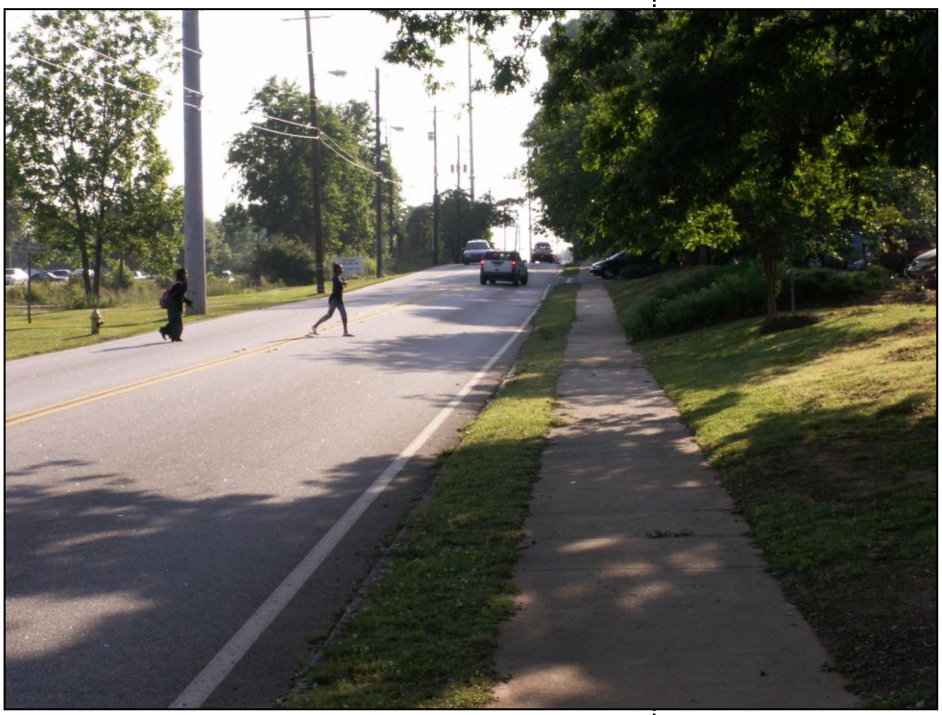
Technical Studies

Creating a safe and efficient multi-modal transportation system requires a fine balancing act. As the City of Decatur encourages citizens to embrace active living by providing more options to be physically active like biking and walking, it cannot completely ignore the needs of modern automobiles. Therefore, the CTP embraces a complete streets model of transportation that works to ensure the safety of all travels of all modes while balancing the convenience of all travelers.

Four technical studies have been completed to craft a plan for bicycle and pedestrian facilities—latent demand score (LDS), level of service (LOS), street typology and a policy and regulatory audit. The purpose of this four-part technique is to combine the results with stakeholder feedback and previous plans to provide data from which to identify and prioritize street, bicycle and pedestrian facility improvements.

Pedestrians crossing East College Avenue



These technical studies focus on facility supply, facility demand, and classification language. A strong foundation is built for the recommendations of the Community Transportation Plan by studying both supply and demand for transportation facilities, as well as providing a new framework for organizing and identifying them.

Overview of Technical Results

The first component of analysis focuses on public demand for pedestrian and bicycle facilities. The LDS calculations use geographic information systems (GIS) to locate trip destinations throughout the City of Decatur and surrounding areas. The program then determines where there is potential demand for bicycle and pedestrian trips on the existing road network. The model for the City of Decatur highlighted the greatest intensity of demand for pedestrian and bicycle facilities concentrated within the downtown core and tapering out towards the edges of the city.

The second area of study is current supply. The next section details the multi-modal Level of Service (LOS) scores for city corridors. For automobiles, LOS measures the delay experienced at intersections. For bicycle and pedestrians, LOS measures the factors that influence quality of travel, such as pavement condition, auto speeds, sidewalk widths, and other influencing details. LOS for all modes grades corridors on a scale of A to F and measures the quality of travel along major corridors. LOS scores for the City of Decatur indicate that conditions are generally good for all modes. However, there are several regional corridors, such as Scott Boulevard, that are notably bad for bicyclists and pedestrians.

"The CTP embraces a *complete streets* model of transportation which works to ensure the safety of all travels in all modes while balancing the convenience of all travelers."

The third leg of analysis is context. The last section details the street typology categories developed for the city and the results of a Quality Growth Audit. Currently, roads are generally classified in a hierarchy based on their ability to gather and distribute automobile traffic. As the City moves towards a more holistic transportation system, a more comprehensive classification system is needed. This section categorizes facilities based on the character of the street and surrounding land uses. The Quality Growth Audit examined Decatur's existing planning documents, policies, codes, and practices to identify potential barriers to achieving the CTP's vision of a healthy, efficient and equitable transportation system.

These analyses combined with input from the general public and City staff, inform the recommendations and help the City build its vision of a truly healthy, accessible and well-connected community.

Data Collection Methodology

The calculations detailed in the sections that follow reflect a wide variety of data that were collected for transportation facilities in Decatur, including signal timing, sidewalk existence and width, travel lane widths, grass buffer areas, and many other factors influencing travel conditions and characteristics for each mode. The City of Decatur's engineering department was able to provide preliminary data on streets, sidewalk coverage, and signal timing but more in depth measurements were required to provide data for the plan.

Project team members and traffic engineers gathered data for analysis over the first few months of the planning process through field research. Measurements of widths for lanes and sidewalks, observation of signal timing and intersection geometries were made in the field. Existence of bicycle and pedestrian facilities were made through observation and recorded on standardized data collection forms provided by the team. Intersection and corridor information was verified by examination of aerial photographs.

Signal timings and phases were evaluated by a timing study conducted by the city in 2006. The data was collected and utilized in the calculation of vehicular level of service scores. The scores reported in this plan reflect the recommended and implemented timings from that study.

Latent Demand for Bicycle and Pedestrian Facilities (Demand)

The Latent Demand Score (LDS) analysis was applied to determine latent, or potential, demand for bicycling and walking on the existing road network in the City of Decatur.[1] The LDS provides an estimate of potential demand for non-motorized travel throughout a transportation network. For the Decatur Community Transportation Plan, the LDS was customized so that it could be used to analyze potential pedestrian demand as well as bicycle demand. This analysis provides results that allow decision makers to compare the demand for bike and pedestrian trips many on each road segment of the primary transportation network.

Methodology

LDS is a GIS-based analysis that identifies trip attractors or destinations and the probability that someone will walk or bike to one of these attractors from various distances. As such, LDS uses a gravity model designed to rank road segments based on their proximity to different types of major attractors and the probability that someone will walk or bike a certain distance to those different types of attractors. Figure 5-1 shows an example of the equation used in calculating LDS for an individual road segment.

Figure 5-1 LDS Equation

$$LDS = \sum_{n=1}^{4} \left[TTS_n \times \frac{\sum_{n=1}^{4} (GA_n \times \overline{TG}_n)}{(GA_n \times \overline{TG}_n)} \times \left[\overline{TG}_n \sum_{d=1}^{l} P_{nd} \times ga_n \right] \right]$$

Where:			
	n	=	bicycle trip purpose (e.g., work, personal/business, recreation, school)
	TTS	=	trip purpose share of all bicycle trips (obtained from Census data)
	GA	=	number of generators or attractors per trip purpose
	TG	=	average trip generation of attractor or generator
	P	=	effect of travel distance on bike trip interchange, expresses as a probability
	ga	=	number of generators or attractors within specified travel distance range
	d	=	travel distance range from generator or attractor
	l	=	maximum travel distance from generator or attractor

Source: Shawn Turner, P.E.; Aaron Hottenstein, Gordon Shunk, P.E. 1997. *Bicycle And Pedestrian Travel Demand Forecasting: Literature Review*, Research Report 1723-1, Research Study Number 0-1723, Texas Transportation Institute, College Station, TX. Available online at http://tti.tamu.edu/documents/1723-1.pdf. [1] [1]

[1] The LDS methodology was devised by Bruce Landis of Sprinkle Consulting.

Residents visiting the Decatur Recreation Center

The number of trips generated by the major attractors was determined using the Trip Generation 5 software. The software utilizes average trip generation rates from Institute of Transportation Engineers' *Trip Generation Manual* (7th Edition, 2003) to calculate the number of weekday trips produced by different land uses. These trip generation rates represent the decision to travel for a given purpose. Attractors were categorized based on land use as city park, elementary school, middle school, high school, library, recreation center, business park, specialty retail center, or university/college. For each attractor, trip generation rates were used to determine the number of weekday (24-hour period) two-way trips. An average number of trips were then calculated for each land use. For example, three Decatur recreation centers—Decatur YMCA, Ebster Recreation Center, and Decatur Recreation Center—were considered major attractors. Two of the centers generate 572 trips each and one center generates 1,121 trips (see Table 5.1 for variables to determine trip generation). The average of these three values was calculated to estimate that a typical recreation center in Decatur would generate 755 weekday trips. After the estimated weekday trips were calculated for each type of land use, the attractors were divided into the more broad categories of school, work, recreation, or shopping to simplify the data for use in the model.

