



Z-17-05-006

City of Greensboro Planning Department Zoning Staff Report and Plan Amendment Evaluation

Zoning Commission Hearing Date: June 19, 2017

GENERAL INFORMATION

APPLICANT

Marc Isaacson on behalf of Sun Capital, Inc.

HEARING TYPE

Original Zoning

REQUEST

Original zoning from County AG (Agricultural), County LB (Limited Business) and County RS-40 (Residential Single-Family) to City PUD (Planned Unit Development)

CONDITIONS

1. Uses for Lot 1, containing 11.31 (+/-) acres, as shown on the approved PUD Concept Plan dated March 30, 2017, shall be limited to a maximum of 50 residential dwelling units.
2. Uses for Lot 2, containing 1.08(+/-) acres, as shown on the approved PUD Concept Plan dated March 30, 2017, shall be limited to all uses allowed in the C-M zoning district **except** animal shelters, bus terminals, shooting range, vehicle sales and service, bars and nightclubs, ABC stores and sexually oriented businesses, and the total square footage shall be limited to a maximum of 7,000 square feet.
3. Uses for Lot 3, containing 2.91 (+/-) acres, as shown on the approved PUD Concept Plan dated March 30, 2017, shall be limited to the uses allowed in the O zoning district **except** Funeral Home, Crematorium, Cemetery, Group Living Uses, Social Service Facilities, and Hotel/Motel and the total square footage shall be limited to a maximum of 20,000 square feet.
4. The maximum building height above ground on Lots 1, 2 and 3 shall not exceed 35 feet.

LOCATION

5908, 5910 & 5812 Lake Brandt Road and 2000, 2018 & 2020 Trooper Road and a portion of Trooper Road right-of-way

PARCEL ID NUMBER(S)

Multiple

PUBLIC NOTIFICATION

The notification area for this public hearing was 600 feet (Chapter 30-4-1.4 of the Land Development Ordinance requires notification of the owner of that parcel of land and the owners of all parcels of land adjoining and contiguous to that parcel of land as shown on the County tax listing). **65** notices were mailed to those property owners in the mailing area.

TRACT SIZE

15.93 Acres

TOPOGRAPHY

Undulating

VEGETATION

Mostly wooded with vacant commercial and residential structures

SITE DATA

Existing Use

	Adjacent Zoning	Adjacent Land Uses
N	City PNR (Parks and Natural Resources) County AG (Agricultural)	Undeveloped Undeveloped and single family dwellings
E	City CD-RM-5 (Multifamily) County RS-40 (Residential)	Undeveloped and single family dwellings Undeveloped and single family dwellings
W	City PNR (Parks and Natural Resources)	Undeveloped and Jesse Wharton Elementary
S	County RS-40 (Residential Single-Family)	Single family dwellings

Zoning History

Case #	Date	Request Summary
N/A	N/A	The subject property is not currently located within the City's planning jurisdiction.

ZONING DISTRICT STANDARDS

District Summary *

Zoning District Designation:	Existing (County AG)	Existing (County LB)	Existing (County RS-40)	Requested (PUD)
------------------------------	----------------------	----------------------	-------------------------	-----------------

Max. Density:	N/A	N/A	1.0 units per gross acre	N/A
---------------	-----	-----	--------------------------	-----

<p>Typical Uses Primarily intended to accommodate uses of an agricultural nature, including farm residences and farm tenant housing.</p>	<p>Primarily intended to accommodate moderate intensity shopping and services close to residential areas. The district is established to provide locations for businesses which serve nearby neighborhoods.</p>	<p>Primarily intended to accommodate single-family detached dwellings on large lots in areas without access to public water and wastewater services.</p>	<p>Conditioned to allow 50 residential dwelling units on Tract 1; all uses allowed in the C-M zoning district except animal shelters, bus terminals, shooting range, vehicle sales and service, bars and nightclubs, ABC stores and sexually oriented businesses on Tract 2 and all uses allowed in the O zoning district except Funeral Home, Crematorium, Cemetery, Group Living Uses, Social Service Facilities, and Hotel/Motel on Tract 3.</p>
--	---	--	---

