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GRTA DRI Review Report

For DRI 1277

JONQUIL VILLAGE REDEVELOPMENT

City of Smyrna, Georgia



Site Plan Elements Traffic Impact Analysis Facility Needs Analysis Area of Influence Analysis Air Quality Benchmark Statement DRI Review Criteria





July 2007



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This report presents a variety of analyses and documentation for submittal as the major portion of the GRTA DRI Review Package. This study presents an analysis of the traffic impact expected to result from a mixed-use redevelopment located in the City of Smyrna, Cobb County, Georgia. The impact of the traffic from the Site was analyzed at full Build-Out in 2009, and this report addresses the analyses and findings at Site Build-Out. The proposed redevelopment consists of a total of 300 condominium units, 112,940 square feet of general office space, 141,048 square feet of specialty retail, a 39,203 square foot grocery store, and a 5,500 square-foot bank on twelve acres. The Site has three access points, two on Atlanta Road, and one on Spring Road.

At Total Build-Out (2009), the Site is expected to generate approximately 14,447 vehicle trips per day (gross), but after internal capture and pass-by trips are considered, it will generate approximately 9,385 new external trips (to/from the site) per day. Approximately 526 new external trips (327 in and 199 out) will be generated during the AM peak hour; approximately 984 new external trips (438 in and 546 out) will be generated during the PM peak hour.

Approximately 28% of the trips are expected to use Atlanta Road to/from the north; around 28% of the trips are expected to use Atlanta Road to/from the south; about 21% are expected to use Spring Road; about 20% are expected to use Concord Road; and the remaining 3% are expected to use local roads.

The Site consists of a mix of uses such that approximately 30% of the people anticipated to work on the site will have a reasonable opportunity to live within the Site.

The Site will be zoned Mixed-Use and complies with Smyrna Future Land Use Plan.

The Site is not located in an area where the anticipated level of development and availability of infrastructure within the study network is such that the Site is reasonably anticipated to result in unplanned and poorly served development.

Name and Number of DRI	Jonquil Village Redevelopment Plan DRI 1277
Jurisdiction	City of Smyrna, Cobb County, GA
Local Development Approval Sought	Re-zoning
Location	NE Quadrant Atlanta Rd at Spring Rd
Uses and Intensities of Use	185,751 square feet (sf) Retail & Service 112,940 sf Office & 300 Residential Units
Project Phasing and Build-Out	2009 Build-out
Trip Generation (ADT, AM, PM)	9,385, 526, 984



Capacity analysis indicated inadequate Levels of Service currently exist at the following intersections, and suggested mitigating improvements for each are listed.

- Atlanta Road at Church Street Signalize the intersection and add protected/permitted phasing for northbound left turns.
- Atlanta Road at Concord Road/Spring Road Modify the northbound, southbound, and westbound right-turn lanes to allow through movements in these lanes also (this will require the construction of third receiving lanes for each of these approaches), and add second left-turn lanes northbound and southbound on Atlanta Road. These improvements to achieve Level of Service D operations for existing traffic conditions should not require replacement of the railroad crossing bridge, but would probably require additional right-of-way acquisition to change Atlanta Road from a six-lane to an eight-lane cross-section and the addition of a third receiving lane on Concord Road. Changes to the traffic signal would also be required for the dual left-turn lanes, and the signal timing should be adjusted to optimize operations.

For Future Background conditions in the year 2009, without the project, the same intersections are expected to continue to operate at inadequate Levels of Service and require the same mitigating improvements identified for existing conditions.

- > Atlanta Road at Church Street Signalize the intersection.
- Atlanta Road at Concord Road/Spring Road Add third northbound, southbound, and westbound through movements to the existing right-turn lanes with receiving lanes and create dual northbound and southbound left-turn lanes. Modify the signal and adjust the signal timing to optimize operations.

For Future with Site traffic conditions in the year 2009, the same intersections are expected to continue to operate at inadequate Levels of Service and require the mitigating improvements identified for existing and background conditions:

- Atlanta Road at Church Street Signalize the intersection. In addition, add second northbound left-turn lane with a receiving lane. The westbound approach will require a separate left-turn lane. Even with these improvements, the Level of Service for the westbound left-turning vehicles during the weekday PM peak period is expected to be F.
- Atlanta Road at Concord Road/Spring Road Add third northbound, southbound, and westbound through movements to the existing right-turn lanes with receiving lanes and create dual northbound and southbound left-turn lanes. Modify the signal and adjust the signal timing to optimize operations. Even with these improvements, the Level of Service at this intersection during the PM weekday peak period is expected to be E, although an improvement over the existing conditions. Primarily because of the proximity of the intersection to the railroad crossing bridge, additional geometric improvements to achieve Level of Service D were not identified as feasible.



General Introduction

This report presents a variety of analyses and documentation for submittal as the major portion of the GRTA DRI Review Package. It focuses on the major elements that the Georgia Regional Transportation Authority (GRTA) requires as part of their Development of Regional Impact (DRI) Review Package. This report is composed of the following primary elements and/or documents: (1) Site Plan Elements; (2) a Traffic Impact Analysis; (3) a Facility Needs Assessment; (4) an Area of Influence Analysis; (5) an Air Quality Benchmark Statement; and, (6) a Summary of the DRI Review Criteria. There are other elements that are submitted with this report, including the GRTA Review Package Checklist, and electronic copies of these and other documentation are part of the total GRTA DRI Review Package.

These analyses have been initiated in response to a re-zoning from General Commercial and Light Industrial to Mixed-Use. Due to the size and characteristics of the Site, it qualifies for a Development of Regional Impact (DRI) level of review and analysis per rules and guidelines established by GRTA, the Atlanta Regional Commission (ARC), and the Georgia Department of Community Affairs (DCA). This is a rigorous, multi-step process, involving close coordination with GRTA, ARC, and the City of Smyrna. The Applicant has elicited to undertake the GRTA review via the Non-Expedited Review Process.

The Site Plan Elements, in both text and drawing form (in both hard copy and electronic format), are a description of the locations, types, characteristics, and amounts of land uses on the Site, and their inter-relationships. The Site Plan Elements also include a description of all access points (for both motorized and non-motorized users), including location, character, lane use, and traffic control. Site circulation characteristics, and the inter-relationships of the various pods, sections, or phases are also a required part of the Site Plan Elements. Another required feature of the Site Plan are the numbers, locations, and types of parking spaces provided, and their inter-relationship with the proposed land uses and access points. All of these items are discussed and/or analyzed below.

The Traffic Impact Analysis (Sections 3 through 5) presents an analysis of the traffic impact expected to result from the Site. This analysis establishes the existing traffic conditions in the vicinity of the Site, determines the effects of background traffic growth upon the study area, and assesses the impacts of the Site upon the vicinity roadways and intersections. The analysis of traffic operations is described for Existing conditions, Future Background conditions (existing traffic plus background growth by the Build-Out Year of the Site), and Future with Site conditions (existing traffic plus background growth plus the traffic expected from the Site). If negative impacts are identified, appropriate



mitigation is identified. This analysis is a requirement of GRTA, and is performed to GRTA study standards.

The Facility Needs Assessment (Section 6) is essentially a summary of the traffic impact analysis, providing in text and tabular form all of the required improvements under the various study scenarios, both with and without the Site. Thus it includes required improvements for Existing conditions, Future Background conditions, and Future with Site conditions.

The Area of Influence Analysis (Section 7) involves an analysis of the opportunities for the workforce from the Site to establish residence within the Site. It is an effort intended to confirm that the Site is so well designed and located as to reduce overall Vehicle Miles of Travel to less than typical developments of its size and type. This analysis is also a requirement of GRTA, and is also prepared according to GRTA study standards.

The Air Quality Benchmark Statement (Section 8) is a requirement of ARC. This evaluation also attempts to establish, following a different approach than GRTA, that the Site is so well designed and located as to reduce overall Vehicle Miles of Travel to less than typical developments of its size and type, and thus benefit regional air quality.

The GRTA DRI Review Criteria for Non-Expedited Review are contained in Sections 3-101 and 3-103(A) of the <u>Procedures and Principles for GRTA Development of Regional</u> <u>Impact Review</u>, January 14, 2002. Section 9 of the report focuses on Section 3-103(A), and addresses each criterion specifically, even though many of the criteria are also addressed elsewhere in the report.

Introduction to the Study Process

This study includes the following steps to determine the various impacts and needs of the Site:

- Attendance at one Methodology Meeting with the Georgia Regional Transportation Authority (GRTA);
- > Attendance at one Pre-Application Conference with GRTA;
- Inventory of the existing roadway network;
- Collection of existing traffic data;
- Identification of planned improvements to the road network;
- Identification of a background growth rate which will contribute traffic to the road network;
- Identification of other approved developments in the area which will contribute traffic to the road network;
- Detailed Site definition, including type, size and location of each land use, location and configuration of all external access points (both vehicular and pedestrian), location and configuration of all internal intersections and driveways



(and pedestrian crossing points), internal circulation characteristics, parking requirements and number and location of parking spaces provided, transit interface, if any, etc.;

- > Determination of the number of trips generated by the Site;
- Distribution and assignment of the new traffic onto the roadway network, for each land use, and for each scenario that GRTA has requested to be studied;
- Analysis of conditions of the key intersections for Existing conditions, Future Background conditions, and Future with Site conditions;
- Acquisition of various socio-economic information about both the Site and the Area of Influence;
- Definition of population and employment characteristics of both the Site and the Area of Influence, and comparison with GRTA's criteria;
- > Identification of Site elements that address ARC's air quality assessment;
- Reporting of results and conclusions, along with recommendations to mitigate any identified deficiencies; and,
- Summarization of the data and information that address GRTA's DRI Review Criteria.