Based on the LDS methodology and feedback from stakeholders and city officials the following destinations (or attractors) were identified:

- Schools (elementary, middle, and high school) located within Decatur
- Parks and recreation centers located within Decatur
- MARTA train stations (East Lake, Decatur and Avondale Estates) in Decatur
- Employment and shopping clusters located within Decatur; Decatur Square, eastern end of E. College Ave, intersection of Oakview Dr. and E. Lake Dr., W. Ponce de Leon Ave. west of the Square, and Church St. north of the Square
- Three employment and shopping clusters located outside of the city (the intersection of Clairmont Road and North Decatur Road, the intersection of North Decatur Road and Church Street, and Emory University's main campus and the Centers for Disease Control and Prevention located on Clifton Road)

Map 5-1 identifies the attractors used in the LDS analysis for Decatur.

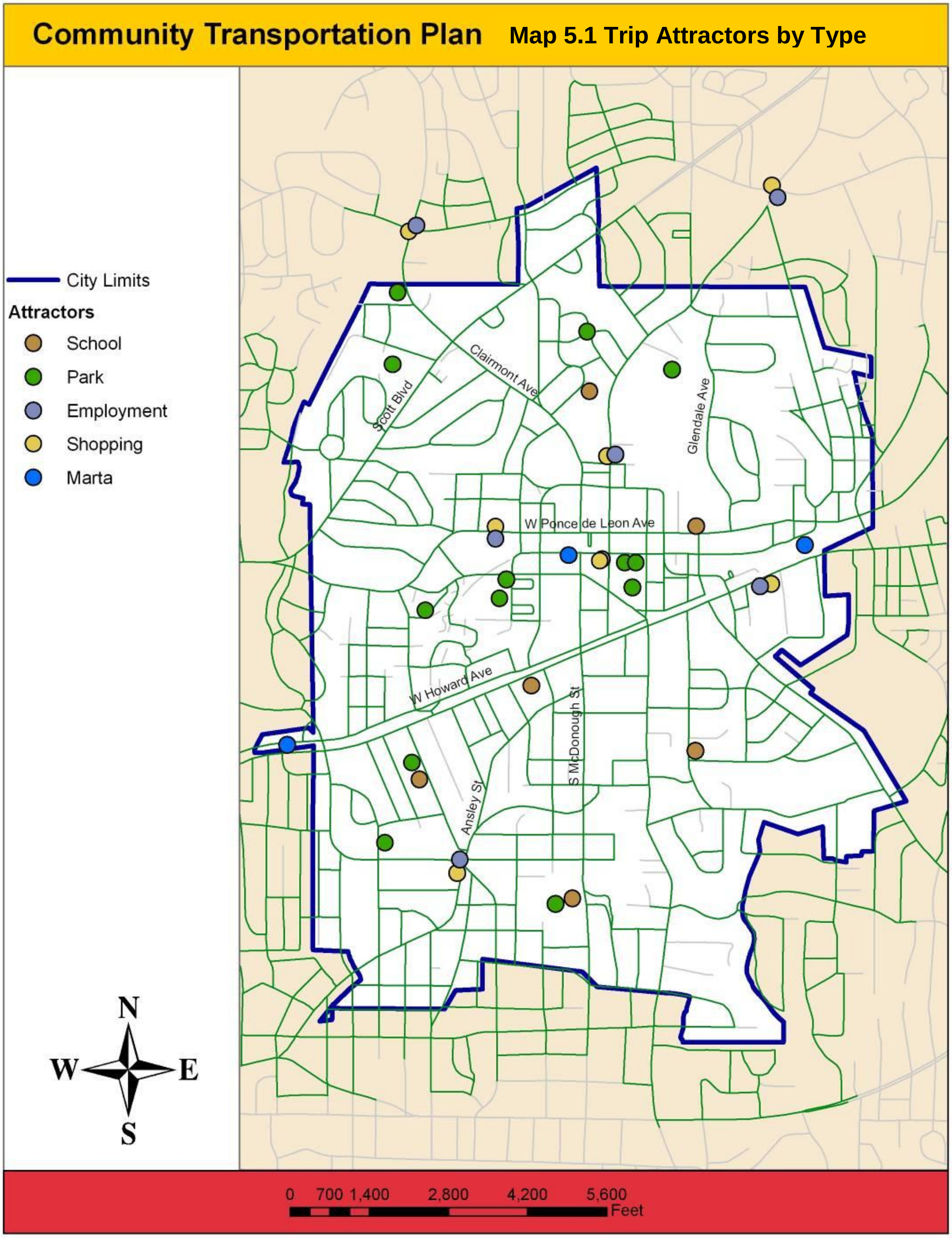

Community Transportation Plan
Map 5.1 Trip Attractors by Type
City Limits
Attractors
School
Park
Employment
Shopping
Marta
Clairmont Ave
Scott Blvd
Glendale Ave
W Ponce de Leon Ave
W Howard Ave
S McDonough St
Ansley St
N
W
E
S
0 700 1,400 2,800 4,200 5,600
Feet

Table 5-1 identifies the specific types of attractors, groups them into more general trip attractor types, identifies the land use category as defined by the trip generation software, illustrates the variables used to calculate estimated number of trips, and provides the estimated number of trips per attractor by land use category for the City of Decatur.

Table 5-1 Summary of Inputs for Trip Generation 5 Software

Attractor	Trip Attractor Type	Trip Generation 5 Land Use	Variable	Average Estimated Trips per Weekday per Attractor
Park	Park/Recreation	City Park	Acres	9
Recreation Center/YMCA		Recreation Community Center	Gross square footage of the facility/1,000	755
Elementary School	School	School	Students	320
Middle School				954
High School				800
Library	Park/Recreation	Library	Gross square footage of the facility/1,000	2,862
Colleges/ Universities	Employment	University	Employees	2,785
Employment Center	Employment	Business Park	Employees	21,141
	Shopping	Specialty Retail Center	Employees	60,283
MARTA Train Stations	Employment	NA[2]	Employees	21,141

Note: Employment centers considered both business park and specialty retail land uses based on the actual percentage mix of retail and business uses at the center. This mix was determined using 2006 BusinessPoint™ employment data from Claritas, a company that provides marketing research demographic data, marketing software and market segmentation services (http://www.claritas.com).

To conduct the LDS analysis, the probability of a trip to a particular attractor occurring by biking or walking was determined using data from the 2002 SMARTRAQ survey. SMARTRAQ is a transportation and land use project that was conducted jointly by Georgia Tech Research Institute and the Bombardier Active Transport Research Lab at University of British Columbia. The survey was a component of this project and produced activity based travel data representing travel patterns for all modes in the 13-county Atlanta region.[3]

[2] For this study, each of the three MARTA stations in or near Decatur (East Lake, Decatur, and Avondale) was assigned the average estimated trip number for employment clusters in the area.

[3] A complete overview of the SMARTRAQ project can be found at http://www.act-trans.ubc.ca/smartraq/pages/.

Table 5-2 shows the distance-based probabilities for walking and biking to each trip attractor type.