**These regulations may not reflect all requirements for all situations; see the City of Greensboro Land Development Ordinance for all applicable regulations for site requirements for this zoning district.*

SPECIAL INFORMATION

Overlay District Ordinance/Historic Preservation

N/A

Environmental/Soils

Water Supply Site is located in the Watershed Critical Area Tier 3, Greensboro Watershed Watersupply Watershed, Lake Townsend basin. See LDO Chp.30 and 30-12-4 for Watershed Critical Area Provisions

Floodplains <1200ft

Streams Possible streams onsite. Streams must be identified for any 401/404 State and Corps permits. Stream feature will retain a 30ft non-encroachment area measured from top of stream bank. No disturbance is allowed within the non-encroachment area.

Other: Maximum High Density development with sewer is 30% BUA, Low Density with sewer is 12%. No High Density option without sewer. Water Quality and Water Quantity control must be addressed for the entire site. All BUA must be treated by a State approved water quality device. Site must meet all Watershed Critical Area requirements. Per LDO Tier 3, 20% of site must be left undisturbed and Tier 1, 90% must be left undisturbed.

Utilities (Availability)

Potable Water

A feasibility for sewer should be requested for service (contact Kenny Treadway 336-373-2897)

Airport Overlay District & Noise Cone

N/A

Landscaping & Tree Conservation Requirements

Landscaping:

Landscaping requirements will be as set out in the Unified Development Plan.

Tree Conservation:

10% of total acreage in critical root zone to be dedicated for Tree Conservation.

Transportation

Street Classification: Lake Brandt Road – Major Thoroughfare.
Trospen Road – Local Street.

Site Access: All access(s) must be designed and constructed to the City of Greensboro standards.

Traffic Counts: Lake Brandt Road ADT = 9,810 (GDOT, 2015).
Trospen Road ADT = 516 (GDOT, 2015).

Trip Generation:	24 Hour = 3,555, AM Peak Hour = 445, PM Peak Hour = 502.
Sidewalks:	Sidewalks are a requirement of the Development Ordinance. 5' sidewalk with a 5' grass strip is required along both sides of thoroughfares. 5' sidewalk with a 3' grass strip is required along one side (at a minimum, collectors may require sidewalk on both sides) of all other street types. Sidewalk does not exist along the frontage of this property.
Transit in Vicinity:	No.
Traffic Impact Study: (TIS)	Yes, required per TIS Ordinance. Please see the end of this staff report for the <u>DRAFT</u> Executive Summary of the TIS.
Street Connectivity:	N/A.
Other:	This section of Lake Brandt Road is identified in the City of Greensboro's BiPed Plan for future bicycle facilities.

IMPACT/POLICY ANALYSIS

Land Use Compatibility

The proposed **PUD (Planned Unit Development)** zoning would allow land uses that are compatible with the general character of the area.

Connections 2025 Comprehensive Plan Policies

The Generalized Future Land Use Map designates this location as **Interim Residential**. The requested **PUD (Planned Unit Development)** zoning district is generally inconsistent with the **Interim Residential** GFLUM designation, however the applicant has concurrently submitted a request to amend the GFLUM designation (**CP 17-94**) on the subject site to **Mixed Use Residential** which would, if approved, resolve this inconsistency. The Growth Strategy Map identifies the subject site as being within **Growth Tier 1, Current Growth Area (2013 – 2019)**.

Connections 2025 Written Policies

Land Use Goal 4.3 – Growth at the Fringe: Provide a development framework for the fringe that guides sound, sustainable patterns of land use, limits sprawl, protects rural character, evidences sound stewardship of the environment, and provides for efficient provision of public services and facilities as the City expands. Development will increase density and mix land uses at a pedestrian scale with sidewalks, bikeways, and where possible, public transit.

