Avondale Estates Roundabout and
Road Diet Feasibility Study

Study Report and Concept Recommendations

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by

Nelson\Nygaard Consulting Associates
McGee Partners, Inc.
GHD, Inc.
Edwards-Pitman Environmental, Inc.

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Introduction

The City of Avondale Estates, in partnership with the Atlanta Regional Commission, has led a feasibility study to explore two transportation project candidates recommended in its recent Downtown Master Plan update: the conversion of US 278 through the city from five lanes to three, and the installation of a roundabout intersection at US 278 and North Clarendon Avenue, adjacent to the city's Tudor Village historic district. This report documents the findings of a traffic study that explored the impacts of these two projects on current and projected levels of vehicular traffic.

BACKGROUND OF THE FEASIBILITY STUDY

The study is being conducted as part of the Atlanta Regional Commission's Livable Centers Initiative (LCI) program, which also provided funding assistance for the City's recent Downtown Master Plan update. The LCI program makes funds available for implementation studies that explore in greater detail how to advance project proposals made in LCI area planning studies.

The City and ARC have organized this study to explore the feasibility of converting US 278 (East College Avenue) through the City from a five-lane road to a three-lane road and installing a roundabout intersection at the corner of US 278 and North Clarendon Avenue.

ORIGINS OF THE IDEAS

The Downtown Master Plan update identified these two project ideas as key strategies for improving pedestrian conditions downtown and introducing safer pedestrian access between residential neighborhoods south of US 278 and the commercial properties along it. The roundabout intersection in particular was proposed as a means of calming traffic passing through the City's primary downtown intersection.

These ideas had also been recommended in the Lifelong Communities study undertaken in partnership with the City and ARC prior to the Downtown Master Plan update; the Master Plan explored more advanced concepts that examined how the roundabout intersection might fit into the overall built environment and how typical cross-sections might be designed. It articulated community desires for both of these elements, primarily to increase pedestrian safety and repurpose the existing right-of-way along US 278 to better match travel demand, to accommodate other users of the street, and to pursue a design that could control speeds through the community.

Additionally, when viewed from a larger perspective, the road diet is balancing capacity on the US 278 corridor with the extents on either side of Avondale Estates. As illustrated in the diagram below, the 4- and 5-lane typical cross-sections in the City are bookended by two-lane sections at either end. The additional capacity through the City is distributed onto crossing streets.

US 278 is a 4- and 5-lane street through the City of Avondale Estates and parts of Decatur, but reverts to two lanes to the east and west of this corridor extent.

Overall conditions of the area

US 278 is classified by the Georgia Department of Transportation (GDOT) as a minor urban arterial, and throughout the Avondale Estates City limits features a typical section of four or five lanes (two travel lanes per direction throughout, with a two-way left turn lane except for a short transitional section around the intersection of Dalerose Avenue where the roadway is only four lanes total. The most recent available traffic counts or volume estimates from the Georgia Department of Transportation are 18,000 at Lakeshore Drive (an estimate from 2013) and 21,100 just east of Sams Crossing-Arcadia Avenue.

The US 278 corridor serves the primary commercial and industrial area of the City of Avondale Estates, with mostly retail, restaurant and other non-residential uses on both sides of the street between Sams Crossing and South Avondale Road. Between South Avondale Road and North Clarendon Avenue, these commercial uses continue on the north side of the road only; the south side features a continuous vegetation hedge planted in a narrow parkway with no driveway cuts or intersecting streets for the entire hedge's length. For this reason, although left turns to access cross streets or private property are common throughout the corridor, they occur only in the eastbound direction between South Avondale Road and Clarendon Avenue.

By and large, the side streets from US 278 do not add significant volumes of traffic to the corridor. Many of these streets only extend short distances; on the north they end before the CSX/Georgia Railroad corridor and on the south they are limited by breaks in the street network. East of the South Avondale Road intersection and west of Clarendon, there are no intersecting streets on the south side of the corridor at all due to the historic hedge row separating South Avondale Road from US 278. For this reason, many current intersections do not appear to experience severe congestion.

The corridor's current traffic levels are generally consistent throughout its length, with little traffic coming from or leading to side streets except for North Clarendon Avenue and Arcadia Avenue-Sams Crossing.

Apart from transportation-related concerns, a large portion of downtown Avondale Estates is designated as a Historic District on the National Register of Historic Places; this is discussed in greater detail in the Environmental Screening summary of this report.

Primary Components of the Feasibility Study

Owing to downtown's historic district status and GDOT's ownership of US 278, the feasibility study has included three principal components:

1. An environmental screening to determine what natural or historic resources might be in the project area and whether or not any changes to US 278 might constitute adverse impacts;

2. A traffic study that counted current traffic levels, estimated future traffic levels based on new development in the area, and analyzed the capacity of intersections along US 278 under the current design and the proposed design of the roundabout; and

3. A GDOT Concept Report for a roadway construction project that would implement the feasibility study's recommended ideas. Concept Reports are the first step in GDOT's formal project development process, in which transportation projects are defined, studied, designed, funded and ultimately constructed.