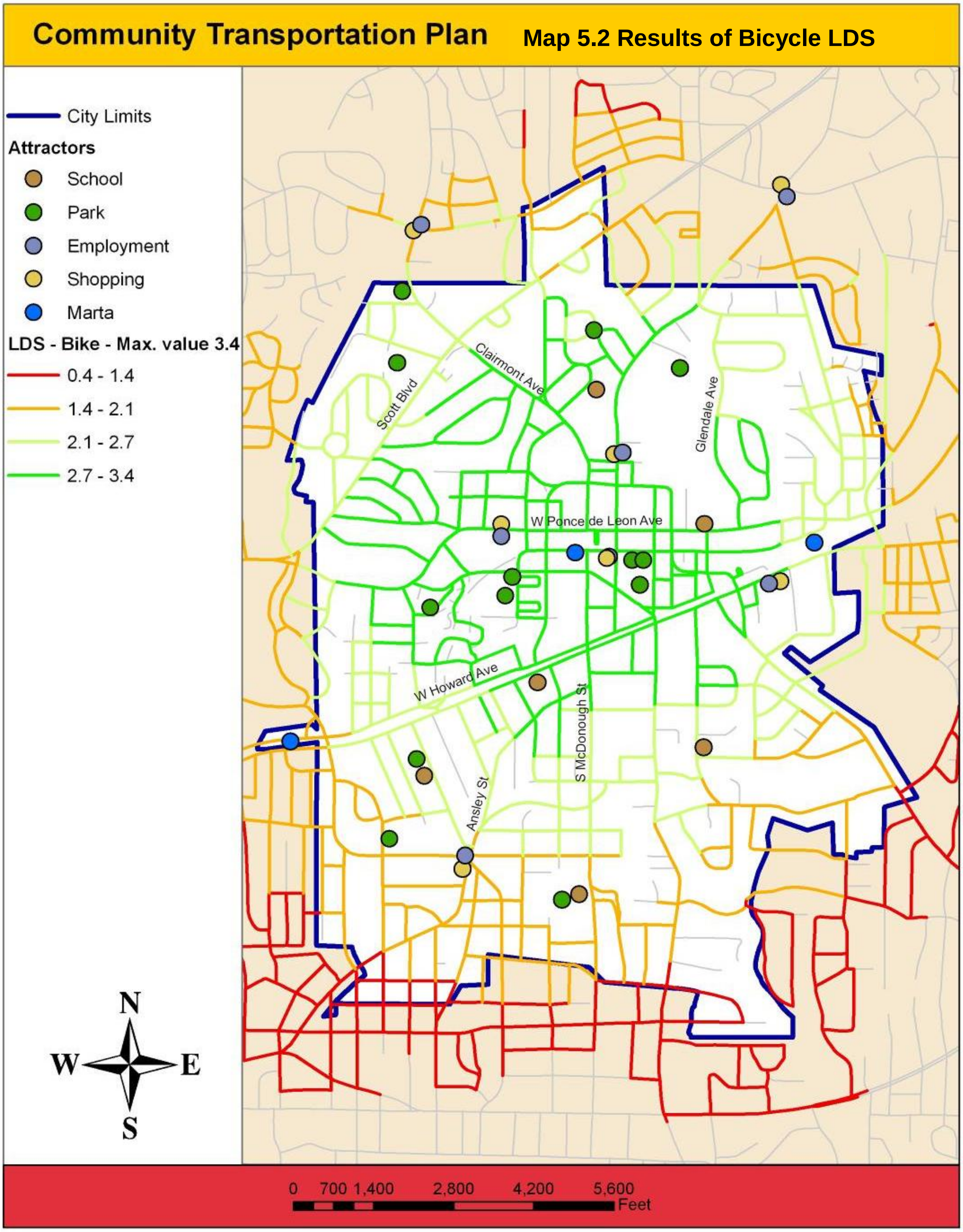
Table 5-2 Probability of Walking and Biking by Land Use and Distance

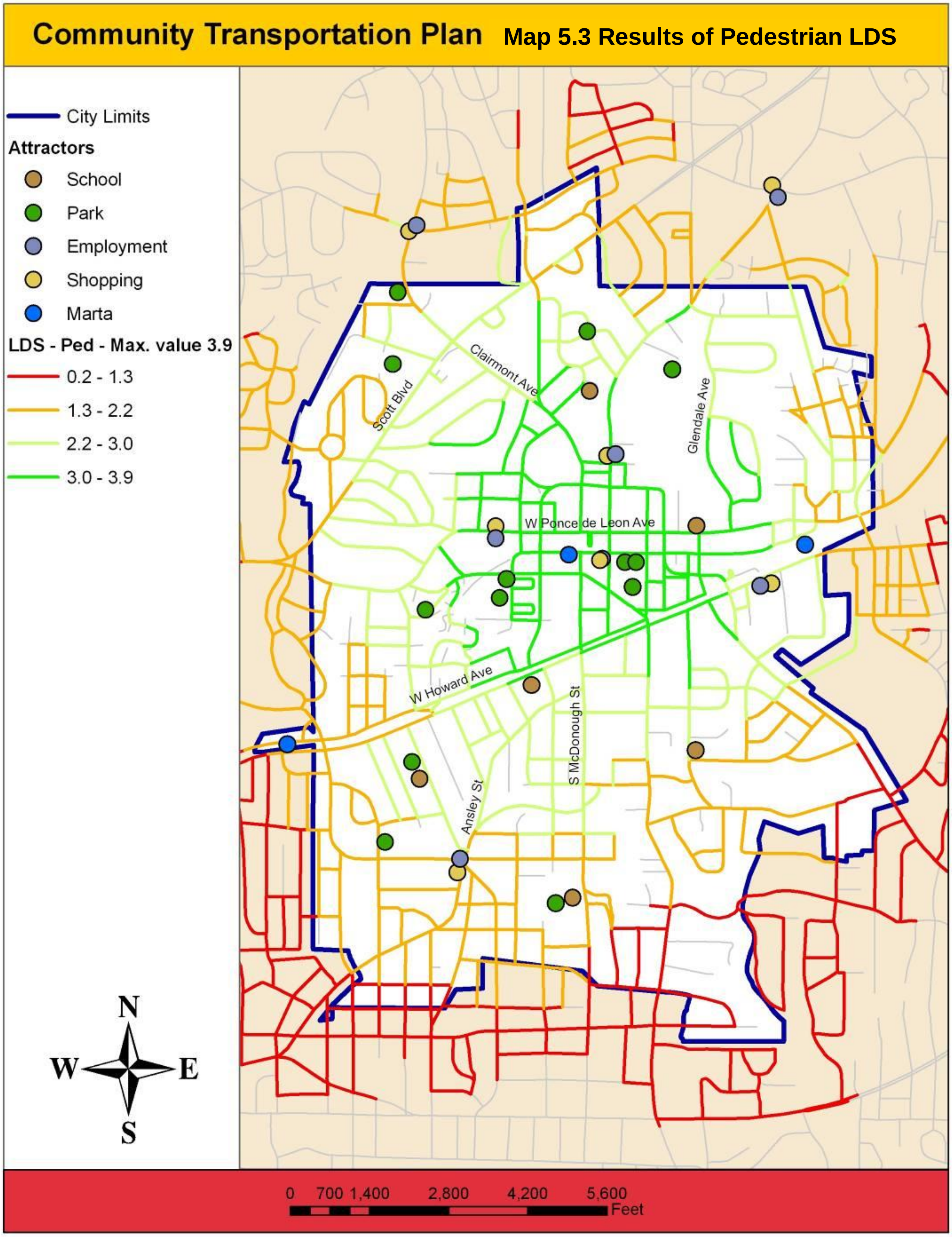
Trip Attractor Type	Mode	Miles from Attractor			
		0.5	1.0	1.5	2.0
Parks/Recreation	Walking	.62	.36	.21	.12
	Biking	.28	.23	.20	.17
School	Walking	.69	.34	.17	.08
	Biking	.36	.29	.23	.18
Employment	Walking	.71	.32	.15	.06
	Biking	.28	.24	.20	.17
Shopping	Walking	.72	.32	.14	.06
	Biking	.29	.25	.21	.17

Using GIS, buffers in ½ mile increments up to 2 miles were created around each attractor. Next, the buffers were overlaid onto the road system. Each road in the system was divided into segments, which are individual segments of road between intersections. For each segment a sum of each type of attractor that is within ½ mile, 1 mile, 1 ½ miles, and 2 miles was calculated. These sums were input into the LDS equation (Figure 5-1), along with the trip probabilities (Table 5-2) to calculate a score for each road segment. Then the road segment LDS were compiled into separate citywide maps for bicycle and pedestrian latent demand.

Results

The following maps show the potential demand for bicycle and pedestrian facilities for each segment in the transportation network (Map 5-2 Bike, Map 5-3 Pedestrian). In both maps, the darker green segments have the highest potential demand and the red has the lowest potential demand. It is important to note that the LDS analysis indicates relative demand by road segment. Therefore, the numbers depicted in the legend indicate a demand for bicycle or pedestrian trips compared to other segments in the network.


Community Transportation Plan
Map 5.2 Results of Bicycle LDS
City Limits
Attractors
School
Park
Employment
Shopping
Marta
LDS - Bike - Max. value 3.4
0.4 - 1.4
1.4 - 2.1
2.1 - 2.7
2.7 - 3.4
Clairmont Ave
Scott Blvd
Glendale Ave
W Ponce de Leon Ave
W Howard Ave
S McDonough St
Ansley St
N
W
E
S
0
700
1,400
2,800
4,200
5,600
Feet


Community Transportation Plan
Map 5.3 Results of Pedestrian LDS
City Limits
Attractors
School
Park
Employment
Shopping
Marta
LDS - Ped - Max. value 3.9
0.2 - 1.3
1.3 - 2.2
2.2 - 3.0
3.0 - 3.9
Clairmont Ave
Scott Blvd
Glendale Ave
W Ponce de Leon Ave
W Howard Ave
S McDonough St
Ansley St
N
W
E
S
0 700 1,400 2,800 4,200 5,600
Feet

There are several important caveats to the LDS analysis. First, this analysis measures demand under existing conditions. Therefore, the creation of new attractors can increase demand in particular areas. For this reason, it is important to examine future land use plans to determine future needs for facilities (see street typology assessment in the following section). Second, the scores present relative demand for bicycle and pedestrian facilities. Therefore, all segments in the analysis have at least some demand for non-motorized facilities, but those segments in red simply indicate lesser demand and may require less intensive facilities (e.g. “share the road” signs instead of bike lanes, narrower sidewalks or sidewalks on only one side of the street). Third, the LDS analysis provides a framework, along with the other technical studies, to set priorities for improvements and new facilities. The LDS, when combined with level of service analysis of biking and walking facilities and community input can be effectively used to set standards and priorities for future facilities.