Policy 4F: Initiate a fringe area growth management framework comprising the following elements:

- Create a Fringe Area Land Use Plan;
- Establish a “tiered” approach that designates growth areas for staged development, annexation, and extension of public facilities within the water and sewer service boundary;
- Define specific criteria for water and sewer extensions and annexations;

- Initiate designation of the fringe as Greensboro's extraterritorial jurisdiction; and
- Establish a proactive plan to provide infrastructure in advance of development, consistent with the growth “tiers” and Fringe Area Land Use Concept Plan.

Policy 4G: Improve the quality and patterns of development through incentives and regulatory guidelines.

Community Character, Goal 5.2 – Man-Made Environment: Preserve and enhance the character and visual quality of Greensboro’s built environment, including historic resources, private developments, and public landscapes.

Policy 5E: Improve the aesthetic quality of publicly owned and maintained landscapes.

Policy 5F: Implement and improve design standards governing the appearance of development from public roadways.

Housing and Neighborhoods, Goal 6: Meet the needs of present and future Greensboro citizens for a choice of decent, affordable housing in stable, livable neighborhoods that offer security, quality of life, and the necessary array of services and facilities.

Policy 6C: Promote the diversification of new housing stock to meet the needs of all citizens for suitable, affordable housing.

Economic Development, Goal 7: Promote a healthy, diversified economy with a strong tax base and opportunities for employment, entrepreneurship and for-profit and non-profit economic development for all segments of the community, including under-served areas such as East Greensboro.

Policy 7A: Target city investment and regulatory policies for economic development.

Policy 7C: Ensure that city land use policies and regulations allow for an adequate supply of land to accommodate economic development.

Transportation, Goal 8: Develop and maintain a safe, efficient, and environmentally sound transportation system that provides convenient choices for accessing destinations throughout Greensboro and the Triad, including a range of well-integrated transit, pedestrian, and bicycle linkages.

Policy 8A: Maintain a roadway network that safely and efficiently accommodates vehicular traffic while supporting other community objectives defined in the Comprehensive Plan.

Community Facilities, Services, and Infrastructure, Goal 9: Provide community facilities, services, and infrastructure in a cost-effective manner to meet citizens’ needs, contribute to quality of life, and support desired land use patterns.

Policy 9A: Proactively target infrastructure (water/sewer) extensions to support desired land use patterns.

Policy 9B: Proactively plan for the provision of sufficient capacity to meet the City’s future infrastructure needs.

Connections 2025 Map Policies

Interim Residential (generally at or above 3 dwelling units per acre): Areas with a mix of all types of residential densities and uses (single family detached, single family attached and multi-family), with some limited local-serving non-residential uses (schools, churches, convenience services). It is assumed that most of the new housing developed in the Water Sewer Service Area would be connected to water and sewer.

Mixed Use Residential: This designation applies to neighborhoods or districts where the predominant use is residential and where substantial, compatible local-serving nonresidential uses may be introduced. Such use mixes are typically found in older, in-town neighborhoods

that accommodate "corner stores" and other local services, as well as in newly developed traditional neighborhood developments (TNDs). This district is also applied in areas suited to a diverse mix of housing types and densities. Ensuring that buildings are of the appropriate scale and intensity is critical.

Growth Tier 1, Current Growth Area (2013 – 2019): Where infrastructure systems are in place, can be economically provided and/or will be proactively extended and where continued annexation and consolidation of the City’s development pattern shall be encouraged over the next six years.

Comprehensive Plan Amendment History

Case #	Date	Request Summary
n/a	n/a	n/a

Applicant Stated Reasons for Request

“The existing designation of Interim Residential was placed on this area as a placeholder until the property was annexed into Greensboro and more thoroughly evaluated for a comprehensive plan designation. However, annexation policy changed, so that last step was never completed. The area, both immediate and more broadly, has developed with a great deal of single family homes and no nearby supporting goods and services. The applicant would like to develop this property as a neighborhood scale mixed use residential development that would likely include townhomes, office uses and a restaurant or coffee shop. The rezoning request seeks PUD zoning from County AG, LB and RS-40.”