In the following sections, the analysis of traffic operations is described for Existing conditions, Future Background conditions, and Future with Site conditions. The Area of Influence analysis is described, including study parameters, and Site and area analyses. ARC's air quality issues are addressed in relation to how the Site helps achieve ARC's regional goals. Finally, findings, conclusions, and recommendations are presented.



Site Description

The Site is located on the northeast quadrant of the intersection of Atlanta Road and Spring Road, in the City of Smyrna. Figure 2-1 shows the Site Orientation within the Atlanta Metropolitan Region. Figure 2-2 provides a more detailed Site Location Map. Figure 2-3 shows an aerial photograph of the near vicinity of the Site.

Types and Amounts of Development

The Site is proposed to be a mix of residential, retail, and office space above a single level of parking. The Site will be developed in one Phase. The analyses and report focus upon the conditions at Site Build-Out. The Build-Out Year for the Site is 2009 and consists of a total of 300 condominium units, 112,940 square feet of general office space, 141,048 square feet of specialty retail, a 39,203 square foot grocery store, and a 5,500 square foot bank. The Site Plan is shown in Figure 2-4.

The Site is bordered by Atlanta Road on the west, Spring Road on the south, and the CSX railroad on the east. A small historic building borders the Site on the north.

Site Parking Requirements

The parking requirements for the Site, per City of Smyrna Central Business District Guidelines, are:

- > 1 space per 1,000 square feet of office and commercial space; and
- > 1 space per unit for residential condominiums.

Based on the City of Smyrna's requirements, the Jonquil Village development must provide 604 parking spaces. The parking that the Site will be providing is 1,291 spaces. The parking ratios are summarized below:

- > 3.59 spaces per 1,000 square feet of office and retail space;
- > 1 reserved parking spaces per residential condominium.





Figure 2-1. Site Orientation within Atlanta Metropolitan Region



Jonquil Village GRTA DRI Report City of Smyrna, Cobb County, GA

0.00 g Ê Legacy Golf Links Fox Creek Windy Hill Ra Golf Club Beim Windy Hill Rd SE Windy Hill Rd SE DV pd St Smyrna Eank St SE Spring St SE Spring Rd S Spring Rd St Church St SE Medin St SE Site (280) Allanta Rd SE Concord Rd St 볈 Dunn St SE 20 š E. 20 Tolleson Cod Trail Sc phillipe. NORTH Rd R While Oak Lake 280) Dr SA Pranta No ot 設け 9 篮 Emory-Adventist @2007 Google - Map data @2007 NA

















Site Access Points and Driveways

The City of Smyrna is the permitting agency for driveway access. The existing site has nine (9) driveway access points onto Atlanta Road, and one (1) access point onto Spring Road. The Jonquil Village development is proposed to have three (3) driveway access points. Briefly, the driveways are as follows:

- At Intersection #3, the site access point will form a new eastern leg at the existing intersection of Church Street and Atlanta Road.
- At Intersection #7, the site access point will be Street B at Atlanta Road between the intersections of Church Street and Spring Road/Concord Road. Street B at Atlanta Road will be a right-turn only access point.
- At Intersection #8, the site access point will be the opposite end of Street B at Spring Road, east of the intersection of Spring Road at Atlanta Road. Street B at Spring Road will be a full-access driveway.

Local Plan Summary

The existing zoning of the Site is General Commercial, and Light Industrial. In order to develop the Site as intended, part or all of it must be re-zoned. The proposed new zoning is Mixed-Use.

The City of Smyrna's Future Land Use Plan indicates that the Site lies within a Mixed-Use zone, therefore, the Site is in conformance with the City's Future Land Use Plan. See Figure 2-5.

Pedestrian and Transit Facilities

External to the Site, there are existing sidewalks on:

- Both sides of Atlanta Road;
- Both sides of Spring Road;
- > Both sides of Concord Road, between King Street and Atlanta Road;
- > The south side of Concord Road, west of King Street;
- The west side of King Street;
- The north side of Church Street;
- > The west side of Memorial Place;
- Both sides of West Spring Street; and,
- > Both sides of Spring Street, east of the Railroad.

The developer is proposing on-site sidewalks linking all uses and buildings on the Site.

There is an existing Cobb Community Transit bus stop within 1/2 mile of the Site, at the intersection of Atlanta Road and Spring Road/Concord Road.



Figure 2-5. Future Land Use Plan





Site Plan Elements

As can be seen on the Site Plan (Figure 2-4), there are a number of enhancements that were included to provide for more efficient vehicle movements. These include (but are not limited to):

- Provision of three access points to separate and distribute traffic to the different buildings and parking facilities more efficiently;
- > A traffic signal at the main access point;
- An efficient on-site circulation system that provides multiple paths to all access points, and to all pods and sections of the Site;
- An on-site road network to significantly reduce unnecessary off-site movements and to provide options for ingress to/egress from the Site;
- Design of access points, in combination with parcel design, to minimize queuing problems for on-site intersections;
- > Multiple access points to every parking facility; and,
- Adequate capacity and turning storage lanes on-site, especially along the main access drive, for vehicles wishing to exit the Site.

The Site Plan also shows a number of enhancements to provide for more efficient pedestrian movements. These include (but are not limited to):

> An on-site pedestrian system that connects every building and every parking facility;

An on-site pedestrian system that connects every pod and section within the Site;

- > Pedestrian facilities concurrent with all vehicular access points to the Site;
- Crosswalks at all vehicular/pedestrian crossing points;

Connection of the on-site pedestrian system, as directly as is practical, to the offsite pedestrian systems of adjacent roadways and developments; and,

> Connections of the on-site pedestrian system to the off-site sidewalks along Atlanta Road and Spring Road.



Trip Generation

As noted above, the Site will consist of 300 residential units, 141,048 square feet of retail space, a 39,203 square foot grocery store, a 5,500 square foot bank, and 112,940 square feet of office space.

The number of vehicle trips expected from the Site was estimated. The trip generation was based on the Site Plan and information provided by the developer, and their architect, and site civil engineer.

The typical procedure for determining the traffic generated by a new development is to apply the rates or equations developed by the Institute of Transportation Engineers (ITE) as published in <u>Trip Generation</u>, 7th Edition, 2003, an ITE Informational Report, and related information in the <u>Trip Generation Handbook</u>, 2nd Edition, 2004, an ITE Recommended Practice. The rates and equations in these documents are calculated from nationally collected data. The rates and equations were used to estimate the number of trips expected for the Site. The ITE Land Use Codes used in the analyses are shown in Table 3-1.

Internal capture rates, published in ITE's <u>Trip Generation Handbook</u> between retail, residential, and office portions of the Site were used to reduce trips based on the mixed-use nature of the development.

Pass-by trips were also reduced from the trip generation for the retail portion of the Site. The pass-by rate was calculated using ITE's <u>Trip Generation Handbook</u>. The pass-by rate was found to be 33%. GRTA caps pass-by trips at 10% of the average daily traffic (ADT) on the adjacent roadway. The limits test was performed to determine whether the pass-by trips that would be expected based on the rates given in ITE's <u>Trip Generation</u> <u>Handbook</u> would be more than 10% of the ADT for the adjacent roadway. It was determined that the pass-by trips were expected to be 5% of the Year 2009 projected ADT for Atlanta Road and Spring Road.

Trip Generation has been determined for the Site Build-Out (Year 2009). The results of the trip generation are shown in Table 3-1.



ITE	Land Use	Do	ily	AM Peak Hour		PM Peak Hour		
Code			In	Out	In	Out	In	Out
230	Residential Condominium/Townhouse	300 units	817	817	21	103	99	49
710	General Office Building	112.940 ksf	733	732	182	25	35	170
814	Specialty Retail Center	141.048 ksf	3036	3036	92	58	158	202
850	Grocery Store	39.203 ksf	2008	2008	76	48	227	218
912	Drive - In Bank	5.500 ksf	630	630	38	30	126	126
	Total Trips		7224	7223	409	264	645	765
⊵ ct	Internally Captured Trips 12%			866	866	27	30	80
oje	Driveway Trips	6358	6357	382	234	565	685	
L P	Retail Pass-by Trips	1665	1665	55	35	127	139	
	New External Trips		4693	4692	327	199	438	546

Table 3-1. Site Build-Out (Year 2009) Trip Generation

Distribution and Assignment

The distribution of the trips generated by a development is determined by both the distribution of population (and residences, that is where people live) within the area, for employment and retail types of development, and the distribution of employment locations within the area for residential types of development. The distribution of the trips is to a lesser extent determined by the surrounding road system (which more directly affects traffic assignment). For the purposes of developing trip distribution, a radius of fifteen miles is used for both residential and employment types of land uses (with the assumption that the vast majority of home to work trips will be satisfied within that fifteen mile radius). Generally a five mile radius is used for retail related trips (for both neighborhood and community types of retail centers – regional retail centers have a much greater radius, which can exceed fifteen miles).