“It is important to examine future land use plans to determine future needs for facilities.”

Level of Service by Mode (Supply)

Level of Service (LOS) is a calculated score used to describe the operating characteristics of a road segment or intersection. LOS scores help translate the characteristics of a roadway to a relative score in order to help compare various corridors against each other. LOS scores are useful for highlighting areas that need improvement as well as comparing the potential improvement of future projects.

Intersection of Commerce Drive and Church Street looking South

Methodology

The methodology used for the Bicycle and Pedestrian Level-of-Service (LOS) analysis tool is based upon the proven peer-reviewed research documented in *Transportation Research Records (TRR)1578* and *1773* published by the Transportation Research Board of the National Academy of Sciences. It was developed with a background of over 150,000 miles of evaluated urban, suburban, and rural streets across North America. Many urban planning agencies and state highway departments are using this established method of evaluating their street networks. Following is a description of the methodology used to determine bicycle LOS followed by pedestrian LOS and then vehicular LOS.

Bicycle Level of Service

Bicycle level-of-service for on-street bike lanes, as referenced in the Highway Capacity Manual 2000 edition, is determined by counting the number of bicyclists per hour and then estimating the intersection delay and bicycling speed along an urban street. In contrast, *TRR 1578* evaluates the comfort level and perceived safety for cyclists, determined by cyclists' evaluations of conditions along street segments including factors such as motor vehicle traffic volume and speed as well as their own sense of comfort and safety. More than level-of-service, it quantifies the quality-of-service provided for cyclists.

Bicycle Parking

The bicycle LOS model uses the measurable traffic and roadway factors that transportation planners and engineers use for evaluating the design and operation of other travel modes, including street width, bike lane width and striping combinations, traffic volume, pavement surface condition, motor vehicle speed and type, and on-street parking. Subsequent applications and research using the original formula have resulted in the three scenarios for the calculation of effective width of the outside lane, adjustments for streets with low traffic volume, and the influences of heavy vehicles. The resulting Bicycle LOS score equates to a LOS category (A, B, C, D, E, or F) similar to those used for highway capacity operations, based on the ranges shown in Table 5-3, that reflects the cyclist's perceived comfort and safety traveling on the street.

Table 5-3 Bicycle Level of Service Categories

Level-of-Service	Bicycle LOS Score
A	<1.5
B	> 1.5 and < 2.5
C	> 2.5 and < 3.5
D	> 3.5 and < 4.5
E	> 4.5 and < 5.5
F	> 5.5

Figure 5-2 Calculations for Bicycle Level of Service

Bicycle LOS = $a_1 \ln(Vol_{15}/L_n) + a_2 SP_t(1+10.38HV)^2 + a_3(1/PR_5)^2 + a_4(W_e)^2 + C$

Where:

Vol_{15} = Volume of autos and trucks in 15 minute time period traveling in same direction as bicyclists
= (AADT x D x K_d) / (4 x PHF)
where:
AADT = annual average daily traffic on the segment or link
D = directional factor (assumed = 0.565)
K_d = peak to daily factor (assumed = 0.1)
PHF = peak hour factor (assumed = 1.0)

L_n = Total number of directional *through* lanes (includes shared through/turn lanes)

SP_t = Effective speed limit (in miles per hour)
= 1.1199 ln(SP_p - 20) + 0.8103
SP_p = Posted speed limit (a surrogate for average running speed)

HV = Percentage of heavy vehicles (vehicles with more than four wheels touching the pavement)

PR_5 = FHWA’s five point pavement surface condition rating

W_e = Average effective width of outside through lane where:
$W_e = W_v$ - (10 ft x % OSPA) if $W_l = 0$, or
$W_e = W_v + W_l$ (1 - 2 x % OSPA) if $W_l > 0$ & $W_{ps} = 0$, or
$W_e = W_v + W_l$ - 2 (10 x % OSPA) if $W_l > 0$ & $W_{ps} > 0$ and a bike lane exists
where:

W_l = width of pavement between the outside lane stripe and the edge of pavement (not including the gutter pan)

W_v = effective width as a function of traffic volume as follows:
$W_v = W_t$ if AADT is more than 4,000vehicles per day

$W_v = W_t$ (2-0.00025 x ADT) if AADT is less than or equal to 4,000vehicles per day, and if the street is undivided and unstriped

% OSPA = percentage of segment with occupied on-street parking
W_{ps} = width of pavement striped for on-street parking

a_1: 0.507, a_2: 0.199, a_3: 7.066,a_4: - 0.005, C: 0.760
(a_1, a_2 a_3 and a_4) are coefficients established by the multivariate regression analysis.

Source: Transportation Research Record 1578, published by the Transportation Research Board of the National Academy of Sciences. Research conducted by Bruce Landis et.al.with Sprinkle Consulting, Inc.

The following figure 5.3 relates the full range of bicycle facilities, from exemplary (LOS A) to poor (LOS E & F). The pictures represent the level of quality for various facility types and designs, including lane widths, traffic volumes, traffic speeds, shoulder widths, bicycle lanes and types, and other variables. The pictures serve as a valuable tool for interpreting the LOS scores calculated by the above equation.

Figure 5-3 Bicycling Levels of Quality

Credit: Dan Burden, Glatting Jackson Kercher Anglin, Inc., and Walkable Communities, Inc.

Pedestrian Level of Service

Pedestrian level-of-service, as referenced in the *Highway Capacity Manual* 2000 edition, is determined by measuring or estimating either walking speed or pedestrian crowding. The crowding effect accounts for street furniture (e.g. benches, poles, meters, etc.), landscaping, and building protrusions (e.g. sidewalk cafes). There is a different approach to determining pedestrian LOS that assumes street furniture, landscaping, interesting building facades and sidewalk cafes are generally appreciated by pedestrians; showing their appreciation by walking there more frequently. Instead of using the *Highway Capacity Manual* to determine pedestrian LOS, the pedestrian LOS model used for the evaluation in this report is based on research documented in *TRR 1773*. It uses roadway width, presence of sidewalks and intervening buffers, barriers within those buffers, traffic volume, motor vehicle speed, and on-street parking. The resulting pedestrian LOS score equates to a LOS category (A, B, C, D, E, or F), based on the ranges shown in Table 5-4, that reflect pedestrian's perceived comfort and safety.

Wide sidewalk on the Decatur Square

Table 5-4 Pedestrian Level of Service Categories

Level-of-Service	Pedestrian LOS Score
A	<1.5
B	> 1.5 and < 2.5
C	> 2.5 and < 3.5
D	> 3.5 and < 4.5
E	> 4.5 and < 5.5
F	> 5.5

The following figure details the equation used to calculate pedestrian Level of Service scores.

Figure 5-4 Calculation for Pedestrian Level of Service

$$\textbf{Pedestrian LOS} = -1.2021 \ln (W_{ol} + W_l + f_p \times \%OSP + f_b \times W_b + f_{sw} \times W_s) + 0.253 \ln (Vol_{15}/L_n) + 0.0005\, SPD^2 + 5.3876$$

Where:

W_{ol}	= Width of outside vehicular travel lane, excluding the gutter (in feet)
W_l	= Width of shoulder or striped bike lane (in feet)
f_p	= On-street parking effect coefficient (= 0.20)
%OSP	= Percent of segment with occupied on-street parking
f_b	= Buffer area barrier coefficient (= 5.37 for trees spaced 20 feet on center)
W_b	= Buffer width (distance between edge of pavement and sidewalk, in feet)
f_{sw}	= Sidewalk presence coefficient = $6 - 0.3W_s$
W_s	= Width of sidewalk (feet)
Vol_{15}	= Average auto and truck traffic during a fifteen (15) minute period in the direction of travel under study
L_n	= Total number of directional *through* lanes (includes shared through/turn lanes) in both directions
SPD	= Average running speed of motor vehicle traffic (in miles per hour)

Source: Transportation Research Record 1773, published by the Transportation Research Board of the National Academy of Sciences. Research conducted by Bruce Landis et.al with Sprinkle Consulting, Inc.