Explain in detail the conditions that you think may warrant a Plan Amendment – Per Applicant and Application

“As stated above, the Interim Residential designation was never intended to be permanent. At this time, we can see how the area has developed and what additional uses are needed in proximity to the houses. A mix of different residential and other supporting uses are needed to round out this part of town and serve the nearby residents entering and leaving the City from northern parts of the county.”

COMPREHENSIVE PLAN POLICY ANALYSIS

Need for Proposed Change

The requested **PUD (Planned Unit Development)** zoning, would allow uses that are incompatible with the subject site’s current designations in the GFLUM as **Interim Residential**. If approved, the requested GFLUM amendment (**CP 17-04**) to **Mixed Use Residential** would resolve this inconsistency.

Effect of the proposed Change on the Need for City Services and Facilities (e.g. roadway level of service).

n/a

Implications, if any, the Amendment may have for Other Parts of the Plan

n/a

Unforeseen Circumstances or the Emergence of New Information (e.g. significant economic opportunity in Tier 2 or 3)

n/a

PLANNING BOARD COMMENTS

The Planning Board reviewed GFLUM amendment request CP 17-04 during its meeting on May 17, 2017. The Planning Board commented that the requested change complements the location and surrounding area.

CONFORMITY WITH OTHER PLANS

City Plans

Sustainability Action Plan

Element 1) Transportation and Land Use:

Policy 1) Encourage increased density, a mix of land uses and more integrated links between transportation and land use through changes to Greensboro's Comprehensive Plan, Development Ordinance and other related plans.

Element 2) Green Jobs and Buildings:

Policy 3) Develop a coordinated City program to provide technical support, energy audits and education and outreach to increase energy efficiency and conservation in commercial and residential buildings.

Policy 4) Use a combination of code changes, incentives, partnerships and education to promote green building in Greensboro.

Policy 6) Promote more efficient use of water through education, partnerships and pilot projects.

Element 3) Waste Reduction and Recycling:

Policy 7) Employ a combination of expanded recycling infrastructure, regulations and incentives to increase Greensboro's solid waste diversion and recycling rates.

Element 6) Education and Outreach:

Policy 11) Provide technical support, awards and recognition to individuals and organizations furthering Greensboro's energy and sustainability efforts.

Other Plans

n/a

STAFF ANALYSIS AND RECOMMENDATION

Community Outreach

Applicant is strongly encouraged to discuss this proposed rezoning and development with owners of surrounding properties.

Based on the proximity of the subject site to Jesse Wharton Elementary School (located just to the west) and to the planned Sweet Gum Trail (crossing Trosper Road, just to the east), as specified in the 2015 Greensboro Area BiPed Plan, long term livability, safety, and accessibility for residents, users, and employees at the subject site would be greatly enhanced by provision of secure, convenient bicycle parking.

Staff Analysis

This 15.93 acre subject site is currently a combination of a former convenience store with fuel pumps, single family dwellings and undeveloped property. North of the request is undeveloped property (zoned County AG). East of the request is a combination of single family dwellings and undeveloped property (zoned City CD-RM-5 and County RS-40). South of the request are single family dwellings (zoned County RS-40). West of the request is a combination of Jesse Wharton Elementary school and undeveloped property (zoned PNR) buffering the lake.

The Comprehensive Plan's Generalized Future Land Use Map designates this site as Interim Residential. The Interim Residential designation pertains to areas with a mix of all types of residential densities and uses (single family detached, single family attached and multifamily), with some limited local-serving non-residential uses (schools, churches and convenience services). In conjunction with the zoning application, the applicant filed a Comprehensive Plan amendment to revise the designation to Mixed Use Residential. The Mixed Use Residential designation applies to neighborhoods or districts where the predominant use is residential and where substantial, compatible local-serving non-residential uses may be introduced.

