

Aerotropolis Atlanta Brownfield Redevelopment Health Impact Assessment



Produced for Health Impact Project, an initiative of The Pew Charitable Trusts and the Robert Wood Johnson Foundation

Prepared by Center for Quality Growth and Regional Development at the Georgia Institute of Technology

Catherine L. Ross, Ph.D., Director and Harry West Chair
Michael L. Elliott, Ph.D., Associate Director
Michelle Marcus Rushing & Jason Barringer, Research Scientists
Sarah Cox, Alexandra Frackelton, John Kent, & Arthi Rao, Research Assistants

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Atlanta Aerotropolis Brownfield Redevelopment

Health Impact Assessment

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About the Health Impact Project

The Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, is a national initiative designed to promote the use of health impact assessments (HIAs) as a decision-making tool for policymakers. HIAs use a flexible, data-driven approach that identifies the health consequences of new policies and develops practical strategies to enhance their health benefits and minimize adverse effects. For more information, visit www.healthimpactproject.org.

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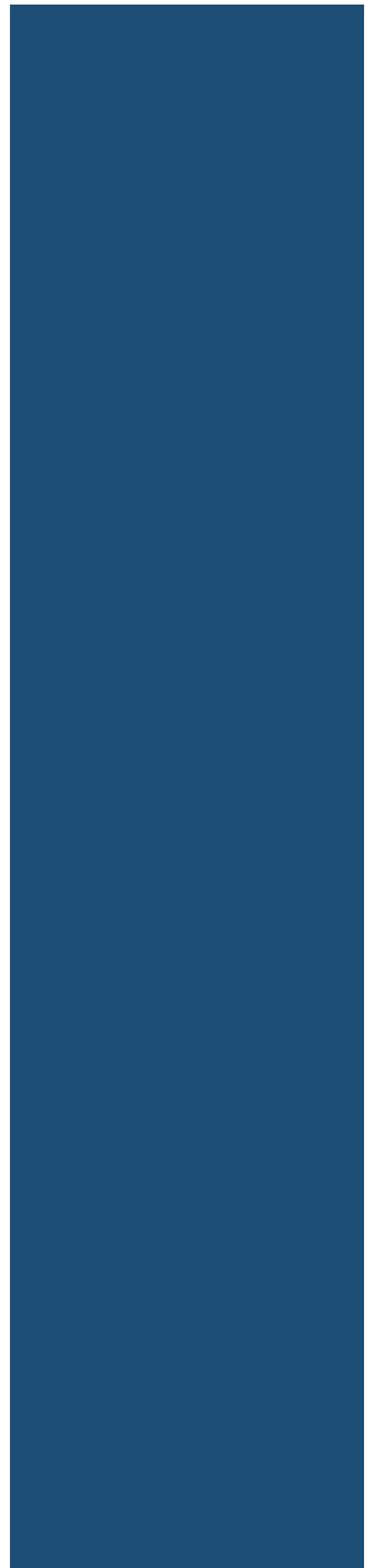
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Executive Summary

Healthy places are those designed and built to improve the quality of life for all people who live, work, worship, learn, and play within their borders – where every person is free to make choices amid a variety of healthy, available, accessible, and affordable options.

Healthy places rarely occur spontaneously. The policies, plans, and projects that shape a place over the decades must be carefully refined to support healthful results from planning and operations. Health Impact Assessment can guide these activities using current evidence from health research and global best practices.

What is Health Impact Assessment?

A Health Impact Assessment, or HIA, is “a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of the effects within the population. HIA provides recommendations on monitoring and managing those effects.” (National Research Council, 2011).

HIA is a process that uses a variety of methods and approaches to identify and measure potential health impacts, both positive and negative, that may result from a particular policy or project. Furthermore, an HIA seeks to link these impacts to a given segment of the population (for example, children, older adults, people living in poverty, or residents of a particular neighborhood). The final product of an HIA is a set of evidence-based recommendations intended to inform decision-makers and the general public about the health-related issues associated with the project. The recommendations provide practical solutions that seek to magnify positive health impacts and remove or minimize negative impacts, for the current project and to set future policies.

How does HIA prevent disease and promote health?

Many external factors—including, for example, the environment where we live, work, and go to school; social conditions; economic policies and public services—affect the health of individuals and communities. In recent years, for example, research has demonstrated a linkage between the

characteristics of the built environment and human health outcomes. The built environment is the manmade surroundings that provide the setting for human activity, such as land use patterns, transportation systems, and urban design. It represents the collective outcome of public and private projects, policies, and other activities and it affects where and how people live, travel, work, shop, and interact with each other. It influences everything from traffic to agriculture, job opportunities to crime rates, air quality to cultural norms, and their daily impact on human health.

The fundamental importance of issues outside the traditional sphere of public health to the health and wellbeing of affected communities has led to the assertion that “policy makers in all sectors and at all levels” should “be aware of the health consequences of their decisions and ... accept their responsibilities for health” (WHO 1986). However, health is not routinely addressed in planning, policy-making, and public works. Policy levers are not in place, and there is no standard procedure for the inclusion of health concerns. Although environmental impact assessment is used to consider some ecological effects for large projects, it has failed to influence many pressing health concerns. Meanwhile, communities contend with many different types of health threats, such as the emerging epidemics of obesity, diabetes, and other chronic diseases; infectious diseases; environmental pollution; and mental illness, without a clear way to address these problems in a comprehensive manner. A new tool is urgently needed, to translate public health data into relevant information for decision-makers in other sectors, and to promote a collaborative and cross-sectoral approach to health promotion and disease prevention. Health Impact Assessment has shown great promise as that tool (Collins 2009).

Is HIA an effective strategy for health and development?

Many health departments have discovered that HIA is an effective intervention strategy to promote health and prevent disease. The San Francisco Department of Health routinely uses HIA to promote walking and bicycling within pedestrian-friendly development. Also in California, HIA was used to improve after-school and walk-to-school programs, as well as a countywide land use and development plan. London’s health department used HIA to improve the city’s transportation plan for active transportation. The Center for Quality Growth and Regional Development (CQGRD) used HIA to integrate Active Living principles into the City of Decatur’s transportation plan. CQGRD also conducted an HIA of the Atlanta BeltLine and identified numerous ways to improve its effect on physical activity at the design and project management levels, and through less obvious tactics such as crime prevention. As a result of the HIA, health outcomes are a routine consideration in the BeltLine project implementation.

What is the purpose of an HIA?

HIA has evolved from the awareness that many projects, policies, and initiatives which have no explicit health goals nonetheless impact the health of the population. Four values are integral to HIA – democracy, equity, sustainable development and the ethical use of evidence based on rigorous structured analyses. To incorporate the full range of concerns, these analyses should incorporate a range of scientific disciplines and methodologies.

How does an HIA work?

The steps of an HIA include:

Screening determines whether a proposal is likely to have health effects and whether the HIA will provide information useful to the stakeholders and decision-makers.

Scoping establishes the scope of health effects that will be included in the HIA, the populations affected, the HIA team, sources of data, methods to be used, and alternatives to be considered.

Assessment involves a two-step process that first describes the baseline health status of the affected population and then assesses potential impacts.

Recommendations suggest design alternatives that could be implemented to improve health or actions that could be taken to manage the health effects, if any, that are identified.

Reporting documents and presents the findings and recommendations to stakeholders and decision-makers.

Monitoring and evaluation are variably grouped and described. Monitoring can include monitoring of the adoption and implementation of HIA recommendations or monitoring of changes in health or health determinants. Evaluation can address the process, impact, or outcomes of an HIA.

SOURCES:

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Understanding the Aerotropolis HIA

The Center for Quality Growth and Regional Development (CQGRD) conducted a Health Impact Assessment (HIA) on redevelopment plans for the site of the former Hapeville Ford Assembly Plant in Hapeville, GA. The 122-acre site is bounded by I-75, Hartsfield-Jackson Atlanta International Airport, the new residential development of Asbury Park, and downtown Hapeville.

The site was deemed a brownfield, and had undergone remediation for potential contaminants. A portion of the site was sold to the City of Atlanta for airport use. The assembly plant is to be redeveloped as 'Aerotropolis Atlanta', with over 3 million square feet of office, hotel, shopping and airport parking facilities, as well as a solar energy component.

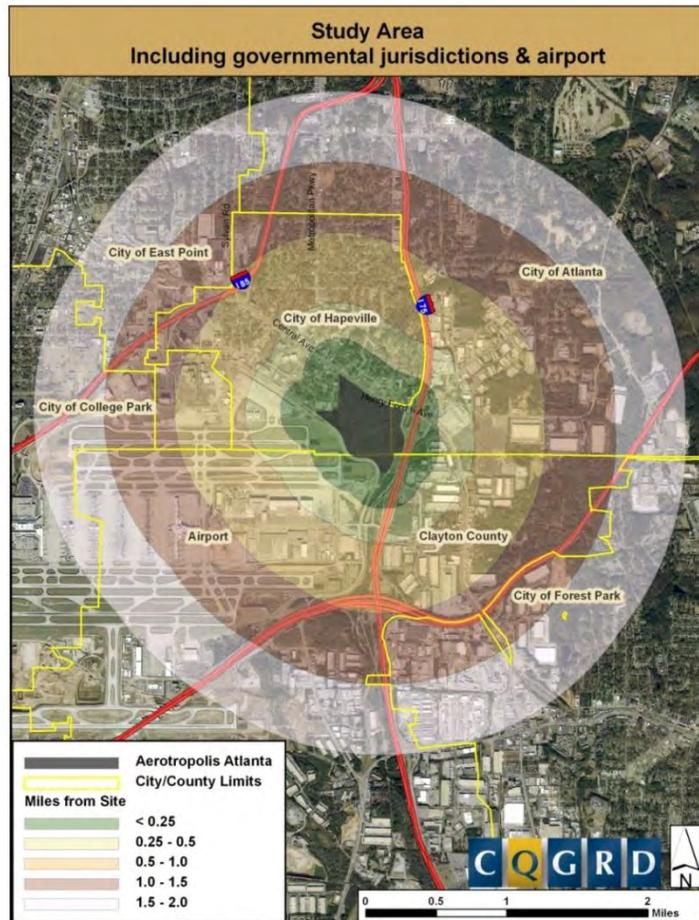


Figure 1. Aerotropolis site and study area overview



Figure 2. Aerotropolis rendering viewed from northeast

In our initial review of the Aerotropolis proposal, CQGRD determined that the Aerotropolis redevelopment did have the potential to impact health through active living, injury, air quality, social capital, crime, access, noise and gentrification.

HIA Results and Recommendations

What is the current health status in the study area?

Deaths from hypertensive and chronic ischemic heart disease, stroke, HIV, and homicide were markedly higher in the study area than statewide, while local residents fared somewhat better on acute heart attack and respiratory disease. However, emergency department visits due to asthma attack were nearly double state rates. Variation in certain medical indicators suggested that study area residents were relatively less likely to have access to primary care and prevention. The HIA team concluded that opportunities for incidental physical activity, access to health care and healthy foods, and supportive social networks appeared to be the highest priority health determinants in the study area.

How was the scope of the HIA determined?

The HIA team convened an Advisory Committee to gain input from stakeholders about local concerns, perceptions of sources of danger, and desired changes to the environment and daily life, and the vision that local residents, business owners, and officials held for the area. The HIA scope was developed from proceedings from the Advisory Committee, which participated in visioning, scoping, and review exercises, and from results of a community survey.

What did stakeholders envision as a healthy community?

According to stakeholders, tax revenue, economic stability, connectivity, and availability of public and commercial services must be present in order to create a safe, walkable, interactive community with access to jobs and education, access to healthy food, and a strong sense of social support – things which the health data analysis found lacking in some or all of the study area. As a result of stakeholder participation, greater emphasis was placed on societal and fiscal impacts.

What did the HIA measure?

Pursuant to the study area profile, stakeholder engagement, and range of key appraisal topics, the appraisal framework for the health impact assessment addressed impacts on **multimodal transportation environments, economic opportunities and services, community preservation and revitalization**, and **environmental exposures**. Each of these broad topics will encompass several sub-topics. Several **overarching issues** were also addressed regarding management of the Aerotropolis project and the airport area in general.

How did the HIA evaluate these issues?

The appraisal used pedestrian and bicycle latent demand scores, a healthy places audit of ordinances and plans in the central study area, a walkability audit around the immediate Aerotropolis vicinity, geographic information systems analysis, a review of the Aerotropolis plans and

other relevant plans, and a thorough review of published health research to understand the connections between the selected environmental and policy determinants with health.

The community vision for the area, the healthful changes that were called for, and the recommendations to improve health all proved to be complementary. Many of the recommendations, if implemented, would accomplish multiple objectives. For example, revitalization of Hapeville's downtown shopping district would likely improve access to useful services for nearby workers and residents, improve community involvement, and result in more walking trips that boost physical activity.

What did the HIA reveal about healthy planning in the study area?

The Aerotropolis project, the airport, and local transportation and land use planning could all impact health, in both positive and negative ways. But evidence-based changes to these plans could:

- Increase the number of local trips made by walking and bicycling, which would increase physical activity and likely reduce risk of heart disease, stroke, and diabetes
- Improve traffic safety, which could reduce traffic-related injuries and deaths and make the area easier to navigate
- Increase local retail opportunities and make local businesses more successful, thereby increasing local choices for healthy food and other daily needs
- Improve access to jobs, which could reduce stress and improve economic security for local families
- Increase transportation, shopping, and housing options, thereby reducing the cost of living and improving quality of life
- Revitalize communities and increase social connections, for an improvement in mental health and reduction in crime
- Reduce personal exposure to pollution of the air, soil, and water and to noise, potentially reducing rates of respiratory disease, heart disease, cancers, and stress

What were the most important recommendations of the HIA?

Key recommendations related to local land use and transportation policy, and the role Aerotropolis and the airport could play in connecting their surrounding communities; detailed recommendations on each subject are provided throughout the full report.

Mixed Land Use. Mixed-use development allows downtowns, commercial districts, town centers and transportation hubs to include offices, shopping, and residences. Existing neighborhoods remain residential, although they may choose to allow some small businesses, such as a

coffee shop or newsstand, locate at major intersections. Planning departments should create a mixed-use zoning district, allow a wider range of complementary uses in existing districts, or apply very fine-grained zoning in their corridors and centers.

A Human-Scaled City. Development looks and feels different to pedestrians. To facilitate new walking and bicycling trips and more active engagement with the project and city, average block sizes should decrease and development along centers and corridors may need to become more compact and several stories taller. Regulatory requirements for minimum parking supply, on the other hand, may be eliminated, leaving supply considerations up to market demand. These transformations are also linked to economic revitalization.

Residential Choices. Do area residents have to relocate for each phase of life? We recommend ways for single-family and multi-family neighborhoods to welcome residents as young singles, growing families, empty-nesters, and retirees. Offering small amounts of both high-end and affordable housing in each district strengthens community ties and improves outcomes for today's children.

Accommodating Industry. Industrial properties compose a significant portion of local land, and support the local economy. But does every industrial use need to be banished to the edge of town? We recommend ways to reconnect industrial companies with the rest of the community .

Safe Streets. Highways are for going fast. Places where people live, work, and shop need safe, pleasant streets. We recommend ways to accommodate safe, efficient, multimodal traffic operations on local streets and major roads.

Transportation Choices. A complete transportation system includes traffic lanes, sidewalks and crosswalks, bicycle lanes, well-maintained streets, quality transit service, shuttles, and multiple routes to your destination. There should be more than one way to get there, in every sense.

Public Spaces and Places. Public life takes place on sidewalks and streets and in parks and plazas. Zoning and transportation practices can ensure these accommodating spaces are created on both public and private property. Local regulations can enliven existing spaces and increase access with cultural events, farmers' markets, and temporary vendors.

Clean Human Environments. Transportation and land uses can be sources of pollution in the air, soil, and water, as well as noise emitters. Local ordinances and environmental management standards can encourage clean industry, while transportation policies can reduce traffic volume. Land use regulations can also prevent homes, schools, hospitals, and other sensitive uses from being sited in the most polluted areas.

A Green City. Parks, community gardens, landscaping, and tree cover contribute to health and well-being in multiple ways, as sources of recreation, fresh food, shade, and simple aesthetics. Local plans and ordinances can ensure that these amenities are present throughout the area.

Coordinated Management. Among the numerous cities, counties, and major landholders in the study area, coordinated plans and policies become essential to comprehensive healthy development. Area stakeholders could form an airport area consortium for this purpose; it would ensure a long-term vision and implementation process, facilitate better representation of local community interests, and capitalize on the airport as an economic asset while managing potential environmental issues.

Reading the Report

The report begins with the project background and additional information about the HIA process. This is followed by a profile of the study area in terms of demographics, health status, and the local stakeholders. Our community engagement process is described in detail. Finally, there is an extensive description of our appraisal methodology before presenting our detailed findings and recommendations, sorted by topic. Each major assessment topic begins with an overview, followed by detailed analysis of individual subtopics in the Planning Environment, and then specific items from the Healthy Places Audit.

The Planning Environment subtopic sections are organized as follows:

- Literature review: a summary of the scientific evidence linking the policy, planning, and environmental factors to health outcomes, and describing any techniques for improving their effect on health
- Existing conditions: a summary of the current planning and environmental factors identified by the appraisal strategies. Note that ordinances are addressed separately in the Healthy Places Audit.
- Research questions: an itemized list of questions we investigated
- Potential impacts: an expert analysis of the potential effect that proposed plans would likely have on identified health determinants
- Recommendations: suggested changes to both proposed plans and the existing physical, social, or organizational environment. Note that are addressed separately in the Healthy Places Audit.

The Healthy Places Audit subtopic sections are organized in a slightly different fashion:

- Discussion: explanation of how selected ordinances relate to the health determinants identified in the Planning Environment analysis
- Audit questions: a list of the information for which we searched the ordinances and plans
- Existing conditions: a summary of the ordinances that relate to the given subtopic, by jurisdiction. This section also identifies major elements of short term work plans that fund projects related to the ordinances in question, or in comprehensive transportation and/or land use plans that specifically recommend changes to the ordinances in question.
- Recommendations: suggested changes to the existing codes of ordinances, or specific targets.

Finally, the recommendations are summarized in a table which also indicates their priority level and responsibility. Our communications plan and monitoring and evaluation plan are included, for the period after the HIA report is complete. We conclude with some discussion of our experiences during the HIA process and the future of the HIA. The appendices include references and supplementary reports.

Using the Results and Recommendations

Potential uses of the HIA and its recommendations vary by groups. These uses could include:

For city and county elected officials

Using the HIA results to pass a “health in all policies” ordinance; publicly endorsing the HIA findings; giving planning, zoning, and public works staff explicit encouragement and support to use the HIA findings in their work; fostering relationships with the public health department; appointing individuals with public health credentials to key positions in your government’s departments and advisory boards; remaining informed and concerned about healthy public policy.

For city and county planning, zoning, and public works departments

Using the HIA results to update plans, policies, projects, and ordinances; using the HIA to better understand how your work affects health, safety, and welfare; fostering relationships with the public health department and other health professionals; providing public health partners with the results of monitoring and evaluation activities; learning how to use public health data in planning; seeking credentials in public health for planning; reviewing relevant items from the Resources section, below.

For developers

Using the HIA results to update current and future development plans; hiring individuals with public health credentials to work in your firm; sharing healthy design resources with your professional networks, including clients and consultants; reviewing relevant items from the Resources section, below.

For residents, workers, and neighborhood or business associations

Sharing your opinions about HIA, healthy community design, and healthy public policy with elected officials, public candidates, and planning entities; inviting individuals with public health credentials to assist with community planning activities and participate in local advisory boards; remaining informed and concerned about healthy public policy.

For public health officials

Monitoring health indicators in the area; providing additional healthy public policy resources to decision-makers and community members; remaining informed and concerned about healthy public policy.

For anyone who wishes to conduct their own HIA

Please see the Resources section, below.

Resources

Transportation

- Active Living By Design (North Carolina Institute for Public Health/UNC Gillings School of Global Public Health): <http://www.activelivingbydesign.org/>
- Active Living Research resources page (Robert Wood Johnson Foundation): <http://www.activelivingresearch.org/alr/resourcesearch>
- Complete Streets: <http://www.completestreets.org/>
- Federal Highway Administration: <http://www.fhwa.dot.gov/planning/scp/index.htm> and <http://www.fhwa.dot.gov/environment/bikeped/>
- American Association of State Highway and Transportation Officials (AASHTO)/Institute of Transportation Engineers (ITE)/Congress for New Urbanism – “Designing Walkable Urban Thoroughfares: <http://www.ite.org/css/> or <http://www.cnu.org/streets>

Access

- Public Health Law & Policy: healthy planning & food access: <http://www.phlpnet.org/healthy-planning>
- National Association of Home Builders on compact and mixed-use development: <http://www.nahb.org/generic.aspx?sectionID=628&genericContentID=16945>
- Smart Growth America (SGA): <http://www.smartgrowthamerica.org/>

Community

- Project for Public Spaces: <http://www.pps.org/>
- SGA on revitalization: <http://www.smartgrowthamerica.org/issues/revitalization/>

Environment

- Environmental Protection Agency (EPA) general information: <http://www.epa.gov/>
- EPA – Environmental Management Systems: <http://www.epa.gov/EMS/index.html>
- EPA – Smart Growth Resources: http://www.epa.gov/smartgrowth/sg_implementation.htm
- Georgia Dept. of Natural Resources - Partnership for a Sustainable Georgia: <http://www.gasustainability.org/partnership>
- Smart Communities Network – Eco-Industrial Parks: <http://www.smartcommunities.ncat.org/business/ecoparks.shtml>
- US Green Building Council/LEED: <http://www.usgbc.org/>

HIA Method and Practice

- UCLA HIA Clearinghouse Learning & Information Center: <http://www.hiaguide.org/>
- Online HIA training: <http://professional.captus.com/Planning/hia2> (free)
- Online HIA resources: <http://www.hiaguide.org/training/training-guides/presentations-cdcnacchoapacla-hia-training-workshop>
- CDC on HIA: <http://www.cdc.gov/healthyplaces/hia.htm>
- World Health Organization on HIA:

Executive Summary

- CQGRD HIA resources: http://www.cqgrd.gatech.edu/program_areas/hia/resources.php

Public Health for Planning and Policymakers

- APA: <http://www.planning.org/nationalcenters/health/healthimpactassess.htm>
Also, many planning conferences and events now include sessions on healthy places
- CDC Healthy Community Design: <http://www.cdc.gov/healthyplaces/default.htm>
- American Public Health Association (APHA): <http://www.apha.org/>
- National Environmental Health Association (NEHA): <http://www.neha.org/index.shtml>
- Federal Highway Administration Community Impact Assessment:
http://www.ciatrans.net/CIA_Quick_Reference/Purpose.html

Local Resources

- 15-hour Graduate Certificate in Public Health at Georgia State University:
<http://publichealth.gsu.edu/564.html>
- Healthy Places Research Group: <http://www.cqgrd.gatech.edu/proceedings/hprg/index.php>
- Southface – Green building services and host of Sustainable Atlanta Roundtable:
<http://www.southface.org/>

Introduction

The Center for Quality Growth and Regional Development (CQGRD) conducted a Health Impact Assessment (HIA) on redevelopment plans for the site of the former Hapeville Ford Assembly Plant in Hapeville, GA. The 122-acre site is bounded by I-75, Hartsfield-Jackson Atlanta International Airport, the new residential development of Asbury Park, and downtown Hapeville. The site was deemed a brownfield, and had undergone remediation for potential contaminants. A portion of the site was sold to the City of Atlanta for airport use. The assembly plant is to be redeveloped as ‘Aerotropolis Atlanta’, with over 3 million square feet of office, hotel, shopping and airport parking facilities, as well as a solar energy component.

CQGRD conducted a comprehensive HIA on the process of redeveloping a former industrial brownfield site situated close to an historical community, a diverse district of homes and industrial properties, and one of the world’s busiest airports. In this light, “Aerotropolis” was not only the name of the proposed development, but also the overarching concept behind the assessment. The HIA sought to ensure the explicit consideration of the human health impacts of the proposed redevelopment project so that health costs are not unevenly distributed and all health promoting impacts are considered. Secondly, it attempted to increase the capacity for HIA practice through activities with community and research partners, and develop a prototypical approach for measuring and improving outcomes when large-scale industrial sites are redeveloped and reused.

The Health Impact Assessment considered the health impacts of the Aerotropolis Atlanta project on the affected populations, especially disadvantaged and vulnerable groups. Health Impact Assessment is “a combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population”. The final product of an HIA is a set of evidence-based recommendations intended to inform decision-makers and the general public about the health-related issues associated with the project. The recommendations provide practical solutions to magnify positive health impacts, and remove or minimize negative impacts.

Working with stakeholders and an Advisory Committee, CQGRD identified potential health impacts due to the redevelopment project. The report provides a comprehensive public health analysis of the project to inform decision makers. No Environmental Impact Statement (EIS) is expected for this project, making the assessment and community participation aspect of HIA more important. Lastly, this HIA creates a body of work that can be referenced by HIA project funders, public health and

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transportation practitioners and academics, citizens, developers, and elected officials throughout the country.

The project team would like to thank Jacoby Development Inc. (JDI), Hapeville, Atlanta, Fulton County, and Clayton County officials, the Department of Public Health, community members and associations, and local agencies for their ongoing participation in this project. Participants worked with the project team to consider the project's range of potential benefits and impacts on surrounding communities, and to offer a series of practical measures to maximize health benefits, potentially positioning the Aerotropolis as a catalyst for healthy, sustainable living. The team would also like to express its appreciation for the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, which provided the financial support needed to fund this project.

About Health Impact Assessment

What is health?

Health has often been defined as the absence of disease. Unfortunately, such a narrow definition fails to recognize the multidimensional factors that influence health. In 1941, American Public Health Association President C.E.A. Winslow recognized this distinction, writing:

Thirty years ago, our major emphasis was transferred from the physical environment to the individual. Today, we must shift our gaze from the individual back to the environment, but in a broader sense...to the whole social and economic environment in which the individual lives and moves and has his being (as quoted in Krieger and Higgins, 2002).

The rationale for a Health Impact Assessment of major development projects such as the Aerotropolis Atlanta project is based on the social model of health accepted by various national and international agencies. The World Health Organization defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1994). This definition clearly takes a broad view of health that seeks to include a variety of inter-sectoral factors rather than pure medical judgments to determine the health of a population, community or individual. This definition was further expanded in the 1986 Ottawa Charter for Health Promotion to include the ability of an individual or group “to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment” (World Health Organization, 1986). The Health Impact Assessment of the project is based on this conceptual framework.

The WHO definition of health significantly recognizes that numerous factors influence the ability to be healthy. Known as health determinants, these factors include biological, social and economic, environmental, lifestyle, services, and policy (Dahlgren and Whitehead, 1991). Additionally, the literature recognizes that economically disadvantaged communities experience disparities of health outcomes. With the rise of chronic disease in the developed world, significant determinants of health are often seen as being based on biological factors such as genes, sex, and age, and behavioral factors such as diet, activity levels, sexual behavior, and the consumption of drugs and alcohol. Yet many environmental factors, pertaining to occupational health, economic conditions and policies shaping the environment, also affect one’s ability to achieve positive health outcomes.

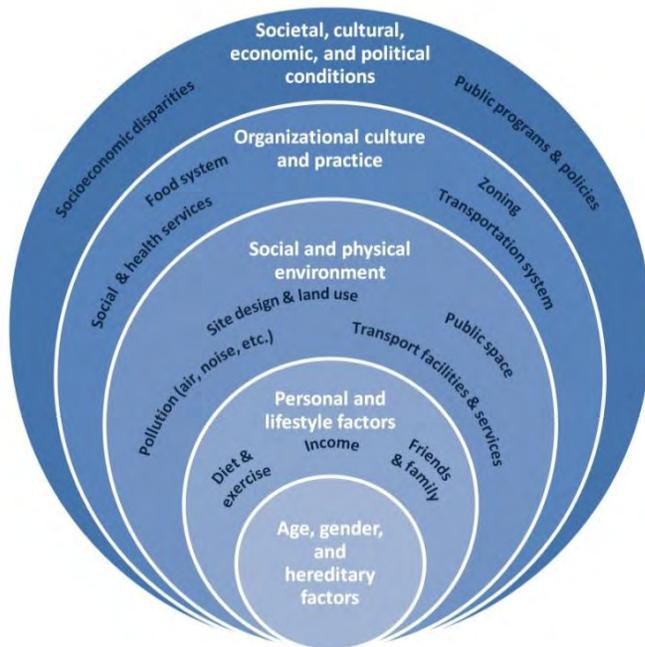


Figure 3. Socio-ecological model of health. Source: Dahlgren and Whitehead, 1991

making it difficult to identify the specific determinants of health in a quantitative fashion. Figure 3Error! Reference source not found. shows the conceptual model used to describe these relationships.

In recent years research has suggested further linkages between the characteristics of the built environment and human health (Ewing and Kreutzer, 2006; Frumkin, 2005). This research has received national attention from both the public health and planning communities as well as from the popular media. It has associated the built environment with respiratory and cardiovascular health, fatal and non-fatal injuries, physical fitness, and mental health. While most research has not been able to determine the specifics of the causal relationships that link elements of the built environment and chronic disease, it is evident that a relationship exists and is significant enough to warrant health consideration in projects and policy decisions.

As concerns about infectious disease has increasingly given way to concerns about chronic disease, a more nuanced understanding of the relationship between health and the built environment is needed. Instead of simply identifying concrete environmental exposures, we must also understand how built environments affect behavior. Of course, the built environment is not the only thing determinant of behavior and lifestyle. Culture, socioeconomic status, and personal preference are important factors in shaping lifestyle choices. Furthermore, urban environments are extremely complex,

What is a Health Impact Assessment?

While causal links between chronic health conditions and the built environment are still being determined, there is evidence that a relationship exists. Therefore, a need exists for tools and methodology to understand how changes in the built environment might affect public health. One such tool is a Health Impact Assessment, or HIA. Widely used in other countries and recently rising in

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use in the US, an HIA is often defined as “a combination of procedures, methods, and tools by which a policy, program, or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population” (WHO, 1999).

Four values are integral to the HIA: democracy, equity, sustainable development, and the ethical use of evidence that emphasizes a rigorous structured analysis based on different scientific disciplines and methodologies (WHO, 1999). HIAs explicitly consider social and environmental justice issues, adopt a multidisciplinary and participatory process, and use both qualitative and quantitative evidence as well as transparency in the process.

The HIA methodology is based on the socio-ecological model of health accepted by various national and international agencies. There are three main types of HIAs. Prospective HIAs are conducted before a policy or project is implemented; retrospective HIAs take place after; and concurrent HIAs are simultaneous and are more common in project or policies that are implemented over an extended period of time. There is also a differentiation in HIAs based on the amount of time and effort, leading to distinctions between rapid, intermediate, and comprehensive assessments (Ison, 2000).

Because HIAs are intended to make health considerations part of the decision-making process, HIA methodologies all share six critical steps as illustrated in Figure 4: Steps of Health Impact Assessment. Regardless of type, HIAs seek to identify potential health impacts, to link these impacts to a given segment of the population (for example, children, older adults, people living in poverty, or residents of a particular neighborhood), and to produce a set of evidence-based recommendations intended to inform decision-makers and the general public about the health-related issues associated with the Project. The recommendations provide practical solutions that seek to augment positive health impacts, and eliminate, minimize, or mitigate negative impacts.



Figure 4: Steps of Health Impact Assessment

Introduction

Screening

Before conducting an HIA, a quick assessment, called a screening, is conducted to decide whether an HIA is warranted and if further action is required. The screening examines whether the policy, program or project being assessed is likely to impact health to a significant extent and whether opportunities to improve the outcome exist.

Scoping

Scoping is a process for establishing the issues to be examined by the HIA by identifying possible negative consequences and benefits associated with the project, the boundaries for analysis, and steps for managing the HIA. Scoping utilizes health status and existing conditions data, initial literature review, and stakeholder participation.

Appraisal

Appraisal requires characterizing the nature and magnitude of both harmful and beneficial impacts. The resulting plan identifies positive and negative effects and determines if they are distributed disproportionately over the affected population. Appraisal consists of analysis, baseline health and demographic profiling of the affected communities, identifying and characterizing potential health impacts and reporting on the impacts and developing an impact management plan. A comprehensive appraisal through a systematic investigation and analysis of health impacts using several different methods to consult stakeholders and acquire new information relevant to the assessment is required.

Recommendation

After all quantitative and qualitative data have been analyzed; recommendations for an impact management plan are developed. Recommendations are intended to mobilize changes to the project in order to promote good health.

Dissemination

The results of the HIA must be imparted to all stakeholders – including the individuals and organizations that determine policy and the communities affected by these decisions – to support understanding of the HIA and implementation of the recommendations.

Monitoring and Evaluation

It is recommended that continuous monitoring of the project be conducted to gauge the accuracy and the appropriateness of the impact measures used in HIA, as well as to evaluate the effectiveness of the HIA and identify process improvement opportunities. In addition, actual health outcomes as a result of the project are evaluated.

About Aerotropolis

Ford Motor Company built its first post-war modern assembly plant in the City of Hapeville, GA in 1947. However, after almost 60 years of assembling vehicles at this location, Ford announced that the Hapeville assembly plant would be closed in October 2006. On June 12, 2008, the Ford Motor Company Assembly Plant was sold to Jacoby Development, Inc. for redevelopment. Jacoby Development had previous experience in brownfield redevelopment following their construction of Atlantic Station, a 135 acre live-work-play community in Midtown Atlanta.

The redevelopment site is located approximately 8 miles south of downtown Atlanta, adjacent to Hartsfield-Jackson Atlanta International Airport (HJIA). Several highways serve as both link and

barrier to other areas of the Atlanta region. The Hapeville Ford Assembly Plant site is located on the southeast corner of the City of Hapeville, and is bounded by South Central/Henry Ford II Ave. and a set of railroad tracks to the north, I-75 to the east, the airport and Airport Loop Rd. to the south, and the new mixed-use residential development of Asbury Park to the west. Plans for the Aerotropolis redevelopment are primarily subject to approval and land use policies of the Hapeville planning department and planning commission, with small sections under jurisdiction of the City of Atlanta or Clayton County.



Figure 5: The Project Site in the Context of Metropolitan Atlanta

The Ford Assembly Plant site offered the opportunity to undertake a “smart growth” initiative to redevelop the brownfield site into a mixed-use property containing office, retail, entertainment, and hotel components. The new Aerotropolis concept – “an aviation-intensive, amenity-laden business district that includes corporate headquarters, general office, restaurants and retail space, hotels and airport parking” – was hoped to encourage development around the airport and serve as a catalyst for attracting global companies to the Hapeville area (*Tax Allocation District*, 2008). Because of its proximity to the “busiest airport in the world” and the development of the new international terminal at Hartsfield-Jackson Airport, the Ford Assembly Plant site redevelopment provides a perfect opportunity to incorporate the Aerotropolis concept into the redevelopment of the Ford plant.

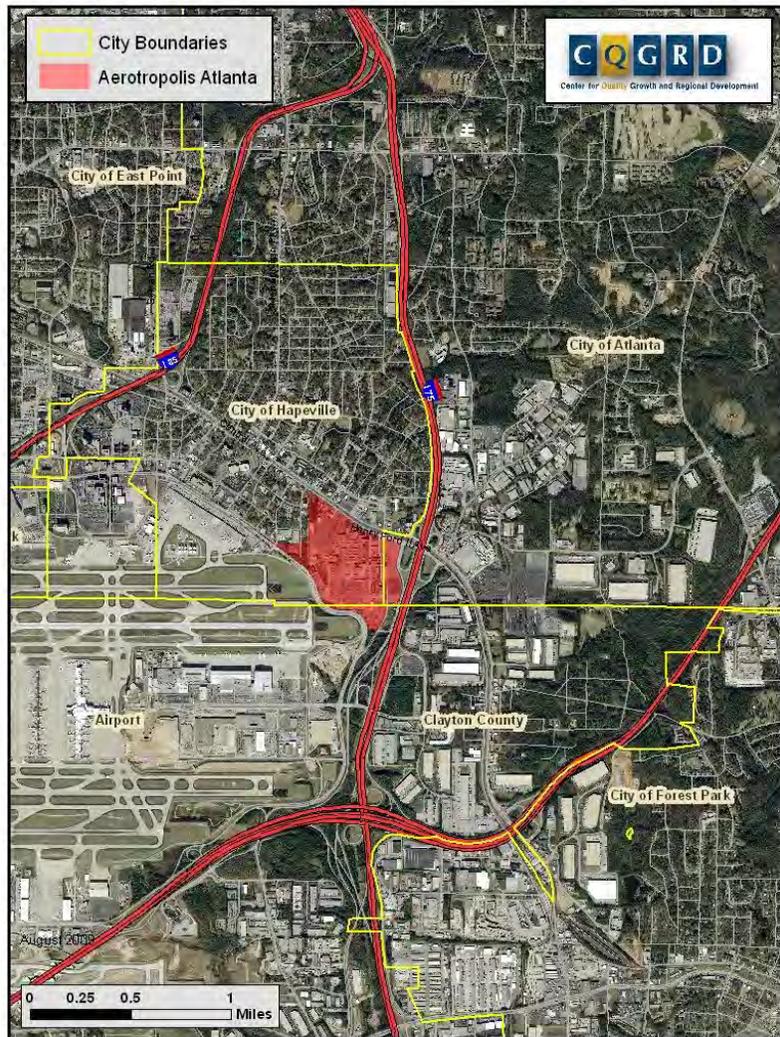


Figure 6: Aerotropolis Atlanta project site

In preparation for the closing of the plant, the City of Hapeville adopted a Future Land Use Map in 2006 as part of the Hapeville Plan 2025, identifying the site as an area for mixed-use development. On June 10, 2007, the site was officially rezoned Urban Village (UV). The Urban Village designation sets detailed guidelines for permitted uses, which include offices, schools and libraries, specific types of retail (such as apparel, new furniture, bakeries, drugstores, or grocery stores, all with restrictions on square footage), inns, dining, entertainment facilities, and residential uses under 40 units per acre; some other uses are explicitly not permitted (such as pawn shops or health clinics) or require approval. Additionally, it was given an overlay zone called a “regionally significant development” because of its large amount of acreage. In addition to the commercial and office uses already allowed, the overlay zone allows for the inclusion of conference and convention centers;

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hotels and motels with at least 200 rooms and a restaurant; telecommunications and/or data centers; commercial parking lots and decks with a Day-Night Sound Level (DNL) in excess of 75 decibels; and commercial parking lots and decks to serve retail, hotel, office, and other uses.



Figure 7. Historic Hapeville



Figure 8. Historic Hapeville

The Hapeville Ford Assembly Plant site was previously zoned industrial property and contained no resident population and few residential uses exist in the immediate vicinity. Under the terms of sale of the Ford Plant, Jacoby Development chose not to develop residential properties on the site, but instead, to transfer those development rights to the adjacent mixed-use development, Asbury Park (Hallman 2008). Asbury Park, a separate project, was planned to offer 58 townhomes, 1,357 condominiums, and 689 multi-family housing units (*Tax Allocation District, 2008*). In addition, 70,000 square feet of ground-floor retail space were incorporated into the Asbury Park design, creating an urban live-work village. Phase 1A had been completed with nearly 100% of the condos and 50% of the townhomes already sold. Construction on Phases 1B and 1C were expected to begin in the near future, pending improved real estate and finance conditions.



Figure 9: An early Aerotropolis site rendering, facing southwest



Figure 10: Plans for Asbury Park. Aerotropolis begins on the far left side.

The Aerotropolis Atlanta Project was scheduled for a ten year construction timeline, which could be affected by macroeconomic forces and local trends in real estate and capital markets. The property was almost entirely located in the City of Hapeville, with small parcels governed by the City of Atlanta or Clayton County. For the Hapeville properties, each new structure or phase of site development must be reviewed and approved separately by three city departments (planning, design, and permitting). The process was similar in Clayton County. In the City of Atlanta, developers were required to first get approval from the Neighborhood Planning Unit (NPU-Z) in which the property is situated, and then to proceed through the city approval processes. Prior to the HIA process, Jacoby

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Development had already worked directly with the City of Hapeville to draft new zoning codes and rezone the Aerotropolis property to facilitate implementation of their proposal. Public meetings were held during the rezoning activities.

HIA and Aerotropolis

Screening

This Health Impact Assessment was funded by the Health Impact Project, a collaboration of The Pew Charitable Trusts and the Robert Wood Johnson Foundation. The Health Impact Project is a national initiative designed to promote the use of HIAs as a decision-making tool for policy makers. Prior to submitting the proposal, public health and planning experts at Georgia Tech conducted a preliminary review of the project plans, demographic data about the area around the project site, and relevant health research to quickly assess whether the Aerotropolis Atlanta brownfield redevelopment project was a suitable HIA subject. They considered whether the Aerotropolis project had the potential to impact health, whether potential impacts were readily known or whether they would require comprehensive review, and whether the scale of the project was large enough to justify a comprehensive HIA process.

During the screening process, CQGRD determined that the area in the vicinity of Aerotropolis was at risk for poor health due socio-economic indicators below the regional median, a high percentage of racial and ethnic minorities, underserved residential areas and struggling commercial centers, and proximity to industrial properties and a major airport. CQGRD also found that the Aerotropolis redevelopment would be larger than the business district in downtown Hapeville, and relatively large in size compared to nearby residential, office, and industrial districts, and that it might offer essential services that were in inadequate supply prior to the project. Thus CQGRD concluded that Aerotropolis had a significant potential to impact health. The full list of theoretical impacts suggested during screening is shown in Table 1. Ultimately in the HIA process, some of the suggested screening items were found insignificant. The scale and complexity of the project and surrounding communities suggested a comprehensive HIA effort utilizing several research scientists at partial allocation and one student graduate research assistant, as well as project management. Additionally, the ten-year construction timeline, which had been delayed to accommodate shifts in the real estate market, provided ample time to conduct a comprehensive assessment.

Table 1: Screening Review

Proposed Impact Category	Proposed Impact Sub-category	Proposed Potential Health Impacts	Proposed Qualitative and Quantitative Measures	Proposed Change in Environment as a Result of Aerotropolis
Physical Activity	Physical Activity	Potential for increase in walking and bicycling trips, possibly reducing obesity and CVD	<ul style="list-style-type: none"> i. Pedestrian or bicycle traffic within project vicinity ii. Estimated changes due to new or upgraded facilities for pedestrian or bicycle use iii. Passenger counts from transit providers 	<ul style="list-style-type: none"> • New street layout and transportation facilities • New destinations • New or improved transit services (unknown)
Environment	Air Quality	Potential changes in asthma and respiratory diseases because of changes in personal exposure to air pollution	<ul style="list-style-type: none"> i. Evaluate site design and number of occupants for proximity to pollution sources, based on literature review ii. Changes in air quality indicators as measured by regional and local air quality models, including MOBILE 6 and MATES III, 	<ul style="list-style-type: none"> • New office, hotel, and retail buildings located in close proximity to airport, rail line, and highway • New destinations • Temporary construction
		Potential contribution to climate change and urban heat island effects	<ul style="list-style-type: none"> i. Estimated change in private vehicle miles traveled (proportional to greenhouse gases emissions) ii. Net change in solar gain or reflection iii. Net change in energy resources used 	<ul style="list-style-type: none"> • New destinations • Conversion of industrial site to mixed-use site • New buildings
		Change in asthma and respiratory diseases related to air pollution levels, due to potential changes in travel patterns and tree cover	<ul style="list-style-type: none"> i. Estimated air contaminant emission and deposition changes due to change in trip generation and greenspace through literature review 	<ul style="list-style-type: none"> • New street layout and transportation facilities • New destinations • New greenspace (unknown)

Proposed Impact Category	Proposed Impact Sub-category	Proposed Potential Health Impacts	Proposed Qualitative and Quantitative Measures	Proposed Change in Environment as a Result of Aerotropolis
Environment (cont.)	Noise	Potential increase in work or sleep disturbance and impact on mental health due to noise exposure	i. Measure noise levels at building sites to estimate exposure to noise pollution and review impact in literature ii. Literature review of noise mitigation in building design	<ul style="list-style-type: none"> New office, hotel, and retail buildings located in close proximity to airport, rail line, and highway New roads (unknown)
	Brownfield Redevelopment	Change in disease rates caused by toxicants from brownfields	i. Literature review of brownfield redevelopment health impacts ii. Estimate exposure during remediation	<ul style="list-style-type: none"> Up to 122 acres of brownfield cleanup
	Water	Potential changes to water and sanitation affecting quality and availability of water for drinking, agriculture, and natural areas	i. Estimated change in permeable surface ii. Change in pollutants entering stormwater runoff iii. Change in water consumption and treatment from new facilities	<ul style="list-style-type: none"> New office, hotel, and retail buildings Conversion of industrial site to mixed-use site New greenspace (unknown)
Injury	Unintentional Injury - Traffic	Potential change in traffic injuries due to changes in travel mode and volume	i. Change in estimated fatality rate through mode share shift ii. Change in estimated traffic volumes based on literature review iii. Estimate exposure from quality of facilities	<ul style="list-style-type: none"> New street layout and transportation facilities New destinations New or improved transit services (unknown) New office, hotel, and retail buildings with parking located in close proximity to airport, rail line, and highway
	Unintentional Injury - Industrial	Possible injuries caused by airport or freight rail activities	i. Literature review of morbidity and mortality rates in vicinity of airports or rail lines	<ul style="list-style-type: none"> New office, hotel, and retail buildings located in close proximity to airport, rail line

Proposed Impact Category	Proposed Impact Sub-category	Proposed Potential Health Impacts	Proposed Qualitative and Quantitative Measures	Proposed Change in Environment as a Result of Aerotropolis
Injury (cont.)	Crime	Potential changes in exposure to crime	i. Identification of high risk locations or routes and degree of change	<ul style="list-style-type: none"> • Conversion of industrial site to mixed-use site with parking
Equity and Access	Equitable Accessibility	Relative accessibility and mobility options for study area users including disadvantaged, disabled, or non-driving population	i. Identify current and future disadvantaged populations in study area ii. Assess level of current and estimated future access for each transportation mode and population	<ul style="list-style-type: none"> • New street layout and transportation facilities • New destinations • New or improved transit services (unknown)
	Employment & Income	Changes in employment status, wage, or benefits affecting access to quality housing, nutritious foods, healthcare, etc.	i. Estimate quantity, duration, and compensation of jobs created or lost ii. Identify distribution of employment gains or losses	<ul style="list-style-type: none"> • Remediation and construction phases • New office, hotel, retail, and related worksites
	Access to Goods and Services	Changes in access to stores and services	i. Identify current and future goods and services available relative to demand	<ul style="list-style-type: none"> • New retail and new customers in currently underserved area
	Mental Health	Potential change in stress or depression due to change in land use	i. Literature review of relationship between mental health and vacant industrial sites ii. Literature review of relationship between mental health and urban intensity iii. Literature review of relationship between mental health and exposure to greenspace	<ul style="list-style-type: none"> • Conversion of industrial site to mixed-use site • New retail and new daily visitors • Increased density • New greenspace (unknown)

Proposed Impact Category	Proposed Impact Sub-category	Proposed Potential Health Impacts	Proposed Qualitative and Quantitative Measures	Proposed Change in Environment as a Result of Aerotropolis
Social and Environmental Sustainability	Social Capital	Increased social capital because of greater access and connectivity between residential, business, community facilities, and social support institutions	<ol style="list-style-type: none"> i. Define the local community (residents and workers) and identify change in access to public space, social settings, and community facilities ii. Measure regional connectivity by identifying access routes to the project area iii. Estimate change in travel behavior 	<ul style="list-style-type: none"> • Conversion of industrial site to mixed-use site • New greenspace (unknown)
	Gentrification	Displacement of lower income individuals leading to disruption and change in access to quality housing, nutritious foods, healthcare, etc.	<ol style="list-style-type: none"> i. Demographic projections for study area and estimates of potential gentrification. ii. Literature review of relationship between gentrification and decreased health 	<ul style="list-style-type: none"> • Conversion of undesirable industrial site to upscale mixed-use site
	Lifecycle	Long term effect on area development and character	<ol style="list-style-type: none"> i. Literature review of development in proximity to similar projects ii. Assessment of durability and flexibility of buildings iii. Comparison with development plans of adjacent jurisdictions and facilities 	<ul style="list-style-type: none"> • Conversion of industrial site to mixed-use site • New retail and new daily visitors • Increased density • New street layout and transportation facilities • New or improved transit services (unknown)

Why conduct an HIA on the Atlanta Aerotropolis Brownfield Redevelopment?

In support of 2020 Healthy People goals — which include eliminating health disparities and increasing the duration and quality of life — the Aerotropolis redevelopment project would have the potential to impact health and health disparities, and to integrate health into the decision-making process (Healthy People, 2011). The screening phase determined that the project would likely affect health determinants and outcomes for visitors, workers and the surrounding area. After reviewing the project documents, the research team decided to conduct a Health Impact Assessment in order to give consideration to these inadvertent effects. The potential impacts were assessed at the immediate level on or near the site, and in the larger local area including Hartsfield-Jackson Atlanta International Airport, the City of Hapeville, and portions of surrounding cities or counties.

The project area was located at the intersection of several different transportation systems. It was almost entirely surrounded by a major airport, a railroad, and a large Interstate highway with very little residential development immediately adjacent to the project site. These serve as barriers, opportunities, and sources of health risk. Based on a preliminary screening process to determine health impacts and measurements,

Introduction

Table 1: identifies a number of measures, methods, and directions for conducting a comprehensive assessment of this development proposal's impact on health.

Workers and visitors to the area would potentially suffer negative health effects due to noise and poor local air quality, as would travelers in the vicinity, and safety can always be an issue at major intersections (Berglund & Lindvall, 1995; Dora & Phillips, 2000; McCarthy, 2000). Hotel guests may experience temporary environmental exposures similar to a residential setting, particularly for extended or frequent hotel stays. However, the project creates opportunities to mitigate these issues through soundproofing, air filtration, and provision of greenspace. Most air and noise pollution likely originated from outside of the development, from the airport, nearby Interstates, and region at large.

Access to and within the formerly industrial area could also influence health. The project would create new streets, walkways, and parking facilities, and may involve a shuttle service and upgraded connections at the edge of the development. Travel mode share, which is influenced by transportation facilities, street and land use patterns, maintenance, and other factors, can have multiple positive or negative health outcomes including emissions levels, safety from both traffic and crime (as well as perceived safety), changes in physical activity, and levels of social interaction (Kavanagh, Doyle & Metcalfe, 2005). These factors can also determine whether some individuals have better access to the development than others, which can exacerbate existing economic and health disparities (Litman, 2002). Certain populations may be affected by these aspects more than others including workers, lower-income households and users of retail services, immigrants, and individuals who do not drive (including the elderly and people with disabilities) who wish to access the property.

Without a residential component, housing cost and quality was not a concern, except to the extent that this development could affect housing prices or characteristics in the nearby neighborhoods (Barnes & Scott-Samuel, 2002; Ross, 2007). However, the project would generate many local jobs and host a large number of workers, temporarily during construction and long-term in the completed adjacent facilities. The range of wages that the new jobs were likely to offer relative to the local cost of living was also significant as it can influence housing options and access to health-promoting goods and services for workers (Lynch, Smith, Kaplan & House, 2000; Marmot & Wilkinson, 2006). Job training or other services may increase local opportunity for job access.

Since the project would redevelop a former industrial site, the HIA must consider brownfield remediation, addition of new greenspace, energy and water consumption, and other resource issues

Introduction

for their potential to improve existing conditions and influence future health outcomes (Quigley, Conland & McAuley, 2006; Solitare & Greenberg, 2002; Younger, Morrow-Almeida, Vindigni & Dannenberg, 2008). The construction phase itself could be a source of health impacts, especially considering the duration of the project (completion in 2018). Finally, the project needed to be appraised for its appropriateness relative to the existing and future community nearby. Did it make physical and social connections with the community, fulfill needs for particular markets or public amenities, and support local sustainability including integration with future adjacent land use? The HIA would therefore consider site and building design to enhance mental wellbeing and social capital, and the potential of the project to increase or reduce existing disparities (Elliott & Williams, 2004).

Although there were many examples of HIA demonstration projects in North America and Europe, few HIAs had focused on brownfield redevelopment (for a clearinghouse of HIAs, see UCLA HIA Clearinghouse, 2011). However, this HIA may be considered in context with several prior assessments, pointing to the relevance of this project to HIA best practices and opportunities to inform future decision-making: An HIA in Colorado addressed health impacts of a downtown redevelopment project, while two HIAs in the San Francisco area examined efforts to develop former military installations for reuse (Tri-County Health Department, 2007; San Francisco Department of Public Health, 2009; Human Impact Partners, 2008). While these HIAs also focused on redevelopment issues, the Aerotropolis Atlanta redevelopment project was conducted in cooperation with the Jacoby Development team and therefore provided a unique opportunity to inform decision-making. In addition, as a brownfield located near concentrations of population and an airport, the Aerotropolis project had the potential to significantly impact regional health and quality of life.