By setting up the feasibility study to also prepare the GDOT concept report, the City has expedited the process of beginning more detailed engineering and securing funding for a US 278 project.

Environmental Screening

The first step of the feasibility study was performing a planning-level environmental screening report. The study team conducted field surveys and research in August 2014 and focused on the identification of visible constraints that should be considered during the development of the proposed project concept. The environmental survey included identification of historical resources, underground storage tank (UST) locations, natural features, and parks and other sensitive land uses (such as churches, cemeteries, libraries, and schools) that could be viewed from the roadway and which could impact the proposed project. In addition to these field survey efforts, the team reviewed available documentation from the National Register of Historic Places (NRHP) and the Georgia Department of Natural Resources (GADNR) to obtain additional information related to historical resources, threatened and endangered species, and hazardous materials.

Land use within the study area consists of single and multi-family housing, commercial businesses, strip mall shopping centers and civic buildings (the Avondale Estates City Hall and Police Department). Much of this area is within the Avondale Estates Historic District, including the two elliptical island parks that make up Avondale Plaza.

Environmental Screening: Key Guidance for the Study

The primary purpose for the screening was to understand the potential for environmental impact in developing a recommended project. These key points helped to inform the team in moving forward.

- Given that the **two islands comprising the Avondale Plaza** are part of the city's original design plan, it is likely that the conversion of any part of these areas to a transportation use would result in an adverse effect to the historic district, regardless of how much of these areas would ultimately be disturbed.
- The three-block **hedgerow along US 278** should be considered in a similar fashion. The removal of any part of this feature would likely result in an adverse effect to the historic district.
- Assuming that the streetcar shelter at the end of the hedge row is not historic, further modification of this structure, or its removal, would not likely result in an adverse effect to the historic district.
- Efforts should be made to **retain the existing granite curbing** within the historic district boundary. If this is not possible, then any granite curbing that is removed should be reused or reinstalled at other locations when possible.
- Any **modifications to contributing buildings** within the historic district would most likely be regarded as an adverse effect to the historic district.
- The reconstruction of existing sidewalks or grass strips along the corridor would most likely not result in an adverse effect to the historic district if previous modifications have been undertaken within the past fifty years.
- **Modifications to US 278** could result in an adverse effect to the historic district if the proposed improvements result in any substantial changes to the historic character of the area. For example, incorporation of a roundabout into the current roadway configuration at US 278 and Clarendon Avenue could be viewed as an adverse effect because it considerably alters the historic linear alignment of the existing roadway.

SURVEY METHODOLOGY

For the purposes of the screening, the team grouped the identified resources into three distinct categories:

1. Those requiring individual evaluation for eligibility on the National Register of Historic Places (National Register);

2. Those that appear to be part of larger National Register-eligible historic districts; and

3. Those that are already listed on the National Register.

For the resources requiring individual evaluation, the study team identified properties constructed in or prior to 1965, as these resources will be recognized as historic by National Register evaluation standards due to being at least fifty years old in 2015. In identifying resources that appear to be part of larger historic districts, the team extended the survey period to 1969 to conform with the period of significance for certain types of mid-twentieth century domestic architecture established in *The Ranch House in Georgia: Guidelines for Evaluation*.

After establishing the spatial and temporal parameters of the screening, the team consulted DeKalb County tax assessor's records for all properties adjacent to the survey corridor in order to ascertain each property's date of construction. Review of tax assessor's records was also undertaken for numerous properties located beyond the survey corridor in order to establish approximate boundaries of potential historic districts in the vicinity of the corridor. In addition to the tax records, the National Park Service's inventory of National Register-listed properties in DeKalb County and the Department of Natural Resources' Natural, Archaeological, and Historical Resources GIS (NAHRGIS) database were consulted to identify any previously surveyed historic resources located along the corridor.

The team ground-checked this database research with a windshield survey of the corridor.

