NEW TOOLS FOR NEW URBAN TRANSPORTATION PLANNING

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ABSTRACT

The City of Decatur, GA wanted a safe and efficient multimodal transportation system that would improve overall quality of life and wellbeing of the community. Researchers introduced city officials to a series of tools to meet their transportation needs under these principles. The tools included a Street Typology Overlay, Bicycle and Pedestrian Latent Demand Score (LDS) analysis, Multimodal Level of Service analysis, a Quality Growth Audit, and a Health Impact Assessment (HIA). These tools shaped the transportation plan around Decatur's vision: based on principles of Active Living, multi-modal and non-motorized travel, public participation, and minimization of negative transportation impacts.

NEW TOOLS FOR NEW URBAN TRANSPORTATION PLANNING

Decatur, Georgia is a small city situated eight miles from downtown Atlanta. Despite its location in a large metropolitan area, Decatur maintains a small-town character with a lively downtown surrounded by walkable neighborhoods. City leaders have worked to keep and enhance this character with revitalization projects in their city center and updated zoning codes that support a mixture of land uses and housing types. However, the existing transportation infrastructure was not fully compatible with their community character, as depicted in Figure 1. Decatur wanted a "*Community Transportation Plan"* or CTP built around principles of Active Living, multi-modal and non-motorized travel, public participation, and minimization of negative transportation impacts. Traditional transportation planning methods were poorly equipped to generate such results.

Figure 1. Decatur: Expansive motor vehicle infrastructure clashes with the traditional town center.

The [BLINDED SUBMITTING INSTITUTION (SUBMITTER)], working with [BLINDED CONSULTANT 1] and [BLINDED CONSULTANT 2], provided technical assistance to implement new approaches to the transportation planning process. SUBMITTER introduced new evaluation tools that produce the results consistent with the wishes of Decatur residents. These included Health Impact Assessment (HIA), a Quality Growth Audit of existing

and proposed plans, and Bicycle and Pedestrian Latent Demand Analysis. Street Typology and Level of Service assessments for bicyclists and pedestrians were also included. Four values guided the CTP: Health, Choice, Community, and Connectivity.

TRANSPORTATION AND HEALTH

An active living community provides opportunities for people of all ages and abilities to engage in routine daily physical activity. Widespread increases in physical activity can help reverse the chronic disease crisis facing us today. Currently, only 26% of Americans get the recommended amount of physical activity, and 20% get no regular activity at all. Physical inactivity is a primary factor in obesity. Physical inactivity and obesity (defined as body mass index over 30) are linked to elevated risk for heart disease, type 2 diabetes, cancers (including breast cancer and colon cancer), high blood pressure, stroke, liver disease, sleep disorders, arthritis, and infertility.

Individuals living in communities that align with active living guidelines get more physical activity, on average, than their counterparts. Finding ways to accommodate active living in more localities increases the opportunity for physical activity. Numerous studies have shown that walking and bicycling have positive effects on the accumulation of physical activity and therefore has positive effects on health. The layout of cities and communities and their transportation infrastructure are important factors in determining whether people walk or drive as a means of transportation (Frank et al.,2004; Frank and Engelke, 2001; Moudon et al., 1997; Pucher et al., 2010). Neighborhood design has a greater impact on active travel than on other forms of neighborhood-based exercise (Handy, 2004).

Design components can make neighborhoods more walkable – grid street pattern, narrow streets, small lot size, mix of uses, density, traffic calming, sidewalks and crosswalks, and the presence of parks, trails, and other public spaces. Designation of crosswalks, traffic signals, pedestrian signage, and other amenities are important for complete access. A community that emphasizes and provides for active living will especially benefit older adults and children. In addition to promoting physical activity, an active living community will likely see a reduction in air pollution and greenhouse gas (GHG) emissions; better access to employment, goods, and services for everyone regardless of their access to private car travel; lower rates of serious injury or fatality related to traffic crashes; a potential reduction in travel times; and an increase of social capital.