Scoping & Methodology

Community Assessment

Demographic Profile

The HIA study area was defined as a two mile area measured by air line, or “as the crow flies” from the boundaries of the Aerotropolis Atlanta Redevelopment Project. Health and demographic data, which was only obtained at the Census tract level and includes all Census tracts that fall partly or entirely within the two mile buffer. Those Census tracts that met this criterion are identified in Figure 11. A total of 27,347 people lived in the study area in 2000, the most recent year for which complete Census data was available. Population and demographics may have changed since the 2000 decennial census. Using American Community Survey estimates for the larger Public Use Microdata Area (PUMA 01105), the population was estimated to be 28,095 in 2005 and 27,832 in 2009. Data from the 2010 Census became available just before the end of the HIA but were not utilized as full demographic and socioeconomic information is no longer collected in the decennial Census.

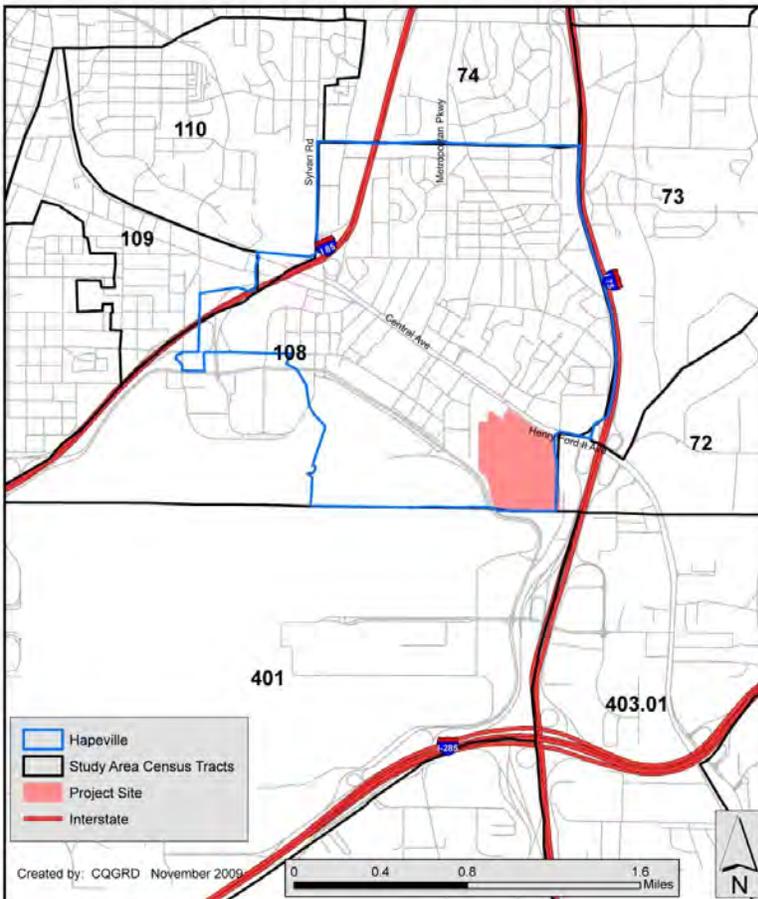


Figure 11: Census tracts within Aerotropolis HIA study area

As shown in Table 2, three of the census tracts had very few residents; tract 401 represents the airport, and tracts 403.01 and 109 are industrial areas. Census tracts 72, 73, and 74 were in the Atlanta city limits. Census tract 108 was closely aligned with the boundaries of the City of Hapeville and contains a small part of the airport. Tract 401 contained the majority of the airport and a few adjacent properties. Tracts 109 and 110 were in the neighboring city of East Point. Tract 403.01, in northern Clayton County, and the southern portion of 72 have been heavily impacted by the airport. Hundreds of properties due east of the runways were purchased by the airport as a result of noise levels at those sites. Some of the area remains vacant, as required by the Federal Aviation Administration, while the logistics industry dominates the developable land. Tracts 401 and 403.01 were located in Clayton County; the remaining tracts were in Fulton County. There were major employment centers at and around the airport; the study area had a positive jobs to housing ratio.

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The study area was home to a racially, ethnically, and socioeconomically diverse population. The city of Hapeville had a much larger percentage of Hispanic residents than the rest of the state, as do census tracts 74, 109, 110, and 403.01. The black population was higher in all tracts except Hapeville. Median household income was much lower than the statewide average (\$50,834) and poverty levels are higher, especially outside of Hapeville. Rates of disability, carless households, and adults lacking a high school diploma are all higher than the rest of Georgia. Again, this was true to a greater degree outside of Hapeville. Average household size was higher in tracts 72 and 74, as shown in Table 2. Tract level poverty rates ranged from 18% in the City of Hapeville up to 42% in parts of East Point.

Table 2: Demographic profile of study area

	Census Tract							
	108.00	401.00	403.01	72.00	73.00	74.00	109.00	110.00
<i>Total Population</i>	6,180	18	229	4,162	7,396	4,158	728	4,476
White percentage	3196 52%	12 67%	89 39%	212 5%	286 4%	849 20%	327 45%	584 13%
Black percentage	1641 27%	6 33%	131 57%	3,841 92%	6,992 95%	2,052 49%	254 35%	3,500 78%
Two or More Races percentage	140 2%	0 0%	4 2%	43 1%	40 1%	159 4%	47 6%	71 2%
Hispanic or Latino percentage	1348 22%	0 0%	35 15%	221 5%	180 2%	1,102 27%	191 26%	595 13%
Under 18 percentage	1511 24%	3 17%	45 20%	1640 39%	2572 35%	1160 28%	168 23%	1581 35%
65 + percentage	666 11%	6 33%	8 3%	143 3%	352 5%	406 10%	67 9%	416 9%
Households	2375	8	44	1,289	2,477	1,110	265	1,426
Average Household Size	2.6	2.25	2.3	3.23	2.98	3.42	2.75	3.04
MHHI (1999)	\$34,158	\$36,250	\$17,321	\$24,833	\$25,164	\$25,000	\$24,022	\$20,824
<i>Disadvantaged Populations</i>								
With Disability (non-institutional) percentage*	1445 25%	7 70%	19 12%	752 21%	1982 29%	1423 37%	204 32%	1408 36%
Non-citizen percentage	1039 17%	0 0%	31 14%	238 6%	217 3%	1,580 38%	115 16%	535 12%
Below Poverty percentage	1101 18%	0 0%	0 0%	1,464 35%	2,100 28%	1,622 39%	181 25%	1,875 42%
Carless (households) percentage	410 17%	0 0%	4 9%	341 26%	650 26%	300 27%	63 24%	503 35%
No HS Diploma (18+) percentage	1625 34%	3 30%	90 45%	758 29%	1657 34%	1776 59%	321 60%	1494 51%

Health Profile

A data request for morbidity (disease and injury) and mortality (death) rates by cause in the study area was processed through the Fulton County Department of Health and Wellness, which was represented on the HIA Advisory Committee. The data originated from the Georgia Department of Community Health, Division of Public Health, Office of Health Information and Policy (OHIP). Data were provided for deaths, de-duplicated hospital discharges, and de-duplicated emergency department (ED) visits. To protect potentially confidential data, the data were aggregated across the study area and in 5-year groupings (1998-2002 and 2003-2007 for deaths; 2003-2007 only for discharges and ED visits), and groupings with less than five cases were suppressed. Raw case numbers were provided for the study area and for the State of Georgia, as well as their calculated percentage of all mortalities or morbidities. No age or race/ethnicity information was provided for the sake of patient confidentiality, meaning that age-adjusted rates and health disparities could not be calculated from these data.

The morbidity and mortality data can provide an objective picture of health issues in the study area. The tables were ranked by greatest to least consequential cause of death or medical treatment in the study area, in order to prioritize them by urgency. Gross rates per 100,000 residents were calculated using 2005 population estimates. Due to the small number of deaths, mortality data was aggregated from 1998-2007; 2005 population data was still used as the base for developing rates. Categories with more than 20 deaths or more than 50 discharges or ED visits are presented in Figure 12, Figure 13, and Figure 14. Complete data tables can be found in Appendix A-5.

Overall, the death rate in the study area was about 30% higher than for all of Georgia. Discharges are about 12% higher and ER visits 23% higher. Mortality from hypertensive and chronic ischemic heart disease, stroke, HIV, and homicide are markedly higher in the study area, visible in Figure 12. However, maps provided by the Georgia Division of Public Health that portray rates by census tract suggest that there was considerable variation of homicide rates in the study area, with the majority of the homicide burden occurring in tracts 72 and 73, (Figure 15 through Figure 21). The unusually high rate of mortality from HIV may indicate a health crisis or could simply indicate a hospice or other type of medical residence in the area. Diabetes and septicemia are other major excessive mortality burdens near the project site, while local residents fare somewhat better on acute heart attack and respiratory disease. Lung cancer and certain other cancers, other forms of heart disease, and kidney disease also contribute a sizable proportion of deaths at rates similar to the rest of the state.

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Morbidity rates offer a different view. The area exhibits elevated rates of unclassified heart disorders, septicemia, HIV, asthma, and kidney disease and slightly higher rates of mental disorders (Figure 13). However, visits for pneumonia and many other diseases occur at lower rates, including for the leading cause of death, other forms of chronic ischemic heart disease. Likewise, discharges for certain cancers are lower than statewide rates, but deaths for these diseases are higher, suggesting a lack of screening or prevention. ED data hints at lower access to primary care for residents of the study area. ED visits for asthma are more than double state rates while discharge rates are only slightly elevated, suggesting that this disease is not being controlled by routine treatments (Figure 13 and Figure 14). In sum, this population may have reduced access to primary and preventive care.

The health profile can be influenced by environmental factors as well as demographics (and demographic profile can be affected by the built environment). The study area population was similar in age to the State of Georgia, but had lower educational levels and higher percentage of black and Hispanic residents. Disability rates are higher as are poverty rates. From the perspective of the built environment, the study area was more comparable to metropolitan Atlanta and Fulton County than to the state of Georgia, which has a considerable rural and semi-rural population. The Atlanta region performs better than the state in certain disease classes. For instance, death rates from heart disease and stroke are generally much lower in the core metropolitan area, as are diabetes, motor vehicle injury, lower respiratory disease, and lung cancer. These differences may be attributed to higher socio-economic status for the Atlanta region, as well as greater density of food stores, medical providers, social services, and settings for physical activity (parks, fitness centers, and developed land). On the other hand, homicide, HIV and infectious diseases, other cancers, and hypertensive heart disease claim a greater proportion of lives in the Atlanta area. Overall, the death rate in metropolitan Atlanta is lower than the rest of the state. Therefore, some of the elevated morbidity and mortality rates in the study area contrast even more starkly against their surrounding communities. Complete epidemiological data was not obtained for Fulton and Clayton counties or for the region, so a full analysis could not be conducted between these populations.

In conclusion, opportunities for incidental physical activity, access to health care, and supportive social networks appeared to be the health determinants most in need of improvement for study area residents. Physical activity is a factor in many types of heart disease and diabetes. Access to health care, especially routine primary care, could reduce mortality for some diseases, such as many cancers, if caught early and treated consistently, and can reduce ED visits for chronic diseases such as asthma. Access to nutritious foods was also potentially a culprit in the local disease burden. HIV

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and homicides are often correlated with dysfunctional social networks, drug use, and low educational and economic status. Air quality could constitute a problem as well, as asthma, other respiratory diseases, and common types of heart disease are exacerbated by certain air contaminants. Thus, the HIA focused on the built environment component of these determinants, such as safe and convenient places to be physically active, mobility options for travelling to jobs and services, supportive environments for learning and social interaction, and indoor and outdoor air quality hazards.

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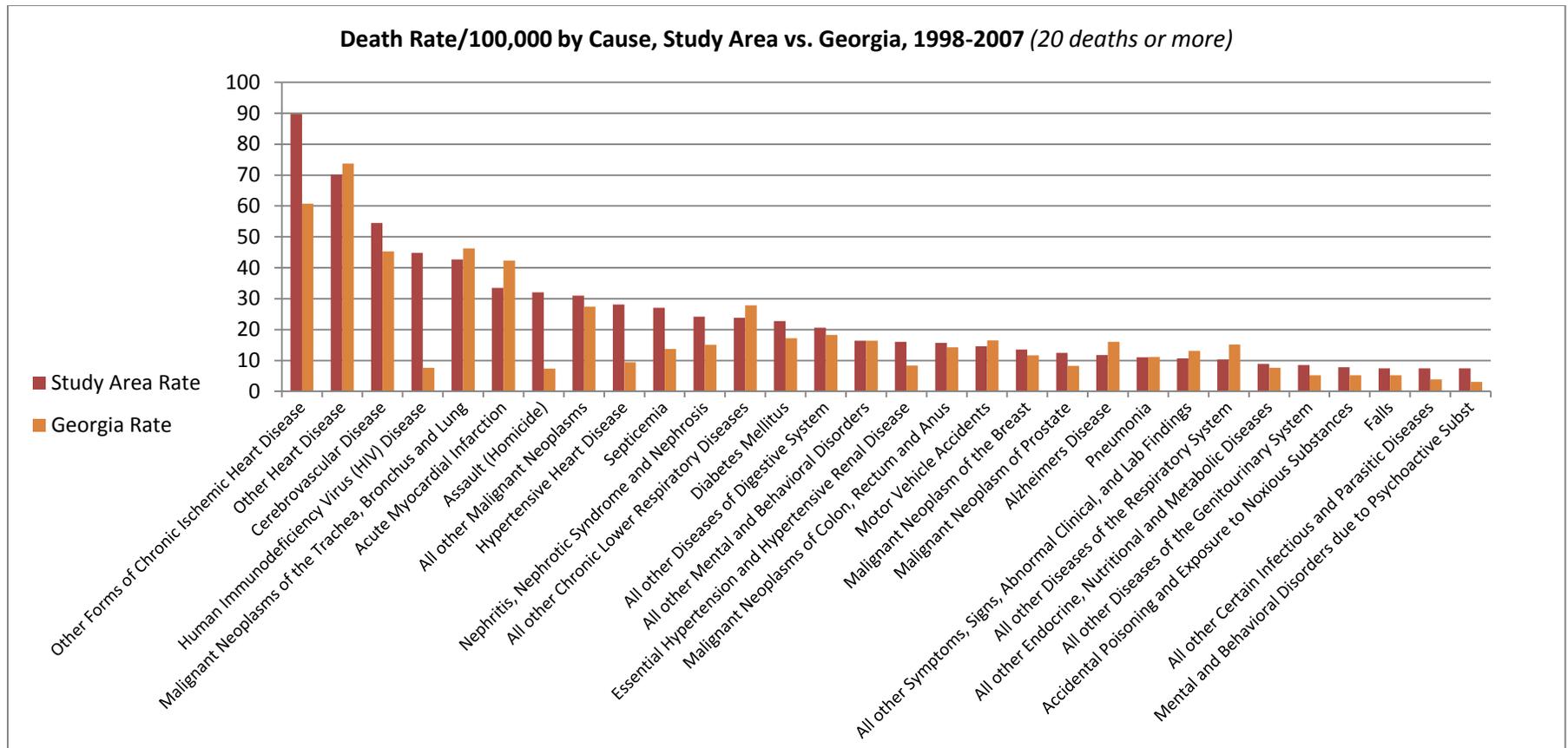


Figure 12: Mortality rates

Source: Georgia Department of Community Health, Division of Public Health, Office of Health Information and Policy

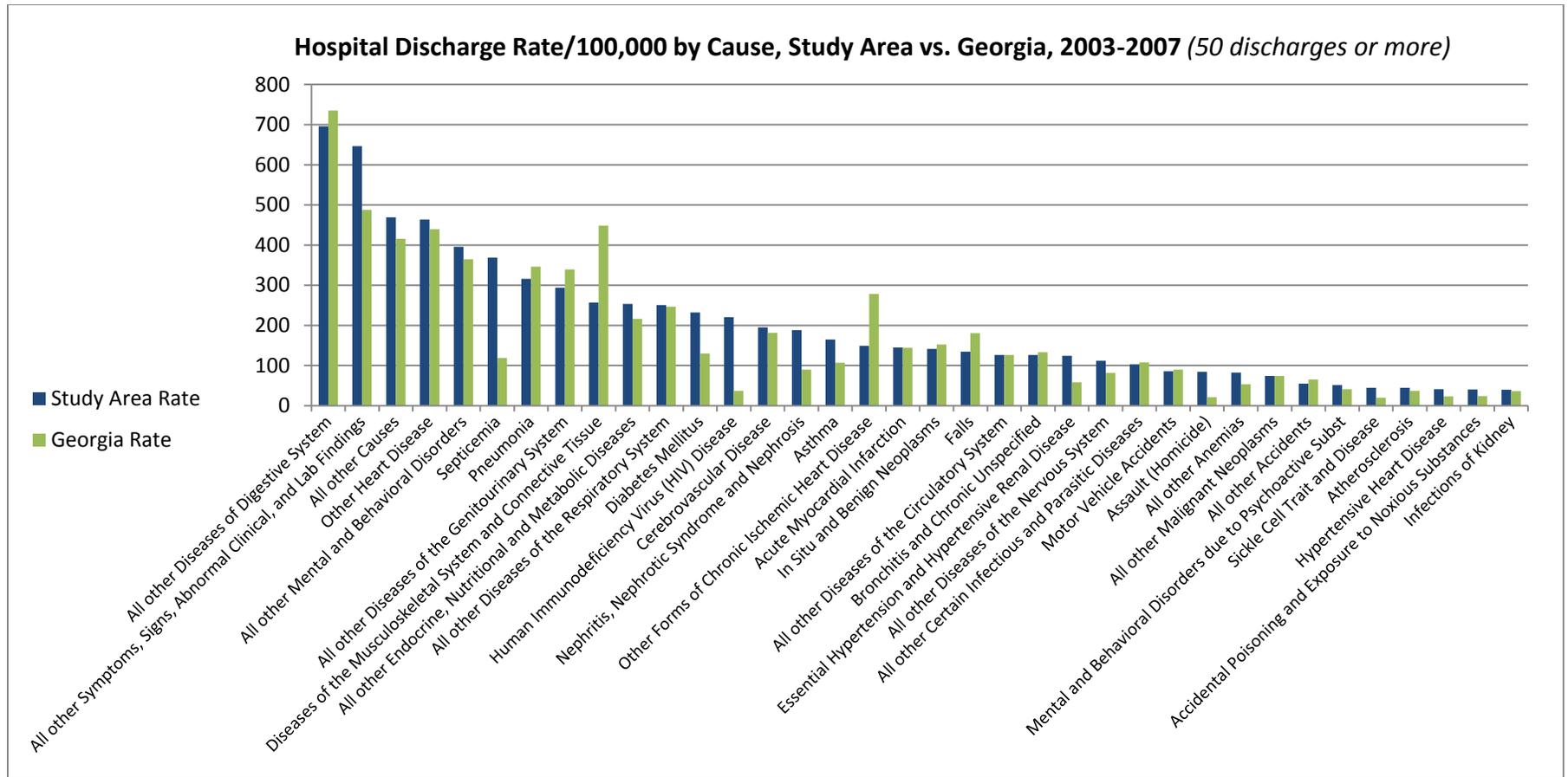


Figure 13: Morbidity rates

Source: Georgia Department of Community Health, Division of Public Health, Office of Health Information and Policy

*Excluded: Disorders of Pregnancy, Childbirth, and the Puerperium

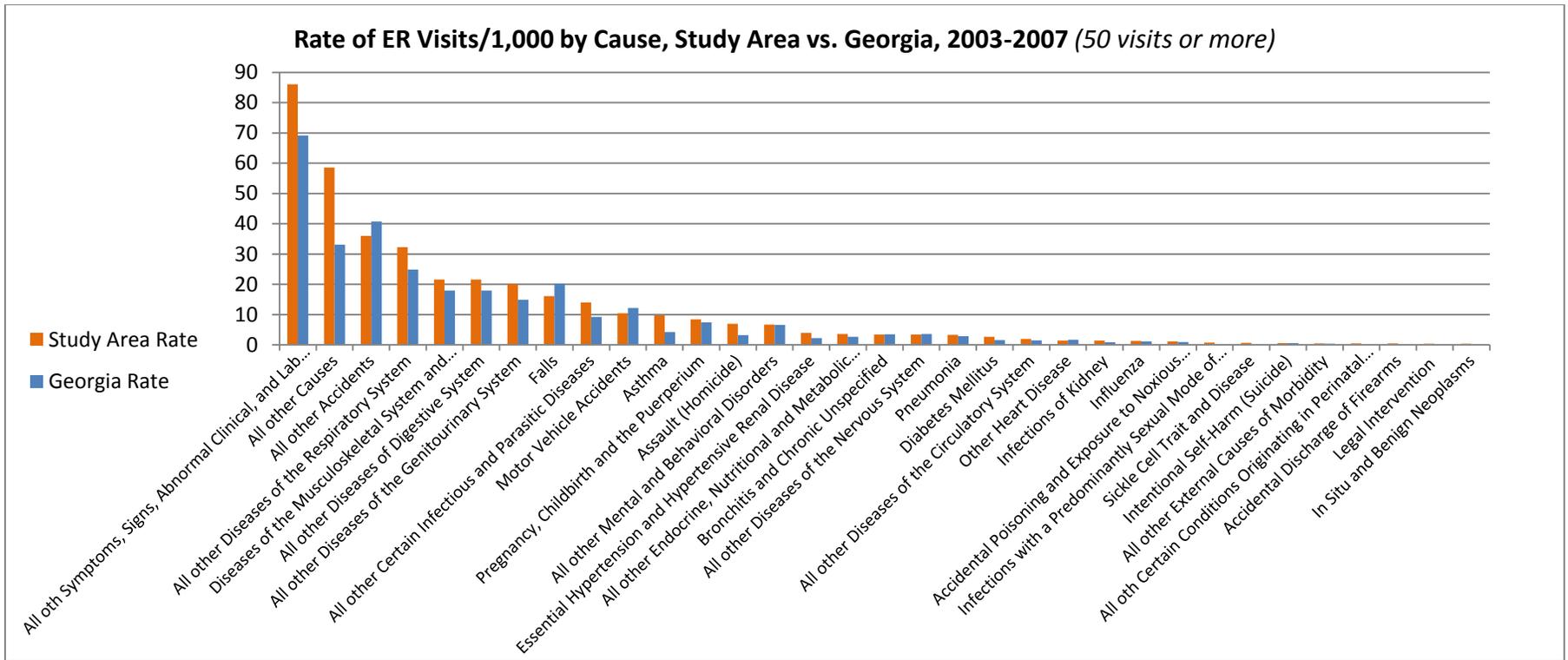


Figure 14: Rate of Visits to Emergency Department

Source: Georgia Department of Community Health, Division of Public Health, Office of Health Information and Policy

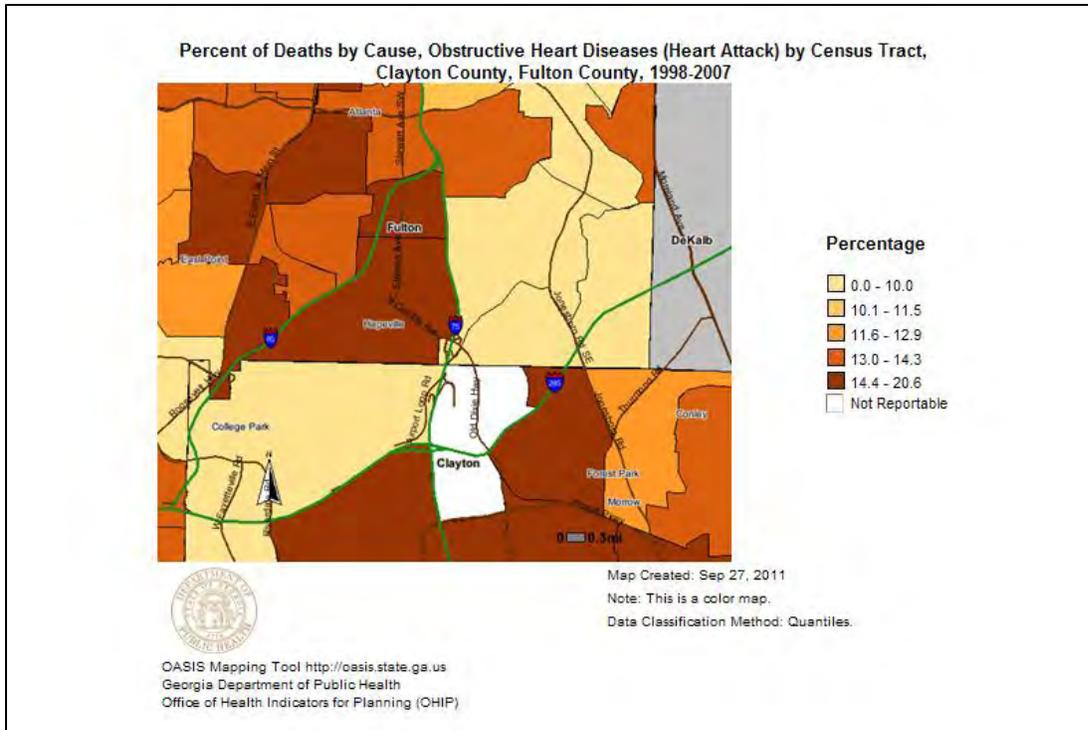


Figure 15: Percentage of deaths with obstructive heart diseases and myocardial infarction as primary cause, by census tract, by quintile

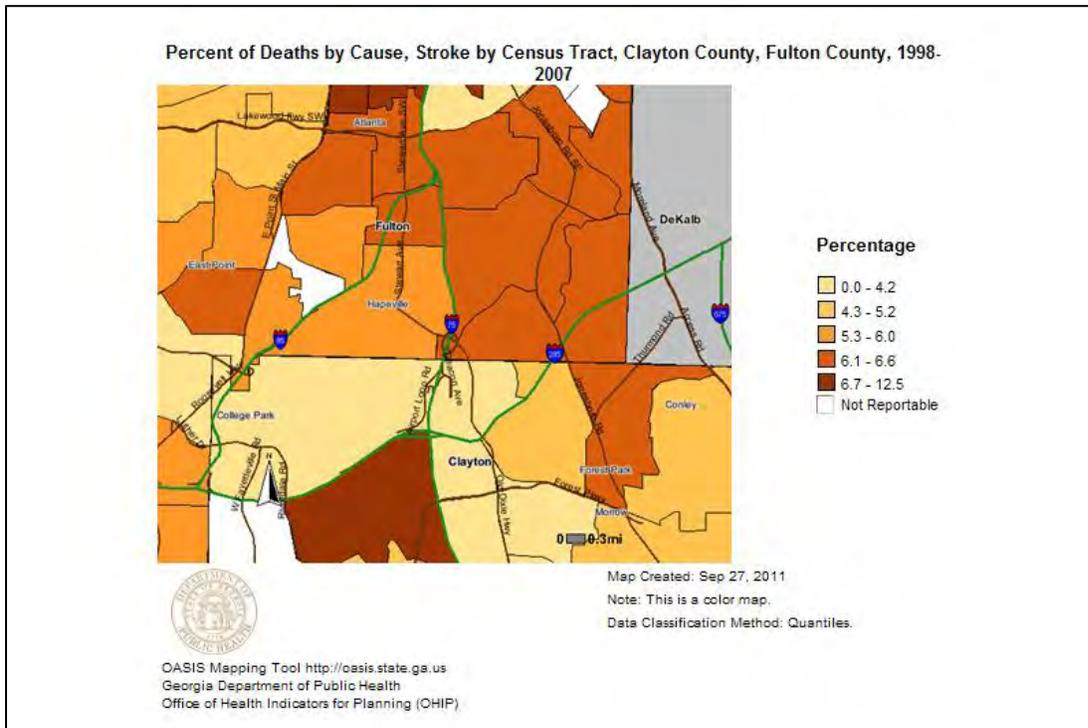


Figure 16: Percentage of deaths with stroke as primary cause, by census tract, by quintile

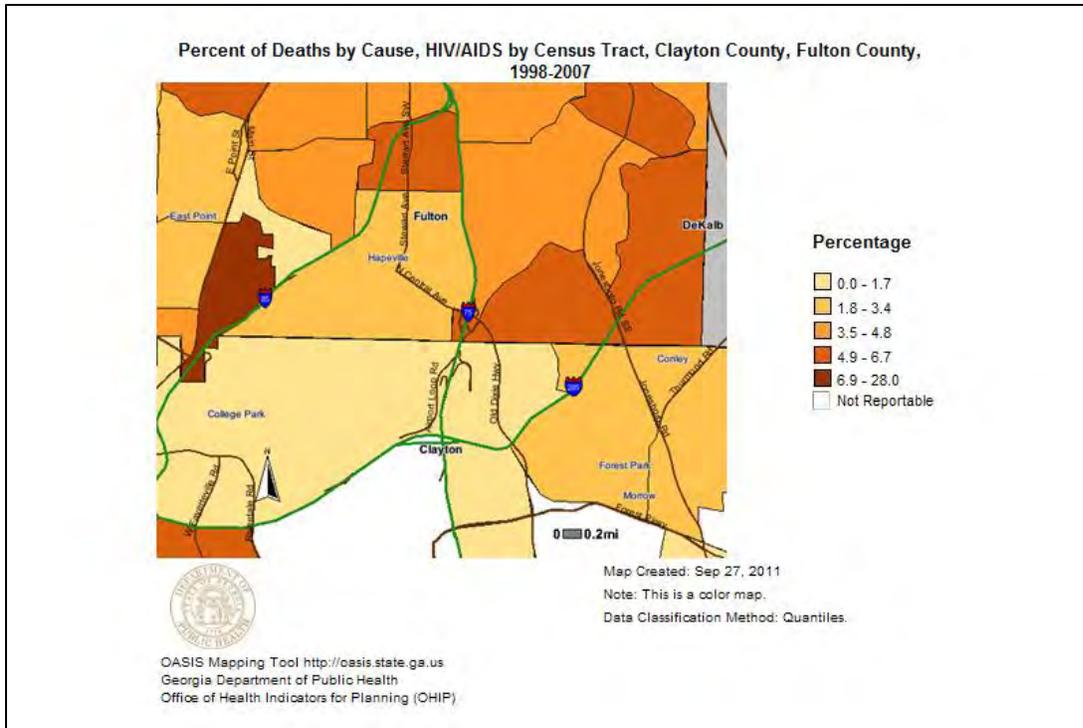


Figure 17: Percentage of deaths with HIV/AIDS as primary cause, by census tract, by quintile

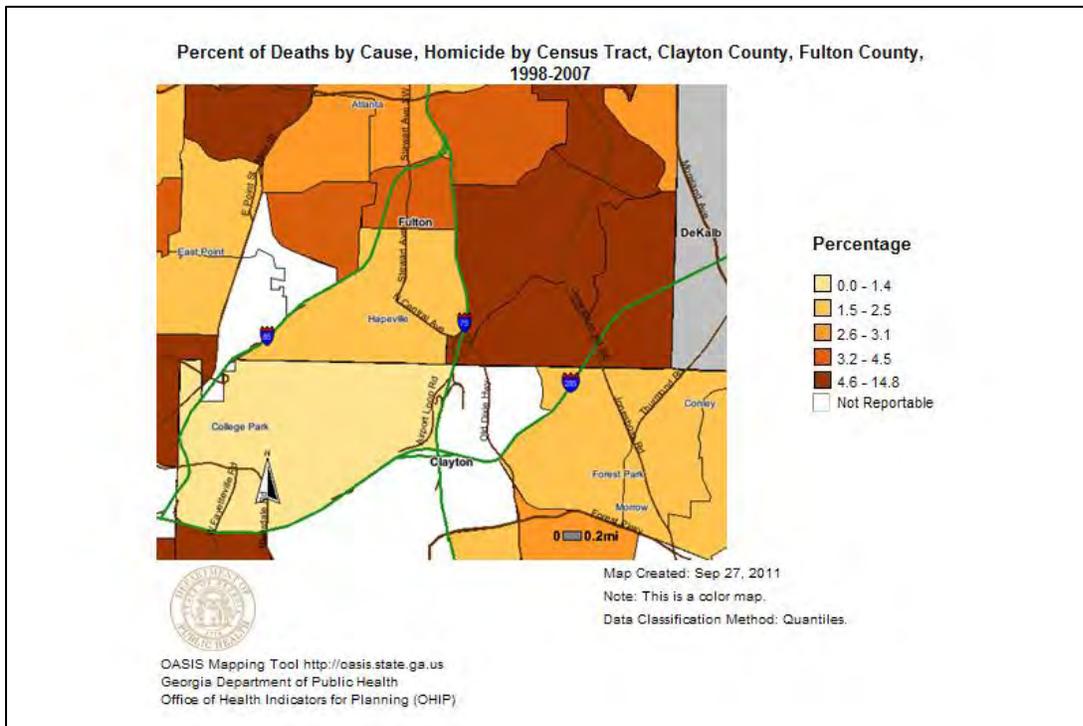


Figure 18: Percentage of deaths with homicide as primary cause, by census tract, by quintile

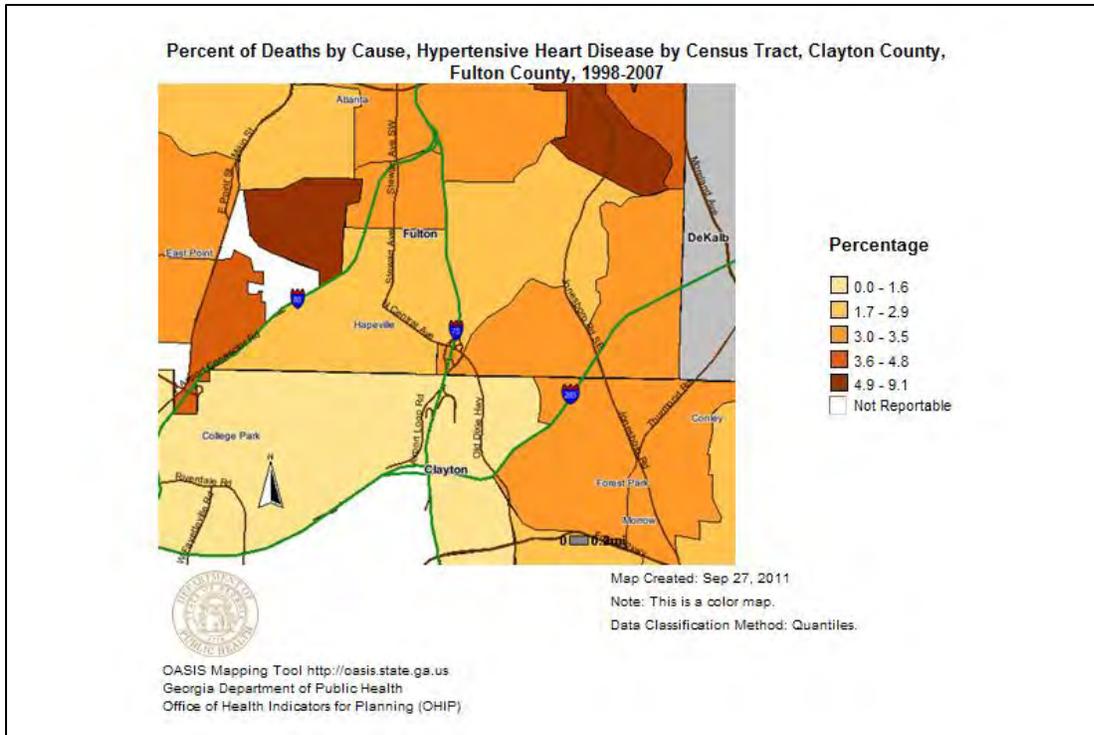


Figure 19: Percentage of deaths with hypertensive heart disease as primary cause, by census tract, by quintile

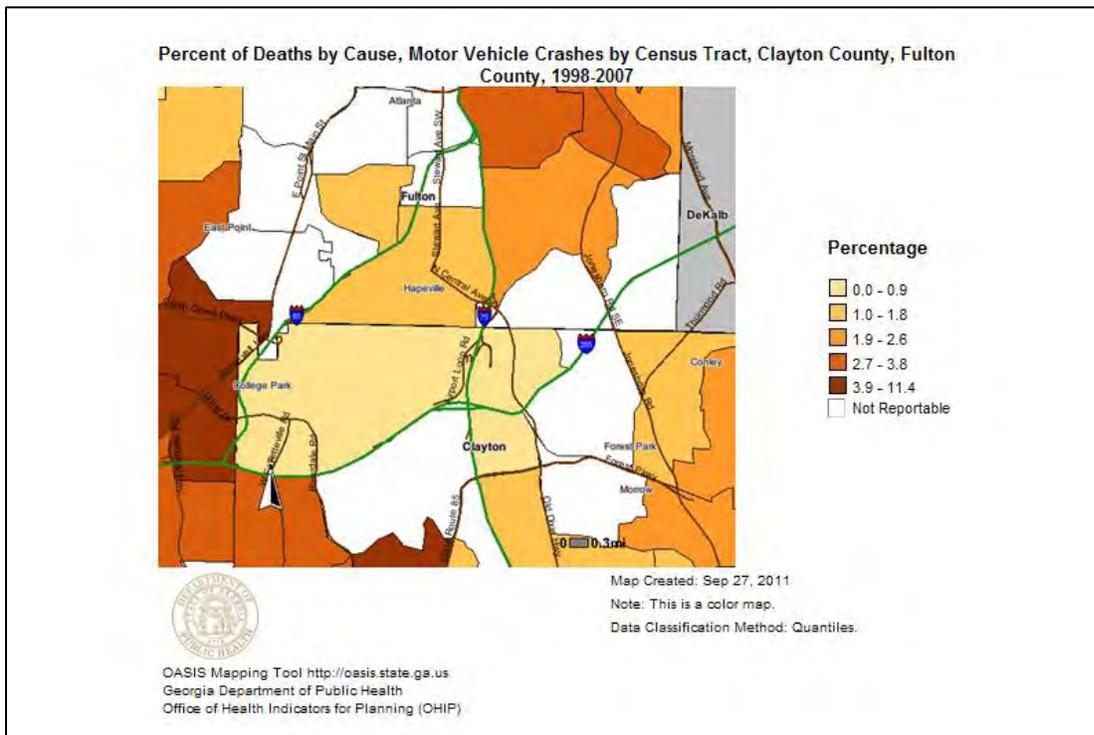


Figure 20: Percentage of deaths with motor vehicle crash as primary cause, by census tract, by quintile

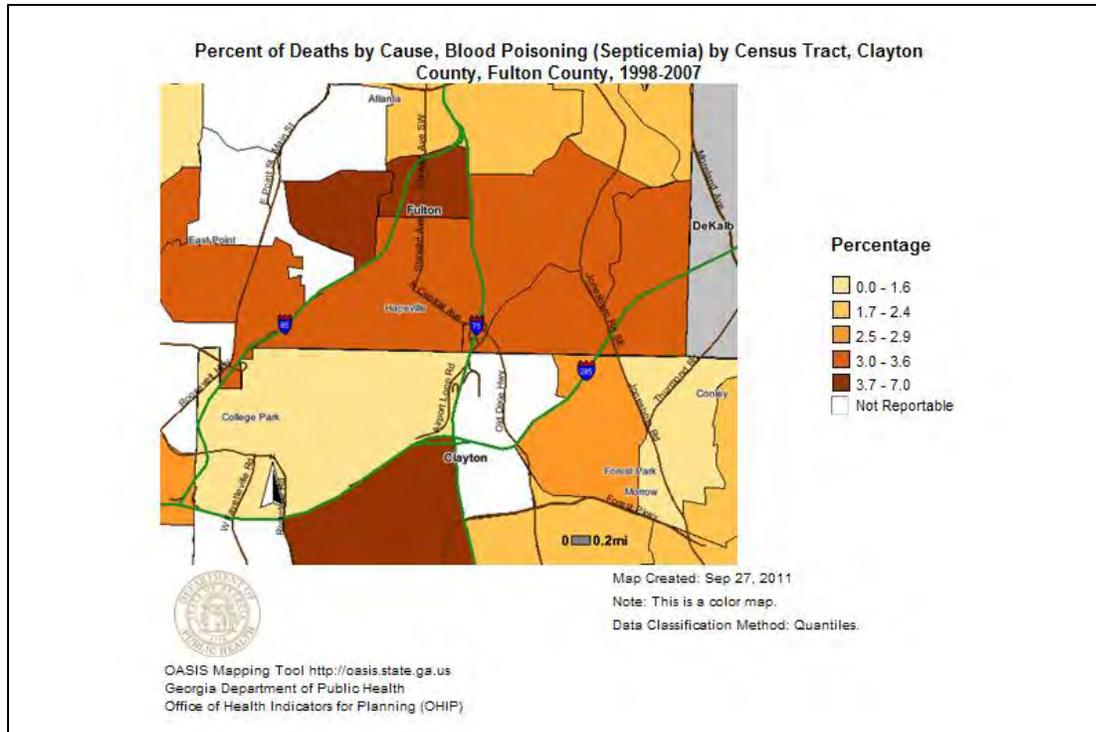


Figure 21: Percentage of deaths with septicemia as primary cause, by census tract, by quintile

Geographic Profile

Observations of the study area, evaluation of demographic, spatial, and network data, and commentary from stakeholders suggested that the Aerotropolis project was likely to have different potential impacts at different scales. The scales of appraisal used for this HIA were:

- Aerotropolis Atlanta site: The design and operation of the project site will likely impact anyone who works, stays, or visits there.
- Connections to the site: The site will significantly interact with and affect land uses and neighborhoods within quarter and half-mile distances. This includes downtown Hapeville, the airport, and other local residents and businesses. This also captures walking distance from the site, and was the area selected for the Walkability Audit analysis.
- The big picture: Major retail and community amenities affect a larger travel area, so the Aerotropolis project would potentially impact that larger population of workers and residents. This was the area used in the Healthy Places Audit and Latent Demand Score analysis.

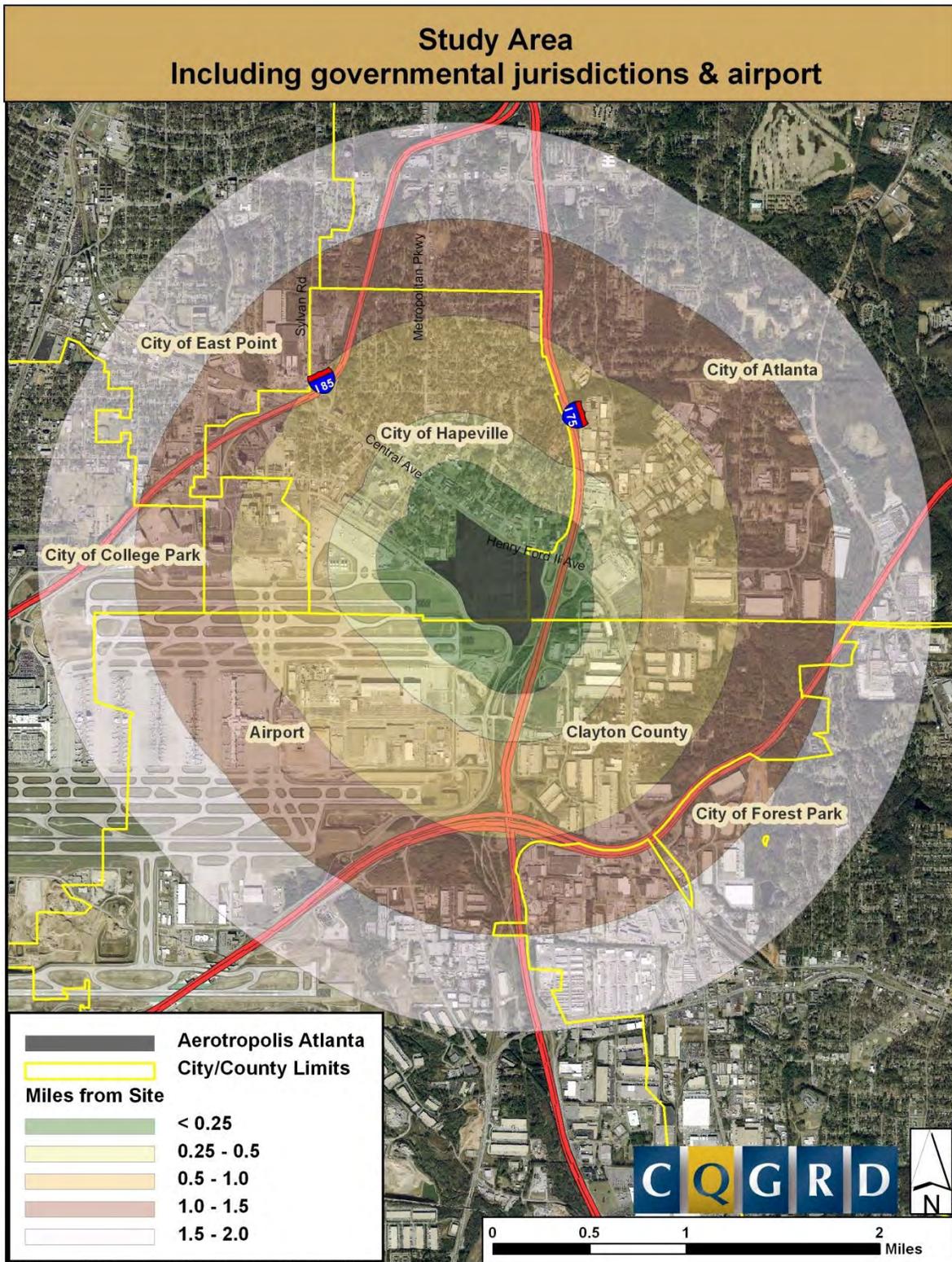


Figure 22: Geographic scope levels

Stakeholders Who Influence Project Outcome

The Aerotropolis Atlanta redevelopment would be designed and constructed by the developer and its subcontractors. However, there were many other organizations that could influence the project and the surrounding area. Thus, the HIA had to consider how all of those decisions would interact, identify who the decision-makers were, and develop appropriate recommendations for each. The following actors were identified:

Jacoby Group of Companies. This group encompasses a development company as well as health and energy enterprises. Based in Atlanta, Jacoby described themselves as ‘focused on real estate, education, energy and healthcare - all with an emphasis on sustaining the environment and seeking solutions for tomorrow's generations. Founded by Jim Jacoby in 1975, the company has expanded its focus from initial endeavors in 'traditional' retail center development to broader projects that embrace and promote environmental stewardship’. Airport Station, a group of investors managed by Jacoby Development Inc. (JDI), purchased the assembly plant in 2008 and had completed demolition and remediation before the HIA began. They developed an initial site plan which allowed them to have the site rezoned. They had also conducted some public engagement. JDI was actively engaged in the HIA process through regular meetings with the Principal Investigator. The site itself carries some covenants regarding permitted uses.

City of Hapeville. The majority of the project site was within the Hapeville city limits. As a result, the city controls zoning, site plan approval, building permitting and inspection, and certain types of fees and taxation. These decisions are determined in part by Hapeville’s comprehensive land use plan, public engagement processes, and city ordinances, as well as special programs such as their two Livable Centers Initiative studies (combined into a single plan in December 2010), urban design guidelines, transportation plans or projects (including paving and streetscaping), and community development activities of the Main Street Board. The city also enacted a tax allocation district (TAD) for the former Ford site, which allocates all additional property tax revenue for investment in the project area for a fixed period of time. City services offered by Hapeville include general administration, a City Manager who is charged with effectively implementing policies, code enforcement, community services (water, sanitation, etc.), economic development and redevelopment, emergency medical services and fire prevention, planning and zoning, police, and recreational facilities and programs.

City of Atlanta. The eastern edge of the project site was located within Atlanta city limits. As a large city, Atlanta had especially complex zoning and permitting processes. Design and construction will be affected by Atlanta’s development plans, zoning, transportation plans and projects, public

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engagement process, and various ordinances. Additionally, the city purchased a southern portion of the site during the HIA.

Other Cities. The western edge of the study area includes small portions of the cities of East Point and College Park. Travelling from the Aerotropolis site to the airport entrance involves passing through College Park. Travelling from the Aerotropolis site to the closest MARTA station involves passing through East Point. The city of Forest Park overlaps the southeastern edge of the study area.

County governments. Fulton County and Clayton County have some controlling interest in the site. They permit and inspect some aspects of sanitation, food service licensing, emergency response, and other processes. The section of Clayton County closest to the site was unincorporated, giving the county additional responsibility for community services and transportation there. A small section of the project site was in unincorporated Clayton County.

Community and business associations. The six neighborhood associations of Hapeville, Southside Concerned Citizens, adjacent Atlanta Neighborhood Planning Units, the Airport Area Chamber of Commerce, and the Atlanta Air Cargo Association influence decisions through personal and professional relationships, moral right, and the potential to raise opposition or support for proposals.

Hartsfield Jackson Atlanta International Airport. The airport generally impacts development at the site through their operations. Aircraft movements, facilities management, and daily business operations shape the physical and economic environment in which the Aerotropolis Atlanta project was planned. The airport assesses certain impacts, such as noise and air quality, in accordance with FAA (Federal Aviation Administration) regulations.

Norfolk Southern. Responsible for design, operation, and maintenance of adjacent railroad tracks, which may influence site planning through noise, appearance, and limitations on travel in that direction.

Other developers. Nearby real estate development, in particular Asbury Park (being developed by InterCity Partners) could have a significant effect on the ability of Aerotropolis to connect to the surrounding community. The timing, design, and transportation impacts of other developments change the land use environment for which the project was designed.

Architects. Firms hired to design the Aerotropolis Atlanta site and nearby projects will partially shape the final form of this project. Past design concepts for the site – through Georgia Tech planning studios and planning renderings – could influence preferences for the final design.

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Atlanta Regional Commission (ARC). The ARC conducts region-wide planning. The site, and local city and county plans, may be impacted by transportation, land use, and human services plans created by ARC.

Georgia Department of Community Affairs (DCA). DCA reviewed the Development of Regional Impact (DRI) application and had some influence over local planning activities through incentive programs, training, and planning standards.

Georgia Department of Transportation (GDOT). GDOT controls state and interstate highways, including North Central Ave (US 19) and I-75 which run within a few hundred feet of the site and affect access. Exits from I-75 are located immediately adjacent to the Aerotropolis site and a short distance to the south. GDOT can also influence project funding, and are in turn steered by the state legislature and policies of the U.S. Department of Transportation.

Federal Aviation Administration (FAA). The FAA sets guidelines regarding land use in relationship to airports. These rules set some restrictions on development and landscaping.

Environmental protection agencies. The U.S. Environmental Protection Agency (EPA) and the Georgia Environmental Protection Division (EPD) have been involved in usage decisions for the Atlanta Aerotropolis site due to contamination that was present on the site. They had some authority over remediation and future uses.

Stakeholder Engagement

Introduction

The HIA team believed that input from stakeholders was essential to the success of the Health Impact Assessment. Researchers hoped to gain more information about local concerns, perceptions of sources of danger, and desired changes to the environment and daily life. They also hoped to learn more about the vision that local residents, business owners, and officials held for the area, and to ensure that the HIA addressed local priorities.

The Advisory Committee

The advisory committee was recruited to provide overall health impact assessment (HIA) project direction, component specific guidance and analytical expertise. The HIA team invited representatives from neighborhood associations and other community members, Hapeville city staff and city council, local business community leaders, and neighbors from the airport and the City of Atlanta, as well as the Clayton and Fulton county health departments. The Health Impact Assessment could not address every aspect of health or healthy community design. Therefore, it was necessary to establish priorities for the HIA based on community preferences.

The advisory committee was asked to assist at three key points during the HIA:

- During the scoping phase, in order to inform the HIA team about local issues and determines how to focus the appraisal on the highest-priority health impacts.
- During the data gathering and assessment phase, in order to plan for community feedback and to review the HIA team's initial assessment.
- After the HIA team had examined the results of the study and drawn up draft recommendations, in order to review these recommendations and develop an impact management strategy that was feasible and reflected the community's values.

Advisory Committee Members

- Bill Bailey, Community Representative
- Jan Bolien, President, Cofield Park
- Katrina Bradbury, President, Virginia Park
- Candace L. Byrd, City of Atlanta
- Scott Condra (proxy: Todd Addison), Jacoby Development
- LaVoria Green-Willis, President, Moreland Park
- Allan Hallman, Mayor, City of Hapeville
- Joel Harrell, Norfolk Southern Railroad
- Walter Howard, Environmental Health County Manager, Clayton County Board of Health
- Racquel Jackson, NPU Planner, City of Atlanta
- Kim Jones, Glenrose Heights Community Association

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- Jimmy Lovern, Councilman (1st Ward) City of Hapeville
- Clarice Mackie, Chairperson, NPU-Z
- David Maddox, President, Azalea Park
- Latoya Miller, US Environmental Protection Agency – Region 4
- Chris Montesinos, Planning and Zoning Manager, City of Hapeville
- Donna Mullins, President, Atlanta Air Cargo Association
- Richard Murray, Councilman at Large, City of Hapeville
- Tom Nissalke, Hartsfield-Jackson Atlanta International Airport
- Allie O'Brien, Main Street Manager, City of Hapeville
- Bill O'Brien, InterCiti Partners
- Hernan Quevedo, Parochial Vicar, Saint John the Evangelist Catholic Church
- Caleb Racicot, Tunnell-Spangler-Walsh and Associates
- Ann Ray, Alderman at Large, City of Hapeville & President, Airport Chamber of Commerce
- Monica Robinson, Fulton County Department of Health & Wellness
- Billy Slocumb, President, Northwoods
- Joyce Smith, Southside Concerned Citizens
- Pearlean Tyrell, Southside Concerned Citizens
- Scott VanDerbeck, President, Central Park & Development Authority Board
- Lew Valero, Councilman (2nd Ward) City of Hapeville
- Bill Werner, City Manager, City of Hapeville
- Jon West, Georgia Department of Community Affairs
- John Williams, Williams Residential Management

First Advisory Committee Meeting

An Advisory Committee, consisting of representatives from neighborhood associations and other community members, Hapeville city staff and city council, local business community leaders, and neighbors from the airport and the City of Atlanta, as well as the Clayton and Fulton county health departments, was recruited to provide overall health impact assessment (HIA) project direction, component-specific guidance, and analytical expertise. The first visioning and scoping Advisory Committee meeting was held on September 1, 2010. At the meeting, the Center for Quality Growth project team provided an overview of the Aerotropolis HIA process and the role of the Advisory Committee within that context. The goal of the meeting was to define a vision, identify opportunities and challenges, and establish priorities. Decisions made by meeting participants in this initial meeting guided the scope of research and policy recommendations for the entire project.