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The following figure 5.5 relates the full range of pedestrian facilities, from exemplary (LOS A) to poor (LOS E & F). The pictures represent the level of quality for various facility types and designs, including sidewalk widths, adjacent streetscaping, crossing locations and types, and other variables. The pictures serve as a valuable tool for interpreting the LOS scores calculated by the equation above.

Figure 5-5 Walking Levels of Quality

Credit: Dan Burden, Glatting Jackson Kercher Anglin, Inc., and Walkable Communities, Inc.

Vehicular Level of Service at Intersections

In a vehicular context, Level of Service (LOS) is used to describe the operating characteristics of a road segment or intersection in relation to its capacity. LOS is defined as a qualitative measure that describes operational conditions and motorists' perceptions within a traffic stream. The *Highway Capacity Manual* defines six levels of service, LOS A through LOS F, with A being the best and F being the worst. LOS analyses were conducted at all intersections within the study network for which traffic counts were available using *Synchro Professional, Version 6.0* software. Synchro provides LOS calculations that are consistent with the *Highway Capacity Manual* 2000 edition.

For intersections, LOS is determined based on the average delay experienced by a motorist traveling through the intersection. Levels of Service for signalized intersections are reported for the intersection as a whole. One or more movements at an intersection may experience a worse LOS (i.e. longer delays), while the intersection as a whole may operate acceptably. Levels of Service thresholds for signalized intersections are shown in Table 5-5.

Table 5-5 Vehicle Levels of Service Categories

Level of Service	Control Delay (seconds per vehicle)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

The pictures below illustrate examples of both free-flowing and more congested conditions at Decatur intersections.

Intersection of Commerce Drive and Church Street looking West

Intersection of Commerce Drive and Church Street looking East

Level of Service Results

Bicycle and Pedestrian Level of Service

Table 5-6 shows the existing Bicycle and Pedestrian Levels of Service along the analyzed corridors.

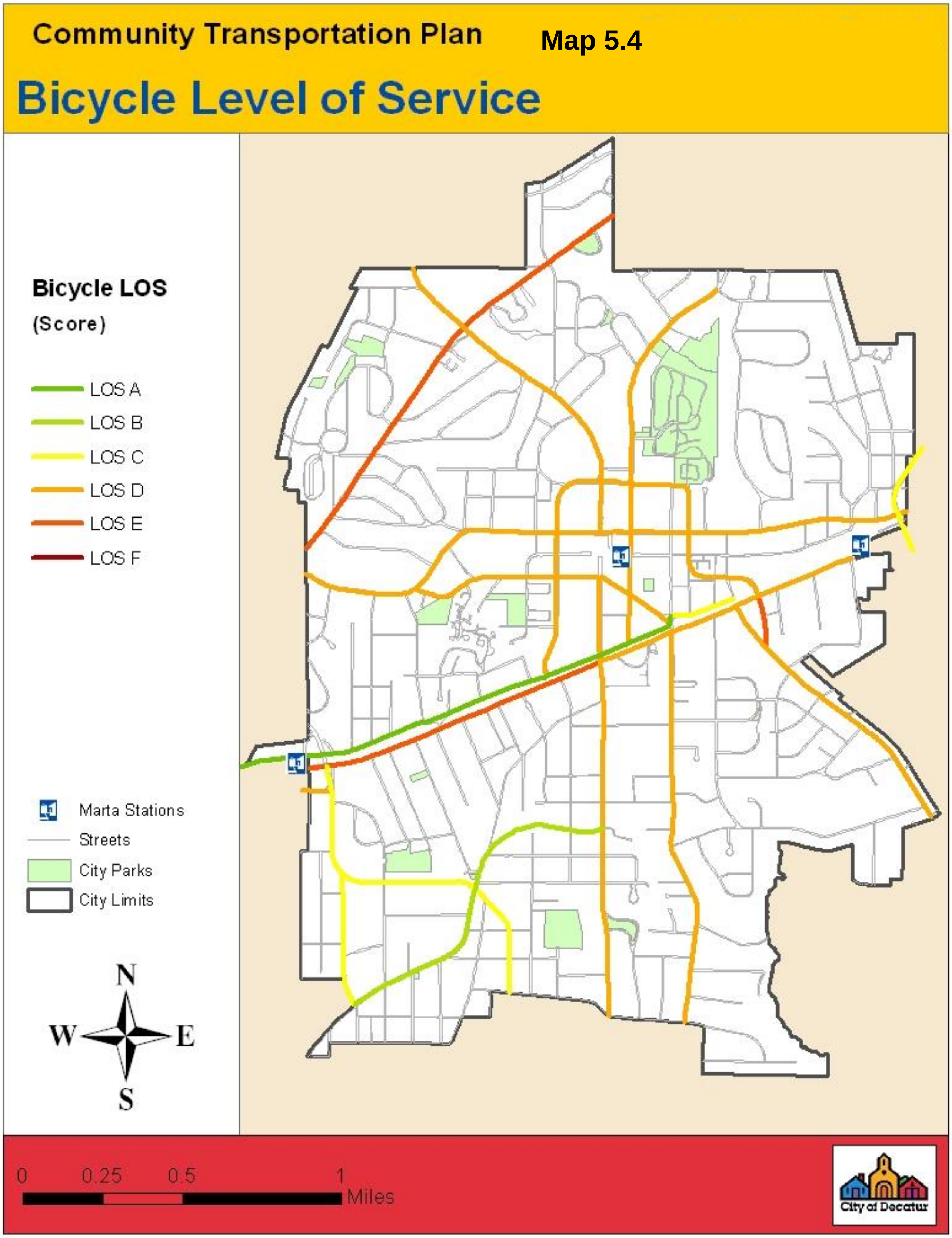
Table 5-6 Existing Bicycle and Pedestrian LOS

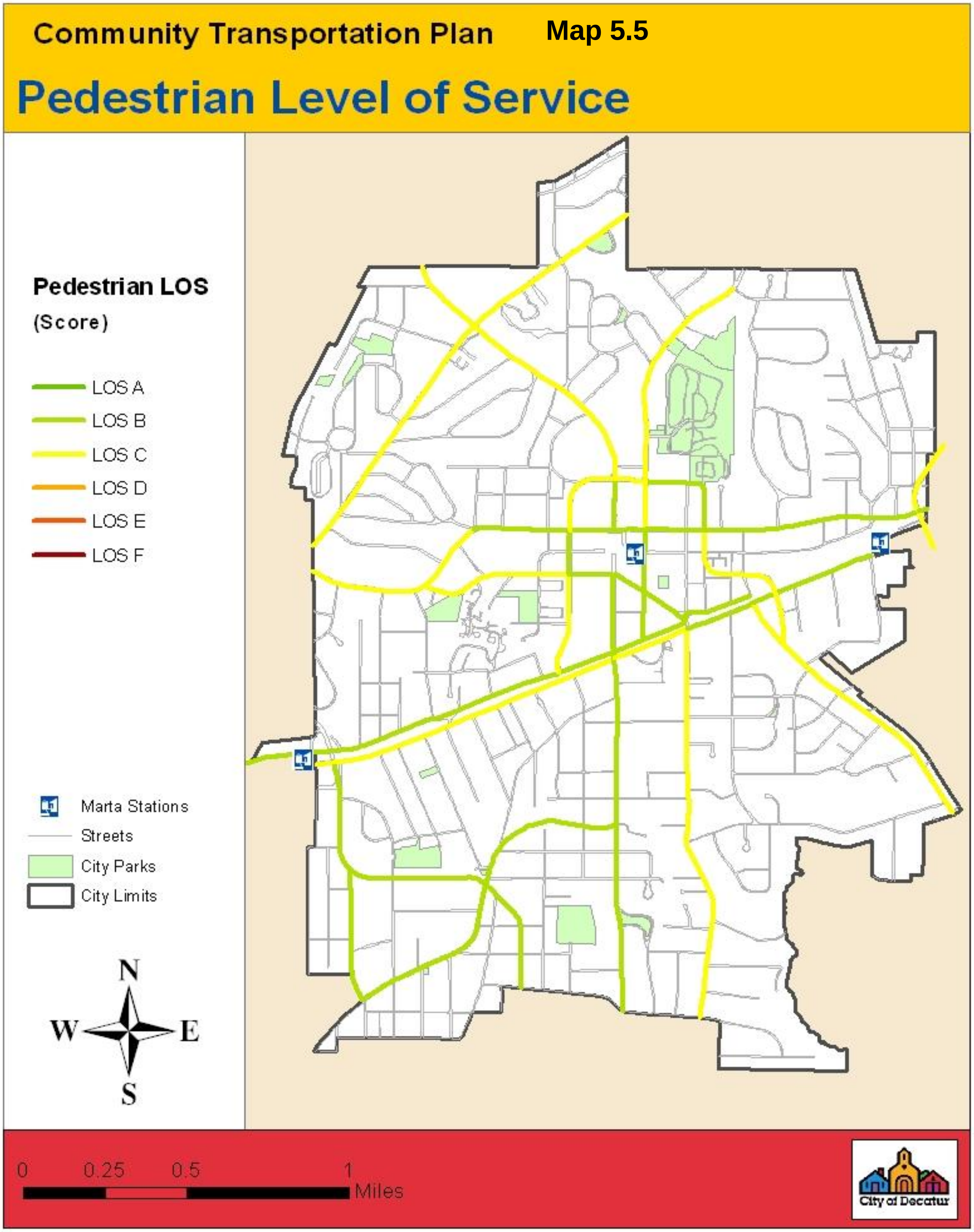
Corridor	Existing Bicycle LOS	Existing Pedestrian LOS
Church Street	D	B/C
Clairemont Avenue	D	B/C
College Avenue	D/E	B/C
Commerce Drive	D/E	B/C
Howard Avenue	A/C	B
South Candler Street	D	C
Oakview Road	B	B
Ponce de Leon Avenue	D	B/C
McDonough Street	D	B
Scott Boulevard	E	C
Second Avenue	C	B
East Lake Drive	C	B
Trinity Place	D	B/C
South Columbia Drive	D	C

