eliminated as part of the project. Traffic which currently utilizes this section of Greglen Avenue is projected to shift to Main Site Drive and Lovers Lane. The traffic study assumed that 100 percent of the future Greglan Avenue traffic oriented to/from the east (AM 47, PM 51, SAT 46) would shift to the Main Site Drive and traffic oriented to/from the west (AM 81, PM 123, SAT 113)

would shift equally split between Lovers Lane and the Main Site Drive. These redistributions appear to be reasonable.

- The Applicant should confirm that they have met with the Nantucket Fire Department and that the Department is comfortable with site access and circulation around the site. The Applicant should provide an AutoTurn analysis showing that the largest emergency vehicle used by the Nantucket Fire Department can adequately access the site and maneuver through the site. The Applicant should address the adequacy of emergency vehicle access to the apartment buildings located between parking areas and single family homes.
- The Applicant should discuss possible bus pick-up/drop-off locations with the School Department. The anticipated location(s) of any bus stops should have adequate sight lines for vehicles driving behind or opposing the school bus to see the bus's flashing lights.
- Adequate pedestrian accommodations should be provided between the residential and retail areas and proposed Nantucket Regional Transit Authority bus stops and school bus stops.
- It should be confirmed that there is a legal agreement which will allow the connection between the site and the property between the site and Lovers Lane to be remain in place should the parcels change ownership.
- The Applicant may want to consider traffic calming measures such as speed bumps or humps along the proposed site roadways.
- The Applicant may want to consider on-site wayfinding signs for the condominium units.
- Should central trash/recycling be proposed, the Applicant should ensure that trash removal vehicles can adequately maneuver through the site.
- Should a central mailing system be implemented, the Applicant should consider a curb bump out or designated parking space for the mail delivery vehicles and motorists picking up/dropping off mail.

## **Mitigation**

### **Old South Road**

The applicant has offered to fully fund the design and construction of modifications to Old South Road along with providing additional right of way as needed. The currently proposed modifications include 14 feet of widening, required to provide a 12-foot wide through lane and a 2-foot shoulder in each travel direction with a 14-foot wide shared two-way left turn lane between Lovers Lane and Main Site Drive. The applicant's concept for Old South Road is attached for the reader's convenience. The study indicates that the purpose of the two-way left turn lane is to facilitate a left turn from side streets and driveways onto Old South Road. Motorists would have an opportunity to stack in the two-way left turn lane completing the left turn in two steps. The study indicates that the two-way left turn lane would significantly improve operations for the minor street approaches.

However, it is noted that there are no two-way left turn lanes currently located on Nantucket, two-way left turn lanes are not in character with other roadways on the island and two-way left turn lanes are not desirable to the Town.

Based on input from the Town, it is strongly suggested that the applicant consider an alternative design for Old South Road, one that makes safe pedestrian and bicycle connections to the Old South Road Bike Path a priority, enhances aesthetics of the corridor and encourages driveway consolidation wherever possible. Also, opportunities to provide traditional left turn lanes with center median islands rather than a shared two-way left turn lane are encouraged. Landscaped median islands along Old South Road are suggested and should be considered in subsequent submittals. MassDOT, in its *Project Development*

*and Design Guide (2006), states that “segments of non-traversable median interspersed with left-turn lanes is often preferable to the use of a TWLTL section to provide pedestrian accommodation and to reduce the perceived width of the street.”*

For example, with a median island on the eastbound approach to Main Site Drive, the proposed Old South Road crosswalk could be shifted from the east leg of the intersection to the west leg of the intersection, requiring pedestrians to cross only two travel lanes with the added benefit of a refuge in the median island.

The applicant is also encouraged to provide bus stop turnouts with shelters on both sides of Old South Road in the vicinity of Main Site Drive. Adequate pedestrian connections between the bus stops, Old South Road Bike Path and both the residential and retail areas of the project should be provided.

To the extent possible, the applicant is encouraged to consolidate curb cuts/driveways along this stretch of road in accordance with good access management strategies.

Driveway sight distance analyses should be resubmitted reflecting changes to proposed improvements to Old South Road or any changes to driveway locations.