As a visioning exercise, participants were divided into three groups and asked a series of questions. The questions were designed to help participants creatively consider what infrastructure, services, and land uses needs should be incorporated in the Aerotropolis project to maximize health, safety, and opportunity. The visioning process helps the HIA team understand the underlying values and greatest needs in this area. Common themes that emerged from the process are listed below:

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- Attract quality retail, especially food markets.
- Connect comprehensively to adjacent areas, for all modes, in function and design.
- Enhance the existing community and stimulate future economic development and revitalization.
- Incorporate cultural and civic functions.
- Benefit the natural environment.

Next, participants were asked to identify both the existing opportunities in the community surrounding the Aerotropolis site and challenges that could hinder the implementation of the vision for the site and the community. Common sentiments were that Aerotropolis was an opportunity to “do it right” from the ground up – buildings, amenities, transportation, public space. Additionally, that if it is done right, it will be the physical and economic missing link for the surrounding communities; done wrong it could seriously harm the entire sub-region. Participants felt that the City of Hapeville and its citizens had a great deal of influence over the outcome; adjacent jurisdictions, communities, and agencies have significant influence as well. They felt that economic realities, physical barriers, environmental conditions, and an underdeveloped multimodal transportation network posed real challenges. Meeting participants identified a number of opportunities and challenges to be considered by the project team in the HIA process.

Meeting participants reviewed a list of potential priorities provided by the project team and were asked to provide additional missing community priority items. The project team then distributed a revised list of priorities that included the additional community added items. Meeting participants then ranked their priorities on a scale of 1 to 5. Access issues were deemed the highest priority, followed closely by factors that could weaken community ties. Differences in ranking illustrated the degree of consensus surrounding each issue. “Employment & Income” ranked most important with little disagreement. “Access to Goods and Services”, “Property Values and “Community Character” all received a large number of first place scores.

Comments about “Employment & Income” indicated an interest in job creation, in rebuilding the tax base, and in creating a community where people can live where they work. Comments on “Property Values” reinforced these concepts. Meanwhile, the comments made on “Access to Goods and Services” and “Connectivity” suggested that the area was underserved by retail, especially grocery stores, multimodal transportation, and recreational amenities, and that this was not only hurting current residents but also discouraging new residents and development from locating here.

During discussion, participants added 5 new topics: Wastewater, City Services, Micro-climate, Healthy Food, and Education. “City Services” refers to the high level of service currently provided by

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the City of Hapeville, from fire and police response to road maintenance and trash pickup, and supported by robust tax rates. “Micro-climate” refers to the localized ‘heat island’ phenomenon created in areas with extensive pavement and minimal vegetation. Participants also modified “Noise” to specifically indicate noise from the airport (“Noise/Airport”), “Water” to include stormwater runoff (“Water/Stormwater”), and “Crime” to include potential issues of airport security (“Crime/Security”).

As a final step, each individual was given 5 stickers to vote their priorities on the new list created by the Advisory Committee. The new list was posted. The results are shown in Table 3.

Table 3: Dot Ranking of Potential Impacts by Advisory Committee

Impact Sub-category	Impact Category	Votes
Property Values	Social and Environmental Sustainability	12
Access to Goods and Services	Equity and Access	10
City Services	Added by Committee	9
Unintentional Injury – Traffic & Transportation	Injury	8
Connectivity	Equity and Access	8
Employment & Income	Equity and Access	7
Crime/Security	Injury	6
Accessibility	Equity and Access	6
Physical Activity	Physical Activity	5
Community Character	Social and Environmental Sustainability	5
Noise/Airport	Environment	3
Emotional Wellbeing	Equity and Access	3
Education	Added by Committee	3
Air Quality	Environment	2
Water/Stormwater	Environment	2
Waste Water	Added by Committee	2
Brownfield Redevelopment	Environment	1
Community Interaction	Social and Environmental Sustainability	1
Healthy Food	Added by Committee	1
Microclimate	Added by Committee	0

Participants noted that typical “health” items did not get many votes. Participants felt that healthier behaviors will come naturally once other issues are addressed. For instance, a revitalized downtown and Aerotropolis area with multimodal connections would naturally lead to more walking and better

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access to healthy foods. Participants also expressed that other concerns – about retail, services, and economic development – were simply more pressing at the moment. Traffic safety had a fairly low ranking in the worksheet exercise, but scored fourth in the dots exercise. Crime and security also scored higher in the dots exercise. City services, a new issue added by the advisory committee, placed third, illustrating the critical importance of the advisory committee input.

Second Advisory Committee Meeting

The Aerotropolis Advisory Committee met a second time near the end of the scoping process. Participants reviewed a summary of the draft scope and discussed whether researchers' interpretation of the data and definition of the HIA scope seemed correct to those familiar with the community.

Members reviewed the health data and provided comments. The members felt that the heart disease statistics seemed accurate. Their other comments focused on the air quality issues that previously existed as a result of the Ford plant, and those that continue to exist due to the close proximity of the airport. The members also felt that the diversity of conditions found in the community would be reflected in the health data.

Members also discussed the impact of Aerotropolis on the health statistics. They were concerned that the project would only target airport travelers and other outsiders. Local residents expressed concerns that they would not gain from the benefits provided by the project. The residents felt that connectivity with other adjacent areas of the city was important, as well as connectivity with the airport. If the project provided connectivity, goods, and services that supported local residents, then it could have a positive impact on the overall community.

Members were asked to provide feedback on the structure and content of a community survey. They asked the research team to distribute the survey to existing organizations through a variety of methods. The content of the survey should gauge resident's preferences for the future which should then guide the development of the Aerotropolis project to reflect local community needs and desires.

Third Advisory Committee Meeting

A third meeting was scheduled for review of the draft HIA report with findings and recommendations.

This section to be updated following Advisory Committee meeting and comments.

Stakeholder Survey

Preparation and Response

Researchers prepared a survey about stakeholders' opinions of their community, their health, and the way their community might affect their health. The survey was provided in a printed and online format. Twenty-six individuals responded to the survey; all of them submitted their responses online. Nearly all of the respondents were college educated. Excluding those who did not answer the question, the majority of respondents identified themselves as Black or African American, and the predominant household income range was between \$50,000 and \$75,000. No respondents identified themselves as Hispanic, despite efforts to provide a Spanish-language version of the survey and to distribute this survey within the Latino community located within the study area. The most prevalent age range was 30-44 at 45%, with 30% identifying as 18-29 year olds, and 20% identifying as age 45-64.

Highlights of the Survey

Getting Around and Getting Active

- 76% of respondents disagreed with the statement “This community offers complete sidewalks and safe street crossings.” Of those who disagreed, all but two believed this had a negative effect on their health.
- Only one person felt that the area had a traffic problem.
- 76% would not feel safe riding a bicycle on local streets in the area. Of those, 68% agreed that this was having a negative effect on their health.
- 72% agreed that “Freight rail is a major presence here”; of those who agree with the statement, half felt this had a negative effect on their health.
- Only 28% felt they had multiple transportation options in the area.
- 36% agreed that they had destinations, such as parks or stores, within walking distance.

Safety and Security

- Respondents were divided on their feeling of safety in the community; and the majority of respondents felt that crime would have a negative impact on their health.
- 60% of respondents agreed that streets were well lit, and that this was good for health.

Social Connections

- About two thirds of respondents felt part of a community, felt there was a strong community identity and sense of shared values, and interacted regularly with others in the community.
- However, less than one third felt that there was a thriving business district, or that the area was appealing to young professionals.
- 91% of respondents agreed that some districts in the study area were unable to become successful due to their proximity to failing areas. Of those, half felt that this could have a negative impact on their health.

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- 70% of respondents considered the area diverse. Over half of all respondents agreed that diversity had a positive effect on their health.

Access and Opportunity

- 79% of respondents felt that they could not find healthy food in local stores and restaurants, and 72% agreed that this would have a negative effect on their health.
- 82% disagreed with the statement “This community has good schools”; 59% of all respondents thought this could have a negative effect on health.
- The majority of respondents were satisfied with availability of community services and health services, and with local prices.
- Only one third of respondents thought there were enough recreational opportunities in the area.

Economic Development

- Respondents felt that real estate in the area was affordable (94%) and that new development would boost property values (84%).
- However, respondents felt that jobs were scarce (95%); fewer than half felt that local jobs paid well or offered good benefits, or that the area was attractive to businesses.
- 100% of respondents felt that some residents in the community were having trouble getting by.

Nature and Environment

- The majority of respondents thought that the area was relatively quiet with clean water and soil, but about two thirds stated their community did not have clean air, and was not clean and attractive.

Management

- Most respondents had a favorable attitude about the influence of regional and state leadership (70%), local businesses (72%), proximity to the airport (94%), and their place in the Atlanta region (88%), but not about property maintenance (29%).
- 58% stated that poorly maintained property would have a negative effect on their health.
- 70% thought proximity to the airport was positive for their health.

Development and the Aerotropolis Project

- More than 85% of respondents thought that Aerotropolis, as planned, would bring more retail, higher property values, and community revitalization to the area, as well as more traffic. More than 80% felt that retail, rising property values, and revitalization would promote good health, but the impact of traffic evoked mixed reviews.
- More than a third of respondents were unsure or disagreed that Aerotropolis would be compatible with the existing community.
- 100% felt that shuttle services provided by Aerotropolis would improve their transportation options, which 82% thought would improve their health.

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- 82% felt a commuter rail station in the community would improve their transportation options. 70% of respondents thought this would be positive for their health, and none expected negative impacts.
- The majority of respondents thought the new International Terminal at the airport would increase traffic, but they were unsure whether it could provide any revitalization or transportation benefits to the local community. 29% worried that increased traffic could have a negative effect on their health.

Respondents were given an open-ended request to list the three things that were most important to their health in the community, out of all of the topics addressed earlier in the survey. For their first choice, the majority of respondents identified safety or access. “Safety” or “safety and security” was listed by some, while one person specified lighting and sidewalks in his or her description of safety features. Respondents who listed access-related elements specified that they needed access to restaurants, stores, grocery stores, parks and open space, fitness sites, and healthcare. Clean air and more transportation choices were also selected. For their second choice, the list included several selections of walkways, public transit, and bicycle lanes; more interest in stores, parks, and healthy food sources; clean air; and requests for better public services such as schools, crime control, and community centers. These points were reiterated in the third choice, with the addition of economic development, recreational opportunities, and noise control.

Finally, respondents were asked to provide their definition of health. These definitions addressed physical health, but nearly all added aspects of mental and spiritual health, freedom from fear and stress, or access to an environment that provides the resources for a healthy lifestyle.

Stakeholder Summary

Area stakeholders have a diverse range of identities and interests. Impacts on businesses, industry, and residents from all backgrounds and socioeconomic identities are under consideration. These diverse interests form a cohesive community and ultimately appear to be interdependent and to depend on Aerotropolis for success. The Aerotropolis development may be the economic linchpin for the study area, bringing in necessary services and allowing the area to share in the prosperity of the airport. It may be one of the most significant opportunities for the study area to address the health and quality of life challenges identified by the advisory committee.

According to stakeholders, tax revenue, economic stability, connectivity, and availability of public and commercial services must be present in order to create a safe, walkable, interactive community with access to jobs and education, access to healthy food, and a strong sense of social support – things which the health data analysis found lacking in some or all of the study area. As a result of stakeholder participation, greater emphasis was placed on societal and fiscal impacts.

Methodology

Connecting Environmental and Policy Determinants with Health

Based on the community demographic and health profile and input from community representatives, the following environmental and policy factors were assessed: connectivity, trip generation and mode share, traffic safety, multimodal level of service, access to retail, access to jobs, community revitalization, social capital, traffic emissions, brownfields, and noise, as well as some overarching issues such as management of the project and governance of the airport area. In addition to assessing demographic data, public health data, stakeholder preferences, and health determinants literature, several evaluative tools were utilized. A Healthy Places Audit was conducted to assess current policies and ordinances in the context of health promotion. In addition, the research team conducted a latent travel demand analysis of bicycle and pedestrian needs, and conducted a walkability audit of the study area. These data sources and analysis tools serve to assess current conditions in the study area, as well as potential positive and negative health impacts arising from the Aerotropolis redevelopment project. These analyses are outlined in the following topic area sections.

Healthy Places Audit

The purpose of a “Healthy Places Audit” is to compare the actual laws and policies that create the built environment against their potential for achieving the conditions to support good health. While the purpose of any municipal ordinance is generally to promote health, safety, and welfare, it would be rare to find a set of intentionally evidence-based ordinances. The Healthy Places Audit seeks to compare existing ordinances and executable plan elements against the health objectives and evidence uncovered through this Health impact Assessment.

This audit will focus on key health determinants which can be influenced by municipal codes and plans. It evaluates the healthy places goals established in the scoping phases. The audit evaluates the City of Hapeville, the City of Atlanta, and Clayton County. Transportation projects programmed by the Atlanta Regional Commission or the Georgia Department of Transportation are noted but not audited as a complete system of plans and policies (see the Plan 2040 HIA). City of East Point plans and codes are considered on selected questions where they might affect the character of major corridors or destinations. Fulton County does not conduct planning for its incorporated areas and thus does not factor significantly in the study area.

A healthy, effective transportation system offers more than one safe, convenient, and pleasant mode of travel for most trips. Community health improves when the majority of trips are made by walking,

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bicycling, and transit. These modes are correlated with higher levels of physical activity, reduced household transportation expense, and reduced emissions. Travel on bus and rail transit is much safer than other ground transport modes, while increased rates of walking and cycling are associated with reduced injury crash rates for all modes. Walkable and cyclable activity nodes with increased intensity of use can constitute good locations for transit service. This section of the audit asks whether plans and ordinances related to zoning, subdivision, transportation, enforcement and other selected issues are conducive to creating good conditions for multimodal travel.

During the walkability audit, the HIA team found many instances near the Aerotropolis development where sidewalks were absent, of inadequate design, or poorly maintained. The team also noted large gaps between walking destinations and uncomfortable traffic situations. Safe and attractive walking conditions are essential for reducing injury and for inviting visitors and residents to walk rather than drive. As described elsewhere, walkable streets also promote economic development and a sense of community.

Codes and Plans Referenced:

- City of Hapeville Code of Ordinances: http://library2.municode.com/default-test/home.htm?infobase=12355&doc_action=whatsnew
- City of Atlanta Code of Ordinances: <http://library.municode.com/index.aspx?clientId=10376&stateId=10&stateName=Georgia>
- Clayton County Code of Ordinances: <http://library.municode.com/index.aspx?clientId=10562&stateId=10&stateName=Georgia>
- East Point: <http://library.municode.com/index.aspx?nomobile=1&clientId=10677>
- Hapeville Ford Plant Redevelopment DRI# 1778: Development of Regional Impact Transportation Analysis
- Plan Hapeville 2025
- Hapeville Main Street Town Center LCI - December 19, 2005
- Virginia Avenue LCI (now combined with Main Street LCI)
- Hapeville Economic Development Outlook 2008
- Atlanta Strategic Action Plan 2008
- City of Atlanta Connect Atlanta Plan Transportation Action Plan
- City of Atlanta NPU-Z Redevelopment Plan 2007
- Clayton County Comprehensive Plan 2005 – 2025
- City of Forest Park Comprehensive Plan 2005 – 2025
- East Point Plan Update

Latent Demand Scores

The existing and proposed mix of land uses and associated street network in the Aerotropolis development project will influence the accessibility, desirability, and feasibility of active modes of transportation. If an active transportation mode such as walking or cycling is truly a viable choice in the built environment, then individuals are more likely to use these travel methods and therefore incorporate physical activity into their daily routine. This behavioral change has been shown to prevent or reduce the occurrence of numerous diseases. Development strategies which increase the availability of active transportation modes should be considered when design decisions are made regarding land use and street type in the Aerotropolis project. The probability of the use of alternative modes of transportation can be modeled to determine exactly how the new development will influence pedestrian and cycling demand using the Latent Demand Score (LDS). The Latent Demand Score (LDS) is a GIS based analysis which was applied to determine latent, or potential, demand for bicycling and walking on the existing road network in the study area.¹

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. To calculate the score, researchers first identified the existing land uses in the study area. The land uses were then assigned a standardized trip generation rate based on the attractiveness of the destination, using the Institute of Transportation Engineers' *Trip Generation Manual* (6th Edition, 2003). These trip generation rates represent the decision to travel for a given purpose. Once the average number of trips was calculated for each land use, the uses were categorized into broad groups. Next, employee counts for retail and non-retail business locations were obtained from available commercial sources, which were used to identify activity clusters. The employee activity nodes were spatially located using GIS within the study area along with the land use nodes categorized into the following primary categories: school, work, recreation, or shopping.

Once the major land use attractors and nodes were determined, spatial buffers in 0.5 mile increments up to 1.5 miles were created around each attractor. Scores were calculated based on the numerical assignment for each land use type, as well as and the estimation of trips generated by each land use cluster. The total building square footage of each node was also incorporated into the

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

score. All these inputs were combined to determine the probability of travel to each cluster according to type and distance. The results are shown in the following table.

Table 4: Probability of walking and biking by land use and distance

Trip Attractor Type	Mode	Travel Mode Probability (Scale 0 – 1)		
		Miles from Attractor		
		0.5	1.0	1.5
Parks/Recreation	Walking	.62	.36	.21
	Biking	.28	.23	.20
School	Walking	.69	.34	.17
	Biking	.36	.29	.23
Employment	Walking	.71	.32	.15
	Biking	.28	.24	.20
Shopping	Walking	.72	.32	.14
	Biking	.29	.25	.21

As can be seen in Table 4, the probability of an individual walking or biking to their destination decreases as travel distance increases. The activities with the highest probability of an active mode of transport include walking to employment or shopping destinations within a half mile of a trip origin. While these findings are not surprising, they do reinforce the concept that locating trip destinations, especially employment and shopping destinations, in close proximity to trip origins will likely result in the majority of trips to that location being made on foot.

Next, the buffers were overlaid on the existing road system. Each road in the system was divided into individual segments split by intersections. For each segment, the sum of each type of attractor that is within 0.5 mile, 1 mile, and 1.5 miles was calculated. These sums were input into the LDS equation, along with the trip probabilities (Table 4) to calculate a score for each individual road segment. Then the road segment LDS were compiled into separate area-wide maps for bicycle and pedestrian latent demand. The initial attractors were mapped and scored for the existing condition; that is, without any development on the Aerotropolis site. The road segment LDS as it currently exists for pedestrians is shown in Figure 23: Pedestrian Latent Demand Score- Before Aerotropolis. The road segment LDS as it currently exists for bicycles is shown in Figure 24: Bicycle Latent Demand Score- Before Aerotropolis.

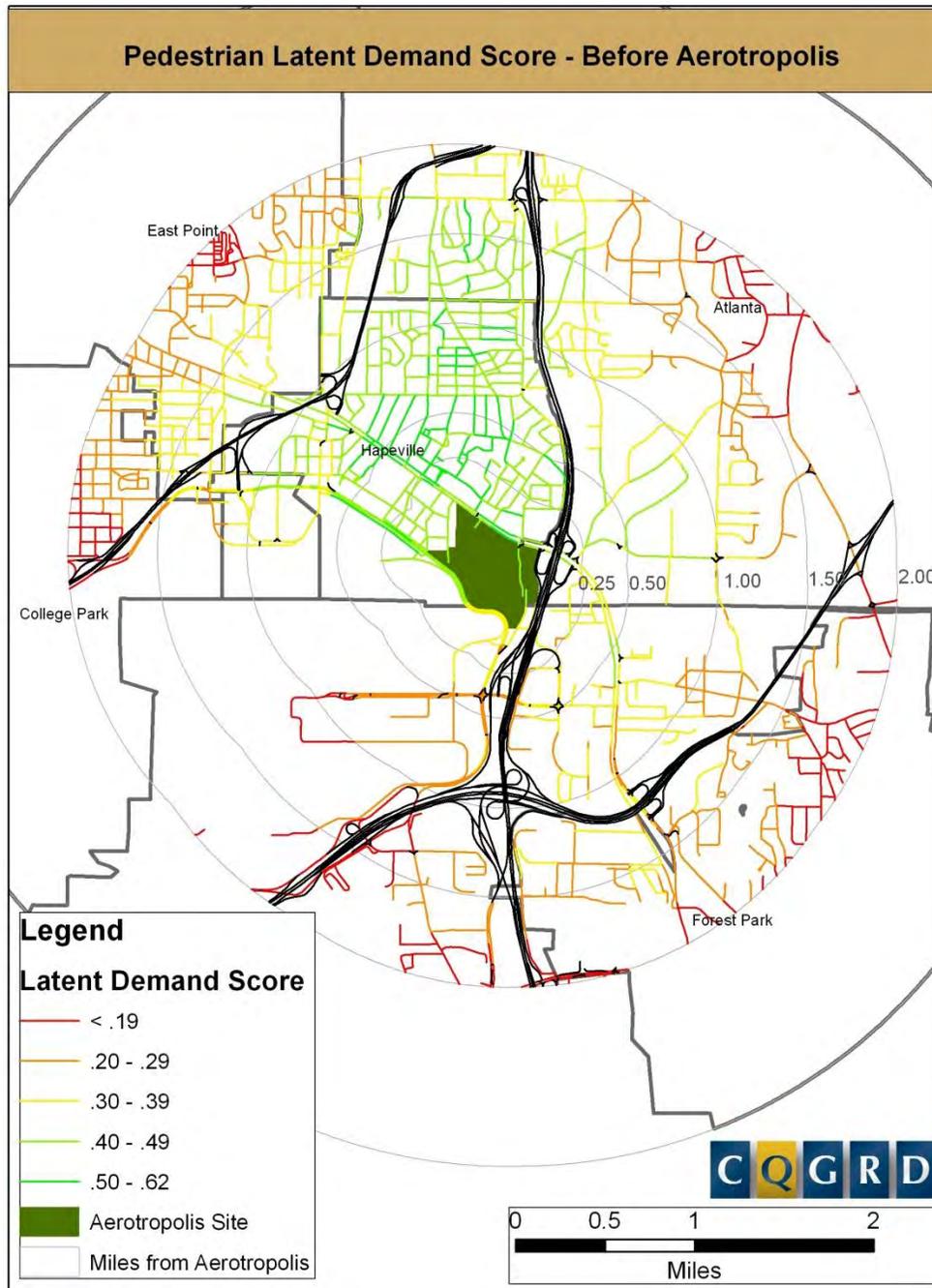


Figure 23: Pedestrian Latent Demand Score- Before Aerotropolis

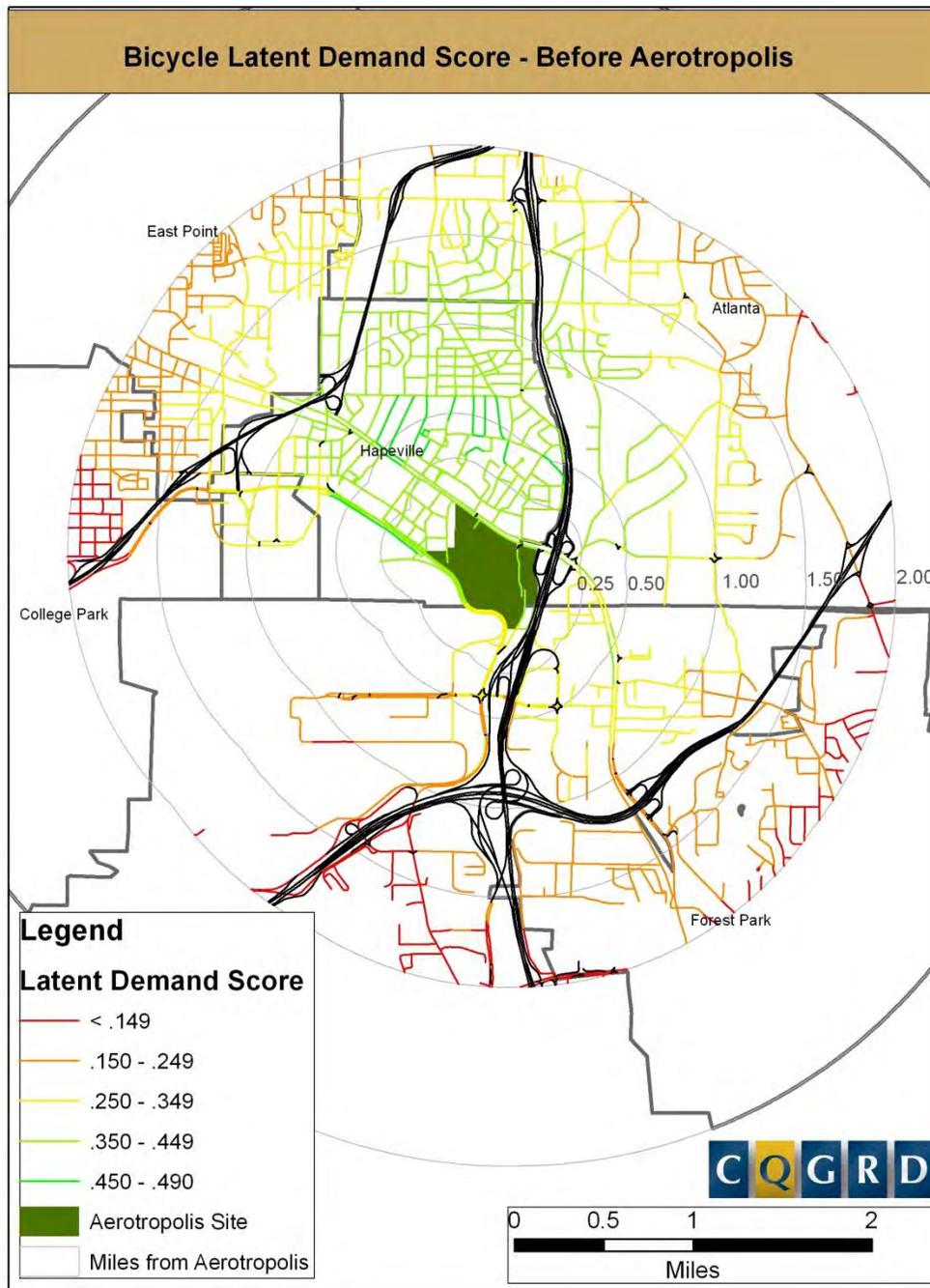


Figure 24: Bicycle Latent Demand Score- Before Aerotropolis

Next, locations and scores were recalculated to include the new employment and shopping estimates proposed for the Aerotropolis development. Trip generation estimates were based on the Development of Regional Impact study, but divided in half due to market conditions in concordance with the developer’s revised projections.

Table 5: Gross Trip Generation

DRI: Gross Trip Generation									
Land Use	ITE Code	Daily Traffic		AM Peak Hour		PM Peak Hour		Saturday MD	
		Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
Build-Out (Year 2020)									
Data Center (Utilities)	170	1,900	1,900	220	180	171	209	37	31
Hotel	310	6,258	6,258	681	435	451	399	664	589
Office	710	6,907	6,907	1,872	255	410	2,000	233	199
Retail	820	21,101	21,101	515	330	1,920	2,081	2,797	2,582
Convention Center	N/A	9,114	9,114	439	237	194	2,227	194	2,227
Airport Parking Lot	N/A	1,225	1,225	238	27	142	194	148	80
Total		46,505	46,505	3,965	1,464	3,288	7,110	4,073	5,708

The revised road segment LDS were again compiled into separate area-wide maps specific to bicycle and pedestrian latent demand. The road segment LDS as it currently exists for pedestrians is shown in Figure 25: Pedestrian Latent Demand Score - Including Aerotropolis. The road segment LDS as it currently exists for bicycles is shown on Figure 26: Bicycle Latent Demand Score - Including Aerotropolis. These maps clearly illustrate the projected impact that the Aerotropolis development will have on active travel demand.

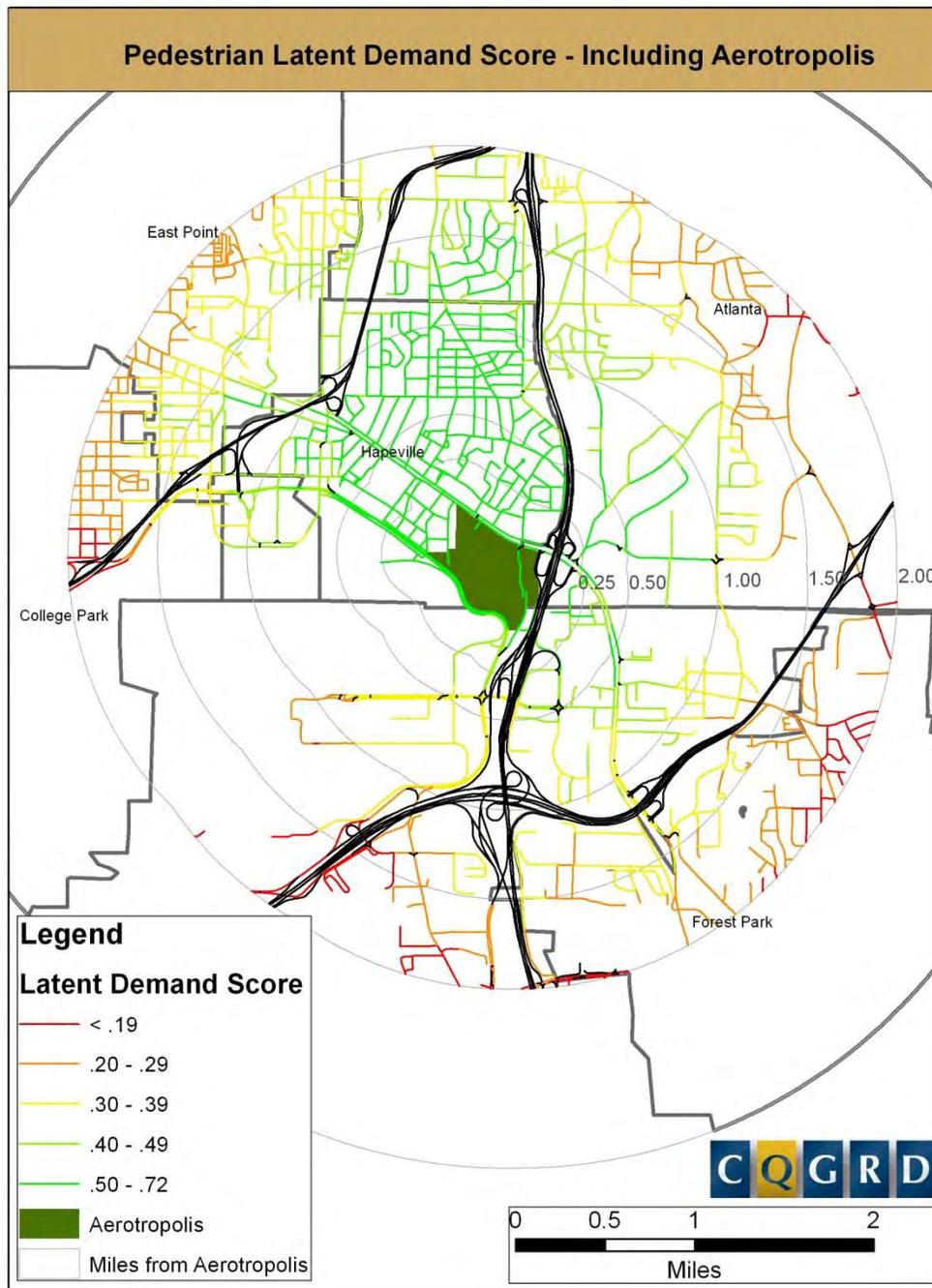


Figure 25: Pedestrian Latent Demand Score - Including Aerotropolis

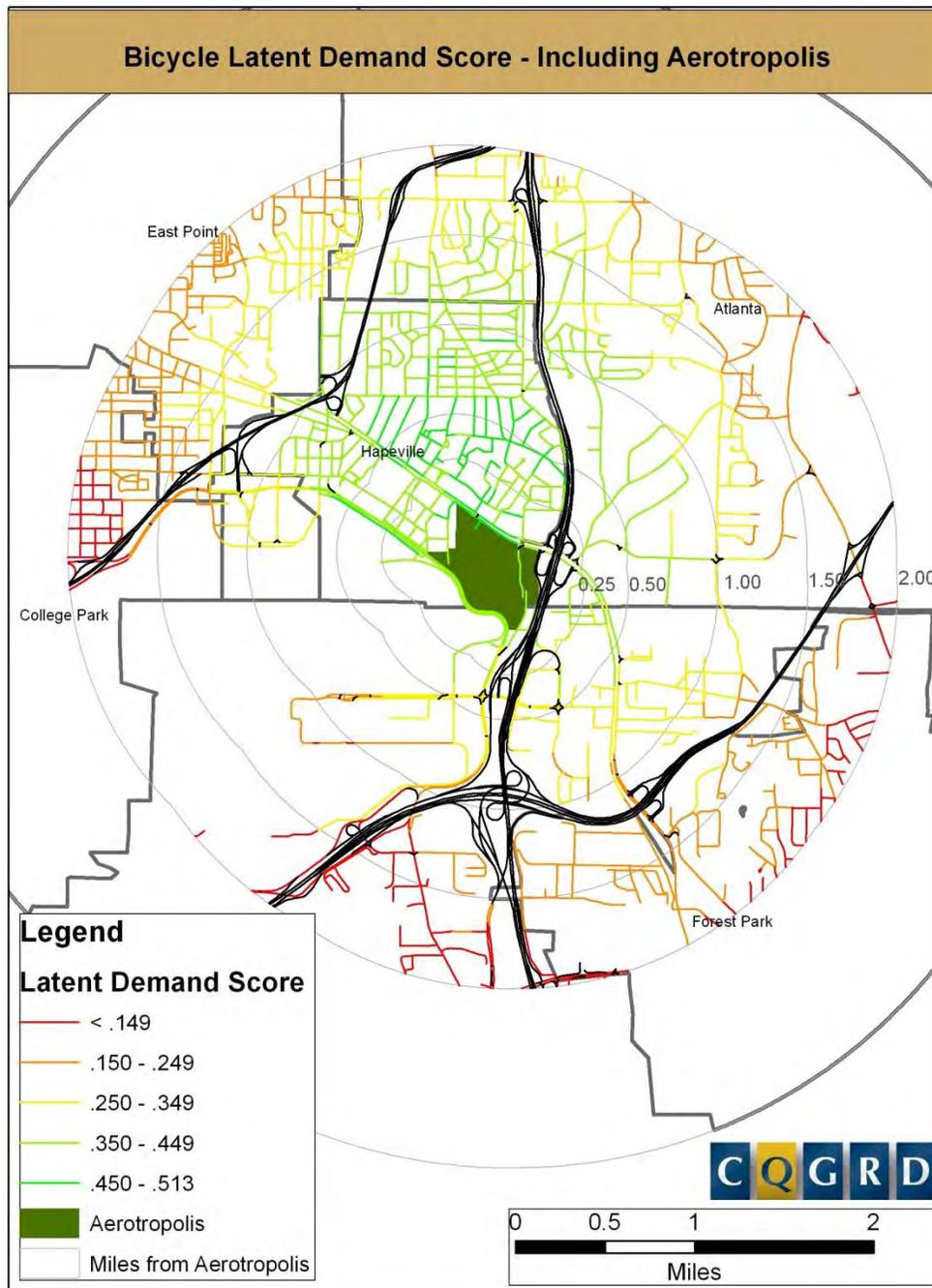


Figure 26: Bicycle Latent Demand Score - Including Aerotropolis

The analysis suggests that Aerotropolis will have a very large effect on latent pedestrian demand, meaning the number of people who would walk to the site if desirable walking conditions were provided. The change from the baseline to the Aerotropolis scenario is significant, representing scores with an above 0.5 increase. The probability of pedestrian activity increases from the current level of a few central streets to nearly the entire city of Hapeville. The projected increase in demand also extends beyond the city limits along several corridors towards the office and industrial parks to the east. Demand for walking trips also increases significantly towards the airport. Bicycle demand appears to increase along North Central and South Central/Henry Ford II Avenues. From this, it is possible to conclude that bicycle and pedestrian infrastructure will become considerably more important with the development of the Aerotropolis project.

Walkability Audit

Members of the community who live and work around the Aerotropolis site have expressed considerable interest in having a walkable, interconnected city where daily amenities and social activities can be accessed without a car. As part of this Health Impact Assessment, the research team conducted a “Walkability Audit” to determine how suitable the existing streets are for foot travel, and how policy changes could improve conditions.

A large number of studies limit their measures of the environment to data that are readily available and comparable across US locations through secondary sources, such as the U.S. Census Bureau (Crane, 1996; Berrigan and Troiano, 2002). These generally consist of measures of population or employment density, land use mix calculated by residential to employment ratios, and street network connectivity from street network files at some aggregate spatial unit such as zip code areas, traffic analysis zones, census tracts or block groups. Geographic information systems (GIS) now permit these land use and urban form variables to be computed at more disaggregate spatial units, such as buffer zones around an individual residence or destination, calculated at some radial distance (either straight line or network) from the location of interest. Despite these advances, it is likely the micro-features in the environment that largely shape how accommodating an area is for pedestrian travel. Because of the slow speed and nature of walking, a pedestrian is typically much more aware of and exposed to the environment than a driver. These features are likely to be important in determining behavioral patterns, but are rarely ascertained because of the difficulty in acquiring and accessing these data (Talen, 2002). For these reasons, the HIA team conducted a “walkability audit” of the study area to get a personal feel of what it is like to be a pedestrian in the neighborhood.



Figure 27: Sidewalks, crosswalks, benches, landscaping, traffic, and adjacent buildings all factored into the audit

A walkability audit was completed on the afternoon of Friday, April 8, 2011. The study used the audit instrument referred to as the Pedestrian Environmental Data Scan (PEDS). PEDS was designed to capture a range of elements of the built and natural environment efficiently and reliably. The audit instrument includes a checklist of ranking criteria, as well as a detailed description of audit protocol. The full audit tool used is located in the appendix. Each audit item was designed to assess individual elements of the built and natural environment with respect to pedestrian activity. Audit items include sections on the macro-scale environment, pedestrian facilities, road attributes, and the micro-scale features of the walking/cycling environment. In recognition that the overall quality of the walking (and cycling) environment may not be adequately reflected by the sum of the individual parts, four subjective evaluation items were added as a separate section to rate the environment as a whole.

The PEDS form prompted for characteristics that affect walkability, including sidewalk condition and quality, presence of a planting or furniture zone to buffer the walkway from the roadway, traffic volume, presence of traffic control devices and pedestrian crossing treatments, amenities such as benches and lighting, and driveways. It also measured key land use indicators, such as building frontage along the sidewalk, architectural interest of adjacent structures, and presence of parking

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lots. An additional metric, noise, was added to the audit sheets in this study. Auditors noted significant differences in the quality of the pedestrian environment related to levels exposure to noise from airplanes, trucks, trains, and heavy traffic, which varied throughout the audit area. The audit was conducted on a weekday afternoon with temperatures in the mid-80s, high humidity, and partly cloudy sky cover.

The results of the walkability audit indicated that the area around Aerotropolis would not support walkability without targeted effort from Hapeville, Atlanta, and the state of Georgia. Hapeville was already undertaking pedestrian and streetscape projects on Doug Davis Drive, Virginia Ave, and North Fulton Ave. They had also been awarded a grant to conduct a bicycle and pedestrian study. However, it would likely take careful and consistent investment, as well as the changes described in the Healthy Places Audit, to make walking a safe and pleasant option for intown trips.

Many local streets had a 25 MPH limit, which provided actual and perceived safety for walkers and promoted walkability in those residential and retail areas. However, higher speed limits on major roads could create barriers between different parts of town for longer walking trips. This could be particularly important around Aerotropolis, which is located between 45 MPH Loop Road and 35 MPH South Central/Henry Ford II Ave, and close to the 35 MPH section of North Central Ave. It appeared unlikely that people would choose walk along or across these streets to visit Aerotropolis (or to walk from Aerotropolis to visit local stores and restaurants) without targeted investment in pedestrian facilities, streetscape, and pedestrian-friendly traffic operations (e.g. speed zones, narrowed lanes and turn radii and capacity optimization). The Latent Demand Scores offer more guidance on priority pedestrian streets.

Access management was the other element that affected overall walkability. Frequent driveways and extensive parking infrastructure interfered with the quality and safety of the roadside environment. This was observed along the southern end of Atlanta Ave., along North Central Ave. from Dearborn Pl. to Browns Mill Rd., and in some areas of South Central Ave. and College St. Centralized parking accessed by a rear alley or a restricted number of driveways would leave pedestrians with an undisrupted walking environment. In areas with extensive freight movement, auditors felt there could be high risk of conflicts between trucks and pedestrians, and a resulting perception of unsuitable walking conditions, especially for children and senior citizens.

Wide sidewalks enclosed by interesting building façades, crosswalks, and attractive landscaping at North Central Ave. and South Central Ave. near Fulton Ave. contributed to a positive pedestrian environment and could be a factor in the success of businesses along this short section. Elsewhere,

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gaps were identified in building enclosure of sidewalks in the audit area, created by vacant sites, parking lots, and low-quality pedestrian environments, and resulted in negative scores on the audit. Wide right-of-way on certain streets, such as King Arnold St, created opportunities to install wider sidewalks and attractive planting/furniture zones. Long blocks, also on King Arnold St. and near I-75, made these segments feel much longer than they were. Long blocks were also created by large land use complexes such as the Wells Fargo campus, utilities, and transportation facilities such as the Interstates and railroads.

The audit also provided some information about conditions for bicycling. Bicycling can be an effective way to accommodate trips longer than half a mile without exacerbating traffic volume, noise, or emissions. It provides similar physical activity and social interaction benefits as walking, but also depends on the presence of safe and attractive facilities. No bicycle facilities were observed anywhere in the audit area, although the audit team rated most of the residential areas appropriate for riding a bicycle. Several people were observed riding bicycles, on Oak St., King Arnold St., and South Central Ave. The rider on South Central Ave., a woman, was observed illegally riding on the sidewalk, which supports conclusions that demand for safe bicycling conditions is not being met by the existing road design.

Mapping Access

Geographic Information Systems were used to locate features, assets, and hazards and to estimate community exposure to them. 2010 Claritas Business Point data supplied the location of local businesses, including food stores, restaurants, medical facilities, retail sites in general, and non-retail employment sites in general. Business data was subsequently used to evaluate the quantity and distribution of these services and employment opportunities. It was also used in the Latent Demand Score analysis, to map destinations. Motor vehicle crash data was obtained from the Georgia Department of Transportation and used to map the location of all crashes, injury crashes, and fatal crash sites in the study area. Files containing the alignment and features of the street network were obtained from the Atlanta Regional Commission and from the Center for GIS at Georgia Tech, and used in calculating measures of connectivity, such as intersection density and block size, and in conducting the Latent Demand Score analysis. Specific maps and their interpretation are presented throughout the report.

Literature Review Purpose and Procedure

The purpose of a literature review is to summarize established correlations between a particular policy or environment and a particular health status or behavior, and any evidence-based ways to improve/change the health outcomes. Health status means measurable symptom or disorder, such

as a blood pressure reading, hospitalization for heart disease, a visit to the ER for asthma attack, or self-reported height and weight that constitute body mass index (BMI). Health behavior means any sort of action (or inaction), and the underlying knowledge, capacity, or beliefs that lead to those actions, that a person makes that is known to affect their health, such as self-reported number of daily servings of fruits and vegetables, amount of physical activity as reported or measured (for instance, by a pedometer), tested knowledge of skin cancer prevention, etc.

Researchers reviewed evidence collected in our previous HIA work, and added a review of recent articles from health-specific or health-inclusive research databases in addition to ones oriented to planning/policy research. They checked the reference list of the articles they find for other relevant sources. Peer-reviewed literature was used whenever possible, although government documents that have been through an agency review were also accepted. Third-party reports, dissertations, or conference proceedings were occasionally used to identify ideas, but not as solid evidence.

It takes a large body of research to reliably establish correlation. HIA should only make assertions that are supported by multiple studies that generally agree with each other in their conclusions. In order to make environmental and policy conditions and health outcomes into a testable hypothesis, the investigators have to select a few limited indicators to measure. They are generally prohibited for both ethical and budgetary reasons from conducting the randomized, controlled trials and prospective cohort studies that establish causality. Thus it takes many iterations of similar research projects, new natural experiments, and ongoing peer review to create a sufficiently robust body of research on a particular hypothesized association. If there was a considerable body of research with strong agreement in its conclusions, or if there was a meta-analysis or thorough review of existing studies, researchers could make fairly firm conclusions about the association between environment/policy and health. They reported the dominant methodologies and common conclusions, and noted any major areas of disagreement and gaps in the research/limitations.

Recommendations

The final product of an HIA is a set of evidence-based recommendations intended to inform decision-makers and the general public about the health-related issues associated with the project. The fourth step of HIA, development of practical recommendations, is critical as to whether the decision-makers will consider the results of the HIA in their decisions. The recommendations provide practical solutions that seek to magnify positive health impacts and remove or minimize negative impacts, for the current project and to set future policies. Decision-makers are encouraged to choose to implement the recommendations in their work.

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Effective HIA involves a collaboration between public health researchers, public officials and decision-makers, and subject matter experts (specific to the type of project, plan, or policy under consideration). A successful HIA

- Provides information in a clear and transparent way for decision makers and stakeholders.
- Creates a new avenue for stakeholder engagement and dialogue.
- Raises awareness of the relationship between health and projects/policies/programs.
- Provides guidance to improve and maintain the health and reduce health inequalities.
- At its best, an HIA leads to better informed decisions that take health impacts into account.

Aerotropolis Site Plan Review

Established by the Georgia Planning Act of 1989, the Development of Regional Impact (DRI) is a development review process to assess developments that create impacts beyond their local jurisdictions. The DRI review can be “triggered” by an application for a building permit or re-zoning in the early development review (Georgia Department of Community Affairs 2009). The Hapeville Aerotropolis redevelopment completed a non-expedited DRI process with review from the Atlanta Regional Commission (ARC) and GRTA. The developer also commissioned a study to assess the anticipated traffic impacts of the redevelopment, as well as impacts on land-use and regional mobility (Kimley-Horn and Associates 2008).

Through the DRI process, the relevant regional commissions (in this case, the Atlanta Regional Commission) assesses whether the project is in the “best interest” of the state of Georgia through an analysis of local impacts, consistency with regional planning, and adherence to quality growth standards. After the DRI review, the regional commission issues their finding of whether the development is in the state’s “best interest” and makes recommendations to the local government (Atlanta Regional Commission 2010).

ARC’s DRI review of the Ford Plant Redevelopment concluded that the development was “in the best interest of the region and therefore of the state.” The ARC further commented that the development was consistent with regional planning objectives. During the review process, MARTA advocated for heavy rail connectivity to Hapeville and additional pedestrian improvements. In their comments, ARC stated that transit and transportation agencies should coordinate to devise an appropriate transit solution for the study area. As to the issue of affordable housing, ARC’s preliminary report states that the development will not create demand for housing, and that the provision of affordable housing is likely if the development approves housing of various price levels (ARC 2008).

Additionally, DRIs within the Georgia Regional Transportation Authority’s 13-county jurisdiction are subject to a separate DRI review to determine approval of state and federal transportation funding. GRTA’s DRI review process considers the development’s consistency with regional transportation planning and federal air quality standards. In addition, the outcome of the GRTA review determines whether the agency will approve allocation of state and federal transportation funds to the development (Georgia Regional Transportation Authority 2008a). GRTA DRI review concluded that the development was approved for transportation funding, subject to certain conditions. In addition to a variety of roadway improvements (such as adding turn lanes, re-striping and signalization at intersection), GRTA requires additional pedestrian infrastructure (including crosswalks at all

intersections, and sidewalks on both sides of internal roads and selected property frontage) as well as bike parking facilities (GRTA 2008b).

Bicycle and Pedestrian Facilities

The DRI traffic study states that pedestrian access between internal destinations will be provided. The site is large enough that physical activity could be increased for a site user (employees, hotel guests) if walking or bicycling to other on-site locations is convenient. This effect may be enhanced if parking is mostly centralized in a few locations and streetscapes use recommended design. However, residents, workers, and visitors near Aerotropolis but not on-site may not benefit unless the minimum level of connectivity is provided between the site and adjacent areas.

The Aerotropolis site plan as included in the DRI, and shown in Figure 28, depicts blocks A, B, C, D, and F as small blocks that promote connectivity. Blocks E and G are larger, and while exact dimensions cannot be determined from the plan as shown the size may exceed recommended block size. The street stubs left to the north and south of block A will be useful for future restoration of connectivity with Elm Street or with future conversion of the rail spur to carry pedestrian and bicycle traffic. One four-way intersection is created by the redevelopment. The block including J, K, and L is extremely large and results in a much longer connection to employment centers on Aviation Blvd and the future International Terminal.



Figure 28. Excerpt of site plan rendering. Credit Jacoby Development Inc. and Thompson, Ventulett, Stainback & Associates (TVS)

Consistent with GRTA's stipulations, it is recommended that the redevelopment include improved pedestrian and bike infrastructure. Although the traffic study mentions the provision of pedestrian access, specific recommendations for much-needed sidewalk construction or repair along connecting streets are not included. The study does not identify places where pedestrian crossings, signals, or refuges are needed. Safety treatments such as traffic calming are not mentioned in the study. The traffic study suggests several dozen transportation projects which would increase vehicular capacity but may degrade the pedestrian environment. Four to six lane streets with extensive turning traffic can be intimidating to pedestrians, as well as dangerous. Signalized or not, large streets tend to add significant delay to walking trips. Multiple turn lanes can be highly

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dangerous for bicycle riders, as evidenced by several recent cases in the Atlanta region. Free-flowing turn lanes should be avoided as they create a highly unsafe and intimidating environment for walking or riding a bicycle.

The study additionally does not consider potential bicycle/ motor vehicle conflicts and bicycle operations, or to identify places where bicycle signals, lanes, or paths are needed. The study does not answer whether the bikeable shoulders on Loop Road will be preserved. The study also does not include bicycle or pedestrian traffic counts, which would be useful to determine the appropriate level of service for non-motorized transportation in the study area.

In order to improve pedestrian use in the redevelopment area, it is recommended:

- Consistent with GRTA's conditions, it is necessary to provide safe crossings and access points for pedestrians on both sides of the street throughout the redevelopment area.
- Wrapping retail along the edges of the major parking structures (L and K) would connect the development through to nearby employment and retail centers and enhance pedestrian level of service.
- Convoy Road/Leslie Drive should take a more direct route along storefronts; use side streets or alleys to connect motorists to parking areas, and trucks to delivery areas.
- The block between driveways 2 and 3 is too long – consider adding pedestrian archway through middle of E block or dividing into two or more blocks.
- Add north-south pedestrian route through J block aligned with Lavista Street.
- Ensure pleasant and safe pedestrian routes along the northern and southern edges of the airport parking facility, so that walkers and joggers from Loop Road can access K4-5-6 without excessive detours.

Traffic and Transportation

Jacoby Development also conducted a traffic analysis in 2008 for their DRI review application. This analysis found traffic on Henry Ford II Ave was around 600 vehicles per hour at peak demand and Airport Loop Rd was around 2000 vehicles per hour at peak. No pedestrian counts, bicycle counts, or mode share studies were identified. The DRI indicates trip generation rates derived from standard ITE Trip Generation Handbook figures based on a 500,000 sq. ft. data center (utilities), 1,440 hotel rooms, 2,081,400 sq. ft. of general office, 1,662,000 sq. ft. of shopping center, a 980,000 sq. ft. convention center, and 4,000 airport parking spaces. However, market forces have scaled back the site plans since the DRI was approved, and JDI anticipates building about half of the office, shopping, and hotel space (personal communication).

Trip generation rates have been disputed by some research for several reasons, including insufficient data for the given land use or regional transportation propensities, and lack of

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information for trips by modes other than private motor vehicle (Shoup 2005). Additionally, VMT trends have deviated from projections in the past decade, calling into question the standard growth rates for traffic volume. Table 6 on page 97 and Table 7 on page 97 show trip generation figures as calculated for the DRI study. These rates may be reduced by half due to more recent market conditions.

'Growth' rates for motorized traffic now appear to be less consistent than in past decades. In Georgia, VMT growth was -0.4% in April 2010 over the previous year. While VMT does appear to be linked to economic activity, declines in the rate of change began as early as 2003 when the economy was still growing strongly (. Rising gas prices, better transportation alternatives, and growing preferences for reduced driving suggest that the term 'change rate' should be substituted and those rates may need to be revised. These rates could be entirely flexible based on changes in bicycling and walking conditions and transit service. While it may be standard, designating an entire hour as peak may not reflect a reality in which motorized traffic could be heavy for several hours or for much less than an hour. Stakeholder input did not indicate that traffic congestion was a concern.