The trip distribution for the Site was calculated using Census data with the GIS software *Maptitude*.

The trip distribution for the Site, in its simplest terms, is as follows:

- > From north on Atlanta Road 30% retail trips, 30% office trips, 17% residential trips.
- > From south on Atlanta Road 27% retail trips, 27% office trips, 31% residential trips.
- > From west on Concord Road 24% retail trips, 27% office trips, 2% residential trips.
- > From west on Church Street 3% retail trips, 0% office trips, 0% residential trips.
- > From east on Spring Road 16% retail trips, 16% office trips, 50% residential trips.

The trip distributions developed for the Site are shown in Figure 3-1 for Site Build-Out (Year 2009).





Figure 3-1. Site Build-Out (Year 2009) Trip Distribution



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Figure 3-2. Site Build-Out (Year 2009) Traffic Volumes



Identification of the Study Network

An early step in the development of a study and report for the GRTA DRI Non-Expedited Review Process is the determination of the Study Network utilizing the 7% Rule. The 7% Rule requires study of each roadway segment that is impacted to determine if traffic from the Site consumes 7% or more of the Service Volume (volume at a specific Level of Service (LOS), usually D) of that roadway segment. The LOS Standards are intended to be established by each jurisdiction, although many have not yet officially done so, thus LOS D is generally used as a default value (and LOS C may be used as a default in more rural areas). The LOS standard for the City of Smyrna is assumed to be LOS D.

This effort, to determine how much of the Service Volume on all roadway segments within several miles of the Site is consumed by the Site, requires a potentially extensive roadway and traffic control inventory. The inventory provides information for each roadway segment within a reasonable distance from the Site. This information is presented to GRTA at the Methodology Meeting on either a map and/or a spreadsheet. The information that GRTA wishes to see includes: the portion of the gross 24-hour two-way Site traffic assigned to each roadway segment (this requires that trip generation, trip distribution and traffic assignment be performed in advance); a description of each roadway segment (numbers of lanes, existence of a median, amount and types of traffic control, existence of left turn lanes, functional classification of the roadway, jurisdictional control of the roadway (State or Non-state), etc.); the Level of Service standard for each roadway segment; the Service Volume threshold for each roadway segment; the number of trips and percent of total trip generation from the Site assigned to each roadway segment; and the percent of Service Volume consumed by the Site on each roadway segment.

The generalized Annual Average Daily Traffic volumes adopted by GRTA are used for the roadway service volumes. Where the daily trips generated by the Site exceed 7% of the two-way daily roadway service volumes at the appropriate Level of Service standard, the roadway segment is included in the Study Network. In addition to specific roadway segments being identified, the level of analysis (detailed level or planning level) is also established. Finally, the study intersections to be analyzed are also identified.

Figure 3-3 presents a graphic of the overall Study Area.









After consultation with GRTA, the following intersections were agreed upon for investigation as part of the Traffic Impact Analysis.

- > All three Site driveway access points;
- > West Spring Street/Spring Street at Atlanta Road;
- Memorial Place at Atlanta Road;
- King Street at Concord Road;
- > Concord Road/Spring Road at Atlanta Road; and,
- > Jonquil Drive at Spring Road.

Figure 3-4 shows the location of the study intersections, and Figure 3-5 shows the existing traffic controls and lane configurations at the study intersections.





Figure 3-4. Location of Study Intersections



Jonquil Village GRTA DRI Report City of Smyrna, Cobb County, GA



Figure 3-5. Existing Traffic Controls and Lane Configurations



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Existing Roadway Facilities

To determine existing traffic conditions of the identified study roadway segments and study intersections in the area, an inventory was made of the major roads surrounding the Site. The physical and traffic control elements of each of the roadways, as well as the functional classification and other important elements for the study roadways, follows:

Spring Road is a four-lane Urban Minor Arterial roadway that runs east from Atlanta Road where it aligns with Concord Road. Spring Road is on a bridge over the rail corridor to Cobb Parkway. The posted speed limit is 45 mph with traffic signals at major intersections. There is a median from Jonquil Drive to Woodruff Drive and Spring Road continues east with a center two-way left turn lane.

Atlanta Road runs southeast from the City of Marietta (as a continuation of Atlanta Street) to the City of Atlanta (as Marietta Street). Atlanta Road has four lanes with a center twoway left turn lane. The posted speed limit is 45 mph with traffic signals at major intersections. Atlanta Road is classified as an Urban Collector Street. The main Atlanta to Chattanooga rail corridor runs on the east side of Atlanta Road in the vicinity of the site.

Concord Road is a four-lane roadway in the vicinity of Atlanta Road that runs southwest from Atlanta Road, where it aligns with Spring Road, to intersect with South Cobb Drive as an Urban Minor Arterial, and to the East West Connector and Floyd Road as an Urban Collector roadway. The posted speed limit is 40 mph with traffic signals at major intersections.

Church Street is a two-lane roadway that runs between Atlanta Road and South Cobb Drive. It is a local residential street with a 25 mph speed limit. One of the Jonquil Village access points is proposed to align with Church Street at its intersection with Atlanta Road.

Spring Street/Roswell Street/Smyrna Roswell Road are two-lane local roadways that run east from a signalized intersection at Atlanta Road to intersect Windy Hill Road to the northeast and Spring Road to the east. The posted speed limit is 35 mph.

King Street is a two-lane road with a 25 mph speed limit. It runs south from Village Green Circle to intersect with Concord Road. King Street serves both commercial and residential land uses.

Jonquil Drive is a two-lane road that runs from south from a signalized intersection at Spring Street. Jonquil Drive is a local road with a 25 mph speed limit that serves primarily commercial uses along with some residential and industrial uses near its south end.



Existing Traffic Volumes

After consultation with GRTA, it was determined that capacity analyses would be performed at the study intersections for the weekday AM peak hour and the weekday PM peak hour. For these two peak periods, turning movement counts were collected on Wednesday, May 2, and Thursday May 17at the following intersections:

- West Spring Street/Spring Street at Atlanta Road;
- Memorial Place at Atlanta Road;
- King Street at Concord Road;
- > Concord Road/Spring Road at Atlanta Road; and,
- Jonquil Drive at Spring Road.

Additionally, a 14-hour turning movement count was collected at the intersection of Church Street at Atlanta Road, on Thursday, May 3.

Figure 4-1 shows the existing volumes at the study intersections for the weekday AM peak hour and the weekday PM peak hour.

Average Daily Traffic (ADT) volumes were acquired from the Georgia Department of Transportation's (GDOT) permanent counting stations located in the study area for the six year period 2000 to 2005.





Figure 4-1. Traffic Volumes: Existing

Jonquil Village GRTA DRI Report City of Smyrna, Cobb County, GA

Programmed Improvements

The local Transportation Improvement Program (TIP), the State Transportation Improvement Program (STIP), the Regional Transportation Plan (RTP), and the Georgia Department of Transportation's (GDOT's) Construction Work Program have been researched to determine if there are any proposed transportation improvements, either programmed or planned, that would impact the Site. For identified projects, the opening-to-traffic dates, sponsors, costs of projects, funding sources, and logical termini are usually also identified.

The following improvements are scheduled to be completed by the total Build-Out Year for the Site, Year 2009:

- CO-AR-299– Atlanta Road from Concord Road to Fleming Street; Intersection improvements and multi-use path; Completion date is 2008; est. \$1,955,401; Federal and Local Funding Sources.
- CO-374 Railroad at Fleming Street/Hawthorne Avenue, Spring Street, and Nickajack Road crossings; Railroad quiet zones; Completion date is 2009; est. \$1,250,000; Federal and Local Funding Sources.

There are other relevant transportation improvements that are programmed just beyond the Build-Out Year of the Site. These have been identified as:

- CO-373 Atlanta Road from Spring Road/Concord Road to Ridge Road; Multiuse path; Completion date is 2010; est. \$1,250,000; Federal and Local Funding Sources.
- CO-375– Spring Street; Pedestrian bridge over railroad; Completion date is 2010; est. \$1,250,000; Federal and Local Funding Sources.

It is important at this juncture to distinguish between "required" improvements, and "programmed" improvements. "Required" improvements are those that are necessary to support the Existing or Future conditions. That is, they are improvements required to improve the projected Level of Service back to (or better than) the LOS Standard. "Programmed" improvements are those improvements that have been proposed, planned for, and programmed for implementation (most often by a governmental agency). "Programmed" improvements generally already have an identified sponsoring agency, a funding source, a programmed amount of funds for implementation, and a scheduled or projected date for construction and opening to traffic. "Required" improvements and "programmed" improvements may be very similar, or very different.



Capacity Analysis Methodology

Level of Service Standards

Operating conditions at intersections and roadway segments are evaluated in terms of Levels of Service (LOS).

Levels of Service A through E are generally considered to be adequate peak hour operations. LOS F is generally considered an inadequate peak hour condition. However, for the GRTA DRI process, the City of Smyrna's LOS Standards for the roadways in the Study Area are assumed to be LOS D. That is, LOS D is assumed to be the Standard for Arterial Thoroughfares, Major and Minor Thoroughfares, and Collectors. This Standard means that it is desirable, after new development has been put in place, that no less than a LOS D be maintained. However, GRTA accepts exceptions to this guideline. For example, if the LOS at a specific location degrades to LOS E when existing traffic is considered, then GRTA finds as acceptable, after background traffic, and again after the Site's traffic has also been added to the specific location, a return to LOS E.