TOOLS AND METHODOLOGIES

Health Impact Assessment

Health Impact Assessment is a process that identifies and measures potential health impacts, both positive and negative, that may result from a particular policy or project. An HIA begins with the broad definition of "health" from the World Health Organization: "a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity." (World Health Organization, 1986). The final product of an HIA is a set of evidence-based recommendations intended to inform decision-makers and community stakeholders how the project could impact health. The recommendations provide practical solutions that seek to magnify positive health impacts, and remove or minimize negative impacts. The steps of HIA include

- screening to determine if there are potential significant and unknown health impacts as the result of a policy, program, or plan;
- scoping to establish geographical boundaries, identify possible consequences, and determine a strategic approach for the HIA;

- appraisal, in which the nature and magnitude of health impacts and the affected population are studied;
- recommendations, which are developed for the decision-makers to address the results of the HIA in their decisions;
- dissemination of the results of the HIA to decision-makers, individuals implementing the plan/policy, and community stakeholders;
- monitoring and evaluation to review the effectiveness of the HIA process and evaluate the actual health outcomes as a result of the project or policy.

The purpose of an HIA in the CTP was to create a comprehensive picture of the effect that the local transportation environment would have on travel choices and conditions and to frame an approach that would embrace the vision and preferences of Decatur residents. The Decatur CTP HIA focused on health impacts related to safety, social connections and physical activity as they are affected by the transportation and land use environment. The HIA was initiated by investigating the concerns of Decatur residents, businesses, and institutions through a one-day workshop. This workshop focused on issues of accessibility, safety, physical activity, and intersection improvements. Several broad areas of concern emerged from the groups that addressed four primary topics: intersection improvements, bicycle facilities, sidewalk improvements, and traffic safety. The project team also looked at residential demographic data, such as elderly population (Figure 2).

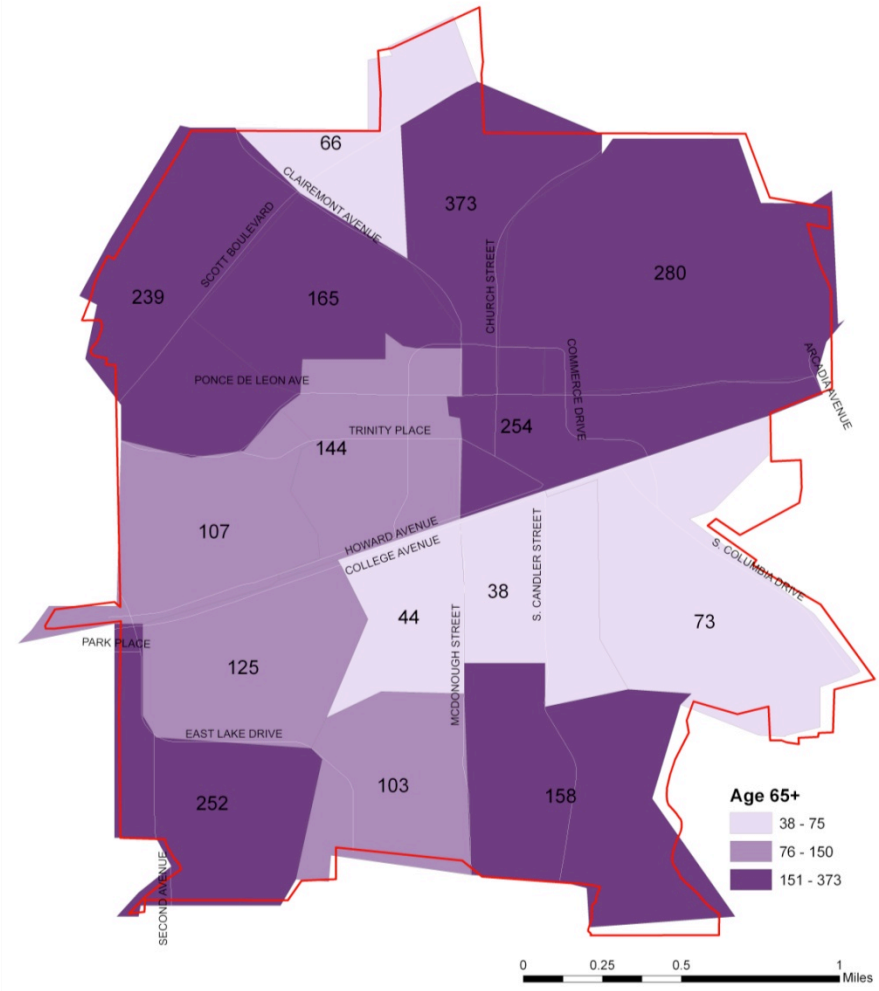

Figure 2. Distribution of population over 65.