Bicycle levels of service in Decatur range from A to E, with the highest level of service (A) on Howard Avenue, where the PATH facility is adjacent to the roadway and provides a multi-use pathway separated (by curb) from the street. Lower-volume streets such as Oakview Road are at LOS B, while most facilities in the City range from LOS C to E, depending primarily on the lane widths and volume of adjacent street traffic. For example, Scott Boulevard as well as sections of Commerce Drive and College Avenue are classified as LOS E, primarily because their higher vehicular volumes make travel by bicycle more challenging.

All of the corridors analyzed have an existing pedestrian level of service of B or C. While pedestrian conditions may not be ideal in all locations, sidewalks do exist on at least one side of each of these facilities. Decatur has done a very good job providing pedestrian facilities on major streets citywide. When comparing pedestrian LOS results, it is important to remember that facilities receiving Levels of Service E and F typically would not have sidewalks at all, and this is not the case for any of the streets studied in Decatur. It is also noted that the Pedestrian LOS model applies only to conditions walking along streets, not to crosswalks or intersections.

The maps on the following pages are graphical depictions of the above table.


Community Transportation Plan
Map 5.4
Bicycle Level of Service
Bicycle LOS
(Score)
LOS A
LOS B
LOS C
LOS D
LOS E
LOS F
Marta Stations
Streets
City Parks
City Limits
N
W
E
S
0
0.25
0.5
1
Miles
City of Decatur


Community Transportation Plan
Map 5.5
Pedestrian Level of Service
Pedestrian LOS
(Score)
LOS A
LOS B
LOS C
LOS D
LOS E
LOS F
Marta Stations
Streets
City Parks
City Limits
N
W
E
S
0
0.25
0.5
1
Miles
City of Decatur

Vehicle Level of Service

A total of 28 signalized intersections, including one intersection controlled by pedestrian-actuated signal at the Clairemont Oaks housing complex, were analyzed along the primary corridors identified by the City of Decatur. All of the analyzed intersections are currently operating at LOS D or better, which is widely recognized as the standard Level of Service for acceptable intersection operation. Four of the intersections currently operate at LOS D during the PM peak hour, including the following: Commerce Drive at West Ponce de Leon Avenue, Commerce Drive at Clairemont Avenue, Clairemont Avenue at Scott Boulevard, and College Avenue at South Candler Street. Levels of Service and delay are displayed for all intersections during the PM peak hour in Table 5-7.

Intersection of East College Avenue and South Candler Street looking East.

Commerce Drive serves as a bypass to Ponce de Leon Avenue, Church Street and West Trinity Place in downtown Decatur and therefore processes higher volumes than these other streets. This corridor includes two of the intersections operating at LOS D: Commerce Drive at W. Ponce de Leon Avenue and Commerce Drive at Clairemont Avenue. Ponce de Leon Avenue is an urban minor arterial that connects the city of Decatur with Midtown Atlanta to the west and I-285 to the east. The intersection of W. Ponce de Leon Avenue with Commerce Drive has reasonably high volumes during the PM peak period. The eastbound approach at this intersection widens abruptly from one lane to four lanes, comprising two left-turn lanes, one through lane, and one right-turn lane. Queuing occurs on the eastbound approach due to short storage lengths for the turn bays.

The intersection of Commerce Drive at Clairemont Avenue has some of the highest total intersection traffic volumes of those studied. Queuing often occurs along the southbound and westbound approaches of this intersection. The intersection is located a close distance (approximately 500 feet) from an adjacent signalized intersection at Commerce Drive at Church Street. Large numbers of southbound left-turn and eastbound through movement vehicles along Clairemont Avenue and Commerce Drive, respectively, have limited storage downstream before the next intersection. Additionally, the eastbound left-turn lane on Commerce Drive at Church Street, which also sustains a large number of vehicles, has a relatively short storage bay. Vehicles often queue beyond the lane and obstruct the through lane. Because of these geometric deficiencies and the downstream queuing generated as a result, the signal often cannot process the demand efficiently, causing queues to build. Efficient coordination and interaction between the Clairemont Avenue and Church Street intersections is critical to maintain vehicular progression.

The intersection of Clairemont Avenue and Scott Boulevard also operates at LOS D during the PM peak hour due to the overall volume approaching the intersection, particularly in the eastbound direction along Scott Boulevard and the southbound direction along Clairemont Avenue. Scott Boulevard (U.S. Route 78/23) begins at Ponce de Leon Avenue in DeKalb County (between Atlanta and Decatur), travels through the northwest edge of Decatur and later becomes Stone Mountain Freeway, intersecting I-285 and traveling into Gwinnett County. Therefore, the eastbound direction is a primary commute route leaving downtown Atlanta during the PM peak hour.

Table 5-7 Existing 2006 Intersection Levels of Service (delay in seconds)

Intersection		Control	PM Peak Hour
1	Commerce Drive @ Howard Avenue	Signal	B (15.6)
2	Commerce Drive @ W. Trinity Place	Signal	C (24.2)
3	Commerce Drive @ Swanton Way	Signal	A (5.7)
4	Commerce Drive @ W. Ponce de Leon Avenue	Signal	D (38.1)
5	Commerce Drive @ Clairemont Avenue	Signal	D (46.2)
6	Commerce Drive @ Church Street	Signal	C (33.6)
7	Commerce Drive @ N. Candler Street	Signal	B (17.3)
8	Commerce Drive @ E. Ponce de Leon Avenue	Signal	C (27.7)
9	Commerce Drive @ Sycamore Street	Signal	B (17.1)
10	Commerce Drive @ Sycamore Place	Signal	B (10.4)
11	Commerce Drive @ College Avenue	Signal	B (19.0)
12	Clairemont Avenue @ E. Ponce de Leon Avenue	Signal	A (10.0)
13	Clairemont Avenue @ Clairemont Oaks	Signal (Ped)	A (2.0)
14	Clairemont Avenue @ Wilton Drive	Signal	A (9.3)
15	Clairemont Avenue @ Scott Boulevard	Signal	D (48.8)
16	Church Street @ E. Trinity Place	Signal	C (34.0)
17	Church Street @ Sycamore Street	Signal	A (7.1)
18	Church Street @ E. Ponce de Leon Avenue	Signal	C (29.5)
19	Church Street @ Clairemont Oaks	Signal	A (3.2)
20	Church Street @ Lucerne Street	Signal	A (3.0)
21	Church Street @ Medlock Road	Signal	A (6.6)
22	N. Candler Street @ E. Ponce de Leon Avenue	Signal	B (15.0)
23	Howard Avenue @ Paden Circle	Signal	A (4.1)
24	Howard Avenue @ Atlanta Avenue	Signal	C (23.7)
25	College Avenue @ Atlanta Avenue	Signal	B (13.4)
26	College Avenue @ S. McDonough Street	Signal	B (19.5)
27	College Avenue @ S. Candler Street	Signal	D (48.4)
28	College Avenue @ Sams Street	Signal	B (12.4)

Source: Traffic counts conducted by Traffic Data Services in 2006 and 2007. Results reflect traffic signal phasing and timing changes made by DeKalb County in late 2006 and early 2007.

The fourth intersection operating at LOS D during the PM peak hour is College Avenue at South Candler Street, one of three major railroad crossings in the city of Decatur. College Avenue is located across the railroad tracks from Howard Avenue. One signal controller controls both intersections, but lost time at the intersection is high due to the effective width of the intersection over the railroad tracks on South Candler that needs to remain clear between phases. Additionally, eastbound College Avenue and southbound Candler Street have relatively high conflicting volumes during the PM peak that result in a low Level of Service for the intersection.