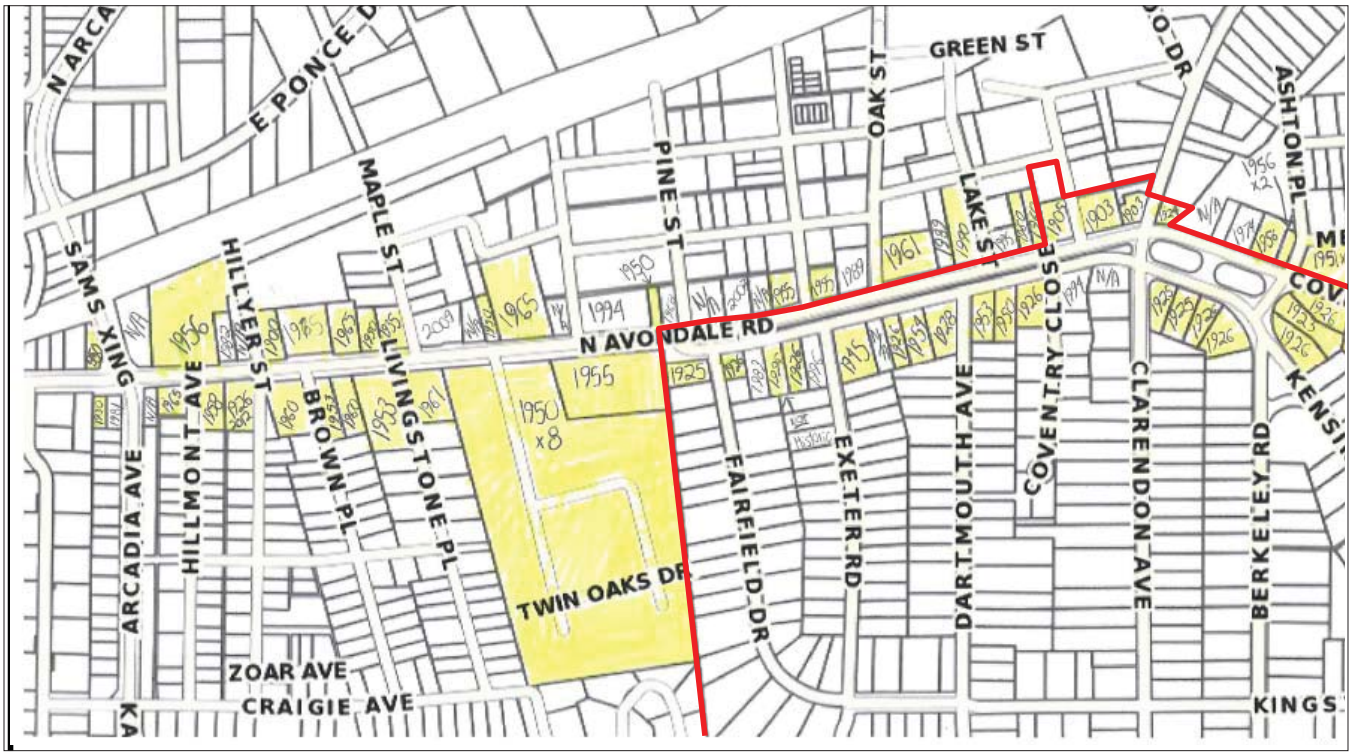
SURVEY RESULTS

The Avondale Estates Historic District is the primary resource along the corridor, and was listed on the National Register in 1976 (refer to Figure 2 below for original boundary). In addition, 49 historic resources were identified along the corridor based on information obtained from the DeKalb County tax assessor's records and the windshield survey. Many of these resources are included in the boundary of the Avondale Estates Historic District and are recognized as contributing features of the district.

The resources identified include examples of single and multi-family housing along with numerous commercial and institutional structures. According to the tax assessor's records, these properties were constructed between the early to mid-twentieth century. Most of the resources beyond the western edge of the historic boundary of the Avondale Estates Historic District consist of multi-family housing and commercial buildings, including the building that housed the first Waffle House restaurant. It is also in this area where the existing streetscape is less cohesive due to a general absence of formal landscaping and breaks in the continuity of sidewalks that extend west from Clarendon Avenue.

Within the district's historic boundary, many of the buildings convey distinct elements of Tudor Revival architecture that is not only prevalent throughout the City of Avondale Estates, but was also an integral part of George F. Willis's overall design plan for the city in the 1920s. In addition to the buildings themselves, notable landscape features, including the two elliptical island parks of the original Avondale Plaza, and a three-block hedgerow planted in the early 1930s along a corridor that formerly functioned as a streetcar line, are located within the district boundary and the survey area. A streetcar shelter is also located at the southwest quadrant of the intersection of US 278 and Clarendon Avenue; but based on a comparison of historic photographs with the appearance of the current structure, it does not appear to be historic. A clock tower was placed atop the shelter in 1976.

Limits of the environmental screening survey.



Highlighted parcels indicate historic properties identified from property records consulted in the survey; the red line shows the boundary of the Avondale Estates Historic District.

The National Register eligibility of the properties outside the historic district boundary is unknown. Additional research and documentation would be required before an adequate assessment of each property's National Register eligibility can be made.

Traffic Study

The next step of the feasibility study was an evaluation of current and future traffic levels. This study followed a process similar to traffic impact studies undertaken in conjunction with private development, and it is the backbone of the feasibility study in that it determines how well modifications to the roadway will work now and into the future.