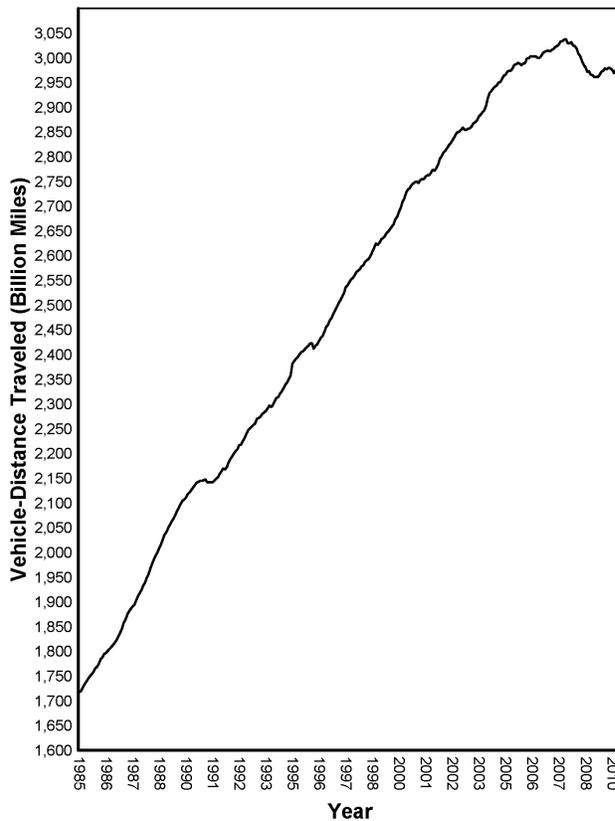


Figure 29: Moving 12-Month Vehicle Miles Traveled Total on All Roads (U.S. Department of Transportation)

Health Impact Assessment (HIA)
on the Aerotropolis Atlanta Brownfield
Redevelopment Project

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Motor vehicle parking provisions exceed requirements in spite of the potential for a considerable share of trips to be made by walking, bicycle, and bus/shuttle. Research suggests that parking generation rates are much less accurate than expected and should not be used for calculating parking demand (Shoup 2005). Parking generation rates may also be used in conjunction with travel demand management and parking demand management.

The DRI traffic study provided some information about transit, bicycle, and pedestrian facilities or services and their current mode share. The trip generation rates were reduced due to estimates of mixed-use internal capture/shared trips and pedestrian, bicycle, and transit mode share.

New/modified pedestrian, bicycle, and transit capacity was not described in the DRI report or site plan. The DRI describes bus routes which operate within one half mile of the site (some of those routes have been cancelled or changed since the DRI was submitted), proposals for shuttle service to the airport and MARTA rail, and proposed commuter rail service next to the site.

MARTA identified two of their best performing bus routes operating in the area, although there have since been route changes. At the time of this appraisal, Route 78 (Cleveland Ave) and Route 178 (Empire Blvd/Southside Industrial Blvd) typically operated on 20 minute headways, Route 95 (Metropolitan Ave/Hapeville) and operated on a 30 minute headway while Route 172 (Sylvan Rd/Virginia Ave) operated about every 45 minutes (Metropolitan Atlanta Rapid Transit Authority 2011). Ridership numbers were not available. There were no rail stops in the study area.

Housing

The DRI traffic study described an “Area of Influence” (AOI) defined as the area within six miles by street network from the site boundaries, and extending into Clayton County, DeKalb County, and Fulton County. 73,787 people lived in this area, based on U.S. Census data. The DRI anticipated 12,470 positions offering salaries from \$1,403 (food preparation and serving) to \$7,690 (management). According to the DRI study, there will be adequate low-cost housing options based on their anticipated levels of employment, but a sizable shortage of moderately-priced and higher-priced housing in the six-mile AOI (Kimley-Horn and Associates 2008). There may be insufficient properties for purchase rather than rental. Again, these figures may be reduced by as much as half due to subdued real estate markets (GRTA 2003, U.S. Department of Labor 2005). Thus Aerotropolis could help reduce local unemployment rates and shorten commute distance or cost. The potential impact on earnings or benefits could not be determined.

Site Evolution

Although the Development of Regional Impact review process has been completed and the Ford Plant Redevelopment project has been approved by GRTA and ARC, it is vital to consider additional recommendations to improve health outcomes during the project's continuing development. From GRTA's conditions for transportation funding, it is necessary to include additional improvements to bike and pedestrian facilities for increased safety and walkability on the project site. Through coordination with transportation and transit agencies, there is great potential to explore options for transit access to the project area, such as shuttle service to the airport or rail connectivity. In addition, the Aerotropolis redevelopment creates the opportunity to improve economic and housing conditions for the population in the area of influence.

Plans for the Aerotropolis site evolved between initiation of the HIA scoping phase and completion of the appraisal and recommendations. The first tenant of the site was announced: Porsche's North American headquarters. In addition to an office building, this would include a test track for Porsche cars. The site they selected was located on about 20 acres along the northeastern side of the site, adjacent to the I-75 on-ramp and highway.



Figure 30. Concept design for headquarters building. Credit ototrick.com

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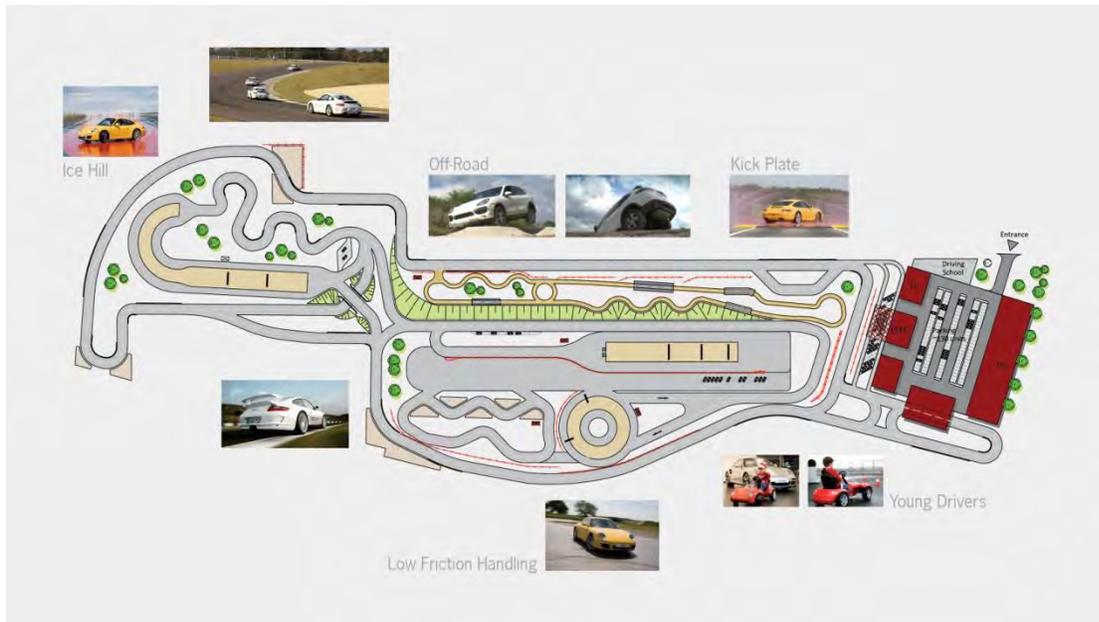


Figure 31. Porsche facility plan. Credit porschebahn.wordpress.com

The other development that occurred since the HIA began was announcement of the sale of a southern portion of the site to the City of Atlanta. The city is likely to use this property for airport parking and other airport related purposes; no major changes to the design are anticipated. However, Jacoby Development may not be able to pursue certain innovations, such as electric vehicle charging stations or solar power arrays.

Assessment of Impacts

- Safe, Active, Multimodal Transportation Environments
- Economic Activities and Opportunities
- Community Preservation and Revitalization
- Environmental Exposures
- Overarching Issues

Safe, Active, Multimodal Transportation Environments

Background: Health and Transportation

Personal travel is linked to health outcomes in numerous ways. Foremost are physical inactivity, injury, air quality, and equitable access to jobs and services. Lack of safe, convenient places and ways to walk and bicycle have led to sedentary lifestyles, which has contributed to a massive epidemic of obesity and chronic diseases. Physical activity can prevent overweight and obesity, which are defined as an elevated body mass index (BMI). Physical activity can also be used to treat patients who are already overweight or obese, and to reduce complications and symptoms of many obesity-related disorders. Obesity, defined as a BMI over 30, leads to elevated risk for heart disease, type 2 diabetes, cancer (including breast cancer and colon cancer), high blood pressure, stroke, liver disease, sleep disorders, arthritis, and infertility (National Institute of Health, 1998). Obese individuals are twice as likely to die prematurely as their non-obese counterparts. 21.4% of Fulton County residents were obese in 2009 and 53.5% reported that they did not get the recommended amount of physical activity, while 41.5% of Clayton County residents were obese and 56.9% reported inadequate physical activity (Centers for Disease Control and Prevention, 2009). There were 884 deaths from heart disease, stroke, hypertension, and diabetes in the study area Census Tracts from 1998-2007, constituting 36% of all fatalities in that time period. These diseases also contributed 1722 hospitalizations and 1196 visits to the emergency department. Street design, pedestrian and bicycle facilities, perceptions of traffic safety, access to transit, and access to parks can significantly influence rates of physical activity.

Attributes of land use, transportation facility design, and transportation operations can make a large difference in the rate and severity of traffic crashes, and thus in the rate of deaths and injuries. From 1998-2007, 41 people from the study area were killed in car crashes. Another 121 hospitalizations and 1460 ER visits resulted from motor vehicle crashes. From another perspective, 7705 crashes occurred in the study area from 2001-2010, resulting in 2989 injuries and 33 deaths. These crashes did not necessarily involve local residents or workers. In addition to deaths and permanent disability that can result from traffic crashes, perceived traffic danger can further discourage walking and bicycling which are thought to increase personal risk of injury.

Safe, Active, Multimodal Transportation Environments

Even the economic health of a community and its residents can be affected by the cost, availability, and mode of transportation used for daily activities. Transportation not only facilitates (or impedes) travel to destinations, it can also influence the character, circulation, and cohesiveness of neighborhoods and business districts. Emotional well-being is challenged by traffic congestion, long and stressful commutes, and noise. Nearly every community is affected, and often vulnerable populations face the greatest risk. Current levels of motor vehicle emissions contribute to many negative health outcomes, including increased incidence of asthma, lung disease, and cardiovascular disease, which are addressed in the Environmental Exposures section, page 164. This section focuses on ground transportation – buses, cars, bicycles, trucks, trains, and pedestrians – while air travel is addressed in the Methodological Issues – Airport Areas section and in Environmental Exposures.

A transportation system that offers multiple travel options may offer many benefits, such as greater efficiency, flexibility, and affordability. The ability to choose the most appropriate travel mode for each trip helps reduce congestion, and relieves economic and environmental costs. A multimodal transportation system can also accommodate unanticipated situations, such as sudden increases in fuel prices or temporary closure of a major transportation facility. Multiple travel choices also help reduce socioeconomic disparities by providing mobility to young people, elderly individuals, and families who may not be able to afford a car. Wide, continuous sidewalks increase the comfort and efficiency of walking, especially for groups or people employing wheelchairs or strollers, and lead to more people walking. Planting zones or furniture zones improve the comfort and efficiency of walking by buffering pedestrians from traffic, leaving room for pedestrians to pass behind turning vehicles, and removing obstacles from the main walkway. Good aesthetics, amenities, and sidewalk-oriented building frontage and design create a lively social environment and increase personal safety.

Planning Environment

Connectivity

Research Questions

- How might levels of physical activity be influenced by the directness and convenience of walking and cycling routes to and within Aerotropolis, and to nearby destinations?
- How might the future viability of enhanced transit services, such as commuter rail, be influenced by the directness and convenience of travel routes in the vicinity of the rail corridor and airport?
- How might the ability of nearby residents and workers to access services (including groceries, employment, and medical care) at Aerotropolis be influenced by the directness and convenience of travel routes to and within the site?
- How might the potential for economic development be influenced by the ease of traveling between Aerotropolis and other businesses within a quarter mile, half mile, and two mile distance from its borders, and to residences within two miles?

Literature review

Research suggests that distance to destinations (actual or perceived) reduces walking and bicycling rates and frequency of visits to those destinations, reducing opportunities for physical activity, social interaction, and access to health-promoting goods and services. In urban planning literature, connectivity refers specifically to block size or intersection density. In this research we have expanded the definition of connectivity to include a lack of physical barriers (such as train tracks, gulches, fences, and roadways that are difficult to cross by one or more transportation modes, also referred to as permeability) and an uninterrupted positive experience for the user. For example, travel routes between potential destinations provide a continuous series of sensory and social stimulation, perceived safety, and physical comfort.

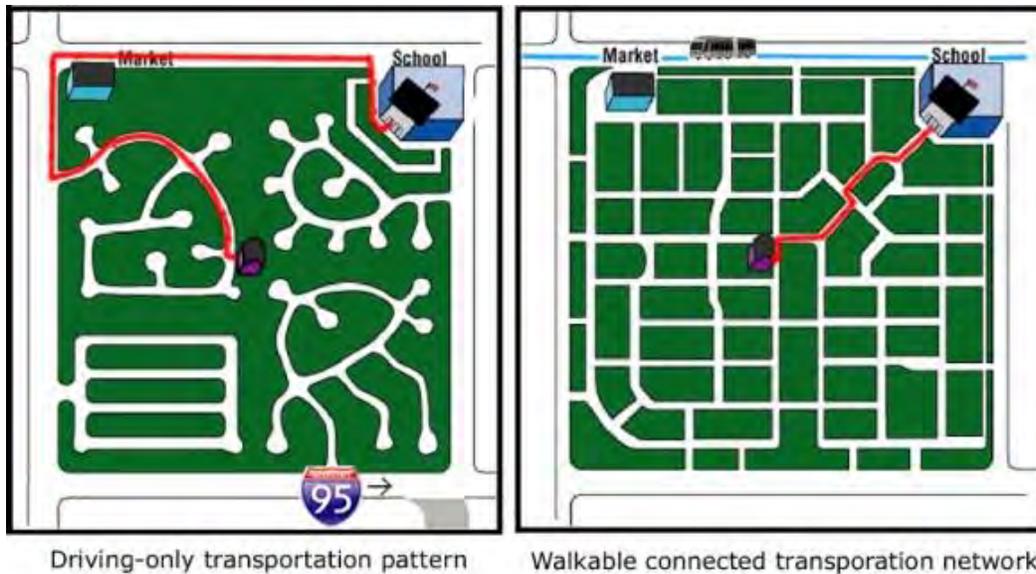


Figure 32. The same trip on a connected street network is often shorter and can avoid busy streets. (Credit: Congress for New Urbanism)

Marshall and Garrick (2010) evaluated the ratio of street segments (links) to intersections (nodes) relative to the probability of walking, bicycling, driving, or transit trips. Controlling for street design and land use, they found that intersection density was associated with much higher rates of walking and bicycling. Additionally, they found that higher rates of dead-end streets correlated with lower rates of walking and bicycling, and higher rates of transit use, and that driving trips decreased as link-to-node ratio increased. Agrawal, Schlossberg, and Irvin (2008) examined how far pedestrians walked to access rail transit stations and what environmental factors influenced route choice. The literature generally recognizes that pedestrians are willing to walk approximately one quarter to one third of a mile to access transit. However, a major finding from this research showed that over fifty percent of commuters surveyed walked at least half a mile to access the train stations for their commute trips. Of the factors that influenced route choice, the first priority indicated was minimizing time and distance travelled. Individuals gave priority to the quickest and most direct route, which was influenced by street layout or design that provided direct routes to major destinations. Work by Wang and Lee (2010) also showed that older adults are willing to walk half a mile from home compared to the quarter-mile national estimate. This distance, however, is strongly associated with the street connectivity available to users.

In an effort to link the relationship between the built environment and physical activity, Handy, Boarnet, Ewing, and Killingsworth (2002) extended insights obtained from trip-making and travel choice models that are more often used to assess automobile travel. Their work concluded that the physical elements of design such as mixed land use, higher density and improved street and

sidewalk connectivity influenced travel distance and time, and thus changed the price or utility of travel. Walking and bicycling are also influenced by perceived route safety, comfort, aesthetics, and other factors. Although their work expands on findings from models and research done on automobile travel, Handy et al. (2002) expressed the need to more directly research the link between the built environment and physical activity. Additionally, they proposed that the study of walking and cycling behavior must consider motivations beyond the intention of reaching the trip destination – that mode and route choice may be influenced by social, pleasure, or fitness goals as well, and that aesthetics, comfort, and perceived safety would be particularly important in determining this behavior.

There exists a strong relationship between transit-related physical activity (walking and bicycling for transit purposes) behaviors and perception with commute distances. Badland, Schofield, and Garrett (2008) and Cerin, Leslie, Toit, Owen, and Frank (2007) suggest that persons are more likely to engage in transit-related physical activity if the street network is well connected with low cul-de-sac densities and high intersection densities and has high access to destinations. Berke, Koepsell, Moudon, Hoskins, and Larson (2007) proposed that the ideal walkable community has a balance of retail and residential spaces with small block sizes, has close proximity to destinations, and small amounts of land dedicated to office and educational use. Cervero and Kockelman (1997), Forsyth, Oakes, Lee, and Schmitz, (2009), Rodriguez, Evenson, Diez Roux, and Brines (2009), Moudon, Lee, Cheadle, Garvin, Johnson, Schmid and Weathers (2007) and Chatman (2008) also support that compact, mixed use, and pedestrian friendly design may reduce vehicle trips and VMT per capita, and encourages non-motorized travel. However the mix between density, diverse land use and design were also of great importance. For example, neighborhoods with attractive sidewalks with other pedestrian amenities in a low density, residential only neighborhood were less likely to increase walking rates.

Infrastructure such as pedestrian crossings, signalized intersections and cycle paths are more appreciated by the older adult population than the younger age group and ultimately influences the safety and mobility of this older group (Bernhoft & Carstensen, 2008). Borst, Miedema, de Vries, Graham, and van Dongen (2008) also identified the influence of street characteristics and perceived attractiveness for walking on the physical activity of the elderly. In this study, perceived link attractiveness was positively affected by zebra crossings, bus stops, well maintained walking services, maintenance of streets, and the presence of greenery and vegetation. High-rise building structures and vacant building sites had a negative effect on physical activity in older adult populations. Moving beyond the effect of the built environment on physical activity, Rodriguez, Aytur,

Forsyth, Oakes, and Clifton (2008) and Ryley (2008) both suggested that policies influencing parking availability or costs to motorists appear to be most promising to increase walking for short trips. Hou et al. (2010) found that high urban areas generally have higher intersection density and link-node ratios which reflect greater street connectivity, and that there is a positive association between intersection density and local roads with rates of walking, bicycling and jogging. Wang and Lee (2010) reported that older adults walked more frequently and for longer periods of time if there were walking route choices. Further, the authors found that older adults were more likely to walk if there were “daily life” destinations within a half mile of their home, especially drugstores. Debrezion, Pels, and Rietveld (2009) found that distance was extremely important for access to railway stations by foot or bicycle.

Existing conditions

The Healthy Places Audit found that Hapeville’s subdivision ordinance allowed blocks that were too large for convenient local travel, especially walking. The code also allowed dead end or cul-de-sac streets. The audit found that Hapeville’s subdivision guidelines for intersection placement were likely to be suitable for direct, convenient travel routes. In the audit of Atlanta’s codes, block sizes were not explicit, but subdivision ordinances were structured to discourage connected street networks, although with some provisions for pedestrian paths in planned developments and for continuation of the street network in historic districts. Atlanta’s code of ordinances allowed cul-de-sacs and had a process for abandoning existing streets. Clayton County did not appear to specify block size or street connections; they allow cul-de-sacs.

The Aerotropolis site plan as included in the DRI shows blocks A, B, C, D, and F as small blocks that promote connectivity. Blocks E and G are larger, and while exact dimensions cannot be determined from the plan as shown the size may exceed recommended block size. The street stubs left to the north and south of block A will be useful for future restoration of connectivity with Elm Street or with future conversion of the rail spur to carry pedestrian and bicycle traffic. One four-way intersection would be created by the development. The block including J, K, and L is extremely large and results in a much longer connection to employment centers on Aviation Blvd and the future International Terminal. Recommendations are provided below.

Barriers to connectivity have been identified in the HIA area, such as the Interstate highways, active railroads, airport, and lack of existing street network on large industrial and corporate real estate parcels. Block sizes are shown in Figure 33. Figure 34 shows the location and density of four-way intersections. Both the block size and intersection density analysis suggest that there is a strong urban form in central Hapeville and in East Point and College Park, but that connectivity decreases

Safe, Active, Multimodal Transportation Environments

significantly before reaching the City of Atlanta, the airport, Clayton County, or the Aerotropolis district. Health data assessment and stakeholder engagement have both indicated that connectivity is not currently sufficient for positive health outcomes in the study area. During the walkability audit, researchers found that the railroad tracks, some intersection designs, and some long blocks made walking connections in the study area inconvenient.

There are seven programmed transportation projects in the regional Transportation Improvement Program:

- Widening of Southside Industrial Boulevard from 2 to 4 lanes at a cost of \$6 million
- Pedestrian facilities along North Central Ave from Whitney Ave to Dearborn Plaza, \$1.5 million
- Grade separation of Aviation Boulevard under Old Dixie Road and the railroad tracks, including 5' sidewalks, for \$35 million
- Stations and parking for Atlanta-to-Macon commuter rail at a cost of \$10 million
- Sidewalks, crosswalks, and streetscape along Virginia Ave from the city limits to Doug Davis Dr. for \$1.7 million (underway)
- Reconstruction of the Aviation Boulevard interchange with I-75 for \$165 million
- Construction of managed lanes on I-75 for \$150 million

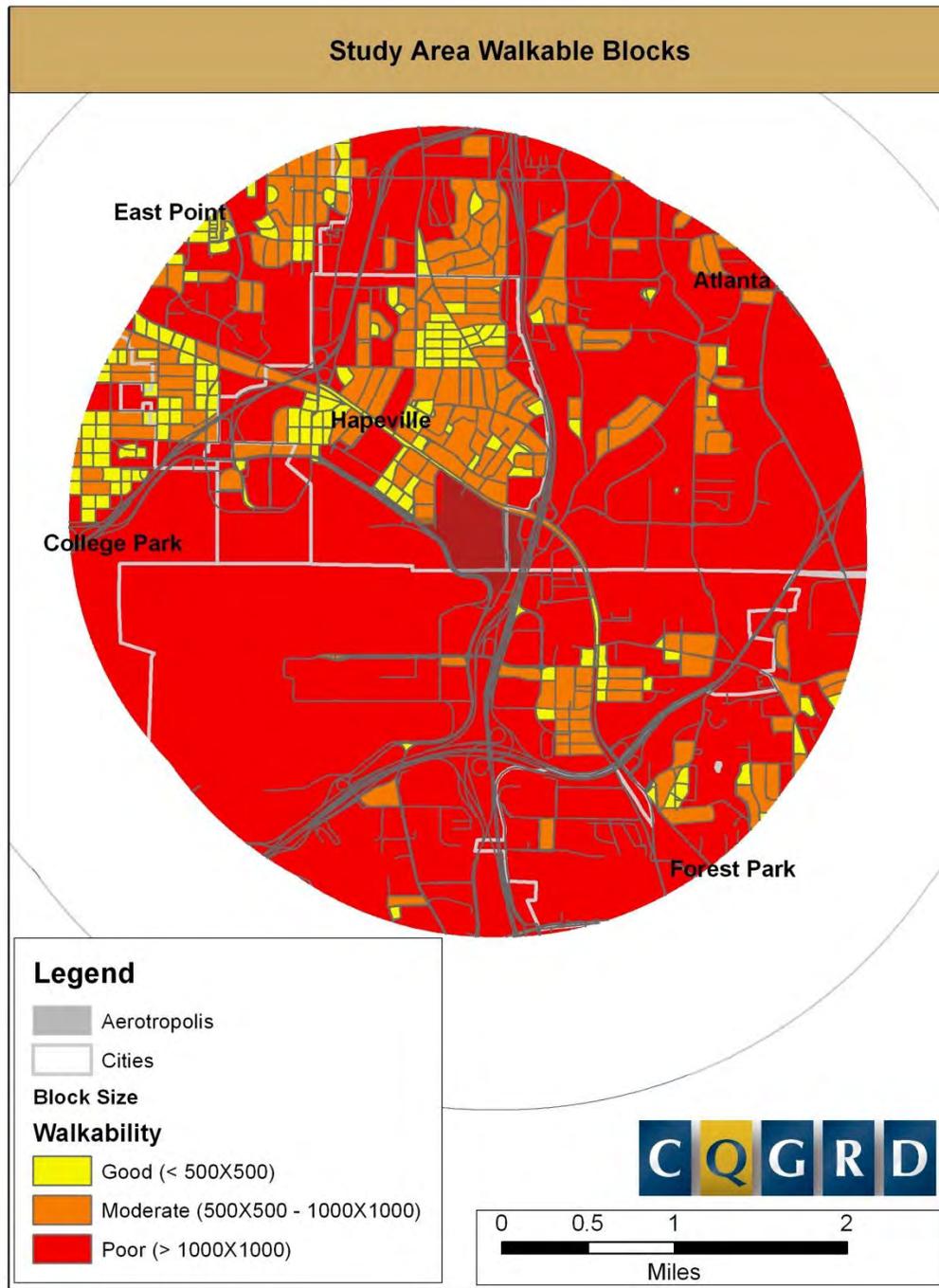


Figure 33: Study area walkable blocks

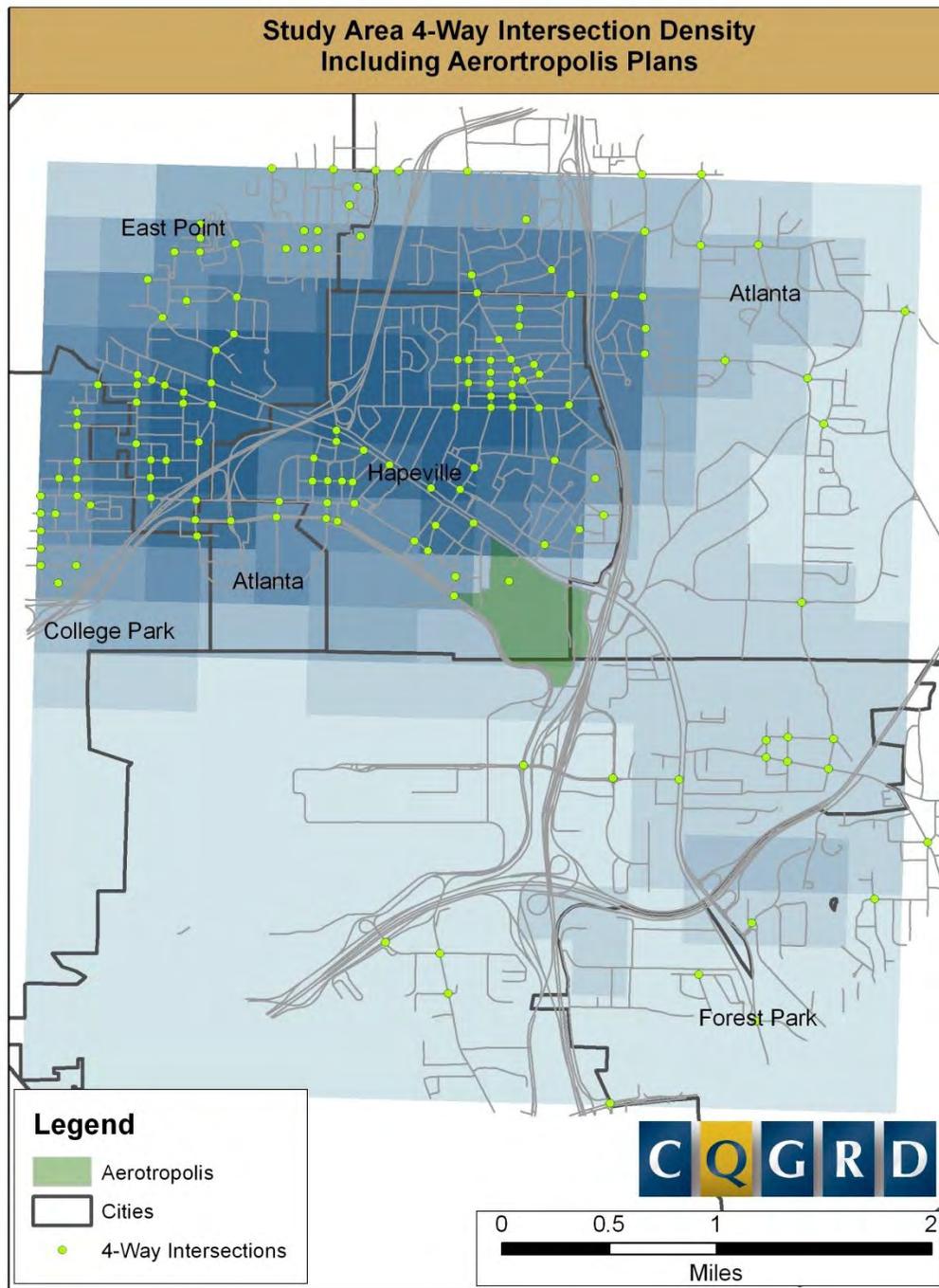


Figure 34: Study area 4-way intersection density

Potential impacts

Aerotropolis will be redeveloping a large parcel of land which currently does not provide any significant transportation connections – utilitarian or aesthetic – to the surrounding community.

Aerotropolis can impact connectivity through placement and design of streets, buildings, and other features on the site, through placement and design of access points at the boundaries of the site, through coordination with surrounding transportation facilities and land uses (such as the airport, the railroads, and downtown Hapeville), and through other design and operational characteristics of approach and site use. The DRI stated that pedestrian access between internal destinations will be provided. The site is large enough that physical activity could be increased for site users, such as employees and hotel guests, if walking or bicycling to other on-site locations is convenient. This effect may be enhanced if parking is centralized in a few locations and streetscapes design as recommended. However, residents, workers, and visitors near Aerotropolis but not on-site will not benefit unless the minimum level of connectivity is provided between the site and adjacent areas.

Recommendations

Aerotropolis:

Pursue a block length of 200 to 600 feet in site platting and along the site perimeter (excluding along I-75). Where necessary, divide blocks or create attractive arcades, passageways, alleys, or courtyards to shorten blocks. Ensure street crossings are frequent and convenient with respect to routes and destinations; no crossings should be closed or left unmarked, including at site entrances. JDI, Hapeville, Atlanta, and Clayton County should work together to achieve this level of connectivity. Figure 35 and Figure 36 provide two examples in which pedestrian connections are created through blocks or buildings, which adds connectivity while allowing economical building sizes.



Figure 35. Passageways or “arcades” can create pedestrian connections through large buildings.
Credit Flickr/dorena-wm



Figure 36. A shopping corridor could link to parking facilities or a future rail station while providing secure access through the center of the block.
Credit Flickr/Toban Black

Safe, Active, Multimodal Transportation Environments

Figure 37 depicts locations where pedestrian connections are recommended. Red lines indicate simple continuation of the street network, with or without motor vehicle access. These streets could even include “smart” bollards which generally restrict motor vehicle access but can be retracted by authorized personnel to permit service or emergency vehicles through. The blue area is recommended as a plaza that could welcome airport parking customers into the rest of the development (perhaps for some shopping before their flight), serve as a valet parking drop-off site, and provide a seamless connection for pedestrians who choose to walk south from the development (an increasingly likely option as the area around the International Terminal develops). It also includes the possibility of a passageway through the ground floor of the airport parking structure. Not only would this encourage airport parking customers to visit Aerotropolis shops and restaurants, it could also serve as a future pedestrian linkage, again to the developing International Terminal area, if Airport Loop Road is eventually improved. Finally, archways or arcades are suggested in green, to allow pedestrians to take a shorter route to their destination in the Aerotropolis development, and generally improve the sense of interaction with the street and surrounding community. The site plan has likely evolved since it was created, with new plans for the Porsche North American headquarters. These recommendations apply regardless of site ownership or usage.

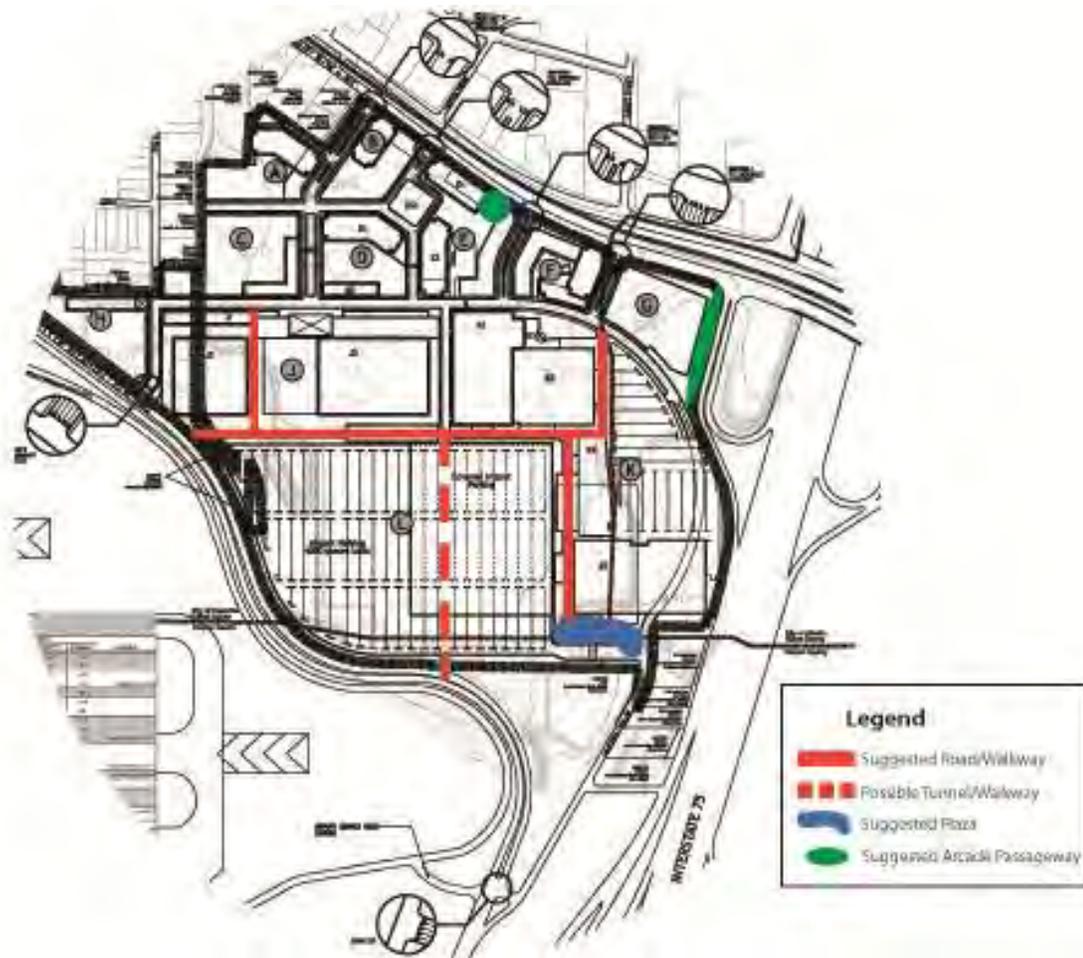


Figure 37. Study area recommended pedestrian connections

Hapeville, Atlanta, Clayton:

- Ordinances should specify that new subdivisions use a mostly rectilinear arrangement of streets, that at least 70% of intersections should be four-way, and that no streets may terminate other than at an intersection. Where the adjacent property is undeveloped and unplatted, a “stub” street should extend to the property line such that compliant connections and blocks can be created when the adjoining property is eventually developed. Concerns about cut-through traffic on side streets by cars and trucks can be addressed by adopting a variety of traffic calming and diversion treatments that prioritize local and non-motorized traffic.
- Ordinances should specify that blocks should be 200 to 600 feet from intersection to intersection. A block should be less than 6.5 acres in area. Consider allowing alleyways.
- Ordinances should provide guidelines and incentives for pedestrian or shared-use easements that may be created to create connections from dead end/cul-de-sac streets or through large blocks or parcels. Consider making an attractive bicycle and pedestrian passageway on Cofield Dr.

Trip Generation & Mode Choice

Research Question

- How might Aerotropolis affect trip generation and mode share?

Literature review

Mode share is the share of trips made by car, bicycle, walking, or transit, while trip generation is the number of discrete visits made to a given site within a given period of time. The literature demonstrates a correlation between mode share and a range of intermediary health determinants. Specifically, higher volumes of car travel are associated with increased rates of traffic fatalities, noise, air pollution, social isolation, and sedentary behavior. Travel by mass transit (bus, rail, streetcar, shuttle), walking, or bicycling is likely to reduce these health effects. Healthful transportation and land use planning would seek to maximize the share of trips made by these modes while maintaining or increasing access to trip destinations. This section considers factors in the number of trips made (trip generation rates) and the mode of travel selected (mode choice).

Trip generation rates can be calculated for many types of businesses and other activities. These rates are based on prior studies, although some are more robust than others and there may be questions about their generalizability (Shoup, 2005). However, determining probable travel mode is less reliable and is typically approached as an economic question – cost comparisons, opportunity cost, marketing, etc. Finally, the total number of vehicle miles traveled (VMT) increased at a fairly steady rate for several decades, but since 2002 it has flattened out and declined somewhat, both nationally and in the Atlanta region (Figure 29). Future travel patterns in the study area may depend on transportation and land use investment decisions.

Daisa and Parker (2009) addressed the shortfalls or deficiencies that exist in the ITE trip generation data as it relates to urban infill land use in California. The study developed trip generation data for at least 10 land uses that are consistent with ITE categories. Their investigation found that current ITE trip generation rates were not calculated for uses within urbanized areas, since sites that meet the ITE requirements were usually “isolated locations with ample, dedicated free parking and little transit and pedestrian accessibility”. Although the scope research was limited by project funding and survey participation, the authors observed that the trip generation rates were generally lower in comparison to the ITE trip generation rates. They concluded that the variance was due to alternative travel modes available within urban environments which may include walking and transit access.

Mode choice is partially a function of demographic factors such as income, age, family role, and gender, but studies have repeatedly shown a further correlation between the built environment and mode choice. Controlling for demographic factors, Boarnet and Crane (2001) modeled mode choice

relative to travel cost (price and time), land use, and a mixed, two-step model accounting for both, for non-work trips. They found that a gridded or mixed grid (with some curvilinear or cul-de-sac streets) was associated with non-driving mode choice, as was a dense street network (though to a lesser degree). They also found that car trips became more frequent as distance from the central business district increased. In the two-step mixed model, having a percentage of retail locations in the neighborhood made non-driving trips more likely. Cervero (2002) modeled the travel choices of commuters and found sidewalk availability at origin and destination to be the strongest factor in selecting a travel mode other than driving; observed neighborhood characteristics not present in the data suggested that completeness of the sidewalk network most closely represented the urban character of the district. In the same study, density and mix of uses at the destination also discouraged driving. Both of these studies found that the cost of mode alternatives influenced mode choice, but only to a limited degree. Rodríguez and Joo (2004) found that relative travel time and travel cost influenced mode choice, while availability of sidewalks and transit was associated with mode choice to a lesser (but still significant) degree.

Bhat and Sardesai (2006) argued that trip chaining – making several stops on a single outing from home – played a significant role in mode choice. For instance, a work commuter might wish to travel to a restaurant at lunch time, stop at a grocery store after work, and pick up a child from childcare. Thus, the possibility of accessing these activities by alternate travel modes helps to determine choice of travel by car, bicycle, bus, shuttle, etc. In particular, commuters may consider their other stops before selecting their travel mode on a given day. Bhat and Sardesai (2006) examined mode choice in the context of traveler preference, travel time reliability, and possibility of trip chaining by alternate mode. This research suggested that higher density or the presence of a grocery store at the workplace encouraged transit use.

Ye, Pendyala, and Gottardi (2007) explored whether mode choice influences the complexity of trip chaining patterns or whether the complexity of trip chaining patterns influence mode choice. The paper, using data from the 2000 Swiss Travel Microcensus, identified causal links between mode choice behavior and trip chains (both in intensity and work/non-work tours) at the macro-level. Results from the research suggest that complexity of trip chaining activities drives mode choice for both non-work and work related tours, such that a complex tour is more likely to favor the use of the auto mode of travel. Other factors which influences mode choice and the complexity of tours includes demographics, socio-economic characteristics, the tour's primary purpose and the time of day at which the tour is conducted.

Existing conditions

According to Hapeville Plan 2025, Dogwood Drive (US 19/41) has capacity to carry 20,000 vehicles per day, but averages less than 6,000. North Central Ave and South Central Ave are described as being at a fraction of their motor vehicle capacity. These figures were based on a traffic study conducted in 2004 by Moreland-Altobelli Associates. Jacoby Development also conducted traffic analysis in 2008 for their DRI. This analysis found traffic on Henry Ford II Ave was around 600 vehicles per hour at peak demand and Airport Loop Rd was around 2000 vehicles per hour at peak. No pedestrian counts, bicycle counts, or mode share studies were identified. MARTA identified two of their best performing bus routes operating in the area, although there have since been route changes. At the time of this appraisal, Route 78 (Cleveland Ave) and Route 95 (Metropolitan Ave/Hapeville) typically operated on 15-20 minute headways, while Route 172 (Sylvan Rd/Virginia Ave) operated about every 45 minutes and Route 178 (Empire Blvd/Southside Industrial Blvd) operated every 30 minutes. Ridership numbers were not available. There were no rail stops in the study area.

Potential impacts

Changes in motor vehicle trips to and from the project site will likely be a factor in several of the other topics addressed in this HIA: vehicle emissions, actual and subjective traffic safety, noise, and possibly active transportation. The change in trips may also correspond with parking demand and community character.

The DRI indicates trip generation rates derived from standard ITE Trip Generation Handbook figures based on a 500,000 sq. ft. data center (utilities), 1,440 hotel rooms, 2,081,400 sq. ft. of general office, 1,662,000 sq. ft. of retail, a 980,000 sq. ft. convention center, and 4,000 airport parking spaces. However, market forces have scaled back the site plans since the DRI was approved, and JDI anticipates building about half of the office, shopping, and hotel space (personal communication). The DRI provided some information about transit, bicycle, and pedestrian facilities or services and their current mode share. The trip generation rates were reduced due to estimates of mixed-use internal capture/shared trips and pedestrian, bicycle, and transit mode share. New/modified pedestrian, bicycle, and transit capacity was not described in the DRI report or site plan. Trip generation rates have been disputed by some research for several reasons, including insufficient data for the given land use or regional transportation propensities, and lack of information for trips by modes other than private motor vehicle (Cervero, Adkins, and Sullivan, 2010; Cervero and Arrington, 2008). Additionally, VMT trends have deviated from projections in the past decade, calling into question the standard growth rates for traffic volume. The following tables show trip generation figures as calculated for the DRI study. These rates may be reduced by half due to

more recent market conditions. Aerotropolis is likely to cause an increase in the share of transit, walking, and cycling trips, as a result of adding a higher-density mixed use destination. On-site pedestrian infrastructure design is likely to moderate this effect.

Table 6. Gross trip generation for Aerotropolis. Source: Jacoby Development, Inc.

Gross Trip Generation									
Land Use	ITE Code	Daily Traffic		AM Peak Hour		PM Peak Hour		Saturday MD	
		Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
Build-Out (Year 2020)									
Data Center (Utilities)	170	1,900	1,900	220	180	171	209	37	31
Hotel	310	6,258	6,258	681	435	451	399	664	589
Office	710	6,907	6,907	1,872	255	410	2,000	233	199
Retail	820	21,101	21,101	515	330	1,920	2,081	2,797	2,582
Convention Center	N/A	9,114	9,114	439	237	194	2,227	194	2,227
Airport Parking Lot	N/A	1,225	1,225	238	27	142	194	148	80
Total		46,505	46,505	3,965	1,464	3,288	7,110	4,073	5,708

Table 7. Net trip generation for Aerotropolis. Source: Jacoby Development, Inc.

Net Trip Generation									
Land Use		Daily Traffic		AM Peak Hour		PM Peak Hour		Saturday MD	
		Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit
Build-Out (Year 2020)									
Gross Trips		46,505	46,505	3,965	1,464	3,288	7,110	4,073	5,708
Mixed-Use Reductions		-5,873	-5,873	-0	-0	-486	-486	-486	-486
Alternate Mode Reductions		-3,287	-3,287	-299	-140	-176	-567	-236	-521
Pass-by Reductions		-2,600	-2,600	0	0	-260	-260	-66	-66
New Trips		34,745	34,745	3,666	1,324	2,366	5,797	3,285	4,635
Airport Parking Lot	N/A	1,225	1,225	238	27	142	194	148	80
Total		46,505	46,505	3,965	1,464	3,288	7,110	4,073	5,708

Recommendations

Aerotropolis:

- Ensure that safe, convenient accommodations are provided for bicycle and pedestrian traffic at all project entrances.
- Manage retail tenants to achieve a range of daily goods and services are available to visitors – food retailers (grocery stores, bakeries, etc.), child care services, dry cleaners, newsstands, and medical offices may help capture daily errands.

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- Partner with Zipcar to provide carsharing option for midday trips for commuters who arrive by foot, bicycle, or transit.
- Evaluate bicycle and pedestrian level of service as described in the Transportation Research Board's (TRB) National Cooperative Highway Research Program (NCHRP) Report 616: Multimodal Level of Service Analysis for Urban Streets.
- Operate shuttle service to major origins and destinations in the area, including downtown Hapeville.

Hapeville, Atlanta, Clayton:

- Plan ahead for transit lanes and stops, and for access to them. For instance, provide bus pullouts and crosswalks to bus stops, and orient buildings toward proposed commuter rail station site.

Traffic safety

Research Questions

- How might trip generation and mode share changes affect crashes?
- How might design and operation of transportation facilities affect crashes?
- How might design and operation at and around the site affect perceived safety and personal behavior?

Literature review

A variety of environmental and policy factors are associated with crash rates in general and in localized settings, and there is not a single accepted way to mitigate traffic-related injuries. In general, higher speed and higher volume motor vehicle traffic corresponds with increased rates of fatality and serious injury. In addition to the personal and economic cost, traffic crashes can put a burden on emergency responders, public safety personnel, and the trauma system. The Atlanta region suffers from a higher rate of traffic fatalities than many other US cities, and the US in turn has a higher fatality rate than most other developed countries.

Communities that are bisected by a major thoroughfare, such as Hapeville and East Point, may struggle to reconcile the competing demands of traffic mobility and quality of life. Rather than risk the economic decline and loss of community character that can accompany construction of a bypass, some towns have sought to create a multimodal traffic environment that works well for multiple users. Leden, Wikström, Gårder, and Rosander, (2006) investigated the safety effects of reconstruction to a major thoroughfare in a Swedish community with 6500 residents. The project implemented traffic islands, chicanes, a roundabout, a cycle track, and bollards along the roadway, and replaced crosswalks with new pedestrian walkways. At the same time, traffic laws were strengthened, requiring drivers to yield to pedestrians entering or crossing a marked crosswalk. After these changes, significantly more children walked or biked to school rather than being driven or

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riding on the school bus. Vehicle speed decreased throughout the community and some trucks selected an alternate route. Traffic injuries and falls decreased after the changes. Video observation showed increased compliance with traffic laws by both motorists and pedestrians after the changes were implemented. Additionally, road users surveyed after the treatment was implemented felt safer walking in the area.

Review evidence for links between crashes prevalence and severity related to traffic volume, travel time, travel speeds, availability of travel alternatives for risky drivers, availability of appropriate bicycle and pedestrian facilities, and other design and operational factors. Rifaat and Tay (2009) and Rifaat, Tay, and de Barros (2010) evaluated motor vehicle crashes relative to the local street pattern (rectilinear grid, “warped” network, “loop and lollipop”, or mixed). Their conclusion was that a higher crash rate occurred in grid networks when all crashes were evaluated as the equivalent of property damage only (PDO) crashes. However, they were unable to control for motor vehicle traffic volume and other confounders, and used incomplete representations of local land use. Additionally, the studies excluded major roads; the fundamental difference between grid networks and the other networks studies is that the other networks offset a significant portion of travel from local streets to collector and arterial roads, and potentially increases trip length and speed. Thus this research may inaccurately represent the total impact of less-gridded networks on crash rates. From a health perspective, injury and fatality crashes are of much greater interest, although PDO crashes could impact health through stress, fear, economic burden, emergency response resource allocation, delay, and other mechanisms. These findings have implications for zoning ordinances.

According to a study conducted for the National Highway Traffic Safety Administration, speeding is a factor in about one-third of all traffic-related fatalities. In the urban setting, the largest number of all traffic fatalities occurred on principal arterial roads, followed by minor arterials and local roads. The largest number of traffic fatalities in which speed was a factor were found on rural major collectors, urban principal arterials, and local roads in both contexts, even when factored for miles traveled per roadway class (Liu, Chen, Subramanian, and Utter, 2005). Prior studies have shown that changes to posted speed limits have only about a 1.5 mile per hour difference in average speed (Parker 1997). Speeding has traditionally been addressed through traffic enforcement, but some researchers have suggested that it is more effective to change the design speed of the road (Donnell, Himes, Mahoney, and Porter, 2009; Dumbaugh & Li, 2011). Conventional wisdom has held that roads can be made safer for motor vehicles by moving fixed objects back from the roadside; widening travel lanes; and employing channelization, acceleration lanes, and grade separation at intersections. However, such designs are associated with increased driving speed and less driver attentiveness,

and thus with increased crash severity, higher risk for pedestrians and cyclists, and a less suitable environment for local access (Dumbaugh, 2005; Dumbaugh & Rae, 2009; Noland, 2003). Some studies have found a linear relationship between increased speeds and increased crash rates, as well as increased delay due to crash incidents, while other studies have only found an increase in severity (Ivan, Garrick, & Hanson, 2009; Redelmeier & Bayoumi, 2010).

Once a large body of research has been conducted on a specific subject, it may be possible to synthesize their discoveries through a systematic, quantitative process known as meta-analysis. Researchers undertake a meta-analysis by collecting every available peer-reviewed study conducted on the given subject, reviewing them for rigor and methodological consistency, and then comparing the level of agreement in their results. Bunn, et al. (2003) conducted a meta-analysis on the effectiveness of area-wide traffic calming to prevent traffic injuries. They identified sixteen studies that used controlled before/after or randomized controlled design to isolate the effects of generalized traffic calming techniques, such as road narrowing, diverters, or changes to road surface texture. The studies also measured the impact on road safety, indicated by the rate of all crashes, injury and fatality crashes, or fatalities. This meta-analysis found some variability in the results of the included studies, but concluded from the pooled results that a comprehensive traffic-calming initiative could reduce traffic-related injuries and deaths by 11%.

Greibe (2003) conducted supporting research to develop an accident prediction model for urban roadway junctions and links. This research revealed that vehicle traffic flow was the strongest variable contributing to accident prediction at junctions. Between junctions, there was a variety of variables that predicted accident rates. In addition to traffic flow, the significant variables included land use, the number of minor side streets, available parking facilities, speed limit, and number of access points to the roadway.

Jacobson (2003) reviewed fourteen studies from locations in Europe and the U.S. in order to evaluate the rate collisions between motorists and pedestrians or motorists and bicyclists relative to pedestrian or cyclist traffic metrics. This crash rate decreased in places where more people were walking or bicycling. On average, a location that doubled its rate of walking could expect to see each pedestrian's risk of injury decrease by 66%. In theory, communities that see some driving trips replaced by walking or cycling trips could expect to see their overall traffic injury rates decline.

Existing conditions

As described above, 7705 crashes occurred in the study area from 2001-2010, resulting in 2989 injuries and 33 deaths. Collisions between two or more cars constituted about 78% of crashes, 77% of injuries, and 51% of fatalities. Pedestrians struck by motor vehicles were the second most

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common cause of fatality, of which 80% occurred on Cleveland Ave. In total, 62 crashes involved pedestrians, resulting in 59 injuries and 5 deaths. The third most common fatality was from motor vehicles striking parked cars. There were also 15 collisions between motor vehicles and bicycles, resulting in one death and 11 injuries, and 12 collisions involving a train, resulting in just 2 injuries. Most fatalities have occurred on the Interstate system, but there have been two deaths on Jonesboro Rd, one on Airport Loop Rd, four on Cleveland Ave, and one on Old Dixie Hwy. All of the Cleveland Ave fatalities were pedestrians. One Jonesboro Rd fatality was a bicyclist; the other was a motor vehicle occupant who struck a curb. The Airport Loop Rd. fatality involved a car striking a tree. The Old Dixie Hwy crash was due to a two-car collision.