Street Typology (Context)

Why is a Street Typology Map Important?

Before World War II, city streets across America were filled with a mix of people walking, cycling and riding in all manner of vehicles. The tremendous growth in auto use following the war prompted highway engineers and city officials to enforce ways to manage congestion. One of the tools they used was a street hierarchy map to create functional road classifications that distinguished between the dual primary roles of streets at the time – to move people and to provide access to abutting land. The *function* of streets (i.e. mobility and access) was emphasized, nearly to the exclusion of the myriad other roles of streets as quality urban spaces and places for citizens to enjoy city life.

A **street typology map** aids in the creation of quality street environments by adopting an “overlay” to the official functional classification or hierarchy map. The “overlay” serves as a guide for decision-makers to use as the street transformation process ensues. The “overlay” adds to the functional hierarchy of the official map by introducing the relationship to Decatur’s adopted land use plan, recognizing building form, land uses and the mix of uses. So a street not only has a function (mobility and access) but a relationship to buildings and sites along the way. The activity in each building and site and more importantly the activity of people moving from one building to another and from one site to another creates different levels of pedestrian activity which in turn creates different demands on the street. For example, a very busy downtown, where office workers walk to lunch and window-shop on their lunch hour, creates a need for high-quality streetscapes. Citizens want to safely cross the street and generally feel comfortable being outside, near the street.

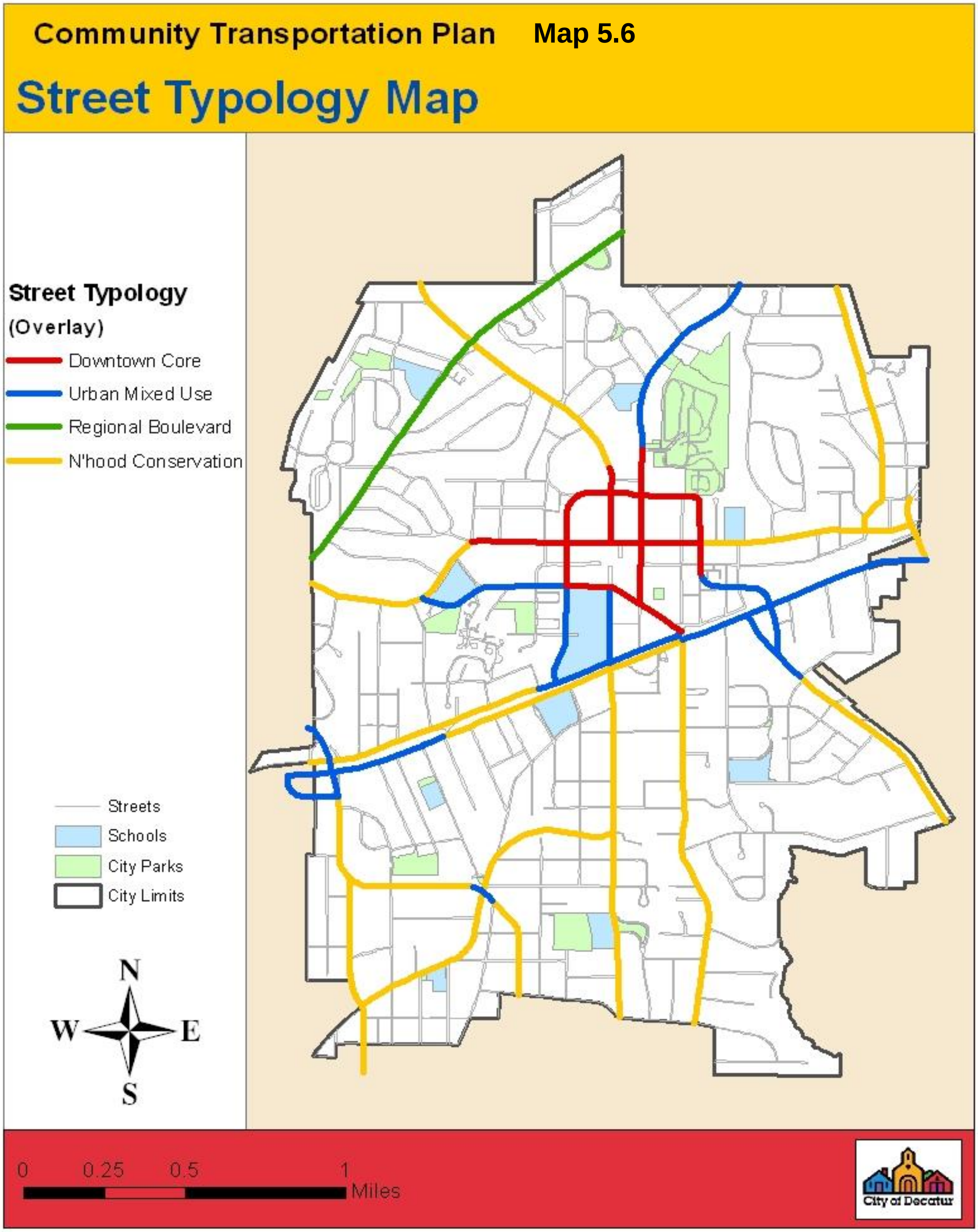
Redesigning Streets

Decatur’s desire to transform streets into pedestrian- and bicycle-friendly places, while accommodating vehicles traveling reasonable speeds, is achievable. Reasonable speeds are a key ingredient to the formula for success. For example, an arterial street such as Clairemont Avenue could be friendly to cyclists and pedestrians if traffic moved at 35 mph or less at all times — day and night. Downtown streets including Church Street and Commerce Drive should be traveled at 25 mph or less. This would foster an environment where pedestrians feel safe crossing streets and comfortable walking beside the street and stopping to talk.

The various decisions made regarding a redesign of such streets involves a myriad of choices, such as the paving material to use in a crosswalk, how frequently crosswalks should be installed, whether to provide benches and shelters and wayfinding signs along the sidewalk. Even the width of the sidewalk is a critical design decision. The street typology “overlay” serves as a guide to this type of decision-making. It can be used to guide investment decisions for rebalancing, redesigning, and rebuilding the streets of Decatur. The street typology overlay consists of a map and companion table such as the attached examples (see Table 5-8 and Map 5-6). The map shows Decatur’s arterial streets, officially adopted as either “principal arterials” or “minor arterials” and it shows new terms to be used by the City, with definitions following.

Table 5-8 Elements of Street Typology

	Travel lanes	Lane Widths	Median priority	Targeted Operating Speed	Traffic Calming	Transit service	Bicycle Facility	Restrict/Limit driveway access	On-street parking priority	Pedestrian way
Arterials										
Regional Blvd	4	11-12	High	35	Limited to select horizontal measures	Frequent		Yes	None	Sidewalk on both sides
Downtown Core	2-4	10-11	None / low	20-25	Limited to select horizontal measures	Frequent	Bike lane / shared lane	Yes	High	10-16 ft sidewalk 6 ft. furniture zone or tree pits
Urban Mixed Use	2 (one-way) 4 (two-way)	10-12	None/ low	25-30	Limited to select horizontal measures	Frequent	Bike lane/ shared lane	Yes	High	10-12 ft sidewalk 6 ft furniture zone or tree pits
Neighborhood Conservation	2	10-11	Low / None	20 - 25	Limited to select horizontal measures	Limited	Shared lane	No	Medium	5-6 ft sidewalk
Non-arterials										
Medium and High Density Residential	2	10-12	Low	25	Limited to select horizontal measures	Limited	Shared lane /Bike Lane	No	High	6-8 ft sidewalk 4-6 ft green strip
Low Density Residential	2	10-11	Low/ none	20 -25	Consider vertical and horizontal measures	Limited	Shared lane	No	Med	5-6 ft sidewalk 4 ft green strip
Alley/Service	1-1/2 (yield)	15-16	None	10	Consider vertical	None	Shared lane	No	Low	None/5 ft sidewalk limited land-scaping


Community Transportation Plan
Map 5.6
Street Typology Map
Street Typology
(Overlay)
Downtown Core
Urban Mixed Use
Regional Boulevard
N'hood Conservation
Streets
Schools
City Parks
City Limits
N
W
E
S
0
0.25
0.5
1
Miles
City of Decatur

Downtown Core Streets: These streets are located within areas of high-intensity mixed-use commercial, retail, office, and residential areas with substantial pedestrian activity. The pedestrian realm in a mixed-use street is the primary physical environment of the street realm and where most of the activity occurs. Amenities are preferred and include awnings, opaque windows, street furniture, café tables, bike racks, pedestrian-scale lighting and landscaping. Downtown core streets may have raised medians with high quality hardscape or landscaping, specially-designed refuge areas at intersection crosswalks, and street trees.