This portion of the feasibility study used a three-step process, defined as follows:

STEP 1: Traffic counts. The study team used traffic counts for the US 278/North Clarendon intersection taken in 2013 and supplemented these with counts of the other signalized intersections along US 278 within the Avondale Estates City limits taken in September 2014.

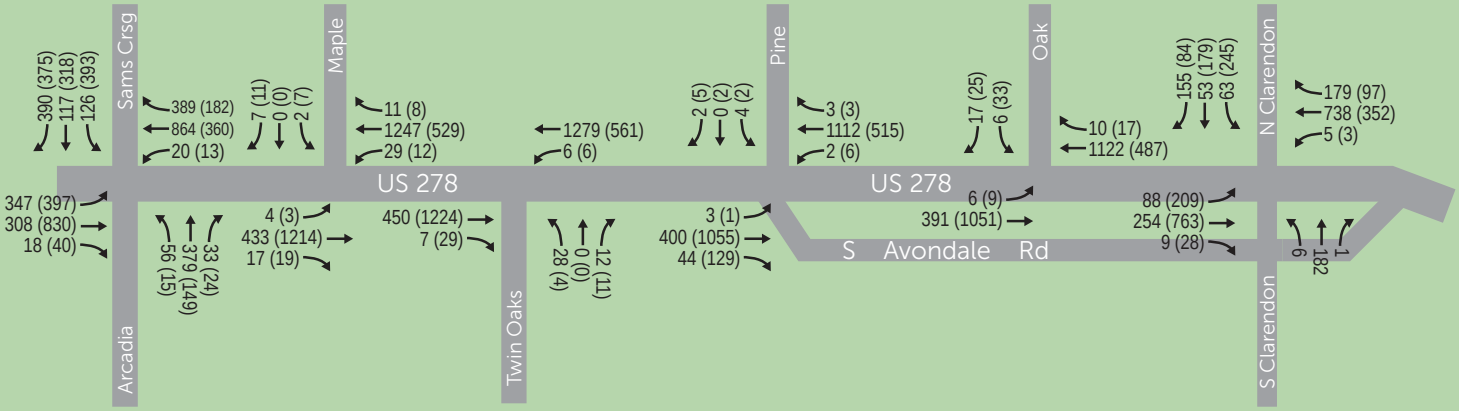
STEP 2: Forecast growth. In addition to added traffic from the DeKalb Farmer's Market expansion, the study team applied an additional 1 percent of traffic growth to all intersection turning movements throughout the area. This increased overall traffic by approximately 10 percent during the period of the study.

STEP 3: Evaluate traffic on the roadway network. The study team used Synchro traffic simulation software to evaluate how current traffic levels operate on the current design of US 278, how current traffic levels would operate if a lane reduction were implemented today, and how forecast traffic levels would operate with the lane reduction. The traffic models that the team developed in Synchro used current signal timing plans for the intersections, maintained by DeKalb County, although the team recommended revised timing plans for the road diet (which are shared later in this study report).

First Steps of the traffic study

Step 1: Traffic Counts

Traffic counts taken in 2013 (for the Clarendon intersection) and 2014 (for all other intersections with signals) gave the study team a baseline for the analysis. Volumes are reported for each specific movement at an intersection and reflect the morning and afternoon peak travel hours (morning is stated first; afternoon follows in parentheses).



TRAFFIC FORECASTING METHODOLOGY

The study team developed consensus with GDOT on a methodology for forecasting future traffic volumes, relying on the traffic forecasts from the DeKalb Farmer's Market Expansion Development of Regional Impact (DRI) traffic study that affected the US 278 corridor intersections in the study area. This was limited to the Clarendon Avenue and Sams Crossing intersections.

In addition, the study assumed an annual growth factor of one percent (1%) on all turning movement volumes at study area intersections, including turns onto and from side streets. This was intended to capture the effects of future development for which traffic studies and detailed development programs had not yet been finalized at the time of the feasibility study.