The HIA team used findings from current research, and insights from local, regional and national experts in planning and health to identify potential health impacts. Based on their findings, they created an evidence-based matrix of strategies specific to bicycle planning and facilities, pedestrian facilities, implementation, and the design of five key intersections. They also provided nine overarching recommendations to increase positive health outcomes and mitigate negative health outcomes related to the plan. Recommendations addressed the transportation planning and implementation process, project selection, and continued use of innovative tools and methodologies.

Quality Growth Audits

The specific role of the quality growth audit is to provide an effective and comprehensive way to assess the community's current policy, budgetary, and regulatory effects on pedestrians, bicyclists, motorists and transit users. The quality growth audit for Decatur evaluated existing plans, policies, and practices against the accepted principles of Active Living, Context Sensitive Solutions (CSS), and Universal Design (UD) and includes a review of recent visioning exercises.

The project team worked with stakeholders to define quality growth from a transportation perspective; developed a checklist for the evaluation of existing plans, policies, regulations, and practices; and identified and prioritized recommended changes and actions based on the results of the audit. The results of the audit, in conjunction with other recommendations from the CTP, can be used by local decision makers to explore changes in policies, practices, and regulations.

The audit process included six steps:

1. Defining "quality growth" based on community outreach and an inventory of existing plans
2. Developing questions that determine the effect of current policies and design standards on pedestrians, bicyclists, transit users, and motorists
3. Identifying documents to be audited
4. Conducting the audit
5. Implementing changes to plans, policies, and regulations. The audit provides recommended courses of action, but it is at the discretion of local policymakers to pursue initiatives that best achieve the quality growth goals articulated by the community.
6. Recommendations for periodically repeating the audit process.

Latent Demand Scores for Bicycle and Pedestrian Facilities

Potential bicycling or walking trips may be taken by a different mode if current facilities are inadequate. Latent Demand Score (LDS) analysis determines latent, or potential, demand for bicycling and walking on the existing road network. The LDS methodology was devised by Bruce Landis of Sprinkle Consulting. The LDS provides an estimate of potential demand for non-motorized travel throughout a transportation network.

For Decatur, the LDS was customized so that it could be used to analyze potential pedestrian demand as well as bicycle demand. 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. The variables used in computing the LDS (for bicycles) include bicycle trip purpose (e.g., work, personal/business, recreation, school), trip purpose share of all bicycle trips (obtained from Census data), number of generators or attractors per trip purpose, average trip generation of attractor or generator, effect of travel distance on bike trip interchange, expressed as a probability, number of generators or attractors within specified travel distance range, travel distance range from generator or attractor, and maximum travel distance from generator or attractor (Turner et al., 1997).

The LDS identified the street segments that had the highest levels of demand and thus the highest-priority need for suitable facilities. However, researchers noted that all segments had some demand, meaning that bicycle and pedestrian accommodations in those locations might be less intensive but should not be excluded. Figures 3 and 4 show the potential demand for bicycle and pedestrian facilities for each segment in the transportation network. 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.