Intersection Capacity Analysis Methodology

Capacity analyses of the study intersections were completed using procedures in the <u>Highway Capacity Manual (HCM), Millennium Edition</u>. This is the usual methodology for the analysis of traffic conditions. The software program *Synchro* 6 (a nationally recognized computer software package for analyzing capacities and Levels of Service) was used to perform the capacity analyses for the study intersections.

Levels of Service for <u>signalized</u> intersections are reported in composite fashion, i.e., one LOS for the entire intersection, and are presented in terms of average control delay. Individual turning movements at signalized intersections may experience inadequate LOS, particularly where those volumes are relatively low, while the intersection as a whole has an adequate LOS. This is because the major movements on the major roadway are given priority in assigning signal green time.

Traffic conditions at <u>unsignalized</u> intersections, with stop sign control on the minor street only, are evaluated for the minor street approach(es) and for the left turns from the major street. This is because the major street traffic is assumed to have no delay since there is no control (no stop sign). Inadequate Levels of Service for minor street approaches to unsignalized intersections are not uncommon, as the continuous flow traffic will always get the priority.



Levels of Service for <u>all-way STOP controlled</u> intersections are reported both for study intersection movements, and in composite fashion, i.e., one LOS for the entire intersection, and are based on average control delay.

The <u>Highway Capacity Manual</u> Level of Service criteria for signalized and unsignalized intersections are shown in Table 4-1.

Level of Service	Control Delay (seconds per vehicle)						
	Signalized Intersection	Unsignalized Intersection					
Α	≤ 10	≤ 10					
В	>10 and ≤20	>10 and ≤15					
С	>20 and ≤35	>15 and ≤25					
D	>35 and ≤55	>25 and ≤35					
E	>55 and ≤80	>35 and ≤50					
F	> 80	> 50					

 Table 4-1. Highway Capacity Manual Intersection LOS Criteria

Source: Highway Capacity Manual, Millennium Edition.

For two-way stop controlled intersections, the <u>Highway Capacity Manual</u> does not calculate a composite Level of Service for the entire intersection. For this reason, the Intersection Capacity Utilization (ICU) method was used to show the intersection LOS. The ICU output is analogous to the intersection volume to capacity ratio. This is different from the methodology used for HCM LOS. The ICU LOS provides a valuable measure of the difference in LOS expected under different traffic volume and lane configuration scenarios for the entire intersection under unsignalized conditions. The ICU LOS criteria for the overall intersection for two-way stop controlled intersections are shown in Table 4-2.



Level of Service	Intersection Capacity Utilization
Α	0% to 55%
В	>55% to 64%
С	>64% to 73%
D	>73% to 82%
E	>82% to 91%
F	>91%

Table 4-2. Intersection Capacity Utilization LOS Criteria

Source: based upon Synchro 6.

The Intersection Capacity Utilization Level of Service was reported for only the overall intersection LOS for two-way stop controlled intersections. The <u>Highway Capacity</u> <u>Manual</u> LOS is reported for the individual movements for two-way stop controlled intersections. All other LOS reported in this study are the HCM LOS.

Intersection Capacity Analysis

Using the methodologies previously described, intersection Levels of Service were determined for the study intersections for Existing conditions.

Existing Traffic Controls and Lane Configurations

Table 4-3 presents the results of the intersection capacity analysis for Existing conditions. Printouts of these analyses are included in the Appendix.



Intersection		Intersection Control Movement				PM		
#	Name	Connor	Movement	LOS	Delay (s)	LOS	Delay (s)	
1	Atlanta Rd at West Spring St/Spring St	Traffic Signal	Overall	А	9.9	В	19.1	
2	Atlanta Rd at Memorial Place	None	Overall	А	0.0	A	0.0	
3	Atlanta Rd at Church St	Side	NBL	А	0.7	F	142.6	
		Street Stop Sign	EB	В	14.6	F	>1000	
			Overall	A*	3.3	E*	>1000	
4	Concord Rd at King St	Traffic Signal	Overall	В	12.5	В	10.1	
5	Atlanta Rd at Concord Rd/Spring Rd	Traffic Signal	Overall	D	52.0	F	93.6	
6	Spring Rd at Jonquil Dr	Traffic Signal	Overall	В	16.2	В	10.4	

Table 4-3. Intersection LOS: Existing Traffic Conditions

*ICU LOS

As can be seen from Table 4-3, all of the movements, and all of the overall intersection operations, function at adequate Levels of Service for Existing conditions, except at the following locations:

- At the intersection of Atlanta Road at Church Street, the northbound left turn and eastbound left turn movements operate inadequately during the PM peak hour; and,
- The intersection of Atlanta Road at Concord Road/Spring Road operates inadequately overall during the PM peak hour.

Required Improvements

Table 4-3 identifies deficiencies that already exist at the study intersections. Improvements have been identified, that if implemented immediately, could correct the Existing deficiencies. Their impacts on the intersections are shown in Table 4-4. (See also Table 6-1 for a summary of the improvements required for Existing conditions.)



Intersection AM РМ Control Movement Improvement Delay Delay LOS LOS # Name (s) (S) Atlanta Rd at Traffic Signalize with protected/ 3 А 6.5 С 29.0 Overall Church St Signal permitted NB left turns Add 2nd NB & SB left-turn lanes. Atlanta Rd at Traffic Convert NB, SB, & WB right С 5 Concord Overall 34.1 D 45.0 Signal turn lanes to shared Rd/Spring Rd thru/right lanes (with receiving lanes),

 Table 4-4. Intersection LOS: Existing with Required Improvements

As can be seen from Table 4-4, the following required improvements are expected to bring the intersections back into adequacy for Existing conditions:

- At the intersection of Atlanta Road at Church Street, signalize the intersection and provide protected/permitted phasing for northbound left turns; and,
- > At the intersection of Atlanta Road at Concord Road/Spring Road:
 - Convert the existing northbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second northbound left-turn lane;
 - Convert the existing southbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second southbound left-turn lane;
 - Convert the existing westbound right turn lane to a shared through/right-turn lane, and construct a corresponding receiving lane.

Figure 4-2 shows the lane configurations and traffic control that would be required to mitigate the Existing deficiencies.

Table 4-5 shows the Levels of Service to be used for the analyses.

	Intersection	Approach	Levels of		
#	Name	Approach	AM	PM	
1	Atlanta Rd at West Spring St/Spring St	Overall	D	D	
2	Atlanta Rd at Memorial Place	Overall	D	Е	
3	Atlanta Rd at Church St	Overall	D	D	
4	Concord Rd at King St	Overall	D	D	
5	Atlanta Rd at Concord Rd/Spring Rd	Overall	D	E	
6	Spring Rd at Jonquil Dr	Overall	D	D	

Table 4-5. Calculated Intersection Levels of Service Standards





Figure 4-2. Required Improvements: Existing Traffic Conditions

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Year 2009 Future Background

Between the time this study is performed and the Site is built in Year 2009, the traffic volumes on the adjacent roadways are expected to increase. This is due to other development which will take place both in the study area by the Year 2009, as well as growth outside of it, whether or not the Site being studied is built. This growth is called background traffic growth. There are generally two components to background traffic growth:

- (a) growth close to the Site due to specific, identified developments already in the "pipeline" (that is, actual nearby developments already approved, or further along in the approval process, that can reasonably be expected to be built by Build-out of the Site), sometimes called "background development"; and
- (b) general traffic growth along major roadways due to the expanding nature of the region, and to other non-specific development further from the Site, often simply referred to as "background growth".

No background developments have been identified close enough to the Site, and proposed to either reach build-out, or sustain some amount of development, either before or in the same time frame as Site Build-Out (Year 2009).

Traffic volumes are expected to increase due to other developments that are not in the immediate vicinity, but that will contribute traffic to the road network ("background growth"). Growth of this nature can generally be determined by examining historic trends in the vicinity of the Site, and by applying those trends to the appropriate roadways.

Historical traffic volume trends on the study network were taken into account. Where available, the last six years (2000 – 2005) of historical Annual Average Daily Traffic (AADT) collected by GDOT were used to help develop traffic volume trends on the study area roadways.

Based upon this historical data, there are two different methodologies for projecting future year traffic volumes (either directly for roadways with the historical data, or indirectly for similar types of roadways in the study area). The first methodology is to calculate the average annual growth, and apply that growth, including compounding as appropriate, to project traffic volumes.

The second methodology is to use linear regression, and the "Forecast" tool within MS Excel, to smooth out the annual rises and dips and project future growth. The "Forecast" tool calculates, or predicts, a future value by using existing values. The



predicted value is a y-value for a given x-value. The known values are existing y-values (the traffic volumes for the years 2000 through 2005) and the known x-values (the years 2000 through 2005). Linear regression, using the "Forecast" tool within MS Excel, was used in this analysis. Table 5-1 shows the historical data, as well as the future projections based upon the linear regression methodology.