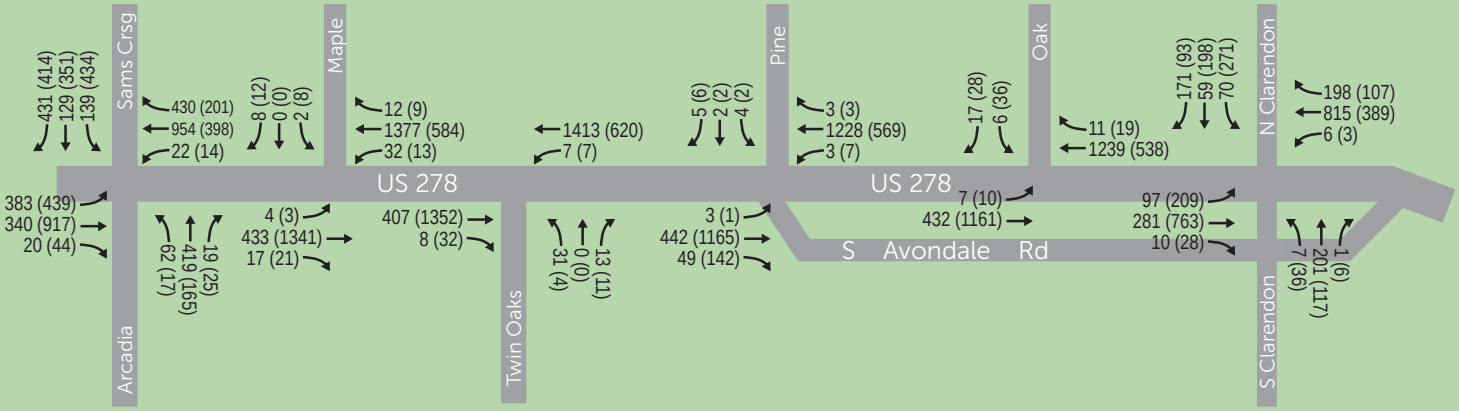
The study team applied this growth to a ten (10) year period to capture all traffic forecast from the DeKalb Farmer's Market Expansion DRI, the final phases of which are anticipated to come online in 2023. Background growth mounted to an increase of just over 10 percent to all turning movements through the corridor, with additional volume added at intersections included in the Farmer's Market DRI traffic study. An increase of this magnitude would account for nearly 2,200 additional trips on the corridor per day, or around 100 per direction in the peak hours of travel.

TRAFFIC CONTROL AND ANALYSIS METHODOLOGY

Traffic signals along the corridor are maintained by DeKalb County, and although it is not immediately apparent from signal timing plan reports how signals operate, it appears (and discussions with DeKalb County Traffic Engineering staff confirm) that they operate on an actuated-coordinated system for the corridor's length.

Step 2: Forecasting Traffic Growth

Traffic counts taken in 2013 (for the Clarendon intersection) and 2014 (for all other intersections with signals) gave the study team a baseline for the analysis.



The analysis used 100-second cycle lengths in both AM and PM peak periods for all signals, and used offsets as provided from the plan reports. In an effort to reflect current travel demand as indicated by intersection turning movement volumes, the analysis set maximum recall for east and west phasing, with no recall set for north and south phasing.

In considering future scenarios, the study team took liberty to propose alternative timing plans in an effort to facilitate traffic flow, reduce congestion, and present an effective operational environment for a three-lane section. Specific details on this are discussed in the subsequent report section on the Road Diet Analysis results.

ROAD DIET ANALYSIS

The road diet assumed that today's two general travel lanes per direction would be reduced to one, although the two-way left turn lane present through much of today's corridor was retained. In order to increase effectiveness of traffic signals in the road diet configuration, the study team explored different configurations for signal timing.

To facilitate traffic operations and reduce delay in the road diet scenario, the study team used different signal timing configurations: a 110-second cycle length for the AM peak and a 90-second cycle length for the PM peak. These did not use offsets, although they do leave potential for future coordination, especially as the signals in the corridor are programmed for upgrades through the Atlanta Regional Commission's regional long-range plan and improvement program.

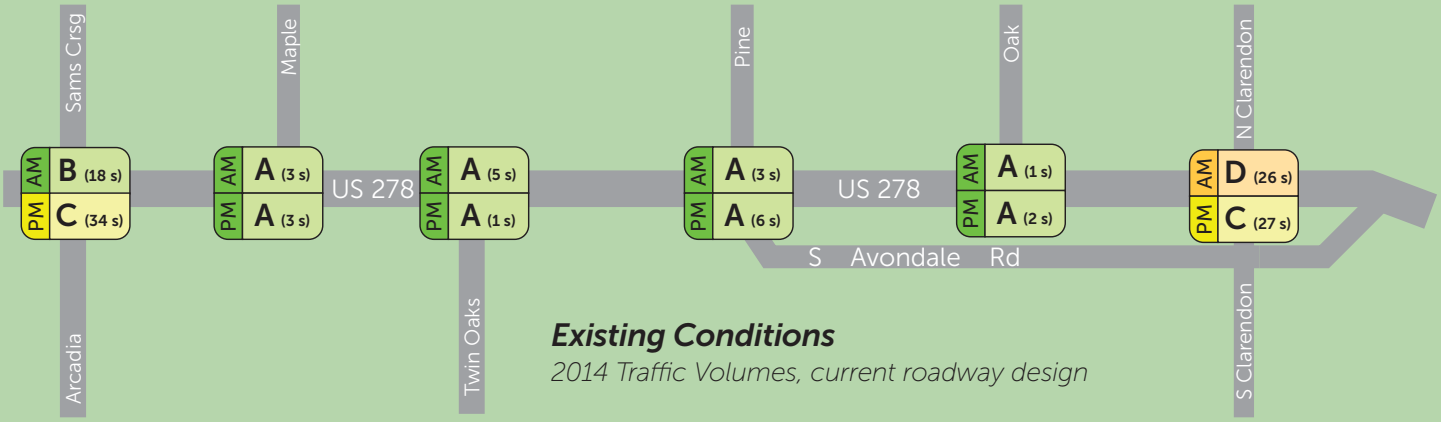
At each intersection, 100-foot left turn pockets were used in the Synchro model, although these could be easily extended due to the convertible, continuous nature of a two-way left turn lane.