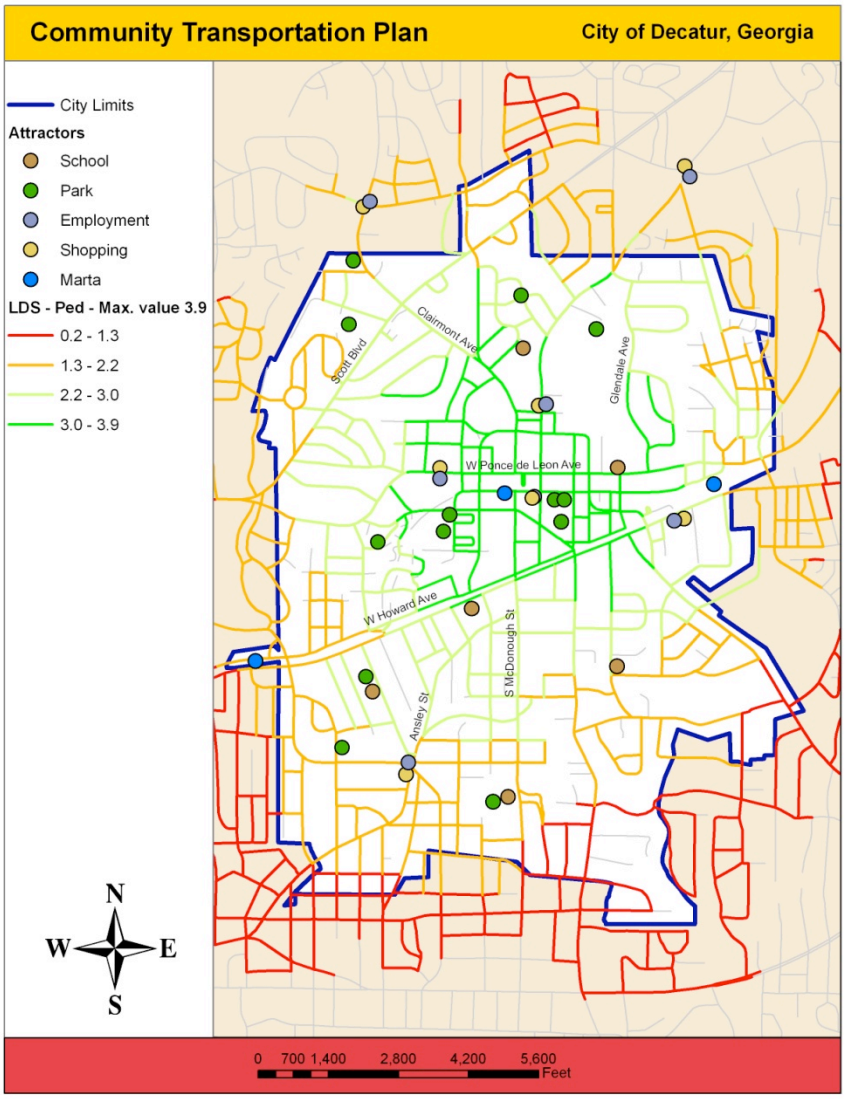

Figure 3. Pedestrian Latent Demand Scores

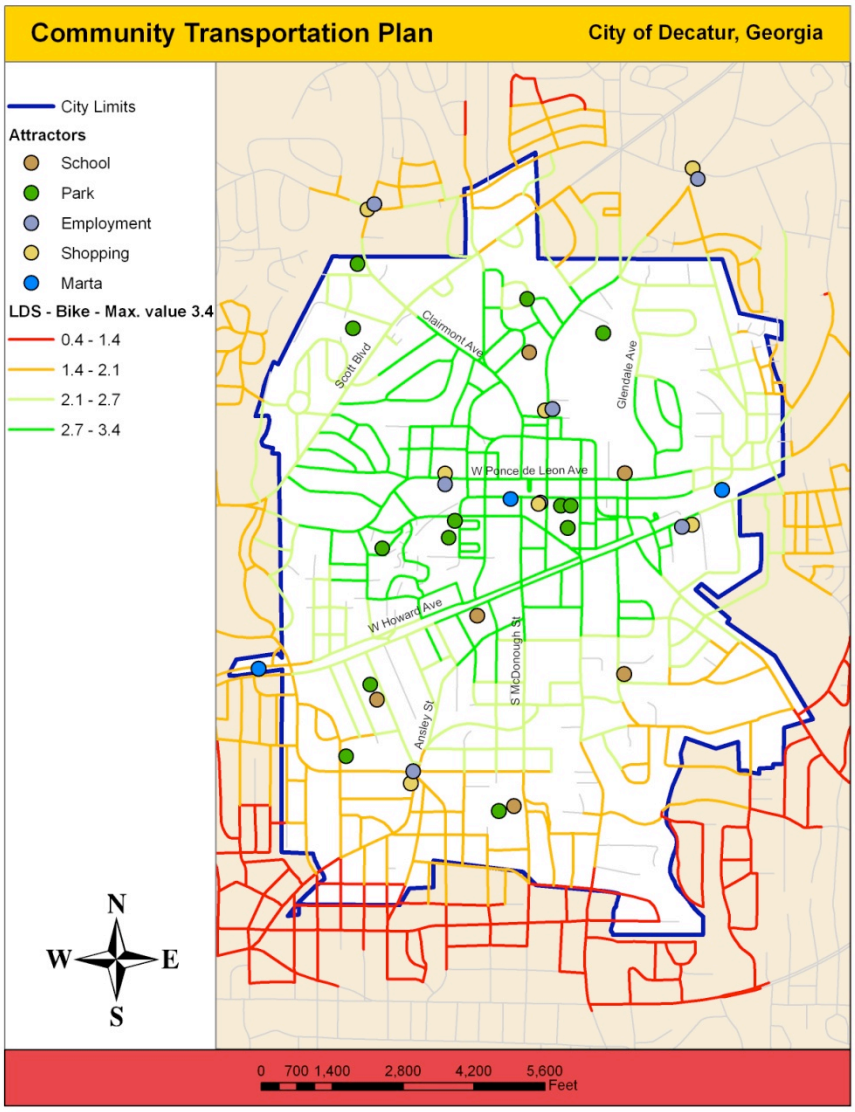

Figure 4. Bicycle Latent Demand Scores

Planning the Transportation Experience

Two additional measures were used to ensure that Decatur's transportation facilities would provide a positive experience for travelers, residents, and visitors: Level of Service scores and Street Typology classification.

Bicycle, motor vehicle, and pedestrian Level of Service (LOS) calculations based upon methods documented in Transportation Research Records 1578 and 1773 (Landis et al., 1997; Landis et al., 2001). LOS scores ranged from A (exemplary) through F (unacceptable). Each mode had a different method for LOS scoring; motor vehicles measured delay at intersections while bicycle and pedestrian scoring used a formula with nine and eleven variables, respectively. Variables referred to such metrics as facility width and quality, separation from traffic, and speed and volume of traffic. All major roads were scored, and their scores were used to prioritize future projects. LOS scores for pedestrians were between B and C; bicycle scores ranged from A (a side

path) to E (busy, high speed, multilane roads); and vehicle scores ranged from A to D with a maximum delay of 48.8 seconds.

The team created Street Typology classifications that would define the appropriate roadway characteristics for various purposes and settings. These classifications were meant to replace the functional classifications often used in transportation planning, which emphasize motor vehicle mobility and access but may exclude other attributes, such as quality of urban space or support for multi-modal travel. In the new Street Typology, major roads could be classified as Downtown Core, Regional Boulevard, Urban Mixed Use, or Neighborhood Conservation. Each classification provided guidelines for operating speed limits, pedestrian facilities, lane number and width, bicycle facilities, access management, parking management, and traffic calming.