 Table 5-1. Percentage Growth of Study Network Segments

Roadway	Between	And	Traffic Count Station	2000 Traffic Volumes	2001 Traffic Volumes	2002 Traffic Volumes	2003 Traffic Volumes	2004 Traffic Volumes	2005 Traffic Volumes	Annual Growth 2000 to 2005
Spring Rd	Atlanta Rd	Jonquil Dr	2805	26,400	27,354	28,024	28,711	28,612	26,540	0.11%
Concord Rd	Concord Cir	Dunton St	2799	24,961	26,282	29,354	24,751	27,548	27,830	2.20%
Weighted Average Growth Rate										1.15%

Based on the historical traffic volumes collected in the vicinity of the Site and after discussion with GRTA staff, a 2% annual traffic growth percentage was used.

The Year 2009 Future Background traffic volumes were developed by adding the background growth out to the Year 2009 to existing traffic. The Year 2009 Future Background traffic volumes are shown in Figure 5-1.





Figure 5-1. Traffic Volumes: Year 2009 Future Background

Jonquil Village GRTA DRI Report City of Smyrna, Cobb County, GA

Intersection Capacity Analysis

Using the methodologies previously described, intersection Levels of Service were determined for the study intersections for Year 2009 Future Background conditions.

Existing Traffic Controls and Lane Configurations

Table 5-2 presents the results of the intersection capacity analyses for Year 2009 Future Background traffic conditions, assuming existing lane configurations and traffic control.

	Intersection	ction Control Movement			AM	PM		
#	Name	Connor	Movement	LOS	Delay (s)	LOS	Delay (s)	
1	Atlanta Rd at West Spring St/Spring St	Traffic Signal	Overall	В	10.7	С	23.4	
2	Atlanta Rd at Memorial Place	None	Overall	А	0.0	В	0.0	
		Side	NBL	А	0.7	F	207.6	
3	Atlanta Rd at Church St	Street Stop	EB	С	15.2	F	>1000	
			Overall	A*	3.4	E*	>1000	
4	Concord Rd at King St	Traffic Signal	Overall	В	14.9	В	11.6	
5	Atlanta Rd at Concord Rd/Spring Rd	Traffic Signal	Overall	E	59.8	F	108.9	
6	Spring Rd at Jonquil Dr	Traffic Signal	Overall	В	17.4	В	12.1	

 Table 5-2. Intersection LOS: Year 2009 Future Background

*ICU LOS

As can be seen from Table 5-2, all of the movements, and all of the overall intersection operations, are expected to function at adequate Levels of Service for Year 2009 Future Background conditions, except at the following locations:

- At the intersection of Atlanta Road at Church Street, the northbound left turn and the eastbound movements are expected to operate inadequately during the PM peak hour; and,
- The intersection of Atlanta Road at Concord Road/Spring Road is expected to operate inadequately during both the AM and the PM peak hours.



Required Improvements

Table 5-2 identifies deficiencies that are expected to exist at the study intersections for Year 2009 Future Background conditions. Improvements have been identified that would be expected to correct the Year 2009 Future Background deficiencies. Their impacts on the Year 2009 Future Background deficiencies are shown in Table 5-3.

Table 5-3. Intersection LOS: Year 2009 Background with Improvements

	Intersection					AM		PM
#	Name	Control	Movement	Improvement	LOS	Delay (s)	LOS	Delay (s)
3	Atlanta Rd at Church St	Traffic Signal	Overall	 Signalize with NB left turn protected/permitted phase 	A	8.7	D	41.1
5	Atlanta Rd at Concord Rd/Spring Rd	Traffic Signal	Overall	 Add 2nd NB & SB left-turn lanes. Convert NB, SB, & WB right turn lanes to shared thru/right lanes (with receiving lanes), 	D	46.6	D	53.0

As can be seen from Table 5-3, the same improvements required for existing conditions would be expected to bring the intersections back into adequacy for Year 2009 Future Background conditions:

- At the intersection of Atlanta Road at Church Street, signalize the intersection and provide protected/permitted phasing for northbound left turns; and,
- > At the intersection of Atlanta Road at Concord Road/Spring Road:
 - Convert the existing northbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second northbound left-turn lane;
 - Convert the existing southbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second southbound left-turn lane;
 - Convert the existing westbound right turn lane to a shared through/right-turn lane and construct a corresponding receiving lane.

Figure 5-2 shows the lane configurations and traffic control that would be required to mitigate the Year 2009 Future Background deficiencies.





Figure 5-2. Required Improvements: Year 2009 Future Background



Year 2009 Future with Site Conditions

The projected volumes for Site Build-Out were added to the Year 2009 Future Background traffic volumes to represent the total traffic expected in the area when the Site is complete. The Year 2009 Future with Site traffic volumes are shown in Figure 5-3.

Intersection Capacity Analysis

Using the methodologies previously described, intersection Levels of Service were determined for the study intersections for Year 2009 Future with Site conditions.

Existing Traffic Controls and Lane Configurations

Table 5-4 presents the results of the intersection capacity analysis for Year 2009 Future with Site conditions, but still assuming the existing lane configurations and traffic control.

	Intersection	Control	Movement	AM		PM	
#	Name	Connor	Movemeni	LOS	Delay (s)	LOS	Delay (s)
1	Atlanta Rd at West Spring St/Spring St	Traffic Signal	Overall	В	10.1	D	38.6
2	Atlanta Rd at Memorial Place	None	Overall	A*	0.0	В*	0.0
			NBL	А	0.6	F	183.0
		Side Street	SBL	В	2.4	F	69.7
3	Atlanta Rd at Church St	side sileei	EB	С	18.2	F	>1000
		3100	WBL/T/R	F	>1000	F	>1000
			Overall	F*	775.2	F*	>1000
4	Concord Rd at King St	Traffic Signal	Overall	D	36.1	В	15.4
5	Atlanta Rd at Concord Rd/Spring Rd	Traffic Signal	Overall	Е	78.2	F	159.2
6	Spring Rd at Jonquil Dr	Traffic Signal	Overall	В	18.6	В	12.3
7	Atlanta Pd at Stroat B	Side Street	WBR	В	11.2	С	20.4
/		Stop	Overall	A*	0.1	C*	0.2
		Cide Street	SB	В	10.6	E	49.0
8	Spring Rd at Street B	stop	EBL	А	0.0	А	0.3
		3100	Overall	C*	0.2	C*	2.8
		;					

Table 5-4. Intersection LOS: Year 2009 Future with Site





Figure 5-3. Traffic Volumes: Year 2009 Future with Site

Jonquil Village GRTA DRI Report City of Smyrna, Cobb County, GA As can be seen from Table 5-4, all of the movements, and all of the overall intersection operations, are expected to function at adequate Levels of Service for Year 2009 Future with Site conditions, except at the following locations:

- > At the intersection of Atlanta Road at Church Street;
 - The northbound left turn movement is expected to operate inadequately during the PM peak hour;
 - The southbound left turn movement is expected to operate inadequately during the PM peak hour;
 - The eastbound approach is expected to operate inadequately during the PM peak hour; and,
 - The westbound approach is expected to operate inadequately during both the AM and PM peak hours.
- > The intersection of Atlanta Road at Concord Road/Spring Road is expected to operate inadequately during both the AM and PM peak hours.

Required Improvements

Table 5-4 identifies deficiencies that are expected to exist at the study intersections for Year 2009 Future with Site conditions. Improvements have been identified that would be expected to correct the Year 2009 Future with Site deficiencies. Their impacts on the Year 2009 Future with Site deficiencies are shown in Table 5-5.

Table	5-5.	Intersection	LOS: Year	2009 with	Site with	Improvements
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	Intersection		AM		PM			
#	Name	Control	Movement	Improvement	LOS	Delay (s)	LOS	Delay (s)
3	Atlanta Rd at Church St	Traffic Signal	Overall	 Signalize with dual NB left- turn lanes. 	В	14.2	D	43.3
5	Atlanta Rd at Concord Rd/Spring Rd	Traffic Signal	Overall	 Add 2nd NB & SB left-turn lanes. Convert NB, SB, & WB right turn lanes to shared thru/right lanes (with receiving lanes), 	D	45.1	E	74.3



As can be seen from Table 5-5, the following required improvements are expected to bring the intersections back into adequacy for Year 2009 Future with Site conditions:

- At the intersection of Atlanta Road at Church Street, signalize the intersection (required for existing and background conditions), provide dual northbound leftturn lanes; and,
- > At the intersection of Atlanta Road at Concord Road/Spring Road:
 - Convert the existing northbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second northbound left-turn lane;
 - Convert the existing southbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second southbound left-turn lane; and,
 - Convert the existing westbound right turn lane to a shared through/right-turn lane and construct a corresponding receiving lane.

These are the same improvements identified as required for existing and background conditions without the project traffic at this intersection. Additional improvements to achieve an adequate LOS are infeasible due to the proximity of the intersection of Atlanta Road at Concord Road/Spring Road to the railroad crossing bridge.

Figure 5-4 shows the lane configurations and traffic control that would be required to mitigate the Year 2009 Future with Site deficiencies.