This request allows for the introduction of both non-residential service uses and expanded housing options in immediate proximity to multiple existing single family developments and a large institutional use (elementary school). In addition to restrictions on uses per zoning conditions, the standards of the Land Development Ordinance and Tier 3 watershed regulations greatly restrict the amount of land that can be developed, which further limits potential impacts on adjacent existing residential neighborhoods. The requested Planned Unit Development (PUD) zoning district is also specifically designed to accommodate both residential and non residential uses in a integrated and unified project.

The request as submitted supports the Comprehensive Plan's Economic Development goal to promote a healthy and diversified economy and the Housing and Neighborhoods goal to meet the needs of present and future Greensboro citizens for a choice of decent, affordable housing in stable, livable neighborhoods that offer security, quality of life, and the necessary array of services and facilities. The request is also consistent with the Growth at the Fringe goal to promote sound and sustainable patterns of land use.

This request is consistent with the intent and purpose of the zoning code, the Comprehensive Plan (Connections 2025) and is generally compatible with the existing development and trend in the surrounding area.

Staff Recommendation

Staff recommends **approval** of the requested **PUD** (Planned Unit Development) zoning district.

Additional Information

DRAFT**Lake Brandt Neighborhood Village – Transportation Impact Analysis
Greensboro, NC**

Prepared for Sun Capital, Inc.

Original: May 31, 2016

Revised: July 20, 2016; October 31, 2016; May 2, 2017

Executive Summary

Since the submissions of previous TIAs, the site plan for proposed Lake Brandt Neighborhood Village has been updated. The development is located along the east side of Lake Brandt Road on both sides of Troser Road in Greensboro, North Carolina. The site plan now includes 49 townhome units, 20,000 square feet of medical office, 4,800 square feet of high-turnover restaurant and 2,200 square feet of coffee shop with drive-thru. However, for analysis purposes, 49 apartments were used as a land use to represent a more conservative result since apartments will generate a higher number of vehicle trips than townhomes. The site plan currently shows four (4) full accesses, two (2) on Lake Brandt Road and two (2) on Troser Road.

DAVENPORT was retained to determine the potential traffic impacts of this development and to identify transportation improvements that may be required to accommodate the impacts of both background traffic and new development traffic. The following intersections were included in the study:

- Lake Brandt Road at Air Harbor Road
- Lake Brandt Road at Troser Road/ Jesse Wharton Elementary School Entrance
- Lake Brandt Road at Jesse Wharton Elementary School Bus Entrance
- Troser Road at Oak Tree Road
- Lake Brandt Road at Site Access 1
- Lake Brandt Road at Site Access 2
- Troser Road at Site Access 3
- Troser Road at Site Access 4

The intersections were analyzed during the AM (7-9 am) and PM (4-6 pm) peaks for the following conditions:

- 2017 Existing Conditions
- 2019 Future No Build Conditions
- 2019 Future Build Conditions
- 2019 Future Build Condition with Mitigation (if necessary)

The Greensboro Department of Transportation (GDOT) and the North Carolina Department of Transportation (NCDOT) were contacted to obtain background information and to ascertain the elements to be covered in this Transportation Impact Analysis (TIA). Information regarding the property was provided by the civil engineer, Stimmel.

Discussion of Results

The following section discusses level of service for each intersection.

Lake Brandt Road at Air Harbor Road

This signalized intersection currently operates at LOS E during the AM peak and LOS D in the PM peak. In 2019 future no build conditions, LOS E is expected in the AM peak and LOS D in the PM peak. With the addition of proposed site traffic, LOS E is expected in the AM and PM peaks. It should be noted that LOS E is expected as a result of background volumes and will be expected if this proposed development is not built in the future. Therefore, no improvements are recommended.