West Ponce de Leon Avenue

On-street parking is an important element in a downtown street design in order to reduce travel speeds, buffer pedestrians from moving traffic, and support adjacent retail establishments. Ample parking may be located in lots or structures nearby, and on-street parking should be managed for frequent turnover. Most downtown mixed-use streets emphasize pedestrian movement primarily, transit access through the corridor secondarily, accommodate bicyclists as vehicles, and lastly target reasonable speeds for motor vehicles. Posted speed limits should be 25 to 30 mph.

Examples: Portions of Clairemont Ave., Commerce Drive, and Ponce de Leon

Regional Boulevards: The regional boulevard is designed to balance traffic mobility with land access. A landscaped median is a desirable treatment to enhance aesthetics, improve traffic safety and flow, and provide a pedestrian refuge at intersections. In some places, however, a median is not feasible. Typically, businesses are setback from the street with intervening parking structures or large parking lots, relying on the vehicular access to the streets they front.

However, regional boulevards should be more pleasant for pedestrians, accessible by transit, and efficient for vehicles. The emphasis for these corridors does not need to focus on pedestrian mobility as much as other typologies, but the cross-section should still provide adequate sidewalks to supplement pedestrian access within and across the adjacent land uses. Speed limits are usually 35 mph.

Example: Scott Boulevard

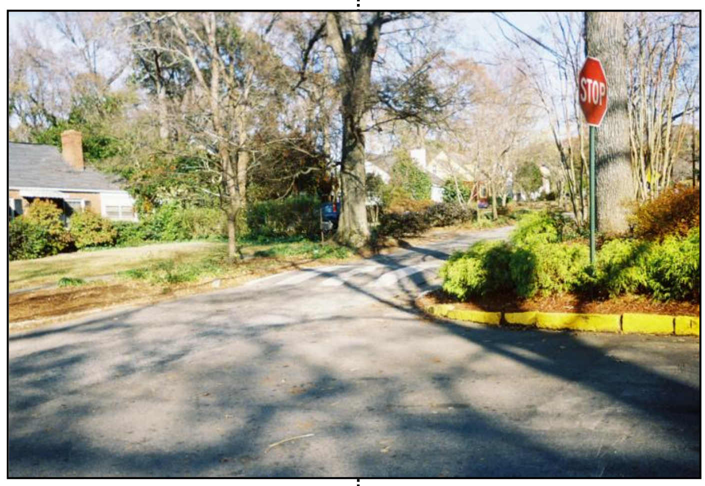
Neighborhood Conservation Streets: These streets carry more traffic than most neighborhood local streets; nevertheless, neighborhood conservation streets must be safe for walkers and bicyclists by providing adequate sidewalks and crossings while maintaining reasonable automobile and bus travel speeds. However, design elements can be selected to provide no more than a minimum width necessary for traffic use with the remainder rededicated to improving non-motorized travel facilities. Target operating speeds should be 25 miles per hour.

Residential streets in areas of medium to high housing density are more likely to have multiple lanes (i.e. more than two), wider sidewalks, more extensive transit facilities, and more on-street parking opportunities than those residential streets with lower residential densities.

Examples: South Candler Street, East Lake Drive.

Non-arterial Street Typologies: The smaller neighborhood local streets (as defined by the City's functional classifications) do not provide the mobility accommodated by arterials, but serve to provide access to residences and businesses throughout the community.

In urban settings, **Downtown Local Streets** provide on-street parking, comparatively easy access to off-street parking, and alternative routes around congested areas for all users. Commercial vehicles commonly use **Service Streets** and **Alleys** to load goods at local businesses, and some private alleys can be found behind denser residential developments within the City. **Residential Local Streets** provide not just a way to and from home, but a shared space in the neighborhood for walking, biking, conversing with neighbors, and conducting the everyday duties of home life.



Neighborhood street in Winnona Park

Prioritization based on Classification/Typology

An issue in every urban area is the limitation of available right-of-way (ROW). Right-of-way acquisition also substantially lengthens the time required for implementing street improvements. Tradeoffs are needed. Priorities should be used to maximize the use the public ROW and also to identify elements that should be emphasized in the context zone outside of the public ROW.

To determine the design for roadway in the Decatur street system, a planner or engineer will need to identify the functional classification and target vehicular volumes to determine the necessary number of lanes. The next consideration will be to verify the street typology and modal priority. These factors help to determine the ultimate design cross-section for the proposed street. Equipped with the ultimate cross-section, the designer and the City staff will be able to make an informed decision on how to proceed with the project, how feasible right-of-way acquisition is if necessary, and the priority of design elements to consider if the cross-section will change.

Quality Growth Audit (Context)

As part of the Decatur CTP, a Quality Growth Audit was conducted to assess Decatur's existing planning documents, policies, codes, and practices to identify potential barriers to achieving the CTP's vision of a healthy, efficient and equitable transportation system. To complete the audit, the policies were compared to principles of Active Living, Context Sensitive Solutions, Universal Design, and national best practices.

The first step in the audit consisted of defining what "Quality Growth" means to Decatur, as it pertains to transportation. To accomplish this, results of past outreach efforts were considered as well as comments received as part of the CTP process. The next step included drafting questions to assess the effects of current policies on access and connectivity, design standards, parking, safety, land use and community and design, and the area of policy and procedures. Documents to be audited were then identified and the audit was conducted. Those documents included in the audit are:

- 2000 Strategic Plan
- Comprehensive Plan Update 2005
- Code of Ordinances
- Short-term Work Plan (2005)
- Interim Bicycle Master Plan
- Atlanta Regional Commission Plans
- Avondale LCI
- Infill Housing Standards
- Athletic Facility Master Plan
- Downtown Decatur Streetscape Design Guidelines
- Georgia Department of Transportation Policy Design Manual

The following is a summary of findings for each of the audit areas. The Quality Growth Audit in its entirety can be found in the Appendix E of this plan.

Access & Connectivity

The City does plan for effective connectivity (between cities and within the City), providing access for its citizens and visitors. In order to continue to build on this accessibility and connectivity, civic leaders should foster relationships with local and regional partners and increase communication between the City of Decatur and potential partners. The transportation system should focus on wayfinding, operation and programming, and design and maintenance of all transportation infrastructures. The city should prioritize transportation connections to public facilities when using bond funds and continue to support the Safe Routes to Schools program in all Decatur schools.

Design Standards

Roadways and sidewalks should be designed for all users, in a way that encourages pedestrian circulation by children, people with disabilities, and older adults, as well as those using nonmotorized transit, such as bicycles. An update of the Code of Ordinances could incorporate more specific and detailed design standards that address individual street types. Landscaping ordinances should be established to provide appropriate guidelines for commercial, multi-family residential, industrial, and transit districts. An integrated approach should be taken when developing landscaping standards: the standards should address lighting, signage, plantings and street furniture. Public Works Standards should be developed for the proper installation and maintenance of pedestrian, bicycle, and transit-related facilities.

Parking

Moped parked on Church Street

Guaranteeing drivers an overabundance of free parking discourages the use of alternative transportation modes in place of automobiles. Decatur ordinances should provide both minimum and maximum parking space requirements in order to prevent excessive supply and explore flexible parking options. Bicycle parking should be provided in public spaces and also be a requirement for private commercial/retail properties, in order to facilitate bike riding for more than recreation.

Safety

Transit stops should be protected from traffic and crime, as well as be easily identifiable. All measures that make streets pedestrian-friendly are relevant to areas in the vicinity of transit stops. An update to the Decatur Code of Ordinances should include standards for bus stops and for pedestrian facilities and the streetscaping that surrounds them.

Policy and Procedures

There should be a direct connection between budgetary provisions and planning activities. To improve accountability and transparency, the City of Decatur should designate “responsible parties” in the work plans and institute a monitoring program to track progress on tasks set forth in community plans. Events and programming in Decatur illustrate that City staff and officials are actively supporting alternative modes of transportation, but additional programming and marketing that targets a larger segment of the population should be investigated. The audit concludes with a gallery of images of best and worst practice that illustrate specific principles and recommendations. The complete Quality Growth Audit with specific recommendations regarding ordinances, policies and practices is in Appendix E.

Conclusion

These technical analyses were combined to determine optimal bike networks, pedestrian facility priorities and feasible opportunities to create complete streets and an Active Living community. For example, using the analysis regarding corridors where there is unmet demand for bike and foot travel, combined with LOS analysis that identifies where there is an existing oversupply of infrastructure, it is possible to identify appropriate and cost-effective areas for new or retrofitted facilities. Furthermore, the Street Typology and Quality Growth Audit provide implementation assistance that explicitly relates land use, urban design and transportation systems. Together, this analysis lays the foundation for the specific recommendations that are found in the Streets, Pedestrian, Bicycle and Transit sections of this document.