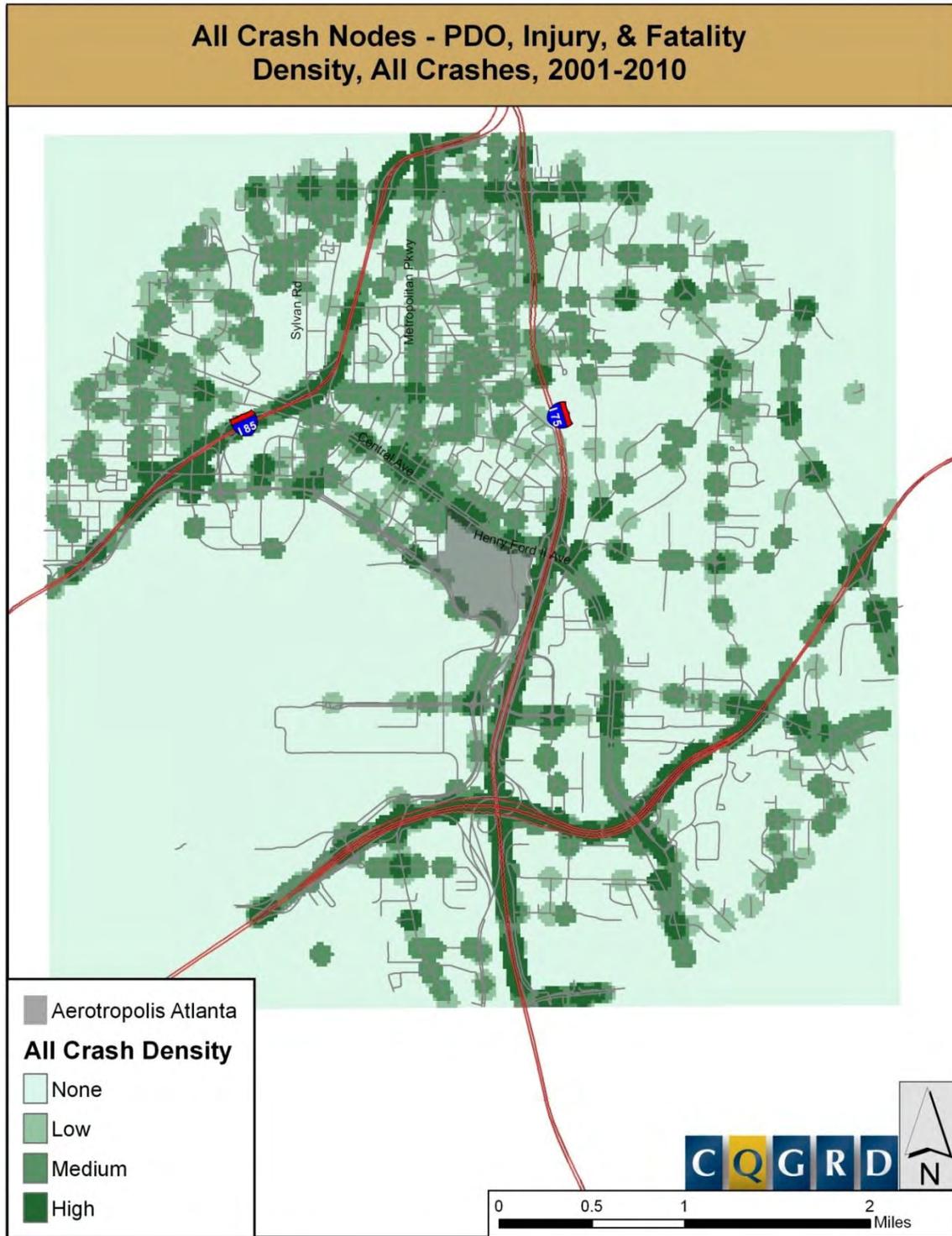


Figure 38: All Crash Nodes, 2001-2010

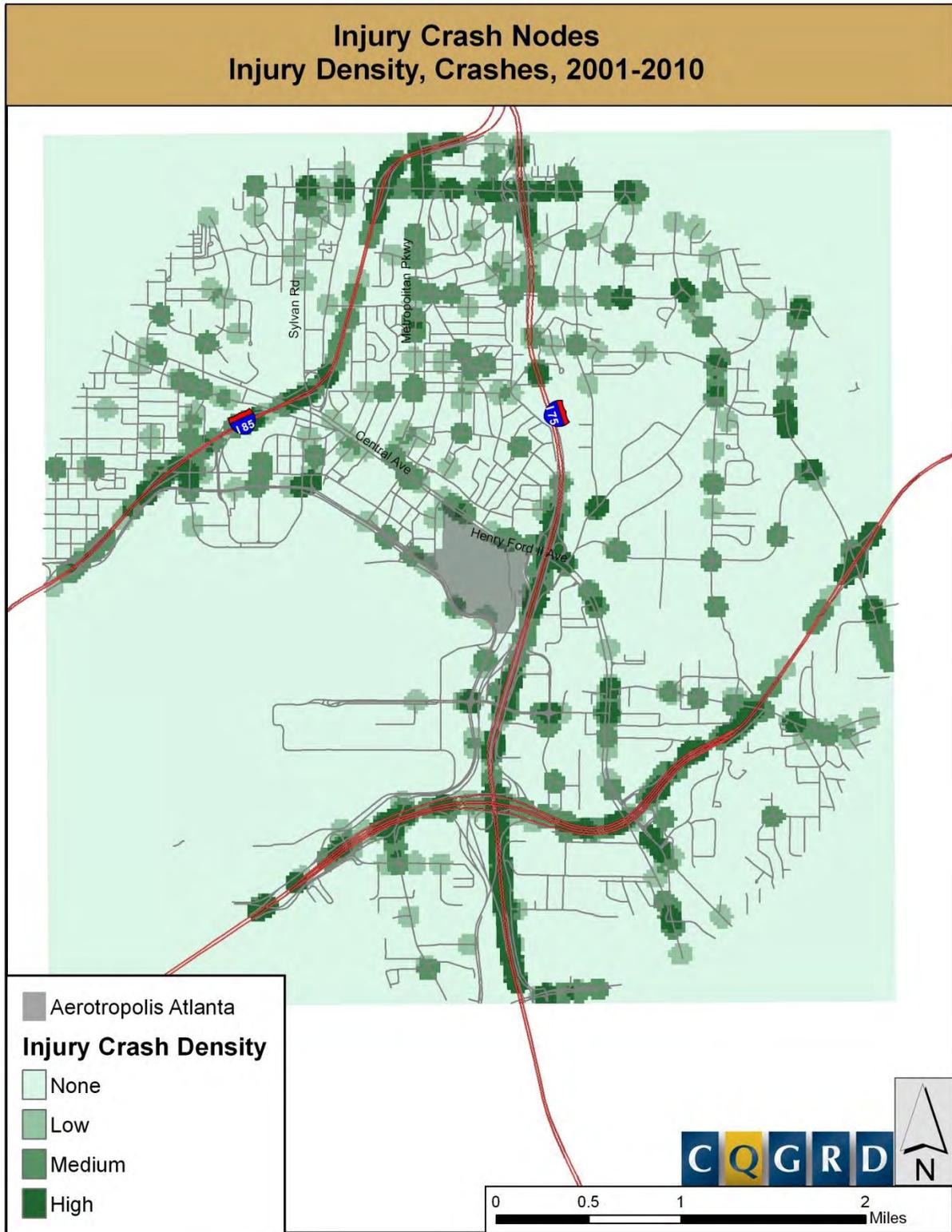


Figure 39: Injury Crash Nodes, 2001-2010

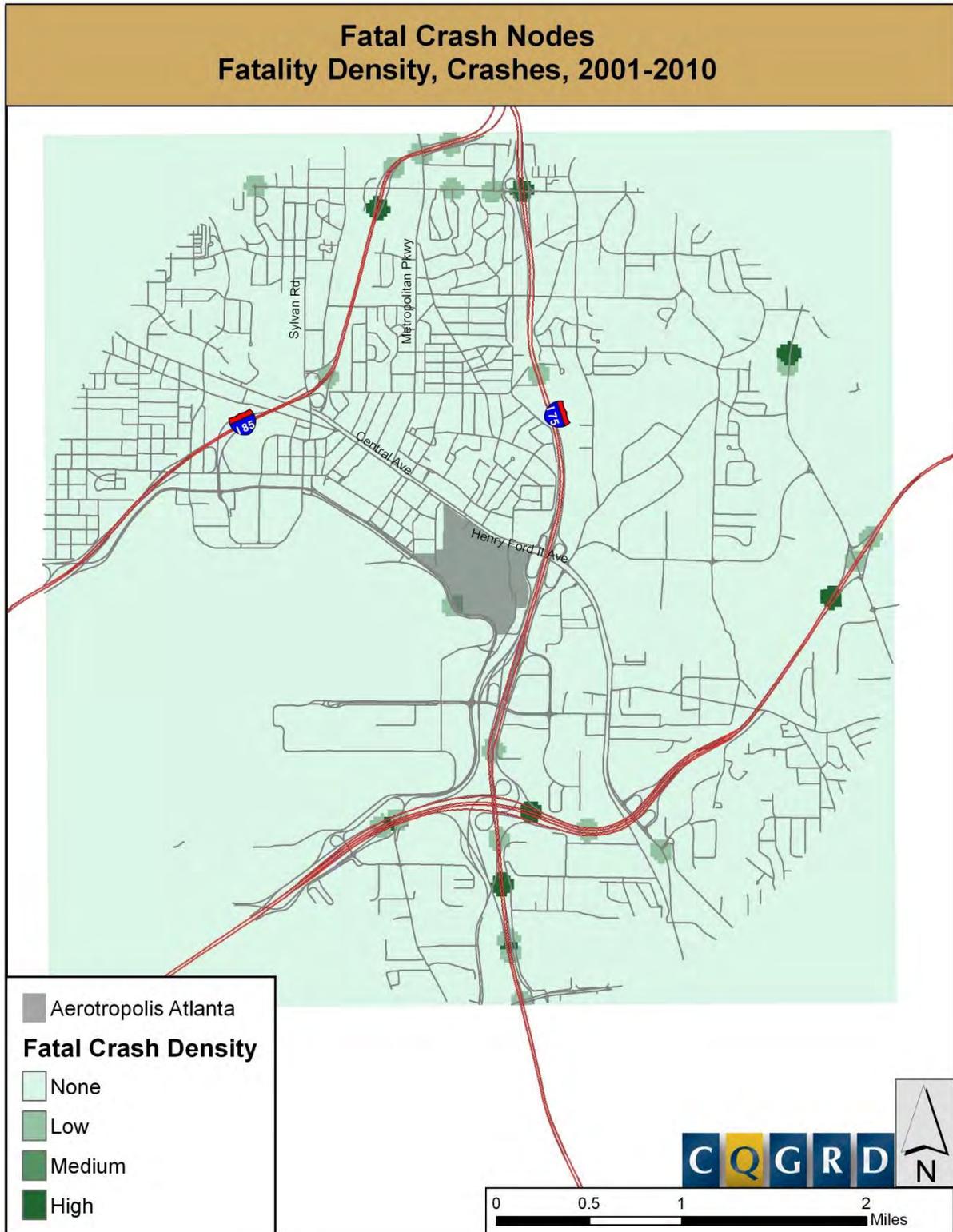


Figure 40: Fatal Crash Nodes, 2001-2010

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There are seven programmed transportation projects in the regional Transportation Improvement Program:

- Widening of Southside Industrial Boulevard from 2 to 4 lanes at a cost of \$6 million
- Pedestrian facilities along North Central Ave from Whitney Ave to Dearborn Plaza, \$1.5 million
- Grade separation of Aviation Boulevard under Old Dixie Road and the railroad tracks, including 5' sidewalks, for \$35 million
- Stations and parking for Atlanta-to-Macon commuter rail at a cost of \$10 million
- Sidewalks, crosswalks, and streetscape along Virginia Ave from the city limits to Doug Davis Dr. for \$1.7 million (underway)
- Reconstruction of the Aviation Boulevard interchange with I-75 for \$165 million
- Construction of managed lanes on I-75 for \$150 million

Potential impacts

Aerotropolis may change traffic volumes, modes, or patterns in a way that affects traffic safety. It is also likely to affect safety through the creation and design of new streets, parking facilities, and public spaces, and possible transportation facilities or services beyond its boundaries. As described on page 94-95, Aerotropolis is projected to increase the amount of traffic, including motor vehicle traffic traveling to the site, although these projections may be significantly altered by site design and management, multimodal facilities and services in the area, and larger trends. The DRI study includes twelve potential road expansion projects (adding new through or turn lanes) in addition to planned site entrances. Aerotropolis may also influence travelers' perceptions about safe and appropriate behavior in the new environment based on streetscape and multimodal level of service.

Recommendations

Aerotropolis:

- Build priced, public parking rather than proprietary parking to reduce traffic volumes.

Hapeville, Atlanta, Clayton:

- Select design speed of 30 MPH on main roads and 20 to 25 MPH on local roads. This includes conventional design speed factors such as lane width and sight distance, but also more subjective factors such as street trees, visual narrowing, and pavement designs. Slow, steady vehicle movement is preferable to high speed intervals punctuated by long delays.
- Give road treatments that are linked to reduced crash rates preference. For instance, consider addressing capacity or queuing issues at an intersection with a roundabout rather than adding turn lanes. On congested segments, consider medians and driveway consolidation before adding travel or turn lanes.
- Disperse traffic flow in order to reduce total volume at any given location, by creating a connected network of streets.

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- Encourage transit, walking, and bicycling in place of driving trips to reduce overall crash rates and address localized congestion due to concentrated destinations. Add priced, public parking to further reduce traffic volumes and localized congestion.
- Proactively apply a range of proven traffic calming treatments, including:
 - Convert one-way street to two-way operation
 - Road Diet: widen sidewalks/narrow streets or traffic lanes/reduce number of lanes/add bicycle lanes
 - Bulb-outs and chokers
 - Chicanes
 - Roundabout or traffic circle
 - Raised median
 - Tighter corner radii (with truck/bus apron as needed)
 - Diverters
 - Road humps, speed tables, or speed cushions
 - Colored or textured pavement
 - For treatment details, see <http://www.pps.org/articles/livememtraffic/>

Level of service/ infrastructure

Research Questions

- How might levels of physical activity be influenced by the safety and attractiveness of walking and cycling routes to and within Aerotropolis, and to nearby destinations?
- How might economic development be influenced by the ease and attractiveness of traveling between Aerotropolis and other businesses within a quarter mile, half mile, and two mile distance from its borders, and residential survey, physical audit, market analysis within two miles?
- How might the ability of nearby residents and workers to access services at Aerotropolis be influenced by the safety and attractiveness of travel routes to and within the site?
- How might the future viability of transit services, such as commuter rail, be influenced by the safety and attractiveness of travel routes in the vicinity of the rail corridor and airport?
- How might changes in infrastructure impact levels of physical activity?
- How might changes in destinations and amenities impact levels of physical activity?

Literature review

Pedestrian and bicycle level of service (LOS) assessments have evolved from simple capacity measurements to comprehensive evaluation criteria that address the convenience and comfort of users. 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. For instance, LOS methodology published in the Transportation Research Records (TRR) 1578 and 1773

by the Transportation Research Board of the National Academy of Sciences measures up to 11 criteria. This standard of pedestrian LOS uses roadway width, presence of sidewalks and intervening buffers, barriers within those buffers, traffic volume, motor vehicle speed, and on-street parking. Bicycle LOS utilizes 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. Guo (2009) referenced 13 prior studies, of which 10 found that the built environment influenced travel behavior. Five of these studies identified some degree of self-selection based on mode preference, but this had a minimal (marginal to less than 40%) impact on travel behavior. In Guo's sample of 2748 transit riders, participants selected walking routes to or from transit based on wider sidewalks, shorter blocks, and presence of interesting storefronts, and presence of greenspace, even if it resulted in longer total travel time. Wang and Lee (2010) reported that usable sidewalks were a factor in older adults' walking frequency and duration.

Existing conditions

The walkability audit identified several wide, well-maintained, and attractive walking routes near downtown Hapeville. Additionally, many neighborhood streets were considered pleasant and safe for cycling. However, sidewalks to the east of downtown/Fulton St. tended to be uncomfortably narrow and poorly maintained. Along busier streets, proximity to heavy traffic created noise and safety hazards that were not suitable for walking. Sidewalks and crosswalks were largely absent around the Aerotropolis site, on South Central/Henry Ford II Ave and Airport Loop Rd. Additionally, land uses were not conducive to walking within several blocks of the Aerotropolis site. See Walkability Audit, page 67.

Potential impacts

The Aerotropolis project will redesign and rebuild transportation and other infrastructure in the project site, while adding new destinations for area workers and residents. The design of these facilities may be able to facilitate more physical activity. The DRI describes bus routes which operate within one half mile of the site (some of those routes have been cancelled or changed since the DRI was submitted), proposals for shuttle service to the airport and MARTA rail, and proposed commuter rail service next to the site.

Recommendations

Aerotropolis:

- Follow recommended pedestrian infrastructure practices from page 110
- Connect Aerotropolis to downtown Hapeville, the Asbury Park and Virginia Park neighborhoods, and the commercial and residential areas to the north via continuous, safe, and pleasant walking routes – wide sidewalks buffered from traffic by street furniture and vegetation, continuous storefronts or homes with few driveways, and intersections with ample time and space for pedestrians.

Hapeville:

- Connect Aerotropolis to downtown Hapeville, the Asbury Park and Virginia Park neighborhoods, and the commercial and residential areas to the north via continuous, safe, and pleasant walking routes – wide sidewalks buffered from traffic by street furniture and vegetation, continuous storefronts or homes with few driveways, and intersections with ample time and space for pedestrians.
- Connect these areas with well-designed bicycle facilities. Potential facilities include:
 - Bicycle and pedestrian path along the railroad siding on the west side of the Aerotropolis property, with access points from adjacent streets.
 - Signed route along Chestnut St leading to bicycle lanes on Doug Davis Dr.
 - Bicycle lanes on King Arnold and Sunset Ave, with sharrows marked on Sherman Rd. and across the closest railroad crossing.
 - As right of way allows, bicycle lanes on South Central Ave/Henry Ford Ave. Alternately, the presence of the railroad provides a corridor without driveways; this could be a suitable location for a two-way, 10-foot bicycle path, with a new bicycle signal phase at intersections. Access points must be provided at all intersections on South Central Ave.
 - Sharrows on North Central Ave. (or, if right of way allows, a path as described above.)
 - An underpass below the railroad aligned with Sunset Ave, with pedestrian and bicycle lanes.

Clayton County & Hartsfield-Jackson Atlanta International Airport:

- Create a direct, safe, and pleasant walking route from the airport parking deck to the International Terminal.
- Provide bicycle facilities and long term bicycle parking at the International Terminal.

Atlanta:

- Connect Aerotropolis with employment sites in the study area, such as Atlanta Tradeport, via safe, pleasant, and convenient pedestrian and bicycle accommodations.

Department of Community Affairs & the Georgia Regional Transit Authority:

- Update DRI policies to be more inclusive of pedestrian and bicycle mobility
- Update DRI policies to reflect more recent VMT trends
- Update DRI policies with urban trip generation rates
- Update DRI policies to incentivize transportation management through compact, mixed use design.

Figure 41 is an example of a (signalized) intersection that will function well for drivers and pedestrians. The large turn radius shown in intersection 1 leads to higher-speed turning traffic and low crosswalk compliance, creating a discouraging and dangerous situation for pedestrians trying to cross the street even with a walk signal. Intersection 2 shows tighter corners which encourage safer traffic speeds, yielding to pedestrians, and a direct route for pedestrians. A median that extends past the crosswalk on the multilane leg of the intersection creates a refuge for slower pedestrians and additional traffic calming. A leading pedestrian walk interval can improve pedestrian safety without affecting intersection performance for vehicles (Van Houten, Retting, Farmer, Van Houten, 2000).

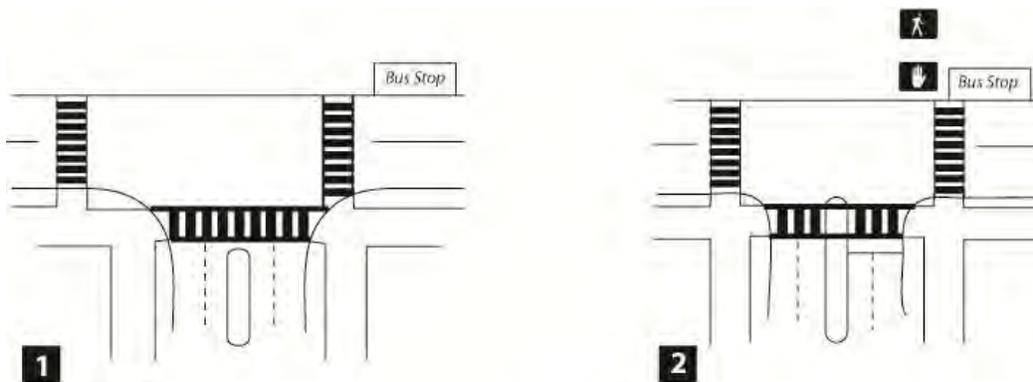


Figure 41: Model signalized intersection (Van Houten, Retting, Farmer, Van Houten & Malenfant, 2000)

Healthy Places Audit: Transportation

Implementing a safe, pleasant, and functional pedestrian environment

A pedestrian plan allows the planning authority to make optimal use of their finite funding, using proven methods of needs assessment, existing conditions assessment, and efficacy. The planning effort can be conducted independently or as part of the comprehensive or transportation planning process, as long as the results are integrated into the decision-making flow.

Accommodations other than sidewalks may be considered when certain land use or transportation criteria are met. Where zoning provides less than one unit per acre, and curb and gutter is not required, shoulders may be sufficient. Where the street is designated as a limited access roadway (not recommended) or has a posted speed limit above 45 MPH and no property access points, shared-use paths could be an option, as long as they exceed AASHTO and MUTCD standards and have equal or better priority at cross-streets (users do not have to stop at cross-streets unless traffic on the parallel street is also stopped).

A mixed model in which some sidewalk maintenance is allocated to the property owner (such as pruning branches and removing debris) may be acceptable if there is a strong mechanism for enforcement of maintenance standards, and if there is a program to assist elderly, disabled, and very low income residents.

Audit Questions

- Is there a pedestrian master plan?
- Is there clear language that will cause sidewalks to be placed along all new and existing streets?
- Is sidewalk maintenance defined, enforceable, and not burdensome on property-owners?
- Do sidewalk construction specifications meet minimum walkability and accessibility standards?
- Are there clear and enforceable procedures for maintaining unobstructed pedestrian ways?
- Is there clear language to minimize high-volume driveway access across the sidewalk?

Audit Findings

Hapeville: The city did not have a specific pedestrian plan, but were in the process of conducting one. Their most recent comprehensive plan included some planning for pedestrian circulation, and the city had secured funding for several projects to install or upgrade sidewalks and add streetscaping. Citywide sidewalk requirements were not identified. However, Architectural Design Standard districts, about 50% of the city, required sidewalks and designated adequate width for the

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clear zone and furniture/planting zone (except for allowance of 4 ft. sidewalks in certain districts). Ordinances appear to designate maintenance responsibilities to the city, but also levy fees against the property owner for sidewalk construction. Sidewalks may not be obstructed, although penalties were unclear. There are some restrictions on curb cuts along major streets, and alleys are permitted in non-residential areas.

Atlanta: The city includes pedestrian planning in their transportation plan, which includes pedestrian metrics for project selection. It requires sidewalks on all streets for any planned development or any zoning district which permits multifamily residential, commercial or industrial uses. However, property owners must petition for a sidewalk on local residential streets. The city requires property owners to maintain and repair sidewalks at their own expense. Sidewalk specifications call for a 5 ft. wide sidewalk at the back edge of the right-of-way, compliant with ADAAG. Mixed use districts require 15 ft. sidewalks. Clear zone and furniture/planting zone width are only specified in overlay districts. Prohibits sidewalk obstruction and requires a pedestrian bypass or scaffolding of obstructed areas. The city appears to require a driveway for every lot, although shared driveways are permitted, or encouraged in planned developments.

Clayton: The County has created a partial sidewalk inventory, conducted sidewalk plans around schools, and designated priority sidewalk locations based on access to school, transit, recreation, and latent demand scores from ARC. Multi-modal access planning is prescribed in overlay districts. The county requires sidewalks on both sides of the street in new subdivisions in all districts except agricultural, but not for infill construction. Routine sidewalk maintenance is assigned to the property owner, and regulation was identified pertaining to repair or replacement of sidewalks. The county requires 5 ft. sidewalks in residential districts and 6 ft. sidewalks in other districts, in or adjacent to the right-of-way. There were no ordinances identified to prevent obstruction of sidewalks. A minimum number of parking access points is given, but no maximum. No language regarding driveways or alleyways was identified.

East Point: The city may require sidewalks in new subdivisions based on certain performance factors. It requires 5' sidewalk in residential subdivisions and 6' in non-residential subdivisions. No guidelines were identified for small infill development or redevelopment, or for existing parcels. Sidewalk obstructions are subject to enforcement, but maintenance is the responsibility of the abutting property owner. The city's short term work plan included funding for sidewalk rehabilitation in unspecified locations.

Audit Recommendations

- Pedestrian accommodations should be guided by an assessment of existing and future conditions in order to prioritize investments and match the appropriate facilities to land use and travel patterns (existing and latent).
- Require sidewalks on both sides of the street generally wherever curb and gutter is required; all new construction or redevelopment should be required to install sidewalks along all sides of their property where it abuts a public or private street.
- New subdivisions should provide sidewalks on both sides of all streets and along the entire length of their property where it abuts existing streets.
- Additionally, stipulate that sidewalks will be added (or upgraded/maintained) when existing roads are repaved, and that funding will be sought to construct sidewalks on existing roads that lack them, in accordance with the pedestrian master plan.
- Provide maintenance guidelines for sidewalks. It is strongly recommended that the entity with jurisdiction over the adjacent street should also provide routine maintenance, repairs, and replacement of the sidewalk as needed. This will ensure a safe, complete system of sidewalks and prevent deterioration of the infrastructure.
- It is strongly discouraged to allocate repair, replacement, or installation costs of sidewalks to the property owner, unless they have caused the need for repair through their own damage or negligence. Sidewalks should be funded and operated as public infrastructure.
- Specify that sidewalks must be five feet wide at a minimum. In mixed-use, office, institutional, and commercial zones, and when residential development is three stories or higher, minimum sidewalk width should be ten feet. Even wider sidewalks may be recommended in very busy commercial or mixed-use areas.
- Specify that sidewalk width refers strictly to the “clear zone” and that plantings, trees, street furniture such as benches and trashcans, signs, utilities (including telephone poles), or any other obstructions shall not be placed in the “clear zone”.
- Specify engineering standards for sidewalks. Use the standards developed by the Federal Highway Administration, American Association of State Highway and Transportation Officials (AASHTO), and Institute of Transportation Engineers (ITE). The surface should be smooth with light texturing for traction. Bricks, pavers, and imprinted patterns are not recommended in the clear zone as they can cause discomfort for wheelchair and stroller users; these motifs may be used for accents and borders.
- Provide guidelines for a “furniture and planting zone” (F/P Zone) between the sidewalk and the roadway, where landscaping, street trees, benches, telephone poles, signs, and other items can be placed out of the clear zone.
- A four-foot wide zone is recommended; this is adequate width for most fixtures and also makes it possible to eliminate cross-slope where driveways cross the sidewalk.
- A “frontage zone” is recommended between the sidewalk and adjacent structures, walls, or fences. This leaves room for doors or gates to swing open without obstructing the clear zone and gives pedestrians room to walk a comfortable distance away from them.
- Specify that the sidewalk continues at grade where it intersects with driveways, and that the driveway must conform to the grade set by the sidewalk clear zone. Tactile strips and crosswalks should not be installed at driveways.

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- Provide enforcement mechanisms for compliance with Americans with Disabilities Act Accessibility Guidelines (ADAAG) and forthcoming Public Right of Way Accessibility Guidelines (PROWAG).
- During construction or utility work, require that a temporary pedestrian route be provided adjacent to the normal walkway, even if this results in a lane shift for other traffic modes. Except in extraordinary circumstances, construction should not require pedestrians to cross the street in order to proceed past a construction zone.
- Prohibit obstruction of the sidewalk at any time by signs, vehicles, refuse, or any other object.
- Ensure proper drainage for sidewalks and curb ramps to prevent water from pooling in the walkway.
- The number of high-volume access points for motor vehicles should be tightly restricted. This will make the sidewalk area safer and more conducive to walking. Vehicular access to parking lots, or drive-throughs where they are permitted, will ideally occur only once per block or less. In order to achieve this, parking and other motor vehicle facilities will necessarily be aggregated and shared. When separate facilities exist, they might be connected by an alley or pass through.

Livable Streets

A majority of transportation departments currently use a method of road classification that places the road on a spectrum ranging from high mobility to high access. The system is hierarchical, increasing the importance of the road as its emphasis on mobility – traffic volume and speed – increases. The primary categories are major arterial, minor arterial, collector, and local street, with some subcategories. It is expected that users will select their travel route to maximize the percent of travel on the highest mobility roads, rather than the most direct route. Perhaps unsurprisingly, land access is not well accommodated along the high-mobility arterials, leading to unpredictable movements, crashes, congestion, and indirect travel patterns from one parcel to another. Similarly, mobility is not well accommodated on local streets, leading to connectivity issues discussed below. Pedestrian and bicycle travel is not well served by the system, which tends to increase trip length as well as increasing exposure to noise, emissions, and crash risk when these travelers are routed onto busy arterials. Other models are available, including the street typology system, context sensitive design, and street hierarchy systems that include more variables relating to context and multimodal use.

Motor vehicle traffic movement is generally safer and more efficient at lower speeds. When speeds are reduced, vehicle spacing can be closer, acceleration factors less, and traffic controls can be ramped-down to allow context-based traffic operation (e.g. stop signs or roundabouts rather than traffic signals). Narrow streets reduce crossing distance for pedestrians and discourage speeding.

Low operating speeds reduce injury rates. A pedestrian struck by a car at 20 MPH has only a 5% chance of being killed. At 30 MPH their risk increases to 45%, and at 40 MPH their risk of death is over 85%. Speeds of 20 MPH and below have been linked with significant health, safety, and social benefits as the right-of-way begins to feel like shared territory for the whole community.

Fatalities Based on Speed of Vehicle

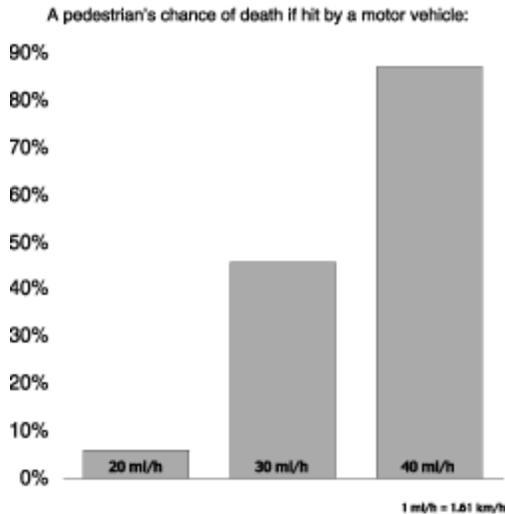


Figure 42. Likelihood of pedestrian fatality with increasing traffic speed. Source: U.K. Department of Transportation, Killing Speed and Saving Lives, London, 1987.

Narrow streets can also significantly reduce maintenance and operating costs for the city. Narrowing a city street from 30' to 22' can result in maintenance savings of up to \$1,000 per mile in terms of cleaning and repair. They also cut down stormwater runoff and heat impacts, and allocate more space for streetscapes, sidewalks, or development. Curb extensions, raised crosswalks or intersections, marked crossings, and use of landscaped medians and traffic circles remind drivers that they are no longer on the freeway. Design specifications for pedestrian streets, bike boulevards, or plazas; bicycle, pedestrian, or shared-use paths can empower developers to use these elements in their projects without a risk of additional permitting delays, and ensure that this infrastructure, whether publicly or privately constructed, has a consistent design and complies with national standards.

Audit Questions

- Are streets and their design classified by use and context, rather than exclusively by vehicular volume and mobility?
- Do street design specifications favor narrow lanes and low design speeds?
- Are there design specifications for other pedestrian and bicycle facilities?
- Is there a clear process for requesting, warranting, and selecting traffic calming treatments?

Audit Findings

Hapeville: The city uses a conventional street hierarchy. A minimum right-of-way width is specified for each classification, starting at 40 ft. for local streets (including sidewalks). The classification of each street in the city is as shown on a map entitled "Official Major Street Plan of Hapeville, Georgia." The city may designate "play streets". It has established a citywide 25 MPH speed limit which does not apply to major roads. Their comprehensive plan references a traffic study that indicated that city streets along the railroad corridor are significantly under capacity. City engineer determines location of crosswalks, "safety zones", and traffic lanes, and removal of mid-block crosswalks deemed unnecessary by the engineer. No codes were identified to guide pedestrian signals and other treatments. Traffic control signal monitoring devices (red light cameras) are permitted. Traffic calming devices are restricted to speed humps on local residential streets, and require support by a speed study and resident petition; they can be removed by petition by a smaller percentage of residents.

Atlanta: The city uses a conventional street hierarchy. A minimum right-of-way width is specified for each classification, starting at 28 ft. curb to curb or 32 ft. total. Establishes maximum speed limit at 25 MPH for all streets within 2.5 miles of the intersection of Peachtree and Marietta Streets, and 35 MPH on all other streets. Limits may be higher if specifically authorized for that street, or lower if there is a hazard that warrants it. City may designate "play streets" which only allow local traffic and carry a maximum speed limit of 5 MPH. Traffic control signal monitoring devices are permitted. Traffic calming devices are restricted to speed humps on local or collector residential streets according to Traffic Calming Device Implementation Guidebook. Planned developments require deceleration lanes on major roads. The transportation plan provides guidelines for pedestrian and bicycle facilities and favors transport projects that incorporate "Complete Streets" and speed reduction, but also assigns a lower ranking to projects that reduce vehicular capacity or truck movement.

Clayton: The county uses a conventional street hierarchy. Their comprehensive plan proposes access management in lieu of road expansion projects. The county DOT determines street changes. Subdivisions must install crosswalks and other safety features at all intersections hosting a sidewalk or path. Specifications are provided for walkways and shared use paths in subdivisions. However, trails are not permitted in office, commercial, or industrial areas. Overlay districts contain additional guidance for placement and design of pedestrian and bicycle facilities. Automated traffic monitoring devices are permitted. No procedures for traffic calming plans were identified. The county established a 25 MPH speed limit in all school, residential, and business zones excluding state and

federal roads. Residential zones are defined as a subdivision or where the density of houses is greater than 10 per half-mile.

East Point: The city uses a conventional street hierarchy. It specifies minimum street width of 32' from curb to curb, except where specifically exempted by city council. Design guidelines for streets start at 25 MPH and up.

Audit Recommendations

- Where all modes will be relatively higher volume, ROW should include 10 foot general travel lanes, 5 foot bike lanes, and off-street or angled back-in parking (rather than parallel) interspersed with curb extensions, and careful programming of traffic operations.
- Lanes should not be wider than 10 feet unless a wide outside lane has been selected as bicycle accommodation strategy or, in selected applications, a truck or bus route.
- There should be options for at least one of the following: where higher demand for on-street parking is planned (e.g. less off-street parking or relatively high rates of car ownership or household size) and cut-through traffic is a concern - “yield streets” allow parking on one side and are narrow enough that two cars cannot pass in the remaining space.
- Where pedestrian volumes will be higher and adjacent land use consists of family-oriented housing, institute “play streets” or “woonerfs” that do not separate or control any modes of traffic.
- Street corner and driveway turning radius should be the minimum size to be navigated; evaluate mountable curb aprons to tighten corners for passenger cars while accommodating the occasional truck or emergency vehicle.
- Designs should be discussed with emergency response services. Refer to the Emergency Response and Street Design Initiative report from the Congress for New Urbanism (Congress for the New Urbanism, 2011).
- Pedestrian-friendly traffic control devices should be utilized where designated crossings are implicit and where crosswalks are warranted; the use and timing of pedestrian signals at signalized intersections should be standardized
- The community should have some options for recourse if a significant majority feels that traffic conditions are unsafe in a particular location. However, the governing jurisdiction may restrict these options so as to ensure an equitable level of mobility for all modes and trips.
- Speed limits should default to 25 MPH, with conservative application of higher speed limits on major roads. 20 MPH limits are strongly encouraged for predominantly residential local streets.
- Proposed treatments should be selected and engineered to avoid unintended negative impacts on the ability of bicyclists, emergency vehicles, and persons with disabilities to navigate the area. Some treatments may be designated as more suitable in a given context of land use and traffic volume.
- Effective treatments should be available for any road that is not limited access, as the need for pedestrian and roadside safety persists throughout the transportation system.
- There should be a clear process by which a designated representative of the jurisdiction works with the community to select from (but not necessarily limited to) the treatments listed in Traffic Safety on page 105

Distance to destinations

Four-way intersections are desirable because they create a complete street network that provides travelers with direct routes to their destination. Frequent use of three-way intersections, loop roads, and cul-de-sacs, especially in creating subdivisions with few connections to exterior streets, can result in longer trips that discourage walking and bicycling. Disconnected street networks force additional trips to be made on roads with heavier traffic volume, including trips made by walking or bicycling. Through routes on side streets accommodate shorter and often safer trips, as long as major roads can be crossed easily.

Block length and street width – and thus the time and distance required to walk to desired destinations – has been identified as one of the most important factors in active transportation. Some of Hapeville’s most pleasant areas for walking would be illegal under the current code, due to short block length. College St from Georgia Ave to South Fulton Ave and North Central Ave from North Fulton Ave to Dearborn Plaza are both less than 400 feet, the minimum. And South Central Ave from Atlanta Ave to Fulton Street is less than 200 feet. On foot, these short blocks offer a variety of route choices, reduce travel distance, and make the trip feel shorter and more interesting. On the contrary, dead end and cul-de-sac streets reduce route choice and can quickly make walking or bicycling unfeasible and unpleasant. Well-managed alleyways can enhance connectivity and provide access management, including in single-family (attached or detached) neighborhoods.

Research has suggested 12,500 persons per square mile (or approximately 8 dwelling units per acre, assuming an average household size of 2.5) is the minimum density to support frequent transit services, while fewer than 1,500 persons per square mile (or approximately 1 dwelling unit per acre) is unable to support any transit service. In the range between those two increments, low capacity transit (e.g. bus service with long headways) may be justified. However, the area is not likely to generate ridership to justify premium services such as commuter rail, regional rail, or streetcar until the 8 dwelling unit mark is exceeded. Commercial or office development can partially compensate for ridership, but only at higher intensities as well. Legislated density may be reduced as much as a third by undeveloped land used for streets, parks, utilities, and other purposes. Given the political will for premium transit service in the study area, higher-intensity residential and mixed use zones may be called for along existing and potential transit corridors (South Central Ave/Henry Ford II Blvd, North Central Ave/Old Dixie Highway, Dogwood Dr., Sylvan Rd., Virginia Ave., Loop Rd., Willingham Dr., Jonesboro Rd., and the railroad tracks). Increased physical activity is associated with a bus or rail stop within 1500 meters. Transit service near home appears to be a significant factor in access

to employment and access to healthful goods and services for lower-income households; transit service near employment centers appears to be a significant factor in access to jobs.

Audit Questions

- Will new streets connect directly to existing streets by the shortest means possible, accommodate future connections, and create a complete network of streets?
- Will block length be in the recommended range for pedestrian travel?
- Do permitted densities support quality transit service corridors within walking or bicycling distance of jobs, stores, and homes and ensure that pedestrian access will be accommodated to current and future transit right-of-way, stations, or stops?

Audit Findings

Hapeville: The city requires new subdivision streets to conform to the city's street plan. Cul-de-sacs and dead-end streets permitted. Four-way intersections neither required nor encouraged, though some limitations on jogs. City ordinances require block lengths between 400 and 1200 feet. The comprehensive plan recommends increasing connectivity, but also proposes closure of Springdale Road, a small road that could provide an alternate route for bicyclists to avoid busier Sylvan Avenue. Higher density, mixed use zoning is used along most major roads and transit corridors, with exception along the northern end of Dogwood Drive. A potential corridor exists along Willingham Way in the direction of the East Point MARTA station, but does not currently have favorable infrastructure or zoning. Higher intensity commercial and mixed-use development targeted along interstates, U.S. Highway 19/41, and marginally around the train depot which has upgraded pedestrian facilities. No high capacity bicycle or transit facilities exist. A pad and shelter have been constructed for Route 95 and adjacent land zoned for mixed-use. The comprehensive plan recommends that Hapeville foster vanpooling, ridesharing, and transit options for commuters, and promote rail transit, shuttles, and travel demand management (TDM). No specific plans were identified for development within walking distance of the proposed commuter rail station. Available rendering of the proposed commuter rail station suggests a park-and-ride design.

Atlanta: The city's subdivision ordinances contain language that that new blocks should result in 'access, circulation, and safety' of pedestrian and vehicular traffic.' Planned housing developments discourage connections to the existing local street network and are instructed to provide convenient pedestrian and bicycle access points , but location of access points are not specified and fencing is recommended around the development. Some mixed-use districts prohibit new streets to create jogs greater than a certain length and require coordination with existing streets, including continuation of street network in historic neighborhoods. In new subdivisions, cul-de-sacs are explicitly permitted, but stub streets can be used instead; however, new connections to existing cul-de-sacs are not

permitted. Also for subdivision, residential streets are required to discourage through traffic access, with access management along major streets. Residential streets must be looped or dead-end. A process is provided for abandoning existing streets. Alleys and pathways through parks may provide pedestrian and bicycle connections, but alleys are not publicly maintained and park routes close at night. The Metropolitan Pkwy and Cleveland Ave. corridors had somewhat higher-density zoning but east of I-75, zoning did not favor higher density of corridors or nodes. Placement of bus shelters was specified and the quantity of citywide bus shelters was limited in city ordinances to 300. The comprehensive plan recommended reintroducing connectivity with new street and intersection connections and land development requirements for through streets. It also identified destination nodes for future transit connections including western edge of airport, but not Cleveland Ave., Hapeville, the airport employment district, or the Aerotropolis site. It also identified corridors with higher density or ridership, including the Route 95/Metropolitan Pkwy, and recommended increased density and mixed use along transit corridors and at stations.

Clayton: No street connection specifications were identified in the county's ordinances. No ordinances relating to block size or length were identified. A pedestrian easement was depicted in the cul-de-sac definition graphic. Overlay districts defined an open space network in which parks, walkways, bikeways, and other non-motorized public facilities should connect to each other and to destinations, especially to community facilities. No corridors in the study area were zoned for transit-supportive density, although higher density, mixed use zoning was present along corridors elsewhere in the community. Redevelopment plans for Mountain View suggest non-residential mixed-use development surrounding the proposed multi-modal Southern Crescent Transportation Service Center. The comprehensive plan recommended creating transit corridors, although no transit service was operating in the county during the study period except limited regional commuter bus service.

East Point: Connections of local streets to collector or arterial streets discouraged in new subdivisions, and both cul-de-sacs and stub streets are allowed.

Audit Recommendations

- Ordinances should specify that new subdivisions use a mostly rectilinear arrangement of streets, that at least 70% of intersections should be four-way, and that no streets may terminate other than at an intersection.
- Where the adjacent property is undeveloped and unplatted, a "stub" street should extend to the property line such that compliant connections and blocks can be created when the adjoining property is eventually developed. Concerns about cut-through traffic on side streets by cars and trucks can be addressed by adopting a variety of traffic calming and diversion treatments that prioritize local and non-motorized traffic.

- Blocks should be 200 to 600 feet from intersection to intersection. A block should be less than 6.5 acres in area.

Bicycle Infrastructure

Creating a bikeable community is a very reachable goal, but it takes time and effort. Becoming truly "bicycle friendly" means more than just adding isolated bike lanes to a few major streets. It requires an interconnected network of bikeways that make bicycling convenient, safe, and enjoyable.

Whether it is due to traffic volume or speed, lack of a shoulder, or other reasons, many roads are uninviting for bicyclists. However, there are many cost-effective options available for incorporating bicycle facilities into an existing community. A comprehensive bicycle plan can anticipate the creation of a complete network of safe cycling routes, and determine the appropriate type of facilities – ranging from signage to bicycle lanes or cycle tracks to a standalone bicycle path – for each route. A plan can also establish design standards to ensure that infrastructure investments are made wisely, ensure that private developments comply with planned routes, and prioritize investments.

Audit Questions

- Is there a bicycle master plan?
- Are bicycle accommodations included in street specifications?

Audit Findings

Hapeville: The city did not have a specific bicycle plan, but were in the process of conducting one. Consideration of bicycle accommodations is recommended for new streets. The comprehensive plan recommends bike lanes on South Central Ave., Willingham Dr., and Dogwood Dr., and recommended renewing an early bicycle plan that suggested bicycle routes to schools and parks.

Atlanta: The city did not have a specific bicycle plan, but included bicycle planning in the primary transportation plan. The city requires platting of bikeways. City code authorizes bicycle lanes, routes, and paths, establishes operation for bicycle and motor vehicle traffic relative to these facilities, and prevents removal without approval by city council. New subdivisions are to add 5 ft. to right-of-way width if new roads include bicycle facilities, or continue a road that has facilities. In the transportation plan, Level of Service and Latent Demand scores were developed for bicycle network roads, and a bicycle parking inventory. The plan does not show that any facilities have been constructed in or near the study area. Routes are planned along Pryor Rd., Sylvan Rd., Cleveland Ave., a section of Jonesboro Rd., and Browns Mill Rd. and included in the project list. The plan references the pre-empted 1995 bicycle plan which had proposed bicycle facilities extending the full length of Jonesboro Rd., Browns Mill Rd., Ruby H. Harper Dr., Southside Industrial Dr., the Old Hapeville/ Hapeville/ Empire Blvd corridor, the Humphries/ School Dr. corridor, Macedonia Rd., and

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Cleveland Ave. The transportation plan provides renderings for design of bicycle lanes, designs relative to parking and turn lanes, and specifications for other bicycle facilities and devices.

Clayton: The county did not have a specific bicycle plan, but did include Latent Demand Scores, a prioritized facility list, and a map of planned and existing facilities in its transportation plan. Multi-modal access planning is prescribed in overlay districts. No specific bicycle provisions were identified in the code of ordinances.

East Point: No bicycle accommodations identified.

Audit Recommendations

- Bicycle accommodations should be guided by an assessment of existing and future conditions in order to prioritize investments and match the appropriate facilities to land use and travel patterns (existing and latent).
- Designate the conditions that warrant bicycle lanes, “sharrows”, cycle tracks or buffered bike lanes, bicycle paths, shared paths, bicycle-specific traffic signals or detectors, bike boxes, and other treatments. This could refer to inclusion in local or regional bicycle plan, proximity to school, connection to existing facility, poor performance in crash rate or level of service, connection to activity center, or other criteria.
- Road design should ensure that bicycle lanes will be at least 5 feet wide, and will not place bicycle traffic within 3 feet of parked cars. Refer to the NACTO Urban Bikeways Guide (National Association of Transportation City Officials, 2011).
- Ensure bicycle accommodations will not be degraded by turning traffic, parking and delivery practices, transit stops, construction, and other hazards.

Institutional support

In addition to design and infrastructure, a community that is committed to multimodal transportation will consider walking, bicycling, and transit in their daily operations – making these transportation options available to their employees and public participants, and promoting a safe transportation environment for all users through enforcement and regulation.

Audit Questions

- Is there a policy to accommodate multimodal access to public facilities and events?
- Are there design specifications for other pedestrian and bicycle amenities?
- Do traffic operation and enforcement codes enhance the safety and wellbeing of all persons, including vehicle operators (pedal or motorized), children, workers, residents, and pedestrians to the greatest extent permitted by law?

Audit Findings

Hapeville: City ordinances require all traffic to obey posted signs. Architectural Design Standard districts include provisions for the creation and aesthetic design of pedestrian amenities and public

space. Bicycle parking is required in some mixed use districts. No plans or ordinances pertaining to multimodal access to city facilities were identified.

Atlanta: The city code requires that all traffic must obey traffic laws and drivers must drive safely, and reiterates that bicyclist traffic is not allowed on the sidewalks in the central business district.

Planned developments and some mixed-use districts have additional conditions for open space and pedestrian amenities. Some overlay districts require bicycle parking. The city's comprehensive plan recommends coordination of street lighting and other amenities; some streetscaping projects were funded in the short term work plan, including Metropolitan Pkwy. The code calls for consideration of pedestrian and bicycle access for new city facilities to reduce energy usage.

Clayton: County ordinances specify that pedestrians must cross street at right angles, at crosswalks where available, in accordance with traffic signals, and must look for oncoming vehicles before entering the street to cross, but that if a pedestrian and a vehicle meet in the street the pedestrian has the right-of-way over the vehicle. Drivers must observe a reasonable and prudent speed based on conditions. Common open space was required in subdivisions, as were streetlights and street trees. No plans or ordinances pertaining to multimodal access to city facilities were identified.

Audit Recommendations

- Policies regarding the scheduling and conduct of community events or public meetings should direct their planners to give preferential treatment to locations that can have good pedestrian, bicycle, and transit access and to provide the public with directions for using these modes, in addition to driving directions.
- Ordinances or plans related to new community facilities and their funding mechanisms should instruct the implementing body to seek site locations that are favorable to access by foot, bicycle, and/or transit by their users.
- Provide walking and cycling instruction in schools.

Economic Activities and Opportunities

Background: Health and Access

Distance to goods and services, especially full service grocery stores, has been shown to limit access to nutritious foods and increase household food costs. Low food outlet density seems to have a greater impact on lower-income or otherwise disadvantaged households. The nutritional value of products offered at food stores (whether convenience stores or grocery stores) and their prices additionally impact consumption of fruits and vegetables, sugar, and fat, particularly for disadvantaged families and teenagers. Additionally, proximity to restaurants and their overall density shows correlation with food consumption patterns, BMI, and related diseases, particularly for fast food restaurants. Other retail and service location proximity appears to influence health as well, such as, pharmacies, libraries, and medical centers.

Travel time and cost for accessing these locations factors into their overall availability, resulting in reduced access when transportation options are limited. Additionally, the form and function of the community influence the potential viability of local businesses and the community as a whole. Extensive separation of land use results in large daily shifts of population from residential areas to office/ institutional sites and back, which can limit the amount of time a retailer has access to their customer base, and thus limit profitability. People tend to factor the opportunity cost of traveling to a given retailer, from home, work, or a nearby store, into their decision to shop or dine at that location. Activity nodes, where multiple destinations are clustered together, allow visitors to park (or walk, or bike, or ride) once and visit several locations with greatly reduced opportunity cost. Co-locating office and residential uses in and around activity nodes further reduces travel time and cost, and increases the potential customer base for more hours during the day. Alternately, zoning practices can create concentrated districts of lower-income households which are less able to attract and support desirable businesses – these nodes are most effective with a wide range of housing sizes and prices. The question of transportation infrastructure in nodes is addressed in the Active, Multimodal Transportation section.

Individual and household health significantly improves with satisfying employment at a livable wage relative to the local market. Employment can provide or allow the household to acquire quality

Economic Activities and Opportunities

housing, nutritious food, education, transportation, medical care or coverage, savings, and many other necessities of a healthful life. Lack of access to employment, under-employment, or jobs which do not pay a living wage or provide sufficient benefits can contribute to stress, depression, malnourishment or obesity, homelessness, and many other negative outcomes.

Planning Environment

Access to retail

Research Questions

- What types of retail and service spaces are likely to be created?
- How might these changes affect health indicators for the stakeholders (e.g. food costs, fruit and vegetable consumption, routine medical care)?

Literature review

Distance to retail services, especially full service grocery stores, has been shown to limit access to nutritious foods and increase household food costs (Larson & Story, 2009). Larson, Story, and Nelson (2009) provided a review of major works or studies that address the relationship between neighborhood access to healthy food options (supermarkets and restaurants) and the influence on health factors such as dietary intake and risk of obesity. Their review found that residents of neighborhoods with greater access to supermarkets and large grocery chains that offer healthier food options such as fresh fruits and vegetables tend to have healthier dietary intake and lower risk of obesity than individuals with limited access to these establishments and greater access to convenience stores. Residents of low income, minority, and rural communities tend to have less access to retail establishments with healthier food choices (supermarkets and large groceries) (Larson et al., 2009). Likewise, in a study of 10,763 individuals living in 207 different Census tracts, Morland, Diez Roux, and Wing, (2006) found that the presence of a chain supermarket in the Census tract was associated with lower rates of overweight and obesity, while the presence of convenience stores and other grocery stores correlated with higher rates of overweight and obesity.

Low food outlet density seems to have a greater impact on lower-income or otherwise disadvantaged households, who may enjoy shorter travel distances to food markets, a greater likelihood of fruit and vegetable markets, and better selection of healthy foods at the stores in their neighborhood (Ball, Timperio, & Crawford, 2009). The nutritional value of products offered at food stores (whether convenience stores or grocery stores) and their prices additionally impact consumption of fruits and vegetables, sugar, and fat, particularly for disadvantaged families and teenagers (Ball, Timperio, & Crawford, 2009; Powell, Auld, Chaloupka, & O'Malley, et al., 2007). Additionally, proximity to restaurants and their overall density shows correlation with food consumption patterns, BMI, and related diseases, particularly for fast food restaurants (Morland & Evenson, 2009; Powell, Chaloupka, & Bao, 2007; Treuhaft & Karpyn, 2010).