Lake Brandt Road at Trospen Road/ Jesse Wharton Elementary School Entrance

This unsignalized intersection currently operates at LOS F during the AM peak and LOS C in the PM peak. In 2019 future no build condition, LOS F is expected in the AM peak and LOS C in the peak. With the addition of proposed site traffic, LOS F is expected in the AM and PM peaks. This intersection was assessed for a signal warrant, discussed in the following section, and it was determined that a signal is warranted. Therefore, to accommodate the site traffic the following is recommended:

- Provide a signal
- Provide a separate northbound through and right lane, with 100 feet of storage and appropriate taper
- Provide separate westbound left and through-right turn lanes with full storage

With these improvements, LOS D is expected in the AM peak and LOS B in the PM peak.

Lake Brandt Road at Jesse Wharton Elementary School Bus Entrance

This unsignalized intersection currently operates at LOS C during the AM peak and LOS A in the PM peak. In 2019 future no build condition, LOS C is expected in the AM peak and LOS A in the PM peak. With the addition of proposed site traffic, LOS C is expected in the AM and PM peaks. No improvements are recommended for this intersection.

Trospen Road at Oak Tree Road

This unsignalized intersection currently operates at LOS A during the AM and PM peaks. In 2019 future no build condition, LOS A is expected in the AM and PM peaks. With the addition of proposed site traffic, LOS A is expected in the AM and PM peaks. No improvements are recommended.

Lake Brandt Road at Site Access 1

In 2019 future build condition, LOS D is expected in the AM and PM peaks. This site access was assessed for the need of turn lanes. It was determined based on GDOT Driveway Manual, that an auxiliary turn lane would not be warranted. Therefore, no improvements are recommended.

Lake Brandt Road at Site Access 2

In 2019 future build condition, LOS C is expected in the AM and LOS D in the PM peak. This site access was assessed for the need of turn lanes. It was determined based on GDOT Driveway Manual, that an auxiliary would not be warranted. Therefore, no improvements are recommended.

Lake Brandt Road at Site Access 3

In 2019 future build condition, LOS B is expected in the AM and LOS C in the PM peak. This site access was assessed for the need of turn lanes. It was determined based on GDOT Driveway Manual, that an auxiliary would not be warranted. Therefore, no improvements are recommended.

Trosper Road at Site Access 4

In 2019 future build condition, LOS A is expected in the AM and PM peaks. This site access was assessed for the need of turn lanes. It was determined based on GDOT Driveway Manual, that an auxiliary would not be warranted. Therefore, no improvements are recommended.

The recommended improvements are illustrated in Figure 9.

Level of Service Summary

Table A summarizes the level of service analysis at the study intersections:

Table A - Level of Service Summary				
AM Peak	2017 Existing	2019 No Build	2019 Build	2019 Build with Improvements
Lake Brandt Road at Air Harbor Road	E (66.6)	E (67.8)	E (62.4)	
Lake Brandt Road at School Entrance/Trosper Road	F (86.6) WB Approach	F (205.8) WB Approach	F (Err) WB Approach	D (55.0) Signalized
Lake Brandt Road at School Bus Entrance	C (17.9) EB Approach	C (19.5) EB Approach	C (20.9) EB Approach	
Trosper Road at Oak Tree Road	A (9.1) NB Approach	A (9.1) NB Approach	A (9.4) NB Approach	
Lake Brandt Road at Site Access 1			D (28.6) WB Approach	
Lake Brandt Road at Site Access 2			C (18.0) WB Approach	
Trosper Road at Site Access 3			B (14.4) NB Approach	
Trosper Road at Site Access 4			A (8.9) SB Approach	
LOS (delay in seconds) Note for unsignalized conditions, LOS and delay indicates only minor street approach with longest delay				