Figure 5-4. Required Improvements: Year 2009 Future with Site

Jonquil Village GRTA DRI Report City of Smyrna, Cobb County, GA



Introduction

This section of the study presents a summary of the findings of the foregoing traffic impact analyses. The findings that are summarized include the various scenarios studied: Existing conditions, Future Background conditions, and Future with Site conditions. A summary is also provided of the <u>required</u> transportation improvements, for each traffic scenario studied. As a basis of comparison, a summary of all <u>programmed</u> transportation improvements that affect the Site is provided.

Programmed Improvements

The County Transportation Improvement Program (TIP), State Transportation Improvement Program (STIP), Regional Transportation Plan (RTP), and the Georgia Department of Transportation's (GDOT's) Construction Work Program were researched to determine the opening-to-traffic dates, sponsors, costs of projects, funding sources, and logical termini of all projects in the study network. There are a number of transportation improvements that are programmed within the area.

The following improvements are scheduled to be complete by the Site Build-Out Year 2009:

- CO-AR-299– Atlanta Road from Concord Road to Fleming Street; Intersection improvements and multi-use path; Completion date is 2008; est. \$1,955,401; Federal and Local Funding Sources.
- CO-374 Railroad at Fleming Street/Hawthorne Avenue, Spring Street, and Nickajack Road crossings; Railroad quiet zones; Completion date is 2009; est. \$1,250,000; Federal and Local Funding Sources.

The following additional improvements are programmed within the study area beyond the Site Build-Out Year 2009:

- CO-373 Atlanta Road from Spring Road/Concord Road to Ridge Road; Multi-use path; Completion date is 2010; est. \$1,250,000; Federal and Local Funding Sources.
- CO-375– Spring Street; Pedestrian bridge over railroad; Completion date is 2010; est. \$1,250,000; Federal and Local Funding Sources.



Existing Conditions Needs

Table 6-1 presents a summary of the improvements required for Existing conditions.

	Intersection					AM		PM
#	Name	Control	Movement	Improvement	LOS	Delay (s)	LOS	Delay (s)
3	Atlanta Rd at Church St	Traffic Signal	Overall	 Signalize with NB left turn protected/permitted phase 	А	6.5	С	29.0
5	Atlanta Rd at Concord Rd/Spring Rd	Traffic Signal	Overall	 Add 2nd NB & SB left-turn lanes. Convert NB, SB, & WB right turn lanes to shared thru/right lanes (with receiving lanes) 	С	34.1	D	45.0

Table 6-1. Required Improvements: Existing

As can be seen from Table 6-1, the following required improvements are expected to bring the intersections back into adequacy for Existing conditions:

- At the intersection of Atlanta Road at Church Street, signalize the intersection and provide protected/permitted phasing for northbound left turns; and,
- > At the intersection of Atlanta Road at Concord Road/Spring Road:
 - Convert the existing northbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second northbound left-turn lane;
 - Convert the existing southbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second southbound left-turn lane;
 - Convert the existing westbound right turn lane to a shared through/right-turn lane, and construct a corresponding receiving lane.



Site Build-Out (Year 2009) Conditions Needs

Year 2009 Future Background

Table 6-2 presents a summary of the improvements required for Year 2009 Future Background conditions.

Intersection						AM		PM	
#	Name	Control	Movement	Improvement	LOS	Delay (s)	LOS	Delay (s)	
3	Atlanta Rd at Church St	Traffic Signal	Overall	 Signalize with NB left turn protected/permitted phase 	A	8.7	D	41.1	
5	Atlanta Rd at Concord Rd/Spring Rd	Traffic Signal	Overall	 Add 2nd NB & SB left-turn lanes. Convert NB, SB, & WB right turn lanes to shared thru/right lanes (with receiving lanes) 	D	46.6	D	53.0	

Table 6-2. Required Improvements: Year 2009 Future Background

As can be seen from Table 6-2, the following improvements, required for the Existing conditions, are be expected to bring the intersections back into adequacy for Year 2009 Future Background conditions.

- At the intersection of Atlanta Road at Church Street, signalize the intersection and provide protected/permitted phasing for northbound left turns; and,
- > At the intersection of Atlanta Road at Concord Road/Spring Road:
 - Convert the existing northbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second northbound left-turn lane;
 - Convert the existing southbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second southbound left-turn lane;
 - Convert the existing westbound right turn lane to a shared through/right-turn lane, and construct a corresponding receiving lane.



Year 2009 Future with Site

Table 6-3 presents a summary of the improvements required for Year 2009 Future with Site conditions.

	Intersection		Move		Α	Μ	P	Μ
#	Name	Control	ment	Improvement	LOS	Delay (s)	LOS	Delay (s)
3	Atlanta Rd at Church St	Traffic Signal	Overall	 Signalize with dual NB left- turn lanes 	В	14.0	D	37.1
5	Atlanta Rd at Concord Rd/Spring Rd	Traffic Signal	Overall	 Add 2nd NB & SB left-turn lanes. Convert NB, SB, & WB right turn lanes to shared thru/right lanes (with receiving lanes), 	D	45.1	Е	74.3

Table 6-3. Required Improvements: Year 2009 Future with Site

As can be seen from Table 6-3, the following required improvements (in addition to those required for the Existing and Year 2009 Future Background conditions) are be expected to bring the intersections back into adequacy for Year 2009 Future with Site conditions:

- At the intersection of Atlanta Road at Church Street, signalize the intersection, provide dual northbound left-turn lanes; and,
- > At the intersection of Atlanta Road at Concord Road/Spring Road:
 - Convert the existing northbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second northbound left-turn lane;
 - Convert the existing southbound right turn lane to a shared through/right-turn lane, construct a corresponding receiving lane, and add a second southbound left-turn lane;
 - Convert the existing westbound right turn lane to a shared through/right-turn lane and construct a corresponding receiving lane.

Additional improvements to achieve an adequate LOS are infeasible due to the proximity of the intersection of Atlanta Road at Concord Road/Spring Road to the railroad crossing bridge.



Introduction

This section of the study presents an analysis of the opportunities for the employees of Jonquil Village to find residence in the Area of Influence (AOI). The DRI is classified as "mixed-use" for the purpose of this analysis. This analysis will focus on comparing the 748 workers anticipated to be employed in the approximately 298,691 square feet of retail and office space in the DRI to the 450 workers expected to live in the 300 residential dwelling units in the DRI.

This section will describe the study parameters and methodologies, the sources of data used for the analysis, information concerning the demographics and economic conditions in the site area and the AOI, and the estimate of work-related single-occupant (SOV) vehicle trips that will be satisfied within the DRI. The following sections of the report will address Criterion 7a of Section 3-103 of GRTA's Development of Regional Impact (DRI) requirements. Criterion 7a states:

- 7. The proposed DRI:
 - (a) Contains a mix of uses which are reasonably anticipated to contribute to a balancing of land uses such that it would be affordable for at least ten percent (10%) of the persons who are reasonably anticipated to be employed in the proposed DRI are reasonably anticipated to have an opportunity reside within the DRI.

The following sections will more fully describe:

- > The type of DRI land uses and jobs anticipated to be found within the project;
- > The wage levels of the jobs anticipated to be found within the project;
- > Types and costs of DRI housing choices;
- > Housing affordability within the DRI; and
- > Findings related to meeting GRTA's Evaluation Criterion.

Study Parameters and Methodology

This analysis required the identification of an Area of Influence (AOI) boundary for the project. The project's AOI was determined using Caliper Corporation's *TransCAD* software to map six (6) road miles from the site. The intersection closest to the site was identified as Atlanta Road at Spring Road. *TransCAD* was used to measure six road miles from the nearest intersection in all directions to obtain the AOI boundaries. A map of the AOI area is provided in Figure 7-1.





Figure 7-1. AOI Boundary



In order to identify the employment, population, housing, household and other data for the Area of Influence, the boundaries were created in a geographic information system (GIS) format and were placed over a GIS layer of the census tracts containing the applicable data from the 2000 U.S. Census. Census tracts located within or intersecting with the AOI were identified from the region's total census tracts. Where 2000 U.S. Census data were not available, the analysis incorporated data from other sources, including the Atlanta Regional Commission (ARC), U.S. Bureau of Labor Statistics, the Government National Mortgage Association (Ginnie Mae), and ESRI. The sources and methodologies for obtaining data for various elements of the AOI analysis have been referenced throughout the document.

Project Employment Analysis

The DRI is proposed to contain 112,940 square feet of office space and 185,751 square feet of retail space. Using assumed ratios of one (1) office worker per 300 square feet and one (1) retail worker per 500 square feet of retail building space, the number of employees was calculated. Table 7-1 shows the results of the analysis.

Land Use	Intensity (SF)	1 Employee per SF	Number of Employees					
Office	112,940	300	376					
Retail	185,751	500	372					
	TOTAL	TOTAL						

Table 7-1. DRI Employment	ŀ
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Source: GRTA's Area of Influence Guidebook, April 10, 2003

Assuming an 80/20 split for managers to other non-manager or hourly workers, these figures were then placed into sub-categories. Considering the abundance of occupations that could be housed in general office space, these jobs were broken down further. The remaining 80% of available employees were assigned evenly to the following non-managerial office positions:

- Business/Financial Occupations
- Computer Occupations
- Technical Occupations
- Office/Administrative Support

The wages paid for each job type in May 2006 were identified from the U.S. Department of Labor, Bureau of Labor Statistics (BLS) website. Tables 7-2 and 7-3 show the estimated number of site employees and the associated average annual incomes.