Based on a review of studies concerning food deserts and the impacts of increased access to healthy foods on health factors, Treuhaft and Karpyn (2010) concluded that individuals with

Economic Activities and Opportunities

increased access to full service restaurants tended to have better dietary intake and reduced risk of obesity due to the quality of food available and the cost constraint of meals from full service restaurants in comparison to fast food establishments. They also found that the introduction of new and improved healthy food retail in underserved communities adds to job creation in those communities and contributes to the revitalization of low-income neighborhoods. However, consumption of healthy foods can be a complex relationship between retail availability, cost, cultural preferences, and presence of alternative sources (such as food gardens or farm stands) (Sparks, Bania, & Leete, 2011). Other retail and service location proximity appears to influence health, too – for instance, pharmacies, libraries, and medical centers. Travel time and cost for accessing these locations factors into their overall availability, resulting in reduced access when transportation options are limited.

Existing conditions

Several members of the Advisory Committee and survey respondents expressed dissatisfaction with the lack of shopping and upscale dining options for local residents, which were limited to a small selection, mostly located in downtown Hapeville and the airport business district. See Figure 43: Fast food and full service dining options and Figure 46: Retail employment density. It is important to note the location of fast food restaurants (brown dots) relative to full service restaurants (blue dots) in Figure 43; visitors, workers, and residents in Hapeville and East Point have fairly good access to different types of dining options, while residents and workers in the Cleveland Ave., Clayton County, and NPU-Z areas were almost exclusively offered fast food. Participants in the Advisory Committee and survey also indicated a lack of grocery stores and other healthful food markets in the study area.

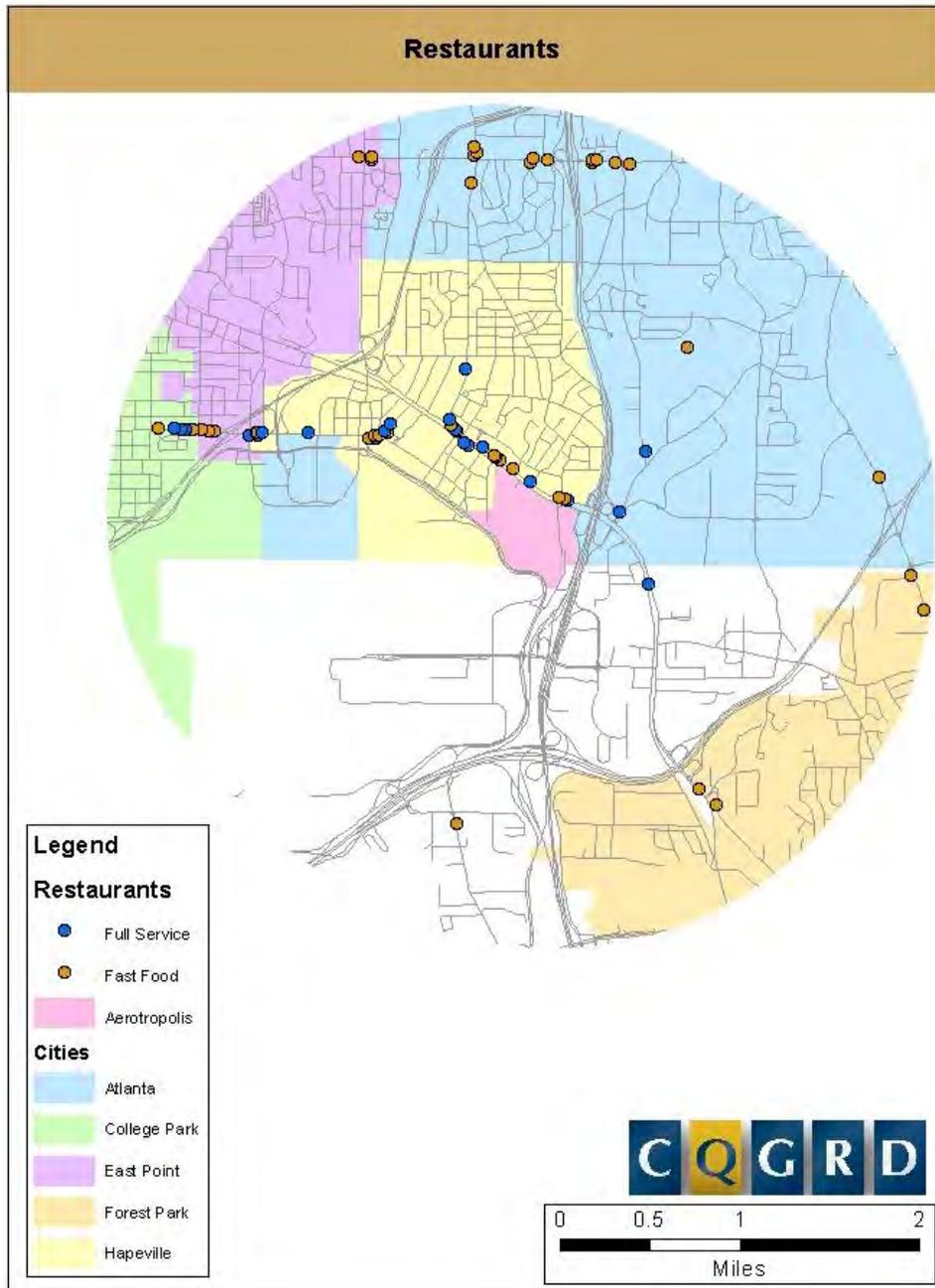


Figure 43. Fast food and full service dining options in study area

Figure 44 shows the location of grocery and produce stores that were identified in the study area, by size (note that one of these businesses, a small produce market in downtown Hapeville, had reportedly closed prior to publication of the HIA report). There was one full-service chain grocery store, at the far northern edge of the study area, and a limited number of other food markets in the study area. There was an Hispanic-oriented market across the railroad tracks from the site which does not appear to meet demand. The advisory committee also expressed frustration with the

study area was considerably less well served, as shown in Figure 45. Chapman Drugs, a popular, locally-owned pharmacy in downtown Hapeville, was thought to attract shoppers.

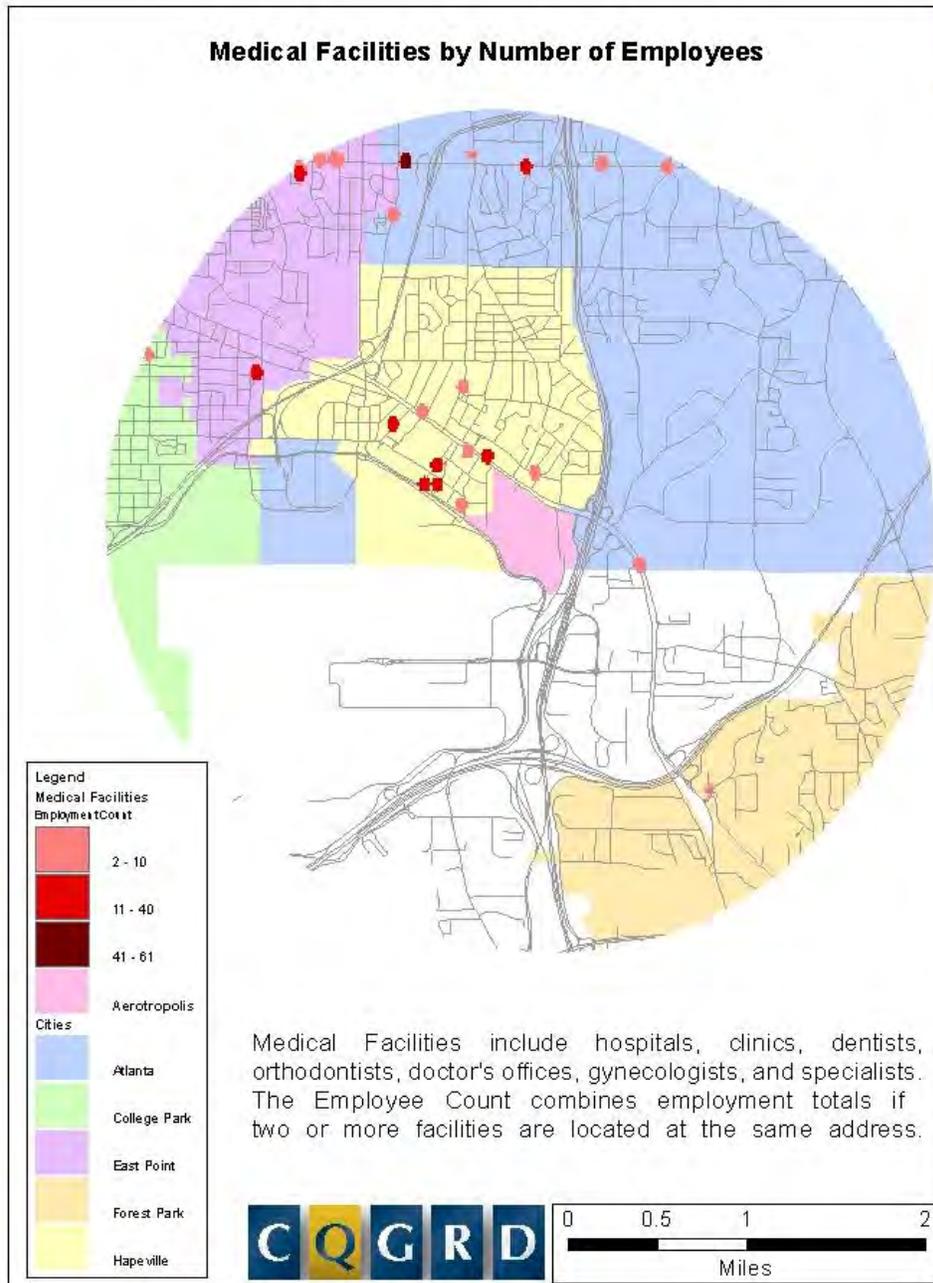


Figure 45. Location of medical facilities, by size

Potential impacts

Aerotropolis will introduce new retail space, as well as generate additional demand for services by office workers, hotel guests, and other site visitors. The ability of the new development

Economic Activities and Opportunities

accommodates demand and creates a larger market for the stores and services needed by the existing community were likely to affect any potential impact on health outcomes. Zoning changes might impact availability and type of goods and services in the area. The International Terminal might change the commercial environment through offerings in the terminal or near the entrance.

Recommendations

Aerotropolis:

- Conduct market analysis to show potential tenants the types of businesses that would be most viable.
- Solicit sellers of healthy food – full-service grocery stores; restaurants that promote fresh, healthful options; bakeries, butchers, and greengrocers – to fill retail locations.
- Design locations suitable for a farmers market, daily produce stand, and food trucks.

Hapeville, Atlanta, Clayton:

- Update zoning to allow selected types of neighborhood commercial development at crossroads and major streets.
- Create ordinances to support vendors and restaurants that sell healthy foods. For instance, adopt a “fresh food store” definition and expedite or reduce the cost of permitting for retailers that meet that definition. Or make fast food restaurants a conditional use where full-service restaurants are permitted.
- Make higher-intensity commercial districts more multimodal so they can serve through traffic and local workers and residents – establish the build-to line at the front of the lot with parking to rear; encourage shared driveways and parking.
- Consider allowing neighborhood scale commercial zoning in residential districts, especially in areas without a current commercial corridor or center.
- Consider increasing the granularity of zoning to create neighborhood commercial centers at crossroads.
- Consider using small multifamily and attached single-family development to transition from commercial streets to single-family neighborhoods.

Hartsfield-Jackson Atlanta International Airport:

- As noted in the Airport Areas section, communities close to the airport may be negatively impacted by noise, air pollution, traffic, and restrictions on the development of heavily affected properties. However, proximity to the airport also represents economic and community development opportunities. HJAIA should help the study area communities capture this value. The International Terminal should interact with surrounding properties in its design, access, and operation.
- Make the connection to Airport Loop Rd. attractive, well-maintained, and visually cohesive, and provide a sidewalk.
- Make the terminal welcoming for travelers, visitors, and shoppers.
- Provide bicycle parking and shuttle stops near the main entrance.
- Pursue new rail and bus service for the new terminal.

Activity nodes

Research Questions

- How might Aerotropolis affect the concentration of destinations in the study area?
- How might new land uses affect market size and purchasing power? What retailers would this scenario attract?
- What is the likelihood of activity node creation in the future?

Literature review

As noted elsewhere in this report, strategies that reduce travel distance to jobs, goods, and services can improve access to them for nearby residents and workers, while also increasing active transportation and reducing the number of miles traveled by car. On a large scale, these changes can increase physical activity, reduce injuries, and reduce noise and air pollution. However, such changes are contingent on the success of the new land use patterns and new businesses introduced into the existing community, and that success is not guaranteed. Some recent studies may help explain varying rates of success through the spatial distribution or clustering of housing types, business types, and civic uses.

Filion (2009) summarized activity nodes as “high-density multifunctional developments featuring a pedestrian-conducive environment and good public-transit accessibility”. They may also be referred to as “centers”, and should contain retail, services, housing, and non-retail employment (such as offices or institutional uses). In order to be fully walkable, the scale is limited to a reasonable walking distance from one side to the other; and they often have a distinct identity. One could think of nodes or centers as small towns that are located in, and well connected to, a larger metropolitan area. Compatible design and gentle, graduated transitions between changes in density and mix of uses plays a major role in acceptance from current and future residents (Searle & Filion, 2011). Searle and Filion (2011) reviewed planning and development trends in Sydney, Australia and Toronto, Canada from the 1940s through the 2000s. They found that quality transit services, especially commuter rail, were a factor in the success of high density multiuse development nodes. Toronto utilized nodes to facilitate higher density developments without encroaching on existing single family neighborhoods and to coordinate growth patterns with planned and existing transportation investments. This plan was balanced with a “greenbelt” program which conserved large areas of undeveloped land at the edge of the city. Citizens had become more supportive of higher intensity development due to their concerns about environmental health impacts and loss of significant natural resources, although there was almost ubiquitous fear that such development would be pursued in a way that destroyed the value of their neighborhood through random placement of incongruous structures. Additionally, nodal development that targets residential density without

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comparable growth in office and retail at the same node was less likely to produce successful results (Searle & Filion, 2011).

Cervero and Duncan (2006) summarized previous literature on the effect shorter distances to shopping or to work have on travel time and distance. They noted that there was considerable, but not wholly consistent, research supporting both of these strategies as means to reduce vehicle miles traveled (VMT) and vehicle hours traveled (VHT). In their own analysis of travel patterns in the San Francisco area, they found that trips to multiple destinations (including work, shopping, or personal services) were frequently combined in a single excursion, although travelers did not go far out of their way to add destinations. The number of jobs and the number of occupationally-matched jobs within four miles of the residence reduced personal VMT and VHT, and more so than the presence of retail and service businesses within that distance.

A new round of studies are showing that new low density commercial development and new low density residential development in previously undeveloped areas cost the local jurisdiction considerably more in expenditures than they generate in tax revenue (Katz, 2011; Leeman, Ohm, & Rose, 2011). Mixed use, higher-density development in existing town centers generated tax returns several times higher per acre at lower infrastructure and service costs (Katz, 2011), while compact housing had about half the infrastructure costs of more scattered residences (James Duncan and Associates, Inc., et al., 1989). Centers that include food shopping tend to fare better than those that do not (Bromley & Thomas, 2002).

Existing conditions

There are some clusters of retail and other uses in downtown Hapeville, the Virginia Park/ airport hotel district, around the Metropolitan Pkwy/Cleveland Ave intersection, and near the Jonesboro Rd junction with I-285. According to members of the Advisory Committee, each cluster has different activity patterns, but none were considered to balance living, shopping, and business uses or to constitute a continually vibrant center of activity. Rather, the airport business district was described as busy from 9 a.m. to 5 p.m. on weekdays and nearly vacant on evenings and weekends. The other areas were considered to be busier on evenings and weekends, but rarely crowded. Clayton County is built-out by its own estimates, with less than 2% of developable land remaining vacant or undeveloped. However, that does not mean that the county has reached its limit of economic activity or residential settlement, nor does it mean that the county's fate has been determined in terms of transportation and other infrastructure. The existing land has occurred at generally low densities, leaving extensive opportunities for land use optimization in redevelopment areas as the market allows.

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Potential impacts

Aerotropolis will create a new activity node well-situated in relation to existing highways, proposed commuter rail, and planned airport access. On its own, it will not be a complete center, being relatively small in size and lacking residential uses.

Recommendations

Hapeville, Atlanta, Clayton:

- Identify current and potential activity node sites that have good transportation access and avoid existing neighborhoods.
- Update zoning to accommodate at least 2/3 of current and future population and jobs in a series of walkable activity nodes, located logically at town centers, crossroads or corridors, major attractions, and transportation hubs.
- Create a node around Aerotropolis, up to a mile in diameter (approximately) that will include office, residential, commercial, and institutional uses and connect to transportation assets.
- Ensure that nodes are distributed throughout the study area. For instance, the part of NPU-Z in the study area lacks any apparent activity center at the time of this HIA.
- Of the remaining area, maximize the amount of land preserved for conservation or agriculture.
- Create a transportation plan that would support walking and bicycling in nodes and improve their access to regional transit.
- Clayton County's zoning should be revised with a focus on redevelopment, identifying certain areas to preserve at existing or even reduced densities (to address traffic and provide opportunities for agriculture and recreation) and targeting other areas for redevelopment with higher intensity, small-block, walkable mixed use centers.

Access to jobs

Research Questions

- How might Aerotropolis affect the number, type, and location of temporary and permanent jobs?
- What are the possible wages and terms of jobs to be created, relative to area median income and local cost of living?
- How might Aerotropolis relate to other employment factors, such as local hiring or training initiatives?

Literature review

The health of an adult individual and their household significantly improves with satisfying employment at a livable wage relative to the local market. Employment can provide or allow the household to acquire quality housing, nutritious food, education, transportation, medical care or coverage, savings, and many other necessities of a healthful life. Lack of access to employment, under-employment, or jobs which do not pay a living wage or provide sufficient benefits can

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contribute to stress, depression, malnourishment or obesity, homelessness, and many other negative outcomes.

Doyle, Kavanagh, Metcalfe, and Lavin (2005) provided a comprehensive review on the impacts of employment, and by extension unemployment on health. According to their findings, unemployment is a stressful event and can have marked negative effects on one's health. These may include but are not limited to premature mortality; poverty due to long-term unemployment may result in individuals having less healthy lifestyles and being exposed to more unhealthy environments; financial strains may contribute to one being more depression prone; affects psychological well-being which might result in anxiety, self-harm or even suicide; individuals might be more likely to undertake unhealthy practices such as drinking and smoke; increased risk of coronary heart disease due to increased stress; etc. Doyle, et al. (2005) also found evidence that certain sections of society are more vulnerable to unemployment such as individuals with disabilities, the elderly, females (under-represented in workforce), travelers and migrants. The types of jobs held by individuals are also a factor to health for example, temporary workers (exposed to poor working conditions, less likely to receive training, job insecurity). Commuting patterns and mode choice can also have effects on individual health which can include reduced physical activity; increased stress due to long travel distances and times; increased commuting to access employment may contribute to air pollution, accidents, noise, etc. It would be important to influence not only the quantity of jobs that persons have access to but also the quality of jobs (types of jobs attracted to an area).

Litman (2002) identified equity impacts that should be considered in transportation planning, and cited a number of examples to illustrate transportation equity analysis. One example addressed economic opportunity, and suggested that overall economic productivity and employment does not necessarily increase as a result of increased vehicle travel. In fact productivity rates appeared to increase with transit ridership and decrease with automobile use. This indicated that community economic development supported by a more multi-modal transit system.

Existing conditions

As shown in Figure 46 and Figure 47, many jobs are spread throughout the study area. Overall, there are many more jobs than residents in the study area. Nonetheless, the poverty rate in the area ranges from 17% in Hapeville to 42%. In the survey, respondents did not think that it was easy to find a job, or that local jobs paid well or offered good benefits.

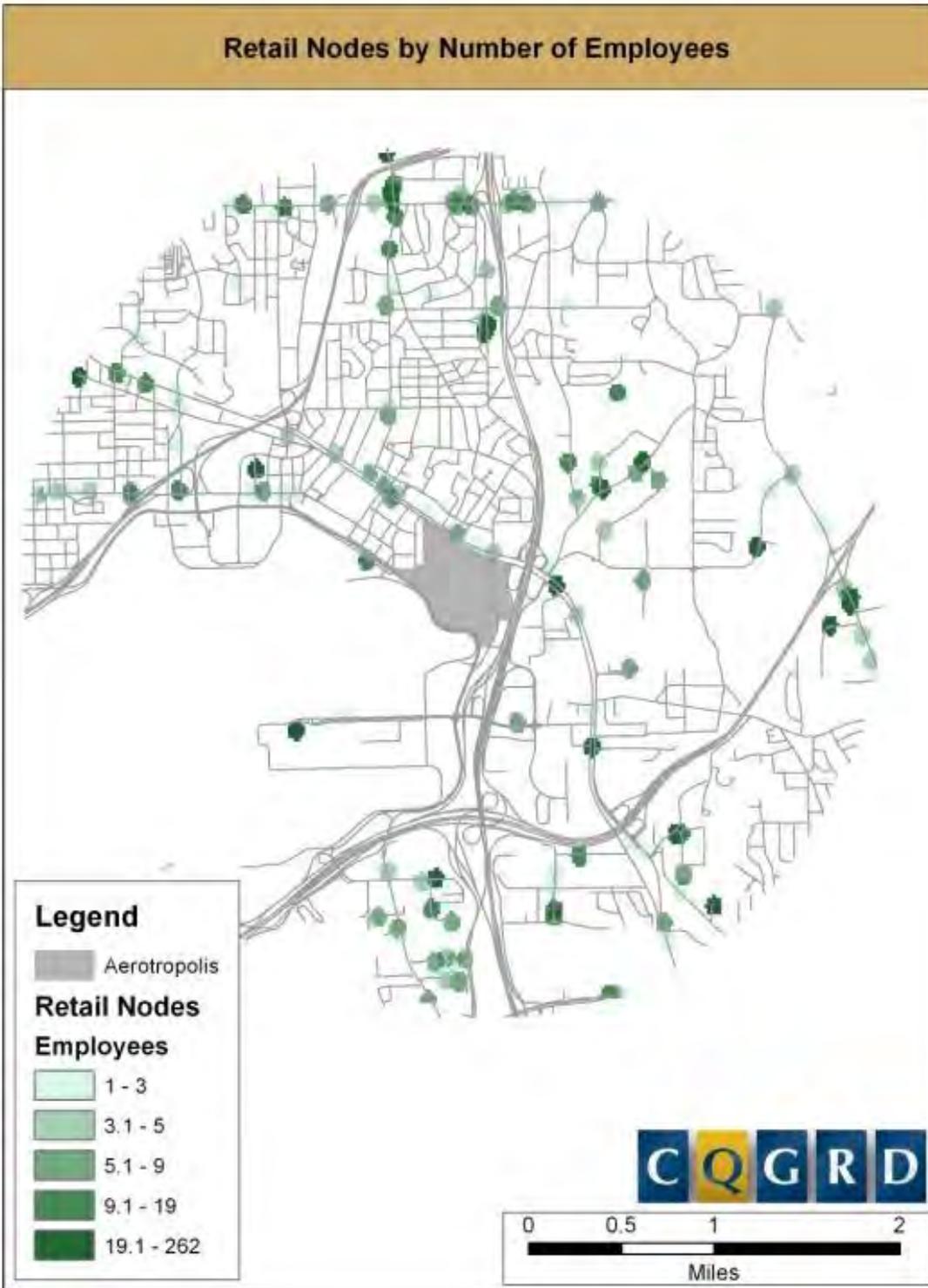


Figure 46: Retail employment density

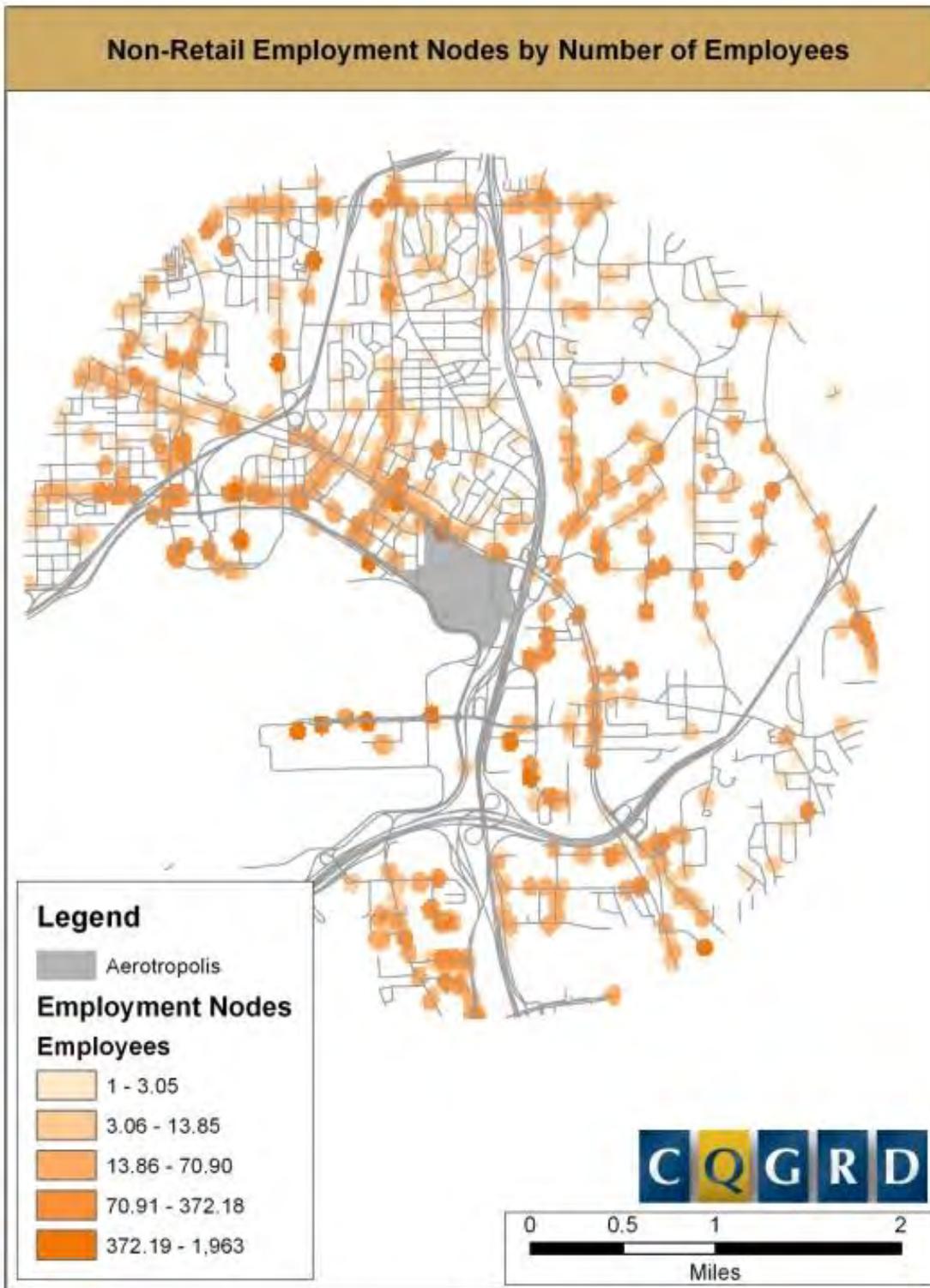


Figure 47: Non-retail employment density

Potential impacts

Aerotropolis was expected to create new jobs at the project site, initially through design and construction, then through the businesses that locate on site, as well as some facilities management. The DRI report described an “Area of Influence” (AOI) defined as the area within six miles by street network from the site boundaries, and extending into Clayton County, DeKalb County, and Fulton County. 73,787 people lived in this area, based on U.S. Census data. The DRI anticipated 12,470 positions offering salaries from \$1,403 (food preparation and serving) to \$7,690 (management). According to the DRI, there will be adequate low-cost housing options based on their anticipated levels of employment, but a sizable shortage of moderately-priced and higher-priced housing in the six-mile AOI. There may be insufficient properties for purchase rather than rental. Again, these figures may be reduced by as much as half due to subdued real estate markets. These calculations were derived from the Area of Influence (AOI) Guidebook for Non-Expedited Reviews, April 2003 and the U.S. Department of Labor’s May 2005 Metropolitan Area Occupational Employment and Wage Estimates Atlanta-Sandy Springs-Marietta, GA. Thus Aerotropolis could help reduce local unemployment rates and shorten commute distance or cost. The potential impact on earnings or benefits could not be determined.

Recommendations

Aerotropolis

- Initiate a local hiring program. This program could be in effect for design, construction, and facilities management, and could also be adopted for post-construction tenancy. See the Atlanta Beltline Community Benefits Jobs Program for a local example which has been extensively vetted by economic development groups and legal review (FAQ and contract at <http://www.beltline.org/Portals/26/PDF/FAQ%20and%20FSEA%20for%20Website%20-%20community%20benefits.pdf>)

Hapeville, Atlanta, Clayton:

- Have regular communication with Aerotropolis developers, and with the Airport Area Chamber of Commerce, to determine the quantity and compensation of jobs located in the area. Investigations could even include employee surveys to assess demand for housing types and for community amenities.
- Ensure that areas around the airport are zoned or otherwise regulated to allow the quantity, quality, and price of housing and amenities could meet expected demand.
- Ensure that the study area is zoned or otherwise regulated to allow growth in jobs that are most likely to offer good compensation, benefits, and long-term stability, based on recommendations from the Department of Labor and other reliable sources.
- Invest in school programs to prepare today’s children for quality employment and seek to attract post-secondary educational organizations to the area.

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- Offer development incentives to companies that agree to provide job training and other benefits.
- Investigate community programs that could assist families experiencing unemployment, such as job training, job search resources through the libraries, connections to aid groups (such as churches or United Way), local hiring initiatives, and even select types of financial assistance, such as deferred property taxes for unemployed residents participating in a job preparation program.

Property values and tax revenue

Research Questions

- How might Aerotropolis impact property values in nearby districts?
- What are the implications of property values for household wealth, affordable housing, and city services?
- What is the potential for variance in impacts relative to variations in design and operation of the site?

Literature review

For a homeowner, rising property values generally mean an increase in wealth and home equity, while falling values equate to an equally serious loss. Higher median area property values are associated with many advantages, including better city services, better schools, and well-maintained properties. However, an increase in the appraised value of a home, or business, will nearly always be followed by a proportional increase in annual property taxes for that parcel. Higher taxes are rarely welcome, although they do fund valuable public infrastructure and services. For homeowners with a fixed income, such as retirees, or experiencing difficulties with their mortgage payment due to a job loss or adjustable-rate increase, the additional expense of higher property taxes can have a significant impact on their risk of default and more generally on the household budget. For renters, their lease or rental terms may allow the cost of their rent to increase if the value or tax burden of the unit increases, again impacting their other household expenditures and potentially causing them to relocate to less expensive housing. Finally, for someone newly seeking residence in the area, property values can determine which, if any, homes are available at their desired prices range (high or low). Property values are strongly influenced by zoning regulations and other ordinances which often place restrictions on lot sizes, style and size of housing, presence of amenities, and proximity to desirable or undesirable land uses. However, this use of zoning may disadvantage some households relative to property values (for instance, by creating an artificial price floor for new homes, or limiting development scenarios in existing neighborhoods) (Green, 1999).

If property values rise sharply, housing affordability can become a serious issue. Affordable housing is defined as mortgage or rent expenses that equal less than 30 percent of a household's income. Housing affordability is not just an issue for poor families; the inability to find affordable housing can

Economic Activities and Opportunities

affect middle and upper income households as well, especially in areas with high housing costs. Where affordable housing is not available, more crowded living conditions may result. Crowded living conditions have also been associated with the transmission of respiratory infections, such as tuberculosis, and ear infections in children and even mold growth, as well as an increase in noise and lack of space for playing. In preliminary research, mold growth has also been linked with fatigue, depression, cerebral strokes, heart attacks, and hypertension. Lack of affordable housing can also impact ability to pay for food or health care, and is linked to higher rates of homelessness (Lavin, Higgins, Metcalfe, & Jordan, 2006, Pollack, Egerter, Sadegh-Nobari, Dekker, et al., 2008). Foreclosure and housing unaffordability have been associated with higher rates of poor physical health, including chest pain, nausea, fatigue, and heart palpitations and severe psychological distress, including depression and anxiety (Cannuscio, Alley, Pagán, Soldo, et al., 2011).

Several measures of walkability appear to impact housing prices. Eppli and Tu (2000) discovered that homebuyers paid more for homes in neighborhoods that provided a good walking environment. The CEOs for Cities organization analyzed property values related to their “WalkScore” score, a measure which represents the number of destinations in walking distance, and found that higher scores could account for a more than \$30,000 price premium in some markets (Cortright, 2009). Some consumer surveys have identified a stated preference for neighborhoods with sidewalks among potential homebuyers. Two earlier studies linked lower traffic volume with increased home values up to 18% (Bagby, 1980; Hughes & Sirmans, 1992).

Additionally, access to high-quality transit services can elevate residential and commercial property values. Debrezion, Pels, and Rietveld (2007) conducted a meta-analysis of 57 datasets that compared property values based on their distance from rail stations. Based on these studies, they determined that properties within $\frac{1}{4}$ mile of a commuter rail commanded significantly higher prices, while subway and bus rapid transit stations showed no significant effect. The difference was greatest for commercial properties. A study conducted in Bogotá, Colombia, however, did find that proximity to the extensive bus rapid transit system increase property values in middle-income neighborhoods, but not lower-income areas (Munoz-Raskin, 2010). Increases in residential property value with proximity to a rail station have also been seen in Dallas, Washington DC, the Netherlands, and others (FTA, 2000; Pagliara & Papa, 2011; TI, 2006; Weinstein & Clower, 1999).

School quality, access to jobs, and crime rates can also have a sizable impact on home values (see Economic Opportunities and Community Preservation and Revitalization sections) (Gibbons & Machin, 2008). Families will also pay more for an otherwise similar house in a neighborhood with low levels of air pollution (see Environmental Exposures section) (Smith & Huang, 1995). Homes in

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locations with perceived health or environmental risks have consistently maintained lower property values; this may refer to locations near landfills, hazardous waste sites, power plants, and industrial emitters (Farber, 1998). Airport noise and contaminated sites have been linked to lower home values on properties where their impact is immediately apparent (Mieszkowski & Saper, 1978; Neupane & Gustavson, 2008). Although proximity to contaminated sites has been linked with depressed property values, a study of a remediated brownfield site in Dallas, TX found that property values began to recover once the site was closed, and were no longer impacted once the site was cleaned (Dale, Murdoch, Thayer, & Waddell, 1999).

Parent and vom Hofe (2011) discovered that homes within 1,000 ft. of a major pedestrian and bicycle trail or nearby parks sold for \$9,000 more than those further away. Anderson and West (2006) likewise found that home sales prices were higher in proximity to a park or golf course, with regional parks having a much larger effect than smaller neighborhood parks, after controlling for other attributes of the property and neighborhood. Proximity to greenspace was especially significant if the home were on a large lot or if the neighborhood in which it was located were dense, near the central business district, high-income, high-crime, or home to many children. Anderson and Cordell (1988) discovered that single-family homes in Athens, GA, sold for about 4% more if they had five or more trees in the front yard. Using regression analysis to control for lot size, home size, and amenities, they concluded that large trees and hardwoods added more to the selling price of a home than smaller trees or pines, and that the added value of each large tree was \$336. Community plans and ordinances which create or preserve greenspace, create trails and paths, or increase tree cover may support higher property values in the impacted areas.

Existing conditions

Median value of owner-occupied homes in the study area was \$124833 in 2005-2009 ACS data from the US Census Bureau. This is about 64% of the regional average of \$196400 (28-county Metropolitan Statistical Area) reported by the Census Bureau for 2010. Affordable housing (small apartment complexes and older houses) could be found to the north and west of the Aerotropolis site, although many of the properties to the west were already slated for redevelopment in the Asbury Park project. Property values were the highest ranked concern during our initial Advisory Committee meeting. Survey respondents believed that Aerotropolis would increase property values.

Potential impacts

Aerotropolis is most likely to increase property values by remediating a contaminated site and introducing new walking destinations, if the site is readily accessible from nearby neighborhoods. Increasing property values might spur revitalization of existing neighborhoods and commercial areas,

Economic Activities and Opportunities

but it could also result in a loss of the affordable housing which currently exists near the site. Increasing property values would fund city operations and community services.

Recommendations

Aerotropolis:

Continue meeting regularly with community representatives to maximize design compatibility, connections, and positive perception of the development.

Hapeville, Atlanta, Clayton:

Implement environmental, transportation, and community recommendations from elsewhere in the HIA report. During comprehensive plan updates, evaluate property values and housing affordability with data and survey collection. Implement Housing Balance recommendations on Page 159 of and pursue additional measures if there appears to be a lack of housing choices at either the low or high value point.

Healthy Places Audit: Economy

Vibrant activity nodes

While no land use is entirely lacking in health merits, certain characteristics, identified in this report, are associated with improved health outcomes. Given the fixed availability of land and the continued growth of both the population and of economic activity, demand for land is increasing and competitive. Zoning determines the supply of land for different uses, and thus also determines its productivity, value, and many health determinants.

A strategy for healthful land use ensures that the fullest appropriate range of use and density are enabled and guided based on environmental and social context. In particular, judicious amounts of land should be available for open space that supports recreation, cultivation, or conservation, and for urban zones that support walkable neighborhoods, town or village centers, and transit. These two uses are complementary, as the concentration of housing and business into walkable, compact arrangements inherently leaves more remaining land available for open space.

However, land that is extensively developed but not walkable can detract from health through lack of physical activity, loss of social cohesion, and increases in energy use, emissions, crashes, and cost of living; land where development is too compact and vertical is at risk for stress, exposure to toxic or unsafe micro-climates, and also loss of social cohesion. As stated above, favorable conditions for walking and transit begin around 8 dwelling units per acre, while some of the world's most highly-rated pedestrian and retail environments are encountered between 20 and 35 dwelling units per acre, assuming an average 2.5 residents per unit.

Walking distance less than 1500 meters from home to a shopping center, post office, news stand, school, or convenience store is associated with higher levels of physical activity. Distance to shopping, services, and employment is associated with better household access to everyday health needs. Proximity to commercial interests can facilitate increased physical activity, access, and economic vitality, but this effect is largely predicated on the presence of businesses that provide everyday shopping and service needs, such as a grocery store, bakery, greengrocer, laundry/drycleaner, café, or drugstore.

With appropriate mitigation of noise, traffic, and emissions, industrial activities can be included in walkable activity nodes. This improves access and physical activity for workers. Regardless of location, industrial sites can be made more suitable for access by foot, bicycle, or transit, and less undesirable as a neighbor.

Audit Questions

- Do building and site codes favor walkable, dense clusters of development?
- Do site and building requirements in activity nodes create an appealing and functional human environment?
- How extensively may commercial, office/ institutional, and residential development be mixed or located within walking distance of each other?
- Are industrial uses located and codified to function seamlessly in the urban fabric?

Audit Findings

Hapeville: Hapeville's code of ordinances, combined with the official zoning map, had no High density or Rural density areas. About 45% of the city was zoned for Medium density uses and 55% for Low density. Approximately 27% of the city allows some degree of mixed uses. Due to its small area, many residential areas are in walking distance from retail zoning. However, the northern section of the city is relatively far from any commercial services, and there are some large areas of single-use industrial, residential, or low-density commercial at the edges of town. Industrial zoning constitutes 28% of the city, and no other uses are allowed in these areas. Architectural Design Standards, which apply to about half of the city's land including downtown, are conducive to relatively closely-spaced storefronts or homes which line the sidewalks, pedestrian-oriented façades and occupancy on ground floor, and hidden parking. Some of the commercial zoning along North Central Ave. is lower density and automobile-oriented, which limits the impact of the walkable downtown area and the Aerotropolis site. The current comprehensive plan encourages nodes of dense, mixed-use development in targeted areas, and preservation of remaining areas. There is a "Façade Grant Program" to restore building fronts.

Atlanta: Atlanta uses Floor Area Ratio (FAR) and minimum residential lot width to determine land use character. Residential density is uniformly Low throughout most of the study area. Mixed use is possible in certain planned developments, and residential development is allowed in some commercial or office zones. According to the city's 2011 comprehensive development plan analysis of existing conditions, 42% of land in the "southside" is residential, almost entirely low density. 4% is described as medium density residential; 7% commercial, 15% industrial, 11% institutional, and no mixed use. Transfer of development rights is permitted in some circumstances. There are no minimum densities. Some zones require setbacks over 35 feet. The area closest to Aerotropolis is industrial, which does allow hotels, offices, and educational institutions. Screening is required adjacent to non-industrial parcels and some landscaping requirements applied to industrial areas, but no other site restrictions were identified. The 2008 short-term work plan for NPU-Z includes preservation of industrial areas and low density residential and commercial. It encourages higher-intensity commercial development at Cleveland Ave and I-75 interchange. Jonesboro Road

Economic Activities and Opportunities

Redevelopment Plan proposes mixed-use neighborhood activity nodes at School Dr. and Macedonia Rd., larger mixed-use activity nodes at Cleveland Ave and Southside Industrial Pkwy, and a major node at Conley Rd. The Cleveland Avenue Corridor Plan, conducted for South Fulton Medical Center, recommends mixed use nodes, elimination of setback requirements, and human-scaled design along the corridor. The Metropolitan Parkway Tax Allocation District (TAD) recommends a retail development node at Cleveland Ave. mixed with higher-density residential, buildings that front on the sidewalk, and parking to the rear. It was not possible to calculate the resulting local density if these plans were fully implemented.

Clayton: Office, commercial, and industrial zones are adjacent to each other but not mixed in study area, although office zoning allows limited retail functions. Restrictions provided for minimum lot width, minimum lot area, minimum setbacks, maximum lot coverage, and maximum height resulting in large lots and low density. There are some façade guidelines for commercial buildings, but not sufficient to create a pedestrian-friendly street enclosure. Mixed use and neighborhood business zones support moderate to intense commercial or mixed uses, but these zones are not found in the study area. Elsewhere in county, residential density kept below 8 units per acre except in mixed use district; agricultural zone available. Planned developments may create mixed-use node in any zone. Very little commercial permitted in industrial areas; offices are allowed. Forest Park envisions mixed use commercial node at I-285/Jonesboro Rd junction. The state farmer's market is shown as a redevelopment node in the county's comprehensive transportation plan, with a large buffer that nearly touches the Aerotropolis site. The Mountain View community, roughly defined by I-75 to the west, I-285 to the south and east, and the Fulton County border to the north, is an Opportunity Zone as defined by the Department of Community Affairs, and has a Mountain View Urban Redevelopment Plan (unavailable) to create a "community of commerce". Office and commercial uses are lacking in the Clark Howell area.

East Point: The city has zoned the Sylvan/ Central/ Willingham corridors primarily for industrial use with some medium and high density residential, and a hospitality section around Virginia Ave. There is some mixed use at Cleveland Ave.

Audit Recommendations

- If the net density of allowable uses were to be categorized as High (> 20 units per acre or >90 employees per acre), Medium (8-20 units per acre or 30-90 employees per acre), Low (1-8 units per acre or 6-30 employees per acre), and Rural (<1 unit per acre, rural, or agricultural), no more than a third of developable land should be in the Low category.
- High and Medium density qualify as walkable development, Low qualifies as unwalkable development, and Rural qualifies as conservation or agricultural land.

Economic Activities and Opportunities

- Lot width in walkable development should accommodate 15 to 20 commercial entrances every 100 meters (328 feet) in commercial districts This figure was derived from successful shopping districts in cities and towns across the world. It equates to a new storefront every 16 to 21 feet, or about every 5 seconds at normal walking speed. (Gehl, 2010)
- Site primary building at or within 20 feet of the right-of-way
- Require active uses on ground floor
- Require façades, building entrances, and signage to accommodate pedestrians
- Develop minimum glazing requirements for front and sides of buildings, especially on ground floor, in accordance with the community's traditional buildings.
- Public and semi-private places to congregate are permitted or incentivized, including plazas, cafés, lobbies, and sidewalks wide enough for promenading, window-shopping, or sidewalk dining
- Guidance is provided for the placement of new public buildings, such as schools and courthouses, in or near development nodes
- Zoning ordinances should take care to allow everyday shopping in addition to the specialty shops, such as clothing or gift shops, which may anchor their shopping districts.
- Maximize the proportion and location of districts where three or more uses can be co-located by increasing:
 - Extent of mixed-use zoning, or extent of coding that does not prescribe use
 - Extent to which mixed-use zoning allows commercial, office/ institutional, and residential development within the same building or block
 - Extent to which zoning, if any, allows multiple categories of land use in zones not designated 'mixed use'
 - Granularity of zoning
- Permitted businesses meet the daily utilitarian needs of nearby workers and residents
- Build-to line between zero and 20' from right-of-way with a walkway to the entrance
- Parking and delivery bays in rear
- Glazing facing right-of-way
- Vertical factories permitted; height restrictions removed or conditional
- Same landscaping standards and incentives as other districts, screening standards for parts of property
- Requirement to install sidewalks, except where exempted, and implement on-site freight operations and design to facilitate safe interaction of freight vehicles with other traffic including pedestrians
- Define transitional area, use, or design
- Prioritize access to rail facilities and incentivize use of freight rail

Parking supply and pricing

Parking ordinances have been standardized across the U.S., but emerging research shows that these ordinances can have extensive, undesirable effects on economic vitality, transportation choices, and health. Requiring a minimum number of car parking spaces in relation to the volume of business

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effectively increases the cost of doing business for local merchants due to higher property and maintenance costs. The overall profitability of the land within the jurisdiction may decrease, as a significant percentage is used for non-revenue generating parking space, resulting in lower property and sales tax returns on per square foot and potentially increasing prices. This lost value generally cannot be recouped from priced parking, as the minimum requirements are designed to create an oversupply of parking. Opportunities for internal capture (customers visiting multiple businesses) are reduced, since most businesses take a proprietary stance towards the parking they provide, and thus require customers to return to their car and remove it from the lot before visiting adjacent businesses. However, shoppers are reluctant to make multiple stops due to the friction and lost time involved in each parking operation. The presence of parking facilities results in a loss of density and continuity of the business district. (Shoup, 2005)

Research has shown that small cities with the most expansive parking minima have experienced the most severe declines in their downtown districts, while cities with centralized parking and no parking requirements at the site level have been more successful (McCahill & Garrick, 2010). Centralized parking should not be a major expense for a city, as they should recoup their expenditures through parking fees (since supply will be more equal to demand) and higher tax revenue per acre from the business district. Priced parking tends to correspond with a reduction in traffic congestion and improvements in health, when the cost of parking is a factor in travelers' decision to walk, bicycle, or take transit to the business district rather than drive.

Audit Question

- Have minimum on-site parking requirements been replaced with strategies for market-rate shared parking (on or off-site)?

Audit Findings

Hapeville: The city establishes a minimum number of parking spaces based on use. Two spaces are required for each residential unit except in the Urban Village district, where 1 or 1.5 are allowed. One space is required for every 200 sq. ft. of commercial space, every 3 seats in event/church space, every hotel or hospital room, or every 2 industrial employees; requirements are slightly lower in one mixed-use district. Parking can be up to 400 feet from the site, and shared parking may be authorized by the board of appeals. In some districts, such as Urban Village, parking must meet design guidelines. The city's current comprehensive plan calls for recalculating parking requirements, reducing parking requirements in areas served by airport shuttles, and creating consolidated parking facilities for the downtown. Architectural Design Standards require first floor occupancy on all buildings including parking decks.

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Atlanta: The city requires one space per 300 sq. ft. for most uses, or one space for every 4 seats. One space required per 100 sq. ft. for restaurants and 75 sq. ft. for bars. Parking for multifamily residential based on floor area. Requirements can be reduced slightly in planned developments and overlay districts. Parking structures are required to have a screened façade but not usable ground floor. Front yard may not be used for parking in residential or office districts. All of the redevelopment plans except NPU-Z referenced relocating parking to rear of lot. None addressed the question of parking supply, minimum parking requirements, or shared parking. The city's 2008 comprehensive plan recommended reducing parking requirements in transit centers and mixed-use districts.

Clayton: The county requires minimum parking supply at the rate of 2 spaces per dwelling unit (1.75 in certain mixed-use areas), 1 per 3 seats in church or theater; 2 per hospital bed; 1 per 200 or 250 sq. ft. for offices; 1 per 250 sq. ft. for retail; 1 per every 70 to 100 sq. ft. for restaurants; 1 per 1000 sq. ft. for manufacturing; and 5 spaces per 1000 sq. ft. plus 1 per employee for warehouses. Parking lots permitted in front of building in most zones. Parking may be up to 300 ft. from site. Some parking reductions permitted adjacent to transit, bicycle, or pedestrian facilities, adjacent to other uses, or in overlay districts.

Audit Recommendations

- Minimum parking requirements should be eliminated, although property owners should still be allowed to construct parking facilities on their property.
- Parking garages should be required to place active uses (e.g. retail or offices) on at least 50% of their ground floor; parking lots should be required to be placed behind buildings.
- Shared parking facilities should be facilitated through explicit authorization in code of ordinances, and through the coordination of the local development authority.
- On-street parking in activity nodes should be priced to encourage workers and long-term visitors to use garages or lots instead, and to maintain turnover and availability of on-street spaces for short visits.
- Changes to parking requirements should be made in conjunction with improved multimodal access, information about the change, and if necessary, resident-only parking restrictions in nearby residential areas.

Enable access to nutritious food

As noted in the literature review in “Access to Retail”, reduced travel distance or time to healthy food outlets such as grocery stores, greengrocers, butchers, or bakeries, is generally associated with the

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frequency with which a family purchases and consumes fresh, nutritious foods. However, the location of homes, workplaces, and grocery or other food stores is often closely regulated by zoning codes. The success of a neighborhood grocery store, where they do occur, can further be influenced by permitting and development requirements, and the economic stability of the surrounding community (PHLP, 2009). Zoning also regulates where restaurants can locate, and may or may not restrict the type or restaurants allowed in each district. Produce stands, farmers' markets, and food trucks can bring fresh, often local, food sales to places where it otherwise would not be feasible. Research has associated access to these retail food sources with improved nutrition. Community gardens, home food gardens, and local food growers have also been linked to better health for families and children. However, these land uses can also be restricted by zoning that excludes any agricultural uses, or homeowners' associations that limit landscaping options; ordinances can be modified to allow community gardens in city parks or temporary gardens on vacant properties.

Audit Questions

- Are food markets, such as a grocery store, bakery, or greengrocer, encouraged within a half-mile of most residences and workplaces?
- Are there accommodations for temporary food sellers, such as produce stands, farmers' markets, and food trucks?
- Are there regulations to facilitate access to healthy dining options?
- Are there regulations favorable to growing fresh food?

Audit Findings

Hapeville: Grocery and food stores are permitted or conditional uses in most mixed-use zones. Some residential areas are more than 15 minutes by foot or transit from any places zoned for food stores, but not more than 15 minutes by bicycle or car. No accommodations for food trucks, temporary produce stands, or farmers' markets were identified. The city has several zones, including Urban Village, which allow full service restaurants, but not fast food restaurants. Private gardens are explicitly permitted in lower-density residential districts. No other urban agriculture policies were identified.

Atlanta: The city does not allow grocery stores in any residential districts in the study area. They are permissible in commercial, industrial, and mixed use zones. The city is undertaking changes to its food truck permitting process in order to allow them to prepare food; stationary food vendors and trucks selling pre-prepared foods are permitted. Vendor ordinances also accommodate farmers' markets. No distinction is made between full service and fast food restaurants in the city's zoning code. Eateries are permitted in mixed-use districts, industrial districts, hotels, and multi-family

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residential buildings for the use of building occupants. Gardens are explicitly permitted in residential districts. Community gardens are explicitly permitted in planned conservation districts.

Clayton: The county permits food stores in commercial districts, and accommodates some wholesale and retail food sales in its industrial districts. Their ordinances provide a permitting process for mobile and temporary food service establishments. The county puts some restrictions on drive-through restaurants in office districts, but does not distinguish between full service and fast food restaurants. No ordinances relating to urban agriculture were identified.

Audit Recommendations

- Utilize a “fresh food store” definition
- Streamline approval for fresh food stores and set the option to waive site restrictions where justified
- Allow food markets in all districts, including conditionally in residential areas
- Identify areas without a fresh food source within a half-mile, and adjust regulations to attract stores to those locations
- Institute a licensing/permitting process with low fees and expeditious review
- Designate of public property which may be used for temporary food sales, such as on-street parking stalls, publicly owned parking facilities by schools or business districts, public parks or plazas
- Coordinate with health department to ensure sanitary practices
- Place restrictions on fast-food restaurants
- Streamline approval for full-service and fast-casual restaurants and set the option to waive site restrictions where justified
- Allow small restaurants in all districts, including conditionally in residential areas
- Develop menu labeling requirements
- Coordination with health department to ensure sanitary practices
- Develop expedited permitting for small farmers’ markets, and create a map of public spaces where such markets are explicitly permitted to operate (e.g., designated areas of public parks, public parking lots – distributed throughout the community)
- Expressly permit food gardens on private property
- Enact a legal mechanism for creating community gardens in parks, school grounds, or other public property
- Include community gardens in park design
- Enact a legal mechanism to permit temporary food gardens on vacant private property

Community Preservation and Revitalization

Background: Health and Community

There is a wide, if not conclusive, body of literature regarding the health effects of community development, economic development, and revitalization of downtowns and industrial districts. This can be linked to health through the creation of retail sites and services, as discussed above. Community revitalization can also be linked to economic and social security of households through property values, availability of government services (and the funding streams to support them), and job creation (see below). However, changes in property values can mean different things to different households. For a retiree on a fixed income or a young family trying to make ends meet, a large rise in property values could mean a big property tax bill and the possible loss of their home. For an established family or investor, rising property values mean a good return on their investment while decreasing values represent the potential loss of income. Changes in property values also impact the tax digest. In the literature, aspects of mental well-being and social cohesion are often associated with development or revitalization, as residents come to perceive a positive outlook for their community and enjoy increased opportunities to interact with community members and visitors.