Table A - Level of Service Summary cont.				
PM Peak	2017 Existing	2019 No Build	2019 Build	2019 Build with Improvements
Lake Brandt Road at Air Harbor Road	D (44.1)	D (51.2)	E (62.8)	
Lake Brandt Road at School Entrance/Trosper Road	C (19.4) WB Approach	C (21.0) WB Approach	F (75.5) WB Approach	B (10.3) Signalized
Lake Brandt Road at School Bus Entrance	A (0) EB Approach	A (0) EB Approach	A (0) EB Approach	
Trosper Road at Oak Tree Road	A (8.7) NB Approach	A (8.7) NB Approach	A (9.2) NB Approach	
Lake Brandt Road at Site Access 1			D (30.3) WB Approach	
Lake Brandt Road at Site Access 2			D (25.4) WB Approach	
Trosper Road at Site Access 3			C (15.6) NB Approach	
Trosper Road at Site Access 4			A (8.8) SB Approach	
LOS (delay in seconds) Note for unsignalized conditions, LOS and delay indicates only minor street approach with longest delay				

Proposed Site Access Throat Distances

The internal throat distances for the site accesses were reviewed using the GDOT Driveway Manual, which states that the distance from the adjacent street right of way to the near side of any internal service drive or parking aisle should be 25 feet, or greater than the expected inbound queue at the location. To determine the inbound queues, internal intersections were modeled for each access and queue reports generated using SimTraffic 9. Based on the number of vehicles entering Site Access 1 during the AM and PM peaks (4 and 16 vehicles, respectively), a minimum throat distance of 50 feet will be required. For Site Access 2, with 31 vehicles entering in the AM peak and 33 vehicles entering in the PM peak, a minimum throat distance of 50 feet will be required. For Site Access 3 northside of Trospers Road, with 140 vehicles entering in the AM peak and 157 vehicles entering in the PM peak, a minimum throat distance of 75 feet will be required. For Site Access 3 southside of Trospers Road, with 33 vehicles entering in the AM peak and 35 vehicles entering in the PM peak, a minimum throat distance of 50 feet will be required. For Site Access 4, with 4 vehicles entering in the AM peak and 13 vehicles entering in the PM peak, a minimum throat distance of 50 feet will be required. Table B lists the 95th percentile queues for the AM and PM peaks. The queuing reports can be found in the Appendix. The access points should be designed according to the GDOT Driveway Manual.

Table B – Site Access Throat Queuing			
Intersection Movement	SimTraffic 95th Percentile Queue (feet)		Minimum Recommended Throat Distance (Feet)
	AM Peak	PM Peak	
Site Access 1 EB Through-Right	15	39	50
Site Access 2 EB Left-Through	42	43	50
Site Access 3 NB Left-Through (Northside)	57	65	75
Site Access 3 SB Left-Through (Southside)	46	47	50
Site Access 4 NB Left-Right	15	32	50

Signal Warrant Analysis

The signal warrant analysis was conducted for the intersection of Lake Brandt Road at Trosper Road/ Jesse Wharton Elementary School Entrance. This intersection is currently an unsignalized intersection. The analysis was conducted using PC-Warrants software. The Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD 2009 Edition), has established nine criteria that can be used to justify the installation of a Traffic signal, which are the following:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network
- Warrant 9, Intersection Near a Grade Crossing

The applicable warrants were measured for existing conditions, and future build conditions. Warrants 4, 5, 6, 7, 8 and 9 were not applicable for this analysis.

Existing Conditions

Warrants 1-3, Traffic Volumes

Warrants 1-3 are related to traffic volumes and were considered for existing conditions. The 85th percentile speed on Lake Brandt Road was assumed to be greater than 40 mph for this analysis; therefore, the 70% volumes were utilized for the warrants.

Based on the existing traffic volumes at this intersection, Warrants 1-3 are currently not satisfied.

Future Build Conditions

Warrants 1-3, Traffic Volumes

Warrants 1-3 are related to traffic volumes and were considered for future build conditions. The 85th percentile speed on Lake Brandt Road was assumed to be greater than 40 mph for this analysis; therefore, the 70% volumes were utilized for the warrants. The site trips were distributed over the 13-hour time period based on the existing volume percentages at the intersection.