Table 7-2. Anticipated DRI Office Employees Salaries

Occupation Code	Occupation Title	Number of Jobs in DRI	2006 Annual Salary
11-0000	Executive/Manager	75	\$92,990
13-0000	Business/ Financial Occupations	75	\$62,270
15-0000	Computer Occupations	75	\$67,920
17-0000	Technical Occupations	75	\$61,200
43-0000	Office/Admin. Support	75	\$31,080

Source: US Dept of Labor, Bureau of Labor Statistics (May 2006 Atlanta MSA) Wage Estimates

Table 7-3. Anticipated DRI Retail Employees Salaries

Occupation		Number of	2006 Annual
Code	Occupation Title	Jobs in DRI	Salary
	First-Line Supervisors/ Managers		
41-1011	of Retail Sales Workers	74	\$35,890
41-2031	Retail Salespersons	298	\$22,720

Source: US Dept of Labor, Bureau of Labor Statistics (May 2006 Atlanta MSA) Wage Estimates

Housing Costs Analysis

A conservative approach was used for the calculation of household incomes for the DRI workers by applying a factor of 1.5 to the monthly wage to approximate the contributions made by other workers in the households. For Criterion 7 evaluation, it is assumed that a third worker in a household would not likely contribute to housing costs.

To determine an individual's or family's ability to afford the monthly housing costs of the AOI's owner or rental housing, the recommended ratio of monthly housing costs to monthly household income (30%) was applied to determine the maximum affordable owner-occupied housing unit cost for each category of workers.

Monthly housing costs for owner occupied units were determined using the Government National Mortgage Association (Ginnie Mae) Affordability Calculator. Ginnie Mae uses this tool to assess an individual's or family's ability to afford an owner occupied unit depending on the cost of the home, its geographic location, and the market rates for mortgage loans. For the purpose of this analysis, a conservative approach was taken using only conventional 30-year, 80%-financed, 6.5% interest rate mortgages to determine the expected total monthly housing costs. The use of FHA or VA financing would result in substantially lower monthly mortgage payments, where applicable (maximum loan amounts currently apply). Table 7-4 shows the affordable monthly housing costs for workers' households within the DRI.



Land Use	Occupation	Employees	Monthly Employee	Monthly Household	Affordable Housing
			Salary	Salary	Payment
	Executive/Manager	75	\$7,749	\$11,624	\$3,487
	Business/Financial Occupations	75	\$5,189	\$7,784	\$2,335
Office	Computer Occupations	75	\$5,660	\$8,490	\$2,547
	Technical Occupations	75	\$5,100	\$7,650	\$2,295
	Office/Admin. Support	76	\$2,590	\$3,885	\$1,166
	First-Line Supervisors/ Managers				
Retail	of Retail Sale Workers	74	\$2,991	\$4,486	\$1,346
	Retail Salespersons	298	\$1,893	\$2,840	\$852

Table	7-4.	Affordability	of Housing	Costs for	Workers	in	DRI
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The number of DRI workers households for each range of monthly housing payments is summarized in Table 7-5.

Monthly Payment	Number of Households
< \$499	0
\$500 - \$599	0
\$600 - \$699	0
\$700 - \$799	0
\$800 - \$899	298
\$900 - \$999	0
\$1,000 - \$1,249	76
\$1,250 - \$1,499	74
\$1,500 - \$1,999	0
\$2000+	300

Table	7-5.	Affordability	of Housina	Costs for	DRI Workers'	Households
		/	••••••••••••••••••••••••••••••••••••••	00010101		



Affordability Analysis

The number of DRI workers' households for each range of monthly housing costs were compared to the expected monthly housing costs for the DRI residential units, using monthly housing costs calculated as described above with the estimated residential unit purchase prices supplied by the developer for the homes. Table 7-6 shows the number of DRI workers whose household incomes would be expected to allow them the opportunity to live within the DRI.

				Number of DRI Worker Households	Number of Worker HHs Who Can Be
DRI Unit Type	Price	# of Units	Monthly Payment	per Housing Cost Range	Housed in
DRI GIIII I JPC	i nee	Onna	rayment	cost kange	
Condominium	\$175,000-200,000	150	\$1,250-1,499	74	74
Condominium	\$200,000-250,000	150	\$1,500-1,999	300	150
TOTAL		278	-	374	224

Table 7-6. Affordability of DRI Housing for DRI Workers' Households

Government National Mortgage Association Loan Estimator Calculator http://www.ginniemae.gov/2 prequal/le intro questions.asp?Section=YPTH



Criterion 7 Evaluation

Based on the distribution of jobs and their associated salaries in the proposed DRI, economics of the housing costs in the DRI, and the demographics of the area (household size, etc.), the number of individuals with reasonable opportunity to work in the DRI and live in the DRI has been estimated to be thirty percent (30%). The proposed project meets GRTA's evaluation Criterion 7a.

Employment information for the Area of Influence was obtained to estimate the number of jobs and associated average annual pay in the AOI. There are approximately 102,427 persons currently employed in the AOI. Table 7-7 presents characteristics of the AOI.

Characteristic	Year 2007	Year 2011			
Size (acres)	44,524				
Jurisdiction(s)	City of Smyrna, Cobb County				
Population	192,156	202,873			
Number of Housing Units	86,753	92,465			
Rental / Owner / Vacant	32,966/46,586/7,201	34,490/49,191/8,784			
	Range of Owner Occupied Housing				
	Units by Value : les	Value : less than \$50,000 to			
Price of Housing/Rent	greater than \$1,000,000				
	Average Home Value: \$165,387				
	Average Rent: \$714				

Table 7-7. Summary of AOI Characteristics



Introduction

This section of the study presents an analysis of the site layout for the Site in relation to its compliance with the air quality guidelines established by the Atlanta Regional Commission (ARC). The ARC procedure for reviewing and approving Developments of Regional Impact (DRI) requires the establishment of Air Quality "Performance Benchmarks." These benchmarks are necessary for the region to identify air quality progress in accordance with federal air quality regulations.

ARC Specifications

ARC guidelines indicate that a reduction in emissions from 250 to 214 tons per day is needed to bring the region into compliance with the National Ambient Air Quality Standards (NAAQS). This desired reduction applies to developments reviewed by the ARC. Each development must incorporate transportation-related measures that contribute to a 15% reduction in vehicle miles traveled (VMT), which are directly linked to improvements in air quality. Roadway infrastructure and non-vehicular connectivity features such as walking trails, bike lanes, sidewalks, and public transit concepts are a few proactive solutions that would induce VMT reductions.

Reductions in VMT are directly linked to improvements in air quality. There is a strong relationship between a vehicle mile of travel and NOx emissions. A decrease in VMT results in a direct decrease in NOx emissions. Therefore, a 15% reduction in VMT is appropriate to reduce NOx emissions in the amount by which the Atlanta region exceeds federal air quality standards.

An assortment of measures may be incorporated in project design and implementation that will help achieve the needed reduction in mobile source emissions (VMT 'credits'). These measures range from programs that may be implemented (e.g. shuttle service to nearby centers) to design elements that may be defined generically (net density levels) or specifically (interconnected sidewalks). A number of mitigation measures identified in the following section have been demonstrated by transportation practitioners and academics to reduce levels of VMT by 1) reducing the length of trips; 2) reducing the quantity or frequency of vehicular trips and/or 3) shifting trip making from vehicles to alternative modes. (Other mitigation measures may be considered subject to submission of appropriate justification and data supporting the reductions in VMT/NOx.)



Evaluation

VMT reductions were taken for the Site as follows:

- 1. Projects that meet the relevant density target levels will receive the following VMT credits:
 - b. For projects where Residential is the dominant use:

Greater than 15 dwelling units/acre (-6%)

- 2. Projects that contain a 'mix' of uses will receive the following VMT credits (ITE Trip Generation Manual 7th Edition):
 - c. For projects where Residential is the dominant use based on area*:

If both target levels are met (-9%)

4. Proximity to Public Transportation

For all project types: If the project is located within 1/4 mile of a bus stop (MARTA, CCT, Other) (-3%)

- 6. Projects that contain bicycle or pedestrian facilities within the site receive the following VMT credits:
 - a. Bike/ped networks in developments that meet one Density or Mixed Use 'target' (-4%)

A 6% reduction was taken since the dominant use of the site is residential with greater than 15 dwelling units per acre. A 9% reduction was taken since the dominant use of the Site is residential with at least 10% of gross floor area as retail space. 3% was taken since the site is within 1/4 mile of CCT. 4% was taken to account for sidewalks provided throughout the Site for interconnectivity. The sum of the VMT reductions is 22%.

Conclusion

Based on the data and information presented in this study, it is concluded that the site layout for Jonquil Village coincides with the air quality guidelines set out by the ARC. The residential linkage to the proposed on-site retail center is expected to substantially reduce the overall VMT for the Site and accelerate air quality improvements.



Introduction

This section of the report presents a summary of the data and information that address the GRTA DRI Review Criteria that are contained in Section 3-103(A) of the <u>Procedures</u> <u>and Principles for GRTA Development of Regional Impact Review</u>, January 14, 2002.