Using current traffic volumes, the road diet did not show a considerable decline in levels of service, as depicted in the diagrams at the bottom of this page and the opposite page. Noteworthy locations

Findings of the traffic study

Step 3: Evaluate Traffic on the Roadway Network

The diagram below shows existing conditions for the corridor, with levels of service provided for both morning and afternoon peak periods. As levels of service for intersections address average delay at the intersection, this delay (in seconds) is provided in addition to the LOS letter grade.



Existing Conditions

2014 Traffic Volumes, current roadway design

included the intersection of Sams Crossing, where delay increases due to limited storage capacity, and the intersection of Pine Street-South Avondale Road, at which the signal also grants a separate green light phase to the exiting traffic from the Twin Oaks shopping center.

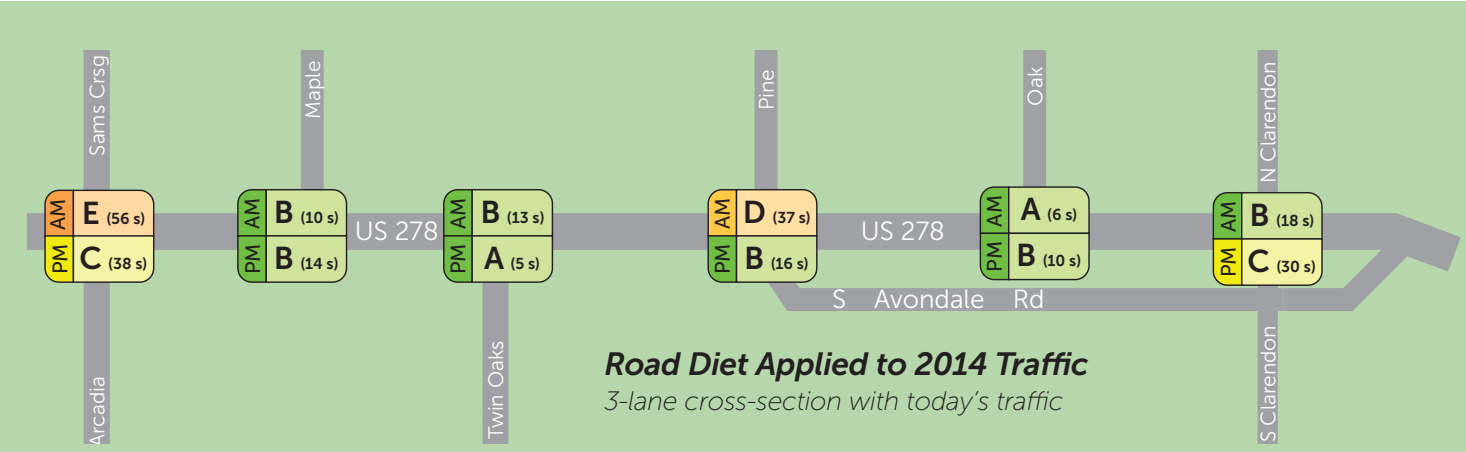
When analyzing the road diet with future traffic volumes, the corridor shows significant change in level of service at the intersections, although for the most part these levels of service continue to meet GDOT standards for a corridor of this type.

An alternative form of comparison between the different scenarios is corridor level of service, or a measurement of travel time through the extent of a roadway. This is a measure more intuitive to most commuters and citizens, as it relates more closely to their own travel times and is easier to understand in a context of daily life. The intersection levels of service shown in the diagrams below report an average delay at each intersection, which factors in all movements weighted by traffic volume.

The table below shows how the different corridor scenarios compare when this measurement is considered. Overall, the road diet with future traffic does add time to travel through the corridor, but this time is under two minutes.