INTEGRATING NEW METHODOLOGY INTO THE COMMUNITY TRANSPORTATION PLAN

The project team identified ways that Decatur can increase opportunities for physical activity, improve safety, provide better access to local resources, and enhance the public space with transportation planning. They also warned against policies or projects likely to have a negative effect on the city. To ensure that the health benefits derived from the CTP are shared with all members of the community, they recommended that the City of Decatur prioritize the consideration of the needs of groups that have limitations on their mobility due to physical and financial constraints, including children, older adults, people with disabilities, and low-income households.

New visioning and analysis tools can serve to structure and adapt a standard transportation plan into a plan that furthers community health and wellbeing. The HIA component, along with quantitative indicators for bicycle, roadway and pedestrian accommodations, is instrumental in achieving transformational outcomes. The planning process that created Decatur's CTP showed how new tools can be integrated into the planning process. It required collaboration between city planners, planning researchers, consultants and public health experts.

The CTP worked toward desired outcomes – Active Living, multi-modal and non-motorized travel, public participation, and minimization of negative transportation impacts – rather than traditional traffic metrics. As the assessment tools utilized scientific research to establish the environmental determinants necessary for supporting Decatur's goals, it was more likely to generate an effective plan. The final plan included a timeframe for proposed projects, identified potential funding sources, and provided a framework for successful plan implementation.

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