Based on the future build traffic volumes at this intersection, Warrants 2 and 3 are satisfied.

Signal Warrant Analysis Results

The results of the signal warrant analysis are summarized in Table C, below. As shown, none of the MUTCD signal warrants are currently met under existing conditions. Additional information and reports from PC-Warrants can be found in the Appendix.

Table C – Signal Warrant Analysis						
Warrant	Existing Conditions			Future Build Conditions		
	Status			Status		
	N/A	Not Met	Met	N/A	Not Met	Met
Warrant 1: Eight-Hour Vehicular Volume		X			X	
Warrant 1A – Minimum Vehicular Volume		X			X	
Warrant 1B – Interruption of Continuous Traffic		X			X	
Warrant 1C – Combination of Warrants		X			X	
Warrant 2: Four-Hour Vehicular Volume		X				X
Warrant 3: Peak Hour		X				X
Warrant 4: Pedestrian Volume	X			X		
Warrant 5: School Crossing	X			X		
Warrant 6: Coordinated Signal System	X			X		
Warrant 7: Crash Experience	X			X		
Warrant 8: Roadway Network	X			X		
Warrant 9: Intersection Near a Grade Crossing	X			X		

Summary and Conclusion

Since the submissions of previous TIAs, the site plan for proposed Lake Brandt Neighborhood Village has been updated. The development is located along the east side of Lake Brandt Road on both sides of Trosper Road in Greensboro, North Carolina. The site plan now includes 49 townhome units, 20,000 square feet of medical office, 4,800 square feet of high-turnover restaurant and 2,200 square feet of coffee shop with drive-thru. The site plan currently shows four (4) full accesses, two (2) on Lake Brandt Road and two (2) on Trosper Road.

Based on trip generation rates and equations published in Trip Generation (Institute of Transportation Engineers, 9th Edition), this development has a trip generation potential of 445 gross trips in the AM peak and 502 gross trips in the PM peak. After the reductions, 317 net trips in the AM peak and 379 net trips in the PM peak are expected.

Based on the analysis, it is expected that each study intersection is to operate at LOS D or better in the AM and PM peaks with recommended improvements with the exception of Lake Brandt Road at Air Harbor Road. This intersection is expected to operate at LOS E. Lake Brandt Road at Air Harbor Road is expected to operate at LOS E regardless of the proposed development.

A signal warrant analysis was conducted on the intersection of Lake Brandt Road and Trosper Road/ School Entrance for a 13-hour time period. It was determined that Warrants 2 and 3 were met in the future build conditions. These are significant in decision making to install a signal. Since two volume based warrants are met, it is recommended to install a signal at the intersection of Lake Brandt Road and Trosper Road/ School Entrance.

The recommended improvements are summarized in Table D on the following page.

Table D – Recommended Improvement Summary	
Lake Brandt Road at Air Harbor Road	No improvements recommended
Lake Brandt Road at School Entrance/ Troser Road	<ul style="list-style-type: none"> • Provide a signal • Provide a separate northbound through and right turn lane with 100 feet of storage and appropriate taper • Provide a separate westbound left and through-right turn lane with full storage
Lake Brandt Road at School Bus Entrance	No improvements recommended
Troser Road at Oak Tree Road	No improvements recommended
Lake Brandt Road at Site Access 1	No improvements recommended
Lake Brandt Road at Site Access 2	No improvements recommended
Troser Road at Site Access 3	No improvements recommended
Troser Road at Site Access 4	No improvements recommended

In conclusion, this study has reviewed the impacts of both background traffic and this development traffic, and has determined that with the recommended improvements in place, there will be adequate capacity to accommodate future traffic. The final design of these improvements will need to be coordinated during the site plan approval process. Please note that all accesses to the site are required to be constructed to GDOT standards.