Social capital, or the collective bonds within a community and to the surrounding society, is linked to mental wellbeing and access to goods and services (including education and jobs). High levels of perceived social capital have been associated with lower crime rates and a reduction in behavioral disorder, such as drug addiction and disenfranchisement. While research into the indicators and causal chain for social capital is still in the early stages, this concept seems to be of importance to the study area due to concerns about loss of community engagement and character, coupled with low rates of educational attainment and high rates of homicide and HIV infection. Advisory committee members have indicated that there is a considerable amount of social capital in the Hapeville community, but that local workers, residents of adjacent communities, and certain demographic groups are not fully engaged with it.

Planning Environment

Re-energizing Communities

Research Questions

- How might Aerotropolis impact market and social vitality in nearby districts?
- How might variations in design and operation of the site create variance in impacts relative to vitality?
- How might fiscal position and planning policies of local jurisdictions correlate with community development or revitalization?

Literature review

Based on the literature, economic investment, sociocultural factors and transportation access have the potential to influence a region's community development efforts. Ongoing investment is critical to a healthy urban community. In order to provide a safe, attractive place that can support its occupants, there must be routine maintenance of public and private properties, businesses that grow or change to meet evolving demand, new neighbors to replace those who leave, and gradual development to accommodate a growing population. Studies suggest that spatial integration with existing shopping linkages is likely to assist community revitalization efforts (Thomas, 2003).

Remaining occupants, who do not have the resources or motivation to leave the area, are likely to experience higher crime rates, higher rates of mental illness and dissatisfaction, and reduced quality or quantity of public services including schools. Residents encounter reduced access to jobs and services and poorer housing quality, while businesses suffer from declining profits (Thomson, Atkinson, Petticrew, & Kearns, 2006). Communities that fail to maintain and renew themselves can quickly drive away successful residents and business, lose their main sources of tax revenue, and fall into a vicious cycle of disinvestment and negative perception of the area.

Research suggests that community involvement and dedication is necessary To foster an environment that promotes community development and revitalization. In Schadler et al.'s study (2011) of a model for brownfield redevelopment, it is suggested that an integrated assessment approach, with an emphasis on stakeholder engagement, may aid consideration of land-use options. Further, "sense of community" and "community resilience" have been identified as social factors which may promote successful community redevelopment (Chavis, 1990; Zautra, 2008). Research also suggests that despite poor physical quality of neighborhood facilities or housing, strong "place attachment" may contribute to revitalization (Brown, 2003). Thus, there is support in the literature for the association between attachment to community and community revitalization.

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Cultural events and expressions appear to be a significant part of revitalization efforts. The expression of culture and community identity, and the presence of engaging forms of expression in otherwise unexceptional public spaces can stimulate new interest in the area by current residents and visitors. Streets, plazas, parks, and even vacant storefronts can become catalyzing spaces that attract new attention. Programs that feel inclusive for all community members and express positive values can promote mental wellness (West & Scott-Samuel, 2010). However, this source of regeneration is only possible when appropriate spaces are available and authorized for use in public and artistic expression. For example, the town of Pittsfield, MA had suffered from several decades of decline following the departure of a major employer. Finally, an initiative to let artists use unleased retail spaces at little or no cost brought new activity to the downtown, and began attracting tourists and new residents (Filipov, 2010). Such strategies have been referred to as “creative clusters”, and are associated with an increase in economic activity, redevelopment, and community support. Some creative clusters may have been too successful, leading to large increases in property values and loss of the existing community (Evans & Shaw, 2004). Ordinances regarding affordable housing and historic preservation may help to maintain healthy but gradual revitalization.

Tourist spending can be significant to community and economic development. In the study area, tourism from the Hartsfield International Airport could contribute to the economic success of the Aerotropolis redevelopment and economic development in surrounding communities. To succeed as a destination for tourists an area should be accessible to these users and should thus provide sufficient and appropriate travel options (rental cars, public transportation, tours) for their use. Koo, Wu, and Dwyer (2010) demonstrated the effects of public transportation on the dispersal of air leisure arrivals to peripheral areas in Cairns, Australia. Thompson and Schofield (2007) investigated the relationship between public transport performance and its influence on destination satisfaction. These studies suggest that economic development in the study area can be aided through the provision of tourist-oriented public transportation to the destination offerings at the Aerotropolis site.

Existing conditions

The study area currently suffers from multiple underperforming and non-performing land uses including storefronts in downtown Hapeville, strip and freestanding commercial sites, industrial properties, and some aging residential areas. Stakeholders report that past revitalization efforts have not succeeded in fully reversing this condition

Potential impacts

Aerotropolis has the potential to shift market opportunities and demand by attracting a large number of new workers and visitors to the area. However, these users may or may not also visit the

surrounding areas as a result of their trip to Aerotropolis. If the Aerotropolis integrates well with the surrounding community in both function and design, it may make the area more attractive and drive up property values. On the other hand, if it looks out of place, does not bring many amenities to nearby residents, and generates heavy traffic, it could depress property values. Additionally, functionality with the airport could affect the number of new visitors. Profitability of the Aerotropolis properties will correspond with property and sales tax generation for the governing jurisdictions; it could constitute a major piece of Hapeville's city budget, and thus their ability to maintain and reinvest in community amenities. The assessed value, and thus both wealth creations and tax obligations, of nearby properties could correlate with the perception of Aerotropolis as a positive or negative influence.

Recommendations

Aerotropolis/Hapeville, Atlanta, Clayton

- The offering of essential daily goods and services should be considered to attract retail and small office tenants as discussed above. A market analysis would show the types of businesses that are lacking. In our outreach activities, demand was expressed for grocery stores, clothing stores, and upscale dining.



Figure 48: Variation in materials, angles and height can soften the front of a building.

Credit: Flickr/cityscape

- Aerotropolis must present a compatible façade to the surrounding communities. While there are primarily office and industrial buildings to the south and east, the community character towards Hapeville – both to the north across the railroad tracks and to the west towards downtown and Asbury Park – should evoke a walkable, traditional town with thriving retail and community sites. Figure 48 through Figure 50 provide examples of pedestrian oriented design for a major grocery store and for an industrial or corporate campus. This includes:
 - Build-to lines within 10 feet of the right-of-way
 - Ground floor restaurants and retail, especially at corners of the property and at likely locations of a future commuter rail station or underpass.

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- Motor vehicle access to the rear or side of buildings, and generally reserved to a few parking structures. However, on-street parking on some streets, including Henry Ford II/South Central Ave could promote engagement with the street.
- Ample sidewalks, streetscaping, lighting, benches, and bicycle parking.
- Visually interesting building façades, up close and at a distance, that borrow architectural details and materials from nearby historical structures.



Figure 49. Volkswagen factory.
Credit: Flickr/Poom!



Figure 50. Volkswagen factory.
Credit: Flickr/jacobchristensen

The famous Volkswagen “Glass Factory” in downtown Dresden, Germany is a good neighbor, with attractive landscaping and easy access by car, bicycle, foot or tram. It is owned by Porsche.

Social connections

Research questions

- What types of public spaces are likely to be created?
- How might site design and facilities impact social interaction and civic engagement?

Literature review

Social capital can be defined as the collective value of a network—social, political, and economic—whose purpose is to inspire trust in and provide support for other members of that community (Dannenberg et al., 2003). It is the degree to which people feel that they live in and belong to a socially cohesive local environment, and the range of activities and resources that emerge as consequence of those ties. Individuals who are not well integrated into the social, political and economic networks, those with low social capital, are reportedly at increased risk for poor physical and mental health (Kawachi, I. 1999; Hawe, King, Noort, Jordens & Lloyd, 2000). On the contrary, people socially engaged in their communities live longer and are healthier both physically and psychologically (Kawachi & Berkman, 2001; Berkman, Glass, Brissette, & Seeman, 2000).

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Recent studies have explored the relationship between the built environment and its effect on the building of social capital. Walkability has been found to be positively correlated to social capital. The following design components can make neighborhoods more walkable and may increase social capital: 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. These last elements are particularly important, as they provide public realms that encourage both interaction and physical activity (Ewing & Kreutzer, 2006). A strong connection has been made between lowered social capital and automobile dependence (Ewing & Kreutzer, 2006; Adler & Newman, 2002).

The health benefits that have been linked to high levels of social capital are extensive. Various studies have shown that isolation is a major cause of illness, and that once ill, socially isolated individuals are two to five times more likely to die than those with strong social networks. Social capital has also been linked to better overall health, better cardiovascular health, and improved mental health (self-esteem, better self-image, greater self-worth). Social capital has even been shown to reduce incidents of violent crime and increase physical activity (Ewing & Kreutzer, 2006).

The design of the built environment can have an effect not only on physical activity but also on the sense of community. Front-facing residential entrances, or residential entrances that are directly connected to pedestrian paths or active common spaces, increase the likelihood of social interaction. The inclusion of certain architectural features such as stoops, porches, and communal gathering spaces also increases social interaction, improving one's sense of emotional well-being. Views of and access to nature have also been shown to have positive health impacts resulting in increased recovery times for hospital patients, decreased mortality in seniors, lower blood pressure and decreased anxiety, and higher levels of attention in school age children (Lavin, Higgins, Metcalfe, & Jordan, 2006).

Leyden (2003) suggested that the built environment and neighborhood design influences the social capital generated and impacts residents' physical and mental health. Results from this research suggest that walkable, mixed use communities foster and promote a greater level of social capital than those residing in the modern automobile oriented suburban neighborhoods. Unlike the chance interactions that occasionally occur in suburban neighborhoods, mixed-use communities allow interactions to occur while performing daily tasks such as taking children to school, grocery shopping or having drinks at a local café or pub.

Wood, Frank, and Giles-Corti (2010) also examined the effect that walking and neighborhood characteristics have on sense of community. Sense of community was defined and captured through

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a composite measure which included respondents' reactions to items such as if they stopped and talk to their neighbors, how easy is it to make friends in the neighborhood, if they borrowed items from neighbors, their willingness to work with others to improve the neighborhood, etc. The independent variables used included neighborhood and individual demographics, self-reported physical activity (walk – leisure and brisk walking) and vehicle use, and both subjective and objective perceptions to the built environment. Of the demographic variables examined home ownership and race were significantly associated with sense of community. Owning one's own home was associated with an increased average sense of community score while being non-white was associated with a decreased average sense of community. The frequency of leisure walking per week had a positive association with sense of community, but, no association was observed for brisk walking. For each additional day of leisure walking activity, sense of community scores increased marginally.

Of the factors associated with the built environment (level of mixed land use, connectivity, net residential density and commercial floor area ratio) there was an inverse relationship between mixed land use and sense of community. Persons living in low mixed land uses were more likely to have a higher sense of community in comparison to those in a high mixed land use area. Whereas high commercial floor area ratio (an indicator of the retail relative size and proximity to shops, and services to street frontage) was associated with a high sense of community. Items related with one's perception of the neighborhood relating to walkability which were significantly associated with sense of community included seeing neighbors while walking and the presence of interesting sites, both were positively associated. This research attempted to go beyond the usual work done, relating to the relationship between community design and physical activity, to empirically explore how the concept of the sense of community is affected by or is associated with neighborhood design features (Wood, Frank, and Giles-Corti, 2010).

Limiting crime within a community and increasing residents' sense of security might have great implications for the overall vitality of a community. Schweitzer, Kim, and Mackin (1999) examined the built environment and its influence on crime and also the fear of crime in urban neighborhoods. A distinction was made between the level of crime within a neighborhood and the residents' perception or fear of crime, since a neighborhood with relatively low crime rates but high perceptions or fear of crime may still be negatively affected. This study hypothesized that certain aspects of the built environment within a neighborhood might have some effect on the sense of community or social interactions that may occur and thus influence crime and the fear of crime. Their overall findings suggest that the actual crime rate is not significantly related to the sense of community; however sense of community was the major factor or variable in predicting fear of crime. To reduce fear of

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crime efforts should be undertaken to foster a sense of community among neighborhood residents and the built environment should be used to promote safety (shared driveways, presence of nearby stores, porches, etc.). These perceptions of crime within a community can also affect the rate at which individuals engage in active transportation there. Kuo and Sullivan's (2001) landmark study on the effect of the physical environment on behavior investigated the effects of vegetation on the level of crime within the inner city. Contrary to fears that that dense greenery provides a haven for criminal activity, this research showed that residential urban greenery may deter crime. Greenspace and vegetation appears to hinder crime through increased usage of spaces which increases natural surveillance by residents. It also appears to act as a territorial marker signaling that a particular area is cared for, and to reduce negative emotions that might contribute to violent behavior.

Existing conditions

Certain parts of the study area have a considerable amount of social capital, especially the small city of Hapeville. However, not all Hapeville residents seem to participate in this social circle, particularly Latino families. There is a limited amount of interaction with local businesses and workers. Community ties outside of Hapeville seem to be less consistent.

Social capital, or the collective bonds within a community and to the surrounding society, is linked to mental wellbeing and access to goods and services (including education and jobs). High levels of perceived social capital have been associated with lower crime rates and a reduction in behavioral disorder (such as drug addiction and disenfranchisement). While research into the indicators and causal chain for social capital is still in the early stages, this concept seems to be of importance to the study area due to concerns about loss of community engagement and character, coupled with low rates of educational attainment and high rates of homicide and HIV infection. Additionally, the more general sense of community experienced by individuals contributes to their social and civic identity.

Based on survey responses, people who felt there were gathering places in their community were also more likely to have visited a neighbor of local business recently, to encounter people they knew at local businesses, and to say that the area had a thriving business district. They were more likely to agree that there were places they could walk to nearby, and to feel safe in the community. Currently, there are no inviting public spaces on or near the site. Parks can be found to the north, along King Arnold Dr. and to the west in southern downtown Hapeville. Attractive streetscape areas are observed in downtown Hapeville and Asbury Park with wide sidewalks along several downtown blocks. Landscaped areas near the post office and train depot create inviting public plazas.

Potential impacts

Aerotropolis will create new commercial and public spaces. These spaces and the activities that occur in them may be more or less supportive of positive social bonding than the existing environment. There appears to be a small plaza near the northwestern corner of the Aerotropolis site plan, and possibly several courtyards. Streetscapes have not been described in detail, although they will almost definitely improve existing conditions.

Recommendations

Aerotropolis

- Design open spaces that encourage a variety of legitimate usage (walking, office workers taking lunch break, occasional performances or events) and discourage undesirable uses (clear sight lines and well lit).

Hapeville

- Include a “public space plan” in future planning efforts, which identifies streets, sidewalks, parks, and plazas, and ensures that each part of the city has opportunities to encounter these spaces in daily routines.
- Continue to encourage citywide and neighborhood civic participation.
- Make extra efforts to include renters and lower-income households in community planning.
- Work with residents to identify easy fixes that will improve sense of security, such as changes to street lighting.
- Take advantage of the community’s small size to hold special events that bring residents together, such as block parties and festivals. Many of these may be downtown, but others could feature other parts of the city.
- Explore ways to involve residents as well as workers from airport-area businesses into joint community events.
- Rezone the airport business area to encourage retail and services that also attract local residents.

Atlanta

- Work with NPU-Z, NPU-X and their neighborhoods to update area redevelopment plans based on recommendations in this HIA report.
- Include a “public space plan” in future planning efforts, which identifies streets, sidewalks, parks, and plazas, and ensures that each part of the city has opportunities to encounter these spaces in daily routines.
- Prioritize improvements to public space for implementation in the short term work plan.
- Explore new ways to receive planning input from industrial workers.

Clayton

- Include a “public space plan” in future planning efforts, particularly oriented around Aerotropolis and the airport.
- Explore new ways to receive planning input from industrial workers.

Healthy Places Audit: Community

Housing Balance

Some experts have stated that national homeownership rates may be too high, or may be artificially inflated by lending practices. While there can be resistance to both single-family and multi-family rental properties, with some justification, this does not obviate the legitimate demand for rental housing and its role in a viable local economy. In fact, demand for leased units in the study area may be higher than regional average due to mobility of employees in air travel and logistics. Additionally, high ownership rates that are supported by unsustainable lending practices may make the area vulnerable to foreclosures.

Overall, the number of employees in the study area is many times larger than the amount of available housing, perhaps by as much as 10-to-1. While some of this imbalance may be appropriate due to the airport's presence, there are still significant missed opportunities to make the area livelier and more economically successful by providing the appropriate amount of residences.

Failure to provide housing of all types can have a range of consequences, from homelessness, to overcrowding, to departure by executives and entrepreneurs (potentially followed by their firms), to an inhospitable environment for today's demographics ('Millennials', young families, elderly), to declining property values, to pockets of concentrated poverty and associated ills. Relatively even distribution of residences by age, income, household size, and lifephase can improve educational outcomes, reduce crime, and improve access to goods and services. It can be a key factor in attracting and supporting successful businesses. It can also improve the viability of local medical providers, by diminishing the proportion of uninsured patients, Medicaid clients, and health disparities.

Audit Question

- Do unit sizes, lot sizes and FAR requirements allow a complete range of housing prices and terms, relative to area household types, sizes, and incomes, and total housing demand?
- Are new accessory dwelling units (detached or in the primary residence) permitted?

Audit Findings

Hapeville: Zoning ordinances strictly limit the type and size of permitted development in residential districts. About 37% of land in the city is zoned exclusively for single family detached. About 27% of land is zoned to allow multifamily/condominium, duplexes, or attached single family housing. All single-family homes are required to have at least 3 bedrooms and 2 bathrooms, except Urban Village districts which require 2 bedrooms and 2 bathrooms. Minimum lot size, minimum occupiable square

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footage, and minimum lot frontage are stipulated for each zone. No minimum bedroom or bathroom count for was identified for multifamily rental development except Urban Village districts which require 1 bedroom and 1 bathroom. Accessory dwelling units prohibited in any residential area. The comprehensive plan targets a 70% home ownership rate and seeks to encourage upscale residential development.

Atlanta: The majority of residential zoning districts in the study area require minimum lot sizes 40 ft. X 25 ft. and a minimum dwelling size of 1,000 sq. ft. Minimum lot frontage, setbacks, maximum FAR, and maximum lot coverage are established for most residential development. Districts which allow multifamily residential development establish minimum lot size and maximum FAR. Subdivision ordinance specifies minimum lot size, minimum dwelling size, and minimum total developable area. Accessory dwelling units are only allowed as servant quarters and other uses for the occupant of the primary unit, but not for separate occupancy.

Clayton: Very little residential zoning was identified in the study area. In the Forest Park area, there was some single family residential zoning, restricted to 4 dwelling units per acre. Additionally, there was some zoning for duplex and multifamily development at the border of the study area. The county appears to establish a minimum dwelling unit size of 750 square feet. Multifamily development must assemble at least 10 acres. One accessory dwelling unit is permitted per lot in most districts.

Audit Recommendations

Best practices in code enforcement and rental management may be preferable to owner-occupancy goals. Rental issues may also be mitigated with inclusive housing policies that disperse lower-income households rather than concentrating them in pockets of affordable, but possibly substandard, housing. The range of earnings provided by area businesses should serve as a guide for housing costs.

Rather than avoiding multi-family, small lot, or attached single-family housing development, embrace these housing forms in higher-density mixed-use redevelopment areas as a way to meet total housing demand without exerting pressure on existing single-family neighborhoods. This recommendation is supported by research such as SMARTRAQ which indicated extensive latent demand (as much as 30%) in the Atlanta region for these housing options. Again, demand may be higher than average due to the influence of the airport.

- Index residential development policies to housing needs assessment
- Regulate appearance of residential property, rather than size or number of units
- Define affordable housing policies in districts with higher property values, especially around activity centers

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- Provide ample and balanced opportunity for development of attached multi-family, attached single family, and detached single family development, with adjustments for housing needs assessment results and existing surpluses
- Set targets and incentivize larger attached single-family or multi-family units suitable for families with children
- Set targets and incentivize accessible units relative to expected elderly and disabled population, incentivize 'visitable' standards for all new homes
- Consider permitting ADUs as a special use in single family zones, possibly with a community petition option in case of problem properties. This allows extra housing options for seniors and young adults in a supervised setting, while modestly increasing density to support better retail and transit services with minimal impact on the character of the neighborhood
- Consider collector streets appropriate locations for small multifamily construction; transitional areas between neighborhoods and busy corridors or commercial centers can be an ideal location for apartments, condominiums, or townhomes.

Public safety

The absence of 'incivilities' (barbed wire fence, broken windows, etc.) have been linked to lower crime rates and better mental health; while vacant buildings and obscured or overgrown viewlines increase the opportunities for crime to occur.

While moderate alcohol consumption may be considered a neutral or even healthy activity, excessive use has been linked to injury and crime, and businesses that sell alcohol as a predominate part of their business have been associated with higher crime rates.

Building codes are intended to ensure a minimum standard of protection from fire, falls and injuries, hazardous materials, noise, and other hazards and nuisances. They establish performance standards for systems and materials. Adoption of some basic codes is ubiquitous: building, electrical, plumbing, fire safety. However, it is less common to find adopted standards regarding energy efficiency, water efficiency, use of natural or recycled materials, or very low exposures to noise and contaminants. These additional standards may be established to reduce environmental exposure.

Audit Question

- Are there regulations that control the concentration or activity of businesses that sell alcohol?
- Is there clear and enforceable language regarding the maintenance of landscaping, features, and buildings?
- Are there guidelines for building codes to reduce risk of illness or injury?

Audit Findings

Hapeville: The city prohibits bars; restaurants may serve alcohol with a license. The city's code allows retail alcohol sales to be licensed by an alcohol review board which is to consider zoning of surrounding properties, schools, parking, and traffic. Retail alcohol outlets are prohibited in residential zones and near schools, churches, and treatment centers. No more than one alcohol retailer is allowed per 1500 residents. Pawn brokers are restricted to one store per 5000 residents due to association with crime. The code includes maintenance standards for vacant lots regarding trash and vegetation, classification of fire and safety hazards, and a mechanism for citing and penalizing violations. There is also a maintenance policy for condominiums. An ordinance defines nuisance properties with a mechanism for repairing or demolishing them. The city ordinances invoke state and international minimum building codes, and establish additional acoustical standards in a defined southeastern part of the city, near the airport.

Atlanta: The city prohibits alcohol sales for on-premise consumption near residences, hospitals, churches, parks, or schools with specific distance requirements, but with exceptions for shopping centers and mixed use districts. Off-premise sales are prohibited near residences, schools, parks, libraries, hospitals, churches, child care centers, or another package store, again with specific distance requirements. Ordinances have been created regarding overgrown vegetation, litter, damaged fences and structures, lighting issues, and other dangerous conditions, along with procedures to enforce and secure properties in violation. The city provides a procedure to demolish abandoned buildings. The city's code invokes minimum standards and international building codes for construction, plumbing, electrical, gas, and HVAC codes. Sustainable development design standards are established for city facilities. Housing codes establish standards for kitchen and bathroom facilities, lighting, heat, ventilation, sanitary conditions, fire safety, and other elements.

Clayton: The county prohibits bars, and allows on-premise retail sales only in restaurants or clubs. Sellers must be minimum distance from churches, schools, and treatment centers. The county designates districts where on-premise retail alcohol sales may occur and prohibits alcohol sales at adult entertainment establishments. The code includes a process for securing vacant buildings. International building codes are referenced, including the International Energy Conservation Code.

Audit Recommendations

- Plantings should be lower than 3 feet or start higher than 7 feet to eliminate hiding places, and should not block lights or other safety features. Poorly maintained fences or trees can endanger passersby.

Community Preservation and Revitalization

- Ordinances should describe the type of maintenance issues that will be targeted, how issues will be identified or reported, and what notification and penalty procedures will be followed. There should be some mechanism for staff to clear or secure properties after due process has been attempted with the property owner.

Environmental Exposures

Background: Health and the Environment

Roadways, other transportation facilities, freight logistics, and industry can create “hot spots” of locally elevated air pollution levels, which may impact homes and schools and may inequitably impact some citizens more than others. Air pollution hot spots are linked to increased rates of asthma attack, premature and low birth weight babies, infant mortality, and other respiratory diseases. These sources also contribute to regional levels of five criteria pollutants (carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), coarse and fine particulate matter (PM), and sulfur dioxide (SO₂)). Additionally, emissions of carbon dioxide and other greenhouse gases are linked to climate change which may affect health through impacts on agriculture, water supply, heat waves and tornadoes, and spread of tropical diseases. Proximity to high-volume motor vehicle emission sources, such as major highways and congested areas, appears to significantly influence exposure.

Traffic, airport, and industrial noise could affect stress levels for residents and workers, and learning opportunities for children. Studies have found a range of health implications relative to the total decibels, frequency, distance, sound contours, structures, and other factors. On the ground, prior industrial activity at or near the site has created a risk of potential exposure to contaminants by current and future users. For example, benzene, a carcinogen, may be present in soils due to previous underground motor fuel storage.

Planning Environment

Transportation emissions

Research Questions

- How might trip generation and mode share changes affect localized emissions?
- How might changes in emissions and site design affect pollution contours and personal exposures for site users?

Literature review

Air quality is linked to health in a variety of ways. The health effects of these pollutants include reduced lung function, asthma and other respiratory illnesses, cancer, irritation of breathing passages, premature death, with children and the elderly being at a higher risk than the general population (EPA, 2006). Changes in vehicle emissions, including carbon monoxide, nitrogen oxides, particulate matter, and hydrocarbons are linked to changes in motor vehicle trips, miles, or hours of operation (EPA, 2007; Samet, 2007). Nitrogen oxides and hydrocarbons (also called volatile organic compounds) combine in sunlight to form ground-level ozone. Diesel freight transport generates these pollutants as well as high levels of black carbon, sulfur dioxide, and some suspected carcinogens. However, freight rail generates significantly fewer emissions per ton-mile than freight trucking (You, Lee, Ritchie, Saphores, et al., 2010; Zhu, Hinds, Kim, Shen, et al., 2002). These air toxics contribute to respiratory and cardiovascular diseases, and other disorders (EPA, 2001). Additionally, transportation-related emissions of carbon dioxide is linked to anthropogenic climate change which could affect food and water supply, adverse weather events, and expanding transmissible disease vectors (EPA, 2006b; Haines, Korvats, Campbell-Lendrum, & Corvalan, 2006; Younger, Morrow-Almeida, Vindigni, & Dannenberg, 2008). Polluting land uses, including industrial facilities and transportation hubs, have also been identified as sources of air toxics at the local and regional level (Corburn, 2007; Willis & Keller, 2007).

Short- and long-term exposure to air pollutants can have health effects at both a regional and local scale. Increased rates of disease and death from cardiovascular and respiratory diseases have been associated with various measures of air pollution, including those generated by the burning of fossil fuels and those created by road and vehicle wear (Health Effects Institute, 1999; Lippman et al., 2002; Samet, 2007). Over 150 studies have identified correlations of exposure to particulate matter with cardiovascular and respiratory diseases, even at very low levels (Peters & Pope, 2002).

Proximity to high-volume motor vehicle emission sources (highways, major roads, and congested areas) appears to significantly influence exposure (Corburn, 2007; Venkatram, Isakov, Seila, & Baldauf, 2009).

Environmental Exposures

The effects of gaseous and particulate pollutants on health have been found in both short- (acute exposure) and long-term studies (chronic exposure) with effects being seen at very low levels of exposure. However research is inconclusive on whether or not there is a threshold concentration below which no effect on health will occur (Brunekreef & Holgate, 2002). Both short- and long-term exposure to particulate matter (PM) have been associated with increased rates of cardio-respiratory morbidity and mortality. This includes increased lung cancer risk, along with short- and long-term non-cancer health effects such as bronchitis, asthma, and reduced lung function. Additionally, PM 2.5 is seen to have an adverse effect on lung development in adolescents that can lead to lifelong lung deficiency (Gauderman, McConnell, Gliland, London, et al., 2000; Gauderman, Avol, Gliland, Vora, et al., 2004). The elderly are also at increased risk for negative health effects stemming from exposure to PM. Research has shown that common emission sources for PM have significant associations with elderly cardiovascular hospital emissions and that modest amounts of air pollutants are associated with small changes in cardiac function in the elderly (Barnett, Williams, Schwartz, Best, et al., 2006; Mar, Koenig, Jansen, Sullivan, et al., 2005).

Studies by Houston et al. (2006) and Fischer, et al. (2000), have examined particulate matter's impact on human health. PM 2.5 is generally seen to have a greater negative effect on health, since the particles are small enough to be absorbed through lung tissue into the bloodstream, but both PM 2.5 and PM 10 can have a negative effect on health (Health Effects Institute, 1999; Health Effects Institute, 2001). Studies have indicated that vehicle-related fine particulate matter becomes highly concentrated in areas immediately adjacent (200 meters) to major roadways. Outdoor particulate matter concentrations (PM2.5 and PM10) are an estimated 15 to 20 percent higher at homes located in high traffic intensity streets compared to low traffic homes. Vehicle-related pollutants have been associated with increased respiratory illness, impaired lung development and function, and increased infant mortality. Also, pregnant women living within 200 to 300 meters of high-volume roads face a 10 to 20 percent higher risk of early birth and of low-birth-weight babies. In addition to general vehicle exhaust, exposure to fine particulates from diesel exhaust has a negative effect on those that live near roadways or areas such as rail yards or inter-modal yards with high diesel emissions. People living in immediate proximities (200 meters) of major diesel thoroughfares are more likely to suffer from respiratory ailments, childhood cancer, brain cancer, leukemia, and higher mortality rates than those who live further away. Research shows that particulate concentrations approach normal background levels at distances greater than 200 meters (Houston, Wu, Ong, & Winer, 2006; Fischer, Hoek, van Reeuwijk, Briggs, et al., 2000).

Environmental Exposures

There are mitigation strategies for transportation-related air pollutant emissions. Van Houtte, Eisinger, and Niemeier (2008) found that freight truck operations affected their impact on air quality; stop-and-go traffic, high speeds, heavy loads, and hills contributed to a higher rate of emissions. They suggested routing trucks away from congested areas and hills, and limiting their weight and speed. Freight rail typically has lower emissions per ton of freight than trucking, and can be used to reduce roadway (line) emissions as well as the localized emissions around logistics hubs. A study of the Ports of Los Angeles and Long Beach in California concluded that relatively minute shifts from truck to rail – less than 1% of total movements – could produce 5% to 10% reductions in carbon monoxide, nitrogen oxides, particulate matter, and hydrocarbons (You, Lee, Ritchie, Saphores, et al., 2010). Reducing overall congestion is likely to reduce emissions as well, however research suggests that congestion maintains a static level on unpriced roads (Cervero and Hansen, 2002; Noland, 2001). Congestion pricing may reduce congestion (Duranton & Turner, 2008, Kall, Guensler, Rodgers, & Pandey, 2009). Providing pedestrian, bicycle, and transit alternatives may reduce localized emissions at destinations, and will at least improve mobility without increasing congestion. Air pollution from roadways (also known as line source emissions) decreases with distance; exposure is most likely within 200 feet of a road carrying more than 50,000 vehicles per day, or within 100 feet of a road carrying 25,000-49,999 vehicles per day (significant amounts of truck traffic may change these criteria). Locating sensitive uses – residences, child care facilities and schools, and medical centers outside of these buffers can reduce health impacts (Brugge, Durant, & Rioux, 2007; Zhu, Hinds, Kim, Shen, et al., 2002).

Fuller, Bai, Eisinger, and Niemeier (2009) evaluated the effectiveness of sound barriers and vegetation adjacent to high-volume roadways for reducing exposure to pollutants at homes and other sites near the roadway. They found that sound walls did not reduce spread of pollutants, but that vegetation did. Their paper provides a table for selecting the most effective vegetation for pollutant reduction. It recommends hardy, long-lived evergreen conifer trees with dense leaf structure, and finds they are more effective when planted densely and as close to the emissions source as possible. Tree barriers may help reduce emissions from point sources, such as factories and warehouses, as well. Environmental management of industrial emissions – e.g. scrubbers or low-emission processes – and ordinances to reduce truck idling could have an impact on local emissions levels. Airport emissions management is included in the Airport Areas section, below.

Existing conditions

Asthma, respiratory disease, and heart disease rates are higher in the study area than rates in the rest of Georgia. Two-thirds of survey respondents did not think the study area had clean air.

Discussions with the advisory committee included stories about particulate matter collecting on

Environmental Exposures

windows and walls. The study area includes several major and minor highways, the “World’s Busiest” airport in passenger takeoffs and landings, freight rail, and industrial and freight activities. Industrial zoning and access to transportation facilities attract logistics industries, while new development and existing residents are drawn to other parts of the study area by the established community, transportation access, and progressive leadership. Residents, workers, and other regular visitors to the area (such as students) would be vulnerable to ambient or localized air pollution. The study area includes several major and minor highways and freight activities. Areas were considered affected if they were within 200 meters of a road that carried more than 25,000 motor vehicles per day, or within 100 meters of a road that carried more than 10,000 vehicles per day.

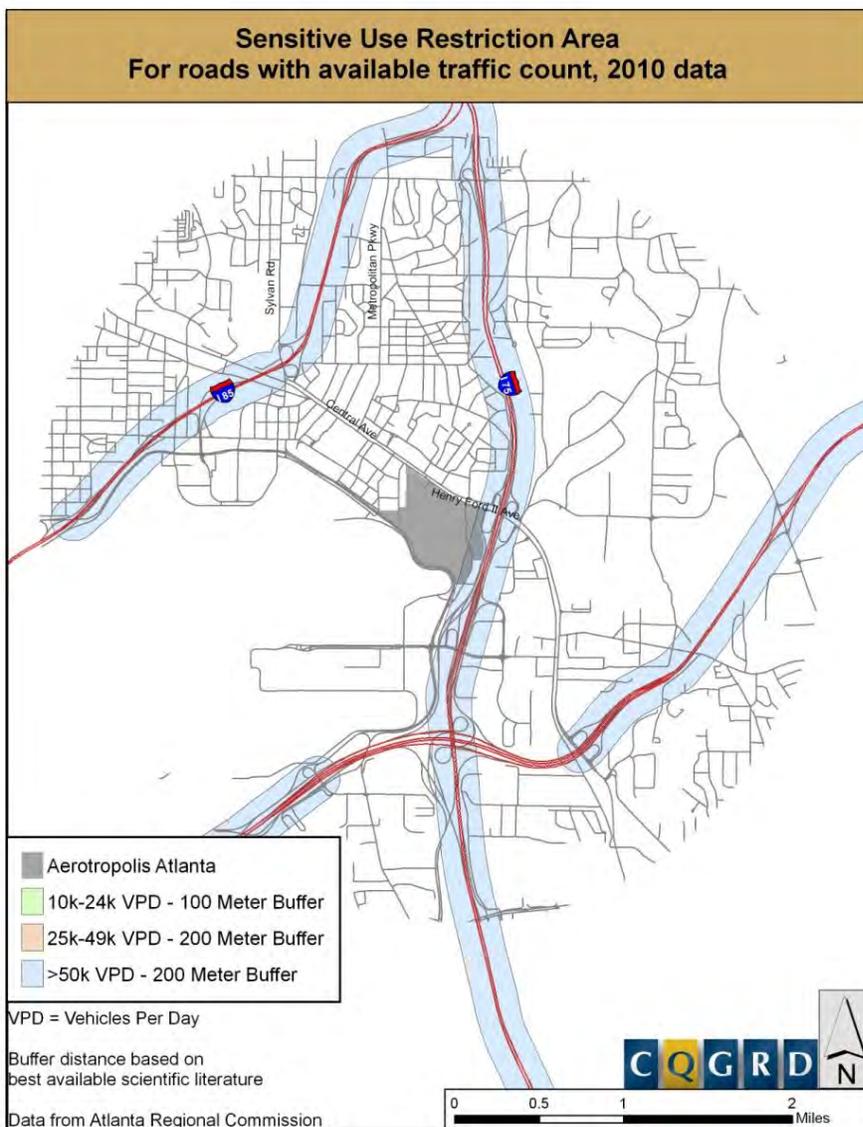


Figure 51: Sensitive Use Restriction Area, 2010

Potential impacts

Aerotropolis may lead to a change in traffic volume around the site (relative to current conditions or when the Ford plant was operating), potentially impacting people who live, work, or visit within the air-shed of the affected streets. Users on the site could be exposed to emissions from busy streets, the airport, and airport-related activities. The existing sources of air pollution cannot readily be relocated, particularly the airport and the highways. However, emissions from those sources could change due to operational changes, changes in fuel efficiency (for both aircraft and ground transport), alternative fuels, and modal shifts. There are mitigation methods and technologies for on-site exposure to emissions.

Recommendations

Georgia Department of Transportation

- Encourage congestion pricing.
- Encourage alternate travel modes to driving. In particular, shifting passenger trips to non-driving modes will reduce the amount of congested traffic encountered by freight trucking.

Hapeville, Atlanta, Clayton

- Maintain freight rail options to the degree possible.
- Zone sensitive uses away from major emissions sources.
- Pursue vegetation buffers around major emissions sources, after ensuring that vegetation choices do not conflict with migratory bird reduction strategies near flight paths.

Noise

Research Questions

- How might trip generation and mode share changes affect noise generation?
- How might changes in noise generation and site design affect sound contours and personal exposures for site users?

Literature review

Traffic, airport, and industrial noise could affect stress levels for residents and workers, and learning opportunities for children. Studies have found a range of health implications relative to the total decibels, frequency, distance, sound contours, structures, and other factors.

Construction noise and vibration levels will vary depending upon such factors as the type and condition of equipment, whether the equipment is stationary or mobile (crane versus a bulldozer), the type of work being performed, and the composition of the soil (clay, rock, sand) (FTA, 2006). Noise and vibration levels will be of greater concern at night than during the day when urban noise is at its loudest. They will also have greater impact in residential rather than commercial or industrial settings. Airport noise can impact residents' health directly, as their body experiences sound and vibration, or mediated through their reaction to noise, by which they may feel annoyance. Feelings of

Environmental Exposures

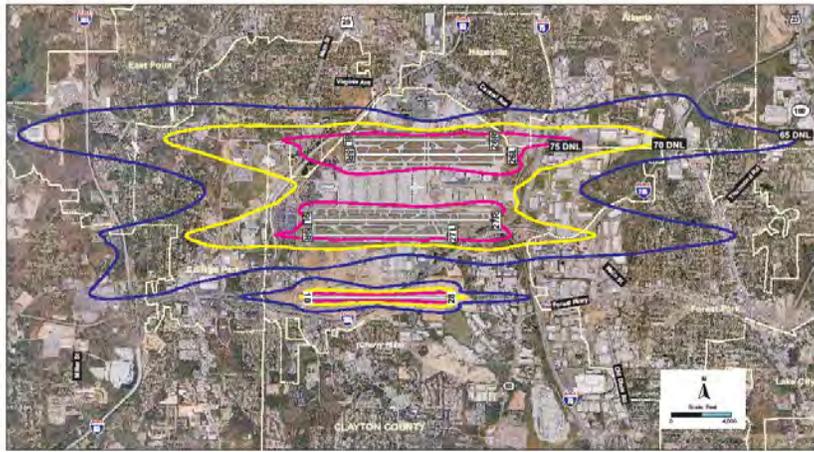
annoyance, stress, or loss of control over one's environment may have as much significance to health as the direct physical effects (Schreckenber, Meis, Kahl, Peschel, et al., 2010). However, some people perceive proximity to the airport as a positive feature which improves their access to travel or jobs, and this appears to reduce their sensitivity to airport noise (Tomkins, Topham, Twomey, & Ward, 1998).

Exposure to noise has been associated with a number of negative health effects. There are psychosocial responses of which noise annoyance is the primary cause. Included in psychosocial responses are sleep disturbance, disruption of daily activities, and interference with performance—all subjective responses that pertain to well-being and quality of life. Noise also has physical impacts such as hearing loss, tinnitus, hypertension, ischemic heart disease, and some forms of cardiovascular disease (Van Kempen, Kruize, Boshuizen, Ameling, et al., 2002). Stress-related health effects brought on by noise exposure can be psychological (feelings of depression, fear, resentment, discomfort, displeasure, anger), behavioral (isolation, aggression, abuse of alcohol, drugs, food, and tobacco), or somatic (cardiovascular, gastrointestinal, respiratory illness), and physical (hearing loss, tinnitus) (Porter, Flindell, & Berry, 1998).

Existing conditions

The airport has acquired over 2700 residences and conducted soundproofing on at least 1700 more buildings. The airport has plans to sell the acquired properties, lease them, or use them for airport activities (HJAIA, 2009). Above 65 decibel average day-night level (DNL), uses are restricted. In particular, residences, lodging, and schools are not allowed, and hospitals and churches must have sound proofing. For each 5 dB increase in DNL noise levels, the permitted uses become much more limited. Agriculture, manufacturing, sales of machinery and building materials, and parking are permitted up to 85 dB DNL.. Figure 52 depicts the 2007 DNL contours identified by the airport; Figure 53 depicts their projected 2012 levels with no significant change in the study area.

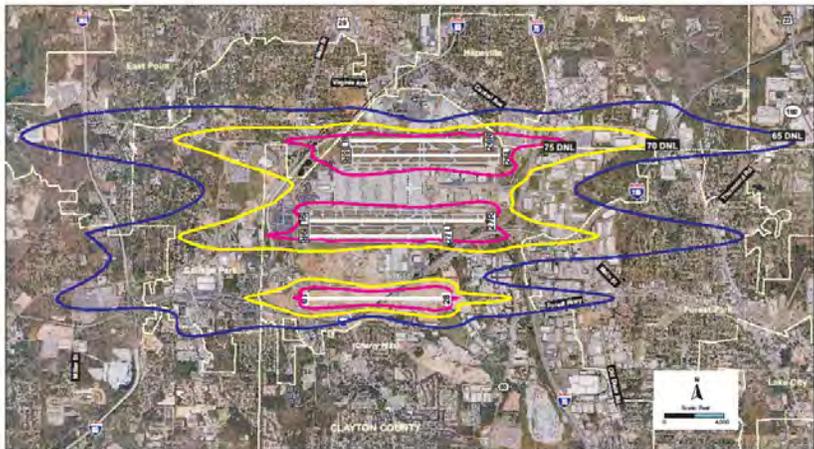
During the walkability audit, researchers experienced uncomfortable noise levels along North Central Ave and South Central/Henry Ford II Ave (due to car/truck traffic and lack of buffering), near I-75, and along Henry Ford II Ave, Airport Loop Rd, Elm St, Chestnut St, and all points south of Chestnut St (due to air traffic). A freight train created moderate noise levels. The City of Hapeville and the Federal Aviation Administration have established acoustical standards for new buildings in areas exposed to high sound levels due to the airport. These standards are designed to reduce noise levels for building occupants.



SOURCE: EPA/Arjpm

Atlanta-Fulton County Stadium International Airport (ATL) Part 150 Study
Figure 3-4
2007 Noise Contours

Figure 52. 2007 Noise Contours



SOURCE: EPA/Arjpm

Atlanta-Fulton County Stadium International Airport (ATL) Part 150 Study
Figure 4-1
2012 Noise Contours

Figure 53. Projected 2012 Noise Contours

Potential impacts

Aerotropolis may lead to a change in traffic volume around the site (relative to current conditions or when the Ford plant was operating), potentially impacting people who live, work, or visit within the noise-shed of the affected streets. Users on the site could be exposed to noise from busy streets, the airport, and airport-related activities.

Recommendations

Hapeville, Atlanta, Clayton

- Implement recommendations from Safe, Active, Multimodal Transportation Environments that could reduce motor vehicle volume.
- Implement noise reduction in buildings.
- Explore availability of sound barriers for noise sources.
- Discourage or disallow sensitive uses (homes, schools, and childcare facilities) near high-volume highways, truck routes, and railroads.

Brownfields

Research Question

- What are the implications for land use relative to brownfield restrictions?

Literature review

Proximity to brownfields sites has been shown to have a statistically significant relationship with increased sickness and disease (Litt et al., 2002; Ding, 2005; Solitare and Greenberg, 2002). Indeed, the presence of brownfield sites in a community can essentially act like a “cancer,” as they become havens for criminal activity and centers of neighborhood neglect (Greenberg, 1998). However, brownfield redevelopment, which entails a remediation of the site to acceptable health standards, can cause positive health impacts on the community by reducing the health risks associated with the contamination and mitigating the overall negative impact of brownfield sites on the community (Solitare and Greenberg, 2002). In sites with a known or suspected history of ground contamination, developers face two challenges: remediating the site according to regulatory standards, and managing potential liability issues on the site (actual or perceived). Developers with experience in brownfield redevelopment appear primarily concerned about the remediation expense and do not anticipate that “contamination stigma” will impact their potential profitability, whereas developers with less brownfield experience tend to focus on liability and regulatory compliance (Alberini, Longo, Tonin, Trombetta, et al., 2005).

One method for evaluating redevelopment projects is with the Sustainable Brownfield Redevelopment (SBR) Tool. This tool evaluates the project on forty different points, from liability mitigation, energy use, and greenspace to job creation, property value impact, affordable housing creation, diversity of uses, and walking distance to grocery store. These indicators are categorized into four headings: environmental health, financial, socio-economic, and livability (Wedding and Crawford-Brown, 2007).

Existing conditions

Prior industrial activity at and near the site means that there is a risk of exposure to contaminants by current and future users. Prior to remediation, the Ford Assembly Plant was on Environmental Protection Agency (EPA) registries for chemicals released into the air, chemicals relocated to other sites, potential criteria air pollutant emissions, and underground storage tanks (EPA, 2011). The EPA identifies many other sources of past and current ground, air, and water hazards in the study area as well. The headwaters of the Flint River begin within a quarter mile of the Aerotropolis site.

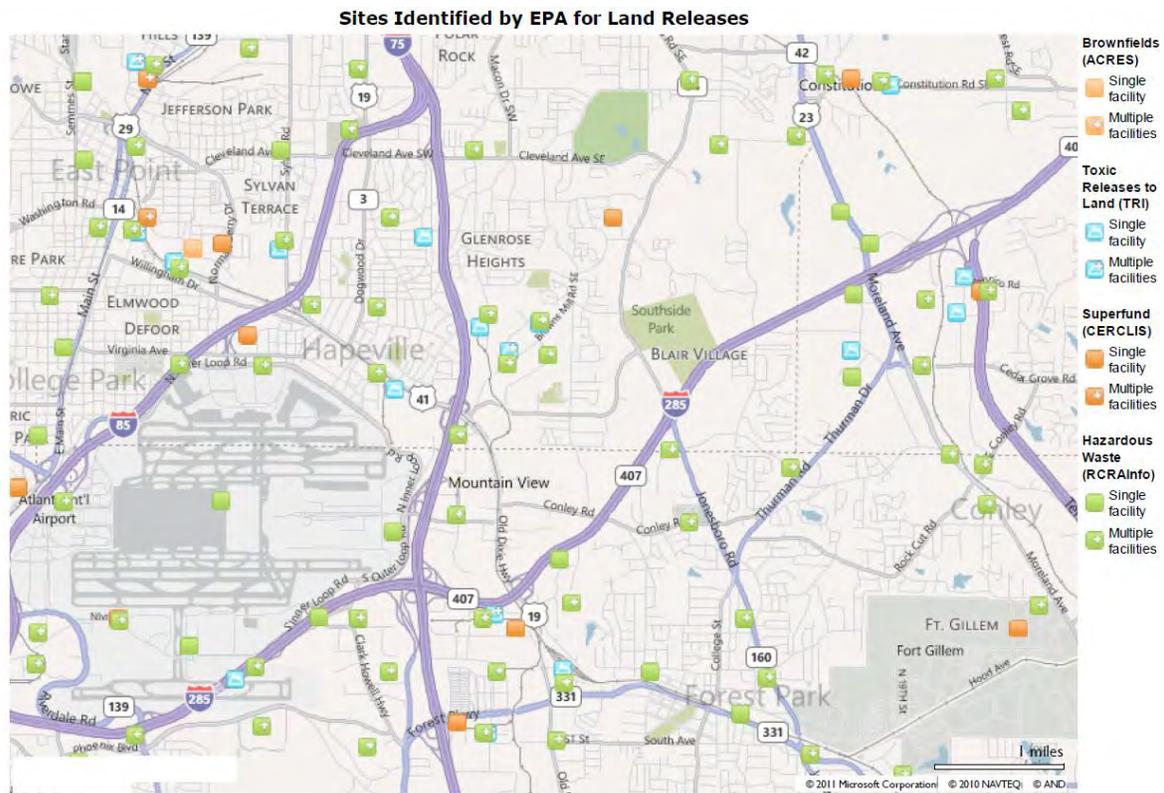


Figure 54. EPA registry of potential and known land contamination sources, current and past

Environmental Exposures



Figure 55. EPA registry of potential and known air contamination sources, current and past

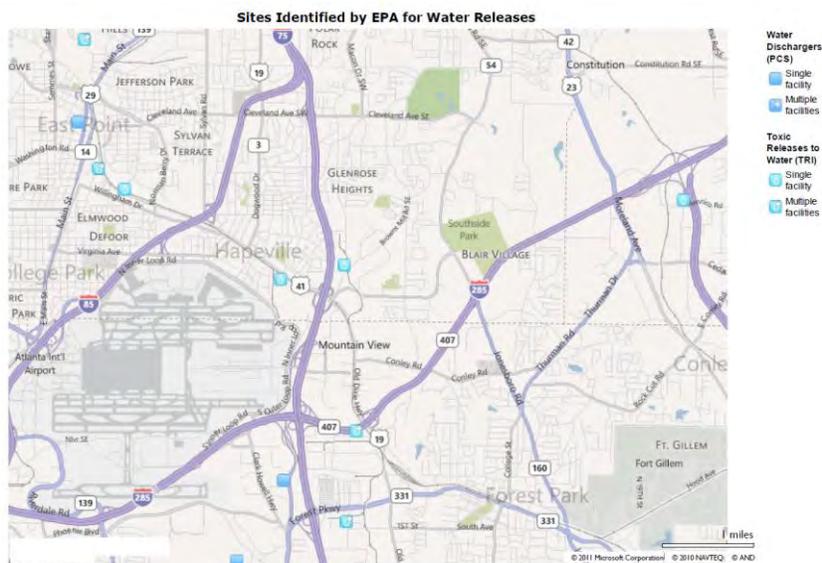


Figure 56. EPA registry of potential and known land contamination sources, current and past

Potential impacts

Remediation has been conducted at the site – testing for and addressing all known sources of contamination. Ford Motor Company has contractually prohibited certain uses, such as residential, to further reduce potential risks. A detailed remediation report was not available. The total level of risk from soil contamination, at the project site or anywhere in the study area, is unknown.

Covenants placed on the property by Ford which restrict usage could impact the ability to achieve a diverse land use mix or other livability and socio-economic performance indicators identified in the SBR Tool..

Recommendations

Aerotropolis:

- Adhere to covenants
- Collaborate with surrounding jurisdictions and developers to ensure that residential opportunities are available for Aerotropolis site users, and to ensure that Aerotropolis provides services for both international travelers and local residents.
- Use Environmental Management Systems , the SBR Tool, and the HIA recommendations to plan, implement, and review environmental safety and quality on the site. Include promotion of environmental goals and achievements, so visitors may recognize these efforts and tenants may support them.

Hapeville, Atlanta, Clayton:

- Collaborate with the Aerotropolis project developers to ensure that housing opportunities are available.
- Prepare resources using Environmental Management Systems , the SBR Tool, and the HIA recommendations to facilitate brownfield redevelopment.

U.S. Environmental Protection Agency, Georgia Environmental Protection Division:

- Update Environmental Management Systems guidance for developers using the recommendations in this report.

Healthy Places Audit: Environment

Pollutant Mitigation

As described above, people who live in close proximity to major roads and other sources of air pollution can have significantly increased risk of disease. While individual towns may not be able to change the source of the pollution, they can use zoning to prevent certain sensitive uses from locating too close to major emission sources. Additionally, they can influence the ability of the environment to absorb pollution.

Audit Question

- Do land use and building plans and codes serve to reduce emissions and mitigate exposure to noise, air contaminants, and other emissions from transportation and industrial sources?

Audit Findings

Hapeville: Some residential zoning was located immediately adjacent to Interstate highways. Schools were permitted in residential and commercial districts. No ordinances were identified regarding siting of schools or child, health, and elderly care facilities relative to pollution sources. There were no ordinances identified that required transitional areas or buffers between industrial and residential property. Limitations were placed on emissions of light, noise, odor, and other hazards from commercial districts; screening and pollution control were required. Plantings, walls, and setbacks were used to buffer uses in planned developments. No buffers were defined at city borders.

Atlanta: Some residential districts were located immediately adjacent to Interstate highways. One school was identified immediately adjacent to a highway. Public schools were primarily permitted in residential districts; truck stops were not permitted within 1000 ft. of a school. No other ordinances were identified regarding siting of schools or child, health, and elderly care facilities relative to pollution sources. Some residential districts were located immediately adjacent to industrial zones; industrial property within 100 ft. of a residential district has certain limitations on uses, including parking and automotive use restrictions and screening requirements. Similar regulations are in place for commercial property adjacent to residential zoning. However, more specific controls on emissions or pollution control were not identified. No buffers were defined at city borders.