### **Lovers Lane**

The Lovers Lane driveway is one of several driveways located along the west side of Lovers Lane between Old South Road and Nancy Ann Lane, a distance of approximately 600 feet. Again, the applicant is encouraged to consolidate curb cuts along this stretch of road.

Driveway sight distance analyses should be resubmitted reflecting changes to Lovers Lane, or any changes to driveway locations.

### **Old South Road at Fairgrounds Road**

As the project is anticipated to significantly increase traffic volumes at this intersection (approximately 8 percent during the morning peak hour, 11 percent during the afternoon peak hour and 10 percent during the Saturday midday peak hour), the applicant should provide a fair share contribution towards the design and construction of the proposed roundabout.

### **Old South Road at Macy’s Lane**

The project results in increase of approximately 20 to 90 new peak hour trips at this intersection. The Old South Road eastbound approach is expected to operate at poor levels of service with peak hour queues of 325 feet to 375 feet without the addition of project trips. With the project, the poor levels of service would be exacerbated on the eastbound approach and queues would increase by 50 feet during the weekday morning peak hour and by 75 feet during the Saturday midday peak hour. The applicant has offered to fully design and construct a 150 foot right turn lane on the Old South Road eastbound approach to Macy’s Lane. With the right turn lane, the level of service during the peak hours on the Old South Road eastbound approach to the intersection would improve to LOS D or better and vehicle queues reduced to approximately 125 feet.

The turn lane will required widening Old South Road for a distance of approximately 250 feet. The applicant should indicate if sufficient right of way is available to construct the right turn lane.

A two-lane approach at a four-way Stopped controlled intersection could be confusing to drivers. Therefore, it is suggested that the applicant consider channelizing the proposed eastbound right turn lane with a triangular island and that the right turn lane be under Yield control.



## **Transit**

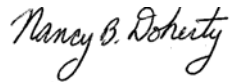
It is understood that the Nantucket Regional Transit Authority (NRTA) is considering running the “Sconset via Old South Road” bus route year round. It currently runs only between from mid-May to early October. The applicant is encouraged to work with the NRTA to facilitate year round service and to provide adequate bus stop accommodations in the vicinity of Main Site Drive. The applicant should provide bus shelters at all proposed bus stops.

## **Transportation Demand Management Plan**

A transportation demand management (TDM) plan should be developed and committed to by the proponent. The TDM plan should include elements such as on-site secure bicycle storage.