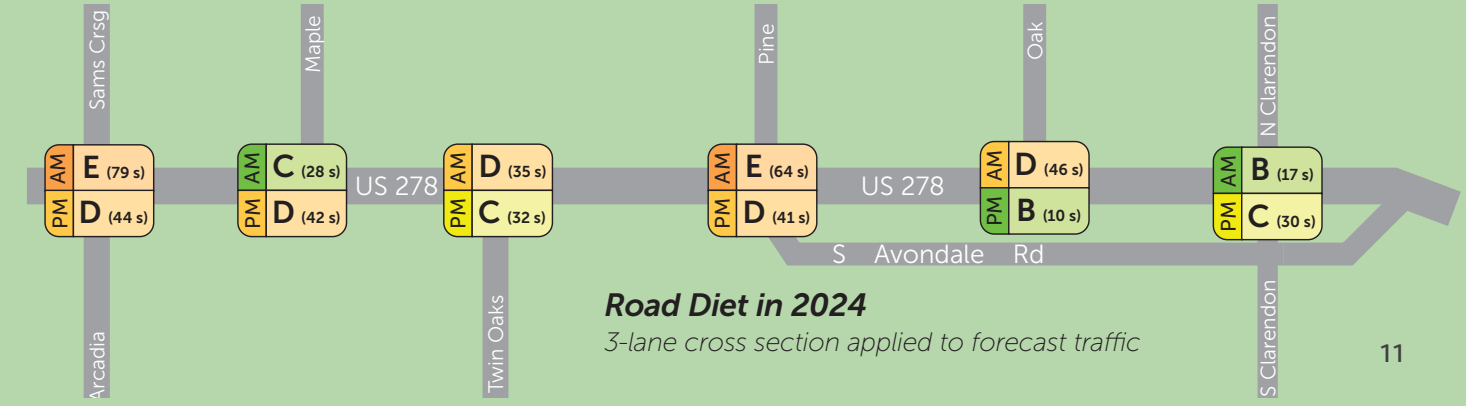
	2014 Existing	2014 Road Diet	2024 Road Diet
AM Peak (westbound traffic)	4 min	3.6 min	5.2 min
PM Peak (eastbound traffic)	2.2 min	2.9 min	4 min
AM reverse-peak (eastbound traffic)	1.9 min	1.9 min	2 min
PM reverse-peak (westbound traffic)	2.3 min	3 min	3.6 min

Overall, the greater increase for a particular travel direction and peak hour is the afternoon peak period, which is forecast to increase by just under two minutes.



Road Diet Applied to 2014 Traffic

3-lane cross-section with today's traffic



Road Diet in 2024

3-lane cross section applied to forecast traffic

Clarendon Avenue Roundabout: What was considered?

The study team developed an analysis of three different roundabout concepts, determining that only one would allow sufficient capacity to handle current and forecast traffic. This option featured a dual-lane traffic circle. The diagrams and images shown below illustrate the different concepts studied.

Option 1: *A conventional single-lane roundabout approximately 100 feet in diameter. This would impact the plaza island on its southeast corner.*

Option 2: *A dual-circle option that could fit within the existing intersection footprint. This would allow free-flow movement and replace both North and South Clarendon signals.*

Option 3: *A single-circle, dual-lane roundabout. This would feature more significant impacts on the park and hedge row.*

ROUNDABOUT ANALYSIS

In addition to the road diet, the team analyzed a potential roundabout at US 278 and North Clarendon Avenue separately from the road diet. This was largely to remain consistent with accepted GDOT methodology for analyzing roundabouts, itself recognizing limitations in Synchro software on modeling roundabout operations. Instead, the team used the ARCADY modeling platform for the roundabout capacity procedure, applying a 10% reduction in the ARCADY model capacity prediction equation will generate reliable results for American conditions. This is slightly conservative as compared to UK driving conditions, but is appropriate for U.S. urban traffic conditions

As with the road diet, the roundabout analysis considered both current and future traffic volumes at this intersection. The study team performed a capacity analysis to determine an appropriate lane configuration for the existing traffic demand. After this, the lane configuration developed for the existing traffic demand was subjected to the forecast traffic using a GDOT-recognized capacity assessment procedure. Those results were used to determine if an expanded lane configuration (i.e. more than a single lane in the roundabout circle and its approaches) would be needed and generally how soon. The team developed a concept level sketch of the appropriate lane configuration, a two-lane roundabout in this case, in order to assess the footprint of the roundabout at the intersection. At this early stage of investigation, the initial check is for intersection capacity. The size of roundabout needed is assumed to accommodate the GDOT policy design vehicle.

Summary of the Roundabout Capacity Model Predictions

The traffic forecasts indicate over 1000 eastbound peak-hour vehicles passing through the roundabout, impeded by 500 vehicles southbound making left turns and traveling through the intersection. Using national guidelines (from NCHRP Report 672), a rule of thumb for planning level analysis is that a roundabout entry with a single lane reaches its

capacity when the combined volumes of entering traffic plus traffic already in the circle are about 1100 in a single hour. This level of traffic demand makes it difficult to implement a single lane roundabout without excess congestion. In response to this, the study team explored other options for a roundabout design, including a two-lane circle (which would require two-lane entry and exit approaches from the circle) and a dual-circle option intended to replace the intersections at North Clarendon and US 278 and South Clarendon and South Avondale Plaza.