Clayton: Residential uses were zoned adjacent to major highways elsewhere in the county, but not in the study area. No ordinances were identified regarding siting of schools or child, health, and elderly care facilities relative to pollution sources. The county designates a buffer yard between differing zones. Spatial and vegetative buffers are required next to facilities where large numbers of people congregate. No buffers were defined at county borders.

Audit Recommendations

- Target zoning to provide 100 meter buffer of commercial, institutional, light industrial, and office along busy roads (AADT over 10,000) and housing to reduce exposure to noise and traffic.
- Implement land use and building plans and codes serve to reduce emissions and mitigate exposure to noise, air contaminants, and other emissions from transportation and industrial sources:
 - Guidelines for use of barriers along private and public sources of emissions (e.g. highways, airports, railroads, industrial sites, warehouses)
 - Guidelines for strategic use of vegetation, pervious pavement, and absorptive materials
 - Incentives for reducing energy or water consumption, which could invoke a scoring system such as LEED¹, EarthCraft², or EnergyStar³
 - Building requirements and incentives for soundproofing, low-emission building materials and techniques, and filtration (may use scoring systems referenced above)
 - Restrictions on pavement coverage
 - Incentives for exceeding minimum requirements for scrubbers, filters, and other environmental controls
 - Restrictions on idling trucks or buses
 - Definition of potential emission hazards and their area of impact
 - Spatial separation of emission sources and sensitive land uses (schools, daycare centers, homes), for example transitional zoning classes or minimum distance requirements for new uses

1. US Green Building Council Leadership in Energy and Environmental Design.

<http://www.usgbc.org/DisplayPage.aspx?CategoryID=19>

2. Greater Atlanta Home Builders Association and Southface, EarthCraft program.

<http://www.earthcraft.org/>

3. US Environmental Protection Agency EnergyStar for new homes, home improvement, buildings and plants. <http://www.energystar.gov/>

Greenspace

The presence of greenery has been linked to lower crime rates and better mental health, air quality improvement, and micro-climate improvement. Green streets are designed to improve stormwater retention, enhance aesthetics, and reduce impervious surfaces through the careful use of materials and landscaping. The presence of a thriving natural environment can also boost property values.

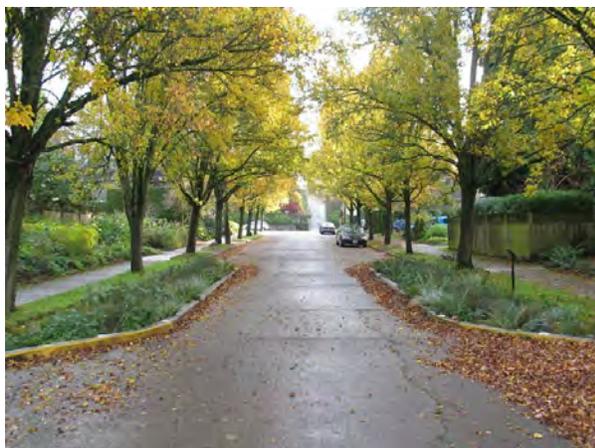


Figure 57. Example of street trees and bioretention plantings. Credit: Low Impact Development Center



Figure 58. Example of permeable pavement parking. Credit: ICPI

Audit Question

- Are there specifications for tree planting, maintenance, and conservation?
- Are there designs and criteria for development of “green streets”?
- Do subdivision and site codes favor preservation of natural ecosystems?
- Are there provisions for acquiring, designing, and maintaining parks and greenspace?

Audit Findings

Hapeville: The city endorses street trees to reduce heat and glare. It established a tree preservation commission and developed an extensive tree ordinance which classifies the type, size, and density of trees and the actions which must be taken to preserve, plant, or replace them. Through its ordinances, the city recommends that new subdivisions plant street trees; it suggests planting outside of right-of-way (not in planting zone). A tree survey and a tree protection plan are required during development. There is a minimum tree coverage metric and bonuses for providing trees in right-of-way. The short term work plan allocated funding to tree preservation. Hapeville also had a development stormwater ordinance, which encourages “the use of nonstructural stormwater management and stormwater better site design practices, such as the preservation of greenspace and other conservation areas”. The ordinance identifies types of development that are and are not exempt from stormwater management planning, and refers to the Georgia Stormwater Management Manual (GSMM). The city also has a floodplain development ordinance. The code of ordinances establishes the city’s responsibility for operating parks, requires subdivisions to give due consideration for parks and playgrounds, and allows the city to require open space to be reserved for

Environmental Exposures

planned parks or other public amenities. Parks are to provide both active and passive recreation opportunities. The short term work plan established \$280,000 for greenspace planning and acquisition and \$800,000 for park renovations. No green infrastructure policies were identified.

Atlanta: The city has enacted a tree preservation ordinance. The code also requires landscaping in front yard and tree preservation in new subdivisions. Landscaping must allow access for emergency services, routine service, and parking. City ordinances require buffers around streams and wetlands. The subdivision ordinance is intended to restrict development of new building lots within floodplains and to minimize disturbance of natural topography, tree cover, and natural drainage. Sensitive land in new subdivisions, such as wetlands and steep slopes, may be designated as a permanent undisturbed area or given to a public or non-profit management entity. No green infrastructure policies were identified.

Clayton: The county has an extensive tree ordinance. Street trees are required, but must leave a “clear zone” relative to vehicle traffic. The code provides specifications for the type and number of trees relative to development, for landscaping to be included in site plan, and for landscaping to be provided around parking facilities and other hardscape. The county also has a stream protection ordinance, which seeks to avoid environmental impacts on local streams. The ordinance includes a provision for reuse of gray wastewater and a provision to require sales of phosphate-free detergent. Outdoor watering restrictions are in place (food production excluded). Watershed protection districts are defined to reduce impervious surface in sensitive areas. The county’s comprehensive plan recommended adding 214 acres of greenspace per year to achieve a ratio of 10 acres per 1000 residents. No green infrastructure policies were identified.

Audit Recommendations

- Identify standards for tree preservation: species, size, condition, site
- Identify cases in which removal is justified due to tree health or adverse environment
- Set criteria for planting trees, shrubs, flowers, grasses, or food gardens on public property, including in the public right-of-way, with funding sources or strategies
- Set fees for activity that is detrimental to tree preservation, to be used for planting, maintenance, and enforcement.
- Develop incentives for planting and conserving trees, vegetation, or food gardens on private property and reducing impervious surfaces (e.g. green roof, ribbon driveways)
- Develop standards for maintenance of trees and plants, including designation of the responsible party and enforcement methods.
- Adopt a “green infrastructure” policy. See <http://www.lowimpactdevelopment.org/greestreets/>
- Authorize and regulate systems that use rainwater or treated “graywater” for non-potable purposes in homes and businesses

Environmental Exposures

- Authorize systems that conserve energy or use renewable energy sources in homes and businesses
- Codify the definition of sensitive environmental areas and divert development away from these areas, including:
 - Streams, wetlands, and riparian corridors
 - Floodplains
 - Wildlife corridors

Environmental Tobacco Smoke

Smoking is the leading cause of death in the U.S. In addition to lung cancer, it causes heart disease, lung disease, and other cancers. Although only 20% of the U.S. population smokes, many more people are put at risk by exposure to second-hand smoke. This includes workers and patrons in public places where smoking is permitted, and the families of smokers including small children. They, too, have a higher risk of heart disease and lung disease, and children are at risk for developmental problems, asthma, and Sudden Infant Death Syndrome. Ventilation, air filtration, and barriers do not effectively reduce exposure. Smoke-free policies improve health by reducing exposure in public places, particularly for hospitality workers. They also support smokers in their efforts to quit – a process attempted by 45% of the smoking population each year. In Georgia, smoking is still permitted in some public places, including bars and over-18 restaurants, some meeting spaces, and some workplaces. However, municipalities have the option to pass additional restrictions on smoking in any public place. (Source: CDC – Fact Sheets – Smoking & Tobacco Use http://www.cdc.gov/tobacco/data_statistics/fact_sheets/index.htm)

Audit Question

- Are there provisions to limit smoking and exposure to environmental tobacco smoke (ETS)?

Audit Findings

Hapeville: No specific ordinances were identified. Fulton County is pursuing a smoke-free ordinance.

Atlanta: The city code defines smoking regulations, which allows any private property to be declared smoke free by its operator. Complaints may be enforced by police. Fulton County is pursuing a smoke-free ordinance.

Clayton: The county prohibits smoking on county or state property. No other ordinances were identified.

Audit Recommendations

- Adopt a smoke-free ordinance, such as the one adopted by the City of Savannah in 2010:
<http://www.savannahga.gov/cityweb/savannahgagov.nsf/b0173dd20736f792852572960072eb3f/d1bfd7ee4327aa178525779d004c234e?OpenDocument>
- Require a designated smoking area outside of multifamily housing (at least 25 feet away from doors and windows and away from the main entry path) to discourage smoking in private residences.

Overarching Issues

Background: Health and Administration

The overall management of the Aerotropolis Atlanta project and surrounding areas is likely to play a significant role in the health of residents, workers, and visitors. The effectiveness of collaboration between the developer, acting jurisdictions, residents and community groups, and other actors may influence implementation of HIA recommendations, as well as the ability of the area to respond to other issues now and in the future. Ongoing changes to the development as a result of economic or political environments will also impact the final form of the project.

Living or working in proximity to a major airport may result in increased exposure to noise and to air pollution from airfield activities, air transport, and ground transportation to airports. However, airport development represents a sizable opportunity for economic development, community revitalization, and reduction of motor vehicle miles/hours traveled. Policies, practices, and projects relating to the airport and its surrounding land uses may lead to air pollution and noise exposures, potential benefits through new economic and transportation options, and the potential for alleviating exposures and maximizing social benefits through design substitution. The Atlanta Regional Commission has even designated an “Airport Investment Area” development type to address the question of suitable airport area growth (see Figure 59 below).

Airport Investment Area



Implementation Priorities

- Prioritize preservation of existing transit and roadway systems
- Ensure that new areas of airport expansion have good access to local and regional transit options
- Improve access into and out of the Airport Investment Area and ensure that the unique needs for parking are met
- Ensure the continued efficiency of cargo and freight transport with easy connectivity to trucking and shipping routes through the region
- Promote access to continuing education, post-secondary education, and workforce training with existing developments in high employment areas

Figure 59: Airport Investment Area. Credit: Atlanta Regional Commission Plan 2040 Regional Development Guide.

Planning Environment

Community engagement

Research question

- How might communication and engagement strategies of the relevant actors affect other appraisal topics?

Literature review

Stakeholder involvement in public decision-making has been upheld as a civic right, a tool for more effective governance, and a mechanism by which root problems and meaningful solutions can be discovered using local knowledge (Glicken, 1999; King, Feltey, & Susel, 1998). Additionally, stakeholder involvement educates the public while incorporating their values and preferences into decisions that affect them (Beierle, 1999). Civic engagement is associated with better health, especially for at-risk populations such as youth and young adults, minorities, women, and lower-income individuals (Chung & Probert, 2011; Fothergill, Ensminger, Robertson, Green, et al., 2011; Yates & Youniss, 1996).

Potential impacts

Effective stakeholder involvement in local and regional decision-making processes could improve the response to community needs and concerns. This HIA process highlighted potential health risks due to infrastructure problems, unsuitable local ordinances, and complaints about the quality of the environment, urban form, and future public and private investments. Local government need to respond to these risks with some degree of urgency. In particular, the large jurisdictions of Clayton County and the City of Atlanta may dilute the voice of citizen advocates in the study area. Additionally, the Aerotropolis Atlanta project will be more likely to have a beneficial impact on the surrounding community if community members can continue to be involved in decisions regarding site planning and design. Finally, participation of community members, who may have participated in the HIA process or be interested in adoption of its results, could influence implementation of HIA recommendations.

Existing conditions

In the Healthy Places Audit, Hapeville and Atlanta were found to have a relatively robust community engagement process for city proceedings. Hapeville, as a smaller community, has the advantage of engaging residents and business owners in informal methods as well as official city events. The city council has conducted a constituent survey by mail in the past few years. Atlanta residents in Neighborhood Planning Unit-Z participate in community and city meetings, but in HIA meetings and surveys, they expressed concern that they did not receive as much consideration from the city as

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other neighborhoods. Clayton County appeared to have a limited engagement process. Jacoby Development had several community meetings during the process of rezoning their property.

Recommendations

Hapeville:

- Continue to involve residents, property owners, and business owners in city governance.
- Be sure to engage renters, new residents, lower-income households, and speakers of English as a second language.
- Continue to promote the neighborhood association system and ensure that every parcel belongs to a neighborhood association
- Encourage neighborhood associations to reach out to areas or populations with low participation rates.

Atlanta:

- Meet regularly with NPU, community groups, and neighborhood associations to ensure communities in the study area have the plans and resources to meet their needs.
- Encourage industrial property owners and operators to participate in planning.
- Make regular updates to the redevelopment plans for Cleveland Ave, Jonesboro Rd, and NPU-Z.
- Ensure that the community's goals are reflected in the 2011 comprehensive development plan.

Clayton:

- Evaluate county ordinances regarding public participation in planning and development activities, and update them to reflect the best of local and global practices.
- Meet regularly with community groups, and neighborhood associations to ensure communities in the study area have the plans and resources to meet their needs.
- Ensure that the community's goals are reflected in future infrastructure and development plans.

Changes in ownership and tenancy

Research question

- How will current and future changes to ownership, use, and planning of the Aerotropolis site affect the viability of findings and recommendations developed in this HIA?

Literature review

Not applicable

Existing conditions

In the summer of 2011, plans were announced to construct new headquarters and a test track for Porsche on 20 acres in the northeastern corner of the property, adjacent to I-75. In September

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2011, JDI and the City of Atlanta announced that Atlanta was purchasing the southern portion of the site for airport parking.

Potential impacts

New owners or major tenants that have not participated in the HIA process may be less likely to adopt HIA recommendations.

Recommendations

Aerotropolis/Hapeville, Atlanta, Clayton/Advisory Committee Members:

Organizations and other stakeholders who have been involved in the HIA process should endorse it to their partners, or even include implementation of HIA recommendations as a covenant or community benefits agreement in their contracts.

Multijurisdictional coordination

Research question

- How will coordination between the cities, counties, authorities, property owners, and regional bodies that govern the study area affect the viability of findings and recommendations developed in this HIA?

Literature review

Not applicable.

Existing conditions

The study area included five cities (Hapeville, Atlanta, East Point, College Park, and a fraction of Forest Park). It overlapped two counties, Fulton and Clayton. It included the property of the City of Atlanta-owned Hartsfield Jackson Atlanta International Airport (HJAIA), and portions of Interstate highway and privately-owned railroad. Atlanta Regional Commission and state agencies, including the Department of Community Affairs and the Department of Transportation, have authority over some local activities. Numerous federal agencies make regulations relevant to the area, such as the Federal Railroad Administration and the Federal Aviation Administration. Conversations with the advisory committee and other stakeholders during the HIA gave the impression that cities and counties in the study area did not engage in joint planning or programming, or have any formal process to coordinate their development. It appeared that HJAIA and Norfolk Southern (the railroad owner) met with local jurisdictions on occasion to address certain concerns or proposals. Jacoby Development and the developers of Asbury Park had reportedly worked closely with the city of Hapeville. There is an Airport Area Chamber of Commerce.

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Potential impacts

Without sufficient coordination, the area may fail to realize the potential economic and redevelopment benefits from proximity to the airport and other area amenities. The area may suffer from redundant processes or services, incompatible land uses, and missed infrastructure opportunities.

Recommendations

Hapeville, Atlanta, Clayton/Advisory Committee Members:

Establish an Airport Area Development Consortium. Each jurisdiction or relevant authority should join. Members should commit to developing a vision and development plan for the entire area, and to aligning their own plans, ordinances, services, capital improvements, and economic development activities with this plan.

Airport areas

Research question

- What are the potential air pollution and noise contours related to airport activities, mitigation initiatives, and exposure risk?
- How might airport proximity and activities impact economic development and community revitalization?

Literature review

Living or working in proximity to a major airport may result in increased exposure to noise and to air pollution from airfield activities, air transport, and ground transportation to airports. However, airports are major economic centers and important transportation hubs. Many regions have designated the area around their airport as an “Aerotropolis”. The Atlanta Regional Commission has applied the Aerotropolis designation to an extensive area surrounding HJAIA, much larger than the Aerotropolis Atlanta redevelopment project. Evaluation of the potential health impacts of an airport must seek to maximize the economic and mobility effects while minimizing environmental exposures.

Due to these conflicting health directions, a number of health impact assessments have been conducted regarding airport operations or expansion. An HIA of a proposed airport near Finningley, UK, found that economic and redevelopment benefits would outweigh potential harm from noise and pollution, especially if those negative aspects could be mitigated. It recommended prioritizing the hiring of local residents; soundproofing; some restrictions on flight paths and aircraft use at nighttime; a “green” transportation plan that managed trip demand and encouraged pedestrian and bicycle access; and diversion of road traffic from local communities; as well as formation of a health advisory group and ongoing health impact monitoring. An HIA of the Santa Monica airport operations in California found that the airport was having a significant negative impact on surrounding residents

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due to emissions of noise, particulate matter, black carbon, and polycyclic aromatic hydrocarbons. However, these impacts were uniquely due to the location of the airport in the center of a residential community without any buffer – some homes are within 300 feet of the end of the runway. An HIA of the Stansted Airport Generation 2 expansion, also in the UK, found that exposure to noise and pollution would increase, and that this would cause a minute increase in cases of cardiovascular disease, respiratory disease, or mental distress. They suggested that uncertainty about potential impact from the expansion was one of the greatest sources of likely mental distress, and that this could be managed through outreach and stakeholder participation exercises.

Fewer than 10% of airport passengers travel to or from Hartsfield Jackson by transit. Use of transit for airport travel is associated with the ability to walk to transit at the trip's origin or destination, and may suggest an untapped niche for shuttle and van services (Mandle, Mansel, and Coogan, 2000). Humphreys and Ison (2005) addressed ground transportation to airports as a potential source of traffic congestion, unreliable travel times, and pollution, related to trips made to the airport by private car. Looking at airport employees in the UK, they found that charging for parking, providing a partial subsidy for transit services, and improving cycling infrastructure resulted in positive changes in travel behavior and often provided a cost-benefit. Airport development represents a sizable opportunity for economic development, community revitalization, and reduction of motor vehicle miles/hours traveled.

Land near airports may receive low-intensity industrial development. The majority of air travelers must leave the airport area to conduct their business or pursue pleasure activities, or must travel from distant residential areas, potentially resulting in increased ground transportation emissions, added delays and costs due to ground travel, and lost market capture opportunities. Simultaneously, workers and employers may miss the chance to connect with each other if travel options or distance are prohibitive for the worker. Workers seeking goods and services and retail sites offering them may fail to connect with each other due to spatial distance. Local jurisdictions receive less revenue relative to infrastructure and services under a low-density development model, potentially jeopardizing service delivery.

Existing conditions

As described in other sections, the airport is a major employer and a regional destination, while some properties near the airport may be exposed to noise, air pollution, or traffic.

Potential impacts

Concurrent changes at HJAIA, including construction of the new international terminal building may lead to potential health benefits in the study area. Without changes to zoning ordinances and

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transportation facilities by Hapeville, City of Atlanta, Clayton County, HJAIA, and possibly GDOT and the City of Forest Park, the communities surrounding Aerotropolis will likely not experience these health benefits.

In the past, industrial and logistics land uses were simply segregated from living and shopping areas due to their negative externalities on air quality, noise levels, traffic volume, and often on crime rates. These industrial zones have been common around airports and other transportation hubs. However, as metropolitan areas have grown to engulf these zones, and as their impacts have been felt more strongly at the regional level, a new standard of ecologically and socially compatible industrial development has emerged. Additionally, many light industrial uses may be entirely appropriate next to commercial or office/institutional properties.

There are now worldwide examples of successful and healthful airport-area development. These areas offer multimodal transportation options (including a walkable urban design, rail and bus passenger transport, and bicycle paths or lanes), freight and access management (including integration with freight rail and freight mobility systems that may incorporate trams, conveyors, or electric vehicles), soundproofing and air filtration for airport-impacted buildings, attractive landscape and architectural design, and green design: ecological industry with low emissions, energy and water efficient buildings, resource conservation through shared or recycled waste streams, and utilization of otherwise undevelopable areas for wetlands, multimodal transportation facilities, wind or solar energy farms, or recreational spaces. Jacoby Development has been exploring these potential aspects of aerotropolis development. Local authorities should promote its implementation at Aerotropolis Atlanta and other sites near the airport with appropriate policy changes.

Recommendations

Hapeville, Atlanta, Clayton:

- Using the Airport Area Consortium, described above, apply land use and transportation planning to address potential health impacts of airport proximity, including maximization of economic benefits and jobs, and minimization of environmental exposures and traffic risk.
- Implement incentives and policy supports for renewable resource use, waste recycling, building and operations efficiency, and sustainable design
- Implement a non-residential mixed-use district to house offices (e.g. global headquarters), industry/logistics (e.g. warehouses and factories), hotels, and significant retail for the global traveler (e.g. dining, dry cleaners, department stores)
- Relax FAR restrictions at transitional scale to allow increasing intensity moving away from adjacent residential/mixed-use districts
- Alleviate parking requirements & prohibit parking between ROW and main structure
- Implement a build-to zone so that main structure is placed 0 to 30 feet from ROW; main entrance must be alongside of building facing public street

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- Require structured parking, rather than a surface lot, if parking exceeds 2500 sq. ft. at a single location or 10,000 sq. ft. per block.
- Adjust land valuation policies to encourage more compact development – parking taxes can fund alternative transportation
- Specify block lengths between 200 and 600 feet. Large office or industrial complexes may occupy multiple blocks but should provide passageways through the complex unless an exception is fully warranted.
- Construct pedestrian walkways along both sides of existing streets and from sidewalk to main building entrances; require 10' (minimum) sidewalks along blocks with more than 10,000 sq. ft. of retail.
- Include a pedestrian walkway to the International Terminal
- Redesign intersections for safe, convenient, comfortable, accessible pedestrian usage.
- Conduct a bicycle and pedestrian audit and correct any deficiencies.
- Include buffered bicycle lanes on major streets in future transportation projects
- Include transit accommodations on major streets in future transportation projects
- Seek transportation funding and projects that enhance access to passenger rail (including light rail, streetcar, people-mover, and intercity rail) and freight rail, local circulators, and regional bus service.
- Seek transportation funding and projects that enhance access to premium non-motorized facilities that connect to nearby communities or destinations.
- Adjust roadway design speed and speed limit as appropriate for intensity of use
- Require 4' planting/furniture zone between sidewalk and roadway; incentivize or require street trees and pedestrian-scale lighting
- Ensure that the area is well-connected by all transport modes to adjacent communities such as Forest Park and downtown Hapeville
- Buffer the transition to adjacent communities with zones of neighborhood commercial, major commercial, or parkland, or with residential mixed use (where exposure to noise or air contaminants is not excessive)
- Create appropriate public spaces (parks or plazas) in the district
- Allowing industrial uses in other zones, but with restrictions on noise, traffic, odors, and other emissions; alternative traffic patterns for freight movement such as rail, tram, or electric low speed vehicle may serve to sufficiently mitigate loading and freight impacts.

Examples:

- Eco-industrial parks: An eco-industrial park (EIP) is an industrial park in which businesses cooperate with each other and with the local community in an attempt to reduce waste and pollution, efficiently share resources (such as information, materials, water, energy, infrastructure, and natural resources), and help achieve sustainable development, with the intention of increasing economic gains and improving environmental quality. An EIP may also be planned, designed, and built in such a way that it makes it easier for businesses to cooperate, and that results in a more financially sound, environmentally friendly project for the

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developer. See references at <http://ie.tudelft.nl/index.php/Category:EcoIndustrialPark> for a list of global sites, http://gei.ucsc.edu/eco-industrial_parks.html for U.S. sites, or <http://www.smartcommunities.ncat.org/business/ecoparks.shtml> for analysis, case studies, and guides to creating such districts.

- Airport development: El Paso, Texas adopted “SmartCode” zoning, a form-based, unified land development ordinance that replaces conventional zoning and subdivision codes with an emphasis on scale, form and context while allowing a mixture of land uses. They continued the new development codes into the airport area. Although residential development was unsuitable near the airport, the new codes supported offices, light industry, hospitality, and retail in a walkable urban form. El Paso expects to create a vibrant district where travelers, hotel guests, and office workers want to shop, eat, and run errands. The district could capture economic opportunities from airport visitors and attract global innovators. Figure 60 shows the plan El Paso developed for their airport district, including street network, allowable mix and density of land uses, and major amenities like parks and boulevards.



Figure 60: El Paso International Airport Development Study. Credit: Placemakers LLC

Healthy Places Audit: Overarching Issues

Administration

There is opportunity for more coordination between the cities of Atlanta, Hapeville, and East Point and Fulton and Clayton counties in terms of development and transportation.

Audit Questions

- Is strategic planning conducted for healthful, comprehensive planning and development?
- Is there a robust community participation process?

Audit Findings

Hapeville: The city conducts routine comprehensive planning and short-term work plans according to state policy. They participated in the South Fulton plan and try to engage with the Atlanta Regional Commission. The city communicates with the railroad operators and the airport. They have completed two LCI studies (now combined) and received funding to conduct a bicycle and pedestrian plan. The city has worked closely with developers to increase density and mixed use. Hapeville does not appear to have extensive relations with adjacent municipalities; land use is not coordinated at city limits. Citizens attend public meetings, and the city conducts occasional resident surveys.

Atlanta: Most economic development efforts and transportation programs seem to be targeted outside of the study area. Citizens vote on all ordinance changes, new developments, alcohol licenses, and variances through the neighborhood planning unit system. New developments must adhere to local plans created by neighborhoods and NPUs. There is a citizen option to dispute deeds.

Clayton: The county replaced its planning department with a county planner in the permits and licenses department. Planning does not seem to be jointly coordinated between the county and its cities. Subdivisions must comply with the comprehensive plan and with county board of health regulations. Public hearings appear to be the primary method of public input.

Audit Recommendations

- All affected citizens – residents, property owners, and business owners – should be engaged in the planning process from start to finish, with opportunities to identify issues, propose solutions, and react to proposals.

Conclusion

Aerotropolis has the potential to impact health. The main impacts are likely to be on transportation, access to jobs and retail, community revitalization, and the environment, and as a catalyst for new ways of planning and developing Hapeville, south Atlanta, and the Airport district.

Challenges for Aerotropolis HIA

Significant staff resources were needed to conduct a comprehensive HIA of the Aerotropolis project. In particular, because this was the first pilot application of the Healthy Places Audit (HPA), no trainings, templates or frameworks existed to guide the process. The audit methodology was adapted from CQGRD's Quality Growth Audit (QGA). However, the HPA used very different metrics than the QGA, based on healthy places research. As Aerotropolis represented the first application of the HPA, staff simultaneously were developing a template and methodology for application, and conducting the first application. Resource requirements for this application may not reflect those for subsequent applications, although further development of the tool is anticipated. CQGRD may add metrics to the tool, or refine existing metrics against real world examples and the scientific evidence base.

During screening, CQGRD hoped to appraise the Environmental Management Systems (EMS) process for its potential synergy with HIA. However, the Aerotropolis EMS was stalled due to real estate market forces, and no appraisal was available beyond review of the process as detailed by EPA and the Partnership for a Sustainable Georgia.

Development in areas near Aerotropolis would impact the needs of site visitors and nearby current and future residents. However, some future developments were unknown, while current developments may not proceed until the market recovers, or may change their development plans. Land use and transportation planning is also influenced by the inherently political processes at the city, county, region, and state levels, as well as by federal policies. All of these factors were beyond the scope of this HIA. In particular, the fate and design of the International Terminal at the airport and the proposed commuter rail line will likely have a significant impact on Aerotropolis and on the area in general, but these projects could not be adequately considered in the scope of the HIA.

Finally, lack of coordinated governance in the study area may have interfered with effective participation in the HIA process, and may impede implementation of the recommendation. Many of the findings and recommendations have been targeted to a particular entity in order to improve the chances of implementation. Additionally, coordinated governance is recommended in the HIA.

Conclusion

Next steps

It is recommended that continuous monitoring of the Aerotropolis Atlanta Redevelopment Project be conducted to gauge the accuracy and the appropriateness of the impact measures used in HIA. This is not currently in the scope of this HIA due to funding limitation, but will be addressed again at the culmination of the project.

Dissemination Report & Technical Assistance Manual

The HIA process, findings, and recommendations were compiled into a draft report for circulation to the Advisory Committee and other reviewers, so that their comments could be addressed in the final report.

Meetings will be scheduled with Jacoby Development Inc.; planners and officials from the cities of Hapeville, Atlanta, and East Point and Clayton County; health and environmental officers; and airport representatives. Additionally, presentations will be made at community meetings and as requested.

The Executive Summary, as a stand-alone summary of the key findings and recommendations, will be transmitted to a wider range of stakeholders and decision-makers, including all of those on the governance list. The Executive Summary, full report, and a very short overview flyer will be available on the CQGRD website. These documents will also be submitted to online HIA databases, such as hiaguide.org. Additionally, CQGRD, in collaboration with the Health Impact Project, will develop and issue a press release about the HIA.

CQGRD intends to generate two peer-reviewed articles about the HIA, and to submit applications or abstracts to make presentations about the Aerotropolis HIA at major relevant professional conferences. These presentations will not simply describe the methods and results, but also focus on lessons learned and the refinement of our HIA methodology. CQGRD staff will be available to answer questions about this HIA for interested stakeholders and HIA practitioners.

Monitoring and Evaluation Strategy

Evaluation

The effectiveness of the Aerotropolis Atlanta Brownfield Redevelopment Project Health Impact Assessment was not evaluated during the HIA process. Rather, evaluation was proposed in the following format:

- Following completion of the report, CQGRD will invite product and process evaluation review from the Health Impact Project, other HIA practitioners, and HIA participants. However, CQGRD may not have the objectivity to conduct its own evaluation. Review is invited in accordance with standard HIA review methodology, such as that found in *A review package for Health Impact Assessment reports of development projects*. As described by Bekker, Putters, and van der Grinten (2005), this portion of evaluation may include:
 - Product (quality of the report):
 - Validity of predictions
 - Argumentation
 - Readability and understandability
 - Process: (Preparation (screening, scoping), research (appraisal, assessment, analysis); report; evaluation; follow up):
 - Systematic plan of action on problem formulation, data collection, analysis and making inferences
 - Equal attention to all stages of the process
 - Communication plan throughout HIA process: interactions with project planners and key

Monitoring and Evaluation Strategy

- In 2012, CQGRD staff and students will research, write, and submit a paper that analyzes the Aerotropolis HIA process. The paper will specifically address ways to evaluate the utility of specialized appraisal tools – the walkability audit, the healthy places audit, and the latent demand scores – in developing HIA assessment and recommendations. It will also consider their effectiveness as a communication tool with decision-makers.
- In 2012-2013, CQGRD staff and students will research, write, and submit a paper regarding the near-term impact of the HIA. The paper will consider participation rates during the ongoing dissemination process, awareness of the HIA and its recommendations by decision-makers, and actual and proposed changes to the Aerotropolis project, local ordinances, and other relevant policies and plans. Some of this information will be available through the monitoring program, below. In addition, researchers may use interviews, plan review, or media review. Priority recommendations will be given additional attention for their potential implementation.

Monitoring

Once the HIA findings and recommendations have been disseminated to stakeholders, it is the responsibility of the HIA team to observe how the HIA is used by stakeholders. Action on HIA recommendations cannot be undertaken by the HIA team; rather, the evidence, analysis, and guidance are intended to encourage decision-makers to act on the recommendations that are relevant to them. Additionally, community and business representatives may choose to advocate for implementation of certain recommendations, based on the potential benefits to their constituents.

In the case of Aerotropolis, only a few of the recommendations could be executed by the developer. Most of the other recommendations could be used by planning and transportation staff, city councils, planning commissions, and other official representatives of the cities and counties in the study area. A few recommendations were directed toward state agencies or other authorities; local jurisdictions may choose to meet with the relevant agencies to discuss the possibility of using those recommendations.

CQGRD will be interested in observing whether any of these activities occur, and supporting the HIA report as necessary. The Aerotropolis timelines originally projected construction through 2018, and that date may be delayed further due to forces of the real estate and financial markets. CQGRD intends to conduct a limited amount of monitoring through that time. Monitoring activities are proposed in the following format:

- At least once a year until the project is complete, CQGRD staff will communicate with Jacoby Development Inc., the City of Hapeville, and other actors to learn about the status of Aerotropolis and to see how HIA recommendations are being implemented. CQGRD will also offer additional technical assistance at these times.
- Through our ongoing relationships with local and state health departments, CQGRD will encourage future partnerships between public health professionals and identified actors in the Aerotropolis HIA study area (cities and counties, the airport, citizen groups, and other regulatory agencies).
- CQGRD will seek opportunities for follow-up projects that could test changes in health outcomes in the study area, or that would actually help to implement some of the HIA recommendations.

Appendices

A-1. Environmental Management Systems

The Environmental Protection Agency (EPA) has developed an Environmental Management System (EMS) to empower public and private entities with a comprehensive strategy to reduce their environmental footprint. According to the EPA, an EMS is “a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency” (EPA 2011). By their definition, an EMS follows an ongoing cycle with four phases:

- Planning for environmental improvement, which includes reviewing the organization’s areas of environmental impact, setting goals, ensuring that key members of the organization understand and support the goals, and committing resources.
- Implementing organizational changes, which include assessing processes and products for their environmental impact, crafting a strategy to bring operations in line with environmental goals without compromising other organizational goals, and establishing detailed programs and plans as well as a monitoring process.
- Checking progress with regular audits and monitoring procedures, taking corrective action as needed.
- Reviewing progress toward goals once corrective actions have been taken, and identifying areas where inadequate progress indicates that a new cycle of planning and implementation is required.

EPA supports EMS to improve both environmental performance and business competitiveness of U.S. firms. Information about the EMS indicates that they can improve environmental performance, increase efficiency and conserve resources, reduce cost, improve public reputation, and protect entities from potential regulatory non-compliance. However, participating organizations may have to make resource investments in order to achieve these benefits. The EPA EMS is based on the international standard ISO 14001.

In the state of Georgia, EMS programs are managed through the Partnership for a Sustainable Georgia (PSG), a division of the Environmental Protection Division (EPD). PSG offers three levels of EMS commitment (Bronze, Silver, and Gold), each of which carries a three-year series of activities

A-1. Environmental Management Systems

intended to transition the participating organization to the next level. Briefly, Bronze level participants enter at the planning phase and transition to the implementing phase, Silver level participants enter at the implementing phase and transition into the checking phase, and Gold level participants are conducting the full EMS cycle.

EMS programs receive federal and state support through guidance and funding opportunities. In the case of Aerotropolis Atlanta, the redevelopment project presented a synergy between brownfield remediation and reuse, and the potential application of EMS principles to a new business sector. EPA and the Georgia Department of Natural Resources (GA DNR) perceived that many brownfield redevelopment projects were simply meeting minimum remediation standards, and creating a “a disconnection between most project developers’ approaches and the longer-term goals of future operators of the property” (EPA 2008).

Through the State Innovation Grant Program, EPA supported GA DNR in an initiative to integrate sustainable design, construction and operational practices in brownfield redevelopment projects. This pilot project utilized EMS methodology in the redevelopment and operation of the Aerotropolis Atlanta brownfield site in order to achieve better environmental performance and stimulate increased public participation in the redevelopment decision-making processes. Jacoby Development had previously established partnership with the EPA and GA DNR during redevelopment of the Atlantic Steel brownfield site into Atlantic Station. The Atlantic Steel project included participation in an EPA environmental pilot project (through Project XL) to ensure consideration of air quality improvements in Jacoby Development’s redevelopment of the former Atlantic Steel 135-acre brownfield site.

The project to develop an EMS for the Aerotropolis redevelopment is coordinated through Partnership for a Sustainable Georgia. Jacoby Development has been entered into the program as a “Bronze Level Partner.” Bronze Level EMS criteria requires a preexisting environmental team and environmental policy, and includes a three-year commitment to document and prioritize environmental impacts, define targets to improve environmental performance, and report on environmental compliance and progress on environmental commitments (Partnership for a Sustainable Georgia). The EMS project for Hapeville Aerotropolis provides a model for integration of environmental management criteria into brownfield redevelopment, including EMS documentation and the development of a technical guidance for future redevelopment projects.

This project was proposed to test the application of EMS in the redevelopment of the property and as a framework for facility operations after development. Two deliverables were proposed to assist

A-1. Environmental Management Systems

other developers in integrating EMS into their future brownfield redevelopment projects. One deliverable would be EMS documentation detailing how it was used in the redevelopment process. The second deliverable would be a guidance manual for developers to establish procedures for using EMS for a brownfield redevelopment project.

EMS and HIA

Although an organization participating in EMS is encouraged to commit to reducing risk to human health and the environment for workers and the surrounding community, guidance materials emphasize environmental concerns such as exposure to contaminants, worker safety, emissions and energy, and environmentally-responsible procurement. At onset of the EMS process, under ISO 14001, the organization must institute commitments to prevention of pollution, improvements in overall environmental performance, and compliance with all applicable statutory and regulatory requirements, as well as identification of all aspects of the organization's activities, products, and services that could have a significant impact on the environment, including those that are not regulated (EPA, 2011). As we have learned through the HIA process and the body of health research that supports it, many physical, social, and organizational environmental conditions which affect health are not currently regulated, by an environmental agency or at all.

The public health community has an opportunity to inform organizations undertaking EMS about environmental determinants of health that are not included in the existing body of applicable environmental statutes and regulations, through the body of EMS guidance resources.

ISO stands for the International Organization for Standardization, located in Geneva, Switzerland. ISO promotes the development and implementation of voluntary international standards, both for particular products and for environmental management issues. ISO 14000 refers to a series of voluntary standards in the environmental field under development by ISO. It provides a framework for the development of an environmental management system and audit program. The idea for such a standard developed at the 1992 Rio Summit on the Environment. As a number of national standards emerged, the International Organization for Standardization (ISO) investigated the potential impact of such standards on business and industry. Concluding that standardized environmental management procedures would benefit businesses, an ISO committee began work on an international standard. ISO 14001 is the cornerstone standard of the ISO 14000 series. It specifies a framework for implementing an Environmental Management System. Other standards in the series provide additional guidelines for developing, auditing, and maintaining an EMS. These standards must be purchased from ISO. Companies may be asked to demonstrate conformance with

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ISO 14001 as a condition of doing business in some markets. The EMS and auditing standards have been finalized, while the others are in various stages of development. The EPA and other environmental agencies have acted as reviewers on the development of the ISO 14000 series and ISO 14001., and are now evaluating its usefulness through a variety of pilot projects. (EPA, 2011; ISO, 2007)

The public health community could petition ISO to modify “prevention of pollution” to “prevention of environmental and human health risks and promotion of healthful environmental conditions” to its list of commitments.

The public health community could work with EPA and state agencies to include HIA in future pilot projects, based partly on the Aerotropolis HIA.

EMS documentation emphasizes the potential economic returns from reducing waste, conserving energy, presenting a positive public image, preventing cleanup and remediation expenses, and avoiding regulatory fines (Stapleton, Glover, & Davis, 2001). However, a business or agency can also see economic benefits from a healthy community and workforce. For instance, employees that are more physically active tend to miss fewer days of work, to be more productive at work, and to keep their health care expenses lower, which can help employers manage the costs of their health insurance offerings. Healthy communities will provide a better quality of life for the organizations, workers and directors, attract relocating employees, and ensure a healthy and productive workforce for the future generation.

The public health community could inform EMS organizations about the economic benefits of a healthy community and workplace, and provide health cost-benefit analysis tools to be used in conjunction with an HIA.

Once an organization has properly committed and prepared itself for EMS, the next requirements are to develop measurable performance objectives and targets for achieving its commitments, and then to devise an implementation strategy to meet these objectives. Numerous activities may be introduced at this stage, from training initiatives to new management and monitoring processes to operational changes. EMS may be enacted for an entire company or agency, or for one location or division of a larger organization. In this phase, the organization should evaluate their current policies and practices and identify specific changes that would improve their environmental performance and reduce risks (Stapleton, Glover, & Davis, 2001). These activities are very similar to the purpose and process of HIA, and could utilize many of the appraisal tools that have been developed for use with

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HIA such as campus walkability audits, San Francisco's Healthy Development Measurement Tool (for new facilities), and behavioral risk factor surveys. Ideally, an HIA would assess likely impacts of the organization's current policies, plans, and procedures, with acknowledgement of the potential benefits from other components of the EMS plan. The appropriate design and scale of an EMS-based HIA would be primarily concurrent, with some prospective review of the EMS elements, and either rapid or intermediate, depending on the size of the organizational unit covered by the EMS and the nature of its operations. The HIA findings and recommendations should be fully integrated into the EMS strategy.

The public health community could

- develop a guide for using HIA in EMS and disseminate it with existing EMS resources, including EPA's Design for Environment Program's Integrated Environmental Management System
- offer HIA training to EMS program developers and consultants
- provide a succinct list of health indicators and objectives that are appropriate for the organizational setting
- collaborate on EMS pilot projects with environmental protection agencies to more accurately identify appropriate timing of HIA in the EMS workflow
- collaborate with EPA and other environmental organizations to customize healthy policy and design tools for use in an EMS-based HIA or create integrated health and environment appraisal tools, and to incorporate these tools into EMS guides and resources
- develop a list of regional and national agencies or firms that are qualified to provide HIA services and technical assistance

Once the EMS strategy is developed and set into motion, the framework calls for ongoing monitoring. EMS audit procedures have been developed to evaluate the process and the effect of the EMS strategy, and revise the strategy where needed (Stapleton, Glover, & Davis, 2001). This phase coincides with the HIA monitoring and evaluation phase, and can be used to evaluate the effectiveness of the HIA component, as well as summarize achievements and savings that are attributable to the HIA. The EMS audit process should include a review to determine if HIA recommendations have been implemented, include any such deficiencies in the EMS strategy revision, identify whether implemented changes have had the expected effect on health behaviors or outcomes, and note whether any barriers or missing elements might be making them less effective.

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The public health community could connect EMS organizations with tools and data sources, such as the local health department, to measure changes in health determinants and outcomes.

As always, the goal of HIA theory and analysis is not purely to increase HIA capacity, but also to find ways that known health impacts of policies and planning can become routinely addressed through internal procedures. If HIA becomes an established procedure within EMS, the EMS audit process may eventually identify recurrent recommended practices. These practices should be captured in a continually-evolving guide to best practices in organizational management.

The public health community could establish permanent ties with business and organizational development organizations to develop a situational, living collection of best practices for health.

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A-3. Latent Demand Scores

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 study area.² The LDS provides an estimate of potential demand for non-motorized travel throughout a transportation network. 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 61 shows an example of the equation used in calculating LDS for an individual road segment.

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

Figure 61: Latent Demand Score equation

- 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>.^{3 4}

² The LDS methodology was devised by Bruce Landis of Sprinkle Consulting.

³ For the Decatur analysis, the calculation of TTS used trip purpose data obtained from the Georgia Tech SMARTRAQ travel survey of the 13-County Atlanta Metropolitan Area in place of Census data.

A-3. Latent Demand Scores

The number of trips generated by the major attractors was determined using the Institute of Transportation Engineers' *Trip Generation Manual* (6th 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 was then calculated for each land use. 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.

Employee counts for retail and non-retail business locations were derived from Claritas Business Data 2010. Employee density for each category was derived in ArcMap 10 to identify retail and employment "clusters". Low volume locations were excluded, based on the distribution of the data. Researchers manually reviewed the data to ensure clusters were consolidated appropriately. Additionally, they reviewed municipal information sources, such as websites, and available GIS data to locate public and private schools, parks, and community facilities in the 3-mile study area boundary.

⁴ The LDS methodology is typically applied to bicycle trips, but has been adapted for the Decatur Community Transportation Plan to estimate demand for walking trips as well.

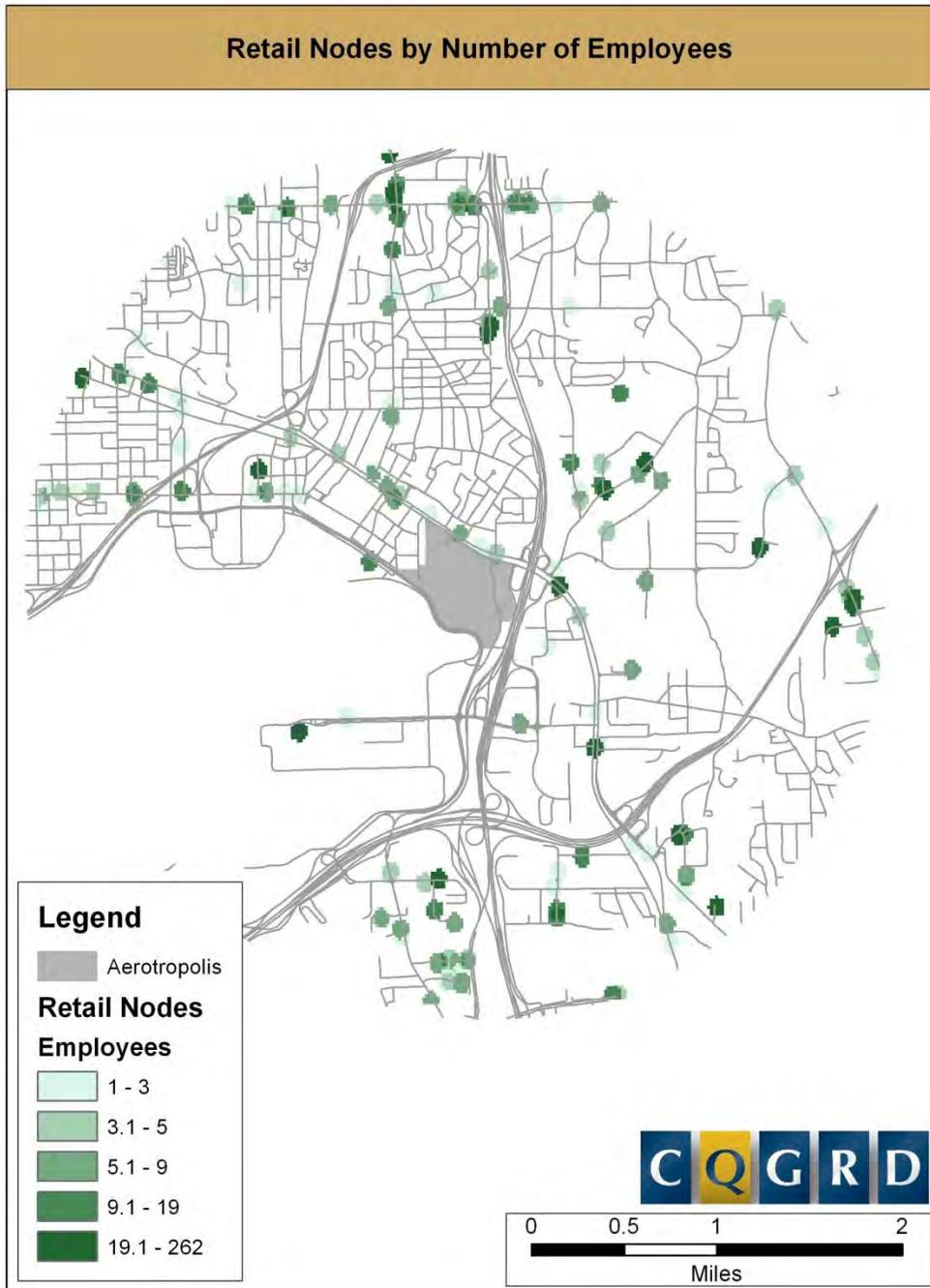


Figure 62: Retail nodes by number of employees

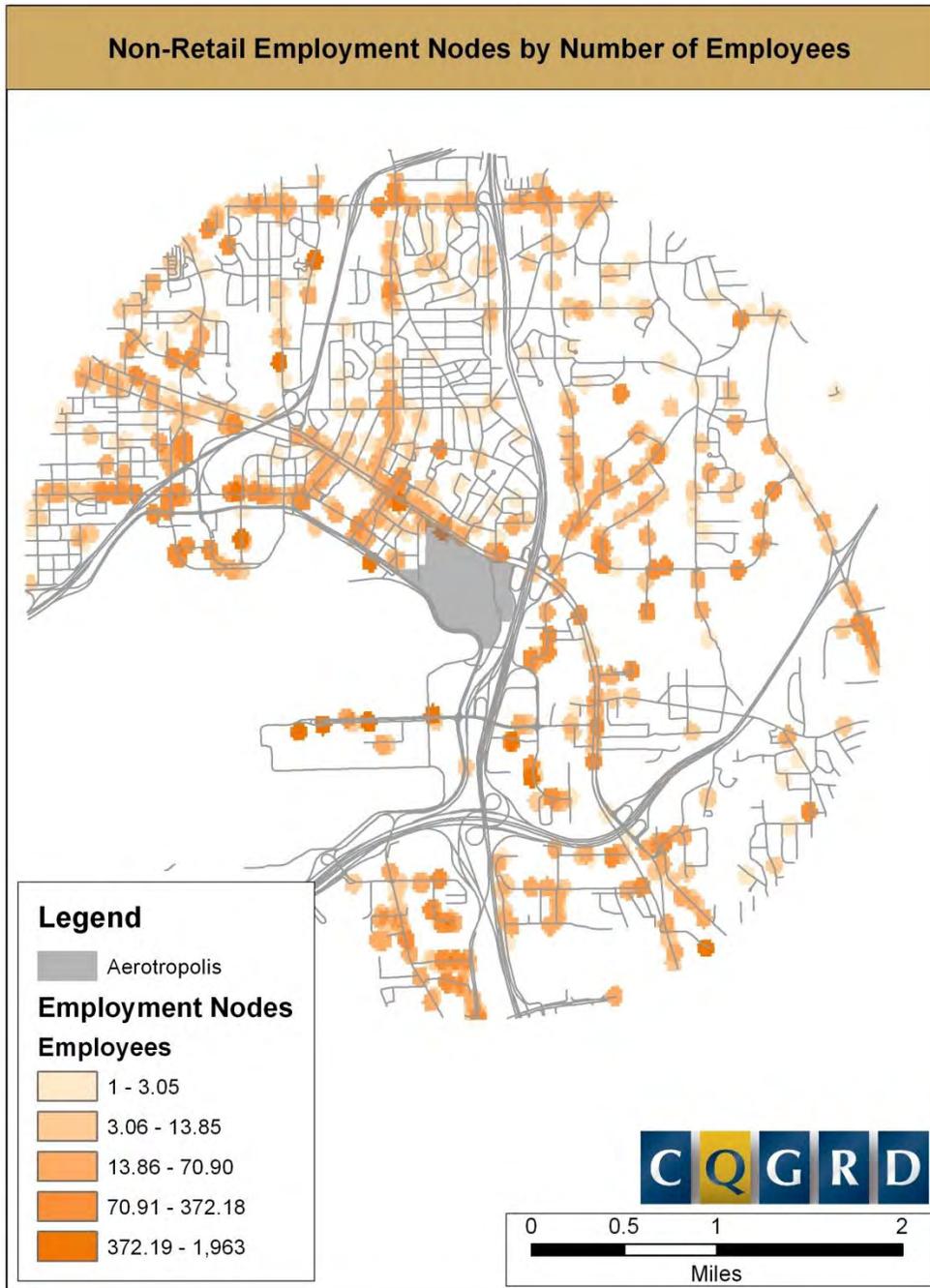


Figure 63: Non-retail nodes by number of employees

A-3. Latent Demand Scores

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

- 14 schools (elementary, middle, and high school) located within the study area
- 19 parks, libraries, senior centers, and recreation centers located within the study area
- 25 employment clusters located within the study area: Cleveland/Metro, Virginia Ave East, Virginia Ave West, Sylvan Rd Industrial, Southpoint Industrial District, Browns Mill Industrial, Southside Industrial Mid, East Point North, Conley Rd/Route 19, Southside Industrial East, Loop Rd Corporate District, Clark Howell Industrial, Exit 55/Jonesboro, East Point Mid, Cleveland Ave West/Medical Center, Tradeport Corporate District, Hapeville Downtown, Highway 85 Industrial, East Point South, Aviation Blvd West, International Pkwy/Tradeport, Forest Parkway Industrial District, Southside Industrial West, Aviation Blvd East, Delta Corporate District
- 24 shopping clusters located within the study area: Cleveland/Metro, Virginia Ave East, Virginia Ave West, Mt. Zion East, Southpoint Industrial District, Browns Mill Retail, Metro/Mt. Zion, Dogwood/North, Old Dixie Hwy/Blalock, Southside Industrial East, Hapeville East, Lake Mirror West/Clark Howell, Exit 55/Jonesboro Rd, East Point North, Cleveland Ave/Interstate, Cleveland Ave West/Medical Center, Old Dixie Hwy/Interstate, Cleveland Ave East, Hapeville Downtown, Highway 85 Retail, East Point South, Aviation Blvd West, Lake Mirror East, Forest Parkway Retail.