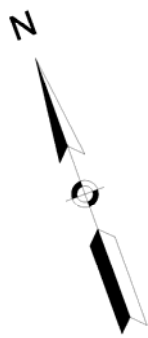
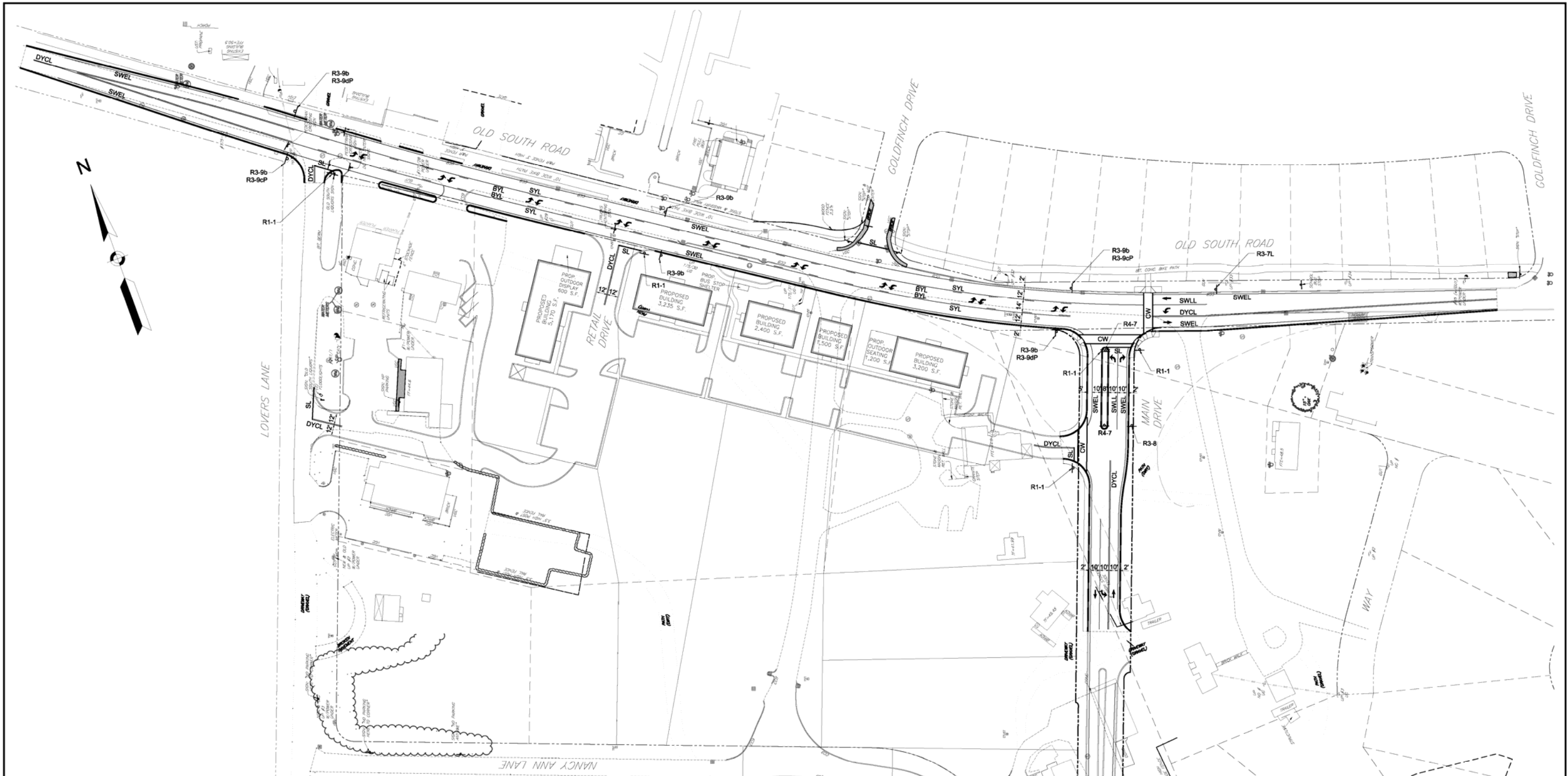
Thank for the opportunity to provide these peer review services. If you have any questions or comments regarding the above information, please feel free to contact me at (508) 786-2208.

Very truly yours,



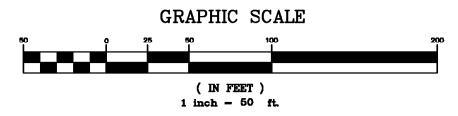
Nancy B. Doherty, P.E.  
Senior Transportation Planner

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SIGN LEGEND			
R1-1		R3-9b	
R3-7L		R3-9cP	
R3-8		R3-9dP	
		R4-7	

PAVEMENT MARKING LEGEND	
DYCL	DOUBLE YELLOW CENTER LINE
SWEL	SOLID WHITE EDGE LINE
SYEL	SOLID YELLOW EDGE LINE
BYL	BROKEN YELLOW LINE
SL	STOP LINE
SWLL	SOLID WHITE LANE LINE
CW	CROSSWALK



REV. #	DESCRIPTION	DATE
<b>Ron Muller &amp; Associates</b> Traffic Engineering and Consulting Services <small>56 TERESA ROAD, HOPKINTON, MA, 01748            P: (508)395-1376 F: (508)433-2481</small>		
<b>PROPOSED CENTER TURN LANE            OLD SOUTH ROAD            NANTUCKET,            MASSACHUSETTS</b>		
<b>CONCEPTUAL IMPROVEMENT PLAN</b>		
DATE:	8/18/16	FIGURE 1