Section 3-103(A) Review Criteria

1. Indicate whether or not the proposed DRI is likely to promote improved regional mobility in terms of the quality, character, convenience and flexibility of transportation options. The Site is likely to promote improved regional mobility in terms of the quality, character, convenience, and flexibility of transportation options that exist at this time. The Site is located in an area where there are practical transportation options other than the personal vehicle. The developer will build sidewalks within the Site and sidewalks connecting to existing external sidewalks.

2. Indicate whether or not the proposed DRI is likely to promote improved regional mobility by reducing Vehicle Miles of Travel. The Site is likely to promote improved regional mobility by reducing Vehicle Miles of Travel (VMT) because 30% of the persons who are reasonably anticipated to work in the Site will have an opportunity to live within the Site, thus potentially reducing the VMT for work. In addition, due to the mixed-use nature of the Site, some of the Site's trips (12%) will be internally captured and will not add traffic to the external roadway system.

3. Indicate whether or not the proposed DRI is likely to promote improved regional mobility because it is located in an urban core, town center, an activity center previously designated by an RDC, a rail/transit station development or is part of a publicly sponsored redevelopment or infill initiative. The Site is not located in an urban core, a town center, an activity center previously designated by an RDC, or a rail/transit station development, and may not be part of a publicly sponsored redevelopment or infill initiative.

4. Indicate whether or not the proposed DRI is located sufficiently close to existing or planned transit facilities to indicate a likelihood of significant use of transit by residents, employees and visitors of the proposed DRI. There is currently a CCT bus stop within 1/2 mile of the Site (at the intersection of Atlanta Road and Spring Road).



5. Indicate whether or not the proposed DRI is located within an established Transportation Management Area which creates a likelihood that the proposed DRI is reasonably anticipated to result in improved regional mobility as a result of the Transportation Management Area. The Site is not located within an established Transportation Management Area.

6. Indicate whether or not off-site trip generation from the proposed DRI is reduced by at least fifteen percent (15%), or, in the event that a proposed DRI is unable to satisfy the trip reduction standard established in this subsection because of other conditions which are beyond the control of the developer or the affected local government, the proposed DRI implements all available trip reduction techniques which are reasonably practical. The number of new off-site trips that would be expected from the same land uses individually is reduced by approximately 12% for trips internally captured within the site and by an additional approximate 33% retail trips (only) pass-by trip reduction recognizing that many the retail site generated trips would have been on the adjacent roadways, whether or not the Site was redeveloped. The total off-site trip reduction is expected to be approximately 35%. In addition, significant additional existing trips generated because the site is currently developed as retail would also be eliminated from the area roadway network by the Redevelopment of this Site.

7. Indicate whether or not the proposed DRI:

(a) Contains a mix of uses which are reasonably anticipated to contribute to a balancing of land uses such that it would be affordable for at least ten percent (10%) of the persons who are reasonably anticipated to be employed in the proposed DRI are reasonably anticipated to have an opportunity reside within the DRI; or,

(b) Is located in an Area of Influence where the proposed DRI is reasonably anticipated to contribute to a balancing of land uses within the Area of Influence such that twenty-five percent (25%) of the persons who are reasonably anticipated to be employed in the proposed DRI have the opportunity to live within the Area of Influence; or,

(c) Is located in an Area of Influence with employment opportunities which are such that at least twenty-five percent (25%) of the persons who are reasonably anticipated to live in the proposed DRI and are reasonably expected to be employed will have an opportunity to find employment appropriate to such persons' qualifications and experience within the Area of Influence.

The Site contains a mix of uses which are reasonably anticipated to contribute to a balancing of land uses such that it would be affordable for approximately thirty percent (30%) of the persons who are reasonably anticipated to be employed in the proposed DRI are reasonably anticipated to have an opportunity reside within the DRI thus exceeding the ten percent (10%) threshold.



8. Indicate whether or not the proposed DRI is located in an area where the existing level of development and availability of infrastructure within the Area of Influence of the proposed DRI is such that the proposed DRI is reasonably anticipated to result in unplanned and poorly served development which would not otherwise occur until well-planned growth and development and adequate public facilities are available. The Site is not located in an area where the anticipated level of development and availability of infrastructure within the study network is such that the Site is reasonably anticipated to result in unplanned and poorly served development.



Site Description

The Site is proposed to be a mix of residential, retail, and office space. The Site will be developed in one Phase. The analyses and report focus upon the conditions at Site Build-Out. The Build-Out Year for the Site is 2009. The Site consists of a total of 300 condominium units, 112,940 square feet of general office space, 141,048 square feet of specialty retail, a 39,203 square foot grocery store, and a 5,500 square-foot bank on twelve acres. Figures 2-1 and 2-2 show the Site Location. Figure 2-3 shows an aerial photograph of the near vicinity of the Site. The Site Plan is shown in Figure 2-4.

The Site is proposed to have three (3) access points onto the external road network:

- At Intersection #3, the site access point will form a new eastern leg at the existing intersection of Church Street and Atlanta Road.
- At Intersection #7, the site access point will be Street B at Atlanta Road between the intersections of Church Street and Spring Road/Concord Road. Street B at Atlanta Road will be a right-turn only access point.
- At Intersection #8, the site access point will be the opposite end of Street B at Spring Road, east of the intersection of Spring Road at Atlanta Road. Street B at Spring Road will be a full-access driveway.

At Total Build-Out (2009), the Site is expected to generate approximately 14,447 vehicle trips per day (gross), but after internal capture and pass-by trips are considered, it will generate approximately 9,385 new external trips (to/from the site) per day. Approximately 526 new external trips (327 in and 199 out) will be generated during the AM peak hour; approximately 984 new external trips (438 in and 546 out) will be generated during the PM peak hour.

Approximately 28% of the trips are expected to use Atlanta Road to/from the north, around 28% of the trips are expected to use Atlanta Road to/from the south, about 21% are expected to use Spring Road, about 20% are expected to use Concord Road, and the remaining 3% are expected to use local roads.

The following intersections were included in the Traffic Impact Study:

- > All three Site driveway access points;
- West Spring Street/Spring Street at Atlanta Road;
- Memorial Place at Atlanta Road;
- King Street at Concord Road;
- > Concord Road/Spring Road at Atlanta Road; and,
- Jonquil Drive at Spring Road.



Intersection Capacity Analysis

The study intersections are expected to operate at a wide range of Levels of Service for Existing, Future Background, and Future with Site conditions. Table 10-1 summarizes the expected LOS for the study intersections. The required and programmed transportation improvements have been summarized previously, in Section 6.

Intersection			Levels of Service						
		Time of	Existing		Future Background		Future With Project		
#	Name	Day	Existing	Imprm'ts	Existing	Imprm'ts	Existing	Imprm'ts	
1	Atlanta Pd at West Spring St/Spring St	AM	А	N/A	В	N/A	В	N/A	
1		PM	В	N/A	С	N/A	D	N/A	
2	Atlanta Rd at Mamarial Place	AM	А	N/A	А	N/A	А	N/A	
2	Aliania ka al Memolian lace	PM	А	N/A	В	N/A	В	N/A	
2	Atlanta Rd at Church St	AM	А	А	А	А	В	В	
5	Aliania ka al Church Si	PM	E	С	Е	D	F	D	
1	Concord Pd at King St	AM	В	N/A	В	N/A	D	N/A	
4	Concora ka ar king si	PM	В	N/A	В	N/A	В	N/A	
5	Atlanta Pd at Concord (Spring Pd	AM	D	С	Е	D	Е	D	
5	Aliditid ka al Colicola / spillig ka	PM	F	D	F	D	F	E	
2	Spring Rd at Jonguil Dr	AM	В	N/A	В	N/A	В	N/A	
0	spring Ra at Jonquii Dr	PM	В	N/A	В	N/A	В	N/A	
7	Atlanta Pd at Stroat B	AM	-	-	-	-	А	N/A	
ľ			-	-	-	-	С	N/A	
0	Spring Pd at Streat P	AM	-	-	-	-	С	N/A	
0	spillig ku di sileel b	PM	-	_	-	-	С	N/A	

Table 10-1. Intersection LOS: Summary

Area of Influence Analysis

The Site consists of a mix of uses such that approximately 30% of the people anticipate to work on the site will have a reasonable opportunity to live within the Site. The Site meets GRTA's evaluation Criterion 7a.

Air Quality Benchmark Statement

The layout for the Site coincides with the air quality guidelines set out by the ARC. The residential linkages to the proposed on-site retail center and offices are expected to substantially reduce the overall VMT for the Site by 22% and accelerate air quality improvements. Furthermore, the non-vehicular connectivity proposed will serve as an attractive travel alternative for local residents.



Conclusion

In summary, it has been shown that traffic operations in the vicinity of the Site are in some cases less than optimal. After the completion of required improvements identified in this study, most studied intersections are expected operate adequately. They are expected continue to operate adequately when traffic from the Site is added, with the exception of the intersection of Atlanta Road at Concord Road/Spring Road.



TRIP GENERATION WORK SHEETS

and

INTERNAL CAPTURE WORK SHEETS

and

INTERSECTION CAPACITY ANALYSIS WORK SHEETS

and

TURNING MOVEMENT COUNTS

and

PROJECT FACT SHEETS

(available upon request)