The two-lane roundabout analysis yielded more promising results; using the Design Hourly traffic flow estimates provided by GDOT, the intersection operates with less congestion. The tables below indicate the following capacity performance measures. As shown on the tables below, eastbound entry has nearly equal volume and capacity, suggesting that this two-lane option would need to be used to accommodate future traffic. By contrast, designing for a single-lane roundabout will not even accommodate current traffic volumes, as shown on the two lower tables, which point to a two-lane approach being required even today.

Similar analysis was not performed on the two-circle approach, which would have an even more limited capacity in the primary circle at US 278 than the single-lane roundabout studied in this analysis.

Street Approach	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS for the Approach	Intersection Delay (sec)	Intersection LOS	Network Residual Capacity
US 278/Clarendon Two Lane Roundabout - 2024 Forecast Volumes							
N Clarendon Ave.	1	7.02	0.57	A	15.8	C	2% [US 278 EB)
US 278 EB	31	26.33	0.91	D			
S. Avondale Plaza	1	11.91	0.40	B			
US 278 WB	1	5.64	0.48	A			

Street Approach	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS for the Approach	Intersection Delay (sec)	Intersection LOS	Network Residual Capacity
US 278/Clarendon Single Lane Roundabout - Existing (2013) AM Peak Volumes							
N Clarendon Ave.	1	10.42	0.46	B	137.4	F	-19% [US 278 WB)
US 278 EB	1	5.97	0.39	A			
S. Avondale Plaza	1	6.03	0.26	A			
US 278 WB	126	251.64	1.14	F			

Street Approach	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS for the Approach	Intersection Delay (sec)	Intersection LOS	Network Residual Capacity
US 278/Clarendon Single Lane Roundabout - Existing (2013) PM Peak Volumes							
N Clarendon Ave.	4	13.98	0.69	B	383.0	F	-30% [US 278 EB)
US 278 EB	200	792.74	1.39	F			
S. Avondale Plaza	1	12.03	0.35	B			
US 278 WB	1	9.41	0.57	A			

RECOMMENDATIONS AND NEXT STEPS

It is important to note that this traffic analysis was developed in the context of the environmental screening report also developed for the feasibility study, which determined that the Avondale Estates Historic District designation on the National Register of Historic Places included not only buildings but also the existing curb lines, park property, and the entire town plan. What might have been a feasible option from the standpoint of traffic operations has also been considered with regard to potential impacts on historic property, which would in turn affect the overall timing and cost of implementing the road diet.

For this reason, the study team recommends that the City move forward with pursuing the road diet on US 278 from Clarendon Avenue to Sams Crossing. This includes a conventional intersection design at Clarendon Avenue and does not include a roundabout. This concept is discussed in the following sections.

Sams Crossing Intersection Capacity

One of the most notable capacity challenges on the corridor is the Sams Crossing-Arcadia Avenue intersection, which is forecast to see significant increases in turning volumes due to the DeKalb Farmer's Market expansion. Although these volumes are not added in the US 278 extent in the City of Avondale Estates, they do increase demand for signal time at the US 278/Sams Crossing intersection and as such add to overall delay. The study team recommends restoring the typical section of US 278 to five lanes of capacity on approach to and exiting from this intersection in order to provide additional westbound storage capacity and reduce delays.

Avondale Estates should continue to coordinate with the City of Decatur on any forthcoming plans that may make changes to the cross-section of US 278 west of Sams Crossing; as the enhancement project for US 278 moves forward through the GDOT process, the City will need to work with the City of Decatur and GDOT to ensure a coordinated design for this intersection that allows sufficient capacity to meet travel demand.

Added midblock crossings

Due to the length between signal-protected crossings on some parts of the corridor, the recommended concept for a road diet section should include mid-block crossings protected by median refuge islands and with pedestrian-activated traffic control devices. In order to minimize disruptions to traffic, the study team recommends applying rectangular rapid flashing beacons (RRFB), which activate a flashing light when pedestrians reach a crossing and push a button on the signal. Drivers are required to stop while pedestrians are in the crosswalk, but do not need to stop once pedestrians have cleared it, even if the warning light remains flashing.

Development of the Concept Report

Moving forward, the study team plans to present the concept to the Avondale Estates community in late winter or early spring 2015 and will develop the GDOT Concept Report, the third major step in the feasibility study after that time.

Future Consideration of the Roundabout Concept

Over time, community sentiment on the roundabout may evolve, community desires for engaging the park islands as accessible public space may prompt further discussion on the US 278/Clarendon Avenue intersection, traffic increases may not meet the forecast levels used in this feasibility study, or some combination of these may happen. It is worth using the analysis of the roundabout presented in this document to understand major operational factors and, should the Avondale Estates community wish to explore the roundabout in the future, to begin conversations with GDOT on how this could be studied and implemented.